Priority Development Project (PDP)
Storm Water Quality Management Plan (SWQMP)

ARE - Scripps HQ

[Insert Permit Application Number]

[Insert Drawing Number (if applicable) and Internal Order Number (if applicable)]

☐ **Check if electing for offsite alternative compliance**

Engineer of Work:

Brendan Hastie, RCE #65809, Exp. 9/21
Provide Wet Signature and Stamp Above Line

Prepared For:

Alexandria Real Estate Equities, Inc.
10996 Torreyana Road, Suite 250
San Diego, California, 92121
(858) 768-7985

Prepared By:

RICK
ENGINEERING COMPANY

Rick Engineering Company
5620 Friars Road
San Diego, California, 92110
(619) 291-0707

Date:

July 9, 2021

Approved by: City of San Diego Date

The City of SAN DIEGO

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- Attachment 3: Structural BMP Maintenance Plan
    - Maintenance Agreement (Form DS-3247) (when applicable)
- Attachment 4: Copy of Plan Sheets Showing Permanent Storm Water BMPs
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- Attachment 6: Project's Geotechnical and Groundwater Investigation Report

Acronyms

APN	Assessor's Parcel Number
ASBS	Area of Special Biological Significance
BMP	Best Management Practice
CEQA	California Environmental Quality Act
CGP	Construction General Permit
DCV	Design Capture Volume
DMA	Drainage Management Areas
ESA	Environmentally Sensitive Area
GLU	Geomorphic Landscape Unit
GW	Ground Water
HMP	Hydromodification Management Plan
HSG	Hydrologic Soil Group
HU	Harvest and Use
INF	Infiltration
LID	Low Impact Development
LUP	Linear Underground/Overhead Projects
MS4	Municipal Separate Storm Sewer System
N/A	Not Applicable
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
PDP	Priority Development Project
PE	Professional Engineer
POC	Pollutant of Concern
SC	Source Control
SD	Site Design
SDRWQCB	San Diego Regional Water Quality Control Board
SIC	Standard Industrial Classification
SWPPP	Stormwater Pollutant Protection Plan
SWQMP	Storm Water Quality Management Plan
TMDL	Total Maximum Daily Load
WMAA	Watershed Management Area Analysis
WPCP	Water Pollution Control Program
WQIP	Water Quality Improvement Plan

Certification Page

Project Name:
Permit Application

I hereby declare that I am the Engineer in Responsible Charge of design of storm water BMPs for this project, and that I have exercised responsible charge over the design of the project as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with the requirements of the Storm Water Standards, which is based on the requirements of SDRWQCB Order No. R9-2013-0001 as amended by R9-2015-0001 and R9-2015-0100 (MS4 Permit).

I have read and understand that the City Engineer has adopted minimum requirements for managing urban runoff, including storm water, from land development activities, as described in the Storm Water Standards. I certify that this PDP SWQMP has been completed to the best of my ability and accurately reflects the project being proposed and the applicable source control and site design BMPs proposed to minimize the potentially negative impacts of this project's land development activities on water quality. I understand and acknowledge that the plan check review of this PDP SWQMP by the City Engineer is confined to a review and does not relieve me, as the Engineer in Responsible Charge of design of storm water BMPs for this project, of my responsibilities for project design.

____

Engineer of Work's Signature

65809 | 09/21

PE# | Expiration Date

Brendan Hastie

Print Name

Rick Engineering Company

Company

____

Date

Engineer's Stamp

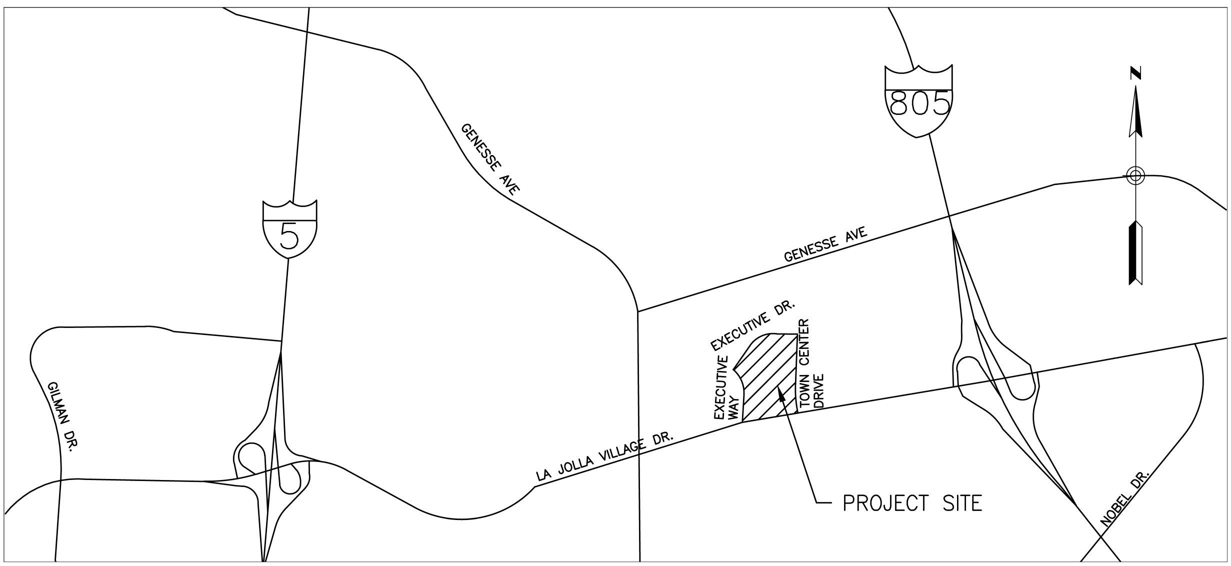
Submittal Record

Use this Table to keep a record of submittals of this PDP SWQMP. Each time the PDP SWQMP is re-submitted, provide the date and status of the project. In last column indicate changes that have been made or indicate if response to plancheck comments is included. When applicable, insert response to plancheck comments.

Submittal Number	Date	Project Status	Changes
1	March 11, 2021	☐ **Preliminary Design/Planning/CEQA** ☑ **Final Design**	**Initial Submittal**
2		☐ **Preliminary Design/Planning/CEQA** ☑ **Final Design**	
3		☐ **Preliminary Design/Planning/CEQA** ☑ **Final Design**	
4		☐ **Preliminary Design/Planning/CEQA** ☑ **Final Design**	

Project Vicinity Map

Project Name: ARE - Scripps HQ
Permit Application



City of San Diego Form DS-560 Storm Water Requirements Applicability Checklist

Attach DS-560 form.

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City of San Diego
Development Services
1222 First Ave., MS-302
San Diego, CA 92101
(619) 446-5000

Storm Water Requirements Applicability Checklist

FORM
DS-560
November 2018

Project Address: 4555 Executive Dr, San Diego, CA 92121	Project Number:

SECTION 1. Construction Storm Water BMP Requirements:

All construction sites are required to implement construction BMPs in accordance with the performance standards in the Storm Water Standards Manual. Some sites are additionally required to obtain coverage under the State Construction General Permit (CGP)[1] , which is administered by the State Regional Water Quality Control Board.

For all projects complete PART A: If project is required to submit a SWPPP or WPCP, continue to PART B.

PART A: Determine Construction Phase Storm Water Requirements.

1. Is the project subject to California's statewide General NPDES permit for Storm Water Discharges Associated with Construction Activities, also known as the State Construction General Permit (CGP)? (Typically projects with land disturbance greater than or equal to 1 acre.)

   ☒ Yes; SWPPP required, skip questions 2-4 ☐ No; next question

2. Does the project propose construction or demolition activity, including but not limited to, clearing, grading, grubbing, excavation, or any other activity resulting in ground disturbance and/or contact with storm water?

   ☐ Yes; WPCP required, skip questions 3-4 ☐ No; next question

3. Does the project propose routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of the facility? (Projects such as pipeline/utility replacement)

   ☐ Yes; WPCP required, skip question 4 ☐ No; next question

4. Does the project only include the following Permit types listed below?

   - Electrical Permit, Fire Alarm Permit, Fire Sprinkler Permit, Plumbing Permit, Sign Permit, Mechanical Permit, Spa Permit.
   - Individual Right of Way Permits that exclusively include only ONE of the following activities: water service, sewer lateral, or utility service.
   - Right of Way Permits with a project footprint less than 150 linear feet that exclusively include only ONE of the following activities: curb ramp, sidewalk and driveway apron replacement, pot holing, curb and gutter replacement, and retaining wall encroachments.

   ☐ Yes; no document required

Check one of the boxes below, and continue to PART B:

☒ If you checked "Yes" for question 1, **a SWPPP is REQUIRED. Continue to PART B**

☐ If you checked "No" for question 1, and checked "Yes" for question 2 or 3, **a WPCP is REQUIRED.** If the project proposes less than 5,000 square feet of ground disturbance AND has less than a 5-foot elevation change over the entire project area, a Minor WPCP may be required instead. **Continue to PART B.**

☐ If you checked "No" for all questions 1-3, and checked "Yes" for question 4 PART B **does not apply and no document is required. Continue to Section 2.**

1. More information on the City's construction BMP requirements as well as CGP requirements can be found at: www.sandiego.gov/stormwater/regulations/index.shtml

PART B: Determine Construction Site Priority

This prioritization must be completed within this form, noted on the plans, and included in the SWPPP or WPCP. The city reserves the right to adjust the priority of projects both before and after construction. Construction projects are assigned an inspection frequency based on if the project has a "high threat to water quality." The City has aligned the local definition of "high threat to water quality" to the risk determination approach of the State Construction General Permit (CGP). The CGP determines risk level based on project specific sediment risk and receiving water risk. Additional inspection is required for projects within the Areas of Special Biological Significance (ASBS) watershed. **NOTE:** The construction priority does **NOT** change construction BMP requirements that apply to projects; rather, it determines the frequency of inspections that will be conducted by city staff.

Complete PART B and continued to Section 2

1. ☐ **ASBS**

a. Projects located in the ASBS watershed.

2. ☒ **High Priority**

a. Projects that qualify as Risk Level 2 or Risk Level 3 per the Construction General Permit (CGP) and not located in the ASBS watershed.

b. Projects that qualify as LUP Type 2 or LUP Type 3 per the CGP and not located in the ASBS watershed.

3. ☐ **Medium Priority**

a. Projects that are not located in an ASBS watershed or designated as a High priority site.

b. Projects that qualify as Risk Level 1 or LUP Type 1 per the CGP and not located in an ASBS watershed.

c. WPCP projects (>5,000sf of ground disturbance) located within the Los Penasquitos watershed management area.

4. ☐ **Low Priority**

a. Projects not subject to a Medium or High site priority designation and are not located in an ASBS watershed.

SECTION 2. Permanent Storm Water BMP Requirements.

Additional information for determining the requirements is found in the Storm Water Standards Manual.

PART C: Determine if Not Subject to Permanent Storm Water Requirements.

Projects that are considered maintenance, or otherwise not categorized as "new development projects" or "redevelopment projects" according to the Storm Water Standards Manual are not subject to Permanent Storm Water BMPs.

If "yes" is checked for any number in Part C, proceed to Part F and check "Not Subject to Permanent Storm Water BMP Requirements".

If "no" is checked for all of the numbers in Part C continue to Part D.

1.	Does the project only include interior remodels and/or is the project entirely within an existing enclosed structure and does not have the potential to contact storm water?	☐ Yes ☒ No
2.	Does the project only include the construction of overhead or underground utilities without creating new impervious surfaces?	☐ Yes ☒ No
3.	Does the project fall under routine maintenance? Examples include, but are not limited to: roof or exterior structure surface replacement, resurfacing or reconfiguring surface parking lots or existing roadways without expanding the impervious footprint, and routine replacement of damaged pavement (grinding, overlay, and pothole repair).	☐ Yes ☒ No

Clear Page 2

PART D: PDP Exempt Requirements.

PDP Exempt projects are required to implement site design and source control BMPs.

If "yes" was checked for any questions in Part D, continue to Part F and check the box labeled "PDP Exempt."

If "no" was checked for all questions in Part D, continue to Part E.

1. Does the project ONLY include new or retrofit sidewalks, bicycle lanes, or trails that:

- **Are designed and constructed to direct storm water runoff to adjacent vegetated areas, or other non-erodible permeable areas? Or;**
- **Are designed and constructed to be hydraulically disconnected from paved streets and roads? Or;**
- **Are designed and constructed with permeable pavements or surfaces in accordance with the Green Streets guidance in the City's Storm Water Standards manual?**

☐ Yes; PDP exempt requirements apply ☒ No; next question

2. Does the project ONLY include retrofitting or redeveloping existing paved alleys, streets or roads designed and constructed in accordance with the Green Streets guidance in the City's Storm Water Standards Manual?

☐ Yes; PDP exempt requirements apply ☒ No; project not exempt.

PART E: Determine if Project is a Priority Development Project (PDP).

Projects that match one of the definitions below are subject to additional requirements including preparation of a Storm Water Quality Management Plan (SWQMP).

If "yes" is checked for any number in PART E, continue to PART F and check the box labeled "Priority Development Project".

If "no" is checked for every number in PART E, continue to PART F and check the box labeled "Standard Development Project".

1.	**New Development that creates 10,000 square feet or more of impervious surfaces collectively over the project site.** This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.	☐ Yes ☒ No
2.	**Redevelopment project that creates and/or replaces 5,000 square feet or more of impervious surfaces on an existing site of 10,000 square feet or more of impervious surfaces.** This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.	☒ Yes ☐ No
3.	**New development or redevelopment of a restaurant.** Facilities that sell prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC 5812), and where the land development creates and/or replace 5,000 square feet or more of impervious surface.	☐ Yes ☒ No
4.	**New development or redevelopment on a hillside.** The project creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site) and where the development will grade on any natural slope that is twenty-five percent or greater.	☐ Yes ☒ No
5.	**New development or redevelopment of a parking lot that creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site).**	☒ Yes ☐ No
6.	**New development or redevelopment of streets, roads, highways, freeways, and driveways.** The project creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site).	☐ Yes ☒ No

Clear Page 3

7. **New development or redevelopment discharging directly to an Environmentally Sensitive Area.** The project creates and/or replaces 2,500 square feet of impervious surface (collectively over project site), and discharges directly to an Environmentally Sensitive Area (ESA). "Discharging directly to" includes flow that is conveyed overland a distance of 200 feet or less from the project to the ESA, or conveyed in a pipe or open channel any distance as an isolated flow from the project to the ESA (i.e. not commingled with flows from adjacent lands). ☐ Yes ☒ No

8. **New development or redevelopment projects of a retail gasoline outlet (RGO) that create and/or replaces 5,000 square feet of impervious surface.** The development project meets the following criteria: (a) 5,000 square feet or more or (b) has a projected Average Daily Traffic (ADT) of 100 or more vehicles per day. ☐ Yes ☒ No

9. **New development or redevelopment projects of an automotive repair shops that creates and/or replaces 5,000 square feet or more of impervious surfaces.** Development projects categorized in any one of Standard Industrial Classification (SIC) codes 5013, 5014, 5541, 7532-7534, or 7536-7539. ☐ Yes ☒ No

10. **Other Pollutant Generating Project.** The project is not covered in the categories above, results in the disturbance of one or more acres of land and is expected to generate pollutants post construction, such as fertilizers and pesticides. This does not include projects creating less than 5,000 sf of impervious surface and where added landscaping does not require regular use of pesticides and fertilizers, such as slope stabilization using native plants. Calculation of the square footage of impervious surface need not include linear pathways that are for infrequent vehicle use, such as emergency maintenance access or bicycle pedestrian use, if they are built with pervious surfaces of if they sheet flow to surrounding pervious surfaces. ☐ Yes ☒ No

PART F: Select the appropriate category based on the outcomes of PART C through PART E.

1. The project is **NOT SUBJECT TO PERMANENT STORM WATER REQUIREMENTS**. ☐
2. The project is a **STANDARD DEVELOPMENT PROJECT**. Site design and source control BMP requirements apply. See the Storm Water Standards Manual for guidance. ☐
3. The project is **PDP EXEMPT**. Site design and source control BMP requirements apply. See the Storm Water Standards Manual for guidance. ☐
4. The project is a **PRIORITY DEVELOPMENT PROJECT**. Site design, source control, and structural pollutant control BMP requirements apply. See the Storm Water Standards Manual for guidance on determining if project requires a hydromodification plan management ☒

Name of Owner or Agent *(Please Print)*	Title
Signature	Date

Clear Page 4

Clear Form

Applicability of Permanent, Post-Construction Storm Water BMP Requirements			Form I-1
Project Identification			
Project Name: ARE - Scripps HQ			
Permit Application Number:			Date: March 11, 2021
Determination of Requirements			
The purpose of this form is to identify permanent, post-construction requirements that apply to the project. This form serves as a short summary of applicable requirements, in some cases referencing separate forms that will serve as the backup for the determination of requirements. Answer each step below, starting with **Step 1** and progressing through each step until reaching "Stop". Refer to the manual sections and/or separate forms referenced in each step below.			
Step	**Answer**	**Progression**	
Step 1: Is the project a "development project"? See Section 1.3 of the manual (Part 1 of Storm Water Standards) for guidance.	☑ Yes	Go to **Step 2**.	
	☐ No	**Stop**. Permanent BMP requirements do not apply. No SWQMP will be required. Provide discussion below.	
Discussion / justification if the project is not a "development project" (e.g., the project includes *only* interior remodels within an existing building):			
Step 2: Is the project a Standard Project, PDP, or PDP Exempt? To answer this item, see Section 1.4 of the manual in its entirety for guidance AND complete Form DS-560, Storm Water Requirements Applicability Checklist.	☐ Standard Project	**Stop.** Standard Project requirements apply	
	☑ PDP	PDP requirements apply, including PDP SWQMP. Go to **Step 3**.	
	☐ PDP Exempt	**Stop.** Standard Project requirements apply. Provide discussion and list any additional requirements below.	
Discussion / justification, and additional requirements for exceptions to PDP definitions, if applicable:			

Project Name: ARE – Scripps HQ

Form I-1 Page 2 of 2		
Step	**Answer**	**Progression**
Step 3. Is the project subject to earlier PDP requirements due to a prior lawful approval? See Section 1.10 of the manual (Part 1 of Storm Water Standards) for guidance.	☐ Yes	Consult the City Engineer to determine requirements. Provide discussion and identify requirements below. Go to **Step 4**.
	☑ No	BMP Design Manual PDP requirements apply. Go to **Step 4**.
Discussion / justification of prior lawful approval, and identify requirements (<u>not required if prior lawful approval does not apply</u>):		
Step 4. Do hydromodification control requirements apply? See Section 1.6 of the manual (Part 1 of Storm Water Standards) for guidance.	☑ Yes	PDP structural BMPs required for pollutant control (Chapter 5) and hydromodification control (Chapter 6). Go to **Step 5**.
	☐ No	**Stop**. PDP structural BMPs required for pollutant control (Chapter 5) only. Provide brief discussion of exemption to hydromodification control below.
Discussion / justification if hydromodification control requirements do <u>not</u> apply:		
Step 5. Does protection of critical coarse sediment yield areas apply? See Section 6.2 of the manual (Part 1 of Storm Water Standards) for guidance.	☐ Yes	Management measures required for protection of critical coarse sediment yield areas (Chapter 6.2). **Stop**.
	☑ No	Management measures not required for protection of critical coarse sediment yield areas. Provide brief discussion below. **Stop**.
Discussion / justification if protection of critical coarse sediment yield areas does <u>not</u> apply: Please refer Attachment 2B for Management of Critical Coarse Sediment Yield Areas exhibit. There are no critical coarse sediment yield areas in the project site.		

Project is not HMP exempt

HMP Exemption Exhibit

Attach a HMP Exemption Exhibit that shows direct storm water runoff discharge from the project site to HMP exempt area. Include project area, applicable underground storm drain line and/or concrete lined channels, outfall information and exempt waterbody.
Reference applicable drawing number(s).

Exhibit must be provided on 11"x17" or larger paper.

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Site Information Checklist For PDPs	Form I-3B
Project Summary Information	
Project Name	ARE - Scripps HQ
Project Address	4555 Executive Dr, San Diego, CA 92121
Assessor's Parcel Number(s) (APN(s))	345-012-04, 345-012-05 & 345-080-18
Permit Application Number	
Project Watershed	Select One: ☐ San Dieguito River ☑ Penasquitos ☐ Mission Bay ☐ San Diego River ☐ San Diego Bay ☐ Tijuana River
Hydrologic subarea name with Numeric Identifier up to two decimal places (9XX.XX)	Miramar Hydrologic Area 906.40
Project Area (total area of Assessor's Parcel(s) associated with the project or total area of the right-of-way)	3.9 Acres (169884 Square Feet)
Area to be disturbed by the project (Project Footprint)	3.9 Acres (169884 Square Feet)
Project Proposed Impervious Area (subset of Project Footprint)	2.73 Acres (118919 Square Feet)
Project Proposed Pervious Area (subset of Project Footprint)	1.17 Acres (50965 Square Feet)
Note: Proposed Impervious Area + Proposed Pervious Area = Area to be Disturbed by the Project. This may be less than the Project Area.	
The proposed increase or decrease in impervious area in the proposed condition as compared to the pre-project condition	7.5 % Impervious Increase = (Proposed Impervious - Existing Impervious)/Existing Impervious

Project Name: ARE – Scripps HQ

Form I-3B Page 2 of 11
Description of Existing Site Condition and Drainage Patterns
Current Status of the Site (select all that apply): ☑Existing development ☐Previously graded but not built out ☐Agricultural or other non-impervious use ☐Vacant, undeveloped/natural Description / Additional Information: The project site consists of a commercial office building, parking lot and landscape areas.
Existing Land Cover Includes (select all that apply): ☑Vegetative Cover ☐Non-Vegetated Pervious Areas ☑Impervious Areas Description / Additional Information: The project site consists of a commercial office building, parking lot and landscape areas.
Underlying Soil belongs to Hydrologic Soil Group (select all that apply): ☐NRCS Type A ☐NRCS Type B ☐NRCS Type C ☑NRCS Type D
Approximate Depth to Groundwater: ☐Groundwater Depth < 5 feet ☐5 feet < Groundwater Depth < 10 feet ☐10 feet < Groundwater Depth < 20 feet ☑Groundwater Depth > 20 feet
Existing Natural Hydrologic Features (select all that apply): ☐Watercourses ☐Seeps ☐Springs ☐Wetlands ☑None Description / Additional Information: There are no known existing natural hydrologic features.

Form I-3B Page 3 of 11
Description of Existing Site Topography and Drainage
How is storm water runoff conveyed from the site? At a minimum, this description should answer: 1. Whether existing drainage conveyance is natural or urban; 2. If runoff from offsite is conveyed through the site? If yes, quantification of all offsite drainage areas, design flows, and locations where offsite flows enter the project site and summarize how such flows are conveyed through the site; 3. Provide details regarding existing project site drainage conveyance network, including storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, and natural and constructed channels; 4. Identify all discharge locations from the existing project along with a summary of the conveyance system size and capacity for each of the discharge locations. Provide summary of the pre-project drainage areas and design flows to each of the existing runoff discharge locations.
Descriptions/Additional Information
1. Existing drainage conveyance is urban. 2. No, runoff from offsite areas are not conveyed through the site. 3 & 4. The project consists of two major basins in the pre-project condition. Basin 100 encompasses the westerly portions of the project (1.4 ac approximately). Basin 100 is conveyed primarily by the onsite private storm drain network and day lights to Executive Way via a curb outlet. The perimeter slopes of Basin 100 however sheet flow to Executive Drive and Executive Way. Basin 200 encompasses the easterly portions of the project (2.5 ac approximately). Basin 200 is conveyed primarily by a separate onsite private storm drain network and it ties into the public storm drain system running north along Executive Drive. For more detailed information about the existing drainage, please refer to the project drainage Study included in Attachment 5.

Form I-3B Page 4 of 11
Description of Proposed Site Development and Drainage Patterns
Project Description / Proposed Land Use and/or Activities: The project proposed a new office building, parking garage, courtyard, parking lot and landscape areas.
List/describe proposed impervious features of the project (e.g., buildings, roadways, parking lots, courtyards, athletic courts, other impervious features): The proposed impervious features include office building, parking garage, parking lots and driveways.
List/describe proposed pervious features of the project (e.g., landscape areas): The proposed pervious features include, landscape areas, DG pathways, and biofiltration basins.
Does the project include grading and changes to site topography? ☑ Yes ☐ No Description / Additional Information: The project proposes to grade approximately 3.7 acres. The proposed grading will follow the existing contours with minor changes to accommodate the proposed development.

Form I-3B Page 5 of 11

Does the project include changes to site drainage (e.g., installation of new storm water conveyance systems)?

☑ Yes

☐ No

If yes, provide details regarding the proposed project site drainage conveyance network, including storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural and constructed channels, and the method for conveying offsite flows through or around the proposed project site. Identify all discharge locations from the proposed project site along with a summary of the conveyance system size and capacity for each of the discharge locations. Provide a summary of pre and post-project drainage areas and design flows to each of the runoff discharge locations. Reference the drainage study for detailed calculations.

Description / Additional Information:

The project drainage will remain similar to the pre-project condition. In the post-project condition, Basin 100 still encompasses the westerly portions of the project site (1.5 ac approximately). The existing onsite private storm drain network has been replaced with a new network of storm drains. The collected runoff will daylight to Executive Way via curb outlets. Basin 200 encompasses the easterly portions of the project (2.5 ac approximately). A separate network of proposed storm drains collect and convey the runoff to the public storm drain system running north along Executive Drive. For more detailed information about the proposed drainage, please refer to the project drainage Study included in Attachment 5.

Project Name: ARE - Scripps HQ

Form I-3B Page 6 of 11

Identify whether any of the following features, activities, and/or pollutant source areas will be present (select all that apply):

- ☑ Onsite storm drain inlets
- ☐ Interior floor drains and elevator shaft sump pumps
- ☑ Interior parking garages
- ☐ Need for future indoor & structural pest control
- ☑ Landscape/outdoor pesticide use
- ☑ Pools, spas, ponds, decorative fountains, and other water features
- ☑ Food service
- ☐ Refuse areas
- ☐ Industrial processes
- ☑ Outdoor storage of equipment or materials
- ☐ Vehicle and equipment cleaning
- ☐ Vehicle/equipment repair and maintenance
- ☐ Fuel dispensing areas
- ☑ Loading docks
- ☐ Fire sprinkler test water
- ☐ Miscellaneous drain or wash water
- ☑ Plazas, sidewalks, and parking lots

Description/Additional Information:

1. All proposed storm drain inlets shall be marked with the words "No Dumping! Flows to Bay" or similar (i.e. Lagoon/Ocean) and maintained periodically to replace inlet markings. The proposed on-site storm drain network complies with the latest stormwater regulations for pollutant control and hydromodification management.

2. Landscaping areas shall be maintained using minimum or no pesticides. Pesticides shall be used only after monitoring indicates they are needed according to established guidelines.

Form I-3B Page 7 of 11
Identification and Narrative of Receiving Water
Narrative describing flow path from discharge location(s), through urban storm conveyance system, to receiving creeks, rivers, and lagoons and ultimate discharge location to Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable) Urban Drain System -> Unnamed Canyon -> Rose Canyon -> Mission Bay -> Pacific Ocean
Provide a summary of all beneficial uses of receiving waters downstream of the project discharge locations Rose Canyon - MUN, IND, REC1, REC2, WARM, WILD Pacific Ocean - IND, NAV, REC1, REC2, COMM, BIOL, WILD, RARE, MAR, AQUA, MIGR, SPWN, SHELL Refer to the May 17, 2016 Water Quality Control Plan for the San Diego Basin (9) (formerly known as the Basin Plan) for descriptions of each beneficial use category.
Identify all ASBS (areas of special biological significance) receiving waters downstream of the project discharge locations There are no ASBS downstream of the project outfall.
Provide distance from project outfall location to impaired or sensitive receiving waters It is approximately 1.8 miles between the project outfall location to the first impaired or sensitive receiving water.
Summarize information regarding the proximity of the permanent, post-construction storm water BMPs to the City's Multi-Habitat Planning Area and environmentally sensitive lands It is approximately 1.8 miles between the proposed post-construction permanent stormwater BMPs to the closest Environmentally Sensitive Area (ESA).

Form I-3B Page 8 of 11		
Identification of Receiving Water Pollutants of Concern		
List any 303(d) impaired water bodies within the path of storm water from the project site to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable), identify the pollutant(s)/stressor(s) causing impairment, and identify any TMDLs and/or Highest Priority Pollutants from the WQIP for the impaired water bodies:		
303(d) Impaired Water Body (Refer to Appendix K)	**Pollutant(s)/Stressor(s) (Refer to Appendix K)**	**TMDLs/WQIP Highest Priority Pollutant (Refer to Table 1-4 in Chapter 1)**
Mission Bay/La Jolla	Eutrophic	Nutrients, Oxygen Demanding
Los Penasquitos Lagoon	Lead	Heavy Metals

Identification of Project Site Pollutants*

*Identification of project site pollutants is only required if flow-thru treatment BMPs are implemented onsite in lieu of retention or biofiltration BMPs (note the project must also participate in an alternative compliance program unless prior lawful approval to meet earlier PDP requirements is demonstrated)

Identify pollutants anticipated from the project site based on all proposed use(s) of the site (see Appendix B.6):

Pollutant	Not Applicable to the Project Site	Anticipated from the Project Site	Also a Receiving Water Pollutant of Concern
Sediment	☑	☐	☐
Nutrients	☑	☐	☑
Heavy Metals	☐	☑	☑
Organic Compounds	☑	☐	☐
Trash & Debris	☐	☑	☐
Oxygen Demanding Substances	☑	☐	☑
Oil & Grease	☐	☑	☐
Bacteria & Viruses	☑	☐	☐
Pesticides	☐	☑	☐

Form I-3B Page 9 of 11
Hydromodification Management Requirements
Do hydromodification management requirements apply (see Section 1.6)? ☑ Yes, hydromodification management flow control structural BMPs required. ☐ No, the project will discharge runoff directly to existing underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean. ☐ No, the project will discharge runoff directly to conveyance channels whose bed and bank are concrete-lined all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean. ☐ No, the project will discharge runoff directly to an area identified as appropriate for an exemption by the WMAA for the watershed in which the project resides. Description / Additional Information (to be provided if a 'No' answer has been selected above): Note: If "No" answer has been selected the SWQMP must include an exhibit that shows the storm water conveyance system from the project site to an exempt water body. The exhibit should include details about the conveyance system and the outfall to the exempt water body.
Critical Coarse Sediment Yield Areas* ***This Section only required if hydromodification management requirements apply**
Based on Section 6.2 and Appendix H does CCSYA exist on the project footprint or in the upstream area draining through the project footprint? ☐ Yes ☑ No Discussion / Additional Information: Please refer Attachment 2B for Management of Critical Coarse Sediment Yield Areas exhibit. There are no critical coarse sediment yield areas in the project site.

Form I-3B Page 10 of 11
Flow Control for Post-Project Runoff*   ***This Section only required if hydromodification management requirements apply**
List and describe point(s) of compliance (POCs) for flow control for hydromodification management (see Section 6.3.1). For each POC, provide a POC identification name or number correlating to the project's HMP Exhibit and a receiving channel identification name or number correlating to the project's HMP Exhibit.   For this project, two (2) POCs for HMP has been identified. POC-1 is the curb outlet along Executive Way. DMA-1A & 1B are tributary to POC-1.   POC-2 is the cleanout where the proposed private storm drain ties into the public storm drain running north along Executive Drive. DMA-2A & 2B is tributary to POC-2.   Both POCs have been identified in the DMA Exhibit (Attachment 1A).
Has a geomorphic assessment been performed for the receiving channel(s)?   ☑No, the low flow threshold is $0.1Q_2$ (default low flow threshold)   ☐Yes, the result is the low flow threshold is $0.1Q_2$ ☐Yes, the result is the low flow threshold is $0.3Q_2$ ☐Yes, the result is the low flow threshold is $0.5Q_2$ If a geomorphic assessment has been performed, provide title, date, and preparer:
Discussion / Additional Information: (optional)

Form I-3B Page 11 of 11
Other Site Requirements and Constraints
When applicable, list other site requirements or constraints that will influence storm water management design, such as zoning requirements including setbacks and open space, or local codes governing minimum street width, sidewalk construction, allowable pavement types, and drainage requirements.
Optional Additional Information or Continuation of Previous Sections As Needed
This space provided for additional information or continuation of information from previous sections as needed.

Source Control BMP Checklist for PDPs			Form I-4B
Source Control BMPs			
All development projects must implement source control BMPs where applicable and feasible. See Chapter 4 and Appendix E of the BMP Design Manual (Part 1 of the Storm Water Standards) for information to implement source control BMPs shown in this checklist. Answer each category below pursuant to the following. • "Yes" means the project will implement the source control BMP as described in Chapter 4 and/or Appendix E of the BMP Design Manual. Discussion / justification is not required. • "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided. • "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project has no outdoor materials storage areas). Discussion / justification may be provided.			
Source Control Requirement	**Applied?**		
4.2.1 Prevention of Illicit Discharges into the MS4	☑ Yes	☐ No	☐ N/A
Discussion / justification if 4.2.1 not implemented:			
4.2.2 Storm Drain Stenciling or Signage	☑ Yes	☐ No	☐ N/A
Discussion / justification if 4.2.2 not implemented:			
4.2.3 Protect Outdoor Materials Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	☑ N/A
Discussion / justification if 4.2.3 not implemented:			
4.2.4 Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	☑ N/A
Discussion / justification if 4.2.4 not implemented:			
4.2.5 Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☑ Yes	☐ No	☐ N/A
Discussion / justification if 4.2.5 not implemented:			

Project Name: ARE – Scripps HQ

Form I-4B Page 2 of 2	
Source Control Requirement	**Applied?**
4.2.6 Additional BMPs Based on Potential Sources of Runoff Pollutants (must answer for each source listed below)	
On-site storm drain inlets	☑ Yes ☐ No ☐ N/A
Interior floor drains and elevator shaft sump pumps	☐ Yes ☐ No ☑ N/A
Interior parking garages	☑ Yes ☐ No ☐ N/A
Need for future indoor & structural pest control	☐ Yes ☐ No ☑ N/A
Landscape/Outdoor Pesticide Use	☑ Yes ☐ No ☐ N/A
Pools, spas, ponds, decorative fountains, and other water features	☐ Yes ☐ No ☑ N/A
Food service	☐ Yes ☐ No ☑ N/A
Refuse areas	☑ Yes ☐ No ☐ N/A
Industrial processes	☐ Yes ☐ No ☑ N/A
Outdoor storage of equipment or materials	☐ Yes ☐ No ☑ N/A
Vehicle/Equipment Repair and Maintenance	☐ Yes ☐ No ☑ N/A
Fuel Dispensing Areas	☐ Yes ☐ No ☑ N/A
Loading Docks	☑ Yes ☐ No ☐ N/A
Fire Sprinkler Test Water	☐ Yes ☐ No ☑ N/A
Miscellaneous Drain or Wash Water	☐ Yes ☐ No ☑ N/A
Plazas, sidewalks, and parking lots	☑ Yes ☐ No ☐ N/A
SC-6A: Large Trash Generating Facilities	☐ Yes ☐ No ☑ N/A
SC-6B: Animal Facilities	☐ Yes ☐ No ☑ N/A
SC-6C: Plant Nurseries and Garden Centers	☐ Yes ☐ No ☑ N/A
SC-6D: Automotive Facilities	☐ Yes ☐ No ☑ N/A
Discussion / justification if 4.2.6 not implemented. Clearly identify which sources of runoff pollutants are discussed. Justification must be provided for all "No" answers shown above.	

Project Name: ARE – Scripps HQ

Site Design BMP Checklist for PDPs			Form I-5B
Site Design BMPs			
All development projects must implement site design BMPs where applicable and feasible. See Chapter 4 and Appendix E of the BMP Design Manual (Part 1 of Storm Water Standards) for information to implement site design BMPs shown in this checklist. Answer each category below pursuant to the following. • "Yes" means the project will implement the site design BMP as described in Chapter 4 and/or Appendix E of the BMP Design Manual. Discussion / justification is not required. • "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided. • "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project site has no existing natural areas to conserve). Discussion / justification may be provided. A site map with implemented site design BMPs must be included at the end of this checklist.			
Site Design Requirement	**Applied?**		
4.3.1 Maintain Natural Drainage Pathways and Hydrologic Features	☐ Yes	☐ No	☑ N/A
Discussion / justification if 4.3.1 not implemented: There are no known hydrologic features on-site. The project is a redevelopment of an existing pad. There are no natural drainage pathways. However, the proposed grading will follow the historic drainage pattern with minor changes to accommodate the redevelopment. TCV has not been estimated or used for the project.			
1-1 Are existing natural drainage pathways and hydrologic features mapped on the site map?	☐ Yes	☐ No	☑ N/A
1-2 Are trees implemented? If yes, are they shown on the site map?	☐ Yes	☐ No	☑ N/A
1-3 Implemented trees meet the design criteria in 4.3.1 Fact Sheet (e.g. soil volume, maximum credit, etc.)?	☐ Yes	☐ No	☑ N/A
1-4 Is tree credit volume calculated using Appendix B.2.2.1 and SD-1 Fact Sheet in Appendix E?	☐ Yes	☐ No	☑ N/A
4.3.2 Have natural areas, soils and vegetation been conserved?	☑ Yes	☐ No	☐ N/A
Discussion / justification if 4.3.2 not implemented:			

Project Name: ARE – Scripps HQ

Form I-5B Page 2 of 4			
Site Design Requirement	**Applied?**		
4.3.3 Minimize Impervious Area	☑ Yes	☐ No	☐ N/A
Discussion / justification if 4.3.3 not implemented:			
4.3.4 Minimize Soil Compaction	☑ Yes	☐ No	☐ N/A
Discussion / justification if 4.3.4 not implemented: This site design has been implemented for the proposed landscape areas only.			
4.3.5 Impervious Area Dispersion	☑ Yes	☐ No	☐ N/A
Discussion / justification if 4.3.5 not implemented:			
5-1 Is the pervious area receiving runon from impervious area identified on the site map?	☑ Yes	☐ No	☐ N/A
5-2 Does the pervious area satisfy the design criteria in 4.3.5 Fact Sheet in Appendix E (e.g. maximum slope, minimum length, etc.)	☑ Yes	☐ No	☐ N/A
5-3 Is impervious area dispersion credit volume calculated using Appendix B.2.1.1 and 4.3.5 Fact Sheet in Appendix E?	☐ Yes	☑ No	☐ N/A

Form I-5B Page 3 of 4			
Site Design Requirement	**Applied?**		
4.3.6 Runoff Collection	☐ Yes	☑ No	☐ N/A
Discussion / justification if 4.3.6 not implemented: The project does not propose any rain barrels, green roofs or permeable pavements for runoff collection.			
6a-1 Are green roofs implemented in accordance with design criteria in 4.3.6A Fact Sheet? If yes, are they shown on the site map?	☐ Yes	☐ No	☑ N/A
6a-2 Is the green roof credit volume calculated using Appendix B.2.1.2 and 4.3.6A Fact Sheet in Appendix E?	☐ Yes	☐ No	☑ N/A
6b-1 Are permeable pavements implemented in accordance with design criteria in 4.3.6B Fact Sheet? If yes, are they shown on the site map?	☐ Yes	☐ No	☑ N/A
6b-2 Is the permeable pavement credit volume calculated using Appendix B.2.1.3 and 4.3.6B Fact Sheet in Appendix E?	☐ Yes	☐ No	☑ N/A
4.3.7 Landscaping with Native or Drought Tolerant Species	☑ Yes	☐ No	☐ N/A
Discussion / justification if 4.3.7 not implemented:			
4.3.8 Harvest and Use Precipitation	☐ Yes	☑ No	☐ N/A
Discussion / justification if 4.3.8 not implemented: Based on Form I-7 provided in Attachment 1C, harvesting and using precipitation is infeasible for the proposed land use.			
8-1 Are rain barrels implemented in accordance with design criteria in 4.3.8 Fact Sheet? If yes, are they shown on the site map?	☐ Yes	☐ No	☑ N/A
8-2 Is the rain barrel credit volume calculated using Appendix B.2.2.2 and 4.3.8 Fact Sheet in Appendix E?	☐ Yes	☐ No	☑ N/A

Form I-5B Page 4 of 4
Insert Site Map with all site design BMPs identified:
Refer To DMA Exhibit located in Attachment 1A

Project Name: ARE - Scripps HQ

Summary of PDP Structural BMPs	Form I-6
PDP Structural BMPs	
All PDPs must implement structural BMPs for storm water pollutant control (see Chapter 5 of the BMP Design Manual, Part 1 of Storm Water Standards). Selection of PDP structural BMPs for storm water pollutant control must be based on the selection process described in Chapter 5. PDPs subject to hydromodification management requirements must also implement structural BMPs for flow control for hydromodification management (see Chapter 6 of the BMP Design Manual). Both storm water pollutant control and flow control for hydromodification management can be achieved within the same structural BMP(s). PDP structural BMPs must be verified by the City at the completion of construction. This includes requiring the project owner or project owner's representative to certify construction of the structural BMPs (complete Form DS-563). PDP structural BMPs must be maintained into perpetuity (see Chapter 7 of the BMP Design Manual). Use this form to provide narrative description of the general strategy for structural BMP implementation at the project site in the box below. Then complete the PDP structural BMP summary information sheet (page 3 of this form) for each structural BMP within the project (copy the BMP summary information page as many times as needed to provide summary information for each individual structural BMP).	
Describe the general strategy for structural BMP implementation at the site. This information must describe how the steps for selecting and designing storm water pollutant control BMPs presented in Section 5.1 of the BMP Design Manual were followed, and the results (type of BMPs selected). For projects requiring hydromodification flow control BMPs, indicate whether pollutant control and flow control BMPs are integrated or separate. Structural BMPs (BMP-1A for DMA-1A, BMP-1B for DMA-1B, BMP-2A for DMA-2A and BMP-2B for DMA-2B) have been proposed for storm water pollutant control and hydromodification management. Selection of the BMP type was performed using SWS Figures 5-1 and 5-2. DMA-1A, DMA-1B, DMA-2A and DMA-2B contains impervious surfaces; therefore, the selection begins at Step 1B. After calculating the Design Capture Volume estimations, Step 2 was completed to determine Harvest and Use feasibility. Based on the proposed land use proposed for the site, it was determined that Harvest and Use is infeasible (refer to Form I-7 provided in Attachment 1C). In Step 3, the infiltration feasibility was assessed for the project based on the approved infiltration testing methods in Appendix C and D of the SWS manual. Form I-8A and I-8B (refer to Attachment 1D) prepared by the Project Geotechnical Engineer concluded that both full and partial infiltration is infeasible for the project. Hence "no infiltration" condition has been adopted for the project. (Continue on page 2 as necessary.)	

Form I-6 Page 2 of 10

(Continued from page 1)

In Step 4, it was determined that Biofiltration BMP-1A can be designed to treat the full DCV based on the maximum feasible footprint. The footprint of the BMP will satisfy the DCV and footprint requirements outlined in Worksheet B.5-1.

Due to horizontal constraints, alternative minimum footprint sizing was used to reduce the sizing factor and thereby the BMP bottom footprint of Biofiltration BMP-2B. Due to horizontal and vertical constraints, proprietary compact biofiltration BMPs (Modular Wetland System) have been proposed for both DMA-1B and DMA-2A. A Modular Wetland System (MWS) meets the performance standard in Appendix B.6.2.2 and is TAPE certified through third-party field scale evaluation.

BMP-1A and 2B will also be designed to comply with the hydromodification management (flow control) requirements. This will be achieved through the use of a low flow restrictor on the perforated sub-drain at the bottom of the basins and through a series of outlets set above the required design capture volume. The outlet works design consists of a mid-flow orifice, for HMP control, on the face of a grate inlet. The flow line of the grate inlet is set at the ponding depth of the HMP volume. Modular Wetlands are flow-thru BMPs and don't provide the required HMP benefit for DMAs 1B and 2A. Hence, conventional Biofiltration BMPs 1A and 2B will over detain to meet the HMP requirements at the POC as shown in the HMP schematic provided in Attachment 2D.

DMA 3 and 4 are self-mitigating DMAs pursuant to Section 5.2.1 of the SWS Manual and does not require any site-design, pollutant control, hydromodification control and DCV calculations.

Project Name: ARE – Scripps HQ

Form I-6 Page 3 of 10 (Copy as many as needed)	
Structural BMP Summary Information	
Structural BMP ID No. BMP 1A	
Construction Plan Sheet No.	
Type of Structural BMP: ☐ Retention by harvest and use (e.g. HU-1, cistern) ☐ Retention by infiltration basin (INF-1) ☐ Retention by bioretention (INF-2) ☐ Retention by permeable pavement (INF-3) ☐ Partial retention by biofiltration with partial retention (PR-1) ☑ Biofiltration (BF-1) ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐ Detention pond or vault for hydromodification management ☐ Other (describe in discussion section below)	
Purpose: ☐ Pollutant control only ☐ Hydromodification control only ☑ Combined pollutant control and hydromodification control ☐ Pre-treatment/forebay for another structural BMP ☐ Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification form DS-563	Brendan Hastie (619) 291-0707
Who will be the final owner of this BMP?	Alenxandria Real Estate Equities, Inc.
Who will maintain this BMP into perpetuity?	Alenxandria Real Estate Equities, Inc.
What is the funding mechanism for maintenance?	Alenxandria Real Estate Equities, Inc.

Form I-6 Page 4 of 10 (Copy as many as needed)
Structural BMP ID No. BMP 1A
Construction Plan Sheet No.
Discussion (as needed; must include worksheets showing BMP sizing calculations in the SWQMPs): The discussion regarding this BMP is included in Form I-6. Additionally, refer to Attachment 1E for the BMP sizing and details.

Project Name: ARE – Scripps HQ

Form I-6 Page 5 of 10 (Copy as many as needed)	
Structural BMP Summary Information	
Structural BMP ID No. BMP 1B	
Construction Plan Sheet No.	
Type of Structural BMP: ☐ Retention by harvest and use (e.g. HU-1, cistern) ☐ Retention by infiltration basin (INF-1) ☐ Retention by bioretention (INF-2) ☐ Retention by permeable pavement (INF-3) ☐ Partial retention by biofiltration with partial retention (PR-1) ☑ Biofiltration (BF-1) Compact Biofiltration BMP - Modular Wetland System ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐ Detention pond or vault for hydromodification management ☐ Other (describe in discussion section below)	
Purpose: ☑ Pollutant control only ☐ Hydromodification control only ☐ Combined pollutant control and hydromodification control ☐ Pre-treatment/forebay for another structural BMP ☐ Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification form DS-563	Brendan Hastie (619) 291-0707
Who will be the final owner of this BMP?	Alenxandria Real Estate Equities, Inc.
Who will maintain this BMP into perpetuity?	Alenxandria Real Estate Equities, Inc.
What is the funding mechanism for maintenance?	Alenxandria Real Estate Equities, Inc.

Form I-6 Page 6 of 10 (Copy as many as needed)
Structural BMP ID No. BMP 1B
Construction Plan Sheet No.
Discussion (as needed; must include worksheets showing BMP sizing calculations in the SWQMPs): The discussion regarding this BMP is included in Form I-6. Additionally, refer to Attachment 1E for the BMP sizing and details.

Project Name: ARE – Scripps HQ

Form I-6 Page 7 of 10 (Copy as many as needed)	
Structural BMP Summary Information	
Structural BMP ID No. BMP 2A	
Construction Plan Sheet No.	
Type of Structural BMP: ☐ Retention by harvest and use (e.g. HU-1, cistern) ☐ Retention by infiltration basin (INF-1) ☐ Retention by bioretention (INF-2) ☐ Retention by permeable pavement (INF-3) ☐ Partial retention by biofiltration with partial retention (PR-1) ☑ Biofiltration (BF-1) Compact Biofiltration BMP - Modular Wetland System ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐ Detention pond or vault for hydromodification management ☐ Other (describe in discussion section below)	
Purpose: ☑ Pollutant control only ☐ Hydromodification control only ☐ Combined pollutant control and hydromodification control ☐ Pre-treatment/forebay for another structural BMP ☐ Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification form DS-563	Brendan Hastie (619) 291-0707
Who will be the final owner of this BMP?	Alenxandria Real Estate Equities, Inc.
Who will maintain this BMP into perpetuity?	Alenxandria Real Estate Equities, Inc.
What is the funding mechanism for maintenance?	Alenxandria Real Estate Equities, Inc.

Project Name: ARE - Scripps HQ

Form I-6 Page 8 of 10 (Copy as many as needed)
Structural BMP ID No. BMP 2A
Construction Plan Sheet No.
Discussion (as needed; must include worksheets showing BMP sizing calculations in the SWQMPs): The discussion regarding this BMP is included in Form I-6. Additionally, refer to Attachment 1E for the BMP sizing and details.

Project Name: ARE – Scripps HQ

Form I-6 Page 9 of 10 (Copy as many as needed)	
Structural BMP Summary Information	
Structural BMP ID No. BMP 2B	
Construction Plan Sheet No.	
Type of Structural BMP: ☐ Retention by harvest and use (e.g. HU-1, cistern) ☐ Retention by infiltration basin (INF-1) ☐ Retention by bioretention (INF-2) ☐ Retention by permeable pavement (INF-3) ☐ Partial retention by biofiltration with partial retention (PR-1) ☑ Biofiltration (BF-1) ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐ Detention pond or vault for hydromodification management ☐ Other (describe in discussion section below)	
Purpose: ☐ Pollutant control only ☐ Hydromodification control only ☑ Combined pollutant control and hydromodification control ☐ Pre-treatment/forebay for another structural BMP ☐ Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification form DS-563	Brendan Hastie (619) 291-0707
Who will be the final owner of this BMP?	Alenxandria Real Estate Equities, Inc.
Who will maintain this BMP into perpetuity?	Alenxandria Real Estate Equities, Inc.
What is the funding mechanism for maintenance?	Alenxandria Real Estate Equities, Inc.

Project Name: ARE - Scripps HQ

Form I-6 Page 10 of 10 (Copy as many as needed)
Structural BMP ID No. BMP 2B
Construction Plan Sheet No.
Discussion (as needed; must include worksheets showing BMP sizing calculations in the SWQMPs): The discussion regarding this BMP is included in Form I-6. Additionally, refer to Attachment 1E for the BMP sizing and details.

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Attachment 1
Backup For PDP Pollutant Control BMPs

This is the cover sheet for Attachment 1.

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Project Name: ARE - Scripps HQ

Indicate which Items are Included:

Attachment Sequence	Contents	Checklist
Attachment 1a	DMA Exhibit (Required) See DMA Exhibit Checklist.	☒ Included
Attachment 1b	Tabular Summary of DMAs Showing DMA ID matching DMA Exhibit, DMA Area, and DMA Type (Required)* *Provide table in this Attachment OR on DMA Exhibit in Attachment 1a	☐ Included on DMA Exhibit in Attachment 1a ☑ Included as Attachment 1b, separate from DMA Exhibit
Attachment 1c	Form I-7, Harvest and Use Feasibility Screening Checklist (Required unless the entire project will use infiltration BMPs) Refer to Appendix B.3-1 of the BMP Design Manual to complete Form I-7.	☑ Included ☐ Not included because the entire project will use infiltration BMPs
Attachment 1d	Infiltration Feasibility Information. Contents of Attachment 1d depend on the infiltration condition: • No Infiltration Condition: ○ Infiltration Feasibility Condition Letter (*Note: must be stamped and signed by licensed geotechnical engineer*) ○ Form I-8A (optional) ○ Form I-8B (optional) • Partial Infiltration Condition: ○ Infiltration Feasibility Condition Letter (*Note: must be stamped and signed by licensed geotechnical engineer*) ○ Form I-8A ○ Form I-8B • Full Infiltration Condition: ○ Form I-8A ○ Form I-8B ○ Worksheet C.4-3 ○ Form I-9 Refer to Appendices C and D of the BMP Design Manual for guidance.	☑ Included ☐ Not included because the entire project will use harvest and use BMPs
Attachment 1e	Pollutant Control BMP Design Worksheets / Calculations (Required) Refer to Appendices B and E of the BMP Design Manual for structural pollutant control BMP design guidelines and site design credit calculations	☑ Included

Project Name: ARE – Scripps HQ

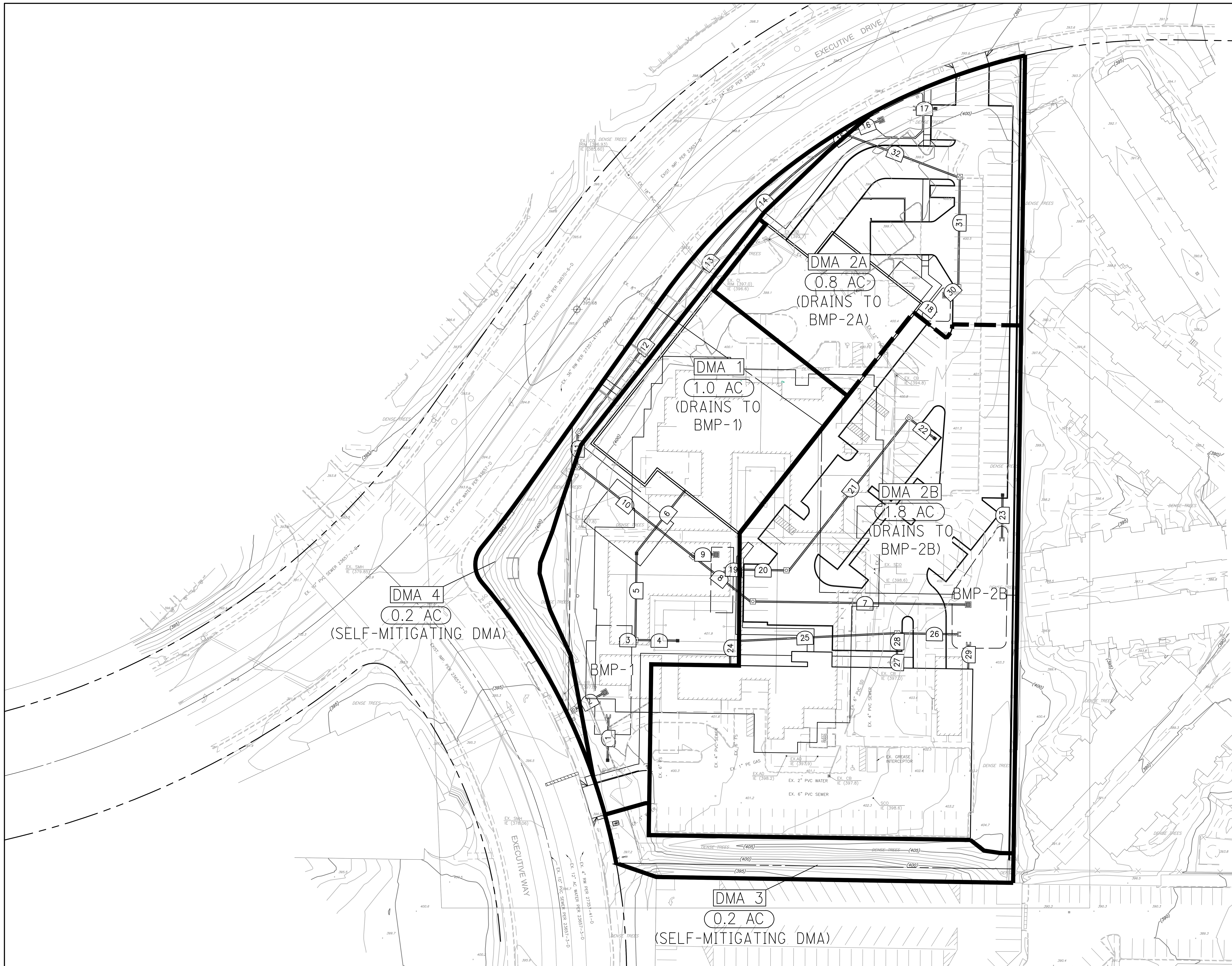
Use this checklist to ensure the required information has been included on the DMA Exhibit:

The DMA Exhibit must identify:

- ☑ Underlying hydrologic soil group
- ☑ Approximate depth to groundwater
- N/A ☐ Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
- N/A ☐ Critical coarse sediment yield areas to be protected
- ☑ Existing topography and impervious areas
- ☑ Existing and proposed site drainage network and connections to drainage offsite
- ☑ Proposed grading
- ☑ Proposed impervious features
- ☑ Proposed design features and surface treatments used to minimize imperviousness
- ☑ Drainage management area (DMA) boundaries, DMA ID numbers, and DMA areas (square footage or acreage), and DMA type (i.e., drains to BMP, self-retaining, or self-mitigating)
- ☑ Potential pollutant source areas and corresponding required source controls (see Chapter 4, Appendix E.1, and Form I-3B)
- ☑ Structural BMPs (identify location, type of BMP, size/detail, and include cross-section) BMP cross-section detail has been provided separately in Attachment 1E.

Attachment 1A

DMA Exhibit



NOTES:

1. UNDERLYING HYDROLOGIC SOIL GROUP = NRCS TYPE D.
2. APPROXIMATE DEPTH TO GROUNDWATER IS GREATER THAN 20FT.
3. THERE ARE NO KNOWN EXISTING NATURAL HYDROLOGIC FEATURES LOCATED WITHIN THE PROJECT SITE.
4. THE PROJECT SITE IS NOT LOCATED WITHIN ANY CRITICAL COARSE SEDIMENT YIELD AREAS (ATTACHMENT 2B).

LEGEND:

- DMA BOUNDARY
- DMA X — DMA ID
- X.X AC — DMA AREA
- BMP X — BMP ID
- POC
- PROPOSED BIOFILTRATION BMP
- PROPOSED DG
- PROPOSED CONCRETE
- OFFSET AREAS DRAINING TO BMP-1 (NOT DISTURBED)

40 20 0 40 80 120

GRAPHIC SCALE: 1"=40'

RICK ENGINEERING COMPANY
San Diego
5620 FRIARS ROAD
SAN DIEGO, CA 92110
619.291.0707
(FAX)619.291.4165
rickengineering.com
Riverside - Orange - San Luis Obispo - Denver - Sacramento - Phoenix - Tucson

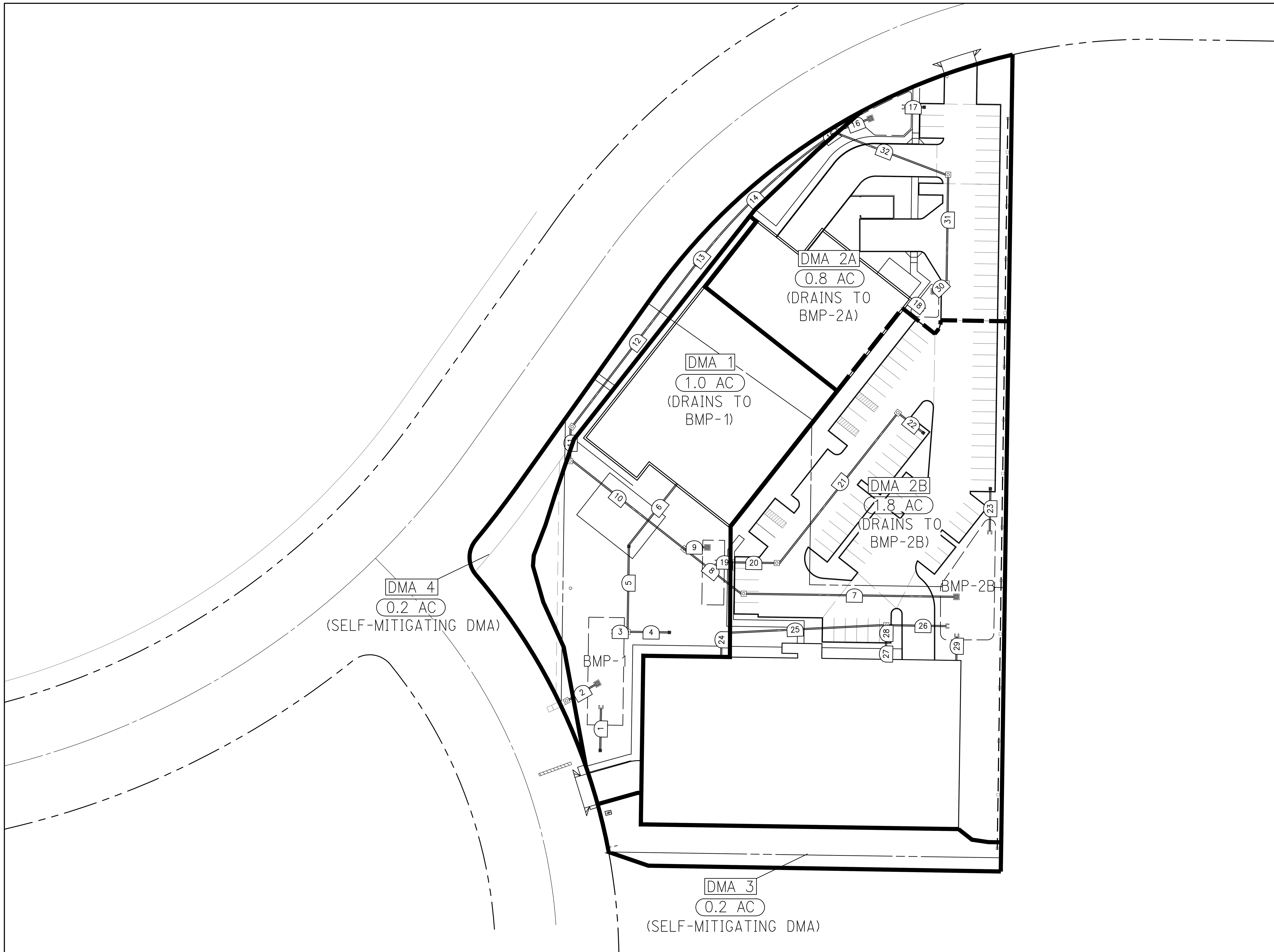
SITE DESIGN, DMA AND HMP EXHIBIT FOR ARE-SCRIPPS HQ

DATE: 01/25/21

J-19276

SHEET 1 OF 1

NOT FOR CONSTRUCTION – EXHIBIT FOR PDP SWQMP ONLY



40 20 0 40 80 120

GRAPHIC SCALE: 1"=40'

NOTES:

1. UNDERLYING HYDROLOGIC SOIL GROUP = NRCS TYPE D.
2. APPROXIMATE DEPTH TO GROUNDWATER IS GREATER THAN 20FT.
3. THERE ARE NO KNOWN EXISTING NATURAL HYDROLOGIC FEATURES LOCATED WITHIN THE PROJECT SITE.
4. THE PROJECT SITE IS NOT LOCATED WITHIN ANY CRITICAL COARSE SEDIMENT YIELD AREAS (ATTACHMENT 2B).

LEGEND:

	DMA BOUNDARY
DMA X	DMA ID
X.X AC	DMA AREA
BMP X	BMP ID
	POC
	PROPOSED BIOFILTRATION BMP
	PROPOSED DG
	PROPOSED CONCRETE
	OFFSET AREAS DRAINING TO BMP-1 (NOT DISTURBED)

SITE DESIGN, DMA AND HMP EXHIBIT FOR ARE-SCRIPPS HQ

DATE: 01/25/21

J-19276

SHEET 1 OF 1

RICK ENGINEERING COMPANY
San Diego
5620 FRIARS ROAD
SAN DIEGO, CA 92110
619.291.0707
(FAX)619.291.4165
rickengineering.com
Riverside - Orange - San Luis Obispo - Denver - Sacramento - Phoenix - Tucson

NOT FOR CONSTRUCTION – EXHIBIT FOR PDP SWQMP ONLY

Project Name: **ARE - Scripps HQ**

Attachment 1B

DMA Summary Table

Project Name: ARE - Scripps HQ

Tabular Summary of DMAs							Worksheet B-1		
DMA Unique Identifier	Area (acres)	Impervious Area (acres)	% Imp	HSG	Area Weighted Runoff Coefficient	DCV (cubic feet)	Treated By (BMP ID)	Pollutant Control Type	Drains to (POC ID)
1A	0.8	0.56	70	D	0.72	1089	BMP-1A	BF-1	POC-1
1B	0.1	0.04	35	D	0.51	125	BMP-1B	BF-3	POC-1
2A	0.5	0.43	85	D	0.81	755	BMP-2A	BF-3	POC-2
2B	2	1.7	85	D	0.81	3063	BMP-2B	BF-1	POC-2
3	0.2	0	0	D	0.3	-	Self-Mitigating	Self-Mitigating	POC-1
4	0.3	0	0	D	0.3	-	Self-Mitigating	Self-Mitigating	POC-1
Summary of DMA Information (Must match project description and SWQMP Narrative)									
No. of DMAs	Total DMA Area (acres)	Total Impervious Area (acres)	% Imp		Area Weighted Runoff Coefficient	Total DCV (cubic feet)	Total Area Treated (acres)		No. of POCs
6	3.9	2.73	70		0.72	5032	3.9		2

Where: DMA = Drainage Management Area; Imp = Imperviousness; HSG = Hydrologic Soil Group; DCV= Design Capture Volume; BMP = Best Management Practice; POC = Point of Compliance; ID = identifier; No. = Number

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Attachment 1C

Form I-7

Harvest and Use Feasibility Screening Checklist

<table>
<tr><th colspan="2">Harvest and Use Feasibility Checklist</th><th>Worksheet B.3-1 : Form I-7</th></tr>
<tr><td colspan="3">1. Is there a demand for harvested water (check all that apply) at the project site that is reliably present during the wet season?
☑ Toilet and urinal flushing
☑ Landscape irrigation
☐ Other:___________</td></tr>
<tr><td colspan="3">2. If there is a demand; estimate the anticipated average wet season demand over a period of 36 hours. Guidance for planning level demand calculations for toilet/urinal flushing and landscape irrigation is provided in Section B.3.2.
[Provide a summary of calculations here]
Toilet Demand = 7 gal/person/day x 250 people = 1750 gal x 1.5 days = 2625 gal/36-hr
Irrigation Demand = Moderate plant water use, 1470 gal/acre x 1.17 acre = 1720 gal/36-hr
Total Demand = 4345 gallons = 581 cu.ft
581/5032 x 100% = 11.5% of DCV</td></tr>
<tr><td colspan="3">3. Calculate the DCV using worksheet B-2.1.
DCV = 5032 (cubic feet)
[Provide a summary of calculations here]</td></tr>
<tr><td>3a. Is the 36-hour demand greater than or equal to the DCV?
☐ Yes / ☑ No ⇨
⇩</td><td>3b. Is the 36-hour demand greater than 0.25DCV but less than the full DCV?
☐ Yes / ☑ No ⇨
⇩</td><td>3c. Is the 36-hour demand less than 0.25DCV?
☑ Yes
⇩</td></tr>
<tr><td>Harvest and use appears to be feasible. Conduct more detailed evaluation and sizing calculations to confirm that DCV can be used at an adequate rate to meet drawdown criteria.</td><td>Harvest and use may be feasible. Conduct more detailed evaluation and sizing calculations to determine feasibility. Harvest and use may only be able to be used for a portion of the site, or (optionally) the storage may need to be upsized to meet long term capture targets while draining in longer than 36 hours.</td><td>Harvest and use is considered to be infeasible.</td></tr>
<tr><td colspan="3">Is harvest and use feasible based on further evaluation?
☐ Yes, refer to Appendix E to select and size harvest and use BMPs.
☑ No, select alternate BMPs.</td></tr>
</table>

Attachment 1D

Categorization of Infiltration Feasibility Condition

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ENVIRONMENTAL
MATERIALS

STORM WATER MANAGEMENT INVESTIGATION

ARE – SCRIPPS HQ PROJECT
4555 EXECUTIVE DRIVE
SAN DIEGO, CALIFORNIA

PREPARED FOR

ALEXANDRIA®

FEBRUARY 18, 2021
PROJECT NO. G2557-52-02

GEOCON
INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. G2557-52-02
February 18, 2021

Alexandria Real Estate Equities, Inc.
10996 Torreyana Road, Suite 250
San Diego, California 92121

Attention: Mr. Chris Clement

Subject: STORM WATER MANAGEMENT INVESTIGATION
ARE – SCRIPPS HQ PROJECT
4555 EXECUTIVE DRIVE
SAN DIEGO, CALIFORNIA

References:
1. *Geotechnical Investigation, 4555 Executive Drive, San Diego, California*, prepared by Geocon Incorporated, draft dated February 18, 2021 (Project No. G2557-52-02).

2. *[Preliminary] Grading and Improvement Plans For: ARE/Scripps HQ, 4555 Executive Drive, San Diego, California*, prepared by Rick Engineering, plot dated February 4, 2021.

Dear Mr. Clement:

In accordance with your request and authorization of our Proposal No. LG-20450 dated October 13, 2020, we herein submit the results of our storm water management investigation for the subject project located at 4555 Executive Drive in the City of San Diego, California (see Vicinity Map).

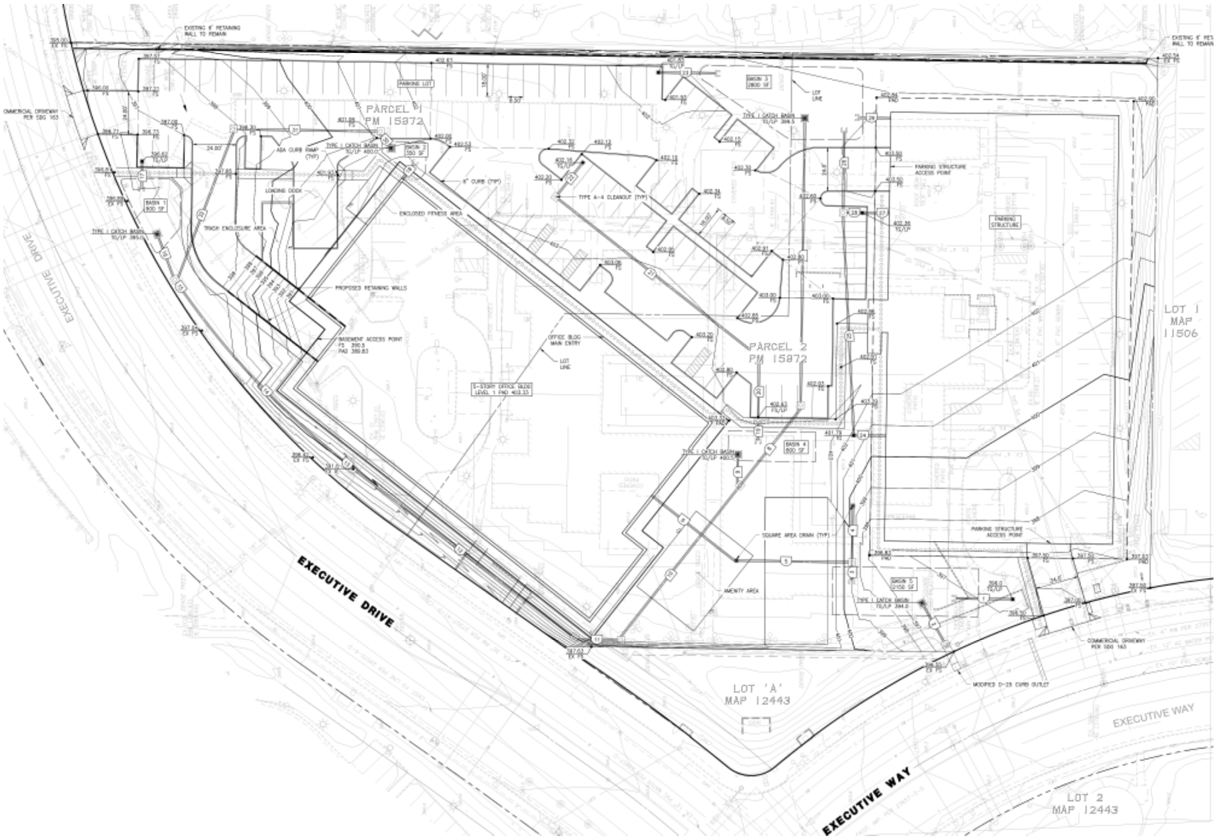
Vicinity Map

SITE AND PROJECT DESCRIPTION

The existing property consists of the Braille Institute that is comprised of one- to two-story buildings with surface parking on the north, east and south sides of the property. The site is accessed by gated entrances on the north and southwest sides from Executive Drive and Executive Way, respectively. The site is relatively flat with elevations of about 395 to 405 feet above mean seal level (MSL) on the northwest and southeast, respectively. The Existing Site Plan shows the existing conditions of the property.

Existing Site Plan

We understand the proposed development will include demolishing the existing buildings and constructing a new commercial office building and parking structure as shown on the Proposed Site Plan. The proposed commercial office building will have 5 levels with one subterranean level with a pad grade elevation of approximately 390 feet MSL. The proposed parking structure will have a pad grade elevation ranging from approximately 397 to 404 feet MSL with no subterranean levels planned. We expect grading will consist of minor fills and cuts of less than 5 feet to achieve proposed grades with the exception of estimated cuts up to approximately 10 feet for the commercial building pad area where a subterranean level is planned. The project will also consist of driveways and surface parking, and will also include storm water management devices, landscaping and other associated improvements.



Proposed Site Plan

Based on published geologic maps, the referenced report and our experience, the site is underlain by fill associated with the existing developments, and the Very Old Paralic Deposits. The existing soil possesses a "very low" to "low" expansion potential (expansion index of 50 or less) and generally consists of silty to clayey sand and sandy clay.

Our field investigation at the site consisted of excavating 8 small-diameter borings (Borings B-1 through B-4 and Infiltration Tests P-1 through P-4) to depths ranging from approximately 2 and 20 feet below existing grades. Borings B-1 through B-4 were excavated using a truck-mounted CME 75 drill rig, and we performed hand-auger borings and infiltration tests (P-1 through P-4) in areas underlain by shallow fills of approximately 5½ feet or less overlying formational materials. The Geologic Map, Figure 1, shows the locations of the infiltration tests. The infiltration tests were performed within underlying formational materials consisting of Very Old Paralic Deposits (Qvop).

SOIL AND GEOLOGIC CONDITIONS

Based on the referenced geotechnical document and regional geologic maps, the site is underlain by one surficial soil unit (consisting of undocumented fill) and three formational units (consisting of Very Old Paralic Deposits, Stadium Conglomerate, and Scripps Formation). The approximate occurrence, distribution, and description of each unit is shown on the Geologic Map, Figure 1. The surficial soil and geologic unit are described herein in order of increasing age.

Undocumented Fill (Qudf)

The site is underlain by varying depths of undocumented fill up to approximately 5½ feet below existing grade, as encountered. The Geologic Map, Figure 1, shows the approximate fill thicknesses encountered at each exploratory excavation. We expect the fill materials are generally less than 5 feet across the site with the exception of the southwest end of the site where we encountered 5½ feet of undocumented fill. Infiltration should be considered infeasible in areas underlain by greater than 5 feet of fill.

Very Old Paralic Deposits (Qvop)

The Quaternary-age Very Old Paralic Deposits underlies the existing fill soil and extends to the maximum depth explored of 20 feet below existing grade during the referenced investigation. The Very Old Paralic Deposits consist of reddish brown, medium dense to very dense sandstone and cobble conglomerate

Stadium Conglomerate (Tst)

We expect a relatively thin layer of Eocene-age Stadium Conglomerate exists below the Very Old Paralic Deposits at depths of greater than 20 feet below existing grade. The Stadium Conglomerate typically consists of gravel and cobble in a sandy to clayey matrix and can be cemented. Local concretions are common within this unit.

Scripps Formation (Tsc)

The Tertiary-age Scripps Formation likely exists below the Stadium Conglomerate. The Scripps Formation typically consists of gray and yellowish brown, sandy to clayey siltstone and possesses areas of highly cemented concretionary beds.

STORM WATER MANAGEMENT INVESTIGATION

We understand storm water management devices are being proposed in accordance with the 2018 City of San Diego Storm Water Standards (SWS). If not properly constructed, there is a potential for distress to improvements and properties located hydrologically down gradient or adjacent to these devices. Factors such as the amount of water to be detained, its residence time, and soil permeability have an important effect on seepage transmission and the potential adverse impacts that may occur if the storm water management features are not properly designed and constructed. We have not performed a hydrogeological study at the site. If infiltration of storm water runoff occurs, downstream properties may be subjected to seeps, springs, slope instability, raised groundwater, movement of foundations and slabs, or other undesirable impacts as a result of water infiltration.

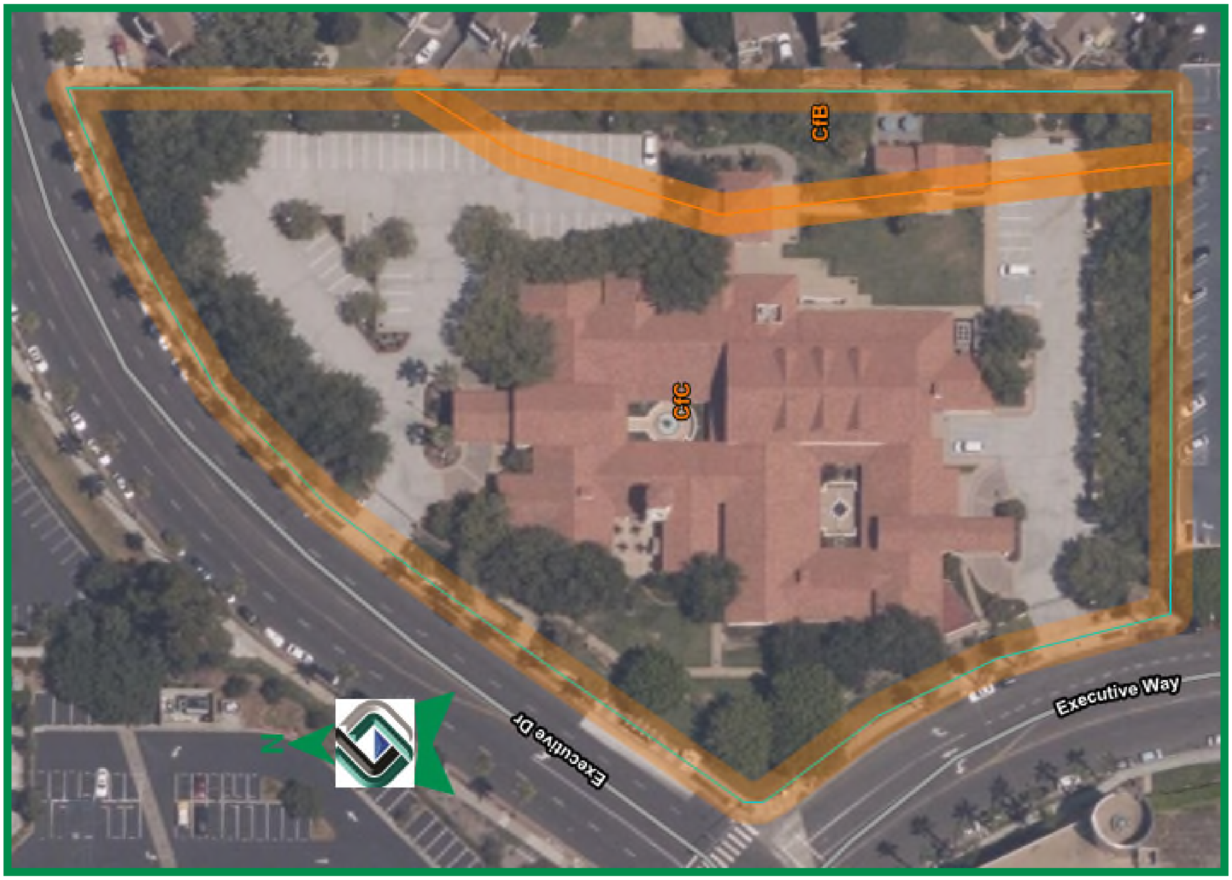
Hydrologic Soil Group

The United States Department of Agriculture (USDA), Natural Resources Conservation Services, possesses general information regarding the existing soil conditions for areas within the United States. The USDA website also provides the Hydrologic Soil Group. Table 1 presents the descriptions of the hydrologic soil groups. If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. In addition, the USDA website also provides an estimated saturated hydraulic conductivity for the existing soil.

TABLE 1
HYDROLOGIC SOIL GROUP DEFINITIONS

Soil Group	Soil Group Definition
A	Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.
B	Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.
C	Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.
D	Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

The property is underlain by man-made fill and should be classified as Soil Group D. The Hydrologic Soil Group Map presents output from the USDA website showing the limits of the soil units.



Hydrologic Soil Group Map

Table 2 presents the information from the USDA website for the subject property. The data presented in Table 2 is based on the previous grades, prior to the placement of fill.

TABLE 2
USDA WEB SOIL SURVEY – HYDROLOGIC SOIL GROUP*

Map Unit Name	Map Unit Symbol	Approximate Percentage of Property	Hydrologic Soil Group	k_{SAT} of Most Limiting Layer (Inches/ Hour)
Chesterton fine Sandy Loam, 2 to 5 percent slopes	CfB	12	D	0.00 – 0.06
Chesterton fine Sandy Loam 5 to 9 percent slopes	CfC	88	D	0.00

* The areas of the property that possess fill materials should be considered to possess a Hydrologic Soil Group D.

In Situ Testing

We performed constant-head infiltration tests using the Aardvark permeameter at the locations shown on the Geologic Map, Figure 1. Table 3 presents the results of the infiltration tests. The field data sheets are attached herein. We applied a feasibility factor of safety of 2.0 to our estimated infiltration rates to provide input on Worksheet C.4-1. Soil infiltration rates from in-situ tests can vary significantly from one location to another due to the heterogeneous characteristics inherent to most soil.

TABLE 3
INFILTRATION TEST RESULTS

Test No.	Geologic Unit	Test Elevation (feet, MSL)	Field-Saturated Hydraulic Conductivity/Infiltration Rate, k_{sat} (inch/hour)	Worksheet Infiltration Rate[1] (inch/hour)
P-1	Qvop	396.0	0.018	0.009
P-2	Qvop	396.0	0.003	0.001
P-3	Qvop	397.0	0.011	0.006
P-4	Qvop	397.0	0.008	0.004
Average			0.010	0.005

[1] Using a Factor of Safety of 2.

Infiltration categories include full infiltration, partial infiltration and no infiltration. Table 4 presents the commonly accepted definitions of the potential infiltration categories based on the infiltration rates.

TABLE 4
INFILTRATION CATEGORIES

Infiltration Category	Field Infiltration Rate, I (Inches/Hour)	Factored Infiltration Rate[1], I (Inches/Hour)
Full Infiltration	$I > 1.0$	$I > 0.5$
Partial Infiltration	$0.10 < I \leq 1.0$	$0.05 < I \leq 0.5$
No Infiltration (Infeasible)	$I < 0.10$	$I < 0.05$

[1] Using a Factor of Safety of 2.

Based on our observations and test results, the factored infiltration rates for the formational materials onsite (Very Old Paralic Deposits) is less than 0.05 inches per hour. Therefore, full and partial infiltration on the property is considered infeasible based on the calculated infiltrations rates and the site possesses a “No Infiltration” condition. Vertical cutoff walls or liners should be installed on the sides and bottom of planned infiltration devices and a drain should be installed at the base of the devices. A liner will not be required where incidental infiltration would be allowed if located at least 10 feet from the planned structures and utilities and no subterranean levels are planned.

GEOTECHNICAL CONSIDERATIONS

Groundwater Elevations

We did not encounter groundwater during our site investigation. We expect the static groundwater elevation exists greater than 50 feet below existing grades. However, it is not uncommon for shallow seepage conditions to develop where none previously existed when sites are irrigated or infiltration is implemented. Groundwater and seepage are dependent on seasonal precipitation, irrigation, land use, among other factors, and varies as a result. Proper surface drainage will be important to future performance of the project. We do not expect groundwater to be encountered during construction of the proposed development.

New or Existing Utilities

Utilities are located on and adjacent to the property within the existing parking areas, driveways and roadways. Therefore, full and partial infiltration within the areas near these utilities should be considered infeasible. Setbacks for infiltration should be incorporated if infiltration were to be considered. The setback for infiltration devices should be a minimum of 10 feet and a 1:1 plane of 1 foot below the closest edge of the deepest adjacent utility.

Soil or Groundwater Contamination

We are unaware of contaminated soil on the property. Therefore, infiltration associated with this risk is considered feasible. In addition, groundwater mounding would not be a concern due to the lack of a near surface groundwater table.

CONCLUSIONS AND RECOMMENDATIONS

Storm Water Evaluation Narrative

We used the referenced report and site observations to help evaluate possible locations for infiltration based on the known geologic information on the property. We selected areas on the property underlain by approximately 5½ feet or less of fill materials overlying Very Old Paralic Deposits. The in-place infiltration test locations were also selected in areas likely used for potential infiltration devices. We performed 4 infiltration tests within the formational Very Old Paralic Deposits and the results indicate an average rate of 0.005 inches per hour (with an applied factor of safety of 2).

Storm Water Evaluation Conclusion

Based on the results of our infiltration tests performed within the existing formational materials (less than 0.05 inches per hour), we opine full and partial infiltration on the property is considered infeasible and the property possesses a "No Infiltration" condition. However, some storm water management devices can be installed to allow incidental infiltration (i.e. no liner on the base of the device) where formational materials are exposed and where not located within 50 feet or 1.5 times the height of a slope, 10 feet within an existing/proposed structure and 10 feet of existing utilities.

Storm Water Management Devices

Liners and subdrains should be incorporated into the design and construction of the planned storm water devices. The liners should be impermeable (e.g. High-density polyethylene, HDPE, with a thickness of about 30 mil or equivalent Polyvinyl Chloride, PVC) to prevent water migration. The subdrains should be perforated within the liner area, installed at the base and above the liner, be at least 3 inches in diameter and consist of Schedule 40 PVC pipe. The subdrains outside of the liner should consist of solid pipe. The penetration of the liners at the subdrains should be properly waterproofed. The subdrains should be connected to a proper outlet. The devices should also be installed in accordance with the manufacturer's recommendations.

Storm Water Standard Worksheets

The SWS requests the geotechnical engineer complete the Categorization of Infiltration Feasibility Condition (Worksheet C.4-1 or I-8) worksheet information to help evaluate the potential for infiltration on the property. Worksheet C.4-1 presents the completed information for the submittal process and is attached herein.

The regional storm water standards also have a worksheet (Worksheet D.5-1 or Form I-9) that helps the project civil engineer estimate the factor of safety based on several factors. Table 5 describes the suitability assessment input parameters related to the geotechnical engineering aspects for the factor of safety determination.

TABLE 5
SUITABILITY ASSESSMENT RELATED CONSIDERATIONS FOR INFILTRATION FACILITY SAFETY FACTORS

Consideration	High Concern – 3 Points	Medium Concern – 2 Points	Low Concern – 1 Point
Assessment Methods	Use of soil survey maps or simple texture analysis to estimate short-term infiltration rates. Use of well permeameter or borehole methods without accompanying continuous boring log. Relatively sparse testing with direct infiltration methods	Use of well permeameter or borehole methods with accompanying continuous boring log. Direct measurement of infiltration area with localized infiltration measurement methods (e.g., Infiltrometer). Moderate spatial resolution	Direct measurement with localized (i.e. small-scale) infiltration testing methods at relatively high resolution or use of extensive test pit infiltration measurement methods.
Predominant Soil Texture	Silty and clayey soils with significant fines	Loamy soils	Granular to slightly loamy soils

Consideration	High Concern – 3 Points	Medium Concern – 2 Points	Low Concern – 1 Point
Site Soil Variability	Highly variable soils indicated from site assessment or unknown variability	Soil boring/test pits indicate moderately homogenous soils	Soil boring/test pits indicate relatively homogenous soils
Depth to Groundwater/ Impervious Layer	<5 feet below facility bottom	5-15 feet below facility bottom	>15 feet below facility bottom

Based on our geotechnical investigation and the previous table, Table 6 presents the estimated factor values for the evaluation of the factor of safety. This table only presents the suitability assessment safety factor (Part A) of the worksheet. The project civil engineer should evaluate the safety factor for design (Part B) and use the combined safety factor for the design infiltration rate.

TABLE 6
FACTOR OF SAFETY WORKSHEET DESIGN VALUES – PART A

Suitability Assessment Factor Category	Assigned Weight (w)	Factor Value (v)	Product (p = w x v)
Assessment Methods	0.25	2	0.50
Predominant Soil Texture	0.25	2	0.50
Site Soil Variability	0.25	2	0.50
Depth to Groundwater/ Impervious Layer	0.25	1	0.25
Suitability Assessment Safety Factor, $S_A = \sum p$			1.75

* The project civil engineer should complete Worksheet D.5-1 or Form I-9 using the data on this table. Additional information is required to evaluate the design factor of safety.

If you have any questions regarding this correspondence, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

Lilian E. Rodriguez
RCE 83227

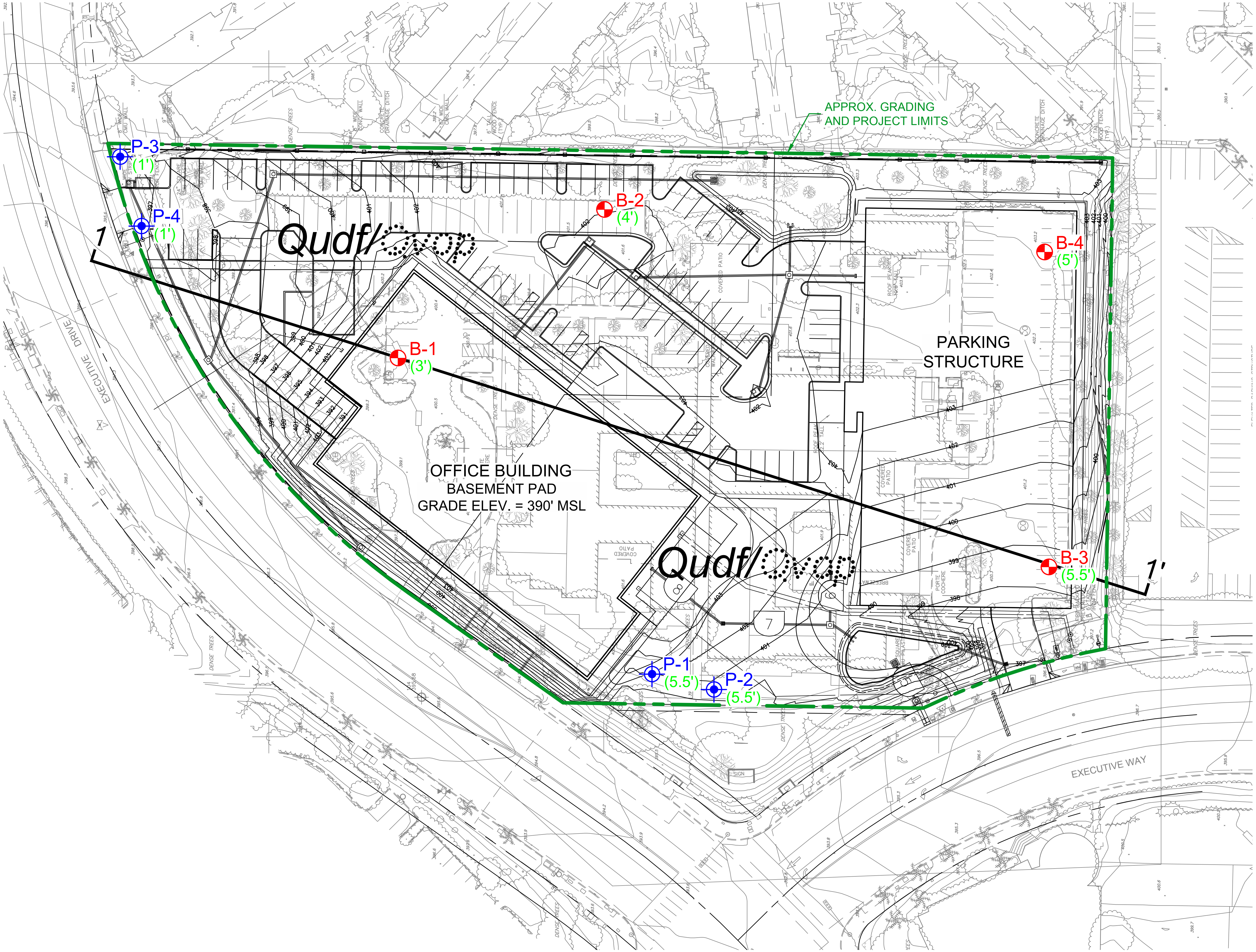
REGISTERED PROFESSIONAL ENGINEER LILIAN E. RODRIGUEZ No.83227 CIVIL STATE OF CALIFORNIA

Shawn Foy Weedon
GE 2714

REGISTERED PROFESSIONAL ENGINEER SHAWN WEEDON No. 2714 GEOTECHNICAL STATE OF CALIFORNIA

LER:SFW:dmc

(e-mail) Addressee



ARE - SCRIPPS HQ PROJECT
4555 EXECUTIVE DRIVE
SAN DIEGO, CALIFORNIA

0' 30' 60' 90' 120'

SCALE 1"=60'(on 11x17)

GEOCON LEGEND

Qudf ........UNDOCUMENTED FILL

Qvop........VERY OLD PARALIC DEPOSITS (Dotted Where Buried)

B-4 ....APPROX. LOCATION OF GEOTECHNICAL BORING

P-4 ....APPROX. LOCATION OF INFILTRATION TEST

(5.5') ....APPROX. DEPTH TO FORMATIONAL Qvop (In Feet)

1 1' ....APPROX. LOCATION OF GEOLOGIC CROSS SECTION

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GEOLOGIC MAP

PROJECT NO. G2557 - 52 - 02

FIGURE 1

DATE 02 - 18 - 2021

Plotted:02/18/2021 12:00PM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\G2557-52-02 (Executive Drive)\SHEETS\G2557-52-02 Geo Map.dwg

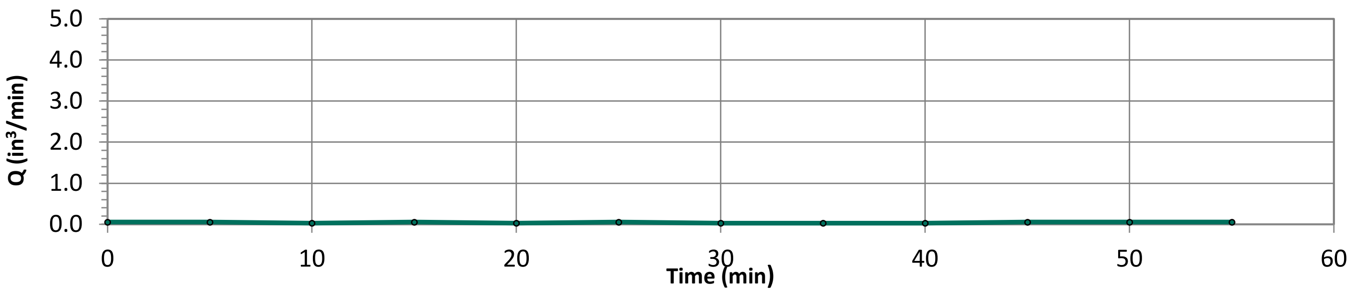
TEST NO.: **P-1**

GEOLOGIC UNIT: **Qvop**

EXCAVATION ELEVATION (MSL, FT): **400**

TEST INFORMATION	
BOREHOLE DIAMETER (IN):	4
BOREHOLE DEPTH (FT):	5.6
TEST/BOTTOM ELEVATION (MSL, FT):	394
MEASURED HEAD HEIGHT (IN):	4.8
CALCULATED HEAD HEIGHT (IN):	5.5
FACTOR OF SAFETY:	2.0

TEST RESULTS	
STEADY FLOW RATE (IN^3/MIN):	**0.055**
FIELD-SATURATED INFILTRATION RATE (IN/HR):	**0.018**
FACTORED INFILTRATION RATE (IN/HR):	**0.009**



TEST DATA

Reading	Time Elapsed (min)	Water Weight Consumed (lbs)	Water Volume Consumed (in^3)	Q (in^3/min)
1	0.00	0.000	0.00	0.00
2	5.00	0.010	0.28	0.055
3	5.00	0.010	0.28	0.055
4	5.00	0.005	0.14	0.028
5	5.00	0.010	0.28	0.055
6	5.00	0.005	0.14	0.028
7	5.00	0.010	0.28	0.055
8	5.00	0.005	0.14	0.028
9	5.00	0.005	0.14	0.028
10	5.00	0.005	0.14	0.028
11	5.00	0.010	0.28	0.055
12	5.00	0.010	0.28	0.055
13	5.00	0.010	0.28	0.055

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AARDVARK PERMEAMETER TEST RESULTS

4555 EXECUTIVE DRIVE

PROJECT NO.: G2557-52-02

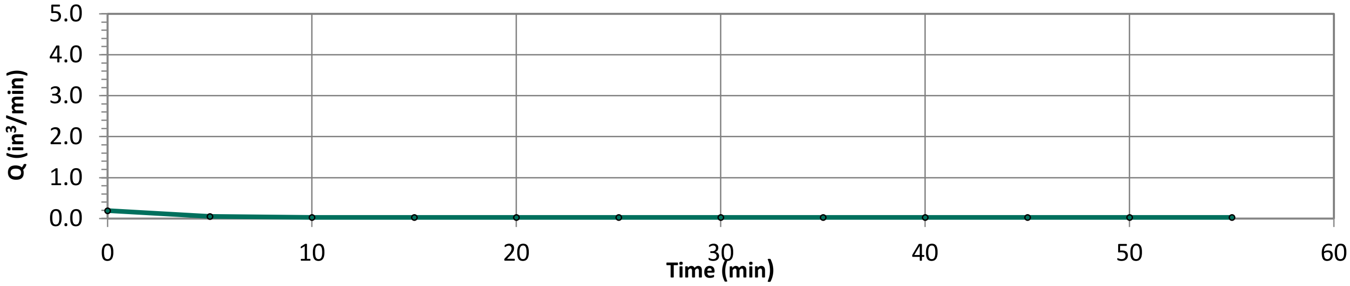
TEST NO.: **P-2**

GEOLOGIC UNIT: **Qvop**

EXCAVATION ELEVATION (MSL, FT): **400**

TEST INFORMATION	
BOREHOLE DIAMETER (IN):	4
BOREHOLE DEPTH (FT):	5.7
TEST/BOTTOM ELEVATION (MSL, FT):	394
MEASURED HEAD HEIGHT (IN):	12.8
CALCULATED HEAD HEIGHT (IN):	14.4
FACTOR OF SAFETY:	2.0

TEST RESULTS	
STEADY FLOW RATE (IN^3/MIN):	**0.028**
FIELD-SATURATED INFILTRATION RATE (IN/HR):	**0.003**
FACTORED INFILTRATION RATE (IN/HR):	**0.001**



TEST DATA				
Reading	Time Elapsed (min)	Water Weight Consumed (lbs)	Water Volume Consumed (in^3)	Q (in^3/min)
1	0.00	0.000	0.00	0.00
2	5.00	0.035	0.97	0.194
3	5.00	0.010	0.28	0.055
4	5.00	0.005	0.14	0.028
5	5.00	0.005	0.14	0.028
6	5.00	0.005	0.14	0.028
7	5.00	0.005	0.14	0.028
8	5.00	0.005	0.14	0.028
9	5.00	0.005	0.14	0.028
10	5.00	0.005	0.14	0.028
11	5.00	0.005	0.14	0.028
12	5.00	0.005	0.14	0.028
13	5.00	0.005	0.14	0.028

GEOCON INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
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AARDVARK PERMEAMETER TEST RESULTS

4555 EXECUTIVE DRIVE

PROJECT NO.: **G2557-52-02**

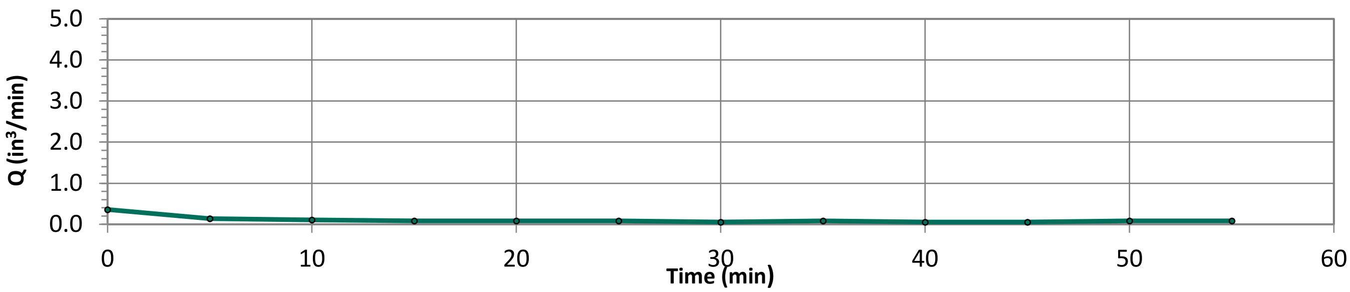
TEST NO.: **P-3**

GEOLOGIC UNIT: **Qvop**

EXCAVATION ELEVATION (MSL, FT): **396.5**

TEST INFORMATION	
BOREHOLE DIAMETER (IN):	4
BOREHOLE DEPTH (FT):	2.0
TEST/BOTTOM ELEVATION (MSL, FT):	395
MEASURED HEAD HEIGHT (IN):	4.3
CALCULATED HEAD HEIGHT (IN):	4.7
FACTOR OF SAFETY:	2.0

TEST RESULTS	
STEADY FLOW RATE (IN^3/MIN):	**0.074**
FIELD-SATURATED INFILTRATION RATE (IN/HR):	**0.011**
FACTORED INFILTRATION RATE (IN/HR):	**0.006**



TEST DATA				
Reading	Time Elapsed (min)	Water Weight Consumed (lbs)	Water Volume Consumed (in^3)	Q (in^3/min)
1	0.00	0.000	0.00	0.00
2	5.00	0.065	1.80	0.360
3	5.00	0.025	0.69	0.138
4	5.00	0.020	0.55	0.111
5	5.00	0.015	0.42	0.083
6	5.00	0.015	0.42	0.083
7	5.00	0.015	0.42	0.083
8	5.00	0.010	0.28	0.055
9	5.00	0.015	0.42	0.083
10	5.00	0.010	0.28	0.055
11	5.00	0.010	0.28	0.055
12	5.00	0.015	0.42	0.083
13	5.00	0.015	0.42	0.083

GEOCON INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

AARDVARK PERMEAMETER TEST RESULTS

4555 EXECUTIVE DRIVE

PROJECT NO.: **G2557-52-02**

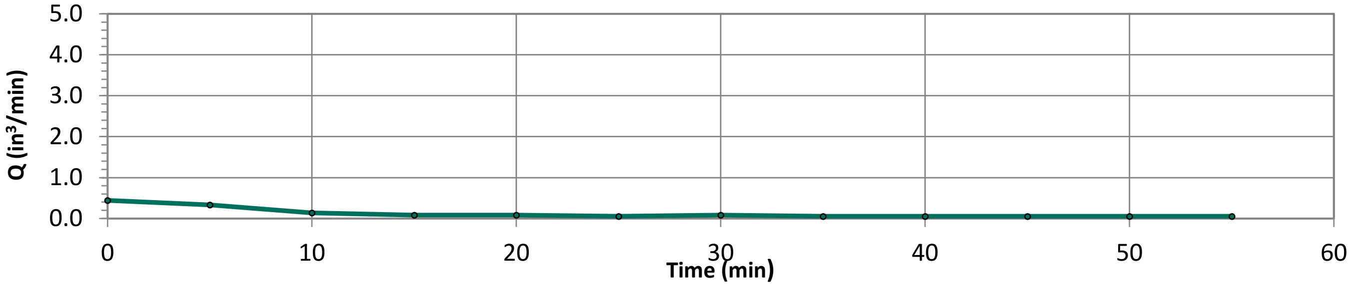
TEST NO.: **P-4**

GEOLOGIC UNIT: **Qvop**

EXCAVATION ELEVATION (MSL, FT): **397**

TEST INFORMATION	
BOREHOLE DIAMETER (IN):	4
BOREHOLE DEPTH (FT):	2.5
TEST/BOTTOM ELEVATION (MSL, FT):	395
MEASURED HEAD HEIGHT (IN):	4.3
CALCULATED HEAD HEIGHT (IN):	4.8
FACTOR OF SAFETY:	2.0

TEST RESULTS	
STEADY FLOW RATE (IN^3/MIN):	**0.055**
FIELD-SATURATED INFILTRATION RATE (IN/HR):	**0.008**
FACTORED INFILTRATION RATE (IN/HR):	**0.004**



TEST DATA

Reading	Time Elapsed (min)	Water Weight Consumed (lbs)	Water Volume Consumed (in^3)	Q (in^3/min)
1	0.00	0.000	0.00	0.00
2	5.00	0.080	2.22	0.443
3	5.00	0.060	1.66	0.332
4	5.00	0.025	0.69	0.138
5	5.00	0.015	0.42	0.083
6	5.00	0.015	0.42	0.083
7	5.00	0.010	0.28	0.055
8	5.00	0.015	0.42	0.083
9	5.00	0.010	0.28	0.055
10	5.00	0.010	0.28	0.055
11	5.00	0.010	0.28	0.055
12	5.00	0.010	0.28	0.055
13	5.00	0.010	0.28	0.055

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AARDVARK PERMEAMETER TEST RESULTS

4555 EXECUTIVE DRIVE

PROJECT NO.: G2557-52-02

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1:Form I-8A[10]
Part 1 - Full Infiltration Feasibility Screening Criteria		
DMA(s) Being Analyzed:		**Project Phase:**
ARE – Scripps HQ Project: 4555 Executive Drive		Design
Criteria 1: Infiltration Rate Screening		
1A	Is the mapped hydrologic soil group according to the NRCS Web Soil Survey or UC Davis Soil Web Mapper Type A or B and corroborated by available site soil data[11]? ☐ Yes; the DMA may feasibly support full infiltration. Answer "Yes" to Criteria 1 Result or continue to Step 1B if the applicant elects to perform infiltration testing. ☐ No; the mapped soil types are A or B but is not corroborated by available site soil data (continue to Step 1B). ☐ No; the mapped soil types are C, D, or "urban/unclassified" and is corroborated by available site soil data. Answer "No" to Criteria 1 Result. ☒ No; the mapped soil types are C, D, or "urban/unclassified" but is not corroborated by available site soil data (continue to Step 1B).	
1B	Is the reliable infiltration rate calculated using planning phase methods from Table D.3-1? ☐ Yes; Continue to Step 1C. ☒ No; Skip to Step 1D.	
1C	Is the reliable infiltration rate calculated using planning phase methods from Table D.3-1 greater than 0.5 inches per hour? ☒ Yes; the DMA may feasibly support full infiltration. Answer "Yes" to Criteria 1 Result. ☐ No; full infiltration is not required. Answer "No" to Criteria 1 Result.	
1D	**Infiltration Testing Method.** Is the selected infiltration testing method suitable during the design phase (see Appendix D.3)? Note: Alternative testing standards may be allowed with appropriate rationales and documentation. ☒ Yes; continue to Step 1E. ☐ No; select an appropriate infiltration testing method.	

Note that it is not required to investigate each and every criterion in the worksheet, a single "no" answer in Part 1, Part 2, Part 3, or Part 4 determines a full, partial, or no infiltration condition.

[10] This form must be completed each time there is a change to the site layout that would affect the infiltration feasibility condition. Previously completed forms shall be retained to document the evolution of the site storm water design.

[11] Available data include site-specific sampling or observation of soil types or texture classes, such as obtained from borings or test pits necessary to support other design elements.

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions	Worksheet C.4-1:Form I-8A[10]
1E	**Number of Percolation/Infiltration Tests.** Does the infiltration testing method performed satisfy the minimum number of tests specified in Table D.3-2? ☒ Yes; continue to Step 1F. ☐ No; conduct appropriate number of tests.
IF	**Factor of Safety.** Is the suitable Factor of Safety selected for full infiltration design? See guidance in D.5; Tables D.5-1 and D.5-2; and Worksheet D.5-1 (Form I-9). ☒ Yes; continue to Step 1G. ☐ No; select appropriate factor of safety.
1G	**Full Infiltration Feasibility.** Is the average measured infiltration rate divided by the Factor of Safety greater than 0.5 inches per hour? ☐ Yes; answer "Yes" to Criteria 1 Result. ☒ No; answer "No" to Criteria 1 Result.
Criteria 1 Result	Is the estimated reliable infiltration rate greater than 0.5 inches per hour within the DMA where runoff can reasonably be routed to a BMP? ☐ Yes; the DMA may feasibly support full infiltration. Continue to Criteria 2. ☒ No; full infiltration is not required. Skip to Part 1 Result.

Summarize infiltration testing methods, testing locations, replicates, and results and summarize estimates of reliable infiltration rates according to procedures outlined in D.5. Documentation should be included in project geotechnical report.

We performed 4 infiltration tests in formational Very Old Paralic Deposits within the areas of the site underlain by 5½ feet or less of fill. The results indicate an average rate of 0.005 inches per hour (with an applied factor of safety of 2). Therefore, full infiltration is considered infeasible at the site.

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions			Worksheet C.4-1:Form I-8A[10]	
Criteria 2: Geologic/Geotechnical Screening				
2A	If all questions in Step 2A are answered “Yes,” continue to Step 2B. For any “No” answer in Step 2A answer “No” to Criteria 2, and submit an “Infiltration Feasibility Condition Letter” that meets the requirements in Appendix C.1.1. The geologic/geotechnical analyses listed in Appendix C.2.1 do not apply to the DMA because one of the following setbacks cannot be avoided and therefore result in the DMA being in a no infiltration condition. The setbacks must be the closest horizontal radial distance from the surface edge (at the overflow elevation) of the BMP.			
2A–1	Can the proposed full infiltration BMP(s) avoid areas with existing fill materials greater than 5 feet thick below the infiltrating surface?	☐ Yes	☐ No	
2A-2	Can the proposed full infiltration BMP(s) avoid placement within 10 feet of existing underground utilities, structures, or retaining walls?	☐ Yes	☐ No	
2A-3	Can the proposed full infiltration BMP(s) avoid placement within 50 feet of a natural slope (>25%) or within a distance of 1.5H from fill slopes where H is the height of the fill slope?	☐ Yes	☐ No	
2B	When full infiltration is determined to be feasible, a geotechnical investigation report must be prepared that considers the relevant factors identified in Appendix C.2.1. If all questions in Step 2B are answered “Yes,” then answer “Yes” to Criteria 2 Result. If there are “No” answers continue to Step 2C.			
2B–1	**Hydroconsolidation.** Analyze hydroconsolidation potential per approved ASTM standard due to a proposed full infiltration BMP. Can full infiltration BMPs be proposed within the DMA without increasing hydroconsolidation risks?	☐ Yes	☐ No	
2B-2	**Expansive Soils.** Identify expansive soils (soils with an expansion index greater than 20) and the extent of such soils due to proposed full infiltration BMPs. Can full infiltration BMPs be proposed within the DMA without increasing expansive soil risks?	☐ Yes	☐ No	

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1: Form I-8A[10]	
2B-3	**Liquefaction**. If applicable, identify mapped liquefaction areas. Evaluate liquefaction hazards in accordance with Section 6.4.2 of the City of San Diego's Guidelines for Geotechnical Reports (2011 or most recent edition). Liquefaction hazard assessment shall take into account any increase in groundwater elevation or groundwater mounding that could occur as a result of proposed infiltration or percolation facilities. Can full infiltration BMPs be proposed within the DMA without increasing liquefaction risks?	☐ Yes	☐ No
2B-4	**Slope Stability**. If applicable, perform a slope stability analysis in accordance with the ASCE and Southern California Earthquake Center (2002) Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Landslide Hazards in California to determine minimum slope setbacks for full infiltration BMPs. See the City of San Diego's Guidelines for Geotechnical Reports (2011) to determine which type of slope stability analysis is required. Can full infiltration BMPs be proposed within the DMA without increasing slope stability risks?	☐ Yes	☐ No
2B-5	**Other Geotechnical Hazards.** Identify site-specific geotechnical hazards not already mentioned (refer to Appendix C.2.1). Can full infiltration BMPs be proposed within the DMA without increasing risk of geologic or geotechnical hazards not already mentioned?	☐ Yes	☐ No
2B-6	**Setbacks.** Establish setbacks from underground utilities, structures, and/or retaining walls. Reference applicable ASTM or other recognized standard in the geotechnical report. Can full infiltration BMPs be proposed within the DMA using established setbacks from underground utilities, structures, and/or retaining walls?	☐ Yes	☐ No

<table>
<tr><th colspan="2">Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions</th><th colspan="2">Worksheet C.4-1:Form I-8A[10]</th></tr>
<tr><td>2C</td><td> Mitigation Measures. Propose mitigation measures for each geologic/geotechnical hazard identified in Step 2B. Provide a discussion of geologic/geotechnical hazards that would prevent full infiltration BMPs that cannot be reasonably mitigated in the geotechnical report. See Appendix C.2.1.8 for a list of typically reasonable and typically unreasonable mitigation measures. Can mitigation measures be proposed to allow for full infiltration BMPs? If the question in Step 2 is answered “Yes,” then answer “Yes” to Criteria 2 Result. If the question in Step 2C is answered “No,” then answer “No” to Criteria 2 Result. </td><td>☐ Yes</td><td>☐ No</td></tr>
<tr><td>Criteria 2 Result</td><td>Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geologic or geotechnical hazards that cannot be reasonably mitigated to an acceptable level?</td><td>☐ Yes</td><td>☐ No</td></tr>
<tr><td colspan="4"> Summarize findings and basis; provide references to related reports or exhibits. We performed 4 infiltration tests in formational Very Old Paralic Deposits within the areas of the site underlain by 5½ feet or less of fill. The results indicate an average rate of 0.005 inches per hour (with an applied factor of safety of 2). Therefore, full infiltration is considered infeasible at the site. </td></tr>
<tr><th colspan="2">Part 1 Result – Full Infiltration Geotechnical Screening[12]</th><th colspan="2">Result</th></tr>
<tr><td colspan="2"> If answers to both Criteria 1 and Criteria 2 are “Yes”, a full infiltration design is potentially feasible based on Geotechnical conditions only. If either answer to Criteria 1 or Criteria 2 is “No”, a full infiltration design is not required. </td><td colspan="2"> ☐ Full infiltration Condition ☒ Complete Part 2 </td></tr>
</table>

[12] To be completed using gathered site information and best professional judgement considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by City Engineer to substantiate findings.

<table>
<tr><th colspan="2">Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions</th><th>Worksheet C.4-1:Form I-8A[10]</th></tr>
<tr><td colspan="3">Part 2 – Partial vs. No Infiltration Feasibility Screening Criteria</td></tr>
<tr><td colspan="2">DMA(s) Being Analyzed:</td><td>Project Phase:</td></tr>
<tr><td colspan="2">ARE – Scripps HQ Project: 4555 Executive Drive</td><td>Design</td></tr>
<tr><td colspan="3">Criteria 3: Infiltration Rate Screening</td></tr>
<tr><td>3A</td><td colspan="2">NRCS Type C, D, or “urban/unclassified”: Is the mapped hydrologic soil group according to the NRCS Web Soil Survey or UC Davis Soil Web Mapper is Type C, D, or “urban/unclassified” and corroborated by available site soil data?
☐ Yes; the site is mapped as C soils and a reliable infiltration rate of 0.15 in/hr. is used to size partial infiltration BMPS. Answer “Yes” to Criteria 3 Result.
☐ Yes; the site is mapped as D soils or “urban/unclassified” and a reliable infiltration rate of 0.05 in/hr. is used to size partial infiltration BMPS. Answer “Yes” to Criteria 3 Result.
☒ No; infiltration testing is conducted (refer to Table D.3–1), continue to Step 3B.</td></tr>
<tr><td>3B</td><td colspan="2">Infiltration Testing Result: Is the reliable infiltration rate (i.e. average measured infiltration rate/2) greater than 0.05 in/hr. and less than or equal to 0.5 in/hr?
☐ Yes; the site may support partial infiltration. Answer “Yes” to Criteria 3 Result.
☒ No; the reliable infiltration rate (i.e. average measured rate/2) is less than 0.05 in/hr., partial infiltration is not required. Answer “No” to Criteria 3 Result.</td></tr>
<tr><td>Criteria 3 Result</td><td colspan="2">Is the estimated reliable infiltration rate (i.e., average measured infiltration rate/2) greater than or equal to 0.05 inches/hour and less than or equal to 0.5 inches/hour at any location within each DMA where runoff can reasonably be routed to a BMP?
☐ Yes; Continue to Criteria 4.
☒ No: Skip to Part 2 Result.</td></tr>
<tr><td colspan="3">Summarize infiltration testing and/or mapping results (i.e. soil maps and series description used for infiltration rate).

We performed 4 infiltration tests in formational Very Old Paralic Deposits within the areas of the site underlain by 5½ feet or less of fill. The results indicate an average rate of 0.005 inches per hour (with an applied factor of safety of 2). Therefore, full infiltration is considered infeasible at the site.</td></tr>
</table>

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1: Form I-8A[10]	
Criteria 4: Geologic/Geotechnical Screening			
4A	If all questions in Step 4A are answered “Yes,” continue to Step 4B. For any “No” answer in Step 4A answer “No” to Criteria 4 Result, and submit an “Infiltration Feasibility Condition Letter” that meets the requirements in Appendix C.1.1. The geologic/geotechnical analyses listed in Appendix C.2.1 do not apply to the DMA because one of the following setbacks cannot be avoided and therefore result in the DMA being in a no infiltration condition. The setbacks must be the closest horizontal radial distance from the surface edge (at the overflow elevation) of the BMP.		
4A–1	Can the proposed partial infiltration BMP(s) avoid areas with existing fill materials greater than 5 feet thick?	☐ Yes	☐ No
4A-2	Can the proposed partial infiltration BMP(s) avoid placement within 10 feet of existing underground utilities, structures, or retaining walls?	☐ Yes	☐ No
4A-3	Can the proposed partial infiltration BMP(s) avoid placement within 50 feet of a natural slope (>25%) or within a distance of 1.5H from fill slopes where H is the height of the fill slope?	☐ Yes	☐ No
4B	When full infiltration is determined to be feasible, a geotechnical investigation report must be prepared that considers the relevant factors identified in Appendix C.2.1 If all questions in Step 4B are answered “Yes,” then answer “Yes” to Criteria 4 Result. If there are any “No” answers continue to Step 4C.		
4B–1	**Hydroconsolidation.** Analyze hydroconsolidation potential per approved ASTM standard due to a proposed full infiltration BMP. Can partial infiltration BMPs be proposed within the DMA without increasing hydroconsolidation risks?	☐ Yes	☐ No
4B-2	**Expansive Soils.** Identify expansive soils (soils with an expansion index greater than 20) and the extent of such soils due to proposed full infiltration BMPs. Can partial infiltration BMPs be proposed within the DMA without increasing expansive soil risks?	☐ Yes	☐ No

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1:Form I-8A[10]	
4B-3	**Liquefaction**. If applicable, identify mapped liquefaction areas. Evaluate liquefaction hazards in accordance with Section 6.4.2 of the City of San Diego's Guidelines for Geotechnical Reports (2011). Liquefaction hazard assessment shall take into account any increase in groundwater elevation or groundwater mounding that could occur as a result of proposed infiltration or percolation facilities. Can partial infiltration BMPs be proposed within the DMA without increasing liquefaction risks?	☐ Yes	☐ No
4B-4	**Slope Stability**. If applicable, perform a slope stability analysis in accordance with the ASCE and Southern California Earthquake Center (2002) Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Landslide Hazards in California to determine minimum slope setbacks for full infiltration BMPs. See the City of San Diego's Guidelines for Geotechnical Reports (2011) to determine which type of slope stability analysis is required. Can partial infiltration BMPs be proposed within the DMA without increasing slope stability risks?	☐ Yes	☐ No
4B-5	**Other Geotechnical Hazards.** Identify site-specific geotechnical hazards not already mentioned (refer to Appendix C.2.1). Can partial infiltration BMPs be proposed within the DMA without increasing risk of geologic or geotechnical hazards not already mentioned?	☐ Yes	☐ No
4B-6	**Setbacks.** Establish setbacks from underground utilities, structures, and/or retaining walls. Reference applicable ASTM or other recognized standard in the geotechnical report. Can partial infiltration BMPs be proposed within the DMA using recommended setbacks from underground utilities, structures, and/or retaining walls?	☐ Yes	☐ No
4C	**Mitigation Measures.** Propose mitigation measures for each geologic/geotechnical hazard identified in Step 4B. Provide a discussion on geologic/geotechnical hazards that would prevent partial infiltration BMPs that cannot be reasonably mitigated in the geotechnical report. See Appendix C.2.1.8 for a list of typically reasonable and typically unreasonable mitigation measures. Can mitigation measures be proposed to allow for partial infiltration BMPs? If the question in Step 4C is answered “Yes,” then answer “Yes” to Criteria 4 Result. If the question in Step 4C is answered “No,” then answer “No” to Criteria 4 Result.	☐ Yes	☐ No

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions			Worksheet C.4-1:Form I-8A[10]
Criteria 4 Result	Can infiltration of greater than or equal to 0.05 inches/hour and less than or equal to 0.5 inches/hour be allowed without increasing the risk of geologic or geotechnical hazards that cannot be reasonably mitigated to an acceptable level?	☐ Yes	☒ No
Summarize findings and basis; provide references to related reports or exhibits. We performed 4 infiltration tests in formational Very Old Paralic Deposits within the areas of the site underlain by 5½ feet or less of fill. The results indicate an average rate of 0.005 inches per hour (with an applied factor of safety of 2). Therefore, full infiltration is considered infeasible at the site.			

Part 2 – Partial Infiltration Geotechnical Screening Result[13]	**Result**
If answers to both Criteria 3 and Criteria 4 are "Yes", a partial infiltration design is potentially feasible based on geotechnical conditions only. If answers to either Criteria 3 or Criteria 4 is "No", then infiltration of any volume is considered to be infeasible within the site.	☐ Partial Infiltration Condition ☒ No Infiltration Condition

[13] To be completed using gathered site information and best professional judgement considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by City Engineer to substantiate findings

Project Name: Townsgate

Attachment 1E

Pollutant Control BMP Design Worksheet/Calculations

BMP Cross-section Schematics and Details

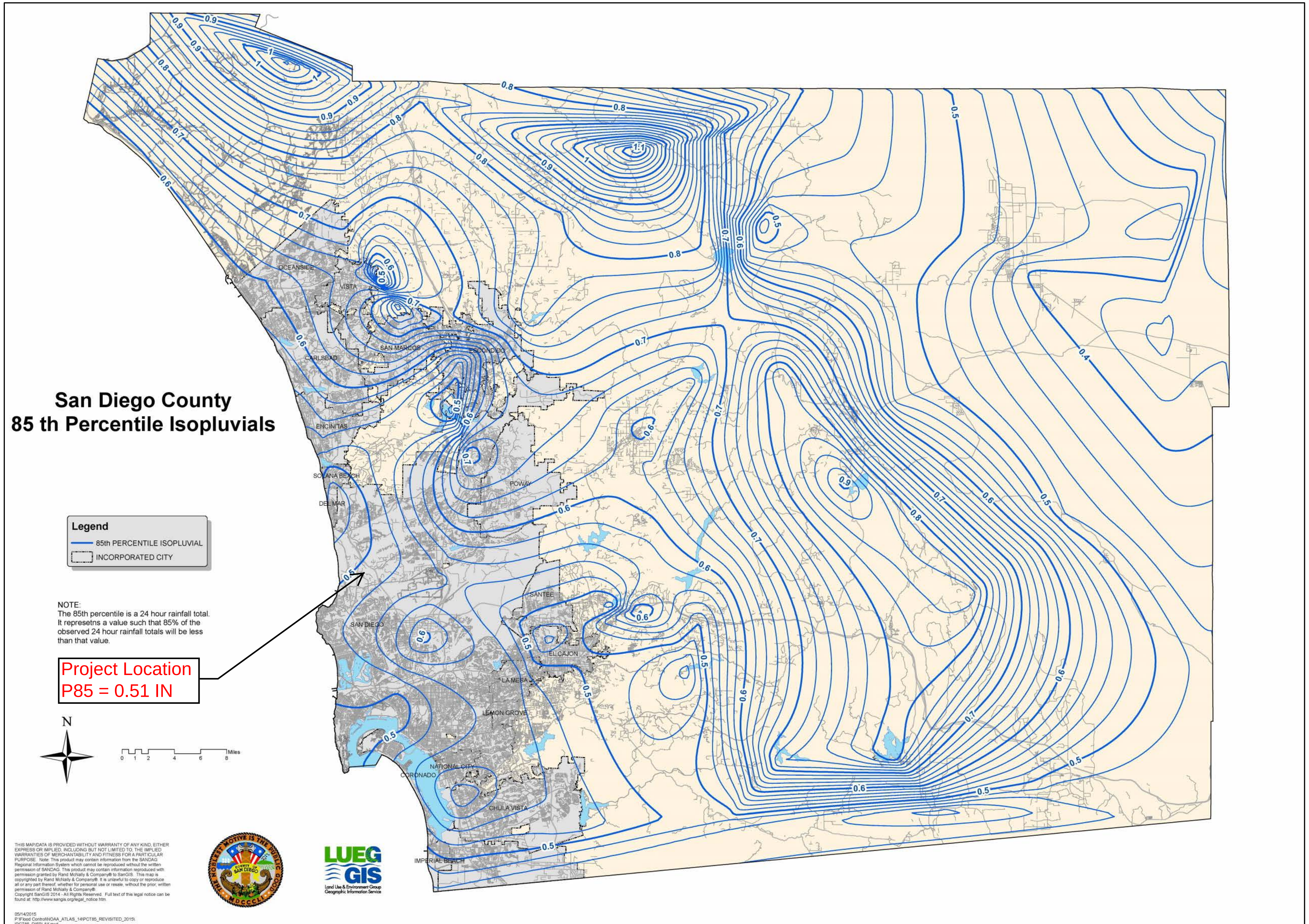


Figure B.1-1: 85th Percentile 24-hour Isopluvial Map

Weighted Runoff Factor Calculation

DMA ID	Area (acres)	% Impervious	Impervious Runoff Factor[1]	Pervious Runoff Factor[1]	Weighted Runoff Factor
DMA-1A	0.8	70%	0.90	0.30	**0.72**
DMA-1B	0.1	35%	0.90	0.30	**0.51**
DMA-2A	0.5	85%	0.90	0.30	**0.81**
DMA-2B	2.0	85%	0.90	0.30	**0.81**
DMA-3	0.2	0%	0.90	0.30	**0.30**
DMA-4	0.3	0%	0.90	0.30	**0.30**
Composite	3.9	70%	0.90	0.30	**0.72**

Note:
1. Runoff factors are from, "Table B.1-1: Runoff factors for surfaces draining to BMPs - Pollutant Control BMPs". Pervious runoff factor corresponds to Natural Type B Soil.

DMA-1A

	Design Capture Volume	Worksheet B.2-1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.51	inches
2	Area tributary to BMP (s)	A=	0.8	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.72	unitless
4	Trees Credit Volume Note: In the SWQMP list the number of trees, size of each tree, amount of soil volume installed for each tree, contributing area to each tree and the inlet opening dimension for each tree.	TCV=	-	cubic-feet
5	Rain barrels Credit Volume Note: In the SWQMP list the number of rain barrels, size of each rain barrel and the use of the captured storm water runoff.	RCV=	-	cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	1089	cubic-feet

DMA-1B

	Design Capture Volume	Worksheet B.2-1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.51	inches
2	Area tributary to BMP (s)	A=	0.1	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.51	unitless
4	Trees Credit Volume Note: In the SWQMP list the number of trees, size of each tree, amount of soil volume installed for each tree, contributing area to each tree and the inlet opening dimension for each tree.	TCV=	-	cubic-feet
5	Rain barrels Credit Volume Note: In the SWQMP list the number of rain barrels, size of each rain barrel and the use of the captured storm water runoff.	RCV=	-	cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	125	cubic-feet

DMA-2A

	Design Capture Volume	Worksheet B.2-1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.51	inches
2	Area tributary to BMP (s)	A=	0.5	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.81	unitless
4	Trees Credit Volume Note: In the SWQMP list the number of trees, size of each tree, amount of soil volume installed for each tree, contributing area to each tree and the inlet opening dimension for each tree.	TCV=	-	cubic-feet
5	Rain barrels Credit Volume Note: In the SWQMP list the number of rain barrels, size of each rain barrel and the use of the captured storm water runoff.	RCV=	-	cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	755	cubic-feet

DMA-2B

Design Capture Volume		Worksheet B.2-1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.51	inches
2	Area tributary to BMP (s)	A=	2.0	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.81	unitless
4	Trees Credit Volume Note: In the SWQMP list the number of trees, size of each tree, amount of soil volume installed for each tree, contributing area to each tree and the inlet opening dimension for each tree.	TCV=	-	cubic-feet
5	Rain barrels Credit Volume Note: In the SWQMP list the number of rain barrels, size of each rain barrel and the use of the captured storm water runoff.	RCV=	-	cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	3063	cubic-feet

The City of SAN DIEGO	Project Name	ARE - Scripps HQ	
	BMP ID	BMP-1A / DMA-1A	
Sizing Method for Pollutant Removal Criteria		**Worksheet B.5-1**	
1	Area draining to the BMP	35584	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.72	
3	85^{th} percentile 24-hour rainfall depth	0.51	inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]	1089	cu. ft.
BMP Parameters			
5	Surface ponding [6 inch minimum, 12 inch maximum]	6	inches
6	Media thickness [18 inches minimum], also add mulch layer and washed ASTM 33 fine aggregate sand thickness to this line for sizing calculations	24	inches
7	Aggregate storage (also add ASTM No 8 stone) above underdrain invert (12 inches typical) – use 0 inches if the aggregate is not over the entire bottom surface area	12	inches
8	Aggregate storage below underdrain invert (3 inches minimum) – use 0 inches if the aggregate is not over the entire bottom surface area	3	inches
9	Freely drained pore storage of the media	0.2	in/in
10	Porosity of aggregate storage	0.4	in/in
11	Media filtration rate to be used for sizing (maximum filtration rate of 5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate (includes infiltration into the soil and flow rate through the outlet structure) which will be less than 5 in/hr.)	1.18	in/hr.
Baseline Calculations			
12	Allowable routing time for sizing	6	hours
13	Depth filtered during storm [Line 11 x Line 12]	7.08	inches
14	Depth of Detention Storage [Line 5 + (Line 6 x Line 9) + (Line 7 x Line 10) + (Line 8 x Line 10)]	16.8	inches
15	Total Depth Treated [Line 13 + Line 14]	23.88	inches
Option 1 – Biofilter 1.5 times the DCV			
16	Required biofiltered volume [1.5 x Line 4]	1633	cu. ft.
17	Required Footprint [Line 16/ Line 15] x 12	821	sq. ft.
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
18	Required Storage (surface + pores) Volume [0.75 x Line 4]	817	cu. ft.
19	Required Footprint [Line 18/ Line 14] x 12	583	sq. ft.
Footprint of the BMP			
20	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Line 11 in Worksheet B.5-4)	0.03	
21	Minimum BMP Footprint [Line 1 x Line 2 x Line 20]	769	sq. ft.
22	Footprint of the BMP = Maximum(Minimum(Line 17, Line 19), Line 21)	769	sq. ft.
23	Provided BMP Footprint	1007	sq. ft.
24	Is Line 23 ≥ Line 22?	**Yes, Performance Standard is Met**	

BMP-1B / DMA-1B

Flow-thru Design Flows		Worksheet B.6-1		
1	DCV	DCV	125	cubic-feet
2	DCV retained	$DCV_{retained}$	0	cubic-feet
3	DCV biofiltered	$DCV_{biofiltered}$	0	cubic-feet
4	DCV requiring flow-thru (Line 1 – Line 2 – 0.67*Line 3)	$DCV_{flow-thru}$	125	cubic-feet
5	Adjustment factor (Line 4 / Line 1)	AF=	1	unitless
6	Design rainfall intensity	i=	0.20	in/hr.
7	Area tributary to BMP (s)	A=	0.1	acres
8	Area-weighted runoff factor (estimate using Appendix B.2)	C=	0.51	unitless
9	Calculate Flow Rate = AF x (C x i x A)	Q=	0.0133	cfs

1. Adjustment factor shall be estimated considering only retention and biofiltration BMPs located upstream of flow-thru BMPs. That is, if the flow-thru BMP is upstream of the project's retention and biofiltration BMPs then the flow-thru BMP shall be sized using an adjustment factor of 1.
2. Volume based (e.g., dry extended detention basin) flow-thru treatment control BMPs shall be sized to the volume in Line 4 and flow based (e.g., vegetated swales) shall be sized to flow rate in Line 9. Sand filter and media filter can be designed either by volume in Line 4 or flow rate in Line 9.
3. Proprietary BMPs, if used, shall provide certified treatment capacity equal to or greater than the calculated flow rate in Line 9; certified treatment capacity per unit shall be consistent with third party certifications.

Design Flow Rate = 1.5 * Line 9 = 1.5 * 0.0133 = 0.02 CFS
Per Appendix F.2.2, Sizing of flow-based biofiltration BMP, SWS Manual (Oct 2018)

BMP-2A / DMA-2A

Flow-thru Design Flows		Worksheet B.6-1		
1	DCV	DCV	755	cubic-feet
2	DCV retained	$DCV_{retained}$	0	cubic-feet
3	DCV biofiltered	$DCV_{biofiltered}$	0	cubic-feet
4	DCV requiring flow-thru (Line 1 – Line 2 – 0.67*Line 3)	$DCV_{flow-thru}$	755	cubic-feet
5	Adjustment factor (Line 4 / Line 1)	AF=	1	unitless
6	Design rainfall intensity	i=	0.20	in/hr.
7	Area tributary to BMP (s)	A=	0.5	acres
8	Area-weighted runoff factor (estimate using Appendix B.2)	C=	0.81	unitless
9	Calculate Flow Rate = AF x (C x i x A)	Q=	0.081	cfs

1. Adjustment factor shall be estimated considering only retention and biofiltration BMPs located upstream of flow-thru BMPs. That is, if the flow-thru BMP is upstream of the project's retention and biofiltration BMPs then the flow-thru BMP shall be sized using an adjustment factor of 1.
2. Volume based (e.g., dry extended detention basin) flow-thru treatment control BMPs shall be sized to the volume in Line 4 and flow based (e.g., vegetated swales) shall be sized to flow rate in Line 9. Sand filter and media filter can be designed either by volume in Line 4 or flow rate in Line 9.
3. Proprietary BMPs, if used, shall provide certified treatment capacity equal to or greater than the calculated flow rate in Line 9; certified treatment capacity per unit shall be consistent with third party certifications.

Design Flow Rate = 1.5 * Line 9 = 1.5 * 0.081 = 0.122 CFS
Per Appendix F.2.2, Sizing of flow-based biofiltration BMP, SWS Manual (Oct 2018)

The City of SAN DIEGO	Project Name	ARE-Scripps HQ	
	BMP ID	BMP-2B / DMA-2B	

Alternative Minimum Footprint Sizing Factor for Non-Standard Biofiltration — **Worksheet B.5-4**

1	Area draining to the BMP	88980	sq. ft.
2	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.81	
3	Load to Clog (default value when using Appendix E fact sheets is 2.0)	2	lb/sq. ft.
4	Allowable Period to Accumulate Clogging Load (T_L) (default value is 10)	10	years

Volume Weighted EMC Calculation

Land Use	Fraction of Total DCV	TSS EMC (mg/L)	Product
Single Family Residential		123	0
Commercial		128	0
Industrial		125	0
Education (Municipal)		132	0
Transportation		78	0
Multi-family Residential		40	0
Roof Runoff	0.45	14	6.3
Low Traffic Areas	0.4	50	20
Open Space	0.15	216	32.4
Other, specify:			0
Other, specify:			0
Other, specify:			0

5	Volume Weighted EMC (sum of all products)	58.7	mg/L

Sizing Factor for Clogging

6	Adjustment for pretreatment measures Where: Line 6 = 0 if no pretreatment; Line 6 = 0.25 when pretreatment is included; Line 6 = 0.5 if the pretreatment has an active Washington State TAPE approval rating for "pre-treatment."	0	
7	Average Annual Precipitation [Provide documentation of the data source in the discussion box; SanGIS has a GIS layer for average annual precipitation]	13.5	inches
8	Calculate the Average Annual Runoff (Line 7/12) x Line 1 x Line2	81083	cu-ft/yr
9	Calculate the Average Annual TSS Load (Line 8 x 62.4 x Line 5 x (1 – Line 6))/10^6	297	lb/yr
10	Calculate the BMP Footprint Needed (Line 9 x Line 4)/Line 3	1485	sq. ft.
11	Calculate the Minimum Footprint Sizing Factor for Clogging [Line 10/ (Line 1 x Line 2)]	0.021	

Discussion:

The City of SAN DIEGO	Project Name	ARE-Scripps HQ	
	BMP ID	BMP-2B / DMA-2B	

Sizing Method for Pollutant Removal Criteria		**Worksheet B.5-1**	
1	Area draining to the BMP	88980	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.81	
3	85th percentile 24-hour rainfall depth	0.51	inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]	3063	cu. ft.
BMP Parameters			
5	Surface ponding [6 inch minimum, 12 inch maximum]	6	inches
6	Media thickness [18 inches minimum], also add mulch layer and washed ASTM 33 fine aggregate sand thickness to this line for sizing calculations	24	inches
7	Aggregate storage (also add ASTM No 8 stone) above underdrain invert (12 inches typical) – use 0 inches if the aggregate is not over the entire bottom surface area	12	inches
8	Aggregate storage below underdrain invert (3 inches minimum) – use 0 inches if the aggregate is not over the entire bottom surface area	3	inches
9	Freely drained pore storage of the media	0.2	in/in
10	Porosity of aggregate storage	0.4	in/in
11	Media filtration rate to be used for sizing (maximum filtration rate of 5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate (includes infiltration into the soil and flow rate through the outlet structure) which will be less than 5 in/hr.)	0.28	in/hr.
Baseline Calculations			
12	Allowable routing time for sizing	6	hours
13	Depth filtered during storm [Line 11 x Line 12]	1.68	inches
14	Depth of Detention Storage [Line 5 + (Line 6 x Line 9) + (Line 7 x Line 10) + (Line 8 x Line 10)]	16.8	inches
15	Total Depth Treated [Line 13 + Line 14]	18.48	inches
Option 1 – Biofilter 1.5 times the DCV			
16	Required biofiltered volume [1.5 x Line 4]	4595	cu. ft.
17	Required Footprint [Line 16/ Line 15] x 12	2984	sq. ft.
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
18	Required Storage (surface + pores) Volume [0.75 x Line 4]	2297	cu. ft.
19	Required Footprint [Line 18/ Line 14] x 12	1641	sq. ft.
Footprint of the BMP			
20	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Line 11 in Worksheet B.5-4)	0.021	
21	Minimum BMP Footprint [Line 1 x Line 2 x Line 20]	1514	sq. ft.
22	Footprint of the BMP = Maximum(Minimum(Line 17, Line 19), Line 21)	1641	sq. ft.
23	Provided BMP Footprint	1874	sq. ft.
24	Is Line 23 ≥ Line 22?	**Yes, Performance Standard is Met**	

The City of SAN DIEGO		Project Name	ARE-Scripps HQ	
		BMP ID	DMA 1B, 2A & 2B	
Sizing Method for Volume Retention Criteria			**Worksheet B.5-2**	
1	Area draining to the BMP		116701	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)		0.8	
3	85th percentile 24-hour rainfall depth		0.51	inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]		3968	cu. ft.
Volume Retention Requirement				
5	Measured infiltration rate in the DMA Note: When mapped hydrologic soil groups are used enter 0.10 for NRCS Type D soils and for NRCS Type C soils enter 0.30 When in no infiltration condition and the actual measured infiltration rate is unknown enter 0.0 if there are geotechnical and/or groundwater hazards identified in Appendix C or enter 0.05		0	in/hr.
6	Factor of safety		2	
7	Reliable infiltration rate, for biofiltration BMP sizing [Line 5 / Line 6]		0	in/hr.
8	Average annual volume reduction target (Figure B.5-2) When Line 7 > 0.01 in/hr. = Minimum (40, 166.9 x Line 7 +6.62) When Line 7 ≤ 0.01 in/hr. = 3.5%		3.5	%
9	Fraction of DCV to be retained (Figure B.5-3) When Line 8 > 8% = 0.0000013 x Line 8^3 - 0.000057 x Line 8^2 + 0.0086 x Line 8 - 0.014 When Line 8 ≤ 8% = 0.023		0.023	
10	Target volume retention [Line 9 x Line 4]		91	cu. ft.

The City of SAN DIEGO	Project Name	ARE-Scripps HQ				
	BMP ID	DMA 1B, 2A & 2B				

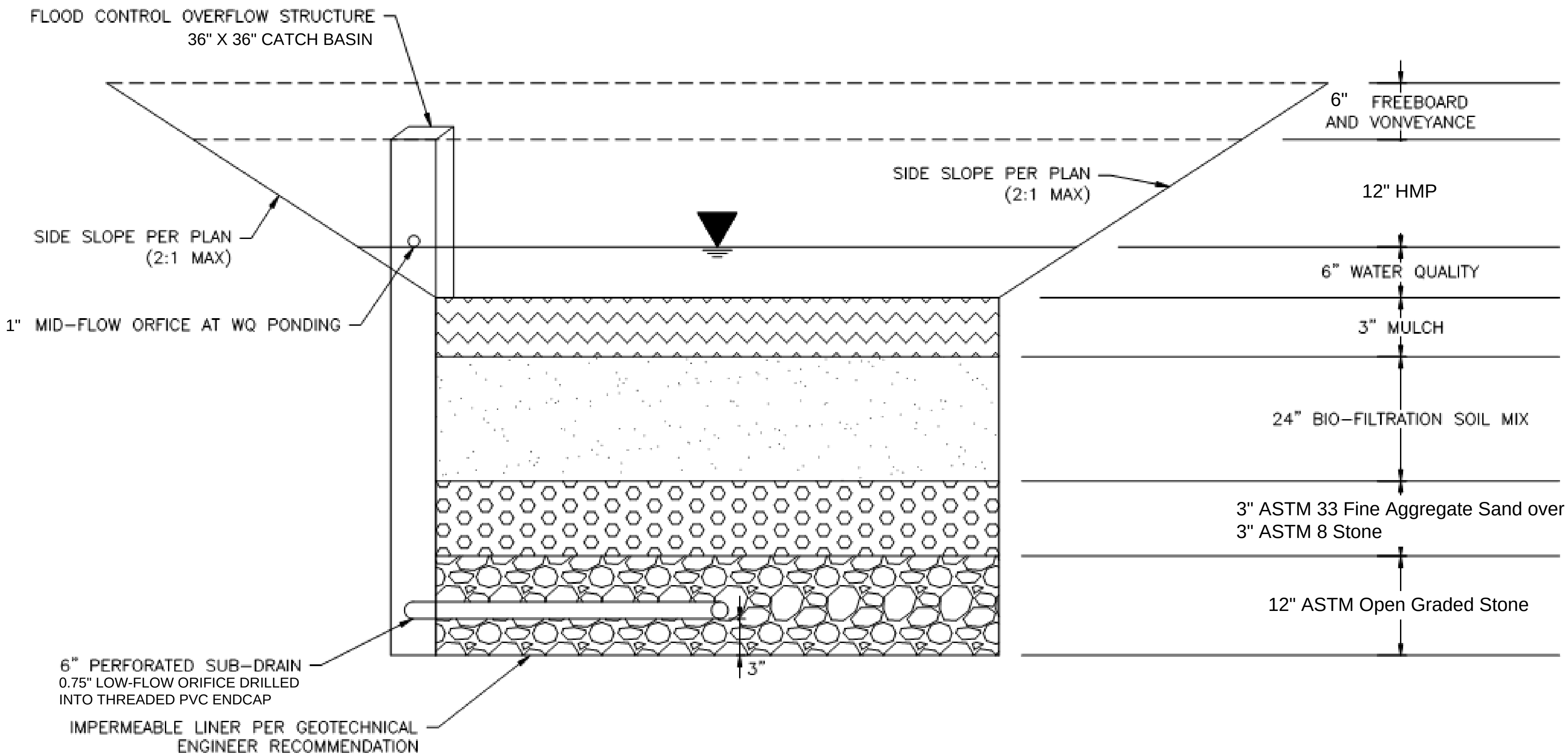
Volume Retention for No Infiltration Condition — **Worksheet B.5-6**

1	Area draining to the biofiltration BMP				116701	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)				0.8	
3	Effective impervious area draining to the BMP [Line 1 x Line 2]				93361	sq. ft.
4	Required area for Evapotranspiration [Line 3 x 0.03]				2801	sq. ft.
5	Biofiltration BMP Footprint				1961	sq. ft.
Landscape Area (must be identified on DS-3247)						
	Identification	**1**	**2**	**3**	**4**	**5**
6	Landscape area that meet the requirements in SD-B and SD-F Fact Sheet (sq. ft.)	900				
7	Impervious area draining to the landscape area (sq. ft.)	1350				
8	Impervious to Pervious Area ratio [Line 7/Line 6]	1.50	0.00	0.00	0.00	0.00
9	Effective Credit Area If (Line 8 >1.5, Line 6, Line 7/1.5]	900	0	0	0	0
10	Sum of Landscape area [sum of Line 9 Id's 1 to 5]				900	sq. ft.
11	Provided footprint for evapotranspiration [Line 5 + Line 10]				2861	sq. ft.
Volume Retention Performance Standard						
12	Is Line 11 ≥ Line 4?	Volume Retention Performance Standard is Met				
13	Fraction of the performance standard met through the BMP footprint and/or landscaping [Line 11/Line 4]				1.02	
14	Target Volume Retention [Line 10 from Worksheet B.5.2]				91	cu. ft.
15	Volume retention required from other site design BMPs [(1-Line 13) x Line 14]				-1.82	cu. ft.
Site Design BMP						
	Identification	**Site Design Type**			**Credit**	
16	**1**					cu. ft.
	2					cu. ft.
	3					cu. ft.
	4					cu. ft.
	5					cu. ft.
	Sum of volume retention benefits from other site design BMPs (e.g. trees; rain barrels etc.). [sum of Line 16 Credits for Id's 1 to 5] Provide documentation of how the site design credit is calculated in the PDP SWQMP.				0	cu. ft.
17	Is Line 16 ≥ Line 15?	Volume Retention Performance Standard is Met				

Self-Mitigating DMA Standards Checklist

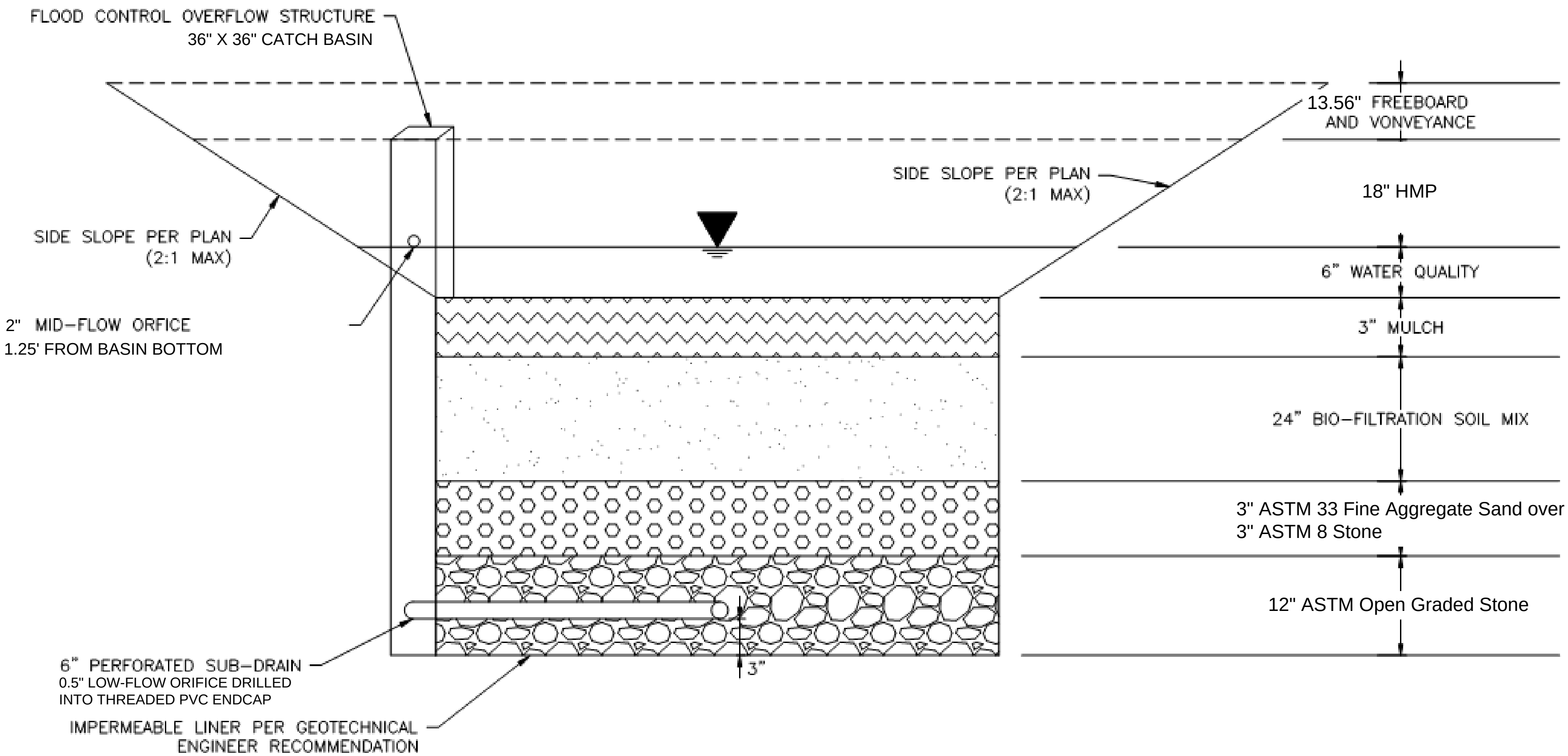
DMAs 2 and 3 meet the self-mitigating DMAs standards pursuant to Section 5.2.1 of the Storm Water Standards Manual, January 2018 edition. The incidental impervious percent is less than 5% for each DMA. The proposed/existing landscape areas do not require regular application of fertilizers and pesticides. The self-mitigating areas are hydraulically separate from other DMAs that contain storm water pollutant control BMPs. The impervious areas within each self-mitigating DMA are hydraulically disconnected to other impervious areas.

DMA ID	Self-Mitigating DMA Standards Checklist (per Section 5.2.1)	Comments
DMA 2	☒ Vegetation in the natural or landscaped area is native and/or non-native/non-invasive drought tolerant species that do not require regular application of fertilizers and pesticides. ☒ Soils are undisturbed native topsoil, or disturbed soils that have been amended and aerated to promote water retention characteristics equivalent to undisturbed native topsoil. ☒ The incidental impervious areas are less than 5 percent of the self-mitigating area. ☒ Impervious area within the self-mitigated area should not be hydraulically connected to other impervious areas unless it is a storm water conveyance system (such as brow ditches). ☒ The self-mitigating area is hydraulically separate from DMAs that contain permanent storm water pollutant control BMPs.	Pervious area – 0.4 acres Impervious Area – NA Impervious % - 0%
DMA 3	☒ Vegetation in the natural or landscaped area is native and/or non-native/non-invasive drought tolerant species that do not require regular application of fertilizers and pesticides. ☒ Soils are undisturbed native topsoil, or disturbed soils that have been amended and aerated to promote water retention characteristics equivalent to undisturbed native topsoil. ☒ The incidental impervious areas are less than 5 percent of the self-mitigating area. ☒ Impervious area within the self-mitigated area should not be hydraulically connected to other impervious areas unless it is a storm water conveyance system (such as brow ditches). ☒ The self-mitigating area is hydraulically separate from DMAs that contain permanent storm water pollutant control BMPs.	Pervious area – 0.5 acres Impervious Area – NA Impervious % - 0%



BMP-1A BIOFILTRATION BASIN CROSS-SECTION

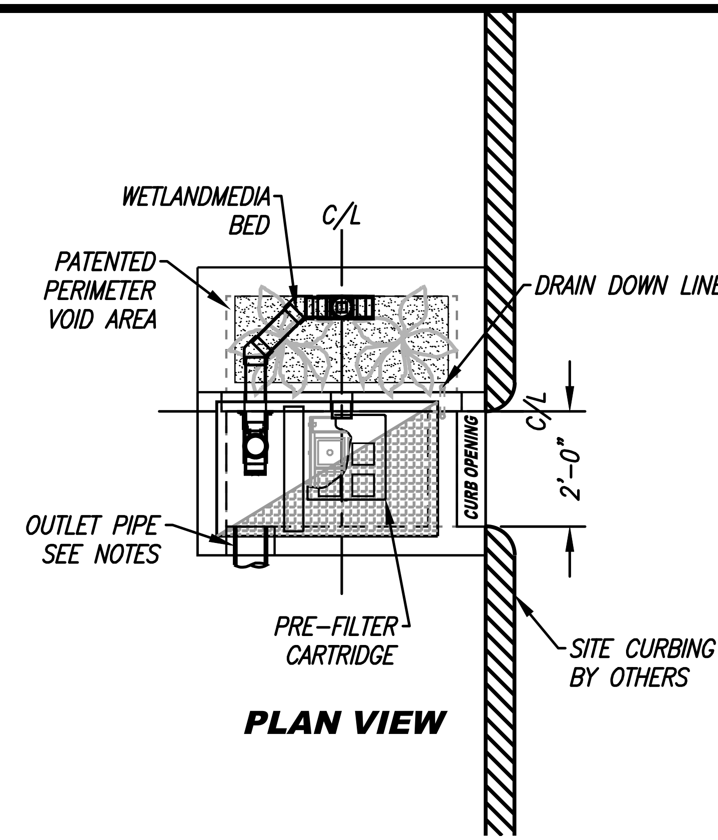
NOT TO SCALE



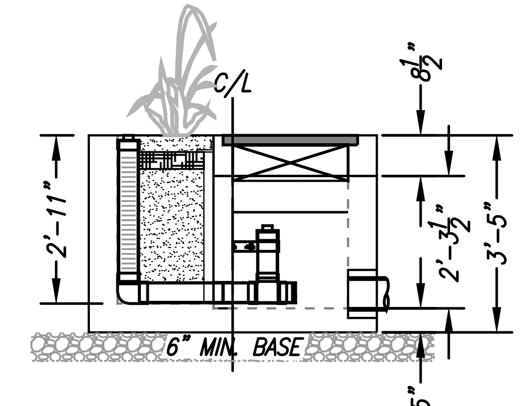
BMP-2B BIOFILTRATION BASIN CROSS-SECTION

NOT TO SCALE

SITE SPECIFIC DATA			
PROJECT NUMBER		12618	
PROJECT NAME		ARE – SCRIPPS HQ	
PROJECT LOCATION		SAN DIEGO, CA	
STRUCTURE ID		BMP-1B WEST DRIVEWAY	
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
N/A		0.022	
TREATMENT HGL AVAILABLE (FT)			N/K
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			FLOW BY
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	N/A	N/AN	N/A
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE	394.45	PVC	6"
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION	397.45	397.45	397.45
SURFACE LOAD	PEDESTRIAN	N/A	PEDESTRIAN
FRAME & COVER	24" X 42"	OPEN PLANTER	N/A
WETLANDMEDIA VOLUME (CY)			0.60
ORIFICE SIZE (DIA. INCHES)			ø0.83"
NOTES: PRELIMINARY NOT FOR CONSTRUCTION.			



PLAN VIEW



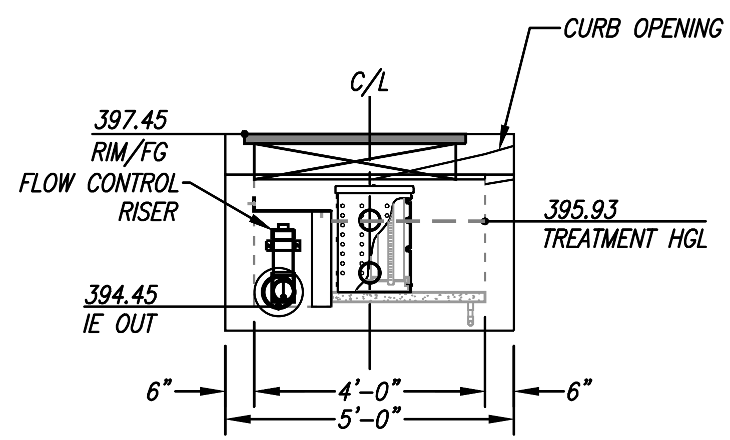
LEFT END VIEW

INSTALLATION NOTES

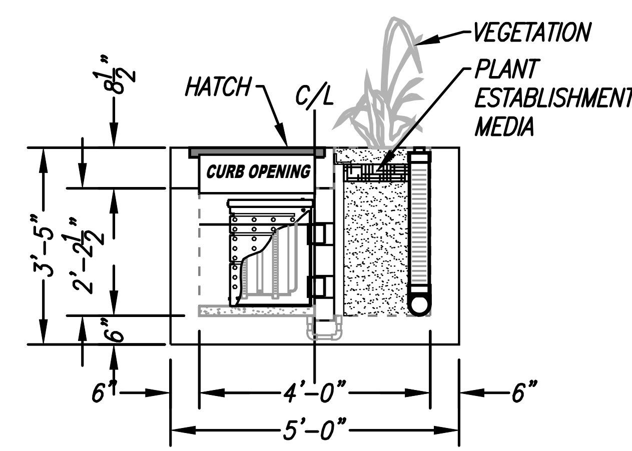
1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS' SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURER'S CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE FOR VERIFYING PROJECT ENGINEER'S RECOMMENDED BASE SPECIFICATIONS.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL PIPES SHALL BE SEALED WATERTIGHT PER MANUFACTURER'S STANDARD CONNECTION DETAIL.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL PIPES, RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO GROUT ALL MANHOLES AND HATCHES TO MATCH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
6. VEGETATION SUPPLIED AND INSTALLED BY OTHERS. ALL UNITS WITH VEGETATION MUST HAVE DRIP OR SPRAY IRRIGATION SUPPLIED AND INSTALLED BY OTHERS.
7. CONTRACTOR RESPONSIBLE FOR CONTACTING BIO CLEAN FOR ACTIVATION OF UNIT. MANUFACTURER'S WARRANTY IS VOID WITHOUT PROPER ACTIVATION BY A BIO CLEAN REPRESENTATIVE.

GENERAL NOTES

1. MANUFACTURER TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT BIO CLEAN.



ELEVATION VIEW



RIGHT END VIEW

TREATMENT FLOW (CFS)	0.022
OPERATING HEAD (FT)	1.4
PRETREATMENT LOADING RATE (GPM/SF)	0.8
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

MODULAR WETLANDS

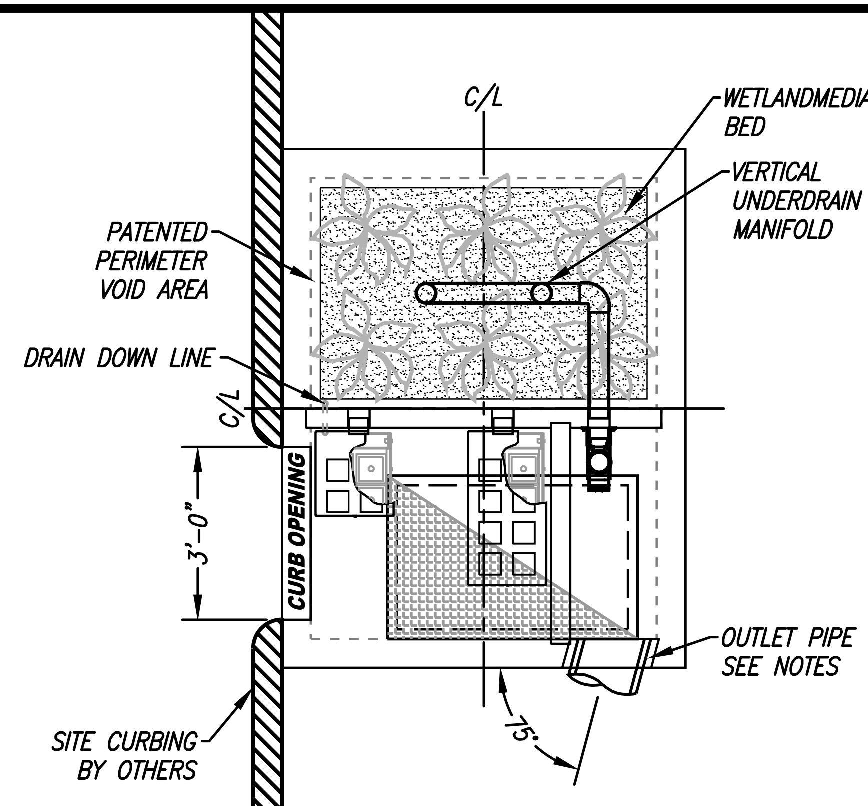
THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING US PATENTS: 7,425,262; 7,470,362; 7,674,378; 8,303,816; RELATED FOREIGN PATENTS OR OTHER PATENTS PENDING

Bio Clean
A Forterra Company

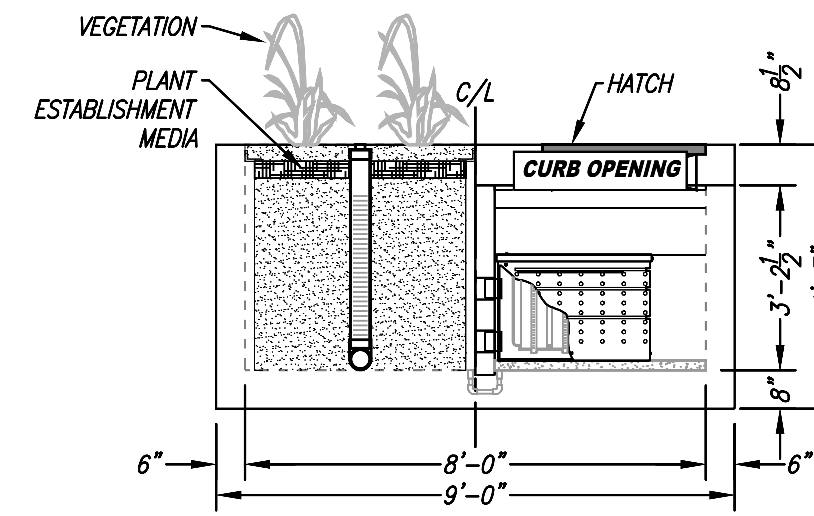
MWS-L-4-4-2'-11"-C
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

3/4/21MWOOLERY

SITE SPECIFIC DATA			
PROJECT NUMBER		12618	
PROJECT NAME		ARE – SCRIPPS HQ	
PROJECT LOCATION		SAN DIEGO, CA	
STRUCTURE ID		BMP-2A NORTH DRIVEWAY	
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
N/A		0.126	
TREATMENT HGL AVAILABLE (FT)			N/K
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			2.00
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	N/A	N/A	N/A
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE	392.65	PVC	12"
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION	396.65	396.65	396.65
SURFACE LOAD	PEDESTRIAN	N/A	PEDESTRIAN
FRAME & COVER	30" X 48"	OPEN PLANTER	N/A
WETLANDMEDIA VOLUME (CY)			3.06
ORIFICE SIZE (DIA. INCHES)			ø1.66"
NOTES: PRELIMINARY NOT FOR CONSTRUCTION.			



PLAN VIEW



LEFT END VIEW

INSTALLATION NOTES

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GENERAL NOTES

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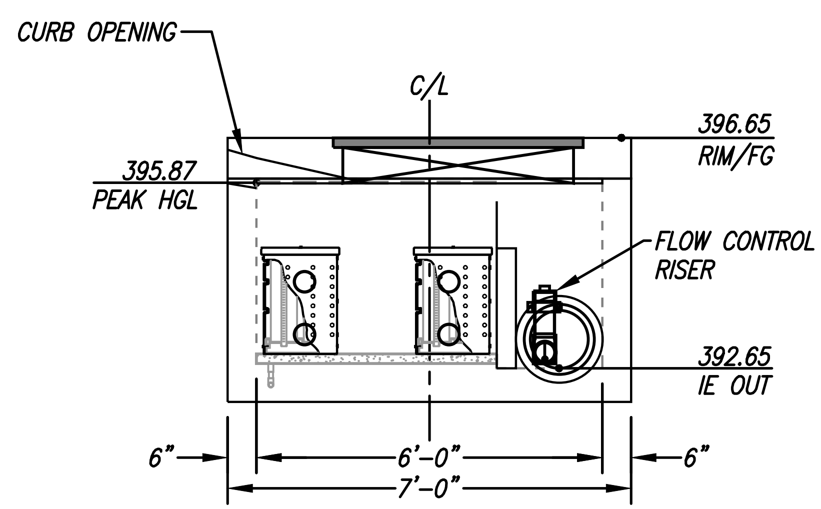
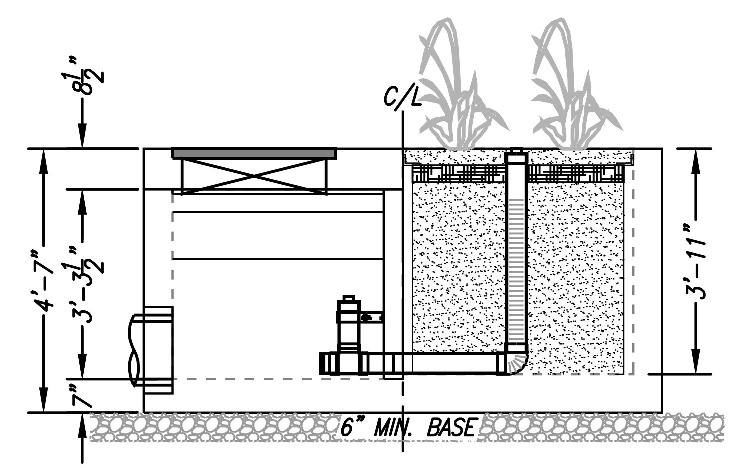


ELEVATION VIEW



RIGHT END VIEW

INTERNAL BYPASS DISCLOSURE:

THE DESIGN AND CAPACITY OF THE PEAK CONVEYANCE METHOD TO BE REVIEWED AND APPROVED BY THE ENGINEER OF RECORD. HGL(S) AT PEAK FLOW SHALL BE ASSESSED TO ENSURE NO UPSTREAM FLOODING. PEAK HGL AND BYPASS CAPACITY SHOWN ON DRAWING ARE USED FOR GUIDANCE ONLY.

TREATMENT FLOW (CFS)	0.126
OPERATING HEAD (FT)	2.9
PRETREATMENT LOADING RATE (GPM/SF)	1.5
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

MODULAR WETLANDS

THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING US PATENTS: 7,425,262; 7,470,362; 7,674,378; 8,303,816; RELATED FOREIGN PATENTS OR OTHER PATENTS PENDING

Bio Clean
A Forterra Company

MWS-L-6-8-3'-11"-C
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

3/4/21MWOOLERY

Compact (high rate) Biofiltration BMP Checklist	Form I-10

Compact (high rate) biofiltration BMPs have a media filtration rate greater than 5 in/hr. and a media surface area smaller than 3% of contributing area times adjusted runoff factor. Compact biofiltration BMPs are typically proprietary BMPs that may qualify as biofiltration.

A compact biofiltration BMP may satisfy the pollutant control requirements for a DMA onsite in some cases. This depends on the characteristics of the DMA **and** the performance certification/data of the BMP. If the pollutant control requirements for a DMA are met onsite, then the DMA is not required to participate in an offsite storm water alternative compliance program to meet its pollutant control obligations.

An applicant using a compact biofiltration BMP to meet the pollutant control requirements onsite must complete Section 1 of this form and include it in the PDP SWQMP. A separate form must be completed for each DMA. In instances where the City Engineer does not agree with the applicant's determination, Section 2 of this form will be completed by the City and returned to the applicant.

Section 1: Biofiltration Criteria Checklist (Appendix F)

Refer to Part 1 of the Storm Water Standards to complete this section. When separate forms/worksheets are referenced below, the applicant must also complete these separate forms/worksheets (as applicable) and include in the PDP SWQMP. The criteria numbers below correspond to the criteria numbers in Appendix F.

<table>
<tr><th>Criteria</th><th>Answer</th><th>Progression</th></tr>
<tr><td rowspan="3"><u>Criteria 1 and 3</u>:

What is the infiltration condition of the DMA?

Refer to Section 5.4.2 and Appendix C of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.

Applicant must complete and include the following in the PDP SWQMP submittal to support the feasibility determination:
• Infiltration Feasibility Condition Letter; or
• Worksheet C.4-1: Form I-8A and Worksheet C.4-2: Form I-8B.

Applicant must complete and include all applicable sizing worksheets in the SWQMP submittal</td><td>○ Full Infiltration Condition</td><td>Stop. Compact biofiltration BMP is not allowed.</td></tr>
<tr><td>○ Partial Infiltration Condition</td><td>Compact biofiltration BMP is only allowed, if the target volume retention is met onsite (Refer to Table B.5-1 in Appendix B.5). Use Worksheet B.5-2 in Appendix B.5 to estimate the target volume retention (Note: retention in this context means reduction).

If the required volume reduction is achieved proceed to Criteria 2.

If the required volume reduction is not achieved, compact biofiltration BMP is not allowed. Stop.</td></tr>
<tr><td>◉ No Infiltration Condition</td><td>Compact biofiltration BMP is allowed if volume retention criteria in Table B.5-1 in Appendix B.5 for the no infiltration condition is met. Compliance with this criterion must be documented in the PDP SWQMP.

If the criteria in Table B.5-1 is met proceed to Criteria 2.

If the criteria in Table B.5-1 is not met, compact biofiltration BMP is not allowed. Stop.</td></tr>
</table>

Compact (high rate) Biofiltration BMP Checklist	Form I-10

Provide basis for Criteria 1 and 3:

<u>**Feasibility Analysis:**</u>

Summarize findings and include either infiltration feasibility condition letter or Worksheet C.4-1: Form I-8A and Worksheet C.4-2: Form I-8B in the PDP SWQMP submittal.

<u>**If Partial Infiltration Condition:**</u>

Provide documentation that target volume retention is met (include Worksheet B.5-2 in the PDP SWQMP submittal). Worksheet B.5-7 in Appendix B.5 can be used to estimate volume retention benefits from landscape areas.

<u>**If No Infiltration Condition:**</u>

Provide documentation that the volume retention performance standard is met (include Worksheet B.5-2 in the PDP SWQMP submittal) in the PDP SWQMP submittal. Worksheet B.5-6 in Appendix B.5 can be used to document that the performance standard is met.

All applicable Appendix B.5 Worksheets including Worksheets B.5-2 are included in the SWQMP Attachment 1e which show that the performance standard has been met

<table>
<tr><th>Criteria</th><th>Answer</th><th>Progression</th></tr>
<tr><td rowspan="3"><u>Criteria 2:</u>
Is the compact biofiltration BMP sized to meet the performance standard from the MS4 Permit?

Refer to Appendix B.5 and Appendix F.2 of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.</td><td>◉ Meets Flow based Criteria</td><td>Use guidance from Appendix F.2.2 to size the compact biofiltration BMP to meet the flow based criteria. Include the calculations in the PDP SWQMP.
Use parameters for sizing consistent with manufacturer guidelines and conditions of its third party certifications (i.e. a BMP certified at a loading rate of 1 gpm/sq. ft. cannot be designed using a loading rate of 1.5 gpm/sq. ft.)
Proceed to Criteria 4.</td></tr>
<tr><td>○ Meets Volume based Criteria</td><td>Provide documentation that the compact biofiltration BMP has a total static (i.e. non-routed) storage volume, including pore-spaces and pre-filter detention volume (Refer to Appendix B.5 for a schematic) of at least 0.75 times the portion of the DCV not reliably retained onsite.
Proceed to Criteria 4.</td></tr>
<tr><td>○ Does not Meet either criteria</td><td>Stop. Compact biofiltration BMP is not allowed.</td></tr>
</table>

Compact (high rate) Biofiltration BMP Checklist	Form I-10

Provide basis for Criteria 2:

Provide documentation that the BMP meets the numeric criteria and is designed consistent with the manufacturer guidelines and conditions of its third-party certification (i.e., loading rate, etc., as applicable).

Refer to Attachment 1E for standard sheet provided by vendor.

Criteria	Answer	Progression
Criteria 4: Does the compact biofiltration BMP meet the pollutant treatment performance standard for the projects most significant pollutants of concern? Refer to Appendix B.6 and Appendix F.1 of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	◉ Yes, meets the TAPE certification.	Provide documentation that the compact BMP has an appropriate TAPE certification for the projects most significant pollutants of concern. **Proceed to Criteria 5.**
	○ Yes, through other third-party documentation	Acceptance of third-party documentation is at the discretion of the City Engineer. The City engineer will consider, (a) the data submitted; (b) representativeness of the data submitted; and (c) consistency of the BMP performance claims with pollutant control objectives in Table F.1-2 and Table F.1-1 while making this determination. If a compact biofiltration BMP is not accepted, a written explanation/ reason will be provided in Section 2. **Proceed to Criteria 5.**
	○ No	**Stop**. Compact biofiltration BMP is not allowed.

Provide basis for Criteria 4:

Provide documentation that identifies the projects most significant pollutants of concern and TAPE certification or other third party documentation that shows that the compact biofiltration BMP meets the pollutant treatment performance standard for the projects most significant pollutants of concern.

See Attachment 1e for Tape Certification and Modular Wetland Calculations, Modular Wetland Brochure, and Fact Sheet.

Compact (high rate) Biofiltration BMP Checklist		Form I-10
Criteria	**Answer**	**Progression**
Criteria 5: Is the compact biofiltration BMP designed to promote appropriate biological activity to support and maintain treatment process? Refer to Appendix F of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	◉ Yes	Provide documentation that the compact biofiltration BMP support appropriate biological activity. Refer to Appendix F for guidance. **Proceed to Criteria 6.**
	○ No	**Stop**. Compact biofiltration BMP is not allowed.

Provide basis for Criteria 5:

Provide documentation that appropriate biological activity is supported by the compact biofiltration BMP to maintain treatment process.

Refer to the manufacturer's specifications on the proprietary "WetlandMEDIA" mix.

Criteria	Answer	Progression
Criteria 6: Is the compact biofiltration BMP designed with a hydraulic loading rate to prevent erosion, scour and channeling within the BMP?	◉ Yes	Provide documentation that the compact biofiltration BMP is used in a manner consistent with manufacturer guidelines and conditions of its third-party certification. **Proceed to Criteria 7.**
	○ No	**Stop**. Compact biofiltration BMP is not allowed.

Provide basis for Criteria 6:

Provide documentation that the BMP meets the numeric criteria and is designed consistent with the manufacturer guidelines and conditions of its third-party certification (i.e., maximum tributary area, maximum inflow velocities, etc., as applicable).

Refer to the manufacturer's specifications.

Compact (high rate) Biofiltration BMP Checklist		Form I-10
Criteria	**Answer**	**Progression**
Criteria 7: Is the compact biofiltration BMP maintenance plan consistent with manufacturer guidelines and conditions of its third-party certification (i.e., maintenance activities, frequencies)?	◉ Yes, and the compact BMP is privately owned, operated and not in the public right of way.	Submit a maintenance agreement that will also include a statement that the BMP will be maintained in accordance with manufacturer guidelines and conditions of third-party certification. **Stop**. The compact biofiltration BMP meets the required criteria.
	○ Yes, and the BMP is either owned or operated by the City or in the public right of way.	Approval is at the discretion of the City Engineer. The city engineer will consider maintenance requirements, cost of maintenance activities, relevant previous local experience with operation and maintenance of the BMP type, ability to continue to operate the system in event that the vending company is no longer operating as a business or other relevant factors while making the determination. **Stop**. Consult the City Engineer for a determination.
	○ No	**Stop**. Compact biofiltration BMP is not allowed.

Provide basis for Criteria 7:

Include copy of manufacturer guidelines and conditions of third-party certification in the maintenance agreement. PDP SWQMP must include a statement that the compact BMP will be maintained in accordance with manufacturer guidelines and conditions of third-party certification.

Refer to the manufacturer's specifications and the project's SWMDCMA.

Compact (high rate) Biofiltration BMP Checklist	Form I-10
Section 2: Verification (For City Use Only)	
Is the proposed compact BMP accepted by the City Engineer for onsite pollutant control compliance for the DMA?	○ Yes ○ No, See explanation below
Explanation/reason if the compact BMP is not accepted by the City for onsite pollutant control compliance:	

July 2017

GENERAL USE LEVEL DESIGNATION FOR BASIC, ENHANCED, AND PHOSPHORUS TREATMENT

For the

MWS-Linear Modular Wetland

Ecology's Decision:

Based on Modular Wetland Systems, Inc. application submissions, including the Technical Evaluation Report, dated April 1, 2014, Ecology hereby issues the following use level designation:

1. General use level designation (GULD) for the MWS-Linear Modular Wetland Stormwater Treatment System for Basic treatment

    - Sized at a hydraulic loading rate of 1 gallon per minute (gpm) per square foot (sq ft) of wetland cell surface area. For moderate pollutant loading rates (low to medium density residential basins), size the Prefilters at 3.0 gpm/sq ft of cartridge surface area. For high loading rates (commercial and industrial basins), size the Prefilters at 2.1 gpm/sq ft of cartridge surface area.

2. General use level designation (GULD) for the MWS-Linear Modular Wetland Stormwater Treatment System for Phosphorus treatment

    - Sized at a hydraulic loading rate of 1 gallon per minute (gpm) per square foot (sq ft) of wetland cell surface area. For moderate pollutant loading rates (low to medium density residential basins), size the Prefilters at 3.0 gpm/sq ft of cartridge surface area. For high loading rates (commercial and industrial basins), size the Prefilters at 2.1 gpm/sq ft of cartridge surface area.

3. General use level designation (GULD) for the MWS-Linear Modular Wetland Stormwater Treatment System for Enhanced treatment

    - Sized at a hydraulic loading rate of 1 gallon per minute (gpm) per square foot (sq ft) of wetland cell surface area. For moderate pollutant loading rates (low to medium density residential basins), size the Prefilters at 3.0 gpm/sq ft of cartridge surface area. For high loading rates (commercial and industrial basins), size the Prefilters at 2.1 gpm/sq ft of cartridge surface area.

4. Ecology approves the MWS - Linear Modular Wetland Stormwater Treatment System units for Basic, Phosphorus, and Enhanced treatment at the hydraulic loading rate listed above. Designers shall calculate the water quality design flow rates using the following procedures:

   - Western Washington: For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using the latest version of the Western Washington Hydrology Model or other Ecology-approved continuous runoff model.
   - Eastern Washington: For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using one of the three methods described in Chapter 2.2.5 of the Stormwater Management Manual for Eastern Washington (SWMMEW) or local manual.
   - Entire State: For treatment installed downstream of detention, the water quality design flow rate is the full 2-year release rate of the detention facility.

5. These use level designations have no expiration date but may be revoked or amended by Ecology, and are subject to the conditions specified below.

Ecology's Conditions of Use:

Applicants shall comply with the following conditions:

1. Design, assemble, install, operate, and maintain the MWS – Linear Modular Wetland Stormwater Treatment System units, in accordance with Modular Wetland Systems, Inc. applicable manuals and documents and the Ecology Decision.
2. Each site plan must undergo Modular Wetland Systems, Inc. review and approval before site installation. This ensures that site grading and slope are appropriate for use of a MWS – Linear Modular Wetland Stormwater Treatment System unit.
3. MWS – Linear Modular Wetland Stormwater Treatment System media shall conform to the specifications submitted to, and approved by, Ecology.
4. The applicant tested the MWS – Linear Modular Wetland Stormwater Treatment System with an external bypass weir. This weir limited the depth of water flowing through the media, and therefore the active treatment area, to below the root zone of the plants. This GULD applies to MWS – Linear Modular Wetland Stormwater Treatment Systems whether plants are included in the final product or not.
5. Maintenance: The required maintenance interval for stormwater treatment devices is often dependent upon the degree of pollutant loading from a particular drainage basin. Therefore, Ecology does not endorse or recommend a "one size fits all" maintenance cycle for a particular model/size of manufactured filter treatment device.

   - Typically, Modular Wetland Systems, Inc. designs MWS - Linear Modular Wetland systems for a target prefilter media life of 6 to 12 months.
   - Indications of the need for maintenance include effluent flow decreasing to below the design flow rate or decrease in treatment below required levels.
   - Owners/operators must inspect MWS - Linear Modular Wetland systems for a minimum of twelve months from the start of post-construction operation to determine site-specific

maintenance schedules and requirements. You must conduct inspections monthly during the wet season, and every other month during the dry season. (According to the SWMMWW, the wet season in western Washington is October 1 to April 30. According to SWMMEW, the wet season in eastern Washington is October 1 to June 30). After the first year of operation, owners/operators must conduct inspections based on the findings during the first year of inspections.

- Conduct inspections by qualified personnel, follow manufacturer's guidelines, and use methods capable of determining either a decrease in treated effluent flowrate and/or a decrease in pollutant removal ability.
- When inspections are performed, the following findings typically serve as maintenance triggers:
  - Standing water remains in the vault between rain events, or
  - Bypass occurs during storms smaller than the design storm.
  - If excessive floatables (trash and debris) are present (but no standing water or excessive sedimentation), perform a minor maintenance consisting of gross solids removal, not prefilter media replacement.
  - Additional data collection will be used to create a correlation between pretreatment chamber sediment depth and pre-filter clogging (see *Issues to be Addressed by the Company* section below)

6. Discharges from the MWS - Linear Modular Wetland Stormwater Treatment System units shall not cause or contribute to water quality standards violations in receiving waters.

Applicant: Modular Wetland Systems, Inc.
Applicant's Address: *PO. Box 869*
Oceanside, CA 92054

Application Documents:

- *Original Application for Conditional Use Level Designation*, Modular Wetland System, Linear Stormwater Filtration System Modular Wetland Systems, Inc., January 2011
- *Quality Assurance Project Plan*: Modular Wetland system – Linear Treatment System performance Monitoring Project, draft, January 2011.
- *Revised Application for Conditional Use Level Designation*, Modular Wetland System, Linear Stormwater Filtration System Modular Wetland Systems, Inc., May 2011
- *Memorandum: Modular Wetland System-Linear GULD Application Supplementary Data, April 2014*
- *Technical Evaluation Report: Modular Wetland System Stormwater Treatment System Performance Monitoring, April 2014.*

Applicant's Use Level Request:

General use level designation as a Basic, Enhanced, and Phosphorus treatment device in accordance with Ecology's Guidance for Evaluating Emerging Stormwater Treatment Technologies Technology Assessment Protocol – Ecology (TAPE) January 2011 Revision.

Applicant's Performance Claims:

- The MWS – Linear Modular wetland is capable of removing a minimum of 80-percent of TSS from stormwater with influent concentrations between 100 and 200 mg/l.
- The MWS – Linear Modular wetland is capable of removing a minimum of 50-percent of Total Phosphorus from stormwater with influent concentrations between 0.1 and 0.5 mg/l.
- The MWS – Linear Modular wetland is capable of removing a minimum of 30-percent of dissolved Copper from stormwater with influent concentrations between 0.005 and 0.020 mg/l.
- The MWS – Linear Modular wetland is capable of removing a minimum of 60-percent of dissolved Zinc from stormwater with influent concentrations between 0.02 and 0.30 mg/l.

Ecology Recommendations:

- Modular Wetland Systems, Inc. has shown Ecology, through laboratory and field-testing, that the MWS - Linear Modular Wetland Stormwater Treatment System filter system is capable of attaining Ecology's Basic, Total phosphorus, and Enhanced treatment goals.

Findings of Fact:

<u>Laboratory Testing</u>

The MWS-Linear Modular wetland has the:

- Capability to remove 99 percent of total suspended solids (using Sil-Co-Sil 106) in a quarter-scale model with influent concentrations of 270 mg/L.
- Capability to remove 91 percent of total suspended solids (using Sil-Co-Sil 106) in laboratory conditions with influent concentrations of 84.6 mg/L at a flow rate of 3.0 gpm per square foot of media.
- Capability to remove 93 percent of dissolved Copper in a quarter-scale model with influent concentrations of 0.757 mg/L.
- Capability to remove 79 percent of dissolved Copper in laboratory conditions with influent concentrations of 0.567 mg/L at a flow rate of 3.0 gpm per square foot of media.
- Capability to remove 80.5-percent of dissolved Zinc in a quarter-scale model with influent concentrations of 0.95 mg/L at a flow rate of 3.0 gpm per square foot of media.
- Capability to remove 78-percent of dissolved Zinc in laboratory conditions with influent concentrations of 0.75 mg/L at a flow rate of 3.0 gpm per square foot of media.

Field Testing

- Modular Wetland Systems, Inc. conducted monitoring of an MWS-Linear (Model # MWS-L-4-13) from April 2012 through May 2013, at a transportation maintenance facility in Portland, Oregon. The manufacturer collected flow-weighted composite samples of the system's influent and effluent during 28 separate storm events. The system treated approximately 75 percent of the runoff from 53.5 inches of rainfall during the monitoring period. The applicant sized the system at 1 gpm/sq ft. (wetland media) and 3gpm/sq ft. (prefilter).
- Influent TSS concentrations for qualifying sampled storm events ranged from 20 to 339 mg/L. Average TSS removal for influent concentrations greater than 100 mg/L (n=7) averaged 85 percent. For influent concentrations in the range of 20-100 mg/L (n=18), the upper 95 percent confidence interval about the mean effluent concentration was 12.8 mg/L.
- Total phosphorus removal for 17 events with influent TP concentrations in the range of 0.1 to 0.5 mg/L averaged 65 percent. A bootstrap estimate of the lower 95 percent confidence limit (LCL95) of the mean total phosphorus reduction was 58 percent.
- The lower 95 percent confidence limit of the mean percent removal was 60.5 percent for dissolved zinc for influent concentrations in the range of 0.02 to 0.3 mg/L (n=11). The lower 95 percent confidence limit of the mean percent removal was 32.5 percent for dissolved copper for influent concentrations in the range of 0.005 to 0.02 mg/L (n=14) at flow rates up to 28 gpm (design flow rate 41 gpm). Laboratory test data augmented the data set, showing dissolved copper removal at the design flow rate of 41 gpm (93 percent reduction in influent dissolved copper of 0.757 mg/L).

Issues to be addressed by the Company:

1. Modular Wetland Systems, Inc. should collect maintenance and inspection data for the first year on all installations in the Northwest in order to assess standard maintenance requirements for various land uses in the region. Modular Wetland Systems, Inc. should use these data to establish required maintenance cycles.
2. Modular Wetland Systems, Inc. should collect pre-treatment chamber sediment depth data for the first year of operation for all installations in the Northwest. Modular Wetland Systems, Inc. will use these data to create a correlation between sediment depth and pre-filter clogging.

Technology Description:
Download at http://www.modularwetlands.com/

Contact Information:
Applicant: Zach Kent
BioClean A Forterra Company.
398 Vi9a El Centro
Oceanside, CA 92058
zach.kent@forterrabp.com

Applicant website: http://www.modularwetlands.com/

Ecology web link: http://www.ecy.wa.gov/programs/wg/stormwater/newtech/index.html

Ecology: Douglas C. Howie, P.E.
Department of Ecology
Water Quality Program
(360) 407-6444
douglas.howie@ecy.wa.gov

Revision History

Date	Revision
June 2011	Original use-level-designation document
September 2012	Revised dates for TER and expiration
January 2013	Modified Design Storm Description, added Revision Table, added maintenance discussion, modified format in accordance with Ecology standard
December 2013	Updated name of Applicant
April 2014	Approved GULD designation for Basic, Phosphorus, and Enhanced treatment
December 2015	Updated GULD to document the acceptance of MWS-Linear Modular Wetland installations with or without the inclusion of plants
July 2017	Revised Manufacturer Contact Information (name, address, and email)

Bio Clean

A Forterra Company

Modular Wetlands® System Linear

A Stormwater Biofiltration Solution

OVERVIEW

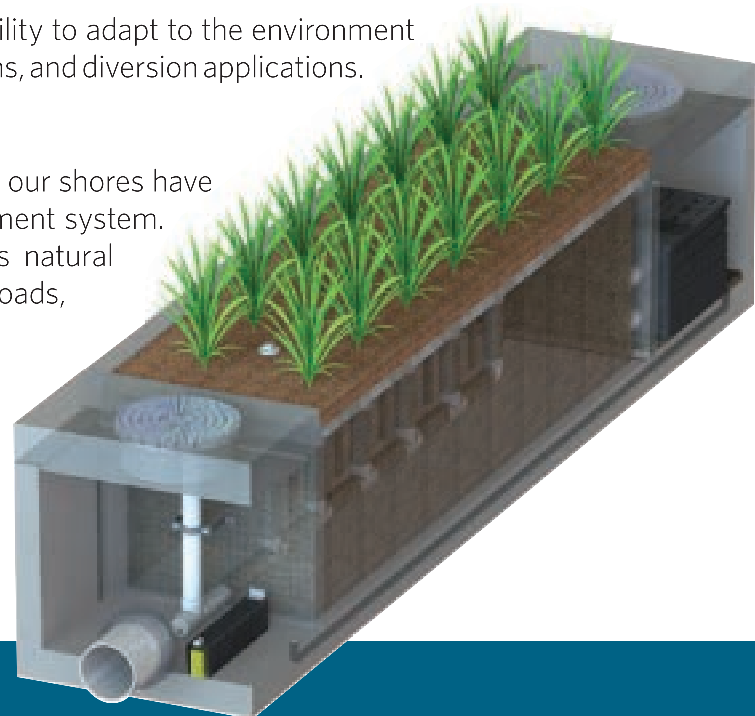
The Bio Clean Modular Wetlands® System Linear represents a pioneering breakthrough in stormwater technology as the only biofiltration system to utilize patented horizontal flow, allowing for a smaller footprint, higher treatment capacity, and a wide range of versatility. While most biofilters use little or no pretreatment, the Modular Wetlands® incorporates an advanced pretreatment chamber that includes separation and pre-filter cartridges. In this chamber, sediment and hydrocarbons are removed from runoff before entering the biofiltration chamber, reducing maintenance costs and improving performance.

Horizontal flow also gives the system the unique ability to adapt to the environment through a variety of configurations, bypass orientations, and diversion applications.

The Urban Impact

For hundreds of years, natural wetlands surrounding our shores have played an integral role as nature's stormwater treatment system. But as cities grow and develop, our environment's natural filtration systems are blanketed with impervious roads, rooftops, and parking lots.

Bio Clean understands this loss and has spent years re-establishing nature's presence in urban areas, and rejuvenating waterways with the Modular Wetlands® System Linear.



PERFORMANCE

The Modular Wetlands® continues to outperform other treatment methods with superior pollutant removal for TSS, heavy metals, nutrients, hydrocarbons, and bacteria. Since 2007 the Modular Wetlands® has been field tested on numerous sites across the country and is proven to effectively remove pollutants through a combination of physical, chemical, and biological filtration processes. In fact, the Modular Wetlands® harnesses some of the same biological processes found in natural wetlands in order to collect, transform, and remove even the most harmful pollutants.

66% REMOVAL OF DISSOLVED ZINC	69% REMOVAL OF TOTAL ZINC	38% REMOVAL OF DISSOLVED COPPER	64% REMOVAL OF TOTAL PHOSPHORUS	
45% REMOVAL OF NITROGEN	50% REMOVAL OF TOTAL COPPER	95% REMOVAL OF MOTOR OIL	67% REMOVAL OF ORTHO PHOSPHORUS	85% REMOVAL OF TSS

APPROVALS

The Modular Wetlands® System Linear has successfully met years of challenging technical reviews and testing from some of the most prestigious and demanding agencies in the nation and perhaps the world. Here is a list of some of the most high-profile approvals, certifications, and verifications from around the country.

State of Washington TAPE GULD Basic Enhanced/Metals Phosphorus

Washington State Department of Ecology TAPE Approved
The MWS Linear is approved for General Use Level Designation (GULD) for Basic, Enhanced, and Phosphorus treatment at 1 gpm/ft^2 loading rate. The highest performing BMP on the market for all main pollutant categories.

CA

California Water Resources Control Board, Full Capture Certification
The Modular Wetlands® System is the first biofiltration system to receive certification as a full capture trash treatment control device.

VA

Virginia Department of Environmental Quality, Assignment
The Virginia Department of Environmental Quality assigned the MWS Linear the highest phosphorus removal rating for manufactured treatment devices to meet the new Virginia Stormwater Management Program (VSMP) regulation technical criteria.

MD

Maryland Department of the Environment, Approved ESD
Granted Environmental Site Design (ESD) status for new construction, redevelopment, and retrofitting when designed in accordance with the design manual.

MA

MASTEP Evaluation
The University of Massachusetts at Amherst – Water Resources Research Center issued a technical evaluation report noting removal rates up to 84% TSS, 70% total phosphorus, 68.5% total zinc, and more.

RI

Rhode Island Department of Environmental Management, Approved BMP
Approved as an authorized BMP and noted to achieve the following minimum removal efficiencies: 85% TSS, 60% pathogens, 30% total phosphorus, and 30% total nitrogen.

ADVANTAGES

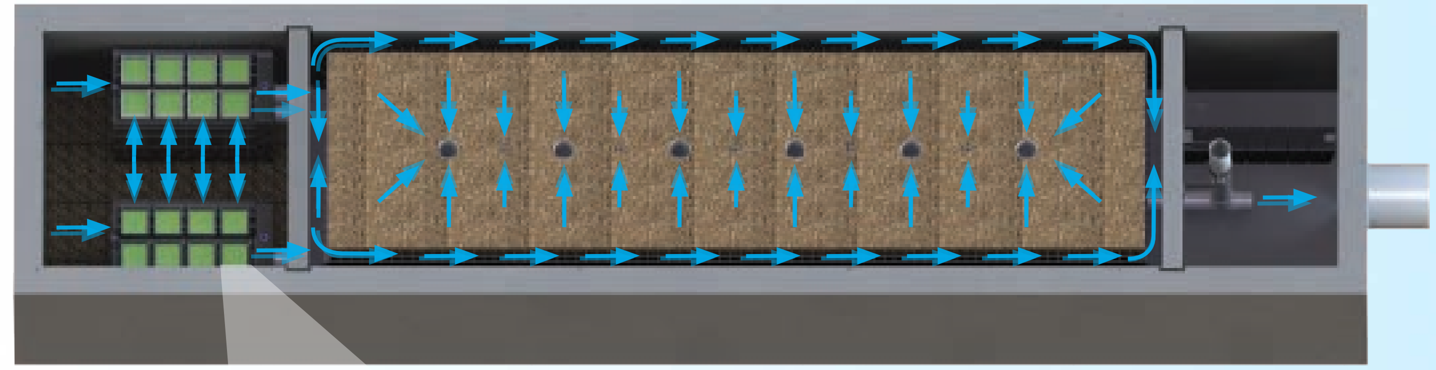
- HORIZONTAL FLOW BIOFILTRATION
- GREATER FILTER SURFACE AREA
- PRETREATMENT CHAMBER
- PATENTED PERIMETER VOID AREA
- FLOW CONTROL
- NO DEPRESSED PLANTER AREA
- AUTO DRAINDOWN MEANS NO MOSQUITO VECTOR

OPERATION

The Modular Wetlands® System Linear is the most efficient and versatile biofiltration system on the market, and it is the only system with horizontal flow which:

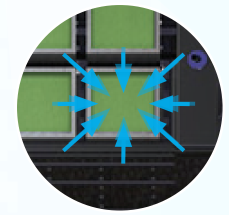
- Improves performance
- Reduces footprint
- Minimizes maintenance

Figure 1 & Figure 2 illustrate the invaluable benefits of horizontal flow and the multiple treatment stages.



2x to 3x more surface area than traditional downward flow bioretention systems.

Figure 2,
Top View



1 PRETREATMENT

SEPARATION

- Trash, sediment, and debris are separated before entering the pre-filter cartridges
- Designed for easy maintenance access

PRE-FILTER CARTRIDGES

- Over 25 sq. ft. of surface area per cartridge
- Utilizes BioMediaGREEN™ filter material
- Removes over 80% of TSS and 90% of hydrocarbons
- Prevents pollutants that cause clogging from migrating to the biofiltration chamber

2 BIOFILTRATION

HORIZONTAL FLOW

- Less clogging than downward flow biofilters
- Water flow is subsurface
- Improves biological filtration

PATENTED PERIMETER VOID AREA

- Vertically extends void area between the walls and the WetlandMEDIA™ on all four sides
- Maximizes surface area of the media for higher treatment capacity

WETLANDMEDIA

- Contains no organics and removes phosphorus
- Greater surface area and 48% void space
- Maximum evapotranspiration
- High ion exchange capacity and lightweight

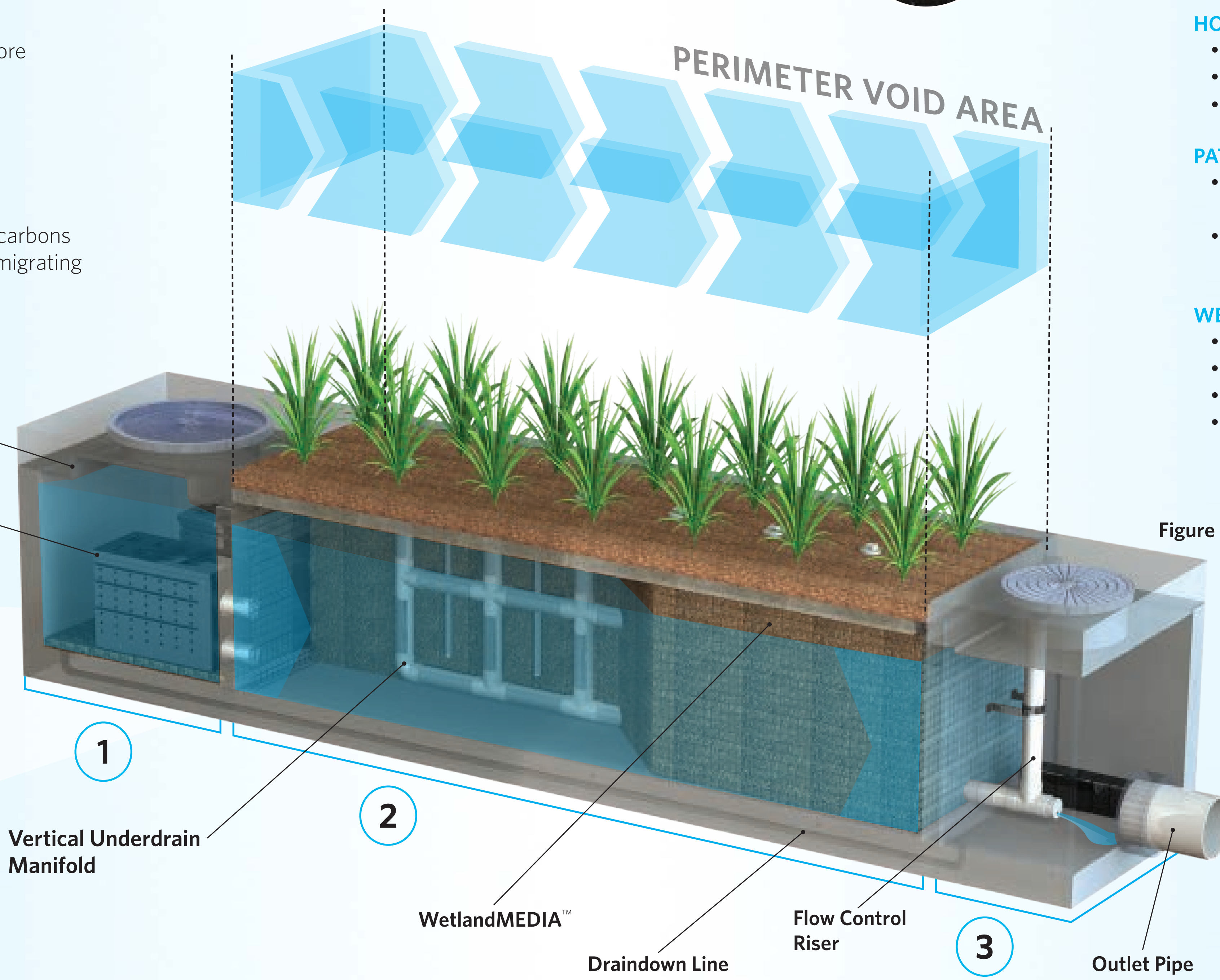
3 DISCHARGE

FLOW CONTROL

- Orifice plate controls flow of water through WetlandMEDIA™ to a level lower than the media's capacity
- Extends the life of the media and improves performance

DRAINDOWN FILTER

- The draindown is an optional feature that completely drains the pretreatment chamber
- Water that drains from the pretreatment chamber between storm events will be treated



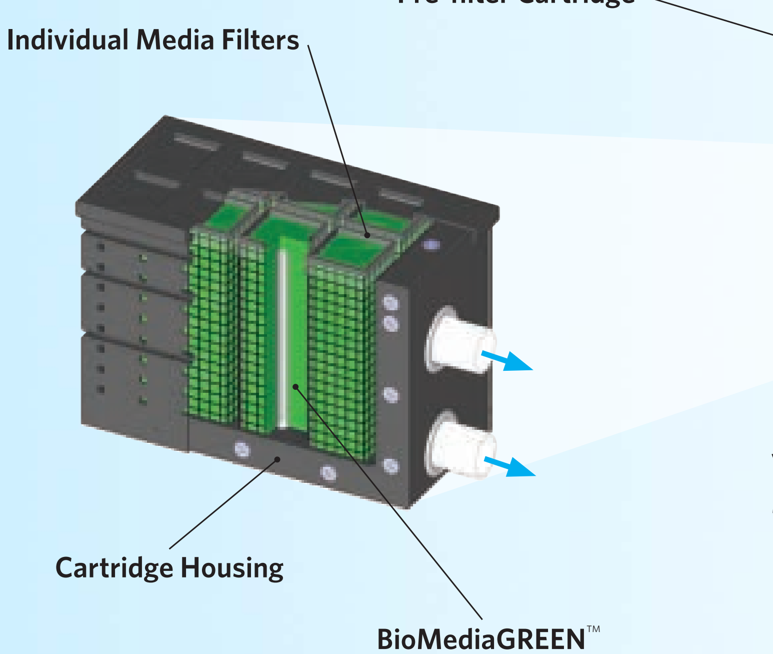
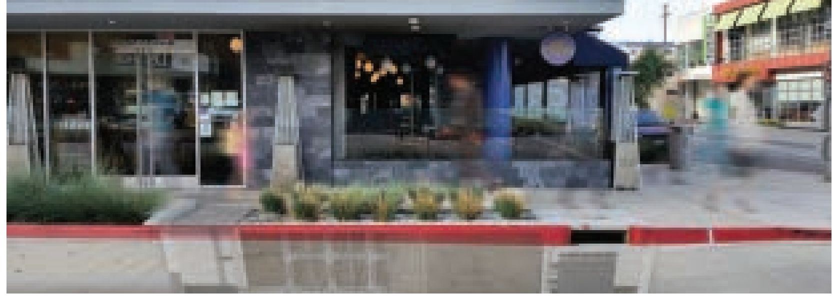
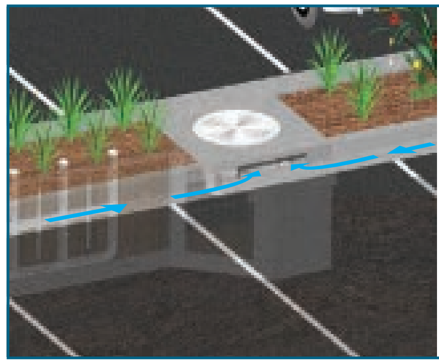


Figure 1



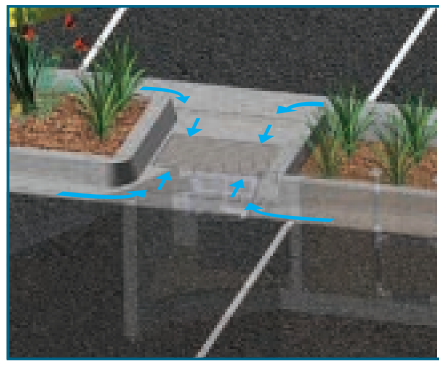
CONFIGURATIONS

The Modular Wetlands® System Linear is the preferred biofiltration system of civil engineers across the country due to its versatile design. This highly versatile system has available "pipe-in" options on most models, along with built-in curb or grated inlets for simple integration into your storm drain design.



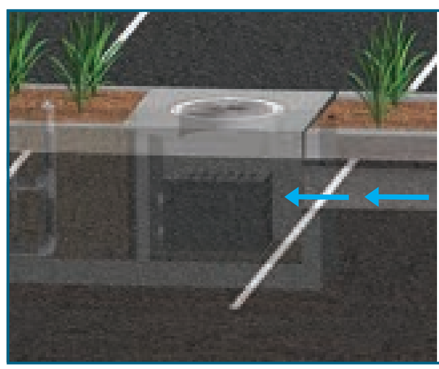
CURB TYPE

The Curb Type configuration accepts sheet flow through a curb opening and is commonly used along roadways and parking lots. It can be used in sump or flow-by conditions. Length of curb opening varies based on model and size.



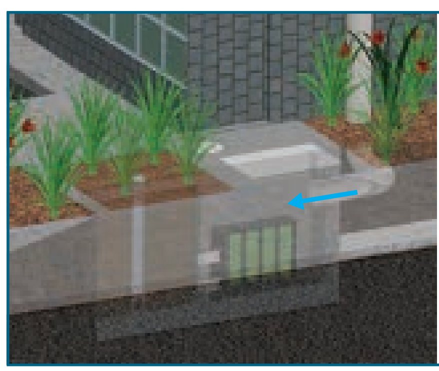
GRATE TYPE

The Grate Type configuration offers the same features and benefits as the Curb Type but with a grated/drop inlet above the systems pretreatment chamber. It has the added benefit of allowing pedestrian access over the inlet. ADA-compliant grates are available to assure easy and safe access. The Grate Type can also be used in scenarios where runoff needs to be intercepted on both sides of landscape islands.



VAULT TYPE

The system's patented horizontal flow biofilter is able to accept inflow pipes directly into the pretreatment chamber, meaning the Modular Wetlands® can be used in end-of-the-line installations. This greatly improves feasibility over typical decentralized designs that are required with other biofiltration/bioretention systems. Another benefit of the "pipe-in" design is the ability to install the system downstream of underground detention systems to meet water quality volume requirements.



DOWNSPOUT TYPE

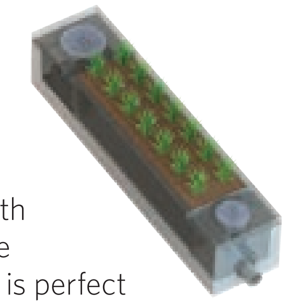
The Downspout Type is a variation of the Vault Type and is designed to accept a vertical downspout pipe from rooftop and podium areas. Some models have the option of utilizing an internal bypass, simplifying the overall design. The system can be installed as a raised planter, and the exterior can be stuccoed or covered with other finishes to match the look of adjacent buildings.

ORIENTATIONS

SIDE-BY-SIDE

The Side-By-Side orientation places the pretreatment and discharge chamber adjacent to one another with the biofiltration chamber running parallel on either side. This minimizes the system length, providing a highly compact footprint. It has been proven useful in situations such as streets with directly adjacent sidewalks, as half of the system can be placed under that sidewalk. This orientation also offers internal bypass options as discussed below.

END-TO-END



The End-To-End orientation places the pretreatment and discharge chambers on opposite ends of the biofiltration chamber, therefore minimizing the width of the system to 5 ft. (outside dimension). This orientation is perfect for linear projects and street retrofits where existing utilities and sidewalks limit the amount of space available for installation. One limitation of this orientation is that bypass must be external.

BYPASS

INTERNAL BYPASS WEIR (SIDE-BY-SIDE ONLY)

The Side-By-Side orientation places the pretreatment and discharge chambers adjacent to one another allowing for integration of internal bypass. The wall between these chambers can act as a bypass weir when flows exceed the system's treatment capacity, thus allowing bypass from the pretreatment chamber directly to the discharge chamber.

EXTERNAL DIVERSION WEIR STRUCTURE

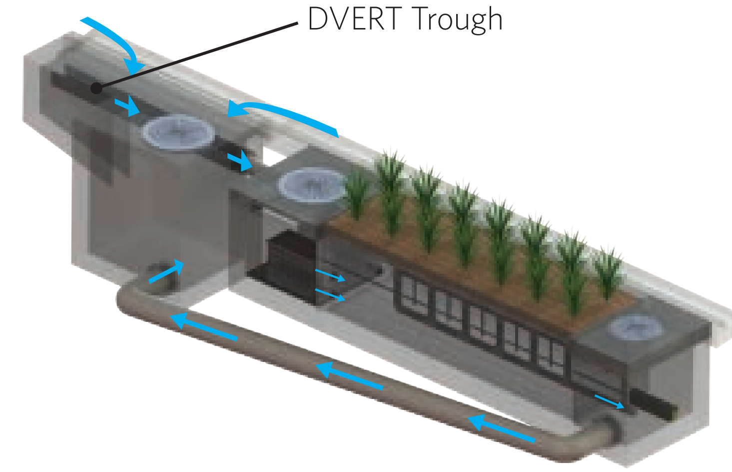
This traditional offline diversion method can be used with the Modular Wetlands® in scenarios where runoff is being piped to the system. These simple and effective structures are generally configured with two outflow pipes. The first is a smaller pipe on the upstream side of the diversion weir - to divert low flows over to the Modular Wetlands® for treatment. The second is the main pipe that receives water once the system has exceeded treatment capacity and water flows over the weir.

FLOW-BY-DESIGN

This method is one in which the system is placed just upstream of a standard curb or grate inlet to intercept the first flush. Higher flows simply pass by the Modular Wetlands® and into the standard inlet downstream.

DVERT LOW FLOW DIVERSION

This simple yet innovative diversion trough can be installed in existing or new curb and grate inlets to divert the first flush to the Modular Wetlands® via pipe. It works similar to a rain gutter and is installed just below the opening into the inlet. It captures the low flows and channels them over



to a connecting pipe exiting out the wall of the inlet and leading to the MWS Linear. The DVERT is perfect for retrofit and green street applications that allow the Modular Wetlands® to be installed anywhere space is available.

SPECIFICATIONS

FLOW-BASED DESIGNS

The Modular Wetlands® System Linear can be used in stand-alone applications to meet treatment flow requirements. Since the Modular Wetlands® is the only biofiltration system that can accept inflow pipes several feet below the surface, it can be used not only in decentralized design applications but also as a large central end-of-the-line application for maximum feasibility.

MODEL #	DIMENSIONS	WETLANDMEDIA SURFACE AREA (sq. ft.)	TREATMENT FLOW RATE (cfs)
MWS-L-4-4	4' x 4'	23	0.052
MWS-L-4-6	4' x 6'	32	0.073
MWS-L-4-8	4' x 8'	50	0.115
MWS-L-4-13	4' x 13'	63	0.144
MWS-L-4-15	4' x 15'	76	0.175
MWS-L-4-17	4' x 17'	90	0.206
MWS-L-4-19	4' x 19'	103	0.237
MWS-L-4-21	4' x 21'	117	0.268
MWS-L-6-8	7' x 9'	64	0.147
MWS-L-8-8	8' x 8'	100	0.230
MWS-L-8-12	8' x 12'	151	0.346
MWS-L-8-16	8' x 16'	201	0.462
MWS-L-8-20	9' x 21'	252	0.577
MWS-L-8-24	9' x 25'	302	0.693
MWS-L-10-20	10' x 20'	302	0.693

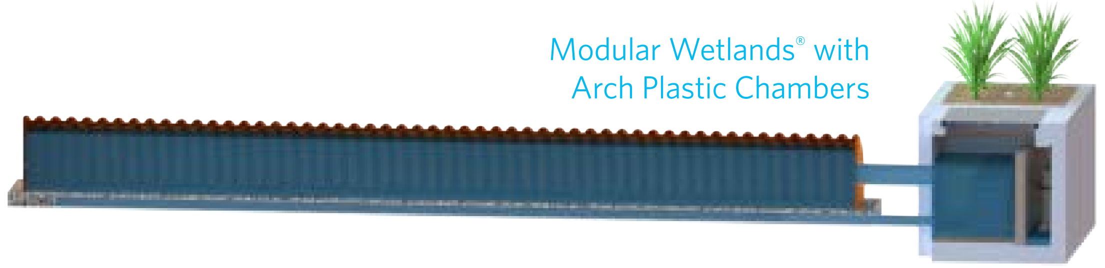
VOLUME-BASED DESIGNS

HORIZONTAL FLOW BIOFILTRATION ADVANTAGE

Modular Wetlands® with
Box Culvert Prestorage

The Modular Wetlands® System Linear offers a unique advantage in the world of biofiltration due to its exclusive horizontal flow design: Volume-Based Design. No other biofilter has the ability to be placed downstream of detention ponds, extended dry detention basins, underground storage systems and permeable paver reservoirs. The systems horizontal flow configuration and built-in orifice control allows it to be installed with just 6" of fall between inlet and outlet pipe for a simple connection to projects with shallow downstream tie-in points. In the example above, the Modular Wetlands® is installed downstream of underground box culvert storage. Designed for the water quality volume, the Modular Wetlands® will treat and discharge the required volume within local draindown time requirements.

Modular Wetlands® with
Arch Plastic Chambers



DESIGN SUPPORT

Bio Clean engineers are trained to provide you with superior support for all volume sizing configurations throughout the country. Our vast knowledge of state and local regulations allow us to quickly and efficiently size a system to maximize feasibility. Volume control and hydromodification regulations are expanding the need to decrease the cost and size of your biofiltration system. Bio Clean will help you realize these cost savings with the Modular Wetlands®, the only biofilter than can be used downstream of storage BMPs.

ADVANTAGES

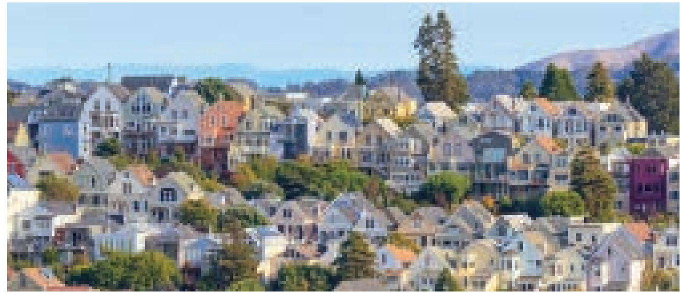
- LOWER COST THAN FLOW-BASED DESIGN
- MEETS LID REQUIREMENTS
- BUILT-IN ORIFICE CONTROL STRUCTURE
- WORKS WITH DEEP INSTALLATIONS

APPLICATIONS

The Modular Wetlands® System Linear has been successfully used on numerous new construction and retrofit projects. The system's superior versatility makes it beneficial for a wide range of stormwater and waste water applications - treating rooftops, streetscapes, parking lots, and industrial sites.

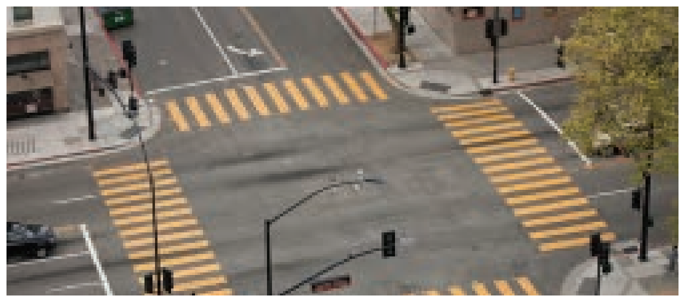
INDUSTRIAL

Many states enforce strict regulations for discharges from industrial sites. The Modular Wetlands® has helped various sites meet difficult EPA-mandated effluent limits for dissolved metals and other pollutants.



RESIDENTIAL

Low to high density developments can benefit from the versatile design of the Modular Wetlands®. The system can be used in both decentralized LID design and cost-effective end-of-the-line configurations.



STREETS

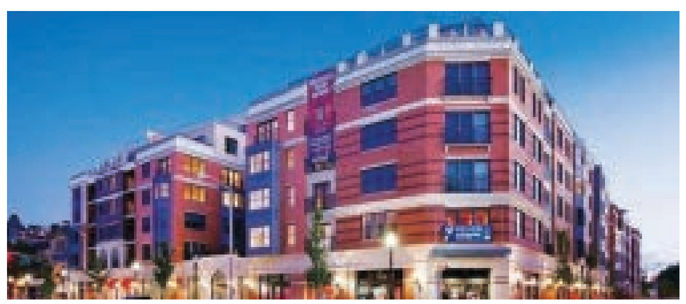
Street applications can be challenging due to limited space. The Modular Wetlands® is very adaptable, and it offers the smallest footprint to work around the constraints of existing utilities on retrofit projects.

PARKING LOTS

Parking lots are designed to maximize space and the Modular Wetlands'® 4 ft. standard planter width allows for easy integration into parking lot islands and other landscape medians.

COMMERCIAL

Compared to bioretention systems, the Modular Wetlands® can treat far more area in less space, meeting treatment and volume control requirements.



MIXED USE

The Modular Wetlands® can be installed as a raised planter to treat runoff from rooftops or patios, making it perfect for sustainable "live-work" spaces.

More applications include:

• Agriculture • Reuse • Low Impact Development • Waste Water

PLANT SELECTION

Abundant plants, trees, and grasses bring value and an aesthetic benefit to any urban setting, but those in the Modular Wetlands® System Linear do even more - they increase pollutant removal. What's not seen, but very important, is that below grade, the stormwater runoff/flow is being subjected to nature's secret weapon: a dynamic physical, chemical, and biological process working to break down and remove non-point source pollutants. The flow rate is controlled in the Modular Wetlands®, giving the plants more contact time so that pollutants are more successfully decomposed, volatilized, and incorporated into the biomass of the Modular Wetlands'® micro/macro flora and fauna.

A wide range of plants are suitable for use in the Modular Wetlands®, but selections vary by location and climate. View suitable plants by visiting biocleanenvironmental.com/plants.

INSTALLATION

The Modular Wetlands® is simple, easy to install, and has a space-efficient design that offers lower excavation and installation costs compared to traditional tree-box type systems. The structure of the system resembles precast catch basin or utility vaults and is installed in a similar fashion.

The system is delivered fully assembled for quick installation. Generally, the structure can be unloaded and set in place in 15 minutes. Our experienced team of field technicians is available to supervise installations and provide technical support.

MAINTENANCE

Reduce your maintenance costs, man hours, and materials with the Modular Wetlands®. Unlike other biofiltration systems that provide no pretreatment, the Modular Wetlands® is a self-contained treatment train which incorporates simple and effective pretreatment.

Maintenance requirements for the biofilter itself are almost completely eliminated, as the pretreatment chamber removes and isolates trash, sediments, and hydrocarbons. What's left is the simple maintenance of an easily accessible pretreatment chamber that can be cleaned by hand or with a standard vac truck. Only periodic replacement of low-cost media in the pre-filter cartridges is required for long-term operation, and there is absolutely no need to replace expensive biofiltration media.

Bio Clean
A Forterra Company

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Carlsbad, CA 92008
855.566.3938
stormwater@forterrabp.com
biocleanenvironmental.com

010419R1A

Attachment 2
Backup for PDP Hydromodification Control Measures

This is the cover sheet for Attachment 2.

☐ Mark this box if this attachment is empty because the project is exempt from PDP hydromodification management requirements.

Project Name: ARE - Scripps HQ

Indicate which Items are Included:

Attachment Sequence	Contents	Checklist
Attachment 2a	Hydromodification Management Exhibit (Required)	☑ Included See Hydromodification Management Exhibit Checklist.
Attachment 2b	Management of Critical Coarse Sediment Yield Areas (WMAA Exhibit is required, additional analyses are optional) See Section 6.2 of the BMP Design Manual.	☑ Exhibit showing project drainage boundaries marked on WMAA Critical Coarse Sediment Yield Area Map (Required) Optional analyses for Critical Coarse Sediment Yield Area Determination ☐ 6.2.1 Verification of Geomorphic Landscape Units Onsite ☐ 6.2.2 Downstream Systems Sensitivity to Coarse Sediment ☐ 6.2.3 Optional Additional Analysis of Potential Critical Coarse Sediment Yield Areas Onsite
Attachment 2c	Geomorphic Assessment of Receiving Channels (Optional) See Section 6.3.4 of the BMP Design Manual.	☑ Not Performed ☐ Included ☐ Submitted as separate stand-alone document
Attachment 2d	Flow Control Facility Design and Structural BMP Drawdown Calculations (Required) Overflow Design Summary for each structural BMP See Chapter 6 and Appendix G of the BMP Design Manual	☑ Included ☐ Submitted as separate stand-alone document

Project Name: ARE – Scripps HQ

Use this checklist to ensure the required information has been included on the Hydromodification Management Exhibit:

The Hydromodification Management Exhibit must identify:

- ✔ Underlying hydrologic soil group
- ✔ Approximate depth to groundwater
- N/A ☐ Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
- N/A ☐ Critical coarse sediment yield areas to be protected OR provide a separate map showing that the project site is outside of any critical coarse sediment yield areas
- ✔ Existing topography
- ✔ Existing and proposed site drainage network and connections to drainage offsite
- ✔ Proposed grading
- ✔ Proposed impervious features
- ✔ Proposed design features and surface treatments used to minimize imperviousness
- ✔ Point(s) of Compliance (POC) for Hydromodification Management
  Existing and proposed drainage boundary and drainage area to each POC (when necessary, create separate exhibits for pre-development and post-project conditions)
- ✔ Structural BMPs for hydromodification management (identify location, type of BMP, and size/detail).

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Project Name: Townsgate

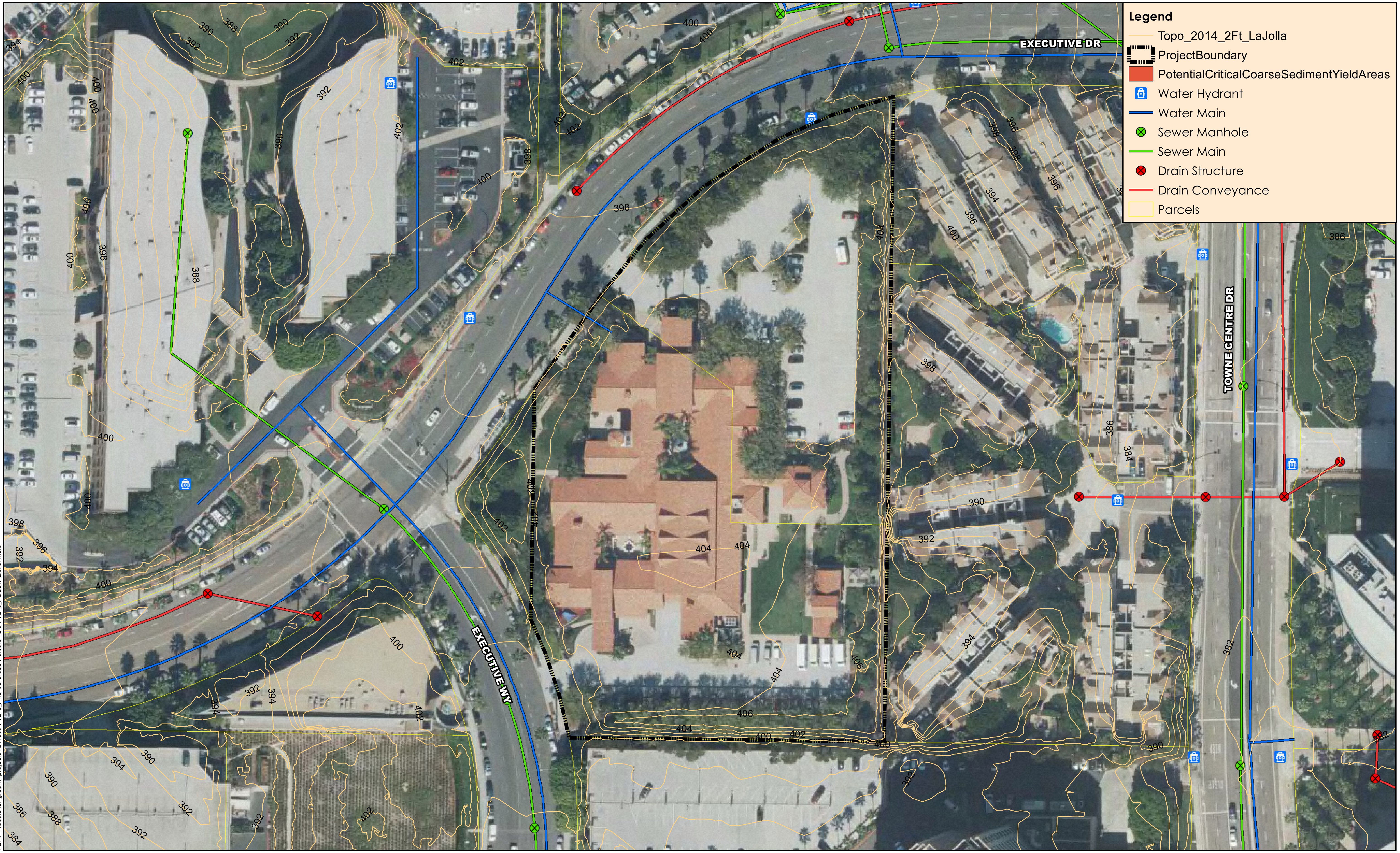
Attachment 2A

Hydromodification Management Exhibit

Project Name: Townsgate

Attachment 2B

Critical Coarse Sediment Yield Areas Exhibit



Path: \\cp.rickeng.com\projects\C19000\19276_ARE- SD Braille Institute\GIS\19276_PCCSYAExhibit.mxd

RICK ENGINEERING COMPANY

Scale in Feet
0 75 150

North

Date of Exhibit: 1/20/2021
SanGIS/USGS Aerial Imagery: 11/2014

ARE Scripps HQ
PCCSYA Exhibit

JN-19276

Attachment 2C

Geomorphic Assessment of Receiving Channels

Not Performed

Project Name: **Townsgate**

Attachment 2D

Flow Control Facility Design & Structural BMP Drawdown Calculations

- SWMM Model Inputs
- SWMM Model Outputs
- Drawdown Calculations
- Compact Disc (CD): Electronic Files for HMP Calculations

Project Name: Townsgate

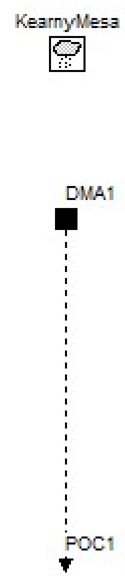
SWMM Model Inputs

- **Model Schematic**
- **Model Input Report Summary**
- **Rating Curve Calculation**
- **LID Controls**

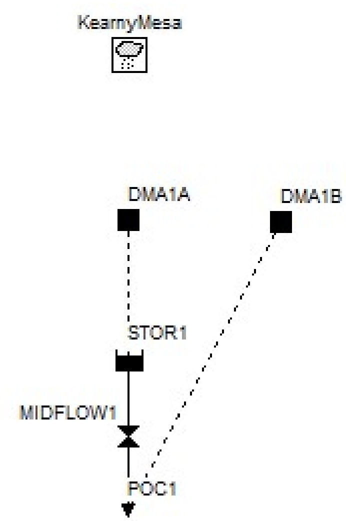
JN-19276
ARE-Scripps HQ
February 16, 2021

SWMM Model Schematics

Pre-development Model



Post-project Model



DMA-1 Pre-Project SWMM Input

```
[TITLE]
;;Project Title/Notes
19276 ARE-Scripps HQ DMA1
Pre-Project Condition

[OPTIONS]
;;Option             Value
FLOW_UNITS           CFS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         KINWAVE
LINK_OFFSETS         DEPTH
MIN_SLOPE            0
ALLOW_PONDING        NO
SKIP_STEADY_STATE    NO

START_DATE           09/08/1964
START_TIME           06:00:00
REPORT_START_DATE    09/08/1964
REPORT_START_TIME    06:00:00
END_DATE             05/23/2008
END_TIME             22:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         0:01:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         12.557
MAX_TRIALS           8
HEAD_TOLERANCE       0.005
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              1

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
MONTHLY          .03    .05    .08    .11    .13    .15    .15    .13    .11    .08    .04    .02
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
;;-------------- --------- ------ ------ ----------
KearnyMesa       INTENSITY 1:00     1.0      TIMESERIES KearnyMesa

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- ----------------
;Pre-Project Condition
DMA1             KearnyMesa       POC1             0.95     0        215      5        0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
DMA1             .012       .10        .05        .1         25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    Ksat       IMD
;;-------------- ---------- ---------- ----------
DMA1             9          0.01875    0.3

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
POC1             0          FREE                        NO

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
```

```
KearnyMesa       FILE
"\\cp.rickeng.com\projects\C_SD_R\18483_OAS\WaterResources\Hydromodification\RainfallData\kearny_mesa_1.dat"

[REPORT]
;;Reporting Options
INPUT      NO
CONTROLS   NO
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS 0.000 0.000 10000.000 10000.000
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC1             4021.330           5821.832

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
DMA1             4021.330           7804.266

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
KearnyMesa       4046.424           8720.201
```

BMP-1A (Discharge Rating Curve)

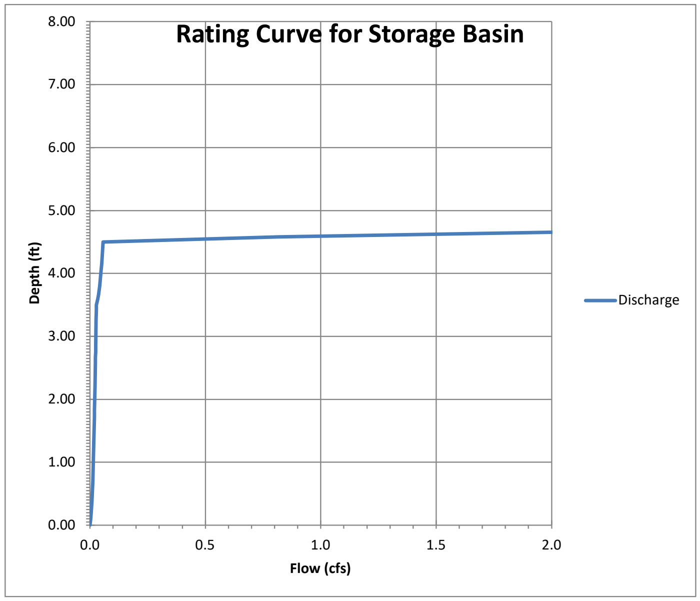
Basin Characteristics	
WQ ponding depth (ft) =	0.5
Media Layer, including 3" mulch (ft) =	2
Gravel Choker Layer (ft) =	0.25
Gravel layer (ft) =	0.75

Low Flow Orifice (Underdrain)	
Num. of Offices =	1
Orifice Invert (ft) =	0
Orifice Diameter (in) =	0.75
Cg =	0.6

Midflow Orfice (Lower)	
Num. of Offices =	1
Orifice Invert (ft) =	3.5
Orifice Diameter (in) =	1
Cg =	0.6

Midflow Orfice (Upper)(Rectangular)	
Num. of Offices =	0
Orifice Invert (ft) =	0
Orifice Width (ft) =	0
Orifice Height (ft) =	0
Cg (orifice) =	0.6
Cg (weir) =	3

Top of Inlet	
Upper Weir Inv (ft) =	4.5
B (ft) =	10.53
Cs =	3



Outlet Link Rating Curve (Input to SWMM)

h (in)	h (ft)	Underdrain Orifice	Lower Orifice	Upper Orifice (weir calc)	Upper Orifice (orifice calc)	Inlet Top	Total Flow (cfs)
0.0	0.000	0.000	0.000	0.000	0.000	0.000	0.0000
0.5	0.042	0.001	0.000	0.000	0.000	0.000	0.0013
1.0	0.083	0.003	0.000	0.000	0.000	0.000	0.0034
1.5	0.125	0.005	0.000	0.000	0.000	0.000	0.0045
2.0	0.167	0.005	0.000	0.000	0.000	0.000	0.0054
2.5	0.208	0.006	0.000	0.000	0.000	0.000	0.0062
3.0	0.250	0.007	0.000	0.000	0.000	0.000	0.0069
3.5	0.292	0.008	0.000	0.000	0.000	0.000	0.0075
4.0	0.333	0.008	0.000	0.000	0.000	0.000	0.0081
4.5	0.375	0.009	0.000	0.000	0.000	0.000	0.0087
5.0	0.417	0.009	0.000	0.000	0.000	0.000	0.0092
5.5	0.458	0.010	0.000	0.000	0.000	0.000	0.0097
6.0	0.500	0.010	0.000	0.000	0.000	0.000	0.0101
6.5	0.542	0.011	0.000	0.000	0.000	0.000	0.0106
7.0	0.583	0.011	0.000	0.000	0.000	0.000	0.0110
7.5	0.625	0.011	0.000	0.000	0.000	0.000	0.0114
8.0	0.667	0.012	0.000	0.000	0.000	0.000	0.0118
8.5	0.708	0.012	0.000	0.000	0.000	0.000	0.0122
9.0	0.750	0.013	0.000	0.000	0.000	0.000	0.0125
9.5	0.792	0.013	0.000	0.000	0.000	0.000	0.0129
10.0	0.833	0.013	0.000	0.000	0.000	0.000	0.0132
10.5	0.875	0.014	0.000	0.000	0.000	0.000	0.0136
11.0	0.917	0.014	0.000	0.000	0.000	0.000	0.0139
11.5	0.958	0.014	0.000	0.000	0.000	0.000	0.0142
12.0	1.000	0.015	0.000	0.000	0.000	0.000	0.0145
12.5	1.042	0.015	0.000	0.000	0.000	0.000	0.0148
13.0	1.083	0.015	0.000	0.000	0.000	0.000	0.0152
13.5	1.125	0.015	0.000	0.000	0.000	0.000	0.0154
14.0	1.167	0.016	0.000	0.000	0.000	0.000	0.0157
14.5	1.208	0.016	0.000	0.000	0.000	0.000	0.0160
15.0	1.250	0.016	0.000	0.000	0.000	0.000	0.0163
15.5	1.292	0.017	0.000	0.000	0.000	0.000	0.0166
16.0	1.333	0.017	0.000	0.000	0.000	0.000	0.0169
16.5	1.375	0.017	0.000	0.000	0.000	0.000	0.0171
17.0	1.417	0.017	0.000	0.000	0.000	0.000	0.0174
17.5	1.458	0.018	0.000	0.000	0.000	0.000	0.0176
18.0	1.500	0.018	0.000	0.000	0.000	0.000	0.0179
18.5	1.542	0.018	0.000	0.000	0.000	0.000	0.0182
19.0	1.583	0.018	0.000	0.000	0.000	0.000	0.0184
19.5	1.625	0.019	0.000	0.000	0.000	0.000	0.0186
20.0	1.667	0.019	0.000	0.000	0.000	0.000	0.0189
20.5	1.708	0.019	0.000	0.000	0.000	0.000	0.0191
21.0	1.750	0.019	0.000	0.000	0.000	0.000	0.0194
21.5	1.792	0.020	0.000	0.000	0.000	0.000	0.0196
22.0	1.833	0.020	0.000	0.000	0.000	0.000	0.0198
22.5	1.875	0.020	0.000	0.000	0.000	0.000	0.0201
23.0	1.917	0.020	0.000	0.000	0.000	0.000	0.0203
23.5	1.958	0.021	0.000	0.000	0.000	0.000	0.0205

24.0	2.000	0.021	0.000	0.000	0.000	0.000	0.0207
24.5	2.042	0.021	0.000	0.000	0.000	0.000	0.0209
25.0	2.083	0.021	0.000	0.000	0.000	0.000	0.0212
25.5	2.125	0.021	0.000	0.000	0.000	0.000	0.0214
26.0	2.167	0.022	0.000	0.000	0.000	0.000	0.0216
26.5	2.208	0.022	0.000	0.000	0.000	0.000	0.0218
27.0	2.250	0.022	0.000	0.000	0.000	0.000	0.0220
27.5	2.292	0.022	0.000	0.000	0.000	0.000	0.0222
28.0	2.333	0.022	0.000	0.000	0.000	0.000	0.0224
28.5	2.375	0.023	0.000	0.000	0.000	0.000	0.0226
29.0	2.417	0.023	0.000	0.000	0.000	0.000	0.0228
29.5	2.458	0.023	0.000	0.000	0.000	0.000	0.0230
30.0	2.500	0.023	0.000	0.000	0.000	0.000	0.0232
31.0	2.583	0.024	0.000	0.000	0.000	0.000	0.0236
32.0	2.667	0.024	0.000	0.000	0.000	0.000	0.0240
33.0	2.750	0.024	0.000	0.000	0.000	0.000	0.0244
34.0	2.833	0.025	0.000	0.000	0.000	0.000	0.0247
35.0	2.917	0.025	0.000	0.000	0.000	0.000	0.0251
36.0	3.000	0.025	0.000	0.000	0.000	0.000	0.0255
37.0	3.083	0.026	0.000	0.000	0.000	0.000	0.0258
38.0	3.167	0.026	0.000	0.000	0.000	0.000	0.0262
39.0	3.250	0.027	0.000	0.000	0.000	0.000	0.0265
40.0	3.333	0.027	0.000	0.000	0.000	0.000	0.0268
41.0	3.417	0.027	0.000	0.000	0.000	0.000	0.0272
42.0	3.500	0.028	0.000	0.000	0.000	0.000	0.0275
43.0	3.583	0.028	0.005	0.000	0.000	0.000	0.0332
44.0	3.667	0.028	0.009	0.000	0.000	0.000	0.0375
45.0	3.750	0.028	0.012	0.000	0.000	0.000	0.0405
46.0	3.833	0.029	0.014	0.000	0.000	0.000	0.0430
47.0	3.917	0.029	0.016	0.000	0.000	0.000	0.0452
48.0	4.000	0.029	0.018	0.000	0.000	0.000	0.0472
49.0	4.083	0.030	0.019	0.000	0.000	0.000	0.0491
50.0	4.167	0.030	0.021	0.000	0.000	0.000	0.0508
51.0	4.250	0.030	0.022	0.000	0.000	0.000	0.0524
52.0	4.333	0.031	0.023	0.000	0.000	0.000	0.0540
53.0	4.417	0.031	0.025	0.000	0.000	0.000	0.0555
54.0	4.500	0.031	0.026	0.000	0.000	0.000	0.0569
55.0	4.583	0.032	0.027	0.000	0.000	0.760	0.8182
56.0	4.667	0.032	0.028	0.000	0.000	2.149	2.2092
57.0	4.750	0.032	0.029	0.000	0.000	3.949	4.0097
58.0	4.833	0.032	0.030	0.000	0.000	6.079	6.1416
59.0	4.917	0.033	0.031	0.000	0.000	8.496	8.5599
60.0	5.000	0.033	0.032	0.000	0.000	11.169	11.2334

DMA-1 Post-Project SWMM Input

```
[TITLE]
;;Project Title/Notes
19276 ARE-Scripps HQ DMA1
Post-Project Condition

[OPTIONS]
;;Option             Value
FLOW_UNITS           CFS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         KINWAVE
LINK_OFFSETS         DEPTH
MIN_SLOPE            0
ALLOW_PONDING        NO
SKIP_STEADY_STATE    NO

START_DATE           09/08/1964
START_TIME           06:00:00
REPORT_START_DATE    09/08/1964
REPORT_START_TIME    06:00:00
END_DATE             05/23/2008
END_TIME             22:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         0:01:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         12.557
MAX_TRIALS           8
HEAD_TOLERANCE       0.005
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              1

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
MONTHLY          .03    .05    .08    .11    .13    .15    .15    .13    .11    .08    .04    .02
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
;;-------------- --------- ------ ------ ----------
KearnyMesa       INTENSITY 1:00     1.0      TIMESERIES KearnyMesa

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- ----------------
;Post-Project Condition
DMA1A            KearnyMesa       STOR1            0.82     70       184      3        0
DMA1B            KearnyMesa       POC1             0.13     32       45       3        0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
DMA1A            .012       .10        .05        .1         25         OUTLET
DMA1B            0.012      0.1        0.05       0.1        25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    Ksat       IMD
;;-------------- ---------- ---------- ----------
DMA1A            9          0.01875    0.3
DMA1B            9          0.01875    0.3

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
POC1             0          FREE                        NO
```

```
[STORAGE]
;;Name           Elev.    MaxDepth   InitDepth  Shape      Curve Name/Params            N/A      Fevap    Psi      Ksat     IMD

;;-------------- -------- ---------- ----------- ---------- ---------------------------- -------- --------          --------
--------
STOR1            0        5          0          TABULAR    STOR1                        0        1

[OUTLETS]
;;Name           From Node        To Node          Offset     Type            QTable/Qcoeff    Qexpon     Gated
;;-------------- ---------------- ---------------- ---------- --------------- ---------------- ---------- --------
MIDFLOW1         STOR1            POC1             0          TABULAR/DEPTH   RC1                         NO

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
RC5              Rating     0.000      0.0000
RC5                         0.042      0.0009
RC5                         0.083      0.0016
RC5                         0.125      0.0021
RC5                         0.167      0.0025
RC5                         0.208      0.0028
RC5                         0.250      0.0031
RC5                         0.292      0.0034
RC5                         0.333      0.0037
RC5                         0.375      0.0039
RC5                         0.417      0.0041
RC5                         0.458      0.0043
RC5                         0.500      0.0045
RC5                         0.542      0.0047
RC5                         0.583      0.0049
RC5                         0.625      0.0051
RC5                         0.667      0.0053
RC5                         0.708      0.0054
RC5                         0.750      0.0056
RC5                         0.792      0.0058
RC5                         0.833      0.0059
RC5                         0.875      0.0061
RC5                         0.917      0.0062
RC5                         0.958      0.0064
RC5                         1.000      0.0065
RC5                         1.042      0.0066
RC5                         1.083      0.0068
RC5                         1.125      0.0069
RC5                         1.167      0.0070
RC5                         1.208      0.0072
RC5                         1.250      0.0073
RC5                         1.292      0.0074
RC5                         1.333      0.0075
RC5                         1.375      0.0076
RC5                         1.417      0.0078
RC5                         1.458      0.0079
RC5                         1.500      0.0080
RC5                         1.542      0.0081
RC5                         1.583      0.0082
RC5                         1.625      0.0083
RC5                         1.667      0.0084
RC5                         1.708      0.0085
RC5                         1.750      0.0086
RC5                         1.792      0.0087
RC5                         1.833      0.0088
RC5                         1.875      0.0089
RC5                         1.917      0.0090
RC5                         1.958      0.0091
RC5                         2.000      0.0092
RC5                         2.042      0.0093
RC5                         2.083      0.0094
RC5                         2.125      0.0095
RC5                         2.167      0.0096
RC5                         2.208      0.0097
RC5                         2.250      0.0098
RC5                         2.292      0.0099
RC5                         2.333      0.0100
RC5                         2.375      0.0101
RC5                         2.417      0.0102
RC5                         2.458      0.0103
RC5                         2.500      0.0103
RC5                         2.583      0.0105
```

RC5		2.667	0.0107
RC5		2.750	0.0108
RC5		2.833	0.0110
RC5		2.917	0.0112
RC5		3.000	0.0113
RC5		3.083	0.0115
RC5		3.167	0.0116
RC5		3.250	0.0118
RC5		3.333	0.0119
RC5		3.417	0.0121
RC5		3.500	0.0122
RC5		3.583	0.0124
RC5		3.667	0.0125
RC5		3.750	0.0127
RC5		3.833	0.0128
RC5		3.917	0.0130
RC5		4.000	0.0131
RC5		4.083	0.0325
RC5		4.167	0.0678
RC5		4.250	0.1135
RC5		4.333	0.1852
RC5		4.417	0.2239
RC5		4.500	0.2565
RC5		4.583	0.2853
RC5		4.667	0.3113
RC5		4.750	0.3352
RC5		4.833	0.3575
RC5		4.917	0.3784
RC5		5.000	0.3982
RC5		5.083	1.1777
RC5		5.167	2.5866
RC5		5.250	4.4049
RC5		5.333	6.5542
RC5		5.417	8.9896
RC5		5.500	11.6799
RC5		5.583	14.6031
RC5		5.667	17.7421
RC5		5.750	21.0822
RC5		5.833	24.6123
RC5		5.917	28.3230
RC5		6.000	32.2050
;			
RC7	Rating	0.000	0.0000
RC7		0.042	0.0009
RC7		0.083	0.0016
RC7		0.125	0.0021
RC7		0.167	0.0025
RC7		0.208	0.0028
RC7		0.250	0.0031
RC7		0.292	0.0034
RC7		0.333	0.0037
RC7		0.375	0.0039
RC7		0.417	0.0041
RC7		0.458	0.0043
RC7		0.500	0.0045
RC7		0.542	0.0047
RC7		0.583	0.0049
RC7		0.625	0.0051
RC7		0.667	0.0053
RC7		0.708	0.0054
RC7		0.750	0.0056
RC7		0.792	0.0058
RC7		0.833	0.0059
RC7		0.875	0.0061
RC7		0.917	0.0062
RC7		0.958	0.0064
RC7		1.000	0.0065
RC7		1.042	0.0066
RC7		1.083	0.0068
RC7		1.125	0.0069
RC7		1.167	0.0070
RC7		1.208	0.0072
RC7		1.250	0.0073
RC7		1.292	0.0074
RC7		1.333	0.0075
RC7		1.375	0.0076
RC7		1.417	0.0078

RC7		1.458	0.0079
RC7		1.500	0.0080
RC7		1.542	0.0081
RC7		1.583	0.0082
RC7		1.625	0.0083
RC7		1.667	0.0084
RC7		1.708	0.0085
RC7		1.750	0.0086
RC7		1.792	0.0087
RC7		1.833	0.0088
RC7		1.875	0.0089
RC7		1.917	0.0090
RC7		1.958	0.0091
RC7		2.000	0.0092
RC7		2.042	0.0093
RC7		2.083	0.0094
RC7		2.125	0.0095
RC7		2.167	0.0096
RC7		2.208	0.0097
RC7		2.250	0.0098
RC7		2.292	0.0099
RC7		2.333	0.0100
RC7		2.375	0.0101
RC7		2.417	0.0102
RC7		2.458	0.0103
RC7		2.500	0.0103
RC7		2.583	0.0105
RC7		2.667	0.0107
RC7		2.750	0.0108
RC7		2.833	0.0110
RC7		2.917	0.0112
RC7		3.000	0.0113
RC7		3.083	0.0115
RC7		3.167	0.0116
RC7		3.250	0.0118
RC7		3.333	0.0119
RC7		3.417	0.0121
RC7		3.500	0.0122
RC7		3.583	0.0124
RC7		3.667	0.0125
RC7		3.750	0.0127
RC7		3.833	0.0128
RC7		3.917	0.0130
RC7		4.000	0.0131
RC7		4.083	0.0229
RC7		4.167	0.0437
RC7		4.250	0.0564
RC7		4.333	0.0662
RC7		4.417	0.0744
RC7		4.500	0.0817
RC7		4.583	0.0883
RC7		4.667	0.0944
RC7		4.750	0.1000
RC7		4.833	0.1054
RC7		4.917	0.1104
RC7		5.000	0.1152
RC7		5.083	0.1198
RC7		5.167	0.1242
RC7		5.250	0.1285
RC7		5.333	0.8932
RC7		5.417	2.2881
RC7		5.500	4.0929
RC7		5.583	6.2293
RC7		5.667	8.6523
RC7		5.750	11.3307
RC7		5.833	14.2423
RC7		5.917	17.3701
RC7		6.000	20.6993
;			
RC1	Rating	0.000	0.0000
RC1		0.042	0.0013
RC1		0.083	0.0034
RC1		0.125	0.0045
RC1		0.167	0.0054
RC1		0.208	0.0062
RC1		0.250	0.0069
RC1		0.292	0.0075

RC1	0.333	0.0081
RC1	0.375	0.0087
RC1	0.417	0.0092
RC1	0.458	0.0097
RC1	0.500	0.0101
RC1	0.542	0.0106
RC1	0.583	0.0110
RC1	0.625	0.0114
RC1	0.667	0.0118
RC1	0.708	0.0122
RC1	0.750	0.0125
RC1	0.792	0.0129
RC1	0.833	0.0132
RC1	0.875	0.0136
RC1	0.917	0.0139
RC1	0.958	0.0142
RC1	1.000	0.0145
RC1	1.042	0.0148
RC1	1.083	0.0152
RC1	1.125	0.0154
RC1	1.167	0.0157
RC1	1.208	0.0160
RC1	1.250	0.0163
RC1	1.292	0.0166
RC1	1.333	0.0169
RC1	1.375	0.0171
RC1	1.417	0.0174
RC1	1.458	0.0176
RC1	1.500	0.0179
RC1	1.542	0.0182
RC1	1.583	0.0184
RC1	1.625	0.0186
RC1	1.667	0.0189
RC1	1.708	0.0191
RC1	1.750	0.0194
RC1	1.792	0.0196
RC1	1.833	0.0198
RC1	1.875	0.0201
RC1	1.917	0.0203
RC1	1.958	0.0205
RC1	2.000	0.0207
RC1	2.042	0.0209
RC1	2.083	0.0212
RC1	2.125	0.0214
RC1	2.167	0.0216
RC1	2.208	0.0218
RC1	2.250	0.0220
RC1	2.292	0.0222
RC1	2.333	0.0224
RC1	2.375	0.0226
RC1	2.417	0.0228
RC1	2.458	0.0230
RC1	2.500	0.0232
RC1	2.583	0.0236
RC1	2.667	0.0240
RC1	2.750	0.0244
RC1	2.833	0.0247
RC1	2.917	0.0251
RC1	3.000	0.0255
RC1	3.083	0.0258
RC1	3.167	0.0262
RC1	3.250	0.0265
RC1	3.333	0.0268
RC1	3.417	0.0272
RC1	3.500	0.0275
RC1	3.583	0.0332
RC1	3.667	0.0375
RC1	3.750	0.0405
RC1	3.833	0.0430
RC1	3.917	0.0452
RC1	4.000	0.0472
RC1	4.083	0.0491
RC1	4.167	0.0508
RC1	4.250	0.0524
RC1	4.333	0.0540
RC1	4.417	0.0555
RC1	4.500	0.0569

```
RC1                         4.583      0.8182
RC1                         4.667      2.2092
RC1                         4.750      4.0097
RC1                         4.833      6.1416
RC1                         4.917      8.5599
RC1                         5.000      11.2334
;
STOR5            Storage    0          542
STOR5                       1          542
STOR5                       1.01       271
STOR5                       3.5        271
STOR5                       3.51       1356
STOR5                       4          1502
STOR5                       4.5        1655
STOR5                       4.99       1813
STOR5                       5          1813
STOR5                       6          2150
;
STOR7            Storage    0          266
STOR7                       1          266
STOR7                       1.01       133
STOR7                       3.5        133
STOR7                       3.51       664
STOR7                       4          782
STOR7                       4.5        907
STOR7                       4.99       1038
STOR7                       5          1038
STOR7                       6          1318
;
STOR1            Storage    0          403
STOR1                       1          403
STOR1                       1.01       201
STOR1                       3          201
STOR1                       3.01       1007
STOR1                       3.5        1215
STOR1                       4          1438
STOR1                       4.49       1675
STOR1                       4.5        1675
STOR1                       5.00       1925

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
KearnyMesa       FILE
"\\cp.rickeng.com\projects\C_SD_R\18483_OAS\WaterResources\Hydromodification\RainfallData\kearny_mesa_1.dat"

[REPORT]
;;Reporting Options
INPUT      NO
CONTROLS   NO
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS 0.000 0.000 10000.000 10000.000
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC1             4019.384           6145.952
STOR1            4019.384           6989.738

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
DMA1A            4021.330           7804.266
DMA1B            4885.975           7787.913
DMA1B            4885.975           7787.913
DMA1B            4885.975           7787.913
```

```
[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
KearnyMesa       4046.424           8720.201
```

BMP-1A (Discharge Rating Curve)

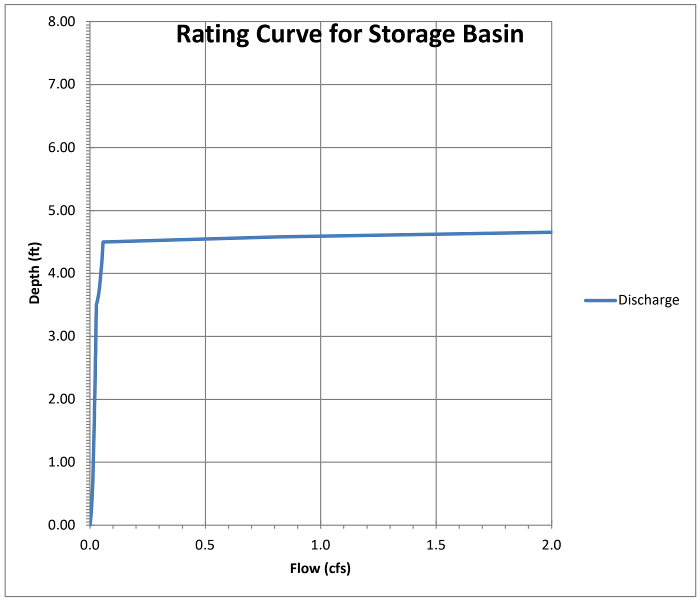
Basin Characteristics	
WQ ponding depth (ft) =	0.5
Media Layer, including 3" mulch (ft) =	2
Gravel Choker Layer (ft) =	0.25
Gravel layer (ft) =	0.75

Low Flow Orifice (Underdrain)	
Num. of Orfices =	1
Orifice Invert (ft) =	0
Orifice Diameter (in) =	0.75
Cg =	0.6

Midflow Orfice (Lower)	
Num. of Orfices =	1
Orifice Invert (ft) =	3.5
Orifice Diameter (in) =	1
Cg =	0.6

Midflow Orfice (Upper)(Rectangular)	
Num. of Orfices =	0
Orifice Invert (ft) =	0
Orifice Width (ft) =	0
Orifice Height (ft) =	0
Cg (orifice) =	0.6
Cg (weir) =	3

Top of Inlet	
Upper Weir Inv (ft) =	4.5
B (ft) =	10.53
Cs =	3



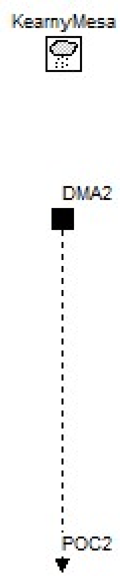
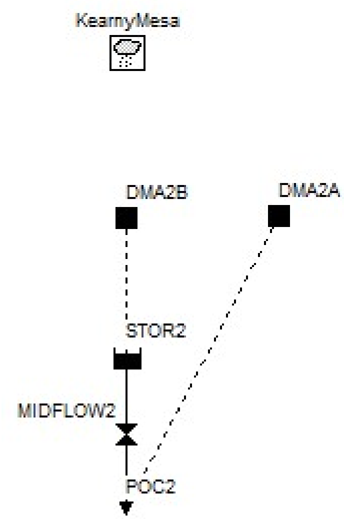
Outlet Link Rating Curve (Input to SWMM)

h (in)	h (ft)	Underdrain Orifice	Lower Orifice	Upper Orifice (weir calc)	Upper Orifice (orifice calc)	Inlet Top	Total Flow (cfs)
0.0	0.000	0.000	0.000	0.000	0.000	0.000	0.0000
0.5	0.042	0.001	0.000	0.000	0.000	0.000	0.0013
1.0	0.083	0.003	0.000	0.000	0.000	0.000	0.0034
1.5	0.125	0.005	0.000	0.000	0.000	0.000	0.0045
2.0	0.167	0.005	0.000	0.000	0.000	0.000	0.0054
2.5	0.208	0.006	0.000	0.000	0.000	0.000	0.0062
3.0	0.250	0.007	0.000	0.000	0.000	0.000	0.0069
3.5	0.292	0.008	0.000	0.000	0.000	0.000	0.0075
4.0	0.333	0.008	0.000	0.000	0.000	0.000	0.0081
4.5	0.375	0.009	0.000	0.000	0.000	0.000	0.0087
5.0	0.417	0.009	0.000	0.000	0.000	0.000	0.0092
5.5	0.458	0.010	0.000	0.000	0.000	0.000	0.0097
6.0	0.500	0.010	0.000	0.000	0.000	0.000	0.0101
6.5	0.542	0.011	0.000	0.000	0.000	0.000	0.0106
7.0	0.583	0.011	0.000	0.000	0.000	0.000	0.0110
7.5	0.625	0.011	0.000	0.000	0.000	0.000	0.0114
8.0	0.667	0.012	0.000	0.000	0.000	0.000	0.0118
8.5	0.708	0.012	0.000	0.000	0.000	0.000	0.0122
9.0	0.750	0.013	0.000	0.000	0.000	0.000	0.0125
9.5	0.792	0.013	0.000	0.000	0.000	0.000	0.0129
10.0	0.833	0.013	0.000	0.000	0.000	0.000	0.0132
10.5	0.875	0.014	0.000	0.000	0.000	0.000	0.0136
11.0	0.917	0.014	0.000	0.000	0.000	0.000	0.0139
11.5	0.958	0.014	0.000	0.000	0.000	0.000	0.0142
12.0	1.000	0.015	0.000	0.000	0.000	0.000	0.0145
12.5	1.042	0.015	0.000	0.000	0.000	0.000	0.0148
13.0	1.083	0.015	0.000	0.000	0.000	0.000	0.0152
13.5	1.125	0.015	0.000	0.000	0.000	0.000	0.0154
14.0	1.167	0.016	0.000	0.000	0.000	0.000	0.0157
14.5	1.208	0.016	0.000	0.000	0.000	0.000	0.0160
15.0	1.250	0.016	0.000	0.000	0.000	0.000	0.0163
15.5	1.292	0.017	0.000	0.000	0.000	0.000	0.0166
16.0	1.333	0.017	0.000	0.000	0.000	0.000	0.0169
16.5	1.375	0.017	0.000	0.000	0.000	0.000	0.0171
17.0	1.417	0.017	0.000	0.000	0.000	0.000	0.0174
17.5	1.458	0.018	0.000	0.000	0.000	0.000	0.0176
18.0	1.500	0.018	0.000	0.000	0.000	0.000	0.0179
18.5	1.542	0.018	0.000	0.000	0.000	0.000	0.0182
19.0	1.583	0.018	0.000	0.000	0.000	0.000	0.0184
19.5	1.625	0.019	0.000	0.000	0.000	0.000	0.0186
20.0	1.667	0.019	0.000	0.000	0.000	0.000	0.0189
20.5	1.708	0.019	0.000	0.000	0.000	0.000	0.0191
21.0	1.750	0.019	0.000	0.000	0.000	0.000	0.0194
21.5	1.792	0.020	0.000	0.000	0.000	0.000	0.0196
22.0	1.833	0.020	0.000	0.000	0.000	0.000	0.0198
22.5	1.875	0.020	0.000	0.000	0.000	0.000	0.0201
23.0	1.917	0.020	0.000	0.000	0.000	0.000	0.0203
23.5	1.958	0.021	0.000	0.000	0.000	0.000	0.0205

24.0	2.000	0.021	0.000	0.000	0.000	0.000	0.0207
24.5	2.042	0.021	0.000	0.000	0.000	0.000	0.0209
25.0	2.083	0.021	0.000	0.000	0.000	0.000	0.0212
25.5	2.125	0.021	0.000	0.000	0.000	0.000	0.0214
26.0	2.167	0.022	0.000	0.000	0.000	0.000	0.0216
26.5	2.208	0.022	0.000	0.000	0.000	0.000	0.0218
27.0	2.250	0.022	0.000	0.000	0.000	0.000	0.0220
27.5	2.292	0.022	0.000	0.000	0.000	0.000	0.0222
28.0	2.333	0.022	0.000	0.000	0.000	0.000	0.0224
28.5	2.375	0.023	0.000	0.000	0.000	0.000	0.0226
29.0	2.417	0.023	0.000	0.000	0.000	0.000	0.0228
29.5	2.458	0.023	0.000	0.000	0.000	0.000	0.0230
30.0	2.500	0.023	0.000	0.000	0.000	0.000	0.0232
31.0	2.583	0.024	0.000	0.000	0.000	0.000	0.0236
32.0	2.667	0.024	0.000	0.000	0.000	0.000	0.0240
33.0	2.750	0.024	0.000	0.000	0.000	0.000	0.0244
34.0	2.833	0.025	0.000	0.000	0.000	0.000	0.0247
35.0	2.917	0.025	0.000	0.000	0.000	0.000	0.0251
36.0	3.000	0.025	0.000	0.000	0.000	0.000	0.0255
37.0	3.083	0.026	0.000	0.000	0.000	0.000	0.0258
38.0	3.167	0.026	0.000	0.000	0.000	0.000	0.0262
39.0	3.250	0.027	0.000	0.000	0.000	0.000	0.0265
40.0	3.333	0.027	0.000	0.000	0.000	0.000	0.0268
41.0	3.417	0.027	0.000	0.000	0.000	0.000	0.0272
42.0	3.500	0.028	0.000	0.000	0.000	0.000	0.0275
43.0	3.583	0.028	0.005	0.000	0.000	0.000	0.0332
44.0	3.667	0.028	0.009	0.000	0.000	0.000	0.0375
45.0	3.750	0.028	0.012	0.000	0.000	0.000	0.0405
46.0	3.833	0.029	0.014	0.000	0.000	0.000	0.0430
47.0	3.917	0.029	0.016	0.000	0.000	0.000	0.0452
48.0	4.000	0.029	0.018	0.000	0.000	0.000	0.0472
49.0	4.083	0.030	0.019	0.000	0.000	0.000	0.0491
50.0	4.167	0.030	0.021	0.000	0.000	0.000	0.0508
51.0	4.250	0.030	0.022	0.000	0.000	0.000	0.0524
52.0	4.333	0.031	0.023	0.000	0.000	0.000	0.0540
53.0	4.417	0.031	0.025	0.000	0.000	0.000	0.0555
54.0	4.500	0.031	0.026	0.000	0.000	0.000	0.0569
55.0	4.583	0.032	0.027	0.000	0.000	0.760	0.8182
56.0	4.667	0.032	0.028	0.000	0.000	2.149	2.2092
57.0	4.750	0.032	0.029	0.000	0.000	3.949	4.0097
58.0	4.833	0.032	0.030	0.000	0.000	6.079	6.1416
59.0	4.917	0.033	0.031	0.000	0.000	8.496	8.5599
60.0	5.000	0.033	0.032	0.000	0.000	11.169	11.2334

JN-19276
ARE-Scripps HQ
February 16, 2021

SWMM Model Schematics

Pre-development Model	Post-project Model
	

DMA-2 Pre-Project SWMM Input

```
[TITLE]
;;Project Title/Notes
19276 ARE-Scripps HQ DMA2
Pre-Project Condition

[OPTIONS]
;;Option             Value
FLOW_UNITS           CFS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         KINWAVE
LINK_OFFSETS         DEPTH
MIN_SLOPE            0
ALLOW_PONDING        NO
SKIP_STEADY_STATE    NO

START_DATE           09/08/1964
START_TIME           06:00:00
REPORT_START_DATE    09/08/1964
REPORT_START_TIME    06:00:00
END_DATE             05/23/2008
END_TIME             22:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         0:01:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         12.557
MAX_TRIALS           8
HEAD_TOLERANCE       0.005
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              1

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
MONTHLY          .03    .05    .08    .11    .13    .15    .15    .13    .11    .08    .04    .02
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
;;-------------- --------- ------ ------ ----------
KearnyMesa       INTENSITY 1:00     1.0      TIMESERIES KearnyMesa

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- ----------------
;Pre-Project Condition
DMA2             KearnyMesa       POC2             2.54     0        250      5        0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
DMA2             .012       .10        .05        .1         25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    Ksat       IMD
;;-------------- ---------- ---------- ----------
DMA2             9          0.01875    0.3

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
POC2             0          FREE                        NO

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
```

```
KearnyMesa       FILE
"\\cp.rickeng.com\projects\C_SD_R\18483_OAS\WaterResources\Hydromodification\RainfallData\kearny_mesa_1.dat"

[REPORT]
;;Reporting Options
INPUT      NO
CONTROLS   NO
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS 0.000 0.000 10000.000 10000.000
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC2             4021.330           5821.832

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
DMA2             4021.330           7804.266

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
KearnyMesa       4046.424           8720.201
```

DMA-2 Post-Project SWMM Input

```
[TITLE]
;;Project Title/Notes
19276 ARE-Scripps HQ DMA2
Post-Project Condition

[OPTIONS]
;;Option             Value
FLOW_UNITS           CFS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         KINWAVE
LINK_OFFSETS         DEPTH
MIN_SLOPE            0
ALLOW_PONDING        NO
SKIP_STEADY_STATE    NO

START_DATE           09/08/1964
START_TIME           06:00:00
REPORT_START_DATE    09/08/1964
REPORT_START_TIME    06:00:00
END_DATE             05/23/2008
END_TIME             22:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         0:01:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         12.557
MAX_TRIALS           8
HEAD_TOLERANCE       0.005
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              1

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
MONTHLY          .03    .05    .08    .11    .13    .15    .15    .13    .11    .08    .04    .02
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
;;-------------- --------- ------ ------ ----------
KearnyMesa       INTENSITY 1:00     1.0      TIMESERIES KearnyMesa

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- ----------------
;Post-Project Condition
DMA2B            KearnyMesa       STOR2            2.04     85       312      2.5      0
;Post-Project Condition
DMA2A            KearnyMesa       POC2             0.5      85       139      2.5      0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
DMA2B            .012       .10        .05        .1         25         OUTLET
DMA2A            0.012      0.1        0.05       0.1        25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    Ksat       IMD
;;-------------- ---------- ---------- ----------
DMA2B            9          0.01875    0.3
DMA2A            9          0.01875    0.3

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
POC2             0          FREE                        NO
```

```
[STORAGE]
;;Name           Elev.    MaxDepth   InitDepth  Shape      Curve Name/Params            N/A      Fevap    Psi      Ksat     IMD

;;-------------- -------- ---------- ----------- ---------- ---------------------------- -------- --------          --------
--------
STOR2            0        6.13       0          TABULAR    STOR2                        0        1

[OUTLETS]
;;Name           From Node        To Node          Offset     Type            QTable/Qcoeff    Qexpon     Gated
;;-------------- ---------------- ---------------- ---------- --------------- ---------------- ---------- --------
MIDFLOW2         STOR2            POC2             0          TABULAR/DEPTH   RC2                         NO

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
RC5              Rating     0.000      0.0000
RC5                         0.042      0.0009
RC5                         0.083      0.0016
RC5                         0.125      0.0021
RC5                         0.167      0.0025
RC5                         0.208      0.0028
RC5                         0.250      0.0031
RC5                         0.292      0.0034
RC5                         0.333      0.0037
RC5                         0.375      0.0039
RC5                         0.417      0.0041
RC5                         0.458      0.0043
RC5                         0.500      0.0045
RC5                         0.542      0.0047
RC5                         0.583      0.0049
RC5                         0.625      0.0051
RC5                         0.667      0.0053
RC5                         0.708      0.0054
RC5                         0.750      0.0056
RC5                         0.792      0.0058
RC5                         0.833      0.0059
RC5                         0.875      0.0061
RC5                         0.917      0.0062
RC5                         0.958      0.0064
RC5                         1.000      0.0065
RC5                         1.042      0.0066
RC5                         1.083      0.0068
RC5                         1.125      0.0069
RC5                         1.167      0.0070
RC5                         1.208      0.0072
RC5                         1.250      0.0073
RC5                         1.292      0.0074
RC5                         1.333      0.0075
RC5                         1.375      0.0076
RC5                         1.417      0.0078
RC5                         1.458      0.0079
RC5                         1.500      0.0080
RC5                         1.542      0.0081
RC5                         1.583      0.0082
RC5                         1.625      0.0083
RC5                         1.667      0.0084
RC5                         1.708      0.0085
RC5                         1.750      0.0086
RC5                         1.792      0.0087
RC5                         1.833      0.0088
RC5                         1.875      0.0089
RC5                         1.917      0.0090
RC5                         1.958      0.0091
RC5                         2.000      0.0092
RC5                         2.042      0.0093
RC5                         2.083      0.0094
RC5                         2.125      0.0095
RC5                         2.167      0.0096
RC5                         2.208      0.0097
RC5                         2.250      0.0098
RC5                         2.292      0.0099
RC5                         2.333      0.0100
RC5                         2.375      0.0101
RC5                         2.417      0.0102
RC5                         2.458      0.0103
RC5                         2.500      0.0103
```

RC5		2.583	0.0105
RC5		2.667	0.0107
RC5		2.750	0.0108
RC5		2.833	0.0110
RC5		2.917	0.0112
RC5		3.000	0.0113
RC5		3.083	0.0115
RC5		3.167	0.0116
RC5		3.250	0.0118
RC5		3.333	0.0119
RC5		3.417	0.0121
RC5		3.500	0.0122
RC5		3.583	0.0124
RC5		3.667	0.0125
RC5		3.750	0.0127
RC5		3.833	0.0128
RC5		3.917	0.0130
RC5		4.000	0.0131
RC5		4.083	0.0325
RC5		4.167	0.0678
RC5		4.250	0.1135
RC5		4.333	0.1852
RC5		4.417	0.2239
RC5		4.500	0.2565
RC5		4.583	0.2853
RC5		4.667	0.3113
RC5		4.750	0.3352
RC5		4.833	0.3575
RC5		4.917	0.3784
RC5		5.000	0.3982
RC5		5.083	1.1777
RC5		5.167	2.5866
RC5		5.250	4.4049
RC5		5.333	6.5542
RC5		5.417	8.9896
RC5		5.500	11.6799
RC5		5.583	14.6031
RC5		5.667	17.7421
RC5		5.750	21.0822
RC5		5.833	24.6123
RC5		5.917	28.3230
RC5		6.000	32.2050
;			
RC7	Rating	0.000	0.0000
RC7		0.042	0.0009
RC7		0.083	0.0016
RC7		0.125	0.0021
RC7		0.167	0.0025
RC7		0.208	0.0028
RC7		0.250	0.0031
RC7		0.292	0.0034
RC7		0.333	0.0037
RC7		0.375	0.0039
RC7		0.417	0.0041
RC7		0.458	0.0043
RC7		0.500	0.0045
RC7		0.542	0.0047
RC7		0.583	0.0049
RC7		0.625	0.0051
RC7		0.667	0.0053
RC7		0.708	0.0054
RC7		0.750	0.0056
RC7		0.792	0.0058
RC7		0.833	0.0059
RC7		0.875	0.0061
RC7		0.917	0.0062
RC7		0.958	0.0064
RC7		1.000	0.0065
RC7		1.042	0.0066
RC7		1.083	0.0068
RC7		1.125	0.0069
RC7		1.167	0.0070
RC7		1.208	0.0072
RC7		1.250	0.0073
RC7		1.292	0.0074
RC7		1.333	0.0075
RC7		1.375	0.0076

RC7		1.417	0.0078
RC7		1.458	0.0079
RC7		1.500	0.0080
RC7		1.542	0.0081
RC7		1.583	0.0082
RC7		1.625	0.0083
RC7		1.667	0.0084
RC7		1.708	0.0085
RC7		1.750	0.0086
RC7		1.792	0.0087
RC7		1.833	0.0088
RC7		1.875	0.0089
RC7		1.917	0.0090
RC7		1.958	0.0091
RC7		2.000	0.0092
RC7		2.042	0.0093
RC7		2.083	0.0094
RC7		2.125	0.0095
RC7		2.167	0.0096
RC7		2.208	0.0097
RC7		2.250	0.0098
RC7		2.292	0.0099
RC7		2.333	0.0100
RC7		2.375	0.0101
RC7		2.417	0.0102
RC7		2.458	0.0103
RC7		2.500	0.0103
RC7		2.583	0.0105
RC7		2.667	0.0107
RC7		2.750	0.0108
RC7		2.833	0.0110
RC7		2.917	0.0112
RC7		3.000	0.0113
RC7		3.083	0.0115
RC7		3.167	0.0116
RC7		3.250	0.0118
RC7		3.333	0.0119
RC7		3.417	0.0121
RC7		3.500	0.0122
RC7		3.583	0.0124
RC7		3.667	0.0125
RC7		3.750	0.0127
RC7		3.833	0.0128
RC7		3.917	0.0130
RC7		4.000	0.0131
RC7		4.083	0.0229
RC7		4.167	0.0437
RC7		4.250	0.0564
RC7		4.333	0.0662
RC7		4.417	0.0744
RC7		4.500	0.0817
RC7		4.583	0.0883
RC7		4.667	0.0944
RC7		4.750	0.1000
RC7		4.833	0.1054
RC7		4.917	0.1104
RC7		5.000	0.1152
RC7		5.083	0.1198
RC7		5.167	0.1242
RC7		5.250	0.1285
RC7		5.333	0.8932
RC7		5.417	2.2881
RC7		5.500	4.0929
RC7		5.583	6.2293
RC7		5.667	8.6523
RC7		5.750	11.3307
RC7		5.833	14.2423
RC7		5.917	17.3701
RC7		6.000	20.6993
;			
RC1	Rating	0.000	0.0000
RC1		0.042	0.0013
RC1		0.083	0.0034
RC1		0.125	0.0045
RC1		0.167	0.0054
RC1		0.208	0.0062
RC1		0.250	0.0069

RC1	0.292	0.0075
RC1	0.333	0.0081
RC1	0.375	0.0087
RC1	0.417	0.0092
RC1	0.458	0.0097
RC1	0.500	0.0101
RC1	0.542	0.0106
RC1	0.583	0.0110
RC1	0.625	0.0114
RC1	0.667	0.0118
RC1	0.708	0.0122
RC1	0.750	0.0125
RC1	0.792	0.0129
RC1	0.833	0.0132
RC1	0.875	0.0136
RC1	0.917	0.0139
RC1	0.958	0.0142
RC1	1.000	0.0145
RC1	1.042	0.0148
RC1	1.083	0.0152
RC1	1.125	0.0154
RC1	1.167	0.0157
RC1	1.208	0.0160
RC1	1.250	0.0163
RC1	1.292	0.0166
RC1	1.333	0.0169
RC1	1.375	0.0171
RC1	1.417	0.0174
RC1	1.458	0.0176
RC1	1.500	0.0179
RC1	1.542	0.0182
RC1	1.583	0.0184
RC1	1.625	0.0186
RC1	1.667	0.0189
RC1	1.708	0.0191
RC1	1.750	0.0194
RC1	1.792	0.0196
RC1	1.833	0.0198
RC1	1.875	0.0201
RC1	1.917	0.0203
RC1	1.958	0.0205
RC1	2.000	0.0207
RC1	2.042	0.0209
RC1	2.083	0.0212
RC1	2.125	0.0214
RC1	2.167	0.0216
RC1	2.208	0.0218
RC1	2.250	0.0220
RC1	2.292	0.0222
RC1	2.333	0.0224
RC1	2.375	0.0226
RC1	2.417	0.0228
RC1	2.458	0.0230
RC1	2.500	0.0232
RC1	2.583	0.0236
RC1	2.667	0.0240
RC1	2.750	0.0244
RC1	2.833	0.0247
RC1	2.917	0.0251
RC1	3.000	0.0255
RC1	3.083	0.0258
RC1	3.167	0.0262
RC1	3.250	0.0265
RC1	3.333	0.0268
RC1	3.417	0.0272
RC1	3.500	0.0275
RC1	3.583	0.0332
RC1	3.667	0.0375
RC1	3.750	0.0405
RC1	3.833	0.0430
RC1	3.917	0.0452
RC1	4.000	0.0472
RC1	4.083	0.0491
RC1	4.167	0.0508
RC1	4.250	0.0524
RC1	4.333	0.0540
RC1	4.417	0.0555

RC1		4.500	0.0569
RC1		4.583	0.8182
RC1		4.667	2.2092
RC1		4.750	4.0097
RC1		4.833	6.1416
RC1		4.917	8.5599
RC1		5.000	11.2334
;			
RC2	Rating	0.000	0.0000
RC2		0.042	0.0009
RC2		0.083	0.0016
RC2		0.125	0.0021
RC2		0.167	0.0025
RC2		0.208	0.0028
RC2		0.250	0.0031
RC2		0.292	0.0034
RC2		0.333	0.0037
RC2		0.375	0.0039
RC2		0.417	0.0041
RC2		0.458	0.0043
RC2		0.500	0.0045
RC2		0.542	0.0047
RC2		0.583	0.0049
RC2		0.625	0.0051
RC2		0.667	0.0053
RC2		0.708	0.0054
RC2		0.750	0.0056
RC2		0.792	0.0058
RC2		0.833	0.0059
RC2		0.875	0.0061
RC2		0.917	0.0062
RC2		0.958	0.0064
RC2		1.000	0.0065
RC2		1.042	0.0066
RC2		1.083	0.0068
RC2		1.125	0.0069
RC2		1.167	0.0070
RC2		1.208	0.0072
RC2		1.250	0.0073
RC2		1.292	0.0074
RC2		1.333	0.0075
RC2		1.375	0.0076
RC2		1.417	0.0078
RC2		1.458	0.0079
RC2		1.500	0.0080
RC2		1.542	0.0081
RC2		1.583	0.0082
RC2		1.625	0.0083
RC2		1.667	0.0084
RC2		1.708	0.0085
RC2		1.750	0.0086
RC2		1.792	0.0087
RC2		1.833	0.0088
RC2		1.875	0.0089
RC2		1.917	0.0090
RC2		1.958	0.0091
RC2		2.000	0.0092
RC2		2.042	0.0093
RC2		2.083	0.0094
RC2		2.125	0.0095
RC2		2.167	0.0096
RC2		2.208	0.0097
RC2		2.250	0.0098
RC2		2.292	0.0099
RC2		2.333	0.0100
RC2		2.375	0.0101
RC2		2.417	0.0102
RC2		2.458	0.0103
RC2		2.500	0.0103
RC2		2.583	0.0105
RC2		2.667	0.0107
RC2		2.750	0.0108
RC2		2.833	0.0110
RC2		2.917	0.0112
RC2		3.000	0.0113
RC2		3.083	0.0115
RC2		3.167	0.0116

```
RC2                        3.250      0.0118
RC2                        3.333      0.0119
RC2                        3.417      0.0121
RC2                        3.500      0.0122
RC2                        3.583      0.0124
RC2                        3.667      0.0125
RC2                        3.750      0.0127
RC2                        3.833      0.0128
RC2                        3.917      0.0130
RC2                        4.000      0.0131
RC2                        4.083      0.0132
RC2                        4.167      0.0134
RC2                        4.250      0.0135
RC2                        4.333      0.0233
RC2                        4.417      0.0441
RC2                        4.500      0.0568
RC2                        4.583      0.0665
RC2                        4.667      0.0748
RC2                        4.750      0.0821
RC2                        4.833      0.0887
RC2                        4.917      0.0948
RC2                        5.000      0.1004
RC2                        5.083      0.1057
RC2                        5.167      0.1108
RC2                        5.250      0.1156
RC2                        5.333      0.8801
RC2                        5.417      2.2741
RC2                        5.500      4.0776
RC2                        5.583      6.2123
RC2                        5.667      8.6334
RC2                        5.750      11.3095
RC2                        5.833      14.2186
RC2                        5.917      17.3437
RC2                        6.000      20.6700
RC2                        6.083      24.1863
RC2                        6.167      27.8834
;
STOR5            Storage    0          542
STOR5                       1          542
STOR5                       1.01       271
STOR5                       3.5        271
STOR5                       3.51       1356
STOR5                       4          1502
STOR5                       4.5        1655
STOR5                       4.99       1813
STOR5                       5          1813
STOR5                       6          2150
;
STOR7            Storage    0          266
STOR7                       1          266
STOR7                       1.01       133
STOR7                       3.5        133
STOR7                       3.51       664
STOR7                       4          782
STOR7                       4.5        907
STOR7                       4.99       1038
STOR7                       5          1038
STOR7                       6          1318
;
STOR1            Storage    0          403
STOR1                       1          403
STOR1                       1.01       201
STOR1                       3          201
STOR1                       3.01       1007
STOR1                       3.5        1215
STOR1                       4          1438
STOR1                       4.49       1675
STOR1                       4.5        1675
STOR1                       5.00       1925
;
STOR2            Storage    0          750
STOR2                       1          750
STOR2                       1.01       375
STOR2                       3          375
STOR2                       3.01       1874
STOR2                       3.5        2206
STOR2                       4          2544
```

```
STOR2                       4.5        2888
STOR2                       4.99       3238
STOR2                       5          3238
STOR2                       6.13       4053

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
KearnyMesa       FILE
"\\cp.rickeng.com\projects\C_SD_R\18483_OAS\WaterResources\Hydromodification\RainfallData\kearny_mesa_1.dat"

[REPORT]
;;Reporting Options
INPUT      NO
CONTROLS   NO
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS 0.000 0.000 10000.000 10000.000
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC2             4019.384           6145.952
STOR2            4019.384           6989.738

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
DMA2B            4021.330           7804.266
DMA2A            4885.975           7810.718
DMA2A            4885.975           7810.718

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
KearnyMesa       4046.424           8720.201
```

BMP-2B (Discharge Rating Curve)

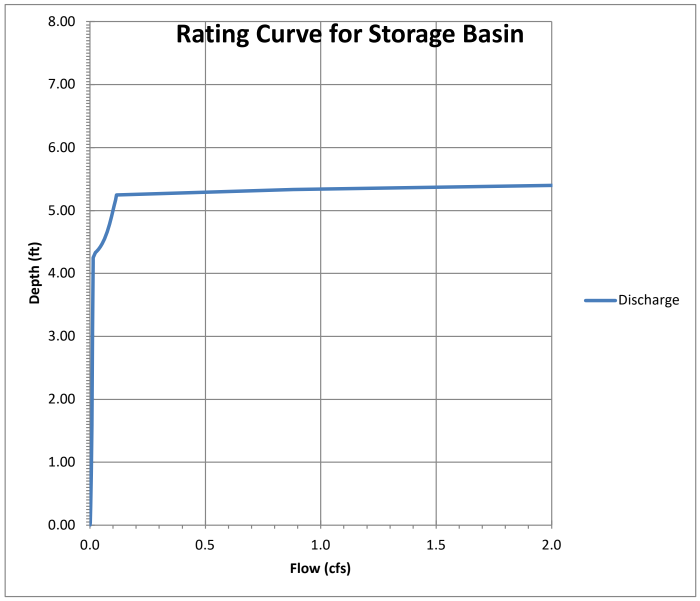
Basin Characteristics	
WQ ponding depth (ft) =	0.5
Media Layer, including 3" mulch (ft) =	2
Gravel Choker Layer (ft) =	0.25
Gravel layer (ft) =	0.75

Low Flow Orifice (Underdrain)	
Num. of Orfices =	1
Orifice Invert (ft) =	0
Orifice Diameter (in) =	0.5
Cg =	0.6

Midflow Orfice (Lower)	
Num. of Orfices =	1
Orifice Invert (ft) =	4.25
Orifice Diameter (in) =	2
Cg =	0.6

Midflow Orfice (Upper)(Rectangular)	
Num. of Orfices =	0
Orifice Invert (ft) =	0
Orifice Width (ft) =	0
Orifice Height (ft) =	0
Cg (orifice) =	0.6
Cg (weir) =	3

Top of Inlet	
Upper Weir Inv (ft) =	5.25
B (ft) =	10.53
Cs =	3



Outlet Link Rating Curve (Input to SWMM)

h (in)	h (ft)	Underdrain Orifice	Lower Orifice	Upper Orifice (weir calc)	Upper Orifice (orifice calc)	Inlet Top	Total Flow (cfs)
0.0	0.000	0.000	0.000	0.000	0.000	0.000	0.0000
0.5	0.042	0.001	0.000	0.000	0.000	0.000	0.0009
1.0	0.083	0.002	0.000	0.000	0.000	0.000	0.0016
1.5	0.125	0.002	0.000	0.000	0.000	0.000	0.0021
2.0	0.167	0.003	0.000	0.000	0.000	0.000	0.0025
2.5	0.208	0.003	0.000	0.000	0.000	0.000	0.0028
3.0	0.250	0.003	0.000	0.000	0.000	0.000	0.0031
3.5	0.292	0.003	0.000	0.000	0.000	0.000	0.0034
4.0	0.333	0.004	0.000	0.000	0.000	0.000	0.0037
4.5	0.375	0.004	0.000	0.000	0.000	0.000	0.0039
5.0	0.417	0.004	0.000	0.000	0.000	0.000	0.0041
5.5	0.458	0.004	0.000	0.000	0.000	0.000	0.0043
6.0	0.500	0.005	0.000	0.000	0.000	0.000	0.0045
6.5	0.542	0.005	0.000	0.000	0.000	0.000	0.0047
7.0	0.583	0.005	0.000	0.000	0.000	0.000	0.0049
7.5	0.625	0.005	0.000	0.000	0.000	0.000	0.0051
8.0	0.667	0.005	0.000	0.000	0.000	0.000	0.0053
8.5	0.708	0.005	0.000	0.000	0.000	0.000	0.0054
9.0	0.750	0.006	0.000	0.000	0.000	0.000	0.0056
9.5	0.792	0.006	0.000	0.000	0.000	0.000	0.0058
10.0	0.833	0.006	0.000	0.000	0.000	0.000	0.0059
10.5	0.875	0.006	0.000	0.000	0.000	0.000	0.0061
11.0	0.917	0.006	0.000	0.000	0.000	0.000	0.0062
11.5	0.958	0.006	0.000	0.000	0.000	0.000	0.0064
12.0	1.000	0.006	0.000	0.000	0.000	0.000	0.0065
12.5	1.042	0.007	0.000	0.000	0.000	0.000	0.0066
13.0	1.083	0.007	0.000	0.000	0.000	0.000	0.0068
13.5	1.125	0.007	0.000	0.000	0.000	0.000	0.0069
14.0	1.167	0.007	0.000	0.000	0.000	0.000	0.0070
14.5	1.208	0.007	0.000	0.000	0.000	0.000	0.0072
15.0	1.250	0.007	0.000	0.000	0.000	0.000	0.0073
15.5	1.292	0.007	0.000	0.000	0.000	0.000	0.0074
16.0	1.333	0.008	0.000	0.000	0.000	0.000	0.0075
16.5	1.375	0.008	0.000	0.000	0.000	0.000	0.0076
17.0	1.417	0.008	0.000	0.000	0.000	0.000	0.0078
17.5	1.458	0.008	0.000	0.000	0.000	0.000	0.0079
18.0	1.500	0.008	0.000	0.000	0.000	0.000	0.0080
18.5	1.542	0.008	0.000	0.000	0.000	0.000	0.0081
19.0	1.583	0.008	0.000	0.000	0.000	0.000	0.0082
19.5	1.625	0.008	0.000	0.000	0.000	0.000	0.0083
20.0	1.667	0.008	0.000	0.000	0.000	0.000	0.0084
20.5	1.708	0.009	0.000	0.000	0.000	0.000	0.0085
21.0	1.750	0.009	0.000	0.000	0.000	0.000	0.0086
21.5	1.792	0.009	0.000	0.000	0.000	0.000	0.0087
22.0	1.833	0.009	0.000	0.000	0.000	0.000	0.0088
22.5	1.875	0.009	0.000	0.000	0.000	0.000	0.0089
23.0	1.917	0.009	0.000	0.000	0.000	0.000	0.0090
23.5	1.958	0.009	0.000	0.000	0.000	0.000	0.0091

24.0	2.000	0.009	0.000	0.000	0.000	0.000	0.0092
24.5	2.042	0.009	0.000	0.000	0.000	0.000	0.0093
25.0	2.083	0.009	0.000	0.000	0.000	0.000	0.0094
25.5	2.125	0.010	0.000	0.000	0.000	0.000	0.0095
26.0	2.167	0.010	0.000	0.000	0.000	0.000	0.0096
26.5	2.208	0.010	0.000	0.000	0.000	0.000	0.0097
27.0	2.250	0.010	0.000	0.000	0.000	0.000	0.0098
27.5	2.292	0.010	0.000	0.000	0.000	0.000	0.0099
28.0	2.333	0.010	0.000	0.000	0.000	0.000	0.0100
28.5	2.375	0.010	0.000	0.000	0.000	0.000	0.0101
29.0	2.417	0.010	0.000	0.000	0.000	0.000	0.0102
29.5	2.458	0.010	0.000	0.000	0.000	0.000	0.0103
30.0	2.500	0.010	0.000	0.000	0.000	0.000	0.0103
31.0	2.583	0.011	0.000	0.000	0.000	0.000	0.0105
32.0	2.667	0.011	0.000	0.000	0.000	0.000	0.0107
33.0	2.750	0.011	0.000	0.000	0.000	0.000	0.0108
34.0	2.833	0.011	0.000	0.000	0.000	0.000	0.0110
35.0	2.917	0.011	0.000	0.000	0.000	0.000	0.0112
36.0	3.000	0.011	0.000	0.000	0.000	0.000	0.0113
37.0	3.083	0.011	0.000	0.000	0.000	0.000	0.0115
38.0	3.167	0.012	0.000	0.000	0.000	0.000	0.0116
39.0	3.250	0.012	0.000	0.000	0.000	0.000	0.0118
40.0	3.333	0.012	0.000	0.000	0.000	0.000	0.0119
41.0	3.417	0.012	0.000	0.000	0.000	0.000	0.0121
42.0	3.500	0.012	0.000	0.000	0.000	0.000	0.0122
43.0	3.583	0.012	0.000	0.000	0.000	0.000	0.0124
44.0	3.667	0.013	0.000	0.000	0.000	0.000	0.0125
45.0	3.750	0.013	0.000	0.000	0.000	0.000	0.0127
46.0	3.833	0.013	0.000	0.000	0.000	0.000	0.0128
47.0	3.917	0.013	0.000	0.000	0.000	0.000	0.0130
48.0	4.000	0.013	0.000	0.000	0.000	0.000	0.0131
49.0	4.083	0.013	0.000	0.000	0.000	0.000	0.0132
50.0	4.167	0.013	0.000	0.000	0.000	0.000	0.0134
51.0	4.250	0.014	0.000	0.000	0.000	0.000	0.0135
52.0	4.333	0.014	0.010	0.000	0.000	0.000	0.0233
53.0	4.417	0.014	0.030	0.000	0.000	0.000	0.0441
54.0	4.500	0.014	0.043	0.000	0.000	0.000	0.0568
55.0	4.583	0.014	0.053	0.000	0.000	0.000	0.0665
56.0	4.667	0.014	0.061	0.000	0.000	0.000	0.0748
57.0	4.750	0.014	0.068	0.000	0.000	0.000	0.0821
58.0	4.833	0.014	0.074	0.000	0.000	0.000	0.0887
59.0	4.917	0.015	0.080	0.000	0.000	0.000	0.0948
60.0	5.000	0.015	0.086	0.000	0.000	0.000	0.1004
61.0	5.083	0.015	0.091	0.000	0.000	0.000	0.1057
62.0	5.167	0.015	0.096	0.000	0.000	0.000	0.1108
63.0	5.250	0.015	0.101	0.000	0.000	0.000	0.1156
64.0	5.333	0.015	0.105	0.000	0.000	0.760	0.8801
65.0	5.417	0.015	0.109	0.000	0.000	2.149	2.2741
66.0	5.500	0.015	0.113	0.000	0.000	3.949	4.0776
67.0	5.583	0.015	0.117	0.000	0.000	6.079	6.2123
68.0	5.667	0.016	0.121	0.000	0.000	8.496	8.6334
69.0	5.750	0.016	0.125	0.000	0.000	11.169	11.3095
70.0	5.833	0.016	0.129	0.000	0.000	14.074	14.2186
71.0	5.917	0.016	0.132	0.000	0.000	17.196	17.3437
72.0	6.000	0.016	0.136	0.000	0.000	20.518	20.6700
73.0	6.083	0.016	0.139	0.000	0.000	24.031	24.1863
74.0	6.167	0.016	0.142	0.000	0.000	27.725	27.8834

Project Name: Townsgate

SWMM Model Outputs

- **Model Output Report Summary**
- **Flow Frequency Curves**
- **Flow Frequency Table**
- **Flow Duration Curves**
- **Flow Duration Summary Table**

DMA-1 Pre-Project SWMM Output

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.012)
--------------------------------------------------------------

19276 ARE-Scripps HQ DMA1
Pre-Project Condition


*********************************************************
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
*********************************************************

****************
Analysis Options
****************
Flow Units ............... CFS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Starting Date ............ 09/08/1964 06:00:00
Ending Date .............. 05/23/2008 22:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 01:00:00
Wet Time Step ............ 00:15:00
Dry Time Step ............ 04:00:00


**************************        Volume         Depth
Runoff Quantity Continuity     acre-feet        inches
**************************     ---------       -------
Total Precipitation ......        38.722       489.120
Evaporation Loss .........         1.115        14.083
Infiltration Loss ........        28.381       358.501
Surface Runoff ...........         9.802       123.816
Final Storage ............         0.000         0.000
Continuity Error (%) .....        -1.488


**************************        Volume        Volume
Flow Routing Continuity        acre-feet      10^6 gal
**************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......         9.802         3.194
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........         9.802         3.194
Flooding Loss ............         0.000         0.000
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.000         0.000
Continuity Error (%) .....         0.000


***************************
Subcatchment Runoff Summary
***************************

----------------------------------------------------------------------------------------------------------
                            Total        Total        Total        Total        Total        Total     Peak  Runoff
                           Precip        Runon         Evap        Infil       Runoff       Runoff   Runoff   Coeff
Subcatchment                   in           in           in           in           in     10^6 gal      CFS
----------------------------------------------------------------------------------------------------------
DMA1                       489.12         0.00        14.08       358.50       123.82         3.19     1.20   0.253


Analysis begun on:  Wed Mar 10 12:03:55 2021
Analysis ended on:  Wed Mar 10 12:04:19 2021
Total elapsed time: 00:00:24
```

DMA-1 Post-Project SWMM Output

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.012)
--------------------------------------------------------------

19276 ARE-Scripps HQ DMA1
Post-Project Condition


*********************************************************
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
*********************************************************

****************
Analysis Options
****************
Flow Units ............... CFS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Flow Routing Method ...... KINWAVE
Starting Date ............ 09/08/1964 06:00:00
Ending Date .............. 05/23/2008 22:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 01:00:00
Wet Time Step ............ 00:15:00
Dry Time Step ............ 04:00:00
Routing Time Step ........ 60.00 sec


**************************        Volume         Depth
Runoff Quantity Continuity     acre-feet        inches
**************************     ---------       -------
Total Precipitation ......        38.722       489.120
Evaporation Loss .........         3.648        46.076
Infiltration Loss ........         9.882       124.826
Surface Runoff ...........        25.703       324.672
Final Storage ............         0.002         0.029
Continuity Error (%) .....        -1.325


**************************        Volume        Volume
Flow Routing Continuity        acre-feet      10^6 gal
**************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......        25.703         8.376
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........        25.611         8.346
Flooding Loss ............         0.000         0.000
Evaporation Loss .........         0.078         0.026
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.007         0.002
Continuity Error (%) .....         0.024


********************************
Highest Flow Instability Indexes
********************************
All links are stable.


*************************
Routing Time Step Summary
*************************
Minimum Time Step           :     59.00 sec
Average Time Step           :     60.00 sec
Maximum Time Step           :     60.00 sec
```

Percent in Steady State : 0.00
Average Iterations per Step : 1.00
Percent Not Converging : 0.00

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff
DMA1A	489.12	0.00	48.83	106.25	340.51	7.58	1.13	0.696
DMA1B	489.12	0.00	28.68	241.98	224.79	0.79	0.17	0.460

****
Node Depth Summary
****

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Reported Max Depth Feet
POC1	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
STOR1	STORAGE	0.06	4.60	4.60	3739 02:56	4.60

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
POC1	OUTFALL	0.17	1.31	3739 02:56	0.793	8.35	0.000
STOR1	STORAGE	1.13	1.13	3739 02:31	7.58	7.58	0.027

****
Node Flooding Summary
****

No nodes were flooded.

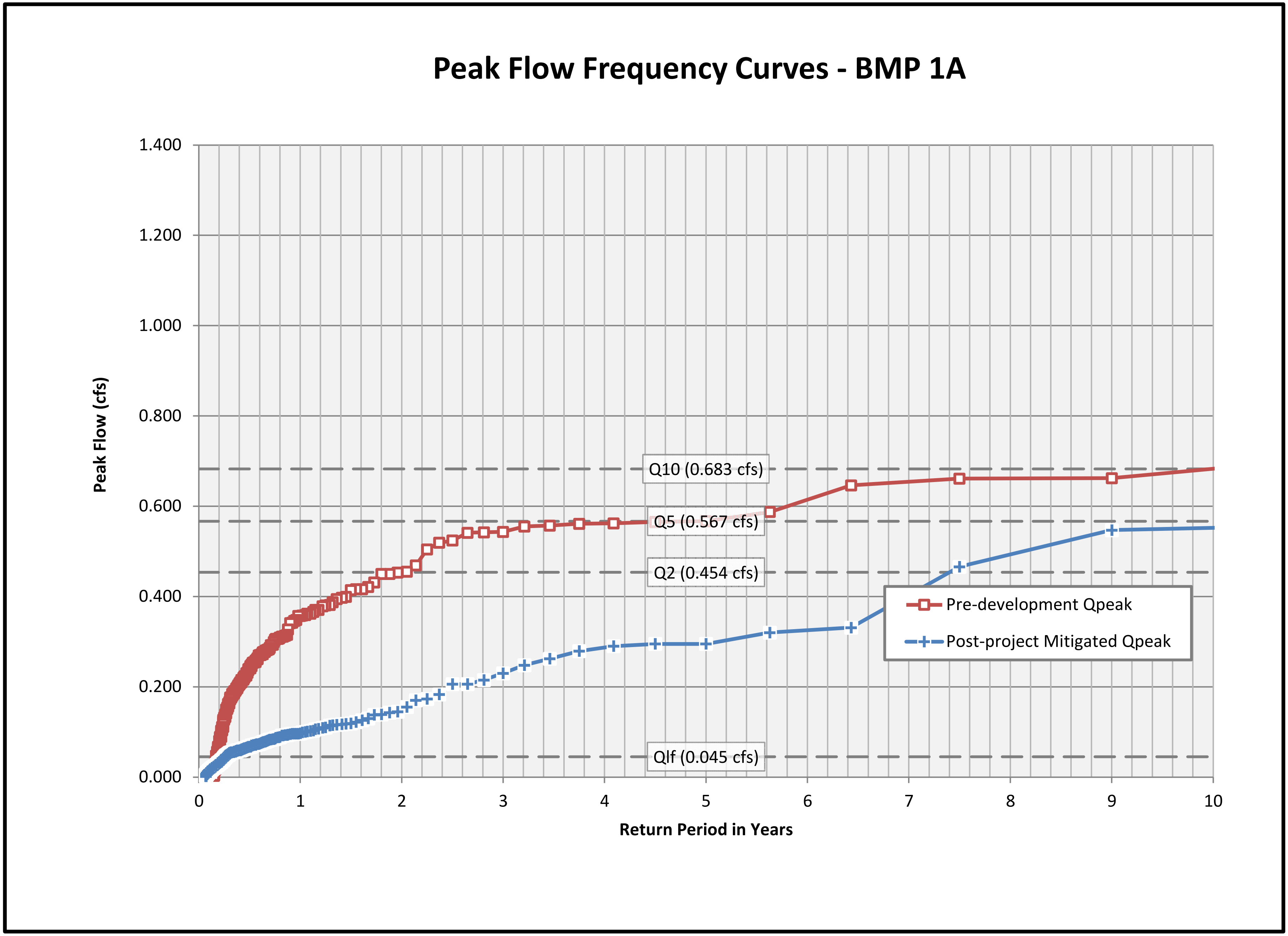
****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
STOR1	0.022	1	0	0	2.975	80	3739 02:54	1.14

****
Outfall Loading Summary
****

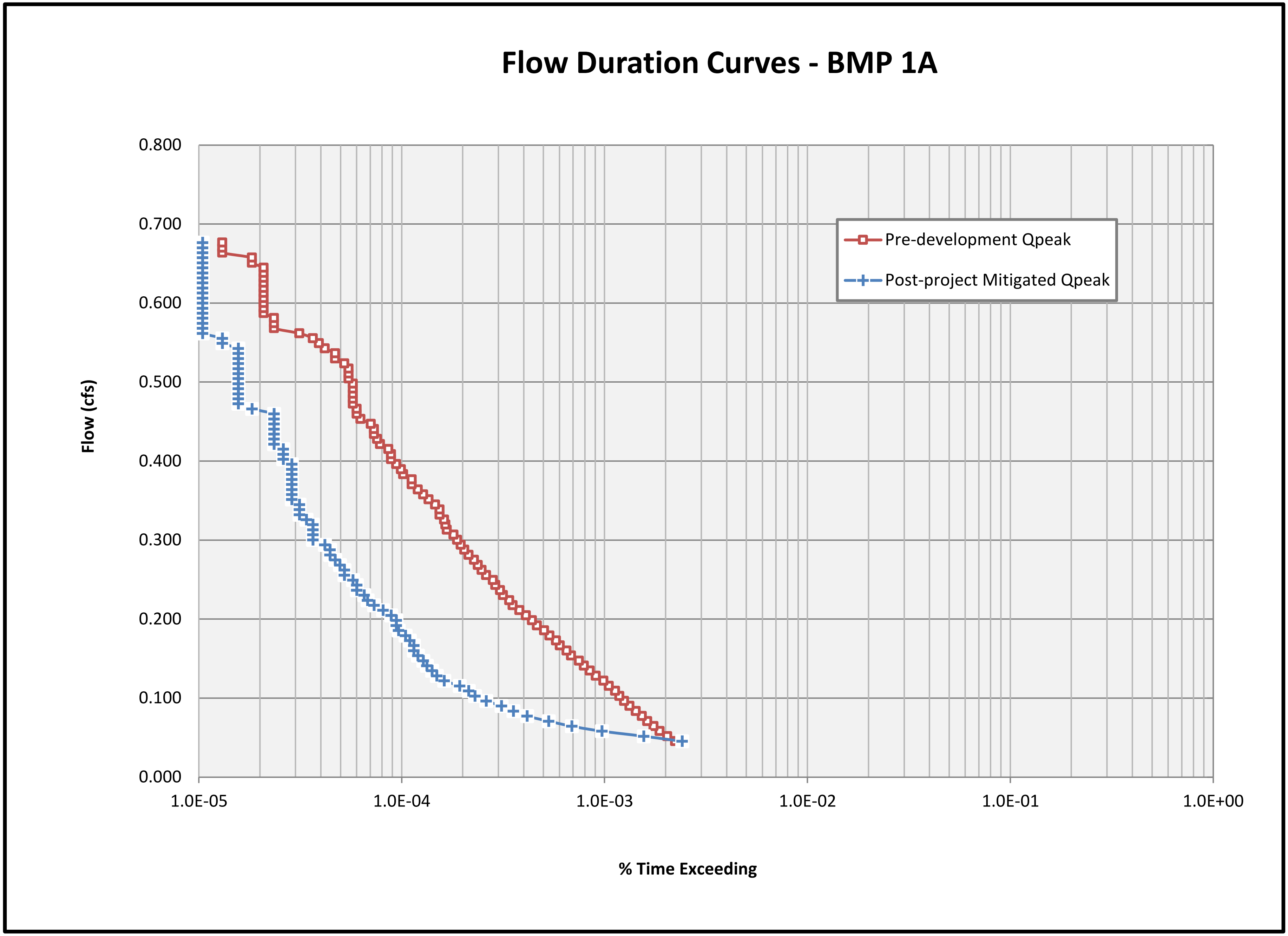
Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
POC1	5.45	0.01	1.31	8.345
System	5.45	0.01	1.31	8.345

```
*******************
Link Flow Summary
*******************

---------------------------------------------------------------------------
                            Maximum  Time of Max   Maximum    Max/    Max/
                             |Flow|   Occurrence   |Veloc|    Full    Full
Link                 Type       CFS  days hr:min    ft/sec    Flow   Depth
---------------------------------------------------------------------------
MIDFLOW1             DUMMY     1.14  3739  02:56


************************
Conduit Surcharge Summary
************************

No conduits were surcharged.


Analysis begun on:  Wed Mar 10 12:18:35 2021
Analysis ended on:  Wed Mar 10 12:19:09 2021
Total elapsed time: 00:00:34
```


Peak Flow Frequency Curves - BMP 1A
Peak Flow (cfs)
1.400
1.200
1.000
0.800
0.600
0.400
0.200
0.000
0
1
2
3
4
5
6
7
8
9
10
Return Period in Years
Q10 (0.683 cfs)
Q5 (0.567 cfs)
Q2 (0.454 cfs)
Qlf (0.045 cfs)
Pre-development Qpeak
Post-project Mitigated Qpeak

Peak Flow Frequency Summary

Return Period	Pre-development Qpeak (cfs)	Post-project - Mitigated Q (cfs)	*Check*
LF = 0.1*Q2	0.045	0.015	*Ok!*
2-year	0.454	0.149	*Ok!*
3-year	0.543	0.230	*Ok!*
4-year	0.562	0.287	*Ok!*
5-year	0.567	0.295	*Ok!*
6-year	0.614	0.325	*Ok!*
7-year	0.654	0.403	*Ok!*
8-year	0.661	0.493	*Ok!*
9-year	0.662	0.547	*Ok!*
10-year	0.683	0.552	*Ok!*



Flow Duration Curves - BMP 1A
Flow (cfs)
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
1.0E-05
1.0E-04
1.0E-03
1.0E-02
1.0E-01
1.0E+00
% Time Exceeding
Pre-development Qpeak
Post-project Mitigated Qpeak

Low-flow Threshold:	10%	
0.1xQ2 (Pre):	0.045	cfs
Q10 (Pre):	0.683	cfs
Ordinate #:	100	
Incremental Q (Pre):	0.00638	cfs
Total Hourly Data:	383127	hours

The proposed BMP: PASSED

Beginning of Interval	Pre-develop. Flow (cfs)	Pre-develop. Hours	Pre-develop. % Time Exceeding	Post-project Hours	Post-project % Time Exceeding	Percentage	Pass/Fail
1	0.045	853	2.23E-03	925	2.41E-03	108%	*Pass^*
2	0.052	781	2.04E-03	597	1.56E-03	76%	Pass
3	0.058	717	1.87E-03	372	9.71E-04	52%	Pass
4	0.065	669	1.75E-03	264	6.89E-04	39%	Pass
5	0.071	623	1.63E-03	203	5.30E-04	33%	Pass
6	0.077	586	1.53E-03	159	4.15E-04	27%	Pass
7	0.084	546	1.43E-03	136	3.55E-04	25%	Pass
8	0.090	509	1.33E-03	119	3.11E-04	23%	Pass
9	0.096	479	1.25E-03	100	2.61E-04	21%	Pass
10	0.103	454	1.18E-03	88	2.30E-04	19%	Pass
11	0.109	432	1.13E-03	82	2.14E-04	19%	Pass
12	0.116	402	1.05E-03	74	1.93E-04	18%	Pass
13	0.122	379	9.89E-04	62	1.62E-04	16%	Pass
14	0.128	347	9.06E-04	57	1.49E-04	16%	Pass
15	0.135	324	8.46E-04	54	1.41E-04	17%	Pass
16	0.141	303	7.91E-04	51	1.33E-04	17%	Pass
17	0.147	287	7.49E-04	49	1.28E-04	17%	Pass
18	0.154	262	6.84E-04	46	1.20E-04	18%	Pass
19	0.160	249	6.50E-04	44	1.15E-04	18%	Pass
20	0.167	231	6.03E-04	44	1.15E-04	19%	Pass
21	0.173	221	5.77E-04	42	1.10E-04	19%	Pass
22	0.179	205	5.35E-04	40	1.04E-04	20%	Pass
23	0.186	193	5.04E-04	37	9.66E-05	19%	Pass
24	0.192	178	4.65E-04	36	9.40E-05	20%	Pass
25	0.198	168	4.38E-04	36	9.40E-05	21%	Pass
26	0.205	157	4.10E-04	34	8.87E-05	22%	Pass
27	0.211	146	3.81E-04	31	8.09E-05	21%	Pass
28	0.218	135	3.52E-04	28	7.31E-05	21%	Pass
29	0.224	130	3.39E-04	26	6.79E-05	20%	Pass
30	0.230	121	3.16E-04	25	6.53E-05	21%	Pass
31	0.237	117	3.05E-04	23	6.00E-05	20%	Pass
32	0.243	111	2.90E-04	23	6.00E-05	21%	Pass
33	0.249	108	2.82E-04	22	5.74E-05	20%	Pass
34	0.256	100	2.61E-04	20	5.22E-05	20%	Pass
35	0.262	95	2.48E-04	20	5.22E-05	21%	Pass
36	0.269	91	2.38E-04	19	4.96E-05	21%	Pass
37	0.275	87	2.27E-04	18	4.70E-05	21%	Pass
38	0.281	82	2.14E-04	17	4.44E-05	21%	Pass
39	0.288	78	2.04E-04	17	4.44E-05	22%	Pass
40	0.294	75	1.96E-04	16	4.18E-05	21%	Pass
41	0.300	72	1.88E-04	14	3.65E-05	19%	Pass
42	0.307	69	1.80E-04	14	3.65E-05	20%	Pass
43	0.313	64	1.67E-04	14	3.65E-05	22%	Pass
44	0.320	63	1.64E-04	14	3.65E-05	22%	Pass
45	0.326	62	1.62E-04	13	3.39E-05	21%	Pass
46	0.332	59	1.54E-04	12	3.13E-05	20%	Pass
47	0.339	59	1.54E-04	12	3.13E-05	20%	Pass
48	0.345	56	1.46E-04	12	3.13E-05	21%	Pass
49	0.351	52	1.36E-04	11	2.87E-05	21%	Pass
50	0.358	49	1.28E-04	11	2.87E-05	22%	Pass
51	0.364	46	1.20E-04	11	2.87E-05	24%	Pass
52	0.371	43	1.12E-04	11	2.87E-05	26%	Pass

Beginning of Interval	Pre-develop. Flow (cfs)	Pre-develop. Hours	Pre-develop. % Time Exceeding	Post-project Hours	Post-project % Time Exceeding	Percentage	Pass/Fail
53	0.377	43	1.12E-04	11	2.87E-05	26%	Pass
54	0.383	39	1.02E-04	11	2.87E-05	28%	Pass
55	0.390	38	9.92E-05	11	2.87E-05	29%	Pass
56	0.396	36	9.40E-05	11	2.87E-05	31%	Pass
57	0.402	34	8.87E-05	10	2.61E-05	29%	Pass
58	0.409	34	8.87E-05	10	2.61E-05	29%	Pass
59	0.415	33	8.61E-05	10	2.61E-05	30%	Pass
60	0.422	30	7.83E-05	9	2.35E-05	30%	Pass
61	0.428	29	7.57E-05	9	2.35E-05	31%	Pass
62	0.434	28	7.31E-05	9	2.35E-05	32%	Pass
63	0.441	28	7.31E-05	9	2.35E-05	32%	Pass
64	0.447	27	7.05E-05	9	2.35E-05	33%	Pass
65	0.453	24	6.26E-05	9	2.35E-05	38%	Pass
66	0.460	23	6.00E-05	9	2.35E-05	39%	Pass
67	0.466	23	6.00E-05	7	1.83E-05	30%	Pass
68	0.473	22	5.74E-05	6	1.57E-05	27%	Pass
69	0.479	22	5.74E-05	6	1.57E-05	27%	Pass
70	0.485	22	5.74E-05	6	1.57E-05	27%	Pass
71	0.492	22	5.74E-05	6	1.57E-05	27%	Pass
72	0.498	22	5.74E-05	6	1.57E-05	27%	Pass
73	0.504	21	5.48E-05	6	1.57E-05	29%	Pass
74	0.511	21	5.48E-05	6	1.57E-05	29%	Pass
75	0.517	21	5.48E-05	6	1.57E-05	29%	Pass
76	0.524	20	5.22E-05	6	1.57E-05	30%	Pass
77	0.530	18	4.70E-05	6	1.57E-05	33%	Pass
78	0.536	18	4.70E-05	6	1.57E-05	33%	Pass
79	0.543	16	4.18E-05	6	1.57E-05	38%	Pass
80	0.549	15	3.92E-05	5	1.31E-05	33%	Pass
81	0.555	14	3.65E-05	5	1.31E-05	36%	Pass
82	0.562	12	3.13E-05	4	1.04E-05	33%	Pass
83	0.568	9	2.35E-05	4	1.04E-05	44%	Pass
84	0.575	9	2.35E-05	4	1.04E-05	44%	Pass
85	0.581	9	2.35E-05	4	1.04E-05	44%	Pass
86	0.587	8	2.09E-05	4	1.04E-05	50%	Pass
87	0.594	8	2.09E-05	4	1.04E-05	50%	Pass
88	0.600	8	2.09E-05	4	1.04E-05	50%	Pass
89	0.606	8	2.09E-05	4	1.04E-05	50%	Pass
90	0.613	8	2.09E-05	4	1.04E-05	50%	Pass
91	0.619	8	2.09E-05	4	1.04E-05	50%	Pass
92	0.626	8	2.09E-05	4	1.04E-05	50%	Pass
93	0.632	8	2.09E-05	4	1.04E-05	50%	Pass
94	0.638	8	2.09E-05	4	1.04E-05	50%	Pass
95	0.645	8	2.09E-05	4	1.04E-05	50%	Pass
96	0.651	7	1.83E-05	4	1.04E-05	57%	Pass
97	0.657	7	1.83E-05	4	1.04E-05	57%	Pass
98	0.664	5	1.31E-05	4	1.04E-05	80%	Pass
99	0.670	5	1.31E-05	4	1.04E-05	80%	Pass
100	0.677	5	1.31E-05	4	1.04E-05	80%	Pass

DMA-2 Pre-Project SWMM Output

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.012)
--------------------------------------------------------------

19276 ARE-Scripps HQ DMA2
Pre-Project Condition


*********************************************************
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
*********************************************************

****************
Analysis Options
****************
Flow Units ............... CFS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Starting Date ............ 09/08/1964 06:00:00
Ending Date .............. 05/23/2008 22:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 01:00:00
Wet Time Step ............ 00:15:00
Dry Time Step ............ 04:00:00


**************************        Volume         Depth
Runoff Quantity Continuity     acre-feet        inches
**************************     ---------       -------
Total Precipitation ......       103.530       489.120
Evaporation Loss .........         3.075        14.529
Infiltration Loss ........        76.635       362.056
Surface Runoff ...........        25.176       118.940
Final Storage ............         0.000         0.000
Continuity Error (%) .....        -1.310


**************************        Volume        Volume
Flow Routing Continuity        acre-feet      10^6 gal
**************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......        25.176         8.204
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........        25.176         8.204
Flooding Loss ............         0.000         0.000
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.000         0.000
Continuity Error (%) .....         0.000


***************************
Subcatchment Runoff Summary
***************************

----------------------------------------------------------------------------------------------------------
                            Total      Total      Total      Total      Total       Total     Peak  Runoff
                           Precip      Runon       Evap      Infil     Runoff      Runoff   Runoff   Coeff
Subcatchment                   in         in         in         in         in    10^6 gal      CFS
----------------------------------------------------------------------------------------------------------
DMA2                       489.12       0.00      14.53     362.06     118.94        8.20     3.12   0.243


Analysis begun on:  Wed Mar 10 16:16:24 2021
Analysis ended on:  Wed Mar 10 16:16:49 2021
Total elapsed time: 00:00:25
```

DMA-2 Post-Project SWMM Output

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.012)
--------------------------------------------------------------

19276 ARE-Scripps HQ DMA2
Post-Project Condition


*********************************************************
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
*********************************************************

****************
Analysis Options
****************
Flow Units ............... CFS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Flow Routing Method ...... KINWAVE
Starting Date ............ 09/08/1964 06:00:00
Ending Date .............. 05/23/2008 22:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 01:00:00
Wet Time Step ............ 00:15:00
Dry Time Step ............ 04:00:00
Routing Time Step ........ 60.00 sec


**************************        Volume         Depth
Runoff Quantity Continuity     acre-feet        inches
**************************     ---------       -------
Total Precipitation ......       103.530       489.120
Evaporation Loss .........        12.159        57.444
Infiltration Loss ........        11.224        53.027
Surface Runoff ...........        81.372       384.435
Final Storage ............         0.009         0.041
Continuity Error (%) .....        -1.191


**************************        Volume        Volume
Flow Routing Continuity        acre-feet      10^6 gal
**************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......        81.371        26.516
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........        80.855        26.348
Flooding Loss ............         0.000         0.000
Evaporation Loss .........         0.467         0.152
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.034         0.011
Continuity Error (%) .....         0.018


********************************
Highest Flow Instability Indexes
********************************
All links are stable.


*************************
Routing Time Step Summary
*************************
Minimum Time Step           :     59.00 sec
Average Time Step           :     60.00 sec
Maximum Time Step           :     60.00 sec
```

Percent in Steady State : 0.00
Average Iterations per Step : 1.00
Percent Not Converging : 0.00

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff
DMA2B	489.12	0.00	57.64	53.08	384.01	21.27	2.84	0.785
DMA2A	489.12	0.00	56.66	52.82	386.16	5.24	0.70	0.790

****
Node Depth Summary
****

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Reported Max Depth Feet
POC2	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
STOR2	STORAGE	0.33	5.44	5.44	3739 02:59	5.44

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
POC2	OUTFALL	0.70	3.54	3739 02:59	5.24	26.3	0.000
STOR2	STORAGE	2.84	2.84	3739 03:01	21.3	21.3	0.022

****
Node Flooding Summary
****

No nodes were flooded.

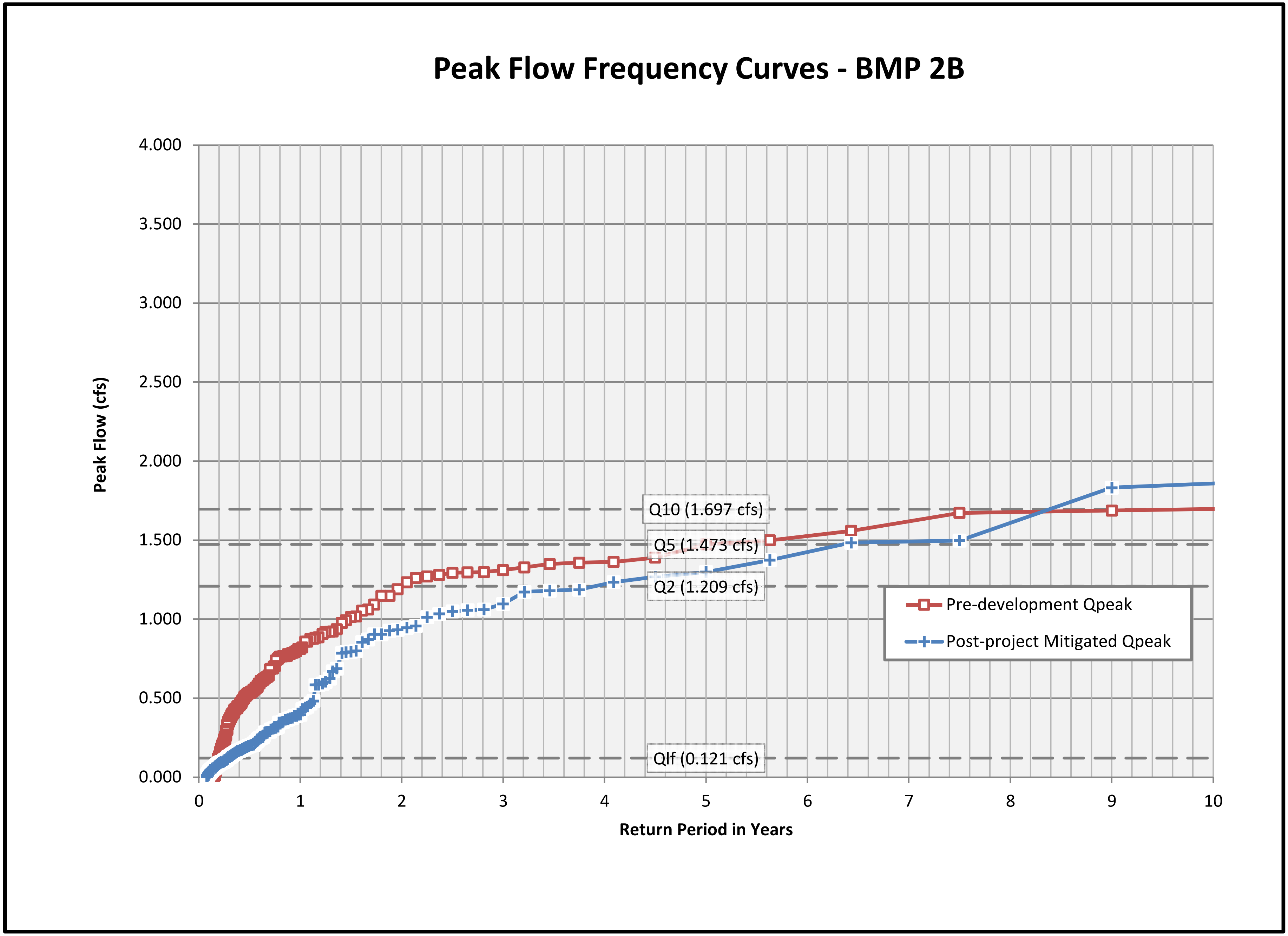
****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
STOR2	0.270	3	1	0	8.100	76	3739 02:58	2.85

****
Outfall Loading Summary
****

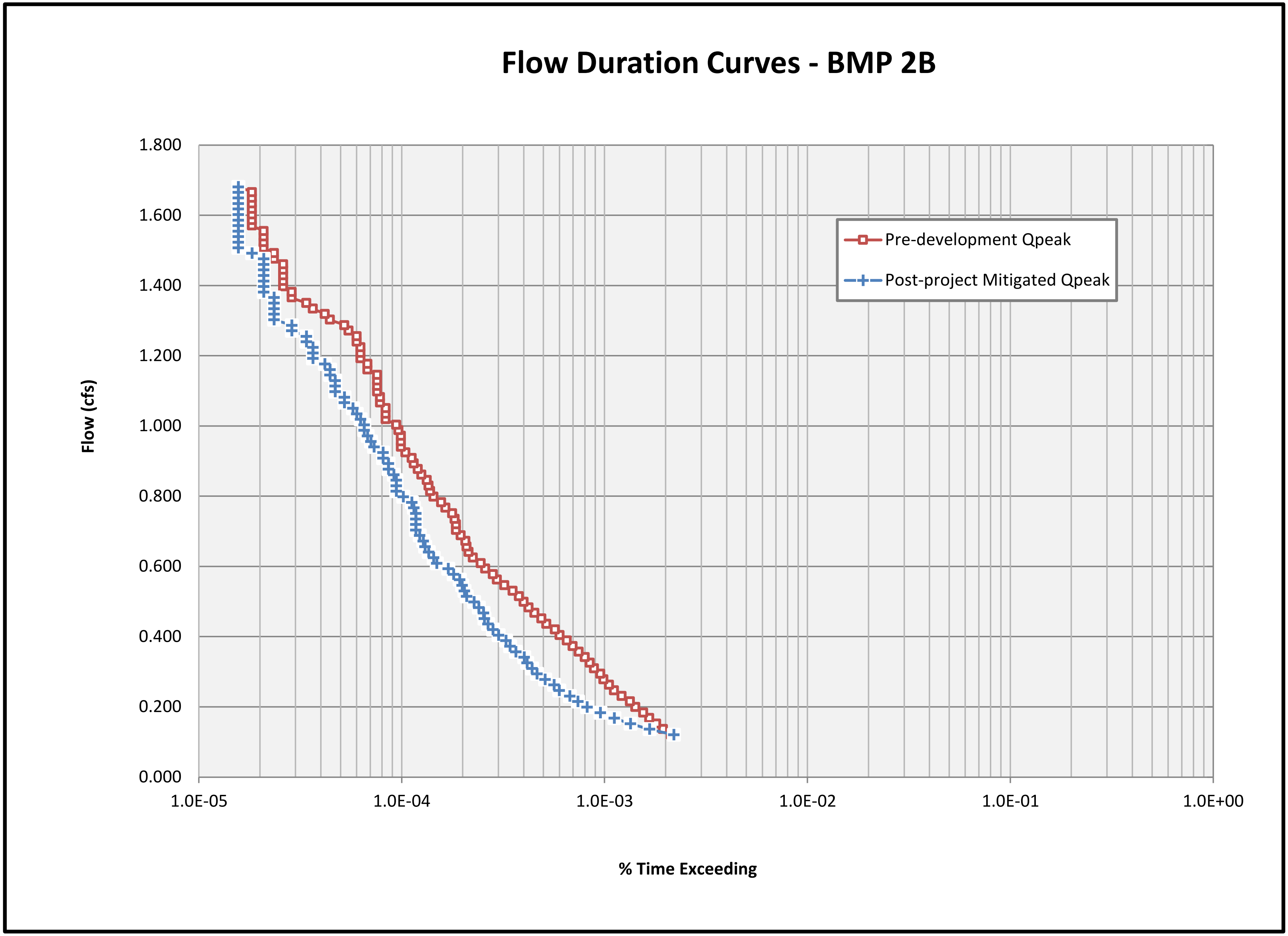
Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
POC2	17.15	0.01	3.54	26.346
System	17.15	0.01	3.54	26.346

```
*******************
Link Flow Summary
*******************

-----------------------------------------------------------------------------
                            Maximum  Time of Max   Maximum    Max/    Max/
                             |Flow|   Occurrence   |Veloc|    Full    Full
Link                 Type       CFS  days hr:min    ft/sec    Flow   Depth
-----------------------------------------------------------------------------
MIDFLOW2             DUMMY     2.85  3739  02:59


************************
Conduit Surcharge Summary
************************

No conduits were surcharged.


Analysis begun on:  Wed Mar 10 17:21:14 2021
Analysis ended on:  Wed Mar 10 17:21:48 2021
Total elapsed time: 00:00:34
```


Peak Flow Frequency Curves - BMP 2B
Peak Flow (cfs)
4.000
3.500
3.000
2.500
2.000
1.500
1.000
0.500
0.000
0
1
2
3
4
5
6
7
8
9
10
Return Period in Years
Q10 (1.697 cfs)
Q5 (1.473 cfs)
Q2 (1.209 cfs)
Qlf (0.121 cfs)
Pre-development Qpeak
Post-project Mitigated Qpeak

Peak Flow Frequency Summary

Return Period	Pre-development Qpeak (cfs)	Post-project - Mitigated Q (cfs)	*Check*
LF = 0.1*Q2	0.121	0.094	*Ok!*
2-year	1.209	0.939	*Ok!*
3-year	1.310	1.096	*Ok!*
4-year	1.361	1.221	*Ok!*
5-year	1.473	1.298	*Ok!*
6-year	1.526	1.424	*Ok!*
7-year	1.619	1.490	*Ok!*
8-year	1.677	1.609	*Ok!*
9-year	1.687	1.832	*Ok!*
10-year	1.697	1.858	*Ok!*


Flow Duration Curves - BMP 2B
Flow (cfs)
1.800
1.600
1.400
1.200
1.000
0.800
0.600
0.400
0.200
0.000
1.0E-05
1.0E-04
1.0E-03
1.0E-02
1.0E-01
1.0E+00
% Time Exceeding
Pre-development Qpeak
Post-project Mitigated Qpeak

Low-flow Threshold:	10%	
0.1xQ2 (Pre):	0.121	cfs
Q10 (Pre):	1.697	cfs
Ordinate #:	100	
Incremental Q (Pre):	0.01576	cfs
Total Hourly Data:	383127	hours

The proposed BMP: PASSED

Beginning of Interval	Pre-develop. Flow (cfs)	Pre-develop. Hours	Pre-develop. % Time Exceeding	Post-project Hours	Post-project % Time Exceeding	Percentage	Pass/Fail
1	0.121	816	2.13E-03	842	2.20E-03	103%	*Pass^*
2	0.137	744	1.94E-03	639	1.67E-03	86%	Pass
3	0.152	690	1.80E-03	514	1.34E-03	74%	Pass
4	0.168	637	1.66E-03	428	1.12E-03	67%	Pass
5	0.184	594	1.55E-03	365	9.53E-04	61%	Pass
6	0.200	544	1.42E-03	314	8.20E-04	58%	Pass
7	0.215	511	1.33E-03	283	7.39E-04	55%	Pass
8	0.231	466	1.22E-03	258	6.73E-04	55%	Pass
9	0.247	427	1.11E-03	229	5.98E-04	54%	Pass
10	0.263	403	1.05E-03	216	5.64E-04	54%	Pass
11	0.278	379	9.89E-04	195	5.09E-04	51%	Pass
12	0.294	365	9.53E-04	178	4.65E-04	49%	Pass
13	0.310	340	8.87E-04	168	4.38E-04	49%	Pass
14	0.326	324	8.46E-04	159	4.15E-04	49%	Pass
15	0.341	306	7.99E-04	154	4.02E-04	50%	Pass
16	0.357	286	7.46E-04	140	3.65E-04	49%	Pass
17	0.373	267	6.97E-04	131	3.42E-04	49%	Pass
18	0.389	250	6.53E-04	125	3.26E-04	50%	Pass
19	0.405	230	6.00E-04	115	3.00E-04	50%	Pass
20	0.420	218	5.69E-04	108	2.82E-04	50%	Pass
21	0.436	198	5.17E-04	102	2.66E-04	52%	Pass
22	0.452	187	4.88E-04	98	2.56E-04	52%	Pass
23	0.468	173	4.52E-04	97	2.53E-04	56%	Pass
24	0.483	162	4.23E-04	92	2.40E-04	57%	Pass
25	0.499	153	3.99E-04	87	2.27E-04	57%	Pass
26	0.515	145	3.78E-04	80	2.09E-04	55%	Pass
27	0.531	135	3.52E-04	78	2.04E-04	58%	Pass
28	0.546	123	3.21E-04	76	1.98E-04	62%	Pass
29	0.562	113	2.95E-04	74	1.93E-04	65%	Pass
30	0.578	108	2.82E-04	69	1.80E-04	64%	Pass
31	0.594	99	2.58E-04	65	1.70E-04	66%	Pass
32	0.609	94	2.45E-04	57	1.49E-04	61%	Pass
33	0.625	86	2.24E-04	55	1.44E-04	64%	Pass
34	0.641	82	2.14E-04	52	1.36E-04	63%	Pass
35	0.657	80	2.09E-04	50	1.31E-04	63%	Pass
36	0.672	79	2.06E-04	49	1.28E-04	62%	Pass
37	0.688	75	1.96E-04	47	1.23E-04	63%	Pass
38	0.704	71	1.85E-04	45	1.17E-04	63%	Pass
39	0.720	71	1.85E-04	45	1.17E-04	63%	Pass
40	0.735	70	1.83E-04	45	1.17E-04	64%	Pass
41	0.751	68	1.77E-04	45	1.17E-04	66%	Pass
42	0.767	63	1.64E-04	44	1.15E-04	70%	Pass
43	0.783	60	1.57E-04	43	1.12E-04	72%	Pass
44	0.799	55	1.44E-04	39	1.02E-04	71%	Pass
45	0.814	53	1.38E-04	36	9.40E-05	68%	Pass
46	0.830	52	1.36E-04	36	9.40E-05	69%	Pass
47	0.846	51	1.33E-04	36	9.40E-05	71%	Pass
48	0.862	48	1.25E-04	35	9.14E-05	73%	Pass
49	0.877	46	1.20E-04	33	8.61E-05	72%	Pass
50	0.893	44	1.15E-04	33	8.61E-05	75%	Pass
51	0.909	43	1.12E-04	31	8.09E-05	72%	Pass
52	0.925	40	1.04E-04	31	8.09E-05	78%	Pass

Beginning of Interval	Pre-develop. Flow (cfs)	Pre-develop. Hours	Pre-develop. % Time Exceeding	Post-project Hours	Post-project % Time Exceeding	Percentage	Pass/Fail
53	0.940	38	9.92E-05	28	7.31E-05	74%	Pass
54	0.956	38	9.92E-05	27	7.05E-05	71%	Pass
55	0.972	38	9.92E-05	26	6.79E-05	68%	Pass
56	0.988	37	9.66E-05	25	6.53E-05	68%	Pass
57	1.003	36	9.40E-05	25	6.53E-05	69%	Pass
58	1.019	32	8.35E-05	24	6.26E-05	75%	Pass
59	1.035	32	8.35E-05	23	6.00E-05	72%	Pass
60	1.051	32	8.35E-05	22	5.74E-05	69%	Pass
61	1.066	30	7.83E-05	20	5.22E-05	67%	Pass
62	1.082	30	7.83E-05	20	5.22E-05	67%	Pass
63	1.098	29	7.57E-05	18	4.70E-05	62%	Pass
64	1.114	29	7.57E-05	18	4.70E-05	62%	Pass
65	1.129	29	7.57E-05	18	4.70E-05	62%	Pass
66	1.145	29	7.57E-05	17	4.44E-05	59%	Pass
67	1.161	26	6.79E-05	17	4.44E-05	65%	Pass
68	1.177	26	6.79E-05	16	4.18E-05	62%	Pass
69	1.192	24	6.26E-05	14	3.65E-05	58%	Pass
70	1.208	24	6.26E-05	14	3.65E-05	58%	Pass
71	1.224	24	6.26E-05	14	3.65E-05	58%	Pass
72	1.240	23	6.00E-05	13	3.39E-05	57%	Pass
73	1.256	23	6.00E-05	13	3.39E-05	57%	Pass
74	1.271	21	5.48E-05	11	2.87E-05	52%	Pass
75	1.287	20	5.22E-05	11	2.87E-05	55%	Pass
76	1.303	17	4.44E-05	9	2.35E-05	53%	Pass
77	1.319	16	4.18E-05	9	2.35E-05	56%	Pass
78	1.334	14	3.65E-05	9	2.35E-05	64%	Pass
79	1.350	13	3.39E-05	9	2.35E-05	69%	Pass
80	1.366	11	2.87E-05	9	2.35E-05	82%	Pass
81	1.382	11	2.87E-05	8	2.09E-05	73%	Pass
82	1.397	10	2.61E-05	8	2.09E-05	80%	Pass
83	1.413	10	2.61E-05	8	2.09E-05	80%	Pass
84	1.429	10	2.61E-05	8	2.09E-05	80%	Pass
85	1.445	10	2.61E-05	8	2.09E-05	80%	Pass
86	1.460	10	2.61E-05	8	2.09E-05	80%	Pass
87	1.476	9	2.35E-05	8	2.09E-05	89%	Pass
88	1.492	9	2.35E-05	7	1.83E-05	78%	Pass
89	1.508	8	2.09E-05	6	1.57E-05	75%	Pass
90	1.523	8	2.09E-05	6	1.57E-05	75%	Pass
91	1.539	8	2.09E-05	6	1.57E-05	75%	Pass
92	1.555	8	2.09E-05	6	1.57E-05	75%	Pass
93	1.571	7	1.83E-05	6	1.57E-05	86%	Pass
94	1.586	7	1.83E-05	6	1.57E-05	86%	Pass
95	1.602	7	1.83E-05	6	1.57E-05	86%	Pass
96	1.618	7	1.83E-05	6	1.57E-05	86%	Pass
97	1.634	7	1.83E-05	6	1.57E-05	86%	Pass
98	1.650	7	1.83E-05	6	1.57E-05	86%	Pass
99	1.665	7	1.83E-05	6	1.57E-05	86%	Pass
100	1.681	6	1.57E-05	6	1.57E-05	100%	*Pass^*

Project Name: **Townsgate**

Drawdown Calculations

Project Name: Townsgate

Compact Disc (CD): Electronic Files for HMP Calculation

Attachment 3
Structural BMP Maintenance Information

This is the cover sheet for Attachment 3.

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Project Name: ARE - Scripps HQ

Indicate which Items are Included:

Attachment Sequence	Contents	Checklist
Attachment 3	Maintenance Agreement (Form DS-3247) (when applicable)	☑ Included ☐ Not applicable

Project Name: ARE – Scripps HQ

Use this checklist to ensure the required information has been included in the Structural BMP Maintenance Information Attachment:

Attachment 3: For private entity operation and maintenance, Attachment 3 must include a Storm Water Management and Discharge Control Maintenance Agreement (Form DS-3247). The following information must be included in the exhibits attached to the maintenance agreement:

- ☐ Vicinity map
- ☐ Site design BMPs for which DCV reduction is claimed for meeting the pollutant control obligations.
- ☐ BMP and HMP location and dimensions
- ☐ BMP and HMP specifications/cross section/model
- ☑ Maintenance recommendations and frequency
- ☐ LID features such as (permeable paver and LS location, dim, SF).

SITE DESIGN, SOURCE CONTROL, AND POLLUTANT CONTROL BMP OPERATION & MAINTENANCE PROCEDURE[1]						
STORM WATER MANAGEMENT AND DISCHARGE CONTROL MAINTENANCE AGREEMENT APPROVAL NO.:						
O&M RESPONSIBLE PARTY DESIGNEE: PROPERTY OWNER						
BMP DESCRIPTION		**INSPECTION FREQUENCY[2]**	**MAINTENANCE FREQUENCY**	**MAINTENANCE METHOD**	**QUANTITY**	**INCLUDED IN O&M MANUAL**
SITE DESIGN	LANDSCAPED AREAS WITH AMENDED SOILS (VOLUME RETENTION)	MONTHLY (NOTE: INSPECTOR SHALL CHECK FOR THE FOLLOWING MAINTENANCE INDICATORS: EROSION IN THE FORM OF RILLS OR GULLIES, PONDING WATER, BARE AREAS, ANIMAL BURROWS, HOLES, MOUNDS, AND TRASH)	1. AS DETERMINED BY INSPECTION; AND 2. ON OR BEFORE SEPTEMBER 30TH.	1. FILL AND COMPACT AREAS OF RUTS, RILLS, OR GULLIES; 2. RE-SEED AND/OR PLANT SLOPES AND AREAS OF EXPOSED SOILS; AND 3. ROUTINE MOWING AND TRIMMING AND TRASH REMOVAL.	900 SF	YES
	OUTLET PROTECTION	1. MONTHLY; 2. WITHIN 24 HOURS AFTER EACH "SIGNIFICANT RAIN EVENT" AND 3. WITHIN 24 HOURS FOLLOWING CONSTRUCTION IN IMMEDIATE AREA OF OUTLET PROTECTION	1. AS DETERMINED BY INSPECTION; 2. WHEN DISTURBED OR MISSING ROCKS (RIP RAP), OR SOIL EROSION BELOW AND/OR ADJACENT TO OUTLET PROTECTION ARE OBSERVED.	1. REMOVE TRASH, DEBRIS AND LEAVES. REPAIR ANY DAMAGE TO ROOF DRAINS; 2. IMMEDIATELY REPOSITION ALL DISPLACED ENERGY DISSIPATER; AND 3. IF SOIL EROSION IS FOUND, EXTEND ENERGY DISSIPATER (I.E. LANDSCAPE ROCKS AND/OR SPLASH PADS); REPOSITION OR INCREASE LIMITS OF ENERGY DISSIPATER TO COVER ERODED AREA.	-	YES
SOURCE CONTROL	INTEGRATED PEST MANAGEMENT	MONTHLY (NOTE: INSPECTOR SHALL CHECK FOR INDICATIONS OF THE PRESENCE OF PESTS ON-SITE)	WHEN THE PEST OR PESTS, OBSERVED IN GREATEST ABUNDANCE OR CAUSE THE MOST OBSERVED SYMPTOMS, ARE IDENTIFIED.	CHECK FREQUENTLY FOR PESTS, AND TREAT WITH A PESTICIDE ONLY WHEN A PEST IS PRESENT, ETC.	-	YES
	TRASH STORAGE AREAS	WEEKLY	1. AS DETERMINED BY INSPECTION; 2. STANDING WATER IN TRASH STORAGE AREA. 3. LOOSE TRASH OR DEBRIS. 4. LEAKED OR SPILLED MATERIALS. 5. COMPROMISED FENCE, SCREEN, GATE, WALL, BIN. LID OR ROOF AWNING (WHERE APPLICABLE). 6. CRACKED OR OTHERWISE COMPROMISED PAVING OR OTHER FLAWED FLOOR SURFACE (AS APPLICABLE).	1. IF STANDING WATER IS OBSERVED IN THE AREA, DETERMINE THE WATER SOURCE AND REMOVE THE SOURCE. ALLOW STANDING WATER TO EVAPORATE. IF WATER DOES NOT EVAPORATE IN 48 HOURS, REDISTRIBUTE THE WATER TO LANDSCAPED AREA(S). DO NOT DRAIN WATER TO STORM DRAIN SYSTEM. 2. REMOVE AND PROPERLY DISPOSE LOOSE TRASH, DEBRIS, AND LEAKED OR SPILLED MATERIALS. USE APPROPRIATE SPILL CLEANUP MATERIAL AS NECESSARY TO REMOVE ALL LEAKED AND SPILLED MATERIALS INCLUDING MATERIALS ADHERED TO PAVEMENT. IDENTIFY AND REMOVE OR REPAIR THE SOURCE OF ANY LEAKED OR SPILLED MATERIALS. 3. REPAIR THE FOLLOWING AS APPLICABLE: COMPROMISED FENCE, SCREEN, GATE, WALL, BIN, LID OR ROOF AWNING (WHERE APPLICABLE), CRACKED OR COMPROMISED PAVING OR OTHER FLOOR SURFACE (AS APPLICABLE).	1	YES
	PREVENTIVE STENCILING AND SIGNAGE	ANNUALLY	WHEN FULLY OR PARTIALLY ERASED SIGNS ARE OBSERVED; WHEN DUMPING OF TRASH ARE OBSERVED AT PUBLIC ACCESS POINTS, BUILDING ENTRANCES, PUBLIC PARKS, ETC.	1. REPLACE OR REPAINT THE STENCILS AND SIGNAGE SO THAT THEY ARE LEGIBLE; AND 2. MAKE SURE THAT THEY ARE PLACED AT ALL REQUIRED LOCATIONS (I.E. - ALL INLETS).	2	YES
	EFFECTIVE IRRIGATION SYSTEM	MONTHLY	WHEN BROKEN SPRINKLER HEADS, RAIN SHUTOFF DEVICES, AND FLOW REDUCERS ARE OBSERVED; OR RUNNING SPRINKLERS IN RAIN ARE	REPAIR OR REPLACE THE BROKEN AND/OR MALFUNCTIONING PARTS OF IRRIGATION SYSTEM.	-	YES

SITE DESIGN, SOURCE CONTROL, AND POLLUTANT CONTROL BMP OPERATION & MAINTENANCE PROCEDURE[1]						
STORM WATER MANAGEMENT AND DISCHARGE CONTROL MAINTENANCE AGREEMENT APPROVAL NO.:						
O&M RESPONSIBLE PARTY DESIGNEE: PROPERTY OWNER						
BMP DESCRIPTION		**INSPECTION FREQUENCY[2]**	**MAINTENANCE FREQUENCY**	**MAINTENANCE METHOD**	**QUANTITY**	**INCLUDED IN O&M MANUAL**
STRUCTURAL BMP	MODULAR WETLAND SYSTEM (BMP-1B & 2A) (POLLUTANT CONTROL ONLY)	1. MINIMUM TWICE A YEAR (ON OR BEFORE SEPTEMBER 15TH AND FOLLOWING THE RAINY SEASON AFTER MAY 1ST); AND 2. AFTER EACH "SIGNIFICANT RAIN EVENT"	AS NEEDED BASED ON INSPECTION FINDINGS	1. ROUTINE MAINTENANCE TO REMOVE THE ACCUMULATED MATERIALS IN THE SCREENING FILTER, SEPARATION CHAMBER, AND PERIMETER FILTER (BIOMEDIA GREEN) AND REPLACE FILTER MEDIA PERFORMED BY A QUALIFIED SERVICE PROVIDER PER MANUFACTUER'S GUIDELINES AND CONDITIONS AND CONDITIONS DEFINED IN THE WASHINGTON ECOLOGY T.A.P.E. CERTIFICATION. 2. IF INSPECTION INDICATES INTERNAL COMPONENTS ARE DAMAGED, ADDITIONAL NON-ROUTINE MAINTENANCE WILL BE REQUIRED TO REPAIR OR REPLACE DAMAGED PARTS AS APPLICABLE.	2	YES
	BIOFILTRATION FACILITY (BMP-1A & 2B) (POLLUTANT CONTROL & HMP)	1. TWICE A YEAR (ON OR BEFORE SEPTEMBER 15TH AND FOLLOWING THE RAINY SEASON AFTER MAY 1ST); AND 2. AFTER EACH "SIGNIFICANT RAIN EVENT" (NOTE: INSPECTOR SHALL CHECK FOR THE FOLLOWING MAINTENANCE INIDICATORS: EROSION IN THE FORM OF RILLS OR GULLIES, PONDING WATER, BARE AREAS, DEAD VEGETATION, ANIMAL BURROWS, HOLES, MOUNDS, AND TRASH)	1. AS DETERMINED BY INSPECTION; AND 2. ON OR BEFORE SEPTEMBER 30TH AND FOLLOWING THE RAINY SEASON AFTER MAY 1ST; AND 3. AFTER EACH "SIGNIFICANT RAIN EVENT"2	1. REPLACE MULCH IN AREAS OF RUTS, RILLS, OR GULLIES; 2. RE-SEED AND/OR PLANT SLOPES AND AREAS OF EXPOSED SOILS; 3. ROUTINE MAINTENANCE TO REMOVE ACCUMULATED MATERIALS SUCH AS TRASH AND DEBRIS; 4. NON-ROUTINE MAINTENANCE WILL BE REQUIRED TO BACKWASH AND CLEAR UNDERDRAINS IF INSPECTION INDICATES UNDERDRAINS ARE CLOGGED; AND 5. DEPENDING ON POLLUTANT LOADS, SOILS MAY NEED TO BE REPLACED EVERY 5 TO 10 YEARS. 6. THE RISER STRUCTURE SHOULD BE MAINTAINED TO AVOID CLOGGING AND ANY LEAKAGE THROUGH BOLTHOLES.	2	YES

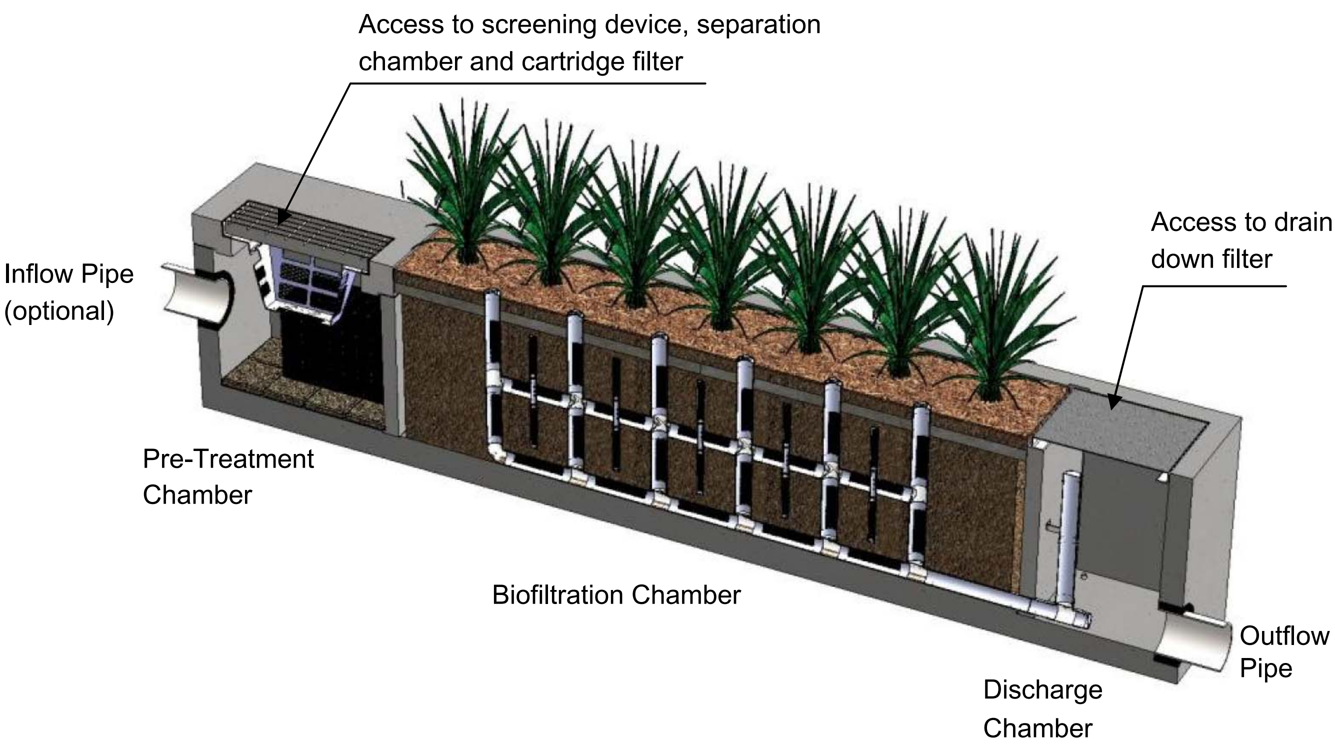
NOTE:
1. REFER TO THE PRIORITY DEVELOPMENT PROJECT (PDP) STORM WATER QUALITY MANAGEMENT PLAN (SWQMP) DATED MARCH 11, 2021 OR ANY REVISION THEREAFTER FOR MORE SPECIFIC INSPECTION AND MAINTENANCE INFORMATION.
2. DURING THE FIRST YEAR OF NORMAL OPERATION, ALL BMPS SHOULD BE INSPECTED ONCE BEFORE AUGUST 31 AND THEN MONTHLY FROM SEPTEMBER THROUGH MAY. THE MINIMUM INSPECTION AND MAINTENANCE FREQUENCY SHOULD BE DETERMINED BASED ON THE RESULTS OF THE FIRST YEAR INSPECTIONS.
3. A SIGNIFICANT RAIN EVENT IS CONSIDERED WHEN THE NATIONAL WEATHER SERVICE REPORTS 0.5 INCHES OF RAINFALL OVER A 48 HOUR PERIOD.

Maintenance Guidelines for
Modular Wetland System - Linear

Maintenance Summary

- Remove Trash from Screening Device – average maintenance interval is 6 to 12 months.
  - (*5 minute average service time*).
- Remove Sediment from Separation Chamber – average maintenance interval is 12 to 24 months.
  - (*10 minute average service time*).
- Replace Cartridge Filter Media – average maintenance interval 12 to 24 months.
  - (*10-15 minute per cartridge average service time*).
- Replace Drain Down Filter Media – average maintenance interval is 12 to 24 months.
  - (*5 minute average service time*).
- Trim Vegetation – average maintenance interval is 6 to 12 months.
  - (*Service time varies*).

System Diagram



Maintenance Procedures

Screening Device

1. Remove grate or manhole cover to gain access to the screening device in the Pre-Treatment Chamber. Vault type units do not have screening device. Maintenance can be performed without entry.
2. Remove all pollutants collected by the screening device. Removal can be done manually or with the use of a vacuum truck. The hose of the vacuum truck will not damage the screening device.
3. Screening device can easily be removed from the Pre-Treatment Chamber to gain access to separation chamber and media filters below. Replace grate or manhole cover when completed.

Separation Chamber

1. Perform maintenance procedures of screening device listed above before maintaining the separation chamber.
2. With a pressure washer spray down pollutants accumulated on walls and cartridge filters.
3. Vacuum out Separation Chamber and remove all accumulated pollutants. Replace screening device, grate or manhole cover when completed.

Cartridge Filters

1. Perform maintenance procedures on screening device and separation chamber before maintaining cartridge filters.
2. Enter separation chamber.
3. Unscrew the two bolts holding the lid on each cartridge filter and remove lid.
4. Remove each of 4 to 8 media cages holding the media in place.
5. Spray down the cartridge filter to remove any accumulated pollutants.
6. Vacuum out old media and accumulated pollutants.
7. Reinstall media cages and fill with new media from manufacturer or outside supplier. Manufacturer will provide specification of media and sources to purchase.
8. Replace the lid and tighten down bolts. Replace screening device, grate or manhole cover when completed.

Drain Down Filter

1. Remove hatch or manhole cover over discharge chamber and enter chamber.
2. Unlock and lift drain down filter housing and remove old media block. Replace with new media block. Lower drain down filter housing and lock into place.
3. Exit chamber and replace hatch or manhole cover.

Maintenance Notes

1. Following maintenance and/or inspection, it is recommended the maintenance operator prepare a maintenance/inspection record. The record should include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanisms.

2. The owner should keep maintenance/inspection record(s) for a minimum of five years from the date of maintenance. These records should be made available to the governing municipality for inspection upon request at any time.

3. Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements.

4. Entry into chambers may require confined space training based on state and local regulations.

5. No fertilizer shall be used in the Biofiltration Chamber.

6. Irrigation should be provided as recommended by manufacturer and/or landscape architect. Amount of irrigation required is dependent on plant species. Some plants may require irrigation.

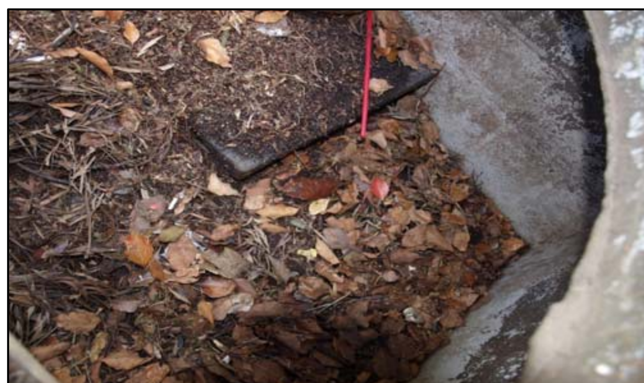
Maintenance Procedure Illustration

Screening Device

The screening device is located directly under the manhole or grate over the Pre-Treatment Chamber. It's mounted directly underneath for easy access and cleaning. Device can be cleaned by hand or with a vacuum truck.

Separation Chamber

The separation chamber is located directly beneath the screening device. It can be quickly cleaned using a vacuum truck or by hand. A pressure washer is useful to assist in the cleaning process.



Cartridge Filters

The cartridge filters are located in the Pre-Treatment chamber connected to the wall adjacent to the biofiltration chamber. The cartridges have removable tops to access the individual media filters. Once the cartridge is open media can be easily removed and replaced by hand or a vacuum truck.

Drain Down Filter

The drain down filter is located in the Discharge Chamber. The drain filter unlocks from the wall mount and hinges up. Remove filter block and replace with new block.

Trim Vegetation

Vegetation should be maintained in the same manner as surrounding vegetation and trimmed as needed. No fertilizer shall be used on the plants. Irrigation per the recommendation of the manufacturer and or landscape architect. Different types of vegetation requires different amounts of irrigation.

Inspection Form

Modular Wetland System, Inc.
P. 760.433-7640
F. 760-433-3176
E. Info@modularwetlands.com

www.modularwetlands.com

Inspection Report
Modular Wetlands System

Project Name ______________________	For Office Use Only
Project Address ______________________ (city) (Zip Code)	(Reviewed By)
Owner / Management Company ______________________	(Date) Office personnel to complete section to the left.

Contact ______________________ Phone ( ) –

Inspector Name ______________________ Date ___/___/_____ Time ________ AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition ______________________ Additional Notes ______________________

Inspection Checklist

Modular Wetland System Type (Curb, Grate or UG Vault): ____________ Size (22', 14' or etc.): ____________

Structural Integrity:	**Yes**	**No**	**Comments**
Damage to pre-treatment access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?			
Damage to discharge chamber access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?			
Does the MWS unit show signs of structural deterioration (cracks in the wall, damage to frame)?			
Is the inlet/outlet pipe or drain down pipe damaged or otherwise not functioning properly?			
Working Condition:			
Is there evidence of illicit discharge or excessive oil, grease, or other automobile fluids entering and clogging the unit?			
Is there standing water in inappropriate areas after a dry period?			
Is the filter insert (if applicable) at capacity and/or is there an accumulation of debris/trash on the shelf system?			
Does the depth of sediment/trash/debris suggest a blockage of the inflow pipe, bypass or cartridge filter? If yes specify which one in the comments section. Note depth of accumulation in in pre-treatment chamber.			Depth:
Does the cartridge filter media need replacement in pre-treatment chamber and/or discharge chamber?			Chamber:
Any signs of improper functioning in the discharge chamber? Note issues in comments section.			
Other Inspection Items:			
Is there an accumulation of sediment/trash/debris in the wetland media (if applicable)?			
Is it evident that the plants are alive and healthy (if applicable)? Please note Plant Information below.			
Is there a septic or foul odor coming from inside the system?			

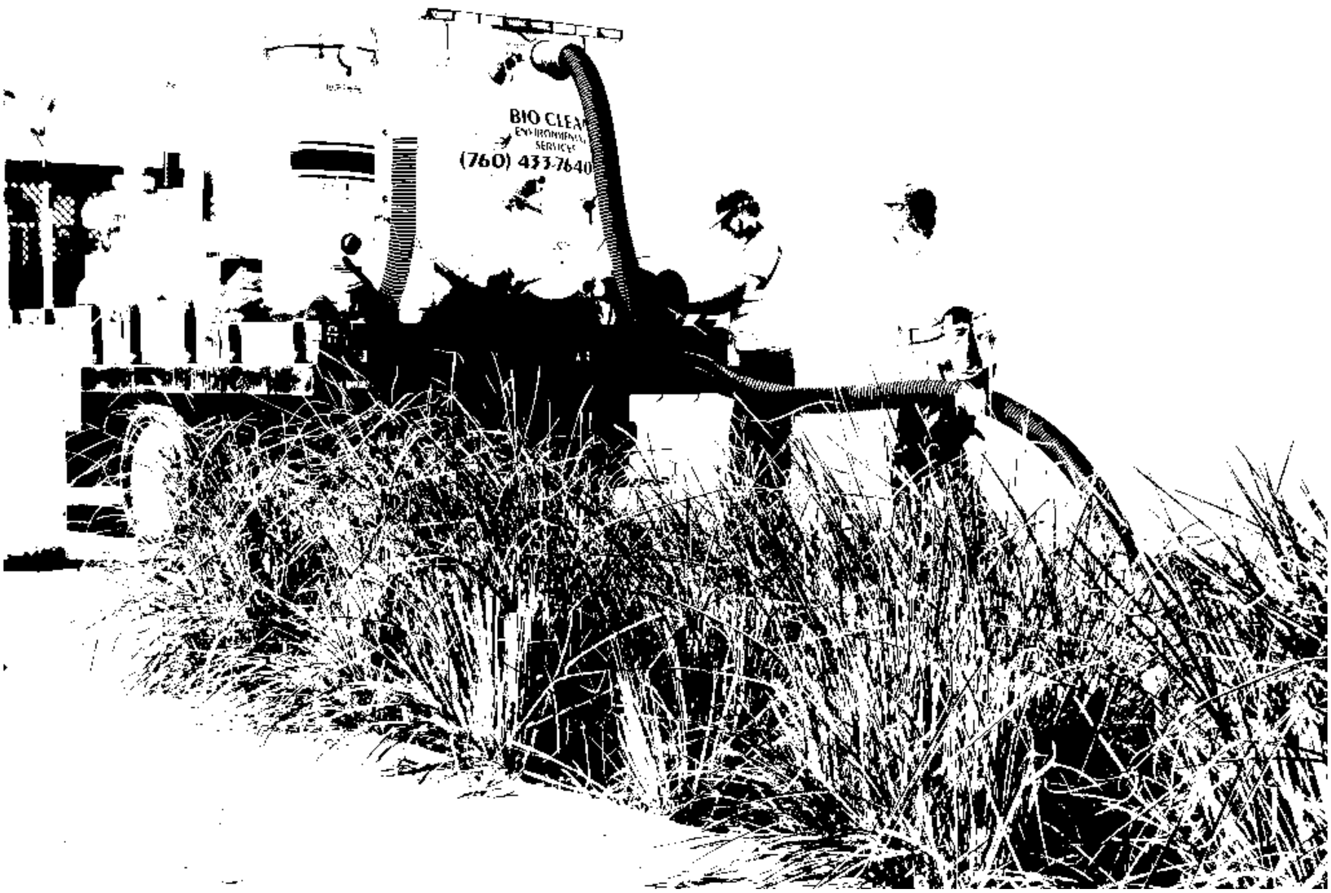
Waste:	**Yes**	**No**
Sediment / Silt / Clay		
Trash / Bags / Bottles		
Green Waste / Leaves / Foliage		

Recommended Maintenance	
No Cleaning Needed	
Schedule Maintenance as Planned	
Needs Immediate Maintenance	

Plant Information	
Damage to Plants	
Plant Replacement	
Plant Trimming	

Additional Notes: ______________________

Maintenance Report



Modular Wetland System, Inc.
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E. Info@modularwetlands.com

www.modularwetlands.com

Cleaning and Maintenance Report
Modular Wetlands System

For Office Use Only
(Reviewed By)
(Date)
Office personnel to complete section to the left.

Project Name ______________________________

Project Address ______________________________ (city) (Zip Code)

Owner / Management Company ______________________________

Contact ______________________________ Phone ( ) –

Inspector Name ______________________________ Date ____/____/______ Time __________ AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

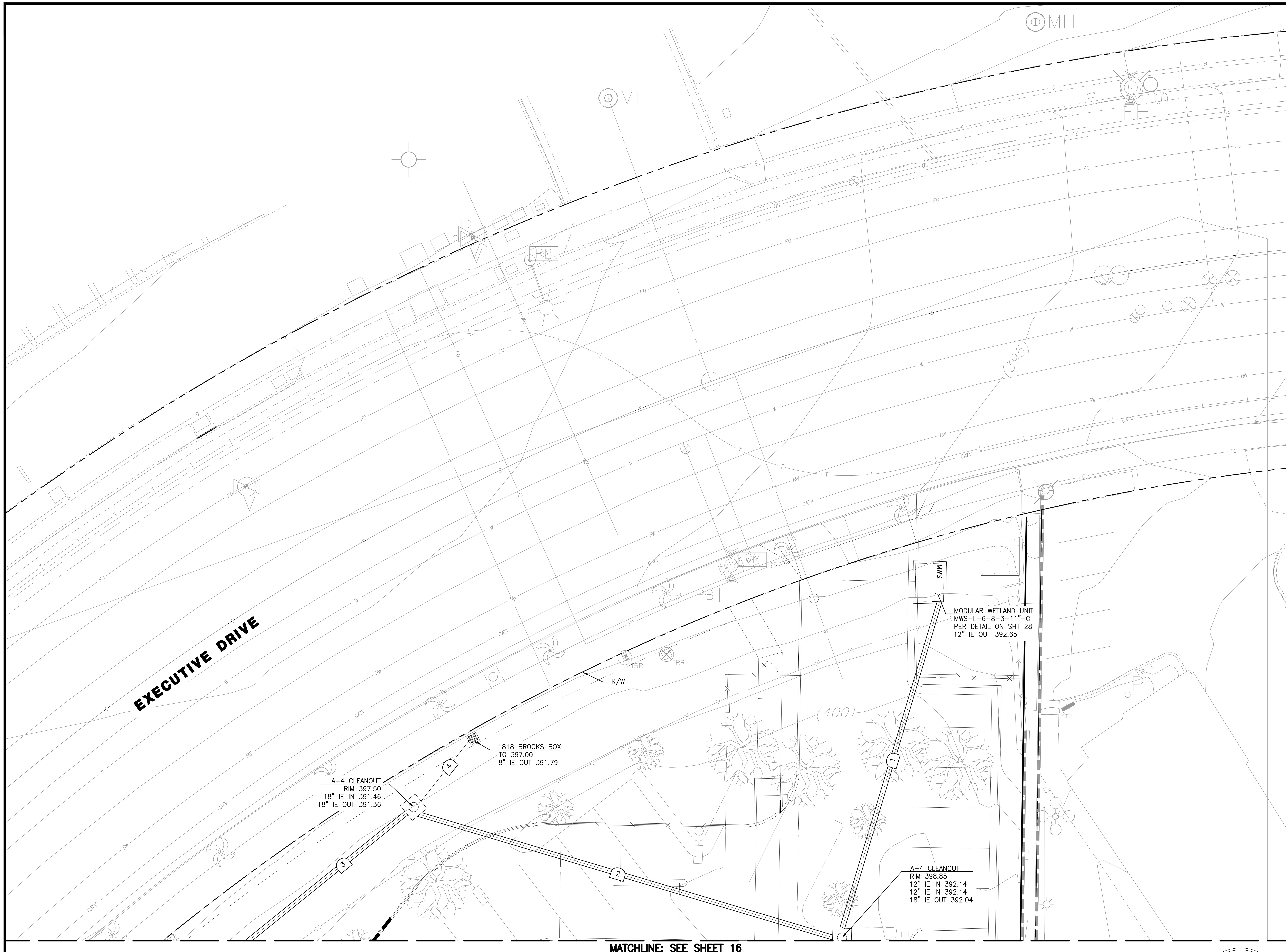
Weather Condition ______________________________ Additional Notes ______________________________

Site Map #	GPS Coordinates of Insert	Manufacturer / Description / Sizing	Trash Accumulation	Foliage Accumulation	Sediment Accumulation	Total Debris Accumulation	Condition of Media 25/50/75/100 (will be changed @ 75%)	Operational Per Manufactures' Specifications (If not, why?)
	Lat: Long:	MWS Catch Basins						
		MWS Sedimentation Basin						
		Media Filter Condition						
		Plant Condition						
		Drain Down Media Condition						
		Discharge Chamber Condition						
		Drain Down Pipe Condition						
		Inlet and Outlet Pipe Condition						

Comments:

Attachment 4
Copy of Plan Sheets Showing Permanent Storm Water BMPs

This is the cover sheet for Attachment 4.



PRIVATE STORM DRAIN					
NO.	RADIUS	BEARING/DELTA	LENGTH	REMARKS	SLOPE (%)
1		S16°35'12.51"W	72.14'	12" PVC (SDR-35)	0.7%
2		S73°24'47.49"E	91.17'	18" HDPE	0.6%
3		N51°02'21.19"E	42.96'	18" HDPE	0.6%
4		N38°31'08.45"E	16.60'	12" PVC (SDR-35)	2.0%

N

10 5 0 10
GRAPHIC SCALE: 1"=10'

PRIVATE CONTRACT

STORM DRAIN PLANS FOR:

ARE/SCRIPPS HQ

4555 EXECUTIVE DRIVE SAN DIEGO CALIFORNIA
PARCELS 1&2 OF PARCEL MAP NO. 15872
LOT A OF MAP NO. 12443

CITY OF SAN DIEGO, CALIFORNIA
DEVELOPMENT SERVICES DEPARTMENT
SHEET 15 OF 28 SHEETS

PROJECT NO. XXXXXX

FOR CITY ENGINEER — DATE

V.T.M. XXXXXX

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			
AS-BUILTS				

1906-6267
NAD83 COORDINATES

266-1707
LAMBERT COORDINATES

CONTRACTOR ____ DATE STARTED ____
INSPECTOR ____ DATE COMPLETED ____

XXXXX-15 -D

REGISTERED PROFESSIONAL ENGINEER
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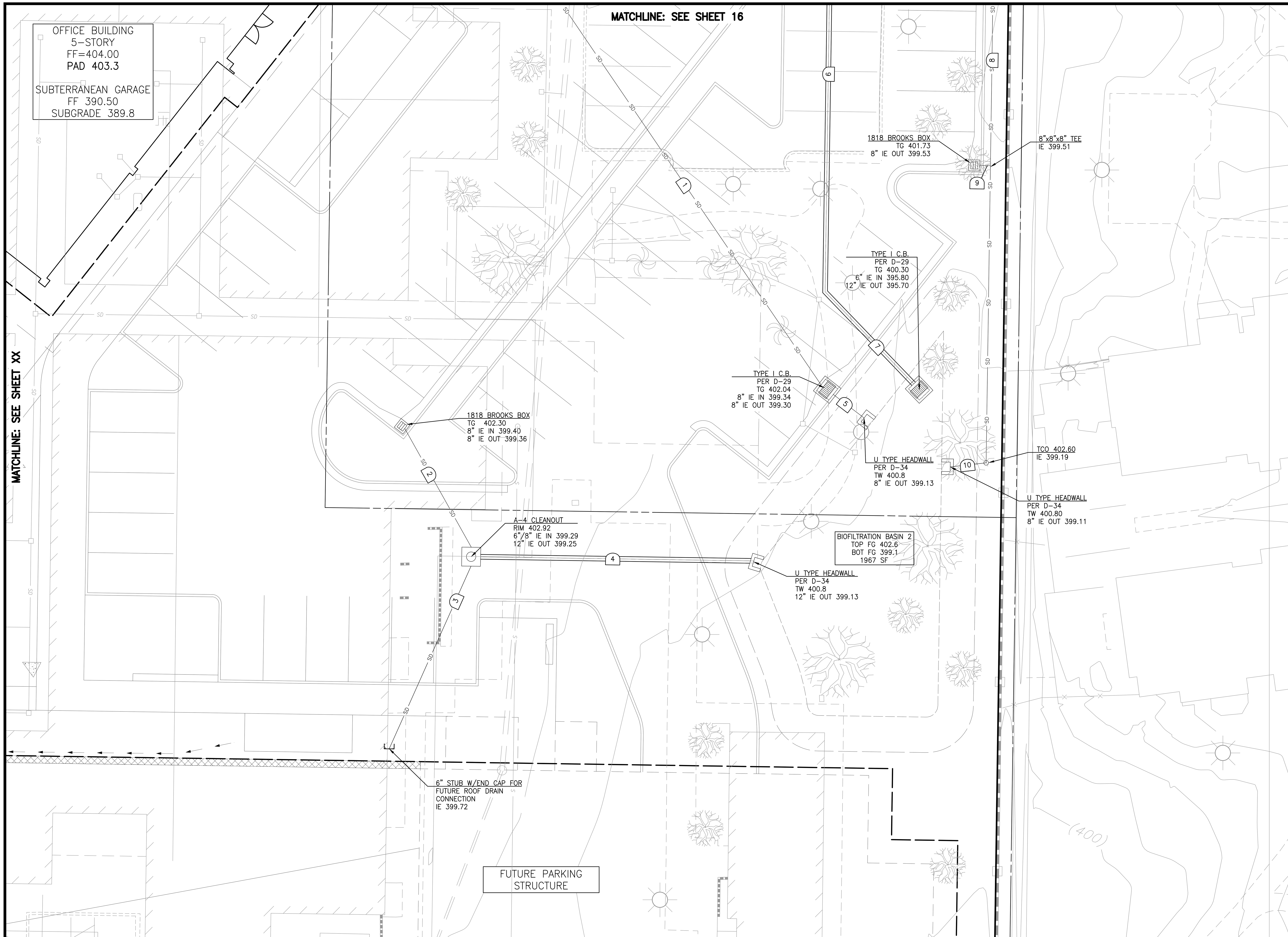

PRIVATE STORM DRAIN					
NO.	BEARING/DELTA	RADIUS	LENGTH	REMARKS	SLOPE (%)
1	S34°14'43"E		97.44	6" PVC (SDR-35)	0.5%
2	S29°31'06"E		28.45	8" PVC (SDR-35)	0.5%
3	N24°08'41"E		42.28	6" PVC (SRD-35)	0.5%
4	S89°08'52"E		57.71	12" PVC (SDR-35)	0.5%
5	S52°29'17"E		7.73	8" PVC (SRD-35)	2.7%
6	N0°50'53"E		60.90	12" PVC (SRD-35)	1.2%
7	S43°52'53"E		27.00	12" PVC (SDR-35)	1.2%
8	N0°49'36"E		97.05	8" PVC (SRD-35)	0.5%
9	S89°10'24"E		2.25	8" PVC (SRD-35)	0.5%
10	N83°35'28"E		7.66	8" PVC (SRD-35)	1.0%

PRIVATE CONTRACT

STORM DRAIN PLANS FOR:

ARE/SCRIPPS HQ

4555 EXECUTIVE DRIVE SAN DIEGO CALIFORNIA
PARCELS 1&2 OF PARCEL MAP NO. 15872
LOT A OF MAP NO. 12443

CITY OF SAN DIEGO, CALIFORNIA
DEVELOPMENT SERVICES DEPARTMENT
SHEET 17 OF 28 SHEETS

PROJECT NO. XXXXXX

V.T.M. XXXXXX

FOR CITY ENGINEER DATE

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			
AS-BUILTS				

1906-6267
NAD83 COORDINATES

266-1707
LAMBERT COORDINATES

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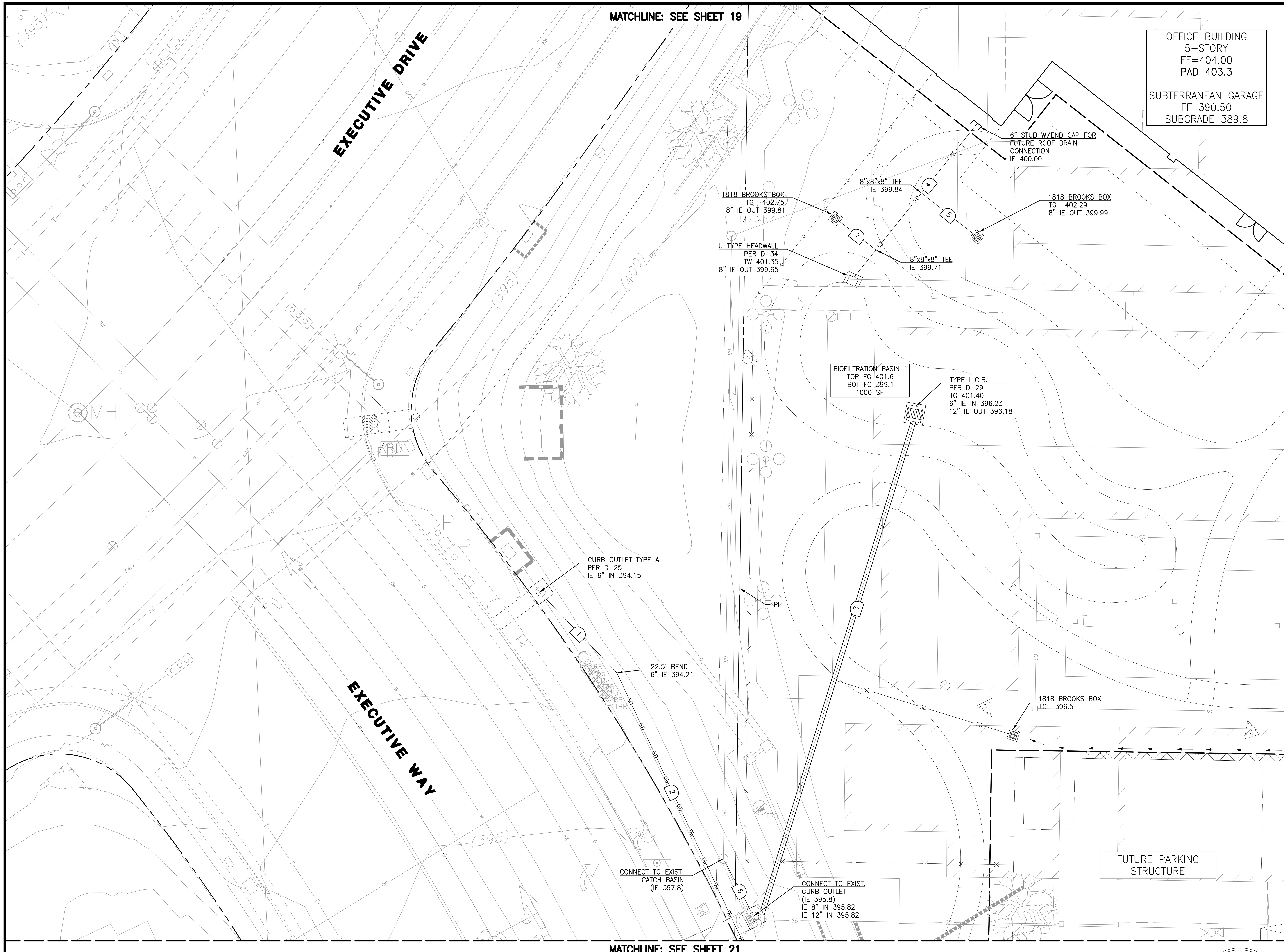

PRIVATE STORM DRAIN

NO.	BEARING/DELTA	RADIUS	LENGTH	REMARKS	SLOPE (%)
1	N43°48'31"W		21.56	6" PVC (SDR-35)	0.25%
2	N25°04'58"W		62.62	6" PVC (SDR-35)	0.25%
3	N17°06'22"E		108.71	12" PVC (SDR-35)	0.33%
4	S38°42'45"W		41.73	6" PVC (SDR-35)	0.60%
5	N51°46'09"W		13.89	6" PVC (SDR-35)	1.0%
6	N27°54'15"W		11.89	8" PVC (SDR-35)	16.65%
7	S51°59'37"E		10.10	8" PVC (SDR-35)	1.0%

PRIVATE CONTRACT

STORM DRAIN PLANS FOR:

ARE/SCRIPPS HQ

4555 EXECUTIVE DRIVE SAN DIEGO CALIFORNIA
PARCELS 1&2 OF PARCEL MAP NO. 15872
LOT A OF MAP NO. 12443

CITY OF SAN DIEGO, CALIFORNIA
DEVELOPMENT SERVICES DEPARTMENT
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PROJECT NO. XXXXXX

V.T.M. XXXXXX

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DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			
AS-BUILTS				

1906-6267
NAD83 COORDINATES

266-1707
LAMBERT COORDINATES

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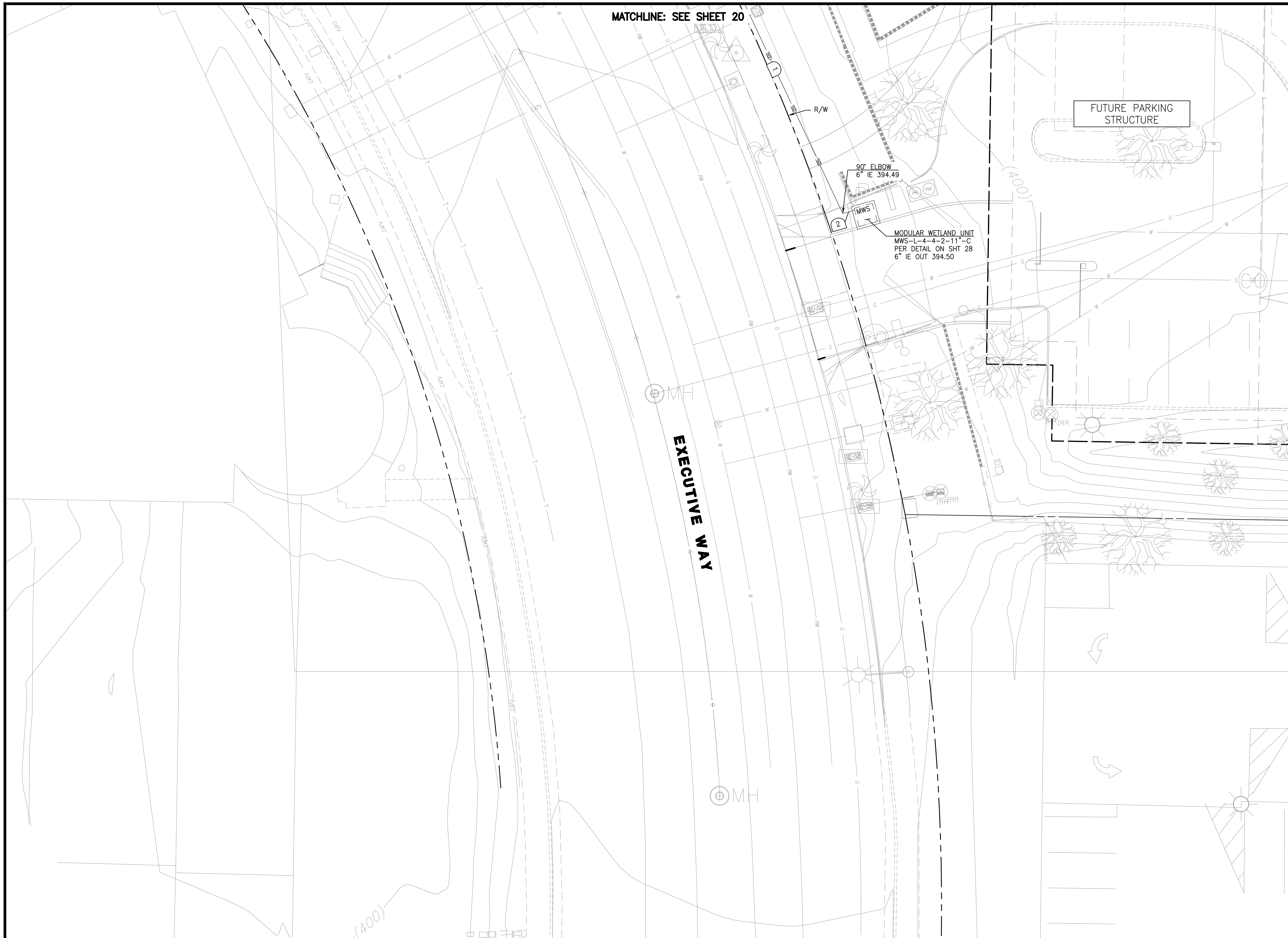

PRIVATE STORM DRAIN

NO.	BEARING/DELTA	RADIUS	LENGTH	REMARKS	SLOPE (%)
1	N25°04'58"W		48.91	6" PVC (SDR-35)	0.25%
2	S74°30'22"W		2.58	6" PVC (SDR-35)	0.25%

PRIVATE CONTRACT

STORM DRAIN PLANS FOR:

ARE/SCRIPPS HQ

4555 EXECUTIVE DRIVE SAN DIEGO CALIFORNIA
PARCELS 1&2 OF PARCEL MAP NO. 15872
LOT A OF MAP NO. 12443

CITY OF SAN DIEGO, CALIFORNIA
DEVELOPMENT SERVICES DEPARTMENT
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FOR CITY ENGINEER DATE

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1906-6267
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LAMBERT COORDINATES

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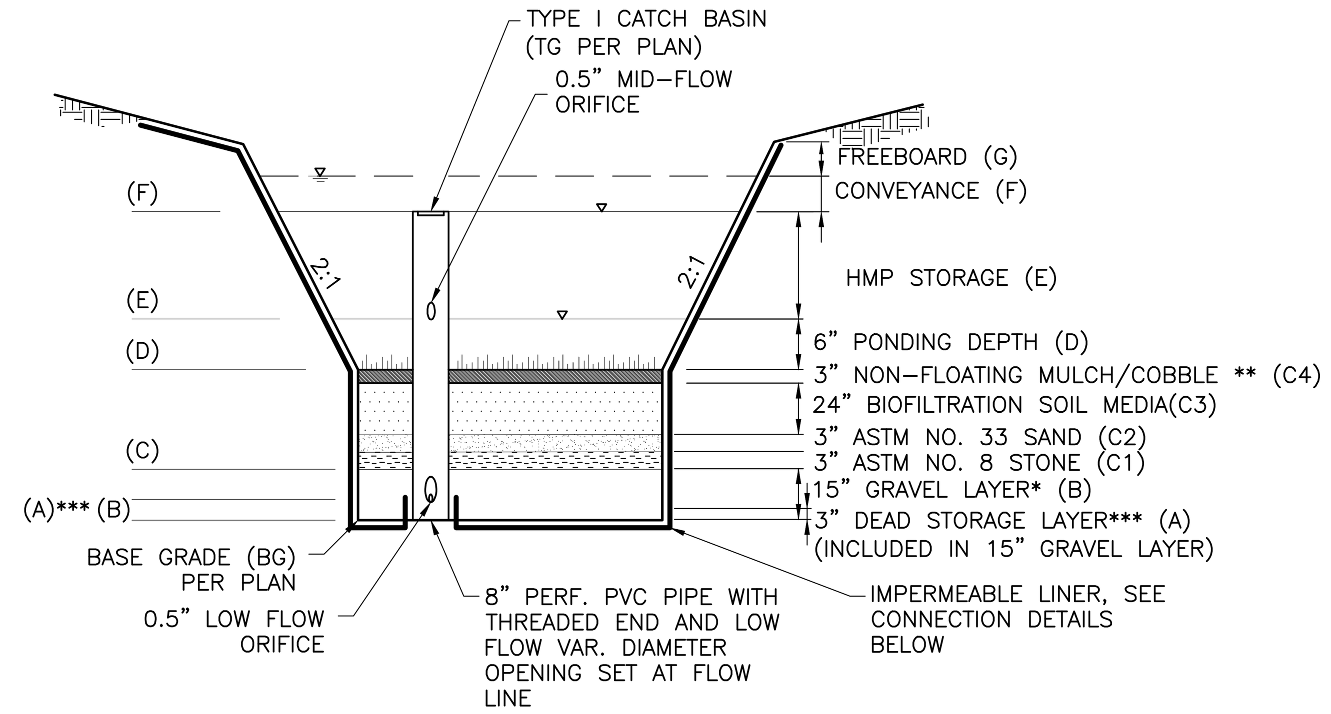
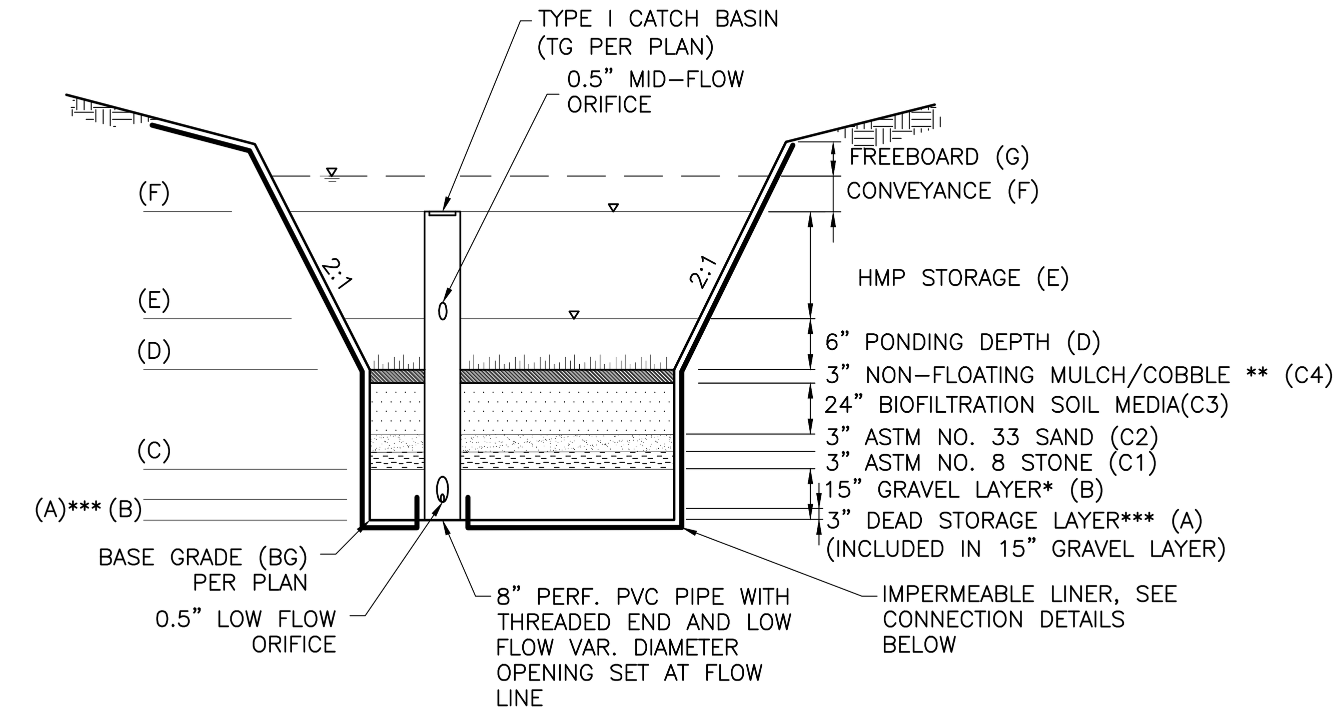


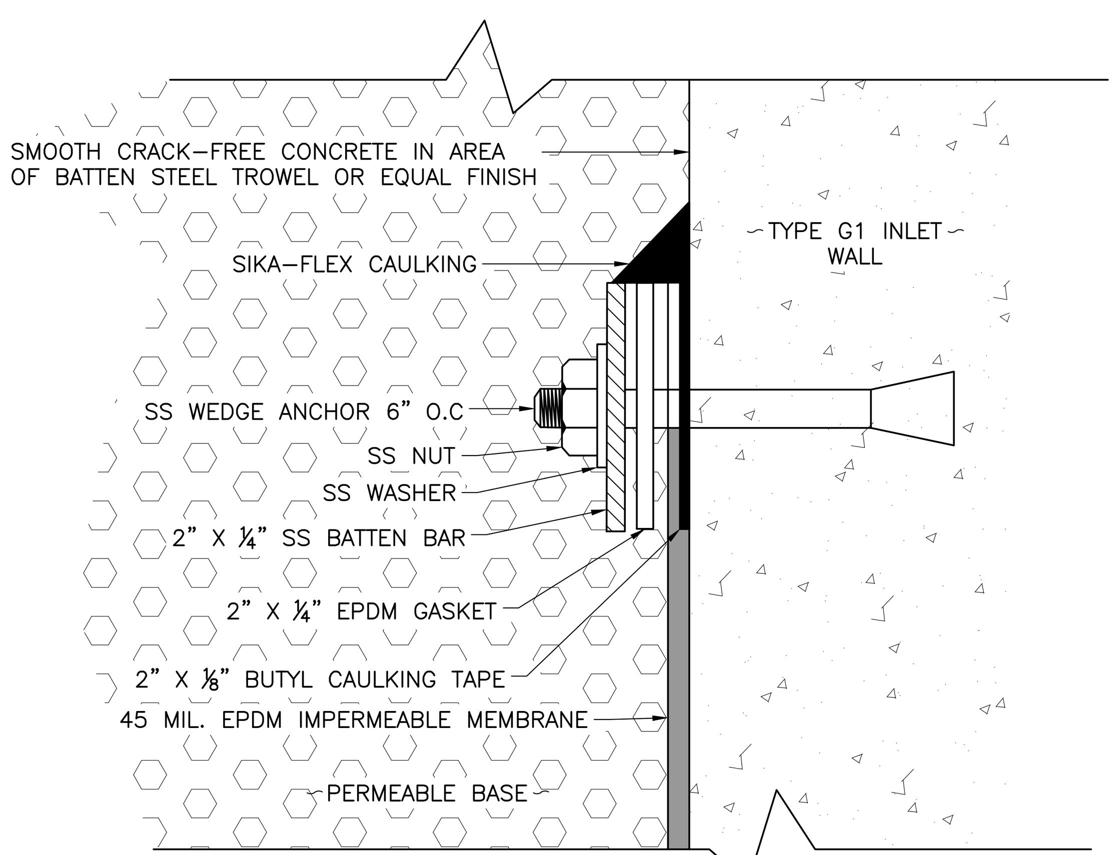
• GRAVEL LAYER = ASTM NO. 57 STONE. PROVIDE 4" MIN. AROUND INLETS.
•• NON FLOATING SHREDDED HARDWOOD (MULCH/COBBLE)
*** 3" DEAD STORAGE LAYER INCLUDED IN 15" GRAVEL LAYER

BIOFILTRATION BASIN TYPICAL
SECTION - BASIN 1 (PVT)
NTS

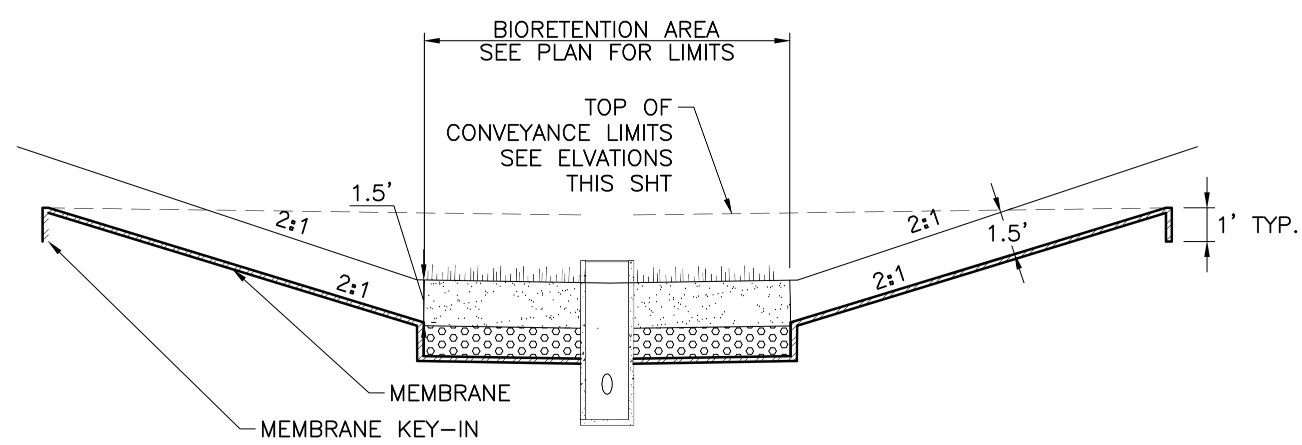


• GRAVEL LAYER = ASTM NO. 57 STONE. PROVIDE 4" MIN. AROUND INLETS.
•• NON FLOATING SHREDDED HARDWOOD (MULCH/COBBLE)
*** 3" DEAD STORAGE LAYER INCLUDED IN 15" GRAVEL LAYER

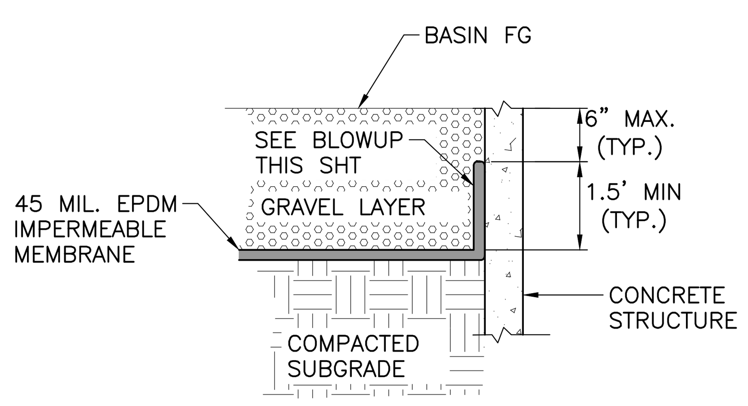
BIOFILTRATION BASIN TYPICAL
SECTION BASIN 2 (PVT)
NTS



MEMBRANE CONNECTION DETAIL AT BASIN GRATE INLET (PVT)
N.T.S



MEMBRANE KEY-IN DETAIL (PVT)
NTS



MEMBRANE CONNECTION DETAIL AT
OUTSIDE FACE OF GRATE INLET (PVT)
N.T.S

PRIVATE CONTRACT

POST CONSTRUCTION BMP PLANS FOR:

ARE/SCRIPPS HQ

4555 EXECUTIVE DRIVE SAN DIEGO CALIFORNIA
PARCELS 1&2 OF PARCEL MAP NO. 15872
LOT A OF MAP NO. 12443

CITY OF SAN DIEGO, CALIFORNIA
DEVELOPMENT SERVICES DEPARTMENT
SHEET 23 OF 28 SHEETS

PROJECT NO. XXXXXX

FOR CITY ENGINEER — DATE

V.T.M. XXXXXX

DESCRIPTION	BY	APPROVED	DATE	FILMED
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1906-6267
NAD83 COORDINATES

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XXXXX-23-D

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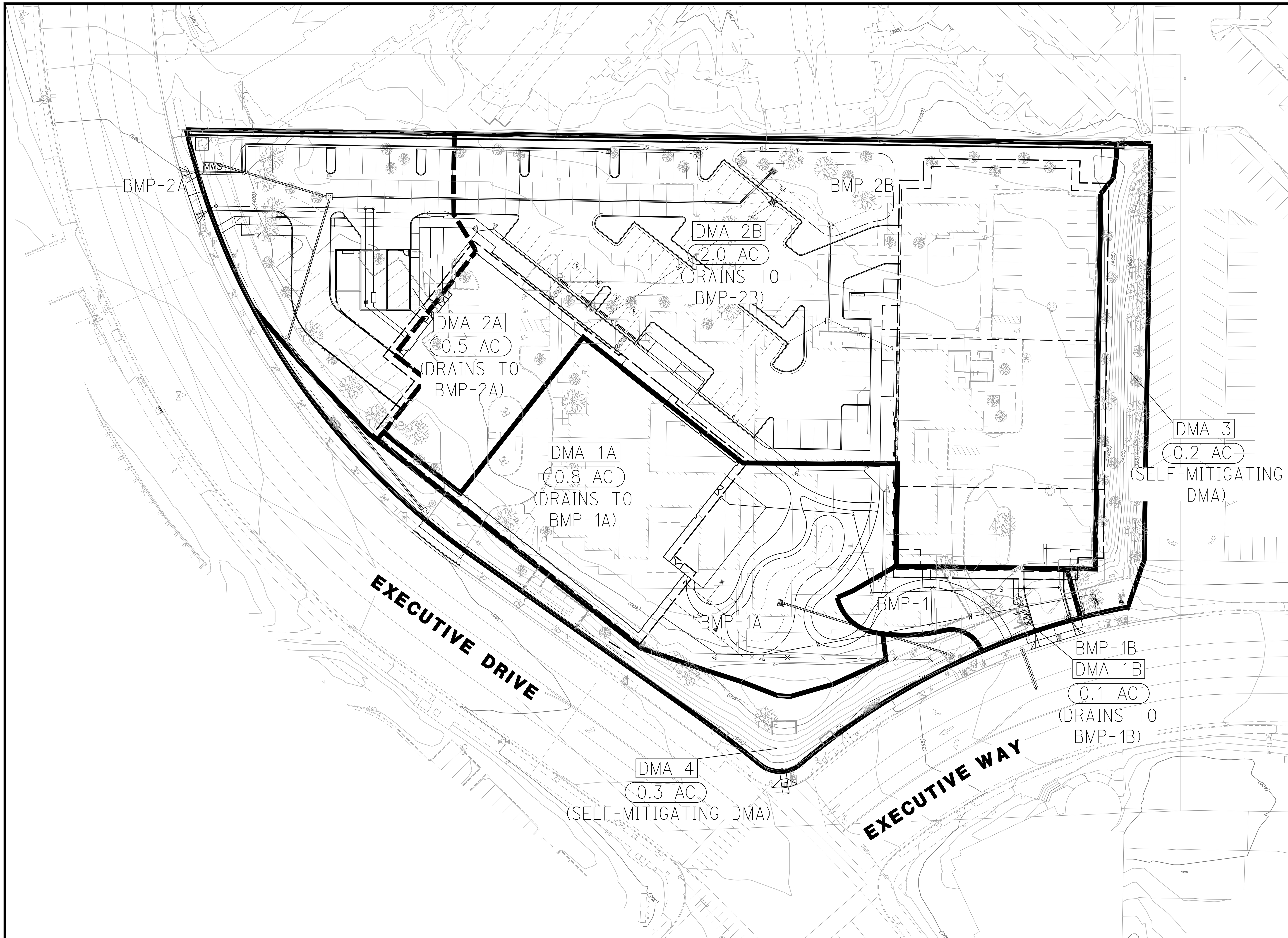

NOTES:

1. UNDERLYING HYDROLOGIC SOIL GROUP = NRCS TYPE D.
2. APPROXIMATE DEPTH TO GROUNDWATER IS GREATER THAN 20FT.
3. THERE ARE NO KNOWN EXISTING NATURAL HYDROLOGIC FEATURES LOCATED WITHIN THE PROJECT SITE.
4. THE PROJECT SITE IS NOT LOCATED WITHIN ANY CRITICAL COARSE SEDIMENT YIELD AREAS (ATTACHMENT 2B).

LEGEND

(line)	DMA BOUNDARY
DMA X	DMA ID
X.X AC	DMA AREA
BMP X	BMP ID
◎	POC
	PROPOSED BIOFILTRATION BMP
	PROPOSED DG
	PROPOSED CONCRETE
	OFFSET AREAS DRAINING TO BMP-1 (NOT DISTURBED)

PRIVATE CONTRACT

POST CONSTRUCTION BMP PLANS FOR:

ARE/SCRIPPS HQ

4555 EXECUTIVE DRIVE SAN DIEGO CALIFORNIA
PARCELS 1&2 OF PARCEL MAP NO. 15872
LOT A OF MAP NO. 12443

CITY OF SAN DIEGO, CALIFORNIA
DEVELOPMENT SERVICES DEPARTMENT
SHEET 22 OF 28 SHEETS

PROJECT NO. XXXXXX

V.T.M. XXXXXX

FOR CITY ENGINEER DATE

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			
AS-BUILTS				

CONTRACTOR ________ DATE STARTED ________
INSPECTOR ________ DATE COMPLETED ________

1906-6267
NAD83 COORDINATES

266-1707
LAMBERT COORDINATES

XXXXX-22-D

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Project Name: ARE - Scripps HQ

Use this checklist to ensure the required information has been included on the plans:

The plans must identify:

- ☐ Structural BMP(s) with ID numbers matching Form I-6 Summary of PDP Structural BMPs
- ☐ The grading and drainage design shown on the plans must be consistent with the delineation of DMAs shown on the DMA exhibit
- ☐ Details and specifications for construction of structural BMP(s)
- ☐ Signage indicating the location and boundary of structural BMP(s) as required by the City Engineer
- ☐ How to access the structural BMP(s) to inspect and perform maintenance
- ☐ Features that are provided to facilitate inspection (e.g., observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds)
- ☐ Manufacturer and part number for proprietary parts of structural BMP(s) when applicable
- ☐ Maintenance thresholds specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP)
- ☐ Recommended equipment to perform maintenance
- ☐ When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management
- ☐ Include landscaping plan sheets showing vegetation requirements for vegetated structural BMP(s)
- ☐ All BMPs must be fully dimensioned on the plans
- ☐ When proprietary BMPs are used, site specific cross section with outflow, inflow and model number shall be provided. Broucher photocopies are not allowed.

Attachment 5
Drainage Report

Attach project's drainage report. Refer to Drainage Design Manual to determine the reporting requirements.

DRAINAGE STUDY
FOR
ARE – SCRIPPS HQ PROJECT

Job Number 19276

July 9, 2021

DRAINAGE STUDY

FOR

ARE – SCRIPPS HQ PROJECT

Job Number 19276

Carson Edgington, P.E.
R.C.E. #76519
Exp. 12/22

Prepared For:

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10996 Torreyana Road, Suite 250
San Diego, California 92121

Prepared By:

Rick Engineering Company
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July 9, 2021

Table of Contents

Figures

Tables

Appendices

Map Pockets

1.0 INTRODUCTION

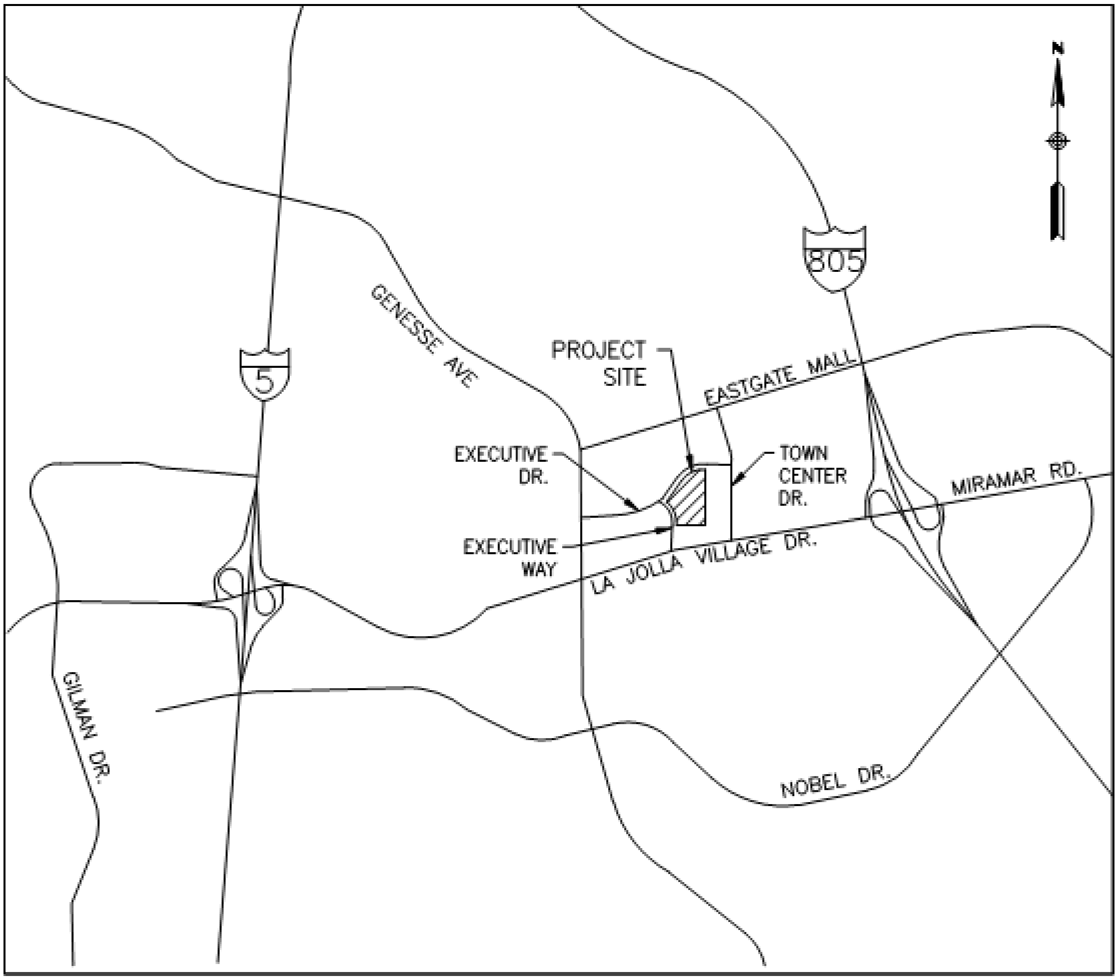
1.1 Project Description

This design report summarizes hydrologic and hydraulic analyses for the proposed ARE - Scripps HQ Project (herein referred to as the "project"). The project is located within the City of San Diego in the University Town Center community, at the south-east corner of Executive Drive and Executive Way. For the location of the project see Figure 1, Vicinity Map, located at the end of Section 1.0. The proposed redevelopment encompasses approximately 3.7 acres and consists of a 5-story Office Headquarters office building, an underground parking structure spaces, a separate parking structure, outdoor amenity areas, landscaped green spaces and associated surface improvements.

1.2 Water Quality

The project will include Low Impact Development (LID) Site Design, Source Control, Pollutant Control and Hydromodification Management Best Management Practices (BMPs), designed pursuant to the guidelines of the City of San Diego Storm Water Standards, dated October 1, 2018 (herein referred to as the "Storm Water Standards") to achieve water quality treatment and hydromodification management. Please refer to the report titled, "Priority Development Project (PDP) Storm Water Quality Management Plan (SWQMP): ARE - Scripps HQ," dated July 9, 2021 (or any revisions thereafter), prepared by Rick Engineering Company (Job No. 19276), for more information on storm water quality requirements and post-construction BMPs.

Figure 1: Vicinity Map



VICINITY MAP

2.0 HYDROLOGY

Hydrologic conditions for the project area have been analyzed for both pre-project and post-project conditions.

2.1 Methodology

The City of San Diego Drainage Design Manual, dated January 2017 requires that the Rational Method be used for hydrologic analysis of a watershed up to but not exceeding 1.0 square-mile (640 acres). The Rational Method computer program developed by Advanced Engineering Software (AES 2003) was used for this study because it satisfies the City of San Diego's design criteria.

2.2 AES Rational Method Computer Model

The AES hydrologic model is developed by creating independent node-link models of each interior drainage basin and linking these sub-models together at confluence points. The AES program has the capability to perform calculations for 15 hydrologic processes. These processes are assigned code numbers that appear in the results. The code numbers and their significance are as follows:

Subarea Hydrologic Processes (Codes)

Code 1:	Confluence analysis at node
Code 2:	Initial subarea analysis
Code 3:	Pipe flow travel time (computer-estimate pipe sizes)
Code 4:	Pipe flow travel time (user-specified pipe size)
Code 5:	Trapezoidal channel travel time
Code 6:	Street flow analysis through a subarea
Code 7:	User-specified information at a node
Code 8:	Addition of the subarea runoff to mainline
Code 9:	V-Gutter flow through subarea
Code 10:	Copy mainstream data onto memory bank
Code 11:	Confluence a memory bank with the mainstream memory

Code 12: Clear a memory bank

Code 13: Clear the mainstream memory

Code 14: Copy a memory bank onto the mainstream memory

Code 15: Hydrologic data bank storage functions

In order to perform the hydrologic analysis; base information for the study area is required. This information includes the existing drainage facility locations and sizes, existing land uses, flow patterns, drainage basin boundaries, and topographic elevations. Drainage basin boundaries, flow patterns, and topographic elevations are shown on the drainage exhibits located in the map pockets.

2.3 Design Criteria

The hydrologic conditions were analyzed in accordance with the City of San Diego's design criteria as follows:

Design Storm:	50-year
Runoff Coefficients (1):	
Asphalt/Concrete	C = 0.95
Undisturbed, Natural Terrain	C = 0.45
Soil Type:	D
Rainfall Intensity:	Based on time-intensity criteria per City of San Diego

(1) Weighted runoff coefficients were calculated as required in in Section A.1.2 - Runoff Coefficient of the City of San Diego Drainage Design Manual (January 2017)

2.4 Hydrologic Results

The results of the Modified Rational Method analysis for the pre- and post-project are provided in Appendix A and B of this report respectively. Please refer to the Drainage Study Maps in Map Pockets 1 and 2 for the drainage area boundaries, nodes, and areas used in the Modified Rational Method analysis for pre-project and post-project conditions, respectively. A summary of the hydrologic results is provided below in Table 1.

Table 1: Summary of Hydrologic Results

Points of Interest (POI)/ Node Number	Pre-Project			Post-Project		
	Area (acres)	Tc (minutes)	Peak Flow, Q_{100} (cfs)	Area (acres)	Tc (minutes)	Peak Flow, Q_{100} (cfs)
BASIN 1: POI-1 (Node 105/1006)	1.44	10.20	3.69	1.47	7.66	3.54
BASIN 2: POI-2 (Node 206/2006)	2.31	15.70	5.49	2.48	13.02	5.91

Notes:

1) In the Pre-Project condition, the existing 18" RCP pipe in Executive Drive between Nodes 205-206 conveys 2.31 acres.

2) In the Post-Project condition, the existing 18" RCP pipe in Executive Drive between Nodes 205-206 conveys 2.48 acres and a higher flow rate when compared to the pre-project condition. The increased flow rate is 0.41 cfs, however, see the enclosed hydraulic calculations which validate that the existing pipe will not be under pressure flow since the anticipated normal depth is 11.3 inches within the 18-inch diameter pipe.

Pre-Project Condition

The project site consists of an existing building complex, formerly housing the San Diego Braille Institute. The facility is completely developed with walkways, outdoor courtyards, a smaller building, and parking lots on both the north and south ends of the project site. Two existing driveways provide access into the site off Executive Way on the south and Executive Drive on the north. The Project site (on-site area) is approximately 4.0 acres.

In the pre-project condition, the project site has two major drainage basins namely, Basin 1 and Basin 2. Basin 1 encompasses the westerly and some of the northerly portions of the project site, which generally flow to the northwest via the curb gutter in Executive Way, and the curb gutter in Executive Drive. This confluence point is depicted as Node 105 on the Drainage Study Map and as point of interest (POI-1) in the summary table above. Ultimately, the street gutter flows are collected into the existing public storm drain system in executive Drive, on the west side of the Executive Dr. and Executive Way intersection. The total basin area to POI-1 is 1.44 acres.

Also in the pre-project condition, Basin 2 encompasses the larger portion of the project site, mainly the southerly, easterly and remaining northerly portions of the project site. However, only 2.31 acres of the existing site is collected into the existing underground storm drain network, which is conveyed into an existing curb inlet at Node 205. The project flows are conveyed into the existing public storm drain in Executive Drive via an existing 18" RCP pipe between nodes 205 and 206. The remaining 0.23-acre area sheets flows into Executive Drive and flows easterly along the curb gutter. The total watershed area conveyed to POI-2 is 2.31 acres.

Ultimately, both existing public storm drains systems in Executive Drive discharge into the Pacific Ocean through Los Peñasquitos Creek. Relevant as-built drawings are included for reference purposes in Appendix E.

<u>Post-Project Condition</u>

The proposed condition consists of a proposed office commercial building complex, parking structure and associated landscaped amenity spaces and a surface parking lot. Access into the site will remain off Executive Way on the south and Executive Drive on the north. The Project site (on-site graded area) is approximately 3.7 acres.

In the post-project condition, the project site was designed to maintain the pre-project drainage patterns; the two major drainage basins are identified as, Basin 1 and Basin 2. Basin 1 encompasses the westerly portions of the project site, including about 60% off the proposed building's rooftop. These areas will be collected in an underground storm system and routed through a bio-filtration basin located on the south side of the proposed building. Some of the landscaped areas will continue to sheet flow towards Executive Way, and the northerly landscaped areas will continue to shset flow towards Executive Drive. The existing curb gutter outlet structure at Node 1005 will convey a slightly lower flow rate into the curb gutter in Executive Way. The point of interest (POI-1) is depicted as Node 1006 on the Drainage Study Map and in the summary table above. Ultimately, the street gutter flows are collected into the existing public storm drain system in executive Drive, on the west side of the Executive Dr. and Executive Way intersection. In the Post-Project condition, the total basin area to POI-1 is 1.47 acres.

Also in the post-project condition, Basin 2 encompasses the larger portion of the project site, including the future parking structure, surface parking lot, and landscaped outdoor amenity areas, as well as the second bio-filtration basin. In this condition, 2.48 acres of the proposed site is collected into the proposed underground storm drain network which is the existing public storm drain in Executive Drive via the existing 18” RCP pipe between nodes 2005 and 2006. The remaining 0.04-acre area sheets flows into Executive Drive and flows easterly along the curb gutter. The total basin area to POI-2 is 2.48 acres.

Lastly, The project does not propose to impact any jurisdiction water, or wetlands. As such, it is anticipated that the project will not be subject to requirements under the Federal Clean Water Act (CWA) Section 401 or 404.

3.0 HYDRAULICS

3.1 Hydraulic Methodology and Criteria

The 50-year pre-project and post-project peak flow rates determined using the Modified Rational Method were used to evaluate the potential impacts to existing storm drain system due to the project improvements. The 50-year post-project peak flow rates were also used to size the onsite storm drain system.

3.2 Storm Drain Sizing

Pipe sizes were evaluated using Manning's equation:

$Q= (1.486/n)\ A\ R^{2/3}\ S^{1/2}$

Where:

Q = discharge (cfs)

n = Manning coefficient of roughness

A = Cross-sectional Area of flow (sq. ft.)

R = Hydraulic radius (ft.) = A/WP (WP = Wetted Perimeter)

S = Slope of pipe (ft./ft.)

The Manning's roughness coefficient "n" used for the hydraulic calculations for RCP is 0.013 and for PVC pipes it is 0.012. The pipe sizes were evaluated based on the AES rational method flow rates with a 30% bump up sizing factor.

3.3 Storm Drain Evaluation Results

Normal depth hydraulic calculations were performed to size the on-site (private) storm drain pipes, and a more detailed pipe flow/pipe hydraulic analysis was performed for the existing 18" RCP pipe in Executive Drive which we anticipate will convey an increased flow rate of 0.41 cfs when compared to the pre-project condition. The pipe flow calculations validate that the existing pipe will not be under pressure flow since the anticipated normal depth is 11.3 inches within the 18-inch diameter pipe. Refer to the pipe hydraulic calculations included in Appendix C for further details.

For the private storm drain system, the pipe sizes were evaluated based on the AES rational method peak flow rates with a 30% bump up sizing factor and an assumed minimum pipe slope of 0.5%. A summary of the performed normal depth hydraulic analyses is provided in Appendix C in the form of a sizing matrix table.

4.0 CONCLUSION

This drainage report presents the hydrologic and hydraulic calculations in support of the ARE - Scripps HQ project. The 50-year pre- and post-project condition hydrologic analyses have been performed for the total tributary area to two points of interests. The 50-year post-project peak flow rates were utilized to size the proposed drainage system. The peak discharge rates were determined using the Modified Rational Method based on the hydrologic methodology and criteria described in the City of San Diego, Drainage Design Manual January 2017 edition.

Existing storm drain capacities have been verified based on the post-project 50-year peak flow rates to evaluate potential impacts. The included hydrologic and hydraulic calculations quantify the change in runoff (between pre- and post-project) and verify the adequacy of the existing storm drain system, including the existing 18” RCP in Executive Drive. Normal Depth hydraulic calculations were performed to size the onsite storm drain system. Since, the project has been designed to improve the collection and conveyance of storm water runoff within the project limits and the difference in the pre- and post-project 50-year peak flow (less than 1 cfs) is minimal, the project is not anticipated to result in any adverse impacts to downstream drainage facilities or adjacent properties. The project proposes on-site bio-filtration basins for Basin 1 and Basin 2.

Post-project runoff will be treated via a network of storm water management features, designed pursuant to the guidelines of the City of San Diego Storm Water Standards, dated October 1, 2018. Please refer to the report titled, “Priority Development Project (PDP) Storm Water Quality Management Plan (SWQMP): ARE - Scripps HQ,” dated July 9, 2021 (or any revisions thereafter), prepared by Rick Engineering Company (Job No. 19276), for more information on storm water quality requirements and post-construction BMPs.

APPENDIX A

Modified Rational Method Analyses (50-year, 6-hour)
[Pre-Project]

```
****************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
         (c) Copyright 1982-2014 Advanced Engineering Software (aes)
             Ver. 21.0 Release Date: 06/01/2014  License ID 1261

                          Analysis prepared by:

                          RICK ENGINEERING COMPANY
                              5620 Friars Road
                        San Diego, California 92110
                      619-291-0707   Fax 619-291-4165

 ************************** DESCRIPTION OF STUDY **************************
 JN 19276 - ARE SCRIPPS HQ PROJECT
 4555 EXECUTIVE DR., SAN DIEGO, CA 92121
 PRE-PROJECT CONDITION (BASIN 100)
 **************************************************************************

  FILE NAME: C:\RCV\EX501.DAT
  TIME/DATE OF STUDY: 06:48 07/13/2021
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  1981 SAN DIEGO HYDROLOGY MANUAL RAINFALL INFORMATION USED

  USER SPECIFIED STORM EVENT(YEAR) =  50.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   4.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   20.0     15.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0180

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  1.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint = 10.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   117.00
  UPSTREAM ELEVATION(FEET) =    406.00
```

```
  DOWNSTREAM ELEVATION(FEET) =    401.20
  ELEVATION DIFFERENCE(FEET) =      4.80
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.041
  *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
   DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.910
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    400.20  DOWNSTREAM(FEET) =    399.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =    86.00   CHANNEL SLOPE =  0.0070
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  90.000
  MANNING'S FACTOR = 0.020   MAXIMUM DEPTH(FEET) =   0.67
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.490
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .6000
  S.C.S. CURVE NUMBER (AMC II) =  92
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.48
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.59
  AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   2.44
  Tc(MIN.) =    8.44
  SUBAREA AREA(ACRES) =     0.14       SUBAREA RUNOFF(CFS) =    0.29
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.63

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   0.64
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     203.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   399.60  DOWNSTREAM(FEET) =   397.10
  FLOW LENGTH(FEET) =   178.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   4.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.94
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.63
  PIPE TRAVEL TIME(MIN.) =   0.75    Tc(MIN.) =    9.19
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =     381.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.374
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  SUBAREA AREA(ACRES) =    0.29   SUBAREA RUNOFF(CFS) =    0.83
```

```
  TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =       1.46
  TC(MIN.) =    9.19

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    397.10  DOWNSTREAM(FEET) =    395.70
  CHANNEL LENGTH THRU SUBAREA(FEET) =    15.00   CHANNEL SLOPE =  0.0933
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.023   MAXIMUM DEPTH(FEET) =   0.25
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.46
  FLOW VELOCITY(FEET/SEC.) =   4.27   FLOW DEPTH(FEET) =   0.11
  TRAVEL TIME(MIN.) =   0.06   Tc(MIN.) =    9.25
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =     396.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.10 TO NODE    104.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.367
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  SUBAREA AREA(ACRES) =    0.37   SUBAREA RUNOFF(CFS) =    1.06
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       2.52
  TC(MIN.) =    9.25

****************************************************************************
  FLOW PROCESS FROM NODE    104.20 TO NODE    104.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.367
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .6000
  S.C.S. CURVE NUMBER (AMC II) =  92
  SUBAREA AREA(ACRES) =    0.15   SUBAREA RUNOFF(CFS) =    0.30
  TOTAL AREA(ACRES) =        1.0   TOTAL RUNOFF(CFS) =       2.82
  TC(MIN.) =    9.25

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    395.70  DOWNSTREAM(FEET) =    393.90
  CHANNEL LENGTH THRU SUBAREA(FEET) =   118.00   CHANNEL SLOPE =  0.0153
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.023   MAXIMUM DEPTH(FEET) =   0.40
  CHANNEL FLOW THRU SUBAREA(CFS) =       2.82
  FLOW VELOCITY(FEET/SEC.) =   2.07   FLOW DEPTH(FEET) =   0.13
  TRAVEL TIME(MIN.) =   0.95   Tc(MIN.) =   10.20
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    105.00 =     514.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE    105.10 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.238
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .6000
  S.C.S. CURVE NUMBER (AMC II) =  92
  SUBAREA AREA(ACRES) =    0.17   SUBAREA RUNOFF(CFS) =    0.33
  TOTAL AREA(ACRES) =        1.2   TOTAL RUNOFF(CFS) =       3.15
  TC(MIN.) =   10.20

****************************************************************************
  FLOW PROCESS FROM NODE    105.20 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.238
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =  92
  SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.30
  TOTAL AREA(ACRES) =        1.3   TOTAL RUNOFF(CFS) =       3.45
  TC(MIN.) =   10.20

****************************************************************************
  FLOW PROCESS FROM NODE    105.30 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.238
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .6000
  S.C.S. CURVE NUMBER (AMC II) =  92
  SUBAREA AREA(ACRES) =    0.12   SUBAREA RUNOFF(CFS) =    0.23
  TOTAL AREA(ACRES) =        1.4   TOTAL RUNOFF(CFS) =       3.69
  TC(MIN.) =   10.20
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.4  TC(MIN.) =     10.20
  PEAK FLOW RATE(CFS)   =       3.69
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
         (c) Copyright 1982-2014 Advanced Engineering Software (aes)
             Ver. 21.0 Release Date: 06/01/2014  License ID 1261

                           Analysis prepared by:

                          RICK ENGINEERING COMPANY
                              5620 Friars Road
                        San Diego, California 92110
                      619-291-0707   Fax 619-291-4165

 ************************** DESCRIPTION OF STUDY **************************
 JN 19276 - ARE SCRIPPS HQ PROJECT
 4555 EXECUTIVE DR., SAN DIEGO, CA 92121
 PRE-PROJECT CONDITION (BASIN 200)
 **************************************************************************

  FILE NAME: C:\RCV\EX50.DAT
  TIME/DATE OF STUDY: 16:45 01/25/2021
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  1981 SAN DIEGO HYDROLOGY MANUAL RAINFALL INFORMATION USED

  USER SPECIFIED STORM EVENT(YEAR) =  50.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   4.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   20.0     15.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0180

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  1.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint = 10.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   117.00
  UPSTREAM ELEVATION(FEET) =    406.00
```

```
  DOWNSTREAM ELEVATION(FEET) =    401.20
  ELEVATION DIFFERENCE(FEET) =      4.80
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.041
  *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
   DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.910
  SUBAREA RUNOFF(CFS) =      0.66
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.66

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    401.20  DOWNSTREAM(FEET) =    400.70
  CHANNEL LENGTH THRU SUBAREA(FEET) =   301.00   CHANNEL SLOPE =  0.0017
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  90.000
  MANNING'S FACTOR = 0.020   MAXIMUM DEPTH(FEET) =   0.67
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.703
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.63
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.55
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   9.19
  Tc(MIN.) =   15.19
  SUBAREA AREA(ACRES) =     0.81       SUBAREA RUNOFF(CFS) =    1.86
  TOTAL AREA(ACRES) =        1.0         PEAK FLOW RATE(CFS) =       2.53

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   0.63
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =     418.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.703
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  SUBAREA AREA(ACRES) =    0.64   SUBAREA RUNOFF(CFS) =    1.47
  TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       4.00
  TC(MIN.) =   15.19

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   394.80  DOWNSTREAM(FEET) =   393.90
  FLOW LENGTH(FEET) =    83.00   MANNING'S N =  0.012
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.09
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =       4.00
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =   15.46
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    203.00 =     501.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.679
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  SUBAREA AREA(ACRES) =    0.16   SUBAREA RUNOFF(CFS) =    0.36
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =       4.36
  TC(MIN.) =   15.46

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   393.90  DOWNSTREAM(FEET) =   392.70
  FLOW LENGTH(FEET) =    59.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.44
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.36
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   15.59
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =     560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.667
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  SUBAREA AREA(ACRES) =    0.41   SUBAREA RUNOFF(CFS) =    0.93
  TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =       5.29
  TC(MIN.) =   15.59

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    205.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   392.70  DOWNSTREAM(FEET) =   391.60
  FLOW LENGTH(FEET) =    52.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.74
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.29
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   15.70
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    205.00 =     612.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    205.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.657
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  SUBAREA AREA(ACRES) =    0.09   SUBAREA RUNOFF(CFS) =    0.20
  TOTAL AREA(ACRES) =        2.3   TOTAL RUNOFF(CFS) =       5.49
  TC(MIN.) =   15.70

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   391.60  DOWNSTREAM(FEET) =   385.60
  FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.53
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.49
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   15.82
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    206.00 =     697.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.10 TO NODE    206.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.647
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .6000
  S.C.S. CURVE NUMBER (AMC II) =  92
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.16
  TOTAL AREA(ACRES) =        2.4   TOTAL RUNOFF(CFS) =       5.65
  TC(MIN.) =   15.82

****************************************************************************
  FLOW PROCESS FROM NODE    206.20 TO NODE    206.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.647
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .6000
  S.C.S. CURVE NUMBER (AMC II) =  92
  SUBAREA AREA(ACRES) =    0.13   SUBAREA RUNOFF(CFS) =    0.21
  TOTAL AREA(ACRES) =        2.5   TOTAL RUNOFF(CFS) =       5.86
  TC(MIN.) =   15.82
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.5  TC(MIN.) =     15.82
  PEAK FLOW RATE(CFS)   =       5.86
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

APPENDIX B

Modified Rational Method Analyses (50-year, 6-hour)
[Post-Project]

```
****************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
         (c) Copyright 1982-2014 Advanced Engineering Software (aes)
             Ver. 21.0 Release Date: 06/01/2014  License ID 1261

                          Analysis prepared by:

                         RICK ENGINEERING COMPANY
                             5620 Friars Road
                       San Diego, California 92110
                     619-291-0707   Fax 619-291-4165

 ************************** DESCRIPTION OF STUDY **************************
 JN 19276 - ARE SCRIPPS HQ PROJECT
 4555 EXECUTIVE DR., SAN DIEGO, CA 92121
```

POST-PROJECT CONDITION (BASIN 1000)

```
 **************************************************************************

  FILE NAME: C:\RCV\DEV501.DAT
  TIME/DATE OF STUDY: 07:39 07/14/2021
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  1981 SAN DIEGO HYDROLOGY MANUAL RAINFALL INFORMATION USED

  USER SPECIFIED STORM EVENT(YEAR) =  50.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   4.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   20.0     15.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0180

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  1.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint = 10.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE   1000.00 TO NODE   1001.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    404.00
```

```
  DOWNSTREAM ELEVATION(FEET) =    403.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.500
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.910
  SUBAREA RUNOFF(CFS) =      1.30
  TOTAL AREA(ACRES) =      0.39   TOTAL RUNOFF(CFS) =      1.30

****************************************************************************
  FLOW PROCESS FROM NODE   1001.00 TO NODE   1002.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.00  DOWNSTREAM(FEET) =   399.84
  FLOW LENGTH(FEET) =    18.90   MANNING'S N =  0.012
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   6.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.98
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.30
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    6.08
  LONGEST FLOWPATH FROM NODE   1000.00 TO NODE   1002.00 =     118.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1002.00 TO NODE   1002.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.895
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .6000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.14   SUBAREA RUNOFF(CFS) =    0.33
  TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =       1.62
  TC(MIN.) =    6.08

****************************************************************************
  FLOW PROCESS FROM NODE   1002.00 TO NODE   1003.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   399.84  DOWNSTREAM(FEET) =   399.65
  FLOW LENGTH(FEET) =    22.83   MANNING'S N =  0.012
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.23
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.62
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    6.17
  LONGEST FLOWPATH FROM NODE   1000.00 TO NODE   1003.00 =     141.73 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1003.00 TO NODE   1003.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.17
  RAINFALL INTENSITY(INCH/HR) =   3.88
```

```
  TOTAL STREAM AREA(ACRES) =     0.53
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.62

****************************************************************************
  FLOW PROCESS FROM NODE   1100.00 TO NODE   1101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .6000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    404.10
  DOWNSTREAM ELEVATION(FEET) =    401.50
  ELEVATION DIFFERENCE(FEET) =      2.60
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.150
  *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
   DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.910
  SUBAREA RUNOFF(CFS) =      0.12
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.12

****************************************************************************
  FLOW PROCESS FROM NODE   1101.00 TO NODE   1003.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    401.50  DOWNSTREAM(FEET) =    399.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =    35.00   CHANNEL SLOPE =  0.0600
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  40.000
  MANNING'S FACTOR = 0.020   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.832
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .6000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.30
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.42
  AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =   0.41
  Tc(MIN.) =    6.41
  SUBAREA AREA(ACRES) =     0.16       SUBAREA RUNOFF(CFS) =    0.37
  TOTAL AREA(ACRES) =       0.2         PEAK FLOW RATE(CFS) =       0.49

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   1.78
  LONGEST FLOWPATH FROM NODE   1100.00 TO NODE   1003.00 =     110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1003.00 TO NODE   1003.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.41
  RAINFALL INTENSITY(INCH/HR) =   3.83
  TOTAL STREAM AREA(ACRES) =     0.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.49
```

```
  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        1.62     6.17        3.878          0.53
      2        0.49     6.41        3.832          0.21

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        2.10     6.17       3.878
      2        2.09     6.41       3.832

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.10   Tc(MIN.) =    6.17
  TOTAL AREA(ACRES) =        0.7
  LONGEST FLOWPATH FROM NODE   1000.00 TO NODE   1003.00 =     141.73 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1003.00 TO NODE   1004.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   396.18  DOWNSTREAM(FEET) =   395.82
  FLOW LENGTH(FEET) =   108.71   MANNING'S N =  0.012
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.06
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.10
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =    6.76
  LONGEST FLOWPATH FROM NODE   1000.00 TO NODE   1004.00 =     250.44 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1004.10 TO NODE   1004.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.766
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .6000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.08   SUBAREA RUNOFF(CFS) =    0.18
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       2.28
  TC(MIN.) =    6.76

****************************************************************************
  FLOW PROCESS FROM NODE   1004.20 TO NODE   1004.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.766
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.14   SUBAREA RUNOFF(CFS) =    0.24
  TOTAL AREA(ACRES) =        1.0   TOTAL RUNOFF(CFS) =       2.52
```

```
  TC(MIN.) =    6.76

****************************************************************************
  FLOW PROCESS FROM NODE   1004.00 TO NODE   1005.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    395.82  DOWNSTREAM(FEET) =    395.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =    10.00   CHANNEL SLOPE =  0.0320
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.023   MAXIMUM DEPTH(FEET) =   0.25
  CHANNEL FLOW THRU SUBAREA(CFS) =       2.52
  FLOW VELOCITY(FEET/SEC.) =   3.76   FLOW DEPTH(FEET) =   0.21
  TRAVEL TIME(MIN.) =   0.04   Tc(MIN.) =    6.80
  LONGEST FLOWPATH FROM NODE   1000.00 TO NODE   1005.00 =     260.44 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1005.00 TO NODE   1005.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.80
  RAINFALL INTENSITY(INCH/HR) =   3.76
  TOTAL STREAM AREA(ACRES) =     0.96
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.52

****************************************************************************
  FLOW PROCESS FROM NODE   1200.00 TO NODE   1201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    40.00
  UPSTREAM ELEVATION(FEET) =    397.50
  DOWNSTREAM ELEVATION(FEET) =    396.90
  ELEVATION DIFFERENCE(FEET) =      0.60
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.486
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.910
  SUBAREA RUNOFF(CFS) =      0.10
  TOTAL AREA(ACRES) =      0.03   TOTAL RUNOFF(CFS) =      0.10

****************************************************************************
  FLOW PROCESS FROM NODE   1201.00 TO NODE   1201.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.910
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .6000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.21   SUBAREA RUNOFF(CFS) =    0.49
  TOTAL AREA(ACRES) =        0.2   TOTAL RUNOFF(CFS) =       0.59
  TC(MIN.) =    6.00
```

```
****************************************************************************
  FLOW PROCESS FROM NODE   1201.00 TO NODE   1005.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    396.50  DOWNSTREAM(FEET) =    395.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =    55.00   CHANNEL SLOPE =  0.0182
  CHANNEL BASE(FEET) =    1.50   "Z" FACTOR =  12.000
  MANNING'S FACTOR = 0.018   MAXIMUM DEPTH(FEET) =   0.40
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.59
  FLOW VELOCITY(FEET/SEC.) =   1.92   FLOW DEPTH(FEET) =   0.11
  TRAVEL TIME(MIN.) =   0.48   Tc(MIN.) =    6.48
  LONGEST FLOWPATH FROM NODE   1200.00 TO NODE   1005.00 =      95.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1005.00 TO NODE   1005.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.48
  RAINFALL INTENSITY(INCH/HR) =   3.82
  TOTAL STREAM AREA(ACRES) =     0.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.59

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        2.52     6.80        3.757          0.96
      2        0.59     6.48        3.819          0.24

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        3.07     6.48       3.819
      2        3.10     6.80       3.757

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.10   Tc(MIN.) =    6.80
  TOTAL AREA(ACRES) =        1.2
  LONGEST FLOWPATH FROM NODE   1000.00 TO NODE   1005.00 =     260.44 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1005.00 TO NODE   1006.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    395.50  DOWNSTREAM(FEET) =    393.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   130.00   CHANNEL SLOPE =  0.0192
  CHANNEL BASE(FEET) =    1.50   "Z" FACTOR =  12.000
  MANNING'S FACTOR = 0.023   MAXIMUM DEPTH(FEET) =   0.40
  CHANNEL FLOW THRU SUBAREA(CFS) =       3.10
  FLOW VELOCITY(FEET/SEC.) =   2.55   FLOW DEPTH(FEET) =   0.26
```

```
  TRAVEL TIME(MIN.) =   0.85   Tc(MIN.) =    7.66
  LONGEST FLOWPATH FROM NODE   1000.00 TO NODE   1006.00 =     390.44 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1006.00 TO NODE   1006.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.615
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.27   SUBAREA RUNOFF(CFS) =    0.44
  TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       3.54
  TC(MIN.) =    7.66
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.5  TC(MIN.) =      7.66
  PEAK FLOW RATE(CFS)   =       3.54
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
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             Ver. 21.0 Release Date: 06/01/2014  License ID 1261

                          Analysis prepared by:

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 ************************** DESCRIPTION OF STUDY **************************
 JN 19276 - ARE SCRIPPS HQ PROJECT
 4555 EXECUTIVE DR., SAN DIEGO, CA 92121
 POST-PROJECT CONDITION (BASIN 2000)
 **************************************************************************

  FILE NAME: C:\RCV\DEV50.DAT
  TIME/DATE OF STUDY: 08:34 07/14/2021
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  1981 SAN DIEGO HYDROLOGY MANUAL RAINFALL INFORMATION USED

  USER SPECIFIED STORM EVENT(YEAR) =  50.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   4.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   20.0     15.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0180

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  1.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint = 10.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE   2000.00 TO NODE   2001.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   130.00
  UPSTREAM ELEVATION(FEET) =    404.00
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  DOWNSTREAM ELEVATION(FEET) =    403.50
  ELEVATION DIFFERENCE(FEET) =      0.50
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =   15.521
  *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
   DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.673
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE   2001.00 TO NODE   2002.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    403.50  DOWNSTREAM(FEET) =    398.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =    30.00   CHANNEL SLOPE =  0.1567
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.020   MAXIMUM DEPTH(FEET) =   3.00
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.645
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.20
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.59
  AVERAGE FLOW DEPTH(FEET) =   0.01   TRAVEL TIME(MIN.) =   0.31
  Tc(MIN.) =   15.84
  SUBAREA AREA(ACRES) =     0.11       SUBAREA RUNOFF(CFS) =    0.13
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.26

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.01   FLOW VELOCITY(FEET/SEC.) =   2.12
  LONGEST FLOWPATH FROM NODE   2000.00 TO NODE   2002.00 =     160.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2002.00 TO NODE   2002.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.84
  RAINFALL INTENSITY(INCH/HR) =   2.64
  TOTAL STREAM AREA(ACRES) =     0.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.26

****************************************************************************
  FLOW PROCESS FROM NODE   2100.00 TO NODE   2101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   125.00
  UPSTREAM ELEVATION(FEET) =    404.00
  DOWNSTREAM ELEVATION(FEET) =    403.90
  ELEVATION DIFFERENCE(FEET) =      0.10
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =   11.675
  *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
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   DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.069
  SUBAREA RUNOFF(CFS) =      0.60
  TOTAL AREA(ACRES) =      0.23   TOTAL RUNOFF(CFS) =      0.60

****************************************************************************
  FLOW PROCESS FROM NODE   2101.00 TO NODE   2102.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.13  DOWNSTREAM(FEET) =   399.34
  FLOW LENGTH(FEET) =   142.12   MANNING'S N =  0.012
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   4.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.83
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.60
  PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =   12.51
  LONGEST FLOWPATH FROM NODE   2100.00 TO NODE   2102.00 =     267.12 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2102.00 TO NODE   2102.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.994
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.53   SUBAREA RUNOFF(CFS) =    1.30
  TOTAL AREA(ACRES) =       0.8   TOTAL RUNOFF(CFS) =      1.90
  TC(MIN.) =   12.51

****************************************************************************
  FLOW PROCESS FROM NODE   2102.00 TO NODE   2002.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   399.30  DOWNSTREAM(FEET) =   399.13
  FLOW LENGTH(FEET) =     7.73   MANNING'S N =  0.012
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   5.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.28
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.90
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   12.53
  LONGEST FLOWPATH FROM NODE   2100.00 TO NODE   2002.00 =     274.85 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2002.00 TO NODE   2002.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.53
  RAINFALL INTENSITY(INCH/HR) =   2.99
  TOTAL STREAM AREA(ACRES) =     0.76
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.90
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****************************************************************************
  FLOW PROCESS FROM NODE   2200.00 TO NODE   2201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  UPSTREAM ELEVATION(FEET) =    400.50
  DOWNSTREAM ELEVATION(FEET) =    400.00
  ELEVATION DIFFERENCE(FEET) =      0.50
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =   11.314
  *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
   DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.102
  SUBAREA RUNOFF(CFS) =      1.88
  TOTAL AREA(ACRES) =      0.74   TOTAL RUNOFF(CFS) =      1.88

****************************************************************************
  FLOW PROCESS FROM NODE   2201.00 TO NODE   2202.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   399.72  DOWNSTREAM(FEET) =   399.29
  FLOW LENGTH(FEET) =    42.28   MANNING'S N =  0.012
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.74
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.88
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   11.46
  LONGEST FLOWPATH FROM NODE   2200.00 TO NODE   2202.00 =     242.28 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2202.00 TO NODE   2202.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.088
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.39   SUBAREA RUNOFF(CFS) =    0.99
  TOTAL AREA(ACRES) =        1.1   TOTAL RUNOFF(CFS) =       2.87
  TC(MIN.) =   11.46

****************************************************************************
  FLOW PROCESS FROM NODE   2202.00 TO NODE   2002.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   399.25  DOWNSTREAM(FEET) =   399.13
  FLOW LENGTH(FEET) =    24.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.03
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.87
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   11.56
```

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  LONGEST FLOWPATH FROM NODE   2200.00 TO NODE   2002.00 =     266.28 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2002.00 TO NODE   2002.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.56
  RAINFALL INTENSITY(INCH/HR) =   3.08
  TOTAL STREAM AREA(ACRES) =     1.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.87

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        0.26    15.84        2.645          0.20
      2        1.90    12.53        2.992          0.76
      3        2.87    11.56        3.079          1.13

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        4.94    11.56       3.079
      2        4.92    12.53       2.992
      3        4.41    15.84       2.645

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.94   Tc(MIN.) =   11.56
  TOTAL AREA(ACRES) =        2.1
  LONGEST FLOWPATH FROM NODE   2100.00 TO NODE   2002.00 =     274.85 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2002.00 TO NODE   2003.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   395.70  DOWNSTREAM(FEET) =   392.14
  FLOW LENGTH(FEET) =   284.90   MANNING'S N =  0.012
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.49
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.94
  PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =   12.29
  LONGEST FLOWPATH FROM NODE   2100.00 TO NODE   2003.00 =     559.75 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2003.00 TO NODE   2003.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.29
```

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  RAINFALL INTENSITY(INCH/HR) =   3.01
  TOTAL STREAM AREA(ACRES) =     2.09
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.94

****************************************************************************
  FLOW PROCESS FROM NODE   2300.00 TO NODE   2301.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    85.00
  UPSTREAM ELEVATION(FEET) =    402.60
  DOWNSTREAM ELEVATION(FEET) =    398.70
  ELEVATION DIFFERENCE(FEET) =      3.90
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.497
  *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
   DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.910
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.13   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE   2301.00 TO NODE   2302.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    398.50  DOWNSTREAM(FEET) =    396.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =    70.00   CHANNEL SLOPE =  0.0329
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.020   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.730
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.78
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.23
  AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =   0.95
  Tc(MIN.) =    6.95
  SUBAREA AREA(ACRES) =     0.23       SUBAREA RUNOFF(CFS) =    0.69
  TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       1.12

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   1.35
  LONGEST FLOWPATH FROM NODE   2300.00 TO NODE   2302.00 =     155.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2302.00 TO NODE   2003.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   392.65  DOWNSTREAM(FEET) =   392.14
  FLOW LENGTH(FEET) =    72.10   MANNING'S N =  0.012
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.60
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =       1.12
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =    7.28
  LONGEST FLOWPATH FROM NODE   2300.00 TO NODE   2003.00 =     227.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2003.00 TO NODE   2003.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.28
  RAINFALL INTENSITY(INCH/HR) =   3.68
  TOTAL STREAM AREA(ACRES) =     0.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.12

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        4.94    12.29        3.014          2.09
      2        1.12     7.28        3.675          0.36

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        5.17     7.28       3.675
      2        5.86    12.29       3.014

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.86   Tc(MIN.) =   12.29
  TOTAL AREA(ACRES) =        2.4
  LONGEST FLOWPATH FROM NODE   2100.00 TO NODE   2003.00 =     559.75 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2003.00 TO NODE   2004.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   392.04  DOWNSTREAM(FEET) =   391.46
  FLOW LENGTH(FEET) =    91.17   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.25
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.86
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =   12.58
  LONGEST FLOWPATH FROM NODE   2100.00 TO NODE   2004.00 =     650.92 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2004.00 TO NODE   2004.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.988
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
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  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.04   SUBAREA RUNOFF(CFS) =    0.05
  TOTAL AREA(ACRES) =        2.5   TOTAL RUNOFF(CFS) =       5.91
  TC(MIN.) =   12.58

****************************************************************************
  FLOW PROCESS FROM NODE   2004.00 TO NODE   2005.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   391.36  DOWNSTREAM(FEET) =   390.54
  FLOW LENGTH(FEET) =   135.74   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.16
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.91
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   13.02
  LONGEST FLOWPATH FROM NODE   2100.00 TO NODE   2005.00 =     786.66 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2005.00 TO NODE   2006.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   390.40  DOWNSTREAM(FEET) =   385.60
  FLOW LENGTH(FEET) =    77.20   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.53
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.91
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   13.13
  LONGEST FLOWPATH FROM NODE   2100.00 TO NODE   2006.00 =     863.86 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2006.00 TO NODE   2006.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.935
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.04   SUBAREA RUNOFF(CFS) =    0.05
  TOTAL AREA(ACRES) =        2.5   TOTAL RUNOFF(CFS) =       5.97
  TC(MIN.) =   13.13
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.5  TC(MIN.) =     13.13
  PEAK FLOW RATE(CFS)   =       5.97
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

APPENDIX C

Hydraulic Calculations (Pipe Flow) and
Normal Depth Storm Drain Sizing Matrix
[Post-Project]

```
****************************************************************************
                PIPE-FLOW HYDRAULICS COMPUTER PROGRAM PACKAGE
          (Reference: LACFCD,LACRD, AND OCEMA HYDRAULICS CRITERION)
         (c) Copyright 1982-2014 Advanced Engineering Software (aes)
             Ver. 21.0  Release Date: 06/01/2014  License ID 1261

                            Analysis prepared by:

                           RICK ENGINEERING COMPANY
                               5620 Friars Road
                         San Diego, California 92110
                       619-291-0707   Fax 619-291-4165

  ************************** DESCRIPTION OF STUDY **************************
  JN 19276 – ARE SCRIPPS HQ PROJECT
  4555 EXECUTIVE DR., SAN DIEGO, CA 92121
  PIPE HYDRAULICS FOR EXIST. 18" RCP IN EXECUTIVE DR. (Nodes 2005 to 2006)
  **************************************************************************

   FILE NAME: C:\RCV\NODE2006.DAT
   TIME/DATE OF STUDY: 08:42 07/14/2021

****************************************************************************
               GRADUALLY VARIED FLOW ANALYSIS FOR PIPE SYSTEM
                         NODAL POINT STATUS TABLE
                (Note: "*" indicates nodal point data used.)
                      UPSTREAM RUN                   DOWNSTREAM RUN
    NODE    MODEL   PRESSURE      PRESSURE+        FLOW        PRESSURE+
   NUMBER  PROCESS  HEAD(FT)   MOMENTUM(POUNDS)   DEPTH(FT)  MOMENTUM(POUNDS)
  2006.00-             1.50             121.01       0.50*           137.29
         } FRICTION
  2005.00-             0.94*Dc           87.78       0.94*Dc          87.78
         } CATCH BASIN
  2005.10-             1.28*             42.95       0.94 Dc          29.60
----------------------------------------------------------------------------
  MAXIMUM NUMBER OF ENERGY BALANCES USED IN EACH PROFILE =  25
----------------------------------------------------------------------------
  NOTE: STEADY FLOW HYDRAULIC HEAD-LOSS COMPUTATIONS BASED ON THE MOST
  CONSERVATIVE FORMULAE FROM THE CURRENT LACRD,LACFCD, AND OCEMA
  DESIGN MANUALS.
****************************************************************************
  DOWNSTREAM PIPE FLOW CONTROL DATA:
  NODE NUMBER =  2006.00            FLOWLINE ELEVATION =   385.60
  PIPE FLOW =       5.91 CFS        PIPE DIAMETER =  18.00 INCHES
  ASSUMED DOWNSTREAM CONTROL HGL =   387.100 FEET
----------------------------------------------------------------------------
  NODE  2006.00 : HGL = <  386.102>;EGL= <  388.120>;FLOWLINE= <  385.600>

****************************************************************************
  FLOW PROCESS FROM NODE  2006.00 TO NODE  2005.00 IS CODE =  1
  UPSTREAM NODE  2005.00     ELEVATION =   390.40  (FLOW IS SUPERCRITICAL)
----------------------------------------------------------------------------
  CALCULATE FRICTION LOSSES(LACFCD):
  PIPE FLOW   =       5.91 CFS     PIPE DIAMETER =  18.00 INCHES
  PIPE LENGTH =      77.20 FEET          MANNING'S N  =  0.01300
----------------------------------------------------------------------------
  NORMAL DEPTH(FT) =      0.48          CRITICAL DEPTH(FT) =      0.94
============================================================================
  UPSTREAM CONTROL ASSUMED FLOWDEPTH(FT) =     0.94
```

==
GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:

DISTANCE FROM CONTROL(FT)	FLOW DEPTH (FT)	VELOCITY (FT/SEC)	SPECIFIC ENERGY(FT)	PRESSURE+ MOMENTUM(POUNDS)
0.000	0.939	5.078	1.339	87.78
0.013	0.920	5.196	1.340	87.83
0.052	0.902	5.321	1.342	87.98
0.121	0.884	5.452	1.346	88.25
0.225	0.866	5.591	1.352	88.62
0.365	0.848	5.737	1.359	89.12
0.549	0.830	5.892	1.369	89.74
0.781	0.811	6.056	1.381	90.49
1.069	0.793	6.230	1.396	91.39
1.420	0.775	6.414	1.414	92.44
1.845	0.757	6.609	1.436	93.65
2.355	0.739	6.817	1.461	95.03
2.966	0.721	7.038	1.490	96.60
3.695	0.702	7.274	1.525	98.37
4.568	0.684	7.526	1.564	100.35
5.614	0.666	7.795	1.610	102.56
6.874	0.648	8.084	1.663	105.02
8.404	0.630	8.393	1.724	107.75
10.282	0.612	8.726	1.795	110.78
12.621	0.593	9.085	1.876	114.13
15.601	0.575	9.472	1.969	117.85
19.521	0.557	9.891	2.077	121.95
24.942	0.539	10.345	2.202	126.50
33.128	0.521	10.839	2.346	131.53
48.136	0.503	11.379	2.514	137.11
77.200	0.502	11.396	2.520	137.29

NODE 2005.00 : HGL = < 391.339>;EGL= < 391.739>;FLOWLINE= < 390.400>

****
FLOW PROCESS FROM NODE 2005.00 TO NODE 2005.10 IS CODE = 8
UPSTREAM NODE 2005.10 ELEVATION = 390.54 (FLOW IS SUBCRITICAL)

CALCULATE CATCH BASIN ENTRANCE LOSSES(LACFCD):
PIPE FLOW = 5.91 CFS PIPE DIAMETER = 18.00 INCHES
FLOW VELOCITY = 5.08 FEET/SEC. VELOCITY HEAD = 0.401 FEET
CATCH BASIN ENERGY LOSS = .2*(VELOCITY HEAD) = .2*(0.401) = 0.080

NODE 2005.10 : HGL = < 391.819>;EGL= < 391.819>;FLOWLINE= < 390.540>

****
UPSTREAM PIPE FLOW CONTROL DATA:
NODE NUMBER = 2005.10 FLOWLINE ELEVATION = 390.54
ASSUMED UPSTREAM CONTROL HGL = 391.48 FOR DOWNSTREAM RUN ANALYSIS

==
END OF GRADUALLY VARIED FLOW ANALYSIS

Preliminary Storm Drain Size

The purpose of this table is to provide an estimated pipe size to convey the 100-year flow rates with a sizing factor.

Manning's n: 0.012

Sizing Factor (%): 30

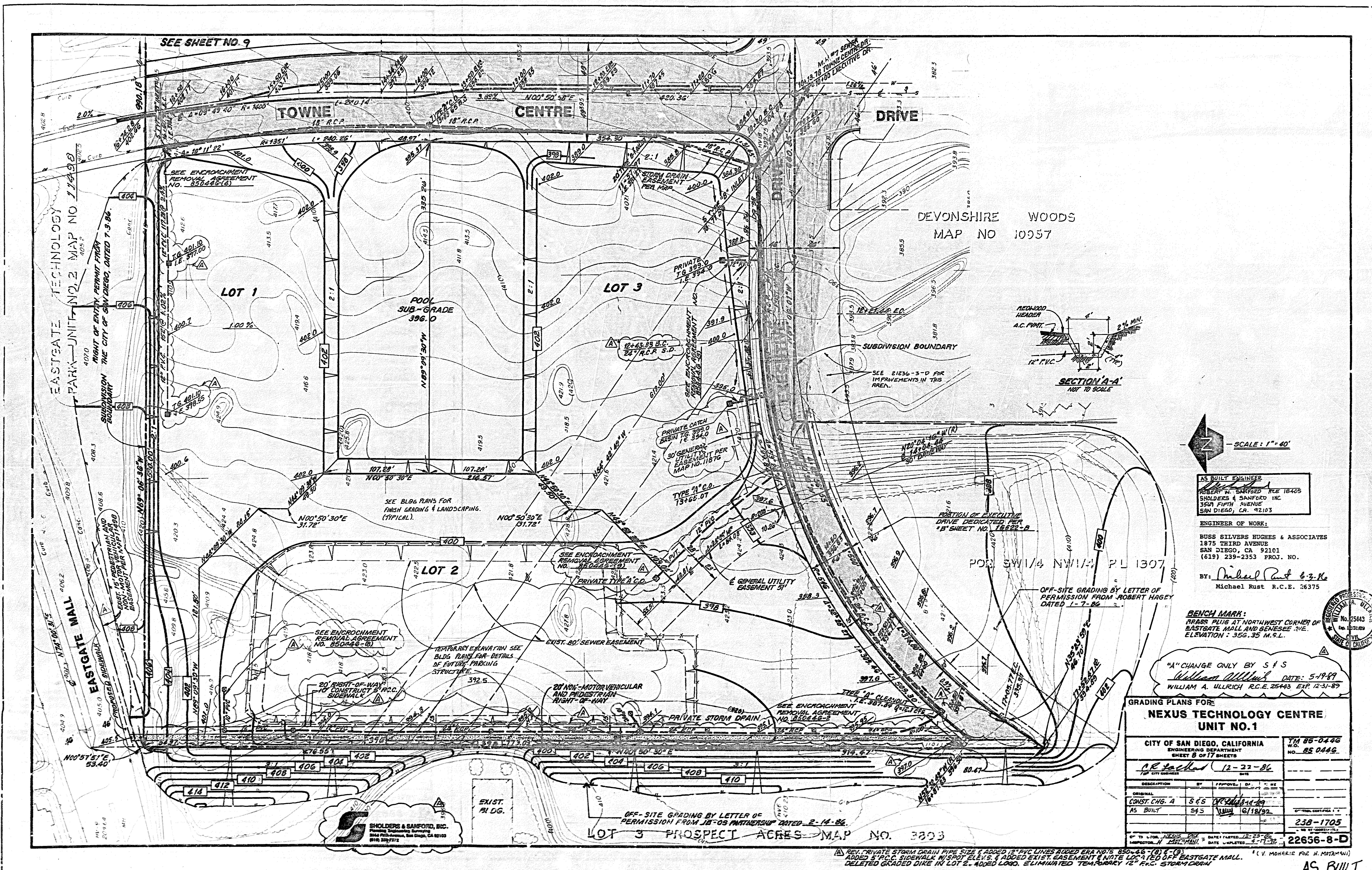
	Slope at:	0.5%		1.0%		2.0%		4.0%	
Q_{100} (cfs[1])	Q_{100} with Sizing Factor (cfs[1])	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Minimum Pipe Size [2] (feet)	Recommended Pipe Size (inches)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)
0.5	0.7	0.58	8"	0.51	6"	0.45	6"	0.39	6"
1.0	1.3	0.76	10"	0.66	8"	0.58	8"	0.51	6"
2.0	2.6	0.98	12"	0.86	12"	0.76	10"	0.66	8"
3.0	3.9	1.14	18"	1.00	12"	0.88	12"	0.77	10"
4.0	5.2	1.27	18"	1.12	18"	0.98	12"	0.86	12"
5.0	6.5	1.38	18"	1.21	18"	1.07	18"	0.94	12"
6.0	7.8	1.48	18"	1.30	18"	1.14	18"	1.00	12"
7.0	9.1	1.57	24"	1.38	18"	1.21	18"	1.06	18"
8.0	10.4	1.65	24"	1.45	18"	1.27	18"	1.12	18"
9.0	11.7	1.72	24"	1.51	18"	1.33	18"	1.17	18"
10.0	13.0	1.79	24"	1.58	24"	1.38	18"	1.21	18"
15.0	19.5	2.09	30"	1.83	24"	1.61	24"	1.41	18"
20.0	26.0	2.33	30"	2.04	30"	1.79	24"	1.58	24"
25.0	32.5	2.53	36"	2.22	30"	1.95	24"	1.71	24"
30.0	39.0	2.71	36"	2.38	30"	2.09	30"	1.83	24"
35.0	45.5	2.87	36"	2.52	36"	2.21	30"	1.94	24"
40.0	52.0	3.02	42"	2.65	36"	2.33	30"	2.04	30"
50.0	65.0	3.28	42"	2.88	36"	2.53	36"	2.22	30"
75.0	97.5	3.82	48"	3.35	42"	2.94	36"	2.59	36"
100.0	130.0	4.25	54"	3.74	48"	3.28	42"	2.88	36"

Note:

1. "cfs" = cubic feet per second.
2. Minimum pipe sizes are calculated using the Manning's equation and are based on the flow rates with 30% factor.

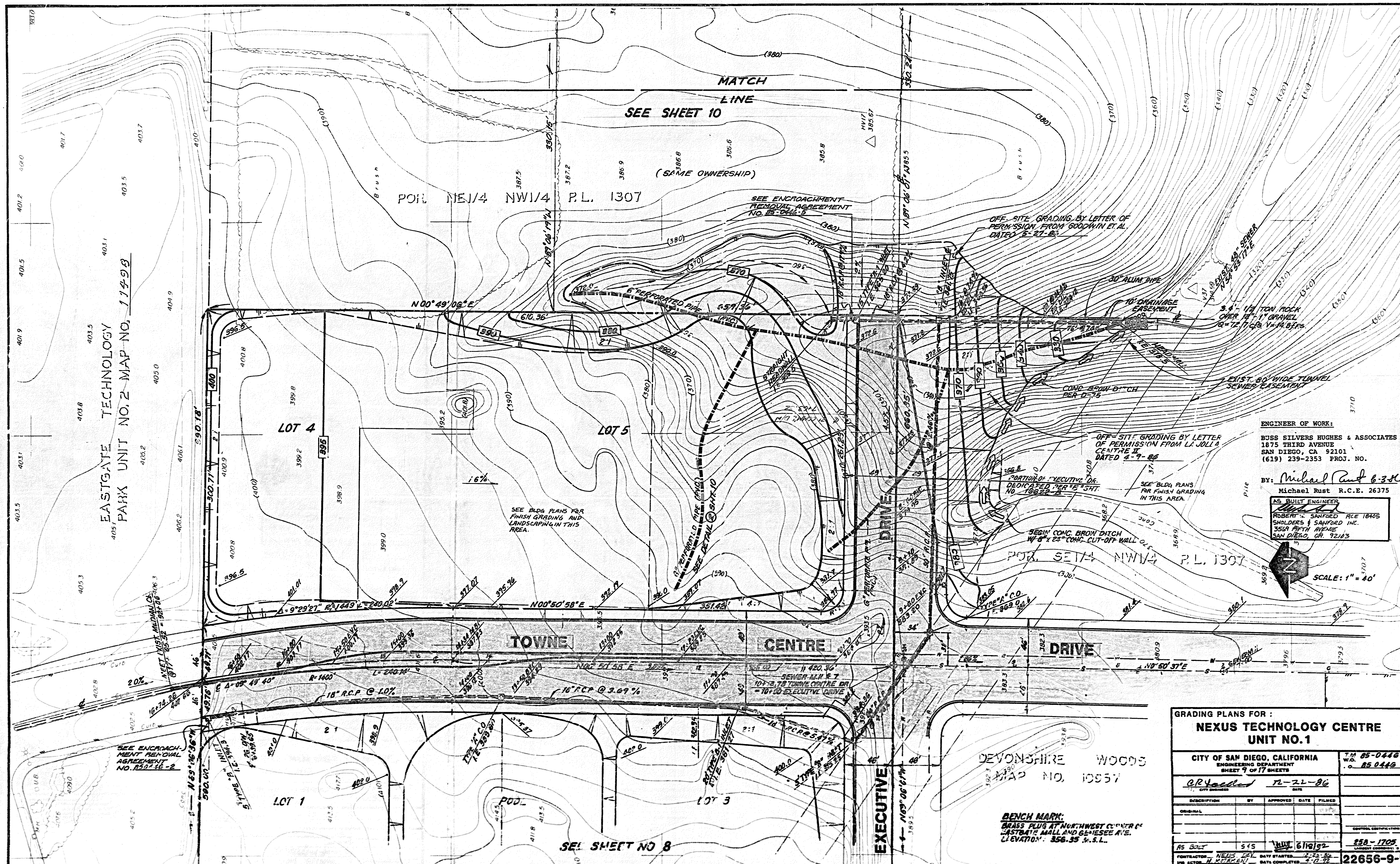
APPENDIX D

Reference Drawings



AS BUILT

10925



ENGINEER OF WORK:

BJSS SILVERS HUGHES & ASSOCIATES
1875 THIRD AVENUE
SAN DIEGO, CA 92101
(619) 239-2353 PROJ. NO.

BY: Michael Rust 6-3-86
Michael Rust R.C.E. 26375

AS BUILT ENGINEER
ROBERT W. SANFORD RCE 18405
SHOLDERS & SANFORD INC.
3569 FIFTH AVENUE
SAN DIEGO, CA. 92103

GRADING PLANS FOR :
NEXUS TECHNOLOGY CENTRE UNIT NO.1

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING DEPARTMENT
SHEET 9 OF 17 SHEETS

T.M. 85-0446
W.O. 85 0446

CITY ENGINEER: C R Yaeckel DATE: 12-22-86

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL				
AS BUILT	SES		6/18/92	

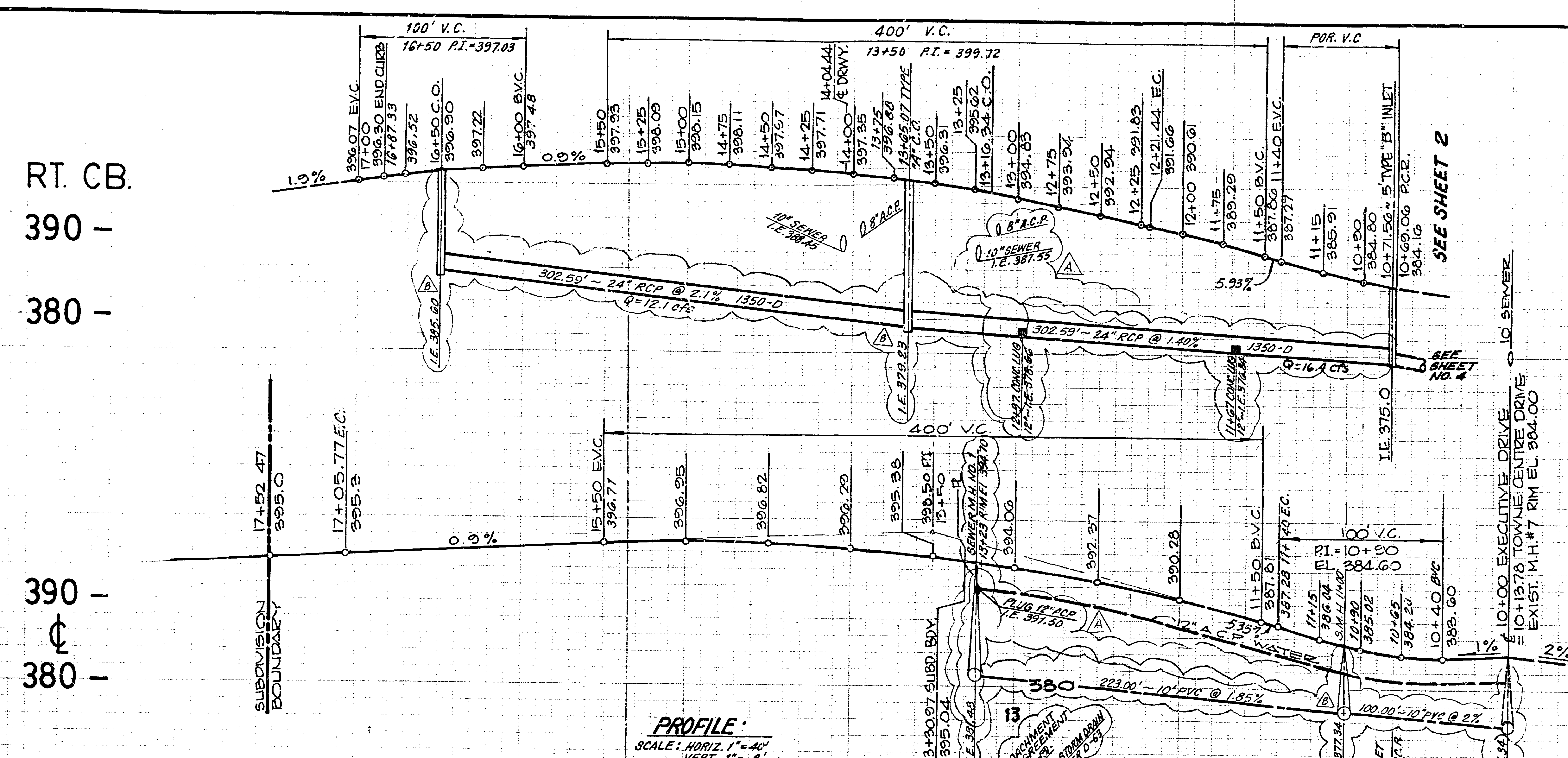
CONTROL CERTIFICATION
258-1705
LAMBERT COORDINATES

CONTRACTOR NEXUS DEV. DATE STARTED 12-23-86
INSPECTOR H. MOTAMANI DATE COMPLETED 4-10-92
(V. MOHARIR FOR H. MOTAMANI)

22656-9-D

AS BUILT

10925 A 1092



SEWER LATERAL TABLE

LOT NO.	F.L. ELEV. @ MAIN	F.L. MAIN PLUS 1.0'	LENGTH IN FEET	INV. ELEV. @ P.L. 2%	TOP OF CURB ELEV.	DEPTH BELOW T.C. @ P.L.	STATION
1	391.01	392.01	49.00	392.99	398.98	5.99'	15+12-6"P.V.C. T.C.D.
3	389.98	390.98	28.00	391.94	398.50	6.96'	1+88.35-6"P.V.C. D/W
3	379.96	380.96	49.00	381.94	387.96	6.02'	11+85-6"P.V.C. T.C.D.
4	393.10	394.10	49.00	395.08	401.17	6.09'	15+96-6"P.V.C. T.C.D
5	378.00	379.00	49.00	379.98	385.64	5.66'	11+20-8"P.V.C. T.C.D
—	371.45	372.45	46.00	373.37	378.87	5.5'	6+25-6"P.V.C. T.C.D.

CURB DATA

NO.	DELTA / BEARING	LENGTH	RADIUS	NOTE
1	N 89°06'01"W	152.38'	——	6" TYPE "H" CURB & GUT.
2	Δ=53°26'42"	500.00'	536.00'	" "
3	N 89°06'01"W	50.00	——	6" TYPE "H" CURB & GUT.
4	N 82°41'33"W	215.50	——	6" TYPE "A" DIKE

STORM DRAIN DATA

NO.	DELTA / BEARING	LENGTH	RADIUS	NOTE
1	N 88°20'01"E	173.83'	——	24" R.C.P.
2	Δ=13°53'35"	128.76'	531.00'	" "
3	Δ=32°39'00"	302.59'	531.00'	24" R.C.P.

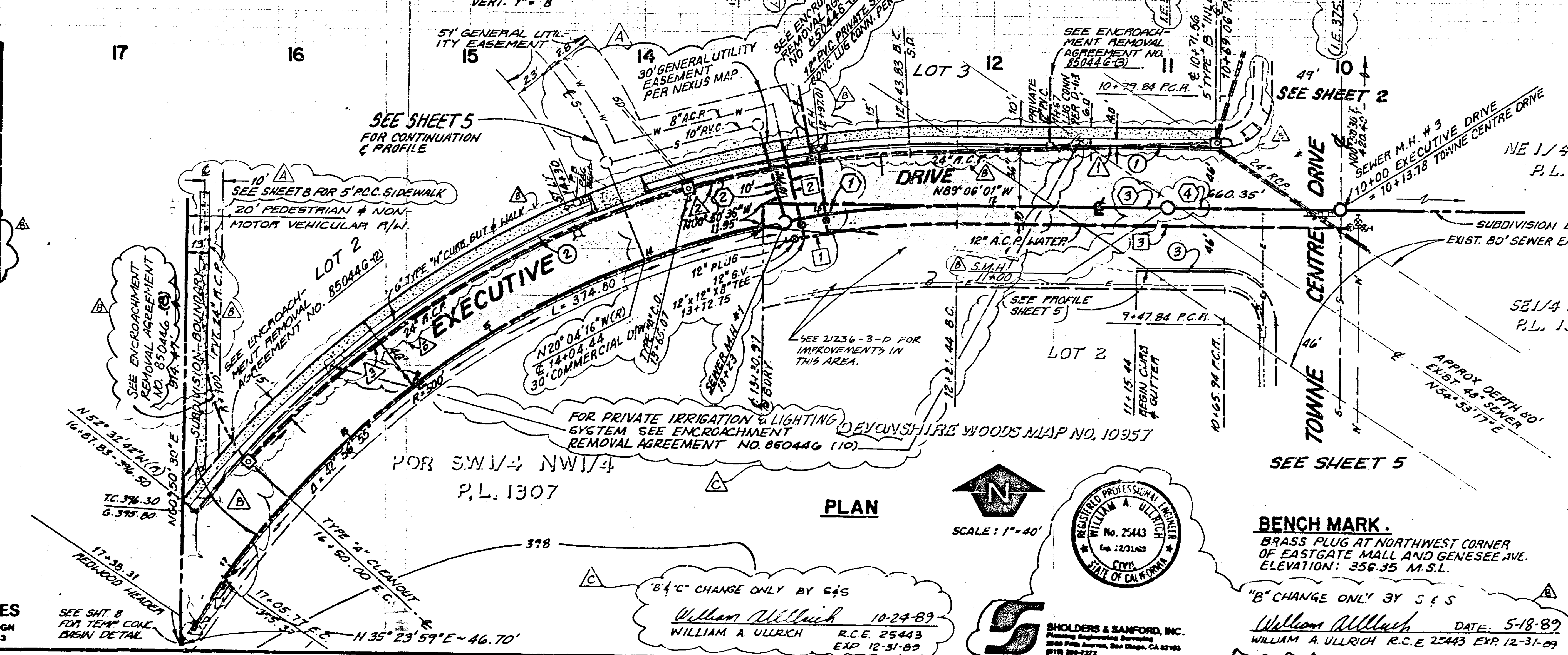
WATER DATA

NO.	DELTA / BEARING	LENGTH	RADIUS	NOTE
1	Δ=10°27'51"	89.49'	490.00'	12" A.C.P.
2	N10°44'18"W	56.01'	--	8" A.C.P.
3	N89°06'01"W	231.44'	—	12" A.C.P.

SEWER DATA

NO.	DELTA / BEARING	LENGTH	RADIUS	NOTE
1	Δ=11°38'17"	101.56'	500.00'	10" P.V.C.
2	N 10°44'18"W	46.00'	—	"P.V.C.
3	N 89°06'01"W	221.44'	—	10" P.V.C.

BUSS SILVERS HUGHES & ASSOCIATES
ARCHITECTURE - ENGINEERING - PLANNING - INTERIOR DESIGN
1875 THIRD AVE. - P.O. BOX 950 - SAN DIEGO, CA. 92112 - 619/239-2353



BENCH MARK.
BRASS PLUG AT NORTHWEST CORNER OF EASTGATE MALL AND GENESEE AVE.
ELEVATION: 356.35 M.S.L.

"B&C" CHANGE ONLY BY S&S
William A Ullrich 10-24-89
WILLIAM A. ULLRICH R.C.E. 25443 EXP 12-31-89

"B" CHANGE ONLY BY S&S
William A Ullrich DATE: 5-18-89
WILLIAM A. ULLRICH R.C.E. 25443 EXP. 12-31-89

SHOLDERS & SANFORD, INC.

AS BUILT ENGINEER
ROBERT W. SANFORD R.C.E. 18405
SHOLDERS & SANFORD INC.
3569 FIFTH AVENUE
SAN DIEGO, CA. 92103

ENGINEER OF WORK:
BUSS SILVERS HUGHES & ASSOCIATES
1875 THIRD AVENUE
SAN DIEGO, CA 92101
(619) 239-2353 PROJ. NO.

BY: Michael Rust 6-3-86
Michael Rust R.C.E. 26375

PRIVATE CONTRACT:

PLANS FOR THE IMPROVEMENT OF:

EXECUTIVE DRIVE

NEXUS TECHNOLOGY CENTRE UNIT NO. 1

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING DEPARTMENT
SHEET 3 OF 7 SHEETS

T.M. 85-0446
W.O. NO. 850446

FOR CITY ENGINEER 12-22-86 DATE

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL				
CHANGE "A"	BSH&A		7-9-87	
CONSTR. CHG. "B"	S&S		11-14-89	
CONST. CHG. "C"			11-9-89	
AS-BUILT	S&S		6/18/92	

CONTRACTOR NEXUS DEV. DATE STARTED 12-23-86
INSPECTOR H. MOTAMANI DATE COMPLETED 4-17-92

CONTROL CERTIFICATION
258-1705
LAMBERT COORDINATES

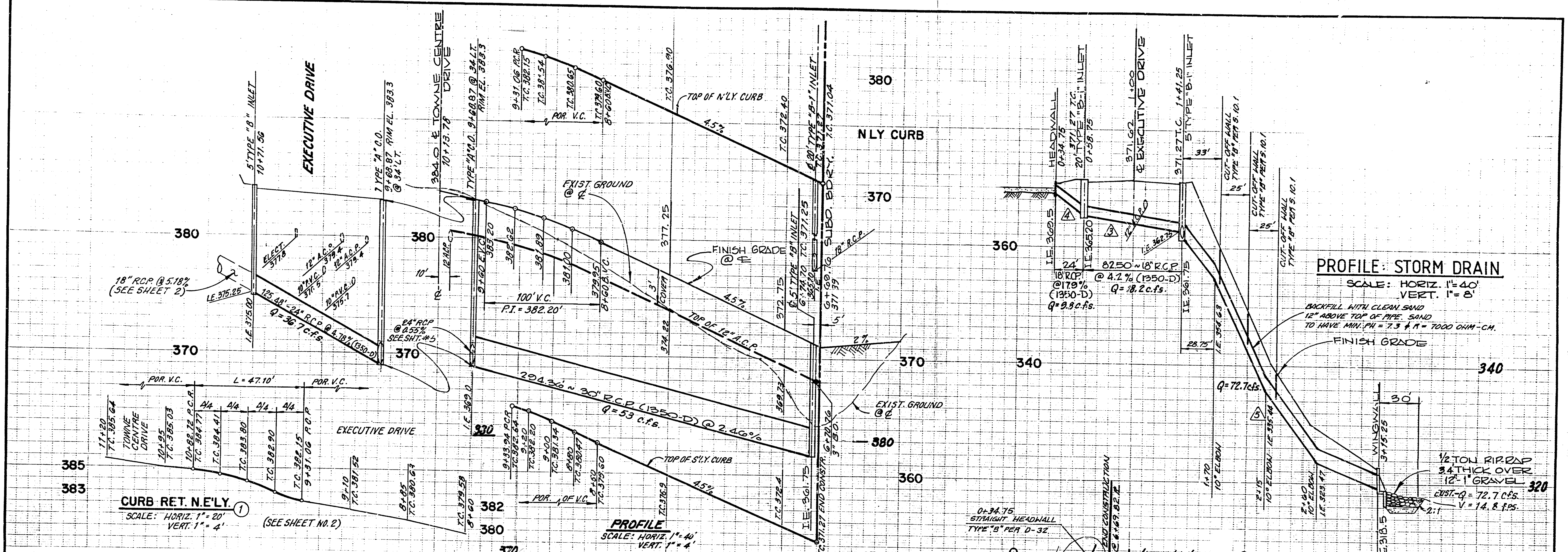
22656-3-D

B ADDED FIRE HYDRANT, REV. SIDEWALK-PARKWAY, REV. STORM DRAIN & SEWER PROFILE, ADDED S.M.H. / ADDED LOGO & ENCROACHMENT NOTE. ELIMINATED 12" PVC. TEMPORARY STORM DRAIN
C ADDED ERA NOTE

A FOR REF. 5' P.C.C. SIDEWALK SEE SHEET 8 ADDED TO 30' UTILITY EASE. PER NEXUS MAP
RELOCATED SEWER & WATER AND RELOCATED 12" PVC PIPE & CONC. LUG.
REVISED WATER DATA TABLE NO.'S 1 & 2
REVISED SEWER DATA TABLE NO.'S 1 & 2. (V. MOHARIR FOR H. MOTAMANI)

AS-BUILT

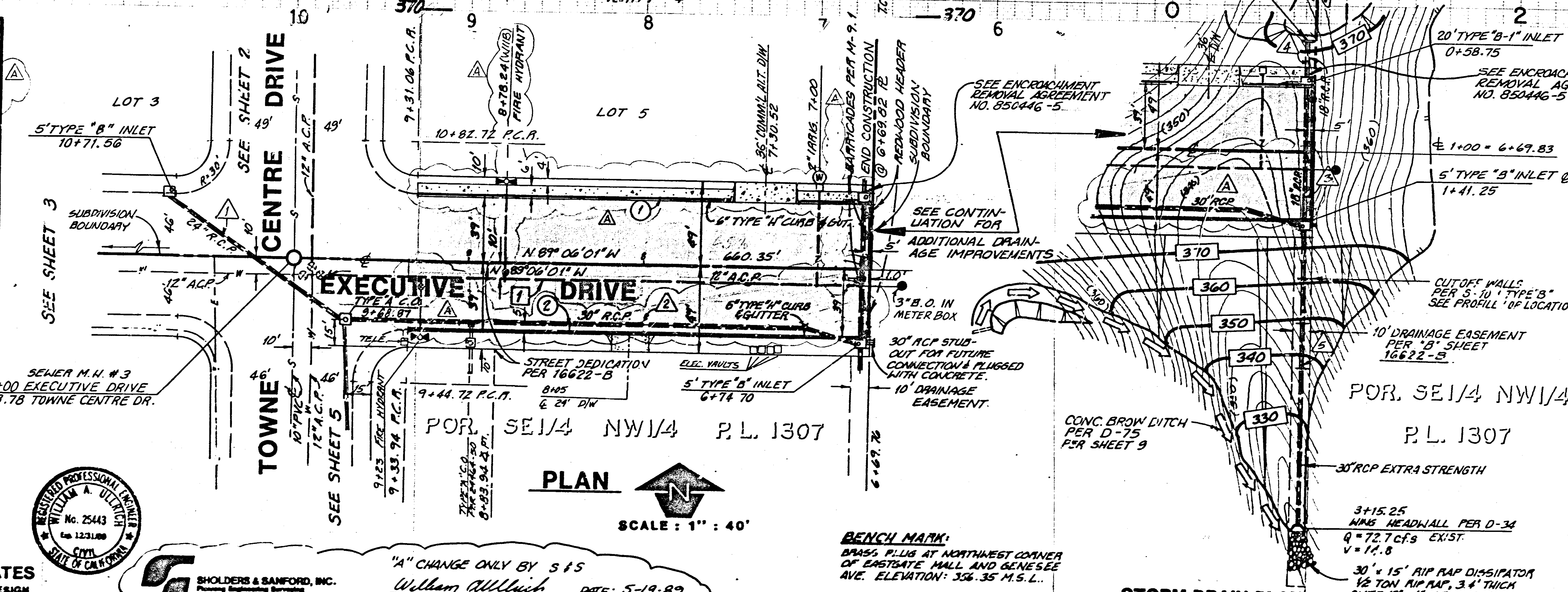
10925



CURB DATA ○				
NO.	DELTA/BEARING	LENGTH	RADIUS	NOTE
①	N 89°06'01" W	261.24'	———	6" TYPE "H" Cb. & GUT.
②	N 89°06'01" W	264.18'	———	6" TYPE "H" Cb. & GUT.

STORM DRAIN DATA △				
NO.	DELTA / BEARING	LENGTH	RADIUS	NOTE
1	N 53°56'39" W	125.48'	———	24" R.C.P.
2	N 87°41'20" W	294.36'	———	30" RCP
3	N 00°49'06" W	82.50'	———	18" R.C.P.
4	N 00°49'06" W	24.00'	———	18" R.C.P.
6	N 00°49'06" W	1?4.00'	———	30" R.C.P.

WATER DATA □				
NO.	DELTA/BEARING	LENGTH	RADIUS	NOTE
1	N89°06'01" W	±319.00'	———	12" A.C.P.



BENCH MARK:
BRASS PLUG AT NORTHWEST CORNER OF EASTGATE MALL AND GENESEE AVE. ELEVATION: 356.35 M.S.L.

AS BUILT ENGINEER
ROBERT W. SANFORD RCE 18405
SHOLDERS & SANFORD INC.
3569 FIFTH AVENUE
SAN DIEGO, CA. 92103

ENGINEER OF WORK:
BUSS SILVERS HUGHES & ASSOCIATES
1875 THIRD AVENUE
SAN DIEGO, CA 92101
(619) 239-2353 PROJ. NO.

BY: Michael Rust 6-3-86
Michael Rust R.C.E. 26375

"A" CHANGE ONLY BY S & S
William Ullrich DATE: 5-19-89
WILLIAM A. ULLRICH R.C.E. 25443 EXP 12-31-89

REGISTERED PROFESSIONAL ENGINEER WILLIAM A. ULLRICH No. 25443 Exp. 12.31.89 CIVIL STATE OF CALIFORNIA

BUSS SILVERS HUGHES & ASSOCIATES
ARCHITECTURE - ENGINEERING - PLANNING - INTERIOR DESIGN
1875 THIRD AVE. - P.O. BOX 950 - SAN DIEGO, CA. 92112 - 619/239-2353

SHOLDERS & SANFORD, INC.

PRIVATE CONTRACT:
PLANS FOR THE IMPROVEMENT OF

EXECUTIVE DRIVE

NEXUS TECHNOLOGY CENTRE UNIT NO.1

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING DEPARTMENT
SHEET 4 OF 17 SHEETS

T.M. 85-0446
W.O. NO. 850446

FOR CITY ENGINEER 12-22-86 DATE

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL				
CONST CHG. "A"	S&S		11-9-89	
AS-BUILT	S&S		6/18/92	

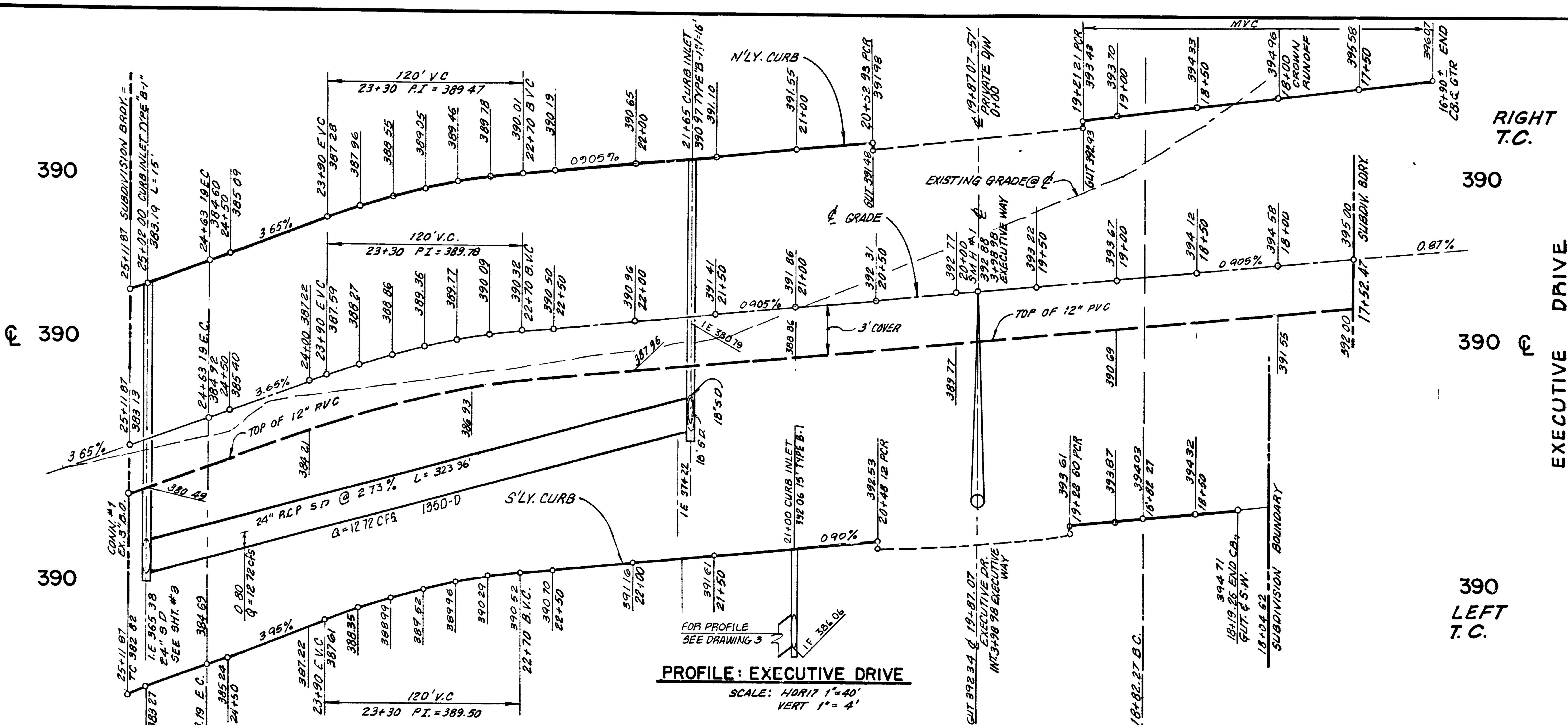
CONTRACTOR NEXUS DEV. DATE STARTED 12-23-86
INSPECTOR H. MOTAMANI DATE COMPLETED 4-17-92

CONTROL CERTIFICATION
258-1705
LAMBERT COORDINATES

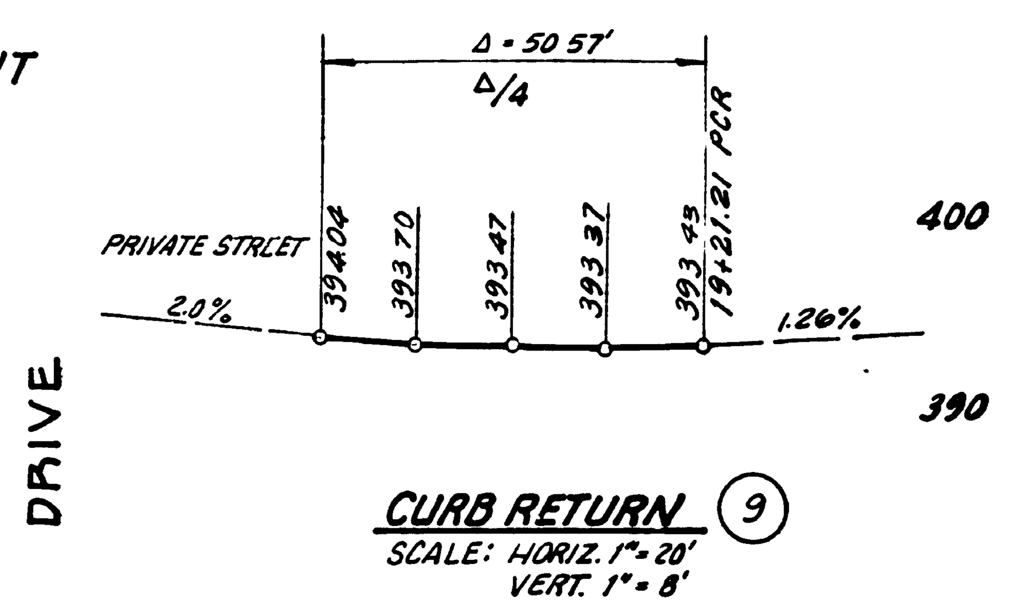
22556-4-D

△A IMPROVED ENTIRE STREET, PAVEMENT & CURB & GUT. RELOCATED F.H. & ADDED 8" FIRE SERVICE / ADDED LOGO.
V. MOHARIK FOR H. MOTAMANI

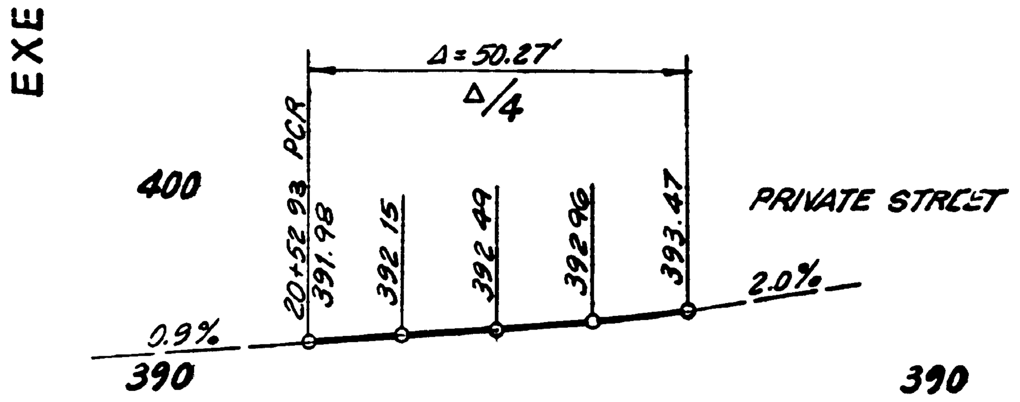
AS-BUILT
10925 A



PROFILE: EXECUTIVE DRIVE
SCALE: HORIZ 1" = 40'
VERT 1" = 4'



CURB RETURN (9)
SCALE: HORIZ. 1" = 20'
VERT. 1" = 8'

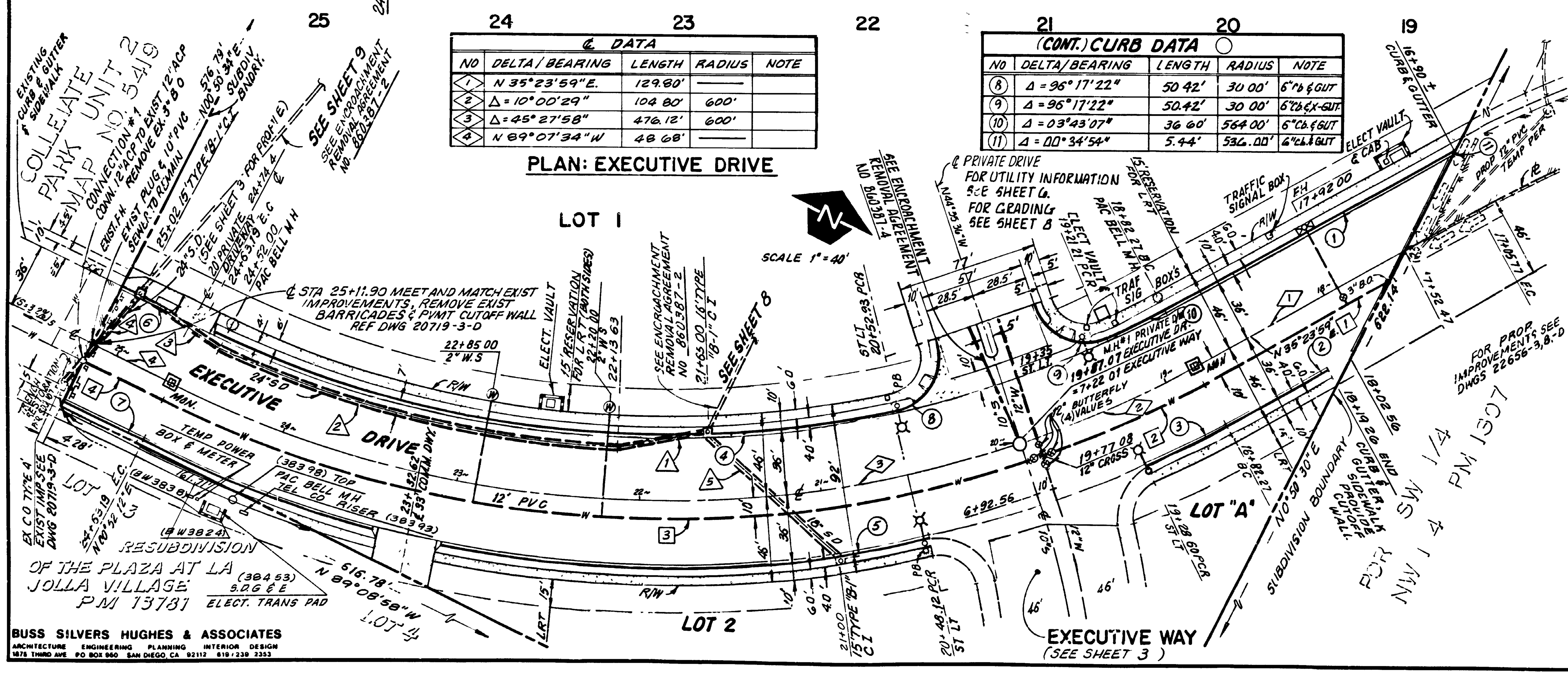


CURB RETURN (8)
SCALE: HORIZ 1" = 20'
VERT. 1" = 8'

ENGINEER OF WORK (A)
STUART ENGINEERING
7525 METROPOLITAN DR STE. 308
SAN DIEGO, CA 92108
619-296-1010
Stuart Peace 12-3-90
STUART PEACE R.C.E. 27232
MY REGISTRATION EXPIRES 3-31-93

REGISTERED PROFESSIONAL ENGINEER STUART PLACE No 27232 CIVIL STATE OF CALIFORNIA

BENCH MARK:
BRASS PLUG AT NORTHWEST CORNER OF EASTGATE MALL AND GENESEE AVE.
ELEV. = 356 35 DATUM M.S.L.



PLAN: EXECUTIVE DRIVE

℄ DATA				
NO	DELTA / BEARING	LENGTH	RADIUS	NOTE
1	N 35°23'59"E.	129.80'	———	
2	Δ = 10°00'29"	104 80'	600'	
3	Δ = 45°27'58"	476.12'	600'	
4	N 89°07'34"W	48 68'	———	

(CONT.) CURB DATA ○				
NO	DELTA/BEARING	LENGTH	RADIUS	NOTE
8	Δ = 96°17'22"	50 42'	30 00'	6" Cb & GUT
9	Δ = 96°17'22"	50.42'	30 00'	6" Cb. & X-GUT.
10	Δ = 03°43'07"	36 60'	564 00'	6" Cb. & GUT
11	Δ = 00°34'54"	5.44'	536.00'	6" Cb. & GUT

CURB DATA ○				
NO.	DELTA/BEARING	LENGTH	RADIUS	NOTE
1	N35°23'59"W	176 59	———	6" Cb & GUT
2	N35°23'59"W	63.02	———	" "
3	Δ = 4°25'27"	49 11'	636 00'	" "
4	Δ = 39°10'36"	385.64'	564 00'	6" Cb & GUT
5	Δ = 39°38'12"	439 98'	636.00'	PORTION 6" Cb & GUT
6	N89°07'38"W	30 70'	———	6" Cb & GUT
7	N89°07'38"W	48.68'	———	PORTION 6" Cb & GUT
(WATER DATA CONTINUE)				

WATER DATA □				
NO	DELTA/BEARING	LENGTH	RADIUS	NOTE
1	N35°23'59"E	112 14'	———	12" P.V.C
2	Δ = 9°03'13"	96.39'	610 00'	" "
3	Δ = 46°25'12"	494 21'	610.00'	" "
4	N 89°07'38"W	48 68'	———	" "

STORM DRAIN DATA △				
NO.	DELTA/BEARING	LENGTH	RADIUS	NOTE
1	N.53°19'59"E	46 81'	———	24" RCP 1350-D
2	Δ = 22°45'46"	226 85'	571 00'	" "
3	N78°38'39"W	50 30'	———	" "
4	N12°24'59"E	70.68'	———	" "
5	N 71°05'12"W SEE SHEET 3 FOR PROFILE	100.28'	———	18" R.C.P 1350-D

ISSUE	DATE
ISSUED FOR BID	
REVISIONS	
REVISIONS	

ENGINEER OF WORK:

BUSS SILVERS HUGHES & ASSOCIATES
1875 THIRD AVENUE
SAN DIEGO, CA 92101
(619) 239-2352 PROJ. NO.

BY:
Christopher Denchev - PE
RCE #34555

PRIVATE CONTRACT: PID-860387

PLANS FOR THE IMPROVEMENT OF.

EXECUTIVE DRIVE

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING DEPARTMENT
SHEET 2 OF 16 SHEETS

T.M. 86-0387
W.O. NO 860387

C R (A) 11-25-87
FOR CITY ENGINEER DATE

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL				
(A) CHANGE	S.E		12-6-90	
AS BUILT	S.E.		9-11-91	

258-1705
LAMBERT COORDINATES

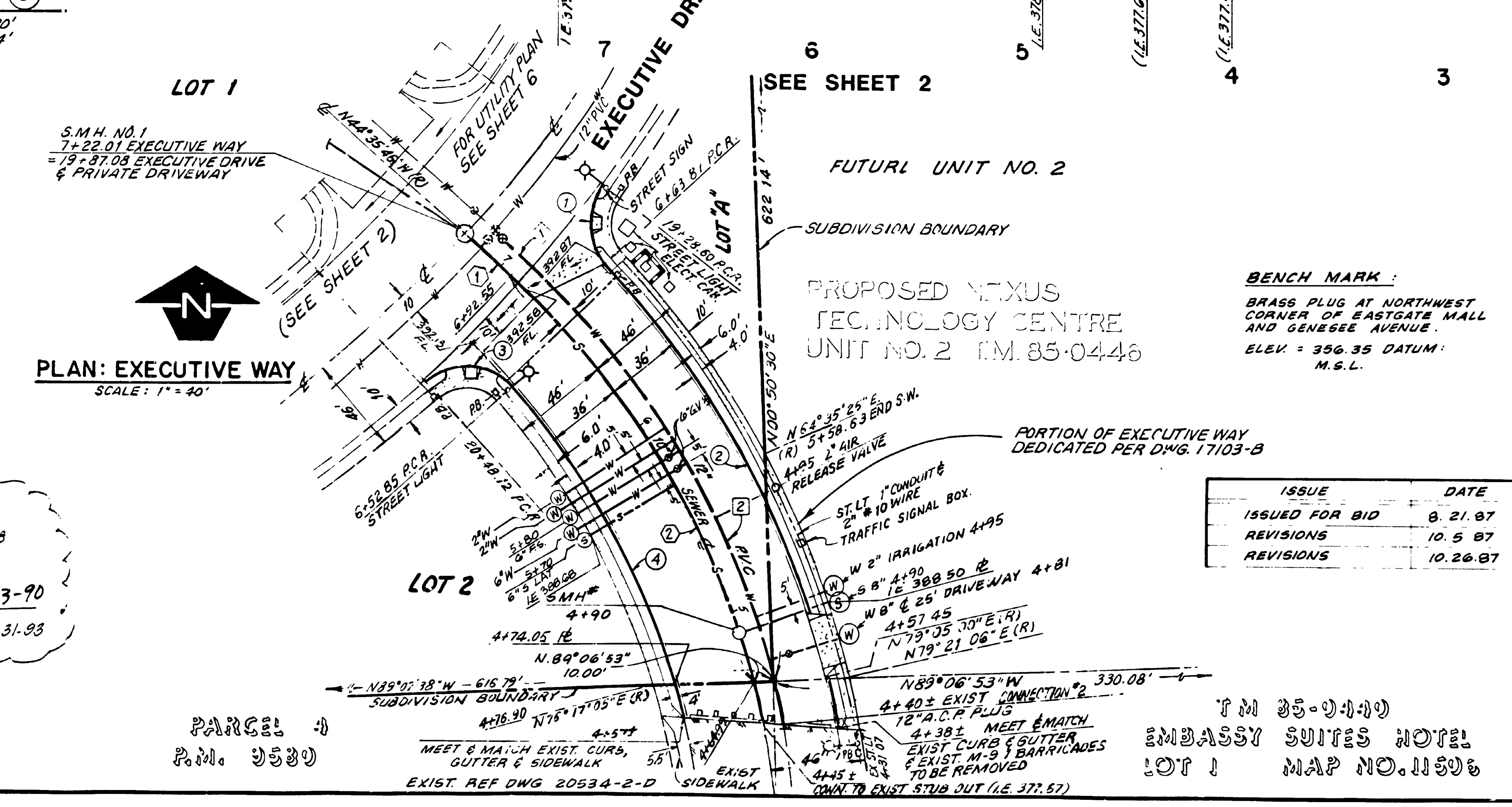
CONTRACTOR JOSEPH DEY DATE STARTED 11-25-87
INSPECTOR H MONTAMANI DATE COMPLETED 9-11-91

23657-2-D

(A) CHANGE REVISE TOTAL SHEET NO & NEW ENGINEER OF WORK

BUSS SILVERS HUGHES & ASSOCIATES
ARCHITECTURE ENGINEERING PLANNING INTERIOR DESIGN
1875 THIRD AVE PO BOX 860 SAN DIEGO, CA 92112 619-239-2352

AS BUILT



CURB DATA

NO.	DELTA/BEARING	LENGTH	RADIUS	NOTE
1	Δ = 30°18'31"	42.05'	30.00	6" Cb. & GUT
2	Δ = 31°03'15"	236.31'	436.00'	6" Cb. & GUT
3	Δ = 89°51'26"	47.05'	30.00'	" "
4	Δ = 29°08'11"	185.10'	364.00'	6" Cb. & GUT

WATER DATA

NO.	DELTA/BEARING	LENGTH	RADIUS	NOTE
1	N44°35'36"W	19.53'	——	12" A.C.P.
2	Δ = 36°08'42"	258.65'	410.00'	12" A.C.P.

SEWER & ℄ DATA

NO.	DELTA / BEARING	LENGTH	RADIUS	NOTE
1	N 44°35'46" W.	29.45'		10" P.V.C.
2	Δ = 35°25'43"	247.34'	400.00'	10" P.V.C.

ENGINEER OF WORK:
BUSS SILVERS HUGHES & ASSOCIATES
1875 THIRD AVENUE
SAN DIEGO, CA 92101
(619) 239-2353 PROJ. NO.

BY:

BENCH MARK:
BRASS PLUG AT NORTHWEST CORNER OF EASTGATE MALL AND GENESEE AVENUE.
ELEV. = 356.35 DATUM: M.S.L.

ENGINEER OF WORK
STUART ENGINEERING
7525 METROPOLITAN DR STE. 308
SAN DIEGO, CA 92108
619-296-1010
Stuart Peace 12-3-90
STUART PEACE R.C.E. 27032
MY REGISTRATION EXPIRES 3-31-93

BUSS SILVERS HUGHES & ASSOCIATES
ARCHITECTURE · ENGINEERING · PLANNING · INTERIOR DESIGN
1875 THIRD AVE. · P.O. BOX 950 · SAN DIEGO, CA. 92112 · 619 / 239-2353

ISSUE	DATE
ISSUED FOR BID	8.21.87
REVISIONS	10.5.87
REVISIONS	10.26.87

PRIVATE CONTRACT
P.I.D 860397

PLANS FOR THE IMPROVEMENT OF:
EXECUTIVE WAY

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING DEPARTMENT
SHEET 3 OF 16 SHEETS

T.M. 85-0387
W.O. NO. 860387

C.R. Leeled 11-25-87
FOR CITY ENGINEER DATE

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL				
CHANGE	C.F.		12/6/90	
AS BUILT	S.E.		9-11-92	

258-1705
LAMBERT COORDINATES

CONTRACTOR JOSEPH DEV. DATE STARTED 11-25-87
INSPECTOR H. NONTAMANI DATE COMPLETED 9-11-91

23657-3-D

CHANGE: REVISE TOTAL SHEET NO. & NEW ENGINEER OF WORK

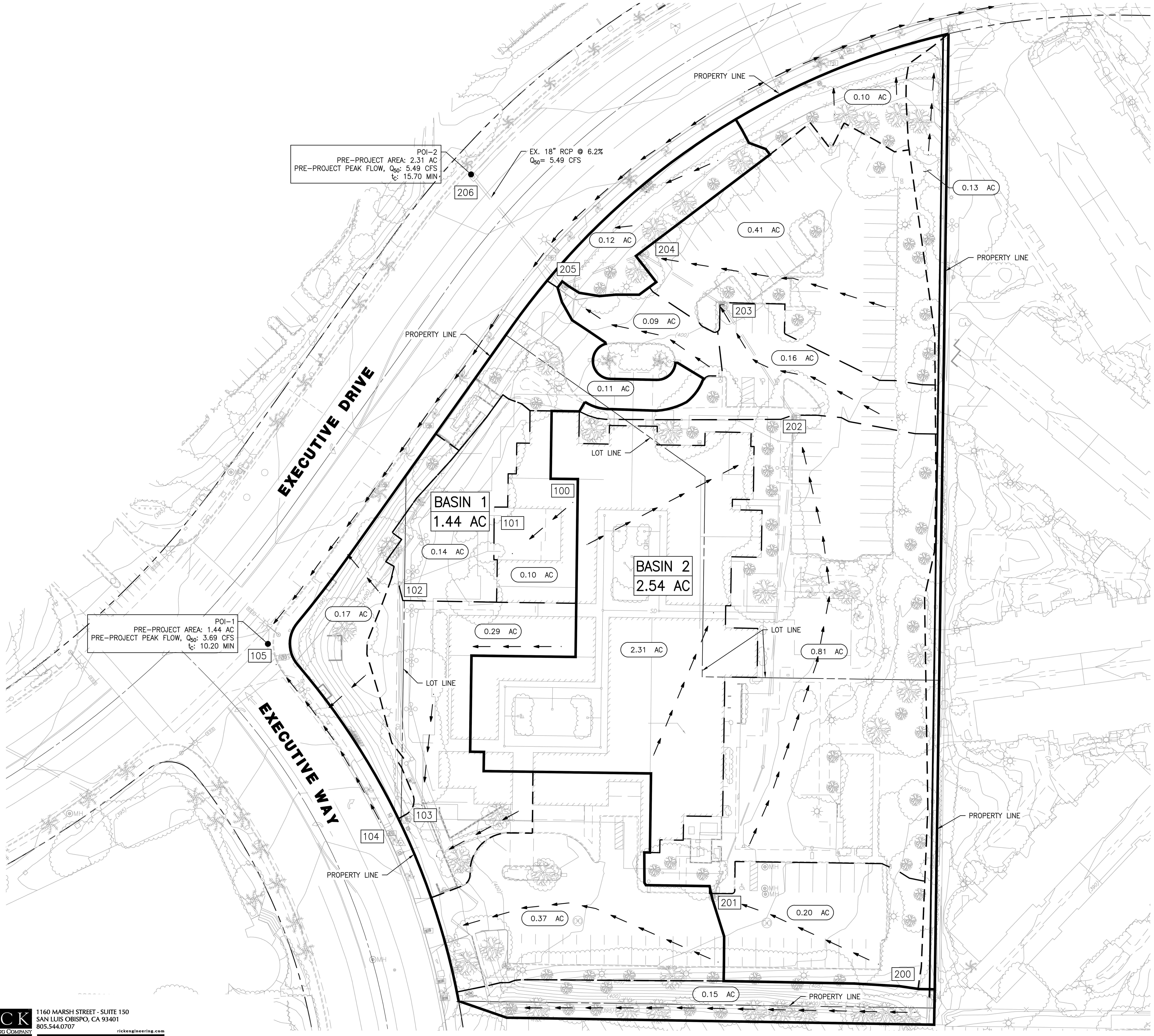
AS BUILT

MAP POCKET 1

Pre-Project Drainage Map

for

ARE - Scripps HQ



LEGEND

BASIN BOUNDARY	
SUBBASIN BOUNDARY	
FLOW PATTERN	
BASIN ID & AREA	BASIN 1 / 1.44 AC
SUBBASIN AREA	0.12 AC
DRAINAGE STUDY NODE	101

30 15 0 30 60 90
GRAPHIC SCALE: 1"=30'

RICK ENGINEERING COMPANY
San Luis Obispo
1160 MARSH STREET - SUITE 150
SAN LUIS OBISPO, CA 93401
805.544.0707
rickengineering.com
San Diego - Denver - Riverside - Orange - Sacramento - Phoenix - Tucson

DRAINAGE STUDY MAP

SCRIPPS HQ PROJECT
(PRE-PROJECT CONDITION)

DATE: 7/9/2021
REVISED:

J- 19276

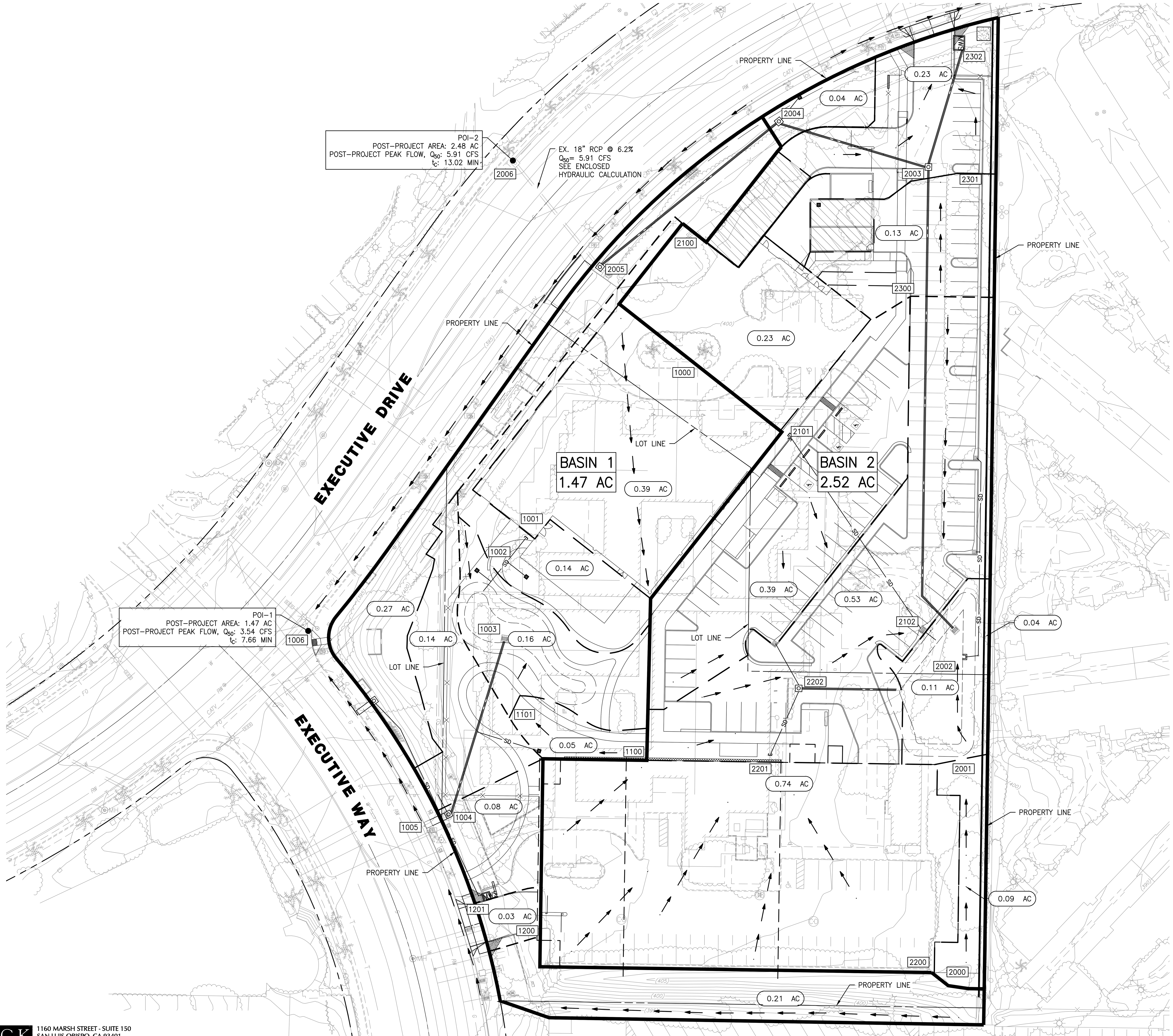
NOT FOR CONSTRUCTION – EXHIBIT FOR DRAINAGE STUDY REPORT ONLY

MAP POCKET 2

Post-Project Drainage Map

for

ARE - Scripps HQ



LEGEND

BASIN BOUNDARY

SUBBASIN BOUNDARY

DRAINAGE STUDY BOUNDARY

BASIN ID & AREA — BASIN 1 / 1.47 AC

SUBBASIN AREA — 0.12 AC

DRAINAGE STUDY NODE — 1001

DRAINS TO BUILDING DRAINAGE SYSTEM

30 15 0 30 60 90
GRAPHIC SCALE: 1"=30'

DRAINAGE STUDY MAP

SCRIPPS HQ PROJECT (POST-PROJECT CONDITION)

DATE: 7/9/2021

REVISED:

J- 19276

RICK ENGINEERING COMPANY
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Attachment 6
Geotechnical and Groundwater Investigation Report

Attach project's geotechnical and groundwater investigation report. Refer to Appendix C.4 to determine the reporting requirements.

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GEOTECHNICAL INVESTIGATION

ARE – SCRIPPS HQ PROJECT
4555 EXECUTIVE DRIVE
SAN DIEGO, CALIFORNIA

GEOCON
INCORPORATED

GEOTECHNICAL
ENVIRONMENTAL
MATERIALS

PREPARED FOR

ALEXANDRIA®

FEBRUARY 18, 2021
PROJECT NO. G2557-52-02

Project No. G2557-52-02
February 18, 2021

Alexandria Real Estate Equities, Inc.
10996 Torreyana Road, Suite 250
San Diego, California 92121

Attention: Mr. Chris Clement

Subject: GEOTECHNICAL INVESTIGATION
ARE – SCRIPPS HQ PROJECT
4555 EXECUTIVE DRIVE
SAN DIEGO, CALIFORNIA

Dear Mr. Clement:

In accordance with your request and authorization of our Proposal No. LG-20450 dated October 13, 2020 we herein submit the results of our geotechnical investigation for the subject project. We performed our investigation to evaluate the underlying soil and geologic conditions and potential geologic hazards, and to assist in the design of the proposed buildings and associated improvements.

The accompanying report presents the results of our study and conclusions and recommendations pertaining to geotechnical aspects of the proposed project. The site is suitable for the proposed buildings and improvements provided the recommendations of this report are incorporated into the design and construction of the planned project.

Should you have questions regarding this report, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

Lilian E. Rodriguez
RCE 83227

REGISTERED PROFESSIONAL ENGINEER
LILIAN E. RODRIGUEZ
No.83227
CIVIL
STATE OF CALIFORNIA

Shawn Foy Weedon
GE 2714

REGISTERED PROFESSIONAL ENGINEER
SHAWN WEEDON
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GEOTECHNICAL
STATE OF CALIFORNIA

Michael C. Ertwine
CEG 2659

PROFESSIONAL GEOLOGIST
MICHAEL C. ERTWINE
No. 2659
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

LER:SFW:MCE:dmc

(email) Addressee

TABLE OF CONTENTS

GEOTECHNICAL INVESTIGATION

1. PURPOSE AND SCOPE

This report presents the results of our geotechnical investigation for the proposed ARE – Scripps HQ development to the property located at 4555 Executive Drive in the City of San Diego, California (see Vicinity Map).

Vicinity Map

The purpose of the geotechnical investigation is to evaluate the surface and subsurface soil conditions and general site geology, and to identify geotechnical constraints that may affect development of the property including faulting, liquefaction and seismic shaking based on the 2019 CBC seismic design criteria. In addition, we provided recommendations for remedial grading, shallow foundations, concrete slab-on-grade, concrete flatwork, pavement, and retaining walls.

We reviewed the following plans and report in preparation of this report:

1. *Geologic Reconnaissance, Braille Institute Property, 4555 Executive Drive, San Diego, California*, prepared by Geocon Incorporated, dated June 1, 2020 (Project No. G2557-52-01).

2. *[Preliminary] Grading and Improvement Plans For: ARE/Scripps HQ, 4555 Executive Drive, San Diego, California*, prepared by Rick Engineering, plot dated February 4, 2021.

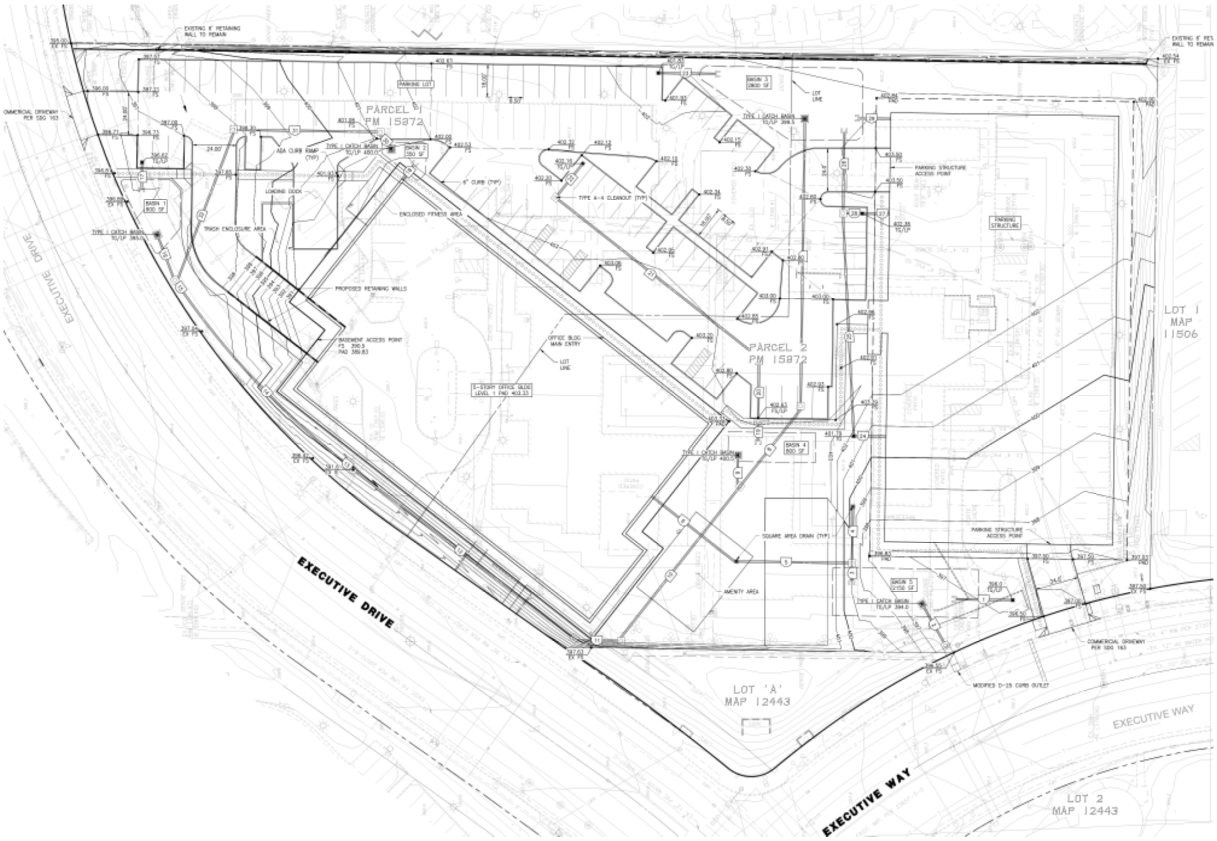
The scope of this investigation included reviewing readily available published and unpublished geologic literature (see List of References); performing engineering analyses; and preparing this report. We also advanced 4 exploratory borings to a maximum depth of about 20 feet, performed percolation/infiltration testing, sampled soil and performed laboratory testing. Appendix A presents the exploratory boring logs and details of the field investigation. The details of the laboratory tests and a summary of the test results are shown in Appendix B and on the boring logs in Appendix A.

2. SITE AND PROJECT DESCRIPTION

The existing property consists of the Braille Institute that is comprised of one- to two-story buildings with surface parking on the north, east and south sides of the property. The site is accessed by gated entrances on the north and southwest sides from Executive Drive and Executive Way, respectively. We expect the buildings consist of wood framing and stucco supported by conventional shallow foundations and a concrete slab-on-grade. The parking areas consist of Portland Cement concrete that is approximately 5 to 7 inches thick. The site is relatively flat with elevations of about 395 to 405 feet above mean seal level (MSL) on the northwest and southeast, respectively. The Existing Site Plan shows the existing conditions of the property.

Existing Site Plan

We understand the proposed development will include demolishing the existing buildings and construction of a new commercial office building and parking structure as shown on the Proposed Site Plan. The proposed commercial office building will have 5 levels with one subterranean level with a pad grade elevation of approximately 390 feet MSL. The proposed parking structure will have a pad grade elevation ranging from approximately 397 to 404 feet MSL with no subterranean levels planned. We expect grading will consist of minor fills and cuts of less than 5 feet to achieve proposed grades with the exception of estimated cuts up to approximately 10 feet for the commercial building pad area where a subterranean level is planned. The project will also consist of driveways and surface parking, and will also include storm water management devices, landscaping and other associated improvements.



Proposed Site Plan

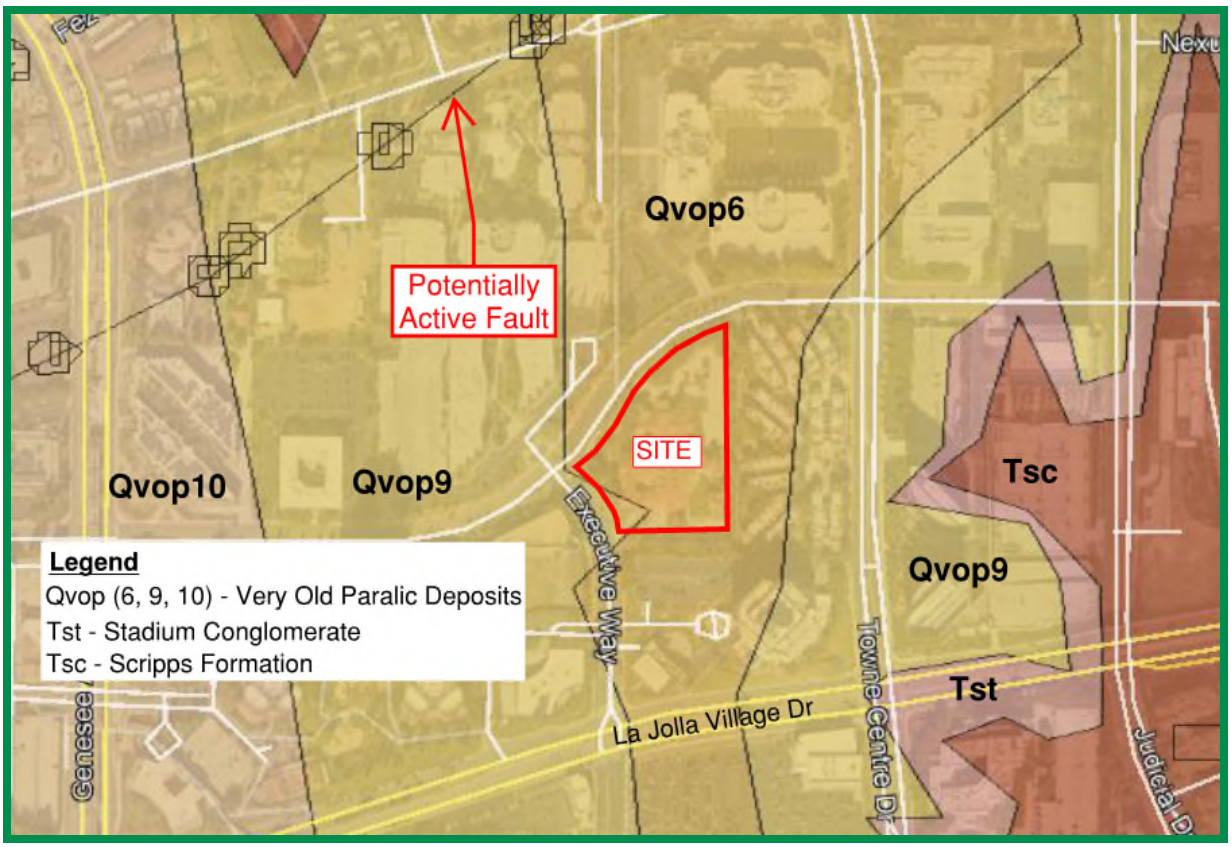
The locations, site descriptions, and proposed development are based on our site reconnaissance, review of published geologic literature, a field investigation and discussions with project personnel. If development plans differ from those described herein, Geocon Incorporated should be contacted for review of the plans and possible revisions to this report.

3. GEOLOGIC SETTING

Regionally, the site is located in the Peninsular Ranges geomorphic province. The province is bounded by the Transverse Ranges to the north, the San Jacinto Fault Zone on the east, the Pacific Ocean coastline on the west, and the Baja California on the south. The province is characterized by elongated northwest-trending mountain ridges separated by straight-sided sediment-filled valleys. The northwest trend is further reflected in the direction of the dominant geologic structural features of the province that are northwest to west-northwest trending folds and faults, such as the nearby Rose Canyon fault zone.

Locally, the site is within the coastal plain of San Diego County. The coastal plain is underlain by a thick sequence of relatively undisturbed and non-conformable sedimentary bedrock units that thicken to the west and range in age from Upper Cretaceous age through the Pleistocene age which have been deposited on Cretaceous to Jurassic age igneous and volcanic bedrock. Geomorphically, the coastal plain is characterized by a series of 21, stair-stepped marine terraces (younger to the west) that have been dissected by west flowing rivers. The coastal plain is a relatively stable block that is dissected by relatively few faults consisting of the potentially active La Nacion Fault Zone and the active Rose Canyon Fault Zone.

The site is located on the western portion of the coastal plain. Sedimentary units make up the geologic sequence encountered on the site and consist of Pleistocene-age Very Old Paralic Deposits (formerly called the Lindavista Formation). We expect Tertiary-age Stadium Conglomerate and the Scripps Formation underlie the Very Old paralic Deposits at depth. The Regional Geologic Map shows the geologic units in the area of the site.



Regional Geologic Map

4. SOIL AND GEOLOGIC CONDITIONS

We encountered one surficial soil unit (consisting of undocumented fill) and one formational unit (consisting of Very Old Paralic Deposits). The occurrence, distribution, and description of each unit encountered is shown on the Geologic Map, Figure 1, and on the boring logs in Appendix A. The Geologic Cross-Section, Figure 2, shows the approximate subsurface relationship between the geologic units. We prepared the geologic cross-section using interpolation between exploratory excavations and observations; therefore, actual geotechnical conditions may vary from those illustrated and should be considered approximate. The surficial soil and geologic unit are described herein in order of increasing age.

4.1 Undocumented Fill (Qudf)

We encountered undocumented fill in our borings to depths ranging from about 3 to 5½ feet across the site. In general, the fill consists of medium dense, moist to wet, silty to clayey sand, and sandy clay and possesses a "very low" to "low" expansion index (expansion index of 50 or less). The undocumented fill is not considered suitable in its current condition for the support of foundations or structural fill and remedial grading will required. The undocumented fill can be reused for new compacted fill during grading operations provided it is free of roots and debris.

4.2 Very Old Paralic Deposits (Qvop)

Quaternary-age Very Old Paralic Deposits, Unit 6 (formerly called the Lindavista Formation) underlies the existing fill soil and extends to the maximum depth explored of 20 feet. The Very Old Paralic Deposits consist of reddish brown, medium dense to very dense sandstone and cobble conglomerate and generally possesses a "very low" to "low" expansive potential (expansion index of 50 or less). We expect the proposed building foundations may be embedded within the sandstone and cobble conglomerate materials as discussed herein. Excavations within this unit will likely encounter difficult digging conditions in the cemented zones and oversize material with abundant cobbles will be generated. In addition, coring and rock breaking equipment may be required to excavate the very dense and cemented sandstone and cobble layers.

4.3 Stadium Conglomerate (Tst)

We expect a relatively thin layer of Eocene-age Stadium Conglomerate exists below the Very Old Paralic Deposits at depths of greater than 20 feet below existing grade. The Stadium Conglomerate typically consists of gravel and cobble in a sandy to clayey matrix and can be cemented. Local concretions are common within this unit. The soil typically possesses a "very low to "low" expansion potential (expansion index [EI] of 50 or less). The Stadium Conglomerate is generally considered suitable for support of properly compacted structural fill and improvements. However, we do not expect this unit is near the surface that would be encountered during the construction of the planned development.

4.4 Scripps Formation (Tsc)

The Tertiary-age Scripps Formation likely exists below the Stadium Conglomerate. The Scripps Formation typically consists of gray and yellowish brown, sandy to clayey siltstone and possesses areas of highly cemented concretionary beds. This unit typically possesses a “low” to “high” expansion potential (expansion index [EI] of 21 to 130) and can possess “S0” to “S2” water-soluble sulfate classifications. The Scripps Formation is generally considered suitable for support of properly compacted structural fill and improvements. We do not expect this unit will be encountered during construction of the proposed development.

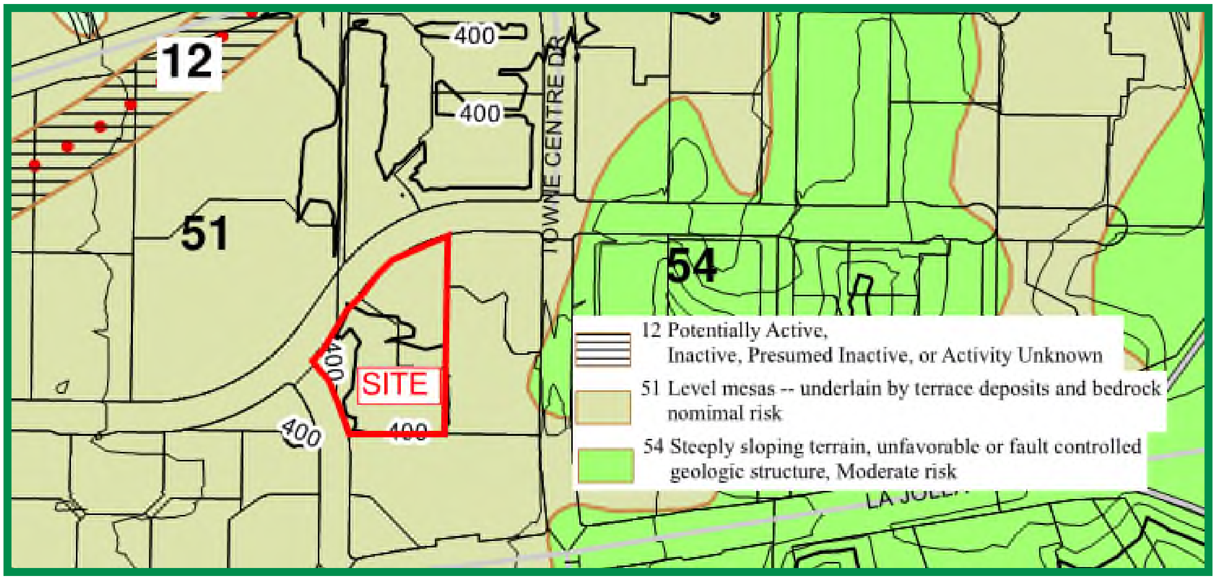
5. GROUNDWATER

We did not encounter groundwater or seepage during our site investigation. However, it is not uncommon for shallow seepage conditions to develop where none previously existed when sites are irrigated or infiltration is implemented. Seepage is dependent on seasonal precipitation, irrigation, land use, among other factors, and varies as a result. Proper surface drainage will be important to future performance of the project. We expect groundwater is deeper than about 50 feet below existing grade. We do not expect groundwater to be encountered during construction of the proposed development.

6. GEOLOGIC HAZARDS

6.1 Geologic Hazard Category

The City of San Diego Seismic Safety Study, Geologic Hazards and Faults, Map Sheet 34 defines the site as a Hazard Category 51: *Level Mesas – underlain by terrace deposits and bedrock, nominal risk.* The Seismic Safety Map shows the proposed property and hazard categories.

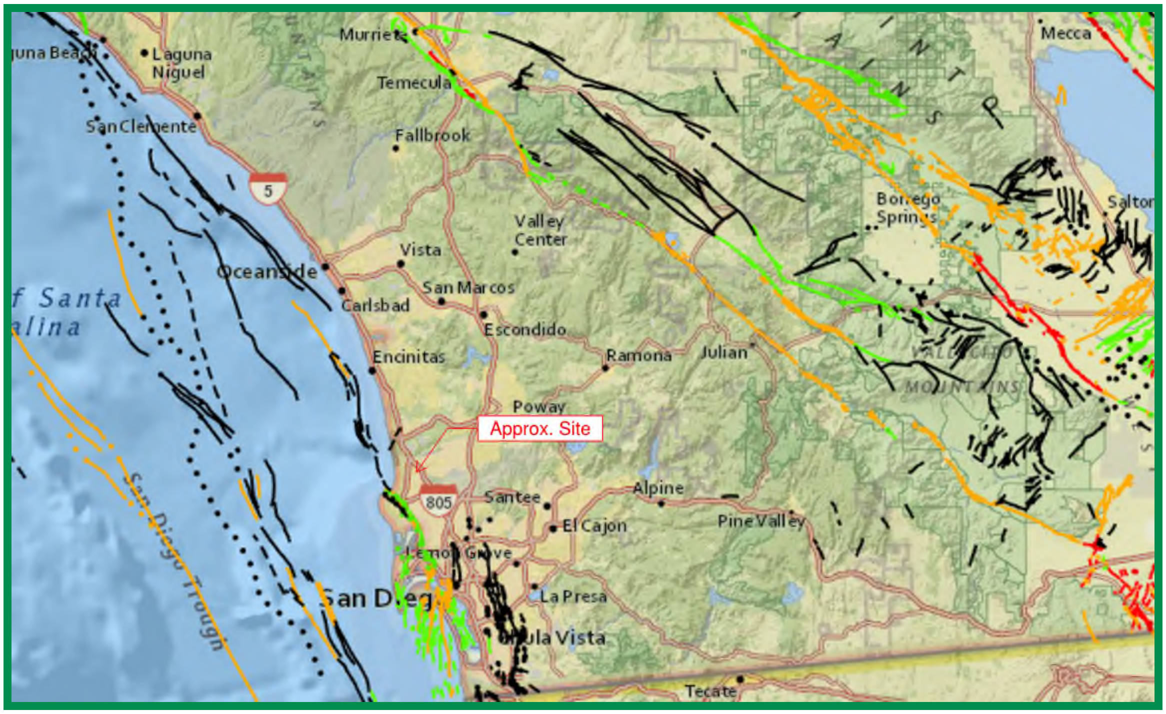


Hazard Category Map

6.2 Faulting and Seismicity

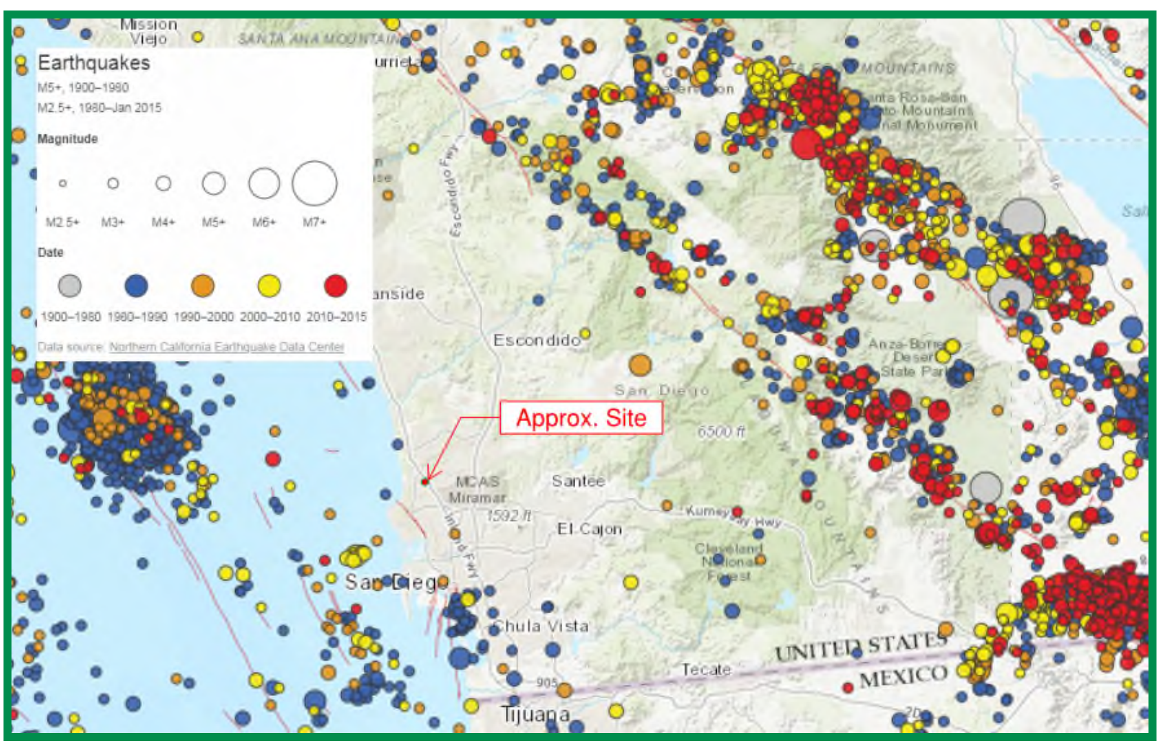
A review of the referenced geologic materials and our knowledge of the general area indicate that the site is not underlain by active, potentially active, or inactive faults. An active fault is defined by the California Geological Survey (CGS) as a fault showing evidence for activity within the last 11,700 years. The site is not located within a State of California Earthquake Fault Zone. A potentially active fault is located about 650 feet northwest of the property, according to the City of San Diego Seismic Safety Study, Geologic Hazards and Faults, Map Sheet 34.

The USGS has developed a program to evaluate the approximate location of faulting in the area of properties. The following figure shows the location of the existing faulting in the San Diego County and Southern California region. The fault traces are shown as solid, dashed and dotted that represent well-constrained, moderately constrained and inferred, respectively. The fault line colors represent fault with ages less than 150 years (red), 15,000 years (orange), 130,000 years (green), 750,000 years (blue) and 1.6 million years (black).



Faults in Southern California

The San Diego County and Southern California region is seismically active. The following figure presents the occurrence of earthquakes with a magnitude greater than 2.5 from the period of 1900 through 2015 according to the Bay Area Earthquake Alliance website.



Earthquakes in Southern California

Considerations important in seismic design include the frequency and duration of motion and the soil conditions underlying the site. Seismic design of structures should be evaluated in accordance with the California Building Code (CBC) guidelines currently adopted by the local agency.

6.3 Ground Rupture

Ground surface rupture occurs when movement along a fault is sufficient to cause a gap or rupture where the upper edge of the fault zone intersects the ground surface. The potential for ground rupture is considered to be very low due to the absence of active faults at the subject site.

6.4 Liquefaction

Liquefaction typically occurs when a site is located in a zone with seismic activity, onsite soils are cohesionless or silt/clay with low plasticity, groundwater is encountered within 50 feet of the surface and soil densities are less than about 70 percent of the maximum dry densities. If the four previous criteria are met, a seismic event could result in a rapid pore water pressure increase from the earthquake-generated ground accelerations. Due to the lack of a permanent, near-surface groundwater table and the dense nature of the underlying Very Old Paralic Deposits, liquefaction potential for the site is considered very low.

6.5 Storm Surge, Tsunamis, and Seiches

Storm surges are large ocean waves that sweep across coastal areas when storms make landfall. Storm surges can cause inundation, severe erosion and backwater flooding along the water front. The site is located approximately 2.5 miles from the Pacific Ocean at an elevation of greater than 400 feet Mean Sea Level (MSL); therefore, the potential of storm surges affecting the site is considered low.

A tsunami is a series of long-period waves generated in the ocean by a sudden displacement of large volumes of water. The site is located approximately 2.5 miles from the Pacific Ocean at an elevation of greater than 400 feet Mean Sea Level (MSL). The risk of a tsunami affecting the site is considered negligible due to the distance of the site from the ocean and relatively high elevation.

Seiches are standing wave oscillations of an enclosed water body after the original driving force has dissipated. Driving forces are typically caused by seismic ground shaking. The site is not located near a body of water; therefore, the risk of a seiche affecting the site is considered negligible.

6.6 Landslides

We did not observe evidence of previous or incipient slope instability at the site during our study and the property is relatively flat. Published geologic mapping indicates landslides are not present on or adjacent to the site. Therefore, in our professional opinion, the potential for a landslide is not a significant concern for this project.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 General

7.1.1 We did not encounter soil or geologic conditions during our exploration that would preclude the proposed development, provided the recommendations presented herein are followed and implemented during design and construction. We will provide supplemental recommendations if we observe variable or undesirable conditions during construction, or if the proposed construction will differ from that anticipated herein.

7.1.2 With the exception of possible moderate to strong seismic shaking, we did not observe or know of significant geologic hazards to exist on the site that would adversely affect the proposed project.

7.1.3 Our field investigation indicates the property is underlain by undocumented fill ranging from approximately 3 to 5½ feet over medium dense to very dense Very Old Paralic Deposits. The undocumented fill is not considered suitable for the support of settlement-sensitive structures and remedial grading will be required where encountered beneath the planned structures. The Very Old Paralic Deposits are considered suitable for the support of compacted fill and settlement-sensitive structures.

7.1.4 We did not encounter groundwater during our subsurface exploration and we do not expect it to be a constraint to project development. However, seepage within the existing materials may be encountered during the grading operations, especially during the rainy seasons.

7.1.5 Excavation of the undocumented fill and Very Old Paralic Deposits should generally be possible with moderate to heavy effort using conventional, heavy-duty equipment during grading and trenching operations. We expect very heavy effort with possible refusal in localized areas for excavations into strongly cemented portions of the Very Old Paralic Deposits and formational materials.

7.1.6 Proper drainage should be maintained in order to preserve the engineering properties of the fill in both the building pads and slope areas. Recommendations for site drainage are provided herein.

7.1.7 We performed a storm water management investigation under a separate report to help evaluate the potential for infiltration on the property. The project civil engineer should use that report to help design the storm water management devices.

7.1.8 Based on our review of the project plans, we opine the planned development can be constructed in accordance with our recommendations provided herein. We do not expect the planned development will destabilize or result in settlement of adjacent properties if properly constructed.

7.1.9 Surface settlement monuments and canyon subdrains will not be required on this project.

7.2 Excavation and Soil Characteristics

7.2.1 Excavation of the in-situ soil should be possible with moderate to heavy effort using conventional heavy-duty equipment. Excavation of the formational materials will require very heavy effort and may generate oversized material using conventional heavy-duty equipment during the grading operations. Oversized materials (materials greater than 12-inches in dimension) may be generated with the Very Old Paralic Deposit materials that can be incorporated into landscape use or deep compacted fill areas, if available.

7.2.2 The soil encountered in the field investigation is considered to be "non-expansive" and "expansive" (expansion index [EI] of 20 or less, and greater than 20, respectively) as defined by 2019 California Building Code (CBC) Section 1803.5.3. Table 7.2 presents soil classifications based on the expansion index. We expect a majority of the soil encountered possesses a "very low" to "low" expansion potential (EI of 50 or less).

TABLE 7.2
EXPANSION CLASSIFICATION BASED ON EXPANSION INDEX

Expansion Index (EI)	ASTM D 4829 Expansion Classification	2019 CBC Expansion Classification
0 – 20	Very Low	Non-Expansive
21 – 50	Low	Expansive
51 – 90	Medium	
91 – 130	High	
Greater Than 130	Very High	

7.2.3 We performed laboratory tests on samples of the site materials to evaluate the percentage of water-soluble sulfate content. Appendix B presents results of the laboratory water-soluble sulfate content tests. The test results indicate the on-site materials at the locations tested possess "S0" sulfate exposure to concrete structures as defined by 2019 CBC Section 1904 and ACI 318-14 Chapter 19. The presence of water-soluble sulfates is not a visually discernible characteristic; therefore, other soil samples from the site could yield different concentrations. Additionally, over time landscaping activities (i.e., addition of fertilizers and other soil nutrients) may affect the concentration.

7.2.4 Geocon Incorporated does not practice in the field of corrosion engineering. Therefore, further evaluation by a corrosion engineer may be performed if improvements susceptible to corrosion are planned.

7.3 Grading

7.3.1 Grading should be performed in accordance with the recommendations provided in this report, the Recommended Grading Specifications contained in Appendix C and the City of San Diego's Grading Ordinance. Geocon Incorporated should observe the grading operations on a full-time basis and provide testing during the fill placement.

7.3.2 Prior to commencing grading, a preconstruction conference should be held at the site with the county inspector, developer, grading and underground contractors, civil engineer, and geotechnical engineer in attendance. Special soil handling and/or the grading plans can be discussed at that time.

7.3.3 Site preparation should begin with the removal of deleterious material, debris, and vegetation. The depth of vegetation removal should be such that material exposed in cut areas or soil to be used as fill is relatively free of organic matter. Material generated during stripping and/or site demolition should be exported from the site. Asphalt and concrete should not be mixed with the fill soil unless approved by the Geotechnical Engineer.

7.3.4 Abandoned foundations and buried utilities (if encountered) should be removed and the resultant depressions and/or trenches should be backfilled with properly compacted material as part of the remedial grading.

7.3.5 **Grading for Office Building Pad (Subterranean Level Proposed) –** We expect the excavation for the office building with a planned subterranean level will expose formational Very Old Paralic Deposits at the base of the removal. We do not expect additional removals will be required below pad elevation if the base of the excavation exposes competent Very Old Paralic Deposits. The buildings can be supported on a shallow foundation system embedded in Very Old Paralic Deposits.

7.3.6 **Grading for Parking Structure (Subterranean Level Not Proposed) –** The existing undocumented fill within the parking structure building pad area should be removed to expose the underlying formational materials and replaced with properly compacted fill. The base of the removals should extend at least 5 feet outside the perimeter of the proposed building. The building can be supported on a shallow foundation system embedded entirely in properly compacted fill or a deepened shallow foundation system embedded entirely in Very Old Paralic Deposits subsequent to grading. If the building will be supported on properly compacted fill, the building pad should be undercut such that at least 3 feet below proposed grade or 2 feet below the bottom of the planned footing elevations, whichever results in a deeper excavation, in order to reduce the potential for differential settlement. The building pad does not need to be undercut if the building will be embedded in Very Old Paralic Deposits.

7.3.7 In areas of proposed improvements outside of the building areas, the upper 1 to 2 feet of existing soil should be processed, moisture conditioned as necessary and recompacted. Deeper removals may be required in areas where loose or saturated materials are encountered. The removals should extend at least 2 feet outside of the improvement area, where possible. Table 7.3.1 provides a summary of the grading and foundation type recommendations.

TABLE 7.3.1
SUMMARY OF GRADING RECOMMENDATIONS

Area	Removal Requirements	Foundation Type(s)
Office Building Pad	Grade to Finish Grade Elevation	Shallow Foundations Embedded in Very Old Paralic Deposits
Parking Structure Building Pad (Subterranean Level Not Proposed)	Removal and Recompaction of Undocumented Fill Materials to Formational Materials	Option 1 – Deepened Shallow Foundations Embedded in Very Old Paralic Deposits
	Undercut 2 Feet Below Bottom of Proposed Footings (Option 2 Foundation Type only)	Option 2 – Shallow Foundations Embedded in Properly Compacted Fill
Parking Structure Building Pad Lateral Removals	5 Feet Outside of Building Pad/Footing Area, Where Possible	--
Site Improvement Areas	Removal and Recompaction of Upper 1 to 2 Feet of Existing Materials	--
Exposed Bottoms of Remedial Grading	Scarify Upper 12 Inches	--

7.3.8 The bottom of the excavations should be sloped 1 percent to the adjacent street or deepest fill. Prior to fill soil being placed, the existing ground surface should be scarified, moisture conditioned as necessary, and compacted to a depth of at least 12 inches. Deeper removals may be required if saturated or loose fill soil is encountered. A representative of Geocon should be on-site during removals to evaluate the limits of the remedial grading.

7.3.9 Some areas of overly wet and saturated soil could be encountered due to the existing landscape and pavement areas. The saturated soil would require additional effort prior to placement of compacted fill or additional improvements. Stabilization of the soil would include scarifying and air-drying, removing and replacement with drier soil, use of stabilization fabric (e.g. Tensar TX7 or other approved fabric), or chemical treating (i.e. cement or lime treatment).

7.3.10 The site should then be brought to final subgrade elevations with fill compacted in layers. In general, soil native to the site is suitable for use from a geotechnical engineering standpoint as fill if relatively free from vegetation, debris and other deleterious material. Layers of fill should be about 6 to 8 inches in loose thickness and no thicker than will allow for adequate bonding and compaction. Fill, including backfill and scarified ground surfaces, should be compacted to a dry density of at least 90 percent of the laboratory maximum dry density near to slightly above optimum moisture content in accordance with ASTM Test Procedure D 1557. Fill materials placed below optimum moisture content may require additional moisture conditioning prior to placing additional fill. The upper 12 inches of subgrade soil underlying pavement should be compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content shortly before paving operations.

7.3.11 Import fill (if necessary) should consist of the characteristics presented in Table 7.3.2. Geocon Incorporated should be notified of the import soil source and should perform laboratory testing of import soil prior to its arrival at the site to determine its suitability as fill material.

TABLE 7.3.2
SUMMARY OF IMPORT FILL RECOMMENDATIONS

Soil Characteristic	Values
Expansion Potential	"Very Low" to "Medium" (Expansion Index of 90 or less)
Particle Size	Maximum Dimension Less Than 3 Inches
	Generally Free of Debris

7.4 Subdrains

7.4.1 With the exception of retaining wall drains, we do not expect the installation of other subdrains. We should be contacted to provide recommendations for wick drains, if proposed.

7.5 Temporary Excavations

7.5.1 The recommendations included herein are provided for stable excavations. It is the responsibility of the contractor and their competent person to ensure all excavations, temporary slopes and trenches are properly constructed and maintained in accordance with applicable OSHA guidelines in order to maintain safety and the stability of the excavations and adjacent improvements. These excavations should not be allowed to become saturated or to dry out. Surcharge loads should not be permitted to a distance equal to the height of the excavation from the top of the excavation. The top of the excavation should be a minimum of 15 feet from the edge of existing improvements. Excavations steeper than those recommended or closer than 15 feet from an existing surface improvement should be shored in accordance with applicable OSHA codes and regulations.

7.5.2 The stability of the excavations is dependent on the design and construction of the shoring system and site conditions. Therefore, Geocon Incorporated cannot be responsible for site safety and the stability of the proposed excavations.

7.6 Seismic Design Criteria – 2019 California Building Code

7.6.1 Table 7.6.1 summarizes site-specific design criteria obtained from the 2019 California Building Code (CBC; Based on the 2018 International Building Code [IBC] and ASCE 7-16), Chapter 16 Structural Design, Section 1613 Earthquake Loads. We used the computer program *U.S. Seismic Design Maps*, provided by the Structural Engineers Association (SEA) to calculate the seismic design parameters. The short spectral response uses a period of 0.2 second. We evaluated the Site Class based on the discussion in Section 1613.2.2 of the 2019 CBC and Table 20.3-1 of ASCE 7-16. The values presented herein are for the risk-targeted maximum considered earthquake (MCE_R). Sites designated as Site Class D, E and F may require additional analyses if requested by the project structural engineer and client.

TABLE 7.6.1
2019 CBC SEISMIC DESIGN PARAMETERS

Parameter	Value	2019 CBC Reference
Site Class	C	Section 1613.2.2
MCE_R Ground Motion Spectral Response Acceleration – Class B (short), S_S	1.161g	Figure 1613.2.1(1)
MCE_R Ground Motion Spectral Response Acceleration – Class B (1 sec), S_1	0.409g	Figure 1613.2.1(2)
Site Coefficient, F_A	1.200	Table 1613.2.3(1)
Site Coefficient, F_V	1.500*	Table 1613.2.3(2)
Site Class Modified MCE_R Spectral Response Acceleration (short), S_{MS}	1.393g	Section 1613.2.3 (Eqn 16-36)
Site Class Modified MCE_R Spectral Response Acceleration – (1 sec), S_{M1}	0.614g*	Section 1613.2.3 (Eqn 16-37)
5% Damped Design Spectral Response Acceleration (short), S_{DS}	0.929g	Section 1613.2.4 (Eqn 16-38)
5% Damped Design Spectral Response Acceleration (1 sec), S_{D1}	0.409g*	Section 1613.2.4 (Eqn 16-39)

***** Using the code-based values presented in this table, in lieu of a performing a ground motion hazard analysis, requires the exceptions outlined in ASCE 7-16 Section 11.4.8 be followed by the project structural engineer. Per Section 11.4.8 of ASCE/SEI 7-16, a ground motion hazard analysis should be performed for projects for Site Class "E" sites with Ss greater than or equal to 1.0g and for Site Class "D" and "E" sites with S1 greater than 0.2g. Section 11.4.8 also provides exceptions which indicates that the ground motion hazard analysis may be waived provided the exceptions are followed.

7.6.2 Table 7.6.2 presents the mapped maximum considered geometric mean (MCE_G) seismic design parameters for projects located in Seismic Design Categories of D through F in accordance with ASCE 7-16.

TABLE 7.6.2
ASCE 7-16 PEAK GROUND ACCELERATION

Parameter	Value	ASCE 7-16 Reference
Mapped MCE_G Peak Ground Acceleration, PGA	0.522g	Figure 22-7
Site Coefficient, F_{PGA}	1.200	Table 11.8-1
Site Class Modified MCE_G Peak Ground Acceleration, PGA_M	0.626g	Section 11.8.3 (Eqn 11.8-1)

7.6.3 Conformance to the criteria in Tables 7.6.1 and 7.6.2 for seismic design does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur in the event of a large earthquake. The primary goal of seismic design is to protect life, not to avoid all damage, since such design may be economically prohibitive.

7.6.4 The project structural engineer and architect should evaluate the appropriate Risk Category and Seismic Design Category for the planned structures. The values presented herein assume a Risk Category of II and resulting in a Seismic Design Category D. Table 7.6.3 presents a summary of the risk categories in accordance with ASCE 7-16.

TABLE 7.6.3
ASCE 7-16 RISK CATEGORIES

Risk Category	Building Use	Examples
I	Low risk to Human Life at Failure	Barn, Storage Shelter
II	Nominal Risk to Human Life at Failure (Buildings Not Designated as I, III or IV)	Residential, Commercial and Industrial Buildings
III	Substantial Risk to Human Life at Failure	Theaters, Lecture Halls, Dining Halls, Schools, Prisons, Small Healthcare Facilities, Infrastructure Plants, Storage for Explosives/Toxins
IV	Essential Facilities	Hazardous Material Facilities, Hospitals, Fire and Rescue, Emergency Shelters, Police Stations, Power Stations, Aviation Control Facilities, National Defense, Water Storage

7.7 Shallow Foundations

7.7.1 The proposed structures can be supported on a shallow foundation system founded in the compacted fill or formational materials. Foundations for the structure should consist of continuous strip footings and/or isolated spread footings. Footings should be deepened such that the bottom outside edge of the footing is at least 7 feet horizontally from the face of the slope. Table 7.7.1 provides a summary of the foundation design recommendations.

TABLE 7.7.1
SUMMARY OF FOUNDATION RECOMMENDATIONS

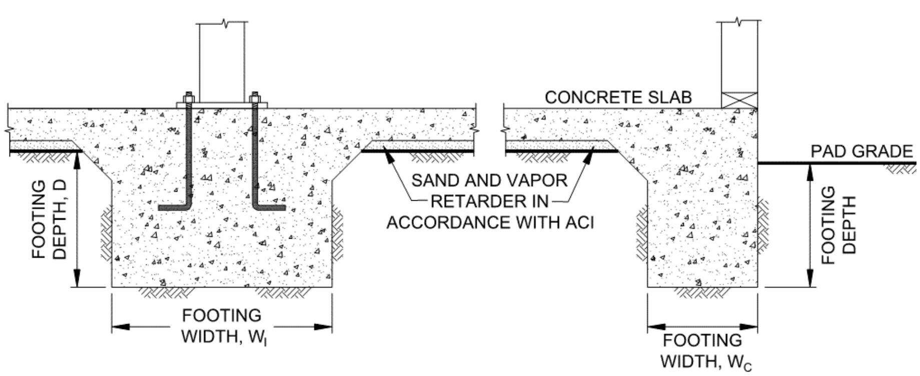
Parameter	Value
Minimum Continuous Foundation Width, W_C	12 inches
Minimum Isolated Foundation Width, W_I	24 inches
Minimum Foundation Depth, D	24 Inches Below Lowest Adjacent Grade
Minimum Steel Reinforcement	4 No. 5 Bars, 2 at the Top and 2 at the Bottom

7.7.2 We expect ancillary structures will be supported on compacted fill, the office building will be supported at 1-level below grade on formational materials and the parking structure will be supported on compacted fill or formational materials. We assume that at least 10 feet of material will be removed to achieve pad grade for the office building with a subterranean level. Table 7.7.2 provide the proposed bearing capacities for the proposed structures.

TABLE 7.7.2
SUMMARY OF FOUNDATION BEARING CAPACITY RECOMMENDATIONS

Structure	Parameter	Value
Ancillary Structures	Allowable Bearing Capacity – Properly Compacted Fill (Existing Grade)	2,500 psf
Office Building (1 Level Subterranean)	Allowable/Maximum Bearing Capacity – Formation	6,500 psf / 8,500 psf
Parking Structure	Allowable/Maximum Bearing Capacity – Formation	5,000 psf / 7,000 psf
	Allowable/Maximum Bearing Capacity – Compacted Fill	2,500 psf / 4,500 psf
All Structures	Bearing Capacity Increase	500 psf per Foot of Depth and Width
	Estimated Total Settlement	1 Inch
	Estimated Differential Settlement	½ Inch in 40 Feet
	Footing Size Used for Settlement	8-Foot Square
	Design Expansion Index	50 or less

7.7.3 The foundations should be embedded in accordance with the recommendations herein and the Wall/Column Footing Dimension Detail. The embedment depths should be measured from the lowest adjacent pad grade for both interior and exterior footings. Footings should be deepened such that the bottom outside edge of the footing is at least 7 feet horizontally from the face of the slope (unless designed with a post-tensioned foundation system as discussed herein).



Wall/Column Footing Dimension Detail

7.7.4 The bearing capacity values presented herein are for dead plus live loads and may be increased by one-third when considering transient loads due to wind or seismic forces.

7.7.5 Overexcavation of the footings and replacement with slurry can be performed in areas where formational materials are not encountered at the bottom of the footing. Minimum two-sack slurry can be placed in the excavations for the conventional foundations to the bottom of proposed footing elevation.

7.7.6 We should observe the foundation excavations prior to the placement of reinforcing steel and concrete to check that the exposed soil conditions are similar to those expected and that they have been extended to the appropriate bearing strata. Foundation modifications may be required if unexpected soil conditions are encountered.

7.7.7 Geocon Incorporated should be consulted to provide additional design parameters as required by the structural engineer.

7.8 Concrete Slabs-On-Grade

7.8.1 Concrete slabs-on-grade for the structures should be constructed in accordance with Table 7.8.1.

TABLE 7.8.1
MINIMUM CONCRETE SLAB-ON-GRADE RECOMMENDATIONS

Parameter	Value
Minimum Concrete Slab Thickness	4 inches
Minimum Steel Reinforcement	No. 3 Bars 18 Inches on Center, Both Directions
Typical Slab Underlayment	3 to 4 Inches of Sand/Gravel/Base
Design Expansion Index	50 or less

7.8.2 Slabs that may receive moisture-sensitive floor coverings or may be used to store moisture-sensitive materials should be underlain by a vapor retarder. The vapor retarder design should be consistent with the guidelines presented in the American Concrete Institute's (ACI) *Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials* (ACI 302.2R-06). In addition, the membrane should be installed in accordance with manufacturer's recommendations and ASTM requirements and installed in a manner that prevents puncture. The vapor retarder used should be specified by the project architect or developer based on the type of floor covering that will be installed and if the structure will possess a humidity controlled environment.

7.8.3 The bedding sand thickness should be determined by the project foundation engineer, architect, and/or developer. It is common to have 3 to 4 inches of sand in the southern California region. However, we should be contacted to provide recommendations if the bedding sand is thicker than 6 inches. The foundation design engineer should provide appropriate concrete mix design criteria and curing measures to assure proper curing of the slab by reducing the potential for rapid moisture loss and subsequent cracking and/or slab curl. We suggest that the foundation design engineer present the concrete mix design and proper curing methods on the foundation plans. It is critical that the foundation contractor understands and follows the recommendations presented on the foundation plans.

7.8.4 Concrete slabs should be provided with adequate crack-control joints, construction joints and/or expansion joints to reduce unsightly shrinkage cracking. The design of joints should consider criteria of the American Concrete Institute (ACI) when establishing crack-control spacing. Crack-control joints should be spaced at intervals no greater than 12 feet. Additional steel reinforcing, concrete admixtures and/or closer crack control joint spacing should be considered where concrete-exposed finished floors are planned.

7.8.5 Special subgrade presaturation is not deemed necessary prior to placing concrete; however, the exposed foundation and slab subgrade soil should be moisturized to maintain a moist condition as would be expected in any such concrete placement.

7.8.6 The concrete slab-on-grade recommendations are based on soil support characteristics only. The project structural engineer should evaluate the structural requirements of the concrete slabs for supporting expected loads.

7.8.7 The recommendations of this report are intended to reduce the potential for cracking of slabs due to expansive soil (if present), differential settlement of existing soil or soil with varying thicknesses. However, even with the incorporation of the recommendations presented herein, foundations, stucco walls, and slabs-on-grade placed on such conditions may still exhibit some cracking due to soil movement and/or shrinkage. The occurrence of concrete shrinkage cracks is independent of the supporting soil characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of the concrete, proper concrete placement and curing, and by the placement of crack control joints at periodic intervals, in particular, where re-entrant slab corners occur.

7.9 Exterior Concrete Flatwork

7.9.1 Exterior concrete flatwork not subject to vehicular traffic should be constructed in accordance with the recommendations presented in Table 7.9. The recommended steel reinforcement would help reduce the potential for cracking.

TABLE 7.9
MINIMUM CONCRETE FLATWORK RECOMMENDATIONS

Expansion Index, EI	Minimum Steel Reinforcement* Options	Minimum Thickness
EI $\leq$ 90	6x6-W2.9/W2.9 (6x6-6/6) welded wire mesh	4 Inches
	No. 3 Bars 18 inches on center, Both Directions	

* In excess of 8 feet square.

7.9.2 The subgrade soil should be properly moisturized and compacted prior to the placement of steel and concrete. The subgrade soil should be compacted to a dry density of at least 90 percent of the laboratory maximum dry density near to slightly above optimum moisture content in accordance with ASTM D 1557.

7.9.3 Even with the incorporation of the recommendations of this report, the exterior concrete flatwork has a potential to experience some uplift due to expansive soil beneath grade. The steel reinforcement should overlap continuously in flatwork to reduce the potential for vertical offsets within flatwork. Additionally, flatwork should be structurally connected to the curbs, where possible, to reduce the potential for offsets between the curbs and the flatwork.

7.9.4 Concrete flatwork should be provided with crack control joints to reduce and/or control shrinkage cracking. Crack control spacing should be determined by the project structural engineer based upon the slab thickness and intended usage. Criteria of the American Concrete Institute (ACI) should be taken into consideration when establishing crack control spacing. Subgrade soil for exterior slabs not subjected to vehicle loads should be compacted in accordance with criteria presented in the grading section prior to concrete placement. Subgrade soil should be properly compacted and the moisture content of subgrade soil should be verified prior to placing concrete. Base materials will not be required below concrete improvements.

7.9.5 Where exterior flatwork abuts the structure at entrant or exit points, the exterior slab should be dowelled into the structure's foundation stemwall. This recommendation is intended to reduce the potential for differential elevations that could result from differential settlement or minor heave of the flatwork. Dowelling details should be designed by the project structural engineer.

7.9.6 The recommendations presented herein are intended to reduce the potential for cracking of exterior slabs as a result of differential movement. However, even with the incorporation of the recommendations presented herein, slabs-on-grade will still crack. The occurrence of concrete shrinkage cracks is independent of the soil supporting characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of the concrete, the use of crack control joints and proper concrete placement and curing. Crack control joints should be spaced at intervals no greater than 12 feet. Literature provided by the Portland Concrete Association (PCA) and American Concrete Institute (ACI) present recommendations for proper concrete mix, construction, and curing practices, and should be incorporated into project construction.

7.10 Retaining Walls

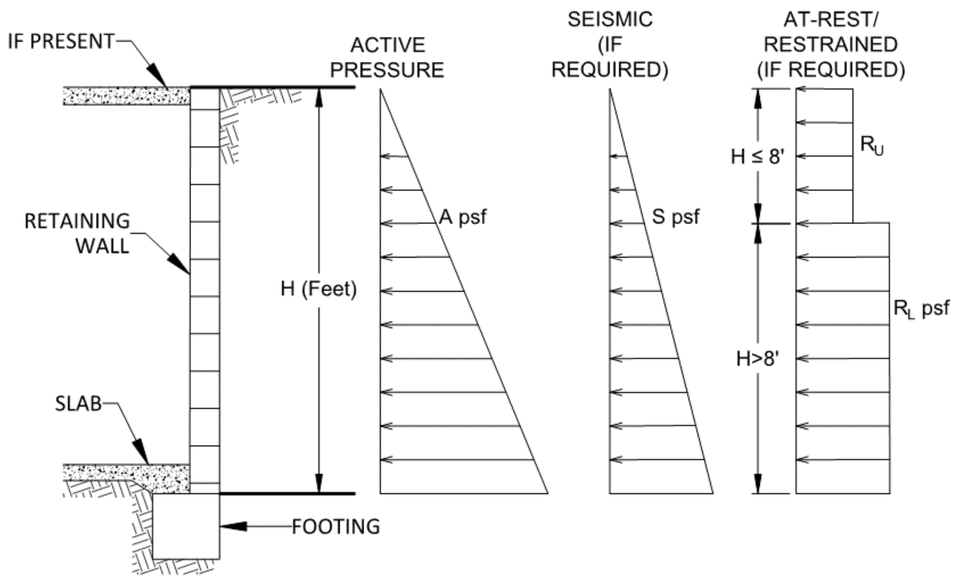
7.10.1 Retaining walls should be designed using the values presented in Table 7.10.1. Soil with an expansion index (EI) of greater than 50 should not be used as backfill material behind retaining walls.

TABLE 7.10.1
RETAINING WALL DESIGN RECOMMENDATIONS

Parameter	Value
Active Soil Pressure, A (Fluid Density, Level Backfill)	35 pcf
Active Soil Pressure, A (Fluid Density, 2:1 Sloping Backfill)	50 pcf
Seismic Pressure, S	15H psf
At-Rest/Restrained Walls Additional Uniform Pressure (0 to 8 Feet High)	7H psf
At-Rest/Restrained Walls Additional Uniform Pressure (8+ Feet High)	13H psf
Expected Expansion Index for the Subject Property	EI$\leq$50

H equals the height of the retaining portion of the wall

7.10.2 The project retaining walls should be designed as shown in the Retaining Wall Loading Diagram.



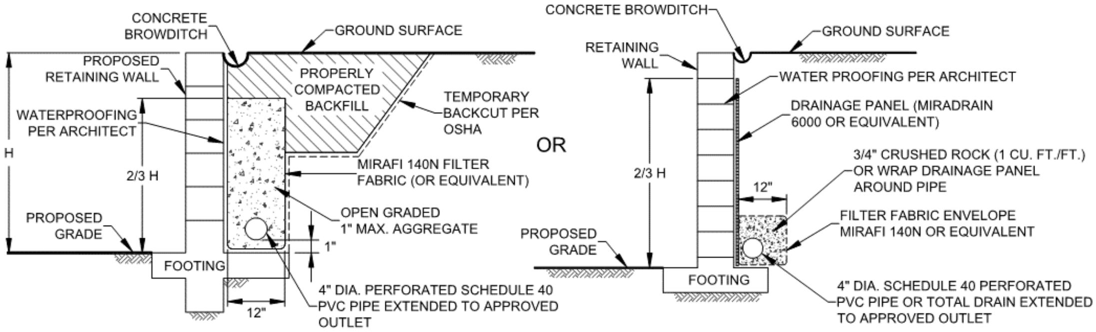
Retaining Wall Loading Diagram

7.10.3 Unrestrained walls are those that are allowed to rotate more than 0.001H (where H equals the height of the retaining portion of the wall) at the top of the wall. Where walls are restrained from movement at the top (at-rest condition), an additional uniform pressure should be applied to the wall. For retaining walls subject to vehicular loads within a horizontal distance equal to two-thirds the wall height, a surcharge equivalent to 2 feet of fill soil should be added.

7.10.4 The structural engineer should determine the Seismic Design Category for the project in accordance with Section 1613.3.5 of the 2019 CBC or Section 11.6 of ASCE 7-10. For structures assigned to Seismic Design Category of D, E, or F, retaining walls that support more than 6 feet of backfill should be designed with seismic lateral pressure in accordance with Section 1803.5.12 of the 2019 CBC. The seismic load is dependent on the retained height where H is the height of the wall, in feet, and the calculated loads result in pounds per square foot (psf) exerted at the base of the wall and zero at the top of the wall.

7.10.5 Retaining walls should be designed to ensure stability against overturning sliding, and excessive foundation pressure. Where a keyway is extended below the wall base with the intent to engage passive pressure and enhance sliding stability, it is not necessary to consider active pressure on the keyway.

7.10.6 Drainage openings through the base of the wall (weep holes) should not be used where the seepage could be a nuisance or otherwise adversely affect the property adjacent to the base of the wall. The recommendations herein assume a properly compacted granular (EI of 50 or less) free-draining backfill material with no hydrostatic forces or imposed surcharge load. The retaining wall should be properly drained as shown in the Typical Retaining Wall Drainage Detail. If conditions different than those described are expected, or if specific drainage details are desired, Geocon Incorporated should be contacted for additional recommendations.



Typical Retaining Wall Drainage Detail

7.10.7 The retaining walls may be designed using either the active and restrained (at-rest) loading condition or the active and seismic loading condition as suggested by the structural engineer. Typically, it appears the design of the restrained condition for retaining wall loading may be adequate for the seismic design of the retaining walls. However, the active earth pressure combined with the seismic design load should be reviewed and also considered in the design of the retaining walls.

7.10.8 In general, wall foundations should be designed in accordance with Table 7.10.2. The proximity of the foundation to the top of a slope steeper than 3:1 could impact the allowable soil bearing pressure. Therefore, retaining wall foundations should be deepened such that the bottom outside edge of the footing is at least 7 feet horizontally from the face of the slope.

TABLE 7.10.2
SUMMARY OF RETAINING WALL FOUNDATION RECOMMENDATIONS

Parameter	Value
Minimum Retaining Wall Foundation Width	12 inches
Minimum Retaining Wall Foundation Depth	12 Inches
Minimum Steel Reinforcement	Per Structural Engineer
Allowable Bearing Capacity	2,500 psf
Estimated Total Settlement	1 Inch
Estimated Differential Settlement	½ Inch in 40 Feet

7.10.9 The recommendations presented herein are generally applicable to the design of rigid concrete or masonry retaining walls. In the event that other types of walls (such as mechanically stabilized earth [MSE] walls, soil nail walls, or soldier pile walls) are planned, Geocon Incorporated should be consulted for additional recommendations.

7.10.10 Unrestrained walls will move laterally when backfilled and loading is applied. The amount of lateral deflection is dependent on the wall height, the type of soil used for backfill, and loads acting on the wall. The retaining walls and improvements above the retaining walls should be designed to incorporate an appropriate amount of lateral deflection as determined by the structural engineer.

7.10.11 Soil contemplated for use as retaining wall backfill, including import materials, should be identified in the field prior to backfill. At that time, Geocon Incorporated should obtain samples for laboratory testing to evaluate its suitability. Modified lateral earth pressures may be necessary if the backfill soil does not meet the required expansion index or shear strength. City or regional standard wall designs, if used, are based on a specific active lateral earth pressure and/or soil friction angle. In this regard, on-site soil to be used as backfill may or may not meet the values for standard wall designs. Geocon Incorporated should be consulted to assess the suitability of the on-site soil for use as wall backfill if standard wall designs will be used.

7.11 Lateral Loading

7.11.1 Table 7.11 should be used to help design the proposed structures and improvements to resist lateral loads for the design of footings or shear keys. The allowable passive pressure assumes a horizontal surface extending at least 5 feet, or three times the surface generating the passive pressure, whichever is greater. The upper 12 inches of material in areas not protected by floor slabs or pavement should not be included in design for passive resistance.

TABLE 7.11
SUMMARY OF LATERAL LOAD DESIGN RECOMMENDATIONS

Parameter	Value
Passive Pressure Fluid Density	350 pcf
Coefficient of Friction (Concrete and Soil)	0.35
Coefficient of Friction (Along Vapor Barrier)	0.2 to 0.25*

* Per manufacturer's recommendations.

7.11.2 The passive and frictional resistant loads can be combined for design purposes. The lateral passive pressures may be increased by one-third when considering transient loads due to wind or seismic forces.

7.12 Preliminary Pavement Recommendations

7.12.1 We calculated the flexible pavement sections in general conformance with the *Caltrans Method of Flexible Pavement Design* (Highway Design Manual, Section 608.4) using an estimated Traffic Index (TI) of 5.0, 5.5, 6.0, and 7.0 for parking stalls, driveways, medium truck traffic areas, and heavy truck traffic areas, respectively. The project civil engineer and owner should review the pavement designations to determine appropriate locations for pavement thickness. The final pavement sections for the parking lot should be based on the R-Value of the subgrade soil encountered at final subgrade elevation. We have assumed an R-Value of 6 and 78 for the subgrade soil and base materials, respectively, for the purposes of this preliminary analysis. Table 7.12.1 presents the preliminary flexible pavement sections.

TABLE 7.12.1
PRELIMINARY FLEXIBLE PAVEMENT SECTION

Location	Assumed Traffic Index	Assumed Subgrade R-Value	Asphalt Concrete (inches)	Class 2 Aggregate Base (inches)
Parking stalls for automobiles and light-duty vehicles	5.0	6	3	10
Driveways for automobiles and light-duty vehicles	5.5	6	3	12
Medium truck traffic areas	6.0	6	3.5	13
Driveways for heavy truck traffic	7.0	6	4	16

7.12.2 Prior to placing base materials, the upper 12 inches of the subgrade soil should be scarified, moisture conditioned as necessary, and recompacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content as determined by ASTM D 1557. Similarly, the base material should be compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content. Asphalt concrete should be compacted to a density of at least 95 percent of the laboratory Hveem density in accordance with ASTM D 2726.

7.12.3 A rigid Portland cement concrete (PCC) pavement section should be placed in roadway aprons and cross gutters. We calculated the rigid pavement section in general conformance with the procedure recommended by the American Concrete Institute report ACI 330R-08 Guide for Design and Construction of Concrete Parking Lots using the parameters presented in Table 7.12.2.

TABLE 7.12.2
RIGID PAVEMENT DESIGN PARAMETERS

Design Parameter	Design Value
Modulus of subgrade reaction, k	50 pci
Modulus of rupture for concrete, M_R	500 psi
Concrete Compressive Strength	3,000 psi
Traffic Category, TC	A and C
Average daily truck traffic, ADTT	10 and 100

7.12.4 Based on the criteria presented herein, the PCC pavement sections should have a minimum thickness as presented in Table 7.12.3.

TABLE 7.12.3
RIGID VEHICULAR PAVEMENT RECOMMENDATIONS

Location	Portland Cement Concrete (inches)
Automobile Parking Stalls (TC=A)	6.0
Driveways (TC=C)	7.5

7.12.5 The PCC vehicular pavement should be placed over subgrade soil that is compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content.

7.12.6 The rigid pavement should also be designed and constructed incorporating the parameters presented in Table 7.12.4.

TABLE 7.12.4
ADDITIONAL RIGID PAVEMENT RECOMMENDATIONS

Subject	Value
Thickened Edge	1.2 Times Slab Thickness
	Minimum Increase of 2 Inches
	4 Feet Wide
Crack Control Joint Spacing	30 Times Slab Thickness
	Max. Spacing of 12 feet for 5.5-Inch-Thick
	Max. Spacing of 15 Feet for Slabs 6 Inches and Thicker
Crack Control Joint Depth	Per ACI 330R-08
	1 Inch Using Early-Entry Saws on Slabs Less Than 9 Inches Thick
Crack Control Joint Width	¼-Inch for Sealed Joints
	⅜-Inch is Common for Sealed Joints
	$^{1}/_{10}$- to $^{1}/_{8}$-Inch is Common for Unsealed Joints

7.12.7 Reinforcing steel will not be necessary within the concrete for geotechnical purposes with the possible exception of dowels at construction joints as discussed herein.

7.12.8 To control the location and spread of concrete shrinkage cracks, crack-control joints (weakened plane joints) should be included in the design of the concrete pavement slab. Crack-control joints should be sealed with an appropriate sealant to prevent the migration of water through the control joint to the subgrade materials. The depth of the crack-control joints should be determined by the referenced ACI report.

7.12.9 To provide load transfer between adjacent pavement slab sections, a butt-type construction joint should be constructed. The butt-type joint should be thickened by at least 20 percent at the edge and taper back at least 4 feet from the face of the slab. As an alternative to the butt-type construction joint, dowelling can be used between construction joints for pavements of 7 inches or thicker. As discussed in the referenced ACI guide, dowels should consist of smooth, 1-inch-diameter reinforcing steel 14 inches long embedded a minimum of 6 inches into the slab on either side of the construction joint. Dowels should be located at the midpoint of the slab, spaced at 12 inches on center and lubricated to allow joint movement while still transferring loads. In addition, tie bars should be installed as recommended in Section 3.8.3 of the referenced ACI guide. The structural engineer should provide other alternative recommendations for load transfer.

7.12.10 Concrete curb/gutter should be placed on soil subgrade compacted to a dry density of at least 90 percent of the laboratory maximum dry density near to slightly above optimum moisture content. Cross-gutters that receives vehicular should be placed on subgrade soil compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content. Base materials should not be placed below the curb/gutter, or cross-gutters so water is not able to migrate from the adjacent parkways to the pavement sections. Where flatwork is located directly adjacent to the curb/gutter, the concrete flatwork should be structurally connected to the curbs to help reduce the potential for offsets between the curbs and the flatwork.

7.13 Site Drainage and Moisture Protection

7.13.1 Adequate site drainage is critical to reduce the potential for differential soil movement, erosion and subsurface seepage. Under no circumstances should water be allowed to pond adjacent to footings. The site should be graded and maintained such that surface drainage is directed away from structures in accordance with 2019 CBC 1804.4 or other applicable standards. In addition, surface drainage should be directed away from the top of slopes into swales or other controlled drainage devices. Roof and pavement drainage should be directed into conduits that carry runoff away from the proposed structure.

7.13.2 In the case of basement walls or building walls retaining landscaping areas, a water-proofing system should be used on the wall and joints, and a Miradrain drainage panel (or similar) should be placed over the waterproofing. The project architect or civil engineer should provide detailed specifications on the plans for all waterproofing and drainage.

7.13.3 Underground utilities should be leak free. Utility and irrigation lines should be checked periodically for leaks, and detected leaks should be repaired promptly. Detrimental soil movement could occur if water is allowed to infiltrate the soil for prolonged periods of time.

7.13.4 Landscaping planters adjacent to paved areas are not recommended due to the potential for surface or irrigation water to infiltrate the pavement's subgrade and base course. Area drains to collect excess irrigation water and transmit it to drainage structures or impervious above-grade planter boxes can be used. In addition, where landscaping is planned adjacent to the pavement, construction of a cutoff wall along the edge of the pavement that extends at least 6 inches below the bottom of the base material should be considered.

7.13.5 We should prepare a storm water infiltration feasibility report of storm water management devices are planned.

7.14 Grading and Foundation Plan Review

7.14.1 Geocon Incorporated should review the grading and building foundation plans for the project prior to final design submittal to evaluate if additional analyses and/or recommendations are required.

7.15 Testing and Observation Services During Construction

7.15.1 Geocon Incorporated should provide geotechnical testing and observation services during the grading operations, foundation construction, utility installation, retaining wall backfill and pavement installation. Table 7.15 presents the typical geotechnical observations we would expect for the proposed improvements.

TABLE 7.15
EXPECTED GEOTECHNICAL TESTING AND OBSERVATION SERVICES

Construction Phase	Observations	Expected Time Frame
Grading	Base of Removal	Part Time During Removals
	Geologic Logging	Part Time to Full Time
	Fill Placement and Soil Compaction Operations	Full Time
Foundations	Foundation Excavation Observations	Part Time
Utility Backfill	Fill Placement and Soil Compaction Operations	Part Time to Full Time
Retaining Wall Backfill	Fill Placement and Soil Compaction Operations	Part Time to Full Time
Subgrade for Sidewalks, Curb/Gutter and Pavement	Soil Compaction Operations	Part Time
Pavement Construction	Base Placement and Compaction	Part Time
	Asphalt Concrete Placement and Compaction	Full Time

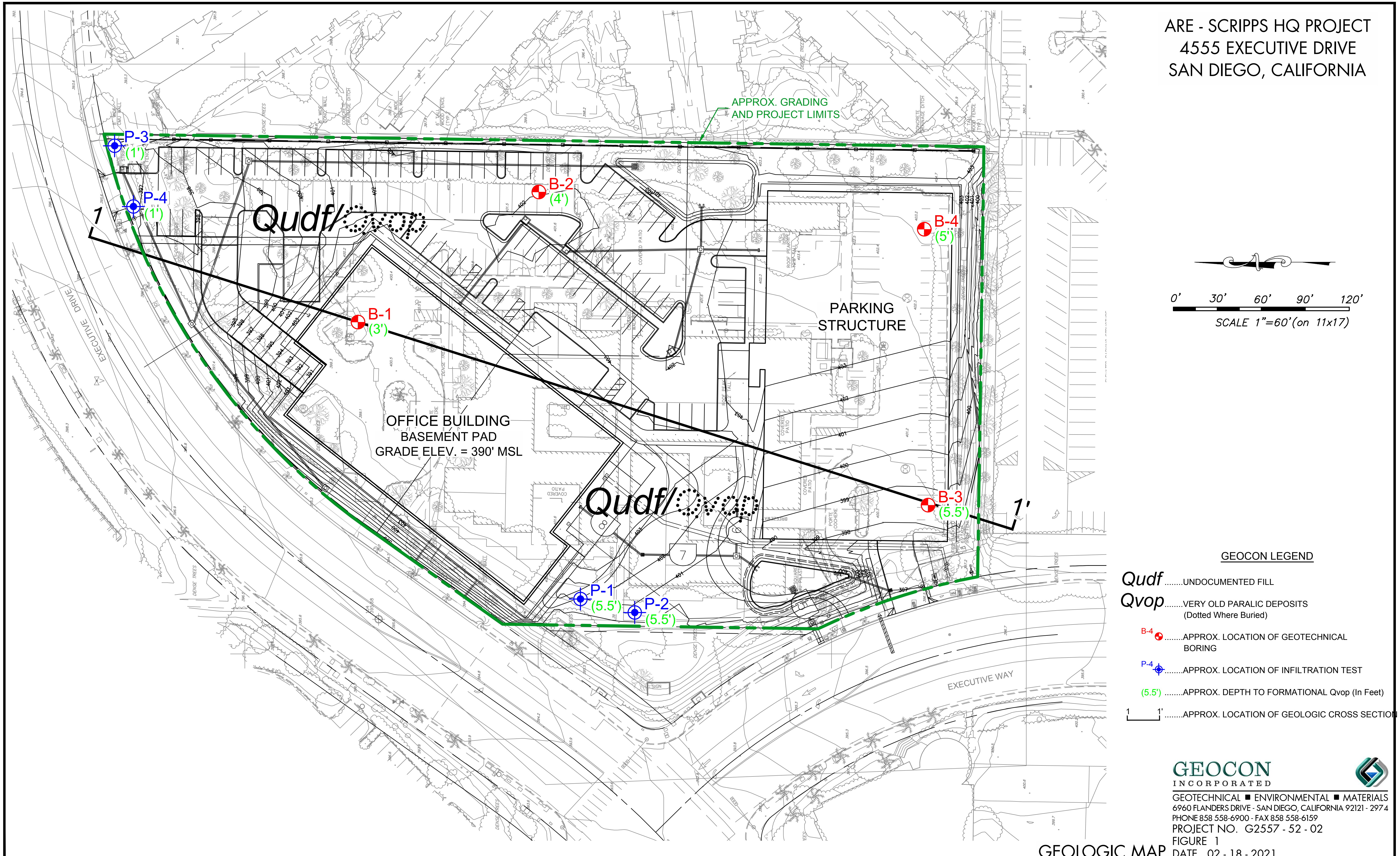
LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. The firm that performed the geotechnical investigation for the project should be retained to provide testing and observation services during construction to provide continuity of geotechnical interpretation and to check that the recommendations presented for geotechnical aspects of site development are incorporated during site grading, construction of improvements, and excavation of foundations. If another geotechnical firm is selected to perform the testing and observation services during construction operations, that firm should prepare a letter indicating their intent to assume the responsibilities of project geotechnical engineer of record. A copy of the letter should be provided to the regulatory agency for their records. In addition, that firm should provide revised recommendations concerning the geotechnical aspects of the proposed development, or a written acknowledgement of their concurrence with the recommendations presented in our report. They should also perform additional analyses deemed necessary to assume the role of Geotechnical Engineer of Record.

2. The recommendations of this report pertain only to the site investigated and are based upon the assumption that the soil conditions do not deviate from those disclosed in the investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, Geocon Incorporated should be notified so that supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous or corrosive materials was not part of the scope of services provided by Geocon Incorporated.

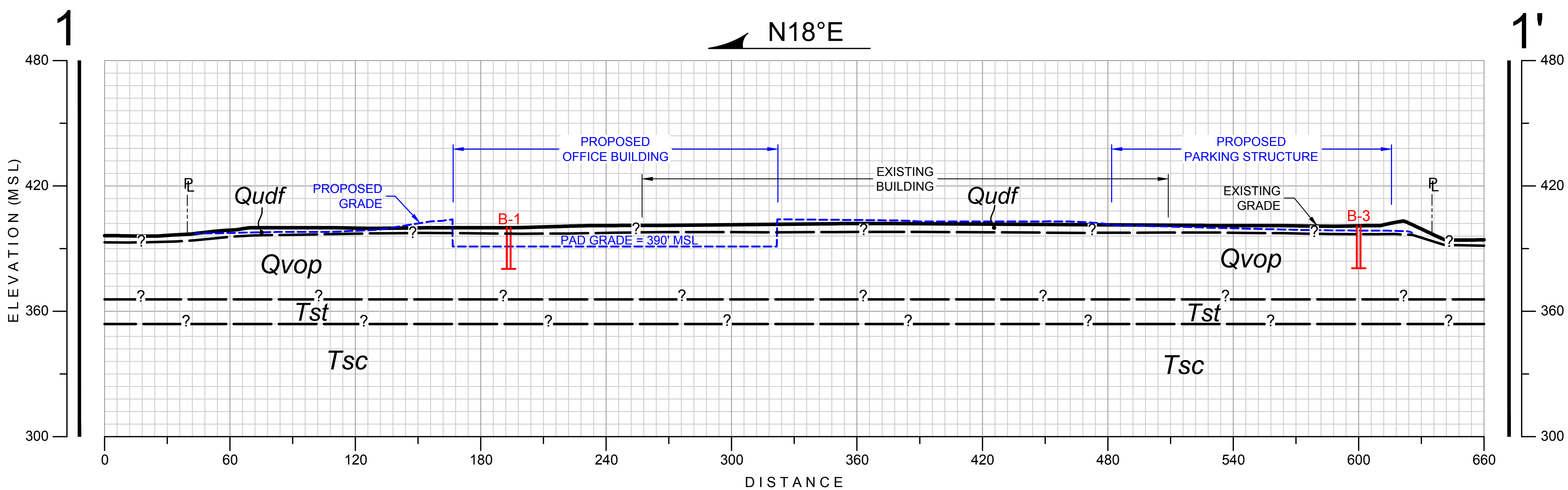
3. This report is issued with the understanding that it is the responsibility of the owner or his representative to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

4. The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.



Plotted:02/18/2021 12:00PM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\G2557-52-02 (Executive Drive)\SHEETS\G2557-52-02 Geo Map.dwg

ARE - SCRIPPS HQ PROJECT
4555 EXECUTIVE DRIVE
SAN DIEGO, CALIFORNIA



GEOLOGIC CROSS-SECTION 1-1'

SCALE: 1" = 60' (Vert. = Horiz.)

GEOCON LEGEND

Qudf ........UNDOCUMENTED FILL

Qvop ....VERY OLD PARALIC DEPOSITS

Tst ....STADIUM CONGLOMERATE

Tsc ....SCRIPPS FORMATION

........APPROX. LOCATION OF GEOLOGIC CONTACT (Queried Where Uncertain)

B-3 ....APPROX. LOCATION OF GEOTECHNICAL BORING

GEOCON INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
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PROJECT NO. G2557 - 52 - 02
FIGURE 2
DATE 02 - 18 - 2021

APPENDIX A

APPENDIX A

FIELD INVESTIGATION

We performed the drilling operations on November 6, 2020 with Baja Exploration using a CME 75 drill rig equipped with hollow-stem augers. Borings extended to maximum depth of approximately 16 to 20 feet. The locations of the exploratory borings are shown on the Geologic Map, Figure 1 and the boring logs are presented in this Appendix. We located the borings in the field using a measuring tape and existing reference points; therefore, actual boring locations may deviate slightly.

We obtained samples during our subsurface exploration in the borings using a California sampler. The sampler is composed of steel and is driven to obtain ring samples. The California sampler has an inside diameter of 2.5 inches and an outside diameter of 3 inches. Up to 18 rings are placed inside the sampler that is 2.4 inches in diameter and 1 inch in height. We obtained ring samples at appropriate intervals, placed them in moisture-tight containers, and transported them to the laboratory for testing. The type of sample is noted on the exploratory boring logs.

The samplers were driven 12 inches. The sampler is connected to A rods and driven into the bottom of the excavation using a 140-pound hammer with a 30-inch drop. Blow counts are recorded for every 6 inches the sampler is driven. The penetration resistances shown on the boring logs are shown in terms of blows per foot. The values indicated on the boring logs are the sum of the last 12 inches of the sampler. If the sampler was not driven for 12 inches, an approximate value is calculated in term of blows per foot or the final 6-inch interval is reported. These values are not to be taken as N-values as adjustments have not been applied. We estimated elevations shown on the boring logs either from a topographic map or by using a benchmark. Each excavation was backfilled as noted on the boring logs.

We visually examined, classified, and logged the soil encountered in the borings in general accordance with American Society for Testing and Materials (ASTM) practice for Description and Identification of Soils (Visual-Manual Procedure D 2488). The logs depict the soil and geologic conditions observed and the depth at which samples were obtained.

PROJECT NO. G2557-52-02

BORING B 1

ELEV. (MSL.) 400' DATE COMPLETED 11-06-2020

EQUIPMENT CME 75 - Auto hammer BY: L. RODRIGUEZ

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**5 INCH PORTLAND CEMENT CONCRETE OVER 7 INCHES BASE**			
	B1-1			SC/CL	**UNDOCUMENTED FILL (Qudf)** Medium dense/stiff, moist, reddish brown to dark brown, Clayey, fine to coarse SAND to Sandy CLAY			
2								
				SM	**VERY OLD PARALIC DEPOSITS (Qvop)** Dense, moist, reddish brown, Silty, fine- to medium-grained SANDSTONE			
4								
	B1-2					70	122.4	9.3
6								
8	B1-3					51	116.7	10.2
10	B1-4					75	120.6	11.8
12								
14								
	B1-5					61		
16								
18								
	B1-6				-Becomes finer-grained	76		
20					BORING TERMINATED AT 20 FEET No groundwater encountered			

Figure A-1,
Log of Boring B 1, Page 1 of 1

G2557-52-02.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2557-52-02

BORING B 2

ELEV. (MSL.) **402'** DATE COMPLETED **11-06-2020**

EQUIPMENT **CME 75 - Auto hammer** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**7 INCH PORTLAND CEMENT CONCRETE OVER 8 INCHES BASE**			
2				SC/CL	**UNDOCUMENTED FILL (Qudf)** Medium dense/stiff, moist to wet, reddish brown, Clayey, fine to coarse SAND to Sandy CLAY			
4				SM	**VERY OLD PARALIC DEPOSITS (Qvop)** Very dense, moist, reddish brown, Silty, fine-grained SANDSTONE			
	B2-1				-Disturbed sample due to rock	50/3"	102.9	8.2
6								
8	B2-2					81/9"	122.4	9.3
10	B2-3				-Becomes dry	79/11"		
12					-Drilling becomes very difficult			
14								
	B2-4					84/9"		

BORING TERMINATED AT 15.75 FEET
no groundwater encountered

Figure A-2,
Log of Boring B 2, Page 1 of 1

G2557-52-02.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

BORING B 3

ELEV. (MSL.) **401'** DATE COMPLETED **11-06-2020**

EQUIPMENT **CME 75 - Auto hammer** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0			**7 INCH PORTLAND CEMENT CONCRETE OVER 3 INCHES BASE**			
1		SM	**UNDOCUMENTED FILL (Qudf)** Medium dense, wet, reddish brown, Silty, fine to coarse SAND			
5	B3-1	SC	**VERY OLD PARALIC DEPOSITS (Qvop)** Medium dense, moist, Clayey, fine- to medium-grained SANDSTONE; weathered	38	116.8	14.6
10	B3-2		-Becomes light grayish brown, wet	46	108.6	17.7
15	B3-3	SM/SW	Medium dense, wet, reddish brown, Silty, fine- to medium-grained SANDSTONE to well-graded SANDSTONE	44	107.9	17.2
19	B3-4	ML	Very stiff, moist, yellowish to grayish brown, Sandy SILTSTONE	36		
20			BORING TERMINATED AT 20 FEET No groundwater encountered			

Figure A-3,
Log of Boring B 3, Page 1 of 1

G2557-52-02.GPJ

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

BORING B 4

ELEV. (MSL.) **403'** DATE COMPLETED **11-06-2020**

EQUIPMENT **CME 75 - Auto hammer** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**7 INCH PORTLAND CEMENT CONCRETE OVER 3 INCHES BASE**			
	B4-1			SC	**UNDOCUMENTED FILL (Qudf)** Medium dense, moist, dark reddish brown, Clayey, fine to coarse SAND			
2								
4					-Gray PVC pipe debris, likely abandoned-soil inside pipe			
	B4-2			SC	**VERY OLD PARALIC DEPOSITS (Qvop)** Very dense, moist, reddish brown to gray, Clayey, fine- to medium-grained SANDSTONE	84	119.6	12.7
6								
8					-Becomes reddish brown			
10	B4-3					82	124.2	10.0
	B4-4							
12					-Drilling becomes difficult			
14								
	B4-5			SM	Very dense, damp, light reddish brown, Silty, fine- to medium-grained SANDSTONE	78/11"		
16					BORING TERMINATED AT 16 FEET No groundwater encountered			

Figure A-4,
Log of Boring B 4, Page 1 of 1

G2557-52-02.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

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APPENDIX B

APPENDIX B

LABORATORY TESTING

We performed laboratory tests in accordance with generally accepted test methods of the American Society for Testing and Materials (ASTM) or other suggested procedures. Selected soil samples were tested for in-place dry density and moisture content, maximum density and optimum moisture content, direct shear strength, expansion index, water soluble sulfate, R-Value and unconfined compressive strength characteristics. The results of our current laboratory tests are presented herein. The in-place dry density and moisture content of the samples tested are presented on the boring logs in Appendix A.

SUMMARY OF LABORATORY MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT TEST RESULTS ASTM D 1557

Sample No.	Description	Maximum Dry Density (pcf)	Optimum Moisture Content (% dry wt.)
B1-1	Reddish brown, Clayey, fine to coarse SAND (Qudf/Qvop)	133.1	8.2

SUMMARY OF LABORATORY EXPANSION INDEX TEST RESULTS ASTM D 4829

Sample No.	Moisture Content (%)		Dry Density (pcf)	Expansion Index	2019 CBC Expansion Classification	ASTM Soil Expansion Classification
	Before Test	After Test				
B1-1	9.6	19.0	110.4	6	Non Expansive	Very Low
B4-4	9.1	17.3	113.9	21	Expansive	Low

SUMMARY OF LABORATORY WATER-SOLUBLE SULFATE TEST RESULTS CALIFORNIA TEST NO. 417

Sample No.	Depth (feet)	Geologic Unit	Water-Soluble Sulfate (%)	ACI 318 Sulfate Exposure
B1-1	1-5	Qudf/Qvop	0.015	S0
B4-4	10-15	Qvop	0.022	S0

SUMMARY OF LABORATORY RESISTANCE VALUE (R-VALUE) TEST RESULTS
ASTM D 2844

Sample No.	Depth (feet)	Description (Geologic Unit)	R-Value
B1-1	1-5	Reddish brown, Clayey, fine to coarse SAND (Qudf/Qvop)	6

SUMMARY OF LABORATORY UNCONFINED COMPRESSIVE STRENGTH TEST RESULTS
ASTM D 1558

Sample No.	Depth (feet)	Geologic Unit	Hand Penetrometer Reading/Unconfined Compression Strength (tsf) and Undrained Shear Strength (ksf)
B1-2	5	Qvop	4.5+
B1-3	7.5	Qvop	4.5+
B1-4	10	Qvop	4.5+
B2-1	5	Qvop	3.5
B2-2	7.5	Qvop	4.5+
B2-3	10	Qvop	4.5+
B3-2	10	Qvop	4.5
B4-2	5	Qvop	4.5+
B4-3	10	Qvop	4.5+

SAMPLE NO.:	**B1-1**	GEOLOGIC UNIT:	**Qudf / Qvop**
SAMPLE DEPTH (FT):	**0-5'**	NATURAL/REMOLDED:	**R**

INITIAL CONDITIONS

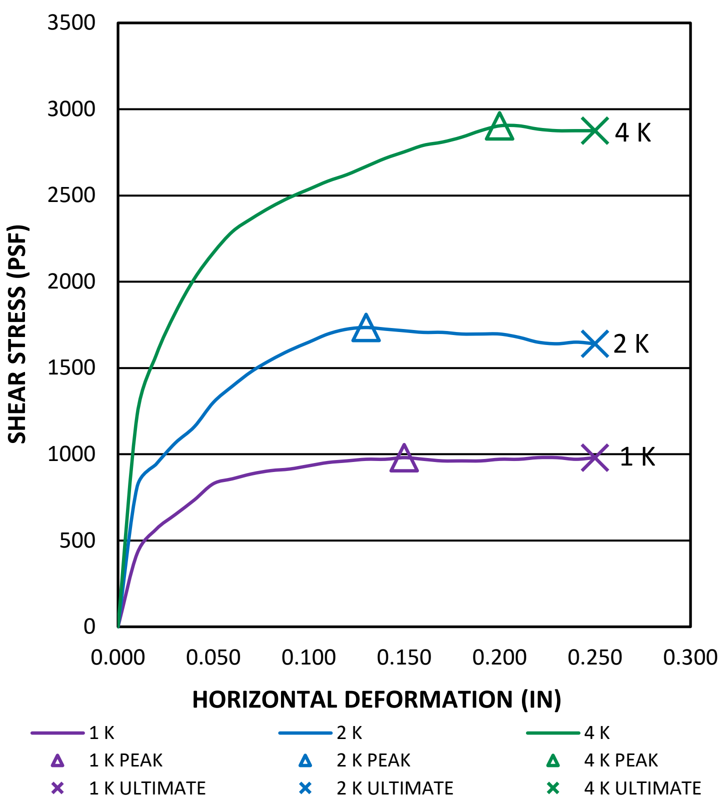
NORMAL STRESS TEST LOAD	1 K	2 K	4 K	AVERAGE
ACTUAL NORMAL STRESS (PSF):	890	2030	4300	--
WATER CONTENT (%):	8.9	7.7	7.1	7.9
DRY DENSITY (PCF):	119.3	120.8	120.6	120.2

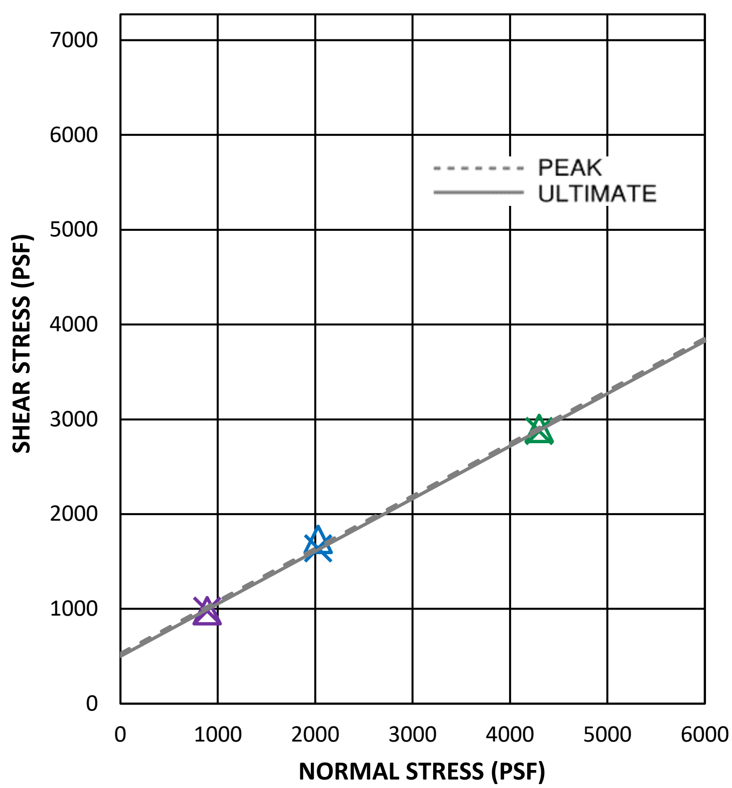
AFTER TEST CONDITIONS

NORMAL STRESS TEST LOAD	1 K	2 K	4 K	AVERAGE
WATER CONTENT (%):	14.2	13.2	13.5	13.7
PEAK SHEAR STRESS (PSF):	980	1735	2904	--
ULT.-E.O.T. SHEAR STRESS (PSF):	980	1640	2875	--

RESULTS

PEAK	COHESION, C (PSF)	530
	FRICTION ANGLE (DEGREES)	29
ULTIMATE	COHESION, C (PSF)	500
	FRICTION ANGLE (DEGREES)	29





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DIRECT SHEAR - ASTM D 3080

4555 EXECUTIVE DRIVE

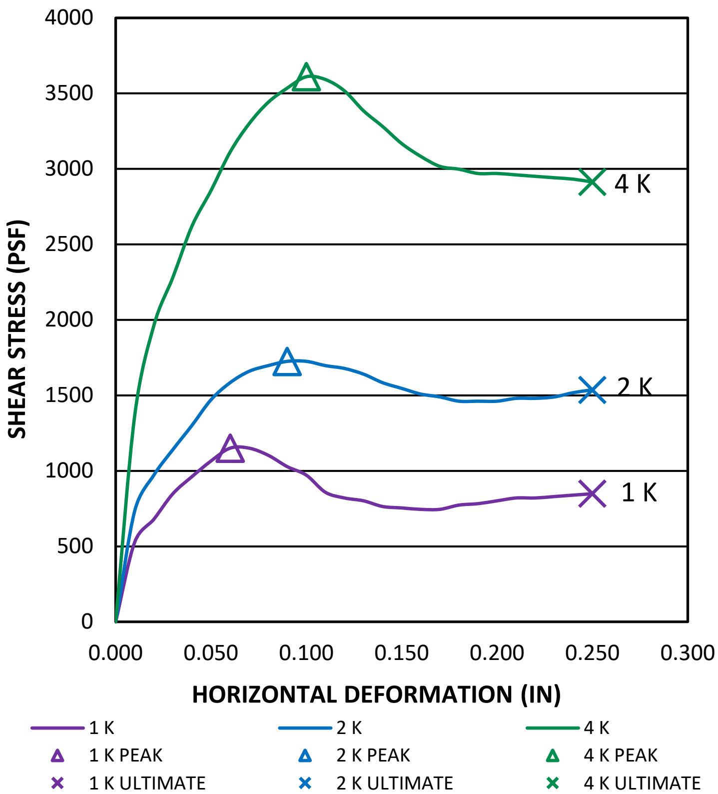
PROJECT NO.: G2557-52-02

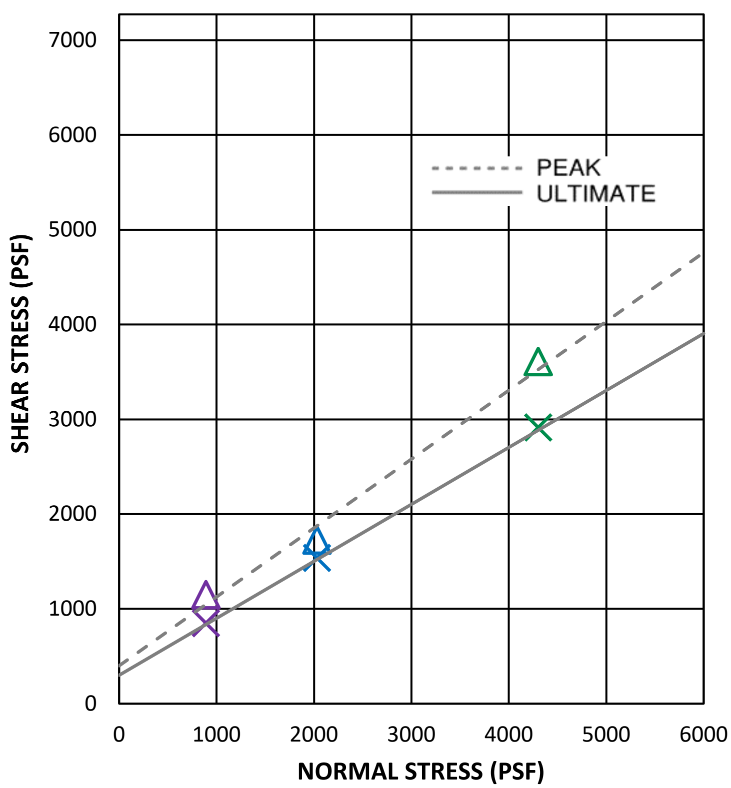
SAMPLE NO.:	B3-3	GEOLOGIC UNIT:	Qvop
SAMPLE DEPTH (FT):	15'	NATURAL/REMOLDED:	N

INITIAL CONDITIONS				
NORMAL STRESS TEST LOAD	1 K	2 K	4 K	AVERAGE
ACTUAL NORMAL STRESS (PSF):	890	2030	4300	--
WATER CONTENT (%):	15.9	15.0	15.7	15.5
DRY DENSITY (PCF):	110.4	105.3	108.2	107.9

AFTER TEST CONDITIONS				
NORMAL STRESS TEST LOAD	1 K	2 K	4 K	AVERAGE
WATER CONTENT (%):	17.2	17.5	16.9	17.2
PEAK SHEAR STRESS (PSF):	1150	1725	3611	--
ULT.-E.O.T. SHEAR STRESS (PSF):	848	1537	2913	--

RESULTS		
PEAK	COHESION, C (PSF)	400
	FRICTION ANGLE (DEGREES)	36
ULTIMATE	COHESION, C (PSF)	300
	FRICTION ANGLE (DEGREES)	31





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DIRECT SHEAR - ASTM D 3080

4555 EXECUTIVE DR

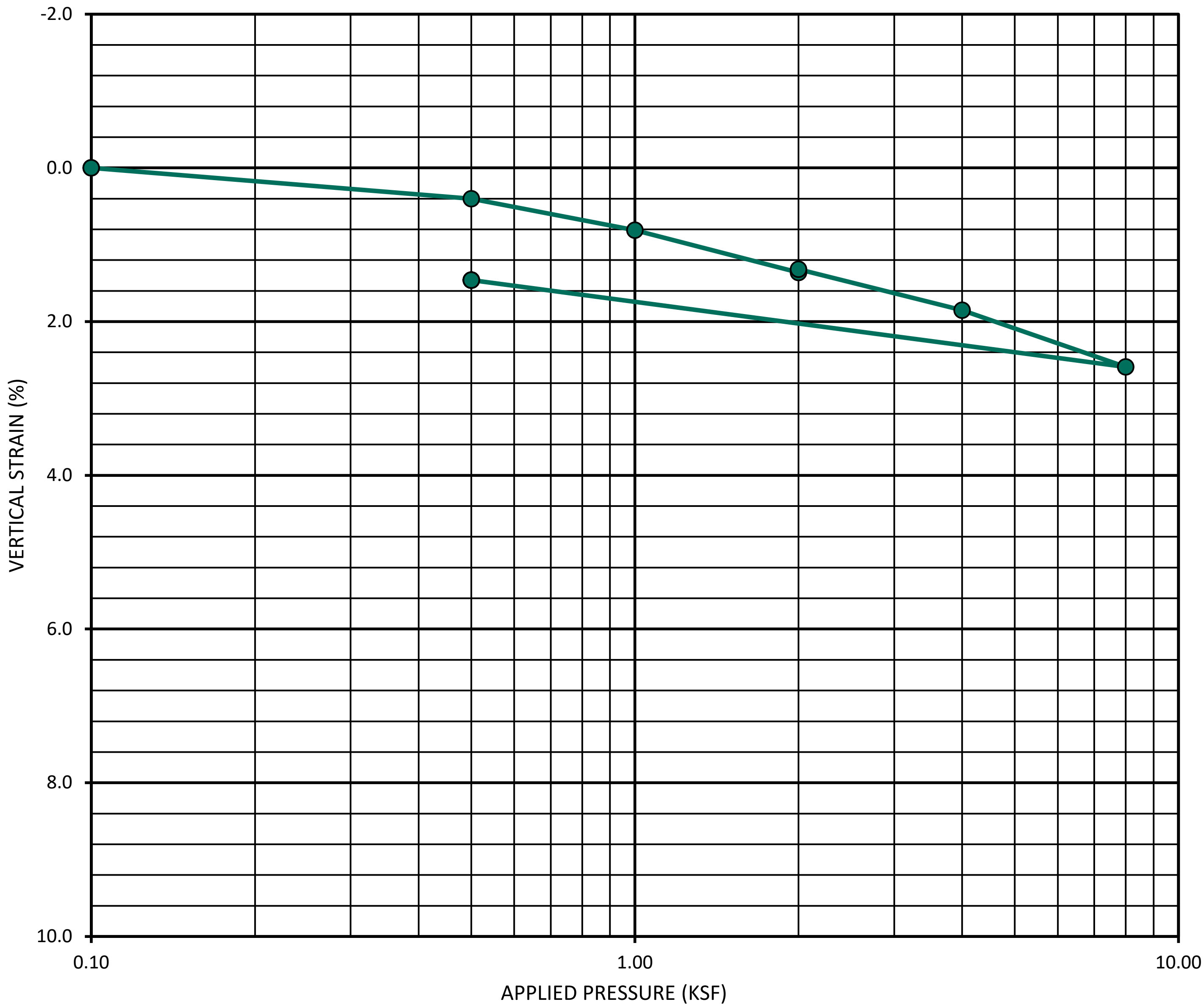
PROJECT NO.: G2557-52-02

SAMPLE NO.: **B3-1**

SAMPLE DEPTH (FT): **5'**

GEOLOGIC UNIT: **Qvop**

TEST INFORMATION	
INITIAL DRY DENSITY (PCF):	116.8
INITIAL WATER CONTENT (%):	14.6%
SAMPLE SATURATED AT (KSF):	2.0
INITIAL SATURATION (%):	92.4%



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CONSOLIDATION CURVE - ASTM D 2435

4555 EXECUTIVE DRIVE

PROJECT NO.: G2557-52-02

APPENDIX C

APPENDIX C

RECOMMENDED GRADING SPECIFICATIONS

FOR

ARE — SCRIPPS HQ PROJECT
4555 EXECUTIVE DRIVE
SAN DIEGO, CALIFORNIA

PROJECT NO. G2557-52-02

RECOMMENDED GRADING SPECIFICATIONS

1. GENERAL

1.1 These Recommended Grading Specifications shall be used in conjunction with the Geotechnical Report for the project prepared by Geocon. The recommendations contained in the text of the Geotechnical Report are a part of the earthwork and grading specifications and shall supersede the provisions contained hereinafter in the case of conflict.

1.2 Prior to the commencement of grading, a geotechnical consultant (Consultant) shall be employed for the purpose of observing earthwork procedures and testing the fills for substantial conformance with the recommendations of the Geotechnical Report and these specifications. The Consultant should provide adequate testing and observation services so that they may assess whether, in their opinion, the work was performed in substantial conformance with these specifications. It shall be the responsibility of the Contractor to assist the Consultant and keep them apprised of work schedules and changes so that personnel may be scheduled accordingly.

1.3 It shall be the sole responsibility of the Contractor to provide adequate equipment and methods to accomplish the work in accordance with applicable grading codes or agency ordinances, these specifications and the approved grading plans. If, in the opinion of the Consultant, unsatisfactory conditions such as questionable soil materials, poor moisture condition, inadequate compaction, and/or adverse weather result in a quality of work not in conformance with these specifications, the Consultant will be empowered to reject the work and recommend to the Owner that grading be stopped until the unacceptable conditions are corrected.

2. DEFINITIONS

2.1 **Owner** shall refer to the owner of the property or the entity on whose behalf the grading work is being performed and who has contracted with the Contractor to have grading performed.

2.2 **Contractor** shall refer to the Contractor performing the site grading work.

2.3 **Civil Engineer** or **Engineer of Work** shall refer to the California licensed Civil Engineer or consulting firm responsible for preparation of the grading plans, surveying and verifying as-graded topography.

2.4 **Consultant** shall refer to the soil engineering and engineering geology consulting firm retained to provide geotechnical services for the project.

2.5 **Soil Engineer** shall refer to a California licensed Civil Engineer retained by the Owner, who is experienced in the practice of geotechnical engineering. The Soil Engineer shall be responsible for having qualified representatives on-site to observe and test the Contractor's work for conformance with these specifications.

2.6 **Engineering Geologist** shall refer to a California licensed Engineering Geologist retained by the Owner to provide geologic observations and recommendations during the site grading.

2.7 **Geotechnical Report** shall refer to a soil report (including all addenda) which may include a geologic reconnaissance or geologic investigation that was prepared specifically for the development of the project for which these Recommended Grading Specifications are intended to apply.

3. MATERIALS

3.1 Materials for compacted fill shall consist of any soil excavated from the cut areas or imported to the site that, in the opinion of the Consultant, is suitable for use in construction of fills. In general, fill materials can be classified as *soil* fills, *soil-rock* fills or *rock* fills, as defined below.

3.1.1 **Soil fills** are defined as fills containing no rocks or hard lumps greater than 12 inches in maximum dimension and containing at least 40 percent by weight of material smaller than ¾ inch in size.

3.1.2 **Soil-rock fills** are defined as fills containing no rocks or hard lumps larger than 4 feet in maximum dimension and containing a sufficient matrix of soil fill to allow for proper compaction of soil fill around the rock fragments or hard lumps as specified in Paragraph 6.2. **Oversize rock** is defined as material greater than 12 inches.

3.1.3 **Rock fills** are defined as fills containing no rocks or hard lumps larger than 3 feet in maximum dimension and containing little or no fines. Fines are defined as material smaller than ¾ inch in maximum dimension. The quantity of fines shall be less than approximately 20 percent of the rock fill quantity.

3.2 Material of a perishable, spongy, or otherwise unsuitable nature as determined by the Consultant shall not be used in fills.

3.3 Materials used for fill, either imported or on-site, shall not contain hazardous materials as defined by the California Code of Regulations, Title 22, Division 4, Chapter 30, Articles 9 and 10; 40CFR; and any other applicable local, state or federal laws. The Consultant shall not be responsible for the identification or analysis of the potential presence of hazardous materials. However, if observations, odors or soil discoloration cause Consultant to suspect the presence of hazardous materials, the Consultant may request from the Owner the termination of grading operations within the affected area. Prior to resuming grading operations, the Owner shall provide a written report to the Consultant indicating that the suspected materials are not hazardous as defined by applicable laws and regulations.

3.4 The outer 15 feet of *soil-rock* fill slopes, measured horizontally, should be composed of properly compacted *soil* fill materials approved by the Consultant. *Rock* fill may extend to the slope face, provided that the slope is not steeper than 2:1 (horizontal:vertical) and a soil layer no thicker than 12 inches is track-walked onto the face for landscaping purposes. This procedure may be utilized provided it is acceptable to the governing agency, Owner and Consultant.

3.5 Samples of soil materials to be used for fill should be tested in the laboratory by the Consultant to determine the maximum density, optimum moisture content, and, where appropriate, shear strength, expansion, and gradation characteristics of the soil.

3.6 During grading, soil or groundwater conditions other than those identified in the Geotechnical Report may be encountered by the Contractor. The Consultant shall be notified immediately to evaluate the significance of the unanticipated condition.

4. CLEARING AND PREPARING AREAS TO BE FILLED

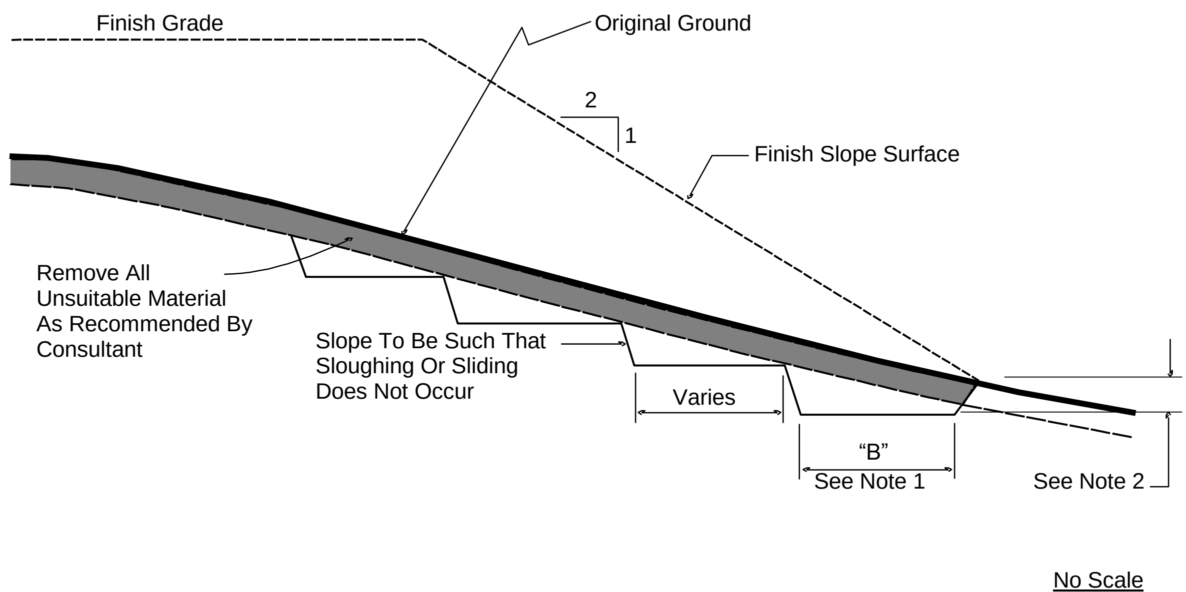
4.1 Areas to be excavated and filled shall be cleared and grubbed. Clearing shall consist of complete removal above the ground surface of trees, stumps, brush, vegetation, man-made structures, and similar debris. Grubbing shall consist of removal of stumps, roots, buried logs and other unsuitable material and shall be performed in areas to be graded. Roots and other projections exceeding 1½ inches in diameter shall be removed to a depth of 3 feet below the surface of the ground. Borrow areas shall be grubbed to the extent necessary to provide suitable fill materials.

4.2 Asphalt pavement material removed during clearing operations should be properly disposed at an approved off-site facility or in an acceptable area of the project evaluated by Geocon and the property owner. Concrete fragments that are free of reinforcing steel may be placed in fills, provided they are placed in accordance with Section 6.2 or 6.3 of this document.

4.3 After clearing and grubbing of organic matter and other unsuitable material, loose or porous soils shall be removed to the depth recommended in the Geotechnical Report. The depth of removal and compaction should be observed and approved by a representative of the Consultant. The exposed surface shall then be plowed or scarified to a minimum depth of 6 inches and until the surface is free from uneven features that would tend to prevent uniform compaction by the equipment to be used.

4.4 Where the slope ratio of the original ground is steeper than 5:1 (horizontal:vertical), or where recommended by the Consultant, the original ground should be benched in accordance with the following illustration.

TYPICAL BENCHING DETAIL



DETAIL NOTES: (1) Key width "B" should be a minimum of 10 feet, or sufficiently wide to permit complete coverage with the compaction equipment used. The base of the key should be graded horizontal, or inclined slightly into the natural slope.

(2) The outside of the key should be below the topsoil or unsuitable surficial material and at least 2 feet into dense formational material. Where hard rock is exposed in the bottom of the key, the depth and configuration of the key may be modified as approved by the Consultant.

4.5 After areas to receive fill have been cleared and scarified, the surface should be moisture conditioned to achieve the proper moisture content, and compacted as recommended in Section 6 of these specifications.

5. COMPACTION EQUIPMENT

5.1 Compaction of *soil* or *soil-rock* fill shall be accomplished by sheepsfoot or segmented-steel wheeled rollers, vibratory rollers, multiple-wheel pneumatic-tired rollers, or other types of acceptable compaction equipment. Equipment shall be of such a design that it will be capable of compacting the *soil* or *soil-rock* fill to the specified relative compaction at the specified moisture content.

5.2 Compaction of *rock* fills shall be performed in accordance with Section 6.3.

6. PLACING, SPREADING AND COMPACTION OF FILL MATERIAL

6.1 *Soil* fill, as defined in Paragraph 3.1.1, shall be placed by the Contractor in accordance with the following recommendations:

6.1.1 *Soil* fill shall be placed by the Contractor in layers that, when compacted, should generally not exceed 8 inches. Each layer shall be spread evenly and shall be thoroughly mixed during spreading to obtain uniformity of material and moisture in each layer. The entire fill shall be constructed as a unit in nearly level lifts. Rock materials greater than 12 inches in maximum dimension shall be placed in accordance with Section 6.2 or 6.3 of these specifications.

6.1.2 In general, the *soil* fill shall be compacted at a moisture content at or above the optimum moisture content as determined by ASTM D 1557.

6.1.3 When the moisture content of *soil* fill is below that specified by the Consultant, water shall be added by the Contractor until the moisture content is in the range specified.

6.1.4 When the moisture content of the *soil* fill is above the range specified by the Consultant or too wet to achieve proper compaction, the *soil* fill shall be aerated by the Contractor by blading/mixing, or other satisfactory methods until the moisture content is within the range specified.

6.1.5 After each layer has been placed, mixed, and spread evenly, it shall be thoroughly compacted by the Contractor to a relative compaction of at least 90 percent. Relative compaction is defined as the ratio (expressed in percent) of the in-place dry density of the compacted fill to the maximum laboratory dry density as determined in accordance with ASTM D 1557. Compaction shall be continuous over the entire area, and compaction equipment shall make sufficient passes so that the specified minimum relative compaction has been achieved throughout the entire fill.

6.1.6 Where practical, soils having an Expansion Index greater than 50 should be placed at least 3 feet below finish pad grade and should be compacted at a moisture content generally 2 to 4 percent greater than the optimum moisture content for the material.

6.1.7 Properly compacted *soil* fill shall extend to the design surface of fill slopes. To achieve proper compaction, it is recommended that fill slopes be over-built by at least 3 feet and then cut to the design grade. This procedure is considered preferable to track-walking of slopes, as described in the following paragraph.

6.1.8 As an alternative to over-building of slopes, slope faces may be back-rolled with a heavy-duty loaded sheepsfoot or vibratory roller at maximum 4-foot fill height intervals. Upon completion, slopes should then be track-walked with a D-8 dozer or similar equipment, such that a dozer track covers all slope surfaces at least twice.

6.2 *Soil-rock* fill, as defined in Paragraph 3.1.2, shall be placed by the Contractor in accordance with the following recommendations:

6.2.1 Rocks larger than 12 inches but less than 4 feet in maximum dimension may be incorporated into the compacted *soil* fill, but shall be limited to the area measured 15 feet minimum horizontally from the slope face and 5 feet below finish grade or 3 feet below the deepest utility, whichever is deeper.

6.2.2 Rocks or rock fragments up to 4 feet in maximum dimension may either be individually placed or placed in windrows. Under certain conditions, rocks or rock fragments up to 10 feet in maximum dimension may be placed using similar methods. The acceptability of placing rock materials greater than 4 feet in maximum dimension shall be evaluated during grading as specific cases arise and shall be approved by the Consultant prior to placement.

6.2.3 For individual placement, sufficient space shall be provided between rocks to allow for passage of compaction equipment.

6.2.4 For windrow placement, the rocks should be placed in trenches excavated in properly compacted *soil* fill. Trenches should be approximately 5 feet wide and 4 feet deep in maximum dimension. The voids around and beneath rocks should be filled with approved granular soil having a Sand Equivalent of 30 or greater and should be compacted by flooding. Windrows may also be placed utilizing an "open-face" method in lieu of the trench procedure, however, this method should first be approved by the Consultant.

6.2.5 Windrows should generally be parallel to each other and may be placed either parallel to or perpendicular to the face of the slope depending on the site geometry. The minimum horizontal spacing for windrows shall be 12 feet center-to-center with a 5-foot stagger or offset from lower courses to next overlying course. The minimum vertical spacing between windrow courses shall be 2 feet from the top of a lower windrow to the bottom of the next higher windrow.

6.2.6 Rock placement, fill placement and flooding of approved granular soil in the windrows should be continuously observed by the Consultant.

6.3 *Rock* fills, as defined in Section 3.1.3, shall be placed by the Contractor in accordance with the following recommendations:

6.3.1 The base of the *rock* fill shall be placed on a sloping surface (minimum slope of 2 percent). The surface shall slope toward suitable subdrainage outlet facilities. The *rock* fills shall be provided with subdrains during construction so that a hydrostatic pressure buildup does not develop. The subdrains shall be permanently connected to controlled drainage facilities to control post-construction infiltration of water.

6.3.2 *Rock* fills shall be placed in lifts not exceeding 3 feet. Placement shall be by rock trucks traversing previously placed lifts and dumping at the edge of the currently placed lift. Spreading of the *rock* fill shall be by dozer to facilitate *seating* of the rock. The *rock* fill shall be watered heavily during placement. Watering shall consist of water trucks traversing in front of the current rock lift face and spraying water continuously during rock placement. Compaction equipment with compactive energy comparable to or greater than that of a 20-ton steel vibratory roller or other compaction equipment providing suitable energy to achieve the required compaction or deflection as recommended in Paragraph 6.3.3 shall be utilized. The number of passes to be made should be determined as described in Paragraph 6.3.3. Once a *rock* fill lift has been covered with *soil* fill, no additional *rock* fill lifts will be permitted over the *soil* fill.

6.3.3 Plate bearing tests, in accordance with ASTM D 1196, may be performed in both the compacted *soil* fill and in the *rock* fill to aid in determining the required minimum number of passes of the compaction equipment. If performed, a minimum of three plate bearing tests should be performed in the properly compacted *soil* fill (minimum relative compaction of 90 percent). Plate bearing tests shall then be performed on areas of *rock* fill having two passes, four passes and six passes of the compaction equipment, respectively. The number of passes required for the *rock* fill shall be determined by comparing the results of the plate bearing tests for the *soil* fill and the *rock* fill and by evaluating the deflection variation with number of passes. The required number of passes of the compaction equipment will be performed as necessary until the plate bearing deflections are equal to or less than that determined for the properly compacted *soil* fill. In no case will the required number of passes be less than two.

6.3.4 A representative of the Consultant should be present during *rock* fill operations to observe that the minimum number of "passes" have been obtained, that water is being properly applied and that specified procedures are being followed. The actual number of plate bearing tests will be determined by the Consultant during grading.

6.3.5 Test pits shall be excavated by the Contractor so that the Consultant can state that, in their opinion, sufficient water is present and that voids between large rocks are properly filled with smaller rock material. In-place density testing will not be required in the *rock* fills.

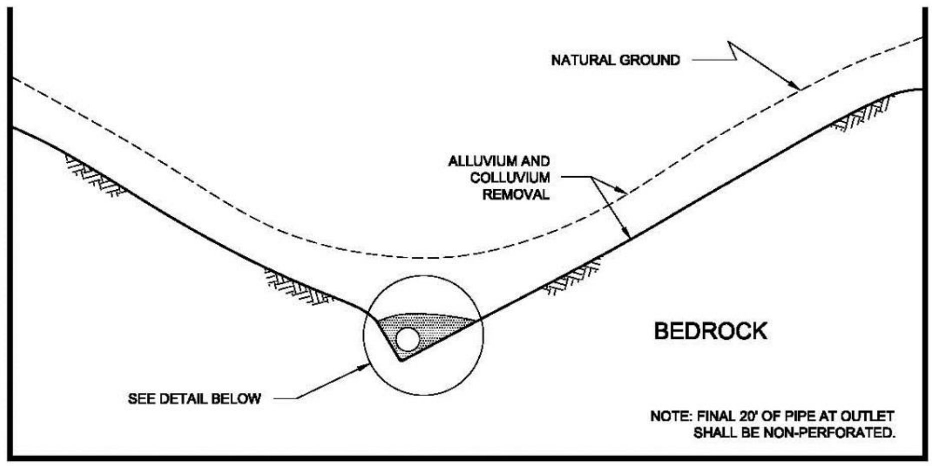
6.3.6 To reduce the potential for "piping" of fines into the *rock* fill from overlying *soil* fill material, a 2-foot layer of graded filter material shall be placed above the uppermost lift of *rock* fill. The need to place graded filter material below the *rock* should be determined by the Consultant prior to commencing grading. The gradation of the graded filter material will be determined at the time the *rock* fill is being excavated. Materials typical of the *rock* fill should be submitted to the Consultant in a timely manner, to allow design of the graded filter prior to the commencement of *rock* fill placement.

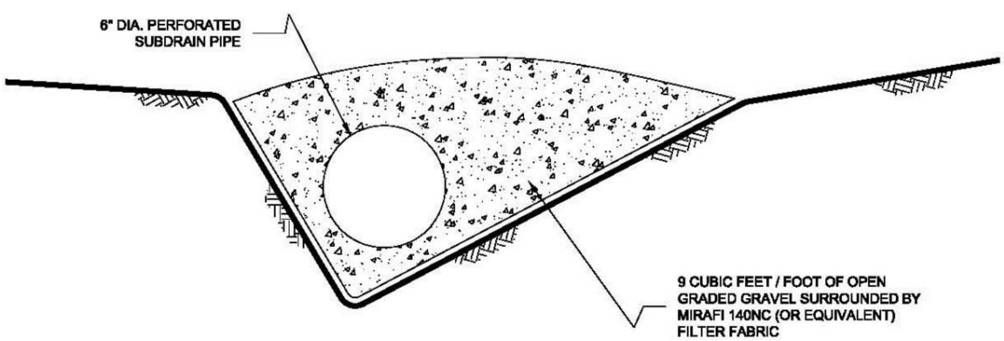
6.3.7 *Rock* fill placement should be continuously observed during placement by the Consultant.

7. SUBDRAINS

7.1 The geologic units on the site may have permeability characteristics and/or fracture systems that could be susceptible under certain conditions to seepage. The use of canyon subdrains may be necessary to mitigate the potential for adverse impacts associated with seepage conditions. Canyon subdrains with lengths in excess of 500 feet or extensions of existing offsite subdrains should use 8-inch-diameter pipes. Canyon subdrains less than 500 feet in length should use 6-inch-diameter pipes.

TYPICAL CANYON DRAIN DETAIL





NOTES:

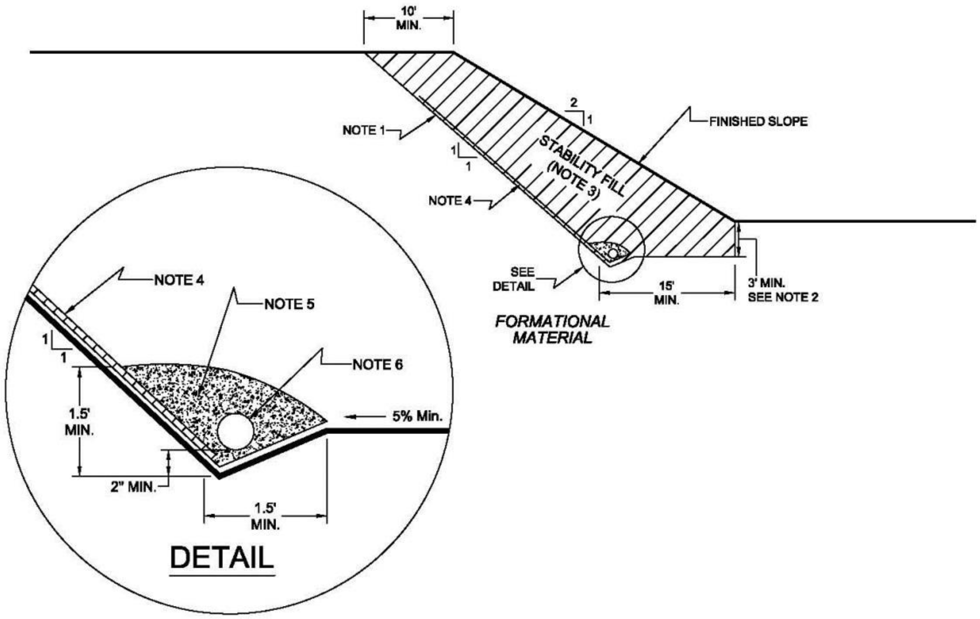
1......6-INCH DIAMETER, SCHEDULE 80 PVC PERFORATED PIPE FOR FILLS IN EXCESS OF 100-FEET IN DEPTH OR A PIPE LENGTH OF LONGER THAN 500 FEET.

2......6-INCH DIAMETER, SCHEDULE 40 PVC PERFORATED PIPE FOR FILLS LESS THAN 100-FEET IN DEPTH OR A PIPE LENGTH SHORTER THAN 500 FEET.

NO SCALE

7.2 Slope drains within stability fill keyways should use 4-inch-diameter (or lager) pipes.

TYPICAL STABILITY FILL DETAIL



NOTES:

1.....EXCAVATE BACKCUT AT 1:1 INCLINATION (UNLESS OTHERWISE NOTED).

2.....BASE OF STABILITY FILL TO BE 3 FEET INTO FORMATIONAL MATERIAL, SLOPING A MINIMUM 5% INTO SLOPE.

3.....STABILITY FILL TO BE COMPOSED OF PROPERLY COMPACTED GRANULAR SOIL.

4.....CHIMNEY DRAINS TO BE APPROVED PREFABRICATED CHIMNEY DRAIN PANELS (MIRADRAIN G200N OR EQUIVALENT) SPACED APPROXIMATELY 20 FEET CENTER TO CENTER AND 4 FEET WIDE. CLOSER SPACING MAY BE REQUIRED IF SEEPAGE IS ENCOUNTERED.

5.....FILTER MATERIAL TO BE 3/4-INCH, OPEN-GRADED CRUSHED ROCK ENCLOSED IN APPROVED FILTER FABRIC (MIRAFI 140NC).

6.....COLLECTOR PIPE TO BE 4-INCH MINIMUM DIAMETER, PERFORATED, THICK-WALLED PVC SCHEDULE 40 OR EQUIVALENT, AND SLOPED TO DRAIN AT 1 PERCENT MINIMUM TO APPROVED OUTLET.

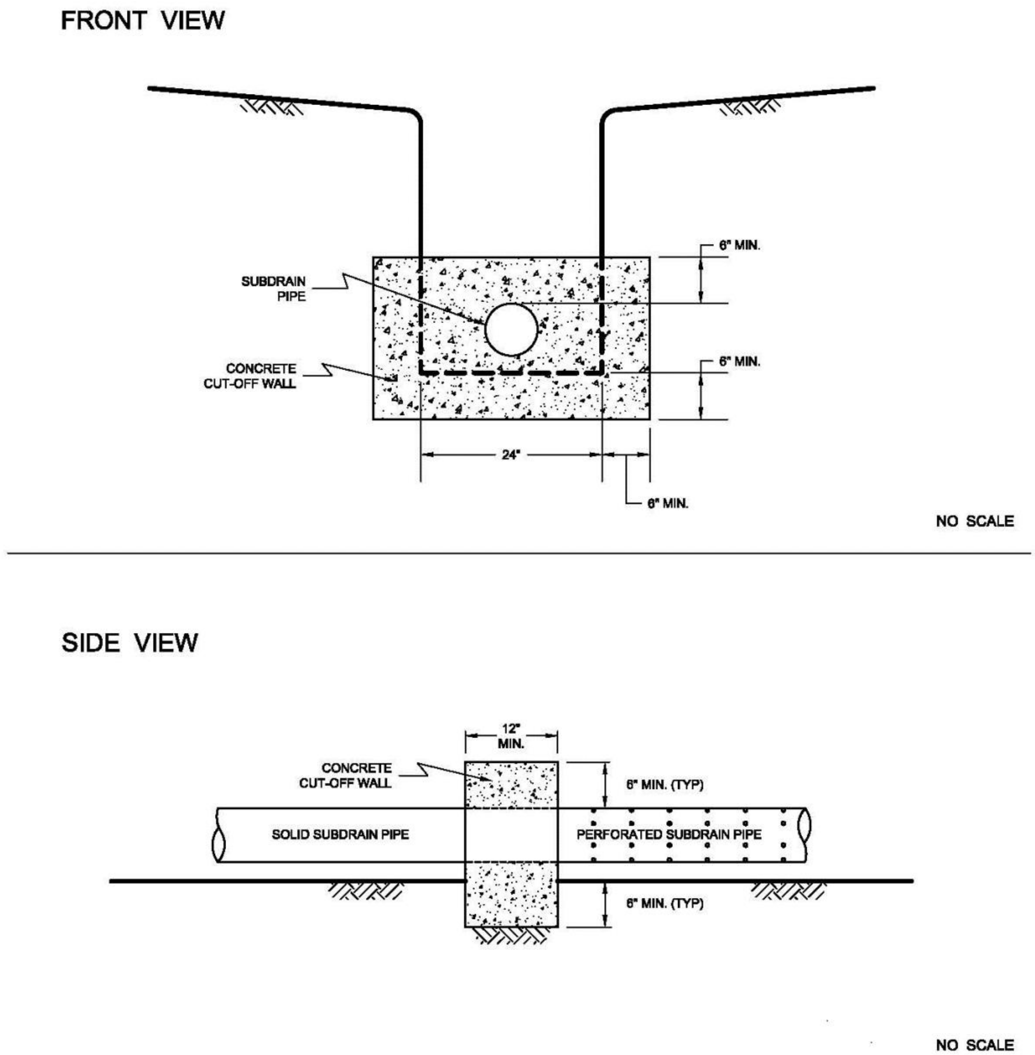
NO SCALE

7.3 The actual subdrain locations will be evaluated in the field during the remedial grading operations. Additional drains may be necessary depending on the conditions observed and the requirements of the local regulatory agencies. Appropriate subdrain outlets should be evaluated prior to finalizing 40-scale grading plans.

7.4 *Rock* fill or *soil-rock* fill areas may require subdrains along their down-slope perimeters to mitigate the potential for buildup of water from construction or landscape irrigation. The subdrains should be at least 6-inch-diameter pipes encapsulated in gravel and filter fabric. *Rock* fill drains should be constructed using the same requirements as canyon subdrains.

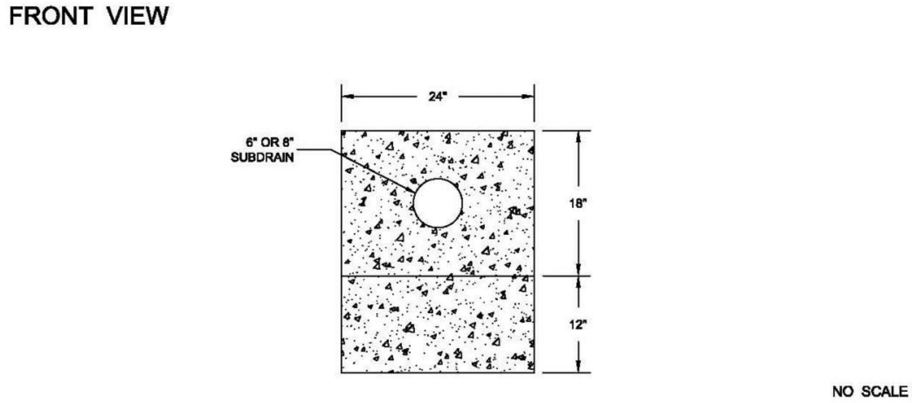
7.5 Prior to outletting, the final 20-foot segment of a subdrain that will not be extended during future development should consist of non-perforated drainpipe. At the non-perforated/ perforated interface, a seepage cutoff wall should be constructed on the downslope side of the pipe.

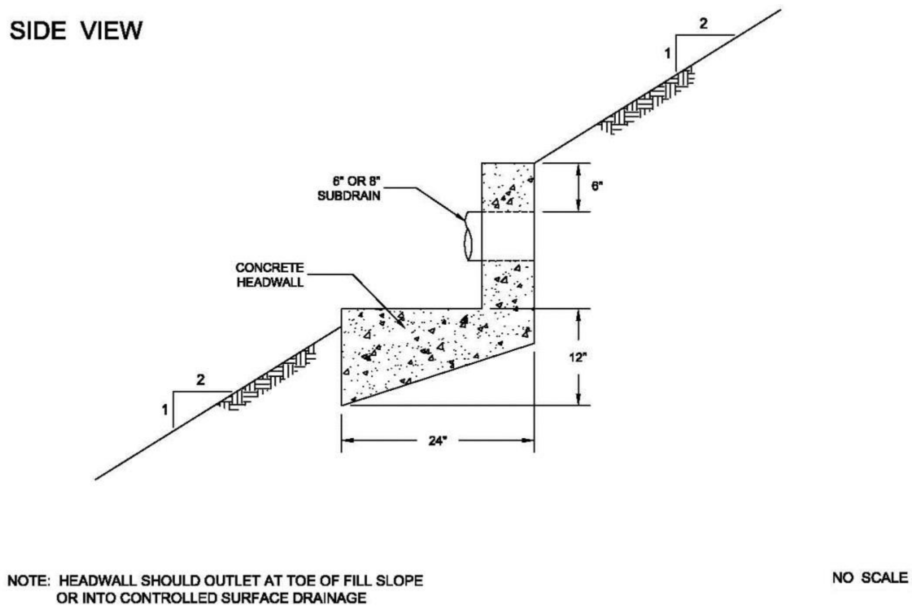
TYPICAL CUT OFF WALL DETAIL



7.6 Subdrains that discharge into a natural drainage course or open space area should be provided with a permanent headwall structure.

TYPICAL HEADWALL DETAIL





7.7 The final grading plans should show the location of the proposed subdrains. After completion of remedial excavations and subdrain installation, the project civil engineer should survey the drain locations and prepare an "as-built" map showing the drain locations. The final outlet and connection locations should be determined during grading operations. Subdrains that will be extended on adjacent projects after grading can be placed on formational material and a vertical riser should be placed at the end of the subdrain. The grading contractor should consider videoing the subdrains shortly after burial to check proper installation and functionality. The contractor is responsible for the performance of the drains.

8. OBSERVATION AND TESTING

8.1 The Consultant shall be the Owner's representative to observe and perform tests during clearing, grubbing, filling, and compaction operations. In general, no more than 2 feet in vertical elevation of *soil* or *soil-rock* fill should be placed without at least one field density test being performed within that interval. In addition, a minimum of one field density test should be performed for every 2,000 cubic yards of *soil* or *soil-rock* fill placed and compacted.

8.2 The Consultant should perform a sufficient distribution of field density tests of the compacted *soil* or *soil-rock* fill to provide a basis for expressing an opinion whether the fill material is compacted as specified. Density tests shall be performed in the compacted materials below any disturbed surface. When these tests indicate that the density of any layer of fill or portion thereof is below that specified, the particular layer or areas represented by the test shall be reworked until the specified density has been achieved.

8.3 During placement of *rock* fill, the Consultant should observe that the minimum number of passes have been obtained per the criteria discussed in Section 6.3.3. The Consultant should request the excavation of observation pits and may perform plate bearing tests on the placed *rock* fills. The observation pits will be excavated to provide a basis for expressing an opinion as to whether the *rock* fill is properly seated and sufficient moisture has been applied to the material. When observations indicate that a layer of *rock* fill or any portion thereof is below that specified, the affected layer or area shall be reworked until the *rock* fill has been adequately seated and sufficient moisture applied.

8.4 A settlement monitoring program designed by the Consultant may be conducted in areas of *rock* fill placement. The specific design of the monitoring program shall be as recommended in the Conclusions and Recommendations section of the project Geotechnical Report or in the final report of testing and observation services performed during grading.

8.5 We should observe the placement of subdrains, to check that the drainage devices have been placed and constructed in substantial conformance with project specifications.

8.6 Testing procedures shall conform to the following Standards as appropriate:

8.6.1 Soil and Soil-Rock Fills:

8.6.1.1 Field Density Test, ASTM D 1556, *Density of Soil In-Place By the Sand-Cone Method.*

8.6.1.2 Field Density Test, Nuclear Method, ASTM D 6938, *Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth).*

8.6.1.3 Laboratory Compaction Test, ASTM D 1557, *Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-Pound Hammer and 18-Inch Drop.*

8.6.1.4. Expansion Index Test, ASTM D 4829, *Expansion Index Test*.

9. PROTECTION OF WORK

9.1 During construction, the Contractor shall properly grade all excavated surfaces to provide positive drainage and prevent ponding of water. Drainage of surface water shall be controlled to avoid damage to adjoining properties or to finished work on the site. The Contractor shall take remedial measures to prevent erosion of freshly graded areas until such time as permanent drainage and erosion control features have been installed. Areas subjected to erosion or sedimentation shall be properly prepared in accordance with the Specifications prior to placing additional fill or structures.

9.2 After completion of grading as observed and tested by the Consultant, no further excavation or filling shall be conducted except in conjunction with the services of the Consultant.

10. CERTIFICATIONS AND FINAL REPORTS

10.1 Upon completion of the work, Contractor shall furnish Owner a certification by the Civil Engineer stating that the lots and/or building pads are graded to within 0.1 foot vertically of elevations shown on the grading plan and that all tops and toes of slopes are within 0.5 foot horizontally of the positions shown on the grading plans. After installation of a section of subdrain, the project Civil Engineer should survey its location and prepare an *as-built* plan of the subdrain location. The project Civil Engineer should verify the proper outlet for the subdrains and the Contractor should ensure that the drain system is free of obstructions.

10.2 The Owner is responsible for furnishing a final as-graded soil and geologic report satisfactory to the appropriate governing or accepting agencies. The as-graded report should be prepared and signed by a California licensed Civil Engineer experienced in geotechnical engineering and by a California Certified Engineering Geologist, indicating that the geotechnical aspects of the grading were performed in substantial conformance with the Specifications or approved changes to the Specifications.

LIST OF REFERENCES

1. *2019 California Building Code, California Code of Regulations, Title 24, Part 2, Based on the 2018 International Building Code*, prepared by California Building Standards Commission, dated July 2019.

2. American Concrete Institute, *ACI 318-11, Building Code Requirements for Structural Concrete and Commentary*, dated August, 2011.

3. American Concrete Institute, *ACI 330-08, Guide for the Design and Construction of Concrete Parking Lots,* dated June, 2008.

4. American Society of Civil Engineers (ASCE), *ASCE 7-16, Minimum Design Loads and Associated Criteria for Buildings and Other Structures*, 2017.

5. California Department of Conservation, Division of Mines and Geology, *Probabilistic Seismic Hazard Assessment for the State of California,* Open File Report 96-08, 1996.

6. *City of San Diego Seismic Safety Study, Geologic Hazards and Faults,* 2008 edition, Map Sheet 34.

7. Historical Aerial Photos. historical aerials

8. Jennings, C. W., 1994, California Division of Mines and Geology, *Fault Activity Map of California and Adjacent Areas*, California Geologic Data Map Series Map No. 6.

9. Kennedy, M. P., and S. S. Tan, 2008, *Geologic Map of the San Diego 30'x60' Quadrangle, California*, USGS Regional Map Series Map No. 3, Scale 1:100,000.

10. SEAOC web application, *OSHPD Seismic Design Maps*, seismic maps.

11. Special Publication 117A, *Guidelines For Evaluating and Mitigating Seismic Hazards in California 2008*, California Geological Survey, Revised and Re-adopted September 11, 2008.

12. Unpublished reports, aerial photographs, and maps on file with Geocon Incorporated.

13. USGS computer program, Seismic Hazard Curves and Uniform Hazard Response Spectra, *usgs geo hazard design maps.*