VOLUME 1

WATER QUALITY MANAGEMENT PLAN (WQMP)




FOR

PORTOLA CENTER TENTATIVE TRACT MAP No. 17300 LAKE FOREST, CA

Prepared for:

USA Portola, LLC

280 Newport Center Drive, Suite 240
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Prepared by:

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(949) 583-1010

PREPARED: March 18, 2013

WO # 3645-2

Water Quality Management Plan (WQMP)

for

PORTOLA CENTER
Tentative Tract Map No. 17300

On the North Side of Glenn Ranch Road at Saddleback Ranch Road in Lake Forest, CA

APNs: 606-321- (01, 02, 03, 04, 05, 06, 07, 08, 09)
606-331- (01, 02, 03), 606-322-01, 606-161 – (28, 30, 31)

Prepared for:

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PREPARED: March 18, 2013

Owner's Certification
Water Quality Management Plan (WQMP)

Portola Center
Tentative Tract Map No. 17300

This Water Quality Management Plan (WQMP) has been prepared for USA Portola LLC by Hunsaker and Associates. The WQMP is intended to comply with the requirements of the City of Lake Forest Urban Runoff Management Program and Storm Water Ordinance, as well as the Municipal Storm Water Permit which require the preparation of WQMPs for priority development projects.

The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this WQMP. The undersigned will ensure that this plan is carried out and amended as appropriate to reflect up-to-date conditions on the site consistent with the current City of Lake Forest Urban Runoff Management Program and the intent of the NPDES/MS4 Permit for Waste Discharge Requirements as authorized by the State and EPA. Once the undersigned transfers its interest in the property, its successors-in-interest shall bear the aforementioned responsibility to implement and amend the WQMP. An appropriate number of approved and signed copies of this document shall be available on the subject site in perpetuity.

This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party having responsibility for implementing portions of this WQMP.

Signed: _____

Name: _____

Title: _____

Company: _____

Address: _____

Telephone #: _____

Date: _____

Email Address: _____

Table of Contents

Tables

Figures

Appendices

Section 1

Section 1 Project Description

1. Detailed development description:

USA Portola LLC proposes Tentative Tract Map No. 17300, a residential development which includes 304 single family detached residences, 18 second units, 2 public parks, open space, streets, sidewalks, utility easements and other related improvements. No on-site laundry or car wash community facilities are proposed for the project.

Lot Summary

Lot No.	Land Use	Maintenance Responsibility	Acres
1-304	Single Family Residential	Homeowner	49.0
305	Park Site (Private)	HOA	0.5
306	Park Site (Private)	HOA	0.6
307	Gated Entry (Private)	HOA	0.5
308	Gated Entry (Private)	HOA	0.5
A-J	Open Space	HOA	27.3
K-L	Private Driveway	HOA	0.1
M-R	Private Streets	HOA	14.7
S	Emergency Access	HOA	0.2
	Existing Glenn Ranch Road and Saddleback Ranch Road	City of Lake Forest	6.1
			99.5

This project is classified as a Priority Project, Category 1 (residential development of 10 units or more) per the Orange County Drainage Area Management Plan (DAMP) and the City of Lake Forest WQMP. Therefore, treatment control BMPs are required to remove pollutants typically associated with urban runoff.

2. Project location and site address:

The site is located at and adjacent to the north side of Glenn Ranch Road at the intersection with Saddleback Ranch Road. Thomas Brothers Guide Page 862, Grids E6 and F6.

3. Property size:

The proposed project is approximately 99.5 acres, (4,334,220 sf)

4. Existing use:

The existing pre-construction site includes portions of existing Glenn Ranch Road and Saddleback Ranch Road, but is otherwise vacant.

5. Type of Development:

The project is a detached residential development with related improvements. Project data follows:

Single Family Lot Area Summary
55' x 100' Lot (West of Saddleback Ranch Road)
(Lots 1, 2, 5, 8-12, 48-51,53-62 & 81)

Lot No.	S.F	Lot No.	S.F
1	6,415	53	5,786
2	6,950	54	5,981
5	8,842	55	6,475
8	8,433	56	6,210
9	6,759	57	6,228
10	6,538	58	6,174
11	6,150	59	6,122
12	5,885	60	6,076
48	9,652	61	6,076
49	6,526	62	6,038
50	6,833	81	9,086
51	6,252		
Total Gross 155,486 S.F. 3.5 Acres Average Gross 6,760 S.F. 23 Residential Lots			

Single Family Lot Area Summary
55' x 100' Lot (East of Saddleback Ranch Road)
(Lots 82-85, 123-149, 166-183, 250-284 & 300-304)

Lot No.	S.F	Lot No.	S.F	Lot No.	S.F
82	6,935	149	7,315	261	6,067
83	6,671	166	7,111	262	6,095
84	6,734	167	6,695	263	6,096
85	6,541	168	6,491	264	6,071
123	8,678	169	6,490	265	6,558
124	5,956	170	6,490	266	6,044
125	6,742	171	6,490	267	5,894
126	7,150	172	6,490	268	5,646
127	6,408	173	6,050	269	10,575
128	8,478	174	6,050	270	6,057
129	7,855	175	6,050	271	6,362
130	6,909	176	6,050	272	6,279
131	7,009	177	6,050	273	6,374
132	6,755	178	6,050	274	6,050
133	6,529	179	5,980	275	6,050
134	6,652	180	6,507	276	6,050
135	6,744	181	6,521	277	6,050
137	6,332	182	6,290	278	6,050
137	6,490	183	10,784	279	7,771
138	6,050	250	6,057	280	7,143
139	6,050	251	6,065	281	6,366
140	6,050	252	6,065	282	5,676
141	6,050	253	6,065	283	5,928
142	6,278	254	6,059	284	9,402
143	6,262	255	6,051	300	5,793
144	6,379	256	6,051	301	6,130
145	6,334	257	6,051	302	6,258
146	6,300	258	6,052	303	6,783
147	6,418	259	6,052	304	7,094
148	5,802	260	6,051		
Total Gross 580,828 S.F. 13.3 Acres Average Gross 6,526 S.F. 89 Residential Lots					

Single Family Lot Area Summary
60' x 100' Lot (West of Saddleback Ranch Road)
(Lots 3, 4, 6, 7, 13-47, 52 & 63-80)

Lot No.	S.F	Lot No.	S.F	Lot No.	S.F
3	7,555	29	7,236	63	8,396
4	13,442	30	7,330	64	9,810
6	6,589	31	7,832	65	7,788
7	7,644	32	9,139	66	6,567
13	6,720	33	10,010	67	6,483
14	6,648	34	8,823	68	6,350
15	6,950	35	6,494	69	6,394
16	7,324	36	6,331	70	6,623
17	7,187	37	6,306	71	6,862
18	7,344	38	6,281	72	6,741
19	7,614	39	6,328	73	6,309
20	10,915	40	6,437	74	6,136
21	11,071	41	6,957	75	6,244
22	8,736	42	6,386	76	6,400
23	6,943	43	6,200	77	8,089
24	7,657	44	6,272	78	7,226
25	8,129	45	6,512	79	6,084
26	7,182	46	6,668	80	6,193
27	7,695	47	9,055		
28	9,159	52	6,818		
Total Gross 430,614 S.F. 9.8 Acres Average Gross 7,424 S.F. 58 Residential Lots					

Single Family Lot Area Summary
60' x 100' Lot (East of Saddleback Ranch Road)
(Lots 82-122, 150-165, 184-249, & 285-299)

Lot No.	S.F	Lot No.	S.F	Lot No.	S.F	Lot No.	S.F
86	6,633	120	7,506	199	6,134	233	6,808
87	6,647	121	7,086	200	6,134	234	6,552
88	6,565	122	8,955	201	6,204	235	6,576
89	6,500	150	10,672	202	6,516	236	6,563
90	6,269	151	7,225	203	7,118	237	6,348
91	6,081	152	7,505	204	9,614	238	6,244
92	6,074	153	6,800	205	8,680	239	6,651
93	6,126	154	6,673	206	8,284	240	8,691
94	6,179	155	6,533	207	8,678	241	8,464
95	6,800	156	6,393	208	10,493	242	7,316
96	6,355	157	6,257	209	8,703	243	7,486
97	6,170	158	6,336	210	8,884	244	7,869
98	7,263	159	6,400	211	7,813	245	7,650
99	6,097	160	6,457	212	7,185	246	6,851
100	7,614	161	7,200	213	8,014	247	8,656
101	8,345	162	7,332	214	7,067	248	9,638
102	7,570	163	8,191	215	8,104	249	11,892
103	7,201	164	10,387	216	7,712	285	12,528
104	9,745	165	8,084	217	9,097	286	8,041
105	6,924	184	9,974	218	8,668	287	6,213
106	6,634	185	6,334	219	6,816	288	6,234
107	6,595	186	6,259	220	6,109	289	7,279
108	6,287	187	6,246	221	11,174	290	7,942
109	6,389	188	6,413	222	8,103	291	6,683
110	6,424	189	6,303	223	6,669	292	6,092
111	6,391	190	6,674	224	7,509	293	6,109
112	6,102	191	6,867	225	6,974	294	6,000
113	7,619	192	6,447	226	8,176	295	6,033
114	7,000	193	6,298	227	8,241	296	6,068
115	8,081	194	6,130	228	7,277	297	6,303
116	7,440	195	6,109	229	7,564	298	6,264
117	8,533	196	6,099	230	7,369	299	6,352
118	6,880	197	6,024	231	6,822		
119	7,005	198	6,128	232	6,825		
Total Gross 973,847 S.F. 22.4 Acres Average Gross 7,268 S.F. 134 Residential Lots							

Park Summary

Lot No.	Gross S.F.	Net Acres
305	24,490	0.5
306	24,417	0.6
Total	48,907	1.1

Open Space Summary

Lot No.	S.F.	Acres
A	200,567	4.60
B	161,946	3.72
C	70,106	1.61
D	179,753	4.13
E	104,803	2.40
F	126,748	2.91
G	18,632	0.43
H	67,995	1.56
I	192,860	4.43
J	65,839	1.51
Total	1,189,249	27.30

6. Impervious/pervious surface areas:

In the developed condition impervious areas will consist of streets, common access ways, sidewalks and rooftops. Area quantities are approximates and are listed in the table below:

Project Area	Pre construction			Post construction		
	Acreage	Sq. ft.	%	Acreage	Sq. ft.	%
Total Space	99.5 ac.	4,334,220	100%	99.5 ac.	4,334,220	100%
Pervious	92.5 ac.	4,030,825	93%	37.8 ac	1,647,004	38%
Impervious	7.0 ac.	303,395	7%	61.7 ac.	2,687,216	62%

7. Property ownership:

The project is a planned community that will be incorporated into one proposed property owner/Homeowner's Association. Until such time as the contact information for said HOA is established, the project's owner, USA Portola LLC will serve as the HOA contact. The contact person for USA Portola LLC is Stephen Haase who can be reached at USA Portola, LLC, 280 Newport Center Drive, Suite 240, Newport Beach, CA, (619) 234-4050.

8. Other:

This WQMP complies with the SUSMP requirements of the 2002 NPDES Permit (Order R9-2002-0001) for new development projects and the 2003 Orange County Drainage Area Management Plan (DAMP). This WQMP is also consistent with the interim hydromodification requirements as defined in Order R9-2009-0002.

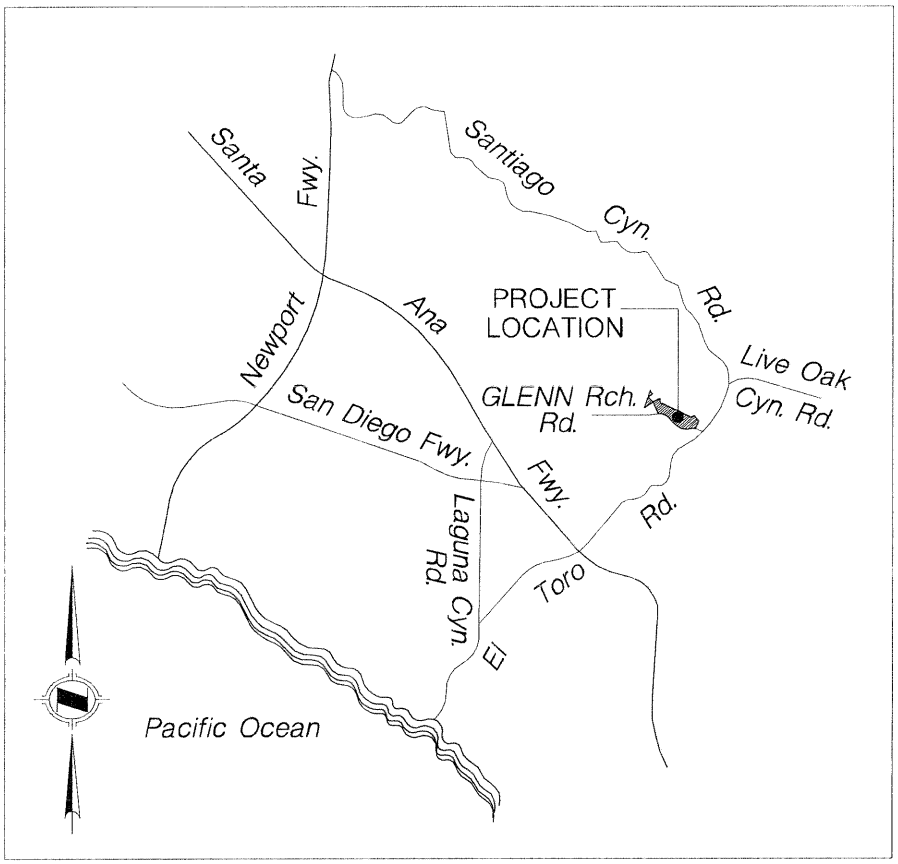
Section 2

Section 2 Project Location Map

The project is located within the Portola Hills Planned Community Area. The location of the project site is illustrated in Figure 2.1

Figure 2.1 Location Map

(See following page)



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N.T.S.

Section 3

Section 3 Project Site Assessment

This project site assessment section provides important information that is used when considering the potential water quality and hydrologic impacts that could be caused by the proposed project. This information is important when considering the appropriate BMPs to reduce identified potential impacts as well as when developing measures to reduce those impacts.

1. Zoning and land use designation:

The project is zoned City of Lake Forest – Portola Hills Planned Community, Single Family, Multifamily, Mixed Use, Park and Open Space.

2. Existing and proposed drainage:

The project's existing and proposed drainage conditions are linked with adjacent, downstream VTTM 15353 located offsite. Portions of a hydrology report covering the drainage for both this project (TTM 17300) and offsite, downstream VTTM 15353 are provided in Appendix B. A related Hydromodification Report is included in Appendix E. A complete project hydrology report is available at the City of Lake Forest.

Existing Condition

The Project site is presently in an undeveloped condition with a mix of native and non-native vegetation covering much of the site. The site has previously undergone rough grading in the north and portions of the south. A review of the Flood Insurance Rate Map (FIRM) (Map #: 06059C0317J) dated December 3, 2009, indicates that no portion of the Project site is in a floodplain (please see a copy of the FIRM map in Appendix B for more detail).

The Project is comprised of six (6) major drainage areas (Drainage Areas "A" through "F") that exit the Project site at thirteen (13) concentration nodes (outlets) located around the perimeter of the Project, as shown on the existing and proposed conditions hydrology maps in Appendix B. Drainage Area "A" is comprised of approximately 213.9 acres, including the off- site area of approximately 151.4 acres of the Portola Hills Community. Drainage Areas "B", "C", "D", "E" & "F" are comprised of a total acreage of approximately 137.5 acres. All the drainage runoff discharging from the 13 outlets are tributary to existing earthen channels that drain to the existing Serrano Creek and Aliso Creek.

There is an existing 60-inch R.C.P. storm drain (Facility #: J01P06) that extends underneath Saddleback Ranch Road carrying flows from the Portola Hills Community (located to the north of the Project site) into to an existing approximately 12 acre-foot detention basin located approximately 500 feet southwest of the Saddleback Ranch/Glenn Ranch Road intersection, in the northwest corner of the adjacent, offsite TTM 15353 Project site. This existing Portola Hills basin outlets at the bottom of Drainage Area "A" at Node 377 in the western corner of the Project site. The outlet of the existing detention basin (at Node 377) was designed for Expected Value (EV) peak discharges of 264 cubic feet per second (cfs), 195 cfs, and 151 cfs for the 100-, 25-, and 10-year storm events, respectively (per Portola Hills Retarding Basin Study by J.P Kapp & Associates, Inc. dated November 1989, which is included in the complete project hydrology report at the City of Lake Forest.

Proposed Condition

The post-development condition includes the six drainage areas (Drainage Areas "A" through "F") discharging across the southern and eastern boundary of the Project site, similar to existing condition. The 2-Yr, 5-Yr, 10-Yr, 25-Yr, 50-Yr and 100-Yr expected values (EV) with high confidence values (HC) for these drainage areas are shown on the summary table titled: "Tentative Tract 15353 & 17300 Areas "A", "B", "C", "D", "E" & "F" Summary of Hydrology Analysis Existing Condition vs. Proposed Condition" (included in Appendix B and at the end of Section 5).

Drainage Area "A" includes 151.4 acres of the Portola Hills Community to the North of the Project site. Runoff from the 151.4 acres of the existing Portola Hills Community and a portion of the runoff from the existing Glenn Ranch Road and Saddleback Ranch Road, account for approximately 72% of the total runoff in Drainage Area "A". The remaining 28% of these flows are coming from those portions of Drainage Area "A" that are part of the Project site. The existing flows from Portola Hills and portions of Glenn Ranch Road and Saddleback Ranch Road will not be comingled with the Project's flows. Instead, these existing flows will be confined to a separate bypass storm drain system and diverted into a new underground 5.4 acre-foot flow-by underground detention chamber at node 336.11, (Basin #2). Flows from those portions of Drainage Area "A" that are part of the Project site will be captured and routed through a separate storm water detention and conveyance system that treats and detains these flows in compliance with water quality and hydromodification requirements. After accounting for the project flows discharging at Node 377, Basin #2 is sized to limit the peak discharge at Node 377 to 263.9 cfs, 178.8 cfs and 150.9 cfs, for 100-year, 25-year and 10-year EV storm events, respectively.

Hydromodification

As shown on the map titled "Preliminary Design Detention – Hydromodification and Water Quality Volume Exhibit" (included in Appendix B, Tab 3), the Project includes 7 – underground flow-through Hydromodification/Water Quality (HYD/WQ) Chambers, 1 underground Hydromodification use only chamber, 2 underground detention chambers and 1 above ground water quality basin (with combined uses for water quality treatment, hydromodification and retention). See Section 6.3.1 for reference.

Nuisance runoff, and runoff during minor storms of up to 10-year frequencies, will be diverted and routed through the underground HYD/WQ chambers for treatment and flow-retardation (to meet hydromodification requirements) prior to being released to the downstream storm drain system.

Onsite portion of Drainage Area "A" has been divided into Subareas A1, A3, A4 & A5. Runoff from Subareas A1 & A3 will be routed into Basin #3; Subarea A4 will be routed through HYD/WQ Basin #4; and Subarea A5 will be routed through Basin #1.

Drainage Area "B" has been divided into Subareas B1, B2 & B3. Subareas B1 & B2 will be routed through HYD/WQ Basin #5; and Subarea B3 will be routed through two interconnected underground chambers, i.e. HYD/WQ Basins #7A and HYD/WQ Basin #7B.

Drainage Area "C" has been divided into Subareas C1 & C2. Runoff from Subarea C1 will be routed through HYD/WQ Basin #8A; and Subarea C2 will be routed through HYD/WQ Basin #8B.

Drainage Area "D" consists of two Subareas D1 & D2. Runoff from both the subareas will be routed through a water quality/hydromodification/detention basin, Basin #9.

The Project's discharges in the proposed condition must also meet Regional Water Quality Control Board water quality and the Interim Hydromodification standards. Water Quality Management Plans (WQMPs) outlining these elements of the Project's stormwater conveyance system have been prepared for the Project's two Tentative Tract Maps (TTM15353 and TTM17300) as separate reports.

Conclusions

The onsite storm water detention and conveyance system in Drainage Area "A" will be designed as a separate system to ensure no commingling of flows originating in Portola Hills and portions of Glenn Ranch and Saddleback Ranch Roads and flows originating onsite before the onsite flows undergo treatment and detention for water quality and hydromodification purposes.

Thirteen (13) discharges locations (nodes) around the perimeter of the Project site are proposed in the Proposed Condition. The study indicates that, with the proposed detention and hydromodification basins, the individual post-development (Proposed Condition) peak discharges at the 13 discharge locations are less than the individual pre-developed (Existing Condition) peak discharges at these 13 different discharge locations, thereby preventing any new contribution to a localized flooding condition. The outlets will be designed with riprap and/or energy dissipaters to ensure post-development discharge velocities do not exceed discharge velocities in the Existing Condition. Therefore, the proposed Project has no impact on erosion and scour at outlet locations.

Per the FIRM Map #06059C0317J dated December 3, 2009, no portion of the Project site is in a floodplain in the site's Existing Condition nor would any portion of the site be in a floodplain in the Proposed Condition. Please see the summary table entitled "Summary of Hydrology Analysis, Existing Condition vs. Proposed Condition" in Section 5 for more detail on Project flows in the Existing and Proposed Conditions. Finally, all of the Project's proposed storm water facilities will be protected and designed for the 100-year storm event per the requirements of the current Orange County Local Drainage Manual and the Project's discharges in the proposed condition have been designed to meet applicable water quality and the Interim Hydromodification standards.

3. Will the drainage system be modified by the development?

Yes,
See Section 7 Exhibit A, Item #2 above and Appendix B.

4. Will drainage coincide with City's system or flow to a creek or ocean?

Yes. Drainage will flow offsite to either Serrano Creek by sheet flows from the site or to Aliso Creek via storm drain pipe systems to be constructed by the project.

5. Watershed and receiving waters:

Approximately 98.6% (or approximately 98.1 acres) of the project is located within the jurisdiction of the San Diego Regional Water Quality Control Board and within the **Aliso Creek Watershed**.

Aliso Creek is located offsite and east of the project site. It is a natural creek located along the west side of El Toro Road. The creek flows through natural open space and urban development and outlets at the ocean at Aliso Creek Beach. Aliso Creek's watershed encompasses 23,000 acres, and includes natural open space, rural and urban development, agriculture and ranching, regional parks and other recreational facilities. There are a number of street crossings over Aliso Creek which have been built as the result of newer or existing developments, upstream and downstream of the project.

Approximately 1.4% (or approximately 1.4 acres) of the project is located in the **Newport Bay Watershed**. More specifically it is in the Serrano Creek drainage area of "Watershed F", San Diego Creek Subwatershed. The project flows to offsite Serrano Creek Channel (F19), San Diego Creek Channel (F05) and the **Upper Newport Bay/Pacific Ocean**.

6. 303(d) listed receiving waters:

There are no pre-existing water quality problems with this site. However, approximately 98.6% (or approximately 98.1 acres) of the project site is tributary to Aliso Creek.

The remaining 1.4% portion of the site (or approximately 1.4 acres) is tributary to Serrano Creek Channel F19. The project is approximately 6.5 miles northeast via storm drains of the San Diego Creek Reach 2 (Cal Watershed 80111000) via Serrano Creek Channel F19.

Further downstream is San Diego Creek Reach 1. Reach 1 extends 7.8 miles from Jeffrey Road to Upper Newport Bay (Ecological Reserve). Further downstream is Lower Newport Bay (Cal Watershed 80114000) and the Pacific Ocean.

7. Total Maximum Daily Loads (TMDLs):

The USEPA approved November 12, 2010 (with October 2011 final decision) Integrated Report (Clean Water Act Section 303(d) List 305(b) Report) which was also approved August 4, 2010 by the California State Water Resources Control Board with corresponding Total Maximum Daily Loads (TMDLs) has been reviewed as it relates to the Project's receiving waters and is summarized as follows:

A. Aliso Creek*

Pollutant	TMDL Requirement Status**	TMDL Date ***
1. Indicator Bacteria	5A	2005
2. Phosphorus	5A	2019
3. Selenium	5A	2021
4. Total Nitrogen as N	5A	2019
5. Toxicity	5A	2019

B. Aliso Creek (Mouth)*

Pollutant	TMDL Requirement Status**	TMDL Date ***
1. Indicator Bacteria	5A	2019

C. Serrano Creek*

Pollutant	TMDL Requirement Status**	TMDL Date ***
1. Ammonia (Unionized)	5A	2021
2. pH	5A	2021

D. San Diego Creek, Reach 2****

Pollutant	TMDL Requirement Status**	TMDL Date ***
1. Nutrients	B	1999
2. Sedimentation/Siltation	B	1999
3. Unknown Toxicity	B	2004

E. San Diego Creek, Reach 1*

Pollutant	TMDL Requirement Status**	TMDL Date ***
1. Fecal Coliform	5A	2019
2. Nutrients	5B	1999
3. Pesticides	5B	2004
4. Sedimentation/Siltation	5B	1999
5. Selenium	5A	2007
6. Toxaphene	5A	2019

F. Newport Bay (Upper)*

Pollutant	TMDL Requirement Status**	TMDL Date ***
1. Chlordane	5A	2019
2. Copper	5A	2007
3. DDT	5A	2019
4. Indicator Bacteria	5B	2000
5. Metals	5A	2019
6. Nutrients	5B	1999
7. PCBs	5A	2019
8. Pesticides	5B	2004
9. Sediment Toxicity	5A	2019
10. Sedimentation/Siltation	5B	1999

g. Newport Bay (Lower)*

Pollutant	TMDL Requirement Status**	TMDL Date ***
1. Chlordane	5A	2019
2. Copper	5A	2007
3. DDT	5A	2019
4. Indicator Bacteria	5B	2000
5. Nutrients	5B	1999
6. PCBs	5A	2019
7. Pesticides	5B	2004
8. Sediment Toxicity	5A	2019

Notes:

*Category 5 criteria: 1) A water segment where standards are not met and a TMDL is required, but not yet completed, for at least one of the pollutants being listed for this segment.

**TMDL requirement status definitions for listed pollutants are: A=TMDL still required, B=being addressed by USEPA approved TMDL, C=being addressed by action other than a TMDL.

***Dates related to the TMDL requirement status, so a date for A=TMDL scheduled completion date, B=Date USEPA approved TMDL, and C=Completion date for action other than a TMDL.

****Category 4A Criteria: 1) A water segment where all its 303(d) listings are being addressed; and 2) at least one of these listings is being addressed by a USEPA approved TMDL.

8. Environmentally Sensitive Areas (ESAs) and/or Areas of Special Biological Significance (ASBA):

The project site contains no Environmentally Sensitive Areas (ESAs) or Areas of Special Biological Significance. The project does not directly discharge to any ESA or ASBS.

9. Soil type(s) and condition:

Onsite earth materials are comprised, in general, of colluvial material consisted of silty sand, brown to grayish brown, slightly moist, porous and subject to consolidation. This material was mapped were thicknesses are greater than 4 feet. Alluvial material consisted of silty sand, medium brown to grayish brown, slightly moist to moist and medium dense in consistency. These materials are subject to consolidation and not suitable for structural support. Sandstone of the Capistrano formation, Oso Member, has been mapped throughout the site. This unit is characteristically light gray to white in color, and structurally massive. The sandstone is generally moderately hard and can be locally friable as well as cemented. The materials vary from silty fine sandstone to coarse grained sandstone.

The Natural Resources Conservation Service Web Soil Survey 2.0 shows the site as being comprised of 65.3% D-group soil, 16.7% C-group soil and 18% B-group soil, in general.

Soils in the Group D category are described as soils having a high runoff potential, soils having very slow infiltration rates when thoroughly wetted and consist chiefly of clay soils with a high swelling potential; soils with a permanent high water table; soils with a claypan or clay layer at or near the surface; and shallow soils over nearly impervious material. These soils have a very slow rate of water transmission and, therefore, are not suitable for infiltration.

Group C soils have slow infiltration rates when thoroughly wetted and consist chiefly of silty-loam soils with a layer that impedes downward movement of water, or soils with moderately fine to fine texture. These soils have a slow rate of water transmission.

Group B Soils have moderate infiltration rates when thoroughly wetted and consist chiefly of moderately deep to deep, moderately well to well drained sandy-loam soils with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission.

Section 4

Section 4 Project Pollutants of Concern

This section of the water quality management plan identifies primary and secondary pollutants of concern. Pollutants of concern are those that are anticipated to be generated by the proposed project. Pollutants of concern are differentiated between primary and secondary depending on the condition of downstream receiving waters. If the project will drain to a receiving water that is impaired for a pollutant anticipated from that project, that pollutant is a primary pollutant of concern. Pollutants frequently identified on the 303(d) list of California impaired water bodies include metals, nitrogen, nutrients, indicator bacteria, pesticides and trash (see 303(d) list). In some cases, there may be specific conditions (i.e. other known water quality problems) that warrant identifying an anticipated pollutant as a primary pollutant of concern. If there is no corresponding impairment or other water quality problem in the receiving waters for an anticipated pollutant, the pollutant is a secondary pollutant of concern.

1. Project categories and features:

USA Portola LLC proposes Tentative Tract Map No. 17300, a residential development which includes 304 single family detached residences, 2 parks, open space, streets, sidewalks, utility easements and other related improvements. No on-site laundry or car wash community facilities are proposed for the project..

This project is classified as a Priority Project, Category 1 (residential development of 10 units or more) per the Orange County Drainage Area Management Plan (DAMP) and the City of Lake Forest WQMP. Therefore, treatment control BMPs are required to remove pollutants typically associated with urban runoff.

2. Primary pollutants of concern:

Primary project pollutants of concern for the **Aliso Creek Watershed** are based on the 303(d) impairments to applicable downstream waterbodies as follows:

- *Toxicity*. Toxic substance can defined as broad group of chemicals capable of causing harm to plants and animals including humans. There are several classes of toxic substances that have the potential to affect surface waters. Toxic compounds can be grouped into five categories: atmospherically – deposited compounds; organic and inorganic contaminants that result from industrial, manufacturing or other point and non-point discharges from facilities; pesticides; contaminants of emerging concern (CECs); and biological contaminants. These groupings reflect the commonality of management options that are applied to address each contaminant group.
- *Selenium.* Selenium is a naturally occurring element that is necessary for life, but it is toxic at high levels and is unusual in that the difference between essential and toxic levels is relatively small. Selenium is a bioaccumulative pollutant, meaning that it accumulates in the food chain through uptake and consumption by plants and wildlife, and can cause adverse effects on fish and birds. Selenium occurs in many forms in the environment, and can convert between different forms depending on chemical and biological conditions. Also, some forms of selenium are more harmful than others.

- *Bacteria and viruses.* Anticipated sources include animal excrement (found in areas where pets are often walked), sanitary sewer overflow, and trash container handling areas.
- *Total Nitrogen as N and Phosphorus (Nutrients).* Nutrients, including nitrogen, phosphorous, and other compounds can be anticipated to be generated by or found in organic litter, fertilizers, food waste, sewage and sediment.

Primary project pollutants of concern for the **Newport Bay Watershed** are based on Table 7.11-2 (Anticipated and Potential Pollutants Generated by Land Use Type) of the DAMP that also occur on the applicable 303 (d) tributary waterbodies are as follows:

- *Bacteria and viruses.* Anticipated sources include animal excrement (found in areas where pets are often walked), sanitary sewer overflow, and trash container handling areas.
- *Sediment.* Driveways and roof-tops are expected to be common sources of sediment due to wear.
- *Pesticides.* Sources of pesticides include household bug-spray, weed killers and other household sources.

3. Secondary pollutants of concern:

Secondary Pollutants of Concern for the **Aliso Creek Watershed** identified in Table 7.II-2 (Anticipated and Potential Pollutants Generated by Land Use Type) of the DAMP include Sediment, Pesticides, Trash & Debris, Oxygen-demanding Substances, and Oil & Grease:

- Sediment. *Driveways and roof-tops are expected to be common sources of sediment due to wear.*
- *Pesticides.* Sources of pesticides include household bug-spray, weed killers and other household sources.
- *Trash and Debris.* These sources include common litter, biodegradable organic matter such as leaves, grass cuttings and food wastes from landscaped areas and homeowners.
- *Oxygen-Demanding Substances.* Potential sources include biodegradable organic materials and various household chemicals, which deplete dissolved oxygen levels in water courses.
- *Oil and Grease.* Potential sources of oil and grease include motor vehicles.

Secondary project pollutants of concern for the **Newport Bay Watershed** are based on Table 7.11-2 (Anticipated and Potential Pollutants Generated by Land Use Type) of the DAMP include Nutrients, Pesticides, Trash & Debris, Oxygen-demanding Substances, and Oil & Grease:

- *Nutrients.* Nutrients, including nitrogen, phosphorous, and other compounds can be anticipated to be generated by or founding organic litter, fertilizers, food waste, sewage and sediment.
- *Trash and Debris.* These sources include common litter, biodegradable organic matter such as leaves, grass cuttings and food wastes from landscaped areas and homeowners.

- *Trash and Debris*. These sources include common litter, biodegradable organic matter such as leaves, grass cuttings and food wastes from landscaped areas and homeowners.
- Oxygen-Demanding Substances. *Potential sources include biodegradable organic materials and various household chemicals, which deplete dissolved oxygen levels in water courses.*
- *Oil and Grease*. Potential sources of oil and grease include motor vehicles.

4. Project water quality analyses:

Project water quality analysis information shall be included under part of a larger study, the Draft Program Environmental Impact Report for the Portola Center Development Plan as prepared for the Lake Forest Opportunities Study. Further information regarding water quality can be found at :

http://www.city-lakeforest.com/opportunitiesstudy/pdf/deir

5. Project watershed information:

Approximately 98.6% of the proposed project (approximately 98.1 acres) is located within the jurisdiction of the San Diego Regional Water Quality Control Board and within the **Aliso Creek Watershed**.

Aliso Creek is located east and offsite of the project site. This natural creek is located along the west side of El Toro Road. It flows through natural open space and urban development and outlets at the ocean at Aliso Creek Beach. Aliso Creek's watershed encompasses 23,000 acres, and includes natural open space, rural and urban development, agriculture and ranching, regional parks and other recreational facilities. There are a number of street crossings over Aliso Creek both upstream and downstream which have been built as the result of newer or existing developments. The project represents less than 1% approximately of the Aliso Creek watershed.

Approximately 1.4% (or an approximately 1.4 acre portion of Lot B of TTM 17300) of the project is located in the jurisdiction of the Santa Ana Regional Water Quality Control Board and within the **Newport Bay Watershed**. More specifically this approximately 1.4 acre portion of the project is tributary to and located within a sub-drainage area of the Serrano Creek Drainage Area of the San Diego Creek Subwatershed. The San Diego Creek Watershed covers 112.2 square miles in central Orange County. It includes portions of the cities of Costa Mesa, Irvine, Laguna Woods, Lake Forest, Newport Beach, Orange, Santa Ana, and Tustin, Its main tributary, San Diego Creek, drains into Upper Newport Bay. Smaller tributaries include Serrano Creek, Borrego Canyon Wash, Agua Chinon Wash, Bee Canyon Was, Peters Canyon Wash, Sand Canyon Wash, Bonita Canyon Creek, and the Santa Ana Delhi Channel.

The U.S. Army Corps of Engineers completed a Watershed Reconnaissance Study in 1998 and initiated the Feasibility Study phase in 1999. These regulations will limit the "Total Maximum Daily Load" of sediments, nutrients, pathogens and toxics entering waters of the creek and bay.

Further watershed information is included under part of a larger study that was included under a Final Draft Program Environmental Impact Report, dated May 23, 2008 prepared for the Lake Forest Opportunities Study. The project is designated as "Site 6" under this study. Further information regarding this document can be found at:

http://www.city-lakeforest.com/opportunitiesstudy/final_eir.php

TABLE 4.1

DAMP Table 7.II-2 Anticipated and Potential Pollutants Generated by Land Use Type

Priority Project Categories and/or Project Features	General Pollutant Categories								
	Bacteria/Virus	Heavy Metals	Nutrients	Pesticides	Organic Compounds	Sediments	Trash & Debris	Oxygen Demanding Substances	Oil & Grease
Detached Residential Development	X		X	X		X	X	X	X
Attached Residential Development	X		X	X		X	X	P (1)	P (2)
Commercial/ Industrial Development >100,000 ft^2	P (3)	P	P (1)	P (1)	P (2)	P (1)	X	P (1)	X
Automotive Repair Shops		X			X (4) (5)		X		X
Restaurants	X						X	X	X
Hillside Development >5,000 ft^2 In SDRWQCB	X		X	X		X	X	X	X
Hillside Development >10,000 ft^2 In SARWQCB	X		X	X		X	X	X	X
Parking Lots	P (6)	X	P (1)	P (1)	X (4)	P (1)	X	P (1)	X
Streets, Highways & Freeways	P (6)	X	P (1)	P (1)	X (4)	X	X	P (1)	X

X= expected.
P = potential
(1) A potential pollutant if landscaping exists onsite.
(2) A potential pollutant if the project includes uncovered parking areas.
(3) A potential pollutant if land use involves food or animal waste products.
(4) Including petroleum hydrocarbons.
(5) Including solvents.
(6) Bacterial indicators are routinely detected in pavement runoff.

Section 5

Section 5 Hydrologic and Geotechnical Conditions of Concern/ Drainage Report

This section of the water quality management plan identifies hydrologic and geotechnical conditions of concern related to the proposed project. Hydrologic or geotechnical conditions of concern are identified through a review of on-site and downstream drainage paths. If the proposed project would cause or contribute flows to problems along on-site or downstream drainage paths, these problems or future problems are considered conditions of concern. Conditions of concern can include problems such as flooding, erosion, scour, and other impacts that can adversely affect channel and habitat integrity.

In order to identify conditions of concern, a comprehensive understanding of flow volume, rate, duration, energy, and peak flow is necessary. Often, a formal drainage study is necessary which considers the project area's location in the larger watershed, topography, soil and vegetation conditions, percent impervious area, natural and infrastructure drainage features, and any other relevant hydrologic and environmental factors. As part of the study, the drainage report includes:

- Field reconnaissance to observe downstream conditions
- Computed rainfall and runoff characteristics including a minimum of peak flow rate, flow velocity, runoff volume, time of concentration and retention volume
- Establishment of site design, source control and treatment control measures to be incorporated and maintained to address downstream conditions of concern

A Hydrology and Hydraulics report was prepared, as required by the City, for the proposed project by Hunsaker and Associates, and relevant portions of it are included as Appendix B. The entire report, including printouts of all computations, is available at the City of Lake Forest.

A geotechnical report and supplemental letters recommending against infiltration BMPs were prepared, as required by the City, for the proposed project by GEOCON and separately by the City's third party geotechnical reviewers, and are included as Appendix C.

A project hydromodification report, dated January 15, 2013, was prepared by Geosyntec Consultants (Appendix E refers). Recommendations from portions of the GeoSyntec report are also included in Appendices B and C and incorporated into the hydrology report and the proposed water quality design concept (Project Plan Exhibit in Section 7 refers).

1. Project location: The project is located in the City of Lake Forest at and adjacent to the south side of Glenn Ranch Road at its intersection with Saddleback Ranch Road.
2. Topography, soil and vegetation: The northwestern corner of the adjacent, offsite TTM 15353 site contains an existing earthen retention basin with spillway and has been previously graded. The TTM 17300 site is relatively undisturbed with the exception of some small areas of disturbance from recreational activities by trespassers. The site retains much of its rolling foothill topography. Onsite earth materials are comprised of "colluvial material consisted of silty sand, brown to grayish brown, slightly moist, porous and subject to consolidation. This material was mapped were thicknesses are greater than 4 feet. Alluvial material consisted of silty sand, medium

brown to grayish brown, slightly moist to moist and medium dense in consistency. These materials are subject to consolidation and not suitable for structural support. Sandstone of the Capistrano formation, Oso Member, has been mapped in the site. This unit is characteristically light gray to white in color, and structurally massive. The sandstone is generally moderately hard and can be locally friable as well as cemented. The materials vary from silty fine sandstone to coarse grained sandstone."

The Natural Resources Conservation Service Web Soil Survey 2.0 shows **the site as being comprised of 65.3% D-group soil**, 16.7% C-group soil and 18% B-group soil, in general.

Soils in the Group D category are described as having a high runoff potential; soils having very slow infiltration rates when thoroughly wetted; soils consisting chiefly of clay soils with a high swelling potential; soils with a permanent high water table; soils with a claypan or clay layer at or near the surface; and shallow soils over nearly impervious material. **These soils have a very slow rate of water transmission and, therefore, are not suitable for infiltration**.

Group C soils have slow infiltration rates when thoroughly wetted and consist chiefly of silty-loam soils with a layer that impedes downward movement of water, or soils with moderately fine to fine texture. These soils have a slow rate of water transmission.

Group B Soils have moderate infiltration rates when thoroughly wetted and consist chiefly of moderately deep to deep, moderately well to well drained sandy-loam soils with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission.

Site vegetation includes Sagebrush, Sage Scrub, Mulefat Scrub, and non-native grasses.

3. Impervious area:

In the developed condition impervious areas will include of streets, sidewalks and rooftops. Area quantities are listed in the table below:

Project Area	Pre construction			Post construction		
	Acreage	Sq. ft.	%	Acreage	Sq. ft.	%
Total Space	99.5 ac.	4,334,220	100%	99.5 ac.	4,334,220	100%
Pervious	92.5 ac.	4,030,825	93%	37.8 ac	1,647,004	38%
Impervious	7.0 ac.	303,395	7%	61.7 ac.	2,687,216	62%

4. Drainage features:

The project's existing and proposed drainage conditions are linked with the adjacent, downstream area of VTTM 15353, located offsite. Relevant portions of a hydrology report covering both the drainage for this project (TTM 17300) and offsite, downstream VTTM 15353 are provided in Appendix B and a related Hydromodification Report is included in Appendix E. A complete project hydrology report is available at the City of Lake Forest.

Existing Condition

The Project site is presently in an undeveloped condition with a mix of native and non-native vegetation covering much of the site. The site has previously undergone rough grading in the north and portions of the south. A review of the Flood Insurance Rate Map (FIRM) (Map #: 06059C0317J) dated December 3, 2009, indicates that no portion of the Project site is in a floodplain (please see a copy of the FIRM map in Appendix B for more detail).

The Project is comprised of six (6) major drainage areas (Drainage Areas "A" through "F") that exit the Project site at thirteen (13) concentration nodes (outlets) located around the perimeter of the Project, as shown on the existing and proposed condition hydrology maps. Drainage Area "A" is comprised of approximately 213.9 acres, including off-site area of approximately 151.4 acres of the Portola Hills Community. Drainage Areas "B, "C", "D", "E" & "F" are comprised of a total acreage of approximately 137.5 acres. All the drainage runoff discharging from the 13 outlets are tributary to existing earthen channels that drain to the existing Serrano Creek and Aliso Creek.

There is an existing 60-inch R.C.P. storm drain (Facility #: J01P06) that extends underneath Saddleback Ranch Road carrying flows from the Portola Hills Community (located to the north of the Project site) into to an existing approximately 12 acre-foot detention basin located approximately 500 feet southwest of adjacent, offsite TTM 15353 the Saddleback Ranch/Glenn Ranch Road intersection, in the northwest corner of the Project site. This existing Portola Hills basin outlets at the bottom of Drainage Area "A" at Node 377 in the western corner of the Project site. The outlet of the existing detention basin (at Node 377) was designed for Expected Value (EV) peak discharges of 264 cubic feet per second (cfs), 195 cfs, and 151 cfs for the 100-, 25-, and 10-year storm events, respectively (per Portola Hills Retarding Basin Study by J.P Kapp & Associates, Inc. dated November 1989, which is included in the complete project hydrology report at the City of Lake Forest).

Proposed Condition

The post-development condition includes the six drainage areas (Drainage Areas "A" through "F") discharging across the southern and eastern boundary of the Project site, similar to existing condition. The 2-Yr, 5-Yr, 10-Yr, 25-Yr, 50-Yr and 100-Yr expected values (EV) with high confidence values (HC) for these drainage areas are shown on the summary table titled: "Tentative Tract 15353 & 17300 Areas "A", "B", "C", "D", "E" & "F" Summary of Hydrology Analysis Existing Condition vs. Proposed Condition" (included in Appendix B and at the end of Section 5).

Drainage Area "A" includes 151.4 acres of the Portola Hills Community to the North of the Project site. Runoff from the 151.4 acres of the existing Portola Hills Community and a portion of the runoff from the existing Glenn Ranch Road and Saddleback Ranch Road, account for approximately 72% of the total runoff in Drainage Area "A". The remaining 28% of these flows are coming from those portions of Drainage Area "A" that are part of the Project site. The existing flows from Portola Hills and portions of Glenn Ranch Road and Saddleback Ranch Road will not be comingled with the Project's flows. Instead, these existing flows will be confined to a separate bypass storm drain system and diverted into a new underground 5.4 acre-foot flow-by underground detention chamber at node 336.11, (Basin #2). Flows from those portions of Drainage Area "A" that are part of the Project site will be captured and routed through a separate storm water detention and conveyance system that treats and detains these flows in compliance with water quality and hydromodification requirements. After accounting for the project flows discharging at Node 377, Basin #2 is sized to limit the peak discharge at Node 377 to 263.9 cfs, 178.8 cfs and 150.9 cfs, for 100-year, 25-year and 10-year EV storm events, respectively.

Hydromodification

As shown on the map titled "Preliminary Design Detention – Hydromodification and Water Quality Volume Exhibit" (included in Appendix B, Tab 3), the Project includes 7 – underground flow-through Hydromodification/Water Quality (HYD/WQ) Chambers, 1 underground Hydromodification use only chamber, 2 underground detention chambers and

1 above ground water quality basin (with combined uses for water quality treatment, hydromodification and retention). See Section 6.3.1 for reference.

Nuisance runoff, and runoff during minor storms of up to 10-year frequencies, will be diverted and routed through the underground HYD/WQ chambers for treatment and flow-retardation (to meet hydromodification requirements) prior to being released to the downstream storm drain system.

Onsite portion of Drainage Area "A" has been divided into Subareas A1, A3, A4 & A5. Runoff from Subareas A1 & A3 will be routed into Basin #3; Subarea A4 will be routed through HYD/WQ Basin #4; and Subarea A5 will be routed through Basin #1.

Drainage Area "B" has been divided into Subareas B1, B2 & B3. Subareas B1 & B2 will be routed through HYD/WQ Basin #5; and Subarea B3 will be routed through two interconnected underground chambers, i.e. HYD/WQ Basins #7A and HYD/WQ Basin #7B.

Drainage Area "C" has been divided into Subareas C1 & C2. Runoff from Subarea C1 will be routed through HYD/WQ Basin #8A; and Subarea C2 will be routed through HYD/WQ Basin #8B.

Drainage Area "D" consists of two Subareas D1 & D2. Runoff from both the subareas will be routed through a water quality/hydromodification/detention basin, Basin #9.

The Project's discharges in the proposed condition must also meet Regional Water Quality Control Board water quality and the Interim Hydromodification standards. Water Quality Management Plans (WQMPs) outlining these elements of the Project's stormwater conveyance system have been prepared for the Project's two Tentative Tract Maps (TTM15353 and TTM17300) as separate reports.

Conclusions

The onsite storm water detention and conveyance system in Drainage Area "A" will be designed as a separate system to ensure no commingling of flows originating in Portola Hills and portions of Glenn Ranch and Saddleback Ranch Roads and flows originating onsite before the onsite flows undergo treatment and detention before for water quality hydromodification purposes.

Thirteen (13) discharges locations (nodes) around the perimeter of the Project site are proposed in the Proposed Condition. The study indicates that, with the proposed detention and hydromodification basins, the individual post-development (Proposed Condition) peak discharges at the 13 discharge locations are less than the individual pre-developed (Existing Condition) peak discharges at these 13 different discharge locations, thereby preventing any new contribution to a localized flooding condition. The outlets will be designed with riprap and/or energy dissipaters to ensure post-development discharge velocities do not exceed discharge velocities in the Existing Condition. Therefore, the proposed Project has no impact on erosion and scour at outlet locations.

Per the FIRM Map #06059C0317J dated December 3, 2009, no portion of the Project site is in a floodplain in the site's Existing Condition nor would any portion of the site be in a floodplain in the Proposed Condition. Please see the summary table entitled "Summary of Hydrology Analysis, Existing Condition vs. Proposed Condition" in Section 5 for more detail on Project flows in the Existing and Proposed Conditions. Finally, all of the Project's proposed storm water facilities will be protected and designed for the 100-year storm event per the requirements of the current Orange County Local Drainage Manual and the Project's

discharges in the proposed condition have been designed to meet applicable water quality and the Interim Hydromodification standards.

5. Relevant hydrologic and environmental factors:

The project does not directly discharge to Environmentally Sensitive areas (ESAs) or Areas of Special Biological Significance (ASBSs). Water quality measures will be implemented by structural Best-Management Practices (BMP's) to mitigate the project's post development impacts. The number of proposed structures are to be determined prior to project approval. During the design stage these may require modification based upon unforeseen design issues. The objective of the project hydrology study included as Appendix B is to ensure that the 100-year runoff water into Aliso Creek during the after development will be no greater than those currently experienced under existing conditions. Per Master Plan project J01P06 study the developed peak discharge was to be limited to approximately 90% of peak runoff under existing condition.

Ten (10) underground basins and one (1) open air basin will be provided to mitigate the increase in runoff due to the development of Tentative Tract 17300 and Tentative Tract 15353. Final designs and design sizing of these basins shall be provided during the final design phase of the project. See Section 6.3.1 for additional information regarding these basins.

Function of Detention and Hydromodification.

Detention is the collection and attenuation of stormwater runoff resulting in a controlled release of the runoff to prevent flooding and erosion in downstream areas. Hydromodification Management is one component of detention that is based on a continuous simulation model for a flow duration control between a range of flows extending from 10% of the 2-year peak flow event to the 10-year peak flow event in the pre-developed/natural condition. The purpose of hydromodification management is to control erosion by mimicking the natural flows for a selected range of storms in the post development condition. Hydromodification management is often based on a separate set of flow control requirements. However, this Project's proposed hydromodification detention facilities have been designed to work in conjunction with the Project's flood control facilities which handle much larger storm events out to the 100-year event. Please see the hydromodification report prepared by Geosyntec in Appendix E for more information on the design of the Project's hydromodification management facilities.

6. Proposed hydrologic condition summary:

For the proposed condition, there are six relevant drainage areas. (Drainage Areas A-D)

(See proposed hydrology map, Appendix B for other details)

The proposed drainage conditions have been linked with adjacent, downstream VTTM 15353 located offsite.

For a Summary of Peak-Flow Comparisons please see Appendix B and refer to the 11 x 17 table inserted immediately following, and titled "Tentative Tracts 15353 & 17300, Areas B, C, D, E & F, Summary of Hydrology Analysis, Existing Condition vs. Proposed Condition."

TENTATIVE TRACTS 15353 & 17300
AREAS "A", "B", "C", "D", "E" & "F"
SUMMARY OF HYDROLOGY ANALYSIS
EXISTING CONDITION VS. PROPOSED CONDITION

DRAINAGE AREA	OUTLET NUMBER	OUTLET NODE	LAND USE	AREA (AC) PROP.	AREA (AC) EXIST.	PEAK FLOW RATE (CFS) 2-Year Storm Rational Method (EV)	2-Year Storm (HC)	2-Year Storm With Detention (EV)	2-Year Storm With Detention (HC)	5-Year Storm Rational Method (EV)	5-Year Storm (HC)	5-Year Storm With Detention (EV)	5-Year Storm With Detention (HC)	10-Year Storm Rational Method (EV)	10-Year Storm (HC)	10-Year Storm With Detention (EV)	10-Year Storm With Detention (HC)	25-Year Storm Rational Method (EV)	25-Year Storm (HC)	25-Year Storm With Detention (EV)	25-Year Storm With Detention (HC)	50-Year Storm Rational Method (EV)	50-Year Storm (HC)	50-Year Storm With Detention (EV)	50-Year Storm With Detention (HC)	100-Year Storm Rational Method (EV)	100-Year Storm (HC)	100-Year Storm With Detention (EV)	100-Year Storm With Detention (HC)	Remarks
			Design Peak Runoff Per J.P. Kapp													**151.0**				**195.0**									**264.0**		
A	1	377	Existing Condition		213.9	187.9	224.0	N/A	N/A	247.8	290.1	N/A	N/A	285.2	348.5	N/A	N/A	343.6	426.6	N/A	N/A	379.7	494.2	N/A	N/A	421.7	572.4	N/A	N/A	
			Proposed Condition	217.2		204.9	236.9	105.0	*123.1*	267.9	306.3	120.8	*151.5*	303.7	367.8	**150.9**	*182.3*	365.2	448.4	**178.8**	*221.5*	403.3	518.0	198.4	*260.0*	445.9	598.7	**263.9**	*305.6*	Onsite upto 10-Yr (EV) Peak, $V_{REQUIRED}$ = 2.5ac-ft (Basin #3), Provided $V_{HYDROMOD}$ = 2.8ac-ft; $V_{REQUIRED}$ = 1.1ac-ft (Basin #4), Provided $V_{HYDROMOD}$ = 1.2ac-ft; Offsite With Flowby of 101.7cfs, $V_{REQUIRED}$ = 5.4ac-ft (Basin #2)
	2	382	Existing Condition		1.3	0.7	1.6	N/A	N/A	1.3	2.4	N/A	N/A	2.3	3.1	N/A	N/A	3.0	3.8	N/A	N/A	3.5	4.3	N/A	N/A	3.7	4.9	N/A	N/A	Proposed Condition Peak Discharges Less Than Existing Condition Peak Discharges
			Proposed Condition	0.4		0.4	0.7	N/A	N/A	0.6	1.0	N/A	N/A	1.0	1.3	N/A	N/A	1.3	1.6	N/A	N/A	1.4	1.8	N/A	N/A	1.5	2.0	N/A	N/A	
	3	383	Existing Condition		4.9	2.6	6.1	N/A	N/A	5.1	9.1	N/A	N/A	8.8	11.7	N/A	N/A	11.4	14.2	N/A	N/A	13.1	16.1	N/A	N/A	13.9	18.4	N/A	N/A	Proposed Condition Peak Discharges Less Than Existing Condition Peak Discharges
			Proposed Condition	2.3		1.2	2.9	N/A	N/A	2.4	4.2	N/A	N/A	4.1	5.5	N/A	N/A	5.3	6.6	N/A	N/A	6.1	7.5	N/A	N/A	6.5	8.6	N/A	N/A	
	4	384	Existing Condition		0.6	0.2	0.7	N/A	N/A	0.5	1.0	N/A	N/A	1.0	1.3	N/A	N/A	1.3	1.6	N/A	N/A	1.4	1.8	N/A	N/A	1.5	2.0	N/A	N/A	Proposed Condition Peak Discharges Less Than Existing Condition Peak Discharges
			Proposed Condition	0.1		0.1	0.2	N/A	N/A	0.1	0.2	N/A	N/A	0.2	0.3	N/A	N/A	0.3	0.3	N/A	N/A	0.3	0.4	N/A	N/A	0.3	0.4	N/A	N/A	
	5	385	Existing Condition		3.6	1.4	4.1	N/A	N/A	3.1	6.1	N/A	N/A	5.8	8.0	N/A	N/A	7.7	9.7	N/A	N/A	8.6	11.1	N/A	N/A	9.4	12.7	N/A	N/A	Proposed Condition Peak Discharges Less Than Existing Condition Peak Discharges
			Proposed Condition	2.4		1.0	2.7	N/A	N/A	2.1	4.1	N/A	N/A	3.9	5.3	N/A	N/A	5.1	6.4	N/A	N/A	5.8	7.3	N/A	N/A	6.2	8.4	N/A	N/A	
B	6	82	Existing Condition		77.1	7.3	58.0	N/A	N/A	38.5	91.8	N/A	N/A	86.5	121.4	N/A	N/A	116.2	150.4	N/A	N/A	132.9	172.9	N/A	N/A	145.1	198.7	N/A	N/A	Onsite upto 10-Yr (EV) Peak, $V_{REQUIRED}$ = 5.7ac-ft (Basin #5), Provided $V_{HYDROMOD}$ = 6.4ac-ft; $V_{REQUIRED}$ = 0.7ac-ft (Basins #7A & #7B), Provided $V_{HYDROMOD}$ = 0.9ac-ft
			Proposed Condition	94.8		47.3	87.4	4.2	12.2	78.3	129.7	9.1	53.0	127.1	167.8	56.9	94.9	165.2	203.6	91.2	130.0	187.5	231.8	110.1	157.7	201.1	264.9	127.6	187.4	
C	7	116	Existing Condition		17.2	4.7	17.2	N/A	N/A	12.8	26.2	N/A	N/A	24.7	34.2	N/A	N/A	32.7	41.9	N/A	N/A	37.6	47.8	N/A	N/A	40.4	54.8	N/A	N/A	Onsite upto 10-Yr (EV) Peak, $V_{REQUIRED}$ = 0.06ac-ft (Basin #8); $V_{REQUIRED}$ = 0.4ac-ft (Basin #8A), Provided $V_{HYDROMOD}$ = 0.4ac-ft; $V_{REQUIRED}$ = 0.6ac-ft (Basin #8B), Provided $V_{HYDROMOD}$ = 0.6ac-ft
			Proposed Condition	17.7		9.0	20.3	2.9	8.4	17.1	30.3	6.6	16.4	29.2	39.3	16.0	25.5	38.2	47.8	23.4	35.3	43.1	54.4	29.6	43.0	46.6	62.2	33.5	50.9	
D	8	200.5	Existing Condition		13.4	4.0	12.8	N/A	N/A	10.1	19.6	N/A	N/A	19.0	25.6	N/A	N/A	25.1	31.3	N/A	N/A	28.5	35.8	N/A	N/A	30.8	41.1	N/A	N/A	$V_{REQUIRED}$ = 1.9ac-ft (Basin #9), Provided $V_{HYDROMOD}$ = 3.3ac-ft
			Proposed Condition	14.6		7.7	14.5	1.7	3.2	13.0	21.7	2.9	4.6	21.4	28.2	4.5	6.2	27.8	34.3	5.9	13.9	31.7	39.1	9.4	24.4	34.0	44.6	13.2	33.0	
	9	202.1	Existing Condition		5.8	2.3	6.5	N/A	N/A	5.2	9.9	N/A	N/A	9.6	12.9	N/A	N/A	12.6	15.7	N/A	N/A	14.1	17.9	N/A	N/A	15.4	20.5	N/A	N/A	Proposed Condition Peak Discharges Less Than Existing Condition Peak Discharges
			Proposed Condition	1.8		1.5	2.9	N/A	N/A	2.5	4.3	N/A	N/A	4.2	5.6	N/A	N/A	5.5	6.7	N/A	N/A	6.3	7.6	N/A	N/A	6.6	8.7	N/A	N/A	
	10	204.2	Existing Condition		3.1	1.2	3.3	N/A	N/A	2.7	5.0	N/A	N/A	4.9	6.6	N/A	N/A	6.5	8.0	N/A	N/A	7.3	9.2	N/A	N/A	7.9	10.5	N/A	N/A	Proposed Condition Peak Discharges Less Than Existing Condition Peak Discharges
			Proposed Condition	1.7		0.8	2.0	N/A	N/A	1.7	3.0	N/A	N/A	3.0	3.9	N/A	N/A	3.9	4.7	N/A	N/A	4.4	5.4	N/A	N/A	4.7	6.2	N/A	N/A	
	11	207	Existing Condition		3.2	1.1	3.3	N/A	N/A	2.6	5.0	N/A	N/A	4.9	6.6	N/A	N/A	6.5	8.1	N/A	N/A	7.4	9.2	N/A	N/A	8.0	10.5	N/A	N/A	Proposed Condition Peak Discharges Less Than Existing Condition Peak Discharges
			Proposed Condition	1.5		0.7	1.7	N/A	N/A	1.4	2.6	N/A	N/A	2.5	3.3	N/A	N/A	3.3	4.1	N/A	N/A	3.8	4.6	N/A	N/A	4.1	5.3	N/A	N/A	
E	12	402	Existing Condition		14.6	7.1	17.6	N/A	N/A	14.3	26.5	N/A	N/A	25.5	34.5	N/A	N/A	33.6	42.0	N/A	N/A	38.4	47.9	N/A	N/A	41.1	54.9	N/A	N/A	Proposed Condition Peak Discharges Less Than Existing Condition Peak Discharges
			Proposed Condition	4.8		3.8	6.7	N/A	N/A	6.1	9.8	N/A	N/A	9.5	12.6	N/A	N/A	12.4	15.3	N/A	N/A	14.5	17.4	N/A	N/A	15.0	19.9	N/A	N/A	
F	13	501	Existing Condition		3.1	1.2	3.4	N/A	N/A	2.7	5.2	N/A	N/A	5.0	6.7	N/A	N/A	6.5	8.2	N/A	N/A	7.4	9.3	N/A	N/A	8.0	10.6	N/A	N/A	Proposed Condition Peak Discharges Less Than Existing Condition Peak Discharges
			Proposed Condition	2.5		1.0	2.7	N/A	N/A	2.2	4.1	N/A	N/A	4.0	5.4	N/A	N/A	5.3	6.5	N/A	N/A	5.9	7.5	N/A	N/A	6.4	8.5	N/A	N/A	
			Total	361.8	361.8																									

7. Significant impact on downstream channels and habitat integrity:

Hydrologic Conditions of Concern (HCOC) for any development such as the proposed project may include potential water quality degradation; increased runoff volume and velocity; reduced infiltration; increased flow frequency, duration and peaks; and faster time to reach peak flow resulting from development.

The project would develop less than 1% (approximately) of the total Aliso Creek watershed area. Given that hydrologic and geomorphic conditions in the receiving stream, Aliso Creek, are driven by large-scale watershed processes in conjunction with project storm drain and site plan designs which will result in conditions below the HCOC significance thresholds shown below, no project hydrologic conditions of concern have been identified by the project HCOC assessment.

Hydrologic Conditions of Concern	Significance Threshold
1. Increased Stormwater Runoff Flow Rate, Volume, and Flow Duration	A. Substantially alter the existing drainage pattern of the site or area, including alteration of the course of a stream river, in a manner that would cause substantial erosion or siltation. B. Substantially increase the frequencies and duration of channel adjusting flows.
2. Decreased Infiltration and Groundwater Recharge	A. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge that would cause a net deficit in aquifer volumes or lowering of the local groundwater table.
3. Changed Base Flow	A. Substantially increase or decrease base flows as to negatively impact riparian habitat. B. Substantially increase or decrease low flows where high groundwater elevations are considered important.

The project shall comply with Order No. R9-2009-0002 by implementing proper installation and maintenance of hydromodification control BMPs, in order to effect the following hydromodification principles:

- Detain runoff and release it in a controlled way that either mimics predevelopment hydrograph or reduces flow durations to account for a reduction in sediment supply.
- Manage excess runoff volumes through one or more of the following pathways: infiltration, evapotranspiration, storage and use, discharge at a rate below the critical rate for adverse impact, or discharge downstream to a non-susceptible water body.

Thus, no significant impact on downstream channels and habitat integrity is anticipated by the project development including no potential water quality degradation; no increased runoff volume and velocity; no reduced infiltration; no increased flow frequency, duration and peaks; and no faster time to reach peak flow resulting from development.

Note: Hydrologic controls have been integrated into the proposed project such that the flow duration curve corresponding to the post-project condition agrees with the baseline condition curve over the range of flows of interest. As a result, runoff from the developed project would not contribute additional erosive forces to the project's receiving stream channel. See Appendices B (hydrology) and D (hydromodification controls and treatment BMPs) for reference.

8. Project hydrology analyses:

See Section 5.1 through 5.7 for reference.

The storm drain system in Drainage Area "A" will be designed as a separate system to assure no commingling between offsite and onsite runoffs.

All proposed outlet devices will be protected with rock riprap and energy dissipators. All proposed structures will be protected and designed for the 100-year storm per the current Orange County Local Drainage Manual.

9. Project watershed information:

An approximate 98.6% (or approximately 98.1 acres) of the proposed project is located within the jurisdiction of the San Diego Regional Water Quality Control Board and within the **Aliso Creek Watershed**.

Aliso Creek is located offsite and southeast of the project site. It is a natural creek located along the west side of El Toro Road. The creek flows through natural open space and urban development and outlets at the ocean at Aliso Creek Beach. Aliso Creek's watershed encompasses 23,000 acres, and includes natural open space, rural and urban development, agriculture and ranching, regional parks and other recreational facilities. There are a number of street crossings over Aliso Creek, both upstream and downstream, which have been built as the result of newer or existing developments. The project represents less than 1% approximately of the Aliso Creek watershed.

An approximate 1.4% (or an approximately 1.4 acre portion of Lot B of TTM 17300) of the project is located in the **Newport Bay Watershed**. More specifically this approximately 1.4 acre portion of the project is located within a sub-drainage area of the Serrano Creek Drainage Area of the San Diego Creek Subwatershed. The San Diego Creek Watershed covers 112.2 square miles in central Orange County. It includes portions of the cities of Costa Mesa, Irvine, Laguna Woods, Lake Forest, Newport Beach, Orange, Santa Ana, and Tustin, Its main tributary, San Diego Creek, drains into Upper Newport Bay. Smaller tributaries include Serrano Creek, Borrego Canyon Wash, Agua Chinon Wash, Bee Canyon Wash, Peters Canyon Wash, Sand Canyon Wash, Bonita Canyon Creek, and the Santa Ana Delhi Channel.

The U.S. Army Corps of Engineers completed a Watershed Reconnaissance Study in 1998 and initiated the Feasibility Study phase in 1999. These regulations will limit the "Total Maximum Daily Load" of sediments, nutrients, pathogens and toxics entering waters of the creek and bay.

Watershed information is included under part of a larger study that was included under a Final Draft Program Environmental Impact Report, dated May 23, 2008 prepared for the Lake Forest Opportunities Study. The project is designated as "Site 6" under this study. Further information regarding this document can be found at:

http://www.city-lakeforest.com/opportunitiesstudy/final_eir.php

The portion of the project within the Newport Bay Watershed represents less than approximately 2 one thousandths of 1% of the approximately 152.02 square mile area of the Newport Bay Watershed.

Section 6

Section 6 Best Management Practices (BMPs)

Minimizing a development's effects on water quality and the environment can be most effectively achieved by using a combination of BMPs which include Site Design, Source Control and Treatment Control measures. These design and control measures employ a multi-level strategy. The strategy consists of: 1) reducing or eliminating post-project runoff; 2) controlling sources of pollutants; and 3) treating storm water runoff before discharging it to the storm drain system or to receiving waters.

This WQMP and the proposed BMPs for the proposed project have been developed to minimize drainage impacts identified in Section 5 and the introduction of pollutants identified in Section 4 into the municipal storm drain system and/or ultimate drainage receiving water body.

For more detailed information on the use and design of BMPs please see the California Stormwater Quality Association New development and Redevelopment handbook. The handbook is available at **www.cabmphandbooks.com**. Additional information is also available in the City's WQMP.

6.1 Site Design BMPs

The most effective means of avoiding or reducing water quality and hydrologic impacts is through incorporation of measures into the project design. These measures should be taken into consideration early in the planning of a project as they can affect the overall design of a project.

The design of the proposed project has considered and incorporated site design concepts as described below.

SITE DESIGN CONCEPT 1: MINIMIZE STORMWATER RUNOFF, MINIMIZE PROJECT'S IMPERVIOUS FOOTPRINT AND CONSERVE NATURAL AREAS

1.	**Minimizing impervious footprint:** The Project's site design includes approximately 30 acres (roughly 1/3rd of the site) of HOA-maintained or City-maintained landscape areas, including parks, open space lots, and parkways, and, in total, the proposed Project would contain approximately 37.8 acres (approximately 38% of the site) of pervious area.
2.	**Conservation of natural areas:** The project proposes approximately 27.3 acres of Open Space, which is located primarily along the northwestern, southwestern and western edges of the site. Project will incorporate CASQA EC-2 "Preservation of Existing Vegetation"
3.	**Use of permeable paving or other surfaces:** Use of permeable paving and permeable paving materials will not be utilized for this project because the site's soil conditions and underlying geologic formations are not conducive to infiltration. Other BMPs will be employed instead.

4.	**Designing to minimum widths necessary:** Streets, sidewalks and parking lot aisles have been designed to the minimum widths necessary specified in the City of Lake Forest Municipal Code § 7.08.055 (Street Widths), while complying with ADA regulations and other life safety requirements. Generally, project streets have been designed to the minimum widths necessary to accommodate parking and traffic flow with a minimum pavement width of thirty-two (32) feet.
5.	**Incorporation of landscaped buffers:** Landscaped buffers are incorporated throughout the project and as part of the Utility Easement.
6.	**Reduced street widths:** The project has incorporated reduced street widths through the inclusion of private, common alley and/or drive access ways in compliance with City of Lake Forest Municipal Code § 7.08.055 (Street Widths).
7.	**Maximize canopy interception:** The project is at the Tentative Tract Map stage and the type of neighborhood canopy tree plantings has not been determined. Where appropriate, the use of canopy trees shall be incorporated into the landscape palette chosen for the project
8.	**Use of native or drought tolerant trees/shrubs:** The project is at the Tentative Tract Map stage and as such, the specific type of planting materials is still under development. Where possible and consistent with fuel management zone requirements, native/drought tolerant plans will be utilized.
9.	**Minimizing impervious surfaces in landscaping:** Use of impervious surfaces and decorative concrete in landscaped areas will be avoided wherever appropriate.
10.	**Use of natural drainage systems:** Natural drainages will be maintained throughout the project's open space areas as connections to the larger offsite natural drainage area of Aliso Creek and Serrano Creek.
11.	**Low flow infiltration:** The site's soil conditions and underlying geologic formations are not conducive to infiltration, and, therefore, low-flow infiltration systems are not proposed for the project.
12.	**Onsite ponding areas or retention facilities:** Occasional, temporary ponding will occur for the project at the open air, combined-use basin on Lot LL of offsite TTM 15353. An additional ten (10) underground chamber systems for hydromodification, retention and/or water quality treatment detention are proposed under lots 310, 311, 312, 313, 315, D and AA of offsite TTM 15353 for peak flow mitigation and/or hydromodification. Sections 1.1, 6.3.1 and 7 refer.
13.	**Other site design features:** The project also proposes the use of seven (7) modular wetland BMP systems to treat for Project Pollutants of Concern and seven (7) Nutrients Separating Baffle Box (NSBB) BMP systems to pretreat flows discharging into select underground basins for trash and sediment located within offsite TTM 15353. See the exhibits enclosed at the end of Section 6 for additional reference.

SITE DESIGN CONCEPT 2: MINIMIZE DIRECTLY CONNECTED IMPERVIOUS AREAS (DCIAs)

1.	**Draining rooftops into adjacent landscaping:** The project soils report recommends that downspouts should outlet a minimum of 5 feet from structures or to a subsurface drainage system.
2.	**Draining to adjacent landscaping:** Impervious sidewalks, walkways, trails, and patios will drain into adjacent landscaping prior to entering area drains and the project storm drain system where feasible.
3.	**Vegetated drainage swales:** Although landscaped areas are incorporated into the site plan to direct drainage over landscape and away from structural foundations, these landscaped areas do not have the length or slope necessary to meet the minimum hydraulic residence time of 5-9 minutes indicated in CASQA TC-30.
4.	**Site drainage system:** The site's soil conditions and underlying geologic formations are not conducive to infiltration, and, therefore, rural swale systems and urban curb/swale systems have not been incorporated as a part of this project.
5.	**Residential driveways:** Private alleys and drives incorporate shared access for select residences throughout the project as common access ways. Other driveways will drain flows starting from the garage doors sited at the front of each house to interior streets and thence into a downstream catch basin/storm drain pipe system.
6.	**Residential parking areas:** Residential parking will be in driveways, streets or in enclosed private garages (where vehicles will not come in contact with stormwater). Total project parking spaces shall be consistent with City of Lake Forest's parking regulations, standards and requirements. All onsite streets, alleys, and drives are private and will be maintained by the HOA.
7.	**Non-residential parking areas:** Non-residential parking will be provided at the project's neighborhood parks.

6.2 Source Control BMPs

Source Control BMPs are measures focusing on reducing or eliminating post-project runoff and controlling sources of pollutants. Source Control BMPs must be included in all projects and can be represented in structural measures such as landscape, irrigation, signage considerations, materials, and design of areas; and non-structure measures such as requirements, cleaning, education, and maintenance.

Table 6.1 Source Control Structural and Non-Structural BMPs

Number	BMP and Objective	Included
Routine Non-Structural BMPs (numbers correspond to those in City's WQMP)		
N1	**Education for Property Owners, Tenants and Occupants:** Practical informational materials are provided to residents, occupants, or tenants to increase the public's understanding of stormwater quality, sources of pollutants, and what they can do to reduce pollutants in stormwater. The HOA will be responsible for ensuring that all maintenance staff and contractors are given information outlining the environmental awareness education materials and for establishing requirements for the implementation of an awareness program that informs the staff of the impacts of dumping oil, paints, solvents or other potentially harmful chemicals into the storm drain; the proper use and management of fertilizers, pesticides and herbicides in home landscaping and gardening practices; the impacts of littering and improper. Environmental awareness education materials consistent with those included in Appendix A of this WQMP shall be provided to all members of the maintenance staff and annually thereafter by the HOA.	Y
N2	**Activity Restrictions:** Rules or guidelines for developments are established within appropriate documents (i.e. CC&Rs, lease terms, etc.) which prohibit activities that can result in discharges of pollutants. The HOA shall be required to limit the activities within the limits of the proposed project to those applicable to its intended use. Therefore, activities that have the potential to impact water quality, such as outdoor vehicle maintenance, will not be allowed on the premises. Within the CC&Rs prepared by the project developer, language shall be included to identify surface water quality protection required by the HOA. Surface water quality activities shall be conducted in conformance with the Water Quality Management Plan as it relates to the handling and disposal of contaminants. The following example from a similar project's Master Declaration of CC&Rs provides additional direction for controlling activities that may affect the environment of the project and/or surrounding areas (it should be noted that the HOA as cited in the CC&Rs refers to a typical Homeowners Maintenance Corporation, as a California Nonprofit Corporation formed for maintenance obligations of a community similar to this project): EXCERPT FROM MASTER DECLARATION OF CONDITIONS COVENANTS AND RESTRICTIONS, SECTION 2.13 2.13 POLLUTANT RUNOFF (a) The Neighborhood Corporation shall periodically provide to their	Y

Number	BMP and Objective	Included
	members environmental awareness education materials made available by the local municipalities. These materials will describe the use of chemicals (including household types) that should be limited to the Covered Property with no discharge of specified wastes via hosing or other direct discharge to gutter, catch basins, settling basins and storm drains. The materials shall also provide a description of fertilizer and pesticide usage guidelines consistent with County Management Guidelines for Use of Fertilizers and Pesticides. (b) The Neighborhood Corporation shall establish trash management and litter control procedures aimed at reducing pollution of drainage water. (c) The Neighborhood Corporation shall have any drainage systems, streets and catch basins on property they maintain inspected and cleaned, and any streets and parking areas they maintain swept on a weekly basis. (d) The Neighborhood Corporation shall implement irrigation and landscaping practices which will include provision of water sensors, programmable irrigation times, and grouping of plants with similar water requirements in order to minimize irrigation runoff. The Neighborhood Corporations shall maintain erosion control devices on the property they maintain until adequate vegetation coverage has been achieved following establishment.	
N3	**Common Area Landscape Management:** Specific practices are followed and ongoing maintenance is conducted to minimize erosion and over-irrigation, conserve water, and reduce pesticide and fertilizer applications. Landscape management programs will be designed and established by the project developer. The HOA will own and maintain all project common landscape areas. These programs will include how to mitigate the potential dangers of fertilizer and pesticide usage through the incorporation of an Integrated Pest Management Program (IPM). Ongoing maintenance will be consistent with the City of Lake Forest Municipal Code § 9.144.060.2 (Landscaping) and Chapter 15.10 (Stormwater and Urban Runoff Pollution Controls).	Y
N4	**BMP Maintenance:** In order to ensure adequate and comprehensive BMP implementation, all responsible parties are identified for implementing all non-structural BMPs and for structural BMPs, cleaning, inspection, and other maintenance activities are specified including responsible parties for conducting such activities. As indicated in (N2) above, the CC&R's shall identify the HOA as being responsible for implementation of each applicable non-structural BMP as well as scheduling inspection and maintenance cleaning of all applicable structural BMP facilities for HOA-maintained areas. The HOA, through its landscape maintenance contractor, will be responsible for inspection and maintenance activities in HOA-maintained landscape areas. Debris and other water pollutants will be controlled, contained and disposed of in a proper manner by the maintenance contractor. The City of Lake Forest will be the responsible party as it relates to the implementation and maintenance of both non-structural and structural BMPs on the public 5-acre park site located offsite in adjacent TTM 15353.	Y

Number	BMP and Objective	Included
N5	**Title 22 CCR Compliance:** Hazardous waste is managed properly through compliance with applicable Title 22 regulations. ***Not applicable.*** Generally applies to those facilities that generate, store or dispose of hazardous materials.	N
N6	**Local Water Quality Permit Compliance:** The project complies with water quality permits issued by the City to ensure clean stormwater discharges. Project incorporates County of Orange DAMP and City requirements, requiring the preparation of a WQMP and treatment of project pollutants of concern.	Y
N7	**Spill Contingency Plan:** A Spill Contingency Plan is implemented to ensure that spills are managed properly by requiring stockpiling of cleanup materials, notification of responsible agencies, disposal of cleanup materials, documentation, etc. ***Not applicable.*** This requirement generally apples to commercial or industrial developments that generate, store or dispose of hazardous materials. However, in the event that oil, hydrocarbon and other materials that may impact storm water is leaked or spilled within the project area, the material(s) shall be cleaned up immediately and disposed of properly.	N
N8	**Underground Storage Tank Compliance:** Because of the known or potential presence of underground storage tanks (USTs) on the project site, applicable UST regulations apply and are adhered to in order to avoid harm to humans or the environment. ***Not applicable.*** No applicable underground storage tanks are proposed.	N
N9	**Hazardous Materials Disclosure Compliance:** Because hazardous materials or wastes will be generated, handled, transported, or disposed of in association with the project, measures are taken to comply with applicable local, state, and federal regulation to avoid harm to humans and the environment. ***Not applicable.*** This requirement generally apples to commercial or industrial developments that generate, store or dispose of hazardous materials.	N
N10	**Uniform Fire Code Implementation:** The project includes a hazardous material storage facility or other area regulated by Article 80 and therefore implements measures to comply with this section of the Uniform Fire Code. ***Not applicable.*** This requirement generally apples to commercial or industrial developments that generate, store or dispose of hazardous materials.	N
N11	**Common Area Litter Control:** Trash management and litter control procedures are specified, including responsible parties, and implemented to reduce pollution of drainage water. With the exception of the public 5-acre park (located offsite in adjacent TTM 15353) which will be maintained by the City of Lake Forest, the HOA shall be responsible for common area litter control, emptying of trash receptacles, noting of disposal violations and investigating violations as necessary.	Y

Number	BMP and Objective	Included
N12	**Employee Training:** Practical informational materials and/or training are provided to employees to increase their understanding of stormwater quality, sources of pollutants, and their responsibility for reducing pollutants in stormwater. Post construction, an employee training/education program will be established for future employees, contractors of the HOA, and HOA volunteers engaged in maintenance activities regarding the impact of dumping oil, paints, solvents or other potentially harmful chemicals into the storm drain; the proper use of fertilizers and pesticides in landscaping maintenance practices; and the impacts of littering and improper water disposal.	Y
N13	**Housekeeping of Loading Docks:** Cleaning and clean up procedures are specified and implemented for loading dock areas to keep the area free for pollutants and reduce associated pollutant discharges. ***Not applicable.*** No Loading docks proposed.	N
N14	**Drainage Facility Inspection:** Inspection procedures, schedules, and responsibilities are established for drainage facilities to ensure regular cleaning, inspection, and maintenance. With the exception of Basins #1 and #2 located in offsite, TTM 15353's 5-acre public park site which will be owned, inspected and maintained by the City of Lake Forest, all project drainage facilities will be owned, inspected and maintained by the HOA. Area drains will be inspected on a regular basis during the rainy season in conjunction with landscape maintenance operations and maintained as necessary. Catch basin maintenance will consist of manual and/or vacuum removal of silt and debris from the bottom of the basins and the entrance of the storm drain. This will be done on an annual basis or more frequently depending on the amount of silt and debris that can be expected to build up to a point where the functionality of the BMP could be impaired. This annual cleaning will be done prior to the start of the storm season, and no later than October 1st of each year.	Y
N15	**Street Sweeping Private Streets and Parking Lots:** Street sweeping frequency and responsible parties are identified and regular sweeping is conducted to reduce pollution of drainage water. During construction and prior to the acceptance of the project streets for maintenance by the HOA, the project developer will have all streets and any parking areas vacuum swept. On a long-term basis, after acceptance of all streets for maintenance, this BMP will be implemented prior to October 1st of each year by the HOA.	Y
N17	**Retail Gasoline Outlets:** Specific operational and maintenance BMPs are implemented to the extent feasible to reduce potential for pollutant discharge from wash off by runoff, leaks, and spills. ***Not applicable.*** No retail gasoline outlets proposed.	N

Number	BMP and Objective	Included
Source Control Structural BMPs (numbers correspond to the California BMP Handbook)		
SD-10	**Site Design and Landscape Planning:** Landscape planning methodologies are incorporated into project design to maximize water storage and infiltration opportunities and minimize surface and groundwater contamination from stormwater. The project has incorporated Site Design and Landscape Planning methodologies such as minimizing impervious footprint, incorporation of landscaped buffers, and use of native and drought tolerant species as previously detailed in section 6.1 of this report.	Y
SD-11	**Roof Runoff Controls:** Direct roof runoff away from paved areas and to pervious areas, cisterns, infiltration trenches, and/or storage areas for reuse to reduce total volume and rate of site runoff and retain pollutant on site. The site's soil conditions and underlying geologic formations are not conducive to infiltration, and, therefore, roof drains will be directed to flow away from building foundations to avoid the potential for erosion, oversaturation of foundation footings, and other conditions that can lead to a public safety or health impact by jeopardizing the integrity of building foundations, leading to slab weeping, water intrusion, and/or mold conditions on the interior of buildings.	Y
SD-12	**Efficient Irrigation:** Project plans include application methods to minimize irrigation water discharged into stormwater drainage systems. Efficient irrigation practices will be consistent with the City of Lake Forest Municipal Code § 9.144.060.2 (Landscaping) and Chapter 15.10 (Stormwater and Urban Runoff Pollution Controls). Irrigation systems shall be automatically controlled and designed, installed, and maintained so as to minimize overspray and runoff onto streets, sidewalks, driveways, structures, windows, walls, and fences. Provisions such as water sensors, programmable irrigation timers (for short cycles) etc. will be used. These devices will be maintained by the HOA.	Y
SD-13	**Storm Drain System Signs:** Stencils or affixed signs placed adjacent to storm drain inlets to prevent waste dumping at storm drain inlets. The project's catch basins located in paved areas will be labeled with catch basin markers which state: "No Dumping - Drains to Ocean, No Descargue Basura". This will be done in a location that can be clearly seen The HOA shall routinely inspect and re-label the catch basins, as necessary.	Y

Number	BMP and Objective	Included
SD-20	**Pervious Pavements:** Porous concrete or asphalt, blocks with pervious spaces or joints, or grass or gravel surfaces are employed to reduce runoff volume and provides treatment. **The site's soil conditions and underlying geologic formations are not conducive to infiltration, and, therefore, the use of permeable pavement is not proposed.** Per recommendations of the project Soils Report, all sidewalks and other concrete flatwork should include joints at approximately 10 feet spacing to avoid cracking. No permeable pavement is proposed for the project. Granular materials were not considered because the efficiency of this type of infiltration system quickly becomes negated by predictable sediment accumulation and maintenance costs are extremely high as the entire system must be removed and replaced on a periodic basis.	N
SD-21	**Alternative Building Materials:** Specialized building materials are employed that have lower potential to leach pollutants, and reduce need for future painting or other pollutant generating maintenance activities. For example, some treated wood contains pollutants that can leach out to the environment and some metal roofs and roofing materials result in high metal content in runoff. Currently no alternative building materials have been proposed. They will be considered during construction of the project.	N
SD-30	**Fueling Areas:** Project plans are developed for cleaning, spill cleanup, containment, leak prevention, and incorporation of design to reduce rain and runoff that could come in contact with fueling areas. ***Not applicable.*** No fueling areas are proposed for site.	N
SD-31	**Maintenance Bays and Docks:** Project design incorporates measures to cover or otherwise eliminate run-on and off from bays and docks, and direct connections to storm drain are eliminated. ***Not applicable.*** No maintenance bays or docks have been proposed for site.	N
SD-32	**Trash Enclosures:** Trash storage areas are covered and enclosed to prevent introduction of trash and debris to site runoff. Residents in the Project's single family neighborhoods will store trash covered trash containers in individual garage spaces or sideyards. This will be specified and enforceable through the HOA via provisions in the CC&Rs. Normal homeowner use related trash can be anticipated to be produced daily. Lake Forest residents typically use a 3 cart system for recyclables, trash, and green waste. Trash will be removed by the local private solid waste management contractor on a weekly basis for proper disposal of the trash to landfill. Further information about trash pickup in the City of Lake Forest can be found at this site: http://www.wmorangecounty.com/cities/lakeforest.asp	Y
SD-33	**Vehicle and Equipment Washing Areas:** Designated wash areas or facilities are contained and wash water is reused, treated, or otherwise properly disposed of.	N

Number	BMP and Objective	Included
	Not applicable. No Vehicle and Equipment Wash Areas are proposed for site.	
SD-34	**Outdoor Material Storage Areas:** Outdoor storage areas for materials containing pollutants, especially hazardous materials, are covered and enclosed, on impervious surfaces, and include secondary containment when applicable. ***Not applicable.*** No Outdoor Material Storage Areas are proposed for site.	N
SD-35	**Outdoor Work Areas:** Outdoor work areas are covered, contained, and treated as necessary to reduce opportunity of pollutants from work activities to enter stormwater. ***Not applicable.*** No Outdoor Work Areas are proposed for site.	N
SD-36	**Outdoor Processing Areas:** Outdoor processing areas are covered, contained, and treated as necessary to reduce opportunity of pollutants from work activities to enter stormwater. ***Not applicable.*** No Outdoor Processing Areas are proposed for site.	N

6.3 Treatment Control BMPs

Treatment control BMPs utilize treatment mechanisms to remove pollutants that have entered stormwater runoff and consist of public domain BMPs (identified in the following table with as TC-##) and manufactured or proprietary BMPs (identified in the following table with as MP-##). BMP numbers correspond to the California BMP Handbook.

The following table identifies the treatment control BMPs included in the proposed project.

Table 6.2 Treatment Control BMPs

Number	BMP and Objective	Included
	Infiltration	
TC-10	**Infiltration Trench:** A long narrow rock filled trench with no outlet receives water and stores it until it infiltrates into the underlying soil. It is effective at removing most pollutants but can get clogged with sediment. Not proposed for the project. See the geologist's letter in Appendix C.	N
TC-11	**Infiltration Basin:** A shallow impoundment designed to capture and hold stormwater until it infiltrates into underlying soil. Effective at removing most pollutants but requires large areas and may be constrained by soil types. The Project's Soils Report recommends avoiding areas that promote "ponding". Not desirable for a hill with slopes and retaining walls. Possible vector concerns. See Appendix C.	N
TC-12	**Retention/Irrigation:** Stormwater is captured in cistern, basin, trench, or other storage area and is subsequently used for irrigation of site landscaping. Without proper containment and post-treatment, vector and contamination issues from retention and reuse could pose a public health risk.	N

Number	BMP and Objective	Included
	Detention and Settling	
TC-20	**Wet Pond:** A constructed basin with a permanent pool of water throughout the year. Differ from wetlands because it is of greater depth. Treats stormwater runoff by settling and biological uptake. The Project's Soils Report recommends avoiding areas that promote "ponding". Vector issues from permanent ponding could pose a public health risk.	N
TC-21	**Constructed Wetland:** A constructed basin with permanent pool of shallow water throughout most of year with substantial vegetative coverage. The project will implement seven (7) Modular Wetland Systems (MWS). A MWS is a storm water hybrid biofiltration water polishing unit manufactured by Modular Wetlands for use with flows prior to being discharged from all applicable underground basins. See Section 6.3.3 for location/details.	Y
TC-22	**Extended Detention Basin:** A constructed basin with an outlet designed to detain storm water for at least 48 hours to allow particles and pollutants to settle. One combination-use basin is proposed in Lot LL which shall combine effective Water Quality Treatment, Hydromodification and Detention uses.	Y
MP-20	**Wetland:** Similar to a constructed wetland but a self contained, manufactured module with vegetation that mimics natural wetland processes. See TC-21. TC-21s shall be implemented in lieu of any MP20 BMP system.	N
	Biofiltration	
TC-30	**Vegetated Swale:** Open, shallow, vegetated channels that collect and slowly convey runoff through the property. Filters runoff through vegetation, subsoil matrix, and/or underlying soils; traps pollutants, promotes infiltration and reduce flow velocity. Although landscaped areas are incorporated into the site plan to direct drainage over landscaping and away from structural foundations, these landscaped areas do not have the length or slope necessary to meet the minimum hydraulic residence time of 5-9 minutes indicated in CASQA TC-30.	N
TC-31	**Vegetated Buffer Strip:** Vegetated surfaces that are designed to treat sheet flow from adjacent surfaces. Removes pollutants by deceleration, settling, and infiltration. Landscaped areas graded to allow drainage to flow over landscaped areas prior to entering area drains or the street and the project's storm drain system have been incorporated. These are not designed as vegetated buffer strips as defined by CASQA TC-31. Drainage setbacks will be 5 feet per the recommendations of the Project's Soils Report.	N
TC-32	**Bioretention:** A soil and plant based filtration strategy that involves capturing stormwater in depressed landscaped areas. Bioretention practices are flexible strategies for using landscaping as treatment. Not proposed for the Project.	N

	Filtration	
TC-40	**Media Filter:** Usually two-chambered with a pretreatment settling basin and a filter bed filled with sand or other absorptive filter media. Not proposed for the Project.	N
MP-40	**Media Filter:** Similar to constructed media filter but manufactured as self-contained filtering vaults, units, or cartridges. Not proposed for the Project.	N
	Flow Through Separation	
TC-50	**Water Quality Inlet:** Vaults with chambers including screens, settling areas, and/or filter media to promote settling and/or separation of pollutants from stormwater. The project shall install seven (7) Nutrient Separating Baffle Box (NSBB), a stormwater pre-treatment device manufactured by BioClean for use with flows prior to entering all applicable underground basins. See Section 6.3 for locations and details.	Y
MP-50	**Wet Vault:** A vault with a permanent water pool and internal features to promote settling and/or separation of pollutants from stormwater. Not proposed for the Project.	N
MP-51	**Vortex Separator:** Similar to wet vaults but round and use centrifugal action as primary separation mechanism. Not proposed for the Project.	N
MP-52	**Drain Inserts:** Boxes, trays, or socks with screens or filter fabric and may also include filter media. They are installed in inlets or catch basins and removal effectiveness for pollutants is generally low except for large sediment. None proposed.	N
	Other	
TC-60	**Multiple Systems:** A system that uses two or more BMPs in series to increase treatment. Useful when one BMP does not provide sufficient treatment alone. Not proposed for the Project.	N

6.3.1 SELECTION

Many factors were taken into consideration in selecting the proposed BMPs. These include anticipated pollutants, existing and proposed site conditions (such as grade constraints and soils/geotechnical considerations), feasibility of employment (feasibility of routing runoff to proposed BMP), ease of integrating the BMP into overall land plan, visual aesthetics, public safety, ease of maintenance, the practicality and long-term viability of consolidated systems as opposed to distributed (lot by lot) systems, and overall treatment effectiveness.

During the design process Wet ponds (a SQDV method BMP) were briefly considered, but ruled out because of the project's rolling hillside nature and underlying soil and geologic conditions. A treatment train incorporating the Abtech Smart Sponge Plus and the Contech StormFilter was also considered but was ruled out for concerns regarding high installation and maintenance costs and disposal issues surrounding "spent" media.

In order to provide an effective degree of treatment for the project's pollutants of concern, the project proposes:

1 Open Air Basin with Combined uses for Water Quality Treatment, Hydromodification and Retention (Lot LL)

10. Underground Basins with a combination of uses including pre-treatment (Nutrient Separating Baffle Boxes), hydromodification, detention, and post-treatment (modular wetlands) at the following locations:

Underground Basin No.	Lot No.	Uses			
		Pre-Treatment (Nutrient Separating Baffle Box (NSBB)	Hydromodification	Detention	Post-Treatment (Mod. Wetland)
1	312	✓	✓		✓
2	312			✓	
3	311	✓	✓		✓
4	310	✓	✓		✓
5	313	✓	✓		✓
7A	313	✓	✓		✓
7B	AA		✓		
8	315			✓	
8A	D	✓	✓		✓
8B	D	✓	✓		✓

Note: These eleven (11) total basins are located in adjacent, downstream and offsite TTM 15353. However, they incorporate the water quality treatment, detention, and hydromodification requirements for both TTM 15353 and TTM 17300, with the exception of the sand filters which treat only the area of the 5-acre public park in TTM 15353, offsite. .

See the text in Section 1.1, 3, 4 Appendix B and the exhibits at the end of Section 6 and in Section 7 for reference.

Bacteria as a pollutant of concern will be addressed, at the Open Air Basin on Lot LL and through the combined use of the MWS and NSBB Water Quality Treatment BMPs located within the basins on Lots D, 310, 311, 312 and 313 (see above) of TTM 15353.

Project Routine Source Control BMPs and good housekeeping measures shall supplement the work of the project's treatment control BMPs to reduce or eliminate the potential effects of this project on downstream waters.

Post construction maintenance of Basins 1 and 2 shall be by the City of Lake Forest.

6.3.2 SIZING

Treatment Control BMPs were designed using the applicable Stormwater Quality Design Volumes (SQDV) and Stormwater Quality Design Flows (SQDF) methods described in the DAMP ($C*I*A= Q_{BMP}$). Units are sized per manufacturer's recommendations to treat for the required Q_{BMP}.

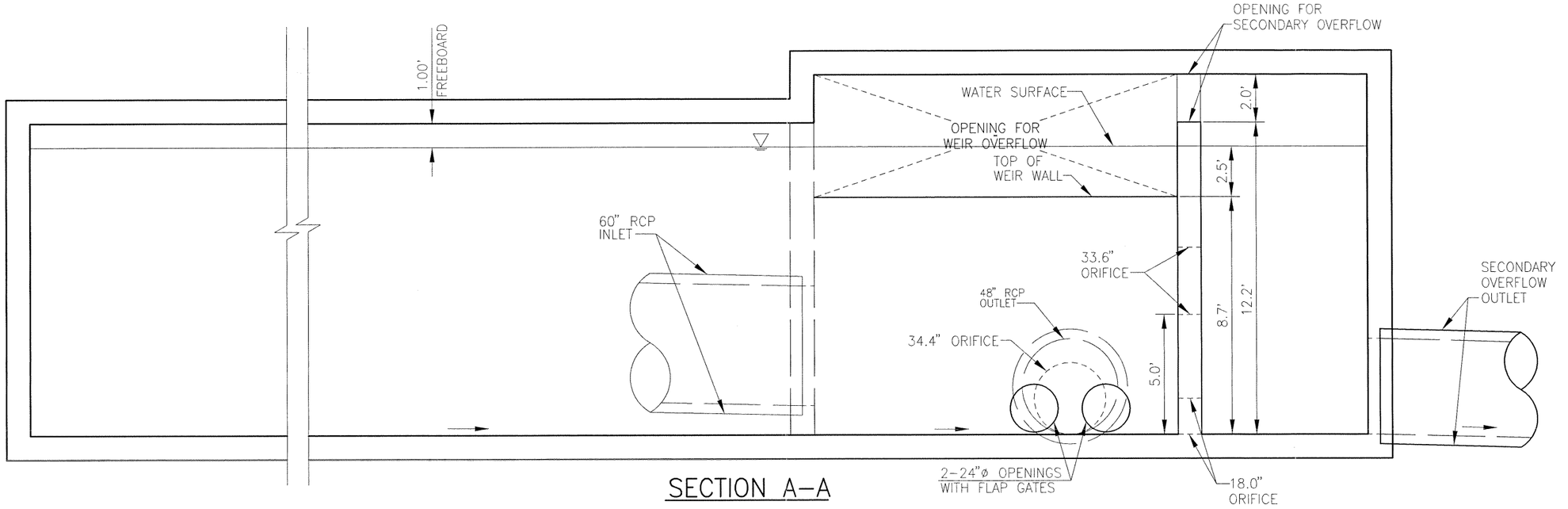
See Appendix D for calculations, sizing, design and product specifications. Appendices B and C include calculations for hydromodification control BMPs.

6.3.3 LOCATION

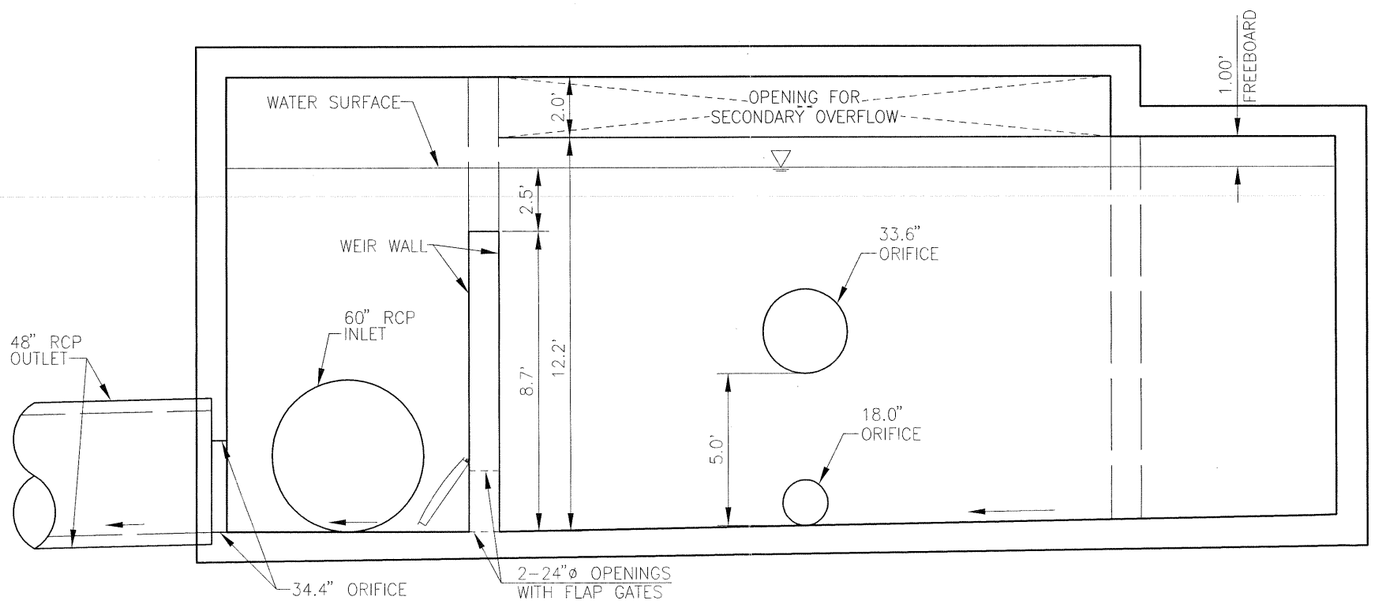
See the exhibits at the end of Section 6 and in Section 7 for the locations of the hydromodification BMPs and Treatment Control BMPs.

6.3.4 RESTRICTIONS ON USE OF INFILTRATION BMPS

The proposed project does not propose infiltration BMPs. The project Soils Report as well as the City of Lake Forest's geotechnical reviewers advise against project design features that would cause ponding or infiltration of water in project soils and overly wet conditions. Please refer to Appendix C.



SECTION A-A



SECTION B-B

FLOW-BY DETENTION CHAMBER

SECTIONS

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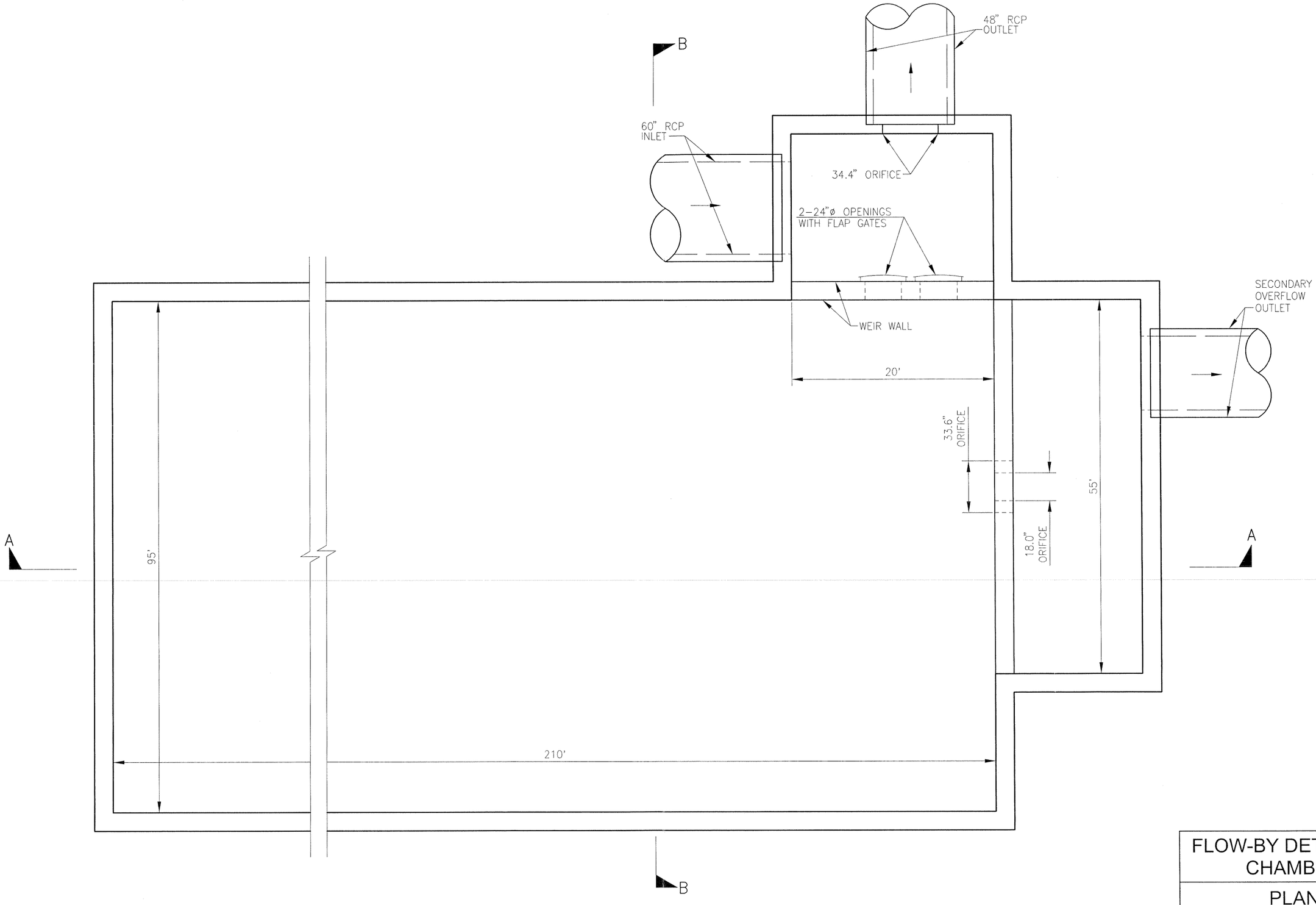


FLOW-BY DETENTION CHAMBER

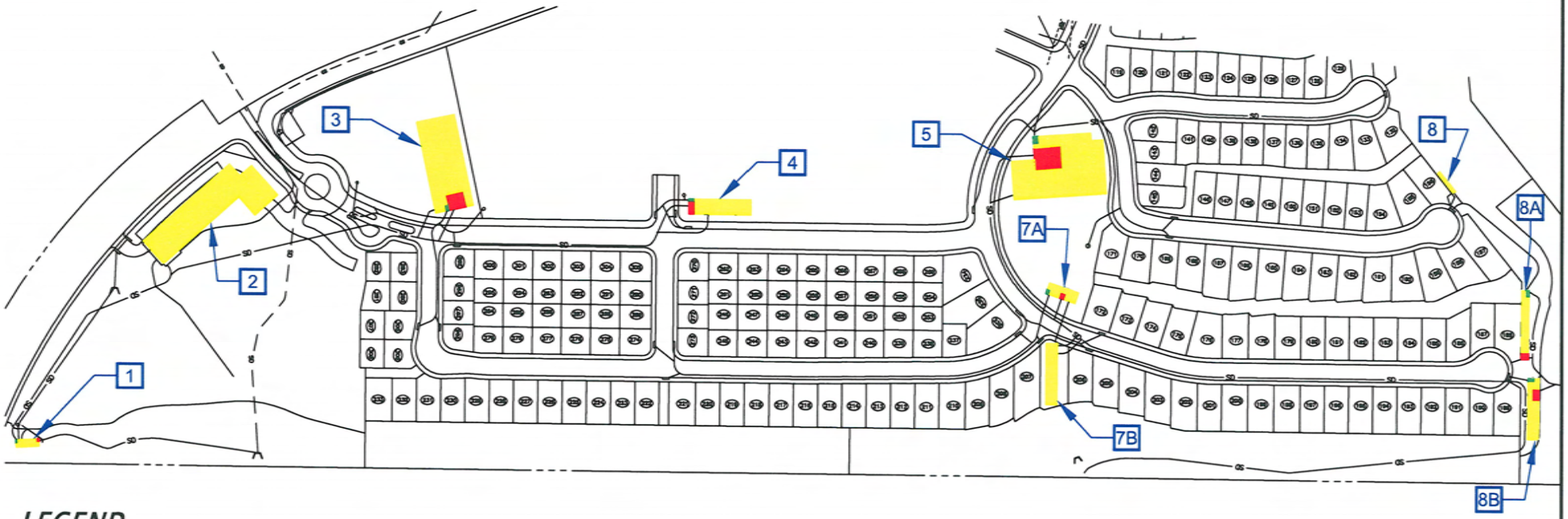
PLAN

PLOTTED BY: Ha To Chau DATE: 2/22/2013 9:53 AM FILENAME: F:\0334\Engineering\SY_Storm Drain\SHT01_with diversion to basin 2.dwg

MODULAR WETLANDS™

PORTOLA CENTER
WATER QUALITY
BASIN SITE MAP

BIO CLEAN ENVIRONMENTAL SERVICES, INC.



LEGEND

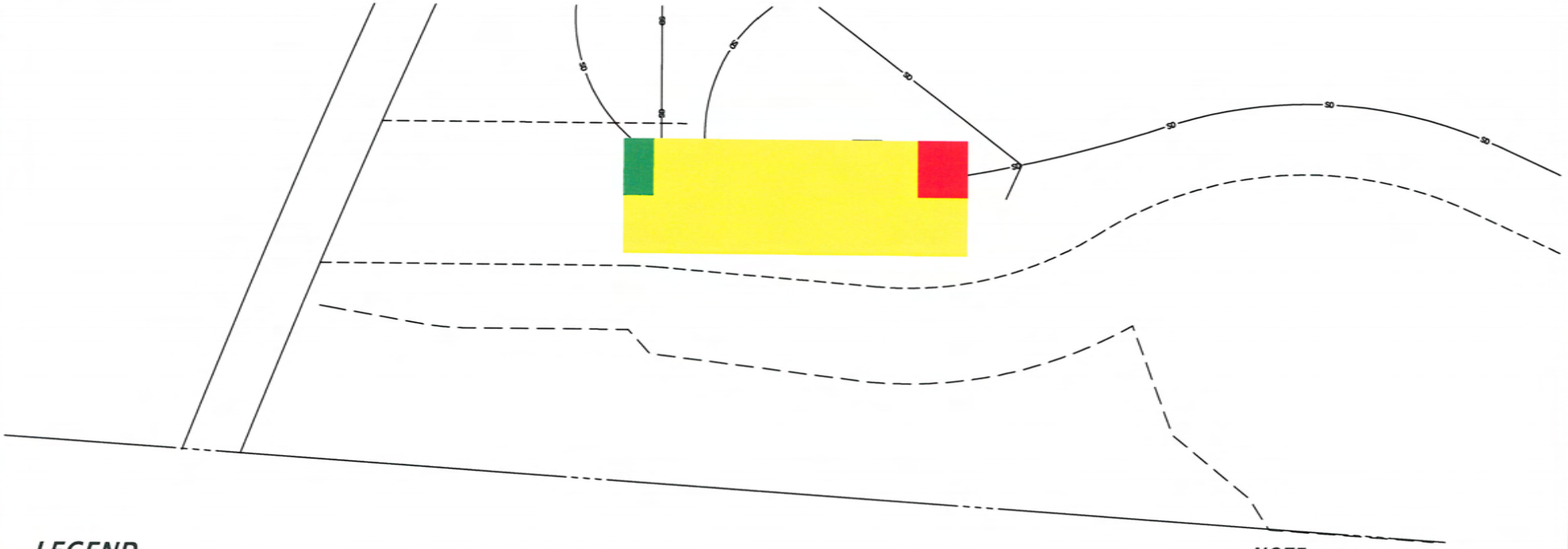
1 BASIN NUMBER

NOT TO SCALE

PORTOLA CENTER
WATER QUALITY
BASIN #1

MODULAR WETLANDS™

BIO CLEAN ENVIRONMENTAL SERVICES, INC.



LEGEND

- STORMCAPTURE – STORM WATER STORAGE UNIT MANUFACTURED BY OLDCASTLE PRECAST
- NUTRIENT SEPARATING BAFFLE BOX (NSBB) – STORM WATER PRE-TREAMENT DEVICE MANUFACTURED BY BIO CLEAN
- MODULAR WETLAND SYSTEM – STORM WATER HYBRID BIOFILTRATION WATER POLISHING UNIT MANUFACTURED BY MODULAR WETLANDS

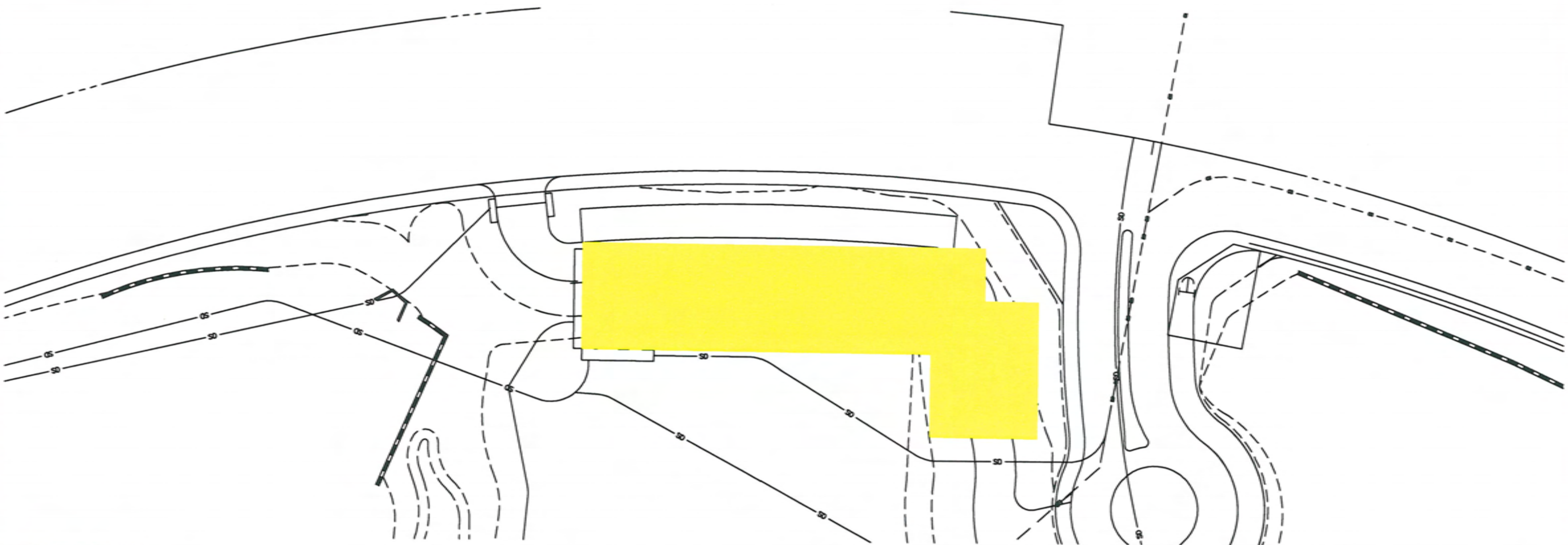
NOTE:

THIS EXHIBIT IS INTENDED AS A CONCEPTUAL GRAPHICAL LAYOUT AND IS NOT TO SCALE AND IS SUBJECT TO CHANGE.

NOT TO SCALE

PORTOLA CENTER
WATER QUALITY

BASIN #2



LEGEND

STORMCAPTURE – STORM WATER STORAGE UNIT
MANUFACTURED BY OLDCASTLE PRECAST

NOTE:

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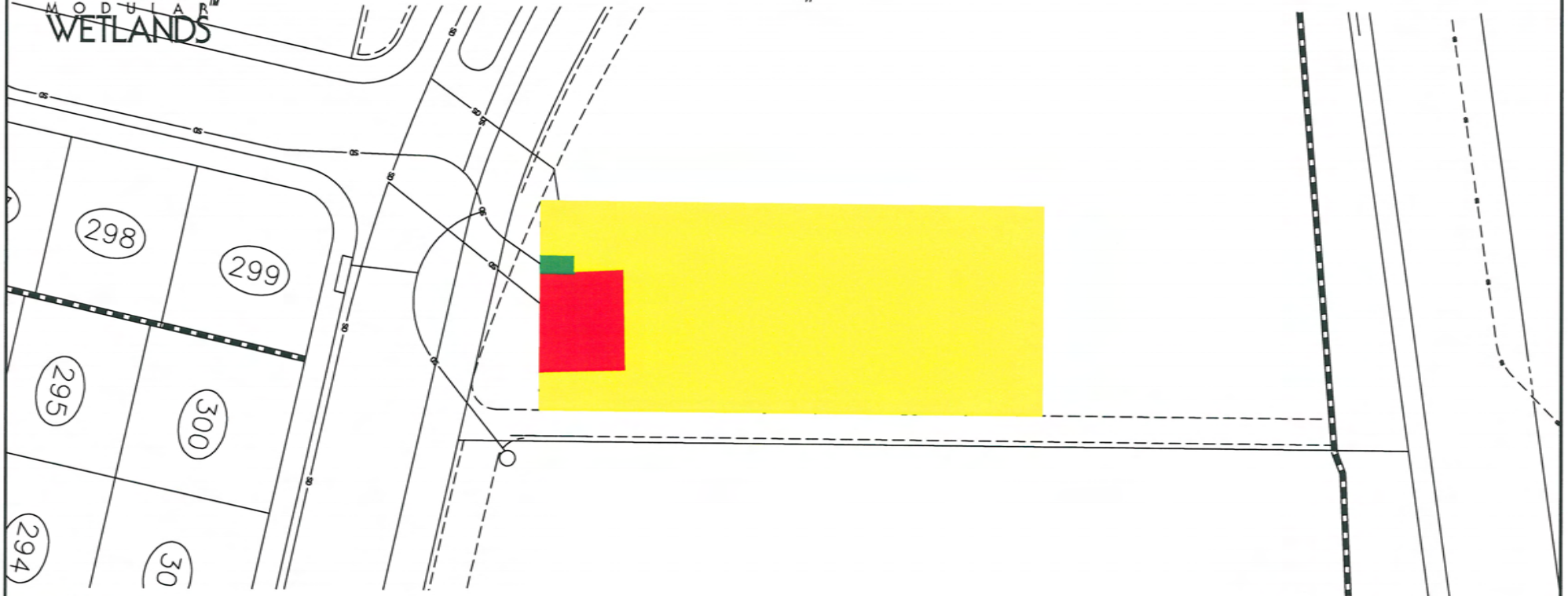
NOT TO SCALE

PORTOLA CENTER
WATER QUALITY

BASIN #3

MODULAR WETLANDS™

BIO CLEAN ENVIRONMENTAL SERVICES, INC.



LEGEND

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- NUTRIENT SEPARATING BAFFLE BOX (NSBB) – STORM WATER PRE-TREAMENT DEVICE MANUFACTURED BY BIO CLEAN
- MODULAR WETLAND SYSTEM – STORM WATER HYBRID BIOFILTRATION WATER POLISHING UNIT MANUFACTURED BY MODULAR WETLANDS

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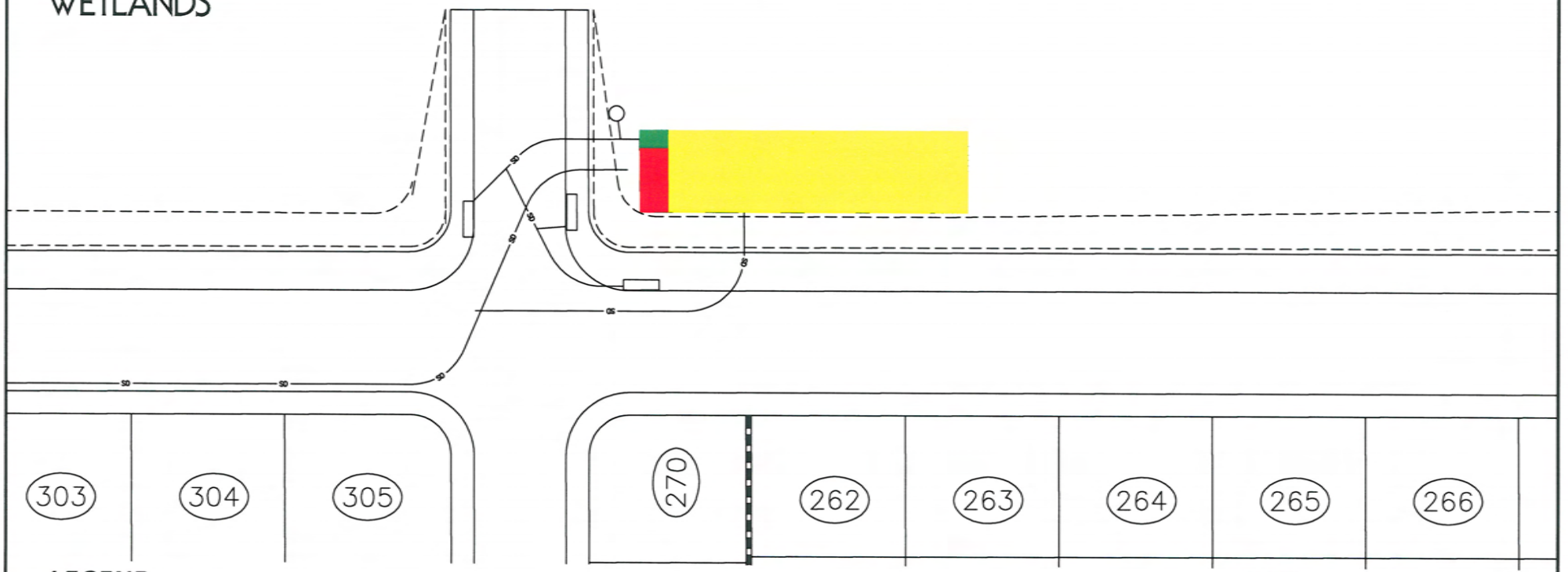
PORTOLA CENTER
WATER QUALITY

BASIN #4

MODULAR WETLANDS™

BIO CLEAN ENVIRONMENTAL SERVICES, INC.



LEGEND

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  MANUFACTURED BY OLDCASTLE PRECAST
- NUTRIENT SEPARATING BAFFLE BOX (NSBB) – STORM WATER PRE-TREAMENT DEVICE
  MANUFACTURED BY BIO CLEAN
- MODULAR WETLAND SYSTEM – STORM WATER HYBRID BIOFILTRATION WATER POLISHING UNIT
  MANUFACTURED BY MODULAR WETLANDS

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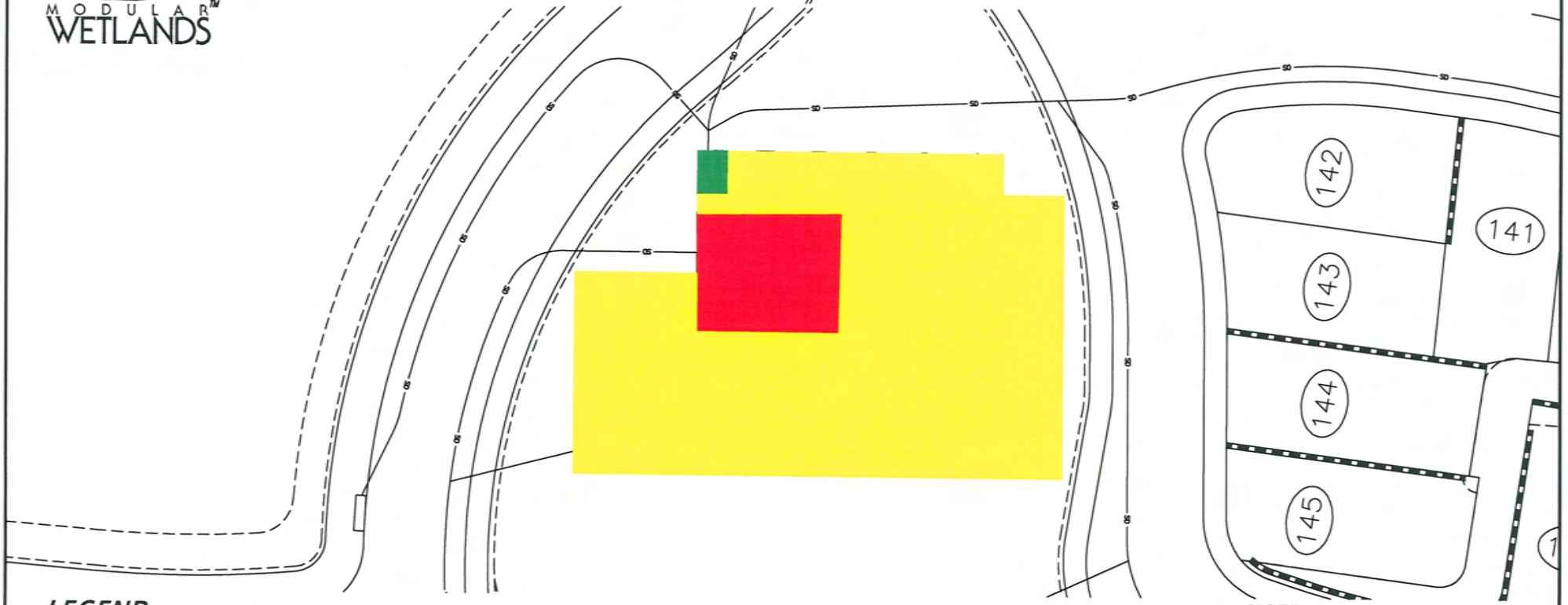
PORTOLA CENTER
WATER QUALITY

BASIN #5



LEGEND

- STORMCAPTURE – STORM WATER STORAGE UNIT
  MANUFACTURED BY OLDCASTLE PRECAST
- NUTRIENT SEPARATING BAFFLE BOX (NSBB) – STORM WATER PRE-TREAMENT DEVICE
  MANUFACTURED BY BIO CLEAN
- MODULAR WETLAND SYSTEM – STORM WATER HYBRID BIOFILTRATION WATER POLISHING UNIT
  MANUFACTURED BY MODULAR WETLANDS

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PORTOLA CENTER
WATER QUALITY
BASIN #7

MODULAR WETLANDS™

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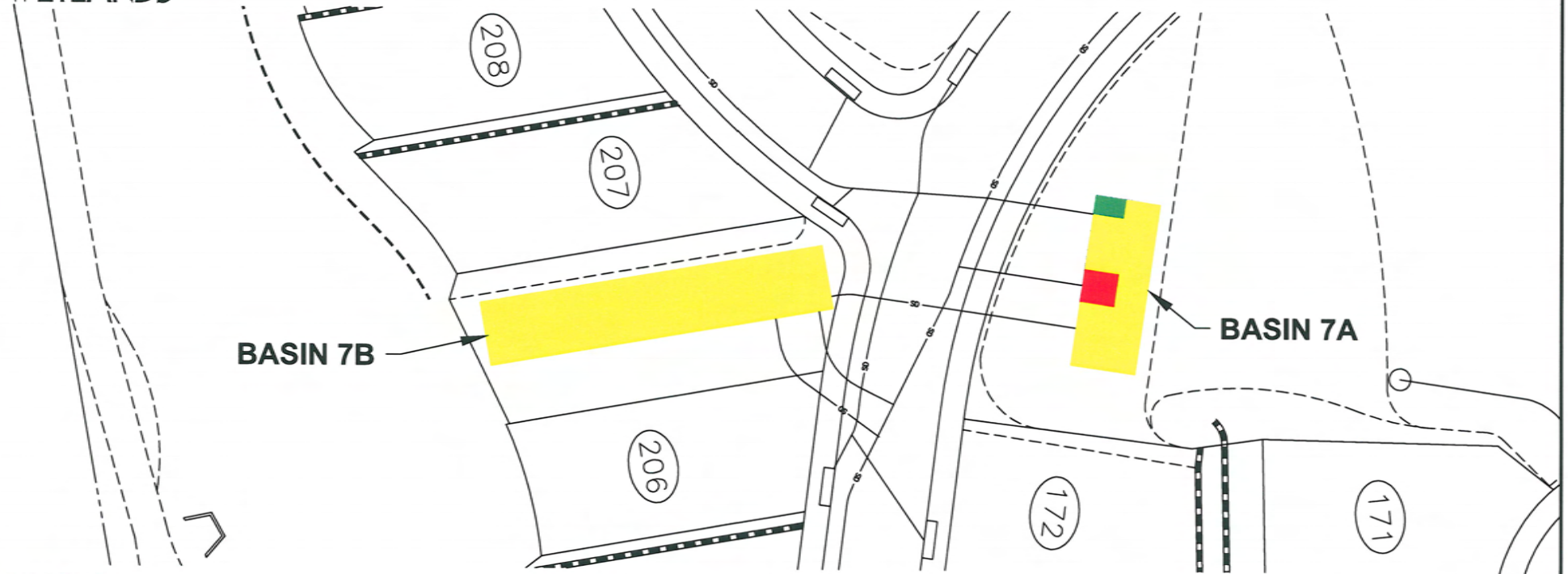

LEGEND

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PORTOLA CENTER
WATER QUALITY
BASIN #8

MODULAR WETLANDS™

BIO CLEAN ENVIRONMENTAL SERVICES, INC.

LEGEND

STORMCAPTURE – STORM WATER STORAGE UNIT MANUFACTURED BY OLDCASTLE PRECAST

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PORTOLA CENTER
WATER QUALITY

BASIN #8A & #8B

MODULAR WETLANDS™

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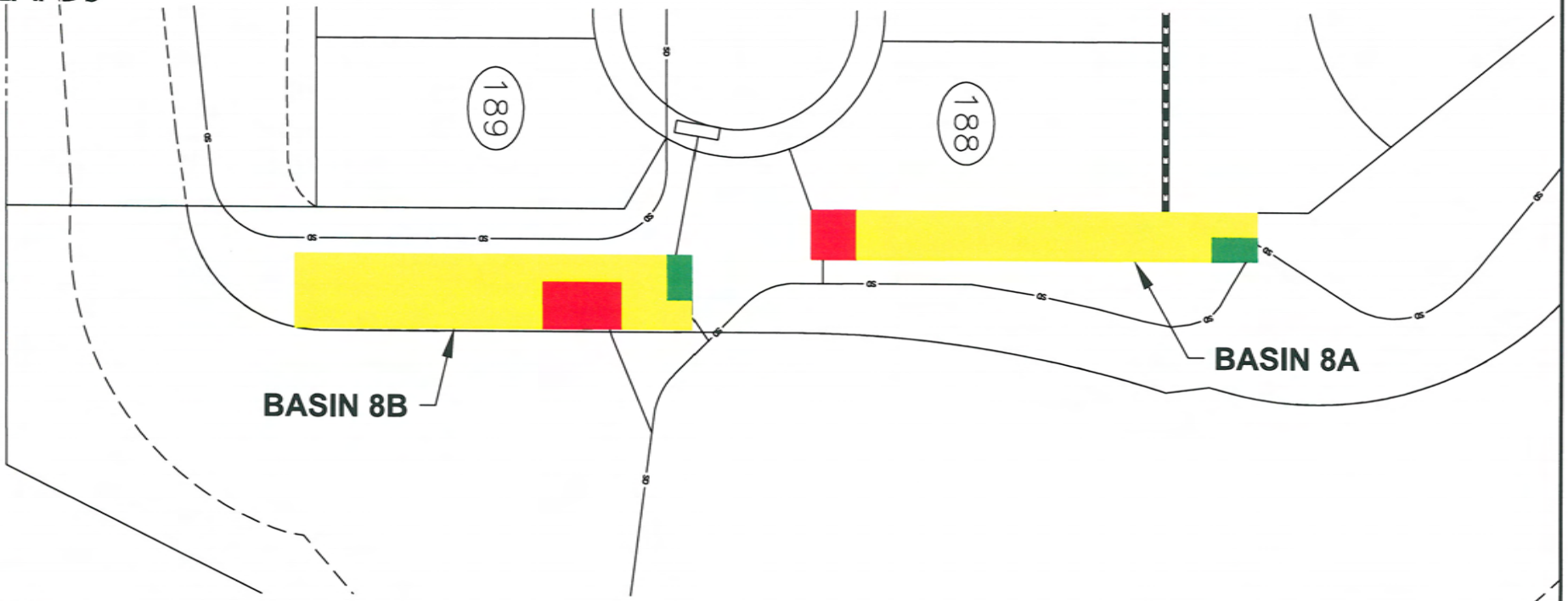

LEGEND

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PORTOLA CENTER
WATER QUALITY
BASIN #9

MODULAR WETLANDS™

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LEGEND

STORMCAPTURE – STORM WATER STORAGE UNIT MANUFACTURED BY OLDCASTLE PRECAST

NOTE:

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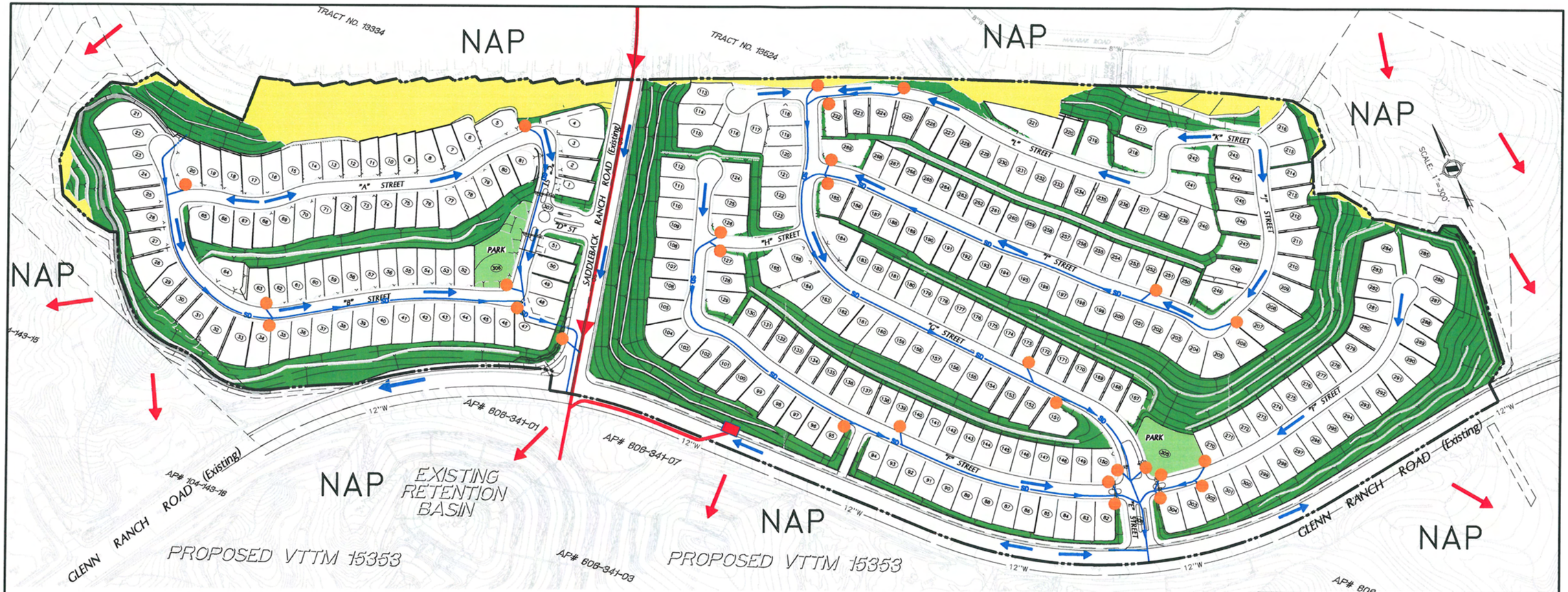
Section 7

Section 7 Project Plan and BMP Location Map

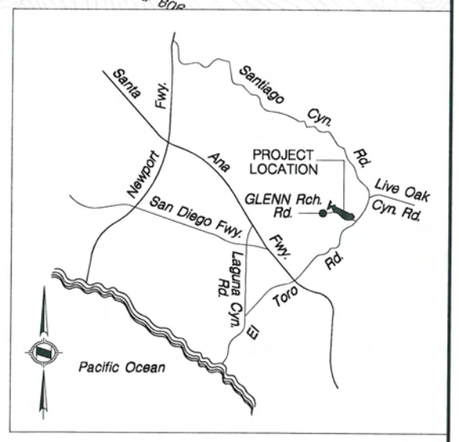
Figure 7.1 illustrates the proposed project and the Source Control structural and Treatment BMPs that will be implemented pursuant to this WQMP. The following checklist identifies the required information that is included in the BMP map.

Included	Requirement
✓	Legend, north arrow, scale
✓	Show drainage arrows, and drainage areas
✓	Entire property on one map (provided sufficient detail is shown)
✓	Show structures to be constructed and removed
✓	Show proposed and existing storm drain systems
✓	Show all external hardscape surfaces such as walkways, driveways, pools, spas, patio areas etc.
✓	Indicate the landscape areas and planters
✓	Show nearby waterbodies by name, if available
✓	Identify site outlet and/or connection to municipal storm drain system
✓	Identify locations of all source control structural and treatment BMPs on the Map. Indicate the BMP location using the BMP number.
✓	Differentiate/identify pervious and impervious surfaces, buildings, activity areas, etc.
✓	Identify areas of potential soil erosion



LEGEND

- TRACT BOUNDARY
- NAP — NOT A PART
- SD — ONSITE (PROPOSED) STORM DRAIN & DIRECTION OF FLOW
- EXISTING STORM DRAIN & DIRECTION OF FLOW
- DIRECTION OF ONSITE SURFACE AND SUB SURFACE FLOWS
- DIRECTION OF OFFSITE SURFACE FLOW
- CATCH BASIN ONLY
  SD-13 CATCH BASIN STENCILING
- LANDSCAPE AREAS (PRIVATE) WITH BMP's:
  (MAINTAINED BY HOA)
  SD-10 SITE DESIGN/LANDSCAPE PLANNING
  SD-12 EFFICIENT IRRIGATION
- PARK - ALL PARKS TO BE MAINTAINED BY HOA.
- OPEN SPACE LOTS
- EXISTING CATCH BASIN
  SD-13 CATCH BASIN STENCILING



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DATE PREPARED: 3/18/13

W.O. 3645-2

PORTOLA CENTER @ TTM 17300
CITY OF LAKE FOREST

WQMP EXHIBIT

SHEET 1

PLOTTED BY: Dien Vu DATE: Apr. 15, 2013 08:50:28 AM FILE: F:\0334\Engineering\0A_Project\WQ_Exh\WQMP_TTM 17300_SHT 1.dwg

ADDITIONAL STRUCTURAL AND NONSTRUCTURAL SOURCE CONTROL BMP'S (SEE PROJECT WQMP OPERATIONS AND MAINTENANCE PLAN FOR DETAILS):

- EDUCATION FOR TENANTS AND EMPLOYEES
- ACTIVITY RESTRICTIONS
- COMMON AREA LANDSCAPE MANAGEMENT
- BMP MAINTENANCE
- TITLE 22 COMPLIANCE
- SPILL CONTINGENCY PLAN
- HAZARDOUS MATERIALS DISCLOSURE COMPLIANCE
- COMMON AREA LITTER CONTROL
- COMMON AREA CATCH BASIN INSPECTION
- PEAK STORM FLOW MITIGATION
- PRIVATE STREETS AND PARKING LOTS STREET SWEEPING
- EFFICIENT IRRIGATION SYSTEM AND LANDSCAPE DESIGN
- PROTECTION OF SLOPES AND CHANNELS
- AT GRADE LOADING DOCKS/DELIVERY AREAS
- WATER DISPOSAL FROM FOUNTAINS, SWIMMING POOL, POOL DECK AND SPA DRAINS TO SANITARY SEWER ONLY

SITE DESIGN AND SOURCE CONTROL BMP'S INCLUDE:

- HILLSIDE LANDSCAPING (DEEP ROOTED, NATIVE, DROUGHT TOLERANT SPECIES)
- INTEGRATED PEST MANAGEMENT (IPM) MEASURES
- SD-10 SITE DESIGN/LANDSCAPE PLANNING
- SD-11 ROOF RUNOFF CONTROLS
- SD-12 EFFICIENT IRRIGATION
- SD-13 STORM DRAIN SIGNAGE

LID PRACTICES TO BE IMPLEMENTED FOR THIS PROJECT INCLUDE:

- CONSERVATION DESIGN
- RUNOFF CONVEYANCE
- FILTRATION
- LOW IMPACT LANDSCAPING

PREPARED BY:

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PREPARED FOR:

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TEL: (619) 234-4050

DATE PREPARED: 2/27/13

W.O. 3645-2

PORTOLA CENTER @ TTM 17300
CITY OF LAKE FOREST

WQMP EXHIBIT

SHEET 2

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ADDITIONAL STRUCTURAL AND NONSTRUCTURAL SOURCE CONTROL BMP'S (SEE PROJECT WQMP OPERATIONS AND MAINTENANCE PLAN FOR DETAILS):

- EDUCATION FOR TENANTS AND EMPLOYEES
- ACTIVITY RESTRICTIONS
- COMMON AREA LANDSCAPE MANAGEMENT
- BMP MAINTENANCE
- TITLE 22 COMPLIANCE
- SPILL CONTINGENCY PLAN
- HAZARDOUS MATERIALS DISCLOSURE COMPLIANCE
- COMMON AREA LITTER CONTROL
- COMMON AREA CATCH BASIN INSPECTION
- PEAK STORM FLOW MITIGATION
- PRIVATE STREETS AND PARKING LOTS STREET SWEEPING
- EFFICIENT IRRIGATION SYSTEM AND LANDSCAPE DESIGN
- PROTECTION OF SLOPES AND CHANNELS
- AT GRADE LOADING DOCKS/DELIVERY AREAS
- WATER DISPOSAL FROM FOUNTAINS, SWIMMING POOL, POOL DECK AND SPA DRAINS TO SANITARY SEWER ONLY

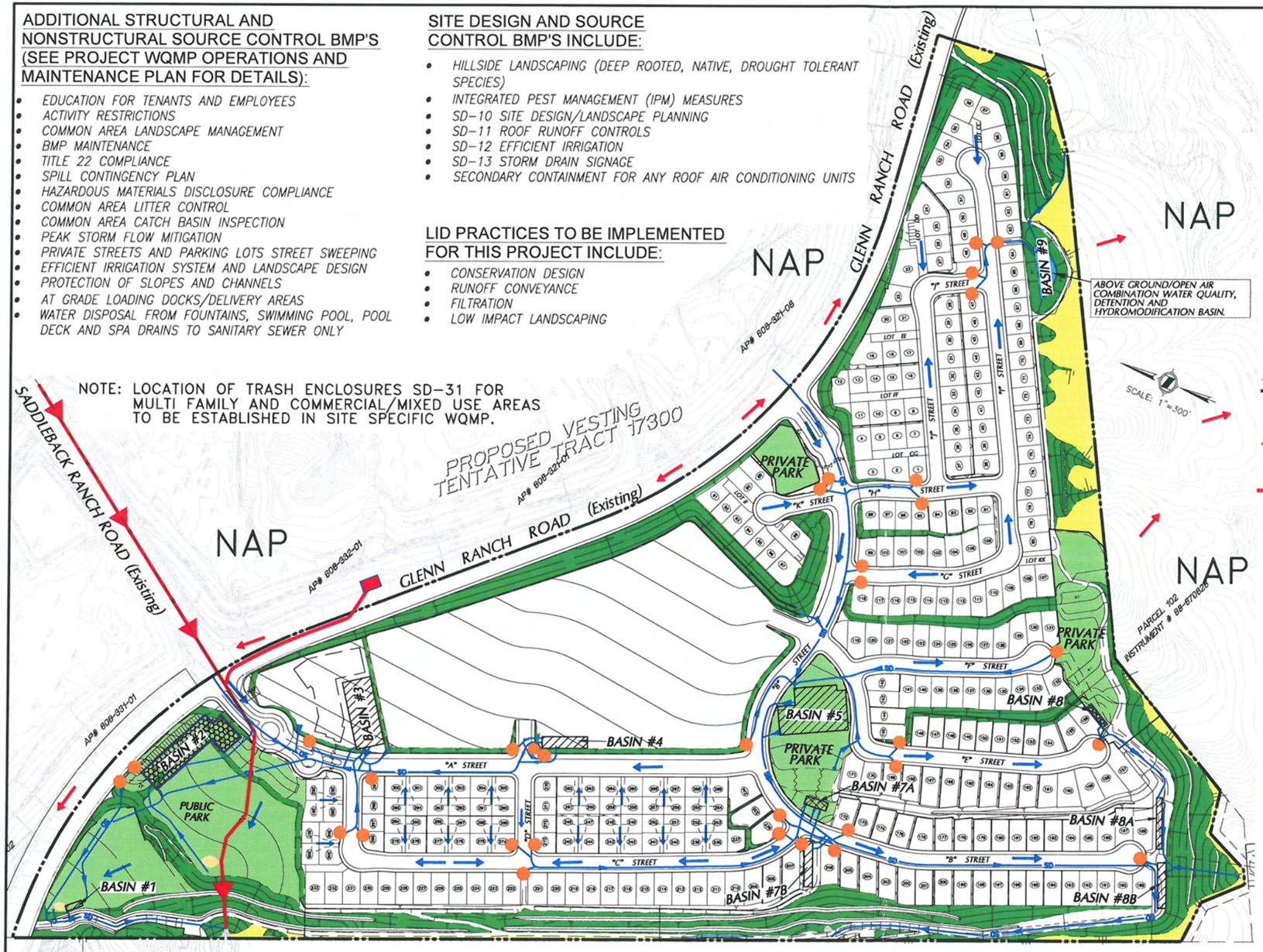
SITE DESIGN AND SOURCE CONTROL BMP'S INCLUDE:

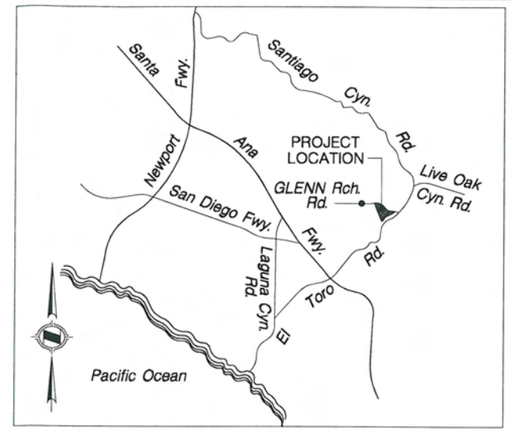
- HILLSIDE LANDSCAPING (DEEP ROOTED, NATIVE, DROUGHT TOLERANT SPECIES)
- INTEGRATED PEST MANAGEMENT (IPM) MEASURES
- SD-10 SITE DESIGN/LANDSCAPE PLANNING
- SD-11 ROOF RUNOFF CONTROLS
- SD-12 EFFICIENT IRRIGATION
- SD-13 STORM DRAIN SIGNAGE
- SECONDARY CONTAINMENT FOR ANY ROOF AIR CONDITIONING UNITS

LID PRACTICES TO BE IMPLEMENTED FOR THIS PROJECT INCLUDE:

- CONSERVATION DESIGN
- RUNOFF CONVEYANCE
- FILTRATION
- LOW IMPACT LANDSCAPING

NOTE: LOCATION OF TRASH ENCLOSURES SD-31 FOR MULTI FAMILY AND COMMERCIAL/MIXED USE AREAS TO BE ESTABLISHED IN SITE SPECIFIC WQMP.





LEGEND

- NAP — TRACT BOUNDARY NOT A PART
- SD — ONSITE (PROPOSED) STORM DRAIN & DIRECTION OF FLOWS
- EXISTING STORM DRAIN & DIRECTION OF FLOWS
- DIRECTION OF ONSITE SURFACE AND SUB SURFACE FLOWS
- DIRECTION OF OFFSITE SURFACE FLOW
- EXISTING CATCH BASIN SD-13 CATCH BASIN STENCILING
- CATCH BASIN ONLY SD-13 CATCH BASIN STENCILING
- LANDSCAPE AREAS (PRIVATE) WITH BMP's: (MAINTAINED BY HOA) SD-10 SITE DESIGN/LANDSCAPE PLANNING SD-12 EFFICIENT IRRIGATION
- PARK - ALL PARKS ARE PRIVATE UNLESS OTHERWISE NOTED
- OPEN SPACE LOTS
- COMBINATION WATER QUALITY/DETENTION AND HYDROMOD BASIN TC-22
- * WATER QUALITY AND HYDROMOD BASIN (UNDERGROUND) BASIN 1, 3-5, 7B, 8A AND 8 B
- * DETENTION BASIN (UNDERGROUND) BASIN 2 AND 8
- * HYDROMOD ONLY BASIN (UNDERGROUND) BASIN 7A
- MODIFIED TC-40-SAND FILTER/MODIFIED MEDIA FILTER

NOTE: THERE IS NO BASIN 6
* SEE NOTES TO THE LEFT HEREON.

NOTES: BASINS 1, 3-5, 7A, 8A AND 8B EACH HAVE A TC-50 PRETREATMENT BMP (NUTRIENT SEPARATING BAFFLE BOX [NSBB] BY Bio Clean)
BASINS 1, 3-5, 7A, 8A AND 8B EACH HAVE A TC-21 CONSTRUCTED WETLANDS BMP (MODULAR WETLAND SYSTEMS [MWS] BY MODULAR WETLANDS FOR HYBRID BIOFILTRATION/WATER POLISHING WATER QUALITY TREATMENT)

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DATE PREPARED: 3/18/13, REV.

W.O. 3751-1

PORTOLA CENTER @ TTM 15353
CITY OF LAKE FOREST

WQMP EXHIBIT

SHEET 1

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Section 8

Section 8 Stormwater BMP Maintenance

The City of Lake Forest requires the incorporation of an Operations and Maintenance (O&M) Plan into the WQMP that provides for the long-term maintenance of all structural and non-structural BMPs.

The WQMP certification Statement requires that the property owner implement the provisions of this WQMP, which includes on-going BMP maintenance as specified in this WQMP. The property owner is responsible to ensure that this plan is carried out and amended as appropriate to reflect up-to-date conditions on the site consistent with the current City of Lake Forest Urban Runoff Management Program and the intent of the NPDES/MS4 Permit for Waste Discharge Requirements as authorized by the State and EPA. Once the property owner transfers its interest in the property, its successors-in-interest shall bear the aforementioned responsibility to implement and amend the WQMP. An appropriate number of approved and signed copies of this document shall be available on the subject site in perpetuity.

The Owner of the project will implement the following maintenance mechanism to ensure ongoing long-term maintenance of all structural and non-structural BMPs.

Project proponent agreement to maintain stormwater BMPs: The City may enter into a contract with the project proponent obliging the project proponent to maintain, repair and replace the stormwater BMP as necessary into perpetuity. USA Portola LLC shall be the responsible party until such time as the HOA is established. **Because the HOA proposes to maintain the stormwater devices in the public right-of-way, a maintenance agreement shall be executed with the City – this will be a Condition of Approval.**

8.1 Operation and Maintenance (O&M) Plan

The O&M Plan describes the designated responsible party for implementation of this WQMP, including the operation and maintenance of all the stormwater BMP(s), the training/educational program and duties, the maintenance frequency, routine service schedule, specific maintenance activities, copies of resource agency permits, and any other necessary activities. Maintenance agreements shall require the inspection and servicing of all structural BMPs per manufacturer or engineering specifications, or, at a minimum, annually. Records are to be maintained for a minimum of 5 years.

8.1.1 Responsible Party

In addition to an overall project HOA, HOA sub-associations may be formed. O&M responsibilities for sub-associations will be shown in a future amendment to this WQMP or in a site specific final WQMP for the respective development areas of those sub-associations.

Until the HOA contacts are identified, the responsible party for implementation of this WQMP is:

Mr. Stephen Haase
USA Portola LLC
280 Newport Center Drive, Suite 240
Newport Beach, CA 92660
Phone: (619) 234-4050

8.1.2 Operation and Maintenance Requirements

BMP Name and BMP Implementation, Maintenance, and Inspection Responsibility	Implementation, Inspection and Maintenance Procedures and Requirements	Frequency
N1. Education for Property Owners, Tenants and Occupants *HOA*	The HOA will ensure that all future homeowners will be given a copy of the recorded CC&R's which will contain a section outlining the environmental awareness education materials at the close of escrow. The HOA shall establish requirements for the implementation of a community awareness program that informs homebuyers of the impacts of dumping oil, paints, solvents or other potentially harmful chemicals into the storm drain; the proper use and management of fertilizers, pesticides and herbicides in home landscaping and gardening practices; and the impacts of littering and improper or over-watering.	Information to be initially provided to Homeowners upon close of escrow and annually thereafter via website or community newsletters. Other agencies providing services to the homeowners (Irvine Ranch Water District, and the County of Orange) provide educational materials to the HOA upon request for distribution to residents by the HOA. See these websites for further information: http://www.irwd.com/ http://www.ocwatersheds.com/
N2. Activity Restriction *HOA*	Within the CC&R's, language shall be included to identify surface water quality protection required of the HOA. Surface water quality activities shall also be conducted in conformance with the Water Quality Management Plan as it relates to the handling and disposal of contaminants. The following sample excerpt from a Declaration of CC&R's provides additional direction for controlling activities that may affect the environment of the project and/or surrounding areas.	Same as above
N3. Common Area Landscape Management *HOA*	Landscape management programs will be designed and established by the developer. The HOA will own and maintain all project common landscaped areas. These programs will include how to mitigate the potential dangers of fertilizer and pesticide usage through the incorporation of an Integrated Pest Management Program (IPM).Ongoing maintenance will be consistent with the City of Lake Forest Municipal Code Chapter § 9.144.060.2 (Landscaping) and Chapter 15.10 (Stormwater and Urban Runoff Pollution Controls).	Monthly during regular maintenance, manage landscaping in accordance with the County of Orange Water Conservation Ordinance No. 3802 and with management guidelines for use of fertilizers and pesticides. If any applicable County of Orange code conflicts with a City of Lake Forest code, the stricter, more conservative one shall apply.

BMP Name and BMP Implementation, Maintenance, and Inspection Responsibility	Implementation, Inspection and Maintenance Procedures and Requirements	Frequency
N4. BMP Maintenance *HOA*	As indicated in (N2) above, the CC&R's shall identify the HOA as being responsible for implementation of each applicable non-structural BMP as well as scheduling inspection and maintenance cleaning of all applicable structural BMP facilities. The HOA, through its landscape maintenance contractor, will be responsible for inspection and maintenance activities in landscape areas. Debris and other water pollutants will be controlled, contained and disposed of in a proper manner by the maintenance contractor.	Per these tables
N11. Common Area Litter Control *HOA*	Weekly sweeping and trash pick up as necessary within all project areas and common landscape areas. Daily inspection of trash receptacles to ensure that lids are closed and pick up any excess trash on the ground, noting trash disposal violations by homeowners and reporting the violations to the HOA for investigation.	Daily inspection and weekly sweeping and clean-up or as needed
N12. Employee Training *HOA*	Post construction, an employee training/education program will be established as it would apply to future employees, contractors of the HOA, and HOA volunteers to inform and train employees engaged in maintenance activities regarding the impact of dumping oil, paints, solvents or other potentially harmful chemicals into storm drain; the proper use of fertilizers and pesticides in landscaping maintenance practices; and the impacts of littering and improper water disposal.	At first hire and annually thereafter for HOA personnel and employees, including but not limited to the educational materials contained in the approved Water Quality Management Plan.
N14. Common Area Catch Basin Inspection *HOA*	Post construction, catch basins will be owned, inspected and maintained by the HOA. Per project Conditions of Approval these activities will be done at a minimum on a yearly basis, and prior to the storm season, no later than October 1st of each year.	At a minimum, basins will be inspected and cleaned around October 1ST of each year, prior to "first flush" storm, or as necessary to clear inlets of trash, debris and silt.

BMP Name and BMP Implementation, Maintenance, and Inspection Responsibility	Implementation, Inspection and Maintenance Procedures and Requirements	Frequency
N15. Street Sweeping Private Streets and Parking Lots *HOA*	During construction and prior to the acceptance of the project streets for maintenance by the HOA, the developer will have all streets and any parking areas vacuum swept on a weekly basis. After acceptance of all streets for maintenance as described herein, above, the HOA shall be responsible for street sweeping.	During construction, streets supporting active construction areas will be vacuum swept on a weekly basis. Following transfer of the maintenance responsibilities to the HOA, streets will be swept annually prior to October 1st.
Provide Storm Drain System Stenciling and Signage *HOA*	As a part of the final civil engineering drawings it will be required by the contractor to label all of the project's catch basins where applicable in paved areas, with catch basin markers which state: "No Dumping - Drains to Ocean, No Descargue Basura". This will be done in a location that can be clearly seen by all and will be routinely inspected and re-labeled, as necessary. Thereafter, the owner/operator shall routinely inspect and re-label the catch basins, as necessary.	Catch basin labels will be inspected annually and relabeled as necessary to maintain legibility.
Design and Construct Trash and Waste Storage Areas to Reduce Pollutant Introduction *HOA*	Residents of the project will store trash covered trash containers in individual garage spaces. Trash will be removed by the local private solid waste management contractor on a weekly basis for proper disposal of the trash to landfill; with recyclable materials and greenwastes to be processed offsite.	The HOA shall hire a local private waste management company to remove trash, green wastes, and recyclables on a weekly basis for proper disposal to a trash facility offsite. Further information about trash pickup in the City of Lake Forest can be found at this site: http://www.danapoint.org/publicworks/SolidWaste.htm
Use Efficient Irrigation Systems & Landscape Design *HOA*	The project has incorporated Site Design and Landscape Design methodologies such as minimizing impervious footprint, incorporation of landscaped buffers and use of native and drought tolerant species as previously detailed in section 6.1 of this report. Efficient irrigation practices will be consistent with the City of Lake Forest Municipal Code Chapter § 9.144.060.2 (Landscaping) and Chapter 15.10 (Stormwater and Urban Runoff Pollution Controls). Irrigation systems shall be automatically controlled and designed, installed, and maintained so as to minimize overspray or runoff onto streets, sidewalks, driveways, structures, walls, and fences.	The Project's landscape areas and irrigation systems will be inspected for proper functioning in conjunction with the regular, on-going maintenance of the landscape areas, including checking that water sensors are functioning properly, that irrigation heads are adjusted properly to eliminate overspray to hardscape areas, and to verify that irrigation timing and cycle lengths are adjusted in accordance with water demands, the given time of year, weather and day or night time temperatures.

BMP Name and BMP Implementation, Maintenance, and Inspection Responsibility	Implementation, Inspection and Maintenance Procedures and Requirements	Frequency
Hillside Landscaping *HOA*	All hillside areas will have at least 70% vegetative cover with erosion-resistant mulch and be inspected regularly for erosion. If erosion problems become evident, inspect for all sources of excess water. Repair or redirect the problem flows. Re-grade any rills & gullies and clean paved areas where necessary. Stabilize these areas with mulch and additional deep-rooted plantings. Landscaping will consist of "California-friendly" deep-rooted, native drought-tolerant plantings. Landscape pests and insects will be controlled through an Integrated Pest Management (IPM) program implemented by the Landscape Maintenance firm contracted by the HOA.	The Project's landscaped slope areas will be inspected in conjunction with the on-going maintenance of these slope areas and prior to finalizing any replanting schemes to verify that plants continue to be grouped according to similar water requirements in order to minimize hillside erosion and excess irrigation runoff.
Treatment Control BMP #1 TC-22 Water Quality Extended Basin on Lot LL of adjacent, offsite TTM 15353 One (1) each Any person performing maintenance activities must have completed a minimum of OSHA 24-hour hazardous waste worker (hazwoper) training. HOA	Basin filters will be inspected for debris and debris blockage and wear; replace or remove as necessary.	Basin/filters will be inspected semi-annually; prior to the start and end of the rainy season (October 1st – April 30th) and after each major rainfall event. Basin/Inlets will be cleaned and media will be replaced on an "as-needed" basis.

BMP Name and BMP Implementation, Maintenance, and Inspection Responsibility	Implementation, Inspection and Maintenance Procedures and Requirements	Frequency
Treatment Control BMP # 2 *TC-50 Water Quality Inlet – Nutrient Separating Baffle Box (NSBB)* *A total of Seven (7) Each: One (1) each at Basin #s 1, 3, 4, 5, 7A , 8A and 8B in TTM 15353 located adjacent, offsite and downstream* *(The exhibits at the end of Section 6 refer)* The City of Lake Forest shall be responsible for maintenance of the NSBB at Basin #1. The HOA shall be responsible for maintaining the NSBBs at Basins #3-5, 7A, 8A and 8B.	NSBB units shall be inspected and maintained by a Professional Maintenance contractor. This unit will be designed with a "mosquito seal" to protect maintenance access points for vector concerns. NSBB units should be pumped down at least once a year and a thorough inspection of the separation chamber (inlet/cylinder and separation screen) and oil baffle performed. The unit's internal components should not show any signs of damage or any loosening of the bolts used to fasten the various components to the manhole structure and to each other. Ideally, the screen should be power washed for the inspection. A vactor truck is recommended for cleanout of the NSBB unit and can be easily accomplished in less than 30-40 minutes for most installations. Standard vactor operations should be employed in the cleanout of the NSBB unit. Disposal of material from the NSBB unit should be in accordance with the local municipality's requirements. Disposal of the decant material to a POTW is recommended. Field decanting to the storm drainage system is not recommended. Solids can be disposed of in a similar fashion as those materials collected from street sweeping operations and catch-basin cleanouts. **Important**: Applicable safety (OSHA) and disposal regulations should be followed during all maintenance activities.	At a minimum, two scheduled inspections/maintenance activities should take place during the year: prior to the first flush rains, October 1st, and at the end of the "Rainy Season", April 30th. It is important to check the condition of the NSBB unit after major storms for damage caused by high flows and for high sediment accumulation that may be caused by localized erosion in the drainage area. It may be necessary to adjust the maintenance activity schedule depending on the actual operating conditions.

BMP Name and BMP Implementation, Maintenance, and Inspection Responsibility	Implementation, Inspection and Maintenance Procedures and Requirements	Frequency
Treatment Control BMP # 3 *TC-21 Modular Wetland System (MWS) by Modular Wetlands, Inc., in TTM 15353 located adjacent offsite and downstream* *(The exhibits at the end of Section 6 refer.)* The City of Lake Forest shall be responsible for maintenance of the MWS for Basin #1. The HOA shall be responsible for the maintenance of the MWSs for Basins 3, 4, 5, 7B, 8A and 8B.	The MWS shall be inspected and maintained by a Professional Maintenance contractor, per attached Operations and Maintenance Guidelines. **Important**: Applicable safety (OSHA) and disposal regulations should be followed during all maintenance activities.	Two scheduled inspections/ maintenance activities should take place during the year. First, an inspection/minor maintenance activity should be done. During the minor maintenance activity (routine inspection, debris removal), the need for major maintenance should be determined and, if disposal during major maintenance will be required, samples of the sediments and media should be obtained. Second, if required, a major maintenance activity (replacement of the filtration media and removal of sediment accumulations) should be performed. Disposal of filtration media and debris shall be in accordance with local regulations. In addition to these two scheduled activities, it is important to check the condition of the MWS unit after major storms for damage caused by high flows and for high sediment accumulation that may be caused by localized erosion in the drainage area. It may be necessary to adjust the maintenance activity schedule depending on the actual operating conditions encountered by the system. In general, minor maintenance activities will occur later in the rainy season, and major maintenance will occur in late summer to early fall when flows into the system are not likely to be present. Refer to http://www.contechstormwater.com/products/sotrmfilter for additional information.

8.1.3 Required Permits

This section must list any permits required for the implementation, operation, and maintenance of the BMPs. Possible examples are:

- Grading Permit for Tract 17300
- Storm Drain Permit for Tract 17300
- Vesting TTM No. 17300

8.1.4 Forms to Record BMP Implementation, Maintenance, and Inspection

The following forms shall be used to record implementation, maintenance, and inspection of BMPs:

WQMP Operations and Maintenance Log				
Designator Code	Date of Inspection	Date of Maintenance	Verified/ Inspected by	Comments

BMP OPERATION & MAINTENANCE LOG
PORTOLA CENTER TTM 17300

Today's Date: _____

Name of Person Performing Activity (Printed): _____

Company or Affiliation: _____

Signature: _____

BMP Name (As Shown in O&M Plan)	Brief Description of Implementation, Maintenance, and Inspection Activity Performed

TRAINING / EDUCATIONAL LOG

Date of Training/Educational Activity: _____

Name of Person Performing Activity (Printed): _____

Company or Affiliation: _____

Signature: _____

Topic of Training/Educational Activity: _____

_____

Name of Participant	Signature of Participant

For newsletter or mailer educational activities, please include the following information:

- Date of mailing
- Number distributed
- Method of distribution
- Topics addressed