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Via FedEx

August 29, 2014
In reply, refer to SHEA-114897

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, 2013/2014 Rainy 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 2013/2014 rain season. 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

If you have any questions or require any further, please contact Debbie Taege at (818) 466-8849.

Sincerely,

Paul Costa
Environmental Operations and Compliance Manager
Santa Susana Field Laboratory

Enclosure: ISRA Performance Monitoring and BMP Monitoring for the Outfalls 008 and 009 Watersheds, 2013/2014 Rainy Season

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ISRA PERFORMANCE MONITORING AND BMP MONITORING FOR THE OUTFALLS 008 AND 009 WATERSHEDS, 2013/2014 RAINY SEASON
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

August 2014

Prepared For:

The Boeing Company
and
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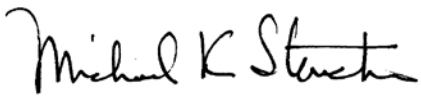

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ABBREVIATIONS AND ACRONYMS

AILF	Area I Landfill
A2LF	Area II Landfill
AP/STP	Ash Pile and Building 515 Sewage Treatment Plant
BMP	Best Management Practice
BEF	bioaccumulation equivalency factor
Boeing	The Boeing Company
CAO	Cleanup and Abatement Order
CM	culvert modification
COC	constituent of concern
cy	cubic yards
DNQ	data not qualified
ELV	Expendable Launch Vehicle
Expert Panel	Santa Susana Site Surface Water Expert Panel
Geosyntec	Geosyntec Consultants
H&A	Haley & Aldrich, Inc.
IEL	Instrument and Equipment Laboratory
ISRA	Interim Source Removal Action
LOX	Liquid Oxygen Plant
MWH	MWH Americas, Inc.
NASA	National Aeronautics and Space Administration
NPDES	National Pollutant Discharge Elimination System
PSD	particle size distribution
RMMP	Restoration, Mitigation, and Monitoring Plan
RWQCB	Los Angeles Regional Water Quality Control Board
SAP	sampling and analysis plan
Santa Susana Site	Santa Susana Field Laboratory
SMARTS	Stormwater Multiple Application and Report Tracking System
SWPPP	Stormwater Pollution Prevention Plan
TEF	toxic equivalency factor
TEQ	toxic equivalency
TSS	total suspended solids

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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 2013/2014 rainy season within the Outfalls 008 and 009 watersheds at the Santa Susana Field Laboratory (Santa Susana Site), 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, and recommendations for modifications to the ISRA performance monitoring and BMP monitoring programs.

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

The 2013/2014 rainy season represents the fifth year of ISRA performance monitoring and the fourth year of BMP monitoring. The results and recommendations from previous rainy seasons are presented in annual reports (MWH, 2010b; MWH *et al.*, 2011, 2012, and 2013). In addition, addenda to the BMP Plan (MWH *et al.*, 2010) have been prepared subsequent to the 2010/2011, 2011/2012, and 2012/2013 rainy season annual reports (Geosyntec Consultants [Geosyntec] and the Santa Susana Site Surface Water Expert Panel [Expert Panel], 2011, 2012, and 2013). 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 2013/2014 rainy season, and a summary of the Outfalls 008 and 009 NPDES sampling results for the 2013/2014 rainy season.

- Section 2 includes a summary of the pre-2013/2014 rainy season ISRA performance monitoring results, and presents the 2013/2014 rainy season ISRA performance monitoring results and the Expert Panel's recommendations for modifications to the ISRA performance monitoring program for the 2014/2015 rainy season.

- Section 3 includes a summary of pre-2013/2014 rainy season BMP monitoring results, and presents the 2013/2014 rainy season BMP monitoring results and the Expert Panel's recommendations for modifications to the potential BMP subarea monitoring program for the 2014/2015 rainy season.

- Section 4 presents the updated milestone schedule.

- Appendix A provides the 2013/2014 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 2013/2014 rainy season.

- Appendix C provides time-series and correlation charts for the performance monitoring program.

- Appendix D provides the BMP performance monitoring data analysis memorandum prepared by the Expert Panel.

- Appendix E provides time-series and correlation charts for the BMP monitoring program.

- 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.

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, 2010b). However, the overall effectiveness of the ISRA remedial activities is based on compliance with the NPDES Permit at the outfall monitoring locations (MWH, 2009). For the ISRA performance monitoring program, total suspended solids (TSS) is also included as a COC for Outfalls 008 and 009, since it may be associated with the other COCs, even though TSS is not regulated at Outfall 008 or 009 by the NPDES permit.

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 2014). 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. 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 is currently in progress. The performance monitoring inspection and sample locations from the 2013/2014 rainy season are listed in Table 1-3 and shown on Figure 1-2. A summary of the activities and results from the 2013/2014 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 NPDES Permit, describes the process for improving stormwater runoff quality and minimizing NPDES Permit exceedances in the Outfalls 008 and 009 watersheds at the Santa Susana Site (MWH *et al.*, 2010). Addenda to the BMP Plan (Geosyntec and Expert Panel, 2011, 2012, and 2013) have been prepared annually and provide a 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 (e.g., ISRA remediation and erosion control activities, Northern Drainage restoration activities, and several

erosion and treatment control recommendations from the Expert Panel). An updated list of the short-term activities and their current status 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 (completed), evaluating existing surface water data (ongoing), developing a prioritized ranking of sites for placing new BMPs (ongoing), and developing BMP sizing criteria (completed).

The BMP monitoring program 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 potential source areas and to identify locations for new BMPs and/or treatment controls, as described in the BMP Plan (MWH *et al.*, 2010) and BMP Plan Addenda (Geosyntec and Expert Panel, 2011, 2012, and 2013), within the Outfall 008 and 009 watersheds. Potential BMP monitoring locations are performed at "planned"[1] or "potential"[2] BMP sites. Following implementation of treatment BMPs, BMP performance monitoring is conducted and stormwater samples are collected at locations up- and downstream 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 is planned to occur on a yearly basis through the end of the BMP Plan coverage period, currently scheduled for 2015. Influent/effluent performance monitoring at existing BMP locations, and monitoring at select potential BMP subareas, will continue for at least one more season:

1. to verify performance of existing treatment controls (and to identify where modifications are needed, such as where performance is waning), and
2. to continue evaluating potential BMP subareas that are highly ranked and/or have limited existing data, to evaluate the need for installing new BMPs.

[1] "Planned" treatment BMPs include those that are expected to be designed and constructed in 2014, irrespective of subarea monitoring results.

[2] "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; if deemed necessary, new BMPs may be designed in late 2014 and constructed thereafter.

Although this is the final year for submittal of a formal BMP ranking memo, the Expert Panel will continue to evaluate the monitoring results next year and will provide Boeing and NASA with new BMP recommendations for their consideration, with the goal of continuing to reduce NPDES exceedances at Outfalls 008 and 009. These annual BMP recommendations, and their implementation status, will be summarized in a letter to the RWQCB in August 2015. Boeing is committed to stormwater quality protection and compliance with NPDES permit requirements, and highly values the Expert Panel for providing expert guidance on how to achieve these goals based on current standards of practice. Boeing intends to continue involving the Expert Panel in surface water issues at the Santa Susana Site through the demolition, remediation, and restoration phases of activity. 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 2013/2014 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 2013/2014 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 2014 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.

ISRA Activities. Phase III ISRA activities were completed as of November 2013. From mid-2013 through the end of the year, ISRA activities were performed at seven ISRA areas (ELV-1C, ELV-1D, LOX-1B-1, LOX-1B-2, LOX-1B-3, and additional portions of AP/STP-1C-1 and AP/STP-1C-2) within the Outfall 009 watershed, resulting in approximately 7,800 cubic yards (cy, *ex situ* estimate) of soil removed. Prior to the start of implementation, fiber rolls and/or silt fences were installed at ISRA areas and active ISRA areas were covered prior to forecasted rain events with plastic secured with sandbags. Restoration at completed AP/STP, ELV, and LOX ISRA areas consisted of re-contouring excavation areas without backfill, installation of fiber rolls, hay bales, jute matting, and/or silt fencing, and application of hydroseed in November 2013. In addition, the excavation area surrounding the power pole in the central portion of ELV-1C was backfilled with gravel, the ELV-1D excavation was partially backfilled with soils from the adjacent soil berm, and the temporary road used to access ISRA area ELV-1D was restored with fiber rolls, jute matting, and application of hydroseed. Also, rip rap was added beneath a storm drain pipe outlet present in the eastern portion of ELV-1C in December 2013 to mitigate potential erosion beneath the drain pipe and a row of fiber rolls was installed along the north side of the access road near AP/STP-1C-1 in March 2014 to reduce

rilling caused by runoff flowing off the paved road. At previously completed ISRA areas, erosion controls were inspected and maintained.

In addition, inspections of the AP/STP, IEL, ELV, and LOX ISRA areas were performed per the ISRA SWPPP through the end of the 2013/2014 rainy season. In April 2014, the ISRA SWPPP Notice of Termination was submitted to the Stormwater Multiple Application and Report Tracking System (SMARTS) website and approved, concluding inspections of the ISRA areas per this SWPPP.

Northern Drainage Restoration Activities. For the Restoration, Mitigation, and Monitoring Plan (RMMP), some portions of the Northern Drainage were hydroseeded and 108 plants were replanted during November 2013. Also, 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, the channel stabilization measures were inspected monthly and during rain events to assess conditions.

Outfall 008 Erosion Controls. Erosion and sediment control inspections were performed near the outfall and within the drainage during each quarter. Excess sediment was cleared from the outfall flume during first quarter 2014. The abandoned roads south of the Happy Valley South site were hydroseeded during December 2013. Within the main Happy Valley site, removal of old, worn fiber rolls along roads where vegetation has reestablished was conducted during March 2014.

Culvert Modifications (CMs). Sediment and plant debris removal was performed in September 2013 at CM-1, CM-8, and CM-9. The remaining CMs, including CM-2, CM-3, CM-4, CM-10, and CM-11 had minimal to no sediment build-up and did not require sediment removal at that time. In addition, fabric covering the weir boards was inspected at all CMs and was replaced at CM-4 and CM-6. See below for explanation of additional work performed at CM-9.

Lower Parking Lot Treatment Control. Plantings at the sediment basin and biofilter areas were inspected and implementation of the watering plan continued. Rain event inspections were performed at the sediment basin and biofilter, as well as the cistern area and pump. Hydroseed was applied to the slope north of the sediment basin during November 2013. Worn and broken sandbags near the cistern and biofilter were replaced during December 2013. Following the February 26 – March 2, 2014 rain event, the following was conducted: street sweeping at the Lower Parking Lot and paved areas adjacent to the sediment basin and biofilter, removal of sandbags along the eastern half of the fence line separating Sage Ranch and Boeing property and placement of fiber rolls along the fence line, and replacement of the gravel bag berm on the north side of the paved area above the IEL 24-inch storm drain outlet spillway with sandbags. Four infiltration holes were drilled into the concrete apron at the biofilter inlet to allow infiltration and

eliminate standing water (from dry weather irrigation). Supplemental rip rap was added at the north end of the biofilter where an overflow occurred during the February 26 – March 2, 2014 rain event.

Site Restoration. Removal of the concrete foundation as part of the Building 1436 demolition was performed during July 2014. Installation of detention bioswales per the 2013 BMP Plan Addendum is scheduled for Fall 2014.

Helipad. The Helipad BMP, consisting of two rows of sandbag berms, infiltration holes upslope of each berm, and a temporary pumping system to convey stormwater captured by the berms to nearby storage tanks, was inspected and maintained during the 2013/2014 rainy season. Upstream of this BMP a concrete curb was installed (see ELV section below for further details). Along the Helipad Road gutter, loose asphalt chunks and sediment/gravel were removed and a small section of missing asphalt was patched during March 2014.

Expendable Launch Vehicle (ELV) Area. Drainage improvements and installment of a treatment control BMP (ELV treatment BMP) was completed in the ELV area during November 2013. A 520-foot asphalt drainage swale was removed south of ELV and the area restored by re-contouring, installation of fiber rolls and jute matting, and application of hydroseed. The ELV treatment BMP consists of a concrete sump, sump pumps, settling tanks with tube settling plates, and a media filter tank which were installed at the corner of Helipad Road and Area II Road. Stormwater gravity flows through the tank system, starting with the settling tanks, then through the filter media tank, before discharging to a tributary that flows beneath Area II Road to Outfall 009. Over the course of the February 26 – March 2, 2014 rain event, the concrete sump was filled with sediment and an area of scouring was identified along the upstream ELV drainage channel. Sediment was removed from the sump and additional rip rap and fiber rolls were placed upstream along the channel.

In August 2013, the sandbag berm placed along the paved area north of and adjacent to ELV-1C to divert stormwater runoff towards the Helipad sandbag berms to the north-northeast was replaced by a concrete curb. Additionally, concrete curbs were constructed at two breaks in the existing curb in the parking lot area west of ELV, to route runoff from this entire paved area to the Helipad.

Liquid Oxygen (LOX) Area. The LOX sandbag berm was inspected, and worn and broken sandbags along the LOX sandbag berm were replaced during November 2013. Following restoration activities at LOX ISRA areas, supplemental gravel and fiber rolls were placed along the main access road to the south. Along the road east of LOX ISRA areas (at monitoring location LXBMP0006/LXSW0010), fiber rolls and supplemental gravel were installed along the road and the slope south of the road was restored with jute matting, fiber rolls, and hydroseed. South of the LOX-1B-2 area, a row of sandbags was placed downslope of the ISRA area to

divert stormwater runoff away from former planned ISRA area LOX-1C (located to the south) and towards the LOX sandbag berm. In March 2014, the gravel immediately beneath the slope drain inlets was removed and sandbags placed underneath to promote flow through the slope drains following observation of stormwater flowing beneath the slope drains during the February 28, 2014 rain event.

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. At the entrance to B-1, the row of sandbags was replaced during October 2013, and inspected and maintained throughout the rainy season. In October 2013, a concrete curb was constructed at a previously open space between the top of the gunite slope and remnant paving area where runoff was flowing underneath. In November 2013, worn and broken sandbags along the top of the gunite slope were replaced. In addition, 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 March 2014.

CM-9 Area. The CM-9 upgrades, including the rip rap berm, perforated pipe, and fiber rolls, were inspected at the same time as ISRA and BMP monitoring activities during the 2013/2014 rainy season. During December 2013, hydroseed was applied to the former road leading down from AILF, at bare soil areas above and below the rip rap berm, and along the slope north of CM-9. The culvert inlet along Area II Road and northeast of CM-9 was inspected and any accumulated plant/leaf debris was removed prior to forecast rain events. In March 2014, leaf litter and twigs were removed from the end of the perforated pipeline upstream of CM-9 and a mesh screen was placed over the inlet following observation of water not escaping a portion of the perforated pipe during the February 28, 2014 rain event. In addition, supplemental gravel was added along the east side of the rip rap apron below the rip rap berm.

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 the Santa Susana Site based on recommendations following routine inspections conducted per the sitewide 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 soil in surface water runoff.

1.3 2013/2014 RAINY SEASON DISCHARGE EVENT SUMMARY

The Santa Susana Site 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, five rain events occurred at the Santa Susana Site during the 2013/2014 rainy season. The dates of each rain event and the total measured rainfall recorded at a RWQCB approved weather station within Area I, as reported in the NPDES Discharge Monitoring Reports (Boeing, 2014a, 2014b) 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 2013/2014 rainy season, the amount of rain received (6.07 inches) was 67% below the average yearly rainfall for the region (~18.17 inches/year for the period between 1960 and 2012). For comparison, the previous five rainy seasons[3] were measured at 11.08 inches in 2008/2009, 19.39 inches in 2009/2010, 23.39 inches in 2010/2011, 11.33 inches in 2011/2012, and 8.10 inches in 2012/2013 from the Santa Susana Site rain gauge. The majority of rainfall received during the 2013/2014 rainy season (approximately 80%) occurred during one rain event between February 26 and March 2, 2014.

1.4 NPDES MONITORING, 2013/2014 RAINY SEASON

NPDES monitoring and sampling of Outfalls 008 and 009 conducted during the 2013/2014 rainy season was performed in accordance with the NPDES permit adopted on June 3, 2010. During the 2013/2014 rainy season, no samples were collected at Outfall 008 (no flow was recorded at Outfall 008 for the 2013/2014 rainy season) and one sample was 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 009 are presented in Table1-6[4]. During the 2013/2014 rainy season, lead, dioxins, and pH were detected above the NPDES permit limits in the one sample collected from Outfall 009. This sample was collected during the February 26 – March 2, 2014 rain event, which recorded the largest rainfall total for a

[3] Rainfall totals for each rainy season are calculated between August and July of the following year. Note that a review of rainfall totals for these five rainy season was performed and minor corrections to these rainfall totals were made compared to totals presented in previous reports.

[4] Per the NPDES permit adopted on June 3, 2010, dioxins toxic equivalency (TEQ) concentrations for NPDES samples were calculated during the 2013/2014 rainy season by multiplying each congener concentration by its respective toxic 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.

rain event in the season and had high rainfall intensity. Prior to these exceedances, ISRA activities within the Outfall 009 watershed removed the majority of known shallow soils with elevated detections of ISRA COCs, which include lead and dioxins. Therefore, it is believed that the lead and dioxin concentrations measured in the Outfall 009 NPDES sample are likely the result of erosion of native sediments and soils from recently disturbed areas within the Outfall 009 watershed caused by the high intensity rainfall. The elevated TSS concentration measured at the outfall supports the explanation that the dioxin and lead exceedances were due to soil and sediment erosion and the dioxin and lead particulate strengths (i.e., particulate-phase constituent mass per mass of TSS) are consistent with background levels suggesting natural background soils as the likely source. Recently a section of roadway south of the Northern Drainage was resurfaced which may have also contributed to the elevated lead concentration; fresh asphalt is a known source of lead and dioxin in stormwater runoff. Another potential regional source of dioxins at the site is wild fires, and there were several fires during 2013 in the southern California area, including the Springs Fire in Ventura County and a fire in the nearby Santa Monica mountains, both of which could contribute dioxins through onsite deposition of ash. Based on previous soil sampling results at the Santa Susana Site, the dioxin congeners detected are representative of background combustion related sources, such as wildfires and automobiles. Lastly, the pH detection is thought to be a result of human or instrument error. This is due to the fact that the pH reading (recorded using a field meter) was the lowest ever recorded and the measurement was collected by inexperienced personnel. Boeing is implementing a corrective action and revising the Standard Operating Procedure for pH measurement to address this. A complete discussion of these results can be found in the First Quarter 2014 Discharge Monitoring Report (Boeing, 2014b). The NPDES results are included in the evaluation of ISRA performance monitoring and BMP monitoring results in Sections 2.0 and 3.0, respectively. 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, 2014a, 2014b).

2.0 ISRA PERFORMANCE MONITORING SUMMARY

The data collected during the 2013/2014 rainy season represents the third year of rainy season monitoring for one Phase III ISRA area (IEL-2), the second 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 first 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 2013/2014 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, 2010/2011, 2011/2012, and 2012/2013 rainy seasons is provided in Section 2.1. A summary of the results from the 2013/2014 rainy season is provided in Section 2.2. Recommendations for modifications to the ISRA performance monitoring program are included in Sections 2.3. 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.

2.1 PRE-2013/2014 RAINY SEASON SAMPLING SUMMARY

A summary of pre-2013/2014 ISRA performance monitoring is provided in Table 2-1 and the monitoring locations and sampling dates are shown on Figures 2-1 through 2-6.

Table 2-1 Pre-2013/2014 ISRA Performance Monitoring Summary

Area Monitored	Rainy Season			
	2009/2010	2010/2011	2011/2012	2012/2013
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])	N/A
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])	N/A

Table 2-1 Pre-2013/2014 ISRA Performance Monitoring Summary, continued

Area Monitored	Rainy Season			
	2009/2010	2010/2011	2011/2012	2012/2013
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
IEL-3	--	--	--	X
AP/STP-1B, -1C-1, -1C-2, -1E-1, -1E-2, -1E-3	--	--	--	X
Sampling Summary	62 samples (from 28 locations)	91 samples (from 25 locations)	40 samples (from 15 locations)	2 samples (from 2 location)

NOTES

- (X) ISRA performance monitoring performed during specified rainy season.
- ([a]) ISRA performance monitoring discontinued after specified rainy season because the locations have been monitored for two or three years 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 2013/2014 RAINY SEASON ACTIVITIES AND RESULTS

During the 2013/2014 rainy season, performance monitoring continued at eight 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, IEL-2, and IEL-3) and was initiated at five Phase III ISRA areas completed during Fall 2013 (ELV-1C, ELV-1D, LOX-1B-1, LOX-1B-2, and LOX-1B-3). A summary of the 2013/2014 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 five qualifying rain events in 2013/2014. During these rain events, stormwater runoff was observed and sampled at two performance monitoring locations within the Outfall 009 watershed, at the AP/STP and LOX areas. The RWQCB collected a split of the performance monitoring sample collected at the LOX 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 2013/2014 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 2013/2014 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[5], and rainfall event measurements from the 2013/2014 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. 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, NPDES monitoring results, and TSS, and correlation charts comparing COC results to TSS are provided in Appendix C.

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

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

Outfall 009 Watershed Findings:

- Cadmium, copper, lead, and mercury were not detected in ISRA performance monitoring samples at concentrations above the NPDES permit limit during the 2013/2014 rainy season. Dioxins were detected above the NPDES permit limit in one performance monitoring sample (located at AP/STP). In the one Outfall 009 NPDES sample collected during the 2013/2014 rainy season, dioxins and lead were detected above the NPDES permit limit. As noted in Section 1.4, these detections may have been caused by high intensity rainfall resulting in erosion of native sediments and soils (with the elevated TSS concentration supporting the explanation that sediment and soil mobilization contributed to the dioxin and lead exceedances), recent resurfacing along a roadway (which can contribute lead and dioxins), and ash deposition from wildfires in the surrounding area (which is a known source of dioxins).

- Performance monitoring samples collected to date 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 RECOMMENDATIONS

The performance monitoring program was to be performed through two rainy seasons for each monitoring location; however, the actual study duration is dependent on the quantity and quality of data collected at the performance monitoring locations and the associated outfall. The 2013/2014 rainy season was the third year of rainy season monitoring for ISRA area IEL-2, the second year of monitoring for ISRA area IEL-3 and six ISRA areas in the AP/STP area, and the first year of monitoring for three ISRA areas in the LOX area and two ISRA areas in the ELV area. Based on the data collected to date, the following recommendations for the performance monitoring program for the 2014/2015 rainy season are made:

- Continue ISRA performance monitoring at all locations, because the unusually dry 2013/2014 rainy season resulted in relatively few new data.

3.0 POTENTIAL BMP AND BMP PERFORMANCE MONITORING PROGRAM

The data collected during the 2013/2014 rainy season represents the fourth year of BMP monitoring. The BMP monitoring inspection and sample locations from the 2013/2014 rainy season are listed in Table 1-4 and shown on Figure 1-2. A summary of the BMP monitoring results from the 2010/2011, 2011/2012, and 2012/2013 rainy seasons is provided in Section 3.1. A summary of the monitoring activities and results from the 2013/2014 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-2013/2014 RAINY SEASON SAMPLING SUMMARY

A summary of pre-2013/2014 BMP monitoring is provided in Table 3-1 and the monitoring locations and sampling dates are shown on Figures 2-1 through 2-6.

Table 3-1 Pre-2013/2014 BMP Monitoring Summary

Area Monitored	Rainy Season		
	2010/2011	2011/2012	2012/2013
Outfall 008			
HVS	X	X	X
Outfall 009			
AILF/CM-9	X	X	X
A2LF	X	X	X
B-1	X	X	X
CM-1	X	X	X
ELV	X	X	X
Helipad	X	X	X
LOX	X	X	X
Lower Parking Lot	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)

NOTES

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

Using the results of the 2010/2011, 2011/2012, and 2012/2013 rainy seasons, the Expert Panel prioritized the potential BMP sites based on water quality considerations. The potential 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 ISRA, BMP, and demolition measures), new 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, and 2013 BMP Plan addenda (Geosyntec and Expert Panel, 2011, 2012, and 2013).

3.2 2013/2014 RAINY SEASON ACTIVITIES AND RESULTS

During the 2013/2014 rainy season, potential BMP subarea monitoring was performed at 13 locations that monitored "planned" or "potential" BMP sites, and BMP performance monitoring was performed at 17 locations that monitored six BMP sites, including CM-1, CM-9, the B-1 Media Filter, the ELV treatment BMP, LOX area BMPs, and the Lower Parking Lot BMP. A summary of the 2013/2014 inspection and sampling activities and results are presented below.

3.2.1 Inspection and Sampling Activities

Field inspections of BMP monitoring locations were conducted during all five qualifying rain events in 2013/2014. During these rain events, stormwater runoff was observed and sampled at 22 BMP monitoring locations within the Outfall 009 watershed and at one location within the Outfall 008 watershed. One sample was collected and placed on hold within the Outfall 009 watershed; the sample was collected on December 7, 2013 at the Lower Lot BMP upstream monitoring location and was placed on hold as the associated downstream sample was not collected that same day. A summary of the number of potential BMP subarea monitoring samples collected during each rain event is presented in Table 1-5. The potential BMP subarea monitoring samples collected during the 2013/2014 rainy season are listed in Table 3-2. The monitoring locations and dates on which potential BMP subarea monitoring samples were collected are shown on Figures 2-1 through 2-6. Charts showing rainfall in inches per hour for the 2013/2014 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 2013/2014 rainy season are presented in Table 3-3 for potential BMP subarea monitoring and in Tables 3-4a through 3-4f for Treatment BMP performance monitoring. Consistent with the approach used during previous rainy seasons, Level II validation was performed on all dioxins results. Laboratory and validation reports for potential BMP subarea 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, NPDES monitoring results, and TSS, and correlation charts comparing COC results to TSS are provided in Appendix E. PSD data will be summarized in the 2014 BMP Plan Addendum because the primary purpose for collecting PSD data is for use in BMP design.

Below is a summary of the potential BMP subarea monitoring, BMP performance monitoring, and NPDES sample results for the Outfall 009 NPDES COCs, 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 008 Watershed Sample Results:

- For the 2013/2014 rainy season, no chemical constituents were detected above the NPDES permit limit in the one BMP sample collected. Additionally, Outfall 008 was not flowing when this sample was collected.

Outfall 009 Watershed Sample Results:

- For the 2013/2014 rainy season, cadmium was not detected in potential BMP subarea monitoring or Outfall 009 NPDES samples at concentrations above the NPDES permit limit (excludes several cadmium J-flagged results below the NPDES permit limit). Lead, copper, mercury, and/or dioxins were detected above the NPDES permit limit in ten samples collected from eight planned or potential BMP monitoring locations within the Outfall 009 watershed, including one location downstream of a treatment BMP (B1BMP0007). For the one Outfall 009 NPDES sample, lead and dioxins were detected above the NPDES permit limit. As noted in Section 1.4, these detections may have been caused by high intensity rainfall resulting in erosion of native sediments and soils (with the elevated TSS concentration supporting the explanation that sediment and soil mobilization contributed to the dioxin and lead exceedances), recent resurfacing along a

roadway (which can contribute lead and dioxins), and ash deposition from wildfires in the surrounding area (which is a known source of dioxins).

- Refer to Section 3.4 for the list of the highest ranked subareas based on the results of the Expert Panel's BMP site ranking analysis. In general, the subarea monitoring sites that receive runoff from primarily paved surfaces had the highest COC concentrations[6], a finding that is generally consistent with other stormwater studies and supports the benefits of the ongoing asphalt removal/demolition projects.

- For the 2013/2014 rainy season, cadmium and mercury were not detected in BMP performance monitoring samples at concentrations above the NPDES permit limit during the 2013/2014 rainy season (excludes one J-flagged result for mercury slightly above the NPDES permit limit). Lead, copper, and/or dioxins were detected above NPDES permit limits in 12 samples collected from 11 BMP performance monitoring locations, including at the B-1 Media Filter (up- and downstream), CM-1 (up- and downstream), Lower Parking Lot BMP (up- and downstream), CM-9 (up- and downstream), ELV treatment BMP (up- and downstream), and LOX (up- and downstream). For the Outfall 009 NPDES sample collected, lead and dioxins were detected above the NPDES permit limit. Refer to Section 3.3 for the evaluation of upstream versus downstream BMP performance monitoring samples.

3.3 UP- AND DOWNSTREAM BMP PERFORMANCE EVALUATIONS

An evaluation of upstream versus downstream BMP performance monitoring sample results was performed by the Expert Panel, with results presented in a memorandum (Geosyntec and Expert Panel, 2014a) included in Appendix D. The memorandum evaluated data collected during the 2009/2010 to 2013/2014 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. Several new monitoring sites were added during the 2013/2014 season, most notably to monitor performance at the new ELV treatment BMP.

In general, data indicate that downstream concentrations at BMP sites tend to be lower than corresponding upstream samples, suggesting positive performance of the BMPs for all COCs

[6] As stated previously, stormwater runoff from asphalt pavement may contribute metals and dioxins concentrations that are above background due to: (1) regional atmospheric deposition (which over time builds up and more effectively washes off pavement during rain events unlike open ground areas where stormwater runoff may partially infiltrate or be sequestered by plants), (2) contributions from the asphalt emulsion and/or pavement sealant themselves, and/or (3) contributions from vehicles (e.g., brake dust, oil leaks, and exhaust particulates).

evaluated.[7] Dioxins, copper, and lead at non-background CM sites were found to have statistically significant reductions (water quality improvements) from upstream to downstream concentrations.

At the newly constructed biofilter treatment train, pollutant removal was observed for all COCs. Data collected to date at the biofilter showed net TSS, dioxins, copper, and lead reductions of 39%, 86%, 51%, and 17%, respectively, for the two monitoring events since completion of the biofilter; these reductions likely underestimate the actual reduction through the biofilter since the 2013/2014 effluent sample was taken during overflow, so it reflects a blend of treated and untreated flows. Effluent concentrations for dioxins, copper, and lead were below the NPDES Permit limits (there is no NPDES Permit limit for TSS).

The monitored performance demonstrates the benefits of the sedimentation and media treatment unit processes. The monitoring data have also been used in the subarea ranking evaluations for CM 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 the Expert Panel and presented in the Expert Panel's BMP ranking memo (Geosyntec and Expert Panel, 2014b), which is included as Appendix F. The highest ranked subareas are summarized in Table 3-5. 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, 2014b).

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). It should be noted that all 20 monitoring locations described below are located in the Outfall 009 drainage area, with none in the Outfall 008 drainage area. Water quality at background locations was generally good with no location ranked above 34.5[8], though there were several instances of concentrations greater than the

[7] Although no data were collected from background sites in the 2013/2014 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] 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.

NPDES permit limits at those locations. However, no flow or exceedances occurred at Outfall 008 during the current season, indicating that retention occurred within the watershed. Finally, it should be noted that the 2013/2014 rainy season was unusually dry; therefore, there are relatively few new data this year for updating the site rankings.

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.).

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

Rank	Potential BMP Subarea (Co-locations)	Water-shed	Description	Approximate Upgradient Drainage Area (ac)	Multi-Constituent Score	Rank from Maximum Metal Weighting	Rank from Maximum Dioxins Weighting	Total Number of Events Sampled	Site Status
1	**ILBMP0002**[a]	Outfall 009	Road runoff to CM-9	2.5	0.98	1	5	10	Being addressed; no further action needed
2	**EVBMP0003** (A2SW0001)[a]	Outfall 009	CM-1 upstream west	2.3	0.89	3	1	19	Being addressed; no further action needed
3	**EVBMP0002**	Outfall 009	Helipad (pre-sandbag berms) - OLD	4.1	0.66	17.5	8	6	Being addressed; no further action needed
5	EVBMP0005[a]	Outfall 009	2012-2013 ELV drainage ditch (pre-ELV-1C ISRA) - OLD	11	0.63	21	7	2	Being addressed; no further action needed
5	A1SW0009-A	Outfall 009	CM-9 downstream-underdrain outlet (post-A1LF asphalt removal, pre-filter fabric over weir boards) - OLD	16.4	0.63	4.5	24.5	1	Being addressed; no further action needed
5	**APBMP0001-A**	Outfall 009	Area II road runoff, post-ELV stormwater improvement	0.2	0.63	4.5	24.5	1	Revisit after more data become available

Rank	Potential BMP Subarea (Co-locations)	Water-shed	Description	Approximate Upgradient Drainage Area (ac)	Multi-Constituent Score	Rank from Maximum Metal Weighting	Rank from Maximum Dioxins Weighting	Total Number of Events Sampled	Site Status
7	**EVBMP0004**[a]	Outfall 009	2012-2013 Lower Helipad Road	1.8	0.62	2	35.5	3	Being addressed; no further action needed
8.5	**LPBMP0002**[a]	Outfall 009	Lower parking lot influent to cistern	4.2	0.60	11.5	12.5	2	Being addressed; no further action required
8.5	**APBMP0001**	Outfall 009	Ashpile culvert/inlet road runoff, pre-ELV improvemen-OLD	32.9	0.60	6	24.5	2	Refer to APBMP-0001-A
10	**ILBMP0001**[b]	Outfall 009	Lower lot 24" stormdrain outlet	23	0.58	23	6	18	Targeted for current control
11	**B1BMP0004 (B1SW0015, B1BMP0004-5)**[a]	Outfall 009	B1 media filter inlet north	3.7	0.51	35	2	12	Being addressed; no further action required
15.5	**LPBMP0001-A**[a]	Outfall 009	Lower lot sheetflow (post-gravel bag berms)	5.1	0.50	37.5	4	6	Being addressed; no further action required
15.5	**B1SW0002**[a]	Outfall 009	Woolsey Canyon Road runoff	1.3	0.50	11.5	24.5	2	Being addressed; no further action required
15.5	B1BMP0001 (B1SW0010)[a]	Outfall 009	B1 media filter inlet (post-media filter installation)	4.5	0.50	11.5	24.5	3	Being addressed; no further action required
15.5	LXBMP0006 (LXSW0010)[a]	Outfall 009	LOX east, runoff along dirt road	0.43	0.50	11.5	24.5	1	Being addressed; no further action required
15.5	EVBMP0006[a]	Outfall 009	2012-2013 Area II Road near ELV ditch	11	0.50	11.5	24.5	1	Being addressed; no further action required
15.5	LPBMP0003[a]	Outfall 009	Lower parking lot sediment basin outlet	4.2	0.50	11.5	24.5	1	Targeted for current control
15.5	B1SW0014-A (B1BMP0006)	Outfall 009	B1 media filter effluent (pre-media Filter recon-struction) - OLD	4.7	0.50	11.5	24.5	1	Being addressed; no further action required

Rank	Potential BMP Subarea (Co-locations)	Water-shed	Description	Approximate Upgradient Drainage Area (ac)	Multi-Constituent Score	Rank from Maximum Metal Weighting	Rank from Maximum Dioxins Weighting	Total Number of Events Sampled	Site Status
15.5	LPBMP0001[a]	Outfall 009	Lower lot sheetflow (pre-gravel bag berms) - OLD	5.1	0.50	11.5	24.5	2	Being addressed; no further action required
20	**B1BMP0003** **(B1BMP0002)**	Outfall 009	B1 parking lot / road runoff to culvert inlet	5.2	0.49	51	3	18	Being addressed; no further action required

NOTES

- These potential BMP subarea monitoring locations are upstream of existing stormwater quality treatment controls.
- These potential BMP subarea monitoring locations have new planned (i.e., designed and ready for construction) stormwater quality treatment controls.
- 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 (Geosyntec, 2011). At locations where the monitoring point is upstream of the catchment outfall a "<" sign is used.
- Bolded locations indicate that both the NPDES permit limit and 95th percentile background particulate strength threshold were exceeded for any one COC.
- 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 BMP Impacts on Rankings

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. In most cases, the site rank based on the multi-constituent score fell after the BMP was implemented, demonstrating that the BMP helped improved water quality at the site.

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

Original Location Name	Description	Rank	Suffix	Implementation Date	Description	Rank	Suffix	Implementation Date	Description	Rank	Suffix	Implementation Date	Description	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	15.5	-B	12/16/2011	B-1 media filter effluent (post-media filter reconstruction) - OLD	31	-C	11/2/2012	B-1 media filter effluent (post-media filter reconstruction, post-curb cuts)	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)	39	N/A			
LPBMP0001	Lower lot sheetflow (pre-gravel bag berms) – OLD	15.5	-A	9/26/2011	Lower lot sheetflow (post-gravel bag berms)	15.5	N/A				N/A			
A1SW0009	CM-9 downstream-underdrain outlet (pre-AILF asphalt removal, pre-filter fabric over weir boards) – OLD	N/A[1]	-A	9/1/2012[2]	CM-9 downstream-underdrain outlet (post-AILF asphalt removal, pre-filter fabric over weir boards) - OLD	5	-B	1/20/2012	CM-9 downstream-underdrain outlet (post-filter fabric over weir boards, post-AILF asphalt removal) – OLD	21	-C	3/1/2013	CM-9 downstream-underdrain outlet (post-perforated pipe and upper basin installed)	34.5
APBMP0001	Ashpile culvert/inlet road runoff - OLD	8.5	**-A**	11/7/2013	Area II road runoff, post-ELV stormwater improvements	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 11 and 23) are both ranked higher than the B-1 effluent, which is ranked 43. A similar occurrence is observed for the influent/effluent ranks for CM-1, CM-9, and the lower parking lot sedimentation basin and biofilter (based on just two samples). 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 B-1 area. Although the ELV treatment BMP rankings were based on just one sample, separate samples collected in past monitoring years that represent influent quality have typically been ranked highly (e.g., EVBMP0005). Therefore, EVBMP0007 and EVBMP0008 have both been included in Table 3-7 to illustrate a water quality improvement between the recent BMP influent and effluent.

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

BMP Area	Influent			Effluent			Rank Change
	Monitoring Location	Description	Influent Rank	Monitoring Location	Description	Effluent Rank	
CM-9	**ILBMP0002**	Road runoff to CM-9	1	A1SW0009-C	CM-9 downstream-underdrain outlet (post-perforated pipe and upper basin installed)	34.5	-33.5
CM-1	**EVBMP0003 (A2SW0001)**	CM-1 upstream west	2	A2SW0002-A (A2BMP0007)	CM-1 effluent (post-filter fabric over weir boards)	42	-40
B-1 Media Filter	**B1BMP0004 (B1SW0015, B1BMP0004-5)**	B-1 media filter inlet north	11	B1SW0014-C (B1BMP0006)	B-1 media filter effluent (post-media filter reconstruction, post-curb cuts)	42	-31
	B1BMP0005 (B1SW0013, B1SW0011, B1BMP0004-5)	B-1 media filter inlet south	23				-19
Lower Lot Sediment Basin	**LPBMP0002**	Lower parking lot influent to cistern	8.5	**LPBMP0003**	Lower parking lot sediment basin outlet	15.5	-7
				LPBMP0004	Lower parking lot biofilter outlet	40.5	-32

BMP Area	Influent			Effluent			Rank Change
	Monitoring Location	Description	Influent Rank	Monitoring Location	Description	Effluent Rank	
Vegetated Area Downstream of B-1 Media Filter	**B1BMP0003** (B1BMP0002)	B-1 parking lot / road runoff to culvert inlet	20	B1BMP0007	B-1, vegetated channel	48	-28
	B1SW0014-C (B1BMP0006)	B-1 media filter effluent (post-media filter reconstruction, post-curb cuts)	43				-5
ELV Treatment BMP*	EVBMP0007	Influent to ELV stormwater treatment system	25	EVBMP0008	Effluent from ELV treatment BMP	34.5	-10.5

NOTES
- **Bolded** locations indicate that the site is ranked within the top 20 of the multi-constituent scores.
- Gray text indicates historic subarea monitoring sites that are discontinued.
- (*) Based on a single influent/effluent sampling event.

2014 BMP Recommendations and Status Updates on 2013 Recommendations

The following area summaries provide a status update on the Expert Panel's 2013 BMP recommendations, as well as new additional recommendations for 2014 (text pulled directly from the ranking memo). Additional details on these BMP concepts and implementation schedule will be provided in the BMP Work Plan Addendum, which will be submitted to the RWQCB in September 2014.

1. **ELV Area:** The ELV treatment BMP was installed in November of 2013 and just one sample has been collected from each of the system influent and effluent. Last year, the Expert Panel had no additional recommendations beyond completion and startup of this facility. During a field meeting on August 14, 2014 amongst NASA and the Panel, recommendations were made regarding modifications to the ELV channel to further improve performance, including: adding sandbags along the edge of the ELV channel rip rap, extending the matting over the side of the ELV channel especially where rodent holes were observed, and adding pass-through bags parallel to the ELV channel to hold matting down but allow runoff to enter the channel. This year the Expert Panel recommends continued inspection and maintenance of the ELV treatment BMP, and that stormwater samples be collected at the mid-point, between the sedimentation basin and the media filter.

   Earlier this year, based on a site visit in March 2014, the Expert Panel recommended continued inspection and maintenance of the stormwater system, in addition to robust

erosion control improvements along the ELV channel. The complete list of Panel recommendations from March 2014 is as follows:

- Improve erosion control along the earth-bottom portions of ELV channel (e.g., add rock check dams, remove soils placed on top of exposed rock, etc.). This will also reduce long-term maintenance costs for the media filter.
- Modify influent screen in the sump if significant clogging is observed.
- If overflows are observed, incorporate automated pump controls to trigger shutoff when settling or filtration tanks are full, and then to restart when low water level set point is reached.
- Evaluate capacity of filter tank overflow pipe (3" diameter PVC pipe) to prevent tank overtopping (note: this would be the backup to the pump auto-shutoff).
- Conduct additional media rinsing until low turbidity goal is met (e.g., <25 NTU or several stable readings in a row).
- Monitoring:
  - Perform turbidity sampling of settling tank effluent
  - Modify settling tank influent sample port to draw water from side of pipe rather than top (top sampler may reflect decanted water)
- Clarify tank draining procedures (e.g., pump vs. gravity drain) and rules (e.g., number of post-storm days that ponding is allowed) to address vector control concerns.

NASA representatives met with Panel members at the Santa Susana Site in March and August of 2014. NASA has considered the Panel's March recommendations for BMP improvements at the ELV area, and has implemented improved erosion controls along the ELV channel (the first bulleted recommendation above), including removal of loose soils, placement of filter fabric on the soil surface, and placement of rip rap in the drainage channel. NASA will continue to consider the additional recommendations as opportunities arise during future operations and maintenance.

2. **ISRA:** The Expert Panel's 2013 recommendations were to continue ISRA performance monitoring at all locations, because the unusually dry 2012-2013 rainy season resulted in relatively few new data. The Panel also recommended adding ISRA performance monitoring locations at recently completed ISRA areas (e.g., LOX). The Panel has no new recommendations this year, and acknowledges that the ISRA performance monitoring will be phased out after final sampling during the 2014/15 season.

3. **CM-9 (Boeing):** In March of 2013, improvements were made at the CM-9 area including: erosion control blanket and straw wattles were installed along the slopes adjacent to the Area II Road; a low flow diversion inlet structure and diversion pipe with

perforations; and a rock berm was installed for ponding runoff as pretreatment prior to CM-9. The inlet and diversion pipe were installed to spread road runoff along the vegetated slope south of the CM-9 media filter. In September of 2013, sediment removal was performed at CM-9. Additionally, maintenance was performed at the perforated pipeline conveying runoff from the Area II Road culvert inlet to upstream of the rip rap berm. The pipe was found to be partially clogged with leaf litter and twigs, so this material was removed and a mesh screen was placed over the culvert inlet pipe to prevent future blockages. In 2013, downstream monitoring at CM-9 was reassigned to the BMP monitoring program, under which other treatment BMPs are currently being monitored (e.g., CM-1 and B-1 Media Filter). The Panel also recommended ongoing maintenance of previously installed BMPs. In addition, the Panel recommended: 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 in accordance with the ISRA SWPPP for the CM-9 downstream underdrain outlet (A1SW0009-A). All of these recommendations were implemented in the 2013-2014 wet season. This year the Expert Panel recommends continued implementation of these inspection and maintenance recommendations.

4. **CM-1 (NASA):** Last year the Expert Panel recommended CM-1 filter fabric inspection (to replace when the fabric became clogged or damaged), monitoring of sediment accumulation in front of weir boards (removal when accumulation nears top of first weir board), and monitoring of water ponding after storms (ponding for greater than 72 hours should be noted as it may suggest that media or underdrain maintenance is needed). These actions were completed as recommended, in accordance with the ISRA SWPPP. In September of 2013, sediment removal was performed at CM-1. This year the Expert Panel recommends continued inspection and maintenance of CM-1 in addition to potentially increasing the CM-1 capacity.

5. **Helipad (NASA):** In August of 2013 the construction of a concrete curb north of ISRA area ELV-1C, parallel to the edge of the Helipad paved area, replaced an existing row of sandbags that had been installed in the previous rainy season. At the same time, drainage from the west was modified by the installation of a lowered concrete slab, increasing flows to the Helipad from the previous monitoring season. The sandbag berms were kept in operation during the 2013-2014 season. The Panel also 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. This year the Expert Panel also recommends 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 on to the Helipad road. The Panel also recommends continued inspection and maintenance of the helipad sandbag berms and any future BMPs.

6. **LOX Area (NASA):** Last year the Expert Panel recommended robust erosion and sediment controls during and following the ISRA soil removal to control runoff along the dirt road. The LOX ISRA excavations were completed during August of 2013. Post-ISRA erosion controls included re-contouring without backfill, installation of fiber rolls, hay bales, and/or silt fencing, and application of hydroseed mulch. Additional actions completed included placement of jute matting on the slope south of the dirt road, installation of fiber rolls along the dirt road and slope to the south, fresh gravel applied along the road, repairs to the grade control structure on the northern drainage channel at the base of LOX, and hydroseed applied to the slope. This year the Expert Panel recommends continued inspection and maintenance of the LOX BMPs.

7. **Lower Lot:** Last year the Expert Panel recommended ongoing inspection of the low-flow diversion, comprehensive erosion controls post-Building 1436 demolition, upper parking lot asphalt removal where possible, and treatment of runoff from the paved storage area near Building 1436. Building 1436 demolition is complete and construction of the detention BMP will commence after permitting is completed, likely in fall of 2014. Hydraulic monitoring of the low flow diversion, cistern, trench drain, and the 24-inch storm drain outlet was conducted between February and April 2014 to assess the quantity of flow along these drainage systems – a calibrated model has calculated that, with the proposed changes, the lower lot biofilter will treat 30-40% of the long term runoff volume from the 24-inch storm drain. The Panel also recommended maintenance of the float switch in the sedimentation basin outlet structure, stabilization of the banks that are eroding in the sedimentation basin, and modification of the concrete "pan" distribution channel in the biofilter so water is not ponded for prolonged periods. Since then, the banks of the sedimentation basin have been stabilized and holes were drilled at the inlet of the biofilter distribution channel to avoid prolonged periods of ponding. This year, the Expert Panel recommends review of the cistern pump programming to prevent future overflows of the biofilter. Additionally, given that a sample at the sediment basin outlet (LPBMP0003) could not be collected this season due to inaccessible conditions, the Panel recommends that the monitoring program be modified such that the sample at LPBMP0003 be collected from the sediment basin outlet structure using a sample pole. This should be more accessible during ponding events. The Panel also recommends that field observations be recorded when biofilter effluent samples are collected during periods of

overflow, or that effluent samples be collected from the underdrain outlet within the biofilter outlet structure. Lastly, the Panel recommends continued inspection, maintenance, and monitoring of the lower lot biofilter system.

8. **B-1 Media Filter:** Last year the Expert Panel recommended continued maintenance of the filter media bed, hillside erosion controls, pretreatment check dams, and curb cuts (B1BMP0004). Inspections were performed of this area as part of the ISRA SWPPP. In addition, prior to each forecasted rain event, sandbags were placed at the curb cuts to help divert storm water runoff towards the cuts (these were removed when it was not raining to prevent them from being run over and worn down). Accumulated vegetation and debris was also cleared away from within the pretreatment check dams. This year the Expert Panel recommends continued inspection and maintenance of the B-1 media filter and adjacent BMPs.

9. **BMP Monitoring Program:** Based on the data collected for the BMP monitoring program to date, the only recommended change to the monitoring program for the 2014-2015 rainy season is to discontinue "planned" BMP monitoring locations where BMP installations were complete and replace with up- and downstream BMP performance monitoring locations (e.g., Bldg. 436 swales). This was initiated last season with the BMP monitoring locations EVBMP0007 (influent) and EVBMP0008 (effluent). Additionally, it is recommended that monitoring at planned BMP locations continue if the locations were ranked in the top 20 in 2013-32014, or if insufficient data exist.

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 BMP SUBAREA MONITORING PROGRAM RECOMMENDATIONS

Based on the data collected to date, the following recommendations for the 2014/2015 rainy season are made:

- Adjust location of monitoring location (the biofilter mid-point sample location) to the sediment basin outlet box. This will avoid the situation observed this previous rainy season where the sample point at the Biofilter influent point could not be accessed due to ponding and submerging of the outlet pipe from the sediment basin.

- When the biofilter effluent sample is collected, note if the overflow standpipe is overflowing at the same time as sample collection.

- Discontinue monitoring at the following "potential" BMP locations: HZBMP0001 and HZBMP0003 in the Happy Valley South area, and A2BMP0003 and A2BMP0005 along the tributary drainage below the Helipad/ELV/AP-STP areas.

- At the ELV treatment BMP, add a mid-point BMP performance sample location between the influent and effluent sample locations, to evaluate stormwater conditions between the settling tanks and media filter tank.

- Add influent and effluent BMP performance monitoring sample locations at the Building 1436 bioswales, after they are completed.

4.0 UPDATED MILESTONES SCHEDULE

The milestone schedule presented in the BMP Plan has been updated, and is provided below. The schedule accounts for phasing of implementation to allow completion of ongoing work within the Outfalls 008 and 009 watersheds.

2014:

September 2014	Submit Final BMP Plan Addendum that identifies new stormwater controls and proposed implementation schedule, as necessary. Install detention bioswales at former Building 1436 area.
2014/2015 Rainy Season	Collect stormwater samples (note: includes continued performance monitoring at existing BMP locations and reduced monitoring at potential BMP monitoring).

2015:

Summer 2015	Submit final annual rainy season report and recommendation of BMP upgrades, as necessary.

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TABLES

Table 1-1
Summary of NPDES Permit Limit Exceedances - Outfall 008
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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) toxic 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 equivalenc 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 toxic 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
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
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

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	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

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) toxic 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 equivalenc 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 toxic 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
2013/2014 Rainy Season
Page 1 of 1

Object ID	Location	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)
Outfall 009 Watershed										
APSW0007	AP/STP	US/BG	AP/STP-1B, -1C-1	AP/STP tributary drainage	X	X	X	X	X	X
APSW0008	AP/STP	US/BG	AP/STP-1C-1, -1C-2	Intermittent stream flow	X	X	X	X	X	X
APSW0009	AP/STP	Secondary*	AP/STP-1B, -1C-1, -1C-2	AP/STP tributary drainage	To Be Determined					
APSW0010	AP/STP	Secondary*	AP/STP-1E-1	Intermittent stream flow	To Be Determined					
APSW0011	AP/STP	Secondary*	AP/STP-1E-2	AP/STP tributary drainage	To Be Determined					
APSW0012	AP/STP	US/BG	AP/STP-1E-3	Intermittent stream flow					X	X
APSW0014	AP/STP	DS	All AP/STP	AP/STP tributary drainage	X	X	X	X	X	X
EVSW0001	ELV	US	ELV-1C	Intermittent sheet flow	X	X	X	X	X	X
EVSW0002	ELV	DS	ELV-1C	Intermittent stream flow	X	X	X	X	X	X
EVSW0003	ELV	US	ELV-1D	Intermittent stream flow	X	X	X	X	X	X
EVSW0004	ELV	DS	ELV-1D	Intermittent stream flow	X	X	X	X	X	X
ILSW0003	IEL	US	IEL-2	Intermittent stream flow	X		X	X		X
ILSW0004	IEL	DS	IEL-2	Intermittent stream flow	X		X	X		X
ILSW0005	IEL	US	IEL-3	Intermittent stream flow	X	X	X	X		X
ILSW0006	IEL	DS	IEL-3	Intermittent stream flow	X	X	X	X		X
LXSW0004	LOX	US	LOX-1B-1, -1B-2, -1B-3	Intermittent stream flow	X	X	X	X	X	X
LXSW0005	LOX	US	LOX-1B-1, -1B-2, -1B-3	Intermittent stream flow	X	X	X	X	X	X
LXSW0006	LOX	US	LOX-1B-1, -1B-2, -1B-3	Intermittent stream flow	X	X	X	X	X	X
LXSW0007	LOX	DS	LOX-1B-1, -1B-2, -1B-3	Slope drain outlet; western end of sand bag berm	X	X	X	X	X	X
LXSW0008	LOX	DS	LOX-1B-1, -1B-2, -1B-3	Slope drain outlet; eastern end of sand bag berm	X	X	X	X	X	X
LXSW0009	LOX	Alternate DS	LOX-1B-1, -1B-2, -1B-3	Slope drain outlet; eastern end of sand bag berm	X	X	X	X	X	X
LXSW0010	LOX	DS	LOX-1B-3	Intermittent stream flow	X	X	X	X	X	X

Abbreviations:

DS - Downstream
US - Upstream
BG - Background Assessment
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
Potential/Planned and Treatment BMP Monitoring Inspection Locations and Analytical Plan
2013/2014 Rainy Season

Object ID	Location	Purpose	Areas Monitored	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 008 Watershed												
HZBMP0001	Happy Valley	Potential BMP Location	HVS	HVS tributary drainage	X	X			X	X	X	X
HZBMP0003	Happy Valley	Potential BMP Location	CYN, DRG	CYN/DRG tributary drainage	X	X			X	X	X	X
Outfall 009 Watershed												
A1BMP0002	AILF	US South, Treatment BMP Performance Monitoring	CM-9, AILF	AILF tributary drainage			X	X	X	X	X	
A1BMP0003	AILF	DS, Treatment BMP Performance Monitoring	CM-9, AILF, IEL, Area II Road	CM-9 underdrain			X	X	X	X	X	
A2BMP0001	A2LF	Potential BMP Location	A2LF	Tributary drainage, west	X	X			X	X	X	X
A2BMP0002	A2LF	Potential BMP Location	A2LF	Tributary drainage, east	X	X			X	X	X	X
A2BMP0003	A2LF, WS-13 Road	Potential BMP Location	AP/STP, ELV, A2LF	Tributary drainage	X	X			X	X	X	X
A2BMP0005	ELV	Potential BMP Location	AP/STP, ELV	Tributary drainage	X	X			X	X	X	X
A2BMP0006	CM-1	US East, Treatment BMP Performance Monitoring	CM-1	CM-1 eastern tributary drainage			X	X	X	X	X	
A2BMP0007	CM-1	DS, Treatment BMP Performance Monitoring	CM-1	CM-1 culvert outlet			X	X	X	X	X	
APBMP0001	Ash Pile	Potential BMP Location	AP/STP, ELV	Area II Road asphalt swale	X	X			X	X	X	X
B1BMP0003	B-1	Potential BMP Location	B-1, Upper Parking Lot	Culvert inlet	X	X			X	X	X	X
B1BMP0004	B-1	US North, Treatment BMP Performance Monitoring	B-1 Media Filter	Tributary drainage			X	X	X	X	X	
B1BMP0005	B-1	US South, Treatment BMP Performance Monitoring	B-1 Media Filter	Asphalt swale downstream of retention basin discharge			X	X	X	X	X	
B1BMP0006	B-1	DS, Treatment BMP Performance Monitoring	B-1 Media Filter	B-1 Media Filter underdrain			X	X	X	X	X	
B1BMP0007	B-1	Potential BMP Location	B-1	Tributary drainage; DS of B-1 storm drain culvert outlet and US of Lower Parking Lot BMP discharge to Northern Drainage	X	X			X	X	X	X

Table 1-4
Potential/Planned and Treatment BMP Monitoring Inspection Locations and Analytical Plan
2013/2014 Rainy Season
Page 2 of 2

Object ID	Location	Purpose	Areas Monitored	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)												
EVBMP0001	ELV	Planned BMP Monitoring Location	ELV, Helipad	Culvert inlet; runoff will only be present when rain events exceed ELV BMP design storm	X	X			X	X	X	X
EVBMP0002	ELV, Helipad	Planned BMP Location	Helipad	Spillway inlet	X	X			X	X	X	X
EVBMP0003	CM-1	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	
EVBMP0007	ELV	US, Treatment BMP Performance Monitoring	ELV BMP	Sample port in BMP influent pipe prior to "T" connection			X	X	X	X	X	
EVBMP0008	ELV	DS, Treatment BMP Performance Monitoring	ELV BMP	Sample port in BMP effluent pipe connected to middle tank			X	X	X	X	X	
ILBMP0001	Lower Parking Lot	Potential BMP Location	IEL	Culvert discharge under spillway chute	X	X			X	X	X	X
ILBMP0002	AILF	US East, Treatment BMP Performance Monitoring	CM-9, IEL, Area II Road	Culvert inlet off Area II Road			X	X	X	X	X	
LPBMP0002	Lower Parking Lot	US, Treatment BMP Performance Monitoring	Lower Parking Lot BMP	Sample port in cistern discharge pipe			X	X	X	X	X	
LPBMP0003	Lower Parking Lot	Intermediate Treatment BMP Performance Monitoring	Lower Parking Lot BMP	Discharge from Sediment Basin effluent pipe into Biofilter			X	X	X	X	X	
LPBMP0004	Lower Parking Lot	DS, Treatment BMP Performance Monitoring	Lower Parking Lot BMP	Discharge from Biofilter effluent pipe			X	X	X	X	X	
LXBMP0006	LOX	Potential BMP Location	LOX	Sheetflow along dirt road; co-located with LXSW0010	X*	X			X	X	X	X
LXBMP0007	LOX	DS, BMP Performance Monitoring	LOX Sandbag Berm and Slope Drains	Slope drain outlet, western end of sandbag berm; co-located with LXSW0007			X	X*	X*	X*	X	
LXBMP0008	LOX	DS, BMP Performance Monitoring	LOX Sandbag Berm and Slope Drains	Slope drain outlet, eastern end of sandbag berm; co-located with LXSW0008			X	X*	X*	X*	X	
LXBMP0009	LOX	Alternate DS, BMP Performance Monitoring	LOX Sandbag Berm and Slope Drains	Slope drain outlet, eastern end of sandbag berm; co-located with LXSW0009			X	X*	X*	X*	X	

Abbreviations:

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

Notes:

* Cd, Cu, Pb, Hg, dioxins, and total suspended solids (TSS) analyses to be obtained from co-located performance monitoring samples.

Table 1-5
2013/2014 Rain Event and Sampling Summary - Outfall 008 and 009 Watersheds
(Page 1 of 1)

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				
				NPDES Samples	BMP Monitoring Samples	ISRA Performance Monitoring Samples[3]			NPDES Samples	BMP Monitoring Samples	ISRA Performance Monitoring Samples[3]		
						Analyzed	Hold	Total			Analyzed	Hold	Total
November 20 - 21, 2013	0.47	0.013	0.12	0	0	0	0	0	0	0	0	0	0
December 7, 2013	0.28	0.070	0.09	0	0	0	0	0	0	5	0	0	0
February 6 - 7, 2014	0.28	0.015	0.15	0	0	0	0	0	0	0	0	0	0
February 26 - March 2, 2014	4.62	0.052	0.47	0	1	0	0	0	1	22	2	0	2
April 1-2, 2014	0.22	0.008	0.14	0	0	0	0	0	0	0	0	0	0
Non Rain Event Total[2]	0.20	--	--	--	--	--	--	--	--	--	--	--	--
TOTAL	**6.07**	**--**	**--**	**0**	**1**	**0**	**0**	**0**	**1**	**27**	**2**	**0**	**2**

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 within Area I.

[2] On the following 9 days, rainfall was measured but was not considered a rain event per the NPDES Permit definition: October 28-29, 2013; November 29, 2013; December 19, 2013; January 30-31, 2014; February 2, 2014; March 31, 2014; and April 25, 2014.

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

Table 1-6
NPDES Sample Results, Outfall 009
2013/2014 Rainy Season
Page 1 of 1

		Object Name:	**OUTFALL 009**
		Sample Name:	**Outfall 009**
		Sample Date:	**02/28/2014 - 03/01/2014**
		Sample Type:	**NPDES**
		Location:	**Outfall**
		Rain Event:	**February 26 - March 2, 2014**
ANALYTE	**UNITS**	**NPDES Permit Limit**	**RESULT**
DIOXINS			
TCDD TEQ_NoDNQ	ug/L	2.80E-08	**1.32E-07**
INORGANICS			
Cadmium	ug/L	4	<0.25
Cadmium, dissolved	ug/L	-/-	<0.25
Copper	ug/L	14	8.2
Copper, dissolved	ug/L	-/-	3.7
Lead	ug/L	5.2	**9.6**
Lead, dissolved	ug/L	-/-	0.51 J (DNQ)
Mercury	ug/L	0.13	<0.10
Mercury, dissolved	ug/L	-/-	<0.10
MISCELLANEOUS			
Total Suspended Solids	mg/L	-/-	120
FIELD MEASUREMENTS			
Temperature	°C	30	12.72 *
pH	SU	6.5-8.5/-	**5.5 ***
RAINFALL MEASUREMENTS			
Intensity (Ave) - Pre-Sampling	in/hr	-/-	0.059
Intensity (Ave) - Rain Event	in/hr	-/-	0.056
Intensity (Max) - Pre-Sampling	in/hr	-/-	0.47
Intensity (Max) - Rain Event	in/hr	-/-	0.47
Total - Pre-Sampling	in	-/-	4.35
Total - Rain Event	in	-/-	4.62
FLOW MEASUREMENTS			
Total Volume - Pre-Sampling	mil gal	-/-	0.49
Total Volume - Event	mil gal	-/-	1.73
Peak Discharge - Pre-Sampling	cfs	-/-	5.161
Peak Discharge - Event	cfs	-/-	5.217
Watershed Inches - Pre-Sampling	in	-/-	0.0009181
Watershed Inches - Event	in	-/-	0.0032346

Notes:

† 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 within Area I.

See Appendix B for explanation of data validation qualifiers.

Table 2-2
ISRA Performance Monitoring Sample Collection Matrix
2013/2014 Rainy Season
Page 1 of 1

Watershed	Object ID	Sample ID	Collection Date	Collection Time	Areas Monitored	Notes	Purpose	Sample Type	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	LXSW0009	LXSW0009S001	02/28/14	13:45	LOX-1B-3	Slope drain outlet, eastern end of sand bag berm; co-located with LXBMP0009	DS	Primary	X	X	X	X	X	X	
009	LXSW0009	LXSW0009S001-RWQCB	02/28/14	13:45	LOX-1B-3	Slope drain outlet, eastern end of sand bag berm; co-located with LXBMP0009	DS	RWQCB Split	X	X	X	X	X	X	
009	APSW0014	APSW0014S001	02/28/14	7:45	All AP/STP	Ash Pile Tributary Drainage	DS	Primary	X	X	X	X	X	X	

Notes:
DS - Downstream
RWQCB - Regional Water Quality Control Board
X - Sample was analyzed

OF008 Sample Totals

Primary - Collected	0
Primary - Analyzed	0
Primary - On Hold	0
RWQCB Split - Collected	0
RWQCB Split - Analyzed	0
RWQCB Split - On Hold	0
Toal Analyzed	**0**

OF009 Sample Totals

Primary - Collected	2
Primary - Analyzed	2
Primary - On Hold	0
RWQCB Split - Collected	1
RWQCB Split - Analyzed	1
RWQCB Split - On Hold	0
Toal Analyzed	**3**

Table 2-3a (LOX)
ISRA Performance Monitoring Sample Results, Outfall 009 Watershed
2013/2014 Rainy Season
Page 1 of 1

		Object Name: Sample Name: Sample Date:	LXSW0009 LXSW0009S001 2/28/2014	LXSW0009 LXSW0009S001-RWQCB 2/28/2014
		Sample Type: Location: Rain Event:	Perf Mon DS LOX February 26 - March 2, 2014	Perf Mon Split DS LOX February 26 - March 2, 2014
ANALYTE	**UNITS**	**NPDES Permit Limit**	**RESULTS**	**RESULTS**
DIOXINS				
TCDD TEQ_NoDNQ	µg/L	2.80E-08	ND	1.26E-08
INORGANICS				
Cadmium	µg/L	4.0	<0.25	<0.017 *
Copper	µg/L	14	4.1	3.0 *
Lead	µg/L	5.2	1.2	0.89 *
Mercury	µg/L	0.13	<0.10	< 0.200*
MISCELANEOUS				
Total Suspended Solids	mg/L	-	24	22.0 *
FIELD MEASUREMENTS				
Conductivity (Field)	mS	-	0.053 *	--
pH (Field)	pH Units	6.5 - 8.5	7.49 *	--
Temperature	°C	30	13.13 *	--
Turbidity (Field)	NTU	-	181 *	--
RAINFALL MEASUREMENTS †				
Intensity (Ave) - Pre-Sampling	in/hr	-	0.074	0.074
Intensity (Ave) - Rain Event	in/hr	-	0.052	0.052
Intensity (Max) - Pre-Sampling	in/hr	-	0.47	0.47
Intensity (Max) - Rain Event	in/hr	-	0.47	0.47
Total - Pre-Sampling	in	-	3.16	3.16
Total - Rain Event	in	-	4.62	4.62

Notes:

* - Data not validated.
Upstream Sample Location
Downstream Sample Location
Results above NPDES Permit Limit in bold with darker shading

† 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.

See Appendix B for explanation of data qualifiers.

Table 2-3b (AP/STP)
ISRA Performance Monitoring Sample Results, Outfall 009 Watershed
2013/2014 Rainy Season

		Object Name: **Sample Name:** **Sample Date:**	**APSW0014** **APSW0014S001** **2/28/2014**
		Sample Type: **Location:** **Rain Event:**	**Perf Mon** **DS AP/STP** **February 26 - March 2, 2014**
ANALYTE	**UNITS**	**NPDES Permit Limit**	**RESULTS**
DIOXINS			
TCDD TEQ_NoDNQ	µg/L	2.80E-08	**2.07E-07**
INORGANICS			
Cadmium	µg/L	4.0	<0.25
Copper	µg/L	14	11
Lead	µg/L	5.2	4.2
Mercury	µg/L	0.13	<0.10
MISCELLANEOUS			
Total Suspended Solids	mg/L	-	35
FIELD MEASUREMENTS			
Conductivity (Field)	mS	-	0.167 *
pH (Field)	pH Units	6.5 - 8.5	**4.96 ***
Temperature	°C	30	12.8 *
Turbidity (Field)	NTU	-	325 *
RAINFALL MEASUREMENTS †			
Intensity (Ave) - Pre-Sampling	in/hr	-	0.074
Intensity (Ave) - Rain Event	in/hr	-	0.052
Intensity (Max) - Pre-Sampling	in/hr	-	0.47
Intensity (Max) - Rain Event	in/hr	-	0.47
Total - Pre-Sampling	in	-	3.16
Total - Rain Event	in	-	4.62

Notes:

* - Data not validated.
Upstream Sample Location
Downstream Sample Location
Results above NPDES Permit Limit in bold with darker shading

† 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.

See Appendix B for explanation of data qualifiers.

Table 3-2
BMP Monitoring Sample Collection Matrix
2013/2014 Rainy Season
Page 1 of 2

Watershed	Object ID	Sample ID	Collection Date	Collection Time	Purpose	Areas Monitored	Notes	Metals (Total Recoverable) (Method 200.7/200.8)	Metals (Total Dissolved) (Method 200.7/2000.8)	Dioxins (Method 1613)	Total Suspended Solids (Method 2540)	Particle Size Distribution (ASTMD422)	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 (Total Dissolved) (Method 200.8)	Lead (Total Dissolved) (Method 200.8)	Cadmium (Total Dissolved) (Method 200.8)	Mercury (Total Dissolved) (Method 245.1)	Comments
009	B1BMP0003	B1BMP0003S011	12/7/2013	9:35	Potential BMP Location	B-1	Culvert inlet near Upper Parking Lot	X	X	X	X	X	X									V1
009	B1BMP0005	B1BMP0005S006	12/7/2013	9:10	US South, Treatment BMP Performance Monitoring	B-1 Media Filter	Upstream south			X	X	X		X	X	X	X	X	X	X	X	V1
009	B1BMP0006	B1BMP0006S007	12/7/2013	10:50	DS, Treatment BMP Performance Monitoring	B-1 Media Filter	Media filter under drains			X	X	X		X	X	X	X	X	X	X	X	V1
009	EVBMP0003	EVBMP0003S010	12/7/2013	10:45	US West, Treatment BMP Performance Monitoring	CM-1	Sheet flow along Area II Road, upstream west			X	X	X		X	X	X	X	X	X	X	X	V1
009	ILBMP0001	ILBMP0001S018	12/7/2013	10:10	Potential BMP Location	IEL	Storm drain discharge under spillway chute	X	X	X	X	X	X									V1
009	LPBMP0002	LPBMP0002S002	12/7/2013	11:10	US, Treatment BMP Location	Lower Lot BMP	Inflow entering cistern; includes Lower Parking Lot sheet flow and flow diverted from IEL storm drain			H	H	H		H	H	H	H	H	H	H	H	1
009	A1BMP0002	A1BMP0002S004	02/28/14	8:00	US South, Treatment BMP Performance Monitoring	CM-9 AILF	AILF tributary drainage			X	X	X		X	X	X	X	X	X	X	X	V1
009	A1BMP0003	A1BMP0003S001	02/28/14	7:45	DS, Treatment BMP Performance Monitoring	CM-9, AILF, IEL, Area II Road	CM-9 under drains			X	X	X		X	X	X	X	X	X	X	X	V1
009	A2BMP0003	A2BMP0003S008	02/28/14	10:15	Potential BMP Location	Wells 13 Road	Tributary drainage	X	X	X	X	X	X									V1
009	A2BMP0005	A2BMP0005S004	02/28/14	9:30	Potential BMP Location	AP/STP, ELV	Tributary drainage	X	X	X	X	X	X									V1
009	A2BMP0007	A2BMP0007S005	02/28/14	8:10	DS, Treatment BMP Performance Monitoring	CM-1	CM-1 culvert outlet			X	X	X		X	X	X	X	X	X	X	X	V1
009	APBMP0001	APBMP0001S003	02/28/14	13:35	Potential BMP Location	Area II Road	Southern asphalt swale	X	X	X	X	X	X									V1
009	B1BMP0003	B1BMP0003S012	02/28/14	7:10	Potential BMP Location	B-1	Culvert inlet near Upper Parking Lot	X	X	X	X	X	X									V1
009	B1BMP0004	B1BMP0004S006	02/28/14	8:05	US North, Treatment BMP Performance Monitoring	B-1 Media Filter	Upstream north			X	X	X		X	X	X	X	X	X	X	X	V1
009	B1BMP0005	B1BMP0005S007	02/28/14	7:25	US South, Treatment BMP Performance Monitoring	B-1 Media Filter	Upstream south			X	X	X		X	X	X	X	X	X	X	X	V1
009	B1BMP0006	B1BMP0006S008	02/28/14	7:35	DS, Treatment BMP Performance Monitoring	B-1 Media Filter	Media filter under drains			X	X	X		X	X	X	X	X	X	X	X	V1
009	B1BMP0007	B1BMP0007S005	02/28/14	9:05	Potential BMP Location	B-1	Tributary drainage downstream of storm drain discharge	X	X	X	X	X	X									V1
009	EVBMP0001	EVBMP0001S009	02/28/14	9:20	Planned BMP Location	ELV	ELV culvert asphalt swale	X	X	X	X	X	X									V1
009	EVBMP0002	EVBMP0002S017	02/28/14	11:50	Planned BMP Location	Helipad	Helipad spillway	X	X	X	X	X	X									V1
009	EVBMP0003	EVBMP0003S011	02/28/14	8:45	US West, Treatment BMP Performance Monitoring	CM-1	Sheet flow along Area II Road, upstream west			X	X	X		X	X	X	X	X	X	X	X	V1
009	EVBMP0007	EVBMP0007S001	02/28/14	9:45	US, Treatment BMP Location	ELV BMP	Sample port in BMP influent pipe prior to "T" connection			X	X	X		X	X	X	X	X	X	X	X	V1
009	EVBMP0008	EVBMP0008S001	02/28/14	10:00	DS, Treatment BMP Performance Monitoring	ELV BMP	Effluent pipeline discharge point			X	X	X		X	X	X	X	X	X	X	X	V1
009	ILBMP0001	ILBMP0001S019	02/28/14	8:45	Potential BMP Location	IEL	Storm drain discharge under spillway chute	X	X	X	X	X	X									V1

Table 3-2
BMP Monitoring Sample Collection Matrix
2013/2014 Rainy Season
Page 2 of 2

Watershed	Object ID	Sample ID	Collection Date	Collection Time	Purpose	Areas Monitored	Notes	Metals (Total Recoverable) (Method 200.7/200.8)	Metals (Total Dissolved) (Method 200.7/2000.8)	Dioxins (Method 1613)	Total Suspended Solids (Method 2540)	Particle Size Distribution (ASTMD422)	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 (Total Dissolved) (Method 200.8)	Lead (Total Dissolved) (Method 200.8)	Cadmium (Total Dissolved) (Method 200.8)	Mercury (Total Dissolved) (Method 245.1)	Comments
009	ILBMP0002	ILBMP0002S010	02/28/14	8:30	US East, Treatment BMP Performance Monitoring	CM-9	Area II Road culvert inlet			X	X	X		X	X	X	X	X	X	X	X	V1
009	LPBMP0002	LPBMP0002S003	02/28/14	8:25	US, Treatment BMP Location	Lower Lot BMP	Inflow entering cistern; includes Lower Parking Lot sheet flow and flow diverted from IEL storm drain			X	X	X		X	X	X	X	X	X	X	X	V1
009	LPBMP0004	LPBMP0004S004	02/28/14	9:20	DS, Treatment BMP Performance Monitoring	Lower Lot BMP	Biofilter effluent pipe (discharge from Biofilter)			X	X	X		X	X	X	X	X	X	X	X	V1
009	LXBMP0009	LXBMP0009S001	02/28/14	14:00	Alternate DS, BMP Performance Monitoring	LOX	Slope drain outlet, eastern end of sand bag berm; co-located with LXSW0009	X	X	X	X	X	X									P
008	HZBMP0003	HZBMP0003S007	03/01/14	10:15	Potential BMP Location	CYN, DRG	CYN/DRG tributary drainage	X	X	X	X	X	X									V1
009	EVBMP0001	EVBMP0001S010	03/01/14	13:15	Planned BMP Location	ELV	ELV culvert asphalt swale	X	X	X	X	X	X									V1

Notes:

1 - Sample not analyzed because associated intermediate and downstream samples were not collected the same day.
H - Sample was collected and put on hold, and not analyzed
X - Sample was analyzed
V1 - Level II validation performed (dioxins)
P - Used results for Cd, Cu, Pb, Hg (all recoverable), Total Suspended Solids and Dioxin analysis from co-located performance monitoring sample.

OF008 Sample Totals

Collected	1
Analyzed	1
On Hold	0
Total Analyzed	**1**

OF009 Sample Totals

Collected	28
Analyzed	27
On Hold	1
Total Analyzed	**27**

Table 3-3
Potential and Planned BMP Monitoring Sample Results, Outfall 009 Watershed
2013/2014 Rainy Season
Page 1 of 4

		Object Name: Sample Name: Sample Date:	B1BMP0003 B1BMP0003S011 12/7/2013	ILBMP0001 ILBMP0001S018 12/7/2013	A2BMP0003 A2BMP0003S008 2/28/2014	A2BMP0005 A2BMP0005S004 2/28/2014	APBMP0001 APBMP0001S003 2/28/2014	B1BMP0003 B1BMP0003S012 2/28/2014	B1BMP0007 B1BMP0007S005 2/28/2014
		Sample Type: Location: Rain Event:	Potential BMP B-1 Upper Parking Lot December 7, 2013	Potential BMP IEL December 7, 2013	Potential BMP AP/STP, ELV, A2LF February 26 - March 2, 2014	Potential BMP AP/STP, ELV February 26 - March 2, 2014	Potential BMP AP/STP, ELV February 26 - March 2, 2014	Potential BMP B-1 Upper Parking Lot February 26 - March 2, 2014	Potential BMP B-1 February 26 - March 2, 2014
ANALYTE	**UNITS**	**NPDES Permit Limit**	**RESULTS**	**RESULTS**	**RESULTS**	**RESULTS**	**RESULTS**	**RESULTS**	**RESULTS**
DIOXINS									
TCDD TEQ_NoDNQ	ug/L	2.80E-08	**5.61E-08**	**1.01E-07**	**4.89E-08**	**1.50E-07**	**5.44E-07**	**3.57E-07**	**1.20E-07**
INORGANICS									
Aluminum	ug/L	-	2100	6000	630 *	1400 *	40000 *	510 *	2600 *
Aluminum, dissolved	ug/L	-	27	170	93 *	76 *	590 *	43 J,DX QP*	350 *
Antimony	ug/L	6.0	0.83	1.6	<0.50 *	<0.50 *	<2.5 *	<0.50 *	<0.50 *
Antimony, dissolved	ug/L	-	<0.50	0.70	<0.50 *	<0.50 *	0.53 J,DX QP*	<0.50 *	<0.50 *
Arsenic	ug/L	-	<7.0	<7.0	<7.0 *	<7.0 *	<7.0 *	<7.0 *	<7.0 *
Arsenic, dissolved	ug/L	-	<7.0	<7.0	<7.0 *	<7.0 *	<7.0 *	<7.0 *	<7.0 *
Barium	mg/L	-	0.060	0.073	0.013 *	0.022 *	0.58 *	0.015 *	0.032 *
Barium, dissolved	mg/L	-	0.010	0.012	0.0083 J,DX QP*	0.0063 J,DX QP*	0.013 *	0.0085 J,DX QP*	0.013 *
Beryllium	ug/L	-	<0.90	<0.90	<0.90 *	<0.90 *	7.4 *	<0.90 *	<0.90 *
Beryllium, dissolved	ug/L	-	<0.90	<0.90	<0.90 *	<0.90 *	<0.90 *	<0.90 *	<0.90 *
Boron	mg/L	1.0	<0.025	<0.025	0.043 J,DX*	0.028 J,DX*	<0.025 *	<0.025 *	0.045 J,DX*
Boron, dissolved	mg/L	-	<0.025	<0.025	0.047 J,DX QP*	0.025 J,DX QP*	<0.025 *	0.026 J,DX QP*	0.045 J,DX QP*
Cadmium	ug/L	4.0	<0.25	1.2	<0.25 *	<0.25 *	<1.3 *	<0.25 *	<0.25 *
Cadmium, dissolved	ug/L	-	<0.25	0.45	<0.25 *	<0.25 *	<0.25 *	<0.25 *	<0.25 *
Chromium	ug/L	-	4.1	8.8	<2.0 *	2.6 J,DX*	47 *	<2.0 *	3.6 J,DX*
Chromium, dissolved	ug/L	-	<2.0	<2.0	<2.0 *	<2.0 *	<2.0 *	<2.0 *	<2.0 *
Cobalt	ug/L	-	<2.0	2.2	<2.0 *	<2.0 *	22 *	<2.0 *	<2.0 *
Cobalt, dissolved	ug/L	-	<2.0	<2.0	<2.0 *	<2.0 *	<2.0 *	<2.0 *	<2.0 *
Copper	ug/L	14	14	**27**	3.5 *	4.4 *	**86 ***	6.1 *	7.5 *
Copper, dissolved	ug/L	-	5.2	13	3.2 MB QP*	3.0 MB QP*	3.5 MB QP*	3.4 MB QP*	5.1 MB QP*
Iron	mg/L	-	2.1	6.2	0.78 *	2.0 *	50 *	0.66 *	2.9 *
Iron, dissolved	mg/L	-	0.036	0.17	0.10 *	0.074 *	0.38 *	0.042 *	0.28 *
Lead	ug/L	5.2	4.9	**12**	1.9 *	4.6 *	**60 ***	1.3 *	2.7 *
Lead, dissolved	ug/L	-	<0.50	<0.50	<0.50 *	<0.50 *	0.50 J,DX QP*	<0.50 *	<0.50 *
Manganese	ug/L	-	37	120	17 J,DX*	41 *	1300 *	17 J,DX*	42 *
Manganese, dissolved	ug/L	-	15	31	<7.0 *	<7.0 *	7.5 J,DX QP*	<7.0 *	<7.0 *
Mercury	ug/L	0.13	<0.10	<0.10	<0.10 *	<0.10 *	**0.45 J,DX***	<0.10 *	<0.10 *
Mercury, dissolved	ug/L	-	<0.10	<0.10	<0.10 *	<0.10 *	<0.10 *	<0.10 *	<0.10 *
Nickel	ug/L	100	4.1	8.4	<2.0 *	2.4 J,DX*	39 *	<2.0 *	3.2 J,DX*
Nickel, dissolved	ug/L	-	<2.0	2.3	2.3 J,DX QP*	<2.0 *	2.0 J,DX QP*	<2.0 *	2.4 J,DX QP*
Selenium	ug/L	-	<0.50	<0.50	<0.50 *	<0.50 *	<2.5 *	<0.50 *	<0.50 *
Selenium, dissolved	ug/L	-	<0.50	<0.50	<0.50 *	<0.50 *	<0.50 *	<0.50 *	<0.50 *
Silver	ug/L	-	<0.50	<0.50	<0.50 *	<0.50 *	<2.5 *	<0.50 *	<0.50 *
Silver, dissolved	ug/L	-	<0.50	<0.50	<0.50 *	<0.50 *	<0.50 *	<0.50 *	<0.50 *
Thallium	ug/L	2.0	<0.50	<0.50	<0.50 *	<0.50 *	<2.5 *	<0.50 *	<0.50 *
Thallium, dissolved	ug/L	-	<0.50	<0.50	<0.50 *	<0.50 *	<0.50 *	<0.50 *	<0.50 *
Vanadium	ug/L	-	9.1	18	<3.0 *	6.2 J,DX*	98 *	<3.0 *	6.8 J,DX*
Vanadium, dissolved	ug/L	-	3.0	3.5	<3.0 *	<3.0 *	3.8 J,DX QP*	<3.0 *	<3.0 *
Zinc	ug/L	-	73	250	14 J,DX MB*	26 MB*	290 MB*	27 MB*	58 MB*
Zinc, Dissolved	ug/L	-	19	150	7.9 J,DX QP*	21 *	11 J,DX QP*	15 J,DX QP*	38 *

Table 3-3
Potential and Planned BMP Monitoring Sample Results, Outfall 009 Watershed
2013/2014 Rainy Season
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		Object Name: Sample Name: Sample Date:	B1BMP0003 B1BMP0003S011 12/7/2013	ILBMP0001 ILBMP0001S018 12/7/2013	A2BMP0003 A2BMP0003S008 2/28/2014	A2BMP0005 A2BMP0005S004 2/28/2014	APBMP0001 APBMP0001S003 2/28/2014	B1BMP0003 B1BMP0003S012 2/28/2014	B1BMP0007 B1BMP0007S005 2/28/2014
		Sample Type: Location: Rain Event:	Potential BMP B-1 Upper Parking Lot December 7, 2013	Potential BMP IEL December 7, 2013	Potential BMP AP/STP, ELV, A2LF February 26 - March 2, 2014	Potential BMP AP/STP, ELV February 26 - March 2, 2014	Potential BMP AP/STP, ELV February 26 - March 2, 2014	Potential BMP B-1 Upper Parking Lot February 26 - March 2, 2014	Potential BMP B-1 February 26 - March 2, 2014
ANALYTE	**UNITS**	**NPDES Permit Limit**	**RESULTS**	**RESULTS**	**RESULTS**	**RESULTS**	**RESULTS**	**RESULTS**	**RESULTS**
MISCELLANEOUS									
Total Suspended Solids	mg/L	-	98	100	13 *	72 *	77 *	20 *	41 *
Turbidity	NTU	-	33 *	95 *	12 *	26 *	340 *	9.9 *	49 *
FIELD MEASUREMENTS									
Conductivity (Field)	mS	-	0.036 *	0.064 *	0.059 *	0.029 *	0.016 *	0.023 *	0.190 *
pH (Field)	pH units	6.5-8.5	**5.95 ***	**5.92 ***	7.24 *	7.50 *	7.90 *	**5.90 ***	6.50 *
Temperature	°C	86	6.66 *	8.51 *	12.86 *	12.87 *	14.37 *	13.95 *	13.72 *
Turbidity (Field)	NTU	-	140 *	290 *	30.3 *	74.1 *	Over Range *	97.3 *	174 *
RAINFALL									
Intensity (Ave) - Pre-Sampling	in/hr	-	0.071	0.073	0.070	0.070	0.073	0.069	0.070
Intensity (Ave) - Rain Event	in/hr	-	0.070	0.070	0.052	0.052	0.052	0.052	0.052
Intensity (Max) - Pre-Sampling	in/hr	-	0.09	0.09	0.47	0.47	0.47	0.47	0.47
Intensity (Max) - Rain Event	in/hr	-	0.09	0.09	0.47	0.47	0.47	0.47	0.47
Total - Pre-Sampling	in	-	0.18	0.23	2.74	2.69	3.11	2.50	2.65
Total - Rain Event	in	-	0.28	0.28	4.62	4.62	4.62	4.62	4.62

Notes:

NR - Not recorded; field meter not functioning properly.
* - Data not validated.

For an explanation of qualifiers, refer to laboratory and data validation reports included in Appendix B.

Results above NPDES Permit Limit in bold and gray shading

† 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 within Area I.

Table 3-3
Potential and Planned BMP Monitoring Sample Results, Outfall 009 Watershed
2013/2014 Rainy Season
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		Object Name: Sample Name: Sample Date:	EVBMP0001 EVBMP0001S009 2/28/2014	EVBMP0002 EVBMP0002S017 2/28/2014	ILBMP0001 ILBMP0001S019 2/28/2014	EVBMP0001 EVBMP0001S010 3/1/2014	HZBMP0003 HZBMP0003S007 3/1/2014
		Sample Type: Location: Rain Event:	Planned BMP ELV, Helipad Road February 26 - March 2, 2014	Planned BMP Helipad February 26 - March 2, 2014	Potential BMP IEL February 26 - March 2, 2014	Planned BMP ELV, Helipad Road February 26 - March 2, 2014	Potential BMP CYN, DRG February 26 - March 2, 2014
ANALYTE	**UNITS**	**NPDES Permit Limit**	**RESULTS**	**RESULTS**	**RESULTS**	**RESULTS**	**RESULTS**
DIOXINS							
TCDD TEQ_NoDNQ	ug/L	2.80E-08	**1.62E-07**	**8.76E-08**	**1.65E-07**	2.48E-08	ND
INORGANICS							
Aluminum	ug/L	-	910 *	380 *	680 *	160 *	120 *
Aluminum, dissolved	ug/L	-	52 *	48 J,DX QP*	45 J,DX QP*	<25 QP*	57 QP*
Antimony	ug/L	6.0	<0.50 *	<0.50 *	2.4 *	<0.50 *	<0.50 *
Antimony, dissolved	ug/L	-	<0.50 *	<0.50 *	2.5 *	<0.50 QP*	<0.50 QP*
Arsenic	ug/L	-	<7.0 *	<7.0 *	<7.0 *	<7.0 *	<7.0 *
Arsenic, dissolved	ug/L	-	<7.0 *	<7.0 *	<7.0 *	<7.0 QP*	<7.0 QP*
Barium	mg/L	-	0.014 *	0.0098 J,DX*	0.017 *	0.012 *	0.013 *
Barium, dissolved	mg/L	-	<0.0060 *	0.0064 J,DX QP*	0.0089 J,DX QP*	0.0098 J,DX QP*	0.011 QP*
Beryllium	ug/L	-	<0.90 *	<0.90 *	<0.90 *	<0.90 *	<0.90 *
Beryllium, dissolved	ug/L	-	<0.90 *	<0.90 *	<0.90 *	<0.90 QP*	<0.90 QP*
Boron	mg/L	1.0	<0.025 *	<0.025 *	<0.025 *	<0.025 *	0.070 *
Boron, dissolved	mg/L	-	<0.025 *	<0.025 *	<0.025 *	<0.025 QP*	0.065 QP*
Cadmium	ug/L	4.0	<0.25 *	<0.25 *	1.3 *	<0.25 *	<0.25 *
Cadmium, dissolved	ug/L	-	<0.25 *	<0.25 *	1.1 *	<0.25 QP*	<0.25 QP*
Chromium	ug/L	-	<2.0 *	<2.0 *	2.3 J,DX*	<2.0 *	<2.0 *
Chromium, dissolved	ug/L	-	<2.0 *	<2.0 *	<2.0 *	<2.0 QP*	<2.0 QP*
Cobalt	ug/L	-	<2.0 *	<2.0 *	<2.0 *	<2.0 *	<2.0 *
Cobalt, dissolved	ug/L	-	<2.0 *	<2.0 *	<2.0 *	<2.0 QP*	<2.0 QP*
Copper	ug/L	14	3.5 *	3.8 *	13 *	2.9 *	2.2 *
Copper, dissolved	ug/L	-	2.6 MB QP*	3.3 MB QP*	13 MB QP*	3.0 QP*	1.7 J,DX QP*
Iron	mg/L	-	1.2 *	0.46 *	0.82 *	0.26 *	0.17 *
Iron, dissolved	mg/L	-	0.050 *	0.039 J,DX QP*	0.051 *	0.057 QP*	0.066 QP*
Lead	ug/L	5.2	3.7 *	2.6 *	3.1 *	1.1 *	<0.50 *
Lead, dissolved	ug/L	-	0.50 J,DX QP*	<0.50 *	<0.50 *	<0.50 QP*	<0.50 QP*
Manganese	ug/L	-	25 *	12 J,DX*	31 *	7.2 J,DX*	10 J,DX*
Manganese, dissolved	ug/L	-	<7.0 *	<7.0 *	16 J,DX QP*	<7.0 QP*	<7.0 QP*
Mercury	ug/L	0.13	**0.14 J,DX***	0.13 J,DX*	**0.18 J,DX***	<0.10 *	<0.10 *
Mercury, dissolved	ug/L	-	<0.10 *	<0.10 *	<0.10 *	<0.10 QP*	<0.10 QP*
Nickel	ug/L	100	<2.0 *	<2.0 *	2.3 J,DX*	<2.0 *	<2.0 *
Nickel, dissolved	ug/L	-	2.0 J,DX QP*	<2.0 *	2.7 J,DX QP*	2.4 J,DX QP*	2.4 J,DX QP*
Selenium	ug/L	-	<0.50 *	<0.50 *	<0.50 *	<0.50 *	<0.50 *
Selenium, dissolved	ug/L	-	<0.50 *	<0.50 *	<0.50 *	<0.50 QP*	<0.50 QP*
Silver	ug/L	-	<0.50 *	<0.50 *	<0.50 *	<0.50 *	<0.50 *
Silver, dissolved	ug/L	-	<0.50 *	<0.50 *	<0.50 *	<0.50 QP*	<0.50 QP*
Thallium	ug/L	2.0	<0.50 *	<0.50 *	<0.50 *	<0.50 *	<0.50 *
Thallium, dissolved	ug/L	-	<0.50 *	<0.50 *	<0.50 *	<0.50 QP*	<0.50 QP*
Vanadium	ug/L	-	4.5 J,DX*	<3.0 *	3.7 J,DX*	<3.0 *	<3.0 *
Vanadium, dissolved	ug/L	-	<3.0 *	<3.0 *	<3.0 *	<3.0 QP*	<3.0 QP*
Zinc	ug/L	-	31 MB*	27 MB*	310 MB*	20 *	11 J,DX*
Zinc, Dissolved	ug/L	-	13 J,DX QP*	21 *	280 *	19 J,DX MB QP*	11 J,DX MB QP*

Table 3-3
Potential and Planned BMP Monitoring Sample Results, Outfall 009 Watershed
2013/2014 Rainy Season
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		Object Name: Sample Name: Sample Date:	EVBMP0001 EVBMP0001S009 2/28/2014	EVBMP0002 EVBMP0002S017 2/28/2014	ILBMP0001 ILBMP0001S019 2/28/2014	EVBMP0001 EVBMP0001S010 3/1/2014	HZBMP0003 HZBMP0003S007 3/1/2014
		Sample Type: Location: Rain Event:	Planned BMP ELV, Helipad Road February 26 - March 2, 2014	Planned BMP Helipad February 26 - March 2, 2014	Potential BMP IEL February 26 - March 2, 2014	Planned BMP ELV, Helipad Road February 26 - March 2, 2014	Potential BMP CYN, DRG February 26 - March 2, 2014
ANALYTE	**UNITS**	**NPDES Permit Limit**	**RESULTS**	**RESULTS**	**RESULTS**	**RESULTS**	**RESULTS**
MISCELLANEOUS							
Total Suspended Solids	mg/L	-	28 *	14 *	16 *	5.3 *	18 *
Turbidity	NTU	-	16 *	12 *	16 *	7.2 *	3.4 *
FIELD MEASUREMENTS							
Conductivity (Field)	mS	-	0.022 *	0.044 *	0.017 *	0.087 *	0.031 *
pH (Field)	pH units	6.5-8.5	7.26 *	8.16 *	**6.12 ***	**5.49 ***	**5.91 ***
Temperature	°C	86	13.00 *	14.02 *	13.97 *	14.80 *	12.35 *
Turbidity (Field)	NTU	-	59.8 *	48.0 *	91.9 *	10.2 *	13.2 *
RAINFALL							
Intensity (Ave) - Pre-Sampling	in/hr	-	0.070	0.068	0.069	0.071	0.070
Intensity (Ave) - Rain Event	in/hr	-	0.052	0.052	0.052	0.052	0.052
Intensity (Max) - Pre-Sampling	in/hr	-	0.47	0.47	0.47	0.47	0.47
Intensity (Max) - Rain Event	in/hr	-	0.47	0.47	0.47	0.47	0.47
Total - Pre-Sampling	in	-	2.67	2.78	2.62	3.02	2.74
Total - Rain Event	in	-	4.62	4.62	4.62	4.62	4.62

Notes:

NR - Not recorded; field meter not functioning properly.
* - Data not validated.

For an explanation of qualifiers, refer to laboratory and data validation reports included in Appendix B.

Results above NPDES Permit Limit in bold and gray shading

† 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 within Area I.

Table 3-4a (B-1 Media Filter)
Treatment BMP Performance Monitoring Sample Results, Outfall 009 Watershed
2013/2014 Rainy Season
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		Object Name:	B1BMP0005	B1BMP0006	B1BMP0004	B1BMP0005	B1BMP0006
		Sample Name:	B1BMP0005S006	B1BMP0006S007	B1BMP0004S006	B1BMP0005S007	B1BMP0006S008
		Sample Date:	12/7/2013	12/7/2013	2/28/2014	2/28/2014	2/28/2014
		Sample Type:	Treatment BMP Perf Mon	Treatment BMP Perf Mon	Treatment BMP Perf Mon	Treatment BMP Perf Mon	Treatment BMP Perf Mon
		Location:	US South (B-1 Media Filter)	DS (B-1 Media Filter)	US North (B-1 Media Filter)	US South (B-1 Media Filter)	DS (B-1 Media Filter)
		Rain Event:	December 7, 2013	December 7, 2013	February 26 - March 2, 2014	February 26 - March 2, 2014	February 26 - March 2, 2014
ANALYTE	**UNITS**	**NPDES Permit Limit**	**RESULTS**	**RESULTS**	**RESULTS**	**RESULTS**	**RESULTS**
DIOXINS							
TCDD TEQ_NoDNQ	ug/L	2.80E-08	ND	ND	**1.95E-07**	2.87E-10	**1.10E-07**
INORGANICS							
Cadmium	ug/L	4.0	<0.25	<0.25	<0.25 *	<0.25 *	<0.25 *
Cadmium, dissolved	ug/L	-	<0.25	<0.25	<0.25 *	<0.25 *	<0.25 *
Copper	ug/L	14	2.7	4.1	3.2 *	2.5 *	2.4 *
Copper, dissolved	ug/L	-	2.1	6.7	2.2 MB QP*	1.6 J,DX MB QP*	2.0 MB QP*
Lead	ug/L	5.2	0.59	0.52	2.5 *	1.8 *	1.9 *
Lead, dissolved	ug/L	-	<0.50	<0.50	<0.50 *	<0.50 *	<0.50 *
Mercury	ug/L	0.13	<0.10	<0.10	<0.10 *	0.10 J,DX*	0.12 J,DX*
Mercury, dissolved	ug/L	-	<0.10	<0.10	<0.10 *	<0.10 *	<0.10 *
MISCELLANEOUS							
Total Suspended Solids	mg/L	-	9.3	5.4	22 *	40 *	21 *
FIELD MEASUREMENTS							
Conductivity (Field)	mS	-	0.082 *	0.550 *	0.06 *	0.017 *	0.031 *
pH (Field)	pH units	6.5-8.5	**4.68 ***	**6.18 ***	**5.86 ***	**5.71 ***	**5.99 ***
Temperature	°C	86	6.53 *	7.86 *	13.69 *	14.17 *	13.88 *
Turbidity (Field)	NTU	-	17.2 *	19 *	68.6 *	103.0 *	50.9 *
RAINFALL							
Intensity (Ave) - Pre-Sampling	in/hr	-	0.067	0.070	0.069	0.069	0.069
Intensity (Ave) - Rain Event	in/hr	-	0.070	0.070	0.052	0.052	0.052
Intensity (Max) - Pre-Sampling	in/hr	-	0.09	0.09	0.47	0.47	0.47
Intensity (Max) - Rain Event	in/hr	-	0.09	0.09	0.47	0.47	0.47
Total - Pre-Sampling	in	-	0.15	0.27	2.58	2.52	2.53
Total - Rain Event	in	-	0.28	0.28	4.62	4.62	4.62

Notes:

* - Data not validated.

Upstream Sample Location
Downstream Sample Location
Results above NPDES Permit Limit in bold and gray shading

† 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.

See Appendix B for explanation of data qualifiers.

Table 3-4b (CM-1)
Treatment BMP Performance Monitoring Sample Results, Outfall 009 Watershed
2013/2014 Rainy Season
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		Object Name: Sample Name: Sample Date:	EVBMP0003 EVBMP0003S010 12/7/2013	A2BMP0007 A2BMP0007S005 2/28/2014	EVBMP0003 EVBMP0003S011 2/28/2014
		Sample Type: Location: Rain Event:	Treatment BMP Perf Mon US West (CM-1) December 7, 2013	Treatment BMP Per Mon DS (CM-1) February 26 - March 2, 2014	Treatment BMP Perf Mon US West (CM-1) February 26 - March 2, 2014
ANALYTE	**UNITS**	**NPDES Permit Limit**	**RESULTS**	**RESULTS**	**RESULTS**
DIOXINS					
TCDD TEQ_NoDNQ	ug/L	2.80E-08	**1.77E-07**	**1.73E-07**	**6.54E-08**
INORGANICS					
Cadmium	ug/L	4.0	<0.25	<0.25 *	<0.25 *
Cadmium, dissolved	ug/L	-	<0.25	<0.25 *	<0.25 *
Copper	ug/L	14	9.0	1.8 J,DX*	2.4 *
Copper, dissolved	ug/L	-	3.4	1.8 J,DX MB QP*	2.0 MB QP*
Lead	ug/L	5.2	**9.0**	1.8 *	1.7 *
Lead, dissolved	ug/L	-	<0.50	<0.50 *	<0.50 *
Mercury	ug/L	0.13	<0.10	<0.10 *	**0.15 J,DX***
Mercury, dissolved	ug/L	-	<0.10	<0.10 *	<0.10 *
MISCELLANEOUS					
Total Suspended Solids	mg/L	-	47	29 *	13 *
FIELD MEASUREMENTS					
Conductivity (Field)	mS	-	0.05 *	0.031 *	0.021 *
pH (Field)	pH units	6.5-8.5	**5.47 ***	**6.27 ***	6.94 *
Temperature	°C	86	7.85 *	13.07 *	13.00 *
Turbidity (Field)	NTU	-	199 *	67.1 *	59.6 *
RAINFALL					
Intensity (Ave) - Pre-Sampling	in/hr	-	0.071	0.069	0.069
Intensity (Ave) - Rain Event	in/hr	-	0.070	0.052	0.052
Intensity (Max) - Pre-Sampling	in/hr	-	0.09	0.47	0.47
Intensity (Max) - Rain Event	in/hr	-	0.09	0.47	0.47
Total - Pre-Sampling	in	-	0.27	2.58	2.62
Total - Rain Event	in	-	0.28	4.62	4.62

Notes:

* - Data not validated.

Upstream Sample Location
Downstream Sample Location
Results above NPDES Permit Limit in bold and gray shading

† 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.

See Appendix B for explanation of data qualifiers.

Table 3-4c (Lower Parking Lot BMP)
Treatment BMP Performance Monitoring Sample Results, Outfall 009 Watershed
2013/2014 Rainy Season
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		Object Name: Sample Name: Sample Date:	LPBMP0002 LPBMP0002S003 2/28/2014	LPBMP0004 LPBMP0004S004 2/28/2014
		Sample Type: Location: Rain Event:	Treatment BMP Perf Mon US (Lower Parking Lot) February 26 - March 2, 2014	Treatment BMP Perf Mon DS (Lower Parking Lot) February 26 - March 2, 2014
ANALYTE	**UNITS**	**NPDES Permit Limit**	**RESULTS**	**RESULTS**
DIOXINS				
TCDD TEQ_NoDNQ	ug/L	2.80E-08	**4.34E-07**	**7.46E-08**
INORGANICS				
Cadmium	ug/L	4.0	0.53 J,DX*	<0.25 *
Cadmium, dissolved	ug/L	-	0.26 J,DX QP*	<0.25 *
Copper	ug/L	14	11 *	6.3 *
Copper, dissolved	ug/L	-	6.7 MB QP*	3.5 MB QP*
Lead	ug/L	5.2	4.2 *	3.4 *
Lead, dissolved	ug/L	-	<0.50 *	0.64 J,DX QP*
Mercury	ug/L	0.13	<0.10 *	<0.10 *
Mercury, dissolved	ug/L	-	<0.10 *	<0.10 *
MISCELLANEOUS				
Total Suspended Solids	mg/L	-	53 *	34 *
FIELD MEASUREMENTS				
Conductivity (Field)	mS	-	0.006 *	0.125 *
pH (Field)	pH units	6.5-8.5	**5.76 ***	7.07 *
Temperature	°C	86	13.65 *	13.43 *
Turbidity (Field)	NTU	-	117 *	123 *
RAINFALL				
Intensity (Ave) - Pre-Sampling	in/hr	-	0.069	0.070
Intensity (Ave) - Rain Event	in/hr	-	0.052	0.052
Intensity (Max) - Pre-Sampling	in/hr	-	0.47	0.47
Intensity (Max) - Rain Event	in/hr	-	0.47	0.47
Total - Pre-Sampling	in	-	2.60	2.67
Total - Rain Event	in	-	4.62	4.62

Notes:

* - Data not validated.

Upstream Sample Location
Intermediate Sample Location
Downstream Sample Location

Results above NPDES Permit Limit in bold and gray shading

† 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.

See Appendix B for explanation of data qualifiers.

Table 3-4d (CM-9)
Treatment BMP Performance Monitoring Sample Results, Outfall 009 Watershed
2013/2014 Rainy Season
Page 1 of 1

		Object Name: Sample Name: Sample Date:	ILBMP0002 ILBMP0002S010 2/28/2014	A1BMP0002 A1BMP0002S004 2/28/2014	A1BMP0003 A1BMP0003S001 2/28/2014
		Sample Type: Location: Rain Event:	Treatment BMP Perf Mon US East (CM-9, IEL, Area II Road) February 26 - March 2, 2014	Treatment BMP Per Mon US (CM-9, AILF) February 26 - March 2, 2014	Treatment BMP Per Mon DS (CM-9, AILF, IEL, Area II Road) February 26 - March 2, 2014
ANALYTE	**UNITS**	**NPDES Permit Limit**	**RESULTS**	**RESULTS**	**RESULTS**
DIOXINS					
TCDD TEQ_NoDNQ	ug/L	2.80E-08	**2.45E-07**	**5.18E-07**	**7.13E-08**
INORGANICS					
Cadmium	ug/L	4.0	0.49 J,DX*	<0.50 *	<0.25 *
Cadmium, dissolved	ug/L	-	0.41 J,DX QP*	0.34 J,DX QP*	<0.25 *
Copper	ug/L	14	8.4 *	**15 ***	6.5 *
Copper, dissolved	ug/L	-	7.0 MB QP*	16 MB QP*	7.0 MB QP*
Lead	ug/L	5.2	**14 ***	<1.0 *	2.3 *
Lead, dissolved	ug/L	-	2.7 *	0.58 J,DX QP*	0.67 J,DX QP*
Mercury	ug/L	0.13	<0.10 *	<0.10 *	<0.10 *
Mercury, dissolved	ug/L	-	<0.10 *	<0.10 *	<0.10 *
MISCELLANEOUS					
Total Suspended Solids	mg/L	-	23 *	4.7 *	10 *
FIELD MEASUREMENTS					
Conductivity (Field)	mS	-	0.087 *	0.182 *	0.147 *
pH (Field)	pH units	6.5-8.5	7.30 *	7.12 *	**6.05 ***
Temperature	°C	86	17.95 *	13.11 *	13.28 *
Turbidity (Field)	NTU	-	59.6 *	10.8 *	35.2 *
RAINFALL					
Intensity (Ave) - Pre-Sampling	in/hr	-	0.069	0.069	0.069
Intensity (Ave) - Rain Event	in/hr	-	0.052	0.052	0.052
Intensity (Max) - Pre-Sampling	in/hr	-	0.47	0.47	0.47
Intensity (Max) - Rain Event	in/hr	-	0.47	0.47	0.47
Total - Pre-Sampling	in	-	2.61	2.57	2.57
Total - Rain Event	in	-	4.62	4.62	4.62

Notes:

* - Data not validated.

Upstream Sample Location
Downstream Sample Location
Results above NPDES Permit Limit in bold and gray shading

† 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.

See Appendix B for explanation of data qualifiers.

Table 3-4e (ELV)
Treatment BMP Performance Monitoring Sample Results, Outfall 009 Watershed
2013/2014 Rainy Season
Page 1 of 1

		Object Name: Sample Name: Sample Date:	EVBMP0007 EVBMP0007S001 2/28/2014	EVBMP0008 EVBMP0008S001 2/28/2014
		Sample Type: Location: Rain Event:	Treatment BMP Perf Mon US (ELV) February 26 - March 2, 2014	Treatment BMP Perf Mon DS (ELV) February 26 - March 2, 2014
ANALYTE	**UNITS**	**NPDES Permit Limit**	**RESULTS**	**RESULTS**
DIOXINS				
TCDD TEQ_NoDNQ	ug/L	2.80E-08	**1.23E-07**	**4.44E-08**
INORGANICS				
Cadmium	ug/L	4.0	<0.25 *	<0.25 *
Cadmium, dissolved	ug/L	-	<0.25 *	<0.25 *
Copper	ug/L	14	5.5 *	2.4 *
Copper, dissolved	ug/L	-	8.7 MB QP*	2.0 MB QP*
Lead	ug/L	5.2	4.1 *	1.9 *
Lead, dissolved	ug/L	-	0.79 J,DX QP*	<0.50 *
Mercury	ug/L	0.13	<0.10 *	<0.10 *
Mercury, dissolved	ug/L	-	<0.10 *	<0.10 *
MISCELLANEOUS				
Total Suspended Solids	mg/L	-	22 *	38 *
FIELD MEASUREMENTS				
Conductivity (Field)	mS	-	0.022 *	0.129 *
pH (Field)	pH units	6.5-8.5	7.68 *	8.23 *
Temperature	°C	86	13.08 *	12.97 *
Turbidity (Field)	NTU	-	98.3 *	148.0 *
RAINFALL				
Intensity (Ave) - Pre-Sampling	in/hr	-	0.070	0.070
Intensity (Ave) - Rain Event	in/hr	-	0.052	0.052
Intensity (Max) - Pre-Sampling	in/hr	-	0.47	0.47
Intensity (Max) - Rain Event	in/hr	-	0.47	0.47
Total - Pre-Sampling	in	-	2.72	2.74
Total - Rain Event	in	-	4.62	4.62

Notes:

* - Data not validated.

Upstream Sample Location
Downstream Sample Location
Results above NPDES Permit Limit in bold and gray shading

† 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.

See Appendix B for explanation of data qualifiers.

Table 3-4f (LOX)
Treatment BMP Performance Monitoring Sample Results, Outfall 009 Watershed
2013/2014 Rainy Season
Page 1 of 1

		Object Name: Sample Name: Sample Date:	LXBMP0009 LXBMP0009S001 2/28/2014	LXSW0009 LXSW0009S001 2/28/2014
		Sample Type: Location: Rain Event:	BMP Perf Mon DS (LOX) February 26 - March 2, 2014	Perf Mon DS (LOX) February 26 - March 2, 2014
ANALYTE	**UNITS**	**NPDES Permit Limit**	**RESULTS**	**RESULTS**
DIOXINS				
TCDD TEQ_NoDNQ	ug/L	2.80E-08	***See LXSW0009S001***	ND
INORGANICS				
Cadmium	ug/L	4.0	***See LXSW0009S001***	<0.25
Cadmium, dissolved	ug/L	-	<0.25 QP*	--
Copper	ug/L	14	***See LXSW0009S001***	4.1
Copper, dissolved	ug/L	-	1.6 J,DX QP*	--
Lead	ug/L	5.2	***See LXSW0009S001***	1.2
Lead, dissolved	ug/L	-	<0.50 QP*	--
Mercury	ug/L	0.13	***See LXSW0009S001***	<0.10
Mercury, dissolved	ug/L	-	<0.10 QP*	--
MISCELLANEOUS				
Total Suspended Solids	mg/L	-	***See LXSW0009S001***	24
FIELD MEASUREMENTS				
Conductivity (Field)	mS	-	0.053 *	0.053 *
pH (Field)	pH units	6.5-8.5	7.49 *	7.49 *
Temperature	°C	86	13.13 *	13.13 *
Turbidity (Field)	NTU	-	181 *	181 *
RAINFALL				
Intensity (Ave) - Pre-Sampling	in/hr	-	0.075	0.074
Intensity (Ave) - Rain Event	in/hr	-	0.052	0.052
Intensity (Max) - Pre-Sampling	in/hr	-	0.47	0.47
Intensity (Max) - Rain Event	in/hr	-	0.47	0.47
Total - Pre-Sampling	in	-	3.23	3.16
Total - Rain Event	in	-	4.62	4.62

Notes:

* - Data not validated.

Upstream Sample Location
Downstream Sample Location
Results above NPDES Permit Limit in bold and gray shading

† 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.

See Appendix B for explanation of data qualifiers.

FIGURES

American Jewish University / BBC

UNDEVELOPED LAND
(BOEING)

NASA
(AREA I)

MRCA/Sage Ranch

9

10

ELV

Area II Landfill

LOX

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

B-1

Area I Landfill

IEL

B515 STP

Ash Pile

12

14

LETF/CTL-1

13

Canyon

Happy Valley South

8

NASA
(AREA II)

BOEING
(AREA I)

N

0 350 700 Feet

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

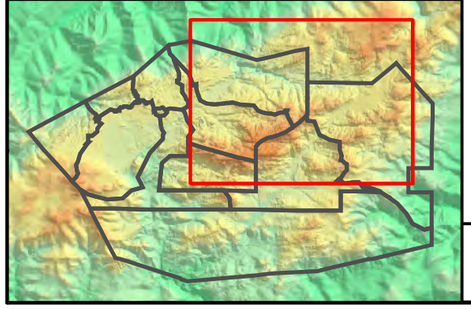
Note:
1. Aerial imagery from 2010 Sage Consulting.
2. Topographic contours from 2010 Sage Consulting.
3. Rationale for discontinuing monitoring at previous sample locations can be found in the text and/or tables of the 2010/2011, 2011/2012, 2012/2013, and 2013/2014 Rainy Season Sampling and Analysis Plan.
4. Inspection/sampling at offsite monitoring locations subject to property owner approval.

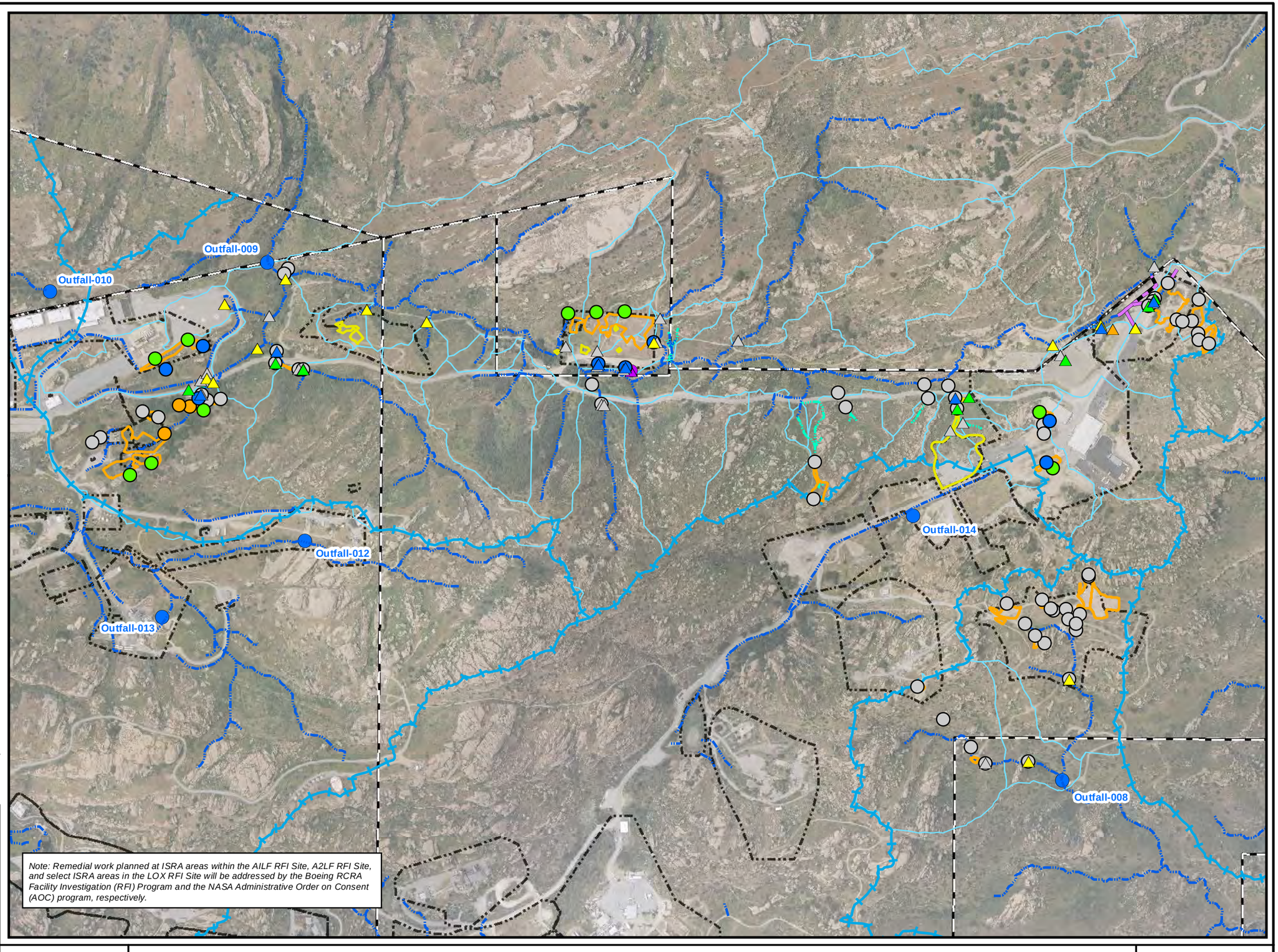
Path: T:\projects\rock3\SRA\Figures\PerfMon\2012-2013 Rainy Season\Overview_11x17_Fig1-2.mxd

Date: 8/27/2014

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.

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SANTA SUSANA FIELD LABORATORY

FIGURE 1-2

BMP Installations 2010-2014
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
- 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:

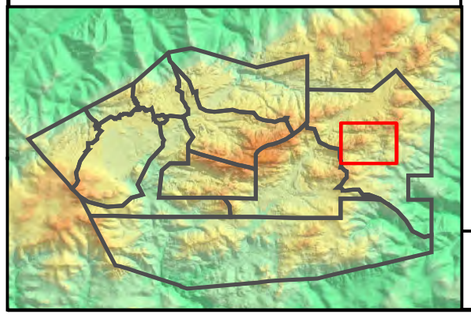
1. Topographic contours from 2010 Sage Consultants, Inc.

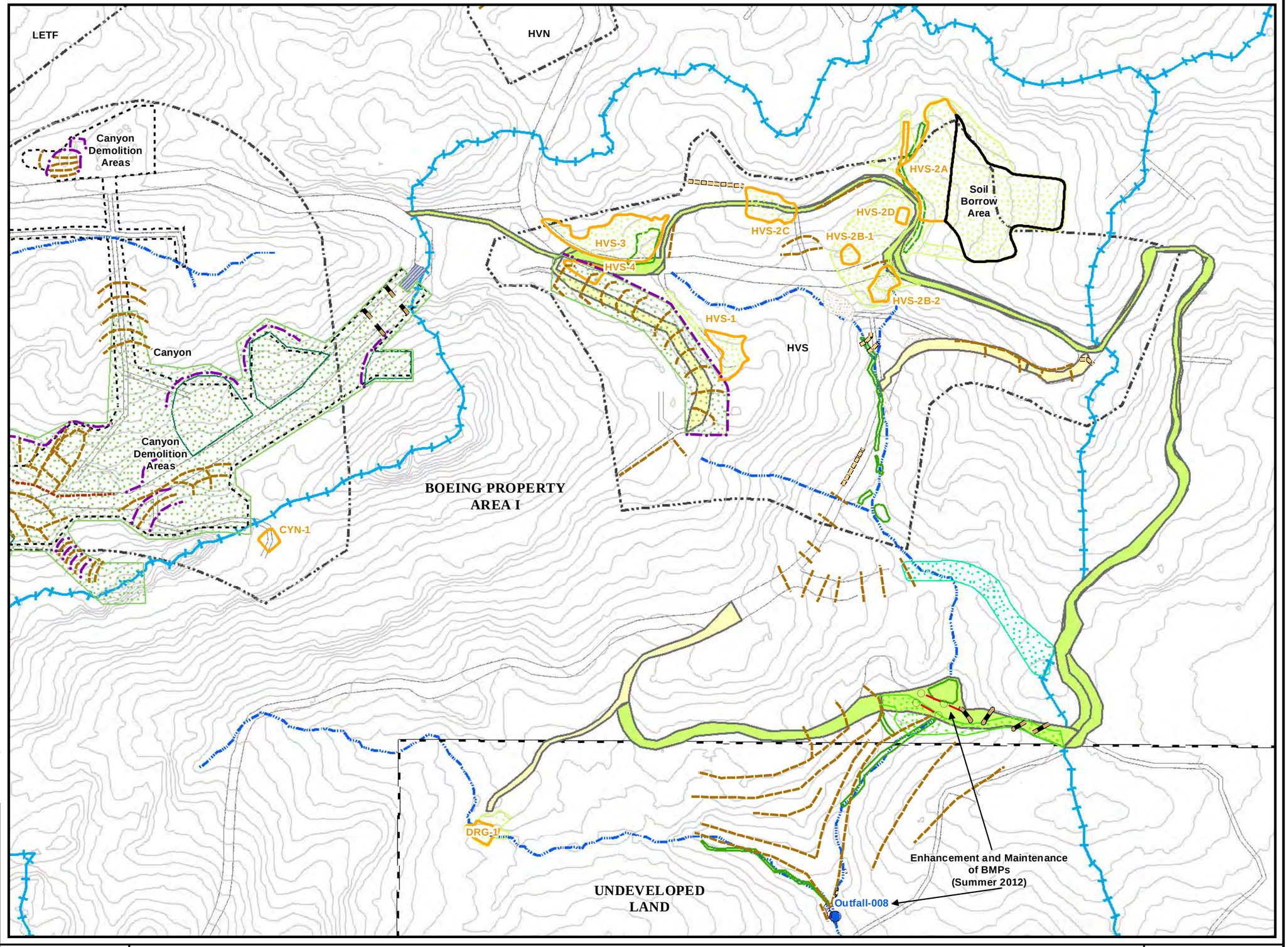
Path: T:\projects\rock3\ISRA\Figures\PhaseIII_Report\Fig1-3_BMP_008.mxd

Date: 8/27/2014

1 inch = 175 feet

0 175 350 Feet





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SANTA SUSANA FIELD LABORATORY

FIGURE 1-3

BMP Installations 2010-2014
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
- 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
- Soil Berm
- Check Dam
- Curb Cut
- Fiber Rolls
- GabionTube Rip Rap
- Pipeline
- Sandbags
- SiltFencing
- Wood Retaining Wall

Figure Notes:

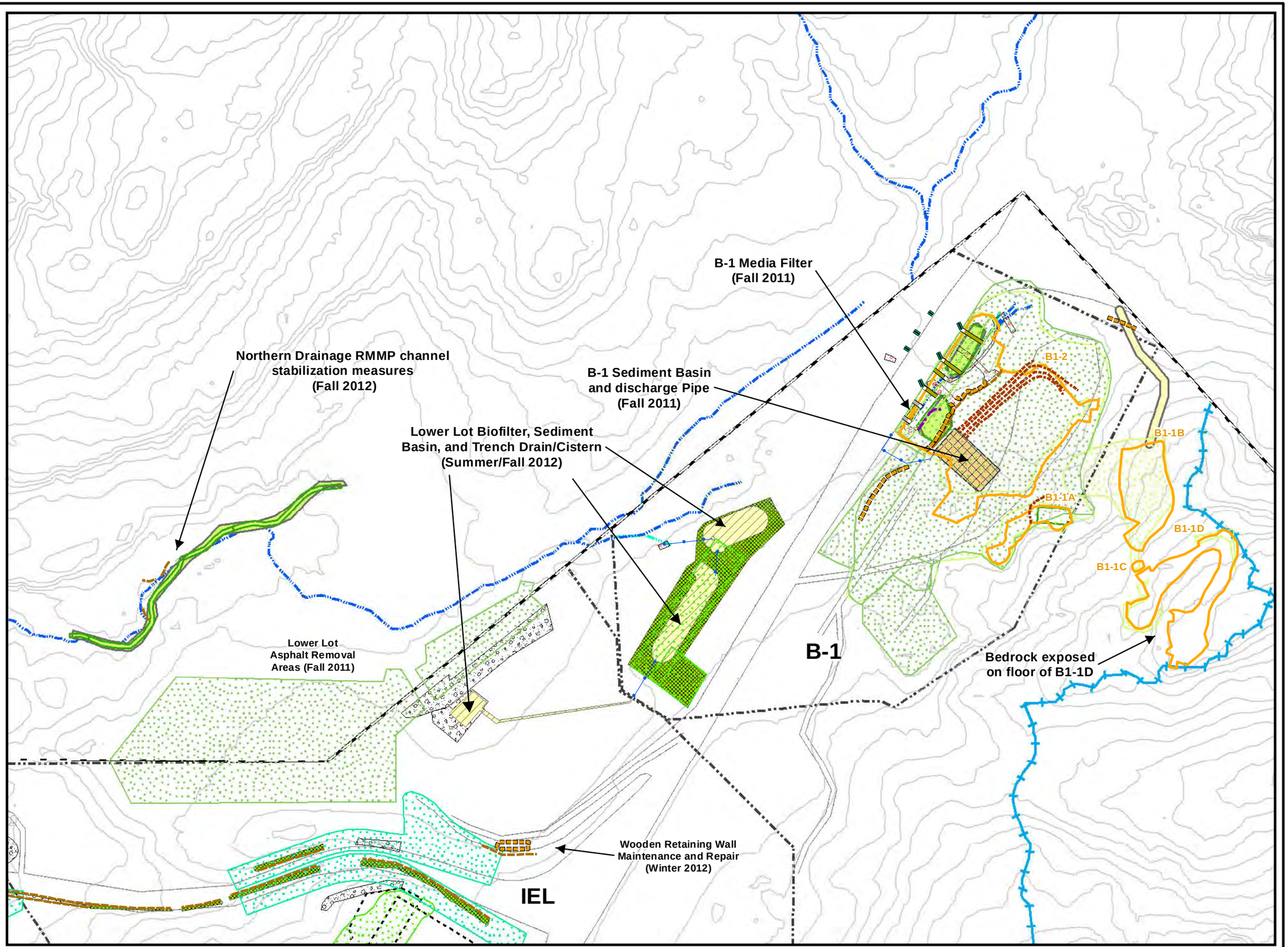
1. Topographic contours from 2010 Sage Consultants, Inc.

Path: T:\projects\rock3\SRA\Figures\PhaseIII_Report\Fig1-4_BMP_B-1.mxd

Date: 8/27/2014

1 inch = 140 feet

0 140 280 Feet



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SANTA SUSANA FIELD LABORATORY

FIGURE 1-4

BMP Installations 2010-2014
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 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.

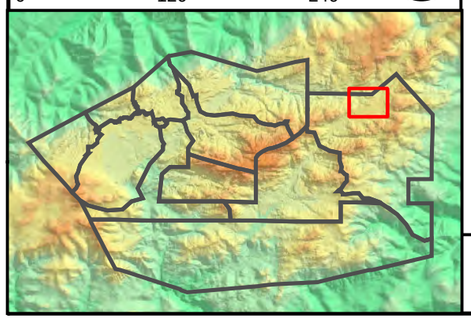
2. Covered the weir boards at CM-1, CM-2, CM-3, CM-4, CM-6, CM-8, CM-9, and CM-10 with filter fabric to facilitate ponding behind the boards and increase flow through filter media beds (Fall 2011).

Path: T:\projects\rock3\ISRA\Figures\PhaseIII_Report\Fig1-5_BMP_AILF_IEL.mxd

Date: 8/27/2014

1 inch = 120 feet

0 120 240 Feet



Lower Lot Asphalt Removal Areas (Fall 2011)

Northern Drainage RMMP channel stabilization measures (Fall 2012)

CM-8

CM-9

Wooden Retaining Wall Maintenance and Repair (Winter 2012)

IEL

Building 1300 Aboveground Demolition Area and Asphalt/Concrete Removal (Summer/Fall 2012)

IEL-3

IEL-1

CM-9 Area BMP Improvements (Fall 2012/Winter 2013)

AILF-2

B1324 Parking Lot Asphalt Removal Area (Fall 2011)

AILF-1

AILF

IEL-2

Building 1436 Demolition and BMP Installation (Summer/Fall 2014)

IEL-2 Soil Borrow Area

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SANTA SUSANA FIELD LABORATORY

FIGURE 1-5

BMP Installations 2010-2014
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.

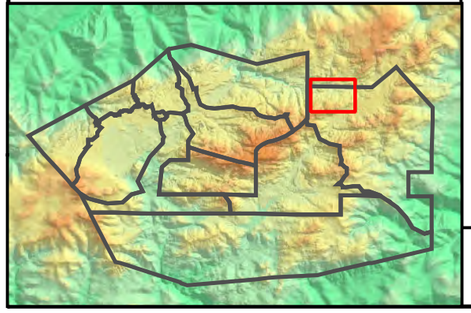
2. Covered the weir boards at CM-1, CM-2, CM-3, CM-4, CM-6, CM-8, CM-9, and CM-10 with filter fabric to facilitate ponding behind the boards and increase flow through filter media beds (Fall 2011).

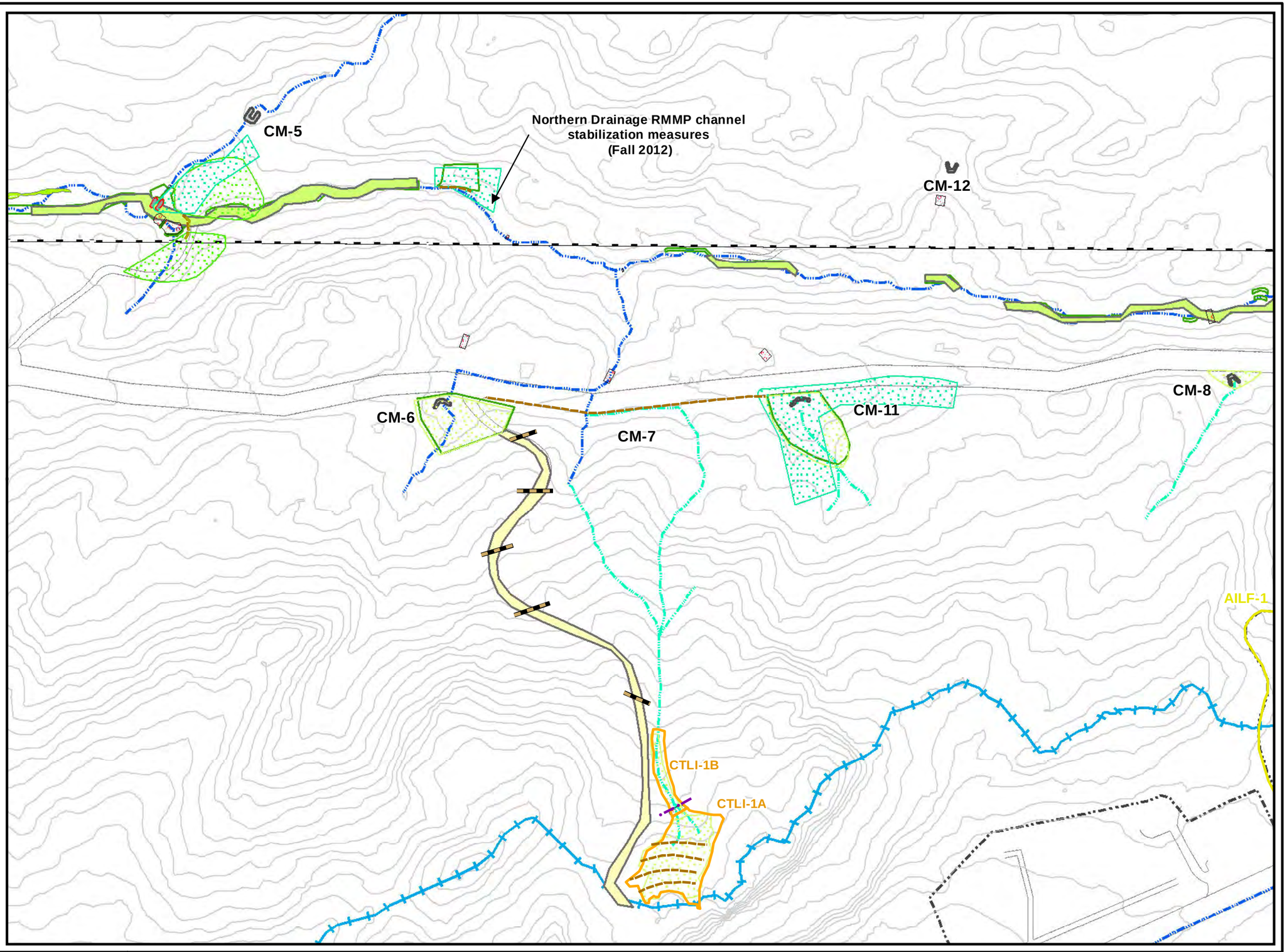
Path: T:\projects\rock3\ISRA\Figures\PhaseIII_Report\Fig1-6_BMP_CTL1.mxd

Date: 8/27/2014

1 inch = 140 feet

0 140 280 Feet





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SANTA SUSANA FIELD LABORATORY

FIGURE 1-6

BMP Installations 2010-2014
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
- 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.

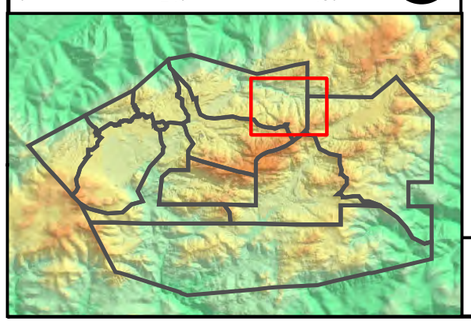
2. Covered the weir boards at CM-1, CM-2, CM-3, CM-4, CM-6, CM-8, CM-9, and CM-10 with filter fabric to facilitate ponding behind the boards and increase flow through filter media beds (Fall 2011).

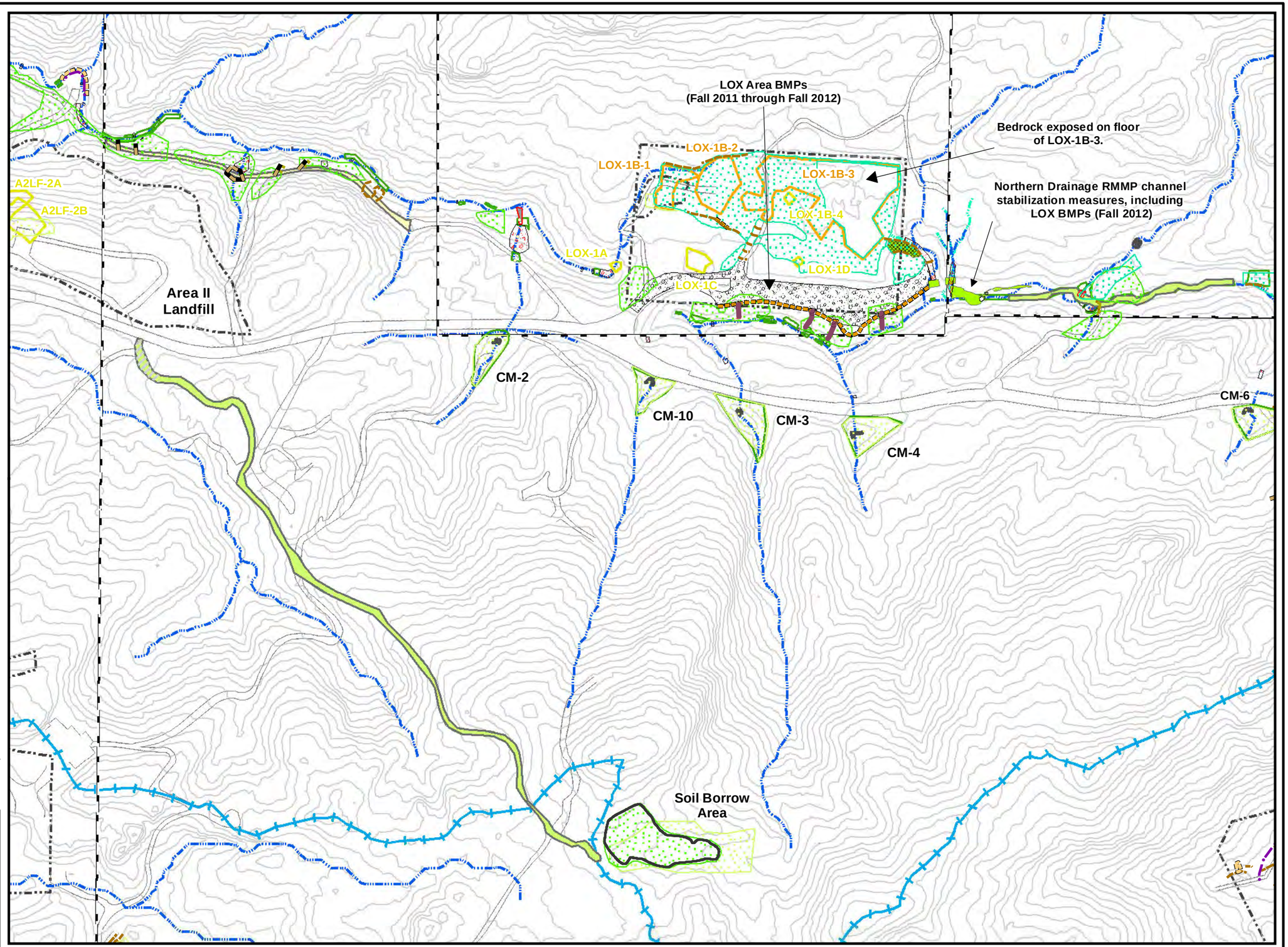
Path: T:\projects\rock3\ISRA\Figures\PhaseII_Report\Fig1-7_BMP_LOX.mxd

Date: 8/27/2014

1 inch = 240 feet

0 240 480 Feet





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SANTA SUSANA FIELD LABORATORY

FIGURE 1-7

BMP Installations 2010-2014
A2LF 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
- Hydroseed 2012/2013
- Hydroseed 2010/2011
- Abandoned Road
- Road Erosion
- Planting Area
- Road Rehab Restoration
- CM
- Rip Rap
- Pump
- Hay Straw Bales
- FiberRolls
- Pipeline
- Rolling Dips
- Sandbags
- Silt Fencing
- Water Gravel Bars

Figure Notes:

1. Topographic contours from 2010 Sage Consultants, Inc.

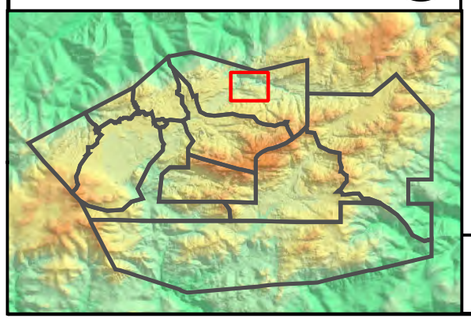
2. Covered the weir boards at CM-1, CM-2, CM-3, CM-4, CM-6, CM-8, CM-9, and CM-10 with filter fabric to facilitate ponding behind the boards and increase flow through filter media beds (Fall 2011).

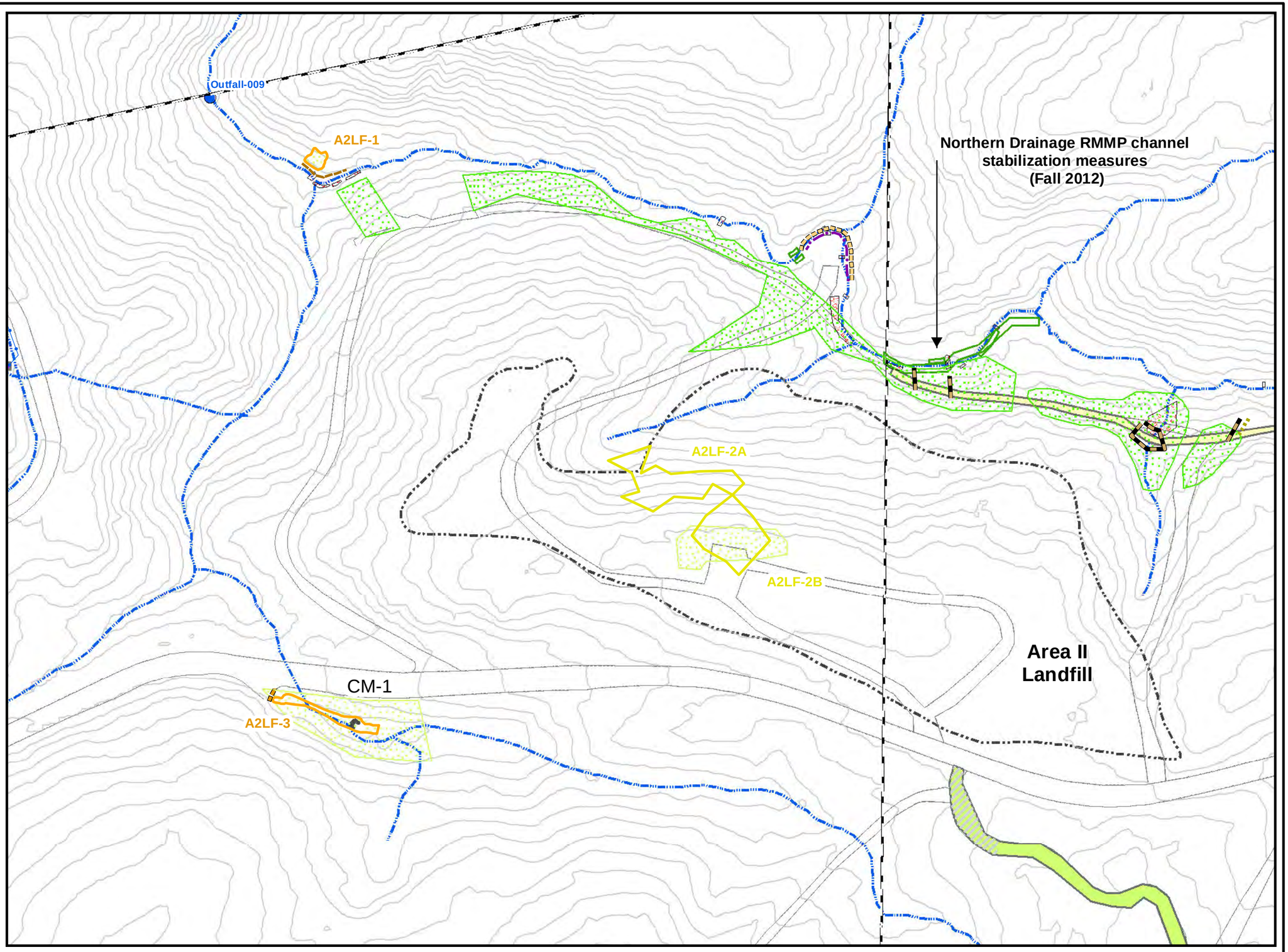
Path: T:\projects\rock3\ISRA\Figures\PhaseIII_Report\Fig1-8_BMP_A2LF.mxd

Date: 8/27/2014

1 inch = 120 feet

0 120 240 Feet





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SANTA SUSANA FIELD LABORATORY

FIGURE 1-8

BMP Installations 2010-2014
AP/STP and ELV Areas
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
- Hydroseed 2013/2014
- Hydroseed 2012/2013
- Hydroseed 2011/2012
- Hydroseed 2010/2011
- Rip Rap
- Retention Sediment Basins
- CM
- Jute Straw Mat
- Abandoned Road
- Gravel
- BMP Tank
- Wet Well Pump
- Pump
- Storage Tank
- Fiber Rolls
- Gravel Bag Berm
- Pipeline
- Sandbags
- Silt Fencing
- Concrete Curb
- Berm Drains
- Percolation Hole

Figure Notes:

1. Topographic contours from 2010 Sage Consultants, Inc

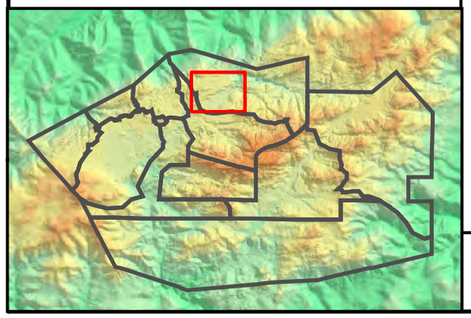
2. Covered the weir boards at CM-1, CM-2, CM-3, CM-4, CM-6, CM-8, CM-9, and CM-10 with filter fabric to facilitate ponding behind the boards and increase flow through filter media beds (Fall 2011).

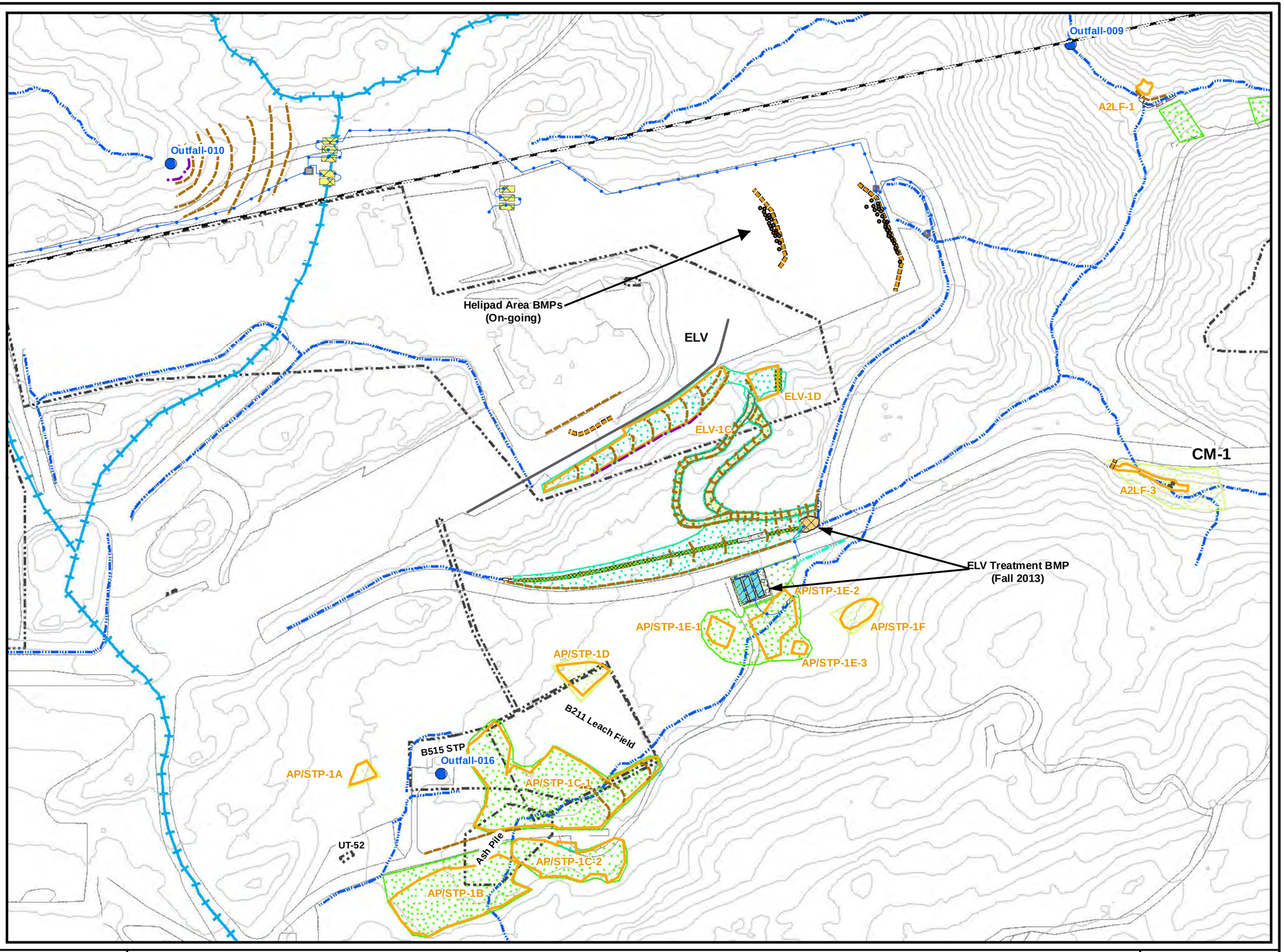
Path: T:\projects\rock3\ISRA\Figures\PhaseII_Report\Fig1-9_BMP_APSTP.mxd

Date: 8/27/2014

1 inch = 170 feet

0 170 340 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 1-9