PDP SWQMP

PRIORITY DEVELOPMENT PROJECT (PDP)
STORM WATER QUALITY MANAGEMENT PLAN (SWQMP)

Project Name Otay Ranch Town Center

Assessor's Parcel Number(s) 643-061-0500, 0400, 0800,

Permit Application Number TM22-0002

Drawing Numbers TBD

CIVIL ENGINEER NAME: Alisa S. Vialpando **; PE #** 47945

Wet Signature and Stamp

PREPARED FOR:

Applicant Name: Brookfield Properties

Address: 733 Eighth Avenue

San Diego, CA 92101

Telephone # (619) 321-1130

PREPARED BY:

Company Name: Hunsaker & Associates SD, Inc.

Address: 9707 Waples Street

San Diego, CA 92121

Telephone # (858) 558-4500

DATE: 02/09/2023

Approved By: City of Chula Vista Date:
(print Name & Sign)

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Project Name/ Otay Ranch Town Center

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ACRONYMS

APN	Assessor's Parcel Number
BMP	Best Management Practice
HMP	Hydromodification Management Plan
HSG	Hydrologic Soil Group
MS4	Municipal Separate Storm Sewer System
N/A	Not Applicable
NRCS	Natural Resources Conservation Service
PDP	Priority Development Project
PE	Professional Engineer
SC	Source Control
SD	Site Design
SDRWQCB	San Diego Regional Water Quality Control Board
SIC	Standard Industrial Classification
SWQMP	Storm Water Quality Management Plan

Project Name/ Otay Ranch Town Center

Certification Page

Project Name: Otay Ranch Town Center

Permit Application Number: TM22-0002

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 City of Chula Vista BMP Design Manual, which is based on the requirements of the San Diego Regional Water Quality Control Board Order No. R9-2013-0001 as amended by R9-2015-0001 and R9-2015-0100 (MS4 Permit).

I have read and understand that the City Engineer has adopted minimum requirements for managing urban runoff, including storm water, from land development activities, as described in the 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 the City Engineer is confined to a review and does not relieve me, as the Engineer in Responsible Charge of design of storm water BMPs for this project, of my responsibilities for project design.

_____, _____

Engineer of Work's Signature — Date

47945, 12/31/23

PE # — Expiration Date

Alisa S. Vialpando

Print Name

Hunsaker & Associates SD, Inc.

Company

Engineer's Seal

Project Name/ Otay Ranch Town Center

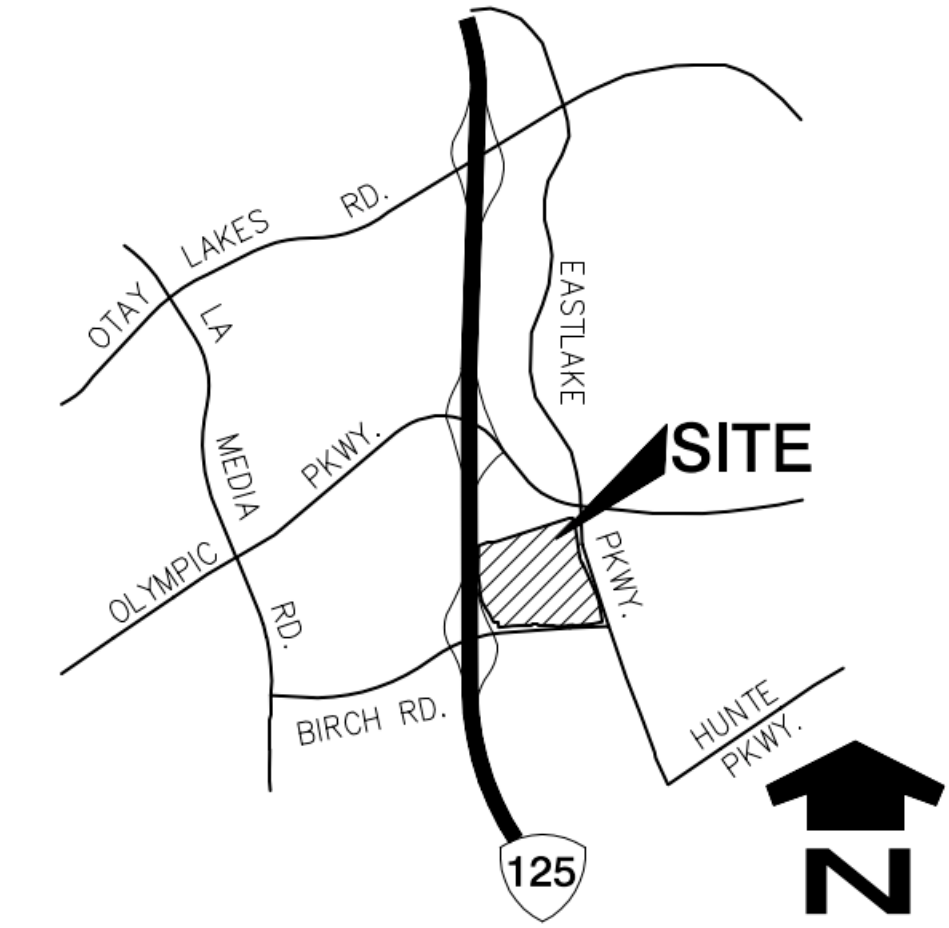
SUBMITTAL RECORD

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.

Submittal Number	Date	Project Status	Summary of Changes
1	01/22/2012	☒ Preliminary Design / Planning/ CEQA ☐ Final Design	Initial Submittal
2	02/27/22	☒ Preliminary Design / Planning/ CEQA ☐ Final Design	Changing the site design
3	07/29/22	☒ Preliminary Design / Planning/ CEQA ☐ Final Design	Second submittal
4	02/10/23	☒ Preliminary Design / Planning/ CEQA ☐ Final Design	Third Submittal

Project Name/ Otay Ranch Town Center

Project Vicinity Map



VICINITY MAP

NOT TO SCALE

Project Name/_____

Insert Completed Intake Form (Storm Water Requirements Applicability Checklist)

https://www.chulavistaca.gov/departments/public-works/services/storm-water-pollution-prevention/documents-and-reports

Storm Water Requirements Applicability Checklist for All Permit Applications

Intake Form

March 2019 Update

Project Information

Project Address: 2015 Birch Rd, Chula Vista, CA 91915	Project Application # TM22-0002
Project Name: Otay Ranch Town Center	APN(s) 643-061-0500, 0400, 0800

Brief Description of Work Proposed: The redevelopment will predominately consist of multi- family residential dwelling units, Plaza with associated streets and utility infrastructure

The project is (select one):

☐ New Development Total Impervious Area _____ ft^2

☑ Redevelopment Total new and/or replaced Impervious Area 443,358 ft^2

(Redevelopment is the creation and/or replacement of impervious surface on an already developed site).

☐ *Others* _____

Name of Person Completing this Form: Alisa Vialpando, PE

Role: ☐ Property Owner ☐ Contractor ☐ Architect ☑ Engineer ☐ Other _____

Email: AVialpando@HunsakerSD.com Phone: (858) 558-4500

Signature: Date Completed: 06-18-2020

Answer each section below, starting with Section 1 and progressing through each section. Additional information for determining the requirements is found in the Chula Vista BMP Design Manual available on the City's website at http://www.chulavistaca.gov/departments/public-works/services/storm-water-pollution-prevention/documents-and-reports.

SECTION 1: Storm Water BMP Requirements

Does the project consist of **one or both** of the following:

- Repair or improvements to an existing building or structure that don't alter the size such as: tenant improvements, interior remodeling, electrical work, fire alarm, fire sprinkler system, HVAC work, Gas, plumbing, etc.
- Routine maintenance activities such as: roof or exterior structure surface replacement; resurfacing existing roadways and parking lots including dig outs, slurry seal, overlay and restriping; repair damaged sidewalks or pedestrian ramps on existing roads without expanding the impervious footprint; routine replacement of damaged pavement, trenching and resurfacing associated with utility work (i.e. sewer, water, gas or electrical laterals, etc.) and pot holing or geotechnical investigation borings.

☐ **Yes**	**Project is <u>NOT</u> Subject to Permanent Storm Water BMP requirements.** **BUT IS** subject to Construction BMP requirements. Review & sign "Construction Storm Water BMP Certification Statement" on page 2.
☑ **No**	**Continue to Section 2, page 3.**

Construction Storm Water BMP Certification Statement

The following stormwater quality protection measures are required by City Chula Vista Municipal Code Chapter 14.20 and the City's Jurisdictional Runoff Management Program.

1. All applicable construction BMPs and non-stormwater discharge BMPs shall be installed and maintained for the duration of the project in accordance with the Appendix K "Construction BMP Standards" of the Chula Vista BMP Design Manual.
2. Erosion control BMPs shall be implemented for all portions of the project area in which no work has been done or is planned to be done over a period of 14 or more days. All onsite drainage pathways that convey concentrated flows shall be stabilized to prevent erosion.
3. Run-on from areas outside the project area shall be diverted around work areas to the extent feasible. Run-on that cannot be diverted shall be managed using appropriate erosion and sediment control BMPs.
4. Sediment control BMPs shall be implemented, including providing fiber rolls, gravel bags, or other equally effective BMPs around the perimeter of the project to prevent transport of soil and sediment offsite. Any sediment tracked onto offsite paved areas shall be removed via sweeping at least daily.
5. Trash and other construction wastes shall be placed in a designated area at least daily and shall be disposed of in accordance with applicable requirements.
6. Materials shall be stored to avoid being transported in storm water runoff and non-storm water discharges. Concrete washout shall be directed to a washout area and shall not be washed out to the ground.
7. Stockpiles and other sources of pollutants shall be covered when the chance of rain within the next 48 hours is at least 50%.

I certify that the stormwater quality protection measures listed above will be implemented at the project described on Intake Form. I understand that failure to implement these measures may result in monetary penalties or other enforcement actions. This certification is signed under penalty of perjury and does not require notarization.

Name: _____ Title: _____

Signature: _____ Date: _____

Section 2: Determine if Project is a Standard Project or Priority Development Project

Is the project in any of the following categories, (a) through (j)?

(a) New development that **creates 10,000 square feet** or more of impervious surfaces (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 project that **creates and/or replaces 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 development or redevelopment projects that **creates and/or replaces a combined total of 5,000 square feet** or more of impervious surface (collectively over the entire project site) and support one or more of the following uses: ☑ **Yes** ☐ **No**

(i) **Restaurant.** This 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 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.

(d) New development or redevelopment project that **creates and/or replaces 2,500 square feet** or more of impervious surface (collectively over the entire project site), 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). ☐ **Yes** ☑ **No**

(e) New development or redevelopment project that creates and/or replaces a combined total of 5,000 square feet or more of impervious surface, that support one or more of the following used: ☐ **Yes** ☑ **No**

(i) Automotive repair shops. This category is defined as a facility that is categorized in any one of the following Standard Industrial Classification (SIC) codes: 5013, 5014, 5541, 7532-7534, or 7536-7539.

(ii) Retail gasoline outlets. This category includes retail gasoline outlets that meet the meet one of 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.

(f) New development or redevelopment that result in the disturbance of **one or more acres** of land and are expected to generate pollutants post construction. This does not include projects creating less than 5,000 sf of impervious surface and where added landscaping does not require regular use of pesticides and fertilizers, such as slope stabilization using native plants. Calculation of the square footage of impervious surface need not include linear pathways that are for infrequent vehicle use, such as emergency maintenance access or bicycle pedestrian use, if they are built with pervious surfaces of if they sheet flow to surrounding pervious surfaces. ☑ **Yes** ☐ **No**

The project is (select one):

☐ If "No" is checked for every category in Section 2, **Project is "Standard Development Project".** Site design and source control BMP requirements apply. **Complete and submit Standard SWQMP** (refer to Chapter 4 & Appendix E of the BMP Design Manual for guidance). Continue to Section 4.

☑ If "Yes" is checked for ANY category in Section 2, **Project is "Priority Development Project (PDP)".** Complete below, if applicable, and continue to Section 3.

Complete for PDP Redevelopment Projects ONLY:

The total existing (pre-project) impervious area at the project site is: 449,534 ft² (A)

The total proposed newly created or replaced impervious area is 472,389 ft² (B)

Percent impervious surface created or replaced (B/A)*100: 105 %

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

☐ less than or equal to fifty percent (50%) – **only new impervious areas are considered a PDP**
OR

☑ greater than fifty percent (50%) – **the entire project site is considered a PDP**

☐ **Continue to Section 3**

Section 3: Determine if project is PDP Exempt

1. Does the project ONLY include new or retrofit sidewalk, bicycle lane or trails that:
   - Are designed and constructed to direct storm water runoff to adjacent vegetated areas, or other non-erodible permeable areas? Or;
   - Are designed and constructed to be hydraulically disconnected from paved streets or roads? Or;
   - Are designed and constructed with permeable pavements or surfaces in accordance with USEPA Green Streets guidance?

   ☐ **Yes. Project is PDP Exempt.**

   Complete and submit **Standard SWQMP** (refer to Chapter 4 of the BMP Design Manual for guidance). **Continue to Section 4.**

   ☑ **No. Next question**

2. Does the project ONLY include retrofitting or redevelopment of existing paved alleys, streets or roads designed and constructed in accordance with the Green Streets standards?

   ☐ **Yes.**
   Project is PDP Exempt.
   Complete and submit Standard SWQMP (refer to Chapter 4 of the BMP Design Manual for guidance). **Continue to Section 4.**

   ☑ **No.**
   Project is PDP.
   Site design, source control and structural pollutant control BMPs apply. Complete and submit PDP SWQMP (refer to Chapters 4, 5 & 6 of the BMP Design Manual for guidance). **Continue to Section 4.**

SECTION 4: Construction Storm Water BMP Requirements:

All construction sites are required to implement construction BMPs in accordance with the performance standards in the BMP Design Manual. Some sites are additionally required to obtain coverage under the State Construction General Permit (CGP), which is administered by the State Water Resource Control Board.

1. Does the project include Building/Grading/Construction permits proposing less than 5,000 square feet of ground disturbance and has less than 5-foot elevation change over the entire project area?

☐ Yes; review & sign Construction Storm Water Certification Statement, skip questions 2-4 ☑ No; next question

2. Does the project propose construction or demolition activity, including but not limited to, clearing grading, grubbing, excavation, or other activity that results in ground disturbance of less than one acre and more than 5,000 square feet?

☐ Yes. complete & submit Construction Storm Water Pollution Control Plan (CSWPCP), skip questions 3-4 ☑ No; next question

3. Does the project results in disturbance of an acre or more of total land area and are considered regular maintenance projects performed to maintain original line and grade, hydraulic capacity, or original purpose of the facility? (Projects such as sewer/storm drain/utility replacement)

☐ Yes. complete & submit Construction Storm Water Pollution Control Plan (CSWPCP), skip question 4 ☑ No; next question

4. Is the project proposing land disturbance greater than or equal to one acre OR the project is part of a larger common plan of development disturbing 1 acre or more?

☑ Yes; Storm Water Pollution Prevention Plan (SWPPP) is required. Refer to online CASQA or Caltrans Template. Visit the SWRCB web site at http://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.shtml.

Note: for Projects that result in disturbance of one to five acres of total land area and can demonstrate that there will be no adverse water quality impacts by applying for a Construction Rainfall Erosivity Waiver, may be allowed to submit a CSWPCP in lieu of a SWPPP.

Project Name/_____

HMP Exemption Exhibit

Attach this Exhibit (if Applicable) that shows direct storm water runoff discharge from the project site to HMP exempt area. Include project area, applicable underground storm drains line and/or concrete lined channels, outfall information and exempt waterbody. Reference applicable drawing number(s). **Exhibit must be provided on 11"x17" or larger paper.**

Not Applicable

Project Name/_____

Insert Completed Form I-3B: Site Information Checklist for PDPs

https://www.chulavistaca.gov/departments/public-works/services/storm-water-pollution-prevention/documents-and-reports

Otay Ranch Town Center

Project Name: _____

Site Information Checklist	Form I-3B
Project Summary Information	
Project Name	Otay Ranch Town Center
Project Address	2015 Birch Rd, Chula Vista, CA 91915
Assessor's Parcel Number(s) (APN(s))	643-061-0500, 0400, 0800,
Permit Application Number	TM22-0002
Project Watershed	☒ San Diego Bay
Hydrologic Subarea name with Numeric Identifier up to two decimal places	Select One: ☐ Pueblo San Diego 908 ☐ Sweetwater 909 ☒ Otay 910
Project Area (total area of Assessor's Parcel(s) associated with the project or total area of the right-of-way)	16.59 Acres (_____ Square Feet)
Area to be Disturbed by the Project` (Project Footprint)	16.59 Acres (_____ Square Feet)
Project Proposed Impervious Area (subset of Project Footprint)	12.16 Acres (_____ Square Feet)
Project Proposed Pervious Area (subset of Project Footprint)	4.43 Acres (_____ Square Feet)
Note: Proposed Impervious Area + Proposed Pervious Area = Area to be Disturbed by the Project. This may be less than the Parcel Area.	
The proposed increase or decrease in impervious area in the proposed condition as compared to the pre-project condition	10 %

Project Name: Otay Ranch Town Center

Form I-3B Page 3 of 10

Description of Existing Site Condition and Drainage Patterns

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

- [x] 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 in its exiting condition consists of surface parking, driveways, a temporary recreation center and an open space.

Existing Land Cover Includes (select all that apply):

- [ ] Vegetative Cover
- [x] Non-Vegetated Pervious Areas
- [x] Impervious Areas

Description / Additional Information:

The site's existing land cover consists of parking\ drive ways impervious area, open space not vegetated area, and temporary recreation area

Underlying Soil belongs to Hydrologic Soil Group (select all that apply):

- [ ] NRCS Type A
- [ ] NRCS Type B
- [x] NRCS Type C
- [x] NRCS Type D

Approximate Depth to Groundwater (GW):

- [ ] GW Depth < 5 feet
- [x] 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
- [x] None

Description / Additional Information:

Otay Ranch Town Center

Project Name: _____

Form I-3B Page 3 of 10

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:

The existing drainage conveyance is urban.
The offsite runoff is collected via inlets and catch basins offsite and conveyed via stormdrain lines through the site.
In Existing condition, the Otay Ranch Town Center site generally flows in a southwesterly direction to be picked up by inlets and catch basins. The collected runoff is routed via three storm drain lines running from north to south to join off site of the redeveloped area and discharge to a single connection point to the public storm drain system in Birch Road.

The storm water then is conveyed to the Poggi Canyon Detention Basin for peak storm attenuation, which ultimately discharges into Otay River, 4.5 miles southwest of the study area.

TABLE 2 - Summary of Developed Flows to Otay River

Discharge Location	Node #	Drainage Area (ac)	100-Year Peak Flow (cfs)	Tc (min)
Point of Connection to the western storm drain	20	14.82	37.14	14.43
Point of Connection to the Central storm drain	6	0.36	1.32	8.42
Point of Connection to the eastern storm drain	23	2.20	8.08	9.29

Project Name: Otay Ranch Town Center

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Description of Proposed Site Development and Drainage Patterns

Project Description / Proposed Land Use and/or Activities:

The re-development will predominately consist of three residential buildings with maximum of 840 residential units with a plaza building, associated streets, sidewalks and utility infrastructure.

The gross project area is approximately 16.59 acres including all high density residential areas as well as plaza area.

List/describe proposed impervious features of the project (e.g., buildings, roadways, parking lots, courtyards, athletic courts, other impervious features):

Development of site will include impervious features such as buildings (residential, plaza), streets, driveways, and sidewalks.

List/describe proposed pervious features of the project (e.g., landscape areas):

The site will include pervious areas including landscaped areas

Does the project include grading and changes to site topography?

- [x] Yes
- [ ] No

Description / Additional Information:

The site will require regrading the site, Grading of pads and streets will slightly alter the current drainage patterns. Grading and improvements will include the construction of streets which will generally drain towards the southwest to the vault.

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

- [x] 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:

Redevelopment of the site will include construction of storm drain improvements including pipes, inlets, cleanouts, detention underground facilitie with riser structures. There are no additional drainage structures for offsite conveyance since offsite runoff is generally not routed through the site.

In general, onsite drainage is collected via inlets and conveyed within the storm drain system within the streets. The conveyance system direction is towards the underground vault which will discharge into the existing storm drain east and west of the vault.

The discharge from the vault will be conveyed similarly to the existing conditions via storm drain lines running from north to south to join off site of the redeveloped area and discharge to a single connection point to the public storm drain system in Birch Rd. The storm water then is conveyed to the Poggi Canyon Detention Basin for peak storm attenuation, which ultimately discharges into Otay River, 4.5 miles southwest of the study area.

Project Name: Otay Ranch Town Center

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

- [x] On-site storm drain inlets
- [ ] Interior floor drains and elevator shaft sump pumps
- [x] Interior parking garages
- [x] Need for future indoor & structural pest control
- [x] Landscape/Outdoor Pesticide Use
- [x] 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
- [x] Plazas, sidewalks, and parking lots

Description / Additional Information:

The development will consist of single and multi-family residential, and community purpose facility (CPF) development. The BMPs above reflect the proposed source control BMPs which are typically applicable to this type of development. The site will include inlet stenciling for public awareness of pollution concerns related to street pollutants. The use of pesticides for landscape use will be discouraged and designated refuse areas (where applicable) will be protected from stormwater.

TABLE 3 - Summary of Pre vs. Post-Developed Flows from Otay Town Center

	PRE-DEVELOPED			POST-DEVELOPED			DIFFERENCE	
Discharge Location	**Node #**	**Drainage Area (ac)**	**100-Year Peak Flow (cfs)**	**Node #**	**Drainage Area (ac)**	**100-Year Peak Flow (cfs)**	**Area (ac)**	**100-Year Peak Flow (cfs)**
Point of Connection to the western storm drain	17	11.02	32.07	20	14.82	37.14 UNATT 21.62 ATT	+3.80	-10.45
Point of Connection to the Central storm drain	9	3.40	12.63	6	0.36	1.32	-3.04	-11.28
Point of Connection to the eastern storm drain	12	2.93	10.94	23	2.20	8.08	-0.73	-2.86
Total*		**17.35**	**55.64**		**17.38**	**32.79**	**0**	**-24.59**

Project Name: _____

Form I-3B Page 7 of 10

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 from the site will be collected via area drain, inlets and catch basins. The majority of runoff is conveyed by storm drain towards the proposed water quality biofiltration MWS unit/ detention and HMP underground vault prior to discharging into existing storm drains. A small portion of 2nd Street will leave the site and be captured by two 4x4 filterra units before connecting to the existing storm drain.
The runoff leaving the redeveloped area will continue in the existing storm drains south to join before discharging into the public storm drain in Birch Rd. Runoff then is conveyed to Poggi Canyon then to Otay River and eventually into San Diego Bay

List any 303(d) impaired water bodies within the path of storm water from the project site to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable), identify the pollutant(s)/stressor(s) causing impairment, and identify any TMDLs and/or Highest Priority Pollutants from the WQIP for the impaired water bodies:

303(d) Impaired Water Body	Pollutant(s)/Stressor(s)	TMDLs / WQIP Highest Priority Pollutant
Poggi Canyon Creek	Nitrogen, Toxicity	Otay Valley HA ,Trash & bacteria
San Diego Bay	Mercury, PAHs and PCBs	Bacteria

Identification of Project Site Pollutants*

*Identification of project site pollutants is only required if flow-thru treatment BMPs are implemented onsite in lieu of retention or biofiltration BMPs (note the project must also participate in an alternative c rements is demonstrated) Not Applicable since the MWS unit is designed as proprietary biofiltration

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	Expected from the Project Site	Also a Receiving Water Pollutant of Concern
Sediment	☐	☐	☐
Nutrients	☐	☐	☐
Heavy Metals	☐	☐	☐
Organic Compounds	☐	☐	☐
Trash & Debris	☐	☐	☐
Oxygen Demanding Substances	☐	☐	☐
Oil & Grease	☐	☐	☐
Bacteria & Viruses	☐	☐	☐
Pesticides	☐	☐	☐

Project Name: Otay Ranch Town Center

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Hydromodification Management Requirements

Do hydromodification management requirements apply (see Section 1.6)?

- ☒ Yes, hydromodification management flow control structural BMPs required.
- ☐ No, the project will discharge runoff directly to existing underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.
- ☐ No, the project will discharge runoff directly to conveyance channels whose bed and bank are concrete-lined all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.
- ☐ No, the project will discharge runoff directly to an area identified as appropriate for an exemption by the WMAA for the watershed in which the project resides.

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

Note: If "No" answer has been selected the SWQMP must include an exhibit that shows the storm water conveyance system from the project site to an exempt water body. The exhibit should include details about the conveyance system and the outfall to the exempt water body.

Critical Coarse Sediment Yield Areas*
***This Section only required if hydromodification management requirements apply**

Based on Section 6.2 and Appendix H does CCSYA exist on the project footprint or in the upstream area draining through the project footprint?

- ☐ Yes
- ☒ No

Description / Additional Information:

No critical coarse sediment yield areas to be protected based on WMAA maps

Otay Ranch Town Center

Project Name: _____

Form I-3B Page 9 of 10

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 HMP Exhibit.

The site has one designated point of compliance (POC1) which is coincident with the single connection point where the site storm drain join before discharging into the public storm drain at Birch Rd.

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:

Discussion / Additional Information: (optional)

Otay Ranch Town Center

Project Name: _____

Form I-3B Page 10 of 10
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.

Project Name/_____

Insert Completed Form I-4: Source Control BMP Checklist for All Development Projects

https://www.chulavistaca.gov/departments/public-works/services/storm-water-pollution-prevention/documents-and-reports

Otay Ranch Town Center

Project Name: _____

Source Control BMP Checklist for All Development Projects	Form I-4

All development projects must implement source control BMPs. Refer to **Chapter 4** and **Appendix E** of the BMP Design Manual for information to implement BMPs shown in this checklist.

Note: All selected BMPs must be shown on the site/construction plans.

Answer each category below pursuant to the following:

- "Yes" means the project will implement the source control BMP as described in Chapter 4 and/or Appendix E of the BMP Design Manual. Discussion / justification is not required.
- "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided.
- "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project has no outdoor materials storage areas). Discussion / justification may be provided.

Source Control Requirement	Applied?		
4.2.1 Prevention of Illicit Discharges into the MS4	☒ Yes	☐ No	☐ N/A
Discussion / justification if 4.2.1 not implemented:			
4.2.2 Storm Drain Stenciling or Signage	☒ Yes	☐ No	☐ N/A
Discussion / justification if 4.2.2 not implemented:			
4.2.3 Protect Outdoor Materials Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	☒ N/A
Discussion / justification if 4.2.3 not implemented:			
4.2.4 Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	☒ N/A
Discussion / justification if 4.2.4 not implemented:			
4.2.5 Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☒ Yes	☐ No	☐ N/A
Discussion / justification if 4.2.5 not implemented:			

Project Name: Otay Ranch Town Center

Source Control BMP Checklist for All Development Projects			Form I-4 (Page 2 of 2)
4.2.6 Additional BMPs Based on Potential Sources of Runoff Pollutants (must answer for each source listed below)	☒ Yes	☐ No	☐ N/A
SC-A Onsite storm drain inlets	☒ Yes	☐ No	☐ N/A
SC-B Interior floor drains and elevator shaft sump pumps	☐ Yes	☐ No	☒ N/A
SC-C Interior parking garages	☒ Yes	☐ No	☐ N/A
SC-D1 Need for future indoor & structural pest control	☒ Yes	☐ No	☐ N/A
SD-D2 Landscape/outdoor pesticide use	☒ Yes	☐ No	☐ N/A
SC-E Pools, spas, ponds, decorative fountains, and other water features	☒ Yes	☐ No	☐ N/A
SC-F Food Service	☐ Yes	☐ No	☒ N/A
SC-G Refuse areas	☐ Yes	☐ No	☒ N/A
SC-H Industrial processes	☐ Yes	☐ No	☒ N/A
SC-I Outdoor storage of equipment or materials	☐ Yes	☐ No	☒ N/A
SC-J Vehicle and equipment cleaning	☐ Yes	☐ No	☒ N/A
SC-K Vehicle/equipment repair and maintenance	☐ Yes	☐ No	☒ N/A
SC-L Fuel dispensing areas	☐ Yes	☐ No	☒ N/A
SC-M Loading docks	☐ Yes	☐ No	☒ N/A
SC-N Fire sprinkler test water	☐ Yes	☐ No	☒ N/A
SC-O Miscellaneous drain or wash water	☐ Yes	☐ No	☒ N/A
SC-P Plazas, sidewalks, and parking lots	☒ Yes	☐ No	☐ N/A
SC-Q: Large Trash Generating Facilities	☐ Yes	☐ No	☒ N/A
SC-R: Animal Facilities	☐ Yes	☐ No	☒ N/A
SC-S: Plant Nurseries and Garden Centers	☐ Yes	☐ No	☒ N/A
SC-T: Automotive Facilities	☐ Yes	☐ No	☒ N/A

Discussion / justification if 4.2.6 not implemented. Justification must be provided for all "No" answers shown above.

Project Name/_____

Insert Completed Form I-5: Site Design BMP Checklist for All Development Projects

https://www.chulavistaca.gov/departments/public-works/services/storm-water-pollution-prevention/documents-and-reports

Otay Ranch Town Center

Project Name.: _____

Site Design BMP Checklist for All Development Projects	Form I-5

All development projects must implement site design BMPs where applicable and feasible. See **Chapter 4 and Appendix E** of the manual for information to implement site design BMPs shown in this checklist. **Note: All selected BMPs must be shown on the site/construction plans.**

Answer each category below pursuant to the following.

- "Yes" means the project will implement the site design BMP as described in Chapter 4 and/or Appendix E of the manual. Discussion / justification is not required.
- "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided.
- "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project site has no existing natural areas to conserve). Discussion / justification may be provided.

Site Design Requirement	Applied?		
4.3.1 Maintain Natural Drainage Pathways and Hydrologic Features	☐ Yes	☐ No	☒ N/A
4.3.2 Conserve Natural Areas, Soils, and Vegetation	☐ Yes	☐ No	☒ N/A
4.3.3 Minimize Impervious Area	☒ Yes	☐ No	☐ N/A
4.3.4 Minimize Soil Compaction	☒ Yes	☐ No	☐ N/A
4.3.5 Impervious Area Dispersion	☒ Yes	☐ No	☐ N/A

Project Name/Address/N Otay Ranch Town Center

Site Design BMP Checklist for All Development Projects			Form I-5
Site Design Requirement	**Applied?**		
4.3.6 Runoff Collection	☐ Yes	☒ No	☐ N/A
Treatment of onsite stormwater will be treated via the proposed proprietary biofiltration MWS units.			
4.3.7 Landscaping with Native or Drought Tolerant Species	☒ Yes	☐ No	☐ N/A
4.3.8 Harvesting and Using Precipitation	☐ Yes	☒ No	☐ N/A
Discussion / justification for all "No" answers shown above: This site design is not feasible for this project.			

Project Name/_____

Insert Completed Form I-6: Summary of PDP Structural BMPs

https://www.chulavistaca.gov/departments/public-works/services/storm-water-pollution-prevention/documents-and-reports

Otay Ranch Town Center

Project Name: _____

Form I-6 Page 2 of _____ *(Copy and attach as many as needed)*	
Structural BMP ID No. BF-3-1	
Construction Plan Sheet No.	

Type of structural BMP:

- ☐ Retention by harvest and use (e.g. HU-1, cistern)
- ☐ Retention by infiltration basin (INF-1)
- ☐ Retention by bioretention (INF-2)
- ☐ Retention by permeable pavement (INF-3)
- ☐ Partial retention by biofiltration with partial retention (PR-1)
- ☒ Biofiltration (BF-1) Volume-based Proprietary Biofiltration
- ☐ 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 if required by the City Engineer (See Section 1.12 of the manual)	Alisa S. Vialpando , PE # 47945 Hunsaker & Associates SD, Inc. 9707 Waples St, San Diego,CA 92121 (858) 558-4500
Who will be the final owner of this BMP?	HOA for Otay Ranch Town Center
Who will maintain this BMP into perpetuity?	HOA for Otay Ranch Town Center
What is the funding mechanism for maintenance?	Rent and fees to the Homeowners Association (HOA) for Otay Ranch Town Center

CITY OF CHULA VISTA

Project Name: _____

Form I-6 Page 3 *of* *(Copy and attach as many as needed)*

Structural BMP ID No. BF-3-1

Construction Plan Sheet No.

Discussion (as needed, must include worksheets showing BMP sizing calculations in the SWQMP):

* 85th percentile 24-hr storm depth from iso map Figure B.1.1 is d =0.53 in

*The area drains to the biofiltration Proprietary MWS unit is delineated A= 645559 sf

* Total impervious area is 466909 sf, and pervious area is 177669 sf

*The weighted area runoff factor is calculated as a composite coefficient made of the different runoff factor for the surfaces of the DMA area per equation
C ={(0.9 * Impervious surfaces)+ (0.1 * pervious areas)} / (total area)
C = {(0.9*466909)+(0.1*177669)}/ (645559)= 0.679

* Calculate DCV = 3630 x C x d x A = 3630 x 0.679 x 0.53 x (645559/43560)= 19349 cft
1.5 DCV = 29023.5 cft

* A portion of the underground vault will be used as WQ storage to store the 1.5 DCV and release it in a rate to drawdown in 36 hr and not exceed the HMP max allowable low flow

*2 8 x 16 MWS unit is used to treat the required volume and draw down in 36 hrs

Otay Ranch Town Center

Project Name: _____

Form I-6 Page 2 of _____ *(Copy and attach as many as needed)*	
Structural BMP ID No. HMP-1	
Construction Plan Sheet No.	
Type of structural BMP: ☐ Retention by harvest and use (e.g. HU-1, cistern) ☐ Retention by infiltration basin (INF-1) ☐ Retention by bioretention (INF-2) ☐ Retention by permeable pavement (INF-3) ☐ Partial retention by biofiltration with partial retention (PR-1) ☐ Biofiltration (BF-1) ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☒ Detention pond or vault for hydromodification management ☐ Other (describe in discussion section below)	
Purpose: ☐ Pollutant control only ☒ Hydromodification control only ☐ Combined pollutant control and hydromodification control ☐ Pre-treatment/forebay for another structural BMP ☐ Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms if required by the City Engineer (See Section 1.12 of the manual)	Alisa S. Vialpando , PE # 47945 Hunsaker & Associates SD, Inc. 9707 Waples St, San Diego,CA 92121 (858) 558-4500
Who will be the final owner of this BMP?	HOA for Otay Ranch Town Center
Who will maintain this BMP into perpetuity?	HOA for Otay Ranch Town Center
What is the funding mechanism for maintenance?	Rent and fees to the Homeowners Association (HOA) for Otay Ranch Town Center

CITY OF CHULA VISTA

Project Name: _____

Form I-6 Page 3 *of* *(Copy and attach as many as needed)*
Structural BMP ID No. HMP-1
Construction Plan Sheet No.
Discussion (as needed, must include worksheets showing BMP sizing calculations in the SWQMP): Determine the required HMP volume using the BMP Sizing spread sheet V.3.1

Otay Ranch Town Center

Project Name: _____

Form I-6 Page 2 of _____ *(Copy and attach as many as needed)*	
Structural BMP ID No. BF-3-2	
Construction Plan Sheet No.	

Type of structural BMP:

- ☐ Retention by harvest and use (e.g. HU-1, cistern)
- ☐ Retention by infiltration basin (INF-1)
- ☐ Retention by bioretention (INF-2)
- ☐ Retention by permeable pavement (INF-3)
- ☐ Partial retention by biofiltration with partial retention (PR-1)
- ☒ Biofiltration (BF-1) Flow-based Proprietary Biofiltration
- ☐ 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 if required by the City Engineer (See Section 1.12 of the manual)	Alisa S. Vialpando , PE # 47945 Hunsaker & Associates SD, Inc. 9707 Waples St, San Diego,CA 92121 (858) 558-4500
Who will be the final owner of this BMP?	HOA for Otay Ranch Town Center
Who will maintain this BMP into perpetuity?	HOA for Otay Ranch Town Center
What is the funding mechanism for maintenance?	Rent and fees to the Homeowners Association (HOA) for Otay Ranch Town Center

CITY OF CHULA VISTA

Project Name: _____

Form I-6 Page 3 *of* *(Copy and attach as many as needed)*

Structural BMP ID No. BF-3-2

Construction Plan Sheet No.

Discussion (as needed, must include worksheets showing BMP sizing calculations in the SWQMP):

* 85th percentile 24-hr storm depth from iso map Figure B.1.1 is d =0.53 in

*The area drains to the biofiltration Proprietary MWS unit is delineated A= 10289 sf

* Total impervious area is 8030 sf, and pervious area is 2258 sf

*The weighted area runoff factor is calculated as a composite coefficient made of the different runoff factor for the surfaces of the DMA area per equation
C ={(0.9 * Impervious surfaces)+ (0.1 * pervious areas)} / (total area)
C = {(0.9*8030)+(0.1*2258)}/ (10289)= 0.724

* Calculate DCV = 3630 x C x d x A = 3630 x 0.724 x 0.53 x (10289/43560)= 329 cft

* 4 x 4 Filterra unit is used to treat the required flow.

Otay Ranch Town Center

Project Name: _____

Form I-6 Page 2 of _____ *(Copy and attach as many as needed)*	
Structural BMP ID No. BF-3-3	
Construction Plan Sheet No.	

Type of structural BMP:

- ☐ Retention by harvest and use (e.g. HU-1, cistern)
- ☐ Retention by infiltration basin (INF-1)
- ☐ Retention by bioretention (INF-2)
- ☐ Retention by permeable pavement (INF-3)
- ☐ Partial retention by biofiltration with partial retention (PR-1)
- ☒ Biofiltration (BF-1) Flow-based Proprietary Biofiltration
- ☐ 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 if required by the City Engineer (See Section 1.12 of the manual)	Alisa S. Vialpando , PE # 47945 Hunsaker & Associates SD, Inc. 9707 Waples St, San Diego,CA 92121 (858) 558-4500
Who will be the final owner of this BMP?	HOA for Otay Ranch Town Center
Who will maintain this BMP into perpetuity?	HOA for Otay Ranch Town Center
What is the funding mechanism for maintenance?	Rent and fees to the Homeowners Association (HOA) for Otay Ranch Town Center

CITY OF CHULA VISTA

Project Name: _____

Form I-6 Page 3 *of* *(Copy and attach as many as needed)*

Structural BMP ID No. BF-3-3

Construction Plan Sheet No.

Discussion (as needed, must include worksheets showing BMP sizing calculations in the SWQMP):

* 85th percentile 24-hr storm depth from iso map Figure B.1.1 is d =0.53 in

*The area drains to the biofiltration Proprietary MWS unit is delineated A= 5306 sf

* Total impervious area is 4208 sf, and pervious area is 1098 sf

*The weighted area runoff factor is calculated as a composite coefficient made of the different runoff factor for the surfaces of the DMA area per equation
C ={(0.9 * Impervious surfaces)+ (0.1 * pervious areas)} / (total area)
C = {(0.9*4208)+(0.1*1098)}/ (5306)= 0.734

* Calculate DCV = 3630 x C x d x A = 3630 x 0.734 x 0.53 x (5304/43560)=172 cft

* 4 x 4 Filterra unit is used to treat the required flow.

Project Name/_____

ATTACHMENT 1

Backup for PDP Pollutant Control BMPs

Project Name/ Otay Ranch Town Center

Indicate which Items are Included:

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

Project Name/ Otay Ranch Town Center

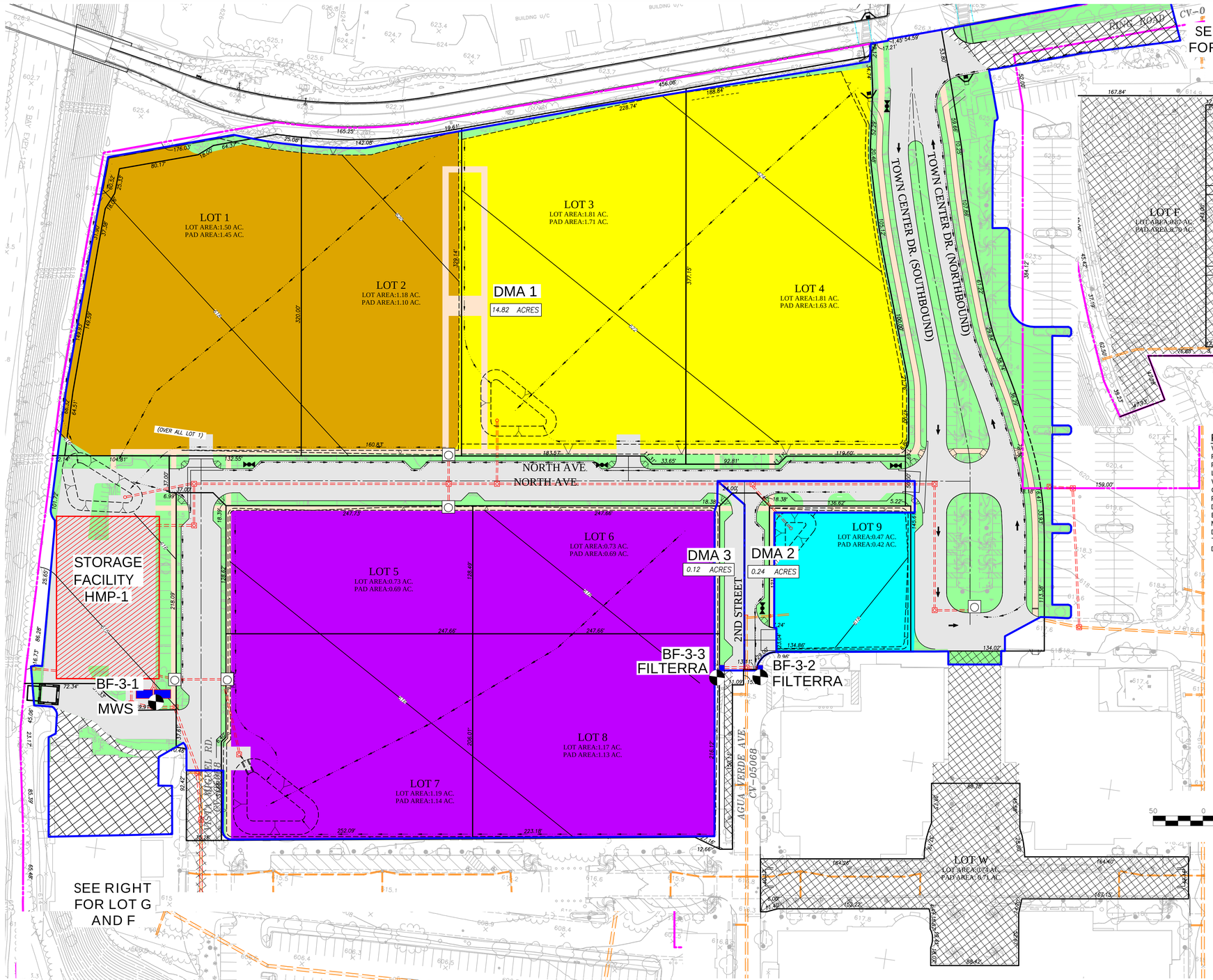
Use this checklist to ensure the required information has been included on the DMA Exhibit:

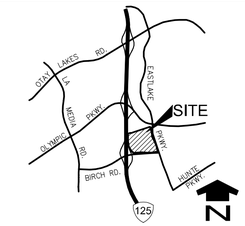
The DMA Exhibit must identify all the following:

- ☒ 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 grading
- ☒ Proposed impervious features
- ☒ Proposed design features and surface treatments used to minimize imperviousness
- ☒ Drainage management area (DMA) boundaries, DMA ID numbers, and DMA areas (square footage or acreage), and DMA type (i.e., drains to BMP, self-retaining, or self-mitigating)
- ☒ Potential pollutant source areas and corresponding required source controls (see Chapter 4, Appendix E.1, and Form I-3B)
- ☒ Structural BMPs (identify location, type of BMP, and size/detail, and include cross-sections)

ATTACHMENT 1a

DMA EXHIBIT





VICINITY MAP

NOT TO SCALE

LEGEND:

	SYMBOL:
PROJECT BOUNDARY	
DMA BOUNDARY	
DAYLIGHT	
PROPOSED STORM DRAIN	
EXISTING STORM DRAIN	
FLOW LINE	
SUBAREA ACREAGE	00.00 ACRES
DMA ICON	DMA 1
IMPERVIOUS - ROAD	
IMPERVIOUS - SIDEWALK	
PERVIOUS AREAS	
LOTS 1 AND 2	
LOTS 3 AND 4	
LOTS 5, 6, 7, AND 8	
LOT 9	
UNDERGROUND STORAGE FACILITY	
MWS UNIT	
TRENCHING & RESURFACING	
EX. IMPREVIOUSNESS DRAINING TO BMPS	
INLET	
HYDROLOGIC SOIL TYPE	D
POINT OF COMPLIANCE	X
STRUCTURAL BMP\ MWS UNIT	

PARK NOTE:

WORK WITHIN LOT F INCLUDES THE RENOVATION OF A DOG PARK CREATING MORE PERVIOUS AREAS BY INCREASING THE LANDSCAPE IN THE LOT.
WORK WITHIN LOT G INCLUDES THE REMOVING ON PARKING AND CREATION OF A SMALL PARK/LANDSCAPE AREA.
DISPERSION AREAS AND AMENDED SOILS WILL BE USED AS THE WATER QUALITY TREATMENT METHOD FOR THESE TWO AREAS.
DUE TO THE EARLY STAGE OF THE PROJECT, THE DISPERSION AREAS WILL BE DETERMINED DURING FINAL ENGINEERING.

SITE DESIGN BMPs:

SD-3 MINIMIZE IMPERVIOUS AREAS
SD-4 MINIMIZE SOIL COMPACTION
SD-5 IMPERVIOUS AREA DISPERSION
SD-7 LANDSCAPING WITH NATIVE OR DROUGHT TOLERANT SPECIES
SD-8 HARVESTING AND USING PRECIPITATION

SOURCE CONTROL BMPs:

SC-1 PREVENTION OF ILLICIT DISCHARGES TO MS4
SC-2 STORM DRAIN STENCILING OR SIGNAGE
SC-5 PROTECT TRASH STORAGE AREAS
SC-6 ADDITIONAL BMPS BASED ON POTENTIAL SOURCES OF RUNOFF POLLUTANTS
- SC-6A ON-SITE STORM DRAIN INLETS
- SC-6C INTERIOR PARKING GARAGES
- SC-6D NEED FOR FUTURE INDOOR & STRUCTURAL PEST CONTROL
- SC-6E LANDSCAPE/OUTDOOR PESTICIDE USE
- SC-6F POOLS, SPAS, PONDS, FOUNTAINS, AND OTHER WATER FEATURES
- SC-6Q PLAZAS, SIDEWALKS, AND PARKING LOTS

UNDERLYING SOIL GROUP : C & D
APPROXIMATE DEPTH TO GROUNDWATER > 20'
NO CRITICAL COARSE AREAS REQUIRE PRESERVATION

PARK NOTE:

WORK WITHIN LOT E WILL INCLUDES RESURFACING OF IMPERVIOUS AREAS AND LANDSCAPE RENOVATIONS. THE BASE SHALL REMAIN IN PLACE. THE RENOVATIONS WILL INCLUDE AN INCREASE IN PERVIOUS AREAS; THE NEW LANDSCAPE AREAS WILL BE IN ISLANDS AND CAN BE COUNTED AS SELF-RETAINING.
NO WATER QUALITY MEASURES ARE EXPECTED TO BE IMPLEMENTED OR NEEDED.

DISPERSION AREAS AND AMENDED SOILS NOTE:

DISPERSION AREAS AND AMENDED SOILS WILL BE DETERMINED DURING FINAL ENGINEERING. THESE AREAS WILL BE REQUIRED TO BE SHOWN ON FUTURE PLANS.

PREPARED BY:
HUNSAKER & ASSOCIATES SAN DIEGO, INC
PLANNING 9707 Waples Street
ENGINEERING San Diego, Ca 92121
SURVEYING PH(858)558-4500 - FX(858)558-1414

DMA MAP

OTAY TOWN CENTER

CITY CHULA VISTA, CALIFORNIA

MAP 1 OF 2

W.O.# 3356-0002

LOT I

LOT 1

LOT 2

LOT 3

DMA 1

14.92 ACRES

LOT 4

LOT A

LOT B

LOT C

LOT D

LOT E

LOT F

LOT G

LOT H

LOT 5

LOT 6

LOT 7

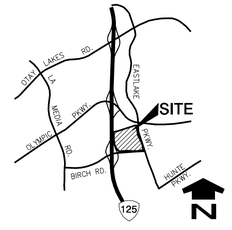
LOT 8

LOT 9

LOT 10

BUILDING U/C

PLAYGROUND



VICINITY MAP

NOT TO SCALE

LEGEND

- PROJECT BOUNDARY
- PROPOSED DMA BOUNDARY
- DAYLIGHT
- FLOW DIRECTION
- 00.00 ACRES — AREA
- D — HYDROLOGIC SOIL TYPE
- EXISTING IMPERVIOUS AREA
- EXISITNG STORM DRAIN

EXISTING IMPERVIOUS AREA = 10.3 AC

50 0 50 100 150

SCALE 1" = 50'

PREPARED BY:

H&A HUNSAKER & ASSOCIATES SAN DIEGO, INC

PLANNING 9707 Waples Street
ENGINEERING San Diego, Ca 92121
SURVEYING PH(858)558-4500 FX(858)558-1414

EXISTING DMA MAP

OTAY TOWN CENTER

CITY CHULA VISTA, CALIFORNIA

MAP 2 OF 2

W.O.# 3356-0002

SITE SPECIFIC DATA			
PROJECT NUMBER		----	
PROJECT NAME		OTAY TOWN CENTER	
PROJECT LOCATION		CHULA VISTA, CA	
STRUCTURE ID		BF-3-1 UNIT 1 OF 2	
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
29,400 (2 UNITS NEEDED)		N/A	
TREATMENT HGL AVAILABLE (FT)			N/K
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			N/A
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	601.40	PVC	8"
EQ PIPE OUT	600.98	PVC	18"
EQ PIPE IN	600.90	PVC	18"
OUTLET PIPE	600.90	PVC	8"
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION	615.20	615.20	615.20
SURFACE LOAD	PEDESTRIAN	PEDESTRIAN	PEDESTRIAN
FRAME & COVER	2EA ø30"	2EA 30" X 48"	ø30"
WETLANDMEDIA VOLUME (CY)			7.61
ORIFICE SIZE (DIA. INCHES)			ø1.53"
NOTES: PRELIMINARY NOT FOR CONSTRUCTION. UPSTREAM BYPASS TO BE SET AT 604.28. (2) MWS-L-8-16 NEEDED TO MEET REQUIRED TREATMENT VOLUME.			

INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS' SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURER'S CONTRACT.
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GENERAL NOTES

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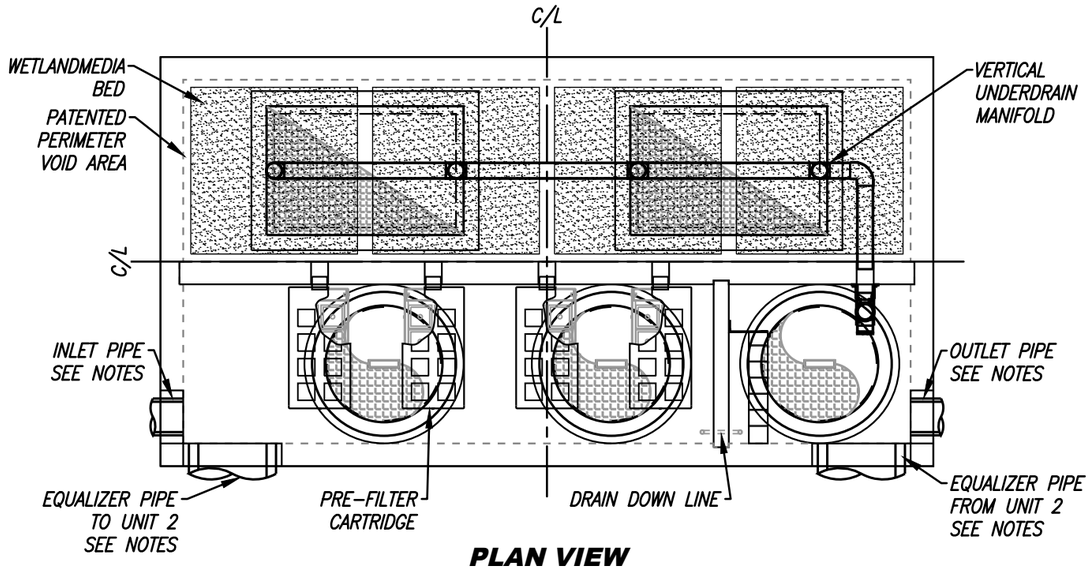
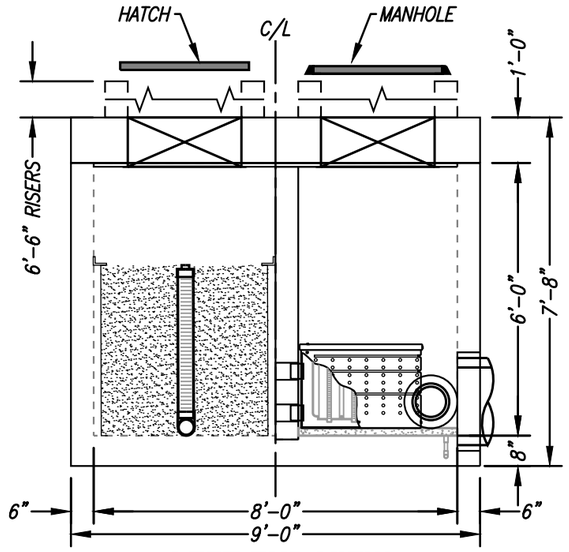
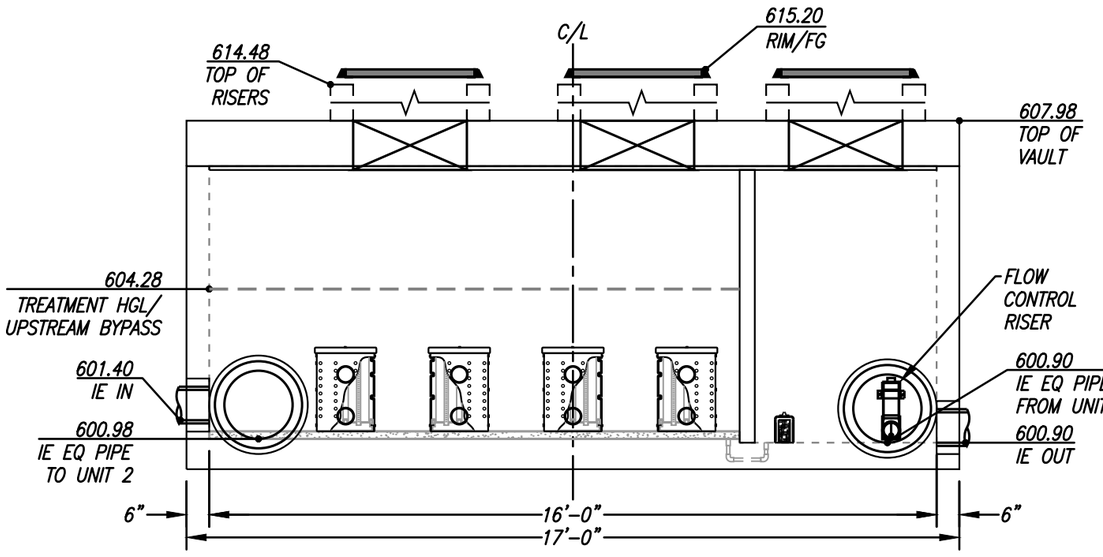
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT BIO CLEAN.



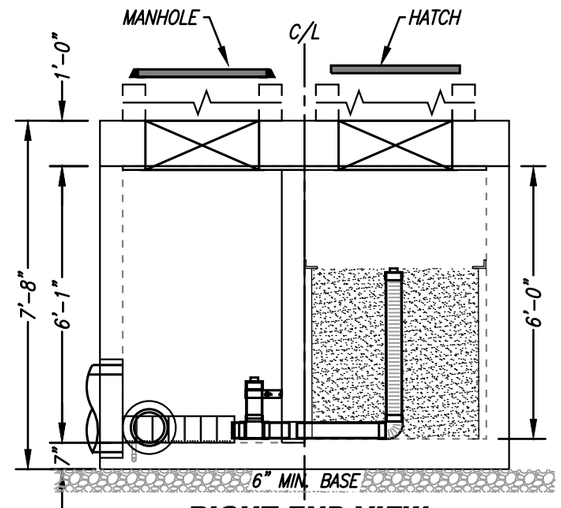
PLAN VIEW



LEFT END VIEW



ELEVATION VIEW



RIGHT END VIEW

REQUIRED TREATMENT VOLUME (CF)		14,700
DRAINDOWN DURATION (HOURS)		36
MAX. DISCHARGE RATE PER MWS UNIT (CFS)		0.113
OPERATING HEAD (FT)		3.3
WETLANDMEDIA INFILTRATION RATE (IN/HR)	OR	26
WETLANDMEDIA LOADING RATE (GPM/SF)		0.26

MWS-L-8-16-6'-0"-V-UG
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

8/2/22CSCHIPPER

SITE SPECIFIC DATA			
PROJECT NUMBER		----	
PROJECT NAME		OTAY TOWN CENTER	
PROJECT LOCATION		CHULA VISTA, CA	
STRUCTURE ID		BF-3-1 UNIT 2 OF 2	
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
29,400 (2 UNITS NEEDED)		N/A	
TREATMENT HGL AVAILABLE (FT)			N/K
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			N/A
PIPE DATA	I.E.	MATERIAL	DIAMETER
EQ PIPE IN	600.98	PVC	18"
EQ PIPE OUT	600.90	PVC	18"
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION	615.20	615.20	615.20
SURFACE LOAD	PEDESTRIAN	PEDESTRIAN	PEDESTRIAN
FRAME & COVER	2EA ø30"	2EA 30" X 48"	ø30"
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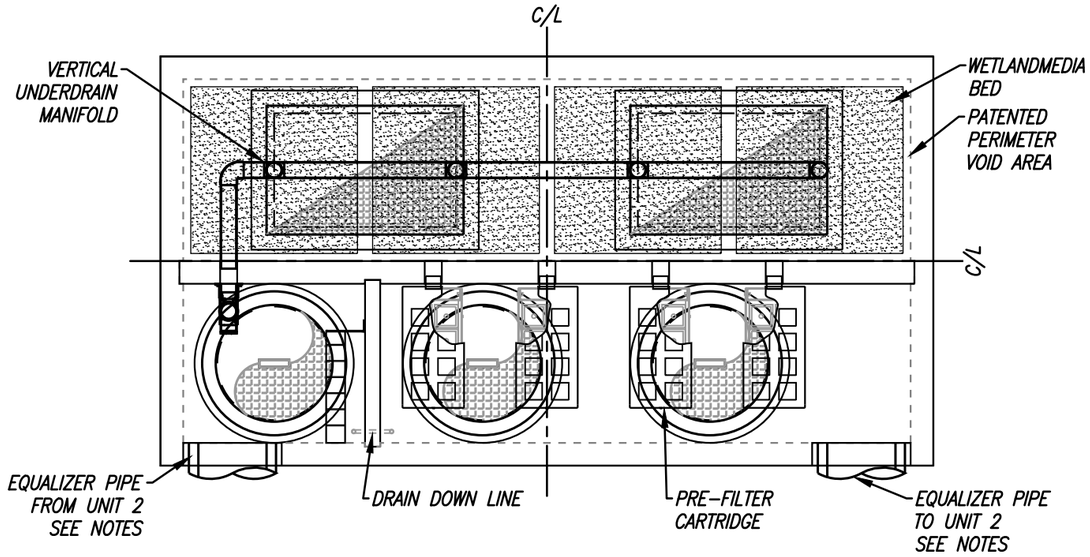
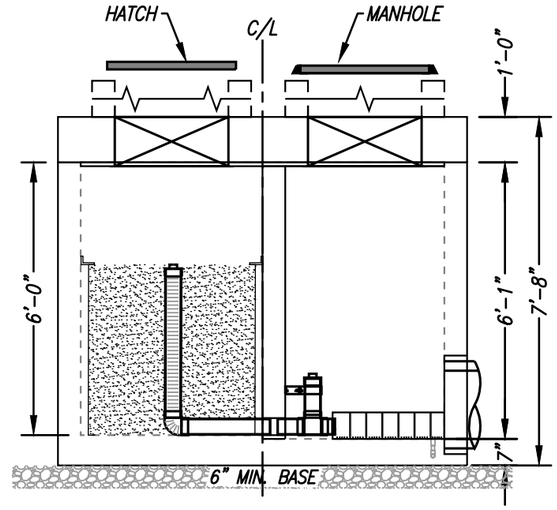
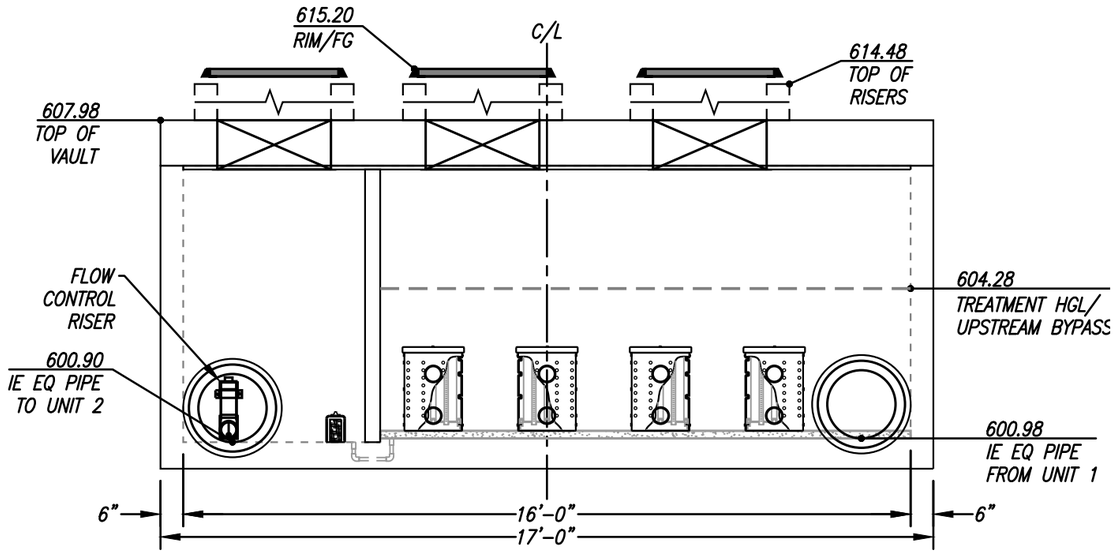


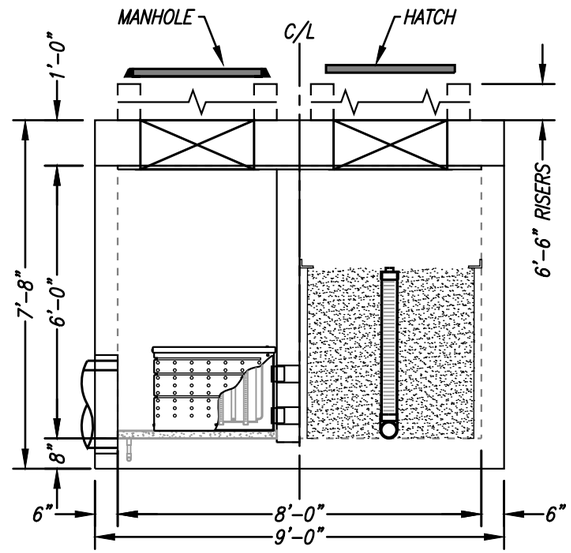
PLAN VIEW



LEFT END VIEW



ELEVATION VIEW



RIGHT END VIEW

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DRAINDOWN DURATION (HOURS)		36
MAX. DISCHARGE RATE PER MWS UNIT (CFS)		0.113
OPERATING HEAD (FT)		3.3
WETLANDMEDIA INFILTRATION RATE (IN/HR)	OR	26
WETLANDMEDIA LOADING RATE (GPM/SF)		0.26

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8/2/22GSCHIPPER

MWS-L-8-16-6'-0"-V-UG
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

ATTACHMENT 1b

TABULAR SUMMARY OF DMAs

Project Name: Otay Ranch Town Center

Tabular Summary of DMAs							Worksheet B-1		
DMA Unique Identifier	Area (acres)	Impervious Area (acres)	% Imp	HSG	Area Weighted Runoff Coefficient	DCV (Cubic feet)	Treated by (BMP ID)	Pollutant Control Type	Drains to (POC ID)
DMA 1	14.82	10.72	72.48	D/C	0.679	19349	BF-3-1	BIOFILTR	1
DMA 2	0.24	0.18	78.05	D	0.724	329	BF-3-2	BIOFILTRL	1
DMA 3	0.12	0.10	79.30	D	0.734	172	BF-3-3	BIOFILTRL	1

Summary of DMA Information (Must match Project description and SWQMP narrative)									
No. of DMAs	Total DMA Area (acres)	Total Impervious Area (acres)	% Impervious		Area Weighted Runoff Coefficient	DCV (Cubic feet)	Total Area Treated (acres)		No. of POCs

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

	Imp. RF	Pervious RF-D	% Imp	DMA 1	Fraction of Total	Imp Area	Pervious Area	Summation RF x A	DMA 2	Fraction of Total	Imp Area	Pervious Area	Summation RF x A	DMA 3	Fraction of Total	Imp Area	Pervious Area	Summation RF x A
				SQFT		SQFT	SQFT		SQFT		SQFT	SQFT		SQFT		SQFT	SQFT	
PERVIOUS	0.90	0.10	0	74018	0.02	0	74018	7402	2258	0.03	0	2258	226	1098	0.03	0	1098	110
SIDEWALK	0.90	0.10	100	15593	0.03	15593	0	14033	1365	0.16	1365	0	1229	917	0.21	917	0	825
ROADS	0.90	0.10	100	96134	0.20	96134	0	86521	6665	0.80	6665	0	5999	3291	0.76	3291	0	2962
EX IMP/RESURFACING	0.90	0.10	VARIES	17021	0.03	17021	0	15319	N/A	-	-	-	-	0	0.00	0	0	0
LOT 1-2 PERVIOUS	0.90	0.10	0	31622	0.01	0	31622	3162	N/A	-	-	-	-	N/A	-	-	-	-
LOT 1-2 IMPERVIOUS	0.90	0.10	100	81886	0.17	81886	0	73697	N/A	-	-	-	-	N/A	-	-	-	-
LOT 3-4 PERVIOUS	0.90	0.10	0	40436	0.01	0	40436	4044	N/A	-	-	-	-	N/A	-	-	-	-
LOT 3-4 IMPERVIOUS	0.90	0.10	100	110234	0.23	110234	0	99211	N/A	-	-	-	-	N/A	-	-	-	-
LOT 5-8 PERVIOUS	0.90	0.10	0	31593	0.01	0	31593	3159	N/A	-	-	-	-	N/A	-	-	-	-
LOT 5-8 IMPERVIOUS	0.90	0.10	100	127391	0.26	127391	0	114652	N/A	-	-	-	-	N/A	-	-	-	-
LOT 9 PERVIOUS	0.90	0.10	0	982	0.00	0	982	98	N/A									
LOT 9 IMPERVIOUS	0.90	0.10	100	18650	0.04	18650	0	16785	N/A	-	-	-	-	N/A	-	-	-	-
				645559	1.00	466909	178651	438083	10289	1.00	8030	2258	7453	5306	1.00	4208	1098	3897
			%Imperv	72.33			Weighted C =	0.679	78.05			Weighted C =	0.724	79.30			Weighted C =	0.734

ATTACHMENT 1c

FORM I-7, HARVEST AND USE FEASIBLITY SCREENING CHECKLIST

Harvest and Use Feasibility Checklist	Form I-7

1. Is there a demand for harvested water (check all that apply) at the project site that is reliably present during the wet season?

☒ Toilet and urinal flushing

☒ Landscape irrigation

☐ Other:

2. If there is a demand; estimate the anticipated average wet season demand over a period of 36 hours. Guidance for planning level demand calculations for toilet/urinal flushing and landscape irrigation is provided in Section B.4.2.

36 hr toilet use per resident= 1.5 x 9.3 gal/resident x 840 residents= 11718 gallons= 1881 cf,

36 hour landscape use/acre= 196.52 cf/ac x 5.14 . ac= 1010 cf

Total anticipated 36 hr use = 2891 cf

3. Calculate the DCV using worksheet B-2.1.

DCV = 20,853 (cubic feet)

0.25DCV= 5213 cubic feet

3a. Is the 36 hour demand greater than or equal to the DCV?	3b. Is the 36 hour demand greater than 0.25DCV but less than the full DCV?	3c. Is the 36 hour demand less than 0.25DCV?
☐ Yes / ☒ No ⇨ ⇩	☐ Yes / ☒ No ⇨ ⇩	☒ Yes ⇩
Harvest and use appears to be feasible. Conduct more detailed evaluation and sizing calculations to confirm that DCV can be used at an adequate rate to meet drawdown criteria.	Harvest and use may be feasible. Conduct more detailed evaluation and sizing calculations to determine feasibility. Harvest and use may only be able to be used for a portion of the site, or (optionally) the storage may need to be upsized to meet long term capture targets while draining in longer than 36 hours.	Harvest and use is considered to be infeasible.

ATTACHMENT 1d

FORM I-8, CATEGORIZATION OF INFILTRATION FEASIBILITY CONDITION

INFILTRATION
FEASIBILITY CONDITION LETTER

OTAY RANCH TOWN CENTER
CHULA VISTA, CALIFORNIA

GEOCON
INCORPORATED

GEOTECHNICAL
ENVIRONMENTAL
MATERIALS

PREPARED FOR

Brookfield
Properties

JULY 28, 2022
PROJECT NO. G2883-52-01

Project No. G2883-52-01
July 28, 2022

Brookfield Properties
733 8th Avenue
San Diego, California 92101

Attention: Mr. Dan Buoye

Subject: INFILTRATION FEASIBILITY CONDITION LETTER
LOGAN YARDS APARTMENTS
SOUTH 16TH STREET AND NATIONAL AVENUE
SAN DIEGO, CALIFORNIA

Reference: *Geotechnical Reconnaissance Report, Otay Ranch Town Center, Chula Vista, California,* prepared by Geocon Incorporated, dated February 4, 2022 (Project No. G2883-52-01).

Dear Mr. Buoye:

In accordance with the request of Mr. Alejandro Chavez Gonzales with Hunsaker & Associates San Diego, we prepared this report regarding storm water management for the subject project. The site is located north of Birch Road and the Otay Ranch Town Center Mall, south of Olympic Parkway and the Planning Area 12 development, west of Eastlake Parkway and east of State Route 125 in the City of Chula Vista, California (see Vicinity Map).

Vicinity Map

SITE DESCRIPTION

The existing property consists of the northern parking area for the existing Otay Ranch Town Center mall. The area consists of surface grade asphalt concrete parking on the east and southwest, an outdoor soccer area and playground in the central portion with a landscape construction storage area in the northwest portion. The site was graded between 2004 and 2005 with observation and testing services provided by Geotechnics, Incorporated. The site is relatively flat with elevations between 624 feet Mean Sea Level (MSL) and 614 feet MSL, descending gently to the southwest. An existing 10- to 15-foot-high cut and fill slope exists on the west limits of the site that descends towards State Route 125. The Existing Site Map shows the current conditions at the site. Based on the previous as-graded map, the site was partially situated over the upper portions of two canyon drainages with fill depths ranging up to about 25 feet at the site.

Existing Site Map

PROJECT DESCRIPTION

We understand the proposed redevelopment will consist of constructing 3, multi-family residential lots with commercial space, reconfiguring the existing Town Center Drive entrance and installing a new

plaza area in the southeast portion of the site with accommodating utilities, flatwork, and landscaping. The Preliminary Site Plan shows a current concept of the proposed improvements.

Preliminary Site Plan

The locations and descriptions of the site and proposed development are based on the referenced site plan and our understanding of project development. If project details vary significantly from those described herein, Geocon Incorporated should be contacted to evaluate the necessity for review and revision of this report.

STORM WATER FEASIBILITY

Below is the specific information requested from Section C.1.1 of the *2021 City of Chula Vista BMP Design Manual*.

The Phase of the Project In which the geotechnical engineer first analyzed the site for infiltration feasibility:

The current design is in the entitlement phase but this report can be used for both the entitlement and design phases.

Results of previous geotechnical analyses conducted in the project area, if any.

Based on our referenced report, the property is underlain by previously placed fill with a thickness of up to about 25 feet overlying Otay Formation. We expect groundwater exists deeper than 100 feet below the existing grade.

The development status of the site prior to the project application.

The property was graded between 2004 and 2005 to construct the northern parking area for the existing Otay Ranch Town Center mall. The area consists of surface grade asphalt concrete parking on the east and southwest, an outdoor soccer area and playground in the central portion with a landscape construction storage area in the northwest portion. Prior to grading, which included placing up to about 25 feet of fill, the site was partially situated over the upper portions of two canyon drainages.

The history of design discussion for the project footprint, resulting the final design determination.

We evaluated the site conditions for infiltration with the project civil engineer. Based on the existing geologic conditions, we opine infiltration should not be considered for the property. An underground storm water storage facility and modular wetlands system are planned that do not allow infiltration.

Full/partial infiltration BMP standard setbacks to underground utilities, structures, retaining walls, fill slopes, and natural slopes applicable to the DMA that prevent full/partial infiltration.

Most of the property is underlain by compacted fill that is used to support the existing improvements. The fill materials were not designed to allow for infiltration (i.e. compacted to a dry density of at least 90 percent of the laboratory maximum dry density and contain a mixture of fine- and coarse-grained materials). Existing utilities are located within the adjacent public right-of-way to the north of the site and the drive lanes that transect the site. A descending slope exists on the western portion of the property. Full or partial infiltration should not be allowed in the areas of the fill, utilities and slope areas to help prevent potential damage/distress to improvements. Mitigation measures to prevent water from infiltrating the utilities consist of setbacks, installing cutoff walls around the utilities and installing subdrains and/or installing liners. The horizontal and vertical setbacks for infiltration devices should be a minimum of 10 feet and a 1:1 plane of 1 foot below the closest edge of the deepest adjacent utility, respectively.

An existing 10- to 15-foot-high cut and fill slope exists on the west limits of the site, descending towards State Route 125. The setback for infiltration devices should be a minimum distance of 50 feet and 1.5H from fill slopes where H is the height of the fill slope.

Physical impairments (i.e., fire road egress, public safety considerations, etc.) that prevent full/partial infiltration.

The Otay Ranch Town Center mall exists adjacent to the south property margin. Infiltration near buildings and improvements should not be allowed, nor should any BMP devices that would prevent or limit access to existing structures.

Consideration of site design alternative to achieve partial/full infiltration within the DMA.

Based on the existing fill materials, utilities and slopes, full and partial infiltration should not be allowed on the property.

The extent site design BMPs requirements were included in the overall design.

BMPs, including an underground storage facility and Modular Wetlands System are being incorporated into the site design for storm water management. These devices should not allow infiltration into the surrounding soil.

Conclusion or recommendation from the geotechnical engineer regarding the DMA's infiltration condition.

The property is underlain by up to approximately 25 feet of previously placed fill materials Based the discussion herein, we opine full and partial infiltration is considered infeasible at the site. We recommend storm water management BMPs be designed so that infiltration does not occur.

An Exhibit for all applicable DMA's that clearly labels:

- **Proposed development areas and development type.**
- **All applicable features and setbacks that prevent partial or full infiltration, including underground utilities, structures, retaining walls, fill slopes, natural slopes, and existing fill materials greater than 5 feet.**
- **Potential locations for structural BMPs.**
- **Areas where full/partial infiltration BMPs cannot be proposed.**

The Geologic Map, Figure 1, is presented as a base map. The figure shows the proposed development area and proposed buildings and improvements, and the area on the site infeasible to infiltration due to existing fill, utilities/improvements, slope areas and property line limits. We opine the entire project site is infeasible for infiltration.

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

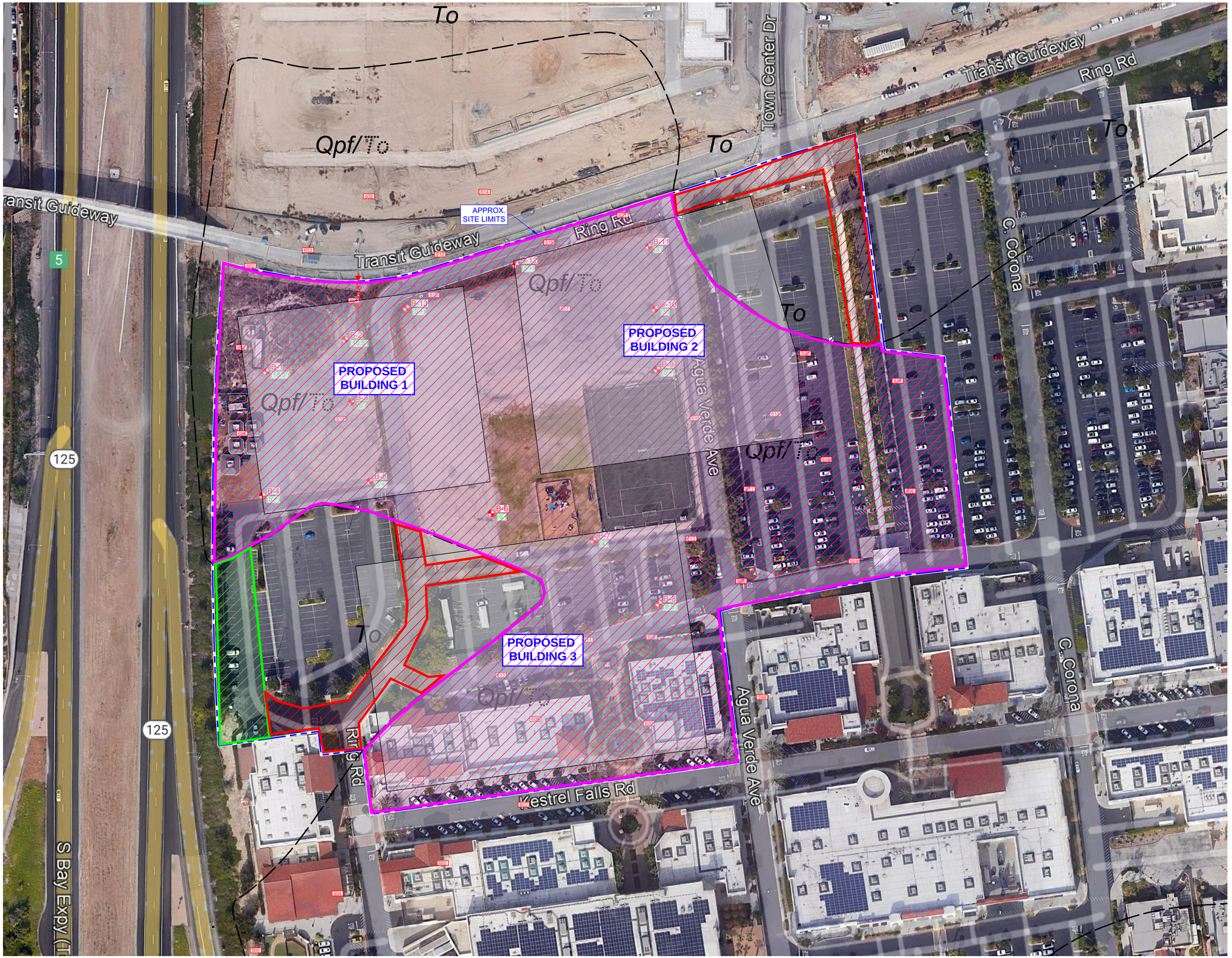
Very truly yours,

GEOCON INCORPORATED

Shawn Foy Weedon
GE 2714

SFW:kv

(e-mail) Addressee



GRAPHIC SCALE

0' 30' 60' 90' 120' 180' 240'

SCALE 1"=60' (on 36x24)

GEOCON LEGEND

Qpf .....PREVIOUSLY PLACED FILL (Geotechnics, Inc. 2005)

To .....OTAY FORMATION (Dotted Where Buried)

.....APPROX. LOCATION OF GEOLOGIC CONTACT

B-13 .....APPROX. LOCATION OF BORING (Geocon, Inc. 2014)

(5'+) .....APPROX. DEPTH OF FILL (In Feet)

613 .....APPROX. ELEVATION AT BASE OF FILL (In Feet, MSL)

.....NO INFILTRATION DUE TO EXISTING UTILITIES, IMPROVEMENTS, AND PROPERTY LINE LIMITS (OUTSIDE FILL AREAS)

.....NO INFILTRATION DUE TO EXISTING FILL 5+ FT.

.....NO INFILTRATION DUE TO EXISTING SLOPE

GEOLOGIC MAP

OTAY RANCH TOWN CENTER
CHULA VISTA, CALIFORNIA

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

SCALE	1" = 60'	DATE	07-28-2022
PROJECT NO.	G2883 - 52 - 01		FIGURE 1
SHEET	1 OF 1		

Plotted:02/04/2022 8:53AM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\G2883-52-01 (OR Town Center)\SHEETS\G2883-52-01 Geo Map.dwg

LIST OF REFERENCES

1. City of Chula Vista (2021), *BMP Design Manual*, dated March 2019, updated August 2021.

2. Geocon Incorporated (2022), *Geotechnical Reconnaissance Report, Otay Ranch Center, Chula Vista, California*, prepared by Geocon Incorporated, dated February 4, 2022 (Project No. G2883-52-01).

3. Geocon Incorporated (2014), *Preliminary Geotechnical Investigation, Otay Ranch Town Center Addition, Otay Ranch Village 12, 2015 Birch Road, Chula Vista, California,* prepared by Geocon Incorporated, dated June 26, 2014 (Project No. G1731-11-01).

4. Geotechnics Incorporated (2006), *As-Graded Geotechnical Report, McMillin Otay Ranch, Village 12 and Borrow and Fill Sites Within the Eastern Urban Center, Chula Vista, California,* prepared by Geotechnics Incorporated, dated February 16, 2006 (Project No. 0367-012-01, Document No. 05-1029).

5. Todd, V. R. (2004), *Preliminary Geologic Map of the El Cajon 30'x60' Quadrangle, Southern California, Version 1.0,* Open-File Report 2004-1361 Scale 1:100,000

6. Unpublished reports, aerial photographs, and maps on file with Geocon Incorporated.

Otay Town Center

Project Name: _____

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions	Form I-8A[1] (Worksheet C.4-1)
Part 1 - Full Infiltration Feasibility Screening Criteria	
DMA(s) Being Analyzed:	**Project Phase:**
DMA-1	Planning

Criteria 1: Infiltration Rate Screening	
1A	Is the mapped hydrologic soil group according to the NRCS Web Soil Survey or UC Davis Soil Web Mapper Type A or B and corroborated by available site soil data[2]? ☐ Yes; the DMA may feasibly support full infiltration. Answer "Yes" to Criteria 1 Result or continue to Step 1B if the applicant elects to perform infiltration testing. ☐ No; the mapped soil types are A or B but is not corroborated by available site soil data (continue to Step 1B). ☒ No; the mapped soil types are C, D, or "urban/unclassified" and is corroborated by available site soil data. Answer "No" to Criteria 1 Result. ☐ No; the mapped soil types are C, D, or "urban/unclassified" but is not corroborated by available site soil data (continue to Step 1B).
1B	Is the reliable infiltration rate calculated using planning phase methods from Table D.3-1? ☐ Yes; Continue to Step 1C. ☐ No; Skip to Step 1D.
1C	Is the reliable infiltration rate calculated using planning phase methods from Table D.3-1 greater than 0.5 inches per hour? ☐ Yes; the DMA may feasibly support full infiltration. Answer "Yes" to Criteria 1 Result. ☐ No; full infiltration is not required. Answer "No" to Criteria 1 Result.
1D	**Infiltration Testing Method.** Is the selected infiltration testing method suitable during the design phase (see Appendix D.3)? Note: Alternative testing standards may be allowed with appropriate rationales and documentation. ☐ Yes; continue to Step 1E. ☐ No; select an appropriate infiltration testing method.
1E	**Number of Percolation/Infiltration Tests.** Does the infiltration testing method performed satisfy the minimum number of tests specified in Table D.3-2? ☐ Yes; continue to Step 1F. ☐ No; conduct appropriate number of tests.

[1] This form must be completed each time there is a change to the site layout that would affect the infiltration feasibility condition. Previously completed forms shall be retained to document the evolution of the site storm water design.
[2] Available data includes site-specific sampling or observation of soil types or texture classes, such as obtained from borings or test pits necessary to support other design elements.

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Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions	Form I-8A[1] (Worksheet C.4-1)
IF	**Factor of Safety.** Is the suitable Factor of Safety selected for full infiltration design? See guidance in D.5; Tables D.5-1 and D.5-2; and Worksheet D.5-1 (Form I-9). ☐ Yes; continue to Step 1G. ☐ No; select appropriate factor of safety.
1G	**Full Infiltration Feasibility.** Is the average measured infiltration rate divided by the Factor of Safety greater than 0.5 inches per hour? ☐ Yes; answer "Yes" to Criteria 1 Result. ☐ No; answer "No" to Criteria 1 Result.
Criteria 1 Result	Is the estimated reliable infiltration rate greater than 0.5 inches per hour within the DMA where runoff can reasonably be routed to a BMP? ☐ Yes; the DMA may feasibly support full infiltration. Continue to Criteria 2. ☒ No; full infiltration is not required. Skip to Part 1 Result.
Summarize infiltration testing methods, testing locations, replicates, and results and summarize estimates of reliable infiltration rates according to procedures outlined in D.5. Documentation should be included in project geotechnical report. Please refer to Geotechical Reconnaissance Report performed by Geocon and dated February 4, 2022 in appendix 6.	
Criteria 2: Geologic/Geotechnical Screening	
2A	**If all questions in Step 2A are answered "Yes," continue to Step 2B.** For any "No" answer in Step 2A answer "No" to Criteria 2 and submit an "Infiltration Feasibility Condition Letter" that meets the requirements in Appendix C.1.1. The geologic/geotechnical analyses listed in Appendix C.2.1 do not apply to the DMA because one of the following setbacks cannot be avoided and therefore result in the DMA being in a no infiltration condition. The setbacks must be the closest horizontal radial distance from the surface edge (at the overflow elevation) of the BMP.

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Project Name: _____

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Form I-8A[1] (Worksheet C.4-1)	
2A-1	Can the proposed full infiltration BMP(s) avoid areas with existing fill materials greater than 5 feet thick below the infiltrating surface?	☐ Yes	☐ No
2A-2	Can the proposed full infiltration BMP(s) avoid placement within 10 feet of existing underground utilities, structures, or retaining walls?	☐ Yes	☐ No
2A-3	Can the proposed full infiltration BMP(s) avoid placement within 50 feet of a natural slope (>25%) or within a distance of 1.5H from fill slopes where H is the height of the fill slope?	☐ Yes	☐ No
2B	When full infiltration is determined to be feasible, a geotechnical investigation report must be prepared that considers the relevant factors identified in Appendix C.2.1. If all questions in Step 2B are answered "Yes," then answer "Yes" to Criteria 2 Result. If there are "No" answers continue to Step 2C.		
2B-1	**Hydroconsolidation.** Analyze hydroconsolidation potential per approved ASTM standard due to a proposed full infiltration BMP. Can full infiltration BMPs be proposed within the DMA without increasing hydroconsolidation risks?	☐ Yes	☐ No
2B-2	**Expansive Soils.** Identify expansive soils (soils with an expansion index greater than 20) and the extent of such soils due to proposed full infiltration BMPs. Can full infiltration BMPs be proposed within the DMA without increasing expansive soil risks?	☐ Yes	☐ No
2B-3	**Liquefaction**. If applicable, identify mapped liquefaction areas. Evaluate liquefaction hazards in accordance with Section 6.4.2 of the City of San Diego's Guidelines for Geotechnical Reports (2011 or most recent edition). Liquefaction hazard assessment shall take into account any increase in groundwater elevation or groundwater mounding that could occur as a result of proposed infiltration or percolation facilities. Can full infiltration BMPs be proposed within the DMA without increasing liquefaction risks?	☐ Yes	☐ No
2B-4	**Slope Stability**. If applicable, perform a slope stability analysis in accordance with the ASCE and Southern California Earthquake Center (2002) Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Landslide Hazards in California to determine minimum slope setbacks for full infiltration BMPs. See the City of San Diego's Guidelines for Geotechnical Reports (2011) to determine which type of slope stability analysis is required. Can full infiltration BMPs be proposed within the DMA without increasing slope stability risks?	☐ Yes	☐ No
2B-5	**Other Geotechnical Hazards.** Identify site-specific geotechnical hazards not already mentioned (refer to Appendix C.2.1). Can full infiltration BMPs be proposed within the DMA without increasing risk of geologic or geotechnical hazards not already mentioned?	☐ Yes	☐ No

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Project Name: _____

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Form I-8A[1] (Worksheet C.4-1)	
2B-6	**Setbacks.** Establish setbacks from underground utilities, structures, and/or retaining walls. Reference applicable ASTM or other recognized standard in the geotechnical report. Can full infiltration BMPs be proposed within the DMA using established setbacks from underground utilities, structures, and/or retaining walls?	☐ Yes	☐ No
2C	**Mitigation Measures.** Propose mitigation measures for each geologic/geotechnical hazard identified in Step 2B. Provide a discussion of geologic/geotechnical hazards that would prevent full infiltration BMPs that cannot be reasonably mitigated in the geotechnical report. See Appendix C.2.1.8 for a list of typically reasonable and typically unreasonable mitigation measures. Can mitigation measures be proposed to allow for full infiltration BMPs? If the question in Step 2 is answered "Yes," then answer "Yes" to Criteria 2 Result. If the question in Step 2C is answered "No," then answer "No" to Criteria 2 Result.	☐ Yes	☐ No
Criteria 2 Result	Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geologic or geotechnical hazards that cannot be reasonably mitigated to an acceptable level?	☐ Yes	☐ No
Summarize findings and basis; provide references to related reports or exhibits.			

Part 1 Result – Full Infiltration Geotechnical Screening [3]	**Result**
If answers to both Criteria 1 and Criteria 2 are "Yes", a full infiltration design is potentially feasible based on Geotechnical conditions only. If either answer to Criteria 1 or Criteria 2 is "No", a full infiltration design is not required.	☐ **Full infiltration Condition** ☒ **Complete Part 2**

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

Project Name: Otay Town Center

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions	Form I-8A[1] (Worksheet C.4-1)
Part 2 – Partial vs. No Infiltration Feasibility Screening Criteria	
DMA(s) Being Analyzed:	**Project Phase:**
DMA-1	Planning

Criteria 3 : Infiltration Rate Screening

3A	**NRCS Type C, D, or "urban/unclassified":** Is the mapped hydrologic soil group according to the NRCS Web Soil Survey or UC Davis Soil Web Mapper is Type C, D, or "urban/unclassified" and corroborated by available site soil data? ☐ Yes; the site is mapped as C soils and a reliable infiltration rate of 0.15 in/hr. is used to size partial infiltration BMPS. Answer "Yes" to Criteria 3 Result. ☒ Yes; the site is mapped as D soils or "urban/unclassified" and a reliable infiltration rate of 0.05 in/hr. is used to size partial infiltration BMPS. Answer "Yes" to Criteria 3 Result. ☐ No; infiltration testing is conducted (refer to Table D.3-1), continue to Step 3B.
3B	**Infiltration Testing Result:** Is the reliable infiltration rate (i.e. average measured infiltration rate/2) greater than 0.05 in/hr. and less than or equal to 0.5 in/hr? ☐ Yes; the site may support partial infiltration. Answer "Yes" to Criteria 3 Result. ☐ No; the reliable infiltration rate (i.e. average measured rate/2) is less than 0.05 in/hr., partial infiltration is not required. Answer "No" to Criteria 3 Result.
Criteria 3 Result	Is the estimated reliable infiltration rate (i.e., average measured infiltration rate/2) greater than or equal to 0.05 inches/hour and less than or equal to 0.5 inches/hour at any location within each DMA where runoff can reasonably be routed to a BMP? ☐ Yes; Continue to Criteria 4. ☐ No: Skip to Part 2 Result.

Summarize infiltration testing and/or mapping results (i.e. soil maps and series description used for infiltration rate).

Please refer to Geotechical Reconnaissance Report performed by Geocon and dated February 4, 2022 in appendix 6.

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Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Form I-8A[1] (Worksheet C.4-1)	
Criteria 4: Geologic/Geotechnical Screening			
4A	If all questions in Step 4A are answered "Yes," continue to Step 2B. For any "No" answer in Step 4A answer "No" to Criteria 4 Result, and submit an "Infiltration Feasibility Condition Letter" that meets the requirements in Appendix C.1.1. The geologic/geotechnical analyses listed in Appendix C.2.1 do not apply to the DMA because one of the following setbacks cannot be avoided and therefore result in the DMA being in a no infiltration condition. The setbacks must be the closest horizontal radial distance from the surface edge (at the overflow elevation) of the BMP.		
4A-1	Can the proposed partial infiltration BMP(s) avoid areas with existing fill materials greater than 5 feet thick?	☐ Yes	☐ No
4A-2	Can the proposed partial infiltration BMP(s) avoid placement within 10 feet of existing underground utilities, structures, or retaining walls?	☐ Yes	☐ No
4A-3	Can the proposed partial infiltration BMP(s) avoid placement within 50 feet of a natural slope (>25%) or within a distance of 1.5H from fill slopes where H is the height of the fill slope?	☐ Yes	☐ No
4B	When full infiltration is determined to be feasible, a geotechnical investigation report must be prepared that considers the relevant factors identified in Appendix C.2.1. If all questions in Step 4B are answered "Yes," then answer "Yes" to Criteria 4 Result. If there are any "No" answers continue to Step 4C.		
4B-1	**Hydroconsolidation.** Analyze hydroconsolidation potential per approved ASTM standard due to a proposed full infiltration BMP. Can partial infiltration BMPs be proposed within the DMA without increasing hydroconsolidation risks?	☐ Yes	☐ No
4B-2	**Expansive Soils.** Identify expansive soils (soils with an expansion index greater than 20) and the extent of such soils due to proposed full infiltration BMPs. Can partial infiltration BMPs be proposed within the DMA without increasing expansive soil risks?	☐ Yes	☐ No
4B-3	**Liquefaction**. If applicable, identify mapped liquefaction areas. Evaluate liquefaction hazards in accordance with Section 6.4.2 of the City of San Diego's Guidelines for Geotechnical Reports (2011). Liquefaction hazard assessment shall take into account any increase in groundwater elevation or groundwater mounding that could occur as a result of proposed infiltration or percolation facilities. Can partial infiltration BMPs be proposed within the DMA without increasing liquefaction risks?	☐ Yes	☐ No

Project Name: _____

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Form I-8A[1] (Worksheet C.4-1)	
4B-4	**Slope Stability**. If applicable, perform a slope stability analysis in accordance with the ASCE and Southern California Earthquake Center (2002) Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Landslide Hazards in California to determine minimum slope setbacks for full infiltration BMPs. See the City of San Diego's Guidelines for Geotechnical Reports (2011) to determine which type of slope stability analysis is required. Can partial infiltration BMPs be proposed within the DMA without increasing slope stability risks?	☐ Yes	☐ No
4B-5	**Other Geotechnical Hazards.** Identify site-specific geotechnical hazards not already mentioned (refer to Appendix C.2.1). Can partial infiltration BMPs be proposed within the DMA without increasing risk of geologic or geotechnical hazards not already mentioned?	☐ Yes	☐ No
4B-6	**Setbacks.** Establish setbacks from underground utilities, structures, and/or retaining walls. Reference applicable ASTM or other recognized standard in the geotechnical report. Can partial infiltration BMPs be proposed within the DMA using recommended setbacks from underground utilities, structures, and/or retaining walls?	☐ Yes	☐ No
4C	**Mitigation Measures.** Propose mitigation measures for each geologic/geotechnical hazard identified in Step 4B. Provide a discussion on geologic/geotechnical hazards that would prevent partial infiltration BMPs that cannot be reasonably mitigated in the geotechnical report. See Appendix C.2.1.8 for a list of typically reasonable and typically unreasonable mitigation measures. Can mitigation measures be proposed to allow for partial infiltration BMPs? If the question in Step 4C is answered "Yes," then answer "Yes" to Criteria 4 Result. If the question in Step 4C is answered "No," then answer "No" to Criteria 4 Result.	☐ Yes	☐ No
Criteria 4 Result	Can infiltration of greater than or equal to 0.05 inches/hour and less than or equal to 0.5 inches/hour be allowed without increasing the risk of geologic or geotechnical hazards that cannot be reasonably mitigated to an acceptable level?	☐ Yes	☐ No

Project Name: Otay Town Center

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions	Form I-8A[1] (Worksheet C.4-1)
Summarize findings and basis; provide references to related reports or exhibits.	

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

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

ATTACHMENT 1e

POLLUTION CONTROL BMP DESIGN WORKSHEETS

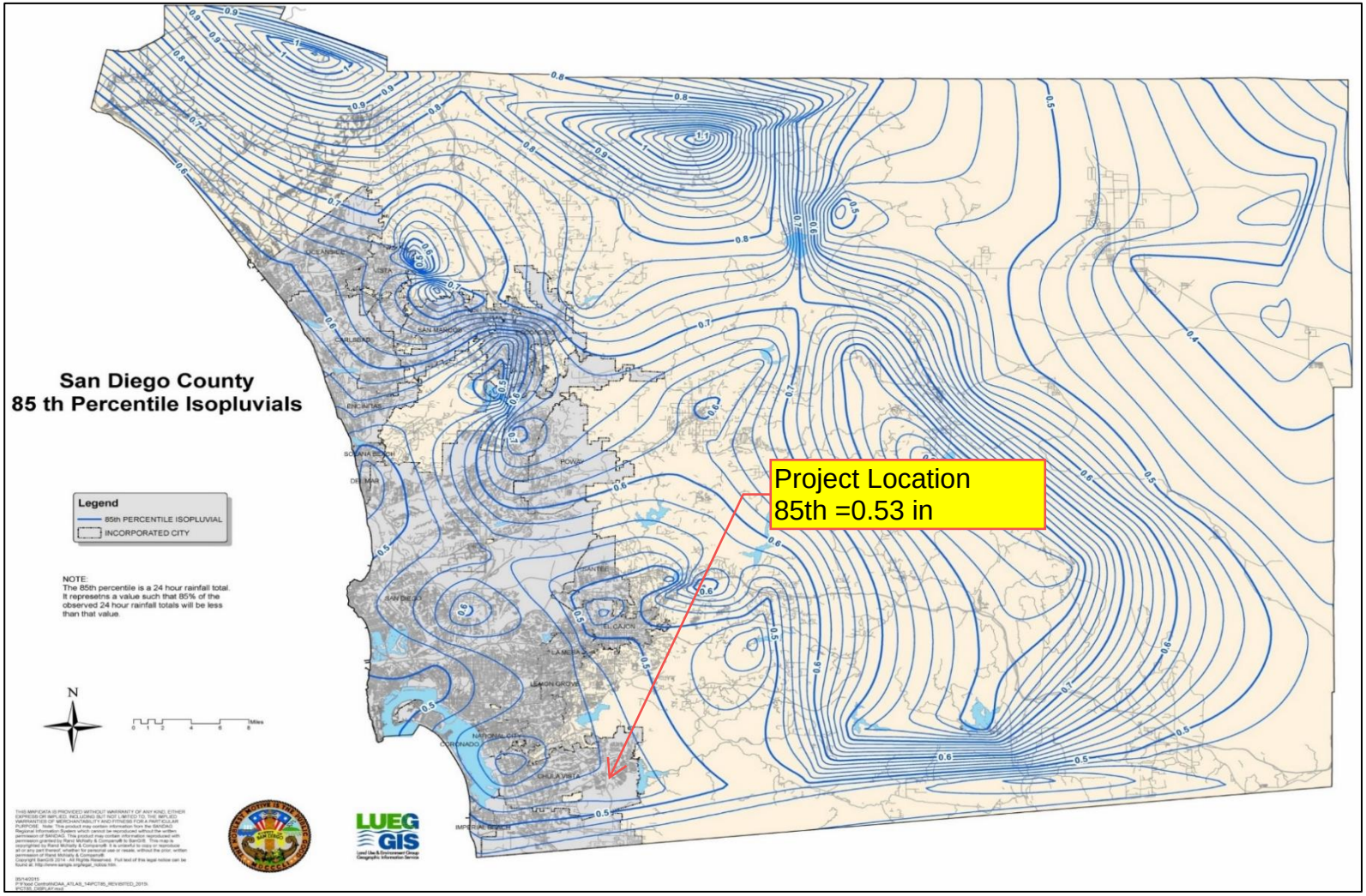


Figure B.1-1: 85th Percentile 24-hour Isopluvial Map

(b) The retention losses from the optimized biofiltration BMP are equal to or greater than the retention losses from the conventional biofiltration BMP. This second criterion is only applicable for partial infiltration condition.

For drawdown times that are outside the range of values presented in Table B.5-5 below, the storage unit should be designed to discharge greater than 92% average annual capture to the downstream Biofiltration BMP.

Table B.5-5: Storage required for different drawdown times

Drawdown Time (hours)	Storage requirement (below the overflow elevation, or below outlet elevation that bypass the biofiltration BMP)
12	0.85 DCV
24	1.25 DCV
36	1.50 DCV
48	1.80 DCV
72	2.20 DCV
96	2.60 DCV
120	2.80 DCV

	Imp. RF	Pervious RF-D	% Imp	DMA 1	Fraction of Total	Imp Area	Pervious Area	Summation RF x A	DMA 2	Fraction of Total	Imp Area	Pervious Area	Summation RF x A	DMA 3	Fraction of Total	Imp Area	Pervious Area	Summation RF x A
				SQFT		SQFT	SQFT		SQFT		SQFT	SQFT		SQFT		SQFT	SQFT	
PERVIOUS	0.90	0.10	0	74018	0.02	0	74018	7402	2258	0.03	0	2258	226	1098	0.03	0	1098	110
SIDEWALK	0.90	0.10	100	15593	0.03	15593	0	14033	1365	0.16	1365	0	1229	917	0.21	917	0	825
ROADS	0.90	0.10	100	96134	0.20	96134	0	86521	6665	0.80	6665	0	5999	3291	0.76	3291	0	2962
EX IMP/RESURFACING	0.90	0.10	VARIES	17021	0.03	17021	0	15319	N/A	-	-	-	-	0	0.00	0	0	0
LOT 1-2 PERVIOUS	0.90	0.10	0	31622	0.01	0	31622	3162	N/A	-	-	-	-	N/A	-	-	-	-
LOT 1-2 IMPERVIOUS	0.90	0.10	100	81886	0.17	81886	0	73697	N/A	-	-	-	-	N/A	-	-	-	-
LOT 3-4 PERVIOUS	0.90	0.10	0	40436	0.01	0	40436	4044	N/A	-	-	-	-	N/A	-	-	-	-
LOT 3-4 IMPERVIOUS	0.90	0.10	100	110234	0.23	110234	0	99211	N/A	-	-	-	-	N/A	-	-	-	-
LOT 5-8 PERVIOUS	0.90	0.10	0	31593	0.01	0	31593	3159	N/A	-	-	-	-	N/A	-	-	-	-
LOT 5-8 IMPERVIOUS	0.90	0.10	100	127391	0.26	127391	0	114652	N/A	-	-	-	-	N/A	-	-	-	-
LOT 9 PERVIOUS	0.90	0.10	0	982	0.00	0	982	98	N/A									
LOT 9 IMPERVIOUS	0.90	0.10	100	18650	0.04	18650	0	16785	N/A	-	-	-	-	N/A	-	-	-	-
				645559	1.00	466909	178651	438083	10289	1.00	8030	2258	7453	5306	1.00	4208	1098	3897
			%Imperv	72.33			Weighted C =	0.679	78.05			Weighted C =	0.724	79.30			Weighted C =	0.734

DMA 1: Design Capture Volume		Worksheet B-2.1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.53	inches
2	Area tributary to BMP (s)	A=	14.82	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.679	unitless
4	Street trees volume reduction	TCV=	0.00	cubic-feet
5	Rain barrels volume reduction	RCV=	0.00	cubic-feet
6	Calculate DCV= (3630 x C x d x A) - TCV - RCV	DCV=	19,349	cubic-feet

DMA 2: Design Capture Volume		Worksheet B-2.1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.53	inches
2	Area tributary to BMP (s)	A=	0.24	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.724	unitless
4	Street trees volume reduction	TCV=	0.00	cubic-feet
5	Rain barrels volume reduction	RCV=	0.00	cubic-feet
6	Calculate DCV= (3630 x C x d x A) - TCV - RCV	DCV=	329	cubic-feet

DMA 3: Design Capture Volume		Worksheet B-2.1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.53	inches
2	Area tributary to BMP (s)	A=	0.12	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.734	unitless
4	Street trees volume reduction	TCV=	0.00	cubic-feet
5	Rain barrels volume reduction	RCV=	0.00	cubic-feet
6	Calculate DCV= (3630 x C x d x A) - TCV - RCV	DCV=	172	cubic-feet

	Project Name	Otay Town Center	
	BMP ID	BF-1	
	hod for Volume Retention	**Worksheet B.5-2**	
1	Area draining to the BMP	**645559.20**	**sq. ft.**
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	**0.68**	
3	85th percentile 24-hour rainfall depth	**0.53**	**inches**
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]	**19349**	**cu. ft.**
Volume Retention Requirement			
5	Measured infiltration rate in the DMA Note: When mapped hydrologic soil groups are used enter 0.10 for NRCS Type D soils and for NRCS Type C soils enter 0.30 When in no infiltration condition and the actual measured infiltration rate is unknown enter 0.0 if there are geotechnical and/or groundwater hazards identified in Appendix C or enter 0.05	**0**	**in/hr.**
6	Factor of safety	**2**	
7	Reliable infiltration rate, for biofiltration BMP sizing [Line 5 / Line 6]	**0**	**in/hr.**
8	Average annual volume reduction target (Figure B.5-2) When Line 7 > 0.01 in/hr. = Minimum (40, 166.9 x Line 7 +6.62) When Line 7 ≤ 0.01 in/hr. = 3.5%	**3.5**	**%**
9	Fraction of DCV to be retained (Figure B.5-3) When Line 8 > 8% = 0.0000013 x Line 8^3 - 0.000057 x Line 8^2 + 0.0086 x Line 8 - 0.014 When Line 8 ≤ 8% = 0.023	**0.023**	
10	Target volume retention [Line 9 x Line 4]	**445**	**cu. ft.**

Pre-filter media life = 6 months

CITY OF CHULA VISTA	Project Name	Otay Town Center	
	BMP ID	BF-1	
Alternative Minimum Footprint Sizing Factor for		**Worksheet B.5-4**	
1	Area draining to the BMP	**645559.20**	**sq. ft.**
2	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	**0.68**	
3	Load to Clog (default value when using Appendix E fact sheets is 2.0)	**2**	**lb/sq. ft.**
4	Allowable Period to Accumulate Clogging Load (T_L) (default value is 10)	**0.5**	**years**

Volume Weighted EMC Calculation

Land Use	Fraction of Total DCV	TSS EMC (mg/L)	Product
Single Family Residential	**0**	123	**0**
Commercial	**0**	128	**0**
Industrial	**0**	125	**0**
Education (Municipal)	**0**	132	**0**
Transportation	**0**	78	**0**
Multi-family Residential	**0**	40	**0**
Roof Runoff	**0.66**	14	**9.24**
Low Traffic Areas	**0.29**	50	**14.5**
Open Space	**0.05**	216	**10.8**
Other, specify:			**0**
Other, specify:			**0**
Other, specify:			**0**

5	Volume Weighted EMC (sum of all products)	**34.54**	**mg/L**
Sizing Factor for Clogging			
6	Adjustment for pretreatment measures Where: Line 6 = 0 if no pretreatment; Line 6 = 0.25 when pretreatment is included; Line 6 = 0.5 if the pretreatment has an active Washington State TAPE approval rating for "pre-treatment."	**0**	
7	Average Annual Precipitation [Provide documentation of the data source in the discussion box; SanGIS has a GIS layer for average annual precipitation]	**12.8**	**inches**
8	Calculate the Average Annual Runoff (Line 7/12) x Line 1 x Line2	**467288**	**cu-ft/yr**
9	Calculate the Average Annual TSS Load (Line 8 x 62.4 x Line 5 x (1 – Line 6))/10^6	**1007**	**lb/yr**
10	Calculate the BMP Footprint Needed (Line 9 x Line 4)/Line 3	**252**	**sq. ft.**
11	Calculate the Minimum Footprint Sizing Factor for Clogging [Line 10/ (Line 1 x Line 2)]	**0.000575**	

Discussion:

Average Annual Precipitation was determined using the GIS layes for it from SanGIS.

CITY OF CHULA VISTA	Project Name	Otay Town Center	
	BMP ID	BF-1	

Optimized Biofiltration BMP Footprint when Downstream of a Storage Unit			Worksheet B.5-5	
1	Area draining to the storage unit and biofiltration BMP		**645559.20**	**sq. ft.**
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)		**0.68**	
3	Effective impervious area draining to the storage unit and biofiltration BMP [Line 1 x Line 2]		**438082.8116**	**sq. ft.**
4	Remaining DCV after implementing retention BMPs		**18,904**	**cu. ft.**
5	Design infiltration rate (measured infiltration rate / 2)		**0**	**ft./hr.**
6	Media thickness [1.5 feet minimum], also add mulch layer and washed ASTM 33 fine aggregate sand thickness to this line for sizing calculations 20" Media		**1.666666667**	**ft.**
7	Media filtration rate to be used for sizing (0.42 ft/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate)		**8.333333**	**ft./hr.**
8	Media retained pore space		**0.05**	**in/in**
Storage Unit Requirement				
9	Drawdown time of the storage unit, minimum(from the elevation that bypasses the biofiltration BMP, overflow elevation)		**36**	**hours**
10	Storage required to achieve greater than 92 percent capture (see Table B.5-5)		**1.5**	**fraction**
11	Storage required in cubic feet (Line 4 x Line 10)		**28355.45758**	**cu. ft.**
12	Storage provided in the design, minimum(from the elevation that bypasses the biofiltration BMP, overflow elevation)		**29400**	**cu. ft.**
13	Is Line 12 ≥ Line 11?	Storage Requirement is Met		
Criteria 1: BMP Footprint Biofiltration Capacity				
14	Peak flow from the storage unit to the biofiltration BMP (using the elevation used to evaluate the percent capture)		**0.4142**	**cfs**
15	Required biofiltration footprint [(3,600 x Line 14)/Line 7]		**179**	**sq. ft.**
Criteria 2: Alternative Minimum Sizing Factor (Clogging)				
16	Alternative Minimum Footprint Sizing Factor [Line 11 of Worksheet B.5-4]		**0.000575**	**fraction**
17	Required biofiltration footprint [Line 3 x Line 16]		**252**	**sq. ft.**
Criteria 3: Retention requirement [Not applicable for No Infiltration Condition]				
18	Retention Target (Line 10 in Worksheet B.5-2)			**cu. ft.**
19	Average discharge rate from the storage unit to the biofiltration BMP			**cfs**
20	Depth retained in the optimized biofiltration BMP {Line 6 x Line 8} + {[(Line 4)/(2400 x Line 19)] x Line 5}		**0**	**ft**
21	Required optimized biofiltration footprint (Line 18/Line 20)		**0**	**sq. ft.**
Optimized Biofiltration Footprint				
22	Optimized biofiltration footprint, maximum(Line 15, Line 17, Line 21)		**252**	**sq. ft.**

From TAPE Certification 100 in/hr

390 per sizing letter.
Please see page 89

CITY OF CHULA VISTA		Project Name	Otay Town Center				
		BMP ID	BF-1				
Volume Retention for No Infiltration Condition					**Worksheet B.5-6**		
1	Area draining to the biofiltration BMP					**645559.20**	**sq. ft.**
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)					**0.68**	
3	Effective impervious area draining to the BMP [Line 1 x Line 2]					**438083**	**sq. ft.**
4	Required area for Evapotranspiration [Line 3 x 0.03]					**13142**	**sq. ft.**
5	Biofiltration BMP Footprint					**256**	**sq. ft.**
Landscape Area (must be identified on DS-3247)							
		Identification	**1**	**2**	**3**	**4**	**5**
6	Landscape area that meet the requirements in SD-B and SD-F Fact Sheet (sq. ft.)		13500				
7	Impervious area draining to the landscape area (sq. ft.)		20250				
8	Impervious to Pervious Area ratio [Line 7/Line 6]		**1.50**	**0.00**	**0.00**	**0.00**	**0.00**
9	Effective Credit Area If (Line 8 >1.5, Line 6, Line 7/1.5]		**13500**	**0**	**0**	**0**	**0**
10	Sum of Landscape area [sum of Line 9 Id's 1 to 5]					**13500**	**sq. ft.**
11	Provided footprint for evapotranspiration [Line 5 + Line 10]					**13756**	**sq. ft.**
Volume Retention Performance Standard							
12	Is Line 11 ≥ Line 4?				Volume Retention Performance Standard is Met		
13	Fraction of the performance standard met through the BMP footprint and/or landscaping [Line 11/Line 4]					**1.05**	
14	Target Volume Retention [Line 10 from Worksheet B.5.2]					**445**	**cu. ft.**
15	Volume retention required from other site design BMPs [(1-Line 13) x Line 14]					**-22.25**	**cu. ft.**
Site Design BMP							
	Identification	**Site Design Type**			**Credit**		
16	**1**						**cu. ft.**
	2						**cu. ft.**
	3						**cu. ft.**
	4						**cu. ft.**
	5						**cu. ft.**
	Sum of volume retention benefits from other site design BMPs (e.g. trees; rain barrels etc.). [sum of Line 16 Credits for Id's 1 to 5] Provide documentation of how the site design credit is calculated in the PDP SWQMP.				**0**		**cu. ft.**
17	Is Line 16 ≥ Line 15?				Volume Retention Performance Standard is Met		

	Project Name	Otay Town Center	
	BMP ID	BF-2	
	hod for Volume Retention	**Worksheet B.5-2**	
1	Area draining to the BMP	**10288.57**	**sq. ft.**
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	**0.72**	
3	85th percentile 24-hour rainfall depth	**0.53**	**inches**
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]	**329**	**cu. ft.**
Volume Retention Requirement			
5	Measured infiltration rate in the DMA Note: When mapped hydrologic soil groups are used enter 0.10 for NRCS Type D soils and for NRCS Type C soils enter 0.30 When in no infiltration condition and the actual measured infiltration rate is unknown enter 0.0 if there are geotechnical and/or groundwater hazards identified in Appendix C or enter 0.05	**0**	**in/hr.**
6	Factor of safety	**2**	
7	Reliable infiltration rate, for biofiltration BMP sizing [Line 5 / Line 6]	**0**	**in/hr.**
8	Average annual volume reduction target (Figure B.5-2) When Line 7 > 0.01 in/hr. = Minimum (40, 166.9 x Line 7 +6.62) When Line 7 ≤ 0.01 in/hr. = 3.5%	**3.5**	**%**
9	Fraction of DCV to be retained (Figure B.5-3) When Line 8 > 8% = 0.0000013 x Line 8^3 - 0.000057 x Line 8^2 + 0.0086 x Line 8 - 0.014 When Line 8 ≤ 8% = 0.023	**0.023**	
10	Target volume retention [Line 9 x Line 4]	**8**	**cu. ft.**

CITY OF CHULA VISTA		Project Name	Otay Town Center				
		BMP ID	BF-2				
Volume Retention for No Infiltration Condition					**Worksheet B.5-6**		
1	Area draining to the biofiltration BMP				**10288.57**	**sq. ft.**	
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)				**0.72**		
3	Effective impervious area draining to the BMP [Line 1 x Line 2]				**7453**	**sq. ft.**	
4	Required area for Evapotranspiration [Line 3 x 0.03]				**224**	**sq. ft.**	
5	Biofiltration BMP Footprint				**16**	**sq. ft.**	
Landscape Area (must be identified on DS-3247)							
		Identification	**1**	**2**	**3**	**4**	**5**
6	Landscape area that meet the requirements in SD-B and SD-F Fact Sheet (sq. ft.)						
7	Impervious area draining to the landscape area (sq. ft.)						
8	Impervious to Pervious Area ratio [Line 7/Line 6]		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
9	Effective Credit Area If (Line 8 >1.5, Line 6, Line 7/1.5]		**0**	**0**	**0**	**0**	**0**
10	Sum of Landscape area [sum of Line 9 Id's 1 to 5]				**0**		**sq. ft.**
11	Provided footprint for evapotranspiration [Line 5 + Line 10]				**16**		**sq. ft.**
Volume Retention Performance Standard							
12	Is Line 11 ≥ Line 4?			No, Proceed to Line 13			
13	Fraction of the performance standard met through the BMP footprint and/or landscaping [Line 11/Line 4]				**0.07**		
14	Target Volume Retention [Line 10 from Worksheet B.5.2]				**8**		**cu. ft.**
15	Volume retention required from other site design BMPs [(1-Line 13) x Line 14]				**7.04**		**cu. ft.**
Site Design BMP							
	Identification	**Site Design Type**			**Credit**		
16	**1**	Credits from DMA-1			**7.5**		**cu. ft.**
	2						**cu. ft.**
	3						**cu. ft.**
	4						**cu. ft.**
	5						**cu. ft.**
	Sum of volume retention benefits from other site design BMPs (e.g. trees; rain barrels etc.). [sum of Line 16 Credits for Id's 1 to 5] Provide documentation of how the site design credit is calculated in the PDP SWQMP.				**7.5**		**cu. ft.**
17	Is Line 16 ≥ Line 15?			Volume Retention Performance Standard is Met			

	Project Name	Otay Town Center	
	BMP ID	BF-3	
	hod for Volume Retention	**Worksheet B.5-2**	
1	Area draining to the BMP	**5305.59**	**sq. ft.**
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	**0.73**	
3	85th percentile 24-hour rainfall depth	**0.53**	**inches**
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]	**172**	**cu. ft.**
Volume Retention Requirement			
5	Measured infiltration rate in the DMA Note: When mapped hydrologic soil groups are used enter 0.10 for NRCS Type D soils and for NRCS Type C soils enter 0.30 When in no infiltration condition and the actual measured infiltration rate is unknown enter 0.0 if there are geotechnical and/or groundwater hazards identified in Appendix C or enter 0.05	**0**	**in/hr.**
6	Factor of safety	**2**	
7	Reliable infiltration rate, for biofiltration BMP sizing [Line 5 / Line 6]	**0**	**in/hr.**
8	Average annual volume reduction target (Figure B.5-2) When Line 7 > 0.01 in/hr. = Minimum (40, 166.9 x Line 7 +6.62) When Line 7 ≤ 0.01 in/hr. = 3.5%	**3.5**	**%**
9	Fraction of DCV to be retained (Figure B.5-3) When Line 8 > 8% = 0.0000013 x Line 8^3 - 0.000057 x Line 8^2 + 0.0086 x Line 8 - 0.014 When Line 8 ≤ 8% = 0.023	**0.023**	
10	Target volume retention [Line 9 x Line 4]	**4**	**cu. ft.**

CITY OF CHULA VISTA		Project Name	Otay Town Center				
		BMP ID	BF-3				
Volume Retention for No Infiltration Condition						**Worksheet B.5-6**	
1	Area draining to the biofiltration BMP					**5305.59**	**sq. ft.**
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)					**0.73**	
3	Effective impervious area draining to the BMP [Line 1 x Line 2]					**3897**	**sq. ft.**
4	Required area for Evapotranspiration [Line 3 x 0.03]					**117**	**sq. ft.**
5	Biofiltration BMP Footprint					**16**	**sq. ft.**
Landscape Area (must be identified on DS-3247)							
		Identification	**1**	**2**	**3**	**4**	**5**
6	Landscape area that meet the requirements in SD-B and SD-F Fact Sheet (sq. ft.)						
7	Impervious area draining to the landscape area (sq. ft.)						
8	Impervious to Pervious Area ratio [Line 7/Line 6]		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
9	Effective Credit Area If (Line 8 >1.5, Line 6, Line 7/1.5]		**0**	**0**	**0**	**0**	**0**
10	Sum of Landscape area [sum of Line 9 Id's 1 to 5]					**0**	**sq. ft.**
11	Provided footprint for evapotranspiration [Line 5 + Line 10]					**16**	**sq. ft.**
Volume Retention Performance Standard							
12	Is Line 11 ≥ Line 4?			No, Proceed to Line 13			
13	Fraction of the performance standard met through the BMP footprint and/or landscaping [Line 11/Line 4]					**0.14**	
14	Target Volume Retention [Line 10 from Worksheet B.5.2]					**4**	**cu. ft.**
15	Volume retention required from other site design BMPs [(1-Line 13) x Line 14]					**3.40**	**cu. ft.**
Site Design BMP							
	Identification	**Site Design Type**				**Credit**	
16	**1**	Credits from DMA-1				**3.5**	**cu. ft.**
	2						**cu. ft.**
	3						**cu. ft.**
	4						**cu. ft.**
	5						**cu. ft.**
	Sum of volume retention benefits from other site design BMPs (e.g. trees; rain barrels etc.). [sum of Line 16 Credits for Id's 1 to 5] Provide documentation of how the site design credit is calculated in the PDP SWQMP.					**3.5**	**cu. ft.**
17	Is Line 16 ≥ Line 15?			Volume Retention Performance Standard is Met			

Flow-Based Proprietary Biofiltration Sizing

OTAY TOWN CENTER			
Description	Units	Filterra Unit	Filterra Unit
Drainage Basin ID or Name	unitless	BF-3-2	BF-3-3
Location	N/A	DMA-2	DMA-3
Total Tributary Area	ac	0.236	0.122
Total Tributary Area	sq ft	10289	5306
Final Adjusted Runoff Factor	unitless	0.72	0.73
85th Percentile Design Rainfall Intensity	in/hr	0.2	0.2
WQ Flow Rate	CFS	0.034	0.018
Flow Rate Safety Factor	unitless	1.5	1.5
Design Flow Rate	CFS	0.051	0.027
Final Design Flow Rate	CFS	0.051	0.027
Modular Wetland Model	unitless	4-4	4-4
Modular Wetland Treatment Flow Rate (each)	CFS	0.065	0.065
Number of Units	#	1	1
Modular Wetland Treatment Flow Rate (Total)	CFS	0.065	0.065
Is The BMP Adequately Sized?	unitless	Yes	Yes

Filterra Sizing Spreadsheet
San Diego Region
Uniform Intensity Approach
Storm Intensity = 0.20 in/hr

Filterra Infiltration Rate = 175 (in/hr)
Filterra Flow per Square Foot = 0.00405 (ft3/sec/ft2)

Filterra Flow Rate, Q = 0.00405 ft3/sec x Filterra Surface Area
Rational Method, Q = C x I x A
San Diego Multiplier, M = 1.5

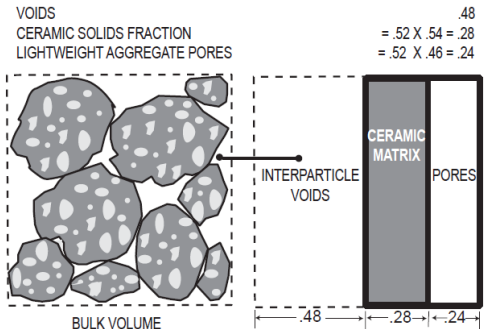
Site Flowrate, Q = (C x DI x DA x M x 43560) / (12 x3600)
OR DA = (12 x 3600 x Q) / (C x 43560 x DI x M)

where
Q = Flow (ft3/sec)
DA = Drainage Area (acres)
DI = Design Intensity (in/hr)
C = Runoff coefficient (dimensionless)
M = Multiplier (dimensionless)

			DI 0.2	C 0.95	C 0.85	C 0.50
Available Filterra Box Sizes			Filterra Flow Rate, Q	100% Imperv. DA	Commercial max DA	Residential max DA
L (ft)	W (ft)	Filterra Surface Area (ft2)	(ft3/sec)	(acres)	(acres)	(acres)
4	4	16	0.0648	0.226	0.252	0.429
6	4	24	0.0972	0.338	0.378	0.643
6.5	4	26	0.1053	0.367	0.410	0.696
8	4	32	0.1296	0.451	0.504	0.857
12	4	48	0.1944	0.677	0.756	1.286
6	6	36	0.1458	0.507	0.567	0.964
8	6	48	0.1944	0.677	0.756	1.286
10	6	60	0.2431	0.846	0.945	1.607
12	6	72	0.2917	1.015	1.134	1.928
13	7	91	0.3686	1.283	1.434	2.437
12	8	96	0.3889	1.353	1.512	2.571
14	8	112	0.4537	1.579	1.765	3.000
16	8	128	0.5185	1.804	2.017	3.428
18	8	144	0.5833	2.030	2.269	3.857
20	8	160	0.6481	2.255	2.521	4.285
22	8	176	0.7130	2.481	2.773	4.714

CALCULATION SHEET FOR EVAPOTRANSPIRATION INSIDE THE MODULAR WETLAND SYSTEM LINEAR

The Modular Wetland System Linear is a biofiltration system utilizing a highly porous bioretention media bed capable of maximizing pollutant removal and reducing volume through evapotranspiration. The media used in the system, known as WetlandMedia, is composed of a non-organic material mix which has a large percentage of interparticle and internal pore space:



Porosity:

- Interparticle Void Percentage = 0.48
- Internal Pore Space (inside particles) = 0.24
- Total Void Space Percentage = 0.72

Benefits:

- Physically Inert
- Greater Surface Area & Porosity
- Excellent Hydraulic Conductivity
- Reduced Weight
- Employs Ion Exchange
- Absorbs High Levels of Moisture for Better Plant Propagation
- Lightweight
- Contains various oxides for removal of dissolved pollutants

Calculating Evapotranspiration:

Several studies have been performed to calculate the amount of evapotranspiration from the biofiltration system. It has been found that it is a function of the moisture holding capacity of the material and it's relation to the "welting point". Much of this work has been done by Geosyntec. In 2016, the City of San Diego released the new "Storm Water Standards Manual" and "Part 1: BMP Design

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Manual – Appendices". The manual and appendices was prepared by Geosyntec Consultants and Michael Baker International.

Page G-23 of the above referenced manual provides the following method of calculating the amount of evapotranspiration that can occur within the soil layer of biofiltration systems:

> *This process layer is typically composed of an amended soil or compost mix. Water that infiltrates into this component is stored in the soil void space and is available for evapotranspiration via plant roots or can percolate into the storage layer below. The following parameters are used:*
>
> - *Thickness: This parameter represents the depth of the amended soil layer.*
> - *Porosity: Ratio of pore space volume to soil volume.*
> - *Field Capacity: Pore water volume ratio after the soil has been drained.*
> - *Wilting Point: Pore water volume ratio after the soil has been dried.*
> - *Conductivity: This represents the saturated hydraulic conductivity.*
> - *Conductivity Slope: Rate at which conductivity decreases with decreasing soil moisture content.*
> - *Suction Head: This represents the capillary tension of water in the soil.*
> - *Porosity, conductivity and suction head values as a function of soil texture were included in Table G.1-5. The flow of water through partially saturated soil is less than under fully saturated conditions. The SWMM program accounts for this reduced hydraulic conductivity to predict the rate at which infiltrated water moves through a layer of unsaturated soil when modeling groundwater or LID controls. The conductivity slope is a dimensionless curve-fitting parameter that relates the partially saturated hydraulic conductivity to the soil moisture content.*

The Modular Wetland System Linear has the following parameters related to evapotranspiration as described above:

- Thickness: 20"
- Porosity (interparticle + internal): 0.72
- Field Capacity: 0.24 (50% of interparticle void space at 0.48 due to capillary tension + 100% of internal void space at 0.24 = (50% x 0.48) + (100% x 0.24)): 0.48
- Welting Point: 0.1 (standard from Manual based on field research done by Geosyntec)
- Conductivity: > 395 in/hr

The following diagram taken from the San Diego Manual illustrates soil saturation, field capacity and permanent wilting point:

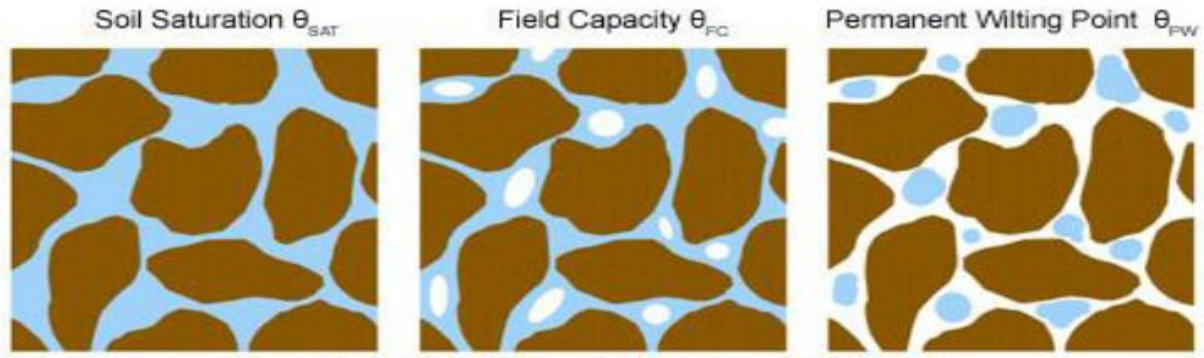

Figure G.1-4: Soil saturation, field capacity, and wilting point

The following worksheet can be used to calculate the amount of volume reduction provided through the process of evapotranspiration in the Modular Wetland System Linear:

Sizing Method of Evapotranspiration Losses in Biofiltration BMPs			
Project Name			
Model #			
Media Volume Calculations			
1	Media bed width	0	ft
2	Media bed length	0	ft
3	Media bed height	0	ft
4	Total media volume [Line 1 x 2 x 3]	0	cu ft
Evapotranspiration Calculations			
5	Porosity	0.72	
6	Field Capacity	0.48	
7	Welting Point	0.1	
8	Water Storage Capacity [Line 4 x Line 5]	0.0	cu ft
9	Field Capacity - Welting Point [Line 6 - Line 7]	0.38	
10	Total Evapotranspiration [Line 4 x Line 9]	0.0	cu ft

This worksheet and supporting data can be used and can be included in your technical report. If you have any questions please call us at 760-433-7640 or email us at info@modularwetlands.com

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Date: 02-13-23

Project: 722608 - Otay Town Center

To Whom It May Concern,

The MWS Linear will be sized in accordance with its TAPE GULD approval. The system is approved at a loading rate less than or equal to 1 gpm/sq ft or 100 inches per hour. The MWS Linear has General Use Level Designation at this loading rate for TSS (Basic), phosphorous and dissolved metals (Enhanced). For this project design, sizing, loading will be reviewed by a Modular Wetland representative for final approval to ensure the system is sized appropriately.

For this project we are utilizing a custom MWS sized volume based system. Due to the volume sizing we are using a safety factor on our media loading rate and only sizing at a loading rate of 0.26 gpm/sf. Using a safety factor will greatly prolong the life of the WetlandMEDIA and decrease the long term maintenance costs.

BF-3-1 – Two MWS0816 units
Wetland Perimeter Length = 59.20'
Treatment HGL = 3.3'
Media Surface Area Provided = 195.36 sf (Combined Surface Area Provided = 390.72 sf)
Average Discharge Rate = 50.79 gpm
WetlandMEDIA Loading Rate = 0.26 gpm/sf or 26 inches per hour

If you have any comments or questions please feel free to contact us at your convenience.

Sincerely,

Mason Noble

Stormwater Engineer

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FOR ALL VOLUME-BASED PROPRIETARY BIOFILTRATION UNITS BF-1 UNIT #1 AND #2

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

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

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

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

Section 1: Biofiltration Criteria Checklist (Appendix F)

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

Criteria	Answer	Progression
Criteria 1 and 3: What is the infiltration condition of the DMA? Refer to Section 5.4.2 and Appendix C of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance. Applicant must complete and include the following in the PDP SWQMP submittal to support the feasibility determination: • Infiltration Feasibility Condition Letter; or • Worksheet C.4-1: Form I-8A and Worksheet C.4-2: Form I-8B. Applicant must complete and include all applicable sizing worksheets in the SWQMP submittal	☐ Full Infiltration Condition	**Stop**. Compact biofiltration BMP is not allowed.
	☐ Partial Infiltration Condition	Compact biofiltration BMP is only allowed, if the target volume retention is met onsite (Refer to Table B.5-1 in Appendix B.5). Use Worksheet B.5-2 in Appendix B.5 to estimate the target volume retention (Note: retention in this context means reduction). If the required volume reduction is achieved **proceed to Criteria 2**. If the required volume reduction is not achieved, compact biofiltration BMP is not allowed. **Stop**.
	☒ No Infiltration Condition	Compact biofiltration BMP is allowed if volume retention criteria in Table B.5-1 in Appendix B.5 for the no infiltration condition is met. Compliance with this criterion must be documented in the PDP SWQMP. If the criteria in Table B.5-1 is met **proceed to Criteria 2**. If the criteria in Table B.5-1 is not met, compact biofiltration BMP is not allowed. **Stop**.

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

Provide basis for Criteria 1 and 3:

Feasibility Analysis:

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

If Partial Infiltration Condition:

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

If No Infiltration Condition:

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

Criteria	Answer	Progression
Criteria 2: Is the compact biofiltration BMP sized to meet the performance standard from the MS4 Permit? Refer to Appendix B.5 and Appendix F.2 of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	☐ Meets Flow based Criteria	Use guidance from **Appendix F.2.2** to size the compact biofiltration BMP to meet the flow based criteria. Include the calculations in the PDP SWQMP. Use parameters for sizing consistent with manufacturer guidelines and conditions of its third party certifications (i.e. a BMP certified at a loading rate of 1 gpm/sq. ft. cannot be designed using a loading rate of 1.5 gpm/sq. ft.) **Proceed to Criteria 4.**
	☒ Meets Volume based Criteria	Provide documentation that the compact biofiltration BMP has a total static (i.e. non-routed) storage volume, including pore-spaces and pre-filter detention volume (Refer to Appendix B.5 for a schematic) of at least 0.75 times the portion of the DCV not reliably retained onsite. **Proceed to Criteria 4.**
	☐ Does not Meet either criteria	**Stop**. Compact biofiltration BMP is not allowed.

Provide basis for Criteria 2:

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

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

Provide basis for Criteria 4:

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

Compact (high rate) Biofiltration BMP Checklist		Form I-10
Criteria	**Answer**	**Progression**
<u>Criteria 5</u>: Is the compact biofiltration BMP designed to promote appropriate biological activity to support and maintain treatment process? Refer to Appendix F of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	☒ Yes	Provide documentation that the compact biofiltration BMP support appropriate biological activity. Refer to Appendix F for guidance. **Proceed to Criteria 6.**
	☐ No	**Stop**. Compact biofiltration BMP is not allowed.
Provide basis for Criteria 5: Provide documentation that appropriate biological activity is supported by the compact biofiltration BMP to maintain treatment process.		
Criteria	**Answer**	**Progression**
<u>Criteria 6</u>: Is the compact biofiltration BMP designed with a hydraulic loading rate to prevent erosion, scour and channeling within the BMP?	☒ Yes	Provide documentation that the compact biofiltration BMP is used in a manner consistent with manufacturer guidelines and conditions of its third-party certification. **Proceed to Criteria 7.**
	☐ No	**Stop**. Compact biofiltration BMP is not allowed.
Provide basis for Criteria 6: Provide documentation that the BMP meets the numeric criteria and is designed consistent with the manufacturer guidelines and conditions of its third-party certification (i.e., maximum tributary area, maximum inflow velocities, etc., as applicable).		

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

Provide basis for Criteria 7:

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

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

FOR ALL FLOW-BASED PROPRIETARY BIOFILTRATION UNITS BF-2 AND BF-3

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

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

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

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

Section 1: Biofiltration Criteria Checklist (Appendix F)

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

Criteria	Answer	Progression
Criteria 1 and 3: What is the infiltration condition of the DMA? Refer to Section 5.4.2 and Appendix C of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance. Applicant must complete and include the following in the PDP SWQMP submittal to support the feasibility determination: • Infiltration Feasibility Condition Letter; or • Worksheet C.4-1: Form I-8A and Worksheet C.4-2: Form I-8B. Applicant must complete and include all applicable sizing worksheets in the SWQMP submittal	○ Full Infiltration Condition	**Stop**. Compact biofiltration BMP is not allowed.
	○ Partial Infiltration Condition	Compact biofiltration BMP is only allowed, if the target volume retention is met onsite (Refer to Table B.5-1 in Appendix B.5). Use Worksheet B.5-2 in Appendix B.5 to estimate the target volume retention (Note: retention in this context means reduction). If the required volume reduction is achieved **proceed to Criteria 2**. If the required volume reduction is not achieved, compact biofiltration BMP is not allowed. **Stop**.
	◉ No Infiltration Condition	Compact biofiltration BMP is allowed if volume retention criteria in Table B.5-1 in Appendix B.5 for the no infiltration condition is met. Compliance with this criterion must be documented in the PDP SWQMP. If the criteria in Table B.5-1 is met **proceed to Criteria 2**. If the criteria in Table B.5-1 is not met, compact biofiltration BMP is not allowed. **Stop**.

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

Provide basis for Criteria 1 and 3:

Feasibility Analysis:

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

If Partial Infiltration Condition:

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

If No Infiltration Condition:

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

Criteria	Answer	Progression
Criteria 2: Is the compact biofiltration BMP sized to meet the performance standard from the MS4 Permit? Refer to Appendix B.5 and Appendix F.2 of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	◉ Meets Flow based Criteria	Use guidance from **Appendix F.2.2** to size the compact biofiltration BMP to meet the flow based criteria. Include the calculations in the PDP SWQMP. Use parameters for sizing consistent with manufacturer guidelines and conditions of its third party certifications (i.e. a BMP certified at a loading rate of 1 gpm/sq. ft. cannot be designed using a loading rate of 1.5 gpm/sq. ft.) **Proceed to Criteria 4.**
	☐ Meets Volume based Criteria	Provide documentation that the compact biofiltration BMP has a total static (i.e. non-routed) storage volume, including pore-spaces and pre-filter detention volume (Refer to Appendix B.5 for a schematic) of at least 0.75 times the portion of the DCV not reliably retained onsite. **Proceed to Criteria 4.**
	☐ Does not Meet either criteria	**Stop**. Compact biofiltration BMP is not allowed.

Provide basis for Criteria 2:

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

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

Provide basis for Criteria 4:

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

Compact (high rate) Biofiltration BMP Checklist		Form I-10
Criteria	**Answer**	**Progression**
<u>Criteria 5</u>: Is the compact biofiltration BMP designed to promote appropriate biological activity to support and maintain treatment process? Refer to Appendix F of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	◉ Yes	Provide documentation that the compact biofiltration BMP support appropriate biological activity. Refer to Appendix F for guidance. **Proceed to Criteria 6.**
	○ No	**Stop**. Compact biofiltration BMP is not allowed.
Provide basis for Criteria 5: Provide documentation that appropriate biological activity is supported by the compact biofiltration BMP to maintain treatment process.		
Criteria	**Answer**	**Progression**
<u>Criteria 6</u>: Is the compact biofiltration BMP designed with a hydraulic loading rate to prevent erosion, scour and channeling within the BMP?	◉ Yes	Provide documentation that the compact biofiltration BMP is used in a manner consistent with manufacturer guidelines and conditions of its third-party certification. **Proceed to Criteria 7.**
	○ No	**Stop**. Compact biofiltration BMP is not allowed.
Provide basis for Criteria 6: Provide documentation that the BMP meets the numeric criteria and is designed consistent with the manufacturer guidelines and conditions of its third-party certification (i.e., maximum tributary area, maximum inflow velocities, etc., as applicable).		

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

Provide basis for Criteria 7:

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

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

ATTACHMENT 2

Backup for PDP Hydromodification Control Measures

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

Indicate which Items are Included

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

Project Name/ Otay Ranch Town Center

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

The Hydromodification Management Exhibit must identify:

- ☑ Underlying hydrologic soil group
- ☑ Approximate depth to groundwater
- ☑ Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
- ☑ Critical coarse sediment yield areas to be protected
- ☑ Existing topography
- ☑ Existing and proposed site drainage network and connections to drainage offsite
- ☑ Proposed grading
- ☑ Proposed impervious features
- ☑ Proposed design features and surface treatments used to minimize imperviousness
- ☑ Point(s) of Compliance (POC) for Hydromodification Management Hydromodification Management, with a POC at each point of discharge
- ☐ Existing and proposed drainage boundary and drainage area to each POC (when necessary, create separate exhibits for pre-development and post-project conditions)
- ☐ Structural BMPs for hydromodification management (identify location, type of BMP, cross-section and size/detail)

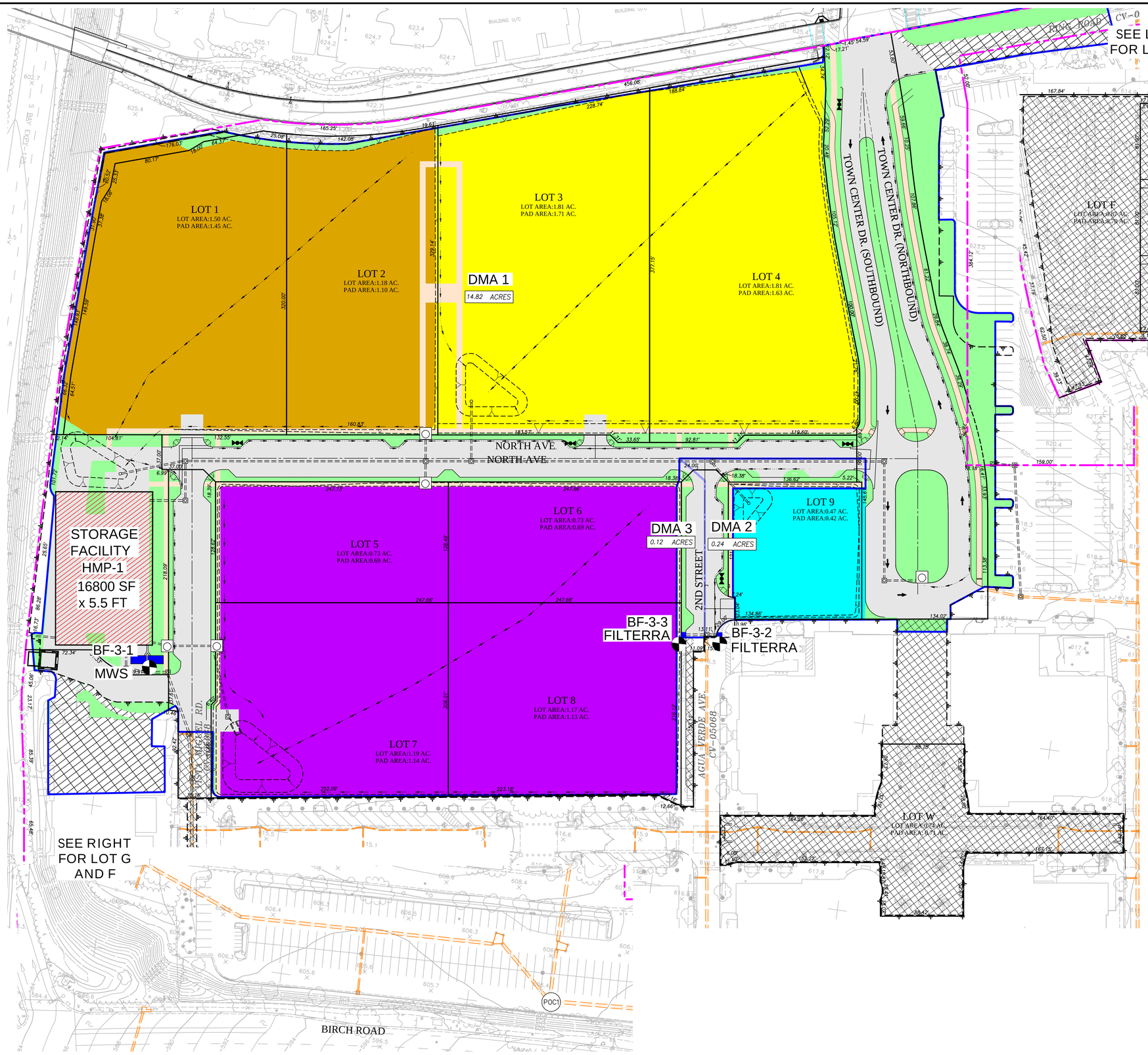
Project Name/_____

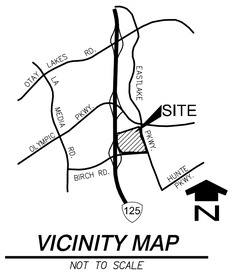
ATTACHMENT 3

Structural BMP Maintenance Information
Hydromodification Control Measures

ATTACHMENT 2a

HYDROMODIFICATION MANAGEMENT EXHIBITS





VICINITY MAP

NOT TO SCALE

LEGEND:

	SYMBOL:
PROJECT BOUNDARY	
DMA BOUNDARY	
DAYLIGHT	
PROPOSED STORM DRAIN	
EXISTING STORM DRAIN	
FLOW LINE	
SUBAREA ACREAGE	00.00 ACRES
DMA ICON	DMA 1
IMPERVIOUS - ROAD	
IMPERVIOUS - SIDEWALK	
PERVIOUS AREAS	
LOTS 1 AND 2	
LOTS 3 AND 4	
LOTS 5, 6, 7, AND 8	
LOT 9	
UNDERGROUND STORAGE FACILITY	
MWS UNIT	
TRENCHING & RESURFACING	
EX. IMPREVIOUSNESS DRAINING TO BMPS	
INLET	
HYDROLOGIC SOIL TYPE	D
POINT OF COMPLIANCE	X
STRUCTURAL BMP\ MWS UNIT	

50 0 50 100 150

SCALE 1" = 50'

PREPARED BY:

HUNSAKER & ASSOCIATES SAN DIEGO, INC

PLANNING
ENGINEERING
SURVEYING

9707 Waples Street
San Diego, Ca 92121
PH(858)558-4500 - FX(858)558-1414

HMP MAP

OTAY TOWN CENTER

CITY CHULA VISTA, CALIFORNIA

MAP 1 OF 2

W.O.# 3356-0002

LOT I

LOT 1

LOT 2

LOT 3

DMA 1

14.92 ACRES

LOT 4

LOT A

LOT B

LOT C

LOT 5

LOT 6

LOT 7

LOT 8

LOT 9

LOT 10

LOT D

LOT E

LOT F

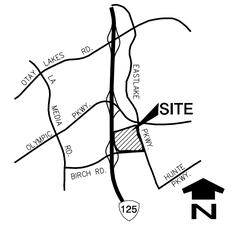
LOT G

LOT H

(OVER ALL LOT 1)

BUILDING U/C

PLAYGROUND



VICINITY MAP

NOT TO SCALE

LEGEND

- PROJECT BOUNDARY
- PROPOSED DMA BOUNDARY
- DAYLIGHT
- FLOW DIRECTION
- 00.00 ACRES — AREA
- D — HYDROLOGIC SOIL TYPE
- EXISTING IMPERVIOUS AREA
- EXISITNG STORM DRAIN

EXISTING IMPERVIOUS AREA = 10.3 AC

50 0 50 100 150

SCALE 1"= 50'

PREPARED BY:

HUNSAKER & ASSOCIATES SAN DIEGO, INC

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EXISTING HMP MAP

OTAY TOWN CENTER

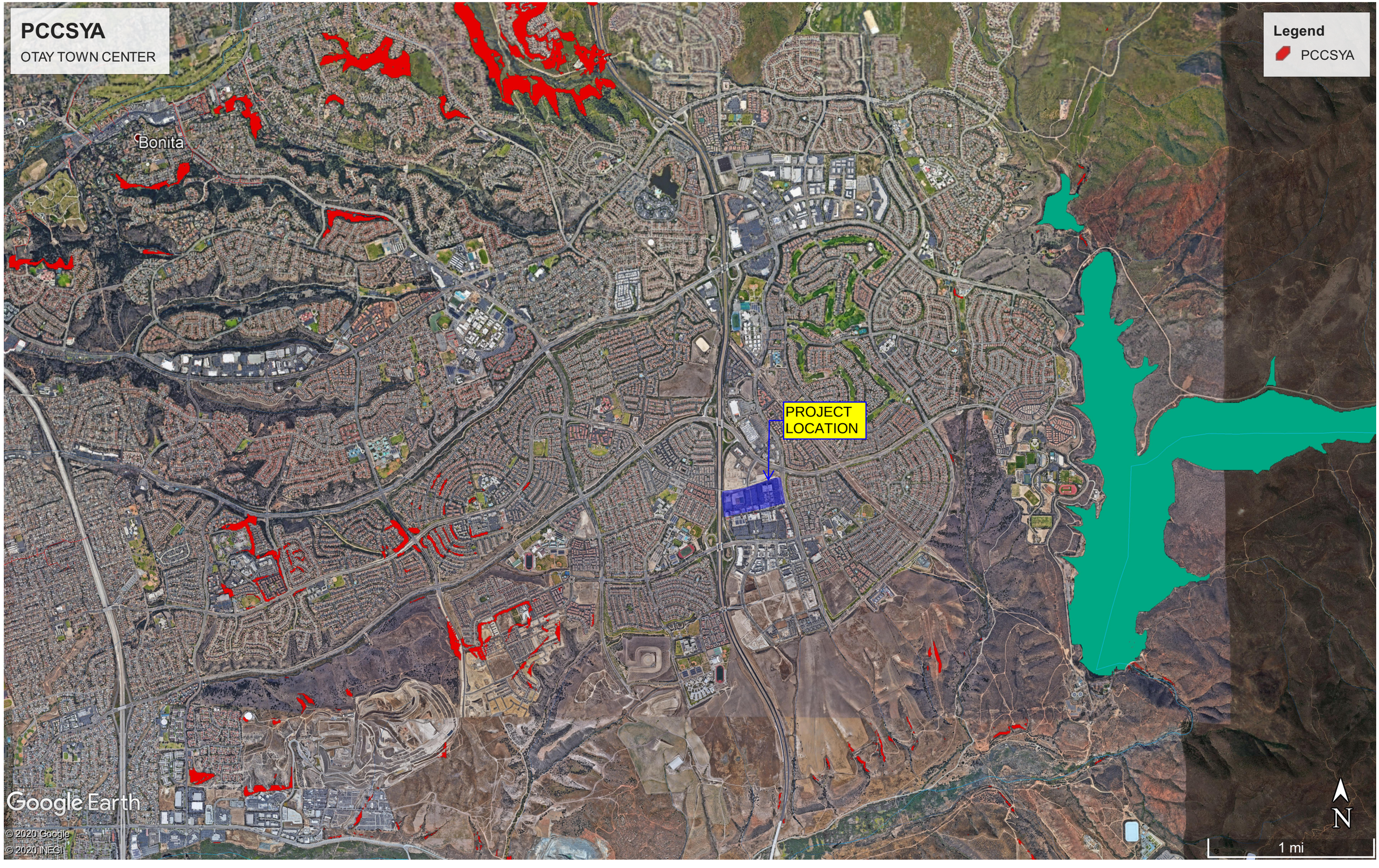
CITY CHULA VISTA, CALIFORNIA

MAP 2 OF 2

W.O.# 3356-0002

ATTACHMENT 2b

MANAGEMENT OF CRITICAL COARSE SEDIMENT YIELD AREAS


PCCSYA
OTAY TOWN CENTER
Legend
PCCSYA
Bonita
PROJECT
LOCATION
Google Earth
© 2020 Google
© 2020 INEGI
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ATTACHMENT 2c

GEOMORPHIC ASSESSMENT OF RECEIVING CHANNELS

NOT PERFORMED FOR THIS PROJECT

ATTACHMENT 2d
FLOW CONTROL FACILITY DESIGN

BMP Sizing Spreadsheet V3.1

Project Name:	Otay Ranch Town Center
Project Applicant:	Brookfield
Jurisdiction:	City of Chula Vista
Parcel (APN):	Enter Parcel Number(s)
Hydrologic Unit:	Otay
Rain Gauge:	Lindbergh
Total Project Area (sf):	645,559
Channel Susceptibility:	High

BMP Sizing Spreadsheet V3.1			
Project Name:	Otay Ranch Town Center	Hydrologic Unit:	Otay
Project Applicant:	Brookfield	Rain Gauge:	Lindbergh
Jurisdiction:	City of Chula Vista	Total Project Area:	645,559
Parcel (APN):	Enter Parcel Number(s)	Low Flow Threshold:	0.1Q2
BMP Name:	HMP-1	BMP Type:	Cistern
BMP Native Soil Type:	C	BMP Infiltration Rate (in/hr):	NA

Areas Draining to BMP						HMP Sizing Factors	Minimum BMP Size
DMA Name	Area (sf)	Pre Project Soil Type	Pre-Project Slope	Post Project Surface Type	Area Weighted Runoff Factor (Table G.2-1)[1]	Volume	Volume (CF)
Impervious	466,909	D	Flat	Roofs	1.00	0.09	42022
Landscaped	178,651	D	Flat	Landscape	0.1	0.09	1608
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
BMP Tributary Area	645,560					Minimum BMP Size	43630
						Proposed BMP Size*	

* Assumes standard configuration

Standard Cistern Depth (Overflow Elevation)	3.5	ft
Provided Cistern Depth (Overflow Elevation)	3.5	ft
Minimum Required Cistern Footprint)	12466	CF

Notes:

1. Runoff factors which are used for hydromodification management flow control (Table G.2-1) are different from the runoff factors used for pollutant control BMP sizing (Table B.1-1). Table references are taken from the San Diego Region Model BMP Design Manua

Describe the BMP's in sufficient detail in your PDP SWQMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

BMP's must be adapted and applied to the conditions specific to the development project such as unstable slopes or the lack of available head.
Designated Staff have final review and approval authority over the project design.

This BMP Sizing Spreadsheet has been updated in conformance with the San Diego Region Model BMP Design Manual, May 2018. For questions or concerns please contact the jurisdiction in which your project is located.

BMP Sizing Spreadsheet V3.1			
Project Name:	Otay Ranch Town Center	Hydrologic Unit:	Otay
Project Applicant:	Brookfield	Rain Gauge:	Lindbergh
Jurisdiction:	City of Chula Vista	Total Project Area:	645,559
Parcel (APN):	Enter Parcel Number(s)	Low Flow Threshold:	0.1Q2
BMP Name	HMP-1	BMP Type:	Cistern

DMA Name	Rain Gauge	Pre-developed Condition		Unit Runoff Ratio (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	Orifice Area (in^2)
		Soil Type	Slope				
Impervious	Lindbergh	D	Flat	0.429	10.719	0.460	6.79
Landscaped	Lindbergh	D	Flat	0.429	4.101	0.176	2.60

3.50	0.636	9.38	3.46
Max Orifice Head (feet)	Max Tot. Allowable Orifice Flow (cfs)	Max Tot. Allowable Orifice Area (in^2)	Max Orifice Diameter (in)

Provide Hand Calc.	0.652	9.62	3.500
Average outflow during surface drawdown (cfs)	Max Orifice Outflow (cfs)	Actual Orifice Area (in^2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	Provide Hand Calculation

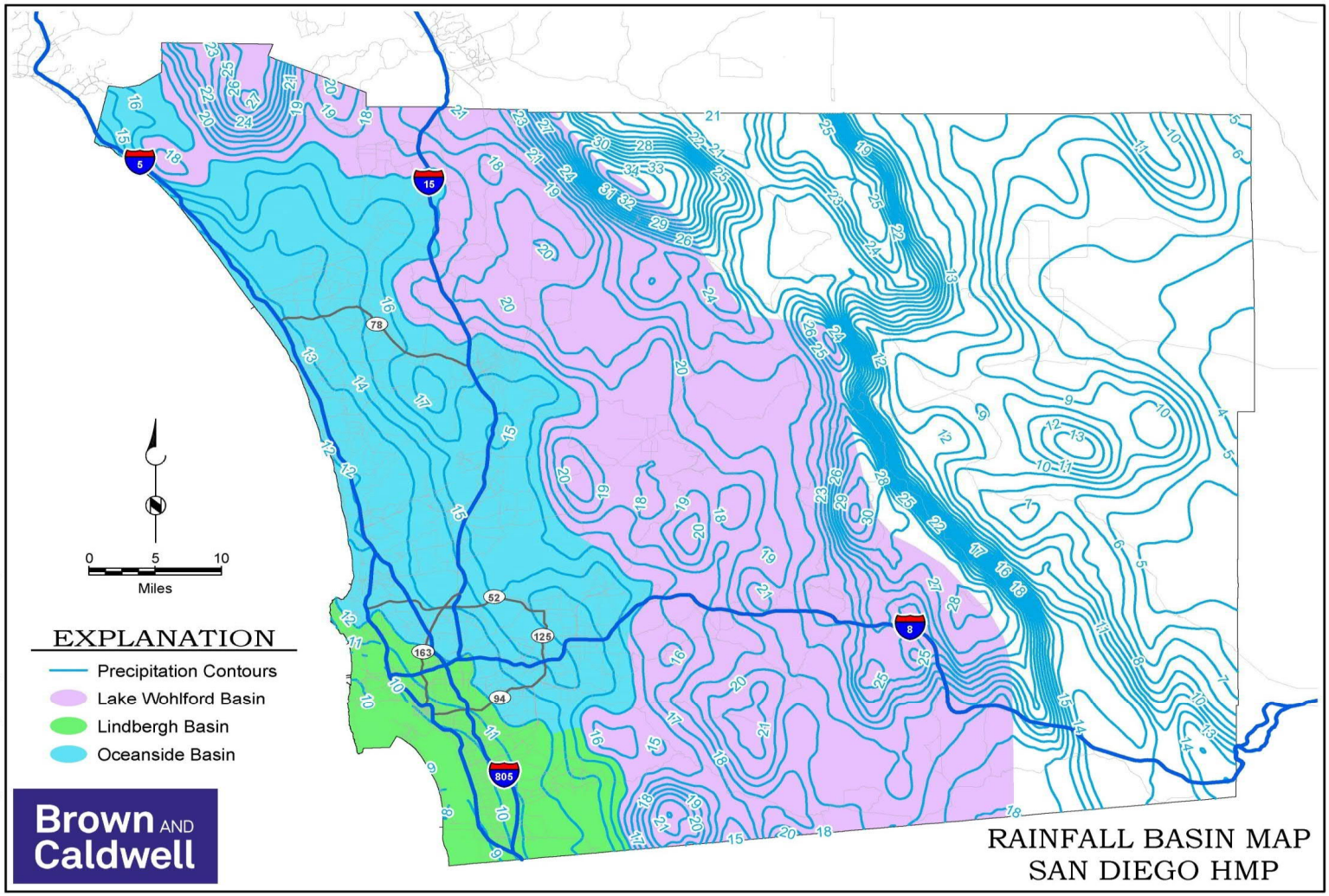

0
5
10
Miles
EXPLANATION
Precipitation Contours
Lake Wohlford Basin
Lindbergh Basin
Oceanside Basin
Brown AND Caldwell
RAINFALL BASIN MAP
SAN DIEGO HMP
File Name: P:\Projects\San Diego County\139942 - HMP Implementation Assistance\GIS\HMF GIS\Basins.mxd

Table G.2-3: Sizing Factors for Hydromodification Flow Control Infiltration BMPs Designed Using Sizing Factor Method				
Lower Flow Threshold	Soil Group	Slope	Rain Gauge	A
0.1Q2	A	Flat	Lindbergh	0.055
0.1Q2	A	Moderate	Lindbergh	0.055
0.1Q2	A	Steep	Lindbergh	0.055
0.1Q2	B	Flat	Lindbergh	0.045
0.1Q2	B	Moderate	Lindbergh	0.045
0.1Q2	B	Steep	Lindbergh	0.045
0.1Q2	C	Flat	Lindbergh	0.035
0.1Q2	C	Moderate	Lindbergh	0.035
0.1Q2	C	Steep	Lindbergh	0.035
0.1Q2	D	Flat	Lindbergh	0.03
0.1Q2	D	Moderate	Lindbergh	0.03
0.1Q2	D	Steep	Lindbergh	0.03
0.1Q2	A	Flat	Oceanside	0.06
0.1Q2	A	Moderate	Oceanside	0.06
0.1Q2	A	Steep	Oceanside	0.06
0.1Q2	B	Flat	Oceanside	0.05
0.1Q2	B	Moderate	Oceanside	0.05
0.1Q2	B	Steep	Oceanside	0.05
0.1Q2	C	Flat	Oceanside	0.05
0.1Q2	C	Moderate	Oceanside	0.05
0.1Q2	C	Steep	Oceanside	0.045
0.1Q2	D	Flat	Oceanside	0.035
0.1Q2	D	Moderate	Oceanside	0.035
0.1Q2	D	Steep	Oceanside	0.035
0.1Q2	A	Flat	Lake Wohlford	0.085
0.1Q2	A	Moderate	Lake Wohlford	0.085
0.1Q2	A	Steep	Lake Wohlford	0.085
0.1Q2	B	Flat	Lake Wohlford	0.07

0.1Q2	B	Moderate	Lake Wohlford	0.07
0.1Q2	B	Steep	Lake Wohlford	0.07
0.1Q2	C	Flat	Lake Wohlford	0.055
0.1Q2	C	Moderate	Lake Wohlford	0.055
0.1Q2	C	Steep	Lake Wohlford	0.055
0.1Q2	D	Flat	Lake Wohlford	0.04
0.1Q2	D	Moderate	Lake Wohlford	0.04
0.1Q2	D	Steep	Lake Wohlford	0.04

Table G.2-4: Sizing Factors for Hydromodification Flow Control Biofiltration with Partial Retention Designed Using Sizing Factor Method

Lower Flow Threshold	Soil Group	Slope	below low orifice inv	Rain Gauge	A
$0.1Q_2$	A	Flat	18	Lindbergh	0.08
$0.1Q_2$	A	Moderate	18	Lindbergh	0.08
$0.1Q_2$	A	Steep	18	Lindbergh	0.08
$0.1Q_2$	B	Flat	18	Lindbergh	0.065
$0.1Q_2$	B	Moderate	18	Lindbergh	0.065
$0.1Q_2$	B	Steep	18	Lindbergh	0.06
$0.1Q_2$	C	Flat	6	Lindbergh	0.05
$0.1Q_2$	C	Moderate	6	Lindbergh	0.05
$0.1Q_2$	C	Steep	6	Lindbergh	0.05
$0.1Q_2$	D	Flat	3	Lindbergh	0.05
$0.1Q_2$	D	Moderate	3	Lindbergh	0.05
$0.1Q_2$	D	Steep	3	Lindbergh	0.05
$0.1Q_2$	A	Flat	18	Oceanside	0.08
$0.1Q_2$	A	Moderate	18	Oceanside	0.075
$0.1Q_2$	A	Steep	18	Oceanside	0.075
$0.1Q_2$	B	Flat	18	Oceanside	0.07
$0.1Q_2$	B	Moderate	18	Oceanside	0.07
$0.1Q_2$	B	Steep	18	Oceanside	0.07

$0.1Q_2$	C	Flat	6	Oceanside	0.07
$0.1Q_2$	C	Moderate	6	Oceanside	0.07
$0.1Q_2$	C	Steep	6	Oceanside	0.07
$0.1Q_2$	D	Flat	3	Oceanside	0.07
$0.1Q_2$	D	Moderate	3	Oceanside	0.07
$0.1Q_2$	D	Steep	3	Oceanside	0.07
$0.1Q_2$	A	Flat	18	Lake Wohlford	0.11
$0.1Q_2$	A	Moderate	18	Lake Wohlford	0.11
$0.1Q_2$	A	Steep	18	Lake Wohlford	0.105
$0.1Q_2$	B	Flat	18	Lake Wohlford	0.09
$0.1Q_2$	B	Moderate	18	Lake Wohlford	0.085
$0.1Q_2$	B	Steep	18	Lake Wohlford	0.085
$0.1Q_2$	C	Flat	6	Lake Wohlford	0.065
$0.1Q_2$	C	Moderate	6	Lake Wohlford	0.065
$0.1Q_2$	C	Steep	6	Lake Wohlford	0.065
$0.1Q_2$	D	Flat	3	Lake Wohlford	0.06
$0.1Q_2$	D	Moderate	3	Lake Wohlford	0.06
$0.1Q_2$	D	Steep	3	Lake Wohlford	0.06

Table G.2-5: Sizing Factors for Hydromodification Flow Control Biofiltration BMPs Designed Using Sizing Factor Method

Lower Flow Threshold	Soil Group	Slope	Rain Gauge	A
0.1Q2	A	Flat	Lindbergh	0.32
0.1Q2	A	Moderate	Lindbergh	0.3
0.1Q2	A	Steep	Lindbergh	0.285
0.1Q2	B	Flat	Lindbergh	0.105
0.1Q2	B	Moderate	Lindbergh	0.1
0.1Q2	B	Steep	Lindbergh	0.095
0.1Q2	C	Flat	Lindbergh	0.055
0.1Q2	C	Moderate	Lindbergh	0.05
0.1Q2	C	Steep	Lindbergh	0.05
0.1Q2	D	Flat	Lindbergh	0.05
0.1Q2	D	Moderate	Lindbergh	0.05

0.1Q2	D	Steep	Lindbergh	0.05
0.1Q2	A	Flat	Oceanside	0.15
0.1Q2	A	Moderate	Oceanside	0.14
0.1Q2	A	Steep	Oceanside	0.135
0.1Q2	B	Flat	Oceanside	0.085
0.1Q2	B	Moderate	Oceanside	0.085
0.1Q2	B	Steep	Oceanside	0.085
0.1Q2	C	Flat	Oceanside	0.075
0.1Q2	C	Moderate	Oceanside	0.075
0.1Q2	C	Steep	Oceanside	0.075
0.1Q2	D	Flat	Oceanside	0.07
0.1Q2	D	Moderate	Oceanside	0.07
0.1Q2	D	Steep	Oceanside	0.07
0.1Q2	A	Flat	Lake Wohlford	0.285
0.1Q2	A	Moderate	Lake Wohlford	0.275
0.1Q2	A	Steep	Lake Wohlford	0.27
0.1Q2	B	Flat	Lake Wohlford	0.15
0.1Q2	B	Moderate	Lake Wohlford	0.145
0.1Q2	B	Steep	Lake Wohlford	0.145
0.1Q2	C	Flat	Lake Wohlford	0.07
0.1Q2	C	Moderate	Lake Wohlford	0.07
0.1Q2	C	Steep	Lake Wohlford	0.07
0.1Q2	D	Flat	Lake Wohlford	0.06
0.1Q2	D	Moderate	Lake Wohlford	0.06
0.1Q2	D	Steep	Lake Wohlford	0.06

Table G.2-6: Sizing Factors for Hydromodification Flow Control Cistern Facilities Designed Using Sizing Factor Method

Lower Flow Threshold	Soil Group	Slope	Rain Gauge	V
0.1Q2	A	Flat	Lindbergh	0.54
0.1Q2	A	Moderate	Lindbergh	0.51
0.1Q2	A	Steep	Lindbergh	0.49
0.1Q2	B	Flat	Lindbergh	0.19

0.1Q2	B	Moderate	Lindbergh	0.18
0.1Q2	B	Steep	Lindbergh	0.18
0.1Q2	C	Flat	Lindbergh	0.11
0.1Q2	C	Moderate	Lindbergh	0.11
0.1Q2	C	Steep	Lindbergh	0.11
0.1Q2	D	Flat	Lindbergh	0.09
0.1Q2	D	Moderate	Lindbergh	0.09
0.1Q2	D	Steep	Lindbergh	0.09
0.1Q2	A	Flat	Oceanside	0.26
0.1Q2	A	Moderate	Oceanside	0.25
0.1Q2	A	Steep	Oceanside	0.25
0.1Q2	B	Flat	Oceanside	0.16
0.1Q2	B	Moderate	Oceanside	0.16
0.1Q2	B	Steep	Oceanside	0.16
0.1Q2	C	Flat	Oceanside	0.14
0.1Q2	C	Moderate	Oceanside	0.14
0.1Q2	C	Steep	Oceanside	0.14
0.1Q2	D	Flat	Oceanside	0.12
0.1Q2	D	Moderate	Oceanside	0.12
0.1Q2	D	Steep	Oceanside	0.12
0.1Q2	A	Flat	Lake Wohlford	0.53
0.1Q2	A	Moderate	Lake Wohlford	0.49
0.1Q2	A	Steep	Lake Wohlford	0.49
0.1Q2	B	Flat	Lake Wohlford	0.28
0.1Q2	B	Moderate	Lake Wohlford	0.28
0.1Q2	B	Steep	Lake Wohlford	0.28
0.1Q2	C	Flat	Lake Wohlford	0.14
0.1Q2	C	Moderate	Lake Wohlford	0.14
0.1Q2	C	Steep	Lake Wohlford	0.14
0.1Q2	D	Flat	Lake Wohlford	0.12
0.1Q2	D	Moderate	Lake Wohlford	0.12
0.1Q2	D	Steep	Lake Wohlford	0.12

NRCS Soil Map


116° 58' 18" W
116° 57' 56" W
32° 37' 36" N
32° 37' 24" N
502660
502720
502780
502840
502900
502960
503020
503080
503140
503200
3609900
3609840
3609780
3609720
3609660
3609600
3609540
DaD
DaC
DaD
Soil Map may not be valid at this scale.
Map Scale: 1:2,580 if printed on A landscape (11" x 8.5") sheet.
N
Meters
0 35 70 140 210
Feet
0 100 200 400 600
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 15, May 27, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 18, 2018—Aug 22, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
DaC	Diablo clay, 2 to 9 percent slopes	D	12.7	64.1%
DaD	Diablo clay, 9 to 15 percent slopes, warm MAAT	C	7.1	35.9%
Totals for Area of Interest			**19.8**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Vault HMP\ Detention\ WQ
Discharge vs Elevation Table

Bottom orifice diameter:	3.50 "	Top orifice diameter:	4 "
Number:	1	Number:	0
Cg-low:	0.61	Cg-low:	0.61
invert elev:	0.00 ft	invert elev:	3.00 ft
Middle orifice diameter:	3.0 "	Emergency weir:	
number of orif:	0	Invert:	3.00 ft
Cg-middle:	0.61	Weir Length (ft)	10.0 ft
invert elev:	2.50 ft	Box riser	2' x 3'

h (ft)	H/D-low -	H/D-mid -	H/D-top -	H/D-peak -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qtop-orif (cfs)	Qtop-weir (cfs)	Qtot-top (cfs)	Qpeak-top (cfs)	Qtot (cfs)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
0.25	0.86	0.00	0.00	0.00	0.11	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0924
0.50	1.71	0.00	0.00	0.00	0.19	0.25	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1946
0.75	2.57	0.00	0.00	0.00	0.25	0.32	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.2542
1.00	3.43	0.00	0.00	0.00	0.30	0.35	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.3023
1.25	4.29	0.00	0.00	0.00	0.34	0.78	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.3437
1.50	5.14	0.00	0.00	0.00	0.38	2.67	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.3806
1.75	6.00	0.00	0.00	0.00	0.41	7.88	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.4142
2.00	6.86	0.00	0.00	0.00	0.45	19.28	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.4454
2.25	7.71	0.00	0.00	0.00	0.47	40.97	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.4744
2.50	8.57	0.00	0.00	0.00	0.50	78.48	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.5018
2.75	9.43	1.00	0.00	0.00	0.53	138.93	0.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.5278
3.00	10.29	2.00	0.00	0.00	0.55	231.32	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.5526
3.25	11.14	3.00	0.75	0.30	0.58	366.64	0.58	0.00	0.00	0.00	0.00	0.00	0.00	4.16	4.7387
3.50	12.00	4.00	1.50	0.60	0.60	558.16	0.60	0.00	0.00	0.00	0.00	0.00	0.00	11.77	12.3723
3.75	12.86	5.00	2.25	0.90	0.62	821.57	0.62	0.00	0.00	0.00	0.00	0.00	0.00	21.63	22.2499
4.00	13.71	6.00	3.00	1.20	0.64	1175.20	0.64	0.00	0.00	0.00	0.00	0.00	0.00	33.30	33.9421
4.25	14.57	7.00	3.75	1.50	0.66	1640.27	0.66	0.00	0.00	0.00	0.00	0.00	0.00	46.54	47.2008
4.50	15.43	8.00	4.50	1.80	0.68	2241.01	0.68	0.00	0.00	0.00	0.00	0.00	0.00	61.18	61.8585
4.75	16.29	9.00	5.25	2.10	0.70	3004.94	0.70	0.00	0.00	0.00	0.00	0.00	0.00	77.09	77.7924
5.00	17.14	10.00	6.00	2.40	0.72	3963.05	0.72	0.00	0.00	0.00	0.00	0.00	0.00	94.19	94.9072
5.25	18.00	11.00	6.75	2.70	0.74	5149.97	0.74	0.00	0.00	0.00	0.00	0.00	0.00	112.39	113.1264
5.50	18.86	12.00	7.50	3.00	0.76	6604.23	0.76	0.00	0.00	0.00	0.00	0.00	0.00	131.63	132.3866

G.2.5 Sizing Factors for "Cistern" BMP

Table G.2-6 presents sizing factors for calculating the required volume (V1) for a cistern BMP. In this context, a "cistern" is a detention facility that stores runoff and releases it at a controlled rate. A cistern can be a component of a harvest and use system, however the sizing factor method will not account for any retention occurring in the system. The sizing factors were developed assuming runoff is released from the cistern. The sizing factors presented in this section are to meet the hydromodification management performance standard only. The cistern BMP is based on the following assumptions:

- Ciste[7/8 x 3.5 = 3-ft Overflow weir]rn is modeled as a 4-foot tall vessel. However, designers could use other configurations (different cistern heights), as long as the lower outlet orifice is sized to properly restrict outflows and the minimum required volume is provided.
- Cistern upper outlet: The upper outlet from the cistern would consist of a weir or other flow control structure with the overflow invert set at an elevation of 7/8 of the water height associated with the required volume of the cistern – V1. For the assumed 4-foot water depth in the cistern associated with the sizing factor analysis, the overflow invert is assumed to be located at an elevation of 3.5 feet above the bottom of the cistern. The overflow weir would be sized to pass the peak design flow based on the tributary drainage area.

How to use the sizing factors:

Obtain sizing factors from Table G.2-6 based on the project's lower flow threshold fraction of Q_2, hydrologic soil group, post-project slope, and rain gauge (rainfall basin). Multiply the area tributary to the structural BMP (A, square feet) by the area weighted runoff factor (C, unitless) (see Table G.2-1) by the sizing factors to determine the required volume (V, cubic feet). Select a low flow orifice that will discharge the lower flow threshold flow at the overflow elevation (i.e. when there is 3.5 feet of head over the lower outlet orifice or adjusted head as appropriate if the cistern overflow elevation is not 3.5 feet tall). The civil engineer shall provide the necessary volume of the BMP and the lower outlet orifice detail on the plans.

Additional steps to use this BMP as a combined pollutant control and flow control BMP:

A cistern could be a component of a full retention, partial retention, or no retention BMP depending on how the outflow is disposed. However use of the sizing factor method for design of the cistern in a combined pollutant control and flow control system is not recommended. The sizing factor method for designing a cistern does not account for any retention or storage occurring in BMPs combined with the cistern (i.e., cistern sized using sizing factors may be larger than necessary because sizing factor method does not recognize volume losses occurring in other elements of a combined system). Furthermore, when the cistern is designed using the sizing factor method, the cistern outflow must be set to the low flow threshold flow for the drainage area, which may be inconsistent with requirements for other elements of a combined system. To optimize a system in which a cistern provides temporary storage for runoff to be either used onsite (harvest and use), infiltrated, or biofiltered, project-specific continuous simulation modeling is recommended. Refer to **Sections 5.6 and 6.3.6**.

Stage Storage Vault HMP-1

Depth (ft)	Area (sq ft)	Volume (cu ft)	Volume Total (cu ft)	Storage (ac-ft)
0.00	16800			0
0.25	16800	4,200	4,200	0.096419
0.50	16800	4,200	8,400	0.192837
0.75	16800	4,200	12,600	0.289256
1.00	16800	4,200	16,800	0.385675
1.25	16800	4,200	21,000	0.482094
1.50	16800	4,200	25,200	0.578512
1.75	16800	4,200	29,400	0.674931
2.00	16800	4,200	33,600	0.77135
2.25	16800	4,200	37,800	0.867769
2.50	16800	4,200	42,000	0.964187
2.75	16800	4,200	46,200	1.060606
3.00	16800	4,200	50,400	1.157025
3.25	16800	4,200	54,600	1.253444
3.50	16800	4,200	58,800	1.349862
3.75	16800	4,200	63,000	1.446281
4.00	16800	4,200	67,200	1.5427
4.25	16800	4,200	71,400	1.639118
4.50	16800	4,200	75,600	1.735537
4.75	16800	4,200	79,800	1.831956
5.00	16800	4,200	84,000	1.928375
5.25	16800	4,200	88,200	2.024793
5.50	16800	4,200	92,400	2.121212

Draw Down				
Elevation	Q_{AVG} (CFS)	DV (CF)	DT (HR)	Total T
0.00				
0.25	0.0924	4200.0	12.6212	48.58
0.50	0.1946	4200.0	5.9939	35.96
0.75	0.2542	4200.0	4.5891	29.97
1.00	0.3023	4200.0	3.8596	25.38
1.25	0.3437	4200.0	3.3946	21.52
1.50	0.3806	4200.0	3.0653	18.12
1.75	0.4142	4200.0	2.8163	15.06
2.00	0.4454	4200.0	2.6196	12.24
2.25	0.4744	4200.0	2.4591	9.62
2.50	0.5018	4200.0	2.3248	7.16
2.75	0.5278	4200.0	2.2104	4.84
3.00	0.5526	4200.0	2.1114	2.63
3.25	4.7387	4200.0	0.2462	0.52
3.50	12.3723	4200.0	0.0943	0.27
3.75	22.2499	4200.0	0.0524	0.18
4.00	33.9421	4200.0	0.0344	0.12
4.25	47.2008	4200.0	0.0247	0.09
4.50	61.8585	4200.0	0.0189	0.07
4.75	77.7924	4200.0	0.0150	0.05
5.00	94.9072	4200.0	0.0123	0.03
5.25	113.1264	4200.0	0.0103	0.02
5.50	132.3866	4200.0	0.0088	0.01

Project Name/_____

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

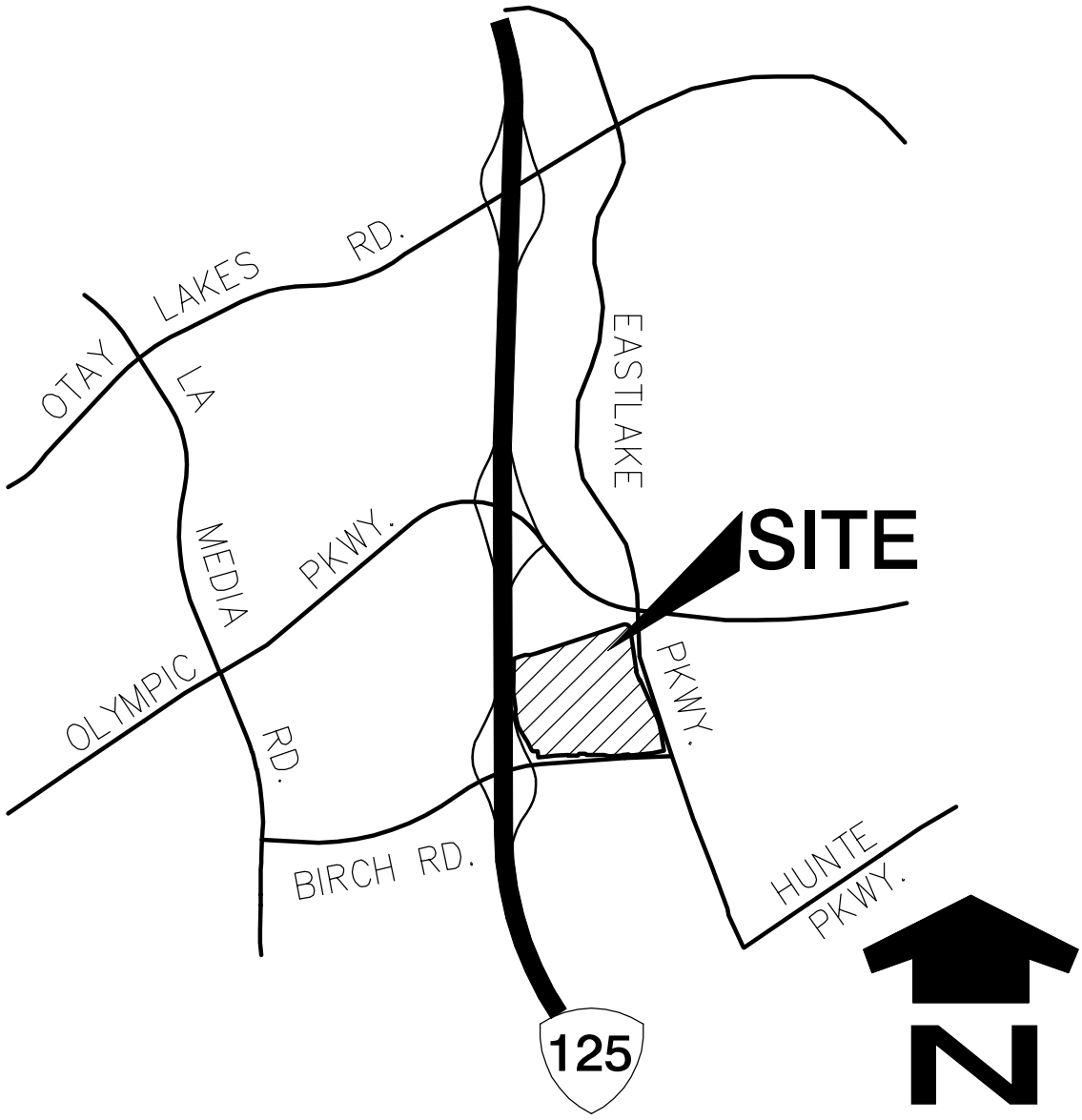
Attachment 3: For private entity operation and maintenance, Attachment 3 must include a Storm Water Management Facilities Maintenance Agreement with Grant of Access and Covenant's ("Maintenance Agreement") Template can be found at the following link (also refer to Chapter 8.2.1 for more information's):

The following information must be included in the exhibits attached to the Maintenance Agreement:

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

Will be provided in the final engineering

EXHIBIT "A"



VICINITY MAP

NOT TO SCALE

EXHIBIT "B"

Maintenance Recommendations and Frequency Inspection Operation and Maintenance Plan (IOMP)

SITE DESIGN, SOURCE CONTROL AND POLLUTANT CONTROL BMP OPERATION + MAINTENANCE PROCEDURE							
STORM WATER MANAGEMENT AND DISCHARGE CONTROL MAINTENANCE AGREEMENT APPROVAL NO.:							
O&M RESPONSIBLE PARTY DESIGNEE: PROPERTY OWNDER:							
BMP DESCRIPTION	**INSPECTION FREQUENCY**	**MAINTENANCE FREQUENCY**	**MAINTENANCE METHOD**	**QUANTITY**	**INCLUDED IN O&M MANUAL**		**SHEET NUMBERS**
SITE DESIGN ELEMENTS						NO	
DESCRIPTION:LANDSCAPE	WEEKLY	AS-NEEDED	MOW AS NECESSARY	223278 sf			
DESCRIPTION:RUNOFF COLLECTION	ANNUAL	AS-NEEDED	MAINTAIN DRIVEWAYS, CLEAN UP AREA DRAINS	1			
SOURCE CONTROL ELEMENTS						NO	
DESCRIPTION: STORM DRAIN STENCILING	ANNUAL	BI-ANNUAL	REPAINT AS NECESSARY	1			
POLLUTANT CONTROL BMP(S)					YES		
DESCRIPTION:PROPRIETARY BIOFILTRATION UNIT	BI-ANNUAL	6-12 MONTHS AS NEEDED	REPLCMNT OF SOIL MATERIAL REMOVE DEBRIS AS NEEDED	3			

Project Name/_____

ATTACHMENT 4

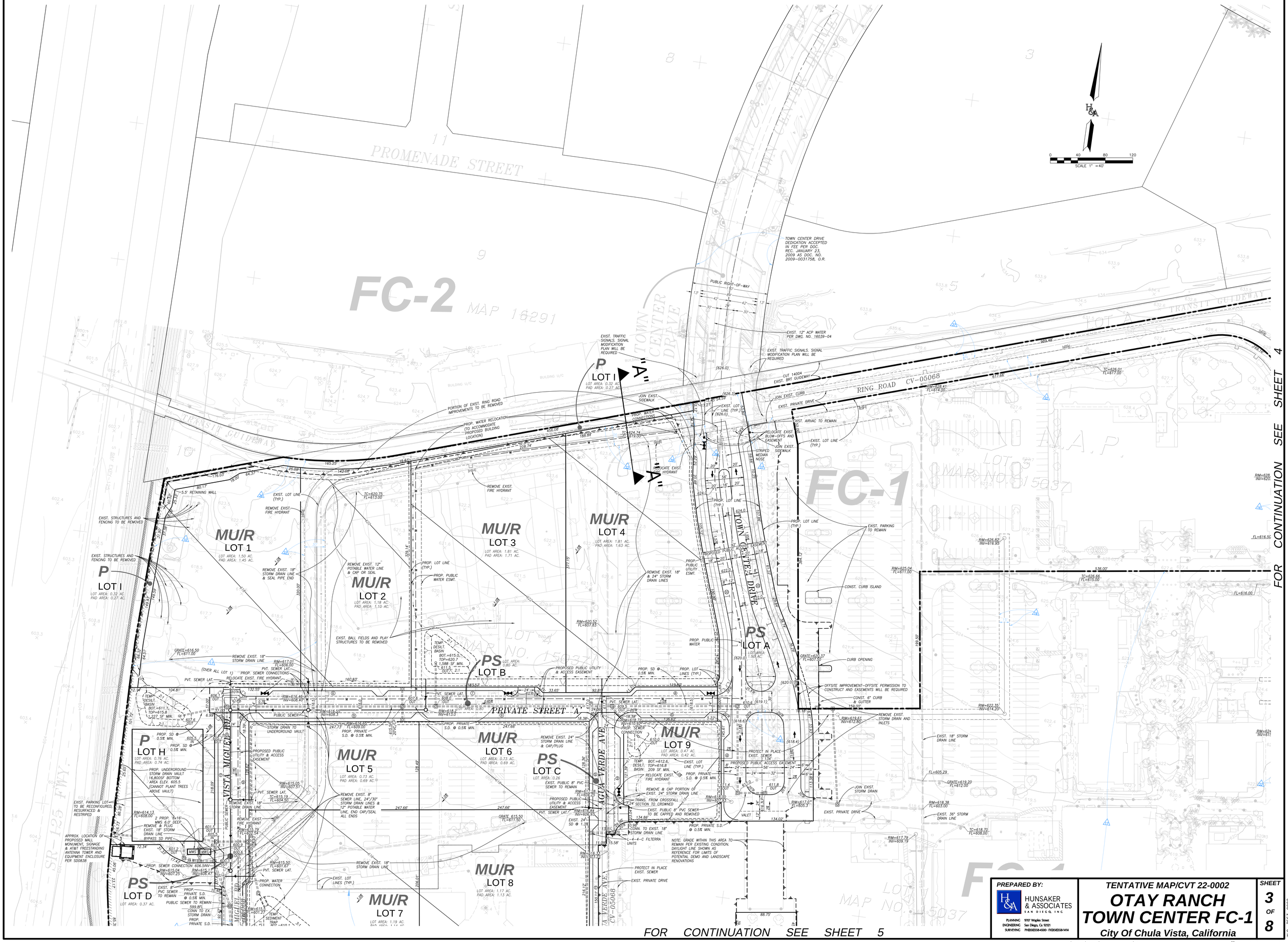
Copy of Plan Sheets Showing Permanent Storm Water BMPs

Project Name/_____

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

The plans must identify:

- [x] Structural BMP(s) with ID numbers matching Form I-6 Summary of PDP Structural BMPs
- [x] The grading and drainage design shown on the plans must be consistent with the delineation of DMAs shown on the DMA exhibit
- [x] Details and specifications for construction of structural BMP(s)
- [x] Signage indicating the location and boundary of structural BMP(s) as required by the City Engineer
- [x] 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)
- [x] Manufacturer and part number for proprietary parts of structural BMP(s) when applicable
- [x] 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)
- [x] Recommended equipment to perform maintenance
- [x] When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management
- [x] Include landscaping plan sheets showing vegetation requirements for vegetated structural BMP(s)
- [x] All BMPs must be fully dimensioned on the plans
- [ ] When proprietary BMPs are used, site specific cross section with outflow, inflow and model number shall be provided. Broucher photocopies are not allowed.



FOR CONTINUATION SEE SHEET 4

FOR CONTINUATION SEE SHEET 5

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TENTATIVE MAP/CVT 22-0002

OTAY RANCH TOWN CENTER FC-1

City Of Chula Vista, California

SHEET 3 OF 8

W.O. 3553-0002

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FOR CONTINUATION SEE SHEET 3

SCALE 1" = 40'

TOWN CENTER DRIVE DEDICATION ACCEPTED IN FEE PER DOC. REC., JANUARY 23, 2009 AS DOC. NO. 2009-0031758, O.R.

PUBLIC RIGHT-OF-WAY

EXIST. 12" ACP WATER PER DWG. NO. 16039-04

EXIST. TRAFFIC SIGNALS. SIGNAL MODIFICATION PLAN WILL BE REQUIRED

RING ROAD CV-05068

CUT 14004 EXIST. BRT GUIDEWAY

JOIN EXIST. SIDEWALK

JOIN EXIST. CURB

EXIST. PRIVATE DRIVE

EXIST. AIRVAC TO REMAIN

EXIST. LOT LINE (TYP.)

RELOCATE EXIST. BLOW-OFFS AND EASEMENT

STRIPED MEDIAN NOSE

EXIST. LOT LINE (TYP.)

EXIST. RING ROAD TO BE REMOVED

WATER RELOCATION (TO ACCOMMODATE PROPOSED BUILDING LOCATION)

PROP. WATER CONNECTIONS

RELOCATE EXIST. FIRE HYDRANT

REMOVE EXIST. FIRE HYDRANT

PROP. LOT LINE (TYP.)

PROPOSED PUBLIC ACCESS EASEMENT

PROP. PUBLIC UTILITY ESMT.

REMOVE EXIST. 18" & 24" STORM DRAIN LINES

PROP. PUBLIC WATER

PROP. LOT LINES (TYP.)

PROPOSED PUBLIC UTILITY & ACCESS EASEMENT

PROP. SD @ 0.5% MIN.

PVT. SEWER LAT.

PROP. SEWER CONNECTION

REMOVE EXIST. 24" STORM DRAIN LINE & CAP/PLUG

EXIST. PUBLIC 8" PVC SEWER TO REMAIN

PROTECT IN PLACE EXIST. SEWER

TEMP. BOT.=612.6, DESILT. TOP=616.8 BASIN 209 SF MIN.

RELOCATE EXIST. FIRE HYDRANT

PROP. PRIVATE S.D. @ 0.5% MIN.

REMOVE & CAP PORTION OF EXIST. 24" STORM DRAIN LINE

TRANS. FROM CROSSFALL SECTION TO CROWNED

EXIST. PUBLIC 8" PVC SEWER TO BE CAPPED AND REMOVED

CONN. TO EXIST. 18" STORM DRAIN LINE

4-4-4-C FILTERRA UNITS

NOTE: GRADE WITHIN THIS AREA TO REMAIN PER EXISTING CONDITION. DAYLIGHT LINE SHOWN AS REFERENCE FOR LIMITS OF POTENTIAL DEMO AND LANDSCAPE RENOVATIONS

PROTECT IN PLACE EXIST. SEWER

EXIST. PRIVATE DRIVE

PROP. LOT LINE (TYP.)

EXIST. PARKING TO REMAIN

CONST. CURB ISLAND

CURB OPENING

OFFSITE IMPROVEMENT-OFFSITE PERMISSION TO CONSTRUCT AND EASEMENTS WILL BE REQUIRED

CONST. 6" CURB & GUTTER

REMOVE EXIST. STORM DRAIN AND INLETS

EXIST. 18" STORM DRAIN LINE

JOIN EXIST. STORM DRAIN

EXIST. PRIVATE DRIVE

EXIST. 36" STORM DRAIN LINE

PROPOSED PUBLIC ACCESS EASEMENT

EXIST. TRAFFIC SIGNALS. SIGNAL MODIFICATION PLAN WILL BE REQUIRED

EXIST. LOT LINE (TYP.)

PROP. PRIVATE S.D. @ 0.5% MIN.

PROTECT IN PLACE EXIST. SEWER

EXIST. PRIVATE DRIVE

PORTION OF EASTLAKE PARKWAY DEDICATED TO THE CITY OF CHULA VISTA PER DOCUMENT RECORDED MARCH 13, 2003 AS FILE NO. 2003-0284411 OF OFFICIAL RECORDS.

PUBLIC RIGHT-OF-WAY

(OVER ALL LOT 1)

LOT 1
LOT AREA: 0.32 AC.
PAD AREA: 0.27 AC.

LOT 3
LOT AREA: 1.81 AC.
PAD AREA: 1.71 AC.

LOT 4
LOT AREA: 1.81 AC.
PAD AREA: 1.63 AC.

LOT A
LOT AREA: 1.50 AC.

LOT B
LOT AREA: 0.80 AC.

LOT C
LOT AREA: 0.26

LOT 6
LOT AREA: 0.73 AC.
PAD AREA: 0.69 AC.

LOT 8
LOT AREA: 1.17 AC.
PAD AREA: 1.13 AC.

LOT 9
LOT AREA: 0.47 AC.
PAD AREA: 0.42 AC.

LOT 10
LOT AREA: 41.91 AC.

FC-1

MU/R

PS

PRIVATE STREET 'A'

AGUA VERDE AVE

TOWN CENTER DRIVE

EASTLAKE PARKWAY

TRANSIT GUIDEWAY

MAP 16291

MAP NO. 15037

FOR CONTINUATION SEE SHEET 5

PREPARED BY:
HUNSAKER & ASSOCIATES SAN DIEGO, INC
PLANNING 9707 Waples Street
ENGINEERING San Diego, Ca 92121
SURVEYING PH(858)558-4500 FX(858)558-1414

TENTATIVE MAP/CVT 22-0002

OTAY RANCH TOWN CENTER FC-1

City Of Chula Vista, California

SHEET 4 OF 8

W.O. 3553-0002

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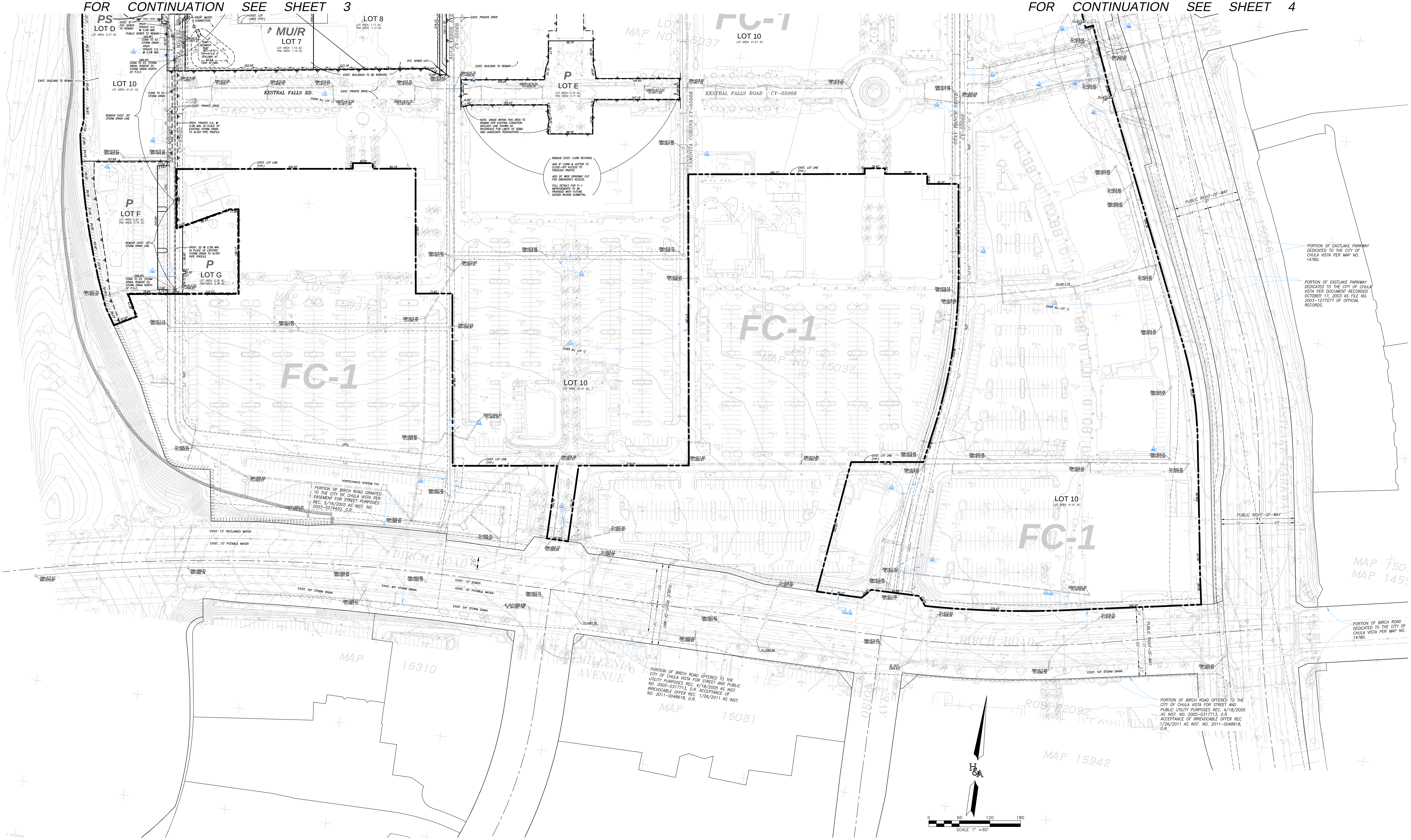
FOR CONTINUATION SEE SHEET 3

FOR CONTINUATION SEE SHEET 4


PS
LOT D
MU/R
LOT 7
LOT 8
LOT 10
P
LOT E
KESTRAL FALLS RD.
KESTRAL FALLS ROAD CV-05068
CAMINITO CORONA CV-05068
AGUA VERDE
P
LOT F
P
LOT G
FC-1
FC-1
FC-1
FC-1
LOT 10
LOT 10
MAP NO. 15037
BIRCH ROAD
MILLENIA AVENUE
MAP 16310
MAP 16081
ROS 22092
MAP 15942
PUBLIC RIGHT-OF-WAY
PORTION OF EASTLAKE PARKWAY DEDICATED TO THE CITY OF CHULA VISTA PER MAP NO. 14780.
PORTION OF EASTLAKE PARKWAY DEDICATED TO THE CITY OF CHULA VISTA PER DOCUMENT RECORDED OCTOBER 17, 2003 AS FILE NO. 2003-1277077 OF OFFICIAL RECORDS.
PORTION OF BIRCH ROAD DEDICATED TO THE CITY OF CHULA VISTA PER MAP NO. 14780.
PORTION OF BIRCH ROAD OFFERED TO THE CITY OF CHULA VISTA FOR STREET AND PUBLIC UTILITY PURPOSES REC. 4/18/2005 AS INST. NO. 2005-0317713, O.R. ACCEPTANCE OF IRREVOCABLE OFFER REC. 1/26/2011 AS INST. NO. 2011-0048618, O.R.
PORTION OF BIRCH ROAD GRANTED TO THE CITY OF CHULA VISTA PER EASEMENT FOR STREET PURPOSES REC. 5/16/2003 AS INST. NO. 2003-0574420, O.R.
0 60 120 180
SCALE 1" = 60'

PREPARED BY:

HUNSAKER & ASSOCIATES SAN DIEGO, INC.

PLANNING 9707 Waples Street
ENGINEERING San Diego, Ca 92121
SURVEYING

TENTATIVE MAP/CVT 22-0002

OTAY RANCH TOWN CENTER FC-1

City Of Chula Vista, California

SHEET 5 OF 8

W.O. 3553-0002

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Project Name/_____

ATTACHMENT 5

Drainage Report

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

Project Name/_____

ATTACHMENT 6

Project's Geotechnical and Groundwater Investigation Report

Attach project's geotechnical and groundwater investigation report. Refer to Appendix C.4 to determine the reporting requirements.

GEOTECHNICAL RECONNAISSANCE REPORT

OTAY RANCH TOWN CENTER
CHULA VISTA, CALIFORNIA

GEOCON
INCORPORATED

GEOTECHNICAL
ENVIRONMENTAL
MATERIALS

PREPARED FOR

Brookfield
Properties

FEBRUARY 4, 2022
PROJECT NO. G2883-52-01

GEOCON
INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. G2883-52-01
February 4, 2022

Brookfield Properties
733 8th Avenue
San Diego, California 92101

Attention: Mr. Dan Buoye

Subject: GEOTECHNICAL RECONNAISSANCE REPORT
OTAY RANCH TOWN CENTER
CHULA VISTA, CALIFORNIA

Dear Mr. Buoye:

In accordance with your request and authorization of our Proposal No. LG-21061 revised January 11, 2022, we prepared this geotechnical reconnaissance report for the proposed Otay Ranch Town Center redevelopment in Chula Vista, California.

The accompanying report describes the general site soil and geologic conditions based on a desktop study and presents our findings. We should be contacted to prepare a geotechnical investigation for proposed redevelopment to the property, if planned.

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

Very truly yours,

GEOCON INCORPORATED

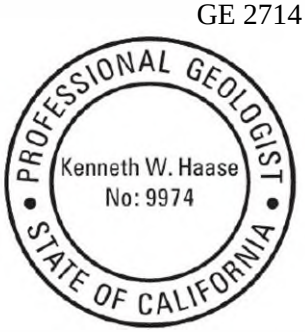
Ken W. Haase
PG 9974

Shawn Foy Weedon
GE 2714

John Hoobs
CEG 1524

KH:SFW:JH:arm

(e-mail) Addressee



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GEOTECHNICAL RECONNAISSANCE

1. PURPOSE AND SCOPE

This report presents the results of a geotechnical reconnaissance related to proposed redevelopment of the Otay Ranch Town Center in the City of Chula Vista, California (see Vicinity Map). The roughly 5-acre property is located north of Birch Road and the Otay Ranch Town Center Mall, south of Olympic Parkway and the Planning Area 12 development, west of Eastlake Parkway and east of State Route 125. The purpose of this study is to review published geotechnical documents and geologic information (see List of References) and evaluate the existing geologic conditions and geologic/geotechnical hazards that may affect the property.

Vicinity Map

The scope of our study included reviewing published and unpublished geotechnical information of the surrounding area. Appendix A presents the boring logs performed during the referenced investigation. In addition, Appendix B includes the laboratory test results from the previous investigation. The conclusions presented herein are based on a review of the available data and our experience with similar soil and geologic conditions in the surrounding area.

The scope of the study included a review of:

1. *As-Graded Geotechnical Report, McMillin Otay Ranch, Village 12 and Borrow and Fill Sites Within the Eastern Urban Center, Chula Vista, California*, prepared by Geotechnics Incorporated, dated February 16, 2006 (Project No. 0367-012-01, Document No. 05-1029).

2. *Preliminary Geotechnical Investigation, Otay Ranch Town Center Addition, Otay Ranch Village 12, 2015 Birch Road, Chula Vista, California,* prepared by Geocon Incorporated, dated June 26, 2014 (Project No. G1731-11-01).

2. SITE DESCRIPTION

The existing property consists of the northern parking area for the existing Otay Ranch Town Center mall. The area consists of surface grade asphalt concrete parking on the east and southwest, an outdoor soccer area and playground in the central portion with a landscape construction storage area in the northwest portion. The site was graded between 2004 and 2005 with observation and testing services provided by Geotechnics, Incorporated. The site is relatively flat with elevations between 624 feet Mean Sea Level (MSL) and 614 feet MSL, sloping gently to the southwest. An existing 10- to 15-foot-high cut and fill slope exists on the west limits of the site, descending towards State Route 125. The Existing Site Map shows the current conditions at the site. Based on the previous as-graded map, the site was partially situated over the upper portions of two canyon drainages with fill depths ranging up to about 25 feet at the site.

Existing Site Map

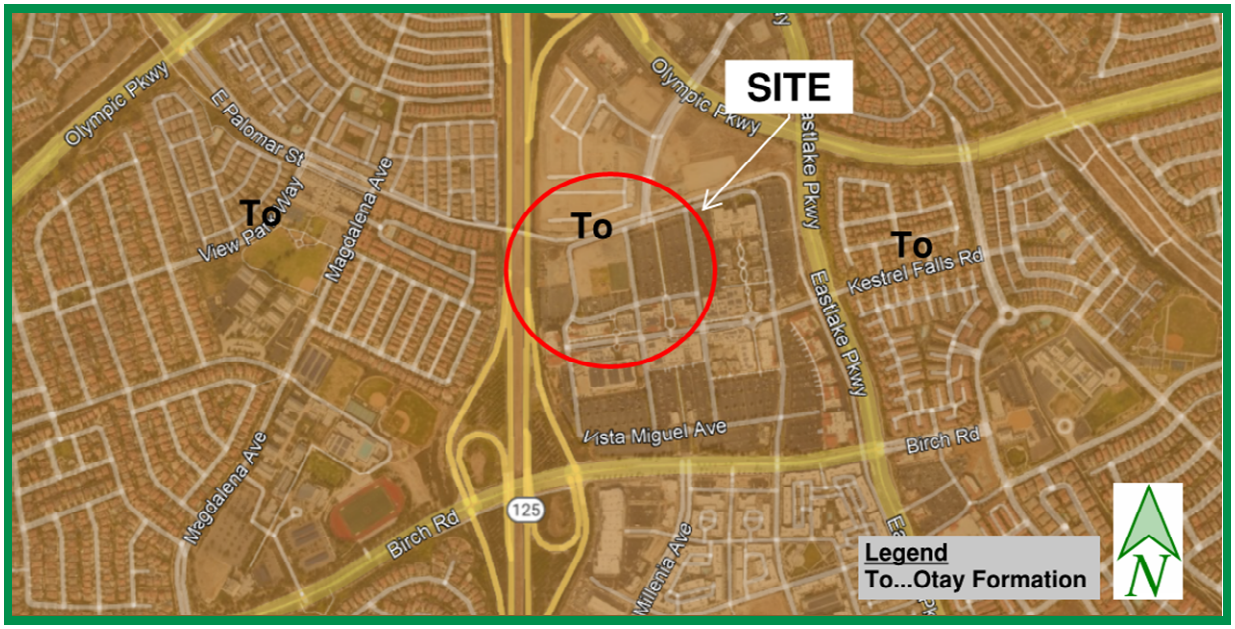
We understand the proposed redevelopment will consist of constructing 3, multi-family residential lots with commercial space, reconfiguring the existing Town Center Drive entrance and installing a new plaza area in the southeast portion of the site with accommodating utilities, flatwork, and landscaping. The Preliminary Site Plan shows a current concept of the proposed improvements.

Preliminary Site Plan

3. GEOLOGIC SETTING

The site is in the eastern portion of the coastal plain within the southern portion of the Peninsular Ranges Geomorphic Province of southern California. The Peninsular Ranges is a geologic and geomorphic province that extends from the Imperial Valley to the Pacific Ocean and from the Transverse Ranges to the north and into Baja California to the south. The coastal plain of San Diego County is underlain by a thick sequence of relatively undisturbed and non-conformable sedimentary rocks that thicken to the west and range in age from Upper Cretaceous through the Pleistocene with intermittent deposition. The sedimentary units are deposited on bedrock Cretaceous to Jurassic age igneous and metavolcanic rocks. Geomorphically, the coastal plain is characterized by a series of 21, stair-stepped marine terraces (younger to the west) that have been dissected by west flowing rivers. The coastal plain is a relatively stable block that is dissected by relatively few faults consisting of the potentially active La Nacion Fault Zone and the active Rose Canyon Fault Zone. The Peninsular Ranges Province is also dissected by the Elsinore Fault Zone that is associated with and sub-parallel to the San Andreas Fault Zone, which is the plate boundary between the Pacific and North American Plates.

The site consists of Oligocene-age (Tertiary) Otay Formation that generally consists of sandstones with interbeds of claystones and siltstones with a reported maximum thickness of roughly 400 feet. The Otay Formation contains multiple layers of bentonitic claystone that is highly expansive and has low shear strength. The Regional Geologic Map shows the geologic units around the site.



Regional Geologic Map

4. SOIL AND GEOLOGIC CONDITIONS

Based on our review of existing geologic information, the site is likely underlain by previously placed fill and the Otay Formation. The geologic units are described herein in order of increasing age.

4.1 Previously Placed Fill

Previously placed fill is present across most of the site based on the referenced as-graded map. The fill depths likely range up to about 25 feet on the site. We expect the fill soil consists of medium dense, damp to moist, sandy silts and clays and possess a "very low" to "high" expansion potential (expansion index of 130 or less) and a "S0" sulfate exposure. We expect the upper 2 to 3 feet of the existing fill will require remedial grading. However, deeper removals may be required during relocation of utilities or from demolishing foundations. The previously placed fill is suitable for the support of the proposed fill and structural loads.

4.2 Otay Formation

Tertiary-age Otay Formation located below the previously placed fill at may be exposed at grade in previous cut areas. This unit consists of interbeds of dense to very dense, slightly cemented, silty to

clayey sandstone and hard, siltstone and claystone layers. Excavations will generally be possible with heavy-duty grading equipment with heavy effort; however, moderately to highly cemented zones may create very difficult ripping and generate oversize cemented cobbles and boulders. The soil from this unit normally possesses a “very low” to “medium” expansion potential (expansion index of 90 or less); however, the claystones may possess a “high” expansion potential (expansion index of 91 to 130). The Otay Formation is suitable for the support of proposed fill and structural loads.

5. GROUNDWATER

We expect groundwater exists deeper than 100 feet below existing grade at the property; therefore, we do not expect groundwater to adversely impact future development. Seepage may be encountered at the fill/formational contact and within the previous canyon drainages. Groundwater elevations and seepage conditions are dependent on seasonal precipitation, irrigation, and land use, among other factors, and vary as a result. Seepage conditions can develop due to over watering or poor drainage practices. In addition, localized seepage conditions are occasionally encountered within deeper fills when drilled caisson foundations are excavated.

6. GEOLOGIC HAZARDS

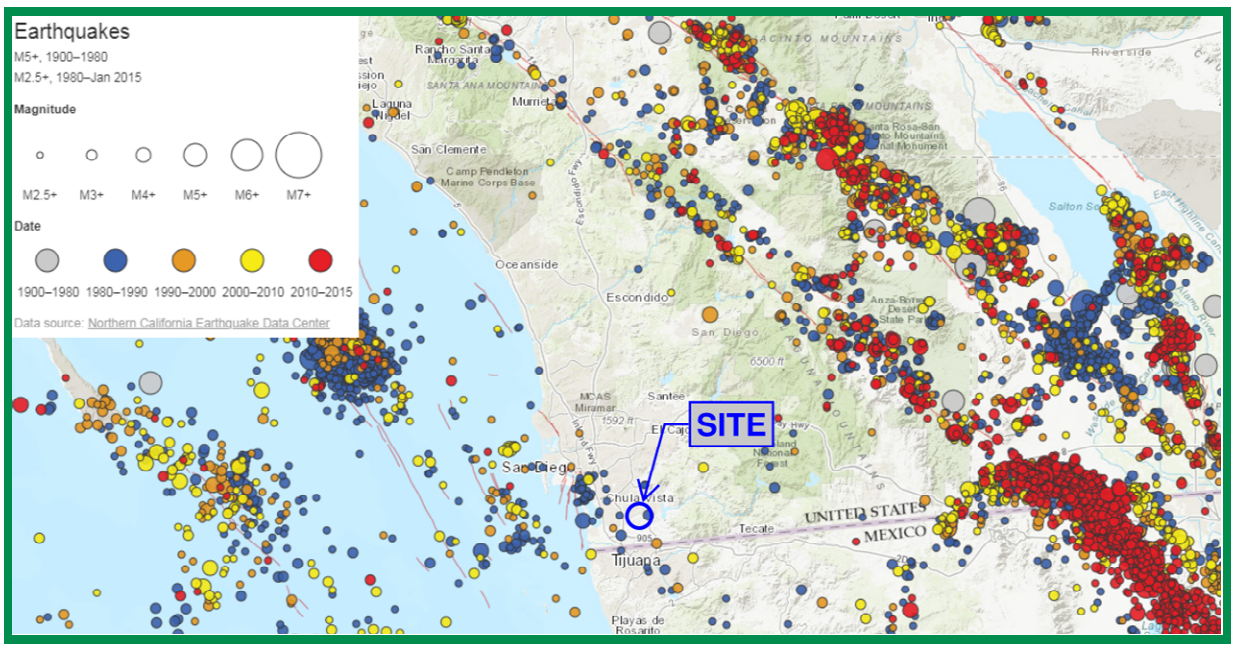
6.1 Faulting and Seismicity

A review of geologic literature and experience with the soil and geologic conditions in the general area indicate that known active, potentially active, or inactive faults are not located at the site. An active fault is defined by the California Geological Survey (CGS) as a fault showing evidence for activity within the last 11,700 years. The site is not located within a State of California Earthquake Fault Zone.

The USGS has developed a program to evaluate the approximate location of regional faulting in the area of properties. The following figure shows the location of the existing faulting in the San Diego County and Southern California region. The fault traces are shown as solid, dashed, and dotted that represent well-constrained, moderately constrained and inferred, respectively. The fault line colors represent fault with ages less than 150 years (red), 15,000 years (orange), 130,000 years (green), 750,000 years (blue, not shown) and 1.6 million years (black).

Faults in Southern California

The San Diego County and Southern California region is seismically active. The following figure presents the occurrence of earthquakes with a magnitude greater than 2.5 from the period of 1900 through 2015 according to the Bay Area Earthquake Alliance website.



Earthquakes in Southern California

Considerations important in seismic design include the frequency and duration of motion and the soil conditions underlying the site. Seismic design of structures should be evaluated in accordance with the California Building Code (CBC) guidelines currently adopted by the local agency.

6.2 Ground Rupture

Ground surface rupture occurs when movement along a fault is sufficient to cause a gap or rupture where the upper edge of the fault zone intersects the earth surface. The potential for ground rupture is considered to be negligible due to the absence of active faults at the subject site.

6.3 Tsunamis and Seiches

A tsunami is a series of long-period waves generated in the ocean by a sudden displacement of large volumes of water. The site is located approximately ten miles from the Pacific Ocean at an elevation greater than 610 feet MSL. Therefore, the risk of a tsunami affecting the site is considered negligible due to the distance of the site from the ocean and elevation.

Seiches are standing wave oscillations of an enclosed water body after the original driving force has dissipated. Driving forces are typically caused by seismic ground shaking. The site is not located near a body of water; therefore, the risk of a seiche affecting the site is considered negligible.

6.4 Liquefaction

Liquefaction typically occurs when a site is located in a zone with seismic activity, on-site soils are cohesionless or silt/clay with low plasticity, groundwater is encountered, and soil relative densities are less than about 70 percent. If the four previous criteria are met, a seismic event could result in a rapid pore-water pressure increase from the earthquake-generated ground accelerations. Seismically induced settlement may occur whether the potential for liquefaction exists or not. Due to the lack of a near surface groundwater table and the very dense nature of the fill and formational materials, the potential for liquefaction and seismically induced settlement occurring at the site is considered negligible.

6.5 Landslides

We did not observe evidence of previous or incipient slope instability at the site during our study and the property is relatively flat. Published geologic mapping indicates landslides are not present on or adjacent to the site. Therefore, we opine the potential for a landslide is not a concern for this project.

6.6 Erosion

The site is relatively flat and is not located adjacent to the Pacific Ocean coast or a free-flowing drainage where active erosion is occurring. Provided the engineering recommendations herein are

followed and the project civil engineer prepares the grading plans in accordance with generally accepted regional standards, we do not expect erosion to be a major impact to site development. In addition, we expect the proposed development would not increase the potential for erosion if properly designed.

6.7 Settlement

Fill is present across the majority of the site approaching maximum depths of about 25 feet. Fills are subject to long term settlement under gravity loading and also subject to settlements due to building loads. Based on previous experience for fill soils that are roughly 15 to 20 years old, long-term settlements due to gravity loading of roughly 0.1 percent could occur resulting in settlements of about 0.3 inches for a 20- to 25-foot deep fill. We should provide estimated settlements in the locations of the proposed buildings once a grading plan has been prepared with building locations.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 General

7.1.1 From a geotechnical engineering standpoint, we opine adverse soil or geologic conditions do not exist at the property and that the proposed redevelopment project can be performed.

7.1.2 Based on a review of the referenced geologic information and our experience in the area, we expect the site is generally underlain by previously placed fill with a maximum thickness of about 25 feet overlying the Otay Formation. The Otay Formation may be present at or near existing grade in the southwest and northeast portions of the site. The upper portion of the fill soil will require remedial grading where present across the site. The fill soil can be reused as new compacted fill. We should perform a geotechnical investigation to provide the design and remedial grading recommendations for the project once architecture and grading plans have been prepared.

7.1.3 We expect that formational materials will be exposed at or near proposed finish grades for portions of the proposed buildings. Due to the dense nature of the formational material, we expect the upper 5 feet of formational material to be removed and replaced with properly compacted fill.

7.1.4 Groundwater extends deeper than 100 feet below the site and will not affect development. It is not uncommon for near surface seepage conditions to develop from excessive irrigation where none previously existed due to the permeability characteristics of the geologic units on site.

7.1.5 We do not expect significant slopes or retaining walls will be constructed. Therefore, slope instability for planned and existing permanent slopes will not be a consideration for redevelopment.

7.1.6 We expect that most of the on-site soils will generally have a “low” to “medium” expansion potential (expansion index between 21 and 90) and an “S0” corrosion potential for design. Therefore, expansive soils will be a consideration for redevelopment.

7.1.7 Grading plans for future redevelopment and improvement for this property are not currently available. We should be contacted to perform a geotechnical investigation if the property will be redeveloped.

7.2 Excavation and Soil Characteristics

7.2.1 Excavation of the in-situ soil should be possible with moderate to heavy effort using conventional heavy-duty equipment. Some cemented zones exist in the formational materials that may require localized very difficult excavation and generation of oversize material, if encountered.

7.2.2 We expect the existing soil is considered to be "expansive" (expansion index [EI] of greater than 20) as defined by 2019 California Building Code (CBC) Section 1803.5.3. Table 7.2.1 presents soil classifications based on the expansion index. We expect the soil onsite to possess a "very low" to "high" expansion potential (expansion index of 130 or less) in accordance with ASTM D 4829.

TABLE 7.2.1
EXPANSION CLASSIFICATION BASED ON EXPANSION INDEX

Expansion Index (EI)	ASTM D 4829 Expansion Classification	2019 CBC Expansion Classification
0 – 20	Very Low	Non-Expansive
21 – 50	Low	Expansive
51 – 90	Medium	
91 – 130	High	
Greater Than 130	Very High	

7.2.3 We expect the onsite fill soils and formational materials will possess an "S0" sulfate exposure to concrete structures in contact with soil as defined by 2019 CBC Section 1904 and ACI 318-14 Chapter 19. The presence of water-soluble sulfates is not a visually discernible characteristic; therefore, other soil samples from the site could yield different concentrations. Additionally, over time landscaping activities (i.e., addition of fertilizers and other soil nutrients) may affect the concentration.

7.2.4 Geocon Incorporated does not practice in the field of corrosion engineering. Therefore, if improvements that could be susceptible to corrosion are planned, further evaluation by a corrosion engineer should be performed.

7.3 Seismic Design Criteria

7.3.1 Table 7.3.1 summarizes site-specific design criteria obtained from the 2019 California Building Code (CBC; Based on the 2018 International Building Code [IBC] and ASCE 7-16), Chapter 16 Structural Design, Section 1613 Earthquake Loads. We used the computer program *U.S. Seismic Design Maps*, provided by the Structural Engineers Association

(SEA) to calculate the seismic design parameters. The short spectral response uses a period of 0.2 second. We evaluated the Site Class based on the discussion in Section 1613.2.2 of the 2019 CBC and Table 20.3-1 of ASCE 7-16. The buildings and improvements should be designed using a Site Class C. The values presented herein are for the risk-targeted maximum considered earthquake (MCE_R). Sites designated as Site Class D, E and F may require additional analyses if requested by the project structural engineer and client.

TABLE 7.3.1
2019 CBC SEISMIC DESIGN PARAMETERS

Parameter	Value	2019 CBC Reference
Site Class	C	Section 1613.2.2
Fill Thickness, T (feet)	T<20	--
MCE_R Ground Motion Spectral Response Acceleration – Class B (short), S_S	0.748g	Figure 1613.2.1(1)
MCE_R Ground Motion Spectral Response Acceleration – Class B (1 sec), S_1	0.273g	Figure 1613.2.1(2)
Site Coefficient, F_A	1.201	Table 1613.2.3(1)
Site Coefficient, F_V	1.500*	Table 1613.2.3(2)
Site Class Modified MCE_R Spectral Response Acceleration (short), S_{MS}	0.898g	Section 1613.2.3 (Eqn 16-36)
Site Class Modified MCE_R Spectral Response Acceleration – (1 sec), S_{M1}	0.410g*	Section 1613.2.3 (Eqn 16-37)
5% Damped Design Spectral Response Acceleration (short), S_{DS}	0.599g	Section 1613.2.4 (Eqn 16-38)
5% Damped Design Spectral Response Acceleration (1 sec), S_{D1}	0.273g*	Section 1613.2.4 (Eqn 16-39)

7.3.2 Table 7.3.2 presents the mapped maximum considered geometric mean (MCE_G) seismic design parameters for projects located in Seismic Design Categories of D through F in accordance with ASCE 7-16.

TABLE 7.3.2
2019 CBC SITE ACCELERATION DESIGN PARAMETERS

Parameter	Value	ASCE 7-16
Site Class	C	--
Fill Thickness, T (Feet)	T≤20	--
Mapped MCE_G Peak Ground Acceleration, PGA	0.324g	Figure 22-9
Site Coefficient, F_{PGA}	1.200	Table 11.8-1
Site Class Modified MCE_G Peak Ground Acceleration, PGA_M	0.389g	Section 11.8.3 (Eqn 11.8-1)

7.3.3 Conformance to the criteria in Tables 7.3.1 and 7.3.2 for seismic design does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur in the event of a large earthquake. The primary goal of seismic design is to protect life, not to avoid all damage, since such design may be economically prohibitive.

7.3.4 The project structural engineer and architect should evaluate the appropriate Risk Category and Seismic Design Category for the planned structures. The values presented herein assume a Risk Category of II and resulting in a Seismic Design Category D. Table 7.3.3 presents a summary of the risk categories in accordance with ASCE 7-16.

TABLE 7.3.3
ASCE 7-16 RISK CATEGORIES

Risk Category	Building Use	Examples
I	Low risk to Human Life at Failure	Barn, Storage Shelter
II	Nominal Risk to Human Life at Failure (Buildings Not Designated as I, III or IV)	Residential, Commercial and Industrial Buildings
III	Substantial Risk to Human Life at Failure	Theaters, Lecture Halls, Dining Halls, Schools, Prisons, Small Healthcare Facilities, Infrastructure Plants, Storage for Explosives/Toxins
IV	Essential Facilities	Hazardous Material Facilities, Hospitals, Fire and Rescue, Emergency Shelters, Police Stations, Power Stations, Aviation Control Facilities, National Defense, Water Storage

7.4 General Grading Recommendations

7.4.1 Grading should be performed in accordance with the recommendations provided in this report and the local grading ordinance. Geocon Incorporated should observe the grading operations on a full-time basis and provide testing during the fill placement.

7.4.2 Prior to commencing grading, a preconstruction conference should be held at the site with the agency inspector, developer, grading and underground contractors, civil engineer, and geotechnical engineer in attendance. Special soil handling and/or the grading plans can be discussed at that time.

7.4.3 Site preparation should begin with the removal of deleterious material, debris, and vegetation. The depth of vegetation removal should be such that material exposed in cut areas or soil to be used as fill is relatively free of organic matter. Material generated during

stripping and/or site demolition should be exported from the site. Asphalt and concrete should not be mixed with the fill soil unless approved by the Geotechnical Engineer.

7.4.4 Abandoned foundations and buried utilities (if encountered) should be removed and the resultant depressions and/or trenches should be backfilled with properly compacted material as part of the remedial grading.

7.4.5 We expect the proposed structures will be supported on a shallow foundation system founded in compacted fill. Where formational material is exposed at grade or less than 5 feet of fill is present, the upper 5 feet below finish grade or 2 feet below the proposed foundations (whichever results in a deeper excavation) should be excavated and replaced with properly compacted fill. Where previously placed fill greater than 5 feet is present below the proposed structures, the upper 2 to 3 feet of material should be ripped, moisture conditioned and recompacted prior to receiving improvements. The excavations should extend at least 10 feet laterally outside of the proposed foundation system, where possible.

7.4.6 In areas of proposed improvements outside of the building areas, the upper 1 to 2 feet of existing soil should be processed, moisture conditioned as necessary and recompacted. Deeper excavations may be required in areas where loose or saturated materials are encountered. The excavations should extend at least 2 feet laterally outside of the improvement area, where possible. Table 7.4.1 provides a summary of the remedial grading recommendations.

TABLE 7.4.1
SUMMARY OF REMEDIAL GRADING RECOMMENDATIONS

Area	Remedial Grading Excavation Requirements
Proposed Buildings (Formational Material or Less Than 5 Feet of Fill)	Excavate 5 Feet Below Pad Grade and 2 Feet Below Footings
Proposed Buildings (Previously Placed Fill)	Remedial Grading of Upper 2 to 3 Feet of Existing Fill
Site Development (Outside Building Areas)	Process Upper 1 to 2 Feet of Existing Materials
Lateral Grading Limits	10 Feet Outside of Buildings
	2 Feet Outside of Improvement Areas
Exposed Bottoms of Excavations	Scarify Upper 12 Inches

7.4.7 The bottom of the excavations should be sloped 1 percent to the adjacent street or deepest fill. Prior to fill soil being placed, the existing ground surface should be scarified, moisture conditioned as necessary, and compacted to a depth of at least 12 inches. Deeper

excavations may be required if saturated or loose fill soil is encountered. A representative of Geocon should be on-site during excavations to evaluate the limits of the remedial grading.

7.4.8 The site should then be brought to final subgrade elevations with fill compacted in layers. In general, the existing soil is suitable for use from a geotechnical engineering standpoint as fill if relatively free from vegetation, debris, and other deleterious material. Layers of fill should be about 6 to 8 inches in loose thickness and no thicker than will allow for adequate bonding and compaction. Fill, including backfill and scarified ground surfaces, should be compacted to a dry density of at least 90 percent of the laboratory maximum dry density near to slightly above optimum moisture content in accordance with ASTM Test Procedure D 1557. Fill materials placed below optimum moisture content may require additional moisture conditioning prior to placing additional fill. The upper 12 inches of subgrade soil underlying pavement should be compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content shortly before paving operations.

7.4.9 The City of Chula Vista requires additional removals and grading requirements within the street and right-of-way areas. Based on the City of Chula Vista, the upper 5 feet of fill and upper 3 feet of formational materials within the public right of way areas should possess an expansion index of 90 or less. Additional removals of formational materials may be required if the expansion index is greater than 90.

7.4.10 Import fill (if necessary) should consist of the characteristics presented in Table 7.3.2. Geocon Incorporated should be notified of the import soil source and should perform laboratory testing of import soil prior to its arrival at the site to determine its suitability as fill material.

TABLE 7.3.2
SUMMARY OF IMPORT FILL RECOMMENDATIONS

Soil Characteristic	Values
Expansion Potential	“Very Low” to “Medium” (Expansion Index of 90 or less)
Particle Size	Maximum Dimension Less Than 3 Inches
	Generally Free of Debris

7.5 Geotechnical Design

7.5.1 The following geotechnical design items should be considered during due diligence.

- We expect that shallow conventional foundations that provide moderate bearing values can be used to support the proposed residential and mixed-use buildings founded in compacted fill.

- Typical subgrade preparation time of exterior concrete flatwork and sidewalk is expected. Expansive soils should be considered.

- We expect that relatively low R-Value laboratory test results for subgrade soils will be encountered that will require thicker pavement sections for the parking lots and driveways. Typical subgrade preparation time of pavement areas are expected.

- Typical design and use of landscape area drains and building roof drains is expected.

- Control of surface drainage and its discharge and containment to storm water management devices will be an important design consideration to reduce the potential for erosion and maintaining the geotechnical design parameters of the project.

- Potential elevated long-term maintenance costs for surface improvements that includes sidewalks and flatwork due to the anticipated "low" to "high" expansive soils at finish grade.

7.6 Site Drainage and Moisture Protection

7.6.1 Adequate site drainage is critical to reduce the potential for differential soil movement, erosion, and subsurface seepage. Under no circumstances should water be allowed to pond adjacent to footings and improvements. The site should be graded and maintained such that surface drainage is directed away from structures in accordance with 2019 CBC 1804.4 or other applicable standards. In addition, surface drainage should be directed away from the top of slopes into swales or other controlled drainage devices. Roof and pavement drainage should be directed into conduits that carry runoff away from the proposed structure.

7.6.2 Underground utilities should be leak free. Utility and irrigation lines should be checked periodically for leaks, and detected leaks should be repaired promptly. Detrimental soil movement could occur if water is allowed to infiltrate the soil for prolonged periods of time.

7.6.3 Landscaping planters adjacent to paved areas are not recommended due to the potential for surface or irrigation water to infiltrate the pavement's subgrade and base course. Area drains to collect excess irrigation water and transmit it to drainage structures or impervious above-grade planter boxes can be used. In addition, where landscaping is planned adjacent to the pavement, construction of a cutoff wall along the edge of the pavement that extends at least 6 inches below the bottom of the base material should be considered.

GRAPHIC SCALE

0' 30' 60' 90' 120' 180' 240'

SCALE 1"=60' (on 36x24)

GEOCON LEGEND

Qpf .....PREVIOUSLY PLACED FILL (Geotechnics, Inc. 2005)

To .....OTAY FORMATION (Dotted Where Buried)

.....APPROX. LOCATION OF GEOLOGIC CONTACT

B-13 .....APPROX. LOCATION OF BORING (Geocon, Inc. 2014)

(5'+) .....APPROX. DEPTH OF FILL (In Feet)

613 .....APPROX. ELEVATION AT BASE OF FILL (In Feet, MSL)

GEOLOGIC MAP

OTAY RANCH TOWN CENTER
CHULA VISTA, CALIFORNIA

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

SCALE	1" = 60'	DATE	02 - 04 - 2022
PROJECT NO.	G2883 - 52 - 01	FIGURE	1
SHEET	1 OF 1		

Plotted:02/04/2022 8:53AM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\G2883-52-01 (OR Town Center)\SHEETS\G2883-52-01 Geo Map.dwg

APPENDIX A

APPENDIX A

PREVIOUS BORING LOGS

FROM

PRELIMINARY GEOTECHNICAL INVESTIGATION
OTAY RANCH TOWN CENTER ADDITION
OTAY RANCH VILLAGE 12

CHULA VISTA, CALIFORNIA
PROJECT NO. G1731-11-01

FOR

OTAY RANCH TOWN CENTER
CHULA VISTA, CALIFORNIA

PROJECT NO. G2883-52-01

PROJECT NO. G1731-11-01

BORING B 1

ELEV. (MSL.) **619'** DATE COMPLETED **06-05-2014**

EQUIPMENT **CME 55** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B1-1			ML	**PREVIOUSLY PLACED FILL (Qpf)** Stiff, moist, olive brown, Sandy SILT; trace gravel			
2								
4	B1-2			ML/SM	Very stiff, moist, light brown, Sandy SILT to Silty, fine SAND	45	97.1	21.8
6								
8	B1-3				-Becomes damp to moist, light olive brown	60	102.7	21.1
10								
12								
14	B1-4				-Trace bentonite	45	95.1	28.6
16								
18	B1-5					73/11.5"		
				ML	**OTAY FORMATION (To)** Very dense, damp, grayish to yellowish brown, Sandy SILTSTONE; slightly cemented; micaceous			

BORING TERMINATED AT 19 FEET
No groundwater encountered

Figure A-1,
Log of Boring B 1, Page 1 of 1

G1731-11-01.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◥ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1731-11-01

BORING B 2

ELEV. (MSL.) **621'** DATE COMPLETED **06-05-2014**

EQUIPMENT **CME 55** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				CL	**PREVIOUSLY PLACED FILL (Qpf)** Stiff, moist, olive brown, Sandy CLAY			
2								
4	B2-1			CL/SC	Very stiff, moist, light olive brown, Sandy CLAY to Clayey fine SAND	47	105.9	19.6
6	B2-2			SM	Dense, damp, light brown to grayish brown, Silty, very fine SAND	52	96.6	26.0
8								
10	B2-3				-Becomes moist	53	99.8	22.7
12	B2-4				-Trace clay	42		
14								
16	B2-5			ML	**OTAY FORMATION (To)** Very stiff to hard, moist, gray, Sandy SILTSTONE; micaceous	52		
18					BORING TERMINATED AT 18 FEET No groundwater encountered			

Figure A-2,
Log of Boring B 2, Page 1 of 1

G1731-11-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1731-11-01

BORING B 3

ELEV. (MSL.) **620'** DATE COMPLETED **06-05-2014**

EQUIPMENT **CME 55** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B3-1			CL	**PREVIOUSLY PLACED FILL (Qpf)** Stiff, moist, olive brown, Sandy CLAY			
2								
4	B3-2				-Becomes very stiff, olive brown to brown	57	101.5	22.9
6	B3-3			SM	**OTAY FORMATION (To)** Very dense, dry to damp, grayish brown, Silty, fine SANDSTONE; moderately to strongly cemented	50/5"		
8								
10	B3-4				-Becomes damp, light grayish brown	80		
					BORING TERMINATED AT 10 FEET No groundwater encountered			

Figure A-3,
Log of Boring B 3, Page 1 of 1

G1731-11-01.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◥ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1731-11-01

BORING B 4

ELEV. (MSL.) **617'** DATE COMPLETED **06-05-2014**

EQUIPMENT **CME 55** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B4-1			CL	**PREVIOUSLY PLACED FILL (Qpf)** Stiff, moist, olive brown, Sandy CLAY; trace gravel			
2								
	B4-2			SC	Dense, moist, light gray, Clayey, fine SAND	52	106.0	19.9
4								
					BORING TERMINATED AT 5 FEET No groundwater encountered			

Figure A-4,
Log of Boring B 4, Page 1 of 1

G1731-11-01.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1731-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING B 5** ELEV. (MSL.) **618'** DATE COMPLETED **06-05-2014** EQUIPMENT **CME 55** BY: **L. RODRIGUEZ**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0	B5-1			CL	**PREVIOUSLY PLACED FILL (Qpf)** Stiff, moist, olive brown, Sandy CLAY			
2	B5-2				-Becomes very stiff, light brown	59	96.9	26.0
4								
					BORING TERMINATED AT 15 FEET No groundwater encountered			

Figure A-5,
Log of Boring B 5, Page 1 of 1

G1731-11-01.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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PROJECT NO. G1731-11-01

BORING B 6

ELEV. (MSL.) **618'** DATE COMPLETED **06-05-2014**

EQUIPMENT **CME 55** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B6-1			CL	**PREVIOUSLY PLACED FILL (Qpf)** Stiff, damp, olive brown, Sandy CLAY			
2	B6-2				-Becomes moist, micaceous	63	99.0	26.1
4								
6	B6-3			SM	**OTAY FORMATION (To)** Very dense, moist, brown to olive brown, Silty, very fine SANDSTONE; micaceous	72/11.5"		
8								
	B6-4			ML	Hard, moist, grayish brown, Sandy SILTSTONE; micaceous	86/9.5"		
					BORING TERMINATED AT 9.75 FEET No groundwater encountered			

Figure A-6,
Log of Boring B 6, Page 1 of 1

G1731-11-01.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1731-11-01

BORING B 7

ELEV. (MSL.) **618'** DATE COMPLETED **06-05-2014**

EQUIPMENT **CME 55** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B7-1			ML	**PREVIOUSLY PLACED FILL (Qpf)** Stiff, damp to moist, light olive brown, Sandy SILT; trace organics; trace gravel			
2	B7-2				-Micaceous	51	93.5	26.4
4				ML	**OTAY FORMATION (To)** Hard, damp to moist, light grayish brown, Sandy SILTSTONE; micaceous			
6	B7-3					80/10"		
8								
	B7-4			SM	Very dense, damp, light brown, Silty SANDSTONE; micaceous	79/11.5"		
10					BORING TERMINATED AT 10 FEET No groundwater encountered			

Figure A-7,
Log of Boring B 7, Page 1 of 1

G1731-11-01.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1731-11-01

BORING B 8

ELEV. (MSL.) **616'** DATE COMPLETED **06-05-2014**

EQUIPMENT **CME 55** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					5" **ASPHALT CONCRETE** over 5" **BASE MATERIAL**			
2	B8-1			CL	**PREVIOUSLY PLACED FILL (Qpf)** Stiff, damp to moist, light olive brown, Sandy CLAY			
4	B8-2			CL/SC	Very stiff, damp, Sandy CLAY to Clayey, fine SAND	43	102.8	22.2
6	B8-3			ML/SM	Very stiff, damp, olive brown, Sandy SILT to Silty, fine SAND	44	103.7	23.8
8	B8-4			SM	**OTAY FORMATION (To)** Very dense, damp, light grayish brown, Silty, fine SANDSTONE; micaceous	85/11.5		
10								
12	B8-5			ML	Hard, damp, gray, Sandy SILTSTONE; micaceous	86/10"		
					BORING TERMINATED AT 13 FEET No groundwater encountered			

Figure A-8,
Log of Boring B 8, Page 1 of 1

G1731-11-01.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◥ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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PROJECT NO. G1731-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING B 9** ELEV. (MSL.) **621'** DATE COMPLETED **06-05-2014** EQUIPMENT **CME 55** BY: **L. RODRIGUEZ**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0	B9-1			SC	**PREVIOUSLY PLACED FILL (Qpf)** Medium dense, dry to damp, olive brown, Clayey, fine to coarse SAND; trace gravel			
2	B9-2					41	101.0	17.2
4				CL/SC	Very stiff, moist, light olive brown, Sandy CLAY to Clayey, fine SAND			
					BORING TERMINATED AT 5 FEET No groundwater encountered			

Figure A-9,
Log of Boring B 9, Page 1 of 1

G1731-11-01.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1731-11-01

BORING B 10

ELEV. (MSL.) **622'** DATE COMPLETED **06-05-2014**

EQUIPMENT **CME 55** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**PREVIOUSLY PLACED FILL (Qpf)** Dense, damp, light brown, Silty, fine to medium SAND			
2								
4				SM	**OTAY FORMATION (To)** Very dense, damp, brown, Silty, fine SANDSTONE; micaceous			
6	B10-1					50/5.5"		11.7
8								
10	B10-2			ML	Hard, damp, light brown, Sandy SILTSTONE; micaceous	86/9.5"	112.9	18.5
					BORING TERMINATED AT 10.75 FEET No groundwater encountered			

Figure A-10,
Log of Boring B 10, Page 1 of 1

G1731-11-01.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◥ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1731-11-01

BORING B 11

ELEV. (MSL.) **624'** DATE COMPLETED **06-05-2014**

EQUIPMENT **CME 55** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B11-1			SM/ML	**PREVIOUSLY PLACED FILL (Qpf)** Loose, moist, light brown, Silty, fine SAND to Sandy SILT			
2								
4				SM	**OTAY FORMATION (To)** Very dense, moist, light brown, Silty, fine SANDSTONE			
6	B11-2					50/4"	105.5	12.7
8								
10	B11-3					50/5.5"	112.1	16.6
12								
14								
	B11-4					50/5.5"		
					BORING TERMINATED AT 15.5 FEET No groundwater encountered			

Figure A-11,
Log of Boring B 11, Page 1 of 1

G1731-11-01.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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PROJECT NO. G1731-11-01

BORING B 12

ELEV. (MSL.) **622'** DATE COMPLETED **06-05-2014**

EQUIPMENT **CME 55** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B12-1			GC CL	**PREVIOUSLY PLACED FILL (Qpf)** Loose to medium dense, damp, grayish brown, Clayey GRAVEL; up to 2" diameter gravel			
2					Very stiff, moist, olive brown, Sandy CLAY; trace gravel; micaceous			
4	B12-2			SC/CL	Dense, moist, light brown, Clayey, fine SAND, to Sandy CLAY; micaceous	45	95.2	27.0
					BORING TERMINATED AT 5 FEET No groundwater encountered			

Figure A-12,
Log of Boring B 12, Page 1 of 1

G1731-11-01.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◥ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1731-11-01

BORING B 13

ELEV. (MSL.) **620'** DATE COMPLETED **06-05-2014**

EQUIPMENT **CME 55** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B13-1			CL	**PREVIOUSLY PLACED FILL (Qpf)** Stiff, moist, olive brown, Sandy CLAY; trace gravel; micaceous			
2								
4	B13-2			SC/CL	Dense, moist, light brown, Clayey fine SAND to Sandy CLAY; micaceous	58	104.6	18.4
					BORING TERMINATED AT 5 FEET No groundwater encountered			

Figure A-13,
Log of Boring B 13, Page 1 of 1

G1731-11-01.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

APPENDIX B

APPENDIX B

PREVIOUS LABORATORY TESTING

FROM

PRELIMINARY GEOTECHNICAL INVESTIGATION
OTAY RANCH TOWN CENTER ADDITION
OTAY RANCH VILLAGE 12

CHULA VISTA, CALIFORNIA
PROJECT NO. G1731-11-01

FOR

OTAY RANCH TOWN CENTER
CHULA VISTA, CALIFORNIA

PROJECT NO. G2883-52-01

APPENDIX B

LABORATORY TESTING

We performed laboratory tests in accordance with generally accepted test methods of the American Society for Testing and Materials (ASTM) or other suggested procedures during a previous investigation in 2014. We tested selected soil samples for in-place dry density/moisture content, maximum density/optimum moisture content, expansion index, water-soluble sulfate, R-Value, unconfined compressive strength, consolidation, gradation, and direct shear strength. The results of our current laboratory tests are presented herein. The in-place dry density and moisture content of the samples tested are presented on the boring logs in Appendix A.

SUMMARY OF LABORATORY MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT TEST RESULTS ASTM D 1557

Sample No.	Description	Maximum Dry Density (pcf)	Optimum Moisture Content (% dry wt.)
B1-1	Olive brown, Sandy SILT (Qpf)	115.7	15.3
B7-1	Light olive brown, Sandy SILT (Qpf)	116.6	14.5

SUMMARY OF LABORATORY EXPANSION INDEX TEST RESULTS ASTM D 4829

Sample No.	Moisture Content (%)		Dry Density (pcf)	Expansion Index	2019 CBC Expansion Classification	ASTM Soil Expansion Classification
	Before Test	After Test				
B3-1	12.7	28.1	100.6	82	Expansive	Medium
B6-1	13.3	31.0	98.9	97	Expansive	High
B11-1	12.0	27.1	102.7	67	Expansive	Medium

SUMMARY OF LABORATORY WATER-SOLUBLE SULFATE TEST RESULTS CALIFORNIA TEST NO. 417

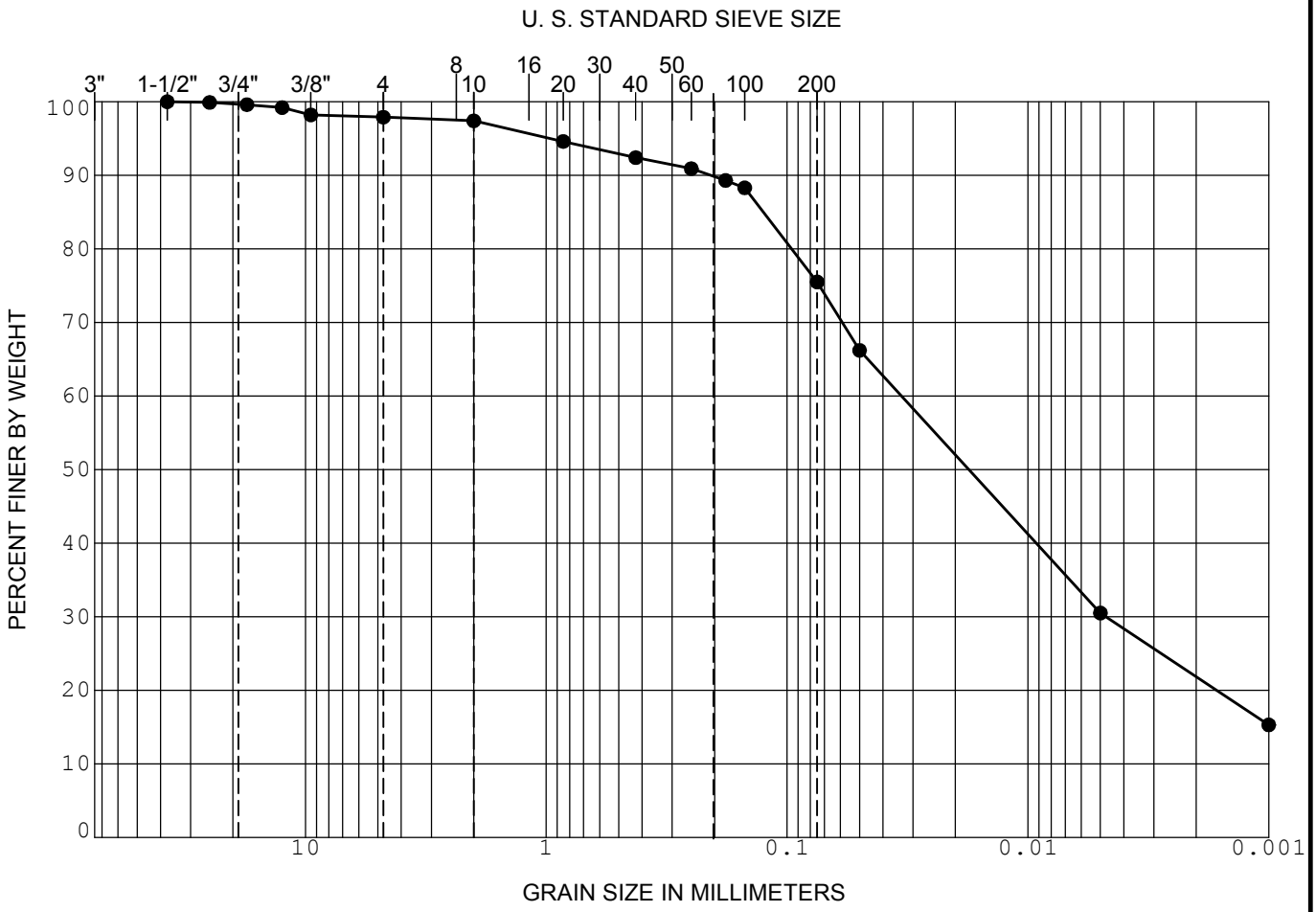
Sample No.	Depth (feet)	Geologic Unit	Water-Soluble Sulfate (%)	ACI 318 Sulfate Exposure
B3-1	0-3	Qpf	0.034	S0
B6-1	0-5	Qpf	0.069	S0
B11-1	0-5	Qpf/To	0.035	S0

SUMMARY OF LABORATORY RESISTANCE VALUE (R-VALUE) TEST RESULTS
ASTM D 2844

Sample No.	Depth (Feet)	Description (Geologic Unit)	R-Value
B4-1	0-5	Olive brown, Sandy CLAY (Qpf)	10
B9-1	0-5	Olive brown, Clayey SAND (Qpf)	21

PROJECT NO. G1731-11-01

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



	SAMPLE	DEPTH (ft)	CLASSIFICATION	NAT WC	LL	PL	PI
●	B3-1	0.0	(CL) Sandy CLAY				
⊠							
▲							

GRADATION CURVE

OTAY RANCH TOWN CENTER ADDITION, OTAY RANCH VILLAGE 12
2015 BIRCH ROAD
CHULA VISTA, CALIFORNIA

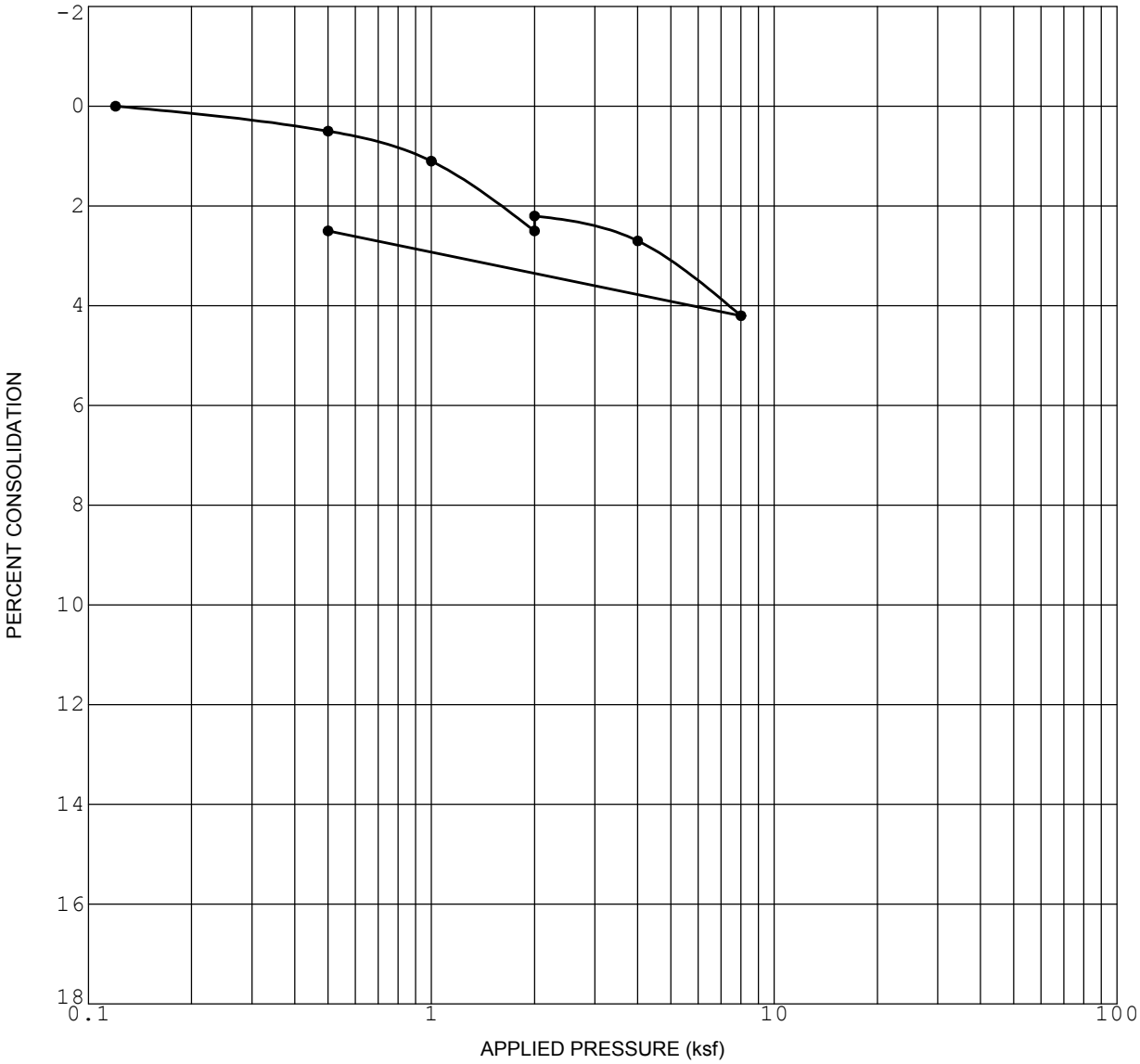
G1731-11-01.GPJ

Figure B-1

GEOCON

PROJECT NO. G1731-11-01

SAMPLE NO. B2-2



Initial Dry Density (pcf)	96.6	**Initial Saturation (%)**	96.5
Initial Water Content (%)	26.0	**Sample Saturated at (ksf)**	2.0

CONSOLIDATION CURVE

OTAY RANCH TOWN CENTER ADDITION, OTAY RANCH VILLAGE 12
2015 BIRCH ROAD
CHULA VISTA, CALIFORNIA

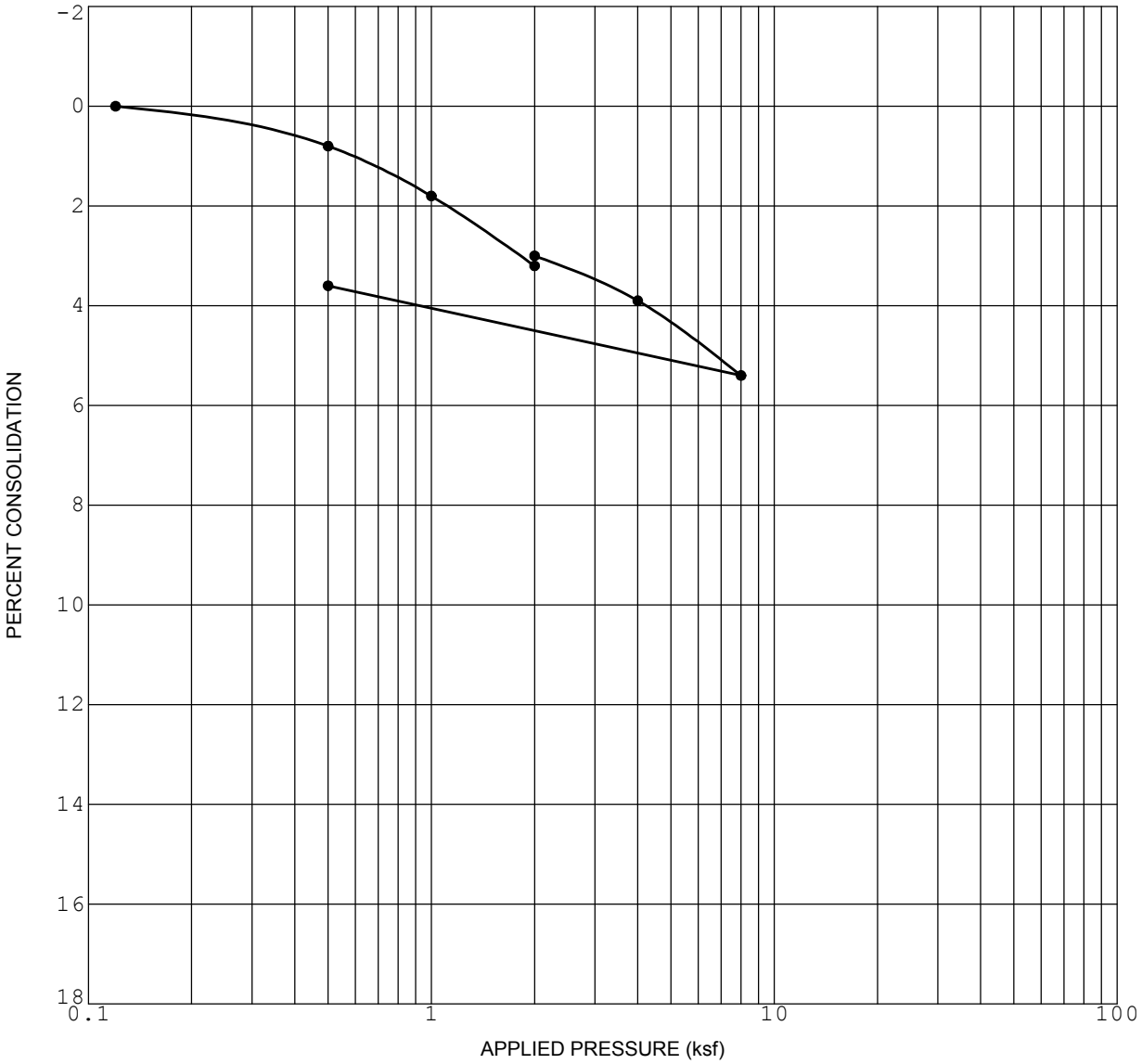
G1731-11-01.GPJ

Figure B-2

GEOCON

PROJECT NO. G1731-11-01

SAMPLE NO. B8-3



Initial Dry Density (pcf)	103.7	**Initial Saturation (%)**	100+
Initial Water Content (%)	23.8	**Sample Saturated at (ksf)**	2.0

CONSOLIDATION CURVE

OTAY RANCH TOWN CENTER ADDITION, OTAY RANCH VILLAGE 12
2015 BIRCH ROAD
CHULA VISTA, CALIFORNIA

G1731-11-01.GPJ

Figure B-3

GEOCON

SAMPLE NO.: B1-2
DEPTH OF SAMPLE: 3'

Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	23.8%	17.5%	24.2%
Dry Density (pcf)	96.3	95.8	99.1
Saturation*	87.7%	63.8%	95.8%
Height (inches)	1	1	1
AFTER TEST			
Water Content	27.3%	26.4%	26.3%
Dry Density (pcf)	92.4	95.6	100.3
FAILURE			
Normal Stress (psf)	952	2080	4350
Ultimate Stress (psf)	1416	1904	2702
Peak Stress (psf)	1625	1964	3809
Rate (in/min)	0.005	0.005	0.005

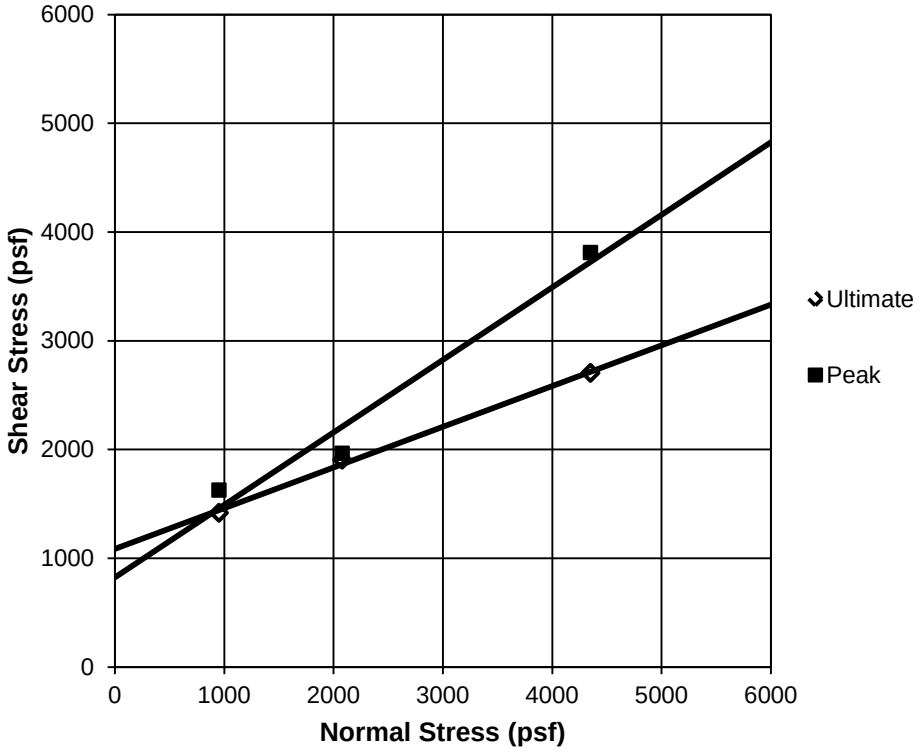
*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ (Ultimate)	21 degrees
ϕ (Peak)	34 degrees
c (Ultimate)	1100 psf
c (Peak)	820 psf

DATE: 6/17/2014
DESCRIPTION: Qpf

☑ Natural

☐ Remold



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SW/LR

DIRECT SHEAR TEST DATA

OTAY RANCH TOWN CENTER ADDITION
OTAY RANCH VILLAGE 12
2015 BIRCH ROAD
CHULA VISTA, CALIFORNIA

PROJECT NO. G1731-11-01 | FIG. B-4

SAMPLE NO.: B7-1
DEPTH OF SAMPLE: 0'

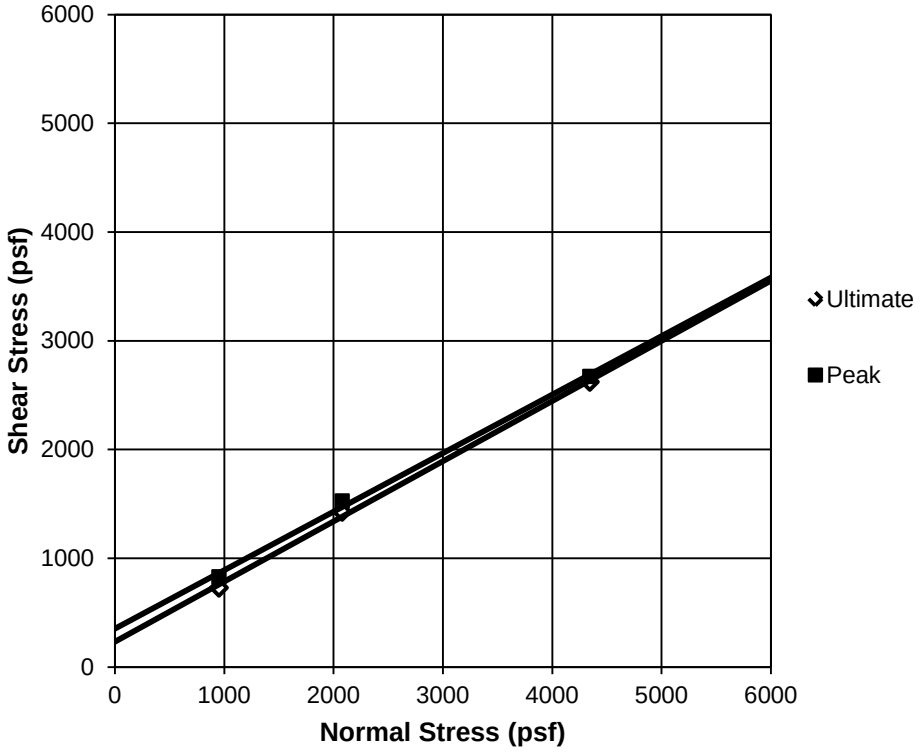
Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	13.7%	14.6%	14.2%
Dry Density (pcf)	105.3	104.6	104.7
Saturation*	63.7%	66.3%	65.0%
Height (inches)	1	1	1
AFTER TEST			
Water Content	26.9%	26.2%	23.6%
Dry Density (pcf)	104.9	105.2	107.1
FAILURE			
Normal Stress (psf)	952	2080	4346
Ultimate Stress (psf)	728	1426	2622
Peak Stress (psf)	828	1526	2672
Rate (in/min)	0.005	0.005	0.005

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ (Ultimate)	28 degrees
ϕ (Peak)	28 degrees
c (Ultimate)	230 psf
c (Peak)	350 psf

DATE: 6/23/2014
DESCRIPTION: Qpf

☐ Natural
☑ Remold



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DIRECT SHEAR TEST DATA

OTAY RANCH TOWN CENTER ADDITION
OTAY RANCH VILLAGE 12
2015 BIRCH ROAD
CHULA VISTA, CALIFORNIA

PROJECT NO. G1731-11-01 | FIG. B-5

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