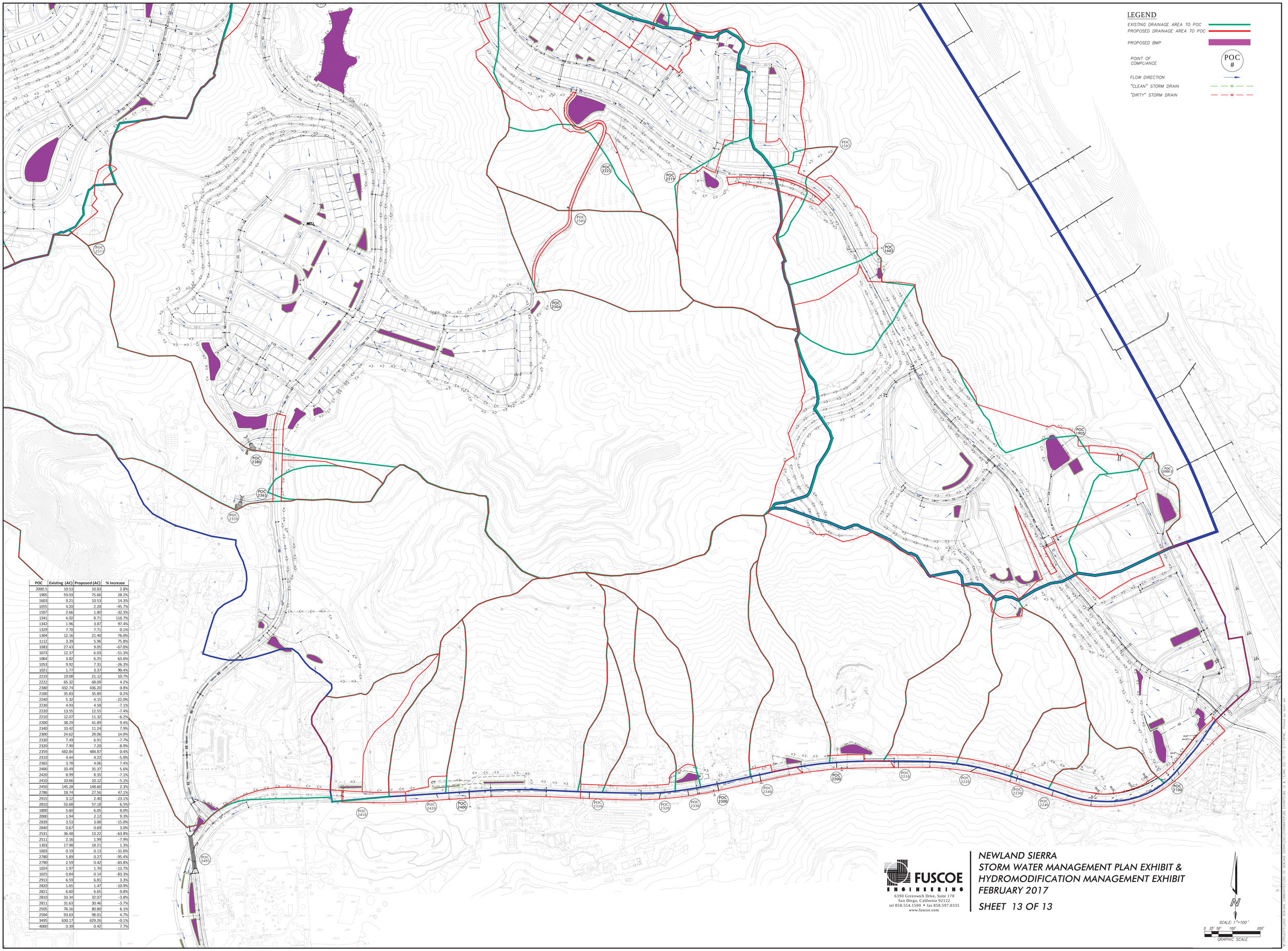

POC	Existing (AC)	Proposed (AC)	% Increase
2000.5	10.53	10.83	2.8%
1905	59.03	75.66	28.2%
1603	9.21	10.53	14.3%
1055	4.20	2.28	-45.7%
1507	2.66	1.80	-32.3%
1341	4.02	8.71	116.7%
1342	1.96	3.87	97.4%
1329	7.70	7.71	0.1%
1304	12.16	21.40	76.0%
1112	3.39	5.96	75.8%
1083	27.43	9.05	-67.0%
1073	12.37	6.03	-51.3%
1064	3.82	6.25	63.6%
1053	9.92	7.31	-26.3%
1021	1.77	3.37	90.4%
2219	19.08	21.12	10.7%
2222	65.32	68.09	4.2%
2380	432.74	436.20	0.8%
2100	35.83	35.89	0.2%
2240	5.32	4.15	-22.0%
2230	4.93	4.58	-7.1%
2220	13.55	12.55	-7.4%
2210	12.07	11.32	-6.2%
2200	38.29	41.89	9.4%
2340	10.42	11.24	7.9%
2300	24.62	28.06	14.0%
2330	7.49	6.91	-7.7%
2320	7.90	7.20	-8.9%
2359	482.84	484.87	0.4%
2310	4.44	4.22	-5.0%
2363	3.78	4.06	7.4%
2400	33.49	35.37	5.6%
2420	8.99	8.35	-7.1%
2410	10.66	10.12	-5.1%
2450	145.28	148.60	2.3%
2786	18.74	27.56	47.1%
2915	3.12	2.40	-23.1%
2810	53.68	57.18	6.5%
1800	5.60	6.05	8.0%
2000	1.94	2.12	9.3%
2839	3.53	3.00	-15.0%
2840	0.67	0.69	3.0%
2531	36.48	13.22	-63.8%
2511	2.16	1.99	-7.9%
1303	17.98	18.21	1.3%
1003	0.19	0.13	-31.6%
2780	5.89	0.27	-95.4%
2790	2.59	0.42	-83.8%
1024	1.97	1.70	-13.7%
1025	0.84	0.14	-83.3%
2913	6.59	6.81	3.3%
2820	1.65	1.47	-10.9%
2821	6.60	6.65	0.8%
2810	33.34	32.07	-3.8%
2811	31.63	30.46	-3.7%
2505	76.16	80.80	6.1%
2504	93.63	98.01	4.7%
3495	630.17	629.26	-0.1%
4000	0.39	0.42	7.7%

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NEWLAND SIERRA
STORM WATER MANAGEMENT PLAN EXHIBIT & HYDROMODIFICATION MANAGEMENT EXHIBIT
FEBRUARY 2017

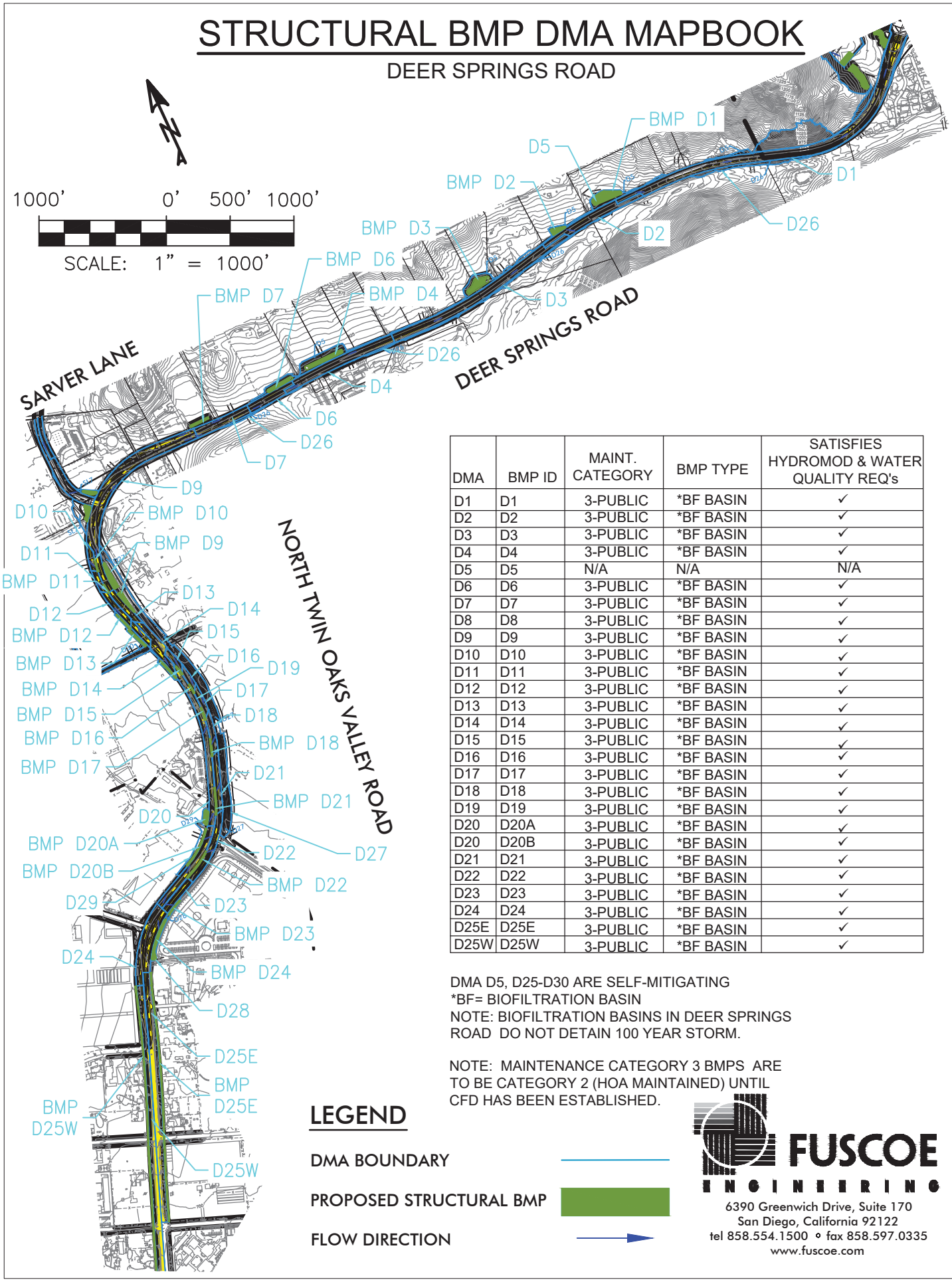
SHEET 13 OF 13

Attachment 1d

Structural BMP DMA Mapbooks

STRUCTURAL BMP DMA MAPBOOK

DEER SPRINGS ROAD



DMA	BMP ID	MAINT. CATEGORY	BMP TYPE	SATISFIES HYDROMOD & WATER QUALITY REQ's
D1	D1	3-PUBLIC	*BF BASIN	✓
D2	D2	3-PUBLIC	*BF BASIN	✓
D3	D3	3-PUBLIC	*BF BASIN	✓
D4	D4	3-PUBLIC	*BF BASIN	✓
D5	D5	N/A	N/A	N/A
D6	D6	3-PUBLIC	*BF BASIN	✓
D7	D7	3-PUBLIC	*BF BASIN	✓
D8	D8	3-PUBLIC	*BF BASIN	✓
D9	D9	3-PUBLIC	*BF BASIN	✓
D10	D10	3-PUBLIC	*BF BASIN	✓
D11	D11	3-PUBLIC	*BF BASIN	✓
D12	D12	3-PUBLIC	*BF BASIN	✓
D13	D13	3-PUBLIC	*BF BASIN	✓
D14	D14	3-PUBLIC	*BF BASIN	✓
D15	D15	3-PUBLIC	*BF BASIN	✓
D16	D16	3-PUBLIC	*BF BASIN	✓
D17	D17	3-PUBLIC	*BF BASIN	✓
D18	D18	3-PUBLIC	*BF BASIN	✓
D19	D19	3-PUBLIC	*BF BASIN	✓
D20	D20A	3-PUBLIC	*BF BASIN	✓
D20	D20B	3-PUBLIC	*BF BASIN	✓
D21	D21	3-PUBLIC	*BF BASIN	✓
D22	D22	3-PUBLIC	*BF BASIN	✓
D23	D23	3-PUBLIC	*BF BASIN	✓
D24	D24	3-PUBLIC	*BF BASIN	✓
D25E	D25E	3-PUBLIC	*BF BASIN	✓
D25W	D25W	3-PUBLIC	*BF BASIN	✓

DMA D5, D25-D30 ARE SELF-MITIGATING
*BF= BIOFILTRATION BASIN
NOTE: BIOFILTRATION BASINS IN DEER SPRINGS ROAD DO NOT DETAIN 100 YEAR STORM.

NOTE: MAINTENANCE CATEGORY 3 BMPS ARE TO BE CATEGORY 2 (HOA MAINTAINED) UNTIL CFD HAS BEEN ESTABLISHED.

LEGEND

DMA BOUNDARY

PROPOSED STRUCTURAL BMP

FLOW DIRECTION

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STRUCTURAL BMP DMA MAPBOOK

HILLSIDE

LEGEND

DMA BOUNDARY

PROPOSED STRUCTURAL BMP

FLOW DIRECTION

500' 0' 250' 500'

SCALE: 1" = 500'

DMA	BMP ID	MAINT. CATEGORY	BMP TYPE	SATISFIES HYDROMOD & WATER QUALITY REQ's
H1	H1	2-HOA	*BF BASIN	✓
H2	H2	2-HOA	*BF BASIN	✓
H3A	H3A	2-HOA	*BF BASIN	✓
H3B	H3B	2-HOA	*BF BASIN	✓
H4	H4	2-HOA	*BF BASIN	✓
H5	H5	2-HOA	*BF BASIN	✓
H6	H6	2-HOA	*BF BASIN	✓
H7	H7	2-HOA	*BF BASIN	✓
H8HR1	H8HR1	3-PUBLIC	*BF BASIN	✓
H9HR2	H9HR2	3-PUBLIC	*BF BASIN	✓
H10	H10	2-HOA	*BF BASIN	✓
H11	H11	2-HOA	*BF BASIN	✓
H12	H12	2-HOA	*BF BASIN	✓
H13	H13	2-HOA	*BF BASIN	✓
H14A	H14A	2-HOA	*BF BASIN	✓
H14B	H14B	2-HOA	*BF BASIN	✓
H15	H15	2-HOA	*BF BASIN	✓
H16**	N/A	2-HOA	N/A	N/A
H17**	N/A	2-HOA	N/A	N/A
H18**	N/A	2-HOA	N/A	N/A

*BF= BIOFILTRATION BASIN
** SELF MITIGATING AREAS

NOTE: BASINS IN HILLSIDE NEIGHBORHOOD DO NOT DETAIN 100 YEAR STORM

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M:\PROJECTS\2660 NEWLAND COMMUNITIES\002-02 NEWLAND SIERRA\ENG\STORMWATER\SWMP (SWQMP)\ATTACHMENTS\ATTACHMENT 1D - STRUCTURAL DMA MAPBOOK\ATTACHMENT 1D - MAPBOOK - H.DWG (01-20-2017 4:46:47PM) Plotted b

STRUCTURAL BMP DMA MAPBOOK

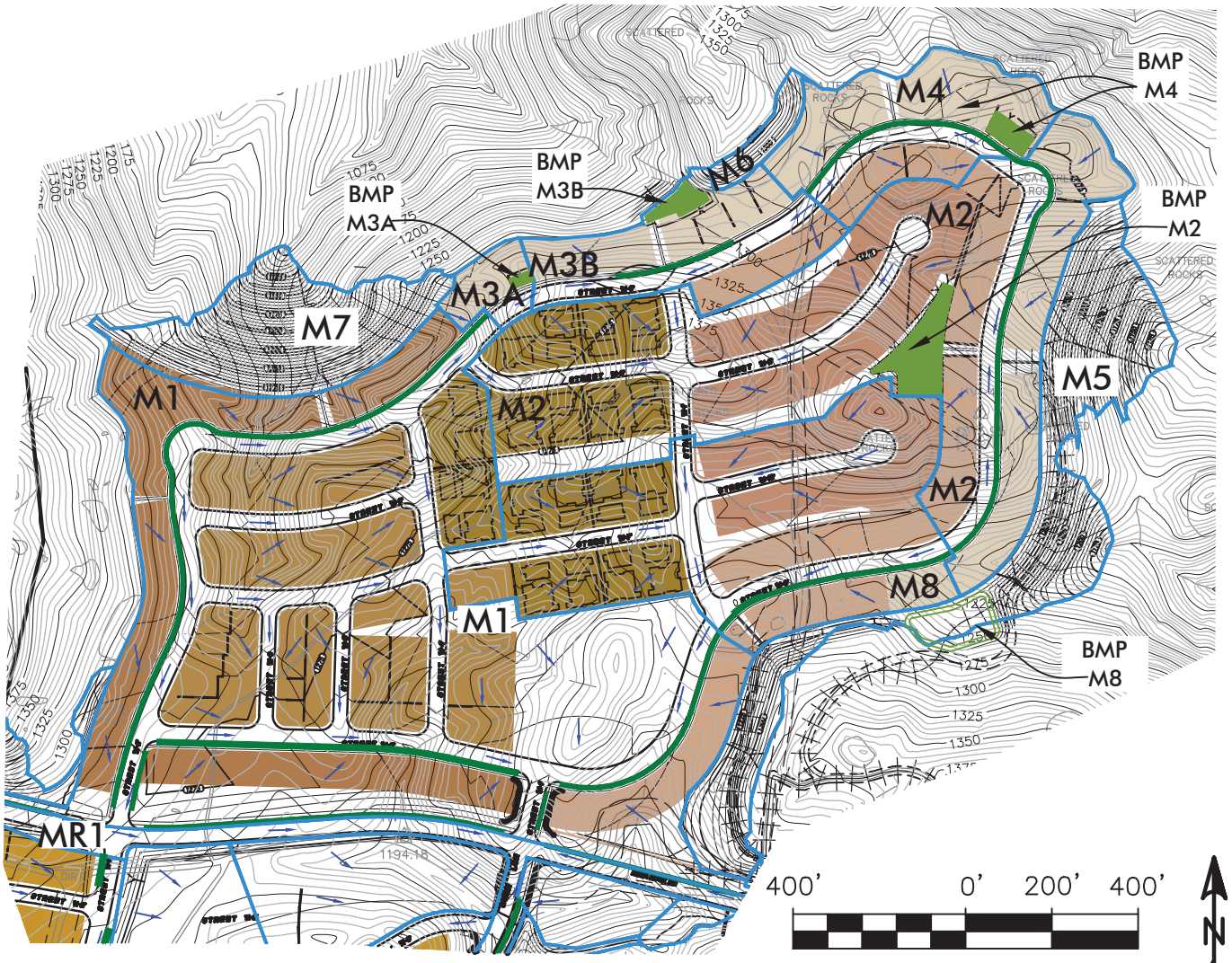
MESA

LEGEND

DMA BOUNDARY

PROPOSED STRUCTURAL BMP

FLOW DIRECTION



SCALE: 1" = 400'

DMA	BMP ID	MAINT. CATEGORY	BMP TYPE	SATISFIES HYDROMOD & WATER QUALITY REQ's	100-YEAR DETENTION
*** M1MR1K1	M1MRK1	3-PUBLIC	*BF BASIN	✓	✓
M2	M2	2-HOA	*BF BASIN	✓	
M3A	M3A	2-HOA	*BF BASIN	✓	
M3B	M3B	2-HOA	*BF BASIN	✓	
M4	M4	2-HOA	*BF BASIN	✓	
M5**	M5	N/A	N/A	N/A	N/A
M6**	M6	N/A	N/A	N/A	N/A
M7**	M7	N/A	N/A	N/A	N/A
M8	M8	2-HOA	*BF BASIN	✓	✓

*BF= BIOFILTRATION BASIN
**SELF-MITIGATING
*** SEE DMA MAPBOOK FOR "VALLEY"

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NOTE: MAINTENANCE CATEGORY 3 BMPS ARE TO BE CATEGORY 2 (HOA MAINTAINED) UNTIL CFD HAS BEEN ESTABLISHED.

M:\PROJECTS\2660 NEWLAND COMMUNITIES\002-02 NEWLAND SIERRA\ENG\STORMWATER\SWMP (SWQMP)\ATTACHMENTS\ATTACHMENT 1D - STRUCTURAL DMA MAPBOOK\ATTACHMENT 1D - MAPBOOK - M.DWG (01-20-2017 4:47:02PM) Plotted b

STRUCTURAL BMP DMA MAPBOOK

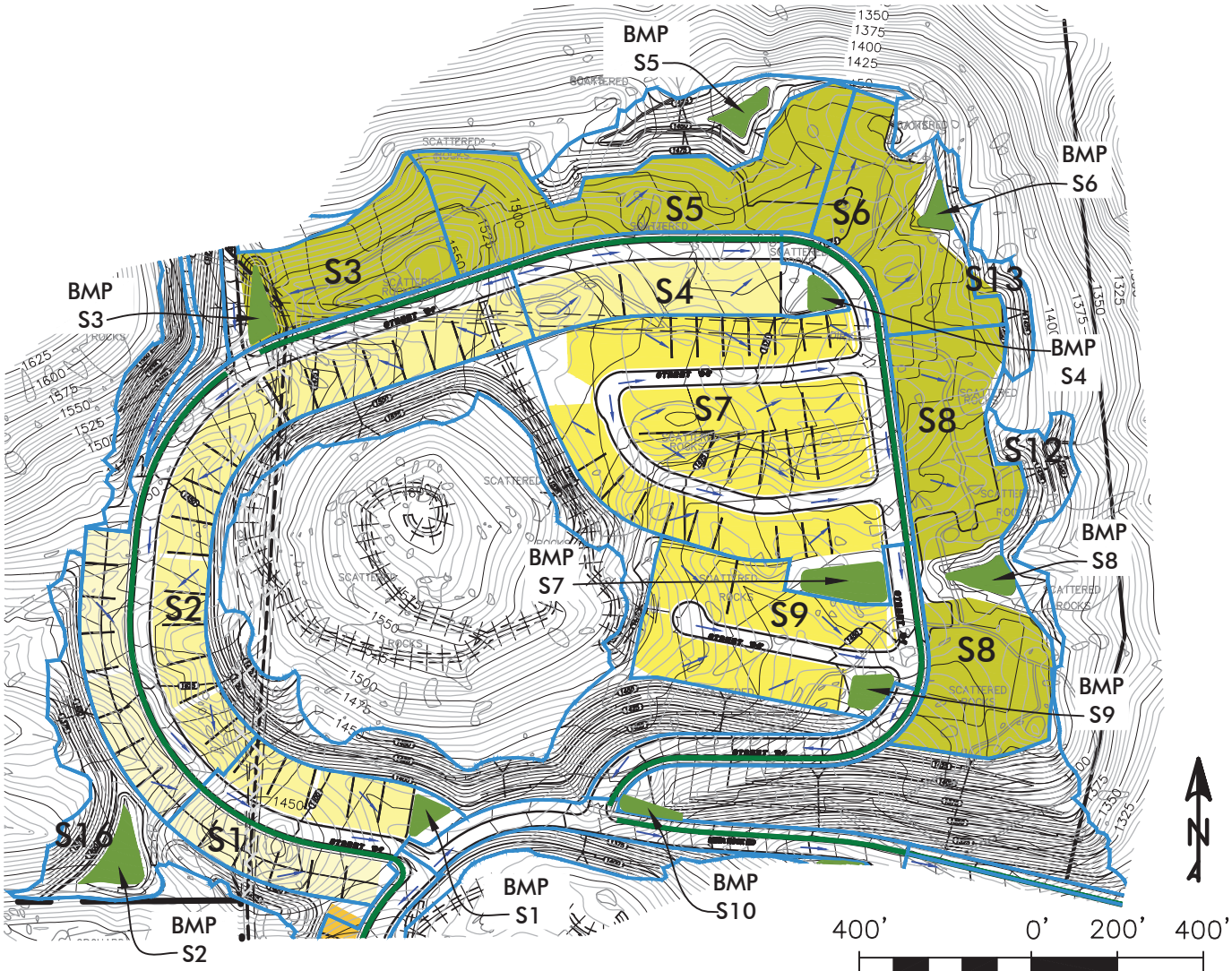
SUMMIT

LEGEND

DMA BOUNDARY

PROPOSED STRUCTURAL BMP

FLOW DIRECTION



DMA	BMP ID	MAINT. CATEGORY	BMP TYPE	SATISFIES HYDROMOD & WATER QUALITY REQ's	100-YEAR DETENTION
S1	S1	2-HOA	*BF BASIN	✓	
S2	S2	2-HOA	*BF BASIN	✓	✓
S3	S3	2-HOA	*BF BASIN	✓	
S4	S4	2-HOA	*BF BASIN	✓	
S5	S5	2-HOA	*BF BASIN	✓	
S6	S6	2-HOA	*BF BASIN	✓	
S7	S7	2-HOA	*BF BASIN	✓	
S8	S8	2-HOA	*BF BASIN	✓	
S9	S9	2-HOA	*BF BASIN	✓	
S10	S10	3-PUBLIC	*BF BASIN	✓	

*BF= BIOFILTRATION BASIN
DMA S11-S16 ARE SELF-MITIGATING

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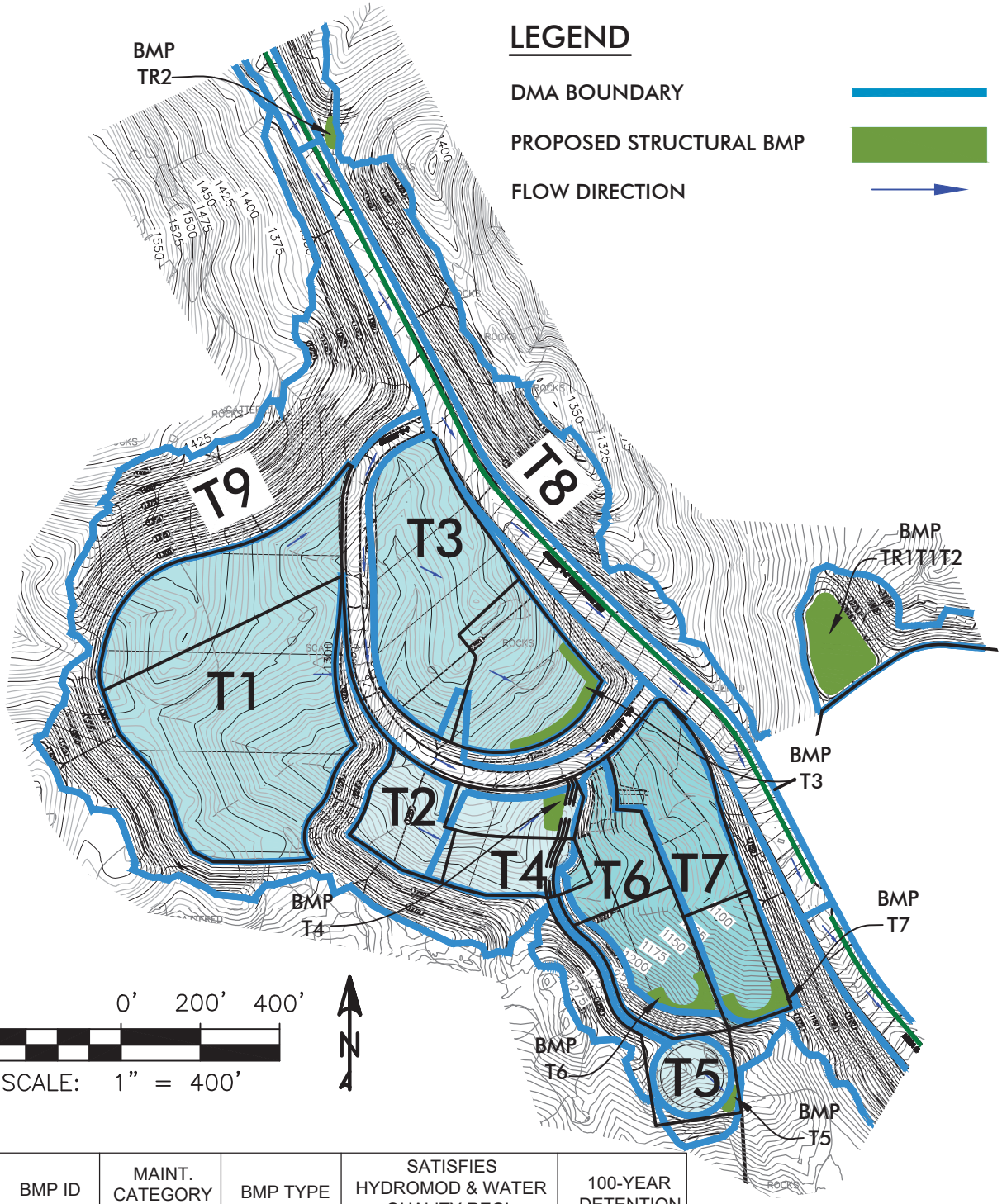
NOTE: MAINTENANCE CATEGORY 3 BMPS ARE TO BE CATEGORY 2 (HOA MAINTAINED) UNTIL CFD HAS BEEN ESTABLISHED.

M:\PROJECTS\2660 NEWLAND COMMUNITIES\002-02 NEWLAND SIERRA\ENG\STORMWATER\SWMP (SWQMP)\ATTACHMENTS\ATTACHMENT 1D - STRUCTURAL DMA MAPBOOK\ATTACHMENT 1D - MAPBOOK - S.DWG (01-20-2017 4:47:35PM) Plotted by:

STRUCTURAL BMP DMA MAPBOOK

TERRACES



DMA	BMP ID	MAINT. CATEGORY	BMP TYPE	SATISFIES HYDROMOD & WATER QUALITY REQ's	100-YEAR DETENTION
TR1&T1&T2	TR1T1T2	3-PUBLIC	*BF BASIN	✓	✓
TR2	TR2	3-PUBLIC	*BF BASIN	✓	
T3	T3	2-HOA	*BF BASIN	✓	
T4	T4	2-HOA	*BF BASIN	✓	
T5	T5	2-HOA	*BF BASIN	✓	
T6	T6	2-HOA	*BF BASIN	✓	
T7	T7	2-HOA	*BF BASIN	✓	
T8**	N/A	2-HOA	N/A	N/A	
T9**	N/A	2-HOA	N/A	N/A	

*BF= BIOFILTRATION BASIN
** SELF MITIGATING AREAS

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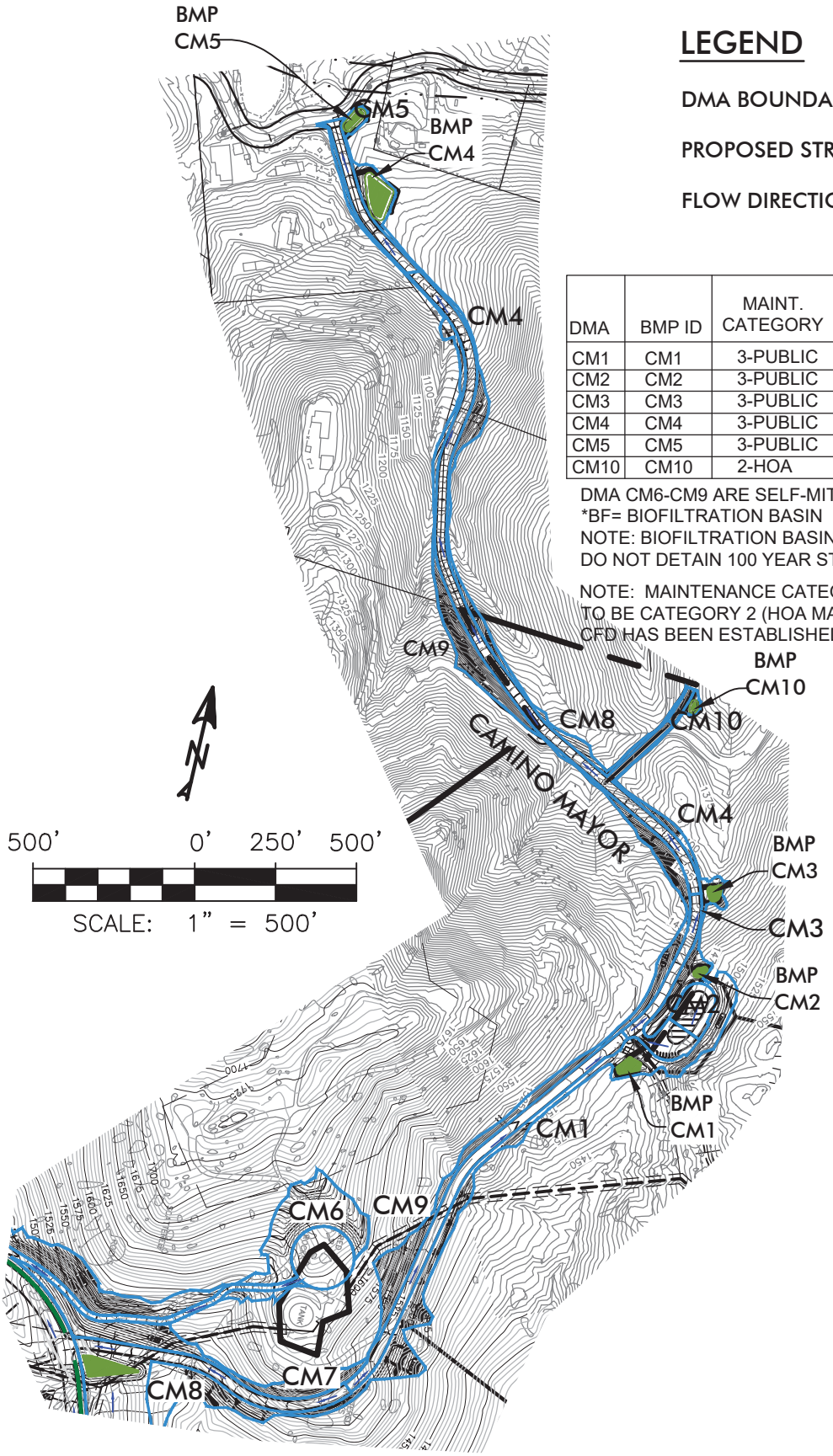
NOTE: MAINTENANCE CATEGORY 3 BMPS ARE TO BE CATEGORY 2 (HOA MAINTAINED) UNTIL CFD HAS BEEN ESTABLISHED.

M:\PROJECTS\2660 NEWLAND COMMUNITIES\002-02 NEWLAND SIERRA\ENG\STORMWATER\SWMP (SWQMP)\ATTACHMENTS\ATTACHMENT 1D - STRUCTURAL DMA MAPBOOK\ATTACHMENT 1D - MAPBOOK - T.DWG (01-20-2017 4:48:10PM) Plotted by

STRUCTURAL BMP DMA MAPBOOK

CAMINO MAYOR



LEGEND

DMA BOUNDARY

PROPOSED STRUCTURAL BMP

FLOW DIRECTION

DMA	BMP ID	MAINT. CATEGORY	BMP TYPE	SATISFIES HYDROMOD & WATER QUALITY REQ's
CM1	CM1	3-PUBLIC	*BF BASIN	✓
CM2	CM2	3-PUBLIC	*BF BASIN	✓
CM3	CM3	3-PUBLIC	*BF BASIN	✓
CM4	CM4	3-PUBLIC	*BF BASIN	✓
CM5	CM5	3-PUBLIC	*BF BASIN	✓
CM10	CM10	2-HOA	*BF BASIN	✓

DMA CM6-CM9 ARE SELF-MITIGATING
*BF= BIOFILTRATION BASIN
NOTE: BIOFILTRATION BASINS IN CAMINO MAYOR DO NOT DETAIN 100 YEAR STORM.

NOTE: MAINTENANCE CATEGORY 3 BMPS ARE TO BE CATEGORY 2 (HOA MAINTAINED) UNTIL CFD HAS BEEN ESTABLISHED.

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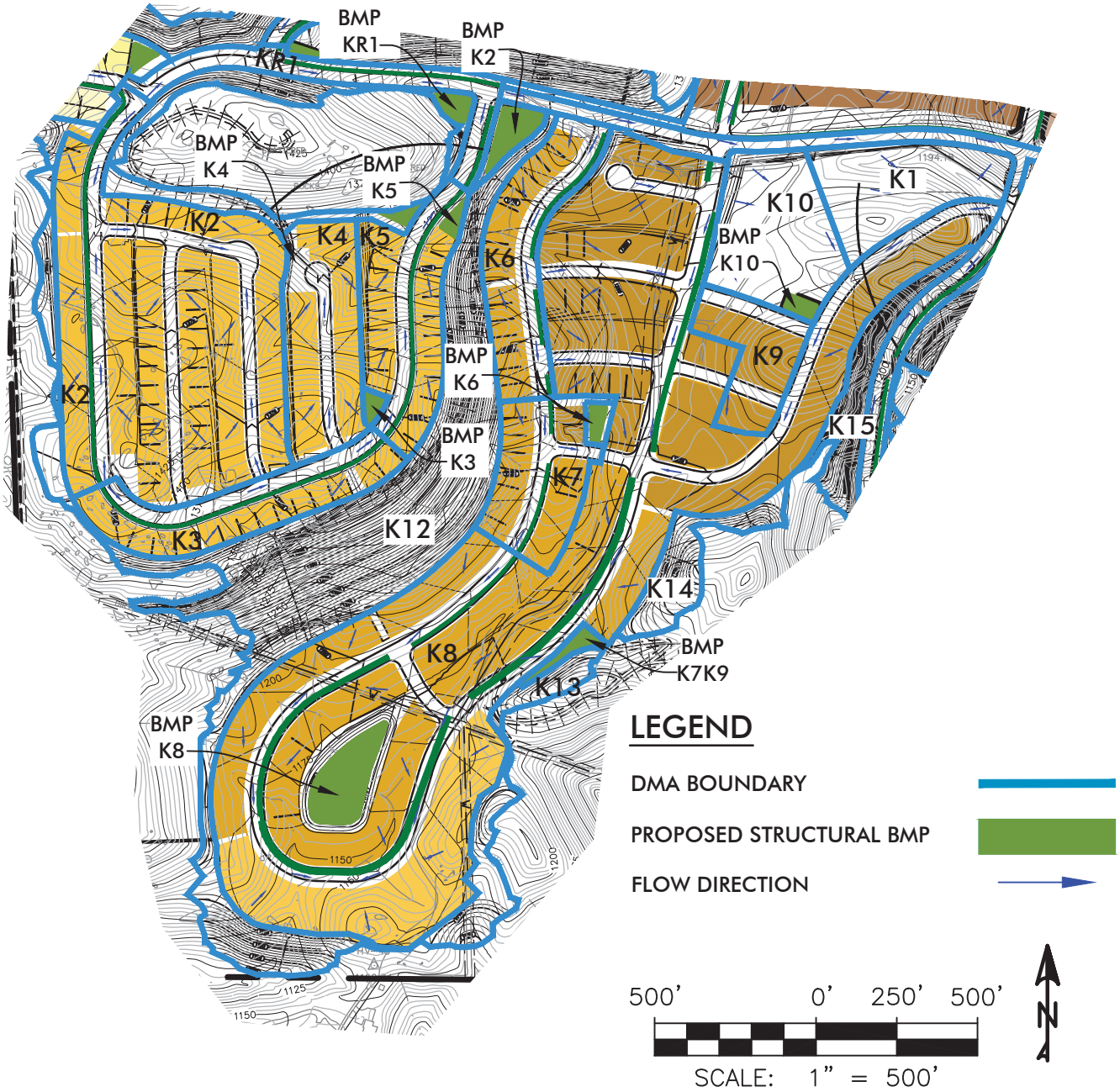
STRUCTURAL BMP DMA MAPBOOK

KNOLLS



DMA	BMP ID	MAINT. CATEGORY	BMP TYPE	SATISFIES HYDROMOD & WATER QUALITY REQ's	100-YEAR DETENTION
KR1	KR1	3-PUBLIC	*BF BASIN	✓	
K2	K2	2-HOA	*BF BASIN	✓	
K3	K3	2-HOA	*BF BASIN	✓	
K4	K4	2-HOA	*BF BASIN	✓	
K5	K5	2-HOA	*BF BASIN	✓	
K6	K6	2-HOA	*BF BASIN	✓	
K7K9	K7K9	2-HOA	*BF BASIN	✓	
K8	K8	2-HOA	*BF BASIN	✓	✓
K10	K10	3-PUBLIC	*BF BASIN	✓	

*BF= BIOFILTRATION BASIN
DMA K11-K17 ARE SELF-MITIGATING

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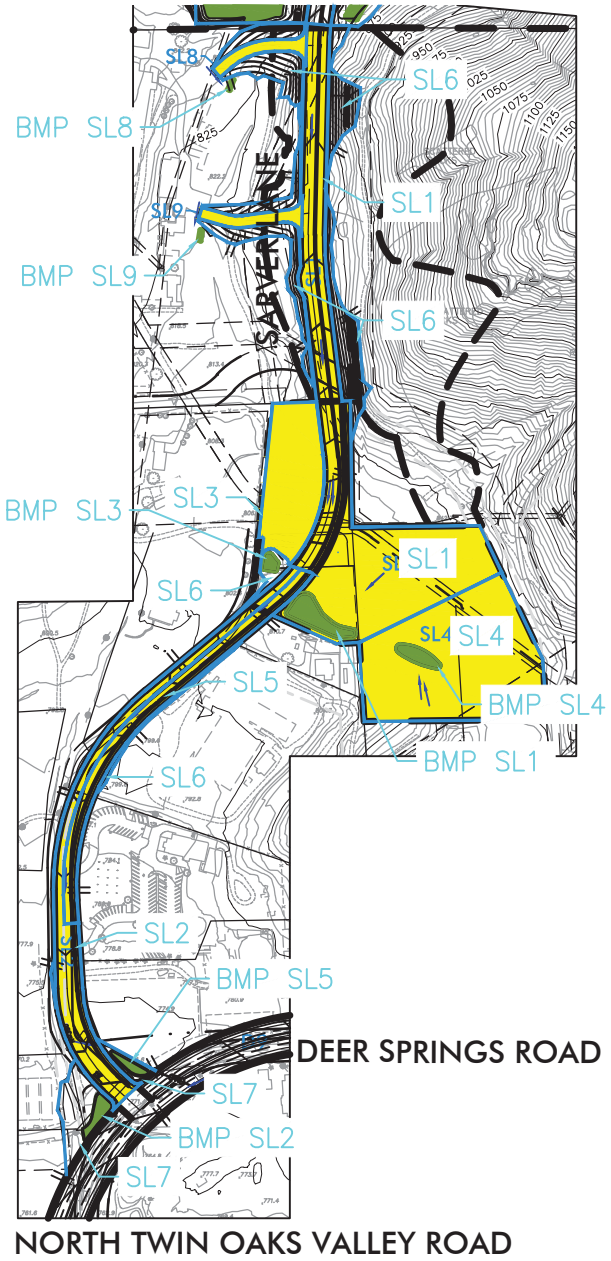
STRUCTURAL BMP DMA MAPBOOK

SARVER LANE



DMA	BMP ID	MAINT. CATEGORY	BMP TYPE	SATISFIES HYDROMOD & WATER QUALITY REQ's
SL1	SL1	3-PUBLIC	*BF BASIN	✓
SL2	SL2	3-PUBLIC	*BF BASIN	✓
SL3	SL3	3-PUBLIC	*BF BASIN	✓
SL4	SL4	3-PUBLIC	*BF BASIN	✓
SL8	SL8	2-HOA	*BF BASIN	✓
SL9	SL9	2-HOA	*BF BASIN	✓

DMA SL5-SL7 ARE SELF-MITIGATING
*BF= BIOFILTRATION BASIN

NOTE: BIOFILTRATION BASINS IN SARVER LANE DO NOT DETAIN 100 YEAR STORM.

NOTE: MAINTENANCE CATEGORY 3 BMPS ARE TO BE CATEGORY 2 (HOA MAINTAINED) UNTIL CFD HAS BEEN ESTABLISHED.

N

500' 0' 250' 500'

SCALE: 1" = 500'

LEGEND

DMA BOUNDARY

PROPOSED STRUCTURAL BMP

FLOW DIRECTION

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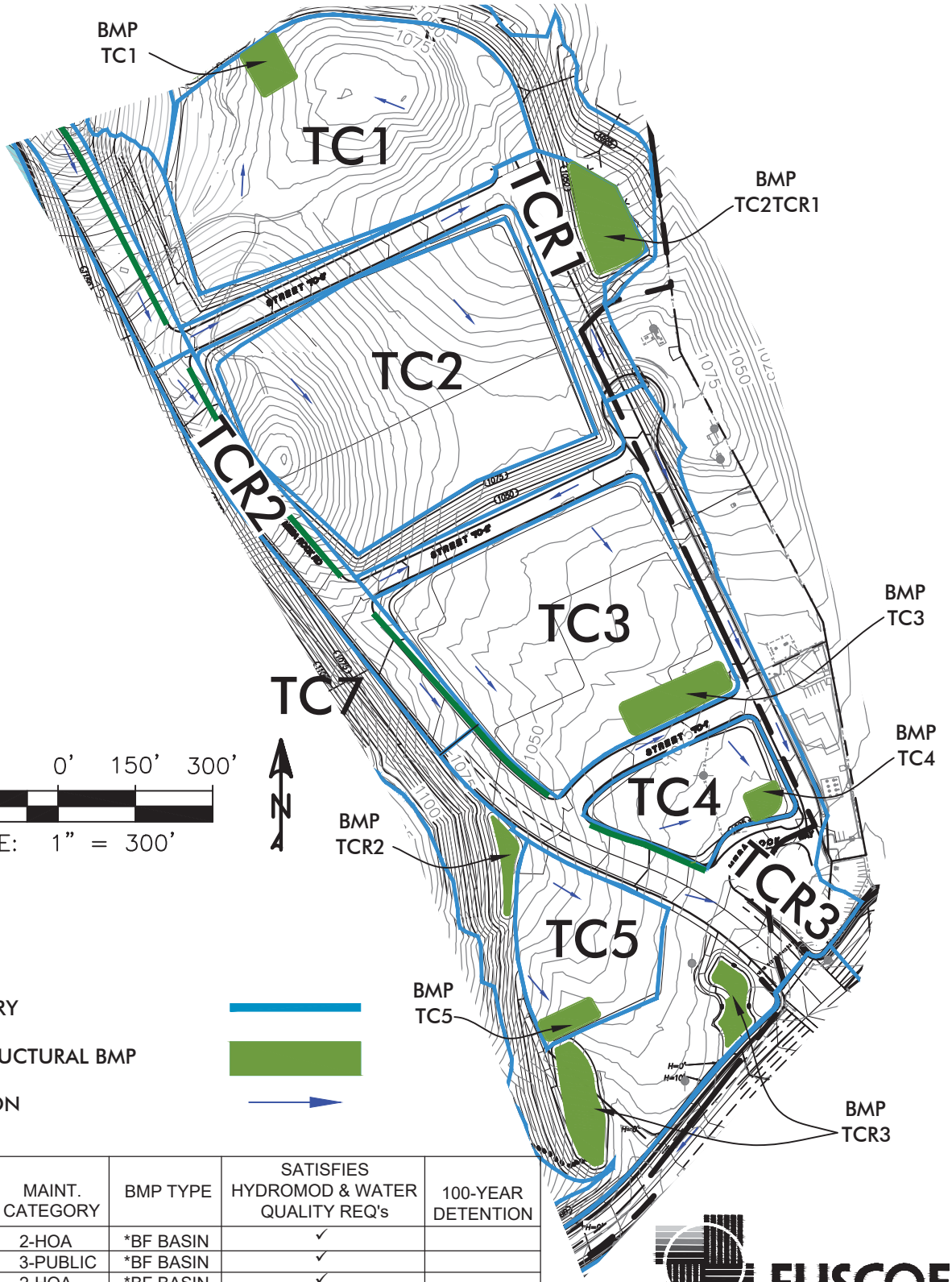
STRUCTURAL BMP DMA MAPBOOK

TOWN CENTER



LEGEND

DMA BOUNDARY

PROPOSED STRUCTURAL BMP

FLOW DIRECTION

DMA	BMP ID	MAINT. CATEGORY	BMP TYPE	SATISFIES HYDROMOD & WATER QUALITY REQ's	100-YEAR DETENTION
TC1	TC1	2-HOA	*BF BASIN	✓	
TC2	TC2TCR1	3-PUBLIC	*BF BASIN	✓	
TC3	TC3	2-HOA	*BF BASIN	✓	
TC4	TC4	2-HOA	*BF BASIN	✓	✓
TC5	TC5	2-HOA	*BF BASIN	✓	
TCR1	TC2TCR1	3-PUBLIC	*BF BASIN	✓	✓
TCR2	TCR2	3-PUBLIC	*BF BASIN	✓	✓
TCR3	TCR3	3-PUBLIC	*BF BASIN	✓	✓

*BF= BIOFILTRATION BASIN

NOTE: MAINTENANCE CATEGORY 3 BMPS ARE TO BE CATEGORY 2 (HOA MAINTAINED) UNTIL CFD HAS BEEN ESTABLISHED.

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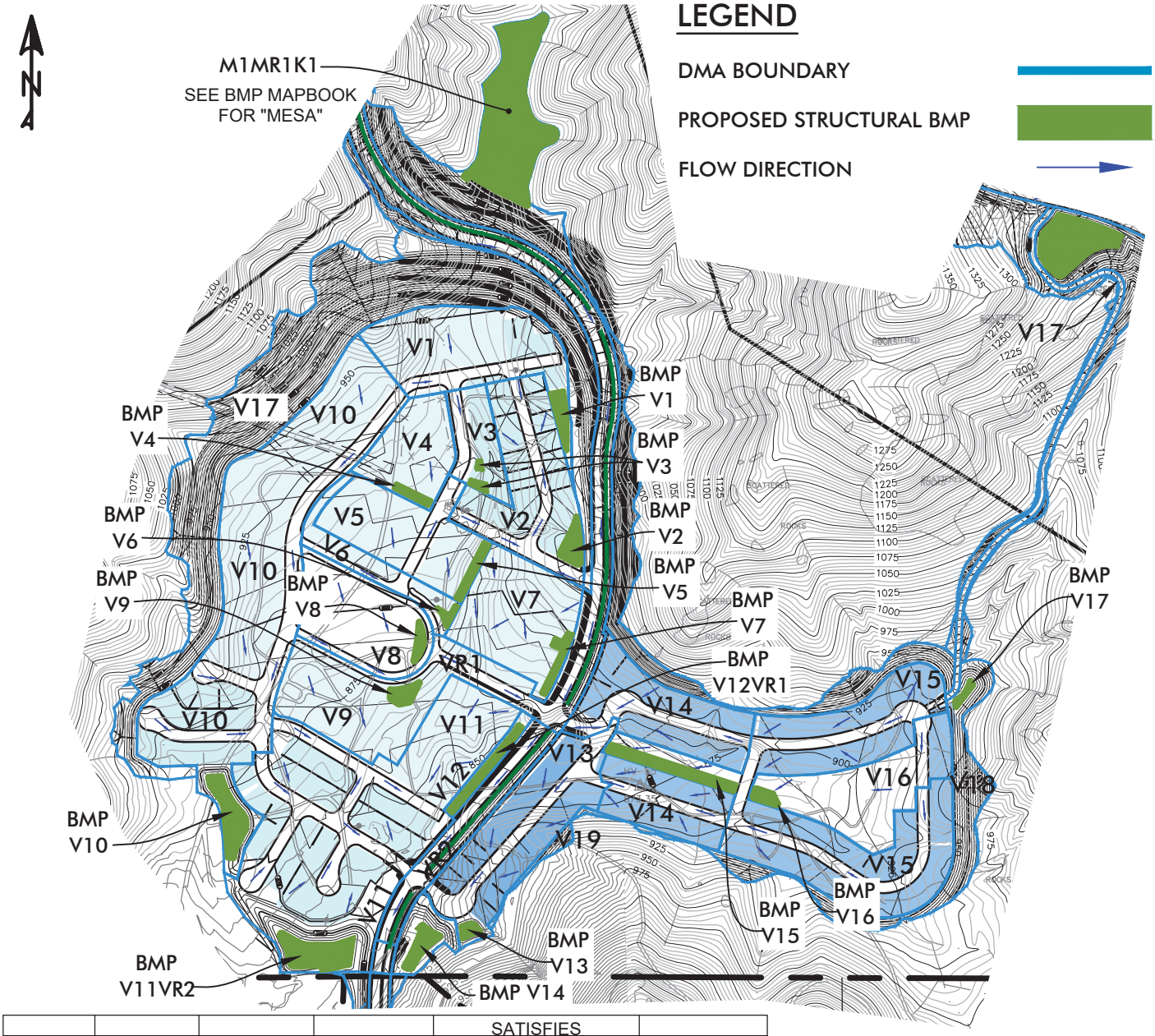
STRUCTURAL BMP DMA MAPBOOK

VALLEY



DMA	BMP ID	MAINT. CATEGORY	BMP TYPE	SATISFIES HYDROMOD & WATER QUALITY REQ's	100-YEAR DETENTION
V1	V1	2-HOA	*BF BASIN	✓	
V2	V2	2-HOA	*BF BASIN	✓	
V3	V3	2-HOA	*BF BASIN	✓	
V4	V4	2-HOA	*BF BASIN	✓	
V5	V5	2-HOA	*BF BASIN	✓	
V6	V6	2-HOA	*BF BASIN	✓	
V7	V7	2-HOA	*BF BASIN	✓	
V8	V8	2-HOA	*BF BASIN	✓	
V9	V9	2-HOA	*BF BASIN	✓	
V10	V10	2-HOA	*BF BASIN	✓	
V11VR2	V11VR2	3-PUBLIC	*BF BASIN	✓	✓
V12VR1	V12VR1	3-PUBLIC	*BF BASIN	✓	
V13	V13	2-HOA	*BF BASIN	✓	
V14	V14	2-HOA	*BF BASIN	✓	✓
V15	V15	2-HOA	*BF BASIN	✓	
V16	V16	2-HOA	*BF BASIN	✓	
V17	V17	2-HOA	*BF BASIN	✓	

*BF= BIOFILTRATION BASIN

500' 0' 250' 500'

SCALE: 1" = 500'

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NOTE: MAINTENANCE CATEGORY 3 BMPS ARE TO BE CATEGORY 2 (HOA MAINTAINED) UNTIL CFD HAS BEEN ESTABLISHED.

M:\PROJECTS\2660 NEWLAND COMMUNITIES\002-02 NEWLAND SIERRA\ENG\STORMWATER\SWMP (SWQMP)\ATTACHMENTS\ATTACHMENT 1D - STRUCTURAL DMA MAPBOOK\ATTACHMENT 1D - MAPBOOK - V.DWG (01-20-2017 4:51:11PM) Plotted by

ATTACHMENT 2

BACKUP FOR PDP HYDROMODIFICATION CONTROL MEASURES

This is the cover sheet for Attachment 2.

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

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	Contents	Checklist
Attachment 2a	Flow Control Facility Design, including Structural BMP Drawdown Calculations and Overflow Design Summary (Required) See Chapter 6 and Appendix G of the BMP Design Manual	☒ Included ☐ Submitted as separate stand-alone document
Attachment 2b	Hydromodification Management Exhibit (Required)	☒ Included See Hydromodification Management Exhibit Checklist on the back of this Attachment cover sheet.
Attachment 2c	Management of Critical Coarse Sediment Yield Areas See Section 6.2 and Appendix H of the BMP Design Manual.	☒ Exhibit depicting onsite and/or upstream sources of critical coarse sediment as mapped by Regional or Jurisdictional approaches outlined in Appendix H.1 AND, ☐ Demonstration that the project effectively avoids and bypasses sources of mapped critical coarse sediment per approaches outlined in Appendix H.2 and H.3. OR, ☒ Demonstration that project does not generate a net impact on the receiving water per approaches outlined in Appendix H.4.
Attachment 2d	Geomorphic Assessment of Receiving Channels (Optional) See Section 6.3.4 of the BMP Design Manual.	☐ Not performed ☒ Included ☐ Submitted as separate stand-alone document
Attachment 2e	Vector Control Plan (Required when structural BMPs will not drain in 96 hours)	☐ Included ☒ Not required because BMPs will drain in less than 96 hours

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

The Hydromodification Management Exhibit must identify:

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

Attachment 2a

Flow Control Facility Design, including Structural BMP Drawdown Calculations and Overflow Design Summary

CAMINO MAYOR
BMP SIZING CALCULATIONS
Newland Sierra Community

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	CM1	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
CM1-D-S-PP	4650	D	Steep	Pervious	0.1	0.045	0.0375	0.027	21	17	13
CM1-D-S-PI	41849	D	Steep	Impervious	1.0	0.045	0.0375	0.027	1883	1569	1130
Total BMP Area	46499										

Minimum BMP Size	1904.13	1587	1142
Proposed BMP Size*	2100	3010	3150
Minimum Ponding Depth		1.87	in
Maximum Ponding Depth		254.08	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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Designated Staff have final review and approval authority over the project design.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	CM1	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
CM1-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.107	0.019	**0.46**
CM1-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.961	0.169	**4.12**

0.187	**4.57**	**2.41**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.129	**3.14**	**2.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.8

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	CM2	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
CM2-D-S-PP	1536	D	Steep	Pervious	0.1	0.045	0.0375	0.027	7	6	4
CM2-D-S-PI	13822	D	Steep	Impervious	1.0	0.045	0.0375	0.027	622	518	373
Total BMP Area	15358										

Minimum BMP Size	628.902	524	377
Proposed BMP Size*	695	996	1043
Minimum Ponding Depth		1.85	in
Maximum Ponding Depth		191.93	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	CM2	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
CM2-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.035	0.006	**0.15**
CM2-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.317	0.056	**1.36**

0.062	**1.51**	**1.39**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.032	**0.79**	**1.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	5.0

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	CM3	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
CM3-D-S-PP	3063	D	Steep	Pervious	0.1	0.045	0.0375	0.027	14	11	8
CM3-D-S-PI	27564	D	Steep	Impervious	1.0	0.045	0.0375	0.027	1240	1034	744
Total BMP Area	30627							Minimum BMP Size	1254.1635	1045	752
								Proposed BMP Size*	1365	1957	2048
								Minimum Ponding Depth		1.99	in
								Maximum Ponding Depth		97.72	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	CM3	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
CM3-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.070	0.012	**0.30**
CM3-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.633	0.111	**2.71**

0.123	**3.01**	**1.96**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.032	**0.79**	**1.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	9.8

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	CM4	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
CM4-B-S-PP	7492	C	Steep	Pervious	0.1	0.06	0.05	0.036	45	37	27
CM4-B-S-PI	67430	C	Steep	Impervious	1.0	0.06	0.05	0.036	4046	3372	2427
CM4-D-S-PP	1353	D	Steep	Pervious	0.1	0.05	0.0417	0.03	7	6	4
CM4-D-S-PI	12175	D	Steep	Impervious	1.0	0.05	0.0417	0.03	609	508	365
Total BMP Area	88450							Minimum BMP Size	4706.267	3922	2824
								Proposed BMP Size*	4900	27440	7350
								Minimum Ponding Depth		2.41	in
								Maximum Ponding Depth		156.80	in
								Selected Ponding Depth		60.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	CM4	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
CM4-B-S-PP	Lake Wohlford	C	Scrub	Steep	0.302	0.172	0.016	**0.38**
CM4-B-S-PI	Lake Wohlford	C	Scrub	Steep	0.302	1.548	0.140	**3.42**
CM4-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.031	0.003	**0.08**
CM4-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.279	0.029	**0.72**

0.189	**4.60**	**2.42**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.185	**4.52**	**2.40**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	36.7

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	CM5	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
CM5-D-S-PP	2002	D	Steep	Pervious	0.1	0.05	0.0417	0.03	10	8	6
CM5-D-S-PI	18016	D	Steep	Impervious	1.0	0.05	0.0417	0.03	901	751	540
Total BMP Area	20018							Minimum BMP Size	910.81	760	546
								Proposed BMP Size*	1000	1433	1500
								Minimum Ponding Depth		1.92	in
								Maximum Ponding Depth		133.39	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	CM5	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
CM5-D-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.046	0.003	**0.09**
CM5-D-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.414	0.031	**0.77**

0.035	**0.85**	**1.04**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.032	**0.79**	**1.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	7.2

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	CM10	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
CM5-D-S-PP	296	D	Steep	Pervious	0.1	0.045	0.0375	0.027	1	1	1
CM5-D-S-PI	2660	D	Steep	Impervious	1.0	0.045	0.0375	0.027	120	100	72
Total BMP Area	2956							Minimum BMP Size	121.032	101	73
								Proposed BMP Size*	200	287	300
								Minimum Ponding Depth		-1.15	in
								Maximum Ponding Depth		166.74	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	CM10	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
CM5-D-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.007	0.001	**0.02**
CM5-D-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.061	0.008	**0.19**

0.009	**0.21**	**0.52**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.008	**0.20**	**0.50**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	5.8

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

HILLSIDE
BMP SIZING CALCULATIONS
Newland Sierra Community

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	H1	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
H1-D-S-PP	23964	D	Steep	Pervious	0.1	0.045	0.0375	0.027	108	90	65
H1-D-S-PI	44505	D	Steep	Impervious	1.0	0.045	0.0375	0.027	2003	1669	1202
Total BMP Area	68469							Minimum BMP Size	2110.563	1759	1266
								Proposed BMP Size*	2120	3039	3180
								Minimum Ponding Depth		2.76	in
								Maximum Ponding Depth		251.68	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	H1	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
H1-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.550	0.097	**2.36**
H1-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.022	0.179	**4.38**

0.276	**6.74**	**2.93**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.129	**3.14**	**2.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.8

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	H2	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
H2-D-S-PP	3831	D	Steep	Pervious	0.1	0.045	0.0375	0.027	17	14	10
H2-D-S-PI	7116	D	Steep	Impervious	1.0	0.045	0.0375	0.027	320	267	192
H2-B-S-PP	2936	D	Steep	Pervious	0.1	0.045	0.0375	0.027	13	11	8
H2-B-S-PI	5453	D	Steep	Impervious	1.0	0.045	0.0375	0.027	245	204	147
Total BMP Area	19336							Minimum BMP Size	596.0565	497	358
								Proposed BMP Size*	650	932	975
								Minimum Ponding Depth		1.97	in
								Maximum Ponding Depth		320.65	in
								Selected Ponding Depth		10.00	in

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Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	H2	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
H2-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.088	0.015	**0.38**
H2-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.163	0.029	**0.70**
H2-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.067	0.009	**0.21**
H2-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.125	0.016	**0.39**

0.068	**1.67**	**1.46**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.050	**1.23**	**1.25**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.0

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	H3	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
H3-B-S-PP	3655	D	Steep	Pervious	0.1	0.045	0.0375	0.027	16	14	10
H3-B-S-PI	6787	D	Steep	Impervious	1.0	0.045	0.0375	0.027	305	255	183
H3-D-S-PP	37545	D	Steep	Pervious	0.1	0.045	0.0375	0.027	169	141	101
H3-D-S-PI	69727	D	Steep	Impervious	1.0	0.045	0.0375	0.027	3138	2615	1883
Total BMP Area	117714							Minimum BMP Size	3628.53	3024	2177
								Proposed BMP Size*	4108	5888	6162
								Minimum Ponding Depth		1.63	in
								Maximum Ponding Depth		397.77	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	H3	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
H3-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.084	0.011	**0.26**
H3-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.156	0.020	**0.48**
H3-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.862	0.151	**3.69**
H3-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.601	0.281	**6.86**

0.463	**11.29**	**3.79**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.394	**9.62**	**3.50**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	2.4

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	H4	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
H4-B-S-PP	10478	D	Steep	Pervious	0.1	0.045	0.0375	0.027	47	39	28
H4-B-S-PI	19459	D	Steep	Impervious	1.0	0.045	0.0375	0.027	876	730	525
Total BMP Area	29937							Minimum BMP Size	922.806	769	554
								Proposed BMP Size*	950	1362	1425
								Minimum Ponding Depth		2.51	in
								Maximum Ponding Depth		315.92	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	H4	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
H4-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.241	0.030	**0.74**
H4-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.447	0.057	**1.38**

0.087	**2.12**	**1.64**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.072	**1.77**	**1.50**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.0

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	H5	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
H5-B-S-PP	10059	D	Steep	Pervious	0.1	0.045	0.0375	0.027	45	38	27
H5-B-S-PI	18681	D	Steep	Impervious	1.0	0.045	0.0375	0.027	841	701	504
Total BMP Area	28740							Minimum BMP Size	885.9105	738	532
								Proposed BMP Size*	1007	1443	1511
								Minimum Ponding Depth		1.60	in
								Maximum Ponding Depth		298.04	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	H5	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
H5-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.231	0.029	**0.71**
H5-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.429	0.054	**1.32**

0.083	**2.04**	**1.61**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.072	**1.77**	**1.50**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.2

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	H6	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
H6-B-S-PP	9674	D	Steep	Pervious	0.1	0.045	0.0375	0.027	44	36	26
H6-B-S-PI	17966	D	Steep	Impervious	1.0	0.045	0.0375	0.027	808	674	485
Total BMP Area	27640							Minimum BMP Size	852.003	710	511
								Proposed BMP Size*	858	1230	1287
								Minimum Ponding Depth		2.73	in
								Maximum Ponding Depth		349.80	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	H6	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
H6-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.222	0.028	**0.69**
H6-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.412	0.052	**1.27**

0.080	**1.96**	**1.58**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.072	**1.77**	**1.50**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	2.7

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	H7	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
H7-B-S-PP	8523	D	Steep	Pervious	0.1	0.045	0.0375	0.027	38	32	23
H7-B-S-PI	15827	D	Steep	Impervious	1.0	0.045	0.0375	0.027	712	594	427
Total BMP Area	24350							Minimum BMP Size	750.5685	625	450
								Proposed BMP Size*	760	1089	1140
								Minimum Ponding Depth		2.68	in
								Maximum Ponding Depth		175.51	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	H7	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
H7-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.196	0.025	**0.60**
H7-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.363	0.046	**1.12**

0.071	**1.73**	**1.48**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.032	**0.79**	**1.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	5.5

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	H8HR1	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
H8-B-S-PP	233808	D	Steep	Pervious	0.1	0.045	0.0375	0.027	1052	877	631
H8-B-S-PI	434213	D	Steep	Impervious	1.0	0.045	0.0375	0.027	19540	16283	11724
H8-D-S-PP	42728	D	Steep	Pervious	0.1	0.045	0.0375	0.027	192	160	115
H8-D-S-PI	79351	D	Steep	Impervious	1.0	0.045	0.0375	0.027	3571	2976	2142
HR1-B-PP	12319	D	Steep	Pervious	0.1	0.045	0.0375	0.027	55	46	33
HR1-B-PI	110869	D	Steep	Impervious	1	0.045	0.0375	0.027	4989	4158	2993
HR1-D-PP	5857	D	Steep	Pervious	0.1	0.045	0.0375	0.027	26	22	16
HR1-D-PI	52713	D	Steep	Impervious	1	0.045	0.0375	0.027	2372	1977	1423
Total BMP Area	971858							Minimum BMP Size	31797.774	26498	19079
								Proposed BMP Size*	32463	46530	48695
								Minimum Ponding Depth		2.60	in
								Maximum Ponding Depth		147.92	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	H8HR1	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
H8-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	5.367	0.679	**16.58**
H8-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	9.968	1.261	**30.79**
H8-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.981	0.172	**4.20**
H8-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.822	0.320	**7.81**
HR1-B-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.283	0.036	**0.87**
HR1-B-PI	Lake Wohlford	B	Scrub	Steep	0.253	2.545	0.322	**7.86**
HR1-D-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.134	0.024	**0.58**
HR1-D-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.210	0.212	**5.19**

3.026	**73.88**	**9.70**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

1.158	**28.27**	**6.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	6.5

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	H9HR2	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
H9-B-S-PP	11668	D	Steep	Pervious	0.1	0.045	0.0375	0.027	53	44	32
H9-B-S-PI	21669	D	Steep	Impervious	1.0	0.045	0.0375	0.027	975	813	585
H9-D-S-PP	27226	D	Steep	Pervious	0.1	0.045	0.0375	0.027	123	102	74
H9-D-S-PI	50562	D	Steep	Impervious	1.0	0.045	0.0375	0.027	2275	1896	1365
HR2-B-S-PP	1425	D	Steep	Pervious	0.1	0.045	0.0375	0.027	6	5	4
HR2-B-S-PI	12825	D	Steep	Impervious	1	0.045	0.0375	0.027	577	481	346
HR2-D-S-PP	6140	D	Steep	Pervious	0.1	0.045	0.0375	0.027	28	23	17
HR2-D-S-PI	55260	D	Steep	Impervious	1	0.045	0.0375	0.027	2487	2072	1492
Total BMP Area	186775							Minimum BMP Size	6523.2855	5436	3914
								Proposed BMP Size*	7428	10647	11142
								Minimum Ponding Depth		1.58	in
								Maximum Ponding Depth		287.32	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	H9HR2	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
H9-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.268	0.034	**0.83**
H9-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.497	0.063	**1.54**
H9-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.625	0.110	**2.68**
H9-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.161	0.204	**4.97**
HR2-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.033	0.004	**0.10**
HR2-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.294	0.037	**0.91**
HR2-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.141	0.025	**0.60**
HR2-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.269	0.223	**5.44**

0.699	**17.07**	**4.66**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.515	**12.57**	**4.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.3

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	H10	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
H10-B-S-PP	32333	D	Steep	Pervious	0.1	0.045	0.0375	0.027	145	121	87
H10-B-S-PI	60047	D	Steep	Impervious	1.0	0.045	0.0375	0.027	2702	2252	1621
Total BMP Area	92380							Minimum BMP Size	2847.6135	2373	1709
								Proposed BMP Size*	2850	4085	4275
								Minimum Ponding Depth		2.79	in
								Maximum Ponding Depth		292.52	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	H10	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
H10-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.742	0.094	**2.29**
H10-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	1.378	0.174	**4.26**

0.268	**6.55**	**2.89**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.201	**4.91**	**2.50**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.3

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	H11	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
H11-B-S-PP	18314	D	Steep	Pervious	0.1	0.045	0.0375	0.027	82	69	49
H11-B-S-PI	34012	D	Steep	Impervious	1.0	0.045	0.0375	0.027	1531	1275	918
Total BMP Area	52326							Minimum BMP Size	1612.953	1344	968
								Proposed BMP Size*	1650	2365	2475
								Minimum Ponding Depth		2.58	in
								Maximum Ponding Depth		323.37	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	H11	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
H11-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.420	0.053	**1.30**
H11-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.781	0.099	**2.41**

0.152	**3.71**	**2.17**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.129	**3.14**	**2.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.0

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	H12	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
H12-B-S-PP	50430	D	Steep	Pervious	0.1	0.045	0.0375	0.027	227	189	136
H12-B-S-PI	93655	D	Steep	Impervious	1.0	0.045	0.0375	0.027	4214	3512	2529
H12-D-S-PP	6946	D	Steep	Pervious	0.1	0.045	0.0375	0.027	31	26	19
H12-D-S-PI	12899	D	Steep	Impervious	1.0	0.045	0.0375	0.027	580	484	348
Total BMP Area	163930							Minimum BMP Size	5053.122	4211	3032
								Proposed BMP Size*	5076	7276	7614
								Minimum Ponding Depth		2.75	in
								Maximum Ponding Depth		236.51	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	H12	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
H12-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	1.158	0.146	**3.58**
H12-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	2.150	0.272	**6.64**
H12-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.159	0.028	**0.68**
H12-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.296	0.052	**1.27**

0.498	**12.17**	**3.94**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	4.1

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	H13	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
H13-B-S-PP	8357	D	Steep	Pervious	0.1	0.045	0.0375	0.027	38	31	23
H13-B-S-PI	15520	D	Steep	Impervious	1.0	0.045	0.0375	0.027	698	582	419
H13-D-S-PP	777	D	Steep	Pervious	0.1	0.045	0.0375	0.027	3	3	2
H13-D-S-PI	1444	D	Steep	Impervious	1.0	0.045	0.0375	0.027	65	54	39
Total BMP Area	26098										

Minimum BMP Size	804.483	670	483
Proposed BMP Size*	900	1290	1350
Minimum Ponding Depth		1.74	in
Maximum Ponding Depth		148.21	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	H13	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
H13-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.192	0.024	**0.59**
H13-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.356	0.045	**1.10**
H13-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.018	0.003	**0.08**
H13-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.033	0.006	**0.14**

0.078	**1.91**	**1.56**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.032	**0.79**	**1.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	6.5

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	H14B	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
H14B-D-S-PP	10773	D	Steep	Pervious	0.1	0.045	0.0375	0.027	48	40	29
H14B-D-S-PI	20007	D	Steep	Impervious	1.0	0.045	0.0375	0.027	900	750	540
H14B-B-S-PP	32251	D	Steep	Pervious	0.1	0.045	0.0375	0.027	145	121	87
H14B-B-S-PI	59896	D	Steep	Impervious	1.0	0.045	0.0375	0.027	2695	2246	1617
Total BMP Area	122927							Minimum BMP Size	3789.243	3158	2274
								Proposed BMP Size*	3800	5447	5700
								Minimum Ponding Depth		2.77	in
								Maximum Ponding Depth		315.92	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	H14B	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
H14B-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.247	0.043	**1.06**
H14B-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.459	0.081	**1.97**
H14B-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.740	0.094	**2.29**
H14B-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	1.375	0.174	**4.25**

0.392	**9.56**	**3.49**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.0

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	H15	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
H15-D-S-PP	8561	D	Steep	Pervious	0.1	0.045	0.0375	0.027	39	32	23
H15-D-S-PI	8561	D	Steep	Impervious	1.0	0.045	0.0375	0.027	385	321	231
H15-B-S-PP	34763	D	Steep	Pervious	0.1	0.045	0.0375	0.027	156	130	94
H15-B-S-PI	34763	D	Steep	Impervious	1.0	0.045	0.0375	0.027	1564	1304	939
Total BMP Area	86648							Minimum BMP Size	2144.538	1787	1287
								Proposed BMP Size*	2755	3949	4133
								Minimum Ponding Depth		0.58	in
								Maximum Ponding Depth		193.67	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	H15	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
H15-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.197	0.034	**0.84**
H15-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.197	0.034	**0.84**
H15-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.798	0.101	**2.47**
H15-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.798	0.101	**2.47**

0.271	**6.61**	**2.90**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.129	**3.14**	**2.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	5.0

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

SDHM 3.0

PROJECT REPORT

BMP H14A

General Model Information

Project Name:	POC 1341-3
Site Name:	Newland Sierra
Site Address:	
City:	County of San Diego
Report Date:	1/24/2017
Gage:	LAKE WOH
Data Start:	10/01/1959
Data End:	09/30/2004
Timestep:	Hourly
Precip Scale:	1.000
Version Date:	2016/11/23

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	10 Year

Landuse Basin Data
Predeveloped Land Use

Ex POC 1341

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
B,NatVeg,Steep	0.8
D,NatVeg,Steep	3.22
Pervious Total	4.02
Impervious Land Use	acre
Impervious Total	0
Basin Total	4.02

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

DMA 14A

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
B,NatVeg,Flat	1.52
D,NatVeg,Flat	1.31
Pervious Total	2.83
Impervious Land Use	acre
IMPERVIOUS-FLAT	4.65
Impervious Total	4.65
Basin Total	7.48

Element Flows To:

Surface	Interflow	Groundwater
Surface BMP 14A	Surface BMP 14A	

DMA 14C

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
B,NatVeg,Steep	0.5
D,NatVeg,Steep	0.74
Pervious Total	1.24
Impervious Land Use	acre
Impervious Total	0
Basin Total	1.24

Element Flows To:

Surface	Interflow	Groundwater

Routing Elements
Predeveloped Routing

Mitigated Routing

BMP 14A

Bottom Length:	240.00 ft.
Bottom Width:	40.67 ft.
Material thickness of first layer:	1.5
Material type for first layer:	Amended 5 in/hr
Material thickness of second layer:	0.33
Material type for second layer:	Coarse sand
Material thickness of third layer:	3.5
Material type for third layer:	GRAVEL
Underdrain used	
Underdrain Diameter (feet):	0.5
Orifice Diameter (in.):	3
Offset (in.):	3
Flow Through Underdrain (ac-ft.):	256.667
Total Outflow (ac-ft.):	261.925
Percent Through Underdrain:	97.99
Discharge Structure	
Riser Height:	3.25 ft.
Riser Diameter:	48 in.
Notch Type:	Rectangular
Notch Width:	0.250 ft.
Notch Height:	1.500 ft.
Element Flows To:	
Outlet 1	Outlet 2

Landscape Swale Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
1260	0.4269	0.0000	0.0000	0.0000
1260.1	0.4243	0.0100	0.0000	0.0000
1260.2	0.4200	0.0201	0.0000	0.0000
1260.3	0.4158	0.0305	0.0000	0.0000
1260.4	0.4116	0.0410	0.0000	0.0000
1260.5	0.4074	0.0516	0.0000	0.0000
1260.6	0.4032	0.0625	0.0000	0.0000
1260.7	0.3990	0.0735	0.0000	0.0000
1260.8	0.3949	0.0846	0.0000	0.0000
1260.9	0.3907	0.0960	0.0000	0.0000
1261.0	0.3866	0.1075	0.0000	0.0000
1261.1	0.3824	0.1192	0.0137	0.0000
1261.2	0.3783	0.1310	0.0206	0.0000
1261.3	0.3741	0.1431	0.0417	0.0000
1261.4	0.3700	0.1553	0.0523	0.0000
1261.5	0.3659	0.1654	0.0684	0.0000
1261.6	0.3618	0.1756	0.0765	0.0000
1261.7	0.3577	0.1860	0.0890	0.0000
1261.8	0.3536	0.1987	0.0953	0.0000
1262.0	0.3496	0.2116	0.1058	0.0000
1262.1	0.3455	0.2247	0.1110	0.0000
1262.2	0.3414	0.2380	0.1201	0.0000
1262.3	0.3374	0.2514	0.1246	0.0000
1262.4	0.3334	0.2650	0.1328	0.0000
1262.5	0.3293	0.2788	0.1448	0.0000
1262.6	0.3253	0.2927	0.1592	0.0000

1262.7	0.3213	0.3068	0.1750	0.0000
1262.8	0.3173	0.3211	0.1909	0.0000
1262.9	0.3133	0.3356	0.2062	0.0000
1263.0	0.3093	0.3503	0.2208	0.0000
1263.1	0.3054	0.3651	0.2346	0.0000
1263.2	0.3014	0.3801	0.2477	0.0000
1263.3	0.2975	0.3953	0.2602	0.0000
1263.4	0.2935	0.4107	0.2721	0.0000
1263.5	0.2896	0.4262	0.2835	0.0000
1263.6	0.2856	0.4419	0.2944	0.0000
1263.7	0.2817	0.4578	0.3050	0.0000
1263.8	0.2778	0.4739	0.3152	0.0000
1264.0	0.2739	0.4901	0.3251	0.0000
1264.1	0.2700	0.5066	0.3347	0.0000
1264.2	0.2662	0.5232	0.3440	0.0000
1264.3	0.2623	0.5400	0.3530	0.0000
1264.4	0.2584	0.5570	0.3619	0.0000
1264.5	0.2546	0.5741	0.3705	0.0000
1264.6	0.2507	0.5915	0.3790	0.0000
1264.7	0.2469	0.6090	0.3872	0.0000
1264.8	0.2431	0.6267	0.3953	0.0000
1264.9	0.2393	0.6446	0.4032	0.0000
1265.0	0.2354	0.6627	0.4110	0.0000
1265.1	0.2316	0.6809	0.4187	0.0000
1265.2	0.2279	0.6994	0.4263	0.0000
1265.3	0.2241	0.7111	0.5503	0.0000

Landscape Swale Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
5.3300	0.4269	0.7111	0.0000	1.2376	0.0000
5.4353	0.4312	0.7563	0.0000	1.2376	0.0000
5.5405	0.4354	0.8019	0.0000	1.3187	0.0000
5.6458	0.4397	0.8479	0.0000	1.3999	0.0000
5.7511	0.4440	0.8945	0.0000	1.4811	0.0000
5.8564	0.4483	0.9414	0.0000	1.5622	0.0000
5.9616	0.4525	0.9888	0.0000	1.6434	0.0000
6.0669	0.4568	1.0367	0.0000	1.7245	0.0000
6.1722	0.4611	1.0850	0.0000	1.8057	0.0000
6.2775	0.4655	1.1338	0.0000	1.8869	0.0000
6.3827	0.4698	1.1830	0.0000	1.9680	0.0000
6.4880	0.4741	1.2327	0.0000	2.0492	0.0000
6.5933	0.4785	1.2828	0.0000	2.1303	0.0000
6.6986	0.4828	1.3334	0.0000	2.2115	0.0000
6.8038	0.4872	1.3845	0.0000	2.2927	0.0000
6.9091	0.4916	1.4360	0.0000	2.3738	0.0000
7.0144	0.4959	1.4880	0.0000	2.4550	0.0000
7.1197	0.5003	1.5404	0.0065	2.5361	0.0000
7.2249	0.5047	1.5933	0.0446	2.6173	0.0000
7.3302	0.5091	1.6467	0.0990	2.6985	0.0000
7.4355	0.5136	1.7005	0.1639	2.7796	0.0000
7.5408	0.5180	1.7548	0.2364	2.8608	0.0000
7.6460	0.5224	1.8096	0.3144	2.9419	0.0000
7.7513	0.5269	1.8648	0.3964	3.0231	0.0000
7.8566	0.5313	1.9205	0.4812	3.1043	0.0000
7.9619	0.5358	1.9767	0.5678	3.1854	0.0000
8.0671	0.5402	2.0333	0.6553	3.2666	0.0000
8.1724	0.5447	2.0905	0.7604	3.3477	0.0000
8.2777	0.5492	2.1480	0.8730	3.4289	0.0000

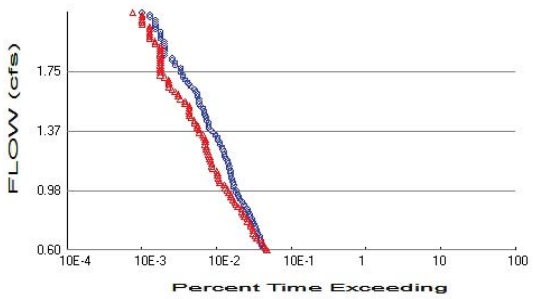
8.3830	0.5537	2.2061	0.9905	3.5101	0.0000
8.4882	0.5582	2.2646	1.4694	3.5912	0.0000
8.5935	0.5627	2.3236	1.6821	3.6724	0.0000
8.6988	0.5673	2.3831	3.3524	3.7535	0.0000
8.8041	0.5718	2.4431	6.1099	3.8347	0.0000
8.9093	0.5764	2.5035	9.6078	3.9159	0.0000
9.0146	0.5809	2.5644	13.684	3.9970	0.0000
9.1199	0.5855	2.6258	18.218	4.0782	0.0000
9.2252	0.5900	2.6877	23.096	4.1593	0.0000
9.3304	0.5946	2.7500	28.207	4.2405	0.0000
9.4357	0.5992	2.8129	33.435	4.3217	0.0000
9.5410	0.6038	2.8762	38.663	4.4028	0.0000
9.5800	0.6055	2.8998	43.775	4.4329	0.0000

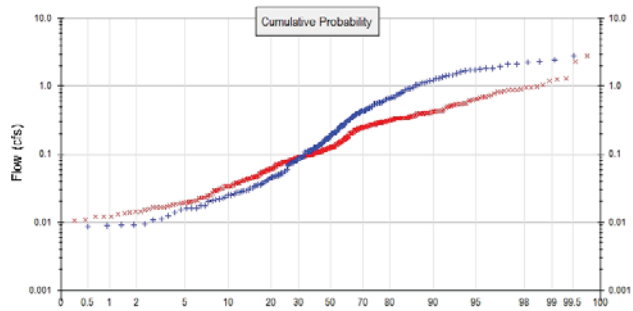
Surface BMP 14A

Element Flows To:

Outlet 1	Outlet 2
	BMP 14A

Analysis Results
POC 1





+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 4.02
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 4.07
Total Impervious Area: 4.65

Flow Frequency Method: Weibull

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	1.1986
5 year	1.801197
10 year	2.136666
25 year	2.399569

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.645318
5 year	0.937921
10 year	1.190857
25 year	2.011344

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.5993	179	187	104	Pass
0.6148	171	179	104	Pass
0.6304	161	168	104	Pass
0.6459	157	164	104	Pass
0.6614	154	151	98	Pass
0.6769	151	137	90	Pass
0.6925	149	130	87	Pass
0.7080	142	124	87	Pass
0.7235	136	122	89	Pass
0.7391	132	120	90	Pass
0.7546	131	113	86	Pass
0.7701	125	113	90	Pass
0.7856	121	104	85	Pass
0.8012	117	101	86	Pass
0.8167	111	94	84	Pass
0.8322	110	89	80	Pass
0.8478	105	85	80	Pass
0.8633	101	85	84	Pass
0.8788	96	76	79	Pass
0.8944	91	72	79	Pass
0.9099	87	69	79	Pass
0.9254	83	65	78	Pass
0.9409	79	62	78	Pass
0.9565	76	61	80	Pass
0.9720	73	58	79	Pass
0.9875	72	55	76	Pass
1.0031	68	52	76	Pass
1.0186	67	50	74	Pass
1.0341	66	44	66	Pass
1.0496	64	43	67	Pass
1.0652	63	42	66	Pass
1.0807	62	41	66	Pass
1.0962	61	41	67	Pass
1.1118	61	40	65	Pass
1.1273	59	35	59	Pass
1.1428	59	34	57	Pass
1.1583	57	34	59	Pass
1.1739	56	33	58	Pass
1.1894	53	32	60	Pass
1.2049	51	32	62	Pass
1.2205	50	31	62	Pass
1.2360	49	30	61	Pass
1.2515	48	29	60	Pass
1.2670	47	29	61	Pass
1.2826	44	28	63	Pass
1.2981	43	28	65	Pass
1.3136	41	28	68	Pass
1.3292	41	27	65	Pass
1.3447	38	26	68	Pass
1.3602	36	23	63	Pass
1.3757	33	23	69	Pass
1.3913	31	22	70	Pass
1.4068	31	22	70	Pass

1.4223	31	20	64	Pass
1.4379	29	20	68	Pass
1.4534	29	18	62	Pass
1.4689	28	17	60	Pass
1.4845	27	17	62	Pass
1.5000	27	17	62	Pass
1.5155	26	17	65	Pass
1.5310	24	17	70	Pass
1.5466	23	15	65	Pass
1.5621	23	15	65	Pass
1.5776	23	13	56	Pass
1.5932	22	12	54	Pass
1.6087	22	12	54	Pass
1.6242	21	11	52	Pass
1.6397	20	10	50	Pass
1.6553	18	9	50	Pass
1.6708	17	9	52	Pass
1.6863	16	9	56	Pass
1.7019	15	9	60	Pass
1.7174	14	8	57	Pass
1.7329	14	7	50	Pass
1.7484	13	7	53	Pass
1.7640	13	7	53	Pass
1.7795	13	7	53	Pass
1.7950	11	7	63	Pass
1.8106	11	7	63	Pass
1.8261	10	7	70	Pass
1.8416	10	7	70	Pass
1.8571	8	7	87	Pass
1.8727	8	7	87	Pass
1.8882	8	7	87	Pass
1.9037	8	7	87	Pass
1.9193	8	7	87	Pass
1.9348	8	6	75	Pass
1.9503	8	6	75	Pass
1.9658	7	5	71	Pass
1.9814	7	5	71	Pass
1.9969	7	5	71	Pass
2.0124	7	5	71	Pass
2.0280	6	5	83	Pass
2.0435	6	5	83	Pass
2.0590	6	4	66	Pass
2.0746	6	4	66	Pass
2.0901	6	4	66	Pass
2.1056	5	4	80	Pass
2.1211	5	4	80	Pass
2.1367	4	3	75	Pass

Water Quality

Drawdown Time Results

Pond: Surface BMP 14A

Days	Stage(feet)	Percent of Total Run Time
1	N/A	100.00
2	N/A	100.00
3	N/A	100.00
4	N/A	100.00
5	N/A	100.00

Maximum Stage: 3.097 Drawdown Time: Less than 1 day

Pond: BMP 14A

Days	Stage(feet)	Percent of Total Run Time
1	3.087	100.00
2	5.330	100.00
3	5.330	100.00
4	5.330	100.00
5	5.330	100.00

Maximum Stage: 5.330 Drawdown Time: Exceeds 5 days.

Model Default Modifications

Total of 0 changes have been made.

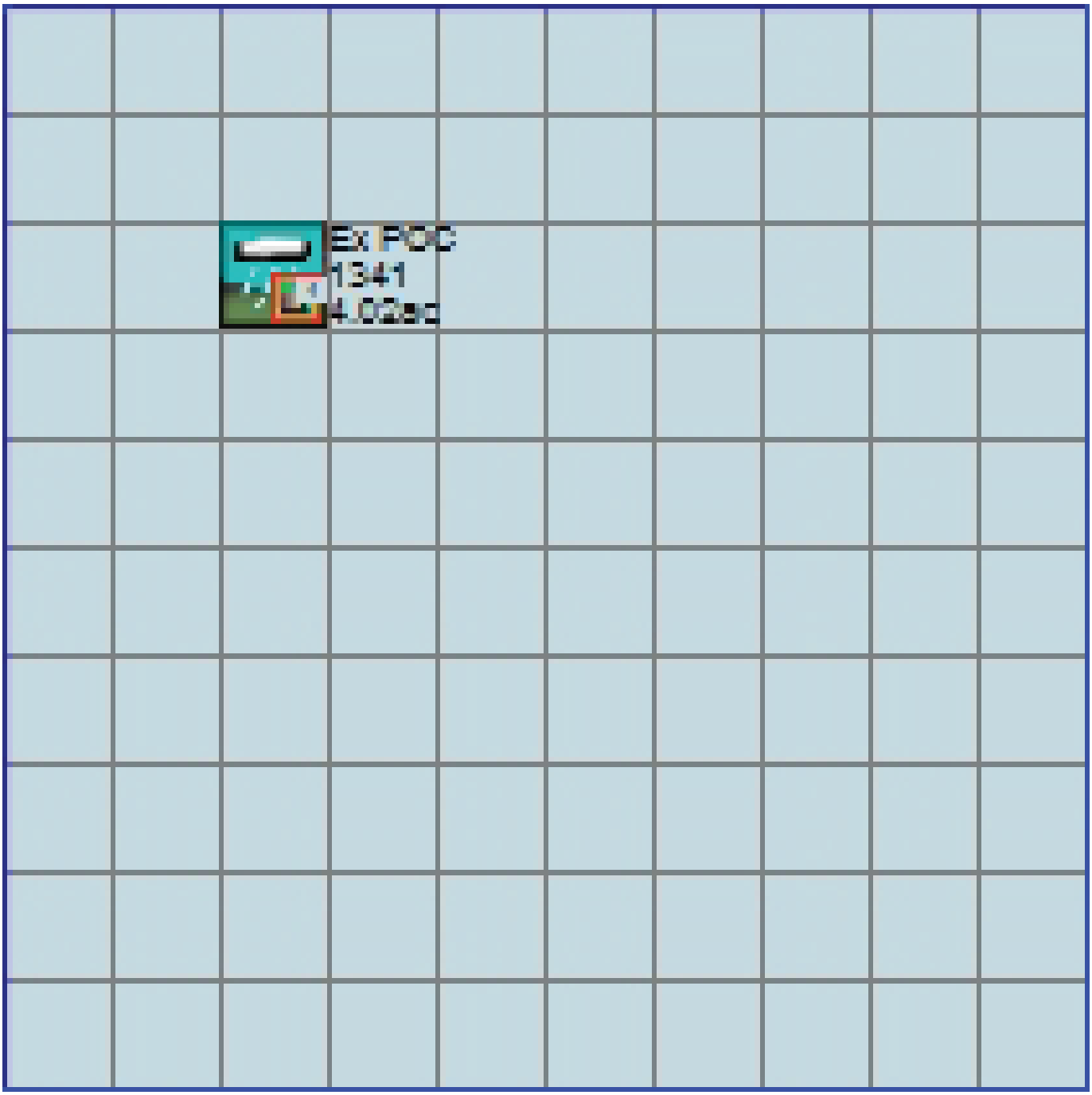
PERLND Changes

No PERLND changes have been made.

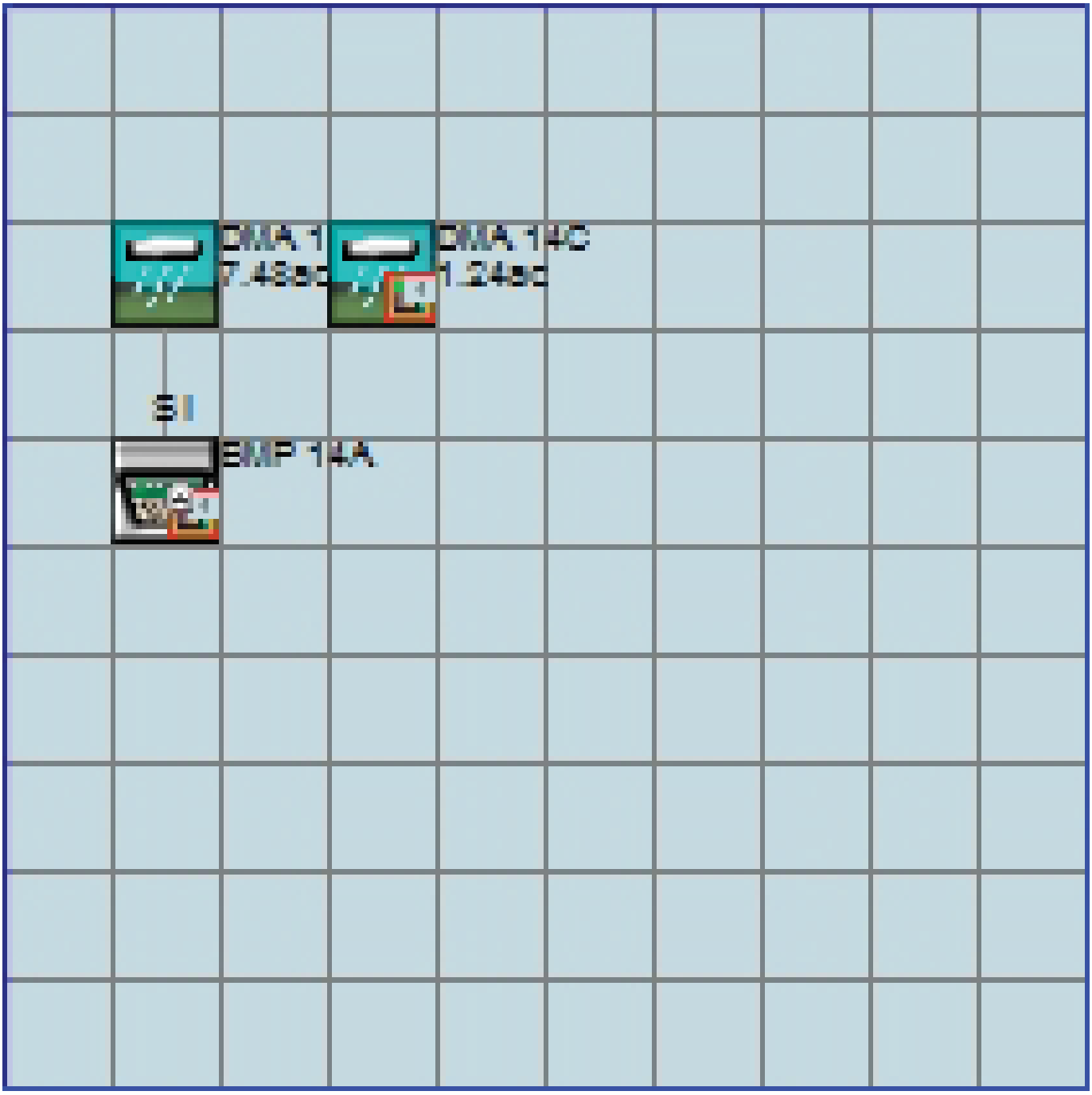
IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1959 10 01        END    2004 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                               ***
WDM        26   POC 1341-3.wdm
MESSU      25   PrePOC 1341-3.MES
           27   PrePOC 1341-3.L61
           28   PrePOC 1341-3.L62
           30   POCPOC 1341-31.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:60
      PERLND      12
      PERLND      30
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Ex POC 1341                MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                           in  out           ***
   12      B,NatVeg,Steep         1    1    1    1   27    0
   30      D,NatVeg,Steep         1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   12         0    0    1    0    0    0    0    0    0    0    0    0
   30         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
```

```
  12         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  30         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
  12         0    1    1    1    0    0    0    0    1    1    0
  30         0    1    1    1    0    0    0    0    1    1    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
  12              0       4.4      0.04       150      0.15       2.5     0.915
  30              0       4.2      0.02       150      0.15       2.5     0.915
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
  12              0         0         2         2         0      0.05      0.05
  30              0         0         2         2         0      0.05      0.05
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
  12              0       0.6       0.2       1.5       0.7         0
  30              0       0.6       0.2       1.5       0.7         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
  12       0.4  0.4  0.4  0.4  0.6  0.6  0.6  0.6  0.6  0.4  0.4  0.4
  30       0.4  0.4  0.4  0.4  0.6  0.6  0.6  0.6  0.6  0.4  0.4  0.4
  END MON-LZETPARM
  MON-INTERCEP
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
  12       0.1  0.1  0.1  0.1 0.06 0.06 0.06 0.06 0.06  0.1  0.1  0.1
  30       0.1  0.1  0.1  0.1 0.06 0.06 0.06 0.06 0.06  0.1  0.1  0.1
  END MON-INTERCEP

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
              ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
  12              0         0      0.01         0       0.4      0.01         0
  30              0         0      0.01         0       0.4      0.01         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                       in  out           ***
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
  END PRINT-INFO
```

```
  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Ex POC 1341***
PERLND  12                        0.8     COPY   501     12
PERLND  12                        0.8     COPY   501     13
PERLND  30                       3.22     COPY   501     12
PERLND  30                       3.22     COPY   501     13

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   12.1        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                       in  out                               ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ******************* PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                  ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
  END HYDR-PARM1
```

```
  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                          ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1              PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1              IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     12.1      WDM    501 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1959 10 01        END    2004 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                               ***
WDM        26   POC 1341-3.wdm
MESSU      25   MitPOC 1341-3.MES
           27   MitPOC 1341-3.L61
           28   MitPOC 1341-3.L62
           30   POCPOC 1341-31.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:60
      PERLND      10
      PERLND      28
      IMPLND       1
      PERLND      12
      PERLND      30
      GENER        2
      RCHRES       1
      RCHRES       2
      COPY         1
      COPY       501
      COPY       601
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Surface BMP 14A             MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  601         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
    2        24
  END OPCODE
  PARM
    #    #         K ***
    2             0.
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                           in  out           ***
   10      B,NatVeg,Flat          1    1    1    1   27    0
   28      D,NatVeg,Flat          1    1    1    1   27    0
   12      B,NatVeg,Steep         1    1    1    1   27    0
   30      D,NatVeg,Steep         1    1    1    1   27    0
```

```
END GEN-INFO
*** Section PWATER***

ACTIVITY
  <PLS > ************* Active Sections ****************************
  # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
 10         0    0    1    0    0    0    0    0    0    0    0    0
 28         0    0    1    0    0    0    0    0    0    0    0    0
 12         0    0    1    0    0    0    0    0    0    0    0    0
 30         0    0    1    0    0    0    0    0    0    0    0    0
END ACTIVITY

PRINT-INFO
  <PLS > ***************** Print-flags **************************** PIVL  PYR
  # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
 10         0    0    4    0    0    0    0    0    0    0    0    0    1    9
 28         0    0    4    0    0    0    0    0    0    0    0    0    1    9
 12         0    0    4    0    0    0    0    0    0    0    0    0    1    9
 30         0    0    4    0    0    0    0    0    0    0    0    0    1    9
END PRINT-INFO

PWAT-PARM1
  <PLS >  PWATER variable monthly parameter value flags  ***
  # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
 10         0    1    1    1    0    0    0    0    1    1    0
 28         0    1    1    1    0    0    0    0    1    1    0
 12         0    1    1    1    0    0    0    0    1    1    0
 30         0    1    1    1    0    0    0    0    1    1    0
END PWAT-PARM1

PWAT-PARM2
  <PLS >      PWATER input info: Part 2         ***
  # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
 10              0         5      0.07       200      0.05       2.5     0.915
 28              0       4.8      0.04       200      0.05       2.5     0.915
 12              0       4.4      0.04       150      0.15       2.5     0.915
 30              0       4.2      0.02       150      0.15       2.5     0.915
END PWAT-PARM2

PWAT-PARM3
  <PLS >      PWATER input info: Part 3         ***
  # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
 10              0         0         2         2         0      0.05      0.05
 28              0         0         2         2         0      0.05      0.05
 12              0         0         2         2         0      0.05      0.05
 30              0         0         2         2         0      0.05      0.05
END PWAT-PARM3
PWAT-PARM4
  <PLS >     PWATER input info: Part 4                                ***
  # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
 10              0       0.6       0.2       1.5       0.7         0
 28              0       0.6       0.2       1.5       0.7         0
 12              0       0.6       0.2       1.5       0.7         0
 30              0       0.6       0.2       1.5       0.7         0
END PWAT-PARM4
MON-LZETPARM
  <PLS >      PWATER input info: Part 3         ***
  # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
 10       0.4  0.4  0.4  0.4  0.6  0.6  0.6  0.6  0.6  0.4  0.4  0.4
 28       0.4  0.4  0.4  0.4  0.6  0.6  0.6  0.6  0.6  0.4  0.4  0.4
 12       0.4  0.4  0.4  0.4  0.6  0.6  0.6  0.6  0.6  0.4  0.4  0.4
 30       0.4  0.4  0.4  0.4  0.6  0.6  0.6  0.6  0.6  0.4  0.4  0.4
END MON-LZETPARM
MON-INTERCEP
  <PLS >      PWATER input info: Part 3         ***
  # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
 10       0.1  0.1  0.1  0.1 0.06 0.06 0.06 0.06 0.06  0.1  0.1  0.1
 28       0.1  0.1  0.1  0.1 0.06 0.06 0.06 0.06 0.06  0.1  0.1  0.1
 12       0.1  0.1  0.1  0.1 0.06 0.06 0.06 0.06 0.06  0.1  0.1  0.1
 30       0.1  0.1  0.1  0.1 0.06 0.06 0.06 0.06 0.06  0.1  0.1  0.1
```

```
  END MON-INTERCEP

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
              ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   10             0         0      0.01         0       0.4      0.01         0
   28             0         0      0.01         0       0.4      0.01         0
   12             0         0      0.01         0       0.4      0.01         0
   30             0         0      0.01         0       0.4      0.01         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                       in  out           ***
    1      IMPERVIOUS-FLAT        1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    1         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    1         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    1         0    0    0    0    1
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    1            100      0.05      0.05       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    1             0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1             0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
DMA 14A***
PERLND  10                       1.52     RCHRES   1      2
PERLND  10                       1.52     RCHRES   1      3
PERLND  28                       1.31     RCHRES   1      2
PERLND  28                       1.31     RCHRES   1      3
IMPLND   1                       4.65     RCHRES   1      5
```

```
DMA 14C***
PERLND  12                          0.5     COPY   501     12
PERLND  12                          0.5     COPY   601     12
PERLND  12                          0.5     COPY   501     13
PERLND  12                          0.5     COPY   601     13
PERLND  30                         0.74     COPY   501     12
PERLND  30                         0.74     COPY   601     12
PERLND  30                         0.74     COPY   501     13
PERLND  30                         0.74     COPY   601     13

******Routing******
PERLND  10                         1.52     COPY     1     12
PERLND  28                         1.31     COPY     1     12
IMPLND   1                         4.65     COPY     1     15
PERLND  10                         1.52     COPY     1     13
PERLND  28                         1.31     COPY     1     13
RCHRES   1                            1     RCHRES   2      8
RCHRES   2                            1     COPY   501     16
RCHRES   1                            1     COPY   501     17
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   12.1        DISPLY   1     INPUT  TIMSER 1
GENER    2 OUTPUT TIMSER      .0002778     RCHRES   1     EXTNL  OUTDGT 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                          in  out                            ***
    1     Surface BMP 14A         3    1    1    1   28    0    1
    2     BMP 14A                 1    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************* Active Sections ******************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
    2         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ******************* PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
    2         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                    ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
    1        0  1  0  0    4  5  6  0  0       0  1  0  0  0       2  1  2  2  2
    2        0  1  0  0    4  0  0  0  0       0  0  0  0  0       2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
    1              1      0.01       0.0    1260.0       0.5       0.0
```

```
    2              2      0.05       0.0    1260.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                        ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1            0         4.0  5.0  6.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    2            0         4.0  0.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
*** User-Defined Variable Quantity Lines
***                          addr
***                        <------>
*** kwd  varnam optyp  opn  vari  s1 s2 s3 tp multiply  lc ls ac as agfn ***
  <****> <----> <----> <-> <----><-><-><-><-><--------> <><-> <><-> <--> ***
  UVQUAN vol2   RCHRES   2 VOL              4
  UVQUAN v2m2   GLOBAL     WORKSP  1        3
  UVQUAN vpo2   GLOBAL     WORKSP  2        3
  UVQUAN v2d2   GENER    2 K       1        3
*** User-Defined Target Variable Names
***                  addr or                       addr or
***                <------>                      <------>
*** kwd   varnam ct  vari  s1 s2 s3  frac oper     vari  s1 s2 s3  frac oper
  <****>  <----><-> <----><-><-><-> <---> <-->    <----><-><-><-> <---> <-->
  UVNAME  v2m2    1 WORKSP  1         1.0 QUAN
  UVNAME  vpo2    1 WORKSP  2         1.0 QUAN
  UVNAME  v2d2    1 K       1         1.0 QUAN
*** opt foplop dcdts  yr mo dy hr mn d t   vnam  s1 s2 s3 ac quantity  tc  ts rp
  <****><-><--><><-><--> <> <> <> <><><>  <----><-><-><-><-><--------> <> <-><->
  GENER   2                              v2m2            =  28941.
*** Compute remaining available pore space
  GENER   2                              vpo2            =  v2m2
  GENER   2                              vpo2           -=  vol2
*** Check to see if VPORA goes negative; if so set VPORA = 0.0
IF (vpo2 < 0.0) THEN
  GENER   2                              vpo2            =  0.0
END IF
*** Infiltration volume
  GENER   2                              v2d2            =  vpo2
END SPEC-ACTIONS
FTABLES
  FTABLE      2
   52    4
     Depth      Area    Volume  Outflow1 Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.426944  0.000000  0.000000
  0.105275  0.424278  0.009991  0.000000
  0.210549  0.420049  0.020150  0.000000
  0.315824  0.415830  0.030476  0.000000
  0.421099  0.411620  0.040970  0.000000
  0.526374  0.407419  0.051633  0.000000
  0.631648  0.403227  0.062465  0.000000
  0.736923  0.399045  0.073466  0.000000
  0.842198  0.394871  0.084637  0.000000
  0.947473  0.390707  0.095978  0.000000
  1.052747  0.386552  0.107490  0.000000
  1.158022  0.382406  0.119173  0.013724
  1.263297  0.378269  0.131027  0.020586
  1.368571  0.374141  0.143053  0.041723
  1.473846  0.370023  0.155250  0.052292
  1.579121  0.365913  0.165353  0.068400
  1.684396  0.361813  0.175597  0.076453
  1.789670  0.357722  0.185982  0.089034
  1.894945  0.353640  0.198720  0.095324
  2.000220  0.349568  0.211629  0.105768
  2.105495  0.345504  0.224711  0.110989
  2.210769  0.341450  0.237966  0.120072
```

```
  2.316044  0.337404  0.251394  0.124613
  2.421319  0.333368  0.264996  0.132758
  2.526593  0.329341  0.278772  0.144830
  2.631868  0.325324  0.292723  0.159159
  2.737143  0.321315  0.306848  0.175008
  2.842418  0.317316  0.321149  0.190885
  2.947692  0.313325  0.335625  0.206201
  3.052967  0.309344  0.350278  0.220773
  3.158242  0.305372  0.365107  0.234587
  3.263516  0.301410  0.380114  0.247693
  3.368791  0.297456  0.395297  0.260163
  3.474066  0.293511  0.410658  0.272068
  3.579341  0.289576  0.426198  0.283471
  3.684615  0.285650  0.441916  0.294429
  3.789890  0.281733  0.457812  0.304989
  3.895165  0.277825  0.473889  0.315192
  4.000440  0.273926  0.490144  0.325071
  4.105714  0.270037  0.506580  0.334656
  4.210989  0.266157  0.523197  0.343973
  4.316264  0.262285  0.539994  0.353043
  4.421538  0.258423  0.556973  0.361886
  4.526813  0.254570  0.574134  0.370519
  4.632088  0.250727  0.591477  0.378957
  4.737363  0.246892  0.609002  0.387214
  4.842637  0.243067  0.626710  0.395304
  4.947912  0.239251  0.644601  0.403238
  5.053187  0.235443  0.662677  0.411030
  5.158462  0.231646  0.680936  0.418699
  5.263736  0.227857  0.699380  0.426283
  5.330000  0.224077  1.493276  0.550349
  END FTABLE  2
  FTABLE      1
   42    6
     Depth      Area    Volume  Outflow1  Outflow2  outflow 3 Velocity  Travel
Time***
      (ft)   (acres) (acre-ft)   (cfs)      (cfs)     (cfs)   (ft/sec)
(Minutes)***
  0.000000  0.224077  0.000000  0.000000  0.000000  0.000000
  0.105275  0.431187  0.045170  0.000000  1.237570  0.000000
  0.210549  0.435440  0.090787  0.000000  1.318730  0.000000
  0.315824  0.439701  0.136852  0.000000  1.399891  0.000000
  0.421099  0.443972  0.183366  0.000000  1.481051  0.000000
  0.526374  0.448252  0.230330  0.000000  1.562212  0.000000
  0.631648  0.452541  0.277746  0.000000  1.643372  0.000000
  0.736923  0.456840  0.325613  0.000000  1.724533  0.000000
  0.842198  0.461147  0.373934  0.000000  1.805693  0.000000
  0.947473  0.465464  0.422708  0.000000  1.886854  0.000000
  1.052747  0.469789  0.471937  0.000000  1.968014  0.000000
  1.158022  0.474124  0.521622  0.000000  2.049175  0.000000
  1.263297  0.478468  0.571764  0.000000  2.130335  0.000000
  1.368571  0.482822  0.622364  0.000000  2.211495  0.000000
  1.473846  0.487184  0.673423  0.000000  2.292656  0.000000
  1.579121  0.491556  0.724941  0.000000  2.373816  0.000000
  1.684396  0.495936  0.776920  0.000000  2.454977  0.000000
  1.789670  0.500326  0.829360  0.006526  2.536137  0.000000
  1.894945  0.504725  0.882264  0.044608  2.617298  0.000000
  2.000220  0.509133  0.935631  0.098985  2.698458  0.000000
  2.105495  0.513551  0.989462  0.163909  2.779619  0.000000
  2.210769  0.517977  1.043759  0.236386  2.860779  0.000000
  2.316044  0.522413  1.098522  0.314399  2.941940  0.000000
  2.421319  0.526858  1.153753  0.396427  3.023100  0.000000
  2.526593  0.531312  1.209452  0.481247  3.104261  0.000000
  2.631868  0.535775  1.265621  0.567832  3.185421  0.000000
  2.737143  0.540247  1.322260  0.655297  3.266581  0.000000
  2.842418  0.544729  1.379370  0.760427  3.347742  0.000000
  2.947692  0.549220  1.436953  0.872956  3.428902  0.000000
  3.052967  0.553719  1.495009  0.990545  3.510063  0.000000
  3.158242  0.558228  1.553539  1.469402  3.591223  0.000000
  3.263516  0.562746  1.612544  1.682084  3.672384  0.000000
  3.368791  0.567274  1.672025  3.352367  3.753544  0.000000
```

```
  3.474066  0.571810  1.731983  6.109901  3.834705  0.000000
  3.579341  0.576356  1.792420  9.607784  3.915865  0.000000
  3.684615  0.580910  1.853335  13.68447  3.997026  0.000000
  3.789890  0.585474  1.914731  18.21811  4.078186  0.000000
  3.895165  0.590047  1.976607  23.09648  4.159347  0.000000
  4.000440  0.594630  2.038965  28.20724  4.240507  0.000000
  4.105714  0.599221  2.101807  33.43525  4.321667  0.000000
  4.210989  0.603822  2.165132  38.66328  4.402828  0.000000
  4.250000  0.605529  2.188721  43.77469  4.432903  0.000000
  END FTABLE  1
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1              PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1              IMPLND   1 999 EXTNL  PETINP
WDM      2 PREC     ENGL    1              RCHRES   1     EXTNL  PREC
WDM      1 EVAP     ENGL    0.5            RCHRES   1     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.7            RCHRES   2     EXTNL  POTEV

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY     1 OUTPUT MEAN   1 1     12.1      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     12.1      WDM    801 FLOW     ENGL      REPL
COPY   601 OUTPUT MEAN   1 1     12.1      WDM    901 FLOW     ENGL      REPL
RCHRES   2 HYDR   RO     1 1        1      WDM   1000 FLOW     ENGL      REPL
RCHRES   2 HYDR   STAGE  1 1        1      WDM   1001 STAG     ENGL      REPL
RCHRES   1 HYDR   STAGE  1 1        1      WDM   1002 STAG     ENGL      REPL
RCHRES   1 HYDR   O      1 1        1      WDM   1003 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        2
PERLND     PWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    2

  MASS-LINK        3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    3

  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK        8
RCHRES     OFLOW  OVOL   2                 RCHRES         INFLOW IVOL
  END MASS-LINK    8

  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13

  MASS-LINK       15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   15

  MASS-LINK       16
RCHRES     ROFLOW                          COPY           INPUT  MEAN
```

```
  END MASS-LINK   16

  MASS-LINK       17
RCHRES     OFLOW  OVOL   1                 COPY           INPUT  MEAN
  END MASS-LINK   17


END MASS-LINK

END RUN
```

Mitigated HSPF Message File

Disclaimer

Legal Notice

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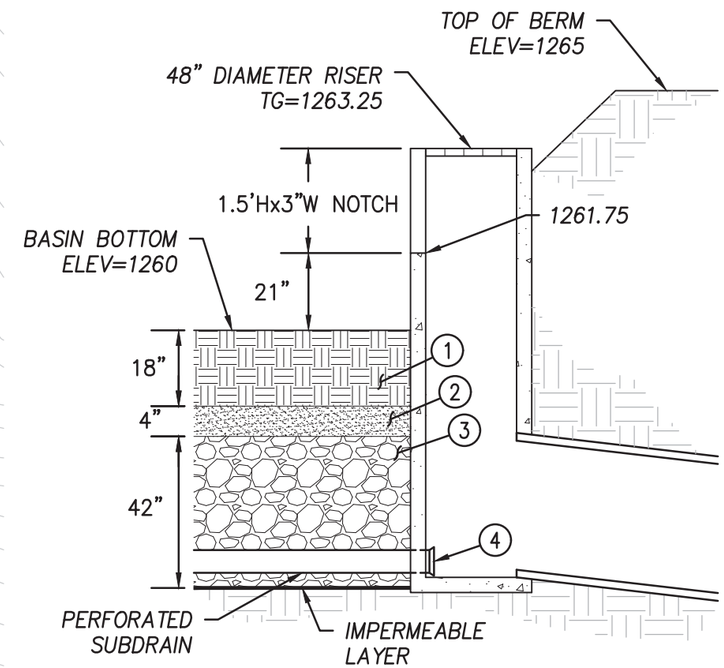

CONSTRUCTION NOTES:

1. 18" BIORETENTION SOIL MEDIA
2. 4" MEDIA BARRIER. (2" WASHED SAND OVER 2" #8 STONE)
3. 42" DRAINAGE LAYER (WASHED #57 STONE)
4. END CAP WITH 3" DIAMETER ORIFICE

PROPOSED OUTLET STRUCTURE

NOT TO SCALE

FUSCOE ENGINEERING
full circle thinking

50 25 0 50 100 150

GRAPHIC SCALE IN FEET

NEWLAND SIERRA BMP 14A DETAILS

KNOLLS
BMP SIZING CALCULATIONS
Newland Sierra Community

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	KR1	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
KR1-B-S-PP	10050	D	Steep	Pervious	0.1	0.045	0.0375	0.027	45	38	27
KR1-B-S-PI	90448	D	Steep	Impervious	1.0	0.045	0.0375	0.027	4070	3392	2442
Total BMP Area	100498										

Minimum BMP Size	4115.385	3429	2469
Proposed BMP Size*	5535	7934	8303
Minimum Ponding Depth		0.24	in
Maximum Ponding Depth		150.62	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	KR1	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
KR1-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.231	0.029	**0.71**
KR1-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	2.076	0.263	**6.41**

0.292	**7.13**	**3.01**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.201	**4.91**	**2.50**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	6.4

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	K2	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
K2-D-S-PP	44850	D	Steep	Pervious	0.1	0.045	0.0375	0.027	202	168	121
K2-D-S-PI	44850	D	Steep	Impervious	1.0	0.045	0.0375	0.027	2018	1682	1211
K2-B-S-PP	288468	D	Steep	Pervious	0.1	0.045	0.0375	0.027	1298	1082	779
K2-B-S-PI	288468	D	Steep	Impervious	1.0	0.045	0.0375	0.027	12981	10818	7789
Total BMP Area	666636							Minimum BMP Size	16499.241	13749	9900
								Proposed BMP Size*	16540	23707	24810
								Minimum Ponding Depth		2.78	in
								Maximum Ponding Depth		290.33	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	K2	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
K2-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	1.030	0.181	**4.41**
K2-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.030	0.181	**4.41**
K2-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	6.622	0.838	**20.46**
K2-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	6.622	0.838	**20.46**

2.037	**49.74**	**7.96**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

1.158	**28.27**	**6.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.3

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	K3	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
K3-B-S-PP	82147	D	Steep	Pervious	0.1	0.045	0.0375	0.027	370	308	222
K3-B-S-PI	82147	D	Steep	Impervious	1.0	0.045	0.0375	0.027	3697	3081	2218
Total BMP Area	164294							Minimum BMP Size	4066.2765	3389	2440
								Proposed BMP Size*	4068	5831	6102
								Minimum Ponding Depth		2.80	in
								Maximum Ponding Depth		295.11	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	K3	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
K3-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	1.886	0.239	**5.83**
K3-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	1.886	0.239	**5.83**

0.477	**11.65**	**3.85**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.3

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	K4	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
K4-D-S-PP	10998	D	Steep	Pervious	0.1	0.045	0.0375	0.027	49	41	30
K4-D-S-PI	10998	D	Steep	Impervious	1.0	0.045	0.0375	0.027	495	412	297
K4-B-S-PP	73084	D	Steep	Pervious	0.1	0.045	0.0375	0.027	329	274	197
K4-B-S-PI	73084	D	Steep	Impervious	1.0	0.045	0.0375	0.027	3289	2741	1973
Total BMP Area	168164							Minimum BMP Size	4162.059	3468	2497
								Proposed BMP Size*	4200	6020	6300
								Minimum Ponding Depth		2.71	in
								Maximum Ponding Depth		127.04	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	K4	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
K4-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.252	0.044	**1.08**
K4-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.252	0.044	**1.08**
K4-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	1.678	0.212	**5.18**
K4-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	1.678	0.212	**5.18**

0.513	**12.53**	**3.99**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.129	**3.14**	**2.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	7.6

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	K5	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
K5-D-S-PP	18640	D	Steep	Pervious	0.1	0.045	0.0375	0.027	84	70	50
K5-D-S-PI	18640	D	Steep	Impervious	1.0	0.045	0.0375	0.027	839	699	503
K5-B-S-PP	72212	D	Steep	Pervious	0.1	0.045	0.0375	0.027	325	271	195
K5-B-S-PI	72212	D	Steep	Impervious	1.0	0.045	0.0375	0.027	3250	2708	1950
Total BMP Area	181704							Minimum BMP Size	4497.174	3748	2698
								Proposed BMP Size*	4500	6450	6750
								Minimum Ponding Depth		2.79	in
								Maximum Ponding Depth		474.27	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	K5	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
K5-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.428	0.075	**1.83**
K5-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.428	0.075	**1.83**
K5-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	1.658	0.210	**5.12**
K5-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	1.658	0.210	**5.12**

0.570	**13.91**	**4.21**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.515	**12.57**	**4.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	2.0

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	K6	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
K6-B-S-PP	83329	D	Steep	Pervious	0.1	0.045	0.0375	0.027	375	312	225
K6-B-S-PI	83329	D	Steep	Impervious	1.0	0.045	0.0375	0.027	3750	3125	2250
Total BMP Area	166658							Minimum BMP Size	4124.7855	3437	2475
								Proposed BMP Size*	4160	5963	6240
								Minimum Ponding Depth		2.72	in
								Maximum Ponding Depth		288.58	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	K6	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
K6-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	1.913	0.242	**5.91**
K6-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	1.913	0.242	**5.91**

0.484	**11.82**	**3.88**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.3

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	K7K9	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
K7-B-S-PP	69375	D	Steep	Pervious	0.1	0.045	0.0375	0.027	312	260	187
K7-B-S-PI	69375	D	Steep	Impervious	1.0	0.045	0.0375	0.027	3122	2602	1873
K9-B-S-PP	47782	D	Steep	Pervious	0.1	0.045	0.0375	0.027	215	179	129
K9-B-S-PI	47782	D	Steep	Impervious	1.0	0.045	0.0375	0.027	2150	1792	1290
Total BMP Area	234314							Minimum BMP Size	5799.2715	4833	3480
								Proposed BMP Size*	6000	8600	9000
								Minimum Ponding Depth		2.47	in
								Maximum Ponding Depth		200.08	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	K7K9	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
K7-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	1.593	0.201	**4.92**
K7-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	1.593	0.201	**4.92**
K9-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	1.097	0.139	**3.39**
K9-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	1.097	0.139	**3.39**

0.680	**16.62**	**4.60**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	4.8

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	K8	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
K8-B-S-PP	841500	D	Steep	Pervious	0.1	0.045	0.0375	0.027	3787	3156	2272
K8-B-S-PI	841500	D	Steep	Impervious	1.0	0.045	0.0375	0.027	37868	31556	22721
K8-D-S-PP	8500	D	Steep	Pervious	0.1	0.045	0.0375	0.027	38	32	23
K8-D-S-PI	8500	D	Steep	Impervious	1.0	0.045	0.0375	0.027	383	319	230
Total BMP Area	1700000							Minimum BMP Size	42075	35063	25245
								Proposed BMP Size*	42326.65	60668	63490
								Minimum Ponding Depth		2.74	in
								Maximum Ponding Depth		113.45	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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Designated Staff have final review and approval authority over the project design.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	K8	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
K8-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	19.318	2.444	**59.67**
K8-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	19.318	2.444	**59.67**
K8-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.195	0.034	**0.84**
K8-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.195	0.034	**0.84**

4.956	**121.02**	**12.41**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

1.158	**28.27**	**6.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	8.5

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	K10	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
K10-B-S-PP	83122	D	Steep	Pervious	0.1	0.045	0.0375	0.027	374	312	224
K10-B-S-PI	83122	D	Steep	Impervious	1.0	0.045	0.0375	0.027	3740	3117	2244
Total BMP Area	166244							Minimum BMP Size	4114.539	3429	2469
								Proposed BMP Size*	4180	5991	6270
								Minimum Ponding Depth		2.64	in
								Maximum Ponding Depth		287.20	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	K10	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
K10-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	1.908	0.241	**5.89**
K10-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	1.908	0.241	**5.89**

0.483	**11.79**	**3.87**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.3

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

MESA
BMP SIZING CALCULATIONS
Newland Sierra Community

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BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	M1MR1K1	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
M1-D-S-PP	16622	D	Steep	Pervious	0.1	0.045	0.0375	0.027	75	62	45
M1-D-S-PI	30869	D	Steep	Impervious	1.0	0.045	0.0375	0.027	1389	1158	833
M1-B-S-PP	582685	D	Steep	Pervious	0.1	0.045	0.0375	0.027	2622	2185	1573
M1-B-S-PI	1082130	D	Steep	Impervious	1.0	0.045	0.0375	0.027	48696	40580	29218
MR1-D-S-PP	1976	D	Steep	Pervious	0.1	0.045	0.0375	0.027	9	7	5
MR1-D-S-PI	17788	D	Steep	Impervious	1.0	0.045	0.0375	0.027	800	667	480
MR1-B-S-PP	22959	D	Steep	Pervious	0.1	0.045	0.0375	0.027	103	86	62
MR1-B-S-PI	206630	D	Steep	Impervious	1.0	0.045	0.0375	0.027	9298	7749	5579
MR1-C-S-PP	2603	C	Steep	Pervious	0.1	0.05	0.0417	0.03	13	11	8
MR1-C-S-PI	23434	C	Steep	Impervious	1.0	0.05	0.0417	0.03	1172	977	703
K1-B-S-PP	97702	D	Steep	Pervious	0.1	0.045	0.0375	0.027	440	366	264
K1-B-S-PI	97702	D	Steep	Impervious	1.0	0.045	0.0375	0.027	4397	3664	2638
Total BMP Area	2183100							Minimum BMP Size	69013.818	57512	41408
								Proposed BMP Size*	93930	78275	56358
								Soil Matrix Depth		18.00	in
								Minimum Ponding Depth		7.35	in
								Maximum Ponding Depth		278.34	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	M1MR1K1	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
M1-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.382	0.067	**1.64**
M1-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.709	0.124	**3.04**
M1-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	13.377	1.692	**41.32**
M1-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	24.842	3.143	**76.74**
MR1-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.045	0.008	**0.19**
MR1-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.408	0.072	**1.75**
MR1-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.527	0.067	**1.63**
MR1-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	4.744	0.600	**14.65**
MR1-C-S-PP	Lake Wohlford	C	Scrub	Steep	0.302	0.060	0.009	**0.22**
MR1-C-S-PI	Lake Wohlford	C	Scrub	Steep	0.302	0.538	0.081	**1.98**
K1-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	2.243	0.284	**6.93**
K1-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	2.243	0.284	**6.93**

6.430	**157.01**	**14.14**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

6.304	**153.94**	**14.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.4

BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	M2	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
M2-D-S-PP	93928	D	Steep	Pervious	0.1	0.045	0.0375	0.027	423	352	254
M2-D-S-PI	174437	D	Steep	Impervious	1.0	0.045	0.0375	0.027	7850	6541	4710
M2-B-S-PP	140201	D	Steep	Pervious	0.1	0.045	0.0375	0.027	631	526	379
M2-B-S-PI	260373	D	Steep	Impervious	1.0	0.045	0.0375	0.027	11717	9764	7030
Total BMP Area	668939										

Minimum BMP Size	20620.0305	17183	12372
Proposed BMP Size*	20650	17208	12390
Soil Matrix Depth		18.00	in
Minimum Ponding Depth		9.99	in
Maximum Ponding Depth		232.54	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	M2	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
M2-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	2.156	0.378	**9.24**
M2-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	4.005	0.703	**17.16**
M2-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	3.219	0.407	**9.94**
M2-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	5.977	0.756	**18.46**

2.245	**54.81**	**8.35**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

1.158	**28.27**	**6.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	4.1

BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	M3A	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
M3A-B-S-PP	10420	D	Steep	Pervious	0.1	0.045	0.0375	0.027	47	39	28
M3A-B-S-PI	19351	D	Steep	Impervious	1.0	0.045	0.0375	0.027	871	726	522
Total BMP Area	29771										

Minimum BMP Size	917.685	765	551
Proposed BMP Size*	930	775	558
Soil Matrix Depth		18.00	in
Minimum Ponding Depth		9.87	in
Maximum Ponding Depth		143.43	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	M3A	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
M3A-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.239	0.030	**0.74**
M3A-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.444	0.056	**1.37**

0.086	**2.11**	**1.64**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.032	**0.79**	**1.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	6.7

BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	M3B	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
M3B-B-S-PP	50857	D	Steep	Pervious	0.1	0.045	0.0375	0.027	229	191	137
M3B-B-S-PI	94450	D	Steep	Impervious	1.0	0.045	0.0375	0.027	4250	3542	2550
Total BMP Area	145307										

Minimum BMP Size	4479.1065	3733	2687
Proposed BMP Size*	4500	3750	2700
Soil Matrix Depth		18.00	in
Minimum Ponding Depth		9.95	in
Maximum Ponding Depth		266.78	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	M3B	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
M3B-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	1.168	0.148	**3.61**
M3B-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	2.168	0.274	**6.70**

0.422	**10.30**	**3.62**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.6

BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	M4	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
M4-D-S-PP	46830	D	Steep	Pervious	0.1	0.045	0.0375	0.027	211	176	126
M4-D-S-PI	86971	D	Steep	Impervious	1.0	0.045	0.0375	0.027	3914	3261	2348
M4-B-S-PP	8469	D	Steep	Pervious	0.1	0.045	0.0375	0.027	38	32	23
M4-B-S-PI	15727	D	Steep	Impervious	1.0	0.045	0.0375	0.027	708	590	425
Total BMP Area	157997							Minimum BMP Size	4870.2555	4059	2922
								Proposed BMP Size*	5000	4167	3000
								Soil Matrix Depth		18.00	in
								Minimum Ponding Depth		9.74	in
								Maximum Ponding Depth		426.85	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	M4	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
M4-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	1.075	0.189	**4.61**
M4-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.997	0.350	**8.56**
M4-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.194	0.025	**0.60**
M4-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.361	0.046	**1.12**

0.609	**14.88**	**4.35**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.515	**12.57**	**4.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	2.2

BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	M8	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
M8-D-S-PP	8064	D	Steep	Pervious	0.1	0.045	0.0375	0.027	36	30	22
M8-D-S-PI	14977	D	Steep	Impervious	1.0	0.045	0.0375	0.027	674	562	404
M8-B-S-PP	146527	D	Steep	Pervious	0.1	0.045	0.0375	0.027	659	549	396
M8-B-S-PI	272121	D	Steep	Impervious	1.0	0.045	0.0375	0.027	12245	10205	7347
Total BMP Area	441689							Minimum BMP Size	13615.0695	11346	8169
								Proposed BMP Size*	13640	11367	8184
								Soil Matrix Depth		18.00	in
								Minimum Ponding Depth		9.98	in
								Maximum Ponding Depth		352.05	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	M8	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
M8-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.185	0.032	**0.79**
M8-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.344	0.060	**1.47**
M8-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	3.364	0.426	**10.39**
M8-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	6.247	0.790	**19.30**

1.309	**31.95**	**6.38**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

1.158	**28.27**	**6.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	2.7

SUMMIT
BMP SIZING CALCULATIONS
Newland Sierra Community

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	S1	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
S1-D-S-PP	73821	D	Steep	Pervious	0.1	0.045	0.0375	0.027	332	277	199
S1-D-S-PI	73821	D	Steep	Impervious	1.0	0.045	0.0375	0.027	3322	2768	1993
S1-B-S-PP	381	D	Steep	Pervious	0.1	0.045	0.0375	0.027	2	1	1
S1-B-S-PI	381	D	Steep	Impervious	1.0	0.045	0.0375	0.027	17	14	10
Total BMP Area	148404							Minimum BMP Size	3672.999	3061	2204
								Proposed BMP Size*	3725	5339	5588
								Minimum Ponding Depth		2.66	in
								Maximum Ponding Depth		322.28	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	S1	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
S1-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	1.695	0.297	**7.26**
S1-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.695	0.297	**7.26**
S1-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.009	0.001	**0.03**
S1-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.009	0.001	**0.03**

0.597	**14.58**	**4.31**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.0

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	S2	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
S2-D-S-PP	186096	D	Steep	Pervious	0.1	0.045	0.0375	0.027	837	698	502
S2-D-S-PI	186096	D	Steep	Impervious	1.0	0.045	0.0375	0.027	8374	6979	5025
S2-B-S-PP	30643	D	Steep	Pervious	0.1	0.045	0.0375	0.027	138	115	83
S2-B-S-PI	30643	D	Steep	Impervious	1.0	0.045	0.0375	0.027	1379	1149	827
Total BMP Area	433478										

Minimum BMP Size	10728.5805	8940	6437
Proposed BMP Size*	11508	16495	17262
Minimum Ponding Depth		2.12	in
Maximum Ponding Depth		185.46	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	S2	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
S2-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	4.272	0.750	**18.31**
S2-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	4.272	0.750	**18.31**
S2-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.703	0.089	**2.17**
S2-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.703	0.089	**2.17**

1.678	**40.96**	**7.22**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.515	**12.57**	**4.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	5.2

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	S3	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
S3-D-S-PP	83846	D	Steep	Pervious	0.1	0.045	0.0375	0.027	377	314	226
S3-D-S-PI	83846	D	Steep	Impervious	1.0	0.045	0.0375	0.027	3773	3144	2264
Total BMP Area	167692										

Minimum BMP Size	4150.377	3459	2490
Proposed BMP Size*	5350	7668	8025
Minimum Ponding Depth		0.56	in
Maximum Ponding Depth		398.92	in
Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	S3	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
S3-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	1.925	0.338	**8.25**
S3-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.925	0.338	**8.25**

0.676	**16.50**	**4.58**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.515	**12.57**	**4.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	2.4

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	S4	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
S4-D-S-PP	66142	D	Steep	Pervious	0.1	0.045	0.0375	0.027	298	248	179
S4-D-S-PI	66142	D	Steep	Impervious	1.0	0.045	0.0375	0.027	2976	2480	1786
Total BMP Area	132284							Minimum BMP Size	3274.029	2728	1964
								Proposed BMP Size*	3380	4845	5070
								Minimum Ponding Depth		2.49	in
								Maximum Ponding Depth		355.18	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	S4	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
S4-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	1.518	0.266	**6.51**
S4-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.518	0.266	**6.51**

0.533	**13.01**	**4.07**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	2.7

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	S5	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
S5-D-S-PP	93960	D	Steep	Pervious	0.1	0.045	0.0375	0.027	423	352	254
S5-D-S-PI	93960	D	Steep	Impervious	1.0	0.045	0.0375	0.027	4228	3524	2537
Total BMP Area	187920										

Minimum BMP Size	4651.02	3876	2791
Proposed BMP Size*	5380	7711	8070
Minimum Ponding Depth		1.45	in
Maximum Ponding Depth		396.70	in
Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	S5	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
S5-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	2.157	0.379	**9.24**
S5-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	2.157	0.379	**9.24**

0.757	**18.49**	**4.85**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.515	**12.57**	**4.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	2.4

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	S6	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
S6-D-S-PP	65064	D	Steep	Pervious	0.1	0.045	0.0375	0.027	293	244	176
S6-D-S-PI	65064	D	Steep	Impervious	1.0	0.045	0.0375	0.027	2928	2440	1757
Total BMP Area	130128							Minimum BMP Size	3220.668	2684	1932
								Proposed BMP Size*	3400	4873	5100
								Minimum Ponding Depth		2.27	in
								Maximum Ponding Depth		627.72	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	S6	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
S6-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	1.494	0.262	**6.40**
S6-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.494	0.262	**6.40**

0.524	**12.80**	**4.04**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.515	**12.57**	**4.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	1.5

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	S7	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
S7-D-S-PP	230396	D	Steep	Pervious	0.1	0.045	0.0375	0.027	1037	864	622
S7-D-S-PI	230396	D	Steep	Impervious	1.0	0.045	0.0375	0.027	10368	8640	6221
Total BMP Area	460792							Minimum BMP Size	11404.602	9504	6843
								Proposed BMP Size*	12400	17773	18600
								Minimum Ponding Depth		2.00	in
								Maximum Ponding Depth		387.26	in
								Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	S7	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
S7-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	5.289	0.928	**22.67**
S7-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	5.289	0.928	**22.67**

1.856	**45.33**	**7.60**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

1.158	**28.27**	**6.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	2.5

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	S8	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
S8-D-S-PP	126345	D	Steep	Pervious	0.1	0.045	0.0375	0.027	569	474	341
S8-D-S-PI	126345	D	Steep	Impervious	1.0	0.045	0.0375	0.027	5686	4738	3411
Total BMP Area	252690										

Minimum BMP Size	6254.0775	5212	3752
Proposed BMP Size*	6390	9159	9585
Minimum Ponding Depth		2.59	in
Maximum Ponding Depth		334.00	in
Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	S8	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
S8-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	2.900	0.509	**12.43**
S8-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	2.900	0.509	**12.43**

1.018	**24.86**	**5.63**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.515	**12.57**	**4.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	2.9

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	S9	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
S9-D-S-PP	97154	D	Steep	Pervious	0.1	0.045	0.0375	0.027	437	364	262
S9-D-S-PI	97154	D	Steep	Impervious	1.0	0.045	0.0375	0.027	4372	3643	2623
Total BMP Area	194308										

Minimum BMP Size	4809.123	4008	2885
Proposed BMP Size*	5380	7711	8070
Minimum Ponding Depth		1.74	in
Maximum Ponding Depth		396.70	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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Designated Staff have final review and approval authority over the project design.

This Sizing Calculator has been developed in compliance with the Countywide Model SUSMP. For questions or concerns please contact the jurisdiction in which your project is located.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	S9	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
S9-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	2.230	0.391	**9.56**
S9-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	2.230	0.391	**9.56**

0.783	**19.12**	**4.93**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.515	**12.57**	**4.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	2.4

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	S10	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
S10-D-S-PP	6005	D	Steep	Pervious	0.1	0.045	0.0375	0.027	27	23	16
S10-D-S-PI	54048	D	Steep	Impervious	1.0	0.045	0.0375	0.027	2432	2027	1459
Total BMP Area	60053										

Minimum BMP Size	2459.1825	2049	1476
Proposed BMP Size*	2700	3870	4050
Minimum Ponding Depth		1.91	in
Maximum Ponding Depth		197.61	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	S10	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
S10-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.138	0.024	**0.59**
S10-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.241	0.218	**5.32**

0.242	**5.91**	**2.74**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.129	**3.14**	**2.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	4.9

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

TERRACES
BMP SIZING CALCULATIONS
Newland Sierra Community

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BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:		Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	TR1T1T2	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
TR1-B-S-PP	7942	C	Steep	Pervious	0.1	0.05	0.0417	0.03	40	33	24
TR1-B-S-PI	71479	C	Steep	Impervious	1.0	0.05	0.0417	0.03	3574	2981	2144
TR1-D-S-PP	11556	D	Steep	Pervious	0.1	0.045	0.0375	0.027	52	43	31
TR1-D-S-PI	104006	D	Steep	Impervious	1.0	0.045	0.0375	0.027	4680	3900	2808
T1-B-S-PP	17104	C	Steep	Pervious	0.1	0.05	0.0417	0.03	86	71	51
T1-B-S-PI	31764	C	Steep	Impervious	1.0	0.05	0.0417	0.03	1588	1325	953
T1-C-S-PP	17730	C	Steep	Pervious	0.1	0.05	0.0417	0.03	89	74	53
T1-C-S-PI	32928	C	Steep	Impervious	1.0	0.05	0.0417	0.03	1646	1373	988
T1-D-S-PP	151611	D	Steep	Pervious	0.1	0.045	0.0375	0.027	682	569	409
T1-D-S-PI	281563	D	Steep	Impervious	1.0	0.045	0.0375	0.027	12670	10559	7602
T2-B-S-PP	17134	C	Steep	Pervious	0.1	0.05	0.0417	0.03	86	71	51
T2-B-S-PI	31819	C	Steep	Impervious	1.0	0.05	0.0417	0.03	1591	1327	955
T2-D-S-PP	780	D	Steep	Pervious	0.1	0.045	0.0375	0.027	4	3	2
T2-D-S-PI	1449	D	Steep	Impervious	1.0	0.045	0.0375	0.027	65	54	39
Total BMP Area	778865							Minimum BMP Size	26852.6215	22383	16112
								Proposed BMP Size*	26863.7	22386	16118
								Soil Matrix Depth		18.00	in
								Minimum Ponding Depth		10.00	in
								Maximum Ponding Depth		178.76	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:		Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	TR1T1T2	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
TR1-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.182	0.023	**0.56**
TR1-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	1.641	0.208	**5.07**
TR1-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.265	0.047	**1.14**
TR1-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	2.388	0.419	**10.23**
T1-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.393	0.050	**1.21**
T1-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.729	0.092	**2.25**
T1-C-S-PP	Lake Wohlford	C	Scrub	Steep	0.302	0.407	0.061	**1.50**
T1-C-S-PI	Lake Wohlford	C	Scrub	Steep	0.302	0.756	0.114	**2.79**
T1-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	3.481	0.611	**14.92**
T1-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	6.464	1.134	**27.70**
T2-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.393	0.050	**1.22**
T2-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.730	0.092	**2.26**
T2-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.018	0.003	**0.08**
T2-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.033	0.006	**0.14**

2.910	**71.06**	**9.51**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

1.158	**28.27**	**6.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	5.4

BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:		Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	TR2	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
TR2-B-S-PP	4434	C	Steep	Pervious	0.1	0.05	0.0417	0.03	22	18	13
TR2-B-S-PI	39904	C	Steep	Impervious	1.0	0.05	0.0417	0.03	1995	1664	1197
Total BMP Area	44338							Minimum BMP Size	2017.37	1682	1210
								Proposed BMP Size*	2104	1753	1262
								Soil Matrix Depth		18.00	in
								Minimum Ponding Depth		9.60	in
								Maximum Ponding Depth		253.59	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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Designated Staff have final review and approval authority over the project design.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:		Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	TR2	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
TR2-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.102	0.013	**0.31**
TR2-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.916	0.116	**2.83**

0.129	**3.14**	**2.00**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.129	**3.14**	**2.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.8

BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:		Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	T3	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
T3-B-S-PP	663	C	Steep	Pervious	0.1	0.05	0.0417	0.03	3	3	2
T3-B-S-PI	1232	C	Steep	Impervious	1.0	0.05	0.0417	0.03	62	51	37
T3-D-S-PP	95295	D	Steep	Pervious	0.1	0.045	0.0375	0.027	429	357	257
T3-D-S-PI	176976	D	Steep	Impervious	1.0	0.045	0.0375	0.027	7964	6637	4778
Total BMP Area	274166										

Minimum BMP Size	8457.6625	7048	5075
Proposed BMP Size*	8483	7069	5090
Soil Matrix Depth		18.00	in
Minimum Ponding Depth		9.97	in
Maximum Ponding Depth		251.59	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:		Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	T3	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
T3-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.015	0.002	**0.05**
T3-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.028	0.004	**0.09**
T3-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	2.188	0.384	**9.38**
T3-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	4.063	0.713	**17.41**

1.102	**26.92**	**5.85**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.515	**12.57**	**4.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.8

BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:		Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	T4	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
T4-B-S-PP	29816	C	Steep	Pervious	0.1	0.05	0.0417	0.03	149	124	89
T4-B-S-PI	55373	C	Steep	Impervious	1.0	0.05	0.0417	0.03	2769	2309	1661
T4-D-S-PP	1081	D	Steep	Pervious	0.1	0.045	0.0375	0.027	5	4	3
T4-D-S-PI	2008	D	Steep	Impervious	1.0	0.045	0.0375	0.027	90	75	54
Total BMP Area	88278										

Minimum BMP Size	3012.9545	2513	1808
Proposed BMP Size*	3150	2625	1890
Soil Matrix Depth		18.00	in
Minimum Ponding Depth		9.57	in
Maximum Ponding Depth		264.66	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:		Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	T4	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
T4-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.684	0.087	**2.11**
T4-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	1.271	0.161	**3.93**
T4-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.025	0.004	**0.11**
T4-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.046	0.008	**0.20**

0.260	**6.34**	**2.84**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.201	**4.91**	**2.50**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.6

BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:		Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	T5	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
T5-B-S-PP	1437	C	Steep	Pervious	0.1	0.05	0.0417	0.03	7	6	4
T5-B-S-PI	2670	C	Steep	Impervious	1.0	0.05	0.0417	0.03	134	111	80
T5-D-S-PP	9548	D	Steep	Pervious	0.1	0.045	0.0375	0.027	43	36	26
T5-D-S-PI	17732	D	Steep	Impervious	1.0	0.045	0.0375	0.027	798	665	479
Total BMP Area	31387										

Minimum BMP Size	981.591	818	589
Proposed BMP Size*	990	825	594
Soil Matrix Depth		18.00	in
Minimum Ponding Depth		9.92	in
Maximum Ponding Depth		134.74	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:		Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	T5	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
T5-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.033	0.004	**0.10**
T5-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.061	0.008	**0.19**
T5-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.219	0.038	**0.94**
T5-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.407	0.071	**1.74**

0.122	**2.98**	**1.95**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.032	**0.79**	**1.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	7.1

BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:		Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	T6	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
T6-B-S-PP	42911	C	Steep	Pervious	0.1	0.05	0.0417	0.03	215	179	129
T6-B-S-PI	79693	C	Steep	Impervious	1.0	0.05	0.0417	0.03	3985	3323	2391
Total BMP Area	122604										

Minimum BMP Size	4199.205	3502	2520
Proposed BMP Size*	4317	3598	2590
Soil Matrix Depth		18.00	in
Minimum Ponding Depth		9.73	in
Maximum Ponding Depth		278.09	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:		Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	T6	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
T6-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.985	0.125	**3.04**
T6-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	1.829	0.231	**5.65**

0.356	**8.69**	**3.33**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.5

BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:		Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	T7	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
T7-B-S-PP	52525	C	Steep	Pervious	0.1	0.05	0.0417	0.03	263	219	158
T7-B-S-PI	97547	C	Steep	Impervious	1.0	0.05	0.0417	0.03	4877	4068	2926
Total BMP Area	150072										

Minimum BMP Size	5139.975	4287	3084
Proposed BMP Size*	5245	4371	3147
Soil Matrix Depth		18.00	in
Minimum Ponding Depth		9.81	in
Maximum Ponding Depth		228.89	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:		Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	T7	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
T7-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	1.206	0.153	**3.72**
T7-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	2.239	0.283	**6.92**

0.436	**10.64**	**3.68**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.289	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	4.2

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BMP SIZING CALCULATIONS
Newland Sierra Community

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BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	TC1	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
TC1-B-S-PP	67602.5	C	Steep	Pervious	0.1	0.05	0.0417	0.03	338	282	203
TC1-B-S-PI	67602.5	C	Steep	Impervious	1.0	0.05	0.0417	0.03	3380	2819	2028
TC1-D-S-PP	60712	D	Steep	Pervious	0.1	0.045	0.0375	0.027	273	228	164
TC1-D-S-PI	60712	D	Steep	Impervious	1.0	0.045	0.0375	0.027	2732	2277	1639
Total BMP Area	256629										

Minimum BMP Size	6723.3815	5605	4034
Proposed BMP Size*	6740	5617	4044
Soil Matrix Depth		18.00	in
Minimum Ponding Depth		9.98	in
Maximum Ponding Depth		494.77	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	TC1	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
TC1-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	1.552	0.196	**4.79**
TC1-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	1.552	0.196	**4.79**
TC1-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	1.394	0.245	**5.97**
TC1-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.394	0.245	**5.97**

0.882	**21.53**	**5.24**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.804	**19.63**	**5.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	1.9

BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	TC2TCR1	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
TC2-B-S-PP	61270	C	Steep	Pervious	0.1	0.05	0.0417	0.03	306	255	184
TC2-B-S-PI	113786	C	Steep	Impervious	1.0	0.05	0.0417	0.03	5689	4745	3414
TC2-D-S-PP	35412	D	Steep	Pervious	0.1	0.045	0.0375	0.027	159	133	96
TC2-D-S-PI	65766	D	Steep	Impervious	1.0	0.045	0.0375	0.027	2959	2466	1776
TCR1-B-S-PP	70745	C	Steep	Pervious	0.1	0.05	0.0417	0.03	354	295	212
TCR1-B-S-PI	23582	C	Steep	Impervious	1.0	0.05	0.0417	0.03	1179	983	707
TCR1-D-S-PP	7861	D	Steep	Pervious	0.1	0.045	0.0375	0.027	35	29	21
TCR1-D-S-PI	2620	D	Steep	Impervious	1.0	0.045	0.0375	0.027	118	98	71
Total BMP Area	381042										

Minimum BMP Size	10800.5735	9005	6480
Proposed BMP Size*	17108	14257	10265
Soil Matrix Depth		18.00	in
Minimum Ponding Depth		6.32	in
Maximum Ponding Depth		194.92	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	TC2TCR1	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
TC2-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	1.407	0.178	**4.34**
TC2-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	2.612	0.330	**8.07**
TC2-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.813	0.143	**3.48**
TC2-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	1.510	0.265	**6.47**
TCR1-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	1.624	0.205	**5.02**
TCR1-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.541	0.068	**1.67**
TCR1-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.180	0.032	**0.77**
TCR1-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.060	0.011	**0.26**

1.232	**30.09**	**6.19**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.804	**19.63**	**5.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	4.9

BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	TC3	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
TC3-B-S-PP	1700	C	Steep	Pervious	0.1	0.06	0.05	0.036	10	9	6
TC3-B-S-PI	9637	C	Steep	Impervious	1.0	0.06	0.05	0.036	578	482	347
TC3-C-S-PP	34094	C	Steep	Pervious	0.1	0.06	0.05	0.036	205	170	123
TC3-C-S-PI	193198	C	Steep	Impervious	1.0	0.06	0.05	0.036	11592	9660	6955
Total BMP Area	238629							Minimum BMP Size	12384.864	10321	7431
								Proposed BMP Size*	12580	10483	7548
								Soil Matrix Depth		18.00	in
								Minimum Ponding Depth		9.84	in
								Maximum Ponding Depth		265.08	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	TC3	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
TC3-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.039	0.003	**0.07**
TC3-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.221	0.017	**0.41**
TC3-C-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.783	0.082	**2.01**
TC3-C-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	4.435	0.467	**11.40**

0.569	**13.90**	**4.21**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.804	**19.63**	**5.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.6

BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	TC4	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
TC4-D-S-PP	4423	D	Steep	Pervious	0.1	0.05	0.0417	0.03	22	18	13
TC4-D-S-PI	25062	D	Steep	Impervious	1.0	0.05	0.0417	0.03	1253	1045	752
TC4-C-S-PP	5247	C	Steep	Pervious	0.1	0.06	0.05	0.036	31	26	19
TC4-C-S-PI	29734	C	Steep	Impervious	1.0	0.06	0.05	0.036	1784	1487	1070
Total BMP Area	64466							Minimum BMP Size	3090.737	2576	1854
								Proposed BMP Size*	3170	2642	1902
								Soil Matrix Depth		18.00	in
								Minimum Ponding Depth		9.75	in
								Maximum Ponding Depth		168.32	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	TC4	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
TC4-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.102	0.011	**0.26**
TC4-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.575	0.061	**1.48**
TC4-C-S-PP	Lake Wohlford	C	Scrub	Steep	0.302	0.120	0.011	**0.27**
TC4-C-S-PI	Lake Wohlford	C	Scrub	Steep	0.302	0.683	0.062	**1.51**

0.144	**3.52**	**2.12**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.129	**3.14**	**2.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	5.7

BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	TC5	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
TC5-B-S-PP	5255	C	Steep	Pervious	0.1	0.06	0.05	0.036	32	26	19
TC5-B-S-PI	29778	C	Steep	Impervious	1.0	0.06	0.05	0.036	1787	1489	1072
TC5-C-S-PP	6607	C	Steep	Pervious	0.1	0.06	0.05	0.036	40	33	24
TC5-C-S-PI	37438	C	Steep	Impervious	1.0	0.06	0.05	0.036	2246	1872	1348
Total BMP Area	79078										

Minimum BMP Size	4104.132	3420	2462
Proposed BMP Size*	4200	3500	2520
Soil Matrix Depth		18.00	in
Minimum Ponding Depth		9.77	in
Maximum Ponding Depth		127.04	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	TC5	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
TC5-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.121	0.009	**0.22**
TC5-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.684	0.052	**1.27**
TC5-C-S-PP	Lake Wohlford	C	Scrub	Steep	0.302	0.152	0.014	**0.34**
TC5-C-S-PI	Lake Wohlford	C	Scrub	Steep	0.302	0.859	0.078	**1.90**

0.153	**3.73**	**2.18**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.129	**3.14**	**2.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	7.6

BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	TCR2	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
TCR2-B-S-PP	7564	D	Steep	Pervious	0.1	0.05	0.0417	0.03	38	32	23
TCR2-B-S-PI	68074	D	Steep	Impervious	1.0	0.05	0.0417	0.03	3404	2839	2042
TCR2-C-S-PP	767	C	Steep	Pervious	0.1	0.06	0.05	0.036	5	4	3
TCR2-C-S-PI	6907	C	Steep	Impervious	1.0	0.06	0.05	0.036	414	345	249
Total BMP Area	83312							Minimum BMP Size	3860.542	3219	2316
								Proposed BMP Size*	3900	19500	2340
								Soil Matrix Depth		18.00	in
								Minimum Ponding Depth		9.91	in
								Maximum Ponding Depth		136.81	in
								Selected Ponding Depth		60.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	TCR2	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
TCR2-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.174	0.013	**0.32**
TCR2-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	1.563	0.119	**2.90**
TCR2-C-S-PP	Lake Wohlford	C	Scrub	Steep	0.302	0.018	0.002	**0.04**
TCR2-C-S-PI	Lake Wohlford	C	Scrub	Steep	0.302	0.159	0.014	**0.35**

0.148	**3.61**	**2.14**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.129	**3.14**	**2.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	42.1

BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	TCR3	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
TCR3-B-S-PP	3066	D	Steep	Pervious	0.1	0.05	0.0417	0.03	15	13	9
TCR3-B-S-PI	27594	D	Steep	Impervious	1.0	0.05	0.0417	0.03	1380	1151	828
TCR3-C-S-PP	23628	C	Steep	Pervious	0.1	0.06	0.05	0.036	142	118	85
TCR3-C-S-PI	212655	C	Steep	Impervious	1.0	0.06	0.05	0.036	12759	10633	7656
TCR3-D-S-PP	2677	D	Steep	Pervious	0.1	0.05	0.0417	0.03	13	11	8
TCR3-D-S-PI	24092	D	Steep	Impervious	1.0	0.05	0.0417	0.03	1205	1005	723
Park-C-PP	29591	C	Flat	Pervious	0.1	0.085	0.0708	0.051	252	210	151
Park-C-PI	29591	C	Flat	Impervious	1.0	0.085	0.0708	0.051	2515	2095	1509
Park-B-PP	26105	D	Flat	Pervious	0.1	0.065	0.0542	0.039	170	141	102
Park-B-PI	26105	D	Flat	Impervious	1.0	0.065	0.0542	0.039	1697	1415	1018
Total BMP Area	405104							Minimum BMP Size	20147.349	16791	12088
								Proposed BMP Size*	20200	101000	12120
								Soil Matrix Depth		18.00	in
								Minimum Ponding Depth		9.97	in
								Maximum Ponding Depth		165.09	in
								Selected Ponding Depth		60.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	TCR3	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
TCR3-B-S-PP	Lake Wohlford	B	Scrub	Steep	0.253	0.070	0.005	**0.13**
TCR3-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.633	0.048	**1.17**
TCR3-C-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.542	0.057	**1.39**
TCR3-C-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	4.882	0.514	**12.55**
TCR3-D-S-PP	Lake Wohlford	D	Scrub	Steep	0.351	0.061	0.006	**0.16**
TCR3-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.553	0.058	**1.42**
Park-C-PP	Lake Wohlford	C	Scrub	Flat	0.245	0.679	0.050	**1.22**
Park-C-PI	Lake Wohlford	C	Scrub	Flat	0.245	0.679	0.050	**1.22**
Park-B-PP	Lake Wohlford	B	Scrub	Flat	0.208	0.599	0.037	**0.91**
Park-B-PI	Lake Wohlford	B	Scrub	Flat	0.208	0.599	0.037	**0.91**

0.864	**21.10**	**5.18**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.804	**19.63**	**5.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	34.9

VALLEY
BMP SIZING CALCULATIONS
Newland Sierra Community

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	V17	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
V17-B-S-PI	11700	C	Steep	Impervious	1.0	0.05	0.0417	0.03	585	488	351
V17-D-S-PI	25740	D	Steep	Impervious	1.0	0.045	0.0375	0.027	1158	965	695
Total BMP Area	37440							Minimum BMP Size	1743.3	1453	1046
								Proposed BMP Size*	1750	2508	2625
								Minimum Ponding Depth		2.76	in
								Maximum Ponding Depth		476.39	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.02			
Project Name:	Newland Sierra	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	V17	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
V17-B-S-PI	Lake Wohlford	B	Scrub	Steep	0.253	0.269	0.034	**0.83**
V17-D-S-PI	Lake Wohlford	D	Scrub	Steep	0.351	0.591	0.104	**2.53**

0.138	**3.36**	**2.07**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.201	**4.91**	**2.50**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	2.0

If Drawdown time exceeds 96 Hrs project must implement a vector control program.

DEER SPRINGS ROAD (OFFSITE) BMP SIZING CALCULATIONS

Newland Sierra Community

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BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	D1	BMP Type:	Bioretention Plus Cistern
BMP Native Soil Type:	C	BMP Infiltration Rate (in/hr):	0.08

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Bioretention Surface Area	Cistern Volume	N/A	Bioretention Surface Area (sf)	Cistern Volume (cf)	N/A
Impervious	68,670	C	Moderate	Asphalt	1.0	0.03	0.18	N/A	2060	12361	N/A
Pervious	7,630	C	Moderate	Landscape	0.1	0.03	0.18	N/A	23	137	N/A
Impervious	152736	D	Moderate	Asphalt	1.0	0.035	0.14	N/A	5346	21383	N/A
Pervious	16970	D	Moderate	Landscape	0.1	0.035	0.14	N/A	59	238	N/A
Impervious	20575	B	Moderate	Asphalt	1.0	0.025	0.24	N/A	514	4938	N/A
Pervious	2286	B	Moderate	Landscape	0.1	0.025	0.24	N/A	6	55	N/A
Total BMP Area	268867										

Minimum BMP Size	8008.235	39111	
Proposed BMP Size*	9,780	N/A	N/A
		18.00	in
Minimum Cistern Depth		N/A	in
Maximum Cistern Depth		N/A	in
Selected Cistern Depth		48.00	in
Selected Cistern Volume		39120	cubic feet

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	D1	BMP Type:	Bioretention Plus Cistern

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious	Lake Wohlford	C	Scrub	Moderate	0.253	1.576	0.120	**1.91**
Pervious	Lake Wohlford	C	Scrub	Moderate	0.253	0.175	0.013	**0.21**
Impervious	Lake Wohlford	D	Scrub	Moderate	0.292	3.506	0.307	**4.91**
Pervious	Lake Wohlford	D	Scrub	Moderate	0.292	0.390	0.034	**0.55**
Impervious	Lake Wohlford	B	Scrub	Moderate	0.227	0.472	0.032	**0.51**
Pervious	Lake Wohlford	B	Scrub	Moderate	0.227	0.052	0.004	**0.06**

0.510	**8.15**	**3.22**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.473	**7.07**	**3.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	46.0

BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	D2	BMP Type:	Bioretention Plus Cistern
BMP Native Soil Type:	C	BMP Infiltration Rate (in/hr):	0.08

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Bioretention Surface Area	Cistern Volume	N/A	Bioretention Surface Area (sf)	Cistern Volume (cf)	N/A
Impervious	59,220	C	Flat	Asphalt	1.0	0.03	0.18	N/A	1777	10660	N/A
Pervious	6,580	C	Flat	Landscape	0.1	0.03	0.18	N/A	20	118	N/A
Total BMP Area	65800							Minimum BMP Size	1796.34	10778	
								Proposed BMP Size*	2,750	N/A	N/A
										18.00	in
								Minimum Cistern Depth		N/A	in
								Maximum Cistern Depth		N/A	in
								Selected Cistern Depth		48.00	in
								Selected Cistern Volume		11000	cubic feet

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	D2	BMP Type:	Bioretention Plus Cistern

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious	Lake Wohlford	C	Scrub	Flat	0.245	1.360	0.100	**1.60**
Pervious	Lake Wohlford	C	Scrub	Flat	0.245	0.151	0.011	**0.18**

0.111	**1.77**	**1.50**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.103	**1.54**	**1.40**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	59.4

BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	D3	BMP Type:	Bioretention Plus Cistern
BMP Native Soil Type:	C	BMP Infiltration Rate (in/hr):	0.08

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Bioretention Surface Area	Cistern Volume	N/A	Bioretention Surface Area (sf)	Cistern Volume (cf)	N/A
Impervious	131,138	C	Flat	Asphalt	1.0	0.03	0.18	N/A	3934	23605	N/A
Pervious	14,571	C	Flat	Landscape	0.1	0.03	0.18	N/A	44	262	N/A
Total BMP Area	145709										

Minimum BMP Size	3977.8557	23867	
Proposed BMP Size*	6,000	N/A	N/A
		18.00	in
Minimum Cistern Depth		N/A	in
Maximum Cistern Depth		N/A	in
Selected Cistern Depth		48.00	in
Selected Cistern Volume		24000	cubic feet

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	D3	BMP Type:	Bioretention Plus Cistern

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious	Lake Wohlford	C	Scrub	Flat	0.245	3.011	0.221	**3.54**
Pervious	Lake Wohlford	C	Scrub	Flat	0.245	0.335	0.025	**0.39**

0.246	**3.93**	**2.24**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.210	**3.14**	**2.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	63.5

BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	D4	BMP Type:	Bioretention Plus Cistern
BMP Native Soil Type:	C	BMP Infiltration Rate (in/hr):	0.08

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Bioretention Surface Area	Cistern Volume	N/A	Bioretention Surface Area (sf)	Cistern Volume (cf)	N/A
Impervious	79,603	C	Flat	Asphalt	1.0	0.03	0.18	N/A	2388	14329	N/A
Pervious	8,845	C	Flat	Landscape	0.1	0.03	0.18	N/A	27	159	N/A
Total BMP Area	88448							Minimum BMP Size	2414.6304	14488	
								Proposed BMP Size*	3,660	N/A	N/A
										18.00	in
								Minimum Cistern Depth		N/A	in
								Maximum Cistern Depth		N/A	in
								Selected Cistern Depth		48.00	in
								Selected Cistern Volume		14640	cubic feet

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	D4	BMP Type:	Bioretention Plus Cistern

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious	Lake Wohlford	C	Scrub	Flat	0.245	1.827	0.134	**2.15**
Pervious	Lake Wohlford	C	Scrub	Flat	0.245	0.203	0.015	**0.24**

0.149	**2.39**	**1.74**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.118	**1.77**	**1.50**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	68.8

BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	D5	BMP Type:	Bioretention Plus Cistern
BMP Native Soil Type:	C	BMP Infiltration Rate (in/hr):	0.08

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Bioretention Surface Area	Cistern Volume	N/A	Bioretention Surface Area (sf)	Cistern Volume (cf)	N/A
Impervious		C	Flat	Asphalt	1.0	0.03	0.18	N/A			N/A
Pervious		C	Flat	Landscape	0.1	0.03	0.18	N/A			N/A
Total BMP Area								Minimum BMP Size			
								Proposed BMP Size*		N/A	N/A
										18.00	in
								Minimum Cistern Depth		N/A	in
								Maximum Cistern Depth		N/A	in
								Selected Cistern Depth		48.00	in
								Selected Cistern Volume			cubic feet

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	D5	BMP Type:	Bioretention Plus Cistern

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious		C	Scrub	Flat				
Pervious		C	Scrub	Flat				

Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**
0.053	**0.79**	**1.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	

BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	D6	BMP Type:	Bioretention Plus Cistern
BMP Native Soil Type:	C	BMP Infiltration Rate (in/hr):	0.08

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Bioretention Surface Area	Cistern Volume	N/A	Bioretention Surface Area (sf)	Cistern Volume (cf)	N/A
Impervious	31,600	C	Flat	Asphalt	1.0	0.03	0.18	N/A	948	5688	N/A
Pervious	3,511	C	Flat	Landscape	0.1	0.03	0.18	N/A	11	63	N/A
Total BMP Area	35111										

Minimum BMP Size	958.5303	5751	
Proposed BMP Size*	900	N/A	N/A
		18.00	in
Minimum Cistern Depth		N/A	in
Maximum Cistern Depth		N/A	in
Selected Cistern Depth		78.00	in
Selected Cistern Volume		5850	cubic feet

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

BMP's must be adapted and applied to the conditions specific to the development project such as unstable slopes or the lack of available head.
Designated Staff have final review and approval authority over the project design.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	D6	BMP Type:	Bioretention Plus Cistern

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious	Lake Wohlford	C	Scrub	Flat	0.245	0.725	0.053	**0.67**
Pervious	Lake Wohlford	C	Scrub	Flat	0.245	0.081	0.006	**0.07**

0.059	**0.74**	**0.97**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.043	**0.50**	**0.80**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	75.8

BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	D7	BMP Type:	Bioretention Plus Cistern
BMP Native Soil Type:	C	BMP Infiltration Rate (in/hr):	0.08

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Bioretention Surface Area	Cistern Volume	N/A	Bioretention Surface Area (sf)	Cistern Volume (cf)	N/A
Impervious	31,305	C	Flat	Asphalt	1.0	0.03	0.18	N/A	939	5635	N/A
Pervious	3,478	C	Flat	Landscape	0.1	0.03	0.18	N/A	10	63	N/A
Total BMP Area	34783										

Minimum BMP Size	949.584	5698	
Proposed BMP Size*	1,440	N/A	N/A
		18.00	in
Minimum Cistern Depth		N/A	in
Maximum Cistern Depth		N/A	in
Selected Cistern Depth		10.00	in
Selected Cistern Volume		5760	cubic feet

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	D7	BMP Type:	Bioretention Plus Cistern

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious	Lake Wohlford	C	Scrub	Flat	0.245	0.719	0.053	**1.85**
Pervious	Lake Wohlford	C	Scrub	Flat	0.245	0.080	0.006	**0.21**

0.059	**2.06**	**1.62**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.054	**1.77**	**1.50**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	59.3

BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	D9	BMP Type:	Bioretention
BMP Native Soil Type:	A	BMP Infiltration Rate (in/hr):	9.3

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
Impervious	101,168	C	Flat	Asphalt	1.0	0.075	0.0625	0.045	7588	6323	4553
Pervious	11,241	C	Flat	Landscape	0.1	0.075	0.0625	0.045	84	70	51
Impervious	30945	A	Flat	Asphalt	1.0	0.05	0.0417	N/A	1547	1290	N/A
Pervious	3438	A	Flat	Landscape	0.1	0.05	0.0417	N/A	17	14	N/A
Total BMP Area	146792							Minimum BMP Size	9236.3475	7698	4603
								Proposed BMP Size*	10,200	8500	6120
								Soil Matrix Depth		18.00	in
								Minimum Ponding Depth		9.06	in
								Maximum Ponding Depth		81.73	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	D9	BMP Type:	Bioretention

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious	Lake Wohlford	C	Scrub	Flat	0.245	2.322	0.171	**4.17**
Pervious	Lake Wohlford	C	Scrub	Flat	0.245	0.258	0.019	**0.46**
Impervious	Lake Wohlford	A	Scrub	Flat	0.136	0.710	0.029	**0.71**
Pervious	Lake Wohlford	A	Scrub	Flat	0.136	0.079	0.003	**0.08**

0.222	**5.42**	**2.63**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.201	**4.91**	**2.50**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	11.7

BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	D10	BMP Type:	Bioretention
BMP Native Soil Type:	A	BMP Infiltration Rate (in/hr):	9.3

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
Impervious	8,444	A	Flat	Asphalt	1.0	0.05	0.0417	N/A	422	352	N/A
Pervious	938	A	Flat	Landscape	0.1	0.05	0.0417	N/A	5	4	N/A
Total BMP Area	9382										

Minimum BMP Size	426.881	356	
Proposed BMP Size*	430	358	258
Soil Matrix Depth		18.00	in
Minimum Ponding Depth		9.94	in
Maximum Ponding Depth		77.55	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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Designated Staff have final review and approval authority over the project design.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	D10	BMP Type:	Bioretention

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious	Lake Wohlford	A	Scrub	Flat	0.136	0.194	0.008	**0.19**
Pervious	Lake Wohlford	A	Scrub	Flat	0.136	0.022	0.001	**0.02**

0.009	**0.21**	**0.52**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.008	**0.20**	**0.50**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	12.4

BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	D11	BMP Type:	Bioretention
BMP Native Soil Type:	A	BMP Infiltration Rate (in/hr):	9.3

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
Impervious	8,135	A	Flat	Asphalt	1.0	0.05	0.0417	N/A	407	339	N/A
Pervious	904	A	Flat	Landscape	0.1	0.05	0.0417	N/A	5	4	N/A
Total BMP Area	9039										

Minimum BMP Size	411.2745	343	
Proposed BMP Size*	420	350	252
Soil Matrix Depth		18.00	in
Minimum Ponding Depth		9.80	in
Maximum Ponding Depth		79.40	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	D11	BMP Type:	Bioretention

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious	Lake Wohlford	A	Scrub	Flat	0.136	0.187	0.008	**0.19**
Pervious	Lake Wohlford	A	Scrub	Flat	0.136	0.021	0.001	**0.02**

0.008	**0.21**	**0.51**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.008	**0.20**	**0.50**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	12.1

BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	D12	BMP Type:	Bioretention
BMP Native Soil Type:	A	BMP Infiltration Rate (in/hr):	9.3

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
Impervious	14,231	A	Flat	Asphalt	1.0	0.05	0.0417	N/A	712	593	N/A
Pervious	1,581	A	Flat	Landscape	0.1	0.05	0.0417	N/A	8	7	N/A
Total BMP Area	15812										

Minimum BMP Size	719.446	600	
Proposed BMP Size*	750	625	450
Soil Matrix Depth		18.00	in
Minimum Ponding Depth		9.60	in
Maximum Ponding Depth		44.46	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	D12	BMP Type:	Bioretention

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious	Lake Wohlford	A	Scrub	Flat	0.136	0.327	0.013	**0.33**
Pervious	Lake Wohlford	A	Scrub	Flat	0.136	0.036	0.001	**0.04**

0.015	**0.36**	**0.68**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.008	**0.20**	**0.50**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	21.6

BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	D13	BMP Type:	Bioretention
BMP Native Soil Type:	A	BMP Infiltration Rate (in/hr):	9.3

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
Impervious	24,851	A	Flat	Asphalt	1.0	0.05	0.0417	N/A	1243	1036	N/A
Pervious	2,761	A	Flat	Landscape	0.1	0.05	0.0417	N/A	14	12	N/A
Total BMP Area	27612										

Minimum BMP Size	1256.346	1048	
Proposed BMP Size*	1,260	1050	756
Soil Matrix Depth		18.00	in
Minimum Ponding Depth		9.98	in
Maximum Ponding Depth		67.75	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	D13	BMP Type:	Bioretention

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious	Lake Wohlford	A	Scrub	Flat	0.136	0.570	0.023	**0.57**
Pervious	Lake Wohlford	A	Scrub	Flat	0.136	0.063	0.003	**0.06**

0.026	**0.63**	**0.90**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.021	**0.50**	**0.80**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	14.2

BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	D14	BMP Type:	Bioretention
BMP Native Soil Type:	A	BMP Infiltration Rate (in/hr):	9.3

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
Impervious	26,451	A	Flat	Asphalt	1.0	0.05	0.0417	N/A	1323	1103	N/A
Pervious	2,939	A	Flat	Landscape	0.1	0.05	0.0417	N/A	15	12	N/A
Total BMP Area	29390										

Minimum BMP Size	1337.245	1115	
Proposed BMP Size*	1,120	1680	672
Soil Matrix Depth		18.00	in
Minimum Ponding Depth		11.95	in
Maximum Ponding Depth		76.22	in
Selected Ponding Depth		18.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	D14	BMP Type:	Bioretention

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious	Lake Wohlford	A	Scrub	Flat	0.136	0.607	0.025	**0.60**
Pervious	Lake Wohlford	A	Scrub	Flat	0.136	0.067	0.003	**0.07**

0.028	**0.67**	**0.93**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.021	**0.50**	**0.80**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	22.7

BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	D15	BMP Type:	Bioretention
BMP Native Soil Type:	A	BMP Infiltration Rate (in/hr):	9.3

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
Impervious	8,874	A	Flat	Asphalt	1.0	0.05	0.0417	N/A	444	370	N/A
Pervious	986	A	Flat	Lanscape	0.1	0.05	0.0417	N/A	5	4	N/A
Total BMP Area	9860										

Minimum BMP Size	448.63	374	
Proposed BMP Size*	460	690	276
Soil Matrix Depth		18.00	in
Minimum Ponding Depth		9.76	in
Maximum Ponding Depth		72.49	in
Selected Ponding Depth		18.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	D15	BMP Type:	Bioretention

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious	Lake Wohlford	A	Scrub	Flat	0.136	0.204	0.008	**0.20**
Pervious	Lake Wohlford	A	Scrub	Flat	0.136	0.023	0.001	**0.02**

0.009	**0.23**	**0.54**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.008	**0.20**	**0.50**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	23.8

BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	D16	BMP Type:	Bioretention
BMP Native Soil Type:	A	BMP Infiltration Rate (in/hr):	9.3

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
Impervious	8,099	A	Flat	Asphalt	1.0	0.05	0.0417	N/A	405	338	N/A
Pervious	900	A	Flat	Landscape	0.1	0.05	0.0417	N/A	4	4	N/A
Total BMP Area	8999										

Minimum BMP Size	409.4545	341	
Proposed BMP Size*	420	630	252
Soil Matrix Depth		18.00	in
Minimum Ponding Depth		9.76	in
Maximum Ponding Depth		79.40	in
Selected Ponding Depth		18.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	D16	BMP Type:	Bioretention

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious	Lake Wohlford	A	Scrub	Flat	0.136	0.186	0.008	**0.19**
Pervious	Lake Wohlford	A	Scrub	Flat	0.136	0.021	0.001	**0.02**

0.008	**0.21**	**0.51**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.008	**0.20**	**0.50**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	21.8

BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	D17	BMP Type:	Bioretention
BMP Native Soil Type:	A	BMP Infiltration Rate (in/hr):	9.3

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
Impervious	10,538	A	Flat	Asphalt	1.0	0.05	0.0417	N/A	527	439	N/A
Pervious	1,171	A	Flat	Landscape	0.1	0.05	0.0417	N/A	6	5	N/A
Total BMP Area	11709										

Minimum BMP Size	532.7595	444	
Proposed BMP Size*	540	810	324
Soil Matrix Depth		18.00	in
Minimum Ponding Depth		9.87	in
Maximum Ponding Depth		61.75	in
Selected Ponding Depth		18.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	D17	BMP Type:	Bioretention

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious	Lake Wohlford	A	Scrub	Flat	0.136	0.242	0.010	**0.24**
Pervious	Lake Wohlford	A	Scrub	Flat	0.136	0.027	0.001	**0.03**

0.011	**0.27**	**0.58**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.008	**0.20**	**0.50**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	28.0

BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	D18	BMP Type:	Bioretention
BMP Native Soil Type:	A	BMP Infiltration Rate (in/hr):	9.3

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
Impervious	14,192	A	Flat	Asphalt	1.0	0.05	0.0417	N/A	710	592	N/A
Pervious	1,577	A	Flat	Landscape	0.1	0.05	0.0417	N/A	8	7	N/A
Total BMP Area	15769										

Minimum BMP Size	717.4895	598	
Proposed BMP Size*	730	1095	438
Soil Matrix Depth		18.00	in
Minimum Ponding Depth		9.84	in
Maximum Ponding Depth		45.68	in
Selected Ponding Depth		18.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	D18	BMP Type:	Bioretention

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious	Lake Wohlford	A	Scrub	Flat	0.136	0.326	0.013	**0.32**
Pervious	Lake Wohlford	A	Scrub	Flat	0.136	0.036	0.001	**0.04**

0.015	**0.36**	**0.68**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.008	**0.20**	**0.50**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	37.8

BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	D19	BMP Type:	Bioretention
BMP Native Soil Type:	A	BMP Infiltration Rate (in/hr):	9.3

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
Impervious	25,276	A	Flat	Asphalt	1.0	0.05	0.0417	N/A	1264	1054	N/A
Pervious	2,808	A	Flat	Landscape	0.1	0.05	0.0417	N/A	14	12	N/A
Total BMP Area	28084										

Minimum BMP Size	1277.822	1066	
Proposed BMP Size*	1,340	2010	804
Soil Matrix Depth		18.00	in
Minimum Ponding Depth		9.54	in
Maximum Ponding Depth		63.71	in
Selected Ponding Depth		18.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	D19	BMP Type:	Bioretention

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious	Lake Wohlford	A	Scrub	Flat	0.136	0.580	0.024	**0.58**
Pervious	Lake Wohlford	B	Scrub	Flat	0.208	0.064	0.004	**0.10**

0.028	**0.68**	**0.93**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.021	**0.50**	**0.80**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	27.1

BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	D20A	BMP Type:	Bioretention
BMP Native Soil Type:	A	BMP Infiltration Rate (in/hr):	9.3

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
Impervious	57,543	A	Flat	Asphalt	1.0	0.05	0.0417	N/A	2877	2400	N/A
Pervious	6,394	A	Flat	Landscape	0.1	0.05	0.0417	N/A	32	27	N/A
Total BMP Area	63937							Minimum BMP Size	2909.12	2426	
								Proposed BMP Size*	3,030	2525	1818
								Soil Matrix Depth		18.00	in
								Minimum Ponding Depth		9.61	in
								Maximum Ponding Depth		74.40	in
								Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	D20A	BMP Type:	Bioretention

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious	Lake Wohlford	A	Scrub	Flat	0.136	1.321	0.054	**1.32**
Pervious	Lake Wohlford	A	Scrub	Flat	0.136	0.147	0.006	**0.15**

0.060	**1.46**	**1.36**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.054	**1.33**	**1.30**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	12.9

BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	D20B	BMP Type:	Bioretention
BMP Native Soil Type:	A	BMP Infiltration Rate (in/hr):	9.3

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
Impervious	38,293	A	Flat	Asphalt	1.0	0.05	0.0417	N/A	1915	1597	N/A
Pervious	4,255	A	Flat	Landscape	0.1	0.05	0.0417	N/A	21	18	N/A
Total BMP Area	42548										

Minimum BMP Size	1935.925	1615	
Proposed BMP Size*	1,960	1633	1176
Soil Matrix Depth		18.00	in
Minimum Ponding Depth		9.89	in
Maximum Ponding Depth		82.35	in
Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	D20B	BMP Type:	Bioretention

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious	Lake Wohlford	A	Scrub	Flat	0.136	0.879	0.036	**0.88**
Pervious	Lake Wohlford	A	Scrub	Flat	0.136	0.098	0.004	**0.10**

0.040	**0.97**	**1.11**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.039	**0.95**	**1.10**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	11.7

BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	D21	BMP Type:	Bioretention
BMP Native Soil Type:	A	BMP Infiltration Rate (in/hr):	9.3

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
Impervious	21,614	A	Flat	Asphalt	1.0	0.05	0.0417	N/A	1081	901	N/A
Pervious	2,402	A	Flat	Landscape	0.1	0.05	0.0417	N/A	12	10	N/A
Total BMP Area	24016							Minimum BMP Size	1092.728	911	
								Proposed BMP Size*	1,100	1650	660
								Soil Matrix Depth		18.00	in
								Minimum Ponding Depth		9.94	in
								Maximum Ponding Depth		77.61	in
								Selected Ponding Depth		18.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	D21	BMP Type:	Bioretention

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious	Lake Wohlford	A	Scrub	Flat	0.136	0.496	0.020	**0.49**
Pervious	Lake Wohlford	A	Scrub	Flat	0.136	0.055	0.002	**0.05**

0.022	**0.55**	**0.84**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.021	**0.50**	**0.80**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	22.3

BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	D22	BMP Type:	Bioretention
BMP Native Soil Type:	A	BMP Infiltration Rate (in/hr):	9.3

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
Impervious	29,654	A	Flat	Asphalt	1.0	0.05	0.0417	N/A	1483	1237	N/A
Pervious	3,295	A	Flat	Landscape	0.1	0.05	0.0417	N/A	16	14	N/A
Total BMP Area	32949										

Minimum BMP Size	1499.1795	1250	
Proposed BMP Size*	1,510	1258	906
Soil Matrix Depth		18.00	in
Minimum Ponding Depth		9.94	in
Maximum Ponding Depth		56.54	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	D22	BMP Type:	Bioretention

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious	Lake Wohlford	A	Scrub	Flat	0.136	0.681	0.028	**0.68**
Pervious	Lake Wohlford	A	Scrub	Flat	0.136	0.076	0.003	**0.08**

0.031	**0.75**	**0.98**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.021	**0.50**	**0.80**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	17.0

BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	D23	BMP Type:	Bioretention
BMP Native Soil Type:	A	BMP Infiltration Rate (in/hr):	9.3

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
Impervious	16,067	A	Flat	Asphalt	1.0	0.05	0.0417	N/A	803	670	N/A
Pervious	1,785	A	Flat	Landscape	0.1	0.05	0.0417	N/A	9	7	N/A
Total BMP Area	17852										

Minimum BMP Size	812.266	677	
Proposed BMP Size*	820	683	492
Soil Matrix Depth		18.00	in
Minimum Ponding Depth		9.91	in
Maximum Ponding Depth		58.56	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	D23	BMP Type:	Bioretention

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious	Lake Wohlford	A	Scrub	Flat	0.136	0.369	0.015	**0.37**
Pervious	Lake Wohlford	A	Scrub	Flat	0.136	0.041	0.002	**0.04**

0.017	**0.41**	**0.72**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.012	**0.28**	**0.60**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	16.4

BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	D24	BMP Type:	Bioretention Plus Cistern
BMP Native Soil Type:	C	BMP Infiltration Rate (in/hr):	0.08

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Bioretention Surface Area	Cistern Volume	N/A	Bioretention Surface Area (sf)	Cistern Volume (cf)	N/A
Impervious	59,901	C	Flat	Asphalt	1.0	0.03	0.18	N/A	1797	10782	N/A
Pervious	6,656	C	Flat	Landscape	0.1	0.03	0.18	N/A	20	120	N/A
Total BMP Area	66557										

Minimum BMP Size	1817.0061	10902	
Proposed BMP Size*	3,600	N/A	N/A
		18.00	in
Minimum Cistern Depth		N/A	in
Maximum Cistern Depth		N/A	in
Selected Cistern Depth		48.00	in
Selected Cistern Volume		14400	cubic feet

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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Designated Staff have final review and approval authority over the project design.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	D24	BMP Type:	Bioretention Plus Cistern

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious	Lake Wohlford	C	Scrub	Flat	0.245	1.375	0.101	**1.62**
Pervious	Lake Wohlford	C	Scrub	Flat	0.245	0.153	0.011	**0.18**

0.112	**1.80**	**1.51**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.118	**1.77**	**1.50**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	67.7

BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	D25W	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	C	BMP Infiltration Rate (in/hr):	0.08

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
Impervious	147,954	C	Flat	Asphalt	1.0	0.085	0.0708	0.051	12576	10475	7546
Pervious	16,439	C	Flat	Landscape	0.1	0.085	0.0708	0.051	140	116	84
Total BMP Area	164393										

Minimum BMP Size	12715.79855	10592	7629
Proposed BMP Size*	12,800	10667	7680
Soil Matrix Depth		18.00	in
Minimum Ponding Depth		9.93	in
Maximum Ponding Depth		65.13	in
Selected Ponding Depth		10.00	in

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BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	D25W	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious	Lake Wohlford	C	Scrub	Flat	0.245	3.397	0.250	**6.10**
Pervious	Lake Wohlford	C	Scrub	Flat	0.245	0.377	0.028	**0.68**

0.277	**6.77**	**2.94**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.201	**4.91**	**2.50**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	14.7

BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	D25E	BMP Type:	Flow-Through Planter
BMP Native Soil Type:	C	BMP Infiltration Rate (in/hr):	0.08

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
Impervious	111,928	C	Flat	Asphalt	1.0	0.085	0.0708	0.051	9514	7925	5708
Pervious	12,436	C	Flat	Landscape	0.1	0.085	0.0708	0.051	106	88	63
Total BMP Area	124364										

Minimum BMP Size	9619.586	8013	5772
Proposed BMP Size*	10,700	8917	6420
Soil Matrix Depth		18.00	in
Minimum Ponding Depth		8.99	in
Maximum Ponding Depth		77.91	in
Selected Ponding Depth		10.00	in

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Deer Springs Road	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	D25E	BMP Type:	Flow-Through Planter

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious	Lake Wohlford	C	Scrub	Flat	0.245	2.570	0.189	**4.61**
Pervious	Lake Wohlford	C	Scrub	Flat	0.245	0.285	0.021	**0.51**

0.210	**5.12**	**2.55**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.201	**4.91**	**2.50**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	12.3

SARVER LANE (OFFSITE)
BMP SIZING CALCULATIONS
Newland Sierra Community

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BMP Sizing Spreadsheet V1.04			
Project Name:	Sarver Lane	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	SL1	BMP Type:	Bioretention Plus Cistern
BMP Native Soil Type:	C	BMP Infiltration Rate (in/hr):	0.08

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Bioretention Surface Area	Cistern Volume	N/A	Bioretention Surface Area (sf)	Cistern Volume (cf)	N/A
Impervious - Road	83,050	C	Moderate	AC	1.0	0.03	0.18	N/A	2492	14949	N/A
Pervious -Road	9,228	C	Moderate	Landscape	0.1	0.03	0.18	N/A	28	166	N/A
Impervious - Park	60325	C	Flat	Concrete	1.0	0.03	0.18	N/A	1810	10859	N/A
Pervious - Park	60325	C	Flat	Landscape	0.1	0.03	0.18	N/A	181	1086	N/A
Total BMP Area	212928							Minimum BMP Size	4509.909	27059	
								Proposed BMP Size*	7,000	N/A	N/A
											in
								Minimum Cistern Depth		N/A	in
								Maximum Cistern Depth		N/A	in
								Selected Cistern Depth		48.00	in
								Selected Cistern Volume		28000	cubic feet

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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Designated Staff have final review and approval authority over the project design.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Sarver Lane	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	SL1	BMP Type:	Bioretention Plus Cistern

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious - Road	Lake Wohlford	C	Scrub	Moderate	0.253	1.907	0.145	**2.31**
Pervious -Road	Lake Wohlford	C	Scrub	Moderate	0.253	0.212	0.016	**0.26**
Impervious - Park	Lake Wohlford	C	Scrub	Moderate	0.253	1.385	0.105	**1.68**
Pervious - Park	Lake Wohlford	C	Scrub	Moderate	0.253	1.385	0.105	**1.68**

0.371	**5.93**	**2.75**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.210	**3.14**	**2.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	74.0

BMP Sizing Spreadsheet V1.04			
Project Name:	Sarver Lane	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	SL2	BMP Type:	Bioretention Plus Cistern
BMP Native Soil Type:	C	BMP Infiltration Rate (in/hr):	0.08

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Bioretention Surface Area	Cistern Volume	N/A	Bioretention Surface Area (sf)	Cistern Volume (cf)	N/A
Impervious	58,266	C	Moderate	AC	1.0	0.03	0.18	N/A	1748	10488	N/A
Pervious	6,474	C	Moderate	Landscape	0.1	0.03	0.18	N/A	19	117	N/A
Total BMP Area	64740							Minimum BMP Size	1767.402	10604	
								Proposed BMP Size*	2,900	N/A	N/A
											in
								Minimum Cistern Depth		N/A	in
								Maximum Cistern Depth		N/A	in
								Selected Cistern Depth		48.00	in
								Selected Cistern Volume		11600	cubic feet

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Sarver Lane	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	SL2	BMP Type:	Bioretention Plus Cistern

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious	Lake Wohlford	C	Scrub	Moderate	0.253	1.338	0.102	**1.62**
Pervious	Lake Wohlford	C	Scrub	Moderate	0.253	0.149	0.011	**0.18**

0.113	**1.80**	**1.52**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.190	**2.84**	**1.90**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	34.0

BMP Sizing Spreadsheet V1.04			
Project Name:	Sarver Lane	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	SL5	BMP Type:	Bioretention Plus Cistern
BMP Native Soil Type:	C	BMP Infiltration Rate (in/hr):	0.08

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Bioretention Surface Area	Cistern Volume	N/A	Bioretention Surface Area (sf)	Cistern Volume (cf)	N/A
Impervious	36,675	C	Moderate	AC	1.0	0.03	0.18	N/A	1100	6602	N/A
Pervious	4,075	C	Moderate	Landscape	0.1	0.03	0.18	N/A	12	73	N/A
Total BMP Area	40750							Minimum BMP Size	1112.475	6675	
								Proposed BMP Size*	1,700	N/A	N/A
											in
								Minimum Cistern Depth		N/A	in
								Maximum Cistern Depth		N/A	in
								Selected Cistern Depth		48.00	in
								Selected Cistern Volume		6800	cubic feet

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Sarver Lane	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	SL5	BMP Type:	Bioretention Plus Cistern

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious	Lake Wohlford	C	Scrub	Moderate	0.253	0.842	0.064	**1.02**
Pervious	Lake Wohlford	C	Scrub	Moderate	0.253	0.094	0.007	**0.11**

0.071	**1.14**	**1.20**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.053	**0.79**	**1.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	71.9

BMP Sizing Spreadsheet V1.04			
Project Name:	Sarver Lane	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	SL3	BMP Type:	Bioretention Plus Cistern
BMP Native Soil Type:	C	BMP Infiltration Rate (in/hr):	0.08

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Bioretention Surface Area	Cistern Volume	N/A	Bioretention Surface Area (sf)	Cistern Volume (cf)	N/A
Impervious - Road	4,352	C	Moderate	AC	1.0	0.03	0.18	N/A	131	783	N/A
Pervious - Road	484	C	Moderate	Landscape	0.1	0.03	0.18	N/A	1	9	N/A
Impervious - Park	24810	C	Flat	Concrete	1.0	0.03	0.18	N/A	744	4466	N/A
Pervious - Park	24810	C	Flat	Landscape	0.1	0.03	0.18	N/A	74	447	N/A
Total BMP Area	54456							Minimum BMP Size	950.742	5704	
								Proposed BMP Size*	1,450	N/A	N/A
											in
								Minimum Cistern Depth		N/A	in
								Maximum Cistern Depth		N/A	in
								Selected Cistern Depth		48.00	in
								Selected Cistern Volume		5800	cubic feet

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Sarver Lane	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	SL3	BMP Type:	Bioretention Plus Cistern

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious - Road	Lake Wohlford	C	Scrub	Moderate	0.253	0.100	0.008	**0.12**
Pervious - Road	Lake Wohlford	C	Scrub	Moderate	0.253	0.011	0.001	**0.01**
Impervious - Park	Lake Wohlford	C	Scrub	Moderate	0.253	0.570	0.043	**0.69**
Pervious - Park	Lake Wohlford	C	Scrub	Moderate	0.253	0.570	0.043	**0.69**

0.095	**1.52**	**1.39**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.053	**0.79**	**1.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	61.3

BMP Sizing Spreadsheet V1.04			
Project Name:	Sarver Lane	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	SL4	BMP Type:	Bioretention Plus Cistern
BMP Native Soil Type:	C	BMP Infiltration Rate (in/hr):	0.08

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Bioretention Surface Area	Cistern Volume	N/A	Bioretention Surface Area (sf)	Cistern Volume (cf)	N/A
Impervious	68,942	C	Moderate	AC	1.0	0.03	0.18	N/A	2068	12410	N/A
Pervious	68,942	C	Moderate	Landscape	0.1	0.03	0.18	N/A	207	1241	N/A
Total BMP Area	137884							Minimum BMP Size	2275.086	13651	
								Proposed BMP Size*	3,500	N/A	N/A
											in
								Minimum Cistern Depth		N/A	in
								Maximum Cistern Depth		N/A	in
								Selected Cistern Depth		48.00	in
								Selected Cistern Volume		14000	cubic feet

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Sarver Lane	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	SL4	BMP Type:	Bioretention Plus Cistern

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious	Lake Wohlford	C	Scrub	Moderate	0.253	1.583	0.120	**1.92**
Pervious	Lake Wohlford	C	Scrub	Moderate	0.253	1.583	0.120	**1.92**

0.240	**3.84**	**2.21**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.210	**3.14**	**2.00**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	37.0

BMP Sizing Spreadsheet V1.04			
Project Name:	Sarver Lane	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	SL8	BMP Type:	Bioretention Plus Cistern
BMP Native Soil Type:	C	BMP Infiltration Rate (in/hr):	0.08

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Bioretention Surface Area	Cistern Volume	N/A	Bioretention Surface Area (sf)	Cistern Volume (cf)	N/A
Impervious	8,334	C	Moderate	AC	1.0	0.03	0.18	N/A	250	1500	N/A
Total BMP Area	8334										

Minimum BMP Size	250.02	1500	
Proposed BMP Size*	275	N/A	N/A
			in
Minimum Cistern Depth		N/A	in
Maximum Cistern Depth		N/A	in
Selected Cistern Depth		48.00	in
Selected Cistern Volume		1100	cubic feet

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V1.04			
Project Name:	Sarver Lane	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	SL8	BMP Type:	Bioretention Plus Cistern

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious	Lake Wohlford	C	Scrub	Moderate	0.253	0.191	0.015	**0.23**
		C	Scrub	Moderate				

0.015	**0.23**	**0.54**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.019	**0.28**	**0.60**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	32.3

BMP Sizing Spreadsheet V1.04			
Project Name:	Sarver Lane	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name:	SL9	BMP Type:	Bioretention Plus Cistern
BMP Native Soil Type:	C	BMP Infiltration Rate (in/hr):	0.08

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Bioretention Surface Area	Cistern Volume	N/A	Bioretention Surface Area (sf)	Cistern Volume (cf)	N/A
Impervious	8,802	C	Moderate	AC	1.0	0.03	0.18	N/A	264	1584	N/A
Total BMP Area	8802										

Minimum BMP Size	264.06	1584	
Proposed BMP Size*	275	N/A	N/A
			in
Minimum Cistern Depth		N/A	in
Maximum Cistern Depth		N/A	in
Selected Cistern Depth		48.00	in
Selected Cistern Volume		1100	cubic feet

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

BMP's must be adapted and applied to the conditions specific to the development project such as unstable slopes or the lack of available head.
Designated Staff have final review and approval authority over the project design.

This Sizing Calculator has been developed in compliance with the Countywide Model SUSMP. For questions or concerns please contact the jurisdiction in which your project is located.

BMP Sizing Spreadsheet V1.04			
Project Name:	Sarver Lane	Hydrologic Unit:	
Project Applicant:	Fuscoe Engineering	Rain Gauge:	Lake Wohlford
Jurisdiction:	County of San Diego	Total Project Area:	
Parcel (APN):		Low Flow Threshold:	0.3Q2
BMP Name	SL9	BMP Type:	Bioretention Plus Cistern

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
Impervious	Lake Wohlford	C	Scrub	Moderate	0.253	0.202	0.015	**0.25**
		C	Scrub	Moderate				

0.015	**0.25**	**0.56**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.019	**0.28**	**0.60**
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	32.3

TECHNICAL MEMORANDUM:

SWMM Modeling for Hydromodification Compliance of:

Newland Sierra: POC-25A

Prepared For:

Fuscoe Engineering

August 19, 2016. Revised: November 3, 2016.

Prepared by:

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

REC Consultants
2442 Second Avenue
San Diego, CA 92101
Telephone: (619) 232-9200

TECHNICAL MEMORANDUM

TO: Fuscoe Engineering

FROM: Luis Parra, PhD, PE, CPSWQ, ToR, D.WRE.

DATE: August 19, 2016. Revised: November 3, 2016.

RE: Summary of SWMM Modeling for Hydromodification Compliance at POC-25A of Newland Sierra, County of San Diego, CA.

INTRODUCTION

This memorandum summarizes the approach used to model the portion of the proposed Newland Sierra residential development site in the County of San Diego using the Environmental Protection Agency (EPA) Storm Water Management Model 5.0 (SWMM). SWMM models were prepared for the pre and post-developed conditions at the site in order to determine if the proposed LID biofiltration facilities have sufficient volume to meet Order R9-2013-001 requirements of the California Regional Water Quality Control Board San Diego Region (SDRWQCB), as explained in the Final Hydromodification Management Plan (HMP), dated March 2011, prepared for the County of San Diego by Brown and Caldwell. A continuous simulation model was prepared only for POC-25A as the results of the model will also be used to demonstrate No Net Impact for Critical Coarse Sediment in the unnamed creek were POC-25A is located (see Chapter 4 of the Technical Memorandum: Analysis of PCCSYAs for Newland Sierra prepared by REC Consultants, August 19, 2016).

SWMM MODEL DEVELOPMENT

The Newland Sierra project proposes the development of residential houses with associated access roads. For the portion of the project draining to POC-25A, two (2) SWMM models were prepared for this study: the first for the pre-developed and the second for the post-developed conditions. The portion of the project site studied drains to one (1) Point of Compliance (POC) called POC-25A located to the south of the project site.

The SWMM model was used since we have found it to be more comparable to San Diego area watersheds than the alternative San Diego Hydrology Model (SDHM) and also because it is a non-proprietary model approved by the HMP document. For both SWMM models, flow duration curves were prepared to determine if the proposed HMP facilities are sufficient to meet the current HMP requirements.

The inputs required to develop SWMM models include rainfall, watershed characteristics, and BMP configurations. The Escondido and Lake Wohlford rain gages are the closest to the site; however, the Lake Wohlford rain gage is at an elevation closest to the average elevation of the Newland Sierra site. Lake Wohlford elevation is 1490 feet and Escondido has an elevation of 645 feet, while the Newland Sierra site has elevation ranging from 900 feet up to 1400 feet, making Lake Wohlford the appropriate choice.

Additionally, the Escondido gage is not recommended for continuous simulation because (a) 22% of the intensities higher than 0.4 in/hr have data problems, and (b) the highest intensities measured in this station do not belong to the location of the gage (were copied from Wolford, at an elevation 850 ft higher than Escondido). Therefore, the rain gauge used was the Lake Wohlford one.

In regards to evapotranspiration, per the California Irrigation Management Information System "Reference Evaporation Zones" (CIMIS ETo Zone Map), the project site is located within the Zone 6 Evapotranspiration Area. Thus evapotranspiration values for the site were modeled using Zone 6 average monthly values from Table G.1-1 from the City of San Diego 2016 BMP Design Manual. The site was modeled with Types B, C and D hydrologic soil as those are the existing soils determined from the NRCS Soil Survey. Soils have been assumed to be uncompact in the existing condition to represent the natural condition of the site, and fully compacted in the post developed conditions. Other SWMM inputs for the subareas are discussed in the appendices to this document, where the selection of the parameters is explained in detail.

HMP MODELING

EXISTING CONDITIONS

In current existing conditions, runoff from the analyzed portion of the project site area discharges to one (1) POC located to the southwest of the project site. The area tributary to POC-25A consists of natural vegetation with rock outcropping. The runoff from the site sheet flows its way to POC-25A at the south west location. See Table 1 for a summary of the DMA areas.

TABLE 1 – SUMMARY OF EXISTING CONDITIONS

DMA	Tributary Area, A (Ac)	Impervious %, Ip(1)	POC
DMA-B	21.88	0%	25A
DMA-C	16.07	0%	25A
DMA-D	353.41	0%	25A
TOTAL	**391.36**	--	n/a

DEVELOPED CONDITIONS

Runoff from the developed project site DMAs area drained to onsite receiving biofiltration LID BMPs. Once flows are routed via the proposed LID BMPs they are conveyed to POC-25A. Additionally, there are two (2) offsite areas that will sheet flow and drain directly to POC-25A where the flows will convey with those coming from the BMPs. Table 2 shows all the DMAs and the LID to which they drain to.

It is assumed all storm water quality requirements for the project will be met by the LID BMPs. However, detailed water quality requirements are not discussed within this technical memo. For further information in regards to storm water quality requirements for the project and drawdown calculations, please refer to the site specific Storm Water Quality Management Plan (SWQMP).

TABLE 2 – SUMMARY OF DEVELOPED CONDITIONS

DMA	BMP	Tributary Area, A (Ac) (1)	Impervious %, Ip
H1-D-S	H1	1.572	67.08%
H2-D-S	H2	0.444	67.27%
H4-B-S	H4	0.687	67.13%
H5-B-S	H5	0.660	67.37%
H6-B-S	H6	0.635	67.09%
H7-B-S	H7	0.559	67.11%
H8-D-S	H8R1	18.138	65.00%
HR1-D-S	H8R1	4.173	90.00%
H9-D-S	H9R2	2.551	65.00%
HR2-D-S	H9R2	1.737	90.00%
M1-D-S	M1MR1K1	39.309	65.00%
K1-D-S	M1MR1K1	4.398	74.77%
MR1-D-S	M1MR1K1	4.706	90.00%
V1-D-S	V1	3.463	78.03%
V2-B-S	V2	1.872	75.00%
V2-C-S	V2	0.100	75.00%
V2-D-S	V2	1.488	82.43%
V3-B-S	V3	0.172	75.00%
V3-D-S	V3	0.955	78.63%
V4-C-S	V4	0.398	75.00%
V4-D-S	V4	1.268	75.00%
V5-C-S	V5	2.676	78.03%
V6-C-S	V6	1.095	78.04%
V7-B-S	V7	1.977	75.00%
V7-C-S	V7	0.025	75.00%
V7-D-S	V7	0.835	86.40%
V8-C-S	V8	2.489	51.47%
V8-D-S	V8	0.092	50.00%
V9-B-S	V9	0.329	75.00%
V9-C-S	V9	2.387	78.67%
V9-D-S	V9	0.141	75.00%
V10-C-S	V10	0.717	75.00%
V10-D-S	V10	9.240	78.20%
V11-B-S	V11VR2	3.321	75.00%
V11-C-S	V11VR2	6.805	80.48%
V11-D-S	V11VR2	0.128	75.00%
VR2-B-S	V11VR2	1.569	90.00%
VR2-C-S	V11VR2	0.033	90.00%
V12-B-S	V12VR1	0.353	92.89%
VR1-B-S	V12VR1	0.860	90.00%
VR1-C-S	V12VR1	0.141	90.00%
VR1-D-S	V12VR1	2.273	90.00%

DMA	BMP	Tributary Area, A (Ac) (1)	Impervious %, Ip
V13-B-S	V13	1.887	75.00%
V13-D-S	V13	1.669	78.17%
V14-B-S	V14	2.639	80.51%
V14-D-S	V14	2.511	75.00%
V15-B-S	V15	4.271	80.42%
V15-D-S	V15	3.314	75.00%
V16-B-S	V16	2.190	51.79%
V16-D-S	V16	0.553	50.00%
OFF-1-B	None(2)	0.442	0.00%
OFF-1-D	None(2)	245.952	0.00%
TOTAL	--	**392.199**	--

Notes: (1) – Tributary areas include the area of the LID BMPs. (2) – This is an offsite area that drains directly to POC-25A.

Twenty five (25) LID biofiltration basins are located within the project site and are responsible for handling hydromodification requirements for the project. In developed conditions, the basins will have a surface depth and a riser spillway structure per the see dimensions shown in Table 3. Flows will then discharge from the basins via the outlet structure or infiltrate through the base of the facility to the receiving amended soil and low flow orifice. The riser structure will act as a spillway such that peak flows can be safely discharged to the receiving storm drain system.

Beneath the basin invert lays the proposed LID biofiltration portion of the drainage facility. This portion of the basin is comprised of a 3-inch layer of mulch, an 18-inch layer of amended soil (a highly sandy, organic rich composite with an infiltration capacity of at least 5 inches/hr) and a layer of gravel. ~~BMPs H8HR1, H9HR2, M1MR1K1, V1, V2, V10, V11VR2, V13, and V14 will be unlined to allow for infiltration into the underlying soil, as they are not located near buildings or at areas with deep fills. Table 3 shows the conductivity values used to model the infiltration of these basins. The remaining~~ All BMPs will be lined to prevent any infiltration into the underlying fill soil and therefore will have a conductivity of 0.00 in/hr. *This is a conservative approach as (a) it increases runoff and consequently E_p; (b) if the FDC satisfies hydromodification conditions with zero infiltration, the use of infiltration in final engineering in some BMPs when infiltration tests are performed will satisfy hydromodification conditions even more and (c) it increases draw-down times when compared to calculations performed with the inclusion of infiltration.*

Also, due to the large size of basins H8HR1, M1MR1K1 V1, V2, V5, V7, V9, V10 and V11VR2, these will have two (2) separate French Drain pipes constrained downstream (at the outlet structure) by two low flow orifices. As the capacity of the orifices is less than the capacity of the PVC French drain pipes the system will be under pressure; therefore, there is no need to assign a slope to the French Drain systems (as they will work under pressure) and those will be placed horizontally at the bottom of the bio-retention. In regards to the remaining basins, they will only have one (1) French drain pipe constrained downstream (at the outlet structure) by a single orifice. Again, the French drain has much higher capacity than the low orifice, the system will be under pressure and again there is no need to assign a slope to the pressurized French Drain system.

The biofiltration basin was modeled using the biofiltration LID module within SWMM. The biofiltration module can model the gravel and amended soil layers, and a surface storage pond up to the elevation of the invert of the first surface discharge. It should be noted that detailed outlet structure location and

elevations will be shown on the construction plans based on the recommendations of this study. It should be noted that detailed outlet structure location and elevations will be shown on the construction plans based on the recommendations of this study.

BMP MODELING FOR HMP PURPOSES

Modeling of dual purpose Water Quality/HMP BMPs

Twenty five (25) LID BMP biofiltration basins are proposed for water quality treatment and hydromodification conformance for the project site. Tables 3 & 4 illustrate the dimensions required for HMP compliance according to the SWMM model that was undertaken for the project. Table 4 shows further details for those LIDs where the outlet structure is more complex than a simple riser: for the LIDs shown in Table 4, an additional slot is included at an intermediate elevation to improved hydromodification control and extreme event flow control.

FLOW DURATION CURVE COMPARISON

The Flow Duration Curve (FDC) for POC-25A was compared at the POC by exporting the hourly runoff time series results from SWMM to a spreadsheet.

Q_2 and Q_{10} were determined with a partial duration statistical analysis of the runoff time series in an Excel spreadsheet using the Cunnane plotting position method (which is the preferred plotting methodology in the HMP Permit). As the SWMM Model includes a statistical analysis based on the Weibull Plotting Position Method, the Weibull Method was also used within the spreadsheet to ensure that the results were similar to those obtained by the SWMM Model.

The receiving creek possesses low susceptibility to erosion, per Chang's screening study (reference [7]); therefore, the low flow threshold is 50% of Q_2. The range between 50% of Q_2 and Q_{10} was divided into 100 equal time intervals; the number of hours that each flow rate was exceeded was counted from the hourly series. Additionally, the intermediate peaks with a return period "i" were obtained (Q_i with i=3 to 9). For the purpose of the plot, the values were presented as percentage of time exceeded for each flow rate. FDC comparison at the POC is illustrated in Figure 1 in both normal and logarithmic scale. Attachment 5 provides a detailed drainage exhibit for the post-developed condition.

As can be seen in Figures 1a and 1b, the FDC for the proposed conditions with the HMP BMP is within 110% of the curve for the existing condition in both peak flows and durations. The additional runoff volume generated from developing the site will be released to the existing point of discharge at a flow rate below the 50% Q_2 lower threshold for POC-25A. Additionally, the project will also not increase peak flow rates between the Q_2 and the Q_{10}, as shown in the peak flow table in Attachment 1.

Discussion of the Manning's coefficient (Pervious Areas) for Pre and Post-Development Conditions

Typically the Manning's coefficient is selected as n = 0.10 for pervious areas and n = 0.012 for impervious areas. However, due to the impact that n has in the continuous simulation a more accurate value of the Manning's coefficient has been chosen for pervious areas. Taken into consideration the study prepared by TRWE (Reference [6]) a value of n = 0.05 has been selected (see Table 1 of Reference [6] included in Attachment 7). An average n value between average grass plus pasture (0.04) and dense grass (0.06) has been selected per the reference cited, for light rain (<0.8 in/hr) as more than 99% of the rainfall has been measured with this intensity.

TABLE 3 – SUMMARY OF DEVELOPED DUAL PURPOSE BMP

BMP	Tributary Area (Ac)	DIMENSIONS						
		BMP Area[1] (ft^2)	Infiltration (in/hr)	Low Flow Orifice # - (in)	Gravel Depth (in)[5]	Depth to Riser Invert (ft)[2]	Weir Perimeter Length[3] (ft)	Total Surface Depth[4] (ft)
H1	1.572	2,120	0.0	1-3.00”	18”	0.50	8	1.0
H2	0.444	655	0.0	1-1.50”	18”	0.50	8	1.0
H4	0.687	950	0.0	1-2.00”	18”	0.50	8	1.0
H5	0.660	1,010	0.0	1-2.00”	18”	0.50	8	1.0
H6	0.635	860	0.0	1-1.75”	18”	0.50	8	1.0
H7	0.559	765	0.0	1-1.75”	18”	0.50	8	1.0
H8HR1	22.311	32,465	**0.0**~~1875~~	2-8.00”	27”	0.50	8	1.0
H9HR2	4.288	7,430	**0.0**~~1875~~	1-6.00”	18”	0.50	8	1.0
M1MR1K1	48.413	94,224	**0.0**~~1875~~	2-12.00”	30”	8.00	20	10.0
V1	3.463	5,865	**0.0**~~1875~~	2-3.00”	18”	0.50	8	1.0
V2	3.460	5,840	**0.0**~~1875~~	2-3.00”	18”	0.50	8	1.0
V3	1.127	1,920	0.0	1-2.50”	18”	0.50	8	1.0
V4	1.665	2,820	0.0	1-3.50”	18”	0.50	8	1.0
V5	2.676	4,520	0.0	2-3.00”	18”	0.50	8	1.0
V6	1.095	1,855	0.0	1-2.50”	18”	0.50	8	1.0
V7	2.838	4,800	0.0	2-3.00”	18”	0.50	8	1.0
V8	2.581	3,100	0.0	1-3.50”	18”	0.50	8	1.0
V9	2.857	4,850	0.0	2-3.00”	18”	0.50	8	1.0
V10	9.958	16,475	**0.0**~~75~~	2-6.00”	18”	0.50	8	1.0
V11VR2	11.856	20,200	**0.0**~~75~~	2-6.00”	24”	3.50	12	5.0
V12VR1	3.627	7,105	0.0	1-6.00”	18”	0.50	8	1.0
V13	3.555	2,945	**0.0**~~1875~~	1-3.50”	18”	0.50	8	1.0
V14	5.150	7,865	~~0.15~~ **0.0**	1-6.00”	18”	8.00	8	10.0
V15	7.586	12,540	0.0	1-6.00”	18”	0.50	8	1.0
V16	2.742	3,300	0.0	1-3.50”	18”	0.50	8	1.0

Notes:
(1): Area of amended soil = area of gravel = area of the BMP
(2): Depth of ponding beneath riser structure’s surface spillway.
(3): Overflow length is the internal perimeter of the riser. Example 8 ft (2 ft x 2 ft internal dimensions).
(4): Total surface depth of BMP from top crest elevation to surface invert.
(5): Gravel depth includes the 3 inches of dead storage below the LID orifice/s.

TABLE 4 – SUMMARY OF RISER DETAILS

BMP	Lower Slot		Top Riser	
	B x h (ft)	Elev.[1] (ft)	Length[2] (ft)	Elev.[1] (ft)
M1MR1K1	6’ x 0.5’	2.0	20	8
V11VR2	3.50’ x 0.33’	1.0	12	3.5
V14	1.33’ x 0.25’	2.0	8	8

Notes:
(1): Basin ground surface elevation assumed to be 0.00 ft elevation.
(2): Overflow length is the internal perimeter of the riser structure.

DRYING TIME

Drying time of the LID is based on the assumed low-flow capacity of the LID orifice or the infiltration capacity of the amended soil, whichever is smaller. Therefore, for a given BMP the drying time is the BMP surface volume below first surface outlet divided by the minimum value between the discharge of the LID orifice $Q_{orifice}$ or the infiltration of the amended soil, Q_{amend}. Please see Table 5 for the drawdown time of the surface for each basin. As it can be seen all BMP drain the surface in less than 24 hours, so it satisfies current requirements.

TABLE 5 – SUMMARY OF DRAWDOWN TIMES

BMP	Volume (cfs)	LID Q (cfs) (min $Q_{orifice}$ and Q_{amend})	Drawdown Time (hrs)
H1	1,206	0.245(1)	1.4
H2	368	0.066	1.5
H4	535	0.111(1)	1.3
H5	558	0.117	1.3
H6	479	0.090	1.5
H7	433	0.089(1)	1.3
H8HR1	16,515	3.758(1)	1.2
H9HR2	3,858	0.860(1)	1.2
M1MR1K1	201,233	10.274	5.4
V1	3,098	0.515	1.7
V2	3,059	0.515	1.6
V3	1,061	0.180	1.6
V4	1,521	0.326(1)	1.3
V5	2,428	0.515	1.3
V6	1,019	0.180	1.6
V7	2,594	0.515	1.4
V8	1,663	0.347	1.3
V9	2,538	0.515	1.4
V10	8,489	1.907(1)	1.2
V11VR2	20,803	2.338(1)	2.5
V12VR1	3,834	0.822(1)	1.3
V13	1,554	0.341(1)	1.3
V14	17,709	0.910(1)	5.4
V15	6,609	0.971	1.9
V16	1,741	0.347	1.4

Notes: (1): The restricting discharge for this basin is the $Q_{amended}$. Therefore drawdown was calculated using the $Q_{amended}$ instead of the $Q_{orifice}$.

SUMMARY

This study has demonstrated that the proposed HMP BMPs provided for the portion of the Newland Sierra site draining to POC-25A are sufficient to meet the current HMP criteria for the one (1) Point of Compliance analyzed here (POC-25A), if the cross-section areas and volumes recommended within this technical memorandum, and the respective orifices and outlet structures are incorporated as specified within the proposed project site.

KEY ASSUMPTIONS

1. Types B, C and D Soil are representative of the existing condition site.
2. Infiltration is assumed **equal zero, which is the most conservative approach for EP calculations and FDC comparisons**. ~~to the standard value of the corresponding soil at the location of the BMP. At this level, infiltration is not considered for most BMPs located in fill areas, which is a conservative assumption as infiltration will help reduce the FDC in post-development conditions~~
3. Receiving creek is low susceptibility, per Chang study (reference [7]).

ATTACHMENTS

1. Q_2 to Q_{10} Comparison Tables
2. Flow Duration Curve Analysis
3. List of the "n" largest Peaks: Pre-Development and Post-Development Conditions
4. Area vs Elevation & Discharge vs Elevation
5. Pre & Post Development Maps, Project Plan and Section Sketches
6. SWMM Input Data in Input Format (Existing and Proposed Models)
7. EPA SWMM Figures and Explanations
8. Soil Maps & Geotechnical Investigation
9. Summary files from the SWMM Model

REFERENCES

[1] – *"Review and Analysis of San Diego County Hydromodification Management Plan (HMP): Assumptions, Criteria, Methods, & Modeling Tools – Prepared for the Cities of San Marcos, Oceanside & Vista",* May 2012, TRW Engineering.

[2] – *"Final Hydromodification Management Plan (HMP) prepared for the County of San Diego",* March 2011, Brown and Caldwell.

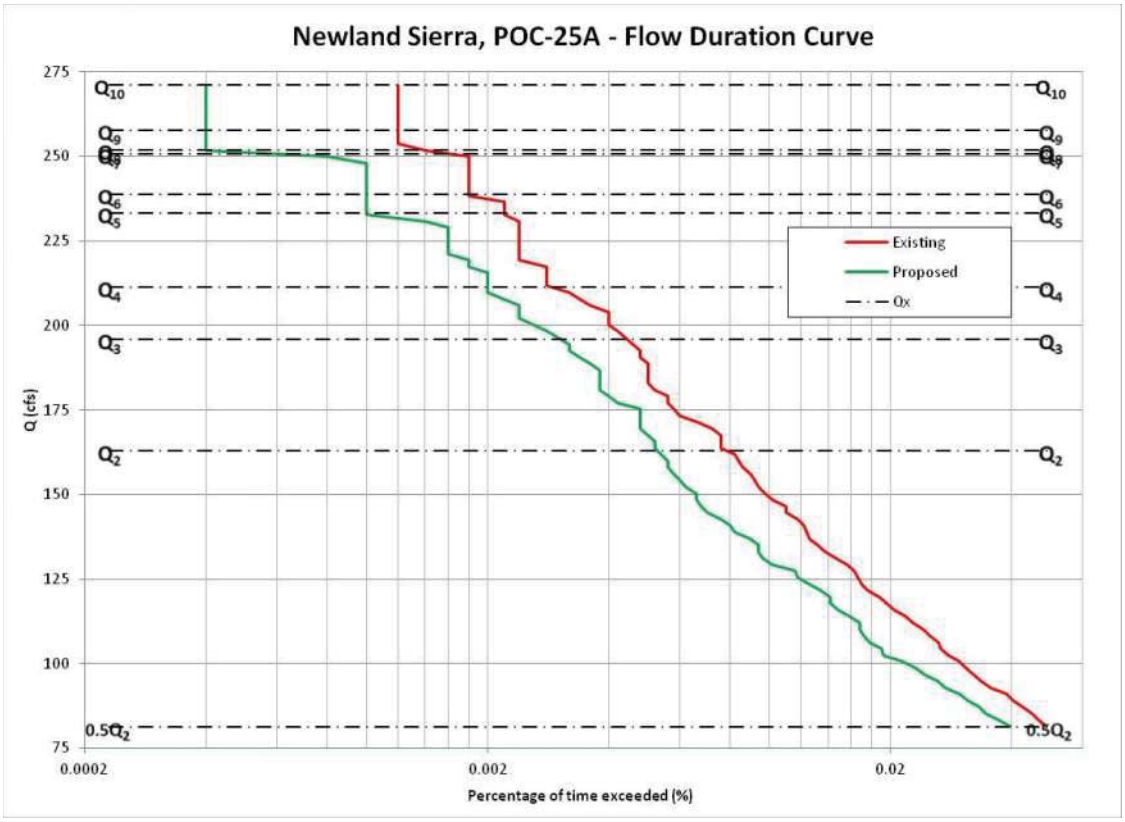
[3] - Order R9-2013-001, California Regional Water Quality Control Board San Diego Region (SDRWQCB).

[4] – "*Handbook of Hydrology*", David R. Maidment, Editor in Chief. 1992, McGraw Hill.

[5] – "*County of San Diego BMP Design Manual*", February 2016.

[6] – *"Improving Accuracy in Continuous Hydrologic Modeling: Guidance for Selecting Pervious Overland Flow Manning's n Values in the San Diego Region"*, TRWE, 2016.

[7] – *"Hydromodification Screening for Highland Sierra",* Chang Consultants, January 15, 2015.



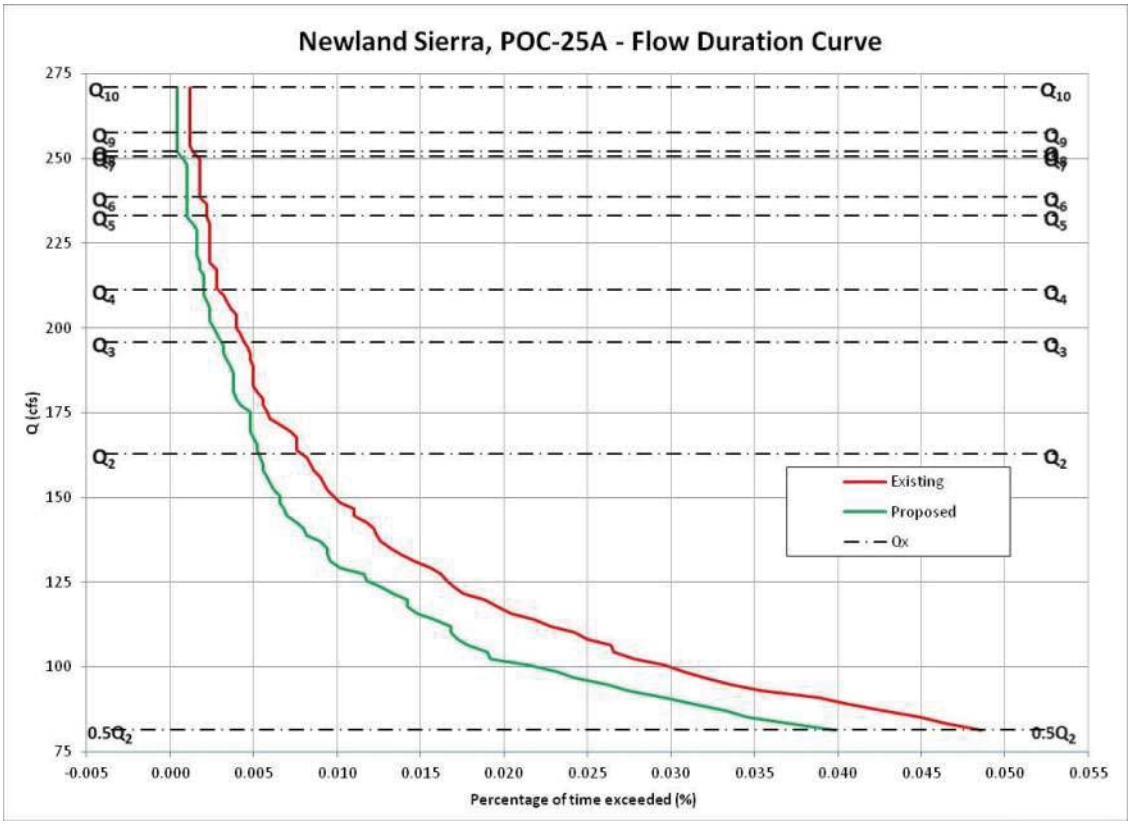


Figure 1a and 1b. Flow Duration Curve Comparison (logarithmic and normal "x" scale)

ATTACHMENT 1

Q_2 to Q_{10} Comparison Table – POC 25A

Return Period	Existing Condition (cfs)	Mitigated Condition (cfs)	Reduction, Exist - Mitigated (cfs)
2-year	162.837	142.542	20.295
3-year	195.886	162.299	33.588
4-year	211.285	196.145	15.140
5-year	233.103	201.899	31.204
6-year	238.771	217.264	21.507
7-year	250.584	224.071	26.514
8-year	252.014	230.430	21.584
9-year	257.731	231.925	25.806
10-year	271.020	232.027	38.993

ATTACHMENT 2

FLOW DURATION CURVE ANALYSIS

1) Flow duration curve shall not exceed the existing conditions by more than 10%, neither in peak flow nor duration.

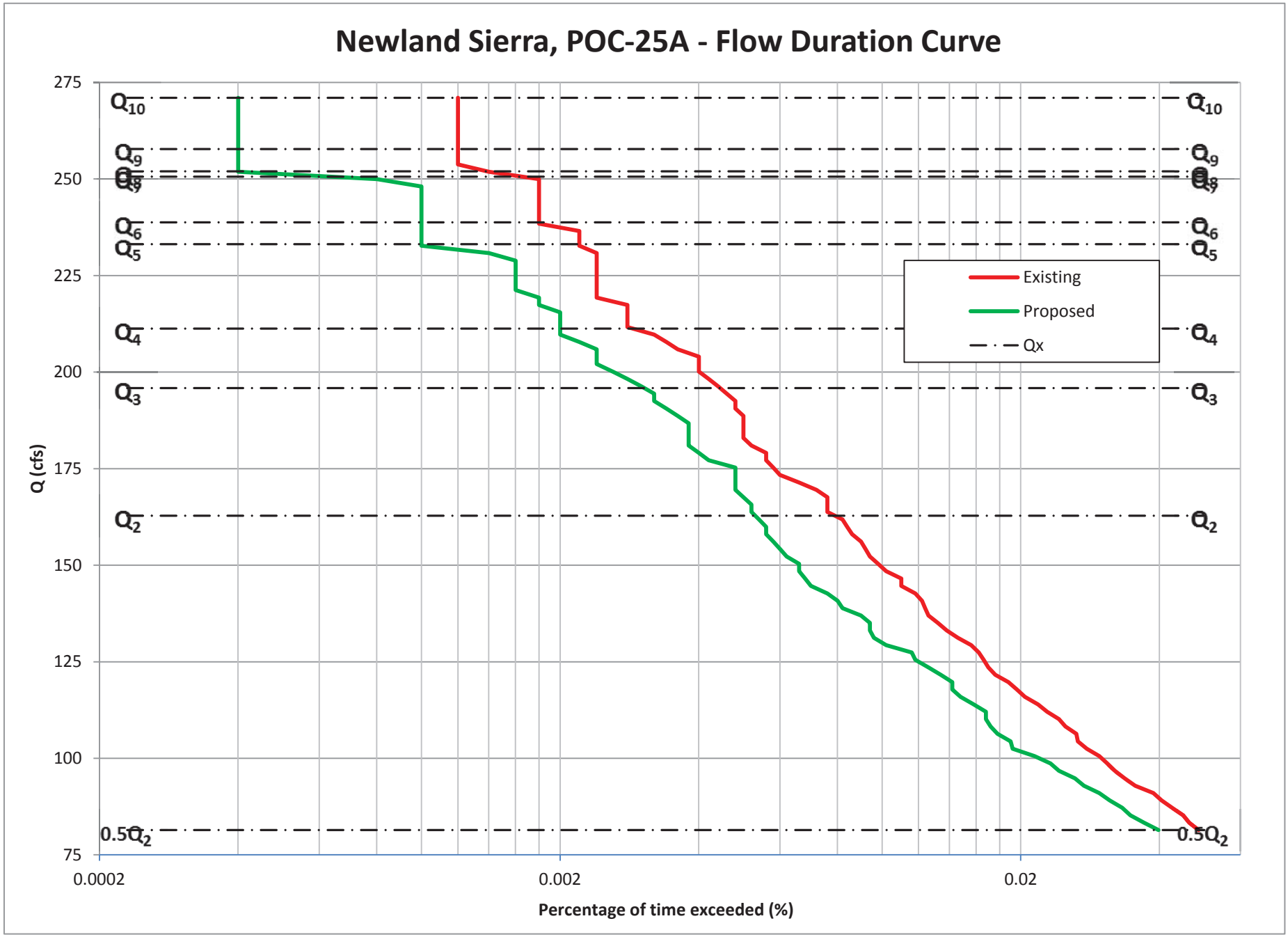
The figures on the following pages illustrate that the flow duration curve in post-development conditions after the proposed BMP is below the existing flow duration curve. The flow duration table following the curve shows that if the interval $0.10Q_2 – Q_{10}$ is divided in 100 sub-intervals, then the post development divided by pre-development durations is never larger than 110% (the permit allows up to 110%).

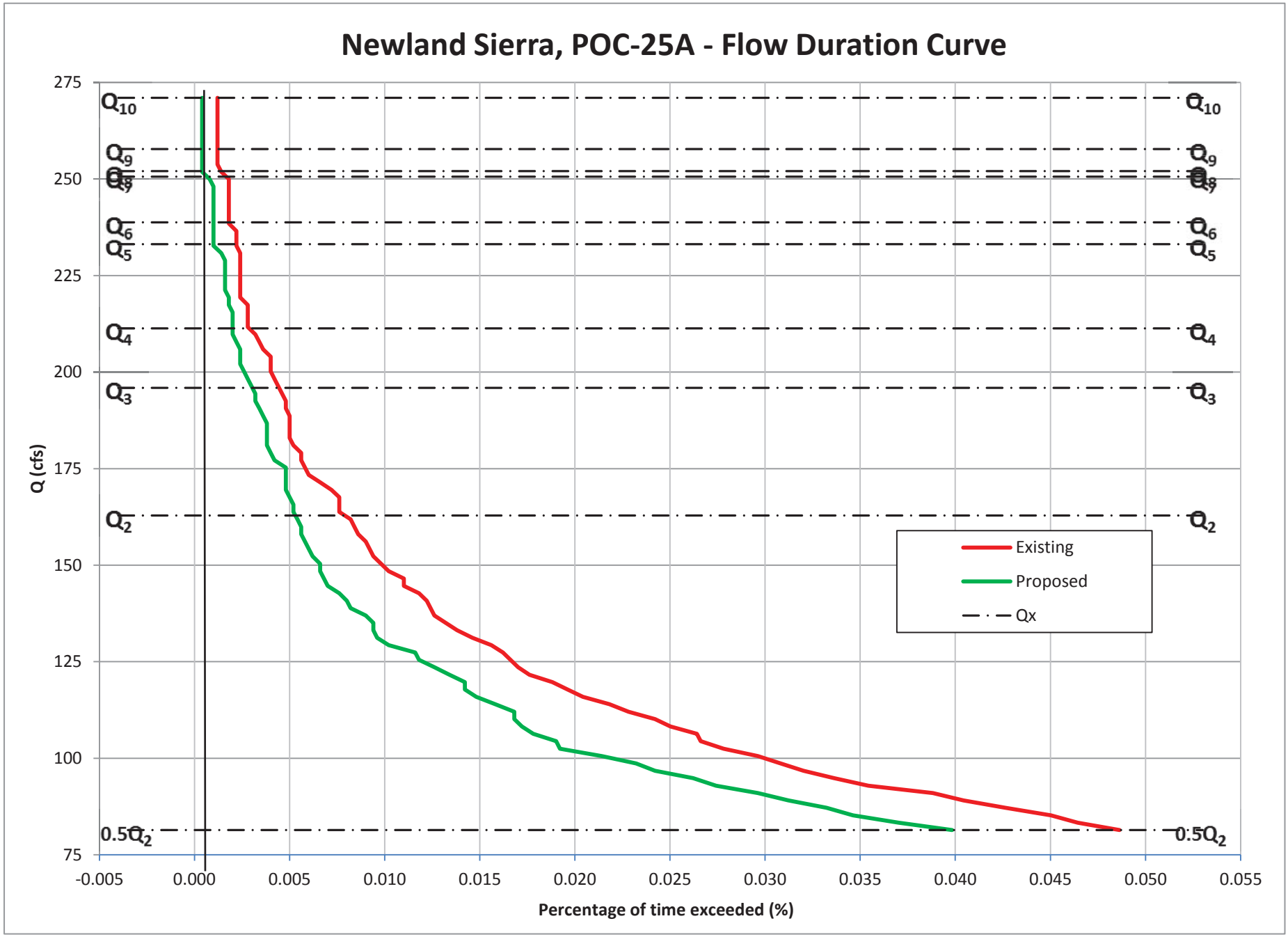
Consequently, the design passes the hydromodification test.

It is important to note that the flow duration curve can be expressed in the "x" axis as percentage of time, hours per year, total number of hours, or any other similar time variable. As those variables only differ by a multiplying constant, their plot in logarithmic scale is going to look exactly the same, and compliance can be observed regardless of the variable selected. However, in order to satisfy the County of San Diego HMP example, % of time exceeded is the variable of choice in the flow duration curve. The selection of a logarithmic scale in lieu of the normal scale is preferred, as differences between the pre-development and post-development curves can be seen more clearly in the entire range of analysis. Both graphics are presented just to prove the difference.

In terms of the "y" axis, the peak flow value is the variable of choice. As an additional analysis performed by REC, not only the range of analysis is clearly depicted (10% of Q_2 to Q_{10}) but also all intermediate flows are shown (Q_2, Q_3, Q_4, Q_5, Q_6, Q_7, Q_8 and Q_9) in order to demonstrate compliance at any range $Q_x – Q_{x+1}$. It must be pointed out that one of the limitations of both the SWMM and SDHM models is that the intermediate analysis is not performed (to obtain Q_i from i = 2 to 10). REC performed the analysis using the Cunnane Plotting position Method (the preferred method in the HMP permit) from the "n" largest independent peak flows obtained from the continuous time series.

The largest "n" peak flows are attached in this appendix, as well as the values of Q_i with a return period "i", from i=2 to 10. The Q_i values are also added into the flow-duration plot.


Newland Sierra, POC-25A - Flow Duration Curve
275
250
225
200
175
150
125
100
75
Q (cfs)
0.0002
0.002
0.02
Percentage of time exceeded (%)
Q10
Q9
Q8
Q6
Q5
Q4
Q3
Q2
0.5Q2
Existing
Proposed
Qx


Newland Sierra, POC-25A - Flow Duration Curve
Q (cfs)
275
250
225
200
175
150
125
100
75
-0.005
0.000
0.005
0.010
0.015
0.020
0.025
0.030
0.035
0.040
0.045
0.050
0.055
Percentage of time exceeded (%)
Q10
Q9
Q8
Q6
Q5
Q4
Q3
Q2
0.5Q2
Existing
Proposed
Qx

Flow Duration Curve Data for Newland Sierra, POC-25A, County of San Diego

Q2 =	162.84	cfs	Fraction	50 %
Q10 =	271.02	cfs		
Step =	1.9152	cfs		
Count =	499679	hours		
	57.00	years		

	Existing Condition			Detention Optimized			Pass or
Interval	Q (cfs)	Hours > Q	% time	Hours>Q	% time	Post/Pre	Fail?
1	81.419	243	4.86E-02	199	3.98E-02	82%	Pass
2	83.334	232	4.64E-02	185	3.70E-02	80%	Pass
3	85.249	225	4.50E-02	173	3.46E-02	77%	Pass
4	87.164	213	4.26E-02	166	3.32E-02	78%	Pass
5	89.079	202	4.04E-02	156	3.12E-02	77%	Pass
6	90.994	194	3.88E-02	148	2.96E-02	76%	Pass
7	92.909	177	3.54E-02	137	2.74E-02	77%	Pass
8	94.825	168	3.36E-02	131	2.62E-02	78%	Pass
9	96.740	160	3.20E-02	121	2.42E-02	76%	Pass
10	98.655	154	3.08E-02	116	2.32E-02	75%	Pass
11	100.570	148	2.96E-02	107	2.14E-02	72%	Pass
12	102.485	139	2.78E-02	96	1.92E-02	69%	Pass
13	104.400	133	2.66E-02	95	1.90E-02	71%	Pass
14	106.316	132	2.64E-02	89	1.78E-02	67%	Pass
15	108.231	125	2.50E-02	86	1.72E-02	69%	Pass
16	110.146	121	2.42E-02	84	1.68E-02	69%	Pass
17	112.061	114	2.28E-02	84	1.68E-02	74%	Pass
18	113.976	109	2.18E-02	79	1.58E-02	72%	Pass
19	115.891	102	2.04E-02	74	1.48E-02	73%	Pass
20	117.807	98	1.96E-02	71	1.42E-02	72%	Pass
21	119.722	94	1.88E-02	71	1.42E-02	76%	Pass
22	121.637	88	1.76E-02	67	1.34E-02	76%	Pass
23	123.552	85	1.70E-02	63	1.26E-02	74%	Pass
24	125.467	83	1.66E-02	59	1.18E-02	71%	Pass
25	127.382	81	1.62E-02	58	1.16E-02	72%	Pass
26	129.298	78	1.56E-02	51	1.02E-02	65%	Pass
27	131.213	73	1.46E-02	48	9.61E-03	66%	Pass
28	133.128	69	1.38E-02	47	9.41E-03	68%	Pass
29	135.043	66	1.32E-02	47	9.41E-03	71%	Pass
30	136.958	63	1.26E-02	45	9.01E-03	71%	Pass
31	138.873	62	1.24E-02	41	8.21E-03	66%	Pass
32	140.789	61	1.22E-02	40	8.01E-03	66%	Pass
33	142.704	59	1.18E-02	38	7.60E-03	64%	Pass
34	144.619	55	1.10E-02	35	7.00E-03	64%	Pass
35	146.534	55	1.10E-02	34	6.80E-03	62%	Pass
36	148.449	51	1.02E-02	33	6.60E-03	65%	Pass

Interval	Existing Condition			Detention Optimized			Pass or Fail?
	Q (cfs)	Hours > Q	% time	Hours>Q	% time	Post/Pre	
37	150.364	49	9.81E-03	33	6.60E-03	67%	Pass
38	152.280	47	9.41E-03	31	6.20E-03	66%	Pass
39	154.195	46	9.21E-03	30	6.00E-03	65%	Pass
40	156.110	45	9.01E-03	29	5.80E-03	64%	Pass
41	158.025	43	8.61E-03	28	5.60E-03	65%	Pass
42	159.940	42	8.41E-03	28	5.60E-03	67%	Pass
43	161.855	41	8.21E-03	27	5.40E-03	66%	Pass
44	163.771	38	7.60E-03	26	5.20E-03	68%	Pass
45	165.686	38	7.60E-03	26	5.20E-03	68%	Pass
46	167.601	38	7.60E-03	25	5.00E-03	66%	Pass
47	169.516	36	7.20E-03	24	4.80E-03	67%	Pass
48	171.431	33	6.60E-03	24	4.80E-03	73%	Pass
49	173.346	30	6.00E-03	24	4.80E-03	80%	Pass
50	175.262	29	5.80E-03	24	4.80E-03	83%	Pass
51	177.177	28	5.60E-03	21	4.20E-03	75%	Pass
52	179.092	28	5.60E-03	20	4.00E-03	71%	Pass
53	181.007	26	5.20E-03	19	3.80E-03	73%	Pass
54	182.922	25	5.00E-03	19	3.80E-03	76%	Pass
55	184.837	25	5.00E-03	19	3.80E-03	76%	Pass
56	186.753	25	5.00E-03	19	3.80E-03	76%	Pass
57	188.668	25	5.00E-03	18	3.60E-03	72%	Pass
58	190.583	24	4.80E-03	17	3.40E-03	71%	Pass
59	192.498	24	4.80E-03	16	3.20E-03	67%	Pass
60	194.413	23	4.60E-03	16	3.20E-03	70%	Pass
61	196.328	22	4.40E-03	15	3.00E-03	68%	Pass
62	198.244	21	4.20E-03	14	2.80E-03	67%	Pass
63	200.159	20	4.00E-03	13	2.60E-03	65%	Pass
64	202.074	20	4.00E-03	12	2.40E-03	60%	Pass
65	203.989	20	4.00E-03	12	2.40E-03	60%	Pass
66	205.904	18	3.60E-03	12	2.40E-03	67%	Pass
67	207.819	17	3.40E-03	11	2.20E-03	65%	Pass
68	209.735	16	3.20E-03	10	2.00E-03	63%	Pass
69	211.650	14	2.80E-03	10	2.00E-03	71%	Pass
70	213.565	14	2.80E-03	10	2.00E-03	71%	Pass
71	215.480	14	2.80E-03	10	2.00E-03	71%	Pass
72	217.395	14	2.80E-03	9	1.80E-03	64%	Pass
73	219.310	12	2.40E-03	9	1.80E-03	75%	Pass
74	221.226	12	2.40E-03	8	1.60E-03	67%	Pass
75	223.141	12	2.40E-03	8	1.60E-03	67%	Pass
76	225.056	12	2.40E-03	8	1.60E-03	67%	Pass
77	226.971	12	2.40E-03	8	1.60E-03	67%	Pass
78	228.886	12	2.40E-03	8	1.60E-03	67%	Pass
79	230.801	12	2.40E-03	7	1.40E-03	58%	Pass
80	232.717	11	2.20E-03	5	1.00E-03	45%	Pass
81	234.632	11	2.20E-03	5	1.00E-03	45%	Pass

Interval	Existing Condition			Detention Optimized			Pass or Fail?
	Q (cfs)	Hours > Q	% time	Hours>Q	% time	Post/Pre	
82	236.547	11	2.20E-03	5	1.00E-03	45%	Pass
83	238.462	9	1.80E-03	5	1.00E-03	56%	Pass
84	240.377	9	1.80E-03	5	1.00E-03	56%	Pass
85	242.292	9	1.80E-03	5	1.00E-03	56%	Pass
86	244.208	9	1.80E-03	5	1.00E-03	56%	Pass
87	246.123	9	1.80E-03	5	1.00E-03	56%	Pass
88	248.038	9	1.80E-03	5	1.00E-03	56%	Pass
89	249.953	9	1.80E-03	4	8.01E-04	44%	Pass
90	251.868	7	1.40E-03	2	4.00E-04	29%	Pass
91	253.783	6	1.20E-03	2	4.00E-04	33%	Pass
92	255.699	6	1.20E-03	2	4.00E-04	33%	Pass
93	257.614	6	1.20E-03	2	4.00E-04	33%	Pass
94	259.529	6	1.20E-03	2	4.00E-04	33%	Pass
95	261.444	6	1.20E-03	2	4.00E-04	33%	Pass
96	263.359	6	1.20E-03	2	4.00E-04	33%	Pass
97	265.274	6	1.20E-03	2	4.00E-04	33%	Pass
98	267.190	6	1.20E-03	2	4.00E-04	33%	Pass
99	269.105	6	1.20E-03	2	4.00E-04	33%	Pass
100	271.020	6	1.20E-03	2	4.00E-04	33%	Pass

Peak Flows calculated with Cunnane Plotting Position

Return Period (years)	Pre-dev. Q (cfs)	Post-Dev. Q (cfs)	Reduction (cfs)
10	271.020	232.027	38.993
9	257.731	231.925	25.806
8	252.014	230.430	21.584
7	250.584	224.071	26.514
6	238.771	217.264	21.507
5	233.103	201.899	31.204
4	211.285	196.145	15.140
3	195.886	162.299	33.588
2	162.837	142.542	20.295

ATTACHMENT 3

List of the "n" Largest Peaks: Pre & Post-Developed Conditions

Basic Probabilistic Equation:

R = 1/P R: Return period (years).

P: Probability of a flow to be equaled or exceeded any given year (dimensionless).

Cunnane Equation:

$$P = \frac{i-0.4}{n+0.2}$$

Weibull Equation:

$$P = \frac{i}{n+1}$$

i: Position of the peak whose probability is desired (sorted from large to small).

n: Number of years analyzed.

Explanation of Variables for the Tables in this Attachment

Peak: Refers to the peak flow at the date given, taken from the continuous simulation hourly results of the n year analyzed.

Posit: If all peaks are sorted from large to small, the position of the peak in a sorting analysis is included under the variable Posit.

Date: Date of the occurrence of the peak at the outlet from the continuous simulation

Note: All peaks are not annual maxima; instead they are defined as event maxima, with a threshold to separate peaks of at least 12 hours. In other words, any peak P in a time series is defined as a value where dP/dt = 0, and the peak is the largest value in 25 hours (12 hours before, the hour of occurrence and 12 hours after the occurrence, so it is in essence a daily peak).

List of Peak events and Determination of Q2 and Q10 (Pre-Development)
Newland Sierra - POC-25A

T (Year)	Cunnane (cfs)	Weibull (cfs)	Peaks (cfs)	Date	Posit	Period of Return (Years)	
10	**271.02**	**274.54**				**Weibull**	**Cunnane**
9	**257.73**	**263.94**	123.48	11/30/2007	57	1.02	1.01
8	**252.01**	**252.69**	123.64	1/15/1978	56	1.04	1.03
7	**250.58**	**250.83**	125.53	12/22/1982	55	1.05	1.05
6	**238.77**	**241.83**	127.13	2/11/1959	54	1.07	1.07
5	**233.10**	**234.28**	129.46	2/18/1980	53	1.09	1.09
4	**211.29**	**211.33**	131.12	3/16/1958	52	1.12	1.11
3	**195.89**	**196.52**	132.63	2/20/1980	51	1.14	1.13
2	**162.84**	**162.84**	133.70	4/3/1958	50	1.16	1.15
			134.28	12/30/1951	49	1.18	1.18
			134.40	1/14/1993	48	1.21	1.20
			136.19	12/9/1982	47	1.23	1.23
			137.38	3/21/1979	46	1.26	1.25
			139.93	2/6/1969	45	1.29	1.28
			141.84	3/5/1995	44	1.32	1.31
			143.19	3/1/1991	43	1.35	1.34
			143.80	1/18/1952	42	1.38	1.38
			146.74	12/29/2004	41	1.41	1.41
			148.34	11/22/1965	40	1.45	1.44
			150.02	3/8/1975	39	1.49	1.48
			151.30	11/21/1963	38	1.53	1.52
			151.51	12/2/1961	37	1.57	1.56
			153.06	3/2/1980	36	1.61	1.61
			154.69	1/9/1998	35	1.66	1.65
			156.66	12/19/1984	34	1.71	1.70
			157.73	1/7/1993	33	1.76	1.75
			159.24	11/8/2002	32	1.81	1.81
			160.33	1/3/1977	31	1.87	1.87
			162.42	3/27/1991	30	1.93	1.93
			162.84	2/27/1983	29	2.00	2.00
			168.48	2/16/1980	28	2.07	2.07
			171.30	3/1/1983	27	2.15	2.15
			172.27	2/3/1998	26	2.23	2.23
			172.87	2/13/1992	25	2.32	2.33
			179.52	2/14/1980	24	2.42	2.42
			179.57	1/23/1969	23	2.52	2.53
			182.89	9/10/1976	22	2.64	2.65
			190.23	11/30/1982	21	2.76	2.78
			193.44	11/9/2002	20	2.90	2.92
			198.14	1/11/2005	19	3.05	3.08
			198.94	3/17/1982	18	3.22	3.25
			206.46	1/16/1978	17	3.41	3.45
			209.09	12/5/1966	16	3.63	3.67
			211.22	1/9/2005	15	3.87	3.92
			211.46	12/6/1966	14	4.14	4.21
			218.69	2/8/1993	13	4.46	4.54
			232.35	8/26/2007	12	4.83	4.93
			237.45	2/15/1986	11	5.27	5.40
			238.04	1/11/1980	10	5.80	5.96
			250.24	1/29/1980	9	6.44	6.65
			251.10	2/14/1998	8	7.25	7.53
			253.30	12/25/1983	7	8.29	8.67
			273.87	1/4/1995	6	9.67	10.21
			277.78	10/20/2004	5	11.60	12.43
			283.92	3/4/1978	4	14.50	15.89
			300.04	2/4/1994	3	19.33	22.00
			335.89	2/10/1963	2	29.00	35.75
			445.51	2/1/1993	1	58.00	95.33

Note:
Cunnane is the preferred method by the HMP permit.

List of Peak events and Determination of Q2 and Q10 (Post-Development)
Newland Sierra - POC-25A

T (Year)	Cunnane (cfs)	Weibull (cfs)	Peaks (cfs)	Date	Posit	Period of Return (Years)	
10	**232.03**	**235.10**				**Weibull**	**Cunnane**
9	**231.92**	**231.97**	102.34	1/14/1993	57	1.02	1.01
8	**230.43**	**231.20**	102.37	2/28/1970	56	1.04	1.03
7	**224.07**	**226.65**	102.60	2/17/1994	55	1.05	1.05
6	**217.26**	**218.14**	105.43	12/9/1982	54	1.07	1.07
5	**201.90**	**203.96**	105.79	1/5/1992	53	1.09	1.09
4	**196.15**	**196.58**	107.26	11/29/1985	52	1.12	1.11
3	**162.30**	**163.52**	109.23	3/1/1991	51	1.14	1.13
2	**142.54**	**142.54**	115.44	12/19/1984	50	1.16	1.15
			115.70	11/16/1972	49	1.18	1.18
			117.36	1/9/1998	48	1.21	1.20
			120.43	11/8/2002	47	1.23	1.23
			122.26	3/16/1958	46	1.26	1.25
			123.27	3/8/1975	45	1.29	1.28
			124.34	2/13/1992	44	1.32	1.31
			124.68	2/16/1980	43	1.35	1.34
			124.95	2/18/1980	42	1.38	1.38
			127.14	2/20/1980	41	1.41	1.41
			127.88	1/3/1977	40	1.45	1.44
			128.28	11/21/1963	39	1.49	1.48
			128.57	12/2/1961	38	1.53	1.52
			128.86	3/21/1979	37	1.57	1.56
			129.24	12/30/1951	36	1.61	1.61
			129.96	1/7/1993	35	1.66	1.65
			130.42	2/3/1998	34	1.71	1.70
			131.22	1/18/1952	33	1.76	1.75
			137.74	2/6/1969	32	1.81	1.81
			138.81	12/29/2004	31	1.87	1.87
			140.26	9/10/1976	30	1.93	1.93
			142.54	3/2/1980	29	2.00	2.00
			142.82	11/22/1965	28	2.07	2.07
			142.84	3/5/1995	27	2.15	2.15
			144.02	2/14/1980	26	2.23	2.23
			145.54	3/27/1991	25	2.32	2.33
			150.93	11/9/2002	24	2.42	2.42
			151.18	1/9/2005	23	2.52	2.53
			152.96	2/27/1983	22	2.64	2.65
			155.91	3/1/1983	21	2.76	2.78
			157.59	3/17/1982	20	2.90	2.92
			166.64	1/23/1969	19	3.05	3.08
			176.51	1/11/2005	18	3.22	3.25
			177.00	11/30/1982	17	3.41	3.45
			188.02	1/16/1978	16	3.63	3.67
			195.52	12/6/1966	15	3.87	3.92
			197.72	2/15/1986	14	4.14	4.21
			199.50	2/8/1993	13	4.46	4.54
			200.58	12/5/1966	12	4.83	4.93
			209.50	1/11/1980	11	5.27	5.40
			217.05	2/14/1998	10	5.80	5.96
			220.54	8/26/2007	9	6.44	6.65
			229.39	10/20/2004	8	7.25	7.53
			231.89	1/29/1980	7	8.29	8.67
			232.05	12/25/1983	6	9.67	10.21
			249.75	3/4/1978	5	11.60	12.43
			251.14	1/4/1995	4	14.50	15.89
			251.79	2/4/1994	3	19.33	22.00
			286.67	2/10/1963	2	29.00	35.75
			386.76	2/1/1993	1	58.00	95.33

Note:
Cunnane is the preferred method by the HMP permit.

ATTACHMENT 4

AREA VS ELEVATION

The storage provided by the LID BMP is entered into the LID Module within SWMM – please refer to Attachment 7 for further information.

Volume provided above the first surface outlet is accounted for in the basin module within SWMM. A stage-storage relationship is provided within this Module, a copy of which is located on the following pages. The volume above the first surface discharge is modeled in SWMM only for BMPs M1MR1K1, V11VR2, and V14.

DISCHARGE VS ELEVATION

The orifice has been selected to maximize its size while still restricting flows to conform with the required 10% of the Q2 event flow as mandated in the Final Hydromodification Management Plan by Brown & Caldwell, dated March 2011. While REC acknowledges that the orifice is small, to increase the size of the outlet would impact the basin's ability to restrict flows beneath the HMP thresholds, thus preventing the BMP from conformance with HMP requirements.

In order to further reduce the risk of blockage of the orifices, regular maintenance of the riser and orifice must be performed to ensure potential blockages are minimized. A detail of the orifice and riser structure is provided in Attachment 5 of this memorandum.

A stage-discharge relationship is provided on the following pages for the surface outlet structure. The LID low flow orifice discharge relationship is addressed within the LID Module within SWMM – please refer to Attachment 7 for further information.

Stage-Area for BMP M1MR1K1

Elevation (ft)	Area (ft^2)	Volume (ft^3)	
0.00	94224	**0**	**BIOFILTRATION (1)**
0.25	95841	23758	
0.50	97453	47919	
0.72	98870	69613	
0.75	99059	72483	
1.00	100660	97447	
1.25	102255	122811	
1.50	103845	148574	
1.75	105430	174733	
2.00	107009	201287	**SURFACE DISCHARGE (2)**
2.25	108583	228236	
2.50	110151	255577	
2.75	111714	283310	
3.00	113272	311434	
3.25	114824	339945	
3.50	116371	368845	
3.75	117913	398130	
4.00	119449	427800	
4.25	120980	457853	
4.50	122505	488289	
4.75	124025	519105	
5.00	125540	550300	
5.25	127049	581874	
5.50	128553	613824	
5.75	130051	646149	
6.00	131544	678848	
6.25	133032	711920	
6.50	134514	745363	
6.75	135991	779176	
7.00	137462	813358	
7.25	138929	847906	
7.50	140389	882821	
7.75	141845	918100	
8.00	143294	953742	**EMERGENCY WEIR (3)**
8.25	144739	989746	
8.50	146178	1026111	
8.75	147612	1062834	
9.00	149040	1099916	
9.25	150463	1137354	
9.50	151881	1175146	
9.75	153293	1213293	
10.00	154700	1251792	

SUB SURFACE STORAGE

Elevation (ft)	Area (ft^2)	Volume (ft^3)	
-1.50	94224	42401	**Amended Soil Base (0.3 voids)**
-3.75	94224	56534	**Gravel Base (0.4 voids) (4)**
Gravel & Amended Soil	**TOTAL =**	98935	(ft^3)
Surface Total	**TOTAL =**	201287	(ft^3)
IMP	**TOTAL =**	**300222**	**(ft^3)**

(1): The area at this surface elevation corresponds to the area of gravel and amended soil (Bio-retention layer
(2): Volume at this elevation coresponds with surface volume for WQ purposes (invert of lowest surface outlet
(3): This elevation corresponds to the top of the riser elevation
(4): The gravel depth does not include the 3 inches of dead storage below the LID orifice

Effective Depth:	25.64 in

Stage-Area for BMP V11VR2

Elevation (ft)	Area (ft^2)	Volume (ft^3)	
0.00	20200	**0**	**BIOFILTRATION (1)**
0.15	20375	2942	
0.25	20501	5088	
0.50	20803	10251	
0.75	21104	15489	
1.00	21405	20802	**SURFACE DISCHARGE (2)**
1.25	21706	26191	
1.50	22008	31655	
1.75	22309	37195	
2.00	22610	42810	
2.25	22911	48500	
2.50	23213	54265	
2.75	23514	60106	
3.00	23815	66022	
3.25	24116	72013	
3.50	24418	78080	**EMERGENCY WEIR (3)**
3.75	24719	84222	
4.00	25020	90439	
4.25	25321	96732	
4.50	25623	103100	
4.75	25924	109543	
5.00	26225	116062	

SUB SURFACE STORAGE

Elevation (ft)	Area (ft^2)	Volume (ft^3)	
-1.50	20200	9090	**Amended Soil Base (0.3 voids)**
-3.50	20200	12120	**Gravel Base (0.4 voids) (4)**
Gravel & Amended Soil	**TOTAL =**	21210	(ft^3)
Surface Total	**TOTAL =**	20802	(ft^3)
IMP	**TOTAL =**	**42012**	**(ft^3)**

(1): The area at this surface elevation corresponds to the area of gravel and amended soil (Bio-retention layer)
(2): Volume at this elevation coresponds with surface volume for WQ purposes (invert of lowest surface outlet)
(3): This elevation corresponds to the top of the riser elevation.
(4): The gravel depth does not include the 3 inches of dead storage below the LID orifice.

Effective Depth:	12.36 in

Stage-Area for BMP V14

Elevation (ft)	Area (ft^2)	Volume (ft^3)	
0.00	7862	**0**	**BIOFILTRATION (1)**
0.25	8106	1996	
0.33	8185	2656	
0.50	8351	4053	
0.75	8597	6171	
1.00	8845	8352	
1.25	9094	10594	
1.50	9344	12899	
1.75	9595	15266	
2.00	9847	17696	**SURFACE DISCHARGE (2)**
2.25	10100	20189	
2.50	10355	22746	
2.75	10611	25367	
3.00	10868	28052	
3.25	11126	30801	
3.50	11385	33614	
3.75	11645	36493	
4.00	11907	39437	
4.25	12170	42447	
4.50	12434	45522	
4.75	12699	48664	
5.00	12965	51872	
5.25	13232	55146	
5.50	13501	58488	
5.75	13771	61897	
6.00	14042	65373	
6.25	14314	68918	
6.50	14587	72530	
6.75	14861	76211	
7.00	15137	79961	
7.25	15414	83780	
7.50	15692	87668	
7.75	15971	91626	
8.00	16251	95653	**EMERGENCY WEIR (3)**
8.25	16532	99751	
8.50	16815	103920	
8.75	17099	108159	
9.00	17384	112469	
9.25	17670	116851	
9.50	17957	121304	
9.75	18245	125829	
10.00	18535	130427	

SUB SURFACE STORAGE

Elevation (ft)	Area (ft^2)	Volume (ft^3)	
-1.50	7862	3538	**Amended Soil Base (0.3 voids)**
-3.00	7862	4717	**Gravel Base (0.4 voids) (4)**
Gravel & Amended Soil	**TOTAL =**	8255	(ft^3)
Surface Total	**TOTAL =**	17696	(ft^3)
IMP	**TOTAL =**	**25951**	**(ft^3)**

(1): The area at this surface elevation corresponds to the area of gravel and amended soil (Bio-retention layer)
(2): Volume at this elevation coresponds with surface volume for WQ purposes (invert of lowest surface outlet)
(3): This elevation corresponds to the top of the riser elevation.
(4): The gravel depth does not include the 3 inches of dead storage below the LID orifice.

Effective Depth:	27.01 in

DISCHARGE EQUATIONS

1) Weir:

$$Q_W = C_W \cdot L \cdot H^{3/2} \qquad (1)$$

2) Slot:

As an orifice: $$Q_s = B_s \cdot h_s \cdot c_g \cdot \sqrt{2g\left(H - \frac{h_s}{2}\right)} \qquad (2.a)$$

As a weir: $$Q_s = C_W \cdot B_s \cdot H^{3/2} \qquad (2.b)$$

For H > h_s slot works as weir until orifice equation provides a smaller discharge. The elevation such that equation (2.a) = equation (2.b) is the elevation at which the behavior changes from weir to orifice.

3) Vertical Orifices

As an orifice: $$Q_o = 0.25 \cdot \pi D^2 \cdot c_g \cdot \sqrt{2g\left(H - \frac{D}{2}\right)} \qquad (3.a)$$

As a weir: Critical depth and geometric family of circular sector must be solved to determined Q as a function of H:

$$\frac{Q_O^2}{g} = \frac{A_{cr}^3}{T_{cr}}; \quad H = y_{cr} + \frac{A_{cr}}{2 \cdot T_{cr}}; \; T_{cr} = 2\sqrt{y_{cr}(D - y_{cr})}\,; \quad A_{cr} = \frac{D^2}{8}[\alpha_{cr} - sin(\alpha_{cr})]\,;$$

$$y_{cr} = \frac{D}{2}[1 - sin(0.5 \cdot \alpha_{cr})] \qquad (3.b.1, 3.b.2, 3.b.3, 3.b.4 \text{ and } 3.b.5)$$

There is a value of H (approximately H = 110% D) from which orifices no longer work as weirs as critical depth is not possible at the entrance of the orifice. This value of H is obtained equaling the discharge using critical equations and equations (3.b).

A mathematical model is prepared with the previous equations depending on the type of discharge.

The following are the variables used above:

Q_W, Q_s, Q_O = Discharge of weir, slot or orifice (cfs)

C_W, c_g : Coefficients of discharge of weir (typically 3.1) and orifice (0.61 to 0.62)

L, B_s, D, h_s : Length of weir, width of slot, diameter of orifice and height of slot, respectively; (ft)

H: Level of water in the pond over the invert of slot, weir or orifice (ft)

A_{cr}, T_{cr}, y_{cr}, α_{cr}: Critical variables for circular sector: area (sq-ft), top width (ft), critical depth (ft), and angle to the center, respectively.

Outlet structure for Discharge of BMP M1MR1K1

Discharge vs Elevation Table

Low orifice	0.625 "	Lower slot		Lower Weir			
Number of orif:	0	Number of slots:	1	Number of weirs:	0		
Cg-low:	0.61	Invert:	0.00 ft	Invert:	0.000 ft		
		B	6.00 ft	B:	0.000 ft		
Middle orifice	2.500 "	hslot	0.500 ft				
Number of orif:	0.000						
Cg-middle:	0.61	Upper slot		Upper Weir		Emergency weir	
invert elev:	0 ft	Number of slots:	0	Number of weirs:	0	Invert:	6.000 ft
		Invert:	0.00 ft	Invert:	0.000 ft	W:	20.00 ft
*Note: h = head above the invert of the lowest surface discharge opening.		B:	0.00 ft	B:	0.00 ft		
		hslot	0.000 ft				

h* (ft)	H/D-low -	H/D-mid -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qslot-low (cfs)	Qslot-upp (cfs)	Qlweir (cfs)	Quweir (cfs)	Qemerg (cfs)	Qtot (cfs)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.125	2.400	0.600	0.000	0.000	0.000	0.000	0.000	0.000	0.822	0.000	0.000	0.000	0.000	0.822
0.250	4.800	1.200	0.000	0.000	0.000	0.000	0.000	0.000	2.325	0.000	0.000	0.000	0.000	2.325
0.375	7.200	1.800	0.000	0.000	0.000	0.000	0.000	0.000	4.271	0.000	0.000	0.000	0.000	4.271
0.500	9.600	2.400	0.000	0.000	0.000	0.000	0.000	0.000	6.576	0.000	0.000	0.000	0.000	6.576
0.625	12.000	3.000	0.000	0.000	0.000	0.000	0.000	0.000	8.993	0.000	0.000	0.000	0.000	8.993
0.750	14.400	3.600	0.000	0.000	0.000	0.000	0.000	0.000	10.384	0.000	0.000	0.000	0.000	10.384
0.875	16.800	4.200	0.000	0.000	0.000	0.000	0.000	0.000	11.610	0.000	0.000	0.000	0.000	11.610
1.000	19.200	4.800	0.000	0.000	0.000	0.000	0.000	0.000	12.718	0.000	0.000	0.000	0.000	12.718
1.125	21.600	5.400	0.000	0.000	0.000	0.000	0.000	0.000	13.737	0.000	0.000	0.000	0.000	13.737
1.250	24.000	6.000	0.000	0.000	0.000	0.000	0.000	0.000	14.686	0.000	0.000	0.000	0.000	14.686
1.375	26.400	6.600	0.000	0.000	0.000	0.000	0.000	0.000	15.577	0.000	0.000	0.000	0.000	15.577
1.500	28.800	7.200	0.000	0.000	0.000	0.000	0.000	0.000	16.419	0.000	0.000	0.000	0.000	16.419
1.625	31.200	7.800	0.000	0.000	0.000	0.000	0.000	0.000	17.220	0.000	0.000	0.000	0.000	17.220
1.750	33.600	8.400	0.000	0.000	0.000	0.000	0.000	0.000	17.986	0.000	0.000	0.000	0.000	17.986
1.875	36.000	9.000	0.000	0.000	0.000	0.000	0.000	0.000	18.721	0.000	0.000	0.000	0.000	18.721
2.000	38.400	9.600	0.000	0.000	0.000	0.000	0.000	0.000	19.427	0.000	0.000	0.000	0.000	19.427
2.125	40.800	10.200	0.000	0.000	0.000	0.000	0.000	0.000	20.109	0.000	0.000	0.000	0.000	20.109
2.250	43.200	10.800	0.000	0.000	0.000	0.000	0.000	0.000	20.769	0.000	0.000	0.000	0.000	20.769
2.375	45.600	11.400	0.000	0.000	0.000	0.000	0.000	0.000	21.408	0.000	0.000	0.000	0.000	21.408
2.500	48.000	12.000	0.000	0.000	0.000	0.000	0.000	0.000	22.029	0.000	0.000	0.000	0.000	22.029
2.625	50.400	12.600	0.000	0.000	0.000	0.000	0.000	0.000	22.632	0.000	0.000	0.000	0.000	22.632
2.750	52.800	13.200	0.000	0.000	0.000	0.000	0.000	0.000	23.220	0.000	0.000	0.000	0.000	23.220
2.875	55.200	13.800	0.000	0.000	0.000	0.000	0.000	0.000	23.794	0.000	0.000	0.000	0.000	23.794
3.000	57.600	14.400	0.000	0.000	0.000	0.000	0.000	0.000	24.353	0.000	0.000	0.000	0.000	24.353
3.125	60.000	15.000	0.000	0.000	0.000	0.000	0.000	0.000	24.901	0.000	0.000	0.000	0.000	24.901
3.250	62.400	15.600	0.000	0.000	0.000	0.000	0.000	0.000	25.436	0.000	0.000	0.000	0.000	25.436

3.375	64.800	16.200	0.000	0.000	0.000	0.000	0.000	0.000	25.961	0.000	0.000	0.000	0.000	25.961
3.500	67.200	16.800	0.000	0.000	0.000	0.000	0.000	0.000	26.475	0.000	0.000	0.000	0.000	26.475
3.625	69.600	17.400	0.000	0.000	0.000	0.000	0.000	0.000	26.979	0.000	0.000	0.000	0.000	26.979
3.750	72.000	18.000	0.000	0.000	0.000	0.000	0.000	0.000	27.474	0.000	0.000	0.000	0.000	27.474
3.875	74.400	18.600	0.000	0.000	0.000	0.000	0.000	0.000	27.961	0.000	0.000	0.000	0.000	27.961
4.000	76.800	19.200	0.000	0.000	0.000	0.000	0.000	0.000	28.439	0.000	0.000	0.000	0.000	28.439
4.125	79.200	19.800	0.000	0.000	0.000	0.000	0.000	0.000	28.909	0.000	0.000	0.000	0.000	28.909
4.250	81.600	20.400	0.000	0.000	0.000	0.000	0.000	0.000	29.371	0.000	0.000	0.000	0.000	29.371
4.375	84.000	21.000	0.000	0.000	0.000	0.000	0.000	0.000	29.827	0.000	0.000	0.000	0.000	29.827
4.500	86.400	21.600	0.000	0.000	0.000	0.000	0.000	0.000	30.275	0.000	0.000	0.000	0.000	30.275
4.625	88.800	22.200	0.000	0.000	0.000	0.000	0.000	0.000	30.717	0.000	0.000	0.000	0.000	30.717
4.750	91.200	22.800	0.000	0.000	0.000	0.000	0.000	0.000	31.153	0.000	0.000	0.000	0.000	31.153
4.875	93.600	23.400	0.000	0.000	0.000	0.000	0.000	0.000	31.583	0.000	0.000	0.000	0.000	31.583
5.000	96.000	24.000	0.000	0.000	0.000	0.000	0.000	0.000	32.007	0.000	0.000	0.000	0.000	32.007
5.125	98.400	24.600	0.000	0.000	0.000	0.000	0.000	0.000	32.425	0.000	0.000	0.000	0.000	32.425
5.250	100.800	25.200	0.000	0.000	0.000	0.000	0.000	0.000	32.838	0.000	0.000	0.000	0.000	32.838
5.375	103.200	25.800	0.000	0.000	0.000	0.000	0.000	0.000	33.246	0.000	0.000	0.000	0.000	33.246
5.500	105.600	26.400	0.000	0.000	0.000	0.000	0.000	0.000	33.649	0.000	0.000	0.000	0.000	33.649
5.625	108.000	27.000	0.000	0.000	0.000	0.000	0.000	0.000	34.047	0.000	0.000	0.000	0.000	34.047
5.750	110.400	27.600	0.000	0.000	0.000	0.000	0.000	0.000	34.441	0.000	0.000	0.000	0.000	34.441
5.875	112.800	28.200	0.000	0.000	0.000	0.000	0.000	0.000	34.830	0.000	0.000	0.000	0.000	34.830
6.000	115.200	28.800	0.000	0.000	0.000	0.000	0.000	0.000	35.215	0.000	0.000	0.000	0.000	35.215
6.125	117.600	29.400	0.000	0.000	0.000	0.000	0.000	0.000	35.596	0.000	0.000	0.000	2.740	38.335
6.250	120.000	30.000	0.000	0.000	0.000	0.000	0.000	0.000	35.972	0.000	0.000	0.000	7.750	43.722
6.375	122.400	30.600	0.000	0.000	0.000	0.000	0.000	0.000	36.345	0.000	0.000	0.000	14.237	50.582
6.500	124.800	31.200	0.000	0.000	0.000	0.000	0.000	0.000	36.714	0.000	0.000	0.000	21.920	58.634
6.625	127.200	31.800	0.000	0.000	0.000	0.000	0.000	0.000	37.080	0.000	0.000	0.000	30.634	67.713
6.750	129.600	32.400	0.000	0.000	0.000	0.000	0.000	0.000	37.441	0.000	0.000	0.000	40.269	77.711
6.875	132.000	33.000	0.000	0.000	0.000	0.000	0.000	0.000	37.800	0.000	0.000	0.000	50.745	88.545
7.000	134.400	33.600	0.000	0.000	0.000	0.000	0.000	0.000	38.155	0.000	0.000	0.000	61.999	100.154
7.125	136.800	34.200	0.000	0.000	0.000	0.000	0.000	0.000	38.506	0.000	0.000	0.000	73.980	112.486
7.250	139.200	34.800	0.000	0.000	0.000	0.000	0.000	0.000	38.855	0.000	0.000	0.000	86.647	125.501
7.375	141.600	35.400	0.000	0.000	0.000	0.000	0.000	0.000	39.200	0.000	0.000	0.000	99.963	139.163
7.500	144.000	36.000	0.000	0.000	0.000	0.000	0.000	0.000	39.542	0.000	0.000	0.000	113.900	153.443
7.625	146.400	36.600	0.000	0.000	0.000	0.000	0.000	0.000	39.882	0.000	0.000	0.000	128.430	168.312
7.750	148.800	37.200	0.000	0.000	0.000	0.000	0.000	0.000	40.218	0.000	0.000	0.000	143.531	183.749
7.875	151.200	37.800	0.000	0.000	0.000	0.000	0.000	0.000	40.552	0.000	0.000	0.000	159.181	199.733
8.000	153.600	38.400	0.000	0.000	0.000	0.000	0.000	0.000	40.883	0.000	0.000	0.000	175.361	216.244

Outlet structure for Discharge of BMP V11VR2

Discharge vs Elevation Table

Low orifice	0.625 "	Lower slot		Lower Weir			
Number of orif:	0	Number of slots:	1	Number of weirs:	0		
Cg-low:	0.61	Invert:	0.00 ft	Invert:	0.000 ft		
		B	3.50 ft	B:	0.000 ft		
Middle orifice	2.500 "	hslot	0.333 ft				
Number of orif:	0.000						
Cg-middle:	0.61	Upper slot		Upper Weir		Emergency weir	
invert elev:	0 ft	Number of slots:	0	Number of weirs:	0	Invert:	2.500 ft
		Invert:	0.00 ft	Invert:	0.000 ft	W:	12.00 ft
*Note: h = head above the invert of the lowest surface discharge opening.		B:	0.00 ft	B:	0.00 ft		
		hslot	0.000 ft				

h* (ft)	H/D-low -	H/D-mid -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qslot-low (cfs)	Qslot-upp (cfs)	Qlweir (cfs)	Quweir (cfs)	Qemerg (cfs)	Qtot (cfs)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.083	1.600	0.400	0.000	0.000	0.000	0.000	0.000	0.000	0.261	0.000	0.000	0.000	0.000	0.261
0.167	3.200	0.800	0.000	0.000	0.000	0.000	0.000	0.000	0.738	0.000	0.000	0.000	0.000	0.738
0.250	4.800	1.200	0.000	0.000	0.000	0.000	0.000	0.000	1.356	0.000	0.000	0.000	0.000	1.356
0.333	6.400	1.600	0.000	0.000	0.000	0.000	0.000	0.000	2.088	0.000	0.000	0.000	0.000	2.088
0.417	8.000	2.000	0.000	0.000	0.000	0.000	0.000	0.000	2.856	0.000	0.000	0.000	0.000	2.856
0.500	9.600	2.400	0.000	0.000	0.000	0.000	0.000	0.000	3.297	0.000	0.000	0.000	0.000	3.297
0.583	11.200	2.800	0.000	0.000	0.000	0.000	0.000	0.000	3.686	0.000	0.000	0.000	0.000	3.686
0.667	12.800	3.200	0.000	0.000	0.000	0.000	0.000	0.000	4.038	0.000	0.000	0.000	0.000	4.038
0.750	14.400	3.600	0.000	0.000	0.000	0.000	0.000	0.000	4.362	0.000	0.000	0.000	0.000	4.362
0.833	16.000	4.000	0.000	0.000	0.000	0.000	0.000	0.000	4.663	0.000	0.000	0.000	0.000	4.663
0.917	17.600	4.400	0.000	0.000	0.000	0.000	0.000	0.000	4.946	0.000	0.000	0.000	0.000	4.946
1.000	19.200	4.800	0.000	0.000	0.000	0.000	0.000	0.000	5.213	0.000	0.000	0.000	0.000	5.213
1.083	20.800	5.200	0.000	0.000	0.000	0.000	0.000	0.000	5.468	0.000	0.000	0.000	0.000	5.468
1.167	22.400	5.600	0.000	0.000	0.000	0.000	0.000	0.000	5.711	0.000	0.000	0.000	0.000	5.711
1.250	24.000	6.000	0.000	0.000	0.000	0.000	0.000	0.000	5.944	0.000	0.000	0.000	0.000	5.944
1.333	25.600	6.400	0.000	0.000	0.000	0.000	0.000	0.000	6.169	0.000	0.000	0.000	0.000	6.169
1.417	27.200	6.800	0.000	0.000	0.000	0.000	0.000	0.000	6.385	0.000	0.000	0.000	0.000	6.385
1.500	28.800	7.200	0.000	0.000	0.000	0.000	0.000	0.000	6.595	0.000	0.000	0.000	0.000	6.595
1.583	30.400	7.600	0.000	0.000	0.000	0.000	0.000	0.000	6.798	0.000	0.000	0.000	0.000	6.798
1.667	32.000	8.000	0.000	0.000	0.000	0.000	0.000	0.000	6.995	0.000	0.000	0.000	0.000	6.995
1.750	33.600	8.400	0.000	0.000	0.000	0.000	0.000	0.000	7.186	0.000	0.000	0.000	0.000	7.186
1.833	35.200	8.800	0.000	0.000	0.000	0.000	0.000	0.000	7.373	0.000	0.000	0.000	0.000	7.373
1.917	36.800	9.200	0.000	0.000	0.000	0.000	0.000	0.000	7.555	0.000	0.000	0.000	0.000	7.555
2.000	38.400	9.600	0.000	0.000	0.000	0.000	0.000	0.000	7.733	0.000	0.000	0.000	0.000	7.733
2.083	40.000	10.000	0.000	0.000	0.000	0.000	0.000	0.000	7.907	0.000	0.000	0.000	0.000	7.907
2.167	41.600	10.400	0.000	0.000	0.000	0.000	0.000	0.000	8.077	0.000	0.000	0.000	0.000	8.077

2.250	43.200	10.800	0.000	0.000	0.000	0.000	0.000	0.000	8.243	0.000	0.000	0.000	0.000	8.243
2.333	44.800	11.200	0.000	0.000	0.000	0.000	0.000	0.000	8.407	0.000	0.000	0.000	0.000	8.407
2.417	46.400	11.600	0.000	0.000	0.000	0.000	0.000	0.000	8.567	0.000	0.000	0.000	0.000	8.567
2.500	48.000	12.000	0.000	0.000	0.000	0.000	0.000	0.000	8.724	0.000	0.000	0.000	0.000	8.724
2.583	49.600	12.400	0.000	0.000	0.000	0.000	0.000	0.000	8.878	0.000	0.000	0.000	0.895	9.773
2.667	51.200	12.800	0.000	0.000	0.000	0.000	0.000	0.000	9.030	0.000	0.000	0.000	2.531	11.561
2.750	52.800	13.200	0.000	0.000	0.000	0.000	0.000	0.000	9.179	0.000	0.000	0.000	4.650	13.829
2.833	54.400	13.600	0.000	0.000	0.000	0.000	0.000	0.000	9.326	0.000	0.000	0.000	7.159	16.485
2.917	56.000	14.000	0.000	0.000	0.000	0.000	0.000	0.000	9.471	0.000	0.000	0.000	10.005	19.476
3.000	57.600	14.400	0.000	0.000	0.000	0.000	0.000	0.000	9.613	0.000	0.000	0.000	13.152	22.765
3.083	59.200	14.800	0.000	0.000	0.000	0.000	0.000	0.000	9.754	0.000	0.000	0.000	16.574	26.327
3.167	60.800	15.200	0.000	0.000	0.000	0.000	0.000	0.000	9.892	0.000	0.000	0.000	20.249	30.141
3.250	62.400	15.600	0.000	0.000	0.000	0.000	0.000	0.000	10.028	0.000	0.000	0.000	24.162	34.190
3.333	64.000	16.000	0.000	0.000	0.000	0.000	0.000	0.000	10.163	0.000	0.000	0.000	28.299	38.462
3.417	65.600	16.400	0.000	0.000	0.000	0.000	0.000	0.000	10.296	0.000	0.000	0.000	32.648	42.944
3.500	67.200	16.800	0.000	0.000	0.000	0.000	0.000	0.000	10.427	0.000	0.000	0.000	37.200	47.627
3.583	68.800	17.200	0.000	0.000	0.000	0.000	0.000	0.000	10.557	0.000	0.000	0.000	41.946	52.502
3.667	70.400	17.600	0.000	0.000	0.000	0.000	0.000	0.000	10.684	0.000	0.000	0.000	46.877	57.562
3.750	72.000	18.000	0.000	0.000	0.000	0.000	0.000	0.000	10.811	0.000	0.000	0.000	51.989	62.800
3.833	73.600	18.400	0.000	0.000	0.000	0.000	0.000	0.000	10.936	0.000	0.000	0.000	57.273	68.209
3.917	75.200	18.800	0.000	0.000	0.000	0.000	0.000	0.000	11.059	0.000	0.000	0.000	62.726	73.785
4.000	76.800	19.200	0.000	0.000	0.000	0.000	0.000	0.000	11.182	0.000	0.000	0.000	68.341	79.522

Outlet structure for Discharge of BMP V14

Discharge vs Elevation Table

Low orifice	0.625 "	Lower slot		Lower Weir			
Number of orif:	0	Number of slots:	1	Number of weirs:	0		
Cg-low:	0.61	Invert:	0.00 ft	Invert:	0.000 ft		
		B	1.33 ft	B:	0.000 ft		
Middle orifice	2.500 "	hslot	0.250 ft				
Number of orif:	0.000						
Cg-middle:	0.61	Upper slot		Upper Weir		Emergency weir	
invert elev:	0 ft	Number of slots:	0	Number of weirs:	0	Invert:	6.000 ft
		Invert:	0.00 ft	Invert:	0.000 ft	W:	8.00 ft
*Note: h = head above the invert of the lowest surface discharge opening.		B:	0.00 ft	B:	0.00 ft		
		hslot	0.000 ft				

h* (ft)	H/D-low -	H/D-mid -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qslot-low (cfs)	Qslot-upp (cfs)	Qlweir (cfs)	Quweir (cfs)	Qemerg (cfs)	Qtot (cfs)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.083	1.600	0.400	0.000	0.000	0.000	0.000	0.000	0.000	0.099	0.000	0.000	0.000	0.000	0.099
0.167	3.200	0.800	0.000	0.000	0.000	0.000	0.000	0.000	0.281	0.000	0.000	0.000	0.000	0.281
0.250	4.800	1.200	0.000	0.000	0.000	0.000	0.000	0.000	0.517	0.000	0.000	0.000	0.000	0.517
0.333	6.400	1.600	0.000	0.000	0.000	0.000	0.000	0.000	0.745	0.000	0.000	0.000	0.000	0.745
0.417	8.000	2.000	0.000	0.000	0.000	0.000	0.000	0.000	0.881	0.000	0.000	0.000	0.000	0.881
0.500	9.600	2.400	0.000	0.000	0.000	0.000	0.000	0.000	0.999	0.000	0.000	0.000	0.000	0.999
0.583	11.200	2.800	0.000	0.000	0.000	0.000	0.000	0.000	1.105	0.000	0.000	0.000	0.000	1.105
0.667	12.800	3.200	0.000	0.000	0.000	0.000	0.000	0.000	1.201	0.000	0.000	0.000	0.000	1.201
0.750	14.400	3.600	0.000	0.000	0.000	0.000	0.000	0.000	1.290	0.000	0.000	0.000	0.000	1.290
0.833	16.000	4.000	0.000	0.000	0.000	0.000	0.000	0.000	1.373	0.000	0.000	0.000	0.000	1.373
0.917	17.600	4.400	0.000	0.000	0.000	0.000	0.000	0.000	1.452	0.000	0.000	0.000	0.000	1.452
1.000	19.200	4.800	0.000	0.000	0.000	0.000	0.000	0.000	1.526	0.000	0.000	0.000	0.000	1.526
1.083	20.800	5.200	0.000	0.000	0.000	0.000	0.000	0.000	1.597	0.000	0.000	0.000	0.000	1.597
1.167	22.400	5.600	0.000	0.000	0.000	0.000	0.000	0.000	1.665	0.000	0.000	0.000	0.000	1.665
1.250	24.000	6.000	0.000	0.000	0.000	0.000	0.000	0.000	1.731	0.000	0.000	0.000	0.000	1.731
1.333	25.600	6.400	0.000	0.000	0.000	0.000	0.000	0.000	1.794	0.000	0.000	0.000	0.000	1.794
1.417	27.200	6.800	0.000	0.000	0.000	0.000	0.000	0.000	1.854	0.000	0.000	0.000	0.000	1.854
1.500	28.800	7.200	0.000	0.000	0.000	0.000	0.000	0.000	1.913	0.000	0.000	0.000	0.000	1.913
1.583	30.400	7.600	0.000	0.000	0.000	0.000	0.000	0.000	1.971	0.000	0.000	0.000	0.000	1.971
1.667	32.000	8.000	0.000	0.000	0.000	0.000	0.000	0.000	2.026	0.000	0.000	0.000	0.000	2.026
1.750	33.600	8.400	0.000	0.000	0.000	0.000	0.000	0.000	2.080	0.000	0.000	0.000	0.000	2.080
1.833	35.200	8.800	0.000	0.000	0.000	0.000	0.000	0.000	2.133	0.000	0.000	0.000	0.000	2.133
1.917	36.800	9.200	0.000	0.000	0.000	0.000	0.000	0.000	2.184	0.000	0.000	0.000	0.000	2.184
2.000	38.400	9.600	0.000	0.000	0.000	0.000	0.000	0.000	2.234	0.000	0.000	0.000	0.000	2.234
2.083	40.000	10.000	0.000	0.000	0.000	0.000	0.000	0.000	2.283	0.000	0.000	0.000	0.000	2.283
2.167	41.600	10.400	0.000	0.000	0.000	0.000	0.000	0.000	2.332	0.000	0.000	0.000	0.000	2.332

2.250	43.200	10.800	0.000	0.000	0.000	0.000	0.000	0.000	2.379	0.000	0.000	0.000	0.000	2.379
2.333	44.800	11.200	0.000	0.000	0.000	0.000	0.000	0.000	2.425	0.000	0.000	0.000	0.000	2.425
2.417	46.400	11.600	0.000	0.000	0.000	0.000	0.000	0.000	2.470	0.000	0.000	0.000	0.000	2.470
2.500	48.000	12.000	0.000	0.000	0.000	0.000	0.000	0.000	2.515	0.000	0.000	0.000	0.000	2.515
2.583	49.600	12.400	0.000	0.000	0.000	0.000	0.000	0.000	2.558	0.000	0.000	0.000	0.000	2.558
2.667	51.200	12.800	0.000	0.000	0.000	0.000	0.000	0.000	2.601	0.000	0.000	0.000	0.000	2.601
2.750	52.800	13.200	0.000	0.000	0.000	0.000	0.000	0.000	2.644	0.000	0.000	0.000	0.000	2.644
2.833	54.400	13.600	0.000	0.000	0.000	0.000	0.000	0.000	2.685	0.000	0.000	0.000	0.000	2.685
2.917	56.000	14.000	0.000	0.000	0.000	0.000	0.000	0.000	2.726	0.000	0.000	0.000	0.000	2.726
3.000	57.600	14.400	0.000	0.000	0.000	0.000	0.000	0.000	2.767	0.000	0.000	0.000	0.000	2.767
3.083	59.200	14.800	0.000	0.000	0.000	0.000	0.000	0.000	2.807	0.000	0.000	0.000	0.000	2.807
3.167	60.800	15.200	0.000	0.000	0.000	0.000	0.000	0.000	2.846	0.000	0.000	0.000	0.000	2.846
3.250	62.400	15.600	0.000	0.000	0.000	0.000	0.000	0.000	2.885	0.000	0.000	0.000	0.000	2.885
3.333	64.000	16.000	0.000	0.000	0.000	0.000	0.000	0.000	2.923	0.000	0.000	0.000	0.000	2.923
3.417	65.600	16.400	0.000	0.000	0.000	0.000	0.000	0.000	2.960	0.000	0.000	0.000	0.000	2.960
3.500	67.200	16.800	0.000	0.000	0.000	0.000	0.000	0.000	2.998	0.000	0.000	0.000	0.000	2.998
3.583	68.800	17.200	0.000	0.000	0.000	0.000	0.000	0.000	3.034	0.000	0.000	0.000	0.000	3.034
3.667	70.400	17.600	0.000	0.000	0.000	0.000	0.000	0.000	3.071	0.000	0.000	0.000	0.000	3.071
3.750	72.000	18.000	0.000	0.000	0.000	0.000	0.000	0.000	3.107	0.000	0.000	0.000	0.000	3.107
3.833	73.600	18.400	0.000	0.000	0.000	0.000	0.000	0.000	3.142	0.000	0.000	0.000	0.000	3.142
3.917	75.200	18.800	0.000	0.000	0.000	0.000	0.000	0.000	3.177	0.000	0.000	0.000	0.000	3.177
4.000	76.800	19.200	0.000	0.000	0.000	0.000	0.000	0.000	3.212	0.000	0.000	0.000	0.000	3.212
4.083	78.400	19.600	0.000	0.000	0.000	0.000	0.000	0.000	3.246	0.000	0.000	0.000	0.000	3.246
4.167	80.000	20.000	0.000	0.000	0.000	0.000	0.000	0.000	3.280	0.000	0.000	0.000	0.000	3.280
4.250	81.600	20.400	0.000	0.000	0.000	0.000	0.000	0.000	3.314	0.000	0.000	0.000	0.000	3.314
4.333	83.200	20.800	0.000	0.000	0.000	0.000	0.000	0.000	3.347	0.000	0.000	0.000	0.000	3.347
4.417	84.800	21.200	0.000	0.000	0.000	0.000	0.000	0.000	3.380	0.000	0.000	0.000	0.000	3.380
4.500	86.400	21.600	0.000	0.000	0.000	0.000	0.000	0.000	3.413	0.000	0.000	0.000	0.000	3.413
4.583	88.000	22.000	0.000	0.000	0.000	0.000	0.000	0.000	3.445	0.000	0.000	0.000	0.000	3.445
4.667	89.600	22.400	0.000	0.000	0.000	0.000	0.000	0.000	3.477	0.000	0.000	0.000	0.000	3.477
4.750	91.200	22.800	0.000	0.000	0.000	0.000	0.000	0.000	3.509	0.000	0.000	0.000	0.000	3.509
4.833	92.800	23.200	0.000	0.000	0.000	0.000	0.000	0.000	3.541	0.000	0.000	0.000	0.000	3.541
4.917	94.400	23.600	0.000	0.000	0.000	0.000	0.000	0.000	3.572	0.000	0.000	0.000	0.000	3.572
5.000	96.000	24.000	0.000	0.000	0.000	0.000	0.000	0.000	3.603	0.000	0.000	0.000	0.000	3.603
5.083	97.600	24.400	0.000	0.000	0.000	0.000	0.000	0.000	3.633	0.000	0.000	0.000	0.000	3.633
5.167	99.200	24.800	0.000	0.000	0.000	0.000	0.000	0.000	3.664	0.000	0.000	0.000	0.000	3.664
5.250	100.800	25.200	0.000	0.000	0.000	0.000	0.000	0.000	3.694	0.000	0.000	0.000	0.000	3.694
5.333	102.400	25.600	0.000	0.000	0.000	0.000	0.000	0.000	3.724	0.000	0.000	0.000	0.000	3.724
5.417	104.000	26.000	0.000	0.000	0.000	0.000	0.000	0.000	3.754	0.000	0.000	0.000	0.000	3.754
5.500	105.600	26.400	0.000	0.000	0.000	0.000	0.000	0.000	3.783	0.000	0.000	0.000	0.000	3.783
5.583	107.200	26.800	0.000	0.000	0.000	0.000	0.000	0.000	3.812	0.000	0.000	0.000	0.000	3.812
5.667	108.800	27.200	0.000	0.000	0.000	0.000	0.000	0.000	3.841	0.000	0.000	0.000	0.000	3.841
5.750	110.400	27.600	0.000	0.000	0.000	0.000	0.000	0.000	3.870	0.000	0.000	0.000	0.000	3.870

5.833	112.000	28.000	0.000	0.000	0.000	0.000	0.000	0.000	3.899	0.000	0.000	0.000	0.000	3.899
5.917	113.600	28.400	0.000	0.000	0.000	0.000	0.000	0.000	3.927	0.000	0.000	0.000	0.000	3.927
6.000	115.200	28.800	0.000	0.000	0.000	0.000	0.000	0.000	3.955	0.000	0.000	0.000	0.000	3.955
6.083	116.800	29.200	0.000	0.000	0.000	0.000	0.000	0.000	3.983	0.000	0.000	0.000	0.597	4.580
6.167	118.400	29.600	0.000	0.000	0.000	0.000	0.000	0.000	4.011	0.000	0.000	0.000	1.687	5.698
6.250	120.000	30.000	0.000	0.000	0.000	0.000	0.000	0.000	4.038	0.000	0.000	0.000	3.100	7.138
6.333	121.600	30.400	0.000	0.000	0.000	0.000	0.000	0.000	4.066	0.000	0.000	0.000	4.773	8.838
6.417	123.200	30.800	0.000	0.000	0.000	0.000	0.000	0.000	4.093	0.000	0.000	0.000	6.670	10.763
6.500	124.800	31.200	0.000	0.000	0.000	0.000	0.000	0.000	4.120	0.000	0.000	0.000	8.768	12.888
6.583	126.400	31.600	0.000	0.000	0.000	0.000	0.000	0.000	4.147	0.000	0.000	0.000	11.049	15.196
6.667	128.000	32.000	0.000	0.000	0.000	0.000	0.000	0.000	4.173	0.000	0.000	0.000	13.499	17.673
6.750	129.600	32.400	0.000	0.000	0.000	0.000	0.000	0.000	4.200	0.000	0.000	0.000	16.108	20.308
6.833	131.200	32.800	0.000	0.000	0.000	0.000	0.000	0.000	4.226	0.000	0.000	0.000	18.866	23.092
6.917	132.800	33.200	0.000	0.000	0.000	0.000	0.000	0.000	4.252	0.000	0.000	0.000	21.766	26.018
7.000	134.400	33.600	0.000	0.000	0.000	0.000	0.000	0.000	4.278	0.000	0.000	0.000	24.800	29.078
7.083	136.000	34.000	0.000	0.000	0.000	0.000	0.000	0.000	4.304	0.000	0.000	0.000	27.964	32.268
7.167	137.600	34.400	0.000	0.000	0.000	0.000	0.000	0.000	4.330	0.000	0.000	0.000	31.252	35.582
7.250	139.200	34.800	0.000	0.000	0.000	0.000	0.000	0.000	4.356	0.000	0.000	0.000	34.659	39.015
7.333	140.800	35.200	0.000	0.000	0.000	0.000	0.000	0.000	4.381	0.000	0.000	0.000	38.182	42.563
7.417	142.400	35.600	0.000	0.000	0.000	0.000	0.000	0.000	4.406	0.000	0.000	0.000	41.817	46.223
7.500	144.000	36.000	0.000	0.000	0.000	0.000	0.000	0.000	4.431	0.000	0.000	0.000	45.561	49.992
7.583	145.600	36.400	0.000	0.000	0.000	0.000	0.000	0.000	4.456	0.000	0.000	0.000	49.409	53.866
7.667	147.200	36.800	0.000	0.000	0.000	0.000	0.000	0.000	4.481	0.000	0.000	0.000	53.361	57.842
7.750	148.800	37.200	0.000	0.000	0.000	0.000	0.000	0.000	4.506	0.000	0.000	0.000	57.413	61.919
7.833	150.400	37.600	0.000	0.000	0.000	0.000	0.000	0.000	4.530	0.000	0.000	0.000	61.562	66.092
7.917	152.000	38.000	0.000	0.000	0.000	0.000	0.000	0.000	4.555	0.000	0.000	0.000	65.807	70.362
8.000	153.600	38.400	0.000	0.000	0.000	0.000	0.000	0.000	4.579	0.000	0.000	0.000	70.145	74.724

ATTACHMENT 5

Pre & Post-Developed Maps, Project Plan and Detention

Section Sketches