PRELIMINARY DESIGN REPORT

City of Malibu - Wildlife Road Treatment and ASBS Focused Outreach

Prepared for:

STATE WATER RESOURCES CONTROL BOARD

Prepared by:

Carollo Engineers, Inc.
City of Malibu

Engineers...Working Wonders With Water®

City of Malibu, California

PRELIMINARY DESIGN REPORT

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1.0 INTRODUCTION

The City of Malibu ("City") is working with the State Water Resources Control Board ("SWRCB") to improve stormwater quality discharging towards the Pacific Ocean and Areas of Special Biological Significance (ASBS). The Wildlife Road and ASBS Focused Outreach Project is being funded by Proposition 84 Grant Agreement No. 10-407-550. The project's goal is to eliminate dry-weather runoff and reduce wet weather stormwater pollutant loading from two existing storm drain inlets discharging towards ASBS 24. The existing inlets are part of the City's Municipal Separate Storm Sewer System (MS4s) which collect dry-weather and wet-weather stormwater from an existing residential neighborhood.

This project includes site investigation, design, construction, and effectiveness monitoring of new stormwater treatment BMP's at the existing inlet locations, which will improve stormwater quality prior to discharge. The project will target and treat pollutants that are likely to be present in adjacent land uses. This project will target the proposed water quality objectives established by the SWRCB and the City, which are outlined further in this report.

1.1 Project Goals

Carollo Engineers is working as a consultant for the City to provide engineering services during design and construction. Carollo has prepared this Preliminary Design Report (PDR) for the City in order to evaluate existing site conditions, develop potential solutions, and provide recommendations for the City. The results of our findings presented in the PDR as well as comments received by the City will be incorporated into the final design for this project. The specific goals of the PDR are:

- Evaluate existing site conditions through field visits, topographic survey, utility investigations, hydrology study, and geotechnical exploration.
- Evaluate existing pollutant loading by modeling, calculations, and preliminary design sampling.
- Develop options, recommendations, and estimated construction costs to achieve the City and SWRCB goals of pollutant load reduction for this project.

2.0 BACKGROUND

The City of Malibu is a beachfront community located along the west coast of California in Los Angeles County. The City of Malibu has been successfully working towards the management and treatment of urban stormwater to preserve its coastal water bodies. The City owns and maintains several MS4s, which have been constructed over the past several decades. MS4s typically discharge into local water bodies including natural waterways, creeks, harbors, and the ocean. MS4s are classified as point source discharges and without pre-treatment, polluted stormwater can be transported through underground pipes and discharged into receiving waters. These untreated discharges can significantly increase contaminant levels and affect water quality.

2.1 Regulation

The following sections describe some of the history of clean water regulation within the United States and the State of California. It includes past and current protections to regulate and control non-point and point source discharge into receiving waters. The history of regulation dates back to the early 1970's and extends to present time.

2.1.1 Federal

The United States Environmental Protection Agency (US EPA) Clean Water Act of 1987 established the requirements to regulate stormwater point source discharges under the National Pollution Discharge Elimination System (NPDES). Phase I, issued in 1990, requires *medium* and *large* cities or certain counties with populations of 100,000 or more to obtain NPDES permit coverage for stormwater discharges. Phase II, issued in 1999, requires regulated small MS4s in urbanized areas, as well as small MS4s outside the urbanized areas, to obtain NPDES permit coverage for their stormwater discharges.

2.1.2 State – California Ocean Plan (COP)

The SWRCB is directed by the US EPA to achieve the "highest water quality allowable" to obtain the "maximum benefit" to the people. These are classified as "Beneficial Uses" and the SWRCB is responsible with protecting these "Beneficial Uses" from pollution that may occur as a result of waste discharge. In 1972, the SWRCB adopted the California Ocean Plan (COP). The COP is the State's water quality control plan for the ocean. The COP establishes specific water quality objectives and sets forth limits and levels of water quality characteristics that discharge into ocean waters. The COP is reviewed on a Triennial basis and updated based on changes in the environment and available background test data. The 2009 COP is the current adopted Water Quality Control Plan for the Ocean Waters of California. Refer to Appendix A for the water quality objectives of the COP.

2.1.3 Areas of Special Biological Significance (ASBS)

The SWRCB has designated several coastal water bodies along the Pacific Coast of California as Areas of Special Biological Significance (ASBS). ASBS's are designated by the State Water Board as ocean (marine) areas requiring protection of species or biological communities to the extent that alteration of natural water quality is undesirable. All ASBS areas are designated by the SWRCB as a "Beneficial Use" and are regulated under the COP and require special protection as determined by the SWRCB. In state water quality protection areas, waste discharges must be prohibited or limited by special conditions in accordance with the Porter-Cologne Water Quality Control Act, California Water Code §13000 et seq. and implementing regulations, including the COP. The COP authorizes the SWRCB to grant an exception to COP provisions where the board determines that the exception will not compromise protection of ocean waters for beneficial uses and that public interest will be served.

The *Wildlife Road and ASBS Focused Outreach Project* is located adjacent to ASBS 24 – Laguna Point to Latigo Point. ASBS 24 extends approximately 25 miles along the Pacific Coastline. The ASBS's are frequently sampled and tested in accordance with SWRCB guidelines to determine if existing background "natural" levels of Ocean Water Quality are being affected by non-point and point source discharges. Figure 1 shows the SWRCB designated location of ASBS 24 - Laguna Point to Latigo Point along the Pacific Coastline.

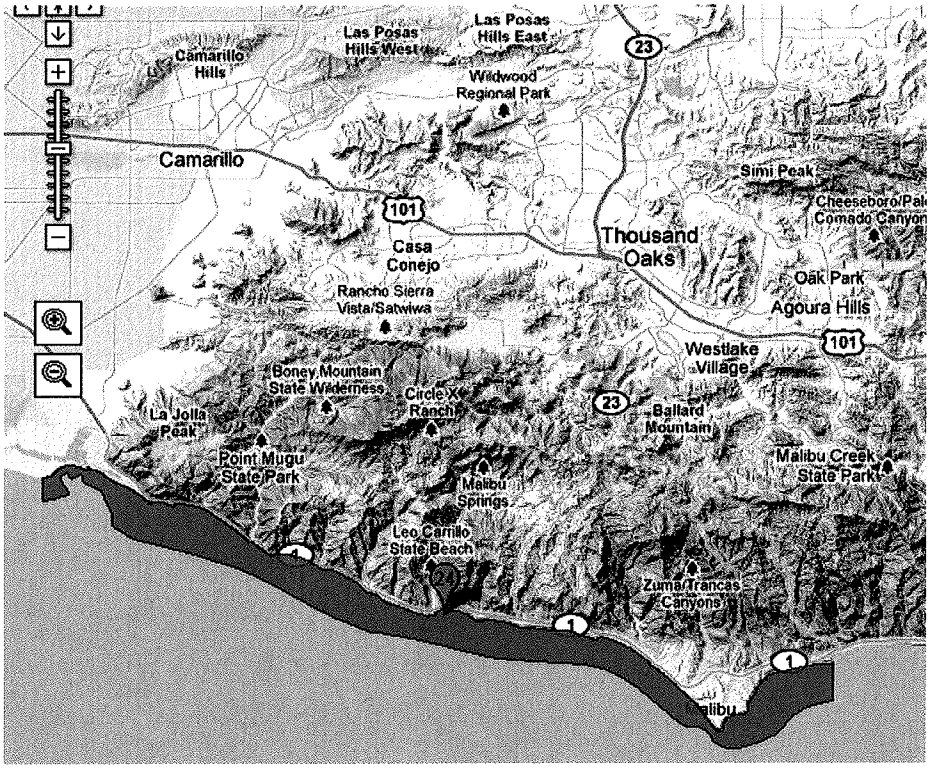

Figure 1 ASBS 24 - Laguna Point to Latigo Point

2.2 Project Water Quality Objectives

The following sections identify the stormwater quality discharge requirements by State of California and the City for this project. In an effort to reduce or eliminate contaminant discharges into ASBS's, the SWRCB administers $32 million in Proposition 84 voter-approved water bond grants. The objective of the Prop 84 grants is to fund a variety of public agency water quality improvement projects and comply with the discharge prohibition contained in the COP for ASBS's.

2.2.1 SWRCB - ASBS Water Quality

The SWRCB notified a number of parties in 2004, that they must cease the discharge of stormwater point and non-point source waste into an ASBS or request exception to the COP. The City of Malibu applied for exception to the COP in 2007. The SWRCB prepared a Program Environmental Impact Report (PEIR) in 2011 to evaluate the potential effects of the adoption and implementation of the proposed statewide General Exception. The City was granted exception to the COP on March 20, 2012 under Resolution No. 2012-0012. The City will abide by the special protections set forth in resolution for this project. Refer to Appendix B for a copy of SWRCB's Resolution No. 2012-0012.

2.2.2 NRDC & Santa Monica Baykeeper Settlement

The City entered into a settlement agreement with the Natural Resources Defense Council (NRDC) and Santa Monica Baykeeper on April 13, 2012 in Civil Case No. CV-08-01465. The settlement agreement requires the City to adhere to special provisions for water quality discharges from existing ASBS drains. The settlement identified an existing ASBS storm drain located within the project limits. The inlet is identified in the settlement as S1D20 (Wildlife Road) and is located on Whitesands Place. This project refers to this drain inlet as SD-1.

2.2.3 Water Quality Discharge Requirements

This project will target the special protections defined in the SWRCB's Resolution and the City's settlement agreement with NRDC for discharge from existing ASBS drains. Refer to Appendix C for a copy of the City's settlement agreement with NRDC. The following items identify the project water quality discharge objectives:

1. 100% reduction of discharge of trash.
2. 100% elimination of dry-weather flows.
3. Reduction in wet-weather pollutant loading in stormwater runoff to meet Table B Instantaneous Maximum Water Quality Objectives in Chapter II of the COP, or
4. A 90% reduction in pollutant loading for the Table B parameters during storm events for the applicants' total discharges.

5. Special protections outlined in Table A of the COP regulating effluent Limitations for oil & grease, total suspended solids, turbidity, and pH.
6. Meet the Santa Monica Bay Beaches Bacteria (SMBBB) TMDL's.
7. Provide passive flow monitoring to confirm dry-weather compliance.

2.3 Project Design Approach

This project aims to achieve its water quality goals by eliminating dry-weather flows and reducing pollutant loading from wet-weather storm events. To treat the wet-weather storm events, the focus will be treating the water quality (WQ) or "First Flush" design storm. This usually occurs during the first 30 to 60 minutes of a storm event and is based on the 85th percentile storm event. The treatment systems will target land-based constituents based on published Event Mean Concentration ("EMC") data, pollutant load modeling, and results from preliminary sampling.

2.3.1 Monitoring and Sampling

A Monitoring Plan (MP) and Quality Assurance Project Plan (QAPP) were also prepared for this project. The purpose of the MP is to evaluate and characterize inflow and outflow pollutants during the preliminary design phase of the project and determine the post construction effectiveness (i.e. pollutant load reduction) after the new BMP's are installed. The SWRCB has retained the Southern California Coastal Water Research Project (SCCWRP) to assist in the review of all ASBS MP's and QAPP's throughout the State. Their goal is to evaluate and provide unity throughout all the Proposition 84 funded ASBS projects. Carollo has been working with the SCCWRP to develop the MP and QAPP for this project. The following items are the specific objectives of the MP:

1. Evaluate inflow characteristics of pollutants to use in preliminary design efforts by collecting "grab" samples during one storm event at each inlet location.
2. Monitor the elimination of dry-weather runoff flow from the site catchment area to the discharge point.
3. Monitor reductions in wet-weather pollutant loading from the site catchment area to the discharge point. This will be completed by collecting composite samples for inflow and outflow during three storm events at each storm drain inlet location.

3.0 SITE INVESTIGATION

A comprehensive site investigation was completed to evaluate the existing site conditions. The results and data were used to developed possible solutions and layout configurations for the proposed stormwater treatment systems BMP's at each project site. The site investigation work included field visits, topographic survey, utility investigations, geotechnical exploration, hydrology study, and pollutant loading calculations.

3.1 Project Location

This project is located within the City of Malibu, Los Angeles County, California, which is adjacent to the Pacific Ocean. The project site is located on Point Dume, which is approximately 3/4 miles southwest of Paradise Cove and 1/2 mile south of Pacific Coast Highway (HYW 1). The existing storm drain inlets, SD-1 and SD-2 are located on Whitesands Place and Wildlife Road. These roads serve an existing developed residential neighborhood and coastal beach access points. The project site map is shown on Figure 2.

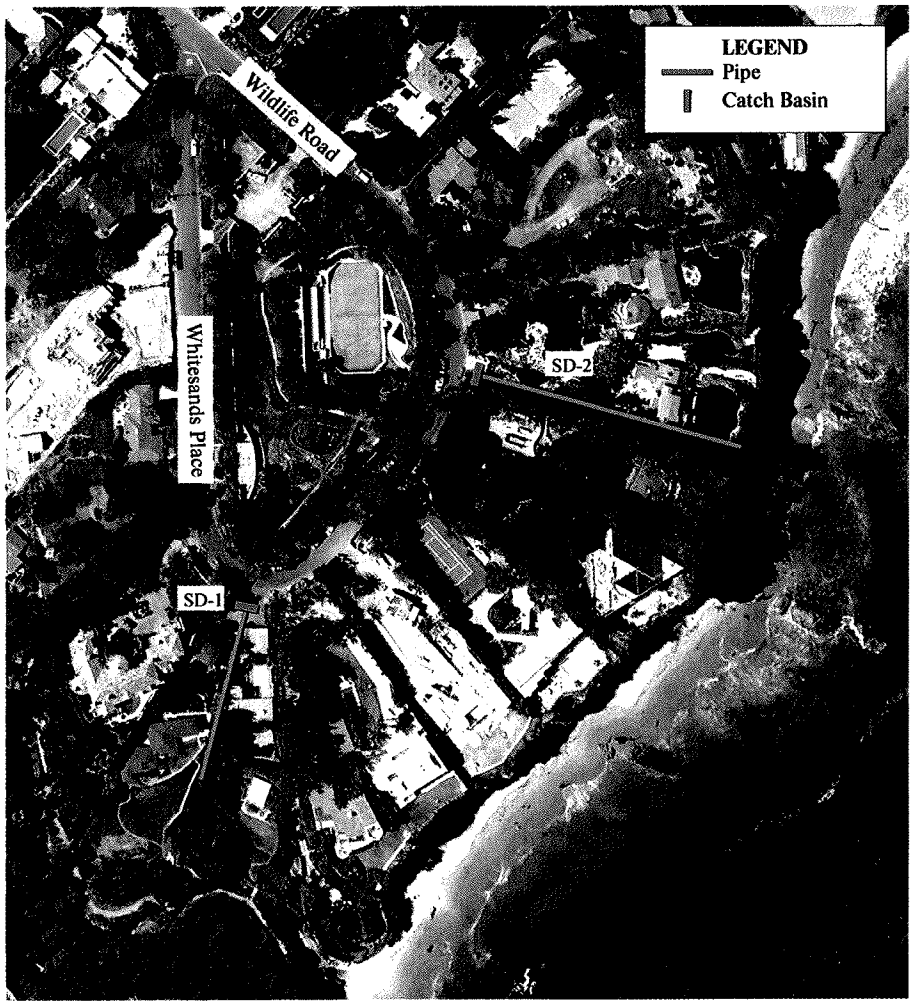

Figure 2 Wildlife Road Project Site

3.2 Field Investigation

A site visit and field investigation was performed by Carollo and the City on October 14th, 2011. Cameron Farrer who manages the old "Carson" home, gave a tour of both properties and discussed his efforts to reduce runoff discharging from this property. This area was identified by the City as discharging large amounts of dry and wet weather runoff into the existing roadway and storm drain system. His onsite improvements include replacement of existing sprinkler heads and construction of infiltration trenches near the discharge point at the south side of the property. The City also discussed plans for installing a new catch basin on the north side of the roadway at Whitesands Place to reduce surface water from crossing the road. Figures 3 and 4 show the existing storm drain inlets located on Whitesands Place (SD-1) and Wildlife Road (SD-2).

Figure 3 Whitesands Place Road (SD-1) Existing Storm Drain Inlet

Figure 4 Wildlife Road (SD-2) Existing Storm Drain Inlet

3.3 Topographic Survey

A topographic survey of the project site was completed to map the location and elevation of all surface features including roadways, catch basins, driveways, structures, walls, landscaping, etc. The data was collected within 300 feet upstream of each storm drain inlet. In addition, the crown and flowline elevations of two upstream street intersections were mapped to determine the drainage path and flow direction of runoff.

A document search was completed at the county courthouse to obtain Record-of-Survey (RS056-29) and Parcel Map (PM028-082). The data shows that the existing roadway is approximately 30-feet wide and is located within a 50-feet wide Right-of-Way (ROW). There are two existing 10-foot wide drainage easements for the existing 18-inch diameter storm drain outlet pipes. It was noted a portion of the existing 18-inch storm drainpipe on Whitesands Place might be installed outside the existing 10-foot wide easement. In additional several of the private residences have improved landscaping and hardscaping

within the existing ROW. Refer to Appendix D for topographic survey and supporting record maps.

3.3.1 Utility Investigations

The City sent out preliminary notices to utility companies and requested base maps of existing underground (UG) and overhead (OVH) facilities. The utility search determined that there are several utilities within the existing street and road ROW near the existing storm drain inlet locations.

Los Angeles County Waterworks owns and maintains an 8-inch ductile iron (DI) water main on the south side of the roadway. Verizon has OVH utilities and several 1- to 3-inch UG conduit crossings. Charter communication has all OVH utilities for TV, Internet, and Phone. Southern California Edison has mostly OVH power lines with some UG crossings for the residential services. Southern California Gas has an existing UG 2-inch distribution main located on the south of the roadway. The existing gas line is in very close proximity to the existing storm catch basins.

3.3.2 Hydrology

A hydrology study and report was completed to determine dry and wet-weather runoff flow rates and volumes discharging into the existing storm drain systems. The report evaluated existing basin hydrology; estimated dry-weather flow rates; calculated stormwater quality and quantity; and analyzed the existing storm drainpipe capacities. The drainage basins have been identified as DB1 (Whitesands Place) and DB2 (Wildlife Road).

Both drainage basins are comprised of mostly roadway, landscaping and low-density residential land uses. The residential lots consist of large private homes on large parcels with driveways and extensive landscaping in the lot interior and along the roadway. The roadway consists of asphalt pavement and limited unconventional gutters in some areas, which convey water to the storm drain inlet locations. The results for dry-weather, water quality (WQ), and water quantity calculations are shown in Tables 1, 2, and 3.

Table 1 Dry-Weather Flow Calculations - Method 2

	Basin Data Input			Dry-Weather Runoff		
Basin	Area[1] (ac)	Irrigation Rate (gpm/acre)	Duration (min)	Flowrate (gpm)	Volume (gal)	Volume (ft^3)
DB1	6.33	20	30	127	3,798	508
DB2	7.34	20	30	147	4,404	589

Notes:
1. Includes landscape and low density residential drainage areas.
2. Method 2 produced more conservative values and was used for this report.

Table 2 Water Quality Calculations (WQ)							
Basin	**Subbasin Area (ac)**	**Landuse**	**Imperviousness (%)**	**Runoff Coefficient (C)**	**85th Percentile Rainfall Intensity (in/hr)**	**Water Quality Flow (cfs)**	**Water Quality Volume (ft^3)**
DB1	1.39	Roadway	98	0.45	0.2*	0.69	13,171
	4.75	Low Density	45				
	1.58	Landscaping	5				
Total	**7.72**						
DB2	1.15	Roadway	98	0.51	0.2*	0.93	17,897
	6.82	Low Density	45				
	0.52	Landscaping	5				
	0.64	Tennis Courts	90				
Total	**9.13**						
Note: * This complies to the state special protection and NPDES permit requirements.							

Table 3 Large Storm Event Flow and Volume Calculations							
		Peak Flow (cfs) DB1		**Peak Flow (cfs) DB2**		**Runoff Volume (ac-ft)**	
Design Storm	**Rainfall Depth (in)**	**Rational Method**	**XP-SWMM**	**Rational Method**	**XP-SWMM**	**DA1**	**DA2**
2-yr	2.57	2.78	2.82	3.73	3.75	0.74	1.08
10-yr	4.75	5.13	5.44	6.88	6.95	1.38	1.99
25-yr	5.84	6.31	6.95	8.46	9.41	1.69	2.45
50-yr	6.65	7.18	7.29	9.63	10.20	1.93	2.79
100-yr	7.46	8.06	8.35	10.80	11.41	2.16	3.13

3.3.3 Geotechnical

A geotechnical investigation of the project area was conducted by Converse Consultants on December 22, 2011. Soil borings (BH-1 and BH-2) were completed near each of the existing catch basin locations to determine soil types, groundwater depths, and percolation rates. BH-1 was bored to a depth 31 feet below ground surface (BGS) and terminated at bedrock. BH-2 was bored to a depth 22 feet BGS before hitting bedrock. No groundwater was encounter at either bore hole location. Soils encountered at the site consisted of fill, old alluvial terrace deposits, and sedimentary bedrock of the Fernando Formation. Silty sands were encountered from 3 to 5 feet BGS. The older alluvial terrace deposits encountered

below the fill consisted primarily of silty sand and sandy silt extending to depths of 9 feet to 11 feet BGS.

Percolation testing was also performed at each test boring locations. The percolation test was performed using the Falling Head Test Method. Each 8-inch diameter test borehole was cased with a combination of two-inch diameter perforated-wall PVC casing and well-screen casing. The results from the percolation tests are shown in Table 4.

Table 4 Percolation Test Results

Boring No./ Storm Drain No.	Depth of Boring (feet)	Predominant Soil Types (USCS)	Average Percolation Rate (inches per hour)
BH-1 / SD-1	31	Silty Sand (SM), Bedrock- Sandstone & Siltstone	1.02
BH-2 / SD-2	22	Silty Sand (SM), Bedrock- Sandstone & Siltstone	0.34

4.0 POLLUTANT LOADING

Urban stormwater runoff in both dry and wet weather can be a source of pollution. Studies have shown stormwater runoff from urban areas can contain the same general types of pollutants found in wastewater from industrial sites. The quality of these stormwater discharges vary considerably and is affected by hydrology, geology, land use, seasons, and duration of storm events.

Pollutants commonly found in urban stormwater runoff include bacteria, heavy metals, pesticides, herbicides, fertilizer, animal waste, trash, food waste, and synthetic compounds such as fuels, waste oils, solvents, lubricants, and grease. The common types of land uses on the project site are landscaping, residential, and roadways. Some of the primary constituents from these types of land uses include: total suspended solids (TSS), total phosphorus (TP), total nitrogen (TN), copper (Cu), zinc (Zn), lead (Pb), nickle (Ni).

The two methods for determining the Pollutant loading for this project are:

1. Pollutant Load Modeling with PLOAD
2. Preliminary Design Grab Sample

Carollo prepared a pollutant-loading model using PLOAD. The results from the PLOAD model were compared to the preliminary design grab samples taken upstream of the existing catch basins. The model was recalibrated and the final effluent concentration levels were used to evaluate and size the proposed treatment system BMP's.

4.1 Pollutant Load Model - PLOAD

PLOAD is used to determine the pollutant loading from watershed point source discharges. The program uses land use data, percent imperviousness, and pollutant export coefficients or event mean concentrations (EMC) values based on either observed data or available literature. PLOAD is among one of the models that is most commonly used to estimate pollutant loadings on an annual average basis for any user-specified pollutant. The PLOAD model was originally developed to calculate pollutant loads for urban and suburban watersheds, which was subsequently adopted by the US EPA for watershed management planning and was integrated into the BASINS model (US EPA 2001). PLOAD models NPS loads using either the export coefficient method or the simple method approach. For this project, Event Mean Concentration (EMC) data published by the Los Angeles County was used as input for the source load concentrations. Refer to Appendix E for LA County published EMC Data.

4.1.1 Export Coefficient Method

If the export coefficient method is designated for calculating pollutant loads in PLOAD, then the loads are calculated for each specified pollutant type by subbasin using the following equation:

$$L_p = \sum_{1}^{u} (L_{pu} * A_u) \quad (1)$$

where, L_P is the pollutant load in pounds, L_{PU} is the export coefficient for land use type 'U' in pounds per acre per year, and A_U is the area of land use type 'U' in acres.

4.1.2 Simple Method

If the Simple Method is designated for calculating pollutant loads in PLOAD, then two equations (Equations 2 and 3) are required to calculate the loads for each specified pollutant type. First, the runoff coefficient for each land use type must be derived with the equation:

$$R_{vu} = 0.05 + 0.009 * I_u \quad (2)$$

Where, R_{VU} is the runoff coefficient for land use type 'U', and I_U is the percent of imperviousness area associated with land type 'U'. The percent impervious is extracted from an impervious terrain factor table.

The pollutant loads are then calculated using the following equation:

$$L_p = \sum_1^u \left(\frac{2.72 * P * P_j * R_{vu} * C_u * A_u}{12}\right) \quad (3)$$

where, L_P is the pollutant load in pounds, P is the precipitation in inches per year, P_j is the ratio of storms producing runoff, the typical value for which is 0.9, R_{VU} is the runoff coefficient for land use type 'U', C_U is the event mean concentration for land use type 'U' in milligrams per liter, and A_U is the area of land use type 'U' in acres

4.1.3 Data

The PLOAD application requires pre-processed GIS and tabular input data for land use, subbasin boundaries, pollutant loading rates, impervious factors, and optional pollutant reduction BMP data and/or point source facility locations and loads. For this project, Event Mean Concentration (EMC) data published by the Los Angeles County was used as input for the source load concentrations.

4.2 Preliminary Design Grab Sample

A preliminary design grab sample was collected from the upstream (inflow) of each existing storm drain catch basin. The sample was collected during the first 30 to 60 minutes of 0.10 inch or greater storm event producing measurable discharge in accordance with the MP and QAPP. The grab sample was analyzed to determine concentrations of existing contaminants discharging into the storm drain systems. The samples were tested for contaminants, which typically are found in residential, roadway and landscape land uses. These include trash, general minerals, heavy metals, bacteria, pesticides, and organics. The results from the preliminary design grab samples were submitted to the City for review.

4.3 PLOAD Model Results

The results from the PLOAD model are shown below in Table 5. The results show estimated existing pollutant loading for various contaminants including general minerals, metals, bacteria, pesticides, and oil & grease. The table shows resultant pollutant loading in pounds per year (lbs/yr), Event Mean Concentration (EMC) or average yearly concentrations (mg/l), and pollutant loading density (lbs/yr/yr). The results show heavier yearly pollutant loadings for TSS, TKN, nitrate, ammonia, zinc, copper, TPH's, and oil & grease.

Table 5 PLOAD Model Results					
Drainage Basin	**TSS lb/yr**	**TP lb/yr**	**TPH lb/yr**	**Oil & Grease lb/yr**	**pBACTERIA MPN/yr**
DB1	960.9	3.9	19.48	19.48	5.08E+13
DB2	1244.5	5.0	20.97	20.97	6.49E+13
Event Mean Concentration (EMC) - Average Year					
Drainage Basin	**TSS mg/L**	**TP mg/L**	**TPH mg/L**	**Oil & Grease mg/L**	**pBACTERIA MPN/100ml**
DB1	96.651	0.396	1.959	1.959	1.12E+06
DB2	94.616	0.383	1.594	1.594	1.09E+06
Pollutant Loading Density					
Drainage Basin	**TSS lbs/ac/yr**	**TP lbs/ac/yr**	**TPH lbs/ac/yr**	**Oil & Grease lbs/ac/yr**	**pBACTERIA MPN/ac/yr**
DB1	123.8	0.51	2.51	2.51	6.55E+12
DB2	135.8	0.55	2.29	2.29	7.09E+12

TSS - Total Suspended Solids
TKN - Total Kjeldahl Nitrogen
TPH - Total Petroleum Hydrocarbons
TP - Total Phosphorus
NH3-N - Ammonia Nitrogen

DB1 – Whitesands Place
DB2 – Wildlife Road

4.4 Pollutant Concentration Evaluation

Table 6 compares the EMC result data from the pollutant load model to the water quality objectives in Table B of the COP. Table B of the COP includes states limiting concentrations for heavy metals and other contaminants for protection of marine aquatic life and human health. This table shows that the existing pollutant discharges for Lead (Pb), Zinc (Zn), and Copper (Cu) do not meet the 6-month median concentrations of the COP and will require load reduction.

Table 6 Pollutant Concentration Evaluation

Pollutant Load Model Results – Average Yearly Mean Concentrations

Drainage Basin	NH3-N µg/L	Lead (Pb) µg/L	Zinc (Zn) µg/L	Copper (Cu) µg/L	Cadmium (Cd) µg/L
DB1	301.7	9.0	149.8	28.2	0.4
DB2	353.9	9.3	135.9	23.6	0.2
Ocean Plan Regulations	**NH3-N µg/L**	**Lead (Pb) µg/L**	**Zinc (Zn) µg/L**	**Copper (Cu) µg/L**	**Cadmium (Cd) µg/L**
6-month Median	600	2	20	3	1
Instantaneous	6000	20	200	30	10

4.5 Estimated Pollutant Load Reduction – DB1 & DB2

Table 7 shows the estimated pollutant load reductions in (lbs/yr) from each drainage basin. The table shows load reduction ranges from 40 percent to 90 percent. It should be noted this ranges will vary depending on the type of BMP and final option selected for this project as described in Section 4.6. This table does not include the pollutant load reductions from dry weather flows. This project will be eliminating dry weather, which will also reduce pollutant loading.

Table 7 Estimated Pollutant Load Reduction (lbs/yr)

Basin	Reduction (%)	TSS (lbs/yr)	TP (lbs/yr)	TKN (lbs/yr)	Nitrate-N (lbs/yr)	Nitrite-N (lbs/yr)	NH3-N (lbs/yr)	Pb (lbs/yr)	Zn (lbs/yr)	Cu (lbs/yr)	Cd (lbs/yr)	TPH (lbs/yr)	Oil & Grease (lbs/yr)
DB1	**Initial**	**960.87**	**3.93**	**18.31**	**9.33**	**0.87**	**3.00**	**0.09**	**1.49**	**0.28**	**0.00**	**19.48**	**19.48**
	40	384.35	1.57	7.32	3.73	0.35	1.20	0.03	0.59	0.11	0.001	7.79	7.79
	50	480.43	1.97	9.15	4.66	0.43	1.50	0.04	0.74	0.14	0.002	9.73	9.74
	60	576.52	2.36	10.98	5.60	0.52	1.80	0.05	0.89	0.16	0.002	11.68	11.68
	70	672.61	2.75	12.81	6.53	0.61	2.10	0.06	1.04	0.19	0.003	13.63	13.63
	80	768.70	3.15	14.65	7.46	0.70	2.39	0.07	1.19	0.22	0.003	15.58	15.58
	90	864.79	3.54	16.48	8.40	0.79	2.69	0.08	1.34	0.25	0.003	17.53	17.53
DB2	**Initial**	**1244.51**	**5.04**	**25.46**	**12.33**	**1.19**	**4.65**	**0.12**	**1.78**	**0.31**	**0.003**	**20.97**	**20.97**
	40	497.81	2.01	10.19	4.94	0.487	1.86	0.05	0.71	0.12	0.001	8.388	8.38
	50	622.26	2.52	12.73	6.17	0.60	2.32	0.06	0.89	0.15	0.001	10.485	10.48
	60	746.71	3.02	15.28	7.43	0.72	2.79	0.07	1.07	0.18	0.002	12.582	12.58
	70	871.16	3.53	17.83	8.64	0.84	3.26	0.09	1.25	0.21	0.002	14.679	14.67
	80	995.62	4.03	20.37	9.87	0.96	3.72	0.10	1.43	0.24	0.002	16.776	16.77
	90	1120.07	4.54	22.92	11.10	1.08	4.19	0.11	1.60	0.27	0.003	18.873	18.87

TSS - Total Suspended Solids
TKN - Total Kjeldahl Nitrogen
TPH - Total Petroleum Hydrocarbons
TP - Total Phosphorus
NH3-N - Ammonia Nitrogen

DB1 – Whitesands Place
DB2 – Wildlife Road

4.6 BMP Performance Pollutant Load Reduction

The percent pollutant load reduction for each pollutant varies with each type of BMP. BMP performance data has been collected and analyzed by independent agencies/associations and equipment suppliers. Treatment performance was reviewed from various sources of information including equipment suppliers (e.g., ConTech, Aqua-Filter, StormwateRx) and the International Stormwater Database. Table 8 presents the removal efficiencies for various pollutants in stormwater as reported by the International Stormwater Database http://www.bmpdatabase.org/.

The International Stormwater Database was developed and analyzed by a variety of regulatory agencies and engineering firms and then presented for public use. The data provide a general overview for average performance for each type of BMP and is not specific to a particular equipment supplier. These removal data are considered to be minimum (or conservative) levels of pollutant reduction as performance was averaged for sites that are well designed and maintained as well as those sites that are not. Site specific performance will depend on the final selected BMP and the proper maintenance of that BMP. BMPs were categorized into different classes, which are defined as follows:

Bioretention: Water is stored, infiltrated, evapotranspired and treated by the vegetated material in place. There can be a permanent pond level associated with the design of this BMP. Any excess water flows out of this BMP to a collection system.

Bioswale: Water flows across vegetated material where both infiltration and treatment occur. There is no permanent pond level as part of the BMP. The BMP is typically used in larger open areas at a downstream point of capture for surface runoff.

Filter Strip: Similar to a bioswale BMP but reduced in size as filter strips are often located along side roads and/or parking lots. Water moves through the treatment system and is discharged at the downstream end of the BMP. There is some storage and infiltration associated with this type of BMP. Any excess water flows out of this BMP to a collection system.

Manufactured Device: These include vendor equipment packages that range from a single treatment device (e.g., hydrodynamic separators) to multiple treatment units in series (e.g., hydrodynamic separator followed by filter bed). Water moves through the treatment system and is discharged to a collection system. There is no storage and infiltration associated with this type of BMP.

Filter Media: A variety of media blends (e.g., sand, natural zeolites, GAC, and/or compost) is housed in a beds or trenches. Housings include concrete vaults, HDPE vaults, or small cartridges. Water moves through the treatment system and is discharged to a collection system. There is no storage and infiltration associated with this type of BMP.

Table 8 Average Percent (%) Removal Rates[1]

Type of BMP	Total Suspended Solids	Phosphorus	Nitrate	Cadmium	Copper	Lead	Zinc
Bioretention	66	7	23[2]	N/A	48	N/A	73
Bioswale	50	-67[3]	7	40	36	53	25
Filter Strip	62	-31	33	60	69	77	76
Manufactured Devices	61	36	-13	0	21	37	33
Media Filter[4]	71	41	-56	50	57	85	83

Notes:
1. Source from the International Stormwater BMP Database, bmpdatabase.org, 2012) comparing influent and effluent concentrations.
2. No data is available
3. Negative valves indicate BMP has potential to release pollutants especially in cases where maintenance on the BMP has not been performed.
4. Companies like Stormwater RX and Aqua-Filter can manufacture filter media units that will achieve a 90% pollutant load reduction.

5.0 DESIGN OPTIONS

Carollo reviewed several different stormwater Best Management Practices (BMPs) and evaluated each one based on the existing background data, site constraints, and treatment capability. The County of Los Angeles Department of Public Works (LADWP) Stormwater BMP Manual was used as a reference source. We also used published performance data on BMP removal efficiencies. For the Whitesands Place and Wildlife Road drainage basins, Carollo recommends the BMPs listed below.

5.1 Option 1 – Bioswale BMP

The Bioswale BMP is a combination of vegetated swales and bioinfiltration swales constructed adjacent to the existing roadway. Vegetated swales are installed upstream of the bioinfiltration swale to provide pretreatment. A small check dam would be installed at the interface between the vegetated swale and bioinfiltration swales. Dry and wet weather WQ runoff would be directed into the swale from the adjacent roadway through curb openings or shallow catch basins.

Vegetated swales are shallow, open channels with low-lying vegetation covering the side slopes and bottom. Vegetated swales provide pollutant load reduction by slowing runoff velocity allowing settlement; filtration through the vegetation; volume reduction through evapotranspiration and infiltration; and nutrient removal through plant uptake.

Bioinfiltration swales are a combination of a vegetated swale BMP and infiltration trench BMP. They allow for above ground storage within the swale and below ground storage within void space between the drain rock. Runoff infiltrates though the sides and bottom of the trench. They are designed to capture, store, and infiltrate dry and wet weather WQ storm events into the subsurface soil. Bioinfiltration swales are used for hydro-modification control and provide pollutant load reduction through infiltration, sedimentation, filtration, and adsorption. The Bioswale BMP targets a wide range of contaminants including sediments, heavy metals, oils & greases, and nutrients.

5.1.1 Bioswale Site Layout

Bioswale BMPs would be installed within the upper and lower section of each drainage basin. They would be installed at locations within the drainage basin to provide the least impact to adjacent landscape and hardscape. Drainage culverts would be installed underneath existing driveways that are within the treatment area. The depth of the infiltration trench may be increased more than 4-feet to decrease the overall length. The Bioswale BMPs have a vegetated mix of erosion-resistant native plant species that would require less fertilizer and limited maintenance. Refer to Figure 5 and 6 for details of the Bioswale BMP.

5.1.2 Bioswale Operation & Maintenance

The routine maintenance activities recommend for Bioswale BMPs are listed below.

- Bi-annually removal trash, debris, and sediment inside the swale and near inlet structures
- Mow routinely to maintain ideal grass height and to suppress weeds
- Remove any evidence of visual contamination from floatables such as oil and grease
- Replace invasive vegetation with non-invasive species
- Stabilize/repair minor erosion and scouring with gravel
- Maintain drip irrigation system.

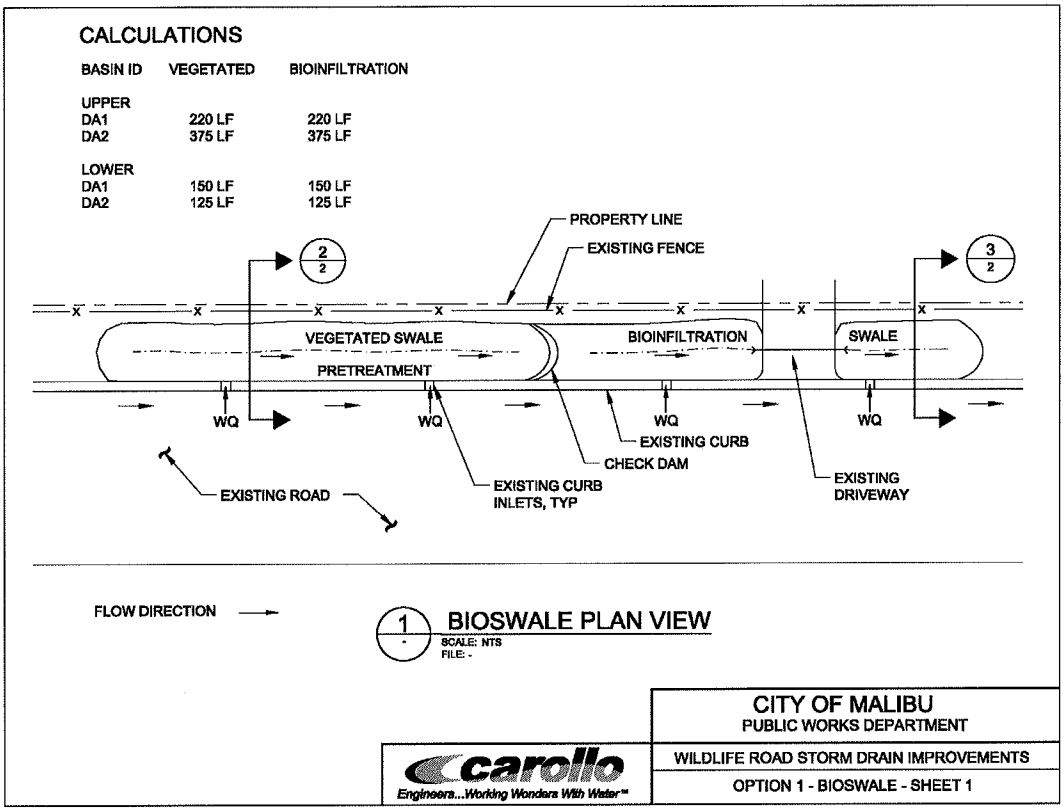

Figure 5 Option 1 – Bioswale Plan View

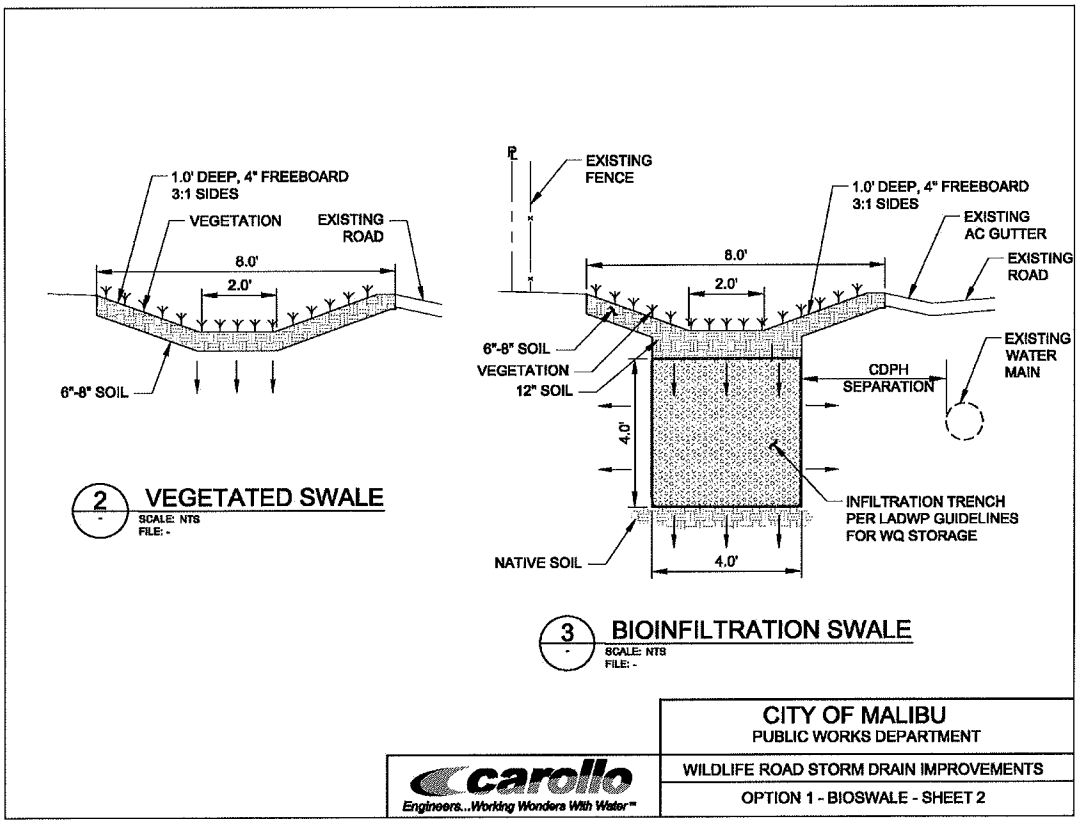

Figure 6 Option 1 – Bioswale Detail

5.2 Option 2 – Infiltration Trench BMP

The infiltration trench BMP is a long, narrow, rock-filled trench that collects, stores, and infiltrates stormwater. The majority of the stormwater is stored in the void space between the drain rock and infiltrates though the sides and bottom of the trench. Infiltration trenches require pretreatment devices to reduce sediment loading which foul or plug the void spaces. A hydrodynamic separator would be installed upstream for pretreatment particulate metals, particulate of nutrients, and sediments.

Infiltration trenches are used for hydro-modification control and provide pollutant load reduction through infiltration, sedimentation, filtration, and adsorption. They target a wide range of contaminants including sediments, heavy metals, nutrients, and oils & greases. They can also be constructed with pre-manufactured underground storage areas, like Rainstore or other similar products. These types of units have higher void spaces and smaller footprints.

5.2.1 Infiltration Trench Site Layout

Infiltration trenches would also be installed within the upper and lower section of each drainage basin to capture, store, and infiltrate dry and WQ wet weather runoff. They can be installed underneath or adjacent to the existing roadway. A hydrodynamic separator would be installed upstream as pretreatment. It would remove particulate metals, particulate nutrients, and sediments. New catch basins and grated inlets would be installed on each side of the roadway. An 8-foot wide concrete cross gutter would be installed to carry overflow from larger storm events and discharge into the existing storm drain system. Refer to Figure 7 and 8 for Infiltration Trench BMP details.

5.2.2 Infiltration Trench Operations & Maintenance

Routine maintenance activities recommend for infiltration trench and hydrodynamic separator BMPs are listed below:

- Monthly inspections for the first year of installation.
- Remove trash, debris, sediment once per year and after heavy loadings (i.e., winter storms and soil disturbances).
- Yearly cleaning of stormdrain catch basins/sumps for debris, trash, and sediment.
- Remove any visual evidence of contamination from floatables such as oil and grease.
- Remove sedimentation, debris, and obstructions near inlet/outlet structures as needed.

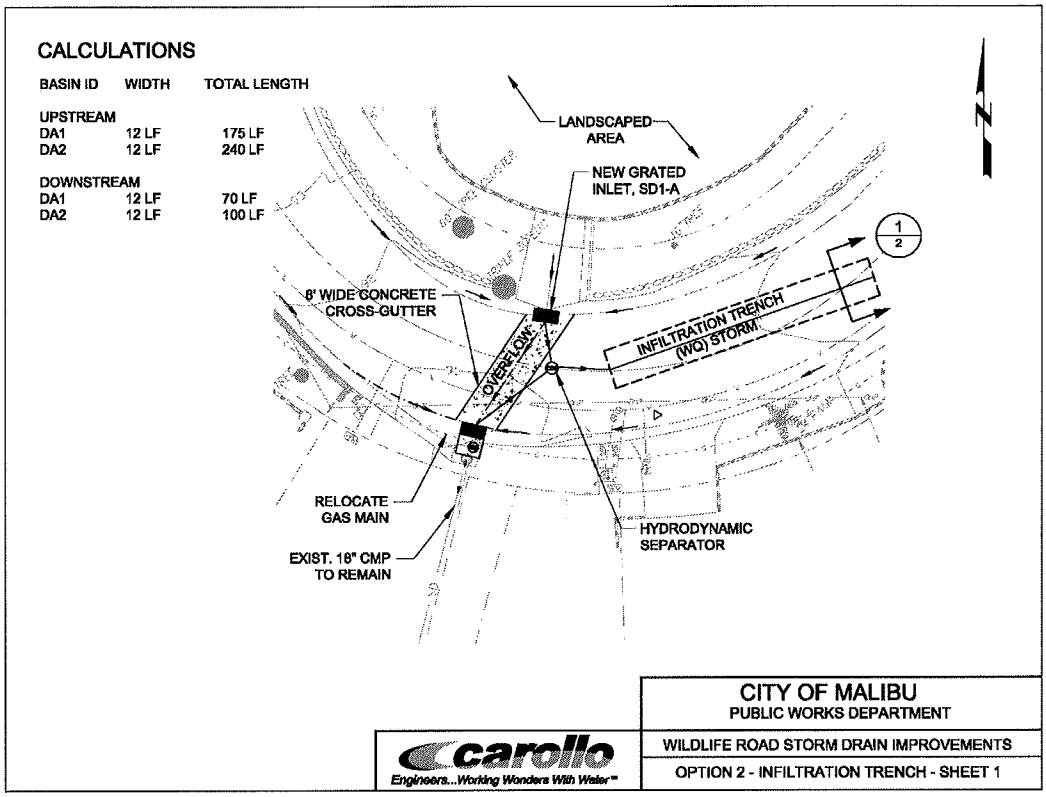

Figure 7 Option 2 – Infiltration Trench Plan View

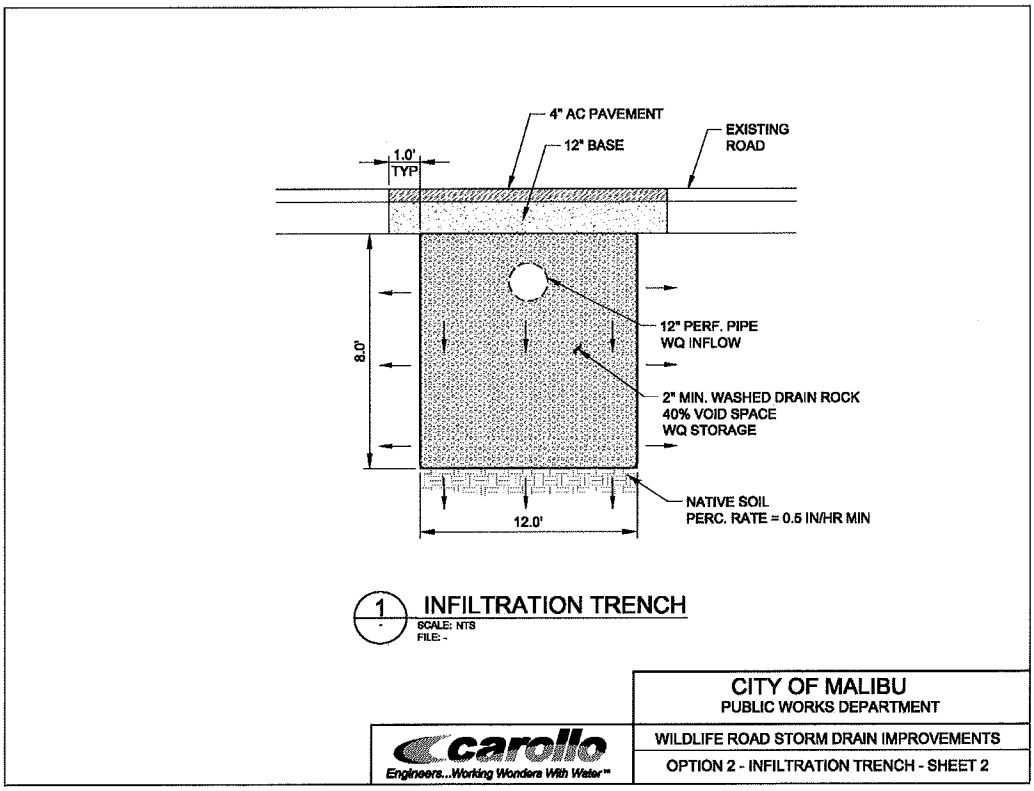

Figure 8 Option 2 – Infiltration Trench Detail

5.3 Option 3 – Filter Media BMP

Filter media BMPs are composed of various combinations of organic media designed to treat dissolved and non-dissolved pollutants. They are typically placed in cartridges or vaults (concrete or HDPE) which use direct contact to provide treatment. Filter media requires pretreatment to remove large particulates and sediments, which may plug or foul the media bed and increase frequency of media replacement. Filter media typically consists of granulated active carbon (GAC), compost or leaf media, perlite, zeolite, or other infused polymers. Some manufactures have special media blends to target a range of pollutants.

GAC is made from wood, coal, or lignite and has been processed to be highly porous and have a very large surface area for adsorption. Adsorption allows for the adhesion of dissolved contaminants to the surface of the carbon. Perlite is a volcanic glass formed from obsidian. It is composed of magnesium oxide (MgO) and calcium oxide (CaO). Perlite also has a very high surface area; is very porous; and adsorbs heavy metals and oils & greases. It also improves moisture retention to form biofilms. Zeolites are hydrous aluminosilicate minerals with a highly porous matrix that has naturally occurring alkali, like sodium (Na) and calcium (Ca). Zeolites cation exchange capacity remove dissolved pollutants like zinc, copper, lead, and ammonia from water.

5.3.1 Filter Media Site Layout

The Biofilter Media BMP would the installed on the downstream end of each drainage basin, near the existing inlets. A manufactured biofilter media bed would be installed in a precast concrete or HDPE vaults. The vault would be installed within or adjacent to the existing roadway and would have access hatches for inspection and media replacement. A hydrodynamic separator would be installed upstream as pretreatment for the filter media. It would remove particulate metals, particulate nutrients, and sediments. The media blend would be sand, pumas, and a proprietary media to target heavy metals and nutrients. A pump station would pump treated water back into the existing 18-inch storm drain outlet. New catch basins and grated inlets would be installed on each side of the roadway. An 8-foot wide concrete cross gutter would be installed to bypass larger storm events and discharge into the existing storm drain system. Refer to Figure 9 for details.

5.3.2 Filter Media Operation & Maintenance

Routine maintenance activities recommend for a filter Media and hydrodynamic Separator BMPs are listed below:

- Monthly inspections for the first year of installation.
- Yearly replacement of top layer of media (as a determined based on performance data).
- Yearly cleaning of storm drain catch basins/sumps for debris, trash, and sediment.

- Yearly cleaning and routine maintenance of storm drain sump pump.
- Remove trash, debris, sediment once per year and after heavy loadings (i.e., winter storms and soil disturbances).
- Remove any visual evidence of contamination from floatables such as oil and grease.
- Remove sedimentation, debris, and obstructions near inlet/outlet structures as needed.
- Periodically observe function under wet weather conditions.

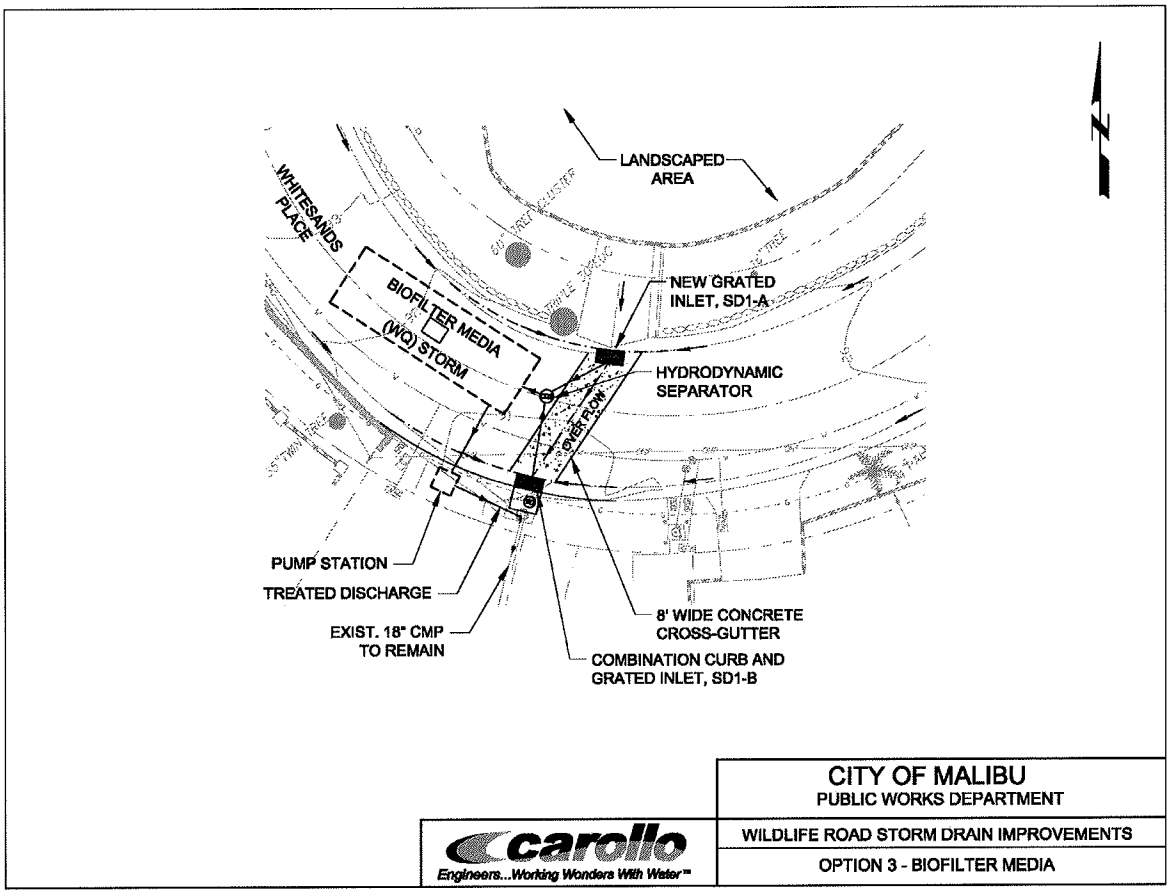

Figure 9 Option 3 – Filter Media Detail

5.4 Option 4 – Bioretention Swale

A site visit was conducted with the City of Malibu on August 1, 2012 to field locate areas where the Biorention Swales could be installed adjacent to the existing roadway without significant impact to existing infrastructure (driveways, hardscape and landscaping). The approximate size and location of each swale were plotted on an aerial map. The hydrology model was updated to determine the depth of the swales based on its location within each sub-basin. Refer to Figure 10 for the Bioretention Swale Site Plan.

Figure 10 Option 4 - Bioretention Swale Site Plan

Bioretention Swales are vegetated shallow depressions that provide above ground storage, evapotranspiration, infiltration, and hydro-modification of stormwater runoff. Bioretention swales remove pollutants by capturing the water quality storm event and filtering runoff through plants that are adapted to local climate, soil moisture conditions, and an engineered soil mix. The above ground swale area stores runoff and removes sediment and trash prior to entering the engineered soils. The pore space, microbes, and organic material in the engineered soils help retain water by increasing the soil moisture content and promoting adsorption of pollutants including heavy metals and petroleum hydrocarbons. Plants utilize soil moisture to promote drying of the soil through evapotranspiration and remove of pollutants through plant uptake. The remaining stormwater runoff is infiltrated through the bottom of swale into the native soils. The infiltration rate is a function of the existing soils permeability. Option 4 would be designed to eliminate all dry-weather flow. It would also be designed to capture, treat, and infiltrate 100-percent of the WQ storm event for DB1 (Whitesands Place) and 90-percent of the WQ storm event for DB2 (Wildlife Road) in accordance with the project's water quality objectives. Refer to Figure 11 for a typical section of a Bioretention Swale.

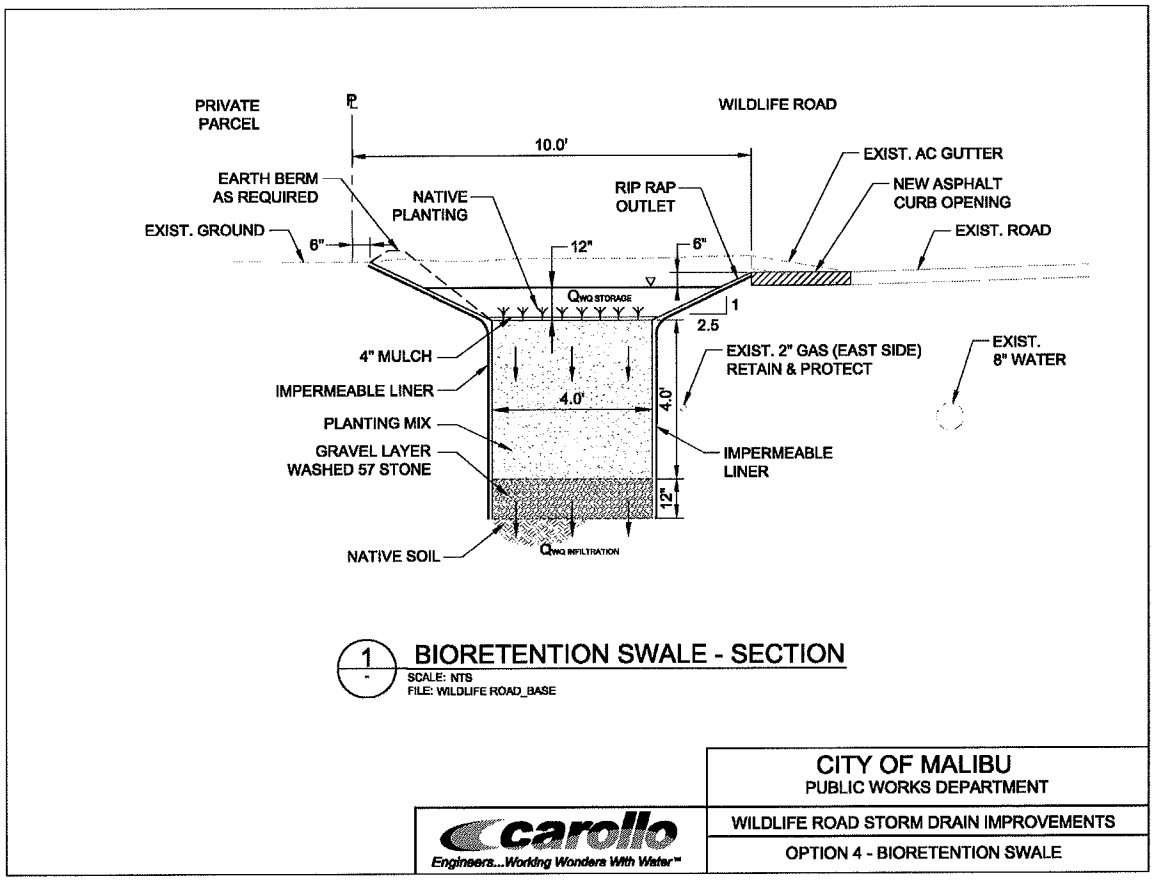

Figure 11 Bioretention Swale Detail

5.5 Estimated Costs

The following Table 9 below list the costs for Options 1, 2, 3, and 4 to provide a 100-percent pollutant load reduction in DB1 and a 90-percent pollutant load reduction in DB2. The level of estimate should be considered a "budget estimate" used for planning level purposes only. Cost estimates presented in Table 9 were developed under the following assumptions:

- General construction work items (e.g., excavation, concrete, paving, piping, etc.) with no items required specialty work (e.g., deep pit shoring).
- No work restrictions related to site access or time of year that construction might be performed.
- Contingency: 15 percent of total construction cost.
- Indirect costs such as sales tax, general conditions, overhead & profit, permits and bonding, and escalation to midpoint of construction are already included in the construction costs for each element of work.
- Material and equipment costs are based on vendor quotes (e.g., filtration systems) or current material pricing (e.g., asphalt, drain rock).

Table 9 Total Construction Cost Estimate[1]

	1	2	3	4
Area of Work	**Bioswale**	**Infiltration Trench[1]**	**Filter Media**	**Bioretention Swale**
Demolition & Cleanup	22,000	15,000	11,000	12,000
Road Repair	38,000	61,000	18,000	45,000
Bioswale	261,000	0	0	137,000
Infiltration Trench	0	232,000	0	0
Filter Media System	0	0	553,000	0
Hydroseparator	0	35,000	42,000	0
Lift Station	0	0	15,000	0
Utility Relocation	16,000	13,000	11,000	0
Contingency	58,000	61,000	115,000	54,000
TOTAL	**395,000**	**417,000**	**765,000**	**248,000**

Notes:
(1) Costs presented are for both sites, Drainage Basin 1 (DB1) located on Whitesands Place and Drainage Basin 2 (DB2) located on Wildlife Road
(2) Cost reduced for reduction in size of infiltration trenches. Size reduction was based on assuming combined infiltration (outflow) from the bottom and sides of the BMP during a storm event.

6.0 CONCLUSION & RECOMMENDATION

Carollo has reviewed all background data, LA county design guidelines, estimated cost, maintenance requirements, and BMP performance data to develop the Options 1, 2, 3, and 4 discussed above. Based on our knowledge of the existing site conditions and objectives for this project, Carollo recommends Option 4, the Bioretention Swale BMP.

Option 4 will have the ability to eliminate dry-weather flow and capture, treat, and infiltrate wet-weather WQ storm water from each drainage basin. This will reduce pollutant loading into the ASBS in accordance with the project water quality objectives.

Carollo understands that the City's total project budget may be a factor for this project. Carollo recommends capturing and treating 100-percent of the WQ storm event on Whitesands Place (DB1) to meet the new bacterial TMDL set forth in the settlement agreement. Adjustments can be made to percent load reduction on Wildlife Road (DB2) to meet project funding. The combined percent load reduction from both sites can be applied to the Citywide 90-percent pollutant load reduction requirements.

Appendix A

WATER QUALITY OBJECTIVES OF THE COP

II. WATER QUALITY OBJECTIVES

A. General Provisions

1. This chapter sets forth limits or levels of water quality characteristics for ocean* waters to ensure the reasonable protection of beneficial uses and the prevention of nuisance. The discharge of waste* shall not cause violation of these objectives.

2. The Water Quality Objectives and Effluent Limitations are defined by a statistical distribution when appropriate. This method recognizes the normally occurring variations in treatment efficiency and sampling and analytical techniques and does not condone poor operating practices.

3. Compliance with the water quality objectives of this chapter shall be determined from samples collected at stations representative of the area within the waste field where initial* dilution is completed.

B. Bacterial Characteristics

1. Water-Contact Standards

Both the SWRCB and the California Department of Public Health (DPH) have established standards to protect water contact recreation in coastal waters from bacterial contamination. Subsection a of this section contains bacterial objectives adopted by the SWRCB for ocean waters used for water contact recreation. Subsection b describes the bacteriological standards adopted by DPH for coastal waters adjacent to public beaches and public water contact sports areas in ocean waters.

a. SWRCB Water-Contact Standards

(1) Within a zone bounded by the shoreline and a distance of 1,000 feet from the shoreline or the 30-foot depth contour, whichever is further from the shoreline, and in areas outside this zone used for water contact sports, as determined by the Regional Board (i.e., waters designated as REC-1), but including all kelp* beds, the following bacterial objectives shall be maintained throughout the water column:

30-day Geometric Mean – The following standards are based on the geometric mean of the five most recent samples from each site:

i. Total coliform density shall not exceed 1,000 per 100 ml;
ii. Fecal coliform density shall not exceed 200 per 100 ml; and
iii. Enterococcus density shall not exceed 35 per 100ml.

Single Sample Maximum:

i. Total coliform density shall not exceed 10,000 per 100 ml;
ii. Fecal coliform density shall not exceed 400 per 100ml;
iii. Enterococcus density shall not exceed 104 per 100 ml; and

* See Appendix I for definition of terms.

iv. Total coliform density shall not exceed 1,000 per 100 ml when the fecal coliform/total coliform ratio exceeds 0.1.

(2) The "Initial* Dilution Zone" of wastewater outfalls shall be excluded from designation as "kelp* beds" for purposes of bacterial standards, and Regional Boards should recommend extension of such exclusion zone where warranted to the SWRCB (for consideration under Chapter III.I.). Adventitious assemblages of kelp plants on waste discharge structures (e.g., outfall pipes and diffusers) do not constitute kelp* beds for purposes of bacterial standards.

b. DPH Standards

DPH has established minimum protective bacteriological standards for coastal waters adjacent to public beaches and for public water-contact sports areas in ocean waters. These standards are found in the California Code of Regulations, title 17, section 7958, and they are identical to the objectives contained in subsection a. above. When a public beach or public water-contact sports area fails to meet these standards, DPH or the local public health officer may post with warning signs or otherwise restrict use of the public beach or public water-contact sports area until the standards are met. The DPH regulations impose more frequent monitoring and more stringent posting and closure requirements on certain high-use public beaches that are located adjacent to a storm drain that flows in the summer.

For beaches not covered under AB 411 regulations, DPH imposes the same standards as contained in Title 17 and requires weekly sampling but allows the county health officer more discretion in making posting and closure decisions.

2. Shellfish* Harvesting Standards

a. At all areas where shellfish* may be harvested for human consumption, as determined by the Regional Board, the following bacterial objectives shall be maintained throughout the water column:

(1) The median total coliform density shall not exceed 70 per 100 ml, and not more than 10 percent of the samples shall exceed 230 per 100 ml.

C. Physical Characteristics

1. Floating particulates and grease and oil shall not be visible.

2. The discharge of waste* shall not cause aesthetically undesirable discoloration of the ocean* surface.

3. Natural* light shall not be significantly* reduced at any point outside the initial* dilution zone as the result of the discharge of waste*.

4. The rate of deposition of inert solids and the characteristics of inert solids in ocean* sediments shall not be changed such that benthic communities are degraded*.

* See Appendix I for definition of terms.

D. Chemical Characteristics

1. The dissolved oxygen concentration shall not at any time be depressed more than 10 percent from that which occurs naturally, as the result of the discharge of oxygen demanding waste* materials.
2. The pH shall not be changed at any time more than 0.2 units from that which occurs naturally.
3. The dissolved sulfide concentration of waters in and near sediments shall not be significantly* increased above that present under natural conditions.
4. The concentration of substances set forth in Chapter II, Table B, in marine sediments shall not be increased to levels which would degrade* indigenous biota.
5. The concentration of organic materials in marine sediments shall not be increased to levels that would degrade* marine life.
6. Nutrient materials shall not cause objectionable aquatic growths or degrade* indigenous biota.
7. Numerical Water Quality Objectives
   a. Table B water quality objectives apply to all discharges within the jurisdiction of this Plan. Unless otherwise specified, all metal concentrations are expressed as total recoverable concentrations.
   b. Table B Water Quality Objectives

* See Appendix I for definition of terms.

TABLE B
WATER QUALITY OBJECTIVES

	Units of Measurement	Limiting Concentrations 6-Month Median	Daily Maximum	Instantaneous Maximum
OBJECTIVES FOR PROTECTION OF MARINE AQUATIC LIFE				
Arsenic	ug/l	8.	32.	80.
Cadmium	ug/l	1.	4.	10.
Chromium (Hexavalent) (see below, a)	ug/l	2.	8.	20.
Copper	ug/l	3.	12.	30.
Lead	ug/l	2.	8.	20.
Mercury	ug/l	0.04	0.16	0.4
Nickel	ug/l	5.	20.	50.
Selenium	ug/l	15.	60.	150.
Silver	ug/l	0.7	2.8	7.
Zinc	ug/l	20.	80.	200.
Cyanide (see below, b)	ug/l	1.	4.	10.
Total Chlorine Residual (For intermittent chlorine sources see below, c)	ug/l	2.	8.	60.
Ammonia (expressed as nitrogen)	ug/l	600.	2400.	6000.
Acute* Toxicity	TUa	N/A	0.3	N/A
Chronic* Toxicity	TUc	N/A	1.	N/A
Phenolic Compounds (non-chlorinated)	ug/l	30.	120.	300.
Chlorinated Phenolics	ug/l	1.	4.	10.
Endosulfan	ug/l	0.009	0.018	0.027
Endrin	ug/l	0.002	0.004	0.006
HCH*	ug/l	0.004	0.008	0.012
Radioactivity	Not to exceed limits specified in Title 17, Division 1, Chapter 5, Subchapter 4, Group 3, Article 3, Section 30253 of the California Code of Regulations. Reference to Section 30253 is prospective, including future changes to any incorporated provisions of federal law, as the changes take effect.			

* See Appendix I for definition of terms.

Table B Continued

Chemical	30-day Average (ug/l) Decimal Notation	Scientific Notation
OBJECTIVES FOR PROTECTION OF HUMAN HEALTH – NONCARCINOGENS		
acrolein	220.	2.2×10^{2}
antimony	1,200.	1.2×10^{3}
bis(2-chloroethoxy) methane	4.4	4.4×10^{0}
bis(2-chloroisopropyl) ether	1,200.	1.2×10^{3}
chlorobenzene	570.	5.7×10^{2}
chromium (III)	190,000.	1.9×10^{5}
di-n-butyl phthalate	3,500.	3.5×10^{3}
dichlorobenzenes*	5,100.	5.1×10^{3}
diethyl phthalate	33,000.	3.3×10^{4}
dimethyl phthalate	820,000.	8.2×10^{5}
4,6-dinitro-2-methylphenol	220.	2.2×10^{2}
2,4-dinitrophenol	4.0	4.0×10^{0}
ethylbenzene	4,100.	4.1×10^{3}
fluoranthene	15.	1.5×10^{1}
hexachlorocyclopentadiene	58.	5.8×10^{1}
nitrobenzene	4.9	4.9×10^{0}
thallium	2.	$2. \times 10^{0}$
toluene	85,000.	8.5×10^{4}
tributyltin	0.0014	1.4×10^{-3}
1,1,1-trichloroethane	540,000.	5.4×10^{5}
OBJECTIVES FOR PROTECTION OF HUMAN HEALTH – CARCINOGENS		
acrylonitrile	0.10	1.0×10^{-1}
aldrin	0.000022	2.2×10^{-5}
benzene	5.9	5.9×10^{0}
benzidine	0.000069	6.9×10^{-5}
beryllium	0.033	3.3×10^{-2}
bis(2-chloroethyl) ether	0.045	4.5×10^{-2}
bis(2-ethylhexyl) phthalate	3.5	3.5×10^{0}
carbon tetrachloride	0.90	9.0×10^{-1}
chlordane*	0.000023	2.3×10^{-5}
chlorodibromomethane	8.6	8.6×10^{0}

* See Appendix I for definition of terms.

Table B Continued

Chemical	30-day Average (ug/l) Decimal Notation	Scientific Notation
OBJECTIVES FOR PROTECTION OF HUMAN HEALTH – CARCINOGENS		
chloroform	130.	1.3×10^{2}
DDT*	0.00017	1.7×10^{-4}
1,4-dichlorobenzene	18.	1.8×10^{1}
3,3'-dichlorobenzidine	0.0081	8.1×10^{-3}
1,2-dichloroethane	28.	2.8×10^{1}
1,1-dichloroethylene	0.9	9×10^{-1}
dichlorobromomethane	6.2	6.2×10^{0}
dichloromethane	450.	4.5×10^{2}
1,3-dichloropropene	8.9	8.9×10^{0}
dieldrin	0.00004	4.0×10^{-5}
2,4-dinitrotoluene	2.6	2.6×10^{0}
1,2-diphenylhydrazine	0.16	1.6×10^{-1}
halomethanes*	130.	1.3×10^{2}
heptachlor	0.00005	5×10^{-5}
heptachlor epoxide	0.00002	2×10^{-5}
hexachlorobenzene	0.00021	2.1×10^{-4}
hexachlorobutadiene	14.	1.4×10^{1}
hexachloroethane	2.5	2.5×10^{0}
isophorone	730.	7.3×10^{2}
N-nitrosodimethylamine	7.3	7.3×10^{0}
N-nitrosodi-N-propylamine	0.38	3.8×10^{-1}
N-nitrosodiphenylamine	2.5	2.5×10^{0}
PAHs*	0.0088	8.8×10^{-3}
PCBs*	0.000019	1.9×10^{-5}
TCDD equivalents*	0.0000000039	3.9×10^{-9}
1,1,2,2-tetrachloroethane	2.3	2.3×10^{0}
tetrachloroethylene	2.0	2.0×10^{0}
toxaphene	0.00021	2.1×10^{-4}
trichloroethylene	27.	2.7×10^{1}
1,1,2-trichloroethane	9.4	9.4×10^{0}
2,4,6-trichlorophenol	0.29	2.9×10^{-1}
vinyl chloride	36.	3.6×10^{1}

* See Appendix I for definition of terms.

Table B Notes:

a) Dischargers may at their option meet this objective as a total chromium objective.

b) If a discharger can demonstrate to the satisfaction of the Regional Board (subject to EPA approval) that an analytical method is available to reliably distinguish between strongly and weakly complexed cyanide, effluent limitations for cyanide may be met by the combined measurement of free cyanide, simple alkali metal cyanides, and weakly complexed organometallic cyanide complexes. In order for the analytical method to be acceptable, the recovery of free cyanide from metal complexes must be comparable to that achieved by the approved method in 40 CFR PART 136, as revised May 14, 1999.

c) Water quality objectives for total chlorine residual applying to intermittent discharges not exceeding two hours, shall be determined through the use of the following equation:

$$\log y = -0.43 (\log x) + 1.8$$

where: y = the water quality objective (in ug/l) to apply when chlorine is being discharged;
x = the duration of uninterrupted chlorine discharge in minutes.

E. Biological Characteristics

1. Marine communities, including vertebrate, invertebrate, and plant species, shall not be degraded*.

2. The natural taste, odor, and color of fish, shellfish*, or other marine resources used for human consumption shall not be altered.

3. The concentration of organic materials in fish, shellfish* or other marine resources used for human consumption shall not bioaccumulate to levels that are harmful to human health.

F. Radioactivity

1. Discharge of radioactive waste* shall not degrade* marine life.

* See Appendix I for definition of terms.

III. PROGRAM OF IMPLEMENTATION

A. General Provisions

1. Effective Date

   a. The *Water Quality Control Plan, Ocean Waters of California, California Ocean Plan* was adopted and has been effective since 1972. There have been multiple amendments of the Ocean Plan since its adoption.

2. General Requirements For Management Of Waste Discharge To The Ocean*

   a. Waste* management systems that discharge to the ocean* must be designed and operated in a manner that will maintain the indigenous marine life and a healthy and diverse marine community.

   b. Waste discharged* to the ocean* must be essentially free of:

      (1) Material that is floatable or will become floatable upon discharge.

      (2) Settleable material or substances that may form sediments which will degrade* benthic communities or other aquatic life.

      (3) Substances which will accumulate to toxic levels in marine waters, sediments or biota.

      (4) Substances that significantly* decrease the natural* light to benthic communities and other marine life.

      (5) Materials that result in aesthetically undesirable discoloration of the ocean* surface.

   c. Waste* effluents shall be discharged in a manner which provides sufficient initial* dilution to minimize the concentrations of substances not removed in the treatment.

   d. Location of waste* discharges must be determined after a detailed assessment of the oceanographic characteristics and current patterns to assure that:

      (1) Pathogenic organisms and viruses are not present in areas where shellfish* are harvested for human consumption or in areas used for swimming or other body-contact sports.

      (2) Natural water quality conditions are not altered in areas designated as being of special biological significance or areas that existing marine laboratories use as a source of seawater.

      (3) Maximum protection is provided to the marine environment.

* See Appendix I for definition of terms.

e. Waste* that contains pathogenic organisms or viruses should be discharged a sufficient distance from shellfishing* and water-contact sports areas to maintain applicable bacterial standards without disinfection. Where conditions are such that an adequate distance cannot be attained, reliable disinfection in conjunction with a reasonable separation of the discharge point from the area of use must be provided. Disinfection procedures that do not increase effluent toxicity and that constitute the least environmental and human hazard should be used.

3. Areas of Special Biological Significance

   a. ASBS* shall be designated by the SWRCB following the procedures provided in Appendix IV. A list of ASBS* is available in Appendix V.

4. Combined Sewer Overflow: Not withstanding any other provisions in this plan, discharges from the City of San Francisco's combined sewer system are subject to the US EPA's Combined Sewer Overflow Policy.

B. Table A Effluent Limitations

TABLE A
EFFLUENT LIMITATIONS

		Limiting Concentrations		
	Unit of Measurement	Monthly (30-day Average)	Weekly (7-day Average)	Maximum at any time
Grease and Oil	mg/l	25.	40.	75.
Suspended Solids			See below +	
Settleable Solids	Ml/l	1.0	1.5	3.0
Turbidity	NTU	75.	100.	225.
PH	Units		Within limit of 6.0 to 9.0 at all times	

Table A Notes:

+ Suspended Solids: Dischargers shall, as a 30-day average, remove 75% of suspended solids from the influent stream before discharging wastewaters to the ocean*, except that the effluent limitation to be met shall not be lower than 60 mg/l. Regional Boards may recommend that the SWRCB (Chapter IIIJ), with the concurrence of the Environmental Protection Agency, adjust the lower effluent concentration limit (the 60 mg/l above) to suit the environmental and effluent characteristics of the discharge. As a further consideration in making such recommendation for adjustment, Regional Boards should evaluate effects on existing and potential water* reclamation projects.

  If the lower effluent concentration limit is adjusted, the discharger shall remove 75% of suspended solids from the influent stream at any time the influent concentration exceeds four times such adjusted effluent limit.

1. Table A effluent limitations apply only to publicly owned treatment works and industrial discharges for which Effluent Limitations Guidelines have not been established pursuant to Sections 301, 302, 304, or 306 of the Federal Clean Water Act.

* See Appendix I for definition of terms.

Appendix B

SWRCB RESOLUTION NO. 2012-0012

STATE WATER RESOURCES CONTROL BOARD
RESOLUTION NO. 2012-0012

APPROVING EXCEPTIONS TO THE CALIFORNIA OCEAN PLAN FOR SELECTED DISCHARGES INTO AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE, INCLUDING SPECIAL PROTECTIONS FOR BENEFICIAL USES, AND CERTIFYING A PROGRAM ENVIRONMENTAL IMPACT REPORT

WHEREAS:

1. The State Water Resources Control Board (State Water Board) adopted the California Ocean Plan (Ocean Plan) on July 6, 1972 and revised the Ocean Plan in 1978, 1983, 1988, 1990, 1997, 2000, 2005, and 2009.

2. The Ocean Plan prohibits the discharge of waste to designated Areas of Special Biological Significance (ASBS).

3. ASBS are designated by the State Water Board as ocean areas requiring protection of species or biological communities to the extent that alteration of natural water quality is undesirable.

4. Under the Marine Managed Areas Improvement Act, all ASBS are designated as a subset of state water quality protection areas and require special protection as determined by the State Water Board pursuant to the Ocean Plan and the Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California (Thermal Plan).

5. In state water quality protection areas, waste discharges must be prohibited or limited by special conditions, in accordance with the Porter-Cologne Water Quality Control Act, California Water Code §13000 et seq., and implementing regulations, including the Ocean Plan and Thermal Plan.

6. The Ocean Plan authorizes the State Water Board to grant an exception to Ocean Plan provisions where the board determines that the exception will not compromise protection of ocean waters for beneficial uses and the public interest will be served.

7. On October 18, 2004, the State Water Board notified a number of parties that they must cease the discharge of storm water and nonpoint source waste into ASBS or request an exception to the Ocean Plan.

8. The State Water Board has now received 27 applications for an exception to the Ocean Plan prohibition against waste discharges into an ASBS. The applicants, who are listed in Attachment A to this resolution, discharge storm water and nonpoint source waste into ASBS.

9. The State Water Board finds that granting the requested exceptions will not compromise protection of ocean waters for beneficial uses, provided that the applicants comply with the prohibitions and special conditions that comprise the Special Protections contained in this resolution. The prohibitions and special conditions in the Special Protections, contained in Attachment B to this resolution, are intended to ensure that storm water

16. The exceptions will be reviewed during the next triennial review of the Ocean Plan. If the State Water Board finds cause to revoke or re-open the exceptions, the board may do so during the triennial review or at any other time. During the next triennial review period staff will also evaluate those aspects of the exception that are successfully protecting beneficial uses, to make recommendations on a potential Ocean Plan amendment to address storm runoff into ASBS.

17. The State Water Board's record of proceedings in this matter is located at 1001 I Street, Sacramento, California, 95814 and the custodian is the Division of Water Quality.

THEREFORE BE IT RESOLVED THAT:

The State Water Board:

1. The State Water Board certifies that the Final EIR has been completed in compliance with CEQA. The State Water Board has reviewed and considered the information contained in these documents, which reflect the State Water Board's independent judgment and analysis.

2. Approves the exceptions to the Ocean Plan prohibition against waste discharges to ASBS for discharges of storm water and nonpoint source waste by the applicants listed in Attachment A to this resolution provided that:

    a. The discharges are covered under an appropriate authorization to discharge waste to the ASBS, such as an NPDES permit and/or waste discharge requirements;
    b. The authorization incorporates all of the Special Protections, contained in Attachment B to this resolution, which are applicable to the discharge; and
    c. Only storm water and nonpoint source waste discharges by the applicants listed in Attachment A to this resolution are covered by this resolution. All other waste discharges to ASBS are prohibited, unless they are covered by a separate, applicable Ocean Plan exception.

3. Authorizes the Executive Director or designee to file the Notice of Determination with the Governor's Office of Planning and Research.

4. Authorizes the Executive Director or designee to transmit the exceptions to the United States Environmental Agency (U.S. EPA) for concurrence.

5. Directs staff to consider development of, and make recommendations for, an Ocean Plan amendment to address storm runoff into ASBS, during the next triennial review period.

6. Directs staff to propose for Board consideration up to $1 million from the Proposition 50 Coastal Nonpoint Source (CNPS) program for additional ASBS Regional Monitoring, starting in the fall of 2012.

Attachment A – Applicants

Applicant	ASBS
Carmel by the Sea, City of	Carmel Bay
Connolly-Pacific Company	Southeast Santa Catalina Island
Department of Parks and Recreation	Redwoods National Park, Trinidad Head, King Range, Jughandle Cove, Gerstle Cove, James V. Fitzgerald, Año Nuevo, Carmel Bay, Point Lobos, Julia Pfeiffer Burns, Laguna Point to Latigo Point, Irvine Coast
Department of Transportation (CalTrans)	Redwoods National Park, Saunders Reef,James V. Fitzgerald, Año Nuevo, Carmel Bay, Point Lobos, Julia Pfeiffer Burns, Salmon Creek Coast, Laguna Point to Latigo Point, Irvine Coast
Humboldt County	King Range
Humboldt Bay Harbor District	King Range
Irvine Company	Irvine Coast
Laguna Beach, City of	Heisler Park
Los Angeles County	Laguna Point to Latigo Point
Los Angeles County Flood Control District	Laguna Point to Latigo Point
Malibu, City of	Laguna Point to Latigo Point
Marin County	Duxbury Reef
Monterey, City of	Pacific Grove
Monterey, County of	Carmel Bay
Newport Beach, City of, and on behalf of the Pelican Point Homeowners	Robert E. Badham And Irvine Coast
Pacific Grove, City of	Pacific Grove
Pebble Beach Company, and on behalf of the Pebble Beach Stillwater Yacht Club	Carmel Bay
San Diego, City of	La Jolla
San Mateo County	James V. Fitzgerald
Santa Catalina Island Company, and on behalf of the Santa Catalina Island Conservancy	Northwest Santa Catalina Island And Western Santa Catalina Island
Sea Ranch Association	Del Mar Landing
Trinidad, City of	Trinidad Head
Trinidad Rancheria	Trinidad Head
U.S. Dept. of Interior, Point Reyes National Seashore	Point Reyes Headlands, Duxbury Reef
U.S. Dept. of Interior, Redwoods National and State Park	Redwoods National Park
U.S. Dept. of Defense, Air Force	James V. Fitzgerald
U.S. Dept. of Defense, Navy	San Nicolas Island & Begg Rock
U.S. Dept. of Defense, Navy	San Clemente Island

c. The discharge of trash is prohibited.

d. Only discharges from existing storm water outfalls are allowed. Any proposed or new storm water runoff discharge shall be routed to existing storm water discharge outfalls and shall not result in any new contribution of waste to an ASBS (i.e., no additional pollutant loading). "Existing storm water outfalls" are those that were constructed or under construction prior to January 1, 2005. "New contribution of waste" is defined as any addition of waste beyond what would have occurred as of January 1, 2005. A change to an existing storm water outfall, in terms of re-location or alteration, in order to comply with these special conditions, is allowed and does not constitute a new discharge.

e. Non-storm water discharges are prohibited except as provided below:

(1) The term "non-storm water discharges" means any waste discharges from a municipal separate storm sewer system (MS4) or other NPDES permitted storm drain system to an ASBS that are not composed entirely of storm water.

(2) (i) The following non-storm water discharges are allowed, provided that the discharges are essential for emergency response purposes, structural stability, slope stability or occur naturally:

(a) Discharges associated with emergency fire fighting operations.

(b) Foundation and footing drains.

(c) Water from crawl space or basement pumps.

(d) Hillside dewatering.

(e) Naturally occurring groundwater seepage via a storm drain.

(f) Non-anthropogenic flows from a naturally occurring stream via a culvert or storm drain, as long as there are no contributions of anthropogenic runoff.

(ii) An NPDES permitting authority may authorize non-storm water discharges to an MS4 with a direct discharge to an ASBS only to the extent the NPDES permitting authority finds that the discharge does not alter natural ocean water quality in the ASBS.

(3) Authorized non-storm water discharges shall not cause or contribute to a violation of the water quality objectives in Chapter II of the Ocean Plan nor alter natural ocean water quality in an ASBS.

2. Compliance Plans for Inclusion in Storm Water Management Plans (SWMP) and Storm Water Pollution Prevention Plans (SWPPP).

The discharger shall specifically address the prohibition of non-storm water runoff and the requirement to maintain natural water quality for storm water discharges to an ASBS in an ASBS Compliance Plan to be included in its SWMP or a SWPPP, as appropriate to permit type. If a statewide permit includes a SWMP, then the discharger shall prepare a stand-alone

(2) A 90% reduction in pollutant loading during storm events, for the applicant's total discharges.

The baseline for these determinations is the effective date of the Exception, except for those structural BMPs installed between January 1, 2005 and adoption of these Special Protections, and the reductions must be achieved and documented within four (4) years of the effective date.

e. The ASBS Compliance Plan shall address erosion control and the prevention of anthropogenic sedimentation in ASBS. The natural habitat conditions in the ASBS shall not be altered as a result of anthropogenic sedimentation.

f. The ASBS Compliance Plan shall describe the non-structural BMPs currently employed and planned in the future (including those for construction activities), and include an implementation schedule. The ASBS Compliance Plan shall include non-structural BMPs that address public education and outreach. Education and outreach efforts must adequately inform the public that direct discharges of pollutants from private property not entering an MS4 are prohibited. The ASBS Compliance Plan shall also describe the structural BMPs, including any low impact development (LID) measures, currently employed and planned for higher threat discharges and include an implementation schedule. To control storm water runoff discharges (at the end-of-pipe) during a design storm, permittees must first consider, and use where feasible, LID practices to infiltrate, use, or evapotranspirate storm water runoff on-site, if LID practices would be the most effective at reducing pollutants from entering the ASBS.

g. The BMPs and implementation schedule shall be designed to ensure that natural water quality conditions in the receiving water are achieved and maintained by either reducing flows from impervious surfaces or reducing pollutant loading, or some combination thereof.

h. If the results of the receiving water monitoring described in IV.B. of these special conditions indicate that the storm water runoff is causing or contributing to an alteration of natural ocean water quality in the ASBS, the discharger shall submit a report to the State Water Board and Regional Water Board within 30 days of receiving the results.

(1) The report shall identify the constituents in storm water runoff that alter natural ocean water quality and the sources of these constituents.

(2) The report shall describe BMPs that are currently being implemented, BMPs that are identified in the SWMP or SWPPP for future implementation, and any additional BMPs that may be added to the SWMP or SWPPP to address the alteration of natural water quality. The report shall include a new or modified implementation schedule for the BMPs.

(3) Within 30 days of the approval of the report by the State Water Board Executive Director (statewide permits) or Regional Water Board Executive Officer (Regional Water Board permits), the discharger shall revise its ASBS Compliance Plan to incorporate any new or modified BMPs that have been or will be implemented, the implementation schedule, and any additional monitoring required.

the reason for the noncompliance or anticipated noncompliance and specifically refer to this Section of this Exception. It shall describe the anticipated length of time the delay in compliance may persist, the cause or causes of the delay as well as measures to minimize the impact of the delay on water quality, the measures taken or to be taken by the discharger to prevent or minimize the delay, the schedule by which the measures will be implemented, and the anticipated date of compliance. The discharger shall adopt all reasonable measures to avoid and minimize such delays and their impact on water quality.

The discharger may request an extension of time for compliance based on lack of funding. The request for an extension shall require:

1. for municipalities, a demonstration of significant hardship to discharger ratepayers, by showing the relationship of storm water fees to annual household income for residents within the discharger's jurisdictional area, and the discharger has made timely and complete applications for all available bond and grant funding, and either no bond or grant funding is available, or bond and/or grant funding is inadequate; or

2. for other governmental agencies, a demonstration and documentation of a good faith effort to acquire funding through that agency's budgetary process, and a demonstration that funding was unavailable or inadequate.

B. NONPOINT SOURCE DISCHARGES

1. General Provisions for Nonpoint Sources

   a. Existing nonpoint source waste discharges are allowed into an ASBS only under the following conditions:

      (1) The discharges are authorized under waste discharge requirements, a conditional waiver of waste discharge requirements, or a conditional prohibition issued by the State Water Board or a Regional Water Board.

      (2) The discharges are in compliance with the applicable terms, prohibitions, and special conditions contained in these Special Protections.

      (3) The discharges:

         (i) Are essential for flood control or slope stability, including roof, landscape, road, and parking lot drainage;

         (ii) Are designed to prevent soil erosion;

         (iii) Occur only during wet weather;

         (iv) Are composed of only storm water runoff.

   b. Discharges composed of storm water runoff shall not alter natural ocean water quality in an ASBS.

h. All other nonpoint source discharges not specifically authorized above are prohibited.

2. Planning and Reporting

a. The nonpoint source discharger shall develop an ASBS Pollution Prevention Plan, including an implementation schedule, to address storm water runoff and any other nonpoint source discharges from its facilities. The ASBS Pollution Prevention Plan must be equivalent in contents to an ASBS Compliance Plan as described in I (A)(2) in this document. The ASBS Pollution Prevention Plan is subject to approval by the Executive Director of the State Water Board (statewide waivers or waste discharge requirements) or Executive Officer of the Regional Water Board (Regional Water Board waivers or waste discharge requirements).

b. The ASBS Pollution Prevention Plan shall address storm water discharges (wet weather flows) and, in particular, describe how pollutant reductions in storm water runoff that are necessary to comply with these special conditions, will be achieved through Management Measures and associated Management Practices (Management Measures/Practices). Structural BMPs need not be installed if the discharger can document to the satisfaction of the State Water Board Executive Director or Regional Water Board Executive Officer that such installation would pose a threat to health or safety. Management Measures to control storm water runoff during a design storm shall achieve on average the following target levels:

(1) Table B Instantaneous Maximum Water Quality Objectives in Chapter II of the Ocean Plan; or

(2) A 90% reduction in pollutant loading during storm events, for the applicant's total discharges.

The baseline for these determinations is the effective date of the Exception, except for those structural BMPs installed between January 1, 2005 and adoption of these Special Protections, and the reductions must be achieved and documented within four (4) years of the effective date.

c. If the results of the receiving water monitoring described in IV.B. of these special conditions indicate that the storm water runoff or other nonpoint source pollution is causing or contributing to an alteration of natural ocean water quality in the ASBS, the discharger shall submit a report to the State Water Board and the Regional Water Board within 30 days of receiving the results.

(1) The report shall identify the constituents that alter natural water quality and the sources of these constituents.

(2) The report shall describe Management Measures/Practices that are currently being implemented, Management Measures/Practices that are identified in the ASBS Pollution Prevention Plan for future implementation, and any additional Management Measures/Practices that may be added to the Pollution Prevention Plan to address the alteration of natural water quality. The report shall include a new or modified implementation schedule for the Management Measures/Practices.

f. The Executive Director of the State Water Board (statewide waivers or waste discharge requirements) or Executive Officer of the Regional Water Board (Regional Water Board waivers or waste discharge requirements) may only authorize additional time to comply with the special conditions d. and e., above if good cause exists to do so. Good cause means a physical impossibility or lack of funding.

If a discharger claims physical impossibility, it shall notify the Board in writing within thirty (30) days of the date that the discharger first knew of the event or circumstance that caused or would cause it to fail to meet the deadline in d. or e. The notice shall describe the reason for the noncompliance or anticipated noncompliance and specifically refer to this Section of this Exception. It shall describe the anticipated length of time the delay in compliance may persist, the cause or causes of the delay as well as measures to minimize the impact of the delay on water quality, the measures taken or to be taken by the discharger to prevent or minimize the delay, the schedule by which the measures will be implemented, and the anticipated date of compliance. The discharger shall adopt all reasonable measures to avoid and minimize such delays and their impact on water quality.

The discharger may request an extension of time for compliance based on lack of funding. The request for an extension shall require:

1. a demonstration that the discharger has made timely and complete applications for all available bond and grant funding, and either no bond or grant funding is available, or bond and/or grant funding is inadequate; or

2. for governmental agencies, a demonstration and documentation of a good faith effort to acquire funding through that agency's budgetary process, and a demonstration that funding was unavailable or inadequate.

II. ADDITIONAL REQUIREMENTS FOR PARKS AND RECREATION FACILITIES

In addition to the provisions in Section I (A) or I (B), respectively, a discharger with parks and recreation facilities shall comply with the following:

A. The discharger shall include a section in an ASBS Compliance Plan (for NPDES dischargers) or an ASBS Pollution Prevention Plan (for nonpoint source dischargers) to address storm water runoff from parks and recreation facilities.

1. The plan shall identify all pollutant sources, including sediment sources, which may result in waste entering storm water runoff. Pollutant sources include, but are not limited to, roadside rest areas and vistas, picnic areas, campgrounds, trash receptacles, maintenance facilities, park personnel housing, portable toilets, leach fields, fuel tanks, roads, piers, and boat launch facilities.

2. The plan shall describe BMPs or Management Measures/Practices that will be implemented to control soil erosion (both temporary and permanent erosion controls) and reduce or eliminate pollutants in storm water runoff in order to achieve and maintain natural water quality conditions in the affected ASBS. The plan shall include BMPs or

2. For discharges from marinas and recreational boating activities, the Waterfront Plan shall include appropriate Management Measures, described in The Plan for California's Nonpoint Source Pollution Control Program, for marinas and recreational boating, or equivalent practices, to ensure that nonpoint source pollutant discharges do not alter natural water quality in the affected ASBS.

3. The Waterfront Plan shall include Management Practices to address public education and outreach to ensure that the public is adequately informed that waste discharges to the affected ASBS are prohibited or limited by special conditions in these Special Protections. The management practices shall include appropriate signage, or similar measures, to inform the public of the ASBS restrictions and to identify the ASBS boundaries.

4. The Waterfront Plan shall include Management Practices to address the prohibition against trash discharges to ASBS. The Management Practices shall include the provision of adequate trash receptacles for marine recreation areas, including parking areas, launch ramps, and docks. The plan shall also include appropriate Management Practices to ensure that the receptacles are adequately maintained and secured in order to prevent trash discharges into the ASBS. Appropriate Management Practices include covering the trash receptacles to prevent trash from being windblown, staking or securing the trash receptacles so they don't tip over, and periodically emptying the receptacles to prevent overflow.

5. The discharger shall submit its Waterfront Plan to the by the State Water Board Executive Director (statewide waivers or waste discharge requirements) or Executive Officer of the Regional Water Board (Regional Water Board waivers or waste discharge requirements) within six months of the effective date of these special conditions. The Waterfront Plan is subject to approval by the State Water Board Executive Director or the Regional Water Board Executive Officer, as appropriate. The plan must be fully implemented within 18 months of the effective date of the Exception.

B. The discharge of chlorine, soaps, petroleum, other chemical contaminants, trash, fish offal, or human sewage to ASBS is prohibited. Sinks and fish cleaning stations are point source discharges of wastes and are prohibited from discharging into ASBS. Anthropogenic accumulations of discarded fouling organisms on the sea floor must be minimized.

C. Limited-term activities, such as the repair, renovation, or maintenance of waterfront facilities, including, but not limited to, piers, docks, moorings, and breakwaters, are authorized only in accordance with Chapter III.E.2 of the Ocean Plan.

D. If the discharger anticipates that the discharger will fail to fully implement the approved Waterfront Plan within the 18 month deadline, the discharger shall submit a technical report as soon as practicable to the State Water Board Executive Director or the Regional Water Board Executive Officer, as appropriate. The technical report shall contain reasons for failing to meet the deadline and propose a revised schedule to fully implement the plan.

E. The State Water Board or the Regional Water Board may, for good cause, authorize additional time to comply with the Waterfront Plan. Good cause means a physical impossibility or lack of funding.

storm receiving water is sampled, and analyzed for the same constituents as receiving water and reference site samples (see section IV B) as described below.

2. Runoff flow measurements

   a. For municipal/industrial storm water outfalls in existence as of December 31, 2007, 18 inches (457mm) or greater in diameter/width (including multiple outfall pipes in combination having a width of 18 inches, runoff flows must be measured or calculated, using a method acceptable to and approved by the State and Regional Water Boards.

   b. This will be reported annually for each precipitation season to the State and Regional Water Boards.

3. Runoff samples – storm events

   a. For outfalls equal to or greater than 18 inches (0.46m) in diameter or width:

      (1) samples of storm water runoff shall be collected during the same storm as receiving water samples and analyzed for oil and grease, total suspended solids, and, within the range of the southern sea otter indicator bacteria or some other measure of fecal contamination; and

      (2) samples of storm water runoff shall be collected and analyzed for critical life stage chronic toxicity (one invertebrate or algal species) at least once during each storm season when receiving water is sampled in the ASBS.

      (3) If an applicant has no outfall greater than 36 inches, then storm water runoff from the applicant's largest outfall shall be further collected during the same storm as receiving water samples and analyzed for Ocean Plan Table B metals for protection of marine life, Ocean Plan polynuclear aromatic hydrocarbons (PAHs), current use pesticides (pyrethroids and OP pesticides), and nutrients (ammonia, nitrate and phosphates).

   b. For outfalls equal to or greater than 36 inches (0.91m) in diameter or width:

      (1) samples of storm water runoff shall be collected during the same storm as receiving water samples and analyzed for oil and grease, total suspended solids, and, within the range of the southern sea otter indicator bacteria or some other measure of fecal contamination; and

      (2) samples of storm water runoff shall be further collected during the same storm as receiving water samples and analyzed for Ocean Plan Table B metals for protection of marine life, Ocean Plan polynuclear aromatic hydrocarbons (PAHs), current use pesticides (pyrethroids and OP pesticides), and nutrients (ammonia, nitrate and phosphates); and

      (3) samples of storm water runoff shall be collected and analyzed for critical life stage chronic toxicity (one invertebrate or algal species) at least once during each storm season when receiving water is sampled in the ASBS.

pyrethroids, and OP pesticides. For sediment toxicity testing, only an acute toxicity test using the amphipod *Eohaustorius estuarius* must be performed.

c. A quantitative survey of intertidal benthic marine life shall be performed at the discharge and at a reference site. The survey shall be performed at least once every five (5) year period. The survey design is subject to approval by the Regional Water Board and the State Water Board's Division of Water Quality. The results of the survey shall be completed and submitted to the State Water Board and Regional Water Board at least six months prior to the end of the permit cycle.

d. Once during each five (5) year period, a bioaccumulation study shall be conducted to determine the concentrations of metals and synthetic organic pollutants at representative discharge sites and at representative reference sites. The study design is subject to approval by the Regional Water Board and the State Water Board's Division of Water Quality. The bioaccumulation study may include California mussels (*Mytilus californianus*) and/or sand crabs (*Emerita analoga* or *Blepharipoda occidentalis*). Based on the study results, the Regional Water Board and the State Water Board's Division of Water Quality, may adjust the study design in subsequent permits, or add or modify additional test organisms (such as shore crabs or fish), or modify the study design appropriate for the area and best available sensitive measures of contaminant exposure.

e. Marine Debris: Representative quantitative observations for trash by type and source shall be performed along the coast of the ASBS within the influence of the discharger's outfalls. The design, including locations and frequency, of the marine debris observations is subject to approval by the Regional Water Board and State Water Board's Division of Water Quality.

f. The monitoring requirements of the Individual Monitoring Program in this section are minimum requirements. After a minimum of one (1) year of continuous water quality monitoring of the discharges and ocean receiving waters, the Executive Director of the State Water Board (statewide permits) or Executive Officer of the Regional Water Board (Regional Water Board permits) may require additional monitoring, or adjust, reduce or suspend receiving water and reference station monitoring. This determination may be made at any point after the discharge and receiving water is fully characterized, but is best made after the monitoring results from the first permit cycle are assessed.

2. Regional Integrated Monitoring Program: Dischargers may elect to participate in a regional integrated monitoring program, in lieu of an individual monitoring program, to fulfill the requirements for monitoring the physical, chemical, and biological characteristics of the ocean receiving waters within their ASBS. This regional approach shall characterize natural water quality, pre- and post-storm, in ocean reference areas near the mouths of identified open space watersheds and the effects of the discharges on natural water quality (physical, chemical, and toxicity) in the ASBS receiving waters, and should include benthic marine aquatic life and bioaccumulation components. The design of the ASBS stratum of a regional integrated monitoring program may deviate from the otherwise prescribed individual monitoring approach (in Section IV.B.1) if approved by the State Water Board's Division of Water Quality and the Regional Water Boards.

   a. Ocean reference areas shall be located at the drainages of flowing watersheds with minimal development (in no instance more than 10% development), and shall not be located in CWA Section 303(d) listed waterbodies or have tributaries that are 303(d)

(1) For mooring field operators opting for an individual monitoring program (Section IV.B.1 above), this sampling must occur weekly (on the weekend) from May through October.

(2) For mooring field operators opting to participate in a regional integrated monitoring program (Section IV.B.2 above), this sampling must occur monthly from May through October on a high use weekend in each month. The Water Boards may allow a reduction in the frequency of sampling, through the regional monitoring program, after the first year of monitoring.

b. For all mooring field operators, the subtidal sediment (sand or finer, if present) within mooring fields and below piers shall be sampled and analyzed for Ocean Plan Table B metals (for marine aquatic life beneficial use), acute toxicity, PAHs, and tributyltin. For sediment toxicity testing, only an acute toxicity test using the amphipod *Eohaustorius estuarius* must be performed. This sampling shall occur at least three times during a five (5) year period. For mooring field operators opting to participate in a regional integrated monitoring program, the Water Boards may allow a reduction in the frequency of sampling after the first sampling effort's results are assessed.

Municipal Separate Storm Sewer System (MS4) – A municipally-owned storm sewer system regulated under the Phase I or Phase II storm water program implemented in compliance with Clean Water Act section 402(p). Note that an MS4 program's boundaries are not necessarily congruent with the permittee's political boundaries.

Natural Ocean Water Quality - The water quality (based on selected physical, chemical and biological characteristics) that is required to sustain marine ecosystems, and which is without apparent human influence, *i.e.*, an absence of significant amounts of: (a) man-made constituents (*e.g.,* DDT); (b) other chemical (*e.g.,* trace metals), physical (temperature/thermal pollution, sediment burial), and biological (*e.g.*, bacteria) constituents at concentrations that have been elevated due to man's activities above those resulting from the naturally occurring processes that affect the area in question; and (c) non-indigenous biota (*e.g.,* invasive algal bloom species) that have been introduced either deliberately or accidentally by man. Discharges "*shall not alter natural ocean water quality*" as determined by a comparison to the range of constituent concentrations in reference areas agreed upon via the regional monitoring program(s). If monitoring information indicates that *natural ocean water quality* is not maintained, but there is sufficient evidence that a discharge is not contributing to the alteration of natural water quality, then the Regional Water Board may make that determination. In this case, sufficient information must include runoff sample data that has equal or lower concentrations for the range of constituents at the applicable reference area(s).

Nonpoint source – Nonpoint pollution sources generally are sources that do not meet the definition of a point source. Nonpoint source pollution typically results from land runoff, precipitation, atmospheric deposition, agricultural drainage, marine/boating operations or hydrologic modification. Nonpoint sources, for purposes of these Special Protections, include discharges that are not required to be regulated under an NPDES permit.

Non-storm water discharge – Any runoff that is not the result of a precipitation event. This is often referred to as "dry weather flow."

Non-structural control – A Best Management Practice that involves operational, maintenance, regulatory (e.g., ordinances) or educational activities designed to reduce or eliminate pollutants in runoff, and that are not structural controls (i.e. there are no physical structures involved).

Physical impossibility - Means any act of God, war, fire, earthquake, windstorm, flood or natural catastrophe; unexpected and unintended accidents not caused by discharger or its employees' negligence; civil disturbance, vandalism, sabotage or terrorism; restrain by court order or public authority or agency; or action or non-action by, or inability to obtain the necessary authorizations or approvals from any governmental agency other than the permittee.

Representative sites and monitoring procedures – Are to be proposed by the discharger, with appropriate rationale, and subject to approval by Water Board staff.

Sheet-flow – Runoff that flows across land surfaces at a shallow depth relative to the cross-sectional width of the flow. These types of flow may or may not enter a storm drain system before discharge to receiving waters.

Appendix C

NRDC SETTLEMENT CIVIL CASE NO. CV-08-01465

LAWYERS FOR CLEAN WATER, INC.
Daniel Cooper (Bar No. 153576)
daniel@lawyersforcleanwater.com
Caroline Koch (Bar No. 266068)
caroline@lawyersforcleanwater.com
1004A O'Reilly Avenue
San Francisco, California 94129
Tel: (415) 440-6520
Fax: (415) 440-4155
Counsel for Plaintiff Santa Monica Baykeeper

NATURAL RESOURCES DEFENSE COUNCIL
Steve Fleischli (Bar No. 175174)
sfleischli@nrdc.org
1152 15th Street NW, Suite 300
Washington D.C. 20005
Tel: (202) 289-6868
Fax: (202) 289-1060
Counsel for Plaintiff Natural Resources Defense Council

Additional Counsel of Record Listed On Next Page

UNITED STATES DISTRICT COURT
CENTRAL DISTRICT OF CALIFORNIA

SANTA MONICA BAYKEEPER and NATURAL RESOURCES DEFENSE COUNCIL,

Plaintiffs,

v.

CITY OF MALIBU,

Defendant.

Case No.: CV 08-1465-AHM (PLAx)

STIPULATION and SETTLEMENT AGREEMENT

Hon. A. Howard Matz

Plaintiffs Santa Monica Baykeeper ("Baykeeper") and Natural Resources Defense Council ("NRDC") (collectively "Plaintiffs") and Defendant City of Malibu ("Defendant" or "City" or "Malibu"), by and through their attorneys of record, hereby enter into this Stipulation and Settlement Agreement.

WHEREAS, Plaintiffs and Defendant (the "Parties") have entered into a settlement agreement ("Settlement Agreement" or "Agreement") that achieves a full and final settlement of all of Plaintiffs' claims against Defendant as set forth in Civil Case No. CV 08-1465-AHM (PLAx) ("Complaint");

WHEREAS, a copy of the Settlement Agreement is incorporated herein and attached as Exhibit A to this Stipulation;

WHEREAS, the Parties submit concurrently herewith a [Proposed] Order Granting Stipulation and Settlement Agreement;

NOW THEREFORE, the Parties jointly stipulate as follows:

1. All claims alleged in Plaintiffs' Complaint against Defendant as set forth in Civil Case No. CV 08-1465-AHM (PLAx) are hereby dismissed with prejudice.

2. The Parties respectfully request that the Honorable A. Howard Matz retain jurisdiction over Civil Case No. CV 08-1465-AHM (PLAx) for the purpose of resolving any disputes between the Parties with respect to enforcement of any provision of the terms of the Settlement Agreement.

Dated: April 13, 2012

LAWYERS FOR CLEAN WATER, INC.

By: 

Daniel Cooper
Attorney for Santa Monica Baykeeper

EXHIBIT A

SETTLEMENT AGREEMENT

The following Settlement Agreement is entered into by and between Plaintiffs Santa Monica Baykeeper ("Baykeeper") and Natural Resources Defense Council ("NRDC") (collectively "Plaintiffs") and Defendant City of Malibu ("Defendant" or "City" or "Malibu"). The entities entering into this Settlement Agreement are each an individual "Party" and collectively "Parties."

WHEREAS, Plaintiffs mailed via certified mail to Defendant, with copies to, *inter alia*, the United States Environmental Protection Agency ("EPA"), EPA Region IX, the State Water Resources Control Board ("State Board") and the Regional Water Quality Control Board ("Regional Board"), notices of intent to file suit ("60-Day Notices") under Sections 505(a) and (b) of the Act, 33 U.S.C. § 1365(a) and (b). The 60-Day Notices alleged that the City had in the past violated and continued to violate Sections 301(a) and 402 of the Clean Water Act, 33 U.S.C. §§ 1311(a) and 1342, by discharging pollutants into receiving waters, including Malibu Creek and Lagoon and the Mugu to Latigo ASBS, in violation of National Pollutant Discharge Elimination System ("NPDES") Permit No. CAS004001 Regional Board Order No. 01-182;

WHEREAS, on March 3, 2008, Plaintiffs filed a complaint ("Complaint") against Defendant in the United States District Court, Central District of California (Civil Case No. CV-08-01465 AHM (PLAx)) entitled *Santa Monica Baykeeper v. City of Malibu* ("Litigation");

WHEREAS, on January 15, 2009, Plaintiffs filed a First Amended Complaint against Defendant;

WHEREAS, Defendant denies all allegations of the 60-Day Notice Letters, the Complaint, and the First Amended Complaint in the Litigation;

Exhibit 2 and identified as: SAD800-1 and those drop inlets identified by Malibu pursuant to Exhibit 3 (the "Monitoring Program") incorporated herein by reference;

d. "ASBS Exception" means General Exception to the California Ocean Plan Waste Discharge Prohibition for Selected Dischargers into Areas of Special Biological Significance adopted by the State Board on March 20, 2012, State Board Resolution No. 2012-XXXX.

e. "Basin Plan" means the current version of the Water Quality Control Plan, Los Angeles Region, Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties and any amendments thereto;

f. "City" means the City of Malibu;

g. "Civic Center Area Drains" means those storm drain pipes listed on Exhibit 1 and shown on Exhibit 2, and identified by the Parties as: (1) Malibu Road Drain, (2) Civic Center Drain, (3) Texaco 1, (4) Texaco 2, and (5) Texaco Small;

h. "Civic Center SWTF" means the Storm Water Treatment Facility located on the northwest corner of Cross Creek Road and Civic Center Way;

i. "Daily sampling" means sampling conducted seven days per week at receiving water sampling locations specified by the Malibu Creek Bacteria TMDL, the SMBBB Dry Weather TMDL, and/or the SMBBB Wet Weather TMDL;

j. "FIB" means fecal indicator bacteria or coliform as set forth in the Basin Plan;

k. "Legacy Park" means Legacy Park stormwater treatment and detention facility;

r. "Non-ASBS Drop Inlets" means those drop inlets (also called storm drain inlets) associated with the Non-ASBS Drains shown as target symbols on Exhibit 2 and identified by the Parties as: (1) S2D210-1, and (2) S3D153-1;

s. "Serra Retreat" means the residential area in the northeast corner of Malibu bordering the eastern shore of Malibu Creek;

t. "Settlement Agreement" means this Settlement Agreement, and any exhibits incorporated by reference to this Settlement Agreement;

u. "SMBBB TMDL" means Los Angeles Regional Water Quality Control Board Resolution No. 02-004, Attachment A, Santa Monica Bay Beaches Bacteria Dry Weather Total Maximum Daily Load and Los Angeles Regional Water Quality Control Board Resolution No. 2002-022, Attachment A, Santa Monica Bay Beaches Bacteria Wet Weather Total Maximum Daily Load or the TMDL(s) for bacteria currently applicable to Santa Monica Bay;

v. "TMDL Monitoring Frequency" means the frequency of monitoring required to comply with the Malibu Creek Bacteria TMDL or the SMBBB TMDL. Monitoring frequency can be either Weekly sampling or Daily sampling;

w. "Waste Load Allocation" means the allowable number of days that the applicable Water Quality Standards for FIB may be exceeded under the Malibu Creek Bacteria TMDL and the SMBBB TMDL. The allowable number of days applicable Water Quality Standards for FIB may be exceeded is determined by the TMDL Monitoring Frequency;

x. "Water Quality Standards" for purposes of this Agreement means the water quality criteria contained in the Basin Plan for FIB.

set forth in the applicable Malibu Creek Bacteria TMDL are determined according to the TMDL Monitoring Frequency.

7. Malibu shall demonstrate compliance with the obligations in paragraphs 4, 5, and 6 as provided in the Monitoring Program.

8. Malibu shall submit the results of the samples collected pursuant to paragraph 7 to Plaintiffs as set forth in paragraphs 28, 29, and 30 for the life of this Settlement Agreement.

B. Serra Retreat

9. Malibu shall facilitate implementation of the LID Principles appropriate for the represented land uses, topography, and soils in the Serra Retreat area to control discharges of animal waste from Serra Retreat to Malibu Creek and Lagoon with the objective of full compliance with the Malibu Creek Bacteria TMDL or the then applicable total maximum daily load for Malibu Creek and Lagoon.

10. Malibu shall submit to Plaintiffs within ninety (90) days of the Effective Date of this Settlement Agreement an implementation plan describing in detail the LID Principles to be proposed in the Serra Retreat area and measures to facilitate their implementation that are designed to achieve compliance with the objective in paragraph 9. In developing the implementation plan required under this paragraph, Malibu shall consider implementation measures including code enforcement, use of public land, grant funding, or other options.

11. Plaintiffs may submit comments, if any, on the implementation plan required under paragraph 10 to Malibu within thirty (30) days of receipt. Malibu shall respond in writing to Plaintiffs' comments, if any, on the implementation plan, and begin implementation of the specific LID Principles and measures identified therein within thirty (30) days of Malibu's receipt of Plaintiffs' comments or of the date such comments were due if none were provided.

performance' of BMPs" in the Monitoring Program. Any determination that disinfection is required to meet the Waste Load Allocations at the Non-ASBS Drains, as provided in this paragraph, shall, in any event, be made no later than four (4) years from the Effective Date of this Settlement Agreement.

18. Malibu shall demonstrate compliance with the obligations in paragraphs 16 and 17 as provided in the Monitoring Program.

19. Malibu shall submit the results of the samples collected pursuant to paragraph 18 to Plaintiffs as set forth in paragraphs 28, 29, and 30 for the life of this Settlement Agreement.

D. <u>ASBS Drains</u>

i. Non-Storm Water Discharges

20. Malibu shall eliminate non-exempt (as defined in the ASBS Exception) non-storm water discharges to the ASBS Drop Inlets shown on Exhibit 2 consistent with the ASBS Exception within ninety (90) days of the Effective Date of this Settlement Agreement.

21. Malibu shall demonstrate compliance with the obligations in paragraph 20 as provided in the Monitoring Program.

22. Malibu shall submit a report to Plaintiffs demonstrating compliance with the obligation in paragraph 20 within one hundred and twenty (120) days of the Effective Date of this Settlement Agreement.

23. Malibu shall submit the results of sensor or flow meter monitoring required under paragraph 21 to Plaintiffs as set forth in paragraphs 28, 29, and 30 for the life of this Settlement Agreement.

ii. Storm Water Discharges

24. Malibu shall apply the LID Principles appropriate for the represented land uses, topography, and soils in the drainage area tributary to the ASBS Drop Inlets shown on Exhibit 2 within the municipal boundaries of the City.

currently allocated. Defendant shall fund the project within sixty (60) days of the Effective Date of this Settlement Agreement.

32. Plaintiffs' Fees and Costs. Defendant shall pay Plaintiffs the sum of $750,000.00, which shall constitute settlement for all attorneys' and witness fees and other costs of litigation incurred by Plaintiffs that have or could have been claimed in connection with or arising out of this Litigation, and Plaintiffs hereby waive any other claims for recovery arising out of this Litigation up to and including the Effective Date this Settlement Agreement. The payment shall be made within ten (10) days of the Effective Date of this Settlement Agreement. The payment shall be made in the form of a check payable to "Lawyers for Clean Water Attorney Client Trust Account" addressed to: 1004-A O'Reilly Avenue, San Francisco, California 94129, sent overnight delivery.

33. Review of Settlement Agreement and Notice to the Court. Plaintiffs shall submit a copy of this Settlement Agreement to EPA and the United States Department of Justice ("DOJ") within three (3) days of its execution for agency review. In the event that EPA or DOJ comment negatively on the provisions of this Settlement Agreement, the Parties agree to meet and confer to attempt to resolve the issue(s) raised by EPA or DOJ.

34. Within three (3) days of execution of this Settlement Agreement by the Parties, Plaintiffs shall notify the Court of the Parties' settlement pending the review of the Settlement Agreement by DOJ and EPA. Following the DOJ and EPA review period (and after the completion of the meet and confer process referred to in the preceding paragraph, if any), Plaintiffs will thereafter promptly request the Court to enter this Settlement Agreement and dismiss the case with prejudice.

G. Dispute Resolution and Force Majeure

35. Meet and Confer. Prior to making a motion, a Party to this Settlement Agreement shall invoke the dispute resolution procedures of this Section by notifying all other Parties in writing of the matter(s) in dispute and of the Party's intention to resolve

39. If a Party claims Force Majeure or impossibility, it will notify the other Parties in writing within forty-five (45) days of the date that the claiming Party first knew of the event or circumstance that caused or would cause a delay in compliance with this Settlement Agreement, or the date that Party should have known of the event or circumstance by the exercise of due diligence. The notice will describe the reason for the anticipated nonperformance and specifically refer to this Section of this Settlement Agreement. The notice will describe the anticipated length of time the delay may persist, the cause or causes of the delay, the measures taken or to be taken by the Party to prevent or minimize the delay, the schedule by which the measures will be implemented, and the anticipated date of compliance. Each Party will adopt all reasonable measures to avoid and minimize such delays. If any Party disagrees with the claiming Party's notice or the explanation of Force Majeure or impossibility contained therein, or in the event that the Parties cannot timely agree on the terms of new performance deadlines or requirements, either Plaintiffs or Defendant will have the right to invoke the Dispute Resolution procedures of this Settlement Agreement.

IV. RETENTION OF JURISDICTION AND TERMINATION

40. The Court shall retain jurisdiction over this matter for purposes of interpreting, modifying, or enforcing the terms of this Settlement Agreement, or as long thereafter as is necessary for the Court to resolve any motion to enforce this Settlement Agreement filed within sixty (60) days after the deadlines for completion of the obligations set forth in the Settlement Agreement. Should the Court decline jurisdiction this Agreement is null and void.

41. With respect to Civic Center Area Drains, this Settlement Agreement shall terminate four (4) calendar years from the Effective Date of this Settlement Agreement, unless either Party has invoked dispute resolution or other enforcement pursuant to the terms of this Settlement Agreement. Defendant shall submit a report demonstrating full compliance with paragraphs 4, 5, 6, and 7 to Plaintiffs no later than July 16, 2016.

46. Waiver of Civil Code Section 1542. The Parties to this Settlement Agreement acknowledge that they have been advised by legal counsel and are familiar with the provisions of California Civil Code Section 1542, which provides as follows:

> "A general release does not extend to claims which the creditor does not know or suspect to exist in his or her favor at the time of executing this release, which if known by him or her must have materially affected his or her settlement with the debtor."

47. Being aware of this code section, the Parties expressly waive and relinquish all rights and benefits which they may have thereunder as well as under any other statute or common law principle of similar effect. Each Party understands that the facts in respect of which the releases made in this Settlement Agreement are given may hereafter turn out to be other than or different from the facts now believed by each Party to be true; and each Party hereto accepts and assumes the risk of the facts turning out to be different and agrees that this Settlement Agreement shall be and remain in all respects effective and not subject to termination or rescission by virtue of any such difference in facts.

48. Plaintiffs warrant that they have not heretofore assigned or transferred, or purported to assign or transfer, to any party not named herein any Released Claim, or any part or portion thereof. To the Plaintiffs' knowledge, there are no legal actions, suits or similar proceedings pending and served, or threatened in writing against the City that would adversely affect the Parties' ability to consummate the transactions contemplated in this Agreement. To the best of their knowledge, Plaintiffs are not aware of any existing claims nor of any facts that might give rise to any claims of any type or nature against the City pertaining to the Litigation, whether asserted or not, that have not been fully released and discharged by the release set forth in this Agreement.

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Steve Fleischli
Natural Resources Defense Council
1152 15th Street NW, Suite 300
Washington, D.C. 20005

If to Defendant:

James Thorsen
City Manager
City of Malibu
23815 Stuart Ranch Road
Malibu, CA 90265

With copies to:

Christi Hogin
Jenkins & Hogin, LLP
Manhattan Towers
1230 Rosecrans Avenue, Suite 110
Manhattan Beach, CA 90266

54. Communications shall be deemed received three days after the date that they are postmarked and sent by first-class mail or deposited with an overnight mail/delivery service. Any change of address or addresses shall be communicated in the manner described above for giving notices. In addition, the Parties may agree to transmit documents electronically or by facsimile.

55. Effect of Settlement Agreement. Nothing in this Settlement Agreement shall be construed to affect or limit in any way Defendant's obligations to comply with all federal, state, and local laws and regulations governing any activity required by this Settlement Agreement.

56. Counterparts. This Settlement Agreement may be executed in any number of counterparts, all of which together shall constitute one original document. Telecopy

64. The term "Effective Date" shall mean the Effective Date of this Settlement Agreement, which shall be the date on which the District Court enters the [Proposed] Order Granting Stipulation and Settlement Agreement.

The Parties hereby enter into this Settlement Agreement.

Dated: ___ April 2012

CITY OF MALIBU

By: _____

ATTEST:

_____
City Clerk
(Seal)

APPROVED AS TO FORM:

JENKINS & HOGIN, LLP

Dated: ____ April 2012

By: _____
CHRISTI HOGIN (Bar No. 138649)
JENKINS & HOGIN, LLP
Attorney for City of Malibu

SANTA MONICA BAYKEEPER

Dated: April 13, 2012

By: _____
ELIZABETH CROSSON
Executive Director, Santa Monica Baykeeper

64. The term "Effective Date" shall mean the Effective Date of this Settlement Agreement, which shall be the date on which the District Court enters the [Proposed] Order Granting Stipulation and Settlement Agreement.

The Parties hereby enter into this Settlement Agreement.

Dated: ___ April 2012

CITY OF MALIBU

By: Laura Rosenthal

ATTEST:

City Clerk
(Seal)

APPROVED AS TO FORM:

Dated: 13 April 2012

JENKINS & HOGIN, LLP

By: Christi Hogin

CHRISTI HOGIN (Bar No. 138649)
JENKINS & HOGIN, LLP
Attorney for City of Malibu

SANTA MONICA BAYKEEPER

Dated: ___ April 2012

By: _____

ELIZABETH CROSSON
Executive Director, Santa Monica Baykeeper

List of Drains – Coordinates (Latitude and Longitude, decimals) and Proposed Monitoring

		Proposed Project Locations		
	Drain ID/Name	Latitude (decimal)	Longitude (decimal)	Sampling Location?
Civic Center Area Drains				
1	Malibu Road Drain	34.03259	-118.68554	YES
2	Civic Center Drain (Legacy Park)	34.03689	-118.68602	YES
3	Texaco Drain 1	34.03468	-118.68375	YES
4	Texaco Drain 2	34.03468	-118.68375	YES
5	Texaco Small Drain	34.03468	-118.68375	NO
ASBS Drains/Drop Inlets				
6	ASBS Malibu Drain 2	34.03656	-118.86323	rotating
7	ASBS Malibu Drain 3 (SAD 790)	34.03563	-118.85542	rotating
8	ASBS Malibu Drain 4 (SAD 800/MUG223)	34.03551	-118.85477	rotating
9	ASBS Malibu Drain 5 (MUG224)	34.0346	-118.85185	rotating
10	ASBS Malibu Drain 6 (SAD 840/MUG 225)	34.03411	-118.85034	rotating
11	ASBS Malibu Drain 7 (SAD 853)	34.03371	-118.84931	rotating
12	ASBS Malibu Drain 8	34.03269	-118.84681	rotating
13	ASBS Malibu Drain 9 (SAD 900/MUG 232)	34.03231	-118.84603	rotating
14	ASBS Malibu Drain 10 (SAD 910/MUG 233)	34.03200	-118.84550	rotating
15	S1D20 (Wildlife Road)	34.01214	-118.79460	YES
Non-ASBS Drains/Drop Inlets				
16	S2D210 (Marie Canyon)	34.03049	-118.70494	YES
17	S2D153 (Las Flores)	34.03711	-118.63617	YES

Exhibit 2 -- Drain Map

List of Drains – Civic Center Area Drains (Malibu Creek and Lagoon)

CONFIDENTIAL SETTLEMENT COMMUNICATION - PRELIMINARY DRAFT

Geosyntec consultants	April 2012	Malibu Creek and Lagoon Malibu, CA Project No. LA0230

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Exhibit 2 -- Drain Map

ASBS/Wildlife Road

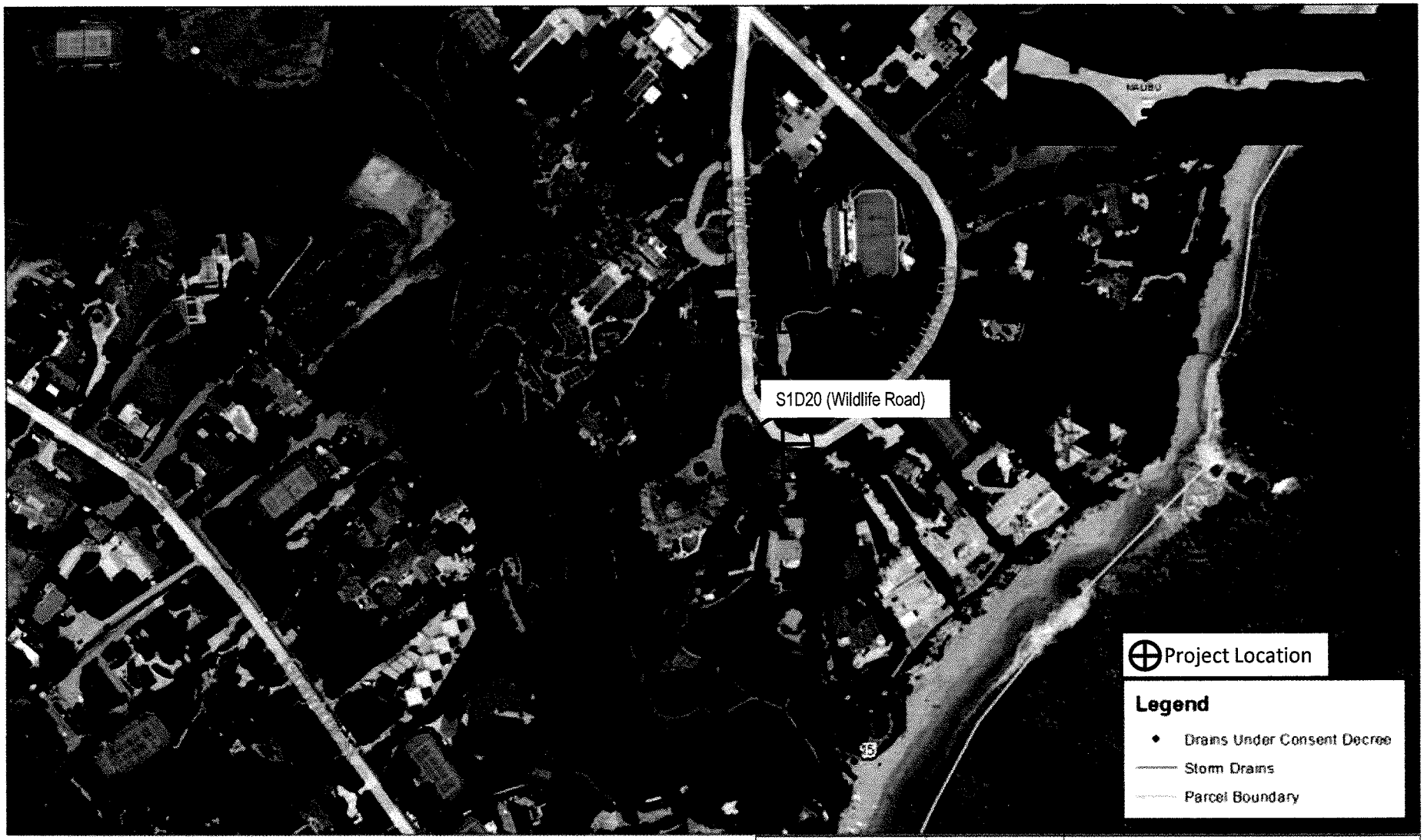

Exhibit 2 -- Drain Map

Las Flores

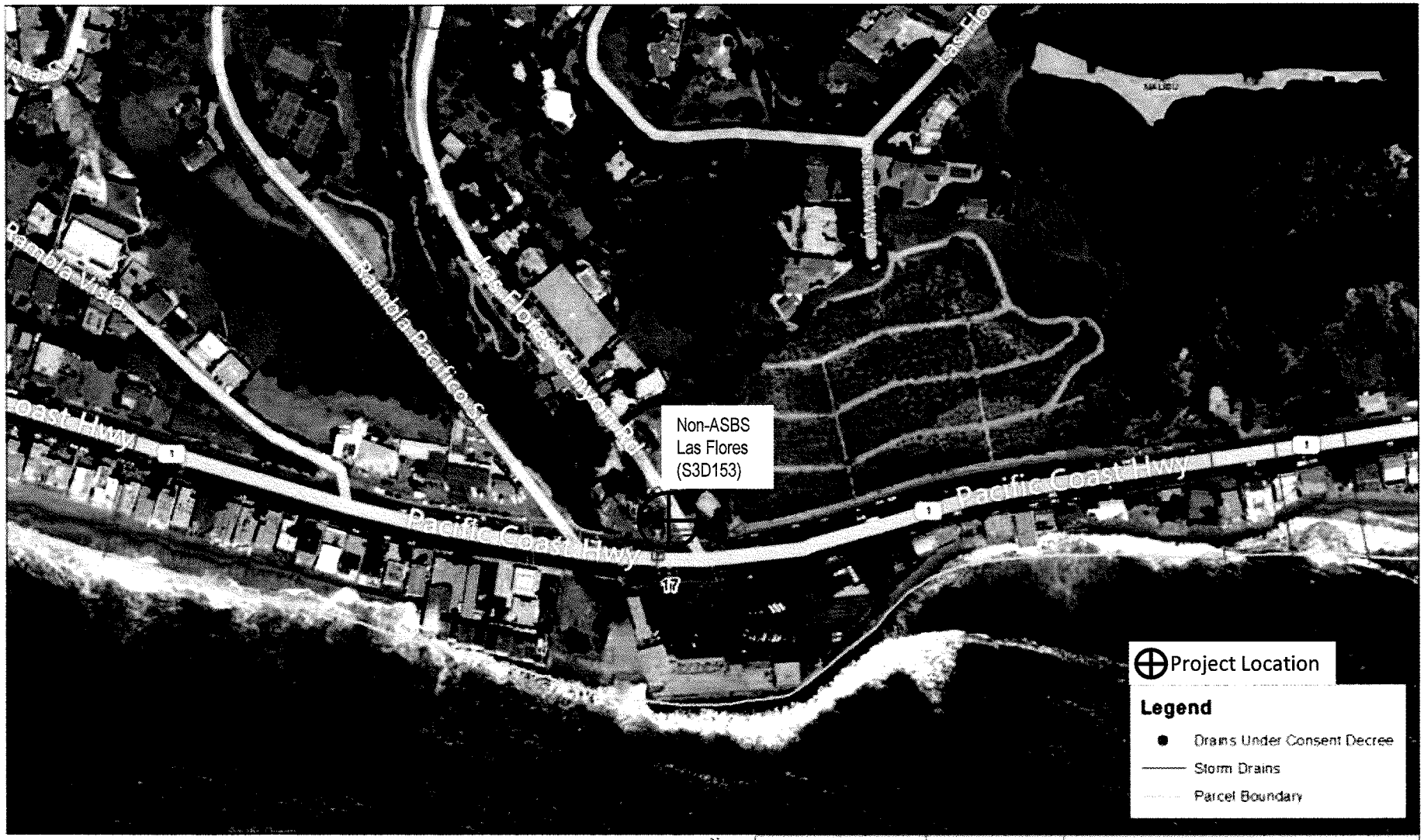

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Exhibit 3 -- Monitoring Program

	Drain ID	Sampling Location(s)	Frequency	Constituents Sampled	Methods
Malibu Creek and Lagoon Drains					
1	Malibu Road Drain	Sampling to occur downstream of diversion structure, but at a location that is not under the influence of creek/lagoon backflows or groundwater impacts. Samples to be taken using automatic grab samplers or equivalent technology to reduce potential for human error. Telemetry or wireless/internet based information technology system to potentially be installed to optimize sampling effort.	Passive monitoring of flow through flow meter/sensor to confirm compliance; any discharges are to be sampled or, absent sampling, acknowledged as an exceedance.	FIB Per Bacteria TMDL	Per TMDL
2	Civic Center Drain (Legacy Park)	Sampling to occur at discharge location from Stormwater Treatment Facility to Civic Center drain, downstream of diversion structure.	Passive monitoring of flow through flow meter/sensor to confirm compliance; any discharges are to be sampled or, absent sampling, acknowledged as an exceedance.	FIB Per Bacteria TMDL	Per TMDL
3	Texaco Drain 1	Sampling of both drains to occur downstream of pump diversion structure, potentially at a new sump associated with increased pumping capacity. Samples to be taken at a location that is not under the influence of creek/lagoon backflows or groundwater impacts, so a check valve or flap gate may be required. Samples to be taken using automatic grab samplers or equivalent technology to reduce potential for human error. Telemetry or wireless/internet based information technology system to potentially be installed to optimize sampling effort.	Passive monitoring of flow through flow meter/sensor to confirm compliance; any discharge to be sampled or, absent sampling, acknowledged as an exceedance.	FIB Per Bacteria TMDL	Per TMDL
4	Texaco Drain 2				
5	Texaco Small Drain	None	n/a	n/a	n/a
6	Serra Retreat	None	n/a	n/a	n/a
ASBS Area Drains					
7	ASBS Malibu Drain 2	Sampling location to be essentially coincident with the drain inlet and not affected by outside influences; surface and underdrain flows to be combined and sampled together. Monitoring at BMP Inlet & BMP Outlet at 3 biofilter locations, to be selected by Malibu from the 5 project sites deemed most conducive to effective monitoring. The 3 locations will be rotated on an annual basis to be representative of the ASBS Area drains. Monitoring locations are considered "representative project locations" at Broad Beach.	Passive monitoring of flow through flow meter/sensor to confirm dry weather compliance; "representative number of wet weather samples" to be taken.	FIB per ASBS Exception	Per ASBS Exception
8	ASBS Malibu Drain 3 (SAD 790)				
9	ASBS Malibu Drain 4 (SAD 800/MUG223)				
10	ASBS Malibu Drain 5 (MUG224)				
11	ASBS Malibu Drain 6 (SAD 840/MUG 225)				
12	ASBS Malibu Drain 7 (SAD 853)				
13	ASBS Malibu Drain 8				
14	ASBS Malibu Drain 9 (SAD 900/MUG 232)				
15	ASBS Malibu Drain 10 (SAD 910/MUG 233)				
16	S1D20 (Wildlife Road)	Sampling to occur at BMP Inlet & BMP Outlet, subject to site specific access constraints. Sampling location to be essentially coincident with the drain inlet and not affected by outside influences; surface and underdrain flows to be combined and sampled together.	Passive monitoring of flow through flow meter/sensor to confirm dry weather compliance; "representative number of wet weather samples" to be taken.		
Non-ASBS Area Drains					
17	S2D210 (Marie Canyon)	BMP Inlet & BMP Outlet. Sampling location to be essentially coincident with the drain inlet and not affected by outside influences; surface and underdrain flows to be combined and sampled together.	Passive monitoring of flow to confirm dry weather compliance; "representative number of wet weather samples" to be taken.	FIB Per TMDL	Per TMDL
18	S2D153 (Las Flores)	BMP Inlet & BMP Outlet. To the extent feasible, sampling location to be essentially coincident with the drain inlet and not affected by outside influences; surface and underdrain flows to be combined and sampled together.	Passive monitoring of flow to confirm dry weather compliance; "representative number of wet weather samples" to be taken.	FIB Per TMDL	Per TMDL

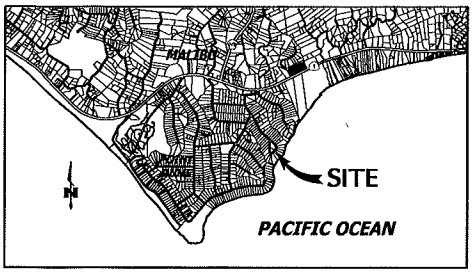
DEFINING TERMS AND DEFINITIONS

Rain gage used for determination of wet/dry days (0.1 in/24 hrs)	Determination of wet/dry days at ASBS Drains measured at Zuma Rain Gage. Determination of wet/dry days at Non-ASBS Area Drains measured at Malibu Fire Station Rain Gage. If gages are deemed unrepresentative, the closest appropriate rain gage will be used for compliance purposes. If daily rainfall gages are utilized, daily rainfall totals shall be equivalent to 24 hour totals.
Representative number of wet weather samples	For the ASBS and Non-ASBS Area drains, should Malibu monitor and sample more than 50% of storms 0.1 to 0.25 in size, 50% of storms 0.25 to 0.5 in., and 50% of storms greater than 0.5 in, Malibu will be deemed to have sampled a representative number of wet weather samples. At each BMP BMP Outlet/drain inlet station sampled, TMDL exceedances for the purpose of assessing compliance in each year shall be calculated by multiplying the number of exceedances measured times the quotient of the total number of storm events with ≥ 0.1 inch of rainfall divided by the number of storms sampled. For example if 50% of storms are sampled and 5 exceedances are observed, 10 exceedances will be considered for compliance purposes.
Representative Project Locations	Project locations with essentially identical land use types, land cover, topography, BMP types, BMP design and sizing criteria, and local conditions.
Storm Event	Rainfall event greater than 0.1 inch, separated by 24-hour period with less than 0.1 in
Exceedance Day	Rainfall event greater than 0.1 inch, separated by 24-hour period with less than 0.1 in, during which FIB results exceed TMDL limits
Conditions to confirm compliance and terminate monitoring	3 years of compliance with TMDL or ASBS Exception (whichever is appropriate).
Condition to establishing "potential non-performance" and remedial action necessary	"Potential non-performance" shall be defined as 1 year of non-compliance with TMDL or ASBS Exception after project completion. In the ASBS Area, potential non-performance will trigger a diagnostic assessment of all ASBS Area BMPs to determine whether the other (unsampled) BMPs are also potentially not performing. This assessment would include examination of potential construction issues, localized damages or vandalism (e.g., due to truck activity), unusual/unique pollutant sources (e.g., dumping), or design (e.g., capacity) issues. Force Majure provisions apply in the condition of Federally or State-declared disasters, and not, for example, simple conditions of inclement weather.
Condition to establishing "non-performance" of BMPs	"Non-performance" shall be defined as 1 additional year of non-compliance with TMDL or ASBS Exception after potential non-performance is established and remedial action is complete, after which disinfection or other appropriate technology shall be implemented. Force Majure provisions apply in the condition of Federally or State-declared disasters, and not, for example, simple conditions of inclement weather.

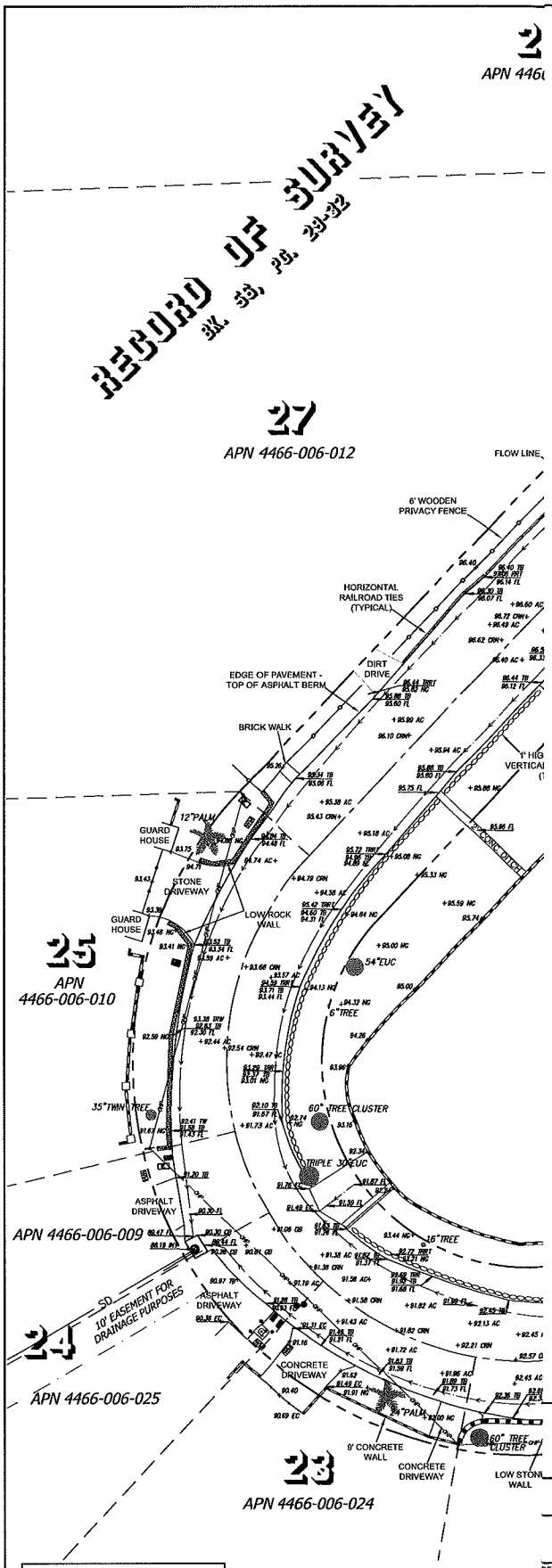
Appendix D

TOPOGRAPHIC SURVEY INFORMATION

RECORD OF SURVEY
BK. 56, PG. 29-32



VICINITY MAP
NOT TO SCALE



ABBREVIATIONS:

AC	ASPHALT CONCRETE
BLDG	BUILDING
BW	BACK OF WALK
CB	CATCH BASIN
CL	CENTER LINE
CONC	CONCRETE
CRN	CROWN
DL	DAYLIGHT
EC	EDGE OF CONCRETE
ES	EDGE OF STEPS
EUC	EUCALYPTUS TREE
EW	EDGE OF WALK
FL	FLOW LINE
FS	FINISH SURFACE
FW	FACE OF WALK
GB	GRADE BREAK
INT	INTERSECTION
INV	INVERT
NG	NATURAL GROUND
OHP	OVERHEAD POWER LINE
REF	REFERENCE
RRT	RAILROAD TIES
TB	TOP OF BERM
TG	TOP OF GRATE
TOE	TOE OF SLOPE
TOP	TOP OF SLOPE
TRRT	TOP OF RAILROAD TIE
TS	TOP OF STEPS
TW	TOP OF WALL
(TYP)	TYPICAL

LEGEND:

	FIRE HYDRANT
	GUARD POST
	IRRIGATION VALVE
MB	MAIL BOX
	POWER POLE
	ELECTRICAL BOX
	STORM DRAIN MAN HOLE
WM	WATER METER
	WATER VALVE
	CHAINLINK FENCE
	METAL FENCE
	WOOD FENCE
	WALL
	CENTERLINE
	FLOWLINE
OHP	OVERHEAD WIRES
	LOT LINE
	ROW LINE
SD	STORM DRAIN LINE

NOTE:

1. BOUNDARIES SHOWN HEREON ARE FROM THE RECORD OF SURVEY AS FILED IN BOOK 56, PAGES 29-32.

2. LANDSCAPING AND LANDSCAPE IRRIGATION DEVICES EXIST WITHIN THE PROPERTY AND ARE NOT SHOWN.

3. IF RETAINING WALLS OR SIMILAR STRUCTURES ARE TO BE DESIGNED FROM TOPOGRAPHY SHOWN HEREON, THE ELEVATIONS OF CRITICAL POINTS CONTROLLING THE DESIGN MUST BE VERIFIED PRIOR TO ADOPTION OF FINAL DESIGN.

4. NOT VALID WITHOUT SHEET 2 OF 2 SHEETS.

BENCH MARK:

B.M. NO 5433 NAVD 88 COUNTY OF LOS ANGELES DATUM

FOUND CS MON IN WELL DN 250 MM 13 M SOUTH OF CENTERLINE PACIFIC COAST HIGHWAY & 96 M WEST OF ZUMIREZ DRIVE 1.5 M EAST OF P/L LACO FIRE STATION # 71 MKD (SOLSTICE CYN A-10A A950)

ELEVATION = 132.552 FEET (MALIBU ADJUSTMENT OF 2003)

DIAL BEFORE YOU DIG
1-800-422-4133
DIGALERT
PLAY IT SAFE. DIAL BEFORE YOU DIG!
AT LEAST TWO WORKING DAYS PRIOR TO EXCAVATING
SERVING NINE SOUTHERN CALIFORNIA COUNTIES

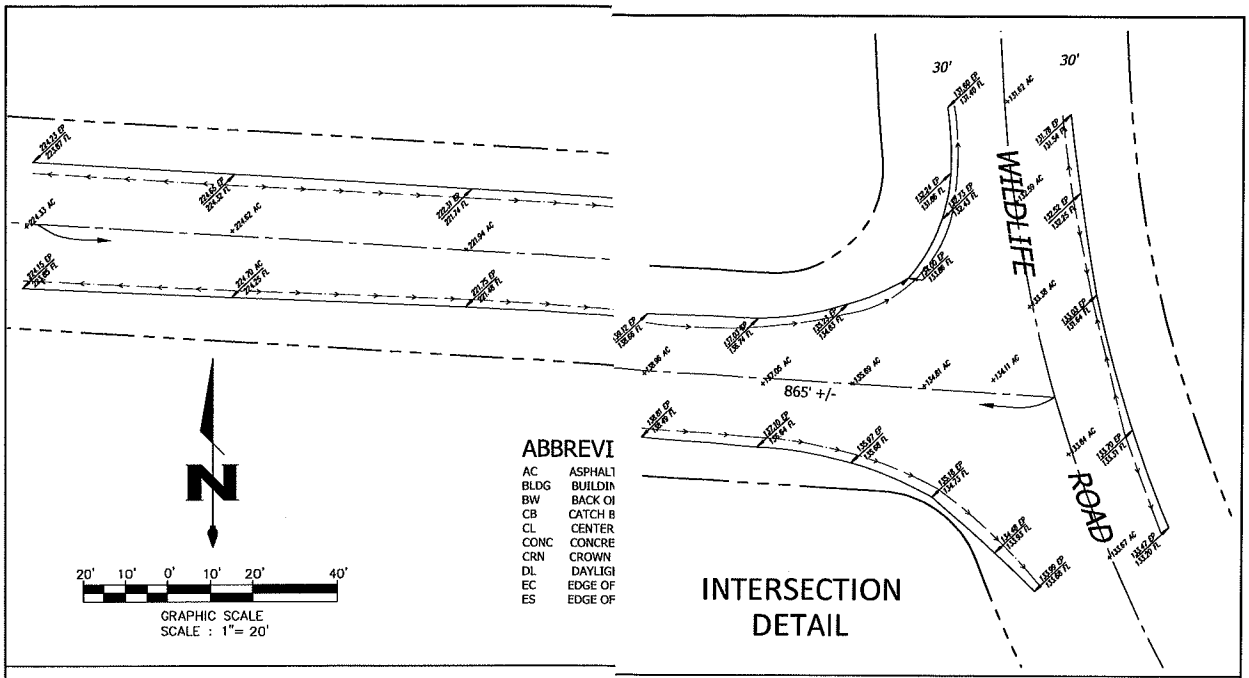
CITY OF MALIBU
PUBLIC WORKS DEPARTMENT

WILDLIFE ROAD STORM DRAIN IMPROVEMENT PROJECT

TOPOGRAPHIC DESIGN SURVEY

DESIGNED BY:	DATE	SCALE	APPROVED BY: DATE
DRAWN BY:	DATE		
CHECKED BY:	DATE	PROJECT NUMBER	ROBERT BRAGER, P.E., J.D. PUBLIC WORKS DIRECTOR/CITY ENGINEER RCE NO. 52102 EXP. 12/31/2010

Sheet 1 of 2 Sheets



NOTES:

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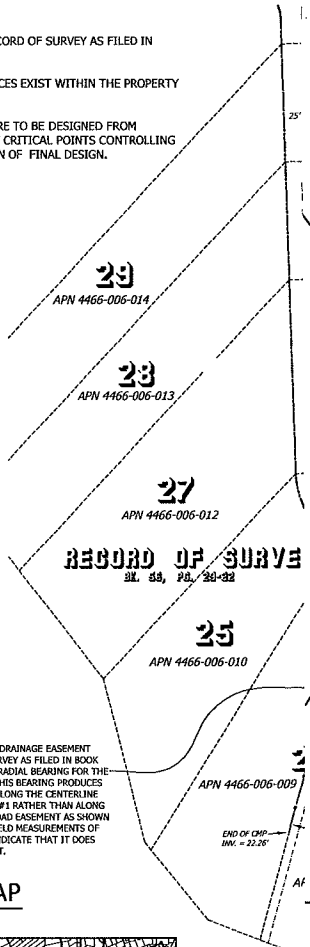
4. NOT VALID WITHOUT SHEET 1 OF 2 SHEETS.

LEGEND:

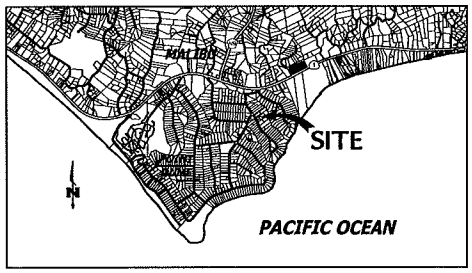
- FIRE HYDRANT
- GUARD POST
- IRRIGATION VALVE
- MAIL BOX
- POWER POLE
- ELECTRICAL BOX
- STORM DRAIN MAN HOLE
- WATER METER
- WATER VALVE
- CHAINLINK FENCE
- METAL FENCE
- WOOD FENCE
- WALL
- CENTERLINE
- FLOWLINE
- OHP — OVERHEAD WIRES
- LOT LINE
- ROW LINE
- SD — STORM DRAIN LINE



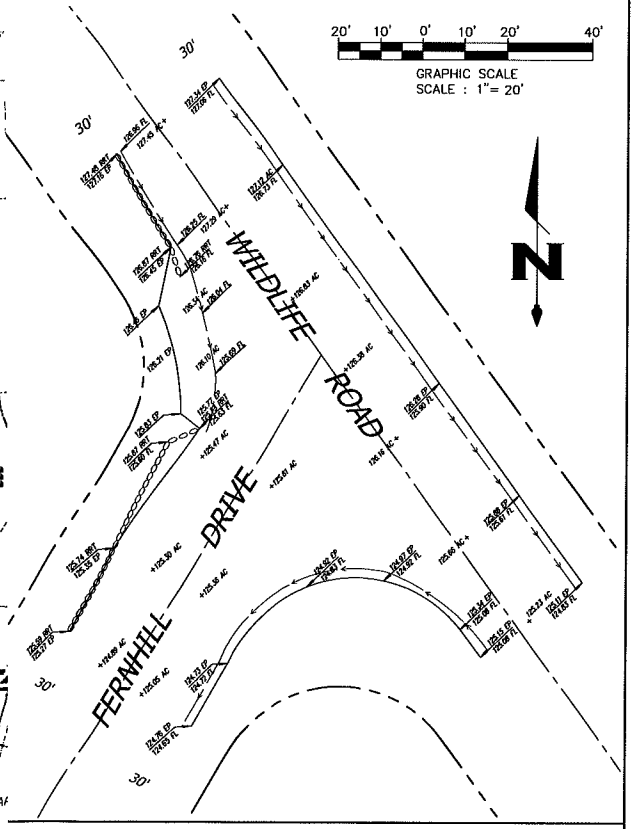
SURVEYOR'S NOTE:
THE LOCATION OF THE 10 FOOT DRAINAGE EASEMENT SHOWN PER THE RECORD OF SURVEY AS FILED IN BOOK 56, PAGES 29-32 IS BASED ON A RADIAL BEARING FOR THE WEST LINE OF THE EASEMENT. THIS BEARING PRODUCES AN ARC LENGTH OF 23.39 FEET ALONG THE CENTERLINE OF THE 50 FOOT PRIVATE ROAD #1 RATHER THAN ALONG THE SOUTHERLY LINE OF THE ROAD EASEMENT AS SHOWN ON SAID RECORD OF SURVEY. FIELD MEASUREMENTS OF THE EXISTING DRAINAGE PIPE INDICATE THAT IT DOES NOT FALL WITHIN THE EASEMENT.

VICINITY MAP

NOT TO SCALE



INTERSECTION DETAIL



CITY OF MALIBU

PUBLIC WORKS DEPARTMENT

WILDLIFE ROAD STORM DRAIN IMPROVEMENT PROJECT

TOPOGRAPHIC DESIGN SURVEY

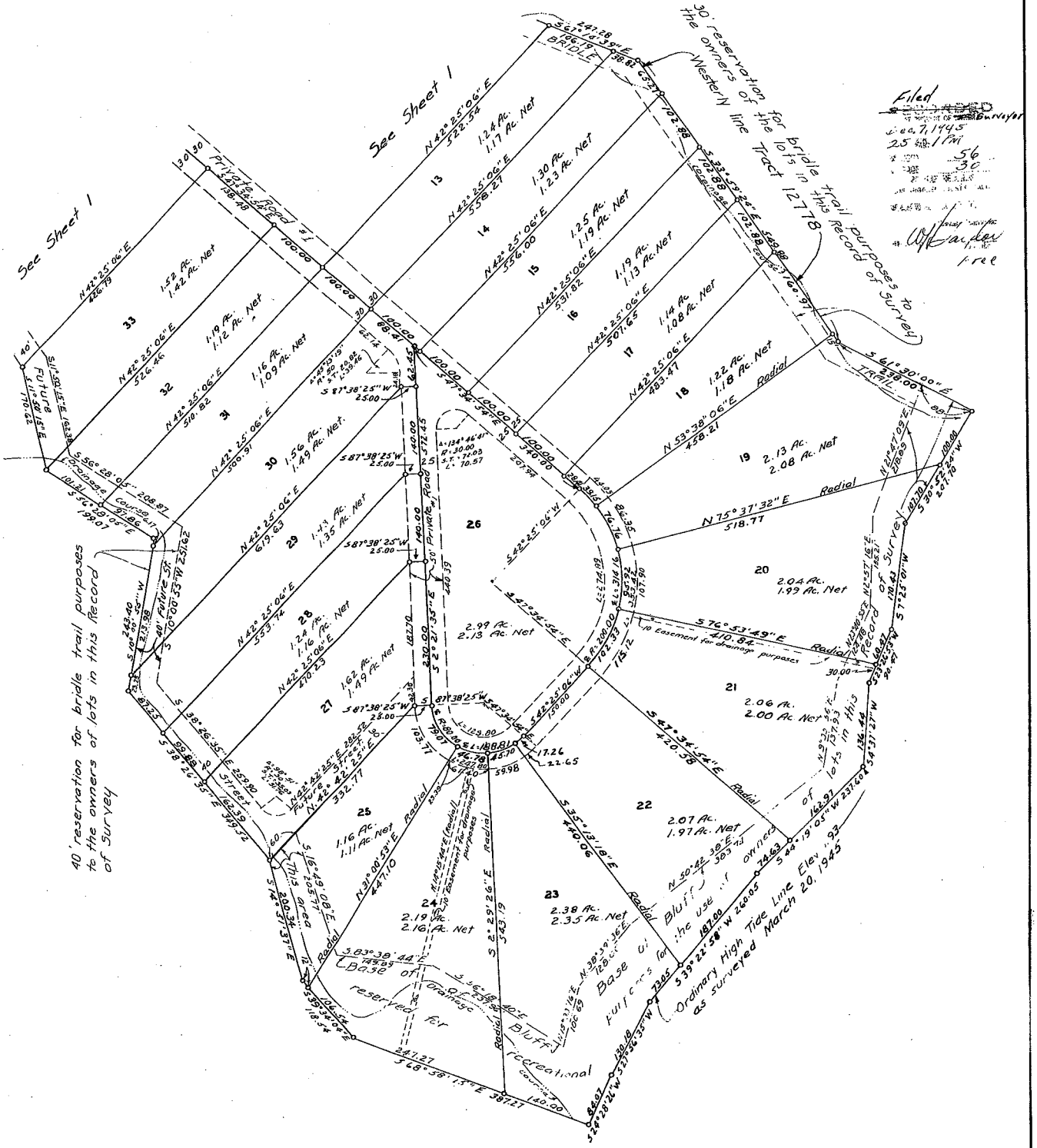
SIGNED BY:	DATE	SCALE	APPROVED BY: DATE
DWN BY:	DATE		
CKED BY:	DATE	PROJECT NUMBER	ROBERT BRAGER, P.E., J.D. PUBLIC WORKS DIRECTOR/CITY ENGINEER RCE NO. 52102 EXP. 12/31/2010
			Sheet 2 of 2 Sheets

RS 56-30

RECORD OF SURVEY

SHEET 2 OF 4 SHEETS

SCALE 1"=100'



Dec. 7, 1945.

C. E. Genung

Table 4-9. Cumulative Event Mean Concentrations
1994-2000 Storm Season

GROUP	Constituent	Unit	High Density Single Family Residential	Light Industrial	Vacant	Retail/ Commercial	Multi-family Residential	Transportation	Education	Mixed Residential
GENERAL MINERALS	Dissolved Phosphorus	mg/ℓ	0.29	0.28	0.06	0.30	0.16	0.36	0.27	0.20
	Kjeldahl-N	mg/ℓ	2.80	3.07	0.81	3.37	1.86	1.81	1.62	2.70
	NH3-N	mg/ℓ	0.36	0.48	0.08	0.91	0.38	0.23	0.26	0.58
	Nitrate-N	mg/ℓ	1.04	0.86	1.11	0.58	1.73	0.75	0.63	0.71
	Nitrite-N	mg/ℓ	0.09	0.09	0.05	0.14	0.08	0.09	0.08	0.10
	Suspended Solids	mg/ℓ	104.65	229.37	164.68	67.40	46.35	75.35	103.02	69.06
	Total Phosphorus	mg/ℓ	0.39	0.44	0.11	0.41	0.19	0.44	0.31	0.26
HEAVY METALS (DISSOLVED)	Dissolved Cadmium	µg/ℓ	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
	Dissolved Chromium	µg/ℓ	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
	Dissolved Copper	µg/ℓ	8.44	20.22	n/m	14.60	6.75	32.68	12.80	11.52
	Dissolved Lead	µg/ℓ	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
	Dissolved Mercury	µg/ℓ	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
	Dissolved Nickel	µg/ℓ	n/m	4.85	n/m	n/m	n/m	3.73	n/m	n/m
	Dissolved Selenium	µg/ℓ	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
	Dissolved Silver	µg/ℓ	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
	Dissolved Zinc	µg/ℓ	39.11	460.19	n/m	164.12	75.36	203.89	65.97	125.83
HEAVY METALS (TOTAL)	Total Cadmium	µg/ℓ	n/m	n/m	n/m	0.71	n/m	1.05	n/m	n/m
	Total Chromium +6	µg/ℓ	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
	Total Copper	µg/ℓ	15.30	31.04	9.12	34.77	12.23	51.86	21.49	17.33
	Total Lead	µg/ℓ	9.59	14.87	n/m	11.53	5.13	9.08	4.53	8.70
	Total Mercury	µg/ℓ	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
	Total Nickel	µg/ℓ	n/m	8.92	n/m	6.71	n/m	5.76	4.65	n/m
	Total Selenium	µg/ℓ	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
	Total Silver	µg/ℓ	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
	Total Zinc	µg/ℓ	80.35	565.60	38.81	238.53	134.88	279.45	123.69	184.85
MISCELLANEOUS	Cyanide	mg/ℓ			n/m					n/m
	Oil and Grease	mg/ℓ	1.36	1.87	n/m	3.65		3.19		n/m
	Total Petroleum Hydrocarbons	mg/ℓ	1.36	1.87	n/m	3.65		3.19		n/m
	Total Phenols	mg/ℓ	n/m	n/m	n/m	n/m		n/m		n/m

Notes:
n/m : Not meaningful, not enough data above detection limit
Blank cells: No data available

Table 4-9. Cumulative Event Mean Concentrations 1994-2000 Storm Season (cont'd)

GROUP	Constituent	Unit	High Density Single Family Residential	Light Industrial	Vacant	Retail/ Commercial	Multi-family Residential	Transportation	Education	Mixed Residential
BACTERIA	Fecal Coliform	MPN/100mℓ	1085353.71	653070.36	2174.82	1071656.51		1340166.71		n/m
	Fecal Enterococcus	MPN/100mℓ	904554.87	128807.20	1043.87	105085.69		34660.95		
	Fecal Streptococcus	MPN/100mℓ	1360392.59	356792.16	3618.32	279561.99		300525.54		n/m
	Total Coliform	MPN/100mℓ	1395690.90	508710.38	21288.48	1733009.14		806939.80		n/m
PESTICIDES	Chlordane	µg/ℓ	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
	Chlorpyrifos	µg/ℓ	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
	Diazinon	µg/ℓ	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
	Malathion	µg/ℓ	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
	p,p' DDT	µg/ℓ	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
	PCB-1016	µg/ℓ	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
	PCB-1221	µg/ℓ	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
	PCB-1232	µg/ℓ	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
	PCB-1242	µg/ℓ	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
	PCB-1248	µg/ℓ	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
	PCB-1254	µg/ℓ	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
	PCB-1260	µg/ℓ	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
	Simazine	µg/ℓ	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
SEMIVOLATILES	Acenaphthene	µg/ℓ	n/m	n/m	n/m		n/m	n/m		n/m
	Acenaphthylene	µg/ℓ	n/m	n/m	n/m		n/m	n/m		n/m
	Antracene	µg/ℓ	n/m	n/m	n/m		n/m	n/m		n/m
	Benzo(a)anthracene	µg/ℓ	n/m	n/m	n/m		n/m	n/m		0.39
	Benzo(a)pyrene	µg/ℓ	n/m	n/m	n/m		n/m	n/m		n/m
	Benzo(b)fluorant	µg/ℓ	n/m	n/m	n/m		n/m	n/m		n/m
	Benzo(k)fluorant	µg/ℓ	n/m	n/m	n/m		n/m	n/m		n/m
	Chrysene	µg/ℓ	n/m	n/m	n/m		n/m	n/m		0.79
	Dibenz(a,h)anthrecene	µg/ℓ	n/m	n/m	n/m		n/m	n/m		n/m
	Fluoranthene	µg/ℓ	n/m	n/m	n/m		n/m	n/m		0.33
	Fluorene	µg/ℓ	n/m	n/m	n/m		n/m	n/m		n/m
	Indeno (1,2,3-cd) pyrene	µg/ℓ	n/m	n/m	n/m		n/m	n/m		n/m
	Naphthalene	µg/ℓ	n/m	n/m	n/m		n/m	n/m		n/m
	Phenanthrene	µg/ℓ	n/m	n/m	n/m		n/m	n/m		0.73
	Pyrene	µg/ℓ	1.50	n/m	n/m		n/m	n/m		0.53

Notes:
n/m : Not meaningful, not enough data above detection limit
Blank cells: No data available