Roselyn Estates II

1623 CINDY WAY
CITY OF PLEASANTON
Alameda County
California

HYDRO-MODIFICATION REPORT

Prepared By:

DeBolt Civil Engineering
811 San Ramon Valley Boulevard
Danville, CA 94526

March 2013
Job No. 06136

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HYDRO-MODIFICATION SUMMARY

Hydromodification refers to the changes in the magnitude and frequency of flows as a result of urbanization and the resulting impacts on receiving channels and drainage facilities in terms of capacity, erosion sedimentation, and degradation.

Hydromodification analysis was based upon the following criteria:

- For flow rates between the pre-project 10-year runoff even, the post-project discharge rates, and durations may not deviate above the pre-project discharge rates and durations by more than 10 percent over more than 10 percent of the length of the flow duration curve.

The entire Roselyn Estates II parcel is 3.71 acres. A portion of the parcel lies within the existing creek, so the area that is proposed to be developed is only 2.28 acres. Seven single family residences and streets are proposed on the 2.28 acres. The hydromodification calculations attached analyses the 7 new lots and adjoining streets. The project naturally drains to the north, to Arroyo del Valle which traverses the subject property.

The proposed development has been divided into Drainage Management Areas (DMA's) that are segregated into different categories: 1) roof area 2) paved area 3) landscape areas. A bio-retention area was selected to manage increases in runoff discharge rates and durations in order to mitigate potential hydromodification impacts due to the proposed development. All stormwater runoff from the proposed development will be routed to bioretention areas. The bio-retention area consists of a surface ponding layer, an 18" growing medium, and a storage layer. The bio-retention area has an overflow catchment for the purposes of routing flows from larger storm events.

While the entire site is 3.71 acres, only 2.28 acres is subject to hydromodification requirements as mentioned previously. After development, runoff will be directed to the bioretention area.

Pervious	Impervious Roof	Impervious Road	Driveways	Total
0.92	0.65	0.57	0.14	**2.28 acres**

Bay Area Hydrology Model
PROJECT REPORT

Project Name: Roselyn esates One swale
Site Address: Calico
City : Pleasanton
Report Date : 4/4/2013
Gage : LIVERMORE
Data Start : 1959/10/01
Data End : 2004/09/30
Precip Scale: 1.00
BAHM Version:

PREDEVELOPED LAND USE

Name : Basin PRE
Bypass: No

GroundWater: No

Pervious Land Use	Acres
A,Shrub,Flat(0-5%)	2.28

Impervious Land Use	Acres

Element Flows To:

Surface	Interflow	Groundwater

Name : Developed Property
Bypass: No

GroundWater: No

Pervious Land Use	Acres
A,Grass,Flat(0-5%)	.92

Impervious Land Use	Acres				
Roads,Flat(0-5%)	0.65	Area	0.57	,Flat(0-5%)	0.14

Element Flows To:

Surface	Interflow	Groundwater
Bioretenti Surfacele,		

Name : Bioretention Swale

Element Flows To:

Outlet 1	Outlet 2

Name : Bioretenti Surfacele

Element Flows To:

Outlet 1	Outlet 2
Bioretention Swale,	

ANALYSIS RESULTS

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.836093
5 year	1.7653
10 year	2.351881
25 year	2.600436

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.316997
5 year	0.501083
10 year	0.50906
25 year	0.526948

Yearly Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1961	0.836	0.131
1962	0.224	0.144
1963	0.793	0.333
1964	1.268	0.482
1965	0.025	0.501
1966	0.601	0.272
1967	0.459	0.209
1968	3.740	0.580
1969	0.838	0.501
1970	1.731	0.486
1971	1.277	0.255
1972	0.967	0.325
1973	0.002	0.182
1974	2.016	0.522
1975	0.979	0.233
1976	0.465	0.117
1977	0.000	0.024
1978	0.001	0.023
1979	1.264	0.218
1980	1.391	0.229
1981	1.136	0.326
1982	0.096	0.319
1983	2.355	0.510
1984	1.775	0.490
1985	0.744	0.317
1986	0.236	0.172
1987	2.492	0.509
1988	0.433	0.280
1989	0.002	0.026
1990	0.018	0.029
1991	0.156	0.256
1992	0.779	0.260
1993	0.710	0.489
1994	1.160	0.355
1995	0.266	0.109
1996	2.193	0.515
1997	2.447	0.505
1998	1.394	0.476
1999	2.072	0.449
2000	0.871	0.191
2001	0.763	0.373
2002	0.010	0.026
2003	0.290	0.149
2004	1.227	0.504
2005	2.350	0.504

Ranked Yearly Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	3.7399	0.5800
2	2.4919	0.5219
3	2.4467	0.5153
4	2.3548	0.5097
5	2.3503	0.5087
6	2.1934	0.5054
7	2.0725	0.5042
8	2.0164	0.5041
9	1.7748	0.5011
10	1.7310	0.5009
11	1.3945	0.4904
12	1.3905	0.4886
13	1.2766	0.4856
14	1.2676	0.4823
15	1.2641	0.4760
16	1.2273	0.4490
17	1.1605	0.3734
18	1.1360	0.3546
19	0.9792	0.3327
20	0.9670	0.3264
21	0.8710	0.3246
22	0.8383	0.3195
23	0.8361	0.3170
24	0.7930	0.2802
25	0.7791	0.2721
26	0.7626	0.2600
27	0.7440	0.2555
28	0.7102	0.2545
29	0.6010	0.2329
30	0.4654	0.2293
31	0.4589	0.2176
32	0.4329	0.2087
33	0.2899	0.1912
34	0.2656	0.1815
35	0.2358	0.1720
36	0.2240	0.1495
37	0.1563	0.1444
38	0.0964	0.1311
39	0.0254	0.1169
40	0.0182	0.1090
41	0.0104	0.0287
42	0.0023	0.0261
43	0.0016	0.0257
44	0.0011	0.0242
45	0.0005	0.0228

POC #1
The Facility PASSED

The Facility PASSED.

Flow(CFS)	Predev	Dev	Percentage	Pass/Fail
0.0836	1152	579	50	Pass
0.1065	1011	473	46	Pass
0.1294	889	375	42	Pass
0.1523	792	315	39	Pass
0.1753	724	264	36	Pass
0.1982	666	225	33	Pass
0.2211	610	189	30	Pass
0.2440	565	161	28	Pass
0.2669	523	113	21	Pass
0.2898	482	91	18	Pass
0.3127	437	73	16	Pass
0.3356	400	63	15	Pass
0.3586	372	56	15	Pass
0.3815	351	51	14	Pass
0.4044	322	46	14	Pass
0.4273	301	43	14	Pass
0.4502	284	39	13	Pass
0.4731	255	35	13	Pass

0.4960	240	23	9	Pass
0.5189	228	5	2	Pass
0.5418	213	3	1	Pass
0.5648	201	2	0	Pass
0.5877	187	0	0	Pass
0.6106	175	0	0	Pass
0.6335	166	0	0	Pass
0.6564	153	0	0	Pass
0.6793	142	0	0	Pass
0.7022	134	0	0	Pass
0.7251	125	0	0	Pass
0.7481	117	0	0	Pass
0.7710	108	0	0	Pass
0.7939	97	0	0	Pass
0.8168	94	0	0	Pass
0.8397	87	0	0	Pass
0.8626	84	0	0	Pass
0.8855	81	0	0	Pass
0.9084	78	0	0	Pass
0.9313	74	0	0	Pass
0.9543	71	0	0	Pass
0.9772	65	0	0	Pass
1.0001	57	0	0	Pass
1.0230	55	0	0	Pass
1.0459	54	0	0	Pass
1.0688	53	0	0	Pass
1.0917	52	0	0	Pass
1.1146	50	0	0	Pass
1.1376	47	0	0	Pass
1.1605	47	0	0	Pass
1.1834	44	0	0	Pass
1.2063	42	0	0	Pass
1.2292	39	0	0	Pass
1.2521	38	0	0	Pass
1.2750	36	0	0	Pass
1.2979	32	0	0	Pass
1.3208	31	0	0	Pass
1.3438	31	0	0	Pass
1.3667	30	0	0	Pass
1.3896	30	0	0	Pass
1.4125	27	0	0	Pass
1.4354	26	0	0	Pass
1.4583	25	0	0	Pass
1.4812	25	0	0	Pass
1.5041	24	0	0	Pass
1.5271	23	0	0	Pass
1.5500	22	0	0	Pass
1.5729	22	0	0	Pass
1.5958	22	0	0	Pass
1.6187	21	0	0	Pass
1.6416	20	0	0	Pass
1.6645	20	0	0	Pass
1.6874	20	0	0	Pass
1.7103	19	0	0	Pass
1.7333	18	0	0	Pass
1.7562	18	0	0	Pass
1.7791	17	0	0	Pass
1.8020	17	0	0	Pass
1.8249	16	0	0	Pass
1.8478	16	0	0	Pass
1.8707	16	0	0	Pass
1.8936	15	0	0	Pass
1.9166	15	0	0	Pass
1.9395	15	0	0	Pass
1.9624	15	0	0	Pass
1.9853	13	0	0	Pass
2.0082	12	0	0	Pass
2.0311	11	0	0	Pass
2.0540	11	0	0	Pass
2.0769	10	0	0	Pass
2.0999	10	0	0	Pass
2.1228	9	0	0	Pass

2.1457	9	0	0	Pass
2.1686	9	0	0	Pass
2.1915	8	0	0	Pass
2.2144	7	0	0	Pass
2.2373	7	0	0	Pass
2.2602	6	0	0	Pass
2.2831	6	0	0	Pass
2.3061	6	0	0	Pass
2.3290	6	0	0	Pass
2.3519	5	0	0	Pass

Roselyn Estates II

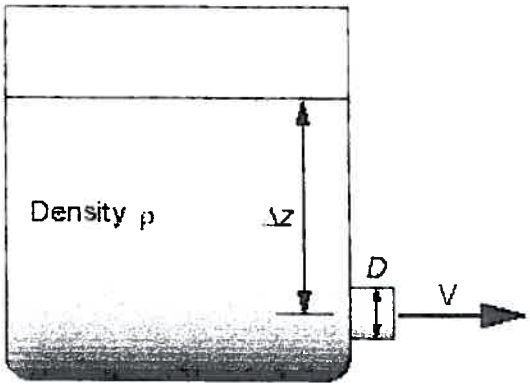
1623 CINDY WAY
CITY OF PLEASANTON
Alameda County
California

HYDRO-MODIFICATION OUTLET

Prepared By:

DeBolt Civil Engineering
811 San Ramon Valley Boulevard
Danville, CA 94526

March 2013
Job No. 06136



Determine 2 year flow through 3 inch pipe

Inputs

Depth of spout, Δz:	10.5	in
Fluid density, ρ:	1	kg/l
Spout exit diameter, *D*:	3	in
Discharge Coefficient, *C*:	0.95	

Answers

Exit Velocity, *V*:	7.50 ft/s	ft/s
Volume Flowrate:	0.350 ft^3/s	ft^3/s

Determine 5 year flow through 2–3 inch pipes

Inputs

Depth of spout, Δz:	5.5
Fluid density, ρ:	1
Spout exit diameter, *D*:	3
Discharge Coefficient, *C*:	0.98

Answers

Exit Velocity, *V*:	5.43 ft/s
Volume Flowrate:	0.251 ft^3/s

10 inch- 10 year/overflow pipe

Inputs

Depth of spout, Δz:	1	ft
Fluid density, ρ:	1	lb/in^3
Spout exit diameter, D:	10	in
Discharge Coefficient, C:	0.98	

Answers

Exit Velocity, V:	8.02 ft/s	ft/s
Volume Flowrate:	4.29 ft^3/s	ft^3/s

ANALYSIS RESULTS

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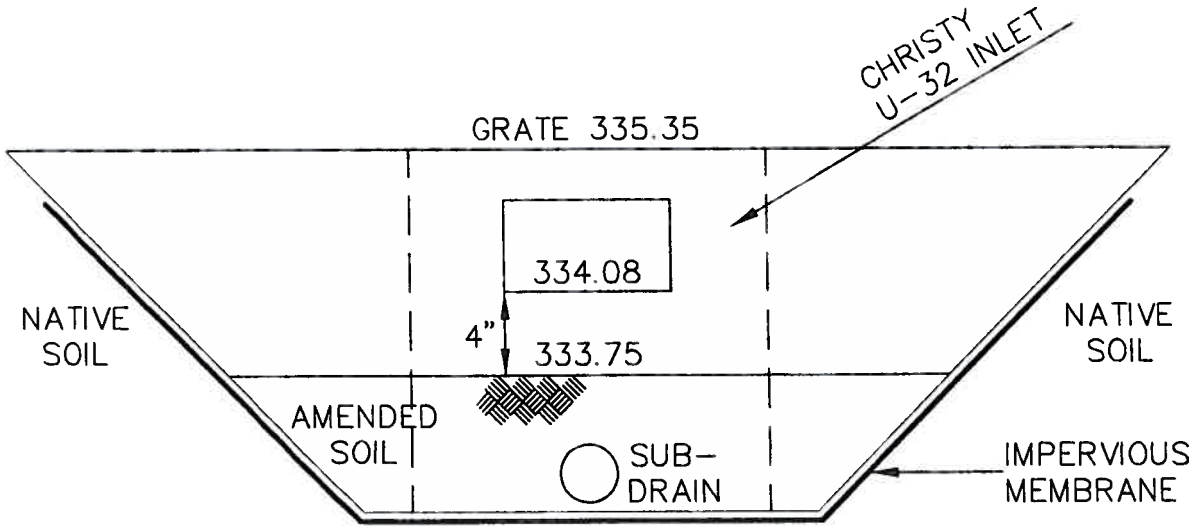
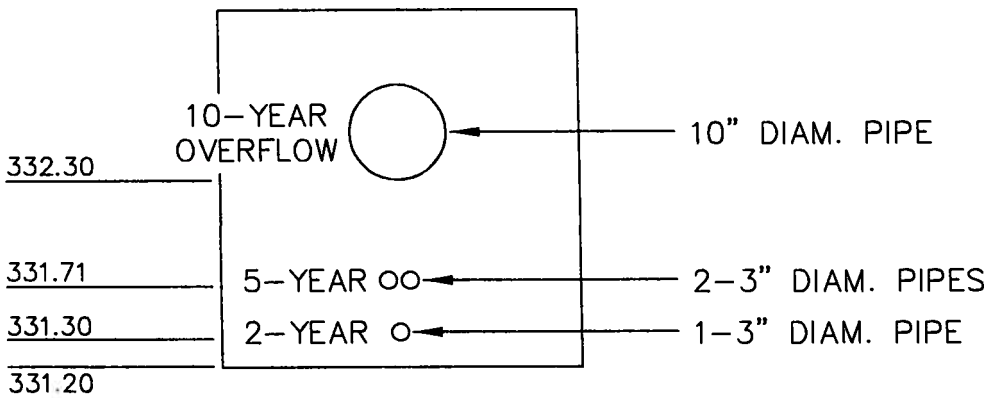


SECTION A-A
N.T.S.



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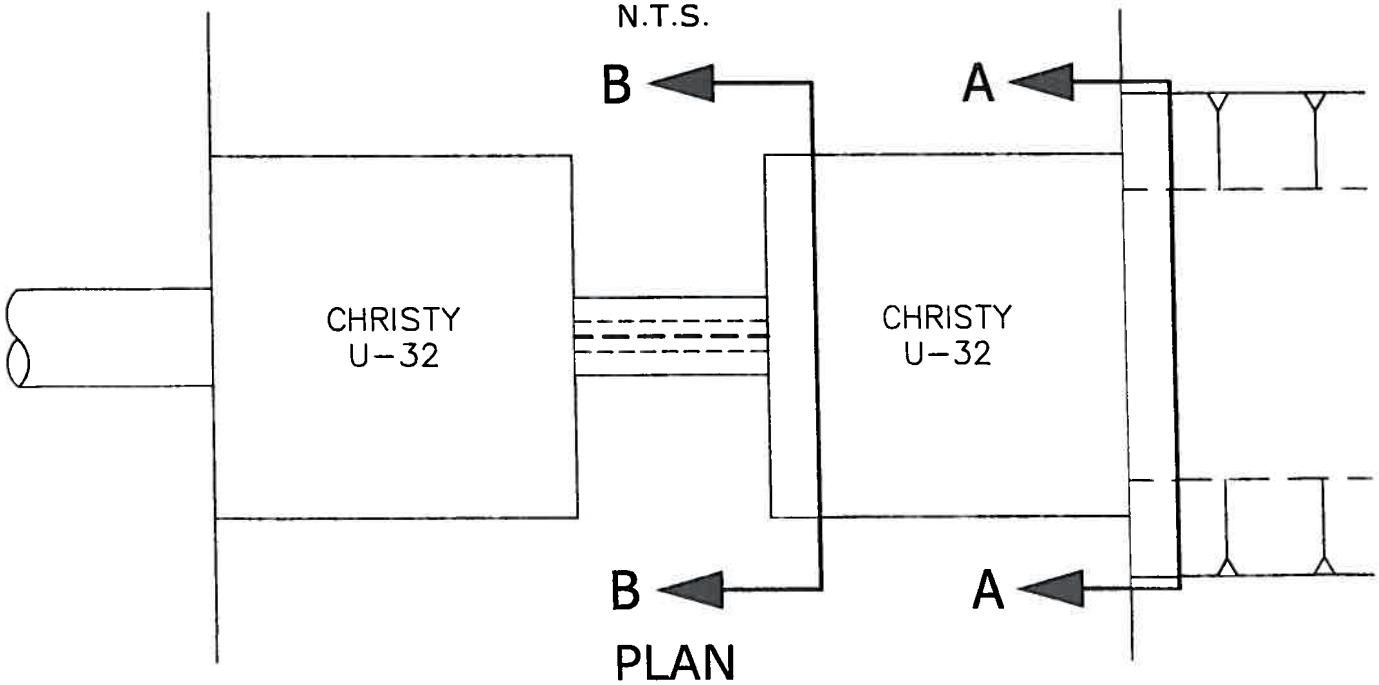
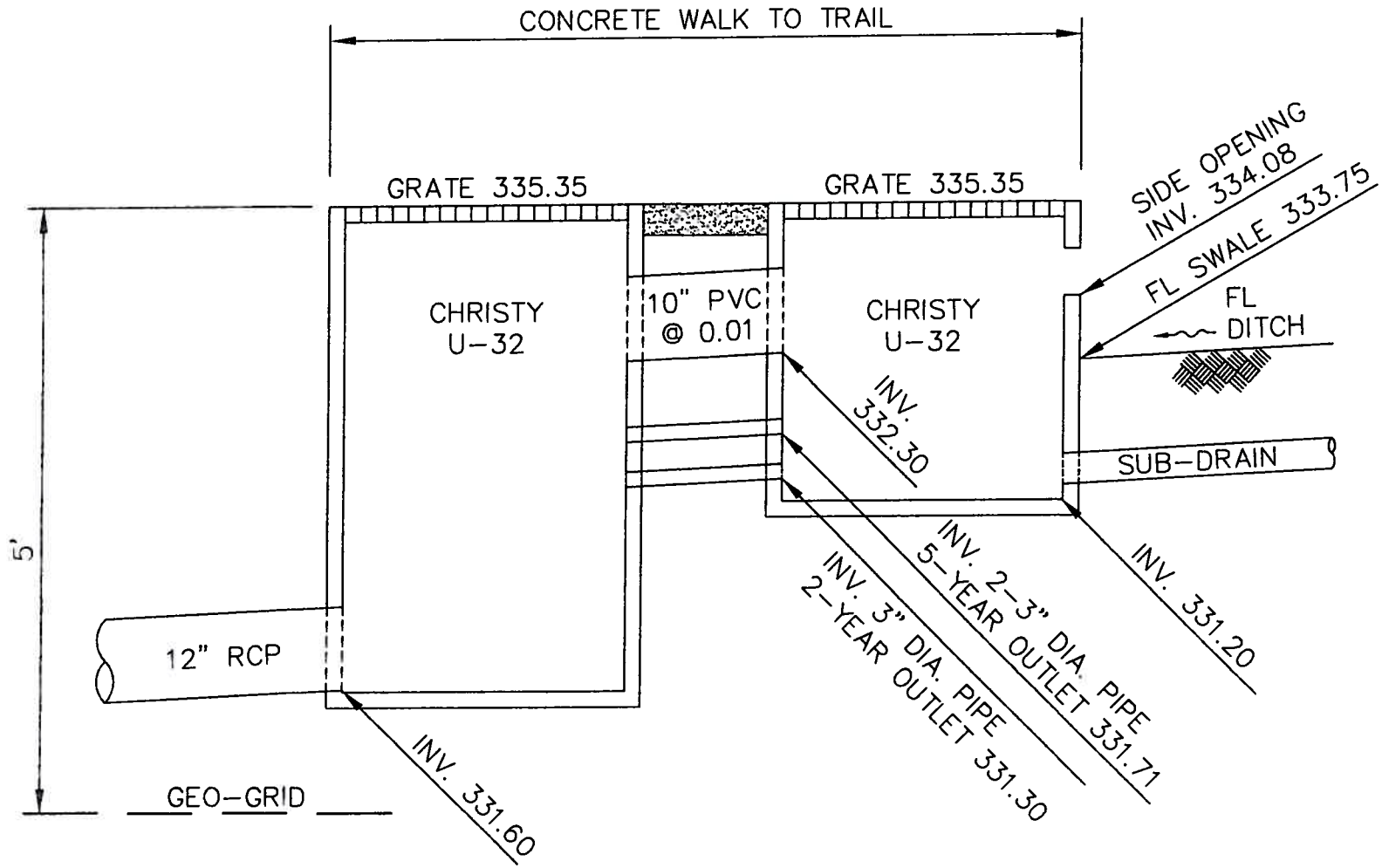


PLAN
N.T.S.



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IMP SIZING CALCULATIONS

Roselyn Estates II
1623 Cindy Way
Plasanton, CA

March 2013
Job # 06136

Prepared by:

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811 San Ramon Valley Boulevard
Danville, CA
925-837-2780

Project Name: Roselyn Estates II
Project Type: Treatment and Flow Control
Location: Pleasanton
APN: Alamed County
Drainage Area: 109500 sf
Mean Annual Precipitation: 20 in

IV. Areas Draining to IMPs

IMP Name: IMP1 (Soil Type: D)

IMP Type: Bioretention Facility
Soil Type: D

DMA Name	DMA Area (sq ft)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	IMP Sizing			
					IMP Sizing Factor	Rain Adjustment Factor	Minimum Area or Volume	Proposed Area or Volume
DMA1	3,670	Conventional Roof	1.00	3,670				
DMA2	3,285	Conventional Roof	1.00	3,285				
DMA3	3,285	Conventional Roof	1.00	3,285				
DMA4	3,285	Conventional Roof	1.00	3,285				
DMA5	3,670	Conventional Roof	1.00	3,670				
DMA8	555	Concrete or Asphalt	1.00	555				
DMA9	1,125	Concrete or Asphalt	1.00	1,125				
DMA10	1,380	Concrete or Asphalt	1.00	1,380				
DMA11	1,210	Concrete or Asphalt	1.00	1,210				
DMA12	535	Concrete or Asphalt	1.00	535				
DMA16	27,890	Landscape	0.70	19,523				
DMA17	11,520	Landscape	0.70	8,064				
			Total	49,587				
				Area	0.050	1.009	2,501	6,845
				Surface Volume	0.042	1.009	2,101	3,020
				Subsurface Volume	0.055	1.009	2,751	10,000
							Maximum Underdrain Flow (cfs)	0.11
							Orifice Diameter (in)	2.16

IMP Name: IMP2 (Soil Type: D)

IMP Type: Bioretention Facility
Soil Type: D

DMA Name	DMA Area (sq ft)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	IMP Sizing			
					IMP Sizing Factor	Rain Adjustment Factor	Minimum Area or Volume	Proposed Area or Volume
DMA6	3,670	Conventional Roof	1.00	3,670				
DMA7	3,670	Conventional Roof	1.00	3,670				
DMA13	540	Concrete or Asphalt	1.00	540				
DMA14	605	Concrete or Asphalt	1.00	605				
DMA15	29,470	Concrete or Asphalt	1.00	29,470				
			Total	37,955				
				Area	0.050	1.009	1,914	5,135
				Surface Volume	0.042	1.009	1,608	2,500
				Subsurface Volume	0.055	1.009	2,106	2,500
							Maximum Underdrain Flow (cfs)	0.07
							Orifice Diameter (in)	1.70