City of Escondido
PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

TENTATIVE SUBDIVISION MAP NO. 20-0006
Permit Application ID: _____

2200 S. Escondido Blvd, Escondido, CA
2208 S. Escondido Blvd, Escondido, CA
2210 S. Escondido Blvd, Escondido, CA
2222 S. Escondido Blvd, Escondido, CA
2224 S. Escondido Blvd, Escondido, CA

ASSESSOR'S PARCEL NUMBER(S):
236-390-02-00 / 236-390-03-00 / 236-390-52-00 / 236-390-53-00 / 236-390-54-00

ENGINEER OF WORK:

Eric Lissner, P.E., C84264

PREPARED FOR:

Warmington Residential
3090 Pullman Street
Costa Mesa, CA 92626
714-557-5511

PDP SWQMP PREPARED BY:

ENGINEERING & CONSULTING

DATE OF SWQMP:
February 2021

PLANS PREPARED BY:
X Engineering & Consulting
Eric Lissner, P.E.
6 Hutton Centre Dr., Suite 650,
Santa Ana, CA 92707
949-522-7100

SWQMP APPROVED BY:
[FOR CITY STAFF ONLY]

APPROVAL DATE:

ESCONDIDO
City of Choice

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ACRONYMS

ACP	Alternative Compliance Project
APN	Assessor's Parcel Number
BMP	Best Management Practice
DMA	Drainage Management Area
EOW	Engineer of Work
HMP	Hydromodification Management Plan
HSG	Hydrologic Soil Group
MS4	Municipal Separate Storm Sewer System
N/A	Not Applicable
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
SWDM	Storm Water Design Manual
SWQMP	Storm Water Quality Management Plan
WMAA	Watershed Management Area Analysis
WQIP	Water Quality Improvement Plan

PDP SWQMP PREPARER'S CERTIFICATION PAGE

Project Name: Escondido 3.4
Permit Application Number: _____

PREPARER'S CERTIFICATION

I hereby declare that I am the Engineer in Responsible Charge of design of storm water best management practices (BMPs) for this project, and that I have exercised responsible charge over the design of the BMPs as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with the PDP requirements of the City of Escondido Storm Water Design Manual, which is a design manual for compliance with the City of Escondido Municipal Code (Chapter 22, Article 2) and regional MS4 Permit (California Regional Water Quality Control Board San Diego Region Order No. R9-2013-0001 as amended by R9-2015-0001 and R9-2015-0100) requirements for storm water management.

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

Engineer of Work's Signature, PE Number & Expiration Date

Eric Lissner, P.E.
Print Name

X Engineering & Consulting, Inc.
Company

02-16-2021
Date

Engineer's Seal:

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 plan check comments is included. When applicable, insert response to plan check comments behind this page.

Preliminary Design / Planning / CEQA

Submittal Number	Date	Summary of Changes
1	April, 2020	Initial Submittal
2	October, 2020	Response to plan check comments
3	December, 2020	Response to plan check comments
4	January, 2021	Response to plan check comments
5	February, 2021	Response to plan check comments

Final Design

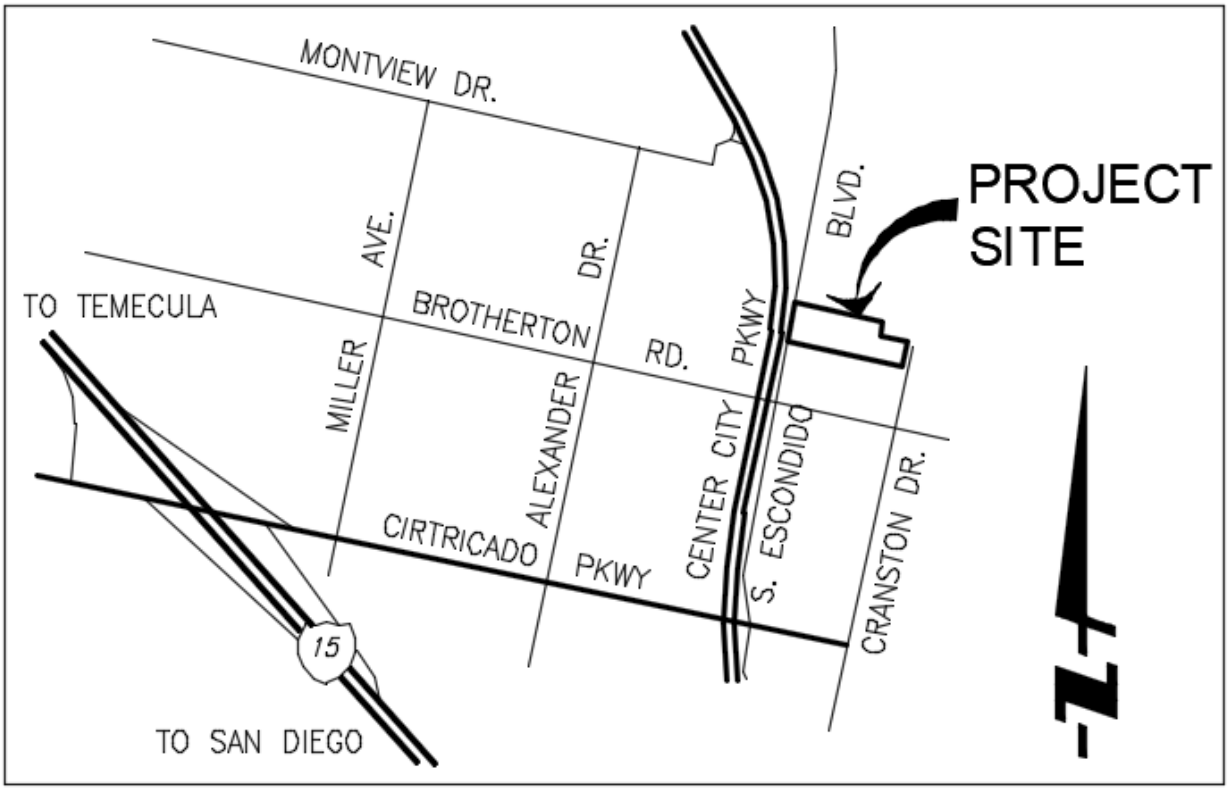
Submittal Number	Date	Summary of Changes
1		Initial Submittal
2		
3		
4		

Plan Changes

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

PROJECT VICINITY MAP

Project Name: Escondido 3.4
Record ID: TBD



VICINITY MAP
N.T.S.

Step 1: Project type determination (Standard or Priority Development Project) (Form I-2a)

Project Summary Information	
Project Name	Escondido 3.4
Project Address	2200 S. Escondido Blvd, Escondido, CA 2208 S. Escondido Blvd, Escondido, CA 2210 S. Escondido Blvd, Escondido, CA 2222 S. Escondido Blvd, Escondido, CA 2224 S. Escondido Blvd, Escondido, CA
Assessor's Parcel Number(s)	236-390-02-00 / 236-390-03-00 / 236-390-52-00 236-390-53-00 / 236-390-54-00
Permit Application Number	TBD
Project Watershed (Hydrologic Unit)	Select One: San Dieguito 905
Parcel Area (total area of Assessor's Parcel(s) associated with the project)	3.47 Acres (150,936 Square Feet)
Area to be disturbed by the project (Project Area)	3.32 Acres (144,619 Square Feet)
Project Proposed Impervious Area (subset of Project Area)	2.43 Acres (105,851 Square Feet)
Project Proposed Pervious Area (subset of Project Area)	0.89 Acres (38,768 Square Feet)
Note: Proposed Impervious Area + Proposed Pervious Area = Area to be Disturbed by the Project. This may be less than the Parcel Area.	

Confirmation of Priority Development Project Determination
The project is (select one): ☒ New Development ☐ Redevelopment[1]
The total proposed newly created or replaced impervious area is: 100,682 ft^2

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

Solar energy farms that are not also one of the categories listed in Step 2b of Table 1-1. City staff must also determine that appropriate BMPs are provided to mitigate for downstream impacts due to significant changes to the existing hydrology

Is the project in any of the following categories, (a) through (f)?			
Yes ☒	No ☐	(a)	New development projects that create 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 projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site on an existing site of 10,000 square feet or more of impervious surfaces). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.
Yes ☐	No ☒	(c)	New and redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site), and support one or more of the following uses: (i) Restaurants. This category is defined as a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (Standard Industrial Classification (SIC) code 5812). (ii) Hillside development projects. This category includes development on any natural slope that is twenty-five percent or greater. (iii) Parking lots. This category is defined as a land area or facility for the temporary parking or storage of motor vehicles used personally, for business, or for commerce. (iv) Streets, roads, highways, freeways, and driveways. This category is defined as any paved impervious surface used for the transportation of automobiles, trucks, motorcycles, and other vehicles.
Yes ☐	No ☒	(d)	New or redevelopment projects that create and/or replace 2,500 square feet or more of impervious surface (collectively over the entire project site), and discharging directly to an Environmentally Sensitive Area (ESA). "Discharging directly to" includes flow that is conveyed overland a distance of 200 feet or less from the project to the ESA, or conveyed in a pipe or open channel any distance as an isolated flow from the project to the ESA (i.e. not commingled with flows from adjacent lands). *Note: ESAs are areas that include but are not limited to all Clean Water Act Section 303(d) impaired water bodies; areas designated as Areas of Special Biological Significance by the State Water Board and San Diego Water Board; State Water Quality Protected Areas; water bodies designated with the RARE beneficial use by the State Water Board and San Diego Water Board; and any other equivalent environmentally sensitive areas which have been identified by the Copermittees.*
Yes ☐	No ☒	(e)	New development projects, or redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface, that support one or more of the following uses: (i) Automotive repair shops. This category is defined as a facility that is categorized in any one of the following SIC codes: 5013, 5014, 5541, 7532-7534, or 7536-7539. (ii) Retail gasoline outlets (RGOs). This category includes RGOs that meet the following criteria: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.

Yes ☐	No ☒	(e)	New development projects, or redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface, that support one or more of the following uses: (iii) Automotive repair shops. This category is defined as a facility that is categorized in any one of the following SIC codes: 5013, 5014, 5541, 7532-7534, or 7536-7539. (iv) Retail gasoline outlets (RGOs). This category includes RGOs that meet the following criteria: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.
Yes ☐	No ☒	(f)	New or redevelopment projects that result in the disturbance of one or more acres of land and are expected to generate pollutants post construction. *Note: See Storm Water Design Manual Section 1.4.2 for additional guidance.*

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

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

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

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

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

The area of existing (pre-project) impervious area at the project site is: _____ ft^2 (A)
The total proposed newly created or replaced impervious area is _____ ft^2 (B)
Percent impervious surface created or replaced (B/A)*100: _____%
The percent impervious surface created or replaced is (select one based on the above calculation):

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

OR

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

Step 1.1: Storm Water Quality Management Plan requirements

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

Step 1.2: Exemption to PDP definitions

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

Step 2: Construction Storm Water BMPs

Construction storm water BMPs shall be shown on the Grading Plan and (if applicable) included in the Storm Water Pollution Prevention Plan (SWPPP).

Step 3: City of Escondido PDP SWQMP Site Information Checklist (Form I-2a)

Step 3.1: Description of Existing Site Condition

Current Status of the Site (select all that apply):
☒Existing development
☐Previously graded but not built out
☐Demolition completed without new construction
☐Agricultural or other non-impervious use
☐Vacant, undeveloped/natural

Description / Additional Information:

Existing Land Cover Includes (select all that apply and provide each area on site):
☐Vegetative Cover _____Acres (_____Square Feet)
☒Non-Vegetated Pervious Areas 2.76 Acres (120,225 Square Feet)
☒Impervious Areas 0.71 Acres (30,749 Square Feet)

Description / Additional Information:

Underlying Soil belongs to Hydrologic Soil Group (select all that apply):
☐NRCS Type A
☐NRCS Type B
☒NRCS Type C
☐NRCS Type D

Approximate Depth to Groundwater (GW) (or N/A for no infiltration BMPs):
☐GW Depth < 5 feet
☐5 feet < GW Depth < 10 feet
☐10 feet < GW Depth < 20 feet
☒GW Depth > 20 feet

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

Description / Additional Information:

Step 3.2: Description of Existing Site Drainage Patterns

How is storm water runoff conveyed from the site? At a minimum, this description should answer:

(1) Whether existing drainage conveyance is natural or urban;
(2) Is runoff from offsite conveyed through the site? if yes, quantify all offsite drainage areas, design flows, and locations where offsite flows enter the project site, and summarize how such flows are conveyed through the site;
(3) Provide details regarding existing project site drainage conveyance network, including any existing storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural or constructed channels; and
(4) Identify all discharge locations from the existing project site along with a summary of conveyance system size and capacity for each of the discharge locations. Provide summary of the pre-project drainage areas and design flows to each of the existing runoff discharge locations.

Describe existing site drainage patterns:

In the existing condition, a portion of the adjacent properties in the east drains into the project site. The offsite runon appears to join the onsite runoff and sheet flow in a northwesterly direction, exiting the site onto South Escondido Boulevard. The storm water is captured by a catch basin approximately 30’ north of the site. There appears to be a privately maintained storm drain system running parallel to South Escondido Boulevard from the catch basin through the adjacent mobile home property, draining to a natural channel leading to Kit Carson Creek – however, the name of this system is not known and is not shown in documents provided by the City of Escondido.

Step 3.3: Description of Proposed Site Development

Project Description / Proposed Land Use and/or Activities:

This development project proposes 10 multi-family residential buildings of 62 townhome units in total and supporting facilities including paved streets, parking, and open space area on 3.47 gross acres of land. The site is divided into four drainage management areas. Drainage area A-1 consists of buildings, street, alleyways, sidewalks, and landscape. Area A-2 consists of open space area and sidewalk. Area A-3 is reserved for the grading of a pad for the neighboring property for a future RV parking. Area A-4 is a self-mitigating DMA.

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

Building rooftops, streets, alleyways, sidewalks, parking, and driveways.

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

Landscape area, open space

Does the project include grading and changes to site topography?

☒Yes
☐No

Description / Additional Information:

The existing site will be graded to provide adequate drainage for the proposed development.

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

Change in Land Cover Type Summary			
Land Cover Type	Existing (acres or ft^2)	Proposed (acres or ft^2)	Percent Change
Vegetation	0	0.53 ac	-
Pervious (non-vegetated)	2.76 ac	0.51 ac	-82%
Impervious	0.71 ac	2.43 ac	+242%

Step 3.4: Description of Proposed Site Drainage Patterns

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

☒Yes
☐No

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

Describe proposed site drainage patterns:

Offsite runon from the adjacent properties in the east drains onto the subject site in the existing condition. To capture the runon from the adjacent properties, a concrete ditch is proposed along the easterly grading boundary. The runon will bypass the onsite treatment system and enter a proposed curb inlet on S. Escondido Blvd, which will connect to the proposed 24" storm drain in S. Escondido Blvd. The proposed onsite grading generally follows the existing drainage pattern. Alleys A and G drain from east to west at centerline slopes between approximately 2% to 7% and Alleys B, C, D, E, and F drain from south to north at approximately 3%. Drain inlets are proposed to be installed at the entrance of each alley and catch basins will be installed in the west end of Alleys A and G to capture stormwater runoff. The runoff generated from offsite grading of the neighboring property is proposed to be intercepted by a storm inlet and comingle with the onsite flows in the proposed storm drain system. As the project site is subject to hydromodification requirements, the collected onsite runoff will be detained in three 10.5'W x 6.5'H underground storage facilities with an orifice to control the outflow from the storage. Refer to the Hydromodification Analysis provided in Attachment 2. The outflow from the storage will then flow to a BioClean Modular Wetland unit for water quality treatment. The treated water will discharge to a proposed 24" storm drain facility in S. Escondido Boulevard. For storm events larger than the water quality event, the system is designed to attenuate peak storm flows. Refer to the SWQMP exhibits for details and a section. Additional discussion of peak storm detention is provided in the project hydrology report.

Step 3.5: Potential Pollutant Source Areas

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

☒On-site storm drain inlets
☐Interior floor drains and elevator shaft sump pumps
☐Interior parking garages
☐Need for future indoor & structural pest control
☒Landscape/Outdoor Pesticide Use
☐Pools, spas, ponds, decorative fountains, and other water features
☐Food service
☐Refuse areas
☐Industrial processes
☐Outdoor storage of equipment or materials
☐Vehicle and Equipment Cleaning
☐Vehicle/Equipment Repair and Maintenance
☐Fuel Dispensing Areas
☐Loading Docks
☒Fire Sprinkler Test Water
☐Miscellaneous Drain or Wash Water
☒Plazas, sidewalks, and parking lots
☐Other (provide description)

Description / Additional Information:

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

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

The project site drains to an 84" existing culvert approximately 650' north of the subject site which discharge to a natural drainage channel. The natural drainage channel connects to the Kit Carson Creek which joins the Hodges Lake. The Hodges Lake connects to the San Dieguito River and ultimately discharge to the Pacific Ocean.

List any 303(d) impaired water bodies[2] 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
Kit Carson Creek	Pentachlorophenol (PCP)	Pentachlorophenol (PCP)
Kit Carson Creek	Total Dissolved Solids	Total Dissolved Solids
Hodges, Lake	Color	Color
Hodges, Lake	Manganese	Manganese
Hodges, Lake	Mercury	Mercury
Hodges, Lake	Nitrogen	Nitrogen
Hodges, Lake	Phosphorus	Phosphorus
Hodges, Lake	Turbidity	Turbidity
Hodges, Lake	pH	pH
San Dieguito River	Benthic Community Effects	Benthic Community Effects
San Dieguito River	Indicator Bacteria	Indicator Bacteria
San Dieguito River	Nitrogen	Nitrogen
San Dieguito River	Phosphorus	Phosphorus
San Dieguito River	Total Dissolved Solids	Total Dissolved Solids
San Dieguito River	Toxicity	Toxicity

Identification of Project Site Pollutants* *Identification of project site pollutants below is only required if flow-thru treatment BMPs are implemented onsite in lieu of retention or biofiltration BMPs. Note the project must also participate in an alternative compliance program (unless prior lawful approval to meet earlier PDP requirements is demonstrated).			
Identify pollutants expected from the project site based on all proposed use(s) of the site (see Storm Water Design Manual Appendix B.6):			
Pollutant	**Not Applicable to the Project Site**	**Anticipated from the Project Site**	**Also a Receiving Water Pollutant of Concern**
Sediment		X	X
Nutrients		X	X
Heavy Metals		X	X
Organic Compounds	X		
Trash & Debris		X	
Oxygen Demanding Substances	X		
Oil & Grease		X	
Bacteria & Viruses	X		
Pesticides		X	X

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

Step 3.7: Hydromodification Management Requirements

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

☒Yes, hydromodification management requirements for flow control and preservation of critical coarse sediment yield areas are applicable.

☐No, the project will discharge runoff directly to existing underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.

☐No, the project will discharge runoff directly to conveyance channels whose bed and bank are concrete-lined all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.

☐No, the project will discharge runoff directly to an area identified as appropriate for an exemption by the WMAA[3] for the watershed in which the project resides.

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

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

Step 3.7.1: Critical Coarse Sediment Yield Areas*

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

Based on the maps provided within the WMAA, do potential critical coarse sediment yield areas exist within the project drainage boundaries?

No, no critical coarse sediment yield areas to be protected based on WMAA maps. See WMAA exhibit in Attachment 2c

If yes, have any of the optional analyses presented in Section 6.2 of the manual been performed?

6.2.1 Verification of GLUs (classification that provides an estimate of sediment yield based on geology, hillslope, and land cover) Onsite
6.2.2 Downstream Systems Sensitivity to Coarse Sediment
6.2.3 Optional Additional Analysis of Potential Critical Coarse Sediment Yield Areas Onsite
No optional analyses performed, the project will avoid critical coarse sediment yield areas identified based on WMAA maps

If optional analyses were performed, what is the final result?

Discussion / Additional Information:

N/A

Flow Control for Post-Project Runoff*

***This Section only required if hydromodification management requirements apply**
List and describe point(s) of compliance (POCs) for flow control for hydromodification management (see Section 6.3.1). For each POC, provide a POC identification name or number correlating to the project's HMP Exhibit and a receiving channel identification name or number correlating to the project's HMP Exhibit. The runoff from the entire site will convey to one single point of compliance (POC 1) which is located at the northwest corner of the project boundary.
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:* N/A *Discussion / Additional Information: (optional)* N/A

Step 3.8: Other Site Requirements and Constraints

When applicable, list other site requirements or constraints that will influence storm water management design, such as zoning requirements including setbacks and open space, or local codes governing minimum street width, sidewalk construction, allowable pavement types, and drainage requirements.

The proposed grading for the development generally follows the existing topography. The higher, eastern portion of the site is proposed to be open space, while the pervious areas will be constructed on the western portion of the site. After extensive testing, it was found that soil infiltration rates were not favorable, rendering infiltration infeasible. Because the pervious area will be downstream of the open space area, an underground water storage facility BMP is proposed. All onsite storm flows, including runoff generated from the grading of the neighboring property, will reach the proposed BMP and low flows will outlet to a proposed Modular Wetlands biotreatment device.

Optional Additional Information or Continuation of Previous Sections As Needed

Onsite Retention Requirements

Onsite retention is required for this project, as a proprietary biofiltration system is proposed. Infiltration is not recommended for the project due to poor infiltration rates. Per correspondence with the City of Escondido, worksheets B.5-2 (Sizing Method for Volume Retention Criteria) and B.5-6 (Volume Retention for No Infiltration Condition) were completed to determine the DCV required to be retained onsite. Onsite retention requirement is satisfied by draining impervious areas to landscaped areas. See completed worksheets B.5-2 and B.5-6 in Attachment 1.

Step 4: Source Control BMP Checklist (Form I-2b)

Source Control BMPs

All development projects must implement source control BMPs 4.2.1 through 4.2.6 where applicable and feasible. See Chapter 4.2 and Appendix E of the City Storm Water Design Manual for information to implement source control BMPs shown in this checklist. The following checklists serve as guides only. Mark what elements are included in your project. See Storm Water Design Manual Chapter 4 and Appendix E for more information on determining appropriate BMPs for your project.

Answer each category below pursuant to the following:

- "Yes" means the project will implement the source control BMP as described in Chapter 4.2 and/or Appendix E of the City Storm Water Design Manual. Discussion / justification is not required.
- "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided.
- "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project has no outdoor materials storage areas). Discussion / justification must be provided.

Source Control Requirement	Applied?		
SC-1 Prevention of Illicit Discharges into the MS4	☒Yes	☐No	☐N/A
☒ Direct irrigation water away from impervious surfaces □ Direct vehicle wash water away from impervious surfaces □ Other: _____ *Discussion / justification if SC-1 not implemented:*			
SC-2 Storm Drain Stenciling or Signage	☒Yes	☐No	☐N/A
☒ Stencil or stamp storm drains with anti-dumping message □ Post signs prohibiting illegal dumping □ Other *Discussion / justification if SC-2 not implemented:*			
SC-3 Protect Outdoor Materials Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐Yes	☐No	☒N/A
□ Store materials inside a covered enclosure □ Direct runoff from downspouts and roofs away from storage areas □ Other *Discussion / justification if SC-3 not implemented: Not outdoor materials storage area.*			

SC-4 Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐Yes	☐No	☒N/A
□ Locate work area away from storm drains or catch basins □ Work over impermeable surfaces where spills and pollutants can be captured and removed *Discussion / justification if SC-4 not implemented:* *Not material will be stored in outdoor work area*			
SC-5 Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐Yes	☐No	☒N/A
□ Locate trash containers in a roofed, walled enclosure □ Locate trash containers away from storm drains *Discussion / justification if SC-5 not implemented: No trash storage area.*			
SC-6 Additional BMPs Based on Potential Sources of Runoff Pollutants (must answer for each source listed below):			
☒ A. On-site storm drain inlets	☒Yes	☐No	☐N/A
☐ B. Interior floor drains and elevator shaft sump pumps	☐Yes	☐No	☒N/A
☐ C. Interior parking garages	☐Yes	☐No	☐N/A
☐ D. Need for future indoor & structural pest control	☐Yes	☐No	☒N/A
☒ E. Landscape/outdoor pesticide use	☒Yes	☐No	☐N/A
☐ F. Pools, spas, ponds, fountains, and other water features	☐Yes	☐No	☒N/A
☐ G. Food service	☐Yes	☐No	☒N/A
☐ H. Refuse areas	☐Yes	☐No	☒N/A
☐ I. Industrial processes	☐Yes	☐No	☒N/A
☐ J. Outdoor storage of equipment or materials	☐Yes	☐No	☒N/A
☐ K. Vehicle and equipment cleaning	☐Yes	☐No	☒N/A
☐ L. Vehicle/equipment repair and maintenance	☐Yes	☐No	☒N/A
☐ M. Fuel dispensing areas	☐Yes	☐No	☒N/A
☐ N. Loading docks	☐Yes	☐No	☒N/A
☒ O. Fire sprinkler test water	☒Yes	☐No	☐N/A
☒ P. Miscellaneous drain or wash water	☒Yes	☐No	☐N/A
☒ Q. Plazas, sidewalks, and parking lots	☒Yes	☐No	☐N/A
Discussion / justification if SC-6 not implemented. Clearly identify which sources of runoff pollutants are discussed. Justification must be provided for <u>all</u> "No" answers shown above.			

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

Step 5: Site Design BMP Checklist (Form I-2c)

Site Design BMPs			
All development projects must implement site design BMPs SD-A through SD-H where applicable and feasible. See Chapter 4.3 and Appendix E of the City Storm Water Design Manual for information to implement site design BMPs shown in this checklist. The following checklists serve as guides only. Mark what elements are included in your project. See Storm Water Design Manual Chapter 4 and Appendix E for more information on determining appropriate BMPs for your project. Answer each category below pursuant to the following: • "Yes" means the project will implement the site design BMP as described in Chapter 4.3 and/or Appendix E of the City Storm Water Design Manual. Discussion / justification is not required. • "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided. • "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project site has no existing natural areas to conserve). Discussion / justification must be provided.			
Site Design Requirement	**Applied?**		
SD-1 Maintain Natural Drainage Pathways and Hydrologic Features	☒Yes	☐No	☐N/A
□ Maintain existing drainage patterns *Discussion / justification if SD-1 not implemented:*			
SD-2 Conserve Natural Areas, Soils, and Vegetation	☒Yes	☐No	☐N/A
□ Preserve trees (see Zoning Code Art. 55 Grading & Erosion Control; Art. 62 Landscape Regulations) □ Avoid sensitive areas such as wetlands and waterways *Discussion / justification if SD-2 not implemented:*			
SD-3 Minimize Impervious Area	☒Yes	☐No	☐N/A
□ Install parking and driving aisles to minimum width required to meet standards *Discussion / justification if SD-3 not implemented:*			

SD-4 Minimize Soil Compaction	☒Yes	☐No	☐N/A
□ Avoid compaction in planned landscaped spaces □ Till and amend soil for improved infiltration capacity *Discussion / justification if SD-4 not implemented:*			
SD-5 Impervious Area Dispersion	☒Yes	☐No	☐N/A
□ Drain rooftops, roads or sidewalks into adjacent landscape areas □ Drain impervious surfaces through pervious areas *Discussion / justification if SD-5 not implemented:*			
SD-6 Runoff Collection	☐Yes		
Discussion / justification if SD-6 not implemented:	☒Yes	☐No	☐N/A
SD-7 Landscaping with Native or Drought Tolerant Species			
Discussion / justification if SD-7 not implemented:	☒Yes	☐No	☐N/A
SD-8 Harvesting and Using Precipitation			
Discussion / justification if SD-8 not implemented: Low demand on urinal, toilet, and irrigation water. See Form B.3-1 in Attachment 1a	☐Yes	☐No	☒N/A

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

Step 6: PDP Structural BMPs (Form I-3)

All PDPs must implement structural BMPs for storm water pollutant control (see Chapter 5 of the Storm Water Design Manual). Selection of PDP structural BMPs for storm water pollutant control must be based on the selection process described in Chapter 5. PDPs subject to hydromodification management requirements must also implement structural BMPs for flow control for hydromodification management (see Chapter 6 of the Storm Water Design Manual). Both storm water pollutant control and flow control for hydromodification management can be achieved within the same structural BMP(s).

PDP structural BMPs must be verified by the City at the completion of construction. This may include requiring the project owner or project owner's representative and engineer of record to certify construction of the structural BMPs (see Section 8.2.3.2 of the Storm Water Design Manual). PDP structural BMPs must be maintained into perpetuity, and the City must confirm the maintenance (see Section 7 of the Storm Water Design Manual).

Use this section to provide narrative description of the general strategy for structural BMP implementation at the project site in the box below. Then complete the PDP structural BMP summary information sheet (Step 6.2) for each structural BMP within the project (copy the BMP summary information sheet [Step 6.2] as many times as needed to provide summary information for each individual structural BMP).

Step 6.1: Description of structural BMP strategy

Describe the general strategy for structural BMP implementation at the site. This information must describe how the steps for selecting and designing storm water pollutant control BMPs presented in Section 5.1 of the Storm Water D*esign Manual were followed, and the results (type of BMPs selected). For projects requiring hydromodification flow control BMPs, indicate whether pollutant control and flow control BMPs are integrated or separate. At the end of this discussion provide a summary of all the structural BMPs within the project including the type and number.*

Based on the preliminary geotechnical investigation prepared by Leighton and Associates, Inc., the project site has an infiltration rate of 0.71inch/hour at a small portion of the project entrance and no infiltration could be measured elsewhere in the site. Due to the low infiltration rate and limited area that can infiltrate, infiltration is infeasible for this project. Harvest and use is also infeasible due to low demand for toilet water, urinal water, and irrigation water.

To mitigate for potential hydromodification impacts of the proposed project, the collected runoff will first be detained in three interconnected 10.5'W x 6.5'H underground storage facilities with an orifice installed to restrict the outflow. For water quality treatment, downstream of the storage facility is a BioClean Modular Wetland unit, a proprietary biofiltration treatment BMP based on the City of Escondido Storm Water Design Manual (ESWDM). The Modular Wetland is sized according to Appendix F.2.2 of the ESWDM, utilizing a flow-based sizing method. Overflow from the storage system will bypass the Modular Wetland unit and discharge to a proposed 24" storm drain facility in S. Escondido Blvd. See Hydromodification Exhibit in Attachment 2b.

The storage system was sized based on drawdown time storage requirements, per Table B.5-3 in Appendix B of the ESWDM. Continuous simulation hydrologic modeling per Appendix G of the Escondido Storm Water Design Manual was used to generate proposed duration and frequency curves below that of the existing, between the $0.1Q_2$ and Q_{10} threshold.

The design of the system will ensure that 100% of the water quality volume detained in the storage system will be treated by the Modular Wetland unit. Therefore, the proposed treatment system will meet both the water quality and hydromodification management requirements.

Step 6.2: Structural BMP Checklist

(Copy this page as needed to provide information for each individual proposed structural BMP)	
Structural BMP ID No. 1, Modular Wetland Unit	
Construction Plan Sheet No. SWQMP Exhibit	
Type of structural BMP: ☐Retention by harvest and use (HU-1) ☐Retention by infiltration basin (INF-1) ☐Retention by bioretention (INF-2) ☐Retention by permeable pavement (INF-3) ☐Partial retention by biofiltration with partial retention (PR-1) ☐Biofiltration (BF-1) ☐Biofiltration with Nutrient Sensitive Media Design (BF-2) ☒Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F ☐Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐Detention pond or vault for hydromodification management ☐Other (describe in discussion section below)	
Purpose: ☒Pollutant control only ☐Hydromodification control only ☐ Combined pollutant control and hydromodification control ☐Pre-treatment/forebay for another structural BMP ☐Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms (See Section 8.2.3.2 of the Storm Water Design Manual)	
Who will be the final owner of this BMP?	☒HOA ☐Property Owner ☐City ☐Other (describe)
Who will maintain this BMP into perpetuity?	☒HOA ☐Property Owner ☐City ☐Other (describe)
Discussion (as needed): *(Continue on subsequent pages as necessary)*	Bioclean Modular Wetland Unit with detention storage facility.

Step 6.2: Structural BMP Checklist

(Copy this page as needed to provide information for each individual proposed structural BMP)	
Structural BMP ID No. 2, 3 – 8'W x 6.5'H Underground Storage Facility	
Construction Plan Sheet No. SWQMP Exhibit	
Type of structural BMP: ☐Retention by harvest and use (HU-1) ☐Retention by infiltration basin (INF-1) ☐Retention by bioretention (INF-2) ☐Retention by permeable pavement (INF-3) ☐Partial retention by biofiltration with partial retention (PR-1) ☐Biofiltration (BF-1) ☐Biofiltration with Nutrient Sensitive Media Design (BF-2) ☐Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F ☐Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☒Detention pond or vault for hydromodification management ☐Other (describe in discussion section below)	
Purpose: ☐Pollutant control only ☒Hydromodification control only ☐ Combined pollutant control and hydromodification control ☐Pre-treatment/forebay for another structural BMP ☐Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms (See Section 8.2.3.2 of the Storm Water Design Manual)	
Who will be the final owner of this BMP?	☒HOA ☐Property Owner ☐City ☐Other (describe)
Who will maintain this BMP into perpetuity?	☒HOA ☐Property Owner ☐City ☐Other (describe)
Discussion (as needed): *(Continue on subsequent pages as necessary)*	

Step 6.3: Offsite Alternative Compliance Participation Form

THIS FORM IS NOT APPLICABLE AT THIS TIME: An Alternative Compliance Program is under consideration by the City of Escondido.	
PDP INFORMATION	
Record ID:	
Assessor's Parcel Number(s) [APN(s)]	
What are your PDP Pollutant Control Debits? *See Attachment 1 of the PDP SWQMP	
What are your PDP HMP Debits? (if applicable) *See Attachment 2 of the PDP SWQMP	
ACP Information	
Record ID:	
Assessor's Parcel Number(s) [APN(s)]	
Project Owner/Address	
What are your ACP Pollutant Control Credits? *See Attachment 1 of the ACP SWQMP	
What are your ACP HMP Debits? (if applicable) *See Attachment 2 of the ACP SWQMP	
Is your ACP in the same watershed as your PDP? ☐Yes ☐No	Will your ACP project be completed prior to the completion of the PDP? ☐Yes ☐No
Does your ACP account for all Deficits generated by the PDP? ☐Yes ☐No (PDP and/or ACP must be redesigned to account for all deficits generated by the PDP.)	What is the difference between your PDP debits and ACP Credits? *(ACP Credits -Total PDP Debits = Total Earned Credits) _____

ATTACHMENT 1

BACKUP FOR PDP POLLUTANT CONTROL BMPS

This is the cover sheet for Attachment 1.

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	Contents	Checklist
Attachment 1a	Storm Water Pollutant Control Worksheet Calculations -Worksheet B.2-1 (Required) -Worksheet B.3-1 (Form I-4; Required) -Worksheet B.4-1 (if applicable) -Worksheet B.5-1 (if applicable) -Worksheet B.5-2 (if applicable) -Worksheet B.5-3 (if applicable) -Worksheet B.6-1 (if applicable) -Summary Worksheet (optional)	☒Included
Attachment 1b	Form I-5, Categorization of Infiltration Feasibility Condition (Required unless the project will use harvest and use BMPs) Refer to Appendices C and D of the Storm Water Design Manual to complete Form I-5.	☒Included ☐Not included because the entire project will use harvest and use BMPs
Attachment 1c	Form I-6, Factor of Safety and Design Infiltration Rate Worksheet (Required unless the project will use harvest and use BMPs) Refer to Appendices C and D of the Storm Water Design Manual to complete Form I-6.	☒Included ☐Not included because the entire project will use harvest and use BMPs
Attachment 1d	DMA Exhibit (Required) See DMA Exhibit Checklist on the back of this Attachment cover sheet.	☒Included
Attachment 1e	Individual Structural BMP DMA Mapbook (Required) -Place each map on 8.5”x11” paper. -Show at a minimum the DMA, Structural BMP, and any existing hydrologic features within the DMA.	☐Included

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

The DMA Exhibit must identify:

☐Underlying hydrologic soil group
☐Approximate depth to groundwater
☐Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
☐Critical coarse sediment yield areas to be protected
☐Existing topography and impervious areas
☐Existing and proposed site drainage network and connections to drainage offsite
☐Proposed demolition
☐Proposed grading
☐Proposed impervious features
☐Proposed design features and surface treatments used to minimize imperviousness
☐Drainage management area (DMA) boundaries, DMA ID numbers, and DMA areas (square footage or acreage), and DMA type (i.e., drains to BMP, self-retaining, or self-mitigating)
☐Potential pollutant source areas and corresponding required source controls (see Chapter 4, Appendix E.1, and Step 3.5)
☐Structural BMPs (identify location, structural BMP ID#, type of BMP, and size/detail)

Worksheet B.2-1. DCV

Design Capture Volume (A-1)		Worksheet B-2.1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.8	inches
2	Area tributary to BMP (s)	A=	2.65	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.9	unitless
4	Street trees volume reduction	TCV=	0	cubic-feet
5	Rain barrels volume reduction	RCV=	0	cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	6,926	cubic-feet
Design Capture Volume (A-2)		**Worksheet B-2.1**		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.8	inches
2	Area tributary to BMP (s)	A=	0.53	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.1	unitless
4	Street trees volume reduction	TCV=	0	cubic-feet
5	Rain barrels volume reduction	RCV=	0	cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	154	cubic-feet
Design Capture Volume (A-3)		**Worksheet B-2.1**		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.8	inches
2	Area tributary to BMP (s)	A=	0.08	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.9	unitless
4	Street trees volume reduction	TCV=	0	cubic-feet
5	Rain barrels volume reduction	RCV=	0	cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	209	cubic-feet

ESCONDIDO City of Choice	**Project Name**	TSM No. 20-0006	
	BMP ID	2	
Sizing Method for Volume Retention Criteria		**Worksheet B.5-2**	
1	Area draining to the BMP	142006	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.77	
3	85^{th} percentile 24-hour rainfall depth	0.8	inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]	7289	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% = $0.0000013 \times \text{Line } 8^3 - 0.000057 \times \text{Line } 8^2 + 0.0086 \times \text{Line } 8 - 0.014$ When Line 8 ≤ 8% = 0.023	0.023	
10	Target volume retention [Line 9 x Line 4]	168	cu. ft.

ESCONDIDO City of Choice		**Project Name**	TSM No. 20-0006					
		BMP ID	2					
Volume Retention for No Infiltration Condition						**Worksheet B.5-6**		
1	Area draining to the biofiltration BMP					142006		sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)					0.76993865		
3	Effective impervious area draining to the BMP [Line 1 x Line 2]					109336		sq. ft.
4	Required area for Evapotranspiration [Line 3 x 0.03]					3280		sq. ft.
5	Biofiltration BMP Footprint							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.)		23087					
7	Impervious area draining to the landscape area (sq. ft.)		4897					
8	Impervious to Pervious Area ratio [Line 7/Line 6]		0.21	0.00	0.00	0.00	0.00	
9	Effective Credit Area If (Line 8 >1.5, Line 6, Line 7/1.5]		3265	0	0	0	0	
10	Sum of Landscape area [sum of Line 9 Id's 1 to 5]					3265		sq. ft.
11	Provided footprint for evapotranspiration [Line 5 + Line 10]					3265		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]					1		
14	Target Volume Retention [Line 10 from Worksheet B.5.2]					168		cu. ft.
15	Volume retention required from other site design BMPs [(1-Line 13) x Line 14]					0		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					

Harvest and Use Feasibility Checklist	Form I-4

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.3.2.

[Provide a summary of calculations here]

Assume 2 resident per housing unit, 124 residents lives in the community.
Usage factor= 9.3 gallon per resident per day.
Toilet and Urinal Water Usage= 9.3 x 124= 1153 gallon= 154 cf / day.
Irrigation water usage= 2.8 x (0.5 x 53,063 / 0.9) x 0.015= 1238
Total usage= 154 +1238= 1392

3. Calculate the DCV using worksheet B-2.1.

DCV = 7,289 (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.

Is harvest and use feasible based on further evaluation?

- ☐ Yes, refer to Appendix E to select and size harvest and use BMPs.
- ☑ No, select alternate BMPs.

Factor of Safety and Design Infiltration Rate Worksheet				Form I-6	
Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
A	Suitability Assessment	Soil assessment methods	0.25	0.25	0.0625
		Predominant soil texture	0.25	0.75	0.1875
		Site soil variability	0.25	0.75	0.1875
		Depth to groundwater / impervious layer	0.25	0.50	0.125
		Suitability Assessment Safety Factor, $S_A = \Sigma p$		2.25	
B	Design	Level of pretreatment/ expected sediment loads	0.5	0.50	0.25
		Redundancy/resiliency	0.25	0.50	0.125
		Compaction during construction	0.25	0.50	0.125
		Design Safety Factor, $S_B = \Sigma p$			1.0625
Combined Safety Factor, $S_{total} = S_A \times S_B$				2.39	
Observed Infiltration Rate, inch/hr, $K_{observed}$ (corrected for test-specific bias)				Max = 2.48 in/hr (uncorrected)	
Design Infiltration Rate, in/hr, $K_{design} = K_{observed} / S_{total}$				1.037	

Supporting Data

Briefly describe infiltration test and provide reference to test forms:

Two deep bore-hole percolation tests were performed using the falling head procedure in accordance with County of Riverside guidelines. Tests were conducted in zone encompassing alluvium/bedrock contact, using 2-inch diameter PVC casing, slotted between 5 and 15 feet below existing grades. Two additional shallow percolation tests were preformed within the bottom of separate exploratory test pits by advancing a 4-inch diameter hand auger to a depth of 1.1 feet. Calculated infiltration rates were determined via the Porchet Method with an applied safety factor. Due to variability in yielded field rates use of a full-infiltration system is not recommended. Given close proximity of groundwater to zone of feasible infiltration, use of partial infiltration is feasible, but with depth and location restrictions. Please refer to our Preliminary Geotechncial Report, dated May 2019.

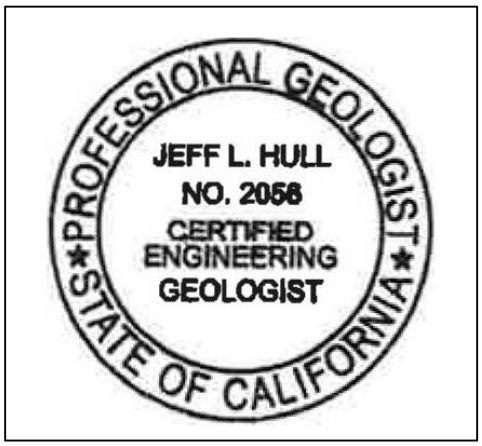
Factor of Safety and Design Infiltration Rate Worksheet	Form I-6 Certification

The Geotechnical Engineer certifies they completed Form I-6 (see Appendix C.4.3).

Professional Geotechnical Engineer's Printed Name:

Professional Geotechnical Engineer's Signed Name:

Date: 5-22-19



Categorization of Infiltration Feasibility Condition	FORM I-8

Part 1 - Full Infiltration Feasibility Screening Criteria

Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?

Criteria	Screening Question	Yes	No
1	**Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X

Provide basis:

Based on our field percolation testing, the "reliable" infiltration rates for the weathered granitic bedrock zone beneath the subject site range from 0.00 to 2.48 inches per hour. Calculated infiltration rates via the Porchet Method, including application of a 2.39 safety factor, are equivalent to a maximum of approximately 1.04 inches per hour. While the maximum factored rate is greater than 0.5 inches per hour, the variability in test results indicates a soil zone that is only locally feasible for infiltration, and thus our conclusion that the site is not recommended for full infiltration system use.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.

2	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		X

Provide basis:

While it is possible that most geotechnical hazards and impacts to roadways, underground utilities/structures, slopes and other improvements, relating to use of full infiltration, can be mitigated within the vicinity of the proposed infiltration site through grading, set-backs, deepened foundations and/or other measures, there is a remote chance that increases in the relatively shallow groundwater (present at 22 feet), may pose a greater risk for groundwater mounding, during years of significant rainfall.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.

FORM I-8 Page 2 of 4			
Criteria	Screening Question	**Yes**	**No**
3	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: It is possible that the risk of groundwater contamination would not increase, provided there are no contaminated soil or groundwater sites within 250 feet of the proposed infiltration site. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
4	**Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: It is possible that water balance issues may not be affected, provided there are no unlined site drainages/creeks/streams within 250 feet of the proposed infiltration site. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
Part 1 Result*	If all answers to rows 1 - 4 are "**Yes**" a full infiltration design is potentially feasible. The feasibility screening category is **Full Infiltration** If any answer from row 1-4 is "**No**", infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a "full infiltration" design. Proceed to Part 2		**Full Infiltration**

FORM I-8 Page 3 of 4

Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria

Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?

Criteria	Screening Question	Yes	No
5	**Do soil and geologic conditions allow for infiltration in any appreciable rate or volume?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	X	

Provide basis:

Based on our field percolation results, which yielded a maximum factored infiltration rate of 1.037 inches per hour, use of a Partial Infiltration system would theoretically be feasible. However, of the four total tests conducted on the site, all within a narrow zone of weathered granite, over 75 percent of the tests yielded little to no measured rate of infiltration, or 0.0 inches per hour. The location of the system would need to be constrained to a small area. In addition, the relatively shallow depth to groundwater beneath the site (22 feet) presents a constraint. Although groundwater was measured during a year of substantially higher rainfall, and is likely close to its historical high, it would need only to experience a minor rise before interacting with infiltration waters. In this event the potential for groundwater mounding is increased.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

6	**Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		X

Provide basis:

The risk of geotechnical hazards and impacts to site improvements would be increased by use of partial infiltration, in that the relatively shallow depth to groundwater beneath the site could increase during years of heavy precipitation, and temporarily result in a groundwater mounding condition, which could in turn adversely impact underground utilities and other site improvements.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

FORM I-8 Page 4 of 4			
Criteria	Screening Question	**Yes**	**No**
7	**Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: While the groundwater surface lies only 22 feet beneath the site, the risk of groundwater contamination would not generally be increased through use of partial infiltration, provided there are no contaminated soil or groundwater sites within 250 feet of the proposed infiltration site. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
8	**Can infiltration be allowed without violating downstream water rights**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: Violation of downstream water rights is not anticipated based on the site location and that there are no unlined site drainages/creeks/streams within 250 feet of the restricted location of a proposed system. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
Part 2 Result*	If all answers from row 5-8 are yes then partial infiltration design is potentially feasible. The feasibility screening category is **Partial Infiltration.** If any answer from row 5-8 is no, then infiltration of any volume is considered to be **infeasible** within the drainage area. The feasibility screening category is **No Infiltration.**		

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

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:	

Response to Form I-10:

1. Biofiltration BMPs shall be allowed only as described in the BMP selection process in this manual (i.e., retention feasibility hierarchy).

    a. The Modular Wetland System Linear (MWS Linear) is only being proposed on plans when retention via infiltration or reuse is proven infeasible. Conditions such as soils with little to no infiltration rate or sites in which insufficient landscaping warrant to successful implementation of reuse systems.

2. Biofiltration BMPs must be sized using acceptable sizing methods described in this manual.

    a. Section B.5.2 Basis for Minimum Sizing Factor for Biofiltration BMPs states:

    "The MS4 Permit describes conceptual performance goals for biofiltration BMPs and specifies numeric criteria for sizing biofiltration BMPs (See Section 2.2.1 of this Manual). However, the MS4 Permit does not define a specific footprint sizing factor or design profile that must be provided for the BMP to be considered "biofiltration."

    "Additionally, it does not apply to alternative biofiltration designs that utilize the checklist in Appendix F (Biofiltration Standard and Checklist). Acceptable alternative designs (such as proprietary systems meeting Appendix F criteria) typically include design features intended to allow acceptable performance with a smaller footprint and have undergone field scale testing to evaluate performance and required O&M frequency."

    As stated in the Manual alternative biofiltration designs are allowed. The MWS Linear therefore qualifies as a biofiltration BMP under this definition as it has both undergone field scale testing (TAPE tested and approved with a GULD) and provides requirements on O&M frequency. In addition, the manual allows for biofiltration BMPs to be sized in either volume based (DCV) or flow based design. The manual states in section F.2.2 Sizing of Flow-Based Biofiltration *BMPs:*

"This sizing method is only available when the BMP meets the pollutant treatment performance standard in Appendix F.1."

"Proprietary biofiltration BMPs are typically designed as a flow-based BMPs (i.e., a constant treatment capacity with negligible storage volume). Additionally, proprietary biofiltration is only acceptable if no infiltration is feasible and where site-specific documentation demonstrates that the use of larger footprint biofiltration BMPs would be infeasible. The applicable sizing method for biofiltration is therefore reduced to: Treat 1.5 times the DCV."

"The following steps should be followed to demonstrate that the system is sized to treat 1.5 times the DCV."

1. Calculate the flow rate required to meet the pollutant treatment performance standard without scaling for the 1.5 factor. Options include either:

- *Calculate the runoff flow rate from a 0.2 inch per hour uniform intensity precipitation event (See methodology Appendix B.6.3), or*

- *Conduct a continuous simulation analysis to compute the size required to capture and treat 80 percent of average annual runoff; for small catchments, 5-minute precipitation data should be used to account for short time of concentration. Nearest rain gage with 5-minute precipitation data is allowed for this analysis.*

2. Multiply the flow rate from Step 1 by 1.5 to compute the design flow rate for the biofiltration system.

3. Based on the conditions of certification/verification (discussed above), establish the design capacity, as a flow rate, of a given sized unit.

4. Demonstrates that an appropriate unit size and number of units is provided to provide a flow rate that meets the required flow rate from Step 2.

3. Biofiltration BMPs must be sited and designed to achieve maximum feasible infiltration and evapotranspiration.

    a. The MWS Linear is utilized and placed in the same manner as other types of biofiltration systems. As with other biofiltration systems the MWS Linear includes and underdrain for the remaining portion of the DCV that is not retained via incidental infiltration (as biofiltration if infiltration is not feasible due to poor soils) and evapotranspiration. The MWS Linear can be design with an open bottom to maximize this incidental infiltration. The only exception to this, as with other biofiltration BMPs, is when the geotechnical consultant recommends an impervious liner be used due to specific soil conditions such as expansive clays. Additionally, the MWS Linear utilizes an amended media that is much more porous than the standard prescribed biofiltration media which is a mix of sand and compost. 100% of the media uses in the MWS Linear has interparticle voids of 48% plus and 24% internal void space for each media particle. This is much greater than the sand which has interparticle voids of 35% and internal voids of 0%. As such, the MWS Linear retains greater moisture which allows for greater volume retention and ultimately evapotranspiration via respiration of the contained vegetation.

4. Biofiltration BMPs must be designed with a hydraulic loading rate to maximize pollutant retention, preserve pollutant control/sequestration processes, and minimize potential for pollutant washout.

    a. The manual states:

    “Alternatively, for proprietary designs and custom media mixes not meeting the media specifications contained in the City or County LID Manual, field scale testing data are provided to demonstrate that proposed media meets the pollutant treatment performance criteria in Section F.1 below.”

The MWS Linear has been tested under the Washington State TAPE protocol which is full scale field testing and has received General Use Level Designation under that protocol. Table F.1-1, as shown below, requires a biofiltration BMP to have Basic Treatment, Phosphorus Treatment, and Enhanced Treatment under this protocol. The MWS Linear has GULD approval for all three and therefore meets this minimum requirement 4. A copy of the TAPE approval has been attached to this document.

Table F.1-1: Required Technology Acceptance Protocol-Ecology Certifications for Polltuants of Concern for Biofiltration Performance Standard

Project Pollutant of Concern	Required Technology Acceptance Protocol-Ecology Certification for Biofiltration Performance Standard
Trash	Basic Treatment, Phosphorus Treatment, Enhanced Treatment
Sediments	Basic Treatment, Phosphorus Treatment, Enhanced Treatment
Oil and Grease	Basic Treatment, Phosphorus Treatment, Enhanced Treatment
Nutrients	Phosphorus Treatment[1]
Metals	Enhanced Treatment
Pesticides	Basic Treatment (including filtration)[2] Phosphorus Treatment, Enhanced Treatment
Organics	Basic Treatment (including filtration)[2] Phosphorus Treatment, Enhanced Treatment
Bacteria and Viruses	Basic Treatment (including bacteria removal processes)[3] , Phosphorus Treatment, Enhanced Treatment
Basic Treatment (including filtration)[2] Phosphorus Treatment, Enhanced Treatment	Basic Treatment (including filtration)[2] Phosphorus Treatment, Enhanced Treatment

5. Biofiltration BMPs must be designed to promote appropriate biological activity to support and maintain treatment processes.

    a. The MWS Linear is an advanced vegetated biofiltration system that promotes biological processes found in both upland bioretention systems and wetlands. The system utilizes an advanced horizontal flow design to ensure maximum contact with the vegetation root mass. Bacterial growth, supported by the root system in the wetland chamber, performs a number of treatment processes. These vary as a function of moisture, temperature, pH, salinity, and pollutant concentrations. Biologically available forms of nitrogen, phosphorus, and carbon are actively taken into the cells of vegetation and bacteria, and used for metabolic processes (i.e., energy production and growth). Nitrogen and phosphorus are actively taken up as nutrients that are vital for a number of cell functions, growth, and energy production. These processes remove metabolites from the media during and between storm events, making the media available to capture more nutrients from subsequent storms.

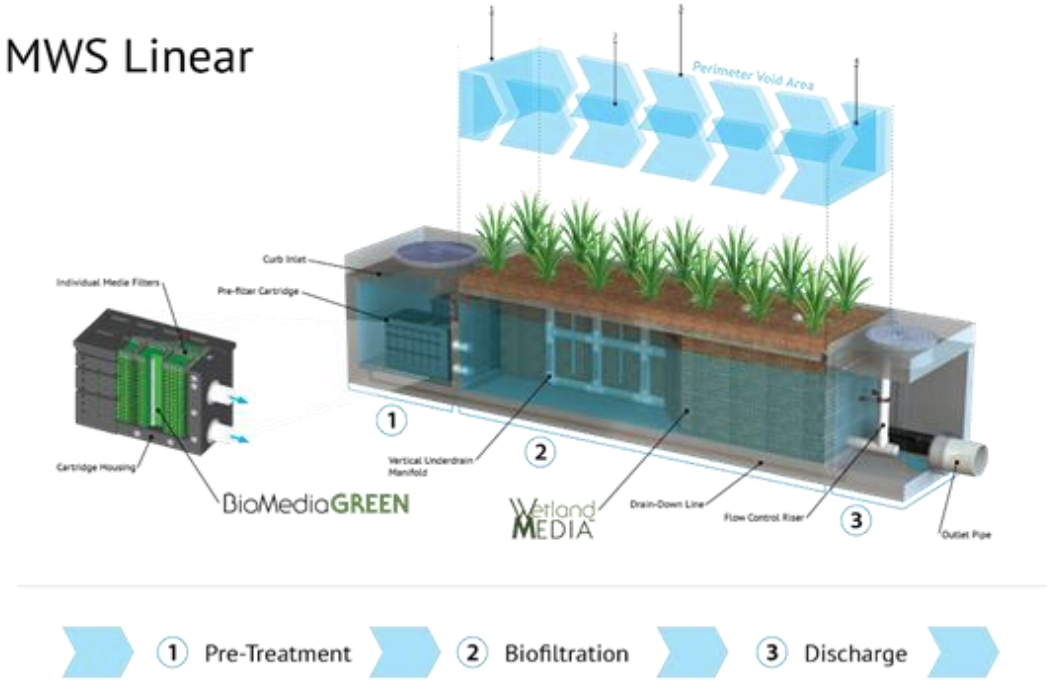
b. Soil organisms in the wetland chamber can break down a wide array of organic compounds into less toxic forms or completely break them down into carbon dioxide and water (Means and Hinchee 1994). Bacteria can also cause metals to precipitate out as salts, bind them within organic material, and accumulate metals in nodules within the cells. Finally, plant growth may metabolize many pollutants, sequester them or rendering them less toxic (Reeves and Baker 2000).

c. The MWS is approved under TAPE protocol with and without plants meeting the minimum requirements set forth in the performance standard. The development of a schmutzdecke (a biological layer) within this subsurface application creates a diversity of microorganisms that meets the necessary requirement for biological activity.

	5. Biofiltration BMPs must be designed to promote appropriate biological activity to support and maintain treatment processes. Intent: Biological processes are an important element of biofiltration performance and longevity.	
☐	Plants have been selected to be tolerant of project climate, design ponding depths and the treatment media composition.	Provide documentation justifying plant selection. Refer to the plant list in Appendix E.20.
☐	Plants have been selected to minimize irrigation requirements.	Provide documentation describing irrigation requirements for establishment and long term operation.
☐	Plant location and growth will not impede expected long-term media filtration rates and will enhance long term infiltration rates to the extent possible.	Provide documentation justifying plant selection. Refer to the plant list in Appendix E.20.
☐	If plants are not part of the biofiltration design, other biological processes are supported as needed to sustain treatment processes (e.g., biofilm in a subsurface flow wetland).	For biofiltration designs without plants, describe the biological processes that will support effective treatment and how they will be sustained.

6. Biofiltration BMPs must be designed to prevent erosion, scour, and channeling within the BMP.

a. The MWS Linear is a self-contained system with a pre-treatment chamber. Unlike other biofiltration BMPs erosion, scour, and channeling with in the BMP is not an issue. Following is a diagram of the BMP. The system pre-treatment chamber prevent any erosion or scour. The system downstream orifice control prevents channeling of the media:

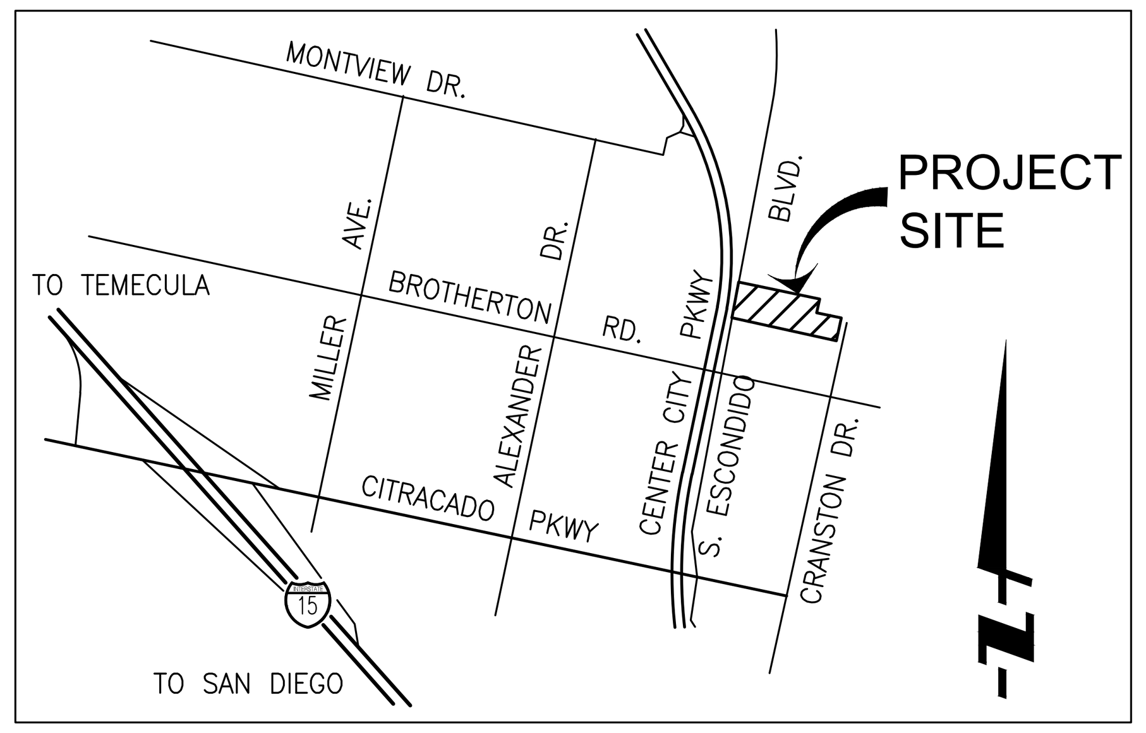


7. Biofiltration BMP must include operations and maintenance design features and planning considerations to provide for continued effectiveness of pollutant and flow control functions.

    a. The MWS Linear provides activation along with the first year of maintenance and inspection free on all installation in the county of San Diego. Unlike other biofiltration BMPs the City and Co-permitees can be assured the system is being properly installed and maintained. The first year of inspections is used the gauge the amount of loading in the system and this information is used to set appropriate maintenance interval for subsequent years. Attached to the document is a copy of the maintenance manual for the MWS Linear.

Designed & Maintained Consistent with their Performance Certifications

We are in agreement that all BMPs should be designed in a manner consistent with the TAPE certification. The MWS Linear is sized in accordance with the TAPE GULD approval which provides certification at a loading rate of 1 gpm/sq ft (100 in/hr) for Basic, Phosphorus and Enhanced treatment. In addition, as stated previously, Modular Wetland System, Inc. provide activation of all system installed in San Diego County along with the first year of inspections and maintenance to ensure appropriate function. As previously stated, a copy of the TAPE GULD approval is attached to support this claim.



VICINITY MAP

N.T.S.

WQMP CALCULATIONS

F.2.2 SIZING OF FLOW-BASED BIOFILTRATION BMP

Worksheet B.6-1: Flow-Thru Design Flows

Flow-thru Design Flows		Worksheet B.6-1		
1	DCV	DCV	7,289	cubic-feet
2	DCV retained	$DCV_{retained}$	0	cubic-feet
3	DCV biofiltered	$DCV_{biofiltered}$	0	cubic-feet
4	DCV requiring flow-thru (Line 1 – Line 2 – 0.67*Line 3)	$DCV_{flow-thru}$	7,289	cubic-feet
5	Adjustment factor (Line 4 / Line 1)*	AF=	1	unitless
6	Design rainfall intensity	i=	0.20	in/hr
7	Area tributary to BMP (s)	A=	3.26	acres
8	Area-weighted runoff factor (estimate using Appendix B.2)	C=	0.77	unitless
9	Calculate Flow Rate = AF x (C x i x A)	Q=	0.50	cfs

REQUIRED TREATMENT FLOW RATE

Q= 1.5 * 0.5 CFS
Q= 0.75 CFS

STORAGE FACILITY

TREAT 1.5 x DCV

Storage Requirement =
1.5 * 7289 CF = 10,934 CF

WQ Storage Facility

# of Boxes	3
WQ WSE	4.5 FT
Width	10.5 FT
Length	120 FT
Porosity	89%
Total Storage Volume	15,139 CF

STORAGE REQUIRED: 10,934 CF
STORAGE PROVIDED: 15,139 CF

BIOCLEAN MODULAR WETLANDS SYSTEM

MWS-L-8-24

REQUIRED TREAMENT FLOWRATE
0.75 CFS
PROPOSED TREATMENT FLOWRATE
0.75 CFS

SITE SPECIFIC DATA

PROJECT ID	12485.00		
PROJECT NAME	ESCONDIDO 3.4		
PROJECT LOCATION	ESCONDIDO, CA		
STRUCTURE ID			
TREATMENT REQUIRED			
VOLUME BASED (CF)	FLOW BASED (CFS)		
	0.75		
TREATMENT HGL AVAILABLE (FT)			---
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			---
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	607.97	N/A	6"
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE	606.00	N/A	6"
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION	614.50	614.50	614.50
SURFACE LOAD	H20 DIRECT	H20 DIRECT	H20 DIRECT
FRAME & COVER	ø30"	(3) 30"x48"	ø24"
WETLANDMEDIA VOLUME (CY)			---
WETLANDMEDIA DELIVERY METHOD			PER CONTRACT
ORIFICE SIZE (DIA. INCHES)			ø2.71"

NOTES: PRELIMINARY, NOT FOR CONSTRUCTION.

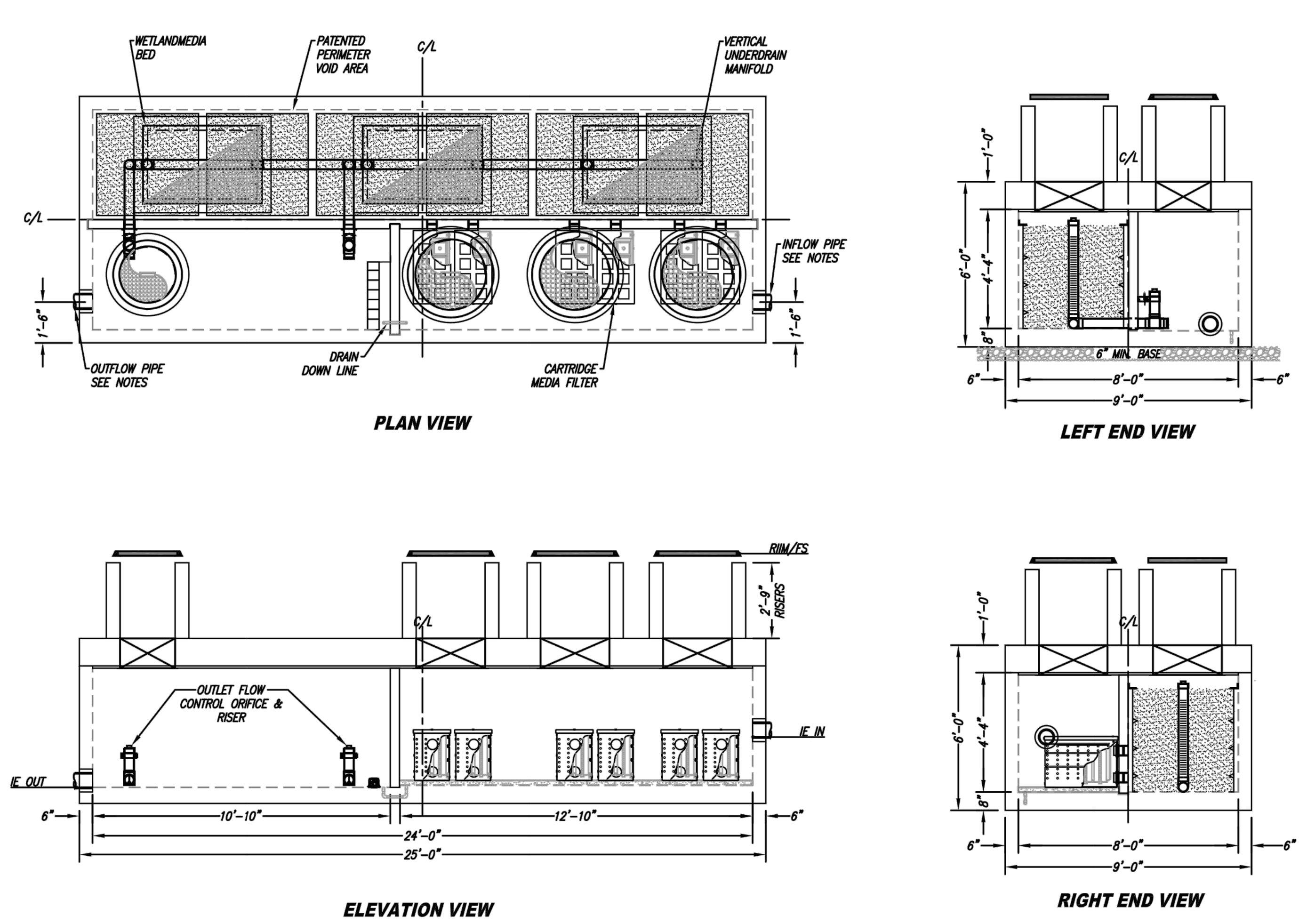
INSTALLATION NOTES

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 MANUFACTURERS CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE TO VERIFY PROJECT ENGINEERS RECOMMENDED BASE SPECIFICATIONS.
3. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE. (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL GAPS AROUND PIPES SHALL BE SEALED WATER TIGHT WITH A NON-SHRINK GROUT PER MANUFACTURERS STANDARD CONNECTION DETAIL AND SHALL MEET OR EXCEED REGIONAL PIPE CONNECTION STANDARDS.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO GROUT ALL MANHOLES AND HATCHES TO MATCH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
6. DRIP OR SPRAY IRRIGATION REQUIRED ON ALL UNITS WITH VEGETATION.

GENERAL NOTES

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

2/9/21GSINGH

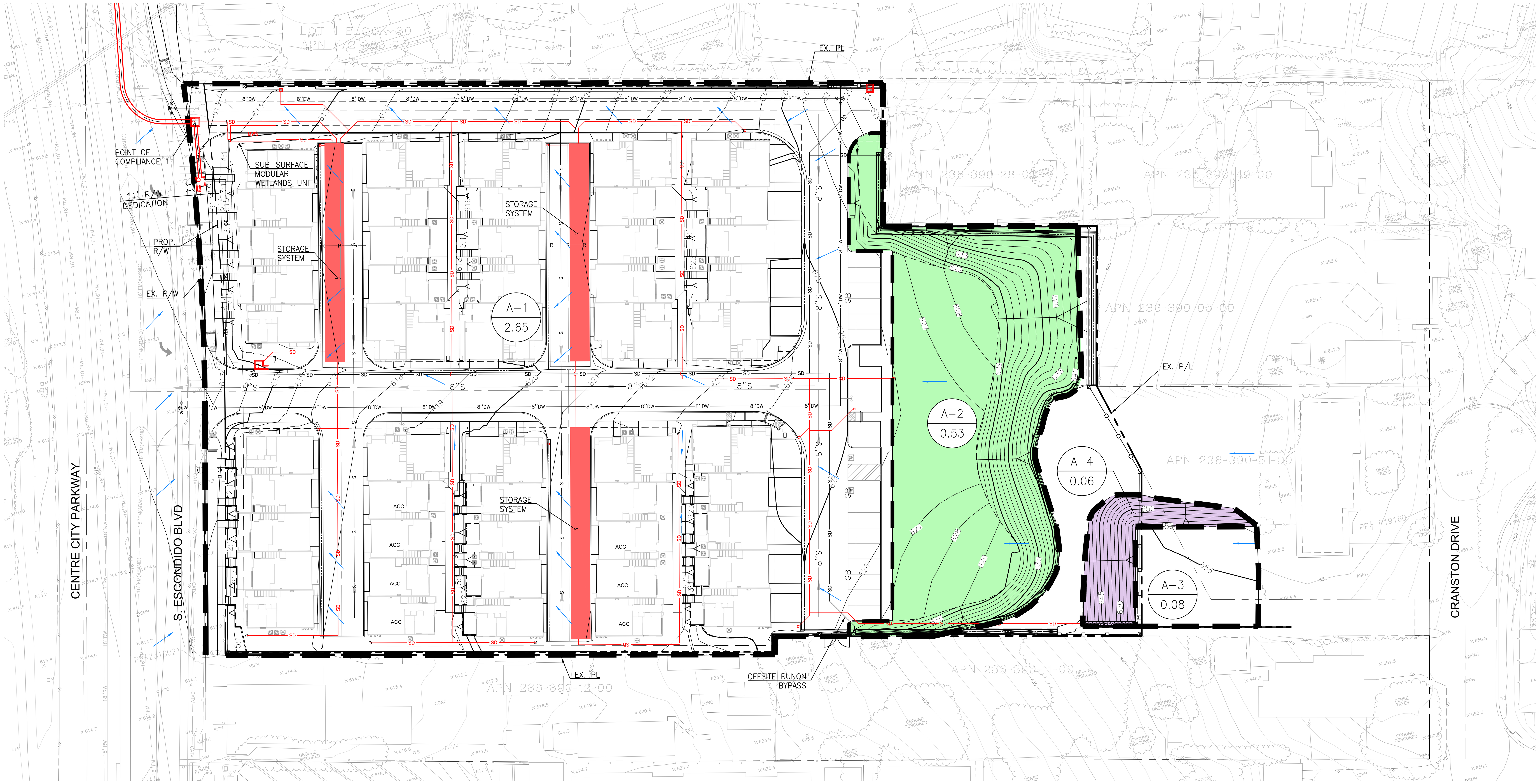


TREATMENT FLOW (CFS)	0.750
OPERATING HEAD (FT)	3.7
PRETREATMENT LOADING RATE (GPM/SF)	1.9
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

Bio Clean A Forterra Company

MWS-L-8-24-4'-4"-V-UG
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

NOTE:
TO TREAT 0.693cfs (STANDARD DETAIL), IT TAKES 6 PRE-TREATMENT CARTRIDGES AND A 1.0gpm/sf MEDIA LOADING RATE AT 3.4' HGL. TO PUSH 0.75cfs THROUGH THE SAME FOOTPRINT, PRE-TREATMENT CARTRIDGE NUMBER INCREASES TO 7 CARTRIDGES AND MEDIA LOADING RATE CHANGES TO 1.0gpm/sf AT 3.7' HGL. THIS MEANS THE VAULT BECOMES DEEPER THAN THE STANDARD VAULT TO GAIN ADDITIONAL MEDIA SURFACE AREA.



LEGEND

EXISTING PROPERTY LINE		PROPOSED LANDSCAPE	
MAJOR DRAINAGE AREA BOUNDARY		PROPOSED SELF-MITIGATING DMA	
MINOR DRAINAGE AREA BOUNDARY		PROPOSED HYDROMODIFICATION STORAGE	
DIRECTION OF SURFACE FLOW		PROPOSED STORM DRAIN	
DRAINAGE AREA NAME (A)		PROPOSED CATCH BASIN	
ACREAGE (0.83)		PROPOSED MODULAR WETLANDS UNIT (MWS)	

SWQMP SUMMARY

SITE ADDRESS: 2200 S. ESCONDIDO BOULEVARD, ESCONDIDO, CA 92025
PRIORITY DEVELOPMENT PROJECT (PDP)
SITE TOTAL ACREAGE: 3.47± AC; TOTAL DISTURBED AREA= 3.32± AC
NRCS SOIL TYPE: C; 85-PERCENTILE STORM DEPTH: 0.8in
APPROXIMATE DEPTH TO GROUNDWATER: 25ft

DMA	A-1	A-2	A-3	A-4
RUNOFF COEFFICIENT	0.9	0.1	0.9	SELF-MITIGATING
AREA (AC)	2.65	0.53	0.08	
DESIGN CAPTURE VOLUME (CF)	6,926	154	209	
BMP TYPES	MODULAR WETLAND UNIT MWS-L-8-24 (BMP ID NO.1) & STORAGE FACILITY (BMP ID NO.2)			

30' 0' 15' 30'
SCALE: 1" = 30'

DMA EXHIBIT

TSM NO. 20-006

X ENGINEERING & CONSULTING, INC.
6 Hutton Centre Drive, Suite 650
Santa Ana, California 92707
949.522.7100 | xengineeringinc.com

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Bio Clean

A Forterra Company

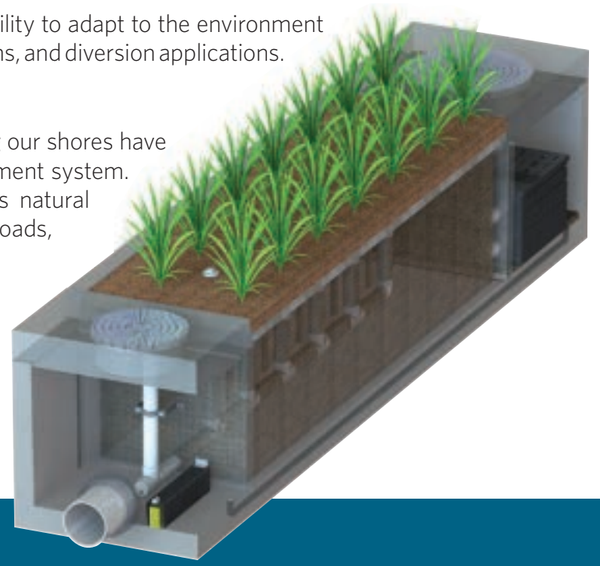
Modular Wetlands® System Linear

A Stormwater Biofiltration Solution

OVERVIEW

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

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



The Urban Impact

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

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

PERFORMANCE

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

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

APPROVALS

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

Washington State Department of Ecology TAPE Approved
The MWS Linear is approved for General Use Level Designation (GULD) for Basic, Enhanced, and Phosphorus treatment at 1 gpm/ft² loading rate. The highest performing BMP on the market for all main pollutant categories.

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

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

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

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

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

ADVANTAGES

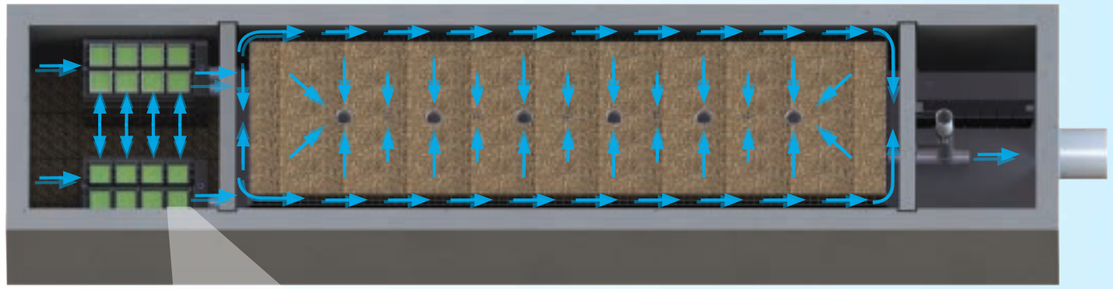
- HORIZONTAL FLOW BIOFILTRATION
- GREATER FILTER SURFACE AREA
- PRETREATMENT CHAMBER
- PATENTED PERIMETER VOID AREA
- FLOW CONTROL
- NO DEPRESSED PLANTER AREA
- AUTO DRAINDOWN MEANS NO MOSQUITO VECTOR

OPERATION

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

- Improves performance
- Reduces footprint
- Minimizes maintenance

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



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

Figure 2, Top View

1 PRETREATMENT

SEPARATION

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

PRE-FILTER CARTRIDGES

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

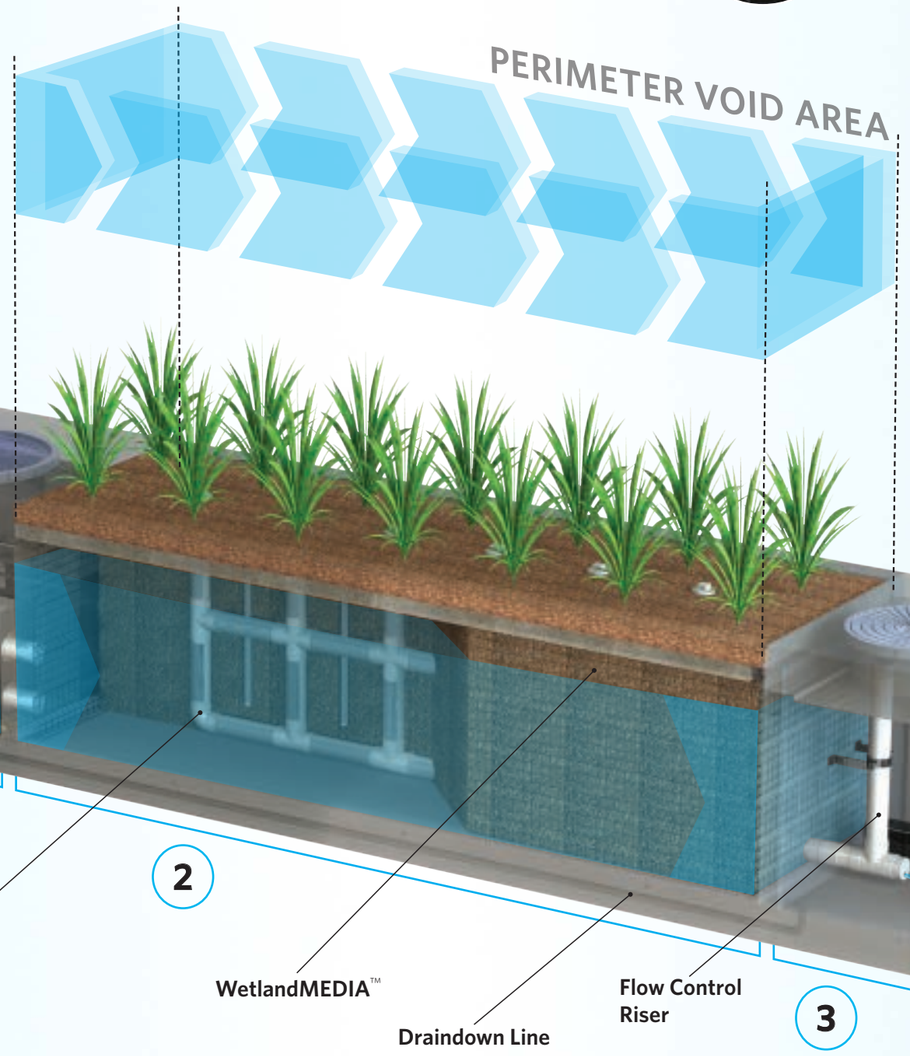


Figure 1

2 BIOFILTRATION

HORIZONTAL FLOW

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

PATENTED PERIMETER VOID AREA

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

WETLANDMEDIA

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

3 DISCHARGE

FLOW CONTROL

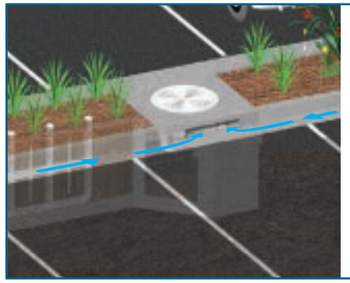
- Orifice plate controls flow of water through WetlandMEDIA™ to a level lower than the media's capacity
- Extends the life of the media and improves performance

DRAINDOWN FILTER

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

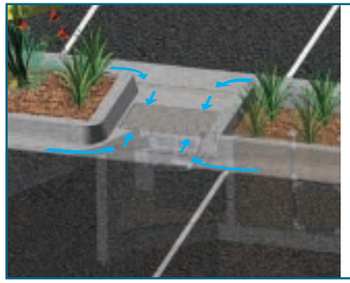
CONFIGURATIONS

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



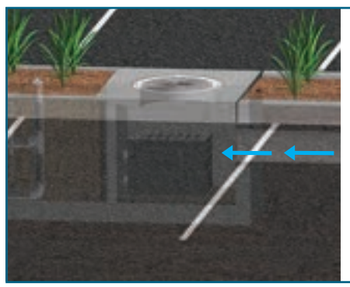
CURB TYPE

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



GRATE TYPE

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



VAULT TYPE

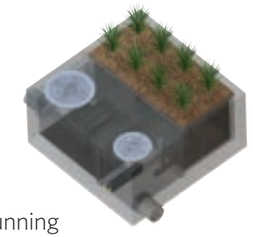
The system's patented horizontal flow biofilter is able to accept inflow pipes directly into the pretreatment chamber, meaning the Modular Wetlands® can be used in end-of-the-line installations. This greatly improves feasibility over typical decentralized designs that are required with other biofiltration/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

DOWNSPOUT TYPE

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

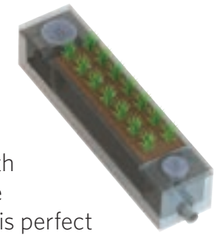
ORIENTATIONS

SIDE-BY-SIDE



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

END-TO-END



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

BYPASS

INTERNAL BYPASS WEIR (SIDE-BY-SIDE ONLY)

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

EXTERNAL DIVERSION WEIR STRUCTURE

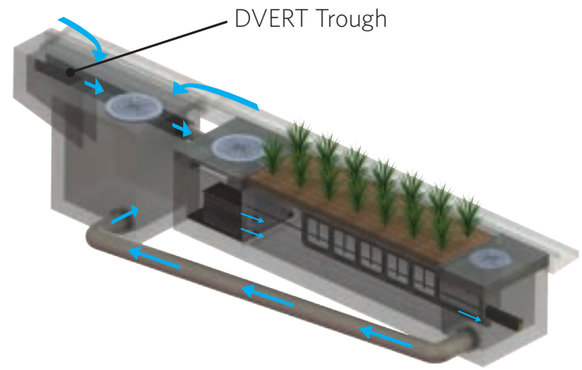
This traditional offline diversion method can be used with the Modular Wetlands® in scenarios where runoff is being piped to the system. These simple and effective structures are generally configured with two outflow pipes. The first is a smaller pipe on the upstream side of the diversion weir - to divert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

FLOW-BY-DESIGN

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

DVERT LOW FLOW DIVERSION

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



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

SPECIFICATIONS

FLOW-BASED DESIGNS

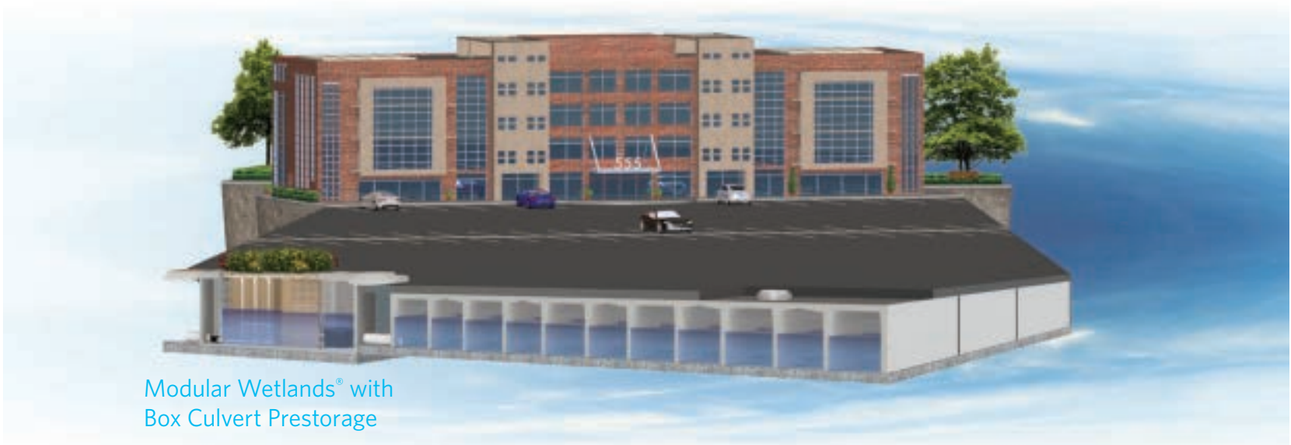
The Modular Wetlands® System Linear can be used in stand-alone applications to meet treatment flow requirements. Since the Modular Wetlands® is the only biofiltration system that can accept inflow pipes several feet below the surface, it can be used not only in decentralized design applications but also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

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

*See Custom MWS-L-8-24 Detail (0.75CFS Treatment Flowrate) on DMA Exhibit.

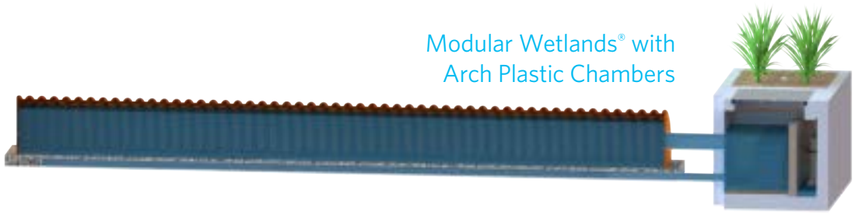
VOLUME-BASED DESIGNS

HORIZONTAL FLOW BIOFILTRATION ADVANTAGE



Modular Wetlands® with Box Culvert Prestorage

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



Modular Wetlands® with Arch Plastic Chambers

DESIGN SUPPORT

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

ADVANTAGES

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

APPLICATIONS

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

INDUSTRIAL

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

RESIDENTIAL

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

STREETS

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

PARKING LOTS

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

COMMERCIAL

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

MIXED USE

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

More applications include:

• Agriculture • Reuse • Low Impact Development • Waste Water

PLANT SELECTION

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

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

INSTALLATION

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

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

MAINTENANCE

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

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

Bio Clean
A Forterra Company

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

010419R1A

WASHINGTON STATE DEPARTMENT OF ECOLOGY

July 2017

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

For the

MWS-Linear Modular Wetland

Ecology's Decision:

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

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

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

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

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

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

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

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

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

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

Ecology's Conditions of Use:

Applicants shall comply with the following conditions:

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

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

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

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

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

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

Application Documents:

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

Applicant's Use Level Request:

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

Applicant's Performance Claims:

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

Ecology Recommendations:

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

Findings of Fact:

<u>Laboratory Testing</u>

The MWS-Linear Modular wetland has the:

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

Field Testing

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

Issues to be addressed by the Company:

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

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

Contact Information:

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

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

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

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

Revision History

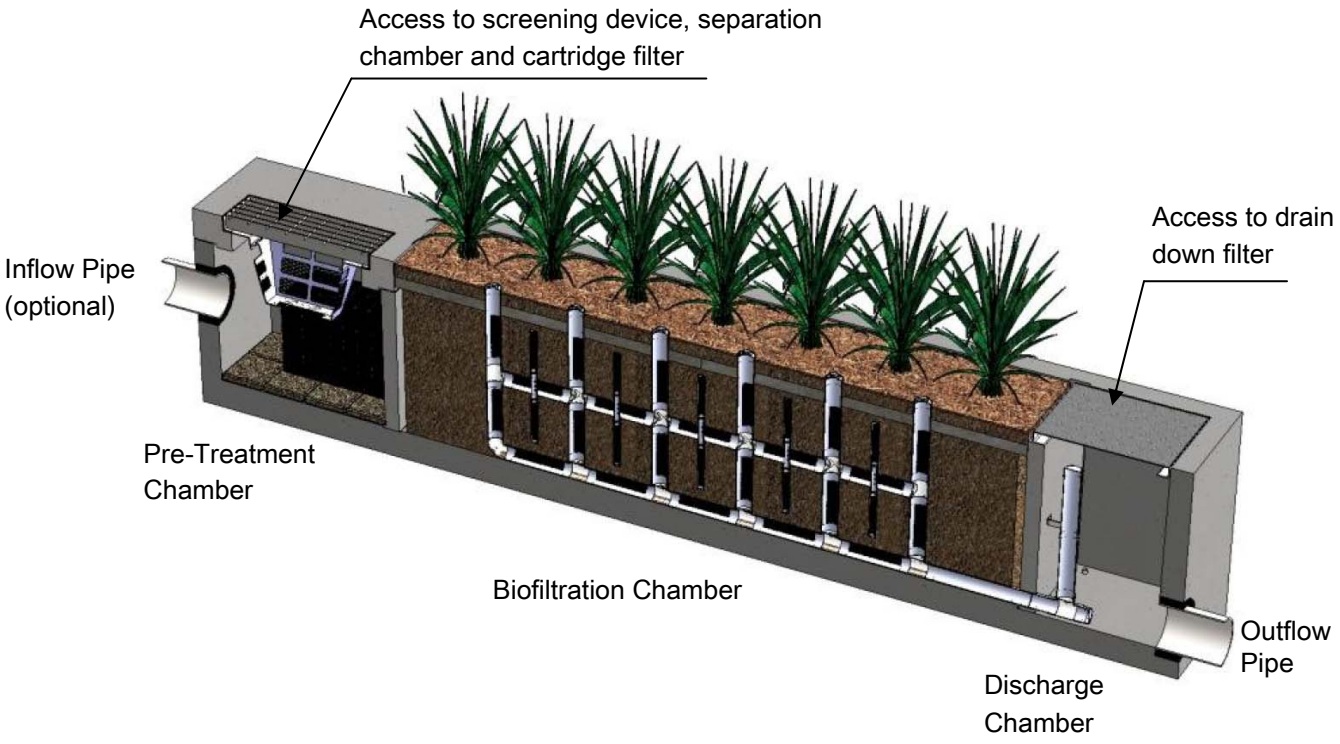
Date	**Revision**
June 2011	Original use-level-designation document
September 2012	Revised dates for TER and expiration
January 2013	Modified Design Storm Description, added Revision Table, added maintenance discussion, modified format in accordance with Ecology standard
December 2013	Updated name of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

Maintenance Guidelines for Modular Wetland System - Linear

Maintenance Summary

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

System Diagram



Maintenance Procedures

Screening Device

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

Separation Chamber

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

Cartridge Filters

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

Drain Down Filter

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

Maintenance Notes

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

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

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

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

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

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

Maintenance Procedure Illustration

Screening Device

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

Separation Chamber

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

Cartridge Filters

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

Drain Down Filter

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

Trim Vegetation

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

Inspection Form

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

www.modularwetlands.com

Inspection Report
Modular Wetlands System

Project Name _____

Project Address _____
(city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

Inspector Name _____ Date ____/____/____ Time _____ AM / PM

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

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

Weather Condition _____ Additional Notes _____

Inspection Checklist

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

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

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

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

Plant Information	
Damage to Plants	
Plant Replacement	
Plant Trimming	

Additional Notes:

2972 San Luis Rey Road, Oceanside, CA 92058 P (760) 433-7640 F (760) 433-3176

Maintenance Report

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

www.modularwetlands.com

Cleaning and Maintenance Report
Modular Wetlands System

Project Name _____

Project Address _____
(city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

Inspector Name _____ Date ____/____/____ Time _____ AM / PM

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

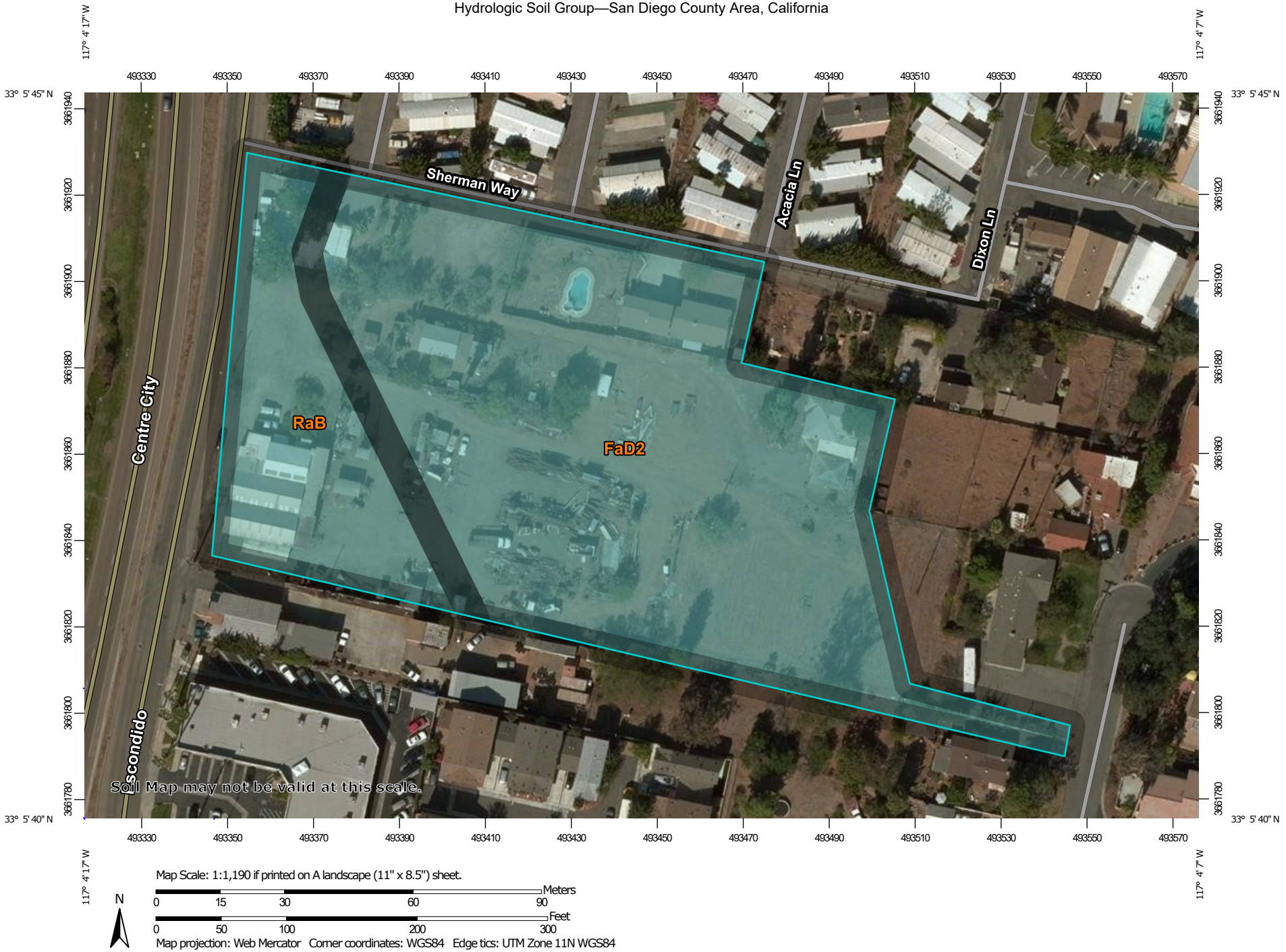
Weather Condition _____ Additional Notes _____

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

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

Comments:

2972 San Luis Rey Road, Oceanside, CA 92058 P. 760.433.7640 F. 760.433.3176



Map Scale: 1:1,190 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 15 30 60 90

Feet: 0 50 100 200 300

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 13, Sep 12, 2018

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

Date(s) aerial images were photographed: Nov 3, 2014—Nov 22, 2014

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
FaD2	Fallbrook sandy loam, 9 to 15 percent slopes, eroded	C	2.8	78.2%
RaB	Ramona sandy loam, 2 to 5 percent slopes	C	0.8	21.8%
Totals for Area of Interest			**3.6**	**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


San Diego County
85th Percentile Isopluvials
PROJECT SITE
85th Percentile Rainfall in Inches
Freeway
Highway
Major Road
Street
Municipal Boundary
Water Body
Note:
The 85th percentile is a 24-hour rainfall total.
It represents a value such that 85% of the
observed 24-hour rainfall totals will be less
than that value.
LUEG GIS
Land Use & Environment Group
Geographic Information Service
SanGIS
0 1 2 3 4 Miles
SAN DIEGO BAY

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ATTACHMENT 2

BACKUP FOR PDP HYDROMODIFICATION CONTROL MEASURES

This is the cover sheet for Attachment 2.

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

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	**Contents**	**Checklist**
Attachment 2a	Flow Control Facility Design, including Structural BMP Drawdown Calculations and Overflow Design Summary (Required) See Chapter 6 and Appendix G of the Storm Water Design Manual	☒Included ☐Submitted as separate stand-alone document
Attachment 2b	Hydromodification Management Exhibit (Required)	☒Included See Hydromodification Management Exhibit Checklist on the back of this Attachment cover sheet.
Attachment 2c	Management of Critical Coarse Sediment Yield Areas See Section 6.2 and Appendix H of the Storm Water Design Manual.	☒Exhibit depicting onsite and/or upstream sources of critical coarse sediment as mapped in the WMAA AND, ☒Demonstration that the project effectively avoids and bypasses sources of mapped critical coarse sediment OR, ☐Demonstration that project does not generate a net impact on the receiving water.
Attachment 2d	Geomorphic Assessment of Receiving Channels (Optional) See Section 6.3.4 of the Storm Water Design Manual.	☒Not performed ☐Included ☐Submitted as separate stand-alone document
Attachment 2e	Vector Control Plan (Required when structural BMPs will not drain in 96 hours)	☐Included ☒Not required because BMPs will drain in less than 96 hours

TENTATIVE SUBDIVISION MAP
SUB20-0006
Escondido, CA

PRELIMINARY HYDROMODIFICATION REPORT

PREPARED FOR:

Warmington Residential California, Inc.
3090 Pullman Street, Costa Mesa, CA 92626
714.557.5511

Date Prepared: September 2020

PREPARED BY:

X Engineering & Consulting, Inc.
6 Hutton Centre Drive, Suite 650
Santa Ana, California 92707
949.522.7100
Project Manager: Eric Lissner, P.E.

Project Number: 101-003

ENGINEERING & CONSULTING

This report was prepared by or under the supervision of the undersigned registered civil engineer who attests to the technical information contained herein. The registered civil engineer has also judged the qualifications of any technical specialists providing engineering data upon which recommendations, conclusions, and decisions are based.

_____ 02-16-2021

Eric Lissner, P.E. Date

TABLE OF CONTENTS

APPENDICES

I. INTRODUCTION

a. PROJECT SITE DESCRIPTION

The subject site is located at 2220 South Escondido Boulevard, in the City of Escondido, County of San Diego, California. The site falls within the Kit Carson Neighborhood, designated as a Tier 1 in the Growth Management Element per the city of Escondido General Plan. The subject site measures approximately 315' along the frontage of S. Escondido Boulevard, and extends approximately 685' east along its longest edge, consisting of 3.47 acres of land. The site is bounded by a mobile home park to the north, South Escondido Boulevard to the west, existing commercial uses to the south, and residential property to the east. The property is currently occupied by a metal fabrication operation on the southwest corner, an HVAC mechanical shop on the northwest corner, a single-family residence with an attached garage on the northeast portion, and existing vegetation and weathered concrete throughout the site.

The land developer is proposing a residential community consisting of 62 townhomes on 3.47 acres within five existing parcels (APN 236-390-02-00, 236-390-03-00, 236-390-52-00, 236-390-53-00, and 236-390-54-00). As a part of the project, the developer is to provide a graded pad for the property to the east of the project, APN 236-390-51-00. The parcels are currently zoned as specific plan per the South City Centre specific plan. This report is intended to accompany the entitlement document submittals for the proposed project.

b. PURPOSE AND SCOPE

The purpose of this preliminary study is to analyze the pre-and post-development drainage conditions in order to minimize the potential of storm water discharges from the project site from causing altered flow regimes and excessive downstream erosion in the receiving waters.

This preliminary hydromodification management analysis was performed utilizing continuous simulation hydrologic modeling based on Appendix G of the Escondido Storm Water Design Manual and the County of San Diego Hydromodification Management Plan.

II. EXISTING TOPOGRAPHIC AND HYDROLOGIC CONDITIONS

a. EXISTING TOPOGRAPHY

The project site is located on previously developed land, used for both residential and commercial uses. The subject site can generally be characterized by an average existing grade of approximately 8%, uniformly sloping from east to west. Elevations range between

approximately 611' to 655' above MSL. Existing vegetation within the site consists primarily of miscellaneous grasses, shrubs, weeds, and trees. Throughout the site, there exists scattered portions of weathered concrete. Existing improvements include a welding operation, abandoned commercial storefront, various sheds, single-family homes with attached garages, and a network of unpaved access roads within the site. The central portion of the subject site is largely undeveloped, primarily used to stockpile welding equipment and debris.

According to the NRCS Web Soil Survey, approximately 80% of the subject site is comprised of Fallbrook sandy loam (9 to 15 percent slopes, eroded) and 20% Ramona sandy loam (2 to 5 percent slopes), both of which are classified as hydrologic soil group C. The site is located within the San Dieguito River Watershed. Runoff for this project is conveyed to a natural channel near the intersection of South Escondido Boulevard and Centre City Parkway, where it travels to Kit Carson Creek, draining to Lake Hodges, then the San Dieguito River, ultimately draining into the Pacific Ocean via the San Dieguito Lagoon in Solana Beach.

b. EXISTING DRAINAGE PATTERN

Approximately 1 acre of offsite area is tributary to the proposed site. The offsite tributary area extends approximately 120' east of the project boundary to a ridgeline approximately 60' east of the project with an approximate elevation of 655'. The storm flows from the offsite tributary area follow a northwesterly direction to the proposed site. Offsite flows were not considered as a part of this hydromodification analysis.

Onsite storm runoff tends to sheet flow in a similar westerly direction, exiting the site onto South Escondido Boulevard, where it travels north to a catch basin approximately 30' north of the site. There appears to be a privately maintained storm drain system running parallel to South Escondido Boulevard from the catch basin through the adjacent mobile home property, draining to a natural channel (name unknown) leading to Kit Carson Creek – however, this system is not known to the city of Escondido and is not identified in any of the documents provided by the City.

c. EXISTING STORM DRAIN FACILITIES

As discussed in section II.a, the subject site is sparsely developed. There are no known onsite existing storm drain facilities.

Offsite, as mentioned in section II.b, there appears to be a privately maintained existing storm drain system parallel to South Escondido Boulevard, appearing to convey storm flows northerly towards the natural channel. However, there is no available information regarding this system. For the purpose of this analysis, this system will not be recognized as an existing facility and will be disregarded. There is no other known public storm drain system in South Escondido Boulevard along the site frontage.

III. HYDROLOGIC ANALYSIS

a. METHODOLOGY

The study site falls under the jurisdiction of the city of Escondido, in the County of San Diego. This preliminary hydromodification management analysis was performed utilizing continuous simulation hydrologic modeling based on Appendix G of the Escondido Storm Water Design Manual (BMP Design Manual). Storm Water Management Model (SWMM) Version 5.1 distributed by the United States Environmental Protection Agency (EPA) was used to analyze and design the development project to performance standards provided in Section 6-9 of the San Diego County Hydromodification Management Plan (HMP) and shown below.

1. For flow rates ranging from 10 percent, 30 percent or 50 percent of the pre-project 2-year runoff event ($0.1Q_2$, $0.3Q_2$, or $0.5Q_2$) to the pre-project 10-year runoff event (Q_{10}), the post-project discharge rates and durations shall not deviate above the pre-project rates and durations by more than 10 percent over and more than 10 percent of the length of the flow duration curve. The specific lower flow threshold will depend on results from the SCCWRP channel screening study and the critical flow calculator.
2. For flow rates ranging from the lower flow threshold to Q5, the post-project peak flows shall not exceed pre-project peak flows. For flow rates from Q5 to Q_{10}, post-project peak flows may exceed pre-project flows by up to 10 percent for a 1-year frequency interval. For example, post-project flows could exceed pre-project flows by up to 10 percent for the interval from Q_9 to Q_{10} or from $Q_{5.5}$ to $Q_{6.5}$, but not from Q_8 to Q_{10}.

No channel assessment has been completed for the project, so the most conservative low flow threshold of $0.1Q_2$ was selected.

b. EXISTING CONDITION

The onsite existing condition was analyzed in SWMM as a single 3.26-acre subcatchment discharging to the point of compliance (POC) at the eastern property boundary. The subcatchment parameters were defined in accordance with Table G.1-4 in the BMP Design Manual. A diagram of the model is shown below.

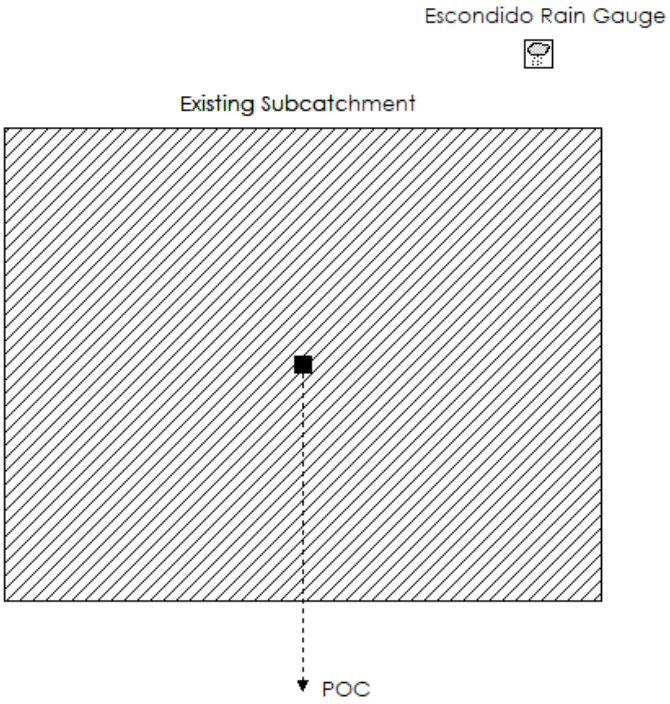

Figure 1: Existing Condition SWMM Study Area Map

C. MITIGATED PROPOSED CONDITION

The proposed development is comprised of 62 townhomes, required public and private roadway and public utility improvements, and drainage and water quality facilities. A portion of the neighboring property to the east is proposed be graded as a part of this project and runoff generated from the disturbed area shall enter the proposed drainage system. The onsite mitigated proposed condition was partitioned into five separate subcatchments to reflect the site – roofs, landscape, hardscape, offsite pad, and BMP. The onsite mitigated proposed condition analysis area is identical in size to that of the existing.

The landscape subcatchment includes the open space area and all pervious landscaping onsite. Though only pervious areas were included in this subcatchment, an impervious value of 10% was assigned to this subcatchment as a conservative measure to account for concrete walkways. The roofs subcatchment consists of all roofing areas onsite. The hardscape subcatchment encompasses all the onsite street paving and curb-adjacent sidewalks. However, since the proposed BMP is a network of three 10.5'W x 6.5'H storm water detention facilities beneath the alley paving, the area of the BMP footprint was partitioned from the hardscape subcatchment and shown as its own subcatchment, with an LID control applied to 100% of its area. The offsite pad subcatchment encompasses the

grading of the property to the east of the project as a part of this development and was modeled with a 65% imperviousness.

The underground storage facility system was modeled as a 4.5' high rain barrel (or cistern) with a 1.4" diameter circular orifice, resulting in a 64.5-hour drawdown time per calculations in Appendix A. In the model, the proposed BMP outlets to the POC at the property boundary. However, the BMP actually outlets to a proposed Modular Wetlands biofiltration system, which provides pollutant control for the project. The Modular Wetlands system was omitted from the SWMM model for simplicity due to its unique horizontal flow design. For the purposes of hydromodification control, the orifice and storage volume provide sufficient mitigation for the model to show adequate storm flow frequency and duration control. We indicate that this model is somewhat conservative. It does not account for the additional flow control that the Modular Wetlands system is proposed to provide.

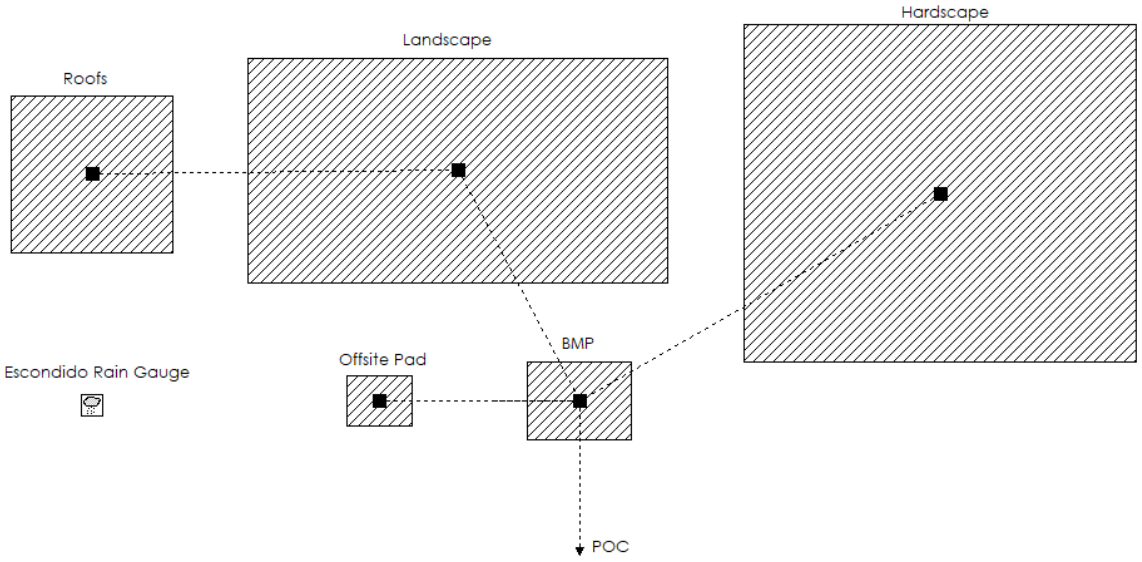

Figure 2: Proposed Condition SWMM Study Area Map

Analysis of the model as described above using continuous simulation yielded a large amount of output data. The results of the analysis for flow frequency and flow duration to comply with the HMP are shown in the following charts. Compliance is demonstrated by the mitigated proposed condition curves being uniformly below the existing condition curves for the interval of $0.1Q_2$ through Q_{10}. Detailed output spreadsheets are shown in Appendices B and C of this report.

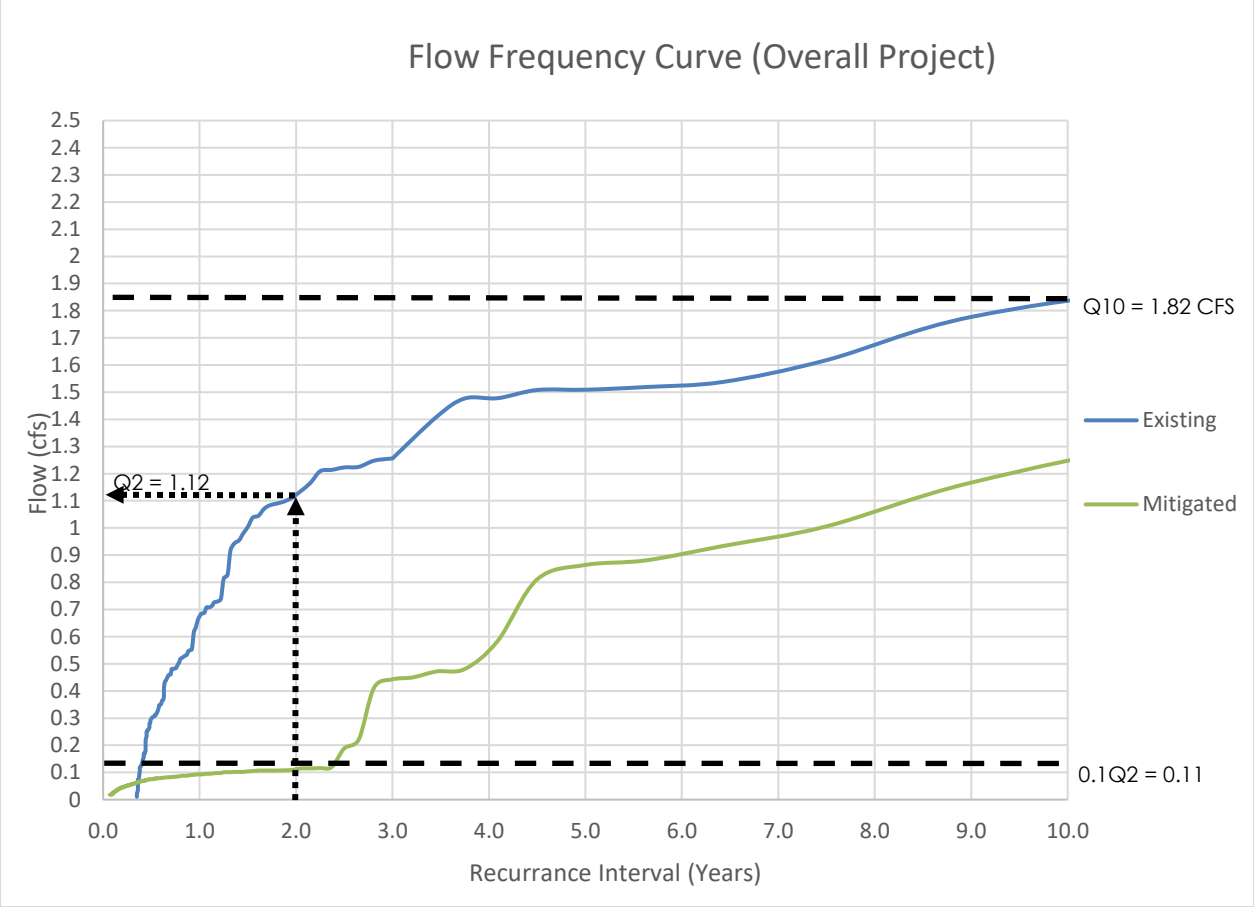

Figure 3: Peak Flow Frequency Curve

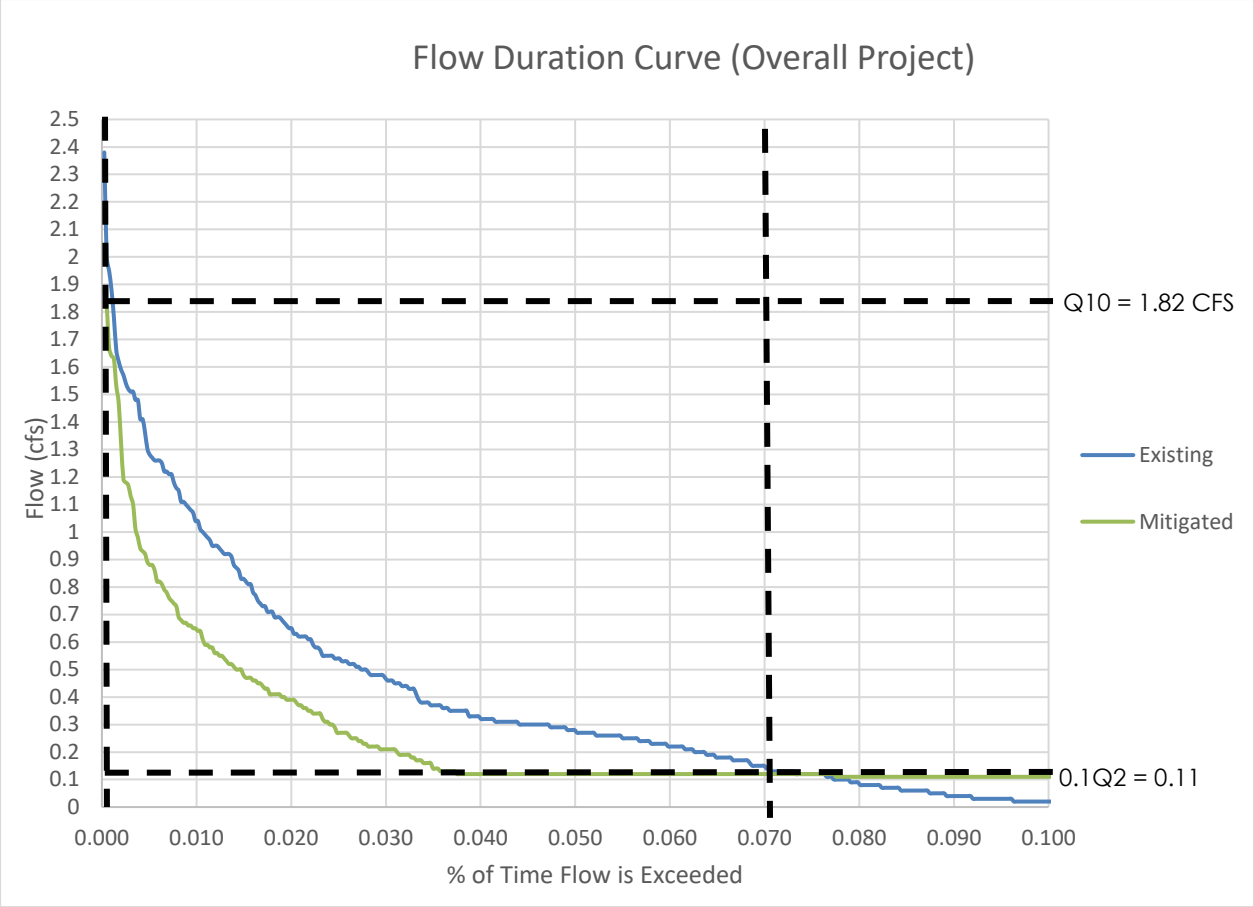

Figure 3: Peak Flow Duration Curve

IV. CONCLUSION

Based upon analyses provided in this report, the mitigated proposed condition development will not adversely impact the flow duration or frequency of the $0.1Q_2$ through Q_{10} runoff. As described previously, existing drainage patterns will generally be preserved. Hydromodification management is provided through three onsite proposed underground storage facilities.

V. REFERENCES

1. Escondido Storm Water Design Manual (February 2016)
2. San Diego County Hydromodification Management Plan (March 2011)
3. EPA Storm Water Management Model User's Manual Version 5.1 (September 2015)

APPENDIX A

```
[TITLE]
;;Project Title/Notes

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

START_DATE           09/24/1964
START_TIME           13:00:00
REPORT_START_DATE    09/24/1964
REPORT_START_TIME    13:00:00
END_DATE             05/23/2008
END_TIME             22:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             01:00:00
DRY_STEP             01:00:00
ROUTING_STEP         0:01:00

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

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
MONTHLY          .06    .08    .11    .16    .18    .21    .21    .2     .16    .12
  .08    .06
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
;;-------------- --------- ------ ------ ----------
```

```
Escondido        INTENSITY 1:00     1.0      FILE       "escondido.txt"  escondido
IN

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope
  CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- --------
-------- -------- ----------------
Existing         Escondido        POC              3.26     0        166      6
  0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo
PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ----------
----------
Existing         .012       .03        .05        .1         25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    Ksat       IMD
;;-------------- ---------- ---------- ----------
Existing         6          .1         .31

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

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

[TAGS]

[MAP]
DIMENSIONS 0.000 0.000 10000.000 10000.000
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC              2306.590           2979.943

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

```
[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Existing         168.998            3583.916
Existing         4446.387           3583.916
Existing         4446.387           6975.524
Existing         168.998            6975.524

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Escondido        4009.324           7482.517

[LABELS]
;;X-Coord          Y-Coord            Label
3181.818           7867.133           "Escondido Rain Gauge" "" "Century Gothic" 10
0 0
1433.566           7237.762           "Existing Subcatchment" "" "Century Gothic" 10
0 0
2447.552           3053.613           "POC" "" "Century Gothic" 10 0 0
```

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

****
Rainfall File Summary
****

Station ID	First Date	Last Date	Recording Frequency	Periods w/Precip	Periods Missing	Periods Malfunc.
escondido	09/24/1964	05/23/2008	60 min	7025	0	0

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

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... NO
  Water Quality ..... NO
Infiltration Method ..... GREEN_AMPT
Starting Date 09/24/1964 13:00:00
Ending Date 05/23/2008 22:00:00
Antecedent Dry Days 0.0
Report Time Step 01:00:00
Wet Time Step 01:00:00
Dry Time Step 01:00:00

Runoff Quantity Continuity	Volume acre-feet	Depth inches
Total Precipitation	166.021	611.120
Evaporation Loss	0.975	3.589
Infiltration Loss	155.146	571.090
Surface Runoff	13.391	49.294
Final Storage	0.000	0.000
Continuity Error (%)	-2.103	

Flow Routing Continuity	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	13.391	4.364
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	13.391	4.364
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

Subcatchment Runoff Summary

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff
Existing	611.12	0.00	3.59	571.09	49.29	4.36	2.41	0.081

Analysis begun on: Wed Dec 02 17:49:37 2020
Analysis ended on: Wed Dec 02 17:50:00 2020
Total elapsed time: 00:00:23

```
[TITLE]
;;Project Title/Notes

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

START_DATE           09/24/1964
START_TIME           13:00:00
REPORT_START_DATE    09/24/1964
REPORT_START_TIME    13:00:00
END_DATE             05/23/2008
END_TIME             22:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             01:00:00
DRY_STEP             01:00:00
ROUTING_STEP         0:01:00
RULE_STEP            00:00:00

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

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
MONTHLY          .06    .08    .11    .16    .18    .21    .21    .2     .16    .12
  .08    .06
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
```

```
;;-------------- --------- ------ ------ ----------
Escondido        INTENSITY 1:00     1.0      FILE       "escondido.txt"  escondido
IN

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope
  CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- --------
-------- -------- ----------------
BuildingRoofs    Escondido        Landscape        0.94     100      55       1
  0
Hardscape        Escondido        bmp              1.16     100      55       2
  0
Landscape        Escondido        bmp              1.00     10       100      2
  0
BMP              Escondido        poc               .075    100      120      0
  0
RV               Escondido        bmp               .10     65       50       2
  0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo
PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ----------
----------
BuildingRoofs    .012       .1         .05        .1         25         OUTLET
Hardscape        .012       .1         .05        .1         25         OUTLET
Landscape        .012       .24        .05        .2         25         OUTLET
BMP              .012       .1         .05        .1         25         OUTLET
RV               0.012      0.03       .05        .2         25         OUTLET

[INFILTRATION]
;;Subcatchment   Param1     Param2     Param3     Param4     Param5
;;-------------- ---------- ---------- ---------- ---------- ----------
BuildingRoofs    6          .1         .31        7          0
Hardscape        6          .1         .32        7          0
Landscape        6          .1         .31        7          0
BMP              6          .1         .31        7          0
RV               4.33       .43        .453       7          0

[LID_CONTROLS]
;;Name           Type/Layer Parameters
;;-------------- ---------- ----------
HydromodStorage  RB
HydromodStorage  STORAGE    54         .67        0          0
HydromodStorage  DRAIN      .2179      .5         0          0          0          0


[LID_USAGE]
;;Subcatchment   LID Process      Number  Area       Width      InitSat    FromImp
```

```
 ToPerv     RptFile                   DrainTo          FromPerv
;;-------------- ---------------- ------- ---------- ---------- ----------
---------- ---------- ----------------------- ---------------- ----------
BMP              HydromodStorage  1       3267.00    24         0          0
 0          *                         *                0

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

[REPORT]
;;Reporting Options
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS 0.000 0.000 10000.000 10000.000
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC              4550.173           1637.832

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

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
BuildingRoofs    -688.077           4386.601
BuildingRoofs    804.628            4386.601
BuildingRoofs    804.628            5823.189
BuildingRoofs    -688.077           5823.189
Hardscape        6065.786           3381.248
Hardscape        9668.480           3381.248
Hardscape        9668.480           6478.891
Hardscape        6065.786           6478.891
Landscape        1496.158           4107.312
Landscape        5356.989           4107.312
Landscape        5356.989           6172.408
Landscape        1496.158           6172.408
BMP              4068.463           2659.501
BMP              5022.447           2659.501
BMP              5022.447           3377.795
```

```
BMP             4068.463          3377.795
RV              2404.844          2791.234
RV              2998.847          2785.467
RV              2998.847          3258.362
RV              2410.611          3258.362

[SYMBOLS]
;;Gage           X-Coord           Y-Coord
;;-------------- ----------------- -----------------
Escondido       69.930            2960.373

[LABELS]
;;X-Coord          Y-Coord           Label
-198.135           6083.916          "Roofs" "" "Century Gothic" 10 0 0
2925.408           6433.566          "Landscape" "" "Century Gothic" 10 0 0
7517.482           6689.977          "Hardscape" "" "Century Gothic" 10 0 0
4393.939           3648.019          "BMP" "" "Century Gothic" 10 0 0
-745.921           3379.953          "Escondido Rain Gauge" "" "Century Gothic" 10
0 0
4662.005           1771.562          "POC" "" "Century Gothic" 10 0 0
2335.640           3494.810          "Offsite Pad" "" "Century Gothic" 10 0 0
```

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

****
Rainfall File Summary
****

Station ID	First Date	Last Date	Recording Frequency	Periods w/Precip	Periods Missing	Periods Malfunc.
escondido	09/24/1964	05/23/2008	60 min	7025	0	0

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

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... NO
  Water Quality ..... NO
Infiltration Method ..... GREEN_AMPT
Starting Date 09/24/1964 13:00:00
Ending Date 05/23/2008 22:00:00
Antecedent Dry Days 0.0
Report Time Step 01:00:00
Wet Time Step 01:00:00
Dry Time Step 01:00:00

Runoff Quantity Continuity	Volume acre-feet	Depth inches
Total Precipitation	166.785	611.120
Evaporation Loss	17.959	65.803
Infiltration Loss	74.015	271.200
Surface Runoff	4.740	17.368
LID Drainage	77.935	285.565
Final Storage	0.011	0.040
Continuity Error (%)	-4.722	

Flow Routing Continuity	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	82.675	26.941
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	82.675	26.941
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

Analysis begun on: Mon Jan 18 11:43:13 2021
Analysis ended on: Mon Jan 18 11:43:34 2021
Total elapsed time: 00:00:21

APPENDIX B

Flow Frequency Compliance

	Pre	Post		Analysis
Return Period (Years)	Existing Peak Q (cfs)	Mitigated Peak Q (cfs)	Mitigated /Existing (%)	Compliance?
45.0	2.380	1.880	78.99	N/A
22.5	1.995	1.824	91.43	N/A
15.0	1.948	1.475	75.72	N/A
11.3	1.883	1.325	70.37	Yes
9.0	1.777	1.167	65.67	Yes
7.5	1.618	1.006	62.18	Yes
6.4	1.538	0.934	60.73	Yes
5.6	1.519	0.881	58.00	Yes
5.0	1.509	0.864	57.26	Yes
4.5	1.508	0.811	53.78	Yes
4.1	1.478	0.584	39.51	Yes
3.8	1.477	0.481	32.57	Yes
3.5	1.410	0.472	33.48	Yes
3.0	1.256	0.450	35.83	Yes
3.0	1.256	0.443	35.27	Yes
2.8	1.248	0.413	33.09	Yes
2.7	1.225	0.221	18.04	Yes
2.5	1.223	0.189	15.45	Yes
2.4	1.214	0.120	9.88	Yes
2.3	1.209	0.116	9.59	Yes
2.1	1.163	0.115	9.89	Yes
2.0	1.111	0.115	10.35	Yes
2.0	1.111	0.109	9.81	Yes
1.9	1.098	0.108	9.84	Yes
1.8	1.090	0.107	9.82	Yes
1.7	1.084	0.107	9.87	Yes
1.7	1.071	0.107	9.99	Yes
1.6	1.045	0.107	10.24	Yes
1.6	1.038	0.105	10.12	Yes
1.5	1.004	0.104	10.36	Yes
1.5	0.979	0.102	10.42	Yes
1.4	0.955	0.102	10.68	Yes
1.4	0.943	0.102	10.82	Yes
1.3	0.917	0.101	11.01	Yes
1.3	0.828	0.101	12.20	Yes
1.3	0.814	0.101	12.41	Yes
1.2	0.739	0.098	13.26	Yes
1.2	0.729	0.098	13.44	Yes
1.2	0.726	0.097	13.36	Yes
1.1	0.714	0.096	13.45	Yes
1.1	0.708	0.095	13.42	Yes

1.1	0.707	0.095	13.44	Yes
1.1	0.688	0.094	13.66	Yes
1.0	0.685	0.093	13.58	Yes
1.0	0.675	0.093	13.78	Yes
1.0	0.660	0.093	14.09	Yes
1.0	0.633	0.092	14.53	Yes
0.9	0.616	0.091	14.77	Yes
0.9	0.554	0.091	16.43	Yes
0.9	0.550	0.090	16.36	Yes
0.9	0.545	0.089	16.33	Yes
0.9	0.534	0.088	16.48	Yes
0.9	0.530	0.088	16.60	Yes
0.8	0.525	0.088	16.76	Yes
0.8	0.522	0.088	16.86	Yes
0.8	0.518	0.087	16.80	Yes
0.8	0.506	0.086	17.00	Yes
0.8	0.501	0.085	16.97	Yes
0.8	0.487	0.085	17.45	Yes
0.8	0.483	0.084	17.39	Yes
0.7	0.481	0.084	17.46	Yes
0.7	0.481	0.084	17.46	Yes
0.7	0.481	0.083	17.26	Yes
0.7	0.461	0.083	18.00	Yes
0.7	0.461	0.083	18.00	Yes
0.7	0.459	0.082	17.86	Yes
0.7	0.453	0.082	18.10	Yes
0.7	0.446	0.082	18.39	Yes
0.7	0.438	0.082	18.72	Yes
0.6	0.434	0.081	18.66	Yes
0.6	0.410	0.081	19.76	Yes
0.6	0.379	0.081	21.37	Yes
0.6	0.366	0.080	21.86	Yes
0.6	0.364	0.080	21.98	Yes
0.6	0.351	0.080	22.79	Yes
0.6	0.349	0.079	22.64	Yes
0.6	0.348	0.079	22.70	Yes
0.6	0.346	0.079	22.83	Yes
0.6	0.330	0.079	23.94	Yes
0.6	0.323	0.079	24.46	Yes
0.6	0.321	0.078	24.30	Yes
0.6	0.315	0.078	24.76	Yes
0.5	0.313	0.078	24.92	Yes
0.5	0.309	0.077	24.92	Yes
0.5	0.307	0.077	25.08	Yes
0.5	0.305	0.077	25.25	Yes
0.5	0.303	0.076	25.08	Yes
0.5	0.303	0.076	25.08	Yes

0.5	0.303	0.075	24.75	Yes
0.5	0.298	0.075	25.17	Yes
0.5	0.292	0.075	25.68	Yes
0.5	0.284	0.075	26.41	Yes
0.5	0.280	0.075	26.79	Yes
0.5	0.266	0.074	27.82	Yes
0.5	0.259	0.074	28.57	Yes
0.5	0.257	0.074	28.79	Yes
0.5	0.257	0.073	28.40	Yes
0.5	0.252	0.073	28.97	Yes
0.5	0.250	0.073	29.20	Yes
0.5	0.238	0.073	30.67	Yes
0.5	0.232	0.072	31.03	Yes
0.4	0.218	0.072	33.03	Yes
0.4	0.179	0.070	39.11	Yes
0.4	0.174	0.070	40.23	Yes
0.4	0.169	0.070	41.42	Yes
0.4	0.168	0.070	41.67	Yes
0.4	0.166	0.070	42.17	Yes
0.4	0.154	0.069	44.81	Yes
0.4	0.147	0.069	46.94	Yes
0.4	0.135	0.069	51.11	Yes
0.4	0.134	0.069	51.49	Yes
0.4	0.131	0.069	52.67	Yes
0.4	0.122	0.068	55.74	Yes
0.4	0.122	0.068	55.74	Yes
0.4	0.122	0.067	54.92	Yes
0.4	0.122	0.067	54.92	Yes
0.4	0.118	0.066	55.93	Yes
0.4	0.108	0.066	61.11	Yes

APPENDIX C

Flow Duration Compliance

Low threshold	10%
Q2=	1.12
Q10=	1.82
Step (cfs)	0.0173
Count (hours)	394470

		Existing		Proposed mitigated		Mitigated	
Interval	Q	Hours w/>Q	% time	Hours w/>Q	% time	post/pre	Pass/fail
1	0.1123	301	0.076%	305	0.077%	101.329%	Pass
2	0.1295	288	0.073%	147	0.037%	51.042%	Pass
3	0.1468	276	0.070%	137	0.035%	49.638%	Pass
4	0.1641	269	0.068%	133	0.034%	49.442%	Pass
5	0.1814	255	0.065%	128	0.032%	50.196%	Pass
6	0.1987	251	0.064%	123	0.031%	49.004%	Pass
7	0.2160	242	0.061%	115	0.029%	47.521%	Pass
8	0.2333	228	0.058%	108	0.027%	47.368%	Pass
9	0.2506	216	0.055%	103	0.026%	47.685%	Pass
10	0.2679	205	0.052%	102	0.026%	49.756%	Pass
11	0.2852	193	0.049%	97	0.025%	50.259%	Pass
12	0.3025	173	0.044%	94	0.024%	54.335%	Pass
13	0.3198	163	0.041%	92	0.023%	56.442%	Pass
14	0.3370	152	0.039%	91	0.023%	59.868%	Pass
15	0.3543	144	0.037%	85	0.022%	59.028%	Pass
16	0.3716	136	0.034%	81	0.021%	59.559%	Pass
17	0.3889	132	0.033%	80	0.020%	60.606%	Pass
18	0.4062	131	0.033%	74	0.019%	56.489%	Pass
19	0.4235	130	0.033%	69	0.017%	53.077%	Pass
20	0.4408	124	0.031%	66	0.017%	53.226%	Pass
21	0.4581	121	0.031%	64	0.016%	52.893%	Pass
22	0.4754	117	0.030%	59	0.015%	50.427%	Pass
23	0.4927	110	0.028%	58	0.015%	52.727%	Pass
24	0.5100	107	0.027%	55	0.014%	51.402%	Pass
25	0.5273	102	0.026%	52	0.013%	50.980%	Pass
26	0.5445	96	0.024%	50	0.013%	52.083%	Pass
27	0.5618	91	0.023%	46	0.012%	50.549%	Pass
28	0.5791	90	0.023%	46	0.012%	51.111%	Pass
29	0.5964	87	0.022%	42	0.011%	48.276%	Pass
30	0.6137	85	0.022%	41	0.010%	48.235%	Pass
31	0.6310	79	0.020%	41	0.010%	51.899%	Pass
32	0.6483	79	0.020%	39	0.010%	49.367%	Pass
33	0.6656	76	0.019%	35	0.009%	46.053%	Pass
34	0.6829	74	0.019%	32	0.008%	43.243%	Pass
35	0.7002	71	0.018%	31	0.008%	43.662%	Pass
36	0.7175	68	0.017%	31	0.008%	45.588%	Pass
37	0.7347	66	0.017%	30	0.008%	45.455%	Pass

38	0.7520	64	0.016%	28	0.007%	43.750%	Pass
39	0.7693	64	0.016%	27	0.007%	42.188%	Pass
40	0.7866	62	0.016%	26	0.007%	41.935%	Pass
41	0.8039	62	0.016%	25	0.006%	40.323%	Pass
42	0.8212	59	0.015%	22	0.006%	37.288%	Pass
43	0.8385	57	0.014%	22	0.006%	38.596%	Pass
44	0.8558	57	0.014%	22	0.006%	38.596%	Pass
45	0.8731	55	0.014%	21	0.005%	38.182%	Pass
46	0.8904	54	0.014%	18	0.005%	33.333%	Pass
47	0.9077	54	0.014%	18	0.005%	33.333%	Pass
48	0.9250	50	0.013%	17	0.004%	34.000%	Pass
49	0.9422	48	0.012%	15	0.004%	31.250%	Pass
50	0.9595	45	0.011%	15	0.004%	33.333%	Pass
51	0.9768	44	0.011%	15	0.004%	34.091%	Pass
52	0.9941	42	0.011%	14	0.004%	33.333%	Pass
53	1.0114	40	0.010%	13	0.003%	32.500%	Pass
54	1.0287	40	0.010%	13	0.003%	32.500%	Pass
55	1.0460	38	0.010%	13	0.003%	34.211%	Pass
56	1.0633	38	0.010%	13	0.003%	34.211%	Pass
57	1.0806	36	0.009%	13	0.003%	36.111%	Pass
58	1.0979	35	0.009%	13	0.003%	37.143%	Pass
59	1.1152	32	0.008%	12	0.003%	37.500%	Pass
60	1.1325	32	0.008%	11	0.003%	34.375%	Pass
61	1.1497	32	0.008%	11	0.003%	34.375%	Pass
62	1.1670	30	0.008%	11	0.003%	36.667%	Pass
63	1.1843	29	0.007%	9	0.002%	31.034%	Pass
64	1.2016	29	0.007%	8	0.002%	27.586%	Pass
65	1.2189	27	0.007%	8	0.002%	29.630%	Pass
66	1.2362	25	0.006%	8	0.002%	32.000%	Pass
67	1.2535	24	0.006%	8	0.002%	33.333%	Pass
68	1.2708	20	0.005%	8	0.002%	40.000%	Pass
69	1.2881	19	0.005%	8	0.002%	42.105%	Pass
70	1.3054	18	0.005%	8	0.002%	44.444%	Pass
71	1.3227	18	0.005%	7	0.002%	38.889%	Pass
72	1.3399	18	0.005%	7	0.002%	38.889%	Pass
73	1.3572	18	0.005%	7	0.002%	38.889%	Pass
74	1.3745	17	0.004%	7	0.002%	41.176%	Pass
75	1.3918	17	0.004%	7	0.002%	41.176%	Pass
76	1.4091	17	0.004%	7	0.002%	41.176%	Pass
77	1.4264	15	0.004%	7	0.002%	46.667%	Pass
78	1.4437	15	0.004%	7	0.002%	46.667%	Pass
79	1.4610	15	0.004%	7	0.002%	46.667%	Pass
80	1.4783	15	0.004%	6	0.002%	40.000%	Pass
81	1.4956	13	0.003%	6	0.002%	46.154%	Pass
82	1.5129	11	0.003%	6	0.002%	54.545%	Pass
83	1.5302	10	0.003%	5	0.001%	50.000%	Pass
84	1.5474	9	0.002%	5	0.001%	55.556%	Pass

85	1.5647	9	0.002%	5	0.001%	55.556%	Pass
86	1.5820	8	0.002%	5	0.001%	62.500%	Pass
87	1.5993	7	0.002%	5	0.001%	71.429%	Pass
88	1.6166	7	0.002%	5	0.001%	71.429%	Pass
89	1.6339	6	0.002%	4	0.001%	66.667%	Pass
90	1.6512	6	0.002%	3	0.001%	50.000%	Pass
91	1.6685	5	0.001%	3	0.001%	60.000%	Pass
92	1.6858	5	0.001%	2	0.001%	40.000%	Pass
93	1.7031	5	0.001%	2	0.001%	40.000%	Pass
94	1.7204	5	0.001%	2	0.001%	40.000%	Pass
95	1.7377	5	0.001%	2	0.001%	40.000%	Pass
96	1.7549	5	0.001%	2	0.001%	40.000%	Pass
97	1.7722	5	0.001%	2	0.001%	40.000%	Pass
98	1.7895	4	0.001%	2	0.001%	50.000%	Pass
99	1.8068	4	0.001%	2	0.001%	50.000%	Pass
100	1.8241	4	0.001%	1	0.000%	25.000%	Pass

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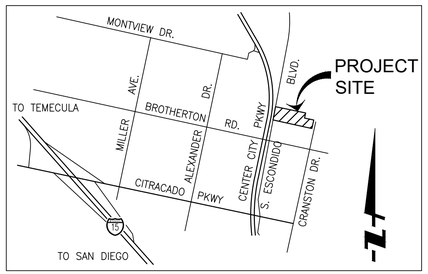
Use this checklist to ensure the required information has been included on the Hydromodification Management Exhibit:

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
- ☐Existing and proposed drainage boundary and drainage area to each POC (when necessary, create separate exhibits for pre-development and post-project conditions)
- ☐Structural BMPs for hydromodification management (identify location, type of BMP, and size/detail)



VICINITY MAP

N.T.S.

HYDROMODIFICATION SUMMARY

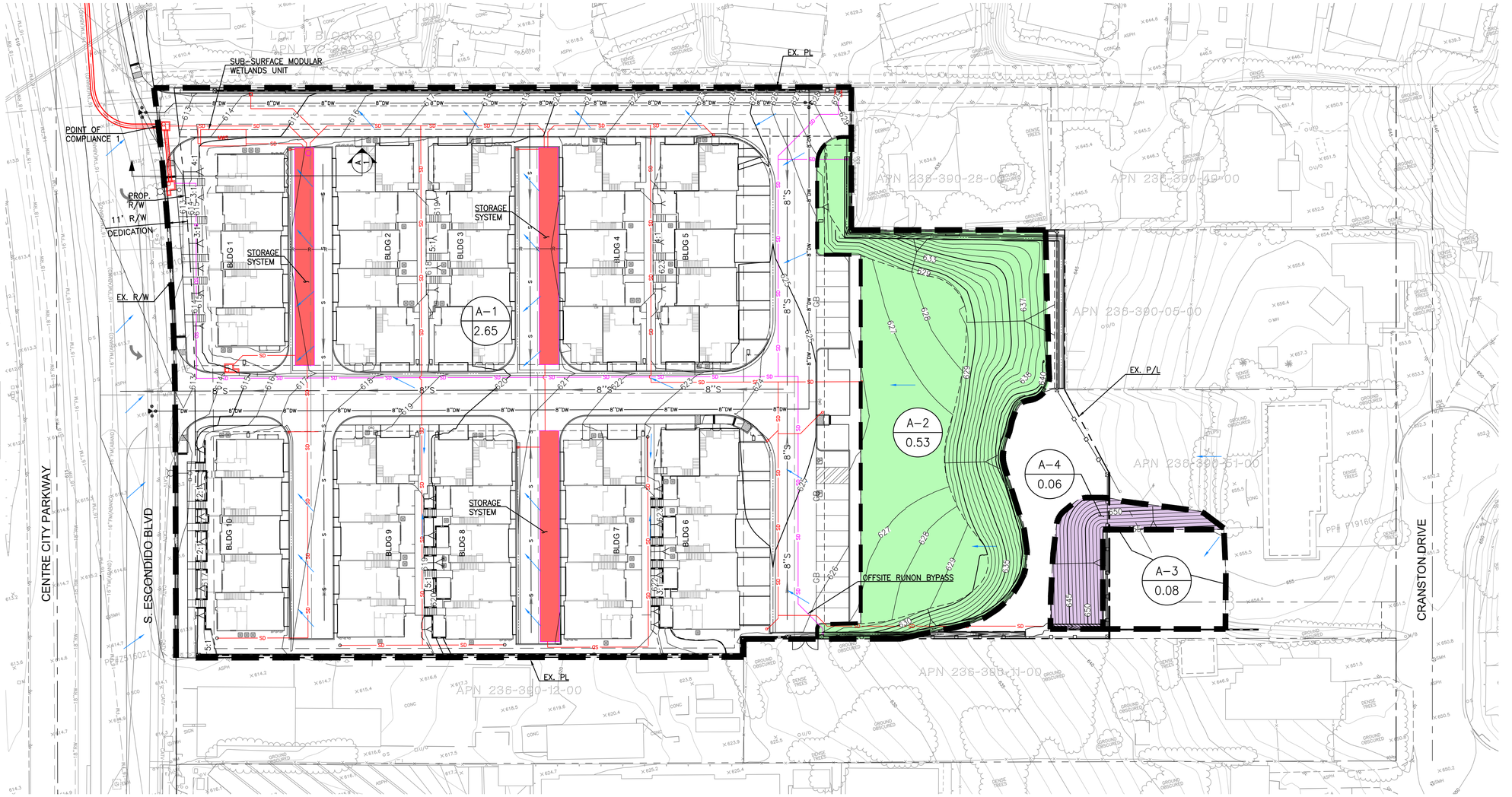
SITE ADDRESS: 2200 S. ESCONDIDO BOULEVARD, ESCONDIDO, CA 92025
PRIORITY DEVELOPMENT PROJECT (PDP)
SITE TOTAL ACREAGE: 3.47± AC; TOTAL DISTURBED AREA= 3.32± AC
NRCS SOIL TYPE: C; 85-PERCENTILE STORM DEPTH: 0.8in
APPROXIMATE DEPTH TO GROUNDWATER: 25ft

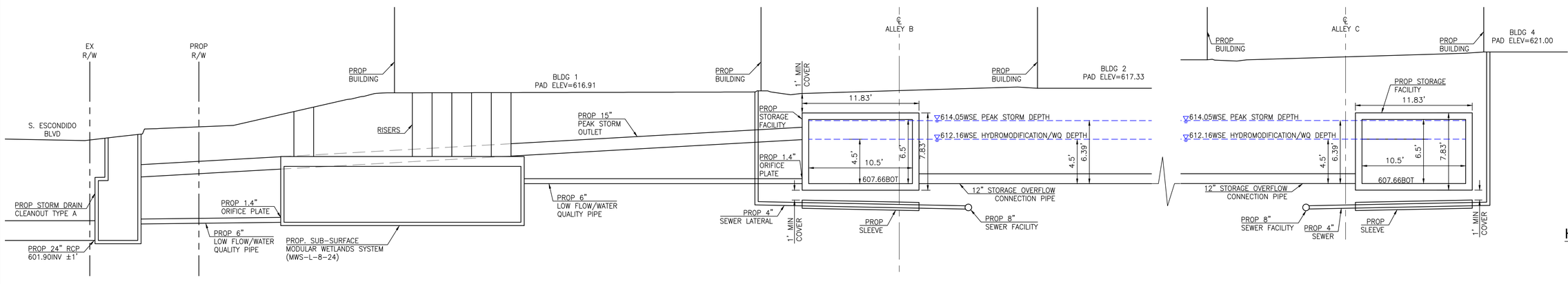
DMA	A-1	A-2	A-3	A-4
BMP TYPE	3 - 10.5'W x 6.5'H STORAGE FACILITY (BMP ID NO. 2)			SELF-MITIGATING
$V_{PROPOSED}$	15,139ft^3			
0.1Q_2 THRESHOLD	0.112cfs			
ORIFICE DIAMETER	1.4"			

PROPOSED STORAGE CAPACITY:
CROSS-SECTION AREA OF STORAGE FACILITY= W x H= 10.5ft x 4.5ft = 47.25ft^2
STORAGE FACILITY VOLUME= 47.25ft^2 x L x C= 47.25ft^2 x 360ft x 0.89 = 15,139ft^3
W = WIDTH OF STORAGE FACILITY
H = HEIGHT FOR HYDROMODIFICATION MITIGATION
L = TOTAL LENGTH OF STORAGE FACILITIES
C = POROSITY

LEGEND

- EXISTING PROPERTY LINE
- MAJOR DRAINAGE AREA BOUNDARY
- MINOR DRAINAGE AREA BOUNDARY
- DIRECTION OF SURFACE FLOW
- A / 0.83 — DRAINAGE AREA NAME / ACREAGE
- PROPOSED LANDSCAPE
- PROPOSED SELF-MITIGATING DMA
- PROPOSED HYDROMODIFICATION STORAGE
- SD — PROPOSED STORM DRAIN
- SD — PROPOSED OFFSITE BYPASS STORM DRAIN
- PROPOSED INLET
- MWS — PROPOSED MODULAR WETLANDS UNIT

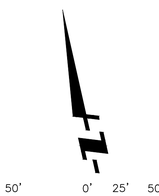




PROPOSED DRAINAGE SYSTEM CONCEPTUAL SECTION

1"=5'

A / 1



HYDROMODIFICATION MANAGEMENT PLAN

TSM NO. 20-006

X ENGINEERING & CONSULTING, INC.
6 Hutton Centre Drive, Suite 650
Santa Ana, California 92707
949.522.7100 | xengineeringinc.com

FLOW DIRECTION

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ATTACHMENT 3

Structural BMP Maintenance Information

This is the cover sheet for Attachment 3.

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	Contents	Checklist
Attachment 3a	Structural BMP Maintenance Plan (Required)	☐Included See Structural BMP Maintenance Information Checklist on the back of this Attachment cover sheet.
Attachment 3b	Draft Storm Water Control Facilities Maintenance Agreement (SWCFMA) (when applicable)	☐Included ☐Not Applicable

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

Attachment 3a must identify:

- ☐Specific maintenance indicators and actions for proposed structural BMP(s). This must be based on Section 7.7 of the Storm Water Design Manual and enhanced to reflect actual proposed components of the structural BMP(s)
- ☐How to access the structural BMP(s) to inspect and perform maintenance
- ☐Features that are provided to facilitate inspection (e.g., observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds)
- ☐Manufacturer and part number for proprietary parts of structural BMP(s) when applicable
- ☐Maintenance thresholds specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP)
- ☐Recommended equipment to perform maintenance
- ☐When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management

Attachment 3b: For all Structural BMPs, Attachment 3b must include a draft maintenance agreement in the City's standard format (PDP applicant to contact City staff to obtain the current maintenance agreement forms or download from City's website).

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ATTACHMENT 4

City of Escondido PDP Structural BMP Verification for Permitted Land Development Projects

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City of Escondido Storm Water Structural BMP Verification Form Page 1 of 4	
Project Summary Information	
Project Name	Escondido 3.4
Record ID (e.g., grading/improvement plan number)	TBD
Project Address	2222 S. ESCONDIDO BOULEVARD, ESCONDIDO, CA 92025
Assessor's Parcel Number(s) (APN(s))	236-390-02-00 / 236-390-03-00 / 236-390-52-00 236-390-53-00 / 236-390-54-00
Project Watershed (Complete Hydrologic Unit, Area, and Subarea Name with Numeric Identifier)	San Dieguito Watershed, Hodges (905.21), Del Dios
Maintenance Notification / Agreement No.	TBD
Responsible Party for Construction Phase	
Developer's Name	Warmington Residential (Contact: Greg Ocasek)
Address	3090 Pullman Street, Costa Mesa, CA 92626
Email Address	
Phone Number	714-557-5511
Engineer of Work	Eric Lissner, P.E. (X Engineering & Consulting, Inc.)
Engineer's Phone Number	949-522-7100
Responsible Party for Ongoing Maintenance	
Owner's Name(s)*	TBD
Address	
Email Address	
Phone Number	
*Note: If a corporation or LLC, provide information for principal partner or Agent for Service of Process. If an HOA, provide information for the Board or property manager at time of project closeout.	

City of Escondido Storm Water Structural BMP Verification Form Page 2 of 4				
Stormwater Structural Pollutant Control & Hydromodification Control BMPs* (List all from SWQMP)				
Description/Type of Structural BMP	**Plan Sheet #**	**Structural BMP ID#**	**Maintenance Agreement Recorded Doc #**	**Revisions**
Modular Wetland Unit	DMA	1	TBD	
Underground Storage Facility	DMA	2	TBD	
*All Priority Development Projects (PDPs) require a Structural BMP				

Note: If this is a partial verification of Structural BMPs, provide a list and map denoting Structural BMPs that have already been submitted, those for this submission, and those anticipated in future submissions.

City of Escondido Storm Structural BMP Verification Form Page 3 of 4

Checklist for Engineer of Work (EOW) to submit to Field Engineering:

- ☐ Copy of the final accepted SWQMP and any accepted addendum.
- ☐ Copy of the most current plan showing the Storm Water Structural BMP Table, plans/cross-section sheets of the Structural BMPs and the location of each verified as-built Structural BMP.
- ☐ Photograph of each Structural BMP.
- ☐ Photograph(s) of each Structural BMP during the construction process to illustrate proper construction.
- ☐ Copy of the approved Structural BMP maintenance agreement and associated security

By signing below, I certify that the Structural BMP(s) for this project have been constructed and all BMPs are in substantial conformance with the approved plans and applicable regulations. I understand the City reserves the right to inspect the above BMPs to verify compliance with the approved plans and Storm Water Ordinance. Should it be determined that the BMPs were not constructed to plan or code, corrective actions may be necessary before permits can be closed.

Please sign your name and seal.

Professional Engineer's Printed Name:

Eric Lissner, P.E.

[SEAL]

Professional Engineer's Signed Name:

Date: _____

City of Escondido Storm Water Structural BMP Verification Form Page 4 of 4

CITY - OFFICIAL USE ONLY:

Permit #:_____

City Inspector: _____

Date Project has/expects to close: _____

Date verification received from Engineer of Work (EOW): _____

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

City Inspector's Signature: _____Date: _____

FOR Environmental Programs:

Date Received from Field Engineering:_____

Environmental Programs Submittal Reviewer:_____

Environmental Programs Reviewer concurs that the information provided for the following Structural BMPs is acceptable to enter into the Structural BMP Maintenance verification inventory:

List **acceptable** Structural BMPs:

Environmental Programs Reviewer's Signature: _____

Date: _____

ATTACHMENT 5

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

This is the cover sheet for Attachment 5.

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

The plans must identify:

☐Structural BMP(s) with ID numbers matching Step 6 Summary of PDP Structural BMPs
☐The grading and drainage design shown on the plans must be consistent with the delineation of DMAs shown on the DMA exhibit
☐Details and specifications for construction of structural BMP(s)
☐Signage indicating the location and boundary of structural BMP(s) as required by City staff
☐How to access the structural BMP(s) to inspect and perform maintenance
☐Features that are provided to facilitate inspection (e.g., observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds)
☐Manufacturer and part number for proprietary parts of structural BMP(s) when applicable
☐Maintenance thresholds specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP)
☐Recommended equipment to perform maintenance
☐When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management
☐Include landscaping plan sheets showing vegetation requirements for vegetated structural BMP(s)
☐All BMPs must be fully dimensioned on the plans
☐When proprietary BMPs are used, site-specific cross section with outflow, inflow, and model number must be provided. Photocopies of general brochures are not acceptable.
☐Include all source control and site design measures described in Steps 4 and 5 of the SWQMP. Can be included as a separate exhibit as necessary.

***Note: Plan sheets included in this attachment can be full size or half size.**

TENTATIVE SUBDIVISION MAP
SUB20-0006

FOR CONDOMINIUM PURPOSES
CITY OF ESCONDIDO, CALIFORNIA

LEGAL DESCRIPTION

THE TITLE DESCRIPTION AND SCHEDULE B ITEMS HEREON ARE FROM CHICAGO TITLE COMPANY, PRELIMINARY REPORT ORDER NO.: 73718008333-RCM, DATED: AUGUST 23, 2018.

THE LAND REFERRED TO HEREIN BELOW IS SITUATED IN THE CITY OF ESCONDIDO, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, AND IS DESCRIBED AS FOLLOWS:

PARCEL 1:

ALL THAT PORTION OF LOT 2 IN BLOCK 30 OF HOMELAND ACRES ADDITION TO ESCONDIDO NO. 2, IN THE CITY OF ESCONDIDO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 1241, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MARCH 11, 1910, DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHWESTERLY CORNER OF THE EASTERLY 182.58 FEET OF THE NORTHERLY 167.07 FEET OF SAID LOT 2 IN BLOCK 30; THENCE ALONG THE WESTERLY BOUNDARY OF THE EASTERLY 182.58 FEET OF SAID LOT 2, NORTH 12°15'19" EAST 88.24 FEET TO A POINT IN THE SOUTHERLY BOUNDARY OF THE NORTHERLY 78.83 OF SAID LOT 2, THENCE ALONG SAID SOUTHERLY BOUNDARY OF SAID NORTHERLY 78.83 FEET, NORTH 77°48'46" WEST 176.92 FEET TO THE WESTERLY BOUNDARY OF THE EASTERLY 359.50 FEET OF SAID LOT 2; THENCE ALONG SAID WESTERLY BOUNDARY, SOUTH 12°15'19" WEST 225.32 FEET TO A POINT IN THE NORTHELRY BOUNDARY OF THE SOUTHERLY 10.00 FEET OF THE NORTHERLY 314.15 FEET OF SAID LOT 2; THENCE ALONG SAID NORTHERLY BOUNDARY SOUTH 77°48'46" EAST 359.50 FEET TO THE EASTERLY BOUNDARY OF SAID LOT 2; THENCE NORTHERLY ALONG SAID EASTERLY BOUNDARY NORTH 12°15'19" EAST 20.00 FEET; THENCE PARALLEL WITH THE NORTHERLY BOUNDARY OF SAID LOT 2 NORTH 77°48'46" WEST 120.00 FEET; THENCE NORTH 15°53'04" WEST 132.69 FEET, MORE OR LESS TO THE POINT OF BEGINNING.

ALSO KNOWN AS PARCEL B OF CERTIFICATE OF COMPLIANCE RECORDED JUNE 25, 2001 AS DOCUMENT NO. 2001-0426059 OF OFFICIAL RECORDS.

PARCEL 2:

THE SOUTHERLY 117.66 FEET OF THE NORTHERLY 196.49 FEET OF LOT 2 IN BLOCK 30 OF HOMELAND ACRES ADDITION TO ESCONDIDO NO. 2, IN THE CITY OF ESCONDIDO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 1241, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MARCH 11, 1910.

EXCEPTING THEREFROM THE EASTERLY 359.50 FEET THEREOF.

ALSO EXCEPTING THEREFROM THAT PORTION GRANTED TO THE STATE OF CALIFORNIA IN GRANT DEED RECORDED MAY 6, 1948 IN BOOK 2786, PAGE 11 OF OFFICIAL RECORDS.

ALSO KNOWN AS PARCEL C OF CERTIFICATE OF COMPLIANCE RECORDED JUNE 25, 2001 AS DOCUMENT NO. 2001-0426060 OF OFFICIAL RECORDS.

PARCEL 3:

THE SOUTHERLY 117.66 FEET OF THE NORTHERLY 314.15 FEET OF LOT 2 IN BLOCK 30 OF HOMELAND ACRES ADDITION TO ESCONDIDO NO. 2, IN THE CITY OF ESCONDIDO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 1241, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MARCH 11, 1910.

EXCEPTING THEREFROM THE EASTERLY 359.50 FEET THEREOF.

ALSO EXCEPTING THEREFROM THAT PORTION GRANTED TO THE STATE OF CALIFORNIA IN GRANT DEED RECORDED MAY 6, 1948 IN BOOK 2786, PAGE 11 OF OFFICIAL RECORDS.

ALSO KNOWN AS PARCEL D OF CERTIFICATE OF COMPLIANCE RECORDED JUNE 25, 2001 AS DOCUMENT NO. 2001-0426061 OF OFFICIAL RECORDS.

ASSESSOR'S PARCEL NUMBERS: 236-390-52-00, 236-390-53-00, 236-390-54-00

STREET ADDRESSES: 2210 S. ESCONDIDO BLVD., ESCONDIDO, CA
2222 S. ESCONDIDO BLVD., ESCONDIDO, CA
2224 S. ESCONDIDO BLVD., ESCONDIDO, CA.

PARCEL A:

ALL THAT PORTION OF LOT 2, BLOCK 30 OF HOMELAND ACRES ADDITION TO ESCONDIDO NO. 2, IN THE CITY OF ESCONDIDO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 1241, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MARCH 11, 1910.

COMMENCING AT THE NORTHWESTERLY CORNER OF SAID LOT 2, THENCE EASTERLY ALONG THE NORTHERLY LINE OF SAID LOT, A DISTANCE OF 220.54 FEET TO THE TRUE POINT OF BEGINNING, BEING THE NORTHEASTERLY CORNER OF A PARCEL OF LAND CONVEYED TO EVA PIPER BY DEED DATED APRIL 9, 1941 AND RECORDED IN BOOK 1160, PAGE 493 OF OFFICIAL RECORDS; THENCE CONTINUING EASTERLY ALONG SAID NORTHERLY LINE OF LOT 2, A DISTANCE OF 200 FEET; THENCE SOUTHERLY PARALLEL WITH THE EASTERLY LINE OF SAID LOT 2, A DISTANCE OF 78.83 FEET; THENCE WESTERLY PARALLEL WITH THE NORTHERLY LINE OF SAID LOT, A DISTANCE OF 200.00 FEET; THENCE NORTHERLY ALONG THE EASTERLY LINE OF THE AFOREMENTIONED LAND CONVEYED TO PIPER, A DISTANCE OF 78.83 FEET TO THE TRUE POINT OF BEGINNING.

PARCEL B:

AN EASEMENT FOR ROAD PURPOSES OVER THE NORTHERLY 10 FEET OF THE WESTERLY 220.54 FEET OF SAID LOT 2, BLOCK 30 OF HOMELAND ACRES ADDITION TO ESCONDIDO NO. 2, IN THE CITY OF ESCONDIDO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 1241, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MARCH 11, 1910.

EXCEPTING THEREFROM THAT PORTION THEREOF CONVEYED TO THE STATE OF CALIFORNIA, BY DEED RECORDED FEBRUARY 24, 1948 IN BOOK 2681, PAGE 311 OF OFFICIAL RECORDS.

ASSESSOR'S PARCEL NUMBER: 236-390-03-00

STREET ADDRESSES: 2208 S. ESCONDIDO BLVD., ESCONDIDO, CA.

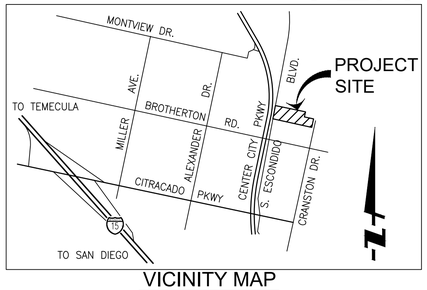
THAT PORTION OF LOT 2, BLOCK 30 OF HOMELAND ACRES ADDITION TO ESCONDIDO, NO. 2, IN THE CITY OF ESCONDIDO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 1241, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MARCH 11, 1910, DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHWEST CORNER OF SAID LOT 2, BLOCK 30 RUNNING THENCE IN AN EASTERLY DIRECTION ON THE NORTHERLY LINE OF SAID LOT A DISTANCE OF 220.54 FEET TO A POINT IN SAID NORTHERLY LINE; THENCE SOUTHERLY PARALLEL TO THE WESTERLY LINE OF SAID LOT A DISTANCE OF 78.83 FEET; THENCE WESTERLY ON A LINE PARALLEL WITH THE NORTHERLY LINE OF SAID LOT A DISTANCE OF 220.54 FEET TO THE WESTERLY LINE OF SAID LOT; THENCE NORTHERLY A DISTANCE OF 78.83 FEET TO THE POINT OF BEGINNING.

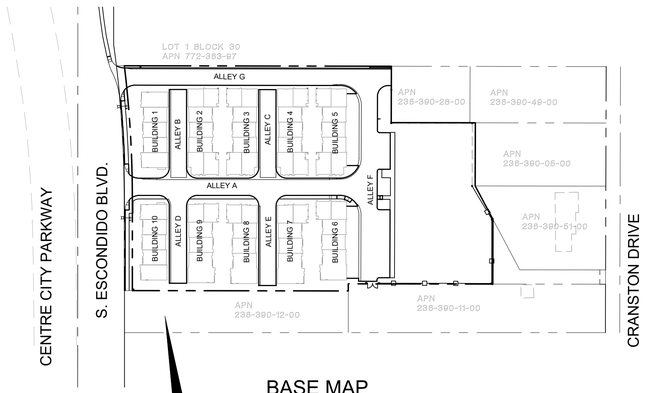
EXCEPTING THEREFROM THAT PORTION THEREOF CONVEYED TO THE STATE OF CALIFORNIA BE DEED RECORDED FEBRUARY 24, 1948 IN BOOK 2681, PAGE 311 OF OFFICIAL RECORDS.

ASSESSOR'S PARCEL NUMBER: 236-390-02-00

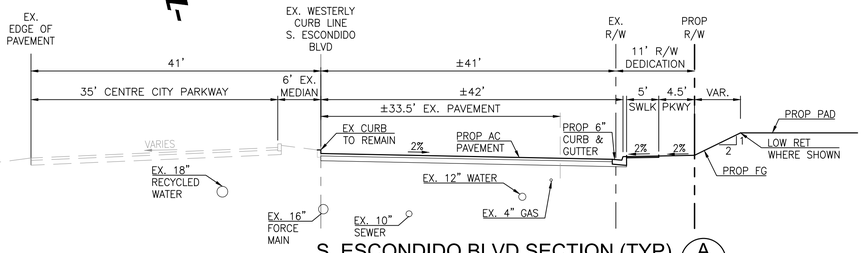
STREET ADDRESSES: 2200 S. ESCONDIDO BLVD., ESCONDIDO, CA.



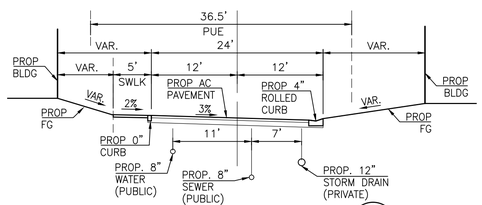
VICINITY MAP
N.T.S.



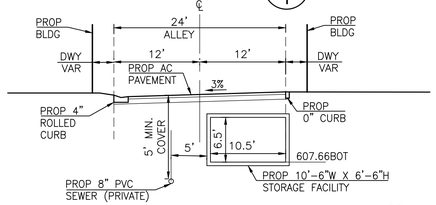
BASE MAP
1"=100'



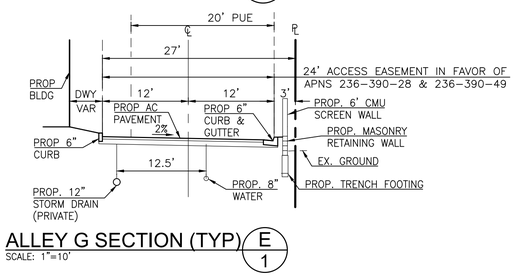
S. ESCONDIDO BLVD SECTION (TYP) A/1
SCALE: 1"=10' NOTE: NO LEGAL ℄ WAS FOUND.



ALLEY A SECTION (TYP) B/1
SCALE: 1"=10'



ALLEY C & E SECTION (TYP) C/1
SCALE: 1"=10'



ALLEY G SECTION (TYP) E/1
SCALE: 1"=10'

UTILITY PURVEYORS

GAS & ELECTRIC:	SAN DIEGO GAS AND ELECTRIC 800-411-7343
WATER:	CITY OF ESCONDIDO 761-839-4657
SEWER:	CITY OF ESCONDIDO 760-839-4657
STORM DRAIN:	CITY OF ESCONDIDO 760-839-4880
FIRE:	CITY OF ESCONDIDO 760-839-5400

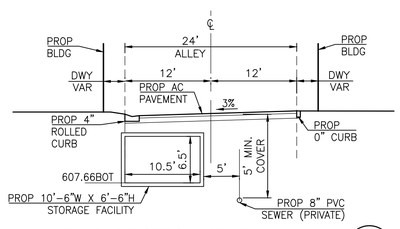
PROPERTY OWNERSHIP

APN:	236-390-02-00
OWNER:	NATHANIEL JOSEPH WULFF
APN:	236-390-03-00
OWNER:	DAVID SMITH & JEANNIE SMITH
APN:	236-390-52-00
OWNER:	ETEM FRANK J 1985 TRUST A/B, ANN MAIORIELLO
APN:	236-390-53-00
OWNER:	ETEM FRANK J 1985 TRUST A/B, ANN MAIORIELLO
APN:	236-390-54-00
OWNER:	ETEM FRANK J 1985 TRUST A/B, ANN MAIORIELLO

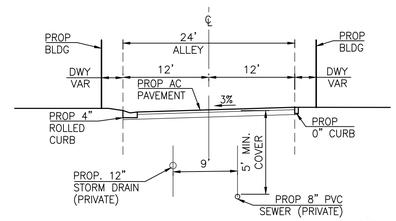
OWNER'S CERTIFICATE

I (WE) HEREBY CERTIFY THAT I (WE) AM (ARE) THE RECORD OWNER OF THE PROPERTY SHOWN ON THE TENTATIVE SUBDIVISION MAP AND THAT SAID MAP SHOWS ALL MY (OUR) CONTIGUOUS OWNERSHIP IN WHICH I (WE) HAVE ANY DEED OR TRUST INTEREST. I (WE) UNDERSTAND THAT MY (OUR) PROPERTY IS CONSIDERED CONTIGUOUS EVEN IF IT IS SEPARATED BY ROADS, STREETS, EASEMENTS, OR RAILROAD RIGHTS-OF-WAY.

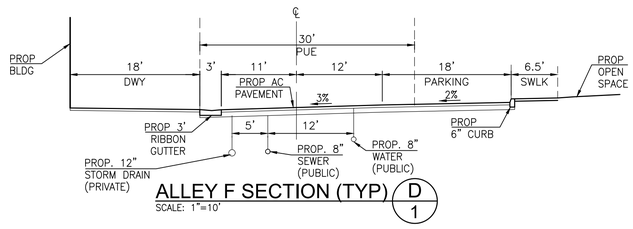
(SIGNATURE)



ALLEY B SECTION (TYP) G/1
SCALE: 1"=10'



ALLEY D SECTION (TYP) H/1
SCALE: 1"=10'



ALLEY F SECTION (TYP) D/1
SCALE: 1"=10'

BASIS OF BEARINGS

THE BASIS OF BEARINGS FOR THIS SURVEY IS THE SOUTH LINE OF LOT 2, BLOCK 30 PER ROS 17273 AND PM 755 ON FILE IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, STATE OF CALIFORNIA, SHOWN HEREON AS SOUTH 77°54'35" EAST.

BENCHMARK

ELEVATIONS FOR THIS SURVEY ARE DERIVED FROM CITY OF ESCONDIDO BENCHMARK NO. 303 DESCRIBED AS: SQUARE CUT ON NW CORNER OF DRAINAGE STRUCTURE S.E. CORNER OF ESCONDIDO BOULEVARD AND BROTHERTON ROAD.
NGVD 1929 ELEVATION = 615.60

TOPOGRAPHIC SOURCE

THE TOPOGRAPHY SHOWN HEREON IS BASED ON AERIAL PHOTOGRAPHY DATED 1/20/2019, COMPILED BY ARROWHEAD MAPPING CORPORATION, JOB NUMBER AMC 19-103.

ASSESSOR PARCEL NUMBERS

236-390-02-00
236-390-03-00
236-390-52-00
236-390-53-00
236-390-54-00

FEMA FLOOD ZONE

THE SITE IS LOCATED IN FLOOD ZONE X, AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN, PER FIRM 06073C1077G.

EXISTING SITE INFORMATION

CITY:	ESCONDIDO
EXISTING AND PROPOSED ZONING:	SPECIFIC PLAN
SPECIFIC PLAN:	SOUTH CENTRE CITY SPECIFIC PLAN
PLANNING AREA:	SOUTHERN ENTRY MIXED USE OVERLAY

DEVELOPMENT STANDARDS

BUILDING COVERAGE:	NONE
FRONT YARD SETBACK:	10'
SIDE YARD SETBACK:	5'
REAR YARD SETBACK:	15'
REQUIRED GARAGE PARKING:	2 SPACES/DU
REQUIRED GUEST PARKING:	0.25 SPACES/DU

SITE ADDRESSES

2200 SOUTH ESCONDIDO BLVD., ESCONDIDO, CA
2208 SOUTH ESCONDIDO BLVD., ESCONDIDO, CA.
2210 SOUTH ESCONDIDO BLVD., ESCONDIDO, CA
2222 SOUTH ESCONDIDO BLVD., ESCONDIDO, CA
2224 SOUTH ESCONDIDO BLVD., ESCONDIDO, CA

CIVIL ENGINEER

X ENGINEERING & CONSULTING, INC.
6 HUTTON CENTRE DR., SUITE 650,
SANTA ANA, CA 92707
TEL: 949-522-7100

CONTACT: ERIC LISSNER, P.E.

DEVELOPER

WARMINGTON RESIDENTIAL
3090 PULLMAN STREET
COSTA MESA, CA 92626
TEL: 714-557-5511

CONTACT: GREG OCASEK

GEOTECHNICAL ENGINEER

LEIGHTON AND ASSOCIATES, INC.
17781 COWAN
IRVINE, CA 92614
TEL: 949.250.1421

CONTACT: JEFF L. HULL, CEG 2056

LOT ACREAGE

GROSS ACREAGE:	3.47 AC
NET ACREAGE:	3.39 AC

*ACREAGES EXCLUSIVE OF POTENTIAL BOUNDARY ADJUSTMENTS

SHEET INDEX

BUILDING AND LOT TABLE

BUILDING #	UNIT #s	LOT #
1	101–105	1
2	201–207	1
3	301–307	1
4	401–407	1
5	501–507	1
6	601–606	1
7	701–706	1
8	801–806	1
9	901–906	1
10	1001–1005	1
TOTAL UNITS	62	

NOTE:
PROJECT PROPOSES CONSOLIDATION OF FIVE PARCELS INTO ONE LOT.

ESTIMATED GRADING QUANTITIES

	CUT (CY)	FILL (CY)
RAW	7,450	9,290
ADDITIONAL EXCAVATION	24,000	24,000
BULKING (5%)*	1,572	
TOTALS	33,022	33,290
268 CY NET IMPORT		

* TO BE CONFIRMED IN GEOTECHNICAL REVIEW OF GRADING PLANS.

ESCONDIDO
City of Choice

PREPARED BY:

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Santa Ana, California 92707
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REGISTERED PROFESSIONAL ENGINEER
ERIC LISSNER
NO. 84264
CIVIL
STATE OF CALIFORNIA

TITLE SHEET
TENTATIVE SUBDIVISION MAP SUB20-0006
CITY OF ESCONDIDO, CALIFORNIA

SHEET 1 OF 8

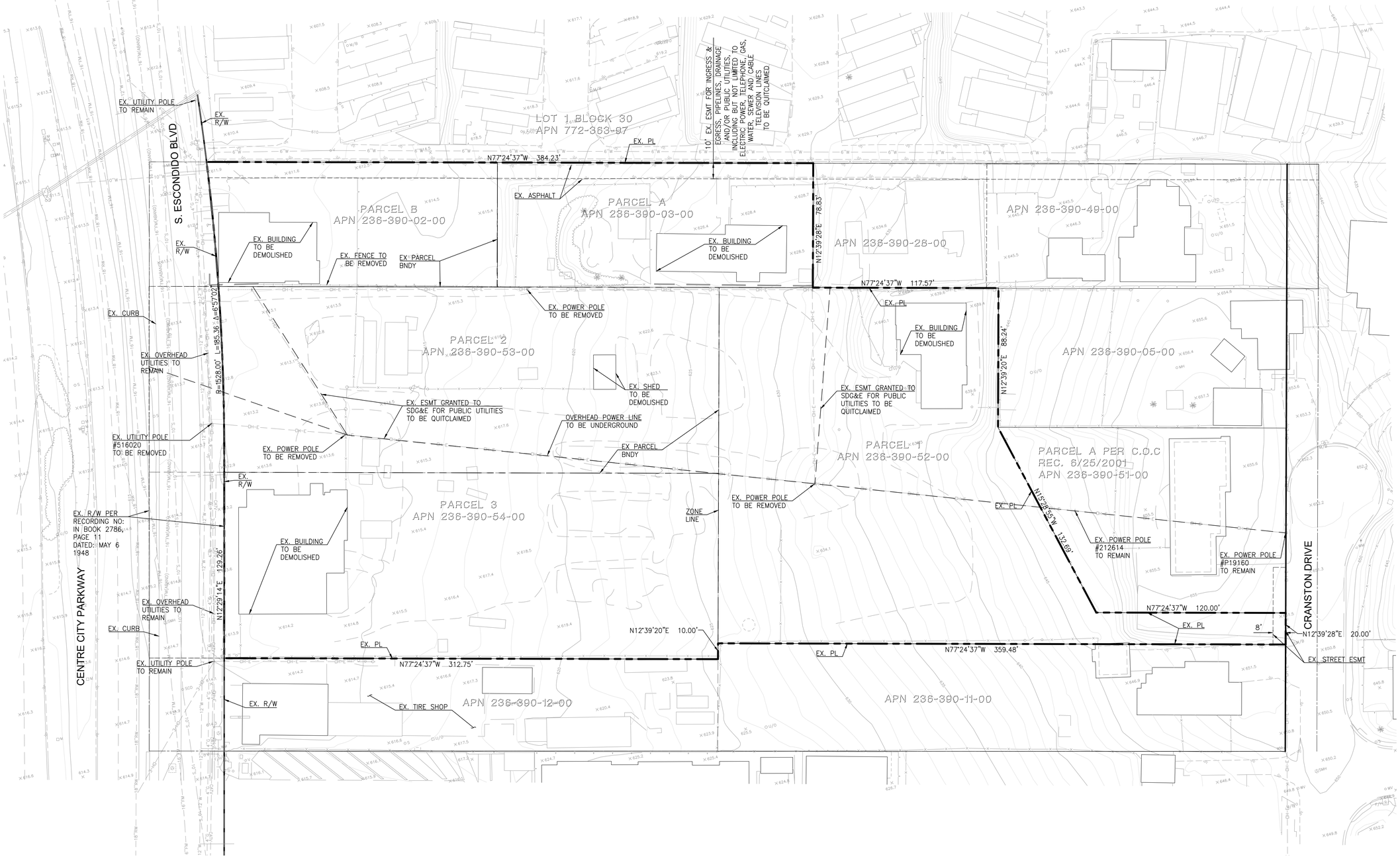
P:\101\003\Plans\Entitlement\TM\101-003-tm01ts.dwg Plotted At: February 16, 2021 11:55 AM Last Saved By: ChristopherShyy Last Saved At: February 12, 2021 11:53 AM

LEGEND

- EXISTING RIGHT-OF-WAY
- EXISTING PROPERTY LINE
- STREET CENTERLINE
- EXISTING EASEMENT

ABBREVIATIONS

BLVD	BOULEVARD
℄/CL	CENTERLINE
DW	DOMESTIC WATER
DWG	DRAWING
E	ELEVATION
ESMT	EASEMENT
EX	EXISTING
OH-E	OVERHEAD ELECTRIC
SDG&E	SAN DIEGO GAS & ELECTRIC



30' 0' 15' 30'

SCALE: 1" = 30'

ESCONDIDO
City of Choice

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Santa Ana, California 92707
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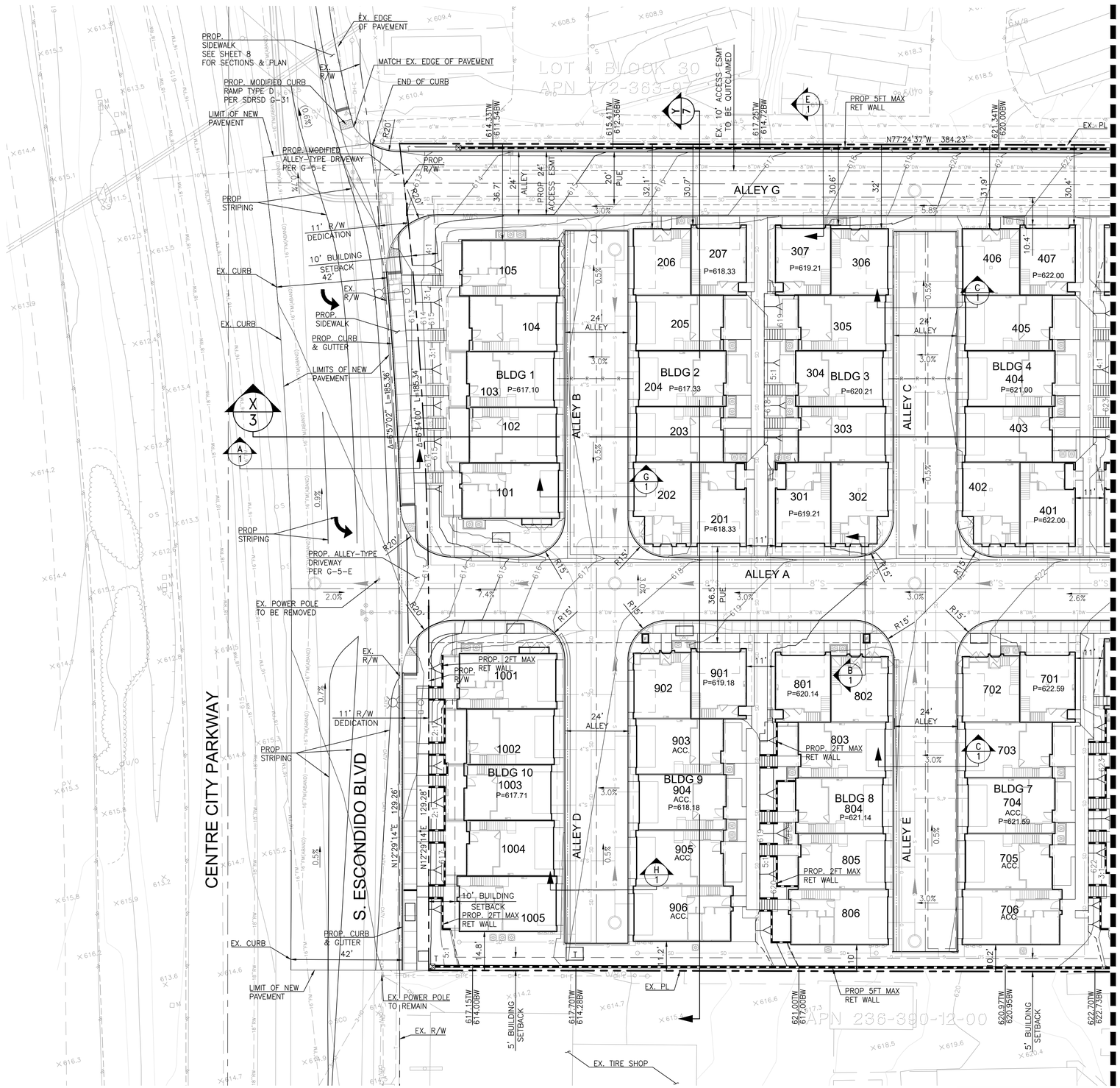
EXISTING CONDITION MAP
TENTATIVE SUBDIVISION MAP SUB20-0006
CITY OF ESCONDIDO, CALIFORNIA

SHEET 2 OF 8

P:\101\003\Plans\Entitlement\TM\101-003-tm02ex.dwg Plotted At: February 16, 2021 11:55 AM Last Saved By: Christopher Shy Last Saved At: December 1, 2020 4:40 PM



ABBREVIATIONS

ACC	ACCESSIBLE
BLVD	BOULEVARD
BW	FINISHED BOTTOM OF WALL
℄/CL	CENTERLINE
DW	DOMESTIC WATER
DWG	DRAWING
E	ELEVATION
ESMT	EASEMENT
EX	EXISTING
HYDROMOD	HYDROMODIFICATION
LAT	LATERAL
MIN	MINIMUM
NTS	NOT TO SCALE
PL	PROPERTY LINE
PROP	PROPOSED
PVC	POLYVINYL CHLORIDE
PUE	PUBLIC UTILITY EASEMENT
R/W	RIGHT OF WAY
S, SS	SEWER
SD	STORM DRAIN
SDRSD	SAN DIEGO REGIONAL STANDARD DRAWINGS
ST	STREET
T	ELECTRICAL TRANSFORMER
TYP	TYPICAL
TW	FINISHED GRADE TOP OF WALL

LEGEND

- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- EXISTING PROPERTY LINE
- STREET CENTERLINE
- EXISTING AND PROPOSED EASEMENT
- PROPOSED DOMESTIC WATER (PUBLIC)
- PROPOSED SEWER (PRIVATE)
- PROPOSED SEWER (PUBLIC)
- PROPOSED SEWER MANHOLE PER CITY OF ESCONDIDO STD. DWG S-1-E
- PROPOSED STORM DRAIN (PRIVATE)
- PROPOSED 2" WATER METER PER ESCONDIDO STD. DWG W-2-E & BACKFLOW PREVENTER PER STD. DWG W-10-E
- 62 PROPOSED UNIT NUMBER
- PROPOSED FIRE HYDRANT PER CITY OF ESCONDIDO STD. DWG W-3-E
- PROPOSED DRAINAGE STORAGE FACILITY (PRIVATE)
- PROPOSED CURB INLET TYPE B PER SDRSD. DWG. D-02
- PROPOSED 12" X 12" BROOKS BOX CATCH BASIN (PRIVATE)
- PROPOSED 12" X 12" GRATE INLET
- MWS SUB-SURFACE MODULAR WETLANDS UNIT
- T PROPOSED ELECTRICAL TRANSFORMER
- PROPOSED MANSORY RETAINING WALL
- DAYLIGHT LINE
- 100 PROPOSED ELEVATION
- 100 EXISTING ELEVATION
- RIDGE LINE

20' 0' 10' 20'

SCALE: 1" = 20'

ESCONDIDO City of Choice

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TENTATIVE SUBDIVISION MAP
TENTATIVE SUBDIVISION MAP SUB20-0006
CITY OF ESCONDIDO, CALIFORNIA

SHEET 3 OF 8

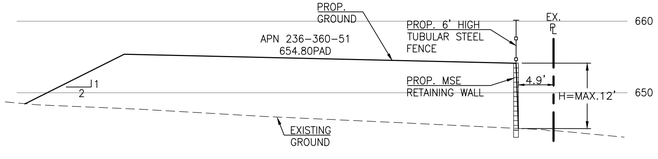
P:\101\003\Plans\Entitlement\TTM\101-003-1tm03tm.dwg Plotted At: February 17, 2021 8:32 AM Last Saved By: Christopher.Shay Last Saved At: February 17, 2021 8:32 AM

ABBREVIATIONS

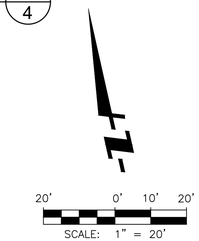
BLVD	BOULEVARD
BW	FINISHED GRADE AT BOTTOM OF WALL
℄/CL	CENTERLINE
DW	DOMESTIC WATER
DWG	DRAWING
E	ELEVATION
ESMT	EASEMENT
EX	EXISTING
HYDROMOD	HYDROMODIFICATION
LAT	LATERAL
MIN	MINIMUM
MSE	MECHANICALLY STABILIZED EARTH
NTS	NOT TO SCALE
PL	PROPERTY LINE
PROP	PROPOSED
PVC	POLYVINYL CHLORIDE
PUE	PUBLIC UTILITY EASEMENT
R/W	RIGHT OF WAY
S, SS	SEWER
SD	STORM DRAIN
SDRSD	SAN DIEGO REGIONAL STANDARD DRAWINGS
ST	STREET
T	ELECTRICAL TRANSFORMER
TYP	TYPICAL
TW	FINISHED GRADE AT TOP OF WALL

LEGEND

- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- EXISTING PROPERTY LINE
- STREET CENTERLINE
- EXISTING AND PROPOSED EASEMENT
- PROPOSED DOMESTIC WATER (PUBLIC)
- PROPOSED SEWER (PRIVATE)
- PROPOSED SEWER (PUBLIC)
- PROPOSED SEWER MANHOLE PER CITY OF ESCONDIDO STD. DWG S-1-E
- PROPOSED STORM DRAIN (PRIVATE)
- PROPOSED 2" WATER METER PER ESCONDIDO STD. DWG W-2-E & BACKFLOW PREVENTER PER STD. DWG W-10-E
- 62 PROPOSED UNIT NUMBER
- PROPOSED FIRE HYDRANT PER CITY OF ESCONDIDO STD. DWG W-3-E
- PROPOSED CURB INLET TYPE C PER SDRSD. DWG. D-03A (PRIVATE)
- PROPOSED 12" X 12" GRATE INLET
- T PROPOSED ELECTRICAL TRANSFORMER
- PROPOSED MANSORY RETAINING WALL
- PROPOSED CMU MANSORY WALL PER LANDSCAPE PLANS
- PROPOSED TUBULAR FENCE PER LANDSCAPE PLANS
- PROPOSED PILASTER PER LANDSCAPE PLANS
- DAYLIGHT LINE
- 100 PROPOSED ELEVATION
- 100 EXISTING ELEVATION
- GB GRADE BREAK



SECTION A
1"=10'
A
4



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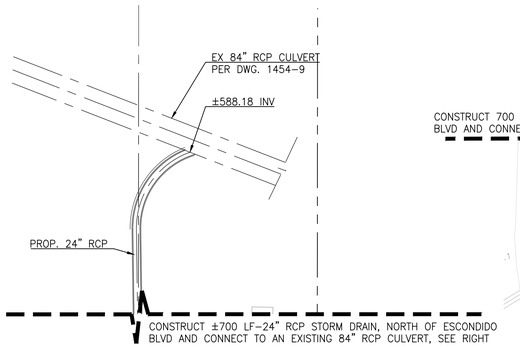
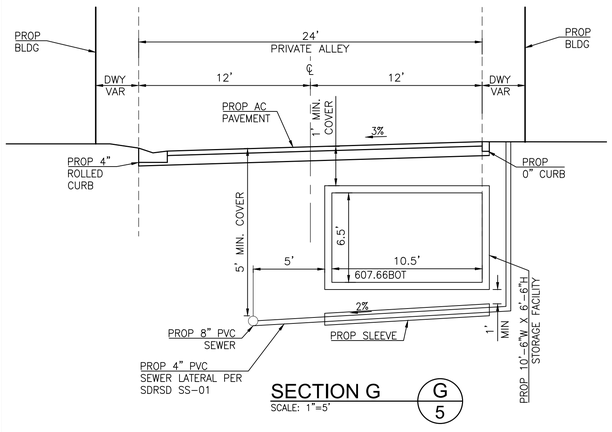
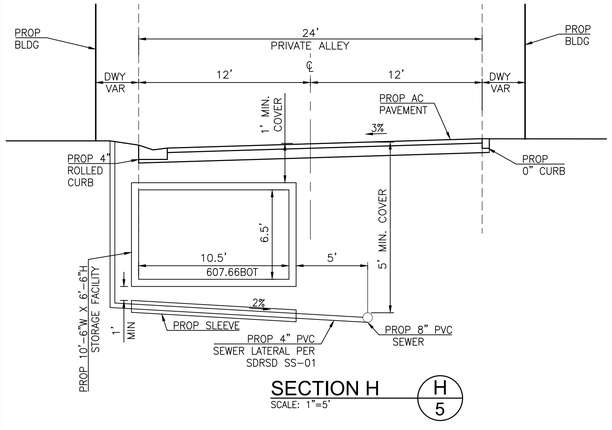
TENTATIVE SUBDIVISION MAP
TENTATIVE SUBDIVISION MAP SUB20-0006
CITY OF ESCONDIDO, CALIFORNIA

SHEET 4 OF 8

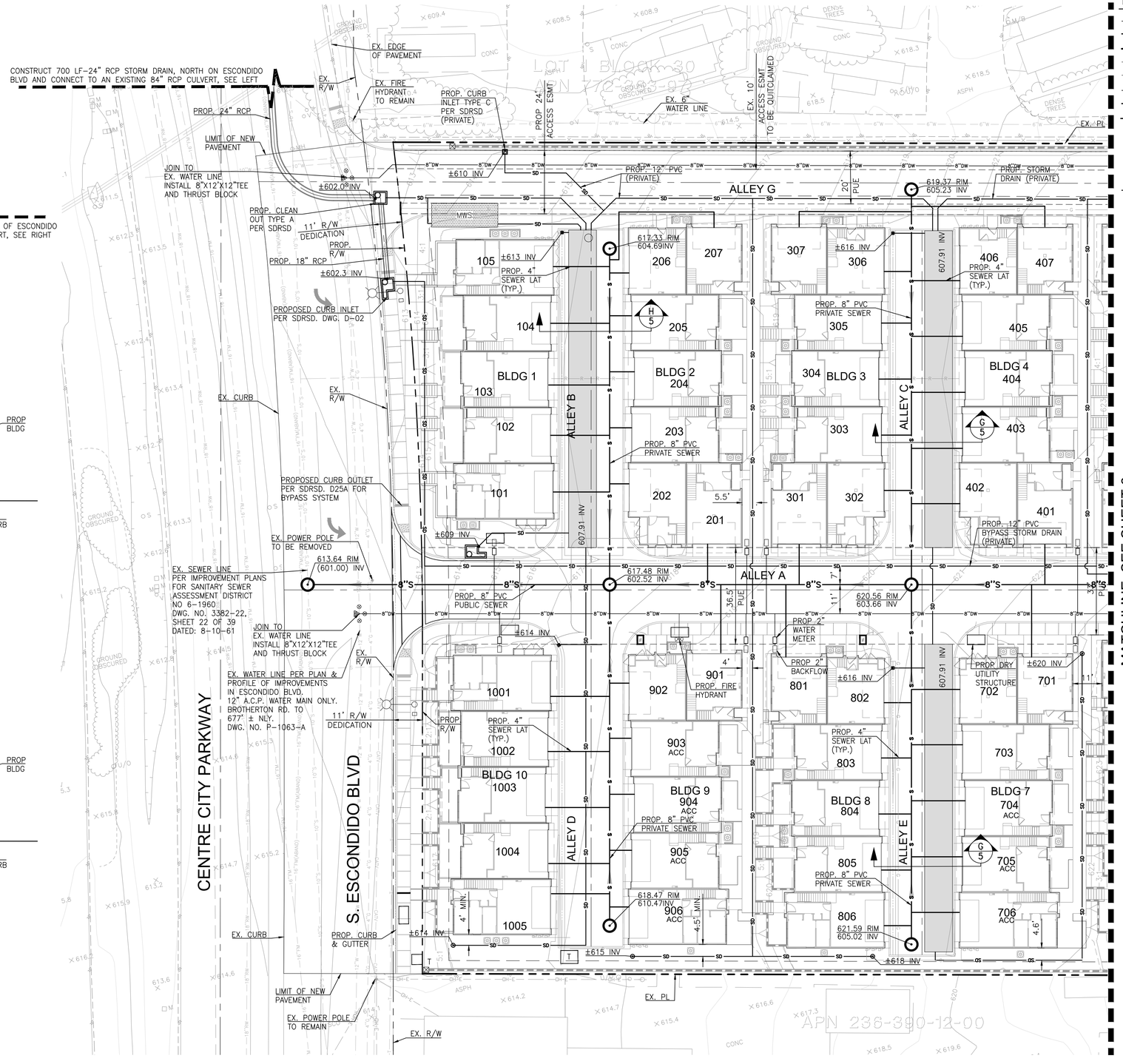




SECTION G (G/5)
SCALE: 1"=5'



SECTION H (H/5)
SCALE: 1"=5'



LEGEND

- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- EXISTING PROPERTY LINE
- STREET CENTERLINE
- EXISTING AND PROPOSED EASEMENT
- PROPOSED DOMESTIC WATER (PUBLIC)
- PROPOSED SEWER (PRIVATE)
- 8"S — PROPOSED SEWER (PUBLIC)
- PROPOSED SEWER MANHOLE PER CITY OF ESCONDIDO STD. DWG S-1-E
- SD — PROPOSED STORM DRAIN (PRIVATE)
- PROPOSED 2" WATER METER PER ESCONDIDO STD. DWG W-2-E & BACKFLOW PREVENTER PER STD. DWG W-10-E
- 62 — PROPOSED UNIT NUMBER
- PROPOSED FIRE HYDRANT PER CITY OF ESCONDIDO STD. DWG W-3-E
- PROPOSED DRAINAGE STORAGE FACILITY (PRIVATE)
- PROPOSED CURB INLET TYPE B PER SDRSD. DWG. D-02
- PROPOSED 12" X 12" BROOKS BOX CATCH BASIN (PRIVATE)
- PROPOSED 12" X 12" GRATE INLET
- MWS — SUB-SURFACE MODULAR WETLANDS UNIT
- T — PROPOSED ELECTRICAL TRANSFORMER

ABBREVIATIONS

ACC	ACCESSIBLE
BLVD	BOULEVARD
℄/CL	CENTERLINE
DW	DOMESTIC WATER
DWG	DRAWING
E	ELEVATION
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PVC	POLYVINYL CHLORIDE
PUE	PUBLIC UTILITY EASEMENT
R/W	RIGHT OF WAY
S, SS	SEWER
SD	STORM DRAIN
SDRSD	SAN DIEGO REGIONAL STANDARD DRAWINGS
ST	STREET
T	ELECTRICAL TRANSFORMER
TYP	TYPICAL

20' 0' 10' 20'
SCALE: 1" = 20'

NOTE

NO PERMANENT STRUCTURES PERMITTED WITHIN THE PUE. RETAINING WALL FOOTINGS MUST BE OUTSIDE THE LIMITS OF THE PUE.

ESCONDIDO City of Choice

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UTILITY MAP
TENTATIVE SUBDIVISION MAP SUB20-0006
CITY OF ESCONDIDO, CALIFORNIA

SHEET 5 OF 8

ABBREVIATIONS

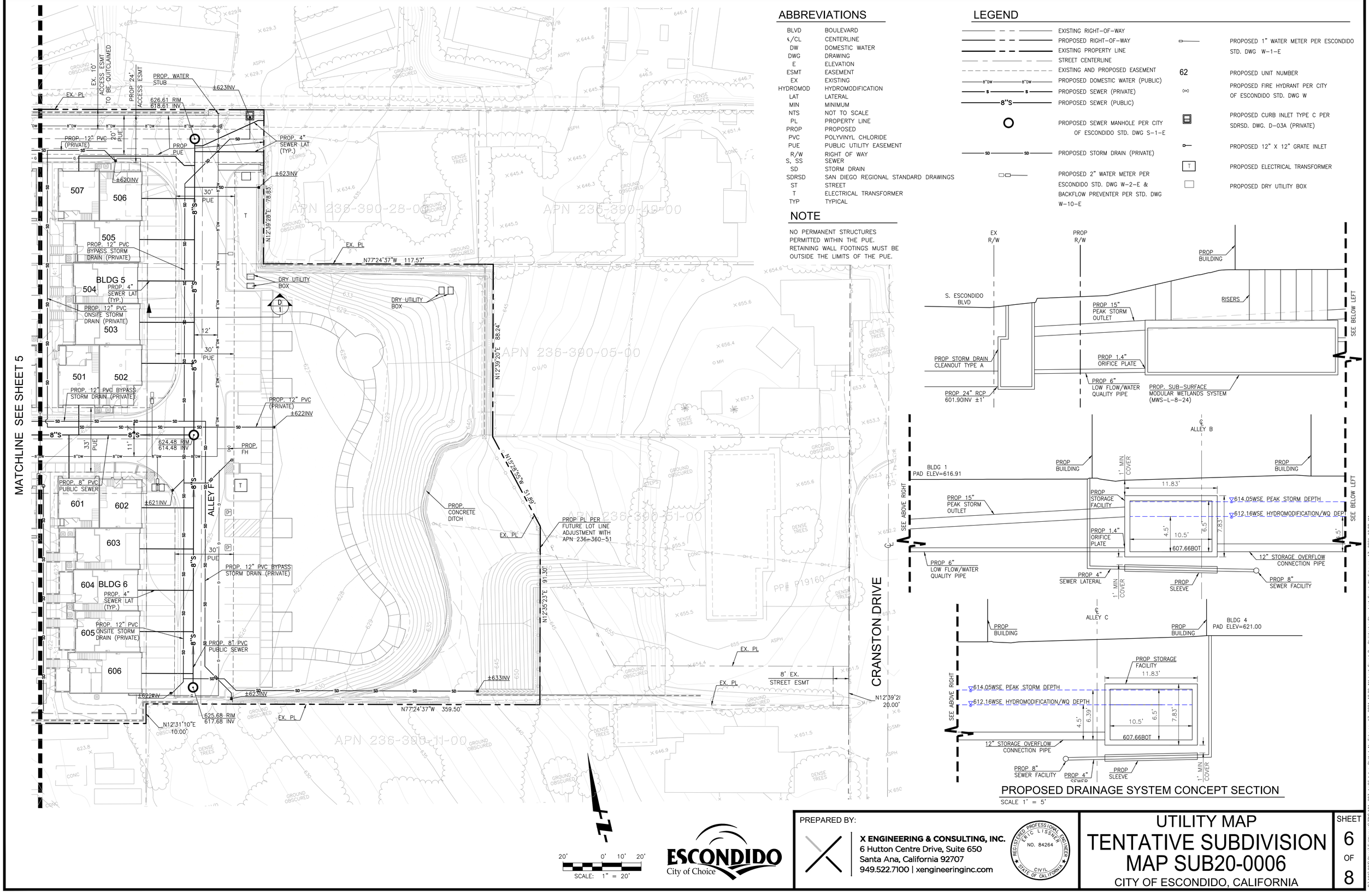
BLVD	BOULEVARD
℄/CL	CENTERLINE
DW	DOMESTIC WATER
DWG	DRAWING
E	ELEVATION
ESMT	EASEMENT
EX	EXISTING
HYDROMOD	HYDROMODIFICATION
LAT	LATERAL
MIN	MINIMUM
NTS	NOT TO SCALE
PL	PROPERTY LINE
PROP	PROPOSED
PVC	POLYVINYL CHLORIDE
PUE	PUBLIC UTILITY EASEMENT
R/W	RIGHT OF WAY
S, SS	SEWER
SD	STORM DRAIN
SDRSD	SAN DIEGO REGIONAL STANDARD DRAWINGS
ST	STREET
T	ELECTRICAL TRANSFORMER
TYP	TYPICAL

LEGEND

- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- EXISTING PROPERTY LINE
- STREET CENTERLINE
- EXISTING AND PROPOSED EASEMENT
- PROPOSED DOMESTIC WATER (PUBLIC)
- PROPOSED SEWER (PRIVATE)
- PROPOSED SEWER (PUBLIC)
- PROPOSED SEWER MANHOLE PER CITY OF ESCONDIDO STD. DWG S-1-E
- PROPOSED STORM DRAIN (PRIVATE)
- PROPOSED 2" WATER METER PER ESCONDIDO STD. DWG W-2-E & BACKFLOW PREVENTER PER STD. DWG W-10-E
- PROPOSED 1" WATER METER PER ESCONDIDO STD. DWG W-1-E
- 62 PROPOSED UNIT NUMBER
- PROPOSED FIRE HYDRANT PER CITY OF ESCONDIDO STD. DWG W
- PROPOSED CURB INLET TYPE C PER SDRSD. DWG. D-03A (PRIVATE)
- PROPOSED 12" X 12" GRATE INLET
- T PROPOSED ELECTRICAL TRANSFORMER
- PROPOSED DRY UTILITY BOX

NOTE

NO PERMANENT STRUCTURES PERMITTED WITHIN THE PUE. RETAINING WALL FOOTINGS MUST BE OUTSIDE THE LIMITS OF THE PUE.



PROPOSED DRAINAGE SYSTEM CONCEPT SECTION

SCALE 1' = 5'

ESCONDIDO City of Choice

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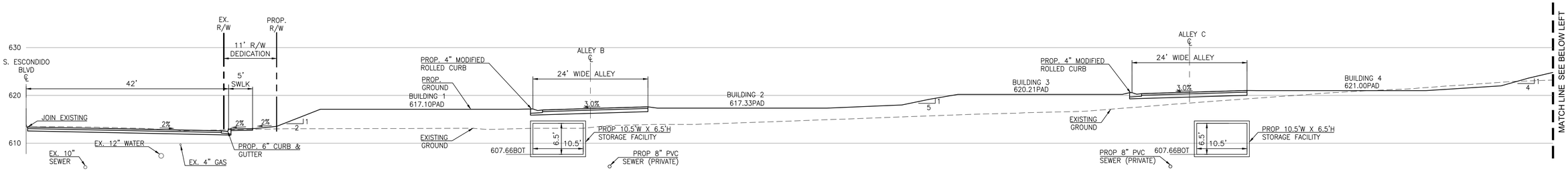
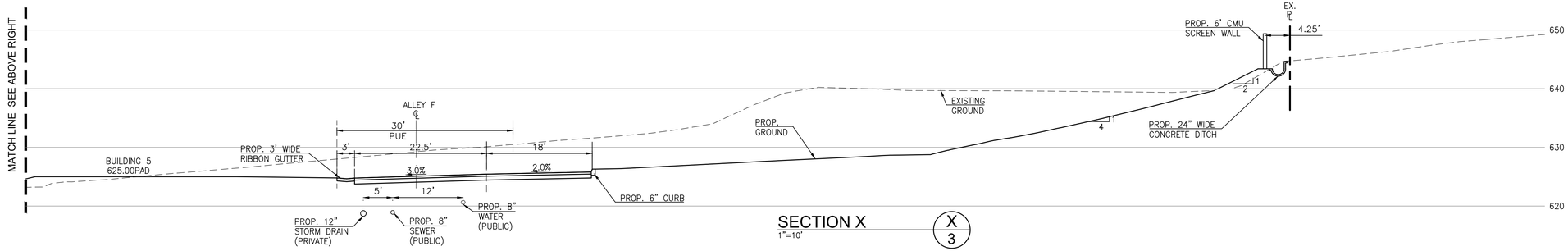
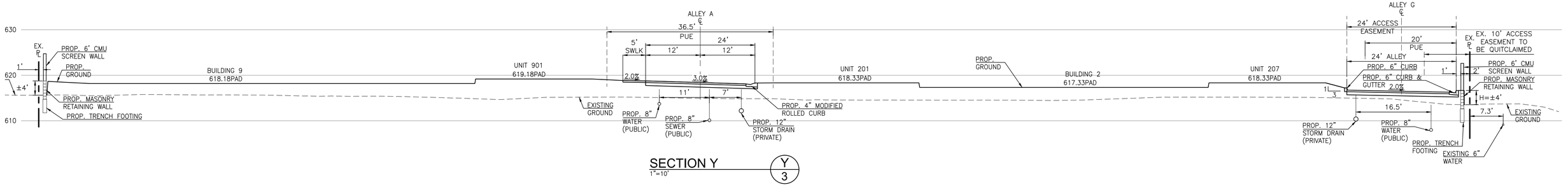
UTILITY MAP
TENTATIVE SUBDIVISION MAP SUB20-0006
CITY OF ESCONDIDO, CALIFORNIA

SHEET 6 OF 8





SECTION X
1"=10'
X
3



SECTION Y
1"=10'
Y
3

ESCONDIDO
City of Choice

PREPARED BY:

X ENGINEERING & CONSULTING, INC.
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Santa Ana, California 92707
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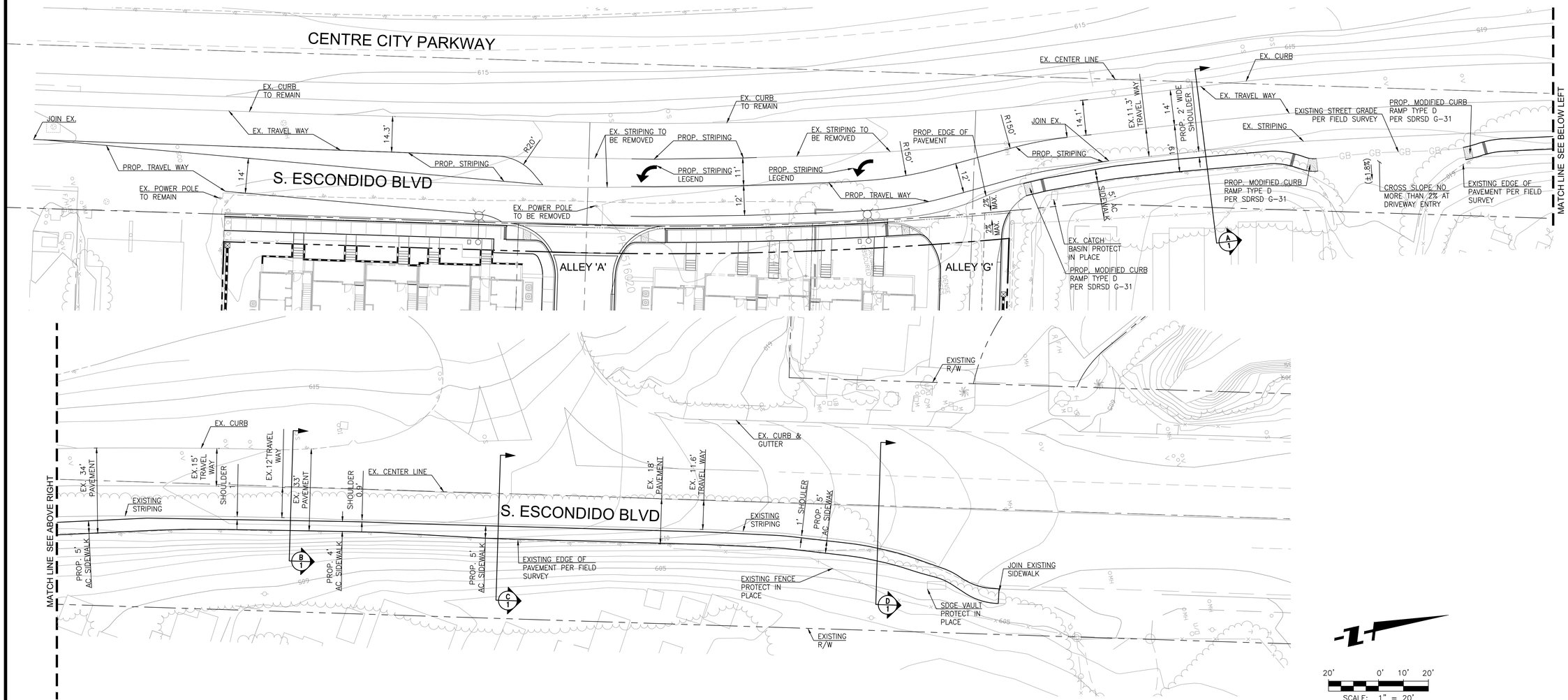
REGISTERED PROFESSIONAL ENGINEER
ERIC LISSNER
NO. 84264
CIVIL
STATE OF CALIFORNIA

DETAILS & SECTIONS
TENTATIVE SUBDIVISION MAP SUB20-0006
CITY OF ESCONDIDO, CALIFORNIA

SHEET 7 OF 8

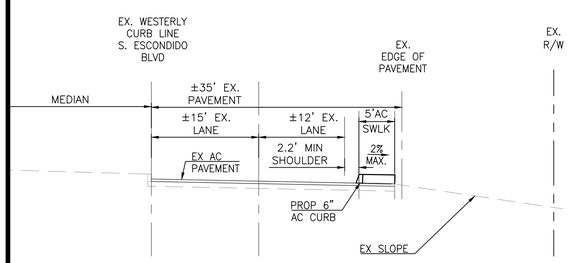
STRIPING NOTE:

STRIPING TO BE CONFIRMED IN FINAL ENGINEERING PHASE BY PROJECT TRAFFIC ENGINEER, PROJECT CIVIL ENGINEER, AND CITY STAFF INPUT BASED UPON AVAILABLE RIGHT-OF-WAY AND EXISTING CONDITIONS.

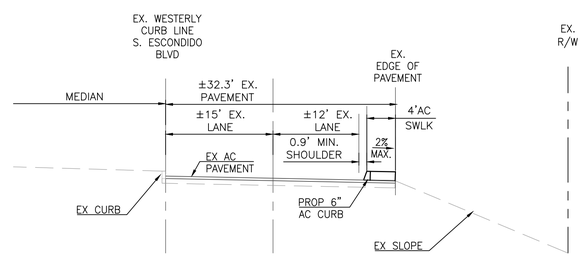


PROPOSED AC SIDEWALK AT ESCONDIDO BLVD

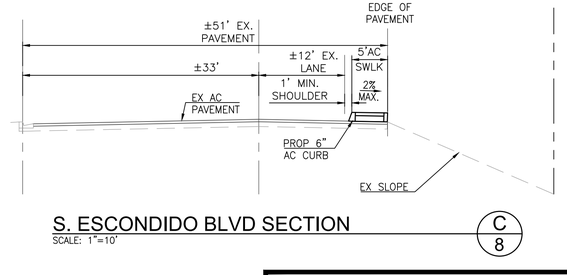
1"=20'



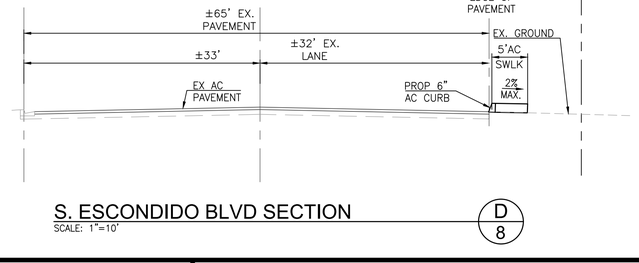
S. ESCONDIDO BLVD (A/8)
SCALE: 1"=10'



S. ESCONDIDO BLVD (B/8)
SCALE: 1"=10'



S. ESCONDIDO BLVD SECTION (C/8)
SCALE: 1"=10'



S. ESCONDIDO BLVD SECTION (D/8)
SCALE: 1"=10'

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AC SIDEWALK IMPROVEMENTS
TENTATIVE SUBDIVISION MAP SUB20-0006
CITY OF ESCONDIDO, CALIFORNIA

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