Attachment J – Priority Development Project: Stormwater Quality Management Plan

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Project Number(s): PC P22-0282 LD _____ GP _____

PRIORITY DEVELOPMENT PROJECT

STORM WATER QUALITY MANAGEMENT PLAN (SWQMP)
FOR

Kensho- Multifamily
212 Guajome Street
Vista, CA

PREPARED FOR:
Tideline Guajome Manager, LLC
P.O. BOX 22036
SAN DIEGO, CA 92192
760 295-9111

PREPARED: AUGUST 2022

NOTE: This Priority Development Project SWQMP Template and Instructions are offered as a tool to assist users in complying with RWQCB Order No. R9-2015-0001 (Permit), and is not intended to warrant or guarantee Permit compliance, which is the independent and sole responsibility of the user. This template is subject to revision without notice, at any time.

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ENGINEER OF WORK CERTIFICATION STATEMENT

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 Vista BMP Design Manual, which is a design manual for compliance with local City and regional MS4 Permit (California Regional Water Quality Control Board San Diego Region Order No. R9-2015-0100) requirements for storm water management.

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

SWQMP PREPARED BY:

William G. Mack
Pasco Laret Suiter & Associates
1911 San Diego Avenue
San Diego, CA 92110
858 259-8212
wmack@plsaengineering.com
RCE 73620
12/31/2022



Signature, PE License Number & Expiration Date

Print Name

Date

PROJECT OWNER CERTIFICATION STATEMENT

Owners Certification

This PDP SWQMP has been prepared for Tideline Guajome Manager, LLC by Pasco Laret Suiter & Associates. The PDP SWQMP is intended to comply with the PDP requirements of the City of Vista BMP Design Manual, which is a design manual for compliance with local City and regional MS4 Permit (California Regional Water Quality Control Board San Diego Region Order No. R9-2015-0100) requirements for storm water management.

The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this plan. Once the undersigned transfers its interests in the property, its successor-in-interest shall bear the aforementioned responsibility to implement the best management practices (BMPs) described within this plan, including ensuring on-going operation and maintenance of structural BMPs. A signed copy of this document shall be available on the subject property into perpetuity.

OWNER DETAILS:

TIDELINE GUAJOME MANAGER, LLC
P.O. BOX 22036
SAN DIEGO, CA 92192
760 295-9111

_____

Project Owner's Signature

_____

Print Name

_____

Date

CITY OF VISTA STAFF REVIEW

Reviewed and Approved:	
City Staff Signature:	Date:

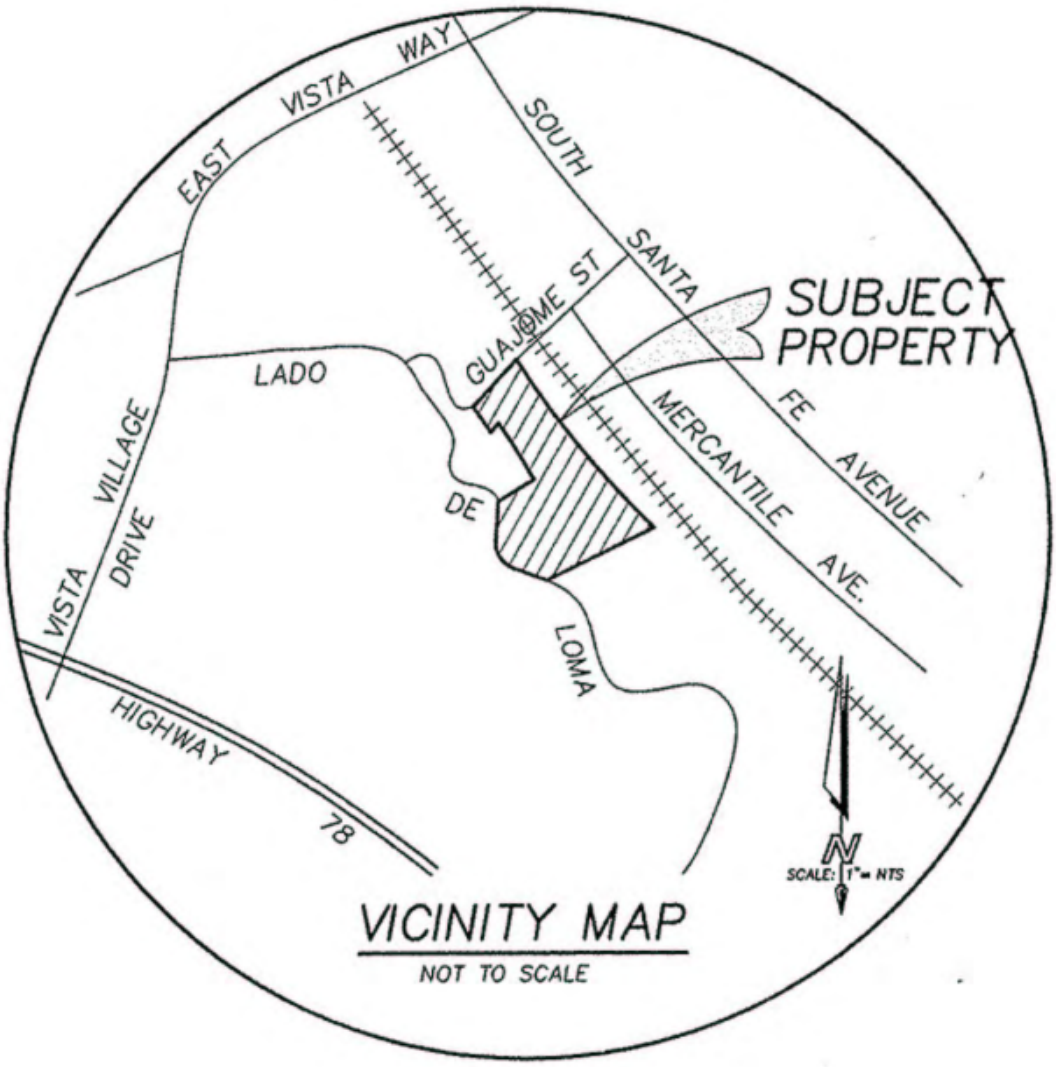
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PROJECT VICINITY MAP

Project Name: Kensho Multifamily

Permit Application Number: P22-0282

Insert Project Vicinity Map Below:



FORM 1 – PROJECT CATEGORY DETERMINATION CHECKLIST

This form is used to assess stormwater BMP requirements applicable to the proposed project. The form is available as a stand-alone fillable checklist on the City's website and a completed copy must be included with the final SWQMP submitted to the City. The form is available at:

http://www.cityofvista.com/services/city-departments/community-development/building-planning-permits-applications/land-development-autocad-templates/storm-water-forms

Project ID: P22-0282

CITY OF VISTA
CALIFORNIA

CHECKLIST FOR DETERMINATION OF PROJECT CATEGORY

Project Name: Kensho Multifamily

Project Location: 212 Guajome Street, Vista, CA

APPLICABILITY OF PERMANENT, POST-CONSTRUCTION STORMWATER BMP REQUIREMENTS AND PROJECT TYPE DETERMINATION

Overview and Instructions

The City of Vista's (City's) Stormwater Management Program is regulated by the San Diego regional municipal stormwater permit (referred to as a Municipal Separate Storm Sewer System Permit). This permit requires that new development and redevelopment projects incorporate permanent stormwater Best Management Practices (BMPs) into the project design. The City of Vista's *BMP Design Manual* (formerly *SUSMP Manual*) discusses BMP requirements applicable to new development and redevelopment projects.

ALL STANDARD AND PRIORITY PROJECTS ARE REQUIRED TO INCORPORATE SITE DESIGN AND SOURCE CONTROL BMPS. Additional treatment control and hydromodification management BMP requirements apply to projects that meet specific criteria or thresholds. This checklist must be completed by the project applicant or proponent, and is used to determine if those additional BMPs are required.

Not all site improvements are considered "development projects" under the MS4 Permit.

Development projects are defined by the MS4 Permit as "construction, rehabilitation, redevelopment, or reconstruction of any public or private projects". Development projects are issued local permits to allow construction activities. To further clarify, this checklist applies only to new development or redevelopment activities and/or projects that have the potential to contact storm water and contribute an anthropogenic source of pollutants, or reduce the natural absorption and infiltration abilities of the land.

A project must be defined consistent with the California Environmental Quality Act (CEQA) definitions of "project."

CEQA requires that the project include "the whole of the action". "Whole of the Action" means the project may not be segmented or phased into small parts either onsite or offsite if the effect is to reduce the quantity of impervious area and fall below thresholds for applicability of storm water requirements. This requirement precludes "piece-mealing," which is the improper (and often artificial) separation of a project into smaller parts to avoid preparing Environmental Impact Report level documentation.

As indicated above, for the purposes of the *BMP Design Manual*, the "project" is the "whole of the action" which has the potential for adding or replacing or resulting in the addition or replacement of, roofs, pavement, or other impervious surfaces, thereby resulting in increased flows and storm water pollutants.

When defining the project, the following questions are considered:

- What are the project activities?
- Do they occur onsite or offsite?
- What are the limits of the project (project boundary)?
- What is the whole of the action associated with the project (i.e. what is the total amount of new or

replaced impervious area considering all of the collective project components through all phases of the project)?

- Are any facilities or agreements to build facilities offsite in conjunction with providing service to the project (street-widening, utilities)?

Responses to the checklist represent an initial assessment of the proposed project conditions and impacts. City staff will confirm this checklist based on assessment of the development application and/or project plans. Results of the checklist will classify a project as one of the following: Priority Development Project, Standard Project, or Non-development Project.

If additional information is needed while completing this checklist, please refer to the City's *BMP Design Manual*. Alternatively, contact City Land Development staff.

This Form is divided into 4 sections:

1. Post-Construction Stormwater Requirement Exemptions
2. Priority Development Project Determination
3. Special Consideration for Redevelopment Projects (50 Percent Rule)
4. Final Project Determination

SECTION 1 – POST CONSTRUCTION STORMWATER REQUIREMENT EXEMPTIONS	City of Vista BMP Design Manual	
This section will determine whether your project is exempt from post-construction BMP requirements and would be classified as a Non-Development Project. See section 1.3 of the City's *BMP Design Manual* for further discussion.	**YES**	**NO**
(a) Replacement of impervious surfaces that are part of a routine maintenance activity, such as (check yes if any apply): (i) Replacing roof material on an existing building (ii) Rebuilding a structure to original design after damage from earthquake, fire or similar disaster (iii) Restoring pavement or other surface materials affected by trenches from utility work (iv) Resurfacing existing roads and parking lots, including slurry, overlay and restriping (v) Routine replacement of damaged pavement, including full depth replacement, if the sole purpose is to repair the damage (vi) Constructing new sidewalk, pedestrian ramps or bike lanes on existing roads (within existing street right-of-way) (vii) Restoring a historic building to its original historic design (viii) Routine replacement of damaged pavement, such as pothole repair **Note**: Work that creates impervious surface outside of the existing impervious footprint is not considered routine maintenance.	☐	☒
(b) Repair or improvements to an existing building or structure that do not alter the size (check yes if any apply): (i) Plumbing, electrical and HVAC work (ii) Interior alterations including major interior remodels and tenant build-out within an existing commercial building (iii) Exterior alterations that do not change the general dimensions and structural framing of the building (does not include building additions or projects where the existing building is demolished)	☐	☒
If you answered **YES** to either category (a) or (b), your project is considered a Non-Development Project, and post construction BMP requirements do not apply. Please proceed to Section 4 and check the **Non-Development Project** box. If you answered **NO** to category (a) and (b), please proceed to Section 2.		

SECTION 2 – PRIORITY DEVELOPMENT PROJECT DETERMINATION	City of Vista BMP Design Manual	
This section determines whether your project is a **Priority Development Project (PDP)** or a **Standard Project.** See section 1.4 of the City's *BMP Design Manual* for further discussion. The following eight (8) types of projects are defined as **PDPs:**	**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.	X	☐
(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.	☐	X
(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.	X	☐

(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 discharge 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; 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 City. For projects adjacent to an ESA, but not discharging to an ESA, the 2,500 sq-ft threshold does not apply as long as the project does not physically disturb the ESA and the ESA is upstream of the project. There are no Areas of Special Biological Significance (ASBS) or State Water Quality Protected Areas in the City's jurisdiction. The ESAs within the City's boundaries which include 303(d)-listed impairments and RARE beneficial use designations are listed below: • Agua Hedionda Creek • Buena Creek • Buena Vista Creek • Loma Alta Creek	☐	☒
(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. This category includes Retail gasoline outlets that meet the following criteria: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic of 100 or more vehicles per day.	☐	☒
(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. This means any activity that moves soils or substantially alters the pre-existing vegetated or man-made cover of any land. This includes, but is not limited to the following: (i) Grading, digging, cutting, scraping, stockpiling, pavement removal, and exterior construction; (ii) Substantial removal of vegetation where soils are disturbed including but not limited to removal by clearing or grubbing; or (iii) Any activity which bares soil or rock or involves streambed alterations or the diversion or piping of any watercourse.	☒	☐
If you answered **YES** to any of the categories above (a-f), your project is considered a PDP. Please proceed to section 3 and check the **Priority Development Project** Box in Section 4. If you answer **NO** to all categories, then your project is considered a Standard Project. Please proceed to Section 4 and check the **Standard Project Box**.		

SECTION 3 – SPECIAL CONSIDERATIONS FOR REDEVELOPMENT PROJECTS (50 PERCENT RULE)	City of Vista BMP Design Manual	
This section determines additional considerations required for **Redevelopment PDPs.** See section 1.7 of the City's *BMP Design Manual* for further discussion.	**YES**	**NO**
Will redevelopment result in the creation or replacement of impervious surface in an amount of more than 50 percent of the surface area of the previously existing development? See clarification on calculation of the ratio of impervious surface below. These requirements for managing storm water on an entire redevelopment project site are commonly referred to as the "50 Percent Rule". For the purpose of calculating the ratio, the surface area of the previously existing development shall be the area of impervious surface within the previously existing development. The following steps shall be followed to estimate the area that requires treatment to satisfy the MS4 Permit requirements: 1. How much total impervious area currently exists on the site? 2. How much existing impervious area will be replaced with new impervious area? 3. How much new impervious area will be created in areas that are pervious in the existing condition? 4. Total created and/or replaced impervious surface = Step 2 + Step 3. 5. **50 Percent Rule Test**: Is step 4 more than 50 Percent of Step 1? If yes, treat all impervious surface on the site (including existing impervious surface not being replaced or added). If no, then treat only Step 4 impervious surface and any area that comingles with created and/or replaced impervious surface area. Note: Step 2 and Step 3 must not overlap, as it is fundamentally not possible for a given area to be both "replaced" and "created" at the same time. Also activities that occur as routine maintenance (see Section 1 of this form) shall not be included in Step 2 and Step 3 calculation. For example, a 10,000 square foot development proposes replacement of 4,000 square feet of impervious area. The treated area is less than 50 percent of the total development area and only the 4,000 square foot area is required to be treated.	☐	☐

If you answered **YES**, then you must implement the PDP requirements for all impervious surfaces across the entire site. Please proceed to Section 4 and check the box under PDP indicating that the Project **Is a Redevelopment Project Subject to the 50 Percent Rule**.

If you answered **NO,** then you are only required to treat impervious surfaces that are replaced or created. Please proceed to section 4 and check the box under PDP indicating this is **Not a Redevelopment Project Subject to the 50 Percent Rule**.

SECTION 4 – FINAL PROJECT DETERMINATION

City of Vista

BMP Design Manual

BASED ON THE INFORMATION PROVIDED IN SECTIONS 1-3, THIS PROJECT IS DETERMINED TO BE A:

☒ **PRIORITY DEVELOPMENT PROJECT.** PRIORITY REQUIREMENTS APPLY AND A STORM WATER QUALITY MANAGEMENT PLAN (SWQMP) MUST BE SUBMITTED AT THE TIME OF APPLICATION.

☐ THIS **IS** A REDEVELOPMENT PROJECT SUBJECT TO THE 50 PERCENT RULE.

☒ THIS **IS NOT** A REDEVELOPEMNT PROJECT SUBJECT TO THE 50 PERCENT RULE.

☐ **STANDARD PROJECT.** STANDARD REQUIREMENTS APPLY AND APPLICABLE SECTIONS OF A STORM WATER QUALITY MANAGEMENT PLAN (SWQMP) MUST BE SUBMITTED AT THE TIME OF APPLICATION.

☐ **NON DEVELOPMENT PROJECT.**

Applicant Information and Signature Box

Address: 212 Guajome ,Vista CA 92083 APN(s) 179-024-09, 179-093-05, 179-093-18, 23, 30, 32, & 34	
Applicant Name: Tideline Guajome Manager,LLC	Applicant Title:
Applicant Signature:	Date:

City use only

Concur:	Yes	No
By:		
Date:		
Land Dev #:		

Supporting discussion for this checklist, as well as BMP requirements for Priority Development Projects and Standard Projects, is provided in the City of Vista *BMP Design Manual*.

FORM 2 – PROJECT OVERVIEW

Page 1 of 11

Project Name	Kensho Multifamily
Project Address	212 Guajome Street, Vista, CA
Assessor's Parcel Number(s) (APN(s))	179-024-09, 179-093-05, 179-093-18, 23, 30, 32, & 34
Permit Application Number	P22-0282
Watershed *(select one checkbox; use webpage below to determine watershed)* http://www.cityofvista.com/services/city-departments/community-development/building-planning-permits-applications/land-development-autocad-templates/storm-water-forms	
San Luis Rey	☐ Lower San Luis Rey – Mission, 903.11
Carlsbad	☐ Loma Alta – Loma Alta, 904.10 ☐ Buena Vista – El Salto, 904.21 ☒ Buena Vista – Vista, 904.22 ☐ Agua Hedionda – Los Monos, 904.31 ☐ Agua Hedionda – Buena, 904.32 ☐ San Marcos – Batiquitos, 904.51
Parcel Area (total area of Assessor's Parcel(s) associated with the project)	4.56 Acres (198,633 Square Feet)
Area to be Disturbed by the Project (Project Area)	4.56 Acres (198,633 Square Feet)
Project Proposed Impervious Area (subset of Project Area)	2.75 Acres (119,665 Square Feet)
Project Proposed Pervious Area (subset of Project Area)	1.81 Acres (78,968 Square Feet)
NOTE: Proposed Impervious Area + Proposed Pervious Area = Area to be Disturbed by the Project. This may be less than the Parcel Area.	

Form 2, Page 2 of 11

DESCRIPTION OF EXISTING SITE CONDITIONS

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

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

Describe: There is an existing single family home located at the northern edge of the property (212 Guajome) and another existing home located at the southern edge of the property (446 Lado De Loma). The remaining portion of the property is sloping undeveloped land containing several dirt access paths.

Existing Land Cover Includes (select all that apply and describe below):

- ☒ Vegetative Cover 4.43 Acres (193,147 Square Feet)
- ☐ Non-Vegetated Pervious Areas Acres (Square Feet)
- ☒ Impervious Areas 0.13 Acres (5,487 Square Feet)

Describe:

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):

- ☐ 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 and describe in next section):

- ☐ Drainage ditch/Swale/Waterway
- ☐ Seeps
- ☐ Springs
- ☐ Wetlands
- ☒ None

Form 2, Page 3 of 11

DESCRIPTION OF EXISTING SITE DRAINAGE PATTERNS

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

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

Describe existing site drainage patterns:

The current site is an undeveloped lot. Topographically, the site slopes North to North-east with slopes around 4:1. For purposes of this Hydrologic analysis, this report analyzes the entire property limits and additional area downstream of the development to the ultimate single POC. The site is situated upon 100% of Type C hydrologic soils, as determined from the Natural Resources Conservation Service (NRCS) Web Soil Survey. Site runoff primarily drains from the South, South-west to the Northern, North-Eastern edge of the project via sheet flow over the undeveloped lot. Once across the Northern project boundary, runoff enters the NCTD right of way where it is collected by an open concrete swale located on the west side of the railroad tracks. This concrete swale conveys drainage to the north, where is enters the City of Vista maintained public storm drain system at Guajome Street. This then flows into Buena Vista Creek, and ultimately outfalls into the Pacific Ocean. There are no known capacity issues with the existing NCTD ditches or downstream drainage systems. There are no existing onsite drainage improvements that concentrate drainage within the subject property and covey it offsite.
There is run-on that enters the project from the adjacent properties to the south and west. Any run-on will be captured in concrete brow ditches located along the southern and western edges of the proposed development and routed around the proposed site. Note that these brow ditches will route this flow into the existing concrete trapezoidal brow ditches to the North and East, matching existing drainage patterns. We therefore assume the western and southern property boundary to be the limits of the of the hydraulic analysis as everything outside of this will remain unchanged and would represent no change. This allows us to properly analyze apples to apples the existing and proposed site conditions within the limits of development to determine that the proposed project mitigates peak flow from existing to proposed conditions. Table 1.1 below summarizes the existing condition 100-year peak flows at the project's discharge locations. For delineated basin details, please refer to the Existing Condition Hydrology Map included as an Attachment of this report.

Table 1 below summarizes the existing condition design 100-year peak flows to the project's outfalls within the project site.

Table 1 – Summary of Existing Conditions

Drainage Basin	Node	Outfall Node	TC (min)	Intensity (inch/hr)	Drainage Area (acres)	C	Pre-100-Year Peak Flow (cfs)	Pre-100-Year Peak Velocity (fs)
POC-1	150	100	9.88	5.43	5.8	0.37	11.58	6.83
Total					5.8	0.37	11.58	6.83

For detailed calculations refer to the drainage report for the project titled "Drainage Study for Kensho Housing" prepared by Pasco Laret Suiter & Associates.

Form 2, Page 4 of 11

DESCRIPTION OF PROPOSED SITE DEVELOPMENT

Project Description / Proposed Land Use and/or Activities:

The project proposes to consolidate all existing lots into one single lot with the exception of lot 10, map 2181, which is to remain as a separate legal lot. All existing site improvements are proposed to be demolished and removed. Four multi-family buildings, private roads, landscaping, and associated amenities are proposed to be constructed.

**Please note that there will be a separate improvement plan for the construction of new curb, gutter, sidewalk, and curb returns from the existing sidewalk along Guajome St. (north of site), and along the north side of Lado De Loma Dr. all the way to the existing sidewalk at the intersection of Eddie Dr. and Lado De Loma Dr. This separate plan is to be constructed and designed by Tideline but the final plans will be signed by the City Engineer as the Engineer of Work. The construction of the sidewalk by Tideline will not affect the entitlement process and will be stated as a condition of approval, but not necessarily included as part of the site plan. This proposed sidewalk alignment will address green street standards by incorporating a 1 ft wide strip of pervious concrete adjacent to the curb along the entire proposed stretch. This was all coordinated and confirmed with City Principal Engineer, Sam Hasenin.

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

The project proposes the removal of all the existing site improvements and the development of (4) four multi-family buildings, private roads, landscaping, and associated improvements. Site grading and drainage improvements, such as concrete brow ditches, catch basins, biofiltration facilities, and storm drain pipes will also be constructed.

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

Proposed pervious features include landscape areas.

Does the project include grading and changes to site topography?

☒ Yes

☐ No

Describe:

Grading is proposed to accommodate the proposed lots, multifamily buildings, access drive, parking lots, and storm drain system.

Form 2, Page 5 of 11

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:

Storm water runoff from the project site is routed to one outfall location (POC-1) in the Northeastern corner of the site at Node 100 as shown in the proposed hydrology exhibit (per Section 5 - Appendix). This outfall location is the same as existing conditions. Offsite stormwater from the west of the developed area will be routed with a concrete brow ditch around the proposed development to not comingle any stormwater runoff. Prior to discharging from the project site, developed site runoff is intercepted by one of six biofiltration-detention basins (BMPs) that are used as onsite multiple purpose best management practice facilities. The BMPs serve to meet water quality, hydromodification and peak flow reduction requirements for the project site.

Unmitigated developed conditions are calculated as the proposed hydrologic conditions without the use of the proposed BMPs. The unmitigated developed condition peak flow is used to calculate the time it takes to fill the available storage in the proposed BMP. The mitigated developed condition can then be modelled by using the increase in the travel time, or the time it would take the unmitigated developed flow to fill and overtop the outlet structure at the proposed BMP. See section 2.4 for specific mitigated travel time calculations.

Undisturbed areas in the project site will continue to flow according to the same historic conditions towards the east or southwest outlet locations.

Table 2 below summarizes the expected cumulative 100-year peak flow rates for at the project's discharge locations.

Table 2 – Summary of Proposed Conditions

Unmitigated Developed Condition

Drainage Basin	Node	Outfall Node	TC (min)	Intensity (inch/hr)	Drainage Area (acres)	C	Post-100-Year Peak Flow (cfs)	Post-100-Year Peak Velocity (fs)
POC-1	180	100	13.89	4.36	5.8	0.61	15.49	7.30
POC-1 Total:					5.8	0.61	15.49	7.30

Mitigated Developed Condition

Drainage Basin	Node	Outfall Node	TC (min)	Intensity (inch/hr)	Drainage Area (acres)	C	Post-100-Year Peak Flow (cfs)	Post-100-Year Peak Velocity (fs)
POC-1	180	100	19.77	3.47	5.8	0.61	9.72	6.24
POC-1 Total:					5.8	0.61	9.72	6.24

For detailed calculations refer to the drainage report for the project titled "Drainage Study for Kensho Housing" prepared by Pasco Laret Suiter & Associates.

Table 3 below summarizes the results of the existing, proposed unmitigated and proposed mitigated condition drainage areas and resultant 100-year peak flow rates at the outfall locations for the project site. Please refer to the Existing and Developed Condition Hydrology Maps for drainage patterns and areas.

Table 3 – Summary of Pre vs. Post Developed Peak Flows

Outfall Condition	Total Drainage Area (acres)	Parcel 2 100-Year Peak Flow (cfs)
Pre-Developed Condition	5.8	11.58
Post-Developed Undetained	5.8	15.49
Mitigated Condition	5.8	9.72
DIFFERENCE	0.00	1.86

Form 2, Page 6 of 11

POTENTIAL POLLUTANT SOURCE AREAS

Identify whether any of the following features, activities, and/or pollutant source areas will be present. Select all Pollutant Source Areas that apply and include them on the DMA Exhibit. Source control BMPs must be identified for each of these areas in Form 3 of this SWQMP:

☒ On-site storm drain inlets

☐ Sump pumps or French drains

☒ Interior or sub-surface parking garages

☐ Need for future indoor & structural pest control

☒ Landscape/outdoor pesticide use

☒ Pools, spas, ponds, decorative fountains, or other water features

☐ Food preparation and/or service

☒ Refuse/trash collection areas

☐ Industrial processes

☒ Outdoor storage of equipment, chemicals, or materials

☐ Vehicle and equipment cleaning

☐ Vehicle/equipment repair and maintenance

☐ Fuel dispensing areas

☐ Loading docks

☐ Fire sprinkler test and relief point

☐ Miscellaneous drain or wash down areas

☒ Plazas, sidewalks, and parking lots

Describe:

Form 2, Page 7 of 11

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):
Treated storm water from the project site discharges through energy dissipators along the northern property line and enters the NCTD right of way where it is collected by an open concrete swale located on the west side of the railroad tracks. This concrete swale conveys drainage to the north, where is enters the City of Vista maintained public storm drain system at Guajome Street. This then flows into Buena Vista Creek, and ultimately outfalls into the Pacific Ocean.

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

303(d) Impaired Water Body	Pollutant(s)/Stressor(s)	TMDLs / WQIP Highest Priority Pollutant
Buena Vista Creek	Benthic Community Effects, Bifenthrin, Selenium, Toxicity	TMDL expected 2025/2029/2021 per 303(d) list report
Buena Vista Lagoon	Indicator Bacteria, Nutrients, Sedimentation/siltation, Toxicity	TMDL expected 2021 per 303(d) list report / WQIP Highest priority pollutant

Identification of Project Site Pollutants*

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

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

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

Form 2, Page 8 of 11

HYDROMODIFICATION MANAGEMENT REQUIREMENTS

Do hydromodification management requirements apply (see Section 1.6 of the BMP Design Manual; select one box and describe below)?

☒ Yes, hydromodification management flow control structural BMPs required.

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

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

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

Describe:

The project's storm water treatment facilities are also designed with restrictor plates on the outlet of the detention structure to restrict post-project flows to meet Hydromodification Management criteria. The project is upstream of a natural channel known as Buena Vista Creek. Continuous model simulation is used to demonstrate the project meets hydromodification management criteria and the higher low flow threshold of 0.5Q2 is being used based on the results of the channel assessment prepared by Torey R.Walker Engineering, Inc., Titled: Technical Memorandum: Susceptibility Analysis of Buena Vista Creek for Condominium Project at 201 W. Los Angeles, Vista CA. Dated November 28, 2012. A copy of the study is included in Attachment 2 for reference. The continuous model simulation SWMM results are provided in attachment 2 that shows the post-development Peak Runoff and Peak Durations are below pre-development conditions. Each bmp is designed with an orifice plate located on the downstream side of the detention structure. The SWMM model results with 1 inch orifice on each BMP of the 6 Biofiltration BMPs. See attachment 2 for more detailed calculations and results.

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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 (select all that apply and describe below)? Additional signed and stamped reports must be provided to document any exemption from coarse sediment yield requirements.

☒ Yes

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

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

☐ 6.2.1 Verification of Geomorphic Landscape Units (GLUs) 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?

☐No critical coarse sediment yield areas to be protected based on verification of GLUs onsite

☒Critical coarse sediment yield areas exist but additional analysis has determined that protection is not required.

☐Critical coarse sediment yield areas exist and require protection. The project will implement management measures described in Sections 6.2.4 and 6.2.5 as applicable, and the areas are identified on the SWQMP Exhibit.

Describe:

Potential critical coarse sediment yield areas exist on-site. A lined conveyance system conveys runoff from the site to a rock-lined pond at Vista Village Creek Park (Site #48). This pond acts as a sediment sinks. The runoff then continues in a lined conveyance system to a concrete lined channel south of Ford (Site #30). In mid-2021, CDFW, Regional Board, and USACE issued channel maintenance permits for authorized sediment removal to the City for select sites, including the two sites mentioned above. Site #48 (Creek Walk) currently receives 350 cubic yards of sediment removal as needed. Site #30 (Concrete Lined Channel South of Ford) currently receives 1,000 cubic yards of sediment removal as needed. Therefore, the downstream receiving bodies are not sensitive to the critical coarse sediment on-site and potential critical coarse sediment yield areas are not required to be protected. Please refer to the included Overview Map and site images for sites 30 & 48 provided by the City of Vista's Stormwater Program Manager, Jon Nottage, in Attachment 2B of this report.

Form 2, Page 10 of 11

FLOW CONTROL FOR POST-PROJECT RUNOFF

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

List and describe point(s) of compliance for hydromodification management flow control (see Section 6.3.1). Identify each point of compliance for flow control on the Hydromodification Management Exhibit in Attachment 2A.

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 the report.

Discussion / Additional Information: (optional)

Please see report included with this application titled "*Susceptibility Analysis of Buena Vista Creek for Condominium project at 201 W. Los Angeles, Vista, CA*."

Form 2, Page 11 of 11

OTHER SITE REQUIREMENTS AND CONSTRAINTS

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

Green Street Stormwater requirements are applicable for the proposed frontage/street improvements along Guajome Street. In order to comply with the USEPA Green Street requirements a 1' wide strip of pervious concrete adjacent to the proposed curb was implemented along the property site frontage (see DMA exhibit). The permeable pavement will be designed to connect directly via PVC storm drain to the curb inlet at POC-1.

Optional Additional Information or Continuation of Previous Sections As Needed

This space provided for additional information or continuation of information from previous sections as needed.

This pervious concrete is designed to be a part of the proposed 4.5' wide sidewalk. All of the proposed impervious area in the ROW, except for the proposed driveway apron, is routed to the 1' wide strip of pervious concrete. After full consideration of all potential Green Street features, we found that this design is the most feasible feature to the maximum extent practicable for these specific site conditions. Because we are widening Guajome Street along the property frontage and adding a new sidewalk, space is very limited. Tree wells were originally considered but it was not possible to get adequate drainage to them. The only potential tree well location that would receive adequate drainage is in direct conflict with an existing power pole (see DMA exhibit). After coordinating with the City of Vista Principal Engineer, Husam Hasenin, for the separate Lado De Loma Drive and Guajome Street Sidewalk Improvement plan on the north side of Guajome Street, it was decided that a 1' wide strip of pervious concrete would satisfy Green Street Stormwater requirements. Therefore, this proposed design meets requirements to the maximum extent practicable and maintains uniform site improvements along Guajome Street.

FORM 3 – SOURCE CONTROL BMPS FOR ALL DEVELOPMENT PROJECTS

PROJECT IDENTIFICATION & SOURCE CONTROLS

Project Name: Kensho Multifamily

Permit Application Number: P22-0282

All development projects must implement source control BMPs SC-1 through SC-6, unless justification is provided by qualified design professional See Chapter 4 and Appendix E of the Model BMP Design Manual for information to implement source control BMPs shown in this checklist.

Answer each category below pursuant to the following, and provide description.

- "Yes" means the project will implement the source control BMP as described in Chapter 4 and/or Appendix E of the Model BMP Design Manual.
- "No" means the BMP is applicable to the project but it is not feasible to implement.
- "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).

Source Control Requirement	Applied?		
SC-1 Prevention of Illicit Discharges into the MS4	☒ Yes	☐ No	☐ N/A
Describe how source control will be implemented, or justify if not feasible: Illicit discharges into the MS4 will be prevented with the use of source controls such as efficient irrigation, directing all surface runoff to permanent biofiltration BMP's. Main sources of MS4 illicit discharges such as vehicle cleaning and fuel dispensing areas are not proposed as a part of this project. Landscaping is designed by a registered landscape design professional and will comply with all applicable permits and codes.			
SC-2 Storm Drain Stenciling or Signage	☒ Yes	☐ No	☐ N/A
Describe how source control will be implemented, or justify if not feasible: Stencil on-site storm drain inlets with "No Dumping–Flows to Pacific Ocean"			
SC-3 Protect Outdoor Materials Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	☒ N/A
Describe how source control will be implemented, or justify if not feasible: No permanent outdoor materials storage areas are proposed. Temporary Material storage areas during construction will utilize approved CASQA BMP's to prevent pollutant discharges			
SC-4 Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	☒ N/A
Describe how source control will be implemented, or justify if not feasible: No permanent outdoor materials storage areas are proposed. Temporary Material storage areas during construction will utilize approved CASQA BMP's to prevent pollutant discharges			

Form 3, Page 2 of 4			
Source Control Requirement	**Applied?**		
SC-5 Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☒ Yes	☐ No	☐ N/A
Describe how source control will be implemented, or justify if not feasible: The trash storage/collection area is covered and gated to prevent wind dispersal and stormwater run off from leaving the enclosure. The storage area is enclosed and the surrounding site area is graded to direct site drainage away from the enclosure.			
SC-6 Additional BMPs Based on Potential Sources of Runoff Pollutants (must answer for each source listed below)	**Applied?**		
a. On-site storm drain inlets	☒ Yes	☐ No	☐ N/A
Describe how source control will be implemented, or justify if not feasible: All inlets to be marked “no dumping.” Tenant Lease to include clause prohibiting discharge into stormdrains.			
b. Sump pumps or French drains	☒ Yes	☐ No	☐ N/A
Describe how source control will be implemented, or justify if not feasible: Due to site topography, sump pumps are not necessary for drainage conveyance purposes and subsurface foundation drains have been designed to either daylight on grade or connect to the proposed onsite drainage conveyance system.			
c. Interior or sub-surface parking garages	☒ Yes	☐ No	☐ N/A
Describe how source control will be implemented, or justify if not feasible: Nuisance water from interior garage areas is designed to be collected and routed to the sanitary sewer system.			
d. Need for future indoor & structural pest control	☐ Yes	☐ No	☒ N/A
Describe how source control will be implemented, or justify if not feasible: Future Indoor and structural pest control is not proposed.			
e. Landscape/outdoor pesticide use	☒ Yes	☐ No	☐ N/A
Describe how source control will be implemented, or justify if not feasible: Existing drought tolerant plants to be preserved in landscaped areas where feasible. Proposed Landscaping has been designed to be appropriate for slopes, climate, and soil conditions specific to the site. Pesticide use is to be limited.			

Form 3, Page 3 of 4			
Source Control Requirement	**Applied?**		
f. Pools, spas, ponds, decorative fountains, or other water features	☒ Yes	☐ No	☐ N/A
Describe how source control will be implemented, or justify if not feasible: Proposed pool deck drainage has been designed to be captured by channel drains adjacent to pool area and routed to onsite treatment control BMP's			
g. Food preparation and/or service	☐ Yes	☐ No	☒ N/A
Describe how source control will be implemented, or justify if not feasible: Commercial/Retail Food Preparation or service is not a proposed project use			
h. Refuse/trash collection areas	☒ Yes	☐ No	☐ N/A
Describe how source control will be implemented, or justify if not feasible: The trash storage/collection area is covered and gated to prevent dispersal and stormwater run off. The storage area is graded to prevent run-on.			
i. Industrial processes	☐ Yes	☐ No	☒ N/A
Describe how source control will be implemented, or justify if not feasible: Industrial processes are not a proposed project use			
j. Outdoor storage of equipment, chemicals, or materials	☐ Yes	☐ No	☒ N/A
Describe how source control will be implemented, or justify if not feasible: Outdoor storage of equipment, chemicals, or materials is not a proposed project use.			
k. Vehicle and equipment cleaning	☐ Yes	☐ No	☒ N/A
Describe how source control will be implemented, or justify if not feasible: Onsite vehicle and equipment cleaning is not a proposed project use			
l. Vehicle/equipment repair and maintenance	☐ Yes	☐ No	☒ N/A
Describe how source control will be implemented, or justify if not feasible: Onsite vehicle and equipment repair and maintenance is not a proposed project use			
m. Fuel dispensing areas	☐ Yes	☐ No	☒ N/A
Describe how source control will be implemented, or justify if not feasible: Onsite fuel dispensing is not a proposed project use.			

Form 3, Page 4 of 4			
n. Loading docks	☐ Yes	☐ No	☒ N/A
Describe how source control will be implemented, or justify if not feasible: No loading docks are proposed as a part of the project			
o. Fire sprinkler test water and relief point	☒ Yes	☐ No	☐ N/A
Describe how source control will be implemented, or justify if not feasible: Fire sprinkler test water to be directed to sanitary sewer per separate plumbing plan			
p. Miscellaneous drain or wash down areas	☐ Yes	☐ No	☒ N/A
Describe how source control will be implemented, or justify if not feasible: No misc drain or wash down areas are proposed as a part of the project			
q. Plaza, sidewalks, parking lots	☒ Yes	☐ No	☐ N/A
Describe how source control will be implemented, or justify if not feasible: Parking areas, walkways, and other amenity areas on site are to be periodically maintained free of litter and debris. Drainage from these areas will be collected and routed to onsite permanent Treatment Control BMP's.			
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.			

FORM 4 – SITE DESIGN BMPS FOR ALL DEVELOPMENT PROJECTS

PROJECT IDENTIFICATION

Project Name: Kensho Multifamily

Permit Application Number: P22-0282

All development projects must implement site design BMPs SD-1 through SD-8, unless justification is provided by qualified design professional. See Chapter 4 and Appendix E of the Model BMP Design Manual for information to implement site design BMPs shown in this checklist.

Answer each category below pursuant to the following, and provide description.

- "Yes" means the project will implement the site design BMP as described in Chapter 4 and/or Appendix E of the Model BMP Design Manual.
- "No" means the BMP is applicable to the project but it is not feasible to implement.
- "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).

Site Design Requirement	Applied?		
SD-1 Maintain Natural Drainage Pathways and Hydrologic Features	☒ Yes	☐ No	☐ N/A
Describe how site design will be implemented, or justify if not feasible: The site has been designed to maintain the natural drainage pattern flowing from west to east across the project site. Drainage from proposed site improvements is collected and routed to the same receiving public drainage system as the existing pre project conditions.			
SD-2 Conserve Natural Areas, Soils, and Vegetation	☒ Yes	☐ No	☐ N/A
Describe how site design will be implemented, or justify if not feasible: Portions of the westerly sloping hillside are being maintained as undisturbed as a part of the project. Significant trees are being protected in place where feasible.			
SD-3 Minimize Impervious Area	☒ Yes	☐ No	☐ N/A
Describe how site design will be implemented, or justify if not feasible: The proposed structure is a multilevel building designed to minimize the overall footprint relative to the site. Onsite access roads, pathways, a surface parking have been designed to minimum dimensions as an effort to reduce the overall site pavement footprint.			
SD-4 Minimize Soil Compaction	☒ Yes	☐ No	☐ N/A

Describe how site design will be implemented, or justify if not feasible:

Surface soils in all proposed landscape zones will be minimally compacted to promote absorption and retention of stormwater. Because the site is underlain by a shallow rock formation, undercutting and recompaction of earth beneath structure foundations and primary access roadways will be necessary to conform to typical design standards.

Form 4, Page 2 of 2

SD-5 Impervious Area Dispersion	☒ Yes	☐ No	☐ N/A

Describe how site design will be implemented, or justify if not feasible:
Drainage from proposed amenity areas and site hardscape has been designed to be directed to adjacent landscape areas for dispersion to the extent practical. Given that the existing topography slopes from west to east at a gradient exceeding 5%, opportunities for qualified Dispersion Area DCV reductions are limited.

SD-6 Runoff Collection	☒ Yes	☐ No	☐ N/A

Describe how site design will be implemented, or justify if not feasible:

Runoff from proposed site impervious areas has been designed to be collected by the onsite storm drain system and routed to onsite Treatment Control BMP's.

SD-7 Landscaping with Native or Drought Tolerant Species	☒ Yes	☐ No	☐ N/A

Describe how site design will be implemented, or justify if not feasible:

The project landscape plan specifies native and drought-tolerant species for site landscaping

SD-8 Harvest and Use of Precipitation *Note: Worksheet B.3-1, "Harvest and Use Feasibility" must be included in this section of the SWQMP.*	☐Yes	☐ No	☒ N/A

Describe how site design will be implemented, or justify if not feasible:
Harvest and reuse has been determined to be infeasible for this project. Refer to attachment 1c.

FORM 5 – STRUCTURAL POLLUTANT CONTROL AND HYDROMODIFICATION MANAGEMENT BMPS

PROJECT IDENTIFICATION

Project Name: Kensho Multifamily

Permit Application Number: P22-0282

PDP Structural BMPs

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

PDP structural BMPs must be verified by the local jurisdiction at the completion of construction. This may include requiring the project owner or project owner's representative and engineer of record to certify construction of the structural BMPs (see Section 1.12 of the *BMP Design Manual*). PDP structural BMPs must be maintained into perpetuity, and the local jurisdiction must confirm the maintenance (see Section 7 of the *BMP Design Manual*).

Use this form to provide narrative description of the general strategy for structural BMP implementation at the project site in the box below. Then complete the PDP structural BMP summary information sheet (page 3 of this form) for each structural BMP within the project (copy the BMP summary information page as many times as needed to provide summary information for each individual structural BMP).

Describe the general strategy for structural BMP implementation at the site. This information must describe how the steps for selecting and designing storm water pollutant control BMPs presented in Section 5.1 of the *BMP Design Manual* were followed, and the results (type of BMP selected). For projects requiring hydromodification flow control BMPs, indicate whether pollutant control and flow control BMPs are integrated or separate structures.

Note: Each structural pollutant control and hydromodification management BMP must be clearly identified on a site map (Attachment 1a), and described in supporting table (Attachment 1B).

Step 1: The DMAs draining to the structural BMPs are not self-mitigating, de minimis, or self-retaining.
Step 2: Harvest and Use is not feasible. Refer to Attachment 1c.
Step 3: Infiltration is not feasible. Refer to Attachment 1d.
Step 3C: A combination of six (6) Biofiltration BMPs and a Modular Wetland System was selected and sized per the design criteria to meet pollutant control and hydromodification management flow control requirements.

For the Modular Wetland system additional site design BMPs are required to satisfy volume retention requirements, there a 10’ diameter tree well has been sized to meet the requirements. The proposed tree is located within DMA 7. Tree credit volume has been calculated per Appendix B.2.2.1 of the Storm Water Standards Manual. Refer to Attachment 1e for the calculations.

FORM 6 – STORMWATER BMP MAINTENANCE MECHANISM

PROJECT IDENTIFICATION
Project Name: Kensho Multifamily
Permit Application Number: P22-0282
Maintenance Requirements
A stormwater structural BMP operations and maintenance plan must be prepared for PDPs. A template plan is available at: http://www.cityofvista.com/services/city-departments/community-development/building-planning-permits-applications/land-development-autocad-templates/storm-water-forms Has a stormwater structural BMP operations and maintenance plan been prepared? ☐ Yes, included with Attachment 3A ☒ No This report is for Discretionary Permit purposes only. The project will be required to prepare and submit a Stormwater Structural BMP Operations and Maintenance Plan as a part of Final Construction Permitting as a condition of approval. [INSERT PLAN NAME] [INSERT PLAN DATE] [INSERT PREPARER'S NAME] [INSERT PREPARER'S TITLE/COMPANY]
All projects are required to maintain designed functionality of structural BMPs in perpetuity. Privately-owned projects must record a *Storm Drain Maintenance Agreement* with the County of San Diego Assessor's Office. A template *Storm Drain Maintenance Agreement* is available at: http://www.cityofvista.com/services/city-departments/community-development/building-planning-permits-applications/land-development-autocad-templates/storm-water-forms Has a Storm Drain Maintenance Agreement been submitted to the County? ☐ Yes, copy included with Attachment 3B ☒ No ☐ Not Applicable (e.g., city-owned property/project)

ATTACHMENT 1 – POLLUTANT CONTROLS: SUPPORT DOCUMENT AND CHECKLIST

Each of the attachments indicated below should be considered for inclusion with the SWQMP. Use this checklist to indicate which attachments are included behind this coversheet.

Attachment Sequence	Contents	Checklist
Attachment 1A	Drainage Management Area (DMA) Exhibit See DMA Exhibit Checklist on next page.	☒ Included
Attachment 1B	Tabular Summary of DMAs Showing DMA ID matching DMA Exhibit, DMA Area, DMA Type, and BMPs* *Provide table in this Attachment OR on DMA Exhibit in Attachment 1A	☒ Included on DMA Exhibit in Attachment 1A ☐ Included as Attachment 1B
Attachment 1C	Harvest and Use Feasibility Screening Checklist (Worksheet B.3-1) Refer to Appendix B.3-1 of the *BMP Design Manual*.	☒ Included ☐ Not included because the entire project will use Infiltration BMPs
Attachment 1D	Categorization of Infiltration Feasibility Condition (Worksheet C.4-1) Refer to Appendices C and D of the *BMP Design Manual*.	☒ Included in the Geotechnical Report ☐ Not included because the entire project will use Harvest and Use BMPs
Attachment 1E	Pollutant Control BMP Design Worksheets and Calculations Refer to Appendices B and E of the *BMP Design Manual* for structural pollutant control BMP design guidelines	☒ Included

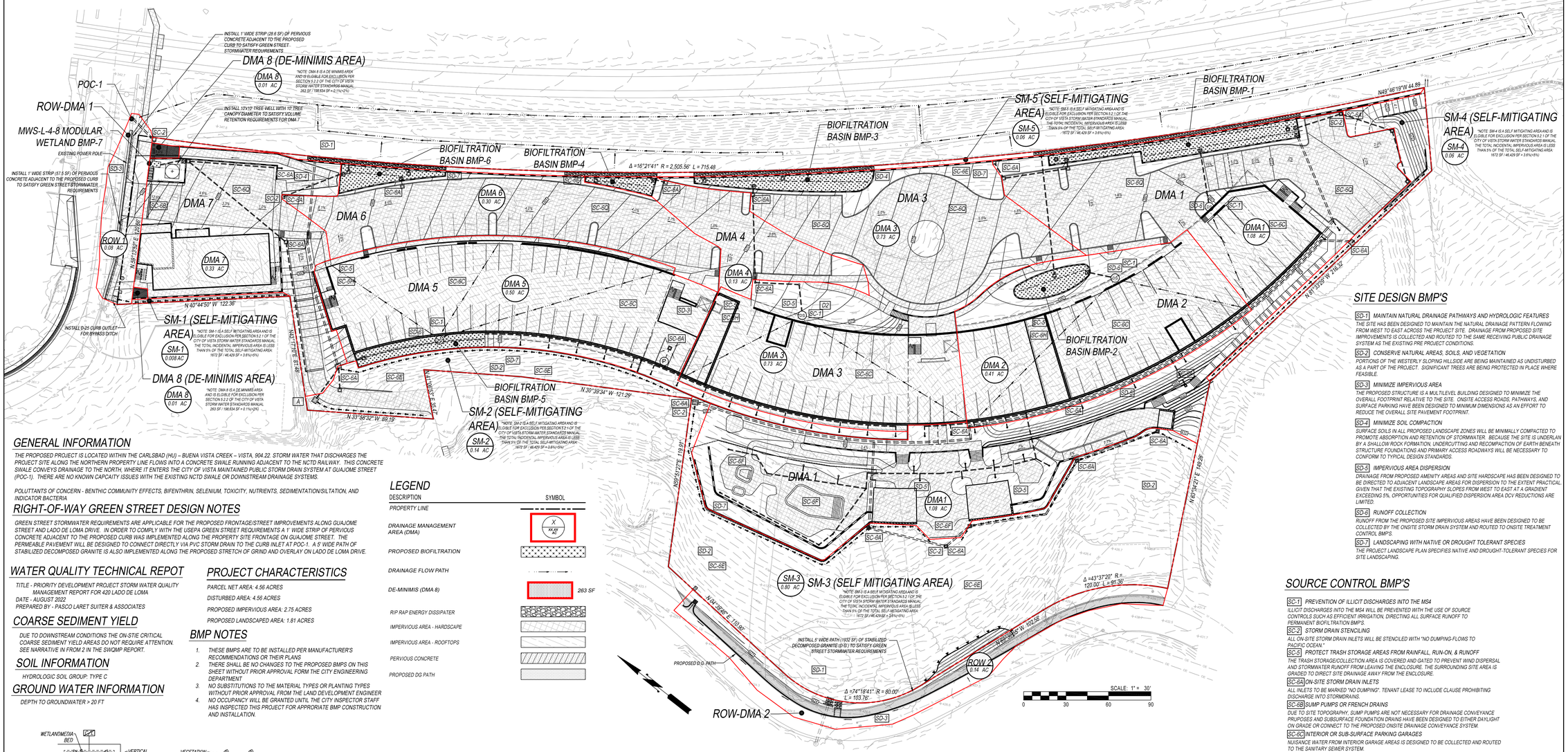
ATTACHMENT 1A – DMA EXHIBIT CHECKLIST

For Attachment 1A, provide map(s) for the project site, titled "DMA Exhibit." The checklist below identifies minimum elements that must be included with the DMA Exhibit.

☒ Underlying hydrologic soil group
☒ Approximate depth to groundwater
☒ Existing natural hydrologic features (watercourses, seeps, springs, wetlands, etc.)
☒ Critical coarse sediment yield areas to be protected
☒ Existing topography and impervious areas
☒ Existing and proposed site drainage network and storm drain structures
☒ Proposed connections to offsite drainage
☒ Proposed demolition
☒ Proposed grading
☒ Proposed impervious features
☒ Proposed design features and surface treatments used to minimize imperviousness
☒ Drainage management area (DMA) boundaries
☒ DMA identification numbers (DMA ID)
☒ DMA areas (square footage or acreage)
☒ DMA type (Drains to BMP, Self-mitigating, De Minimis, or Self-retaining)
☒ Potential pollutant source areas and corresponding required source controls (see Form 2 and Form 3 of SWQMP, *BMP Design Manual* Chapter 4 and Appendix E.1)
☒ Proposed Structural BMPs (see Form 5 of SWQMP)

DRAINAGE MANAGEMENT AREA & HMP EXHIBIT

KENSHO HOUSING - GUAJOME STREET



GENERAL INFORMATION

THE PROPOSED PROJECT IS LOCATED WITHIN THE CARLSBAD (HU) – BUENA VISTA CREEK – VISTA, 904.22. STORM WATER THAT DISCHARGES THE PROJECT SITE ALONG THE NORTHERN PROPERTY LINE FLOWS INTO A CONCRETE SWALE RUNNING ADJACENT TO THE NCTD RAILWAY. THIS CONCRETE SWALE CONVEYS DRAINAGE TO THE NORTH, WHERE IT ENTERS THE CITY OF VISTA MAINTAINED PUBLIC STORM DRAIN SYSTEM AT GUAJOME STREET (POC-1). THERE ARE NO KNOWN CAPCAITY ISSUES WITH THE EXISTING NCTD SWALE OR DOWNSTREAM DRAINAGE SYSTEMS.

POLUTTANTS OF CONCERN - BENTHIC COMMUNITY EFFECTS, BIFENTHRIN, SELENIUM, TOXICITY, NUTRIENTS, SEDIMENTATION/SILTATION, AND INDICATOR BACTERIA

RIGHT-OF-WAY GREEN STREET DESIGN NOTES

GREEN STREET STORMWATER REQUIREMENTS ARE APPLICABLE FOR THE PROPOSED FRONTAGE/STREET IMPROVEMENTS ALONG GUAJOME STREET AND LADO DE LOMA DRIVE. IN ORDER TO COMPLY WITH THE USEPA GREEN STREET REQUIREMENTS A 1' WIDE STRIP OF PERVIOUS CONCRETE ADJACENT TO THE PROPOSED CURB WAS IMPLEMENTED ALONG THE PROPERTY SITE FRONTAGE ON GUAJOME STREET. THE PERMEABLE PAVEMENT WILL BE DESIGNED TO CONNECT DIRECTLY VIA PVC STORM DRAIN TO THE CURB INLET AT POC-1. A 5' WIDE PATH OF STABILIZED DECOMPOSED GRANITE IS ALSO IMPLEMENTED ALONG THE PROPOSED STRETCH OF GRIND AND OVERLAY ON LADO DE LOMA DRIVE.

WATER QUALITY TECHNICAL REPOT

TITLE - PRIORITY DEVELOPMENT PROJECT STORM WATER QUALITY MANAGEMENT REPORT FOR 420 LADO DE LOMA

DATE - AUGUST 2022

PREPARED BY - PASCO LARET SUITER & ASSOCIATES

COARSE SEDIMENT YIELD

DUE TO DOWNSTREAM CONDITIONS THE ON-STIE CRITICAL COARSE SEDIMENT YIELD AREAS DO NOT REQUIRE ATTENTION. SEE NARRATIVE IN FROM 2 IN THE SWQMP REPORT.

SOIL INFORMATION

HYDROLOGIC SOIL GROUP: TYPE C

GROUND WATER INFORMATION

DEPTH TO GROUNDWATER > 20 FT

PROJECT CHARACTERISTICS

PARCEL NET AREA: 4.56 ACRES

DISTURBED AREA: 4.56 ACRES

PROPOSED IMPERVIOUS AREA: 2.75 ACRES

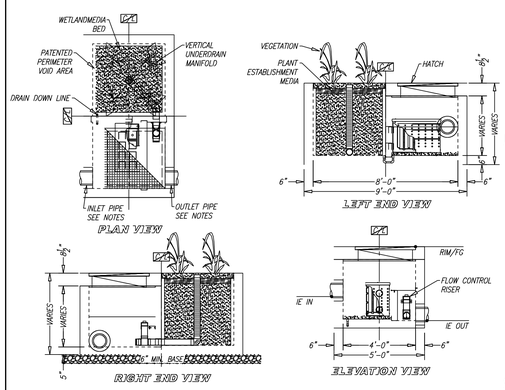
PROPOSED LANDSCAPED AREA: 1.81 ACRES

BMP NOTES

1. THESE BMPS ARE TO BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS OR THEIR PLANS
2. THERE SHALL BE NO CHANGES TO THE PROPOSED BMPS ON THIS SHEET WITHOUT PRIOR APPROVAL FORM THE CITY ENGINEERING DEPARTMENT
3. NO SUBSTITUTIONS TO THE MATERIAL TYPES OR PLANTING TYPES WITHOUT PRIOR APPROVAL FROM THE LAND DEVELOPMENT ENGINEER
4. NO OCCUPANCY WILL BE GRANTED UNTIL THE CITY INSPECTOR STAFF HAS INSPECTED THIS PROJECT FOR APPROPRIATE BMP CONSTRUCTION AND INSTALLATION.

LEGEND

DESCRIPTION	SYMBOL
PROPERTY LINE	
DRAINAGE MANAGEMENT AREA (DMA)	X XX AC
PROPOSED BIOFILTRATION	
DRAINAGE FLOW PATH	
DE-MINIMIS (DMA 8)	263 SF
RIP RAP ENERGY DISSIPATER	
IMPERVIOUS AREA - HARDSCAPE	
IMPERVIOUS AREA - ROOFTOPS	
PERVIOUS CONCRETE	
PROPOSED DG PATH	



MODULAR WETLAND TYPICAL SECTION

NTS

TREATMENT FLOW (CFS)	0.115
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	2.0
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

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.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE. (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL PIPES SHALL BE SEALED WATER TIGHT PER MANUFACTURERS STANDARD CONNECTION DETAIL.
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. VEGETATION SUPPLIED AND INSTALLED BY OTHERS. ALL UNITS WITH VEGETATION MUST HAVE DRIP OR SPRAY IRRIGATION SUPPLIED AND INSTALLED BY OTHERS.
7. CONTRACTOR RESPONSIBLE FOR CONTACTING BIO CLEAN FOR ACTIVATION OF UNIT. MANUFACTURERS WARRANTY IS VOID WITH OUT PROPER ACTIVATION BY A BIO CLEAN REPRESENTATIVE.

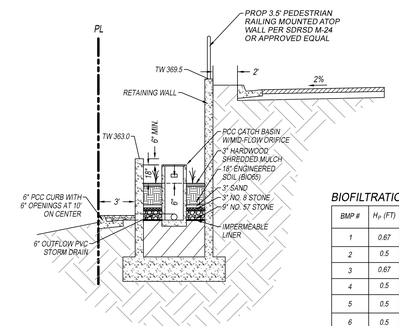
GENERAL NOTES

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

DMA DATA TABLE

DMA	TRIBUTARY AREA (AC)	IMPERV. AREA (AC)	RUNOFF COEFF.	DCV REQ'D (CU. FT.)	BMP ID	STRUCTURAL BMP TYPE
DMA-1	1.08	0.69	0.66	1676	BMP-1	BF-1
DMA-2	0.41	0.34	0.79	763	BMP-2	BF-1
DMA-3	0.73	0.59	0.77	1334	BMP-3	BF-1
DMA-4	0.13	0.11	0.79	243	BMP-4	BF-1
DMA-5	0.50	0.44	0.82	968	BMP-5	BF-1
DMA-6	0.30	0.26	0.81	582	BMP-6	BF-1
DMA-7	0.33	0.26	0.76	597	BMP-7	MODULAR WETLAND
DMA-8	0.01	0.004	0.62	-	-	DE-MINIMIS
SM-TOTAL	1.07	0.04	0.25	-	-	SELF-MIT.
*ROW DMA-1	0.08	0.06	0.73	-	-	PERVIOUS CONC.
*ROW DMA-2	0.15	0.06	0.48	-	-	D.G. PATH

*BOTH ROW DMA-1 AND ROW DMA-2 ARE EXCLUDED FROM THE ON-SITE LIMITS OF DISTURBANCE BUT SUBJECT TO THE USEPA GREEN STREET STORMWATER REQUIREMENTS. ROW DMA-1 (GUAJOME STREET IMPROVEMENTS) MEETS GREEN STREET REQUIREMENTS BY IMPLEMENTING A 1' WIDE STRIP (57.5 SF) OF PERVIOUS CONCRETE ADJACENT TO THE PROPOSED CURB ALONG THE ENTIRE PROPOSED SIDEWALK. ROW DMA-2 (LADO DE LOMA DRIVE IMPROVEMENTS) MEETS GREEN STREET REQUIREMENTS BY IMPLEMENTING A 5' WIDE PATH (1932 SF) OF STABILIZED DECOMPOSED GRANITE ALONG THE PROPOSED STRETCH OF GRIND AND OVERLAY ON LADO DE LOMA DRIVE.



BIOFILTRATION TYPICAL SECTION

NTS

BIOFILTRATION BMP SIZE & ORIFICE DIAMETER SUMMARY

BMP #	H_P (FT)	H_S (FT)	H_G (FT)	HMP ORIFICE (IN)	SLOT ORIFICE DIMENSIONS (IN)	A_{FS} (FT²)	$A_{PONDING}$ (FT²)
1	0.67	2	1	0.8125	(2) 3" H x 6" W	1738	1738
2	0.5	2	1	0.5625	(2) 2" H x 4" W	744	744
3	0.67	2	1	0.75	(2) 2" H x 3" W	1197	1197
4	0.5	2	1	0.375	(2) 2" H x 1" W	345	345
5	0.5	2	1	0.625	(2) 2" H x 5" W	921	921
6	0.5	2	1	0.5	(2) 3" H x 6" W	725	725

SITE DESIGN BMP'S

SD-1 MAINTAIN NATURAL DRAINAGE PATHWAYS AND HYDROLOGIC FEATURES
THE SITE HAS BEEN DESIGNED TO MAINTAIN THE NATURAL DRAINAGE PATTERN FLOWING FROM WEST TO EAST ACROSS THE PROJECT SITE. DRAINAGE FROM PROPOSED SITE IMPROVEMENTS IS COLLECTED AND ROUTED TO THE SAME RECEIVING PUBLIC DRAINAGE SYSTEM AS THE EXISTING PRE PROJECT CONDITIONS.

SD-2 CONSERVE NATURAL AREAS, SOILS, AND VEGETATION
PORTIONS OF THE WESTERLY SLOPING HILLSIDE ARE BEING MAINTAINED AS UNDISTURBED AS A PART OF THE PROJECT. SIGNIFICANT TREES ARE BEING PROTECTED IN PLACE WHERE FEASIBLE.

SD-3 MINIMIZE IMPERVIOUS AREA
THE PROPOSED STRUCTURE IS A MULTILEVEL BUILDING DESIGNED TO MINIMIZE THE OVERALL FOOTPRINT RELATIVE TO THE SITE. ONSITE ACCESS ROADS, PATHWAYS, AND SURFACE PARKING HAVE BEEN DESIGNED TO MINIMUM DIMENSIONS AS AN EFFORT TO REDUCE THE OVERALL SITE PAVEMENT FOOTPRINT.

SD-4 MINIMIZE SOIL COMPACTION
SURFACE SOILS IN ALL PROPOSED LANDSCAPE ZONES WILL BE MINIMALLY COMPACTED TO PROMOTE ABSORPTION AND RETENTION OF STORMWATER. BECAUSE THE SITE IS UNDERLAN BY A SHALLOW ROCK FORMATION, UNDERCUTTING AND RECOMPACTION OF EARTH BENEATH STRUCTURE FOUNDATIONS AND PRIMARY ACCESS ROADWAYS WILL BE NECESSARY TO CONFORM TO TYPICAL DESIGN STANDARDS.

SD-5 IMPERVIOUS AREA DISPERSION
DRAINAGE FROM PROPOSED AMENITY AREAS AND SITE HARDSCAPE HAS BEEN DESIGNED TO BE DIRECTED TO ADJACENT LANDSCAPE AREAS FOR DISPERSION TO THE EXTENT PRACTICAL GIVEN THAT THE EXISTING TOPOGRAPHY SLOPES FROM WEST TO EAST AT A GRADIENT EXCEEDING 5%, OPPORTUNITIES FOR QUALIFIED DISPERSION AREA DCV REDUCTIONS ARE LIMITED.

SD-6 RUNOFF COLLECTION
RUNOFF FROM THE PROPOSED SITE IMPERVIOUS AREAS HAVE BEEN DESIGNED TO BE COLLECTED BY THE ONSITE STORM DRAIN SYSTEM AND ROUTED TO ONSITE TREATMENT CONTROL BMP'S.

SD-7 LANDSCAPING WITH NATIVE OR DROUGHT TOLERANT SPECIES
THE PROJECT LANDSCAPE PLAN SPECIFIES NATIVE AND DROUGHT-TOLERANT SPECIES FOR SITE LANDSCAPING.

SOURCE CONTROL BMP'S

SC-1 PREVENTION OF ILLICIT DISCHARGES INTO THE MS4
ILLICIT DISCHARGES INTO THE MS4 WILL BE PREVENTED WITH THE USE OF SOURCE CONTROLS SUCH AS EFFICIENT IRRIGATION, DIRECTING ALL SURFACE RUNOFF TO PERMANENT BIOFILTRATION BMP'S.

SC-2 STORM DRAIN STENCILING
ALL ON-SITE STORM DRAIN INLETS WILL BE STENCILED WITH "NO DUMPING-FLOWS TO PACIFIC OCEAN."

SC-5 PROTECT TRASH STORAGE AREAS FROM RAINFALL, RUN-ON, & RUNOFF
THE TRASH STORAGE/COLLECTION AREA IS COVERED AND GATED TO PREVENT WIND DISPERSAL AND STORMWATER RUNOFF FROM LEAVING THE ENCLOSURE. THE SURROUNDING SITE AREA IS GRADED TO DIRECT SITE DRAINAGE AWAY FROM THE ENCLOSURE.

SC-6A ON-SITE STORM DRAIN INLETS
ALL INLETS TO BE MARKED "NO DUMPING". TENANT LEASE TO INCLUDE CLAUSE PROHIBITING DISCHARGE INTO STORMDRAINS.

SC-6B SUMP PUMPS OR FRENCH DRAINS
DUE TO SITE TOPOGRAPHY, SUMP PUMPS ARE NOT NECESSARY FOR DRAINAGE CONVEYANCE PRUPOSES AND SUBSURFACE FOUNDATION DRAINS HAVE BEEN DESIGNED TO EITHER DAYLIGHT ON GRADE OR CONNECT TO THE PROPOSED ONSITE DRAINAGE CONVEYANCE SYSTEM.

SC-6C INTERIOR OR SUB-SURFACE PARKING GARAGES
NUISANCE WATER FROM INTERIOR GARAGE AREAS IS DESIGNED TO BE COLLECTED AND ROUTED TO THE SANITARY SEWER SYSTEM

SC-6E LANDSCAPE / OUTDOOR PESTICIDE USE
EXISTING DROUGHT TOLERANT PLANTS TO BE PRESERVED IN LANDSCAPED AREAS WHERE FEASIBLE. PROPOSED LANDSCAPING HAS BEEN DESIGNED TO BE APPROPRIATE FOR SLOPES, CLIMATE, AND SOIL CONDITIONS SPECIFIC TO THE SITE. PESTICIDE USE IS TO BE LIMITED.

SC-6F POOLS, SPAS, PONDS, DECORATIVE FOUNTAINS, OTHER WATER FEATURES
PROPOSED POOL DECK DRAINAGE HAS BEEN DESIGNED TO BE CAPTURED BY CHANNEL DRAINS ADJACENT TO THE POOL AREA AND ROUTED TO ONSITE TREATMENT CONTROL BMP'S.

SC-6H REFUSE / TRASH COLLECTION AREAS
THE TRASH STORAGE / COLLECTION AREA IS COVERED AND GATED TO PREVENT DISPERSAL AND STORMWATER RUNOFF. THE STORAGE AREA IS GRADED TO PREVENT RUN-ON.

SC-6G FIRE SPRINKLER TEST WATER AND RELIEF POINT
THE FIRE SPRINKLER TEST WATER IS TO BE DIRECTED TO THE SANITARY SEWER PER A SEPARATE PLUMBING PLAN.

SC-6Q PLAZA, SIDEWALKS, PARKING LOTS
PARKING AREAS, WALKWAYS, AND OTHER AMENITY AREAS ON SITE ARE TO BE PERIODICALLY MAINTAINED FREE OF LITTER AND DEBRIS. DRAINAGE FROM THESE AREAS WILL BE COLLECTED AND ROUTED TO ONSITE PERMANENT TREATMENT CONTROL BMP'S.

OTHER BMP SUMMARY

BMP #	BMP TYPE	BMP AREA	BMP OUTLET	OULET PIPE
BMP 7	MODULAR WETLAND SYSTEM MWS L-4-8-V	4'x8'	6" OVERFLOW DRAIN	12"
	TREE WELL	10 FT TREE	--	--

© SAFDIE RABINES ARCHITECTS

P22-0282
PLANNING CASE #

KENSHO HOUSING

Vista, CA 92083

TIDELINE PARTNERS

OWNER:
TIDELINE PARTNERS
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REGISTERED PROFESSIONAL ENGINEER — WILLIAM GREGG MASK — No. 73620 — CIVIL — STATE OF CALIFORNIA

REVISIONS

Number	Description	Date
1	SITE DEVELOPMENT PLAN SUBMITTAL	08/08/2022
2	SDP RESUBMITTAL	10/21/2022
3	SDP RESUBMITTAL	12/21/2022

Issue Date	Scale
12/21/2022	1" = 30'
SRA Project Number	PLSA Project Number
2127	3599

PASCO LARET SUITER & ASSOCIATES
San Diego | Solana Beach | Orange County
Phone 858.259.8212 | www.plsaengineering.com

DRAINAGE MANAGEMENT AREA & HMP EXHIBIT

C7
15 OF 34

ATTACHMENT 1c

Harvest and Use Feasibility Screening	**Worksheet B.3-1**

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.

Toilet/Urinal Flushing
(9.3 gal/person-day) x (0.13368 cuft/gal) x (1.5 days) = 1.86 cuft/person-36hr
Assume (2 people per house x 183 units) x (1.86 cuft/person-36 hr) = 366 cuft/36hr

Landscape Irrigation
(1.82 ac irrigated) x (390 gal/ac-36hr) x (0.13368 cuft/gal) = 95 cuft/36hr

Total = 366 cuft + 95 cuft = 461 cuft

3. Calculate the DCV using worksheet B-2.1.

DCV = 5,916 cuft

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

ATTACHMENT 1d

Worksheet C.4-1: Categorization of Infiltration Feasibility Condition

Categorization of Infiltration Feasibility Condition	Worksheet C.4-1

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?

Note that it is not necessary to investigate each and every criterion in the worksheet if infiltration is precluded. Instead a letter of justification from a geotechnical professional familiar with the local conditions substantiating any geotechnical issues will be required.

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 must be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X

Provide basis:

The infiltration rates of the existing soil for locations P-1 through P-4 and P-7 through P-10 based on the on-site infiltration study were calculated to be less than 0.5 inches per hour (P-1=0.03 in/hr; P-2 =0.05 in/hr; P-3=0.06 in/hr, P-4=0.03 in/hr, P-7=0.06 in/hr, P-8=0.34 in/hr, P-9=0.08 in/hr, and P-10= 0.19 inches per hour) after applying a minimum factor of safety (F) of FS=2.

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 must be based on a comprehensive evaluation of the factors presented in Appendix C.2.		X

Provide basis:

No. See Criterion 1.

Worksheet C.4-1 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 must be based on a comprehensive evaluation of the factors presented in Appendix C.3.		X
Provide basis: No. See Criterion 1.			
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 must be based on a comprehensive evaluation of the factors presented in Appendix C.3.		X
Provide basis: No. See Criterion 1.			
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		Proceed to Part 2

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by County staff to substantiate findings.

Worksheet C.4-1 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 must be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	X	

Provide basis:

The infiltration rates of the existing soil for locations P-1 through P-4 and P-7 through P-10 based on the on-site infiltration study were calculated to be less than 0.5 inches per hour (P-1=0.03 in/hr; P-2 =0.05 in/hr; P-3=0.06 in/hr, P-4=0.03 in/hr, P-7=0.06 in/hr, P-8=0.34 in/hr, P-9=0.08 in/hr, and P-10= 0.19 inches per hour) after applying a minimum factor of safety (F) of FS=2.

However, infiltration will increase the risk of geotechnical hazards as described below and in NOVA's reporting (NOVA 2022).

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 must be based on a comprehensive evaluation of the factors presented in Appendix C.2.		X

Provide basis:

C2.1 A geologic investigation was performed at the subject site.
C2.2 Settlement due to water infiltration is possible due to the loose fill/colluvium on site.
C2.3 Infiltration has the potential to cause slope failures. BMPs are to be sited a minimum of 50 feet away from any slope. This setback may not be achieved due to the limited space at the site.
C2.4 BMPs are to be sited a minimum of 10 feet away from all underground utilities.
C2.5 Stormwater infiltration can result in damaging ground water mounding during wet periods. The dense tonalite underlying the entire site may be an impermeable unit causing groundwater mounding.
C2.6 BMPs are to be sited a minimum of 10 feet away from any foundations or retaining walls.
C2.7 Other Factors: It is NOVA's judgment that this site is not suitable for permanent stormwater infiltration BMPs. NOVA recommends lining any BMPs with the required impermeable liner ands be limited by siting any such structures away from property lines.

Worksheet C.4-1 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 must be based on a comprehensive evaluation of the factors presented in Appendix C.3.		X
Provide basis: Based on the geotechnical hazards associated with the relatively low infiltration rates, it is NOVA's judgment that infiltration should not be considered at this site.			
8	**Can infiltration be allowed without violating downstream water rights**? The response to this Screening Question must be based on a comprehensive evaluation of the factors presented in Appendix C.3.		X
Provide basis: Based on the geotechnical hazards associated with the relatively low infiltration rates, it is NOVA's judgment that infiltration should not be considered at this site.			
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.**		No Infiltration

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by Agency/Jurisdictions to substantiate findings

Worksheet C.4-1: Categorization of Infiltration Feasibility Condition

Categorization of Infiltration Feasibility Condition	Worksheet C.4-1

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?

Note that it is not necessary to investigate each and every criterion in the worksheet if infiltration is precluded. Instead a letter of justification from a geotechnical professional familiar with the local conditions substantiating any geotechnical issues will be required.

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 must be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		

Provide basis:

The infiltration rates of the existing soils for locations P-5 and P-6 were calculated to be 1.5 and 1.2 inches per hour, respectively, after applying a minimum factor of safety of F=2. Infiltration rates of greater than 0.5 inches per hour imply that geologic conditions allow for full infiltration; however, infiltration rates at this site are highly variable, due to the degree of weathering of the tonalite under the site, with many of the tests resulting in rates consistent with a No Infiltration Condition. Therefore, based on the widely variable rates across the site, it is NOVA's judgment that more conservative partial infiltration rates should be utilized for design of BMPs in the location of P-5 and P-6.

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 must be based on a comprehensive evaluation of the factors presented in Appendix C.2.		

Provide basis:

No. See Criterion 1.

Worksheet C.4-1 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 must be based on a comprehensive evaluation of the factors presented in Appendix C.3.		X
Provide basis: Based on the geotechnical hazards associated with the high infiltration rates, it is NOVA's judgment that partial infiltration rates be utilized for the design at this site in the locations of P-5 and P-6.			
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 must be based on a comprehensive evaluation of the factors presented in Appendix C.3.		X
Provide basis: Based on the geotechnical hazards associated with the high infiltration rates, and the highly variable infiltration rates across the site, it is NOVA's judgment that partial infiltration rates be utilized for the design at this site in the location of P-5 and P-6.			
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	Proceed to Part 2	

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by County staff to substantiate findings.

Worksheet C.4-1 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 must be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		

Provide basis:

The infiltration rates of the existing soils for locations P-5 and P-6 were calculated to be 1.5 and 1.2 inches per hour, respectively, after applying a minimum factor of safety of F=2. Infiltration rates of greater than 0.5 inches per hour imply that geologic conditions allow for full infiltration; however, infiltration rates at this site are highly variable, due to the degree of weathering of the tonalite under the site, with many of the tests resulting in rates consistent with a No Infiltration Condition. Therefore, based on the widely variable rates across the site, it is NOVA's judgment that more conservative partial infiltration rates should be utilized for design of BMPs in the location of P-5 and P-6.

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 must be based on a comprehensive evaluation of the factors presented in Appendix C.2.		

Provide basis:

C2.1 A geologic investigation was performed at the subject site.
C2.2 Settlement due to water infiltration is possible due to the loose fill/colluvium on site.
C2.3 Infiltration has the potential to cause slope failures. BMPs are to be sited a minimum of 50 feet away from any slope.
C2.4 BMPs are to be sited a minimum of 10 feet away from all underground utilities.
C2.5 Stormwater infiltration can result in damaging ground water mounding during wet periods. The dense tonalite underlying the entire site may be an impermeable unit causing groundwater mounding.
C2.6 BMPs are to be sited a minimum of 10 feet away from any foundations or retaining walls.
C2.7 Other Factors: It is NOVA's judgment that this site design should utilize partial infiltration rates for the locations tested. NOVA recommends lining any BMPs with the required impermeable liner ands be limited by siting any such structures away from property lines.

Worksheet C.4-1 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 must be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: Based on the widely variable infiltration rates across the site, and the geotechnical hazards associated with the high infiltration rates, it is NOVA's judgment that partial infiltration rates be utilized for the design at this site in the locations tested.			
8	**Can infiltration be allowed without violating downstream water rights**? The response to this Screening Question must be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: Based on the widely variable infiltration rates across the site, and the geotechnical hazards associated with the high infiltration rates, it is NOVA's judgment that partial infiltration rates be utilized for the design at this site in the locations tested.			
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.**	Partial Infiltration	

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by Agency/Jurisdictions to substantiate findings

ATTACHMENT 1e

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

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Standard Drainage Basin Inputs	1	Drainage Basin ID or Name	1	2	3	4	5	6	7				unitless
	2	85th Percentile 24-hr Storm Depth	0.65	0.65	0.65	0.65	0.65	0.65	0.65				inches
	3	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	30,262	15,027	25,576	4,724	19,346	11,444	11,460				sq-ft
	4	Semi-Pervious Surfaces Not Serving as Dispersion Area (C=0.30)											sq-ft
	5	Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10)											sq-ft
	6	Natural Type A Soil Not Serving as Dispersion Area (C=0.10)											sq-ft
	7	Natural Type B Soil Not Serving as Dispersion Area (C=0.14)											sq-ft
	8	Natural Type C Soil Not Serving as Dispersion Area (C=0.23)	16,626	2,803	6,402	954	2,446	1,827	3,046				sq-ft
	9	Natural Type D Soil Not Serving as Dispersion Area (C=0.30)											sq-ft
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	10	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No	No	No	No	No	No	Yes	No	No	No	yes/no
	11	Impervious Surfaces **Directed to Dispersion Area** per SD-B (Ci=0.90)											sq-ft
	12	Semi-Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	13	Engineered Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	14	Natural Type A Soil **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	15	Natural Type B Soil **Serving as Dispersion Area** per SD-B (Ci=0.14)											sq-ft
	16	Natural Type C Soil **Serving as Dispersion Area** per SD-B (Ci=0.23)											sq-ft
	17	Natural Type D Soil **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	18	Number of Tree Wells Proposed per SD-A							1				#
	19	Average Mature Tree Canopy Diameter							10				ft
	20	Number of Rain Barrels Proposed per SD-E											#
	21	Average Rain Barrel Size											gal
Initial Runoff Factor Calculation	22	Total Tributary Area	46,888	17,829	31,978	5,679	21,791	13,271	14,505	0	0	0	sq-ft
	23	Initial Runoff Factor for Standard Drainage Areas	0.66	0.79	0.77	0.79	0.82	0.81	0.76	0.00	0.00	0.00	unitless
	24	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	25	Initial Weighted Runoff Factor	0.66	0.79	0.77	0.79	0.82	0.81	0.76	0.00	0.00	0.00	unitless
	26	Initial Design Capture Volume	1,676	763	1,334	243	968	582	597	0	0	0	cubic-feet
Dispersion Area Adjustments	27	Total Impervious Area Dispersed to Pervious Surface	0	0	0	0	0	0	0	0	0	0	sq-ft
	28	Total Pervious Dispersion Area	0	0	0	0	0	0	0	0	0	0	sq-ft
	29	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ratio
	30	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	31	Runoff Factor After Dispersion Techniques	0.66	0.79	0.77	0.79	0.82	0.81	0.76	n/a	n/a	n/a	unitless
	32	Design Capture Volume After Dispersion Techniques	1,676	763	1,334	243	968	582	597	0	0	0	cubic-feet
Tree & Barrel Adjustments	33	Total Tree Well Volume Reduction	0	0	0	0	0	0	40	0	0	0	cubic-feet
	34	Total Rain Barrel Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
Results	35	Final Adjusted Runoff Factor	0.66	0.79	0.77	0.79	0.82	0.81	0.71	0.00	0.00	0.00	unitless
	36	Final Effective Tributary Area	30,946	14,085	24,623	4,486	17,869	10,750	10,299	0	0	0	sq-ft
	37	Initial Design Capture Volume Retained by Site Design Elements	0	0	0	0	0	0	40	0	0	0	cubic-feet
	38	Final Design Capture Volume Tributary to BMP	1,676	763	1,334	243	968	582	557	0	0	0	cubic-feet

No Warning Messages

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

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Basic Analysis	1	Drainage Basin ID or Name	1	2	3	4	5	6	7	-	-	-	unitless
	2	85th Percentile Rainfall Depth	0.65	0.65	0.65	0.65	0.65	0.65	0.65	-	-	-	inches
	3	Predominant NRCS Soil Type Within BMP Location	C	C	C	C	C	C	C				unitless
	4	Is proposed BMP location Restricted or Unrestricted for Infiltration Activities?	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted				unitless
	5	Nature of Restriction	Slopes	Slopes	Slopes	Slopes	Slopes	Slopes	Slopes				unitless
	6	Do Minimum Retention Requirements Apply to this Project?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes/no
	7	Are Habitable Structures Greater than 9 Stories Proposed?	No	No	No	No	No	No	No				yes/no
Advanced Analysis	8	Has Geotechnical Engineer Performed an Infiltration Analysis?	Yes	Yes	Yes	Yes	Yes	Yes	Yes				yes/no
	9	Design Infiltration Rate Recommended by Geotechnical Engineer	0.000	0.000	0.000	0.000	0.000	0.000	0.000				in/hr
Result	10	Design Infiltration Rate Used To Determine Retention Requirements	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-	-	-	in/hr
	11	Percent of Average Annual Runoff that Must be Retained within DMA	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	-	-	-	percentage
	12	Fraction of DCV Requiring Retention	0.01	0.01	0.01	0.01	0.01	0.01	0.01	-	-	-	ratio
	13	Required Retention Volume	17	8	13	2	10	6	6	-	-	-	cubic-feet

No Warning Messages

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

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
BMP Inputs	1	Drainage Basin ID or Name	1	2	3	4	5	6	7	-	-	-	sq-ft
	2	Design Infiltration Rate Recommended	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-	-	-	in/hr
	3	Design Capture Volume Tributary to BMP	1,676	763	1,334	243	968	582	557	-	-	-	cubic-feet
	4	Is BMP Vegetated or Unvegetated?	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated					unitless
	5	Is BMP Impermeably Lined or Unlined?	Lined	Lined	Lined	Lined	Lined	Lined					unitless
	6	Does BMP Have an Underdrain?	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain					unitless
	7	Does BMP Utilize Standard or Specialized Media?	Standard	Standard	Standard	Standard	Standard	Standard					unitless
	8	Provided Surface Area	1,738	744	1,197	345	921	725					sq-ft
	9	Provided Surface Ponding Depth	6	6	6	6	6	6					inches
	10	Provided Soil Media Thickness	24	24	24	24	24	24					inches
	11	Provided Gravel Thickness (Total Thickness)	12	12	12	12	12	12					inches
	12	Underdrain Offset	3	3	3	3	3	3					inches
	13	Diameter of Underdrain or Hydromod Orifice (Select Smallest)	1.00	1.00	1.00	1.00	1.00	1.00					inches
	14	Specialized Soil Media Filtration Rate											in/hr
	15	Specialized Soil Media Pore Space for Retention											unitless
	16	Specialized Soil Media Pore Space for Biofiltration											unitless
	17	Specialized Gravel Media Pore Space											unitless
Retention Calculations	18	Volume Infiltrated Over 6 Hour Storm	0	0	0	0	0	0	0	0	0	0	cubic-feet
	19	Ponding Pore Space Available for Retention	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	unitless
	20	Soil Media Pore Space Available for Retention	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	unitless
	21	Gravel Pore Space Available for Retention (Above Underdrain)	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.40	0.40	0.40	unitless
	22	Gravel Pore Space Available for Retention (Below Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	23	Effective Retention Depth	2.40	2.40	2.40	2.40	2.40	2.40	0.00	0.00	0.00	0.00	inches
	24	Fraction of DCV Retained (Independent of Drawdown Time)	0.21	0.20	0.18	0.28	0.19	0.25	0.00	0.00	0.00	0.00	ratio
	25	Calculated Retention Storage Drawdown Time	120	120	120	120	120	120	0	0	0	0	hours
	26	Efficacy of Retention Processes	0.23	0.22	0.20	0.29	0.21	0.26	0.00	0.00	0.00	0.00	ratio
	27	Volume Retained by BMP (Considering Drawdown Time)	385	169	268	70	204	154	0	0	0	0	cubic-feet
	28	Design Capture Volume Remaining for Biofiltration	1,291	594	1,066	173	764	428	557	0	0	0	cubic-feet
Biofiltration Calculations	29	Max Hydromod Flow Rate through Underdrain	0.0470	0.0470	0.0470	0.0470	0.0470	0.0470	0.0000	0.0000	0.0000	0.0000	cfs
	30	Max Soil Filtration Rate Allowed by Underdrain Orifice	1.17	2.73	1.70	5.89	2.21	2.80	0.00	0.00	0.00	0.00	in/hr
	31	Soil Media Filtration Rate per Specifications	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	32	Soil Media Filtration Rate to be used for Sizing	1.17	2.73	1.70	5.00	2.21	2.80	0.00	0.00	0.00	0.00	in/hr
	33	Depth Biofiltered Over 6 Hour Storm	7.02	16.39	10.19	30.00	13.24	16.82	0.00	0.00	0.00	0.00	inches
	34	Ponding Pore Space Available for Biofiltration	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	unitless
	35	Soil Media Pore Space Available for Biofiltration	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	unitless
	36	Gravel Pore Space Available for Biofiltration (Above Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	37	Effective Depth of Biofiltration Storage	14.40	14.40	14.40	14.40	14.40	14.40	0.00	0.00	0.00	0.00	inches
	38	Drawdown Time for Surface Ponding	5	2	4	1	3	2	0	0	0	0	hours
	39	Drawdown Time for Effective Biofiltration Depth	12	5	8	3	7	5	0	0	0	0	hours
	40	Total Depth Biofiltered	21.42	30.79	24.59	44.40	27.64	31.22	0.00	0.00	0.00	0.00	inches
	41	Option 1 - Biofilter 1.50 DCV: Target Volume	1,937	891	1,599	259	1,146	643	836	0	0	0	cubic-feet
	42	Option 1 - Provided Biofiltration Volume	1,937	891	1,599	259	1,146	643	0	0	0	0	cubic-feet
	43	Option 2 - Store 0.75 DCV: Target Volume	968	446	799	129	573	321	418	0	0	0	cubic-feet
	44	Option 2 - Provided Storage Volume	968	446	799	129	573	321	0	0	0	0	cubic-feet
	45	Portion of Biofiltration Performance Standard Satisfied	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	ratio
Result	46	Do Site Design Elements and BMPs Satisfy Annual Retention Requirements?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	yes/no
	47	Overall Portion of Performance Standard Satisfied (BMP Efficacy Factor)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	ratio
	48	**Deficit of Effectively Treated Stormwater**	**0**	**0**	**0**	**0**	**0**	**0**	-557	**n/a**	**n/a**	**n/a**	cubic-feet

Attention!

Please note that this error message is only present due to the fact that BMP 7 (Modular Wetland with a tree well to satisfy retention requirements) does not have BMP inputs on this sheet. All other Biofiltration BMPs are fully satisfying the standards for pollutant control for the drainage area.

-This BMP does not fully satisfy the performance standards for pollutant control for the drainage area.

3599 Kensho
10/11/2022

Appendix B: Storm Water Pollutant Control Hydrologic Calculations and Sizing Methods

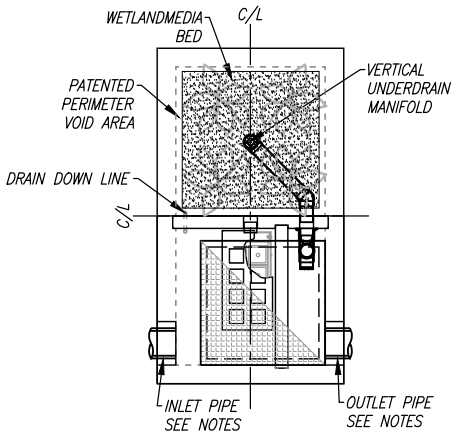
Worksheet B.6-1: Flow-Thru Design Flows

DMA-7

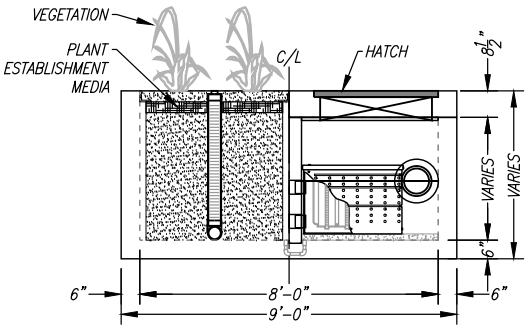
Flow-thru Design Flows		Worksheet B.6-1		
1	DCV	DCV	597	cubic-feet
2	DCV retained	$DCV_{retained}$	40	cubic-feet
3	DCV biofiltered	$DCV_{biofiltered}$	0	cubic-feet
4	DCV requiring flow-thru	$DCV_{flow\text{-}thru}$	557	cubic-feet
5	Adjustment factor (Line 4 / Line 1)*	AF=	0.93	unitless
6	Design rainfall intensity	i=	0.20	in/hr
7	Area tributary to BMP (s)	A=	0.33	acres
8	Area-weighted runoff factor (estimate using Appendix B.2)	C=	0.76	unitless
9	Calculate Flow Rate = (C x i x A)	Q=	0.05	cfs
		1.5Q=	0.070	cfs

SITE SPECIFIC DATA			
PROJECT NUMBER			
PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
N/A		0.115	
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			OFFLINE
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESTRIAN		
FRAME & COVER	36" X 36"	OPEN PLANTER	N/A
NOTES:			

* PRELIMINARY NOT FOR CONSTRUCTION



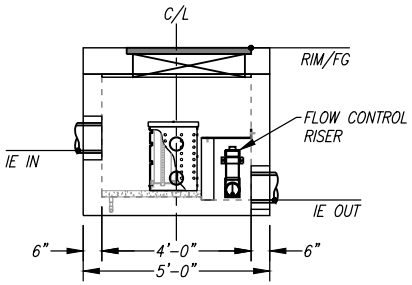
PLAN VIEW



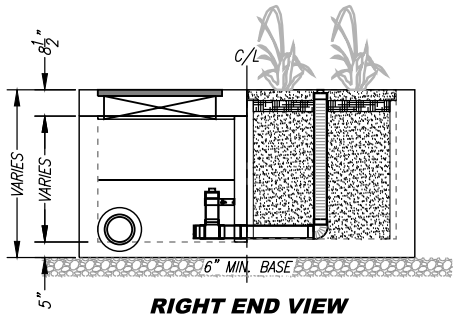
LEFT END VIEW

INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN 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.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE. (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL PIPES SHALL BE SEALED WATER TIGHT PER MANUFACTURERS STANDARD CONNECTION DETAIL.
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. VEGETATION SUPPLIED AND INSTALLED BY OTHERS. ALL UNITS WITH VEGETATION MUST HAVE DRIP OR SPRAY IRRIGATION SUPPLIED AND INSTALLED BY OTHERS.
7. CONTRACTOR RESPONSIBLE FOR CONTACTING BIO CLEAN FOR ACTIVATION OF UNIT. MANUFACTURERS WARRANTY IS VOID WITH OUT PROPER ACTIVATION BY A BIO CLEAN REPRESENTATIVE.



ELEVATION VIEW



RIGHT END VIEW

GENERAL NOTES

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

TREATMENT FLOW (CFS)	0.115
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	2.0
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

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

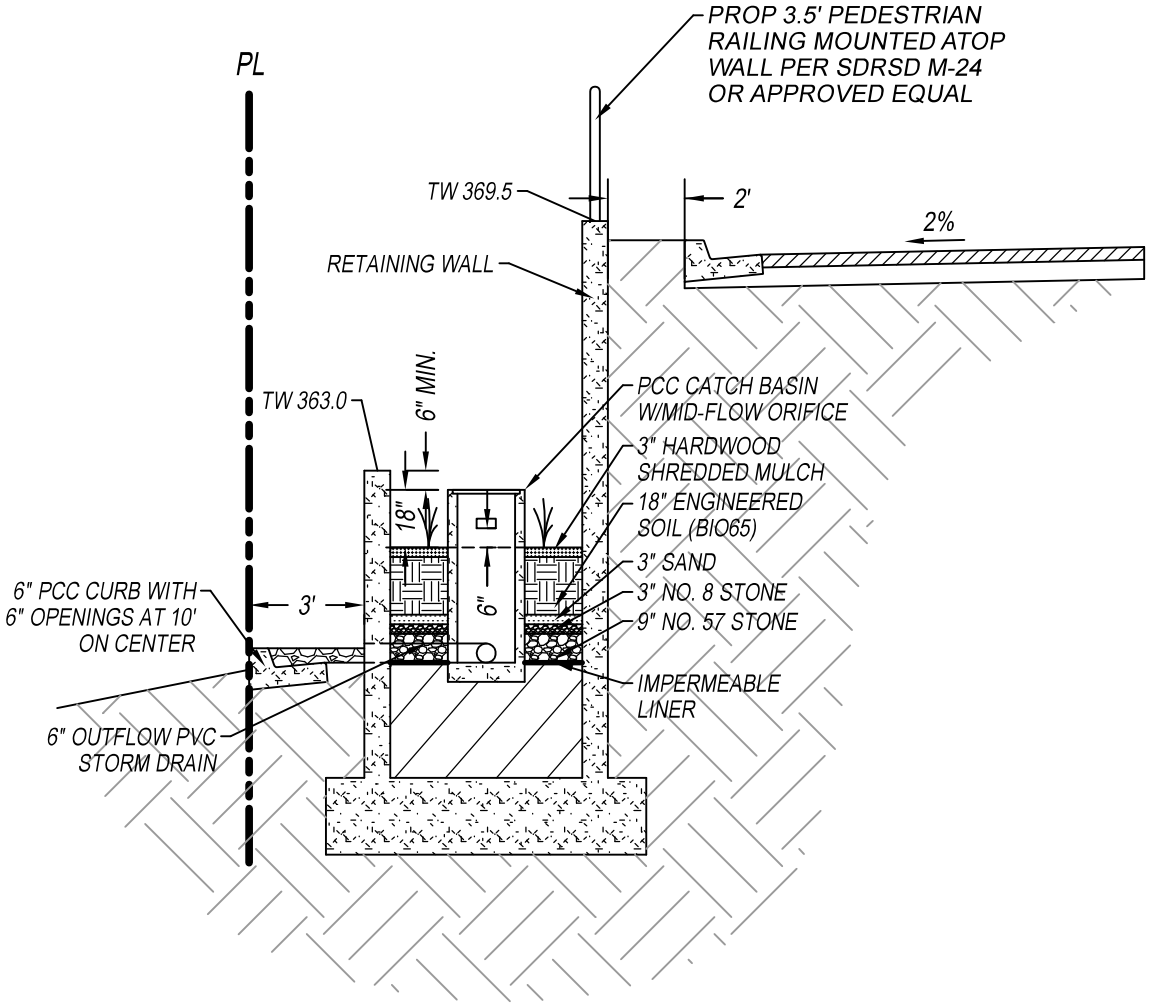
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Bio Clean
A Forterra Company

MWS-L-4-8-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

5/23/19TOLFF



BIOFILTRATION TYPICAL SECTION

NTS

ATTACHMENT 2 – HYDROMODIFICATION MANAGEMENT CONTROLS: SUPPORT DOCUMENTATION & CHECKLIST

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

Each of the attachments indicated below should be considered for inclusion with the SWQMP. Use this checklist to indicate which attachments are included behind this coversheet.

Attachment Sequence	Contents	Checklist
Attachment 2A	Hydromodification Management Exhibit	☒ Included See Hydromodification Management Exhibit Checklist on the back of this Attachment cover sheet.
Attachment 2B	Management of Critical Coarse Sediment Yield Areas See Section 6.2 of the *BMP Design Manual*.	☒ Exhibit showing project drainage boundaries marked on WMAA Critical Coarse Sediment Yield Area Map Analyses, as applicable, for Critical Coarse Sediment Yield Area Determination, per *BMP Design Manual:* ☐ 6.2.1 Verification of Geomorphic Landscape Units Onsite ☐ 6.2.2 Downstream Systems Sensitivity to Coarse Sediment ☐ 6.2.3 Optional Additional Analysis of Potential Critical Coarse Sediment Yield Areas Onsite
Attachment 2C	Geomorphic Assessment of Receiving Channels See Section 6.3.4 of the *BMP Design Manual*.	☐ Not performed ☒ Included ☐ Submitted as separate stand-alone document
Attachment 2D	Flow Control Facility Design, including Structural BMP Drawdown Calculations and Overflow Design Summary See Chapter 6 and Appendix G of the *BMP Design Manual*	☒ Included ☐ Submitted as separate stand-alone document
Attachment 2E	Vector Control Plan	☐ Included ☒ Not required because BMPs will drain in less than 96 hours

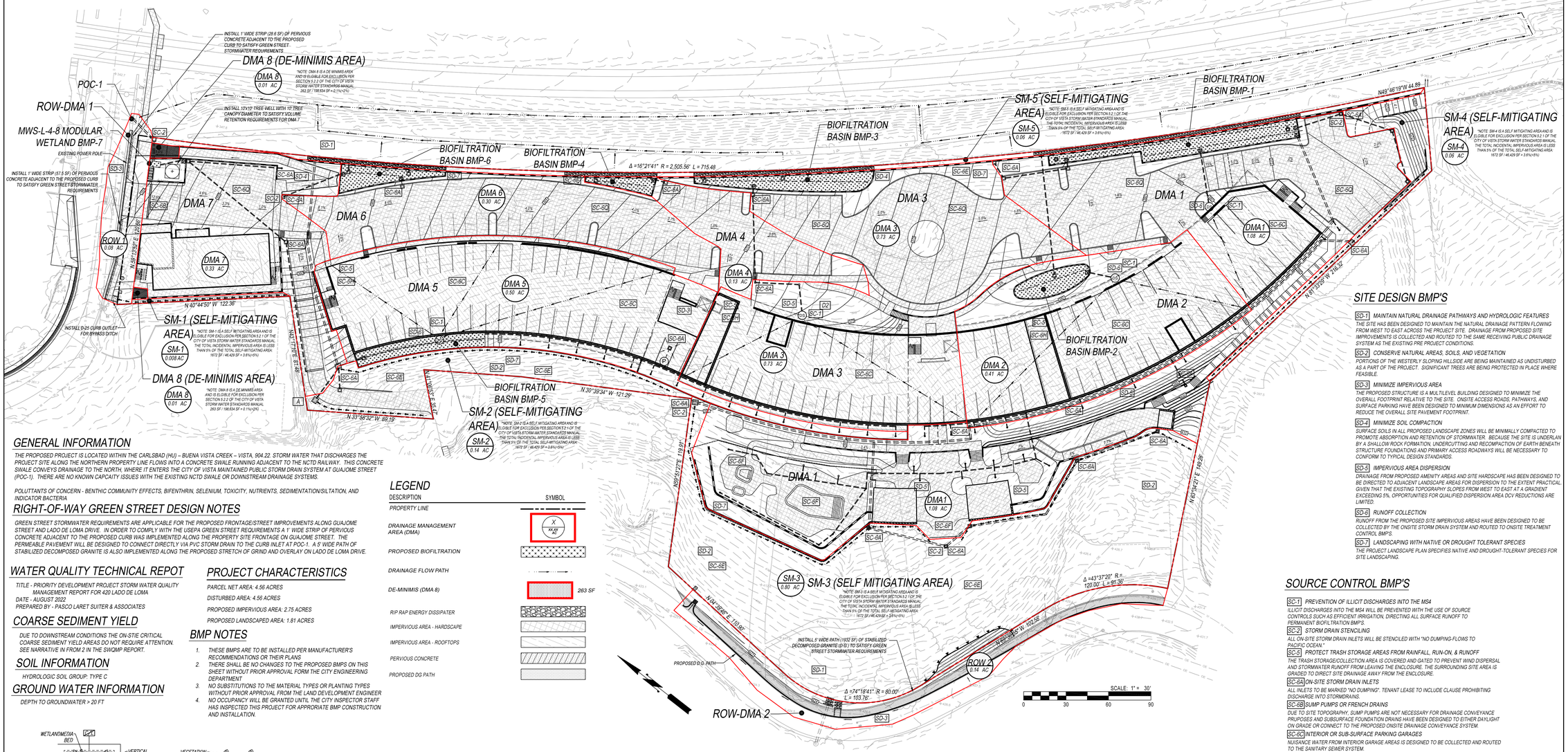
ATTACHMENT 2A – HYDROMODIFICATION MANAGEMENT EXHIBIT

For Attachment 2A, provide map(s) for the project site, titled "Hydromodification Management Exhibit." The checklist below identifies minimum elements that must be included with the exhibit.

☒ Underlying hydrologic soil group
☒ Approximate depth to groundwater
☒ Existing natural hydrologic features (watercourses, seeps, springs, wetlands, etc.)
☒ Critical coarse sediment yield areas to be protected
☒ Existing topography and impervious areas
☒ Existing and proposed site drainage network and storm drain structures
☒ Proposed connections to offsite drainage
☒ Proposed demolition
☒ Proposed grading
☒ Proposed impervious features
☒ Proposed design features and surface treatments used to minimize imperviousness
☒ Points of Compliance for hydromodification management
☒ Existing and proposed drainage boundary and drainage area to each Point of Compliance (when necessary, create separate exhibits for pre-development and post-project conditions)
☒ Structural BMPs for hydromodification management (location, type, and size)

DRAINAGE MANAGEMENT AREA & HMP EXHIBIT

KENSHO HOUSING - GUAJOME STREET



GENERAL INFORMATION

THE PROPOSED PROJECT IS LOCATED WITHIN THE CARLSBAD (HU) – BUENA VISTA CREEK – VISTA, 904.22. STORM WATER THAT DISCHARGES THE PROJECT SITE ALONG THE NORTHERN PROPERTY LINE FLOWS INTO A CONCRETE SWALE RUNNING ADJACENT TO THE NCTD RAILWAY. THIS CONCRETE SWALE CONVEYS DRAINAGE TO THE NORTH, WHERE IT ENTERS THE CITY OF VISTA MAINTAINED PUBLIC STORM DRAIN SYSTEM AT GUAJOME STREET (POC-1). THERE ARE NO KNOWN CAPCAITY ISSUES WITH THE EXISTING NCTD SWALE OR DOWNSTREAM DRAINAGE SYSTEMS.

POLUTTANTS OF CONCERN - BENTHIC COMMUNITY EFFECTS, BIFENTHRIN, SELENIUM, TOXICITY, NUTRIENTS, SEDIMENTATION/SILTATION, AND INDICATOR BACTERIA

RIGHT-OF-WAY GREEN STREET DESIGN NOTES

GREEN STREET STORMWATER REQUIREMENTS ARE APPLICABLE FOR THE PROPOSED FRONTAGE/STREET IMPROVEMENTS ALONG GUAJOME STREET AND LADO DE LOMA DRIVE. IN ORDER TO COMPLY WITH THE USEPA GREEN STREET REQUIREMENTS A 1' WIDE STRIP OF PERVIOUS CONCRETE ADJACENT TO THE PROPOSED CURB WAS IMPLEMENTED ALONG THE PROPERTY SITE FRONTAGE ON GUAJOME STREET. THE PERMEABLE PAVEMENT WILL BE DESIGNED TO CONNECT DIRECTLY VIA PVC STORM DRAIN TO THE CURB INLET AT POC-1. A 5' WIDE PATH OF STABILIZED DECOMPOSED GRANITE IS ALSO IMPLEMENTED ALONG THE PROPOSED STRETCH OF GRIND AND OVERLAY ON LADO DE LOMA DRIVE.

WATER QUALITY TECHNICAL REPOT

TITLE - PRIORITY DEVELOPMENT PROJECT STORM WATER QUALITY MANAGEMENT REPORT FOR 420 LADO DE LOMA

DATE - AUGUST 2022

PREPARED BY - PASCO LARET SUITER & ASSOCIATES

COARSE SEDIMENT YIELD

DUE TO DOWNSTREAM CONDITIONS THE ON-STIE CRITICAL COARSE SEDIMENT YIELD AREAS DO NOT REQUIRE ATTENTION. SEE NARRATIVE IN FROM 2 IN THE SWQMP REPORT.

SOIL INFORMATION

HYDROLOGIC SOIL GROUP: TYPE C

GROUND WATER INFORMATION

DEPTH TO GROUNDWATER > 20 FT

PROJECT CHARACTERISTICS

PARCEL NET AREA: 4.56 ACRES

DISTURBED AREA: 4.56 ACRES

PROPOSED IMPERVIOUS AREA: 2.75 ACRES

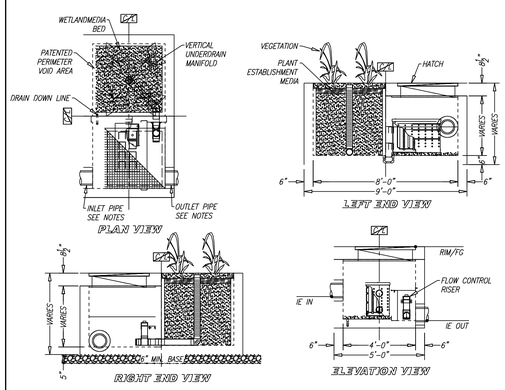
PROPOSED LANDSCAPED AREA: 1.81 ACRES

BMP NOTES

1. THESE BMPS ARE TO BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS OR THEIR PLANS
2. THERE SHALL BE NO CHANGES TO THE PROPOSED BMPS ON THIS SHEET WITHOUT PRIOR APPROVAL FORM THE CITY ENGINEERING DEPARTMENT
3. NO SUBSTITUTIONS TO THE MATERIAL TYPES OR PLANTING TYPES WITHOUT PRIOR APPROVAL FROM THE LAND DEVELOPMENT ENGINEER
4. NO OCCUPANCY WILL BE GRANTED UNTIL THE CITY INSPECTOR STAFF HAS INSPECTED THIS PROJECT FOR APPROPRIATE BMP CONSTRUCTION AND INSTALLATION.

LEGEND

DESCRIPTION	SYMBOL
PROPERTY LINE	
DRAINAGE MANAGEMENT AREA (DMA)	X XX AC
PROPOSED BIOFILTRATION	
DRAINAGE FLOW PATH	
DE-MINIMIS (DMA 8)	263 SF
RIP RAP ENERGY DISSIPATER	
IMPERVIOUS AREA - HARDSCAPE	
IMPERVIOUS AREA - ROOFTOPS	
PERVIOUS CONCRETE	
PROPOSED DG PATH	



MODULAR WETLAND TYPICAL SECTION

NTS

TREATMENT FLOW (CFS)	0.115
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	2.0
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

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.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE. (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL PIPES SHALL BE SEALED WATER TIGHT PER MANUFACTURERS STANDARD CONNECTION DETAIL.
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. VEGETATION SUPPLIED AND INSTALLED BY OTHERS. ALL UNITS WITH VEGETATION MUST HAVE DRIP OR SPRAY IRRIGATION SUPPLIED AND INSTALLED BY OTHERS.
7. CONTRACTOR RESPONSIBLE FOR CONTACTING BIO CLEAN FOR ACTIVATION OF UNIT. MANUFACTURERS WARRANTY IS VOID WITH OUT PROPER ACTIVATION BY A BIO CLEAN REPRESENTATIVE.

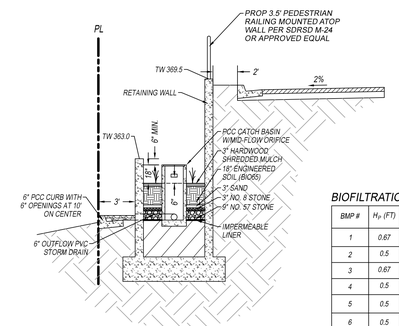
GENERAL NOTES

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

DMA DATA TABLE

DMA	TRIBUTARY AREA (AC)	IMPERV. AREA (AC)	RUNOFF COEFF.	DCV REQ'D (CU. FT.)	BMP ID	STRUCTURAL BMP TYPE
DMA-1	1.08	0.69	0.66	1676	BMP-1	BF-1
DMA-2	0.41	0.34	0.79	763	BMP-2	BF-1
DMA-3	0.73	0.59	0.77	1334	BMP-3	BF-1
DMA-4	0.13	0.11	0.79	243	BMP-4	BF-1
DMA-5	0.50	0.44	0.82	968	BMP-5	BF-1
DMA-6	0.30	0.26	0.81	582	BMP-6	BF-1
DMA-7	0.33	0.26	0.76	597	BMP-7	MODULAR WETLAND
DMA-8	0.01	0.004	0.62	-	-	DE-MINIMIS
SM-TOTAL	1.07	0.04	0.25	-	-	SELF-MIT.
*ROW DMA-1	0.08	0.06	0.73	-	-	PERVIOUS CONC.
*ROW DMA-2	0.15	0.06	0.48	-	-	D.G. PATH

*BOTH ROW DMA-1 AND ROW DMA-2 ARE EXCLUDED FROM THE ON-SITE LIMITS OF DISTURBANCE BUT SUBJECT TO THE USEPA GREEN STREET STORMWATER REQUIREMENTS. ROW DMA-1 (GUAJOME STREET IMPROVEMENTS) MEETS GREEN STREET REQUIREMENTS BY IMPLEMENTING A 1' WIDE STRIP (57.5 SF) OF PERVIOUS CONCRETE ADJACENT TO THE PROPOSED CURB ALONG THE ENTIRE PROPOSED SIDEWALK. ROW DMA-2 (LADO DE LOMA DRIVE IMPROVEMENTS) MEETS GREEN STREET REQUIREMENTS BY IMPLEMENTING A 5' WIDE PATH (1932 SF) OF STABILIZED DECOMPOSED GRANITE ALONG THE PROPOSED STRETCH OF GRIND AND OVERLAY ON LADO DE LOMA DRIVE.



BIOFILTRATION TYPICAL SECTION

NTS

BIOFILTRATION BMP SIZE & ORIFICE DIAMETER SUMMARY

BMP #	H_P (FT)	H_S (FT)	H_G (FT)	HMP ORIFICE (IN)	SLOT ORIFICE DIMENSIONS (IN)	A_{FS} (FT²)	$A_{PONDING}$ (FT²)
1	0.67	2	1	0.8125	(2) 3" H x 6" W	1738	1738
2	0.5	2	1	0.5625	(2) 2" H x 4" W	744	744
3	0.67	2	1	0.75	(2) 2" H x 3" W	1197	1197
4	0.5	2	1	0.375	(2) 2" H x 1" W	345	345
5	0.5	2	1	0.625	(2) 2" H x 5" W	921	921
6	0.5	2	1	0.5	(2) 3" H x 6" W	725	725

SITE DESIGN BMP'S

SD-1 MAINTAIN NATURAL DRAINAGE PATHWAYS AND HYDROLOGIC FEATURES
THE SITE HAS BEEN DESIGNED TO MAINTAIN THE NATURAL DRAINAGE PATTERN FLOWING FROM WEST TO EAST ACROSS THE PROJECT SITE. DRAINAGE FROM PROPOSED SITE IMPROVEMENTS IS COLLECTED AND ROUTED TO THE SAME RECEIVING PUBLIC DRAINAGE SYSTEM AS THE EXISTING PRE PROJECT CONDITIONS.

SD-2 CONSERVE NATURAL AREAS, SOILS, AND VEGETATION
PORTIONS OF THE WESTERLY SLOPING HILLSIDE ARE BEING MAINTAINED AS UNDISTURBED AS A PART OF THE PROJECT. SIGNIFICANT TREES ARE BEING PROTECTED IN PLACE WHERE FEASIBLE.

SD-3 MINIMIZE IMPERVIOUS AREA
THE PROPOSED STRUCTURE IS A MULTILEVEL BUILDING DESIGNED TO MINIMIZE THE OVERALL FOOTPRINT RELATIVE TO THE SITE. ONSITE ACCESS ROADS, PATHWAYS, AND SURFACE PARKING HAVE BEEN DESIGNED TO MINIMUM DIMENSIONS AS AN EFFORT TO REDUCE THE OVERALL SITE PAVEMENT FOOTPRINT.

SD-4 MINIMIZE SOIL COMPACTION
SURFACE SOILS IN ALL PROPOSED LANDSCAPE ZONES WILL BE MINIMALLY COMPACTED TO PROMOTE ABSORPTION AND RETENTION OF STORMWATER. BECAUSE THE SITE IS UNDERLAN BY A SHALLOW ROCK FORMATION, UNDERCUTTING AND RECOMPACTION OF EARTH BENEATH STRUCTURE FOUNDATIONS AND PRIMARY ACCESS ROADWAYS WILL BE NECESSARY TO CONFORM TO TYPICAL DESIGN STANDARDS.

SD-5 IMPERVIOUS AREA DISPERSION
DRAINAGE FROM PROPOSED AMENITY AREAS AND SITE HARDSCAPE HAS BEEN DESIGNED TO BE DIRECTED TO ADJACENT LANDSCAPE AREAS FOR DISPERSION TO THE EXTENT PRACTICAL GIVEN THAT THE EXISTING TOPOGRAPHY SLOPES FROM WEST TO EAST AT A GRADIENT EXCEEDING 5%, OPPORTUNITIES FOR QUALIFIED DISPERSION AREA DCV REDUCTIONS ARE LIMITED.

SD-6 RUNOFF COLLECTION
RUNOFF FROM THE PROPOSED SITE IMPERVIOUS AREAS HAVE BEEN DESIGNED TO BE COLLECTED BY THE ONSITE STORM DRAIN SYSTEM AND ROUTED TO ONSITE TREATMENT CONTROL BMP'S.

SD-7 LANDSCAPING WITH NATIVE OR DROUGHT TOLERANT SPECIES
THE PROJECT LANDSCAPE PLAN SPECIFIES NATIVE AND DROUGHT-TOLERANT SPECIES FOR SITE LANDSCAPING.

SOURCE CONTROL BMP'S

SC-1 PREVENTION OF ILLICIT DISCHARGES INTO THE MS4
ILLICIT DISCHARGES INTO THE MS4 WILL BE PREVENTED WITH THE USE OF SOURCE CONTROLS SUCH AS EFFICIENT IRRIGATION, DIRECTING ALL SURFACE RUNOFF TO PERMANENT BIOFILTRATION BMP'S.

SC-2 STORM DRAIN STENCILING
ALL ON-SITE STORM DRAIN INLETS WILL BE STENCILED WITH "NO DUMPING-FLOWS TO PACIFIC OCEAN."

SC-5 PROTECT TRASH STORAGE AREAS FROM RAINFALL, RUN-ON, & RUNOFF
THE TRASH STORAGE/COLLECTION AREA IS COVERED AND GATED TO PREVENT WIND DISPERSAL AND STORMWATER RUNOFF FROM LEAVING THE ENCLOSURE. THE SURROUNDING SITE AREA IS GRADED TO DIRECT SITE DRAINAGE AWAY FROM THE ENCLOSURE.

SC-6A ON-SITE STORM DRAIN INLETS
ALL INLETS TO BE MARKED "NO DUMPING". TENANT LEASE TO INCLUDE CLAUSE PROHIBITING DISCHARGE INTO STORMDRAINS.

SC-6B SUMP PUMPS OR FRENCH DRAINS
DUE TO SITE TOPOGRAPHY, SUMP PUMPS ARE NOT NECESSARY FOR DRAINAGE CONVEYANCE PRUPOSES AND SUBSURFACE FOUNDATION DRAINS HAVE BEEN DESIGNED TO EITHER DAYLIGHT ON GRADE OR CONNECT TO THE PROPOSED ONSITE DRAINAGE CONVEYANCE SYSTEM.

SC-6C INTERIOR OR SUB-SURFACE PARKING GARAGES
NUISANCE WATER FROM INTERIOR GARAGE AREAS IS DESIGNED TO BE COLLECTED AND ROUTED TO THE SANITARY SEWER SYSTEM

SC-6E LANDSCAPE / OUTDOOR PESTICIDE USE
EXISTING DROUGHT TOLERANT PLANTS TO BE PRESERVED IN LANDSCAPED AREAS WHERE FEASIBLE. PROPOSED LANDSCAPING HAS BEEN DESIGNED TO BE APPROPRIATE FOR SLOPES, CLIMATE, AND SOIL CONDITIONS SPECIFIC TO THE SITE. PESTICIDE USE IS TO BE LIMITED.

SC-6F POOLS, SPAS, PONDS, DECORATIVE FOUNTAINS, OTHER WATER FEATURES
PROPOSED POOL DECK DRAINAGE HAS BEEN DESIGNED TO BE CAPTURED BY CHANNEL DRAINS ADJACENT TO THE POOL AREA AND ROUTED TO ONSITE TREATMENT CONTROL BMP'S.

SC-6H REFUSE / TRASH COLLECTION AREAS
THE TRASH STORAGE / COLLECTION AREA IS COVERED AND GATED TO PREVENT DISPERSAL AND STORMWATER RUNOFF. THE STORAGE AREA IS GRADED TO PREVENT RUN-ON.

SC-6G FIRE SPRINKLER TEST WATER AND RELIEF POINT
THE FIRE SPRINKLER TEST WATER IS TO BE DIRECTED TO THE SANITARY SEWER PER A SEPARATE PLUMBING PLAN.

SC-6Q PLAZA, SIDEWALKS, PARKING LOTS
PARKING AREAS, WALKWAYS, AND OTHER AMENITY AREAS ON SITE ARE TO BE PERIODICALLY MAINTAINED FREE OF LITTER AND DEBRIS. DRAINAGE FROM THESE AREAS WILL BE COLLECTED AND ROUTED TO ONSITE PERMANENT TREATMENT CONTROL BMP'S.

OTHER BMP SUMMARY

BMP #	BMP TYPE	BMP AREA	BMP OUTLET	OULET PIPE
BMP 7	MODULAR WETLAND SYSTEM MWS L-4-8-V	4'x8'	6" OVERFLOW DRAIN	12"
	TREE WELL	10 FT TREE	--	--

© SAFDIE RABINES ARCHITECTS

P22-0282
PLANNING CASE #

KENSHO HOUSING

Vista, CA 92083

TIDELINE PARTNERS

OWNER:
TIDELINE PARTNERS
2148 JIMMY DURANTE BLVD, STE B
SAN DIEGO, CA 92014
P: 760.295.9111

PROJECT TEAM

SAFDIE RABINES ARCHITECTS

ARCHITECT
Safdie Rabines Architects
925 Fort Stockton Drive
San Diego, CA 92103
P: 619.297.6153
www.safdierabines.com

CIVIL ENGINEER
PASCO LARET SUITER & ASSOCIATES
1911 San Diego Ave
San Diego, CA 92110
P: 858.259.8212

LANDSCAPE ARCHITECT
Schmidt Design Group
1310 Rosecrans Street, Suite G
San Diego, CA 92106
P: 619.236.1462

REGISTERED PROFESSIONAL ENGINEER — WILLIAM GREGG MASK — No. 73620 — CIVIL — STATE OF CALIFORNIA

REVISIONS

Number	Description	Date
1	SITE DEVELOPMENT PLAN SUBMITTAL	08/08/2022
2	SDP RESUBMITTAL	10/21/2022
3	SDP RESUBMITTAL	12/21/2022

Issue Date	Scale
12/21/2022	1" = 30'
SRA Project Number	PLSA Project Number
2127	3599

PASCO LARET SUITER & ASSOCIATES
San Diego | Solana Beach | Orange County
Phone 858.259.8212 | www.plsaengineering.com

DRAINAGE MANAGEMENT AREA & HMP EXHIBIT

C7
15 OF 34

ATTACHMENT 2b

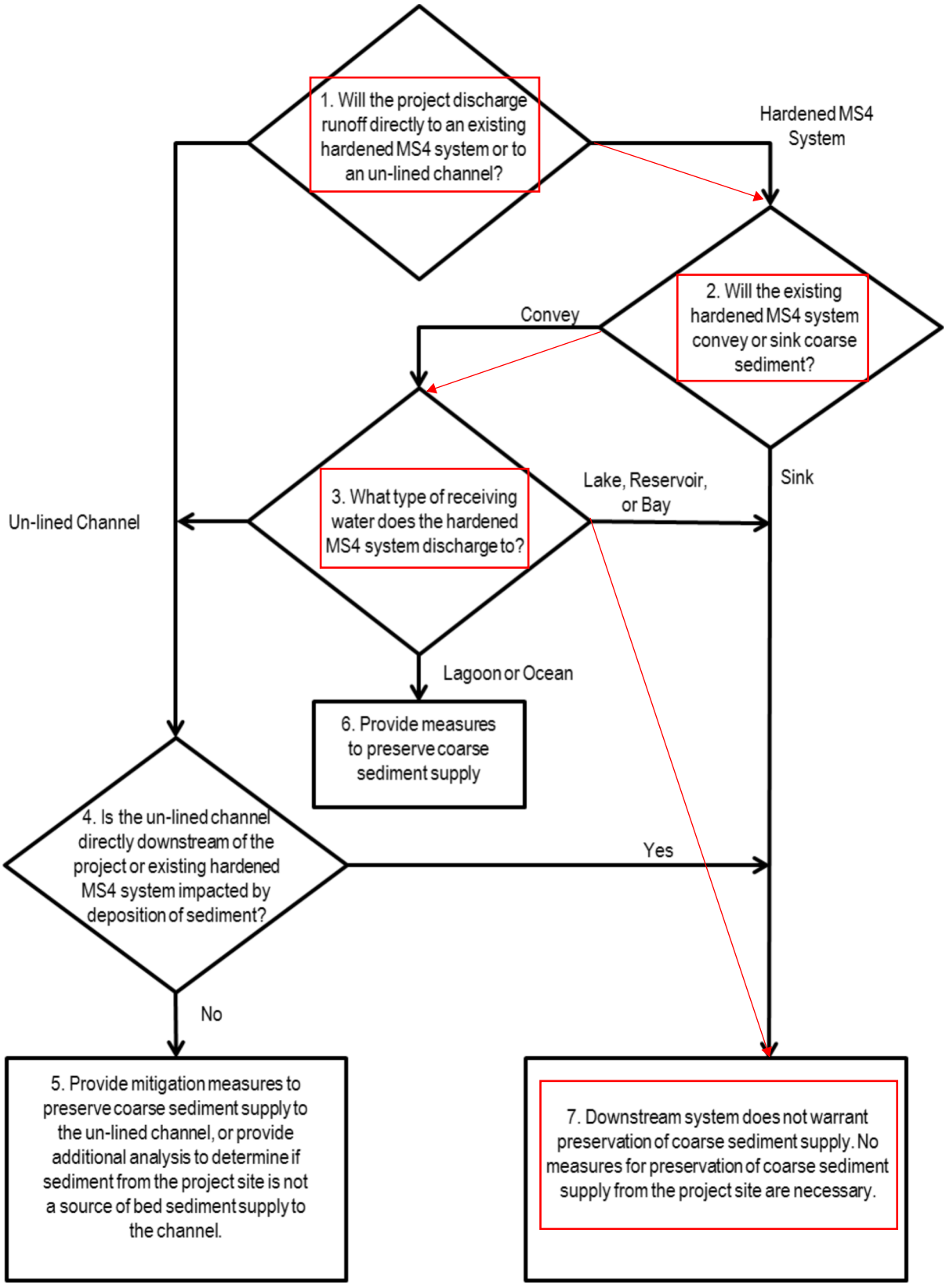
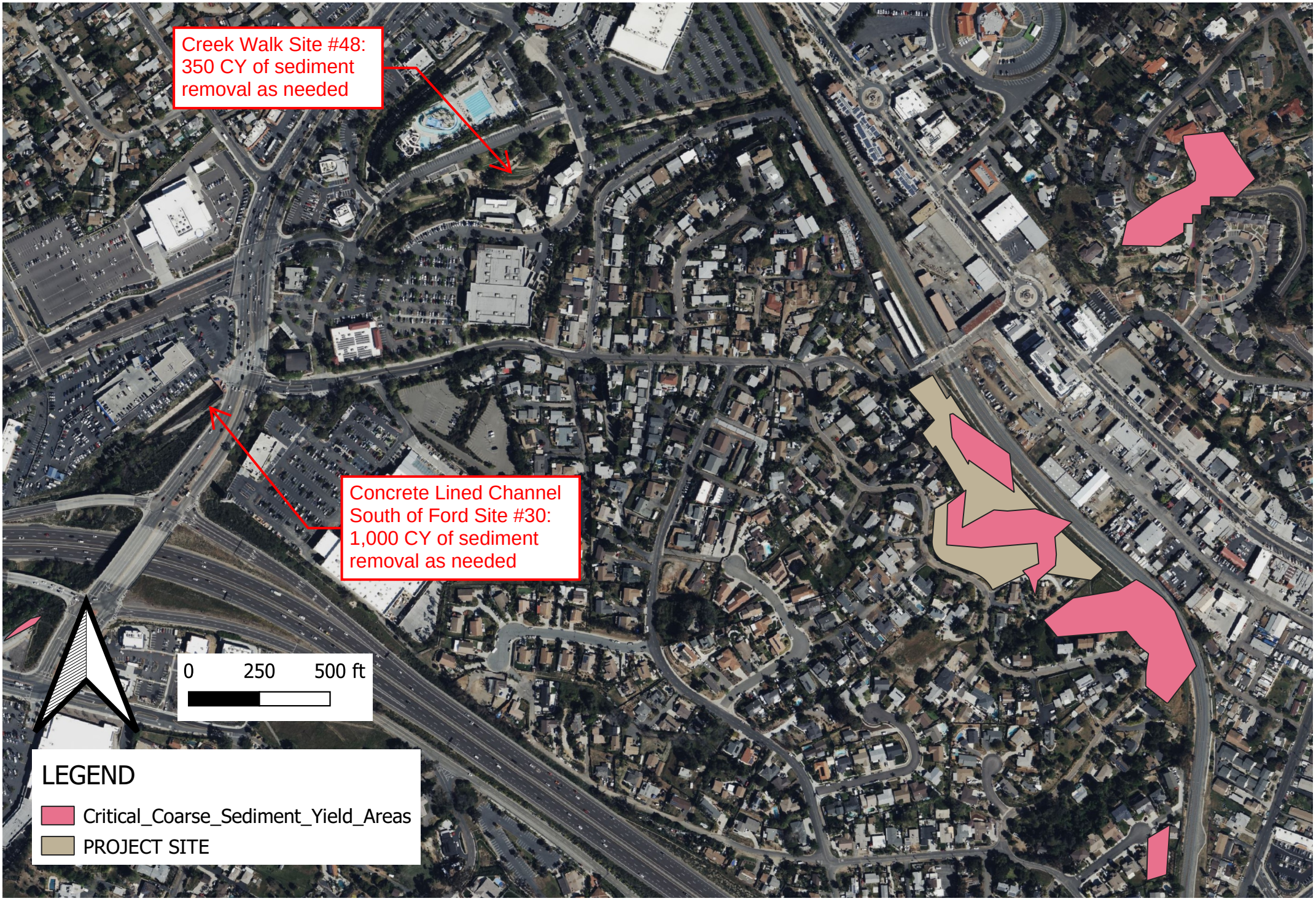
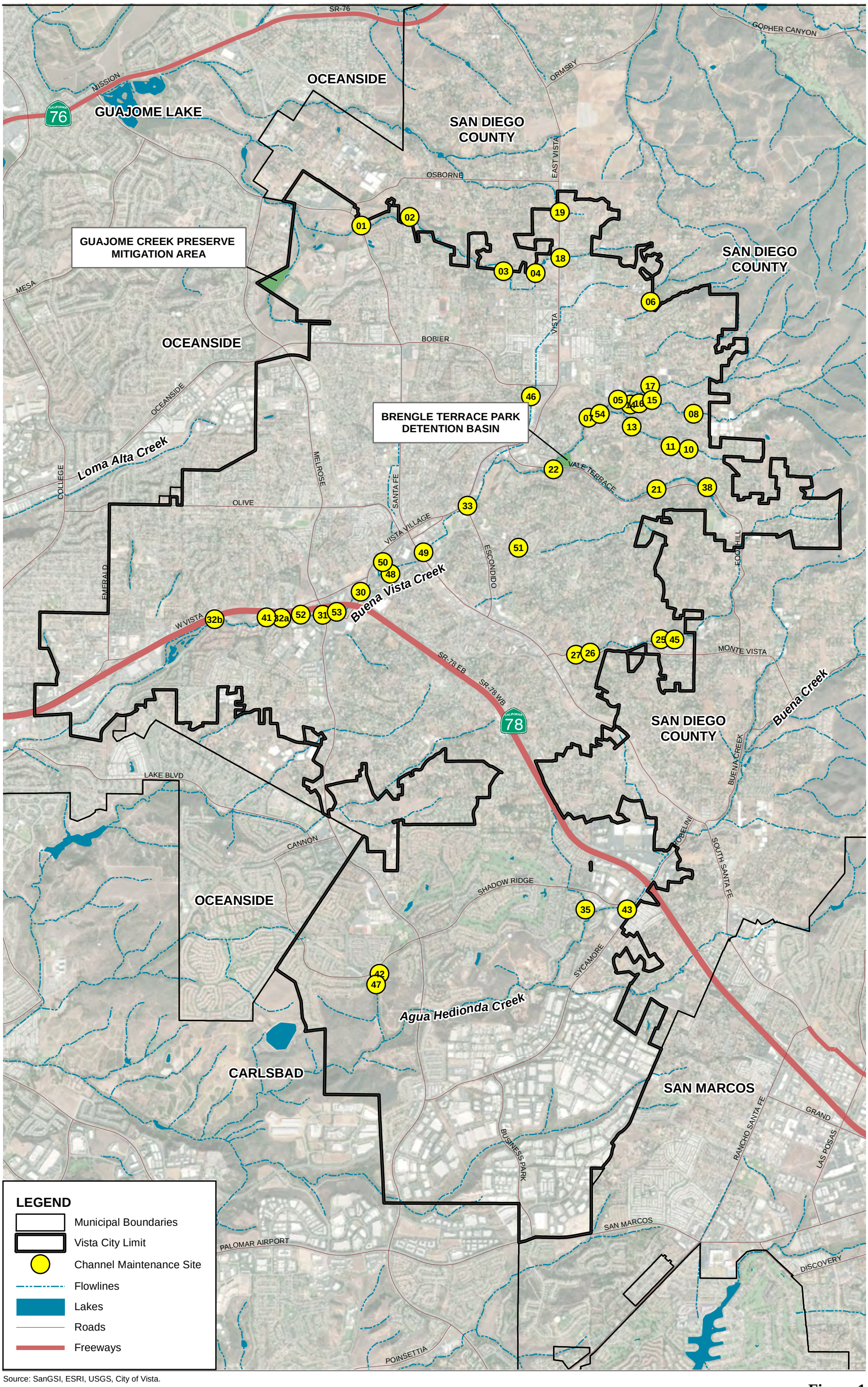


FIGURE 6-1. Evaluation of Downstream Systems Requirements for Preservation of Coarse Sediment Supply


Creek Walk Site #48:
350 CY of sediment
removal as needed
Concrete Lined Channel
South of Ford Site #30:
1,000 CY of sediment
removal as needed
0
250
500 ft
LEGEND
Critical_Coarse_Sediment_Yield_Areas
PROJECT SITE



Source: SanGSI, ESRI, USGS, City of Vista.

3,500 1,750 0 3,500 Feet

Scale: 1:42,000 1 in = 3,500 feet

Figure 1
Overview of Channel Maintenance Sites and Receiving Water Bodies

Path: P:_6053\60530725_Vista_StormW\900-CAD-GIS\920 GIS\map_docs\mxd\TO15_Maintenance\Report\Maintenance_Workbook\Fig1_Channel_Maintenance_Overview.mxd, 4/1/2020, paul.moreno



Legend

Maintenance Limits

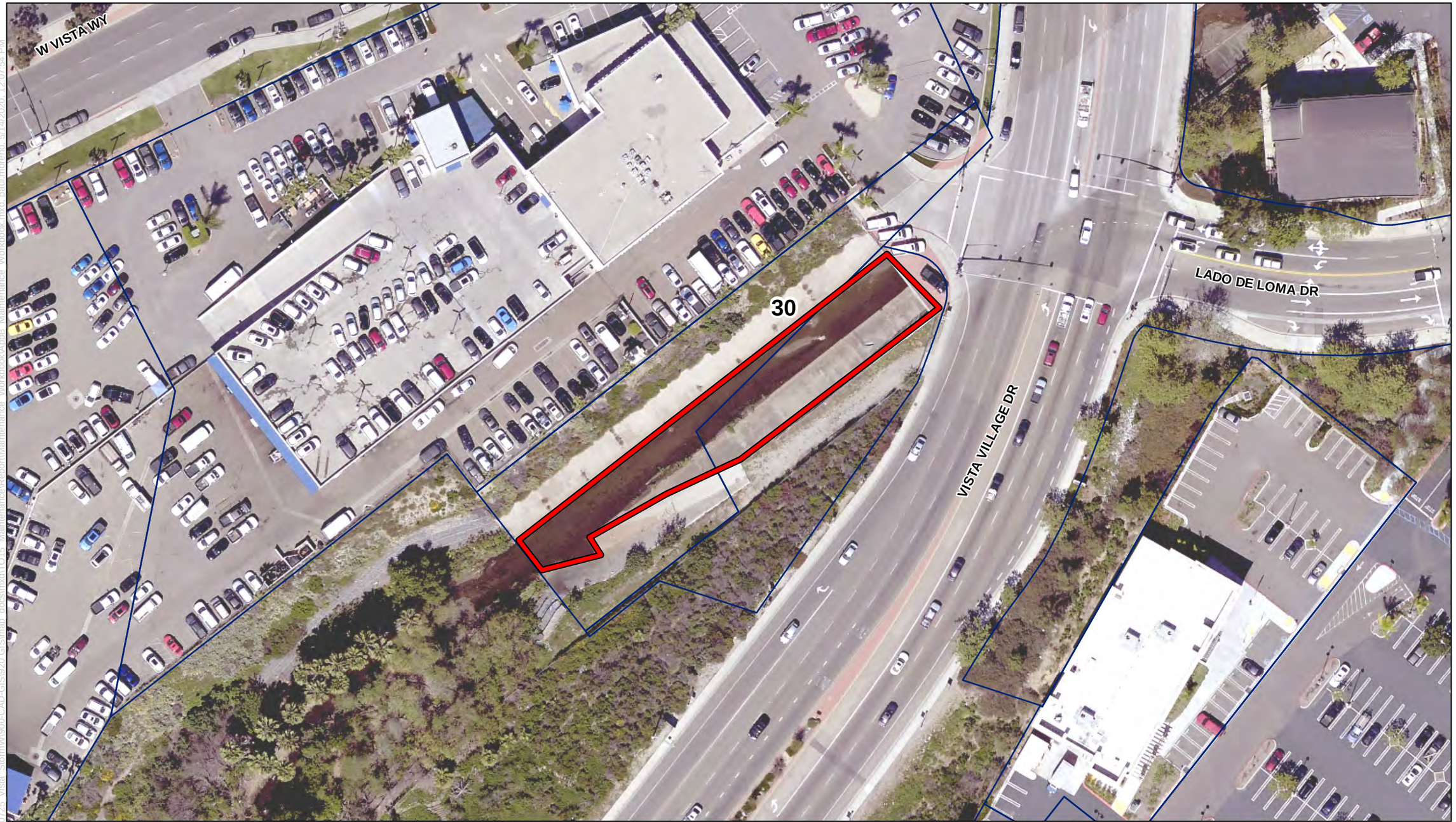
Parcels

Source: SanGIS, CNDDB, City of Vista.

0 80 Feet

1 inch = 80 feet

Appendix B
Maintance Limits
Site 48



Legend

Maintenance Limits

Parcels

Source: SanGIS, CNDDB, City of Vista.

0 60 Feet

1 inch = 60 feet

Appendix B
Maintance Limits
Site 30

ATTACHMENT 2c

TECHNICAL MEMORANDUM:

Susceptibility Analysis of Buena Vista Creek for Condominium Project at 201 W. Los Angeles, Vista, CA.

Prepared for:

Eric Minicilli
2979 State Street
Carlsbad, CA, 92008
November 28, 2012

TORY R. WALKER ENGINEERING, INC.
WATER RESOURCES PLANNING & ENGINEERING
122 Civic Center Drive, Suite 206, Vista, CA 92084 760.414.9212 www.trwengineering.com

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Luis Parra, PhD, CPSWQ, ToR, D.WRE.
R.C.E. 66377

Senior Project Manager

TORY R. WALKER ENGINEERING, INC.
WATER RESOURCES PLANNING & ENGINEERING
122 Civic Center Drive, Suite 206, Vista, CA 92084 760.414.9212 www.trwengineering.com

SUSCEPTIBILITY ANALYSIS OF BUENA VISTA CREEK

This study will determine the level of susceptibility to erosion for Buena Vista Creek near State Route 78 in Vista, CA, starting at the transition from a concrete channel to the gabion lined creek just southwest of the intersection between Lado De Loma Drive and Vista Village Drive and ending about 1,400 ft downstream, where the creek crosses S. Melrose Drive (see Aerial view in Appendix 1). The length of analysis is considerable enough to include multiple grade controls to satisfy domain of analysis criteria, as established in the HMP methodology [1,2].

1. GENERAL CHARACTERISTICS OF THE AREA

Buena Vista Creek originates in the San Marcos Mountains and discharges into the Pacific Ocean via Buena Vista Lagoon. It is a highly and densely urbanized creek with both residential and commercial areas being tributary to it; a large part of the City of Vista is tributary to Buena Vista Creek. Buena Vista Creek is a highly geomorphologically controlled creek within the analyzed length. As a matter of fact, from where this study begins, just upstream of State Route 78, for about the first 200 ft, the channel is lined with gabions on both banks. Additionally, the flat channel, which has an overall slope of about 0.20% in our analysis of domain, has a retaining wall downstream of State Route 78 on the south bank that runs parallel to Hacienda Dr (see pictures in Appendix 2).

1.1 Runoff Measurement

During the day of the visit (11/16/2012) the creek displayed a relatively modest flow due to interflow and possible irrigation runoff. The method used to estimate the runoff is by measuring the flow area A_{flow} (which in the parabolic section assumed is the product of 2/3 by the width W by the total depth H), the surface velocity v_{top}, and indirectly obtaining the mean velocity v_{avg}. Using the definition of peak flow, Q:

$$Q = v_{ave} \cdot A_{flow} = k \cdot v_{top} \cdot A_{flow} \quad (1)$$

The relationship between the average velocity v_{ave} and top velocity v_{top} can be obtained from the velocity distribution equation below [3]:

$$v_{ave} = \frac{1}{H-y_0} \int_{y_0}^{H} \left(2.5 \cdot v^* ln \frac{y}{y_0}\right) dy \quad (2)$$

$$\frac{v_{ave}}{v_{top}} = k = 1 - \left[ln\left(\frac{D}{y_0}\right)\right]^{-1} \quad (3)$$

In the previous equations v* is the shear velocity, D the total depth, and y_0 the constant of integration related to the bottom surface roughness. The constant k, associated with the double integral of the velocity profile (integration in the x-y plane and more importantly in a vertical section) is usually

determined experimentally, but for rough surfaces (like concrete or an irregular earthen channel) it is about 0.7 to 0.75. As the error of the flow determination is about 10%, the lowest recommended value is used, and the peak flow is conservatively determined by equation (1) with k=0.7.

In equation (1) v_{top}= 0.17 ft/sec (as measured by floating indicators), A_{flow}= 10 ft^2 and k= 0.7. The peak flow measured just upstream of State Route 78 was about 1.20 cfs (10:00 am)

1.2 Comparison Between the Measured Peak Flows and the USGS 2-Year Peak Flows

In the HMP document [2], the justification of using $0.1Q_2$ as a low threshold for erosion was performed following the USGS Regression Equation to determine Q_2. This report uses this regression to get an idea what type of flow was in occurrence during the site visit (as a function of Q_2).

The USGS Q_2 Regression Equation [4] (in cfs) can be expressed as:

$$Q_2 = 0.14 \cdot A^{0.72} P^{1.62} \quad (4)$$

In equation (4), A represents the contributing area in square miles, and P the annual precipitation (13.09 inches in the Buena Vista Creek area [5]). The contributing area at the beginning of our study was estimated as 9.19 sq-miles.

The peak flow obtained with equation (4) is:

Q_2 : 44.6 cfs.

The measured flow of 1.20 cfs represents 2.7% of the USGS Q_2 value at our measuring point. This flow is too small to draw a conclusion regarding the potential erosion for flows larger than 10% of the Q_2 value estimated with the USGS Regression Equation. Therefore, conclusions about susceptibility will be obtained only based on the SCCWRP approach [1], which will be discussed in the following sections.

2. SCCWRP APPROACH

The approved SCCWRP approach [1] will be used to determine the susceptibility to erosion based on standard forms and methodologies published by the Water Quality Control Board on its web page. It should be evident to the reader that analyzing the susceptibility to erosion of riprap or a concrete culvert is unnecessary, as by definition those hardened systems are not susceptible to erosion at the low threshold value.

2.1 Basic Information

The contributing area to the discharge point is about 9.19 sq-miles. The mean annual precipitation from records published by the Western Regional Climate Center for Vista, from 8/1/1957 to 9/30/2012 is 13.09 inches [5]. The valley slope S_V (obtained from the topo in the Vista MPD) is mostly 0.2% for the area studied. The valley width W_v corresponds to an average approximation of the width of the channel, determined in the field.

3. INITIAL DESKTOP ANALYSIS

Form 1 was completed with desktop information, and with field information for the valley width. The Valley Width Index (VWI) was determined as 1.04 on average. Table 1 shows the results of the analysis, while Appendix 3 shows Form 1 for our area of study.

TABLE 1. INITIAL DESKTOP ANALYSIS SUMMARY.

Area (mi^2)	9.19
P (in)	13.09
S_v	0.002
W_v (m)	30
Q_{10} (cfs)	908
Q_{10} (m^3/s)	25.70
INDEX	0.01014
W_{ref} (m)	29.0
VWI	1.04

4. PEBBLE COUNT AND EQUIVALENT d_{50}

Form 2 could not be completed in the field, as there are no pebbles, cobbles, or gravel at the surface of Buena Vista Creek in the Domain of Analysis (other than the rocks in areas unsafe to explore). Consequently, Form 2 is shown empty in Appendix 4.

Buena Vista Creek is lined with not very dense hardwood tree plantings, riffles, and pools; and also hardpan is visible below the water surface.(see pictures in Appendix 2). Following the shear stress recommendation of Figure 5-1 of the HMP document (shown in this document as Figure 1 in next page), an equivalent rock size will be determined for the vegetation observed. This same methodology was also approved in San Marcos Creek by the Water Board [6]. It can be seen that the permissible shear stress τ_P in Figure 5-1, expressed on lb/ft^2, is numerically equivalent to 1/3 of the diameter d_{50} of the gravel/cobble equivalent, expressed in inches (in other words, 1-in gravel has a permissible shear stress of 0.33 lb/ft^2; 2-in gravel-cobble has a permissible shear stress of 0.67 lb/ft^2; a 6-in cobble has a permissible shear stress of 2 lb/ft^2, and a 12-in cobble has a permissible shear stress of 4 lb/ft^2; see Figure 5-1 attached in this document). Mathematically, this observation can be written as:

$$\tau_P = \frac{1}{3} d_{50} \qquad (5)$$

Consequently, as the permissible shear stress for hardwood tree plantings is between 0.41 to 2.5 lb/ft^2 and the permissible shear stress for shales and hardpan is about 0.67 lb/ft^2, a conservative value of 0.54 lb/ft^2 will be used. We are assuming the lowest possible value for hardwood tree plantings (0.41 lb/ft^2) and averaging it with the hardpan value (0.67 lb/ft^2) to obtain an approximate representation of the shear stress (0.54 lb/ft^2). This value translates to an equivalent 1.62 inch diameter d_{50}.,k numerically equal to 41.1 mm.

Boundary Category	Boundary Type	Permissible Shear Stress (lb/sq ft)
Soils	Fine colloidal sand	0.02 - 0.03
	Sandy loam (noncolloidal)	0.03 - 0.04
	Alluvial silt (noncolloidal)	0.045 - 0.05
	Silty loam (noncolloidal)	0.045 - 0.05
	Firm loam	0.075
	Fine gravels	0.075
	Stiff clay	0.26
	Alluvial silt (colloidal)	0.26
	Graded loam to cobbles	0.38
	Graded silts to cobbles	0.43
	Shales and hardpan	0.67
Gravel/Cobble	1-in.	0.33
	2-in.	0.67
	6-in.	2.0
	12-in.	4.0
Vegetation	Class A turf	3.7
	Class B turf	2.1
	Class C turf	1.0
	Long native grasses	1.2 – 1.7
	Short native and bunch grass	0.7 - 0.95
	Reed plantings	0.1-0.6
	Hardwood tree plantings	0.41-2.5
Temporary Degradable RECPs	Jute net	0.45
	Straw with net	1.5 – 1.65
	Coconut fiber with net	2.25
	Fiberglass roving	2.00
Non-Degradable RECPs	Unvegetated	3.00
	Partially established	4.0-6.0
	Fully vegetated	8.00
Riprap	6 – in. d_{50}	2.5
	9 – in. d_{50}	3.8
	12 – in. d_{50}	5.1
	18 – in. d_{50}	7.6
	24 – in. d_{50}	10.1
Soil Bioengineering	Wattles	0.2 – 1.0
	Reed fascine	0.6-1.25
	Coir roll	3 - 5
	Vegetated coir mat	4 - 8
	Live brush mattress (initial)	0.4 – 4.1
	Live brush mattress (grown)	3.90-8.2
	Brush layering (initial/grown)	0.4 – 6.25
	Live fascine	1.25-3.10
	Live willow stakes	2.10-3.10
Hard Surfacing	Gabions	10
	Concrete	12.5

[1] Ranges of values generally reflect multiple sources of data or different t

A. Chang, H.H. (1988).
B. Florineth. (1982)
C. Gerstgraser, C. (1998).
D. Goff, K. (1999).
E. Gray, D.H., and Sotir, R.B. (1996).
F. Julien, P.Y. (1995).
G. Kouwen, N.; Li, R. M.; and Simons, D.B., (1980).
H. Norman, J. N. (1975).
I. Schiechtl, H. M. and R. Stern. (1996).
J. Schoklitsch, A. (1937).

Figure 5-1. Range of Critical Shear Stresses (τ_{cr}) for Different Materials (from Fischenich)

Figure 1. Permissible Shear Stress per the HMP Document.

5. VERTICAL SUSCEPTIBILITY FIELD SHEET

The appropriate pathway is shown in Form 3, Appendix 5. In this case, the conservative equivalent diameter cannot be unequivocally assigned as larger than 128 mm, and since the hardpan is of uncertain strength, then as a conservative approach, the intermediate bed path is chosen (See Form 3, Appendix 5).

5.1 Armoring Potential, Grade Control and Screening Index Score

The armoring potential (Form 3, checklist 1), is assigned as B (hardpan of unknown resistance). The grade control is assigned as A (no evidence of failure, no headcutting, grade control is present with less than 50 m spacing, and no apparent undermining). The Screen Index Score is also A, as the combination of variable $S_v Q_{10}{}^{0.5}$ (INDEX in Table 1) and the equivalent d_{50} always generates a less than 50% probability of incision in Form 3 (see Appendix 5). The vertical rating is then calculated as:

$$Vertical\ rating = \sqrt{screening\ index \cdot \sqrt{armoring\ .\ grade\ control}} \qquad (6)$$

In equation (6) the screening index, the armoring index and the grade control index can be assigned a valuation of A, B, or C. Using the SCCWRP equivalence of A = 3, B = 6 and C = 9, the vertical rating can be obtained. The vertical rating is 3.57, and therefore, considered LOW.

6. LATERAL SUSCEPTIBILITY FIELD SHEET

There are two appropriate paths, the first shown in Form 4, Appendix 6 and the second shown in Form 5, Appendix 7. The first option for Form 4 assumes that Buena Vista Creek is laterally adjustable, but lateral adjustments are not occurring, and all bank strata are consolidated. Then, following Form 6, Appendix 8, bank height has a less than 10% risk of failure according to the existing bank angles, and as the vertical rating is less than high, and VWI<2 the lateral susceptibility is low for the area being studied (see Form 4, Appendix 6). Using Form 5, the same conclusion is reached (see Appendix 7), because even if the channel is not considered fully confined (which is an extremely conservative assumption) then: (1) there is no mass wasting or extensive fluvial erosion, (2) both banks are consolidated and (3) no risk factors are present. As both potential paths generate a lateral LOW susceptibility, the lateral susceptibility of the Creek is considered LOW. We should add that Form 6 has been evaluated for the most conservative scenario, as it evaluates the probability of mass wasting in moderately to well-consolidated banks, which is less than 10% when the bank angle is less than 30°, regardless of bank height. Bank angles observed were between 3:1 to 2:1 or about 18.4° to 26.6° for those limited areas where no gabions existed.

From the field observations and taking into account the current conditions of Buena Vista Creek in the reach analyzed, (hardwood tree/hardpan shale channel and lined with retaining walls and gabions in

much of the studied area), there is strong indication that Buena Vista Creek is not laterally adjustable in the domain of analysis. Additionally, no indication of avulsion or chute formation can be seen, banks are stable, and properties adjacent to the creek do not display evidence of "backyard" loss to erosion.

7. FINAL EVALUATION

Buena Vista Creek has a low vertical susceptibility and a low lateral susceptibility to erosion in the domain of analysis; from the transition of the concrete channel to the natural creek all the way to the end, about 1,400 ft downstream, where the creek crosses S. Melrose Drive Therefore, the overall susceptibility of the creek is considered LOW. Overall results are displayed in Table 2. This final evaluation does not even consider the stabilizing factor of gabions in some lateral slopes, which implies that even disregarding the controlling factor of the gabion wall, the creek still has low susceptibility to erosion.

8. CONCLUSION

Buena Vista Creek has a LOW SUSCEPTIBILTY to erosion, according to the SCCWRP methodology approved by the HMP Document, and following a conservative approach.

Hydromodification design for projects draining directly into this section of Buena Vista Creek can be accomplished using a low-susceptibility rating; therefore, the lower threshold recommended for hydromodification analysis is $0.50 \cdot Q_2$.

9. LIST OF APPENDICES

Appendix 1: Aerial View of Buena Vista Creek

Appendix 2: Site Visit Photos

Appendix 3: Form 1: Initial Desktop Analysis

Appendix 4: Form 2: Pebble Count (Empty)

Appendix 5: Form 3: Vertical Susceptibility Field Sheet

Appendix 6: Form 4: Lateral Susceptibility Field Sheet

Appendix 7: Form 5: Sequence of Lateral Susceptibility Questions Option

Appendix 8: Form 6: Probability of Mass Wasting Bank Failure

10. REFERENCES

[1] SCCWRP Hydromodification Screening Tools: Field Manual for Assessing Channel Susceptibility: http://www.waterboards.ca.gov/academy/courses/riverrat/606_hydromodscrntool_fldmanl.pdf

[2] Final Hydromodification Management Plan. County of San Diego, CA, March 2011. Available at: http://www.projectcleanwater.org/html/wg_susmp.html

[3] Open Channel Hydraulics. Richard H. French. Editors: McGraw-Hill Inc., 1985.

[4] USGS Water Resources Investigation Report 94-4002: Nationwide Summary of USGS Regional Regression Equations for Estimating Magnitude and Frequency of Floods for Ungaged Sites, 1993. Equations available at: http://water.usgs.gov/software/NFF/manual/ca/

[5] Western Regional Climate Center: Southern California Summary. Available under Chula Vista at: http://www.wrcc.dri.edu/summary/Climsmsca.html

[6] City of San Marcos. Final San Marcos Creek Specific Plan: Master Water Quality and Hydromodification Management Plan. December 15, 2011. Document is publicly available at: http://www.ci.san-marcos.ca.us/Modules/ShowDocument.aspx?documentid=5531

APPENDIX 1: AERIAL VIEW OF BUENA VISTA CREEK



Aerial View of Buena Vista Creek.

APPENDIX 2: SITE VISIT PHOTOS



Photo 1. West of S. Melrose Dr, Viewing South



Photo 2. Exit of culvert boxes West of S. Melrose Dr



Photo 3. West of S. Melrose Dr, Viewing Downstream



Photo 4. East of S. Melrose Dr, Viewing North



Photo 5. East of S. Melrose Dr, Viewing North



Photo 6. East of S. Melrose Dr, Viewing North



Photo 7. East of S. Melrose Dr, Viewing North



Photo 8. South of State Route 78, Viewing Downstream



Photo 9. South of State Route 78, Viewing West



Photo 10. South of State Route 78, Viewing West



Photo 11. Left Gabion lined bank.



Photo 12. North of State Route 78, Viewing Downstream



Photo 13. North of State Route 78, Viewing Downstream



Photo 14. North of State Route 78, Viewing Downstream



Photo 15. North of State Route 78, Viewing North



Photo 16. North of State Route 78, Viewing Upstream



Photo 17. North of State Route 78, West bank



Photo 18. North of State Route 78, Viewing Downstream



Photo 19. North of State Route 78, Hardpan Surface



Photo 20. North of State Route 78, Viewing Upstream



Photo 21. Beginning of domain of analysis.



Photo 22. West gabion lined part of creek.

APPENDIX 3: FORM 1: INITIAL DESKTOP ANALYSIS

FORM 1: INITIAL DESKTOP ANALYSIS

Complete all shaded sections.

IF required at multiple locations, circle one of the following site types:

Applicant Site / Upstream Extent / Downstream Extent

Location: Latitude: 33° 11' 45.54" Longitude: 117° 14' 59.63"

Description (river name, crossing streets, etc.): Buena Vista Creek

GIS Parameters: The International System of Units (SI) is used throughout the assessment as the field standard and for consistency with the broader scientific community. However, as the singular exception, US Customary units are used for contributing drainage area (A) and mean annual precipitation (P) to apply regional flow equations after the USGS. See SCCWRP Technical Report 607 for example measurements and "Screening Tool Data Entry.xls" for automated calculations.

Form 1 Table 1. Initial desktop analysis in GIS.

	Symbol	Variable	Description and Source	Value
Watershed properties (English units)	A	Area (mi^2)	Contributing drainage area to screening location via published Hydrologic Unit Codes (HUCs) and/or ≤ 30 m National Elevation Data (NED), USGS seamless server	9.19
	P	Mean annual precipitation (in)	Area-weighted annual precipitation via USGS delineated polygons using records from 1900 to 1960 (which was more significant in hydrologic models than polygons delineated from shorter record lengths)	13.09
Site properties (SI units)	S_v	Valley slope (m/m)	Valley slope at site via NED, measured over a relatively homogenous valley segment as dictated by hillslope configuration, tributary confluences, etc., over a distance of up to ~500 m or 10% of the main-channel length from site to drainage divide	0.002
	W_v	Valley width (m)	Valley bottom width at site between natural valley walls as dictated by clear breaks in hillslope on NED raster, irrespective of potential armoring from floodplain encroachment, levees, etc. (imprecise measurements have negligible effect on rating in wide valleys where VWI is >> 2, as defined in lateral decision tree)	30

Form 1 Tabl e 2. Simplif ied peak flo w, screening index, and valley width index. Values for this table should be calculated in the sequence shown in this table, using values from Form 1 Table 1.

Symbol	Dependent Variable	Equation	Required Units	Value
Q_{10cfs}	10-yr peak flow (ft^3/s)	$Q_{10cfs} = 18.2 * A^{0.87} * P^{0.77}$	A (mi^2) P (in)	908
Q_{10}	10-yr peak flow (m^3/s)	$Q_{10} = 0.0283 * Q_{10cfs}$	Q_{10cfs} (ft^3/s)	25.70
INDEX	10-yr screening index ($m^{1.5}/s^{0.5}$)	$INDEX = S_v * Q_{10}^{0.5}$	Sv (m/m) Q_{10} (m^3/s)	0.01014
W_{ref}	Reference width (m)	$W_{ref} = 6.99 * Q_{10}^{0.438}$	Q_{10} (m^3/s)	29.0
VWI	Valley width index (m/m)	$VWI = W_v/W_{ref}$	W_v (m) W_{ref} (m)	1.04

APPENDIX 4: FORM 2: PEBBLE COUNT (EMPTY FORM)

FORM 2: PEBBLE COUNT

If it is necessary to estimate d_{50}, perform a pebble count, after Bunte and Abt (2001a,b), using a minimum of 100 particles and a standard half-phi template, or by measuring along the intermediate axis of each pebble. Use a grid and tape for equally spaced samples over systematic/complete transects across riffle sections (i.e., if the 100th particle is in the middle of a transect, complete the full transect before stopping the count; if more than 125 particles, record data near the bottom of Sheet 2 of 2). If the source of fines (sand/silt d <2 mm; see Form 2 Table 2 below) is less than ½ inch thick (approximately one finger width) at the sampling point, sample the coarser buried substrate; otherwise record observation of fines. Take photographs to support observations (Detailed instructions in Appendix A.3).

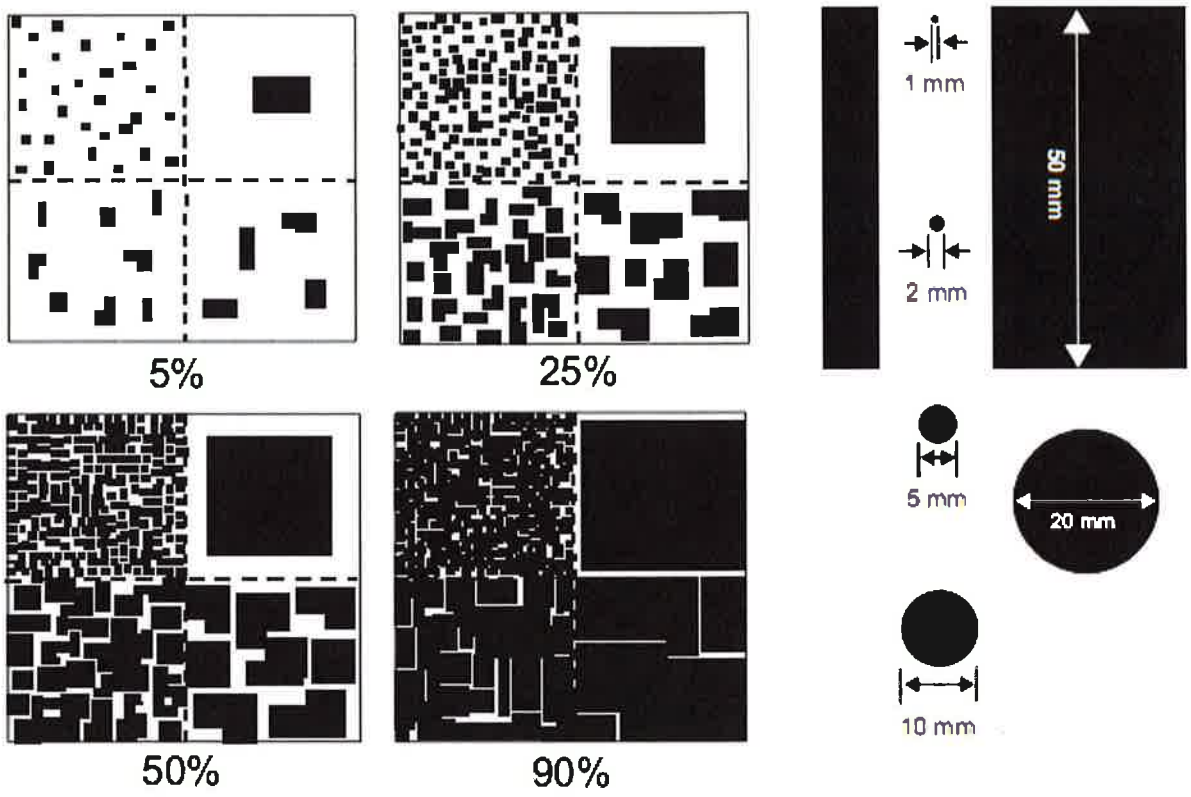
Form 2 Table 1. 100-pebble count tabulation for Vertical Susceptibility. Record station (Sta) and diameter (d) in millimeters.

#	Sta	d (mm)	#	Sta	d (mm)	#	Sta	d (mm)	#	Sta	d (mm)	#	Sta	d (mm)
1			26			51			76			101		
2			27			52			77			102		
3			28			53			78			103		
4			29			54			79			104		
5			30			55			80			105		
6			31			56			81			106		
7			32			57			82			107		
8			33			58			83			108		
9			34			59			84			109		
10			35			60			85			110		
11			36			61			86			111		
12			37			62			87			112		
13			38			63			88			113		
14			39			64			89			114		
15			40			65			90			115		
16			41			66			91			116		
17			42			67			92			117		
18			44			68			93			118		
19			44			69			94			119		
20			45			70			95			120		
21			46			71			96			121		
22			47			72			97			122		
23			48			73			98			123		
24			49			74			99			124		
25			50			75			100			125		

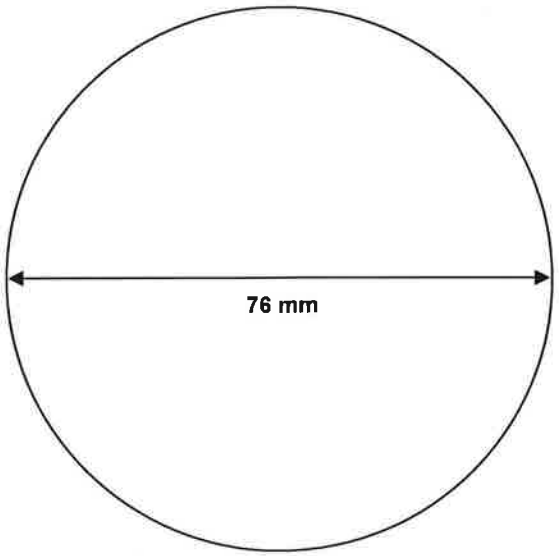
Form 2 Table 2. d_{50} for Screening Index Threshold.

Class Name	Diameter (mm)	Helpful Descriptions for Field Identification
Boulder	> 256	Difficult to lift by hand
Cobble	> 64	Typically able to lift
Gravel	> 2	Fits in one hand
Sand	> 0.0625	Can feel between fingers
Silt	> 0.004	Can feel with tongue
Clay	≤ 0.004	Can not feel individual particle

(Sheet 1 of 2)



Note: Each quadrant within each box contains the same total area covered using different sized objects.



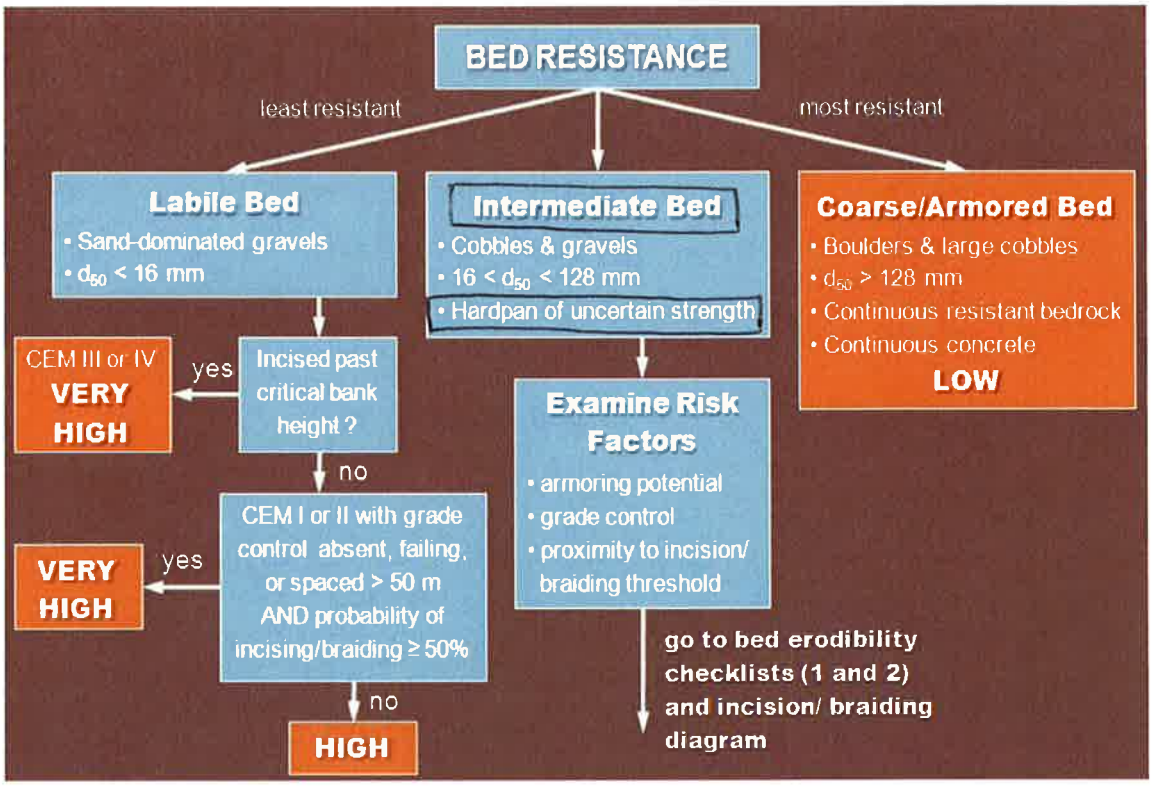
Form 2 Figure 1. Examples of % coverage by volume and substrate sizing adapted from *NRCS Field Book for Describing and Sampling Soils* (Schoeneberger *et al.* 2002) and Julien (1998).

(Sheet 2 of 2)

APPENDIX 5: FORM 3: VERTICAL SUSCEPTIBILITY FIELD SHEET

FORM 3: VERTICAL SUSCEPTIBILITY FIELD SHEET

Circle appropriate nodes/pathway for proposed site.





Form 3 Figure 1. Vertical Susceptibility photographic supplement to be used in conjunction with Form 3 Bed Resistance above.

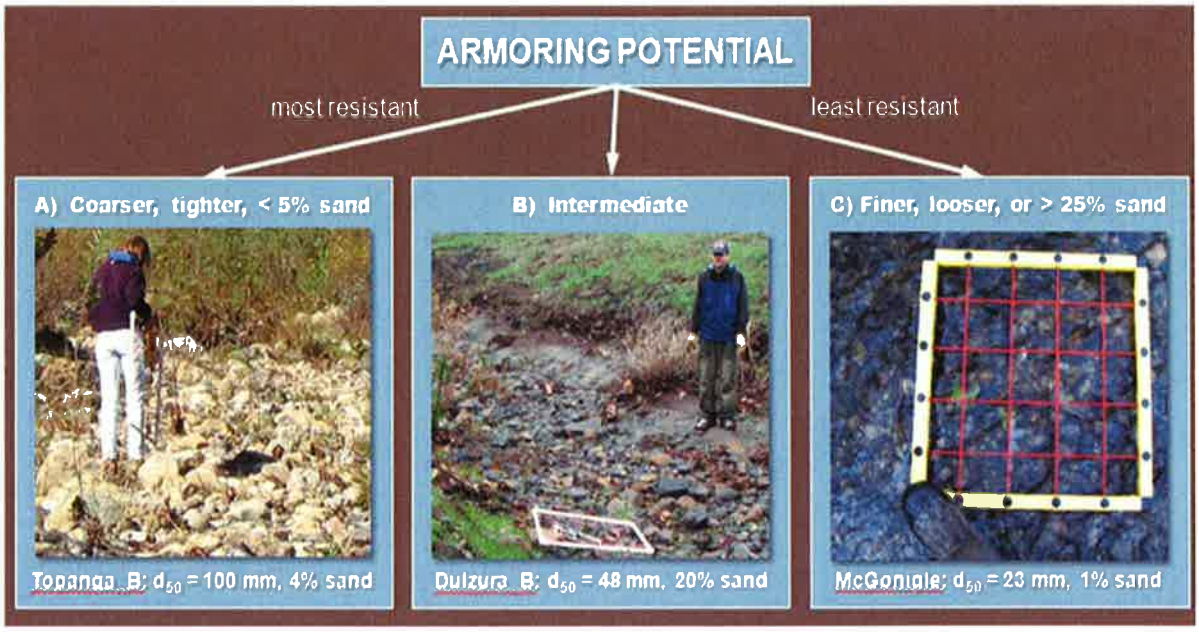
(Sheet 1 of 4)

Form 3 Support Materials

Form 3 Checklists 1 and 2, along with information recording in Form 3 Table 1, are intended to support the decisions pathways illustrated in Form 3 Overall Vertical Rating for Intermediate/Transitional Bed.

Form 3 Checklist 1: Armoring Potential

☐	A	A mix of coarse gravels and cobbles that are tightly packed with <5% surface material of diameter <2 mm
☐	(B)	Intermediate to A and C or hardpan of unknown resistance, spatial extent (longitudinal and depth), or unknown armoring potential due to surface veneer covering gravel or coarser layer encountered with probe
☐	C	Gravels/cobbles that are loosely packed or >25% surface material of diameter <2 mm



Form 3 Figure 2. Armoring potential photographic supplement for assessing intermediate beds (16 < d_{50} < 128 mm) to be used in **conjunction with Form 3 Checklist 1.**

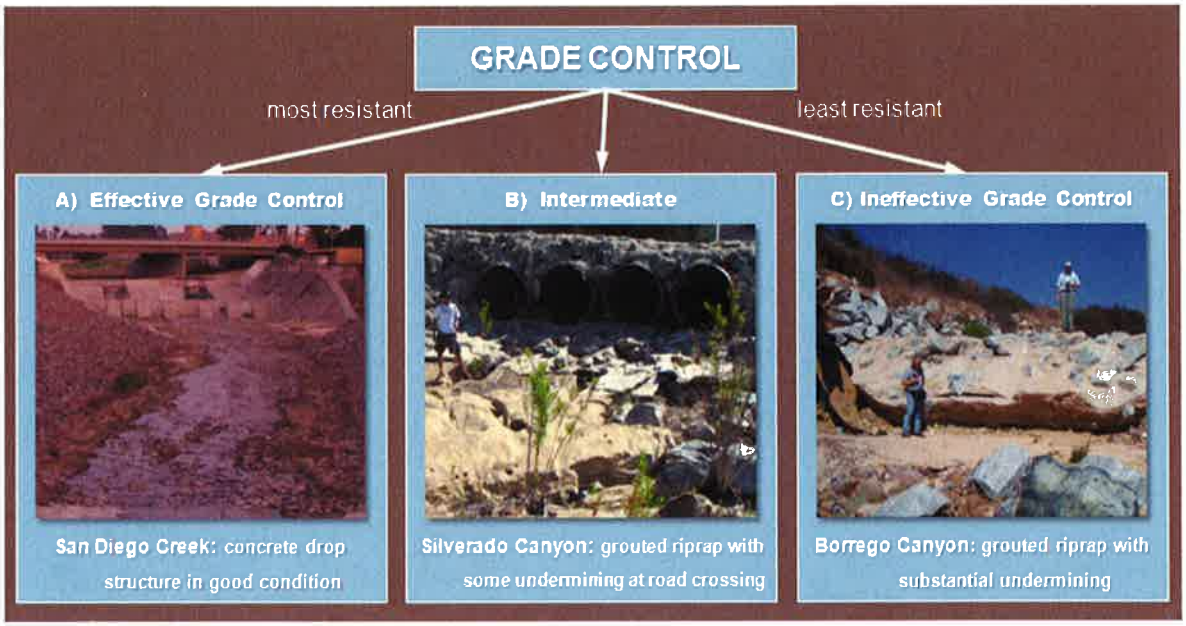
Form 3 Checklist 2: Grade Control

☐ (A) Grade control is present with spacing <50 m or $2/S_v$ m

- No evidence of failure/ineffectiveness, e.g., no headcutting (>30 cm), no active mass wasting (analyst cannot say grade control sufficient if mass-wasting checklist indicates presence of bank failure), no exposed bridge pilings, no culverts/structures undermined
- Hard points in serviceable condition at decadal time scale, e.g., no apparent undermining, flanking, failing grout
- If geologic grade control, rock should be resistant igneous and/or metamorphic; For sedimentary/hardpan to be classified as 'grade control', it should be of demonstrable strength as indicated by field testing such as hammer test/borings and/or inspected by appropriate stakeholder

☐ B Intermediate to A and C – artificial or geologic grade control present but spaced 2/Sv m to 4/Sv m or potential evidence of failure or hardpan of uncertain resistance

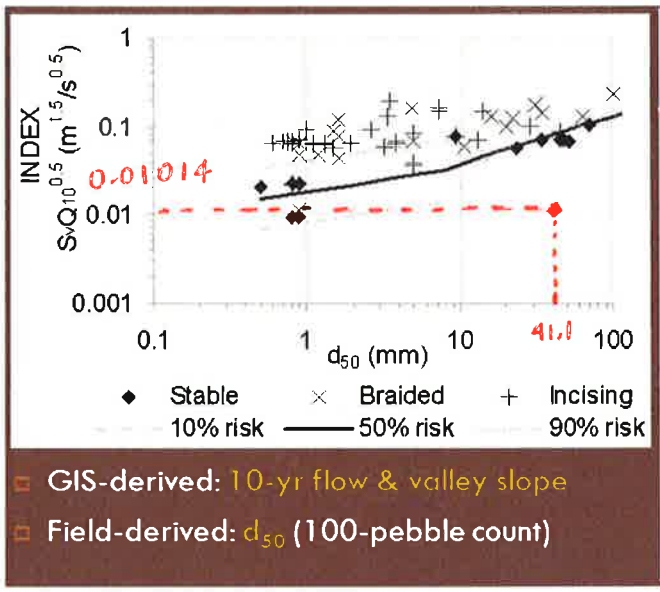
☐ C Grade control absent, spaced >100 m or $>4/S_v$ m, or clear evidence of ineffectiveness



Form 3 Figure 3. Grade-control (condition) photographic supplement for assessing intermediate beds ($16 < d_{50} < 128$ mm) to be used in conjunction with Form 3 Checklist 2.

Regionally-Calibrated Screening Index Threshold for Incising/Braiding

For transitional bed channels (d_{50} between 16 and 128 mm) or labile beds (channel not incised past critical bank height), use Form 3 Figure 3 to determine Screening Index Score and complete Form 3 Table 1.



Model Type	d_{50} (mm)	50% Risk $S_vQ_{10}^{0.5}$ ($m^{1.5}/s^{0.5}$)
Logistic Regression $d_{50} \geq 16$ mm	128	0.145
	96	0.125
	80	0.114
	64	0.101
	48	0.087
	32	0.070
	16	0.049
Logistic Reg. $d_{50} < 16$ mm	8	0.031
	4	0.026
	2	0.022
	1	0.018
	0.5	0.015

Form 3 Figure 4. Probability of incising/braiding based on logistic regression of Screening Index and d_{50} to be used in conjunction with Form 3 Table 1.

Form 3 Table 1. Values for Screening Index Threshold (probability of incising/braiding) to be used in conjunction with Form 3 Figure 4 (above) to complete Form 3 Overall Vertical Rating for Intermediate/Transitional Bed (below).. Screening Index Score: A = <50% probability of incision for current Q_{10}, valley slope, and d_{50}; B = Hardpan/d_{50} indeterminate; and C = ≥50% probability of incising/braiding for current Q_{10}, valley slope, and d_{50}.

d_{50} (mm) *From Form 2*	$S_v*Q_{10}^{0.5}$ ($m^{1.5}/s^{0.5}$) *From Form 1*	$S_v*Q_{10}^{0.5}$ ($m^{1.5}/s^{0.5}$) *50% risk of incising/braiding from table in Form 3 Figure 3 above*	Screening Index Score (A) B, C)

Overall Vertical Rating for Intermediate/Transitional Bed

Calculate the overall Vertical Rating for Transitional Bed channels using the formula below. Numeric values for responses to Form 3 Checklists and Table 1 as follows: A = 3, B = 6, C = 9.

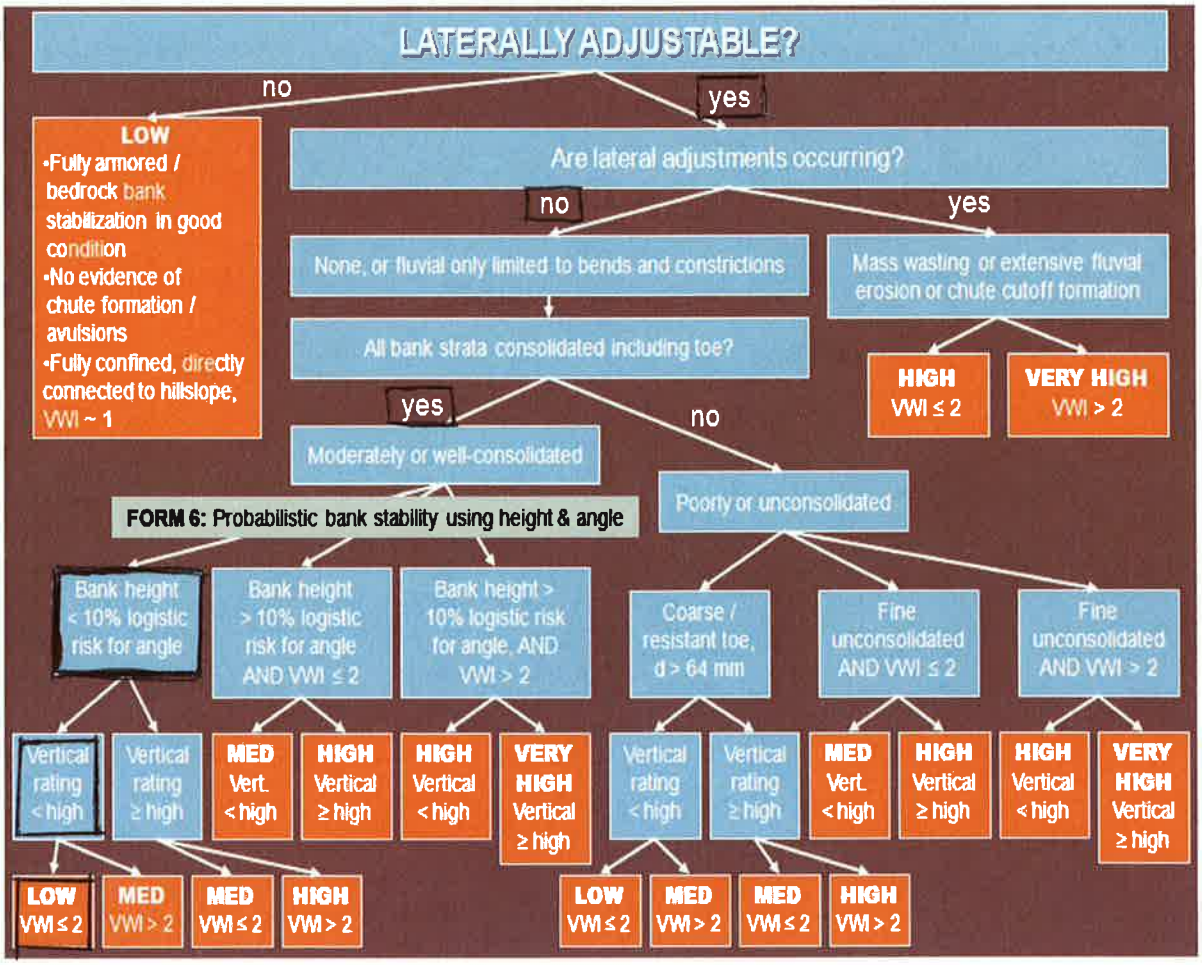
$$Vertical\ Rating = \sqrt{\{(\sqrt{armoring * grade\ control}) * screening\ index\ score\}}$$

Vertical Susceptibility based on Vertical Rating: <4.5 = LOW; 4.5 to 7 = MEDIUM; and >7 = HIGH.

APPENDIX 6: FORM 4: LATERAL SUSCEPTIBILITY FIELD SHEET

FORM 4: LATERAL SUSCEPTIBILTY FIELD SHEET

Circle appropriate nodes/pathway for proposed site
OR use sequence of questions provided in Form 5.



(Sheet 1 of 1)

APPENDIX 7: FORM 5: SEQUENCE OF LATERAL SUSCEPTIBILITY QUESTIONS OPTION

FORM 5: SEQUENCE OF LATERAL SUSCEPTIBILITY QUESTIONS OPTION

Enter Lateral Susceptibility (Very High, High, Medium, Low) in shaded column.
Mass wasting and bank instability from Form 6, VWI from Form 4, and Vertical Rating from Form 3.

		Lateral Susceptibility
Channel fully confined with VWI ~1 – connected hillslopes OR fully-armored/engineered bed and banks in good condition?	If YES, then LOW	
If NO, Is there active **mass wasting** or extensive fluvial erosion (> 50% of bank length)?	If YES, VWI ≤ 2 = HIGH, VWI > 2 = VERY HIGH	
If NO, Are both banks consolidated?	If YES, How many risk factors present? **Risk Factors:** ○ Bank instability p > 10% ○ VWI > 2 ○ Vertical rating ≥ High • All three = VERY HIGH • Two of three = HIGH • One of three = MEDIUM • None = LOW	
If NO, Are banks either consolidated or unconsolidated with coarse toe of d > 64 mm?	If YES, How many risk factors present? **Risk Factors:** ○ VWI > 2 ○ Vertical rating ≥ High • Two = HIGH • One = MEDIUM • None = LOW	
If NO, At least one bank is unconsolidated with toe of d < 64 mm	How many risk factors present? **Risk Factors:** ○ VWI > 2 ○ Vertical rating ≥ High • Two = VERY HIGH • One = HIGH • None = MEDIUM	

(Sheet 1 of 1)

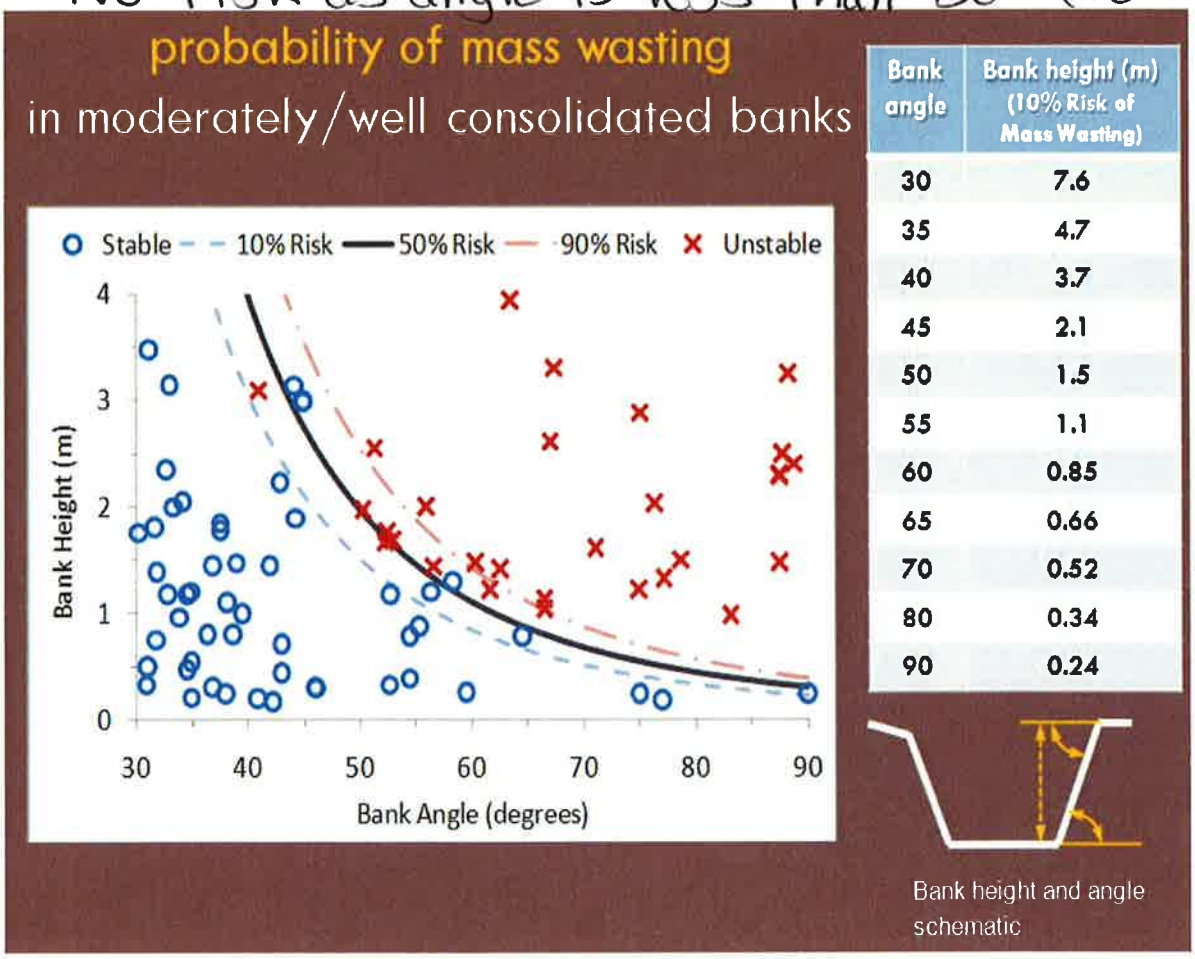
APPENDIX 8: FORM 6: PROBABILITY OF MASS WASTING BANK FAILURE

FORM 6: PROBABILITY OF MASS WASTING BANK FAILURE

If mass wasting is not currently extensive and the banks are moderately- to well-consolidated, measure bank height and angle at several locations (i.e., at least three locations that capture the range of conditions present in the study reach) to estimate representative values for the reach. Use Form 6 Figure 1 below to determine if risk of bank failure is >10% and complete Form 6 Table 1. Support your results with photographs that include a protractor/rod/tape/person for scale.

	Bank Angle (degrees) *(from Field)*	**Bank Height (m)** *(from Field)*	**Corresponding Bank Height for 10% Risk of Mass Wasting (m)** *(from Form 6 Figure 1 below)*	**Bank Failure Risk** *(<10% Risk)* *(>10% Risk)*
Left Bank				
Right Bank				

No risk as angle is less than 30° (18.4°-26.6°)

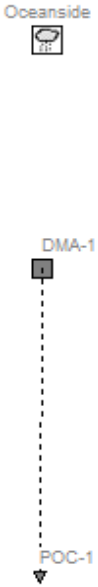
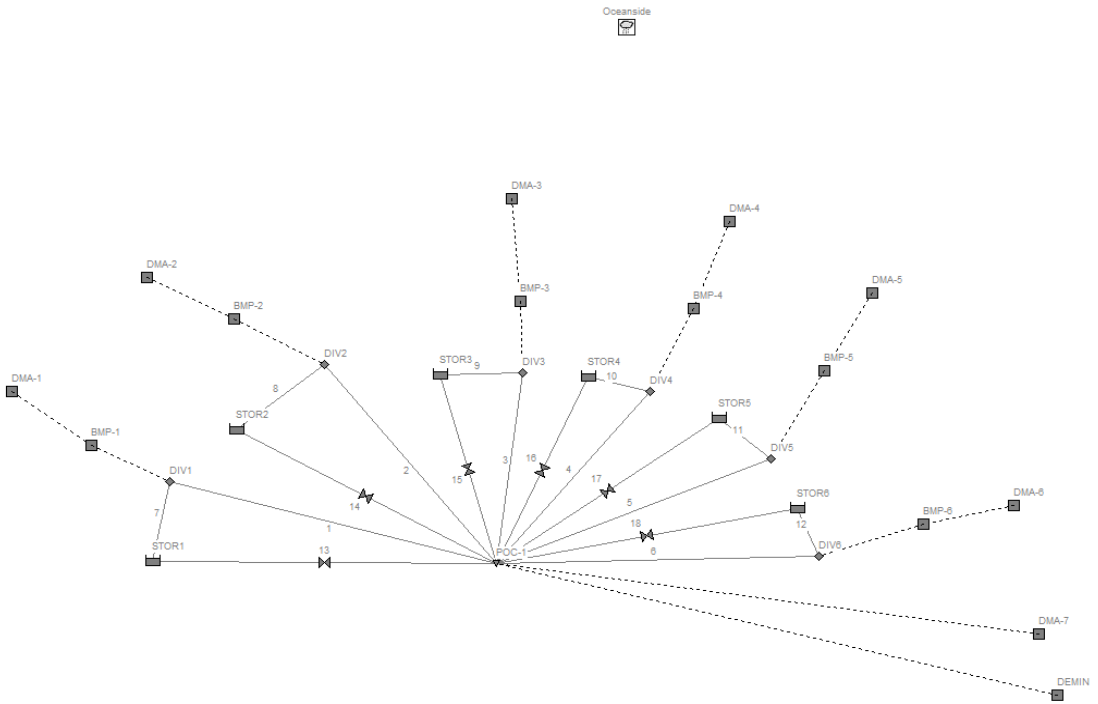


Form 6 Figure 1. Probability Mass Wasting diagram, Bank Angle:Height/% Risk table, and Band Height:Angle schematic.

(Sheet 1 of 1)

ATTACHMENT 2d

SWMM Model Schematics for Kensho Housing

PRE-PROJECT MODEL	POST-PROJECT MODEL
	

SWMM PRE-DEV INPUT PARAMETERS

DMA	Tributary Area, A (ac)	Tributary Area, A (sf)	Overland Flow Length, L	Overland Flow Width, W=A/L	Elevation Drop (ft)	% Slope, S_o	Imp. Area (sf)	% Imperv	N-Imperv	N-Perv	Suction Head	Conductivity	Initial Deficit	Total Inflow	Separation Time
EX. DMA 1	3.494123	152,204	278	547	41	14.7	0.0	0.0%	0.012	0.080	6.0	0.100	0.31		
TOTAL	3.494123	152,204												0.00699	24

SWMM POST-DEV INPUT PARAMETERS

DMA	Tributary Area, A (ac)	Tributary Area, A (sf)	Overland Flow Length, L	Overland Flow Width, W=A/L	Elevation Drop (ft)	% Slope, S_o	Imp. Area (sf)	% Imperv	N-Imperv	N-Perv	Suction Head	Conductivity	Initial Deficit	Total Inflow	Separation Time
DMA 1	1.036501	45150.0	669	67	32.5	4.9%	30,262	67.0%	0.012	0.08	6.0	0.07500	0.31		
BMP 1	0.039899	1,738	8	217	0	0.0	0	0.0%	0.012	0.08	6.0	0.07500	0.31		
DMA 2	0.392218	17,085	171	100	2.5	1.5%	15,027	88.0%	0.012	0.08	6.0	0.07500	0.31		
BMP 2	0.017080	744	23	32	0	0.0	0	0.0%	0.012	0.08	6.0	0.07500	0.31		
DMA 3	0.706635	30,781	213	145	10.1	4.7%	25,576	83.1%	0.012	0.08	6.0	0.07500	0.31		
BMP 3	0.027479	1,197	31	39	0	0.0	0	0.0%	0.012	0.08	6.0	0.07500	0.31		
DMA 4	0.122452	5,334	167	32	7.0	4.2%	4,724	88.6%	0.012	0.08	6.0	0.07500	0.31		
BMP 4	0.007920	345	29	12	0	0.0	0	0.0%	0.012	0.08	6.0	0.07500	0.31		
DMA 5	0.479109	20,870	314	66	13.0	4.1%	19,346	92.7%	0.012	0.08	6.0	0.07500	0.31		
BMP 5	0.021143	921	88	10	0	0.0	0	0.0%	0.012	0.08	6.0	0.07500	0.31		
DMA 6	0.288017	12,546	339	37	14.5	4.3%	11,444	91.2%	0.012	0.08	6.0	0.07500	0.31		
BMP 6	0.016644	725	47	15	0	0.0	0	0.0%	0.012	0.08	6.0	0.07500	0.31		
DMA 7	0.332989	14,505	226	64	29.0	12.8%	11,460	79.0%	0.012	0.08	6.0	0.07500	0.31		
DEMIN	0.006038	263	5	53	0.1	2.0	155	58.9%	0.012	0.08	6.0	0.07500	0.31		
TOTAL	3.494123	152,204												0.00699	24

Pre-project Flow Frequency - Long-term Simulation

Pre-project

3599 Kensho Housing

Statistics - Node POC-1 Total Inflow

Rank	Start Date	Event Duration (hours)	Event Peak (CFS)	Exceedance Frequency (percent)	Return Period (years)
1	4/14/2003	5	3.853	0.53	58
2	10/1/1983	3	3.507	1.06	29
3	1/4/1978	3	3.482	1.6	19.33
4	1/15/1979	2	3.162	2.13	14.5
5	1/4/1995	6	3.021	2.66	11.6
6	2/25/2003	3	2.523	3.19	9.67
7	2/25/1969	6	2.276	3.72	8.29
8	9/23/1986	1	2.2	4.26	7.25
9	2/4/1958	2	2.171	4.79	6.44
10	2/20/1980	1	2.098	5.32	5.8
11	2/18/2005	2	2.09	5.85	5.27
12	2/28/1978	13	2.083	6.38	4.83
13	1/14/1993	1	2.058	6.91	4.46
14	4/1/1958	4	2.007	7.45	4.14
15	10/29/2000	2	1.933	7.98	3.87
16	12/19/1970	3	1.925	8.51	3.63
17	11/15/1952	2	1.917	9.04	3.41
18	1/16/1952	3	1.881	9.57	3.22
19	3/17/1982	9	1.848	10.11	3.05
20	10/27/2004	4	1.808	10.64	2.9
21	2/3/1998	2	1.743	11.17	2.76
22	1/29/1983	2	1.731	11.7	2.64
23	2/27/1983	1	1.729	12.23	2.52
24	10/20/2004	6	1.724	12.77	2.42
25	11/22/1965	10	1.672	13.3	2.32
26	2/10/1978	3	1.672	13.83	2.23
27	2/16/1980	3	1.645	14.36	2.15
28	2/22/1998	26	1.599	14.89	2.07
29	1/27/2008	1	1.563	15.43	2
30	12/30/1991	1	1.494	15.96	1.93
31	2/17/1998	2	1.488	16.49	1.87
32	1/6/2008	2	1.408	17.02	1.81
33	1/28/1980	10	1.4	17.55	1.76
34	1/16/1978	5	1.399	18.09	1.71
35	2/15/1986	6	1.39	18.62	1.66
36	2/12/1992	14	1.361	19.15	1.61
37	1/18/1993	5	1.346	19.68	1.57
38	2/14/1998	2	1.264	20.21	1.53
39	3/11/1995	16	1.246	20.74	1.49
40	3/2/1980	1	1.185	21.28	1.45
41	12/2/1961	1	1.12	21.81	1.41
42	8/17/1977	2	1.113	22.34	1.38
44	11/8/2002	1	1.109	23.4	1.32
44	2/11/2003	25	1.109	23.4	1.32
45	2/28/1991	21	1.102	23.94	1.29
46	2/6/1969	6	1.086	24.47	1.26
47	12/24/1988	2	1.044	25	1.23

10-year Q:	2.943	cfs
5-year Q:	2.007	cfs
2-year Q:	1.703	cfs
Lower Flow Threshold:	50%	
$0.1xQ_2$ (Pre):	0.852	cfs

Post-project Flow Frequency - Long-term Simulation

3599 Kensho Housing

Statistics - Node POC-1 Total Inflow

Rank	Start Date	Event Duration (hours)	Event Peak (CFS)	Exceedance Frequency (percent)	Return Period (years)
1	4/14/2003	25	3.585	0.1	58
2	1/3/1995	45	3.071	0.2	29
3	1/14/1979	33	3.066	0.3	19.33
4	9/29/1983	51	3.006	0.4	14.5
5	1/3/1978	73	2.39	0.5	11.6
6	2/25/2003	63	2.301	0.6	9.67
7	2/23/1969	50	2.168	0.7	8.29
8	2/3/1958	37	2.14	0.81	7.25
9	10/27/2004	34	1.979	0.91	6.44
10	2/13/1980	190	1.966	1.01	5.8
11	2/27/1978	142	1.962	1.11	5.27
12	1/16/1952	12	1.931	1.21	4.83
13	2/5/1978	122	1.705	1.31	4.46
14	9/23/1986	34	1.703	1.41	4.14
15	11/22/1965	28	1.703	1.51	3.87
16	3/17/1982	44	1.693	1.61	3.63
17	12/29/1991	15	1.678	1.71	3.41
18	2/22/1998	58	1.632	1.81	3.22
19	2/18/2005	30	1.607	1.91	3.05
20	2/3/1998	38	1.578	2.01	2.9
21	1/12/1993	150	1.54	2.11	2.76
22	1/27/1980	67	1.525	2.22	2.64
23	1/16/1978	14	1.483	2.32	2.52
24	12/16/1970	75	1.451	2.42	2.42
25	3/2/1980	22	1.435	2.52	2.32
26	8/16/1977	35	1.401	2.62	2.23
27	2/22/2008	12	1.372	2.72	2.15
28	2/16/1998	35	1.342	2.82	2.07
29	1/16/1972	15	1.196	2.92	2
30	2/14/1986	12	1.195	3.02	1.93
31	11/14/1952	41	1.194	3.12	1.87
32	1/5/1979	32	1.188	3.22	1.81
33	4/1/1958	75	1.157	3.32	1.76
34	3/7/1968	20	1.155	3.42	1.71
35	2/27/1991	44	1.147	3.52	1.66
36	2/21/2005	55	1.142	3.63	1.61
37	10/29/2000	27	1.131	3.73	1.57
38	1/14/1978	19	1.118	3.83	1.53
39	2/11/2003	55	1.093	3.93	1.49
40	1/12/1997	37	1.089	4.03	1.45
41	2/12/1992	23	1.072	4.13	1.41
42	1/7/2005	101	1.061	4.23	1.38
43	1/20/1962	59	1.06	4.33	1.35
44	9/17/1963	45	1.056	4.43	1.32
45	4/27/1960	11	1.049	4.53	1.29
46	12/24/1971	40	1.043	4.63	1.26
47	1/9/1980	87	1.022	4.73	1.23

Post-project (Mitigated)

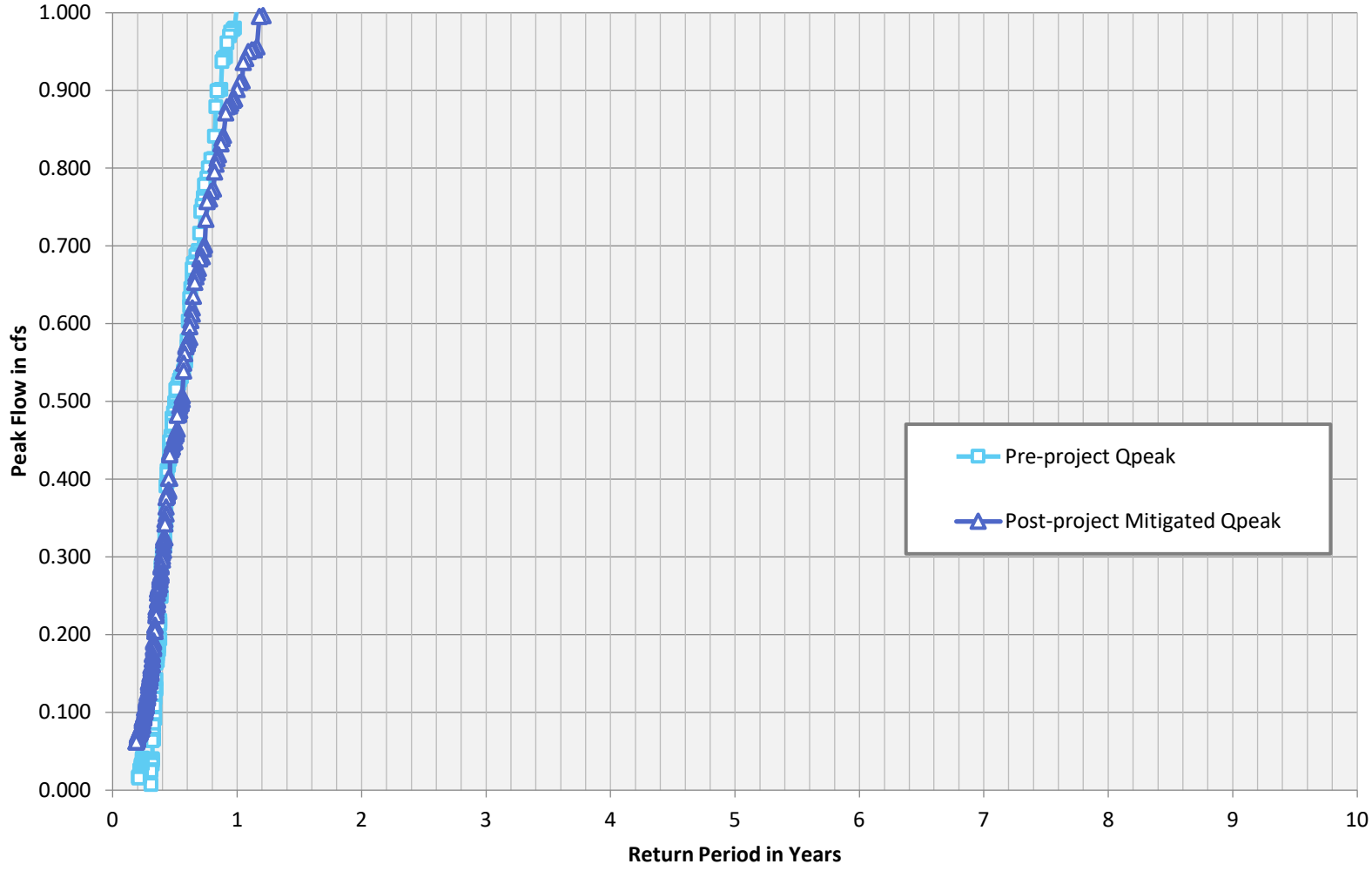
10-year Q:	2.050	cfs
5-year Q:	1.950	cfs
2-year Q:	1.317	cfs
Lower Flow Threshold:	50%	
$0.1xQ_2$ (Pre):	0.658	cfs

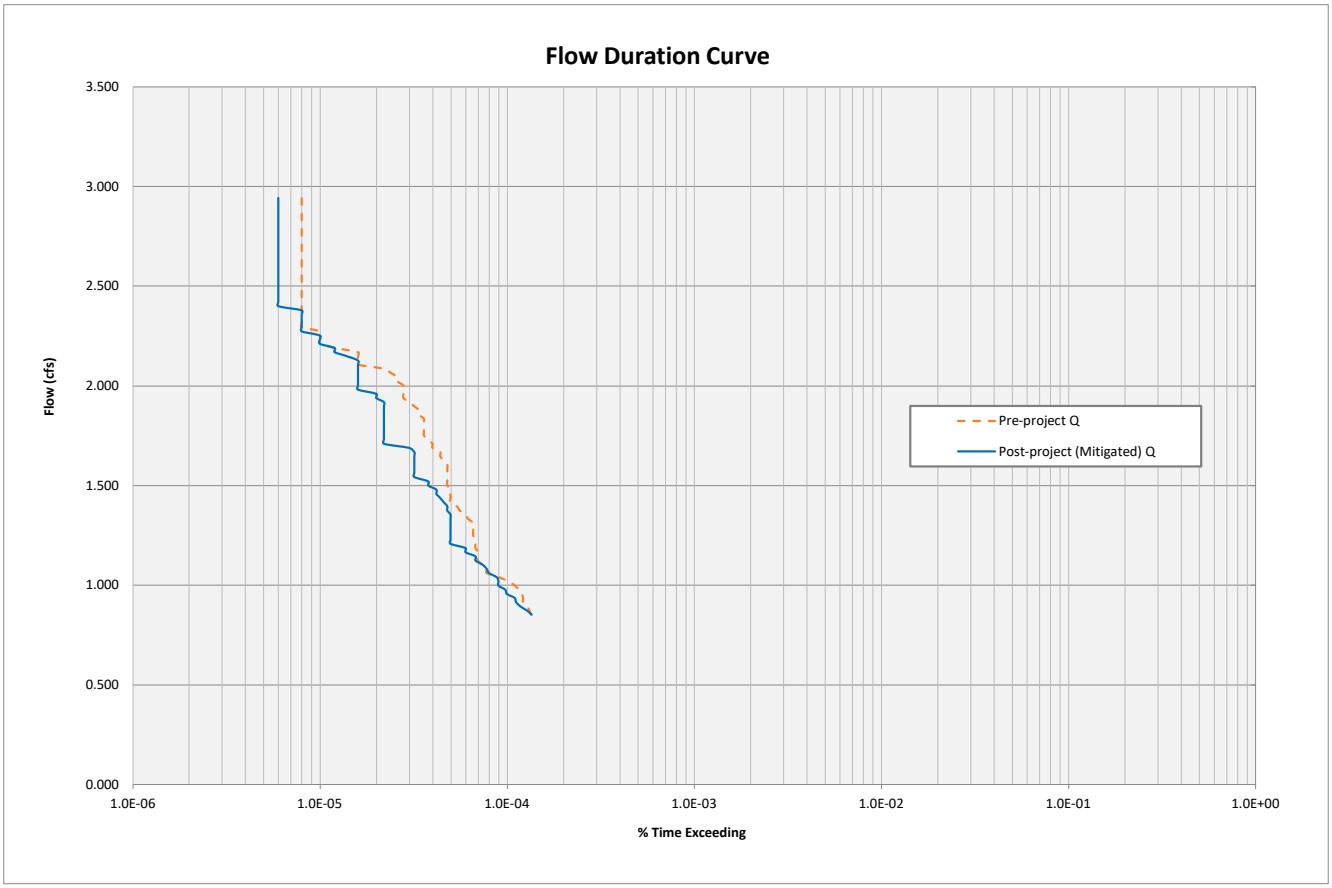
Peak Flow Frequency Summary

Q_2 to Q_{10} Comparison Table

Return Period	Existing Condition (cfs)	Mitigated Condition (cfs)	Reduction, Exist - Mitigated (cfs)
LF = 0.1xQ_2	0.852	0.658	0.193
2-year	1.703	1.317	0.386
3-year	1.904	1.667	0.237
4-year	2.070	1.873	0.197
5-year	2.007	1.950	0.057
6-year	2.109	2.106	0.002
7-year	2.045	2.044	0.001
8-year	2.092	2.224	-0.132
9-year	2.350	2.270	0.080
10-year	2.943	2.050	0.893

Peak Flow Frequency Curves




Flow Duration Curve
3.500
3.000
2.500
2.000
1.500
1.000
0.500
0.000
Flow (cfs)
1.0E-06
1.0E-05
1.0E-04
1.0E-03
1.0E-02
1.0E-01
1.0E+00
% Time Exceeding
Pre-project Q
Post-project (Mitigated) Q

Low Flow Threshold: 50%
0.1xQ2 (Pre): 0.852 cfs
Q10 (Pre): 2.943 cfs
of Ordinates: 100
Incremental Q (Pre): 0.02092 cfs
Total Hourly Data: 501471 hours

The proposed BMP: PASSED

Interval	Pre-project Flow (cfs)	Pre-project Hours	Pre-project % Time Exceeding	Post-project Hours	Post-project % Time Exceeding	Percentage	Pass/Fail
0	0.852	67	1.34E-04	68	1.36E-04	101%	Pass
1	0.872	66	1.32E-04	64	1.28E-04	97%	Pass
2	0.893	64	1.28E-04	59	1.18E-04	92%	Pass
3	0.914	61	1.22E-04	56	1.12E-04	92%	Pass
4	0.935	61	1.22E-04	55	1.10E-04	90%	Pass
5	0.956	60	1.20E-04	50	9.97E-05	83%	Pass
6	0.977	58	1.16E-04	49	9.77E-05	84%	Pass
7	0.998	55	1.10E-04	45	8.97E-05	82%	Pass
8	1.019	51	1.02E-04	45	8.97E-05	88%	Pass
9	1.040	45	8.97E-05	44	8.77E-05	98%	Pass
10	1.061	39	7.78E-05	40	7.98E-05	103%	Pass
11	1.082	39	7.78E-05	39	7.78E-05	100%	Pass
12	1.103	37	7.38E-05	37	7.38E-05	100%	Pass
13	1.123	35	6.98E-05	34	6.78E-05	97%	Pass
14	1.144	35	6.98E-05	34	6.78E-05	97%	Pass
15	1.165	35	6.98E-05	30	5.98E-05	86%	Pass
16	1.186	34	6.78E-05	30	5.98E-05	88%	Pass
17	1.207	34	6.78E-05	25	4.99E-05	74%	Pass
18	1.228	34	6.78E-05	25	4.99E-05	74%	Pass
19	1.249	33	6.58E-05	25	4.99E-05	76%	Pass
20	1.270	33	6.58E-05	25	4.99E-05	76%	Pass
21	1.291	33	6.58E-05	25	4.99E-05	76%	Pass
22	1.312	33	6.58E-05	25	4.99E-05	76%	Pass
23	1.333	31	6.18E-05	25	4.99E-05	81%	Pass
24	1.354	30	5.98E-05	25	4.99E-05	83%	Pass
25	1.374	28	5.58E-05	24	4.79E-05	86%	Pass
26	1.395	27	5.38E-05	24	4.79E-05	89%	Pass
27	1.416	25	4.99E-05	23	4.59E-05	92%	Pass
28	1.437	25	4.99E-05	22	4.39E-05	88%	Pass
29	1.458	25	4.99E-05	21	4.19E-05	84%	Pass
30	1.479	25	4.99E-05	21	4.19E-05	84%	Pass
31	1.500	24	4.79E-05	19	3.79E-05	79%	Pass
32	1.521	24	4.79E-05	19	3.79E-05	79%	Pass
33	1.542	24	4.79E-05	16	3.19E-05	67%	Pass
34	1.563	24	4.79E-05	16	3.19E-05	67%	Pass
35	1.584	24	4.79E-05	16	3.19E-05	67%	Pass
36	1.605	24	4.79E-05	16	3.19E-05	67%	Pass
37	1.625	23	4.59E-05	16	3.19E-05	70%	Pass
38	1.646	22	4.39E-05	16	3.19E-05	73%	Pass
39	1.667	22	4.39E-05	16	3.19E-05	73%	Pass
40	1.688	20	3.99E-05	15	2.99E-05	75%	Pass
41	1.709	20	3.99E-05	11	2.19E-05	55%	Pass
42	1.730	19	3.79E-05	11	2.19E-05	58%	Pass
43	1.751	18	3.59E-05	11	2.19E-05	61%	Pass
44	1.772	18	3.59E-05	11	2.19E-05	61%	Pass
45	1.793	18	3.59E-05	11	2.19E-05	61%	Pass
46	1.814	18	3.59E-05	11	2.19E-05	61%	Pass
47	1.835	18	3.59E-05	11	2.19E-05	61%	Pass
48	1.856	17	3.39E-05	11	2.19E-05	65%	Pass
49	1.876	17	3.39E-05	11	2.19E-05	65%	Pass
50	1.897	16	3.19E-05	11	2.19E-05	69%	Pass
51	1.918	15	2.99E-05	11	2.19E-05	73%	Pass
52	1.939	14	2.79E-05	10	1.99E-05	71%	Pass
53	1.960	14	2.79E-05	10	1.99E-05	71%	Pass
54	1.981	14	2.79E-05	8	1.60E-05	57%	Pass
55	2.002	14	2.79E-05	8	1.60E-05	57%	Pass
56	2.023	13	2.59E-05	8	1.60E-05	62%	Pass
57	2.044	13	2.59E-05	8	1.60E-05	62%	Pass
58	2.065	12	2.39E-05	8	1.60E-05	67%	Pass
59	2.086	11	2.19E-05	8	1.60E-05	73%	Pass
60	2.107	8	1.60E-05	8	1.60E-05	100%	Pass
61	2.127	8	1.60E-05	8	1.60E-05	100%	Pass
62	2.148	8	1.60E-05	7	1.40E-05	88%	Pass
63	2.169	8	1.60E-05	6	1.20E-05	75%	Pass
64	2.190	6	1.20E-05	6	1.20E-05	100%	Pass
65	2.211	5	9.97E-06	5	9.97E-06	100%	Pass
66	2.232	5	9.97E-06	5	9.97E-06	100%	Pass
67	2.253	5	9.97E-06	5	9.97E-06	100%	Pass
68	2.274	5	9.97E-06	4	7.98E-06	80%	Pass
69	2.295	4	7.98E-06	4	7.98E-06	100%	Pass
70	2.316	4	7.98E-06	4	7.98E-06	100%	Pass
71	2.337	4	7.98E-06	4	7.98E-06	100%	Pass
72	2.358	4	7.98E-06	4	7.98E-06	100%	Pass
73	2.378	4	7.98E-06	4	7.98E-06	100%	Pass
74	2.399	4	7.98E-06	3	5.98E-06	75%	Pass
75	2.420	4	7.98E-06	3	5.98E-06	75%	Pass
76	2.441	4	7.98E-06	3	5.98E-06	75%	Pass
77	2.462	4	7.98E-06	3	5.98E-06	75%	Pass
78	2.483	4	7.98E-06	3	5.98E-06	75%	Pass
79	2.504	4	7.98E-06	3	5.98E-06	75%	Pass
80	2.525	4	7.98E-06	3	5.98E-06	75%	Pass
81	2.546	4	7.98E-06	3	5.98E-06	75%	Pass
82	2.567	4	7.98E-06	3	5.98E-06	75%	Pass
83	2.588	4	7.98E-06	3	5.98E-06	75%	Pass
84	2.609	4	7.98E-06	3	5.98E-06	75%	Pass
85	2.629	4	7.98E-06	3	5.98E-06	75%	Pass
86	2.650	4	7.98E-06	3	5.98E-06	75%	Pass
87	2.671	4	7.98E-06	3	5.98E-06	75%	Pass
88	2.692	4	7.98E-06	3	5.98E-06	75%	Pass
89	2.713	4	7.98E-06	3	5.98E-06	75%	Pass
90	2.734	4	7.98E-06	3	5.98E-06	75%	Pass
91	2.755	4	7.98E-06	3	5.98E-06	75%	Pass
92	2.776	4	7.98E-06	3	5.98E-06	75%	Pass
93	2.797	4	7.98E-06	3	5.98E-06	75%	Pass
94	2.818	4	7.98E-06	3	5.98E-06	75%	Pass
95	2.839	4	7.98E-06	3	5.98E-06	75%	Pass
96	2.860	4	7.98E-06	3	5.98E-06	75%	Pass
97	2.880	4	7.98E-06	3	5.98E-06	75%	Pass
98	2.901	4	7.98E-06	3	5.98E-06	75%	Pass
99	2.922	4	7.98E-06	3	5.98E-06	75%	Pass
100	2.943	4	7.98E-06	3	5.98E-06	75%	Pass

SWMM Model Flow Coefficient Calculation

Kensho Housing

BMP-1

PARAMETER	ABBREV.	Bio-Retention Cell LID BMP	
Ponding Depth	PD	8	in
Bioretention Soil Layer	S	24	in
Gravel Layer	G	9	in
TOTAL		3.4	ft
		41	in
Orifice Coefficient	c_g	0.61	--
Low Flow Orifice Diameter	D	0.8125	in
Drain exponent	n	0.5	--
Flow Rate (volumetric)	Q	0.032	cfs
Ponding Depth Surface Area	A_{PD}	1738	ft^2
Bioretention Surface Area	A_S, A_G	1738	ft^2
	A_S, A_G	0.0399	ac
Porosity of Bioretention Soil	n	1.00	-
Flow Rate (per unit area)	q	0.806	in/hr
Effective Ponding Depth	PD_{eff}	**8.00**	in
Flow Coefficient	C	**0.1265**	--
Ponding Depth @ $V_{WQ, required}$	$PD_{orificeFL}$	8	in
Cutoff Flow	Q_{cutoff}	0.03242	cfs

Outlet Structure for Discharge of BMP-1

Discharge vs. Elevation Table

Lower slot orifice			Emergency Weir (2-24" brooks box)	
No. of orif:	2		Invert:	1.08 ft
Invert:	0 ft		L:	16.0 ft
Slot height	0.25 ft		C_w:	3.1
Slot width	0.5 ft			
A	0.125	0.125		
C_o:	0.60			

***Note: h = head above the invert of the lowest surface discharge opening.**

H (ft)	h* (ft)	$Q_{slot-low}$ (cfs)	Q_{emerg} (cfs)	Q_{tot} (cfs)	
0.670	0.000	0.000	0.000	0.000	LOWER OUTLET ORIFICE
0.753	0.083	0.075	0.000	0.075	
0.837	0.167	0.211	0.000	0.211	
0.920	0.250	0.388	0.000	0.388	
1.003	0.333	0.549	0.000	0.549	
1.087	0.417	0.650	0.000	0.650	
1.170	0.500	0.737	0.000	0.737	
1.253	0.583	0.815	0.000	0.815	
1.337	0.667	0.886	0.000	0.886	
1.420	0.750	0.952	0.000	0.952	
1.503	0.833	1.013	0.000	1.013	
1.587	0.917	1.071	0.000	1.071	
1.670	1.000	1.126	0.000	1.126	
1.753	1.083	1.178	0.000	1.178	RISER STRUCTURE
1.837	1.167	1.229	0.600	1.829	
1.920	1.250	1.277	1.692	2.969	
2.00	1.333	1.323	3.106	4.429	

Note:

1. Weir equation, $Q=C_wL_e(h)^{3/2}$
2. Orifice equation, $Q=C_oA_e(2gh)^{1/2}$
3. Slot orifice acts as a weir when $h^* < h_{slot}$; slot orifice acts

Stage Area for BMP-1

SURFACE STORAGE BMP-1

Depth (ft)	Area (ft^2)	Volume (ft^3)	
0.0000	1738	0	
0.0833	1738	144	
0.1667	1738	289	
0.2500	1738	433	
0.3333	1738	577	
0.4167	1738	721	
0.5000	1738	866	WQ PONDING
0.5833	1738	1010	
0.6667	1738	1154	
0.7500	1738	1298	
0.8333	1738	1443	
0.9167	1738	1587	
1.0000	1738	1731	
1.0833	1738	1875	
1.1667	1738	2020	
1.2500	1738	2164	
1.3333	1738	2308	
1.4167	1738	2452	
1.5000	1738	2597	Riser Structure
1.5833	1738	2741	
1.6667	1738	2885	
1.7500	1738	3029	
1.8333	1738	3174	
1.9167	1738	3318	
2.0000	1738	3462	

SUB-SURFACE STORAGE BMP-1

Elevation (ft)	Area (ft^2)	Volume (ft^3)	
-2.00	1738	869	Amended Soil (0.25 voids)
-2.75	1738	873	Gravel Base (0.67 voids)
Gravel & Amend. Soil	TOTAL =	1742	(ft^3)
Surface Total	TOTAL =	2597	(ft^3)
BMP	**TOTAL =**	**4339**	**(ft^3)**

(1): The area at this surface elevation corresponds to the area of gravel and amended soil (biofiltration layer)

(2): Volume at this elevation coresponds with surface volume for WQ purposes (invert of lowest surface outlet)

Effective Depth:	6.00 in

Stage-Storage & Stage-Discharge Relationship for BMP-1

Discharge vs. Elevation Table

Basin Dimensions

Area: 1,738 ft^2

***Note: h = head above the invert of the lowest surface discharge opening.**

Basin Elev.	Area (ft^2)	Volume (ft^3)	Basin Depth (ft)	h* (ft)	Volume (acre-ft)	Q_{total} (cfs)	
365.67	1,738	0	0.667	0.000	0.0000	0.0000	LOWER OUTLET ORIFICE
365.75	1,738	144	0.750	0.083	0.0033	0.0746	
365.84	1,738	289	0.834	0.167	0.0066	0.2109	
365.92	1,738	433	0.917	0.250	0.0099	0.3875	
366.00	1,738	577	1.000	0.333	0.0132	0.5494	
366.09	1,738	721	1.084	0.417	0.0166	0.6501	
366.17	1,738	866	1.167	0.500	0.0199	0.7371	
366.25	1,738	1010	1.250	0.583	0.0232	0.8149	
366.34	1,738	1154	1.334	0.667	0.0265	0.8859	
366.42	1,738	1298	1.417	0.750	0.0298	0.9516	
366.50	1,738	1443	1.500	0.833	0.0331	1.0131	
366.59	1,738	1587	1.584	0.917	0.0364	1.0710	
366.67	1,738	1731	1.667	1.000	0.0397	1.1260	
366.75	1,738	1875	1.750	1.083	0.0431	1.1784	RISER STRUCTURE
366.84	1,738	2020	1.834	1.167	0.0464	1.8287	
366.92	1,738	2164	1.917	1.250	0.0497	2.9693	
367.00	1,738	2308	2.000	1.333	0.0530	4.4294	

Drawdown Calculation - BMP-1

Surface Ponding Depth:	PD	8	in
Ponding Depth Surface Area:	A_{PD}	1738	ft^2
Surface Ponding Volume:	V_{PD}	1,159	ft^3
Low Flow Orifice Diameter:	D	0.8125	in
Flow Rate (volumetric):	Q	0.032	ft^3/s
Drawdown Time:		9.93	hrs

SWMM Model Flow Coefficient Calculation

Kensho Housing

BMP-2

PARAMETER	ABBREV.	Bio-Retention Cell LID BMP	
Ponding Depth	PD	6	in
Bioretention Soil Layer	S	24	in
Gravel Layer	G	9	in
TOTAL		3.3	ft
		39	in
Orifice Coefficient	c_g	0.61	--
Low Flow Orifice Diameter	D	0.5625	in
Drain exponent	n	0.5	--
Flow Rate (volumetric)	Q	0.015	cfs
Ponding Depth Surface Area	A_{PD}	744	ft^2
Bioretention Surface Area	A_S, A_G	744	ft^2
	A_S, A_G	0.0171	ac
Porosity of Bioretention Soil	n	1.00	-
Flow Rate (per unit area)	q	0.881	in/hr
Effective Ponding Depth	PD_{eff}	**6.00**	in
Flow Coefficient	C	**0.1416**	--
Ponding Depth @ $V_{WQ, required}$	$PD_{orificeFL}$	6	in
Cutoff Flow	Q_{cutoff}	0.01517	cfs

Outlet Structure for Discharge of BMP-2

Discharge vs. Elevation Table

Lower slot orifice			Emergency Weir	
No. of orif:	2		Invert:	1.00 ft
Invert:	0 ft		L:	4.0 ft
Slot height	0.167 ft		C_w:	3.1
Slot width	0.33 ft			
A	0.055	0.05511		
C_o:	0.60			

***Note: h = head above the invert of the lowest surface discharge opening.**

H (ft)	h* (ft)	$Q_{slot-low}$ (cfs)	Q_{emerg} (cfs)	Q_{tot} (cfs)	
0.500	0.000	0.000	0.000	0.000	LOWER OUTLET ORIFICE
0.583	0.083	0.049	0.000	0.049	
0.667	0.167	0.139	0.000	0.139	
0.750	0.250	0.217	0.000	0.217	
0.833	0.333	0.265	0.000	0.265	
0.917	0.417	0.306	0.000	0.306	
1.000	0.500	0.343	0.000	0.343	
1.083	0.583	0.375	0.000	0.375	
1.167	0.667	0.405	0.000	0.405	
1.250	0.750	0.433	0.000	0.433	
1.333	0.833	0.460	0.000	0.460	
1.417	0.917	0.484	0.000	0.484	
1.500	1.000	0.508	0.000	0.508	RISER STRUCTURE
1.583	1.083	0.531	0.149	0.680	
1.667	1.167	0.552	0.422	0.974	
1.750	1.250	0.573	0.775	1.348	
1.833	1.333	0.593	1.193	1.786	
1.917	1.417	0.613	1.668	2.280	
2.000	1.500	0.632	2.192	2.824	

Note:

1. Weir equation, $Q=C_wL_e(h)^{3/2}$
2. Orifice equation, $Q=C_oA_e(2gh)^{1/2}$
3. Slot orifice acts as a weir when $h^* < h_{slot}$; slot orifice acts

Stage Area for BMP-2

SURFACE STORAGE BMP-1

Depth (ft)	Area (ft^2)	Volume (ft^3)	
0.0000	744	0	
0.0833	744	62	
0.1667	744	124	
0.2500	744	185	
0.3333	744	247	
0.4167	744	309	
0.5000	744	371	WQ PONDING
0.5833	744	432	
0.6667	744	494	
0.7500	744	556	
0.8333	744	618	
0.9167	744	679	
1.0000	744	741	
1.0833	744	803	
1.1667	744	865	
1.2500	744	926	
1.3333	744	988	
1.4167	744	1050	
1.5000	744	1112	Riser Structure
1.5833	744	1173	
1.6667	744	1235	
1.7500	744	1297	
1.8333	744	1359	
1.9167	744	1420	
2.0000	744	1482	

SUB-SURFACE STORAGE BMP-1

Elevation (ft)	Area (ft^2)	Volume (ft^3)	
-2.00	744	372	Amended Soil (0.25 voids)
-2.75	744	374	Gravel Base (0.67 voids)
Gravel & Amend. Soil	TOTAL =	746	(ft^3)
Surface Total	TOTAL =	1112	(ft^3)
BMP	**TOTAL =**	**1857**	**(ft^3)**

(1): The area at this surface elevation corresponds to the area of gravel and amended soil (biofiltration layer)

(2): Volume at this elevation coresponds with surface volume for WQ purposes (invert of lowest surface outlet)

Effective Depth:	6.00 in

Stage-Storage & Stage-Discharge Relationship for BMP-2

Discharge vs. Elevation Table

Basin Dimensions

Area: 744 ft^2

***Note: h = head above the invert of the lowest surface discharge opening.**

Basin Elev.	Area (ft^2)	Volume (ft^3)	Basin Depth (ft)	h* (ft)	Volume (acre-ft)	Q_{total} (cfs)	
377.50	744	0	0.500	0.000	0.0000	0.0000	LOWER OUTLET ORIFICE
377.58	744	62	0.583	0.083	0.0014	0.0492	
377.67	744	124	0.667	0.167	0.0028	0.1392	
377.75	744	185	0.750	0.250	0.0043	0.2166	
377.83	744	247	0.833	0.333	0.0057	0.2653	
377.92	744	309	0.917	0.417	0.0071	0.3063	
378.00	744	371	1.000	0.500	0.0085	0.3425	
378.08	744	432	1.083	0.583	0.0099	0.3752	
378.17	744	494	1.167	0.667	0.0113	0.4053	
378.25	744	556	1.250	0.750	0.0128	0.4333	
378.33	744	618	1.333	0.833	0.0142	0.4596	
378.42	744	679	1.417	0.917	0.0156	0.4844	
378.50	744	741	1.500	1.000	0.0170	0.5081	RISER STRUCTURE
378.58	744	803	1.583	1.083	0.0184	0.6798	
378.67	744	865	1.667	1.167	0.0198	0.9742	
378.75	744	926	1.750	1.250	0.0213	1.3482	
378.83	744	988	1.833	1.333	0.0227	1.7865	
378.92	744	1050	1.917	1.417	0.0241	2.2803	
379.00	744	1112	2.000	1.500	0.0255	2.8237	

Drawdown Calculation - BMP-2

Surface Ponding Depth:	PD	6	in
Ponding Depth Surface Area:	A_{PD}	744	ft^2
Surface Ponding Volume:	V_{PD}	372	ft^3
Low Flow Orifice Diameter:	D	0.5625	in
Flow Rate (volumetric):	Q	0.015	ft^3/s
Drawdown Time:		6.81	hrs

SWMM Model Flow Coefficient Calculation

Kensho Housing

BMP-3

PARAMETER	ABBREV.	Bio-Retention Cell LID BMP	
Ponding Depth	PD	8	in
Bioretention Soil Layer	S	24	in
Gravel Layer	G	9	in
TOTAL		3.4	ft
		41	in
Orifice Coefficient	c_g	0.61	--
Low Flow Orifice Diameter	D	0.75	in
Drain exponent	n	0.5	--
Flow Rate (volumetric)	Q	0.028	cfs
Ponding Depth Surface Area	A_{PD}	1197	ft^2
Bioretention Surface Area	A_S, A_G	1197	ft^2
	A_S, A_G	0.0275	ac
Porosity of Bioretention Soil	n	1.00	-
Flow Rate (per unit area)	q	0.997	in/hr
Effective Ponding Depth	PD_{eff}	**8.00**	in
Flow Coefficient	C	**0.1565**	--
Ponding Depth @ $V_{WQ, required}$	$PD_{orificeFL}$	8	in
Cutoff Flow	Q_{cutoff}	0.02763	cfs

Outlet Structure for Discharge of BMP-3

Discharge vs. Elevation Table

Lower slot orifice			Emergency Weir 2-24" brooks boxes	
No. of orif:	2		Invert:	1.00 ft
Invert:	0 ft		L:	16.0 ft
Slot height	0.167 ft		C_w:	3.1
Slot width	0.25 ft			
A	0.042	0.04175		
C_o:	0.60			

***Note: h = head above the invert of the lowest surface discharge opening.**

H (ft)	h* (ft)	$Q_{slot-low}$ (cfs)	Q_{emerg} (cfs)	Q_{tot} (cfs)	
0.667	0.000	0.000	0.000	0.000	LOWER OUTLET ORIFICE
0.750	0.083	0.037	0.000	0.037	
0.834	0.167	0.105	0.000	0.105	
0.917	0.250	0.164	0.000	0.164	
1.000	0.333	0.201	0.000	0.201	
1.084	0.417	0.232	0.000	0.232	
1.167	0.500	0.259	0.000	0.259	
1.250	0.583	0.284	0.000	0.284	
1.334	0.667	0.307	0.000	0.307	
1.417	0.750	0.328	0.000	0.328	
1.500	0.833	0.348	0.000	0.348	
1.584	0.917	0.367	0.000	0.367	
1.667	1.000	0.385	0.000	0.385	RISER STRUCTURE
1.750	1.083	0.402	0.597	0.999	
1.834	1.167	0.418	1.687	2.106	
1.917	1.250	0.434	3.100	3.534	
2.000	1.333	0.449	4.773	5.222	

Note:

1. Weir equation, $Q=C_wL_e(h)^{3/2}$
2. Orifice equation, $Q=C_oA_e(2gh)^{1/2}$
3. Slot orifice acts as a weir when $h^* < h_{slot}$; slot orifice acts

Stage Area for BMP-3

SURFACE STORAGE BMP-1

Depth (ft)	Area (ft^2)	Volume (ft^3)	
0.0000	1197	0	
0.0833	1197	99	
0.1667	1197	199	
0.2500	1197	298	
0.3333	1197	397	
0.4167	1197	497	
0.5000	1197	596	WQ PONDING
0.5833	1197	695	
0.6667	1197	795	
0.7500	1197	894	
0.8333	1197	994	
0.9167	1197	1093	
1.0000	1197	1192	
1.0833	1197	1292	
1.1667	1197	1391	
1.2500	1197	1490	
1.3333	1197	1590	
1.4167	1197	1689	
1.5000	1197	1788	Riser Structure
1.5833	1197	1888	
1.6667	1197	1987	
1.7500	1197	2086	
1.8333	1197	2186	
1.9167	1197	2285	
2.0000	1197	2384	

SUB-SURFACE STORAGE BMP-1

Elevation (ft)	Area (ft^2)	Volume (ft^3)	
-2.00	1197	599	Amended Soil (0.25 voids)
-2.75	1197	601	Gravel Base (0.67 voids)
Gravel & Amend. Soil	TOTAL =	1200	(ft^3)
Surface Total	TOTAL =	1788	(ft^3)
BMP	**TOTAL =**	**2988**	**(ft^3)**

(1): The area at this surface elevation corresponds to the area of gravel and amended soil (biofiltration layer)

(2): Volume at this elevation coresponds with surface volume for WQ purposes (invert of lowest surface outlet)

Effective Depth:	6.00 in

Stage-Storage & Stage-Discharge Relationship for BMP-3

Discharge vs. Elevation Table

Basin Dimensions

Area: 1,197 ft^2

***Note: h = head above the invert of the lowest surface discharge opening.**

Basin Elev.	Area (ft^2)	Volume (ft^3)	Basin Depth (ft)	h* (ft)	Volume (acre-ft)	Q_{total} (cfs)	
377.67	1,197	0	0.667	0.000	0.0000	0.0000	LOWER OUTLET ORIFICE
377.75	1,197	99	0.750	0.083	0.0023	0.0373	
377.84	1,197	199	0.834	0.167	0.0046	0.1055	
377.92	1,197	298	0.917	0.250	0.0068	0.1641	
378.00	1,197	397	1.000	0.333	0.0091	0.2010	
378.09	1,197	497	1.084	0.417	0.0114	0.2321	
378.17	1,197	596	1.167	0.500	0.0137	0.2595	
378.25	1,197	695	1.250	0.583	0.0160	0.2842	
378.34	1,197	795	1.334	0.667	0.0182	0.3070	
378.42	1,197	894	1.417	0.750	0.0205	0.3282	
378.50	1,197	994	1.500	0.833	0.0228	0.3481	
378.59	1,197	1093	1.584	0.917	0.0251	0.3670	
378.67	1,197	1192	1.667	1.000	0.0274	0.3849	RISER STRUCTURE
378.75	1,197	1292	1.750	1.083	0.0297	0.9986	
378.84	1,197	1391	1.834	1.167	0.0319	2.1059	
378.92	1,197	1490	1.917	1.250	0.0342	3.5342	
379.00	1,197	1590	2.000	1.333	0.0365	5.2222	

Drawdown Calculation - BMP-3

Surface Ponding Depth:	PD	8	in
Ponding Depth Surface Area:	A_{PD}	1197	ft^2
Surface Ponding Volume:	V_{PD}	798	ft^3
Low Flow Orifice Diameter:	D	0.75	in
Flow Rate (volumetric):	Q	0.028	ft^3/s
Drawdown Time:		8.02	hrs

SWMM Model Flow Coefficient Calculation

Kensho Housing

BMP-4

PARAMETER	ABBREV.	Bio-Retention Cell LID BMP	
Ponding Depth	PD	6	in
Bioretention Soil Layer	S	24	in
Gravel Layer	G	9	in
TOTAL		3.3	ft
		39	in
Orifice Coefficient	c_g	0.61	--
Low Flow Orifice Diameter	D	0.375	in
Drain exponent	n	0.5	--
Flow Rate (volumetric)	Q	0.007	cfs
Ponding Depth Surface Area	A_{PD}	345	ft^2
Bioretention Surface Area	A_S, A_G	345	ft^2
	A_S, A_G	0.0079	ac
Porosity of Bioretention Soil	n	1.00	-
Flow Rate (per unit area)	q	0.846	in/hr
Effective Ponding Depth	PD_{eff}	**6.00**	in
Flow Coefficient	C	**0.1357**	--
Ponding Depth @ $V_{WQ, required}$	$PD_{orificeFL}$	6	in
Cutoff Flow	Q_{cutoff}	0.00675	cfs

Outlet Structure for Discharge of BMP-4

Discharge vs. Elevation Table

Lower slot orifice			Emergency Weir	
No. of orif:	2		Invert:	1.25 ft
Invert:	0 ft		L:	4.0 ft
Slot height	0.167 ft		C_w:	3.1
Slot width	0.08 ft			
A	0.013	0.01336		
C_o:	0.60			

***Note: h = head above the invert of the lowest surface discharge opening.**

H (ft)	h* (ft)	$Q_{slot-low}$ (cfs)	Q_{emerg} (cfs)	Q_{tot} (cfs)	
0.500	0.000	0.000	0.000	0.000	LOWER OUTLET ORIFICE
0.583	0.083	0.012	0.000	0.012	
0.667	0.167	0.034	0.000	0.034	
0.750	0.250	0.052	0.000	0.052	
0.833	0.333	0.064	0.000	0.064	
0.917	0.417	0.074	0.000	0.074	
1.000	0.500	0.083	0.000	0.083	
1.083	0.583	0.091	0.000	0.091	
1.167	0.667	0.098	0.000	0.098	
1.250	0.750	0.105	0.000	0.105	
1.333	0.833	0.111	0.000	0.111	
1.417	0.917	0.117	0.000	0.117	
1.500	1.000	0.123	0.000	0.123	
1.583	1.083	0.129	0.000	0.129	
1.667	1.167	0.134	0.000	0.134	
1.750	1.250	0.139	0.000	0.139	RISER STRUCTURE
1.833	1.333	0.144	0.149	0.293	
1.917	1.417	0.149	0.422	0.570	
2.000	1.500	0.153	0.775	0.928	

Note:

1. Weir equation, $Q=C_wL_e(h)^{3/2}$
2. Orifice equation, $Q=C_oA_e(2gh)^{1/2}$
3. Slot orifice acts as a weir when $h^* < h_{slot}$; slot orifice acts

Stage Area for BMP-4

SURFACE STORAGE BMP-1

Depth (ft)	Area (ft^2)	Volume (ft^3)	
0.0000	345	0	
0.0833	345	29	
0.1667	345	57	
0.2500	345	86	
0.3333	345	115	
0.4167	345	143	
0.5000	345	172	WQ PONDING
0.5833	345	200	
0.6667	345	229	
0.7500	345	258	
0.8333	345	286	
0.9167	345	315	
1.0000	345	344	
1.0833	345	372	
1.1667	345	401	
1.2500	345	430	
1.3333	345	458	
1.4167	345	487	
1.5000	345	515	Riser Structure
1.5833	345	544	
1.6667	345	573	
1.7500	345	601	
1.8333	345	630	
1.9167	345	659	
2.0000	345	687	

SUB-SURFACE STORAGE BMP-1

Elevation (ft)	Area (ft^2)	Volume (ft^3)	
-2.00	345	173	Amended Soil (0.25 voids)
-2.75	345	173	Gravel Base (0.67 voids)
Gravel & Amend. Soil	TOTAL =	346	(ft^3)
Surface Total	TOTAL =	515	(ft^3)
BMP	**TOTAL =**	**861**	**(ft^3)**

(1): The area at this surface elevation corresponds to the area of gravel and amended soil (biofiltration layer)

(2): Volume at this elevation coresponds with surface volume for WQ purposes (invert of lowest surface outlet)

Effective Depth:	6.00 in

Stage-Storage & Stage-Discharge Relationship for BMP-4

Discharge vs. Elevation Table

Basin Dimensions

Area: 345 ft^2

***Note: h = head above the invert of the lowest surface discharge opening.**

Basin Elev.	Area (ft^2)	Volume (ft^3)	Basin Depth (ft)	h* (ft)	Volume (acre-ft)	Q_{total} (cfs)	
377.50	345	0	0.500	0.000	0.0000	0.0000	LOWER OUTLET ORIFICE
377.58	345	29	0.583	0.083	0.0007	0.0119	
377.67	345	57	0.667	0.167	0.0013	0.0337	
377.75	345	86	0.750	0.250	0.0020	0.0525	
377.83	345	115	0.833	0.333	0.0026	0.0643	
377.92	345	143	0.917	0.417	0.0033	0.0743	
378.00	345	172	1.000	0.500	0.0039	0.0830	
378.08	345	200	1.083	0.583	0.0046	0.0910	
378.17	345	229	1.167	0.667	0.0053	0.0982	
378.25	345	258	1.250	0.750	0.0059	0.1050	
378.33	345	286	1.333	0.833	0.0066	0.1114	
378.42	345	315	1.417	0.917	0.0072	0.1174	
378.50	345	344	1.500	1.000	0.0079	0.1232	
378.58	345	372	1.583	1.083	0.0085	0.1286	
378.67	345	401	1.667	1.167	0.0092	0.1339	
378.75	345	430	1.750	1.250	0.0099	0.1390	RISER STRUCTURE
378.83	345	458	1.833	1.333	0.0105	0.2930	
378.92	345	487	1.917	1.417	0.0112	0.5704	
379.00	345	515	2.000	1.500	0.0118	0.9281	

Drawdown Calculation - BMP-4

Surface Ponding Depth:	PD	6	in
Ponding Depth Surface Area:	A_{PD}	345	ft^2
Surface Ponding Volume:	V_{PD}	173	ft^3
Low Flow Orifice Diameter:	D	0.375	in
Flow Rate (volumetric):	Q	0.007	ft^3/s
Drawdown Time:		7.10	hrs

SWMM Model Flow Coefficient Calculation

Kensho Housing

BMP-5

PARAMETER	ABBREV.	Bio-Retention Cell LID BMP	
Ponding Depth	PD	6	in
Bioretention Soil Layer	S	24	in
Gravel Layer	G	9	in
TOTAL		3.3	ft
		39	in
Orifice Coefficient	c_g	0.61	--
Low Flow Orifice Diameter	D	0.625	in
Drain exponent	n	0.5	--
Flow Rate (volumetric)	Q	0.019	cfs
Ponding Depth Surface Area	A_{PD}	921	ft^2
Bioretention Surface Area	A_S, A_G	921	ft^2
	A_S, A_G	0.0211	ac
Porosity of Bioretention Soil	n	1.00	-
Flow Rate (per unit area)	q	0.878	in/hr
Effective Ponding Depth	PD_{eff}	**6.00**	in
Flow Coefficient	C	**0.1412**	--
Ponding Depth @ $V_{WQ, required}$	$PD_{orificeFL}$	6	in
Cutoff Flow	Q_{cutoff}	0.01873	cfs

Outlet Structure for Discharge of BMP-5

Discharge vs. Elevation Table

Lower slot orifice			Emergency Weir	
No. of orif:	2		Invert:	1.17 ft
Invert:	0 ft		L:	4.0 ft
Slot height	0.167 ft		C_w:	3.1
Slot width	0.42 ft			
A	0.070	0.07014		
C_o:	0.60			

***Note: h = head above the invert of the lowest surface discharge opening.**

H (ft)	h* (ft)	$Q_{slot-low}$ (cfs)	Q_{emerg} (cfs)	Q_{tot} (cfs)	
0.500	0.000	0.000	0.000	0.000	LOWER OUTLET ORIFICE
0.583	0.083	0.063	0.000	0.063	
0.667	0.167	0.177	0.000	0.177	
0.750	0.250	0.276	0.000	0.276	
0.833	0.333	0.338	0.000	0.338	
0.917	0.417	0.390	0.000	0.390	
1.000	0.500	0.436	0.000	0.436	
1.083	0.583	0.478	0.000	0.478	
1.167	0.667	0.516	0.000	0.516	
1.250	0.750	0.551	0.000	0.551	
1.333	0.833	0.585	0.000	0.585	
1.417	0.917	0.617	0.000	0.617	
1.500	1.000	0.647	0.000	0.647	
1.583	1.083	0.675	0.000	0.675	
1.667	1.167	0.703	0.000	0.703	RISER STRUCTURE
1.750	1.250	0.730	0.148	0.878	
1.833	1.333	0.755	0.421	1.176	
1.917	1.417	0.780	0.773	1.553	
2.000	1.500	0.804	1.191	1.995	

Note:

1. Weir equation, $Q=C_wL_e(h)^{3/2}$
2. Orifice equation, $Q=C_oA_e(2gh)^{1/2}$
3. Slot orifice acts as a weir when $h^* < h_{slot}$; slot orifice acts

Stage Area for BMP-5

SURFACE STORAGE BMP-1

Depth (ft)	Area (ft^2)	Volume (ft^3)	
0.0000	921	0	
0.0833	921	76	
0.1667	921	153	
0.2500	921	229	
0.3333	921	306	
0.4167	921	382	
0.5000	921	459	WQ PONDING
0.5833	921	535	
0.6667	921	612	
0.7500	921	688	
0.8333	921	764	
0.9167	921	841	
1.0000	921	917	
1.0833	921	994	
1.1667	921	1070	
1.2500	921	1147	
1.3333	921	1223	
1.4167	921	1300	
1.5000	921	1376	Riser Structure
1.5833	921	1452	
1.6667	921	1529	
1.7500	921	1605	
1.8333	921	1682	
1.9167	921	1758	
2.0000	921	1835	

Stage-Storage & Stage-Discharge Relationship for BMP-5

Discharge vs. Elevation Table

Basin Dimensions

Area: 921 ft^2

***Note: h = head above the invert of the lowest surface discharge opening.**

Basin Elev.	Area (ft^2)	Volume (ft^3)	Basin Depth (ft)	h* (ft)	Volume (acre-ft)	Q_{total} (cfs)	
377.50	921	0	0.500	0.000	0.0000	0.0000	LOWER OUTLET ORIFICE
377.58	921	76	0.583	0.083	0.0018	0.0626	
377.67	921	153	0.667	0.167	0.0035	0.1772	
377.75	921	229	0.750	0.250	0.0053	0.2756	
377.83	921	306	0.833	0.333	0.0070	0.3376	
377.92	921	382	0.917	0.417	0.0088	0.3899	
378.00	921	459	1.000	0.500	0.0105	0.4359	
378.08	921	535	1.083	0.583	0.0123	0.4775	
378.17	921	612	1.167	0.667	0.0140	0.5158	
378.25	921	688	1.250	0.750	0.0158	0.5514	
378.33	921	764	1.333	0.833	0.0175	0.5849	
378.42	921	841	1.417	0.917	0.0193	0.6165	
378.50	921	917	1.500	1.000	0.0211	0.6466	
378.58	921	994	1.583	1.083	0.0228	0.6754	
378.67	921	1070	1.667	1.167	0.0246	0.7030	RISER STRUCTURE
378.75	921	1147	1.750	1.250	0.0263	0.8778	
378.83	921	1223	1.833	1.333	0.0281	1.1757	
378.92	921	1300	1.917	1.417	0.0298	1.5533	
379.00	921	1376	2.000	1.500	0.0316	1.9953	

Drawdown Calculation - BMP-5

Surface Ponding Depth:	PD	6	in
Ponding Depth Surface Area:	A_{PD}	921	ft^2
Surface Ponding Volume:	V_{PD}	461	ft^3
Low Flow Orifice Diameter:	D	0.625	in
Flow Rate (volumetric):	Q	0.019	ft^3/s
Drawdown Time:		6.83	hrs

SWMM Model Flow Coefficient Calculation

Kensho Housing

BMP-6

PARAMETER	ABBREV.	Bio-Retention Cell LID BMP	
Ponding Depth	PD	6	in
Bioretention Soil Layer	S	24	in
Gravel Layer	G	9	in
TOTAL		3.3	ft
		39	in
Orifice Coefficient	c_g	0.61	--
Low Flow Orifice Diameter	D	0.5	in
Drain exponent	n	0.5	--
Flow Rate (volumetric)	Q	0.012	cfs
Ponding Depth Surface Area	A_{PD}	725	ft^2
Bioretention Surface Area	A_S, A_G	725	ft^2
	A_S, A_G	0.0166	ac
Porosity of Bioretention Soil	n	1.00	-
Flow Rate (per unit area)	q	0.715	in/hr
Effective Ponding Depth	PD_{eff}	**6.00**	in
Flow Coefficient	C	**0.1148**	--
Ponding Depth @ $V_{WQ, required}$	$PD_{orificeFL}$	6	in
Cutoff Flow	Q_{cutoff}	0.01199	cfs

Outlet Structure for Discharge of BMP-6

Discharge vs. Elevation Table

Lower slot orifice			Emergency Weir	
No. of orif:	2		Invert:	1.25 ft
Invert:	0 ft		L:	4.0 ft
Slot height	0.25 ft		C_w:	3.1
Slot width	0.5 ft			
A	0.125	0.125		
C_o:	0.60			

***Note: h = head above the invert of the lowest surface discharge opening.**

H (ft)	h* (ft)	$Q_{slot-low}$ (cfs)	Q_{emerg} (cfs)	Q_{tot} (cfs)	
0.500	0.000	0.000	0.000	0.000	LOWER OUTLET ORIFICE
0.583	0.083	0.075	0.000	0.075	
0.667	0.167	0.211	0.000	0.211	
0.750	0.250	0.388	0.000	0.388	
0.833	0.333	0.549	0.000	0.549	
0.917	0.417	0.650	0.000	0.650	
1.000	0.500	0.737	0.000	0.737	
1.083	0.583	0.815	0.000	0.815	
1.167	0.667	0.886	0.000	0.886	
1.250	0.750	0.952	0.000	0.952	
1.333	0.833	1.013	0.000	1.013	
1.417	0.917	1.071	0.000	1.071	
1.500	1.000	1.126	0.000	1.126	
1.583	1.083	1.178	0.000	1.178	
1.667	1.167	1.229	0.000	1.229	
1.750	1.250	1.277	0.000	1.277	RISER STRUCTURE
1.833	1.333	1.323	0.149	1.472	
1.917	1.417	1.368	0.422	1.790	
2.000	1.500	1.412	0.775	2.187	

Note:

1. Weir equation, $Q=C_wL_e(h)^{3/2}$
2. Orifice equation, $Q=C_oA_e(2gh)^{1/2}$
3. Slot orifice acts as a weir when $h^* < h_{slot}$; slot orifice acts

Stage Area for BMP-6

SURFACE STORAGE BMP-1

Depth (ft)	Area (ft^2)	Volume (ft^3)	
0.0000	725	0	
0.0833	725	60	
0.1667	725	120	
0.2500	725	181	
0.3333	725	241	
0.4167	725	301	
0.5000	725	361	WQ PONDING
0.5833	725	421	
0.6667	725	481	
0.7500	725	542	
0.8333	725	602	
0.9167	725	662	
1.0000	725	722	
1.0833	725	782	
1.1667	725	842	
1.2500	725	903	
1.3333	725	963	
1.4167	725	1023	
1.5000	725	1083	Riser Structure
1.5833	725	1143	
1.6667	725	1204	
1.7500	725	1264	
1.8333	725	1324	
1.9167	725	1384	
2.0000	725	1444	

SUB-SURFACE STORAGE BMP-1

Elevation (ft)	Area (ft^2)	Volume (ft^3)	
-2.00	725	363	Amended Soil (0.25 voids)
-2.75	725	364	Gravel Base (0.67 voids)
Gravel & Amend. Soil	TOTAL =	727	(ft^3)
Surface Total	TOTAL =	1083	(ft^3)
BMP	**TOTAL =**	**1810**	**(ft^3)**

(1): The area at this surface elevation corresponds to the area of gravel and amended soil (biofiltration layer)

(2): Volume at this elevation coresponds with surface volume for WQ purposes (invert of lowest surface outlet)

Effective Depth:	6.00 in

Stage-Storage & Stage-Discharge Relationship for BMP-6

Discharge vs. Elevation Table

Basin Dimensions

Area: 725 ft^2

***Note: h = head above the invert of the lowest surface discharge opening.**

Basin Elev.	Area (ft^2)	Volume (ft^3)	Basin Depth (ft)	h* (ft)	Volume (acre-ft)	Q_{total} (cfs)	
377.50	725	0	0.500	0.000	0.0000	0.0000	LOWER OUTLET ORIFICE
377.58	725	60	0.583	0.083	0.0014	0.0746	
377.67	725	120	0.667	0.167	0.0028	0.2109	
377.75	725	181	0.750	0.250	0.0041	0.3875	
377.83	725	241	0.833	0.333	0.0055	0.5494	
377.92	725	301	0.917	0.417	0.0069	0.6501	
378.00	725	361	1.000	0.500	0.0083	0.7371	
378.08	725	421	1.083	0.583	0.0097	0.8149	
378.17	725	481	1.167	0.667	0.0111	0.8859	
378.25	725	542	1.250	0.750	0.0124	0.9516	
378.33	725	602	1.333	0.833	0.0138	1.0131	
378.42	725	662	1.417	0.917	0.0152	1.0710	
378.50	725	722	1.500	1.000	0.0166	1.1260	
378.58	725	782	1.583	1.083	0.0180	1.1784	
378.67	725	842	1.667	1.167	0.0193	1.2286	RISER STRUCTURE
378.75	725	903	1.750	1.250	0.0207	1.2768	
378.83	725	963	1.833	1.333	0.0221	1.4724	
378.92	725	1023	1.917	1.417	0.0235	1.7899	
379.00	725	1083	2.000	1.500	0.0249	2.1865	

Drawdown Calculation - BMP-6

Surface Ponding Depth:	PD	6	in
Ponding Depth Surface Area:	A_{PD}	725	ft^2
Surface Ponding Volume:	V_{PD}	363	ft^3
Low Flow Orifice Diameter:	D	0.5	in
Flow Rate (volumetric):	Q	0.012	ft^3/s
Drawdown Time:		8.39	hrs

```
[TITLE]
;;Project Title/Notes
3599 Kensho Housing
Pre-Development Condition
POC-1

[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           08/28/1951
START_TIME           05:00:00
REPORT_START_DATE    08/28/1951
REPORT_START_TIME    05:00:00
END_DATE             05/23/2008
END_TIME             23:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         0:01:00
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    .15    .17    .19    .19    .18    .15    .11    .08    .06
DRY_ONLY         NO

[RAINGAGES]
```

```
;;Name           Format    Interval SCF      Source
;;-------------- --------- ------ ------ ----------
Oceanside        INTENSITY 1:00     1.0      TIMESERIES Oceanside

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- ----------------
DMA-1            Oceanside        poc-1            3.494123 0        547      14.7     0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
DMA-1            0.012      0.08       0.05       0.1        25         OUTLET

[INFILTRATION]
;;Subcatchment   Param1     Param2     Param3     Param4     Param5
;;-------------- ---------- ---------- ---------- ---------- ----------
DMA-1            6          0.1        .31

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
;Basin 1
POC-1            0          FREE                        NO

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
Oceanside        FILE "J:\ACTIVE JOBS\3474 Vista Grande\CIVIL\REPORTS\SWQMP\SWMM\Rain Data\oceanside.dat"

[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-1            995.831            5101.735

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

```
[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
DMA-1            1006.431           6977.959

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Oceanside        1053.922           8357.843
```

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.0)

3599 Kensho Housing
Pre-Development Condition
POC-1

****
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 08/28/1951 05:00:00
Ending Date 05/23/2008 23:00:00
Antecedent Dry Days 0.0
Report Time Step 01:00:00
Wet Time Step 00:15:00
Dry Time Step 04:00:00

**********	Volume	Depth
Runoff Quantity Continuity	acre-feet	inches
**********	---	---
Total Precipitation	196.571	675.090
Evaporation Loss	1.954	6.711
Infiltration Loss	180.506	619.918
Surface Runoff	15.440	53.027
Final Storage	0.000	0.000
Continuity Error (%)	-0.676	

**********	Volume	Volume
Flow Routing Continuity	acre-feet	10^6 gal
**********	---	---
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	15.440	5.031
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	15.440	5.031
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	Imperv Runoff in	Perv Runoff in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff
DMA-1	675.09	0.00	6.71	619.92	0.00	53.03	53.03	5.03	3.85	0.079

Analysis begun on: Wed Oct 5 11:24:41 2022
Analysis ended on: Wed Oct 5 11:25:01 2022
Total elapsed time: 00:00:20

```
[TITLE]
;;Project Title/Notes
3599 Kensho Housing
Proposed Condition

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

START_DATE           08/28/1951
START_TIME           05:00:00
REPORT_START_DATE    08/28/1951
REPORT_START_TIME    05:00:00
END_DATE             05/23/2008
END_TIME             23:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         0:01:00
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    .15    .17    .19    .19    .18    .15    .11    .08    .06
DRY_ONLY         NO

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

```
;;-------------- --------- ------ ------ ----------
Oceanside         INTENSITY 1:00     1.0      TIMESERIES Oceanside

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- ----------------
DMA-1            Oceanside        BMP-1            1.036501 67       67       4.9      0
DMA-2            Oceanside        BMP-2            .392218  88       171      1.5      0
DMA-3            Oceanside        BMP-3            .706635  83.1     145      4.7      0
DMA-4            Oceanside        BMP-4            .122452  88.6     32       4.2      0
DMA-5            Oceanside        BMP-5            .479109  92.7     66       4.1      0
DMA-7            Oceanside        POC-1            .332989  77.3     64       12.8     0
BMP-1            Oceanside        DIV1             .039899  0        217      0        0
BMP-2            Oceanside        DIV2             0.017080 0        32       0        0
BMP-3            Oceanside        DIV3             0.027479 0        39       0        0
BMP-4            Oceanside        DIV4             0.007920 0        12       0        0
BMP-5            Oceanside        DIV5             0.021143 0        10       0        0
DMA-6            Oceanside        BMP-6            .288017  91.2     37       4.3      0
BMP-6            Oceanside        DIV6             .016644  0        15       0        0
DEMIN            Oceanside        POC-1            .006038  58.9     53       2        0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
DMA-1            .012       .08        0.05       .1         25         OUTLET
DMA-2            .012       .08        0.05       .1         25         OUTLET
DMA-3            .012       .08        0.05       .1         25         OUTLET
DMA-4            .012       .08        0.05       .1         25         OUTLET
DMA-5            .012       .08        0.05       .1         25         OUTLET
DMA-7            .012       .08        0.05       .1         25         OUTLET
BMP-1            .012       .08        0.05       .1         25         OUTLET
BMP-2            .012       .08        0.05       .1         25         OUTLET
BMP-3            .012       .08        0.05       .1         25         OUTLET
BMP-4            .012       .08        0.05       .1         25         OUTLET
BMP-5            .012       .08        0.05       .1         25         OUTLET
DMA-6            .012       .08        0.05       .1         25         OUTLET
BMP-6            .012       .08        0.05       .1         25         OUTLET
DEMIN            .012       .08        0.05       .1         25         OUTLET

[INFILTRATION]
;;Subcatchment   Param1     Param2     Param3     Param4     Param5
;;-------------- ---------- ---------- ---------- ---------- ----------
DMA-1            6          .075       .31
DMA-2            6          .075       .31
DMA-3            6          .075       .31
DMA-4            6          .075       .31
DMA-5            6          .075       .31
DMA-7            6          .075       .31
BMP-1            6          .075       .31
BMP-2            6          .075       .31
BMP-3            6          .075       .31
```

```
BMP-4            6          .075       .31
BMP-5            6          .075       .31
DMA-6            6          .075       .31
BMP-6            6          .075       .31
DEMIN            6          .075       .31

[LID_CONTROLS]
;;Name           Type/Layer Parameters
;;-------------- ---------- ----------
BMP-1            BC
BMP-1            SURFACE    8          0.0        0.1        0          5
BMP-1            SOIL       24         0.5        0.2        0.1        0.5        10.0       3.5
BMP-1            STORAGE    12         0.67       0.5        0          NO
BMP-1            DRAIN      0.1265     0.5        3          6          0          0

BMP-2            BC
BMP-2            SURFACE    6          0.0        0.1        0          5
BMP-2            SOIL       24         0.5        0.2        0.1        0.5        10.0       3.5
BMP-2            STORAGE    12         .67        0.5        0          NO
BMP-2            DRAIN      .1416      0.5        3          6          0          0

BMP-3            BC
BMP-3            SURFACE    8          0.0        0.1        0          5
BMP-3            SOIL       24         0.5        0.2        0.1        0.5        10.0       3.5
BMP-3            STORAGE    12         .67        0.5        0          NO
BMP-3            DRAIN      .1565      0.5        3          6          0          0

BMP-4            BC
BMP-4            SURFACE    6          0.0        0.1        0          5
BMP-4            SOIL       24         0.5        0.2        0.1        0.5        10.0       3.5
BMP-4            STORAGE    12         0.67       0.5        0          NO
BMP-4            DRAIN      .1357      0.5        3          6          0          0

BMP-5            BC
BMP-5            SURFACE    6          0.0        0.1        0          5
BMP-5            SOIL       24         0.5        0.2        0.1        0.5        10.0       3.5
BMP-5            STORAGE    12         .67        0.5        0          NO
BMP-5            DRAIN      .1412      0.5        3          6          0          0

BMP-6            BC
BMP-6            SURFACE    6          0.0        0.1        0          5
BMP-6            SOIL       24         0.5        0.2        0.1        0.5        10.0       3.5
BMP-6            STORAGE    12         0.67       0.5        0          NO
BMP-6            DRAIN      .1148      0.5        3          6          0          0

[LID_USAGE]
;;Subcatchment   LID Process      Number  Area       Width      InitSat    FromImp    ToPerv     RptFile                    DrainTo
FromPerv
;;-------------- ---------------- ------- ---------- ---------- ---------- ---------- ---------- ------------------------ ------------
---- ----------
```

```
BMP-1            BMP-1            1       1738.00    0          0          100        0          *                        *
100
BMP-2            BMP-2            1       744.00     0          0          100        0          *                        *
100
BMP-3            BMP-3            1       1196.99    0          0          100        0          *                        *
100
BMP-4            BMP-4            1       345.00     0          0          100        0          *                        *
100
BMP-5            BMP-5            1       920.99     0          0          100        0          *                        *
100
BMP-6            BMP-6            1       725.01     0          0          100        0          *                        *
100

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
;Basin 1
POC-1            0          FREE                        NO

[DIVIDERS]
;;Name           Elevation  Diverted Link    Type       Parameters
;;-------------- ---------- ---------------- ---------- ----------
DIV1             0          7                CUTOFF     .03242     3.4167     0          0          0
DIV2             0          8                CUTOFF     .01517     3.25       0          0          0
DIV3             0          9                CUTOFF     .02763     3.4167     0          0          0
DIV4             0          10               CUTOFF     .00675     3.25       0          0          0
DIV5             0          11               CUTOFF     .01873     3.25       0          0          0
DIV6             0          12               CUTOFF     .01199     3.25       0          0          0

[STORAGE]
;;Name           Elev.    MaxDepth   InitDepth  Shape      Curve Type/Params            SurDepth  Fevap    Psi      Ksat     IMD
;;-------------- -------- ---------- ---------- ---------- ---------------------------- --------- --------          -------- --------
STOR1            0        1.33       0          TABULAR    STOR-1                       0         0
STOR2            0        1.5        0          TABULAR    STOR-2                       0         0
STOR3            0        1.33       0          TABULAR    STOR-3                       0         0
STOR4            0        1.5        0          TABULAR    STOR-4                       0         0
STOR5            0        1.5        0          TABULAR    STOR-5                       0         0
STOR6            0        1.5        0          TABULAR    STOR-6                       0         0

[CONDUITS]
;;Name           From Node        To Node          Length     Roughness  InOffset   OutOffset  InitFlow   MaxFlow
;;-------------- ---------------- ---------------- ---------- ---------- ---------- ---------- ---------- ----------
1                DIV1             POC-1            400        0.01       0          0          0          0
2                DIV2             POC-1            400        0.01       0          0          0          0
3                DIV3             POC-1            400        0.01       0          0          0          0
4                DIV4             POC-1            400        0.01       0          0          0          0
5                DIV5             POC-1            400        0.01       0          0          0          0
6                DIV6             POC-1            400        0.01       0          0          0          0
7                DIV1             STOR1            400        0.01       0          0          0          0
8                DIV2             STOR2            400        0.01       0          0          0          0
9                DIV3             STOR3            400        0.01       0          0          0          0
```

```
10               DIV4             STOR4            400        0.01       0          0          0          0
11               DIV5             STOR5            400        0.01       0          0          0          0
12               DIV6             STOR6            400        0.01       0          0          0          0

[OUTLETS]
;;Name           From Node        To Node          Offset     Type            QTable/Qcoeff    Qexpon     Gated
;;-------------- ---------------- ---------------- ---------- --------------- ---------------- ---------- --------
13               STOR1            POC-1            0          TABULAR/DEPTH   BMP-1                       NO
14               STOR2            POC-1            0          TABULAR/DEPTH   BMP-2                       NO
15               STOR3            POC-1            0          TABULAR/DEPTH   BMP-3                       NO
16               STOR4            POC-1            0          TABULAR/DEPTH   BMP-4                       NO
17               STOR5            POC-1            0          TABULAR/DEPTH   BMP-5                       NO
18               STOR6            POC-1            0          TABULAR/DEPTH   BMP-6                       NO

[XSECTIONS]
;;Link           Shape        Geom1            Geom2      Geom3      Geom4      Barrels    Culvert
;;-------------- ------------ ---------------- ---------- ---------- ---------- ---------- ----------
1                CIRCULAR     1                0          0          0          1
2                CIRCULAR     1                0          0          0          1
3                CIRCULAR     1                0          0          0          1
4                CIRCULAR     1                0          0          0          1
5                CIRCULAR     1                0          0          0          1
6                CIRCULAR     1                0          0          0          1
7                DUMMY        0                0          0          0          1
8                DUMMY        0                0          0          0          1
9                DUMMY        0                0          0          0          1
10               DUMMY        0                0          0          0          1
11               DUMMY        0                0          0          0          1
12               DUMMY        0                0          0          0          1

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
;BMP-1 (2-24" Brooks Boxes)
BMP-1            Rating     0.000      0.0000
BMP-1                       0.083      0.0746
BMP-1                       0.167      0.2109
BMP-1                       0.250      0.3875
BMP-1                       0.333      0.5494
BMP-1                       0.417      0.6501
BMP-1                       0.500      0.7371
BMP-1                       0.583      0.8149
BMP-1                       0.667      0.8859
BMP-1                       0.750      0.9516
BMP-1                       0.833      1.0131
BMP-1                       0.917      1.0710
BMP-1                       1.000      1.1260
BMP-1                       1.083      1.1784
BMP-1                       1.167      1.8287
BMP-1                       1.250      2.9693
BMP-1                       1.333      4.4294
```

```
;
;BMP-2 (1-12" Brooks Box
BMP-2            Rating     0.000      0.0000
BMP-2                       0.083      0.0492
BMP-2                       0.167      0.1392
BMP-2                       0.250      0.2166
BMP-2                       0.333      0.2653
BMP-2                       0.417      0.3063
BMP-2                       0.500      0.3425
BMP-2                       0.583      0.3752
BMP-2                       0.667      0.4053
BMP-2                       0.750      0.4333
BMP-2                       0.833      0.4596
BMP-2                       0.917      0.4844
BMP-2                       1.000      0.5081
BMP-2                       1.083      0.6798
BMP-2                       1.167      0.9742
BMP-2                       1.250      1.3482
BMP-2                       1.333      1.7865
BMP-2                       1.417      2.2803
BMP-2                       1.500      2.8237
;
;BMP-3 (2-24" Brooks Boxes)
BMP-3            Rating     0.000      0.0000
BMP-3                       0.083      0.0373
BMP-3                       0.167      0.1055
BMP-3                       0.250      0.1641
BMP-3                       0.333      0.2010
BMP-3                       0.417      0.2321
BMP-3                       0.500      0.2595
BMP-3                       0.583      0.2842
BMP-3                       0.667      0.3070
BMP-3                       0.750      0.3282
BMP-3                       0.833      0.3481
BMP-3                       0.917      0.3670
BMP-3                       1.000      0.3849
BMP-3                       1.083      0.9986
BMP-3                       1.167      2.1059
BMP-3                       1.250      3.5342
BMP-3                       1.333      5.2222
;
;BMP-4 (1-12" Brooks Box)
BMP-4            Rating     0.000      0.0000
BMP-4                       0.083      0.0119
BMP-4                       0.167      0.0337
BMP-4                       0.250      0.0620
BMP-4                       0.333      0.0955
BMP-4                       0.417      0.0743
BMP-4                       0.500      0.0830
BMP-4                       0.583      0.0910
BMP-4                       0.667      0.0982
```

```
BMP-4                       0.750      0.1050
BMP-4                       0.833      0.1114
BMP-4                       0.917      0.1174
BMP-4                       1.000      0.1232
BMP-4                       1.083      0.1286
BMP-4                       1.167      0.1339
BMP-4                       1.250      0.1390
BMP-4                       1.333      0.2930
BMP-4                       1.417      0.5704
BMP-4                       1.500      0.9281
;
;BMP-5 (1-12" Brooks Box)
BMP-5            Rating     0.000      0.0000
BMP-5                       0.083      0.0626
BMP-5                       0.167      0.1772
BMP-5                       0.250      0.2756
BMP-5                       0.333      0.3376
BMP-5                       0.417      0.3899
BMP-5                       0.500      0.4359
BMP-5                       0.583      0.4775
BMP-5                       0.667      0.5158
BMP-5                       0.750      0.5514
BMP-5                       0.833      0.5849
BMP-5                       0.917      0.6165
BMP-5                       1.000      0.6466
BMP-5                       1.083      0.6754
BMP-5                       1.167      0.7030
BMP-5                       1.250      0.8778
BMP-5                       1.333      1.1757
BMP-5                       1.417      1.5533
BMP-5                       1.500      1.9953
;
;BMP-6 (1-12" Brooks Box)
BMP-6            Rating     0.000      0.0000
BMP-6                       0.083      0.0746
BMP-6                       0.167      0.2109
BMP-6                       0.250      0.3875
BMP-6                       0.333      0.5494
BMP-6                       0.417      0.6501
BMP-6                       0.500      0.7371
BMP-6                       0.583      0.8149
BMP-6                       0.667      0.8859
BMP-6                       0.750      0.9516
BMP-6                       0.833      1.0131
BMP-6                       0.917      1.0710
BMP-6                       1.000      1.1260
BMP-6                       1.083      1.1784
BMP-6                       1.167      1.2286
BMP-6                       1.250      1.2768
BMP-6                       1.333      1.4724
BMP-6                       1.417      1.7899
```

```
BMP-6                       1.500      2.1865
;
;BMP 1 ABOVE MIDFLOW
STOR-1           Storage    0.000      1738
STOR-1                      0.083      1738
STOR-1                      0.167      1738
STOR-1                      0.250      1738
STOR-1                      0.333      1738
STOR-1                      0.417      1738
STOR-1                      0.500      1738
STOR-1                      0.583      1738
STOR-1                      0.667      1738
STOR-1                      0.750      1738
STOR-1                      0.833      1738
STOR-1                      0.917      1738
STOR-1                      1.000      1738
STOR-1                      1.083      1738
STOR-1                      1.167      1738
STOR-1                      1.250      1738
STOR-1                      1.333      1738
;
;BMP-2 ABOVE MIDFLOW
STOR-2           Storage    0.000      744
STOR-2                      0.083      744
STOR-2                      0.167      744
STOR-2                      0.250      744
STOR-2                      0.333      744
STOR-2                      0.417      744
STOR-2                      0.500      744
STOR-2                      0.583      744
STOR-2                      0.667      744
STOR-2                      0.750      744
STOR-2                      0.833      744
STOR-2                      0.917      744
STOR-2                      1.000      744
STOR-2                      1.083      744
STOR-2                      1.167      744
STOR-2                      1.250      744
STOR-2                      1.333      744
STOR-2                      1.417      744
STOR-2                      1.500      744
;
;BMP-3 ABOVE MIDFLOW
STOR-3           Storage    0.000      1197
STOR-3                      0.083      1197
STOR-3                      0.167      1197
STOR-3                      0.250      1197
STOR-3                      0.333      1197
STOR-3                      0.417      1197
STOR-3                      0.500      1197
STOR-3                      0.583      1197
```

```
STOR-3                     0.667      1197
STOR-3                     0.750      1197
STOR-3                     0.833      1197
STOR-3                     0.917      1197
STOR-3                     1.000      1197
STOR-3                     1.083      1197
STOR-3                     1.167      1197
STOR-3                     1.250      1197
STOR-3                     1.333      1197
;
;BMP-4  ABOVE MIDFLOW
STOR-4           Storage   0.000      345
STOR-4                     0.083      345
STOR-4                     0.167      345
STOR-4                     0.250      345
STOR-4                     0.333      345
STOR-4                     0.417      345
STOR-4                     0.500      345
STOR-4                     0.583      345
STOR-4                     0.667      345
STOR-4                     0.750      345
STOR-4                     0.833      345
STOR-4                     0.917      345
STOR-4                     1.000      345
STOR-4                     1.083      345
STOR-4                     1.167      345
STOR-4                     1.250      345
STOR-4                     1.333      345
STOR-4                     1.417      345
STOR-4                     1.500      345
;
;BMP-5  ABOVE MIDFLOW
STOR-5           Storage   0.000      921
STOR-5                     0.083      921
STOR-5                     0.167      921
STOR-5                     0.250      921
STOR-5                     0.333      921
STOR-5                     0.417      921
STOR-5                     0.500      921
STOR-5                     0.583      921
STOR-5                     0.667      921
STOR-5                     0.750      921
STOR-5                     0.833      921
STOR-5                     0.917      921
STOR-5                     1.000      921
STOR-5                     1.083      921
STOR-5                     1.167      921
STOR-5                     1.250      921
STOR-5                     1.333      921
STOR-5                     1.417      921
STOR-5                     1.500      921
```

```
;
;BMP-6  ABOVE MIDFLOW
STOR-6           Storage    0.000      725
STOR-6                      0.083      725
STOR-6                      0.167      725
STOR-6                      0.250      725
STOR-6                      0.333      725
STOR-6                      0.417      725
STOR-6                      0.500      725
STOR-6                      0.583      725
STOR-6                      0.667      725
STOR-6                      0.750      725
STOR-6                      0.833      725
STOR-6                      0.917      725
STOR-6                      1.000      725
STOR-6                      1.083      725
STOR-6                      1.167      725
STOR-6                      1.250      725
STOR-6                      1.333      725
STOR-6                      1.417      725
STOR-6                      1.500      725

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
Oceanside        FILE "J:\ACTIVE JOBS\3474 Vista Grande\CIVIL\REPORTS\SWQMP\SWMM\Rain Data\oceanside.dat"

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

[TAGS]

[MAP]
DIMENSIONS -5253.924 0.000 10000.000 10000.000
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC-1            254.456            2837.989
DIV1             -3097.499          3720.670
DIV2             -1510.907          4983.240
DIV3             522.613            4893.855
DIV4             1829.875           4692.737
DIV5             3070.099           3966.480
DIV6             3561.719           2916.201
STOR1            -3276.270          2860.335
STOR2            -2415.935          4279.330
```

```
STOR3            -326.549          4871.508
STOR4            1193.004          4849.162
STOR5            2533.786          4402.235
STOR6            3338.255          3430.168

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

[Polygons]
;;Subcatchment   X-Coord           Y-Coord
;;-------------- ------------------ ------------------
DMA-1            -4717.611         4692.737
DMA-2            -3332.136         5921.788
DMA-3            410.881           6770.950
DMA-4            2645.518          6525.140
DMA-5            4109.205          5754.190
DMA-7            5818.702          2078.212
BMP-1            -3901.968         4111.732
BMP-2            -2438.281         5474.860
BMP-3            500.266           5664.804
BMP-4            2276.803          5586.592
BMP-5            3617.585          4916.201
DMA-6            5561.719          3463.687
BMP-6            4634.345          3262.570
DEMIN            6008.646          1418.994

[SYMBOLS]
;;Gage           X-Coord           Y-Coord
;;-------------- ------------------ ------------------
Oceanside        1608.247          8608.247
```

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.0)
--------------------------------------------------------------

3599 Kensho Housing
Proposed Condition
WARNING 04: minimum elevation drop used for Conduit 1
WARNING 04: minimum elevation drop used for Conduit 2
WARNING 04: minimum elevation drop used for Conduit 3
WARNING 04: minimum elevation drop used for Conduit 4
WARNING 04: minimum elevation drop used for Conduit 5
WARNING 04: minimum elevation drop used for Conduit 6
WARNING 04: minimum elevation drop used for Conduit 7
WARNING 04: minimum elevation drop used for Conduit 8
WARNING 04: minimum elevation drop used for Conduit 9
WARNING 04: minimum elevation drop used for Conduit 10
WARNING 04: minimum elevation drop used for Conduit 11
WARNING 04: minimum elevation drop used for Conduit 12

****************
Analysis Options
****************
Flow Units ............... CFS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Flow Routing Method ...... KINWAVE
Starting Date ............ 08/28/1951 05:00:00
Ending Date .............. 05/23/2008 23:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 01:00:00
Wet Time Step ............ 00:15:00
Dry Time Step ............ 04:00:00
Routing Time Step ........ 60.00 sec


*************************        Volume         Depth
Runoff Quantity Continuity     acre-feet        inches
*************************     ---------       -------
Initial LID Storage ......         0.026         0.089
Total Precipitation ......       196.571       675.090
Evaporation Loss .........        34.691       119.139
Infiltration Loss ........       119.200       409.373
Surface Runoff ...........        45.027       154.637
Final Storage ............         0.043         0.148
```

Continuity Error (%) ..... -1.202

Flow Routing Continuity	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	45.027	14.673
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	46.232	15.066
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 (%)	-2.678	

Highest Flow Instability Indexes

All links are stable.

Routing Time Step Summary

Minimum Time Step	:	60.00 sec
Average Time Step	:	60.00 sec
Maximum Time Step	:	60.00 sec
% of Time in Steady State	:	0.00
Average Iterations per Step	:	1.00
% of Steps Not Converging	:	0.00

Subcatchment Runoff Summary

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Imperv Runoff in	Perv Runoff in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff
DMA-1	675.09	0.00	72.94	200.87	386.76	20.59	407.35	11.46	1.22	0.603
DMA-2	675.09	0.00	90.47	72.31	513.67	8.68	522.35	5.56	0.47	0.774
DMA-3	675.09	0.00	86.08	102.03	484.58	11.88	496.46	9.53	0.84	0.735
DMA-4	675.09	0.00	91.05	68.69	517.16	8.26	525.42	1.75	0.15	0.778
DMA-5	675.09	0.00	97.13	44.03	537.43	5.21	542.65	7.06	0.57	0.804

DMA-7	675.09	0.00	79.50	137.00	452.37	16.05	468.43	4.24	0.40	0.694
BMP-1	675.09	10582.11	1003.40	7804.52	0.00	0.00	2449.65	2.65	1.24	0.218
BMP-2	675.09	11994.87	1031.55	8007.89	0.00	0.00	3630.68	1.68	0.48	0.287
BMP-3	675.09	12766.45	1037.93	8895.75	0.00	0.00	3508.02	2.62	0.86	0.261
BMP-4	675.09	8123.56	983.75	6337.44	0.00	0.00	1478.01	0.32	0.15	0.168
BMP-5	675.09	12296.46	1029.08	8139.85	0.00	0.00	3802.84	2.18	0.59	0.293
DMA-6	675.09	0.00	95.76	53.11	528.55	6.22	534.77	4.18	0.34	0.792
BMP-6	675.09	9253.90	994.72	6904.61	0.00	0.00	2030.08	0.92	0.35	0.204
DEMIN	675.09	0.00	59.37	246.96	348.64	31.12	379.76	0.06	0.01	0.563

****
LID Performance Summary
****

Subcatchment	LID Control	Total Inflow in	Evap Loss in	Infil Loss in	Surface Outflow in	Drain Outflow in	Initial Storage in	Final Storage in	Continuity Error %
BMP-1	BMP-1	11257.20	1003.44	7804.80	2449.74	0.00	2.40	2.96	-0.01
BMP-2	BMP-2	12669.96	1031.60	8008.23	3630.84	0.00	2.40	3.12	-0.01
BMP-3	BMP-3	13441.54	1037.97	8896.05	3508.14	0.00	2.40	3.15	-0.01
BMP-4	BMP-4	8798.65	983.77	6337.59	1478.04	0.00	2.40	2.92	-0.01
BMP-5	BMP-5	12971.55	1029.12	8140.14	3802.98	0.00	2.40	3.09	-0.01
BMP-6	BMP-6	9928.99	994.76	6904.89	2030.16	0.00	2.40	2.94	-0.01

****
Node Depth Summary
****

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Reported Max Depth Feet
POC-1	OUTFALL	0.00	0.66	0.66	16522 16:31	0.54
DIV1	DIVIDER	0.00	0.47	0.47	124 00:28	0.47
DIV2	DIVIDER	0.00	0.31	0.31	141 06:31	0.31
DIV3	DIVIDER	0.00	0.43	0.43	2351 21:31	0.43
DIV4	DIVIDER	0.00	0.20	0.20	141 06:28	0.20
DIV5	DIVIDER	0.00	0.34	0.34	141 06:28	0.34
DIV6	DIVIDER	0.00	0.27	0.27	123 18:46	0.27
STOR1	STORAGE	0.00	0.86	0.86	18857 12:19	0.75
STOR2	STORAGE	0.00	0.68	0.68	18857 12:18	0.61
STOR3	STORAGE	0.00	1.06	1.06	18857 12:01	1.06
STOR4	STORAGE	0.00	0.71	0.71	18857 12:21	0.57
STOR5	STORAGE	0.00	0.65	0.65	18857 12:18	0.58
STOR6	STORAGE	0.00	0.23	0.23	18857 12:01	0.23

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
POC-1	OUTFALL	0.40	3.60	18857 12:01	4.3	15.1	0.000
DIV1	DIVIDER	1.24	1.24	18857 12:01	2.65	2.65	0.000
DIV2	DIVIDER	0.48	0.48	18857 11:46	1.68	1.68	0.000
DIV3	DIVIDER	0.86	0.86	18857 11:46	2.62	2.62	0.000
DIV4	DIVIDER	0.15	0.15	18857 11:46	0.318	0.318	0.000
DIV5	DIVIDER	0.59	0.59	18857 11:46	2.18	2.18	0.000
DIV6	DIVIDER	0.35	0.35	18857 11:46	0.917	0.917	0.000
STOR1	STORAGE	0.00	1.21	18857 12:01	0	1.98	0.066
STOR2	STORAGE	0.00	0.46	18857 11:46	0	1.2	0.023
STOR3	STORAGE	0.00	0.83	18857 11:46	0	1.85	0.075
STOR4	STORAGE	0.00	0.14	18857 11:46	0	0.207	0.055
STOR5	STORAGE	0.00	0.57	18857 11:46	0	1.56	0.026
STOR6	STORAGE	0.00	0.34	18857 11:46	0	0.654	0.022

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
STOR1	0.000	0	0	0	1.500	65	18857 12:18	1.03
STOR2	0.000	0	0	0	0.508	46	18857 12:17	0.41
STOR3	0.000	0	0	0	1.270	80	18857 12:00	0.83
STOR4	0.000	0	0	0	0.246	47	18857 12:20	0.10
STOR5	0.000	0	0	0	0.600	43	18857 12:17	0.51
STOR6	0.000	0	0	0	0.165	15	18857 12:01	0.34

****
Outfall Loading Summary

****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
POC-1	2.11	0.05	3.60	15.064
System	2.11	0.05	3.60	15.064

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days	hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
1	CONDUIT	0.06	16522	16:31	0.25	0.78	0.47
2	CONDUIT	0.03	9993	00:31	0.23	0.41	0.31
3	CONDUIT	0.05	20548	10:31	0.25	0.72	0.43
4	CONDUIT	0.01	15835	16:31	0.19	0.19	0.20
5	CONDUIT	0.04	12512	08:31	0.24	0.48	0.34
6	CONDUIT	0.02	20548	10:31	0.22	0.32	0.27
7	DUMMY	1.21	18857	12:01			
8	DUMMY	0.46	18857	11:46			
9	DUMMY	0.83	18857	11:46			
10	DUMMY	0.14	18857	11:46			
11	DUMMY	0.57	18857	11:46			
12	DUMMY	0.34	18857	11:46			
13	DUMMY	1.03	18857	12:19			
14	DUMMY	0.41	18857	12:18			
15	DUMMY	0.83	18857	12:01			
16	DUMMY	0.10	18857	12:21			
17	DUMMY	0.51	18857	12:18			
18	DUMMY	0.34	18857	12:01			

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Tue Dec 6 09:13:43 2022
Analysis ended on: Tue Dec 6 09:15:04 2022
Total elapsed time: 00:01:21

TORY R. WALKER ENGINEERING
RELIABLE SOLUTIONS IN WATER RESOURCES

Manning's *n* Values for Overland Flow[1]

The BMP Design Manuals within the County of San Diego allow for a land surface description other than short prairie grass to be used for hydromodification BMP design only if documentation provided is consistent with Table A.6 of the SWMM 5 User's Manual.

In January 2016, the EPA released the SWMM Reference Manual Volume I – Hydrology (SWMM Hydrology Reference Manual). The SWMM Hydrology Reference Manual complements the SWMM 5 User's Manual by providing an in-depth description of the program's hydrologic components. Table 3-5 of the SWMM Hydrology Reference Manual expounds upon Table A.6 of the SWMM 5 User's Manual by providing Manning's *n* values for additional overland flow surfaces. Therefore, in order to provide SWMM users with a wider range of land surfaces suitable for local application and to provide Copermittees with confidence in the design parameters, we recommend using the values published by Yen and Chow in Table 3-5 of the EPA SWMM Reference Manual Volume I – Hydrology. The values are provided in the table below:

Overland Surface	**Manning value (*n*)**
Smooth asphalt pavement	0.010
Smooth impervious surface	0.011
Tar and sand pavement	0.012
Concrete pavement	0.014
Rough impervious surface	0.015
Smooth bare packed soil	0.017
Moderate bare packed soil	0.025
Rough bare packed soil	0.032
Gravel soil	0.025
Mowed poor grass	0.030
Average grass, closely clipped sod	0.040
Pasture	0.040
Timberland	0.060
Dense grass	0.060
Shrubs and bushes	0.080
Land Use	
Business	0.014
Semibusiness	0.022
Industrial	0.020
Dense residential	0.025
Suburban residential	0.030
Parks and lawns	0.040

[1]Content summarized from *Improving Accuracy in Continuous Simulation Modeling: Guidance for Selecting Pervious Overland Flow Manning's n Values in the San Diego Region* (TRWE, 2016).

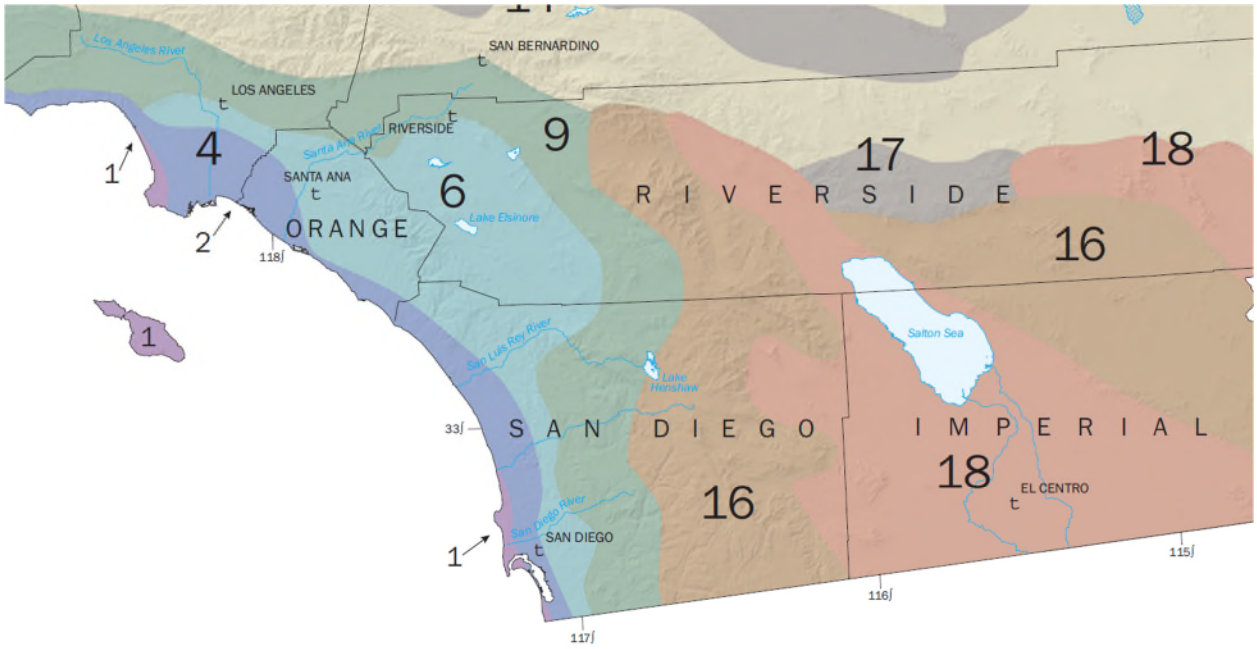


Figure G.1-2: California Irrigation Management Information System "Reference Evapotranspiration Zones"

Table G.1-1: Monthly Average Reference Evapotranspiration by ETo Zone (inches/month and inches/day) for use in SWMM Models for Hydromodification Management Studies in San Diego County CIMIS Zones 1, 4, 6, 9, and 16 (See CIMIS ETo Zone Map)

	January	February	March	April	May	June	July	August	September	October	November	December
Zone	in/month	in/month	in/month	in/month	in/month	in/month	in/month	in/month	in/month	in/month	in/month	in/month
1	0.93	1.4	2.48	3.3	4.03	4.5	4.65	4.03	3.3	2.48	1.2	0.62
4	1.86	2.24	3.41	4.5	5.27	5.7	5.89	5.58	4.5	3.41	2.4	1.86
6	1.86	2.24	3.41	4.8	5.58	6.3	6.51	6.2	4.8	3.72	2.4	1.86
9	2.17	2.8	4.03	5.1	5.89	6.6	7.44	6.82	5.7	4.03	2.7	1.86
16	1.55	2.52	4.03	5.7	7.75	8.7	9.3	8.37	6.3	4.34	2.4	1.55
	January	February	March	April	May	June	July	August	September	October	November	December
Days	31	28	31	30	31	30	31	31	30	31	30	31
Zone	in/day	in/day	in/day	in/day	in/day	in/day	in/day	in/day	in/day	in/day	in/day	in/day
1	0.030	0.050	0.080	0.110	0.130	0.150	0.150	0.130	0.110	0.080	0.040	0.020
4	0.060	0.080	0.110	0.150	0.170	0.190	0.190	0.180	0.150	0.110	0.080	0.060
6	0.060	0.080	0.110	0.160	0.180	0.210	0.210	0.200	0.160	0.120	0.080	0.060
9	0.070	0.100	0.130	0.170	0.190	0.220	0.240	0.220	0.190	0.130	0.090	0.060
16	0.050	0.090	0.130	0.190	0.250	0.290	0.300	0.270	0.210	0.140	0.080	0.050



Oceanside

Project Title: San Diego County Hydrograph Modification Plan Project No: 133904

Date: February 2, 2009

Background

In consideration of other state and regional hydromodification management planning efforts, the County of San Diego has endeavored to compact at least 35 years of historical hourly rainfall data into several .wdm files toward the use of hydrologic modeling in the San Diego region. The hydrologic modeling software HSPF utilizes the .wdm files for both an input and output time series data (precipitation values over time). Each .wdm file is a binary, direct-access file that is organized into discrete data sets associated with either an ALERT or CCDA rainfall station. The ALERT stations are maintained by the County of San Diego; whereas, the CCDA stations are maintained by the Western Regional Climate Center and Scripps Institution of Oceanography's California Climate Change Center, thru funding by the California Energy Commission as part of the CalClim project. A total of eighteen ALERT stations and two CCDA stations were chosen to provide an adequate geographic coverage of the major watersheds within County. This report will describe the methodology used toward the creation of the Oceanside ALERT station input .wdm file.

Alert Data – Framework and Data Gaps

The ALERT station at Oceanside (Sensor ID 67) is still in operation and has provided data between February 1952 and June 2008. The data set for any ALERT station is a series of line by line recordings which reflect the various wet or dry weather events logged by the gauge station. Each data set consists of the recorded sensor data as well as other "attributes" to describe the data (e.g. units).

During a wet event, the mechanical sampler within the gauge station would usually capture the amount of precipitation through the use of a tip bucket. Each time the bucket fills with rain, it tips see-saw like. The total rainfall is measured by counting how many times the bucket tips. However, this recording process was not uniformly done. The data within each ALERT station usually contains an assortment of logging periods at either a 5-minute, 15-minute, hourly or even daily interval. So while the mechanical sampling device is constantly recording the amount of precipitation, the line by line recordings within the time series data are exclusively subject to the whatever logging period was programmed. Additionally, these logging periods are used as the "Source" description in order to properly delineate each recorded event within the time series.

An example of the non-uniform data is provided in Table 1 below:

Table 1 – Oceanside County Data - RAW

Date	Time	Data Value	TipBucketCount	Units	Code	Source
4/26/1994	1500	20		in/100		Oceanside 15-min data 1976-92
4/26/1994	1700	10		in/100		Oceanside 15-min data 1976-92
5/17/1994	1400	10		in/100		Oceanside 15-min data 1976-92
7/1/2007 12:00:06 AM		0	0	in	S	Oceanside ALERT data 1992-2008
7/1/2007 11:05:16 AM		0	0	in	S	Oceanside ALERT data 1992-2008

However, a uniform dataset is necessary for use within the hydrologic modeling software. As such, the following standards were applied toward a uniform hourly dataset:

- If the ALERT data uses an hr 0, it is reflected in the final dataset as hr 24 of the previous day.
- If the ALERT data recorded rainfall precipitation in hundredths of an inch (in/100) or millimeters (mm), the precipitation value was corrected to inches and a "hundredths to inches" or "millimeters to inches" tagline is used within the source description.
- Aggregation – If an ALERT station recorded multiple rainfall entries within a distinct hour, such as when the logging program was set to 5-minute periods, the precipitation values of each entry are added together to reflect a final cumulative precipitation value for the hour. Regardless if multiple rainfall entries occurred or not, this aggregation process was used across all ALERT data entries due to such a large dataset. Once the aggregation process was applied, an "aggregated" tagline is inserted at the end of the source description.
- Disaggregation – If an ALERT station recorded a single daily rainfall entry, the data value provided is broken down into an hourly rainfall distribution. To accomplish this, a unit hyetograph was created following the direction of the County of San Diego Hydrology Manual, Section 4.3.2. The unit hyetograph uses a log-log interpolated value between the 5-year, 6-hr and 24-hr isopulvial graphs, which are also provided by the San Diego Hydrology Manual. Importantly, the disaggregation process generates a group of 24-hr precipitation distribution values which is often less than the initial cumulative daily data value provided due to rounding. If the disaggregation process was applied, a "disaggregated" tagline is inserted within the source description. The disaggreation table is included within Appendix A – Construction of Hyetograph.

Possible Inherent Errors – Data gaps

When creating the initial input .wdm, it is assumed that the recorded sensor data inherently contains errors or data gaps. After recording data for over three decades in a harsh outdoor environment, machinery can fail, sensors can be damaged or perhaps the electronic data was scrambled. Thankfully, the logging program which recorded the precipitation values would usually apply an error attribute alert during the two main data gap situations: an accumulation period or a missing period. An accumulation period is an error scenario where the amount of precipitation is known, but only as a single cumulative amount over a time frame beyond an hour. Basically the distribution of precipitation is unknown, rendering the data unproductive. (e.g. a faulty tip bucket). A missing period is an error scenario where the amount of precipitation is unknown over any time period. This occurred if something affected the logging apparatus directly (e.g. dead battery).

The identifier codes of an accumulation period are (but not limited to) the following: ***, C SA, SA A, A**

They are grouped together to display when the error period begins and ends. Occasionally, an error period would be followed by a subsequent error period resulting in back to back codes: **SA, SA, SA**

The identifier codes of a missing period are (but not limited to) the following: **M, - SM, SM**

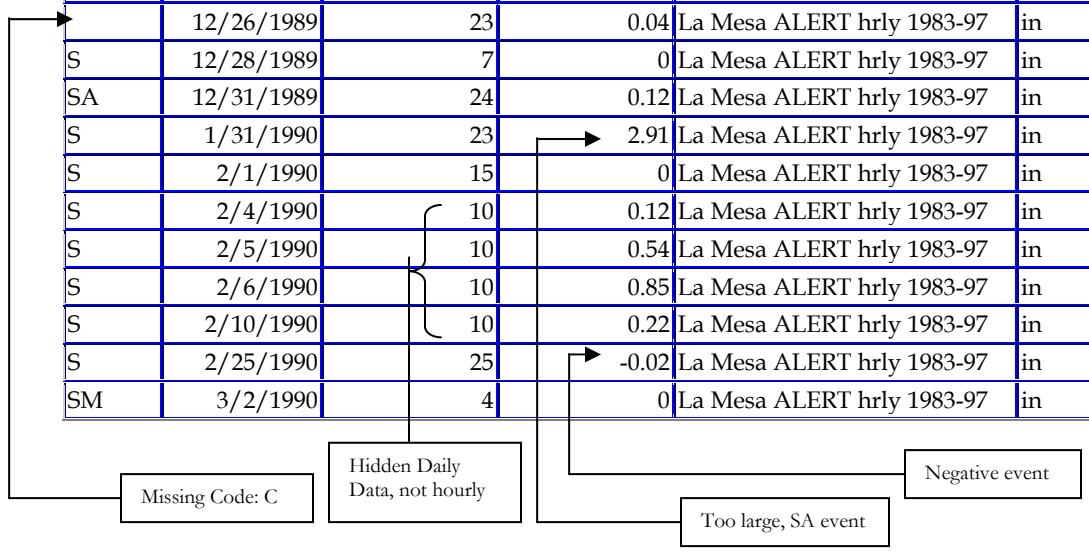
Possible Inherent Errors – Identify Outliers

Unfortunately, not all of these data gaps were so easily identified. Indeed, possible data gaps were at times given a 'passing' code, creating a scenario even more difficult to locate on record characteristics alone. As such, the outlier method of identifying errors was used. The general assumption for any time series data analysis is that it contains (1) a systematic pattern and (2) random event outliers (very high or very low data values) which will make the pattern difficult to identify. Unfortunately, a broad filter of all of these random events in order to make the pattern more salient cannot be implemented as many of these events were concretely observed. This is particularly true for all low data values, with the single exception of any possible negative precipitation events which would obviously be an error. However, some of the very high value outliers do indicate a data gap error. For example, an accumulation event will result in higher than normal precipitation values within a single hour.

An example of the various errors discovered by the outlier method is shown in Table 2 below.

Table 2 - La Mesa County Data

Code	DateMOD	HourMOD	Amount	Source	Units
S	12/21/1989	17	0.08	La Mesa ALERT hrly 1983-97	in
*	12/21/1989	12	0	La Mesa ALERT hrly 1983-97	in
	12/26/1989	23	0.04	La Mesa ALERT hrly 1983-97	in
S	12/28/1989	7	0	La Mesa ALERT hrly 1983-97	in
SA	12/31/1989	24	0.12	La Mesa ALERT hrly 1983-97	in
S	1/31/1990	23	2.91	La Mesa ALERT hrly 1983-97	in
S	2/1/1990	15	0	La Mesa ALERT hrly 1983-97	in
S	2/4/1990	10	0.12	La Mesa ALERT hrly 1983-97	in
S	2/5/1990	10	0.54	La Mesa ALERT hrly 1983-97	in
S	2/6/1990	10	0.85	La Mesa ALERT hrly 1983-97	in
S	2/10/1990	10	0.22	La Mesa ALERT hrly 1983-97	in
S	2/25/1990	25	-0.02	La Mesa ALERT hrly 1983-97	in
SM	3/2/1990	4	0	La Mesa ALERT hrly 1983-97	in



Data Gap Analysis table

Trying to identify each data gap separately would be a time consuming process. Instead, the primary step toward the reestablishment of these data gap errors was to gather them together into a Data Gap Analysis table. As mentioned previously, data gaps occasionally occurred across a successive timeframe which became readily apparent once the gaps are grouped together. Conversely, a flagged data gap would occasionally occur within the same hour or subsequent hour. If the precipitation of the data gap is known (i.e. accumulation event), then the data gap warning can be ignored as the event either occurs within the same hour or subsequent hour. Unfortunately, such a straightforward scenario did not usually occur; as such, the time frame for each data gap is properly identified and then supplemented with verifiable data from a separate source. In order to provide a complete representation of this ALERT station, two historical online datasets were used to supplement any such data gaps. An appropriate supplemental gauge station from either of these historical datasets would be chosen on the basis of location proximity and similarity between the gauge and station elevations. However, a disparity between precipitation values recorded by the ALERT and NNDC publications will potentially exist no matter how precise the location/elevation similarity due to the disordered nature of a stormwater event. A listing of this numerical disparity and the selected supplemental gauge station per data gap is included within the Data Gap Analysis. The Data Gap Analysis table is included as Attachment B.

Filling in the Data Gaps - Supplemental Rainfall Record

NOAA

The first historical online dataset is freely available from the National Weather Service (NWS) at the following website: http://www.wrh.noaa.gov/sgx/obs/rtp/rtpmap.php?wfo=sgx. This link only provides recent daily precipitation data from Regional Temperature and Precipitation (RTP) stations within San Diego. Although not all of these stations reside in the same location as the ALERT stations, they cover some of the same general areas. In this case, the local RTP station at Station ID 10, Oceanside Harbor. If a data gap occurred within a recent timeframe (May 1998 or later), it would be supplemented by the daily data provided by NWS. Whenever a data gap is supplemented in such a fashion, a "NOAA" tagline is used within the source description as the NWS is operated by the National Oceanic Atmospheric Administration (NOAA).

- Disaggregation – The daily data provided by *NOAA* is broken down into an hourly rainfall distribution to fit the time framework of the hydromodification plan. No matter the actual location of the NOAA station, the disaggregation table and unit hyetograph previously created for the Alert station is used. This unit hyetograph was created by following the direction of the County of San Diego Hydrology Manual, Section 4.3.2. It uses a log-log interpolated value between the 5-year, 6-hr and 24-hr isopulvial graphs, which are also provided by the San Diego Hydrology Manual. Importantly, the disaggregation process generates a total 24-hr precipitation distribution value which is less than the initial daily data value provided by NOAA due to rounding. If the disaggregation process was applied, a "disaggregated" tagline is inserted within the source description. The disaggreation table is included within Appendix A – Construction of Hyetograph.

NNDC

The second historical online dataset must be purchased from the National Climatic Data Center (NCDC), specifically thru the Image and Publications System at the following website: http://www7.ncdc.noaa.gov/IPS/hpd/hpd.html?_page=0&jsessionid=7F8ED28E1BD0C792DFBD4BA7FAC08E51&state=CA&_target1=Next+%3E. This link provides a large volume of hourly precipitation data in PDF format from October 1951 through April 2008. A single PDF purchase yields the recorded hourly data of all NCDC stations within California for one month of a specific year. However, only database gaps up until May 1998 were supplemented in such a fashion. Any data gaps from May 1998 until the present were supplemented with the freely available daily data provided by NWS. Whenever a data gap is supplemented in such a fashion, a "NNDC" tagline is used within the source description to reflect the final data dissemination entity operated by the NOAA National Data Centers (NNDC).

Supplemental ALERT or CCDA stations

Whether thru design or coincidence, an occasional data gap would be found across all three historical datasets (ALERT, NOAA and NNDC). During such an unusual event, the supplemental information will be drawn from the various CCDA rainfall stations as each contains very minimal data gaps.

- The final source of supplemental information will be drawn from the nearest ALERT station. In this case, no additional ALERT stations were used.

QA/QC process

While the current goal is to gather together an input .wdm file, the final goal is to create an output .wdm time series analysis to forecast or predict future precipitation values. This predictive process depends upon identifying a sequence of observations (or pattern) within the observed time series data (i.e. input .wdm). Once the pattern is established, the data can be extrapolated to predict future events. As such, the focus of the QA/QC process for the input .wdm file is the filtering or removal of any errors which will interfere with the pattern, while forgiving any lesser errors which have little to no interference. Once the supplemental information was introduced, the primary QA/QC methods used were (1) a script to identify duplicate event times and (2) a repeat of the Outlier method.

Summary of Oceanside ALERT Station and .wdm Data Set

Watershed: **San Luis Rey River**
Latitude/Longitude of Oceanside ALERT station: **33.1238, -117.2112**
Elevation of Oceanside ALERT Station: **30 feet**
Data available from: **07/01/1951 to 06/30/2008**
Highest Precipitation recorded within an hour: **1.20 inch**
Lowest Precipitation recorded within an hour: **0.00 inch**
Historical Dataset Resources: **Oceanside ALERT Data, NNDC San Diego WSO, NNDC Oceanside Pumping Plant, NNDC Oceanside CAA, NNDC Lake Wohlford, NNDC Fallbrook, NNDC Escondido Church RCH, NNDC Escondido Park Hill, NNDC Escondido No 2, NNDC El Capitan Dam, NNDC Buena Vista, NOAA Oceanside Harbor, NOAA Oceanside Airport, CCDA Lindbergh**

APPENDIX A

Construction of Hyetograph

6-hr Storm

Hour #	Minutes (D)	Intensity	Total Rainfall	Rainfall by Hour
1	60	0.33371335	0.33371335	0.33371335
2	120	0.21335468	0.42670937	0.09299602
3	180	0.1642331	0.49269931	0.06598994
4	240	0.13640515	0.54562062	0.05292131
5	300	0.11811073	0.59055366	0.04493304
6	360	0.105	0.63	0.03944634
	Sum			0.63

Oceanside

5-yr	6hr storm	24hr storm
	1.6	2.55

Assumptions: The relationship between a 6hr and 24hr storm is 1:1.59 and that there are no rainfall depth-area adjustments.

The San Diego County Manual, Section 4.3.2 was used to create the below rainfall distribution.

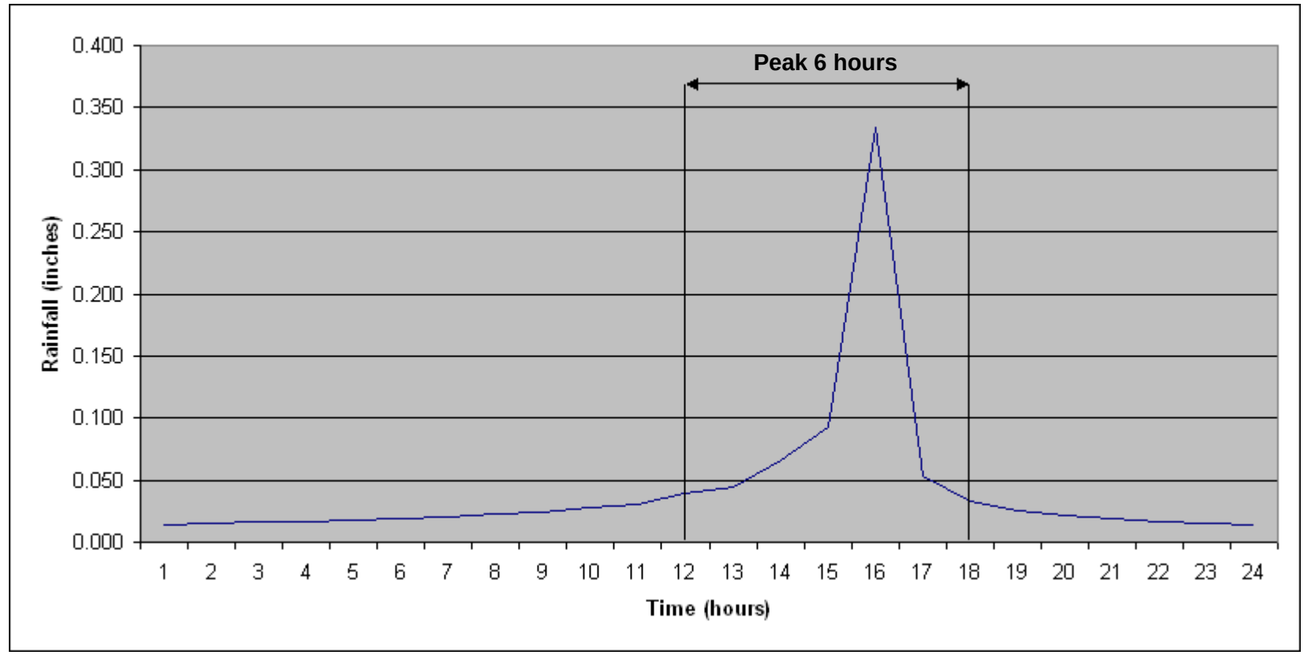
For Hours 1-6; use I = 7.44 * (P6hr) * D^(-0.645) and P=I * (D/60) where P6=0.63 inches and D is in minutes.
For Hours 6-24; use P(x)hr = (x^0.333) * (10^-0.45978) where x equals a particular time in hours

m-slope = 0.333
b-intercept = -0.45978

for hours 6-24 use the formula: log [f(x)] = mlog(x) + b OR f(x)=x^m) * (10^b)

Nested Storm

Hour #	Minutes (D)	Intensity	Total Rainfall	Rainfall by Hour	Distribution
1	60	0.33371335	0.33371335	0.334	0.014
2	120	0.21335468	0.42670937	0.093	0.015
3	180	0.1642331	0.49269931	0.066	0.016
4	240	0.13640515	0.54562062	0.053	0.017
5	300	0.11811073	0.59055366	0.045	0.018
6	360	0.105	0.63	0.039	0.019
7	420		0.66318368	0.033	0.020
8	480		0.69333823	0.030	0.023
9	540		0.72107251	0.028	0.024
10	600		0.74682042	0.026	0.028
11	660		0.77090338	0.024	0.030
12	720		0.79356689	0.023	0.039
13	780		0.81500321	0.021	0.045
14	840		0.83536605	0.020	0.066
15	900		0.85478043	0.019	0.093
16	960		0.87334962	0.019	0.334
17	1020		0.89115998	0.018	0.053
18	1080		0.90828455	0.017	0.033
19	1140		0.92478576	0.017	0.026
20	1200		0.94071739	0.016	0.021
21	1260		0.95612618	0.015	0.019
22	1320		0.971053	0.015	0.017
23	1380		0.98553387	0.014	0.015
24	1440		0.99960064	0.014	0.014



APPENDIX B

Data Gap Analysis Table

DateMOD	HourMOD	Amount	Code	Units	Filler Data	Value Comparison
missing data 1-1-00 to 3-8-00				in	NOAA Oceanside Airport and NOAA	M
missing data 1-27-01 to 4-19-01				in	NOAA Oceanside Airport	M
missing data 1/1/97 to 1/15/97				in	NNDC Oceanside Pumping Plant	M
7/1/1951	1	0	M	in	CCDA Lindbergh Crosstab Reversed	M
7/31/1951	24	0	-	in		
8/1/1951	1	0	M	in	CCDA Lindbergh Crosstab Reversed	M
8/31/1951	24	0	-	in		
9/1/1951	1	0	M	in	CCDA Lindbergh Crosstab Reversed	M
9/30/1951	24	0	-	in		
10/1/1951	1	0	M	in	NNDC Oceanside CAA	M
10/31/1951	24	0	-	in		
11/1/1951	1	0	M	in	NNDC Oceanside CAA	M
11/30/1951	24	0	-	in		
12/1/1951	1	0	M	in	NNDC Oceanside CAA and NNDC Buena Vista	M
12/31/1951	24	0	-	in		
1/1/1952	1	0	M	in	NNDC Oceanside CAA	M
1/31/1952	24	0	-	in		
2/1/1952	1	0	M	in	Nearby stations point to no event - Zero	M
2/11/1952	15	0	-	in		
4/24/1952	8	0	M	in	NNDC Buena Vista	M
4/25/1952	24	0	-	in		
1/1/1955	19	0	*	in	NNDC Escondido Chruch RCH	-0.05
1/2/1955	5	0.34	C	in		
12/6/1955	22	0	M	in	NNDC Esondido Chruch RCH	M
12/7/1955	2	0	-	in		
10/23/1956	2	0	*	in	NNDC Buena Vista	0.00
10/29/1956	11	0.08	C	in		
1/5/1957	1	0	*	in	NNDC Escondido Chruch RCH	0.11
1/5/1957	10	0.35	C	in		
1/28/1957	23	0	*	in	NNDC Fallbrook	-0.18
1/29/1957	24	1.86	C	in		
6/9/1957	24	0	*	in	NNDC Esondido Chruch RCH	0.08
6/10/1957	6	0.32	C	in		
11/5/1957	12	0	*	in	NNDC Fallbrook	0.00
11/5/1957	17	0.05	C	in		
2/4/1958	14	0	*	in	NNDC Buena Vista	-0.04
2/5/1958	4	0.08	C	in		
9/23/1958	13	0	*	in	NNDC Escondido Park Hill	0.17
9/24/1958	5	0.3	C	in		
12/27/1958	23	0	M	in	Nearby stations point to no event - Zero	M
12/28/1958	7	0	-	in		
2/21/1959	20	0	*	in	NNDC Escondido Park Hill	0.02
2/21/1959	24	0.07	C	in		
4/25/1959	23	0	*	in	NNDC Buena Vista	-0.06
4/26/1959	2	0.13	C	in		
12/20/1959	17	0	*	in	NNDC Escondido Park Hill	0.13
12/21/1959	9	0.53	C	in		
12/24/1959	1	0	*	in	NNDC Buena Vista	0.07
12/24/1959	10	0.23	C	in		
3/13/1960	1	0	M	in	NNDC Buena Vista	M
3/13/1960	7	0	-	in		
3/24/1961	22	0	*	in	NNDC Buena Vista	-0.09
3/25/1961	4	0.18	C	in		
3/6/1962	12	0	*	in	NNDC Buena Vista	0.06
3/7/1962	2	0.16	C	in		

DateMOD	HourMOD	Amount	Code	Units	Filler Data	Value Comparison
5/25/1962	22	0	*	in	NNDC Escondido Park Hill	0.07
5/27/1962	19	0.14	C	in		
11/20/1963	10	0	*	in	NNDC Escondido Park Hill	0.4
11/21/1963	5	0.55	C	in		
1/14/1964	7	0	M	in	NNDC Escondido Park Hill	M
1/14/1964	13	0	-	in		
1/21/1964	8	0	*	in	NNDC Buena Vista	-0.06
1/21/1964	9	0.06	C	in		
2/15/1964	23	0	M	in	NNDC Buena Vista	M
2/16/1964	11	0	-	in		
4/19/1964	11	0	M	in	NNDC Fallbrook	M
4/19/1964	18	0	-	in		
11/26/1964	11	0	*	in	NNDC Escondido No 2	0.00
11/26/1964	14	0.05	C	in		
1/20/1965	1	0	*	in	NNDC El Capitan Dam	0.05
1/20/1965	6	0.05	C	in		
3/6/1965	19	0	M	in	NNDC Buena Vista	M
3/6/1965	24	0	-	in		
3/11/1965	1	0	M	in	NNDC Buena Vista	M
3/13/1965	24	0	-	in		
3/24/1965	8	0	M	in	Nearby stations point to no event - Zero	M
3/24/1965	16	0	-	in		
4/1/1965	13	0	*	in	NNDC Fallbrook	0.13
4/1/1965	18	0.07	C	in		
4/3/1965	12	0	*	in	NNDC Fallbrook	0.08
4/4/1965	9	0.12	C	in		
11/15/1965	12	0	M	in	NNDC Buena Vista	M
11/18/1965	16	0	-	in		
12/12/1965	5	0	M	in	NNDC Fallbrook	M
12/14/1965	16	0	-	in		
1/19/1966	21	0	*	in	NNDC Fallbrook	-0.25
1/19/1966	23	0.35	C	in		
3/29/1967	1	0	*	in	NNDC Escondido No 2	-0.65
3/31/1967	24	1.05	C	in		
11/19/1967	6	0	*	in	NNDC Escondido No 2	0.34
11/19/1967	9	0.66	C	in		
12/18/1967	14	0	*	in	NNDC Escondido No 2	0.19
12/19/1967	9	1.91	C	in		
3/7/1968	18	0	*	in	NNDC Fallbrook	-0.30
3/8/1968	12	2.9	C	in		
11/14/1968	18	0	M	in	NNDC Buena Vista	M
11/15/1968	16	0	-	in		
2/5/1969	4	0	*	in	NNDC Buena Vista	-0.08
2/5/1969	10	0.15	C	in		
2/12/1969	18	0	*	in	Nearby stations point to no event - Zero	-0.03
2/12/1969	19	0.03	C	in		
6/11/1969	8	0	*	in	Nearby stations point to no event - Zero	-0.05
6/11/1969	13	0.05	C	in		
12/22/1969	1	0	*	in	NNDC San Diego WB Airport	-0.09
12/22/1969	3	0.1	C	in		
4/27/1970	8	0	*	in	NNDC Fallbrook	0.06
4/27/1970	15	0.04	C	in		
3/13/1971	1	0	*	in	NNDC San Diego WSO	0.07
3/13/1971	7	0.13	C	in		
11/13/1971	4	0	M	in	Nearby stations point to no event - Zero	M
11/13/1971	8	0	-	in		

DateMOD	HourMOD	Amount	Code	Units	Filler Data	Value Comparison
12/3/1971	22	0	*	in	NNDC Escondido No 2	-0.05
12/4/1971	10	0.25	C	in		
12/24/1971	1	0	*	in	NNDC Fallbrook	0.10
12/24/1971	7	0.2	C	in		
12/27/1971	1	0	*	in	Nearby stations point to no event - Zero	-0.08
12/27/1971	8	0.08	C	in		
11/11/1972	7	0	*	in	NNDC Fallbrook	-0.03
11/11/1972	8	0.33	C	in		
1/9/1973	7	0	*	in	NNDC Fallbrook	0.00
1/9/1973	8	0.1	C	in		
1/16/1973	17	0	M	in	NNDC Fallbrook	M
1/17/1973	9	0	-	in		
1/18/1973	17	0	*	in	NNDC Escondido No 2	0.25
1/19/1973	8	0.55	C	in		
11/16/1973	17	0	*	in	NNDC Fallbrook	-0.15
11/17/1973	9	0.35	C	in		
11/18/1973	10	0	*	in	NNDC Lake Wohlford	-0.17
11/19/1973	8	0.47	C	in		
12/1/1973	17	0	*	in	NNDC El Capitan Dam	-0.05
12/1/1973	24	0.05	C	in		
12/21/1973	17	0	M	in	Nearby stations point to no event - Zero	0.00
12/22/1973	17	0	-	in		
1/1/1974	1	0	M	in	NNDC Fallbrook	M
1/1/1974	24	0	-	in		
3/4/1975	13	0	*	in	All stations point to no event - Zero	-0.85
3/5/1975	8	0.85	C	in		
3/22/1975	1	0	M	in	NNDC Escondido No 2	M
3/22/1975	8	0	-	in		
3/22/1978	0	0	*	in	NNDC Escondido No 2	0.1
3/31/1978	24	1.4	C	in		
4/1/1978	0	0	*	in	NNDC Escondido No 2	1.2
4/7/1978	0	0.8	C	in		
1/5/1987	7	0	*	in	NNDC Escondido No 2	0.88
1/5/1987	21	1	C	in		
2/13/1987	15	0	*	in	NNDC Fallbrook	-1.59
2/25/1987	22	2.8	C	in		
2/15/2002	14	0	A	in	NOAA Oceanside Airport Daily Data	0.03
2/19/2002	12	0.2364	A	in		

ATTACHMENT 3 - BMP MAINTENANCE INFORMATION

Each of the attachments indicated below should be considered for inclusion with the SWQMP. Use this checklist to indicate which attachments are included behind this coversheet.

Attachment Sequence	Contents	Checklist
Attachment 3A	Structural BMP Operations and Maintenance Plan	☐ Included See Structural BMP Maintenance Information Checklist on the back of this Attachment cover sheet.
Attachment 3B	Draft Maintenance Agreement	☐ Included ☐ Not Applicable

This report is for Discretionary Permit purposes only. The project will be required to prepare and submit a Stormwater Structural BMP Operations and Maintenance Plan as a part of Final Construction Permitting as a condition of approval.

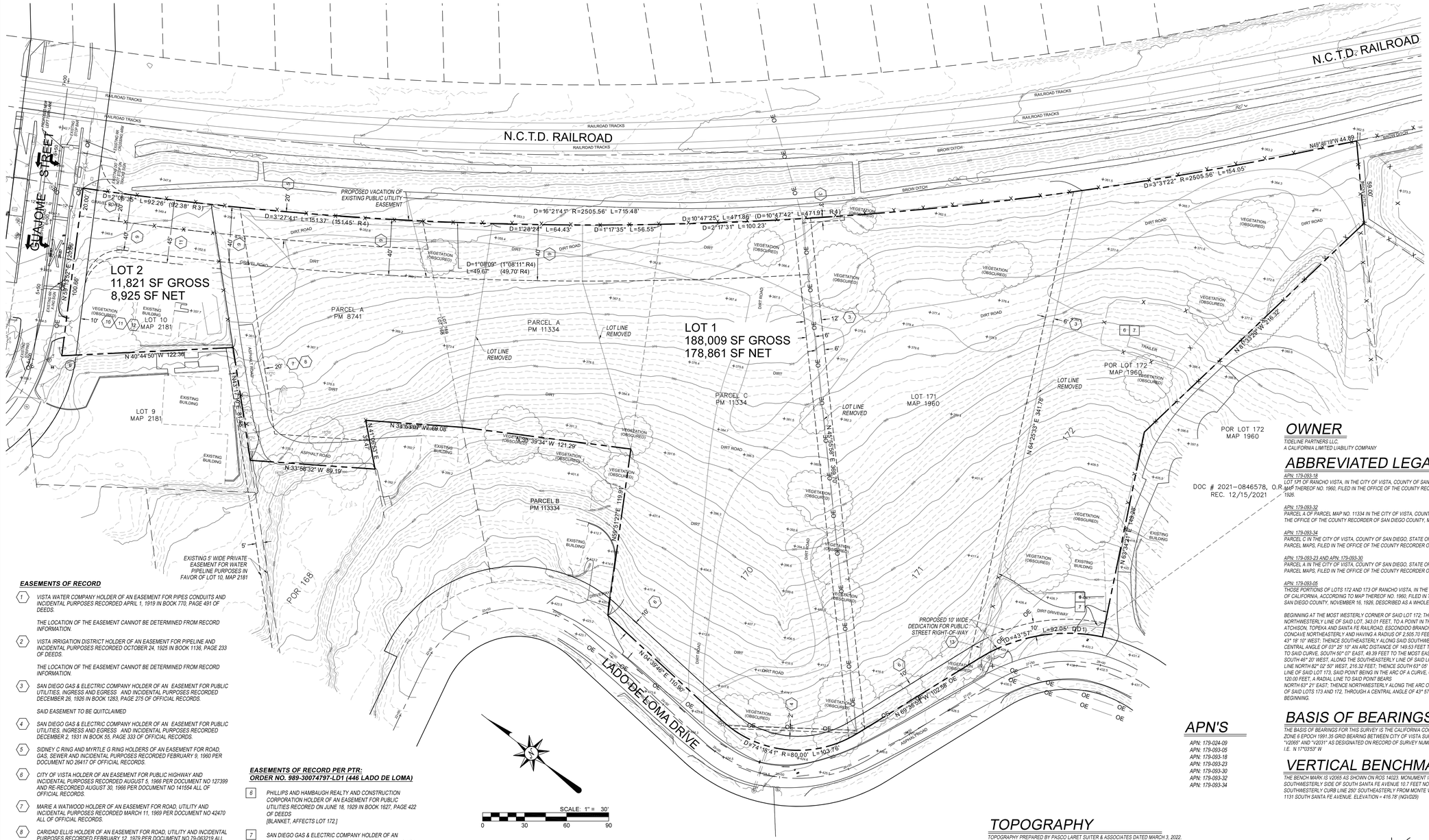
ATTACHMENT 4 - REQUIREMENTS FOR CONSTRUCTION PLANS

Section 8.2.2 of the *BMP Design Manual* identifies minimum requirements for storm drain construction plan sheets. Use this checklist to ensure project construction plans submitted for review include necessary information for storm drain improvements. Construction plans must include the following:

☒ All items identified in Section 8.2.2 of the *BMP Design Manual*.

TENTATIVE MAP

KENSHO HOUSING - GUAJOME STREET



EASEMENTS OF RECORD

1. VISTA WATER COMPANY HOLDER OF AN EASEMENT FOR PIPES CONDUITS AND INCIDENTAL PURPOSES RECORDED APRIL 1, 1919 IN BOOK 770, PAGE 491 OF DEEDS.

   THE LOCATION OF THE EASEMENT CANNOT BE DETERMINED FROM RECORD INFORMATION.

2. VISTA IRRIGATION DISTRICT HOLDER OF AN EASEMENT FOR PIPELINE AND INCIDENTAL PURPOSES RECORDED OCTOBER 24, 1925 IN BOOK 1136, PAGE 233 OF DEEDS.

   THE LOCATION OF THE EASEMENT CANNOT BE DETERMINED FROM RECORD INFORMATION.

3. SAN DIEGO GAS & ELECTRIC COMPANY HOLDER OF AN EASEMENT FOR PUBLIC UTILITIES, INGRESS AND EGRESS AND INCIDENTAL PURPOSES RECORDED DECEMBER 26, 1926 IN BOOK 1283, PAGE 275 OF OFFICIAL RECORDS.

   SAID EASEMENT TO BE QUITCLAIMED

4. SAN DIEGO GAS & ELECTRIC COMPANY HOLDER OF AN EASEMENT FOR PUBLIC UTILITIES, INGRESS AND EGRESS AND INCIDENTAL PURPOSES RECORDED DECEMBER 2, 1931 IN BOOK 55, PAGE 333 OF OFFICIAL RECORDS.

5. SIDNEY C RING AND MYRTLE G RING HOLDERS OF AN EASEMENT FOR ROAD, GAS, SEWER AND INCIDENTAL PURPOSES RECORDED FEBRUARY 9, 1960 PER DOCUMENT NO 26417 OF OFFICIAL RECORDS.

6. CITY OF VISTA HOLDER OF AN EASEMENT FOR PUBLIC HIGHWAY AND INCIDENTAL PURPOSES RECORDED AUGUST 5, 1988 PER DOCUMENT NO 127399 AND RE-RECORDED AUGUST 30, 1988 PER DOCUMENT NO 141504 ALL OF OFFICIAL RECORDS.

7. MARIE A WATWOOD HOLDER OF AN EASEMENT FOR ROAD, UTILITY AND INCIDENTAL PURPOSES RECORDED MARCH 11, 1969 PER DOCUMENT NO 42470 ALL OF OFFICIAL RECORDS.

8. CARIDAD ELLIS HOLDER OF AN EASEMENT FOR ROAD, UTILITY AND INCIDENTAL PURPOSES RECORDED FEBRUARY 12, 1979 PER DOCUMENT NO 79-063219 ALL OF OFFICIAL RECORDS.

9. CITY OF VISTA HOLDER OF AN EASEMENT FOR PUBLIC UTILITY AND INCIDENTAL PURPOSES RECORDED MAY 24, 2018 PER DOCUMENT NO 18-209990 ALL OF OFFICIAL RECORDS.

   SAID EASEMENT TO BE VACATED.

10. CITY OF VISTA HOLDER OF AN EASEMENT FOR PUBLIC ROADWAY PURPOSES RECORDED MAY 2, 1991 PER DOCUMENT NO 91-0203683 ALL OF OFFICIAL RECORDS.

11. VARIOUS OWNERS HOLDER OF AN EASEMENT FOR PRIVATE ROAD AND PUBLIC UTILITY PURPOSES RECORDED SEPTEMBER 10, 2003 PER DOCUMENT NO 2003-1105212 ALL OF OFFICIAL RECORDS.

12. PHILLIPS AND HAMBAUGH REALTY AND CONSTRUCTION CORPORATION HOLDER OF AN EASEMENT FOR PIPE LINE PURPOSES RECORDED JUNE 18, 1929 IN BOOK 1627, PAGE 422 OF OFFICIAL RECORDS.

    THE LOCATION OF THE EASEMENT CANNOT BE DETERMINED FROM RECORD INFORMATION.

13. SAN DIEGO GAS & ELECTRIC COMPANY HOLDER OF AN EASEMENT FOR PUBLIC UTILITY PURPOSES RECORDED APRIL 2, 1945 IN BOOK 1832, PAGE 384 OF OFFICIAL RECORDS.

    THE APPROXIMATE LOCATION OF THE EASEMENT HAS BEEN PLOTTED HEREON.

EASEMENTS OF RECORD PER PTR: ORDER NO. 989-30074797-LD1 (446 LADO DE LOMA)

6. PHILLIPS AND HAMBAUGH REALTY AND CONSTRUCTION CORPORATION HOLDER OF AN EASEMENT FOR PUBLIC UTILITIES RECORED ON JUNE 18, 1929 IN BOOK 1627, PAGE 422 OF DEEDS
   [BLANKET, AFFECTS LOT 172.]

7. SAN DIEGO GAS & ELECTRIC COMPANY HOLDER OF AN EASEMENT FOR PUBLIC UTILITIES RECORDED ON APRIL 2, 1945 IN BOOK 1832, PAGE 384 OF OFFICIAL RECORDS.
   [BLANKET, AFFECTS LOT 172.]

SURVEY NOTES

1. THE BOUNDARIES AND DIMENSIONS OF THE SURVEYED PARCEL(S) SHOWN HEREON ARE BASED ON A FIELD SURVEY. RECORD DIMENSIONS MAY VARY. THE BOUNDARIES OF ADJOINING PARCELS WERE COMPILED FROM RECORDED OR FILED DATA, AND ARE TO BE USED FOR PLANNING PURPOSES ONLY. FULL PROCEDURE OF SURVEY NOT SHOWN HEREON.
2. THE LOCATIONS OF UNDERGROUND UTILITY LINES AND/OR STRUCTURES AS SHOWN HEREON ARE BASED ON OBSERVED ABOVE GROUND EVIDENCE AND RECORD INFORMATION PROVIDED TO THE SURVEYOR. NO EXCAVATIONS WERE MADE DURING THE COURSE OF THIS SURVEY TO LOCATE UNDERGROUND UTILITIES. LOCATIONS OF UNDERGROUND UTILITIES MAY VARY FROM LOCATIONS SHOWN HEREON. ADDITIONAL UNDERGROUND UTILITIES MAY EXIST.
3. TITLE COMMITMENT PROVIDED BY FIRST AMERICAN TITLE INSURANCE COMPANY, ORDER NO DTR-6544193 DATED MARCH 9, 2021 & FIDELITY NATIONAL TITLE COMPANY, ORDER NO 995-30063812-JS3 WITH AN EFFECTIVE DATE OF MARCH 9, 2021. AMENDED AUGUST 27TH, 2021. ALSO ORDER NO. 989-30074797-LD1 DATED 10/08/2021.
4. AERIAL MAPPING FLOWN JULY 27, 2021, PROVIDED BY PLSA ENGINEERING.
5. ACCURACIES OF ± 0.3' CAN BE EXPECTED AS IT RELATES TO THE TOPOGRAPHICAL INFORMATION GENERATED FROM THE DIGITAL TERRAIN MODELING (DTM) INFORMATION.
6. THE BOUNDARY SHOWN HEREON DOES NOT COINCIDE WITH THE LINES SHOWN PER THE TAX ASSESSORS PLAT MAP. THERE IS INSUFFICIENT DATA AVAILABLE ON THE PERFECTING DEEDS OF THE RHODA LANE VACATION. UNDERLYING FEE OWNERSHIP OF THE NORTHEASTERLY 20' OF FORMER RHODA LANE SHOULD BE UPDATED IN GRANT DEEDS TO BENEFIT ALL OF LOT 10.

SHEET INDEX

TITLE SHEET/TENTATIVE MAP:	SHEET C1
PRELIMINARY GRADING PLAN (NORTH):	SHEET C2
PRELIMINARY GRADING PLAN (SOUTH):	SHEET C3
PRELIMINARY UTILITY PLAN:	SHEET C4
CROSS SECTIONS & DETAILS:	SHEET C5
PRELIMINARY IMPROVEMENT PLAN:	SHEET C6
BMP PLAN:	SHEET C7
SLOPE ANALYSIS:	SHEET C8

SCOPE OF WORK

THE PROJECT PROPOSES TO CONSOLIDATE ALL EXISTING LOTS INTO ONE SINGLE LOT WITH THE EXCEPTION OF LOT 10, MAP 2181, WHICH IS TO REMAIN AS A SEPERATE LEGAL LOT. ALL EXISTING SITE IMPROVEMENTS ARE PROPOSED TO BE DEMOLISHED AND REMOVED. FOUR MULTI-FAMILY BUILDINGS, PRIVATE ROAD, LANDSCAPING, AND ASSOCIATED AMMENITIES ARE PROPOSED TO BE CONSTRUCTED.

SITE AREA TABULATION

APN 179-024-09:	11,821 SQ.FT. (0.27 AC.)
APN 179-093-05:	41,827 SQ. FT. (0.96 AC.)
APN 179-093-18:	49,482 SQ.FT. (1.14 AC.)
APN 179-093-23:	25,322 SQ.FT. (0.58 AC.)
APN 179-093-30:	3,624 SQ. FT. (0.08 AC.)
APN 179-093-32:	13,340 SQ.FT. (0.31 AC.)
APN 179-093-34:	54,415 SQ.FT. (1.25 AC.)

GROSS TOTAL: 199,831 SQ.FT. (4.59 AC.)

PROPOSED LOT 1:	188,009 SQ. FT. (4.32 AC.) GROSS 178,861 SQ. FT. (4.11 AC.) NET
PROPOSED LOT 2:	11,821 SQ. FT. (0.27 AC.) GROSS 8,925 SQ. FT. (0.20 AC.) NET
IMPERVIOUS AREA:	119,665 SF
PERVIOUS AREA:	78,998 SF

TOPOGRAPHY

TOPOGRAPHY PREPARED BY PASCO LARET SUITER & ASSOCIATES DATED MARCH 3, 2022.
119 ABERDEEN DRIVE
CARDIFF-BY-THE -SEA, CA 92007
858-259-8212

UTILITIES

WATER	VISTA IRRIGATION DISTRICT
SEWER	CITY OF VISTA SANITATION
FIRE	CITY OF VISTA FIRE DEPARTMENT
ELEMENTARY SCHOOL	VISTA UNIFIED SCHOOL DISTRICT
HIGH SCHOOL	VISTA UNIFIED SCHOOL DISTRICT

SOLAR STATEMENT

THIS IS A SOLAR SUBDIVISION AS REQUIRED BY THE SUBDIVISION ORDINANCE. ALL PARCELS TO HAVE AT LEAST 100 SQUARE FEET OF UNOBSTRUCTED ACCESS TO SUNLIGHT ON THE BUILDABLE PORTION OF THE PARCEL.

CALIFORNIA LAMBERT COORDINATES

CALIFORNIA COORD. INDEX 374-1695

LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- CENTERLINE
- EASEMENT LINE
- EXISTING LOT LINE
- 350 EXISTING CONTOUR
- W EXISTING WATER MAIN
- S EXISTING SEWER MAIN
- OE EXISTING OVERHEAD ELECTRIC
- X EXISTING FENCE
- PROPOSED BUILDING FOOTPRINT
- 350 PROPOSED CONTOUR
- PROPOSED SHORING WALL
- PROPOSED RETAINING WALL
- S PROPOSED SEWER MAIN
- W PROPOSED WATER MAIN

OWNER

TIDELINE PARTNERS LLC.
A CALIFORNIA LIMITED LIABILITY COMPANY

ABBREVIATED LEGAL

APN: 179-093-18
LOT 171 OF RANCHO VISTA, IN THE CITY OF VISTA, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 1960, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, NOVEMBER 16, 1926.

APN: 179-093-32
PARCEL A OF PARCEL MAP NO. 11334 IN THE CITY OF VISTA, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MAY 29, 1981.

APN: 179-093-34
PARCEL C IN THE CITY OF VISTA, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, AS SHOWN AT PAGE NO. 11334 OF PARCEL MAPS, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MAY 29, 1981.

APN: 179-093-23 AND APN: 179-093-30
PARCEL A IN THE CITY OF VISTA, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, AS SHOWN AT PAGE NO. 8741 OF PARCEL MAPS, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MAY 23, 1979.

APN: 179-093-05
THOSE PORTIONS OF LOTS 172 AND 173 OF RANCHO VISTA, IN THE CITY OF VISTA, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 1960, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAID SAN DIEGO COUNTY, NOVEMBER 16, 1926, DESCRIBED AS A WHOLE AS FOLLOWS:

BEGINNING AT THE MOST WESTERLY CORNER OF SAID LOT 172; THENCE NORTH 64° 01' EAST ALONG THE NORTHWESTERLY LINE OF SAID LOT, 343.01 FEET, TO A POINT IN THE SOUTHWESTERLY RIGHT OF WAY LINE OF THE ATCHISON, TOPEKA AND SANTA FE RAILROAD, ESCONDIDO BRANCH, SAID POINT BEING IN THE ARC OF A CURVE CONCAVE NORTHEASTERLY AND HAVING A RADIUS OF 2,505.70 FEET, A RADIAL LINE OF SAID POINT BEARS SOUTH 43° 18' 10" WEST; THENCE SOUTHEASTERLY ALONG SAID SOUTHWESTERLY LINE AND SAID CURVE THROUGH A CENTRAL ANGLE OF 03° 25' 10" AN ARC DISTANCE OF 149.53 FEET TO THE END OF SAID CURVE; THENCE TANGENT TO SAID CURVE, SOUTH 60° 07' EAST, 49.39 FEET TO THE MOST EASTERLY CORNER OF SAID LOT 172; THENCE SOUTH 46° 20' WEST, ALONG THE SOUTHEASTERLY LINE OF SAID LOT 172, 59.00 FEET; THENCE LEAVING SAID LOT LINE NORTH 62° 02' 50" WEST, 216.32 FEET; THENCE SOUTH 63° 05' WEST, 150.00 FEET, TO A POINT IN THE WESTERLY LINE OF SAID LOT 173, SAID POINT BEING IN THE ARC OF A CURVE, CONCAVE WESTERLY AND HAVING A RADIUS OF 120.00 FEET, A RADIAL LINE TO SAID POINT BEARS
NORTH 63° 21' EAST; THENCE NORTHWESTERLY ALONG THE ARC OF SAID CURVE AND ALONG THE WESTERLY LINE OF SAID LOTS 173 AND 172, THROUGH A CENTRAL ANGLE OF 43° 57', AN ARC OF 92.05 FEET TO THE POINT OF BEGINNING.

APN'S

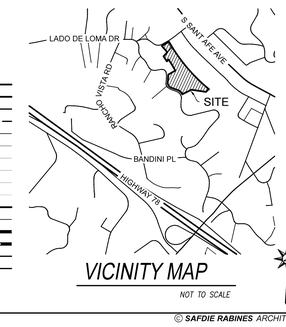
APN: 179-024-09
APN: 179-093-05
APN: 179-093-18
APN: 179-093-23
APN: 179-093-30
APN: 179-093-32
APN: 179-093-34

BASIS OF BEARINGS

THE BASIS OF BEARINGS FOR THIS SURVEY IS THE CALIFORNIA COORDIATE SYSTEM CCS 83, ZONE 6 EPOCH 1991.35 GRID BEARING BETWEEN CITY OF VISTA SURVEY CONTROL STATIONS "V2065" AND "V2031" AS DESIGNATED ON RECORD OF SURVEY NUMBER 14023.
I.E. N 17°03'57" W

VERTICAL BENCHMARK

THE BENCH MARK IS V2065 AS SHOWN ON ROS 14023. MONUMENT IS LOCATED ON THE SOUTHWESTERLY SIDE OF SOUTH SANTA FE AVENUE 10.7 FEET NORTHEASTERLY FROM THE SOUTHWESTERLY CURB LINE 250' SOUTHEASTERLY FROM MONTE VISTA DRIVE, IN FRONT OF 1131 SOUTH SANTA FE AVENUE. ELEVATION = 416.78 (NGVD29)



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P22-0282

PLANNING CASE #

KENSHO HOUSING

Vista, CA 92083

TIDELINE PARTNERS

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P: 760.295.9111

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REGISTERED PROFESSIONAL ENGINEER
WILLIAM GREGG WICK
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REVISIONS

Number	Description	Date
1	SITE DEVELOPMENT PLAN SUBMITTAL	08/08/2022
2	SDP RESUBMITTAL	10/21/2022
3	SDP RESUBMITTAL	12/21/2022

Issue Date	Scale
12/21/2022	1" = 30'
SRA Project Number	**PLSA Project Number**
2127	3599

TENTATIVE MAP

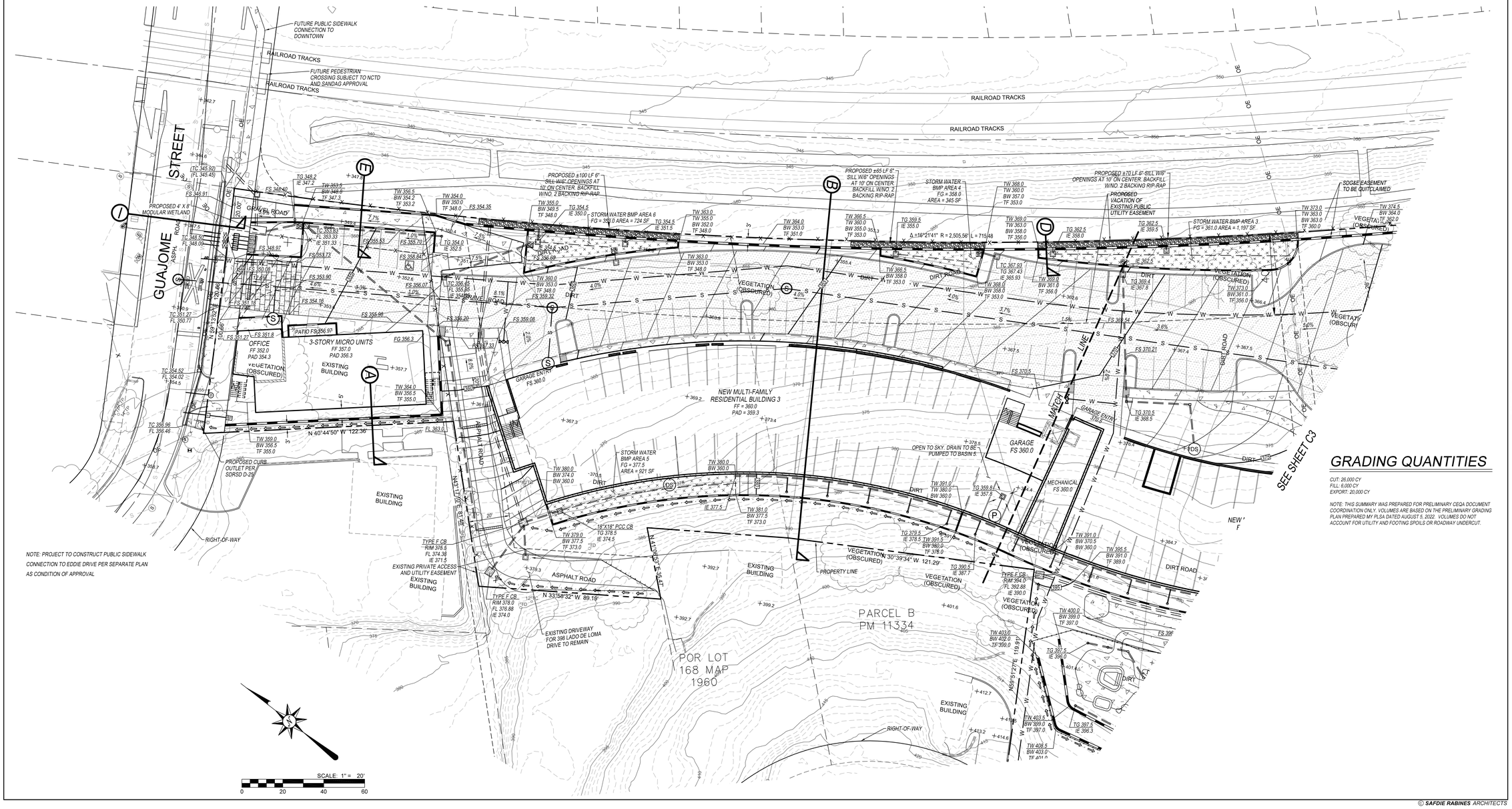
C1
9 OF 34

PRELIMINARY GRADING PLAN

KENSHO HOUSING - GUAJOME STREET

LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- CENTERLINE
- EASEMENT LINE
- EXISTING LOT LINE
- EXISTING CONTOUR (350)
- EXISTING WATER MAIN (W)
- EXISTING SEWER MAIN (S)
- EXISTING OVERHEAD ELECTRIC (OE)
- EXISTING FENCE (X)
- PROPOSED BUILDING FOOTPRINT
- PROPOSED CONTOUR (350)
- PROPOSED SHORING WALL
- PROPOSED RETAINING WALL
- PROPOSED SEWER MAIN (S)
- PROPOSED WATER MAIN (W)
- PROPOSED BROW DITCH
- PROPOSED STORM DRAIN
- PROPOSED LIMITS OF GRADING
- PROPOSED POC PAVEMENT
- PROPOSED DG PATH
- PROPOSED BMP AREA



NOTE: PROJECT TO CONSTRUCT PUBLIC SIDEWALK CONNECTION TO EDDIE DRIVE PER SEPARATE PLAN AS CONDITION OF APPROVAL

GRADING QUANTITIES

CUT: 26,000 CY
FILL: 6,000 CY
EXPORT: 20,000 CY

NOTE: THIS SUMMARY WAS PREPARED FOR PRELIMINARY CEQA DOCUMENT COORDINATION ONLY. VOLUMES ARE BASED ON THE PRELIMINARY GRADING PLAN PREPARED MY PLSA DATED AUGUST 5, 2022. VOLUMES DO NOT ACCOUNT FOR UTILITY AND FOOTING SPOILS OR ROADWAY UNDERCUT.

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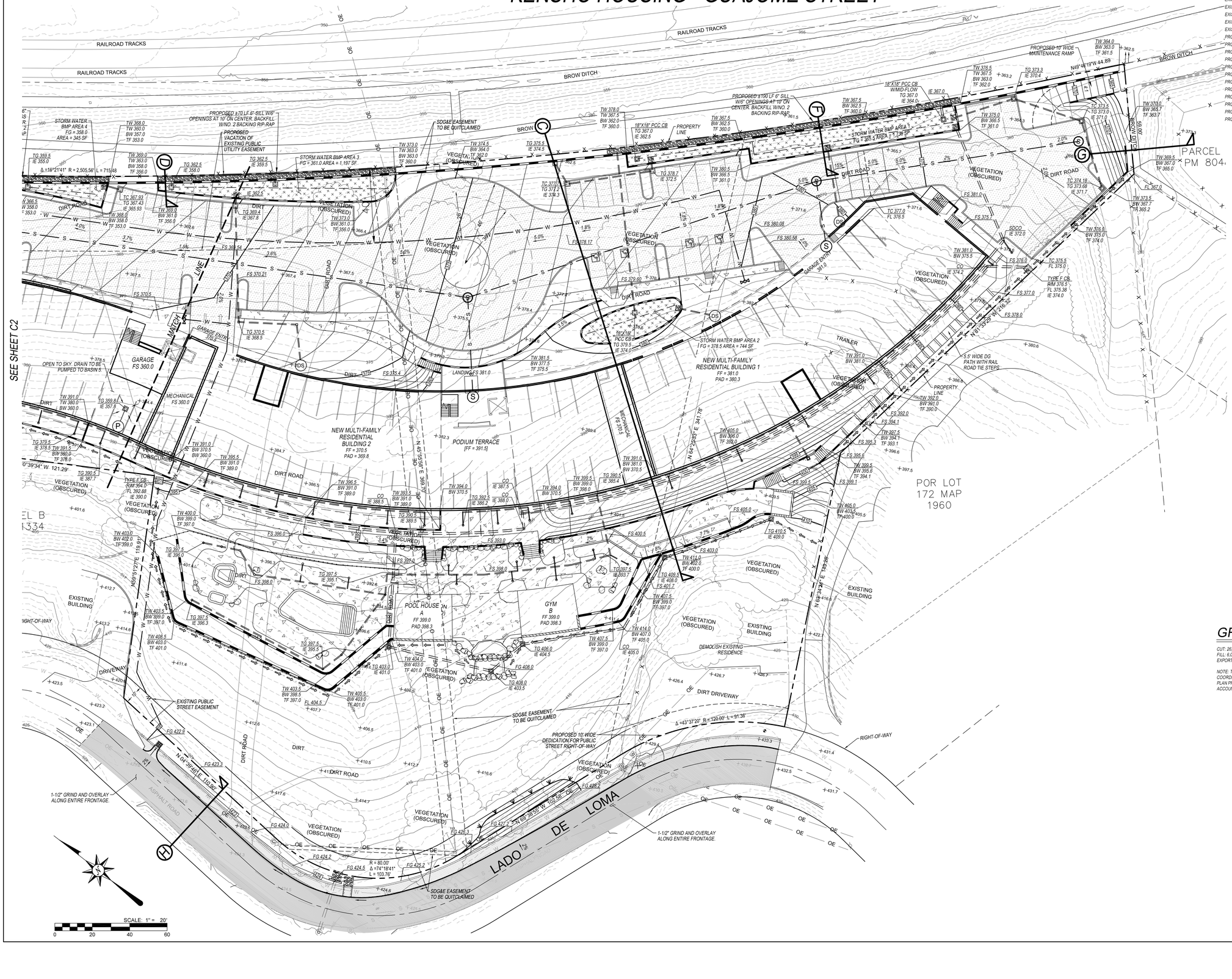
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PRELIMINARY GRADING PLAN

C2
10 OF 34

PRELIMINARY GRADING PLAN

KENSHO HOUSING - GUAJOME STREET



LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- CENTERLINE
- EASEMENT LINE
- EXISTING LOT LINE
- EXISTING CONTOUR
- EXISTING WATER MAIN
- EXISTING SEWER MAIN
- EXISTING OVERHEAD ELECTRIC
- EXISTING FENCE
- PROPOSED BUILDING FOOTPRINT
- PROPOSED CONTOUR
- PROPOSED SHORING WALL
- PROPOSED RETAINING WALL
- PROPOSED SEWER MAIN
- PROPOSED WATER MAIN
- PROPOSED BROW DITCH
- PROPOSED STORM DRAIN
- PROPOSED LIMITS OF GRADING
- PROPOSED POC PAVEMENT
- PROPOSED DG PATH
- PROPOSED BMP AREA

GRADING QUANTITIES

CUT: 26,000 CY
FILL: 6,000 CY
EXPORT: 20,000 CY

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PRELIMINARY GRADING PLAN

C3
11 OF 34

PRELIMINARY UTILITY PLAN

KENSHO HOUSING - GUAJOME STREET



LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- CENTERLINE
- EASEMENT LINE
- EXISTING LOT LINE
- EXISTING CONTOUR (350)
- EXISTING WATER MAIN (W)
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GRADING QUANTITIES

CUT: 26,000 CY
FILL: 6,000 CY
EXPORT: 20,000 CY

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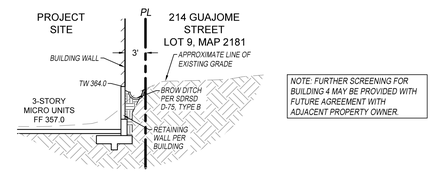
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PRELIMINARY UTILITY PLAN

C4
12 OF 34

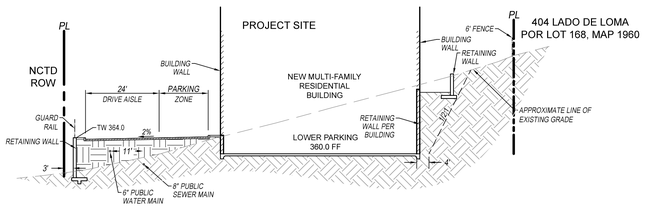
CROSS SECTIONS & DETAILS

KENSHO HOUSING - GUAJOME STREET



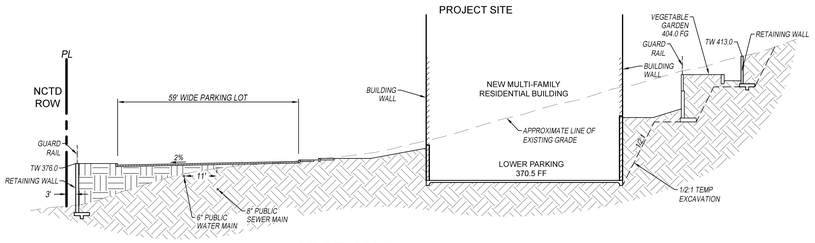
SECTION A

1" = 10'



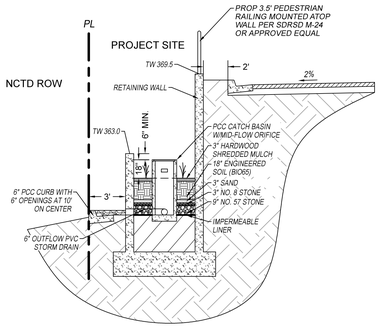
SECTION B

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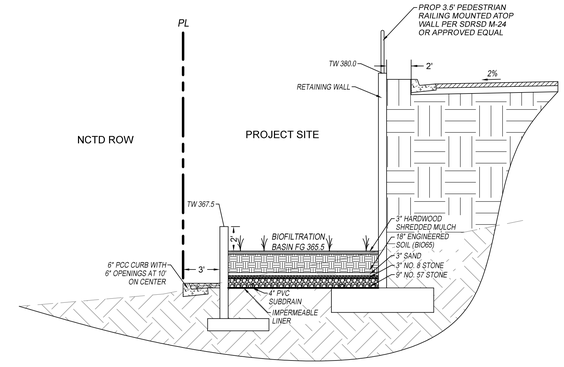
SECTION C

1" = 20'



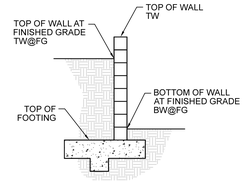
SECTION D - BIOFILTRATION

1" = 5'



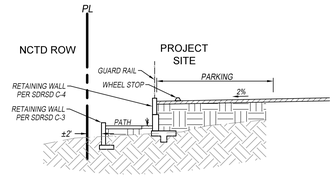
SECTION F - BIOFILTRATION

1" = 5'



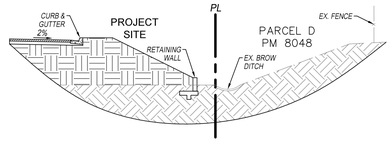
RETAINING WALL DETAIL

NOT TO SCALE



SECTION E

1" = 10'



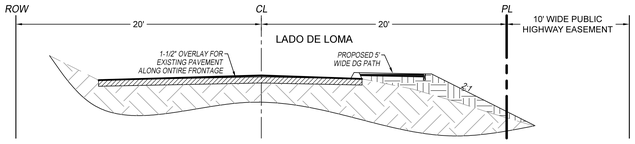
SECTION G

1" = 10'

PAVEMENT SECTIONS

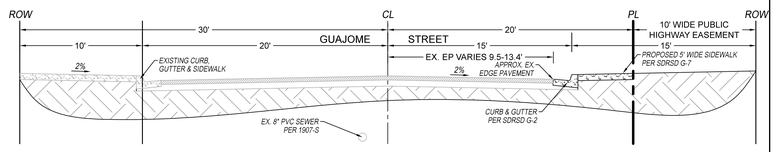
PARKING STALLS	3" AC/4" CL II BASE
DRIVE AISLES	4" AC/6" CL II BASE
FIRE LANES	4" AC/6" CL II BASE

NOTE: THESE ARE MINIMUMS. GEOTECHNICAL ENGINEER SHALL PERFORM IN-SITU "R" VALUE TESTS AND PROVIDE SECTIONS.



SECTION H - LADO DE LOMA

1" = 5'



SECTION I - GUAJOME ST.

1" = 5'

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P22-0282
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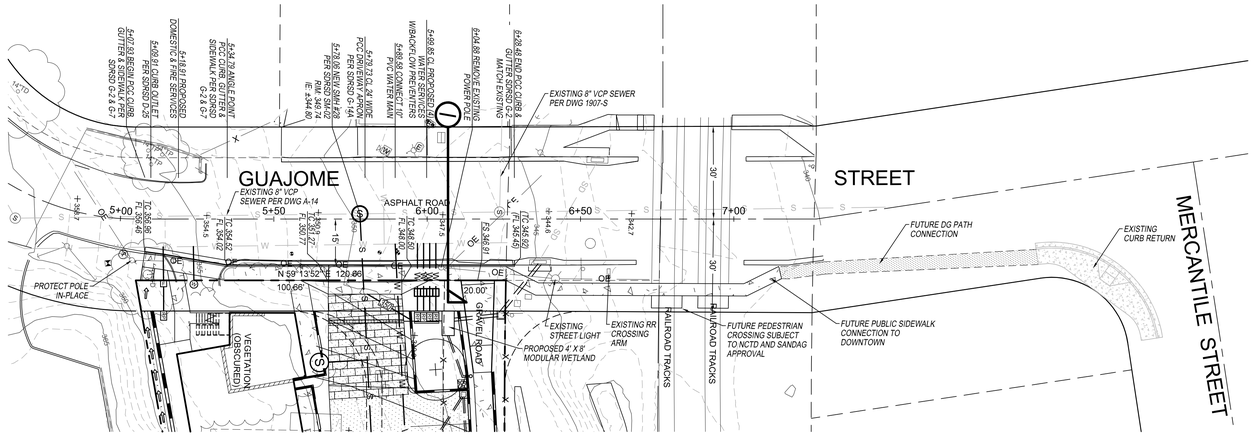
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CROSS SECTIONS AND DETAILS

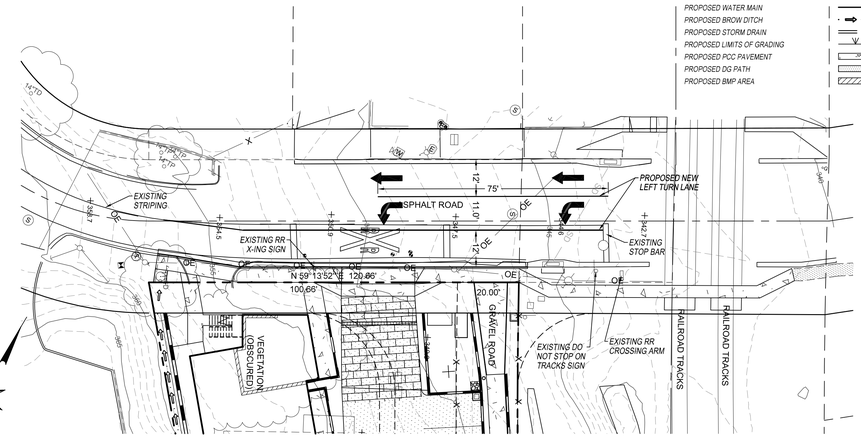
C5
13 OF 34

PRELIMINARY IMPROVEMENT PLAN

KENSHO HOUSING - GUAJOME STREET



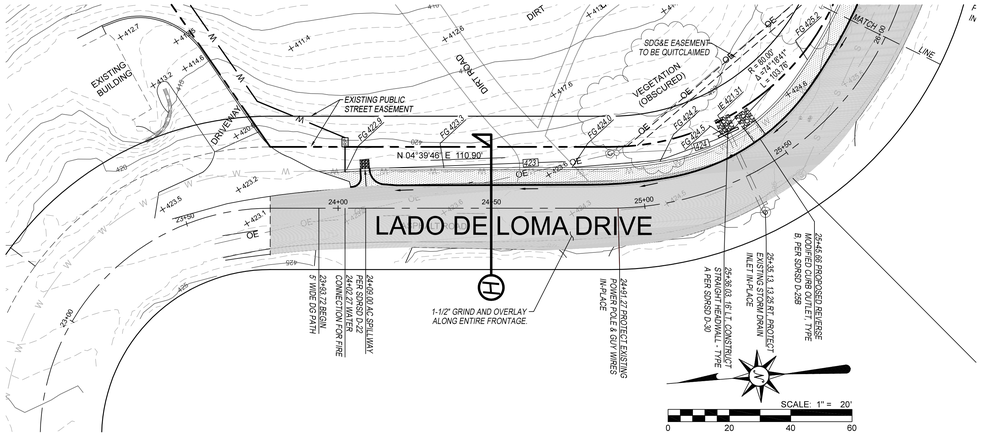
GUAJOME STREET - IMPROVEMENTS



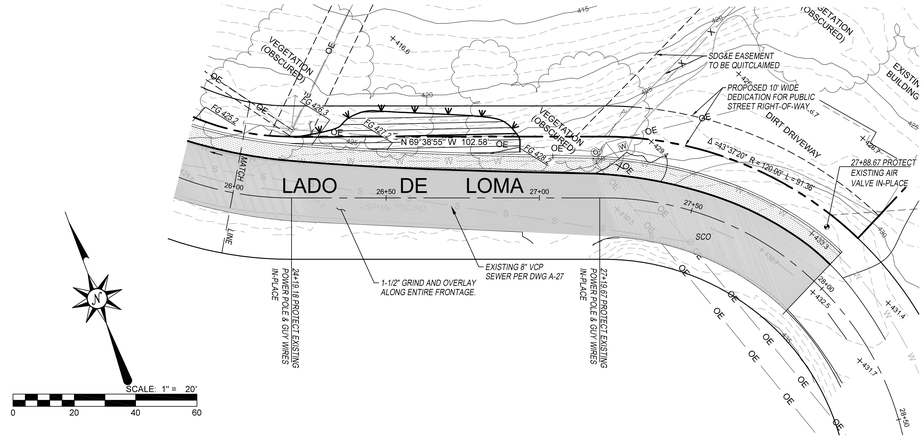
GUAJOME STREET - STRIPING

LEGEND

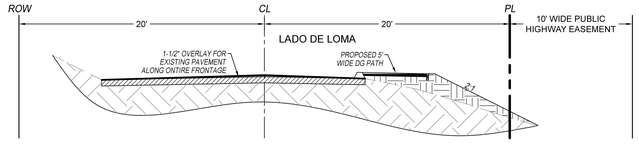
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- PROPOSED PCC PAVEMENT
- PROPOSED DG PATH
- PROPOSED BMP AREA



LADO DE LOMA

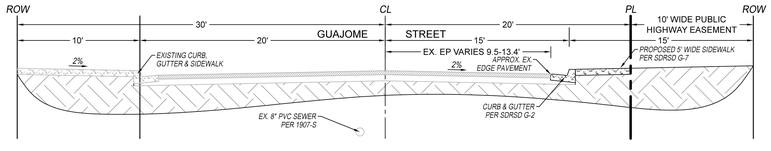


LADO DE LOMA



SECTION H - LADO DE LOMA

1" = 5'



SECTION I - GUAJOME ST.

1" = 5'

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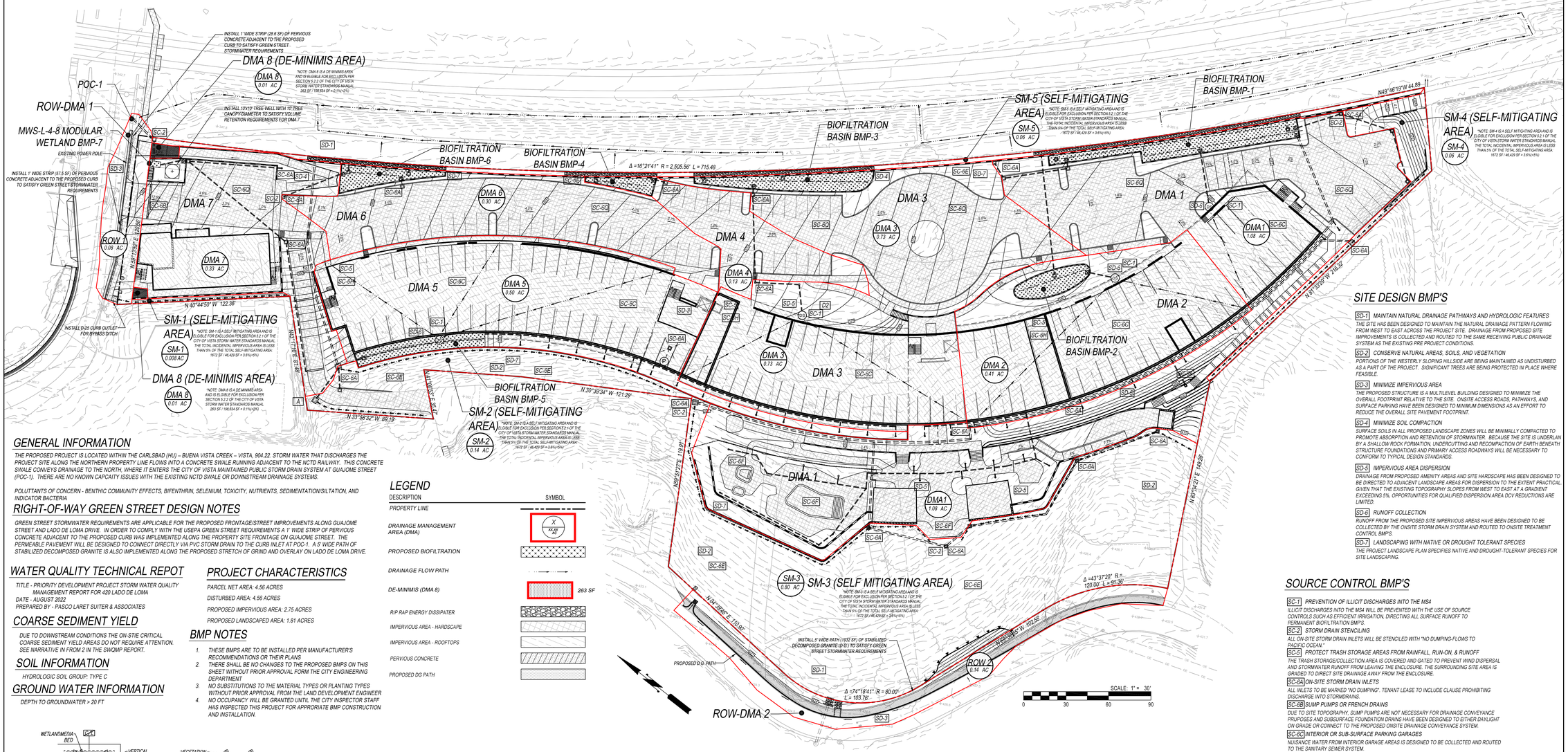
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PRELIMINARY IMPROVEMENT PLAN

C6
14 OF 34

DRAINAGE MANAGEMENT AREA & HMP EXHIBIT

KENSHO HOUSING - GUAJOME STREET



GENERAL INFORMATION

THE PROPOSED PROJECT IS LOCATED WITHIN THE CARLSBAD (HU) – BUENA VISTA CREEK – VISTA, 904.22. STORM WATER THAT DISCHARGES THE PROJECT SITE ALONG THE NORTHERN PROPERTY LINE FLOWS INTO A CONCRETE SWALE RUNNING ADJACENT TO THE NCTD RAILWAY. THIS CONCRETE SWALE CONVEYS DRAINAGE TO THE NORTH, WHERE IT ENTERS THE CITY OF VISTA MAINTAINED PUBLIC STORM DRAIN SYSTEM AT GUAJOME STREET (POC-1). THERE ARE NO KNOWN CAPCAITY ISSUES WITH THE EXISTING NCTD SWALE OR DOWNSTREAM DRAINAGE SYSTEMS.

POLUTTANTS OF CONCERN - BENTHIC COMMUNITY EFFECTS, BIFENTHRIN, SELENIUM, TOXICITY, NUTRIENTS, SEDIMENTATION/SILTATION, AND INDICATOR BACTERIA

RIGHT-OF-WAY GREEN STREET DESIGN NOTES

GREEN STREET STORMWATER REQUIREMENTS ARE APPLICABLE FOR THE PROPOSED FRONTAGE/STREET IMPROVEMENTS ALONG GUAJOME STREET AND LADO DE LOMA DRIVE. IN ORDER TO COMPLY WITH THE USEPA GREEN STREET REQUIREMENTS A 1' WIDE STRIP OF PERVIOUS CONCRETE ADJACENT TO THE PROPOSED CURB WAS IMPLEMENTED ALONG THE PROPERTY SITE FRONTAGE ON GUAJOME STREET. THE PERMEABLE PAVEMENT WILL BE DESIGNED TO CONNECT DIRECTLY VIA PVC STORM DRAIN TO THE CURB INLET AT POC-1. A 5' WIDE PATH OF STABILIZED DECOMPOSED GRANITE IS ALSO IMPLEMENTED ALONG THE PROPOSED STRETCH OF GRIND AND OVERLAY ON LADO DE LOMA DRIVE.

WATER QUALITY TECHNICAL REPOT

TITLE - PRIORITY DEVELOPMENT PROJECT STORM WATER QUALITY MANAGEMENT REPORT FOR 420 LADO DE LOMA

DATE - AUGUST 2022

PREPARED BY - PASCO LARET SUITER & ASSOCIATES

COARSE SEDIMENT YIELD

DUE TO DOWNSTREAM CONDITIONS THE ON-STIE CRITICAL COARSE SEDIMENT YIELD AREAS DO NOT REQUIRE ATTENTION. SEE NARRATIVE IN FROM 2 IN THE SWQMP REPORT.

SOIL INFORMATION

HYDROLOGIC SOIL GROUP: TYPE C

GROUND WATER INFORMATION

DEPTH TO GROUNDWATER > 20 FT

PROJECT CHARACTERISTICS

PARCEL NET AREA: 4.56 ACRES

DISTURBED AREA: 4.56 ACRES

PROPOSED IMPERVIOUS AREA: 2.75 ACRES

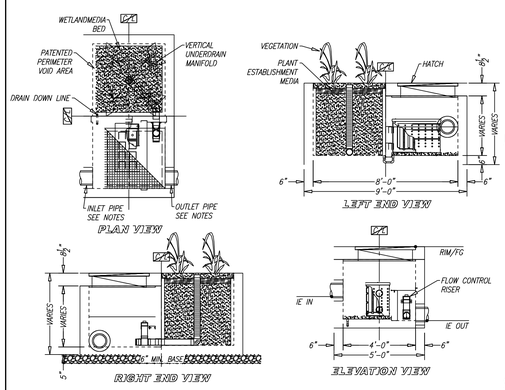
PROPOSED LANDSCAPED AREA: 1.81 ACRES

BMP NOTES

1. THESE BMPS ARE TO BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS OR THEIR PLANS
2. THERE SHALL BE NO CHANGES TO THE PROPOSED BMPS ON THIS SHEET WITHOUT PRIOR APPROVAL FORM THE CITY ENGINEERING DEPARTMENT
3. NO SUBSTITUTIONS TO THE MATERIAL TYPES OR PLANTING TYPES WITHOUT PRIOR APPROVAL FROM THE LAND DEVELOPMENT ENGINEER
4. NO OCCUPANCY WILL BE GRANTED UNTIL THE CITY INSPECTOR STAFF HAS INSPECTED THIS PROJECT FOR APPROPRIATE BMP CONSTRUCTION AND INSTALLATION.

LEGEND

DESCRIPTION	SYMBOL
PROPERTY LINE	
DRAINAGE MANAGEMENT AREA (DMA)	X XX AC
PROPOSED BIOFILTRATION	
DRAINAGE FLOW PATH	
DE-MINIMIS (DMA 8)	263 SF
RIP RAP ENERGY DISSIPATER	
IMPERVIOUS AREA - HARDSCAPE	
IMPERVIOUS AREA - ROOFTOPS	
PERVIOUS CONCRETE	
PROPOSED DG PATH	



MODULAR WETLAND TYPICAL SECTION

NTS

TREATMENT FLOW (CFS)	0.115
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	2.0
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

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.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE. (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL PIPES SHALL BE SEALED WATER TIGHT PER MANUFACTURERS STANDARD CONNECTION DETAIL.
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. VEGETATION SUPPLIED AND INSTALLED BY OTHERS. ALL UNITS WITH VEGETATION MUST HAVE DRIP OR SPRAY IRRIGATION SUPPLIED AND INSTALLED BY OTHERS.
7. CONTRACTOR RESPONSIBLE FOR CONTACTING BIO CLEAN FOR ACTIVATION OF UNIT. MANUFACTURERS WARRANTY IS VOID WITH OUT PROPER ACTIVATION BY A BIO CLEAN REPRESENTATIVE.

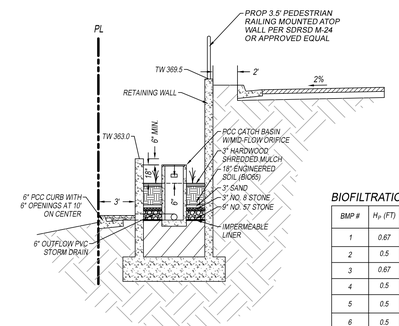
GENERAL NOTES

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

DMA DATA TABLE

DMA	TRIBUTARY AREA (AC)	IMPERV. AREA (AC)	RUNOFF COEFF.	DCV REQ'D (CU. FT.)	BMP ID	STRUCTURAL BMP TYPE
DMA-1	1.08	0.69	0.66	1676	BMP-1	BF-1
DMA-2	0.41	0.34	0.79	763	BMP-2	BF-1
DMA-3	0.73	0.59	0.77	1334	BMP-3	BF-1
DMA-4	0.13	0.11	0.79	243	BMP-4	BF-1
DMA-5	0.50	0.44	0.82	968	BMP-5	BF-1
DMA-6	0.30	0.26	0.81	582	BMP-6	BF-1
DMA-7	0.33	0.26	0.76	597	BMP-7	MODULAR WETLAND
DMA-8	0.01	0.004	0.62	-	-	DE-MINIMIS
SM-TOTAL	1.07	0.04	0.25	-	-	SELF-MIT.
*ROW DMA-1	0.08	0.06	0.73	-	-	PERVIOUS CONC.
*ROW DMA-2	0.15	0.06	0.48	-	-	D.G. PATH

*BOTH ROW DMA-1 AND ROW DMA-2 ARE EXCLUDED FROM THE ON-SITE LIMITS OF DISTURBANCE BUT SUBJECT TO THE USEPA GREEN STREET STORMWATER REQUIREMENTS. ROW DMA-1 (GUAJOME STREET IMPROVEMENTS) MEETS GREEN STREET REQUIREMENTS BY IMPLEMENTING A 1' WIDE STRIP (57.5 SF) OF PERVIOUS CONCRETE ADJACENT TO THE PROPOSED CURB ALONG THE ENTIRE PROPOSED SIDEWALK. ROW DMA-2 (LADO DE LOMA DRIVE IMPROVEMENTS) MEETS GREEN STREET REQUIREMENTS BY IMPLEMENTING A 5' WIDE PATH (1932 SF) OF STABILIZED DECOMPOSED GRANITE ALONG THE PROPOSED STRETCH OF GRIND AND OVERLAY ON LADO DE LOMA DRIVE.



BIOFILTRATION TYPICAL SECTION

NTS

BIOFILTRATION BMP SIZE & ORIFICE DIAMETER SUMMARY

BMP #	H_P (FT)	H_S (FT)	H_G (FT)	HMP ORIFICE (IN)	SLOT ORIFICE DIMENSIONS (IN)	A_{FS} (FT²)	$A_{PONDING}$ (FT²)
1	0.67	2	1	0.8125	(2) 3" H x 6" W	1738	1738
2	0.5	2	1	0.5625	(2) 2" H x 4" W	744	744
3	0.67	2	1	0.75	(2) 2" H x 3" W	1197	1197
4	0.5	2	1	0.375	(2) 2" H x 1" W	345	345
5	0.5	2	1	0.625	(2) 2" H x 5" W	921	921
6	0.5	2	1	0.5	(2) 3" H x 6" W	725	725

SITE DESIGN BMP'S

SD-1 MAINTAIN NATURAL DRAINAGE PATHWAYS AND HYDROLOGIC FEATURES
THE SITE HAS BEEN DESIGNED TO MAINTAIN THE NATURAL DRAINAGE PATTERN FLOWING FROM WEST TO EAST ACROSS THE PROJECT SITE. DRAINAGE FROM PROPOSED SITE IMPROVEMENTS IS COLLECTED AND ROUTED TO THE SAME RECEIVING PUBLIC DRAINAGE SYSTEM AS THE EXISTING PRE PROJECT CONDITIONS.

SD-2 CONSERVE NATURAL AREAS, SOILS, AND VEGETATION
PORTIONS OF THE WESTERLY SLOPING HILLSIDE ARE BEING MAINTAINED AS UNDISTURBED AS A PART OF THE PROJECT. SIGNIFICANT TREES ARE BEING PROTECTED IN PLACE WHERE FEASIBLE.

SD-3 MINIMIZE IMPERVIOUS AREA
THE PROPOSED STRUCTURE IS A MULTILEVEL BUILDING DESIGNED TO MINIMIZE THE OVERALL FOOTPRINT RELATIVE TO THE SITE. ONSITE ACCESS ROADS, PATHWAYS, AND SURFACE PARKING HAVE BEEN DESIGNED TO MINIMUM DIMENSIONS AS AN EFFORT TO REDUCE THE OVERALL SITE PAVEMENT FOOTPRINT.

SD-4 MINIMIZE SOIL COMPACTION
SURFACE SOILS IN ALL PROPOSED LANDSCAPE ZONES WILL BE MINIMALLY COMPACTED TO PROMOTE ABSORPTION AND RETENTION OF STORMWATER. BECAUSE THE SITE IS UNDERLAN BY A SHALLOW ROCK FORMATION, UNDERCUTTING AND RECOMPACTION OF EARTH BENEATH STRUCTURE FOUNDATIONS AND PRIMARY ACCESS ROADWAYS WILL BE NECESSARY TO CONFORM TO TYPICAL DESIGN STANDARDS.

SD-5 IMPERVIOUS AREA DISPERSION
DRAINAGE FROM PROPOSED AMENITY AREAS AND SITE HARDSCAPE HAS BEEN DESIGNED TO BE DIRECTED TO ADJACENT LANDSCAPE AREAS FOR DISPERSION TO THE EXTENT PRACTICAL GIVEN THAT THE EXISTING TOPOGRAPHY SLOPES FROM WEST TO EAST AT A GRADIENT EXCEEDING 5%, OPPORTUNITIES FOR QUALIFIED DISPERSION AREA DCV REDUCTIONS ARE LIMITED.

SD-6 RUNOFF COLLECTION
RUNOFF FROM THE PROPOSED SITE IMPERVIOUS AREAS HAVE BEEN DESIGNED TO BE COLLECTED BY THE ONSITE STORM DRAIN SYSTEM AND ROUTED TO ONSITE TREATMENT CONTROL BMP'S.

SD-7 LANDSCAPING WITH NATIVE OR DROUGHT TOLERANT SPECIES
THE PROJECT LANDSCAPE PLAN SPECIFIES NATIVE AND DROUGHT-TOLERANT SPECIES FOR SITE LANDSCAPING.

SOURCE CONTROL BMP'S

SC-1 PREVENTION OF ILLICIT DISCHARGES INTO THE MS4
ILLICIT DISCHARGES INTO THE MS4 WILL BE PREVENTED WITH THE USE OF SOURCE CONTROLS SUCH AS EFFICIENT IRRIGATION, DIRECTING ALL SURFACE RUNOFF TO PERMANENT BIOFILTRATION BMP'S.

SC-2 STORM DRAIN STENCILING
ALL ON-SITE STORM DRAIN INLETS WILL BE STENCILED WITH "NO DUMPING-FLOWS TO PACIFIC OCEAN."

SC-5 PROTECT TRASH STORAGE AREAS FROM RAINFALL, RUN-ON, & RUNOFF
THE TRASH STORAGE/COLLECTION AREA IS COVERED AND GATED TO PREVENT WIND DISPERSAL AND STORMWATER RUNOFF FROM LEAVING THE ENCLOSURE. THE SURROUNDING SITE AREA IS GRADED TO DIRECT SITE DRAINAGE AWAY FROM THE ENCLOSURE.

SC-6A ON-SITE STORM DRAIN INLETS
ALL INLETS TO BE MARKED "NO DUMPING". TENANT LEASE TO INCLUDE CLAUSE PROHIBITING DISCHARGE INTO STORMDRAINS.

SC-6B SUMP PUMPS OR FRENCH DRAINS
DUE TO SITE TOPOGRAPHY, SUMP PUMPS ARE NOT NECESSARY FOR DRAINAGE CONVEYANCE PRUPOSES AND SUBSURFACE FOUNDATION DRAINS HAVE BEEN DESIGNED TO EITHER DAYLIGHT ON GRADE OR CONNECT TO THE PROPOSED ONSITE DRAINAGE CONVEYANCE SYSTEM.

SC-6C INTERIOR OR SUB-SURFACE PARKING GARAGES
NUISANCE WATER FROM INTERIOR GARAGE AREAS IS DESIGNED TO BE COLLECTED AND ROUTED TO THE SANITARY SEWER SYSTEM

SC-6E LANDSCAPE / OUTDOOR PESTICIDE USE
EXISTING DROUGHT TOLERANT PLANTS TO BE PRESERVED IN LANDSCAPED AREAS WHERE FEASIBLE. PROPOSED LANDSCAPING HAS BEEN DESIGNED TO BE APPROPRIATE FOR SLOPES, CLIMATE, AND SOIL CONDITIONS SPECIFIC TO THE SITE. PESTICIDE USE IS TO BE LIMITED.

SC-6F POOLS, SPAS, PONDS, DECORATIVE FOUNTAINS, OTHER WATER FEATURES
PROPOSED POOL DECK DRAINAGE HAS BEEN DESIGNED TO BE CAPTURED BY CHANNEL DRAINS ADJACENT TO THE POOL AREA AND ROUTED TO ONSITE TREATMENT CONTROL BMP'S.

SC-6H REFUSE / TRASH COLLECTION AREAS
THE TRASH STORAGE / COLLECTION AREA IS COVERED AND GATED TO PREVENT DISPERSAL AND STORMWATER RUNOFF. THE STORAGE AREA IS GRADED TO PREVENT RUN-ON.

SC-6G FIRE SPRINKLER TEST WATER AND RELIEF POINT
THE FIRE SPRINKLER TEST WATER IS TO BE DIRECTED TO THE SANITARY SEWER PER A SEPARATE PLUMBING PLAN.

SC-6Q PLAZA, SIDEWALKS, PARKING LOTS
PARKING AREAS, WALKWAYS, AND OTHER AMENITY AREAS ON SITE ARE TO BE PERIODICALLY MAINTAINED FREE OF LITTER AND DEBRIS. DRAINAGE FROM THESE AREAS WILL BE COLLECTED AND ROUTED TO ONSITE PERMANENT TREATMENT CONTROL BMP'S.

OTHER BMP SUMMARY

BMP #	BMP TYPE	BMP AREA	BMP OUTLET	OULET PIPE
BMP 7	MODULAR WETLAND SYSTEM MWS L-4-8-V	4'x8'	6" OVERFLOW DRAIN	12"
	TREE WELL	10 FT TREE	--	--

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P22-0282
PLANNING CASE #

KENSHO HOUSING

Vista, CA 92083

TIDELINE PARTNERS

OWNER:
TIDELINE PARTNERS
2148 JIMMY DURANTE BLVD, STE B
SAN DIEGO, CA 92014
P: 760.295.9111

PROJECT TEAM

SAFDIE RABINES ARCHITECTS

ARCHITECT
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925 Fort Stockton Drive
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www.safdierabines.com

CIVIL ENGINEER
PASCO LARET SUITER & ASSOCIATES
1911 San Diego Ave
San Diego, CA 92110
P: 858.259.8212

LANDSCAPE ARCHITECT
Schmidt Design Group
1310 Rosecrans Street, Suite G
San Diego, CA 92106
P: 619.236.1462

REGISTERED PROFESSIONAL ENGINEER — WILLIAM GREGG MASK — No. 73620 — CIVIL — STATE OF CALIFORNIA

REVISIONS

Number	Description	Date
1	SITE DEVELOPMENT PLAN SUBMITTAL	08/08/2022
2	SDP RESUBMITTAL	10/21/2022
3	SDP RESUBMITTAL	12/21/2022

Issue Date	Scale
12/21/2022	1" = 30'
SRA Project Number	PLSA Project Number
2127	3599

PASCO LARET SUITER & ASSOCIATES
San Diego | Solana Beach | Orange County
Phone 858.259.8212 | www.plsaengineering.com

DRAINAGE MANAGEMENT AREA & HMP EXHIBIT

C7
15 OF 34

SLOPE ANALYSIS

KENSHO HOUSING - GUAJOME STREET

BASIS OF BEARINGS

THE BASIS OF BEARINGS FOR THIS SURVEY IS THE CALIFORNIA COORDIATE SYSTEM CCS 83, ZONE 6 EPOCH 1991.35 GRID BEARING BETWEEN CITY OF VISTA SURVEY CONTROL STATIONS "V2065" AND "V2031" AS DESIGNATED ON RECORD OF SURVEY NUMBER 14023. I.E. N 17°03'53" W

VERTICAL BENCHMARK

THE BENCH MARK IS V2065 AS SHOWN ON ROS 14023. MONUMENT IS LOCATED ON THE SOUTHWESTERLY SIDE OF SOUTH SANTA FE AVENUE 10.7 FEET NORTHEASTERLY FROM THE SOUTHWESTERLY CURB LINE 250' SOUTHEASTERLY FROM MONTE VISTA DRIVE, IN FRONT OF 1131 SOUTH SANTA FE AVENUE. ELEVATION = 416.78' (NGVD29)

TOPOGRAPHY

TOPOGRAPHY PREPARED BY PASCO LARET SUITER & ASSOCIATES DATED MARCH 3, 2022.
119 ABERDEEN DRIVE
CARDIFF-BY-THE -SEA, CA 92007
858-259-8212

LEGEND

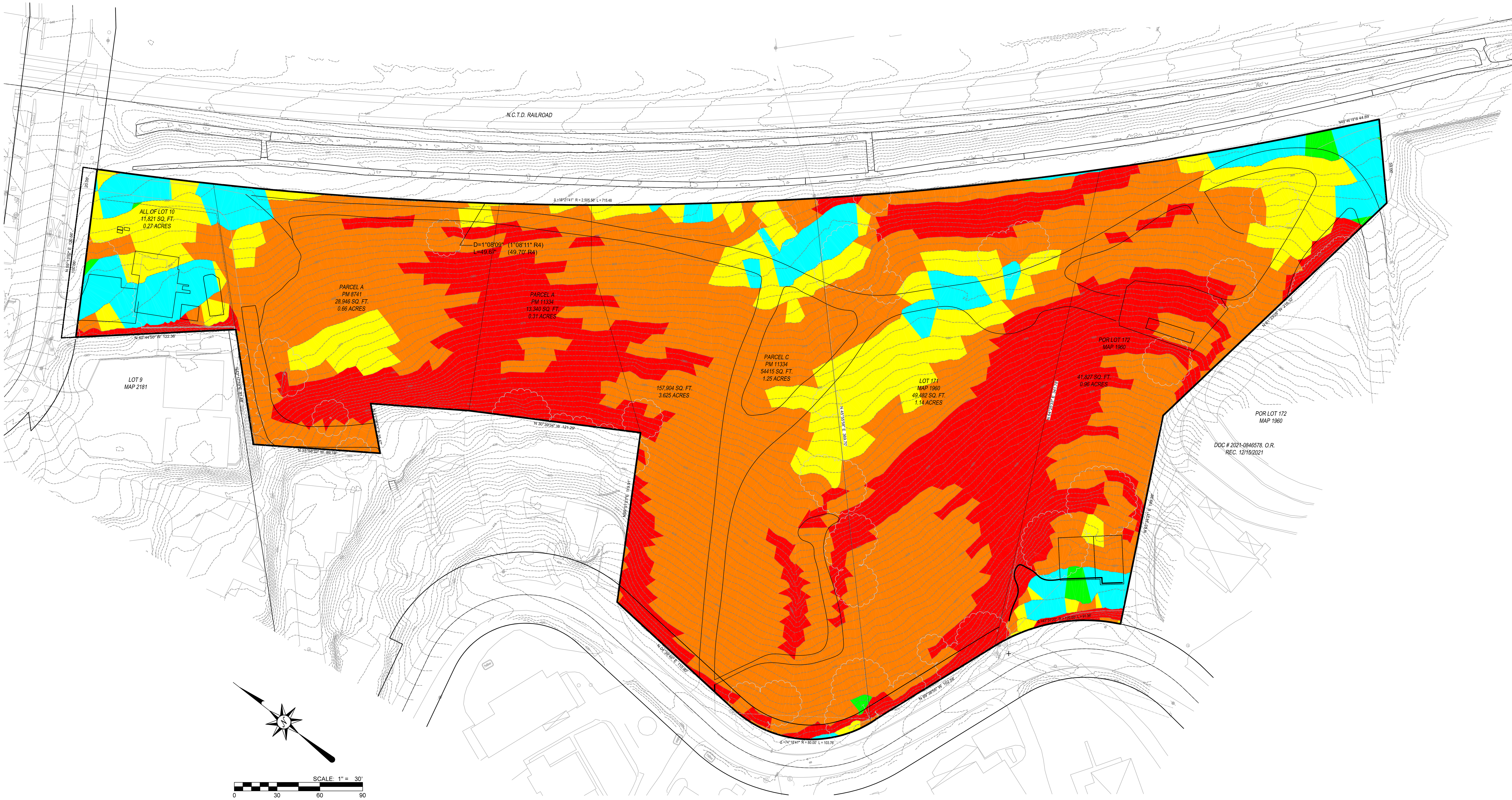
SUBDIVISION BOUNDARY

EXISTING DISTURBED AREA

SLOPE ANALYSIS TABLE

SLOPE RANGE (MIN -MAX)	AREA (AC)	PERCENTAGE OF SITE	COLOR LEGEND
0%-5%	0.02	0.44%	green
6%-10%	0.33	7.28%	cyan
11%-15%	0.58	12.68%	yellow
16%-25%	2.38	52.17%	orange
25% +	1.25	27.43%	red

SLOPE SUMMARY:
AVERAGE SLOPE FOR THE NET AREA OF THIS PROJECT IS 21.6%
TOTAL PROJECT AREA: 4.56 ACRES NET



P22-0282
PLANNING CASE #

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REGISTERED PROFESSIONAL ENGINEER
WILLIAM GREGG MACK
No. 73620
CIVIL
STATE OF CALIFORNIA

REVISIONS

Number	Description	Date
1	SITE DEVELOPMENT PLAN SUBMITTAL	08/08/2022
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3	SDP RESUBMITTAL	12/21/2022

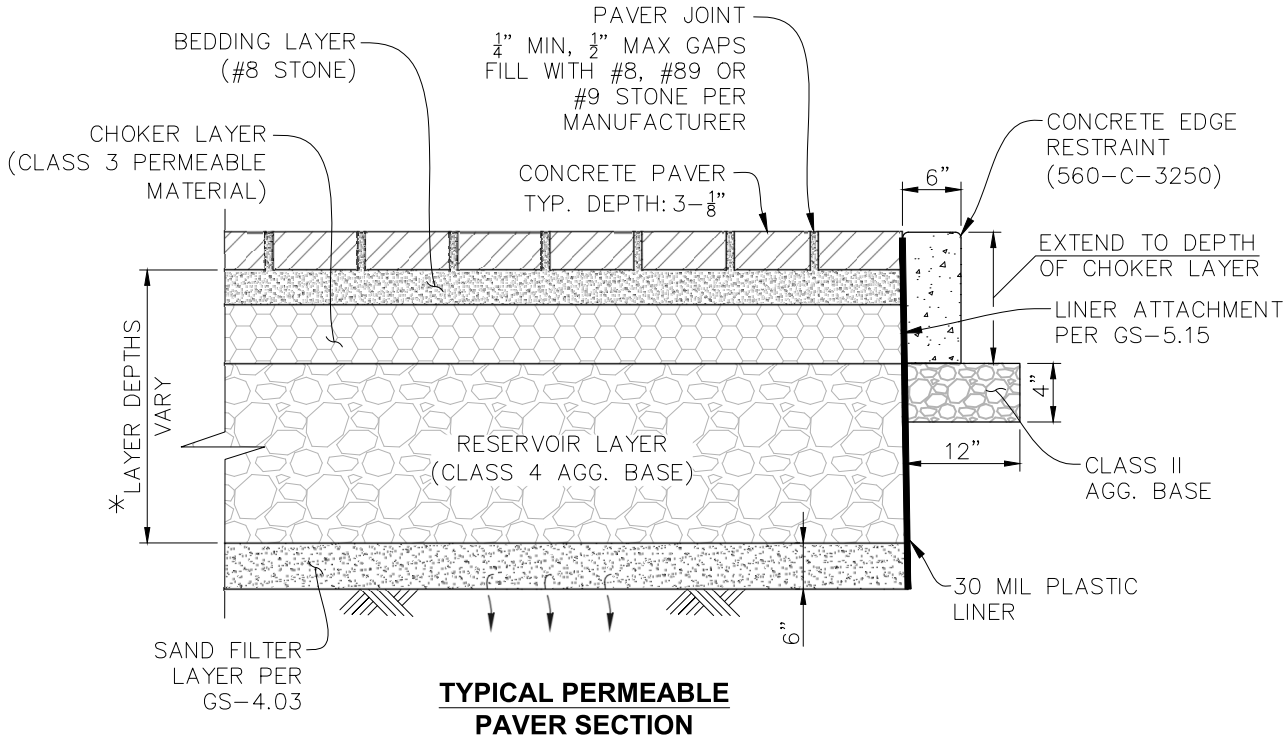
Issue Date: 12/21/2022
Scale: 1" = 30'
SRA Project Number: 2127
PLSA Project Number: 3599

SLOPE ANALYSIS

C8

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*LAYER DEPTHS ARE PROJECT-SPECIFIC AND SHALL BE DESIGNED PER GEOTECHNICAL RECOMMENDATIONS & TRAFFIC LOADING REQUIREMENTS. RESERVOIR LAYER DEPTH SHALL ADDRESS NOTE 5.



TYPICAL PERMEABLE PAVER SECTION

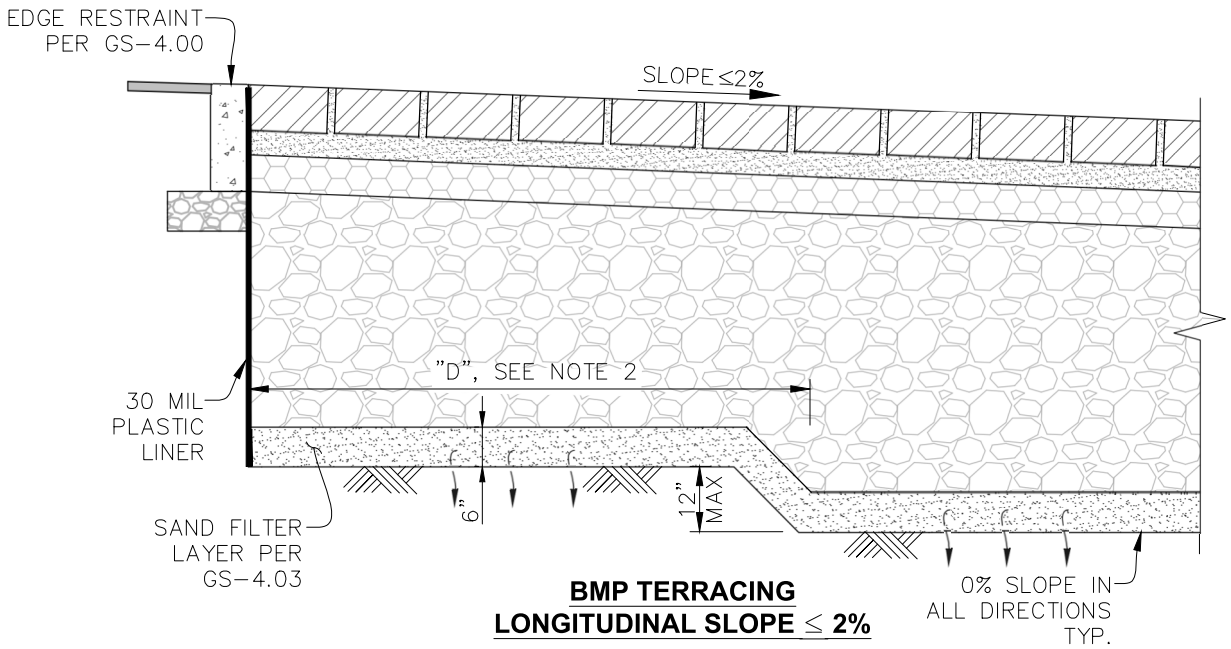
NOTES:

1. STREET IMPROVEMENTS AND DRAINAGE STRUCTURES SHALL BE CONSTRUCTED ACCORDING TO THE LATEST SAN DIEGO REGIONAL STANDARD DRAWINGS AND CALTRANS STANDARD PLANS.
2. REFERENCE COUNTY BMP DESIGN MANUAL FACT SHEETS SD-D & INF-3 "PERMEABLE PAVEMENT" FOR DESIGN APPROACH.
3. THE CALTRANS PERVIOUS PAVEMENT DESIGN GUIDANCE DOCUMENT (DATED MAY 2016) SHALL BE REFERENCED WHERE APPROPRIATE FOR DESIGNS INVOLVING PERVIOUS ASPHALT & PERVIOUS CONCRETE PAVEMENTS.
4. REFER TO GS-4.03 FOR PERMEABLE PAVEMENT SUBSURFACE DRAINAGE TYPES.
5. DEPTH OF RESERVOIR LAYER (PER THE DESIGN PLANS) SHALL ADDRESS STORMWATER RETENTION REQUIREMENTS AS WELL AS THE STRUCTURAL PAVEMENT DESIGN REQUIREMENTS. ENGINEER TO DESIGN SYSTEM TO ACHIEVE STORAGE, DRAW-DOWN, AND STRUCTURAL REQUIREMENTS.
6. AN ENHANCED DESIGN CONTAINS A WATER STORAGE LAYER AND AN INFILTRATION SUMP BENEATH THE UNDERDRAIN PIPE (SEE GS-4.03) WHICH IS SIZED TO DRAIN THE DESIGN STORM WITHIN 96 HOURS.
7. WHERE IN-SITU SOILS ARE NOT CONDUCIVE TO INFILTRATION OF DESIGN STORM VOLUMES WITHIN 96 HOURS; UNDERDRAIN SYSTEMS SHALL BE CONSIDERED THROUGH COORDINATION WITH THE COUNTY.
8. BOTTOM OF RESERVOIR LAYER SHALL BE AT LEAST 10' ABOVE THE SEASONAL HIGH WATER TABLE OR 2' ABOVE THE BEDROCK ELEVATION (AS DETERMINED BY THE GEOTECHNICAL INVESTIGATION).
9. WHEN SAND FILTER LAYER IS OMITTED, PROVIDE GEOTEXTILE BENEATH THE RESERVOIR LAYER PER PROJECT-SPECIFIC GEOTECHNICAL RECOMMENDATIONS.
10. SEAL PLASTIC LINER TO ADJACENT IMPROVEMENTS AND EDGE RESTRAINTS PER GS-5.15. LINER TO EXTEND THE FULL DEPTH OF THE BMP AS SHOWN.
11. OTHER DESIGN ALTERNATIVES MAY BE CONSIDERED SUCH AS MODULAR PERVIOUS PAVEMENT, PERMEABLE CONCRETE PAVING SLABS & POROUS GUTTER SYSTEMS WHERE APPROPRIATE PENDING APPROVAL BY THE COUNTY.
12. CONCRETE SHALL BE 520-C-2500 UNLESS OTHERWISE SPECIFIED.

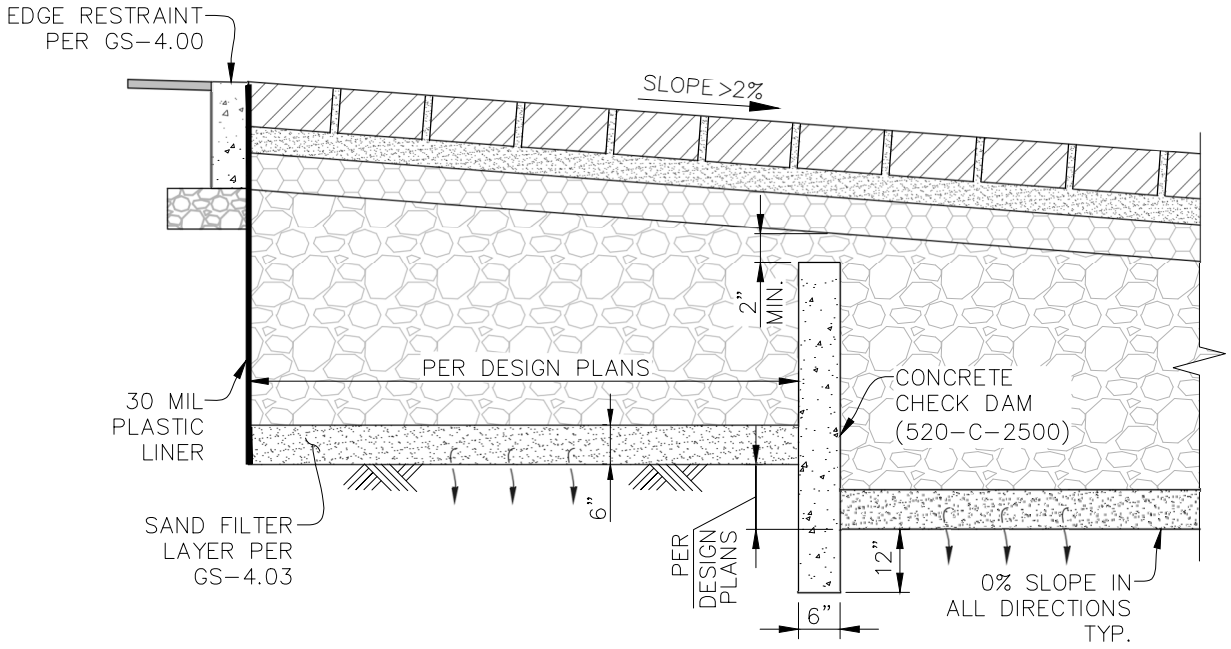
DRAWING NOT TO SCALE

DRAWN BY: NWB	CHECKED BY: KBK	SAN DIEGO COUNTY DESIGN STANDARD
RECOMMENDED BY: CHARLES MOHRLOCK, P.E.		
APPROVED BY COUNTY ENGINEER		PERMEABLE PAVEMENT GENERAL DESIGN GUIDANCE
WP Morgan DATE: 3/15/21		
WILLIAM P. MORGAN, P.E. R.C.E. NO. 49452, EXP 9/30/2022		DRAWING NUMBER GS-4.00

REVISIONS	APPROVED	DATE
ORIGINAL		10-01-2019
REVISED		03-08-2021



BMP TERRACING
LONGITUDINAL SLOPE ≤ 2%



BMP TERRACING
LONGITUDINAL SLOPE > 2%

NOTES:

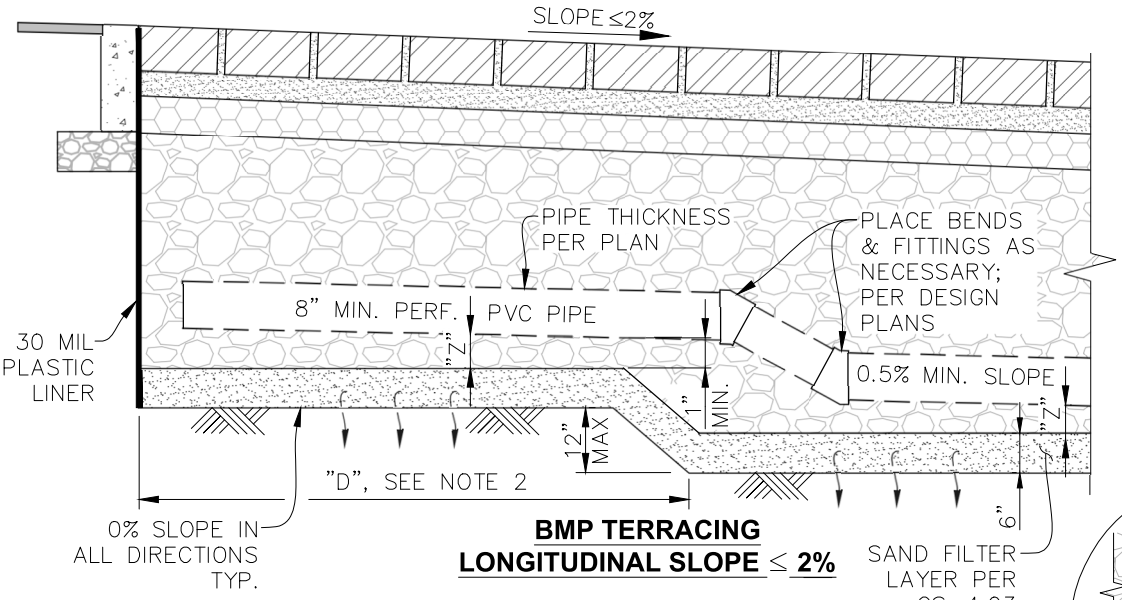
1. REFER TO GS-4.00 FOR ALL DETAILS NOT SHOWN HERE.
2. DISTANCE "D" IS DETERMINED BY THE SURFACE SLOPE, WHICH RESULTS IN 12" MAX STEPS.
3. CHECK DAMS TO BE USED FOR INSTALLATIONS WITH SURFACE SLOPES GREATER THAN 2% OR AS DIRECTED BY THE PROJECT-SPECIFIC DESIGN PLANS.
4. SURFACE SLOPES GREATER THAN 5% ARE NOT RECOMMENDED AND REQUIRE APPROVAL BY THE COUNTY.
5. ALTHOUGH PERVIOUS PAVERS ARE DEPICTED, THE SAME DESIGN CONCEPTS CAN BE UTILIZED FOR PERVIOUS ASPHALT & CONCRETE PAVEMENTS. REFERENCE THE CALTRANS PERVIOUS PAVEMENT DESIGN GUIDANCE DOCUMENT (DATED MAY 2016) WHERE APPROPRIATE.

DRAWING NOT TO SCALE

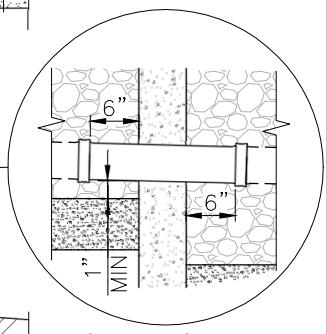
DRAWN BY: NWB	CHECKED BY: KBK	SAN DIEGO COUNTY DESIGN STANDARD	
RECOMMENDED BY: CHARLES MOHRLOCK, P.E.			
APPROVED BY COUNTY ENGINEER		PERMEABLE PAVEMENT ELEVATIONS	
WP Morgan DATE: 3/15/21			
WILLIAM P. MORGAN, P.E. R.C.E. NO. 49452, EXP 9/30/2022			

REVISIONS	APPROVED	DATE
ORIGINAL		10-01-2019
REVISED		03-08-2021

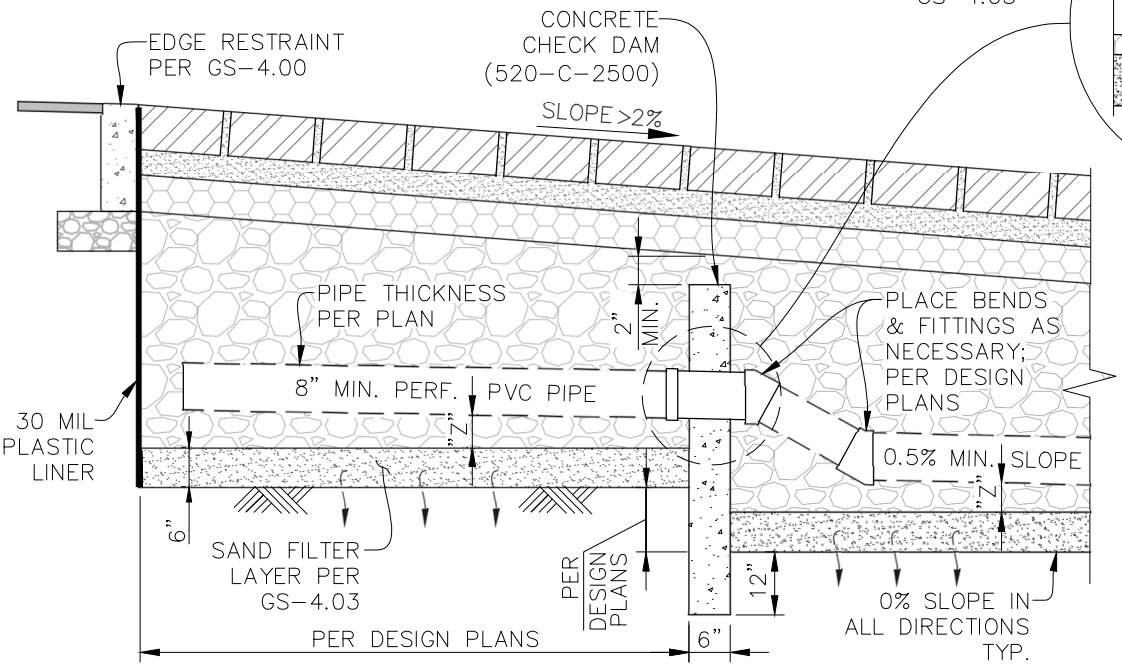
DRAWING NUMBER **GS-4.01**



BMP TERRACING
LONGITUDINAL SLOPE ≤ 2%



NON-PERFORATED PIPE PENETRATION



BMP TERRACING
LONGITUDINAL SLOPE > 2%

NOTES:

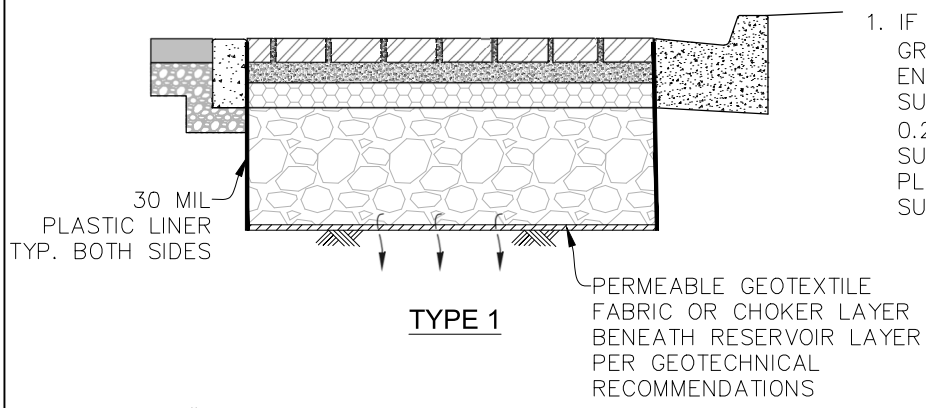
1. REFER TO GS-4.00 FOR ALL DETAILS NOT SHOWN HERE.
2. DISTANCE "D" IS DETERMINED BY THE SURFACE SLOPE, WHICH RESULTS IN 12" MAX STEPS.
3. CHECK DAMS TO BE USED FOR INSTALLATIONS WITH SURFACE SLOPES GREATER THAN 2% OR AS DIRECTED BY THE PROJECT-SPECIFIC DESIGN PLANS.
4. SURFACE SLOPES GREATER THAN 5% ARE NOT RECOMMENDED AND REQUIRE APPROVAL BY THE COUNTY.
5. ALTHOUGH PERVIOUS PAVERS ARE DEPICTED, THE SAME DESIGN CONCEPTS CAN BE UTILIZED FOR PERVIOUS ASPHALT & CONCRETE PAVEMENTS. REFERENCE THE CALTRANS PERVIOUS PAVEMENT DESIGN GUIDANCE DOCUMENT (DATED MAY 2016) WHERE APPROPRIATE.
6. AVERAGE STORAGE DEPTH "Z" SHALL BE MAINTAINED PER TERRACE ELEVATION TO ACHIEVE PROJECT-SPECIFIC STORMWATER RETENTION REQUIREMENTS.

DRAWING NOT TO SCALE

DRAWN BY: NWB	CHECKED BY: KBK	SAN DIEGO COUNTY DESIGN STANDARD	
RECOMMENDED BY: CHARLES MOHRLOCK, P.E.			
APPROVED BY COUNTY ENGINEER		PERMEABLE PAVEMENT ELEVATIONS W/ UNDERDRAIN	
WP Morgan DATE: 3/15/21			
WILLIAM P. MORGAN, P.E. R.C.E. NO. 49452, EXP 9/30/2022			

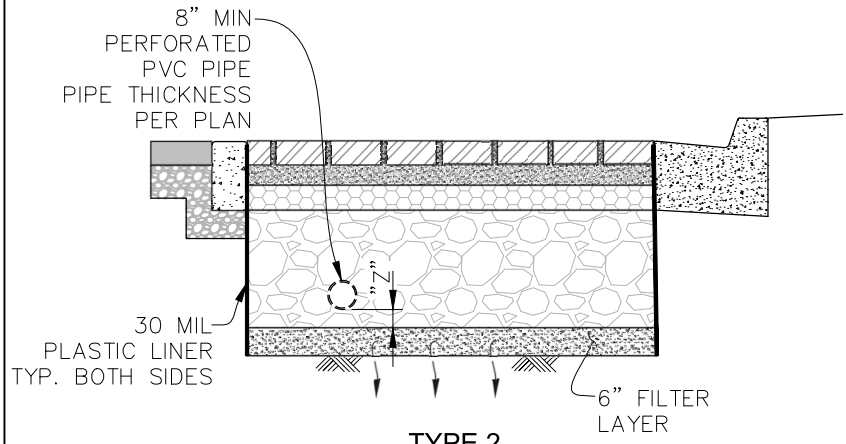
REVISIONS	APPROVED	DATE
ORIGINAL		10-01-2019
REVISED		03-08-2021

DRAWING NUMBER **GS-4.02**



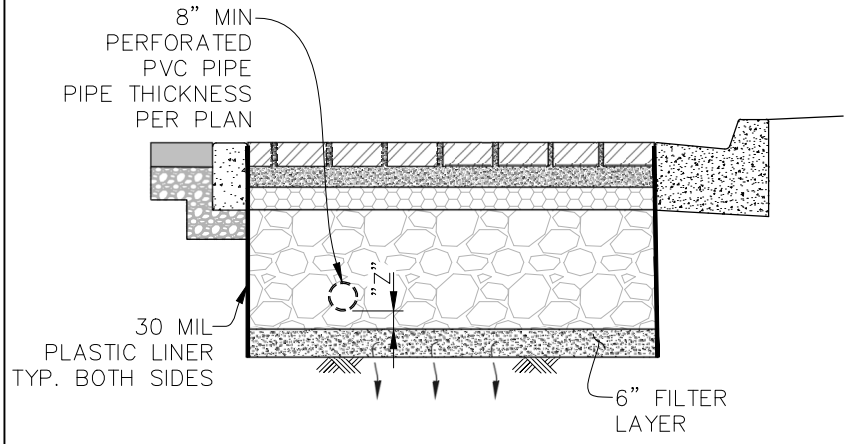
TYPE 1

1. IF NRCS HYDROLOGIC SOIL GROUP "A" OR "B" IS ENCOUNTERED, OR IF THE DESIGN SUBSOIL INFILTRATION RATE IS 0.2 IN/HR OR GREATER; SUBSURFACE LAYERS MAY BE PLACED OVER UNCOMPACTED SUBGRADE.



TYPE 2

2. IF NRCS HYDROLOGIC SOIL GROUP "C" IS ENCOUNTERED, OR IF THE DESIGN SUBSOIL INFILTRATION RATE IS BETWEEN 0.1 AND 0.2 IN/HR; SUBSURFACE LAYERS SHALL BE PLACED OVER 6 INCHES OF SAND OVER UNCOMPACTED SUBGRADE.
   - WHERE IN-SITU SOILS ARE NOT CONDUCIVE TO INFILTRATION OF DESIGN STORM VOLUMES WITHIN 96 HOURS; UNDERDRAIN SYSTEMS SHALL BE CONSIDERED THROUGH COORDINATION WITH THE COUNTY.
   - INFILTRATION SUMP "Z" TO BE DESIGNED PER PLANS.



TYPE 3

3. IF NRCS HYDROLOGIC SOIL GROUP D IS ENCOUNTERED, OR IF THE DESIGN SUBSOIL INFILTRATION RATE IS LESS THAN 0.1 IN/HR; AN UNDERDRAIN PIPE SHALL BE EMBEDDED WITHIN THE RESERVOIR LAYER & CONNECTED TO A NEARBY STORM DRAIN SYSTEM PER GS-5.12 & GS-5.13.
   - WHERE IN-SITU SOILS ARE NOT CONDUCIVE TO INFILTRATION OF DESIGN STORM VOLUMES WITHIN 96 HOURS; UNDERDRAIN SYSTEMS SHALL BE CONSIDERED THROUGH COORDINATION WITH THE COUNTY.
   - INFILTRATION SUMP "Z" TO BE DESIGNED PER PLANS.

NOTES:

1. REFER TO GS-4.00 FOR ALL DETAILS NOT SHOWN HERE.
2. THE DESIGN SUBSOIL INFILTRATION RATE IS EQUAL TO THE MEASURED INFILTRATION RATE MULTIPLIED BY A FACTOR OF SAFETY. SEE COUNTY BMP DESIGN MANUAL APPENDIX D FOR FURTHER DETAILS.
3. FULLY-LINED PERMEABLE PAVEMENT SYSTEMS ARE CONSIDERED FLOW-THROUGH TREATMENT DEVICES AND CAN ONLY BE USED FOR HMP FLOW CONTROL. NO POLLUTANT CONTROL CREDITS CAN BE CLAIMED.

DRAWING NOT TO SCALE

DRAWN BY: NWB	CHECKED BY: KBK	SAN DIEGO COUNTY DESIGN STANDARD	
RECOMMENDED BY: CHARLES MOHRLOCK, P.E.			
APPROVED BY COUNTY ENGINEER DATE: 3/15/21 WILLIAM P. MORGAN, P.E. R.C.E. NO. 49452, EXP 9/30/2022		PERMEABLE PAVEMENT SUBSURFACE DRAINAGE TYPES	

REVISIONS	APPROVED	DATE
ORIGINAL		10-01-2019
REVISED		03-08-2021

DRAWING NUMBER **GS-4.03**