County of San Diego
PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

OCEAN BREEZE RANCH
TRACT NO. 5615

5820 West Lilac Road
Bonsall, CA 92003

ASSESSOR'S PARCEL NUMBER(S):
127-191-20-00, 127-230-59-00, 127-271-02-00, 125-131-49-00, 124-150-28, 126-060-78-00, 124-150-34-00, 124-150-35-00, 125-131-48-00, 125-131-54-00, 127-271-01-00 AND 125080-21-00

ENGINEER OF WORK:

Prepared by: L. Pizarro, C. Pack, P.E.
Under the supervision of

Debby Sue Reece, RCE 56148
Registration Expires 12/31/20

PREPARED FOR:

Ocean Breeze Farms, LLC
1550 S. Coast Highway, Suite 201
Laguna Beach, CA 92651
949.497.0200

PDP SWQMP PREPARED BY:

Project Design Consultants
701 B St. Suite 800
San Diego, CA 92101
619.235.6471

DATE OF SWQMP:
July 31, 2019

Job No. 4192.00

PLANS PREPARED BY:
Project Design Consultants
701 B St. Suite 800
San Diego, CA 92101
619.235.6471

SWQMP APPROVED BY:

APPROVAL DATE:

Table of Contents

Attachments

Acronyms

ACP	Alternative Compliance Project
APN	Assessor's Parcel Number
BMP	Best Management Practice
BMP DM	Best Management Practice Design Manual
HMP	Hydromodification Management Plan
HSG	Hydrologic Soil Group
MS4	Municipal Separate Storm Sewer System
N/A	Not Applicable
NRCS	Natural Resources Conservation Service
PDCI	Private Development Construction Inspection Section
PDP	Priority Development Project
PDS	Planning and Development Services
PE	Professional Engineer
RPO	Resource Protection Ordinance
SC	Source Control
SD	Site Design
SDRWQCB	San Diego Regional Water Quality Control Board
SIC	Standard Industrial Classification
SWQMP	Storm Water Quality Management Plan
WMAA	Watershed Management Area Analysis
WPO	Watershed Protection Ordinance
WQIP	Water Quality Improvement Plan

PDP SWQMP Preparer's Certification Page

Project Name: Ocean Breeze Ranch
Permit Application Number: Tract No. 5615

PREPARER'S CERTIFICATION

I hereby declare that I am the Engineer in Responsible Charge of design of storm water best management practices (BMPs) for this project, and that I have exercised responsible charge over the design of the BMPs as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with the PDP requirements of the County of San Diego BMP Design Manual, which is a design manual for compliance with local County of San Diego Watershed Protection Ordinance (Sections 67.801 et seq.) and regional MS4 Permit (California Regional Water Quality Control Board San Diego Region Order No. R9-2013-0001 as amended by R9-2015-0001 and R9-2015-0100) requirements for storm water management.

I have read and understand that the County of San Diego has adopted minimum requirements for managing urban runoff, including storm water, from land development activities, as described in the BMP Design Manual. 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 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 County staff 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, PE Number & Expiration Date

Debby Reece
Print Name

Project Design Consultants
Company

_____
Date

Engineer's Seal:

Template Date: April 17, 2018
LUEG:SW **PDP SWQMP**

Preparation Date: 7/31/19

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 column 4 summarize the changes that have been made or indicate if response to plancheck comments is included. When applicable, insert response to plancheck comments behind this page.

Preliminary Design / Planning / CEQA

Submittal Number	Date	Summary of Changes
1	9/14/2016	Initial Submittal
2	5/24/2018	Updated report to reflect completely new site plan. Update to text body, update to Attachments 1, 3, 4, and 6.
3	12/17/2018	Update to text body, update to Attachments 1, 2, 3, 6, and 7.
4	5/21/2019	Addressing County Comments, and including Equestrian Center SSD BMPs
5	7/31/2019	Update to report text body and Attachments 1, 3, 4, 5, and 6 for offsite roundabout design change

Final Design

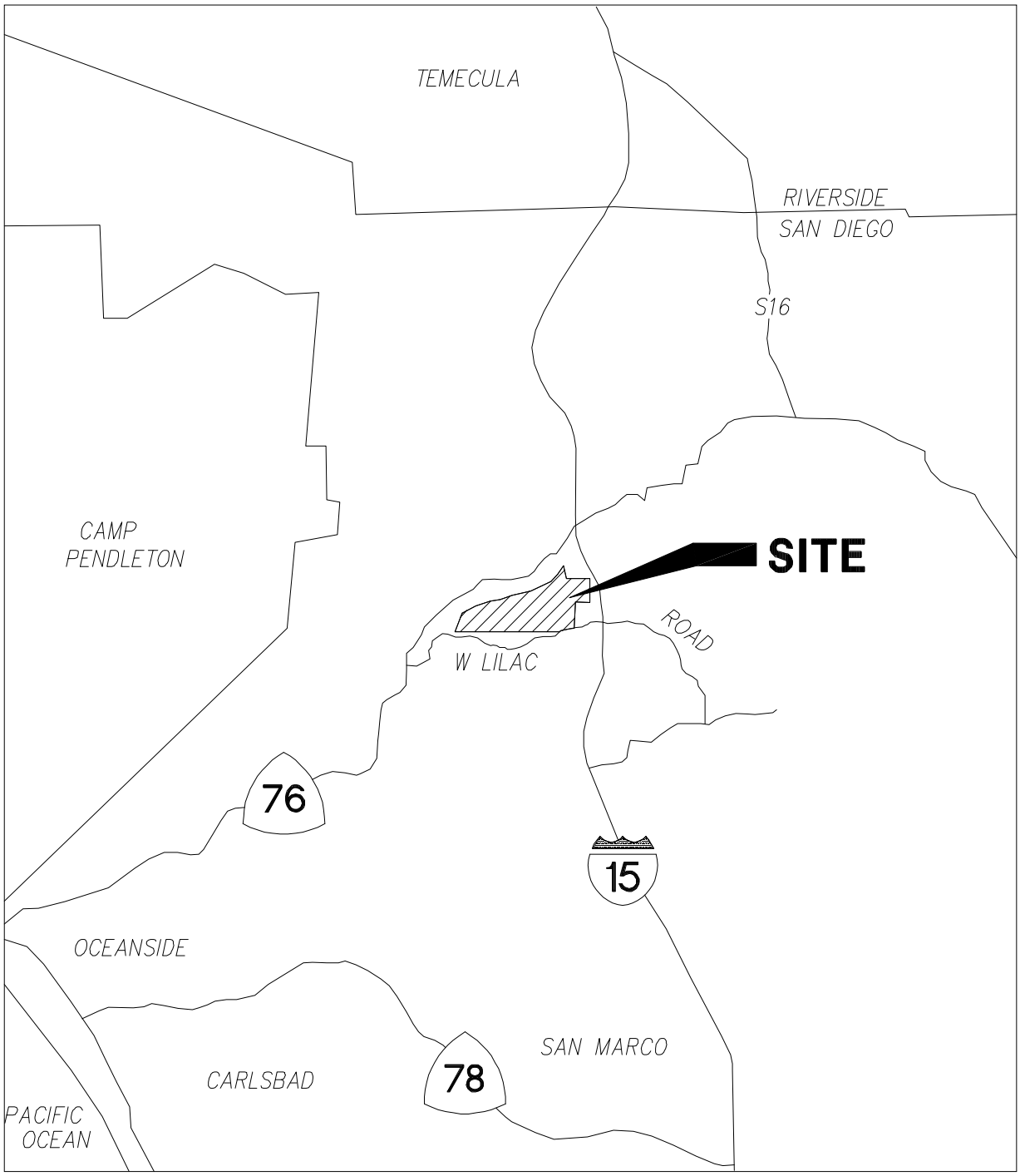
Submittal Number	Date	Summary of Changes
1		Initial Submittal
2		
3		
4		

Plan Changes

Submittal Number	Date	Summary of Changes
1		Initial Submittal
2		
3		

Project Vicinity Map

Project Name: Ocean Breeze Ranch
Record ID: Tract No. 5615



Step 1: Project type determination (Standard or Priority Development Project)

Is the project part of another Priority Development Project (PDP)? If so, a PDP SWQMP is required. Go to Step 2.			(☐ Yes ☒ No
The project is (select one): ☐ New Development ☒ Redevelopment[1]			
The total proposed newly created or replaced impervious area is:			4,789,472 ft²
The total existing (pre-project) impervious area is:			508,274 ft²
The total area disturbed by the project is:			14,425,672 ft²
If the total area disturbed by the project is 1 acre (43,560 sq. ft.) or more OR the project is part of a larger common plan of development disturbing 1 acre or more, a Waste Discharger Identification (WDID) number must be obtained from the State Water Resources Control Board. WDID: to be completed during Final Engineering			
Is the project in any of the following categories, (a) through (f)?[2]			
Yes ☐	No ☒	(a)	New development projects that create 10,000 square feet or more of impervious surfaces [3](collectively over the entire project site). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.
Yes ☒	No ☐	(b)	Redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site 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 ☐	(c)	New and redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site), and support one or more of the following uses: (i) Restaurants. This category is defined as a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (Standard Industrial Classification (SIC) code 5812). (ii) Hillside development projects. This category includes development on any natural slope that is twenty-five percent or greater. (iii) Parking lots. This category is defined as a land area or facility for the temporary parking or storage of motor vehicles used personally, for business, or for commerce. (iv) Streets, roads, highways, freeways, and driveways. This category is defined as any paved impervious surface used for the transportation of automobiles, trucks, motorcycles, and other vehicles.

[1] Redevelopment is defined as: The creation and/or replacement of impervious surface on an already developed site. Examples include the expansion of a building footprint, road widening, the addition to or replacement of a structure, and creation or addition of impervious surfaces. Replacement of impervious surfaces includes any activity that is not part of a routine maintenance activity where impervious material(s) are removed, exposing underlying soil during construction. Redevelopment does not include routine maintenance activities, such as trenching and resurfacing associated with utility work; pavement grinding; resurfacing existing roadways; new sidewalks construction; pedestrian ramps; or bike lanes on existing roads; and routine replacement of damaged pavement, such as pothole repair.

[2] Applicants should note that any development project that will create and/or replace 10,000 square feet or more of impervious surface (collectively over the entire project site) is considered a new development.

[3] For solar energy farm projects, the area of the solar panels does not count toward the total impervious area of the site.

Project type determination (continued)

Yes ☐	No ☒	(d)	New or redevelopment projects that create and/or replace 2,500 square feet or more of impervious surface (collectively over the entire project site), and discharging 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). *Note: ESAs are areas that include but are not limited to all Clean Water Act Section 303(d) impaired water bodies; areas designated as Areas of Special Biological Significance by the State Water Board and San Diego Water Board; State Water Quality Protected Areas; water bodies designated with the RARE beneficial use by the State Water Board and San Diego Water Board; and any other equivalent environmentally sensitive areas which have been identified by the Copermittees. See BMP Design Manual Section 1.4.2 for additional guidance.*
Yes ☐	No ☒	(e)	New development projects, or redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface, that support one or more of the following uses: (i) Automotive repair shops. This category is defined as a facility that is categorized in any one of the following SIC codes: 5013, 5014, 5541, 7532-7534, or 7536-7539. (ii) Retail gasoline outlets (RGOs). This category includes RGOs that meet the following criteria: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.
Yes ☐	No ☒	(f)	New or redevelopment projects that result in the disturbance of one or more acres of land and are expected to generate pollutants post construction. *Note: See BMP Design Manual Section 1.4.2 for additional guidance.*

Does the project meet the definition of one or more of the Priority Development Project categories (a) through (f) listed above?

☐ No – the project is not a Priority Development Project (Standard Project).

☒ Yes – the project is a Priority Development Project (PDP).

Further guidance may be found in Chapter 1 and Table 1-2 of the BMP Design Manual.

The following is for **redevelopment PDPs only**:

The area of existing (pre-project) impervious area at the project site is:	508,274 ft^2 (A)
The total proposed newly created or replaced impervious area is	4,789,472 ft^2 (B)
Percent impervious surface created or replaced (B/A)*100:	942 %

The percent impervious surface created or replaced is (select one based on the above calculation):

☐ less than or equal to fifty percent (50%) – **only newly created or replaced impervious areas are considered a PDP and subject to stormwater requirements**

OR

☒ greater than fifty percent (50%) – **the entire project site is considered a PDP and subject to stormwater requirements**

Step 1.1: Storm Water Quality Management Plan requirements

Step	Answer	Progression
Is the project a Standard Project, Priority Development Project (PDP), or exception to PDP definitions? To answer this item, complete Step 1 Project Type Determination Checklist on Pages 1 and 2, and see PDP exemption information below. For further guidance, see Section 1.4 of the BMP Design Manual *in its entirety*.	☐ Standard Project	Standard Project requirements apply, including Standard Project SWQMP. **Complete Standard Project SWQMP.**
	☒ PDP	Standard and PDP requirements apply, including PDP SWQMP. **Complete PDP SWQMP.**
	☐ PDP with ACP	If participating in offsite alternative compliance, **complete Step 6.3 and an ACP SWQMP.**
	☐ PDP Exemption	**Go to Step 1.2 below.**

Step 1.2: Exemption to PDP definitions

Is the project exempt from PDP definitions based on either of the following:	If so:
☐ Projects that are only new or retrofit paved sidewalks, bicycle lanes, or trails that meet the following criteria: (i) Designed and constructed to direct storm water runoff to adjacent vegetated areas, or other non-erodible permeable areas; OR (ii) Designed and constructed to be hydraulically disconnected from paved streets or roads [i.e., runoff from the new improvement does not drain directly onto paved streets or roads]; OR (iii) Designed and constructed with permeable pavements or surfaces in accordance with County of San Diego Guidance on Green Infrastructure;	Standard Project requirements apply, AND any additional requirements specific to the type of project. County concurrence with the exemption is required. *Provide discussion and list any additional requirements below in this form.* **Complete Standard Project SWQMP**
☐ Projects that are only retrofitting or redeveloping existing paved alleys, streets or roads that are designed and constructed in accordance with the County of San Diego Guidance on Green Infrastructure.	**Complete Green Streets PDP Exempt SWQMP.**
Discussion / justification, and additional requirements for exceptions to PDP definitions, if applicable:	

Step 2: Construction Storm Water BMP Checklist

Minimum Required Standard Construction Storm Water BMPs		
If you answer "Yes" to any of the questions below, your project is subject to Table 1 on the following page (Minimum Required Standard Construction Stormwater BMPs). As noted in Table 1, please select at least the minimum number of required BMPs, or as many as are feasible for your project. If no BMP is selected, an explanation must be given in the box provided. The following questions are intended to aid in determining construction BMP requirements for your project. **Note: All selected BMPs below must be included on the BMP plan incorporated into the construction plan sets.**		
1. Will there be soil disturbing activities that will result in exposed soil areas? (This includes minor grading and trenching.) **Reference Table 1 Items A, B, D, and E** Note: Soil disturbances NOT considered significant include, but are not limited to, change in use, mechanical/electrical/plumbing activities, signs, temporary trailers, interior remodeling, and minor tenant improvement.	☒Yes	☐No
2. Will there be asphalt paving, including patching? **Reference Table 1 Items D and F**	☒Yes	☐No
3. Will there be slurries from mortar mixing, coring, or concrete saw cutting? **Reference Table 1 Items D and F**	☒Yes	☐No
4. Will there be solid wastes from concrete demolition and removal, wall construction, or form work? **Reference Table 1 Items D and F**	☒Yes	☐No
5. Will there be stockpiling (soil, compost, asphalt, concrete, solid waste) for over 24 hours? **Reference Table 1 Items D and F**	☒Yes	☐No
6. Will there be dewatering operations? **Reference Table 1 Items C and D**	☐Yes	☒No
7. Will there be temporary on-site storage of construction materials, including mortar mix, raw landscaping and soil stabilization materials, treated lumber, rebar, and plated metal fencing materials? **Reference Table 1 Items E and F**	☒Yes	☐No
8. Will trash or solid waste product be generated from this project? **Reference Table 1 Item F**	☒Yes	☐No
9. Will construction equipment be stored on site (e.g.: fuels, oils, trucks, etc.?) **Reference Table 1 Item F**	☒Yes	☐No
10. Will Portable Sanitary Services ("Porta-potty") be used on the site? **Reference Table 1 Item F**	☒Yes	☐No

Table 1. Construction Storm Water BMP Checklist

Minimum Required Best Management Practices (BMPs)	CALTRANS SW Handbook[4] Detail or County Std. Detail	✔ BMP Selected	Reference sheet No.'s where each selected BMP is shown on the plans. If no BMP is selected, an explanation must be provided.
A. Select Erosion Control Method for Disturbed Slopes (choose at least one for the appropriate season)			
Vegetation Stabilization Planting[5] (Summer)	SS-2, SS-4	☐	
Hydraulic Stabilization Hydroseeding[2] (Summer)	SS-4	☒	
Bonded Fiber Matrix or Stabilized Fiber Matrix[6] (Winter)	SS-3	☒	
Physical Stabilization Erosion Control Blanket[3] (Winter)	SS-7	☐	
B. Select erosion control method for disturbed flat areas (slope < 5%) (choose at least one)			
County Standard Lot Perimeter Protection Detail	PDS 659[7], SC-2	☐	
Will use erosion control measures from Item A on flat areas also	SS-3, 4, 7	☐	
County Standard Desilting Basin (must treat all site runoff)	PDS 660[8], SC-2	☒	
Mulch, straw, wood chips, soil application	SS-6, SS-8	☒	

4 State of California Department of Transportation (Caltrans). 2003. Storm Water Quality Handbooks, Construction Site Best Management Practices (BMPs) Manual. March. Available online at: http://www.dot.ca.gov/hq/construc/stormwater/manuals.htm.

5 If Vegetation Stabilization (Planting or Hydroseeding) is proposed for erosion control it may be installed between May 1st and August 15th. Slope irrigation is in place and needs to be operable for slopes >3 feet. Vegetation must be watered and established prior to October 1st. The owner must implement a contingency physical BMP by August 15th if vegetation establishment does not occur by that date. If landscaping is proposed, erosion control measures must also be used while landscaping is being established. Established vegetation must have a subsurface mat of intertwined mature roots with a uniform vegetative coverage of 70 percent of the natural vegetative coverage or more on all disturbed areas.

6 All slopes over three feet must have established vegetative cover prior to final permit approval.

7 County of San Diego, Planning & Development Services. 2012. Standard Lot Perimeter Protection Design System. Building Division. PDS 659. Available online at http://www.sandiegocounty.gov/pds/docs/pds659.pdf.

8 County of San Diego, Planning & Development Services. 2012. County Standard Desilting Basin for Disturbed Areas of 1 Acre or Less Building Division. PDS 659. Available online at http://www.sandiegocounty.gov/pds/docs/pds660.pdf.

Table 1. Construction Storm Water BMP Checklist (continued)

Minimum Required Best Management Practices (BMPs)	CALTRANS SW Handbook Detail or County Std. Detail	✔ BMP Selected	Reference sheet No.'s where each selected BMP is shown on the plans. If no BMP is selected, an explanation must be provided.
C. If runoff or dewatering operation is concentrated, velocity must be controlled using an energy dissipater			
Energy Dissipater Outlet Protection[9]	SS-10	☐	
D. Select sediment control method for all disturbed areas (choose at least one)			
Silt Fence	SC-1	☒	
Fiber Rolls (Straw Wattles)	SC-5	☒	
Gravel & Sand Bags	SC-6 & 8	☒	
Dewatering Filtration	NS-2	☐	
Storm Drain Inlet Protection	SC-10	☒	
Engineered Desilting Basin (sized for 10-year flow)	SC-2	☒	
E. Select method for preventing offsite tracking of sediment (choose at least one)			
Stabilized Construction Entrance	TC-1	☒	
Construction Road Stabilization	TC-2	☐	
Entrance/Exit Tire Wash	TC-3	☐	
Entrance/Exit Inspection & Cleaning Facility	TC-1	☐	
Street Sweeping and Vacuuming	SC-7	☒	
F. Select the general site management BMPs			
F.1 Materials Management			
Material Delivery & Storage	WM-1	☒	
Spill Prevention and Control	WM-4	☒	
F.2 Waste Management[10]			
Waste Management Concrete Waste Management	WM-8	☒	
Solid Waste Management	WM-5	☒	
Sanitary Waste Management	WM-9	☒	
Hazardous Waste Management	WM-6	☒	

Note: The Construction General Permit (Order No. 2009-0009-DWQ) also requires all projects not subject to the BMP Design Manual to comply with runoff reduction requirements through the implementation of post-construction BMPs as described in Section XIII of the order.

[9] Regional Standard Drawing D-40 – Rip Rap Energy Dissipater is also acceptable for velocity reduction.

[10] Not all projects will have every waste identified. The applicant is responsible for identifying wastes that will be onsite and applying the appropriate BMP. For example, if concrete will be used, BMP WM-8 must be selected.

Step 3: County of San Diego PDP SWQMP Site Information Checklist

Step 3.1: Description of Existing Site Condition

Project Watershed (Complete Hydrologic Unit, Area, and Subarea Name with Numeric Identifier)	San Luis Rey, Lower San Luis, Bonsall (903.12)

Current Status of the Site (select all that apply):

☒ Existing development
☐ Previously graded but not built out
☐ Demolition completed without new construction
☒ Agricultural or other non-impervious use
☒ Vacant, undeveloped/natural

Description / Additional Information: The site presently supports an equestrian ranch and farmland within the historic floodplain of the San Luis Rey River and on the adjacent hillslopes. There exists significant undeveloped/natural land along the hillslopes.

Existing Land Cover Includes (select all that apply and provide each area on site):

☒ Vegetative Cover 1395.3 Acres (60,780,564 Square Feet)
☒ Non-Vegetated Pervious Areas 13.52 Acres (588,852 Square Feet)
☒ Impervious Areas 11.67 Acres (523,890 Square Feet)

Description / Additional Information: The majority of the site is pervious with some form of vegetated cover. Roughly half is related to agriculture as pasture, row crops, orchards, and non-native grassland, while the rest is on the hillslopes to the southeast and southwest predominantly as sage scrub. The non-vegetated pervious area consists of unpaved access roads and the impervious cover consists of the ranch house, paved access roads and various maintenance/support structures.

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 (GW) (or N/A if no infiltration is used):

☐ GW Depth < 5 feet
☒ 5 feet < GW Depth < 10 feet
☒ 10 feet < GW Depth < 20 feet
☒ GW Depth > 20 feet

Existing Natural Hydrologic Features (select all that apply):
☒ Watercourses
☐ Seeps
☐ Springs
☒ Wetlands
☐ None
☐ Other

Description / Additional Information: Ephemeral stream channels drain the hillslopes and cut through the site. Along one of the channels, to the east, there is a freshwater pond and with an adjacent marsh.

Step 3.2: Description of Existing Site Drainage Patterns

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) Is runoff from offsite conveyed through the site? if yes, quantify 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 any existing storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural or constructed channels; and
(4) Identify all discharge locations from the existing project site along with a summary of 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.

Describe existing site drainage patterns:

Existing condition drainage is predominantly natural. It is mostly undeveloped and includes hillsides and pastures, tomato fields, barns, farm ponds, farm roads, and various scattered buildings throughout the site. The project site mostly sheet drains to the north towards the San Luis Rey River while some areas drain into defined channels which drain towards the river. The southern half of the site drains southerly towards West Lilac Road into various culverts that cross the road and which eventually drain downstream to the San Luis Rey River.

The site drainage is affected by several areas of upstream run-on. East of the Redondo Drive/West Lilac Road intersection, there is a large portion of run-on that drains onto the property and drains to the north through the site via the steep valley channels. There is also another significant area of run-on along the easterly property line that drains through the site along a stream that drains in a northwesterly direction toward the river. The run-on areas are mostly low-density residential areas with agricultural and other improvements. The storm drain improvements consist of small roadway culverts and heavily vegetated channels, typical of the semi-rural character of the surrounding development.

Refer to the Drainage Study (prepared by Project Design Consultants) in Attachment 6 for more information on existing condition drainage and the existing conditions drainage maps. The project drainage is divided generally into twelve drainage areas, Systems 100 through 1800, that includes a system 500 and 550E wherein a large basin is broken up into two at a pond. The "E" in the system name refers to the existing condition drainage area in order to differentiate between the proposed (P) drainage areas.

Step 3.3: Description of Proposed Site Development

Project Description / Proposed Land Use and/or Activities:

The Ocean Breeze Ranch (OBR) project proposes three planning areas (PAs). PA 1 and PA 2 consist of single family home developments with parks and landscaping throughout as well as public streets. PA 3 consists of future estate homes and private access roads. There are three areas outside of the planning areas that will have street widening and roundabout improvements. Two areas are along West Lilac Road and within the property boundary, (one south of PA 2 and one adjacent to Sullivan Middle School). The third area (located offsite) that includes proposed roundabout improvements is located at the three way intersection of West Lilac Road and Camino Del Rey. In addition, the onsite existing Equestrian Center will also include minor improvements as shown in the MUP, which is a part of this entitlement application. Proposed improvements to the Equestrian MUP area include improvements to existing roads to improve fire access, construction of shade structures for horses in the existing pastures, and construction and/or relocation of three buildings.

List/describe proposed impervious features of the project (e.g., buildings, roadways, parking lots, courtyards, athletic courts, other impervious features):
The impervious features will consist of the homes, driveways, streets and sidewalks. In the Equestrian MUP area, some of the existing dirt roadways will be improved and/or widened with soil cement treatment.

List/describe proposed pervious features of the project (e.g., landscape areas):
The pervious features of the project will include multi-use trails, landscaped areas, open space and parks. The Equestrian MUP area is mostly pervious, and will remain mostly pervious in the post-project condition.

Does the project include grading and changes to site topography?

☒Yes

☐No

Description / Additional Information:

Grading and changes to site topography will occur, however the project grading will be designed to fit into the existing landform.

Insert acreage or square feet for the different land cover types in the table below:

Change in Land Cover Type Summary			
Land Cover Type	Existing (acres or ft2)	Proposed (acres or ft2)	Percent Change
Vegetation	1395	1109	21%
Pervious (non-vegetated)	14	66	371%
Impervious	12	110	817%

Step 3.4: Description of Proposed Site Drainage Patterns

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 or 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.

Describe proposed site drainage patterns:

Under proposed conditions, there will be several underground systems of reinforced concrete pipe storm drains in Planning Areas 1, 2, and 3. Connected to these storm drain systems will be storm drain inlets and catch basins that will collect the drainage to be conveyed in the storm drain pipes. There will be several vegetated basins that will serve for the purpose of pollutant control or dual purpose, pollutant control and for hydromodification management. There will be several concrete brow ditches within the site that will direct undeveloped areas/hillside drainage into bypass storm drain systems. Generally, proposed condition drainage patterns and the proposed discharge locations (near the San Luis Rey River) will be similar to existing conditions. Refer to the Drainage Study (prepared by Project Design Consultants) located in Attachment 6. There are some areas in existing conditions that were redirected to another system under proposed conditions. Refer to Table 2 of the Drainage Study for a side by side comparison of the existing and proposed drainage systems.

<u>Equestrian Center MUP Area:</u>

A Major Use Permit is proposed for the existing Equestrian Center, which is an existing pasture area located north of Planning Areas 1 and 3. Currently, the Equestrian Center consists of a large pasture area with trees, barns, existing structures, and pens for horses. Generally, the Equestrian Center drains from south to north, towards San Luis Rey River. Proposed drainage patterns follow existing drainage patterns, characterized mostly by sheet flow. Proposed structures, buildings and access road will sheet flow to its surrounding pasture area.

Step 3.5: Potential Pollutant Source Areas

Identify whether any of the following features, activities, and/or pollutant source areas will be present (select all that apply). Select "Other" if the project is a phased development and provide a description:

☒ On-site 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
☐ Other (provide description)

Description / Additional Information:

Step 3.6: Identification and Narrative of Receiving Water and Pollutants of Concern

Describe flow path of storm water from the project site discharge location(s), through urban storm conveyance systems as applicable, to receiving creeks, rivers, and lagoons as applicable, and ultimate discharge to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable):

Runoff that flows to the north leaves the site through a number of natural channels that discharge into the San Luis Rey River shortly downstream from the project boundary. The portion of runoff that flows to the south enters roadside ditches which lead to a natural channel that heads to the San Luis Rey River after a few thousand feet.

List any 303(d) impaired water bodies[11] 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	Pollutant(s)/Stressor(s)	TMDLs / WQIP Highest Priority Pollutant
San Luis Rey River, Lower	Chloride, Enterococcus, Fecal Coliform, Phosphorus, Total Dissolved Solids, Total Nitrogen, Toxicity	Bacteria
Pacific Ocean Shoreline, at San Luis Rey River mouth	Enterococcus, Total Coliform	Bacteria

Identification of Project Site Pollutants*

*Identification of project site pollutants below 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 expected from the project site based on all proposed use(s) of the site (see BMP Design Manual 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	☐	☐	☐

[11] The current list of Section 303(d) impaired water bodies can be found at http://www.waterboards.ca.gov/water_issues/programs/water_quality_assessment/#impaired

Bacteria & Viruses	☐	☐	☐
Pesticides	☐	☐	☐

Step 3.7: Hydromodification Management Requirements

Do hydromodification management requirements apply (see Section 1.6 of the BMP Design Manual)?

FOR ALL POINTS OF COMPLIANCE EXCEPT # 1:

☒Yes, hydromodification management requirements for flow control and preservation of critical coarse sediment yield areas are applicable.
☐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[12] for the watershed in which the project resides.

Description / Additional Information (to be provided if a 'No' answer has been selected above):

Do hydromodification management requirements apply (see Section 1.6 of the BMP Design Manual)?

FOR POINT OF COMPLIANCE # 1:

☐Yes, hydromodification management requirements for flow control and preservation of critical coarse sediment yield areas are applicable.
☐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[13] for the watershed in which the project resides.

Description / Additional Information (to be provided if a 'No' answer has been selected above):
The point of discharge for Basin #2A qualifies for the direct discharge exemption because the low-flow outlet for Basin #2A discharges below the 10-year water surface elevation for the San Luis Rey River. The San Luis Rey WQIP identifies this reach of the SLR River as an exempt river reach. Please refer to Attachment 2F for the documentation.

[12] The Watershed Management Area Analysis (WMAA) is an optional element for inclusion in the Water Quality Improvement Plans (WQIPs) described in the 2013 MS4 Permit [Provision B.3.b.(4)]. It is available online at the Project Clean Water website: http://www.projectcleanwater.org/index.php?option=com_content&view=article&id=248

[13] The Watershed Management Area Analysis (WMAA) is an optional element for inclusion in the Water Quality Improvement Plans (WQIPs) described in the 2013 MS4 Permit [Provision B.3.b.(4)]. It is available online at the

Step 3.7.1: Critical Coarse Sediment Yield Areas*

***This Section only required if hydromodification management requirements apply**

Projects must satisfy critical coarse sediment yield area (CCSYA) requirements by characterizing the project as one of the scenario-types presented below and satisfying associated criteria. Projects must appropriately satisfy all requirements for identification, avoidance, and bypass, OR may alternatively elect to demonstrate no net impact.

☒ **Scenario 1**: Project is subject to and in compliance with RPO requirements *(without utilization of RPO exemptions 86.604(e)(2)(cc) or 86.604(e)(3) that result in impacts to more than 15% of the project-scale CCSYAs)*.

- ☒ Identify: Project has identified both onsite and upstream CCSYAs as areas that are coarse, ≥25% slope, and ≥50' tall. *(Optional refinement methods may be performed per guidance in Section H.1.2). AND,*
- ☒ Avoid: Project has avoided onsite CCSYAs per existing RPO steep slope encroachment criteria. AND,
- ☒ Bypass: Project has demonstrated that both onsite and upstream CCSYAs are bypassed through or around the project site with a 2 year peak storm velocity of 3 feet per second or greater. OR,
- ☐ No Net Impact: Project does not satisfy all Scenario 1 criteria above and must alternatively demonstrate no net impact to the receiving water.

☐ **Scenario 2**: Project is entirely exempt/not subject to RPO requirements without utilization of RPO exemptions 86.604(e)(2)(cc) or 86.604(e)(3).

- ☐ Identify: Project has identified upstream CCSYAs that are coarse, ≥25% slope, and ≥50' tall. *(Optional refinement methods may be performed per guidance in Section H.1.2). AND,*
- ☐ Avoid: Project is not required to avoid onsite CCSYAs as none were identified in the previous step. AND,
- ☐ Bypass: Project has demonstrated that upstream CCSYAs are bypassed through or around the project site with a 2 year peak storm velocity of 3 feet per second or greater. OR,
- ☐ No Net Impact: Project does not satisfy all Scenario 2 criteria above and must alternatively demonstrate no net impact to the receiving water. *(Skip to next row).*

☐ **Scenario 3**: Project utilizes exemption(s) via RPO Section 86.604(e)(2)(cc) or 86.604(e)(3) and impacts more than 15% of the project-scale CCSYAs.

- ☐ No Net Impact: Project is not eligible for traditional methods of identification, avoidance, and bypass. Project must demonstrate no net impact to the receiving water.

Project Clean Water website:
http://www.projectcleanwater.org/index.php?option=com_content&view=article&id=248

Critical Coarse Sediment Yield Areas Continued
Demonstrate No Net Impact
If the project elects to satisfy CCSYA criteria through demonstration of no net impact to the receiving water. Applicants must identify the methods utilized from the list below and provide supporting documentation in Attachment 2c of the SWQMP. Check all that are applicable. ☒ N/A, the project appropriately identifies, avoids, and bypasses CCSYAs. ☐ Project has performed additional analysis to demonstrate that impacts to CCSYAs satisfy the no net impact standard of Ep/Sp≤1.1. ☐ Project has provided alternate mapping of CCSYAs. ☐ Project has implemented additional onsite hydromodification flow control measures. ☐ Project has implemented an offsite stream rehabilitation project to offset impacts. ☐ Project has implemented other applicant-proposed mitigation measures.

Step 3.7.2: 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.
Has a geomorphic assessment been performed for the receiving channel(s)? ☒ No, the low flow threshold is 0.1Q2 (default low flow threshold) ☒ Yes, the result is the low flow threshold is 0.1Q2 ☐ Yes, the result is the low flow threshold is 0.3Q2 ☒ Yes, the result is the low flow threshold is 0.5Q2 *If a geomorphic assessment has been performed, provide title, date, and preparer:* Please refer to the Hydromodification Screening for Ocean Breeze Ranch prepared by Chang Consultants. The POC locations in the report have been updated with the new site plan. Some of the POCs were not analyzed, so the default low flow threshold was used for the POCs not analyzed in Chang's study. *Discussion / Additional Information: (optional)*

Step 3.8: 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.

Step 4: Source Control BMP Checklist

Source Control BMPs			
All development projects must implement source control BMPs 4.2.1 through 4.2.6 where applicable and feasible. See Chapter 4.2 and Appendix E of the County BMP Design Manual 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 4.2 and/or Appendix E of the County 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 must 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:			

Source Control Requirement	Applied?		
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:			
4.2.6 Additional BMPs Based on Potential Sources of Runoff Pollutants (must answer for each source listed below):			
☐ A. On-site storm drain inlets	☒Yes	☐No	☐N/A
☐ B. Interior floor drains and elevator shaft sump pumps	☐Yes	☐No	☒N/A
☐ C. Interior parking garages	☐Yes	☐No	☒N/A
☐ D. Need for future indoor & structural pest control	☒Yes	☐No	☐N/A
☐ E. Landscape/outdoor pesticide use	☒Yes	☐No	☐N/A
☐ F. Pools, spas, ponds, fountains, and other water features	☒Yes	☐No	☐N/A
☐ G. Food service	☐Yes	☐No	☒N/A
☐ H. Refuse areas	☒Yes	☐No	☐N/A
☐ I. Industrial processes	☐Yes	☐No	☒N/A
☐ J. Outdoor storage of equipment or materials	☐Yes	☐No	☒N/A
☐ K. Vehicle and equipment cleaning	☐Yes	☐No	☒N/A
☐ L. Vehicle/equipment repair and maintenance	☐Yes	☐No	☒N/A
☐ M. Fuel dispensing areas	☐Yes	☐No	☒N/A
☐ N. Loading docks	☐Yes	☐No	☒N/A
☐ O. Fire sprinkler test water	☒Yes	☐No	☐N/A
☐ P. Miscellaneous drain or wash water	☒Yes	☐No	☐N/A
☐ Q. Plazas, sidewalks, and parking lots	☒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 <u>all</u> "No" answers shown above. For Items B and C, OBR consists of a single family home development that will not incorporate elevators or interior parking garages. There are no eateries or restaurants proposed for this project therefore Item G does not apply. There are no industrial features to be incorporated into the site plan, therefore Item I and J is not applicable. There are no retail petroleum stations or automotive repair shops, therefore Items K through M are not applicable. Item N does not apply because there is no proposed commercial development.			

Note: Show all source control measures described above that are included in design capture volume calculations in the plan sheets of Attachment 5.

Step 5: Site Design BMP Checklist

Site Design BMPs
All development projects must implement site design BMPs SD-A through SD-H where applicable and feasible. See Chapter 4.3 and Appendix E of the County BMP Design Manual 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 4.3 and/or Appendix E of the County 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 must be provided.

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 large areas of bio open space around and within the site that will be preserved and will have drainage patterns under proposed conditions that will mimic existing flowpaths.			
4.3.2 Conserve Natural Areas, Soils, and Vegetation	☒Yes	☐No	☐N/A
Discussion / justification if 4.3.2 not implemented: The bio open space areas as discussed in Section 4.3.1 fall under this site design BMP because these areas are going to be preserved and will remain undisturbed and are areas where development has been avoided in the site design.			
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:			
4.3.5 Impervious Area Dispersion	☒Yes	☐No	☐N/A
Discussion / justification if 4.3.5 not implemented: Non-contiguous sidewalks and parks provide opportunity for impervious area dispersion that will be incorporated into the design during final engineering. The Equestrian Center improvements include impervious area dispersion as a SSD BMP for both pollutant and flow control mitigation.			

Site Design Requirement	Applied?		
4.3.6 Runoff Collection	☒Yes	☐No	☐N/A
Discussion / justification if 4.3.6 not implemented: Permeable pavement (decomposed granite pathways) have been incorporated in the site plan.			
4.3.7 Landscaping with Native or Drought Tolerant Species	☒Yes	☐No	☐N/A
Discussion / justification if 4.3.7 not implemented: The landscaping plans have not been developed at the tentative map stage but will include native or drought tolerant species for the final design.			
4.3.8 Harvesting and Using Precipitation	☐Yes	☐No	☒N/A
Discussion / justification if 4.3.8 not implemented: Per the County of San Diego's BMP Design Manual, the OBR project does not need to provide calculations for harvest and use since the development does not propose any structures over nine stories in height.			

Note: Show all site design measures described above that are included in design capture volume calculations in the plan sheets of Attachment 5.

Step 6: PDP Structural BMPs

All PDPs must implement structural BMPs for storm water pollutant control (see Chapter 5 of the BMP Design Manual). 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 County at the completion of construction. This may include requiring the project owner or project owner's representative and engineer of record to certify construction of the structural BMPs (see Section 1.12 of the BMP Design Manual). PDP structural BMPs must be maintained into perpetuity, and the County must confirm the maintenance (see Section 7 of the BMP Design Manual).

Use this section 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 (Step 6.2) for each structural BMP within the project (copy the BMP summary information sheet [Step 6.2] as many times as needed to provide summary information for each individual structural BMP).

Step 6.1: Description of structural BMP strategy

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. At the end of this discussion provide a summary of all the structural BMPs within the project including the type and number.

This SWQMP covers all BMPs for the entire project site (in PAs 1-3) including the BMPs for the future offsite roadway improvements. Refer to Attachment 1c for the Drainage Management Area (DMA) Exhibits. For infiltration feasibility, refer to Attachment 7 for a copy of the Geotechnical consultant's (Geosoils Inc) updated infiltration study for OBR and their supplemental infiltration evaluation for PA3 and the hillside estate east of Sullivan Middle School. All the proposed BMPs were evaluated on a BMP/DMA specific basis by the geotechnical engineer. The structural BMPs selected for OBR were determined per Geosoils recommendations. Note, harvest and reuse BMPs (referred to as "capture and use" BMPs in the County Draft BMP Design Manual (November 2018)) are not required since there are no structures over 9 stories in height proposed on this project.

The structural BMP implementation strategy entails utilizing four lined biofiltration basins (Basin 1A, 2A, 2C, and 3J (for an estate lot in PA 3), five unlined partial infiltration basins (3A-3C, 3E, and 3G (in PA 3 along Dulin Road)) and six full infiltration basins (Basins 2D-2G (in PA2) and 3D and 3F (in PA 3 along Dulin Road)) for onsite treatment. Most of the basins will serve as dual purpose, by complying with both onsite pollutant control treatment requirements and hydromodification management requirements. The onsite basins exempted from hydromodification management requirements are Basins 2A, and 2C-2G. The point of discharge for all of these basins at the San Luis Rey River is below the 10-year water surface elevation. Basins 3C and 3D were sized to accommodate the treatment of drainage from Dulin Road and the future estate lots of PA 3. Basins 3F, 3G, and 3H will each have pretreatment, with more information on each basins' pretreatment measures to be included in final engineering. Per Geosoils, Basin 3J (Lot 395) was found to have a very low infiltration rate, and was noted as may be feasible for partial infiltration. However, when considering the design, it was determined the basin would be a lined biofiltration basin in order to meet the drawdown requirements.

For the roadway widening areas outside of the PAs but within the property boundary, there will be two partial infiltration basins (one along West Lilac Road (Basin 2H) and one east of Sullivan Middle School (Basin 3H). Each of these areas will comply with pollutant treatment and hydromodification management requirements.

<u>Onsite Alternative Compliance:</u>

Refer to the Alternative Compliance Exhibit located in Attachment 1a. There are two areas within the project limits and one offsite area that will not be treated by a pollutant control BMP under developed conditions. The two onsite areas are part of road widening improvements along West Lilac Road, while the offsite area consists of roundabout improvements at the 3-way junction at West Lilac Road and Camino Del Rey, Under proposed conditions, Basin 2H (for DMA 17) treats a large area of existing open space area. Using the Water Quality Equivalence (WQE) Guidance Document for Region 9, dated May 2018, Basin 2H qualifies for onsite alternative compliance. Refer to Attachment 1a for the WQE Worksheets and alternative compliance calculations. It was determined the volume earned from the treatment of the

existing open space area in DMA 17 (identified as the alternative compliance project (ACP) tributary area) from Basin 2H is higher than the proposed total untreated DCV by the three areas noted that will not have pollutant treatment. Therefore, the proposed impervious area from the road widening and roundabout improvements will therefore utilize the credits earned from the treatment of the existing open space area tributary to Basin 2H. While pollutant treatment will not be applied to the offsite area with roundabout improvements, hydromodification requirements will be met. A hydromodification storage vault (Hydromod Vault #1) was sized appropriately. The calculations are included in the Hydromodification Study prepared under a separate cover by PDC.

Refer to Attachment 1a for the BMP calculations. Note, the worksheets included in Attachment 1a are from the County of San Diego's latest version of the BMP worksheet. Version 2.0 was released on November 2018 in accordance with the County's latest BMP Design Manual Draft (November 2018).

Several of the basin BMPs have a tributary area larger than the County's recommended 5-acre maximum. All these basins were sized in accordance with the County's BMP Manual. The runoff velocities into the basins will be reduced by using flat pipe slopes and providing energy dissipation. Basin pre-treatment options to alleviate concerns in regards to the more than 5-acres tributary area maximum will be addressed during final engineering.

Equestrian Center MUP Area:

A Major Use Permit is proposed for the existing Equestrian Center, which is an existing pasture area located north of Planning Areas 1 and 3. Currently, the Equestrian Center consists of a large pasture area with trees, barns, existing structures, and pens for horses. Three small improvements are proposed for this area; shade structures for horses, 3 new or relocated structures, and replacing portions of the existing dirt road to a soil cement road. The shade structures will sheet flow to the adjacent pasture area. Pollutant control and flow control requirements for the shade structures will be met through SSD BMPs, impervious area dispersion. A 1:1 impervious to pervious ratio with 11" of amended soil in accordance with SD-F fact sheet satisfies both the storm water pollutant treatment and flow control requirements per Appendix E of the BMP Design Manual for San Diego County. See BMP Design Fact Sheet SD-B page E-45 for the SSD BMP requirements regarding impervious area dispersion. Similar to the shade structures, the proposed impervious road will sheet flow to the adjacent existing pasture areas and infiltrate. In addition, the existing trees adjacent to the road will also qualify for SSD BMPs. The calculations provided in Attachment 1a show that the existing trees will capture a minimum of twice the DCV to satisfy both pollutant control and flow control requirements. This criteria was provided by the County of San Diego from "Sizing Site Design BMPs to Meet Flow Control Requirements: A Guidance for Meeting Flow Control Requirements on PDP Projects without implementing Structural BMPS" dated September 22, 2016. Impervious area dispersion is proposed in locations where there are not enough existing trees adjacent to the road to satisfy pollutant control and flow control requirements. See BMP Exhibit 4 in Attachment 1c, for DMA boundaries for the SSD BMPs for the Equestrian Center. SSD BMPs were selected for treatment of the Equestrian area improvements because there is plenty of open space for decentralized storm water control and the existing drainage patterns are characterized mostly by sheet flow. A large part of the Equestrian area is underlain by Type A soils.

Step 6.2: Structural BMP Checklist

(Copy this page as needed to provide information for each individual proposed structural BMP)	
Structural BMP ID No. Basin #1A	
Construction Plan Sheet No. N/A	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☐ 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) ☒ Biofiltration with Nutrient Sensitive Media Design (BF-2) ☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F ☐ 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 forms (See Section 1.12 of the BMP Design Manual)	Project Design Consultants 619.235.6471
Who will be the final owner of this BMP?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
Who will maintain this BMP into perpetuity?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
What Category (1-4) is the Structural BMP? Refer to the Category definitions in Section 7.3 of the BMP DM. Attach the appropriate maintenance agreement in Attachment 3.	2
Discussion (as needed): Located in Planning Area 1.	

(Copy this page as needed to provide information for each individual proposed structural BMP)

Structural BMP ID No. Basin #2A

Construction Plan Sheet No. N/A

Type of structural BMP:
☐ Retention by harvest and use (HU-1)
☐ 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)
☒ Biofiltration with Nutrient Sensitive Media Design (BF-2)
☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F
☐ 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 forms (See Section 1.12 of the BMP Design Manual)	Project Design Consultants 619.235.6471
Who will be the final owner of this BMP?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
Who will maintain this BMP into perpetuity?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
What Category (1-4) is the Structural BMP? Refer to the Category definitions in Section 7.3 of the BMP DM. Attach the appropriate maintenance agreement in Attachment 3.	2

Discussion (as needed):

Located in Planning Area 2.

(Copy this page as needed to provide information for each individual proposed structural BMP)	
Structural BMP ID No. Basin #2B	
Construction Plan Sheet No. N/A	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☐ 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) ☐ Biofiltration with Nutrient Sensitive Media Design (BF-2) ☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F ☐ 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 forms (See Section 1.12 of the BMP Design Manual)	Project Design Consultants 619.235.6471
Who will be the final owner of this BMP?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
Who will maintain this BMP into perpetuity?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
What Category (1-4) is the Structural BMP? Refer to the Category definitions in Section 7.3 of the BMP DM. Attach the appropriate maintenance agreement in Attachment 3.	2
Discussion (as needed): Located in Planning Area 2.	

(Copy this page as needed to provide information for each individual proposed structural BMP)	
Structural BMP ID No. Basin #2C	
Construction Plan Sheet No. N/A	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☐ 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) ☒ Biofiltration with Nutrient Sensitive Media Design (BF-2) ☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F ☐ 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 forms (See Section 1.12 of the BMP Design Manual)	Project Design Consultants 619.235.6471
Who will be the final owner of this BMP?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
Who will maintain this BMP into perpetuity?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
What Category (1-4) is the Structural BMP? Refer to the Category definitions in Section 7.3 of the BMP DM. Attach the appropriate maintenance agreement in Attachment 3.	2
Discussion (as needed): Located in Planning Area 2.	

(Copy this page as needed to provide information for each individual proposed structural BMP)

Structural BMP ID No. Basin #2D

Construction Plan Sheet No. N/A

Type of structural BMP:
☐ Retention by harvest and use (HU-1)
☒ 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)
☐ Biofiltration with Nutrient Sensitive Media Design (BF-2)
☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F
☐ 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 forms (See Section 1.12 of the BMP Design Manual)	Project Design Consultants 619.235.6471
Who will be the final owner of this BMP?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
Who will maintain this BMP into perpetuity?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
What Category (1-4) is the Structural BMP? Refer to the Category definitions in Section 7.3 of the BMP DM. Attach the appropriate maintenance agreement in Attachment 3.	2

Discussion (as needed):

Located in Planning Area 2.

(Copy this page as needed to provide information for each individual proposed structural BMP)

Structural BMP ID No. Basin #2E

Construction Plan Sheet No. N/A

Type of structural BMP:
☐ Retention by harvest and use (HU-1)
☒ 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)
☐ Biofiltration with Nutrient Sensitive Media Design (BF-2)
☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F
☐ 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 forms (See Section 1.12 of the BMP Design Manual)	Project Design Consultants 619.235.6471
Who will be the final owner of this BMP?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
Who will maintain this BMP into perpetuity?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
What Category (1-4) is the Structural BMP? Refer to the Category definitions in Section 7.3 of the BMP DM. Attach the appropriate maintenance agreement in Attachment 3.	2

Discussion (as needed):

Located in Planning Area 2.

(Copy this page as needed to provide information for each individual proposed structural BMP)

Structural BMP ID No. Basin #2F

Construction Plan Sheet No. N/A

Type of structural BMP:
☐ Retention by harvest and use (HU-1)
☒ 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)
☐ Biofiltration with Nutrient Sensitive Media Design (BF-2)
☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F
☐ 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 forms (See Section 1.12 of the BMP Design Manual)	Project Design Consultants 619.235.6471
Who will be the final owner of this BMP?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
Who will maintain this BMP into perpetuity?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
What Category (1-4) is the Structural BMP? Refer to the Category definitions in Section 7.3 of the BMP DM. Attach the appropriate maintenance agreement in Attachment 3.	2

Discussion (as needed):

Located in Planning Area 2.

(Copy this page as needed to provide information for each individual proposed structural BMP)

Structural BMP ID No. Basin #2G

Construction Plan Sheet No. N/A

Type of structural BMP:
☐ Retention by harvest and use (HU-1)
☒ 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)
☐ Biofiltration with Nutrient Sensitive Media Design (BF-2)
☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F
☐ 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 forms (See Section 1.12 of the BMP Design Manual)	Project Design Consultants 619.235.6471
Who will be the final owner of this BMP?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
Who will maintain this BMP into perpetuity?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
What Category (1-4) is the Structural BMP? Refer to the Category definitions in Section 7.3 of the BMP DM. Attach the appropriate maintenance agreement in Attachment 3.	2

Discussion (as needed):

Located in Planning Area 2.

(Copy this page as needed to provide information for each individual proposed structural BMP)	
Structural BMP ID No. Basin #2H	
Construction Plan Sheet No. N/A	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☐ 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) ☐ Biofiltration with Nutrient Sensitive Media Design (BF-2) ☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F ☐ 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 forms (See Section 1.12 of the BMP Design Manual)	Project Design Consultants 619.235.6471
Who will be the final owner of this BMP?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
Who will maintain this BMP into perpetuity?	☐ HOA ☐ Property Owner ☒ County ☐ Other (describe)
What Category (1-4) is the Structural BMP? Refer to the Category definitions in Section 7.3 of the BMP DM. Attach the appropriate maintenance agreement in Attachment 3.	4
Discussion (as needed): This basin is for roadway improvements along West Lilac Road and south of PA2. The facility is located in a proposed County Roads Division easement for ongoing maintenance, since the basin treats public roadway runoff.	

(Copy this page as needed to provide information for each individual proposed structural BMP)	
Structural BMP ID No. Basin #3A	
Construction Plan Sheet No. N/A	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☐ 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) ☐ Biofiltration with Nutrient Sensitive Media Design (BF-2) ☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F ☐ 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 forms (See Section 1.12 of the BMP Design Manual)	Project Design Consultants 619.235.6471
Who will be the final owner of this BMP?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
Who will maintain this BMP into perpetuity?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
What Category (1-4) is the Structural BMP? Refer to the Category definitions in Section 7.3 of the BMP DM. Attach the appropriate maintenance agreement in Attachment 3.	2
Discussion (as needed): Located in Planning Area 3.	

(Copy this page as needed to provide information for each individual proposed structural BMP)	
Structural BMP ID No. Basin #3B	
Construction Plan Sheet No. N/A	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☐ 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) ☐ Biofiltration with Nutrient Sensitive Media Design (BF-2) ☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F ☐ 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 forms (See Section 1.12 of the BMP Design Manual)	Project Design Consultants 619.235.6471
Who will be the final owner of this BMP?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
Who will maintain this BMP into perpetuity?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
What Category (1-4) is the Structural BMP? Refer to the Category definitions in Section 7.3 of the BMP DM. Attach the appropriate maintenance agreement in Attachment 3.	2
Discussion (as needed): Located in Planning Area 3.	

(Copy this page as needed to provide information for each individual proposed structural BMP)	
Structural BMP ID No. Basin #3C	
Construction Plan Sheet No. N/A	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☐ 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) ☐ Biofiltration with Nutrient Sensitive Media Design (BF-2) ☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F ☐ 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 forms (See Section 1.12 of the BMP Design Manual)	Project Design Consultants 619.235.6471
Who will be the final owner of this BMP?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
Who will maintain this BMP into perpetuity?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
What Category (1-4) is the Structural BMP? Refer to the Category definitions in Section 7.3 of the BMP DM. Attach the appropriate maintenance agreement in Attachment 3.	2
Discussion (as needed): Located in Planning Area 3.	

(Copy this page as needed to provide information for each individual proposed structural BMP)	
Structural BMP ID No. Basin #3D	
Construction Plan Sheet No. N/A	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☒ 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) ☐ Biofiltration with Nutrient Sensitive Media Design (BF-2) ☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F ☐ 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 forms (See Section 1.12 of the BMP Design Manual)	Project Design Consultants 619.235.6471
Who will be the final owner of this BMP?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
Who will maintain this BMP into perpetuity?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
What Category (1-4) is the Structural BMP? Refer to the Category definitions in Section 7.3 of the BMP DM. Attach the appropriate maintenance agreement in Attachment 3.	2
Discussion (as needed): Located in Planning Area 3.	

(Copy this page as needed to provide information for each individual proposed structural BMP)	
Structural BMP ID No. Basin #3E	
Construction Plan Sheet No. N/A	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☐ 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) ☐ Biofiltration with Nutrient Sensitive Media Design (BF-2) ☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F ☐ 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 forms (See Section 1.12 of the BMP Design Manual)	Project Design Consultants 619.235.6471
Who will be the final owner of this BMP?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
Who will maintain this BMP into perpetuity?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
What Category (1-4) is the Structural BMP? Refer to the Category definitions in Section 7.3 of the BMP DM. Attach the appropriate maintenance agreement in Attachment 3.	2
Discussion (as needed): Located in Planning Area 3.	

(Copy this page as needed to provide information for each individual proposed structural BMP)	
Structural BMP ID No. Basin #3F	
Construction Plan Sheet No. N/A	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☒ 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) ☐ Biofiltration with Nutrient Sensitive Media Design (BF-2) ☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F ☐ 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 forms (See Section 1.12 of the BMP Design Manual)	Project Design Consultants 619.235.6471
Who will be the final owner of this BMP?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
Who will maintain this BMP into perpetuity?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
What Category (1-4) is the Structural BMP? Refer to the Category definitions in Section 7.3 of the BMP DM. Attach the appropriate maintenance agreement in Attachment 3.	2
Discussion (as needed): Located in Planning Area 3. This basin will include pretreatment.	

(Copy this page as needed to provide information for each individual proposed structural BMP)

Structural BMP ID No. Basin #3G

Construction Plan Sheet No. N/A

Type of structural BMP:
☐ Retention by harvest and use (HU-1)
☐ 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)
☐ Biofiltration with Nutrient Sensitive Media Design (BF-2)
☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F
☐ 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 forms (See Section 1.12 of the BMP Design Manual)	Project Design Consultants 619.235.6471
Who will be the final owner of this BMP?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
Who will maintain this BMP into perpetuity?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
What Category (1-4) is the Structural BMP? Refer to the Category definitions in Section 7.3 of the BMP DM. Attach the appropriate maintenance agreement in Attachment 3.	2

Discussion (as needed):

Located in Planning Area 3. This basin will include pretreatment.

(Copy this page as needed to provide information for each individual proposed structural BMP)

Structural BMP ID No. Basin #3H

Construction Plan Sheet No. N/A

Type of structural BMP:
☐ Retention by harvest and use (HU-1)
☐ 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)
☐ Biofiltration with Nutrient Sensitive Media Design (BF-2)
☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F
☐ 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 forms (See Section 1.12 of the BMP Design Manual)	Project Design Consultants 619.235.6471
Who will be the final owner of this BMP?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
Who will maintain this BMP into perpetuity?	☐ HOA ☐ Property Owner ☒ County ☐ Other (describe)
What Category (1-4) is the Structural BMP? Refer to the Category definitions in Section 7.3 of the BMP DM. Attach the appropriate maintenance agreement in Attachment 3.	4

Discussion (as needed): This basin is located east of Sullivan Middle School for the roadway improvements to be done along West Lilac Road. This basin will include pretreatment. The facility is located in a proposed County Roads Division easement for ongoing maintenance, since the basin treats public roadway runoff.

(Copy this page as needed to provide information for each individual proposed structural BMP)

Structural BMP ID No. Basin #3i

Construction Plan Sheet No. N/A

Type of structural BMP:
☐ Retention by harvest and use (HU-1)
☐ 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)
☐ Biofiltration with Nutrient Sensitive Media Design (BF-2)
☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F
☐ 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 forms (See Section 1.12 of the BMP Design Manual)	Project Design Consultants 619.235.6471
Who will be the final owner of this BMP?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
Who will maintain this BMP into perpetuity?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
What Category (1-4) is the Structural BMP? Refer to the Category definitions in Section 7.3 of the BMP DM. Attach the appropriate maintenance agreement in Attachment 3.	2

Discussion (as needed):

Basin located east of Sullivan Middle School for a future hillside estate.

(Copy this page as needed to provide information for each individual proposed structural BMP)	
Structural BMP ID No. Basin #3J	
Construction Plan Sheet No. N/A	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☐ 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) ☒ Biofiltration with Nutrient Sensitive Media Design (BF-2) ☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F ☐ 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 forms (See Section 1.12 of the BMP Design Manual)	Project Design Consultants 619.235.6471
Who will be the final owner of this BMP?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
Who will maintain this BMP into perpetuity?	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe)
What Category (1-4) is the Structural BMP? Refer to the Category definitions in Section 7.3 of the BMP DM. Attach the appropriate maintenance agreement in Attachment 3.	2
Discussion (as needed): Basin located within the limits of a future estate lot which is along West Lilac Road.	

(Copy this page as needed to provide information for each individual proposed structural BMP)

Structural BMP ID No. Hydromod Vault #1

Construction Plan Sheet No. N/A

Type of structural BMP:
☐ Retention by harvest and use (HU-1)
☐ 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)
☐ Biofiltration with Nutrient Sensitive Media Design (BF-2)
☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F
☐ 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 forms (See Section 1.12 of the BMP Design Manual)	Project Design Consultants 619.235.6471
Who will be the final owner of this BMP?	☐ HOA ☐ Property Owner ☒ County ☐ Other (describe)
Who will maintain this BMP into perpetuity?	☐ HOA ☐ Property Owner ☒ County ☐ Other (describe)
What Category (1-4) is the Structural BMP? Refer to the Category definitions in Section 7.3 of the BMP DM. Attach the appropriate maintenance agreement in Attachment 3.	4

Discussion (as needed):

Hydromod. vault to be located at the T-intersection of Camino Del Rey and West Lilac Road.

Step 6.3: Offsite Alternative Compliance Participation Form

PDP INFORMATION	
Record ID:	
Assessor's Parcel Number(s) [APN(s)]	
What are your PDP Pollutant Control Debits? *See Attachment 1 of the PDP SWQMP	
What are your PDP HMP Debits? (if applicable) *See Attachment 2 of the PDP SWQMP	
ACP Information	
Record ID:	
Assessor's Parcel Number(s) [APN(s)]	
Project Owner/Address	
What are your ACP Pollutant Control Credits? *See Attachment 1 of the ACP SWQMP	
What are your ACP HMP Debits? (if applicable) *See Attachment 2 of the ACP SWQMP	
Is your ACP in the same watershed as your PDP? ☐ Yes ☐ No	Will your ACP project be completed prior to the completion of the PDP? ☐ Yes ☐ No
Does your ACP account for all Deficits generated by the PDP? ☐ Yes ☐ No (PDP and/or ACP must be redesigned to account for all deficits generated by the PDP.	What is the difference between your PDP debits and ACP Credits? *(ACP Credits -Total PDP Debits = Total Earned Credits)

ATTACHMENT 1

BACKUP FOR PDP POLLUTANT CONTROL BMPS

This is the cover sheet for Attachment 1.

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	Contents	Checklist
Attachment 1a	Storm Water Pollutant Control Worksheet Calculations Worksheet B.1 Worksheet B.2 Worksheet B.3 Worksheet B.4 (If Applicable) (Worksheets from County of San Diego Worksheet Version 2.0)	☒ Included
Attachment 1b	Capture and Use Calculations	☐ Included ☒ Not included because there are no 9 story structures proposed on this project (per County BMP Draft Manual (November 2018) Section B.4.2)
Attachment 1c	DMA Exhibit (Required) See DMA Exhibit Checklist on the back of this Attachment cover sheet.	☒ Included
Attachment 1d	Individual Structural BMP DMA Mapbook (Required) -Place each map on 8.5”x11” paper. -Show at a minimum the DMA, Structural BMP, and any existing hydrologic features within the DMA.	☒ Included

ATTACHMENT 1a

Storm Water Pollutant Control Worksheet Calculations

Table D.2-3: Determination of Safety Factor

PLANNING AREA 1, BASIN 1A Consideration		Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
Suitability Assessment (A)	Infiltration Testing Method	0.25	Refer to Table D.2-4	0.50
	Soil Texture Class	0.25		0.50
	Soil Variability	0.25		0.50
	Depth to Groundwater/Obstruction	0.25		0.25
	Suitability Assessment Safety Factor, $S_A = \Sigma p$			1.75
Design (B)	Pretreatment	0.50	Refer to Table D.2-4	0.50
	Resiliency	0.25		0.50
	Compaction	0.25		0.75
	Design Safety Factor, $S_B = \Sigma p$			1.75
	Safety Factor, $S = S_A \times S_B$ (Must be always greater than or equal to 2)			3.0

The geotechnical engineer should reference Table D.2-4 below in order to determine appropriate factor values for use in the table above. The values in the table below are subjective in nature and the geotechnical engineer may use professional discretion in how the points are assigned.

PLATE B1
W.O. 6960-A5-SC
11-29-2018
GEOSOILS, INC.

Table D.2-3: Determination of Safety Factor

PLANNING AREA 2, BASIN 2A, 2B, 2C Consideration		Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
Suitability Assessment (A)	Infiltration Testing Method	0.25	Refer to Table D.2-4	0.50
	Soil Texture Class	0.25		0.25
	Soil Variability	0.25		0.25
	Depth to Groundwater/Obstruction	0.25		0.50
	Suitability Assessment Safety Factor, $S_A = \Sigma p$			1.50
Design (B)	Pretreatment	0.50	Refer to Table D.2-4	0.50
	Resiliency	0.25		0.75
	Compaction	0.25		0.25
	Design Safety Factor, $S_B = \Sigma p$			1.50
	Safety Factor, $S = S_A \times S_B$ (Must be always greater than or equal to 2)			2.25

The geotechnical engineer should reference Table D.2-4 below in order to determine appropriate factor values for use in the table above. The values in the table below are subjective in nature and the geotechnical engineer may use professional discretion in how the points are assigned.

PLATE B2
W.O. 6960-A5-SC
11-29-2018
GEOSOILS, INC.

Table D.2-3: Determination of Safety Factor

PLANNING AREA 2, BASIN 2D Consideration		Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
Suitability Assessment (A)	Infiltration Testing Method	0.25	Refer to Table D.2-4	0.50
	Soil Texture Class	0.25		0.25
	Soil Variability	0.25		0.25
	Depth to Groundwater/Obstruction	0.25		0.50
	Suitability Assessment Safety Factor, $S_A = \Sigma p$			1.50
Design (B)	Pretreatment	0.50	Refer to Table D.2-4	0.50
	Resiliency	0.25		0.75
	Compaction	0.25		0.75
	Design Safety Factor, $S_B = \Sigma p$			2.0
	Safety Factor, $S = S_A \times S_B$ (Must be always greater than or equal to 2)			3.0

The geotechnical engineer should reference Table D.2-4 below in order to determine appropriate factor values for use in the table above. The values in the table below are subjective in nature and the geotechnical engineer may use professional discretion in how the points are assigned.

PLATE B3
W.O. 6960-A5-SC
11-29-2018
GEOSOILS, INC.

Table D.2-3: Determination of Safety Factor

PLANNING AREA 2, BASIN 2E, 2F, 2G Consideration		Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
Suitability Assessment (A)	Infiltration Testing Method	0.25	Refer to Table D.2-4	0.50
	Soil Texture Class	0.25		0.25
	Soil Variability	0.25		0.25
	Depth to Groundwater/Obstruction	0.25		0.25
	Suitability Assessment Safety Factor, $S_A = \Sigma p$			1.25
Design (B)	Pretreatment	0.50	Refer to Table D.2-4	0.50
	Resiliency	0.25		0.75
	Compaction	0.25		0.75
	Design Safety Factor, $S_B = \Sigma p$			2.0
	Safety Factor, $S = S_A \times S_B$ (Must be always greater than or equal to 2)			2.5

The geotechnical engineer should reference Table D.2-4 below in order to determine appropriate factor values for use in the table above. The values in the table below are subjective in nature and the geotechnical engineer may use professional discretion in how the points are assigned.

PLATE B4
W.O. 6960-A5-SC
11-29-2018
GEOSOILS, INC.

Table D.2-3: Determination of Safety Factor

PLANNING AREA 3, BASIN 3A, 3B, 3C, 3E Consideration		Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
Suitability Assessment (A)	Infiltration Testing Method	0.25	Refer to Table D.2-4	0.50
	Soil Texture Class	0.25		0.50
	Soil Variability	0.25		0.50
	Depth to Groundwater/Obstruction	0.25		0.25
	Suitability Assessment Safety Factor, $S_A = \Sigma p$			1.75
Design (B)	Pretreatment	0.50	Refer to Table D.2-4	0.50
	Resiliency	0.25		0.50
	Compaction	0.25		0.50
	Design Safety Factor, $S_B = \Sigma p$			1.50
	Safety Factor, $S = S_A \times S_B$ (Must be always greater than or equal to 2)			2.6

The geotechnical engineer should reference Table D.2-4 below in order to determine appropriate factor values for use in the table above. The values in the table below are subjective in nature and the geotechnical engineer may use professional discretion in how the points are assigned.

PLATE B5
W.O. 6960-A5-SC
11-29-2018
GEOSOILS, INC.

Table D.2-3: Determination of Safety Factor

PLANNING AREA PA 3, BASIN 3F Consideration		Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
Suitability Assessment (A)	Infiltration Testing Method	0.25	Refer to Table D.2-4	0.50
	Soil Texture Class	0.25		0.50
	Soil Variability	0.25		0.50
	Depth to Groundwater/Obstruction	0.25		0.50
	Suitability Assessment Safety Factor, $S_A = \Sigma p$			2.0
Design (B)	Pretreatment	0.50	Refer to Table D.2-4	0.50
	Resiliency	0.25		0.50
	Compaction	0.25		0.50
	Design Safety Factor, $S_B = \Sigma p$			1.50
Safety Factor, $S = S_A \times S_B$ (Must be always greater than or equal to 2)				3.0

The geotechnical engineer should reference Table D.2-4 below in order to determine appropriate factor values for use in the table above. The values in the table below are subjective in nature and the geotechnical engineer may use professional discretion in how the points are assigned.

PLATE B6
W.O. 6960-A5-SC
11-29-2018
GEOSOILS, INC.

Table D.2-3: Determination of Safety Factor

DMA 17, BASIN 2H (OFFSITE) Consideration		Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
Suitability Assessment (A)	Infiltration Testing Method	0.25	Refer to Table D.2-4	0.75
	Soil Texture Class	0.25		0.50
	Soil Variability	0.25		0.50
	Depth to Groundwater/Obstruction	0.25		0.25
	Suitability Assessment Safety Factor, $S_A = \Sigma p$			2.0
Design (B)	Pretreatment	0.50	Refer to Table D.2-4	0.50
	Resiliency	0.25		0.50
	Compaction	0.25		0.25
	Design Safety Factor, $S_B = \Sigma p$			1.25
	Safety Factor, $S = S_A \times S_B$ (Must be always greater than or equal to 2)			2.5

The geotechnical engineer should reference Table D.2-4 below in order to determine appropriate factor values for use in the table above. The values in the table below are subjective in nature and the geotechnical engineer may use professional discretion in how the points are assigned.

PLATE B7
W.O. 6960-A5-SC
11-29-2018
GEOSOILS, INC.

Table D.2-3: Determination of Safety Factor

DMA 16, BASIN 3H (OFFSITE) Consideration		Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
Suitability Assessment (A)	Infiltration Testing Method	0.25	Refer to Table D.2-4	0.75
	Soil Texture Class	0.25		0.50
	Soil Variability	0.25		0.50
	Depth to Groundwater/Obstruction	0.25		0.25
	Suitability Assessment Safety Factor, $S_A = \Sigma p$			2.0
Design (B)	Pretreatment	0.50	Refer to Table D.2-4	0.50
	Resiliency	0.25		0.50
	Compaction	0.25		0.25
	Design Safety Factor, $S_B = \Sigma p$			1.25
	Safety Factor, $S = S_A \times S_B$ (Must be always greater than or equal to 2)			2.50

The geotechnical engineer should reference Table D.2-4 below in order to determine appropriate factor values for use in the table above. The values in the table below are subjective in nature and the geotechnical engineer may use professional discretion in how the points are assigned.

PLATE B8
W.O. 6960-A5-SC
11-29-2018
GEOSOILS, INC.

Table D.2-3: Determination of Safety Factor

Consideration (Lot 396) BASIN 3i		Assigned Weight (w)	Favor Value (v)	Product (p) p = w x v
Suitability Assessment (A)	Infiltration Testing Method	0.25	Refer to Table D.2-4	0.50
	Soil Texture Class	0.25		0.50
	Soil Variability	0.25		0.50
	Depth to Groundwater/Obstruction	0.25		0.25
	Suitability Assessment Safety Factor, $S_A = \Sigma p$			1.75
Design (B)	Pretreatment	0.50	Refer to Table D.2-4i	
	Resiliency	0.25		
	Compaction	0.25		
	Design Safety Factor, $SB = \Sigma pi$			
	Safety Factor, $S = S_A \times S_B$ (Must be always greater than or equal to 2)			2

*Design Criteria has been left blank due to the fact that design plans for an infiltration basin have not been created yet.

GEOSOILS, INC.
05-06-2019
W.O. 6960-A6-SC
PLATE B-6

Table D.2-3: Determination of Safety Factor

Consideration (Lot 395) BASIN 3J		Assigned Weight (w)	Favor Value (v)	Product (p) p = w x v
Suitability Assessment (A)	Infiltration Testing Method	0.25	Refer to Table D.2-4	0.50
	Soil Texture Class	0.25		0.50
	Soil Variability	0.25		0.50
	Depth to Groundwater/Obstruction	0.25		0.25
	Suitability Assessment Safety Factor, $S_A = \Sigma p$			1.75
Design (B)	Pretreatment	0.50	Refer to Table D.2-4i	
	Resiliency	0.25		
	Compaction	0.25		
	Design Safety Factor, $SB = \Sigma pi$			
	Safety Factor, $S = S_A \times S_B$ (Must be always greater than or equal to 2)			2

*Design Criteria has been left blank due to the fact that design plans for an infiltration basin have not been created yet.

GEOSOILS, INC.
05-06-2019
W.O. 6960-A6-SC
PLATE B-3

Automated Worksheet B.1: Calculation of Design Capture Volume (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Standard Drainage Basin Inputs	1	Drainage Basin ID or Name	1A		2A	2B	2C	2D	2E	2F	2G	2H	unitless
	2	85th Percentile 24-hr Storm Depth	0.70		0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	inches
	3	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	1,543,801		557,270	563,135	180,247	224,213	88,653	113,711	111,234	181,963	sq-ft
	4	Semi-Pervious Surfaces Not Serving as Dispersion Area (C=0.30)											sq-ft
	5	Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10)	661,629		238,830	241,343	77,249	96,091	37,994	48,733	47,672		sq-ft
	6	Natural Type A Soil Not Serving as Dispersion Area (C=0.10)											sq-ft
	7	Natural Type B Soil Not Serving as Dispersion Area (C=0.14)											sq-ft
	8	Natural Type C Soil Not Serving as Dispersion Area (C=0.23)										113,221	sq-ft
	9	Natural Type D Soil Not Serving as Dispersion Area (C=0.30)										109,178	sq-ft
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	10	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No		No	No	No	No	No	No	No	No	yes/no
	11	Impervious Surfaces **Directed to Dispersion Area** per SD-B (Ci=0.90)											sq-ft
	12	Semi-Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	13	Engineered Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	14	Natural Type A Soil **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	15	Natural Type B Soil **Serving as Dispersion Area** per SD-B (Ci=0.14)											sq-ft
	16	Natural Type C Soil **Serving as Dispersion Area** per SD-B (Ci=0.23)											sq-ft
	17	Natural Type D Soil **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	18	Number of Tree Wells Proposed per SD-A											#
	19	Average Mature Tree Canopy Diameter											ft
	20	Number of Rain Barrels Proposed per SD-E											#
	21	Average Rain Barrel Size											gal
Initial Runoff Factor Calculation	22	Total Tributary Area	2,205,430	0	796,100	804,478	257,496	320,304	126,647	162,444	158,906	404,362	sq-ft
	23	Initial Runoff Factor for Standard Drainage Areas	0.66	0.00	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.55	unitless
	24	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	25	Initial Weighted Runoff Factor	0.66	0.00	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.55	unitless
	26	Initial Design Capture Volume	84,909	0	30,650	30,972	9,914	12,332	4,876	6,254	6,118	12,973	cubic-feet
Dispersion Area Adjustments	27	Total Impervious Area Dispersed to Pervious Surface	0	0	0	0	0	0	0	0	0	0	sq-ft
	28	Total Pervious Dispersion Area	0	0	0	0	0	0	0	0	0	0	sq-ft
	29	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ratio
	30	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	31	Runoff Factor After Dispersion Techniques	0.66	n/a	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.55	unitless
	32	Design Capture Volume After Dispersion Techniques	84,909	0	30,650	30,972	9,914	12,332	4,876	6,254	6,118	12,973	cubic-feet
Tree & Barrel Adjustments	33	Total Tree Well Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
	34	Total Rain Barrel Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
Results	35	Final Adjusted Runoff Factor	0.66	0.00	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.55	unitless
	36	Final Effective Tributary Area	1,455,584	0	525,426	530,955	169,947	211,401	83,587	107,213	104,878	222,399	sq-ft
	37	Initial Design Capture Volume Retained by Site Design Elements	0	0	0	0	0	0	0	0	0	0	cubic-feet
	38	Final Design Capture Volume Tributary to BMP	84,909	0	30,650	30,972	9,914	12,332	4,876	6,254	6,118	12,973	cubic-feet

No Warning Messages

Automated Worksheet B.2: Retention Requirements (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Basic Analysis	1	Drainage Basin ID or Name	1A	-	2A	2B	2C	2D	2E	2F	2G	2H	unitless
	2	85th Percentile Rainfall Depth	0.70	-	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	inches
	3	Predominant NRCS Soil Type Within BMP Location	A		A	A	A	A	A	A	A	D	unitless
	4	Is proposed BMP location Restricted or Unrestricted for Infiltration Activities?	Restricted		Restricted	Unrestricted	Restricted	Unrestricted	Unrestricted	Unrestricted	Unrestricted	Unrestricted	unitless
	5	Nature of Restriction	Fill Depths		n/a	n/a	n/a	n/a	n/a	n/a	n/a	Other	unitless
	6	Do Minimum Retention Requirements Apply to this Project?	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes/no
	7	Are Habitable Structures Greater than 9 Stories Proposed?	No		No	No	No	No	No	No	No	No	yes/no
Advanced Analysis	8	Has Geotechnical Engineer Performed an Infiltration Analysis?	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes/no
	9	Design Infiltration Rate Recommended by Geotechnical Engineer	0.100		3.500	3.500	3.500	2.600	3.100	3.100	3.100	0.160	in/hr
Result	10	Design Infiltration Rate Used To Determine Retention Requirements	0.000	-	0.000	3.500	0.000	2.600	3.100	3.100	3.100	0.160	in/hr
	11	Percent of Average Annual Runoff that Must be Retained within DMA	1.5%	-	1.5%	80.0%	1.5%	80.0%	80.0%	80.0%	80.0%	22.2%	percentage
	12	Fraction of DCV Requiring Retention	0.01	-	0.01	0.99	0.01	0.99	0.99	0.99	0.99	0.15	ratio
	13	Required Retention Volume	849	-	307	30662	99	12209	4827	6191	6057	1946	cubic-feet

No Warning Messages

Automated Worksheet B.3: BMP Performance (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
BMP Inputs	1	Drainage Basin ID or Name	1A	-	2A	2B	2C	2D	2E	2F	2G	2H	sq-ft
	2	Design Infiltration Rate Recommended	0.000	-	0.000	3.500	0.000	2.600	3.100	3.100	3.100	0.160	in/hr
	3	Design Capture Volume Tributary to BMP	84,909	-	30,650	30,972	9,914	12,332	4,876	6,254	6,118	12,973	cubic-feet
	4	Is BMP Vegetated or Unvegetated?	Vegetated		Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	unitless
	5	Is BMP Impermeably Lined or Unlined?	Lined		Lined	Unlined	Lined	Unlined	Unlined	Unlined	Unlined	Unlined	unitless
	6	Does BMP Have an Underdrain?	Underdrain		Underdrain	Underdrain	Underdrain	No Underdrain	No Underdrain	No Underdrain	No Underdrain	Underdrain	unitless
	7	Does BMP Utilize Standard or Specialized Media?	Standard		Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	unitless
	8	Provided Surface Area	57,285		21,468	19,596	5,120	6,851	2,917	3,226	3,158	6,782	sq-ft
	9	Provided Surface Ponding Depth	6		6	6	6	6	6	6	6	6	inches
	10	Provided Soil Media Thickness	18		18	18	18	0	0	0	0	18	inches
	11	Provided Gravel Thickness (Total Thickness)	12		12	12	12	0	0	0	0	12	inches
	12	Underdrain Offset	3		3	3	3	~~3~~	~~3~~	~~3~~	~~3~~	3	inches
	13	Diameter of Underdrain or Hydromod Orifice (Select Smallest)	3.00		6.00	1.00	6.00	~~6.00~~	~~6.00~~	~~6.00~~	~~6.00~~	6.00	inches
	14	Specialized Soil Media Filtration Rate											in/hr
	15	Specialized Soil Media Pore Space for Retention											unitless
	16	Specialized Soil Media Pore Space for Biofiltration											unitless
	17	Specialized Gravel Media Pore Space											unitless
Retention Calculations	18	Volume Infiltrated Over 6 Hour Storm	0	0	0	30,972	0	8,906	4,521	5,000	4,895	543	cubic-feet
	19	Ponding Pore Space Available for Retention	0.00	1.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	unitless
	20	Soil Media Pore Space Available for Retention	0.05	0.05	0.05	0.05	0.05	0.25	0.25	0.25	0.25	0.05	unitless
	21	Gravel Pore Space Available for Retention (Above Underdrain)	0.00	0.40	0.00	0.00	0.00	0.40	0.40	0.40	0.40	0.00	unitless
	22	Gravel Pore Space Available for Retention (Below Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	23	Effective Retention Depth	2.10	0.00	2.10	2.10	2.10	6.00	6.00	6.00	6.00	2.10	inches
	24	Fraction of DCV Retained (Independent of Drawdown Time)	0.12	0.00	0.12	1.11	0.09	1.00	1.23	1.06	1.06	0.13	ratio
	25	Calculated Retention Storage Drawdown Time	120	0	120	6	120	6	6	6	6	13	hours
	26	Efficacy of Retention Processes	0.14	0.00	0.14	1.00	0.11	1.00	1.00	1.00	1.00	0.38	ratio
	27	Volume Retained by BMP (Considering Drawdown Time)	11,960	0	4,317	30,972	1,078	12,332	4,876	6,254	6,118	4,882	cubic-feet
	28	Design Capture Volume Remaining for Biofiltration	72,949	0	26,333	0	8,836	0	0	0	0	8,091	cubic-feet
Biofiltration Calculations	29	Max Hydromod Flow Rate through Underdrain	0.3829	0.0000	1.4948	0.0432	1.4948	0.0000	0.0000	0.0000	0.0000	1.4948	cfs
	30	Max Soil Filtration Rate Allowed by Underdrain Orifice	0.29	0.00	3.01	0.10	12.61	0.00	0.00	0.00	0.00	9.52	in/hr
	31	Soil Media Filtration Rate per Specifications	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	32	Soil Media Filtration Rate to be used for Sizing	0.29	0.00	3.01	0.10	5.00	0.00	0.00	0.00	0.00	5.00	in/hr
	33	Depth Biofiltered Over 6 Hour Storm	1.73	0.00	18.05	0.57	30.00	0.00	0.00	0.00	0.00	30.00	inches
	34	Ponding Pore Space Available for Biofiltration	1.00	0.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	1.00	unitless
	35	Soil Media Pore Space Available for Biofiltration	0.20	0.20	0.20	0.20	0.20	0.00	0.00	0.00	0.00	0.20	unitless
	36	Gravel Pore Space Available for Biofiltration (Above Underdrain)	0.40	0.40	0.40	0.40	0.40	0.00	0.00	0.00	0.00	0.40	unitless
	37	Effective Depth of Biofiltration Storage	13.20	0.00	13.20	13.20	13.20	0.00	0.00	0.00	0.00	13.20	inches
	38	Drawdown Time for Surface Ponding	21	0	2	2	1	2	2	2	2	1	hours
	39	Drawdown Time for Effective Biofiltration Depth	46	0	4	4	3	0	0	0	0	3	hours
	40	Total Depth Biofiltered	14.93	0.00	31.25	13.77	43.20	0.00	0.00	0.00	0.00	43.20	inches
	41	Option 1 - Biofilter 1.50 DCV: Target Volume	109,424	0	39,499	0	13,254	0	0	0	0	12,136	cubic-feet
	42	Option 1 - Provided Biofiltration Volume	71,285	0	39,499	0	13,254	0	0	0	0	12,136	cubic-feet
	43	Option 2 - Store 0.75 DCV: Target Volume	54,712	0	19,750	0	6,627	0	0	0	0	6,068	cubic-feet
	44	Option 2 - Provided Storage Volume	54,712	0	19,750	0	5,632	0	0	0	0	6,068	cubic-feet
	45	Portion of Biofiltration Performance Standard Satisfied	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	ratio
Result	46	Do Site Design Elements and BMPs Satisfy Annual Retention Requirements?	Yes	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes/no
	47	Overall Portion of Performance Standard Satisfied (BMP Efficacy Factor)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	48	**Deficit of Effectively Treated Stormwater**	**0**	**n/a**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	cubic-feet

No Warning Messages

Automated Worksheet B.1: Calculation of Design Capture Volume (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Standard Drainage Basin Inputs	1	Drainage Basin ID or Name	3A	3B	3C	3D	3E	3F	3G	3H	3i	3J	unitless
	2	85th Percentile 24-hr Storm Depth	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	inches
	3	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	125,447	34,200	139,254	264,030	63,023	57,353	80,738	53,717	34,959	26,798	sq-ft
	4	Semi-Pervious Surfaces Not Serving as Dispersion Area (C=0.30)											sq-ft
	5	Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10)	53,763	12,023	221,992	387,637	7,003	6,373	8,971	13,534	232,433	188,166	sq-ft
	6	Natural Type A Soil Not Serving as Dispersion Area (C=0.10)											sq-ft
	7	Natural Type B Soil Not Serving as Dispersion Area (C=0.14)											sq-ft
	8	Natural Type C Soil Not Serving as Dispersion Area (C=0.23)								63,936			sq-ft
	9	Natural Type D Soil Not Serving as Dispersion Area (C=0.30)											sq-ft
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	10	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No	No	No	No	No	No	No	No	No	No	yes/no
	11	Impervious Surfaces **Directed to Dispersion Area** per SD-B (Ci=0.90)											sq-ft
	12	Semi-Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	13	Engineered Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	14	Natural Type A Soil **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	15	Natural Type B Soil **Serving as Dispersion Area** per SD-B (Ci=0.14)											sq-ft
	16	Natural Type C Soil **Serving as Dispersion Area** per SD-B (Ci=0.23)											sq-ft
	17	Natural Type D Soil **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	18	Number of Tree Wells Proposed per SD-A											#
	19	Average Mature Tree Canopy Diameter											ft
	20	Number of Rain Barrels Proposed per SD-E											#
	21	Average Rain Barrel Size											gal
Initial Runoff Factor Calculation	22	Total Tributary Area	179,210	46,223	361,246	651,667	70,026	63,726	89,709	131,187	267,392	214,964	sq-ft
	23	Initial Runoff Factor for Standard Drainage Areas	0.66	0.69	0.41	0.42	0.82	0.82	0.82	0.49	0.20	0.20	unitless
	24	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	25	Initial Weighted Runoff Factor	0.66	0.69	0.41	0.42	0.82	0.82	0.82	0.49	0.20	0.20	unitless
	26	Initial Design Capture Volume	6,900	1,860	8,640	15,966	3,350	3,048	4,291	3,750	3,120	2,508	cubic-feet
Dispersion Area Adjustments	27	Total Impervious Area Dispersed to Pervious Surface	0	0	0	0	0	0	0	0	0	0	sq-ft
	28	Total Pervious Dispersion Area	0	0	0	0	0	0	0	0	0	0	sq-ft
	29	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ratio
	30	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	31	Runoff Factor After Dispersion Techniques	0.66	0.69	0.41	0.42	0.82	0.82	0.82	0.49	0.20	0.20	unitless
	32	Design Capture Volume After Dispersion Techniques	6,900	1,860	8,640	15,966	3,350	3,048	4,291	3,750	3,120	2,508	cubic-feet
Tree & Barrel Adjustments	33	Total Tree Well Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
	34	Total Rain Barrel Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
Results	35	Final Adjusted Runoff Factor	0.66	0.69	0.41	0.42	0.82	0.82	0.82	0.49	0.20	0.20	unitless
	36	Final Effective Tributary Area	118,279	31,894	148,111	273,700	57,421	52,255	73,561	64,282	53,478	42,993	sq-ft
	37	Initial Design Capture Volume Retained by Site Design Elements	0	0	0	0	0	0	0	0	0	0	cubic-feet
	38	Final Design Capture Volume Tributary to BMP	6,900	1,860	8,640	15,966	3,350	3,048	4,291	3,750	3,120	2,508	cubic-feet

No Warning Messages

Automated Worksheet B.2: Retention Requirements (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Basic Analysis	1	Drainage Basin ID or Name	3A	3B	3C	3D	3E	3F	3G	3H	3i	3J	unitless
	2	85th Percentile Rainfall Depth	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	inches
	3	Predominant NRCS Soil Type Within BMP Location	C	C	C	B	C	A	B	C	C	C	unitless
	4	Is proposed BMP location Restricted or Unrestricted for Infiltration Activities?	Unrestricted	Unrestricted	Unrestricted	Unrestricted	Unrestricted	Unrestricted	Unrestricted	Unrestricted	Unrestricted	Unrestricted	unitless
	5	Nature of Restriction	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	unitless
	6	Do Minimum Retention Requirements Apply to this Project?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes/no
	7	Are Habitable Structures Greater than 9 Stories Proposed?	No	No	No	No	No	No	No	No	No	No	yes/no
Advanced Analysis	8	Has Geotechnical Engineer Performed an Infiltration Analysis?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes/no
	9	Design Infiltration Rate Recommended by Geotechnical Engineer	0.380	0.380	0.380	3.000	0.380	2.000	0.380	0.160	0.115	0.008	in/hr
Result	10	Design Infiltration Rate Used To Determine Retention Requirements	0.380	0.380	0.380	3.000	0.380	2.000	0.380	0.160	0.115	0.008	in/hr
	11	Percent of Average Annual Runoff that Must be Retained within DMA	40.0%	40.0%	40.0%	80.0%	40.0%	80.0%	40.0%	22.2%	17.8%	1.5%	percentage
	12	Fraction of DCV Requiring Retention	0.32	0.32	0.32	0.99	0.32	0.99	0.32	0.15	0.12	0.01	ratio
	13	Required Retention Volume	2208	595	2765	15806	1072	3018	1373	563	374	25	cubic-feet

No Warning Messages

Automated Worksheet B.3: BMP Performance (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
BMP Inputs	1	Drainage Basin ID or Name	3A	3B	3C	3D	3E	3F	3G	3H	3i	3J	sq-ft
	2	Design Infiltration Rate Recommended	0.380	0.380	0.380	3.000	0.380	2.000	0.380	0.160	0.115	0.008	in/hr
	3	Design Capture Volume Tributary to BMP	6,900	1,860	8,640	15,966	3,350	3,048	4,291	3,750	3,120	2,508	cubic-feet
	4	Is BMP Vegetated or Unvegetated?	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	unitless
	5	Is BMP Impermeably Lined or Unlined?	Unlined	Unlined	Unlined	Unlined	Unlined	Unlined	Unlined	Unlined	Unlined	Lined	unitless
	6	Does BMP Have an Underdrain?	Underdrain	Underdrain	Underdrain	No Underdrain	Underdrain	No Underdrain	Underdrain	Underdrain	Underdrain	Underdrain	unitless
	7	Does BMP Utilize Standard or Specialized Media?	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	unitless
	8	Provided Surface Area	3,570	3,488	7,590	19,750	1,870	826	1,784	1,864	4,990	4,092	sq-ft
	9	Provided Surface Ponding Depth	6	6	6	12	6	12	6	6	6	6	inches
	10	Provided Soil Media Thickness	18	18	18	0	18	0	18	18	18	18	inches
	11	Provided Gravel Thickness (Total Thickness)	12	12	12	0	12	0	12	12	12	12	inches
	12	Underdrain Offset	3	3	3		3		3	3	3	3	inches
	13	Diameter of Underdrain or Hydromod Orifice (Select Smallest)	1.00	2.00	2.00	~~8.00~~	1.00	~~8.00~~	1.00	1.00	1.00	2.00	inches
	14	Specialized Soil Media Filtration Rate											in/hr
	15	Specialized Soil Media Pore Space for Retention											unitless
	16	Specialized Soil Media Pore Space for Biofiltration											unitless
	17	Specialized Gravel Media Pore Space											unitless
Retention Calculations	18	Volume Infiltrated Over 6 Hour Storm	678	663	1,442	15,966	355	826	339	149	287	0	cubic-feet
	19	Ponding Pore Space Available for Retention	0.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00	unitless
	20	Soil Media Pore Space Available for Retention	0.05	0.05	0.05	0.25	0.05	0.25	0.05	0.05	0.05	0.05	unitless
	21	Gravel Pore Space Available for Retention (Above Underdrain)	0.00	0.00	0.00	0.40	0.00	0.40	0.00	0.00	0.00	0.00	unitless
	22	Gravel Pore Space Available for Retention (Below Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	23	Effective Retention Depth	2.10	2.10	2.10	12.00	2.10	12.00	2.10	2.10	2.10	2.10	inches
	24	Fraction of DCV Retained (Independent of Drawdown Time)	0.19	0.68	0.32	2.24	0.20	0.54	0.15	0.13	0.37	0.29	ratio
	25	Calculated Retention Storage Drawdown Time	6	6	6	6	6	6	6	13	18	120	hours
	26	Efficacy of Retention Processes	0.71	1.00	0.92	1.00	0.74	1.00	0.59	0.38	0.73	0.30	ratio
	27	Volume Retained by BMP (Considering Drawdown Time)	4,884	1,860	7,923	15,966	2,467	3,048	2,548	1,411	2,268	747	cubic-feet
	28	Design Capture Volume Remaining for Biofiltration	2,016	0	717	0	883	0	1,743	2,339	852	1,761	cubic-feet
Biofiltration Calculations	29	Max Hydromod Flow Rate through Underdrain	0.0432	0.1715	0.1715	0.0000	0.0432	0.0000	0.0432	0.0432	0.0432	0.1715	cfs
	30	Max Soil Filtration Rate Allowed by Underdrain Orifice	0.52	2.12	0.98	0.00	1.00	0.00	1.05	1.00	0.37	1.81	in/hr
	31	Soil Media Filtration Rate per Specifications	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	32	Soil Media Filtration Rate to be used for Sizing	0.52	2.12	0.98	0.00	1.00	0.00	1.05	1.00	0.37	1.81	in/hr
	33	Depth Biofiltered Over 6 Hour Storm	3.14	12.75	5.86	0.00	5.99	0.00	6.28	6.01	2.24	10.87	inches
	34	Ponding Pore Space Available for Biofiltration	1.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	unitless
	35	Soil Media Pore Space Available for Biofiltration	0.20	0.20	0.20	0.00	0.20	0.00	0.20	0.20	0.20	0.20	unitless
	36	Gravel Pore Space Available for Biofiltration (Above Underdrain)	0.40	0.40	0.40	0.00	0.40	0.00	0.40	0.40	0.40	0.40	unitless
	37	Effective Depth of Biofiltration Storage	13.20	13.20	13.20	0.00	13.20	0.00	13.20	13.20	13.20	13.20	inches
	38	Drawdown Time for Surface Ponding	7	2	4	4	4	6	4	5	12	3	hours
	39	Drawdown Time for Effective Biofiltration Depth	15	5	10	0	10	0	9	11	27	7	hours
	40	Total Depth Biofiltered	16.34	25.95	19.06	0.00	19.19	0.00	19.48	19.21	15.44	24.07	inches
	41	Option 1 - Biofilter 1.50 DCV: Target Volume	3,023	0	1,075	0	1,324	0	2,615	3,508	1,278	2,641	cubic-feet
	42	Option 1 - Provided Biofiltration Volume	3,023	0	1,075	0	1,324	0	2,615	2,984	1,278	2,641	cubic-feet
	43	Option 2 - Store 0.75 DCV: Target Volume	1,512	0	537	0	662	0	1,307	1,754	639	1,320	cubic-feet
	44	Option 2 - Provided Storage Volume	1,512	0	537	0	662	0	1,307	1,754	639	1,320	cubic-feet
	45	Portion of Biofiltration Performance Standard Satisfied	1.00	0.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	ratio
Result	46	Do Site Design Elements and BMPs Satisfy Annual Retention Requirements?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes/no
	47	Overall Portion of Performance Standard Satisfied (BMP Efficacy Factor)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	48	**Deficit of Effectively Treated Stormwater**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	cubic-feet

Attention!

- BMPs sized at <3% of the effective tributary areas must be accompanied by Reduced Size BMP Maintenance calculations (see last tab)

Automated Worksheet B.4: Reduced Size BMP Maintenance Interval (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Drainage Basin Info	1	Drainage Basin ID or Name	-	-	-	-	-	3F	3G	3H	-	-	unitless
	2	Final Effective Tributary Area	-	-	-	-	-	52,255	73,561	64,282	-	-	sq-ft
	3	Provided BMP Surface Area	-	-	-	-	-	826	1,784	1,864	-	-	sq-ft
Biofiltration Clogging Inputs	4	Average Annual Precipitation						15.3	15.3	15.3			inches
	5	Load to Clog (default =2.0)						2.0	2.0	2.0			lb/sq-ft
	6	TSS Pretreatment Efficacy						0.50	0.25	0.25			yes/no
	7	Percentage "Commercial"						0%	0%	0%			percentage
	8	Percentage "Education"						0%	0%	0%			percentage
	9	Percentage "Industrial"						0%	0%	0%			percentage
	10	Percentage "Low Traffic Areas"						0%	0%	0%			percentage
	11	Percentage "Multi-Family Residential"						0%	0%	0%			percentage
	12	Percentage "Roof Areas"						0%	0%	0%			percentage
	13	Percentage "Single Family Residential"						0%	0%	0%			percentage
	14	Percentage "Transportation"						100%	100%	100%			percentage
	15	Percentage "Vacant/Open Space"						0%	0%	0%			percentage
	16	Percentage "Steep Hillslopes"						0%	0%	0%			percentage
Result	17	Total Percentage of Above Land Uses	0%	0%	0%	0%	0%	100%	100%	100%	0%	0%	percentage
	18	Average TSS Concentration for Tributary After Pretreatment	0	0	0	0	0	35	53	53	0	0	mg/L
	19	Average Annual Runoff Volume	0	0	0	0	0	66,625	93,790	81,960	0	0	cubic-feet
	20	Average Annual TSS Load	0	0	0	0	0	146	310	271	0	0	lb/yr
	21	Available Sediment Storage within BMP	0	0	0	0	0	1,652	3,568	3,728	0	0	lb
	22	Anticipated Major Maintenance Frequency	-	-	-	-	-	11.3	11.5	13.7	-	-	years

No Warning Messages

NOTE: PRETREATMENT WILL BE PROVIDED AT FINAL ENGINEERING

SSD BMPS FOR EQUESTRIAN CENTER

Automated Worksheet B.1: Calculation of Design Capture Volume (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Standard Drainage Basin Inputs	1	Drainage Basin ID or Name	31	32	33	34	35	36	37				unitless
	2	85th Percentile 24-hr Storm Depth	0.70	0.70	0.70	0.70	0.70	0.70	0.70				inches
	3	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	26,300					23,750	8,200				sq-ft
	4	Semi-Pervious Surfaces Not Serving as Dispersion Area (C=0.30)											sq-ft
	5	Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10)											sq-ft
	6	Natural Type A Soil Not Serving as Dispersion Area (C=0.10)											sq-ft
	7	Natural Type B Soil Not Serving as Dispersion Area (C=0.14)											sq-ft
	8	Natural Type C Soil Not Serving as Dispersion Area (C=0.23)											sq-ft
	9	Natural Type D Soil Not Serving as Dispersion Area (C=0.30)											sq-ft
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	10	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	Yes	Yes	Yes	Yes	Yes	Yes	Yes				yes/no
	11	Impervious Surfaces **Directed to Dispersion Area** per SD-B (Ci=0.90)		22,600	16,600	700	700						sq-ft
	12	Semi-Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	13	Engineered Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	14	Natural Type A Soil **Serving as Dispersion Area** per SD-B (Ci=0.10)				700	700						sq-ft
	15	Natural Type B Soil **Serving as Dispersion Area** per SD-B (Ci=0.14)											sq-ft
	16	Natural Type C Soil **Serving as Dispersion Area** per SD-B (Ci=0.23)		22,600	16,600								sq-ft
	17	Natural Type D Soil **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	18	Number of Tree Wells Proposed per SD-A	16					14	5				#
	19	Average Mature Tree Canopy Diameter	20					20	20				ft
	20	Number of Rain Barrels Proposed per SD-E											#
	21	Average Rain Barrel Size											gal
Initial Runoff Factor Calculation	22	Total Tributary Area	26,300	45,200	33,200	1,400	1,400	23,750	8,200	0	0	0	sq-ft
	23	Initial Runoff Factor for Standard Drainage Areas	0.90	0.00	0.00	0.00	0.00	0.90	0.90	0.00	0.00	0.00	unitless
	24	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.57	0.57	0.50	0.50	0.00	0.00	0.00	0.00	0.00	unitless
	25	Initial Weighted Runoff Factor	0.90	0.57	0.57	0.50	0.50	0.90	0.90	0.00	0.00	0.00	unitless
	26	Initial Design Capture Volume	1,381	1,503	1,104	41	41	1,247	431	0	0	0	cubic-feet
Dispersion Area Adjustments	27	Total Impervious Area Dispersed to Pervious Surface	0	22,600	16,600	700	700	0	0	0	0	0	sq-ft
	28	Total Pervious Dispersion Area	0	22,600	16,600	700	700	0	0	0	0	0	sq-ft
	29	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	1.00	1.00	1.00	1.00	n/a	n/a	n/a	n/a	n/a	ratio
	30	Adjustment Factor for Dispersed & Dispersion Areas	1.00	0.31	0.31	0.00	0.00	1.00	1.00	1.00	1.00	1.00	ratio
	31	Runoff Factor After Dispersion Techniques	0.90	0.18	0.18	0.00	0.00	0.90	0.90	n/a	n/a	n/a	unitless
	32	Design Capture Volume After Dispersion Techniques	1,381	475	349	0	0	1,247	431	0	0	0	cubic-feet
Tree & Barrel Adjustments	33	Total Tree Well Volume Reduction	2,880	0	0	0	0	2,520	900	0	0	0	cubic-feet
	34	Total Rain Barrel Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
Results	35	Final Adjusted Runoff Factor	0.00	0.18	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	36	Final Effective Tributary Area	0	8,136	5,976	0	0	0	0	0	0	0	sq-ft
	37	Initial Design Capture Volume Retained by Site Design Elements	2,880	1,028	755	41	41	2,520	900	0	0	0	cubic-feet
	38	Final Design Capture Volume Tributary to BMP	0	475	349	0	0	0	0	0	0	0	cubic-feet

No Warning Messages

EXISTING TREES QUALIFY FOR SSD BMPs BY CAPTURING AT A MINIMUM TWICE THE DCV FOR BOTH POLLUTANT AND FLOW CONTROL REQUIREMENTS.

IMPERVIOUS AREA DISPERSION WITH 1:1 IMPERVIOUS TO PERVIOUS RATIO PER SD-B SATISFY BOTH POLLUTANT AND FLOW CONTROL REQUIREMENTS.

EXISTING TREES QUALIFY FOR SSD BMPs BY CAPTURING AT A MINIMUM TWICE THE DCV FOR BOTH POLLUTANT AND FLOW CONTROL REQUIREMENTS.

SSD BMPS FOR EQUESTRIAN CENTER

Automated Worksheet B.1: Calculation of Design Capture Volume (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Standard Drainage Basin Inputs	1	Drainage Basin ID or Name	21	22	23	24	25	26	27	28	29	30	unitless
	2	85th Percentile 24-hr Storm Depth	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	inches
	3	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	51,700	10,150	15,250	21,150	21,600	20,150	28,370		22,170	22,350	sq-ft
	4	Semi-Pervious Surfaces Not Serving as Dispersion Area (C=0.30)											sq-ft
	5	Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10)											sq-ft
	6	Natural Type A Soil Not Serving as Dispersion Area (C=0.10)											sq-ft
	7	Natural Type B Soil Not Serving as Dispersion Area (C=0.14)											sq-ft
	8	Natural Type C Soil Not Serving as Dispersion Area (C=0.23)											sq-ft
	9	Natural Type D Soil Not Serving as Dispersion Area (C=0.30)											sq-ft
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	10	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes/no
	11	Impervious Surfaces **Directed to Dispersion Area** per SD-B (Ci=0.90)								12,200			sq-ft
	12	Semi-Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	13	Engineered Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	14	Natural Type A Soil **Serving as Dispersion Area** per SD-B (Ci=0.10)								12,200			sq-ft
	15	Natural Type B Soil **Serving as Dispersion Area** per SD-B (Ci=0.14)											sq-ft
	16	Natural Type C Soil **Serving as Dispersion Area** per SD-B (Ci=0.23)											sq-ft
	17	Natural Type D Soil **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	18	Number of Tree Wells Proposed per SD-A	31	6	9	13	13	12	17		13	14	#
	19	Average Mature Tree Canopy Diameter	20	20	20	20	20	20	20		20	20	ft
	20	Number of Rain Barrels Proposed per SD-E											#
	21	Average Rain Barrel Size											gal
Initial Runoff Factor Calculation	22	Total Tributary Area	51,700	10,150	15,250	21,150	21,600	20,150	28,370	24,400	22,170	22,350	sq-ft
	23	Initial Runoff Factor for Standard Drainage Areas	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.00	0.90	0.90	unitless
	24	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.00	unitless
	25	Initial Weighted Runoff Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.50	0.90	0.90	unitless
	26	Initial Design Capture Volume	2,714	533	801	1,110	1,134	1,058	1,489	712	1,164	1,173	cubic-feet
Dispersion Area Adjustments	27	Total Impervious Area Dispersed to Pervious Surface	0	0	0	0	0	0	0	12,200	0	0	sq-ft
	28	Total Pervious Dispersion Area	0	0	0	0	0	0	0	12,200	0	0	sq-ft
	29	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.00	n/a	n/a	ratio
	30	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	ratio
	31	Runoff Factor After Dispersion Techniques	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.00	0.90	0.90	unitless
	32	Design Capture Volume After Dispersion Techniques	2,714	533	801	1,110	1,134	1,058	1,489	0	1,164	1,173	cubic-feet
Tree & Barrel Adjustments	33	Total Tree Well Volume Reduction	5,580	1,080	1,620	2,340	2,340	2,160	3,060	0	2,340	2,520	cubic-feet
	34	Total Rain Barrel Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
Results	35	Final Adjusted Runoff Factor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	36	Final Effective Tributary Area	0	0	0	0	0	0	0	0	0	0	sq-ft
	37	Initial Design Capture Volume Retained by Site Design Elements	5,580	1,080	1,620	2,340	2,340	2,160	3,060	712	2,340	2,520	cubic-feet
	38	Final Design Capture Volume Tributary to BMP	0	0	0	0	0	0	0	0	0	0	cubic-feet

No Warning Messages

EXISTING TREES QUALIFY FOR SSD BMPs BY CAPTURING AT A MINIMUM TWICE THE DCV FOR BOTH POLLUTANT AND FLOW CONTROL REQUIREMENTS.

IMPERVIOUS AREA DISPERSION WITH 1:1 IMPERVIOUS TO PERVIOUS RATIO PER SD-B SATISFY BOTH POLLUTANT AND FLOW CONTROL REQUIREMENTS.

EXISTING TREES QUALIFY FOR SSD BMPs BY CAPTURING AT A MINIMUM TWICE THE DCV FOR BOTH POLLUTANT AND FLOW CONTROL REQUIREMENTS.

Reference Documents for SSD BMPs

E.8 SD-B Impervious Area Dispersion (Dispersion Areas)

Photo Credit: Orange County Technical Guidance Document

MS4 Permit Category

Site Design

Retention

Manual Category

Site Design
Infiltration

Applicable Performance Criteria

Site Design
Pollutant Control
Flow Control

Primary Benefits

Volume Reduction
Peak Flow Attenuation

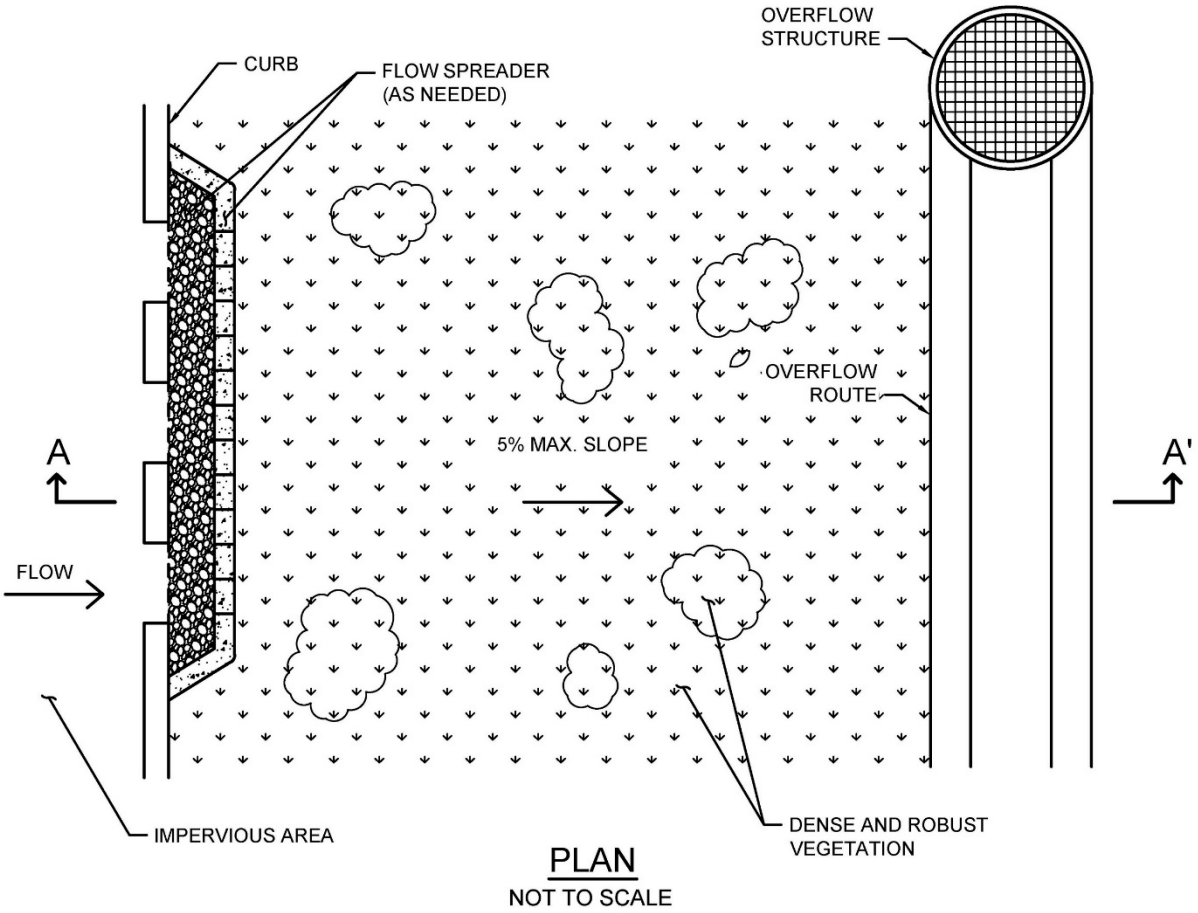
Description

Impervious area dispersion (dispersion) refers to the practice of effectively disconnecting impervious areas from directly draining to the storm drain system by routing runoff from impervious areas such as rooftops (through downspout disconnection), walkways, and driveways onto the surface of adjacent pervious areas. The intent is to slow runoff discharges, and reduce volumes. Dispersion with partial or full infiltration results in significant volume reduction by means of infiltration and evapotranspiration.

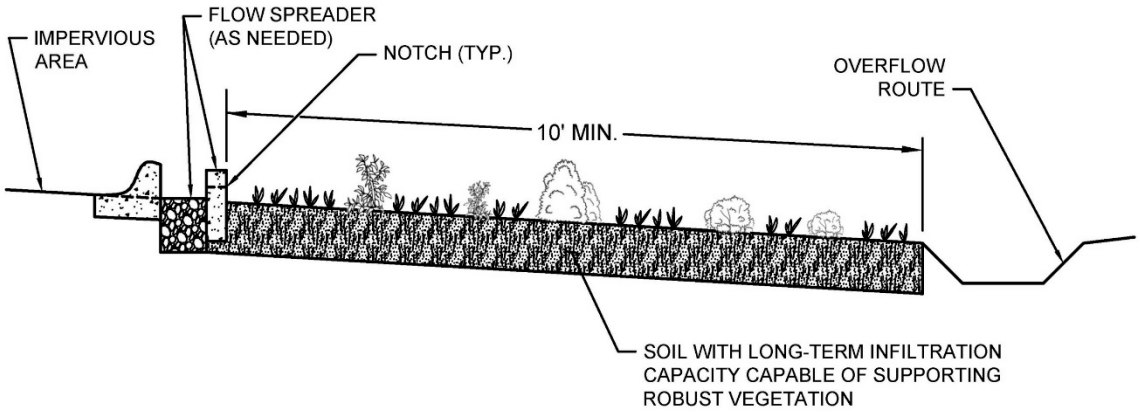
Typical dispersion components include:

- An impervious surface from which runoff flows will be routed with minimal piping to limit concentrated inflows
- Splash blocks, flow spreaders, or other means of dispersing concentrated flows and providing energy dissipation as needed
- Dedicated pervious area, typically vegetated, with in-situ soil infiltration capacity for partial or full infiltration
- Optional soil amendments to improve vegetation support, maintain infiltration rates and enhance treatment of routed flows
- Overflow route for excess flows to be conveyed from dispersion area to the storm drain

system or discharge point



PLAN
NOT TO SCALE



SECTION A-A'
NOT TO SCALE

Typical plan and section view of an Impervious Area Dispersion BMP

Design Adaptations for Project Goals

Site design BMP to reduce impervious area and DCV. Impervious area dispersion primarily functions as a site design BMP for reducing the effective imperviousness of a site by providing partial or full infiltration of the flows that are routed to pervious dispersion areas and otherwise slowing down excess flows that eventually reach the storm drain system. This can significantly reduce the DCV for the site.

Design Criteria and Considerations

Dispersion must meet the following design criteria. Deviations from the below criteria may be approved at the discretion of County Staff if it is determined to be appropriate:

Siting and Design		*Intent/Rationale*
☐	**Impervious area dispersion Placement:** ensure area is graded; and located so that full DCV water drains to the area of dispersion	Minimizes short-circuiting of run off
☐	Dispersion is over areas with soil types capable of supporting or being amended (e.g., with sand or compost) to support vegetation. Media amendments must be tested to verify that they are not a source of pollutants.	Soil must have long-term infiltration capacity for partial or full infiltration and be able to support vegetation to provide runoff treatment. Amendments to improve plant growth must not have negative impact on water quality.
☐	Dispersion has vegetated sheet flow over a relatively large distance (minimum 10 feet) from inflow to overflow route.	Full or partial infiltration requires relatively large areas to be effective depending on the permeability of the underlying soils.
☐	Pervious areas should be flat (with less than 5% slopes) and vegetated.	Flat slopes facilitate sheet flows and minimize velocities, thereby improving treatment and reducing the likelihood of erosion.
Inflow velocities		
☐	Inflow velocities are limited to 3 ft/s or less or use energy dissipation methods (e.g., riprap, level spreader) for concentrated inflows.	High inflow velocities can cause erosion, scour and/or channeling.
Dedication		

Siting and Design		*Intent/Rationale*
☐	Dispersion areas must be owned by the project owner and be dedicated for the purposes of dispersion to the exclusion of other future uses that might reduce the effectiveness of the dispersion area.	Dedicated dispersion areas prevent future conversion to alternate uses and facilitate continued full and partial infiltration benefits.
Vegetation		
☐	Dispersion typically requires dense and robust vegetation for proper function. Drought tolerant species should be selected to minimize irrigation needs. A plant list to aid in selection can be found in Appendix F.	Vegetation improves resistance to erosion and aids in runoff treatment.

Conceptual Design and Sizing Approach for Site Design

1. Determine the areas where dispersion can be used in the site design to reduce the DCV for pollutant control sizing.
2. Calculate the DCV for storm water pollutant control per Appendix B.2, taking into account reduced runoff from dispersion.
3. Determine if a DMA is considered "Self-retaining" if the impervious to pervious ratio is:
    a. 2:1 when the pervious area is composed of Hydrologic Soil Group A
    b. 1:1 when the pervious area is composed of Hydrologic Soil Group B

Conceptual Design and Sizing Approach for Storm Water Pollutant Treatment and Flow Control

DMAs using impervious area dispersion are considered to meet both pollutant control and hydromodification flow control requirements if ALL of the following criteria are met:

1. All impervious area within the DMA discharges to the pervious area before the runoff discharges from the DMA.
2. As a minimum, the top 11 inches of the pervious area uses amended soils in accordance with the SD-F fact sheet and the pervious area also meets the requirements for dispersion (e.g. slope, inflow velocities, etc.) in the SD-B fact sheet.
3. The impervious to pervious area ratio is 1:1 or less.

Impervious Area Dispersion designed to meet both pollutant control and flow control requirements are designated as SSD BMPs.

Maintenance Overview

Normal Expected Maintenance. Vegetated area shall be maintained as part of normal landscape

maintenance. Additionally, ensure that storm water runoff can be conveyed into the vegetated area as designed. That is, the mechanism that allows storm water runoff from impervious area to flow into the pervious area (e.g., a curb cut allows runoff from a parking lot to drain onto adjacent landscaping area, or a roof drain outlet is directed to a lawn) shall not be removed, blocked, filled, or otherwise changed in a manner that prevents storm water from draining into the pervious area. A summary table of standard inspection and maintenance indicators is provided within this Fact Sheet.

Non-Standard Maintenance or BMP Failure. Impervious area dispersion is a site design BMP that normally does not require maintenance actions beyond routine landscape maintenance. If changes have been made to the area, such as the vegetated area has been replaced with impervious area, or the mechanism that allows storm water runoff from impervious area to flow into the pervious area has been removed (e.g., roof drains previously directed to vegetated area have been directly connected to the street or storm drain system), the BMP is not performing as intended to protect downstream waterways from pollution and/or erosion. Corrective maintenance will be required to restore drainage into the pervious area as designed. If the pervious area has been removed, contact the County reviewer to determine a solution.

Runoff directed into vegetated areas is expected to be drained within 24-96 hours following a storm event. Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health, and surface ponding longer than approximately 96 hours following a storm event poses a risk of vector (mosquito) breeding. Poor drainage can result from clogging or compaction of the soils. Loosen or replace the soils to restore drainage.

Other Special Considerations. Site design BMPs, such as impervious area dispersion, installed within a new development or redevelopment project are components of an overall storm water management strategy for the project. The presence of site design BMPs within a project is usually a factor in the determination of the amount of runoff to be managed with structural BMPs (i.e., the amount of runoff expected to reach downstream retention or biofiltration basins that process storm water runoff from the project as a whole). When site design BMPs are not maintained or are removed, this can lead to clogging or failure of downstream structural BMPs due to greater delivery of runoff and pollutants than intended for the structural BMP. Therefore, the County reviewer may require confirmation of maintenance of site design BMPs as part of their structural BMP maintenance documentation requirements. Site design BMPs that have been installed as part of the project should not be removed, nor should they be bypassed by re-routing roof drains or re-grading surfaces within the project. If changes are necessary, consult the County reviewer to determine requirements.

Summary of Standard Inspection and Maintenance

The property owner is responsible to ensure inspection, operation and maintenance of permanent BMPs on their property unless responsibility has been formally transferred to an agency, community facilities district, homeowners association, property owners association, or other special district.

Maintenance frequencies listed in this table are average/typical frequencies. Actual maintenance needs are site-specific, and maintenance may be required more frequently. Maintenance must be performed whenever needed, based on maintenance indicators presented in this table. The BMP owner is responsible for conducting regular inspections to see when maintenance is needed based on the maintenance indicators. During the first year of operation of a structural BMP, inspection is recommended at least once prior to August 31 and then monthly from September through May. Inspection during a storm event is also recommended. After the initial period of frequent inspections, the minimum inspection and maintenance frequency can be determined based on the results of the first year inspections.

Threshold/Indicator	Maintenance Action	Inspection and Maintenance Frequency
Poor vegetation establishment	Re-seed, re-plant, or re-establish vegetation per original plans.	• Inspect monthly. • Maintain when needed.
Dead or diseased vegetation	Remove dead or diseased vegetation, re-seed, re-plant, or re-establish vegetation per original plans.	• Inspect monthly. • Maintain when needed.
Overgrown vegetation	Mow or trim as appropriate.	• Inspect monthly. • Maintain when needed.
Standing water in vegetated pervious area for longer than 24 hours following a storm event Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health	Disperse any areas of standing water to nearby landscaping (i.e., spread it out to another portion of the pervious area so it drains into the soil). Make appropriate corrective measures such as adjusting irrigation system, or repairing/replacing clogged or compacted soils.	• Inspect monthly and after every 0.5-inch or larger storm event. If standing water is observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintain when needed.

Threshold/Indicator	Maintenance Action	Inspection and Maintenance Frequency
Presence of mosquitos/larvae For images of egg rafts, larva, pupa, and adult mosquitos, see http://www.mosquito.org/biology	Disperse any areas of standing water to nearby landscaping (i.e., spread it out to another portion of the pervious area so it drains into the soil). Loosen or replace soils to restore drainage (and prevent standing water)	• Inspect monthly and after every 0.5-inch or larger storm event. If mosquitos are observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintain when needed
Entrance / opening to the vegetated pervious area is blocked such that storm water from impervious area will not drain into the pervious area (e.g., a curb cut opening is blocked by debris or a roof drain outlet has been directly connected to the storm drain system)	Make repairs as appropriate to restore drainage into the vegetated pervious area.	• Inspect monthly. • Maintain when needed.

Sizing Site Design BMPs to meet Flow Control Requirements

A Guidance for Meeting Flow Control Requirements on PDP Projects without implementing Structural BMPs

September 22, 2016

Stuart Kuhn, P.E.

Its Been Done Before!

- San Diego BMP Sizing Calculator Methodology: **Non-Structural BMP Sizing Methodology**
  - Modeling analysis confirmed Self Retaining areas meet flow duration requirements for Group D soils at 1:1 ratio of impervious to pervious area with 3" ponding depth.(Retains 1.5" direct rainfall)
  - In many cases in San Diego the Flow Control Devices are about *Twice* as big as the Pollutant Control Devices.
- Thus, if we capture twice the volume of the DCV we meet **Flow Control** Requirements.
  - Self-retaining areas meeting **flow control** also satisfy the **pollutant control** criteria.

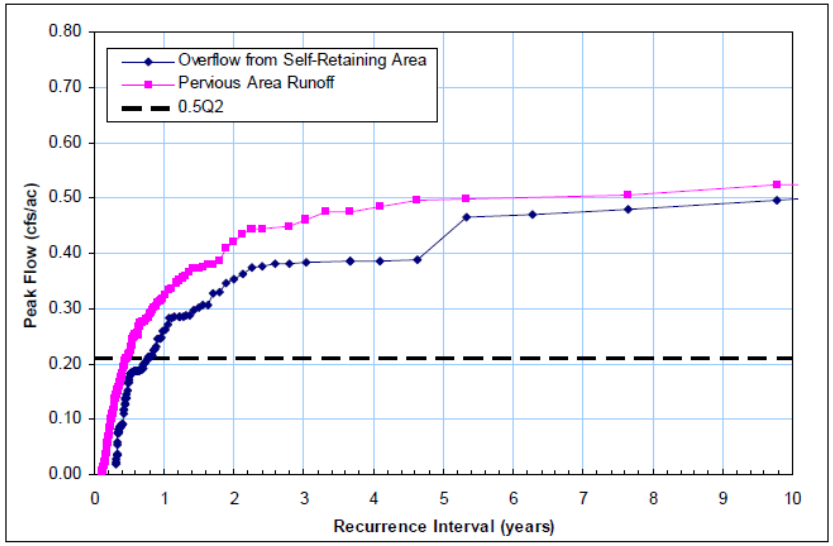


Figure 3-1. GROUP D SOILS: Peak Flows Frequency Statistics for Pre-Project and Self-Retaining Area Simulations with 1:1 Ratio of Upstream Connected Impervious Area

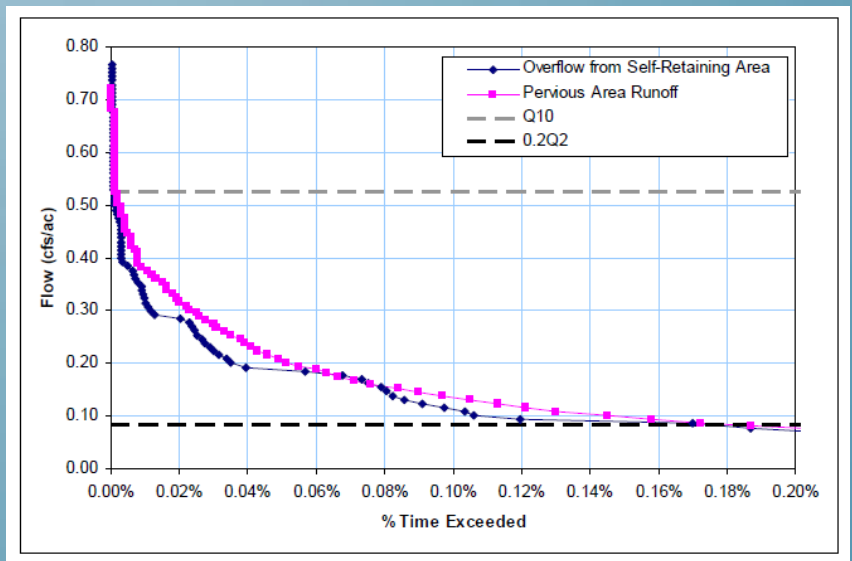


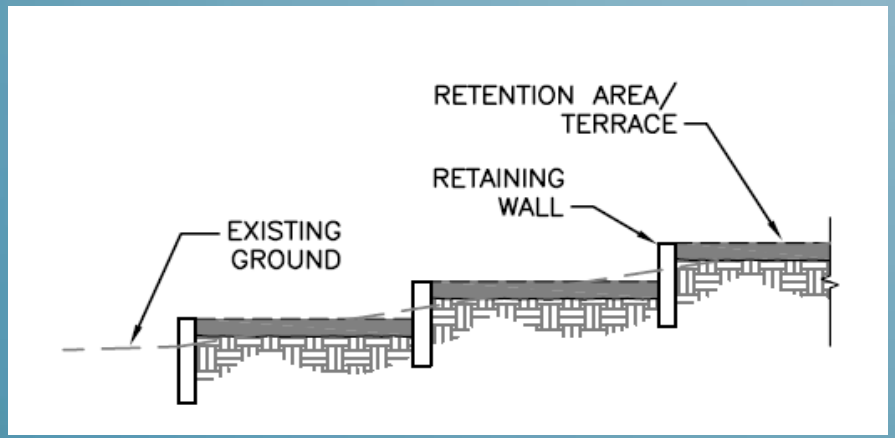
Figure 3-2. GROUP D SOILS: Comparison of Flow Duration Statistics for Pre-Project and Self-Retaining Area Simulations with 1:1 Ratio of Upstream Connected Impervious Area

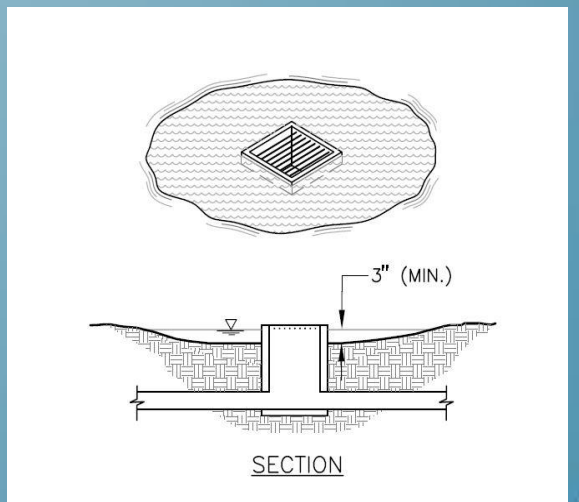
Step by Step Implementation

1. Minimize impervious surfaces
2. Utilize self-mitigating area
3. Drain Impervious areas to self-retaining areas
4. Design self-retaining areas to retain **2** x DCV(1.0 to 2.0 inches) to meet **Flow Control** requirements.
5. Limitations to this methodology:
   - Diversion of flow is not allowed.
   - Maximum 96-hour drawdown time.

Projects designed with all proposed areas meeting the above criteria have been determined to meet storm water obligations and do not require Structural BMPs.

- Include a narrative in your PDP SWQMP explaining how your project follows this guidance.





LEGEND

- DRAINAGE MANAGEMENT AREA
- ALTERNATIVE COMPLIANCE EXCESS AREA TREATED BY POLLUTION CONTROL BMP
- BIOFILTRATION WITH PARTIAL RETENTION BASIN BMP HATCH
- REFERENCE TRIBUTARY AREA/DISTURBED AREA NOT TRIBUTARY TO PROPOSED BMP: 54,312 SF
- PROPOSED AREA NOT TRIBUTARY TO PROPOSED BMP (TRANSPORTATION: 37,503 SF)
- PROPOSED AREA NOT TRIBUTARY TO PROPOSED BMP (LANDSCAPING/OPEN SPACE: 11,177 SF)
- PROPOSED AREA NOT TRIBUTARY TO PROPOSED BMP (DECOMPOSED GRANITE: 5,632 SF)

N

VESSELS RANCH ROAD

WEST LILAC ROAD

(251.8 TW/EG)
250.5 FS

(255.8 TW/EG)
251.8 FS

258.9 TW
(258.9 EG)

256.3 TW
256.3 FS

DMA 17 - ACP TRIBUTARY
1" = 60'

SULLIVAN MIDDLE SCHOOL

WEST LILAC ROAD

West Lilac Road

W. LILAC 1 - REFERENCE TRIBUTARY
1" = 50'

WEST LILAC ROAD

CAMINO DEL REY

ROUNDABOUT - REFERENCE TRIBUTARY
1" = 20'

WEST LILAC ROAD

W. LILAC 2 - REFERENCE TRIBUTARY
1" =40'

JOB #: 4192.00
CREATED: 7/23/19

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey

701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

COUNTY OF SAN DIEGO

OCEAN BREEZE RANCH

SWOMP ATTACHMENT 1A
ONSITE ALTERNATIVE COMPLIANCE EXHIBIT

Last save by LEONORA PIZARRO, File Name P:\4192\Engr\Reports\SWOMP\Attachments\A1 - Pollutant Control BMPs\ROUNDABOUT\4192 Roundabout - ALT COMP- new.dwg, Date Last Saved 7/30/2019 11:46:06 PM, Date Plotted Last 7/31/2019 12:12:37 AM

Automated Worksheet B.1: Calculation of Design Capture Volume (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Standard Drainage Basin Inputs	1	Drainage Basin ID or Name	ROUNDABOUT REF. TRIBUTARY	W. LILAC 1 REF. TRIBUTARY	W. LILAC 2 REF. TRIBUTARY					ACP FROM DMA 17			unitless
	2	85th Percentile 24-hr Storm Depth	0.70	0.70	0.70					0.70			inches
	3	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	21,788	1,941	13,774					13,069			sq-ft
	4	Semi-Pervious Surfaces Not Serving as Dispersion Area (C=0.30)											sq-ft
	5	Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10)	6,016	5,161	5,632								sq-ft
	6	Natural Type A Soil Not Serving as Dispersion Area (C=0.10)											sq-ft
	7	Natural Type B Soil Not Serving as Dispersion Area (C=0.14)											sq-ft
	8	Natural Type C Soil Not Serving as Dispersion Area (C=0.23)								224,590			sq-ft
	9	Natural Type D Soil Not Serving as Dispersion Area (C=0.30)											sq-ft
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	10	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No	No	No	No	No	No	No	No			yes/no
	11	Impervious Surfaces **Directed to Dispersion Area** per SD-B (Ci=0.90)											sq-ft
	12	Semi-Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	13	Engineered Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	14	Natural Type A Soil **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	15	Natural Type B Soil **Serving as Dispersion Area** per SD-B (Ci=0.14)											sq-ft
	16	Natural Type C Soil **Serving as Dispersion Area** per SD-B (Ci=0.23)											sq-ft
	17	Natural Type D Soil **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	18	Number of Tree Wells Proposed per SD-A											#
	19	Average Mature Tree Canopy Diameter											ft
	20	Number of Rain Barrels Proposed per SD-E											#
	21	Average Rain Barrel Size											gal
Initial Runoff Factor Calculation	22	Total Tributary Area	27,804	7,102	19,406	0	0	0	0	237,659	0	0	sq-ft
	23	Initial Runoff Factor for Standard Drainage Areas	0.73	0.32	0.67	0.00	0.00	0.00	0.00	0.27	0.00	0.00	unitless
	24	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	25	Initial Weighted Runoff Factor	0.73	0.32	0.67	0.00	0.00	0.00	0.00	0.27	0.00	0.00	unitless
	26	Initial Design Capture Volume	1,184	133	758	0	0	0	0	3,743	0	0	cubic-feet
Dispersion Area Adjustments	27	Total Impervious Area Dispersed to Pervious Surface	0	0	0	0	0	0	0	0	0	0	sq-ft
	28	Total Pervious Dispersion Area	0	0	0	0	0	0	0	0	0	0	sq-ft
	29	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ratio
	30	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	31	Runoff Factor After Dispersion Techniques	0.73	0.32	0.67	n/a	n/a	n/a	n/a	0.27	n/a	n/a	unitless
	32	Design Capture Volume After Dispersion Techniques	1,184	133	758	0	0	0	0	3,743	0	0	cubic-feet
Tree & Barrel Adjustments	33	Total Tree Well Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
	34	Total Rain Barrel Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
Results	35	Final Adjusted Runoff Factor	0.73	0.32	0.67	0.00	0.00	0.00	0.00	0.27	0.00	0.00	unitless
	36	Final Effective Tributary Area	20,297	2,273	13,002	0	0	0	0	64,168	0	0	sq-ft
	37	Initial Design Capture Volume Retained by Site Design Elements	0	0	0	0	0	0	0	0	0	0	cubic-feet
	38	Final Design Capture Volume Tributary to BMP	1,184	133	758	0	0	0	0	3,743	0	0	cubic-feet

No Warning Messages

TOTAL PROPOSED UNTREATED DCV = 2,075 CF

Ve = 2,358 CF

2,358 CF > 2,075 CF
*Volume Earned is greater than the Proposed Area DCV

IMPACTED DCV (V1) = MITIGATED DCV (V2) SINCE RUNOFF COEFFICIENTS REMAIN UNCHANGED IN PROPOSED CONDITIONS WITH PROPOSED BMP

Automated Spreadsheet Calculation for Worksheet A.3: Partial Retention BMP Efficacy Factor Determination for Water Quality Equivalency (Version 1.0)

Category	#	Description	Value	Units	Notes
BMP Inputs	0	Effective Tributary Area	404,362	sq-ft	User Input (Tributary Runoff Coefficient x Tributary Area)
	1	Design Capture Volume Tributary to BMP	12,973	cubic-feet	User Input from BMPDM
	2	Provided BMP Surface Area	6,782	sq-ft	User Input, must be ≥ 3% of Effective Tributary Area.
	3	Provided Surface Ponding Depth	6.0	inches	User Input
	4	Provided Soil Media Thickness	18.0	inches	User Input, 18 inches minimum
	5	Provided Depth of Gravel Above Underdrain Invert	12.0	inches	User Input, use a value of zero if gravel does not cover entire bottom.
	6	Hydromodification Orifice Diameter of Underdrain	6.0	inches	User Input, select n/a if no hydromodification flow control is provided
	7	Provided Depth of Gravel Below the Underdrain	12.0	inches	User Input
	8	Native Soil Infiltration Rate	0.16	in/hr	User Input from BMPDM
Retention Calculations	9	Soil Media Pore Space Available for Retention	0.10	-	Default = 0.10 for Retention Portion of Partial Retention BMP
	10	Gravel Pore Space Available for Retention	0.40	-	Default = 0.40
	11	Effective Retention Depth	6.60	inches	(Line 4 x Line 9)+ (Line 7 x Line 10)
	12	Calculated Drawdown for Gravel Below Underdrain	30	hours	Maximum of 6 or [(Line 7 x Line 10) / Line 8]
	13	Volume Retained by BMP	3,730	cubic-feet	[(Line 11/12) x Line 2}
	14	Fraction of DCV Retained	0.29	ratio	[Line 13/Line 1]
	15	Provided Capture for Specified Retention BMP	0.49	ratio	Look up value from Retention Provided Capture Curves, Maximum of 1.00.
	16	BMP Efficacy Factor for Retention Element	0.49	ratio	[Line 15 x 1.00]
	17	Equivalent Fraction of DCV Retained with 36-hr Drawdown	0.32	ratio	Look up value from Retention Provided Capture Curves, Maximum of 1.00.
	18	Design Capture Volume Remaining for Biofiltration	8,822	cubic-feet	[Line 1 x (1.00 - Line 17)]
Biofiltration Calculations	19	Max Hydromod Flow Rate through Underdrain	1.568	CFS	If flow controls are provided, calculate per orifice equation below
	20	Max Soil Filtration Rate Allowed by Underdrain Orifice	9.99	in/hr	If flow controls are provided, calculate as [(Line 19 x 12 x 3600)/Line 2]
	21	Soil Media Filtration Rate per Specifications	5.00	in/hr	Default = 5.00
	22	Soil Media Filtration Rate to be used for Sizing	5.00	in/hr	Minimum of Line 20 or Line 21
	23	Depth Biofiltered Over 6 Hour Storm	30.00	inches	[Line 22 x 6]
	24	Soil Media Pore Space Available for Biofiltration	0.20	-	Default = 0.20 for Biofiltration Portion of Partial Retention BMP
	25	Effective Depth of Biofiltration Storage	14.40	inches	[Line 3 + (Line 4 x Line 24) + (Line 5 x Line 10)]
	26	Drawdown Time for Surface Ponding	1	hours	Minimum of [Line 3/5.00] or [Line 3/(Line 8 + Line 22)]
	27	Drawdown Time for Effective Biofiltration Depth	3	hours	Minimum of [Line 25/5.00] or [Line 25/(Line 8 + Line 22)]
	28	Total Depth Biofiltered	44.40	inches	[Line 23 + Line 25]
	29	Option 1 - Biofilter 1.50 DCV: Target Volume	13,233	cubic-feet	[1.50 x Line 18]
	30	Option 1 - Provided Biofiltration Volume	13,233	cubic-feet	[Minimum of Line 29 or [(Line 28/12) x Line 2]]
	31	Option 2 - Store 0.75 DCV: Target Volume	6,617	cubic-feet	[0.75 x Line 18]
	32	Option 2 - Provided Storage Volume	6,617	cubic-feet	[Minimum of Line 31 or [(Line 25/12) x Line 2]]
	33	Provided Capture for Specified Biofiltration BMP	1.50	ratio	[Maximum of (1.50 x Line 30/Line 29) or (1.50 x Line 32/Line 31)]
	34	BMP Efficacy Factor for Biofiltration Element	0.51	ratio	[(1.00 - Line 16) x Line 33 x 0.666]
BMP Factor	35	**Partial Retention BMP Efficacy Factor for Use in WQE Formula**	**1.00**	ratio	[Line 16 + Line 34]

Notes:

1. Applicants must provide user input for yellow shaded cells. Values for all other cells will be automatically generated.
2. Refer to **Section 2.3.1.3** of the guidance document for additional discussion of BMP Efficacy Factors.
3. Orifice Equation: $Q = CA\sqrt{2gh}$

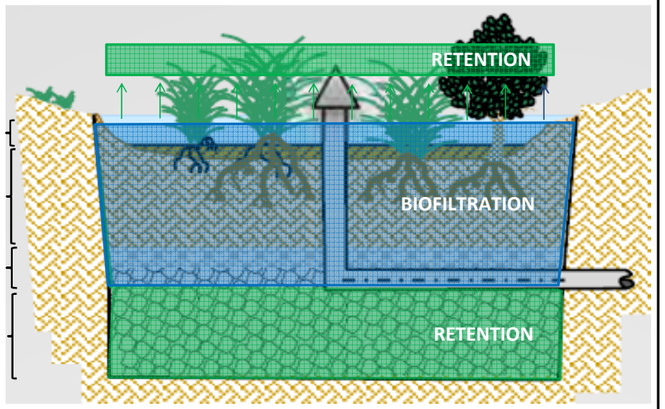
   Where Q: Flow Rate (cfs), C: Discharge Coefficient (0.60), A: Area of Orifice Opening (ft^2), g: acceleration of gravity (ft/s2), and h: head difference across orifice (ft)

Attention!

1. Provided Biofiltration surface area must be at least 3% of the effective tributary area.

Illustration of Partial Retention Characteristics

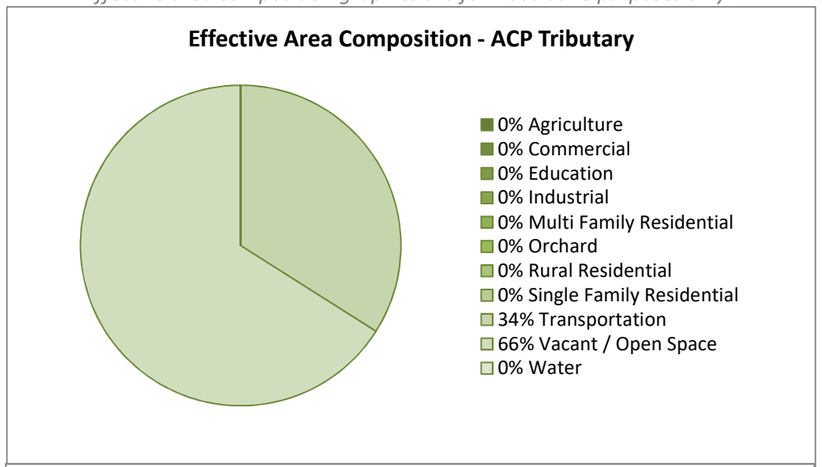
Evapotransp. Volume	1017.3 cf
Surface Ponding Depth	6.00 in.
Surface Ponding Volume	3,391 cf
Soil Media Thickness	18.00 in.
Gravel Depth Above IE	12.00 in.
Gravel Depth Below IE	12.00 in.
Gravel Storage Below IE	2,713 cf
Volume Retained	**3,730 cf**
Opt 1. Volume Biofiltered	**13,233 cf**
Opt 2. Volume Stored	**6,617 cf**

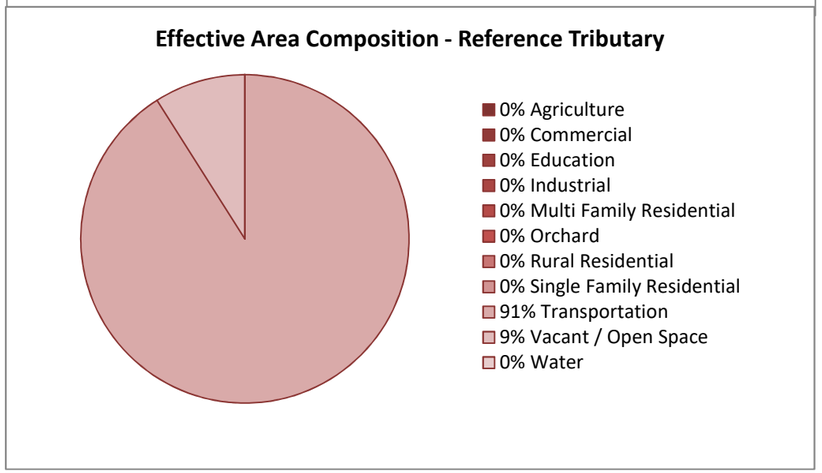


Automated Spreadsheet Calculation for Worksheet A.5: Land Use Factor Determination (Version 1.0)

Land Use Designation	ACP Tributary Characteristics		Reference Tributary Characteristics [2]		Relative Pollutant Concentrations by Land Use [3]						
	Area (Acres)	Runoff Factor [1]	Area (Acres)	Runoff Factor [1]	TSS	TP	TN	TCu	TPb	TZn	FC
Agriculture		0.10		0.10	0.45	1.00	1.00	1.00	1.00	0.59	1.00
Commercial		0.80		0.80	0.13	0.16	0.16	0.56	0.48	1.00	0.87
Education		0.50		0.50	0.13	0.20	0.11	0.14	0.25	0.39	0.13
Industrial		0.90		0.90	0.13	0.19	0.15	0.54	0.68	0.89	0.49
Multi Family Residential		0.60		0.60	0.10	0.13	0.13	0.14	0.15	0.29	0.27
Orchard		0.10		0.10	0.18	0.17	0.67	1.00	1.00	0.59	0.11
Rural Residential		0.30		0.30	1.00	0.51	0.14	0.10	0.71	0.13	0.19
Single Family Residential		0.40		0.40	0.13	0.20	0.15	0.27	0.43	0.35	0.63
Transportation	0.30	0.90	0.86	0.90	0.11	0.26	0.12	0.53	0.31	0.62	0.12
Vacant / Open Space	5.16	0.10	0.39	0.19	0.16	0.10	0.10	0.12	0.10	0.10	0.10
Water		0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	5.46	-	1.25	-	-	-	-	-	-	-	-
Relative Pollutant Concentration for ACP Tributary [4]					0.14	0.15	0.11	0.26	0.17	0.28	0.11
Relative Pollutant Concentration for Reference Tributary [4]					0.11	0.25	0.12	0.49	0.29	0.58	0.12
Watershed Management Area					San Luis Rey						
Hydrologic Unit					San Luis Rey (903.00)						
Land Use Factor [5]					-	0.63	0.90	-	-	-	0.90

Effective area composition graphics are for illustrative purposes only.





Notes:

* Applicants must provide user input for yellow shaded cells. Values for all other cells will be automatically generated.

1. Revisions to default runoff factors must be supported to the satisfaction of the applicable Copermittee.
2. Applicant-Implemented ACPs must identify reference tributary characteristics that are representative of their specific PDP. Independent ACPs must reference **Table 2-3** for appropriate area and runoff factor information applicable to their watershed management area.
3. Relative Pollutant Concentrations by Land Use have been identified through examination of available EMC data. Additional information on how these relative concentrations were developed is provided in **Appendix B**.
4. Relative Pollutant Concentrations for ACP and Reference Tributaries are calculated for each WQE Pollutant of Concern per **Equation 2-2**.
5. Calculate the Land Use Factor for each priority pollutant by dividing the Relative Pollutant Concentration for the ACP Tributary by the Relative Pollutant Concentration for the Reference Tributary. Land Use Factors may never be lower than 0.10 and may never exceed 10.0.

Example: An ACP Tributary with 5.25 acres of Commercial, 1.63 Acres of Education, and 2.65 acres of Transportation land uses produces a relative pollutant concentration 0.12 for Total Suspended Solids (assumes default runoff factors are applied).

Equation 2-2:

$$P_1 = \frac{\sum P_{1a}A_aC_a + P_{1b}A_bC_b + \ldots\ldots P_{1k}A_kC_k}{\sum A_aC_a + A_bC_b + \ldots\ldots A_kC_k}$$

Equation 2-2 Applied to Example:

$$P_{TSS} = \frac{(0.13x5.25x0.80) + (0.13x1.63x0.50) + (0.11x2.65x0.90)}{(5.25x0.80) + (1.63x0.50) + (2.65x0.90)} = 0.12$$

L = 0.63

Equation ES-1: Calculation of ACP Earned Stormwater Pollutant Control Volume

$$V_E = L\,(\Delta V + V_2B_2 - V_1B_1)$$

Where:

V_E: Earned Stormwater Pollutant Control Volume (ft^3)

L: Land Use Factor

ΔV: Change in Design Capture Volume ($V_1 - V_2$)

V_1: Impacted Condition Design Capture Volume for ACP

V_2: Mitigated Condition Design Capture Volume for ACP

B_1: Impacted Condition BMP Efficacy Factor

B_2: Mitigated Condition BMP Efficacy Factor

This credited volume is typically less than the actual volume treated by the ACP due to site-specific factors that take into account relative differences in pollutant loads and efficacies of ACP BMPs compared to onsite retention or biofiltration for PDPs. It is determined according to the general process illustrated in **Figure ES-3**.

The Earned Stormwater Pollutant Control Volume ($\mathbf{V_E}$) can be used to offset the deficit of retained or biofiltered stormwater volume for PDPs either for Applicant-Implemented ACPs (concurrent proposal of a PDP and ACP) or for Independent ACPs (credited for application toward future PDP impacts). Although this calculation is fundamentally the same for Structural BMPs and Natural System Management Practices, project-specific application differs between the two types of project categories: ACP stormwater pollutant control calculations for structural BMPs; and ACP stormwater pollutant control calculations for natural system management practices. These differences are described in greater detail within the report.

V1 = 3,743 CF
V2 = 3,743 CF
B1 = 0
B2 = 1
L = 0.63
V1-V2= 3,743 CF - 3,743CF = 0 CF

Ve = 0.63((0)+(3,743 CF * 1) - (3,743 CF * 0)) = 2,358 CF > 2,075 CF

***Note: The Volume earned is greater than untreated DCV**

ATTACHMENT 1c

DMA EXHIBIT

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
☒ Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
☐ 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 demolition
☒ 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 Step 3.5)
☒ Structural BMPs (identify location, structural BMP ID#, type of BMP, and size/detail)

LEGEND:

- DRAINAGE MANAGEMENT AREA
- XX.XX AC — DRAINAGE SUBAREA ACREAGE
- BMP BASIN BOTTOM SURFACE HATCH
- PROPOSED BYPASS AREA UNTREATED BY PROPOSED BMP
- PLANNING AREA BOUNDARY
- LOT LINE
- WATERS OF THE US AND/OR STATE
- LINES OF INUNDATION
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- PROPOSED STORM DRAIN
- 100' LIMITED BLDG ZONE BUFFER / 100' BIO BUFFER ZONE — BIOLOGICAL SENSITIVE HABITATS

NOTE: ALL MAJOR HILLSIDE DRAINAGE TO BE BYPASSED AWAY FROM POLLUTANT CONTROL BMPS. HILLSIDE AREAS ARE CONSIDERED SELF-MITIGATING AND WILL NOT COMMINGLE WITH ONSITE RUNOFF FOR POLLUTANT TREATMENT.

BMP SUMMARY TABLE

DMA ID	DMA TYPE	DMA SIZE (AC.)	BMP ID	BMP FOOTPRINT (SF)	BMP TYPE
1	DRAINS TO BMP	50.63	BASIN 1A	57,285	LINED BIOFILTRATION (BF-2)
2	DRAINS TO BMP	18.28	BASIN 2A	21,468	
3	DRAINS TO BMP	18.47	BASIN 2B	19,596	BIOFILTRATION PARTIAL (PR-1)
4A,B	DRAINS TO BMP	5.91	BASIN 2C	5,120	LINED BIOFILTRATION (BF-2)
5	DRAINS TO BMP	7.35	BASIN 2D	6,851	INFILTRATION (INF-1)
6	DRAINS TO BMP	2.91	BASIN 2E	2,917	
7	DRAINS TO BMP	3.73	BASIN 2F	3,226	
8	DRAINS TO BMP	3.65	BASIN 2G	3,158	
17	DRAINS TO BMP	9.28	BASIN 2H	6,782	BIOFILTRATION PARTIAL (PR-1)
18	DRAINS TO BMP	7.51	HYDROMOD VAULT #1	1,300	HYDROMOD

EX. 100YR WSE =196.03
EX. 10YR WSE =190.81

BASIN 2B

DMA 3 (18.47 AC)

PLANNING AREA 2

DMA 4B FOR BASIN 2C (2.39 AC)

DMA 2 (18.28 AC)

DMA 7 (3.73 AC)

DMA 6 (2.91 AC)

DMA 8 (3.65 AC)

BASIN 2G

DMA 5 (7.35 AC)

DMA 4A (3.52 AC)

BASIN 2F

BASIN 2E

BASIN 2D

BASIN 2C

BASIN 2A

POC #1
HYDROMOD EXEMPT
10YR WSE = 183.29
OUTLET IE = 182.0

EX. 100YR WSE =187.89
EX. 10YR WSE =183.29

EX. 100YR WSE =197.30
EX. 10YR WSE =191.98

PLANNING AREA 1

DMA 1 (50.63 AC)

BASIN 1A

SELF MITIGATING

BYPASS OUTFALL (HYDROMOD EXEMPT)

BASIN 2H

NOTE: THERE ARE AREAS OF PROPOSED ROADWAY IMPROVEMENTS THAT CANNOT BE TREATED BY A POLLUTANT TREATMENT BMP DUE TO SITE CONSTRAINTS. SEE THE ONSITE ALTERNATIVE COMPLIANCE EXHIBIT AND CALCULATIONS IN ATTACHMENT 1A.

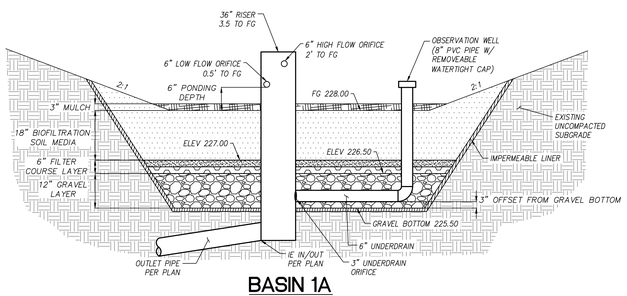
WEST LILAC ROAD

VESSELS RANCH ROAD

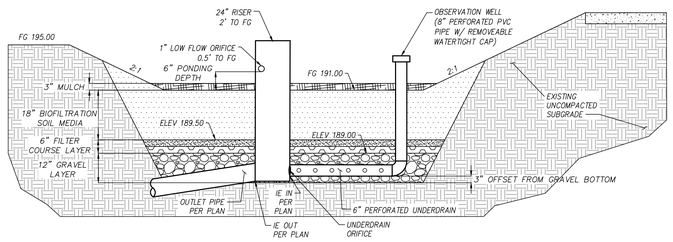
DMA 17 (9.28 AC)

MATCHLINE, SEE RIGHT

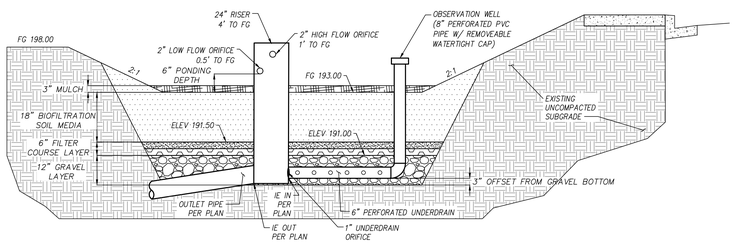
MATCHLINE, SEE LEFT



BASIN 1A
BIOFILTRATION
NTS

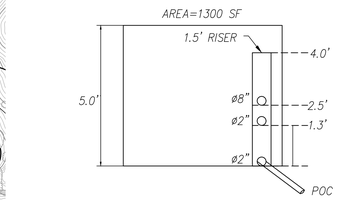


BASIN 2H
BIOFILTRATION WITH PARTIAL INFILTRATION
NTS

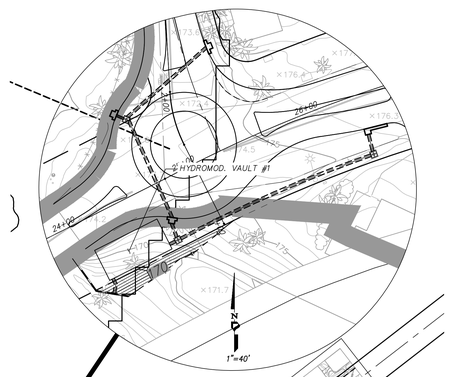


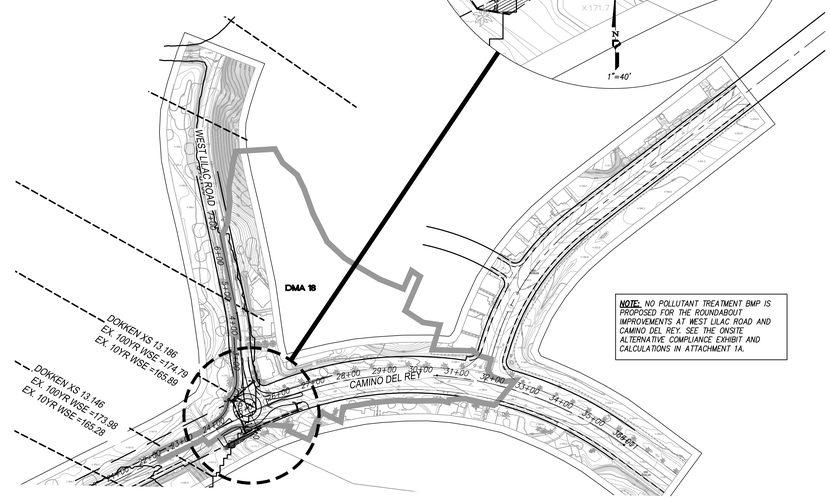
BASIN 2B
BIOFILTRATION WITH PARTIAL INFILTRATION
NTS

SEE EXH 2 FOR BASINS 2A 2C-2G



HYDROMOD VAULT DETAIL
SCALE: NTS





NOTE: NO POLLUTANT TREATMENT BMP IS PROPOSED FOR THE ROUNDABOUT IMPROVEMENTS AT WEST LILAC ROAD AND CAMINO DEL REY. SEE THE ONSITE ALTERNATIVE COMPLIANCE EXHIBIT AND CALCULATIONS IN ATTACHMENT 1A.

SCALE:	1"=150'
JOB #:	4192.00
CREATED:	10/29/18

PREPARED BY:

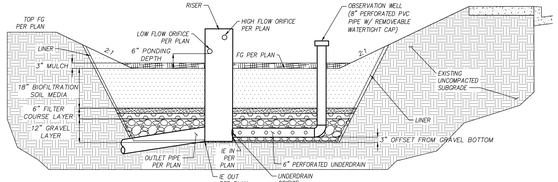
PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey
701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

COUNTY OF SAN DIEGO

OCEAN BREEZE RANCH

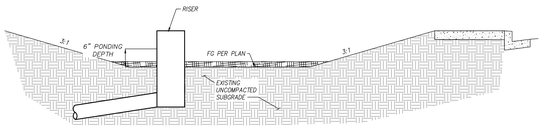
DRAINAGE MANAGEMENT AREA AND BMP EXHIBIT
EXHIBIT 1 OF 4

Last save by LEONORA PIZARRO, File Name P:\4192\Engr\Reports\SWQMP\EXH\4192 DMA Site Map.dwg, Date Last Saved 7/31/2019 1:12:15 AM, Date Plotted Last 7/31/2019 1:20:36 AM



BASINS 2A, 2C
BIOFILTRATION
NTS

SEE DMA EXH 1 FOR BASIN LOCATIONS

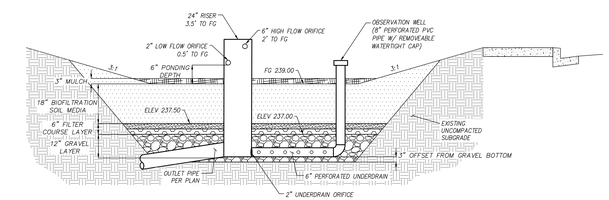


BASIN 2D-2G
INFILTRATION
NTS

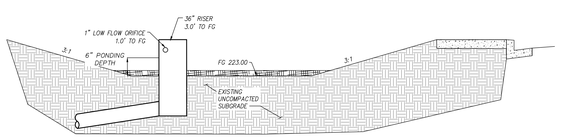
SEE DMA EXH 1 FOR BASIN LOCATIONS

BASIN 3A
BIOFILTRATION WITH PARTIAL INFILTRATION
NTS

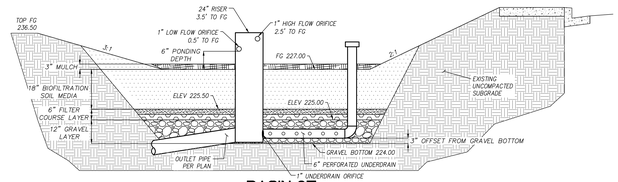
BASIN 3B
BIOFILTRATION WITH PARTIAL INFILTRATION
NTS



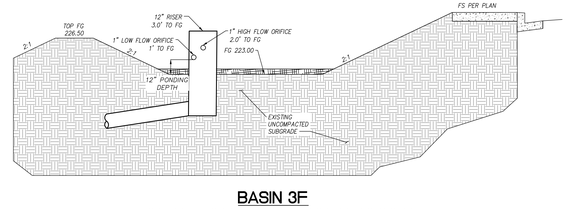
BASIN 3C
BIOFILTRATION WITH PARTIAL INFILTRATION
NTS



BASIN 3D
INFILTRATION
NTS



BASIN 3E
BIOFILTRATION WITH PARTIAL INFILTRATION
NTS



BASIN 3F
INFILTRATION WITH PRETREATMENT
NTS

SEE DMA EXH 3 FOR THE SECTION DETAILS FOR BASINS 3G-3J

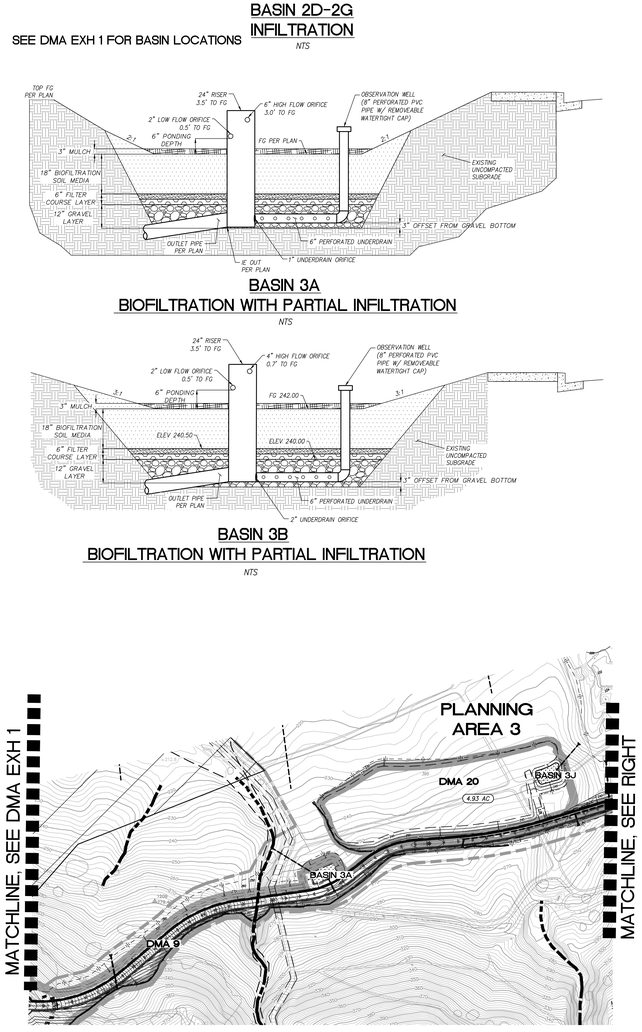
LEGEND:

- DRAINAGE MANAGEMENT AREA
- XX.XX AC — DRAINAGE SUBAREA ACREAGE
- BMP BASIN BOTTOM SURFACE HATCH
- PROPOSED BYPASS AREA UNTREATED BY PROPOSED BMP
- PLANNING AREA BOUNDARY
- LOT LINE
- WATERS OF THE US AND/OR STATE
- LINES OF INUNDATION
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- PROPOSED STORM DRAIN
- 100' LIMITED BLDG ZONE BUFFER
- 100' BIO BUFFER ZONE
- BIOLOGICAL SENSITIVE HABITATS

BMP SUMMARY TABLE

DMA ID	DMA TYPE	DMA SIZE (AC.)	BMP ID	BMP FOOTPRINT (SF)	BMP TYPE
9	DRAINS TO BMP	4.12	BASIN 3A	3,570	BIOFILTRATION WITH PARTIAL INFILTRATION (PR=1)
10	DRAINS TO BMP	1.06	BASIN 3B	3,488	
11	DRAINS TO BMP	8.29	BASIN 3C	7,590	
12	DRAINS TO BMP	14.96	BASIN 3D	19,570	INFILTRATION (INF=1)
13	DRAINS TO BMP	1.61	BASIN 3E	1,870	BIOFILTRATION WITH PARTIAL INFILTRATION (PR=1)
14	DRAINS TO BMP	1.46	BASIN 3F	826	INFILTRATION (INF=1)
15	DRAINS TO BMP	2.02	BASIN 3G	1,784	BIOFILTRATION WITH PARTIAL INFILTRATION (PR=1)
16	DRAINS TO BMP	3.01	BASIN 3H	1,864	
19	DRAINS TO BMP	6.14	BASIN 3I	4,990	
20	DRAINS TO BMP	4.93	BASIN 3J	4,092	BIOFILTRATION (BF=2)

NOTE: ALL MAJOR HILLSIDE DRAINAGE TO BE BYPASSED AWAY FROM POLLUTANT CONTROL BMPS. HILLSIDE AREAS ARE CONSIDERED SELF-MITIGATING AND WILL NOT COMMINGLE WITH ONSITE RUNOFF FOR POLLUTANT TREATMENT.

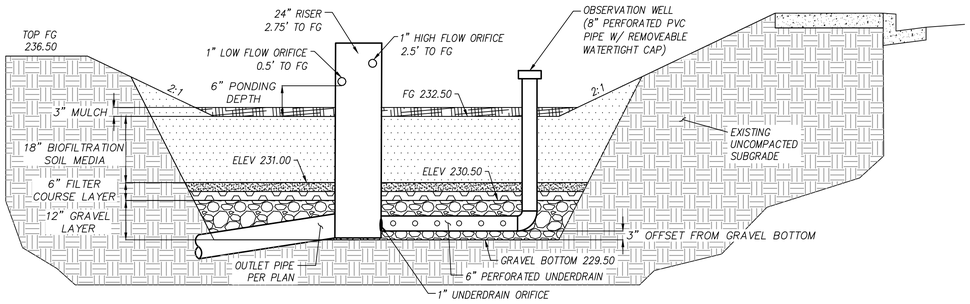


SCALE:	1"=150'
JOB #:	4192.00
CREATED:	10/29/18

PREPARED BY:

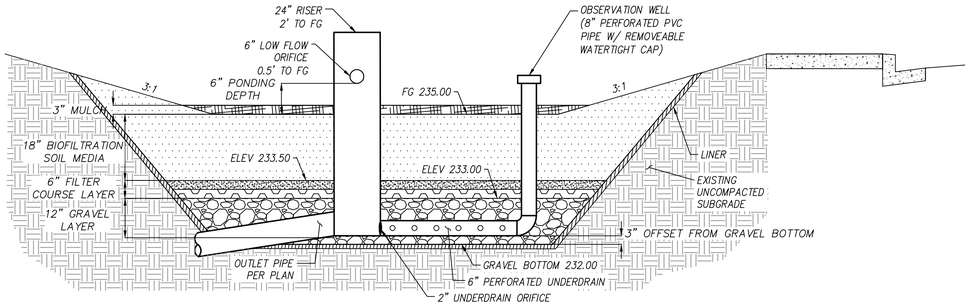
PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey
701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

COUNTY OF SAN DIEGO
OCEAN BREEZE RANCH
DRAINAGE MANAGEMENT AREA AND BMP EXHIBIT
EXHIBIT 2 OF 4



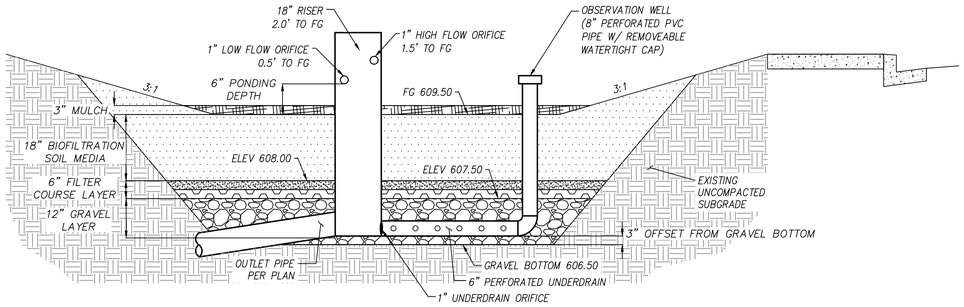
BASIN 3G
BIOFILTRATION WITH PARTIAL INFILTRATION AND PRETREATMENT

NTS



BASIN 3J
BIOFILTRATION

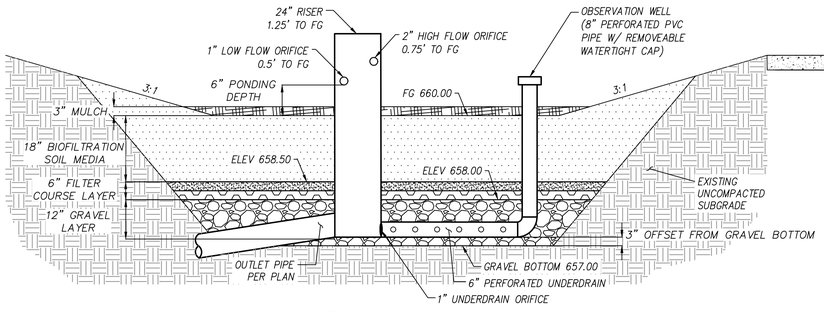
NTS



BASIN 3H
BIOFILTRATION WITH PARTIAL INFILTRATION AND PRETREATMENT

NTS

SEE DMA EXH 2 FOR
LOCATIONS OF BASINS 3G-3J



BASIN 3I
BIOFILTRATION WITH PARTIAL INFILTRATION

NTS

SCALE:	NTS
JOB #:	4192.00
CREATED:	5/20/19

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey

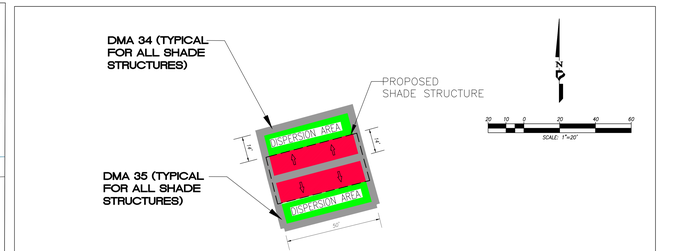
701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

COUNTY OF SAN DIEGO

OCEAN BREEZE RANCH

DRAINAGE MANAGEMENT AREA AND BMP EXHIBIT
EXHIBIT 3 OF 4

SSD BMP SUMMARY TABLE			
DMA ID	DMA TYPE	DMA SIZE (AC.)	SSD BMP TYPE
21	DRAINS TO SSD BMP	1.19	EXISTING TREE CREDIT
22	DRAINS TO SSD BMP	0.23	
23	DRAINS TO SSD BMP	0.35	
24	DRAINS TO SSD BMP	0.49	
25	DRAINS TO SSD BMP	0.49	
26	DRAINS TO SSD BMP	0.46	
27	DRAINS TO SSD BMP	0.65	
28	DRAINS TO SSD BMP	0.65	IMPERVIOUS AREA DISPERSION 1:1 IMPERVIOUS TO PERVIOUS RATIO
29	DRAINS TO SSD BMP	0.62	EXISTING TREE CREDIT
30	DRAINS TO SSD BMP	0.51	
31	DRAINS TO SSD BMP	0.60	
32	DRAINS TO SSD BMP	1.04	
33	DRAINS TO SSD BMP	0.76	IMPERVIOUS AREA DISPERSION 1:1 IMPERVIOUS TO PERVIOUS RATIO
34	DRAINS TO SSD BMP	0.03	
35	DRAINS TO SSD BMP	0.03	
36	DRAINS TO SSD BMP	0.55	EXISTING TREE CREDIT
37	DRAINS TO SSD BMP	0.19	



SHADE STRUCTURE DMA (TYP)

1:1 IMPERVIOUS TO PERVIOUS DISPERSION RATIO WITH TOP 11 INCHES OF PERVIOUS AREA AS AMENDED SOIL IN ACCORDANCE WITH SD-F AND SD-B.

SAN LUIS REY RIVER

SAN LUIS REY RIVER

SAN LUIS

PROPERTY LINE & MUP BOUNDARY

PROP BUILDING B9

DMA 37 (0.19 AC) TYLINE #9

EXISTING TREES ADJACENT TO ACCESS ROAD PROVIDE POLLUTANT AND FLOW CONTROL MITIGATION

EXIST. PASTURE #5

DMA 24 (0.49 AC)

DMA 23 (0.35 AC)

EXISTING BUILDINGS (TYP)

EXIST. PASTURE #12

EXIST. PASTURE #11

EXISTING TREES ADJACENT TO ACCESS ROAD PROVIDE POLLUTANT AND FLOW CONTROL MITIGATION

EXIST. PASTURE #4

EXISTING TREES ADJACENT TO ACCESS ROAD PROVIDE POLLUTANT AND FLOW CONTROL MITIGATION

EXIST. PASTURE #13

DMA 26 (0.46 AC)

DMA 25 (0.49 AC)

EXIST. PASTURE #8

DMA 22 (0.23 AC)

EXIST. PASTURE #7

DMA 21 (1.19 AC)

EXIST. PASTURE #6

EXISTING TREES ADJACENT TO ACCESS ROAD PROVIDE POLLUTANT AND FLOW CONTROL MITIGATION

EXISTING TREES ADJACENT TO ACCESS ROAD PROVIDE POLLUTANT AND FLOW CONTROL MITIGATION

DMA 27 (0.65 AC)

DMA 28 (0.65 AC)

DISPERSION AREA WITH 11" OF AMENDED SOIL

EXISTING TREES ADJACENT TO ACCESS ROAD PROVIDE POLLUTANT AND FLOW CONTROL MITIGATION

SCALE: 1" = 100' PASTURE #3

EXIST. PASTURE #1

16 FT PROPOSED ACCESS ROAD – SOIL CEMENT

PROP BUILDING R7

PROP BUILDING R8

EXIST. PASTURE #15

EXIST. PASTURE #18

EXIST. PASTURE #17

EXIST. PASTURE #18

EXIST. PASTURE #19

EXIST. PASTURE #20

EXIST. PASTURE #21

DMA 29 (0.62 AC)

DMA 30 (0.51 AC)

100 YEAR FLOODPLAIN

EXISTING TREES ADJACENT TO ACCESS ROAD PROVIDE POLLUTANT AND FLOW CONTROL MITIGATION

DMA 36 (0.55 AC)

EXIST. PASTURE #22

EXIST. PASTURE #23

DMA 31 (0.60 AC)

DMA 34 (TYP) (0.03 AC)

DISPERSION AREA WITH 11" AMENDED SOIL (SEE DETAIL ABOVE)

DISPERSION AREA WITH 11" AMENDED SOIL

EXIST. PASTURE #24

DMA 35 (TYP) (0.03 AC)

DISPERSION AREA WITH 11" AMENDED SOIL

EXIST. PASTURE #25

DMA 33 (0.76 AC)

PROPOSED DRIVEWAY & SECONDARY ACCESS

DMA 32 (1.04 AC)

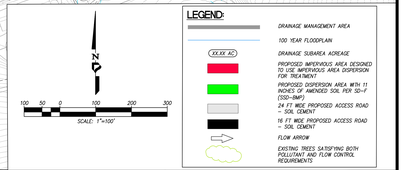
24 FT PROPOSED ACCESS ROAD – SOIL CEMENT

OCEAN BREEZE RANCH

REFER TO BMP EXHIBITS 1 AND 2 FOR STORM WATER QUALITY AND DMA INFORMATION FOR THIS AREA

OCEAN BREEZE RANCH

REFER TO BMP EXHIBITS 1 AND 2 FOR STORM WATER QUALITY AND DMA INFORMATION FOR THIS AREA



SCALE: 1"=100'
JOB #: 4192.00
CREATED: 05/13/19

PREPARED BY:
PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey
701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

COUNTY OF SAN DIEGO
OCEAN BREEZE RANCH
DRAINAGE MANAGEMENT AREA AND BMP EXHIBIT FOR EQUESTRIAN MUP AREA
EXHIBIT 4 OF 4

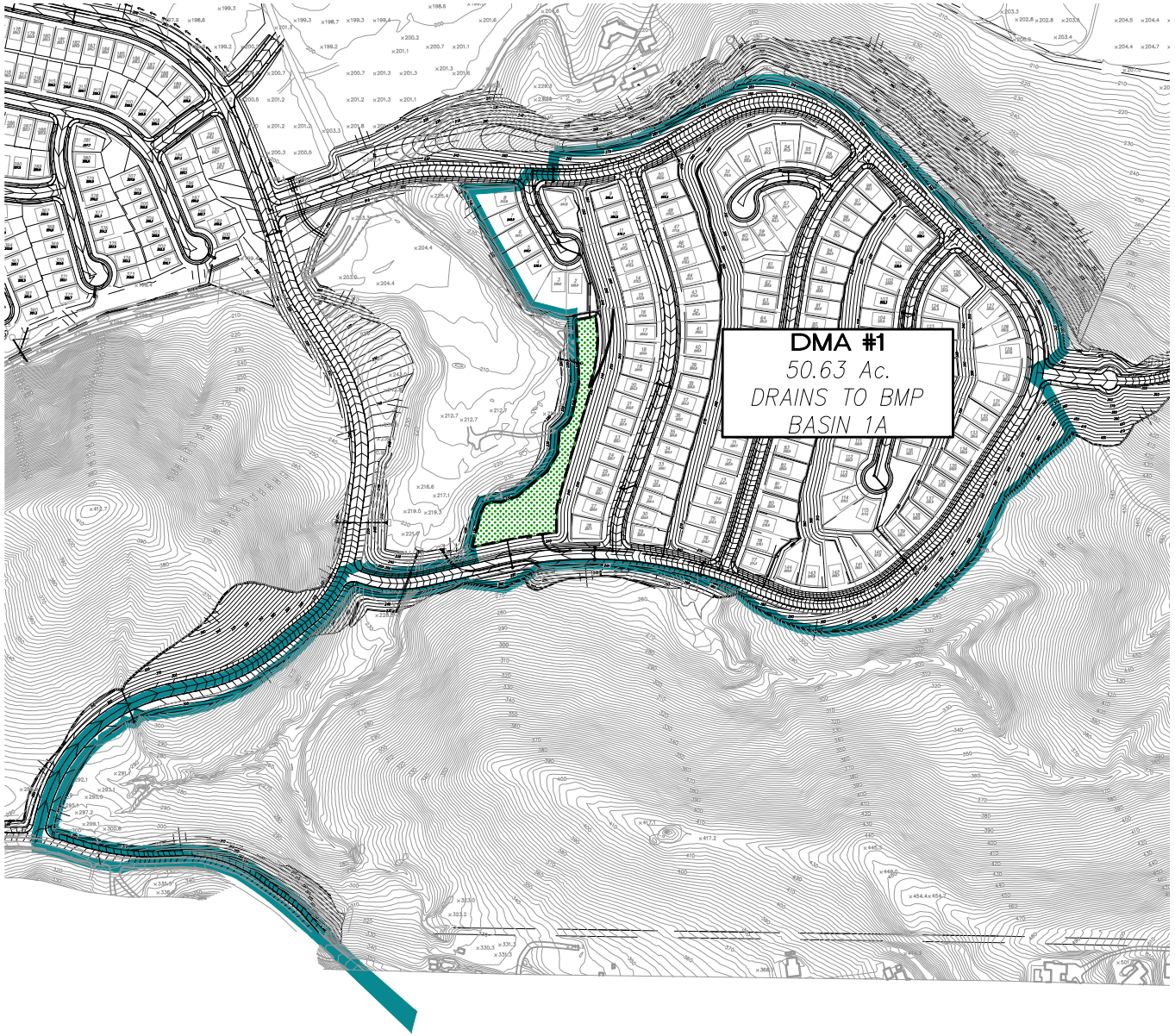
ATTACHMENT 1d

DMA MAPBOOKS

LEGEND:

DRAINAGE MANAGEMENT AREA

PROPOSED BMP



N

SCALE:	1"=500'
JOB #:	4192.00
CREATED:	11/20/18

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey

701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

COUNTY OF SAN DIEGO

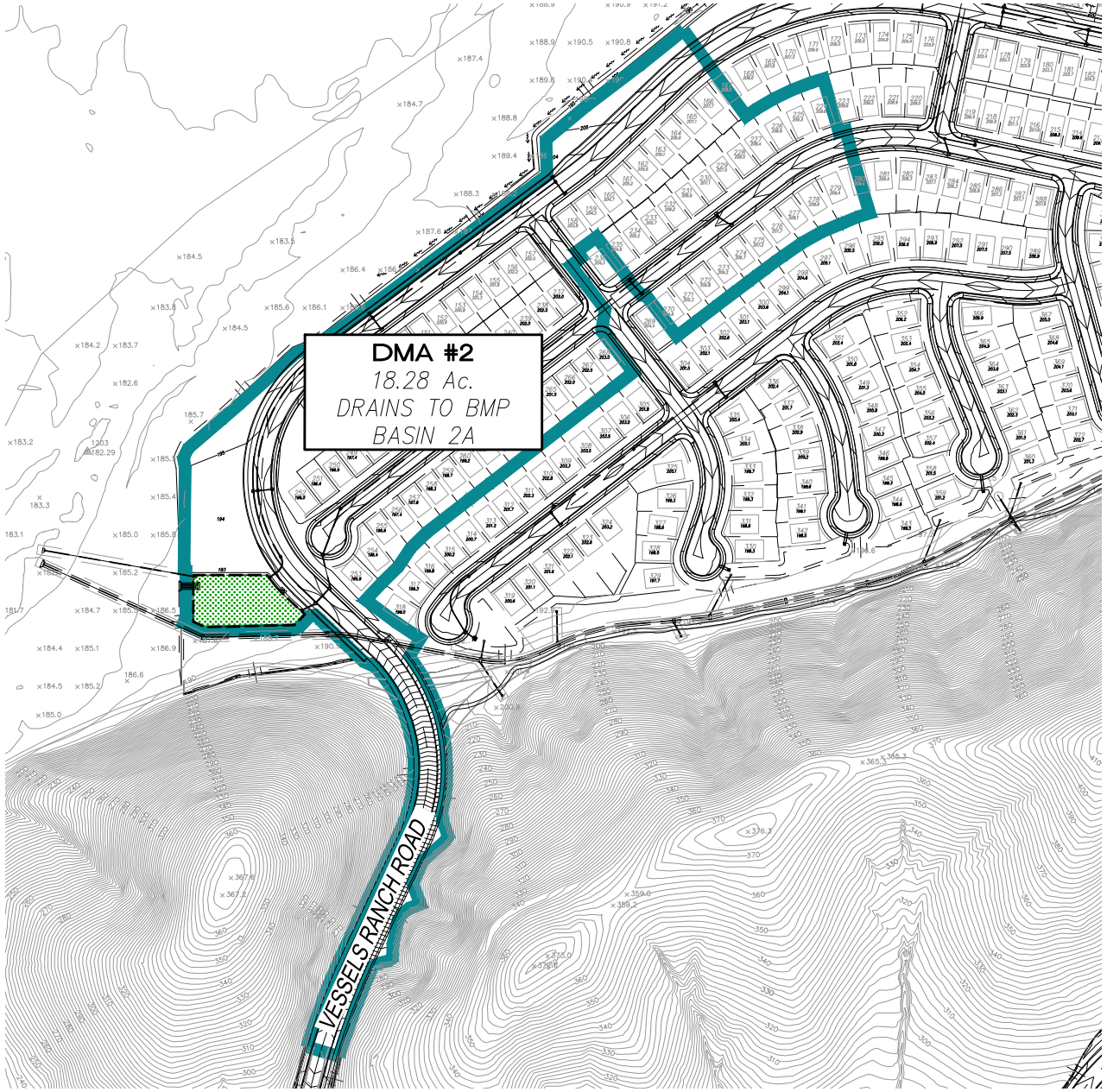
OCEAN BREEZE RANCH

DMA MAPBOOK
DMA#1

LEGEND:

DRAINAGE MANAGEMENT AREA

PROPOSED BMP



N

SCALE:	1"=350'
JOB #:	4192.00
CREATED:	11/20/18

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey

701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

COUNTY OF SAN DIEGO

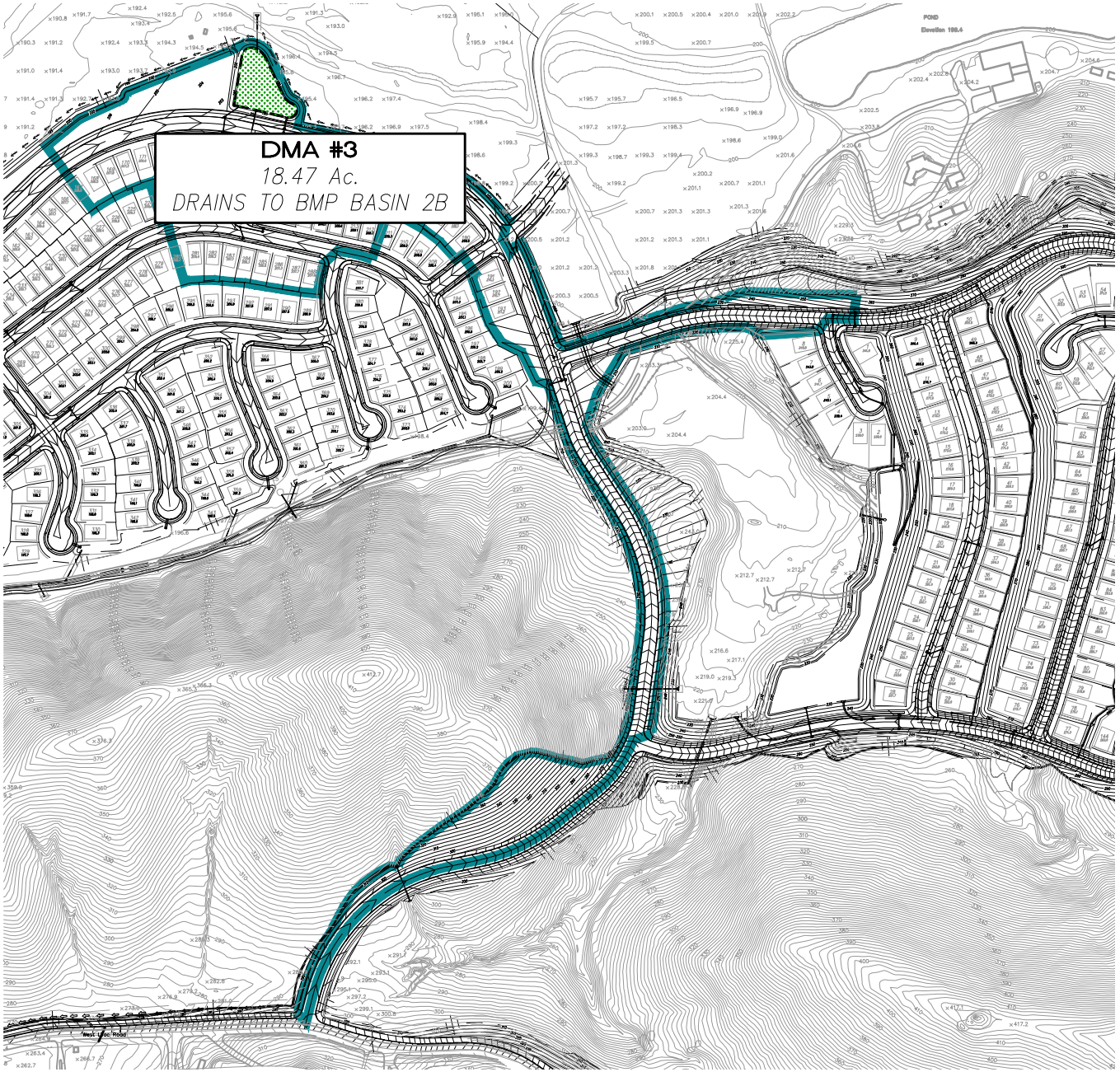
OCEAN BREEZE RANCH

DMA MAPBOOK
DMA#2

LEGEND:

DRAINAGE MANAGEMENT AREA

PROPOSED BMP



N

SCALE:	1"=450'
JOB #:	4192.00
CREATED:	11/20/18

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey

701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

COUNTY OF SAN DIEGO

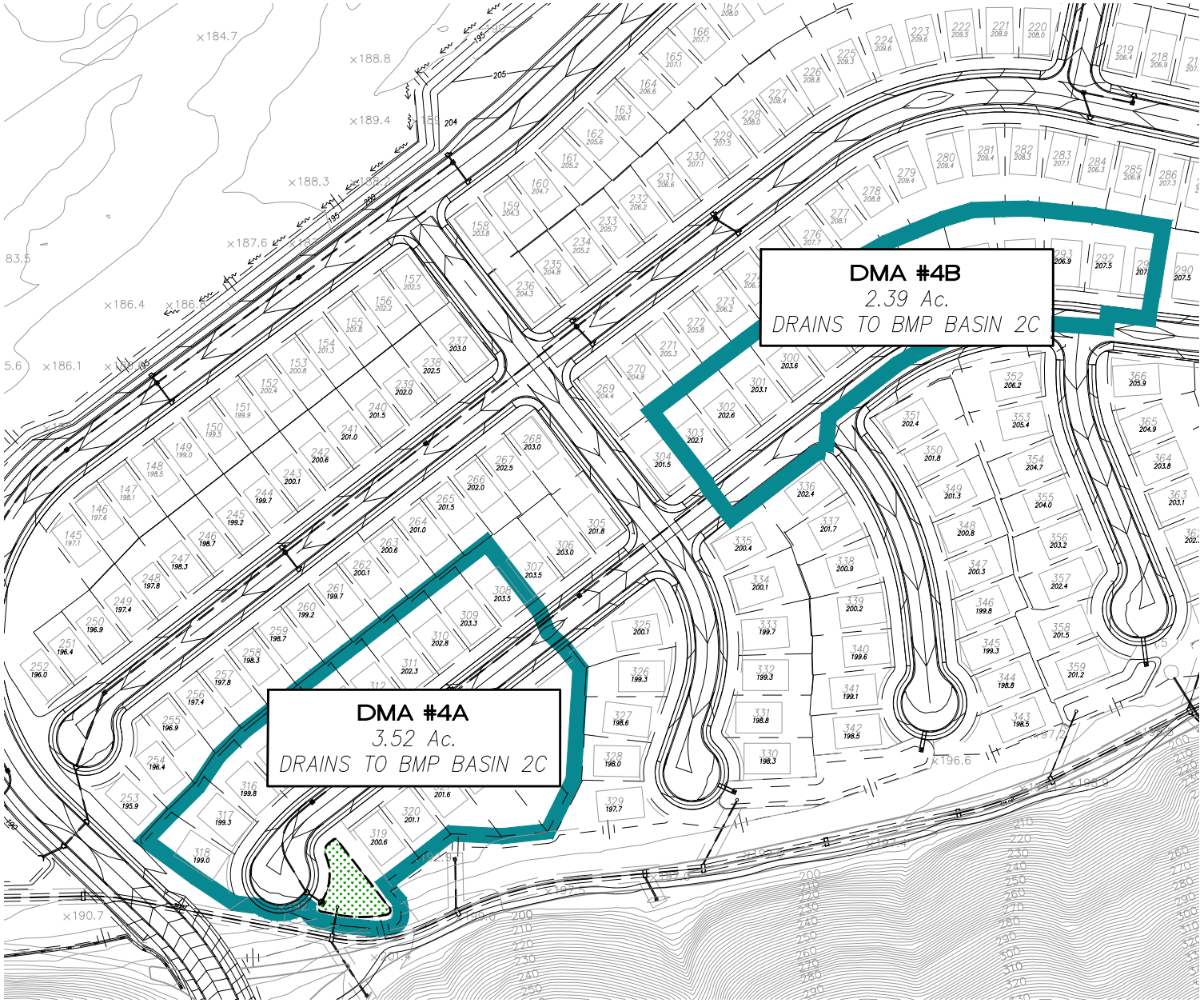
OCEAN BREEZE RANCH

DMA MAPBOOK
DMA#3

LEGEND:

DRAINAGE MANAGEMENT AREA

PROPOSED BMP



N

SCALE:	1"=200'
JOB #:	4192.00
CREATED:	11/20/18

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey
701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

COUNTY OF SAN DIEGO

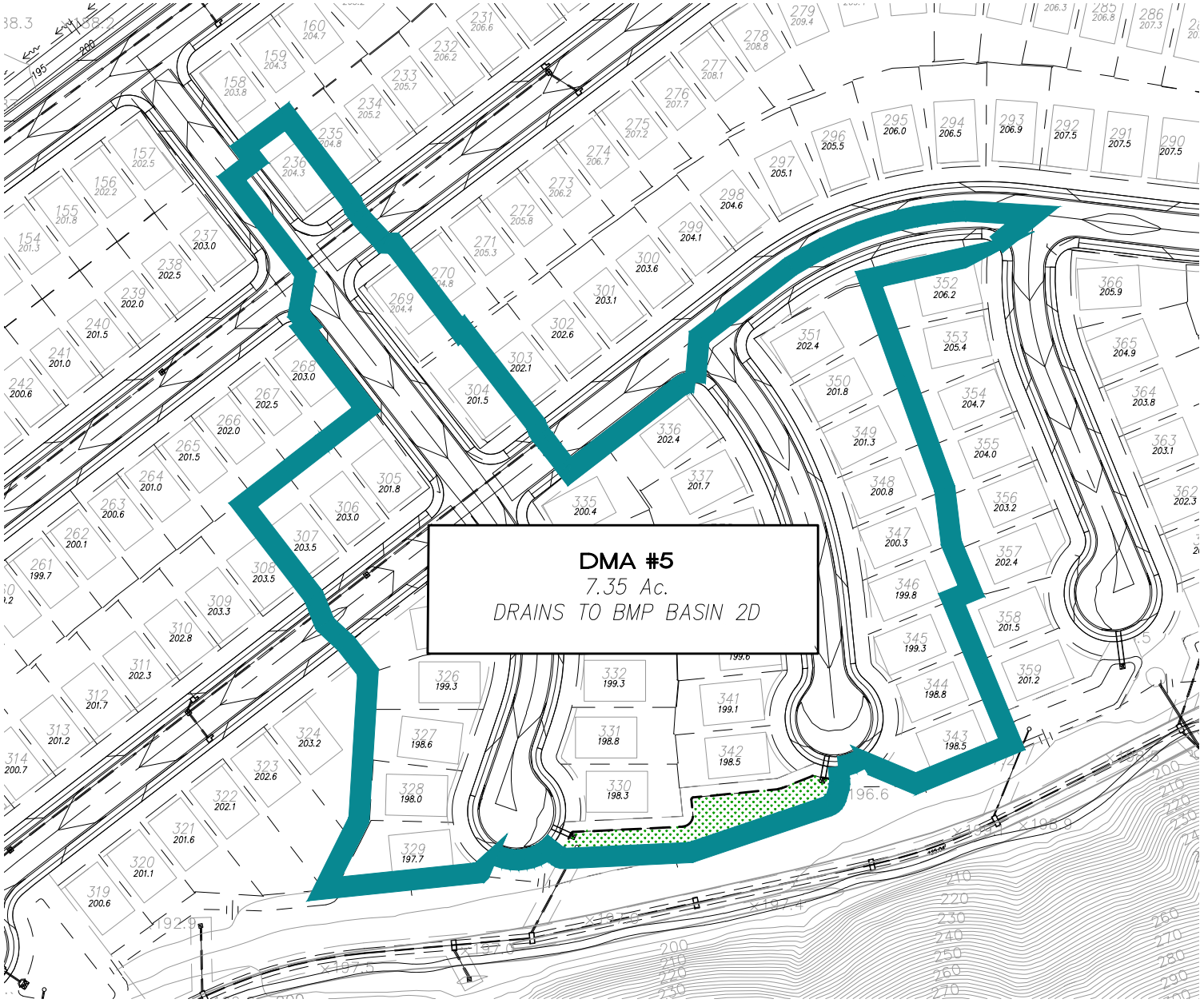
OCEAN BREEZE RANCH

DMA MAPBOOK
DMA 4A AND 4B

LEGEND:

DRAINAGE MANAGEMENT AREA

PROPOSED BMP



N

SCALE:	1"=150'
JOB #:	4192.00
CREATED:	11/20/18

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey
701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

COUNTY OF SAN DIEGO

OCEAN BREEZE RANCH

DMA MAPBOOK
DMA #5

P:\4192\Engr\Reports\SWQMP\EXH\4192 DMA Mapbook – DMAs 1-8.dwg 11/26/2018 2:33:42 PM

LEGEND:

DRAINAGE MANAGEMENT AREA

PROPOSED BMP

N

SCALE:	1"=100'
JOB #:	4192.00
CREATED:	11/20/18

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey

701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

COUNTY OF SAN DIEGO

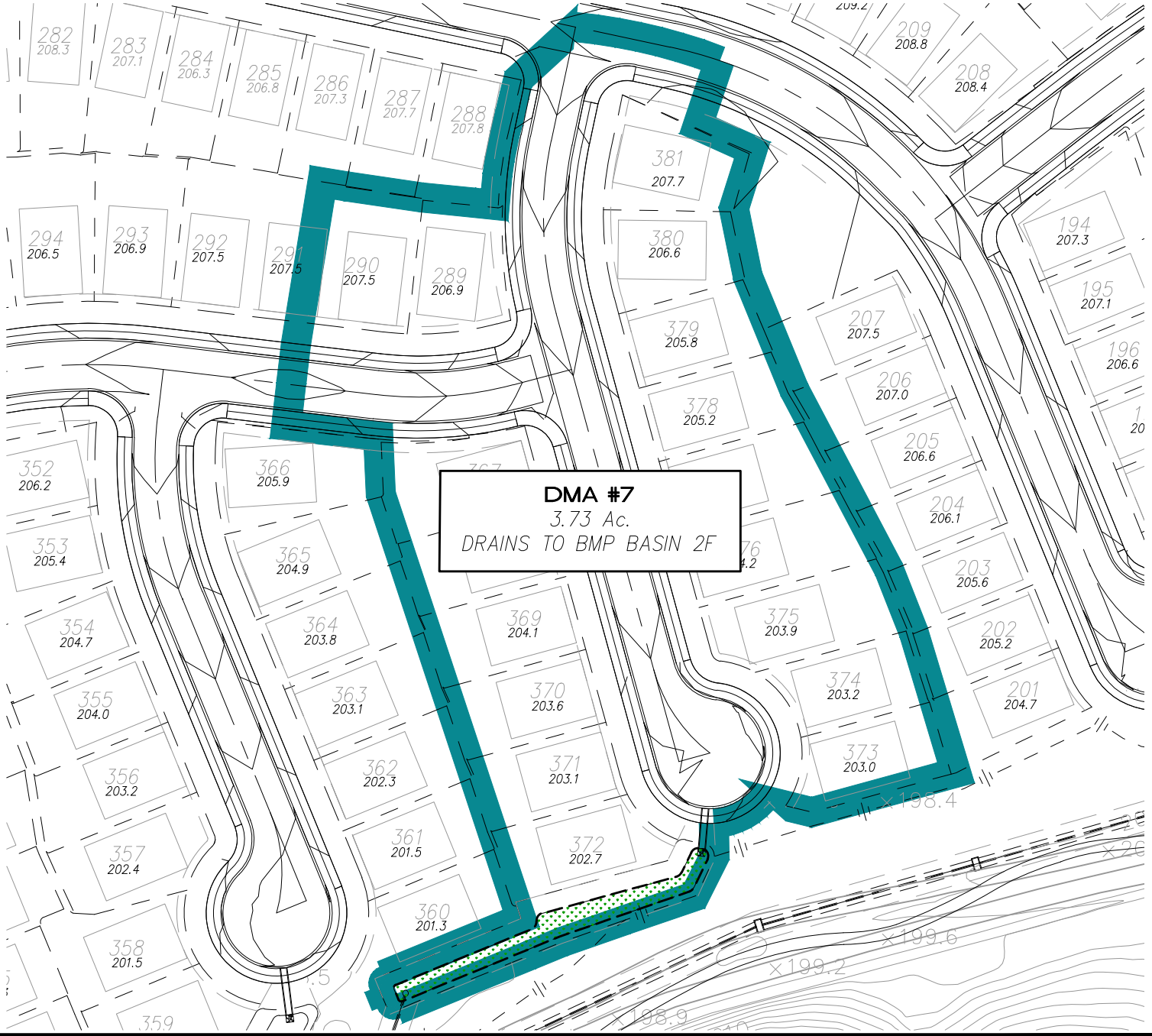
OCEAN BREEZE RANCH

DMA MAPBOOK
DMA #6

LEGEND:

DRAINAGE MANAGEMENT AREA

PROPOSED BMP



N

SCALE:	1"=100'
JOB #:	4192.00
CREATED:	11/20/18

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey
701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

COUNTY OF SAN DIEGO

OCEAN BREEZE RANCH

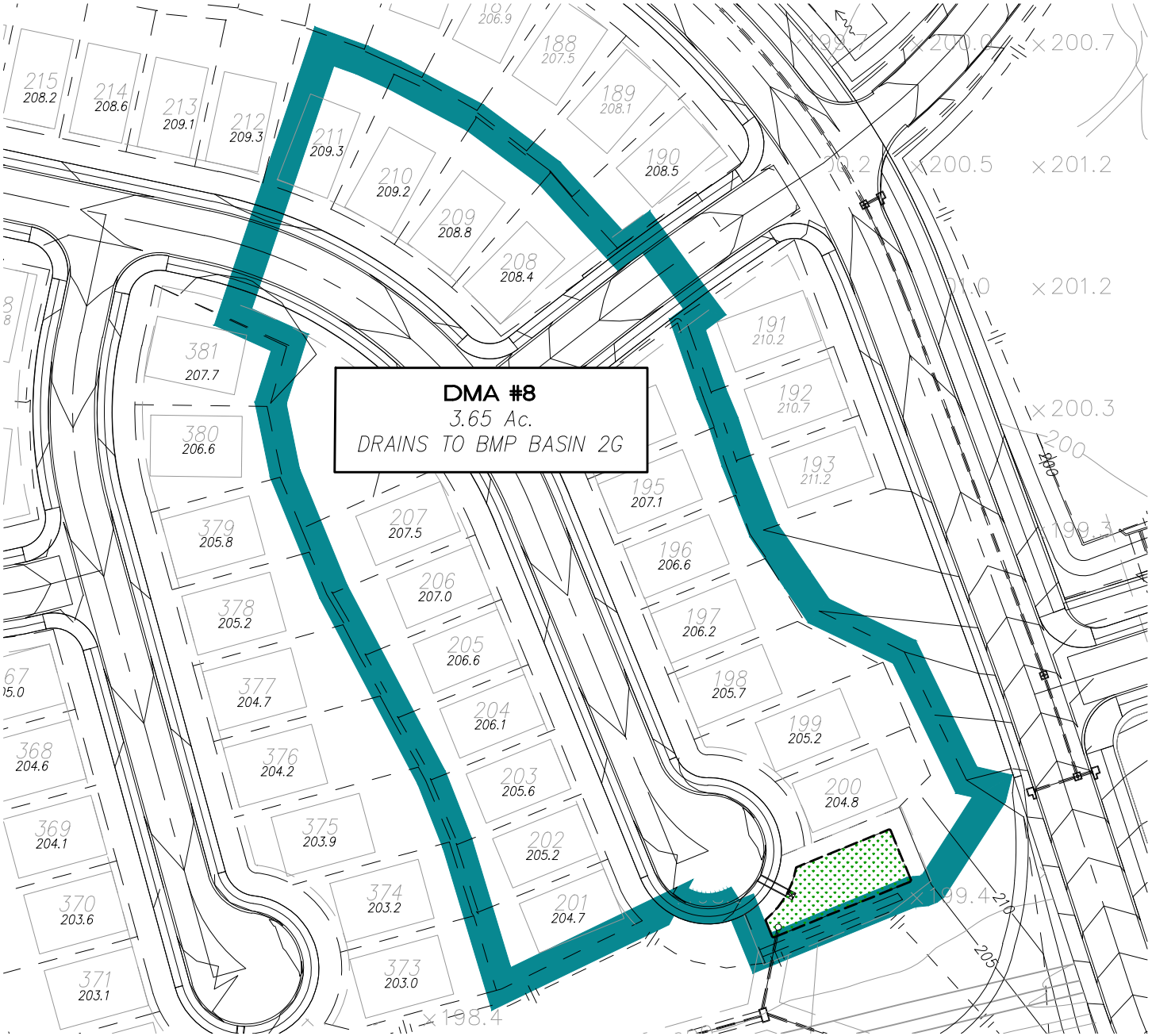
DMA MAPBOOK
DMA #7

P:\4192\Engr\Reports\SWQMP\EXH\4192 DMA Mapbook – DMAs 1-8.dwg 11/21/2018 1:56:42 PM

LEGEND:

DRAINAGE MANAGEMENT AREA

PROPOSED BMP



SCALE:	1"=100'
JOB #:	4192.00
CREATED:	11/20/18

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey

701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

COUNTY OF SAN DIEGO

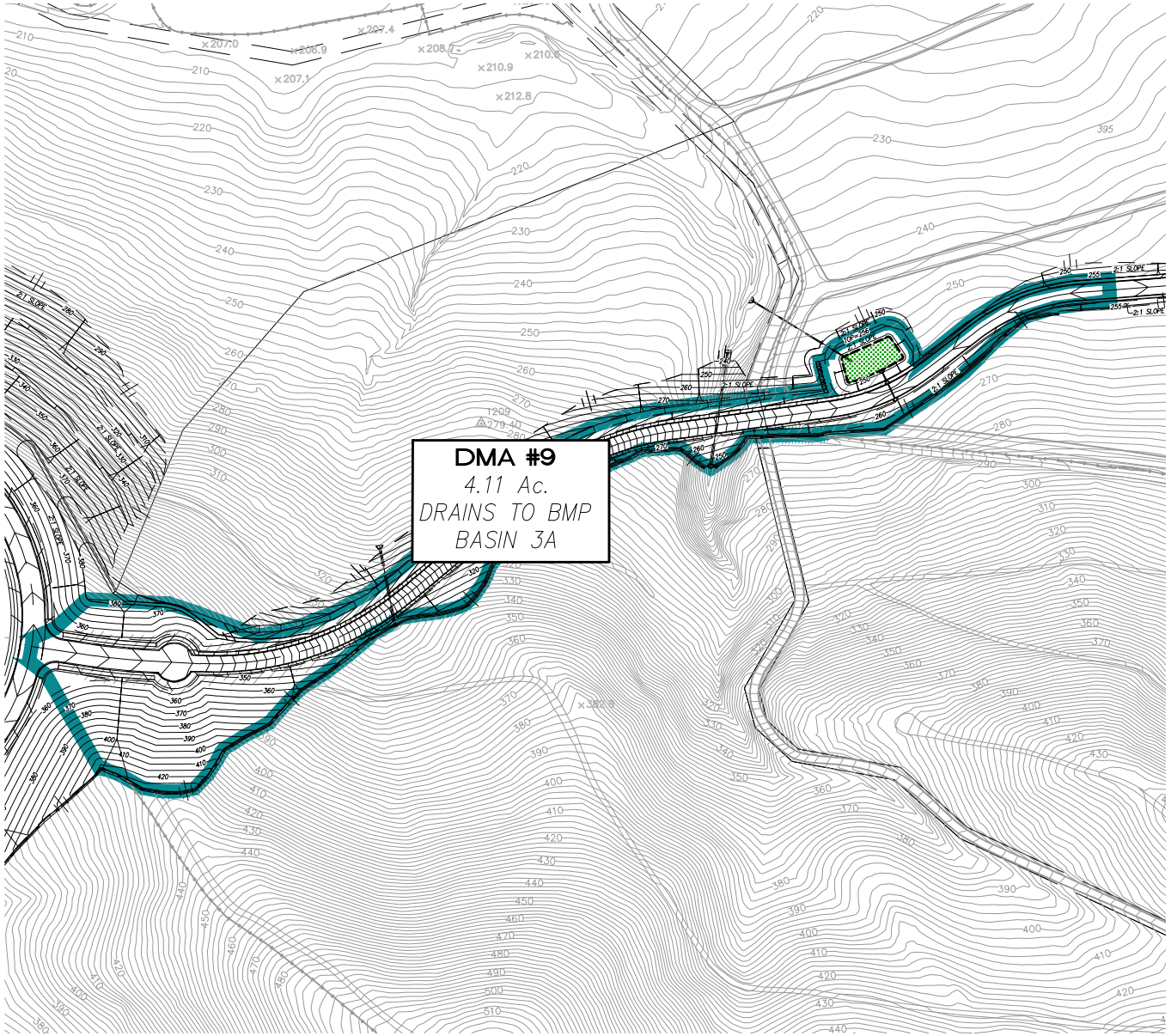
OCEAN BREEZE RANCH

DMA MAPBOOK
DMA #8

LEGEND:

DRAINAGE MANAGEMENT AREA

PROPOSED BMP



N

SCALE:	1"=250'
JOB #:	4192.00
CREATED:	11/20/18

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey

701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

COUNTY OF SAN DIEGO

OCEAN BREEZE RANCH

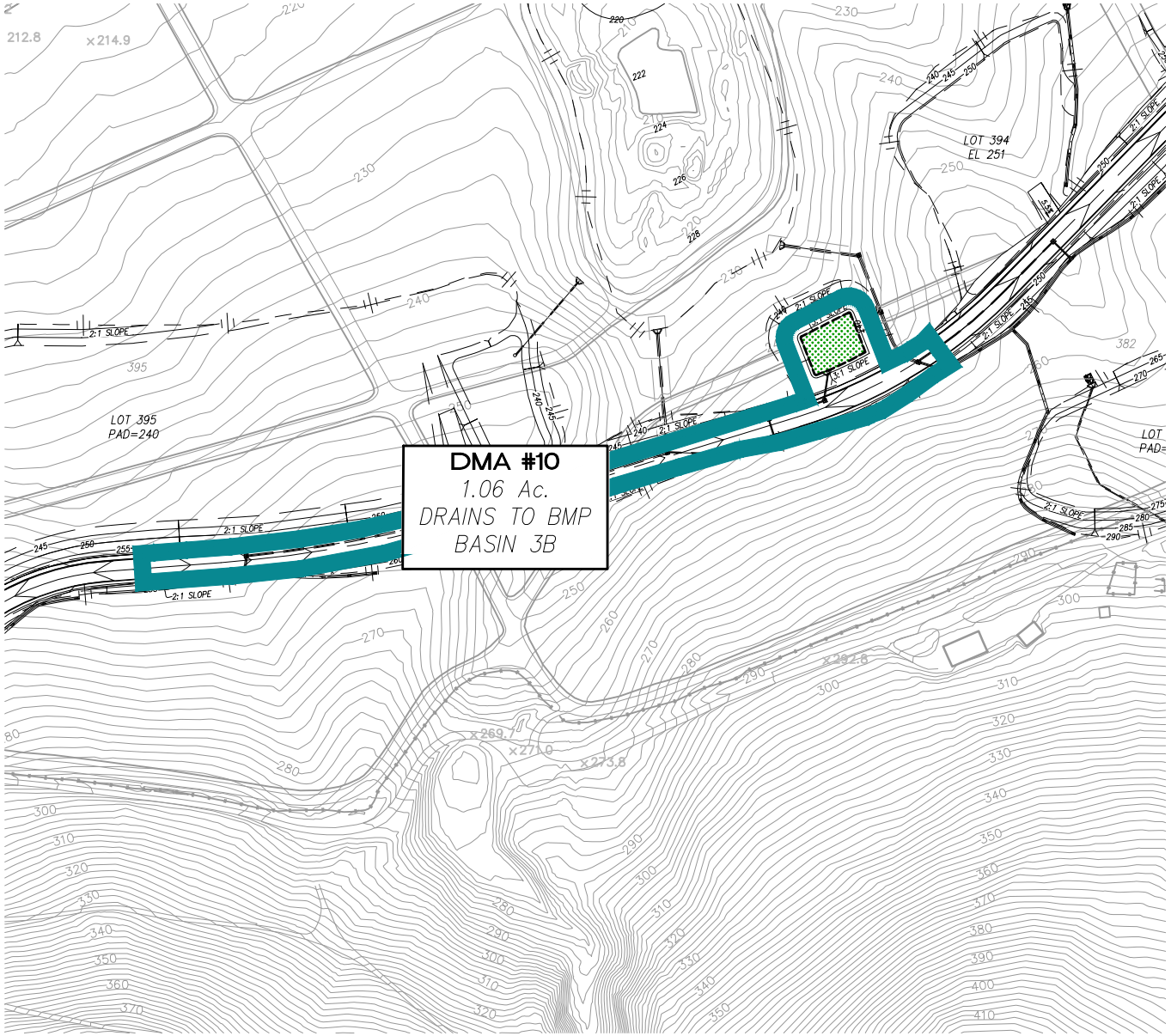
DMA MAPBOOK
DMA#9

P:\4192\Engr\Reports\SWQMP\EXH\4192 DMA Mapbook – DMAs 9-15.dwg 11/21/2018 11:22:06 AM

LEGEND:

DRAINAGE MANAGEMENT AREA

PROPOSED BMP



N

SCALE:	1"=200'
JOB #:	4192.00
CREATED:	11/20/18

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey

701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

COUNTY OF SAN DIEGO

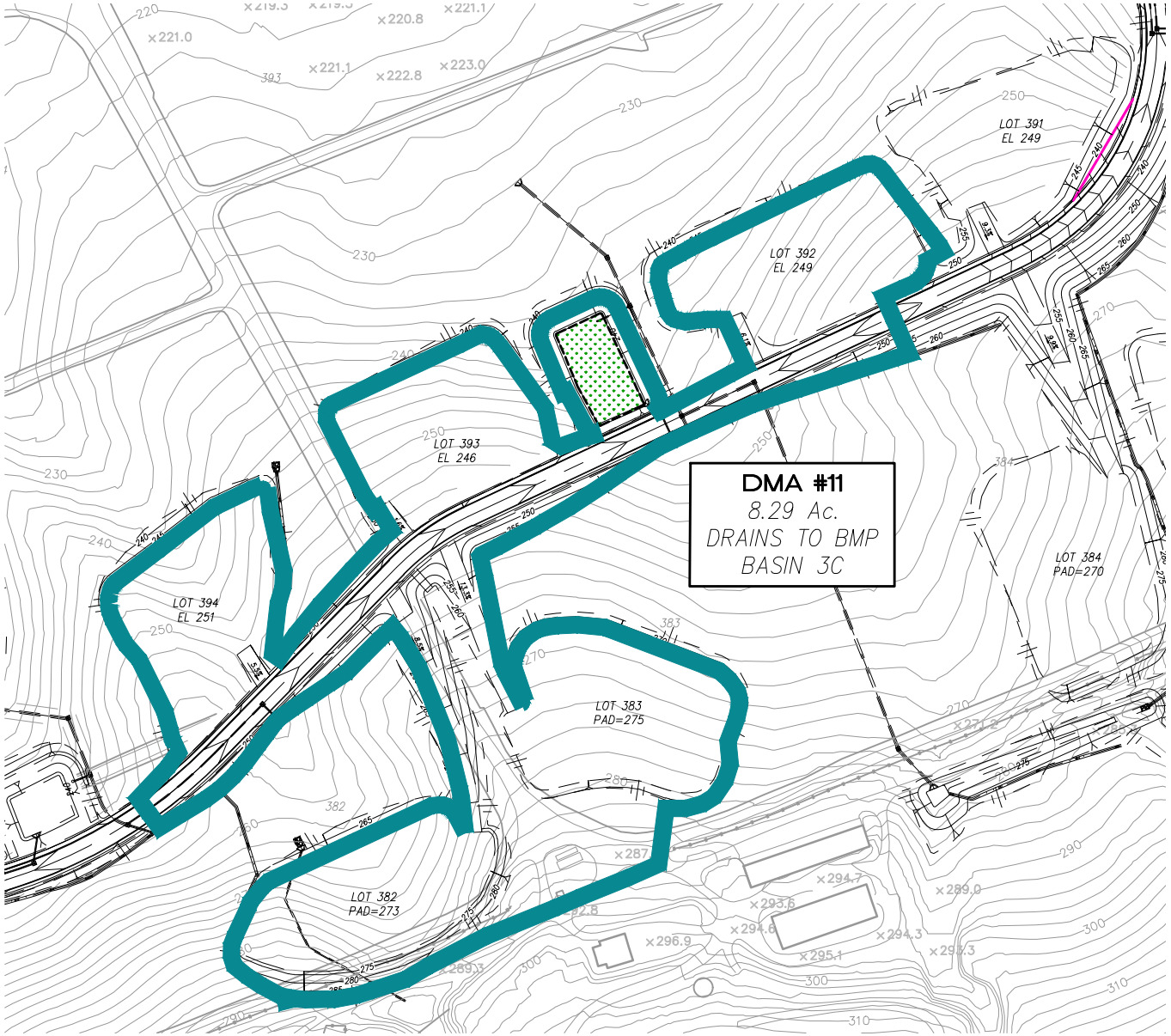
OCEAN BREEZE RANCH

DMA MAPBOOK
DMA#10

LEGEND:

DRAINAGE MANAGEMENT AREA

PROPOSED BMP



N

SCALE:	1"=200'
JOB #:	4192.00
CREATED:	11/20/18

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey

701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

COUNTY OF SAN DIEGO

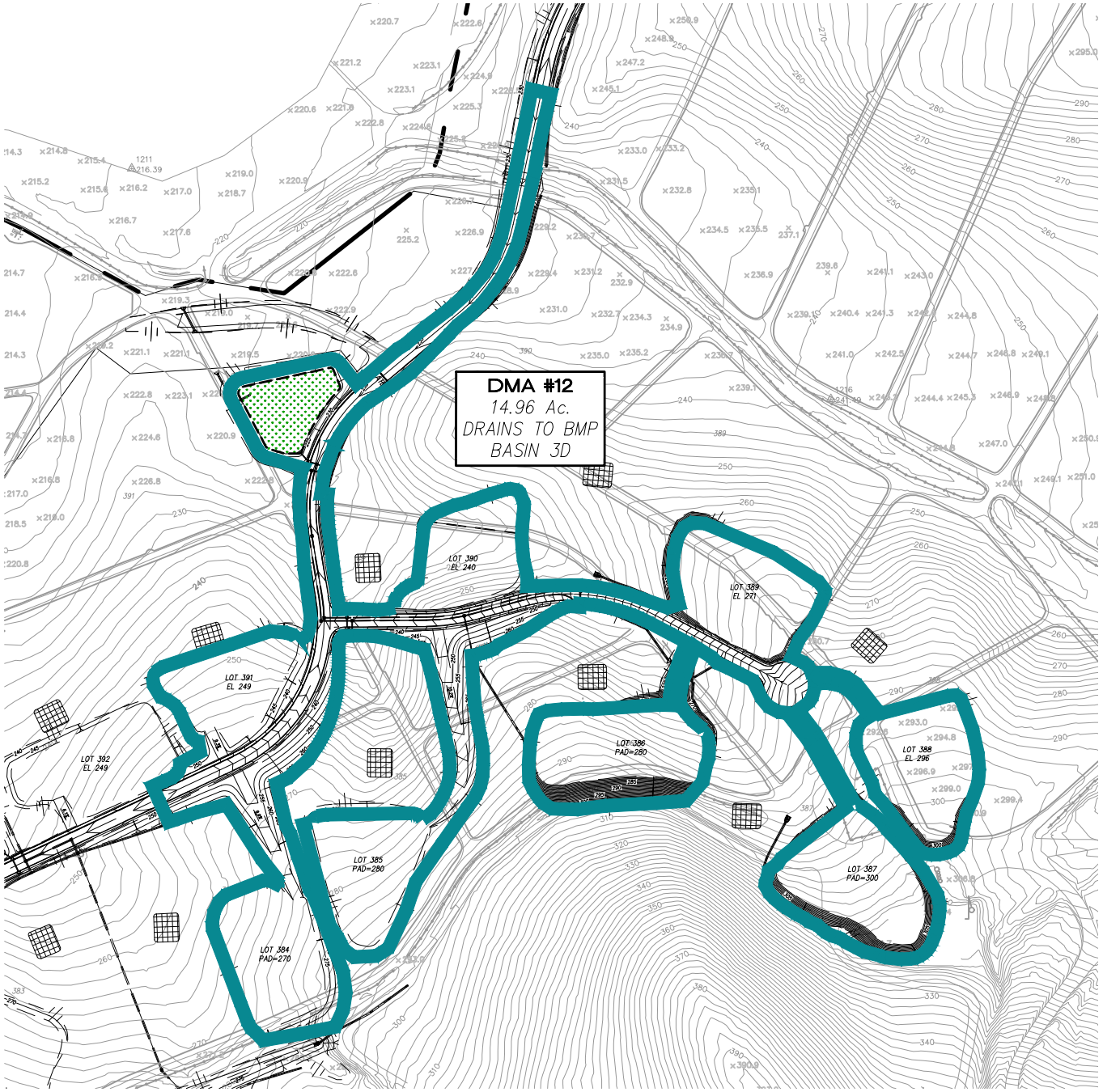
OCEAN BREEZE RANCH

DMA MAPBOOK
DMA#11

LEGEND:

DRAINAGE MANAGEMENT AREA

PROPOSED BMP



N

SCALE:	1"=300'
JOB #:	4192.00
CREATED:	11/20/18

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey

701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

COUNTY OF SAN DIEGO

OCEAN BREEZE RANCH

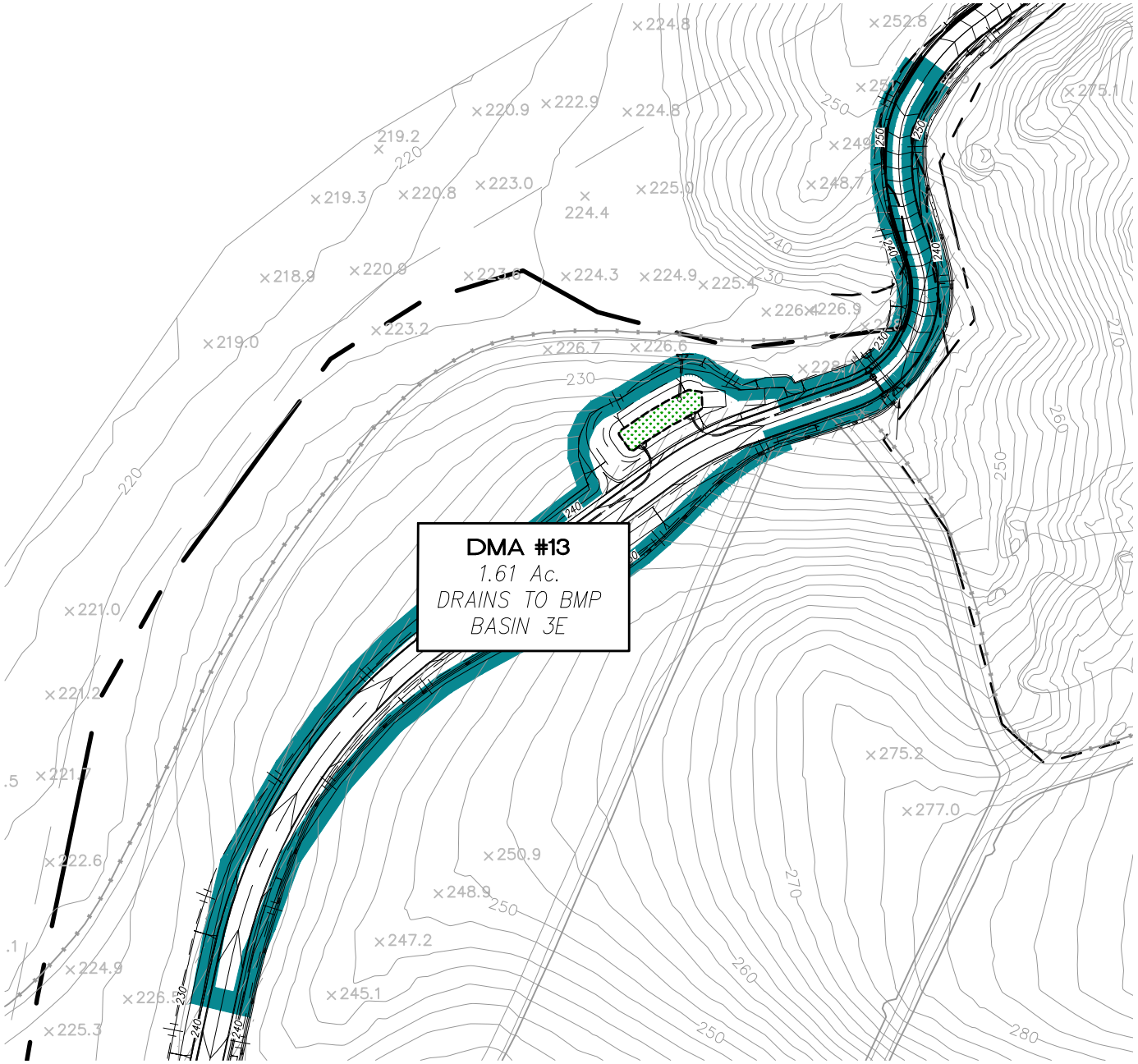
DMA MAPBOOK
DMA#12

P:\4192\Engr\Reports\SWQMP\EXH\4192 DMA Mapbook – DMAs 9-15.dwg 5/20/2019 3:12:13 PM

LEGEND:

DRAINAGE MANAGEMENT AREA

PROPOSED BMP



N

SCALE:	1"=150'
JOB #:	4192.00
CREATED:	11/20/18

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey

701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

COUNTY OF SAN DIEGO

OCEAN BREEZE RANCH

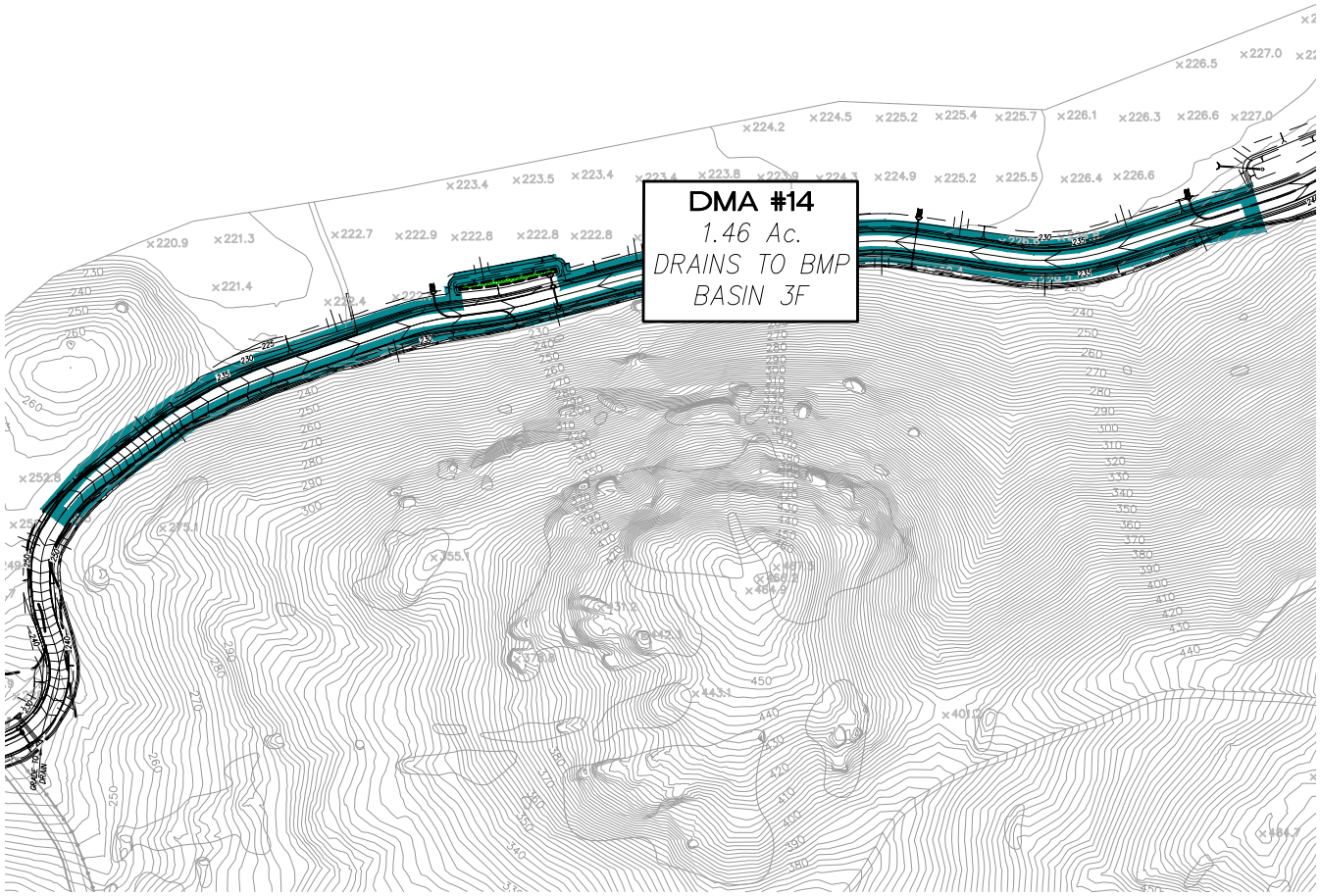
DMA MAPBOOK
DMA#13

P:\4192\Engr\Reports\SWQMP\EXH\4192 DMA Mapbook – DMAs 9-15.dwg 11/21/2018 11:45:48 AM

LEGEND:

DRAINAGE MANAGEMENT AREA

PROPOSED BMP



N

SCALE:	1"=250'
JOB #:	4192.00
CREATED:	11/20/18

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey

701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

COUNTY OF SAN DIEGO

OCEAN BREEZE RANCH

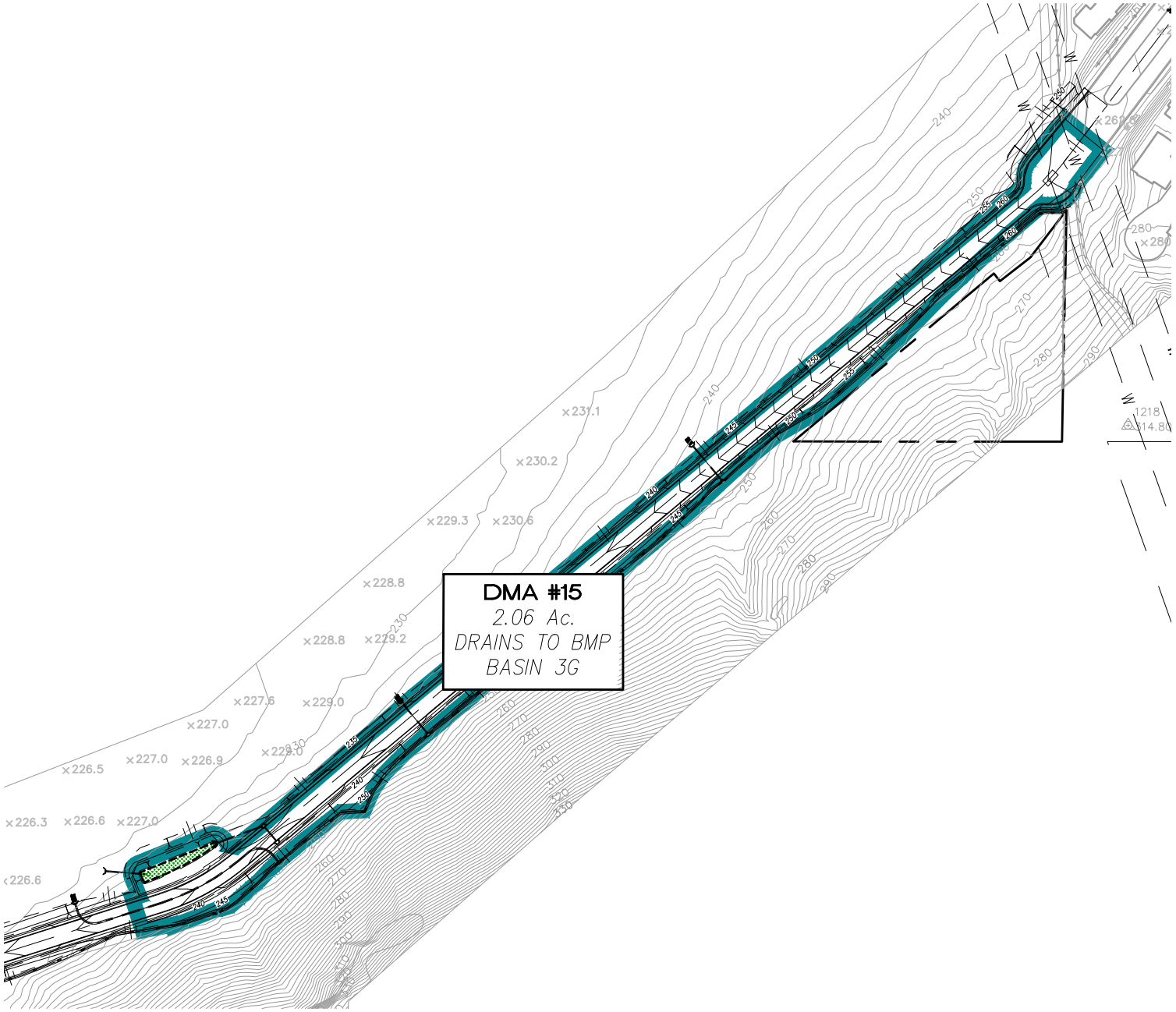
DMA MAPBOOK
DMA#14

P:\4192\Engr\Reports\SWQMP\EXH\4192 DMA Mapbook – DMAs 9-15.dwg 12/17/2018 11:06:10 AM

LEGEND:

DRAINAGE MANAGEMENT AREA

PROPOSED BMP



N

SCALE:	1"=200'
JOB #:	4192.00
CREATED:	11/20/18

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey

701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

COUNTY OF SAN DIEGO

OCEAN BREEZE RANCH

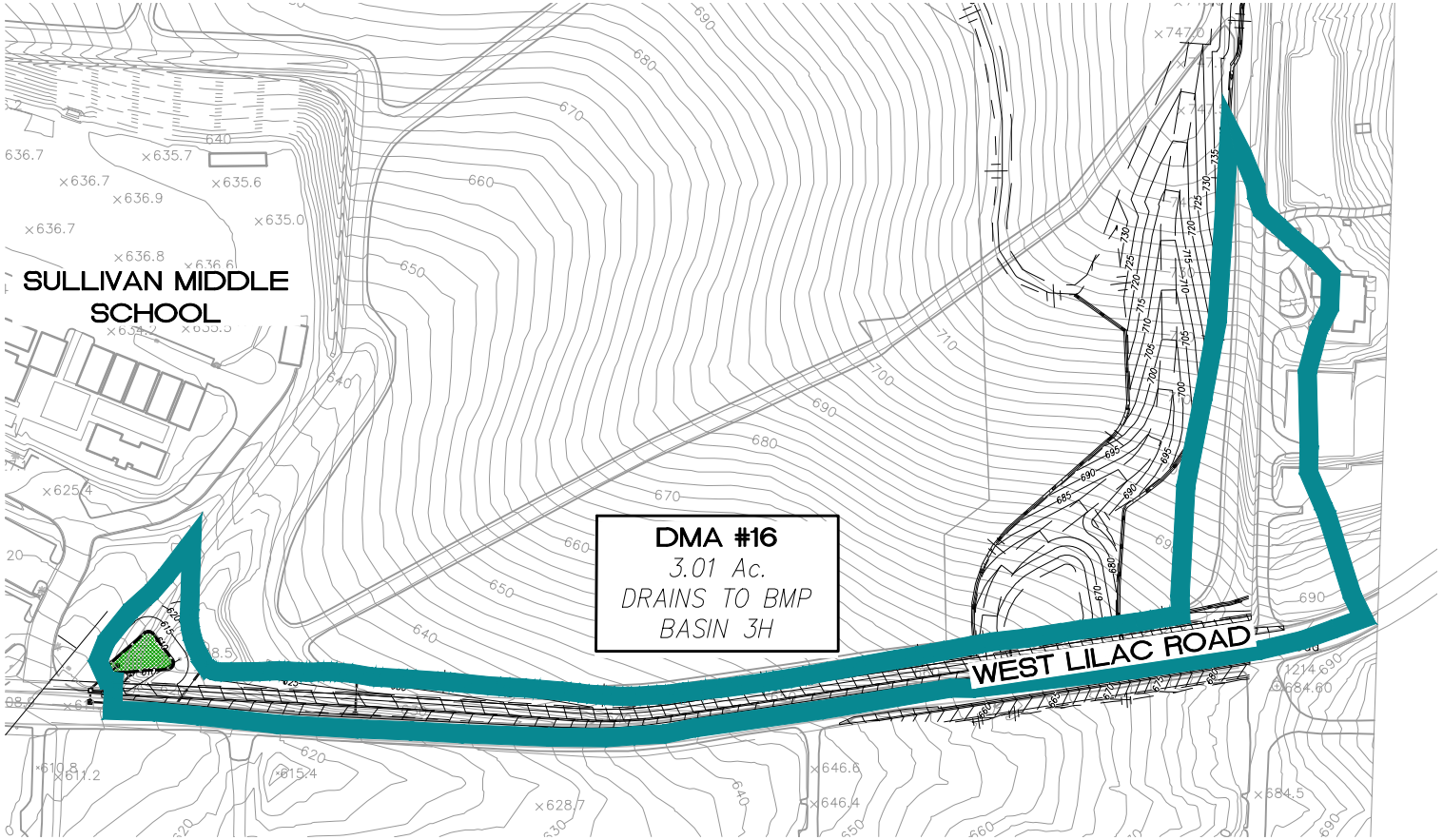
DMA MAPBOOK
DMA#15

P:\4192\Engr\Reports\SWQMP\EXH\4192 DMA Mapbook – DMAs 9-15.dwg 12/17/2018 11:07:53 AM

LEGEND:

DRAINAGE MANAGEMENT AREA

PROPOSED BMP



N

SCALE:	1"=200'
JOB #:	4192.00
CREATED:	11/20/18

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey

701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

COUNTY OF SAN DIEGO

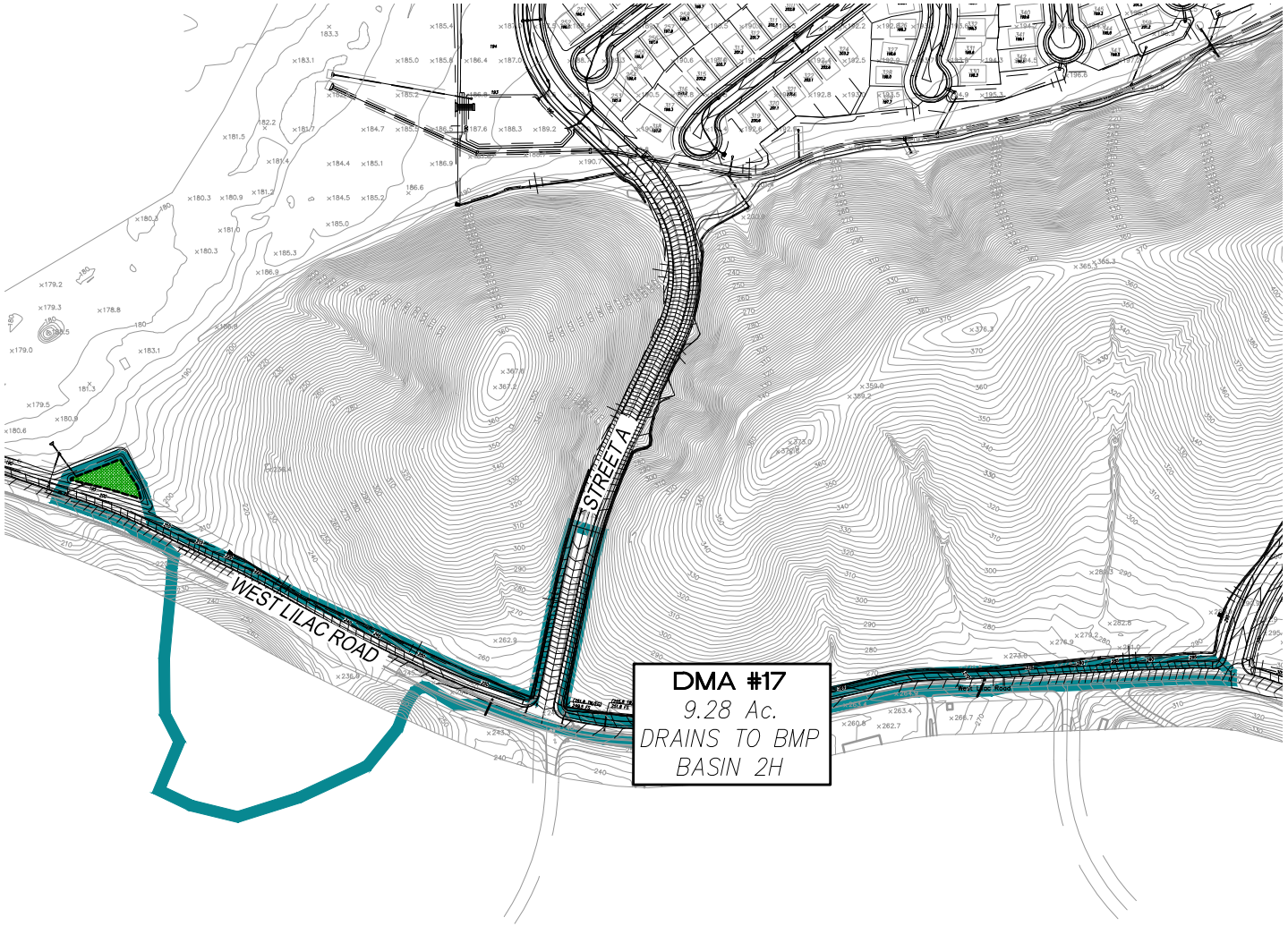
OCEAN BREEZE RANCH

DMA MAPBOOK
DMA#16

LEGEND:

DRAINAGE MANAGEMENT AREA

PROPOSED BMP



N

SCALE:	1"=400'
JOB #:	4192.00
CREATED:	11/20/18

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey

701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

COUNTY OF SAN DIEGO

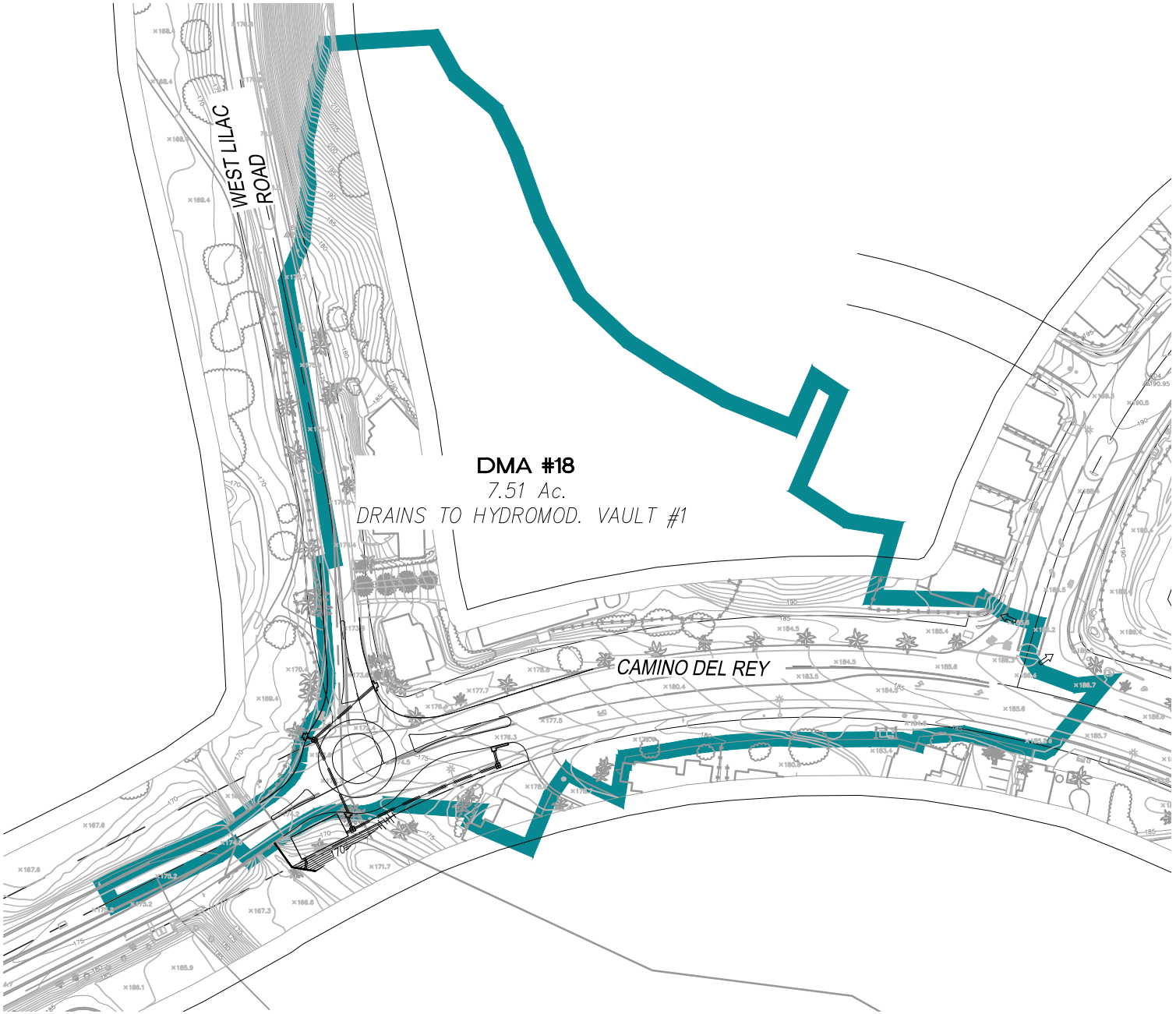
OCEAN BREEZE RANCH

DMA MAPBOOK
DMA#17

LEGEND:

DRAINAGE MANAGEMENT AREA

PROPOSED HYDROMOD. VAULT



N

SCALE:	1"=150'
JOB #:	4192.00
CREATED:	11/20/18

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey
701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

COUNTY OF SAN DIEGO

OCEAN BREEZE RANCH

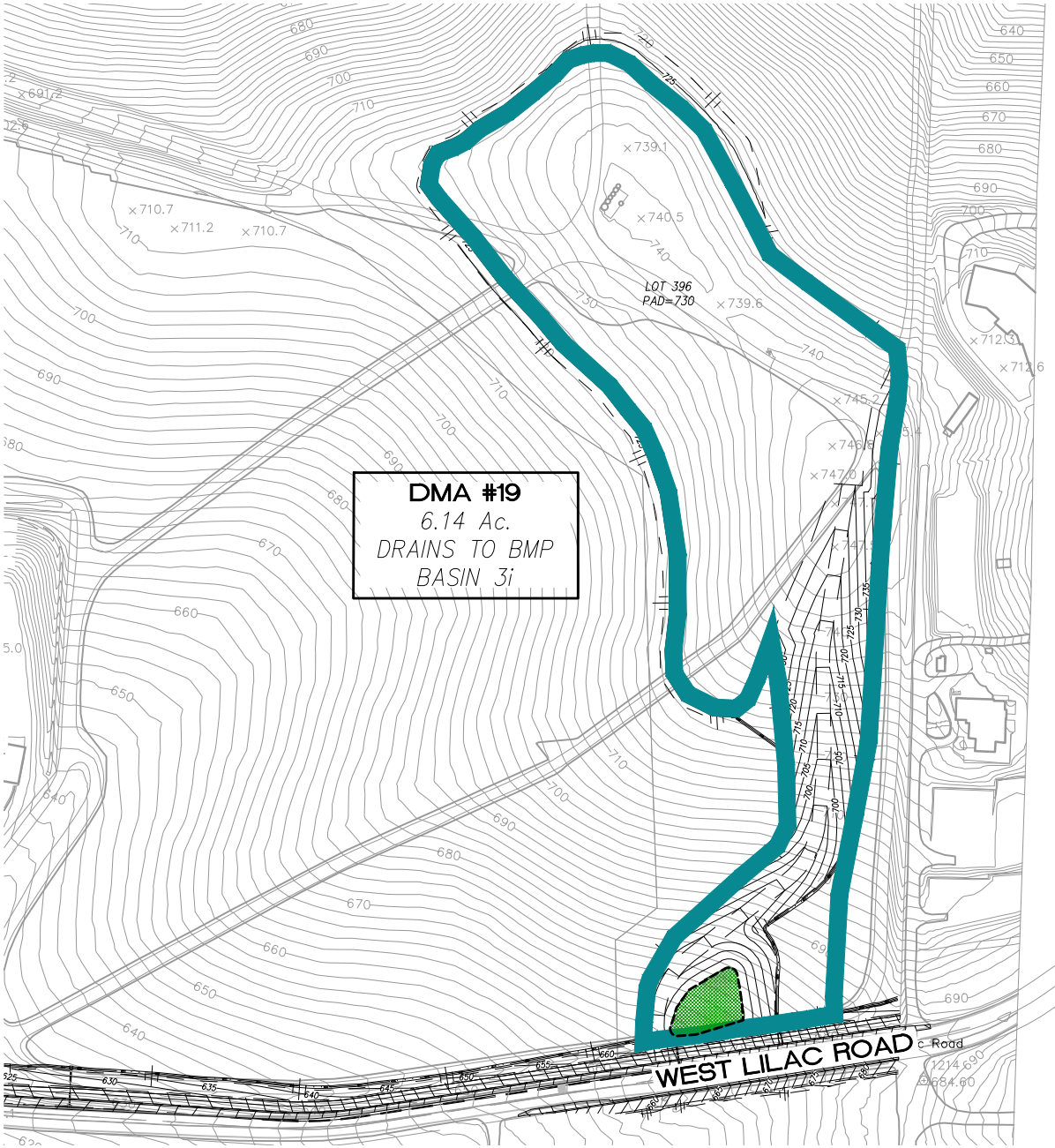
DMA MAPBOOK
DMA#18

P:\4192\Engr\Reports\SWQMP\EXH\4192 DMA Mapbook - DMAs 16-20.dwg 7/31/2019 3:29:47 AM

LEGEND:

DRAINAGE MANAGEMENT AREA

PROPOSED BMP



N

SCALE:	1"=200'
JOB #:	4192.00
CREATED:	11/20/18

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey

701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

COUNTY OF SAN DIEGO

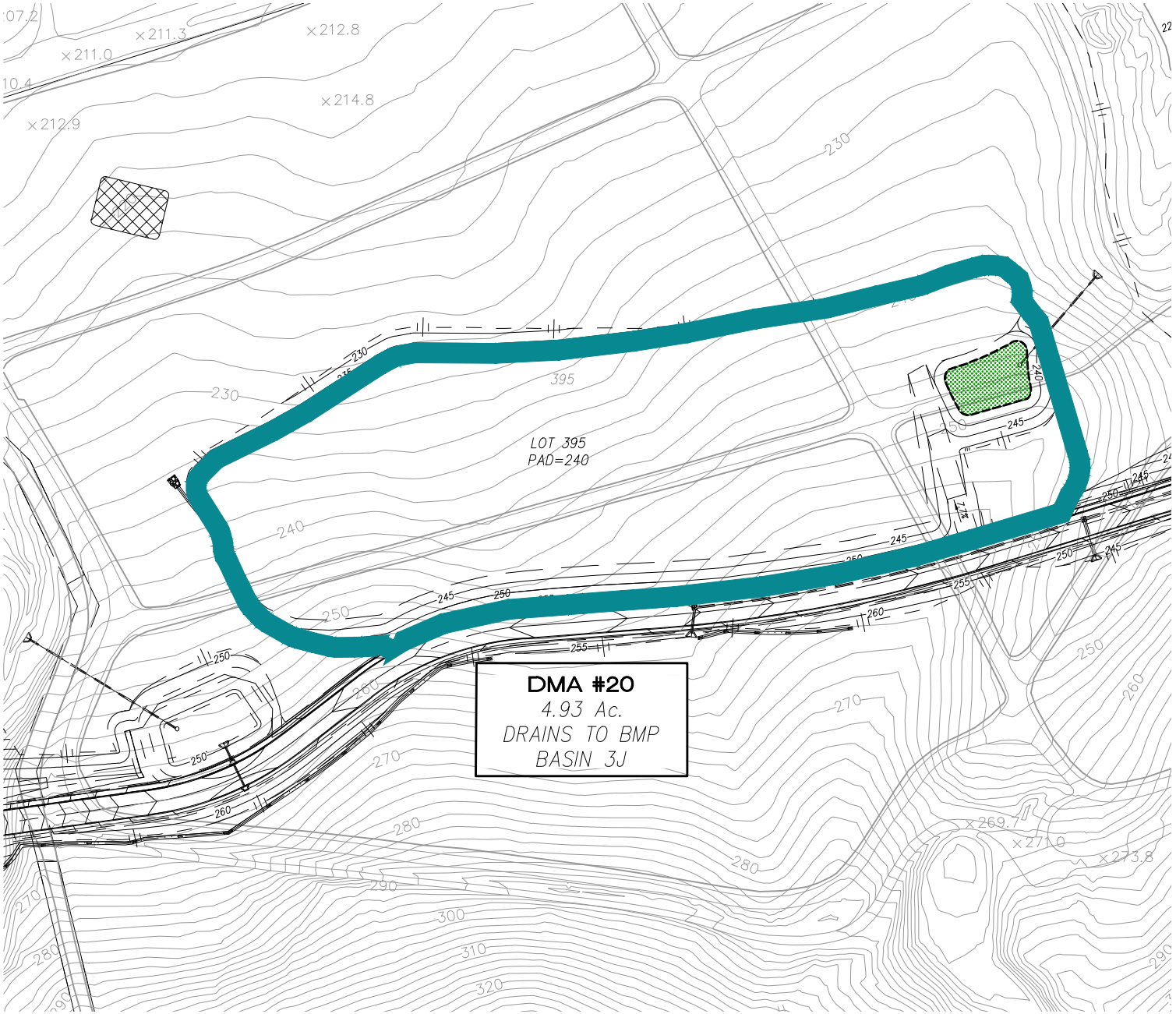
OCEAN BREEZE RANCH

DMA MAPBOOK
DMA#19

LEGEND:

DRAINAGE MANAGEMENT AREA

PROPOSED BMP



N

SCALE:	1"=200'
JOB #:	4192.00
CREATED:	11/20/18

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey

701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

COUNTY OF SAN DIEGO

OCEAN BREEZE RANCH

DMA MAPBOOK
DMA#20

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.

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	Contents	Checklist
Attachment 2a	Flow Control Facility Design, including Structural BMP Drawdown Calculations and Overflow Design Summary (Required) See Chapter 6 and Appendix G of the BMP Design Manual	☐ Included ☒ Submitted as separate stand-alone document
Attachment 2b	Hydromodification Management Exhibit (Required)	☒ Not Included Hydromodification Study prepared by Project Design Consultants under separate cover.
Attachment 2c	Management of Critical Coarse Sediment Yield Areas See Section 6.2 and Appendix H of the BMP Design Manual.	☒ Exhibit depicting onsite and/or upstream sources of critical coarse sediment as mapped by Regional or Jurisdictional approaches outlined in Appendix H.1 AND, ☒ Demonstration that the project effectively avoids and bypasses sources of mapped critical coarse sediment per approaches outlined in Appendix H.2 and H.3. OR, ☐ Demonstration that project does not generate a net impact on the receiving water per approaches outlined in Appendix H.4.
Attachment 2d	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 2e	Vector Control Plan (Required when structural BMPs will not drain in 96 hours)	☐ Included ☒ Not required because BMPs will drain in less than 96 hours
Attachment 2f	Exemption for POC 1 (Direct Discharge Exemption and 10-year Analysis	☒ Included

ATTACHMENT 2c

Critical Coarse Sediment Yield Areas Exhibit

N

LEGEND AND SUMMARY OF AREAS:

	TOTAL PROJECT AREA	= 1,402.52 ACRES
	RPO–SLOPES (>25% SLOPE WITH 50' VERTICAL RISE)	= 402.32 ACRES (28.69% OF TOTAL PROJECT AREA)
	IMPACTED AREAS BY LOTS	= 9.52 ACRES (2.37% OF RPO–SLOPE AREA)
	STEEP SLOPES IMPACTED BY ROADS WITH GRADING	= 14.60 ACRES (3.63% OF RPO–SLOPE AREA)

SAN LUIS REY RIVER

PLANNING AREA 1

PLANNING AREA 2

PLANNING AREA 3

POC #1
POC #1A
POC #2A
POC #2B
POC #3A
POC #3B
POC #3C
POC #3D
POC #3F
POC #3G
POC #3H

1 12.539 ACRES
2 25.258 ACRES
3 0.110 ACRES
4 0.159 ACRES
5 2.916 ACRES
6 21.942 ACRES
7 0.054 ACRES
8 2.559 ACRES
9 0.955 ACRES
10 1.827 ACRES
11 0.575 ACRES
12 0.223 ACRES
13 1.814 ACRES
14 0.190 ACRES
15 0.753 ACRES
16 0.110 ACRES
17 0.120 ACRES
18 0.429 ACRES
19 0.540 ACRES
20 0.540 ACRES
21 0.753 ACRES
22 21.942 ACRES
23 0.110 ACRES
24 69.536 ACRES
25 0.645 ACRES
26 0.096 ACRES
27 0.096 ACRES
28 0.370 ACRES
29 0.958 ACRES
30 1.444 ACRES
31 4.288 ACRES
32 1.036 ACRES
33 0.192 ACRES
34 200.323 ACRES DEDUCT 1.912 ACRES NET 198.71 ACRES
35 0.384 ACRES
36 0.617 ACRES
37 0.429 ACRES
38 2.575 ACRES
39 22.972 ACRES

NORMAN L. SULLIVAN MIDDLE SCHOOL

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey
701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

SCALE:	1" = 350'
JOB #:	4192
CREATED:	8/29/16

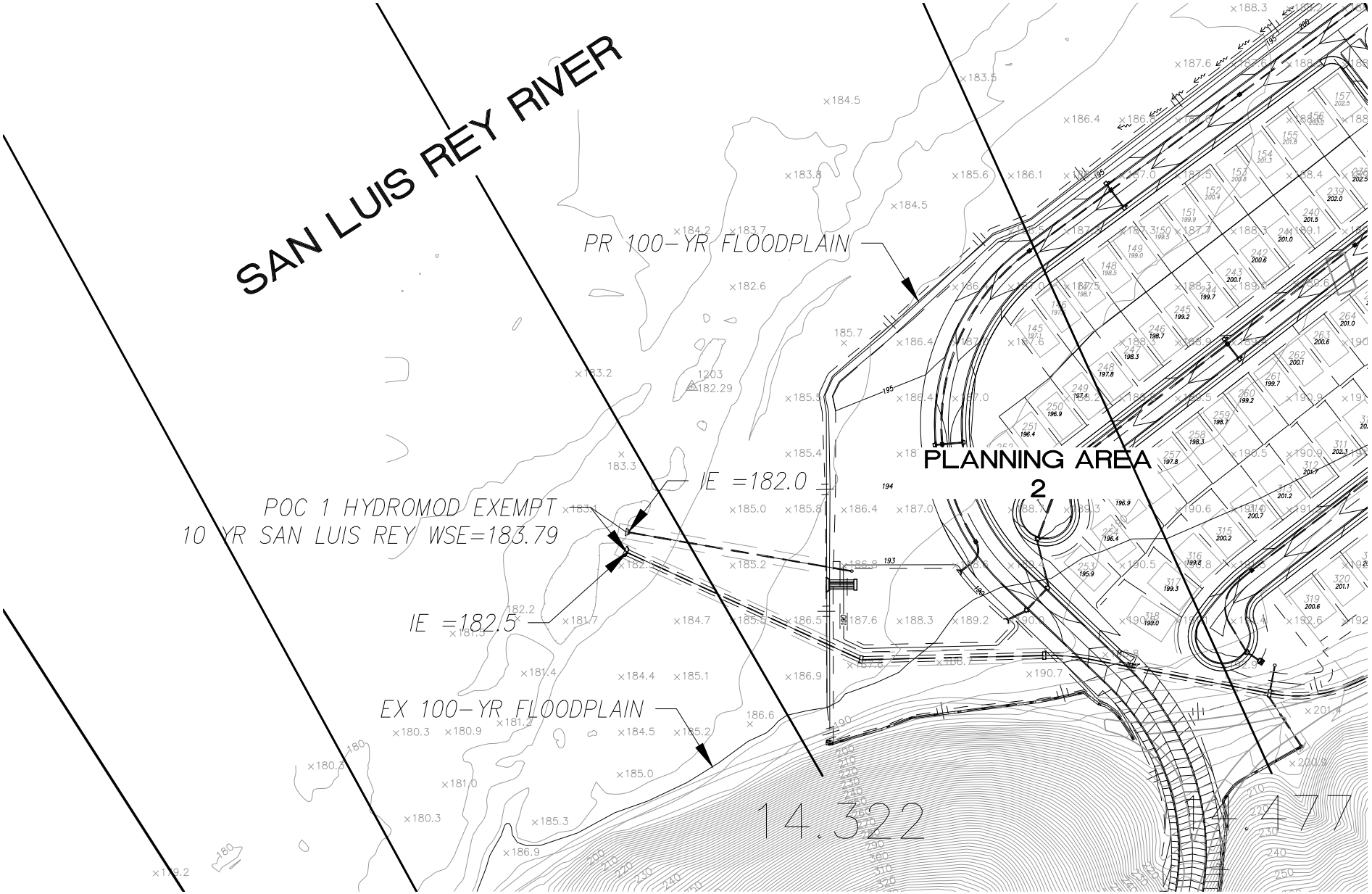
COUNTY OF SAN DIEGO

OCEAN BREEZE RANCH

Attachment 2c
CCSYA Map

ATTACHMENT 2f

Exemption for POC 1 (Direct Discharge Exemption and 10-year Analysis)



N

SCALE:	1"=150'
JOB #:	4192.00
CREATED:	11/20/18

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey
701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

COUNTY OF SAN DIEGO

OCEAN BREEZE RANCH

DISCHARGE HYDROMOD EXEMPTION
POC 1 - SAN LUIS REY RIVER <10 YR WSE

P:\4192\Engr\Reports\SWQMP\Attachments\A2 - hydromod\Att 2F-10-yr analysis\4192 Exhibit Hydromod Exempt.dwg 12/14/2018 3:53:28 PM

TABLE 8: SUMMARY OF PEAK DISCHARGES

Flooding Source and Location	Drainage Area (sq. miles)	Peak Discharges (cubic feet per second) 10% Annual-Chance	2% Annual-Chance	1% Annual-Chance	0.2% Annual-Chance
San Dieguito River					
Upstream of Camino Del Mar Bridge	--	5,700	31,400	41,800	90,000
Upstream of Atchison, Topeka & Santa Fe Railway Bridge	--	5,700	31,400	41,800	90,000
Upstream of Jimmy Durante Bridge	--	5,800	32,100	42,400	90,000
Upstream of U.S. Interstate Highway 5 Bridge	--	5,900	32,500	42,800	90,00
San Elijo Creek					
0.1 Mile Upstream of El Camino Road	5.4	500	1,600	2,100	5,500
San Luis Rey River					
At Mouth	560.0	6,600	31,000	51,000	120,000
Downstream of Confluence with Moosa Canyon	355.6	6,200	30,000	48,000	110,000
Downstream of Confluence with Keys Canyon	252.3	5,000	25,000	41,000	98,000
Upstream of Confluence with Keys Canyon	180.4	4,000[5]	20,000	33,000	85,000
Downstream of Palma	167.3	4,000[5]	18,000	30,000	78,000
Downstream of Confluence with Puma Creek	126.7	4,000[5]	16,800	28,000	72,800
Upstream of Confluence with Puma Creek	71.5	5,000	15,000	24,500	64,000

-- Data Not Available

HEC-RAS Plan: Prop Cond River: SLR River Reach: 1

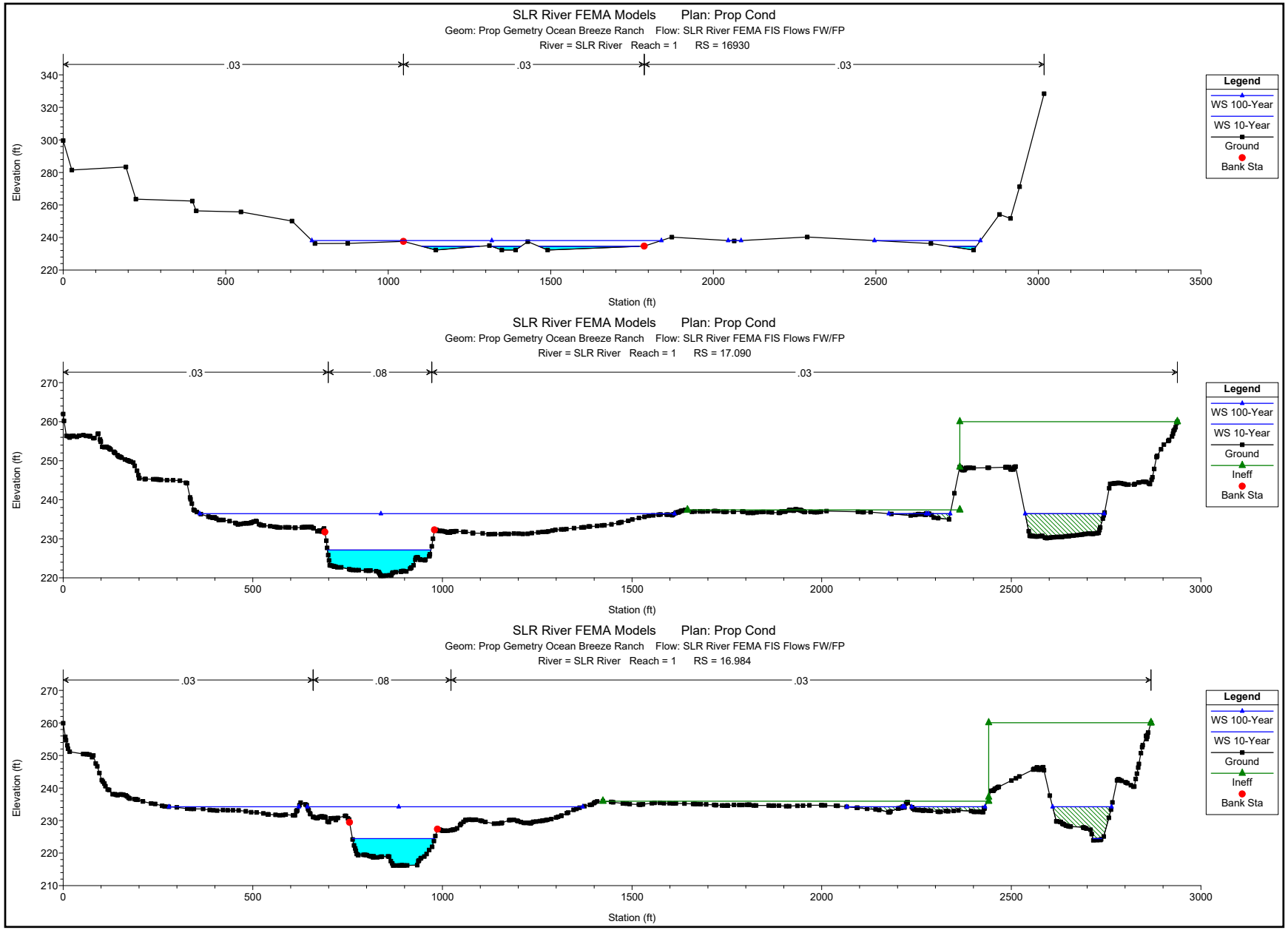
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	16930	10-Year	5000.00	232.30	234.57	234.57	235.19	0.012530	6.33	794.76	657.06	1.01
1	16930	100-Year	41000.00	232.30	238.13	238.13	239.69	0.006723	10.66	4350.52	1441.03	0.91
1	17.090	10-Year	5000.00	220.50	227.13		227.37	0.005702	3.92	1275.17	272.50	0.32
1	17.090	100-Year	41000.00	220.50	236.44		236.97	0.002838	5.76	7064.98	1616.52	0.28
1	16.984	10-Year	5000.00	216.17	224.45		224.68	0.004081	3.87	1291.33	240.39	0.28
1	16.984	100-Year	41000.00	216.17	234.24		235.04	0.004145	7.25	6017.36	1569.29	0.33
1	16.882	10-Year	5000.00	214.28	222.43		222.58	0.003635	3.12	1603.34	342.37	0.25
1	16.882	100-Year	41000.00	214.28	232.21		232.84	0.003816	6.76	6981.12	1883.14	0.31
1	16.779	10-Year	5000.00	210.71	220.05		220.23	0.005176	3.40	1472.16	360.30	0.30
1	16.779	100-Year	41000.00	210.71	229.46		230.33	0.005492	7.75	5693.04	2056.00	0.37
1	16.682	10-Year	5000.00	211.26	218.44		218.54	0.002255	2.50	1999.04	416.09	0.20
1	16.682	100-Year	41000.00	211.26	227.37		227.98	0.003694	6.44	6807.00	1944.18	0.31
1	16.573	10-Year	5000.00	209.61	216.66		216.82	0.004112	3.20	1561.48	360.54	0.27
1	16.573	100-Year	41000.00	209.61	224.86		225.52	0.004918	7.08	7051.37	1765.64	0.36
1	16.499	10-Year	5000.00	208.63	215.13		215.24	0.003946	2.70	1852.73	527.34	0.25
1	16.499	100-Year	41000.00	208.63	223.29		223.79	0.003714	5.84	7503.47	1569.11	0.30
1	16.430	10-Year	5000.00	207.82	213.98		214.06	0.002658	2.34	2138.15	559.15	0.21
1	16.430	100-Year	41000.00	207.82	221.99		222.47	0.003454	5.67	7620.01	1282.24	0.29
1	16.385	10-Year	5000.00	207.27	213.37		213.46	0.002452	2.33	2143.24	548.14	0.21
1	16.385	100-Year	41000.00	207.27	221.25		221.69	0.003050	5.50	7873.51	1285.13	0.28
1	16.337	10-Year	5000.00	206.60	212.63		212.74	0.003323	2.65	1892.49	502.30	0.24
1	16.337	100-Year	41000.00	206.60	220.20		220.76	0.004433	6.31	7126.53	1466.07	0.33
1	16.291	10-Year	5000.00	206.04	211.86		211.97	0.003052	2.67	2069.66	740.27	0.23
1	16.291	100-Year	41000.00	206.04	219.46		219.80	0.003048	5.31	9647.93	1611.64	0.27
1	16.246	10-Year	5000.00	205.69	211.29		211.36	0.002108	2.29	2505.16	850.80	0.19
1	16.246	100-Year	41000.00	205.69	218.94		219.17	0.002115	4.48	11407.02	1821.24	0.23

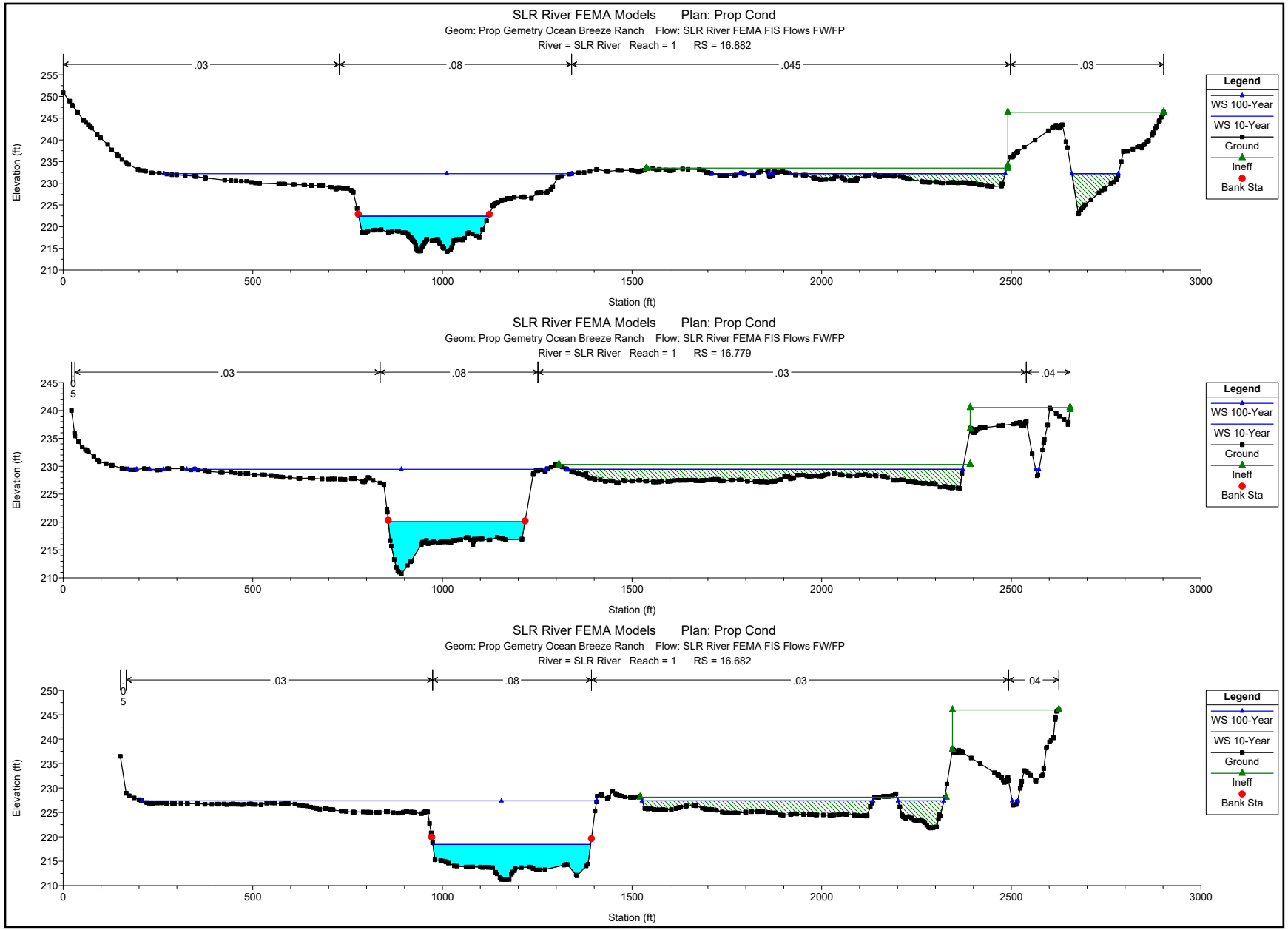
HEC-RAS Plan: Prop Cond River: SLR River Reach: 1 (Continued)

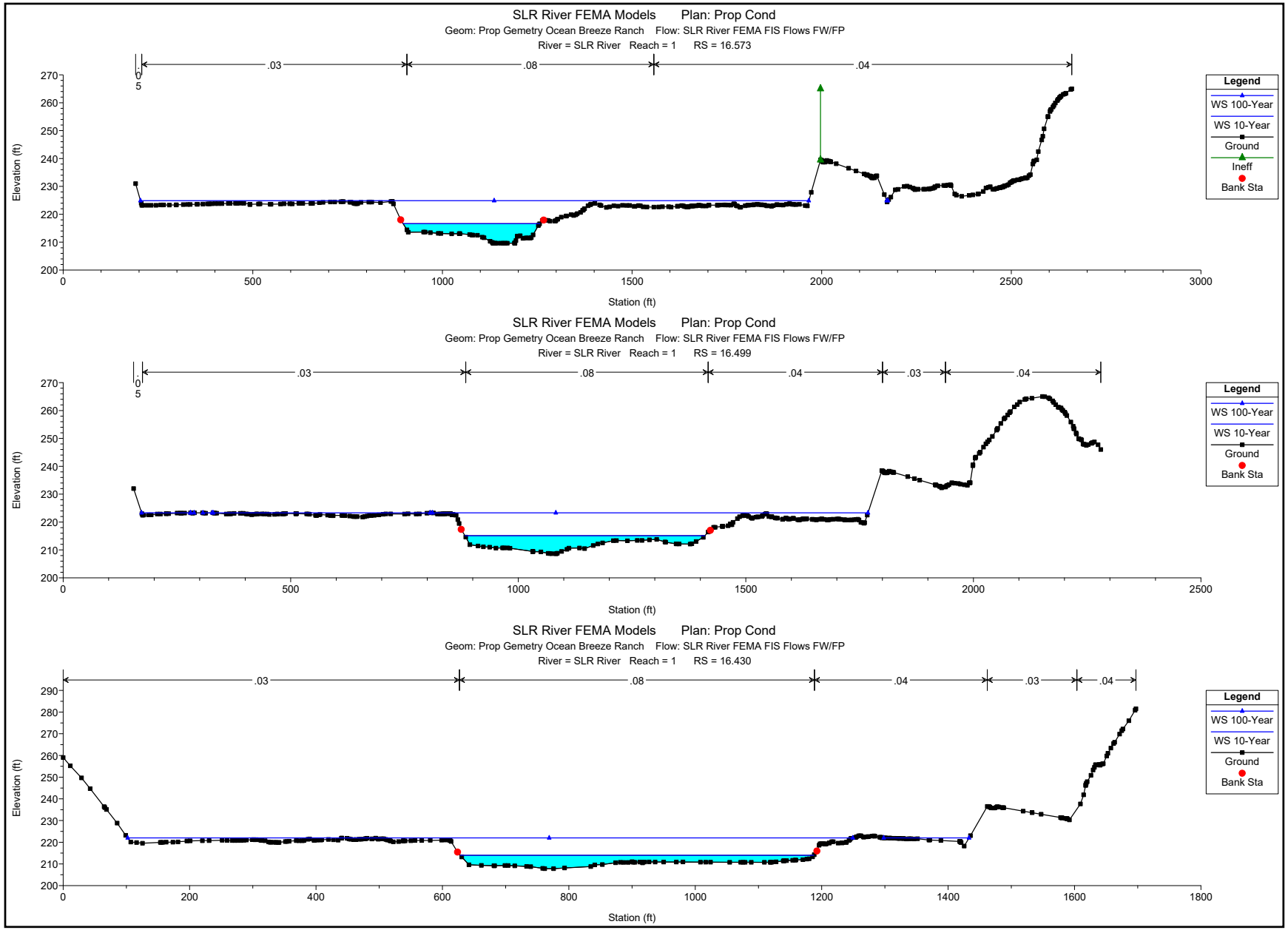
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	16.155	10-Year	5000.00	204.78	210.25		210.32	0.002226	2.14	2339.91	625.35	0.19
1	16.155	100-Year	41000.00	204.78	217.36		217.82	0.003780	5.62	8145.08	1937.25	0.30
1	16.070	10-Year	5000.00	203.60	209.66		209.69	0.000931	1.44	3461.33	848.65	0.13
1	16.070	100-Year	41000.00	203.60	216.40		216.61	0.001769	3.80	11905.60	2660.75	0.20
1	15.977	10-Year	5000.00	202.55	209.00		209.06	0.001828	1.90	2634.46	711.90	0.17
1	15.977	100-Year	41000.00	202.55	215.50		215.71	0.001846	3.69	11246.42	2991.20	0.21
1	15.883	10-Year	5000.00	201.83	207.68		207.80	0.003769	2.72	1837.67	531.78	0.25
1	15.883	100-Year	41000.00	201.83	214.24		214.54	0.003070	4.37	9391.19	2992.00	0.26
1	15.780	10-Year	5000.00	200.68	205.75		205.83	0.003417	2.37	2112.09	1005.47	0.23
1	15.780	100-Year	41000.00	200.68	212.31		212.66	0.003854	5.18	9439.84	3232.96	0.30
1	15.677	10-Year	5000.00	198.94	203.52		203.62	0.004890	2.58	1941.50	694.33	0.27
1	15.677	100-Year	41000.00	198.94	210.19		210.52	0.003940	4.84	9880.17	2499.62	0.29
1	15.580	10-Year	5000.00	196.65	202.16		202.20	0.001738	1.62	3080.86	829.96	0.15
1	15.580	100-Year	41000.00	196.65	208.91		209.06	0.002051	3.47	13806.07	3191.68	0.19
1	15.482	10-Year	5000.00	196.00	200.56		200.65	0.006396	2.37	2105.90	878.04	0.27
1	15.482	100-Year	41000.00	196.00	207.70		207.85	0.002610	3.25	14009.65	3182.33	0.20
1	15.389	10-Year	5000.00	191.73	199.31		199.34	0.001422	1.48	3374.30	993.70	0.13
1	15.389	100-Year	41000.00	191.73	206.38		206.55	0.002677	3.30	12738.55	2961.96	0.20
1	15.324	10-Year	5000.00	191.35	198.54		198.59	0.003800	1.86	2691.58	1109.59	0.20
1	15.324	100-Year	41000.00	191.35	205.40		205.55	0.003160	3.24	12878.44	2187.99	0.20
1	15.298	10-Year	5000.00	190.31	197.88		197.94	0.006001	1.99	2515.59	842.80	0.20
1	15.298	100-Year	41000.00	190.31	204.85		205.02	0.003423	3.24	12280.64	2577.61	0.19
1	15.190	10-Year	5000.00	188.32	195.95		195.99	0.002184	1.68	2985.05	609.16	0.13
1	15.190	100-Year	41000.00	188.32	202.65		202.90	0.003588	3.80	11500.99	2771.04	0.20
1	15.086	10-Year	5000.00	187.80	194.70		194.75	0.002353	1.88	2918.06	700.94	0.14

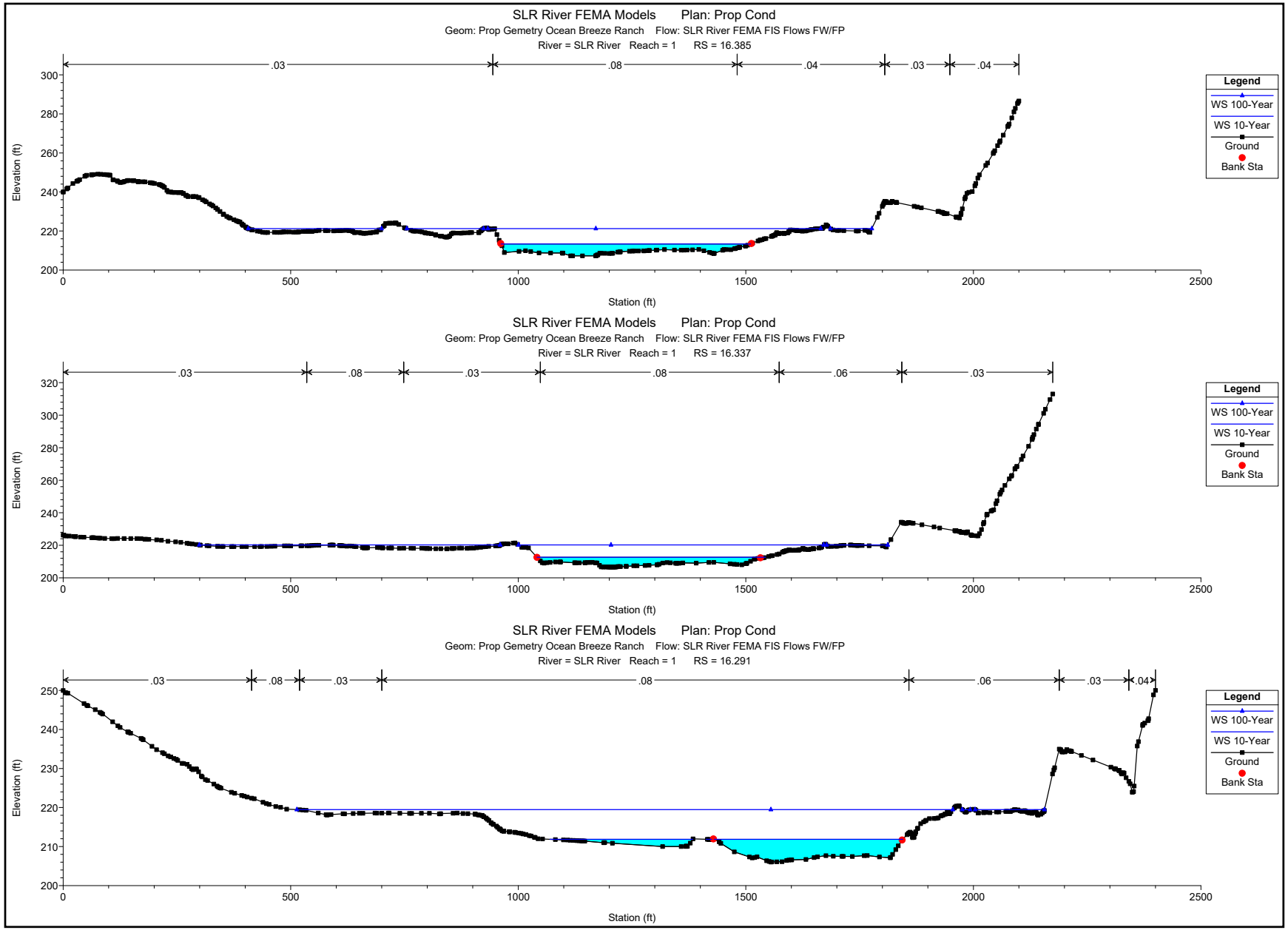
HEC-RAS Plan: Prop Cond River: SLR River Reach: 1 (Continued)

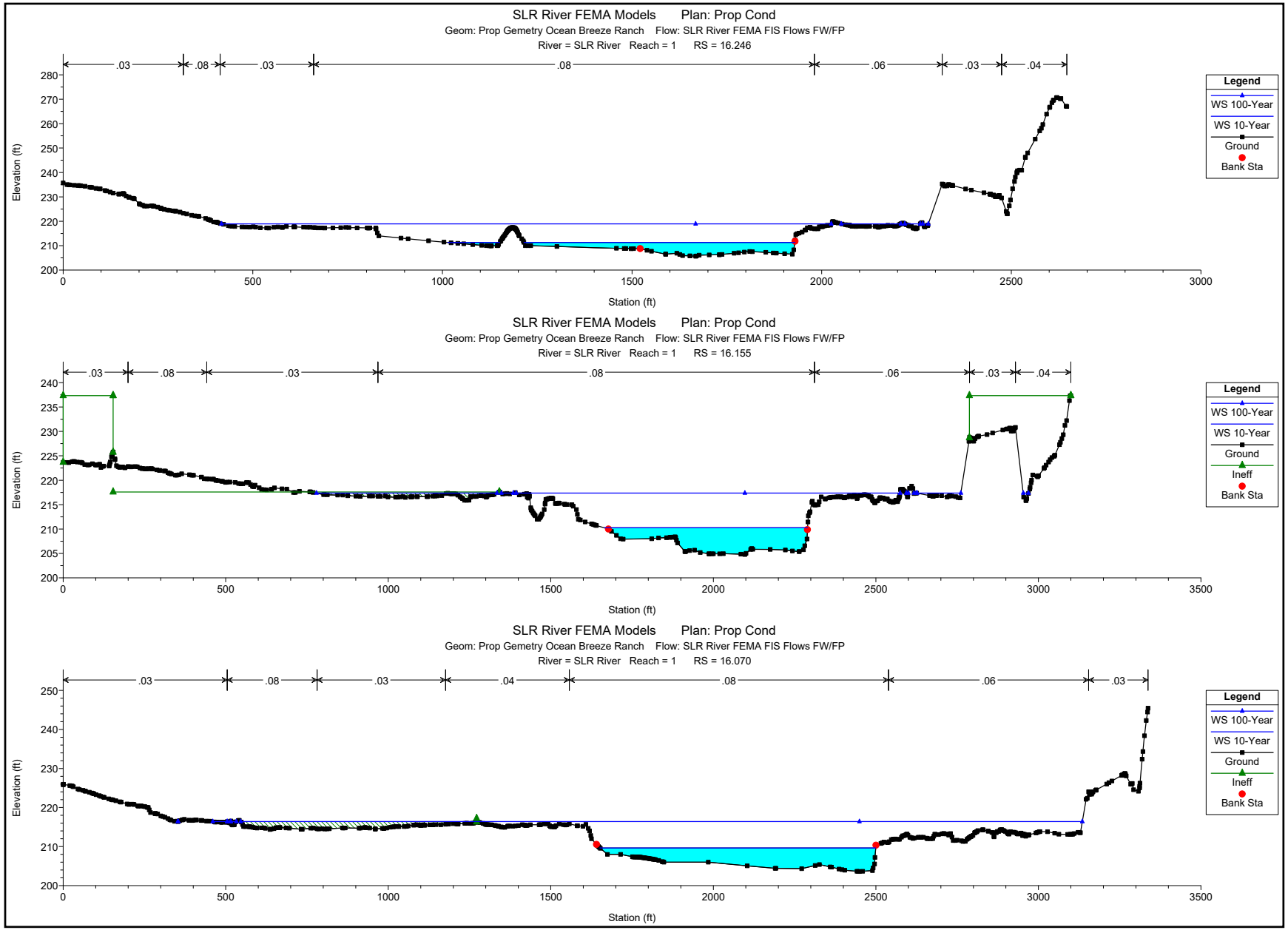
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	15.086	100-Year	41000.00	187.80	200.88		201.10	0.002941	3.46	11712.22	2564.25	0.18
1	14.987	10-Year	5000.00	187.80	193.41		193.47	0.002556	1.83	2731.84	561.14	0.15
1	14.987	100-Year	41000.00	187.80	198.93		199.22	0.004563	4.06	9806.80	2501.36	0.22
1	14.890	10-Year	5000.00	185.50	191.99		192.07	0.002913	2.24	2229.91	507.69	0.18
1	14.890	100-Year	41000.00	185.50	197.47		197.71	0.002065	3.14	11456.95	2391.67	0.18
1	14.789	10-Year	5000.00	183.50	190.94	186.49	190.99	0.001480	1.83	2732.87	638.18	0.13
1	14.789	100-Year	41000.00	183.50	196.23	191.35	196.55	0.002310	3.53	9981.57	1897.09	0.19
1	14.690	10-Year	5000.00	181.90	189.83	185.44	189.94	0.002843	2.70	1848.50	471.20	0.19
1	14.690	100-Year	41000.00	181.90	194.60	192.21	195.07	0.003209	3.97	8293.79	1793.56	0.22
1	14.583	10-Year	5000.00	180.00	188.11	184.11	188.22	0.003235	2.63	1901.85	715.10	0.20
1	14.583	100-Year	41000.00	180.00	192.69	190.47	193.02	0.003834	4.18	9060.33	1895.64	0.24
1	14.477	10-Year	5000.00	178.00	186.41	181.98	186.52	0.002828	2.67	1869.55	857.07	0.19
1	14.477	100-Year	41000.00	178.00	190.66	188.80	190.98	0.003401	4.12	9085.14	1946.62	0.23
1	14.322	10-Year	5000.00	176.12	183.79	179.65	183.92	0.003568	2.96	1690.98	794.53	0.21
1	14.322	100-Year	41000.00	176.12	187.83	186.54	188.22	0.003416	4.00	8455.00	2327.37	0.23
1	14.215	10-Year	5000.00	175.20	182.04	177.94	182.14	0.002798	2.58	1936.27	1095.33	0.19
1	14.215	100-Year	41000.00	175.20	186.30	184.03	186.57	0.002398	3.39	10108.64	2232.95	0.19
1	14.134	10-Year	5000.00	173.77	180.78	176.77	180.89	0.003070	2.70	1854.56	1109.78	0.20
1	14.134	100-Year	41000.00	173.77	185.08	183.01	185.36	0.003471	4.07	9740.32	2185.16	0.23
1	14.053	10-Year	5000.00	172.22	179.42	175.01	179.55	0.003249	2.89	1731.66	1119.64	0.20
1	14.053	100-Year	41000.00	172.22	183.61	182.12	183.93	0.003525	4.01	9176.99	2077.41	0.23
1	13.827	10-Year	5000.00	175.90	178.21	177.32	178.28	0.002002	0.62	2487.20	1796.28	0.11
1	13.827	100-Year	41000.00	175.90	182.72	179.43	182.96	0.001157	1.38	11316.22	2087.60	0.13

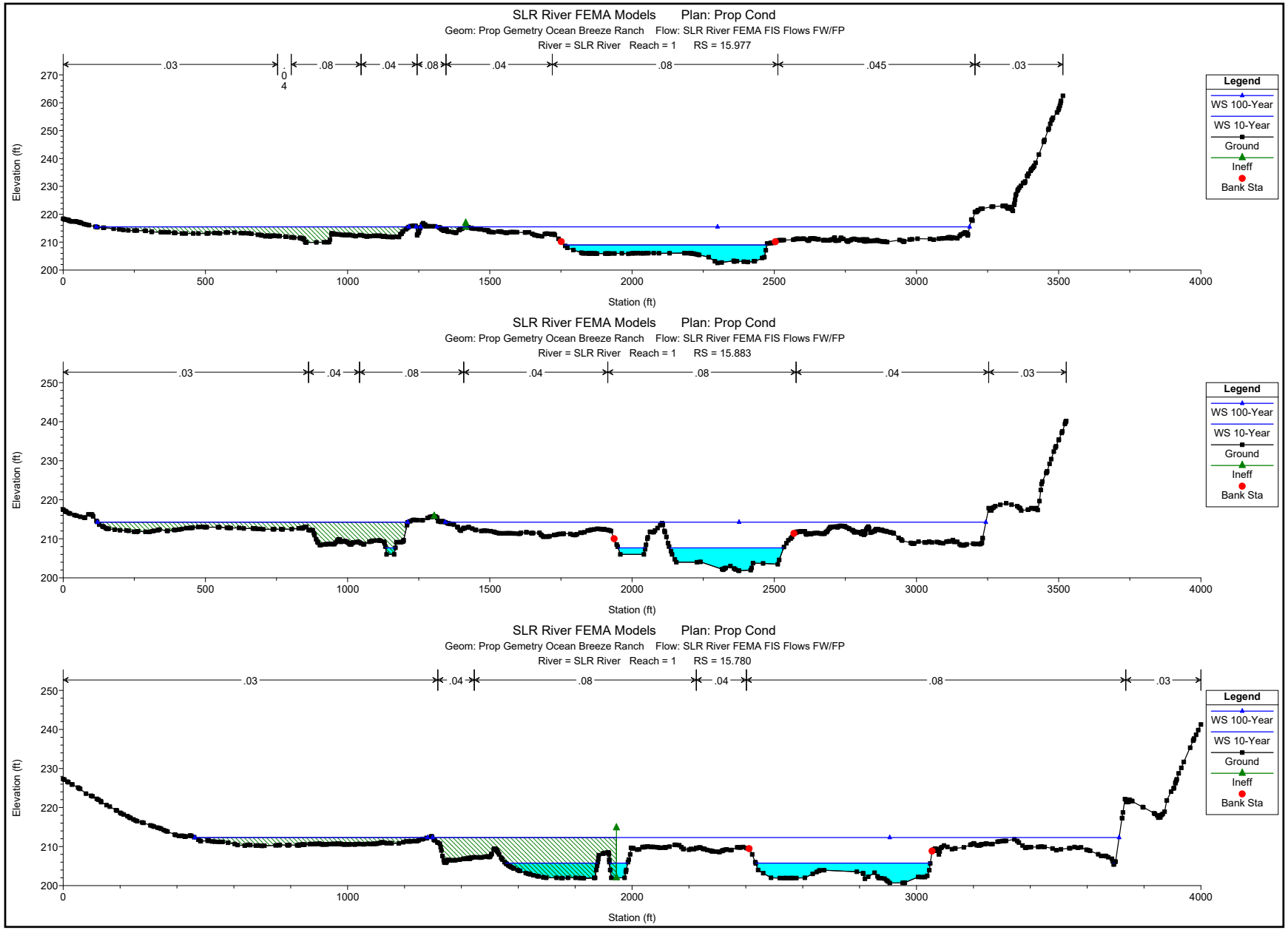

SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 16930
.03
.03
.03
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 10-Year
Ground
Bank Sta
SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 17.090
.03
.08
.03
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 10-Year
Ground
Ineff
Bank Sta
SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 16.984
.03
.08
.03
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 10-Year
Ground
Ineff
Bank Sta

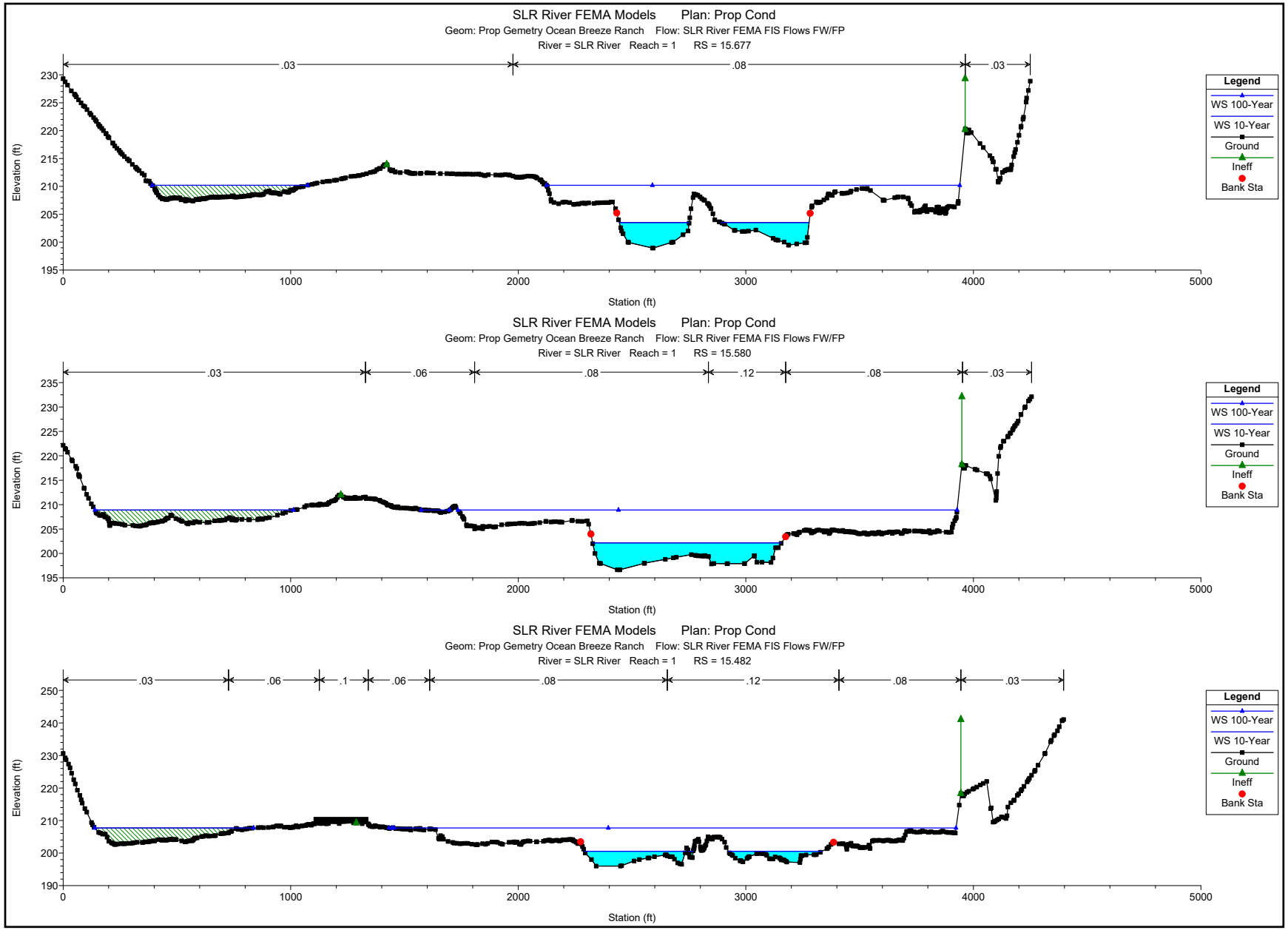

SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 16.882
.03
.08
.045
.03
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 10-Year
Ground
Ineff
Bank Sta
SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 16.779
.03
.08
.03
.04
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 10-Year
Ground
Ineff
Bank Sta
SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 16.682
.03
.08
.03
.04
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 10-Year
Ground
Ineff
Bank Sta

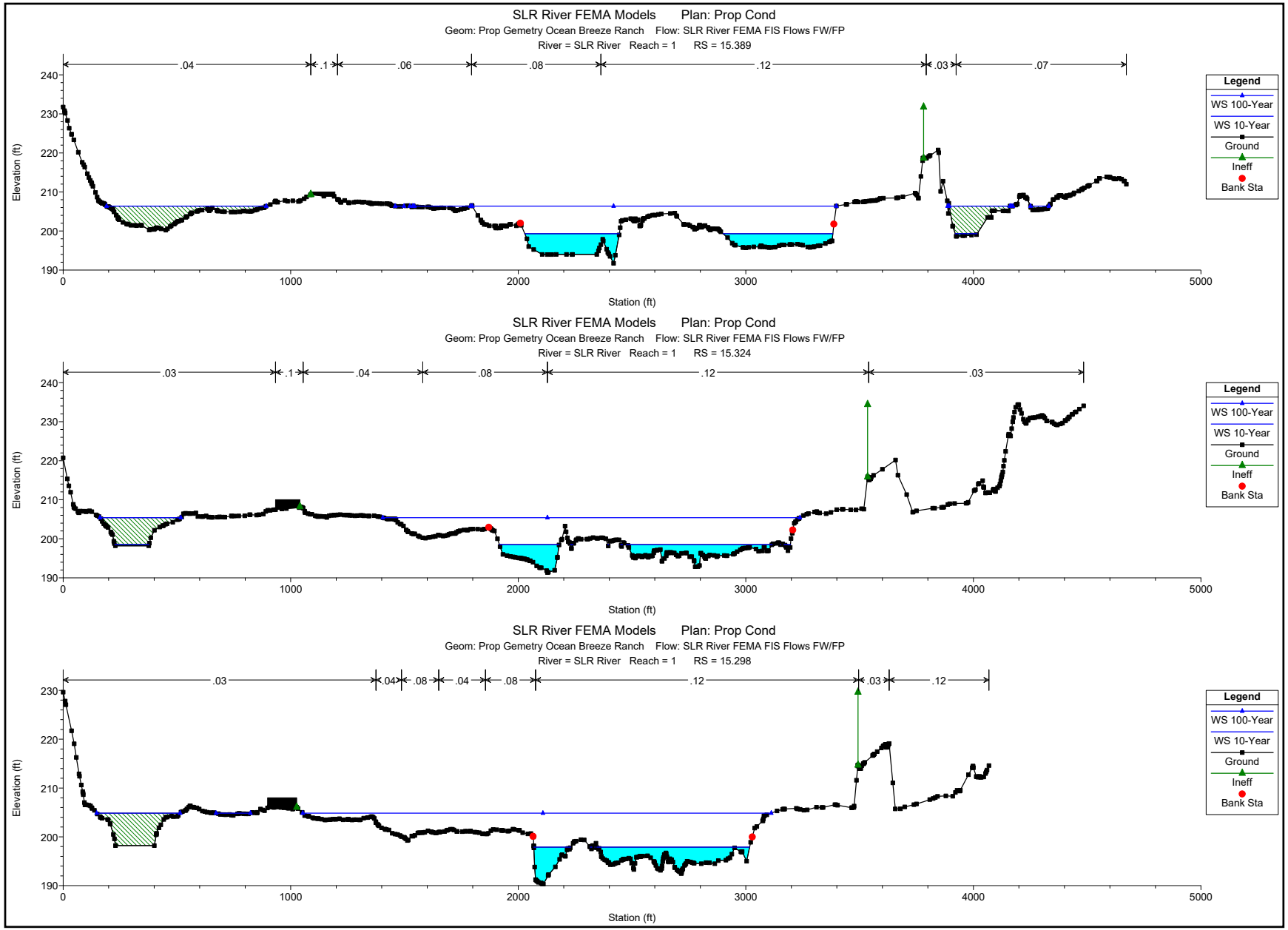

SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 16.573
.03
.08
.04
Legend
WS 100-Year
WS 10-Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 16.499
.03
.08
.04
.03
.04
Legend
WS 100-Year
WS 10-Year
Ground
Bank Sta
Elevation (ft)
Station (ft)
SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 16.430
.03
.08
.04
.03
.04
Legend
WS 100-Year
WS 10-Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

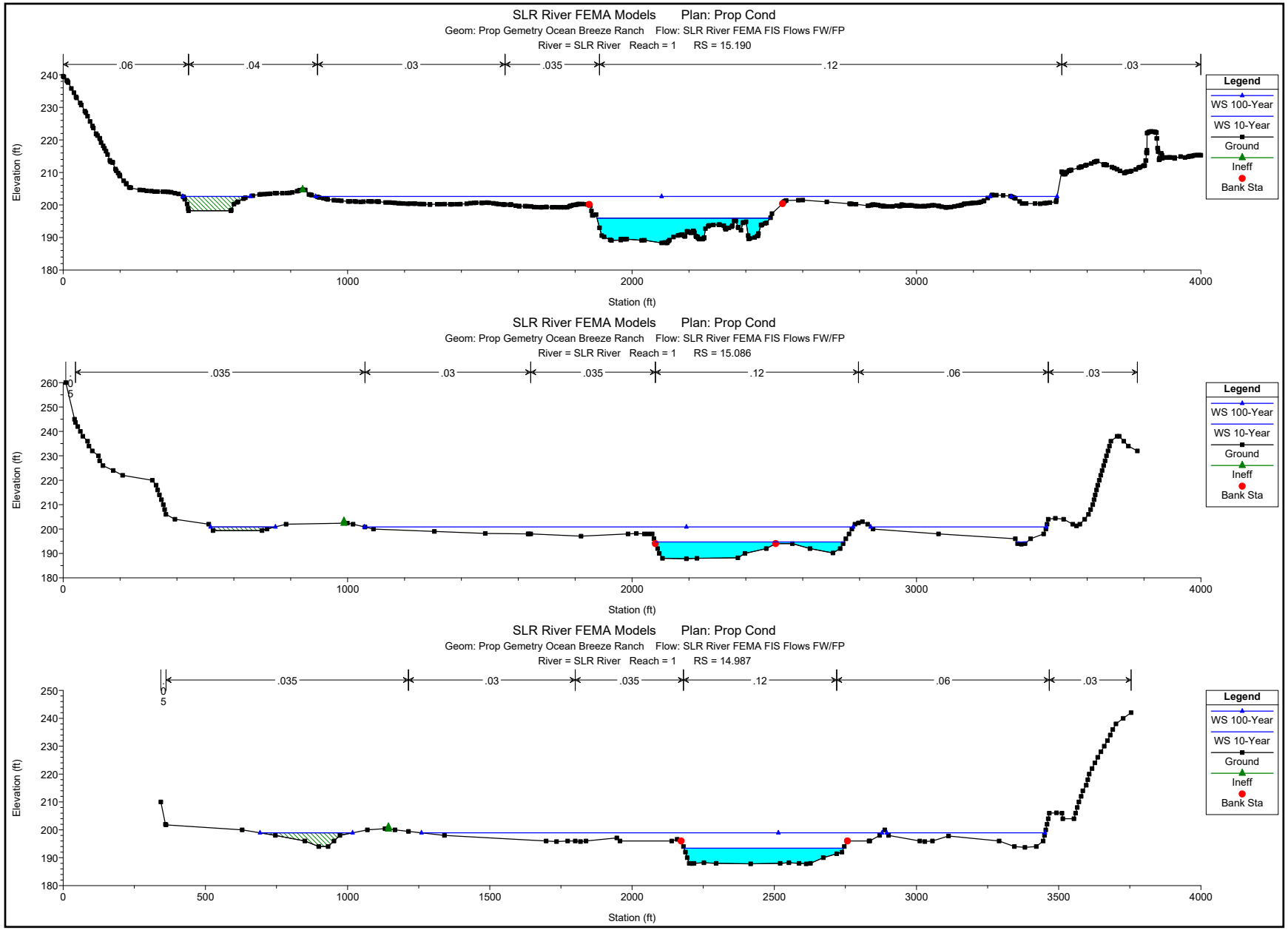

SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 16.385
.03
.08
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 10-Year
Ground
Bank Sta
SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 16.337
.03
.08
.03
.08
.06
.03
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 10-Year
Ground
Bank Sta
SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 16.291
.03
.08
.03
.08
.06
.03
.04
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 10-Year
Ground
Bank Sta

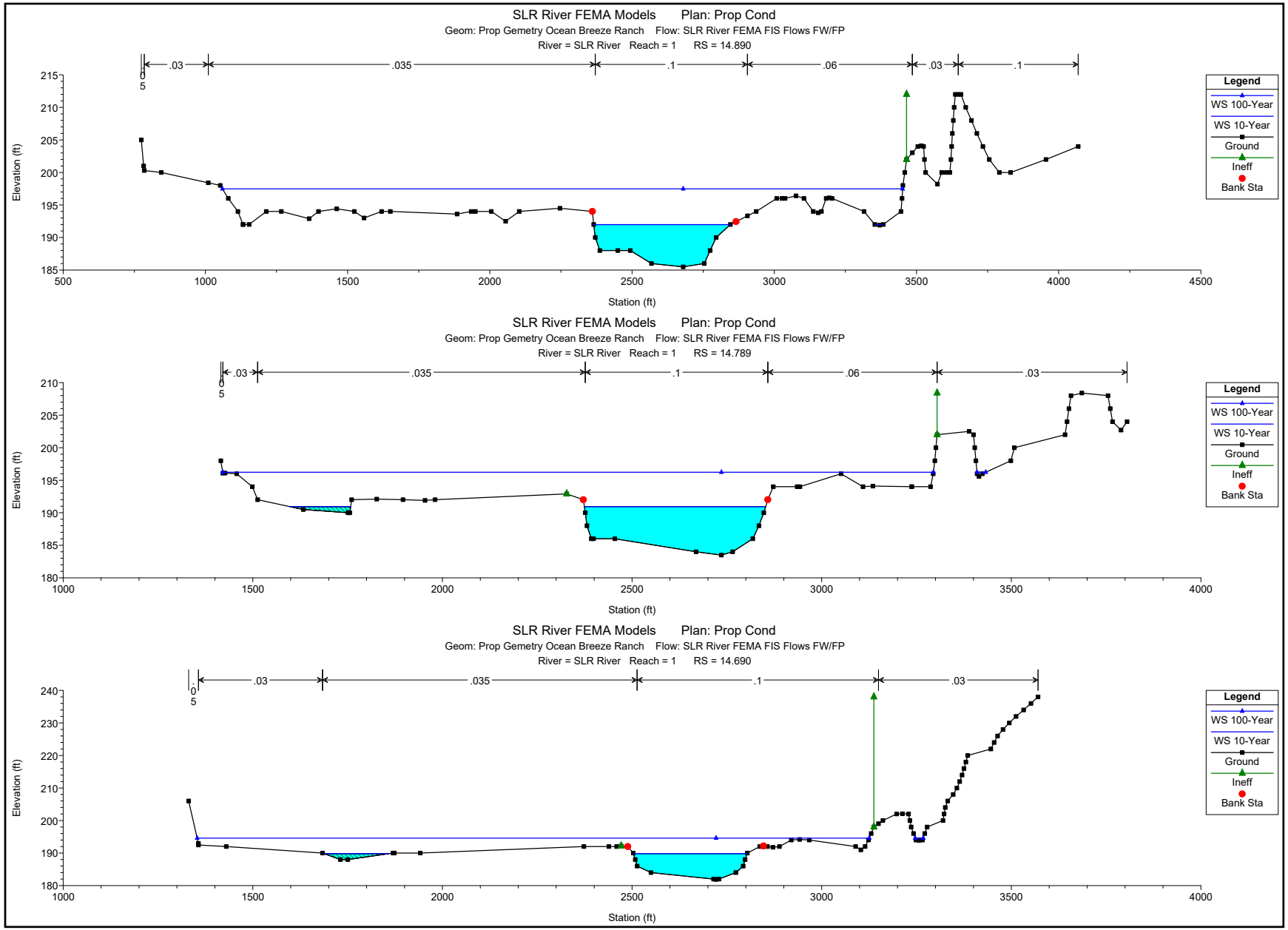

SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 16.246
.03
.08
.03
.08
.06
.03
.04
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 10-Year
Ground
Bank Sta
SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 16.155
.03
.08
.03
.08
.06
.03
.04
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 10-Year
Ground
Ineff
Bank Sta
SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 16.070
.03
.08
.03
.04
.08
.06
.03
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 10-Year
Ground
Ineff
Bank Sta

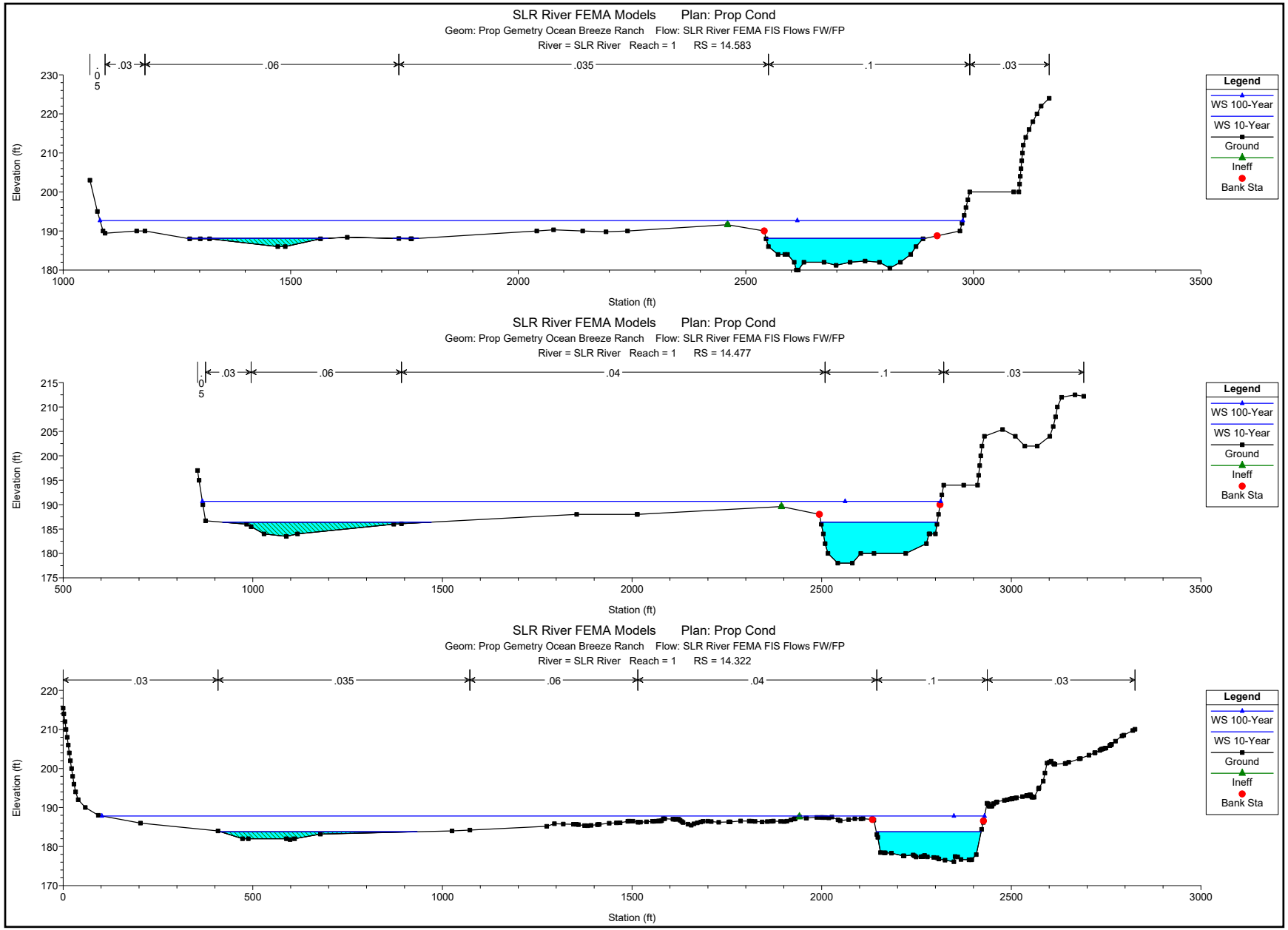

SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 15.977
.03
.08
.04
.08
.04
.08
.045
.03
Legend
WS 100-Year
WS 10-Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 15.883
.03
.04
.08
.04
.08
.04
.03
Legend
WS 100-Year
WS 10-Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 15.780
.03
.04
.08
.04
.08
.03
Legend
WS 100-Year
WS 10-Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

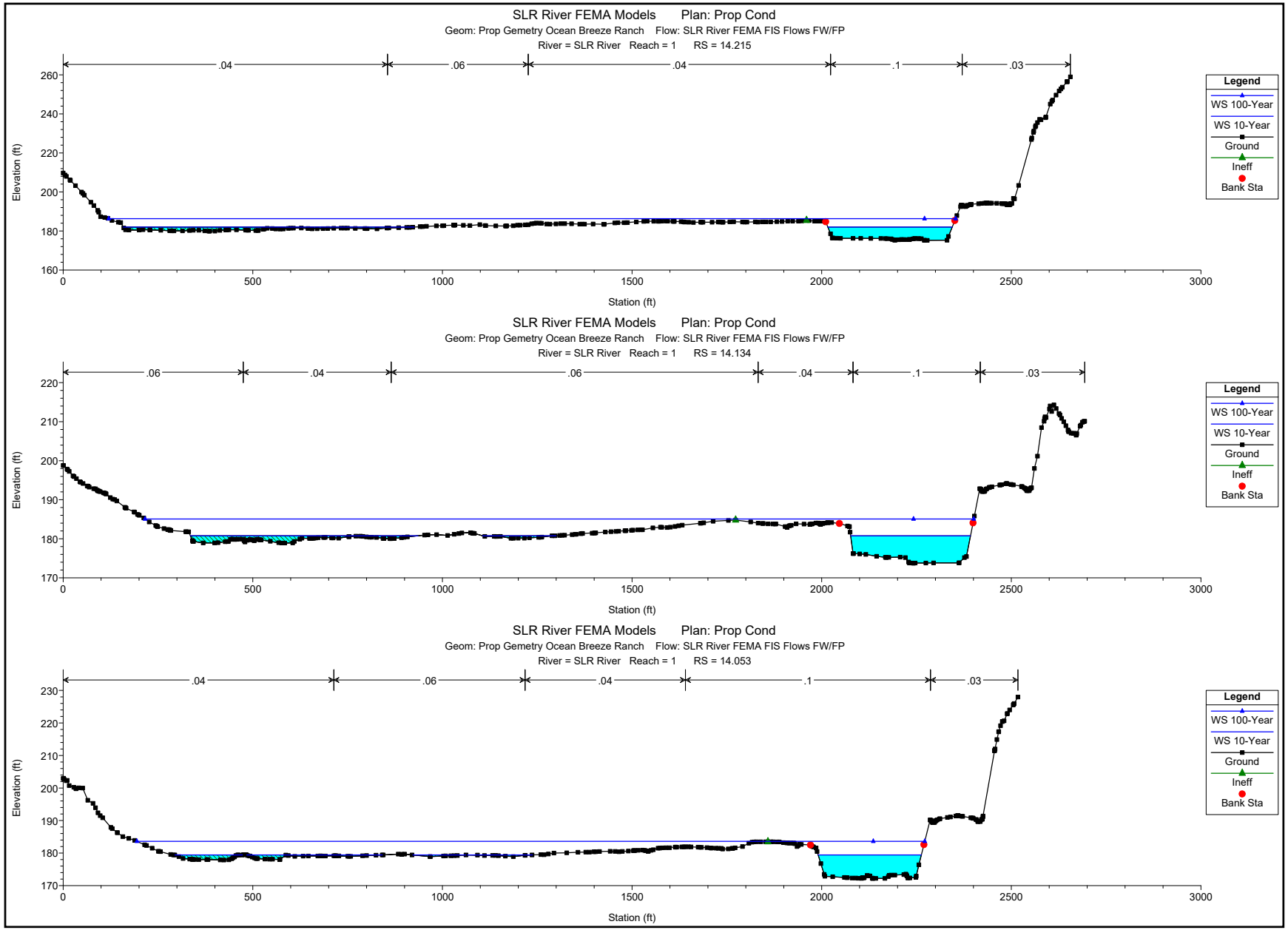

SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 15.677
.03
.08
.03
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 10-Year
Ground
Ineff
Bank Sta
SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 15.580
.03
.06
.08
.12
.08
.03
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 10-Year
Ground
Ineff
Bank Sta
SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 15.482
.03
.06
.1
.06
.08
.12
.08
.03
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 10-Year
Ground
Ineff
Bank Sta

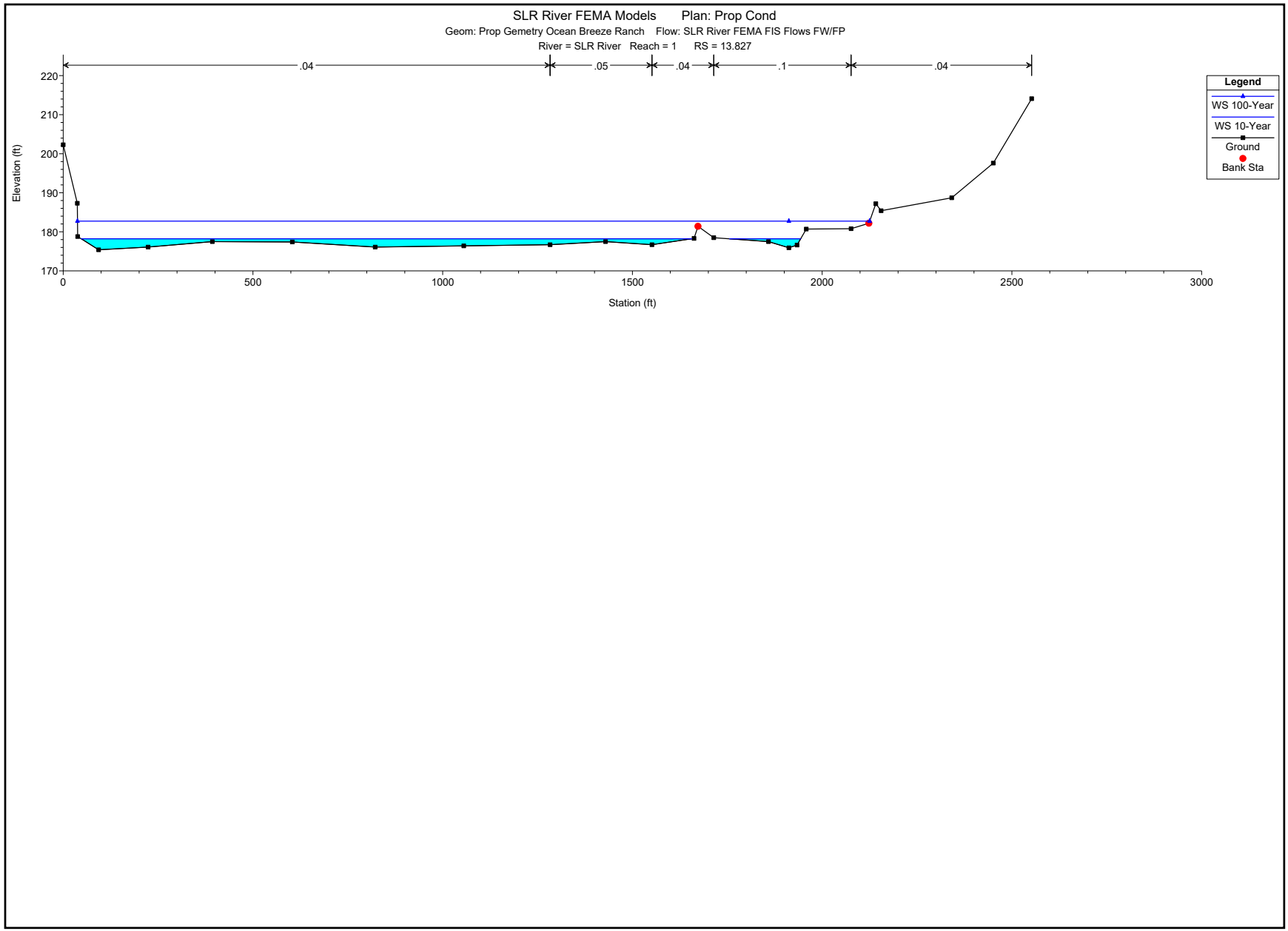

SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 15.389
.04
.1
.06
.08
.12
.03
.07
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 10-Year
Ground
Ineff
Bank Sta
SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 15.324
.03
.1
.04
.08
.12
.03
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 10-Year
Ground
Ineff
Bank Sta
SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 15.298
.03
.04
.08
.04
.08
.12
.03
.12
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 10-Year
Ground
Ineff
Bank Sta


SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 15.190
.06
.04
.03
.035
.12
.03
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 10-Year
Ground
Ineff
Bank Sta
SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 15.086
.035
.03
.035
.12
.06
.03
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 10-Year
Ground
Ineff
Bank Sta
SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 14.987
.035
.03
.035
.12
.06
.03
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 10-Year
Ground
Ineff
Bank Sta


SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 14.890
.03
.035
.1
.06
.03
.1
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 10-Year
Ground
Ineff
Bank Sta
SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 14.789
.03
.035
.1
.06
.03
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 10-Year
Ground
Ineff
Bank Sta
SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 14.690
.03
.035
.1
.03
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 10-Year
Ground
Ineff
Bank Sta


SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 14.583
.05
.03
.06
.035
.1
.03
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 10-Year
Ground
Ineff
Bank Sta
SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 14.477
.05
.03
.06
.04
.1
.03
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 10-Year
Ground
Ineff
Bank Sta
SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 14.322
.03
.035
.06
.04
.1
.03
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 10-Year
Ground
Ineff
Bank Sta


SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 14.215
.04
.06
.04
.1
.03
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 10-Year
Ground
Ineff
Bank Sta
SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 14.134
.06
.04
.06
.04
.1
.03
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 10-Year
Ground
Ineff
Bank Sta
SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 14.053
.04
.06
.04
.1
.03
Elevation (ft)
Station (ft)
Legend
WS 100-Year
WS 10-Year
Ground
Ineff
Bank Sta


SLR River FEMA Models Plan: Prop Cond
Geom: Prop Gemetry Ocean Breeze Ranch Flow: SLR River FEMA FIS Flows FW/FP
River = SLR River Reach = 1 RS = 13.827
.04
.05
.04
.1
.04
Elevation (ft)
220
210
200
190
180
170
0
500
1000
1500
2000
2500
3000
Station (ft)
Legend
WS 100-Year
WS 10-Year
Ground
Bank Sta

ATTACHMENT 3

Structural BMP Maintenance Information

This is the cover sheet for Attachment 3.

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	Contents	Checklist
Attachment 3a	Structural BMP Maintenance Plan (Required)	☒ Included See Structural BMP Maintenance Information Checklist on the back of this Attachment cover sheet.
Attachment 3b	Draft Stormwater Maintenance Notification / Agreement (when applicable)	☒ Included ☐ Not Applicable

PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

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

Attachment 3a must identify:

- ☐ Specific maintenance indicators and actions for proposed structural BMP(s). This must be based on Section 7.7 of the BMP Design Manual and enhanced to reflect actual proposed components of the structural BMP(s)
- ☐ 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

Attachment 3b: For all Structural BMPs, Attachment 3b must include a draft maintenance agreement in the County's standard format depending on the Category (PDP applicant to contact County staff to obtain the current maintenance agreement forms). Refer to Section 7.3 in the BMP Design Manual for a description of the different categories.

Attachment 3A: Structural BMP Maintenance Information Checklist

BMP Type: Biofiltration, Partial Infiltration, Infiltration Basins

Inspection. Perform inspections monthly (or as needed) of the basins for sediment/trash accumulation, inlet and outlet structures, vegetation health, basin erosion and standing water in basins.

Inspection Items	Typical Maintenance Indicator(s)	Maintenance Actions
Trash and Debris	Trash and debris accumulated in area.	Remove and dispose of properly.
Sedimentation	Accumulation of sediment. (Overflow inlets should be at least 6 inches above bottom of basin).	Remove and properly dispose of accumulated materials, without damage to the vegetation. Maintain integrity of side slopes. Do not drive heavy equipment on bottom of basins. Use ramps for staging equipment.
Vegetation	Poor vegetation establishment	Re-seed, re-plant, or re-establish vegetation per original plans. Maintain vegetation health.
	Overgrown vegetation	Mow or trim as appropriate.
	Presence of weeds	Remove weeds.
Erosion	Erosion due to concentrated irrigation flow or storm water flow	Inspect soil and repair/re-seed/re-plant eroded areas after big storm events or as needed
		Repair energy dissipation (riprap or splashblock).
Inlet and outlet structures	Check for clogging.	Clear obstructions. Inspect underdrain via cleanout(s) and outlet structure. Remove removable orifice plate on downstream end of underdrain and cleanout underdrain and replace orifice plate.
Standing water (beyond 96 hours after a rain event)	Inspect perforated underdrain pipe using cleanout riser and inspect downstream connection	Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, unclogging perforated underdrain, loosening or replacing top soil to allow for better infiltration, or minor re-grading for proper drainage. If the issue is not corrected by restoring the BMP to the original plan and grade, the City Engineer shall be contacted prior to any additional repairs or reconstruction.

Inspection Form Checklist for Routine Basin BMP Maintenance

NOTE: COMPLETE THIS FORM FOR EVERY INSPECTION.

~ ORIGINAL – MAKE COPIES. KEEP RECORDS FOR 5 YEARS ~

Inspection Date: _____ Time:_____ Inspected By:_____

BMP Component to Inspect & Task Description	Condition	Comments/Corrective Action
Trash and Debris Basins should be free of trash and debris (including dead leaves/vegetation).	☐ Satisfactory ☐ Needs Attention ☐ Not Inspected	
Sedimentation Check for accumulation of sediment in bottom of basin. (Overflow inlets should be at least 6 inches above bottom of basin).	☐ Satisfactory ☐ Needs Attention ☐ Not Inspected	
Vegetation Health of vegetation is adequate. Vegetation is healthy, but not overgrown and weeds are minimal. Check for coverage, overgrowth, and presence of weeds.	☐ Satisfactory ☐ Needs Attention ☐ Not Inspected	
Erosion Basin bottom is flat and there are no major signs of erosion due to concentrated flow. Inspect soil and repair/re-seed/re-plant eroded areas after big storm events or as needed. Repair energy dissipation (riprap or splashblock).	☐ Satisfactory ☐ Needs Attention ☐ Not Inspected	

PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

BMP Component to Inspect & Task Description	Condition	Comments/Corrective Action
Inlet and outlet structures Check for clogging at inlet pipes, riser outflow. Clear obstructions. Remove removable orifice plate on downstream end of underdrain and cleanout underdrain and then replace orifice plate. Do not drive heavy equipment on bottom of basins. Use ramps for staging equipment.	☐ Satisfactory	
	☐ Needs Attention	
	☐ Not Inspected	
Standing water Basin should not have standing water beyond 96 hours after a rain event. Inspect perforated underdrain pipe using cleanout riser and inspect downstream connection	☐ Satisfactory	
	☐ Needs Attention	
	☐ Not Inspected	

Additional Comments:

ATTACHMENT 4

County of San Diego PDP Structural BMP Verification for Permitted Land Development Projects

County of San Diego PDP-IVF:

Installation Verification Form for Priority Development Projects (PDPs)

This form must be accepted by the County prior to the release of construction permits or granting of occupancy for applicable portions of a Priority Development Project (PDP). Applicants are responsible for providing all requested information. Do not leave any fields blank; indicate *N/A* for any requested item that is not applicable.

PART 1 General Project and Applicant Information

Table 1: Project and Applicant Information

A. Project Summary Information	**ID No. IVF-20__-____ To be assigned by DPW-WPP**
Project Name	Ocean Breeze Ranch
Record ID (e.g., grading/improvement plan number, building permit)	Tract No. 5615
Project Address	5820 West Lilac Road, Bonsall, CA 92003
Assessor's Parcel Number(s) APN(s))	127-191-20-00, 127-230-59-00, 127-271-02-00, 125-131-49-00, 124-150-28, 126-060-78-00, 124-150-34-00, 124-150-35-00, 125-131-48-00, 125-131-54-00, 127-271-01-00 AND 125080-21-00
Project Watershed (complete Hydrologic Unit, Area, and Subarea Name with Numeric Identifier)	San Luis Rey, Lower San Luis, Bonsall (903.12)
B. Owner Information	
Name	***Ocean Breeze Farms, LLC***
Address	***1550 S. Coast Highway, Suite 201, Laguna Beach, CA 92651***
Email Address	***jconradarc@gmail.com***
Phone Number	***949.497.0200***

Document previously verified BMPs for the PDP in **Table 2**. Include the Verification Form ID No. from **Page 1** if one was issued.

****** DO NOT INCLUDE THIS PAGE UNLESS THIS IS A PARTIAL RECORD PLAN VERIFICATION ******

Table 2: Information on Verifications for Partial Record Plans Only

A: Previous Submittals

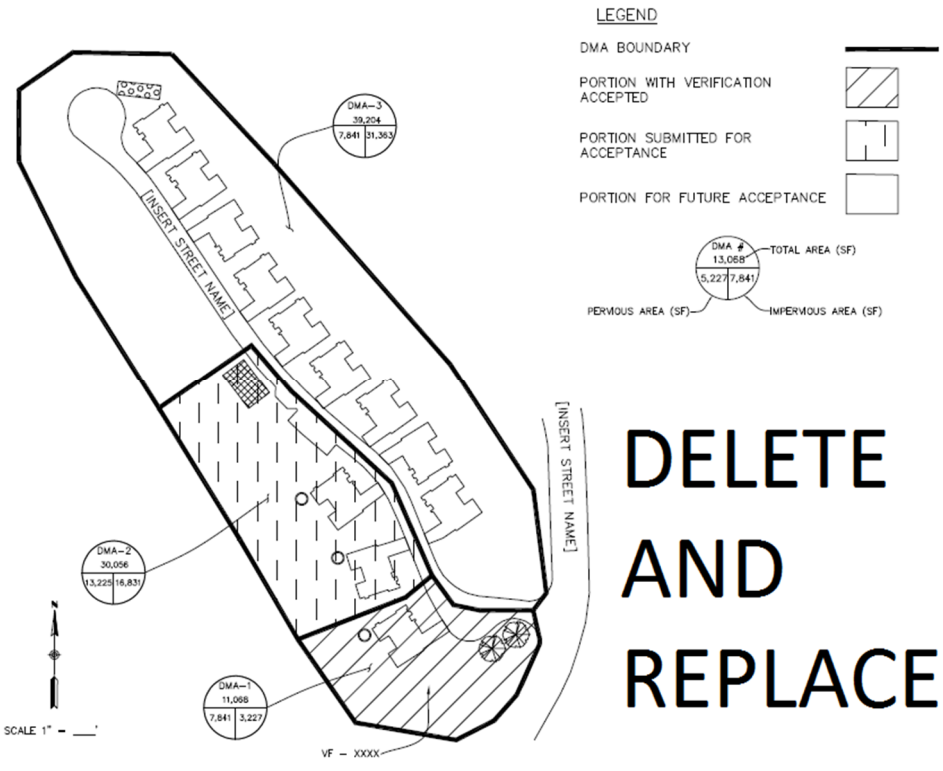
Previous Submittals	Submittal Date	Installation Verification Form ID No. if applicable (e.g., 2016-001)
1		
2		
3		
4		
5		

Add rows as needed

B: DMA and BMP Map

Please attach a map showing (1) all DMAs for the project site, (2) the DMAs and/or lots accepted under previous Verification Forms, and (3) the locations of Structural BMPs and Significant Site Design BMPs previously accepted OR listed in **Table 3** of this Verification Form.

SAMPLE DMA MAP



County of San Diego PDP-IVF:

Installation Verification Form for Priority Development Projects (PDPs)

PART 2 DMA and BMP Inventory Information

Use this table to document Structural BMPs (S-BMPs) and Significant Site Design BMPs (SSD-BMPs) for the PDP. All DMAs are required to have at least one Structural BMP or Significant Site Design BMP.

- In **Part A**, list all Structural BMPs (including both Pollutant Control and/or Hydromodification as applicable) by DMA.
- Complete **Part B** for all DMAs that contain only Significant Site Design BMPs. SSD-BMPs are Site Design BMPs credited in **Worksheet B-1.1** of the BMP Design Manual for Design Capture Volume (DCV) reductions. Only Tree Wells and Dispersion Areas should be included in this inventory.
- For any DMA that contains both S-BMPs and SD-BMPs, document only the S-BMPs; you do not need to include the SD-BMPs.
- The information provided for each BMP in the table must match that provided in the Stormwater Quality Management Plan (SWQMP), construction plans, maintenance agreements, and other relevant project documentation.

DMA #	BMP Information			Maintenance Category	Maintenance Agreement or Maintenance Notification Recorded Doc. #	Construction Plan Sheet #	Landscape Plan # & Sheet # (For Vegetated BMPs Only)	FOR DPW-WPP USE ONLY *Reviewer concurs that the BMP(s) may be accepted into inventory (date and initial)*
	Quantity	Description/Type of Structural BMP	BMP ID #(s)					
Part A Structural BMPs								
1	1	LINED BIOFILTRATION (BF-2)	BASIN 1A (Lot A)	2		13		
2	1		BASIN 2A (Lot N)	2		12		
3	1	BIOFILTRATION W/ PARTIAL INFILTRATION (PR-1)	BASIN 2B (Lot V)	2		12		
4 A,B	1	LINED BIOFILTRATION (BF-2)	BASIN 2C (Lot L)	2		12		
5	1	INFILTRATION (INF-1)	BASIN 2D (Lot L)	2		12		
6	1		BASIN 2E (Lot L)	2		12		
7	1		BASIN 2F (Lot L)	2		12		
8	1		BASIN 2G (Lot L)	2		12		

9	1	BIOFILTRATION W/ PARTIAL INFILTRATION (PR-1)	BASIN 3A (Lot FF)	2		5		
10	1		BASIN 3B (Lot HH)	2		8		
11	1		BASIN 3C (Lot II)	2		8		
12	1	INFILTRATION (INF-1)	BASIN 3D (Lot JJ)	2		8		
13	1	BIOFILTRATION W/ PARTIAL INFILTRATION (PR-1)	BASIN 3E (Lot LL)	2		8		
14	1	INFILTRATION (INF-1)	BASIN 3F (Lot NN)	2		9		
15	1	BIOFILTRATION W/ PARTIAL INFILTRATION (PR-1)	BASIN 3G (Lot PP)	2		9		
17	1		BASIN 2H (Lot UU)	4		14		
16	1		BASIN 3H (Lot XX)	4		17		
18	1	HYDROMODIFICATION VAULT	HYDROMOD VAULT	4		17		
19	1	LINED BIOFILTRATION (BF-2)	BASIN 3i (LOT EE)	2		17		
20	1	BIOFILTRATION W/ PARTIAL INFILTRATION (PR-1)	BASIN 3J (LOT XX)	2		6		
Add rows as needed								
Part B Significant Site Design BMPs								
		Choose an item.						
		Choose an item.						
		Choose an item.						
Add rows as needed								

Table 3: Required Information for Structural BMPs and Significant Site Design BMPs

PART 3 Required Attachments for All BMPs Listed in Table 3

For ALL projects, submit the following to the County inspector (check all that are attached):

☐ Photographs: A photograph of each fully constructed S-BMP or SSD-BMP (or group of BMPs).

☐ Maintenance Agreements: Copies of all approved and recorded Storm Water Maintenance Agreements (SWMAs) or Maintenance Notifications (MNs) for all S-BMPs.

Note: All BMPs proposed for County ownership will remain the responsibility of the owner listed on **Page 1** until a signed Letter of Acceptance of Completion is received by the DPW Watershed Protection Program.

For Grading and Improvement projects only, ALSO submit:

☐ Landscape Plans: An 11" X 17" copy of the most current applicable Landscape Plan sheets where the BMPs are required to be vegetated, including:

- ☐ The Certification of Completion (Form 407), AND
- ☐ The Certificate of Approval from PDS Landscape Architect

Note: For each Landscape Plan, the sheets submitted must show the location of each verified as-built BMP.

☐ Construction Plans: An 11" X 17" copy of the most current applicable approved Construction Plan sheets:

- ☐ Grading Plans, AND/OR
- ☐ Improvement Plans, AND/OR
- ☐ Precise Grading Plan(s) (only for residential subdivisions with tract homes), AND/OR
- ☐ Other (Please specify) Click here to enter text.

Note: For each Construction Plan, the sheets submitted must incorporate all of the following:

- ☐ A BMP Table, AND
- ☐ A plan/cross-section of each verified as-built BMP, AND
- ☐ The location of each verified as-built BMP

Required only for Verifications for Partial Record Plans

☐ If this is a partial record plan verification, please include the following:

- ☐ A list of previously submitted Verification Forms (**Table 2, part A**)
- ☐ A map of DMAs and BMPs (**Table 2, part B**)

County of San Diego PDP-IVF:

Installation Verification Form for Priority Development Projects (PDPs)

PART 4 Engineer of Work Certification

By signing below, I certify that the BMP(s) listed in Table 3 of this Verification Form have been constructed and all are in substantial conformance with the approved plans and applicable regulations. I understand the County reserves the right to inspect the above BMPs to verify compliance with the approved plans and Watershed Protection Ordinance (WPO). Should it be determined that the BMPs were not constructed to plan or code, corrective actions may be necessary before permits can be closed.

Please sign and provide your seal below.

Professional Engineer's Printed Name:

Debby Sue Reece

Email: debby@projectdesign.com

Phone Number: 619.235.6471

Professional Engineer's Signed Name:

_____

Date: Click here to enter text.

County of San Diego PDP-IVF:

Installation Verification Form for Priority Development Projects (PDPs)

COUNTY - OFFICIAL USE ONLY:

For County Inspectors

County Department: _____

Date verification received from EOW: _____

By signing below, County Inspector concurs that every noted BMP has been installed per plan.

Inspector Name: _____

Inspector's Signature: _____ Date: _____

For Building Division Only

Inspection Supervisor Name: _____

Inspector Supervisor's Signature: _____ Date: _____

PDCI & Building, along with the rest of this package, please provide to DPW WPP:

☐ A copy of the final accepted SWQMP and any accepted addendum

For Watershed Protection Program Only

Date Received: _____

WPP Submittal Reviewer: _____

WPP Reviewer concurs that the BMPs accepted in **Part 2** above may be entered into inventory.

WPP Reviewer's Signature: _____ Date: _____

ATTACHMENT 5

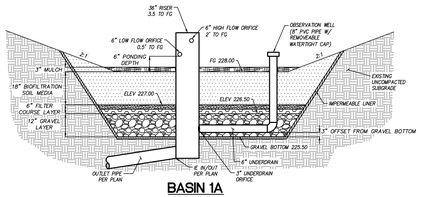
Copy of Plan Sheets Showing Permanent Storm Water BMPs, Source Control, and Site Design

This is the cover sheet for Attachment 5.

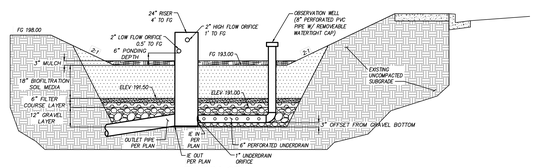
Use this checklist to ensure the required information has been included on the plans:

The plans must identify:

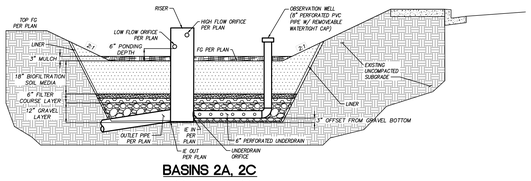
☒ Structural BMP(s) with ID numbers matching Step 6 Summary of PDP Structural BMPs
☒ The grading and drainage design shown on the plans must be consistent with the delineation of DMAs shown on the DMA exhibit
☒ Details and specifications for construction of structural BMP(s)
☐ Signage indicating the location and boundary of structural BMP(s) as required by County staff
☐ 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 must be provided. Photocopies of general brochures are not acceptable.
☐ Include all source control and site design measures described in Steps 4 and 5 of the SWQMP. Can be included as a separate exhibit as necessary.



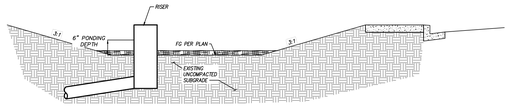
BASIN 1A
BIOFILTRATION
NTS



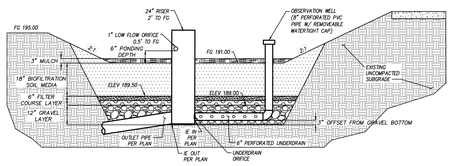
BASIN 2B
BIOFILTRATION WITH PARTIAL INFILTRATION
NTS



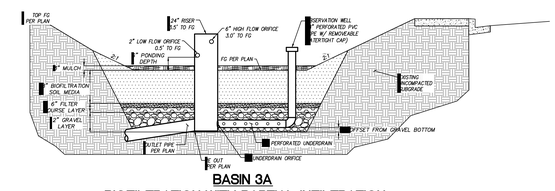
BASINS 2A, 2C
BIOFILTRATION
NTS



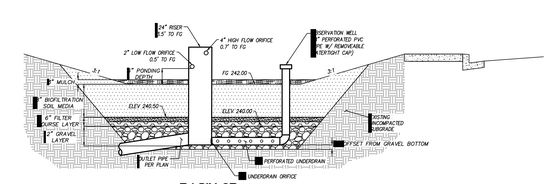
BASIN 2D-2G
INFILTRATION
NTS



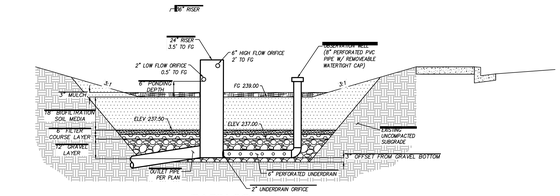
BASIN 2H
BIOFILTRATION WITH PARTIAL INFILTRATION



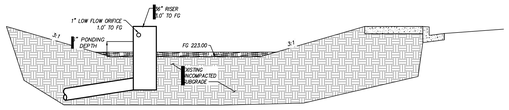
BASIN 3A
BIOFILTRATION WITH PARTIAL INFILTRATION
NTS



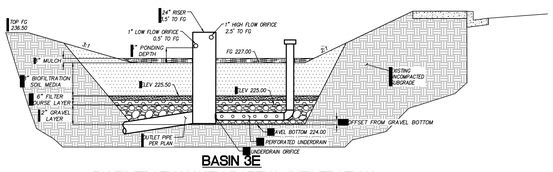
BASIN 3B
BIOFILTRATION WITH PARTIAL INFILTRATION
NTS



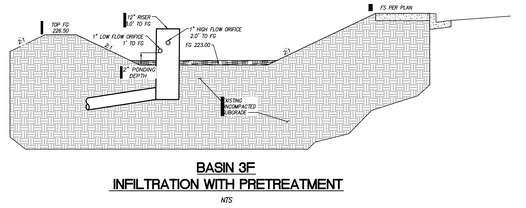
BASIN 3C
BIOFILTRATION WITH PARTIAL INFILTRATION
NTS



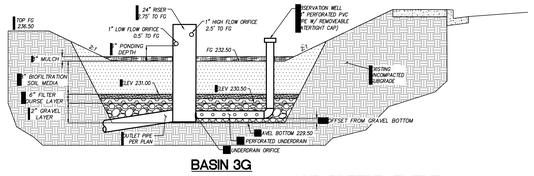
BASIN 3D
INFILTRATION
NTS



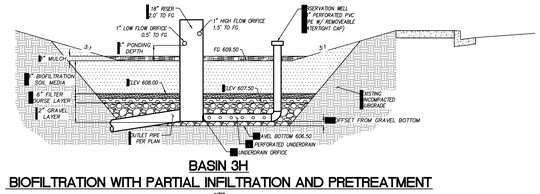
BASIN 3E
BIOFILTRATION WITH PARTIAL INFILTRATION
NTS



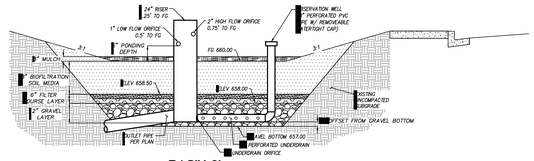
BASIN 3F
INFILTRATION WITH PRETREATMENT
NTS



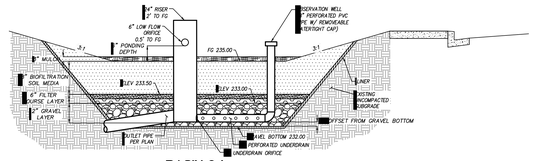
BASIN 3G
BIOFILTRATION WITH PARTIAL INFILTRATION AND PRETREATMENT
NTS



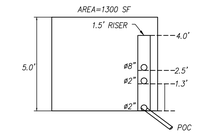
BASIN 3H
BIOFILTRATION WITH PARTIAL INFILTRATION AND PRETREATMENT
NTS



BASIN 3I
BIOFILTRATION WITH PARTIAL INFILTRATION
NTS



BASIN 3J
BIOFILTRATION
NTS



HYDROMOD VAULT DETAIL
SCALE: NTS

COUNTY OF SAN DIEGO TRACT 5615
PLANNED DEVELOPMENT MAJOR USE PERMIT PDS2016-MUP-16-012
PRELIMINARY GRADING PLANS
OCEAN BREEZE RANCH
DETAILS: BASIN AND BIOFILTRATION SYSYEM

PROJECT DESIGN CONSULTANTS
Planning I Landscape Architecture I Engineering I Survey
701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

File Name: P:\4192\Engr\DWG_Plans\Entitlement\Preliminary Grading\4192-PRE-IMP-SHT18.dwg, Date Last Plotted: 7/31/2019 7:41:21 AM,

ATTACHMENT 6

Copy of Project's Drainage Report

This is the cover sheet for Attachment 6.

CD attached for the following report:

Title: CEQA Preliminary Hydrology/Onsite Drainage Study Ocean Breeze Ranch
Prepared By: Project Design Consultants
Date: July 2019

ATTACHMENT 7

Copy of Project's Geotechnical and Groundwater Investigation Report

This is the cover sheet for Attachment 7.

Hardcopies included for the following reports:

- Title: Review of Storm Water Treatment, Ocean Breeze Ranch, Bonsall, California
  Prepared By: GeoSoils, Inc.
  Date: December 12, 2018 (revised)

- Title: Geotechnical Discussion of Rock Hardness, Remedial Earthwork, and Earthwork Balance Factors, Ocean Breeze Ranch Planning Areas, PA-1, PA-2, PA-3, Bonsall San Diego County, California
  Prepared By: GeoSoils, Inc.
  Date: June 16, 2016

- Title: Supplemental Storm Water Infiltration Evaluation Planning Area 3 of Ocean Breeze Ranch Community of Bonsall, San Diego, California
  Prepared By: Geosoils, Inc.
  Date: May 6, 2019

GeoSoils, Inc.

Geotechnical • Geologic • Coastal • Environmental

5741 Palmer Way • Carlsbad, California 92010 • (760) 438-3155 • FAX (760) 931-0915 • www.geosoilsinc.com

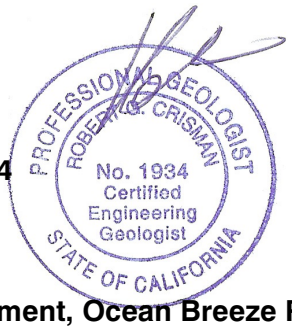
TECHNICAL M E M O R A N D U M

Date: November 29, 2018 (Revised December 12, 2018) **W.O. 6960-A5-SC**

To: Ocean Breeze Ranch
5820 West Lilac Road
Bonsall, California 92003

Attn: Mr. Pete Fagrell

From: Robert G. Crisman, CEG 1934
David W. Skelly, RCE 47857



Subject: Review of Storm Water Treatment, Ocean Breeze Ranch, Bonsall, California

References:

1. "Geotechnical Evaluation for Ocean Breeze Ranch, Bonsall, San Diego County, California," W.O. 6960-A-SC, dated October 6, 2016, by GeoSoils, Inc.

2. "OBR DMA Exhibits," 60 Scale, 5 Sheets, J.N. 4192, Dated November 8, 2018, by Project design Consultants.

3. "County of San Diego BMP Design Manual for Permanent Site Design, Storm Water Treatment and Hydromodification Management, Storm Water Requirements for Development Applications, with Appendices," dated February 2016, pending Revision Dated January 2019, by County of San Diego.

4. "Custom Soils Report for San Diego County Area, Ocean Breeze Ranch, Bonsall, dated August, 2016, by United States Department of Agriculture, National Resources Conservation Service.

In accordance with a request from Project Design Consultants (PDC), GeoSoils, Inc. (GSI), has reviewed storm water infiltration data and discussions presented in Reference No. 1, with respect to the current site design, including Drainage Management Areas (DMAs) and basin locations as shown on Reference No. 2, as well as forthcoming guidelines from the County, regarding storm water treatment (Reference No. 3). Unless specifically superceded herein, the conclusions and recommendations presented in Reference No. 1 remain valid and applicable.

Based on our review of both USDA data (Reference No. 4) and our own site work (Reference No. 1), including infiltration testing on representative soils using the inverse borehole (Porchet) method (Reference No. 1), the following comments are presented regarding storm water basins within Planning Areas 1, 2, and 3. DMAs and basin locations are shown on the attached "Infiltration Exhibits," see Plates 1 through 5, which use Reference No. 2 as a base. Corrected Infiltration Rates, or CIR's, the factor of Safety (FOS) applied to each basin, design rate (inches/hour), infiltration category (i.e., full, partial, or no infiltration), and whether the particular basin is "restricted" or "unrestricted" per Reference No. 3, is indicted on Plates 1 through 5, as well as presented in the following sections.

Planning Area 1, DMA 1, Basin 1A:

Infiltration testing for Basin 1A indicated an infiltration rate of approximately 0.3 in/hr. With an FOS of 3.0 (per Reference No. 3, App. D, Table D.2-3), the design rate would be 0.1 in/hr. However, this basin is considered "restricted" based on the BMP underlain with fill> 5 feet, and within 1.5 times the height of an adjacent "steep" fill slope, as indicated in Table D.1-1 of Reference No. 4. As such, a "no infiltration" design is warranted.

Planning Area 2, Basins 2A, 2B, 2C, 2D, 2E, 2F and 2G:

These basins all occur with the sandy alluviated area of the site. Infiltration testing for these basins indicated a corrected infiltration rate (CIR) of approximately 7.8 in/hr. With an FOS ranging from 2.25 to 3.0, design rates ranging from 2.6 to 3.5 inches/hour were evaluated. Based on the design rates evaluated, Basins 2B, 2D, 2E, 2F, and 2G are considered "full infiltration," and "unrestricted." However, based on relatively shallow groundwater levels to the bottom of the basins in the vicinity of Basins 2A and 2C, these basins are considered as "restricted" even though a full infiltration design is suggested by the design infiltration rates evaluated.

It should be noted that the groundwater table within PA-2 was observed to vary on the order of about 11.5 to 18 feet below existing grades. As also noted in Reference No. 1, this water table appeared to have been relatively stable over the period between 2014 and 2016. Boring logs prepared during subsurface exploration in preparation of Reference No. 1, indicating groundwater depth/elevation, are attached.

A review of County "Restrictions" (Table D.1-1 in Reference No. 3) includes one of the "mandatory" restrictions as "*BMP within highly liquefiable soils and connectivity to structures.*" However, our geotechnical report (Reference No. 1), has evaluated the liquefaction potential and provides both earthwork and foundation recommendations for the mitigation of liquefaction related distress. Furthermore, the liquefaction potential evaluated in Reference No. 1, is not anticipated to be substantially affected by the planned infiltration. As such, this potential restriction is considered "reasonably resolved" per Section D.1 of Reference No. 3, and the basins may be considered "unrestricted" except where shallow groundwater occurs, as noted for Basins 2A and 2C.

Planning Area 3, Basins 3A, 3B, 3C, 3E, 3G:

These basins all occur with areas of older alluvium onsite, predominantly consisting of granular soils with some fines. Infiltration testing for Basins 3A, 3B, 3C, and 3E indicated an infiltration rate of approximately 1.0 in/hr. With an FOS of about 2.6, the design rate would be about 0.38 in/hr. Based on the design rate, these basins are considered "partial infiltration." Groundwater in this area is anticipated to be greater than 15 feet below BMP. These basins are considered "unrestricted."

Planning Area 3, Basins 3D, 3F:

These basins all occur with the sandy alluviated area of the site. Infiltration testing for Basins 3D and 3F indicated an infiltration rate of approximately 6.0 in/hr. With an FOS range of 2.0 to 3.0, the design rate ranges from 2.0 to 3.0 inches/hour. Based on the design rate, these basins are considered "full infiltration." Groundwater is anticipated between 10 to 15 feet below BMP. These basins are considered "unrestricted."

DMA -16, Basin 3H (Offsite)

The predominant USDA soil type (per Reference No. 4) is Placentia sandy loam (2-9% slopes), with an infiltration range of 0.06 to 0.6 in/hr. GSI testing in the vicinity (see Reference No. 1) evaluated a rate of 0.4 in./hr. and appears to be in agreement with USDA data. Regional groundwater in this area is also likely greater than 50 feet below existing grades. As such, the basin location is suited for partial infiltration.

DMA-17, Basin 2H (Offsite)

The predominant USDA soil type is the Bonsall sandy loam. USDA provides an infiltration range of 0.00 to 0.06 in/hr., also noting a high clay percentage. GSI does not have any testing in the immediate vicinity, however, Basin 2H is located a short distance upslope from USDA soils mapped as Tujunga Sand (Reference No. 4), which has a very high infiltration rate (6 to 19 in/hr). While the soil underlying the basin does not appear to be Tujunga, it may not be Bonsall either. Per Reference No. 4, Bonsall soils are defined as a "side slope" soils, while the basin area appears to be more of a "toe slope" soil, or bottom soil, such as the Placentia. Regardless, It is our opinion that soils underlying Basin 2H are neither Bonsall or Tujunga, and the engineering properties are likely somewhere in between, based on topography/geomorphology. Testing of soils mapped as Bonsall, a short distance east of Basin 2H evaluated an infiltration rate of 1 in/hr (see Reference No. 1). As such, it is our opinion that Basin 2H is likely suited for at least partial infiltration, however, no site specific data is available.

Basin 2H appears to have a bottom elevation of around 190 feet. The groundwater elevation in this area is likely around 165 to 170 feet MSL, or 20-25 feet below the basin bottom, based on the available information.

DMA-18 (Offsite)

This area is primarily hard pavement and the planned Hydromod vault appears suitable from a geotechnical viewpoint.

Closure

The conclusions presented herein are professional opinions. These opinions have been derived in accordance with current standards of practice, and no warranty is express or implied. Standards of practice are subject to change with time. GSI assumes no responsibility or liability for work or testing performed by others, or their inaction, or work performed when GSI is not requested to be onsite, to evaluate if our recommendations have been properly implemented. Use of this report constitutes an agreement and consent by the user to all the limitations outlined above, notwithstanding any other agreements that may be in place. In addition, this report may be subject to review by the controlling authorities.

Attachments: Appendix A - Boring Logs HSA-2, HSA-3, FSA-4, HSA-5, HSA-6, and HSA-9
Appendix B - Factor of Safety Determinations
OBR Infiltration Rate Exhibits, Plates 1 through 7

Distribution: Addressee (email)
Project Design Consultants (email)

APPENDIX A

BORING LOGS HSA-2, HSA-3, FSA-4
HSA-5, HSA-6, AND HSA-9

BORING LOG

GeoSoils, Inc.

W.O. 6960-A-SC

PROJECT: OCEAN BREEZE RANCH, LLC
5820 West Lilac Road, Bonsall

BORING HSA-2 *SHEET* 1 *OF* 1

DATE EXCAVATED 5-19-16

SAMPLE METHOD: 140 Lb. Hammer @ 30" Drop

Approx. Elevation: 190'

Standard Penetration Test

Undisturbed, Ring Sample

Groundwater

Seepage

Depth (ft.)	Sample: Bulk	Sample: Undisturbed	Sample: Blows/Ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Saturation (%)	Description of Material
1				SM				**COLLUVIUM (TOPSOIL):** @ 0 ' SILTY SAND, grayish brown, dry, loose; few roots, burrowed.
2			8	SP	96.0	7.8	28.4	**QUATERNARY ALLUVIUM:** @ 1½' SAND with SILT, brown, dry, loose.
5			9		88.7	7.6	23.2	@ 5' As per 1½'.
10			10					@ 10' SAND with SILT, brown, moist, loose to medium dense; micaceous.
13 ▽								@ 13' Groundwater encountered.
15			13	SW				@ 15' SAND, brown, saturated, medium dense; fine to medium grained.
20			22	SP				@ 20' SAND, dark gray, saturated, medium dense; medium grained.
22								Total Depth = 21½' Groundwater Encountered @ 13' (EL = 177' MSL) Backfilled 05/19/16

BORING LOG

GeoSoils, Inc.

W.O. 6960-A-SC

PROJECT: OCEAN BREEZE RANCH, LLC
5820 West Lilac Road, Bonsall

BORING HSA-3 *SHEET* 1 *OF* 2

DATE EXCAVATED 5-19-16

SAMPLE METHOD: 140 Lb. Hammer @ 30" Drop

Approx. Elevation: 190'

Standard Penetration Test

Undisturbed, Ring Sample

Groundwater

Seepage

Depth (ft.)	Sample: Bulk	Sample: Undisturbed	Sample: Blows/Ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Saturation (%)	Description of Material
1				SM				**COLLUVIUM (TOPSOIL):** @ 0' SILTY SAND, grayish brown, slightly moist, loose; few roots and many burrows.
2				SM/SP				**QUATERNARY ALLUVIUM:** @ 2' SILTY SAND to SAND, brown, dry, loose.
5		■	8					@ 5' As per 2'.
10		■	14	SP	94.4	14.0	49.5	@ 10' SAND, brown, moist, loose.
11								@ 11½' Groundwater encountered.
15		■	14					@ 15' SAND, dark grayish brown, saturated, medium dense; fine to medium grained.
20		■	26		108.9	15.3	78.1	@ 20' SAND, dark grayish brown, saturated, medium dense; medium to coarse grained.
25		■	20					@ 25' SAND, medium to dark gray, saturated, medium dense; medium grained.

BORING LOG

GeoSoils, Inc.

W.O. 6960-A-SC

PROJECT: OCEAN BREEZE RANCH, LLC
5820 West Lilac Road, Bonsall

BORING HSA-3 *SHEET* 2 *OF* 2

DATE EXCAVATED 5-19-16

SAMPLE METHOD: 140 Lb. Hammer @ 30" Drop

Approx. Elevation: 190'

Standard Penetration Test

Undisturbed, Ring Sample

Groundwater

Seepage

Depth (ft.)	Sample: Bulk	Sample: Undisturbed	Sample: Blows/Ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Saturation (%)	Description of Material
31			39	SP	102.7	21.7	100	@ 30' SAND, dark gray, saturated, medium dense to dense; medium grained.
35			10					@ 35' SAND, dark gray, saturated, medium dense; fine to medium grained.
40			21		103.0	23.0	100	@ 40' As per 35'.
45			20					@ 45' As per 40'.
50			26		134.0	17.6	100	@ 50' SAND, dark gray brown, saturated, dense.
51								Total Depth = 51' Groundwater Encountered @ 11½' (EL = 178½' MSL) Backfilled 05/19/16

BORING LOG

GeoSoils, Inc.

W.O. 6960-A-SC

PROJECT: OCEAN BREEZE RANCH, LLC
5820 West Lilac Road, Bonsall

BORING HSA-4 *SHEET* 1 *OF* 2

DATE EXCAVATED 5-19-16

SAMPLE METHOD: 140 Lb. Hammer @ 30" Drop

Approx. Elevation: 193'

Standard Penetration Test

Undisturbed, Ring Sample

Groundwater

Seepage

Depth (ft.)	Sample: Bulk	Sample: Undisturbed	Sample: Blows/Ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Saturation (%)	Description of Material
1				SM				**COLLUVIUM (TOPSOIL):**
2								@ 0' SILTY SAND, light brown, dry, loose; few roots, burrowed.
3				SW				**QUATERNARY ALLUVIUM:**
4								@ 2 ' SAND with SILT, brown, slightly moist, loose.
5			15			6.8		@ 5' SAND with SILT, brown, slightly moist, loose.
6								
7								
8								
9								
10			8					@ 10' SAND with SILT, brown, moist, loose.
11								
12								
13								
14								@ 13½' Groundwater encountered.
15			19		108.8	20.4	100	@ 15' SAND, dark to medium gray, saturated, medium dense; fine grained.
16								
17								
18								
19								
20			23	SP				@ 20' SAND, medium gray, saturated, medium dense; fine to medium grained.
21								
22								
23								
24								
25			41		109.2	19.4	100	@ 25' SAND, medium gray, saturated, medium dense; fine to medium grained.
26								
27								
28								
29								

BORING LOG

GeoSoils, Inc.

W.O. 6960-A-SC

PROJECT: OCEAN BREEZE RANCH, LLC
5820 West Lilac Road, Bonsall

BORING HSA-4 *SHEET* 2 *OF* 2

DATE EXCAVATED 5-19-16

SAMPLE METHOD: 140 Lb. Hammer @ 30" Drop

Approx. Elevation: 193'

Standard Penetration Test

Undisturbed, Ring Sample

Groundwater

Seepage

Depth (ft.)	Sample: Bulk	Sample: Undisturbed	Sample: Blows/Ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Saturation (%)	Description of Material
31			12	SP				@ 30' SAND, dark gray, saturated, medium dense; fine grained.
35			24	SP/SM	97.5	26.4	100	@ 35' SAND with SILT, very dark gray, saturated, medium dense; fine grained, micaceous.
40			34	SP				@ 40' SAND, very dark gray, saturated, dense; fine grained.
45			51		113.6	13.6	100	@45 SAND, medium gray to dark gray, saturated, dense; fine to medium grained.
50			49					@ 50' SAND, dary gray, saturated, dense; fine to medium grained.
52								Total Depth = 51½' Groundwater Encountered @ 13½' (EL = 179½' MSL) Backfilled With Bentonite 05/19/16

BORING LOG

GeoSoils, Inc.

W.O. 6960-A-SC

PROJECT: OCEAN BREEZE RANCH, LLC
5820 West Lilac Road, Bonsall

BORING HSA-5 *SHEET* 1 *OF* 2

DATE EXCAVATED 5-18-16

SAMPLE METHOD: 140 Lb. Hammer @ 30" Drop

Approx. Elevation: 197'

Standard Penetration Test

Undisturbed, Ring Sample

Groundwater

Seepage

Depth (ft.)	Sample: Bulk	Sample: Undisturbed	Sample: Blows/Ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Saturation (%)	Description of Material
1				SM				**COLLUVIUM (TOPSOIL):**
2								@ 0' SILTY SAND, grayish brown, dry, loose; few roots, burrowed.
3				SM				**QUATERNARY ALLUVIUM:**
4								@ 2' SILTY SAND, brown, slightly moist, loose; fine.
5			10					
6								@ 5' As per 2'.
7								
8								
9								
10			11	SP	93.1	11.6	39.5	@ 10' SAND with SILT, dark brown, slightly moist, loose.
11								
12								
13								
14								
15			12					@ 15' As Per 10', moist, medium dense.
16								
17								
18 ▽								@ 18' Groundwater encountered.
19								
20			15		No Recovery			@ 20' No recovery.
21								
22								
23								
24								
25			12					@ 25' SAND with SILT, dark brown, saturated, medium dense.
26								
27								
28								
29								

BORING LOG

GeoSoils, Inc.

W.O. 6960-A-SC

PROJECT: OCEAN BREEZE RANCH, LLC
5820 West Lilac Road, Bonsall

BORING HSA-5 *SHEET* 2 *OF* 2

DATE EXCAVATED 5-18-16

SAMPLE METHOD: 140 Lb. Hammer @ 30" Drop

Approx. Elevation: 197'

Standard Penetration Test

Undisturbed, Ring Sample

Groundwater

Seepage

Depth (ft.)	Sample: Bulk	Sample: Undisturbed	Sample: Blows/Ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Saturation (%)	Description of Material
31–34			37	SW	112.0	17.7	100	@ 30 SAND with SILT, dark gray, saturated, medium dense; fine to coarse grained.
35–39			15	SP/ML				@ 35' SAND with SILT, dark gray brown, saturated, medium dense; and SANDY SILT, dark gray, saturated, stiff.
40–44			44	SP	104.1	24.5	100	@ 40' SAND with SILT, gray, saturated, medium dense to dense.
45–49			28	SP/SW				@ 45' SAND with SILT and gravel, dark gray, saturated, medium dense to dense.
50–51			30	SP	108.7	18.1	100	@ 50' SAND with SILT, brown, saturated, medium dense.
52–59								Total Depth = 51' Groundwater Encountered @ 18' (EL = 179' MSL) Backfilled 05/18/16

BORING LOG

GeoSoils, Inc.

W.O. 6960-A-SC

PROJECT: OCEAN BREEZE RANCH, LLC
5820 West Lilac Road, Bonsall

BORING HSA-6 *SHEET* 1 *OF* 2

DATE EXCAVATED 5-18-16

SAMPLE METHOD: 140 Lb. Hammer @ 30" Drop

Approx. Elevation: 195'

Standard Penetration Test

Undisturbed, Ring Sample

Groundwater

Seepage

Depth (ft.)	Sample: Bulk	Sample: Undisturbed	Sample: Blows/Ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Saturation (%)	Description of Material
1				SM				**COLLUVIUM (TOPSOIL):**
2								@ 0' SILTY fine SAND, dark gray, slightly moist, loose; burrowed, roots.
3				SM				**QUATERNARY ALLUVIUM:**
4								@ 2' SILTY SAND, dark brown, slightly moist, loose; fine grained, micaceous.
5			13		97.4	7.7	29.1	@ 5' As per 2', moist, loose to medium dense.
6								
7								
8								
9								
10			12					@ 10' As per 5', medium dense.
11								
12								
13								
14								
15			17	SP	104.2	21.1	95	@ 15' SAND, gray brown, moist to wet, medium dense; medium grained, few fines.
16								
17								@ 17' Groundwater encountered.
18								
19								
20			18					@ 20' SAND with SILT, dark gray, saturated, medium dense.
21								
22								
23								
24								
25			29					@ 25' As per 20'.
26								
27								
28								
29								

BORING LOG

GeoSoils, Inc.

W.O. 6960-A-SC

PROJECT: OCEAN BREEZE RANCH, LLC
5820 West Lilac Road, Bonsall

BORING HSA-6 *SHEET* 2 *OF* 2

DATE EXCAVATED 5-18-16

SAMPLE METHOD: 140 Lb. Hammer @ 30" Drop

Approx. Elevation: 195'

Standard Penetration Test

Undisturbed, Ring Sample

Groundwater

Seepage

Depth (ft.)	Sample: Bulk	Sample: Undisturbed	Sample: Blows/Ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Saturation (%)	Description of Material
31			19	SP				@ 30' SAND with SILT, dark gray, saturated, medium dense; fine to coarse grained.
35			47		113.7	16.1	100	@ 35' As per 30', dense.
40			8					@ 40' As per 35', loose; some gravel.
45			46		107.8	19.2	100	@ 45' As per 40', dense; no gravel.
50			50					@ 50' As per 45'.
52								Total Depth = 51½' Groundwater Encountered @ 17' (EL = 178' MSL) Backfilled with Bentonite Clay 05/18/16

BORING LOG

GeoSoils, Inc.

W.O. 6960-A-SC

PROJECT: OCEAN BREEZE RANCH, LLC
5820 West Lilac Road, Bonsall

BORING HSA-9 *SHEET* 1 *OF* 2

DATE EXCAVATED 7-5-16

SAMPLE METHOD: 140 Lb. Hammer @ 30" Drop

Approx. Elevation: 225'

Standard Penetration Test

Undisturbed, Ring Sample

Groundwater

Seepage

Depth (ft.)	Sample: Bulk	Sample: Undisturbed	Sample: Blows/Ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Saturation (%)	Description of Material
1–10			5	SM	103.8	6.4	28.6	**ALLUVIUM:** @ 0' SILTY SAND, brown, dry, loose; few roots. @ 5' SILTY SAND, dark brown, slightly moist, loose.
10–15			11	SP				@ 10' SAND with SILT, brown, moist, loose.
15–20			16		106.9	4.2	20.1	@ 15' SAND, yellowish brown, moist, loose to medium dense.
20–21			5					@ 20' No recovery.
21								@ 21' Groundwater ecountered.
21–25			13		111.3	16.6	100	@ 25' SAND, brown, saturated, loose.

BORING LOG

GeoSoils, Inc.

W.O. 6960-A-SC

PROJECT: OCEAN BREEZE RANCH, LLC
5820 West Lilac Road, Bonsall

BORING HSA-9 *SHEET* 2 *OF* 2

DATE EXCAVATED 7-5-16

SAMPLE METHOD: 140 Lb. Hammer @ 30" Drop

Approx. Elevation: 225'

Standard Penetration Test

Undisturbed, Ring Sample

Groundwater

Seepage

Depth (ft.)	Sample: Bulk	Sample: Undisturbed	Sample: Blows/Ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Saturation (%)	Description of Material
31			24	CH				@ 30' CLAY, olive brown, wet, stiff.
35			29	CL				@ 35' SANDY CLAY, mottled olive brown to strong brown, moist, very stiff.
37			50-2"	BDR				**BEDROCK:** @ 37' GRANITIC ROCK, very dense (practical refusal). Total Depth = 37¼' Groundwater Encountered @ 21' (EL = 204' MSL) Backfilled 07/5/16 Infiltration Test Location

APPENDIX B

FACTOR OF SAFETY DETERMINATIONS

Table D.2-3: Determination of Safety Factor

PLANNING AREA 1, BASIN 1A Consideration		Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
Suitability Assessment (A)	Infiltration Testing Method	0.25	Refer to Table D.2-4	0.50
	Soil Texture Class	0.25		0.50
	Soil Variability	0.25		0.50
	Depth to Groundwater/Obstruction	0.25		0.25
	Suitability Assessment Safety Factor, $S_A = \Sigma p$			1.75
Design (B)	Pretreatment	0.50	Refer to Table D.2-4	0.50
	Resiliency	0.25		0.50
	Compaction	0.25		0.75
	Design Safety Factor, $S_B = \Sigma p$			1.75
	Safety Factor, $S = S_A \times S_B$ (Must be always greater than or equal to 2)			3.0

The geotechnical engineer should reference Table D.2-4 below in order to determine appropriate factor values for use in the table above. The values in the table below are subjective in nature and the geotechnical engineer may use professional discretion in how the points are assigned.

PLATE B1
W.O. 6960-A5-SC
11-29-2018
GEOSOILS, INC.

Table D.2-3: Determination of Safety Factor

PLANNING AREA 2, BASIN 2A, 2B, 2C Consideration		Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
Suitability Assessment (A)	Infiltration Testing Method	0.25	Refer to Table D.2-4	0.50
	Soil Texture Class	0.25		0.25
	Soil Variability	0.25		0.25
	Depth to Groundwater/Obstruction	0.25		0.50
	Suitability Assessment Safety Factor, $S_A = \Sigma p$			1.50
Design (B)	Pretreatment	0.50	Refer to Table D.2-4	0.50
	Resiliency	0.25		0.75
	Compaction	0.25		0.25
	Design Safety Factor, $S_B = \Sigma p$			1.50
	Safety Factor, $S = S_A \times S_B$ (Must be always greater than or equal to 2)			2.25

The geotechnical engineer should reference Table D.2-4 below in order to determine appropriate factor values for use in the table above. The values in the table below are subjective in nature and the geotechnical engineer may use professional discretion in how the points are assigned.

PLATE B2
W.O. 6960-A5-SC
11-29-2018
GEOSOILS, INC.

Table D.2-3: Determination of Safety Factor

PLANNING AREA 2, BASIN 2D Consideration		Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
Suitability Assessment (A)	Infiltration Testing Method	0.25	Refer to Table D.2-4	0.50
	Soil Texture Class	0.25		0.25
	Soil Variability	0.25		0.25
	Depth to Groundwater/Obstruction	0.25		0.50
	Suitability Assessment Safety Factor, $S_A = \Sigma p$			1.50
Design (B)	Pretreatment	0.50	Refer to Table D.2-4	0.50
	Resiliency	0.25		0.75
	Compaction	0.25		0.75
	Design Safety Factor, $S_B = \Sigma p$			2.0
	Safety Factor, $S = S_A \times S_B$ (Must be always greater than or equal to 2)			3.0

The geotechnical engineer should reference Table D.2-4 below in order to determine appropriate factor values for use in the table above. The values in the table below are subjective in nature and the geotechnical engineer may use professional discretion in how the points are assigned.

PLATE B3
W.O. 6960-A5-SC
11-29-2018
GEOSOILS, INC.

Table D.2-3: Determination of Safety Factor

PLANNING AREA 2, BASIN 2E, 2F, 2G Consideration		Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
Suitability Assessment (A)	Infiltration Testing Method	0.25	Refer to Table D.2-4	0.50
	Soil Texture Class	0.25		0.25
	Soil Variability	0.25		0.25
	Depth to Groundwater/Obstruction	0.25		0.25
	Suitability Assessment Safety Factor, $S_A = \Sigma p$			1.25
Design (B)	Pretreatment	0.50	Refer to Table D.2-4	0.50
	Resiliency	0.25		0.75
	Compaction	0.25		0.75
	Design Safety Factor, $S_B = \Sigma p$			2.0
	Safety Factor, $S = S_A \times S_B$ (Must be always greater than or equal to 2)			2.5

The geotechnical engineer should reference Table D.2-4 below in order to determine appropriate factor values for use in the table above. The values in the table below are subjective in nature and the geotechnical engineer may use professional discretion in how the points are assigned.

PLATE B4
W.O. 6960-A5-SC
11-29-2018
GEOSOILS, INC.

Table D.2-3: Determination of Safety Factor

PLANNING AREA 3, BASIN 3A, 3B, 3C, 3E Consideration		Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
Suitability Assessment (A)	Infiltration Testing Method	0.25	Refer to Table D.2-4	0.50
	Soil Texture Class	0.25		0.50
	Soil Variability	0.25		0.50
	Depth to Groundwater/Obstruction	0.25		0.25
	Suitability Assessment Safety Factor, $S_A = \Sigma p$			1.75
Design (B)	Pretreatment	0.50	Refer to Table D.2-4	0.50
	Resiliency	0.25		0.50
	Compaction	0.25		0.50
	Design Safety Factor, $S_B = \Sigma p$			1.50
	Safety Factor, $S = S_A \times S_B$ (Must be always greater than or equal to 2)			2.6

The geotechnical engineer should reference Table D.2-4 below in order to determine appropriate factor values for use in the table above. The values in the table below are subjective in nature and the geotechnical engineer may use professional discretion in how the points are assigned.

PLATE B5
W.O. 6960-A5-SC
11-29-2018
GEOSOILS, INC.

Table D.2-3: Determination of Safety Factor

PLANNING AREA PA 3, BASIN 3F Consideration		Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
Suitability Assessment (A)	Infiltration Testing Method	0.25	Refer to Table D.2-4	0.50
	Soil Texture Class	0.25		0.50
	Soil Variability	0.25		0.50
	Depth to Groundwater/Obstruction	0.25		0.50
	Suitability Assessment Safety Factor, $S_A = \Sigma p$			2.0
Design (B)	Pretreatment	0.50	Refer to Table D.2-4	0.50
	Resiliency	0.25		0.50
	Compaction	0.25		0.50
	Design Safety Factor, $S_B = \Sigma p$			1.50
Safety Factor, $S = S_A \times S_B$ (Must be always greater than or equal to 2)				3.0

The geotechnical engineer should reference Table D.2-4 below in order to determine appropriate factor values for use in the table above. The values in the table below are subjective in nature and the geotechnical engineer may use professional discretion in how the points are assigned.

PLATE B6
W.O. 6960-A5-SC
11-29-2018
GEOSOILS, INC.

Table D.2-3: Determination of Safety Factor

DMA 17, BASIN 2H (OFFSITE) Consideration		Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
Suitability Assessment (A)	Infiltration Testing Method	0.25	Refer to Table D.2-4	0.75
	Soil Texture Class	0.25		0.50
	Soil Variability	0.25		0.50
	Depth to Groundwater/Obstruction	0.25		0.25
	Suitability Assessment Safety Factor, $S_A = \Sigma p$			2.0
Design (B)	Pretreatment	0.50	Refer to Table D.2-4	0.50
	Resiliency	0.25		0.50
	Compaction	0.25		0.25
	Design Safety Factor, $S_B = \Sigma p$			1.25
	Safety Factor, $S = S_A \times S_B$ (Must be always greater than or equal to 2)			2.5

The geotechnical engineer should reference Table D.2-4 below in order to determine appropriate factor values for use in the table above. The values in the table below are subjective in nature and the geotechnical engineer may use professional discretion in how the points are assigned.

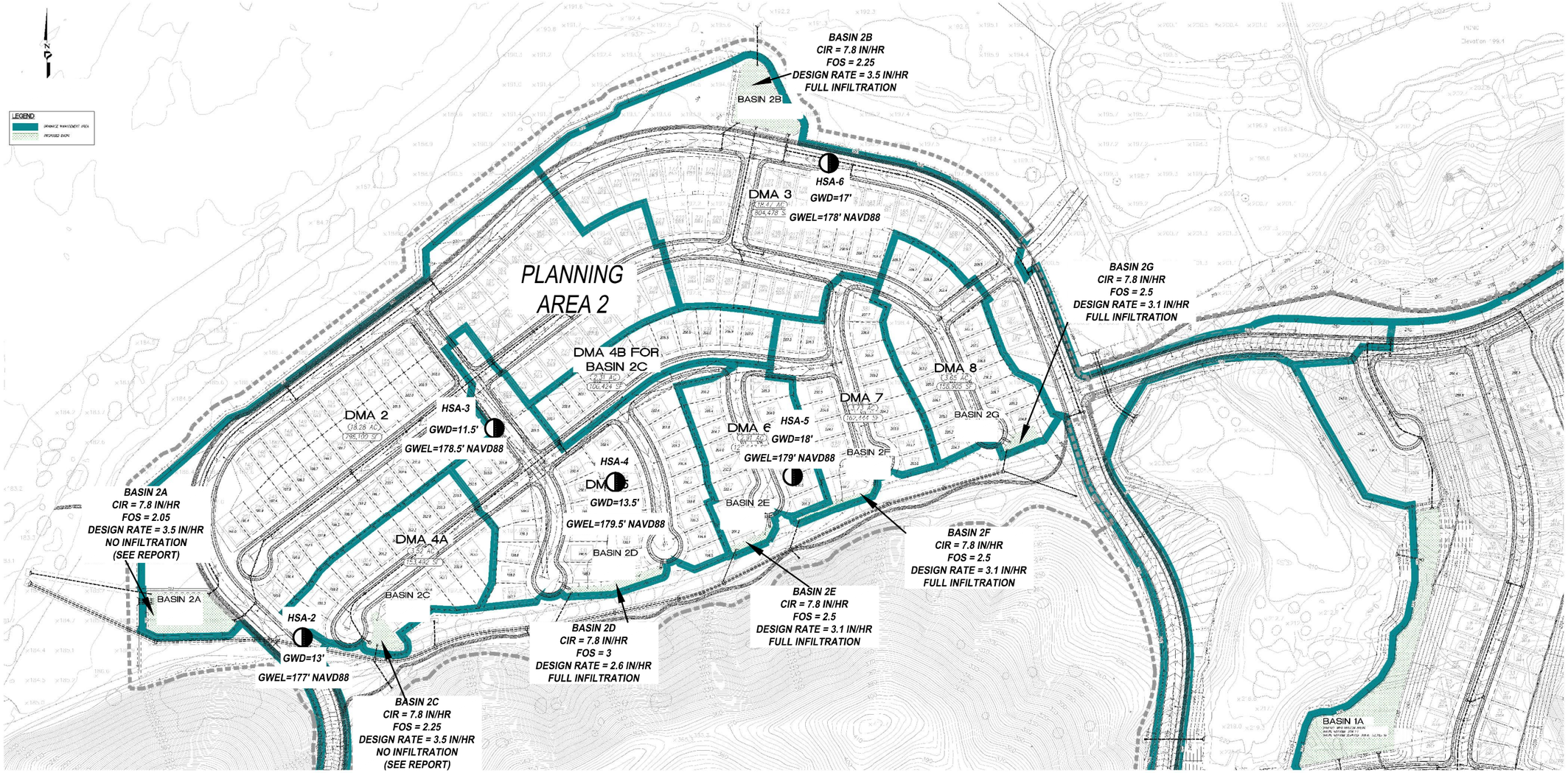
PLATE B7
W.O. 6960-A5-SC
11-29-2018
GEOSOILS, INC.

Table D.2-3: Determination of Safety Factor

DMA 16, BASIN 3H (OFFSITE) Consideration		Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
Suitability Assessment (A)	Infiltration Testing Method	0.25	Refer to Table D.2-4	0.75
	Soil Texture Class	0.25		0.50
	Soil Variability	0.25		0.50
	Depth to Groundwater/Obstruction	0.25		0.25
	Suitability Assessment Safety Factor, $S_A = \Sigma p$			2.0
Design (B)	Pretreatment	0.50	Refer to Table D.2-4	0.50
	Resiliency	0.25		0.50
	Compaction	0.25		0.25
	Design Safety Factor, $S_B = \Sigma p$			1.25
	Safety Factor, $S = S_A \times S_B$ (Must be always greater than or equal to 2)			2.50

The geotechnical engineer should reference Table D.2-4 below in order to determine appropriate factor values for use in the table above. The values in the table below are subjective in nature and the geotechnical engineer may use professional discretion in how the points are assigned.

PLATE B8
W.O. 6960-A5-SC
11-29-2018
GEOSOILS, INC.



GSI LEGEND

CIR — CORRECTED INFILTRATION RATE

FOS — MINIMUM FACTOR OF SAFTEY PER COUNTY BMP MANUAL, TABLE D.2-3

HSA-6 — APPROXIMATE LOCATION OF HOLLOW STEM AUGER BORING (GSI, 2016) WITH GROUNDWATER DEPTH (GWD) AMD APPROXIMATE GROUNDWATER ELEVATION (GWEL) IN FEET NAVD88

N

GRAPHIC SCALE

300 0 150 300 600

1" = 300'

ALL LOCATIONS ARE APPROXIMATE

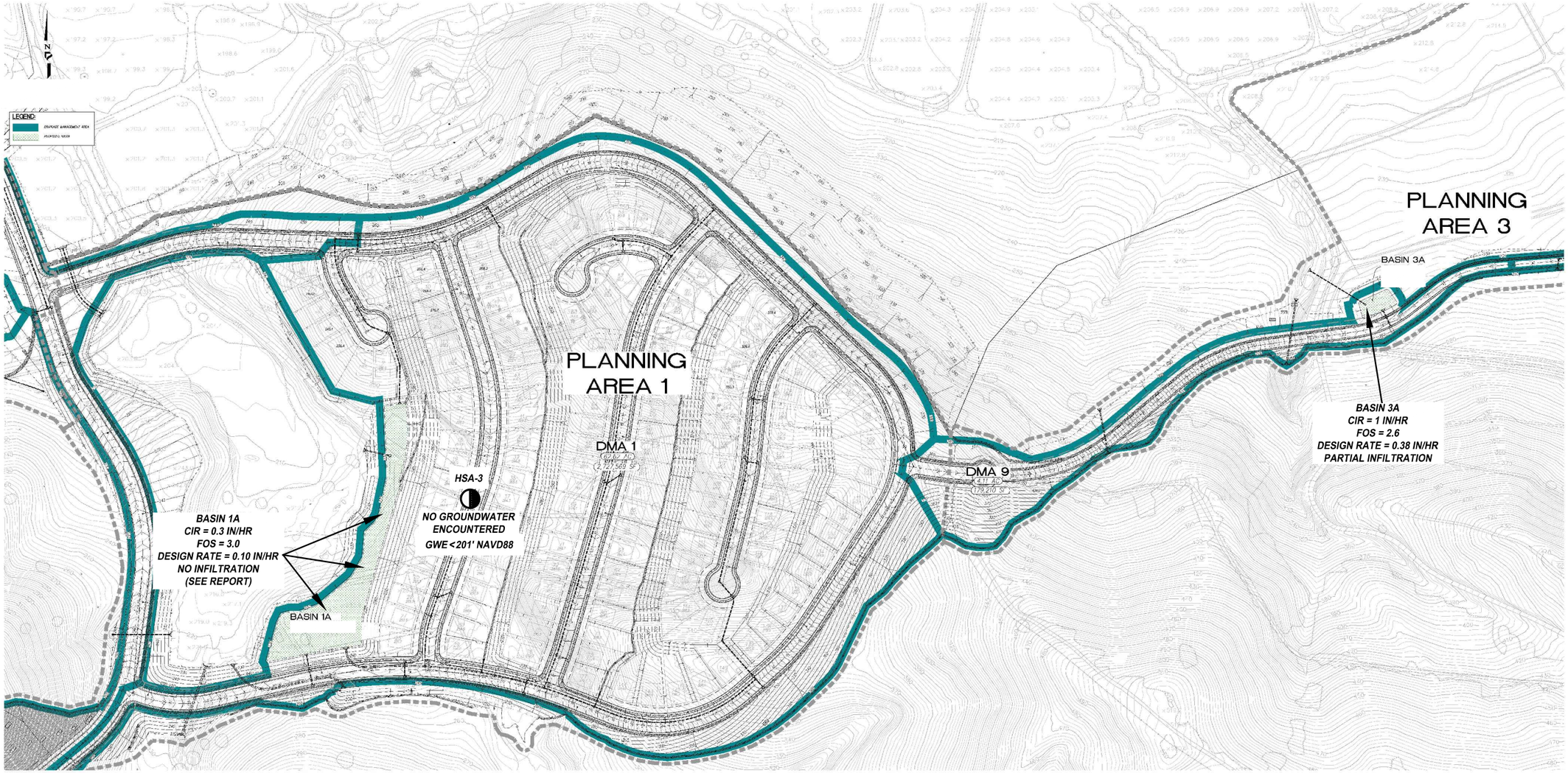
This document or efile is not a part of the Construction Documents and should not be relied upon as being an accurate depiction of design.

GeoSoils, Inc.

OBR INFILTRATION RATE EXHIBIT

Revised Plate 1

W.O. 6960-A5-SC	DATE: 12/18	SCALE: 1" = 300'



GSI LEGEND

CIR — CORRECTED INFILTRATION RATE

FOS — MINIMUM FACTOR OF SAFTEY PER COUNTY BMP MANUAL, TABLE D.2-3

HSA-6 — APPROXIMATE LOCATION OF HOLLOW STEM AUGER BORING (GSI, 2016) WITH GROUNDWATER DEPTH (GWD) AMD APPROXIMATE GROUNDWATER ELEVATION (GWEL) IN FEET NAVD88

N

GRAPHIC SCALE

300 0 150 300 600

1" = 300'

ALL LOCATIONS ARE APPROXIMATE

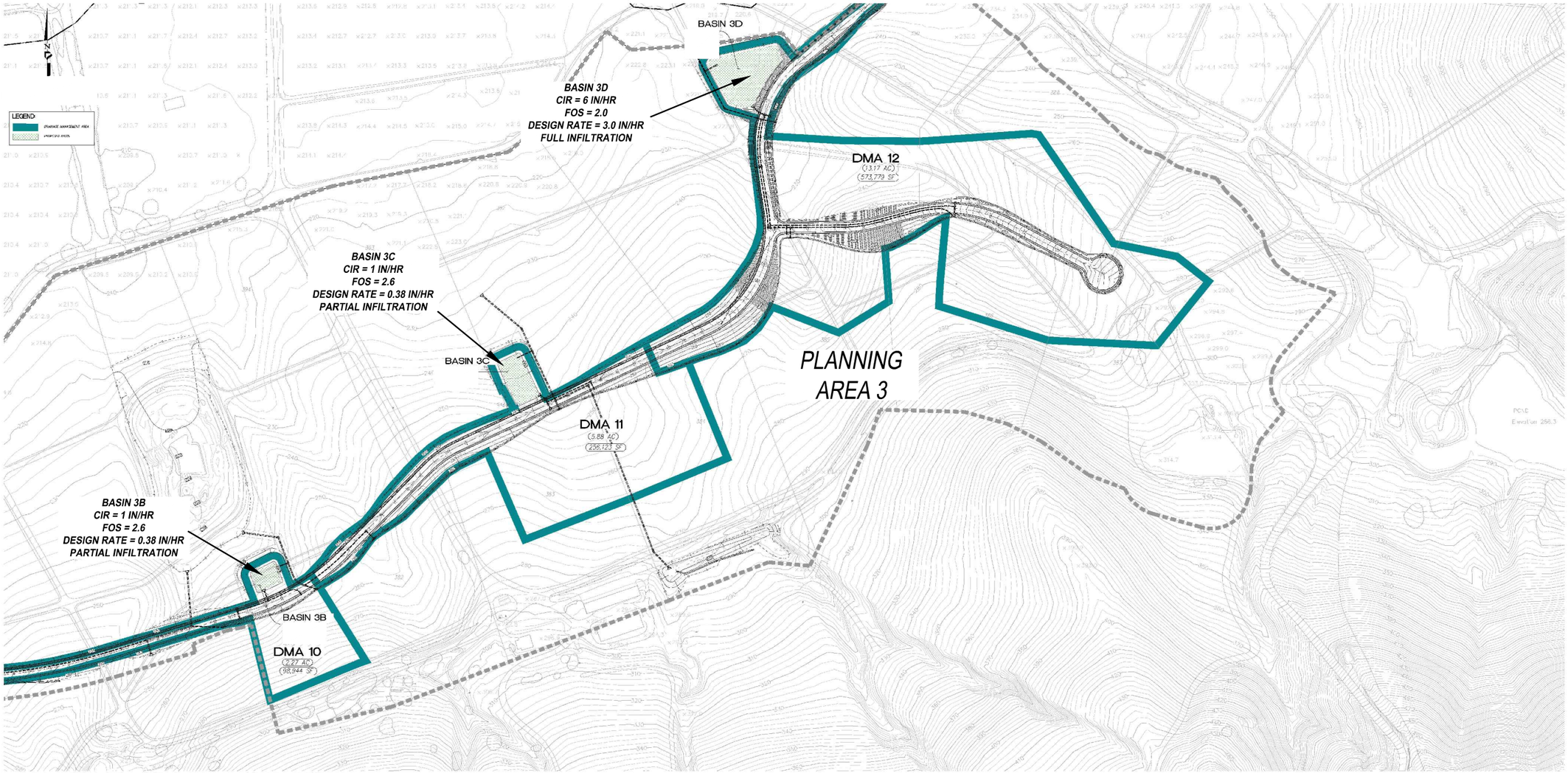
This document or efile is not a part of the Construction Documents and should not be relied upon as being an accurate depiction of design.

GeoSoils, Inc.

OBR INFILTRATION RATE EXHIBIT

Plate 2

W.O. 6960-A5-SC	DATE: 12/18	SCALE: 1" = 300'



GSI LEGEND

CIR — CORRECTED INFILTRATION RATE

FOS — MINIMUM FACTOR OF SAFTEY PER COUNTY BMP MANUAL, TABLE D.2-3

HSA-6 — APPROXIMATE LOCATION OF HOLLOW STEM AUGER BORING (GSI, 2016) WITH GROUNDWATER DEPTH (GWD) AMD APPROXIMATE GROUNDWATER ELEVATION (GWEL) IN FEET NAVD88

N

GRAPHIC SCALE

300 0 150 300 600

1" = 300'

ALL LOCATIONS ARE APPROXIMATE

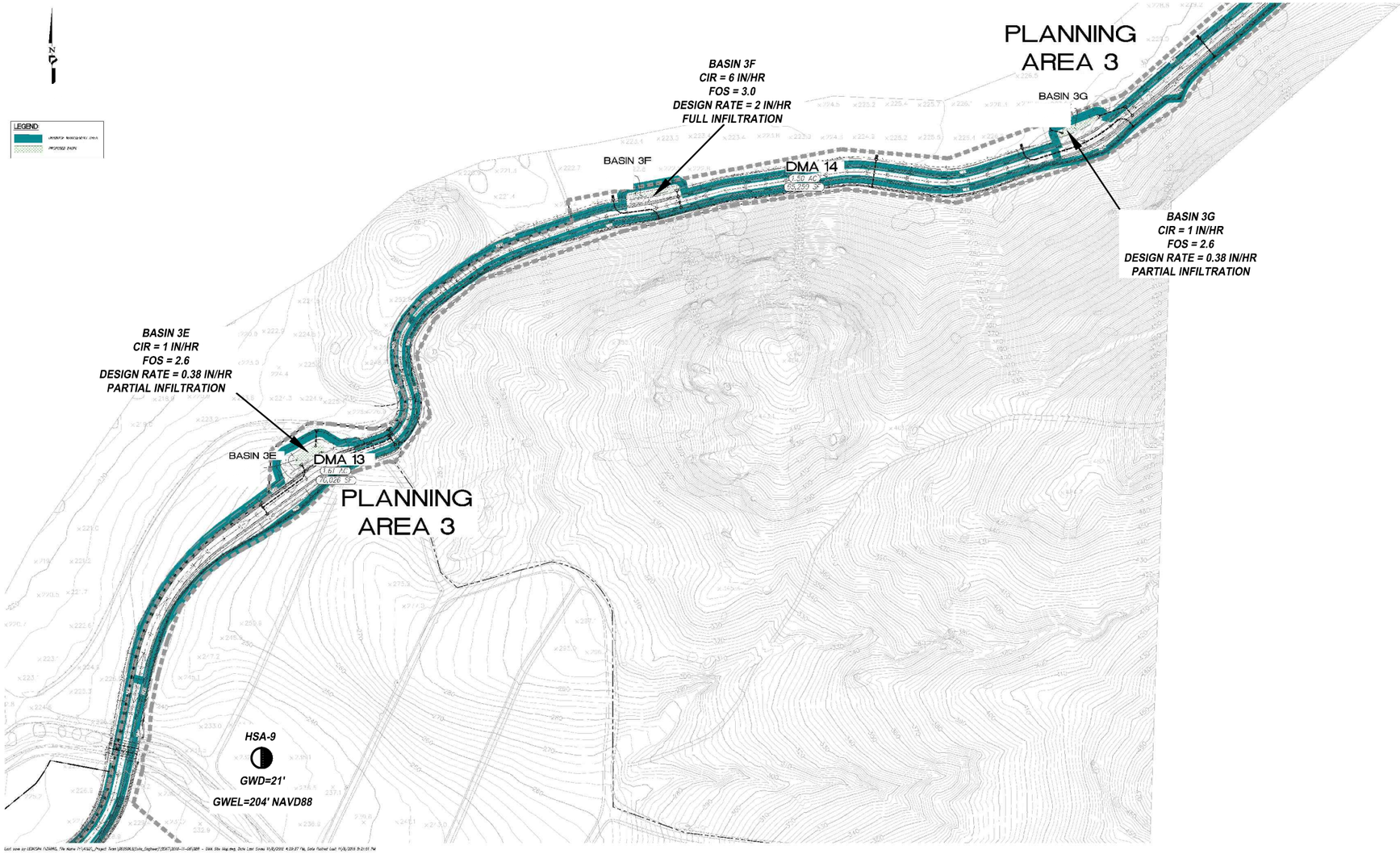
This document or efile is not a part of the Construction Documents and should not be relied upon as being an accurate depiction of design.

GeoSoils, Inc.

OBR INFILTRATION RATE EXHIBIT

Plate 3

W.O. 6960-A5-SC	DATE: 12/18	SCALE: 1" = 300'



GSI LEGEND

CIR — CORRECTED INFILTRATION RATE

FOS — MINIMUM FACTOR OF SAFTEY PER COUNTY BMP MANUAL, TABLE D.2-3

HSA-6 — APPROXIMATE LOCATION OF HOLLOW STEM AUGER BORING (GSI, 2016) WITH GROUNDWATER DEPTH (GWD) AMD APPROXIMATE GROUNDWATER ELEVATION (GWEL) IN FEET NAVD88

N

GRAPHIC SCALE

300 0 150 300 600

1" = 300'

ALL LOCATIONS ARE APPROXIMATE

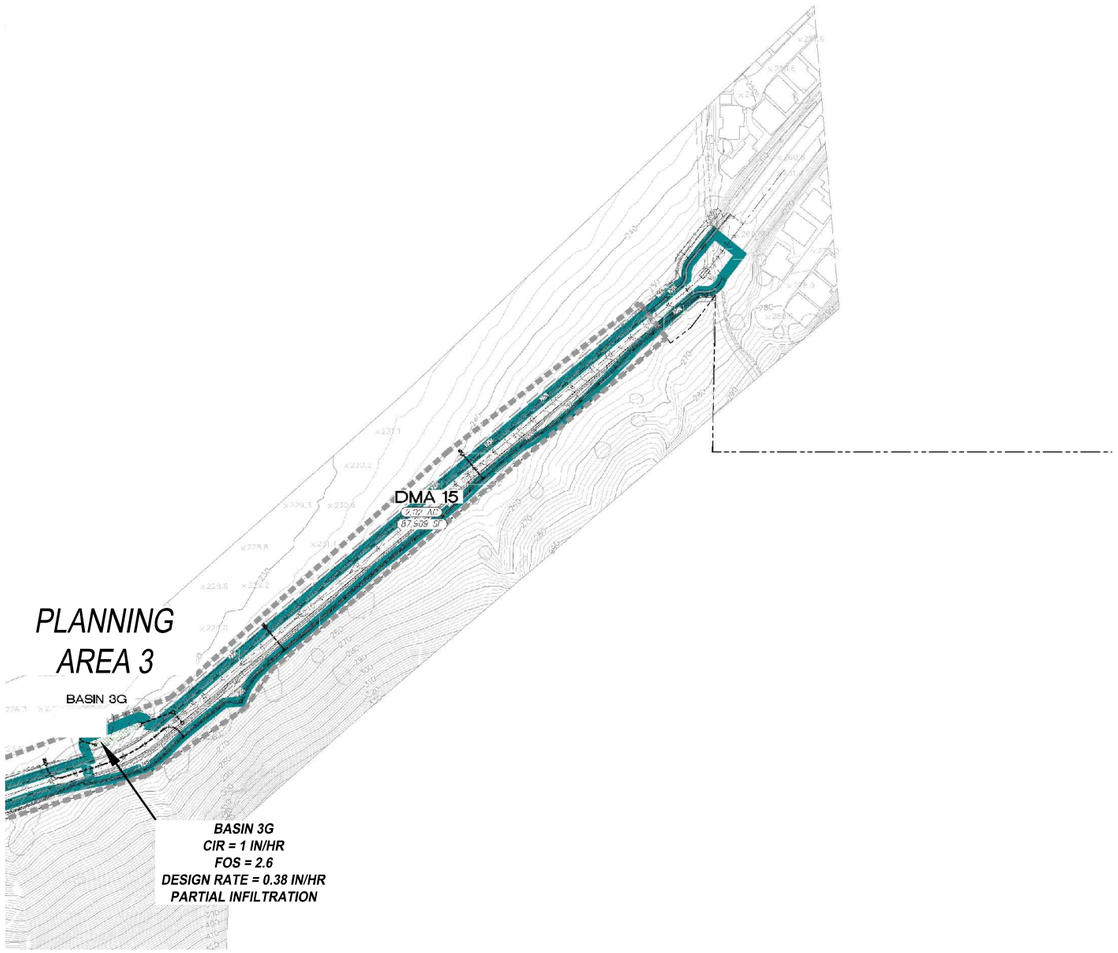
This document or efile is not a part of the Construction Documents and should not be relied upon as being an accurate depiction of design.

GeoSoils, Inc.

OBR INFILTRATION RATE EXHIBIT

Plate 4

W.O. 6960-A5-SC	DATE: 12/18	SCALE: 1" = 300'



GSI LEGEND

CIR — CORRECTED INFILTRATION RATE

FOS — MINIMUM FACTOR OF SAFTEY PER COUNTY BMP MANUAL, TABLE D.2-3

HSA-6 — APPROXIMATE LOCATION OF HOLLOW STEM AUGER BORING (GSI, 2016) WITH GROUNDWATER DEPTH (GWD) AMD APPROXIMATE GROUNDWATER ELEVATION (GWEL) IN FEET NAVD88

N

GRAPHIC SCALE

300 0 150 300 600

1" = 300'

ALL LOCATIONS ARE APPROXIMATE

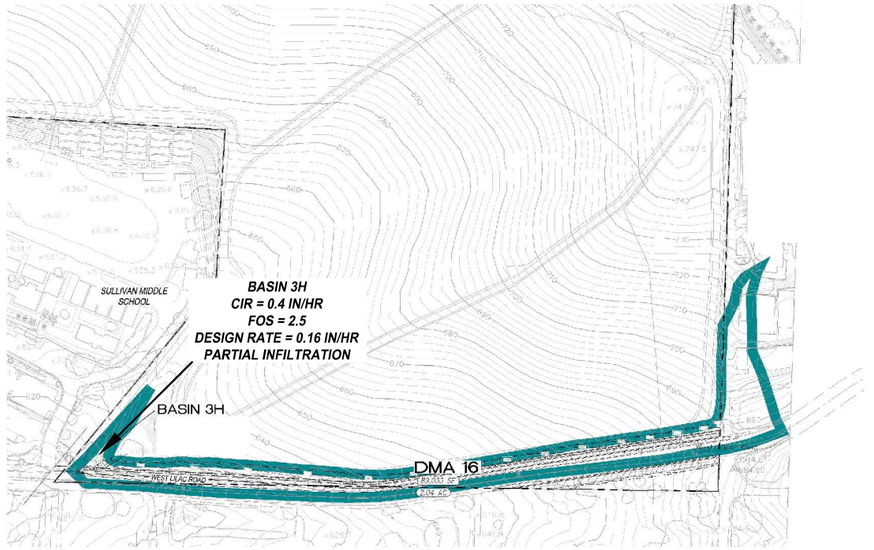
This document or efile is not a part of the Construction Documents and should not be relied upon as being an accurate depiction of design.

GeoSoils, Inc.

OBR INFILTRATION RATE EXHIBIT

Plate 5

W.O. 6960-A5-SC	DATE: 12/18	SCALE: 1" = 300'



GSI LEGEND

CIR — CORRECTED INFILTRATION RATE

FOS — MINIMUM FACTOR OF SAFTEY PER COUNTY BMP MANUAL, TABLE D.2-3

HSA-6 — APPROXIMATE LOCATION OF HOLLOW STEM AUGER BORING (GSI, 2016) WITH GROUNDWATER DEPTH (GWD) AMD APPROXIMATE GROUNDWATER ELEVATION (GWEL) IN FEET NAVD88

N

GRAPHIC SCALE

300 0 150 300 600

1" = 300'

ALL LOCATIONS ARE APPROXIMATE

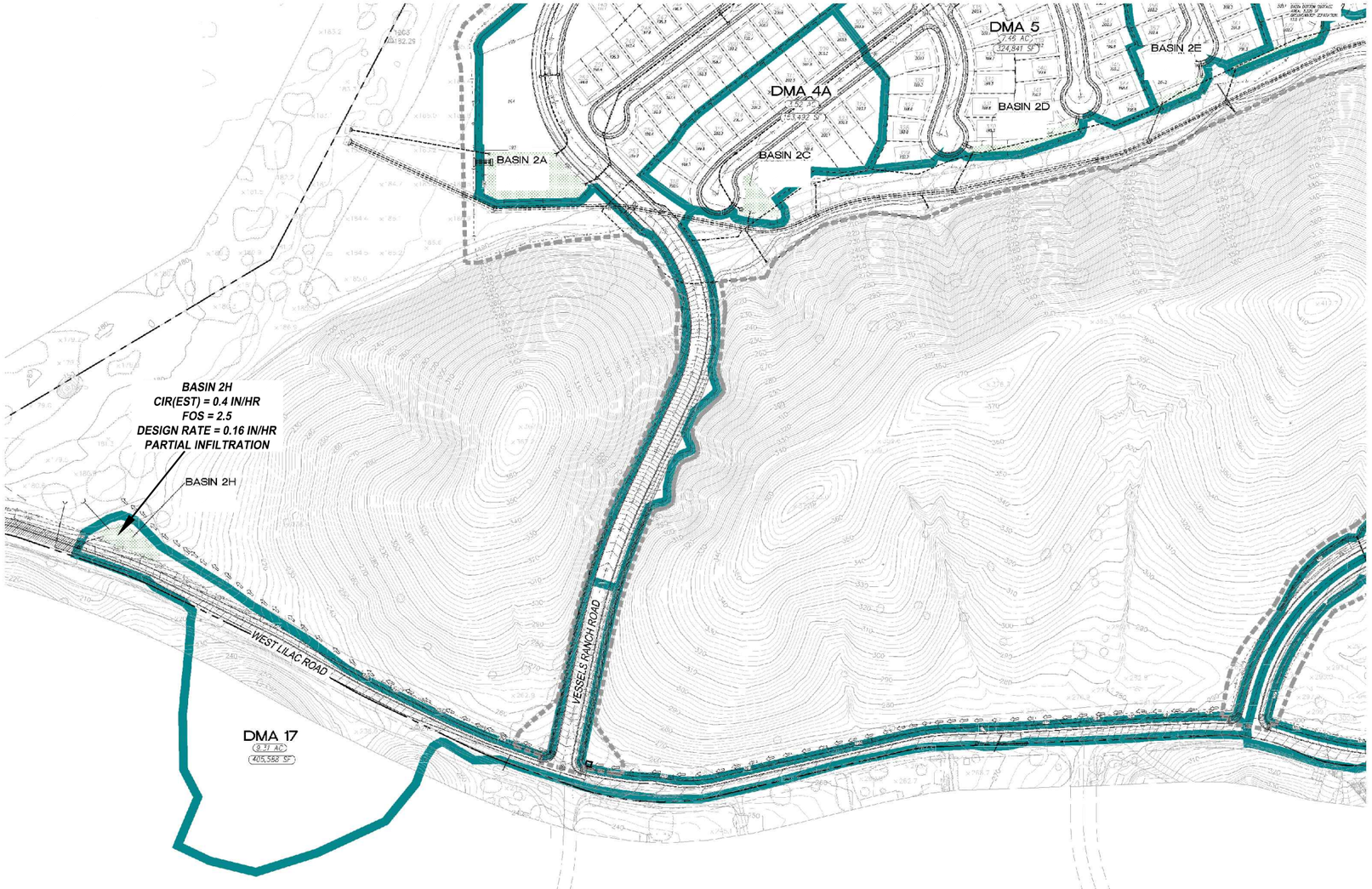
This document or efile is not a part of the Construction Documents and should not be relied upon as being an accurate depiction of design.

GeoSoils, Inc.

OBR INFILTRATION RATE EXHIBIT

Plate 6

W.O. 6960-A5-SC	DATE: 12/18	SCALE: 1" = 300'



GSI LEGEND

CIR — CORRECTED INFILTRATION RATE

FOS — MINIMUM FACTOR OF SAFTEY PER COUNTY BMP MANUAL, TABLE D.2-3

HSA-6 — APPROXIMATE LOCATION OF HOLLOW STEM AUGER BORING (GSI, 2016) WITH GROUNDWATER DEPTH (GWD) AMD APPROXIMATE GROUNDWATER ELEVATION (GWEL) IN FEET NAVD88

N

GRAPHIC SCALE

300 0 150 300 600

1" = 300'

ALL LOCATIONS ARE APPROXIMATE

This document or efile is not a part of the Construction Documents and should not be relied upon as being an accurate depiction of design.

GeoSoils, Inc.

OBR INFILTRATION RATE EXHIBIT

Plate 7

W.O. 6960-A5-SC	DATE: 12/18	SCALE: 1" = 300'

GEOTECHNICAL DISCUSSION OF ROCK HARDNESS REMEDIAL EARTHWORK, AND EARTHWORK BALANCE FACTORS OCEAN BREEZE RANCH PLANNING AREAS, PA-1, PA-2, AND PA-3 BONSALL, SAN DIEGO COUNTY, CALIFORNIA

FOR

OCEAN BREEZE RANCH, LLC
5820 WEST LILAC ROAD
BONSALL, CALIFORNIA 92003

W.O. 6960-A-SC JUNE 16, 2016

GeoSoils, Inc.

Geotechnical • Geologic • Coastal • Environmental

5741 Palmer Way • Carlsbad, California 92010 • (760) 438-3155 • FAX (760) 931-0915 • www.geosoilsinc.com

June 16, 2016

W.O. 6960-A-SC

Ocean Breeze Ranch, LLC
5820 West Lilac Road
Bonsall, California 92003

Attention: Mr. Jim Conrad

Subject: Geotechnical Discussion of Rock Hardness, Remedial Earthwork, and Earthwork Balance Factors, Ocean Breeze Ranch Planning Areas, PA-1, PA-2, and PA-3, Bonsall, San Diego County, California

Reference: "Geotechnical Feasibility Evaluation, Vessels Stallion Ranch, Bonsall, San Diego County, California," W.O. 6688-A-SC, dated January 30, 2015, by GeoSoils, Inc.

Dear Mr. Conrad:

In accordance with your request, GeoSoils Inc. (GSI) has prepared this discussion of remedial earthwork, earthwork balance factors, and rock hardness with respect to rough grading of the Ocean Breeze Ranch site in the community of Bonsall, San Diego County, California. The scope of work performed in preparation of this preliminary report is part of a larger site evaluation in progress. Unless specifically superceded herein, the conclusions and recommendations presented in the reference report remain valid and applicable.

ROCK HARDNESS EVALUATION

A seismic refraction survey was performed in selected areas of deep cuts where the site is underlain with near surface granitic bedrock. To date, the survey consists of seven (7) seismic refraction lines, with four (4) completed within the vicinity of PA-1/2. A summary of methodology and procedures is presented in the referenced report.

Layer boundaries tend to mimic the surface topography, although variations are common depending upon the depth of weathering, fracturing, etc. In general, the survey indicated a near surface layer (Layer 1) thickness (i.e., undocumented fill, colluvium, weathered bedrock), ranging from about ±1 to ±7 feet. The average velocity of Layer 1 material is about ±1,000 fps, and is considered typical for such near surface material. The depth to the Layer 1/Layer 2 transition (bedrock) also ranges from about ±1 to ±7 feet below existing grades. The average velocity of Layer 2 is about ±2,900 fps, with some variability. Layer 3 is inferred at depths on the order of ±9 to possibly 38 feet, with average velocities in Layer 3 (relatively unweathered bedrock) likely greater than 4,700 fps. At depths where

velocities are greater than about 6,000 fps, rippability is ambiguous and blasting usually is required.

An evaluation has been made of the seismic refraction line data to estimate the approximate depth to non-rippable trenching (i.e., utility excavation) and to non-rippable bedrock. Approximate cut-off velocities of ±3,800 and ±6,000 fps are generally used as a basis for non-rippable trenching (assuming a Cat 235 Hoe [a large trackhoe], or equivalent), and non-rippable bedrock (assuming a D9L, or equivalent), respectively. It should be noted that a conventional rubber-tired backhoe can experience non-productive trenching at seismic velocities much less than ±2,000 to 2,500 fps.

Bedrock excavatability with respect to trenching shallower than the approximate ±3,800 fps cut-off depth is expected to vary from easy to very difficult and the necessity for localized areas requiring rock breaking, or blasting should be anticipated. Similarly, bedrock rippability shallower than the approximate ±6,000 fps cut-off depth is expected to vary from easy to very difficult, and the necessity for localized areas requiring rock breaking and/or blasting cannot be entirely precluded.

Variations should be expected. As such, bedrock excavations from the surface downward may generate oversize rock. Isolated "floaters" or corestones may also be encountered. The bulk of the materials derived from the weathered portion of the bedrock (up to and including the ±3,800 to 6,000 fps cut-off) are anticipated to disintegrate to approximately 12 to 24 inches and smaller constituents. Any oversize materials (≥ 12 inches) generated would require special handling for use in fills, and may not be placed within 10 feet of finish grade or used as backfill in utility trenches. Oversize materials typically become commonplace during excavation into 5,000 fps materials, usually requiring specialized placement techniques during grading.

Based upon our experience in this area, and the seismic refraction data obtained, the following table reflects our preliminary estimates of the rippability and trenchability at the locations of the seismic refraction survey lines; other interpretations are possible:

SEISMIC LINE NO.	GENERAL RIPPABILITY (ASSUMING A D9L DOZER OR CAT 235 HOE, OR EQUIVALENT)
ST-1	Rippable and trenchable to depths explored of 30 feet. Difficult trenching below depths of 2 to 4 feet. Localized blasting and/or rock breaking may not be precluded below depths of 10 feet.
ST-2	Rippable and trenchable to depths explored of 30 feet. Difficult trenching below depths of 2½ to 3 feet. Localized blasting and/or rock breaking may not be precluded below depths of 10 feet.
ST-3	Rippable and trenchable to depths explored of 30 feet. Moderate to difficult trenching below depths of 3½ feet. Localized blasting and/or rock breaking may not be precluded below depths of 30 feet.

SEISMIC LINE NO.	GENERAL RIPPABILITY (ASSUMING A D9L DOZER OR CAT 235 HOE, OR EQUIVALENT)
ST-4 (PA-2)	Rippable to depths explored of 30 feet. Not trenchable below depths of 3 to 4 feet. Localized blasting and/or rock breaking may not be precluded below depths of 10 feet. Oversize material is significant.
ST-101 (PA-2)	Rippable and trenchable to depths explored of ±30 feet. Difficult trenching below depths of 2½ to 5½ feet. Localized blasting and/or rock breaking may not be precluded below depths of 30 feet.
ST-102 (PA-2)	Rippable and trenchable to depths explored of ±30 feet. Difficult trenching below a depth of 2½ feet. Localized blasting and/or rock breaking may not be precluded below depths of 30 feet.
ST-103 (PA-2)	Rippable and trenchable to depths explored of ±38 feet. Difficult trenching below depths of 4½ to 7 feet. Localized blasting and/or rock breaking may not be precluded below depths of 30 feet.

Rock Hardness Summary

In general, utilizing the seismic data, it appears that the site area in the vicinity of our seismic lines may be characterized as being underlain by a surficial soils (fill, colluvium, weathered rock) to depths ranging from about ±1 to about ±7 feet in thickness, with less weather bedrock below those depths. At depths inferred to be approximately 30 feet or more, relatively fresh and very dense granitic bedrock likely exists. Based on all of the above, the need for overexcavation, blasting and/or line shooting would be anticipated on the site, should proposed cut grades exceed the depths indicated herein, in areas underlain with granitic bedrock (see Plate 1). It should be noted that a conventional rubber-tired backhoe will experience non-productive trenching at seismic velocities much less than ±2,000 to 2,500 fps. The seismic refraction data presented herein should be further reviewed in conjunction with final grading plans (when available). It should be noted that due to the variability of bedrock weathering, and the potential for local boulders, or less weathered bedrock, very difficult ripping, rock breaking, and/or blasting cannot be entirely precluded at shallower depths, even at or near the surface.

REMEDIAL EARTHWORK

Removals

A remedial removal exhibit was prepared by GSI (Attached as Plate 1). This exhibit indicates removal depths for the various areas of the site, based on the type of near surface material present. In general, this exhibit summarizes removals as follows:

Colluvium - A surficial soil layer with a thickness on the order of 2 to 3 feet where it is underlain by granitic bedrock, and 4 to 5 feet where it is underlain with older alluvium. Colluvium is present within all areas of the site, excluding PA-3.

Alluvium - A surficial soil deposit, predominately occurring within PA-3, and a portion of PA-2. Complete removals are anticipated within PA-2, and may be anticipated to vary from about 13 to 20 feet (see the reference report). Within PA-3, the depth of removal is limited by the depth to a shallow groundwater table. In general, the remedial removal excavations within PA-3 are anticipated to be completed to near the groundwater table, at depths on the order of 10 to 12 feet below existing grades, and be completed to at least 15 feet outside the improvement area.

Deposits of Older Alluvium and granitic bedrock are considered suitable bearing material, and removal is not required. It should be noted that the current limits of PA-3 are greater than indicated on Plate 1; however, this does not affect the anticipated removal depth in these areas.

Transitions/Overexcavation

In order to reduce the potential for differential settlement and facilitate trenching for foundations underground utilities, etc., the entire cut portion of the building pad(s), areas with planned fills less than 4 feet thick, and areas where the as-built fill thickness would be less than 4 feet after remedial removals have been performed should be overexcavated to a minimum depth of 4 feet below finish grade or 2 feet below the lowest foundation element (whichever is greater) and be replaced with compacted fill. The overexcavation subgrade bottom should be inclined to drain away from the structure(s), and into the street. Prior to fill placement, the overexcavation subgrade should be scarified at least 8 inches in depth, moisture conditioned as necessary, and be recompacted to at least 90 percent of the laboratory standard (ASTM D 1557). Overexcavation should be completed to a minimum lateral distance of 5 feet outside the outermost exterior foundation. Overexcavation for underground utilities may be completed to at least 1 foot below the lowest utility invert and be replaced with compacted fill. The undercut transition should not create a minimum to maximum of fill thickness variation of more than 3:1 (maximum to minimum) across any lot.

Miscellaneous

Other type of remedial earthwork, such as stabilization fill, buttresses, etc. are not anticipated at this time, but may not be entirely precluded, as conditions are exposed in the field during grading.

EMBANKMENT FACTORS

Excavation into onsite earth materials, such as existing fills, colluvium, alluvium, and older alluvium, will generally generate mixtures of silty sand, sand and gravelly sand, with minor amounts of clayey sand, and produce good to fair quality fill material. Excavations within the underlying granitic bedrock will generally produce good quality material near the surface, with poor quality fill material consisting of angular gravel to cobble to boulder size rock fragments becoming more abundant with depth of excavation.

Embankment factors (shrinkage/bulking) for the site have been estimated based upon our experience with other sites in the general vicinity, as well as data obtained from ongoing site exploration. It is apparent that shrinkage would vary with depth and with areal extent over the site. The refraction data indicates variability between depths of about 4 feet to 20 feet b.e.g., in addition to other variables, including vegetation, weed control, discing, and previous filling or exporting, etc. All these factors are difficult to define in a three-dimensional fashion, and the contractors compactive efforts may also contribute some variance. Therefore, the information presented below represents average shrinkage and bulking values, using the following assumptions.

Colluvium	10-15% Shrinkage
Alluvium	10-15% Shrinkage
Older Alluvium	2-5% Shrinkage
Existing Fill	2-5% Shrinkage
Bedrock (from Church, 1981)	
25% Rock/75% Earth (about 2½ to 4 feet b.e.g.)	8% Shrinkage
50% Rock/50% Earth (about 4 to 18 feet b.e.g.)	5% Shrinkage
75% Rock/25% Earth (about 18 to 30 feet b.e.g.)	12% Bulk
100% Rock (> ±30 feet b.e.g.)	12-33% Bulk

Please note that the depths assigned to the various bedrock zones are measured below existing grades (b.e.g.). We emphasize that the seismic refraction data obtained does not indicate the actual depth to 100% rock, but infers that it exists below a depth that ranges from about 10 to 38 feet (b.e.g.). Prior to grading and finalization of grading plans, additional rock hardness evaluation with an air track rig should be considered in this regard.

PLAN REVIEW

Final project plans (grading, precise grading, foundation, retaining wall, landscaping, etc.), should be reviewed by this office prior to construction, so that construction is in accordance with the conclusions and recommendations of this report. Based on our review, supplemental recommendations and/or further geotechnical studies may be warranted.

LIMITATIONS

The materials encountered on the project site and utilized for our analysis are believed representative of the area; however, soil and bedrock materials vary in character between excavations and natural outcrops or conditions exposed during mass grading. Site conditions may vary due to seasonal changes or other factors.

Inasmuch as our study is based upon our review and engineering analyses and laboratory data, the conclusions and recommendations are professional opinions. These opinions have been derived in accordance with current standards of practice, and no warranty, either express or implied, is given. Standards of practice are subject to change with time. GSI assumes no responsibility or liability for work or testing performed by others, or their inaction; or work performed when GSI is not requested to be onsite, to evaluate if our recommendations have been properly implemented. Use of this report constitutes an agreement and consent by the user to all the limitations outlined above, notwithstanding any other agreements that may be in place. In addition, this report may be subject to review by the controlling authorities. Thus, this report brings to completion our scope of services for this portion of the project. All samples will be disposed of after 30 days, unless specifically requested by the Client, in writing.

The opportunity to be of service is sincerely appreciated. If you should have any questions, please do not hesitate to contact our office.

Respectfully submitted,

GeoSoils, Inc.

Robert G. Crisman
Engineering Geologist, CEG 1934

John P. Franklin
Engineering Geologist, CEG 1340

David W. Skelly
Civil Engineer, RCE 47857

RGC/DWS/JPF/jh

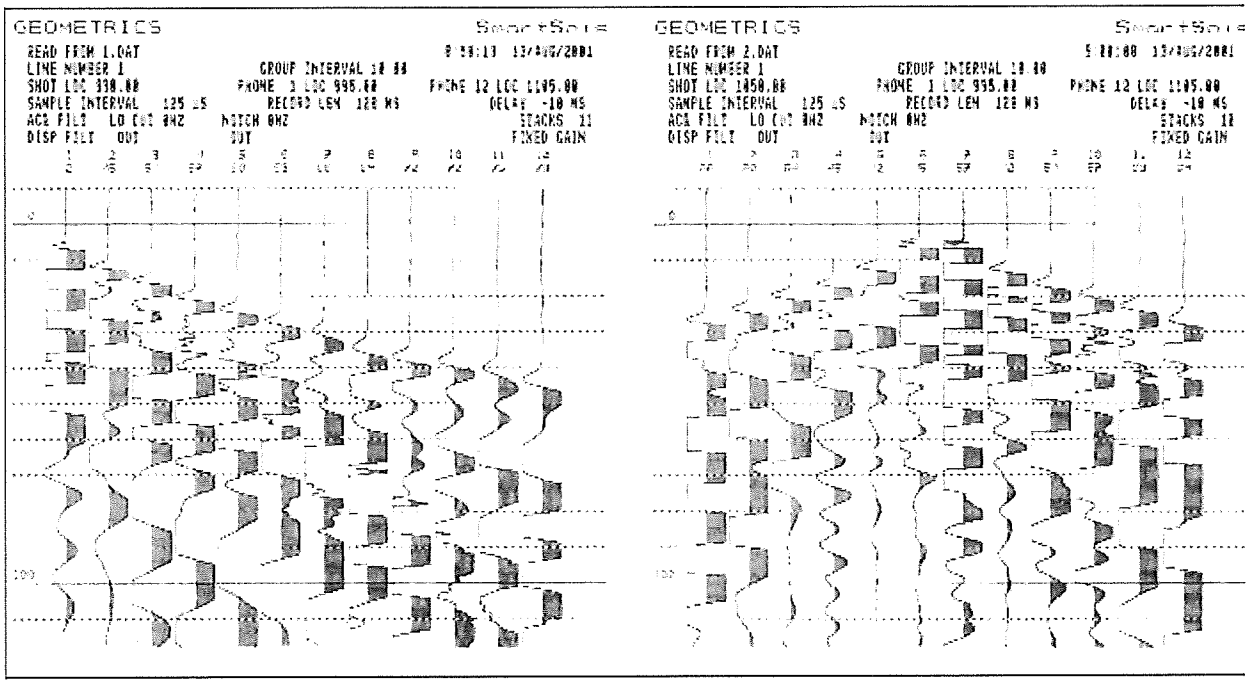
Attachments: Appendix - Seismic Refraction Data
Plate 1 - Geotechnical Map - Remedial Removal Exhibit

Distribution: (1) Addressee (electronic copy)
(1) Helios Property Solutions, Attn: Mr. Pete Fagrell
(1) Project Design Consultants, Attn: Ms. Debbie Reece

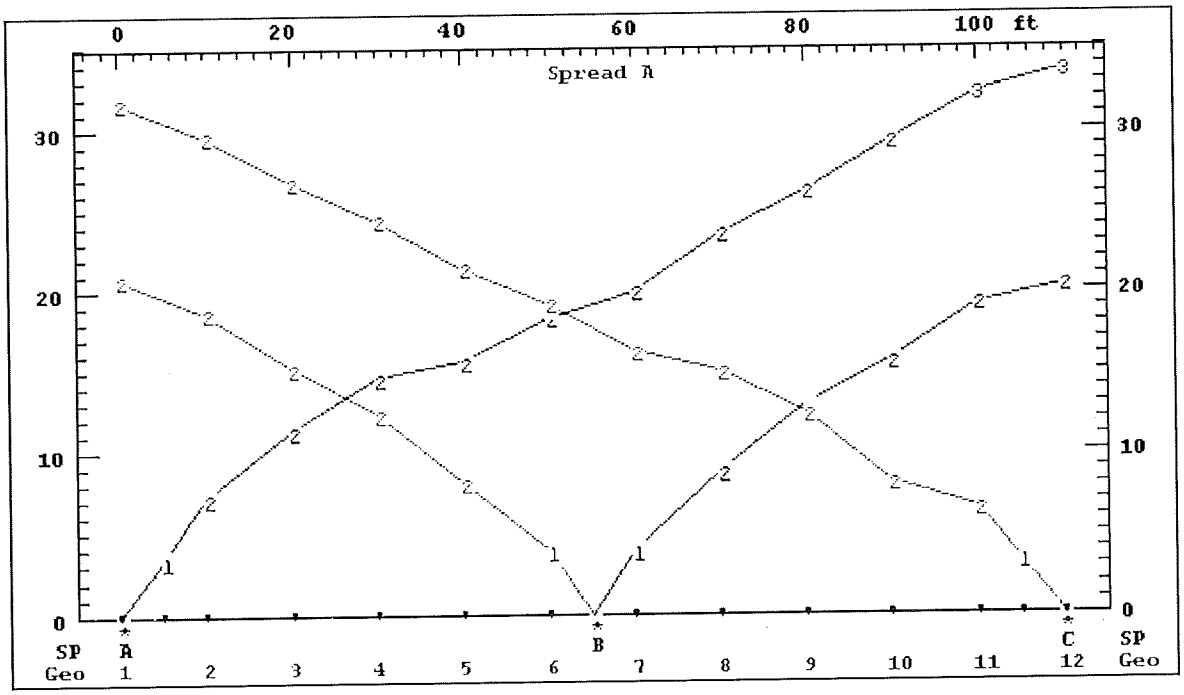
APPENDIX

SEISMIC REFRACTION DATA

Example
Raw Seismic Data



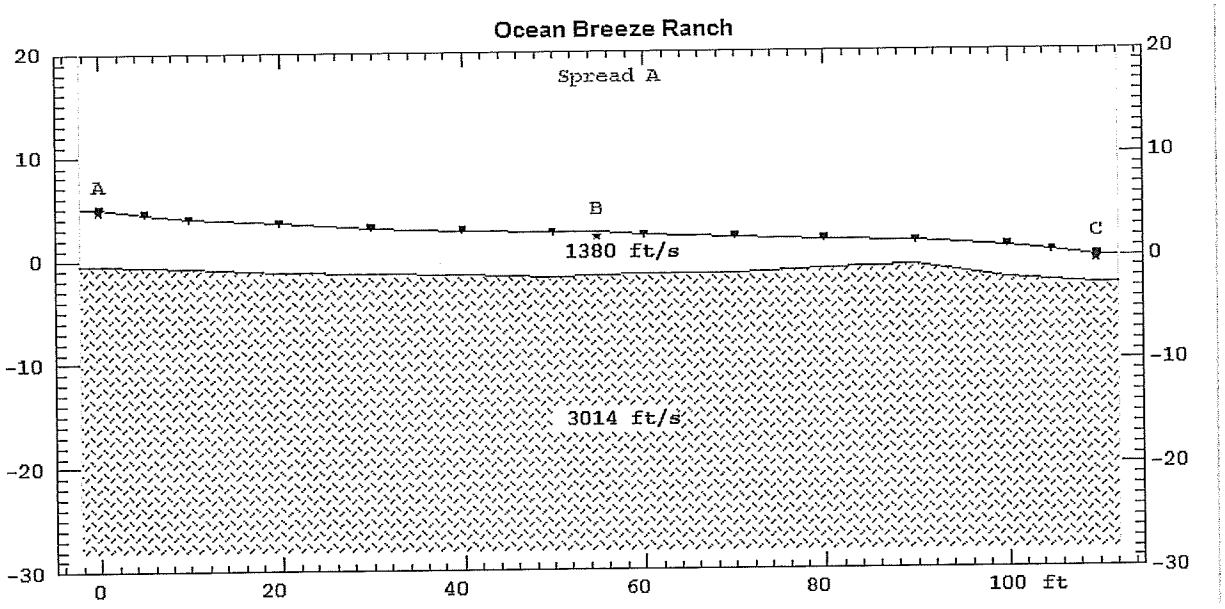
Example
Seismic Line



Ocean Breeze Ranch
Bonsall, California

W.O. 6960-A-SC
Plate A-2

Seismic Line
ST-101



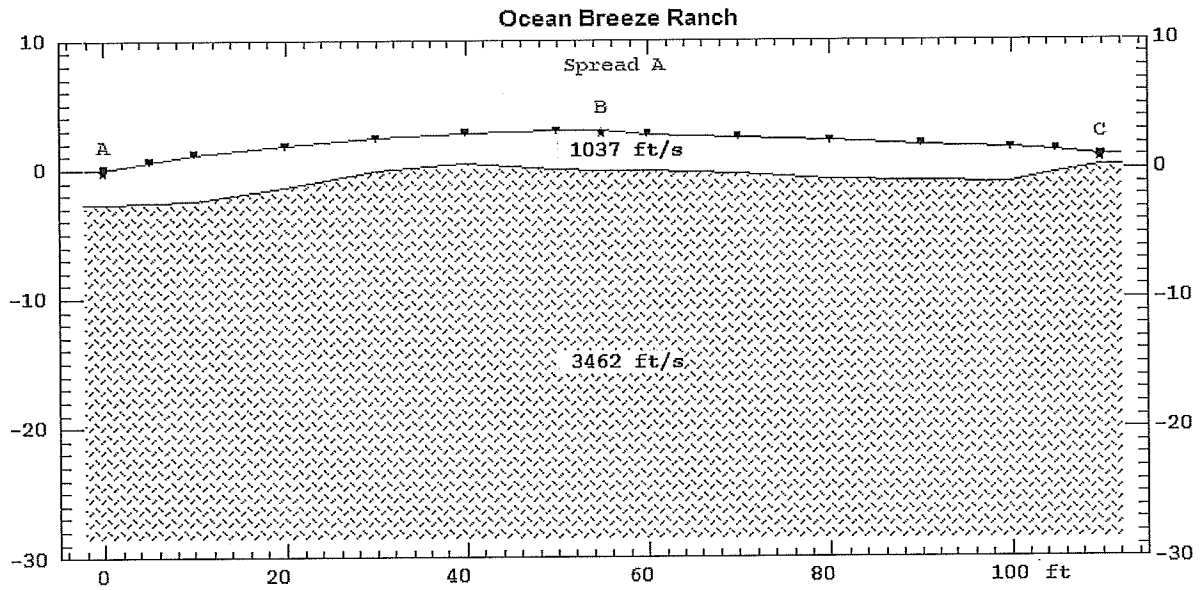
South

North

Ocean Breeze Ranch
Bonsall, California

W.O. 6960-A-SC
Plate A-3

Seismic Line
ST-102



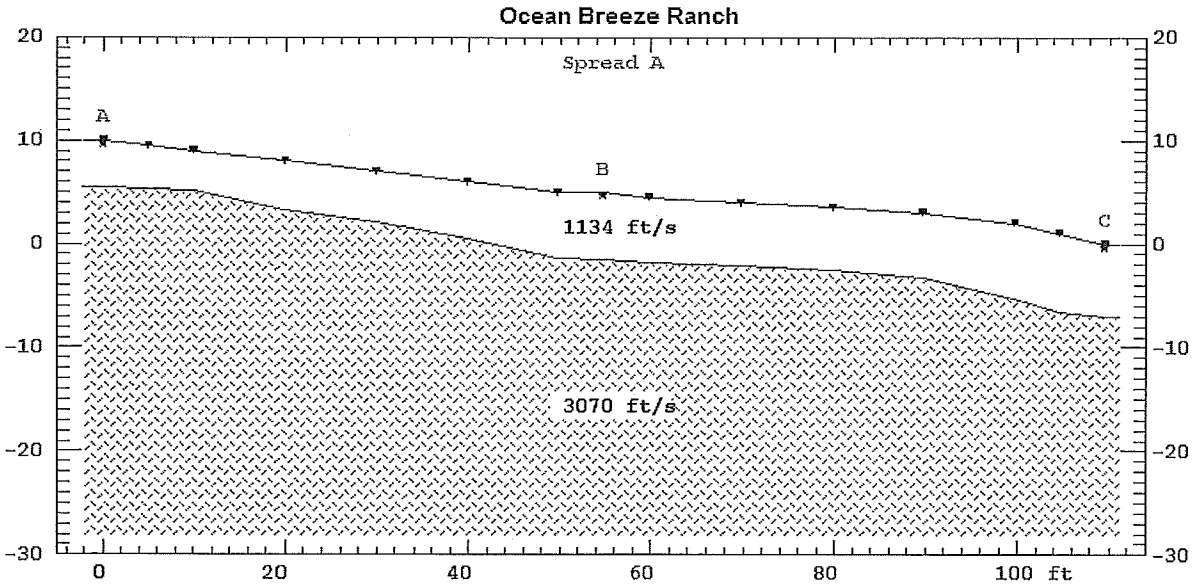
North

South

Ocean Breeze Ranch
Bonsall, California

W.O. 6960-A-SC
Plate A-4

Seismic Line
ST-103



East West

Ocean Breeze Ranch
Bonsall, California

W.O. 6960-A-SC
Plate A-5

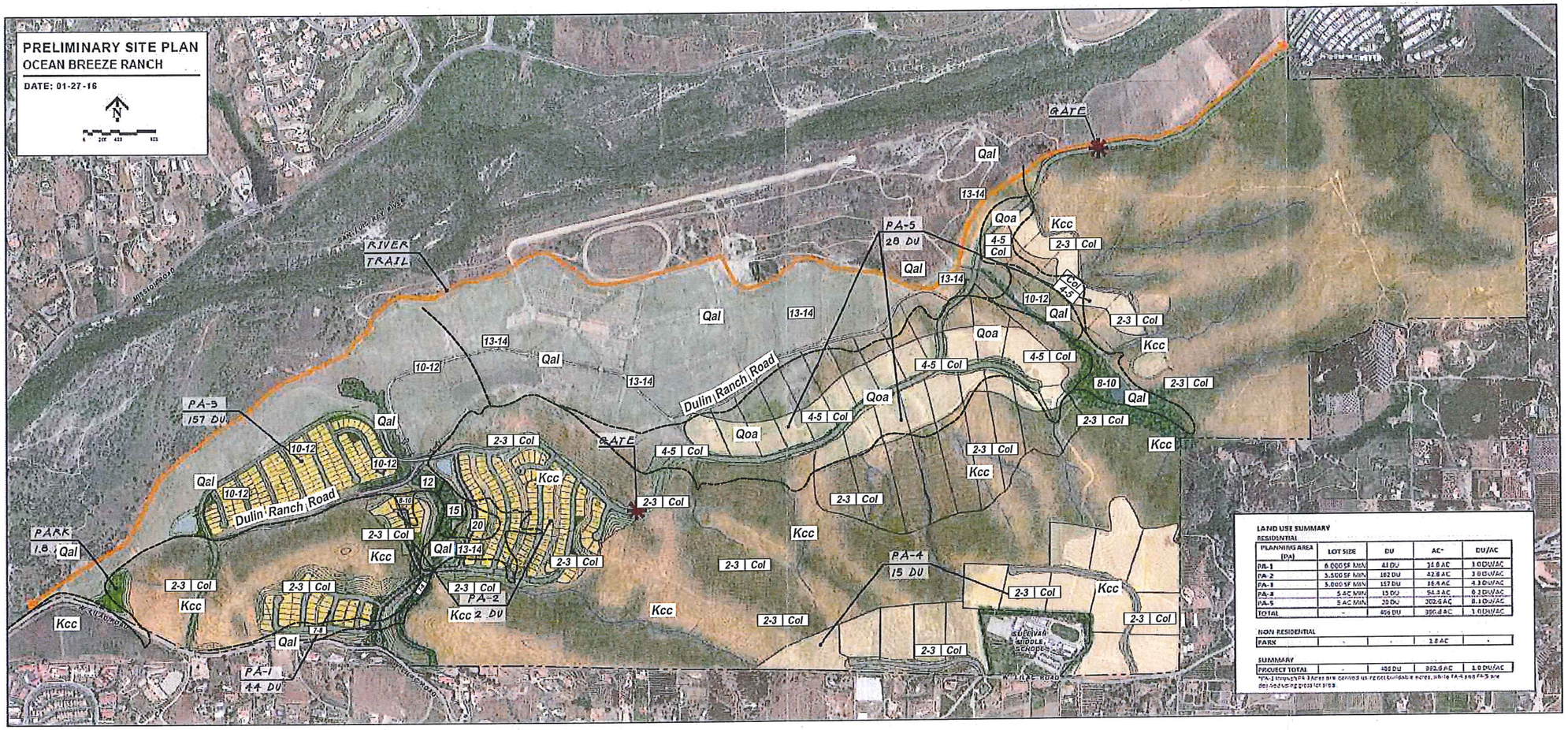


TABLE A

PRELIMINARY SHRINKAGE/BULKING VALUES

COLLUVIUM	10%-15%	SHRINKAGE			
ALLUVIUM	10%-15%	SHRINKAGE			
OLDER ALLUVIUM	2%-5%	SHRINKAGE			
BEDROCK					
25% ROCK/75% EARTH,	8%	SHRINKAGE FROM -3	TO -6	FEET bg	
50% ROCK/50% EARTH,	5%	SHRINKAGE FROM -6	TO -12	FEET bg	
75% ROCK/25% EARTH,	12%	BULK, FROM -12	TO -20	FEET bg	
100% ROCK,	33%	BULK, BELOW	-20	FEET bg	

ALL DEPTHS WILL HAVE VARIABILITY

NOTES

1. REMOVAL DEPTH DATA OBTAINED FROM:

   "GEOTECHNICAL FEASIBILITY EVALUATION, VESSELS STALLION RANCH, BONSALL, SAN DIEGO COUNTY, CALIFORNIA", W.O. #6688-A-SC, DATED: JANUARY 30, 2015, BY GEOSOILS, INC.

2. ANY SHRINKAGE/BULKING ASSOCIATED WITH "CUT" EXCAVATION BELOW THE REMOVAL DEPTH INDICATED AS SHOWN IN TABLE A.

GSI LEGEND

- Col – COLLUVIUM
- Qal – QUATERNARY ALLUVIUM
- Qoa – QUATERNARY OLDER ALLUVIAL FLOOD PLAIN DEPOSITS
- Kcc – CRETACEOUS-AGE GRANITIC BEDROCK (TONALITE OF COUSER CANYON)
- ~~~ – APPROXIMATE BOUNDARY FOR SPECIFIC REMOVAL DEPTH
- 13-14 – APPROXIMATE REMOVAL DEPTH, IN FEET
- 4-5 Col – APPROXIMATE THICKNESS (REMOVAL DEPTH) OF COLLUVIUM OVERLAYING OLDER ALLUVIUM OR BEDROCK

N

GRAPHIC SCALE
400 0 200 400 800 1600
1" = 400'

ALL LOCATIONS ARE APPROXIMATE

This document or effile is not a part of the Construction Documents and should not be relied upon as being an accurate depiction of design.

GeoSoils, Inc.

GEOTECHNICAL MAP
REMEDIAL REMOVALS EXHIBIT
Plate 1

W.O. 6960-A-SC | DATE: 06/16 | SCALE 1" = 400'

SUPPLEMENTAL STORM WATER INFILTRATION RATE EVALUATION
PLANNING AREA 3 OF OCEAN BREEZE RANCH
COMMUNITY OF BONSALL, SAN DIEGO, CALIFORNIA

FOR

OCEAN BREEZE RANCH
5820 WEST LILAC ROAD
BONSALL, CALIFORNIA 92003

W.O. 6960-A6-SC MAY 6, 2019

GeoSoils, Inc.

Geotechnical • Geologic • Coastal • Environmental

5741 Palmer Way • Carlsbad, California 92010 • (760) 438-3155 • FAX (760) 931-0915 • www.geosoilsinc.com

May 6, 2019

W.O. 6960-A6-SC

Ocean Breeze Ranch, LLC
5820 West Lilac Road
Bonsall, California 92003

Attention: Mr. Jim Conrad

Subject: Supplemental Storm Water Infiltration Rate Evaluation, Ocean Breeze Ranch, Bonsall, San Diego County, California

Dear Mr. Conrad:

In accordance with your request and authorization, GeoSoils, Inc. (GSI) has prepared the following supplemental report regarding storm water infiltration within Planning Area PA-3 Project Design Consultants ([PDC], 2019) of the proposed Ocean Breeze Ranch project, located in the Bonsall area of San Diego County, California. GSI's scope of services included a review of the referenced documents (see Appendix A), supplemental infiltration testing, engineering and geologic analysis, and preparation of this report. Unless specifically superceded herein, the conclusions and recommendations presented in the referenced body of work by GSI, remain valid and applicable.

STORM WATER TREATMENT AND HYDROMODIFICATION MANAGEMENT

General Geology

In the Bonsall area during the mid to late Pleistocene (within the Quaternary-age), the granitic rocks belonging to the Peninsular Ranges Batholith have been eroded and alluvial deposits have since filled the lower valleys. Regional mapping by Tan (2007) indicates that the site is primarily underlain by Cretaceous-age granitic rock referred to as the Couser Canyon Tonalite. Pleistocene-age older alluvium (stream terrace deposits), and younger alluvium associated with deposits along the San Luis Rey River, also occurs in the site vicinity (Tan, 2007).

Based on mapping performed by this office, flat-lying ground within Planning Area PA-3 in the vicinity of (primarily north of) Dulin Ranch Road, is underlain by Holocene alluvial sediments. Lower slopes descending to the flood plain, and flatter than about 4:1 (h:v), are developed on deposits of older alluvium (stream terrace deposits). Steeper slopes and upland areas south of Dulin Ranch Road are primarily underlain by granitic bedrock.

Subsurface Exploration

During GSI's site-specific field studies, two separate lots (Lots 395 and 396) were explored with a limited access drill rig. Within each lot, two infiltration test borings (IB-1 and IB-2), with a diameter of 6 inches, were advanced to approximately 5 feet below ground surface, and at the location of the proposed treatment system. The purpose of the borings was to evaluate the site's near-surface soil and geologic conditions, with respect to storm water infiltration.

Groundwater

While groundwater was not encountered in our groundwater borings on Lots 395 and 396, this site has an elevated potential for "perched groundwater." Within alluvial areas north of Planning Area PA 3, regional groundwater is at approximately 178 feet MSL, well below 10 feet from the bottom of the proposed infiltration systems.

USDA Study

A review of the United States Department of Agriculture database (USDA; 1973, 2016) indicates a broad range of infiltration rates, between 0.00 inches per hour, to 19.98 inches per hour for all soil types across the site. Based on the USDA data, the following table provides a summary of representative infiltration rates associated with the three main geologic units on the overall site.

GEOLOGIC UNIT	APPROXIMATE RANGE INFILTRATION RATES (INCHES PER HOUR)	HYDROLOGIC SOIL GROUP (HSG)	COMMENTS
Alluvium	1.98 to 19.98	A, B, D	HSG group D due to potentially shallow groundwater locally
Older Alluvium	0.00 to 0.60	C, D	Contains relatively high clay content within surficial weathered zones
Granitic Bedrock	0.02 to 5.95	C, D	HSG Group D due to shallow depths to rock

It should be noted that the USDA data generally characterizes surficial soil conditions. During the grading/construction process, in areas proposed for improvements, these surficial soils would generally be removed and exported, or recompacted during mass grading, and as such, are not considered entirely representative of "as-built" site conditions, or parent material at greater depths.

Infiltration Feasibility

In accordance with the BMP Design Manual (County, 2019), the infiltration feasibility for this site was evaluated. An evaluation of the soils hydraulic conductivity, or (*K)* was performed in accordance with the Porchet, or inverse auger hole method (Van Hoorm, 1979; USBR, 1984), for the various soil types encountered onsite. Based on the testing performed, corrected (using Porchet method) *K* values ranging from ±0.015 to 0.017 inches per hour for Lot 395, and ±0.03 to 0.43 inches per hour for Lot 396, were evaluated and are summarized in the following table with respect to the corresponding infiltration basins. Infiltration basin locations are shown on Plate 1, which used the Leach Field and Basin Infiltration Test Request plan, prepared by PDC (2019), as a base map.

INFILTRATION TEST HOLE	INITIAL FIELD PERCOLATION RATE (min/in)	CORRECTED INFILTRATION RATE (inches per hour)	INFILTRATION MEDIUM	SOIL UNIT PER USDA (1973)	HYDROLOGIC SOIL GROUP (HSG)
395, IB-1	184	0.017	Clayey Sand	Placentia sandy loam	C
395, IB-2	184	0.015	Clayey Sand	Placentia sandy loam	C
396, IB-1	10.22	0.43	Silty Sand	Fallbrook sandy loam	C
396, IB-2	96	0.03	Silty/Clayey Sand	Placentia sandy loam	C

Differences noted between the USDA data, and this evaluation are likely due to testing being performed on soils generally deeper in the soil profile than characterized in the USDA study. For instance, older alluvium contains relatively more clay in the near surface, than at depth. As such, the zones evaluated result in slightly higher rates than USDA data. Conversely, testing in granitic areas indicates infiltration rates relatively lower than USDA data, as testing was not performed within the near surface soil horizon and is due to decreased permeability with depth within granitic rock.

A combined safety factor (or factor of safety [FOS]) S_A x S_B equal to 2.0 (minimum) per Table D.2-3 (County, 2019), was evaluated, and is also included herein (see Appendix B). An additional discussion of infiltration feasibility is presented in Appendix B (Table D.2-1, also provided by the County [2019]).

The average calculated corrected infiltration rate for lot 395 is ±0.016 inches/hr, while that rate for Lot 396 is ±0.23 inches/hr. Using a minimum "combined safety factor" of 2.0 per Table D.2-3 (County, 2019), a "design infiltration rate" of 0.008 and 0.115 inches/hr are evaluated for Lots 395 and 396, respectively. These are less than the lower limit of infiltration recommended by the USEPA (0.52 inches/hr [see Clar, et al., 2004]), and less

than that currently allowed by the County (>0.50 inches/hr. [see County, 2019]), for full infiltration. Proposed fill, and/or moisture-sensitive improvements, such as pavements, and utility trench backfill, foundations, retaining walls, and below grade building walls, would likely be adversely affected by excessive soil moisture, including offsite improvements, causing settlement and distress. Bio-basins can adversely affect the performance of the onsite and offsite structures, foundation systems by: 1) increasing soil moisture transmission rates through concrete flooring; 2) reducing the stability of slopes; and 3) increase the potential for a loss in bearing strength of soil. Onsite mitigative grading of compressible near-surface soils for the support of structures generally involves removal and recompaction. This is anticipated to create the potential for permeability contrast, and the potential for the development of a shallow "perched" and mounded water table, which can reasonably be anticipated to migrate laterally, beneath the structure(s), or offsite onto adjacent property, causing settlement and associated distress. Based on testing, "partial infiltration" may be considered potentially feasible for Lots 395 and 396. It should also be noted that infiltrating into site soils within 10 feet of any settlement-sensitive structure/improvement is considered poor engineering judgement.

Onsite Infiltration-Runoff Retention Systems

General design criteria regarding the use of onsite infiltration-runoff retention systems (OIRRS) are presented below.

Should onsite infiltration-runoff retention systems (OIRRS) be planned for Best Management Practices (BMPs) or Low Impact Development (LID) principles for the project, some guidelines should be followed in the planning, design, and construction of such systems. Such facilities, if improperly designed or implemented without consideration of the geotechnical aspects of site conditions, can contribute to flooding, saturation of bearing materials beneath site improvements, slope instability, and possible concentration and contribution of pollutants into the groundwater or storm drain and/or utility trench systems.

A key factor in these systems is the infiltration rate (sometimes referred to as the percolation rate) which can be ascribed to, or determined for, the earth materials within which these systems are installed. Additionally, the infiltration rate of the designed system (which may include gravel, sand, mulch/topsoil, or other amendments, etc.) will need to be considered. The project infiltration testing is very site specific, any changes to the location of the proposed OIRRS and/or estimated size of the OIRRS, may require additional infiltration testing. Locally, relatively impermeable formations include the underlying formational (granitic) bedrock, which is anticipated to have a relatively very low vertical infiltration rate.

The following geotechnical guidelines should be considered when designing onsite infiltration-runoff retention systems:

- It is not good engineering practice to allow water to saturate soils, especially near slopes or improvements; however, the controlling agency/authority is now requiring this for OIRRS purposes on many projects.

- Wherever possible, infiltration systems should not be installed within ±50 feet of the tops of slopes steeper than 15 percent or within H/3 from the tops of slopes (where H equals the height of slope).

- Wherever possible, infiltrations systems should not be placed within a distance of H/2 from the toes of slopes (where H equals the height of slope).

- Wherever possible, infiltration systems should not be installed within 10 feet of a residential structure or settlement-sensitive improvement.

- The landscape architect should be notified of the location of the proposed OIRRS. If landscaping is proposed within the OIRRS, consideration should be given to the type of vegetation chosen and their potential effect upon subsurface improvements (i.e., some trees/shrubs will have an effect on subsurface improvements with their extensive root systems). Over-watering landscape areas above, or adjacent to, the proposed OIRRS could adversely affect performance of the system. Soil chemical amendment could alter soil chemistry, which may affect soil corrosion and permeability.

- Areas adjacent to, or within, the OIRRS that are subject to inundation should be properly protected against scouring, undermining, and erosion, in accordance with the recommendations of the design engineer.

- If subsurface infiltration galleries/chambers are proposed, the appropriate size, depth interval, and ultimate placement of the detention/infiltration system should be evaluated by the design engineer, and be of sufficient width/depth to achieve optimum performance, based on the infiltration rates provided. In addition, proper debris filter systems will need to be utilized for the infiltration galleries/chambers. Debris filter systems will need to be self cleaning and periodically and regularly maintained on a regular basis. Provisions for the regular and periodic maintenance of any debris filter system is recommended and this condition should be disclosed to all interested/affected parties.

- Where infiltration systems are located within setback areas noted above, impermeable liners and subdrains should be used along the bottom of bioretention swales/basins located within the influence of slopes and structures. Impermeable liners used in conjunction with bioretention basins should consist of a 30-mil polyvinyl chloride (PVC) membrane that is covered by a minimum of 12 inches of clean soil, free from rocks and debris, with a maximum 4:1 (h:v) slope inclination, or flatter, and meets the following minimum specifications:

Specific Gravity (ASTM D792): 1.2 (g/cc, min.); Tensile (ASTM D882): 73 (lb/in-width, min); Elongation at Break (ASTM D882): 380 (%, min); Modulus (ASTM D882): 32 (lb/in-width, min.); and Tear Strength (ASTM D1004): 8 (lb/in, min); Seam Shear Strength (ASTM D882) 58.4 (lb/in, min); Seam Peel Strength (ASTM D882) 15 (lb/in, min).

- Subdrains should consist of at least 4-inch diameter Schedule 40 or SDR 35 drain pipe with perforations oriented down. The drain pipe should be sleeved with a filter sock.

- Utilities or storm drains ingressing or egressing from an OIRRs, should have the backfill slurried with a two-sack mix, to mitigate piping, the resultant creation of voids, and subsequent settlement and distress.

Final project plans (grading, precise grading, foundation, retaining wall, landscaping, etc.), should be reviewed by this office prior to construction, so that construction is in accordance with the conclusions and recommendations of this report. Based on our review, supplemental recommendations and/or further geotechnical studies may be warranted. It should be noted that structural and landscape plans were not available for review at this time.

LIMITATIONS

The conclusions and recommendations presented herein are professional opinions. These opinions have been derived in accordance with current standards of practice, and no warranty is express or implied. Standards of practice are subject to change with time. GSI assumes no responsibility or liability for work or testing performed by others, or their inaction; or work performed when GSI is not requested to be onsite, to evaluate if our recommendations have been properly implemented. Use of this report constitutes an agreement and consent by the user to all the limitations outlined above, notwithstanding any other agreements that may be in place. In addition, this report may be subject to review by the controlling authorities. Thus, this report brings to completion our scope of services for this portion of the project.

The opportunity to be of service is sincerely appreciated. If you should have any questions, please do not hesitate to contact our office.

Respectfully submitted,

GeoSoils, Inc.

John P. Franklin
Engineering Geologist, CEG 1340

David W. Skelly
Civil Engineer, RCE 47857

MJS/DWS/JPF/jh

Attachments: Appendix A - References
Appendix B - Infiltration Tables D.1-1, D.2-1, and D.2-3
Appendix C - Infiltration Test Data and Groundwater Borings GW-1 and GW-11
Plate 1 - Infiltration Test Location Map

Distribution: (2) Addressee

APPENDIX A

REFERENCES

APPENDIX A

REFERENCES

Clar, M.L., Bartfield, B.J., O'Conner, T.P., 2004, Stormwater best management practice design guide, volume 3, basin best management practices, US EPA/600/R-04/121B, dated September.

County of San Diego, 2019, BMP design manual for permanent site design, storm water treatment and hydromodification management, storm water requirements for development applications, with appendices, effective January 1.

GeoSoils, Inc., 2018, Review of Storm Water Treatment, Ocean Breeze Ranch, Bonsall, California, W.O. 6960-A5-SC, revised December 12.

_____, 2016a, Geotechnical evaluation for Ocean Breeze Ranch, Bonsall, San Diego County, California, W.O. 6960-A-SC, dated October 6.

_____, 2016b, Geotechnical discussion of rock hardness, remedial earthwork, and earthwork balance factors, Ocean Breeze Ranch Planning Areas, PA-1, PA-2, and PA-3, Bonsall, San Diego County, California, W.O. 6960-A-SC, dated June 16.

_____, 2015, Geotechnical feasibility evaluation, Vessels Stallion Ranch, Bonsall, San Diego County, California, W.O. 6688-A-SC, dated January 30.

Project Design Consultants, 2019, Ocean Breeze Ranch PA-3 Leach Field and Basin Infiltration Test Request, 100-scale plan, dated April 1.

_____, 2018a, County of San Diego Tract 5615, Planned Development Major Use Permit, PDS 2016-MUR-16-012, Preliminary grading, Ocean Breeze Ranch, 100-scale, sheets 1-17, dated December

San Diego County, 2016, County of San Diego BMP design manual, for permanent site design, storm water treatment and hydromodification management, storm water requirements for development applications, dated February 16.

Sowers and Sowers, 1979, Unified soil classification system (After U. S. Waterways Experiment Station and ASTM 02487-667) in Introductory Soil Mechanics, New York.

Tan, S.S., 2007, Geologic Map of the Bonsall 7.5' quadrangle San Diego County, California: a digital database, Version 1.0, 1:24,000 scale, Southern California Areal Mapping Project, California Division of Mines and Geology

United States Department of the Interior, Bureau of Reclamation, 1984, Drainage manual, a water resources technical publication, second printing, Denver, U.S. Department of the Interior, Bureau of Reclamation, 286 pp.

United States Department of Agriculture, National Resources Conservation Service, 2016, Custom soils report for San Diego County area, Ocean Breeze Ranch, Bonsall, dated August.

United States Department of Agriculture, 1973, Soil survey, San Diego area, California, Part I and Part II.

Van Hoorm, J.W., 1979, Determining hydraulic conductivity with the inversed auger hole and infiltrometer methods.

APPENDIX B

INFILTRATION TABLES D.1-1, D.2-1, AND D.2-3

Table D.1-1: Considerations for Geotechnical Analysis of Infiltration Restrictions

Restriction Element (Lot 395)		Is Element Applicable? (Yes/No)
Mandatory Considerations	BMP is within 100' of Contaminated Soils	No
	BMP is within 100' of Industrial Activities Lacking Source Control	No
	BMP is within 100' of Well/Groundwater Basin	No
	BMP is within 50' of Septic Tanks/Leach Fields	No
	BMP is within 10' of Structures/Tanks/Walls	No
	BMP is within 10' of Sewer Utilities	No
	BMP is within 10' of Groundwater Table	No
	BMP is within Hydric Soils	No
	BMP is within Highly Liquefiable Soils and has Connectivity to Structures	No
	BMP is within 1.5 Times the Height of Adjacent Steep Slopes (=25%)	No
	County Staff has Assigned "Restricted" Infiltration Category	No
Optional Considerations	BMP is within Predominantly Type D Soil	No
	BMP is within 10' of Property Line	No
	BMP is within Fill Depths of =5' (Existing or Proposed)	No
	BMP is within 10' of Underground Utilities	No
	BMP is within 250' of Ephemeral Stream	No
	Other (Provide detailed geotechnical support)	
Result	Based on examination of the best available information, I have **not identified any restrictions** above.	☒ Unrestricted
	Based on examination of the best available information, I have **identified one or more restrictions** above.	☐ Restricted

W.O. 6960-A6-SC
PLATE B-1

Table D.2-1: Elements for Determination of Design Infiltration Rates (Lot 395)

Item	Value	Unit
Initial Percolation Rate Identify per Section D.2.1	184	min./in.
Corrected Infiltration Rate Identify per Section D.2.2	0.016	in/hr
Safety Factor Identify per Section D.2.3	2.00	unitless
Design Infiltration Rate Corrected Infiltration Rate ÷ Safety Factor	0.008	in/hr

W.O. 6960-A6-SC
PLATE B-2

Table D.2-3: Determination of Safety Factor

Consideration (Lot 395)		Assigned Weight (w)	Favor Value (v)	Product (p) p = w x v
Suitability Assessment (A)	Infiltration Testing Method	0.25	Refer to Table D.2-4	0.50
	Soil Texture Class	0.25		0.50
	Soil Variability	0.25		0.50
	Depth to Groundwater/Obstruction	0.25		0.25
	Suitability Assessment Safety Factor, $S_A = \Sigma p$			1.75
Design (B)	Pretreatment	0.50	Refer to Table D.2-4i	
	Resiliency	0.25		
	Compaction	0.25		
	Design Safety Factor, $SB = \Sigma pi$			
	Safety Factor, $S = S_A \times S_B$ (Must be always greater than or equal to 2)			2

*Design Criteria has been left blank due to the fact that design plans for an infiltration basin have not been created yet.

W.O. 6960-A6-SC
PLATE B-3

Table D.1-1: Considerations for Geotechnical Analysis of Infiltration Restrictions

Restriction Element (Lot 396)		Is Element Applicable? (Yes/No)
Mandatory Considerations	BMP is within 100' of Contaminated Soils	No
	BMP is within 100' of Industrial Activities Lacking Source Control	No
	BMP is within 100' of Well/Groundwater Basin	No
	BMP is within 50' of Septic Tanks/Leach Fields	No
	BMP is within 10' of Structures/Tanks/Walls	No
	BMP is within 10' of Sewer Utilities	No
	BMP is within 10' of Groundwater Table	No
	BMP is within Hydric Soils	No
	BMP is within Highly Liquefiable Soils and has Connectivity to Structures	No
	BMP is within 1.5 Times the Height of Adjacent Steep Slopes (=25%)	No
	County Staff has Assigned "Restricted" Infiltration Category	No
Optional Considerations	BMP is within Predominantly Type D Soil	No
	BMP is within 10' of Property Line	No
	BMP is within Fill Depths of =5' (Existing or Proposed)	No
	BMP is within 10' of Underground Utilities	No
	BMP is within 250' of Ephemeral Stream	No
	Other (Provide detailed geotechnical support)	
Result	Based on examination of the best available information, I have **not identified any restrictions** above.	☒ Unrestricted
	Based on examination of the best available information, I have **identified one or more restrictions** above.	☐ Restricted

W.O. 6960-A6-SC
PLATE B-4

Table D.2-1: Elements for Determination of Design Infiltration Rates (Lot 396)

Item	Value	Unit
Initial Percolation Rate Identify per Section D.2.1	53.11	min./in.
Corrected Infiltration Rate Identify per Section D.2.2	0.23	in/hr
Safety Factor Identify per Section D.2.3	2.00	unitless
Design Infiltration Rate Corrected Infiltration Rate ÷ Safety Factor	0.115	in/hr

W.O. 6960-A6-SC
PLATE B-5

Table D.2-3: Determination of Safety Factor

Consideration (Lot 396)		Assigned Weight (w)	Favor Value (v)	Product (p) p = w x v
Suitability Assessment (A)	Infiltration Testing Method	0.25	Refer to Table D.2-4	0.50
	Soil Texture Class	0.25		0.50
	Soil Variability	0.25		0.50
	Depth to Groundwater/Obstruction	0.25		0.25
	Suitability Assessment Safety Factor, $S_A = \Sigma p$			1.75
Design (B)	Pretreatment	0.50	Refer to Table D.2-4i	
	Resiliency	0.25		
	Compaction	0.25		
	Design Safety Factor, $SB = \Sigma pi$			
Safety Factor, $S = S_A \times S_B$ (Must be always greater than or equal to 2)				2

*Design Criteria has been left blank due to the fact that design plans for an infiltration basin have not been created yet.

W.O. 6960-A6-SC
PLATE B-6

APPENDIX C

INFILTRATION TEST DATA AND GROUNDWATER BORINGS GW-1 AND GW-11

GeoSoils, Inc.

Geotechnical • Geologic • Environmental

5741 Palmer Way • Carlsbad, California 92008 • (760)438-3155 • FAX(760)931-0915

INVERSED AUGER HOLE (PORCHET) METHOD - DATA SHEET

PROJECT: OBR

DATE: 4/16/19

CLIENT:

WORK ORDER: 6960-A6

HOLE NUMBER: 395 IB-1

BORING LOG/SOIL DESCRIPTION

DEPTH (D') OF TEST HOLE (in) 59"

HOLE DIAMETER (in) 6"

INITIAL WATER LEVEL (in) 29.00"

½(3) = 1.5

Time	Δt (min.)	t (total min.)	Ho/Ht (in)	ho/ht (in)	ht + ½ r	K
11:27	—	—	29.00"	30.00"	31.50	—
12:14	47	47	30.50	28.50	30.00	0.093
1:27	73	120	31.00	28.00	29.50	0.021
2:13	46	166	31.25	27.75	29.25	0.017
3:19	66	232	31.25	27.75	29.25	0
4:22	63	295	31.50	27.50	29.00	0.007

$K = 1.15\ r \tan \alpha$ (x60 for units in inches per hour)

where $\tan \alpha = [\log (h_0 + ½\ r) - \log (h_t + ½\ r)] / t\text{-}t_0$

W.O. 6960-A6-SC
PLATE C-1

K =

GeoSoils, Inc.

Geotechnical • Geologic • Environmental

5741 Palmer Way • Carlsbad, California 92008 • (760)438-3155 • FAX(760)931-0915

INVERSED AUGER HOLE (PORCHET) METHOD - DATA SHEET

PROJECT: OBR

DATE: 4/16/19

CLIENT:

WORK ORDER: 6960-A6

HOLE NUMBER: 395-IB2

BORING LOG/SOIL DESCRIPTION

DEPTH (D') OF TEST HOLE (in) 65.5"

HOLE DIAMETER (in) 6"

INITIAL WATER LEVEL (in) 32.75"

+1.5

Time	Δt (min.)	t (total min.)	Ho/Ht (in)	ho/ht (in)	ht + ½ r	K
11:38	—	—	32.75"	32.75	34.25	—
12:16	38	38	33.00	32.50	34.00	0.017
1:29	73	111	33.25	32.25	33.75	0.009
2:15	46	157	33.50	32.00	33.50	0.015
3:20	65	222	33.50	32.00	33.50	0
4:24	64	286	33.50	32.00	33.50	0

$K = 1.15\ r \tan \alpha$ (x60 for units in inches per hour)

where $\tan \alpha = [\log (h_0 + \frac{1}{2} r) - \log (h_t + \frac{1}{2} r)] / t\text{-}t_0$

W.O. 6960-A6-SC
PLATE C-2

K =

GeoSoils, Inc.

Geotechnical • Geologic • Environmental

5741 Palmer Way • Carlsbad, California 92008 • (760)438-3155 • FAX(760)931-0915

INVERSED AUGER HOLE (PORCHET) METHOD - DATA SHEET

PROJECT: OBR

DATE: 4/24/19

CLIENT:

WORK ORDER: 6960-A6

HOLE NUMBER: 396 IB-1

BORING LOG/SOIL DESCRIPTION

DEPTH (D') OF TEST HOLE (in) 56.00"

HOLE DIAMETER (in) 6"

INITIAL WATER LEVEL (in) 21.75"

Time	Δt (min.)	t (total min.)	Ho/Ht (in)	ho/ht (in)	ht + ½ r	K
10:32	–	–	21.75"	34.25	35.75	–
11:28	56		33.75"	22.25	23.75	0.66
1:33	65		40.50"	15.50	17.00	0.46
1:47	–	–	25.50"	30.50	32.00	–
2:19	32		30.00"	26.00	27.50	0.43

$K = 1.15\ r \tan \alpha$ (x60 for units in inches per hour)

where $\tan \alpha = [\log (h_0 + ½\ r) - \log (h_t + ½\ r)] / t\text{-}t_0$

W.O. 6960-A6-SC
PLATE C-3

K =

GeoSoils, Inc.

Geotechnical • Geologic • Environmental

5741 Palmer Way • Carlsbad, California 92008 • (760)438-3155 • FAX(760)931-0915

INVERSED AUGER HOLE (PORCHET) METHOD - DATA SHEET

PROJECT: OBR

DATE: 4/24/19

CLIENT:

WORK ORDER: 6960-A6

HOLE NUMBER: 396- IB-2

BORING LOG/SOIL DESCRIPTION

DEPTH (D') OF TEST HOLE (in) 60.50"

HOLE DIAMETER (in) 6"

INITIAL WATER LEVEL (in) 23.75"

Time	Δt (min.)	t (total min.)	Ho/Ht (in)	ho/ht (in)	ht + ½ r	K
10:35	—	—	23.75"	36.75	38.25	—
11:26	51	51	26.50	34.00	35.50	0.13
1:32	66	117	29.50	31.00	32.50	0.12
2:20	48	165	30.00	30.50	32.00	0.03

$K = 1.15\ r \tan \alpha$ (x60 for units in inches per hour)

where $\tan \alpha = [\log (h_0 + \frac{1}{2} r) - \log (h_t + \frac{1}{2} r)] / t\text{-}t_0$

W.O. 6960-A6-SC
PLATE C-4

K =

GeoSoils, Inc.

BORING LOG

PROJECT: OCEAN BREEZE RANCH
Planning Area 3 of Ocean Breeze Ranch
Including Residences R7and R8, and Barn B9

W.O. 6960-A6-SC BORING GW-1 SHEET 1 OF 1

DATE EXCAVATED 4/16/19 LOGGED BY: MK APPROX. ELEV.: 221' MSL

SAMPLE METHOD: Solid Flight Auger

Depth (ft.)	Sample: Bulk	Sample: Undisturbed	Sample: Blows/Ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Saturation (%)	Material Description
0				SC				@ 0' CLAYEY SAND, reddish brown, dry, loose; trace roots.
5								@ 3' CLAYEY SAND, dark brown, wet, loose to medium dense.
10								@ 6' CLAYEY SAND, brown, wet, dense.
15								Total Depth = 15' No Groundwater/Caving Encountered Backfilled 4-16-2019
20								
25								
30								

▼ *Standard Penetration Test*
⌶ *Undisturbed, Ring Sample*
▽ *Groundwater*
♀ *Seepage*

GeoSoils, Inc.

BORING LOG

PROJECT: OCEAN BREEZE RANCH
Planning Area 3 of Ocean Breeze Ranch
Including Residences R7and R8, and Barn B9

W.O. 6960-A6-SC *BORING* GW-11 *SHEET* 1 *OF* 1

DATE EXCAVATED 4/19/19 *LOGGED BY:* MK *APPROX. ELEV.:* 675'

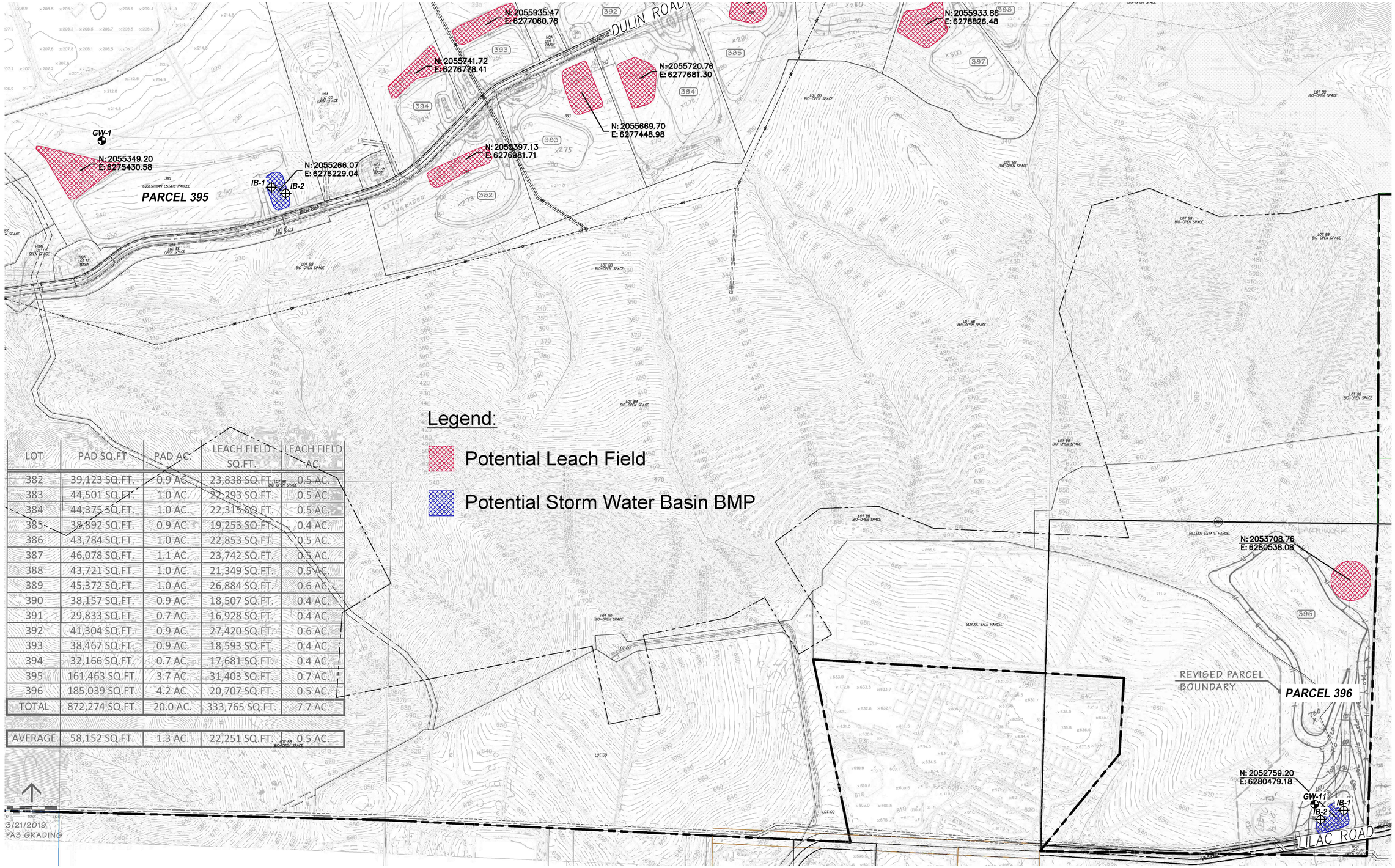
SAMPLE METHOD: Solid Flight Auger

Depth (ft.)	Sample: Bulk	Sample: Undisturbed	Sample: Blows/Ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Saturation (%)	Material Description
0				SC				@ 0' CLAYEY SAND, reddish brown, dry, loose.
				SM				@ 3' SILTY SAND, brown, damp, medium dense.
5								@ 5' SILTY SAND, brown, moist, dense.
								Refusal @ 7½'
								Total Depth = 7½'
								No Groundwater/Caving Encountered
10								Backfilled 4-19-19
15								
20								
25								
30								

▼ *Standard Penetration Test*
⌶ *Undisturbed, Ring Sample*
▽ *Groundwater*
♀ *Seepage*

GeoSoils, Inc.

PLATE C-6



Legend:

- Potential Leach Field
- Potential Storm Water Basin BMP

LOT	PAD SQ.FT.	PAD AC.	LEACH FIELD SQ.FT.	LEACH FIELD AC.
382	39,123 SQ.FT.	0.9 AC.	23,838 SQ.FT.	0.5 AC.
383	44,501 SQ.FT.	1.0 AC.	22,293 SQ.FT.	0.5 AC.
384	44,375 SQ.FT.	1.0 AC.	22,315 SQ.FT.	0.5 AC.
385	38,892 SQ.FT.	0.9 AC.	19,253 SQ.FT.	0.4 AC.
386	43,784 SQ.FT.	1.0 AC.	22,853 SQ.FT.	0.5 AC.
387	46,078 SQ.FT.	1.1 AC.	23,742 SQ.FT.	0.5 AC.
388	43,721 SQ.FT.	1.0 AC.	21,349 SQ.FT.	0.5 AC.
389	45,372 SQ.FT.	1.0 AC.	26,884 SQ.FT.	0.6 AC.
390	38,157 SQ.FT.	0.9 AC.	18,507 SQ.FT.	0.4 AC.
391	29,833 SQ.FT.	0.7 AC.	16,928 SQ.FT.	0.4 AC.
392	41,304 SQ.FT.	0.9 AC.	27,420 SQ.FT.	0.6 AC.
393	38,467 SQ.FT.	0.9 AC.	18,593 SQ.FT.	0.4 AC.
394	32,166 SQ.FT.	0.7 AC.	17,681 SQ.FT.	0.4 AC.
395	161,463 SQ.FT.	3.7 AC.	31,403 SQ.FT.	0.7 AC.
396	185,039 SQ.FT.	4.2 AC.	20,707 SQ.FT.	0.5 AC.
TOTAL	872,274 SQ.FT.	20.0 AC.	333,765 SQ.FT.	7.7 AC.
AVERAGE	58,152 SQ.FT.	1.3 AC.	22,251 SQ.FT.	0.5 AC.

N

GRAPHIC SCALE

200 0 100 200 400 800

1" = 200'

ALL LOCATIONS ARE APPROXIMATE

This document or efile is not a part of the Construction Documents and should not be relied upon as being an accurate depiction of design.

GSI LEGEND

IB-2 — APPROXIMATE LOCATION OF INFILTRATION TEST BORING IN A GIVEN PARCEL AREA

GW-11 — APPROXIMATE LOCATION OF GROUNDWATER TEST BORING IN A GIVEN PARCEL AREA

GeoSoils, Inc.

INFILTRATION TEST LOCATION MAP

Plate 1

W.O. 6960-A6-SC	DATE: 05/19	SCALE: 1" = 200'