DRAINAGE STUDY
for
LA JOLLA CANYON
Project # 154476

Date: June 30, 2008
Job No. UC 20.01-40.06

Prepared By:
LEPPERT ENGINEERING CORPORATION
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By: John D. Leppert, RCE 26283
Exp. 3/31/10

Date: 3/23/09

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Appendix

PURPOSE

The purpose of this report is to estimate the storm water runoff for a multi-family development, consisting of 48 residential units, and to determine the impacts on the existing downstream facilities.

PROJECT LOCATION

The proposed project is located at the Northeast corner of Genesee Avenue and Eastgate Mall in the community of University City, (See Location Map, Exhibit "A"). The site is approximately equidistant from Interstate 5 and Interstate 805.

PROJECT DESCRIPTION

The project will include the construction of the following:

- 48 residential dwelling units.
- two levels of below grade parking to accommodate parking requirements.
- landscape improvements.

METHOD OF CALCULATION

This study proposes to calculate the total runoff from the site using the guidelines set forth in the City of San Diego's Drainage Design Manual, dated April 1984 (See Appendix I). The specific method used is the Rational Formula for watersheds under 0.5 square miles.

PRE-DEVELOPMENT CONDITIONS (See Exhibit "B", Pre-Development Basin Map)

The site consists of 2 runoff basins, that are roughly divided into the northern portion of the property and the southern portion of the property. The runoff from the northern basin, Basin A, ends up in the canyon on the Eastern side of the property. The runoff gets to the canyon either directly from the site or by discharging to Fez Street, where it then travels down into the canyon. The runoff from the southern basin, Basin B, discharges into either Genesee Avenue or Eastgate

Mall, where it travels down the gutter where it is intercepted by the inlet at the corner of Genesee Avenue and Eastgate Mall as shown on City of San Diego Drawing No. 11732-2-D (See Exhibit "C").

The existing land use category for the site is Residential Multi-Units. According to the City of San Diego Drainage Design Manual, residential multi-unit land use has a runoff coefficient of C=0.70, see Appendix II, and this value will be used in analyzing the pre-development runoff from the site.

Per the City of San Diego Drainage Design Manual section 1-102.2(3)(a), "For tributary areas under one square mile, the storm drain system shall be designed so that the combination of storm drain system capacity and overflow will be able to carry the 100-year frequency storm without damage to or flooding of adjacent existing buildings or potential building sites." (See Appendix III) From the Isopluvial Maps for a 100-year storm (see Appendix IV) and the Intensity-Duration Design Chart (see Appendix V) from the San Diego County Hydrology Manual, a P_6 = 2.3 inches is obtained. This yields the following Time of Concentration (T_c), Intensity (I), and Runoff (Q) (see Exhibit "D" for tabulated calculations):

Basin A: T_c = 8.04 minutes
I = 4.46 in/hr
Q = 8.43 cfs

Basin B: T_c = 8.04 minutes
I = 4.46 in/hr
Q = 8.43 cfs

POST-DEVELOPMENT CONDITIONS (See Exhibit "E", Post-Development Basin Map)
Development of the subject properties will consists of the construction of an underground

parking structure with residential units above. The proposed land use category for the site is Residential Multi-Units. According to the City of San Diego Drainage Design Manual, residential multi-unit land use has a runoff coefficient of C=0.70, see Appendix II, and this value will be used in analyzing the post-development runoff from the site.

Per the City of San Diego Drainage Design Manual section 1-102.2(3)(a), "For tributary areas under one square mile, the storm drain system shall be designed so that the combination of storm drain system capacity and overflow will be able to carry the 100-year frequency storm without damage to or flooding of adjacent existing buildings or potential building sites." (See Appendix III) From the Isopluvial Maps for a 100-year storm (see Appendix IV) and the Intensity-Duration Design Chart (see Appendix V) from the San Diego County Hydrology Manual, a P_6 = 2.3 inches is obtained. This yields the following Time of Concentration (T_c), Intensity (I), and Runoff (Q) (see Exhibit "F" for tabulated calculations):

Basin A: T_c = 8.04 minutes
I = 4.46 in/hr
Q = 8.43 cfs

Basin B: T_c = 8.49 minutes
I = 4.31 in/hr
Q = 6.02 cfs

The proposed development occurs entirely within Basin B, so the results within Basin A remain the same. Runoff from Basin B enters an onsite storm drain system which connects to the back of the inlet at the corner of Genesee Avenue and Eastgate Mall as shown on City of San Diego Drawing No. 11732-2-D (See Exhibit "C"). The proposed onsite storm drain needs to handle the Q = 6.02 cfs, so an 18" pipe is proposed. Using the Manning Pipe Calculator within AutoCAD Civil 3D Land Desktop Companion 2008, the capacity of the proposed pipe is 15.98 cfs (see

Exhibit "G").

COMPARISON OF PRE AND POST DEVELOPMENT RUNOFF

Pre-Development Runoff

Basin A, Q_{100} = 8.43 cfs

Basin B, Q_{100} = 5.01 cfs

Post-Development Runoff

Basin A, Q_{100} = 8.43 cfs.

Basin B, Q_{100} = 6.02 cfs

NUMERIC SIZING TREATMENT STANDARDS

For this project, flow-based BMP's have been selected utilizing the runoff produced from a rainfall intensity of 0.2 in./hr. per each storm hour event. For a 6 hour storm event, I=1.2 in/hr.

Sub-Basin	Area (ac.)	Run-off Coeff.	I (in/hr)	Q (cfs)
B	1.996	0.70	1.2	1.68

The proposed development is within Basin B (see Exhibit "E"). Runoff will be collected in 2 deck drains located north of the proposed structure. The runoff will be shared evenly between the two deck drains, so each will receive a Q = 0.84 cfs.

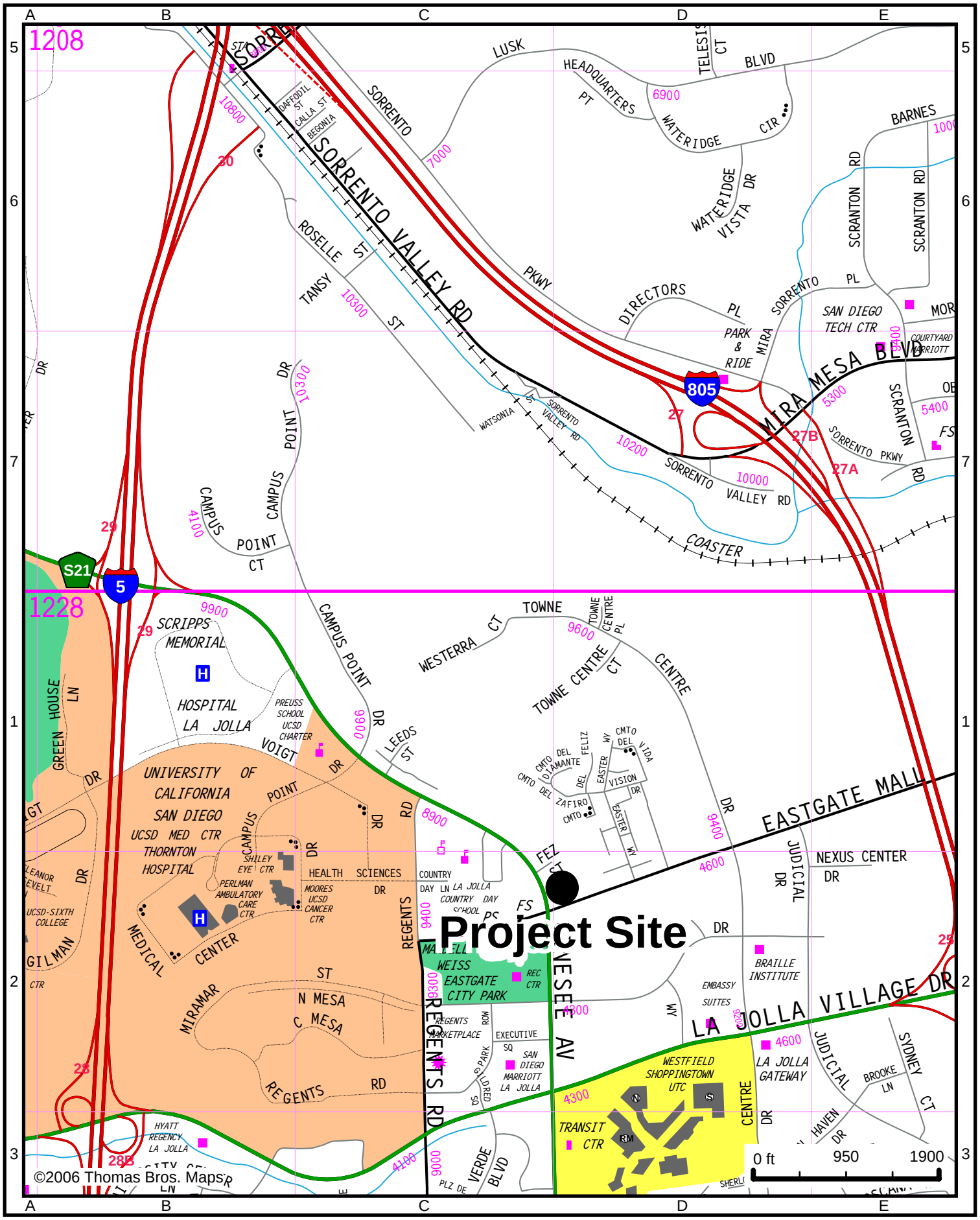
CONCLUSION

Based on the above calculations, the development of the subject property as proposed, results in a nominal increase of 1.01 cfs of runoff as compared to the pre-development

conditions. This nominal increase is due to the decrease in Time of Concentration rather than an increase in impervious surface. It can be concluded that the proposed development will not create an impact to the existing downstream storm drain facilities.

Exhibit “A”

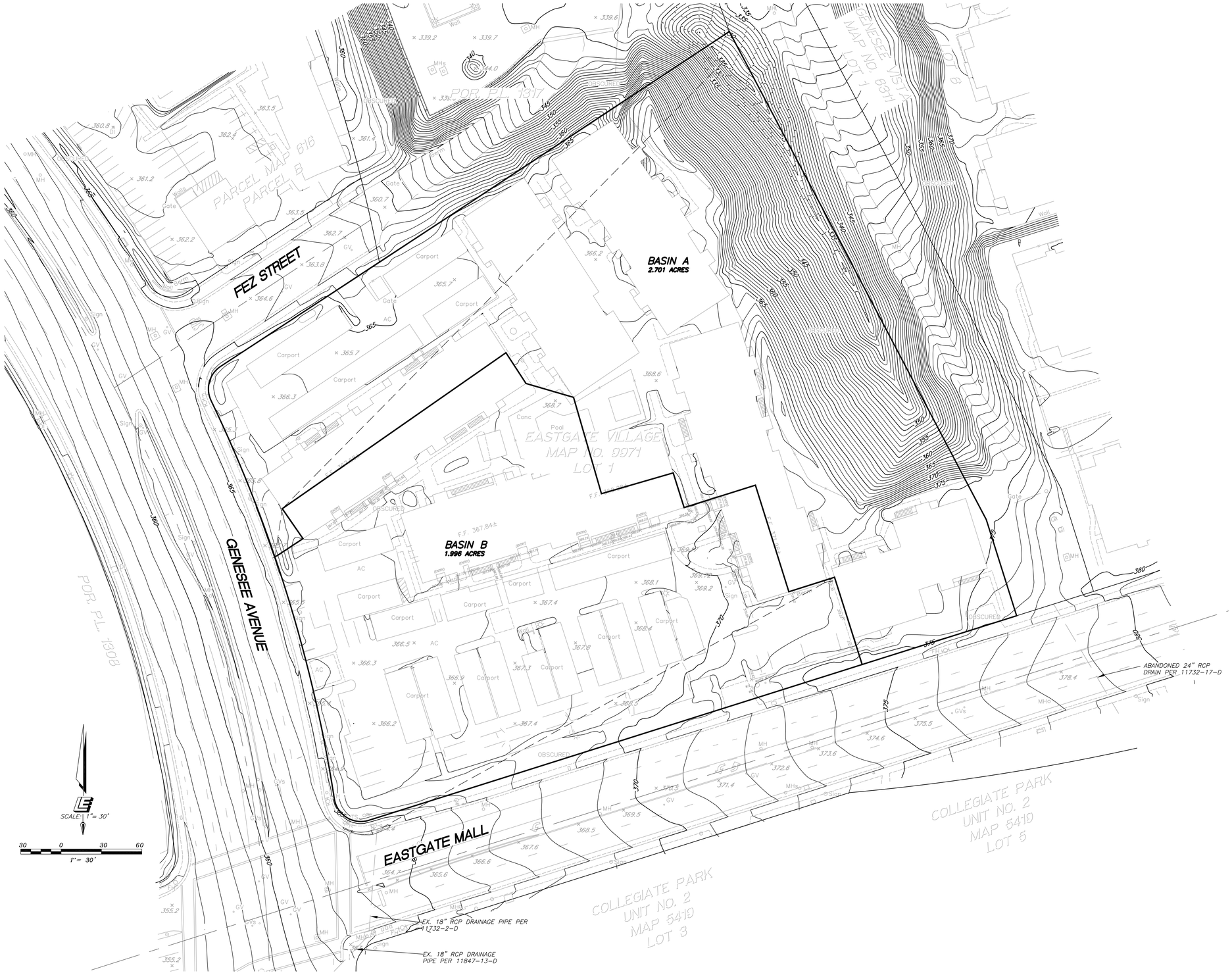
Location Map



Project Site: 1228 - D2

Exhibit “B”

Pre-Development Basin Map



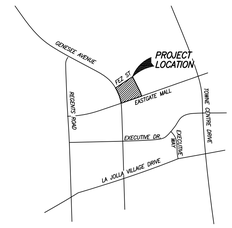
SCALE: 1"= 30'

30 0 30 60

1"= 30'

LEGEND:

BASIN BOUNDARY



VICINITY MAP
NO SCALE

NO.	DATE	BY	DESCRIPTION
6			
5			
4			
3			
2	6/30/08	RL	AGENCY CORRECTIONS
1	4/11/08	RL	ORIGINAL

NO.	DATE	BY	DESCRIPTION
12			
11			
10			
9			
8			
7			

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REGISTRATION R C E 26283

FILE CODE UC 20.01-40.06

DATE

PREPARATION AND REVISION LOG

NAD 83: 1899-6266 | NAD 27: 259-1704 | P.T.S. 154476 | J.O. 43-0749

PREPARED BY:

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PHONE #: (858) 597-2001

PROJECT ADDRESS:
9515 GENESEE AVENUE

PROJECT NAME:
LA JOLLA CANYON

SHEET TITLE:
BASIN MAP
PRE-DEVELOPMENT

REVISION 14:
REVISION 13:
REVISION 12:
REVISION 11:
REVISION 10:
REVISION 9:
REVISION 8:
REVISION 7:
REVISION 6:
REVISION 5:
REVISION 4:
REVISION 3:
REVISION 2:
REVISION 1: 6/30/08

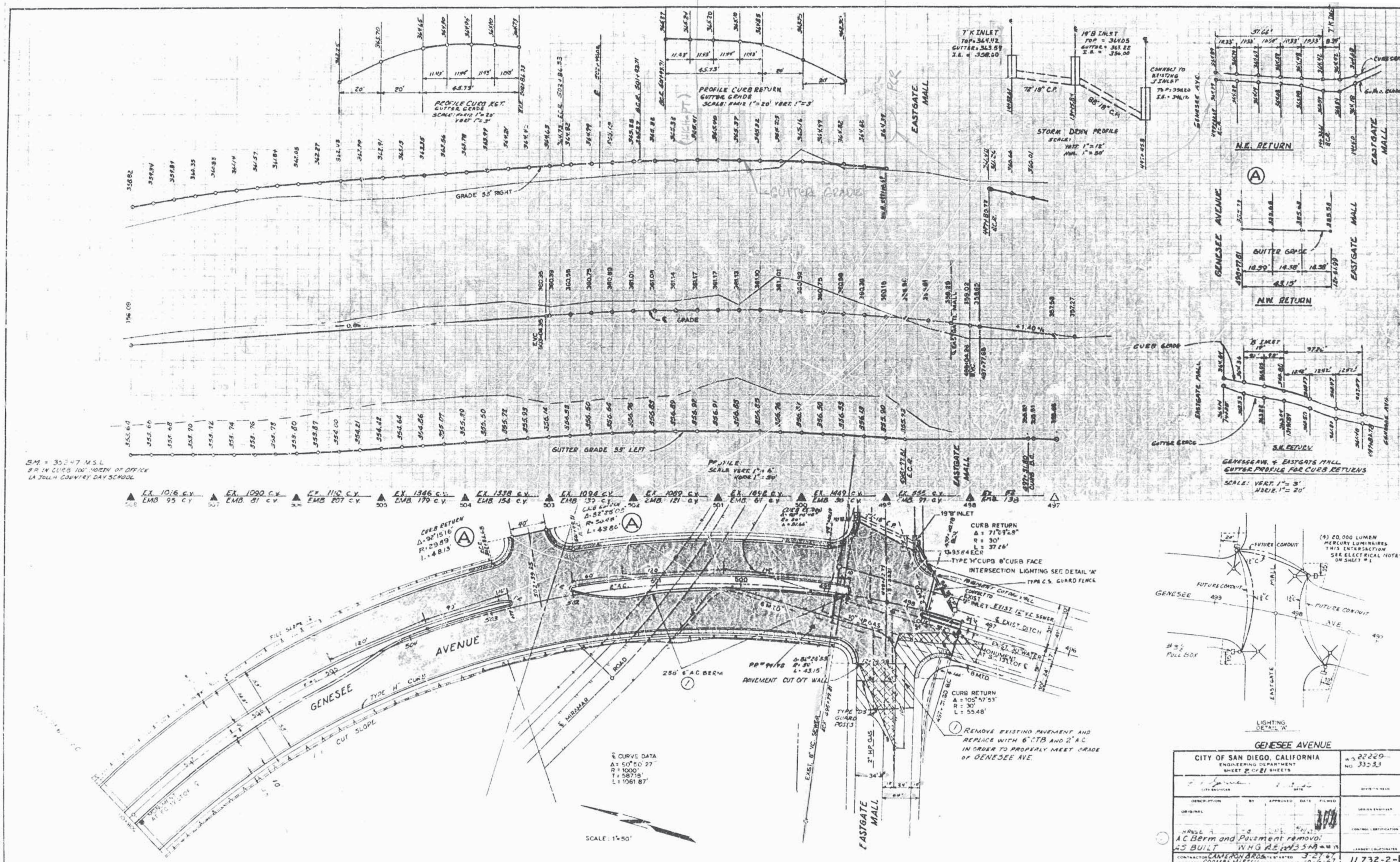
ORIGINAL DATE: 4/11/08

SHEET 1 OF 1

DEP#

Exhibit “C”

Existing Storm Drains



GENESEE AVENUE

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING DEPARTMENT
SHEET 2 OF 21 SHEETS

W.O. 22229
NO. 33533

CHANGE A — A.C. Berm and Pavement removal
AS BUILT — WHG

CONTRACTOR CAMERON BROS.
INSPECTOR COOMBE, MARTELL

11732-2-D

AS BUILT

Exhibit “D”

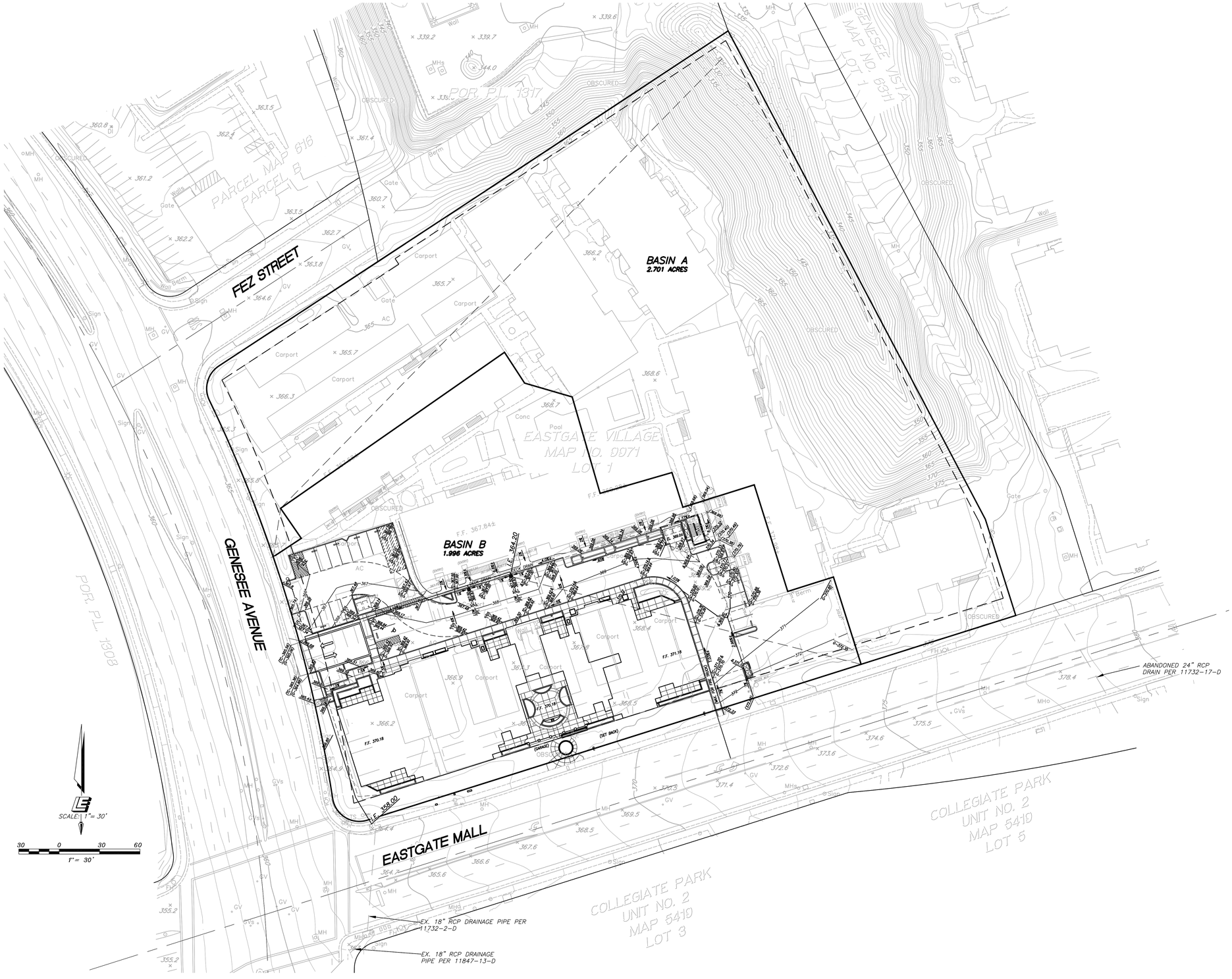
Pre-Development Conditions Spreadsheet

100 year - Existing

					Overland Flow						
Basin	**SF**	**Acres**	**Runoff Coeff.**	**P_6**	**Length (ft)**	**Max Elev. (ft)**	**Min. Elev. (ft)**	**Average Slope (%)**	**T_C (min)**	**I (in/hr)**	**Q (cfs)**
A	117666	2.70	0.7	2.3	504.54	366	325	8.1	8.04	4.46	8.43
B	86957	2.00	0.7	2.3	384.12	372	364.5	2.0	11.29	3.58	5.01

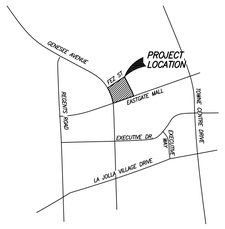
Exhibit “E”

Post-Development Basin Map



LEGEND:

- BASIN BOUNDARY
- DECK DRAIN
- FLOW DIRECTION



VICINITY MAP
NO SCALE

NO.	DATE	BY	DESCRIPTION
6			
5			
4			
3			
2	06/30/08	RL	AGENCY CORRECTIONS
1	04/11/08	RL	ORIGINAL

NO.	DATE	BY	DESCRIPTION
12			
11			
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PROJECT NAME:
LA JOLLA CANYON

SHEET TITLE:
BASIN MAP
POST-DEVELOPMENT

REVISION 14:
REVISION 13:
REVISION 12:
REVISION 11:
REVISION 10:
REVISION 9:
REVISION 8:
REVISION 7:
REVISION 6:
REVISION 5:
REVISION 4:
REVISION 3:
REVISION 2:
REVISION 1: 6/30/08

ORIGINAL DATE: 04/11/08

SHEET 1 OF 1

DEP#

Exhibit “F”

Post-Development Conditions Spreadsheet

100 year - Proposed

					Overland Flow					Pipe Flow					Total		
Basin	SF	Acres	Runoff Coeff.	P_6	Length (ft)	Max Elev. (ft)	Min. Elev. (ft)	Average Slope (%)	T_C (min)	Length (ft)	Slope (ft/ft)	Diameter (in)	Velocity (fps)	T_f (min)	T_C (min)	I (in/hr)	Q (cfs)
A	117666	2.70	0.7	2.3	504.54	366	325	8.1	8.04	n/a	n/a	n/a	n/a	0.00	8.04	4.46	8.43
B	86957	2.00	0.7	2.3	266.34	375.5	366.83	3.3	7.93	309.98	0.02	6.00	9.28	0.56	8.49	4.31	6.02

Exhibit “G”

Manning Pipe Calculator

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Flowrate
Diameter	18.0000 in
Depth	16.8750 in
Slope	0.0200 ft/ft
Manning's n	0.0130

Computed Results:

Flowrate	15.9800 cfs
Area	1.7671 ft2
Wetted Area	1.7212 ft2
Wetted Perimeter	47.4522 in
Perimeter	56.5487 in
Velocity	9.2844 fps
Hydraulic Radius	5.2231 in
Percent Full	93.7500 %
Full flow Flowrate	14.8554 cfs
Full flow velocity	8.4064 fps

Appendix I

Excerpts from the City of San Diego Drainage Design Manual

APPENDIX I

RATIONAL METHOD

Watersheds Less than 0.5 Square Mile

Method of Computing Runoff

Use the Rational Formula Q = CIA where:

Q is the peak rate of flow in cubic feet per second.

C is a runoff coefficient expressed as that percentage of rainfall which becomes surface runoff.

I is the average rainfall intensity in inches per hour for a storm duration equal to the time of concentration (T_c) of the contributing drainage area.

A is the drainage area in acres tributary to design point.

(1) Runoff Coefficient, C

Appendix I-A lists the estimated coefficients for urban areas.

For urban areas select an appropriate coefficient for each type of land use from Table, 2, Appendix I-A. Multiply this coefficient by the percentage of the total area included in that class. The sum of the products for all land uses in San Diego County is the weighted runoff coefficient.

(2) Rainfall Intensity, I

Intensity - duration - frequency curves applicable to all areas within San Diego County are given in Appendix I-B.

(3) Time of Concentration, Tc

The time of concentration is the time required for runoff to flow from the most remote part of the watershed to the outlet point under consideration.

Appendix II

Excerpts from the City of San Diego Drainage Design Manual

TABLE 2

RUNOFF COEFFICIENTS (RATIONAL METHOD)

DEVELOPED AREAS (URBAN)

Land Use	Coefficient, C Soil Type (1)
Residential:	D
Single Family	.55
Multi-Units	.70
Mobile Homes	.65
Rural (lots greater than 1/2 acre)	.45
Commercial (2) 80% Impervious	.85
Industrial (2) 90% Impervious	.95

NOTES:

(1) Type D soil to be used for all areas.

(2) Where actual conditions deviate significantly from the tabulated imperviousness values of 80% or 90%, the values given for coefficient C, may be revised by multiplying 80% or 90% by the ratio of actual imperviousness to the tabulated imperviousness. However, in no case shall the final coefficient be less than 0.50. For example: Consider commercial property on D soil.

Actual imperviousness = 50%

Tabulated imperviousness = 80%

Revised C = $\frac{50}{80}$ x 0.85 = 0.53

Appendix III

Excerpts from the City of San Diego Drainage Design Manual

HYDROLOGY (1-102)

1-102.1 GENERAL

The design discharge depends upon many variables. Some of the more important are duration and intensity of rainfall, storm frequency, ground cover, the size, imperviousness and slope and shape of the drainage area.

1-102.2 DESIGN RUNOFF

Design runoff shall be based upon the following:

(1) Within floodplain and floodplain fringe areas as defined by the Federal Emergency Management Agency (FEMA), the runoff criteria shall be based upon a 100-year frequency storm.

(2) For all drainage channels and storm drain systems, which will convey drainage from a tributary area equal to and greater than one (1) square mile, the runoff criteria shall be based upon a 100-year frequency storm.

(3) For tributary areas under one (1) square mile:

(a) The storm drain system shall be designed so that the combination of storm drain system capacity and overflow will be able to carry the 100-year frequency storm without damage to or flooding of adjacent existing buildings or potential building sites.

(b) The runoff criteria for the underground storm drain system shall be based upon a 50-year frequency storm.

(4) Type D soil shall be used for all areas.

1-102.3 DESIGN RUNOFF METHODS

A. The designer should check with Floodplain Management/Beach Erosion Section, Transportation Design Division, Engineering and Development Department, to determine if there are established storm discharge flows.

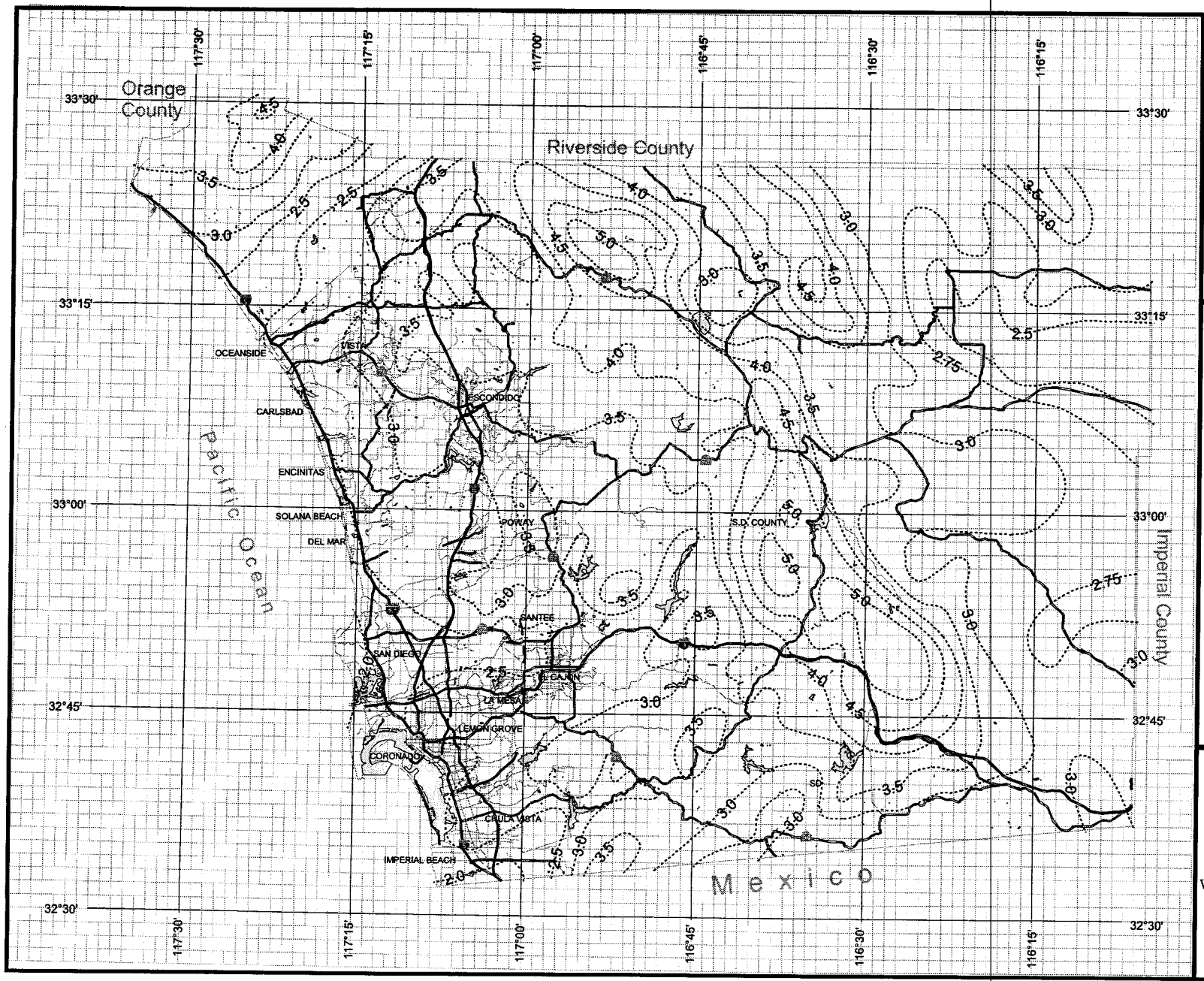
B. If no established storm discharge flows are available, the applicable methods shown in Appendix 1, 2, or 3 shall be used.

Appendix IV

100-year Isopluvial Maps

County of San Diego Hydrology Manual

Rainfall Isopluvials



100 Year Rainfall Event - 6 Hours

Isopluvial (inches)

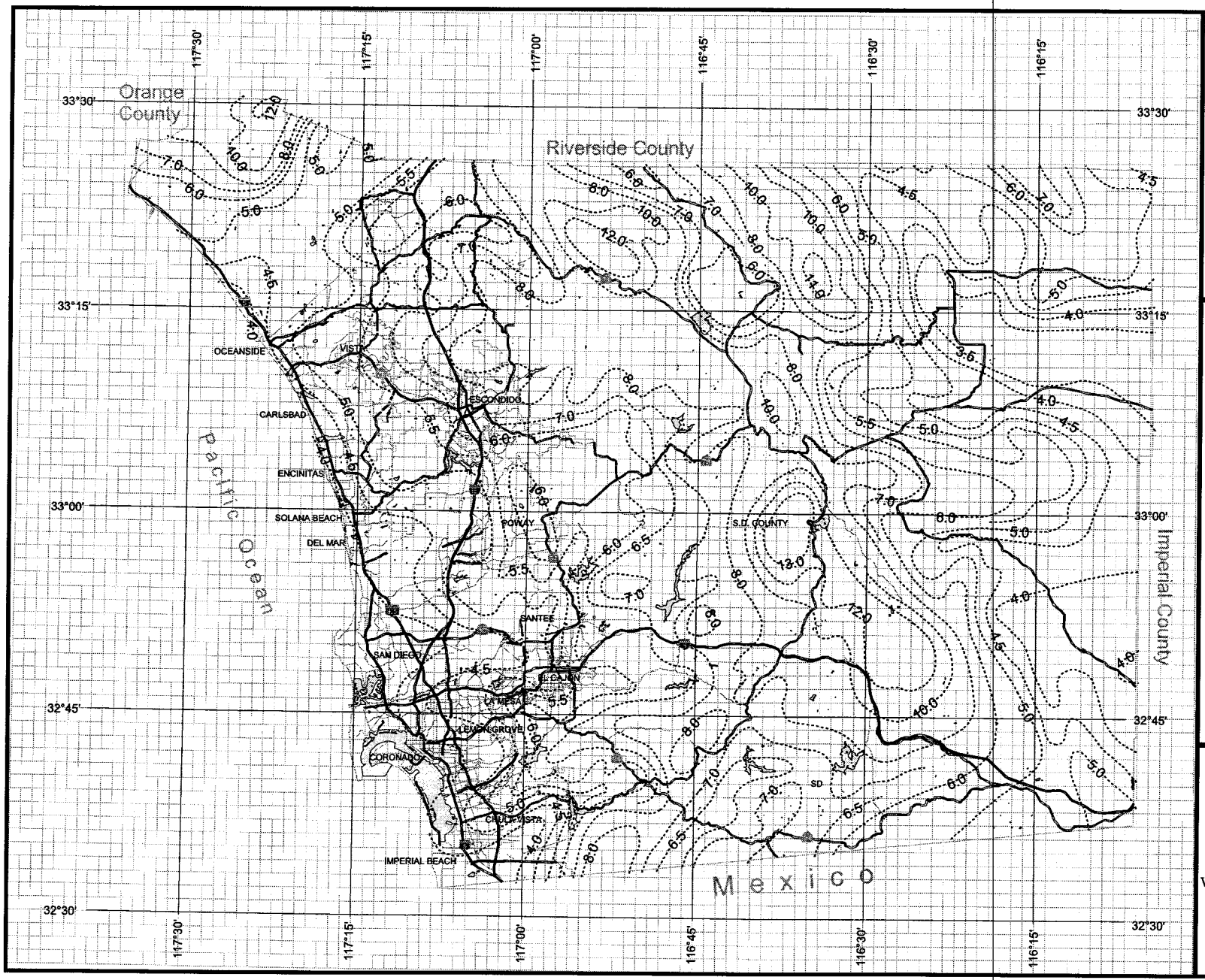
Lat: 32°52'42"
Long: 117°12'49"

DPW GIS
Department of Public Works

SanGIS
We Have San Diego Covered!

N
W E
S

3 0 3 Miles



County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)

Lat: 32°52'42"
Long: 117°12'49"

DPW GIS
Department of Public Works Geographic Information Services

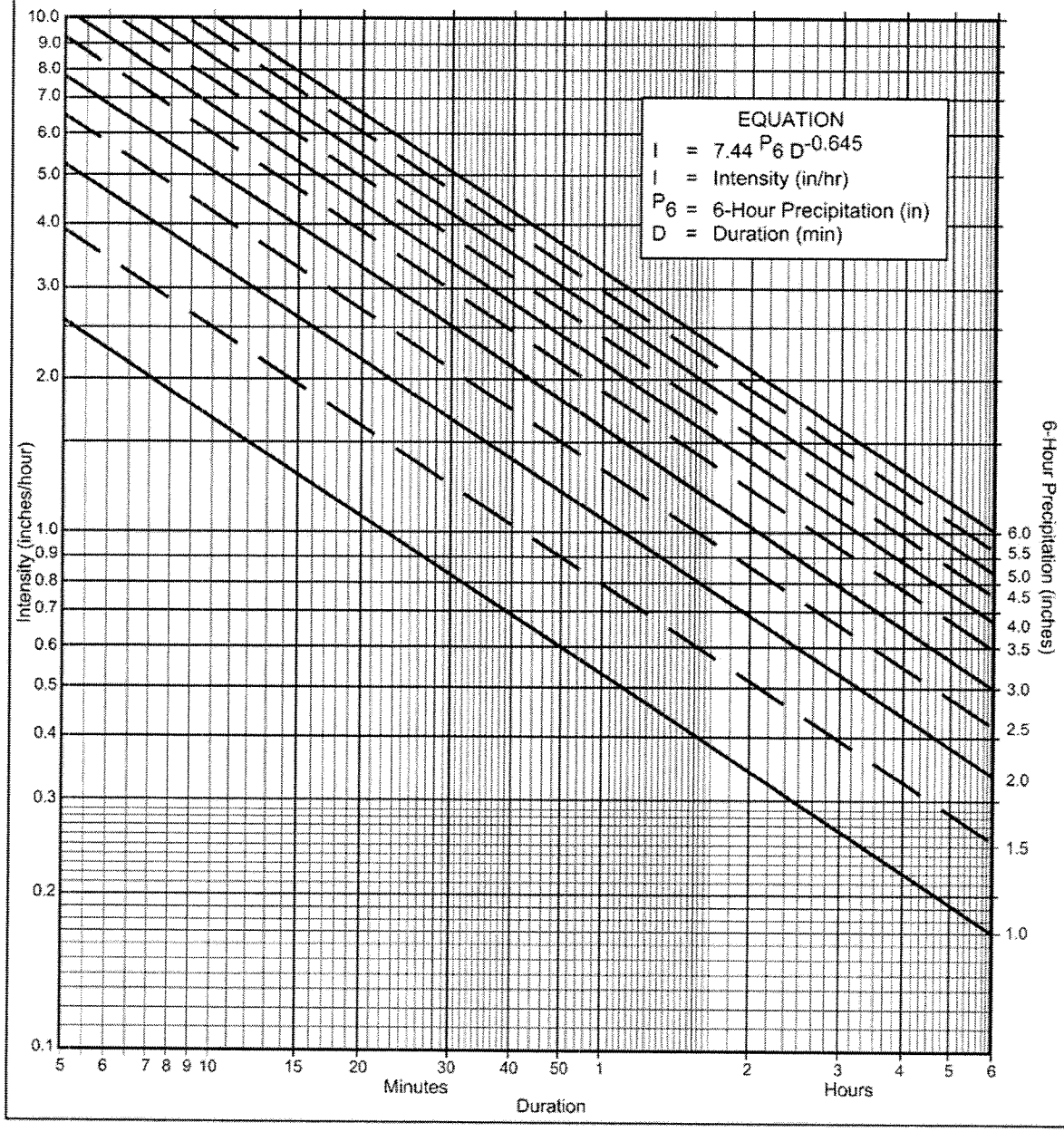
SanGIS
We Have San Diego Covered!

N
W E
S

3 0 3 Miles

Appendix V

100-year Intensity Duration Design Chart



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency 100 year

(b) P_6 = 2.3 in., P_{24} = 4.0, $\frac{P_6}{P_{24}}$ = 58 %(2)

(c) Adjusted P_6(2) = 2.3 in.

(d) t_x = _____ min.

(e) I = _____ in./hr.

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Template

FIGURE 3-1

Priority Development Project
Storm Water Quality Management Plan
FOR
La Jolla Canyon

PTS No. 531066, I.O. No. 24007146

February 15, 2017

Prepared By:
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Job No. UC 20.04-17.15

Prepared For:
La Jolla Canyon Gardens, LLC
C/O Dee Snow
9515 Genesee Ave
San Diego, CA 92121

By: John D. Leppert, RCE 26283
Exp. 3/31/18

3/10/2017
Date

Approved by: City of San Diego Date

TABLE OF CONTENTS

ACRONYMS

APN	Assessor's Parcel Number
ASBS	Area of Special Biological Significance
BMP	Best Management Practice
CEQA	California Environmental Quality Act
CGP	Construction General Permit
DCV	Design Capture Volume
DMA	Drainage Management Areas
ESA	Environmentally Sensitive Area
GLU	Geomorphic Landscape Unit
GW	Ground Water
HMP	Hydromodification Management Plan
HSG	Hydrologic Soil Group
HU	Harvest and Use
INF	Infiltration
LID	Low Impact Development
LUP	Linear Underground/Overhead Projects
MS4	Municipal Separate Storm Sewer System
N/A	Not Applicable
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
PDP	Priority Development Project
PE	Professional Engineer
POC	Pollutant of Concern
SC	Source Control
SD	Site Design
SDRWQCB	San Diego Regional Water Quality Control Board
SIC	Standard Industrial Classification
SWPPP	Stormwater Pollutant Protection Plan
SWQMP	Storm Water Quality Management Plan
TMDL	Total Maximum Daily Load
WMAA	Watershed Management Area Analysis
WPCP	Water Pollution Control Program
WQIP	Water Quality Improvement Plan

CERTIFICATION PAGE

La Jolla Canyon
531066

I hereby declare that I am the Engineer in Responsible Charge of design of storm water BMPs for this project, and that I have exercised responsible charge over the design of the project as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with the requirements of the BMP Design Manual, which is based on the requirements of SDRWQCB Order No. R9-2013-0001 as amended by R9-2015-0001 and R9-2015-0100 (MS4 Permit), and subsequent amendments.

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 Storm Water Standards. 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 source control and site design 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.

JOHN D. LEPPERT
REGISTERED CIVIL ENGINEER – 26283
Exp. 3/31/18

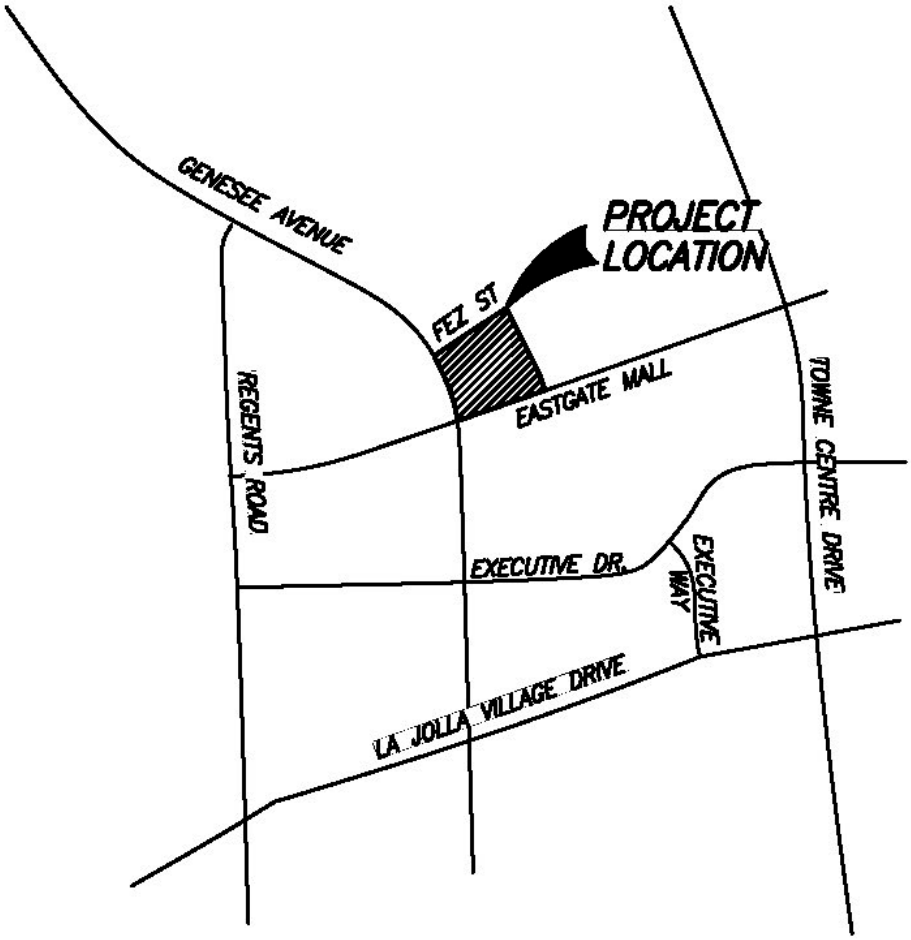
3/10/2017
DATE

Use this Table to keep a record of submittals of this SWQMP. Each time the SWQMP is re-submitted, provide the date and status of the project. In last column indicate changes that have been made or indicate if response to plan check comments is included. When applicable, insert response to plan check comments behind this page.

Submittal Number	Date	Project Status	Changes
1	02/06/2017	☒ Preliminary Design/ Planning/ CEQA ☐ Final Design	Initial Submittal
2		☐ Preliminary Design/ Planning/ CEQA ☐ Final Design	
3		☐ Preliminary Design/ Planning/ CEQA ☐ Final Design	
4		☐ Preliminary Design/ Planning/ CEQA ☐ Final Design	

Project Vicinity Map

La Jolla Canyon
531066



VICINITY MAP
NO SCALE

City of San Diego
Development Services
1222 First Ave., MS-302
San Diego, CA 92101
(619) 446-5000

Storm Water Requirements Applicability Checklist

FORM DS-560
October 2016

Project Address: 9515 Genesee Ave, San Diego, CA 92121

Project Number *(for City Use Only)*: 531066

SECTION 1. Construction Storm Water BMP Requirements:

All construction sites are required to implement construction BMPs in accordance with the performance standards in the Storm Water Standards Manual. Some sites are additionally required to obtain coverage under the State Construction General Permit (CGP)[1], which is administered by the State Water Resources Control Board.

For all projects complete PART A: If project is required to submit a SWPPP or WPCP, continue to PART B.

PART A: Determine Construction Phase Storm Water Requirements.

1. Is the project subject to California's statewide General NPDES permit for Storm Water Discharges Associated with Construction Activities, also known as the State Construction General Permit (CGP)? (Typically projects with land disturbance greater than or equal to 1 acre.)

☐ Yes; SWPPP required, skip questions 2-4 ☒ No; next question

2. Does the project propose construction or demolition activity, including but not limited to, clearing, grading, grubbing, excavation, or any other activity resulting in ground disturbance and contact with storm water runoff?

☒ Yes; WPCP required, skip 3-4 ☐ No; next question

3. Does the project propose routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of the facility? (Projects such as pipeline/utility replacement)

☐ Yes; WPCP required, skip 4 ☐ No; next question

4. Does the project only include the following Permit types listed below?

- Electrical Permit, Fire Alarm Permit, Fire Sprinkler Permit, Plumbing Permit, Sign Permit, Mechanical Permit, Spa Permit.
- Individual Right of Way Permits that exclusively include only ONE of the following activities: water service, sewer lateral, or utility service.
- Right of Way Permits with a project footprint less than 150 linear feet that exclusively include only ONE of the following activities: curb ramp, sidewalk and driveway apron replacement, pot holing, curb and gutter replacement, and retaining wall encroachments.

☐ Yes; no document required

Check one of the boxes below, and continue to PART B:

☐ If you checked "Yes" for question 1, **a SWPPP is REQUIRED. Continue to PART B**

☒ If you checked "No" for question 1, and checked "Yes" for question 2 or 3, **a WPCP is REQUIRED.** If the project proposes less than 5,000 square feet of ground disturbance AND has less than a 5-foot elevation change over the entire project area, a Minor WPCP may be required instead. **Continue to PART B.**

☐ If you checked "No" for all questions 1-3, and checked "Yes" for question 4 PART B **does not apply and no document is required. Continue to Section 2.**

1. More information on the City's construction BMP requirements as well as CGP requirements can be found at: www.sandiego.gov/stormwater/regulations/index.shtml

PART B: Determine Construction Site Priority

This prioritization must be completed within this form, noted on the plans, and included in the SWPPP or WPCP. The city reserves the right to adjust the priority of projects both before and after construction. Construction projects are assigned an inspection frequency based on if the project has a "high threat to water quality." The City has aligned the local definition of "high threat to water quality" to the risk determination approach of the State Construction General Permit (CGP). The CGP determines risk level based on project specific sediment risk and receiving water risk. Additional inspection is required for projects within the Areas of Special Biological Significance (ASBS) watershed. **NOTE:** The construction priority does **NOT** change construction BMP requirements that apply to projects; rather, it determines the frequency of inspections that will be conducted by city staff.

Complete PART B and continued to Section 2

1. ☐ **ASBS**
   a. Projects located in the ASBS watershed.

2. ☐ **High Priority**
   a. Projects 1 acre or more determined to be Risk Level 2 or Risk Level 3 per the Construction General Permit and not located in the ASBS watershed.
   b. Projects 1 acre or more determined to be LUP Type 2 or LUP Type 3 per the Construction General Permit and not located in the ASBS watershed.

3. ☐ **Medium Priority**
   a. Projects 1 acre or more but not subject to an ASBS or high priority designation.
   b. Projects determined to be Risk Level 1 or LUP Type 1 per the Construction General Permit and not located in the ASBS watershed.

4. ☒ **Low Priority**
   a. Projects requiring a Water Pollution Control Plan but not subject to ASBS, high, or medium priority designation.

SECTION 2. Permanent Storm Water BMP Requirements.

Additional information for determining the requirements is found in the Storm Water Standards Manual.

PART C: Determine if Not Subject to Permanent Storm Water Requirements.

Projects that are considered maintenance, or otherwise not categorized as "new development projects" or "redevelopment projects" according to the Storm Water Standards Manual are not subject to Permanent Storm Water BMPs.

If "yes" is checked for any number in Part C, proceed to Part F and check "Not Subject to Permanent Storm Water BMP Requirements".

If "no" is checked for all of the numbers in Part C continue to Part D.

1.	Does the project only include interior remodels and/or is the project entirely within an existing enclosed structure and does not have the potential to contact storm water?	☐ Yes ☒ No
2.	Does the project only include the construction of overhead or underground utilities without creating new impervious surfaces?	☐ Yes ☒ No
3.	Does the project fall under routine maintenance? Examples include, but are not limited to: roof or exterior structure surface replacement, resurfacing or reconfiguring surface parking lots or existing roadways without expanding the impervious footprint, and routine replacement of damaged pavement (grinding, overlay, and pothole repair).	☐ Yes ☒ No

PART D: PDP Exempt Requirements.

PDP Exempt projects are required to implement site design and source control BMPs.

If "yes" was checked for any questions in Part D, continue to Part F and check the box labeled "PDP Exempt."

If "no" was checked for all questions in Part D, continue to Part E.

1. **Does the project ONLY include new or retrofit sidewalks, bicycle lanes, or trails that:**
   - **Are designed and constructed to direct storm water runoff to adjacent vegetated areas, or other non-erodible permeable areas? Or;**
   - **Are designed and constructed to be hydraulically disconnected from paved streets and roads? Or;**
   - **Are designed and constructed with permeable pavements or surfaces in accordance with the Green Streets guidance in the City's Storm Water Standards manual?**

   ☐ Yes; PDP exempt requirements apply ☒ No; next question

2. Does the project ONLY include retrofitting or redeveloping existing paved alleys, streets or roads designed and constructed in accordance with the Green Streets guidance in the City's Storm Water Standards Manual?

   ☐ Yes; PDP exempt requirements apply ☒ No; project not exempt.

PART E: Determine if Project is a Priority Development Project (PDP).

Projects that match one of the definitions below are subject to additional requirements including preparation of a Storm Water Quality Management Plan (SWQMP).

If "yes" is checked for any number in PART E, continue to PART F and check the box labeled "Priority Development Project".

If "no" is checked for every number in PART E, continue to PART F and check the box labeled "Standard Development Project".

1. **New Development that creates 10,000 square feet or more of impervious surfaces collectively over the project site.** This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land. ☒ Yes ☐ No

2. **Redevelopment project that creates and/or replaces 5,000 square feet or more of impervious surfaces on an existing site of 10,000 square feet or more of impervious surfaces.** This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land. ☒ Yes ☐ No

3. **New development or redevelopment of a restaurant.** Facilities that sell prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC 5812), and where the land development creates and/or replace 5,000 square feet or more of impervious surface. ☐ Yes ☒ No

4. **New development or redevelopment on a hillside.** The project creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site) and where the development will grade on any natural slope that is twenty-five percent or greater. ☐ Yes ☒ No

5. **New development or redevelopment of a parking lot that creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site).** ☐ Yes ☒ No

6. **New development or redevelopment of streets, roads, highways, freeways, and driveways.** The project creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site). ☐ Yes ☒ No

7. **New development or redevelopment discharging directly to an Environmentally Sensitive Area.** The project creates and/or replaces 2,500 square feet of impervious surface (collectively over project site), and discharges directly to an Environmentally Sensitive Area (ESA). "Discharging directly to" includes flow that is conveyed overland a distance of 200 feet or less from the project to the ESA, or conveyed in a pipe or open channel any distance as an isolated flow from the project to the ESA (i.e. not commingled with flows from adjacent lands). ☐ Yes ☒ No

8. **New development or redevelopment projects of a retail gasoline outlet (RGO) that create and/or replaces 5,000 square feet of impervious surface.** The development project meets the following criteria: (a) 5,000 square feet or more or (b) has a projected Average Daily Traffic (ADT) of 100 or more vehicles per day. ☐ Yes ☒ No

9. **New development or redevelopment projects of an automotive repair shops that creates and/or replaces 5,000 square feet or more of impervious surfaces.** Development projects categorized in any one of Standard Industrial Classification (SIC) codes 5013, 5014, 5541, 7532-7534, or 7536-7539. ☐ Yes ☒ No

10. **Other Pollutant Generating Project.** The project is not covered in the categories above, results in the disturbance of one or more acres of land and is expected to generate pollutants post construction, such as fertilizers and pesticides. This does not include projects creating less than 5,000 sf of impervious surface and where added landscaping does not require regular use of pesticides and fertilizers, such as slope stabilization using native plants. Calculation of the square footage of impervious surface need not include linear pathways that are for infrequent vehicle use, such as emergency maintenance access or bicycle pedestrian use, if they are built with pervious surfaces of if they sheet flow to surrounding pervious surfaces. ☐ Yes ☒ No

PART F: Select the appropriate category based on the outcomes of PART C through PART E.

1. The project is **NOT SUBJECT TO PERMANENT STORM WATER REQUIREMENTS.** ☐
2. The project is a **STANDARD DEVELOPMENT PROJECT.** Site design and source control BMP requirements apply. See the Storm Water Standards Manual for guidance. ☐
3. The project is **PDP EXEMPT.** Site design and source control BMP requirements apply. See the Storm Water Standards Manual for guidance. ☐
4. The project is a **PRIORITY DEVELOPMENT PROJECT.** Site design, source control, and structural pollutant control BMP requirements apply. See the Storm Water Standards Manual for guidance on determining if project requires a hydromodification plan management ☒

Matt DeVincenzo	Agent for owner
Name of Owner or Agent *(Please Print)*	Title
Signature	02/15/2017 Date

Form I-1: Applicability of Permanent, Post-Construction Storm Water BMP Requirements (Storm Water Intake Form for all Development Permit Applications)	Form I-1:

Project Identification

Project Name: La Jolla Canyon	
Permit Application Number: 531066	Date: February 15, 2017

Determination of Requirements

The purpose of this form is to identify permanent, post-construction requirements that apply to the project. This form serves as a short summary of applicable requirements, in some cases referencing separate forms that will serve as the backup for the determination of requirements.

Answer each step below, starting with Step 1 and progressing through each step until reaching "Stop".
Refer to BMP Design Manual sections and/or separate forms referenced in each step below.

Step	Answer	Progression
Step 1: Is the project a "development project"? See Section 1.3 of the BMP Design Manual for guidance.	☒ Yes	Go to Step 2.
	☐ No	Stop. Permanent BMP requirements do not apply. No SWQMP will be required. Provide discussion below.
Discussion / justification if the project is not a "development project" (e.g., the project includes only interior remodels within an existing building):		
Step 2: Is the project a Standard Project, Priority Development Project (PDP), or exception to PDP definitions? To answer this item, see Section 1.4 of the BMP Design Manual in its entirety for guidance, AND complete Storm Water Requirements Applicability Checklist.	☐ Standard Project	Stop. Standard Project requirements apply.
	☒ PDP	PDP requirements apply, including PDP SWQMP. Go to Step 3.
	☐ Exception to PDP definitions	Stop. Standard Project requirements apply. Provide discussion and list any additional requirements below.
Discussion / justification, and additional requirements for exceptions to PDP definitions, if applicable:		

Form I-1 Page 2		
Step	**Answer**	**Progression**
Step 3. Is the project subject to earlier PDP requirements due to a prior lawful approval? See Section 1.10 of the BMP Design Manual for guidance.	☐ Yes	Consult the City Engineer to determine requirements. Provide discussion and identify requirements below. Go to Step 4.
	☒ No	BMP Design Manual PDP requirements apply. Go to Step 4.
Discussion / justification of prior lawful approval, and identify requirements (not required if prior lawful approval does not apply):		
Step 4. Do hydromodification control requirements apply? See Section 1.6 of the BMP Design Manual for guidance.	☐ Yes	PDP structural BMPs required for pollutant control (Chapter 5) and hydromodification control (Chapter 6). Go to Step 5.
	☒ No	Stop. PDP structural BMPs required for pollutant control (Chapter 5) only. Provide brief discussion of exemption to hydromodification control below.
Discussion / justification if hydromodification control requirements do not apply: Runoff from the proposed development will discharge to an existing 60" storm drain per Dwg. No. 24034-D and Dwg. No. 1964-D. Dwg. No. 1964-D shows the 60" storm drain discharging directly to Mission Bay at an elevation of 4.05' (U.S.C. & G) or 3.38' (NAVD 88). The May 16, 2012 FEMA FIRM map shows Mission Bay as having a base flood elevation of 6.0' (NAVD 88), therefore, the discharge elevation of the 60" drain is below the 100 yr. floodplain elevation. The peak design flow of the 60" storm drain at a grade of 0.16% is 112 c.f.s. The peak discharge velocity has been calculated to be 5.89 ft/sec. Per City of San Diego Standard Drawing No. SDD-104, no energy dissipator is required (discharge velocity less than 6.0 ft/sec.). Per Node 3 of Figure 1-2 of the current Storm Water Standards, the project is exempt from hydromodification management requirements.		
Step 5. Does protection of critical coarse sediment yield areas apply? See Section 6.2 of the BMP Design Manual for guidance.	☐ Yes	Management measures required for protection of critical coarse sediment yield areas (Chapter 6.2). Stop.
	☐ No	Management measures not required for protection of critical coarse sediment yield areas. Provide brief discussion below. Stop.
Discussion / justification if protection of critical coarse sediment yield areas does not apply:		

Site Information Checklist For PDPs	Form I-3B
Project Summary Information	
Project Name	La Jolla Canyon
Project Address	9515 Genesee Ave San Diego, CA 92121
Assessor's Parcel Number(s) (APN(s))	343-140-24-00
Permit Application Number	531066
Project Watershed	Select One: ☐ San Dieguito River ☐ Penasquitos ☒ Mission Bay ☐ San Diego River ☐ San Diego Bay ☐ Tijuana River
Hydrologic subarea name with Numeric Identifier up to two decimal places (9XX.XX)	Miramar-906.40
Parcel Area (total area of Assessor's Parcel(s) associated with the project)	2.94 Acres (128,241 Square Feet)
Area to be disturbed by the project (Project Area)	1.27 Acres (55,166 Square Feet)
Project Proposed Impervious Area (subset of Project Area)	1.02 Acres (44,464 Square Feet)
Project Proposed Pervious Area (subset of Project Area)	0.25 Acres (10,702 Square Feet)
Note: Proposed Impervious Area + Proposed Pervious Area = Area to be Disturbed by the Project. This may be less than the Parcel Area.	
The proposed increase or decrease in impervious area in the proposed condition as compared to the pre-project condition.	5.9% Decreased Imperviousness

Form I-3B Page 2 of 11

Description of Existing Site Condition and Drainage Patterns

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

- ☒ Existing development
- ☐ Previously graded but not built out
- ☐ Agricultural or other non-impervious use
- ☐ Vacant, undeveloped/natural

Description / Additional Information:

The project site is currently a previously developed apartment parking lot.

Existing Land Cover Includes (select all that apply):

- ☐ Vegetative Cover
- ☐ Non-Vegetated Pervious Areas
- ☒ Impervious Areas

Description / Additional Information
The project site cover is primarily composed of the parking lot and the associated carport areas.

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):

- ☐ Watercourses
- ☐ Seeps
- ☐ Springs
- ☐ Wetlands
- ☒ None

Description / Additional Information:

Form I-3B Page 3 of 11

Description of Existing Site Topography and Drainage:

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

1. Whether existing drainage conveyance is natural or urban;
2. If runoff from offsite is conveyed through the site? If yes, quantification of 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 storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, and natural and constructed channels;
4. Identify all discharge locations from the existing project along with a summary of the 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.

Description / Additional Information:

Sub-basin A:
This area is an onsite basin consisting of a paved storage lot and a small offsite fill slope along the Caltrans right of way. Drainage from this basin surface flows via gutter to the existing curb inlet located at the north west corner of the project site.

The site consists of 2 runoff basins, that are roughly divided into the northern portion of the property and the southern portion of the property. The runoff from the northern basin, Basin A, ends up in the canyon on the Eastern side of the property. The runoff gets to the canyon either directly from the site or by discharging to Fez Street, where it then travels down into the canyon. The runoff from the southern basin, Basin B, discharges into either Genesee Avenue or Eastgate Mall, where it travels down the gutter where it is intercepted by the inlet at the corner of Genesee Avenue and Eastgate Mall as shown on City of San Diego Drawing No. 11732-2-D (See Exhibit "C"). The existing land use category for the site is Residential Multi-Units. According to the City of San Diego Drainage Design Manual, residential multi-unit land use has a runoff coefficient of C=0.70, see Appendix II, and this value will be used in analyzing the pre-development runoff from the site. Per the City of San Diego Drainage Design Manual section 1-102.2(3)(a), "For tributary areas under one square mile, the storm drain system shall be designed so that the combination of storm drain system capacity and overflow will be able to carry the 100-year frequency storm without damage to or flooding of adjacent existing buildings or potential building sites." (See Appendix III) From the Isopluvial Maps for a 100-year storm (see Appendix IV) and the Intensity- Duration Design Chart (see Appendix V) from the San Diego County Hydrology Manual, a P6 = 2.3 inches is obtained. This yields the following Time of Concentration (Tc), Intensity (I), and Runoff (Q)

Basin A: Tc = 8.04 minutes
I = 4.46 in/hr
Q = 8.43 cfs
Basin B: Tc = 8.04 minutes
I = 4.46 in/hr
Q = 8.43 cfs

Attachment 5 contains drainage calculations and basin maps for the site.

Form I-3B Page 4 of 11

Description of Proposed Site Development and Drainage Patterns

Project Description / Proposed Land Use and/or Activities:

The project proposes a two level parking structure with a residential project above providing 48 units total on site.

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

The project proposes a two level parking structure with a residential project above providing 48 units total on site.

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

Project frontage and ROW areas adjacent to the project consist of landscaping. Onsite pervious areas are primarily partial retention planters provided for stormwater quality treatment and HMP flow control.

Does the project include grading and changes to site topography?

☒ Yes

☐ No

Description / Additional Information:

The majority of the project area will be covered by a new residential building.

Form I-3B Page 5 of 11

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 and 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.

Description / Additional Information:

The proposed project will plumb all of the onsite Partial Retention area sub-drains through the project site and out to an existing curb inlet located on the northeast corner of the intersection of Genesee Ave and Eastgate Mall.

Form I-3B Page 6 of 11

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

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

Description / Additional Information:

Onsite storm drain inlets

- The proposed development will utilize onsite inlets will be stamped/marked with "No dumping! Flows to Bay." or similar.

Interior floor drains and elevator shaft pumps

- The proposed development will utilize interior floor drains and elevator shaft pumps that will be plumbed to sanitary sewer.

Interior parking garage

- The proposed development will utilize interior parking garage drains that will be plumbed to sanitary sewer.

Landscape/Outdoor Pesticide use

- The proposed development will utilize pest resistant and drought tolerant plant species selected for the site's soil/climate.
- Designing Irrigation Systems for individual area requirements to minimize runoff.
- Utilize rain shutoff devices.

Refuse areas

- All refuse areas provided on-site are enclosed within the subterranean garage.

Fire sprinkler test water

- The proposed development will incorporate fire sprinklers that will discharge into the sanitary sewer during routine maintenance.

Form I-3B Page 7 of 11
Identification and Narrative of Receiving Water
Narrative describing flow path from discharge location(s), through urban storm conveyance system, to receiving creeks, rivers, and lagoons and ultimate discharge location to Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable) The site consists of 2 runoff basins, that are roughly divided into the northern portion of the property and the southern portion of the property. The runoff from the northern basin, Basin A, ends up in the canyon on the Eastern side of the property. The runoff gets to the canyon either directly from the site or by discharging to Fez Street, where it then travels down into the canyon. The runoff from the southern basin, Basin B, discharges into either Genesee Avenue or Eastgate Mall, where it travels down the gutter where it is intercepted by the inlet at the corner of Genesee Avenue and Eastgate Mall as shown on City of San Diego Drawing No. 11732-2-D
Provide a summary of all beneficial uses of receiving waters downstream of the project discharge locations. Rose creek has a listed beneficial use of "Water contact recreation" & :Non-Contact Water Recreatiopn" Mission Bay has a listed beneficial use of "Water contact recreation".
Identify all ASBS (areas of special biological significance) receiving waters downstream of the project discharge locations. There are no ASBS receiving waters downstream of the project location.
Provide distance from project outfall location to impaired or sensitive receiving waters.
Summarize information regarding the proximity of the permanent, post-construction storm water BMPs to the City's Multi-Habitat Planning Area and environmentally sensitive lands There are no MHPA or ESA areas adjacent to the project or its BMPs.

Form I-3B Page 8 of 11

Identification of Receiving Water Pollutants of Concern

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
Rose Creek	Selenium	Expected Completion Date 2019
Rose Creek	Toxicity	Expected Completion Date 2019
Mission Bay Shoreline, at Rose Creek	Eutrophic	Expected Completion Date 2019
Mission Bay Shoreline, at Rose Creek	Lead	Expected Completion Date 2019

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 I-3B Page 9 of 11

Hydromodification Management Requirements

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

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

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

The project site runoff discharges to an existing 60" RCP located across Mission Bay Dr from the project site. From there the runoff travels through approximately 750' of pipe where it is is joined by several other flows before discharging directly into Mission Bay a total of 750' feet from the discharge point.

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?

- ☐ 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. Documentation attached in Attachment 8 of the SWQMP.
- ☐ 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.

Discussion / Additional Information:

Form I-3B 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 (POCs) for flow control for hydromodification management (see Section 6.3.1). For each POC, provide a POC identification name or number correlating to the project's HMP Exhibit and a receiving channel identification name or number correlating to the project's HMP Exhibit.
Has a geomorphic assessment been performed for the receiving channel(s)?   ☐ No, the low flow threshold is 0.1Q2 (default low flow threshold)   ☐ Yes, the result is the low flow threshold is 0.1Q2   ☐ Yes, the result is the low flow threshold is 0.3Q2   ☐ Yes, the result is the low flow threshold is 0.5Q2   If a geomorphic assessment has been performed, provide title, date, and preparer:
Discussion / Additional Information: (optional)

Form I-3B Page 11of 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.
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.

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

Project Identification

Project Name: La Jolla Canyon

Permit Application Number: 531066

Source Control BMPs

All development projects must implement source control BMPs SC-1 through SC-6 where applicable and feasible. See Chapter 4 and Appendix E of the BMP Design Manual for information to implement source control BMPs shown in this checklist.

Answer each category below pursuant to the following.

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

Source Control Requirement	Applied?		
SC-1 Prevention of Illicit Discharges into the MS4	☒ Yes	☐ No	☐ N/A
Discussion / justification if SC-1 not implemented: Manage A/C condensate • The proposed development will direct condensate into landscaped areas wherever feasible.			
SC-2 Storm Drain Stenciling or Signage	☒ Yes	☐ No	☐ N/A
Discussion / justification if SC-2 not implemented: Onsite storm drain inlets • The proposed development will utilize onsite inlets will be stamped/marked with "No dumping! Flows to Bay." or similar.			
SC-3 Protect Outdoor Materials Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	☒ N/A
Discussion / justification if SC-3 not implemented:			
SC-4 Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	☒ N/A
Discussion / justification if SC-4 not implemented:			
SC-5 Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind	☒ Yes	☐ No	☐ N/A
Discussion / justification if SC-5 not implemented: Refuse areas • All refuse areas provided on-site are enclosed within the parking garage.			

Form I-4 Page 2 of 2			
Source Control Requirement	**Applied?**		
SC-6 Additional BMPs Based on Potential Sources of Runoff Pollutants (must answer for each source listed below)			
☒ On-site storm drain inlets	☒ Yes	☐ No	☐ N/A
☒ Interior floor drains and elevator shaft sump pumps	☒ Yes	☐ No	☐ N/A
☒ Interior parking garages	☒ Yes	☐ No	☐ N/A
☐ Need for future indoor & structural pest control	☐ Yes	☐ No	☒ N/A
☒ Landscape/Outdoor Pesticide Use	☒ Yes	☐ No	☐ N/A
☐ Pools, spas, ponds, decorative fountains, and other water features	☐ Yes	☐ No	☒ N/A
☐ Food service	☐ Yes	☐ No	☒ N/A
☒ Refuse areas	☒ Yes	☐ No	☐ N/A
☐ Industrial processes	☐ Yes	☐ No	☒ N/A
☐ Outdoor storage of equipment or materials	☐ Yes	☐ No	☒ N/A
☐ Vehicle and Equipment Cleaning	☐ Yes	☐ No	☒ N/A
☐ Vehicle/Equipment Repair and Maintenance	☐ Yes	☐ No	☒ N/A
☐ Fuel Dispensing Areas	☐ Yes	☐ No	☒ N/A
☐ Loading Docks	☐ Yes	☐ No	☒ N/A
☒ Fire Sprinkler Test Water	☒ Yes	☐ No	☐ N/A
☐ Miscellaneous Drain or Wash Water	☐ Yes	☐ No	☒ N/A
☒ Plazas, sidewalks, and parking lots	☒ Yes	☐ No	☐ N/A
☐ SC-6A: Large Trash Generating Facilities	☐ Yes	☐ No	☒ N/A
☐ SC-6B: Animal Facilities	☐ Yes	☐ No	☒ N/A
☐ SC-6C: Plant Nurseries and Garden Centers	☐ Yes	☐ No	☒ N/A
☐ SC-6D: Automotive-related Uses	☐ Yes	☐ No	☒ N/A

Discussion / justification if SC-6 not implemented. Clearly identify which sources of runoff pollutants are discussed. Justification must be provided for all "No" answers shown above.

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

Site Design BMPs

All development projects must implement site design BMPs SD-1 through SD-8 where applicable and feasible. See Chapter 4 and Appendix E of the BMP Design Manual (Part 1 of Storm Water Standards) for information to implement site design BMPs shown in this checklist.

Answer each category below pursuant to the following.

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

A site map with implemented site design BMPs must be included at the end of this checklist.

Site Design Requirement	Applied?		
SD-1 Maintain Natural Drainage Pathways and Hydrologic Features	☐ Yes	☐ No	☒ N/A
Discussion / justification if SD-1 not implemented: The site is previously developed and as such has no natural areas to conserve. Trees are proposed as a part of the landscaping. But no storm water credits are being taken for their implementation.			
1-1 Are existing natural drainage pathways and hydrologic features mapped on the site map?	☐ Yes	☐ No	☒ N/A
1-2 Are trees implemented? If yes, are they shown on the site map?	☒ Yes	☐ No	☐ N/A
1-3 Implemented trees meet the design criteria in SD-1 Fact Sheet (e.g. soil volume, maximum credit, etc.)?	☐ Yes	☐ No	☒ N/A
1-4 Is tree credit volume calculated using Appendix B.2.2.1 and SD-1 Fact Sheet in Appendix E?	☐ Yes	☐ No	☒ N/A
SD-2 Have natural areas, soils and vegetation been conserved?	☐ Yes	☐ No	☒ N/A
Discussion / justification if SD-2 not implemented: There are no natural areas/vegetation to conserve as the site is >85% impervious in its existing condition.			

Form I-5 Page 2 of 4			
Site Design Requirement	Applied?		
SD-3 Minimize Impervious Area	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-3 not implemented:			
SD-4 Minimize Soil Compaction	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-4 not implemented:			
SD-5 Impervious Area Dispersion	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-5 not implemented:			
5-1 Is the pervious area receiving runon from impervious area identified on the site map?	☒ Yes	☐ No	☐ N/A
5-2 Does the pervious area satisfy the design criteria in SD-5 Fact Sheet in Appendix E (e.g. maximum slope, minimum length, etc.)	☒ Yes	☐ No	☐ N/A
5-3 Is impervious area dispersion credit volume calculated using Appendix B.2.1.1 and SD-5 Fact Sheet in Appendix E?	☐ Yes	☒ No	☐ N/A

Form I-5 Page 3 of 4			
Site Design Requirement	Applied?		
SD-6 Runoff Collection	☐ Yes	☐ No	☒ N/A
Discussion / justification if SD-6 not implemented:			
6a-1 Are green roofs implemented in accordance with design criteria in SD-6A Fact Sheet? If yes, are they shown on the site map?	☐ Yes	☐ No	☒ N/A
6a-2 Is green roof credit volume calculated using Appendix B.2.1.2 and SD-6A Fact Sheet in Appendix E?	☐ Yes	☐ No	☒ N/A
6b-1 Are permeable pavements implemented in accordance with design criteria in SD-6B Fact Sheet? If yes, are they shown on the site map?	☐ Yes	☐ No	☒ N/A
6b-2 Is permeable pavement credit volume calculated using Appendix B.2.1.3 and SD-6B Fact Sheet in Appendix E?	☐ Yes	☐ No	☒ N/A
SD-7 Landscaping with Native or Drought Tolerant Species	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-7 not implemented:			
SD-8 Harvesting and Using Precipitation	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-8 not implemented:			
8-1 Are rain barrels implemented in accordance with design criteria in SD-8 Fact Sheet? If yes, are they shown on the site map?	☐ Yes	☐ No	☒ N/A
8-2 Is rain barrel credit volume calculated using Appendix B.2.2.2 and SD-8 Fact Sheet in Appendix E?	☐ Yes	☐ No	☒ N/A

Form I-5 Page 4 of 4
Insert Site Map with all site design BMPs identified:
Please see Attachment 1 and 4 for the site map and exhibits demonstrating the BMP implementation.

Summary of PDP Structural BMPs	Form I-6

Project Identification

Project Name: La Jolla Canyon

Permit Application Number 531066

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 City at the completion of construction. This includes requiring the project owner or project owner's representative to certify construction of the structural BMPs (complete Form DS-563). PDP structural BMPs must be maintained into perpetuity (see Chapter 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 BMPs selected). For projects requiring hydromodification flow control BMPs, indicate whether pollutant control and flow control BMPs are integrated or separate.

Storm Water Pollutant Control BMP Selection was done using Figures 5-1 & 5-2 "Storm Water Standards BMP Selection Flow Chart" from the City of San Diego BMP Design Manual, dated June 2016. See I-6 sheet 2 & 3 for a summary of each step in the flow chart:

DMA-1 thru DMA-5

Step 1: Evaluate at DMA Scale

- There are two DMAs onsite to account for, see Attachment 4.

Step 1A: Is the DMA "Self-mitigating" or "De Minimis" or "Self-retaining"

- DMAs are "Self-mitigating" or "De Minimis" or "Self-retaining"
  - The project is "Compliant with Pollutant Control BMP Sizing Requirements"

DMA-6:

This DMA is part of the site's source control (SC-6) which is the runoff produced from the parking garage entrance. Runoff from this area will be plumbed to the sanitary system, however the area is included in the DCV calculation for the overall site treatment requirement.

(Continue on page 2 as necessary.)

Form I-6 Page 2 of 3

(Continued from page 1)

DMA-7 thru DMA-10

Step 1: Evaluate at DMA Scale
- There are four DMAs onsite to account for, see Attachment 4.

Step 1A: Is the DMA "Self-mitigating" or "De Minimis" or "Self-retaining"
- DMAs are not "Self-mitigating" or "De Minimis" or "Self-retaining"

Step 1B: Adjust runoff factor to account for site design BMPs and estimate DCV
- DCV calculation performed using Worksheet B.2-1, see Attachment 1e.

Step 2: Is Harvest and Use Feasible
- No, Harvest and Use is not feasible, see calculations in Attachment 1c, based on Worksheet B.3-1.

Step 3: Step 3: Is Infiltration Feasible?
- Yes, partial infiltration is feasible, see Attachment 1d.

Step 3 A&B: Partial Infiltration Condition
- Proceed to Step 3C

Step 3C: Compute Sizing Requirement
- Large footprint Partial Retention with Biofiltration (PR-1) are selected BMP
- Initial sizing performed using 3% ,minimum, surface area per PR-1 fact sheet.

Step 4: Can the BMP be designed for the remaining DCV?
- Yes, based a surface sizing of 3% of the tributary area the BMPs will treat the remaining DCV, see calculations in 1e based on Worksheet B.5-1.

Step 4A:
- The Partial Retention with Biofiltration facilities have been sized based on the PR-1 fact sheets.

Step 6 & 7: The project is "Compliant with Pollutant Control BMP Sizing Requirements".

Form I-6 Page 3 of 3
Structural BMP Summary Information (Copy this page as needed to provide information for each individual proposed structural BMP)
Structural BMP ID No. DMA-7 thru DMA-10
Construction Plan Sheet No. N/A
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☐ Retention by infiltration basin (INF-1) ☐ Retention by bioretention(INF-2) ☐ Retention by permeable pavement (INF-3) ☒ Partial retention by biofiltration with partial retention (PR-1) ☐ Biofiltration (BF-1) ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐ Detention pond or vault for hydromodification management ☐ Other (describe in discussion section below)
Purpose: ☒ Pollutant control only ☐ Hydromodification control only ☐ Combined pollutant control and hydromodification control ☐ Pre-treatment/forebay for another structural BMP Other (describe in discussion section below)

Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification form DS-563	To be determined based upon final design.
Who will be the final owner of this BMP?	To be determined based upon final design.
Who will maintain this BMP into perpetuity?	To be determined based upon final design.
What is the funding mechanism for maintenance?	To be determined based upon final design.

City of San Diego
Development Services
1222 First Ave., MS-501
San Diego, CA 92101

Permanent BMP Construction
Self Certification Form

FORM
DS-563
December 2016

Date Prepared:	Project No./Drawing No.:
Project Applicant:	Phone:
Project Address:	
Project Name:	

The purpose of this form is to verify that the site improvements for the project, identified above, have been constructed in conformance with the approved Storm Water Standards Manual documents and drawings.

This form must be completed by the engineer and submitted prior to final inspection of the construction permit. Completion and submittal of this form is required for Priority Development Projects in order to comply with the City's Storm Water ordinances and applicable San Diego Regional MS4 Permit. Final inspection for occupancy and/or release of grading or public improvement bonds may be delayed if this form is not submitted and approved by the City of San Diego.

Certification:

As the professional in responsible charge for the design of the above project, I certify that I have inspected all constructed Low Impact Development (LID) site design, source control, hydromodification, and treatment control BMP's required per the Storm Water Standards Manual; and that said BMP's have been constructed in compliance with the approved plans and all applicable specifications, permits, ordinances and San Diego Regional MS4 Permit.

I understand that this BMP certification statement does not constitute an operation and maintenance verification.

Signature: _____

Date of Signature: _____

Printed Name: _____

Title: _____

Phone No. _____

Engineer's Stamp

Attachment 1

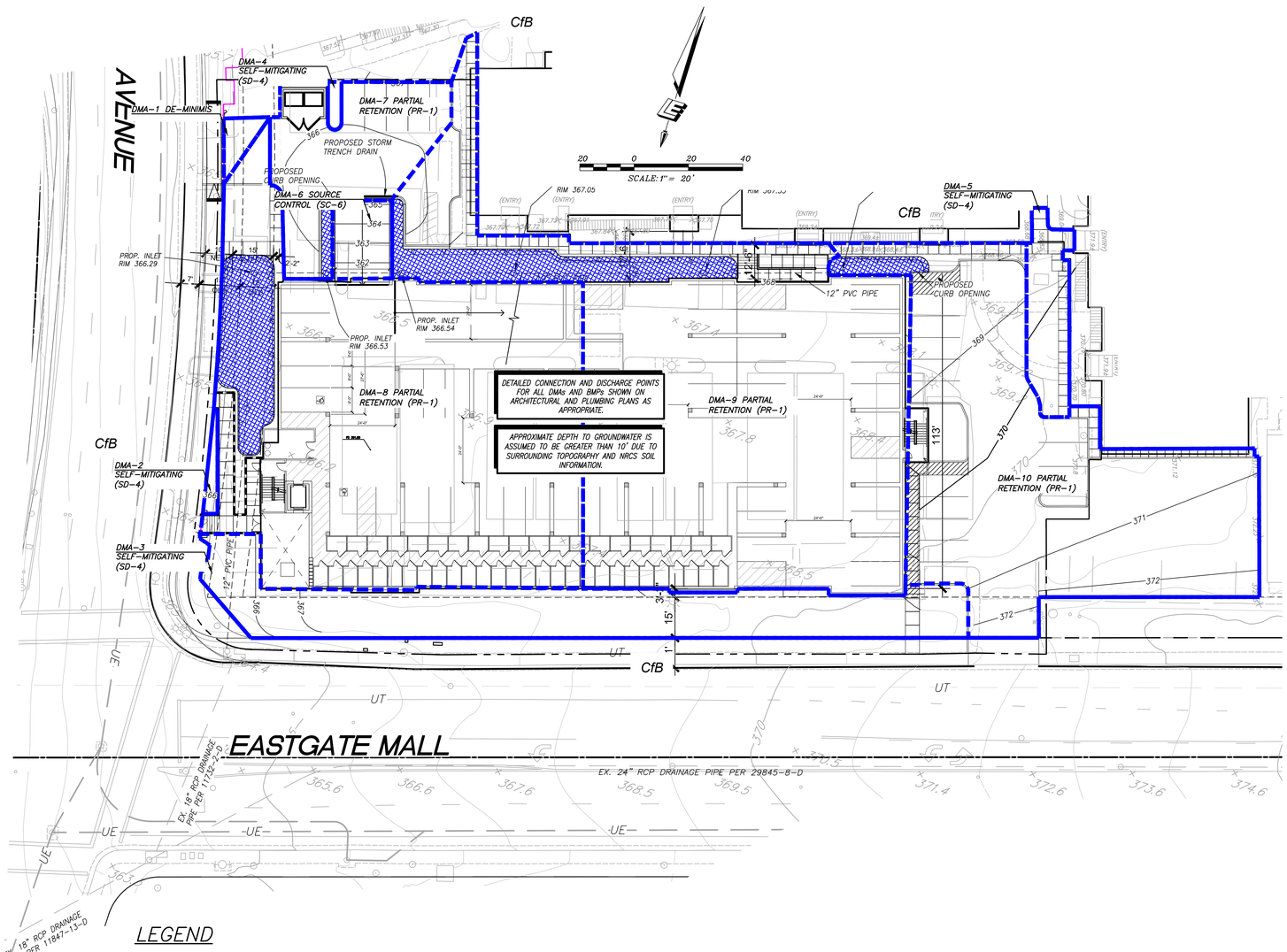
Backup for PDP Pollutant Control BMPs

Items included in this attachment:

Attachment Sequence	Contents	Checklist
Attachment 1a	**DMA Exhibit (Required)** **See DMA Exhibit Checklist.**	**Included**
Attachment 1b	Tabular summary of DMAs showing DMA ID matching DMA Exhibit, DMA Area, and DMA Type (Required)* *Provide table in this Attachment OR on DMA Exhibit in Attachment 1a	☒ Included on DMA exhibit in Attachment 1a ☐ Included as Attachment 1b, separate from DMA Exhibit
Attachment 1c	**Form I-7, Harvest and Use Feasibility Screening Checklist (Required unless the entire project will use infiltration BMPs)** **Refer to Appendix B.3-1 of the BMP design manual to complete Form I-7.**	☒ **Included** ☐ **Not included because the entire project will use infiltration BMPs**
Attachment 1d	Form I-8, Categorization of infiltration feasibility condition (Required unless the project will use harvest and use BMPs) Refer to Appendices C and D of the BMP design manual to complete Form I-8.	☒ Included ☐ Not included because the entire project will use harvest and use BMPs
Attachment 1e	**Pollutant Control BMP Design Worksheets/ Calculations (Required)** **Refer to Appendices B and E of the BMP design manual for structural pollutant control BMP design guidelines**	☒ **Included**

The DMA Exhibit must identify:

- ☐ Underlying hydrologic soil group
- ☐ Approximate depth to groundwater
- ☐ Existing natural hydrologic features (watercourses, seeps, springs, wetlands) Critical coarse sediment yield areas to be protected
- ☐ Existing topography and impervious areas
- ☐ Existing and proposed site drainage network and connections to drainage offsite
- ☐ Proposed grading
- ☐ Proposed impervious features
- ☐ Proposed design features and surface treatments used to minimize imperviousness
- ☐ Drainage management area (DMA) boundaries, DMA ID numbers, and DMA areas (square footage or acreage), and DMA type (i.e., drains to BMP, self-retaining, or self-mitigating)
- ☐ Potential pollutant source areas and corresponding required source controls (see Chapter 4, Appendix E.1, and Form I-3B)
- ☐ Structural BMPs (identify location, type of BMP, and size/detail)



LEGEND

- SUBDIVISION BOUNDARY
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- EX. BUILDING AREA
- EX. IMPERVIOUS A.C./P.C.C.
- EX. PERVIOUS
- PERVIOUS (SD-4)
- BIO-FILTRATION W/ PARTIAL RETENTION (PR-1)

SOILS LEGEND

CfB .....CHESTERTON FINE SANDY LOAM

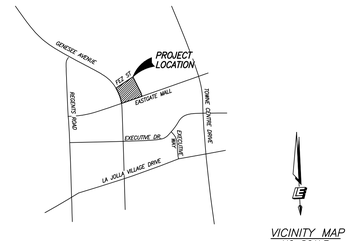
NO.	DATE	BY	DESCRIPTION
6			
5	02/13/17	KS	AGENCY CORRECTIONS
4	12/21/16	KS	AGENCY CORRECTIONS
3	11/25/08	RL	AGENCY CORRECTIONS
2	06/30/08	RL	AGENCY CORRECTIONS
1	4/11/08	NK	ORIGINAL

NO.	DATE	BY	DESCRIPTION
12			
11			
10			
9			
8			
7			

Leppert Engineering CORPORATION
5190 GOVERNOR DRIVE
Suite 205
San Diego, CA 92122
(858) 597-2001

APPROVED BY ENGINEER OF WORK | REGISTRATION R.C.E. 26283
FILE CODE UC 20.04-17.15 | DATE

PREPARATION AND REVISION LOG



VICINITY MAP
NO SCALE

ENGINEER:

LEPPERT ENGINEERING CORPORATION
5190 GOVERNOR DRIVE, SUITE 205
SAN DIEGO, CA 92122

BY: _____ DATE: _____
JOHN D. LEPPERT RCE 26283

REGISTERED PROFESSIONAL ENGINEER — JOHN D. LEPPERT — No. 26283 — CIVIL — STATE OF CALIFORNIA

NAD 83: 1899-6266	NAD 27: 259-1704	P.T.S. 531066	I.O. 24007146

PREPARED BY:
NAME: LEPPERT ENGINEERING CORPORATION
ADDRESS: 5190 GOVERNOR DRIVE, S-205
SAN DIEGO, CA 92122
PHONE #: (858) 597-2001

PROJECT ADDRESS:
9515 GENESEE AVENUE

PROJECT NAME:
LA JOLLA CANYON

REVISION 14: _____
REVISION 13: _____
REVISION 12: _____
REVISION 11: _____
REVISION 10: _____
REVISION 9: _____
REVISION 8: _____
REVISION 7: _____
REVISION 6: _____
REVISION 5: _____
REVISION 4: _____
REVISION 3: _____
REVISION 2: _____
REVISION 1: _____

ORIGINAL DATE: 02/15/17

SHEET TITLE:
ATTACHMENT 1A
AMENDMENT TO SITE DEVELOPMENT PERMIT NO.548029
DMA & EXISTING VS PROPOSED IMPERVIOUS

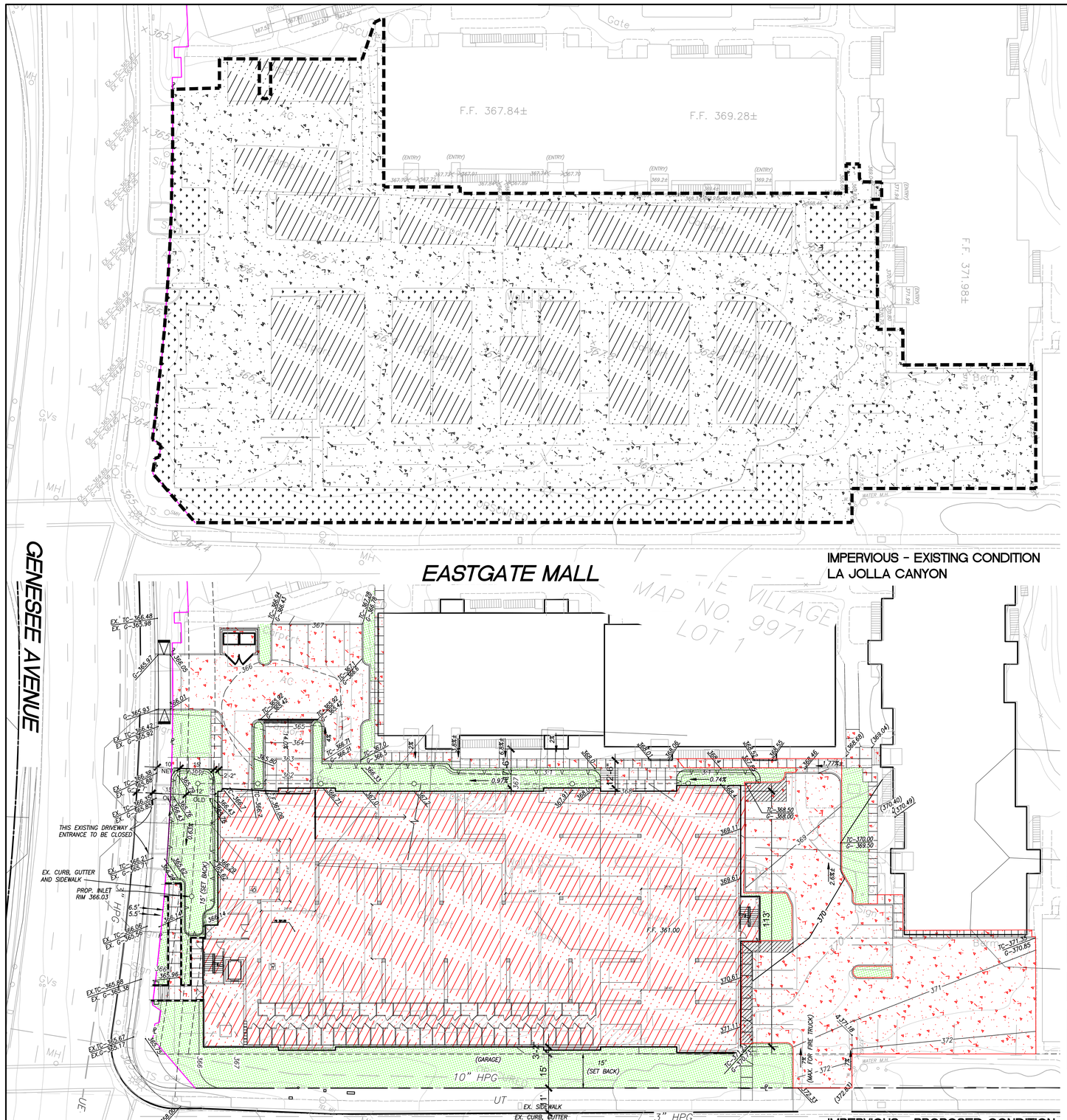
SHEET 1 OF 2
DEP# _____

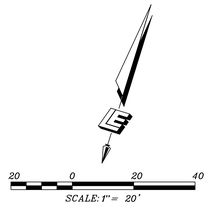
GENESEE AVENUE

EASTGATE MALL

IMPERVIOUS - EXISTING CONDITION
LA JOLLA CANYON

F.F. 367.84±
F.F. 369.28±
F.F. 371.98±
Gate
MAP NO. 9971
LOT 1





LEGEND

- SUBDIVISION BOUNDARY
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- EX. BUILDING AREA
- EX. IMPERVIOUS A.C./P.C.C.
- EX. PERVIOUS
- PERVIOUS (SD-4)
- BIO-FILTRATION W/ PARTIAL RETENTION (PR-1)

SOILS LEGEND

CfB .....CHESTERTON FINE SANDY LOAM

PROPOSED TREATMENT CALCULATIONS

BASIN	AREA (sf)	C FACTOR	Soil Type	Slope (%)	Provide Area (ft²)	Inf. Rate (in/hr)	BMP Type
DMA-01	205	0.90	"D"	≥5%	0	N/A	De-Minimis

BASIN	AREA (sf)	C FACTOR	Soil Type	Slope (%)	Provide Area (ft²)	Inf. Rate (in/hr)	BMP Type
DMA-02	131	0.10	"D"	≥5%	131	0.03	Self Mitigating (SD-4)
DMA-03	5312	0.10	"D"	≥5%	5312	0.03	Self Mitigating (SD-4)
DMA-04	86	0.10	"D"	≥5%	86	0.03	Self Mitigating (SD-4)
DMA-05	1082	0.10	"D"	≥5%	1082	0.03	Self Mitigating (SD-4)

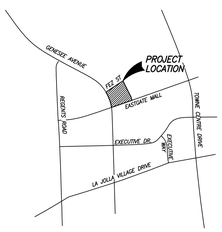
BASIN	AREA (sf)	C FACTOR	Soil Type	Slope (%)	Provide Area (ft²)	Inf. Rate (in/hr)	BMP Type
DMA-06	632	0.90	"D"	≥5%	632	N/A	Source Control (SC-6)

BASIN	AREA (sf)	C FACTOR	Soil Type	Slope (%)	Provide Area (ft²)	Inf. Rate (in/hr)	BMP Type
DMA-07	2971	0.90	"D"	≥5%	80	0.03	Partial Retention (PR-1)
DMA-08	15987	0.90	"D"	≥5%	432	0.03	Partial Retention (PR-1)
DMA-09	17464	0.90	"D"	≥5%	472	0.03	Partial Retention (PR-1)
DMA-10	11296	0.90	"D"	≥5%	305	0.03	Partial Retention (PR-1)

	Impervious		Pervious	
	Area (sf)	%	Area (sf)	%
Pre-Project	47,702	86.5	7,464	13.5
Post-Project	44,464	80.6	10,702	19.4

EASTGATE MALL

IMPERVIOUS - PROPOSED CONDITION
LA JOLLA CANYON



VICINITY MAP
NO SCALE

ENGINEER:

LEPPERT ENGINEERING CORPORATION
5190 GOVERNOR DRIVE, SUITE 205
SAN DIEGO, CA 92122

BY: _____ *DATE:* _____
JOHN D. LEPPERT RCE 26283

REGISTERED PROFESSIONAL ENGINEER — JOHN D. LEPPERT — No. 26283 — CIVIL — STATE OF CALIFORNIA

PREPARED BY:
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SAN DIEGO, CA 92122
PHONE #: (858) 597-2001

PROJECT ADDRESS:
9515 GENESEE AVENUE

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SHEET TITLE:
ATTACHMENT 1A
AMENDMENT TO SITE DEVELOPMENT PERMIT NO.548029
DMA & EXISTING VS PROPOSED IMPERVIOUS

REVISION 14:
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REVISION 1:

ORIGINAL DATE: 02/15/17
SHEET 2 OF 2
DEP#

NAD 83: 1899-6266 | NAD 27: 259-1704 | P.T.S. 531066 | I.O. 24007146

NO.	DATE	BY	DESCRIPTION
6			
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REGISTRATION R C E 26283
FILE CODE UC 20.04-17.15
DATE

PREPARATION AND REVISION LOG

Harvest and Use Feasibility Checklist	Form I-7

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

☒ Toilet and urinal flushing

☐ Landscape irrigation

☐ Other:_____

2. If there is a demand; estimate the anticipated average wet season demand over a period of 36 hours. Guidance for planning level demand calculations for toilet/urinal flushing and landscape irrigation is provided in Section B.3.2.
[Provide a summary of calculations here]

1) Population RM-3-7 = 2.6/DU

2) Total population = 48 DU * 2.6/DU = 124.8 residents

3) Total 24 hr demand = 124.8 * 9.3 gal/day = 1,161 gal/day

4) 36 hr demand = 1,161 gal * 1.5 = 1,742 gal = 233 CF

5) Demand = 233 CF / 1,774 CF = 0.13

3. Calculate the DCV using worksheet B-2.1.
DCV = _____ (cubic feet)

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

Is harvest and use feasible based on further evaluation?

☐ Yes, refer to Appendix E to select and size harvest and use BMPs.

☒ No, select alternate BMPs.

Categorization of Infiltration Feasibility Condition		Form I-8	
Part 1 - Full Infiltration Feasibility Screening Criteria Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?			
Criteria	Screening Question	Yes	No
1	Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	☐	☒
Provide basis: Based upon NRCS soil maps of the area an estimated infiltration rate of 0.0-0.06 in/hr has been identified for the site. Further infiltration testing will be conducted during final engineering, however the rates above are sufficient to allow for the design of the partial infiltration basins shown. Based upon the above data/numbers it is not feasible to infiltrate at 0.5 in/hr or greater, and full infiltration is therefore not feasible. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
2	Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	☐	☒
Provide basis: Based upon NRCS soil maps of the area an estimated infiltration rate of 0.0-0.06 in/hr has been identified for the site. Further infiltration testing will be conducted during final engineering, however the rates above are sufficient to allow for the design of the partial infiltration basins shown. Based upon the above data/numbers it is not feasible to infiltrate at 0.5 in/hr or greater, and full infiltration is therefore not feasible. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			

Form I-8 Page 2 of 4			
Criteria	Screening Question	Yes	No
3	Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☐	☒
Provide basis: Based upon NRCS soil maps of the area an estimated infiltration rate of 0.0-0.06 in/hr has been identified for the site. Further infiltration testing will be conducted during final engineering, however the rates above are sufficient to allow for the design of the partial infiltration basins shown. Based upon the above data/numbers it is not feasible to infiltrate at 0.5 in/hr or greater, and full infiltration is therefore not feasible. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
4	Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☐	☒
Provide basis: Based upon NRCS soil maps of the area an estimated infiltration rate of 0.0-0.06 in/hr has been identified for the site. Further infiltration testing will be conducted during final engineering, however the rates above are sufficient to allow for the design of the partial infiltration basins shown. Based upon the above data/numbers it is not feasible to infiltrate at 0.5 in/hr or greater, and full infiltration is therefore not feasible. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
Part 1 Result*	If all answers to rows 1 - 4 are "Yes" a full infiltration design is potentially feasible. The feasibility screening category is Full Infiltration		☐
	If any answer from row 1-4 is "No", infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a "full infiltration" design. Proceed to Part 2		☒

Form I-8 Page 3 of 4			
Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?			
Criteria	Screening Question	Yes	No
5	Do soil and geologic conditions allow for infiltration in any appreciable rate or volume? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	☒	☐

Provide basis:

Based upon NRCS soil maps of the area an estimated infiltration rate of 0.0-0.06 in/hr has been identified for the site. Further infiltration testing will be conducted during final engineering, however the rates above are sufficient to allow for the design of the partial infiltration basins shown.

Based upon the above data/numbers it is feasible to infiltrate at a design rate of 0.03 in/hr . This is based upon the maximum potential infiltration rate of 0.06 in/hr, with an applied factor of safety of 2 for preliminary design purposes. In final design additional infiltration testing will be conducted.

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

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

Provide basis:

Due to the project elevation as well as its existing development it is not anticipated that there are any un-mitigatable issues with allowing partial infiltration on the site. During final engineering infiltration tests will confirm the design assumptions proposed.

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

Form I-8 Page 4 of 4			
Criteria	Screening Question	Yes	No
7	Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☒	☐
Provide basis: Due to the project elevation as well as its existing development it is not anticipated that there are any un-mitigatable issues with allowing partial infiltration on the site. During final engineering infiltration tests will confirm the design assumptions proposed. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
8	Can infiltration be allowed without violating downstream water rights? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☒	☐
Provide basis: We did not provide a study regarding water rights, however due to the project elevation and lack of on-site streams (ephemeral or otherwise) it is not anticipated that these right would be present on site. These rights are not typical in the San Diego area. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
Part 2 Result*	If all answers from row 5-8 are yes then partial infiltration design is potentially feasible. The feasibility screening category is Partial Infiltration.		☒
	If any answer from row 5-8 is no, then infiltration of any volume is considered to be infeasible within the drainage area. The feasibility screening category is No Infiltration.		☐

SITE DCV FOR HARVEST AND USE ANALYSIS

Design Capture Volume		Worksheet B.2-1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.52	inches
2	Area tributary to BMP (s)	A=	1.27	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.74	unitless
4	Trees Credit Volume	TCV=	0	cubic-feet
5	Rain barrels Credit Volume	RCV=	0	cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	1,774	cubic-feet

1) Area Weighted Runoff Factor

Surfaces	Area(ac)	Factor
Roof & PCC	1.02	0.9
Landscape(Mulched)	0.25	0.1

C=[(1.02 * 0.9) + (0.25 * 0.1)] / (1.27) = 0.74

2) Design Capture Volume without Tree or Rain Barrels Credit Volumes

DCV = (3630 * 0.74 * 0.52 * 1.27) = 1,774 CF

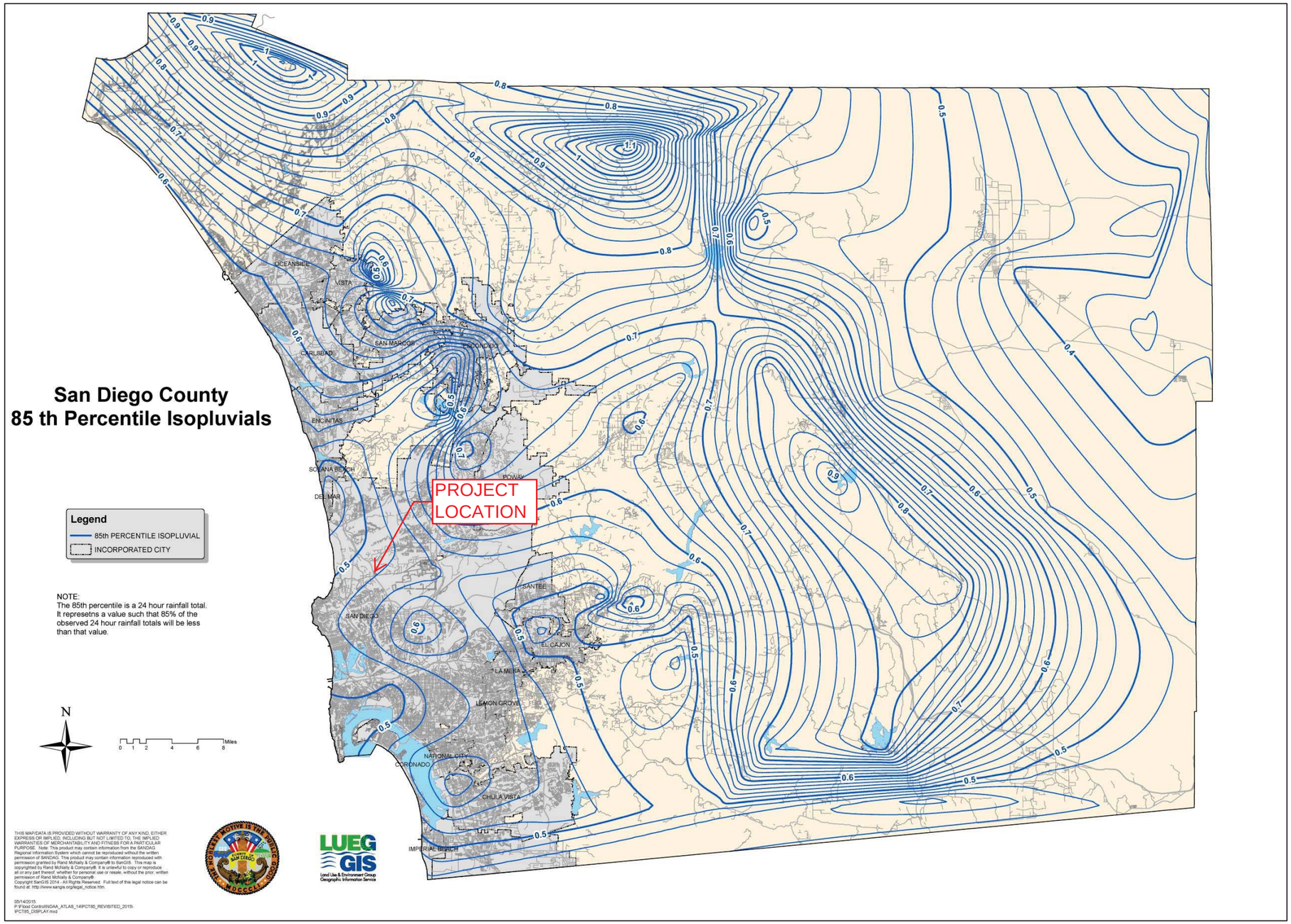


Figure B.1-1: 85th Percentile 24-hour Isopluvial Map

B.1.1 Runoff Factor

Estimate the area weighted runoff factor for the tributary area to the BMP using runoff factor (from Table B.1-1) and area of each surface type in the tributary area and the following equation.

Equation B.1-2: Estimating Runoff Factor for Area

$$C = \frac{\sum C_x A_x}{\sum A_x}$$

where:

C_x = Runoff factor for area X

A_x = Tributary area X (acres)

These runoff factors apply to areas receiving direct rainfall only. For conditions in which runoff is routed onto a surface from an adjacent surface, see Section B.2 for determining composite runoff factors for these areas.

Table B.1-1: Runoff factors for surfaces draining to BMPs – Pollutant Control BMPs

Surface	Runoff Factor
Roofs[1]	0.90
Concrete or Asphalt[1]	0.90
Unit Pavers (grouted)[1]	0.90
Decomposed Granite	0.30
Cobbles or Crushed Aggregate	0.30
Amended, Mulched Soils or Landscape[2]	0.10
Compacted Soil (e.g., unpaved parking)	0.30
Natural (A Soil)	0.10
Natural (B Soil)	0.14
Natural (C Soil)	0.23
Natural (D Soil)	0.30

[1]Surface is considered impervious and could benefit from use of Site Design BMPs and adjustment of the runoff factor per Section B.2.1.

[2]Surface shall be designed in accordance with SD-4 (Amended soils) fact sheet in Appendix E

DMA-7 DCV

Worksheet B.2-1 DCV

Design Capture Volume		Worksheet B.2-1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.52	inches
2	Area tributary to BMP (s)	A=	0.07	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.9	unitless
4	Trees Credit Volume	TCV=	0	cubic-feet
5	Rain barrels Credit Volume	RCV=	0	cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	119	cubic-feet

1) Area Weighted Runoff Factor

Surfaces	Area(ac)	Factor
Roof & PCC	0.08	0.9

C=0.9

2) Design Capture Volume without Tree or Rain Barrels Credit Volumes

DCV = (3630 * 0.9 * 0.52 * 0.08) = 119 CF

DMA-8 DCV

Worksheet B.2-1 DCV

Design Capture Volume		Worksheet B.2-1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.52	inches
2	Area tributary to BMP (s)	A=	0.37	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.9	unitless
4	Trees Credit Volume	TCV=	0	cubic-feet
5	Rain barrels Credit Volume	RCV=	0	cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	629	cubic-feet

1) Area Weighted Runoff Factor

Surfaces	Area(ac)	Factor
Roof & PCC	0.16	0.9
Mulched Soils	0.04	0.1

C=[(0.16 * 0.9) + (0.04 * 0.1)] / (0.20) = 0.74

2) Design Capture Volume without Tree or Rain Barrels Credit Volumes

DCV = (3630 * 0.9 * 0.52 * 0.37) = 629 CF

DMA-9 DCV

Worksheet B.2-1 DCV

Design Capture Volume		Worksheet B.2-1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.52	inches
2	Area tributary to BMP (s)	A=	0.40	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.9	unitless
4	Trees Credit Volume	TCV=	0	cubic-feet
5	Rain barrels Credit Volume	RCV=	0	cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	680	cubic-feet

1) Area Weighted Runoff Factor

Surfaces	Area(ac)	Factor
Roof & PCC	0.05	0.9

C=0.9

2) Design Capture Volume without Tree or Rain Barrels Credit Volumes

DCV = (3630 * 0.9 * 0.52 * 0.40) = 680 CF

DMA-10 DCV

Worksheet B.2-1 DCV

Design Capture Volume		Worksheet B.2-1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.52	inches
2	Area tributary to BMP (s)	A=	0.26	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.9	unitless
4	Trees Credit Volume	TCV=	0	cubic-feet
5	Rain barrels Credit Volume	RCV=	0	cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	442	cubic-feet

1) Area Weighted Runoff Factor

Surfaces	Area(ac)	Factor
Roof & PCC	0.26	0.9

C=0.9

2) Design Capture Volume without Tree or Rain Barrels Credit Volumes

DCV = (3630 * 0.9 * 0.52 * 0.26) = 442 CF

Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs (DMA-7)

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 1 of 2)	
1	Remaining DCV after implementing retention BMPs	119	cubic-feet
Partial Retention			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible	0.03	in/hr.
3	Allowable drawdown time for aggregate storage below the underdrain	36	hours
4	Depth of runoff that can be infiltrated [Line 2 x Line 3]	1.08	inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/ Line 5]	2.7	inches
7	Assumed surface area of the biofiltration BMP	116	sq-ft
8	Media retained pore storage	0.1	in/in
9	Volume retained by BMP [[Line 4 + (Line 12 x Line 8)]/12] x Line 7	28	cubic-feet
10	DCV that requires biofiltration [Line 1 – Line 9]	91	cubic-feet
BMP Parameters			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	6	inches
12	Media Thickness [18 inches minimum], also add mulch layer thickness to this line for sizing calculations	18	inches
13	Aggregate Storage above underdrain invert (12 inches typical) – use 0 inches for sizing if the aggregate is not over the entire bottom surface area	9	inches
14	Freely drained pore storage	0.2	in/in
15	Media filtration rate to be used for sizing (5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate which will be less than 5 in/hr.)	5	in/hr.
Baseline Calculations			
16	Allowable Routing Time for sizing	6	hours
17	Depth filtered during storm [Line 15 x Line 16]	30	inches
18	Depth of Detention Storage [Line 11 + (Line 12 x Line 14) + (Line 13 x Line 5)]	13.2	inches
19	Total Depth Treated [Line 17 + Line 18]	43.2	inches

Note: Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)

Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs (DMA-7)

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 2 of 2)	
Option 1 – Biofilter 1.5 times the DCV			
20	Required biofiltered volume [1.5 x Line 10]	137	cubic- feet
21	Required Footprint [Line 20/ Line 19] x 12	38	sq-ft
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
22	Required Storage (surface + pores) Volume [0.75 x Line 10]	68	cubic- feet
23	Required Footprint [Line 22/ Line 18] x 12	62	sq-ft
Footprint of the BMP			
24	Area draining to the BMP	2,971	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
26	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Worksheet B.5-2, Line 11)	0.03	
27	Minimum BMP Footprint [Line 24 x Line 25 x Line 26]	80	sq-ft
28	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 27)	116	sq-ft
Check for Volume Reduction [Not applicable for No Infiltration Condition]			
29	Calculate the fraction of DCV retained in the BMP [Line 9/Line 1]	0.23	unitless
30	Minimum required fraction of DCV retained for partial infiltration condition	0.375	unitless
31	Is the retained DCV ≥ 0.375? If the answer is no increase the footprint sizing factor in Line 26 until the answer is yes for this criterion.	☐ Yes	☐ No

Note:

1. Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)
2. The DCV fraction of 0.375 is based on a 40% average annual percent capture and a 36-hour drawdown time.
3. The increase in footprint for volume reduction can be optimized using the approach presented in Appendix B.5.2. The optimized footprint cannot be smaller than the alternative minimum footprint sizing factor from Worksheet B.5.2.
4. If the proposed biofiltration BMP footprint is smaller than the alternative minimum footprint sizing factor from Worksheet B.5-2, but satisfies Option 1 or Option 2 sizing, it is considered a compact biofiltration BMP and may be allowed at the discretion of the City Engineer, if it meets the requirements in Appendix F.

Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs (DMA-8)

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 1 of 2)	
1	Remaining DCV after implementing retention BMPs	629	cubic-feet
Partial Retention			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible	0.03	in/hr.
3	Allowable drawdown time for aggregate storage below the underdrain	36	hours
4	Depth of runoff that can be infiltrated [Line 2 x Line 3]	1.08	inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/ Line 5]	2.7	inches
7	Assumed surface area of the biofiltration BMP	1,246	sq-ft
8	Media retained pore storage	0.1	in/in
9	Volume retained by BMP [[Line 4 + (Line 12 x Line 8)]/12] x Line 7	299	cubic-feet
10	DCV that requires biofiltration [Line 1 – Line 9]	330	cubic-feet
BMP Parameters			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	6	inches
12	Media Thickness [18 inches minimum], also add mulch layer thickness to this line for sizing calculations	18	inches
13	Aggregate Storage above underdrain invert (12 inches typical) – use 0 inches for sizing if the aggregate is not over the entire bottom surface area	9	inches
14	Freely drained pore storage	0.2	in/in
15	Media filtration rate to be used for sizing (5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate which will be less than 5 in/hr.)	5	in/hr.
Baseline Calculations			
16	Allowable Routing Time for sizing	6	hours
17	Depth filtered during storm [Line 15 x Line 16]	30	inches
18	Depth of Detention Storage [Line 11 + (Line 12 x Line 14) + (Line 13 x Line 5)]	13.2	inches
19	Total Depth Treated [Line 17 + Line 18]	43.2	inches

Note: Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)

Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs (DMA-8)

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 2 of 2)	
Option 1 – Biofilter 1.5 times the DCV			
20	Required biofiltered volume [1.5 x Line 10]	495	cubic- feet
21	Required Footprint [Line 20/ Line 19] x 12	137	sq-ft
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
22	Required Storage (surface + pores) Volume [0.75 x Line 10]	247	cubic- feet
23	Required Footprint [Line 22/ Line 18] x 12	225	sq-ft
Footprint of the BMP			
24	Area draining to the BMP	15,987	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
26	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Worksheet B.5-2, Line 11)	0.03	
27	Minimum BMP Footprint [Line 24 x Line 25 x Line 26]	432	sq-ft
28	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 27)	1,246	sq-ft
Check for Volume Reduction [Not applicable for No Infiltration Condition]			
29	Calculate the fraction of DCV retained in the BMP [Line 9/Line 1]	0.48	unitless
30	Minimum required fraction of DCV retained for partial infiltration condition	0.375	unitless
31	Is the retained DCV ≥ 0.375? If the answer is no increase the footprint sizing factor in Line 26 until the answer is yes for this criterion.	☐ Yes	☐ No

Note:

1. Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)
2. The DCV fraction of 0.375 is based on a 40% average annual percent capture and a 36-hour drawdown time.
3. The increase in footprint for volume reduction can be optimized using the approach presented in Appendix B.5.2. The optimized footprint cannot be smaller than the alternative minimum footprint sizing factor from Worksheet B.5.2.
4. If the proposed biofiltration BMP footprint is smaller than the alternative minimum footprint sizing factor from Worksheet B.5-2, but satisfies Option 1 or Option 2 sizing, it is considered a compact biofiltration BMP and may be allowed at the discretion of the City Engineer, if it meets the requirements in Appendix F.

Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs (DMA-9)

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 1 of 2)	
1	Remaining DCV after implementing retention BMPs	680	cubic-feet
Partial Retention			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible	0.03	in/hr.
3	Allowable drawdown time for aggregate storage below the underdrain	36	hours
4	Depth of runoff that can be infiltrated [Line 2 x Line 3]	1.08	inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/ Line 5]	2.7	inches
7	Assumed surface area of the biofiltration BMP	1,377	sq-ft
8	Media retained pore storage	0.1	in/in
9	Volume retained by BMP [[Line 4 + (Line 12 x Line 8)]/12] x Line 7	330	cubic-feet
10	DCV that requires biofiltration [Line 1 – Line 9]	350	cubic-feet
BMP Parameters			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	6	inches
12	Media Thickness [18 inches minimum], also add mulch layer thickness to this line for sizing calculations	18	inches
13	Aggregate Storage above underdrain invert (12 inches typical) – use 0 inches for sizing if the aggregate is not over the entire bottom surface area	9	inches
14	Freely drained pore storage	0.2	in/in
15	Media filtration rate to be used for sizing (5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate which will be less than 5 in/hr.)	5	in/hr.
Baseline Calculations			
16	Allowable Routing Time for sizing	6	hours
17	Depth filtered during storm [Line 15 x Line 16]	30	inches
18	Depth of Detention Storage [Line 11 + (Line 12 x Line 14) + (Line 13 x Line 5)]	13.2	inches
19	Total Depth Treated [Line 17 + Line 18]	43.2	inches

Note: Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)

Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs (DMA-9)

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 2 of 2)	
Option 1 – Biofilter 1.5 times the DCV			
20	Required biofiltered volume [1.5 x Line 10]	524	cubic- feet
21	Required Footprint [Line 20/ Line 19] x 12	146	sq-ft
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
22	Required Storage (surface + pores) Volume [0.75 x Line 10]	262	cubic- feet
23	Required Footprint [Line 22/ Line 18] x 12	238	sq-ft
Footprint of the BMP			
24	Area draining to the BMP	17,464	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
26	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Worksheet B.5-2, Line 11)	0.03	
27	Minimum BMP Footprint [Line 24 x Line 25 x Line 26]	472	sq-ft
28	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 27)	1,377	sq-ft
Check for Volume Reduction [Not applicable for No Infiltration Condition]			
29	Calculate the fraction of DCV retained in the BMP [Line 9/Line 1]	0.49	unitless
30	Minimum required fraction of DCV retained for partial infiltration condition	0.375	unitless
31	Is the retained DCV ≥ 0.375? If the answer is no increase the footprint sizing factor in Line 26 until the answer is yes for this criterion.	☐ Yes	☐ No

Note:

1. Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)
2. The DCV fraction of 0.375 is based on a 40% average annual percent capture and a 36-hour drawdown time.
3. The increase in footprint for volume reduction can be optimized using the approach presented in Appendix B.5.2. The optimized footprint cannot be smaller than the alternative minimum footprint sizing factor from Worksheet B.5.2.
4. If the proposed biofiltration BMP footprint is smaller than the alternative minimum footprint sizing factor from Worksheet B.5-2, but satisfies Option 1 or Option 2 sizing, it is considered a compact biofiltration BMP and may be allowed at the discretion of the City Engineer, if it meets the requirements in Appendix F.

Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs (DMA-10)

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 1 of 2)	
1	Remaining DCV after implementing retention BMPs	442	cubic-feet
Partial Retention			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible	0.03	in/hr.
3	Allowable drawdown time for aggregate storage below the underdrain	36	hours
4	Depth of runoff that can be infiltrated [Line 2 x Line 3]	1.08	inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/ Line 5]	2.7	inches
7	Assumed surface area of the biofiltration BMP	239	sq-ft
8	Media retained pore storage	0.1	in/in
9	Volume retained by BMP [[Line 4 + (Line 12 x Line 8)]/12] x Line 7	57	cubic-feet
10	DCV that requires biofiltration [Line 1 – Line 9]	385	cubic-feet
BMP Parameters			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	6	inches
12	Media Thickness [18 inches minimum], also add mulch layer thickness to this line for sizing calculations	18	inches
13	Aggregate Storage above underdrain invert (12 inches typical) – use 0 inches for sizing if the aggregate is not over the entire bottom surface area	9	inches
14	Freely drained pore storage	0.2	in/in
15	Media filtration rate to be used for sizing (5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate which will be less than 5 in/hr.)	5	in/hr.
Baseline Calculations			
16	Allowable Routing Time for sizing	6	hours
17	Depth filtered during storm [Line 15 x Line 16]	30	inches
18	Depth of Detention Storage [Line 11 + (Line 12 x Line 14) + (Line 13 x Line 5)]	13.2	inches
19	Total Depth Treated [Line 17 + Line 18]	43.2	inches

Note: Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)

Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs (DMA-10)

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 2 of 2)	
Option 1 – Biofilter 1.5 times the DCV			
20	Required biofiltered volume [1.5 x Line 10]	577	cubic- feet
21	Required Footprint [Line 20/ Line 19] x 12	160	sq-ft
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
22	Required Storage (surface + pores) Volume [0.75 x Line 10]	288	cubic- feet
23	Required Footprint [Line 22/ Line 18] x 12	262	sq-ft
Footprint of the BMP			
24	Area draining to the BMP	11,296	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
26	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Worksheet B.5-2, Line 11)	0.03	
27	Minimum BMP Footprint [Line 24 x Line 25 x Line 26]	305	sq-ft
28	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 27)	239	sq-ft
Check for Volume Reduction [Not applicable for No Infiltration Condition]			
29	Calculate the fraction of DCV retained in the BMP [Line 9/Line 1]	0.13	unitless
30	Minimum required fraction of DCV retained for partial infiltration condition	0.375	unitless
31	Is the retained DCV ≥ 0.375? If the answer is no increase the footprint sizing factor in Line 26 until the answer is yes for this criterion.	☐ Yes	☐ No

Note:

1. Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)
2. The DCV fraction of 0.375 is based on a 40% average annual percent capture and a 36-hour drawdown time.
3. The increase in footprint for volume reduction can be optimized using the approach presented in Appendix B.5.2. The optimized footprint cannot be smaller than the alternative minimum footprint sizing factor from Worksheet B.5.2.
4. If the proposed biofiltration BMP footprint is smaller than the alternative minimum footprint sizing factor from Worksheet B.5-2, but satisfies Option 1 or Option 2 sizing, it is considered a compact biofiltration BMP and may be allowed at the discretion of the City Engineer, if it meets the requirements in Appendix F.

Attachment 2

Backup for PDP Hydromodification Control Measures

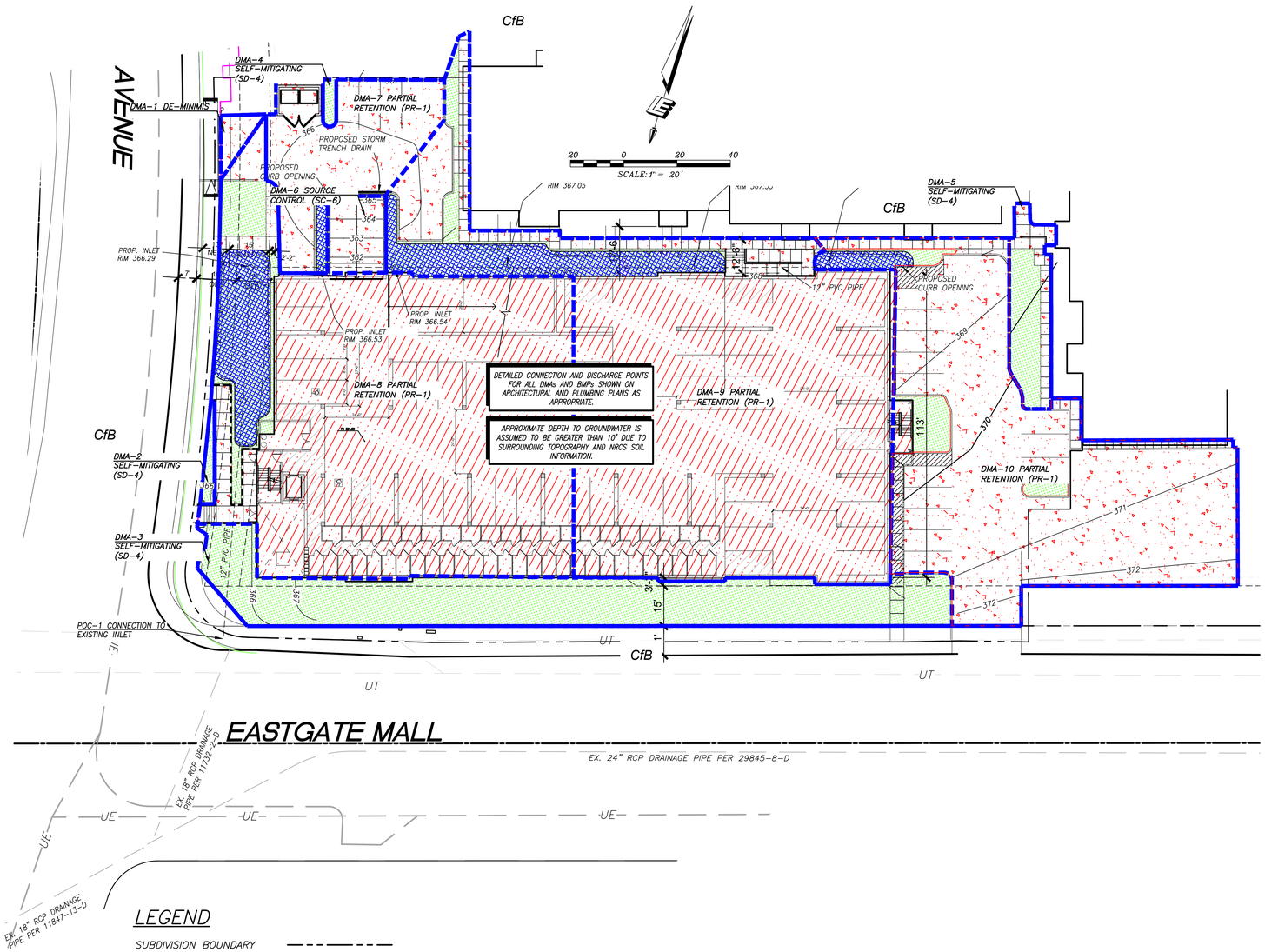
☐ Mark this box if this attachment is empty because the project is exempt from PDP hydromodification management requirements.

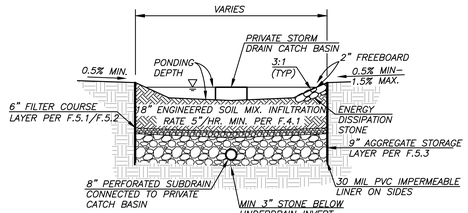
Items included in this attachment:

Attachment Sequence	Contents	Checklist
Attachment 2a	**Hydromodification management exhibit (Required)**	☐ **Included** **See hydromodification management exhibit Checklist.**
Attachment 2b	Management of critical coarse sediment yield areas (WMAA Exhibit is required, additional analyses are optional) See Section 6.2 of the BMP Design Manual.	☐ Exhibit showing project drainage boundaries marked on WMAA critical coarse sediment yield area map (Required) Optional analyses for critical coarse sediment yield area determination ☐ 6.2.1 Verification of geomorphic landscape units onsite ☐ 6.2.2 Downstream systems sensitivity to coarse sediment ☐ 6.2.3 Optional additional analysis of potential critical coarse sediment yield areas onsite
Attachment 2c	**Geomorphic assessment of receiving channels (Optional)** **See section 6.3.4 of the BMP design manual.**	☐ **Not performed** ☐ **Included** ☐ **Submitted as a separate stand-alone document**
Attachment 2d	Flow control facility design and structural BMP drawdown calculations (Required) Overflow design summary for each structural BMP See Chapter 6 and Appendix G of the BMP Design Manual	☐ Included ☐ Submitted as a separate stand-alone document
Attachment 2e	**Vector Control Plan** **(Required when structural BMPs will not drain in 96 hours)**	☐ **Included** ☐ **Not required because BMPs will drain in less than 96 hours**

The Hydromodification Management Exhibit must identify:

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





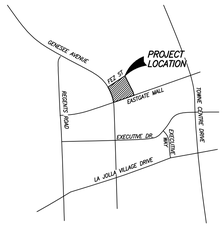
PR DETAIL ~ BIOFILTRATION W/ PARTIAL RETENTION BASIN
NO SCALE

LEGEND

- SUBDIVISION BOUNDARY
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- EX. BUILDING AREA
- EX. IMPERVIOUS A.C./P.C.C.
- EX. PERVIOUS
- PERVIOUS (SD-4)
- BIO-FILTRATION W/ PARTIAL RETENTION (PR-1)

SOILS LEGEND

CfB .....CHESTERTON FINE SANDY LOAM



VICINITY MAP
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4	12/21/16	KS	AGENCY CORRECTIONS	10			
3	11/25/08	RL	AGENCY CORRECTIONS	9			
2	06/30/08	RL	AGENCY CORRECTIONS	8			
1	4/11/08	NK	ORIGINAL	7			

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APPROVED BY ENGINEER OF WORK
REGISTRATION R.C.E. 26283
FILE CODE UC 20.04-17.15
DATE

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9515 GENESEE AVENUE

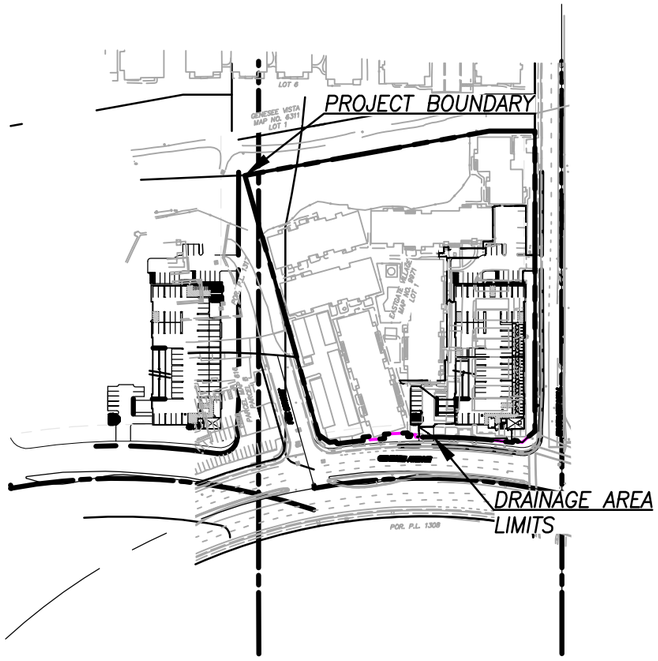
PROJECT NAME:
LA JOLLA CANYON

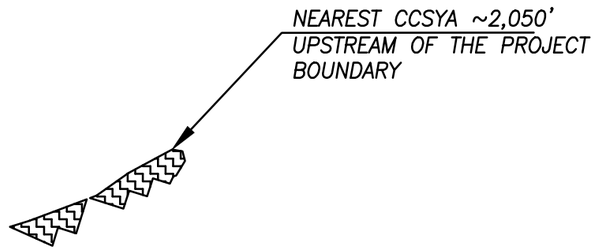
REVISION 14:
REVISION 13:
REVISION 12:
REVISION 11:
REVISION 10:
REVISION 9:
REVISION 8:
REVISION 7:
REVISION 6:
REVISION 5:
REVISION 4:
REVISION 3:
REVISION 2:
REVISION 1:

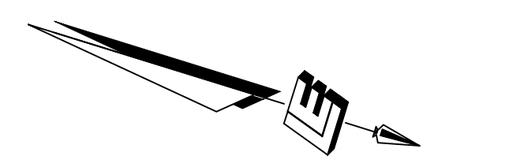
ORIGINAL DATE: 02/15/17

SHEET TITLE:
ATTACHMENT 2A
AMENDMENT TO SITE DEVELOPMENT PERMIT NO.548029
HMP & PROPOSED IMPERVIOUS

SHEET 1 OF 1
DEP#







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SCALE: 1"= 250'

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5			
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1	02/15/17	MFD	ORIGINAL

APPROVED BY ENGINEER OF WORK

REGISTRATION R C E 26283

FILE CODE UC 20.04-17.15

DATE

PREPARATION AND REVISION LOG

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LEGEND

SUBDIVISION BOUNDARY

CRITICAL COURSE SEDIMENT YIELD AREAS

WMAA EXHIBIT
SHEET 1 OF 1
ONE PASEO

Attachment 3

Structural BMP Maintenance Information

Items included in this attachment:

Attachment Sequence	Contents	Checklist
Attachment 3a	Structural BMP maintenance thresholds and actions (Required)	☒ Included (See structural BMP maintenance information checklist.)
Attachment 3b	Maintenance agreement (Form DS-3247) (when applicable)	☐ Included ☒ Not Applicable

Preliminary Design/Planning/CEQA level submittal:

- **Attachment 3a must identify:**

☒ Typical maintenance indicators and actions for proposed structural BMP(s) based on Section 7.7 of the BMP Design Manual

- Attachment 3b is not required for preliminary design / planning / CEQA level submittal.

Final Design level submittal:

Attachment 3a must identify:

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

Attachment 3b: For private entity operation and maintenance, Attachment 3b must include a Storm Water Management and Discharge Control Maintenance Agreement (Form DS-3247). The following information must be included in the exhibits attached to the maintenance agreement:

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

Table 7-2. Maintenance Indicators and Actions for Vegetated BMPs

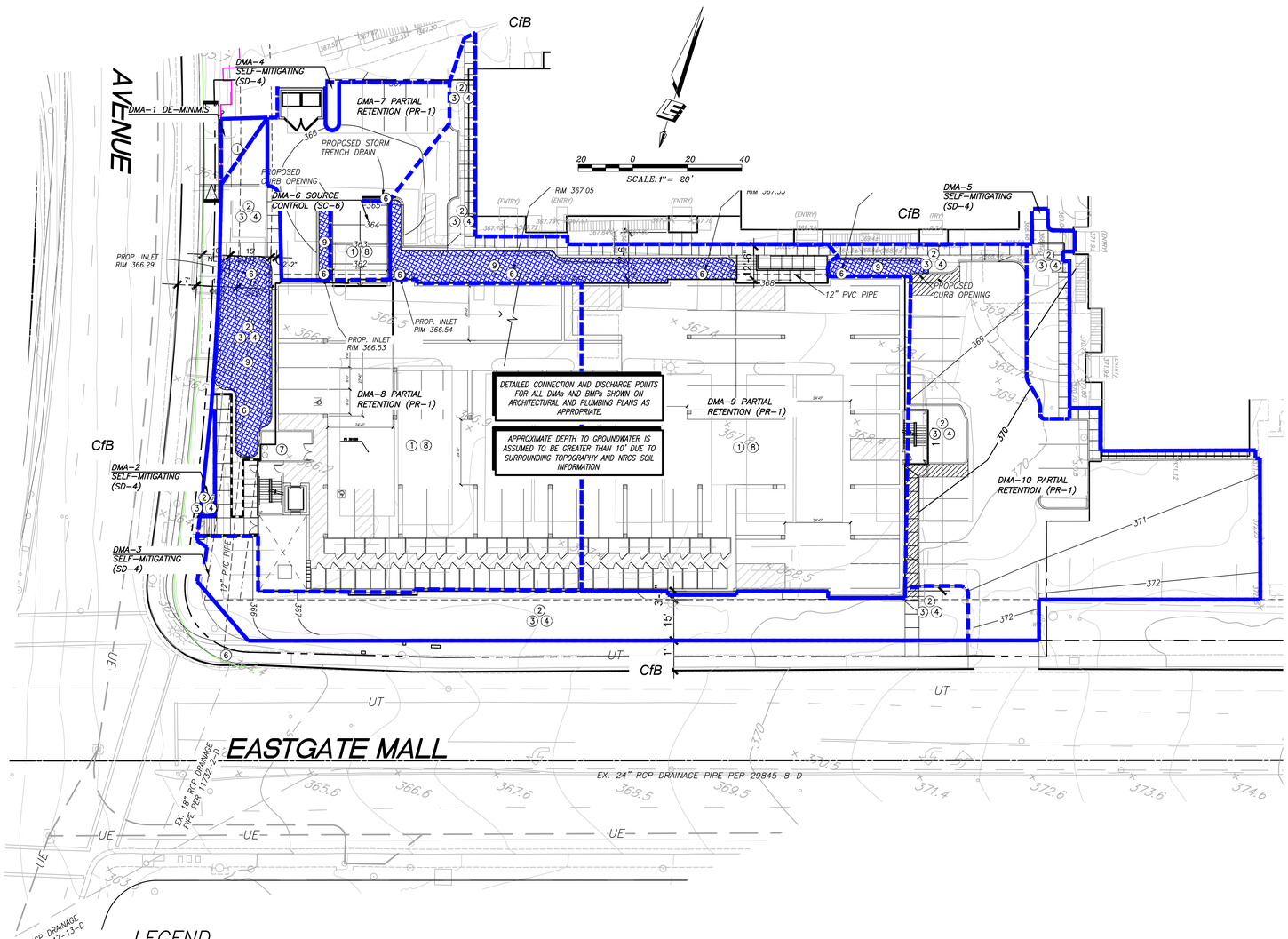
Typical Maintenance Indicator(s) for Vegetated BMPs	Maintenance Actions
Accumulation of sediment, litter, or debris	Remove and properly dispose of accumulated materials, without damage to the vegetation.
Poor vegetation establishment	Re-seed, re-plant, or re-establish vegetation per original plans.
Overgrown vegetation	Mow or trim as appropriate, but not less than the design height of the vegetation per original plans when applicable (e.g. a vegetated swale may require a minimum vegetation height).
Erosion due to concentrated irrigation flow	Repair/re-seed/re-plant eroded areas and adjust the irrigation system.
Erosion due to concentrated storm water runoff flow	Repair/re-seed/re-plant eroded areas, and make appropriate corrective measures such as adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan. If the issue is not corrected by restoring the BMP to the original plan and grade, the City Engineer shall be contacted prior to any additional repairs or reconstruction.
Standing water in vegetated swales	Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, loosening or replacing top soil to allow for better infiltration, or minor re-grading for proper drainage. If the issue is not corrected by restoring the BMP to the original plan and grade, the City Engineer shall be contacted prior to any additional repairs or reconstruction.
Standing water in bioretention, biofiltration with partial retention, or biofiltration areas, or flow-through planter boxes for longer than 96 hours following a storm event*	Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, clearing underdrains (where applicable), or repairing/replacing clogged or compacted soils.
Obstructed inlet or outlet structure	Clear obstructions.
Damage to structural components such as weirs, inlet or outlet structures	Repair or replace as applicable.
*These BMPs typically include a surface ponding layer as part of their function which may take 96 hours to drain following a storm event.	

Attachment 4

Permanent Storm Water BMP Plan

The BMP plan must identify:

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



LEGEND

- SUBDIVISION BOUNDARY
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- EX. BUILDING AREA
- EX. IMPERVIOUS A.C./P.C.C.
- EX. PERVIOUS
- PERVIOUS (SD-4)
- BIO-FILTRATION W/ PARTIAL RETENTION (PR-1)

SOILS LEGEND

CfB .....CHESTERTON FINE SANDY LOAM

IV. STANDARD/PRIORITY PERMANENT BEST MANAGEMENT PRACTICES (BMP'S)

LOW IMPACT DESIGN (LID) BMP'S:

1. MINIMIZE IMPERVIOUS FOOTPRINT THROUGH EFFICIENT DESIGN, INCORPORATING MULTI-LEVEL RESIDENTIAL BUILDINGS, INDOOR PARKING, SHARED DRIVEWAYS AND MINIMUM WIDTHS ON IMPERVIOUS SURFACES (SD-3)
2. LANDSCAPE AREAS TO BE MULCHED (SD-4)
3. DRAIN SIDEWALKS TO ADJACENT LANDSCAPING (SD-5)
4. USE OF PEST RESISTANT AND DROUGHT TOLERANT LANDSCAPING (SD-7)

SOURCE CONTROL BMP'S:

5. DRAIN A/C CONDENSATE TO LANDSCAPE AREAS (SC-1)
6. STENCIL OR STAMP ALL STORM DRAIN INLETS WITH WARNINGS TO DISCOURAGE "ILLEGAL" DUMPING OR DISCHARGE INTO THE STORM DRAIN SYSTEM (SC-2)
7. DESIGN TRASH STORAGE AREAS TO REDUCE POLLUTION CONTRIBUTION (SC-5)
8. INTERIOR PARKING GARAGE DRAINS PLUMBED TO SANITARY SYSTEM (SC-6)

TREATMENT CONTROL BMP'S:

9. USE OF BIOFILTRATION WITH PARTIAL RETENTION TO FILTER RUNOFF (PR-1)

V. CONSTRUCTION STORM WATER BMP PERFORMANCE STANDARDS

A) A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) WILL BE REQUIRED PRIOR TO THE ISSUANCE OF ANY CONSTRUCTION PERMITS FOR THE PROJECT.

B) THE PERMITEE OR DESIGNEE SHALL INCORPORATE ANY CONSTRUCTION BEST MANAGEMENT PRACTICES (BMP'S) NECESSARY TO COMPLY WITH CHAPTER 14, ARTICLE 2, DIVISION 1 (GRADING REGULATIONS) OF THE LAND DEVELOPMENT CODE, INTO THE CONSTRUCTION PLANS AND/OR SPECIFICATIONS, SATISFACTORY TO THE CITY ENGINEER, PRIOR TO THE ISSUANCE OF ANY CONSTRUCTION PERMITS.

VI. IMPLEMENTATION AND MAINTENANCE REQUIREMENTS

A) THE PERMITEE OR DESIGNEE SHALL EXECUTE A MAINTENANCE AGREEMENT FOR ONGOING PERMANENT BMP MAINTENANCE, SATISFACTORY TO THE CITY ENGINEER, PRIOR TO THE ISSUANCE OF ANY CONSTRUCTION PERMITS FOR THE PROJECT.

VICINITY MAP
NO SCALE

NO.	DATE	BY	DESCRIPTION
6			
5	02/13/17	KS	AGENCY CORRECTIONS
4	12/21/16	KS	AGENCY CORRECTIONS
3	11/25/08	RL	AGENCY CORRECTIONS
2	06/30/08	RL	AGENCY CORRECTIONS
1	4/11/08	NK	ORIGINAL

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12			
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FILE CODE UC 20.04-17.15
DATE

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9515 GENESEE AVENUE

PROJECT NAME:
LA JOLLA CANYON

REVISION 14: _____
REVISION 13: _____
REVISION 12: _____
REVISION 11: _____
REVISION 10: _____
REVISION 9: _____
REVISION 8: _____
REVISION 7: _____
REVISION 6: _____
REVISION 5: _____
REVISION 4: _____
REVISION 3: _____
REVISION 2: _____
REVISION 1: _____

ORIGINAL DATE: 02/15/17

SHEET TITLE:
ATTACHMENT 4
AMENDMENT TO SITE DEVELOPMENT PERMIT NO.548029
BMP PLAN

SHEET 1 OF 2
DEP# _____

F.4. BIORETENTION SOIL MEDIA (BSM)

F.4.1 GENERAL

BIORETENTION SOIL MEDIA (BSM) IS A FORMULATED SOIL MIXTURE THAT IS INTENDED TO FILTER STORM WATER AND SUPPORT PLANT GROWTH. WHILE MINIMIZING THE LEACHING OF CHEMICALS FOUND IN THE BSM ITSELF. BSM CONSISTS OF 70% TO 85% BY VOLUME WASHED SAND AND 15% TO 30% BY VOLUME COMPOST OR ALTERNATIVE ORGANIC AMENDMENT. ALTERNATIVE PROPORTIONS MAY BE JUSTIFIED UNDER CERTAIN CONDITIONS. BSM SHALL BE MIXED THOROUGHLY USING A MECHANICAL MIXING SYSTEM AT THE PLANT SITE PRIOR TO DELIVERY. IN ORDER TO REDUCE THE POTENTIAL FOR LEACHING OF NUTRIENTS, THE PROPORTION OF COMPOST OR ALTERNATIVE ORGANIC AMENDMENT SHALL BE HELD TO A MINIMUM LEVEL THAT WILL SUPPORT THE PROPOSED VEGETATION IN THE SYSTEM.

F.4.1.1 SAND FOR BIORETENTION SOIL MEDIA

THE SAND SHALL CONFORM TO ASTM C.33 "FINE AGGREGATE CONCRETE SAND" REQUIREMENTS. A SIEVE ANALYSIS SHALL BE PERFORMED IN ACCORDANCE WITH ASTM C 136, ASTM D 422, OR APPROVED EQUIVALENT METHOD TO DEMONSTRATE COMPLIANCE WITH THE GRADATION LIMITS SHOWN IN TABLE F.4–1. THE SAND SHALL BE THOROUGHLY WASHED TO REMOVE FINES, DUST, AND DELETERIOUS MATERIALS PRIOR TO DELIVERY. FINES PASSING THE NO. 200 SIEVE SHALL BE NON–PLASTIC.

TABLE F.4–1 STANDARD GRADATION LIMITS

SIEVE SIZE (ASTM D422)	PERCENT PASSING SIEVE (BY WEIGHT) MINIMUM	MAXIMUM
3/8 INCH	100	100
#4	95	100
#8	80	100
#16	50	85
#30	25	60
#50	3	30
#100	0	10
#200	0	5

NOTE: COEFFICIENT OF UNIFORMITY (C_U=D60/D10 EQUAL TO OR GREATER THAN 4

F.4.1.2 COMPOST.

COMPOST SHALL BE CERTIFIED BY THE U.S. COMPOSTING COUNCIL'S SEAL OF TESTING ASSURANCE PROGRAM OR AN APPROVED EQUIVALENT PROGRAM. COMPOST SHALL COMPLY WITH THE FOLLOWING REQUIREMENTS:

1. ORGANIC MATERIAL CONTENT SHALL BE 35% TO 75% BY DRY WEIGHT.
2. CARBON TO NITROGEN (C:N) RATIO SHALL BE BETWEEN 15:1 AND 40:1, PREFERABLY ABOVE 20:1 TO REDUCE THE POTENTIAL FOR NITROGEN LEACHING/WASHOUT.
3. PHYSICAL CONTAMINANTS (MANMADE INERT MATERIALS) SHALL NOT EXCEED 1% BY DRY WEIGHT.
4. PH SHALL BE BETWEEN 6.0 AND 7.5.
5. SOLUBLE SALT CONCENTRATION SHALL BE LESS THAN 10 DS/M (METHOD TMECC 4.10– A, USDA AND U.S. COMPOSTING COUNCIL).
6. MATURITY (SEED EMERGENCE AND SEEDLING VIGOR) SHALL BE GREATER THAN 80% RELATIVE TO POSITIVE CONTROL (METHOD TMECC 5.05–A, USDA AND U.S. COMPOSTING COUNCIL)
7. STABILITY (CARBON DIOXIDE EVOLUTION RATE) SHALL BE LESS THAN 2.5 MG CO_2–C PER G COMPOST ORGANIC MATTER (OM) PER DAY OR LESS THAN 5 MG CO_2–C PER G COMPOST CARBON PER DAY, WHICHEVER UNIT IS REPORTED. (METHOD TMECC 5.08– B, USDA AND U.S. COMPOSTING COUNCIL). ALTERNATIVELY A SOLVITA RATING OF 6 OR HIGHER IS ACCEPTABLE.
8. MOISTURE SHALL BE 25%–55% WET WEIGHT BASIS.
9. SELECT PATHOGENS SHALL PASS US EPA CLASS A STANDARD, 40 CFR SECTION 503.32(A).
10. TRACE METALS SHALL PASS US EPA CLASS A STANDARD, 40 CFR SECTION 503.13, TABLES 1 AND 3.
11. SHALL BE WITHIN GRADATION LIMITS IN TABLE F.4–2 (ASTM D 422 SIEVE ANALYSIS OR APPROVED EQUIVALENT).

TABLE F.4–2 COMPOST GRADATION LIMITS

SIEVE SIZE	PERCENT PASSING (BY WEIGHT)
16 MM (5/8")	99 TO 100
6.3 MM (1/4")	40 TO 95
2 MM	40 TO 90

F.4.1.3 ALTERNATIVE MIX COMPONENTS AND PROPORTIONS.

ALTERNATIVE MIX COMPONENTS AND PROPORTIONS MAY BE UTILIZED, PROVIDED THAT THE WHOLE BLENDED MIX (F.4.2) CONFORMS TO AGRICULTURAL, CHEMICAL, AND HYDRAULIC SUITABILITY CRITERIA, AS APPLICABLE. ALTERNATIVE MIX DESIGNS MAY INCLUDE ALTERNATIVE PROPORTIONS, ALTERNATIVE ORGANIC AMENDMENTS AND/OR THE USE OF NATURAL SOILS. ALTERNATIVE MIXES ARE SUBJECT TO APPROVAL BY THE CITY ENGINEER.

ALTERNATIVE MIXTURES MAY BE PARTICULARLY APPLICABLE FOR SYSTEMS WITH UNDERDRAINS IN AREAS WHERE PHOSPHORUS IS ASSOCIATED WITH A WATER QUALITY IMPAIRMENT OR A TOTAL MAXIMUM DAILY LOAD (TMDL) IN A DOWNSTREAM RECEIVING WATER. BSM WITH 15% TO 30% COMPOST BY VOLUME (AS SPECIFIED IN F.4.1.3) WILL LIKELY CONTRIBUTE TO INCREASED PHOSPHORUS IN EFFLUENT. ALTERNATIVE ORGANIC AMENDMENTS, SUCH AS COCO CORE PITH, IN PLACE OF COMPOST SHOULD BE CONSIDERED IN THESE AREAS. A SAND OR SOIL SUBSTRATE WITH LOW PLANT AVAILABLE PHOSPHORUS (< 5 MG/KG) SHOULD ALSO BE CONSIDERED. THE USE OF COMPOST IN THESE MIXES SHOULD BE LIMITED TO THE TOP THREE TO SIX INCHES OF SOIL AND LIMITED TO THE MINIMUM LEVEL NEEDED TO AUGMENT FERTILITY. ADDITIONALLY, AN ACTIVATED ALUMINA POLISHING LAYER CAN BE CONSIDERED TO CONTROL PHOSPHORUS LEACHING.

ADDITIONAL MIX COMPONENTS, SUCH AS GRANULAR ACTIVATED CARBON, ZEOLITE, AND BIOCHAR MAY BE CONSIDERED TO IMPROVE PERFORMANCE FOR OTHER PARAMETERS.

F.4.2 WHOLE BSM TESTING REQUIREMENTS AND CRITERIA.

THE CONTRACTOR SHALL SUBMIT THE FOLLOWING INFORMATION TO THE CITY ENGINEER AT LEAST 30 DAYS PRIOR TO ORDERING MATERIALS:

A) SOURCE/SUPPLIER OF BSM,
B) LOCATION OF SOURCE/SUPPLIER,
C) A PHYSICAL SAMPLE,
D) AVAILABLE SUPPLIER TESTING INFORMATION,
E) WHOLE BSM TEST RESULTS FROM A THIRD PARTY INDEPENDENT LABORATORY,
D) DESCRIPTION OF PROPOSED METHODS AND SCHEDULE FOR MIXING, DELIVERY, AND PLACEMENT OF BSM.

TEST RESULTS SHALL BE NO OLDER THAN 120 DAYS AND SHALL ACCURATELY REPRESENT THE MATERIALS AND FEED STOCKS THAT ARE CURRENTLY AVAILABLE FROM THE SUPPLIER.

TEST RESULTS SHALL DEMONSTRATE CONFORMANCE TO AGRICULTURAL SUITABILITY CRITERIA (F.4.2.1), CHEMICAL SUITABILITY CRITERIA (F.4.2.2), AND HYDRAULIC SUITABILITY CRITERIA (F.4.2.3). NO DELIVERY, PLACEMENT, OR PLANTING OF BSM SHALL BEGIN UNTIL TEST RESULTS CONFIRM THE SUITABILITY OF THE BSM. THE CONTRACTOR SHALL SUBMIT A WRITTEN REQUEST FOR APPROVAL WHICH SHALL BE ACCOMPANIED BY WRITTEN ANALYSIS RESULTS FROM A WRITTEN REPORT OF A TESTING AGENCY. THE TESTING AGENCY MUST BE REGISTERED BY THE STATE FOR AGRICULTURAL SOIL EVALUATION WHICH INDICATES COMPLIANCE STATING THAT THE TESTED MATERIAL PROPOSED SOURCE COMPLIES WITH THESE SPECIFICATIONS. THIRD PARTY INDEPENDENT LABORATORY TESTS SHALL BE PAID FOR BY THE CONTRACTOR.

F.4.2.1 BSM AGRICULTURAL SUITABILITY

THE BSM SHALL BE SUITABLE TO SUSTAIN THE GROWTH OF THE PLANTS SPECIFIED AND SHALL CONFORM TO THE FOLLOWING REQUIREMENTS:

A) PH RANGE SHALL BE BETWEEN 6.0–7.5
B) SALINITY SHALL BE LESS THAN 3.0 MILLIMHO/CM (AS MEASURED BY ELECTRICAL CONDUCTIVITY)
C) SODIUM ADSORPTION RATION (SAR) SHALL BE LESS THAN 3.0
D) CHLORIDE SHALL BE LESS THAN 150 PPM

THE TEST RESULTS SHALL SHOW THE FOLLOWING INFORMATION:

A) DATE OF TESTING B) PROJECT NAME
C) THE CONTRACTOR'S NAME
D) SOURCE OF MATERIALS AND SUPPLIER'S NAME
E) PH
F) Ex
G) TOTAL AND PLANT AVAILABLE ELEMENTS (MG/KG PARTICLE CONCENTRATION): PHOSPHORUS, POTASSIUM, IRON, MANGANESE, ZINC, COPPER, BORON, CALCIUM, MAGNESIUM, SODIUM, SULFUR, MOLYBDENUM, NICKEL, ALUMINUM, ARSENIC, BARIUM, CADMIUM, CHROMIUM, COBALT, LEAD, LITHIUM, MERCURY, SELENIUM, SILVER, STRONTIUM, TIN, AND VANADIUM. PLANT AVAILABLE CONCENTRATION SHALL BE ASSESSED BASED ON WEAK ACID EXTRACTION (AMMONIUM BICARBONATE/DTPA SOIL ANALYSIS OR SIMILAR)
H) SOIL ADSORPTION RATIO
I) CARBON/NITROGEN RATIO
J) CATION EXCHANGE CAPACITY K) MOISTURE CONTENT
L) ORGANIC CONTENT
M) AN ASSESSMENT OF AGRICULTURAL SUITABILITY BASED ON TEST RESULTS.
N) RECOMMENDATIONS FOR ADDING AMENDMENTS, CHEMICAL CORRECTIONS, OR BOTH.

BSM WHICH REQUIRES AMENDING TO COMPLY WITH THESE SPECIFICATIONS SHALL BE UNIFORMLY BLENDED AND TESTED IN ITS BLENDED STATE PRIOR TO TESTING AND DELIVERY.

F.4.2.2 BSM CHEMICAL SUITABILITY

FOR SYSTEMS WITH UNDERDRAINS, THE BSM SHALL EXHIBIT LIMITED POTENTIAL FOR LEACHING OF POLLUTANTS THAT ARE AT LEVELS OF CONCERN. POTENTIAL FOR POLLUTANT LEACHING SHALL BE ASSESSED USING EITHER THE SATURATED MEDIA EXTRACT METHOD (AKA, SATURATION EXTRACT) THAT IS COMMONLY PERFORMED BY AGRICULTURAL LABORATORIES OR THE SYNTHETIC PRECIPITATION LEACHING PROCEDURE (SPLP) (EPA SW–846, METHOD 1312). THE REFERENCED TESTS EXPRESS THE CRITERIA IN TERMS OF THE POLLUTANT CONCENTRATION IN WATER THAT IS IN CONTACT WITH THE MEDIA. IN AREAS IN WHICH A POLLUTANT OR POLLUTANTS ARE ASSOCIATED WITH A WATER QUALITY IMPAIRMENT OR A TMDL, BSM IN SYSTEMS WITH UNDERDRAINS SHALL CONFORM TO THE FOLLOWING SATURATION EXTRACT OR SPLP CRITERIA FOR APPLICABLE POLLUTANT(S):

A) NITRATE < 3 MG/L
B) PHOSPHORUS < 1 MG/L
C) ZINC < 0.1 MG/L
D) COPPER < 0.025 MG/L

* ALTERNATIVE MIXTURES SHOULD BE CONSIDERED FOR SYSTEMS WITH UNDERDRAINS IN AREAS WHERE PHOSPHORUS IS ASSOCIATED WITH A WATER QUALITY IMPAIRMENT OR A TMDL OR WHERE THE BSM DOES NOT ACHIEVE THE SATURATION EXTRACT OR SPLP CRITERIA OF < 1 MG/L TOTAL PHOSPHORUS AS SPECIFIED IN 800–4.2.2. DETAILS REGARDING ALTERNATIVE MIXTURES REQUIREMENTS AND POTENTIAL COMPONENTS ARE INCLUDED IN F.4.1.3.

E) LEAD < 0.025 MG/L
F) ARSENIC < 0.02 MG/L
G) CADMIUM < 0.01 MG/L
H) MERCURY < 0.01 MG/L
I) SELENIUM < 0.01 MG/L

CRITERIA SHALL BE MET AS STATED WHERE A POLLUTANT IS ASSOCIATED WITH A WATER QUALITY IMPAIRMENT OR TOTAL MAXIMUM DAILY LOAD (TMDL) IN ANY DOWNSTREAM RECEIVING WATER. CRITERIA MAY BE WAIVED OR MODIFIED, AT THE DISCRETION OF THE CITY ENGINEER, WHERE A POLLUTANT DOES NOT HAVE A NEXUS TO A WATER QUALITY IMPAIRMENT OR TMDL OF DOWNSTREAM RECEIVING WATER(S). CRITERIA MAY ALSO BE MODIFIED AT THE DISCRETION OF THE CITY ENGINEER IF THE CONTRACTOR DEMONSTRATES THAT SUITABLE BSM MATERIALS CANNOT BE FEASIBLY SOURCED WITHIN A 50–MILE RADIUS OF THE PROJECT SITE AND A GOOD FAITH EFFORT HAS BEEN UNDERTAKEN TO INVESTIGATE AVAILABLE MATERIALS.

NOTE THAT SATURATION EXTRACT AND SPLP TESTS ARE EXPECTED TO RESULT IN SOMEWHAT MORE LEACHING THAN WOULD BE EXPERIENCED WITH REAL STORM WATER; THEREFORE, A DIRECT COMPARISON TO WATER QUALITY STANDARDS OR EFFLUENT LIMITATIONS IS NOT RELEVANT.

THE CHEMICAL SUITABILITY CRITERIA LISTED IN THIS SECTION DO NOT APPLY TO SYSTEMS WITHOUT UNDERDRAINS, UNLESS GROUNDWATER IS IMPARED OR SUSCEPTIBLE TO NUTRIENTS CONTAMINATION.

F.4.2.3 BSM HYDRAULIC SUITABILITY

THE SATURATED HYDRAULIC CONDUCTIVITY OR INFILTRATION RATE OF THE WHOLE BSM SHALL BE MEASURED BY ONE OF THE FOLLOWING METHODS:

A. MEASUREMENT OF HYDRAULIC CONDUCTIVITY (USDA HANDBOOK 60, METHOD 34B) (COMMONLY AVAILABLE AS PART OF STANDARD AGRONOMIC SOIL EVALUATION), OR

B. ASTM D2434 PERMEABILITY OF GRANULAR SOILS (AT APPROXIMATELY 85% RELATIVE COMPACTION STANDARD PROCTOR, ASTM D698)

BSM SHALL CONFORM TO HYDRAULIC CRITERIA ASSOCIATED WITH THE BMP DESIGN CONFIGURATION THAT BEST APPLIES TO THE FACILITY WHERE THE BSM WILL BE INSTALLED (OPTIONS DESCRIBE BELOW).

SYSTEMS WITH UNRESTRICTED UNDERDRAIN SYSTEM (I.E., MEDIA CONTROL). FOR SYSTEMS WITH UNDERDRAINS THAT ARE NOT RESTRICTED, THE BSM SHALL HAVE A MINIMUM MEASURED HYDRAULIC CONDUCTIVITY OF 8 INCHES PER HOUR TO ENSURE ADEQUATE FLOW RATE THROUGH THE BMP AND LONGEVITY OF THE SYSTEM. THE BSM SHOULD HAVE A MAXIMUM MEASURED HYDRAULIC CONDUCTIVITY OF NO MORE THAN 20 INCHES PER HOUR. BSM WITH HIGHER MEASURED HYDRAULIC CONDUCTIVITY MAY BE ACCEPTED AT THE DISCRETION OF THE CITY ENGINEER. IN ALL CASES, AN UPTURNED ELBOW SYSTEM ON THE UNDERDRAIN, MEASURING 9 TO 12 INCHES ABOVE THE INVERT OF THE UNDERDRAIN, SHOULD BE USED TO CONTROL VELOCITIES IN THE UNDERDRAIN PIPE AND REDUCE POTENTIAL FOR SOLID MIGRATION THROUGH THE SYSTEM.

SYSTEMS WITH RESTRICTED UNDERDRAIN SYSTEM (I.E., OUTLET CONTROL). FOR SYSTEMS IN WHICH THE FLOWRATE OF WATER THROUGH THE MEDIA IS CONTROLLED VIA AN OUTLET CONTROL DEVICE (E.G., ORIFICE OR VALVE) AFFIXED TO THE OUTLET OF THE UNDERDRAIN SYSTEM, THE HYDRAULIC CONDUCTIVITY OF THE MEDIA SHOULD BE AT LEAST 15 INCHES PER HOUR AND NOT MORE THAN 40 INCHES PER HOUR. THE OUTLET CONTROL DEVICE SHOULD CONTROL THE FLOWRATE TO BETWEEN 5 AND 12 INCHES PER HOUR. THIS CONFIGURATION REDUCES THE SENSITIVITY OF SYSTEM PERFORMANCE TO THE HYDRAULIC CONDUCTIVITY OF THE MATERIAL, REDUCES THE LIKELIHOOD OF

PREFERENTIAL FLOW THROUGH MEDIA, AND ALLOWS MORE PRECISE DESIGN AND CONTROL OF SYSTEM FLOW RATES. FOR THESE REASONS, OUTLET CONTROL SHOULD BE CONSIDERED THE PREFERRED DESIGN OPTION.

SYSTEMS WITHOUT UNDERDRAINS. FOR SYSTEMS WITHOUT UNDERDRAINS, THE BSM SHALL HAVE A HYDRAULIC CONDUCTIVITY AT LEAST 4 TIMES HIGHER THAN THE UNDERLYING SOIL INFILTRATION RATE, BUT SHALL NOT EXCEED 12 INCHES PER HOUR.

F.4.3 DELIVERY, STORAGE AND HANDLING

THE CONTRACTOR SHALL NOT DELIVER OR PLACE SOILS IN FROZEN, WET, OR MUDDY CONDITIONS. THE CONTRACTOR SHALL PROTECT SOILS AND MIXES FROM ABSORBING EXCESS WATER AND FROM EROSION AT ALL TIMES. THE CONTRACTOR SHALL NOT STORE MATERIALS UNPROTECTED DURING LARGE RAINFALL EVENTS (>0.25 INCHES). IF WATER IS INTRODUCED INTO THE MATERIAL WHILE IT IS STOCKPILED, THE CONTRACTOR SHALL ALLOW THE MATERIAL TO DRAIN TO THE ACCEPTANCE OF THE CITY ENGINEER BEFORE PLACEMENT.

BSM SHALL BE THOROUGHLY MIXED PRIOR TO DELIVERY USING MECHANICAL MIXING METHODS SUCH AS A DRUM MIXER. BSM SHALL BE LIGHTLY COMPACTED AND PLACED IN LOOSE LIFTS APPROXIMATELY 12 INCHES (300 MM) TO ENSURE REASONABLE SETTLEMENT WITHOUT EXCESSIVE COMPACTION. COMPACTION WITHIN THE BSM AREA SHOULD NOT EXCEED 75 TO 85% STANDARD PROCTOR WITHIN THE DESIGNED DEPTH OF THE BSM. MACHINERY SHALL NOT BE USED IN THE BIORETENTION FACILITY TO PLACE THE BSM. A CONVEYOR OR SPRAY SYSTEM SHALL BE USED FOR MEDIA PLACEMENT IN LARGE FACILITIES. LOW GROUND PRESSURE EQUIPMENT MAY BE AUTHORIZED FOR LARGE FACILITIES AT THE DISCRETION OF THE CITY ENGINEER.

PLACEMENT METHODS AND BSM QUANTITIES SHALL ACCOUNT FOR APPROXIMATELY 10% LOSS OF VOLUME DUE TO SETTLING. PLANTING METHODS AND TIMING SHALL ACCOUNT FOR SETTLING OF MEDIA WITHOUT EXPOSING PLANT ROOT SYSTEMS.

THE ENGINEER MAY REQUEST UP TO THREE DOUBLE RING INFILTROMETER TESTS (ASTM D3385) OR APPROVED ALTERNATIVE TESTS TO CONFIRM THAT THE PLACED MATERIAL MEETS APPLICABLE HYDRAULIC SUITABILITY CRITERIA (800–4.2.3). IN THE EVENT THAT THE INFILTRATION RATE OF PLACED MATERIAL DOES NOT MEET APPLICABLE CRITERIA, THE CITY ENGINEER MAY REQUIRE REPLACEMENT AND/OR DECOMPACTION OF MATERIALS.

F.4.4 QUALITY CONTROL AND ACCEPTANCE

CLOSE ADHERENCE TO THE MATERIAL QUALITY CONTROLS HEREIN ARE NECESSARY IN ORDER TO SUPPORT HEALTHY VEGETATION, MINIMIZE POLLUTANT LEACHING, AND ASSURE SUFFICIENT PERMEABILITY TO INFILTRATE/FILTER RUNOFF DURING THE LIFE OF THE FACILITY. AMENDMENTS MAY BE INCLUDED TO ADJUST AGRONOMIC PROPERTIES. ACCEPTANCE OF THE MATERIAL WILL BE BASED ON TEST RESULTS CERTIFIED TO BE REPRESENTATIVE. TEST RESULTS SHALL BE CONDUCTED NO MORE THAN 120 DAYS PRIOR TO DELIVERY OF THE BLENDED BSM TO THE PROJECT SITE. FOR PROJECTS INSTALLING MORE THAN 100 CUBIC YARDS OF BSM, BATCH–SPECIFIC TESTS OF THE BLENDED MIX SHALL BE PROVIDED TO THE CITY ENGINEER FOR EVERY 100 CUBIC YARDS OF BSM ALONG WITH A SITE PLAN SHOWING THE PLACEMENT LOCATIONS OF EACH BSM BATCH WITHIN THE FACILITY.

F.4.5 INTEGRATION WITH OTHER SPECIFICATIONS

THIS SPECIFICATION INCLUDES IS RELATED TO, AND MAY DEPEND OR HAVE DEPENDENCY ON OTHER SPECIFICATIONS, INCLUDING BUT NOT LIMITED TO:

- PLANTINGS AND HYDROSEED
- MULCH
- AGGREGATE (CHOKING STONE, DRAINAGE STONE, ENERGY DISSIPATION)
- GEOTEXTILES
- UNDERDRAINS
- OUTLET CONTROL STRUCTURES
- EXCAVATION

EXECUTION OF THIS SPECIFICATION REQUIRES REVIEW AND UNDERSTANDING OF RELATED SPECIFICATIONS. WHERE CONFLICTS WITH OTHER SPECIFICATIONS EXIST OR APPEAR TO EXIST, THE CONTRACTOR SHALL CONSULT WITH THE CITY ENGINEER TO DETERMINE WHICH SPECIFICATIONS PREVAIL.

F.5. AGGREGATE MATERIALS FOR BSM DRAINAGE LAYERS

DRAINAGE OF BSM REQUIRES THE USE OF SPECIFIC AGGREGATE MATERIALS FOR FILTER COURSE (AKA CHOKING LAYER) MATERIALS AND FOR AN UNDERLYING DRAINAGE AND STORAGE LAYER.

F.5.1 ROCK AND SAND PRODUCTS FOR USE IN BSM DRAINAGE

SIZE CLASSIFICATIONS DETAILED IN TABLES F.5–1 AND F.5–2 SHALL APPLY WITH RESPECT TO BSM DRAINAGE MATERIALS. ALL SAND AND STONE PRODUCTS USED IN BSM DRAINAGE LAYERS SHALL BE CLEAN AND THOROUGHLY WASHED.

TABLE F.5–1 CRUSHED ROCK AND STONE GRADATION LIMITS

SIEVE SIZE	PERCENT PASSING SIEVES ASTM NO. 57	ASTM NO. 8
3 IN	–	–
2.5 IN	–	–
2 IN	–	–
1.5 IN	100	–
1 IN	95 – 100	–
0.75 IN	–	–
0.5 IN	25 – 60	100
0.375 IN	–	85 – 100
NO. 4	10 MAX.	10 – 30
NO. 8	5 MAX.	0 – 10
NO. 16	–	0 – 5
NO. 50	–	–

TABLE F.5–2 SAND GRADATION LIMITS

SIEVE SIZE	PERCENT PASSING SIEVES CHOKER SAND – ASTM C33
0.375 IN	100
NO. 4	95 – 100
NO. 8	80 – 100
NO. 16	50 – 85
NO. 30	25 – 60
NO. 50	5 – 30
NO. 100	0 – 10
NO. 200	0 – 3

F.5.2 GRADED AGGREGATE CHOKER STONE

GRADED AGGREGATE CHOKER MATERIAL IS INSTALLED AS A FILTER COURSE TO SEPARATE BSM FROM THE DRAINAGE ROCK RESERVOIR LAYER. THIS ENSURES THAT NO MIGRATION OF SAND OR OTHER FINES OCCURS. THE FILTER COURSE CONSISTS OF TWO LAYERS OF CHOKING MATERIAL INCREASING IN PARTICLE SIZE. THE TOP LAYER OF THE FILTER COURSE SHALL BE CONSTRUCTED OF THOROUGHLY WASHED ASTM C.33 FINE AGGREGATE SAND MATERIAL CONFORMING TO GRADATION LIMITS CONTAINED IN TABLE F.5–2. THE BOTTOM LAYER OF THE FILTER COURSE SHALL BE CONSTRUCTED OF THOROUGHLY WASHED ASTM NO. 8 AGGREGATE MATERIAL CONFORMING TO GRADATION LIMITS CONTAINED IN TABLE F.5–1.

F.5.3 OPEN–GRADED AGGREGATE STONE

OPEN–GRADED AGGREGATE MATERIAL IS INSTALLED TO PROVIDE DRAINAGE FOR OVERLYING BSM AND FILTER COURSE LAYERS, PROVIDE ADDITIONAL STORM WATER STORAGE CAPACITY, AND CONTAIN THE UNDERDRAIN PIPE(S). THIS LAYER SHALL BE CONSTRUCTED OF THOROUGHLY WASHED ASTM NO. 57 OPEN GRADED AGGREGATE MATERIAL CONFORMING TO GRADATION LIMITS CONTAINED IN TABLE F.5–1.

F.5.4 SPREADING

IMPORTED BSM DRAINAGE MATERIAL SHALL BE DELIVERED TO THE BMP SYSTEM INSTALLATION SITE AS UNIFORM MIXTURES AND EACH LAYER SHALL BE SPREAD IN ONE OPERATION. SEGREGATION WITHIN EACH AGGREGATE LAYER SHALL BE AVOIDED AND THE LAYERS SHALL BE FREE FROM POCKETS OF COARSE OR FINE MATERIAL.

AGGREGATE SHALL BE DEPOSITED ON UNDERLYING LAYERS AT A UNIFORM QUANTITY PER LINEAR FOOT (METER), WHICH QUANTITY WILL PROVIDE THE REQUIRED COMPACTED THICKNESS WITHIN THE TOLERANCES SPECIFIED HEREIN WITHOUT RESORTING TO SPOTTING, PICKING UP, OR OTHERWISE SHIFTING THE AGGREGATE MATERIAL.

THE THICKNESS OF THE AGGREGATE STORAGE LAYER (ASTM NO. 57) WILL DEPEND ON SITE SPECIFIC DESIGN AND SHALL BE DETAILED IN CONTRACT DOCUMENTS.

THE BOTTOM LAYER OF THE FILTER COURSE (ASTM NO.8) SHALL BE INSTALLED TO A THICKNESS OF 3 INCHES (75 MM). THE LAYER SHALL BE SPREAD IN ONE LAYER. THE TOP LAYER OF THE FILTER COURSE (ASTM C.33) SHALL BE INSTALLED TO A THICKNESS OF 3 INCHES (75 MM). THE LAYER SHALL BE SPREAD IN ONE LAYER. MARKER STAKES SHOULD BE USED TO ENSURE UNIFORM LIFT THICKNESS.

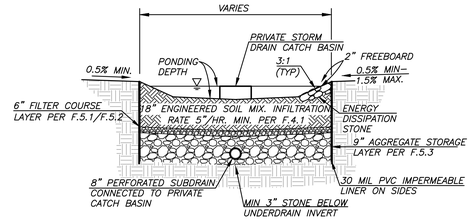
F.5.5 COMPACTING

FILTER COURSE MATERIAL AND AGGREGATE STORAGE MATERIAL SHALL BE LIGHTLY COMPACTED TO APPROXIMATELY 80% STANDARD PROCTOR WITHOUT THE USE OF VIBRATORY COMPACTION.

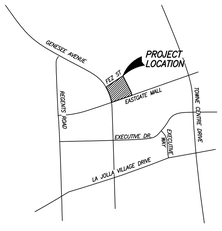
PLANT MATERIAL LIST:

1. CALLISTEMON 'LITTLE JOHN' (DWARF BOTTLE BRUSH)
2. CORDYLINE A. FESTIVAL (FESTINAL CORDYLINE)
3. PHORMIUM 'DARK ELITE' (RED NEW ZEALAND FLAX)
4. PENNISETUM S. 'CAPREUM' (RED FOUNTAIN GRASS)
5. DIETES BICOLOR (FORTNIGHT LILY)

*SEE LANDSCAPE PLAN FOR FULL PLANT MATERIALS LIST
LANDSCAPE PLANS SHALL SUPERCEDE PLANT MATERIAL LIST SHOWN HERE



PR DETAIL ~ BIOFILTRATION W/ PARTIAL RETENTION BASIN
NO SCALE



VICINITY MAP
NO SCALE

ENGINEER:

LEPPERT ENGINEERING CORPORATION
5190 GOVERNOR DRIVE, SUITE 205
SAN DIEGO, CA 92122

BY: _____ DATE: _____
JOHN D. LEPPERT RCE 26283

REGISTERED PROFESSIONAL ENGINEER — JOHN D. LEPPERT — No. 26283 — CIVIL — STATE OF CALIFORNIA

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PROJECT NAME:
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REVISION 13: _____
REVISION 12: _____
REVISION 11: _____
REVISION 10: _____
REVISION 9: _____
REVISION 8: _____
REVISION 7: _____
REVISION 6: _____
REVISION 5: _____
REVISION 4: _____
REVISION 3: _____
REVISION 2: _____
REVISION 1: _____

ORIGINAL DATE: 02/15/17

SHEET TITLE:
ATTACHMENT 4
AMENDMENT TO SITE DEVELOPMENT PERMIT NO.548029
BMP PLAN

SHEET 2 OF 2
DEP# _____

NO.	DATE	BY	DESCRIPTION	NO.	DATE	BY	DESCRIPTION
6				12			
5	02/13/17	KS	AGENCY CORRECTIONS	11			
4	12/21/16	KS	AGENCY CORRECTIONS	10			
3	11/25/08	RL	AGENCY CORRECTIONS	9			
2	06/30/08	RL	AGENCY CORRECTIONS	8			
1	4/11/08	NK	ORIGINAL	7			

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APPROVED BY ENGINEER OF WORK
REGISTRATION R.C.E. 26283
FILE CODE UC 20.04–17.15
DATE

PREPARATION AND REVISION LOG

Attachment 5

Drainage Study

DRAINAGE STUDY
for
LA JOLLA CANYON
Project # 154476

Date: June 30, 2008
Job No. UC 20.01-40.06

Prepared By:
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Exp. 3/31/10

Date: 3/23/09

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Exhibits

Appendix

PURPOSE

The purpose of this report is to estimate the storm water runoff for a multi-family development, consisting of 48 residential units, and to determine the impacts on the existing downstream facilities.

PROJECT LOCATION

The proposed project is located at the Northeast corner of Genesee Avenue and Eastgate Mall in the community of University City, (See Location Map, Exhibit "A"). The site is approximately equidistant from Interstate 5 and Interstate 805.

PROJECT DESCRIPTION

The project will include the construction of the following:

- 48 residential dwelling units.
- two levels of below grade parking to accommodate parking requirements.
- landscape improvements.

METHOD OF CALCULATION

This study proposes to calculate the total runoff from the site using the guidelines set forth in the City of San Diego's Drainage Design Manual, dated April 1984 (See Appendix I). The specific method used is the Rational Formula for watersheds under 0.5 square miles.

PRE-DEVELOPMENT CONDITIONS (See Exhibit "B", Pre-Development Basin Map)

The site consists of 2 runoff basins, that are roughly divided into the northern portion of the property and the southern portion of the property. The runoff from the northern basin, Basin A, ends up in the canyon on the Eastern side of the property. The runoff gets to the canyon either directly from the site or by discharging to Fez Street, where it then travels down into the canyon. The runoff from the southern basin, Basin B, discharges into either Genesee Avenue or Eastgate

Mall, where it travels down the gutter where it is intercepted by the inlet at the corner of Genesee Avenue and Eastgate Mall as shown on City of San Diego Drawing No. 11732-2-D (See Exhibit "C").

The existing land use category for the site is Residential Multi-Units. According to the City of San Diego Drainage Design Manual, residential multi-unit land use has a runoff coefficient of C=0.70, see Appendix II, and this value will be used in analyzing the pre-development runoff from the site.

Per the City of San Diego Drainage Design Manual section 1-102.2(3)(a), "For tributary areas under one square mile, the storm drain system shall be designed so that the combination of storm drain system capacity and overflow will be able to carry the 100-year frequency storm without damage to or flooding of adjacent existing buildings or potential building sites." (See Appendix III) From the Isopluvial Maps for a 100-year storm (see Appendix IV) and the Intensity-Duration Design Chart (see Appendix V) from the San Diego County Hydrology Manual, a P_6 = 2.3 inches is obtained. This yields the following Time of Concentration (T_c), Intensity (I), and Runoff (Q) (see Exhibit "D" for tabulated calculations):

Basin A: T_c = 8.04 minutes
I = 4.46 in/hr
Q = 8.43 cfs

Basin B: T_c = 8.04 minutes
I = 4.46 in/hr
Q = 8.43 cfs

POST-DEVELOPMENT CONDITIONS (See Exhibit "E", Post-Development Basin Map)
Development of the subject properties will consists of the construction of an underground

parking structure with residential units above. The proposed land use category for the site is Residential Multi-Units. According to the City of San Diego Drainage Design Manual, residential multi-unit land use has a runoff coefficient of C=0.70, see Appendix II, and this value will be used in analyzing the post-development runoff from the site.

Per the City of San Diego Drainage Design Manual section 1-102.2(3)(a), "For tributary areas under one square mile, the storm drain system shall be designed so that the combination of storm drain system capacity and overflow will be able to carry the 100-year frequency storm without damage to or flooding of adjacent existing buildings or potential building sites." (See Appendix III) From the Isopluvial Maps for a 100-year storm (see Appendix IV) and the Intensity-Duration Design Chart (see Appendix V) from the San Diego County Hydrology Manual, a P_6 = 2.3 inches is obtained. This yields the following Time of Concentration (T_c), Intensity (I), and Runoff (Q) (see Exhibit "F" for tabulated calculations):

Basin A: T_c = 8.04 minutes
I = 4.46 in/hr
Q = 8.43 cfs

Basin B: T_c = 8.49 minutes
I = 4.31 in/hr
Q = 6.02 cfs

The proposed development occurs entirely within Basin B, so the results within Basin A remain the same. Runoff from Basin B enters an onsite storm drain system which connects to the back of the inlet at the corner of Genesee Avenue and Eastgate Mall as shown on City of San Diego Drawing No. 11732-2-D (See Exhibit "C"). The proposed onsite storm drain needs to handle the Q = 6.02 cfs, so an 18" pipe is proposed. Using the Manning Pipe Calculator within AutoCAD Civil 3D Land Desktop Companion 2008, the capacity of the proposed pipe is 15.98 cfs (see

Exhibit "G").

COMPARISON OF PRE AND POST DEVELOPMENT RUNOFF

Pre-Development Runoff

Basin A, Q_{100} = 8.43 cfs

Basin B, Q_{100} = 5.01 cfs

Post-Development Runoff

Basin A, Q_{100} = 8.43 cfs.

Basin B, Q_{100} = 6.02 cfs

NUMERIC SIZING TREATMENT STANDARDS

For this project, flow-based BMP's have been selected utilizing the runoff produced from a rainfall intensity of 0.2 in./hr. per each storm hour event. For a 6 hour storm event, I=1.2 in/hr.

Sub-Basin	Area (ac.)	Run-off Coeff.	I (in/hr)	Q (cfs)
B	1.996	0.70	1.2	1.68

The proposed development is within Basin B (see Exhibit "E"). Runoff will be collected in 2 deck drains located north of the proposed structure. The runoff will be shared evenly between the two deck drains, so each will receive a Q = 0.84 cfs.

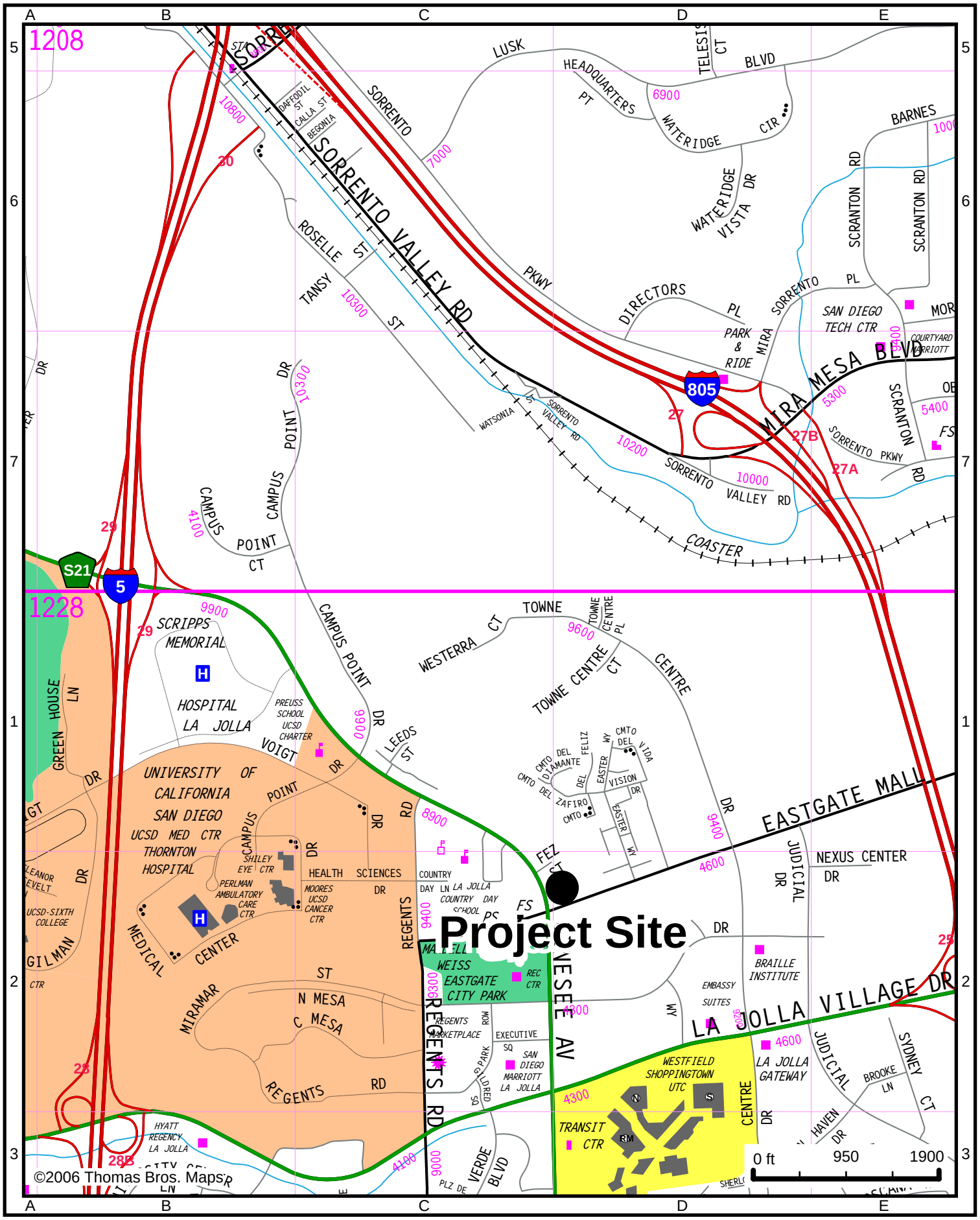
CONCLUSION

Based on the above calculations, the development of the subject property as proposed, results in a nominal increase of 1.01 cfs of runoff as compared to the pre-development

conditions. This nominal increase is due to the decrease in Time of Concentration rather than an increase in impervious surface. It can be concluded that the proposed development will not create an impact to the existing downstream storm drain facilities.

Exhibit “A”

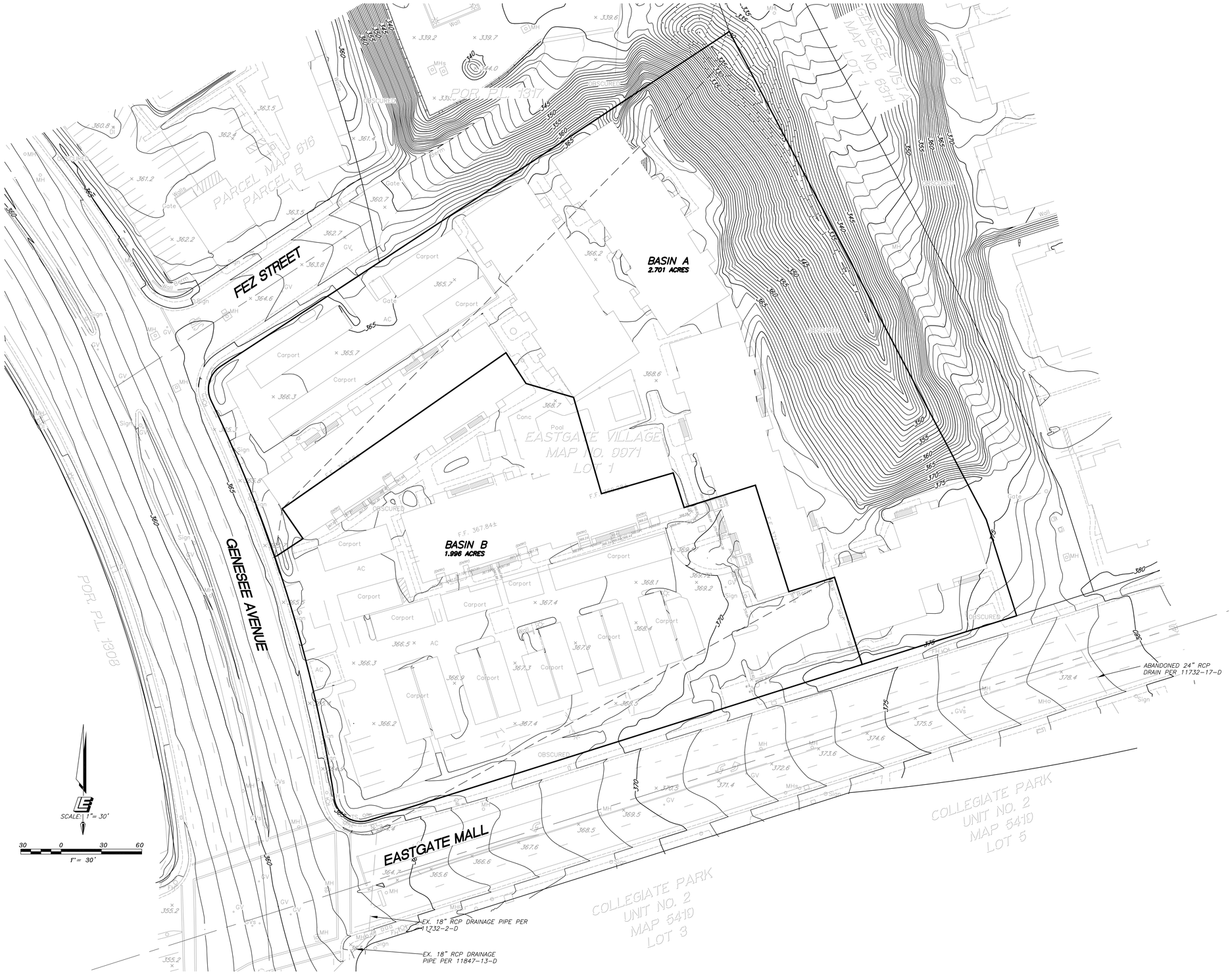
Location Map



Project Site: 1228 - D2

Exhibit “B”

Pre-Development Basin Map



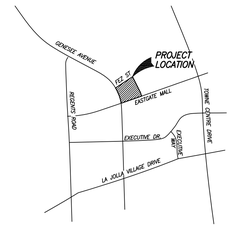
SCALE: 1"= 30'

30 0 30 60

1"= 30'

LEGEND:

BASIN BOUNDARY



VICINITY MAP
NO SCALE

NO.	DATE	BY	DESCRIPTION
6			
5			
4			
3			
2	6/30/08	RL	AGENCY CORRECTIONS
1	4/11/08	RL	ORIGINAL

NO.	DATE	BY	DESCRIPTION
12			
11			
10			
9			
8			
7			

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FILE CODE UC 20.01-40.06

DATE

PREPARATION AND REVISION LOG

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PROJECT ADDRESS:
9515 GENESEE AVENUE

PROJECT NAME:
LA JOLLA CANYON

SHEET TITLE:
BASIN MAP
PRE-DEVELOPMENT

REVISION 14:
REVISION 13:
REVISION 12:
REVISION 11:
REVISION 10:
REVISION 9:
REVISION 8:
REVISION 7:
REVISION 6:
REVISION 5:
REVISION 4:
REVISION 3:
REVISION 2:
REVISION 1: 6/30/08

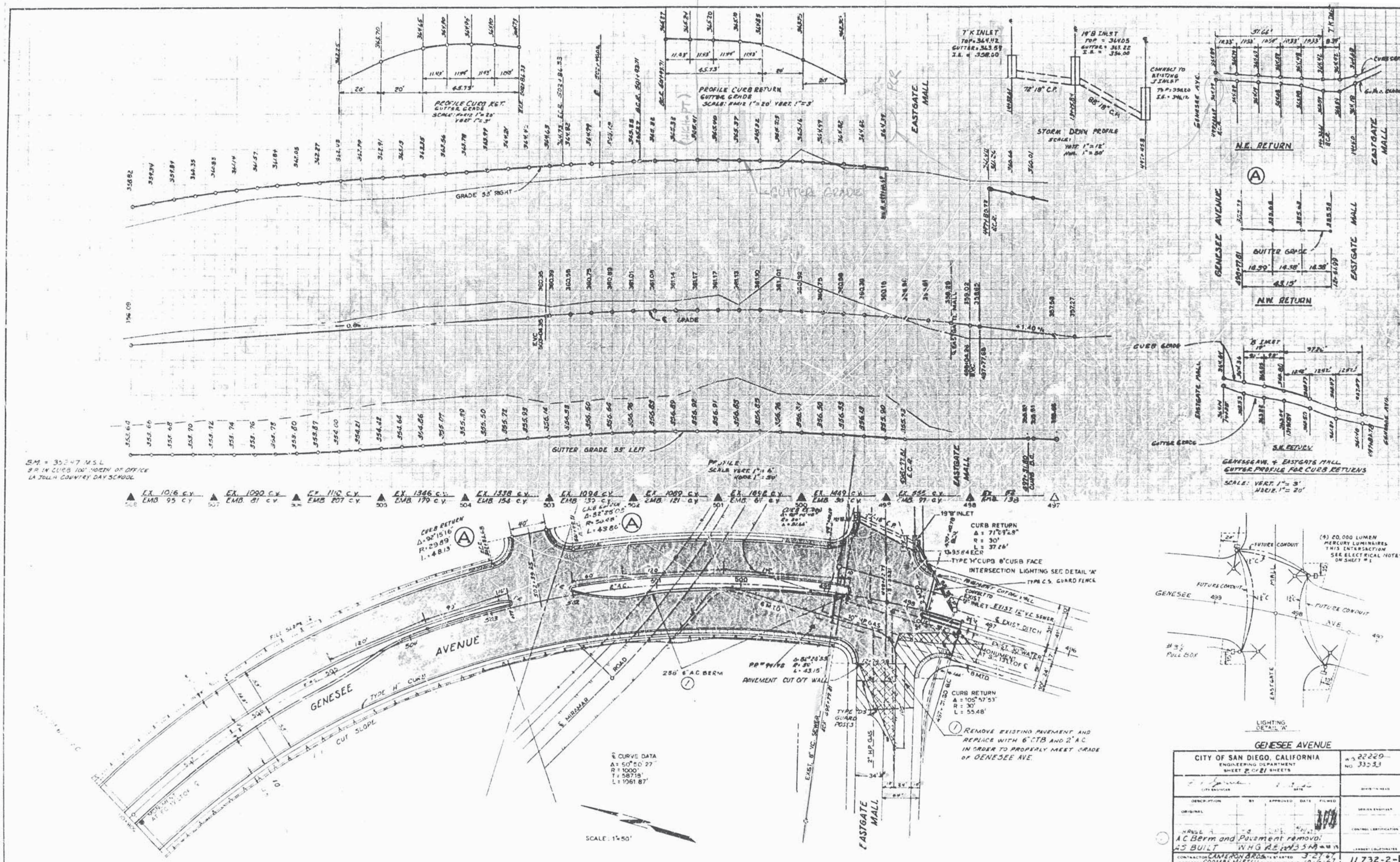
ORIGINAL DATE: 4/11/08

SHEET 1 OF 1

DEP#

Exhibit “C”

Existing Storm Drains



PROFILE CURB RET.
GUTTER GRADE
SCALE: HORIZ 1"=20' VERT 1"=3'
PROFILE CURB RETURN
GUTTER GRADE
SCALE: HORIZ 1"=20' VERT. 1"=3'
GRADE 33' RIGHT
GUTTER GRADE
EASTGATE MALL
7' K INLET
TOP = 364.42
GUTTER = 363.59
I.E. = 358.00
19' B INLET
TOP = 364.05
GUTTER = 363.22
I.E. = 356.00
72' 18" C.P.
88' 18" C.P.
CONNECT TO EXISTING J INLET
STORM DRAIN PROFILE
SCALE: VERT. 1"=12' HOR. 1"=50'
N.E. RETURN
GENESEE AVENUE
GUTTER GRADE
N.W. RETURN
E.V.C.
℄ GRADE
+1.40%
CURB GRADE
'B' INLET
GUTTER GRADE
S.W. RETURN
GENESEE AVE. & EASTGATE MALL
GUTTER PROFILE FOR CURB RETURNS
SCALE: VERT. 1"= 3' HORIZ. 1"= 20'
GUTTER GRADE 55' LEFT
PROFILE:
SCALE VERT. 1"= 6' HORIZ 1"= 50'
B.M. = 352.47 M.S.L.
B.P. IN CURB 100' NORTH OF OFFICE
LA JOLLA COUNTRY DAY SCHOOL
EX. 1016 C.Y. EMB. 95 C.Y.
EX. 1090 C.Y. EMB. 81 C.Y.
EX. 1110 C.Y. EMB 207 C.Y.
EX. 1346 C.Y. EMB. 179 C.Y.
EX. 1338 C.Y. EMB 154 C.Y.
EX. 1094 C.Y. EMB 137 C.Y.
EX. 1089 C.Y. EMB. 121 C.Y.
EX. 1692 C.Y. EMB. 61 C.Y.
EX. 1449 C.Y. EMB 31 C.Y.
EX. 555 C.Y. EMB. 97 C.Y.
CURB RETURN
Δ=92°15'16"
R=29.89'
L=48.13'
GENESEE AVENUE
TYPE "H" CURB
FILL SLOPE
CUT SLOPE
MONUMENT AT P.C. STA ... ℄
19' B INLET
CURB RETURN
Δ = 71°09'28"
R = 30'
L = 37.26'
TYPE 'H' CURB 8" CURB FACE
INTERSECTION LIGHTING SEE DETAIL 'A'
TYPE C.S. GUARD FENCE
PAVEMENT CUTOFF WALL
CONNECT TO EXIST 4' INLET
EXIST 12" V.C. SEWER
℄ EXIST DITCH
EXIST 30" WATER
MONUMENT
8 MTD
6 MTD
10" HP GAS
2" HP GAS
CURB RETURN
Δ = 105°57'53"
R = 30'
L = 55.48'
(1) REMOVE EXISTING PAVEMENT AND REPLACE WITH 6" CTB AND 2" A.C. IN ORDER TO PROPERLY MEET GRADE OF GENESEE AVE.
258' 6" A.C. BERM
PAVEMENT CUT OFF WALL
TYPE "D" GUARD POSTS
EXIST. 8" V.C. SEWER
℄ MIRAMAR ROAD
EASTGATE MALL
℄ CURVE DATA
Δ = 50°50'27"
R = 1000'
T = 587.19'
L = 1061.87'
SCALE: 1"=50'
(4) 20,000 LUMEN MERCURY LUMINAIRES THIS INTERSECTION
SEE ELECTRICAL NOTES ON SHEET #1
FUTURE CONDUIT
GENESEE AVE.
EASTGATE MALL
#3½ PULL BOX
LIGHTING DETAIL 'A'
GENESEE AVENUE
CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING DEPARTMENT
SHEET 2 OF 21 SHEETS
W.O. 22229
NO. 33533
CITY ENGINEER
DESCRIPTION BY APPROVED DATE FILMED
ORIGINAL
CHANGE A
A.C. Berm and Pavement removal
AS BUILT WHG
CONTRACTOR CAMERON BROS. DATE STARTED 3-27-67
INSPECTOR COOMBE, MARTELL DATE COMPLETED 10-6-67
11732-2-D

AS BUILT

Exhibit “D”

Pre-Development Conditions Spreadsheet

100 year - Existing

					Overland Flow						
Basin	**SF**	**Acres**	**Runoff Coeff.**	**P_6**	**Length (ft)**	**Max Elev. (ft)**	**Min. Elev. (ft)**	**Average Slope (%)**	**T_C (min)**	**I (in/hr)**	**Q (cfs)**
A	117666	2.70	0.7	2.3	504.54	366	325	8.1	8.04	4.46	8.43
B	86957	2.00	0.7	2.3	384.12	372	364.5	2.0	11.29	3.58	5.01

Exhibit “E”

Post-Development Basin Map

LEGEND:

BASIN BOUNDARY

DECK DRAIN

FLOW DIRECTION

BASIN A
2.701 ACRES

BASIN B
1.996 ACRES

FEZ STREET

GENESEE AVENUE

EASTGATE MALL

PARCEL MAP 616
PARCEL 2

POR. PL. 1317

POR. PL. 1303

EASTGATE VILLAGE
MAP NO. 9971
LOT 1

GENESEE VISTA
MAP NO. 6311
LOT 1

LOT 6

COLLEGIATE PARK
UNIT NO. 2
MAP 5419
LOT 3

COLLEGIATE PARK
UNIT NO. 2
MAP 5419
LOT 5

EX. 18" RCP DRAINAGE PIPE PER 11732-2-D

EX. 18" RCP DRAINAGE PIPE PER 11847-13-D

ABANDONED 24" RCP DRAIN PER 11732-17-D

SCALE: 1"= 30'

30 0 30 60
1"= 30'

VICINITY MAP
NO SCALE

NO.	DATE	BY	DESCRIPTION	NO.	DATE	BY	DESCRIPTION
6				12			
5				11			
4				10			
3				9			
2	06/30/08	RL	AGENCY CORRECTIONS	8			
1	04/11/08	RL	ORIGINAL	7			

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POST-DEVELOPMENT

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REVISION 7:
REVISION 6:
REVISION 5:
REVISION 4:
REVISION 3:
REVISION 2:
REVISION 1: 6/30/08

ORIGINAL DATE: 04/11/08

SHEET 1 OF 1

DEP#

Exhibit “F”

Post-Development Conditions Spreadsheet

100 year - Proposed

					Overland Flow					Pipe Flow					Total		
Basin	SF	Acres	Runoff Coeff.	P_6	Length (ft)	Max Elev. (ft)	Min. Elev. (ft)	Average Slope (%)	T_C (min)	Length (ft)	Slope (ft/ft)	Diameter (in)	Velocity (fps)	T_f (min)	T_C (min)	I (in/hr)	Q (cfs)
A	117666	2.70	0.7	2.3	504.54	366	325	8.1	8.04	n/a	n/a	n/a	n/a	0.00	8.04	4.46	8.43
B	86957	2.00	0.7	2.3	266.34	375.5	366.83	3.3	7.93	309.98	0.02	6.00	9.28	0.56	8.49	4.31	6.02

Exhibit “G”

Manning Pipe Calculator

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Flowrate
Diameter	18.0000 in
Depth	16.8750 in
Slope	0.0200 ft/ft
Manning's n	0.0130

Computed Results:

Flowrate	15.9800 cfs
Area	1.7671 ft2
Wetted Area	1.7212 ft2
Wetted Perimeter	47.4522 in
Perimeter	56.5487 in
Velocity	9.2844 fps
Hydraulic Radius	5.2231 in
Percent Full	93.7500 %
Full flow Flowrate	14.8554 cfs
Full flow velocity	8.4064 fps

Appendix I

Excerpts from the City of San Diego Drainage Design Manual

APPENDIX I

RATIONAL METHOD

Watersheds Less than 0.5 Square Mile

Method of Computing Runoff

Use the Rational Formula Q = CIA where:

Q is the peak rate of flow in cubic feet per second.

C is a runoff coefficient expressed as that percentage of rainfall which becomes surface runoff.

I is the average rainfall intensity in inches per hour for a storm duration equal to the time of concentration (T_c) of the contributing drainage area.

A is the drainage area in acres tributary to design point.

(1) Runoff Coefficient, C

Appendix I-A lists the estimated coefficients for urban areas.

For urban areas select an appropriate coefficient for each type of land use from Table, 2, Appendix I-A. Multiply this coefficient by the percentage of the total area included in that class. The sum of the products for all land uses in San Diego County is the weighted runoff coefficient.

(2) Rainfall Intensity, I

Intensity - duration - frequency curves applicable to all areas within San Diego County are given in Appendix I-B.

(3) Time of Concentration, Tc

The time of concentration is the time required for runoff to flow from the most remote part of the watershed to the outlet point under consideration.

Appendix II

Excerpts from the City of San Diego Drainage Design Manual

TABLE 2

RUNOFF COEFFICIENTS (RATIONAL METHOD)

DEVELOPED AREAS (URBAN)

Land Use	Coefficient, C Soil Type (1)
Residential:	D
Single Family	.55
Multi-Units	.70
Mobile Homes	.65
Rural (lots greater than 1/2 acre)	.45
Commercial (2) 80% Impervious	.85
Industrial (2) 90% Impervious	.95

NOTES:

(1) Type D soil to be used for all areas.

(2) Where actual conditions deviate significantly from the tabulated imperviousness values of 80% or 90%, the values given for coefficient C, may be revised by multiplying 80% or 90% by the ratio of actual imperviousness to the tabulated imperviousness. However, in no case shall the final coefficient be less than 0.50. For example: Consider commercial property on D soil.

Actual imperviousness = 50%

Tabulated imperviousness = 80%

Revised C = $\frac{50}{80}$ x 0.85 = 0.53

Appendix III

Excerpts from the City of San Diego Drainage Design Manual

HYDROLOGY (1-102)

1-102.1 GENERAL

The design discharge depends upon many variables. Some of the more important are duration and intensity of rainfall, storm frequency, ground cover, the size, imperviousness and slope and shape of the drainage area.

1-102.2 DESIGN RUNOFF

Design runoff shall be based upon the following:

(1) Within floodplain and floodplain fringe areas as defined by the Federal Emergency Management Agency (FEMA), the runoff criteria shall be based upon a 100-year frequency storm.

(2) For all drainage channels and storm drain systems, which will convey drainage from a tributary area equal to and greater than one (1) square mile, the runoff criteria shall be based upon a 100-year frequency storm.

(3) For tributary areas under one (1) square mile:

(a) The storm drain system shall be designed so that the combination of storm drain system capacity and overflow will be able to carry the 100-year frequency storm without damage to or flooding of adjacent existing buildings or potential building sites.

(b) The runoff criteria for the underground storm drain system shall be based upon a 50-year frequency storm.

(4) Type D soil shall be used for all areas.

1-102.3 DESIGN RUNOFF METHODS

A. The designer should check with Floodplain Management/Beach Erosion Section, Transportation Design Division, Engineering and Development Department, to determine if there are established storm discharge flows.

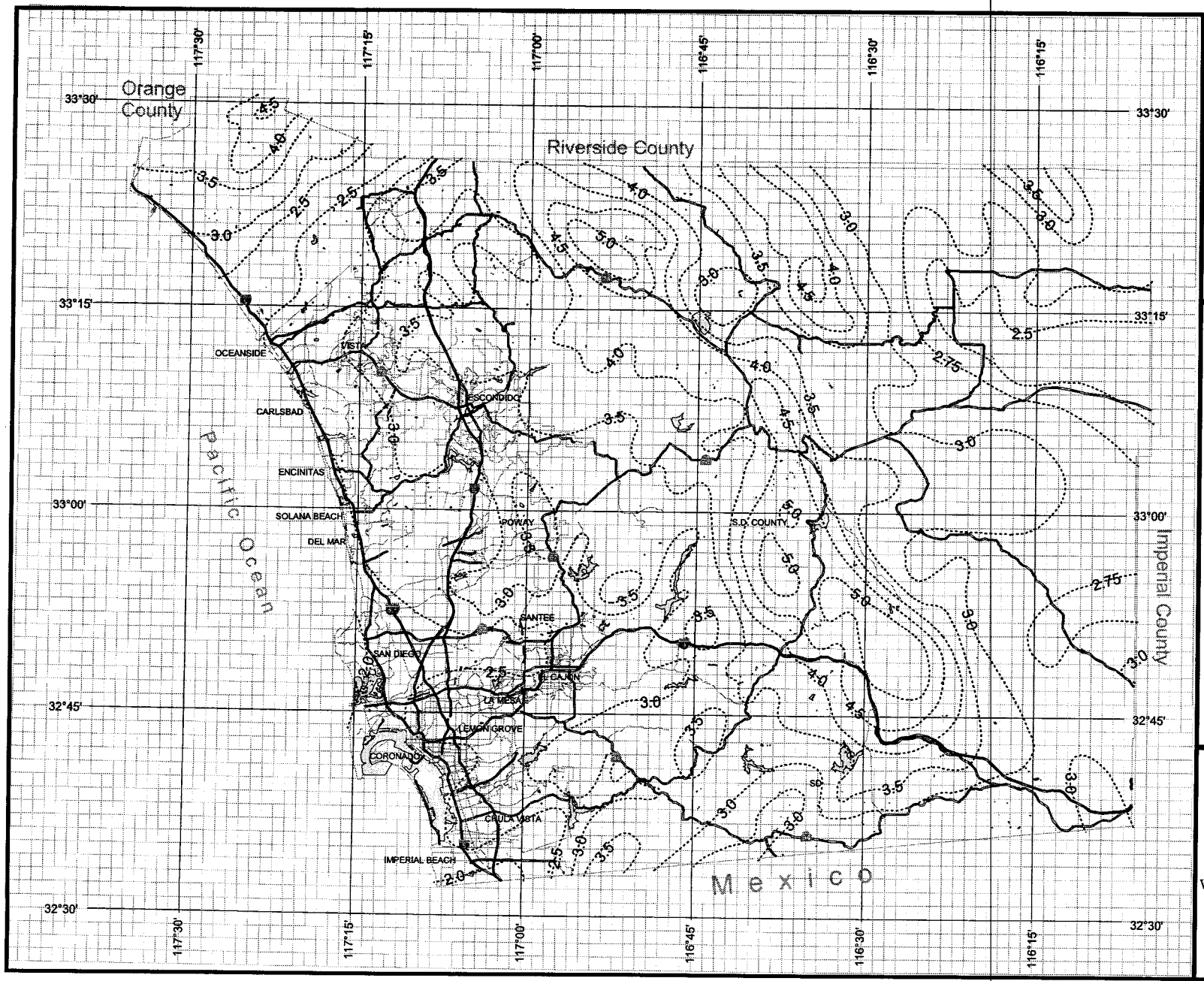
B. If no established storm discharge flows are available, the applicable methods shown in Appendix 1, 2, or 3 shall be used.

Appendix IV

100-year Isopluvial Maps

County of San Diego Hydrology Manual

Rainfall Isopluvials



100 Year Rainfall Event - 6 Hours

Isopluvial (inches)

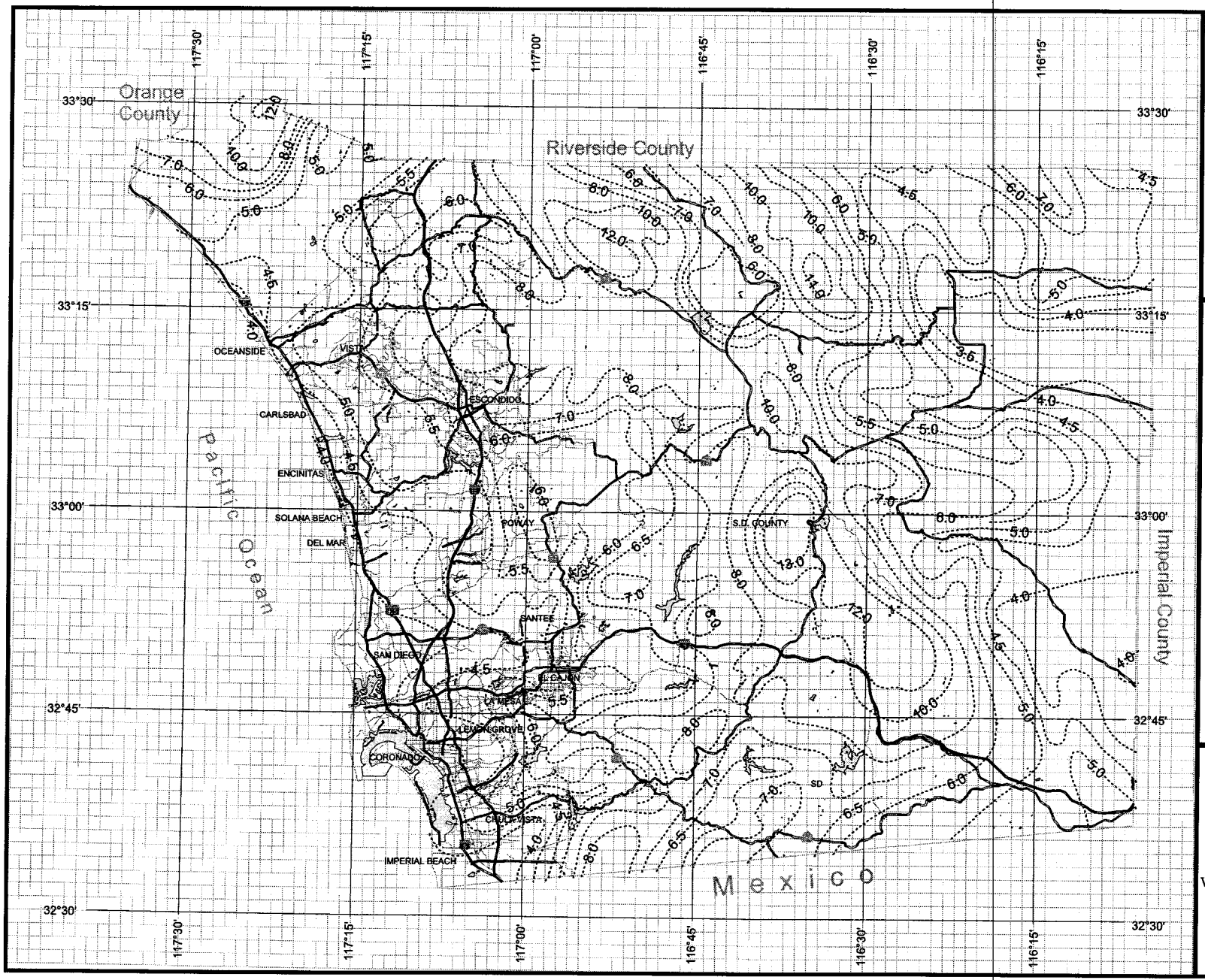
Lat: 32°52'42"
Long: 117°12'49"

DPW GIS
Department of Public Works

SanGIS
We Have San Diego Covered!

N
W E
S

3 0 3 Miles



County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)

Lat: 32°52'42"
Long: 117°12'49"

DPW GIS
Department of Public Works Geographic Information Services

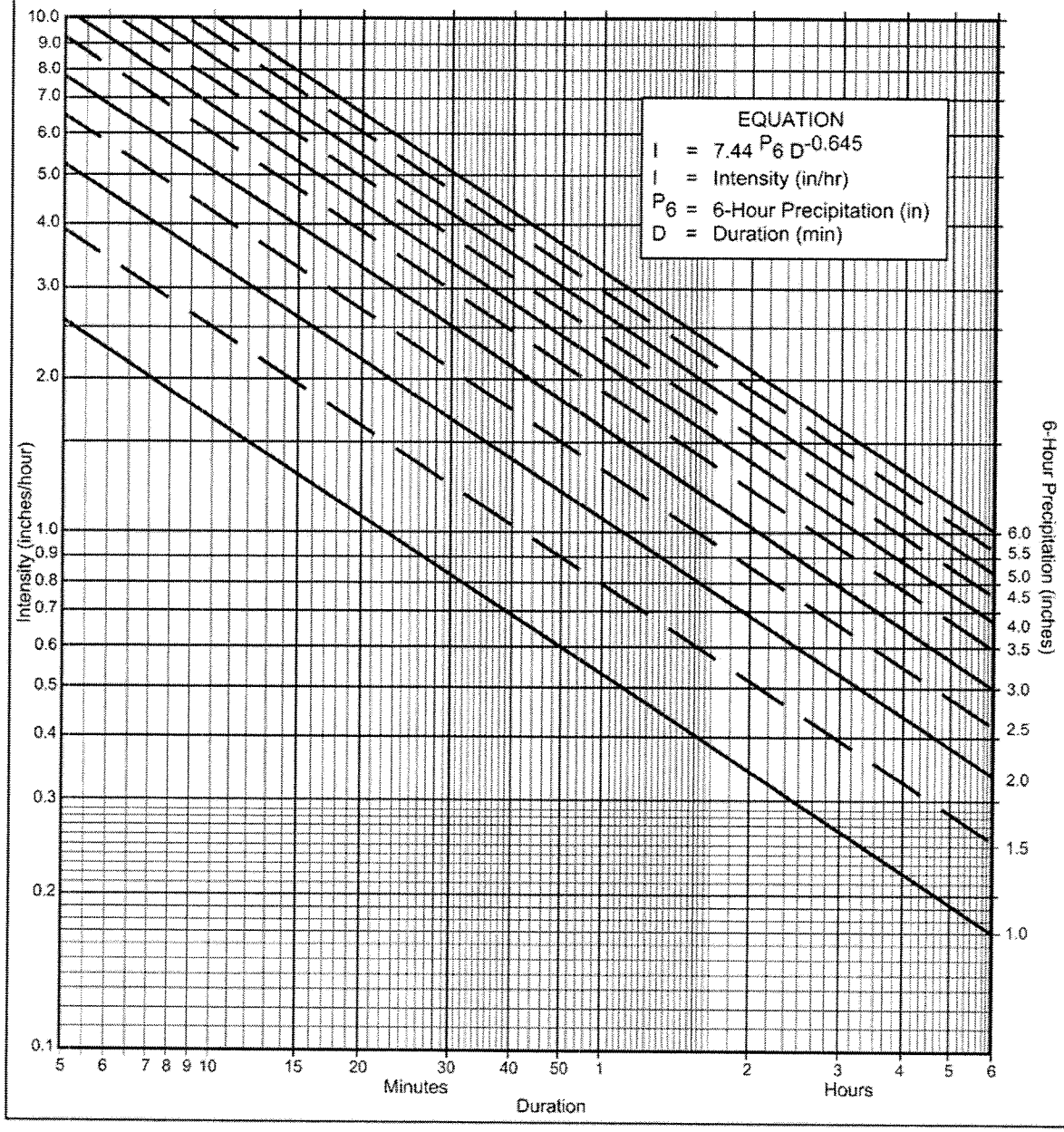
SanGIS
We Have San Diego Covered!

N
W E
S

3 0 3 Miles

Appendix V

100-year Intensity Duration Design Chart



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency 100 year

(b) P_6 = 2.3 in., P_{24} = 4.0, $\frac{P_6}{P_{24}}$ = 58 %(2)

(c) Adjusted P_6(2) = 2.3 in.

(d) t_x = _____ min.

(e) I = _____ in./hr.

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Template

FIGURE 3-1

ATTACHMENT 6

GEOTECHNICAL AND GROUNDWATER INVESTIGATION REPORT

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 San Diego County Area, California

February 13, 2017

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

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: San Diego County Area, California
Survey Area Data: Version 10, Sep 12, 2016

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

Date(s) aerial images were photographed: Dec 7, 2014—Jan 4, 2015

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

San Diego County Area, California (CA638)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
CfB	Chesterton fine sandy loam, 2 to 5 percent slopes	1.5	100.0%
Totals for Area of Interest		**1.5**	**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.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

San Diego County Area, California

CfB—Chesterton fine sandy loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: hb9h
Elevation: 50 to 600 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 330 to 350 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Chesterton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chesterton

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Ferruginous sandstone

Typical profile

H1 - 0 to 19 inches: fine sandy loam
H2 - 19 to 34 inches: sandy clay
H3 - 34 to 60 inches: indurated

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: About 19 inches to abrupt textural change; 20 to 40 inches to duripan
Natural drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: ACID CLAYPAN (Claypan Mesas - 1975) (R019XD062CA)
Hydric soil rating: No

Minor Components

Carlsbad

Percent of map unit: 5 percent

Hydric soil rating: No

Huerhuero

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

Marina

Percent of map unit: 4 percent
Hydric soil rating: No

Unnamed, ponded

Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

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La Jolla Canyon

Contextual Height Analysis

Aerial view looking west over Eastgate Mall

Aerial view looking west

Street view looking south-east on Genesee Ave

Aerial view looking south-east over Genesee Ave

Aerial view looking south-west

3D Simulation Photo Key Map

View 1 - Street view photo simulation looking south-east on Genesee Ave

View 2 - Street view photo simulation looking east on Eastgate Mall

View 3 - Street view photo simulation looking north-east on Genesee Ave

View 4 - Street view photo simulation looking north-west on Eastgate Mall

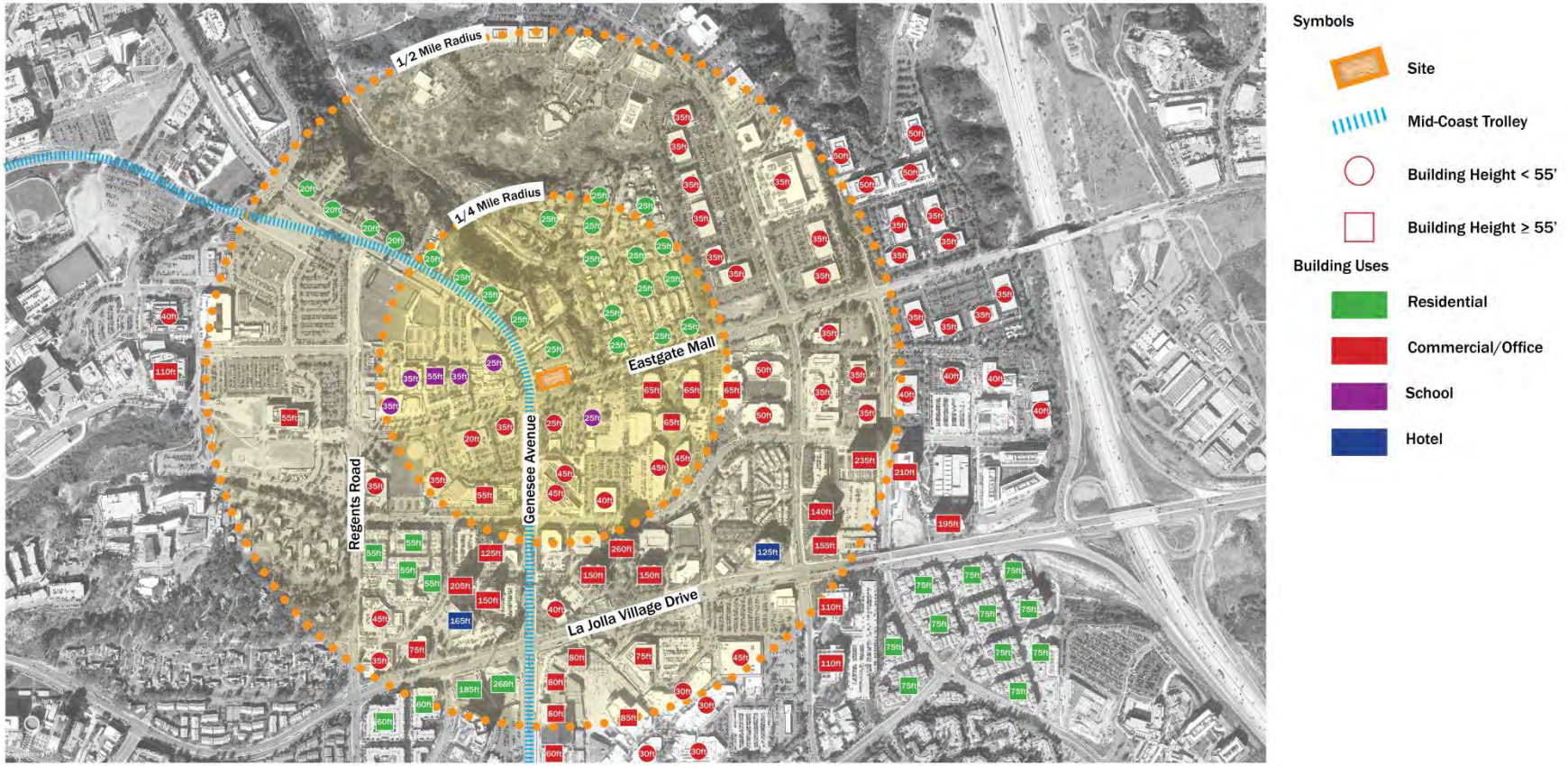
Render exhibiting northern and western elevations

Render exhibiting southern elevation

Render exhibiting southern elevation

Render exhibiting southern elevation

Render exhibiting southern elevation



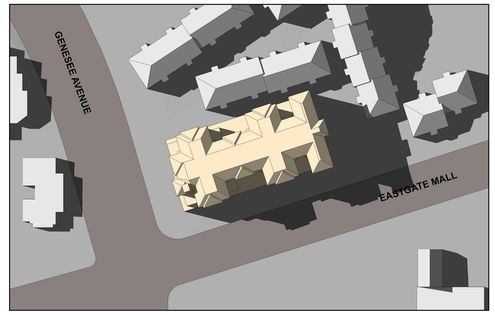
Heights analysis of surrounding buildings

Summer Solstice

9am - June 21st

12pm - June 21st

3pm - June 21st



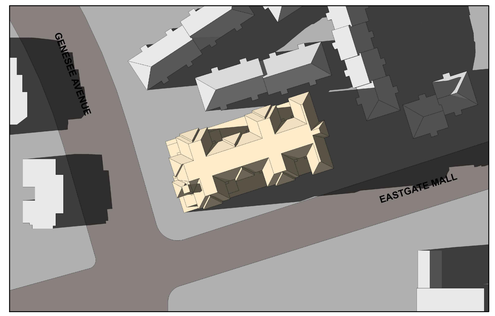
5pm - June 21st

Autumnal Equinox

9am - Sept 21st

12pm - Sept 21st

3pm - Sept 21st

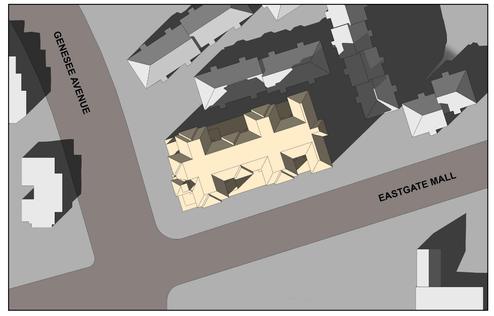


5pm - Sept 21st

Winter Solstice

9am - Dec 21st

12pm - Dec 21st



3pm - Dec 21st

Vernal Equinox

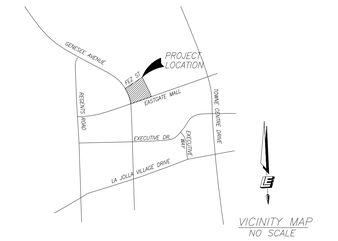
9am - March 21st

12pm - March 21st

3pm - March 21st

1 SHADOW ANALYSIS

Scale: N/A



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SHEET TITLE:
AMENDMENT TO SDP NO.548029

REVISION 14:
REVISION 13:
REVISION 12:
REVISION 11:
REVISION 10:
REVISION 9:
REVISION 8:
REVISION 7:
REVISION 6:
REVISION 5:
REVISION 4: 6/19/17
REVISION 3: 5/12/17
REVISION 2: 4/10/17
REVISION 1: 2/14/17

ORIGINAL DATE: 12/02/16

SHEET _____ OF 14

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Scale: N/A

SHADOW ANALYSIS

EXHIBIT A