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Santa Susana Field Laboratory
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Via FedEx

August 28, 2015
In reply refer to SHEA-115305

Ms. Cassandra Owens
Regional Water Quality Control board
Los Angeles Region
320 West 4th Street, Suite 200
Los Angeles, CA 90013

Dear Ms. Owens:

Subject: ISRA Performance Monitoring and BMP Monitoring for the Outfalls 008 and 009 Watersheds, 2014/2015Rainy Season, The Boeing Company, Santa Susana Field Laboratory, Canoga, CA (Order No. R4-2010-0090; NPDES No. CA0001309, CI No. 6027; and, California Water Code §13304 Order; NPDES NO. CA0001309, CI NO. 1111, Site ID No. 2040109)

Per the requirements of The Boeing Company's (Boeing) National Pollutant Discharge Elimination System (NPDES) Permit and a California Water Code §13304 Cleanup and Abatement Order dated December 3, 2008, Boeing is providing the attached ISRA Performance Monitoring and Best Management Practices (BMP) Monitoring Report for the Outfalls 008 and 009 Watersheds for the 2014/2015 rainy season, which also represents the annual ISRA progress report. This document has been developed with input and in accordance with recommendations from the Santa Susana Site Surface Water Expert Panel and prepared for Boeing and the National Aeronautics and Space Administration (NASA). The attached report will be posted on the Boeing External website at the following address:
http://www.boeing.com/aboutus/environment/santa_susana/isra.html

As stated in the document, ISRA performance monitoring is considered complete based on data collected through the 2014/2015 rainy season, signifying the completion of the ISRA program. Additionally, 2015 represents the end of the BMP Plan coverage period and future BMP-related activities will be performed and reported as specified in a Site-wide Work Plan that is being prepared pursuant to the 2015 NPDES permit. The Site-wide Work Plan is scheduled to be submitted to the Los Angeles Regional Water Quality Control Board (RWQCB) in October 2015.

If you have any questions or require any further, please contact Art Lenox at 818-466-8795.

Sincerely,

Paul J. Costa
Environmental Operations and Compliance Manager
Santa Susana Field Laboratory
The Boeing Company

Enclosure: ISRA Performance Monitoring and BMP Monitoring for the Outfalls 008 and 009 Watersheds, 2014/2015 Rainy Season

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# ISRA PERFORMANCE MONITORING AND BMP MONITORING FOR THE OUTFALLS 008 AND 009 WATERSHEDS, 2014/2015 RAINY SEASON

## SANTA SUSANA FIELD LABORATORY
## VENTURA COUNTY, CALIFORNIA

**August 2015**

**Prepared For:**

**The Boeing Company**
**and**
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# ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| AILF | Area I Landfill |
| A2LF | Area II Landfill |
| AP/STP | Ash Pile and Building 515 Sewage Treatment Plant |
| B-1 | Building 1 |
| BMP | Best Management Practice |
| BEF | bioaccumulation equivalency factor |
| Boeing | The Boeing Company |
| CAO | Cleanup and Abatement Order |
| CM | culvert modification |
| COC | constituent of concern |
| CTL-1 | Component Test Laboratory-1 |
| cy | cubic yards |
| DNQ | data not qualified |
| ELV | Expendable Launch Vehicle |
| Expert Panel | SSFL Surface Water Expert Panel |
| Geosyntec | Geosyntec Consultants |
| HVS | Happy Valley South |
| IEL | Instrument and Equipment Laboratory |
| ISRA | Interim Source Removal Action |
| LOX | liquid oxygen |
| µg/L | microgram per liter |
| MWH | MWH Americas, Inc. |
| NASA | National Aeronautics and Space Administration |
| NPDES | National Pollutant Discharge Elimination System |
| RMMP | Restoration, Mitigation, and Monitoring Plan |
| RWQCB | Los Angeles Regional Water Quality Control Board |
| SAP | sampling and analysis plan |
| SSFL | Santa Susana Field Laboratory |
| SWPPP | Stormwater Pollution Prevention Plan |

## ABBREVIATIONS AND ACRONYMS (continued)

| | |
|---|---|
| TEF | toxicity equivalency factor |
| TEQ | toxicity equivalent |
| TSS | total suspended solids |

# 1.0 INTRODUCTION

This report presents the Interim Source Removal Action (ISRA) performance monitoring and potential Best Management Practices (BMP) subarea and BMP performance monitoring (BMP monitoring) activities and results from the 2014/2015 rainy season within the Outfalls 008 and 009 watersheds at the Santa Susana Field Laboratory (SSFL), Ventura County, California. The locations of Outfalls 008 and 009 watersheds, the subject outfalls of the ISRA program and the BMP Plan, are shown in Figure 1-1. This report also includes a summary of ISRA performance monitoring and BMP monitoring results collected to date, an evaluation of the potential BMP sites based on subarea monitoring results, the recommendation to discontinue the ISRA performance monitoring program, and recommendations for modifications to the BMP monitoring program. This is the final report documenting both ISRA performance monitoring and BMP monitoring for the Outfalls 008 and 009 watersheds. ISRA performance monitoring is considered complete based on data collected through the 2014/2015 rainy season, signifying completion of the ISRA program; 2015 represents the end of the BMP Plan coverage period and future BMP-related activities will be performed and reported as specified in a Site-wide Work Plan that is being prepared pursuant to the 2015 National Pollutant Discharge Elimination System (NPDES) permit (Los Angeles Regional Water Quality Control Board [RWQCB], 2015).

The purpose of the ISRA and BMP programs, which are being implemented with oversight and participation of the Los Angeles Regional Water Quality Control Board (RWQCB), is to improve compliance with NPDES permit limits at Outfalls 008 and 009 and water quality in these watersheds through the dual approach of remediation of surface soils that are above defined thresholds for NPDES constituents of concern (COCs), and through control and/or treatment of stormwater runoff from prioritized subareas, respectively. Neither of these studies is an extension of the NPDES program, and therefore data collected as part of these studies are not a measurement of NPDES compliance within the watersheds.

ISRA performance monitoring and BMP monitoring activities were conducted during the 2014/2015 rainy season by MWH Americas, Inc. (MWH) on behalf of The Boeing Company (Boeing) and CH2M on behalf of the National Aeronautics and Space Administration (NASA). Changes to monitoring locations for the 2014/2015 rainy season were documented in the 2014/2015 Rainy Season Sampling and Analysis Plan (SAP) Update, BMP Monitoring and ISRA Performance Monitoring Programs (2014/2015 BMP and ISRA SAP, 2014b). This document serves as an addendum to the previously submitted BMP and ISRA Performance Monitoring SAPs (MWH, 2010c, 2011b, 2012, 2013, and 2014b).

The 2014/2015 rainy season represents the sixth year of ISRA performance monitoring and the fifth year of BMP monitoring. The results and recommendations from previous rainy seasons are presented in annual reports (MWH, 2010b; MWH *et al.*, 2011, 2012, 2013, and 2014). In addition, addenda to the BMP Plan (MWH *et al.*, 2010) have been prepared subsequent to the

2010/2011, 2011/2012, 2012/2013 and 2013/2014 rainy season annual reports (Geosyntec Consultants [Geosyntec] and the SSFL Surface Water Expert Panel [Expert Panel], 2011, 2012, 2013, and 2014). The BMP Plan addenda provide additional detail on the BMP recommendations presented in the annual reports.

This summary report was prepared for Boeing and NASA by MWH and Geosyntec with input from and in accordance with the recommendations from the Expert Panel. Below is a description of the sections and appendices included in the report.

- Section 1 presents project background information, an update of BMP activities, the rainfall summary for the 2014/2015 rainy season, and a summary of the Outfalls 008 and 009 NPDES sampling results for the 2014/2015 rainy season.
- Section 2 includes a summary of the pre-2014/2015 rainy season ISRA performance monitoring results, and presents the 2014/2015 rainy season ISRA performance monitoring results and the Expert Panel's recommendation to discontinue the ISRA performance monitoring program.
- Section 3 includes a summary of pre-2014/2015 rainy season BMP monitoring results, and presents the 2014/2015 rainy season BMP monitoring results and the Expert Panel's recommendations for modifications to the BMP monitoring program for the 2015/2016 rainy season.
- Section 4 presents the updated milestone schedule.
- Appendix A provides the 2014/2015 rainy season rain event and sampling charts.
- Appendix B provides laboratory and validation reports for ISRA performance monitoring and BMP monitoring samples collected during the 2014/2015 rainy season.
- Appendix C provides time-series and correlation charts for the performance monitoring program.
- Appendix D provides time-series and correlation charts for the BMP monitoring program.
- Appendix E provides the BMP performance monitoring data analysis memorandum prepared by the Expert Panel.
- Appendix F provides the BMP site ranking analysis memorandum prepared by the Expert Panel.

## 1.1 ISRA Program

The ISRA program is being performed pursuant to a California Water Code Section 13304 Cleanup and Abatement Order (CAO) issued by the RWQCB, dated December 3, 2008 (RWQCB, 2008). The objective of the CAO is to improve stormwater quality within the

Outfalls 008 and 009 watersheds by requiring the identification, evaluation, remediation or stabilization, and restoration of areas of contaminated soil containing COCs that may have contributed to exceedances of NPDES permit limits and benchmarks in stormwater. Based on an evaluation of all stormwater samples collected at Outfalls 008 and 009 since August 2004, the following COCs have been identified for each of the outfalls; copper, lead, and dioxins at Outfall 008, and cadmium, copper, lead, mercury, and dioxins at Outfall 009. Results of samples collected at Outfalls 008 and 009 above NPDES permit limits/benchmarks since August 2004 are presented in Tables 1-1 and 1-2, respectively.

ISRA activities were implemented in three phases between 2009 and 2013 and included the removal of approximately 25,664 cubic yards (cy, *ex situ*) from 36 ISRA areas, with the activities performed described in summary reports (MWH, 2010a, 2011a, and 2014a). Restoration activities at Phase I, II, and III ISRA areas included backfilling excavations using a local soil borrow source and/or gravel, re-contouring using adjacent soils, and/or installing erosion control BMPs, including re-vegetation of the areas.

Following ISRA remedial activities, performance monitoring up- and downstream of completed ISRA areas was proposed to be performed through two rainy seasons with the actual study duration depending on the quantity and quality of data collected at the performance monitoring locations and the associated outfall (MWH, 2009). Performance monitoring at Phase I and II ISRA areas was performed for two or three rainy seasons prior to being discontinued following the 2011/2012 rainy season because sufficient data had been collected to show a general decrease in downstream results compared to upstream results (MWH *et al.*, 2012). Monitoring at Phase III ISRA areas was performed for either three or four rainy seasons, and is recommended to be discontinued based on an evaluation of data collected through the 2014/2015 rainy season (see Section 2.3). Discontinuing ISRA performance monitoring at Phase III ISRA areas signifies completion of the ISRA program. The performance monitoring inspection and sample locations from the 2014/2015 rainy season are listed in Table 1-3 and shown on Figure 1-2. A summary of the activities and results from the 2014/2015 rainy season, as well as previous rainy seasons, is provided in Section 2.0.

## 1.2 BMP Plan and Monitoring Program

The BMP Plan, prepared in October 2010 pursuant to the 2010 NPDES Permit, describes the process for improving stormwater runoff quality and minimizing NPDES Permit exceedances in the Outfalls 008 and 009 watersheds at SSFL (MWH *et al.*, 2010). Addenda to the BMP Plan (Geosyntec and Expert Panel, 2011, 2012, 2013, and 2014) have been prepared annually and provide conceptual designs and detailed recommendations for BMPs identified based on procedures described in the BMP Plan and an evaluation of rainy season monitoring data. An updated summary of BMP activities that are planned, are underway, or have been recently

completed in the Outfall 008 and 009 watersheds, referred to as short-term activities, is provided in Section 1.2.1. Several long-term activities are ongoing or have been completed since submittal of the BMP Plan, including developing and implementing a potential BMP subarea monitoring program, evaluating existing surface water data, developing a prioritized ranking of sites for placing new BMPs, and developing BMP sizing criteria.

The BMP monitoring program includes potential BMP subarea monitoring and BMP performance monitoring. Potential BMP subarea monitoring involves the collection of stormwater samples at locations receiving runoff from potential source areas and other infrastructure (e.g., roads, buildings, parking areas) to assess the potential for contribution of COCs from the potential source areas and to identify locations for new BMPs and/or treatment controls. Potential BMP monitoring locations are performed at the "potential"[1] BMP sites. BMP performance monitoring involves the collection of stormwater samples at locations up- and downstream of completed BMPs to evaluate the performance of the BMP.

As part of the BMP monitoring program, an approach was developed by the Expert Panel for ranking the potential BMP sites to prioritize the locations based on water quality considerations. A letter summarizing the BMP site ranking analysis approach was submitted to the RWQCB on June 22, 2011 (Expert Panel, 2011). The BMP site ranking and selection process described in the letter has occurred on a yearly basis through 2015, the end of the BMP Plan coverage period. In its place, a Site-wide Work Plan is being developed per the requirement of the April 2015 NPDES Permit (Order No. R4-2015-033) that will continue monitoring BMPs previously recommended and maintained by the BMP Plan and proposes additional studies and monitoring within the Outfall 009 watershed. Recommendations for BMP sites and modifications to the subarea monitoring program are included in Sections 3.3 and 3.4, respectively.

The BMP monitoring inspection and sample locations from the 2014/2015 rainy season are listed in Table 1-4 and shown on Figure 1-2. A summary of the BMP monitoring activities and results from the 2014/2015 rainy season, as well as previous rainy seasons, is provided in Section 3.0.

### 1.2.1 Short-Term BMP Activities Updates

The status as of August 2015 for the short-term BMP activities that are being performed to improve surface water quality in the Outfalls 008 and 009 watersheds is provided below. These activities are shown on Figures 1-3 through 1-9.

[1] "Potential" treatment BMPs include those that will be considered based on comparison of subarea monitoring results with onsite stormwater background concentrations and NPDES permit limits.

**ISRA Activities.** Erosion and sediment control BMPs at former ISRA areas were inspected and maintained during the 2014/2015 rainy season.

**Northern Drainage Restoration Activities.** For the Restoration, Mitigation, and Monitoring Plan (RMMP) BMPs, the Northern Drainage was monitored and inspected during the 2014/2015 rainy season. During each quarter plantings and pole cuttings in the Northern Drainage were inspected, weeding was performed to remove invasive species, and water replenishment cartons were replaced at existing plants or manual watering was performed at areas of recent planting. In addition, structural BMPs were inspected monthly and following rain events to assess conditions. Maintenance of check structures (including replacing rip rap, lowering of height, and reestablishing key-ins) as well as installation and replacement of vegetated rip rap reinforcement in the Northern Drainage near LOX and the Area II Landfill occurred in September 2014.

**Outfall 008 BMPs.** Erosion and sediment control BMPs near the outfall and within the drainage were inspected and maintained as needed during each quarter.

**Culvert Modifications (CMs).** Sediment and plant debris removal was performed in December 2014 at CM-4. The remaining CMs, including CM-2, CM-3, CM-6, CM-8, CM-9, CM-10, and CM-11 had minimal to no sediment build-up and did not require sediment removal at that time. Filter fabric was placed over the sandbag berm above CM-1 along Area II Road and secured with additional sand bags in January 2015. In addition, fabric covering the weir boards was inspected at all CMs and was replaced at CM-5 in December 2014, and at CM-3 and CM-4 in January 2015.

**Lower Parking Lot BMP.** Plantings at the sediment basin and biofilter areas were inspected and implementation of the watering plan continued. Rain event inspections were performed of the sediment basin and biofilter, as well as the cistern area and pump. Street sweeping was performed following rain events at the Lower Parking Lot, paved areas near the wooden retaining wall, and the cistern drain adjacent to the sediment basin and biofilter. Worn sandbags previously installed along the sediment basin and biofilter were replaced in November and December 2014.

**Site Restoration and B1436 Detention Bioswale BMP.** The Building 1436 (B1436) demolition was completed in July 2014 and per the 2013 BMP Plan Addendum, two vegetated detention bioswales were installed in October and November 2014. The vegetated swale portion of the detention bioswale is constructed over a subsurface storage chamber (i.e., ChamberMaxx® system) and is designed to detain stormwater runoff before slowly discharging these flows through the existing storm drain system. The ChamberMaxx® system is an interlocking corrugated, open-bottom plastic chamber system designed for subsurface storage. The chamber system is plumbed into the existing storm drain system that ultimately drains to the Low Flow Diversion structure in the Lower Parking Lot. During events up through the design storm (i.e.,

the 1 year, 24 hour design storm), stormwater is temporarily retained in the detention bioswale system and is slowly discharged to the existing storm drain system (i.e., the 24-inch storm drain that runs beneath the Lower Parking lot). A diversion weir is located in the 24-inch storm drain to direct low flows to the cistern for subsequent treatment through the sediment basin and biofilter. A portion of flows from this storm drain overtop the weir and discharge partially treated (by the detention bioswales) to the Northern Drainage at LPBMP0004. The existing diversion weir height is currently being evaluated and a new, larger weir is being considered for installation.

The following BMP installations and maintenance activities associated with the B1436 Detention Bioswale BMP were also performed.

- November and December 2014: Topsoil was placed and plantings of native species were installed in the bioswales. Rip rap, fiber rolls, filter fabric, and sand bags were utilized to reduce runoff and run-on into and from the vegetated bioswales.
- December 2014: Hydroseed was applied to the area east of the southern bioswale.
- January 2015: A wooden fence was installed along the eastern and northern boundary of the northern swale and the northern boundary of the southern swale.
- March 2015: An asphalt curb was installed along the eastern edge of the northern bioswale. The curb was installed with several cuts to allow for surface runoff to enter into the vegetated bioswale (near monitoring locations ILBMP0006 and ILBMP0007).
- April 2015: Sand bags located around the northern and eastern perimeter of the former B1436 area were covered with filter fabric and secured with rip rap.
- June 2015: A concrete curb was installed to modify the overflow structure (i.e., increase the height of the structure) at the southern end of the northern bioswale.

**Helipad.** The Helipad BMP, consisting of two rows of sandbag berms covered with plastic and a temporary pumping system to convey stormwater captured by the berms to nearby mobile storage tanks, was inspected and maintained during the 2014/2015 rainy season.

**Expendable Launch Vehicle (ELV) Area.** The treatment control BMP located in the ELV area was monitored and inspected during the 2014/2015 rainy season. Over the course of the December 2014 rain events sediment was removed from the sump as necessary.

As part of the Area II NASA demolition program, demolition of Building 206 began in April 2015. The Building 206 walls, surrounding above-ground structures, and subsurface features (concrete footings, vaults, and tanks) were removed. In addition, the asphalt road and parking lot north of Building 207 were removed. The demolition of Building 207 and the removal of surrounding asphalt are anticipated to begin in September 2015. Erosion and sediment control

BMPs (i.e., fiber rolls and silt fence) were installed in April 2015 and placement of hydroseed is pending.

**Liquid Oxygen (LOX) Area.** The LOX sandbag berm was inspected and maintained, including replacement of worn and broken sandbags, covering the sandbag berm with filter fabric, and adding fiber rolls and sand bags to secure the fabric in January 2015. The sandbag berm was also extended further to the west in January 2015. Fiber rolls and sand bags were replaced along the main access road to the south in January 2015.

**B-1 Area.** Prior to forecasted rain events, sandbags were placed at the curb cuts to direct runoff along the road through the cuts to the B-1 Media Filter. Following rain events, these sand bags were removed as well as any accumulated sediment or plant debris that had built-up behind the sandbags. In the culvert, plant debris that had built-up behind the rip rap check dams upstream to the north of the B-1 Media Filter was removed during November 2014. On the top of the B-1 slope, worn and broken sandbags were replaced, filter fabric was placed over the sandbags, and fiber rolls were staked on both sides of the sandbag berm in February 2015. At the entrance to B-1, the road leading into B-1 was graded and gravel was placed in February 2015.

**CM-9 Area.** The CM-9 upgrades, including a rip rap berm, perforated pipe, and fiber rolls, were inspected during the 2014/2015 rainy season. The culvert inlet along Area II Road and northeast of CM-9 was inspected and any accumulated plant/leaf debris was removed prior to forecasted rain events and as needed during rain events. In December 2014, leaf litter and twigs were removed from the perforated pipeline upstream of CM-9 and a mesh screen was placed over the inlet following observation of a blockage in the pipe to allow water to discharge through perforations in the pipe as designed during the December 2014 rain events.

**Additional Miscellaneous Erosion Control Installations.** Installation and maintenance of additional erosion control BMPs (e.g., hydroseed mulch, straw wattles, culvert outlet protection, etc.) are performed continuously at SSFL based on recommendations following routine inspections conducted per the sitewide Storm Water Pollution Prevention Plan (SWPPP) or individual construction SWPPPs to identify and mitigate sources of pollution to surface water. Performance of inspections prior to and during rain events to identify soil erosion features are critical in identifying BMP maintenance locations and implementing corrective actions in a timely manner to minimize the transportation of sediment in surface water runoff.

## 1.3 2014/2015 Rainy Season Discharge Event Summary

The SSFL NPDES Permit definition of a discharge (rain) event is one that produces more than 0.1 inches of rainfall in a 24-hour period and must be preceded by at least 72 hours of dry weather. By this measure, nine rain events occurred at SSFL during the 2014/2015 rainy season. The dates of each rain event and the total measured rainfall recorded at a RWQCB approved

weather station within Area I[2], as reported in the NPDES Discharge Monitoring Reports (Boeing, 2015a, 2015b, 2015c) are provided in Table 1-5. The table also includes average rainfall intensity and maximum one-hour rainfall intensity, and a summary of sampling activities for the NPDES, ISRA performance monitoring, and BMP monitoring programs.

During the 2014/2015 rainy season, the amount of rain received as discharge rain events (11.22 inches) was 38% below the average yearly rainfall for the region (~18 inches/year for the period between 1960 and 2014). For comparison, rainfall totals measured during the previous six rainy seasons from the SSFL rain gauge are provided below.

| | **Rainy Season** | | | | | |
|---|---|---|---|---|---|---|
| | **2008/2009** | **2009/2010** | **2010/2011** | **2011/2012** | **2012/2013** | **2013/2014** |
| **Rainfall (inches)** | 11.08 | 19.39 | 23.39 | 11.33 | 8.10 | 6.07 |

## 1.4 NPDES Monitoring and Sampling Results, 2014/2015 Rainy Season

NPDES monitoring and sampling of Outfalls 008 and 009 conducted during the 2014/2015 rainy season was performed in accordance with the NPDES permit[3] adopted on June 3, 2010. During the 2014/2015 rainy season, one sample was collected at Outfall 008 and five samples were collected at Outfall 009. The dates and associated rain event information for these samples are presented in Table 1-5. The concentrations of the outfall-specific COCs and field measurements for Outfall 008 and Outfall 009 are presented in Tables 1-6 and 1-7, respectively.

During the 2014/2015 rainy season, COCs were not detected above the NPDES permit limit in the sample collected from Outfall 008. Lead was detected above the NPDES permit limit in three of the five samples and dioxins were detected above the NPDES permit limits in two of the five samples collected from Outfall 009. It was the goal of the Panel's 2010 BMP Work Plan to resolve exceedances at these two outfalls, and it is the opinion of the Panel that significant water quality improvement progress has been made over this period, as clearly demonstrated by the BMP Performance Memo and the BMP Ranking Memo, included in Appendix E and F, respectively. However, the ultimate goal of the BMP Plan has yet to be realized.

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[2] The RWQCB-approved Area I weather station malfunctioned during the December 11 – 12, 2014 rain event. Rainfall totals were obtained from the Station 436 weather station (also in Area I) for this rain event instead.

[3] Per the NPDES permit adopted on June 3, 2010, dioxins toxicity equivalent (TEQ) concentrations for NPDES samples were calculated during the 2010/2011 through the 2014/2015 rainy seasons by multiplying each congener concentration by its respective toxicity equivalency factor (TEF) and bioaccumulation equivalency factor (BEF), and excluding congener data not qualified (DNQ) results. Dioxins TEQ concentrations in samples collected prior to the 2010/2011 rainy season were calculated per the previous NPDES permits by multiplying each congener concentration only by its respective TEF, excluding congener DNQ results.

Based on data analyses shown in the Expert Panel's BMP Ranking Memo, lead concentrations and particulate strengths at Outfall 009 were found to be close to those of stormwater background sites, indicating that lead sources in this watershed may be predominantly from natural background soils. However, for dioxins, concentrations and particulate strengths at Outfall 009 were found to be above those of background sites, indicating that anthropogenic sources may be contributing to the outfall, such as weathered pavement, pavement resurfacing, vehicles, coated wood power poles, and atmospheric deposition (which is more efficiently conveyed by impervious area in developed subwatersheds than pervious area in undeveloped subwatersheds).

A complete set of NPDES sampling results and an evaluation of the data for Outfalls 008 and 009 are presented in the NPDES Discharge Monitoring Reports (Boeing, 2015a, 2015b).

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## 2.0 ISRA PERFORMANCE MONITORING SUMMARY

The data collected during the 2014/2015 rainy season represents the fourth year of rainy season monitoring for one Phase III ISRA area (IEL-2), the third year of monitoring for seven Phase III ISRA areas (AP/STP-1B, AP/STP-1C-1, AP/STP-1C-2, AP/STP-1E-1, AP/STP-1E-2, AP/STP-1E-3, and IEL-3), and the second year of monitoring for five Phase III ISRA areas (ELV-1C, ELV-1D, LOX-1B-1, LOX-1B-2, and LOX-1B-3). The performance monitoring inspection and sample locations from the 2014/2015 rainy season are listed in Table 1-3 and shown on Figure 1-2. A summary of the ISRA performance monitoring results from the 2009/2010 through the 2013/2014 rainy seasons is provided in Section 2.1. A summary of the results from the 2014/2015 rainy season is provided in Section 2.2. An evaluation of upstream versus downstream ISRA performance monitoring sample results could not be performed this year due to lack of observed upstream flows as a result of low rainfall experienced during the rainy season. The conclusion to recommend discontinuing ISRA performance monitoring at the Phase III ISRA areas based on data collected through the 2014/2015 rainy season is included in Section 2.3.

### 2.1 Pre-2014/2015 Rainy Season Sampling Summary

A summary of pre-2014/2015 ISRA performance monitoring is provided in Table 2-1 and the monitoring locations and sampling dates are shown on Figures 2-1 through 2-5.

**Table 2-1: Pre-2014/2015 ISRA Performance Monitoring Summary**

| Area Monitored | Rainy Season | | | | |
|---|---|---|---|---|---|
| | 2009/2010 | 2010/2011 | 2011/2012 | 2012/2013 | 2013/2014 |
| Phase I ISRA Areas | | | | | |
| OF008 ISRA areas (10) | X | X | X (Discontinued[a]) | -- | -- |
| A2LF-1, -3 | X | X | X (Discontinued[a]) | -- | -- |
| CM Systems | | | | | |
| CM-1 | X | X | X (Reassigned[b]) | -- | -- |
| CM-9 | X | X | X | X (Reassigned[b]) | -- |
| CM-3, CM-8, & CM-11 (Background CMs) | X | X (Discontinued[c]) | -- | -- | -- |
| B-1 Media Filter | -- | -- | X (Reassigned[b]) | -- | -- |

**Table 2-1: Pre-2014/2015 ISRA Performance Monitoring Summary, continued**

| Area Monitored | Rainy Season | | | | |
|---|---|---|---|---|---|
| | 2009/2010 | 2010/2011 | 2011/2012 | 2012/2013 | 2013/2014 |
| Phase II ISRA Areas | | | | | |
| B-1 ISRA Areas (5) | -- | X | X (Discontinued[a]) | -- | -- |
| CTLI-1A, -1B | -- | X | X (Discontinued[a]) | -- | -- |
| IEL-1 | -- | X | X (Discontinued[a]) | -- | -- |
| AP/STP-1A, -1D, -1F | -- | X | X (Discontinued[a]) | -- | -- |
| Phase III ISRA Areas | | | | | |
| IEL-2 | -- | -- | X | X | X |
| IEL-3 | -- | -- | -- | X | X |
| AP/STP-1B, -1C-1, -1C-2, -1E-1, -1E-2, -1E-3 | -- | -- | -- | X | X |
| ELV-1C, -1D | -- | -- | -- | -- | X |
| LOX-1B-1, -1B-2, -1B-3 | -- | -- | -- | -- | X |
| **Sampling Summary** | 62 samples (from 28 locations) | 91 samples (from 25 locations) | 40 samples (from 15 locations) | 2 samples (from 2 locations) | 2 samples (from 2 locations) |

NOTES

- (X) ISRA performance monitoring performed during specified rainy season.
- ([a]) ISRA performance monitoring discontinued after specified rainy season because monitoring has been performed for the minimum period of two years as specified in the ISRA Work Plan (MWH, 2009) and sufficient data have been collected to show a general decrease in downstream results, as compared to upstream results.
- ([b]) ISRA performance monitoring reassigned to the BMP performance monitoring program.
- ([c]) ISRA performance monitoring discontinued after specified rainy season because the low concentrations of constituents in samples limits the performance evaluation of the CMs.

## 2.2 2014/2015 Rainy Season Activities and Results

During the 2014/2015 rainy season, performance monitoring continued at the thirteen Phase III ISRA areas (AP/STP-1B, AP/STP-1C-1, AP/STP-1C-2, AP/STP-1E-1, AP/STP-1E-2, AP/STP-1E-3, ELV-1C, ELV-1D, IEL-2, IEL-3, LOX-1B-1, LOX-1B-2, and LOX-1B-3). A summary of the 2014/2015 inspection and sampling activities and results are presented below.

### 2.2.1 Inspection and Sampling Activities

Field inspections of ISRA performance monitoring locations was conducted during all ten qualifying rain events in 2014/2015. During these rain events, stormwater runoff was observed and sampled at five performance monitoring locations within the Outfall 009 watershed, at the AP/STP, IEL, and LOX areas. The RWQCB collected two split samples of the performance monitoring samples collected at the IEL area. The number of primary performance monitoring samples collected during each rain event is presented in Table 1-5, and the performance monitoring samples collected during the 2014/2015 rainy season, including RWQCB splits, are listed in Table 2-2. The monitoring locations and dates on which ISRA performance monitoring samples were collected are shown on Figures 2-1 through 2-6. Charts showing rainfall in inches per hour for the 2014/2015 rain events during which a performance monitoring sample was collected, along with the performance monitoring sampling times and Outfall 009 flow rates and sampling times, are included in Appendix A.

### 2.2.2 Sample Results

ISRA performance monitoring analytical results, including RWQCB split samples, field measurements[4], and rainfall event measurements from the 2014/2015 rainy season are presented in Table 2-3. Consistent with the approach used during previous rainy seasons, Level II validation was performed on dioxins results above the permit limit. In addition, Level V validation was performed on all performance monitoring results for samples monitoring ISRA areas on NASA property. Laboratory and validation reports for performance monitoring samples (primary and RWQCB splits) are included in Appendix B.

Performance monitoring sample results were compared to NPDES outfall results to assess whether there is a general pattern of water quality changes as runoff travels down the watersheds and to provide a context for evaluating possible contributions to NPDES samples at the outfalls. To support this evaluation, time series charts comparing performance monitoring results and NPDES monitoring results, and correlation charts comparing COC results to TSS are provided in Appendix C.

Below is a summary of the performance monitoring sample results and general trends observed in the results; the summary below does not consider RWQCB split samples.

[4] Field measurements include turbidity, temperature, pH, and conductivity.

**Outfall 009 Watershed Sample Results and Findings:**

- ISRA Performance Monitoring Results: Cadmium, copper, mercury, and dioxins were not detected in ISRA performance monitoring samples at concentrations above the NPDES permit limit during the 2014/2015 rainy season. Lead was detected above the NPDES permit limit in one performance monitoring sample (located at AP/STP) during the November 30 - December 4, 2014 rain event.

- Outfall 009 NPDES Monitoring Results: Cadmium, copper, and mercury were not detected in the NPDES monitoring results at concentrations above the NPDES permit limit. Lead and/or dioxins were detected above the NPDES permit limits in three of the five samples collected; however, the NPDES sample collected during the November 30 - December 4, 2014 rain event, the largest rain event of the season and the rain event lead exceeded the NPDES performance limit in a performance monitoring sample, did not contain COCs above the NPDES permit limit.

- Performance monitoring samples collected to date (starting in 2009) show positive correlations between copper and lead concentrations and TSS concentrations, confirming the general understanding that these COCs are associated with soil particulate matter. Correlations between cadmium, mercury, and dioxins concentrations and TSS concentrations were limited by the high number of non-detect results.

## 2.3 ISRA Performance Monitoring Program Recommendation

It is recommended that ISRA performance monitoring be discontinued at the Phase III ISRA areas, as monitoring has been performed for the minimum period of two years as specified in the ISRA Work Plan (MWH, 2009) and sufficient performance monitoring data has been collected to indicate that ISRA activities have successfully reduced the contribution of ISRA COCs from Phase III ISRA areas to surface water runoff. With the completion of ISRA performance monitoring at Phase III ISRA areas, ISRA performance monitoring at all ISRA areas is complete signifying the completion of the ISRA program.

# 3.0 POTENTIAL BMP AND BMP PERFORMANCE MONITORING PROGRAM

The data collected during the 2014/2015 rainy season represents the fifth year of BMP monitoring. The BMP monitoring and sample locations from the 2014/2015 rainy season are listed in Table 1-4 and shown on Figure 1-2. A summary of BMP monitoring from the 2010/2011 through the 2013/2014 rainy seasons is provided in Section 3.1. A summary of the monitoring activities and results from the 2014/2015 rainy season is provided in Section 3.2. An up- and downstream evaluation of BMP performance monitoring results collected to date is included in Section 3.3. Section 3.4 and 3.5 present the results of the BMP site ranking analysis and the recommendations for modifications to the BMP monitoring program, respectively.

## 3.1 Pre-2014/2015 Rainy Season Sampling Summary

A summary of pre-2014/2015 BMP monitoring is provided in Table 3-1 and the monitoring locations and sampling dates are shown on Figures 2-1 through 2-5.

**Table 3-1 Pre-2014/2015 BMP Monitoring Summary**

| Area Monitored | Rainy Season | | | |
|---|---|---|---|---|
| | 2010/2011 | 2011/2012 | 2012/2013 | 2013/2014 |
| **Outfall 008** | | | | |
| HVS | X | X | X | X (Discontinued[a]) |
| **Outfall 009** | | | | |
| AILF/CM-9 | X | X | X | X |
| A2LF | X | X | X | X |
| AP/STP | -- | -- | X | X |
| B-1 | X | X | X | X |
| CM-1 | X | X | X | X |
| ELV | X | X | X | X |
| Helipad | X | X | X | X |
| IEL | X | X | X | X |
| LOX | X | X | X | X |
| Lower Parking Lot | X | X | X | X |
| **Background** | X | X (Discontinued[a]) | -- | -- |
| **Sampling Summary** | 67 samples (from 22 locations) | 88 samples (from 24 locations) | 29 samples (from 23 locations) | 27 samples (from 21 locations) |

NOTES

- (X) BMP monitoring performed during specified rainy season.
- ([a]) BMP monitoring discontinued after specified rainy season because sufficient data have been collected for the program.

Using the results of the 2010/2011, 2011/2012, 2012/2013, and 2013/2014 rainy seasons, the Expert Panel prioritized the BMP sites based on water quality considerations. The BMP sites were ranked based on the multi-constituent score, with the top-ranked sites recommended for consideration for new or enhanced stormwater control placement. Based on the ranking results, and utilizing best professional judgment (including consideration of information on planned BMP and demolition measures), new BMPs or improvements to the existing BMPs were recommended at the Helipad, ELV/CM-1, LOX, AILF, CM-9, and Building 1436. Conceptual designs for the BMP concepts and a proposed implementation schedule were presented in the 2011, 2012, 2013, and 2014 BMP Plan addenda (Geosyntec and Expert Panel, 2011, 2012, 2013, 2014).

## 3.2 2014/2015 Rainy Season Activities and Results

During the 2014/2015 rainy season, potential BMP monitoring was performed at 5 potential BMP sites (A2LF, AP/STP, Helipad, IEL, and LOX) and BMP performance monitoring was performed at 27 locations that monitored seven BMP sites, including the B-1 Media Filter, the Lower Parking Lot BMP, the B1436 Detention Bioswales, CM-9/AILF, LOX area BMPs, CM-1, and the ELV stormwater treatment BMP. A summary of the 2014/2015 inspection and sampling activities and results are presented below.

### 3.2.1 Inspection and Sampling Activities

Field inspections of all BMP monitoring locations were conducted during all nine qualifying rain events in 2014/2015. During these rain events, stormwater runoff was observed and sampled at 22 BMP locations (potential and performance monitoring) within the Outfall 009 watershed. A summary of the number of BMP monitoring samples collected during each rain event is presented in Table 1-5. The BMP monitoring samples collected during the 2014/2015 rainy season are listed in Table 3-2. The monitoring locations and dates on which BMP monitoring samples were collected are shown on Figures 2-1 through 2-5. Charts showing rainfall in inches per hour for the 2014/2015 rain events during which a BMP monitoring sample was collected, along with the BMP monitoring sampling times and Outfall 008 and 009 flow rates and sampling times, are included in Appendix A.

### 3.2.2 Sample Results

BMP monitoring analytical results, including field measurements and rainfall event measurements from the 2014/2015 rainy season are presented in Table 3-3 for potential BMP subarea monitoring and in Tables 3-4a through 3-4g for Treatment BMP performance monitoring. Consistent with the approach used during previous rainy seasons, Level II

validation[5] was performed on all dioxins results. In addition, Level V validation[6] was performed on all BMP monitoring results for samples collected on NASA property. Laboratory and validation reports for BMP monitoring samples are included in Appendix B.

BMP monitoring sample results for NPDES COCs were compared to NPDES outfall results to assess whether there is a general pattern of water quality changes as runoff travels down the watersheds and to provide a context for evaluating possible contributions to NPDES samples at the outfalls. To support this evaluation, time-series charts comparing BMP monitoring results and NPDES monitoring results, and correlation charts comparing COC results to TSS are provided in Appendices C and D.

Below is a summary of the potential BMP subarea monitoring and BMP performance monitoring results, and general trends observed in the results. The results for other analytes (e.g., dissolved metals) in potential BMP subarea monitoring samples were or will be used for stormwater treatability assessment, BMP design, metal particulate strength calculations, and future BMP site ranking analyses.

**Outfall 009 Watershed Sample Results and Findings:**

- Potential BMP Subarea Monitoring Results: Cadmium and mercury were not detected in potential BMP subarea monitoring at concentrations above the NPDES permit limit. Lead, copper and/or dioxins were detected above the NPDES permit limit in six samples collected from two potential BMP monitoring locations (AP/STP and IEL) during five rain events. The list of the highest ranked subareas based on the results of the Expert Panel's BMP site ranking analysis is presented in Section 3.4. In general, the subarea monitoring sites that receive runoff from primarily paved surfaces had the highest COC concentrations, a finding that supports the benefits of the ongoing asphalt removal/demolition projects.

- BMP Performance Monitoring Results: Cadmium was not detected in BMP performance monitoring samples at concentrations above the NPDES permit limit. Lead, copper, mercury, and/or dioxins were detected above NPDES permit limits in 29 samples collected from 12 BMP performance monitoring locations during 5 rain events, including at the B-1 Media Filter (up- and downstream), Lower Parking Lot BMP (up-,

[5] The following items are reviewed during the Level II validation process: sample management (collection techniques, sample containers, preservation, handling, transport, COC, holding times); method blank sample results; blank spike and LCS results; surrogate recoveries, if applicable; MS/MSD recoveries and precision; laboratory duplicate precision, if applicable; serial dilution precision, if applicable; field QA/QC sample results; and other QC indicators as applicable.

[6] A Level V validation involves an evaluation of all metals continuing calibration blanks for potential false positive or false negative influence, in addition to the reviews performed for a Level II validation.

intermediate, and downstream), CM-9 (up- and downstream), CM-1 (up-stream), and ELV stormwater treatment BMP (up-stream). Of the 29 samples with exceedances of the NPDES permit limits, 16 samples were collected from up-stream monitoring locations, 5 samples were collected from intermediate monitoring locations, and 8 samples were collected from downstream locations. Refer to Section 3.3 for the evaluation of upstream versus downstream BMP performance monitoring samples.

- NPDES Monitoring Results: Cadmium, copper, and mercury were not detected in the NPDES monitoring results at concentrations above the NPDES permit limit. Lead and/or dioxins were detected above the NPDES permit limits in three of the five samples collected.

## 3.3 Up- and Downstream BMP Performance Evaluations

An evaluation of upstream versus downstream BMP performance monitoring sample results was performed by Geosyntec under the direction of, and with review by, the Expert Panel, with results presented in a memorandum (Geosyntec and Expert Panel, 2015a) included in Appendix D. The memorandum evaluated data collected during the 2009/2010 through 2014/2015 rainy seasons to identify if treatment BMPs are effectively reducing NPDES COCs. The evaluation used only paired data, or locations with both an upstream and downstream sample collected from the same storm event.

In general, data indicate that downstream concentrations at BMP sites are consistently lower than corresponding upstream samples when upstream samples exceed permit limits, thereby demonstrating consistent BMP pollutant removal for the primary COCs for Outfall 009 (i.e., dioxins and lead) and BMPs evaluated.[7] On average, concentrations of dioxins and lead were found to be reduced at the non-background CMs (including CM-1, CM-9 and the B-1 media filter) by 95%[8] and 45%, respectively. Similarly, the ELV stormwater treatment BMP was found to reduce these COCs by 71% and 68%, respectively. The Lower Parking Lot BMP was found to reduce these COCs by 91% and 41%, respectively; however, these reductions likely underestimate the actual reduction through the biofilter since a 2013/2014 effluent sample was taken during overflow, so it reflects a blend of treated and untreated flows. In the 2014/2015 rainy season, there was only one biofilter effluent concentration (5.6 micrograms per Liter [µg/L] lead on 12/2/2014) that was slightly greater than the NPDES Permit limits (5.2 µg/L).

[7] Although no data was collected from background sites in the 2014/2015 monitoring season, previous data indicate that the only exception to this was dioxins at CM background sites (i.e., CMs where upstream drainages are undeveloped and unimpacted and influent concentrations are generally very low and unlikely to be significantly reduced); however, the difference in upstream versus downstream concentrations for this constituent at these sites was not statistically significant.

[8] Average reduction in dioxin TEQ is heavily influenced by one influent/effluent sample pair at CM-1 taken during the 2010/2011 season (prior to improvements at that CM) and one pair at the B-1 media filter from the 2014/2015 season that had an unusually high influent concentration. Exclusion of these pairs results in an average reduction of 82%.

The monitored performance demonstrates the benefits of the sedimentation and media treatment unit processes employed by the Outfall 009 structural treatment controls. The monitoring data have also been used in the subarea ranking evaluations for BMP improvement consideration at locations where effluent quality remains problematic.

## 3.4 Potential BMP Ranking Results and Recommendations

The BMP site ranking analysis was performed by Geosyntec under the direction of, and with review by, the Expert Panel and is presented in the Expert Panel's BMP ranking memo (Geosyntec and Expert Panel, 2015b), which is included as Appendix F. The highest ranked subareas are described below (text pulled directly from the ranking memo). Additional discussion on each subarea, including the history of BMP improvements that have been implemented at each, is provided in the Expert Panel's BMP ranking memo (Geosyntec and Expert Panel, 2015b).

In general, because the 2014/2015 rainy season was unusually dry, there are relatively few new data this year for updating the site rankings.

In some cases, these ranking results are for datasets that reflect conditions prior to or following implementation of temporary measures or corrective actions and this is described in parentheses following the location designation (in bold). The top 20 monitoring locations described below are located in the Outfall 009 drainage area, with none in the Outfall 008 drainage area. Water quality at stormwater background locations was generally good with no location ranked above 36[9], though there were several historical instances of concentrations greater than the NPDES permit limits at those locations. Only one event produced observable runoff and was sampled at Outfall 008 during the current season, for which there were no exceedances. The few runoff-producing events demonstrate that complete retention occurred within the watershed during most of the storms that occurred this year.

Discontinued locations are indicated by gray text and are included for historic tracking and comparison purposes. Additionally, locations noted as "OLD", while not discontinued, have since been renamed and replaced by a new location due to a new BMP or improvement in the upstream subarea; such locations are currently sampled under a new suffix (e.g., -A, -B, etc.).

[9] Some of the sites' ranks are not expressed as whole numbers because an average of ranks is used when multiple sites are tied with the same rank.

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## Table 3-5. Subareas Ranked by Multi-Constituent Score

| Rank | | | Multi-Constituent Score | BMP Subarea (Co-locations) | Watershed | Description | Approximate Upgradient Drainage Area (ac) | Number of Events Sampled | | Upstream of Existing Treatment BMP | Both the NPDES permit limit and 95th percentile background particulate strength threshold exceeded for any one COC | Site Status | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Overall | From Maximum Metal Weighting | From Maximum Dioxin Weighting | | | | | | 2009-2015 | 2014/2015 | | | Being Addressed; no Further Action Required[1] | Targeted for Current Control | Unaddressed |
| 1 | 1 | 5 | 0.97 | ILBMP0002 | Outfall 009 | Road runoff to CM-9, before treatment | 2.5 | 13 | 3 | X | X | X | | |
| 2 | 2 | 1 | 0.97 | EVBMP0003 (A2SW0001) | Outfall 009 | CM-1 upstream west, pre-ELV improvements, before treatment - OLD | 13.3 | 18 | 0 | X | X | X | | |
| 3 | 15.5 | 7 | 0.66 | EVBMP0002 | Outfall 009 | Helipad (pre-sandbag berms) - OLD | 4.1 | 6 | 0 | X | X | | X | |
| 4.5 | 19 | 6 | 0.63 | EVBMP0005 | Outfall 009 | 2012/2013 ELV drainage ditch (pre-ELV-1C ISRA) - OLD | 11.0 | 2 | 0 | X | X | X | | |
| 4.5 | 4 | 22.5 | 0.63 | A1SW0009-A | Outfall 009 | CM-9 downstream-underdrain outlet (post-AILF asphalt removal, pre-filter fabric over weir boards, pre-perforated pipe and riprap berm) - OLD | 16.4 | 1 | 0 | | X | X | | |
| 6 | 3 | 34 | 0.62 | EVBMP0004 | Outfall 009 | 2012/2013 Lower Helipad Road | 1.8 | 3 | 0 | X | X | X | | |
| 7.5 | 5.5 | 22.5 | 0.60 | APBMP0001-A | Outfall 009 | Area II road runoff, post-ELV stormwater improvements | 0.20 | 2 | 1 | | X | | | X |
| 7.5 | 5.5 | 22.5 | 0.60 | APBMP0001 | Outfall 009 | Area II Road runoff, post-ISRA, pre-ELV improvements - OLD | 32.9 | 2 | 0 | | X | X | | |
| 9 | 24 | 3 | 0.58 | LPBMP0001-A | Outfall 009 | Lower Lot sheetflow (post-gravel bag berms) | 5.1 | 6 | 0 | X | X | X | | |
| 10 | 25 | 8 | 0.53 | ILBMP0001 | Outfall 009 | Lower parking lot 24" storm drain bypass | 23.0 | 23 | 5 | | X | | X | |
| 11 | 15.5 | 13 | 0.51 | A1SW0009-B | Outfall 009 | CM-9 downstream-underdrain outlet (post-AILF asphalt removal, post-filter fabric cover weir boards, pre-perforated pipe and riprap berm) - OLD | 16.4 | 6 | 0 | | X | X | | |
| 14.5 | 29.5 | 9 | 0.50 | EVBMP0003-A | Outfall 009 | CM-1 upstream west, post-ELV improvements, before treatment | 2.3 | 3 | 1 | X | X | X | | |
| 14.5 | 10.5 | 22.5 | 0.50 | LPBMP0001 | Outfall 009 | Lower Lot sheetflow (pre-gravel bag berms) - OLD | 5.1 | 2 | 0 | X | | X | | |
| 14.5 | 10.5 | 22.5 | 0.50 | B1SW0014-A | Outfall 009 | B-1 media filter effluent (pre-media filter reconstruction) - OLD | 4.7 | 1 | 0 | | | X | | |
| 14.5 | 10.5 | 22.5 | 0.50 | EVBMP0006 | Outfall 009 | 2012/2013 Area II Road near ELV ditch | 11.0 | 1 | 0 | X | X | X | | |
| 14.5 | 10.5 | 22.5 | 0.50 | B1SW0002 | Outfall 009 | Woolsey Canyon Road Runoff, before treatment | 1.3 | 2 | 0 | X | X | X | | |
| 14.5 | 51 | 2 | 0.50 | B1BMP0004 (B1BMP0004-5, B1SW0015) | Outfall 009 | B-1 media filter inlet north, before treatment | 3.7 | 16 | 4 | X | X | X | | |
| 18 | 59 | 4 | 0.49 | B1BMP0003 (B1BMP0002) | Outfall 009 | B-1 parking lot / road runoff to culvert inlet | 5.2 | 21 | 3 | | X | | | X |
| 19 | 10.5 | 34 | 0.42 | B1BMP0001 (B1SW0010) | Outfall 009 | B-1 media filter inlet (pre-media filter installation) | 4.5 | 3 | 0 | X | | X | | |
| 20 | 19 | 22 | 0.40 | LXBMP0002 | Outfall 009 | LOX mid - OLD | 1.5 | 2 | 0 | X | | X | | |

NOTES

(1) The site is either upstream of an existing BMP or a BMP is planned for this area. However, the relative sizing of each BMP varies, therefore the percent of stormwater runoff captured and treated also varies, and the Panel will further evaluate this at locations where capture is less than desired.
(2) Stormwater runoff from APBMP0001-A is “unaddressed” because this small drainage area is in the middle of several other treated drainage areas, and this flows directly into a road culvert without opportunity for treatment.
(3) Stormwater runoff from B1BMP0003 is “unaddressed” because it flows directly to the Northern Drainage and the Panel has yet to provide a BMP recommendation for this site.

- The rounding of weights may account for similar weights being ranked differently.
- Approximate drainage areas based on the cumulative drainage area of the SWMM catchment in which the monitoring location is located.
- Gray text indicates historic subarea monitoring locations that are discontinued.
- “OLD” in the location description means that the location is now sampled under a new suffix (-A, -B, etc.) due to a change in the upstream watershed, typically BMP implementation.

### 3.4.1 Assessment of Subarea Water Quality

The Expert Panel's "multi-constituent scores" (i.e., statistically computed values that reflect stormwater quality and area used for subarea ranking) can also be used to evaluate water quality pre- and post-modification (where "modification" is used to describe new or enhanced stormwater quality management or source control activities) at specific subareas. Table 3-6 summarizes a select subset of sites that are associated with BMP modifications. The original location names (without a suffix) and their associated site rank represent the sites pre-BMP implementation, as described in Table 3-6. Once the site underwent modification through BMP implementation and BMP upgrades, the location name gained a suffix and was analyzed independently as a distinct site in the ranking analysis (represented as "Post BMP Rank 1", Post BMP Rank 2, or "Post BMP Rank 3" below, depending on the number of upgrades the BMP underwent). In most cases, the site rank based on the multi-constituent score fell after the BMP was implemented, demonstrating that the BMP helped improve water quality at the site.

**Table 3-6. Ranking Comparison of Top Ranked Sites Pre- vs. Post-BMP**

| Original Location Name | Description | Pre-BMP Rank | Suffix | Implementation Date | Description | Post-BMP Rank1 | Suffix | Implementation Date | Description | Post-BMP Rank2 | Suffix | Implementation Date | Description | Current BMP Rank |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B1SW0014 (B1BMP0006) | B-1 culvert effluent (no media filter) – OLD | N/A[1] | **-A** | 9/1/2011[2] | B-1 media filter effluent (pre-media filter reconstruction) - OLD | 14.5 | -B | 12/16/2011 | B-1 media filter effluent (post-media filter reconstruction) - OLD | 33 | -C | 11/2/2012 | B-1 media filter effluent (post-media filter reconstruction, post-curb cuts) | 42 |
| A1SW0009 | CM-9 downstream-underdrain outlet (pre-AILF asphalt removal, pre-filter fabric over weir boards, pre-perforated pipe and rip-rap berm) - OLD | N/A[1] | **-A** | 9/1/2012[2] | CM-9 downstream-underdrain outlet (post-AILF asphalt removal, pre-filter fabric over weir boards, pre-perforated pipe and rip-rap berm) - OLD | 4.5 | **-B** | 1/20/2012 | CM-9 downstream-underdrain outlet (post-AILF asphalt removal, post-filter fabric over weir boards, pre-perforated pipe and rip-rap berm) - OLD | 11 | -C | 3/1/2013 | CM-9 downstream-underdrain outlet (post-AILF asphalt removal, post-filter fabric over weir boards, post-perforated pipe and rip-rap berm) | 43 |
| **EVBMP0002** | Helipad (pre-sandbag berms) - OLD | 3 | -A | 11/14/2011 | Helipad (post-sandbag berms) - OLD | 47 | -B | 9/5/2012 | Helipad (post-sandbag berms raised, post-drainage holes in asphalt) | 40 | N/A | | | |
| **LPBMP0001** | Lower Lot sheetflow (pre-gravel bag berms) - OLD | 14.5 | **-A** | 9/26/2011 | Lower Lot sheetflow (post-gravel bag berms) | 9 | N/A | | | | | | | |
| **APBMP0001** | Area II Road runoff, post-ISRA, pre-ELV improvements - OLD | 7.5 | **-A** | 11/7/2013 | Area II Road runoff, post-ELV stormwater improvements | 7.5 | N/A | | | | | | | |
| **EVBMP0003 (A2SW0001)** | CM-1 upstream west, pre-ELV improvements, before treatment - OLD | 2 | **-A** | 11/1/2013 | CM-1 upstream west, post-ELV improvements, before treatment | 14.5 | N/A | | | | | | | |

NOTES

- ([1])"N/A" means there were no samples collected at this location under the specified name designation and therefore the monitoring location is not ranked.
- ([2]) Dates of 9/1/20XX assume work completed in the summer, prior to the start of the wet season, but are not confirmed.
- **Bold** locations are ranked in the top 20 of the multi-constituent score.
- Gray text indicates historic subarea monitoring locations that are discontinued.

Table 3-7 summarizes the key locations that have both an influent and effluent paired location, which includes some of the locations ranked in the top 20 from the multi-constituent ranking analysis. This comparison demonstrates that treatment through the BMPs resulted in improved water quality. For example, two influent streams within the B-1 area (ranked 14.5 and 31) are both ranked higher than the B-1 effluent, which is ranked 42. A similar occurrence is observed for the influent/effluent ranks for CM-1, CM-9, the ELV stormwater treatment BMP, and the Lower Parking Lot BMP. B-1 parking lot and road runoff have been included to more fully describe improvements in the vegetated area downstream of the B-1 media filter. EVBMP0007 (influent to ELV stormwater treatment BMP) and EVBMP0008 (effluent from ELV stormwater treatment BMP) also illustrate a water quality improvement between influent and effluent.

**Table 3-7. Ranking Comparison of Top-Ranked Sites and their Pairs**

| BMP Area | Influent Monitoring Location | | | Effluent Monitoring Location | | | Rank Change |
|---|---|---|---|---|---|---|---|
| | Monitoring Location | Description | Influent Rank | Monitoring Location | Description | Effluent Rank | |
| CM-9 | **ILBMP0002** | Road runoff to CM-9 | 1 | A1SW0009-C (A1BMP0003) | CM-9 downstream-underdrain outlet (post- perforated pipe and upper basin installed) | 43 | -42 |
| CM-1 | **EVBMP0003 (A2SW0001)** | CM-1 upstream west | 2 | A2SW0002-A (A2BMP0007) | CM-1 effluent (post-filter fabric over weir boards) | 49 | -47 |
| B-1 Media Filter | **B1BMP0004 (B1SW0015, B1BMP0004-5)** | B-1 media filter inlet north | 14.5 | B1SW0014-C (B1BMP0006) | B-1 media filter effluent (post-media filter reconstruction, post-curb cuts) | 42 | -27.5 |
| | B1BMP0005 (B1SW0013, B1SW0011, B1BMP0004-5) | B-1 media filter inlet south | 31 | B1BMP0006 | | | -11 |
| Lower Lot Sediment Basin | LPBMP0002 | Lower parking lot influent to cistern | 22 | LPBMP0003 | Lower Parking Lot sediment basin outlet | 34 | -12 |
| | | | | LPBMP0004 | Lower parking lot biofilter outlet | 58 | -36 |
| Vegetated Area D/S of B-1 Media Filter | **B1BMP0003 (B1BMP0002)** | B-1 parking lot / road runoff to culvert inlet | 18 | B1BMP0007 | B-1, vegetated channel | 39 | -21 |
| | B1SW0014-C (B1BMP0006) | B-1 media filter effluent (post-media filter reconstruction, post-curb cuts) | 42 | | | | 3 |
| ELV Stromwater Treatment BMP | EVBMP0007 | Influent to ELV treatment BMP | 23.5 | EVBMP0009 | Influent to ELV media filter, before treatment | 25.5 | -2 |
| | | | | EVBMP0008 | Effluent from ELV stormwater treatment BMP | 50.5 | -27 |

NOTES
- **Bolded** locations indicate that the monitoring location is ranked in the top 20 of the multi-constituent score.
- Gray text indicates historic subarea monitoring locations that are discontinued.

### 3.4.2 2015 BMP Recommendations and Status Updates

The following area summaries provide a status update on the Expert Panel's 2014 BMP recommendations, as well as new additional recommendations for 2015 (text pulled directly from the ranking memo).

1. **ELV Area (NASA):** The ELV stormwater treatment BMP[10] was installed in November of 2013 and three samples have been collected to date. Last year, the Expert Panel recommended continued inspection and maintenance of the ELV stormwater treatment BMP, robust erosion control improvements along the ELV channel, and that stormwater samples be collected at the mid-point, between the sedimentation tanks and the media filter tank. The Panel has no new recommendations this year, beyond continued inspections and maintenance, as the ELV treatment system is showing a water quality improvement (based on the limited number of samples collected).

2. **CM-9 (Boeing):** Last year the Panel recommended ongoing maintenance of previously installed BMPs as well as replacement of the filter fabric on the CM-9 weir boards when the fabric became clogged or damaged; monitoring of sediment accumulation at the inlet of the CM and at the new pretreatment rock berm; observation of the duration of water ponding upstream of the weir boards as ponding for greater than 72 hours may suggest that media or underdrain maintenance is needed; and continued performance monitoring, inspection, and maintenance for the CM-9 downstream underdrain outlet (A1SW0009-A). All of these recommendations were implemented in the 2014/2015 rainy season. This year the Expert Panel recommends continued implementation of these inspection and maintenance recommendations.

3. **CM-1 (NASA):** In February of 2015, the sandbag berm near CM-1 west was raised and recovered with fabric; no samples have been collected since this improvement. Last year the Expert Panel recommended continued inspection and maintenance of CM-1. The Panel continues to make this recommendation, in addition to potentially increasing the CM-1 capacity by raising the overflow weir or expanding/enhancing the media bed, as deemed feasible. The Panel also recommends that the influent and effluent samples be collected as close temporally together as possible, particularly during the same storm event.

[10] Designed to meet the design storm requirements.

4. **Helipad (NASA):** The sandbag berms were kept in operation during the 2014/2015 season. Last year, the Panel recommended continued operation of this temporary pumping system or equivalent runoff capture and treatment as a temporary interim control strategy until NASA was able to remove asphalt from the Helipad area during planned demolition; this recommendation still stands as the asphalt has not yet been removed and is not expected to be removed until the soil remediation is completed. Last year the Expert Panel also recommended that ponded water be pumped out of the sump area and the storm drain inlet "plug" under Helipad Road be removed when either 1) Outfall 009 is flowing or 2) the sump is overflowing onto Helipad road. The plug was not removed for any events in the 2014/2015 monitoring season. This year, the Panel continues this recommendation and also recommends that representative runoff from the Helipad be collected for analyses at either 1) the slope drain where the plug is located, or 2) where runoff flows into the Helipad road culvert (which would overflow the ELV stormwater treatment BMP and discharge directly into the creek). The Panel also recommends continued inspection and maintenance of the helipad sandbag berms and any future BMPs. The storage volumes behind the sandbag berms is approximately equivalent to runoff volumes from a quarter inch rain event.

5. **Lower Lot (Boeing):** Last year, the Panel recommended that the monitoring program be modified such that the sample at LPBMP0003 be collected from the sediment basin outlet structure using a sample pole, that field observations be recorded when biofilter effluent samples are collected during periods of overflow, and that effluent samples be collected from the underdrain outlet within the biofilter outlet structure. The Panel also recommended review of the cistern pump programming to prevent future overflows of the biofilter; this review was completed. In December of 2014, detention bioswales were constructed in the upper portion of the drainage area tributary to the Lower Lot diversion structure. This delayed the runoff volume to the Lower Lot Biofilter[11] and increased the total volume treated by the biofilter. Additionally, an analysis of the feasibility and benefit of raising the weir height to further increase the percent capture is currently underway. Preliminary results suggest that raising the 2-inch weir by 6-inches (to an 8-inch height) would achieve a 0% bypass of the low flow diversion for the 1-year, 24-hour design storm for the combined upper and lower drainage areas. The Panel also recommends continued inspection, maintenance, and monitoring of the Lower Lot Biofilter system, specifically to prevent underflow.

[11] Designed to meet the design storm requirements.

6. **Detention Bioswales:** Construction of the detention bioswales[12] near former Building 1436 was completed in December of 2014. Although no stormwater influent samples (due to lack of observable flow) and only one effluent sample (due to complications accessing the underdrains, which are currently being resolved) were collected in the 2014/2015 rainy season, observations indicated that surface water runoff was effectively being diverted into the rip rap area as designed. The Expert Panel recommends continued inspection and maintenance of these BMPs as the vegetation becomes established, as well as review of future influent and effluent monitoring data collected during the upcoming rainy season. The Expert Panel also recommends that sampling at the detention bioswales be prioritized in this next rainy season.

7. **Upper Lot (Boeing):** The Expert Panel recommends asphalt removal or new stormwater capture above the culvert inlet at B1BMP0003. This could occur in a temporary form, like sand bag berms that are currently found at the Helipad.

8. **All BMPs:** The Expert Panel continues to recommend that all BMPs be regularly inspected and maintained to allow for proper function and treatment of runoff.

9. **Northern Drainage:** Due to the continuation of exceedances at Outfall 009 despite demonstrated water quality improvement at the individual BMPs, the Expert Panel recommends that potential opportunities for in-stream improvements within the Northern Drainage be considered to the extent allowed by existing jurisdictional permits. An analysis of lead and dioxin sediment monitoring data within the Northern Drainage is currently under review in order to assess area for effective BMP placement. The Expert Panel has once again determined that, for a variety of reasons, it would not be feasible to build a dam near the outfall and pump to a mechanical treatment system, such as Silvernale.

10. **Roadside Opportunities:** Due to the continuation of exceedances at Outfall 009 despite demonstrated water quality improvement at the individual BMPs, the Expert Panel plans to comprehensively evaluate potential road runoff capture/treatment opportunities and implement any feasible projects that are identified. Specifically, this recommendation is also intended to address the ranking results at APBMP0001-A (ranked 7.5) as well as B1BMP0003 (ranked 18), which are both reflective of direct runoff from paved surfaces. The Panel suggests that these improvements be coupled with planned road improvements per the transportation plan, if the timeline allows for such coordination without delaying BMP implementation.

[12] Designed to meet the design storm requirements.

11. **Special Studies:** The Expert Panel wishes to further investigate the source of persistent NPDES exceedances of dioxins and lead in stormwater at OF009, and has identified the following study questions as the basis for new sampling studies that are recommended for the 2015/16 rainy season.

    1. **Question:** Where (spatially) within the 009 watershed are dioxins and lead in stormwater predominantly coming from?

    **Suggested approach to answer question:** Conduct water sampling along the Northern Drainage, including above the main confluence near OF009, and below/above A2LF, LOX, and the lower lot areas.

    2. **Question:** Given that the 009 subareas (most of which are highly paved) have consistently higher stormwater concentrations of dioxins and lead than both the outfall and the stormwater background sites, what are the predominant pollutant sources to these areas (e.g., pavement material itself, vehicles, atmospheric deposition)?

    **Suggested approach to answer question:** Conduct stormwater sampling from representative areas with newly resurfaced asphalt (e.g., north end of upper parking lot near site entrance), low traffic (e.g., helipad), and high traffic (e.g., lower parking lot, upper parking lot near former Building 1436, top of Woolsey Canyon Road near site entrance). This can be done through analysis of existing, active subarea monitoring sites (i.e., no new subarea monitoring is needed). Also perform atmospheric deposition sampling and hand vacuum sampling of solids from these areas, and analyze these solids for dioxins and lead, to distinguish solids concentration differences between vehicle-traveled areas and pure atmospheric deposition areas. Similarly, with respect to treated wood poles as a potential source, collect soil samples near poles and analyze for dioxins and lead.

12. **BMP Monitoring Program:** This year the Panel recommends additional monitoring locations specific to characterizing road runoff (or other previously unmonitored potential source areas). Lastly, it is recommended that monitoring at existing or potential BMP locations continue if the locations were ranked in the top 20 in 2014/2015, or if insufficient data exist (e.g. APBMP0001).

Although this analysis primarily focuses on the selection of potential stormwater treatment control locations, the Expert Panel continues to strongly recommend the rigorous application of erosion and sediment control practices and stream channel stabilization measures throughout the 008 and 009 watersheds, including and especially at areas where substantial soil removal may be planned at steep areas and/or in proximity to drainage courses. The Expert Panel also continues to recommend the stabilization of unpaved roads and the implementation of source controls (including source removal, such as through the ISRA and demolition programs). Culverts should also continue to be inspected for evidence of piping (or seepage along the outside of the culvert),

not only for water quality purposes, but also for safety concerns near the roadways. Finally, it is important that routine maintenance be undertaken at all CM locations and where sedimentation basins have been constructed (e.g., above B-1).

The Expert Panel believes that new and planned activities, taken together, will improve NPDES compliance at Outfalls 008 and 009 at discharges under and up to the Panel's proposed design storm flows.

## 3.5 Potential BMP Monitoring Program Recommendations

Based on the data collected to date, the following recommendations for the 2015/2016 rainy season are made:

- Add a subarea monitoring location at the outlet of the storm drain near the B-1 area, which flows into the vegetated channel upstream of existing monitoring location B1BMP0007.
- Add monitoring locations specific to characterize road runoff (or other previously unmonitored potential source areas).
- Continue to note if ponded water is overtopping the outlet structure or underdrain standpipes of the biofilter (i.e., overflow is occurring) at the time the Lower Parking Lot BMP effluent sample is collected (LPBMP0004).
- Either modify the detention bioswale infrastructure to more easily allow collection of effluent samples from the detention bioswale underdrain outlets in the catch basin (ILBMP0005 and ILBMP0007), or use the "modified dipper" approach. Additionally, due to a short time of concentration to the influent sample locations, sampling staff should carefully observe these locations, and prioritize sample collection during high intensity periods.
- Collect a sample of runoff from the Helipad at the location where the runoff flows down the channel to the sump along Helipad Road during every rain event flow is observed (EVBMP0002).

## 4.0 UPDATED MILESTONES SCHEDULE

The 2014/2015 rainy season marks the end of ISRA performance monitoring and the BMP Plan coverage period. Future BMP-related activities will be performed and reported as specified in a Site-wide Work Plan that is being prepared pursuant to the 2015 NPDES permit (RWQCB, 2015). Below is the milestone schedule of activities planned as of the preparation of this document, which will be incorporated into the milestone schedule included in the Site-wide Work Plan.

**2015:**

| | |
|---|---|
| October 2015 | Submit Site-wide Work Plan pursuant to the 2015 NPDES permit. |
| 2015/2016 Rainy Season | Collect stormwater samples (note: includes performance monitoring at existing BMP locations and subarea monitoring at potential BMP locations). |

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# TABLES

**Table 1-1**
**Summary of NPDES Permit Limit Exceedances - Outfall 008**
**Page 1 of 1**

| Analyte | Units | 2010 Compliance Limit | Sample Date | Result | Data Type |
|---|---|---|---|---|---|
| Copper | µg/L | 14.0 | 2/18/2005 | 15 | Monitoring-only |
| Copper | µg/L | 14.0 | 4/13/2012 | 18 | Compliance |
| Lead | µg/L | 5.2 | 10/20/2004 | 9.8 | Monitoring-only |
| Lead | µg/L | 5.2 | 10/27/2004 | 9 | Monitoring-only |
| Lead | µg/L | 5.2 | 12/28/2004 | 6.4 | Monitoring-only |
| Lead | µg/L | 5.2 | 2/18/2005 | 13 | Monitoring-only |
| Lead | µg/L | 5.2 | 10/18/2005 | 120 | Monitoring-only |
| Lead | µg/L | 5.2 | 1/1/2006 | 20 | Monitoring-only |
| Lead | µg/L | 5.2 | 4/15/2006 | 18 | Compliance |
| Lead | µg/L | 5.2 | 1/25/2008 | 6.3 | Benchmark |
| Lead | µg/L | 5.2 | 1/18/2010 | 7.9 | Benchmark |
| Lead | µg/L | 5.2 | 2/5/2010 | 10 | Benchmark |
| Lead | µg/L | 5.2 | 2/28/2010 | 7.0 | Benchmark |
| Lead | µg/L | 5.2 | 12/19/2010 | 6.7 | Compliance |
| Lead | µg/L | 5.2 | 4/13/2012 | 10 | Compliance |
| Dioxins / TCDD TEQ | µg/L | 2.80E-08 | 2/18/2005 | 4.46E-08 | Monitoring-only |
| Dioxins / TCDD TEQ | µg/L | 2.80E-08 | 2/28/2006 | 3.19E-07 | Monitoring-only |
| Dioxins / TCDD TEQ | µg/L | 2.80E-08 | 1/18/2010 | 2.35E-06 | Benchmark |

**Notes:**

NPDES Permit exceedances are sample results that are greater than the NPDES limit and were collected after the discharge limit was established and before limit was updated to a benchmark (performance based) limit for the outfalls (compliance data above).

Dioxins / TCDD TEQ - A sum of 17 dioxin / furan congener results adjusted for toxicity. The TEQ is calculated for samples collected before July 2010 by multiplying the result of each congener by its respective World Health Organization's (1998 WHO's) toxicity equivalency factor (TEF), which is based on the relative potency of the congener to cause a toxic response relative to 2,3,7,8-TCDD. Samples collected after July 2010 are also multiplied by the Great Lakes water quality initiative bioaccumulation equivalency factor (BEF), which corresponds to the differences in biological uptake from the water column for the various dioxin congeners. TCDD TEQ values do not include laboratory data not quantified (DNQ) as specified in the NPDES permit.

TCDD TEQ - tetrachlorobenzo-p-dioxin toxicity equivalent (normalized to 2,3,7,8-TCDD)

**Table 1-2**
**Summary of NPDES Permit Limit Exceedances - Outfall 009**
**Page 1 of 2**

| Analyte | Units | 2010 Compliance Limit | Sample Date | Result | Data Type |
|---|---|---|---|---|---|
| Cadmium | µg/L | 4.0 | 10/17/2005 | 9.2 | Monitoring-only |
| Copper | µg/L | 14 | 10/17/2005 | 39 | Monitoring-only |
| Copper | µg/L | 14 | 2/18/2006 | 22 | Monitoring-only |
| Copper | µg/L | 14 | 4/4/2006 | 26 | Compliance |
| Lead | µg/L | 5.2 | 12/28/2004 | 11 | Monitoring-only |
| Lead | µg/L | 5.2 | 2/18/2005 | 10 | Monitoring-only |
| Lead | µg/L | 5.2 | 10/17/2005 | 260 | Monitoring-only |
| Lead | µg/L | 5.2 | 2/18/2006 | 33 | Monitoring-only |
| Lead | µg/L | 5.2 | 4/4/2006 | 64 | Compliance |
| Lead | µg/L | 5.2 | 9/22/2007 | 8.6 | Compliance |
| Lead | µg/L | 5.2 | 2/3/2008 | 6.0 | Benchmark |
| Lead | µg/L | 5.2 | 12/15/2008 | 19 | Benchmark |
| Lead | µg/L | 5.2 | 2/6/2009 | 7.5 | Benchmark |
| Lead | µg/L | 5.2 | 2/13/2009 | 20 | Benchmark |
| Lead | µg/L | 5.2 | 12/7/2009 | 5.7 | Benchmark |
| Lead | µg/L | 5.2 | 1/19/2010 | 9.3 | Benchmark |
| Lead | µg/L | 5.2 | 2/28/2010 | 8.9 | Benchmark |
| Lead | µg/L | 5.2 | 10/6/2010 | 11 | Compliance |
| Lead | µg/L | 5.2 | 3/25/2012 | 7.2 | Compliance |
| Lead | µg/L | 5.2 | 3/1/2014 | 9.6 | Compliance |
| Lead | µg/L | 5.2 | 12/13/2014 | 8.8 | Compliance |
| Lead | µg/L | 5.2 | 12/17/2014 | 13 | Compliance |
| Lead | µg/L | 5.2 | 3/10/2015 | 5.8 | Compliance |
| Mercury | µg/L | 0.13 | 1/4/2005 | 0.20 | Monitoring-only |
| Mercury | µg/L | 0.13 | 10/17/2005 | 0.21 | Monitoring-only |
| Oil & Grease | µg/L | 15 | 1/11/2005 | 16 | Compliance |
| pH | pH units | 6.5 - 8.5 | 10/17/2005 | 8.80 | Compliance |
| pH | pH units | 6.5 - 8.5 | 2/28/2014 | 5.5* | Compliance |
| Dioxins / TCDD TEQ | µg/L | 2.80E-08 | 1/4/2005 | 1.72E-06 | Monitoring-only |
| Dioxins / TCDD TEQ | µg/L | 2.80E-08 | 2/18/2005 | 5.20E-08 | Monitoring-only |
| Dioxins / TCDD TEQ | µg/L | 2.80E-08 | 10/17/2005 | 9.10E-04 | Monitoring-only |
| Dioxins / TCDD TEQ | µg/L | 2.80E-08 | 11/9/2005 | 6.14E-07 | Monitoring-only |
| Dioxins / TCDD TEQ | µg/L | 2.80E-08 | 2/18/2006 | 1.56E-05 | Monitoring-only |
| Dioxins / TCDD TEQ | µg/L | 2.80E-08 | 4/4/2006 | 1.77E-05 | Compliance |
| Dioxins / TCDD TEQ | µg/L | 2.80E-08 | 2/19/2007 | 7.64E-07 | Compliance |

**Table 1-2**
**Summary of NPDES Permit Limit Exceedances - Outfall 009**
**Page 2 of 2**

| Analyte | Units | 2010 Compliance Limit | Sample Date | Result | Data Type |
|---|---|---|---|---|---|
| Dioxins / TCDD TEQ | µg/L | 2.80E-08 | 9/22/2007 | 3.13E-06 | Compliance |
| Dioxins / TCDD TEQ | µg/L | 2.80E-08 | 2/3/2008 | 3.58E-07 | Benchmark |
| Dioxins / TCDD TEQ | µg/L | 2.80E-08 | 11/26/2008 | 3.99E-07 | Benchmark |
| Dioxins / TCDD TEQ | µg/L | 2.80E-08 | 12/15/2008 | 1.83E-06 | Benchmark |
| Dioxins / TCDD TEQ | µg/L | 2.80E-08 | 2/6/2009 | 9.55E-07 | Benchmark |
| Dioxins / TCDD TEQ | µg/L | 2.80E-08 | 2/13/2009 | 1.22E-05 | Benchmark |
| Dioxins / TCDD TEQ | µg/L | 2.80E-08 | 10/14/2009 | 1.60E-06 | Benchmark |
| Dioxins / TCDD TEQ | µg/L | 2.80E-08 | 12/7/2009 | 1.10E-07 | Benchmark |
| Dioxins / TCDD TEQ | µg/L | 2.80E-08 | 1/19/2010 | 3.43E-06 | Benchmark |
| Dioxins / TCDD TEQ | µg/L | 2.80E-08 | 2/5/2010 | 7.21E-07 | Benchmark |
| Dioxins / TCDD TEQ | µg/L | 2.80E-08 | 2/28/2010 | 1.09E-06 | Benchmark |
| Dioxins / TCDD TEQ | µg/L | 2.80E-08 | 3/7/2010 | 2.90E-08 | Benchmark |
| Dioxins / TCDD TEQ | µg/L | 2.80E-08 | 4/5/2010 | 1.58E-06 | Benchmark |
| Dioxins / TCDD TEQ | µg/L | 2.80E-08 | 4/12/2010 | 1.47E-06 | Benchmark |
| Dioxins / TCDD TEQ | µg/L | 2.80E-08 | 10/6/2010 | 3.90E-08 | Compliance |
| Dioxins / TCDD TEQ | µg/L | 2.80E-08 | 3/20/2011 | 8.26E-08 | Compliance |
| Dioxins / TCDD TEQ | µg/L | 2.80E-08 | 3/18/2012 | 1.61E-07 | Compliance |
| Dioxins / TCDD TEQ | µg/L | 2.80E-08 | 3/25/2012 | 5.62E-08 | Compliance |
| Dioxins / TCDD TEQ | µg/L | 2.80E-08 | 4/11/2012 | 3.72E-08 | Compliance |
| Dioxins / TCDD TEQ | µg/L | 2.80E-08 | 3/1/2014 | 1.32E-07 | Compliance |
| Dioxins / TCDD TEQ | µg/L | 2.80E-08 | 12/13/2014 | 8.93E-08 | Compliance |
| Dioxins / TCDD TEQ | µg/L | 2.80E-08 | 12/17/2014 | 7.50E-08 | Compliance |

**Notes:**

NPDES Permit exceedances are sample results that are greater than the NPDES limit and were collected after the discharge limit was established and before limit was updated to a benchmark (performance based) limit for the outfalls (compliance data above).

Dioxins / TCDD TEQ - A sum of 17 dioxin / furan congener results adjusted for toxicity. The TEQ is calculated for samples collected before July 2010 by multiplying the result of each congener by its respective World Health Organization's (1998 WHO's) toxicity equivalency factor (TEF), which is based on the relative potency of the congener to cause a toxic response relative to 2,3,7,8-TCDD. Samples collected after July 2010 are also multiplied by the Great Lakes water quality initiative bioaccumulation equivalency factor (BEF), which corresponds to the differences in biological uptake from the water column for the various dioxin congeners. TCDD TEQ values do not include laboratory data not quantified (DNQ) as specified in the NPDES permit.

TCDD TEQ - tetrachlorobenzo-p-dioxin toxicity equivalent (normalized to 2,3,7,8-TCDD)

* pH reading taken in the field, low result may be due to human and/or instrument error.

**Table 1-3**
**ISRA Performance Monitoring Inspection Locations and Analytical Plan**
**2014/2015 Rainy Season**


| Object ID | Location | Areas Monitored | Purpose | Notes | Cadmium (Total Recoverable) (Method 200.8) | Copper (Total Recoverable) (Method 200.8) | Lead (Total Recoverable) (Method 200.8) | Mercury (Total Recoverable) (Method 245.1) | Dioxins (Method 1613) | Total Suspended Solids (Method 2540) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Outfall 009 Watershed** | | | | | | | | | | |
| APSW0007 | AP/STP | AP/STP-1B, -1C-1 | US/BG | AP/STP tributary drainage | X | X | X | X | X | X |
| APSW0008 | AP/STP | AP/STP-1C-1, -1C-2 | US/BG | Intermittent stream flow | X | X | X | X | X | X |
| APSW0009 | AP/STP | AP/STP-1B, -1C-1, -1C-2 | Secondary | AP/STP tributary drainage | To Be Determined* | | | | | |
| APSW0010 | AP/STP | AP/STP-1E-1 | Secondary | Intermittent stream flow | To Be Determined* | | | | | |
| APSW0011 | AP/STP | AP/STP-1E-2 | Secondary | AP/STP tributary drainage | To Be Determined* | | | | | |
| APSW0012 | AP/STP | AP/STP-1E-3 | US/BG | Intermittent stream flow | | | | | X | X |
| APSW0014 | AP/STP | All AP/STP | DS | AP/STP tributary drainage | X | X | X | X | X | X |
| EVSW0001 | ELV | ELV-1C | US | Intermittent sheet flow | X | X | X | X | X | X |
| EVSW0002 | ELV | ELV-1C | DS | Intermittent stream flow | X | X | X | X | X | X |
| EVSW0003 | ELV | ELV-1D | US | Intermittent stream flow | X | X | X | X | X | X |
| EVSW0004 | ELV | ELV-1D | DS | Intermittent stream flow | X | X | X | X | X | X |
| ILSW0003 | IEL | IEL-2 | US | Intermittent stream flow | X | | X | X | | X |
| ILSW0004 | IEL | IEL-2 | DS | Intermittent stream flow | X | | X | X | | X |
| ILSW0005 | IEL | IEL-3 | US | Intermittent stream flow | X | X | X | X | | X |
| ILSW0006 | IEL | IEL-3 | DS | Intermittent stream flow | X | X | X | X | | X |
| ILSW0007 | IEL | IEL-2 | Alternate DS | Intermittent stream flow | X | | X | X | | X |
| ILSW0008 | IEL | IEL-2 | Alternate DS | Intermittent stream flow | X | | X | X | | X |
| LXSW0004 | LOX | LOX-1B-1, -1B-2, -1B-3 | US/BG | Intermittent stream flow | X | X | X | X | X | X |
| LXSW0005 | LOX | LOX-1B-1, -1B-2, -1B-3 | US/BG | Intermittent stream flow | X | X | X | X | X | X |
| LXSW0006 | LOX | LOX-1B-1, -1B-2, -1B-3 | US/BG | Intermittent stream flow | X | X | X | X | X | X |

**Table 1-3**
**ISRA Performance Monitoring Inspection Locations and Analytical Plan**
**2014/2015 Rainy Season**


| Object ID | Location | Areas Monitored | Purpose | Notes | Cadmium (Total Recoverable) (Method 200.8) | Copper (Total Recoverable) (Method 200.8) | Lead (Total Recoverable) (Method 200.8) | Mercury (Total Recoverable) (Method 245.1) | Dioxins (Method 1613) | Total Suspended Solids (Method 2540) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Outfall 009 Watershed (continued)** | | | | | | | | | | |
| LXSW0007 | LOX | LOX-1B-1, -1B-2, -1B-3 | DS | Slope drain inlet; western end of sand bag berm | X | X | X | X | X | X |
| LXSW0008 | LOX | LOX-1B-1, -1B-2, -1B-3 | DS | Slope drain inlet; eastern end of sand bag berm | X | X | X | X | X | X |
| LXSW0009 | LOX | LOX-1B-1, -1B-2, -1B-3 | Alternate DS | Slope drain inlet; eastern end of sand bag berm | X | X | X | X | X | X |
| LXSW0010 | LOX | LOX-1B-3 | DS | Intermittent stream flow | X | X | X | X | X | X |

**Abbreviations:**
BG - Background Assessment
CM - Culvert Modification
DS - Downstream
US - Upstream
X = Collect and Analyze

**Notes:**
* Analytical suite of secondary monitoring locations will be based on the evaluation of data from primary performance monitoring locations and sampled as warranted by the primary data.

**Table 1-4**
**BMP Monitoring Inspection Locations and Analytical Plan**
**2014/2015 Rainy Season**


| Object ID | Location | Areas Monitored | Purpose | Notes | Metals (Total Recoverable) (Method 200.7/200.8) | Metals (Total Dissolved) (Method 200.7/200.8) | Cd, Cu, Pb, Hg (Total Dissolved) (Method 200.7/200.8) | Cd, Cu, Pb, Hg (Total Recoverable) (Method 200.7/200.8) | Dioxins (Method 1613) | Total Suspended Solids (Method 2540) | Particle Size Distribution (Method ASTM D422) | Turbidity (Method 180.1) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Outfall 009 Watershed** | | | | | | | | | | | | |
| A1BMP0002 | AILF | CM-9, AILF | US South, Treatment BMP Performance Monitoring | AILF tributary drainage | | | X | X | X | X | X | |
| A1BMP0003 | AILF | CM-9, AILF, IEL, Area II Road | DS, Treatment BMP Performance Monitoring | CM-9 underdrain | | | X | X | X | X | X | |
| A2BMP0001 | A2LF | A2LF | Potential BMP Location | Tributary drainage, west | X | X | | | X | X | X | X |
| A2BMP0002 | A2LF | A2LF | Potential BMP Location | Tributary drainage, east | X | X | | | X | X | X | X |
| A2BMP0006 | CM-1 | CM-1 | US East, Treatment BMP Performance Monitoring | CM-1 eastern tributary drainage | | | X | X | X | X | X | |
| A2BMP0007 | CM-1 | CM-1 | DS, Treatment BMP Performance Monitoring | CM-1 culvert outlet | | | X | X | X | X | X | |
| APBMP0001 | Ash Pile | AP/STP, ELV | Potential BMP Location | Area II Road asphalt swale | X | X | | | X | X | X | X |
| B1BMP0003 | B-1 | B-1, Upper Parking Lot | US Monitoring Location of Vegetated Area DS of B-1 Media Filter | Culvert inlet | | | X | X | X | X | X | |
| B1BMP0004 | B-1 | B-1 Media Filter | US North, Treatment BMP Performance Monitoring | Tributary drainage | | | X | X | X | X | X | |
| B1BMP0005 | B-1 | B-1 Media Filter | US South, Treatment BMP Performance Monitoring | Asphalt swale downstream of B-1 sedimention basin discharge | | | X | X | X | X | X | |
| B1BMP0006 | B-1 | B-1 Media Filter | DS, Treatment BMP Performance Monitoring | B-1 Media Filter underdrain | | | X | X | X | X | X | |

**Table 1-4**
**BMP Monitoring Inspection Locations and Analytical Plan**
**2014/2015 Rainy Season**


| Object ID | Location | Areas Monitored | Purpose | Notes | Metals (Total Recoverable) (Method 200.7/200.8) | Metals (Total Dissolved) (Method 200.7/200.8) | Cd, Cu, Pb, Hg (Total Dissolved) (Method 200.7/200.8) | Cd, Cu, Pb, Hg (Total Recoverable) (Method 200.7/200.8) | Dioxins (Method 1613) | Total Suspended Solids (Method 2540) | Particle Size Distribution (Method ASTM D422) | Turbidity (Method 180.1) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Outfall 009 Watershed (continued)** | | | | | | | | | | | | |
| B1BMP0007 | B-1 | Vegetated Area Downstream of B-1 Media Filter | DS Monitoring Location of Vegetated Area DS of B-1 Media Filter | Tributary drainage; DS of B-1 storm drain outlet and US of Lower Parking Lot BMP discharge to Northern Drainage | | | X | X | X | X | X | |
| B1BMP0007[A] | B-1 | Vegetated Area Downstream of B-1 Media Filter | Alternate DS Monitoring Location of Vegetated Area DS of B-1 Media Filter | DS of B-1 storm drain outlet | | | X | X | X | X | X | |
| EVBMP0001 | ELV | ELV, Helipad | ELV Treatment BMP Overflow Monitoring | Culvert inlet; runoff will only be present when rain events exceed ELV BMP design storm | X | X | | | X | X | X | X |
| EVBMP0002 | ELV, Helipad | Helipad | Helipad BMP Overflow Monitoring | Spillway inlet | X | X | | | X | X | X | X |
| EVBMP0003 | CM-1 | CM-1, Area II Road | US West, Treatment BMP Performance Monitoring | Sheetflow along Area II Road upstream of sandbag berm | | | X | X | X | X | X | |
| EVBMP0007 | ELV | ELV Treatment BMP | US, Treatment BMP Performance Monitoring | Sample port in BMP influent pipe prior to "T" connection | | | X | X | X | X | X | |
| EVBMP0008 | ELV | ELV Treatment BMP | DS, Treatment BMP Performance Monitoring | Discharge from media filter tank pipe | | | X | X | X | X | X | X |
| EVBMP0009 | ELV | ELV Treatment BMP | Mid-Point Treatment BMP Performance Monitoring | Composite sample from eastern and western sample ports between settling tanks and media filter | | | X | X | X | X | X | X |
| ILBMP0001 | Lower Parking Lot | IEL | Potential BMP Location | Culvert discharge under spillway chute | X | X | | | X | X | X | X |
| ILBMP0002 | AILF | CM-9, IEL, Area II Road | US East, Treatment BMP Performance Monitoring | Culvert inlet off Area II Road | | | X | X | X | X | X | |
| ILBMP0003 | IEL | Building 1436 Detention Bioswale | US, Treatment BMP Performance Monitoring | Upstream end of southwestern bioswale; DS of both influent locations | | | X | X | X | X | X | |

**Table 1-4**
**BMP Monitoring Inspection Locations and Analytical Plan**
**2014/2015 Rainy Season**


| Object ID | Location | Areas Monitored | Purpose | Notes | Metals (Total Recoverable) (Method 200.7/200.8) | Metals (Total Dissolved) (Method 200.7/200.8) | Cd, Cu, Pb, Hg (Total Dissolved) (Method 200.7/200.8) | Cd, Cu, Pb, Hg (Total Recoverable) (Method 200.7/200.8) | Dioxins (Method 1613) | Total Suspended Solids (Method 2540) | Particle Size Distribution (Method ASTM D422) | Turbidity (Method 180.1) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Outfall 009 Watershed (continued)** | | | | | | | | | | | | |
| ILBMP0004 | IEL | B1436 Southern Detention Bioswale | US, Treatment BMP Performance Monitoring | Concrete swale diverting sheetflow into rock crib (west) | | | X | X | X | X | X | |
| ILBMP0005 | IEL | B1436 Southern Detention Bioswale | DS, Treatment BMP Performance Monitoring | Bioswale underdrain (subsurface 12-inch drain connecting to existing culvert) | | | X | X | X | X | X | |
| ILBMP0006 | IEL | B1436 Northern Detention Bioswale | US, Treatment BMP Performance Monitoring | Curb cut in concrete curb along north side of bioswale | | | X | X | X | X | X | |
| ILBMP0007 | IEL | B1436 Northern Detention Bioswale | DS, Treatment BMP Performance Monitoring | Bioswale underdrain (subsurface 12-inch drain connecting to existing culvert) | | | X | X | X | X | X | |
| ILBMP0008 | IEL | B1436 Southern Detention Bioswale | US, Treatment BMP Performance Monitoring | Concrete swale diverting sheetflow into rock crib (east) | | | X | X | X | X | X | |
| LPBMP0002 | Lower Parking Lot | Lower Parking Lot BMP | US, Treatment BMP Performance Monitoring | Sample port in cistern discharge pipe | | | X | X | X | X | X | |
| LPBMP0003 | Lower Parking Lot | Lower Parking Lot BMP | Mid-Point Treatment BMP Performance Monitoring | Sediment Basin outlet box | | | X | X | X | X | X | |
| LPBMP0004 | Lower Parking Lot | Lower Parking Lot BMP | DS, Treatment BMP Performance Monitoring | Discharge from Biofilter effluent pipe | | | X | X | X | X | X | |
| LXBMP0006 | LOX | LOX | Potential BMP Location | Sheetflow along dirt road; co-located with LXSW0010 | X* | X | | | X* | X* | X | X |
| LXBMP0007 | LOX | LOX Sandbag Berm and Slope Drains | DS, BMP Performance Monitoring | Slope drain outlet; co-located with LXSW0007 | | | X | X* | X* | X* | X | |
| LXBMP0008 | LOX | LOX Sandbag Berm and Slope Drains | DS, BMP Performance Monitoring | Slope drain outlet; co-located with LXSW0008 | | | X | X* | X* | X* | X | |
| LXBMP0009 | LOX | LOX Sandbag Berm and Slope Drains | Alternate DS, BMP Performance Monitoring | Slope drain outlet; co-located with LXSW0009 | | | X | X* | X* | X* | X | |

**Table 1-4**
**BMP Monitoring Inspection Locations and Analytical Plan**
**2014/2015 Rainy Season**


| Object ID | Location | Areas Monitored | Purpose | Notes | Metals (Total Recoverable) (Method 200.7/200.8) | Metals (Total Dissolved) (Method 200.7/200.8) | Cd, Cu, Pb, Hg (Total Dissolved) (Method 200.7/200.8) | Cd, Cu, Pb, Hg (Total Recoverable) (Method 200.7/200.8) | Dioxins (Method 1613) | Total Suspended Solids (Method 2540) | Particle Size Distribution (Method ASTM D422) | Turbidity (Method 180.1) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Abbreviations:**

CM - Culvert Modification
DS - Downstream
US - Upstream
X = Collect and Analyze

**Notes:**

* Cd, Cu, Pb, Hg, dioxin, and total suspended solids analysis to be obtained from co-located performance monitoring sample

[A] Alternate location B1BMP0007[A] added during the 2014/2015 rainy season to avoid sampling overflow from the Biofilter, which occured upstream from the original B1BMP0007 location.

**Table 1-5**
**Rain Event and Sampling Summary, Outfall 008 and 009 Watersheds**
**2014/2015 Rainy Season**


| Rain Event | Total Rainfall[1] (inches) | Average Rainfall Intensity[1] (inches / hour) | Maximum 1-Hour Rainfall Intensity[1] (inches / hour) | Outfall 008 Watershed | Outfall 009 Watershed | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | ISRA Performance Monitoring Samples[2] | | |
| | | | | NPDES Samples | NPDES Samples | BMP Monitoring Samples | Analyzed | Hold | Total |
| October 31 - November 1, 2014 | 0.36 | 0.045 | 0.33 | 0 | 0 | 0 | 0 | 0 | 0 |
| November 30 - December 4, 2014 | 3.20 | 0.035 | 0.40 | 0 | 1 | 18 | 2 | 0 | 2 |
| December 11 - 12, 2014 | 2.62 | Unavailable[3] | Unavailable[3] | 1 | 1 | 18 | 4 | 0 | 4 |
| December 15 - 17, 2014 | 0.91 | 0.025 | 0.33 | 0 | 1 | 11 | 1 | 0 | 1 |
| January 10 - 11, 2015 | 1.56 | 0.071 | 0.23 | 0 | 1 | 7 | 0 | 0 | 0 |
| January 26 - 27, 2015 | 0.25 | 0.015 | 0.06 | 0 | 0 | 0 | 0 | 0 | 0 |
| February 22 - 23 2015 | 0.21 | 0.008 | 0.06 | 0 | 0 | 0 | 0 | 0 | 0 |
| March 1 - 3, 2015 | 1.44 | 0.024 | 0.22 | 0 | 1 | 10 | 0 | 0 | 0 |
| May 14 - 15, 2015 | 0.41 | 0.017 | 0.30 | 0 | 0 | 1 | 0 | 0 | 0 |
| Non Rain Event Total[4] | 0.26 | -- | -- | -- | -- | -- | -- | -- | -- |
| **TOTAL** | **11.22** | **--** | **--** | **1** | **5** | **65** | **7** | **0** | **7** |

**Notes:**

[1] Total rainfall, average rainfall intensity, and maximum 1-hour rainfall intensity were calculated based on rainfall recorded at a Regional Water Quality Control Board (RWQCB)-approved weather station

[2] The numbers of Performance Monitoring samples shown do not include RWQCB split samples.

[3] Area I weather station malfunctioned during rain event; rainfall totals from Station 436 used but hourly rainfall not available.

[4] On the following 6 days, rainfall was measured but was not considered a rain event per the NPDES Permit definition: November 13-14, 2014; February 7-8, 2015; March 13, 2015; and May 8, 2015.

**Table 1-6**
**NPDES Sample Results, Outfall 008**
**2014/2015 Rainy Season**
**Page 1 of 1**

| | | **Object Name:** | **Outfall 008** |
|---|---|---|---|
| | | **Sample Name:** | **Outfall 008** |
| | | **Sample Date:** | **12/12/2014** |
| | | **Sample Type:** | **NPDES** |
| | | **Location:** | **Outfall** |
| | | **Rain Event:** | **December 11-12, 2014** |
| **ANALYTE** | **UNITS** | **NPDES Permit Limit** | **RESULT** |
| **DIOXINS** | | | |
| TCDD TEQ_NoDNQ | ug/L | 2.80E-08 | ND |
| **INORGANICS** | | | |
| Copper | ug/L | 14 | 5.2 |
| Copper, dissolved | ug/L | -- | 3.2 |
| Lead | ug/L | 5.2 | 2.0 |
| Lead, dissolved | ug/L | -- | <0.5 |
| **MISCELANEOUS** | | | |
| Total Suspended Solids | mg/L | -- | 27 |
| **FIELD MEASUREMENTS** | | | |
| Temperature | deg C | 30 | 11.73* |
| pH | SU | 6.5-8.5 | 6.61* |
| **RAINFALL MEASUREMENTS** † | | | |
| Intensity (Ave) - Pre-Sampling | in/hr | -- | Unavailable |
| Intensity (Ave) - Rain Event | in/hr | -- | Unavailable |
| Intensity (Max) - Pre-Sampling | in/hr | -- | Unavailable |
| Intensity (Max) - Rain Event | in/hr | -- | Unavailable |
| Total - Pre-Sampling | in | -- | Unavailable |
| Total - Rain Event | in | -- | 2.62 |
| **FLOW MEASUREMENTS** | | | |
| Total Volume - Pre-Sampling | mil gal | -- | 0.0613 |
| Total Volume - Event | mil gal | -- | 0.0614 |
| Peak Discharge - Pre-Sampling | cfs | -- | 0.4770 |
| Peak Discharge - Event | cfs | -- | 0.4770 |
| Watershed Inches - Pre-Sampling | in | -- | 0.0010 |
| Watershed Inches - Event | in | -- | 0.0010 |

**Notes:**
Results above NPDES Permit Limit in **bold** and gray shading
See Appendix B for explanation of data validation qualifiers.
* Data not validated.
† Total rainfall, average rainfall intensity, and maximum 1-hour rainfall intensity were calculated based on rainfall recorded at a RWQCB-approved weather station within Area I. Due to Area I weather station malfunction during the 12/11-12/12/2014 rain event; rainfall totals from Station 436 were used but hourly rainfall is not available.

**Table 1-7**
**NPDES Sample Results, Outfall 009**
**2014/2015 Rainy Season**


| | | Object Name: | OUTFALL 009 | OUTFALL 009 | OUTFALL 009 | OUTFALL 009 | OUTFALL 009 |
|---|---|---|---|---|---|---|---|
| | | Sample Name: | Outfall 009 | Outfall 009 | Outfall 009 | Outfall 009 | Outfall 009 |
| | | Sample Date: | 12/02/2014 - 12/03/2014 | 12/12/2014 - 12/13/2014 | 12/17/2014 | 1/11/2015 | 3/3/2015 |
| | | Sample Type: | NPDES | NPDES | NPDES | NPDES | NPDES |
| | | Location: | Outfall | Outfall | Outfall | Outfall | Outfall |
| | | Rain Event: | November 30 - December 4, 2014 | December 11-12, 2014 | December 15-17, 2014 | January 10-11, 2015 | March 1-3, 2015 |
| **ANALYTE** | **UNITS** | **NPDES Permit Limit** | **RESULT** | **RESULT** | **RESULT** | **RESULT** | **RESULT** |
| **DIOXINS** | | | | | | | |
| TCDD TEQ_NoDNQ | ug/L | 2.80E-08 | 1.33E-10 | **8.93E-08** | **7.49E-08** | ND | 5.50E-10 |
| **INORGANICS** | | | | | | | |
| Cadmium | ug/L | 4 | <0.25 | 0.31 J (DNQ) | <0.25 | <0.25 * | <0.25 |
| Cadmium, dissolved | ug/L | -- | <0.25 | <0.25 | <0.25 | <0.25 * | <0.25 |
| Copper | ug/L | 14 | 8.2 | 9.0 | 8.8 J+ | 4.5 * | <5.3 U (B) |
| Copper, dissolved | ug/L | -- | 5.9 | 4.6 | 4.4 J+ | 3.7 * | 3.1 |
| Lead | ug/L | 5.2 | 3.5 | **8.8** | **13** | 2.3 * | **5.8** |
| Lead, dissolved | ug/L | -- | 0.85 J (DNQ) | 1.1 | 1.3 | <0.50 * | <0.50 |
| Mercury | ug/L | 0.13 | <0.10* | <0.10* | <0.10* | <0.10* | <0.10* |
| Mercury, dissolved | ug/L | -- | <0.10* | -- | <0.10* | <0.10* | <0.10* |
| **MISC** | | | | | | | |
| Total Suspended Solids | mg/L | -- | 21 | 78 | 78 | 13 | 33 |
| **FIELD MEASUREMENTS** | | | | | | | |
| Temperature | deg C | 30 | 13.11 * | 11.44 * | 8.39 * | 11.46 * | 7.25 * |
| pH | SU | 6.5-8.5 | 6.6 * | 6.5 * | 6.6 * | 6.73 * | 6.54 * |
| **RAINFALL MEASUREMENTS** † | | | | | | | |
| Intensity (Ave) - Pre-Sampling | in/hr | -- | 0.039 | Unavailable | 0.026 | 0.075 | 0.029 |
| Intensity (Ave) - Rain Event | in/hr | -- | 0.033 | Unavailable | 0.025 | 0.071 | 0.024 |
| Intensity (Max) - Pre-Sampling | in/hr | -- | 0.40 | Unavailable | 0.33 | 0.23 | 0.22 |
| Intensity (Max) - Rain Event | in/hr | -- | 0.40 | Unavailable | 0.33 | 0.23 | 0.22 |
| Total - Pre-Sampling | in | -- | 2.88 | Unavailable | 0.91 | 1.56 | 1.43 |
| Total - Rain Event | in | -- | 3.20 | 2.62 | 0.91 | 1.56 | 1.43 |
| **FLOW MEASUREMENTS** | | | | | | | |
| Total Volume - Pre-Sampling | mil gal | -- | 0.121 | 2.801 | 3.450 | 0.142 | 0.203 |
| Total Volume - Event | mil gal | -- | 0.230 | 3.768 | 3.768 | 0.428 | 0.310 |
| Peak Discharge - Pre-Sampling | cfs | -- | 0.584 | 23.840 | 23.840 | 1.382 | 0.601 |
| Peak Discharge - Event | cfs | -- | 0.584 | 23.840 | 23.840 | 1.382 | 0.601 |
| Watershed Inches - Pre-Sampling | in | -- | 0.000226 | 0.0452 | 0.0556 | 0.000264 | 0.000379 |
| Watershed Inches - Event | in | -- | 0.000428 | 0.0608 | 0.0608 | 0.000798 | 0.000579 |

**Notes:**
Results above NPDES Permit Limit in **bold** and gray shading
See Appendix B for explanation of data validation qualifiers.
* Data not validated.
† Total rainfall, average rainfall intensity, and maximum 1-hour rainfall intensity were calculated based on rainfall recorded at a RWQCB-approved weather station within Area I. Due to Area I weather station malfunction during the 12/11-12/12/2014 rain event; rainfall totals from Station 436 were used but hourly rainfall is not available.

**Table 2-2**
**ISRA Performance Monitoring Sample Collection Matrix**
**2014/2015 Rainy Season**


| Watershed | Object ID | Sample ID | Field Sample ID | Collection Date | Collection Time | Purpose | Areas Monitored | Notes | Cadmium (Total Recoverable) (Method 200.8) | Copper (Total Recoverable) (Method 200.8) | Lead (Total Recoverable) (Method 200.8) | Mercury (Total Recoverable) (Method 245.1) | Dioxins (Method 1613) | Total Suspended Solids (Method 2540) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 009 | APSW0014 | APSW0014S002 | APSW0014S001 | 12/02/14 | 13:15 | DS | Ash Pile | AP/STP tributary drainage | X | X | X | X | X | X | V1 |
| 009 | LXSW0009 | LXSW0009S002 | LXSW0009S001 | 12/02/14 | 13:40 | DS | LOX-B1-3 | co-located with LXBMP0009 | X | X | X | X | X | X | V1 |
| 009 | ILSW0007 | ILSW0007S001 | n/a | 12/12/14 | 12:30 | US | IEL-2 | Intermittent stream flow | X | | X | X | | X | |
| 009 | ILSW0007 | ILSW0007S001-RWQCB* | n/a | 12/12/14 | 12:30 | US | IEL-2 | Intermittent stream flow | X | | X | X | | X | |
| 009 | ILSW0008 | ILSW0008S001 | n/a | 12/12/14 | 12:30 | DS | IEL-2 | Intermittent stream flow | X | | X | X | | X | |
| 009 | ILSW0008 | ILSW0008S001-RWQCB* | n/a | 12/12/14 | 12:30 | DS | IEL-2 | Intermittent stream flow | X | | X | X | | X | |
| 009 | LXSW0009 | LXSW0009S003 | LXSW0009S002 | 12/12/14 | 7:50 | DS | LOX-B1-3 | co-located with LXBMP0009 | X | X | X | X | X | X | V1 |
| 009 | LXSW0010 | LXSW0010S001 | n/a | 12/12/14 | 8:30 | DS | LOX-B1-3 | co-located with LXBMP0006 | X | X | X | X | X | X | V1 |
| 009 | LXSW0010 | LXSW0010S003 | n/a | 12/17/14 | 10:30 | DS | LOX-B1-3 | co-located with LXBMP0006 | X | X | X | X | X | X | V1 |

**Notes:**
DS - Downstream
US - Upstream
RWQCB - Regional Water Quality Control Board
V1 - Level V validation performed on all analyses
X - Sample was analyzed
Use the Field Sample ID when looking up analytical results in laboratory and validation reports, where indicated. Otherwise use Sample ID.
* RWQCB split sample

**OF009 Sample Totals**

| | |
|---|---|
| Primary - Collected | 7 |
| Primary - Analyzed | 7 |
| Primary - On Hold | 0 |
| RWQCB Split - Collected | 2 |
| RWQCB Split - Analyzed | 2 |
| RWQCB Split - On Hold | 0 |
| **Total Analyzed** | **9** |

**Table 2-3a (IEL-2)**
**ISRA Performance Monitoring Sample Results, Outfall 009 Watershed**
**2014/2015 Rainy Season**


| | | Object Name: | ILSW0007 | ILSW0007 | ILSW0008 | ILSW0008 |
|---|---|---|---|---|---|---|
| | | Sample Name: | ILSW0007S001 | ILSW0007S001-RWQCB | ILSW0008S001 | ILSW0008S001-RWQCB |
| | | Sample Date: | 12/12/2014 | 12/12/2014 | 12/12/2014 | 12/12/2014 |
| | | Sample Type: | Perf Mon | Perf Mon | Perf Mon | Perf Mon |
| | | Location: | US IEL-2 | US IEL-2 | DS IEL-2 | DS IEL-2 |
| | | Rain Event: | December 11-12, 2014 | December 11-12, 2014 | December 11-12, 2014 | December 11-12, 2014 |
| **ANALYTE** | **UNITS** | **NPDES Permit Limit** | **RESULTS** | **RESULTS** | **RESULTS** | **RESULTS** |
| **INORGANICS** | | | | | | |
| Cadmium | µg/L | 4.0 | 0.29 J,DX* | 0.31 * | 0.34 J,DX* | 0.34 * |
| Lead | ug/L | 5.2 | 2.1 * | 1.4 * | 2.6 * | 1.7 * |
| Mercury | µg/L | 0.13 | <0.10 * | < 0.02* | <0.10 * | < 0.02 * |
| **MISCELANEOUS** | | | | | | |
| Total Suspended Solids | mg/L | - | 47 * | 43.5 * | 69 * | 69.0 * |
| **FIELD MEASUREMENTS** | | | | | | |
| Conductivity (Field) | mS | - | 0.071 * | -- | 0.068 * | -- |
| pH (Field) | pH Units | 6.5 - 8.5 | 7.18 * | -- | 7.21 * | -- |
| Temperature | °C | 30 | 13.18 * | -- | 13.36 * | -- |
| Turbidity (Field) | NTU | - | 167 * | -- | 175 * | -- |
| **RAINFALL MEASUREMENTS** † | | | | | | |
| Intensity (Ave) - Pre-Sampling | in/hr | - | 0.022 | 0.022 | 0.022 | 0.022 |
| Intensity (Ave) - Rain Event | in/hr | - | 0.033 | 0.033 | 0.033 | 0.033 |
| Intensity (Max) - Pre-Sampling | in/hr | - | 0.26 | 0.26 | 0.26 | 0.26 |
| Intensity (Max) - Rain Event | in/hr | - | 0.40 | 0.40 | 0.40 | 0.40 |
| Total - Pre-Sampling | in | - | 1.15 | 1.15 | 1.15 | 1.15 |
| Total - Rain Event | in | - | 3.20 | 3.20 | 3.20 | 3.20 |

**Notes:**

Upstream Sample Location

Downstream Sample Location

Results above NPDES Permit Limit in **bold** with darker shading

See Appendix B for explanation of data qualifiers.

* Data not validated.

† Total rainfall, average rainfall intensity, and maximum 1-hour rainfall intensity were calculated based on rainfall recorded at a RWQCB-approved weather station within Area I.

**Table 2-3b (AP/STP)**
**ISRA Performance Monitoring Sample Results, Outfall 009 Watershed**
**2014/2015 Rainy Season**


| | | Object Name: | APSW0014 |
|---|---|---|---|
| | | Sample Name: | APSW0014S002 |
| | | Sample Date: | 12/2/2014 |
| | | Sample Type: | Perf Mon |
| | | Location: | DS (AP/STP) |
| | | Rain Event: | November 30 - December 4, 2014 |
| **ANALYTE** | **UNITS** | **NPDES Permit Limit** | **RESULTS** |
| **DIOXINS** | | | |
| TCDD TEQ_NoDNQ | ug/L | 2.80E-08 | 1.31E-10 |
| **INORGANICS** | | | |
| Cadmium | µg/L | 4.0 | 0.703 J |
| Copper | µg/L | 14 | 8.29 |
| Lead | ug/L | 5.2 | **7.29** |
| Mercury | µg/L | 0.13 | <0.0453 |
| **MISCELANEOUS** | | | |
| Total Suspended Solids | mg/L | - | 82 |
| **FIELD MEASUREMENTS** | | | |
| Conductivity (Field) | mS | - | 0.016 * |
| pH (Field) | pH Units | 6.5 - 8.5 | 7.0 * |
| Temperature | °C | 30 | 12.11 * |
| Turbidity (Field) | NTU | - | 284 * |
| **RAINFALL MEASUREMENTS** † | | | |
| Intensity (Ave) - Pre-Sampling | in/hr | - | 0.026 |
| Intensity (Ave) - Rain Event | in/hr | - | 0.033 |
| Intensity (Max) - Pre-Sampling | in/hr | - | 0.40 |
| Intensity (Max) - Rain Event | in/hr | - | 0.40 |
| Total - Pre-Sampling | in | - | 1.38 |
| Total - Rain Event | in | - | 3.20 |

**Notes:**

Upstream Sample Location

Downstream Sample Location

Results above NPDES Permit Limit in **bold** with darker shading

See Appendix B for explanation of data qualifiers.

* Data not validated.

† Total rainfall, average rainfall intensity, and maximum 1-hour rainfall intensity were calculated based on rainfall recorded at a RWQCB-approved weather station within Area I.

**Table 2-3c (LOX)**
**ISRA Performance Monitoring Sample Results, Outfall 009 Watershed**
**2014/2015 Rainy Season**


| | | Object Name: | LXSW0009 | LXSW0009 | LXSW0010 | LXSW0010 |
|---|---|---|---|---|---|---|
| | | Sample Name: | LXSW0009S002 | LXSW0009S003 | LXSW0010S001 | LXSW0010S003 |
| | | Sample Date: | 12/2/2014 | 12/12/2014 | 12/12/2014 | 12/17/2014 |
| | | Sample Type: | Perf Mon | Perf Mon | Perf Mon | Perf Mon |
| | | Location: | DS (LOX 1B-3) | DS (LOX 1B-3) | DS (LOX 1B-3) | DS (LOX 1B-3) |
| | | Rain Event: | November 30 - December 4, 2014 | December 11-12, 2014 | December 11-12, 2014 | December 15-17, 2014 |
| **ANALYTE** | **UNITS** | **NPDES Permit Limit** | **RESULTS** | **RESULTS** | **RESULTS** | **RESULTS** |
| **DIOXINS** | | | | | | |
| TCDD TEQ_NoDNQ | ug/L | 2.80E-08 | ND | ND | ND | ND |
| **INORGANICS** | | | | | | |
| Cadmium | µg/L | 4.0 | 0.5 J | <0.128 | <0.128 | <0.128 |
| Copper | µg/L | 14 | 5.3 | 3.29 | 2.67 | 2.68 |
| Lead | ug/L | 5.2 | 2.69 | 1.03 | 0.575 J | <0.0898 |
| Mercury | µg/L | 0.13 | <0.0453 | <0.0453 | <0.0453 | <0.0466 J |
| **MISCELANEOUS** | | | | | | |
| Total Suspended Solids | mg/L | - | 95 | 20 | 40 | 1.4 |
| **FIELD MEASUREMENTS** | | | | | | |
| Conductivity (Field) | mS | - | 0.028 * | 0.77 * | 0.098 * | 0.126 * |
| pH (Field) | pH Units | 6.5 - 8.5 | **6.41*** | **5.52 *** | **6.25 *** | 6.74 * |
| Temperature | °C | 30 | 15.96* | 11.94 * | 11.55 * | 11.89 * |
| Turbidity (Field) | NTU | - | 464* | 50.62 * | 50.9 * | 9.8 * |
| **RAINFALL MEASUREMENTS** † | | | | | | |
| Intensity (Ave) - Pre-Sampling | in/hr | - | 0.029 | Unavailable | Unavailable | 0.025 |
| Intensity (Ave) - Rain Event | in/hr | - | 0.033 | Unavailable | Unavailable | 0.025 |
| Intensity (Max) - Pre-Sampling | in/hr | - | 0.40 | Unavailable | Unavailable | 0.33 |
| Intensity (Max) - Rain Event | in/hr | - | 0.40 | Unavailable | Unavailable | 0.33 |
| Total - Pre-Sampling | in | - | 1.55 | Unavailable | Unavailable | 0.91 |
| Total - Rain Event | in | - | 3.20 | 2.62 | 2.62 | 0.91 |

**Notes:**

Upstream Sample Location

Downstream Sample Location

Results above NPDES Permit Limit in **bold** with darker shading

See Appendix B for explanation of data qualifiers.

* Data not validated.

† Total rainfall, average rainfall intensity, and maximum 1-hour rainfall intensity were calculated based on rainfall recorded at a RWQCB-approved weather staton within Area I. Due to Area I weather station malfunction during the 12/11 - 12/12/2014 rain event, rainfall totals from Station 436 were used but hourly rainfall is not available.

**Table 3-2**
**BMP Monitoring Sample Collection Matrix**
**2014/2015 Rainy Season**


| Watershed | Object ID | Sample ID | Field Sample ID | Collection Date | Collection Time | Purpose | Aras Monitored | Notes | Metals (Total Recoverable) (Method 200.7/200.8) | Metals (Total Dissolved) (Method 200.7/200.8) | Dioxins (Method 1613) | Total Suspended Solids (Method 2540) | Particle Size Distribution (Method ASTM D422) | Turbidity (Method 180.1) | Copper, (Total Recoverable) (Method 200.8) | Lead, (Total Recoverable) (Method 200.8) | Cadmium, (Total Recoverable) (Method 200.8) | Mercury, (Total Recoverable) (Method 245.1) | Copper, (Dissolved) (Method 200.8) | Lead, (Dissolved) (Method 200.8) | Cadmium, (Dissolved) (Method 200.8) | Mercury, (Dissolved) (Method 245.1) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 009 | A1BMP0003 | A1BMP0003S002 | n/a | 12/02/14 | 13:30 | DS, Treatment BMP Performance Monitoring | CM-9, AILF, IEL, Area II Road | CM-9 underdrain | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | APBMP0001 | APBMP0001S004 | APBMP0001S003 | 12/02/14 | 12:35 | Potential BMP Location | AP/STP, ELV | Area II Road asphalt swale | X | X | X | X | X | X | | | | | | | | | V2 |
| 009 | B1BMP0003 | B1BMP0003S013 | n/a | 12/02/14 | 8:12 | US Monitoring Location of Vegetated Area DS of B-1 Media Filter | B-1, Upper Parking Lot | Culvert inlet | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | B1BMP0004 | B1BMP0004S007 | n/a | 12/02/14 | 10:15 | US North, Treatment BMP Performance Monitoring | B-1 Media Filter | Tributary drainage | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | B1BMP0005 | B1BMP0005S008 | n/a | 12/02/14 | 9:00 | US South, Treatment BMP Performance Monitoring | B-1 Media Filter | Asphalt swale downstream of B-1 sedimention basin discharge | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | B1BMP0006 | B1BMP0006S009 | n/a | 12/02/14 | 8:35 | DS, Treatment BMP Performance Monitoring | B-1 Media Filter | B-1 Media Filter underdrain | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | B1BMP0007[A] | B1BMP0007S006 | n/a | 12/02/14 | 11:35 | DS Monitoring Location of Vegetated Area DS of B-1 Media Filter | Vegetated Area Downstream of B-1 Media Filter | Tributary drainage; DS of B-1 storm drain outlet and US of Lower Parking Lot BMP discharge to Northern Drainage | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | EVBMP0003 | EVBMP0003S012 | EVBMP0003S001 | 12/02/14 | 10:30 | US West, Treatment BMP Performance Monitoring | CM-1, Area II Road | Sheetflow along Area II Road upstream of sandbag berm | | | X | X | X | | X | X | X | X | X | X | X | X | V2 |
| 009 | EVBMP0007 | EVBMP0007S002 | EVBMP0007S001 | 12/02/14 | 13:40 | US, Treatment BMP Performance Monitoring | ELV Treatment BMP | Sample port in BMP influent pipe prior to "T" connection | | | X | X | X | | X | X | X | X | X | X | X | X | V2 |
| 009 | EVBMP0008 | EVBMP0008S002 | EVBMP0008S001 | 12/02/14 | 14:00 | DS, Treatment BMP Performance Monitoring | ELV Treatment BMP | Discharge from media filter tank pipe | | | X | X | X | | X | X | X | X | X | X | X | X | V2 |
| 009 | EVBMP0009 | EVBMP0009S001 | n/a | 12/02/14 | 13:45 | Mid-Point Treatment BMP Performance Monitoring | ELV Treatment BMP | Composite sample of eastern and western sample ports between settling tanks and media filter | | | X | X | X | | X | X | X | X | X | X | X | X | V2 |
| 009 | ILBMP0001 | ILBMP0001S020 | n/a | 12/02/14 | 9:02 | Potential BMP Location | IEL | Culvert discharge under spillway chute | X | X | X | X | X | X | | | | | | | | | V1 |
| 009 | ILBMP0002 | ILBMP0002S011 | n/a | 12/02/14 | 9:28 | US East, Treatment BMP Performance Monitoring | CM-9, IEL, Area II Road | Culvert inlet off Area II Road | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | LPBMP0002 | LPBMP0002S004 | n/a | 12/02/14 | 11:00 | US, Treatment BMP Performance Monitoring | Lower Parking Lot BMP | Sample port in cistern discharge pipe | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | LPBMP0003 | LPBMP0003S004 | n/a | 12/02/14 | 10:41 | Mid-Point, Treatment BMP Performance Monitoring | Lower Parking Lot BMP | Sediment Basin outlet box | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | LPBMP0004 | LPBMP0004S005 | n/a | 12/02/14 | 10:45 | DS, Treatment BMP Performance Monitoring | Lower Parking Lot BMP | Discharge from Biofilter effluent pipe | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | LXBMP0006 | LXBMP0006S002 | n/a | 12/02/14 | 13:45 | Potential BMP Location | LOX | Sheetflow along dirt road; co-located with LXSW0010 | X | X | | | X | X | | | | | | | | | P2, V2 |
| 009 | LXBMP0009 | LXBMP0009S002 | LXBMP0009S001 | 12/02/14 | 13:40 | Alternate DS, BMP Performance Monitoring | LOX Sandbag Berm and Slope Drains | Slope drain outlet; co-located with LXSW0009 | X | X | X | X | X | X | | | | | | | | | P1, V2 |
| 009 | A1BMP0002 | A1BMP0002S005 | n/a | 12/12/14 | 9:20 | US South, Treatment BMP Performance Monitoring | CM-9, AILF | AILF tributary drainage | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |

**Table 3-2**
**BMP Monitoring Sample Collection Matrix**
**2014/2015 Rainy Season**


| Watershed | Object ID | Sample ID | Field Sample ID | Collection Date | Collection Time | Purpose | Aras Monitored | Notes | Metals (Total Recoverable) (Method 200.7/200.8) | Metals (Total Dissolved) (Method 200.7/200.8) | Dioxins (Method 1613) | Total Suspended Solids (Method 2540) | Particle Size Distribution (Method ASTM D422) | Turbidity (Method 180.1) | Copper, (Total Recoverable) (Method 200.8) | Lead, (Total Recoverable) (Method 200.8) | Cadmium, (Total Recoverable) (Method 200.8) | Mercury, (Total Recoverable) (Method 245.1) | Copper, (Dissolved) (Method 200.8) | Lead, (Dissolved) (Method 200.8) | Cadmium, (Dissolved) (Method 200.8) | Mercury, (Dissolved) (Method 245.1) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 009 | A1BMP0003 | A1BMP0003S003 | n/a | 12/12/14 | 9:45 | DS, Treatment BMP Performance Monitoring | CM-9, AILF, IEL, Area II Road | CM-9 underdrain | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | A2BMP0007 | A2BMP0007S006 | A2BMP0007S005 | 12/12/14 | 10:50 | DS, Treatment BMP Performance Monitoring | CM-1 | CM-1 culvert outlet | | | X | X | X | | X | X | X | X | X | X | X | X | V2 |
| 009 | B1BMP0003 | B1BMP0003S014 | n/a | 12/12/14 | 8:40 | US Monitoring Location of Vegetated Area DS of B-1 Media Filter | B-1, Upper Parking Lot | Culvert inlet | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | B1BMP0004 | B1BMP0004S008 | n/a | 12/12/14 | 8:15 | US North, Treatment BMP Performance Monitoring | B-1 Media Filter | Tributary drainage | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | B1BMP0005 | B1BMP0005S009 | n/a | 12/12/14 | 7:30 | US South, Treatment BMP Performance Monitoring | B-1 Media Filter | Asphalt swale downstream of B-1 sedimention basin discharge | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | B1BMP0006 | B1BMP0006S010 | n/a | 12/12/14 | 9:15 | DS, Treatment BMP Performance Monitoring | B-1 Media Filter | B-1 Media Filter underdrain | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | B1BMP0007[A] | B1BMP0007S007 | n/a | 12/12/14 | 9:00 | DS Monitoring Location of Vegetated Area DS of B-1 Media Filter | Vegetated Area Downstream of B-1 Media Filter | Tributary drainage; DS of B-1 storm drain outlet and US of Lower Parking Lot BMP discharge to Northern Drainage | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | EVBMP0007 | EVBMP0007S003 | EVBMP0007S002 | 12/12/14 | 13:30 | US, Treatment BMP Performance Monitoring | ELV Treatment BMP | Sample port in BMP influent pipe prior to "T" connection | | | X | X | X | | X | X | X | X | X | X | X | X | V2 |
| 009 | EVBMP0008 | EVBMP0008S003 | EVBMP0008S002 | 12/12/14 | 12:30 | DS, Treatment BMP Performance Monitoring | ELV Treatment BMP | Discharge from media filter tank pipe | | | X | X | X | | X | X | X | X | X | X | X | X | V2 |
| 009 | EVBMP0009 | EVBMP0009S002 | n/a | 12/12/14 | 13:00 | Mid-Point Treatment BMP Performance Monitoring | ELV Treatment BMP | Composite sample of eastern and western sample ports between settling tanks and media filter | | | X | X | X | | X | X | X | X | X | X | X | X | V2 |
| 009 | ILBMP0001 | ILBMP0001S021 | n/a | 12/12/14 | 10:45 | Potential BMP Location | IEL | Culvert discharge under spillway chute | X | X | X | X | X | X | | | | | | | | | V1 |
| 009 | ILBMP0002 | ILBMP0002S012 | n/a | 12/12/14 | 9:00 | US East, Treatment BMP Performance Monitoring | CM-9, IEL, Area II Road | Culvert inlet off Area II Road | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | LPBMP0002 | LPBMP0002S005 | n/a | 12/12/14 | 8:30 | US, Treatment BMP Performance Monitoring | Lower Parking Lot BMP | Sample port in cistern discharge pipe | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | LPBMP0003 | LPBMP0003S005 | n/a | 12/12/14 | 8:00 | Mid-Point, Treatment BMP Performance Monitoring | Lower Parking Lot BMP | Sediment Basin outlet box | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | LPBMP0004 | LPBMP0004S006 | n/a | 12/12/14 | 7:30 | DS, Treatment BMP Performance Monitoring | Lower Parking Lot BMP | Discharge from Biofilter effluent pipe | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | LXBMP0006 | LXBMP0006S004 | n/a | 12/12/14 | 8:30 | Potential BMP Location | LOX | Sheetflow along dirt road; co-located with LXSW0010 | X | X | X | X | X | X | | | | | | | | | P1, V2 |
| 009 | LXBMP0009 | LXBMP0009S003 | LXBMP0009S002 | 12/12/14 | 7:50 | Alternate DS, BMP Performance Monitoring | LOX Sandbag Berm and Slope Drains | Slope drain outlet; co-located with LXSW0009 | | | X | X | X | | X | X | X | X | X | X | X | X | P1, V2 |
| 009 | A1BMP0002 | A1BMP0002S006 | n/a | 12/17/14 | 9:30 | US South, Treatment BMP Performance Monitoring | CM-9, AILF | AILF tributary drainage | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |

**Table 3-2**
**BMP Monitoring Sample Collection Matrix**
**2014/2015 Rainy Season**


| Watershed | Object ID | Sample ID | Field Sample ID | Collection Date | Collection Time | Purpose | Aras Monitored | Notes | Metals (Total Recoverable) (Method 200.7/200.8) | Metals (Total Dissolved) (Method 200.7/200.8) | Dioxins (Method 1613) | Total Suspended Solids (Method 2540) | Particle Size Distribution (Method ASTM D422) | Turbidity (Method 180.1) | Copper, (Total Recoverable) (Method 200.8) | Lead, (Total Recoverable) (Method 200.8) | Cadmium, (Total Recoverable) (Method 200.8) | Mercury, (Total Recoverable) (Method 245.1) | Copper, (Dissolved) (Method 200.8) | Lead, (Dissolved) (Method 200.8) | Cadmium, (Dissolved) (Method 200.8) | Mercury, (Dissolved) (Method 245.1) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 009 | A1BMP0003 | A1BMP0003S004 | n/a | 12/17/14 | 9:20 | DS, Treatment BMP Performance Monitoring | CM-9, AILF, IEL, Area II Road | CM-9 underdrain | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | B1BMP0004 | B1BMP0004S009 | n/a | 12/17/14 | 8:30 | US North, Treatment BMP Performance Monitoring | B-1 Media Filter | Tributary drainage | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | B1BMP0005 | B1BMP0005S010 | n/a | 12/17/14 | 8:45 | US South, Treatment BMP Performance Monitoring | B-1 Media Filter | Asphalt swale downstream of B-1 sedimention basin discharge | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | B1BMP0006 | B1BMP0006S011 | n/a | 12/17/14 | 8:15 | DS, Treatment BMP Performance Monitoring | B-1 Media Filter | B-1 Media Filter underdrain | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | B1BMP0007[A] | B1BMP0007S008 | n/a | 12/17/14 | 10:30 | DS Monitoring Location of Vegetated Area DS of B-1 Media Filter | Vegetated Area Downstream of B-1 Media Filter | Tributary drainage; DS of B-1 storm drain outlet and US of Lower Parking Lot BMP discharge to Northern Drainage | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | ILBMP0001 | ILBMP0001S022 | n/a | 12/17/14 | 10:45 | Potential BMP Location | IEL | Culvert discharge under spillway chute | X | X | X | X | X | X | | | | | | | | | V1 |
| 009 | LPBMP0002 | LPBMP0002S006 | n/a | 12/17/14 | 7:15 | US, Treatment BMP Performance Monitoring | Lower Parking Lot BMP | Sample port in cistern discharge pipe | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | LPBMP0003 | LPBMP0003S006 | n/a | 12/17/14 | 7:30 | Mid-Point, Treatment BMP Performance Monitoring | Lower Parking Lot BMP | Sediment Basin outlet box | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | LPBMP0004 | LPBMP0004S007 | n/a | 12/17/14 | 7:45 | DS, Treatment BMP Performance Monitoring | Lower Parking Lot BMP | Discharge from Biofilter effluent pipe | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | LXBMP0006 | LXBMP0006S005 | n/a | 12/17/14 | 10:30 | Potential BMP Location | LOX | Sheetflow along dirt road; co-located with LXSW0010 | X | X | X | X | X | X | | | | | | | | | P1, V2 |
| 009 | B1BMP0005 | B1BMP0005S011 | n/a | 01/11/15 | 9:30 | US South, Treatment BMP Performance Monitoring | B-1 Media Filter | Asphalt swale downstream of B-1 sedimention basin discharge | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | B1BMP0006 | B1BMP0006S012 | n/a | 01/11/15 | 9:45 | DS, Treatment BMP Performance Monitoring | B-1 Media Filter | B-1 Media Filter underdrain | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | B1BMP0007[A] | B1BMP0007S009 | n/a | 01/11/15 | 11:05 | DS Monitoring Location of Vegetated Area DS of B-1 Media Filter | Vegetated Area Downstream of B-1 Media Filter | Tributary drainage; DS of B-1 storm drain outlet and US of Lower Parking Lot BMP discharge to Northern Drainage | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | ILBMP0001 | ILBMP0001S023 | n/a | 01/11/15 | 10:50 | Potential BMP Location | IEL | Culvert discharge under spillway chute | X | X | X | X | X | X | | | | | | | | | V1 |
| 009 | LPBMP0002 | LPBMP0002S007 | n/a | 01/11/15 | 10:45 | US, Treatment BMP Performance Monitoring | Lower Parking Lot BMP | Sample port in cistern discharge pipe | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | LPBMP0003 | LPBMP0003S007 | n/a | 01/11/15 | 10:30 | Mid-Point, Treatment BMP Performance Monitoring | Lower Parking Lot BMP | Sediment Basin outlet box | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | LPBMP0004 | LPBMP0004S008 | n/a | 01/11/15 | 10:15 | DS, Treatment BMP Performance Monitoring | Lower Parking Lot BMP | Discharge from Biofilter effluent pipe | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | B1BMP0006 | B1BMP0006S013 | n/a | 03/01/15 | 8:50 | DS, Treatment BMP Performance Monitoring | B-1 Media Filter | B-1 Media Filter underdrain | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | B1BMP0003 | B1BMP0003S015 | n/a | 03/02/15 | 8:15 | US Monitoring Location of Vegetated Area DS of B-1 Media Filter | B-1, Upper Parking Lot | Culvert inlet | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |

**Table 3-2**
**BMP Monitoring Sample Collection Matrix**
**2014/2015 Rainy Season**


| Watershed | Object ID | Sample ID | Field Sample ID | Collection Date | Collection Time | Purpose | Aras Monitored | Notes | Metals (Total Recoverable) (Method 200.7/200.8) | Metals (Total Dissolved) (Method 200.7/200.8) | Dioxins (Method 1613) | Total Suspended Solids (Method 2540) | Particle Size Distribution (Method ASTM D422) | Turbidity (Method 180.1) | Copper, (Total Recoverable) (Method 200.8) | Lead, (Total Recoverable) (Method 200.8) | Cadmium, (Total Recoverable) (Method 200.8) | Mercury, (Total Recoverable) (Method 245.1) | Copper, (Dissolved) (Method 200.8) | Lead, (Dissolved) (Method 200.8) | Cadmium, (Dissolved) (Method 200.8) | Mercury, (Dissolved) (Method 245.1) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 009 | B1BMP0004 | B1BMP0004S010 | n/a | 03/02/15 | 8:50 | US North, Treatment BMP Performance Monitoring | B-1 Media Filter | Tributary drainage | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | B1BMP0005 | B1BMP0005S012 | n/a | 03/02/15 | 8:25 | US South, Treatment BMP Performance Monitoring | B-1 Media Filter | Asphalt swale downstream of B-1 sedimention basin discharge | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | B1BMP0007[A] | B1BMP0007S010 | n/a | 03/02/15 | 10:05 | DS Monitoring Location of Vegetated Area DS of B-1 Media Filter | Vegetated Area Downstream of B-1 Media Filter | Tributary drainage; DS of B-1 storm drain outlet and US of Lower Parking Lot BMP discharge to Northern Drainage | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | ILBMP0001 | ILBMP0001S024 | n/a | 03/02/15 | 10:25 | Potential BMP Location | IEL | Culvert discharge under spillway chute | X | X | X | X | X | X | | | | | | | | | V1 |
| 009 | ILBMP0002 | ILBMP0002S013 | n/a | 03/02/15 | 7:55 | US East, Treatment BMP Performance Monitoring | CM-9, IEL, Area II Road | Culvert inlet off Area II Road | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | LPBMP0002 | LPBMP0002S008 | n/a | 03/02/15 | 10:45 | US, Treatment BMP Performance Monitoring | Lower Parking Lot BMP | Sample port in cistern discharge pipe | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | LPBMP0003 | LPBMP0003S008 | n/a | 03/02/15 | 9:30 | Mid-Point, Treatment BMP Performance Monitoring | Lower Parking Lot BMP | Sediment Basin outlet box | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | LPBMP0004 | LPBMP0004S009 | n/a | 03/02/15 | 9:10 | DS, Treatment BMP Performance Monitoring | Lower Parking Lot BMP | Discharge from Biofilter effluent pipe | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |
| 009 | ILBMP0007 | ILBMP0007S001 | n/a | 05/15/15 | 10:44 | DS, Treatment BMP Performance Monitoring | B1436 Northern Detention Bioswale | Bioswale underdrain (subsurface 12-inch drain connecting to existing culvert) | | | X | X | X | | X | X | X | X | X | X | X | X | V1 |

**Notes:**
DS - Downstream
US - Upstream
X - Sample was analyzed
V1 - Level II validation performed on dioxins analysis
V2 - Level V validation performed on all analyses
P1 - Results for Cd, Cu, Pb, Hg (all recoverable), Total Suspended Solids, and/or Dioxin analysis from co-located performance monitoring sample.
P2 - Co-located performance monitoing sample was inadvertantly not collected, therefore results for Cd, Cu, Pb (all recoverable), Total Suspended Solids, and Dioxin analysis not available.
Use the Field Sample ID when looking up analytical results in the laboratory and validation reports, where indicated. Otherwise use Sample ID.
[A] Alternate location B1BMP0007[A] added during the 2014/2015 rainy season to avoid sampling overflow from the Biofilter, which occurred upstream from the original B1BMP0007 location

**OF009 Sample Totals**

| | |
|---|---|
| Collected | 65 |
| Analyzed | 65 |
| On Hold | 0 |
| **Total Analyzed** | **65** |

**Table 3-3**
**Potential BMP Monitoring Sample Results, Outfall 009 Watershed**
**2014/2015 Rainy Season**


| | | Object Name:<br>Sample Name:<br>Sample Date: | APBMP0001<br>APBMP0001S004<br>12/2/2014 | ILBMP0001<br>ILBMP0001S020<br>12/2/2014 | LXBMP0006[(1)]<br>LXBMP0006S002<br>12/2/2014 | ILBMP0001<br>ILBMP0001S021<br>12/12/2014 | LXBMP0006<br>LXBMP0006S004<br>12/12/2014 | LXSW0010<br>LXSW0010S001<br>12/12/2014 |
|---|---|---|---|---|---|---|---|---|
| | | Sample Type:<br>Location:<br>Rain Event: | Potential BMP<br>AP/STP, ELV<br>November 30 - December 4, 2014 | Potential BMP<br>IEL<br>November 30 - December 4, 2014 | Potential BMP<br>LOX<br>November 30 - December 4, 2014 | Potential BMP<br>IEL<br>December 11-12, 2014 | Potential BMP<br>LOX<br>December 11-12, 2014 | Perf Mon<br>DS LOX (1B-3)<br>December 11 - 12, 2014 |
| **ANALYTE** | **UNITS** | **NPDES Permit Limit** | **RESULTS** | **RESULTS** | **RESULTS** | **RESULTS** | **RESULTS** | **RESULTS** |
| **DIOXINS** | | | | | | | | |
| TCDD TEQ_NoDNQ | ug/L | 2.80E-08 | **4.60E-08** | **1.93E-06** | -- | **3.73E-08** | See LXSW0010S001 | ND |
| **INORGANICS** | | | | | | | | |
| Aluminum | ug/L | - | 5810 | 19000* | 1810 | 23000 MB* | 337 | -- |
| Aluminum, dissolved | ug/L | - | 112 | 920* | 121 | 5200 MB QP* | 51.8 | -- |
| Antimony | ug/L | 6.0 | 0.964 J | <1.0* | <0.275 | <1.0 * | 0.204 J | -- |
| Antimony, dissolved | ug/L | - | <0.49 | 0.55 J,DX, QP* | 0.642 J | <0.50 QP* | 0.22 J | -- |
| Arsenic | ug/L | - | 0.522 J | 24* | 1.01 | 29 * | 0.474 J | -- |
| Arsenic, dissolved | ug/L | - | <0.386 | 6.4 J,DX, QP* | <0.386 | 14 QP* | 0.481 J | -- |
| Barium | mg/L | - | 0.0909 | 0.24* | 0.0387 | 0.26 * | 0.0264 | -- |
| Barium, dissolved | mg/L | - | 0.0997 | 0.074 QP* | 0.0318 | 0.058 QP* | 0.0186 | -- |
| Beryllium | ug/L | - | <0.29 | <1.0* | <0.29 | 1.1 J,DX* | <0.29 | -- |
| Beryllium, dissolved | ug/L | - | <0.29 | <1.0 QP* | <0.29 | <1.0 QP* | <0.29 | -- |
| Boron | mg/L | 1.0 | <0.00676 | 0.068 | 0.0386 J | 0.11 * | 0.0349 J | -- |
| Boron, dissolved | mg/L | - | 0.0191 J | 0.060 QP* | 0.0332 J | 0.088 QP* | 0.0343 J | -- |
| Cadmium | ug/L | 4.0 | 0.664 J | <0.50* | -- | 0.51 J,DX* | <0.128 | <0.128 |
| Cadmium, dissolved | ug/L | - | 0.451 J | <0.25 QP* | -- | 0.45 J,DX QP* | <0.128 | <0.128 |
| Chromium | ug/L | - | 8.98 | 27* | 3.49 | 28 * | 0.741 J | -- |
| Chromium, dissolved | ug/L | - | <0.402 | <2.5 QP* | <0.402 | 4.9 J,DX QP* | <0.402 | -- |
| Cobalt | ug/L | - | -- | 9.8 J,DX* | -- | 8.9 J,DX* | -- | -- |
| Cobalt, dissolved | ug/L | - | -- | <2.5 QP* | -- | <2.5 QP* | -- | -- |
| Copper | ug/L | 14 | **16** | **30*** | -- | **28 *** | 2.81 | 2.67 |
| Copper, dissolved | ug/L | - | 0.749 J | 11 QP* | -- | 7.6 QP* | 2.75 | 2.38 |
| Iron | mg/L | - | 9.03 | 21* | 2.83 | 24 * | 0.288 | -- |
| Iron, dissolved | mg/L | - | 0.167 | 0.79 QP* | 0.146 | 3.2 QP* | 0.0479 J | -- |
| Lead | ug/L | 5.2 | **15.1** | **19*** | -- | **14 *** | 0.584 J | 0.575 J |
| Lead, dissolved | ug/L | - | <0.44 | 0.74 J,DX, QP* | -- | 1.5 QP* | <0.0898 | <0.0898 |
| Manganese | ug/L | - | 181 | 480* | 55.4 | 590 * | 15.7 | -- |
| Manganese, dissolved | ug/L | - | 1.82 | 27 QP* | 7.62 | 69 MB QP* | 1.53 | -- |
| Mercury | ug/L | 0.13 | <0.0453 | <0.0453 | <0.0453 | <0.20 * | <0.0453 | <0.0453 |
| Mercury, dissolved | ug/L | - | <0.0453 | <0.0453 | <0.0453 | <0.10 QP* | <0.0453 | <0.0453 |
| Nickel | ug/L | 100 | 9.05 | 21* | 3.68 | 21 * | 1.49 | -- |
| Nickel, dissolved | ug/L | - | 1.16 | <5.0 QP* | 2.12 | <5.0 QP* | 2.03 | -- |
| Selenium | ug/L | - | <0.168 | <1.0* | <0.168 | <1.0 * | 0.238 J | -- |
| Selenium, dissolved | ug/L | - | <0.168 | <0.50 QP* | <0.168 | <0.50 QP* | 0.249 J | -- |
| Silver | ug/L | - | 0.433 J | <1.0* | <0.111 | <1.0 * | <0.111 | -- |
| Silver, dissolved | ug/L | - | 0.286 J | <0.50 QP* | 0.292 J | <0.50 QP* | <0.111 | -- |
| Thallium | ug/L | 2.0 | 0.725 J | <1.0* | <0.101 | <1.0 * | <0.101 | -- |
| Thallium, dissolved | ug/L | - | <0.608 | <0.50 QP* | <0.61 | <0.50 QP* | <0.101 | -- |
| Vanadium | ug/L | - | 17.1 | 42* | 5.69 | 58 * | 1.3 | -- |
| Vanadium, dissolved | ug/L | - | <0.149 | <5.0 QP* | <0.149 | 13 QP* | <0.149 | -- |
| Zinc | ug/L | - | 74.4 | 170* | 16 | 120 * | 30.6 | -- |
| Zinc, Dissolved | ug/L | - | 59.9 | 59 QP* | 21.3 | 20 QP* | 11.6 | -- |

**Table 3-3**
**Potential BMP Monitoring Sample Results, Outfall 009 Watershed**
**2014/2015 Rainy Season**


| | | Object Name:<br>Sample Name:<br>Sample Date: | APBMP0001<br>APBMP0001S004<br>12/2/2014 | ILBMP0001<br>ILBMP0001S020<br>12/2/2014 | LXBMP0006[(1)]<br>LXBMP0006S002<br>12/2/2014 | ILBMP0001<br>ILBMP0001S021<br>12/12/2014 | LXBMP0006<br>LXBMP0006S004<br>12/12/2014 | LXSW0010<br>LXSW0010S001<br>12/12/2014 |
|---|---|---|---|---|---|---|---|---|
| | | Sample Type:<br>Location:<br>Rain Event: | Potential BMP<br>AP/STP, ELV<br>November 30 - December 4, 2014 | Potential BMP<br>IEL<br>November 30 - December 4, 2014 | Potential BMP<br>LOX<br>November 30 - December 4, 2014 | Potential BMP<br>IEL<br>December 11-12, 2014 | Potential BMP<br>LOX<br>December 11-12, 2014 | Perf Mon<br>DS LOX (1B-3)<br>December 11 - 12, 2014 |
| **ANALYTE** | **UNITS** | **NPDES Permit Limit** | **RESULTS** | **RESULTS** | **RESULTS** | **RESULTS** | **RESULTS** | **RESULTS** |
| **MISCELLANEOUS** | | | | | | | | |
| Total Suspended Solids | mg/L | - | 254 | 330 * | -- | 230 * | See LXSW0010S001 | 40 |
| Turbidity | NTU | - | -- | 260 * | 73 | 660 * | 10 | -- |
| Turbidity | ug/L | - | 0.0453 | -- | -- | -- | -- | -- |
| **FIELD MEASUREMENTS** | | | | | | | | |
| Conductivity (Field) | mS | - | 0.009 * | 0.185 * | 0.117 * | 0.247 * | 0.098 * | 0.098 * |
| pH (Field) | pH units | 6.5-8.5 | 7.01 * | 7.60 * | **5.32 *** | 8.17 * | **6.25 *** | **6.25 *** |
| Temperature | °C | 30 | 12.18 * | 13.3 * | 18.66 * | 11.83 * | 11.55 * | 11.55 * |
| Turbidity (Field) | NTU | - | 432 * | >1000 * | 8.3 * | >1000 * | 50.9 * | 50.9 * |
| **RAINFALL**[†] | | | | | | | | |
| Intensity (Ave) - Pre-Sampling | in/hr | - | 0.016 | 0.015 | 0.030 | Unavailable | Unavailable | Unavailable |
| Intensity (Ave) - Rain Event | in/hr | - | 0.033 | 0.033 | 0.033 | Unavailable | Unavailable | Unavailable |
| Intensity (Max) - Pre-Sampling | in/hr | - | 0.12 | 0.14 | 0.40 | Unavailable | Unavailable | Unavailable |
| Intensity (Max) - Rain Event | in/hr | - | 0.40 | 0.40 | 0.40 | Unavailable | Unavailable | Unavailable |
| Total - Pre-Sampling | in | - | 0.62 | 0.72 | 1.58 | Unavailable | Unavailable | Unavailable |
| Total - Rain Event | in | - | 3.20 | 3.20 | 3.20 | 2.62 | 2.62 | 2.62 |

**Notes:**
Results above NPDES Permit Limit in **bold** and gray shading
See Appendix B for explanation of data qualifiers.
* Data not validated.
[†] Total rainfall, average rainfall intensity, and maximum 1-hour rainfall intensity were calculated based on rainfall recorded at a RWQCB-approved weather station within Area I. Due to Area I weather station malfunction during the 12/11-12/12/2014 rain event; rainfall totals from Station 436 were used but hourly rainfall is not available.
[(1)] Co-located sample LXSW0010 inadvertantly not collected on 12/2/2014

**Table 3-3**
**Potential BMP Monitoring Sample Results, Outfall 009 Watershed**
**2014/2015 Rainy Season**


| | | Object Name:<br>Sample Name:<br>Sample Date: | ILBMP0001<br>ILBMP0001S022<br>12/17/2014 | LXBMP0006<br>LXBMP0006S005<br>12/17/2014 | LXSW0010<br>LXSW0010S003<br>12/17/2014 | ILBMP0001<br>ILBMP0001S023<br>1/11/2015 | ILBMP0001<br>ILBMP0001S024<br>3/2/2015 |
|---|---|---|---|---|---|---|---|
| | | Sample Type:<br>Location:<br>Rain Event: | Potential BMP<br>IEL<br>December 15-17, 2014 | Potential BMP<br>LOX<br>December 15-17, 2014 | Perf Mon<br>DS LOX (1B-3)<br>December 15-17, 2014 | Potential BMP<br>IEL<br>January 10-11, 2015 | Potential BMP<br>IEL<br>March 1-3, 2015 |
| **ANALYTE** | **UNITS** | **NPDES Permit Limit** | **RESULTS** | **RESULTS** | **RESULTS** | **RESULTS** | **RESULTS** |
| **DIOXINS** | | | | | | | |
| TCDD TEQ_NoDNQ | ug/L | 2.80E-08 | 3.39E-10 | See LXSW0010S003 | ND | 2.20E-10 | **3.11E-08** |
| **INORGANICS** | | | | | | | |
| Aluminum | ug/L | - | 25000 * | 110 J | -- | 1600 * | 910 MB* |
| Aluminum, dissolved | ug/L | - | 7800 QP* | 29.4 J | -- | 100 QP* | 110 QP* |
| Antimony | ug/L | 6.0 | 1.3 J,DX* | 0.239 J | -- | 0.86 J,DX* | 0.80 J,DX* |
| Antimony, dissolved | ug/L | - | <1.0 QP* | 0.232 J | -- | 0.67 J,DX QP* | 0.69 J,DX* |
| Arsenic | ug/L | - | 56 * | 0.586 J | -- | 17 * | 16 * |
| Arsenic, dissolved | ug/L | - | 32 QP* | 0.44 J | -- | 19 QP* | 8.8 J,DX QP* |
| Barium | mg/L | - | 0.39 * | 0.0262 | -- | 0.16 * | 0.087 * |
| Barium, dissolved | mg/L | - | 0.16 QP* | 0.0263 | -- | 0.13 QP* | 0.071 QP* |
| Beryllium | ug/L | - | 1.4 J,DX* | <0.29 | -- | <1.0 * | <1.0 * |
| Beryllium, dissolved | ug/L | - | <1.0 QP* | <0.29 | -- | <1.0 QP* | <1.0 QP* |
| Boron | mg/L | 1.0 | 0.17 * | 0.0415 J | -- | 0.11 * | 0.055 * |
| Boron, dissolved | mg/L | - | 0.17 QP* | 0.0439 J | -- | 0.10 QP* | 0.059 QP* |
| Cadmium | ug/L | 4.0 | 0.77 J,DX* | <0.128 | <0.128 | <0.25 * | <0.25 * |
| Cadmium, dissolved | ug/L | - | <0.50 QP* | <0.128 | <0.128 | <0.25 QP* | <0.25 QP* |
| Chromium | ug/L | - | 33 * | 0.448 J | -- | <2.5 * | <2.5 * |
| Chromium, dissolved | ug/L | - | 6.2 QP* | <0.402 | -- | <2.5 QP* | <2.5 QP* |
| Cobalt | ug/L | - | 13 * | -- | -- | <2.5 * | <2.5 * |
| Cobalt, dissolved | ug/L | - | 4.2 QP* | -- | -- | <2.5 QP* | <2.5 QP* |
| Copper | ug/L | 14 | **35 *** | 3.1 | 2.68 | **28 MB*** | 9.7 MB* |
| Copper, dissolved | ug/L | - | 15 QP* | 2.81 | 2.4 | 6.0 QP* | 6.6 QP* |
| Iron | mg/L | - | 29 MB* | 0.0856 | -- | 1.9 * | 1.1 MB* |
| Iron, dissolved | mg/L | - | 4.1 QP* | 0.022 J | -- | 0.18 QP* | 0.16 MB QP* |
| Lead | ug/L | 5.2 | **18 *** | 0.114 J | <0.0898 | 1.7 * | 2.3 * |
| Lead, dissolved | ug/L | - | 1.9 J,DX QP* | <0.0898 | <0.0898 | <0.50 QP* | <0.50 QP* |
| Manganese | ug/L | - | 850 * | 1.52 | -- | 260 * | 160 * |
| Manganese, dissolved | ug/L | - | 260 QP* | 0.692 J | -- | 200 QP* | 150 QP* |
| Mercury | ug/L | 0.13 | <0.40 * | <0.0453 | 0.0466 J | <0.20 * | <0.10 * |
| Mercury, dissolved | ug/L | - | <0.10 IB LQ QP* | 0.0453 J | <0.0453 | <0.10 QP* | <0.10 QP* |
| Nickel | ug/L | 100 | 27 * | 1.53 | -- | <5.0 * | <5.0 * |
| Nickel, dissolved | ug/L | - | 8.2 QP* | 1.45 | -- | <5.0 QP* | <5.0 QP* |
| Selenium | ug/L | - | <1.0 * | 0.266 J | -- | <0.50 * | <0.50 * |
| Selenium, dissolved | ug/L | - | <1.0 QP* | 0.336 J | -- | <0.50 QP* | <0.50 * |
| Silver | ug/L | - | <1.0 * | <0.111 | -- | <0.50 * | <0.50 * |
| Silver, dissolved | ug/L | - | <1.0 QP* | <0.111 | -- | <0.50 QP* | <0.50 * |
| Thallium | ug/L | 2.0 | <1.0 * | <0.101 | -- | <0.50 * | <0.50 * |
| Thallium, dissolved | ug/L | - | <1.0 QP* | <0.101 | -- | <0.50 QP* | <0.50 * |
| Vanadium | ug/L | - | 60 * | 0.492 J | -- | 8.8 J,DX* | 8.2 J,DX* |
| Vanadium, dissolved | ug/L | - | 16 QP* | <0.149 | -- | 5.8 J,DX QP* | 6.9 J,DX QP* |
| Zinc | ug/L | - | 160 * | 10.3 | -- | 55 * | 63 MB* |
| Zinc, Dissolved | ug/L | - | 38 J,DX QP* | 9.38 | -- | 33 QP* | 42 MB QP* |

**Table 3-3**
**Potential BMP Monitoring Sample Results, Outfall 009 Watershed**
**2014/2015 Rainy Season**


| | | Object Name:<br>Sample Name:<br>Sample Date: | ILBMP0001<br>ILBMP0001S022<br>12/17/2014 | LXBMP0006<br>LXBMP0006S005<br>12/17/2014 | LXSW0010<br>LXSW0010S003<br>12/17/2014 | ILBMP0001<br>ILBMP0001S023<br>1/11/2015 | ILBMP0001<br>ILBMP0001S024<br>3/2/2015 |
|---|---|---|---|---|---|---|---|
| | | Sample Type:<br>Location:<br>Rain Event: | Potential BMP<br>IEL<br>December 15-17, 2014 | Potential BMP<br>LOX<br>December 15-17, 2014 | Perf Mon<br>DS LOX (1B-3)<br>December 15-17, 2014 | Potential BMP<br>IEL<br>January 10-11, 2015 | Potential BMP<br>IEL<br>March 1-3, 2015 |
| **ANALYTE** | **UNITS** | **NPDES Permit Limit** | **RESULTS** | **RESULTS** | **RESULTS** | **RESULTS** | **RESULTS** |
| **MISCELLANEOUS** | | | | | | | |
| Total Suspended Solids | mg/L | - | 75 * | See LXSW0010S003 | 1.4 | 32 * | 17 * |
| Turbidity | NTU | - | 740 * | 0.67 | -- | 54 * | 37 * |
| Turbidity | ug/L | - | -- | -- | -- | -- | -- |
| **FIELD MEASUREMENTS** | | | | | | | |
| Conductivity (Field) | mS | - | 0.44 * | 0.126 * | 0.126 * | 0.323 * | 0.122 * |
| pH (Field) | pH units | 6.5-8.5 | 8.44 * | 6.74 * | 6.74 * | 8.06 * | **6.03 *** |
| Temperature | °C | 30 | 12.76 * | 11.89 * | 11.89 | 13.14 * | 8.13 * |
| Turbidity (Field) | NTU | - | 805 * | 9.8 * | 9.8 * | 116 * | 104 * |
| **RAINFALL**[†] | | | | | | | |
| Intensity (Ave) - Pre-Sampling | in/hr | - | 0.025 | 0.025 | 0.025 | 0.065 | 0.027 |
| Intensity (Ave) - Rain Event | in/hr | - | 0.025 | 0.025 | 0.025 | 0.062 | 0.016 |
| Intensity (Max) - Pre-Sampling | in/hr | - | 0.33 | 0.33 | 0.33 | 0.23 | 0.14 |
| Intensity (Max) - Rain Event | in/hr | - | 0.33 | 0.33 | 0.33 | 0.23 | 0.22 |
| Total - Pre-Sampling | in | - | 0.91 | 0.91 | 0.91 | 1.56 | 0.89 |
| Total - Rain Event | in | - | 0.91 | 0.91 | 0.91 | 1.56 | 1.43 |

**Notes:**
Results above NPDES Permit Limit in **bold** and gray shading
See Appendix B for explanation of data qualifiers.
* Data not validated.
[†] Total rainfall, average rainfall intensity, and maximum 1-hour rainfall intensity were calculated based on rainfall recorded at a RWQCB-approved weather station within Area I. Due to Area I weather station malfunction during the 12/11-12/12/2014 rain event; rainfall totals from Station 436 were used but hourly rainfall is not available.
[(1)] Co-located sample LXSW0010 inadvertantly not collected on 12/2/2014

**Table 3-4a (B-1 Media Filter)**
**Treatment BMP Performance Monitoring Sample Results, Outfall 009 Watershed**
**2014/2015 Rainy Season**


| | | Object Name: | B1BMP0003 | B1BMP0004 | B1BMP0005 |
|---|---|---|---|---|---|
| | | Sample Name: | B1BMP0003S013 | B1BMP0004S007 | B1BMP0005S008 |
| | | Sample Date: | 12/2/2014 | 12/2/2014 | 12/2/2014 |
| | | Sample Type: | Natural BMP Perf Mon | Treatment BMP Perf Mon | Treatment BMP Perf Mon |
| | | Location: | US (Vegetated Area) | US North (B-1 Media Filter) | US South (B-1 Media Filter) |
| | | Rain Event: | December 11 - December 12, 2014 | November 30 - December 4, 2014 | November 30 - December 4, 2014 |
| **ANALYTE** | **UNITS** | **NPDES Permit Limit** | **RESULTS** | **RESULTS** | **RESULTS** |
| **DIOXINS** | | | | | |
| TCDD TEQ_NoDNQ | ug/L | 2.80E-08 | **1.88E-07** | **4.00E-04** | **4.90E-08** |
| **INORGANICS** | | | | | |
| Cadmium | ug/L | 4.0 | <0.50 * | <0.50 * | <0.25 * |
| Cadmium, dissolved | ug/L | - | <0.25 QP* | <0.25 QP* | <0.25 QP* |
| Copper | ug/L | 14 | **21 MB *** | 5.6 MB* | 4.0 MB* |
| Copper, dissolved | ug/L | - | 8.0 QP* | 4.2 QP* | 3.0 QP* |
| Lead | ug/L | 5.2 | **6.5 *** | 4.5 * | 0.82 J,DX* |
| Lead, dissolved | ug/L | - | <0.50 QP* | 0.85 J,DX QP* | <0.50 QP* |
| Mercury | ug/L | 0.13 | <0.10 * | <0.10 * | <0.10 * |
| Mercury, dissolved | ug/L | - | <0.10 QP* | <0.10 QP* | <0.10 QP* |
| **MISCELLANEOUS** | | | | | |
| Total Suspended Solids | mg/L | - | 99* | 16 * | 3.2 * |
| **FIELD MEASUREMENTS** | | | | | |
| Conductivity (Field) | mS | - | 0.134 * | 0.043 * | 0.155 * |
| pH (Field) | pH units | 6.5-8.5 | 6.57 * | 6.69 * | **5.53 *** |
| Temperature | °C | 30 | 13.44 * | 14.78 * | 12.49 * |
| Turbidity (Field) | NTU | - | 461 * | 122 * | 36.8 * |
| **RAINFALL**[†] | | | | | |
| Intensity (Ave) - Pre-Sampling | in/hr | - | 0.014 | 0.018 | 0.015 |
| Intensity (Ave) - Rain Event | in/hr | - | 0.033 | 0.033 | 0.033 |
| Intensity (Max) - Pre-Sampling | in/hr | - | 0.12 | 0.14 | 0.14 |
| Intensity (Max) - Rain Event | in/hr | - | 0.40 | 0.40 | 0.40 |
| Total - Pre-Sampling | in | - | 0.66 | 0.88 | 0.72 |
| Total - Rain Event | in | - | 3.20 | 3.20 | 3.20 |

**Notes:**

Upstream Sample Location

Downstream Sample Location

Results above NPDES Permit Limit in **bold** with darker shading

See Appendix B for explanation of data qualifiers.

* Data not validated.

[†] Total rainfall, average rainfall intensity, and maximum 1-hour rainfall intensity were calculated based on rainfall recorded at a RWQCB-approved weather staton within Area I. Due to Area I weather station malfunction during the 12/11 - 12/12/2014 rain event, rainfall totals from Station 436 were used but hourly rainfall is not available.

**Table 3-4a (B-1 Media Filter)**
**Treatment BMP Performance Monitoring Sample Results, Outfall 009 Watershed**
**2014/2015 Rainy Season**


| | | Object Name: | B1BMP0006 | B1BMP0007[A] | B1BMP0003 |
|---|---|---|---|---|---|
| | | Sample Name: | B1BMP0006S009 | B1BMP0007S006 | B1BMP0003S014 |
| | | Sample Date: | 12/2/2014 | 12/2/2014 | 12/12/2014 |
| | | Sample Type: | Treatment BMP Perf Mon | Treatment and Natural BMP Perf Mon | Natural BMP Perf Mon |
| | | Location: | DS (B-1 Media Filter) | DS (B-1 Media Filter and Vegetated Area) | US (Vegetated Area) |
| | | Rain Event: | November 30 - December 4, 2014 | November 30 - December 4, 2014 | December 11 - December 12, 2014 |
| **ANALYTE** | **UNITS** | **NPDES Permit Limit** | **RESULTS** | **RESULTS** | **RESULTS** |
| **DIOXINS** | | | | | |
| TCDD TEQ_NoDNQ | ug/L | 2.80E-08 | **4.71E-08** | **1.03E-07** | ND |
| **INORGANICS** | | | | | |
| Cadmium | ug/L | 4.0 | <0.50 * | <0.50 * | <0.25 * |
| Cadmium, dissolved | ug/L | - | <0.25 QP* | <0.25 QP* | <0.25 QP* |
| Copper | ug/L | 14 | 4.5 MB* | 9.1 MB* | 4.4 * |
| Copper, dissolved | ug/L | - | 3.0 QP* | 5.2 QP* | 3.8 QP* |
| Lead | ug/L | 5.2 | 2.2 * | 3.8 * | 2.7 * |
| Lead, dissolved | ug/L | - | <0.50 QP* | <0.50 QP* | <0.50 QP* |
| Mercury | ug/L | 0.13 | <0.10 * | <0.10 * | 0.10 J,DX* |
| Mercury, dissolved | ug/L | - | <0.10 QP* | <0.10 QP* | <0.10 QP* |
| **MISCELLANEOUS** | | | | | |
| Total Suspended Solids | mg/L | - | 11 * | 43 * | 76 * |
| **FIELD MEASUREMENTS** | | | | | |
| Conductivity (Field) | mS | - | 0.038 * | 0.041 * | 0.064 * |
| pH (Field) | pH units | 6.5-8.5 | **5.97 *** | 7.05 * | 7.30 * |
| Temperature | °C | 30 | 12.69 * | 12.39 * | 14.4 * |
| Turbidity (Field) | NTU | - | 91 * | 272 * | 173 * |
| **RAINFALL**[†] | | | | | |
| Intensity (Ave) - Pre-Sampling | in/hr | - | 0.015 | 0.019 | Unavailable |
| Intensity (Ave) - Rain Event | in/hr | - | 0.033 | 0.033 | Unavailable |
| Intensity (Max) - Pre-Sampling | in/hr | - | 0.12 | 0.14 | Unavailable |
| Intensity (Max) - Rain Event | in/hr | - | 0.40 | 0.40 | Unavailable |
| Total - Pre-Sampling | in | - | 0.69 | 0.98 | Unavailable |
| Total - Rain Event | in | - | 3.20 | 3.20 | 2.62 |

**Notes:**

Upstream Sample Location

Downstream Sample Location

Results above NPDES Permit Limit in **bold** with darker shading

See Appendix B for explanation of data qualifiers.

* Data not validated.

[†] Total rainfall, average rainfall intensity, and maximum 1-hour rainfall intensity were calculated based on rainfall recorded at a RWQCB-approved weather staton within Area I. Due to Area I weather station malfunction during the 12/11 - 12/12/2014 rain event, rainfall totals from Station 436 were used but hourly rainfall is not available.

**Table 3-4a (B-1 Media Filter)**
**Treatment BMP Performance Monitoring Sample Results, Outfall 009 Watershed**
**2014/2015 Rainy Season**


| | | Object Name:<br>Sample Name:<br>Sample Date: | B1BMP0004<br>B1BMP0004S008<br>12/12/2014 | B1BMP0005<br>B1BMP0005S009<br>12/12/2014 | B1BMP0006<br>B1BMP0006S010<br>12/12/2014 |
|---|---|---|---|---|---|
| | | Sample Type:<br>Location:<br>Rain Event: | Treatment BMP Perf Mon<br>US North (B-1 Media Filter)<br>December 11-12, 2014 | Treatment BMP Perf Mon<br>US South (B-1 Media Filter)<br>December 11-12, 2014 | Treatment BMP Perf Mon<br>DS (B-1 Media Filter)<br>December 11-12, 2014 |
| **ANALYTE** | **UNITS** | **NPDES Permit Limit** | **RESULTS** | **RESULTS** | **RESULTS** |
| **DIOXINS** | | | | | |
| TCDD TEQ_NoDNQ | ug/L | 2.80E-08 | **5.46E-08** | ND | 2.98E-10 |
| **INORGANICS** | | | | | |
| Cadmium | ug/L | 4.0 | <0.25 * | <0.25 * | <0.25 * |
| Cadmium, dissolved | ug/L | - | <0.25 QP* | <0.25 QP* | <0.25 QP* |
| Copper | ug/L | 14 | 3.7 * | 1.9 J,DX* | 2.2 * |
| Copper, dissolved | ug/L | - | 2.5 QP* | 1.1 J,DX QP* | 1.9 J,DX QP* |
| Lead | ug/L | 5.2 | 2.2 * | 1.2 * | 0.85 J,DX* |
| Lead, dissolved | ug/L | - | <0.50 QP* | <0.50 QP* | <0.50 QP* |
| Mercury | ug/L | 0.13 | <0.10 * | <0.10 * | <0.10 * |
| Mercury, dissolved | ug/L | - | <0.10 QP* | <0.10 QP* | <0.10 QP* |
| **MISCELLANEOUS** | | | | | |
| Total Suspended Solids | mg/L | - | 26 * | 18 * | 15 * |
| **FIELD MEASUREMENTS** | | | | | |
| Conductivity (Field) | mS | - | 0.067 * | 0.087 * | 0.058 * |
| pH (Field) | pH units | 6.5-8.5 | 6.80 * | 6.60 * | 6.90 * |
| Temperature | °C | 30 | 14.39 * | 11.88 * | 13.26 * |
| Turbidity (Field) | NTU | - | 93.7 * | 86.1 * | 44.4 * |
| **RAINFALL**[†] | | | | | |
| Intensity (Ave) - Pre-Sampling | in/hr | - | Unavailable | Unavailable | Unavailable |
| Intensity (Ave) - Rain Event | in/hr | - | Unavailable | Unavailable | Unavailable |
| Intensity (Max) - Pre-Sampling | in/hr | - | Unavailable | Unavailable | Unavailable |
| Intensity (Max) - Rain Event | in/hr | - | Unavailable | Unavailable | Unavailable |
| Total - Pre-Sampling | in | - | Unavailable | Unavailable | Unavailable |
| Total - Rain Event | in | - | 2.62 | 2.62 | 2.62 |

**Notes:**

Upstream Sample Location

Downstream Sample Location

Results above NPDES Permit Limit in **bold** with darker shading

See Appendix B for explanation of data qualifiers.

* Data not validated.

[†] Total rainfall, average rainfall intensity, and maximum 1-hour rainfall intensity were calculated based on rainfall recorded at a RWQCB-approved weather staton within Area I. Due to Area I weather station malfunction during the 12/11 - 12/12/2014 rain event, rainfall totals from Station 436 were used but hourly rainfall is not available.

**Table 3-4a (B-1 Media Filter)**
**Treatment BMP Performance Monitoring Sample Results, Outfall 009 Watershed**
**2014/2015 Rainy Season**


| | | Object Name: | B1BMP0007[A] | B1BMP0004 | B1BMP0005 |
|---|---|---|---|---|---|
| | | Sample Name: | B1BMP0007S007 | B1BMP0004S009 | B1BMP0005S010 |
| | | Sample Date: | 12/12/2014 | 12/17/2014 | 12/17/2014 |
| | | Sample Type: | Treatment and Natural BMP Perf Mon | Treatment BMP Perf Mon | Treatment BMP Perf Mon |
| | | Location: | DS (B-1 Media Filter and Vegetated Area) | US North (B-1 Media Filter) | US South (B-1 Media Filter) |
| | | Rain Event: | December 11-12, 2014 | December 15-17, 2014 | December 15-17, 2014 |
| **ANALYTE** | **UNITS** | **NPDES Permit Limit** | **RESULTS** | **RESULTS** | **RESULTS** |
| **DIOXINS** | | | | | |
| TCDD TEQ_NoDNQ | ug/L | 2.80E-08 | **2.97E-08** | **4.18E-08** | ND |
| **INORGANICS** | | | | | |
| Cadmium | ug/L | 4.0 | <0.25 * | <0.25 * | <0.25 * |
| Cadmium, dissolved | ug/L | - | <0.25 QP* | <0.25 QP* | <0.25 QP* |
| Copper | ug/L | 14 | 2.9 * | 3.2 * | 2.5 * |
| Copper, dissolved | ug/L | - | 2.4 QP* | 2.7 QP* | 2.1 QP* |
| Lead | ug/L | 5.2 | 1.7 * | 0.93 J,DX* | 0.83 J,DX* |
| Lead, dissolved | ug/L | - | <0.50 QP* | <0.50 QP* | <0.50 QP* |
| Mercury | ug/L | 0.13 | <0.10 * | <0.10 * | <0.10 * |
| Mercury, dissolved | ug/L | - | <0.10 QP* | <0.10 IB LQ QP* | <0.10 IB LQ QP* |
| **MISCELLANEOUS** | | | | | |
| Total Suspended Solids | mg/L | - | 39 * | 5.5 * | 12 * |
| **FIELD MEASUREMENTS** | | | | | |
| Conductivity (Field) | mS | - | 0.064 * | 0.092 * | 0.066 * |
| pH (Field) | pH units | 6.5-8.5 | 7.58 * | 6.66 * | 7.01 * |
| Temperature | °C | 30 | 12 * | 8.65 * | 8.25 * |
| Turbidity (Field) | NTU | - | 93.5 * | 40.6 * | 69.3 * |
| **RAINFALL**[†] | | | | | |
| Intensity (Ave) - Pre-Sampling | in/hr | - | Unavailable | 0.026 | 0.026 |
| Intensity (Ave) - Rain Event | in/hr | - | Unavailable | 0.025 | 0.025 |
| Intensity (Max) - Pre-Sampling | in/hr | - | Unavailable | 0.33 | 0.33 |
| Intensity (Max) - Rain Event | in/hr | - | Unavailable | 0.33 | 0.33 |
| Total - Pre-Sampling | in | - | Unavailable | 0.91 | 0.91 |
| Total - Rain Event | in | - | 2.62 | 0.91 | 0.91 |

**Notes:**

Upstream Sample Location

Downstream Sample Location

Results above NPDES Permit Limit in **bold** with darker shading

See Appendix B for explanation of data qualifiers.

* Data not validated.

[†] Total rainfall, average rainfall intensity, and maximum 1-hour rainfall intensity were calculated based on rainfall recorded at a RWQCB-approved weather staton within Area I. Due to Area I weather station malfunction during the 12/11 - 12/12/2014 rain event, rainfall totals from Station 436 were used but hourly rainfall is not available.

**Table 3-4a (B-1 Media Filter)**
**Treatment BMP Performance Monitoring Sample Results, Outfall 009 Watershed**
**2014/2015 Rainy Season**


| | | Object Name:<br>Sample Name:<br>Sample Date: | B1BMP0006<br>B1BMP0006S011<br>12/17/2014 | B1BMP0007[A]<br>B1BMP0007S008<br>12/17/2014 | B1BMP0005<br>B1BMP0005S011<br>1/11/2015 |
|---|---|---|---|---|---|
| | | Sample Type:<br>Location:<br>Rain Event: | Treatment BMP Perf Mon<br>DS (B-1 Media Filter)<br>December 15-17, 2014 | Treatment and Natural BMP Perf Mon<br>DS (B-1 Media Filter and Vegetated Area)<br>December 15-17, 2014 | Treatment BMP Perf Mon<br>US South (B-1 Media Filter)<br>January 10-11, 2015 |
| **ANALYTE** | **UNITS** | **NPDES Permit Limit** | **RESULTS** | **RESULTS** | **RESULTS** |
| **DIOXINS** | | | | | |
| TCDD TEQ_NoDNQ | ug/L | 2.80E-08 | ND | 3.20E-10 | 1.30E-10 |
| **INORGANICS** | | | | | |
| Cadmium | ug/L | 4.0 | <0.25 * | <0.25 * | <0.25 * |
| Cadmium, dissolved | ug/L | - | <0.25 QP* | <0.25 QP* | <0.25 QP* |
| Copper | ug/L | 14 | 2.6 * | 3.9 * | 2.0 MB* |
| Copper, dissolved | ug/L | - | 2.3 QP* | 3.3 QP* | 1.5 J,DX QP* |
| Lead | ug/L | 5.2 | 0.79 J,DX* | 1.4 * | 0.51 J,DX* |
| Lead, dissolved | ug/L | - | <0.50 QP* | <0.50 QP* | <0.50 QP* |
| Mercury | ug/L | 0.13 | <0.10 * | <0.10 * | <0.10 * |
| Mercury, dissolved | ug/L | - | <0.10 IB LQ QP* | <0.10 BU QP* | 0.49 QP* |
| **MISCELLANEOUS** | | | | | |
| Total Suspended Solids | mg/L | - | 5.0 * | 36 * | 3.1 * |
| **FIELD MEASUREMENTS** | | | | | |
| Conductivity (Field) | mS | - | 0.054 * | 0.066 * | 0.120 * |
| pH (Field) | pH units | 6.5-8.5 | 6.56 * | 7.80 * | **5.46 *** |
| Temperature | °C | 30 | 9.18 * | 10.8 * | 12.21 * |
| Turbidity (Field) | NTU | - | 46.8 * | 31.9 * | 25.3 * |
| **RAINFALL**[†] | | | | | |
| Intensity (Ave) - Pre-Sampling | in/hr | - | 0.027 | 0.025 | 0.07 |
| Intensity (Ave) - Rain Event | in/hr | - | 0.025 | 0.025 | 0.06 |
| Intensity (Max) - Pre-Sampling | in/hr | - | 0.33 | 0.33 | 0.23 |
| Intensity (Max) - Rain Event | in/hr | - | 0.33 | 0.33 | 0.23 |
| Total - Pre-Sampling | in | - | 0.91 | 0.91 | 1.56 |
| Total - Rain Event | in | - | 0.91 | 0.91 | 1.56 |

**Notes:**

Upstream Sample Location

Downstream Sample Location

Results above NPDES Permit Limit in **bold** with darker shading

See Appendix B for explanation of data qualifiers.

* Data not validated.

[†] Total rainfall, average rainfall intensity, and maximum 1-hour rainfall intensity were calculated based on rainfall recorded at a RWQCB-approved weather staton within Area I. Due to Area I weather station malfunction during the 12/11 - 12/12/2014 rain event, rainfall totals from Station 436 were used but hourly rainfall is not available.

**Table 3-4a (B-1 Media Filter)**
**Treatment BMP Performance Monitoring Sample Results, Outfall 009 Watershed**
**2014/2015 Rainy Season**


| | | Object Name: | B1BMP0006 | B1BMP0007[A] | B1BMP0006 |
|---|---|---|---|---|---|
| | | Sample Name: | B1BMP0006S012 | B1BMP0007S009 | B1BMP0006S013 |
| | | Sample Date: | 1/11/2015 | 1/11/2015 | 3/1/2015 |
| | | Sample Type: | Treatment BMP Perf Mon | Treatment and Natural BMP Perf Mon | Treatment BMP Perf Mon |
| | | Location: | DS (B-1 Media Filter) | DS (B-1 Media Filter and Vegetated Area) | DS (B-1 Media Filter) |
| | | Rain Event: | January 10-11, 2015 | January 10-11, 2015 | March 1-3, 2015 |
| **ANALYTE** | **UNITS** | **NPDES Permit Limit** | **RESULTS** | **RESULTS** | **RESULTS** |
| **DIOXINS** | | | | | |
| TCDD TEQ_NoDNQ | ug/L | 2.80E-08 | 3.60E-10 | **5.13E-08** | **5.62E-08** |
| **INORGANICS** | | | | | |
| Cadmium | ug/L | 4.0 | <0.25 * | <0.25 * | <0.25 * |
| Cadmium, dissolved | ug/L | - | <0.25 QP* | <0.25 QP* | <0.25 QP* |
| Copper | ug/L | 14 | 3.6 MB* | 4.6 MB* | 3.4 MB* |
| Copper, dissolved | ug/L | - | 1.6 J,DX QP* | 3.2 QP* | 2.4 QP* |
| Lead | ug/L | 5.2 | 0.71 J,DX* | 1.7 * | 2.4 * |
| Lead, dissolved | ug/L | - | <0.50 QP* | <0.50 QP* | 0.50 J,DX QP* |
| Mercury | ug/L | 0.13 | <0.10 * | <0.10 * | **0.24 *** |
| Mercury, dissolved | ug/L | - | <0.10 QP* | <0.10 QP* | <0.10 QP* |
| **MISCELLANEOUS** | | | | | |
| Total Suspended Solids | mg/L | - | 4.9 * | 33 * | 25 * |
| **FIELD MEASUREMENTS** | | | | | |
| Conductivity (Field) | mS | - | 0.048 * | 0.073 * | 0.642 * |
| pH (Field) | pH units | 6.5-8.5 | **6.18 *** | 8.33 * | **5.23 *** |
| Temperature | °C | 30 | 11.96 * | 13.1 * | 10.6 * |
| Turbidity (Field) | NTU | - | 30.1 * | 41.9 * | 67.9 * |
| **RAINFALL**[†] | | | | | |
| Intensity (Ave) - Pre-Sampling | in/hr | - | 0.07 | 0.06 | 0.041 |
| Intensity (Ave) - Rain Event | in/hr | - | 0.06 | 0.06 | 0.016 |
| Intensity (Max) - Pre-Sampling | in/hr | - | 0.23 | 0.23 | 0.12 |
| Intensity (Max) - Rain Event | in/hr | - | 0.23 | 0.23 | 0.22 |
| Total - Pre-Sampling | in | - | 1.56 | 1.56 | 0.32 |
| Total - Rain Event | in | - | 1.56 | 1.56 | 1.43 |

**Notes:**

Upstream Sample Location

Downstream Sample Location

Results above NPDES Permit Limit in **bold** with darker shading

See Appendix B for explanation of data qualifiers.

* Data not validated.

[†] Total rainfall, average rainfall intensity, and maximum 1-hour rainfall intensity were calculated based on rainfall recorded at a RWQCB-approved weather staton within Area I. Due to Area I weather station malfunction during the 12/11 - 12/12/2014 rain event, rainfall totals from Station 436 were used but hourly rainfall is not available.

**Table 3-4a (B-1 Media Filter)**
**Treatment BMP Performance Monitoring Sample Results, Outfall 009 Watershed**
**2014/2015 Rainy Season**


| | | Object Name: | B1BMP0003 | B1BMP0004 | B1BMP0005 |
|---|---|---|---|---|---|
| | | Sample Name: | B1BMP0003S015 | B1BMP0004S010 | B1BMP0005S012 |
| | | Sample Date: | 3/2/2015 | 3/2/2015 | 3/2/2015 |
| | | Sample Type: | Natural BMP Perf Mon | Treatment BMP Perf Mon | Treatment BMP Perf Mon |
| | | Location: | US (Vegetated Area) | US North (B-1 Media Filter) | US South (B-1 Media Filter) |
| | | Rain Event: | March 1-3, 2015 | March 1-3, 2015 | March 1-3, 2015 |
| **ANALYTE** | **UNITS** | **NPDES Permit Limit** | **RESULTS** | **RESULTS** | **RESULTS** |
| **DIOXINS** | | | | | |
| TCDD TEQ_NoDNQ | ug/L | 2.80E-08 | **1.44E-07** | **8.72E-08** | **3.77E-06** |
| **INORGANICS** | | | | | |
| Cadmium | ug/L | 4.0 | <0.25 * | <0.25 * | <0.25 * |
| Cadmium, dissolved | ug/L | - | <0.25 QP* | <0.25 QP* | <0.25 QP* |
| Copper | ug/L | 14 | 11 MB* | 4.2 MB* | **35 MB*** |
| Copper, dissolved | ug/L | - | 3.4 QP* | 2.4 QP* | 1.7 J,DX QP* |
| Lead | ug/L | 5.2 | 2.9 * | **5.8 *** | 0.95 J,DX* |
| Lead, dissolved | ug/L | - | <0.50 QP* | 0.55 J,DX QP* | <0.50 QP* |
| Mercury | ug/L | 0.13 | <0.10 * | <0.10 * | <0.10 * |
| Mercury, dissolved | ug/L | - | <0.10 QP* | <0.10 QP* | <0.10 QP* |
| **MISCELLANEOUS** | | | | | |
| Total Suspended Solids | mg/L | - | 42 * | 27 * | 48 * |
| **FIELD MEASUREMENTS** | | | | | |
| Conductivity (Field) | mS | - | 0.019 * | 0.039 * | 0.037 * |
| pH (Field) | pH units | 6.5-8.5 | **6.10 *** | 6.51 * | 7.47 * |
| Temperature | °C | 30 | 7.25 * | 7.21 * | 7.03 * |
| Turbidity (Field) | NTU | - | 119 * | 113 * | 36.3 * |
| **RAINFALL**[†] | | | | | |
| Intensity (Ave) - Pre-Sampling | in/hr | - | 0.025 | 0.026 | 0.025 |
| Intensity (Ave) - Rain Event | in/hr | - | 0.016 | 0.016 | 0.016 |
| Intensity (Max) - Pre-Sampling | in/hr | - | 0.14 | 0.14 | 0.14 |
| Intensity (Max) - Rain Event | in/hr | - | 0.22 | 0.22 | 0.22 |
| Total - Pre-Sampling | in | - | 0.78 | 0.84 | 0.80 |
| Total - Rain Event | in | - | 1.43 | 1.43 | 1.43 |

**Notes:**

Upstream Sample Location

Downstream Sample Location

Results above NPDES Permit Limit in **bold** with darker shading

See Appendix B for explanation of data qualifiers.

* Data not validated.

[†] Total rainfall, average rainfall intensity, and maximum 1-hour rainfall intensity were calculated based on rainfall recorded at a RWQCB-approved weather staton within Area I. Due to Area I weather station malfunction during the 12/11 - 12/12/2014 rain event, rainfall totals from Station 436 were used but hourly rainfall is not available.

**Table 3-4a (B-1 Media Filter)**
**Treatment BMP Performance Monitoring Sample Results, Outfall 009 Watershed**
**2014/2015 Rainy Season**


| | | Object Name:<br>Sample Name:<br>Sample Date: | B1BMP0007[A]<br>B1BMP0007S010<br>3/2/2015 |
|---|---|---|---|
| | | Sample Type:<br>Location:<br>Rain Event: | Treatment and Natural BMP Perf Mon<br>DS (B-1 Media Filter and Vegetated Area)<br>March 1-3, 2015 |
| **ANALYTE** | **UNITS** | **NPDES Permit Limit** | **RESULTS** |
| **DIOXINS** | | | |
| TCDD TEQ_NoDNQ | ug/L | 2.80E-08 | **6.14E-08** |
| **INORGANICS** | | | |
| Cadmium | ug/L | 4.0 | <0.25 * |
| Cadmium, dissolved | ug/L | - | <0.25 QP* |
| Copper | ug/L | 14 | 4.0 MB* |
| Copper, dissolved | ug/L | - | 2.4 QP* |
| Lead | ug/L | 5.2 | 3.1 * |
| Lead, dissolved | ug/L | - | <0.50 QP* |
| Mercury | ug/L | 0.13 | 0.10 J,DX* |
| Mercury, dissolved | ug/L | - | <0.10 QP* |
| **MISCELLANEOUS** | | | |
| Total Suspended Solids | mg/L | - | 19 * |
| **FIELD MEASUREMENTS** | | | |
| Conductivity (Field) | mS | - | 0.055 * |
| pH (Field) | pH units | 6.5-8.5 | **5.81 *** |
| Temperature | °C | 30 | 8.22 * |
| Turbidity (Field) | NTU | - | 115 * |
| **RAINFALL**[†] | | | |
| Intensity (Ave) - Pre-Sampling | in/hr | - | 0.027 |
| Intensity (Ave) - Rain Event | in/hr | - | 0.016 |
| Intensity (Max) - Pre-Sampling | in/hr | - | 0.14 |
| Intensity (Max) - Rain Event | in/hr | - | 0.22 |
| Total - Pre-Sampling | in | - | 0.89 |
| Total - Rain Event | in | - | 1.43 |

**Notes:**

Upstream Sample Location

Downstream Sample Location

Results above NPDES Permit Limit in **bold** with darker shading

See Appendix B for explanation of data qualifiers.

* Data not validated.

[†] Total rainfall, average rainfall intensity, and maximum 1-hour rainfall intensity were calculated based on rainfall recorded at a RWQCB-approved weather staton within Area I. Due to Area I weather station malfunction during the 12/11 - 12/12/2014 rain event, rainfall totals from Station 436 were used but hourly rainfall is not available.

**Table 3-4b (CM-1)**
**Treatment BMP Performance Monitoring Sample Results, Outfall 009 Watershed**
**2014/2015 Rainy Season**


| | | Object Name:<br>Sample Name:<br>Sample Date: | EVBMP0003<br>EVBMP0003S012<br>12/2/2014 | A2BMP0007<br>A2BMP0007S006<br>12/12/2014 |
|---|---|---|---|---|
| | | Sample Type:<br>Location:<br>Rain Event: | Treatment BMP Perf Mon<br>US West (CM-1)<br>November 30 - December 4, 2014 | Treatment BMP Perf Mon<br>DS (CM-1)<br>December 11 - 12, 2014 |
| **ANALYTE** | **UNITS** | **NPDES Permit Limit** | **RESULTS** | **RESULTS** |
| **DIOXINS** | | | | |
| TCDD TEQ_NoDNQ | ug/L | 2.80E-08 | **1.87E-07** | 2.16E-10 |
| **INORGANICS** | | | | |
| Cadmium | ug/L | 4.0 | <0.128 | <0.128 |
| Cadmium, dissolved | ug/L | - | 0.472 J | -- |
| Copper | ug/L | 14 | 5.37 | 4.05 |
| Copper, dissolved | ug/L | - | 2.44 | -- |
| Lead | ug/L | 5.2 | 1.97 | 1.2 |
| Lead, dissolved | ug/L | - | 0.634 J | -- |
| Mercury | ug/L | 0.13 | <0.0453 | <0.0453 |
| Mercury, dissolved | ug/L | - | <0.0453 | -- |
| **MISCELLANEOUS** | | | | |
| Total Suspended Solids | mg/L | - | 19 | 4.9 |
| **FIELD MEASUREMENTS** | | | | |
| Conductivity (Field) | mS | - | 0.078 * | 0.058 * |
| pH (Field) | pH units | 6.5-8.5 | **4.94 *** | 7.03 * |
| Temperature | °C | 30 | 14.76 * | 11.84 * |
| Turbidity (Field) | NTU | - | 72.1 * | 32.3 * |
| **RAINFALL**[†] | | | | |
| Intensity (Ave) - Pre-Sampling | in/hr | - | 0.02 | Unavailable |
| Intensity (Ave) - Rain Event | in/hr | - | 0.03 | Unavailable |
| Intensity (Max) - Pre-Sampling | in/hr | - | 0.14 | Unavailable |
| Intensity (Max) - Rain Event | in/hr | - | 0.40 | Unavailable |
| Total - Pre-Sampling | in | - | 0.90 | Unavailable |
| Total - Rain Event | in | - | 3.20 | 2.62 |

**Notes:**

Upstream Sample Location

Downstream Sample Location

Results above NPDES Permit Limit in **bold** with darker shading

See Appendix B for explanation of data qualifiers.

* Data not validated.

[†] Total rainfall, average rainfall intensity, and maximum 1-hour rainfall intensity were calculated based on rainfall recorded at a RWQCB-approved weather staton within Area I. Due to Area I weather station malfunction during the 12/11 - 12/12/2014 rain event, rainfall totals from Station 436 were used but hourly rainfall is not available.

**Table 3-4c (Lower Parking Lot BMP)**
**Treatment BMP Performance Monitoring Sample Results, Outfall 009 Watershed**
**2014/2015 Rainy Season**


| | | Object Name: | LPBMP0002 | LPBMP0003 | LPBMP0004 |
|---|---|---|---|---|---|
| | | Sample Name: | LPBMP0002S004 | LPBMP0003S004 | LPBMP0004S005 |
| | | Sample Date: | 12/2/2014 | 12/2/2014 | 12/2/2014 |
| | | Sample Type: | Treatment BMP Perf Mon | Treatment BMP Perf Mon | Treatment BMP Perf Mon |
| | | Location: | US (Lower Parking Lot) | Int (Lower Parking Lot) | DS (Lower Parking Lot) |
| | | Rain Event: | November 30 - December 4, 2014 | November 30 - December 4, 2014 | November 30 - December 4, 2014 |
| **ANALYTE** | **UNITS** | **NPDES Permit Limit** | **RESULTS** | **RESULTS** | **RESULTS** |
| **DIOXINS** | | | | | |
| TCDD TEQ_NoDNQ | ug/L | 2.80E-08 | **9.49E-08** | **3.31E-08** | ND |
| **INORGANICS** | | | | | |
| Cadmium | ug/L | 4.0 | <0.50 * | <0.50 * | <0.50 * |
| Cadmium, dissolved | ug/L | - | <0.25 QP* | <0.25 QP* | <0.25 QP* |
| Copper | ug/L | 14 | 14 MB* | 12 MB* | 14 MB* |
| Copper, dissolved | ug/L | - | 8.7 QP* | 9.0 QP* | 5.9 QP* |
| Lead | ug/L | 5.2 | 4.7 * | 3.0 * | **5.6 *** |
| Lead, dissolved | ug/L | - | <0.50 QP* | <0.50 QP* | 0.75 J,DX QP* |
| Mercury | ug/L | 0.13 | <0.10 * | <0.10 * | <0.10 * |
| Mercury, dissolved | ug/L | - | <0.10 QP* | <0.10 QP* | <0.10 QP* |
| **MISCELLANEOUS** | | | | | |
| Total Suspended Solids | mg/L | - | 68 * | 32 * | 110 * |
| **FIELD MEASUREMENTS** | | | | | |
| Conductivity (Field) | mS | - | 0.142 * | 0.125 * | 0.395 * |
| pH (Field) | pH units | 6.5-8.5 | 7.73 * | 7.17 * | 7.68 * |
| Temperature | °C | 30 | 14.11 * | 13.51 * | 14.91 * |
| Turbidity (Field) | NTU | - | 232 * | 150 * | 311 * |
| **RAINFALL**[†] | | | | | |
| Intensity (Ave) - Pre-Sampling | in/hr | - | 0.019 | 0.018 | 0.018 |
| Intensity (Ave) - Rain Event | in/hr | - | 0.033 | 0.033 | 0.033 |
| Intensity (Max) - Pre-Sampling | in/hr | - | 0.14 | 0.14 | 0.14 |
| Intensity (Max) - Rain Event | in/hr | - | 0.40 | 0.40 | 0.40 |
| Total - Pre-Sampling | in | - | 0.93 | 0.91 | 0.91 |
| Total - Rain Event | in | - | 3.20 | 3.20 | 3.20 |

**Notes:**

Upstream Sample Location
Intermediate Sample Location
Downstream Sample Location

Results above NPDES Permit Limit in **bold** with darker shading
See Appendix B for explanation of data qualifiers.
* Data not validated.

[†] Total rainfall, average rainfall intensity, and maximum 1-hour rainfall intensity were calculated based on rainfall recorded at a RWQCB-approved weather staton within Area I. Due to Area I weather station malfunction during the 12/11 - 12/12/2014 rain event, rainfall totals from Station 436 were used but hourly rainfall is not available.

**Table 3-4c (Lower Parking Lot BMP)**
**Treatment BMP Performance Monitoring Sample Results, Outfall 009 Watershed**
**2014/2015 Rainy Season**


| | | Object Name:<br>Sample Name:<br>Sample Date: | LPBMP0002<br>LPBMP0002S005<br>12/12/2014 | LPBMP0003<br>LPBMP0003S005<br>12/12/2014 | LPBMP0004<br>LPBMP0004S006<br>12/12/2014 |
|---|---|---|---|---|---|
| | | Sample Type:<br>Location:<br>Rain Event: | Treatment BMP Perf Mon<br>US (Lower Parking Lot)<br>December 11-12, 2014 | Treatment BMP Perf Mon<br>Int (Lower Parking Lot)<br>December 11-12, 2014 | Treatment BMP Perf Mon<br>DS (Lower Parking Lot)<br>December 11-12, 2014 |
| **ANALYTE** | **UNITS** | **NPDES Permit Limit** | **RESULTS** | **RESULTS** | **RESULTS** |
| **DIOXINS** | | | | | |
| TCDD TEQ_NoDNQ | ug/L | 2.80E-08 | **5.65E-08** | **2.26E-07** | ND |
| **INORGANICS** | | | | | |
| Cadmium | ug/L | 4.0 | <0.50 * | 0.30 J,DX* | <0.25 * |
| Cadmium, dissolved | ug/L | - | <0.25 QP* | <0.25 QP* | <0.25 QP* |
| Copper | ug/L | 14 | **17 *** | 13 * | 7.6 * |
| Copper, dissolved | ug/L | - | 6.4 QP* | 5.5 QP* | 3.6 QP* |
| Lead | ug/L | 5.2 | **7.9 *** | **6.6 *** | 3.6 * |
| Lead, dissolved | ug/L | - | 0.58 J,DX QP* | <0.50 QP* | 0.65 J,DX QP* |
| Mercury | ug/L | 0.13 | <0.20 * | <0.10 * | <0.10 * |
| Mercury, dissolved | ug/L | - | <0.10 QP* | <0.10 QP* | <0.10 QP* |
| **MISCELLANEOUS** | | | | | |
| Total Suspended Solids | mg/L | - | 96 * | 110 * | 21 * |
| **FIELD MEASUREMENTS** | | | | | |
| Conductivity (Field) | mS | - | 0.239 * | 0.166 * | 0.479 * |
| pH (Field) | pH units | 6.5-8.5 | 7.64 * | 7.47 * | 7.01 * |
| Temperature | °C | 30 | 11.84 * | 12.06 * | 13.58 * |
| Turbidity (Field) | NTU | - | 668 * | 506 * | 204 * |
| **RAINFALL**[†] | | | | | |
| Intensity (Ave) - Pre-Sampling | in/hr | - | Unavailable | Unavailable | Unavailable |
| Intensity (Ave) - Rain Event | in/hr | - | Unavailable | Unavailable | Unavailable |
| Intensity (Max) - Pre-Sampling | in/hr | - | Unavailable | Unavailable | Unavailable |
| Intensity (Max) - Rain Event | in/hr | - | Unavailable | Unavailable | Unavailable |
| Total - Pre-Sampling | in | - | Unavailable | Unavailable | Unavailable |
| Total - Rain Event | in | - | 2.62 | 2.62 | 2.62 |

**Notes:**

Upstream Sample Location
Intermediate Sample Location
Downstream Sample Location

Results above NPDES Permit Limit in **bold** with darker shading
See Appendix B for explanation of data qualifiers.
* Data not validated.
[†] Total rainfall, average rainfall intensity, and maximum 1-hour rainfall intensity were calculated based on rainfall recorded at a RWQCB-approved weather staton within Area I. Due to Area I weather station malfunction during the 12/11 - 12/12/2014 rain event, rainfall totals from Station 436 were used but hourly rainfall is not available.

**Table 3-4c (Lower Parking Lot BMP)**
**Treatment BMP Performance Monitoring Sample Results, Outfall 009 Watershed**
**2014/2015 Rainy Season**


| | | Object Name: | LPBMP0002 | LPBMP0003 | LPBMP0004 |
|---|---|---|---|---|---|
| | | Sample Name: | LPBMP0002S006 | LPBMP0003S006 | LPBMP0004S007 |
| | | Sample Date: | 12/17/2014 | 12/17/2014 | 12/17/2014 |
| | | Sample Type: | Treatment BMP Perf Mon | Treatment BMP Perf Mon | Treatment BMP Perf Mon |
| | | Location: | US (Lower Parking Lot) | Int (Lower Parking Lot) | DS (Lower Parking Lot) |
| | | Rain Event: | December 15-17, 2014 | December 15-17, 2014 | December 15-17, 2014 |
| **ANALYTE** | **UNITS** | **NPDES Permit Limit** | **RESULTS** | **RESULTS** | **RESULTS** |
| **DIOXINS** | | | | | |
| TCDD TEQ_NoDNQ | ug/L | 2.80E-08 | **7.93E-08** | **3.42E-08** | 1.66E-10 |
| **INORGANICS** | | | | | |
| Cadmium | ug/L | 4.0 | 0.75 J,DX* | <0.25 * | <0.25 * |
| Cadmium, dissolved | ug/L | - | <0.50 QP* | <0.25 QP* | <0.25 QP* |
| Copper | ug/L | 14 | **32 *** | 13 * | 9.4 * |
| Copper, dissolved | ug/L | - | 11 QP* | 5.1 QP* | 4.4 QP* |
| Lead | ug/L | 5.2 | **20 *** | **6.6 *** | 4.9 * |
| Lead, dissolved | ug/L | - | 2.1 QP* | 0.57 J,DX QP* | 1.3 QP* |
| Mercury | ug/L | 0.13 | <0.20 * | <0.10 * | <0.10 * |
| Mercury, dissolved | ug/L | - | <0.10 IB LQ QP* | <0.10 IB LQ QP* | <0.10 IB LQ QP* |
| **MISCELLANEOUS** | | | | | |
| Total Suspended Solids | mg/L | - | 280 * | 100 * | 13 * |
| **FIELD MEASUREMENTS** | | | | | |
| Conductivity (Field) | mS | - | 0.307 * | 0.099 * | 0.229 * |
| pH (Field) | pH units | 6.5-8.5 | 7.11 * | 7.73 * | 7.97 * |
| Temperature | °C | 30 | 9.54 * | 7.33 * | 9.23 * |
| Turbidity (Field) | NTU | - | 900 * | 433 * | 225 * |
| **RAINFALL**[†] | | | | | |
| Intensity (Ave) - Pre-Sampling | in/hr | - | 0.027 | 0.027 | 0.027 |
| Intensity (Ave) - Rain Event | in/hr | - | 0.025 | 0.025 | 0.025 |
| Intensity (Max) - Pre-Sampling | in/hr | - | 0.33 | 0.33 | 0.33 |
| Intensity (Max) - Rain Event | in/hr | - | 0.33 | 0.33 | 0.33 |
| Total - Pre-Sampling | in | - | 0.91 | 0.91 | 0.91 |
| Total - Rain Event | in | - | 0.91 | 0.91 | 0.91 |

**Notes:**

Upstream Sample Location
Intermediate Sample Location
Downstream Sample Location

Results above NPDES Permit Limit in **bold** with darker shading
See Appendix B for explanation of data qualifiers.
* Data not validated.

[†] Total rainfall, average rainfall intensity, and maximum 1-hour rainfall intensity were calculated based on rainfall recorded at a RWQCB-approved weather staton within Area I. Due to Area I weather station malfunction during the 12/11 - 12/12/2014 rain event, rainfall totals from Station 436 were used but hourly rainfall is not available.

**Table 3-4c (Lower Parking Lot BMP)**
**Treatment BMP Performance Monitoring Sample Results, Outfall 009 Watershed**
**2014/2015 Rainy Season**


| | | Object Name: | LPBMP0002 | LPBMP0003 | LPBMP0004 |
|---|---|---|---|---|---|
| | | Sample Name: | LPBMP0002S007 | LPBMP0003S007 | LPBMP0004S008 |
| | | Sample Date: | 1/11/2015 | 1/11/2015 | 1/11/2015 |
| | | Sample Type: | Treatment BMP Perf Mon | Treatment BMP Perf Mon | Treatment BMP Perf Mon |
| | | Location: | US (Lower Parking Lot) | Int (Lower Parking Lot) | DS (Lower Parking Lot) |
| | | Rain Event: | January 10-11, 2015 | January 10-11, 2015 | January 10-11, 2015 |
| **ANALYTE** | **UNITS** | **NPDES Permit Limit** | **RESULTS** | **RESULTS** | **RESULTS** |
| **DIOXINS** | | | | | |
| TCDD TEQ_NoDNQ | ug/L | 2.80E-08 | 2.69E-08 | **3.81E-08** | 2.60E-10 |
| **INORGANICS** | | | | | |
| Cadmium | ug/L | 4.0 | <0.25 * | <0.25 * | <0.25 * |
| Cadmium, dissolved | ug/L | - | <0.25 QP* | <0.25 QP* | <0.25 QP* |
| Copper | ug/L | 14 | 7.6 MB* | 6.4 MB* | 5.0 MB* |
| Copper, dissolved | ug/L | - | 4.5 QP* | 3.6 QP* | 2.5 QP* |
| Lead | ug/L | 5.2 | 1.5 * | 1.5 * | 2.6 * |
| Lead, dissolved | ug/L | - | <0.50 QP* | <0.50 QP* | <0.50 QP* |
| Mercury | ug/L | 0.13 | <0.10 * | <0.10 * | <0.10 * |
| Mercury, dissolved | ug/L | - | <0.10 QP* | <0.10 QP* | <0.10 QP* |
| **MISCELLANEOUS** | | | | | |
| Total Suspended Solids | mg/L | - | 14 * | 22 * | 16 * |
| **FIELD MEASUREMENTS** | | | | | |
| Conductivity (Field) | mS | - | 0.192 * | 0.099 * | 0.237 * |
| pH (Field) | pH units | 6.5-8.5 | 7.98 * | 7.46 * | 7.66 * |
| Temperature | °C | 30 | 12.96 * | 12.26 * | 12.26 * |
| Turbidity (Field) | NTU | - | 101 * | 128 * | 128 * |
| **RAINFALL**[†] | | | | | |
| Intensity (Ave) - Pre-Sampling | in/hr | - | 0.066 | 0.066 | 0.067 |
| Intensity (Ave) - Rain Event | in/hr | - | 0.062 | 0.062 | 0.062 |
| Intensity (Max) - Pre-Sampling | in/hr | - | 0.23 | 0.23 | 0.23 |
| Intensity (Max) - Rain Event | in/hr | - | 0.23 | 0.23 | 0.23 |
| Total - Pre-Sampling | in | - | 1.56 | 1.56 | 1.56 |
| Total - Rain Event | in | - | 1.56 | 1.56 | 1.56 |

**Notes:**

Upstream Sample Location
Intermediate Sample Location
Downstream Sample Location

Results above NPDES Permit Limit in **bold** with darker shading
See Appendix B for explanation of data qualifiers.
* Data not validated.
[†] Total rainfall, average rainfall intensity, and maximum 1-hour rainfall intensity were calculated based on rainfall recorded at a RWQCB-approved weather staton within Area I. Due to Area I weather station malfunction during the 12/11 - 12/12/2014 rain event, rainfall totals from Station 436 were used but hourly rainfall is not available.

**Table 3-4c (Lower Parking Lot BMP)**
**Treatment BMP Performance Monitoring Sample Results, Outfall 009 Watershed**
**2014/2015 Rainy Season**


| | | Object Name: | LPBMP0002 | LPBMP0003 | LPBMP0004 |
|---|---|---|---|---|---|
| | | Sample Name: | LPBMP0002S008 | LPBMP0003S008 | LPBMP0004S009 |
| | | Sample Date: | 3/2/2015 | 3/2/2015 | 3/2/2015 |
| | | Sample Type: | Treatment BMP Perf Mon | Treatment BMP Perf Mon | Treatment BMP Perf Mon |
| | | Location: | US (Lower Parking Lot) | Int (Lower Parking Lot) | DS (Lower Parking Lot) |
| | | Rain Event: | March 1-3, 2015 | March 1-3, 2015 | March 1-3, 2015 |
| **ANALYTE** | **UNITS** | **NPDES Permit Limit** | **RESULTS** | **RESULTS** | **RESULTS** |
| **DIOXINS** | | | | | |
| TCDD TEQ_NoDNQ | ug/L | 2.80E-08 | **4.74E-08** | **4.18E-08** | 3.00E-10 |
| **INORGANICS** | | | | | |
| Cadmium | ug/L | 4.0 | <0.25 * | <0.25 * | <0.25 * |
| Cadmium, dissolved | ug/L | - | <0.25 QP* | <0.25 QP* | <0.25 QP* |
| Copper | ug/L | 14 | 7.1 MB* | 8.4 MB* | 8.5 MB* |
| Copper, dissolved | ug/L | - | 5.1 QP* | 4.4 QP* | 5.0 QP* |
| Lead | ug/L | 5.2 | 2.8 * | 2.4 * | 3.3 * |
| Lead, dissolved | ug/L | - | <0.50 QP* | 0.57 J,DX QP* | <0.50 QP* |
| Mercury | ug/L | 0.13 | <0.10 * | <0.10 * | <0.10 * |
| Mercury, dissolved | ug/L | - | <0.10 QP* | <0.10 QP* | <0.10 QP* |
| **MISCELLANEOUS** | | | | | |
| Total Suspended Solids | mg/L | - | 18 * | 23 * | 37 * |
| **FIELD MEASUREMENTS** | | | | | |
| Conductivity (Field) | mS | - | 0.102 * | 0.108 * | 0.111 * |
| pH (Field) | pH units | 6.5-8.5 | 7.50 * | 7.59 * | **6.05 *** |
| Temperature | °C | 30 | 7.51 * | 7.40 * | 7.99 * |
| Turbidity (Field) | NTU | - | 86.4 * | 111 * | 161 * |
| **RAINFALL**[†] | | | | | |
| Intensity (Ave) - Pre-Sampling | in/hr | - | 0.026 | 0.027 | 0.027 |
| Intensity (Ave) - Rain Event | in/hr | - | 0.016 | 0.016 | 0.016 |
| Intensity (Max) - Pre-Sampling | in/hr | - | 0.14 | 0.14 | 0.14 |
| Intensity (Max) - Rain Event | in/hr | - | 0.22 | 0.22 | 0.22 |
| Total - Pre-Sampling | in | - | 0.89 | 0.88 | 0.87 |
| Total - Rain Event | in | - | 1.43 | 1.43 | 1.43 |

**Notes:**

Upstream Sample Location
Intermediate Sample Location
Downstream Sample Location

Results above NPDES Permit Limit in **bold** with darker shading
See Appendix B for explanation of data qualifiers.
* Data not validated.

[†] Total rainfall, average rainfall intensity, and maximum 1-hour rainfall intensity were calculated based on rainfall recorded at a RWQCB-approved weather staton within Area I. Due to Area I weather station malfunction during the 12/11 - 12/12/2014 rain event, rainfall totals from Station 436 were used but hourly rainfall is not available.

**Table 3-4d (CM-9)**
**Treatment BMP Performance Monitoring Sample Results, Outfall 009 Watershed**
**2014/2015 Rainy Season**


| | | Object Name: | ILBMP0002 | A1BMP0003 | ILBMP0002 |
|---|---|---|---|---|---|
| | | Sample Name: | ILBMP0002S011 | A1BMP0003S002 | ILBMP0002S012 |
| | | Sample Date: | 12/2/2014 | 12/2/2014 | 12/12/2014 |
| | | Sample Type: | Treatment BMP Perf Mon | Treatment BMP Per Mon | Treatment BMP Perf Mon |
| | | Location: | US East (CM-9, IEL, Area II Road) | DS (CM-9, AILF, IEL, Area II Road) | US East (CM-9, IEL, Area II Road) |
| | | Rain Event: | November 30 - December 4, 2014 | November 30 - December 4, 2014 | December 11-12, 2014 |
| **ANALYTE** | **UNITS** | **NPDES Permit Limit** | **RESULTS** | **RESULTS** | **RESULTS** |
| **DIOXINS** | | | | | |
| TCDD TEQ_NoDNQ | ug/L | 2.80E-08 | **1.14E-07** | **1.46E-07** | ND |
| **INORGANICS** | | | | | |
| Cadmium | ug/L | 4.0 | 0.29 J,DX* | <0.50 * | <0.25 * |
| Cadmium, dissolved | ug/L | - | <0.25 QP* | <0.25 QP* | <0.25 QP* |
| Copper | ug/L | 14 | **33 MB*** | **16 MB*** | 5.8 * |
| Copper, dissolved | ug/L | - | 18 QP* | 4.8 QP* | 4.8 QP* |
| Lead | ug/L | 5.2 | **13 *** | **12 *** | 2.0 * |
| Lead, dissolved | ug/L | - | 2.3 QP* | 0.70 J,DX QP* | <0.50 QP* |
| Mercury | ug/L | 0.13 | <0.20 * | <0.20 * | <0.10 * |
| Mercury, dissolved | ug/L | - | <0.10 QP* | <0.10 QP* | <0.10 QP* |
| **MISCELLANEOUS** | | | | | |
| Total Suspended Solids | mg/L | - | 320 * | 180 * | 15 * |
| **FIELD MEASUREMENTS** | | | | | |
| Conductivity (Field) | mS | - | 0.079 * | 0.044 * | 0.064 * |
| pH (Field) | pH units | 6.5-8.5 | 7.48 * | 7.40 * | 7.22 * |
| Temperature | °C | 30 | 12.49 * | 17.05 * | 14.97 * |
| Turbidity (Field) | NTU | - | 404 * | 961 * | 47.3 * |
| **RAINFALL**[†] | | | | | |
| Intensity (Ave) - Pre-Sampling | in/hr | - | 0.016 | 0.016 | Unavailable |
| Intensity (Ave) - Rain Event | in/hr | - | 0.033 | 0.033 | Unavailable |
| Intensity (Max) - Pre-Sampling | in/hr | - | 0.14 | 0.12 | Unavailable |
| Intensity (Max) - Rain Event | in/hr | - | 0.40 | 0.40 | Unavailable |
| Total - Pre-Sampling | in | - | 0.79 | 0.62 | Unavailable |
| Total - Rain Event | in | - | 3.20 | 3.20 | 2.62 |

**Notes:**

Upstream Sample Location

Downstream Sample Location

Results above NPDES Permit Limit in **bold** with darker shading

See Appendix B for explanation of data qualifiers.

* Data not validated.

[†] Total rainfall, average rainfall intensity, and maximum 1-hour rainfall intensity were calculated based on rainfall recorded at a RWQCB-approved weather staton within Area I. Due to Area I weather station malfunction during the 12/11 - 12/12/2014 rain event, rainfall totals from Station 436 were used but hourly rainfall is not available.

**Table 3-4d (CM-9)**
**Treatment BMP Performance Monitoring Sample Results, Outfall 009 Watershed**
**2014/2015 Rainy Season**


| | | Object Name: | A1BMP0002 | A1BMP0003 | A1BMP0002 | A1BMP0003 |
|---|---|---|---|---|---|---|
| | | Sample Name: | A1BMP0002S005 | A1BMP0003S003 | A1BMP0002S006 | A1BMP0003S004 |
| | | Sample Date: | 12/12/2014 | 12/12/2014 | 12/17/2014 | 12/17/2014 |
| | | Sample Type: | Treatment BMP Per Mon | Treatment BMP Per Mon | Treatment BMP Per Mon | Treatment BMP Per Mon |
| | | Location: | US South (CM-9, AILF) | DS (CM-9, AILF, IEL, Area II Road) | US CM-9, AILF | DS CM-9, AILF, IEL, Area II Road |
| | | Rain Event: | December 11-12, 2014 | December 11-12, 2014 | December 15-17, 2014 | December 15-17, 2014 |
| **ANALYTE** | **UNITS** | **NPDES Permit Limit** | **RESULTS** | **RESULTS** | **RESULTS** | **RESULTS** |
| **DIOXINS** | | | | | | |
| TCDD TEQ_NoDNQ | ug/L | 2.80E-08 | ND | ND | ND | ND |
| **INORGANICS** | | | | | | |
| Cadmium | ug/L | 4.0 | 0.44 J,DX* | <0.25 * | 0.35 J,DX* | <0.25 * |
| Cadmium, dissolved | ug/L | - | 0.35 J,DX QP* | <0.25 QP* | 0.36 J,DX QP* | <0.25 QP* |
| Copper | ug/L | 14 | 11 * | 6.9 * | 7.7 * | 5.9 * |
| Copper, dissolved | ug/L | - | 11 QP* | 6.3 QP* | 7.8 QP* | 6.3 QP* |
| Lead | ug/L | 5.2 | 0.69 J,DX* | 0.95 J,DX* | <0.50 * | <0.50 * |
| Lead, dissolved | ug/L | - | <0.50 QP* | <0.50 QP* | <0.50 QP* | <0.50 QP* |
| Mercury | ug/L | 0.13 | <0.10 * | <0.10 * | <0.10 * | <0.10 * |
| Mercury, dissolved | ug/L | - | <0.10 QP* | <0.10 QP* | <0.10 IB LQ QP* | <0.10 IB LQ QP* |
| **MISCELLANEOUS** | | | | | | |
| Total Suspended Solids | mg/L | - | 9.3 * | 5.2 * | 0.70 J,DX* | 0.70 J,DX* |
| **FIELD MEASUREMENTS** | | | | | | |
| Conductivity (Field) | mS | - | 0.157 * | 0.102 * | 0.378 * | 0.286 * |
| pH (Field) | pH units | 6.5-8.5 | 7.77 * | 7.51 * | 7.89 * | 7.83 * |
| Temperature | °C | 30 | 13.71 * | 12.97 * | 11.44 * | 10.76 * |
| Turbidity (Field) | NTU | - | 15 * | 26.1 * | 4.6 * | 5.9 * |
| **RAINFALL**[†] | | | | | | |
| Intensity (Ave) - Pre-Sampling | in/hr | - | Unavailable | Unavailable | 0.026 | 0.026 |
| Intensity (Ave) - Rain Event | in/hr | - | Unavailable | Unavailable | 0.025 | 0.025 |
| Intensity (Max) - Pre-Sampling | in/hr | - | Unavailable | Unavailable | 0.33 | 0.33 |
| Intensity (Max) - Rain Event | in/hr | - | Unavailable | Unavailable | 0.33 | 0.33 |
| Total - Pre-Sampling | in | - | Unavailable | Unavailable | 0.91 | 0.91 |
| Total - Rain Event | in | - | 2.62 | 2.62 | 0.91 | 0.91 |

**Notes:**

Upstream Sample Location

Downstream Sample Location

Results above NPDES Permit Limit in **bold** with darker shading

See Appendix B for explanation of data qualifiers.

* Data not validated.

[†] Total rainfall, average rainfall intensity, and maximum 1-hour rainfall intensity were calculated based on rainfall recorded at a RWQCB-approved weather staton within Area I. Due to Area I weather station malfunction during the 12/11 - 12/12/2014 rain event, rainfall totals from Station 436 were used but hourly rainfall is not available.

**Table 3-4d (CM-9)**
**Treatment BMP Performance Monitoring Sample Results, Outfall 009 Watershed**
**2014/2015 Rainy Season**


| | | Object Name: | ILBMP0002 |
|---|---|---|---|
| | | Sample Name: | ILBMP0002S013 |
| | | Sample Date: | 3/2/2015 |
| | | Sample Type: | Treatment BMP Perf Mon |
| | | Location: | US East (CM-9, IEL, Area II Road) |
| | | Rain Event: | March 1-3, 2015 |
| **ANALYTE** | **UNITS** | **NPDES Permit Limit** | **RESULTS** |
| **DIOXINS** | | | |
| TCDD TEQ_NoDNQ | ug/L | 2.80E-08 | **1.04E-07** |
| **INORGANICS** | | | |
| Cadmium | ug/L | 4.0 | <0.25 * |
| Cadmium, dissolved | ug/L | - | <0.25 QP* |
| Copper | ug/L | 14 | 12 MB* |
| Copper, dissolved | ug/L | - | 4.2 QP* |
| Lead | ug/L | 5.2 | **51 *** |
| Lead, dissolved | ug/L | - | 4.7 QP* |
| Mercury | ug/L | 0.13 | <0.10 * |
| Mercury, dissolved | ug/L | - | <0.10 QP* |
| **MISCELLANEOUS** | | | |
| Total Suspended Solids | mg/L | - | 55 * |
| **FIELD MEASUREMENTS** | | | |
| Conductivity (Field) | mS | - | 0.035 * |
| pH (Field) | pH units | 6.5-8.5 | **5.66 *** |
| Temperature | °C | 30 | 7.33 * |
| Turbidity (Field) | NTU | - | 181 * |
| **RAINFALL**[†] | | | |
| Intensity (Ave) - Pre-Sampling | in/hr | - | 0.024 |
| Intensity (Ave) - Rain Event | in/hr | - | 0.016 |
| Intensity (Max) - Pre-Sampling | in/hr | - | 0.14 |
| Intensity (Max) - Rain Event | in/hr | - | 0.22 |
| Total - Pre-Sampling | in | - | 0.75 |
| Total - Rain Event | in | - | 1.43 |

**Notes:**

Upstream Sample Location

Downstream Sample Location

Results above NPDES Permit Limit in **bold** with darker shading

See Appendix B for explanation of data qualifiers.

* Data not validated.

[†] Total rainfall, average rainfall intensity, and maximum 1-hour rainfall intensity were calculated based on rainfall recorded at a RWQCB-approved weather staton within Area I. Due to Area I weather station malfunction during the 12/11 - 12/12/2014 rain event, rainfall totals from Station 436 were used but hourly rainfall is not available.

**Table 3-4e (ELV)**
**Treatment BMP Performance Monitoring Sample Results, Outfall 009 Watershed**
**2014/2015 Rainy Season**


| | | Object Name: | EVBMP0007 | EVBMP0009 | EVBMP0008 |
|---|---|---|---|---|---|
| | | Sample Name: | EVBMP0007S002 | EVBMP0009S001 | EVBMP0008S002 |
| | | Sample Date: | 12/2/2014 | 12/2/2014 | 12/2/2014 |
| | | Sample Type: | Treatment BMP Perf Mon | Treatment BMP Perf Mon | Treatment BMP Perf Mon |
| | | Location: | US (ELV Treatment BMP) | Int (ELV Treatment BMP) | DS (ELV Treatment BMP) |
| | | Rain Event: | November 30 - December 4, 2014 | November 30 - December 4, 2014 | November 30 - December 4, 2014 |
| **ANALYTE** | **UNITS** | **NPDES Permit Limit** | **RESULTS** | **RESULTS** | **RESULTS** |
| **DIOXINS** | | | | | |
| TCDD TEQ_NoDNQ | ug/L | 2.80E-08 | **3.36E-08** | 2.51E-10 | 1.41E-10 |
| **INORGANICS** | | | | | |
| Cadmium | ug/L | 4.0 | 0.251 J | <0.128 | <0.128 |
| Cadmium, dissolved | ug/L | - | 0.474 J | 0.461 J | 0.48 J |
| Copper | ug/L | 14 | **17.2** | 9.95 | 5.33 |
| Copper, dissolved | ug/L | - | 10.1 | 2.84 | 3.67 |
| Lead | ug/L | 5.2 | **11.4** | 2.74 | 1.94 |
| Lead, dissolved | ug/L | - | 1.02 | 0.836 J | 0.69 J |
| Mercury | ug/L | 0.13 | <0.0453 | <0.0453 | <0.0453 |
| Mercury, dissolved | ug/L | - | <0.0453 | <0.0453 | <0.0453 |
| **MISCELLANEOUS** | | | | | |
| Total Suspended Solids | mg/L | - | 58 | 18 | 34 |
| **FIELD MEASUREMENTS** | | | | | |
| Conductivity (Field) | mS | - | 0.021 * | 0.031 * | 0.129 * |
| pH (Field) | pH units | 6.5-8.5 | 6.95 * | 7.18 * | 7.59 * |
| Temperature | °C | 30 | 12.44 * | 12.55 * | 12.99 * |
| Turbidity (Field) | NTU | - | 250 * | 83.6 * | 128 * |
| **RAINFALL**[†] | | | | | |
| Intensity (Ave) - Pre-Sampling | in/hr | - | 0.029 | 0.030 | 0.032 |
| Intensity (Ave) - Rain Event | in/hr | - | 0.033 | 0.033 | 0.033 |
| Intensity (Max) - Pre-Sampling | in/hr | - | 0.40 | 0.40 | 0.40 |
| Intensity (Max) - Rain Event | in/hr | - | 0.40 | 0.40 | 0.40 |
| Total - Pre-Sampling | in | - | 1.55 | 1.58 | 1.68 |
| Total - Rain Event | in | - | 3.20 | 3.20 | 3.20 |

**Notes:**

Upstream Sample Location
Intermediate Sample Location
Downstream Sample Location

Results above NPDES Permit Limit in **bold** and darker shading
See Appendix B for explanation of data qualifiers.
* Data not validated.
[†] Total rainfall, average rainfall intensity, and maximum 1-hour rainfall intensity were calculated based on rainfall recorded at a RWQCB-approved weather staton within Area I. Due to Area I weather station malfunction during the 12/11 - 12/12/2014 rain event, rainfall totals from Station 436 were used but hourly rainfall is not available.

**Table 3-4e (ELV)**
**Treatment BMP Performance Monitoring Sample Results, Outfall 009 Watershed**
**2014/2015 Rainy Season**


| | | Object Name: | EVBMP0007 | EVBMP0009 | EVBMP0008 |
|---|---|---|---|---|---|
| | | Sample Name: | EVBMP0007S003 | EVBMP0009S002 | EVBMP0008S003 |
| | | Sample Date: | 12/12/2014 | 12/12/2014 | 12/12/2014 |
| | | Sample Type: | Treatment BMP Perf Mon | Treatment BMP Perf Mon | Treatment BMP Perf Mon |
| | | Location: | US (ELV Treatment BMP) | Int (ELV Treatment BMP) | DS (ELV Treatment BMP) |
| | | Rain Event: | December 11-12, 2014 | December 11-12, 2014 | December 11-12, 2014 |
| **ANALYTE** | **UNITS** | **NPDES Permit Limit** | **RESULTS** | **RESULTS** | **RESULTS** |
| **DIOXINS** | | | | | |
| TCDD TEQ_NoDNQ | ug/L | 2.80E-08 | 2.25E-10 | 4.04E-10 | 3.02E-10 |
| **INORGANICS** | | | | | |
| Cadmium | ug/L | 4.0 | <0.128 | <0.128 | <0.128 |
| Cadmium, dissolved | ug/L | - | <0.128 | <0.128 | <0.128 |
| Copper | ug/L | 14 | 6.34 | 3.44 | 3.3 |
| Copper, dissolved | ug/L | - | 5.57 | 2.99 | 3.26 |
| Lead | ug/L | 5.2 | 2 | 2.01 | 1.73 |
| Lead, dissolved | ug/L | - | 0.436 J | 0.347 J | 0.398 J |
| Mercury | ug/L | 0.13 | <0.0453 | <0.0453 | <0.0453 |
| Mercury, dissolved | ug/L | - | <0.0453 | <0.0453 | <0.0453 |
| **MISCELLANEOUS** | | | | | |
| Total Suspended Solids | mg/L | - | 7.4 | 7.9 | 10 |
| **FIELD MEASUREMENTS** | | | | | |
| Conductivity (Field) | mS | - | 0.030 * | 0.029 * | 0.042 * |
| pH (Field) | pH units | 6.5-8.5 | 7.34 * | 7.32 * | 7.16 * |
| Temperature | °C | 30 | 13.42 * | 12.69 * | 12.59 * |
| Turbidity (Field) | NTU | - | 36.2 * | 42.4 * | 52.5 * |
| **RAINFALL**[†] | | | | | |
| Intensity (Ave) - Pre-Sampling | in/hr | - | Unavailable | Unavailable | Unavailable |
| Intensity (Ave) - Rain Event | in/hr | - | Unavailable | Unavailable | Unavailable |
| Intensity (Max) - Pre-Sampling | in/hr | - | Unavailable | Unavailable | Unavailable |
| Intensity (Max) - Rain Event | in/hr | - | Unavailable | Unavailable | Unavailable |
| Total - Pre-Sampling | in | - | Unavailable | Unavailable | Unavailable |
| Total - Rain Event | in | - | 2.62 | 2.62 | 2.62 |

**Notes:**

Upstream Sample Location

Intermediate Sample Location

Downstream Sample Location

Results above NPDES Permit Limit in **bold** and darker shading

See Appendix B for explanation of data qualifiers.

* Data not validated.

[†] Total rainfall, average rainfall intensity, and maximum 1-hour rainfall intensity were calculated based on rainfall recorded at a RWQCB-approved weather staton within Area I. Due to Area I weather station malfunction during the 12/11 - 12/12/2014 rain event, rainfall totals from Station 436 were used but hourly rainfall is not available.

**Table 3-4f (LOX)**
**Treatment BMP Performance Monitoring Sample Results, Outfall 009 Watershed**
**2014/2015 Rainy Season**


| | | Object Name: | LXBMP0009 | LXSW0009 | LXBMP0009 | LXSW0009 |
|---|---|---|---|---|---|---|
| | | Sample Name: | LXBMP0009S002 | LXSW0009S002 | LXBMP0009S003 | LXSW0009S003 |
| | | Sample Date: | 12/2/2014 | 12/2/2014 | 12/12/2014 | 12/12/2014 |
| | | Sample Type: | BMP Perf Mon | Perf Mon | BMP Perf Mon | Perf Mon |
| | | Location: | DS (LOX) | DS (LOX) | DS (LOX) | DS (LOX) |
| | | Rain Event: | November 30 - December 4, 2014 | November 30 - December 4, 2014 | December 11-12, 2014 | December 11-12, 2014 |
| **ANALYTE** | **UNITS** | **NPDES Permit Limit** | **RESULTS** | **RESULTS** | **RESULTS** | **RESULTS** |
| **DIOXINS** | | | | | | |
| TCDD TEQ_NoDNQ | ug/L | 2.80E-08 | *See LXSW0009S002* | ND | *See LXSW0009S003* | ND |
| **INORGANICS** | | | | | | |
| Cadmium | ug/L | 4.0 | <0.128 | 0.5 J | *See LXSW0009S003* | <0.128 |
| Cadmium, dissolved | ug/L | - | 0.447 J | 0.455 J | <0.128 | -- |
| Copper | ug/L | 14 | 7.04 | 5.3 | *See LXSW0009S003* | 3.29 |
| Copper, dissolved | ug/L | - | 1.3 | 1.41 | 3.03 | -- |
| Lead | ug/L | 5.2 | 2.69 | 2.69 | *See LXSW0009S003* | 1.03 |
| Lead, dissolved | ug/L | - | <0.373 | <0.377 | 0.145 J | -- |
| Mercury | ug/L | 0.13 | <0.0453 | <0.0453 | *See LXSW0009S003* | <0.0453 |
| Mercury, dissolved | ug/L | - | <0.0453 | <0.0453 | <0.0453 | -- |
| **MISCELLANEOUS** | | | | | | |
| Total Suspended Solids | mg/L | - | *See LXSW0009S002* | 95 | *See LXSW0009S003* | 20 |
| **FIELD MEASUREMENTS** | | | | | | |
| Conductivity (Field) | mS | - | 0.028 * | 0.028 * | 0.77 * | 0.77 * |
| pH (Field) | pH units | 6.5-8.5 | **6.41 *** | **6.41 *** | **5.52 *** | **5.52 *** |
| Temperature | °C | 30 | 15.96 * | 15.96 * | 11.94 * | 11.94 * |
| Turbidity (Field) | NTU | - | 464 * | 464 * | 50.62 * | 50.62 * |
| **RAINFALL**[†] | | | | | | |
| Intensity (Ave) - Pre-Sampling | in/hr | - | 0.029 | 0.029 | Unavailable | Unavailable |
| Intensity (Ave) - Rain Event | in/hr | - | 0.033 | 0.033 | Unavailable | Unavailable |
| Intensity (Max) - Pre-Sampling | in/hr | - | 0.40 | 0.40 | Unavailable | Unavailable |
| Intensity (Max) - Rain Event | in/hr | - | 0.40 | 0.40 | Unavailable | Unavailable |
| Total - Pre-Sampling | in | - | 1.55 | 1.55 | Unavailable | Unavailable |
| Total - Rain Event | in | - | 3.20 | 3.20 | 2.62 | 2.62 |

**Notes:**

Upstream Sample Location

Downstream Sample Location

Results above NPDES Permit Limit in **bold** with darker shading

See Appendix B for explanation of data qualifiers.

* Data not validated.

[†] Total rainfall, average rainfall intensity, and maximum 1-hour rainfall intensity were calculated based on rainfall recorded at a RWQCB-approved weather staton within Area I. Due to Area I weather station malfunction during the 12/11 - 12/12/2014 rain event, rainfall totals from Station 436 were used but hourly rainfall is not available.

**Table 3-4g (B1436 Detention Bioswales)**
**Treatment BMP Performance Monitoring Sample Results, Outfall 009 Watershed**
**2014/2015 Rainy Season**


| | | Object Name: | ILBMP0007 |
|---|---|---|---|
| | | Sample Name: | ILBMP0007S001 |
| | | Sample Date: | 5/15/2015 |
| | | Sample Type: | Treatment BMP Perf Mon |
| | | Location: | DS (B1436 Northern Detention Bioswale) |
| | | Rain Event: | May 14-15, 2005 |
| **ANALYTE** | **UNITS** | **NPDES Permit Limit** | **RESULTS** |
| **DIOXINS** | | | |
| TCDD TEQ_NoDNQ | ug/L | 2.80E-08 | ND |
| **INORGANICS** | | | |
| Cadmium | ug/L | 4.0 | <0.25 * |
| Cadmium, dissolved | ug/L | - | <0.25 * |
| Copper | ug/L | 14 | 6.5 MB* |
| Copper, dissolved | ug/L | - | 12 * |
| Lead | ug/L | 5.2 | <0.50 * |
| Lead, dissolved | ug/L | - | <0.50 * |
| Mercury | ug/L | 0.13 | <0.10 * |
| Mercury, dissolved | ug/L | - | <0.10 * |
| **MISCELLANEOUS** | | | |
| Total Suspended Solids | mg/L | - | 5.7 * |
| **FIELD MEASUREMENTS** | | | |
| Conductivity (Field) | mS | - | 1.33 * |
| pH (Field) | pH units | 6.5-8.5 | 7.32 * |
| Temperature | °C | 30 | 17.88 * |
| Turbidity (Field) | NTU | - | 24.3 * |
| **RAINFALL**[†] | | | |
| Intensity (Ave) - Pre-Sampling | in/hr | - | 0.017 |
| Intensity (Ave) - Rain Event | in/hr | - | 0.017 |
| Intensity (Max) - Pre-Sampling | in/hr | - | 0.30 |
| Intensity (Max) - Rain Event | in/hr | - | 0.30 |
| Total - Pre-Sampling | in | - | 0.41 |
| Total - Rain Event | in | - | 0.41 |

**Notes:**

Upstream Sample Location

Downstream Sample Location

Results above NPDES Permit Limit in **bold** with darker shading

See Appendix B for explanation of data qualifiers.

* Data not validated.

[†] Total rainfall, average rainfall intensity, and maximum 1-hour rainfall intensity were calculated based on rainfall recorded at a RWQCB-approved weather staton within Area I. Due to Area I weather station malfunction during the 12/11 - 12/12/2014 rain event, rainfall totals from Station 436 were used but hourly rainfall is not available.

# FIGURES

American Jewish University / BBC

UNDEVELOPED LAND
(BOEING)

NASA
(AREA I)

MRCA/Sage Ranch

ELV

Area II Landfill

LOX

Rocketdyne/Atomic International
Rifle and Pistol Club
(SWMU 4.20)

B-1

B515 STP

Ash Pile

Area I Landfill

IEL

LETF/CTL-1

Canyon

Happy Valley South

NASA
(AREA II)

BOEING
(AREA I)

9
10
12
13
14
8

Feet
0 350 700

**Base Map Legend**

- NPDES Outfall
- Surface Water Divide
- Surface Water Drainage
- B-1 Area Stormwater Conveyance Pipelines (estimated subsurface trace)
- Rocks
- Paved Roads
- Elevation Contour
- Administrative Area Boundary
- Historical Operations Areas (RFI Sites) Within Outfalls 008 and 009
- Existing Building or Structure

# Outfalls 008 and 009 Location Map

Date: August 20, 2012

File: \\Uspas1netapp1\dei\rocketdyne gis\MasterGISFiles\ISRA_Projects\ISRA_MXD\BMP\CompliancePlanSept2010\OF8_9Location.mxd

MWH

FIGURE
1-1

# Outfalls 008 and 009 BMP and Performance Monitoring Locations

## Base Map Legend

- Administrative Area Boundary
- RFI Site Boundary
- Subwatershed Boundaries
- NPDES Outfall
- Non Jurisdictional Surface Water Pathway
- Surface Water Divide
- Drainage

## Figure Legend

- Primary Downstream ISRA Performance Monitoring Location
- Upstream ISRA Performance Monitoring Location
- Secondary ISRA Performance Monitoring Location
- Discontinued ISRA Performance Monitoring Location
- Alternate Downstream ISRA Performance Monitoring Location
- Potential BMP Subarea Monitoring Location
- Downstream BMP Performance Monitoring Location
- Upstream BMP Performance Monitoring Location
- Mid-Point BMP Performance Monitoring Location
- Discontinued Potential BMP Subarea Monitoring Location
- Alternate BMP Performance Monitoring Location
- B-1 Area Stormwater conveyance Pipelines (estimated subsurface trace)
- B1 Area Inferred Stormwater Conveyance Pipeline
- Actual ISRA Excavation Boundary
- Former Planned ISRA Area Boundary

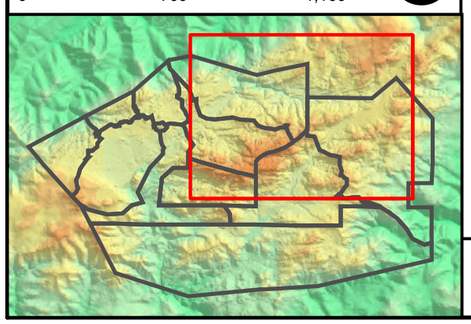
**Note:**
1. Aerial imagery from 2010 Sage Consulting.
2. Rationale for discontinuing monitoring at previous sample locations can be found in the text and/or tables of the 2010/2011, 2011/2012, 2012/2013, 2013/2014, and 2014/2015 Rainy Season Sampling and Analysis Plan.

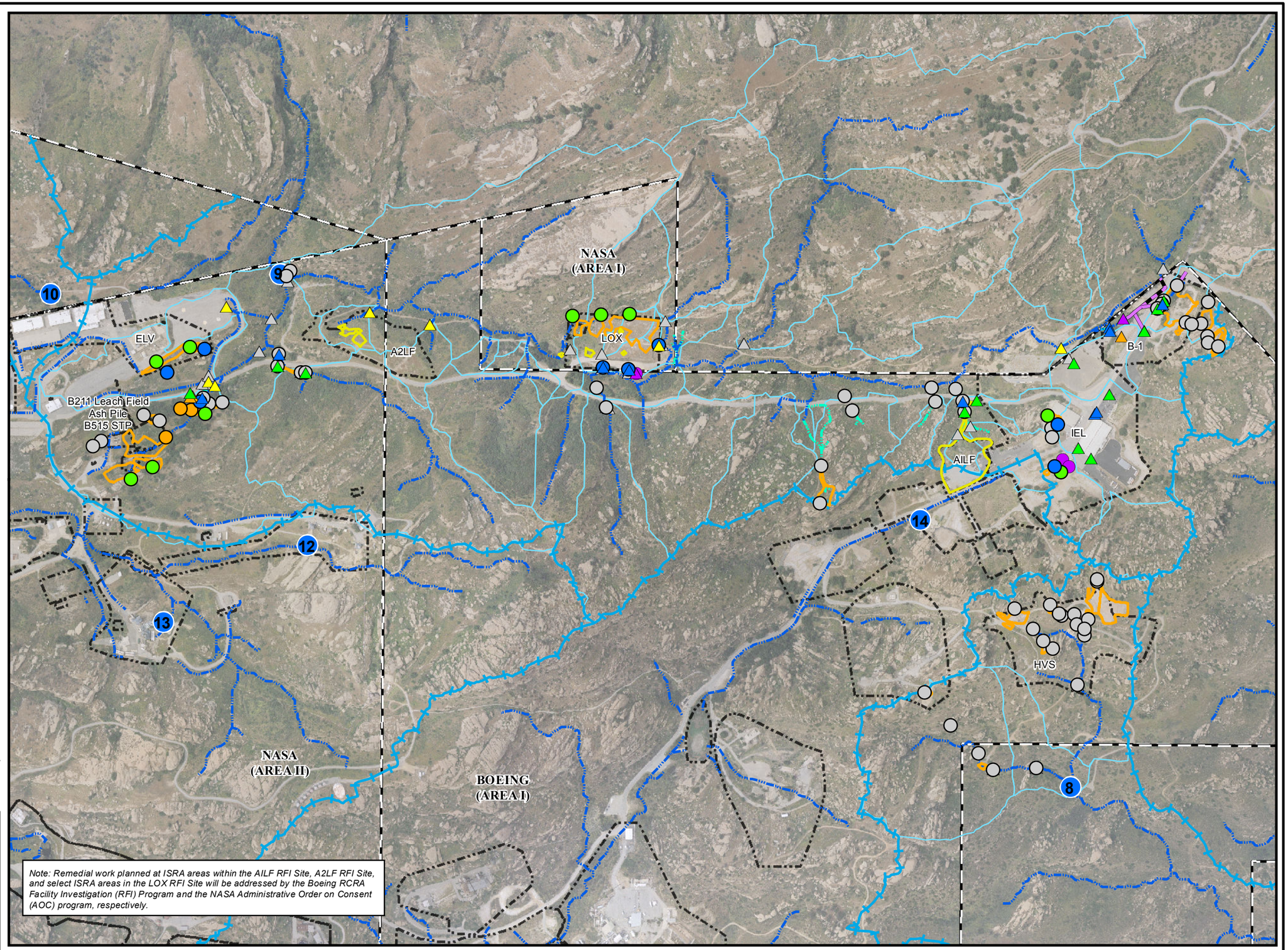
Path: \\SD-004\gis\projects\rock3\ISRA\Figures\PerfMon\2014-2015 Rainy Season\ISRA_BMPOverview_11x17_Fig1-2.mxd

Date: 7/13/2015

1 inch = 700 feet

0 700 1,400 Feet






*Note: Remedial work planned at ISRA areas within the AILF RFI Site, A2LF RFI Site, and select ISRA areas in the LOX RFI Site will be addressed by the Boeing RCRA Facility Investigation (RFI) Program and the NASA Administrative Order on Consent (AOC) program, respectively.*

MWH

SANTA SUSANA FIELD LABORATORY

FIGURE 1-2

# BMP Installations 2010-2015
# HVS Area
# Outfall 008 Watershed

## Base Map Legend

- Administrative Area Boundary
- RFI Site Boundary
- NPDES Outfall
- Drainage
- Surface Water Divide
- A/C Paving
- Dirt Road
- Elevation Contour

## Data Legend

- Actual ISRA Excavation Boundary
- Soil Borrow Area
- Gravel
- Hydromulch Hydroseed
- Planting Area
- Road Rehab Restoration
- Demolition
- Rock Crib Swale
- Abandoned Road
- Rip Rap
- Stabilized Entrance
- Hydroseed 2013/2014
- Hydroseed 2012/2013
- Hydroseed 2011/2012
- Hydroseed 2010/2011
- Water Gravel Bars
- Check Dam
- Fiber Rolls
- Hay Straw Bales
- Silt Fencing
- Soil Berm
- Rip Rap Berm

Figure Notes:

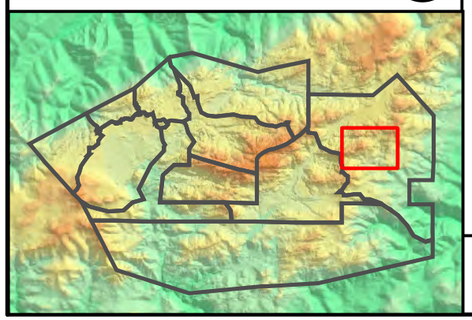
1. Topographic contours from 2010 Sage Consultants, Inc.

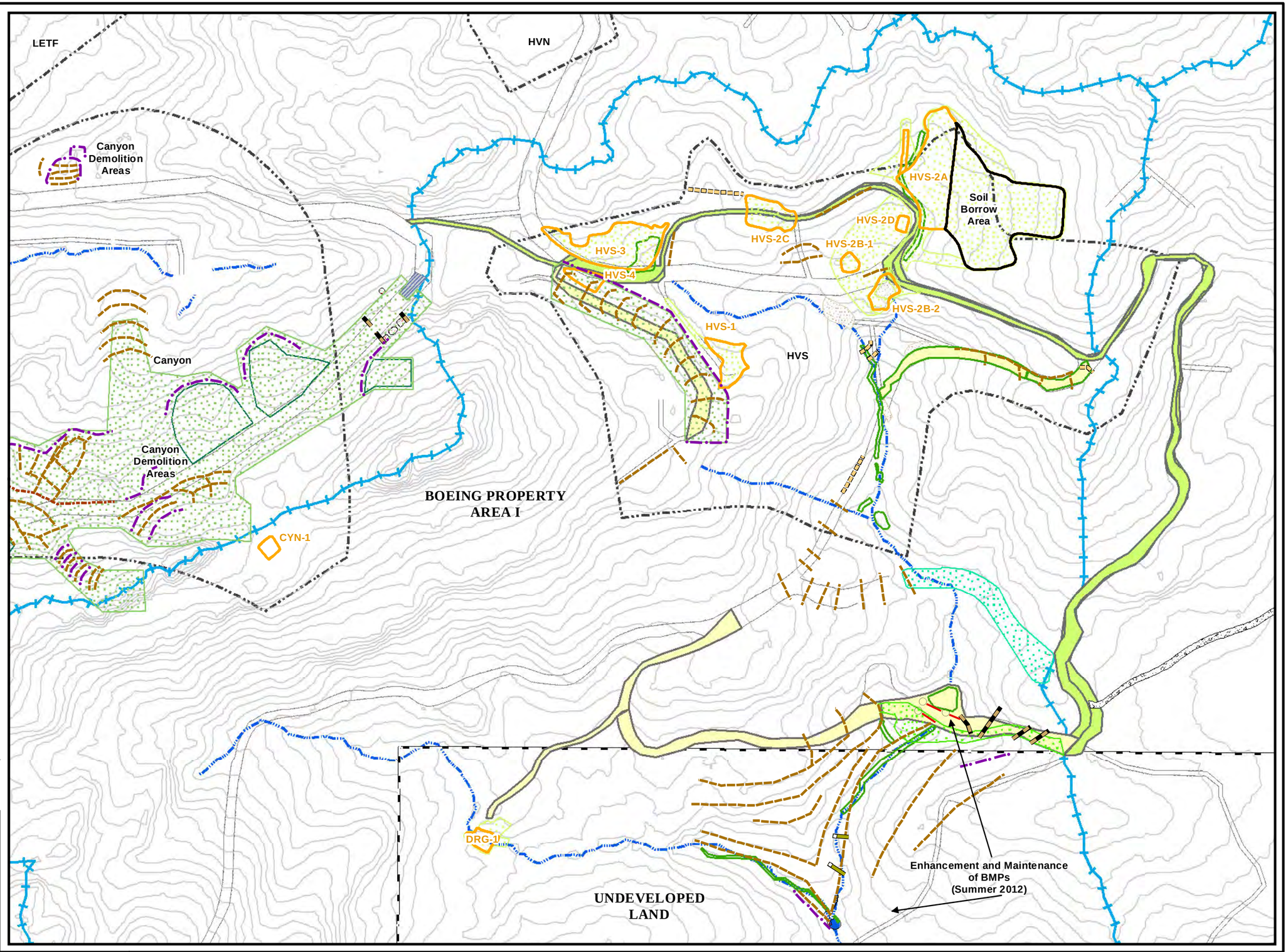
Path: \\SD-004\gis\projects\rock3\ISRA\Figures\PerfMon\2014-2015 Rainy Season\BMP\Fig1-3_BMP_008.mxd

Date: 7/28/2015

1 inch = 175 feet

0 175 350 Feet



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SANTA SUSANA FIELD LABORATORY

FIGURE 1-3

# BMP Installations 2010-2015
# B-1 Area
# Outfall 009 Watershed

## Base Map Legend

- Administrative Area Boundary
- RFI Site Boundary
- NPDES Outfall
- Non Jurisdictional Surface Water Pathway
- Drainage
- Surface Water Divide
- A/C Paving
- Dirt Road
- Elevation Contour

## Data Legend

- Actual ISRA Excavation Boundary
- Former Planned ISRA Area Boundary
- Abandoned Road
- Demolition
- Engineered Natural Treatment System
- Erosion Control Fabric/Cover
- Jute Straw Mat
- Planting Area
- Road Rehab Restoration
- Media Filters
- Retention Sediment Basins
- Rip Rap
- Gravel
- Hydroseed 2013/2014
- Hydroseed 2012/2013
- Hydroseed 2011/2012
- Hydroseed 2010/2011
- Covered Sandbags
- Soil Berm
- Check Dam
- Curb Cut
- Fiber Rolls
- GabionTube Rip Rap
- Pipeline
- Sandbags
- SiltFencing
- Wood Retaining Wall

Figure Notes:

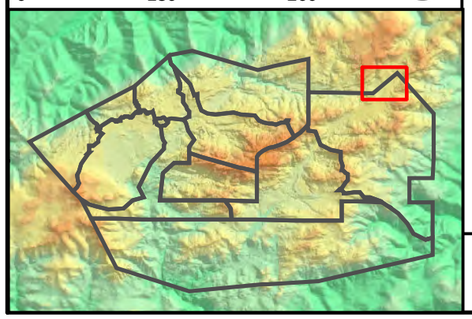
1. Topographic contours from 2010 Sage Consultants, Inc.

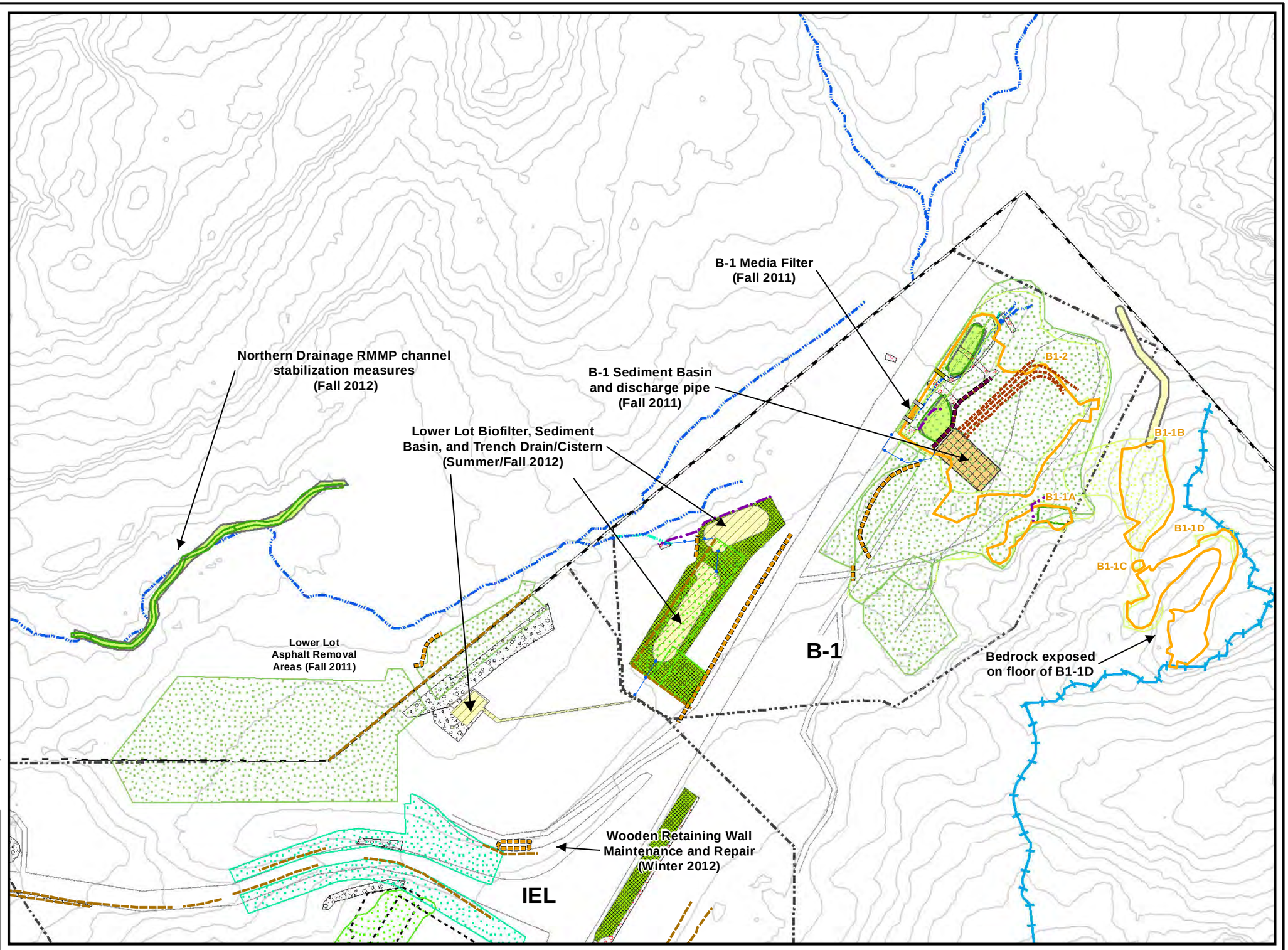
Path: \\SD-004\gis\projects\rock3\ISRA\Figures\PerfMon\2014-2015 Rainy Season\BMP\Fig1-4_BMP_B-1.mxd

Date: 7/28/2015

1 inch = 140 feet

0 130 260 Feet



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SANTA SUSANA FIELD LABORATORY

FIGURE 1-4

# BMP Installations 2010-2015
# AILF and IEL Areas
# Outfall 009 Watershed

## Base Map Legend

- Administrative Area Boundary
- RFI Site Boundary
- NPDES Outfall
- Non Jurisdictional Surface Water Pathway
- Drainage
- Surface Water Divide
- A/C Paving
- Dirt Road
- Elevation Contour

## Data Legend

- Actual ISRA Excavation Boundary
- Former Planned ISRA Area Boundary
- Soil Borrow Area
- Engineered Natural Treatment System
- Demolition
- Erosion Control Fabric/Cover
- Jute Straw Mat
- Planting Area
- Road Rehab Restoration
- CM
- Rip Rap
- Gravel
- Hydroseed 2014/2015
- Hydroseed 2013/2014
- Hydroseed 2012/2013
- Hydroseed 2011/2012
- Hydroseed 2010/2011
- Check Dam
- Fiber Rolls
- Pipeline
- Sandbags
- Silt Fencing
- Concrete Curb
- Wood Retaining Wall

Figure Notes:

1. Topographic contours from 2010 Sage Consultants, Inc.

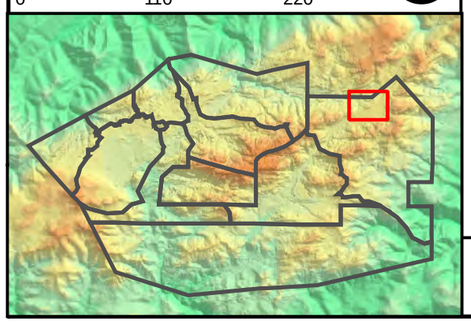
2. Covered the weir boards at CM-1, CM-2, CM-3, CM-4, CM-6, CM-8, CM-9, and CM-10 with filter fabric to facilitate ponding behind the boards and increase flow through filter media beds (Fall 2011).

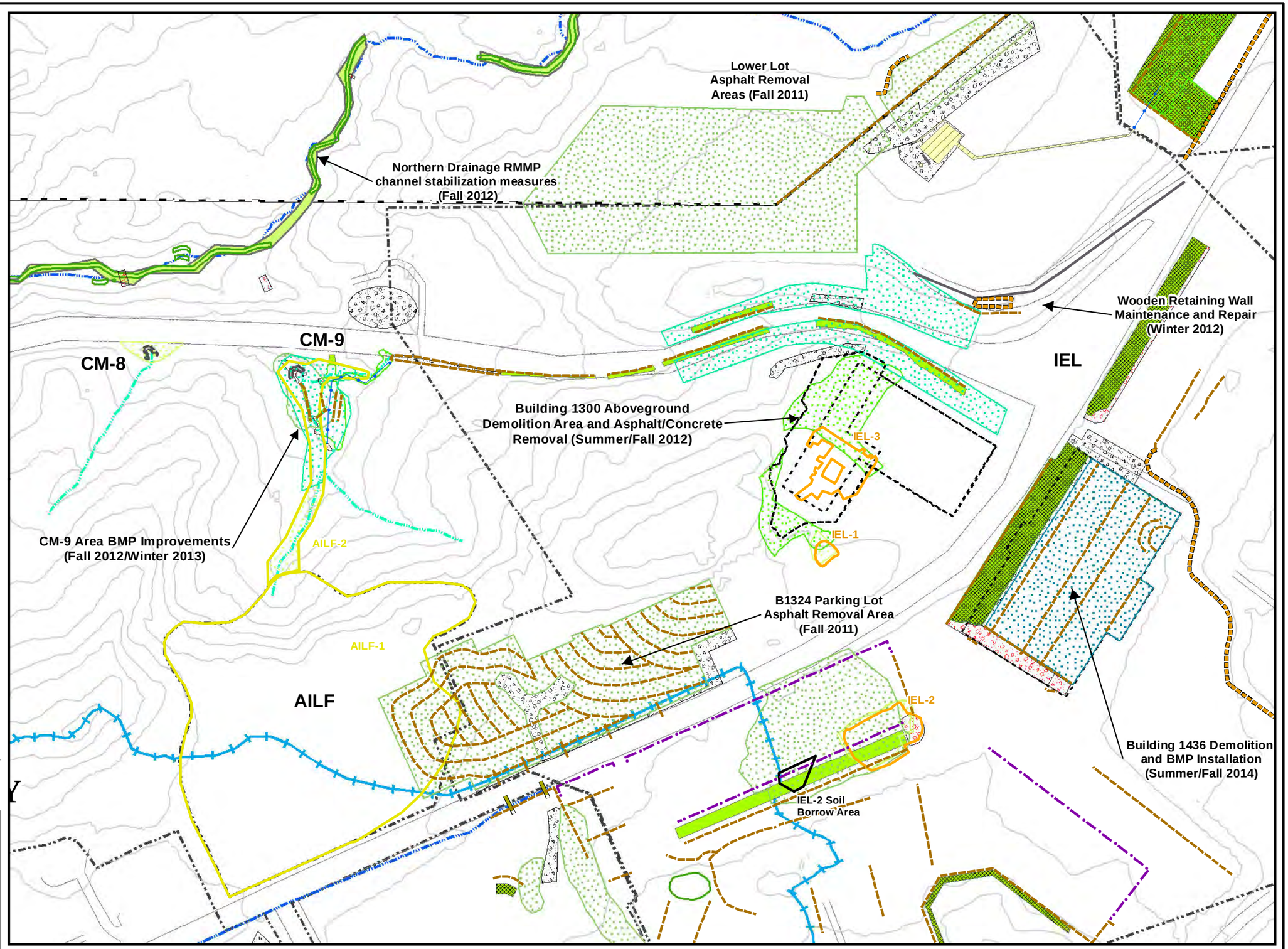
Path: \\SD-004\gist\projects\rock3\USRA\Figures\PerfMon\2014-2015 Rainy Season\BMP\Fig1-5_BMP_AILF_IEL.mxd

Date: 7/28/2015

1 inch = 120 feet

0 110 220 Feet






MWH

S A N T A S U S A N A F I E L D L A B O R A T O R Y

FIGURE 1-5

# BMP Installations 2010-2015
# CTL1 Area
# Outfall 009 Watershed

## Base Map Legend

- Administrative Area Boundary
- RFI Site Boundary
- NPDES Outfall
- Non Jurisdictional Surface Water Pathway
- Drainage
- Surface Water Divide
- A/C Paving
- Dirt Road
- Elevation Contour

## Data Legend

- Actual ISRA Excavation Boundary
- Former Planned ISRA Area Boundary
- Abandoned Road
- Planting Individual
- Runoff Low Spot
- Erosion Control Fabric/Cover
- Planting Area
- Road Rehab Restoration
- CM
- Rip Rap
- Hydroseed 2013/2014
- Hydroseed 2012/2013
- Hydroseed 2010/2011
- FiberRolls
- Fiber Schine
- Silt Fencing
- Water Gravel Bars

Figure Notes:

1. Topographic contours from 2010 Sage Consultants, Inc.

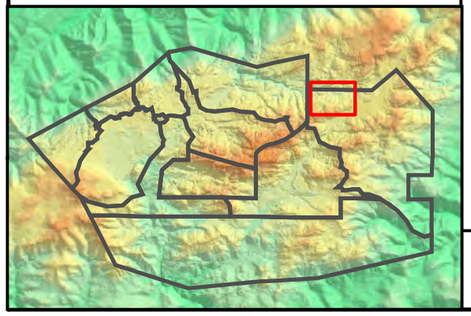
2. Covered the weir boards at CM-1, CM-2, CM-3, CM-4, CM-6, CM-8, CM-9, and CM-10 with filter fabric to facilitate ponding behind the boards and increase flow through filter media beds (Fall 2011).

Path: \\SD-004\gist\projects\rock3\ISRA\Figures\PerfMon\2014-2015 Rainy Season\BMP\Fig1-6_BMP_CTL1.mxd

Date: 7/28/2015

1 inch = 140 feet

0 130 260 Feet



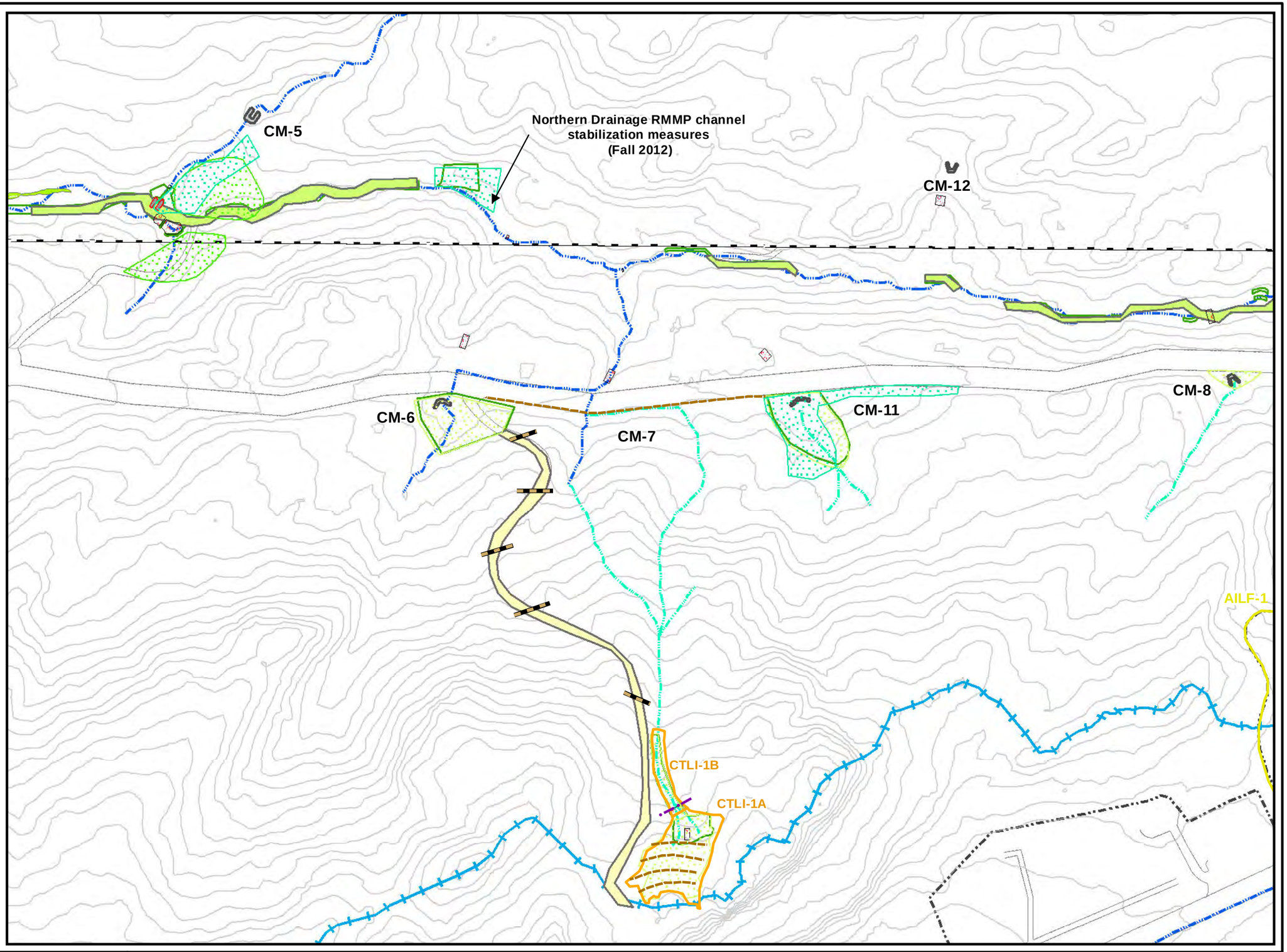



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**FIGURE 1-6**

# BMP Installations 2010-2015
# LOX Area
# Outfall 009 Watershed

## Base Map Legend

- Administrative Area Boundary
- RFI Site Boundary
- NPDES Outfall
- Drainage
- Non Jurisdictional Surface Water Pathway
- Surface Water Divide
- A/C Paving
- Dirt Road
- Elevation Contour

## Data Legend

- Actual ISRA Excavation Boundary
- Former Planned ISRA Area Boundary
- Soil Borrow Area
- Hydroseed 2013/2014
- Hydroseed 2012/2013
- Hydroseed 2010/2011
- Abandoned Road
- Geo Cell
- Planting Individual
- Road Erosion
- Runoff Low Spot
- Gravel
- Erosion Control Fabric/Cover
- Jute Straw Mat
- Planting Area
- Road Rehab Restoration
- CM
- Rip Rap
- Covered Sandbags
- Slope Drain
- Fiber Schine
- Fiber Rolls
- Gabion Tube Rip Rap
- Gravel Bag Berm
- Hay Straw Bales
- Rolling Dips
- Sandbags
- Silt Fencing
- WaterGravelBars
- CulvertEntranceExit

Figure Notes:

1. Topographic contours from 2010 Sage Consultants, Inc.

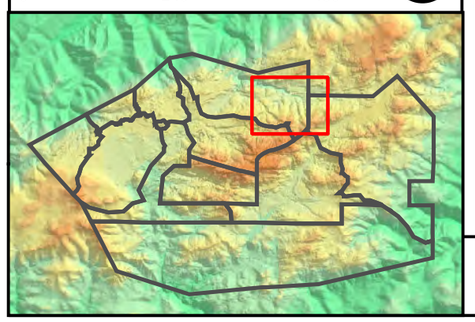
2. Covered the weir boards at CM-1, CM-2, CM-3, CM-4, CM-6, CM-8, CM-9, and CM-10 with filter fabric to facilitate ponding behind the boards and increase flow through filter media beds (Fall 2011).

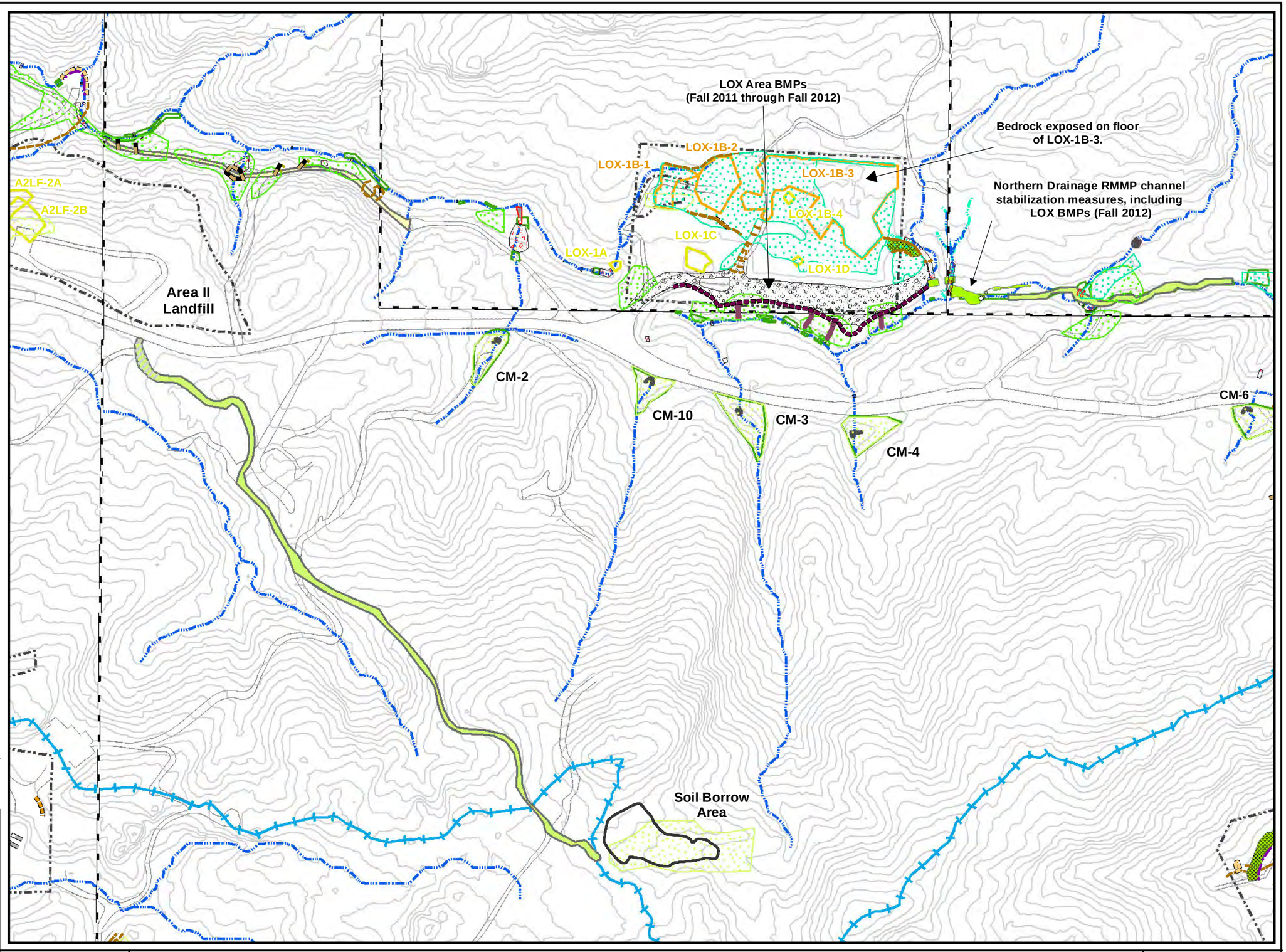
Path: \\SD-004\gist\projects\rock3\ISRA\Figures\PerfMon\2014-2015 Rainy Season\BMP\Fig1-7_BMP_LOX.mxd

Date: 7/28/2015

1 inch = 240 feet

0 240 480 Feet



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SANTA SUSANA FIELD LABORATORY

FIGURE 1-7