
Stormwater Control Plan

For

532 Center Street Affordable Housing

532 Center Street
Santa Cruz, California

By: Matthew Regan
Reviewed By: Richard Tso, RCE #60628

January 2022

Job # 21015



IFLAND
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5300 Soquel Avenue Suite 101
Santa Cruz, CA 95062
(831) 426-5313 FAX (831) 426-1763
www.iflandengineers.com

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I. Introduction

The purpose of this report is to outline the design methodology used in sizing the stormwater mitigation facilities for the subject project that are consistent with Chapter 6B of the Best Management Practices Manual for the City's Stormwater Management Program. The City requirements are based on the minimum design standards from Chapter E.12.d "Source Control Measures" of the State of California General Permit for Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems (Water Quality Order No. 2013-0001-DWQ) and the Central Coast Post-Construction Storm Water Management Requirements for Development Projects adopted by the Central Coast Regional Water Quality Control Board (Resolution No. R3-2013-0032).

II. Project Site Assessment Summary

A. Site Topography

Existing elevations onsite vary from approximately 14.3' at the northeast corner, to 12.4' near the southwest corner, with slopes generally less than 1%. The site is currently developed as a paved public parking lot with access points to both Cedar Street and Center Street.

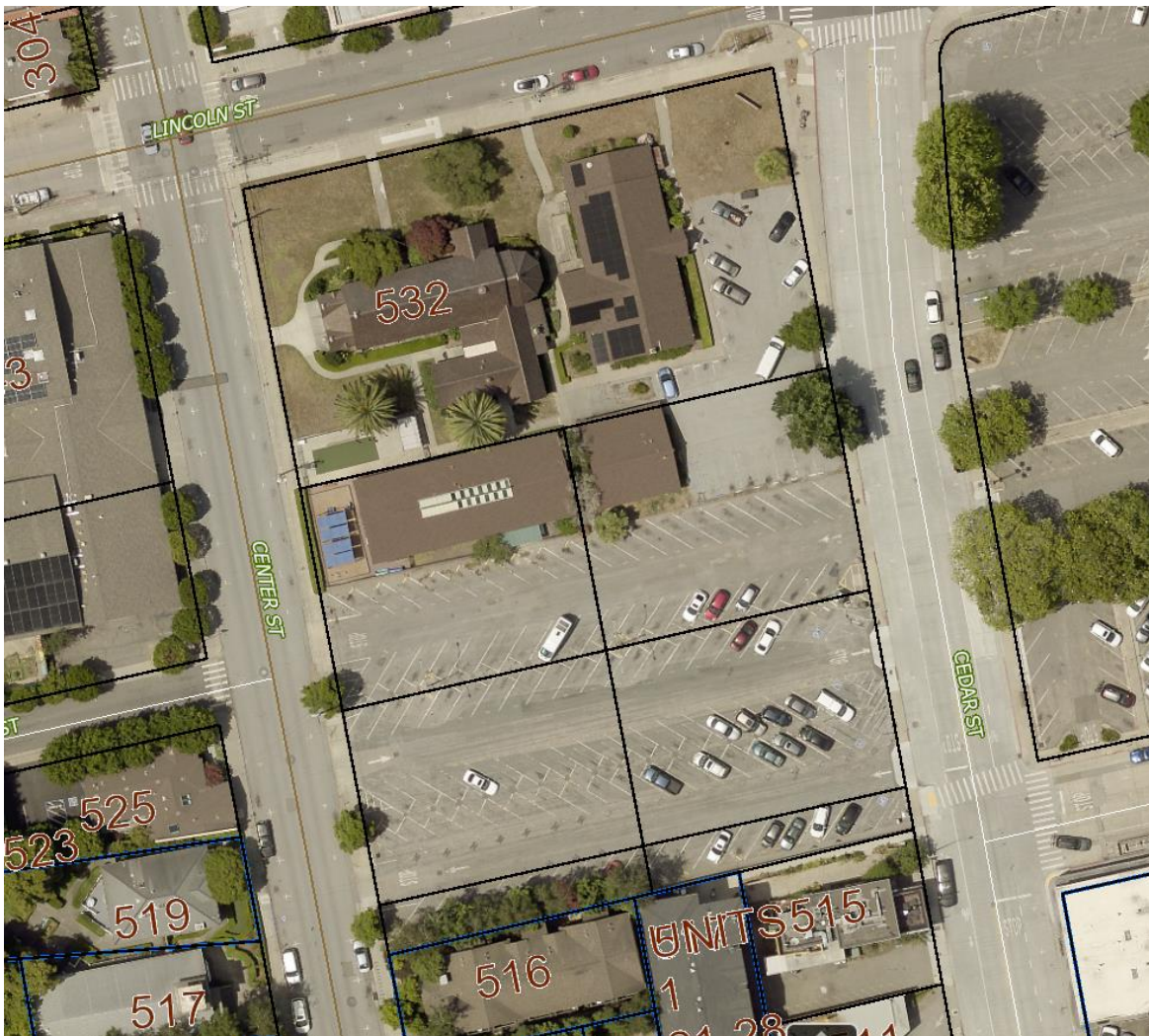


Figure 1 – Site Location Map

Not to scale – Source: City of Santa Cruz GIS, 2020

B. Geology and soil types

The NRCS classifies soil in the site area as the following map unit symbols:

- 104 – Baywood loamy sand, 0 to 2 percent slopes (100% of site)

The NRCS estimates saturated conductivity (Ksat) of the limiting layer of soil at varying levels ranging from approximately 6 inches/hour to approximately 20 inches/hour. See Appendix B for NRCS Web Soil Survey Data.

As of the date of this report, a Geotechnical Investigation has not yet been performed.

To be conservative, we have used a saturated conductivity of 2 inches/hour in the stormwater system sizing calculations.

C. Hydrologic Considerations

The site is located on a fully developed public parking lot as described above. There are no natural features such as wetlands or springs and no drinking water wells are located in the vicinity of the project site.

D. Natural Areas

There are no naturally undisturbed areas on the site.

E. Other Site Features and Constraints

There are no known sources of off-site run-on to the property. Although the site is located within an Urban Sustainability Area (USA), the project design is such that it does not qualify for certain reductions and/or exemptions for stormwater retention and detention.

Following water quality treatment, retention, and detention, runoff from the site will be discharged to the existing public drainage system within Center Street.

III. Project Storm Water Performance Criteria and Drainage Management

A. Development Area and BMP Requirement Tier

Based on the area breakdown provided in Appendix A of this report, the project is considered a Tier 4 category project.

B. Drainage Management Areas (DMA's)

Based upon site improvements and drainage requirements, the site is in two DMAs (see Appendix C).

DMA-1 consists of the northern portion of the building and the paved alley and parking stalls to the north of the building. The impervious area in DMA-1 totals 17,103 square feet (SF). Run-off from DMA-1 is captured and conveyed to SCM-1. See Section IV for a description of SCM-1.

DMA-2 consists of the southern portion of the building and the paved courtyards to the south of the building, as well as the paved public paseo adjacent to the southern property line of the project site. The impervious area in DMA-2 totals 15,428 SF. Run-off from DMA-2 is captured and conveyed to SCM-2. See Section IV for a description of SCM-2.

IV. Site Design and SCM's

A. Summary of Site Design and Runoff Reduction Measures included in the Project (Tier 1)

To minimize runoff and pollution from the development, a number of design considerations and Low Impact Development (LID) methods have been implemented including:

1. Parking has been limited to only the required number of spaces.
2. Patios and walkways will drain into landscaped areas for treatment to the extent feasible.
3. Site runoff will be directed into underground Oldcastle Detention Chambers prior to discharge from the site. The detention chambers will have open bottoms to promote infiltration.
4. Minimize storm water runoff by implementing:
 - a. Direct runoff from walkways and/or patios onto vegetated areas safely away from building foundations and footings, consistent with the CBC.
 - b. Limit new impervious surfaces to those areas within the footprint of existing impervious coverage.
 - c. Provide landscaping in areas that are currently impervious. A total of 5,842 SF of new landscape area will be created by this project.

The project will also implement a number of source control measures to address & reduce potential pollution sources created as a part of this project. The source control measures used are found in the following table.

<u>Pollution Source</u>	<u>Y/N ?</u>	<u>Source Control Measures</u>
Accidental Spills or Leaks	Y	- Owner/operator shall prepare a spill prevention plan to be located onsite - Employees shall be trained on spill prevention and cleanup - Spill cleanup materials shall be located onsite
Interior Floor Drains	Y	- All interior floor drains will be connected to sanitary sewer system
Parking/Storage Area Maintenance	Y	- Trash room and storage areas shall direct wash down runoff to the sanitary sewer system
Indoor and Structural Pest Control	Y	- Owner/operator shall incorporate integrated pest management practices into maintenance plan

Landscape/Outdoor Pesticide Use	Y	- Owner/operator shall incorporate integrated pest management practices into maintenance plan - Owner/operator shall minimize pesticide use onsite - Pesticides shall be applied with a handheld sprayer to minimize quantity used and spray drift - Pesticides shall not be applied prior to rain - Landscape areas shall be maintained per project O&M Manual and CASQA BMP Fact Sheets SC-41 Building Grounds & Maintenance & SC-73 Landscape Maintenance
Pools, Spas, Ponds, Fountains - Water Features	N	- No water features onsite
Restaurants, Grocery Stores, Food Service Operations	N	- Use of Retail space unknown at this time, but not anticipated to be food service operations.
Refuse Areas	Y	- The refuse area will be inside the building and drained to sanitary sewer
Industrial Processes	N	- No industrial processes will occur onsite
Outdoor Storage of Equipment or Materials	N	- No outdoor storage of equipment or materials will occur onsite
Vehicle and Equipment Cleaning	N	- No vehicle or equipment cleaning will occur onsite
Vehicle and Equipment Repair and Maintenance	N	- No vehicle or equipment maintenance will occur onsite
Fuel Dispensing Areas	N	- No vehicle or equipment fueling will occur onsite
Service Docks	N	- No service docks are proposed
Fire Sprinkler Test Water	Y	- Fire sprinkler test water shall not be released to the storm drain system - A fire sprinkler test drain will be installed and connected to the sanitary sewer system
Drain or Wash Water from Boiler Drain Lines, Condensate Drain Lines, Rooftop Equipment, Drainage Sumps and Other Sources	Y	- Condensate lines will discharge to the sanitary sewer or landscape areas
Unauthorized Non-stormwater Discharges	Y	- Storm drains will be painted "NO DUMPING - DRAINS TO BAY. NO TIRE - DESECHO CORRE AL MAR"
Building and Ground Maintenance	Y	- Building and landscape shall be maintained per project O&M Manual and CASQA BMP Fact Sheets SD-20 - Pervious Pavement, SC-41 - Building Grounds & Maintenance, SC-43 - Parking Area Maintenance, SC-73 - Landscape Maintenance & SC-74

Table 2 – Source Control Measure

B. Description of each SCM

- As the site is in two DMAs, surfaces will drain to two SCMs. Both SCMs are in-ground Oldcastle Detention Chambers that will promote infiltration of the volume of runoff required to be retained. The detention chambers will also be designed to detain the required detention volume while discharging at the 10-year, 15-minute predevelopment rate as required by the County of Santa Cruz Design Criteria (CDC). See Appendix C: DMA & SCM Map for a visual breakdown of the DMAs and SCMs.
- Tier 2: Water Quality Treatment – the detention chambers will have open bottoms to promote infiltration.
- Tier 3: Runoff Retention – the detention chambers will be designed to provide the required retention store volume.
- Tier 4: Peak Flow Management – the detention chambers will be designed to store the required detention volume above the elevation of the top of the retention storage. Outlet control structures will be designed to discharge at the 10-year, 15-minute predevelopment rate per the CDC, as specified in Chapter 6B of the City of Santa Cruz Best Management Practices Manual.

V. BMP Operations and Maintenance Plan

An Operations and Maintenance Plan and Maintenance Agreement will be created during future phases of the project. The maintenance agreement will set forth a schedule of maintenance tasks to be performed by the building maintenance staff, which is required for maintaining the functionality of the onsite stormwater facilities. It will also specify procedures for yearly inspections and record keeping of inspections, maintenance and repairs performed.

APPENDIX A

STORM WATER AND LOW-IMPACT DEVELOPMENT BMP REQUIREMENT WORKSHEET

APPENDIX A

STORM WATER AND LOW-IMPACT DEVELOPMENT BMP REQUIREMENT WORKSHEET

How to Use This Worksheet

The City's Storm Water BMP requirements are based on project type, proposed impervious area, and location within the watershed. This worksheet was developed to help permit applicants determine and meet storm water BMP requirements applicable to a proposed development or redevelopment

- 1 - Download this fillable form online at www.cityofsantacruz.com/LID
- 2 - Fill out the Worksheet to determine what stormwater BMP requirements apply to a proposed project.
- 3 - Attach Worksheet and additional documentation required as listed in the City Storm Water Best Management Practices for Private and Public Development Projects to plans for review by the Department of Public Works
- 4 - Please contact the Public Works Environmental Project Analyst at 420-5160 if you have any questions on completing the worksheet.

Project Address: 532 Center Street **Bldg Permit #:** TBD

A - Project Type

Check project type that applies:

- ☐ Single Family Home ☒ Multi-family, Commercial, Industrial, Public facilities

Check development type that applies:

- ☐ New Development ☒ Redevelopment / Remodel

B - Proposed Development Area and Impervious Area:

Pre-project impervious surface area: 38,373 sq ft

Post-project impervious surface area: 32,758 sq ft

Amount of impervious surface area that will be **replaced**: 32,758 sq ft

Amount of new impervious surface area that will be **created**: 0 sq ft

Reduced Impervious Area Credit: 5615 sq ft

New and Replaced Impervious Area = 32758 sq ft

Net Impervious Area = 27143 sq ft

(Net Impervious Area = Impervious Area created + Impervious Area replaced - Reduced Impervious Area Credit)

C - Post-Construction BMP Tier requirement:

Check Project Type and Impervious Area (from calculations above) that applies.

BMP requirements are cumulative (e.g. a project subject to BMP Tier 3 is also subject to Tiers 1 and 2), permit review fees are not cumulative.

Projects requiring a Stormwater Control Plan will need to involve a civil engineer.

SINGLE-FAMILY HOMES		BMP TIER	Permit Review Fee	Stormwater Control Plan required?
☐	Single-family Home with Net Impervious Area < 15,000 sf , please consult Chapter 6A, BMPs for Single-Family Homes on Small Lots	N/A	\$0	No
☐	Net Impervious Area ≥ 15,000 sf ; New and replaced impervious area < 22,500 sf	3	\$330	Yes
☐	New and replaced impervious area ≥ 22,500 sf	4	\$550	Yes
MULTI-FAMILY, COMMERCIAL, INDUSTRIAL, PUBLIC FACILITIES		BMP TIER	Permit Review Fee	Stormwater Control Plan Required?
☐	New and Replaced Impervious Area ≥ 2,500 sf ; Net Impervious Area < 5,000 sf	1	\$0	No
☐	Net Impervious Area ≥ 5,000 sf ; New and Replaced Impervious Area < 15,000 sf	2	\$330	Yes
☐	New and Replaced Impervious Area ≥ 15,000 sf but < 22,500 sf	3	\$550	Yes
☒	New and replaced impervious area ≥ 22,500 sf	4	\$550	Yes

If the proposed project is only subject to BMP Tiers 1 or 2, skip to Step F.

D - Watershed Management Zones - For projects subject to Tiers 3 Post-Construction BMP requirements only.

Watershed Management Zones are viewable online on the City of Santa Cruz GIS website at: <http://gis.cityofsantacruz.com/gis/index.html>

Watershed Management Zones and associated Tier 3 (Runoff Retention) Post-Construction BMP requirements

If Tier 3 BMP requirements are applicable to the project, check the watershed management zone area where the project is located.

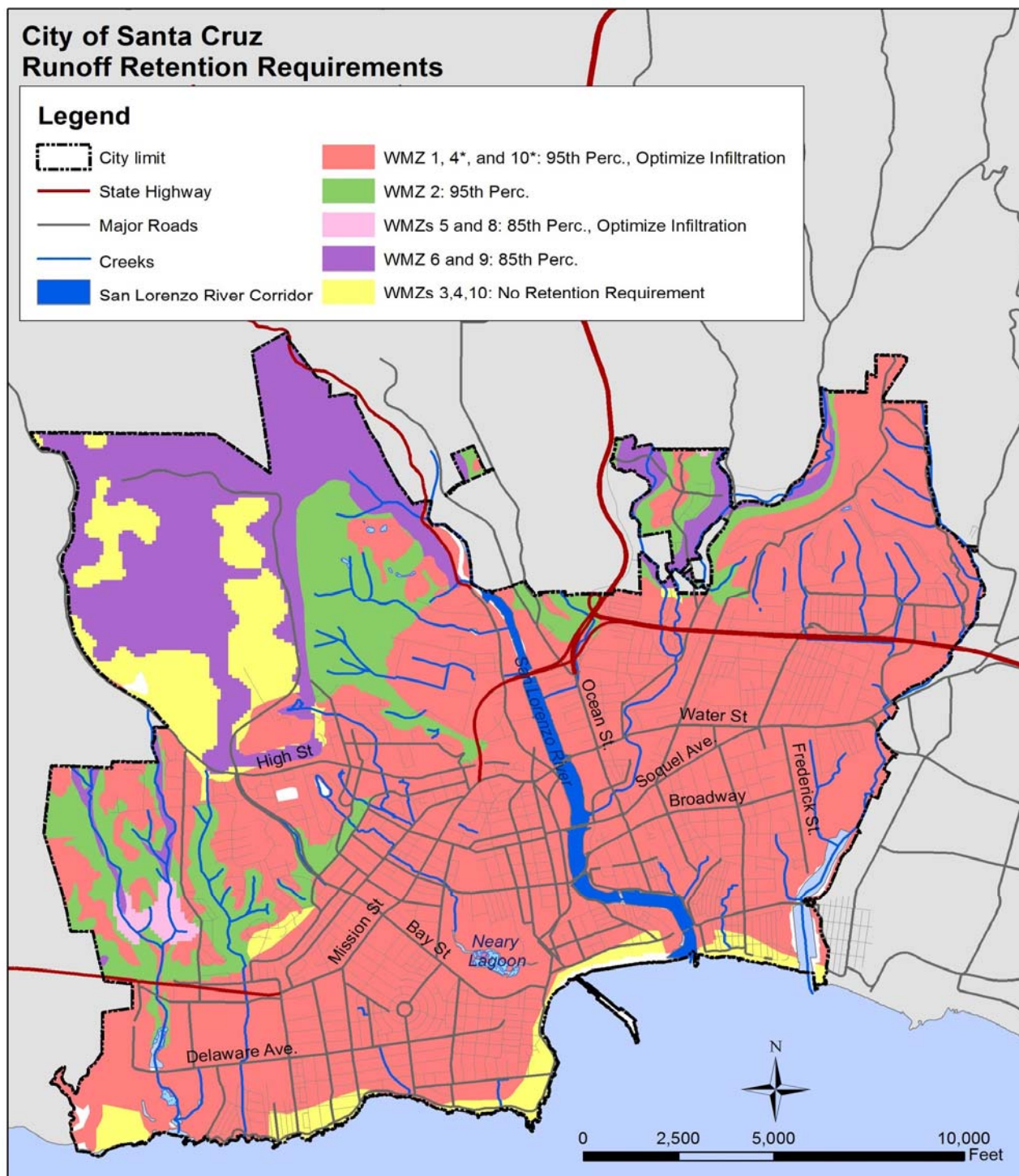
☒ WMZ 1, and portions of 4, and 10 overlying groundwater basin

☐ WMZ 2

☐ WMZ 5 and 8

☐ WMZ 6 and 9

☐ WMZ 3, 4 and 10



E - Special Circumstances - For projects subject to Tiers 3 and 4 Post-Construction BMP requirements only.

Check if special circumstance applies to the project

☐ Highly Altered Channel and Intermediate Flow Control Facility

☒ Urban Sustainability Area

F - Additional Stormwater BMP Requirements for Multi-family, Commercial and Industrial projects

Check if additional BMP requirements apply to the project

a) State Construction Activities Storm Water General Permit

☐ Construction activity resulting in land disturbance of one acre or more, or part of a larger common plan of development

b) Additional Source Control BMP requirements for specific facilities

☐ Commercial or industrial facility

☒ Parking areas

☐ Material Storage Areas

☐ Pools, spas and other water features

☐ Vehicle fueling, maintenance and wash areas

☐ Trash Storage Areas

☐ Equipment and accessory wash areas

☐ Restaurants and food processing or manufacturing facilities

☐ Interior and parking garage floor drains

☐ Miscellaneous drain or wash water

G - Complete if your project is only subject to Tier 1 Requirements - Site planning and LID design measures.

LID design measures shall be clearly marked on site plans

Check applicable boxes and provide short description of measure and location

☐ Conserve natural areas, riparian areas and wetlands

Description: _____

☐ Concentrate improvements on the least-sensitive portions of the site and minimize grading

Description: _____

☐ Direct roof runoff into cisterns or rain barrels

Description: _____

☐ Direct roof downspouts to landscaped areas or rain gardens

Description: _____

☐ Use pervious pavement (pervious concrete or asphalt, turf block, crushed aggregate, etc.)

Description: _____

☐ Disperse runoff from paved areas to adjacent pervious areas

Description: _____

APPENDIX B

NRCS WEB SOIL SURVEY DATA



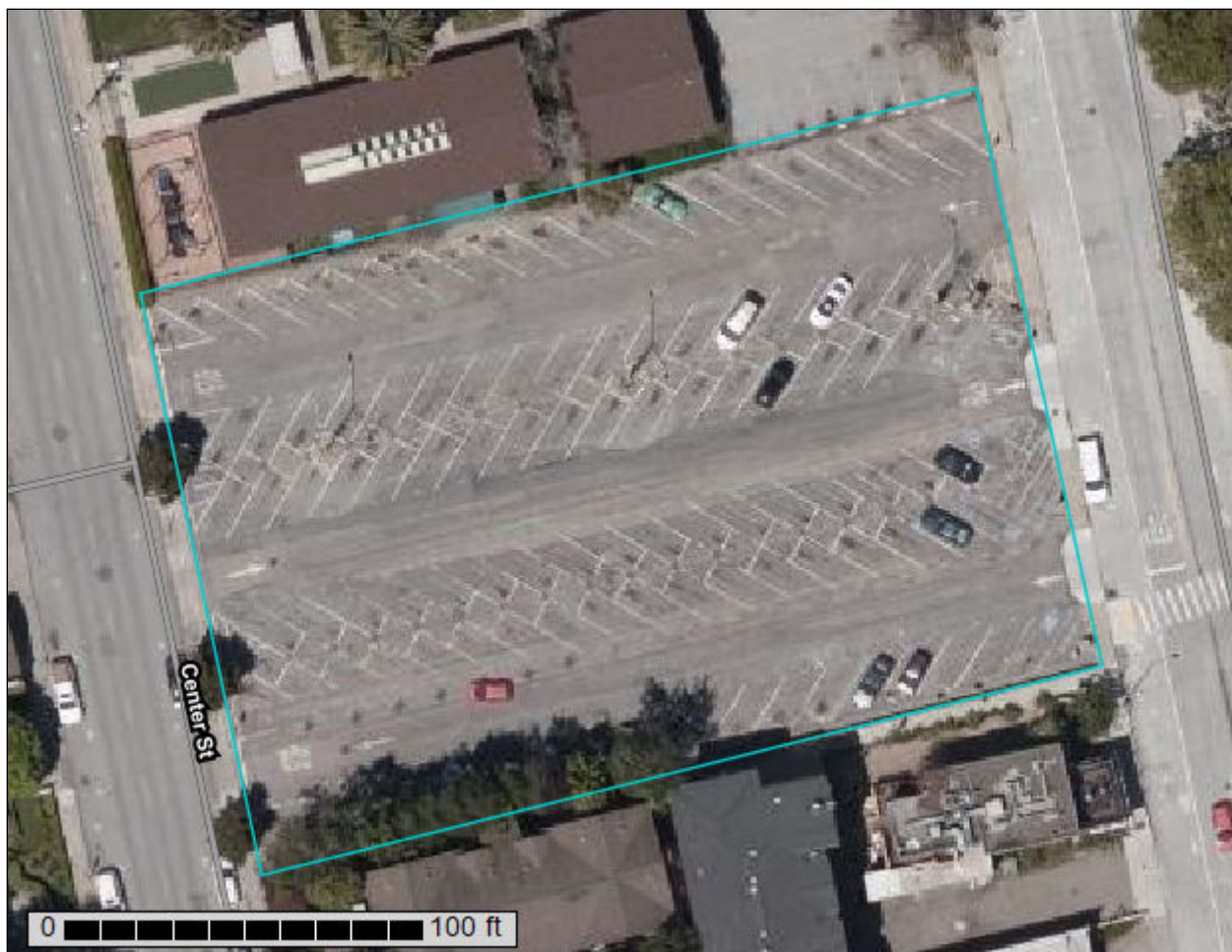
United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for **Santa Cruz County, California**



December 16, 2021

Custom Soil Resource Report Soil Map



Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

Water Features

 Streams and Canals

Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Santa Cruz County, California
Survey Area Data: Version 15, Sep 9, 2021

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

Date(s) aerial images were photographed: Apr 13, 2020—Apr 24, 2020

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
104	Baywood loamy sand, 0 to 2 percent slopes	0.9	100.0%
Totals for Area of Interest		0.9	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Santa Cruz County, California

104—Baywood loamy sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: h9ct
Elevation: 20 to 500 feet
Mean annual precipitation: 15 to 35 inches
Mean annual air temperature: 52 to 55 degrees F
Frost-free period: 245 to 275 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Baywood and similar soils: 85 percent
Minor components: 12 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Baywood

Setting

Landform: Valleys
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Eolian deposits

Typical profile

H1 - 0 to 17 inches: loamy sand
H2 - 17 to 61 inches: loamy sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: R014XD059CA - SANDY
Hydric soil rating: No

Minor Components

Elder, sandy loam

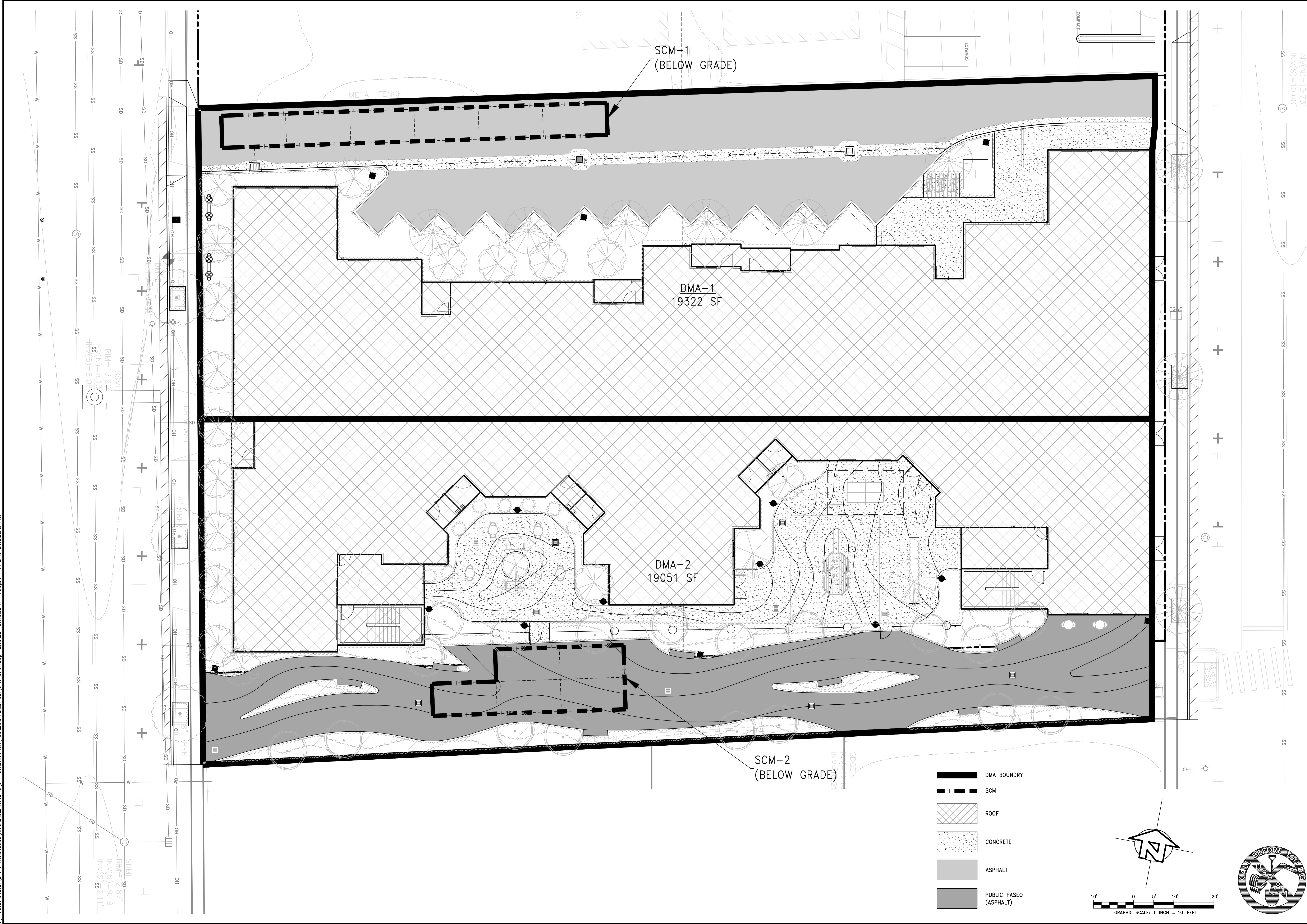
Percent of map unit: 5 percent
Hydric soil rating: No

APPENDIX C

DMA & SCM MAP

I:_PROJECTS\2021\21015 PACIA\DWGS\AFFORDABLE HOUSING\3 - CONSTRUCTION_BUILDING PERMIT SET\C7.0-SWCP.dwg 25Jan22 09:13:32 AM mregion © IFLAND ENGINEERS, INC.

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JOB NO. 21015

SHEET
C7.0

DATE
01/25/2022

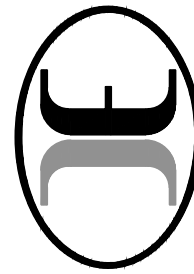
DESIGN
MR

DRAWN
STAFF

APN 005-148-17, 18, 21, 22
CONSTRUCTION DOCUMENTS

STORMWATER CONTROL PLAN
MIXED USE DEVELOPMENT

532 CENTER STREET, SANTA CRUZ, CALIFORNIA



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5300 SOQUEL AVE SUITE 01
SANTA CRUZ, CA 95062
TEL (831) 426-5335
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www.iflandengineers.com

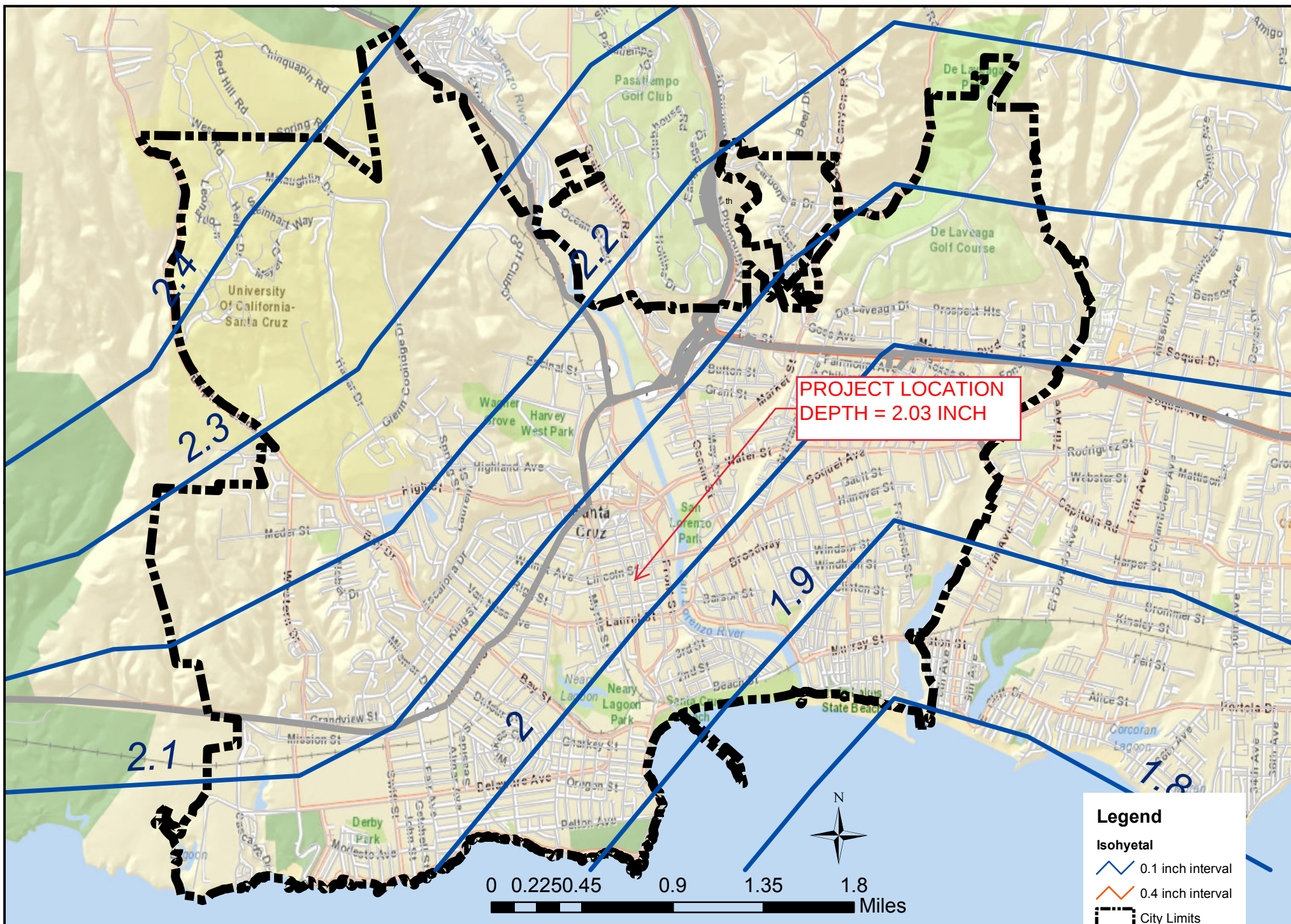
BY
REVISION
DATE

APPENDIX D

SUPPLEMENTAL CALCULATIONS

PROPOSED AREA BREAKDOWN					
	RUNOFF COEFFICIENT 'C' (PER COUNTY DESIGN CRITERIA)	DMA-1	SCM-1	AREA SUMMARY	TOTAL IMPERVIOUS AREA
ROOF	0.9	10421 SF		10421 SF	17103 SF
HARDSCAPE	0.9	6682 SF		6682 SF	
LANDSCAPE	0.3	2219 SF		2219 SF	
TOTAL AREA=		19322 SF		19322 SF	
WEIGHTED 'C' VALUE (PER COUNTY DESIGN CRITERIA) =		0.83		-	
C' VALUE (PER CITY OF SANTA CRUZ CHAPTER 6B)=		0.71		-	

PROPOSED AREA BREAKDOWN					
	RUNOFF COEFFICIENT 'C' (PER COUNTY DESIGN CRITERIA)	DMA-2	SCM-2	AREA SUMMARY	TOTAL IMPERVIOUS AREA
ROOF	0.9	8331 SF		8331 SF	15428 SF
HARDSCAPE	0.9	7097 SF		7097 SF	
LANDSCAPE	0.3	3623 SF		3623 SF	
TOTAL AREA=		19051 SF		19051 SF	
WEIGHTED 'C' VALUE (PER COUNTY DESIGN CRITERIA) =		0.79		-	
C' VALUE (PER CITY OF SANTA CRUZ CHAPTER 6B)=		0.61		-	



City of Santa Cruz
95th Percentile 24-hour Rainfall Depths
Source: Central Coast Regional Water Quality Control Board

Data Source (for spatial variation):
 PRISM Climate Group
 Oregon State University
<http://prism.oregonstate.edu>



SCM-1 SUMMARY**RETENTION SYSTEM SUMMARY**

TRIBUTARY AREA =	19322 SF
'C' VALUE ¹ =	0.71
95TH PERCENTILE 24HR DEPTH =	2.03 in
REQ. RET. VOLUME =	2318 CF
REQ. NUMBER OF CHAMBERS =	6
SATURATED SOIL PERMEABILITY =	2.00 in/hr
STRUCTURE DRAIN TIME =	24 hr

DETENTION SYSTEM SUMMARY

TRIBUTARY AREA =	19322 SF
'C' VALUE ² =	0.83 SF
REQ. DET. VOLUME (SWM-17) =	593 CF
REQ. NUMBER OF CHAMBERS =	6

FULL SYSTEM SUMMARY

TOTAL NUMBER OF CHAMBERS =	6
DEPTH OF RETENTION =	4 FT
DEPTH OF DETENTION =	1 FT
TOTAL DEPTH OF CHAMBERS =	5 FT

1- 'C' VALUE CALCULATED PER CHAPTER 6B OF
THE CITY OF SANTA CRUZ BEST MANAGEMENT
PRACTICES MANUAL

2- 'C' VALUE CALCULATED PER SANTA CRUZ
COUNTY DESIGN CRITERIA FOR USE IN COUNTY
DETENTION SPREADSHEET SWM-17

SCM-2 SUMMARY**RETENTION SYSTEM SUMMARY**

TRIBUTARY AREA =	19051 SF
'C' VALUE ¹ =	0.61
95TH PERCENTILE 24HR DEPTH =	2.03 in
REQ. RET. VOLUME =	1969 CF
REQ. NUMBER OF CHAMBERS =	5
SATURATED SOIL PERMEABILITY =	2.00 in/hr
STRUCTURE DRAIN TIME =	24 hr

DETENTION SYSTEM SUMMARY

TRIBUTARY AREA =	19051 SF
'C' VALUE ² =	0.79 SF
REQ. DET. VOLUME (SWM-17) =	519 CF
REQ. NUMBER OF CHAMBERS =	5

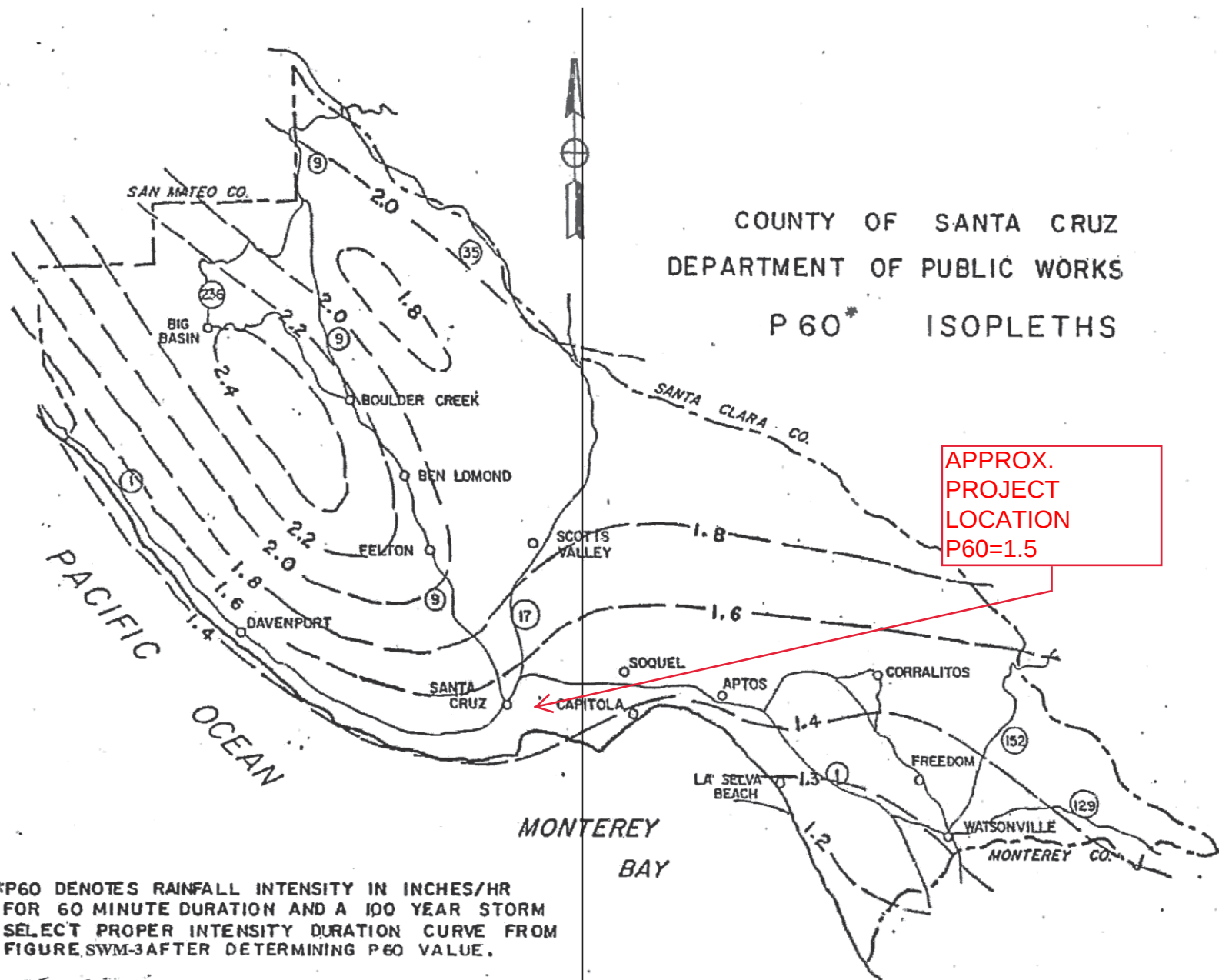
FULL SYSTEM SUMMARY

TOTAL NUMBER OF CHAMBERS =	5
DEPTH OF RETENTION =	4 FT
DEPTH OF DETENTION =	1 FT
TOTAL DEPTH OF CHAMBERS =	5 FT

1- 'C' VALUE CALCULATED PER CHAPTER 6B OF
THE CITY OF SANTA CRUZ BEST MANAGEMENT
PRACTICES MANUAL

2- 'C' VALUE CALCULATED PER SANTA CRUZ
COUNTY DESIGN CRITERIA FOR USE IN COUNTY
DETENTION SPREADSHEET SWM-17

Figure SWM-2: Rainfall Intensity Isopleths



PROJECT: Cedar St Affordable - APNs: 005-148-17, -18, -21, -22

Calc by: Staff

Date: 1/24/2022

RUNOFF DETENTION BY THE MODIFIED RATIONAL METHOD

Data Entry: PRESS TAB & ENTER DESIGN VALUES

SS Ver: 1.0

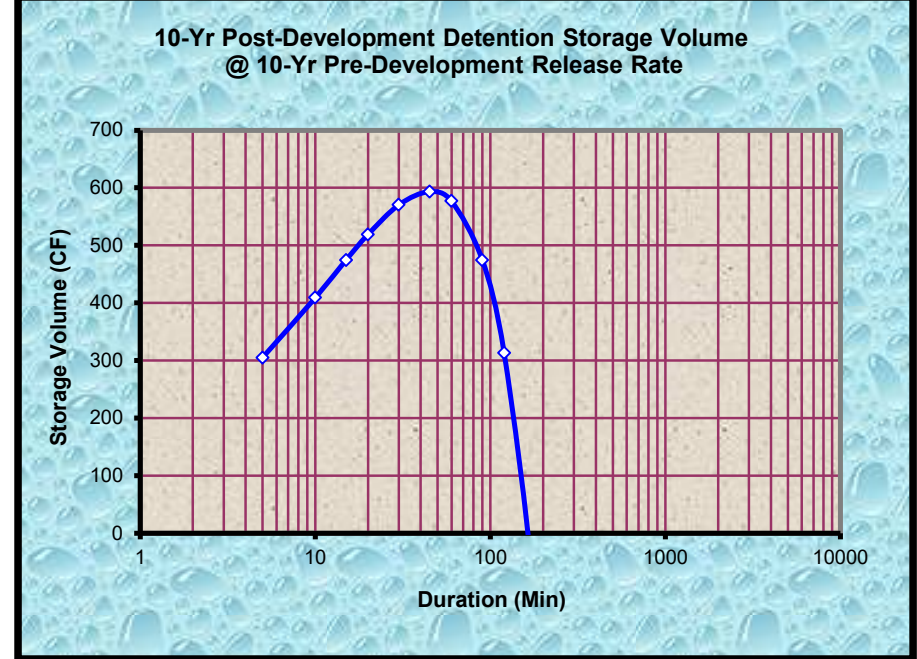
Site Location P60 Isopleth: 1.50 Fig. SWM-2 in County Design Criteria
 Rational Coefficients Cpre: 0.30 See note # 2
 Cpost: 0.83 See note # 2
 Impervious Area: 19322 ft² See note # 2 and # 4

STRUCTURE DIMENSIONS FOR DETENTION

593	ft ³ storage volume calculated		
100	% void space assumed		
593	ft ³ excavated volume needed		
Structure Ratios	Length	Width*	Depth*
	1.00	1.00	1.00
Dimen. (ft)	8.40	8.40	8.40

*For pipe, use the square root of the sectional area

10 - YEAR DESIGN STORM				DETENTION @ 15 MIN.	
Storm Duration (min)	10 - Year Intensity (in/hr)	10 - Yr. Release Qpre (cfs)	10 - Year Qpost (cfs)	Detention Rate To Storage (cfs)	Specified Storage Volume (cf)
1440	0.26	0.034	0.095	-0.143	-15478
1200	0.28	0.037	0.103	-0.136	-12208
960	0.31	0.041	0.113	-0.125	-9031
720	0.34	0.046	0.128	-0.111	-5980
480	0.41	0.055	0.152	-0.087	-3122
360	0.46	0.062	0.172	-0.067	-1810
240	0.55	0.074	0.204	-0.035	-627
180	0.62	0.083	0.230	-0.008	-113
120	0.74	0.099	0.274	0.035	313
90	0.83	0.112	0.309	0.070	474
60	0.99	0.133	0.367	0.128	577
45	1.12	0.150	0.415	0.176	593
30	1.33	0.178	0.492	0.254	571
20	1.57	0.211	0.585	0.346	519
15	1.78	0.239	0.660	0.422	474
10	2.11	0.283	0.784	0.546	409
5	2.83	0.380	1.052	0.813	305

**Notes & Limitations on Use:**

- 1) The modified rational method, and therefore the standard calculations are applicable in watersheds up to 20 acres in size.
- 2) Required detention volume determinations shall be based on all net new impervious area both on and off-site, resulting from the proposed project. Pervious areas shall not be included in detention volume sizing; an exception may be made for incidental pervious areas less than 10% of the total area.
- 3) Gravel packed detention chambers shall specify on the plans, aggregate that is washed, angular, and uniformly graded (of single size), assuring void space not less than 35%.
- 4) A map showing boundaries of both regulated impervious areas and actual drainage areas routed to the hydraulic control structure of the detention facility is to be provided, clearly distinguishing between the two areas, and noting the square footage.
- 5) The EPA defines a class V injection well as any bored, drilled, or driven shaft, or dug hole that is deeper than its widest surface dimension, or an improved sinkhole, or a subsurface fluid distribution system. Such storm water drainage wells are "authorized by rule". For more information on these rules, contact the EPA. A web site link is provided from the County DPW Stormwater Management web page.
- 6) Refer to the County of Santa Cruz Design Criteria, for complete method criteria.

PROJECT: Cedar St Affordable - APNs: 005-148-17, -18, -21, -22

Calc by: Staff

Date: 1/24/2022

RUNOFF DETENTION BY THE MODIFIED RATIONAL METHOD

Data Entry: PRESS TAB & ENTER DESIGN VALUES

SS Ver: 1.0

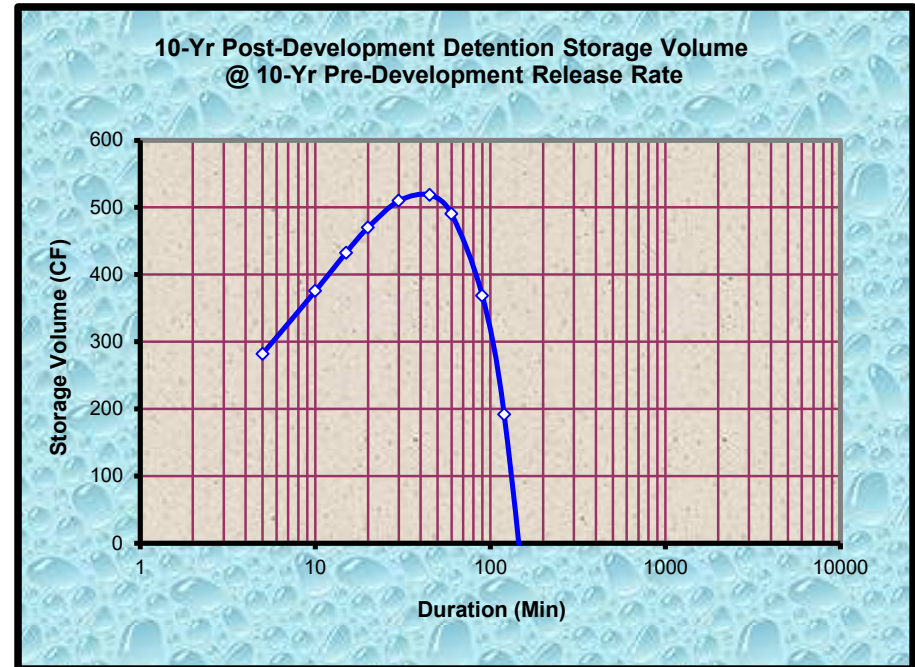
Site Location P60 Isopleth: 1.50 Fig. SWM-2 in County Design Criteria
 Rational Coefficients Cpre: 0.30 See note # 2
 Cpost: 0.79 See note # 2
 Impervious Area: 19051 ft² See note # 2 and # 4

STRUCTURE DIMENSIONS FOR DETENTION

519	ft ³ storage volume calculated		
100	% void space assumed		
519	ft ³ excavated volume needed		
Structure Ratios	Length	Width*	Depth*
	1.00	1.00	1.00
Dimen. (ft)	8.03	8.03	8.03

*For pipe, use the square root of the sectional area

10 - YEAR DESIGN STORM				DETENTION @ 15 MIN.	
Storm Duration (min)	10 - Year Intensity (in/hr)	10 - Yr. Release Qpre (cfs)	10 - Year Qpost (cfs)	Detention Rate To Storage (cfs)	Specified Storage Volume (cf)
1440	0.26	0.034	0.090	-0.146	-15750
1200	0.28	0.037	0.097	-0.139	-12478
960	0.31	0.040	0.106	-0.129	-9291
720	0.34	0.046	0.120	-0.115	-6224
480	0.41	0.054	0.143	-0.093	-3339
360	0.46	0.061	0.161	-0.074	-2004
240	0.55	0.073	0.191	-0.044	-792
180	0.62	0.082	0.216	-0.019	-259
120	0.74	0.097	0.257	0.021	192
90	0.83	0.110	0.290	0.055	369
60	0.99	0.131	0.344	0.109	491
45	1.12	0.148	0.389	0.154	519
30	1.33	0.175	0.462	0.227	510
20	1.57	0.208	0.549	0.313	470
15	1.78	0.235	0.620	0.384	432
10	2.11	0.279	0.736	0.501	375
5	2.83	0.375	0.987	0.752	282

**Notes & Limitations on Use:**

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