1. INTRODUCTION

The purpose of this analysis is to rank subareas in the Santa Susana Site (SSS) Outfall 008 and 009 watersheds for potential implementation of new or enhanced stormwater controls[5], to improve National Pollutant Discharge Elimination System (NPDES) permit compliance at Outfalls 008 and 009. The SSS Stormwater Expert Panel's (Panel's) recommended approach[6] is to:

1. Compare potential BMP subarea[7] monitoring results with subarea-specific stormwater background[8] data and NPDES permit limits;

2. Determine pollutant-specific "weighting factors" for each potential BMP subarea monitoring location based on this comparison (using a statistical methodology that accounts for sample size and number of results that are above both of these thresholds), with the highest weighting factors assigned to subareas that most frequently exceed both of these thresholds;

3. Determine multi-constituent ranking "scores" for each subarea based on the pollutant-specific weighting factors; and

4. Rank the potential best management practices (BMPs) monitoring subareas based on these multi-constituent ranking scores.

[5] For the purpose of this report, the overarching term "stormwater controls" will be used to describe the standard suite of passive control practices, including erosion controls, sediment controls, and treatment controls. For detailed definitions or examples of erosion and sediment controls, see the CASQA Construction BMP Handbook at http://www.cabmphandbooks.com; for a detailed definition or examples of treatment controls, see the Ventura County Technical Guidance Manual for Stormwater Quality Control Measures at http://www.vcstormwater.org/documents/workproducts/technicalguidancemanual/2010final/Ventura_TGM%2011-4-10.pdf. The more general term, "Best Management Practice" (or BMP), is used in this report as a synonym for "stormwater control" but is used only for referencing the "potential BMP subarea monitoring locations," or monitoring locations where new stormwater controls are being contemplated based on a review of available monitoring results.

[6] The recommended approach outlined herein was developed jointly by the SSS Stormwater Expert Panel and Geosyntec Consultants, with review from The Boeing Company, NASA, and the Los Angeles Regional Water Quality Control Board.

[7] "Potential BMP subarea monitoring locations" are defined here as drainage areas with an outlet location for stormwater runoff sampling, and including land uses that include ISRA, RCRA Facility Investigation (RFI), and/or developed areas (i.e., subareas containing buildings, asphalt parking lots, roads, etc.) so that impacted runoff quality might be expected and/or treatment BMPs might be necessary, pending an evaluation of the monitoring results.

[8] "Stormwater background monitoring locations" are defined here as locations in these watersheds that generally represent stormwater runoff from unimpacted areas, or areas that do not include ISRA, RFI, or significant development, thereby representing subarea-specific background (or reference) stormwater quality.

This general approach is summarized in the flow chart included as Attachment 1. SSS stormwater background concentrations are established based on data from Interim Source Removal Action (ISRA) performance and potential BMP subarea monitoring locations that represent runoff from drainage areas with minimal to no RCRA Facility Investigations (RFI), ISRA, or developed (i.e., roof or pavement) areas. The selection of potential BMP subarea monitoring locations is described in the December 16, 2010 sampling recommendations memo from the Expert Panel and Geosyntec (Geosyntec, 2010). Although this analysis is based on concentrations and does not account for pollutant load or watershed size, monitoring locations were selected based on the goal of capturing runoff from nearly all known areas of potential anthropogenic pollutant sources within these two watersheds. In cases where the drainage areas are small, they generally include mostly paved surfaces so that runoff volumes are still significant.

The Outfall 008 and 009 watershed monitoring locations used for this BMP evaluation are shown in Table 1. The locations of the monitoring subareas listed in Table 1 are shown in the Attachment 2 map. In Table 1, each subarea is listed with its category (or data type), watershed, co-location (i.e., an alternate subarea identifier for the same location), a location description, and approximate drainage area. Potential BMP subareas include the letters "BMP" in the subarea identifier, while ISRA performance monitoring locations include the letters "SW" in the subarea identifier. At the Expert Panel's recommendation, some ISRA and Culvert Modification (CM) performance monitoring locations are included here for BMP siting consideration, to verify/test the performance of some stormwater controls, and to verify that runoff from below an ISRA area is comparable to the runoff from above the ISRA area. NPDES compliance monitoring outfalls 008 and 009 were also included here for comparison and method testing purposes. The data summarized and their periods of record in this report are as follows:

- ISRA performance monitoring data: 12/2009 – 3/2014
- Culvert modification (CM) performance monitoring data: 12/2009 – 3/2014
- NPDES outfall monitoring data: 10/2004 – 3/2014
- Potential and active BMP subarea monitoring data: 12/2010 – 3/2014

The number of sampling event results currently available for each of the BMP subarea monitoring locations is based on one to nineteen storms sampled depending on the location – this program has been in place since late December 2010, and subareas on Sage Ranch property were not sampled until March 2011. In comparison, the ISRA performance monitoring program has been in place for nearly five wet seasons[9] (2009-2010, 2010-2011, 2011-2012, 2012-2013, and 2013-2014), so these monitoring subareas have more stormwater sample event results available. As such, where available, data from co-located ISRA subareas were combined with data from BMP subareas in order to provide a more robust dataset at potential BMP locations. Additionally, the number of samples collected from subareas within

[9] Measured precipitation varied by wet season, with 15 inches recorded over 2009-2010, 26 inches recorded over 2010-2011, 10 inches recorded over 2011-2012, and only 6.07 inches recorded over 2013-2014.

the 008 watershed (up to 32 samples depending on parameter) is considerably fewer than the number of samples collected in the 009 watershed (up to 71 samples depending on parameter) due in part to fewer events with sufficient runoff to enable sampling. The smaller frequency of runoff in the 008 watershed is likely due to the absence of directly connected impervious areas and hardened conveyance systems (e.g., paved roads, inlets, storm drains, and lined channels). As a result, there are currently significant limitations to the available stormwater background and potential BMP subarea monitoring datasets; consequently, only a limited number of stormwater control recommendations can be made based on available data for the Outfall 008 watershed. This is the final year of this data collection and analysis process.

All stormwater sampling data reported here were provided by MWH and select analytes were validated by qualified lab quality review professionals[10]. All TCDD TEQ results include Bioaccumulation Equivalency Factors (BEFs), consistent with NPDES reporting requirements (see Appendix A of the 2012 BMP Subarea Ranking Analysis memo for more information on the effects of BEFs on calculated TEQ results). For all parameters, lab results that are estimated (or "J-flagged," or results that are above the detection limit but below the reporting limit) are included in the analysis since it is the Expert Panel's view that statistical confidence in these individual results is greater than confidence in the sample summary statistics due to the limited number of data available for many locations (and it is these summary statistics that serve as the basis for the Expert Panel's BMP recommendations).

Although this analysis discusses current treatment controls and focuses on the identification of subareas that may require new treatment controls, 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. The Panel also continues to recommend the

[10] Data validation is the process of evaluating data for program, method and laboratory quality control compliance, and will determine the validity and usability of the data. A Level II validation was performed on all dioxins results for the BMP monitoring program and for dioxins results above the permit limit for the performance monitoring program. In addition, validation was performed to investigate anomalous results at a Level II and validation was performed to investigate the performance of the Dekaport Cone Splitter at a Level IV. A Level II validation involves a review of field methods and a high level review of laboratory methods. The primary purpose of performing a Level II validation on the dioxin results was to address blank contamination and estimated maximum possible concentration (EMPC) values. An EMPC value is assigned to a dioxin isomer when a peak is within the retention time window of a target dioxin or furan isomer; however, at least one of the identification criteria from the method was not met for that peak. Therefore this peak cannot be positively identified as a dioxin or furan. The Level II validation process would evaluate the EMPC values and revise these values to non-detects at either the level of interference or the reporting limit, whichever is higher. A Level IV validation is a definitive evaluation of the data and involves a very detailed review of the field and laboratory processes including the raw data files used to identify and quantitate dioxins and furan. This level of validation requires the validator to reproduce a percentage of the result from the raw data files to ensure that systemic errors or errors of omission or transcription errors are not present in the final reported data.

stabilization of roadways and the implementation of source controls, including source removal, such as through the successful ongoing ISRA program.

This analysis follows prior reports prepared by the Panel on dioxins and metals stormwater background sources at the SSS (SSS Stormwater Expert Panel, 2010; SSS Stormwater Expert Panel, 2009), and is based on the October 2011 BMP Plan for the Outfall 008 and 009 Watersheds (MWH et al., 2011). This analysis is the most refined of several generations of alternatives that were iteratively developed and tested by the Expert Panel and Geosyntec for the selection of potential BMP locations.

Table 1. SSS 008 and 009 Watershed BMP Evaluation Monitoring Subareas (See Attachment 2 for Location Map)[1]

Location Identifier (and Co-location)	Subcategory	Prioritization Category	Watershed	Description	Approximate Upstream Drainage Area (ac)
A1BMP0001	Subarea for BMP Siting Analysis	Subarea for BMP Siting Analysis	Outfall 009	A1LF downstream - OLD	1.2
A1BMP0002 (A1SW0004)	Existing BMP Performance	Subarea for BMP Siting Analysis	Outfall 009	CM-9 upstream toward A1LF (pre-A1LF asphalt removal) - OLD	6.3
A1BMP0002-A (A1SW0004)	Existing BMP Performance	Subarea for BMP Siting Analysis	Outfall 009	CM-9 upstream toward A1LF (post-A1LF asphalt removal)	6.3
A1SW0002	Existing BMP Performance	Onsite SW Background	Outfall 009	Background – CM-8 upstream	2.5
A1SW0003	Existing BMP Performance	Subarea for BMP Siting Analysis	Outfall 009	CM-8 downstream (pre-filter fabric over weir boards) - OLD	2.5
A1SW0003-A	Existing BMP Performance	Subarea for BMP Siting Analysis	Outfall 009	CM-8 downstream (post-filter fabric over weir boards)	2.5
A1SW0005	Existing BMP Performance	Subarea for BMP Siting Analysis	Outfall 009	CM-9 downstream (pre-filter fabric over weir boards) - OLD	16.4
A1SW0005-A	Existing BMP Performance	Subarea for BMP Siting Analysis	Outfall 009	CM-9 downstream (post-filter fabric over weir boards)	16.4
A1SW0006	Existing BMP Performance	Onsite SW Background	Outfall 009	Background – CM-11 upstream	8.3
A1SW0007	Existing BMP Performance	Subarea for BMP Siting Analysis	Outfall 009	CM-11 downstream (pre-filter fabric over weir boards) - OLD	8.3
A1SW0007-A	Existing BMP Performance	Subarea for BMP Siting Analysis	Outfall 009	CM-11 downstream (post-filter fabric over weir boards)	8.3
A1SW0009	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	CM-9 downstream-underdrain outlet (pre-A1LF asphalt removal, pre-filter fabric over weir boards) - OLD	16.4
A1SW0009-A	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	CM-9 downstream-underdrain outlet (post-A1LF asphalt removal, pre-filter fabric over weir boards) - OLD	16.4
A1SW0009-B	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	CM-9 downstream-underdrain outlet (post-filter fabric over weir boards, post-A1LF asphalt removal) - OLD	16.4
A1SW0009-C	ISRA Performance	Subarea for BMP	Outfall 009	CM-9 downstream-underdrain outlet (post-	9.9

Location Identifier (and Co-location)	Subcategory	Prioritization Category	Watershed	Description	Approximate Upstream Drainage Area (ac)
		Siting Analysis		perforated pipe and upper basin installed)	
A2BMP0001	Subarea for BMP Siting Analysis	Subarea for BMP Siting Analysis	Outfall 009	A2 northeast	2.3
A2BMP0002	Subarea for BMP Siting Analysis	Subarea for BMP Siting Analysis	Outfall 009	A2 road runoff	3.6
A2BMP0003	Subarea for BMP Siting Analysis	Subarea for BMP Siting Analysis	Outfall 009	A2 u/s of ND confluence	100
A2BMP0004	Subarea for BMP Siting Analysis	Subarea for BMP Siting Analysis	Outfall 009	Helipad culvert outlet	4.2
A2BMP0005	Subarea for BMP Siting Analysis	Subarea for BMP Siting Analysis	Outfall 009	A2 u/s of CM-1 confluence	35
A2SW0002 (A2BMP0007)	Existing BMP Performance	Subarea for BMP Siting Analysis	Outfall 009	CM-1 effluent (pre-filter fabric over weir boards) - OLD	52.8
A2SW0002-A (A2BMP0007)	Existing BMP Performance	Subarea for BMP Siting Analysis	Outfall 009	CM-1 effluent (post-filter fabric over weir boards)	52.8
A2SW0003	ISRA Performance	Onsite SW Background	Outfall 009	A2LF1 upstream	431.9
A2SW0004	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	A2 downstream	432
APBMP0001	Subarea for BMP Siting Analysis	Subarea for BMP Siting Analysis	Outfall 009	Ashpile culvert/inlet road runoff, pre-ELV improvements- OLD	32.9
APBMP0001-A	Subarea for BMP Siting Analysis	Subarea for BMP Siting Analysis	Outfall 009	Area II road runoff, post-ELV stormwater improvements	0.2
APSW0005	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	AP upstream	0.7
APSW0006	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	AP downstream (pre-ISRA excavation) - OLD	0.6
APSW0006-A	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	AP downstream (post-ISRA excavation)	0.6
APSW0011	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	AP downstream	1.8
APSW0012	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	AP upstream	1.6
APSW0013	ISRA Performance	Subarea for BMP	Outfall 009	AP downstream	34

Location Identifier (and Co-location)	Subcategory	Prioritization Category	Watershed	Description	Approximate Upstream Drainage Area (ac)
(APBMP0002)		Siting Analysis			
APSW0014	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	Surface drainage from Ash Pile/STP areas	32.3
B1BMP0001 (B1SW0010)	Existing BMP Performance	Subarea for BMP Siting Analysis	Outfall 009	B1 media filter inlet (post-media filter installation)	4.5
B1BMP0003 (B1BMP0002)	Existing BMP Performance	Subarea for BMP Siting Analysis	Outfall 009	B1 parking lot / road runoff to culvert inlet	5.2
B1BMP0004 (B1SW0015)	Existing BMP Performance	Subarea for BMP Siting Analysis	Outfall 009	B1 media filter inlet north	3.7
B1BMP0004-5	Existing BMP Performance	Subarea for BMP Siting Analysis	Outfall 009	B1 combined media filter influent	4.5
B1BMP0005 (B1SW0013)	Existing BMP Performance	Subarea for BMP Siting Analysis	Outfall 009	B1 media filter inlet south	0.8
B1BMP0007	Existing BMP Performance	Subarea for BMP Siting Analysis	Outfall 009	B1, vegetated channel	47.7
B1SW0002	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	Woolsey Canyon Road runoff	1.3
B1SW0003	ISRA Performance	Onsite SW Background	Outfall 009	B1 upstream	0.01
B1SW0004	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	B1 downstream (pre-ISRA excavation) - OLD	0.08
B1SW0004-A	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	B1 downstream (post-ISRA excavation)	0.08
B1SW0005	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	B1 downstream (pre-ISRA excavation) - OLD	0.1
B1SW0005-A	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	B1 downstream (post-ISRA excavation)	0.1
B1SW0006	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	B1 downstream (pre-ISRA excavation) - OLD	0.54
B1SW0006-A	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	B1 downstream (post-ISRA excavation)	0.54
B1SW0007	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	B1 downstream	0.75
B1SW0008	ISRA Performance	Subarea for BMP	Outfall 009	B1 upstream	0.79

Location Identifier (and Co-location)	Subcategory	Prioritization Category	Watershed	Description	Approximate Upstream Drainage Area (ac)
		Siting Analysis			
B1SW0009	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	B1 downstream	0.84
B1SW0012	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	B1 north road runoff	0.05
B1SW0014 (B1BMP0006)	Existing BMP Performance	Subarea for BMP Siting Analysis	Outfall 009	B1 culvert effluent (no media filter) - OLD	4.7
B1SW0014-A (B1BMP0006)	Existing BMP Performance	Subarea for BMP Siting Analysis	Outfall 009	B1 media filter effluent (pre-media filter reconstruction) - OLD	4.7
B1SW0014-B (B1BMP0006)	Existing BMP Performance	Subarea for BMP Siting Analysis	Outfall 009	B1 media filter effluent (post-media filter reconstruction) - OLD	4.7
B1SW0014-C (B1BMP0006)	Existing BMP Performance	Subarea for BMP Siting Analysis	Outfall 009	B1 media filter effluent (post-media filter reconstruction, post-curb cuts)	3.6
BGBMP0001 (A2SW0007)	Existing BMP Performance	Onsite SW Background	Outfall 009	Background – CM-1 upstream east tributary	41.1
BGBMP0002 (LXSW0003)	Existing BMP Performance	Onsite SW Background	Outfall 009	Background – CM-3 upstream	17.2
BGBMP0003	Subarea for BMP Siting Analysis	Onsite SW Background	Outfall 009	Background - Sage Ranch near LOX	23.6
BGBMP0004	Subarea for BMP Siting Analysis	Onsite SW Background	Outfall 009	Background - Sage Ranch near CM5	81.4
BGBMP0005	Subarea for BMP Siting Analysis	Onsite SW Background	Outfall 009	Background - Sage Ranch near entrance	25
BGBMP0006 (A2SW0006)	Existing BMP Performance	Subarea for BMP Siting Analysis	Outfall 009	Background – CM-1 upstream east tributary (ponded footprint)	41.1
BGBMP0007 (LXSW0001)	Existing BMP Performance	Onsite SW Background	Outfall 009	Background – CM-3 upstream	17.2
EVBMP0001	Subarea for BMP Siting Analysis	Subarea for BMP Siting Analysis	Outfall 009	ELV culvert inlet (helipad road gutter) - OLD	1.8
EVBMP0001-A	Subarea for BMP Siting Analysis	Subarea for BMP Siting Analysis	Outfall 009	ELV culvert inlet (helipad road and ELV ditch, composite)	2.5
EVBMP0002	Subarea for BMP Siting Analysis	Subarea for BMP Siting Analysis	Outfall 009	Helipad (pre-sandbag berms) - OLD	4.1
EVBMP0002-A	Subarea for BMP Siting	Subarea for BMP	Outfall 009	Helipad (post-sandbag berms) - OLD	4.1

Location Identifier (and Co-location)	Subcategory	Prioritization Category	Watershed	Description	Approximate Upstream Drainage Area (ac)
	Analysis	Siting Analysis			
EVBMP0002-B	Subarea for BMP Siting Analysis	Subarea for BMP Siting Analysis	Outfall 009	Helipad (post-sandbag berms raised, post-drainage holes in asphalt)	4.3
EVBMP0003 (A2SW0001)	Existing BMP Performance	Subarea for BMP Siting Analysis	Outfall 009	CM-1 upstream west	2.3
EVBMP0004	Existing BMP Performance	Subarea for BMP Siting Analysis	Outfall 009	2012-2013 Lower Helipad Road	1.8
EVBMP0005	Existing BMP Performance	Subarea for BMP Siting Analysis	Outfall 009	2012-2013 ELV drainage ditch (pre-ELV-1C ISRA) - OLD	11
EVBMP0005-A	Existing BMP Performance	Subarea for BMP Siting Analysis	Outfall 009	2012-2013 ELV drainage ditch (post-ELV-1C ISRA)	11
EVBMP0006	Existing BMP Performance	Subarea for BMP Siting Analysis	Outfall 009	2012-2013 Area II Road near ELV ditch	11
EVBMP0007	Subarea for BMP Siting Analysis	Subarea for BMP Siting Analysis	Outfall 009	Influent to ELV treatment BMP	55.3
EVBMP0008	Subarea for BMP Siting Analysis	Subarea for BMP Siting Analysis	Outfall 009	Effluent from ELV treatment BMP	55.3
EVSW0001	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	Helipad slope upstream (post-ELV-1C ISRA)	1.2
EVSW0002	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	Helipad slope downstream (post-ELV-1C-ISRA)	1.3
EVSW0003	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	Helipad slope upstream (post-ELV-1D ISRA)	0.3
EVSW0004	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	Helipad slope downstream (post-ELV-1D-ISRA)	0.3
HZBMP0001 (HZSW0007)	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 008	Happy Valley downstream (pre-improvements) - OLD	21.4
HZBMP0001-A (HZSW0007)	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 008	Happy Valley downstream (post-improvements)	20.4
HZBMP0002 (HZSW0004)	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 008	DRG downstream	23.2
HZBMP0003 (HZSW0003)	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 008	DRG downstream (furthest downstream)	29.6
HZSW0001	ISRA Performance	Subarea for BMP	Outfall 008	Happy Valley downstream	<29

Location Identifier (and Co-location)	Subcategory	Prioritization Category	Watershed	Description	Approximate Upstream Drainage Area (ac)
		Siting Analysis			
HZSW0002	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 008	Happy Valley downstream	<29
HZSW0005	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 008	DRG upstream	21
HZSW0006	ISRA Performance	Onsite SW Background	Outfall 008	CYN upstream	NA/small
HZSW0008	ISRA Performance	Onsite SW Background	Outfall 008	Background - Happy Valley upstream	NA/small
HZSW0009	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 008	Happy Valley downstream	0.2
HZSW0010	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 008	Happy Valley downstream	2.2
HZSW0011	ISRA Performance	Onsite SW Background	Outfall 008	Background - Happy Valley upstream	0.1
HZSW0012	ISRA Performance	Onsite SW Background	Outfall 008	Background - Happy Valley upstream	0.4
HZSW0013	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 008	Happy Valley downstream	0.3
HZSW0014	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 008	Happy Valley upstream	0.1
HZSW0015	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 008	Happy Valley downstream	0.4
HZSW0016	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 008	Happy Valley downstream	4.8
HZSW0018	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 008	Happy Valley downstream	1.4
HZSW0019	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 008	CYN downstream	2.6
HZSW0020 (HZSW0017)	ISRA Performance	Onsite SW Background	Outfall 008	Background - Happy Valley upstream	0.2
ILBMP0001	Subarea for BMP Siting Analysis	Subarea for BMP Siting Analysis	Outfall 009	Lower lot 24" stormdrain outlet	23
ILBMP0002	Subarea for BMP Siting	Subarea for BMP	Outfall 009	Road runoff to CM-9	2.5

Location Identifier (and Co-location)	Subcategory	Prioritization Category	Watershed	Description	Approximate Upstream Drainage Area (ac)
	Analysis	Siting Analysis			
ILBMP0003	Subarea for BMP Siting Analysis	Subarea for BMP Siting Analysis	Outfall 009	A1LF parking lot - OLD	9.5
ILSW0001	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	IEL-3 upstream	0.1
ILSW0002	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	IEL-3 downstream (pre-ISRA excavation) - OLD	0.2
ILSW0002-A	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	IEL-1 downstream (post-ISRA excavation)	0.2
ILSW0003	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	IEL-2 upstream	2.4
ILSW0004	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	IEL-2 downstream (pre-ISRA excavation) - OLD	2.8
ILSW0004-A	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	IEL-2 downstream (post-ISRA excavation)	2.8
ILSW0006	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	IEL-3 downstream (pre-ISRA excavation) - OLD	0.4
ILSW0006-A	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	IEL-3 downstream (post-ISRA excavation)	0.4
LFSW0001	ISRA Performance	Onsite SW Background	Outfall 009	CTLI upstream	NA/small
LFSW0002	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	CTLI downstream (pre-ISRA excavation) - OLD	5.1
LFSW0002-A	ISRA Performance	Subarea for BMP Siting Analysis	Outfall 009	CTLI downstream (post-ISRA excavation)	5.1
LPBMP0001	Subarea for BMP Siting Analysis	Subarea for BMP Siting Analysis	Outfall 009	Lower lot sheetflow (pre-gravel bag berms) - OLD	5.1
LPBMP0001-A	Subarea for BMP Siting Analysis	Subarea for BMP Siting Analysis	Outfall 009	Lower lot sheetflow (post-gravel bag berms)	5.1
LPBMP0002	Existing BMP performance	Subarea for BMP Siting Analysis	Outfall 009	Lower parking lot influent to cistern	4.2
LPBMP0003	Existing BMP Performance	Subarea for BMP Siting Analysis	Outfall 009	Lower parking lot sediment basin outlet	4.2
LPBMP0004	Existing BMP	Subarea for BMP	Outfall 009	Lower parking lot biofilter outlet	4.4

Location Identifier (and Co-location)	Subcategory	Prioritization Category	Watershed	Description	Approximate Upstream Drainage Area (ac)
	Performance	Siting Analysis			
LXBMP0001	Subarea for BMP Siting Analysis	Subarea for BMP Siting Analysis	Outfall 009	LOX west - OLD	1.5
LXBMP0002	Subarea for BMP Siting Analysis	Subarea for BMP Siting Analysis	Outfall 009	LOX mid - OLD	1.5
LXBMP0003	Subarea for BMP Siting Analysis	Subarea for BMP Siting Analysis	Outfall 009	LOX east tributary - OLD	0.4
LXBMP0004	Existing BMP Performance	Subarea for BMP Siting Analysis	Outfall 009	LOX southwest downstream of sandbag berm	10.6
LXBMP0005	Existing BMP Performance	Subarea for BMP Siting Analysis	Outfall 009	LOX southeast downstream of sandbag berm	2.5
LXBMP0006 (LXSW0010)	Subarea for BMP Siting Analysis	Subarea for BMP Siting Analysis	Outfall 009	LOX east, runoff along dirt road	0.43
LXBMP0007 (LXSW0007)	Subarea for BMP Siting	Subarea for BMP Siting Analysis	Outfall 009	LOX, inlet to western slope drain	9.8
LXBMP0008 (LXSW0008)	Subarea for BMP Siting	Subarea for BMP Siting Analysis	Outfall 009	LOX, inlet to central slope drain	0.5
LXBMP0009 (LXSW0009)	Subarea for BMP Siting Analysis	Subarea for BMP Siting Analysis	Outfall 009	LOX, inlet to eastern slope drain	0.6
LXSW0002	Existing BMP Performance	Subarea for BMP Siting Analysis	Outfall 009	CM-3 downstream (pre-filter fabric over weir boards) - OLD	17.2
LXSW0002-A	Existing BMP Performance	Subarea for BMP Siting Analysis	Outfall 009	CM-3 downstream (post-filter fabric over weir boards)	17.2
Outfall 008*	NPDES	NPDES Outfall 008	Outfall 008	NPDES Outfall 008	62
Outfall 009*	NPDES	NPDES Outfall 009	Outfall 009	NPDES Outfall 009	536

Notes

- Gray text indicates historic subarea monitoring locations that have been discontinued.
- ([1]) Locations with zero samples collected are excluded from this table.
- (*) NPDES outfall monitoring data are included in this analysis for comparison and method testing purposes only. New stormwater controls are not being contemplated at these locations.

2. DATA SUMMARY

Table 2A summarizes the various monitoring locations that were selected to be representative of stormwater background runoff quality because they represent locations that are not expected to be impacted by historic or ongoing subarea activities. Due to the varying objectives of each of the monitoring programs, not all pollutants of concern (POCs) were sampled at all subareas. For this BMP subarea ranking analysis, the POCs are defined as total suspended solids (TSS), cadmium (Cd), copper (Cu), lead (Pb), mercury (Hg), TCDD TEQ, and 2,3,7,8-TCDD because these constituents have periodically been measured at concentrations above the current NPDES permit limits at the 008 and 009 monitoring stations, with the exception of TSS and 2,3,7,8-TCDD which are without permit limits but are included here as alternative indicators of POC generation. The number of samples for each POC at each stormwater background subarea is summarized in Table 2A. These samples were collected for all events that occurred when flow was observed; few samples were collected due to little flow at many locations because of the unusually dry 2013-2014 season. Also, at the request of the Panel, all but one background location has been discontinued as of this monitoring season. Table 2B provides a similar summary for the locations where control practice needs are being evaluated. A map that shows the locations of the stormwater monitoring subareas is included as Attachment 2.

Table 2A. Stormwater background locations and number of sample results for indicated parameters

SW Background Location (Co-location)	Description	Number of Sample Results for Indicated Parameters						
		TSS	Cd	Cu	Pb	Hg	TCDD TEQ	2,3,7,8-TCDD
A1SW0002	Background – CM-8 upstream	10	0	0	10	0	0	0
A1SW0006	Background – CM-11 upstream	12	0	0	0	0	12	12
BGBMP0001 (A2SW0007)	Background – CM-1 upstream east tributary	4	4	4	4	4	4	4
BGBMP0002 (LXSW0003)	Background – CM-3 upstream	4	4	4	4	4	4	4
BGBMP0003	Background - Sage Ranch near LOX	5	5	5	5	5	5	5
BGBMP0004	Background - Sage Ranch near CM-5	3	3	3	3	3	3	3
BGBMP0005	Background - Sage Ranch near entrance	1	1	1	1	1	1	1
BGBMP0007 (LXSW0001)	Background – CM-3 upstream	7	7	7	7	7	7	7
HZSW0008	Background - Happy Valley upstream	1	0	0	1	0	1	1
HZSW0011	Background - Happy Valley upstream	2	0	2	0	0	2	2
HZSW0012	Background - Happy Valley upstream	1	0	0	1	0	0	0
HZSW0020 (HZSW0017)	Background - Happy Valley upstream	2	0	0	2	0	2	2
Total		**52**	**24**	**26**	**38**	**24**	**41**	**41**

Notes

- Gray text indicates historic subarea monitoring locations that are discontinued.
- Stormwater background locations with zero samples collected are excluded from this table.

Table 2B. Locations where control practices are being evaluated and number of sample results for indicated parameters

Location (Co-Location)	Description	Number of Sample Results for Indicated Parameters						
		TSS	Cd	Cu	Pb	Hg	TCDD TEQ	2,3,7,8-TCDD
A1BMP0001	A1LF downstream - OLD	5	5	5	5	4	5	5
A1BMP0002 (A1SW0004)	CM-9 upstream toward A1LF (pre-A1LF asphalt removal) - OLD	15	15	15	15	15	8	8
A1BMP0002-A (A1SW0004)	CM-9 upstream toward A1LF (post-A1LF asphalt removal)	4	4	4	4	4	3	3
A1SW0003	CM-8 downstream (pre-filter fabric over weir boards) - OLD	10	0	0	10	0	0	0
A1SW0005	CM-9 downstream (pre-filter fabric over weir boards) - OLD	10	10	10	10	10	5	5
A1SW0007	CM-11 downstream (pre-filter fabric over weir boards) - OLD	12	0	0	0	0	12	12
A1SW0009-A	CM-9 downstream-underdrain outlet (post-A1LF asphalt removal, pre-filter fabric over weir boards) - OLD	1	1	1	1	1	1	1
A1SW0009-B	CM-9 downstream-underdrain outlet (post-filter fabric over weir boards, post-A1LF	6	6	6	6	6	5	5

Location (Co-Location)	Description	Number of Sample Results for Indicated Parameters						
		TSS	Cd	Cu	Pb	Hg	TCDD TEQ	2,3,7,8-TCDD
	asphalt removal) - OLD							
A1SW0009-C	CM-9 downstream-underdrain outlet (post-perforated pipe and upper basin installed)	1	1	1	1	1	1	1
A2BMP0002	A2 road runoff	1	1	1	1	1	1	1
A2BMP0003	A2 u/s of ND confluence	8	8	8	8	8	8	8
A2BMP0004	Helipad culvert outlet	3	3	3	3	3	3	3
A2BMP0005	A2 u/s of CM-1 confluence	4	4	4	4	4	4	4
A2SW0002 (A2BMP0007)	CM-1 effluent (pre-filter fabric over weir boards) - OLD	16	0	0	16	0	16	16
A2SW0002-A (A2BMP0007)	CM-1 effluent (post-filter fabric over weir boards)	9	5	5	9	5	9	9
APBMP0001	Ashpile culvert/inlet road runoff, pre-ELV improvements- OLD	2	2	2	2	2	2	2
APBMP0001-A	Area II road runoff, post-ELV stormwater improvements	1	1	1	1	1	1	1
APSW0014	Surface drainage from Ash Pile/STP areas	1	1	1	1	1	1	1
B1BMP0001 (B1SW0010)	B1 media filter inlet (post-media filter installation)	1	1	1	1	1	1	1
B1BMP0003 (B1BMP0002)	B1 parking lot / road runoff to culvert inlet	18	18	18	18	18	18	18
B1BMP0004 (B1SW0015)	B1 media filter inlet north	12	12	12	12	12	12	12
B1BMP0005 (B1SW0013)	B1 media filter inlet south	16	16	16	16	16	16	16
B1BMP0007	B1, vegetated channel	4	4	4	4	4	4	4
B1SW0002	Woolsey Canyon Road runoff	2	2	2	2	2	2	2
B1SW0008	B1 upstream	2	2	0	0	0	2	2
B1SW0014-A (B1BMP0006)	B1 media filter effluent (pre-media filter reconstruction) - OLD	1	1	1	1	1	1	1
B1SW0014-B (B1BMP0006)	B1 media filter effluent (post-media filter reconstruction) - OLD	4	4	4	4	4	3	3
B1SW0014-C (B1BMP0006)	B1 media filter effluent (post-media filter reconstruction, post-curb cuts)	8	8	8	8	8	8	8
BGBMP0006 (A2SW0006)	Background – CM-1 upstream east tributary (ponded footprint)	7	1	1	7	1	7	7
EVBMP0001	ELV culvert inlet (helipad road gutter) - OLD	3	3	3	3	3	3	3
EVBMP0001-A	ELV culvert inlet (helipad road and ELV ditch, composite)	7	7	7	7	7	7	7
EVBMP0002	Helipad (pre-sandbag berms) - OLD	6	6	6	6	6	6	6
EVBMP0002-A	Helipad (post-sandbag berms) - OLD	5	5	5	5	5	5	5
EVBMP0002-B	Helipad (post-sandbag berms raised, post-drainage holes in asphalt)	5	5	5	5	5	5	5
EVBMP0003 (A2SW0001)	CM-1 upstream west	19	11	11	19	11	19	19
EVBMP0004	2012-2013 Lower Helipad Road	3	3	3	3	3	3	3

Location (Co-Location)	Description	Number of Sample Results for Indicated Parameters						
		TSS	Cd	Cu	Pb	Hg	TCDD TEQ	2,3,7,8-TCDD
EVBMP0005	2012-2013 ELV drainage ditch (pre-ELV-1C ISRA) - OLD	2	2	2	2	2	2	2
EVBMP0006	2012-2013 Area II Road near ELV ditch	1	1	1	1	1	1	1
EVBMP0007	Influent to ELV treatment BMP	1	1	1	1	1	1	1
EVBMP0008	Effluent from ELV treatment BMP	1	1	1	1	1	1	1
HZBMP0001 (HZSW0007)	Happy Valley downstream (pre-improvements) - OLD	13	6	13	13	6	12	12
HZBMP0002 (HZSW0004)	DRG downstream	3	4	4	4	4	4	4
HZBMP0003 (HZSW0003)	DRG downstream (furthest downstream)	15	7	15	15	7	15	15
HZSW0005	DRG upstream	1	0	0	0	0	1	1
HZSW0014	Happy Valley upstream	3	0	3	3	0	0	0
ILBMP0001	Lower lot 24" stormdrain outlet	18	18	18	18	18	18	18
ILBMP0002	Road runoff to CM-9	10	10	10	10	10	10	10
ILBMP0003	A1LF parking lot - OLD	4	4	4	4	4	4	4
ILSW0003	IEL-2 upstream	2	2	0	2	2	0	0
ILSW0004-A	IEL-2 downstream (post-ISRA excavation)	1	1	0	1	1	0	0
LFSW0002-A	CTLI downstream (post-ISRA excavation)	3	0	3	3	0	3	3
LPBMP0001	Lower lot sheetflow (pre-gravel bag berms) - OLD	2	2	2	2	2	2	2
LPBMP0001-A	Lower lot sheetflow (post-gravel bag berms)	6	6	6	6	6	6	6
LPBMP0002	Lower parking lot influent to cistern	2	2	2	2	2	2	2
LPBMP0003	Lower parking lot sediment basin outlet	1	1	1	1	1	1	1
LPBMP0004	Lower parking lot biofilter outlet	2	2	2	2	2	2	2
LXBMP0002	LOX mid - OLD	2	2	2	2	2	2	2
LXBMP0003	LOX east tributary - OLD	6	6	6	6	6	6	6
LXBMP0004	LOX southwest downstream of sandbag berm	5	5	5	5	5	5	5
LXBMP0005	LOX southeast downstream of sandbag berm	5	5	5	5	5	5	5
LXBMP0006 (LXSW0010)	LOX east, runoff along dirt road	1	1	1	1	1	1	1
LXBMP0009 (LXSW0009)	LOX, inlet to eastern slope drain	1	1	1	1	1	1	1
LXSW0002	CM-3 downstream (pre-filter fabric over weir boards) - OLD	9	9	9	9	9	9	8
	Total	**352**	**275**	**291**	**338**	**272**	**321**	**320**

Notes

- Gray text indicates historic subarea monitoring locations that are discontinued.
- Locations where control practices are being evaluated where zero samples have been collected are excluded from this table.

Table 3A summarizes the total samples, non-detects (NDs), and J-flagged (DNQ) numbers of observations, along with the minimum, median, and maximum concentration values for each of the POCs for the complete combined stormwater background dataset. TSS values are summarized by watershed as well as combined for both watersheds. All stormwater background mercury and 2,3,7,8-TCDD results are ND. Stormwater background concentration values for POCs that are higher than current permit limits (which apply only at the NPDES compliance outfalls) are highlighted in yellow. These results confirm previous observations by the Expert Panel and others regarding natural background stormwater quality at the SSS that occasionally exceeds NPDES permit limits for some metals (including copper and lead) as well as TCDD TEQ (although the Permit limit is technically applicable to TCDD TEQ, excluding DNQ congener results). Table 3B provides a similar summary for all locations combined where control practices are being evaluated as well as for Outfalls 008 and 009 data.

Table 3A. Stormwater background samples (all subareas combined) – Concentrations (mg/L for TSS, µg/L otherwise)

POC	# Samples	# NDs	# DNQ	Min	Median	95th Percentile	Max	Permit Limit for OF008 & OF009	% Samples Exceeding Permit Limit
TSS - 008	6	0	3	2	17.5	74	76	NA	NA
TSS - 009	46	6	21	<1.0e+00	6.5	75	750	NA	NA
TSS	52	6	24	<1.0e+00	7	79	750	NA	NA
Cadmium	24	21	3	<1.0e-01	<0.1	0.3	0.9	4	0%
Copper	26	0	11	1	2.35	7.3	19	14	4%
Lead	38	5	19	<2.0e-01	0.77	14.3	64	5.2	21%
Mercury	24	24	0	<1.0e-01	<0.1	<0.1	<0.1	0.13	0%
TCDD TEQ[a]	41	12	0	<1.0e-10	4.86E-10	3.32e-07	8.53e-07	2.80e-08	17%
2,3,7,8-TCDD	41	41	0	<5.0e-08	<8.8e-07	<4.7e-06	<5.4e-06	NA	NA

Notes

- (a) Permit limit applies to TCDD TEQ (no DNQ), while this comparison is made with TCDD TEQ (DNQ included).
- No substitution assumptions were made in the attempt to quantify NDs. For example, "< 0.20" refers to a non-detect with a detection limit of 0.20 µg/L.
- RWQCB split sample results excluded. A separate analysis will be provided in the July ISRA/BMP report to compare split results versus primary sample results.
- All data from 'PS_Trigger_Analysis.xlsx'.
- Highlighted values exceed the permit limit for that POC.
- J flagged/DNQ results are included for all POCs.
- With the exception of cadmium, which had all ND or J-flagged/estimated results, assumptions regarding the treatment of J-flag (or DNQ) results do not impact the 95th percentile stormwater background thresholds for any POC.
- Metals results shown here are for the total form only, consistent with the permit limits.

Table 3B. Locations where control practices are being evaluated (all subareas combined) – Concentrations (mg/L for TSS, µg/L otherwise)

POC	# Samples	# NDs	# DNQ	Min	Median	95th Percentile	Max	Permit Limit for OF008 & OF009	% Samples Exceeding Permit Limit
TSS - 008	35	5	8	<1.0e+00	18	404	840	NA	NA
TSS - 009	317	34	55	<1.0e+00	19	272	1800	NA	NA
TSS	352	39	63	<1.0e+00	19	289	1800	NA	NA
Cadmium	275	148	110	<1.0e-01	<0.25	0.7	1.4	4	0%
Copper	291	0	22	0.6	5.1	19	86	14	10%
Lead	338	28	68	<2.0e-01	2.8	24	82	5.2	28%
Mercury	272	257	13	<1.0e-01	<0.1	0.1	1.7	0.13	3%
TCDD TEQ[a]	321	21	0	<1.0e-10	1.1e-07	1.8e-05	2.1e-04	2.8e-08	81%
2,3,7,8-TCDD	320	310	9	<2.0e-08	<1.1e-06	6.3e-06	2.2e-05	NA	NA

Notes

- (a) Permit limit applies to TCDD TEQ (no DNQ), while this comparison is made with TCDD TEQ.
- No substitution assumptions were made in the attempt to quantify NDs. For example, "< 0.20" refers to a non-detect with a detection limit of 0.20 µg/L.
- RWQCB split sample results excluded. A separate analysis will be provided in the July ISRA/BMP report to compare split results versus primary sample results.
- NA = No permit limit is defined for the given POC.
- All data from 'PS_Trigger_Analysis.xlsx'.
- Highlighted values exceed the permit limit for that POC.
- J flagged/DNQ results are included for all POCs.
- With the exception of cadmium, which had all ND or J-flagged/estimated results, assumptions regarding the treatment of J-flag (or DNQ) results do not impact the 95th percentile stormwater background thresholds for any POC.
- Metals results shown here are for the total form only, consistent with the permit limits.

3. STORMWATER BACKGROUND SAMPLE DATA SUMMARY – PARTICULATE STRENGTH

Particulate strength (PS) is a means to normalize stormwater pollutant concentrations by TSS and also indicate the treatability of the constituents. Normalizing pollutant concentrations by TSS is helpful for evaluating locations that have high POC concentrations in the runoff as a result of high TSS concentrations[11]. This is especially true for the POCs that are highly associated with particulates and are not found in significant quantities in dissolved forms. This normalization with TSS was performed here to help identify critical POC source areas that may otherwise have mass discharges diluted by large flows. PS is computed as total POC concentration minus dissolved POC concentration divided by TSS concentration, or the estimated particulate POC mass per mass of suspended solids. PS values have been previously used by the Expert Panel to assess sources of metals in SSS NPDES outfall compliance monitoring data (SSFL Stormwater Expert Panel, 2009).

Calculations of PS are complicated by the fact that some of the dissolved metal data are not available (e.g., for ISRA samples since this monitoring program does not include analyses for dissolved metals); therefore procedures were established to make assumptions in lieu of missing information. These procedures also address situations where total, dissolved, or TSS results are not detected (ND, below the detection limit as reported by the analytical laboratory). The procedure used to calculate PS is described in Section 3 of the 2012 BMP Subarea Ranking Analysis memo (Santa Susana Site Surface Water Expert Panel and Geosyntec Consultants, 2012).

Dissolved metals were only analyzed at 6 of the 12 sampled stormwater background monitoring locations. Four of the remaining six locations are ISRA performance (upstream) sample locations. Therefore, to obtain PS estimates for the ISRA stormwater background locations, dissolved concentrations were estimated by assuming that dissolved fractions (i.e., percentage of the total metal concentration) for each sample was equal to the average dissolved fraction at Outfalls 008 or 009. Dissolved concentrations were then estimated for ISRA stormwater background subareas based on the watershed in which each subarea is located. This methodology was not necessary for the stormwater background subareas, since dissolved metal measurements were available for those locations.

Only samples at Outfalls 008 and 009, where both the total and dissolved concentrations were detectable, were used to determine the average dissolved fractions. These average dissolved fractions used in the PS calculations are shown in Table 4. TCDD TEQ and 2,3,7,8-TCDD are assumed to have a dissolved fraction of zero because of their extremely low solubility and high affinity for solids. Dissolved cadmium was detected once at a single sampling event in the Outfall 008 watershed. At the recommendation of the Expert Panel, the average dissolved fraction of cadmium in the Outfall 008 watershed was computed using the detection limits of the total cadmium analyses as a conservative estimate for dissolved cadmium.

[11] By applying particulate strengths, the Panel is not suggesting that stormwater at SSS be regulated using such metrics, but rather the Panel is recommending the use of this solely as a diagnostic metric for the identification of source areas and for the ranking of potential BMP monitoring subareas for placement of new stormwater controls.

Table 4. Average dissolved fraction of POCs based on all available monitoring data in defined watershed; used in determination of particulate strength when dissolved POC not measured (e.g., ISRA and CM performance monitoring datasets)

POC	Outfall 008			Outfall 009		
	% Dissolved	# Samples	CV	% Dissolved	# Samples	CV
Copper	59	25	0.47	59	215	0.42
Lead	22	12	0.82	16	168	0.85
Cadmium	40	19	NA	55	30	0.41

Notes

- CV = Coefficient of variation
- # samples = samples with both total and dissolved detected and total > dissolved (results with total < dissolved were excluded from the analysis)
- Only one sample in the Outfall 008 watershed was analyzed for dissolved cadmium as of May 2013. Dissolved fraction was estimated based on the detection limits of the total cadmium analyses.

Stormwater background sample PS estimates were computed for the POCs using the method described above. Results are shown in Table 5 for all stormwater background data combined. The 95th percentile and maximum values are generally unaffected by the ND or missing dissolved data assumptions that were made for the PS estimates.

Table 5. Stormwater background results - particulate strength (mg/kg)

POC	# PS results	# NDs	Min	Median	95th Percentile	Max
Cadmium	23	21	ND	ND	ND	11
Copper	21	0	0	79	310	630
Mercury	24	24	ND	ND	ND	ND
Lead	37	5	ND	67	240	340
TCDD TEQ	41	12	ND	5.80e-08	2.90e-05	4.80e-05
TCDD TEQ_NoDNQ	41	34	ND	ND	1.00e-08	1.90e-08
2,3,7,8-TCDD	41	41	ND	ND	ND	ND

Notes

- Cells with ND refer to values based on total concentration non-detect results.
- RWQCB split sample results excluded
- All data from 'PS_Trigger_Analysis.xlsx'
- # NDs reflect the number of non-detects in the total concentration.
- Particulate strength computation: PS = (Total concentration – Dissolved concentration) / Total Suspended Solids
- Five copper samples were reported as having dissolved concentrations greater than total concentrations. These samples were omitted from the analysis.
- One lead sample was reported as having dissolved concentrations greater than total concentrations. This sample was omitted from the analysis.

4. DATA SUMMARY CHARTS

To allow for a visual and probabilistic comparison of the available stormwater sampling data, Figures 2 through 11 show probability plots of the POCs at locations grouped into the following categories:

- Stormwater background
- Potential BMP subarea
- Outfall 008 (for comparison)
- Outfall 009 (for comparison)

  Note: Outfall 008 and 009 results have been separated into pre-2009 and post-2009. Pre-2009 results represent grab samples and post-2009 results represent flow-weighted composite samples.

The x-axes show POC concentrations or PS and the y-axes show the probability of non-exceedance (or probability that values are below) the given x-axis values. The Cunnane equation (Helsel and Hirsch, 1992) was used to compute the plotting positions, and a best-fit line (assuming a lognormal distribution) is shown for the stormwater background data. Note that non-detect results were included in computing the plotting positions, but are not actually plotted (the other data observations are offset in their plotting position to appropriately consider the non-detect data in order to accurately estimate probability values). In general, these plots show that stormwater background concentrations frequently exceed[12] NPDES permit limits for lead (~18% probability) and TCDD TEQ (~18% probability, although this estimated probability is zero when DNQ results are excluded), and infrequently for copper (~1% probability), but do not exceed the NPDES permit limits for cadmium. The 2,3,7,8-TCDD charts show very few data points because this congener is so rarely detected. Also, most of these 2,3,7,8-TCDD detections are lab estimates (i.e., DNQ) and not quantified at high reliability values. 2,3,7,8-TCDD was also never detected in a stormwater background sample. Furthermore, **dioxin congener DNQ results are included for this analysis in contrast to NPDES reporting practice which does not include DNQs, therefore the NPDES outfall results that are shown above the permit limit here do not reflect past NPDES exceedances at concentrations shown.**

Figure 1 provides a key for the POC probability charts. The yellow-orange area includes observations that were less than background conditions, but still exceeded the permit limits. The blue area includes observations that were less than both the stormwater background best-fit line and the permit limit. The red area includes data that exceeded both the stormwater background conditions and permit limits, while the purple area includes observations that exceeded the stormwater background conditions but

[12] The term "exceed" is being used here as a statistical term only of the likely probability of occurrence. It is only accurate if the data perfectly matched the statistical distribution, which is rare. It indicates values that are greater than a given threshold. It is not intended to have regulatory or non-compliance implications. This is particularly true for TCDD TEQ data which include DNQ results here for statistical analysis purposes, in contrast to NPDES compliance assessment procedures, which require greater reliability for reporting and do not include DNQ results.

not the permit limits. Fundamentally, the question is which subareas most likely contribute to downstream permit limit exceedances as a result of elevated POC concentrations that are most likely due to particulate strengths that are above subarea-specific background levels? These subareas will be identified by potential BMP subarea stormwater sampling results that fall to the right of the Permit limit in the concentration chart (red and orange areas) **and** fall to the right of the stormwater background best-fit line on the particulate strength chart (in the purple and red areas), or in other words, those samples and subareas which may contribute to downstream permit limit exceedances but their elevated POC concentrations are most likely due to particulate strengths that are above subarea-specific stormwater background levels. As will be discussed later in this report, the subareas with data that fall within the red area will receive the highest scores for prioritizing subareas for new or enhanced stormwater controls. Depending on the results for other POCs at an evaluation location, data within the purple and yellow-orange areas may also become a factor in prioritizing potential BMP subareas.

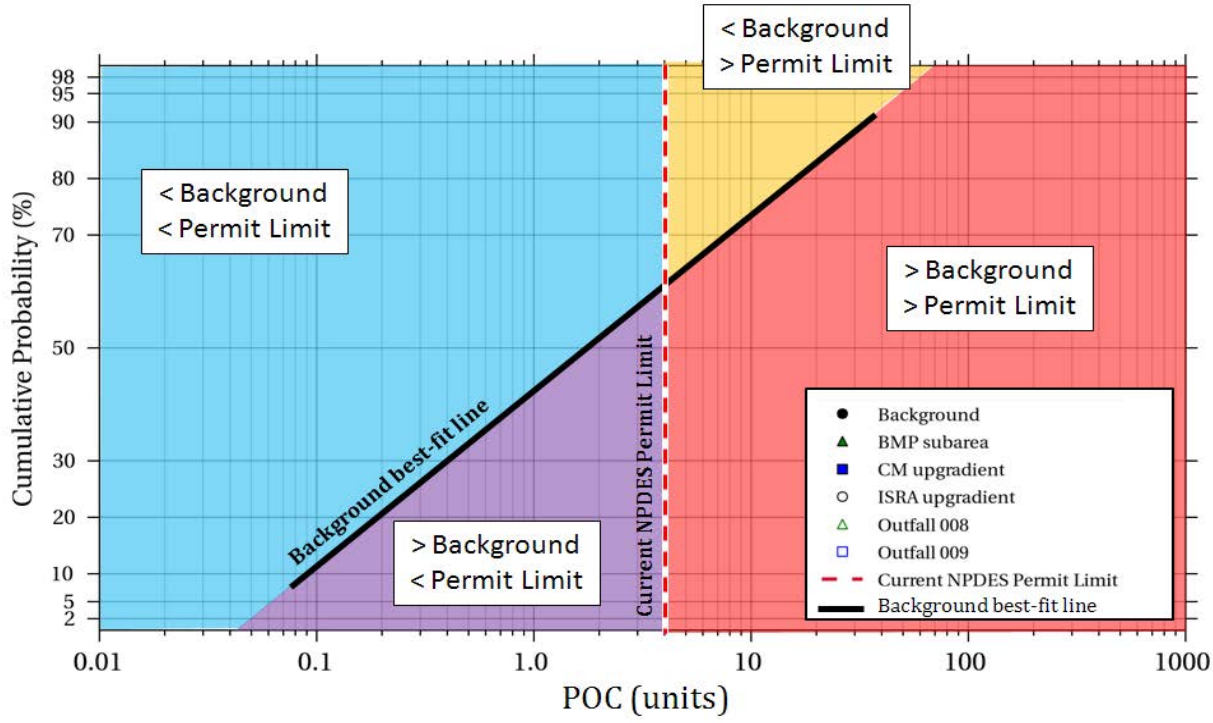


Figure 1. Probability plot key

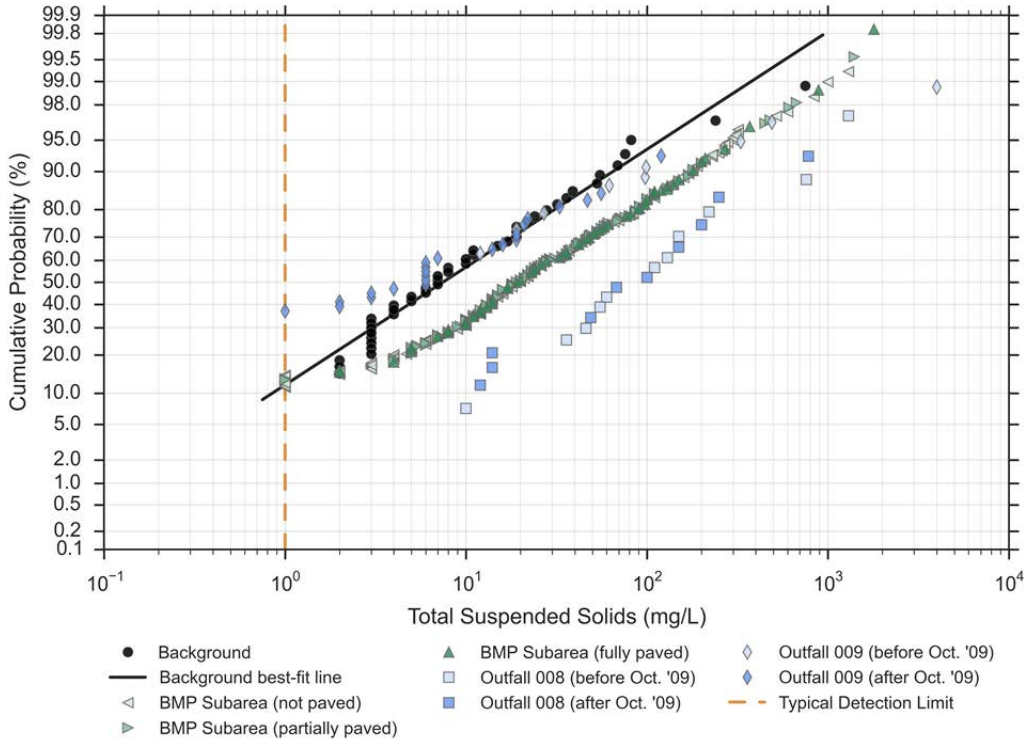


Figure 2. Probability plot for TSS concentrations[13]

[13] Note: Following the 2005 wildfire, an uncharacteristically high TSS value (4000 mg/L) was measured at Outfall 009 on 10/17/2005. This data point is shown near the upper right corner of Figure 2.

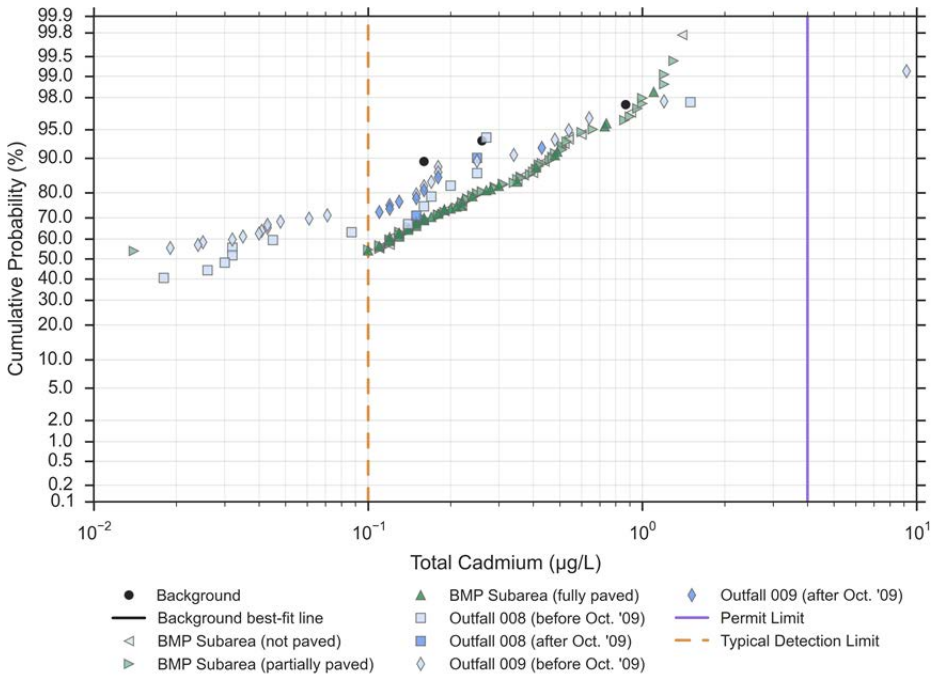


Figure 3. Probability plot for cadmium concentrations[14, 15]

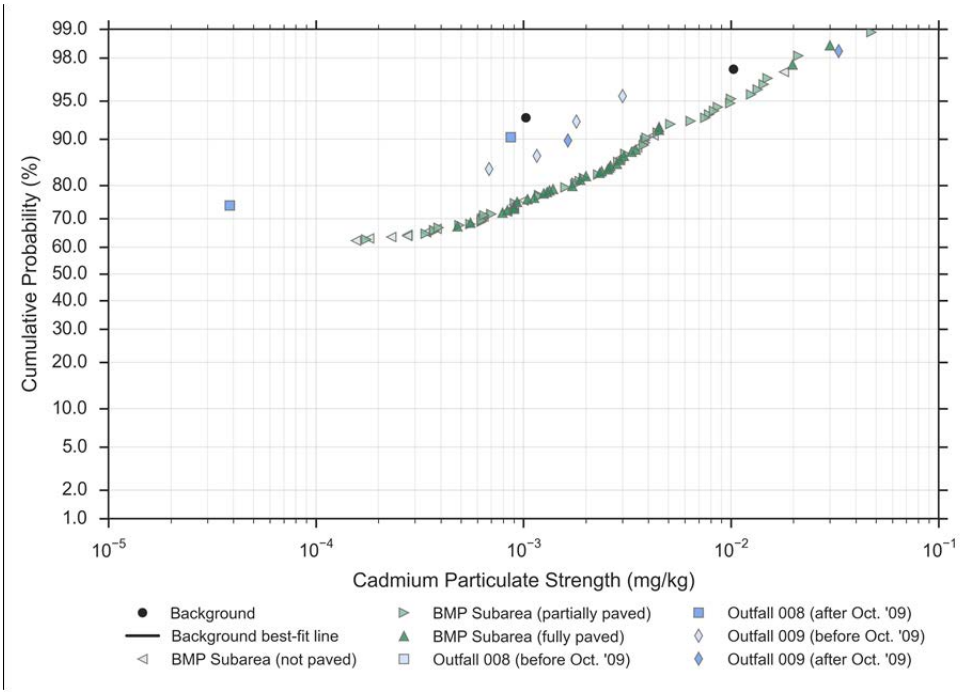


Figure 4. Probability plot for cadmium particulate strengths

[14] Following the 2005 wildfires, an uncharacteristically high cadmium concentration (9.2 µg/L) was measured at Outfall 009 on 10/17/2005. This data point is shown in the upper right corner of Figure 3.

[15] A background best-fit line was not provided for total cadmium due to the limited number of detected results.

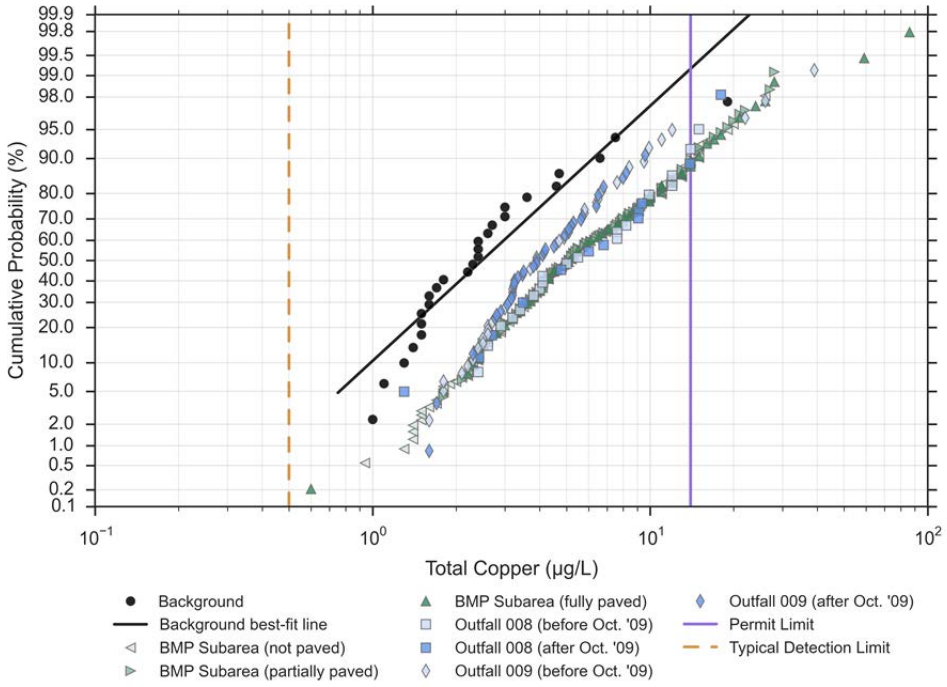


Figure 5. Probability plot for copper concentrations[16]

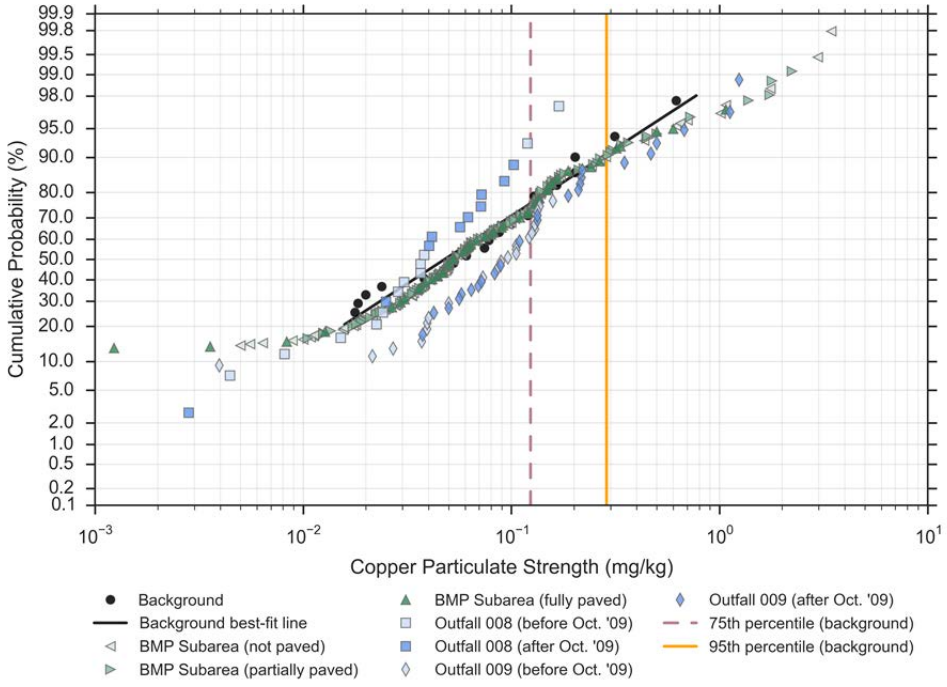


Figure 6. Probability plot for copper particulate strengths

[16] Following the 2005 wildfires, an uncharacteristically high copper concentration (212 µg/L) was measured at Outfall 009 on 10/17/2005. This data point is shown near the upper right corner of Figure 5.

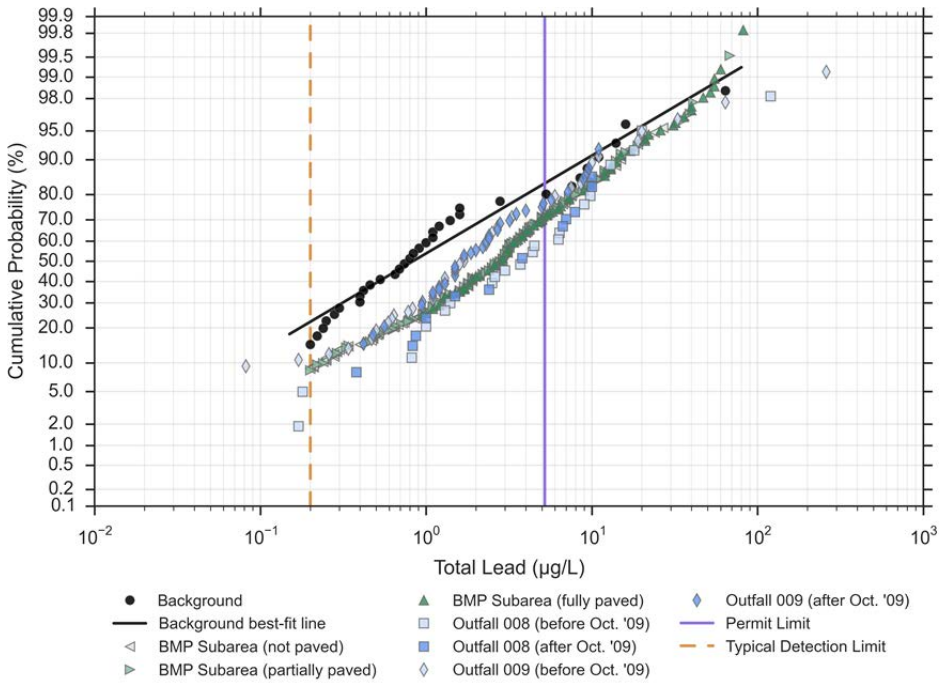


Figure 7. Probability plot for lead concentrations[17]

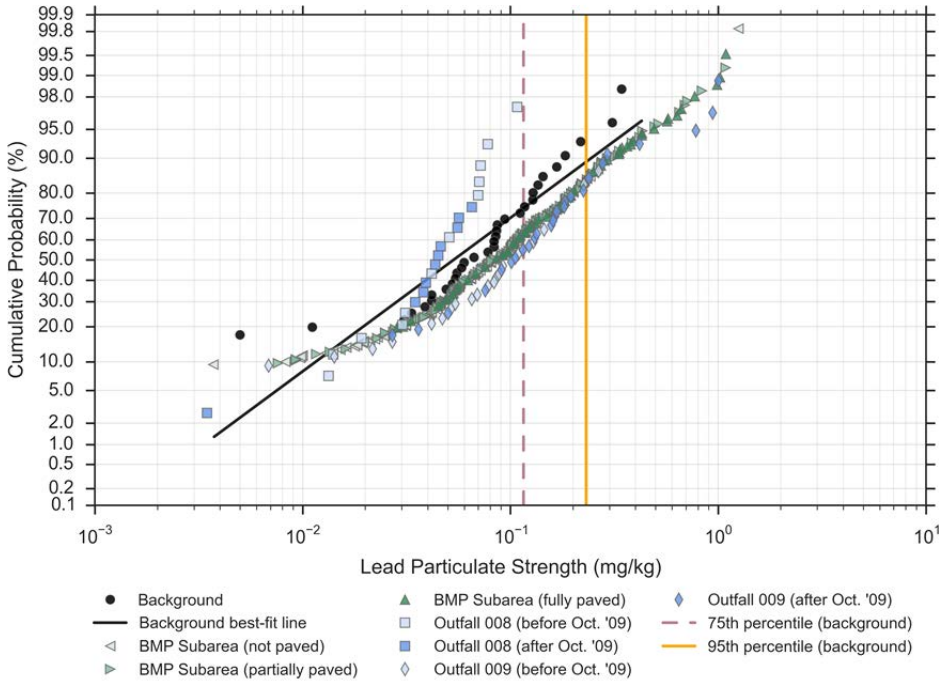


Figure 8. Probability plot for lead particulate strengths

[17] Following the 2005 wildfires, an uncharacteristically high lead concentration (260 µg/L) was measured at Outfall 009 on 10/17/2005. This data point is shown near the upper right corner of Figure 7.

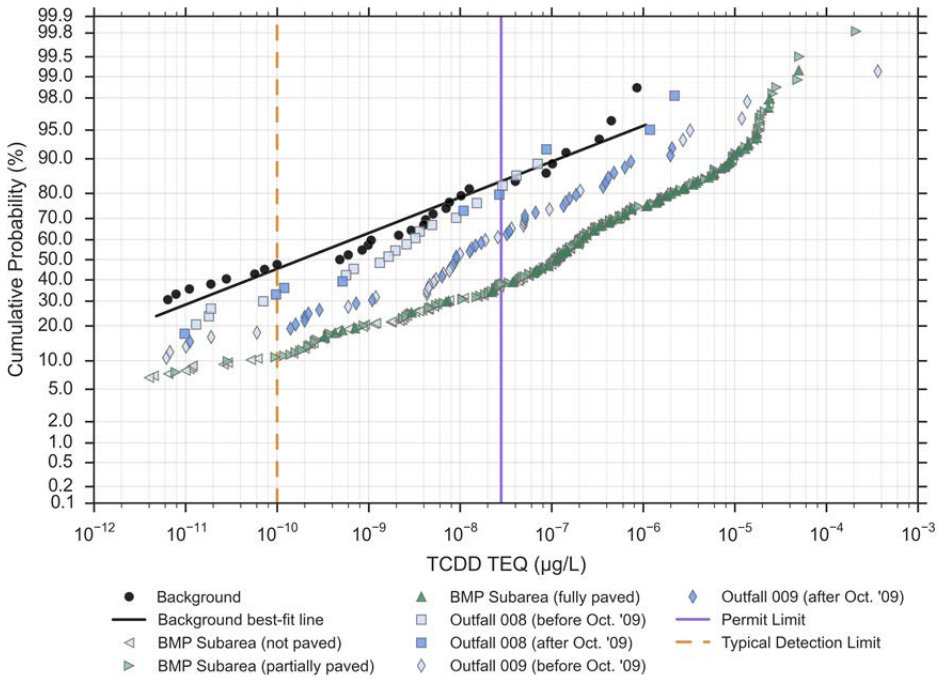


Figure 9. Probability plot for TCDD TEQ concentrations[18]

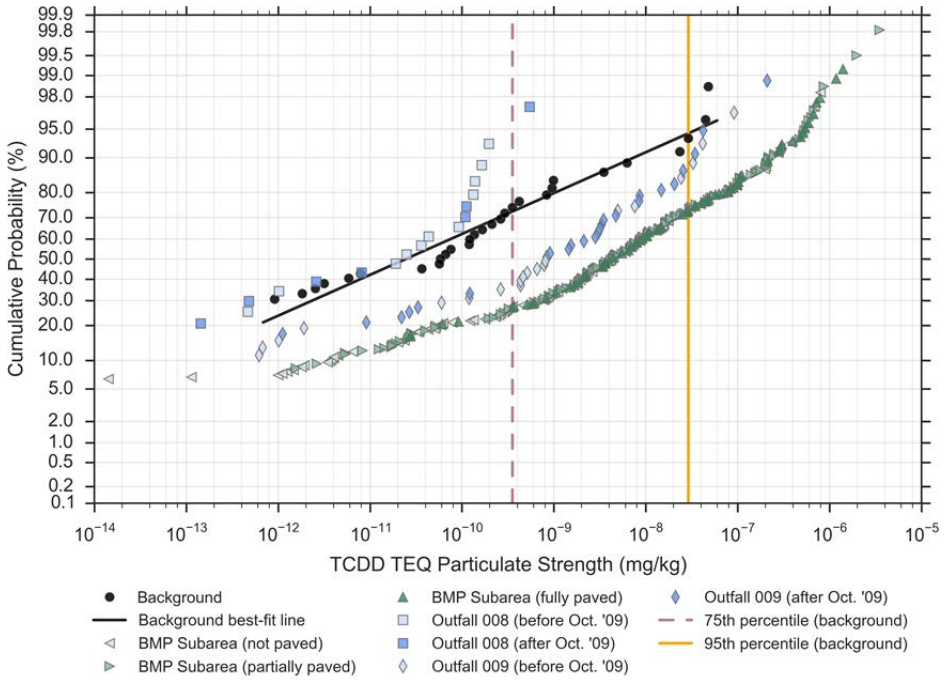


Figure 10. Probability plot for TCDD TEQ particulate strengths

[18] Following the 2005 wildfires, an uncharacteristically high TCDD TEQ concentration (3.6×10^{-4} µg/L) was measured at Outfall 009 on 10/17/2005. This data point is shown in the upper right corner of Figure 9.

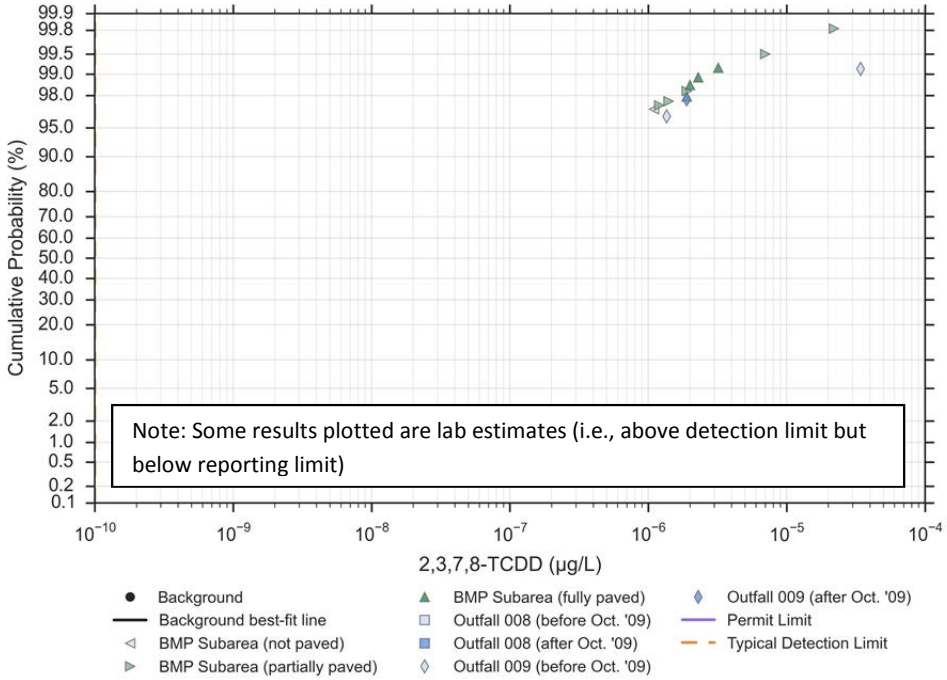


Figure 11. Probability plot for 2,3,7,8-TCDD concentrations[19]

[19] Following the 2005 wildfires, an uncharacteristically high 2,3,7,8-TCDD concentration (3.4×10^{-5} µg/L) was measured at Outfall 009 on 10/17/2005. This data point is shown in the upper right corner of Figure 11.

5. SUBAREA RANKING ANALYSIS

Subareas were ranked based on the results of comparisons between (a) stormwater concentrations and permit limits, and (b) stormwater particulate strengths and stormwater background particulate strengths to identify potential stormwater control locations. A statistical methodology was developed to rank the subareas based on these comparison results, while accounting for the number of useable data available at each subarea as well as number of data observations that fall above these thresholds (i.e., reflecting statistical confidence in how frequently each subarea will exceed the comparison thresholds). This methodology relies on "weighting factors" that are calculated for each POC for each subarea. The potential BMP subareas have been weighted based on general guidelines for small sample sets. The weighting methodology is described in more detail in Section 5 of the 2012 BMP Subarea Ranking Analysis Memo (Santa Susana Site Surface Water Expert Panel and Geosyntec Consultants, 2012).

In the end, the pollutant-specific weighting factors are summed to produce a multi-constituent score to allow for relative ranking amongst the potential BMP subareas. The highest ranked subareas are then recommended for consideration for new or enhanced stormwater control placement. In the case of ties, the average of the ranks is assigned to both subareas. Results for each BMP subarea and background monitoring subarea are summarized in Tables 6, 7, and 8 (subareas are organized by weight, ranked highest to lowest) and illustrated in Attachments 3 and 4.

Table 6. Metals Weighting Factor Results, by Subarea

Rank	Potential BMP Subarea (Co-location)	Watershed	Description	Maximum Metal Score
1	**ILBMP0002**[a]	Outfall 009	Road runoff to CM-9	0.98
2	**EVBMP0004**[a]	Outfall 009	2012-2013 Lower Helipad Road	0.89
3	**EVBMP0003** (A2SW0001)[a]	Outfall 009	CM-1 upstream west	0.79
4.5	**A1SW0009-A**	Outfall 009	CM-9 downstream-underdrain outlet (post-A1LF asphalt removal, pre-filter fabric over weir boards) - OLD	0.75
4.5	**APBMP0001-A**	Outfall 009	Area II road runoff, post-ELV stormwater improvements	0.75
6	**APBMP0001**	Outfall 009	Ashpile culvert/inlet road runoff, pre-ELV improvements- OLD	0.69
11.5	**B1SW0002**[a]	Outfall 009	Woolsey Canyon Road runoff	0.50
11.5	B1SW0014-A (B1BMP0006)	Outfall 009	B1 media filter effluent (pre-media filter reconstruction) - OLD	0.50
11.5	LXBMP0004	Outfall 009	LOX southwest downstream of sandbag berm	0.50
11.5	LXBMP0006 (LXSW0010)[a]	Outfall 009	LOX east, runoff along dirt road	0.50
11.5	EVBMP0006[a]	Outfall 009	2012-2013 Area II Road near ELV ditch	0.50
11.5	LPBMP0003[a]	Outfall 009	Lower parking lot sediment basin outlet	0.50
11.5	B1BMP0001	Outfall 009	B1 media filter inlet (post-media filter	0.50

Rank	Potential BMP Subarea (Co-location)	Watershed	Description	Maximum Metal Score
	(B1SW0010)[a]		installation)	
11.5	LPBMP0002[a]	Outfall 009	Lower parking lot influent to cistern	0.50
11.5	HZSW0020 (HZSW0017)	Outfall 008	Background - Happy Valley upstream	0.50
11.5	LPBMP0001[a]	Outfall 009	Lower lot sheetflow (pre-gravel bag berms) - OLD	0.50
17.5	**A1SW0009-B**	Outfall 009	CM-9 downstream-underdrain outlet (post-filter fabric over weir boards, post-A1LF asphalt removal) - OLD	0.39
17.5	**EVBMP0002**	Outfall 009	Helipad (pre-sandbag berms) - OLD	0.39
19	A1BMP0001[a]	Outfall 009	A1LF downstream - OLD	0.38
21	LXBMP0002	Outfall 009	LOX mid - OLD	0.31
21	HZSW0011	Outfall 008	Background - Happy Valley upstream	0.31
21	EVBMP0005[a]	Outfall 009	2012-2013 ELV drainage ditch (pre-ELV-1C ISRA) - OLD	0.31
23	**ILBMP0001[b]**	Outfall 009	Lower lot 24" stormdrain outlet	0.20
24	A1BMP0002-A (A1SW0004)[a]	Outfall 009	CM-9 upstream toward A1LF (post-A1LF asphalt removal)	0.14
26.5	EVBMP0001[a]	Outfall 009	ELV culvert inlet (helipad road gutter) - OLD	0.11
26.5	BGBMP0004	Outfall 009	Background - Sage Ranch near CM-5	0.11
26.5	LFSW0002-A	Outfall 009	CTLI downstream (post-ISRA excavation)	0.11
26.5	A2BMP0004	Outfall 009	Helipad culvert outlet	0.11
29	**EVBMP0001-A[a]**	Outfall 009	ELV culvert inlet (helipad road and ELV ditch, composite)	0.09
30	**LXBMP0005**	Outfall 009	LOX southeast downstream of sandbag berm	0.05
32.5	A2BMP0005	Outfall 009	A2 u/s of CM-1 confluence	0.04
32.5	B1SW0014-B (B1BMP0006)	Outfall 009	B1 media filter effluent (post-media filter reconstruction) - OLD	0.04
32.5	BGBMP0001 (A2SW0007, A2BMP0006)[a]	Outfall 009	Background – CM-1 upstream east tributary	0.04
32.5	BGBMP0002 (LXSW0003)[a]	Outfall 009	Background – CM-3 upstream	0.04
35	B1BMP0004 (B1SW0015, B1BMP0004-5)[a]	Outfall 009	B1 media filter inlet north	0.03
36	**BGBMP0006** (A2SW0006)[a]	Outfall 009	Background – CM-1 upstream east tributary (ponded footprint)	0.03
37.5	**LXBMP0003**[a]	Outfall 009	LOX east tributary - OLD	0.02
37.5	LPBMP0001-A[a]	Outfall 009	Lower lot sheetflow (post-gravel bag berms)	0.02
39	**A2SW0002-A** (A2BMP0007)	Outfall 009	CM-1 effluent (post-filter fabric over weir boards)	0.02
41.5	EVBMP0002-A	Outfall 009	Helipad (post-sandbag berms) - OLD	0.01
41.5	**A2SW0002** (A2BMP0007)	Outfall 009	CM-1 effluent (pre-filter fabric over weir boards) - OLD	0.01
41.5	EVBMP0002-B	Outfall 009	Helipad (post-sandbag berms raised, post-drainage holes in asphalt)	0.01
41.5	**BGBMP0007**	Outfall 009	Background – CM-3 upstream	0.01

Rank	Potential BMP Subarea (Co-location)	Watershed	Description	Maximum Metal Score
	(LXSW0001)[a]			
44.5	**A1SW0002**[a]	Outfall 009	Background – CM-8 upstream	0.01
44.5	**A1SW0003**	Outfall 009	CM-8 downstream (pre-filter fabric over weir boards) - OLD	0.01
46	**LXSW0002**	Outfall 009	CM-3 downstream (pre-filter fabric over weir boards) - OLD	0.00
47	**A1BMP0002** (A1SW0004)[a]	Outfall 009	CM-9 upstream toward A1LF (pre-A1LF asphalt removal) - OLD	0.00
48	A2BMP0003	Outfall 009	A2 u/s of ND confluence	0.00
49	**A1SW0005**	Outfall 009	CM-9 downstream (pre-filter fabric over weir boards) - OLD	0.00
50	**HZBMP0001** (HZSW0007)	Outfall 008	Happy Valley downstream (pre-improvements) - OLD	0.00
51	**B1BMP0003** (B1BMP0002)	Outfall 009	B1 parking lot / road runoff to culvert inlet	0.00
52.5	B1BMP0005 (B1SW0013, B1SW0011, B1BMP0004-5)[a]	Outfall 009	B1 media filter inlet south	0.00
52.5	Outfall 008**	Outfall 008	NPDES outfall 008	0.00
67.5	**Outfall 009****	Outfall 009	NPDES outfall 009	0.00
67.5	A1SW0007	Outfall 009	CM-11 downstream (pre-filter fabric over weir boards) - OLD	0.00
67.5	A2BMP0002	Outfall 009	A2 road runoff	0.00
67.5	HZSW0012	Outfall 008	Background - Happy Valley upstream	0.00
67.5	HZSW0014	Outfall 008	Happy Valley upstream	0.00
67.5	ILBMP0003	Outfall 009	A1LF parking lot - OLD	0.00
67.5	BGBMP0003	Outfall 009	Background - Sage Ranch near LOX	0.00
67.5	A1SW0006[a]	Outfall 009	Background – CM-11 upstream	0.00
67.5	HZBMP0002 (HZSW0004)	Outfall 008	DRG downstream	0.00
67.5	**HZBMP0003** (HZSW0003)	Outfall 008	DRG downstream (furthest downstream)	0.00
67.5	HZSW0005	Outfall 008	DRG upstream	0.00
67.5	HZSW0008	Outfall 008	Background - Happy Valley upstream	0.00
67.5	BGBMP0005	Outfall 009	Background - Sage Ranch near entrance	0.00
67.5	B1SW0008[a]	Outfall 009	B1 upstream	0.00
67.5	ILSW0003[a]	Outfall 009	IEL-2 upstream	0.00
67.5	ILSW0004-A[a]	Outfall 009	IEL-2 downstream (post-ISRA excavation)	0.00
67.5	EVBMP0007[a]	Outfall 009	Influent to ELV treatment BMP	0.00
67.5	EVBMP0008	Outfall 009	Effluent from ELV treatment BMP	0.00
67.5	B1SW0014-C (B1BMP0006)[a]	Outfall 009	B1 media filter effluent (post-media filter reconstruction, post-curb cuts)	0.00
67.5	A1SW0009-C	Outfall 009	CM-9 downstream-underdrain outlet (post- perforated pipe and upper basin installed)	0.00
67.5	APSW0014	Outfall 009	Surface drainage from Ash Pile/STP areas	0.00
67.5	B1BMP0007	Outfall 009	B1, vegetated channel	0.00
67.5	LPBMP0004	Outfall 009	Lower parking lot biofilter outlet	0.00
67.5	LXBMP0009 (LXSW0009)	Outfall 009	LOX, inlet to eastern slope drain	0.00

Notes

- Potential BMP subareas sorted by maximum weight for the POC group, computed as described in Section 5.
- ([a]) These potential BMP subarea monitoring locations are upstream of existing stormwater quality treatment controls
- ([b]) These potential BMP subarea monitoring locations have new planned (i.e., designed and ready for construction) stormwater quality treatment controls.
- (**)NPDES outfalls are included for comparison and method testing purposes only; stormwater controls are not being contemplated at these locations.
- The rounding of weights may account for similar weights being ranked differently.
- **Bolded** locations indicate that both the metals NPDES permit limit and 95th percentile background particulate strength threshold were exceeded (for at least one metals POC).
- Gray text indicates historic subarea monitoring locations that are discontinued.
- Monitoring locations with zero samples collected are excluded from this table.

Table 7. Dioxins Weighting Factor Results, by Subarea

Rank	Potential BMP Subarea (Co-location)	Watershed	Description	Maximum Dioxins Score
1	**EVBMP0003** (A2SW0001)[a]	Outfall 009	CM-1 upstream west	1.00
2	**B1BMP0004** (B1SW0015, B1BMP0004-5)[a]	Outfall 009	B1 media filter inlet north	0.99
3	**B1BMP0003** (B1BMP0002)	Outfall 009	B1 parking lot / road runoff to culvert inlet	0.99
4	**LPBMP0001-A**[a]	Outfall 009	Lower lot sheetflow (post-gravel bag berms)	0.98
5	**ILBMP0002**[a]	Outfall 009	Road runoff to CM-9	0.98
6	**ILBMP0001**[b]	Outfall 009	Lower lot 24" stormdrain outlet	0.97
7	**EVBMP0005**[a]	Outfall 009	2012-2013 ELV drainage ditch (pre-ELV-1C ISRA) - OLD	0.94
8	**EVBMP0002**	Outfall 009	Helipad (pre-sandbag berms) - OLD	0.93
9	**B1BMP0005** (B1SW0013, B1SW0011, B1BMP0004-5)[a]	Outfall 009	B1 media filter inlet south	0.81
10	**EVBMP0001-A**[a]	Outfall 009	ELV culvert inlet (helipad road and ELV ditch, composite)	0.79
11	**EVBMP0007**[a]	Outfall 009	Influent to ELV treatment BMP	0.75
12.5	**LPBMP0002**[a]	Outfall 009	Lower parking lot influent to cistern	0.69
12.5	**B1SW0008**[a]	Outfall 009	B1 upstream	0.69
14	**A2BMP0005**	Outfall 009	A2 u/s of CM-1 confluence	0.64
15	**A2SW0002** (A2BMP0007)	Outfall 009	CM-1 effluent (pre-filter fabric over weir boards) - OLD	0.57
24.5	APBMP0001	Outfall 009	Ashpile culvert/inlet road runoff- OLD	0.50
24.5	**B1SW0002**[a]	Outfall 009	Woolsey Canyon Road runoff	0.50
24.5	**A1SW0009-B**	Outfall 009	CM-9 downstream-underdrain outlet (post-filter fabric over weir boards, post-A1LF asphalt removal) - OLD	0.50
24.5	B1SW0014-B (B1BMP0006)	Outfall 009	B1 media filter effluent (post-media filter reconstruction) - OLD	0.50
24.5	B1BMP0001 (B1SW0010)[a]	Outfall 009	B1 media filter inlet (post-media filter installation)	0.50
24.5	APSW0014	Outfall 009	Surface drainage from Ash Pile/STP areas	0.50
24.5	LXBMP0006 (LXSW0010)[a]	Outfall 009	LOX east, runoff along dirt road	0.50
24.5	A1BMP0002-A (A1SW0004)[a]	Outfall 009	CM-9 upstream toward A1LF (post-A1LF asphalt removal)	0.50
24.5	A1SW0009-A	Outfall 009	CM-9 downstream-underdrain outlet (post-A1LF asphalt removal, pre-filter fabric over weir boards) - OLD	0.50
24.5	A1SW0009-C	Outfall 009	CM-9 downstream-underdrain outlet (post-perforated pipe and upper basin installed)	0.50
24.5	EVBMP0008	Outfall 009	Effluent from ELV treatment BMP	0.50
24.5	APBMP0001-A	Outfall 009	Area II road runoff, post-ELV stormwater improvements	0.50

Rank	Potential BMP Subarea (Co-location)	Watershed	Description	Maximum Dioxins Score
24.5	EVBMP0006[a]	Outfall 009	2012-2013 Area II Road near ELV ditch	0.50
24.5	LPBMP0003[a]	Outfall 009	Lower parking lot sediment basin outlet	0.50
24.5	B1SW0014-A (B1BMP0006)	Outfall 009	B1 media filter effluent (pre-media filter reconstruction) - OLD	0.50
24.5	**LFSW0002-A**	Outfall 009	CTLI downstream (post-ISRA excavation)	0.50
24.5	LPBMP0001[a]	Outfall 009	Lower lot sheetflow (pre-gravel bag berms) - OLD	0.50
24.5	LXBMP0002	Outfall 009	LOX mid - OLD	0.50
34	**EVBMP0002-B**[a]	Outfall 009	Helipad (post-sandbag berms raised, post-drainage holes in asphalt)	0.38
35.5	**EVBMP0004**[a]	Outfall 009	2012-2013 Lower Helipad Road	0.34
35.5	A2BMP0004	Outfall 009	Helipad culvert outlet	0.34
37	LPBMP0004	Outfall 009	Lower parking lot biofilter outlet	0.31
38	**A2SW0002-A** (A2BMP0007)	Outfall 009	CM-1 effluent (post-filter fabric over weir boards)	0.24
39	**B1SW0014-C** (B1BMP0006)	Outfall 009	B1 media filter effluent (post-media filter reconstruction, post-curb cuts)	0.23
40.5	EVBMP0002-A	Outfall 009	Helipad (post-sandbag berms) - OLD	0.17
40.5	**LXBMP0005**	Outfall 009	LOX southeast downstream of sandbag berm	0.17
42	B1BMP0007	Outfall 009	B1, vegetated channel	0.14
43.5	EVBMP0001[a]	Outfall 009	ELV culvert inlet (helipad road gutter) - OLD	0.11
43.5	BGBMP0004	Outfall 009	Background - Sage Ranch near CM-5	0.11
45	**A2BMP0003**	Outfall 009	A2 u/s of ND confluence	0.11
46	LXBMP0003[a]	Outfall 009	LOX east tributary - OLD	0.07
47	**A1BMP0001**[a]	Outfall 009	A1LF downstream - OLD	0.05
48	BGBMP0002 (LXSW0003)[a]	Outfall 009	Background – CM-3 upstream	0.04
49	**BGBMP0006** (A2SW0006)[a]	Outfall 009	Background – CM-1 upstream east tributary (ponded footprint)	0.03
50.5	**A1SW0006**[a]	Outfall 009	Background – CM-11 upstream	0.01
50.5	**A1SW0007**	Outfall 009	CM-11 downstream (pre-filter fabric over weir boards) - OLD	0.01
52.5	BGBMP0003	Outfall 009	Background - Sage Ranch near LOX	0.01
52.5	LXBMP0004	Outfall 009	LOX southwest downstream of sandbag berm	0.01
54	**LXSW0002**	Outfall 009	CM-3 downstream (pre-filter fabric over weir boards) - OLD	0.00
55	**HZBMP0001** (HZSW0007)	Outfall 008	Happy Valley downstream (pre-improvements) - OLD	0.00
56	HZBMP0003 (HZSW0003)	Outfall 008	DRG downstream (furthest downstream)	0.00
68.5	HZSW0005	Outfall 008	DRG upstream	0.00
68.5	HZSW0008	Outfall 008	Background - Happy Valley upstream	0.00
68.5	HZSW0011	Outfall 008	Background - Happy Valley upstream	0.00
68.5	HZSW0012	Outfall 008	Background - Happy Valley upstream	0.00

Rank	Potential BMP Subarea (Co-location)	Watershed	Description	Maximum Dioxins Score
68.5	HZSW0014	Outfall 008	Happy Valley upstream	0.00
68.5	HZSW0020 (HZSW0017)	Outfall 008	Background - Happy Valley upstream	0.00
68.5	ILBMP0003	Outfall 009	A1LF parking lot - OLD	0.00
68.5	A2BMP0002	Outfall 009	A2 road runoff	0.00
68.5	Outfall 008**	Outfall 008	NPDES outfall 008	0.00
68.5	**Outfall 009****	Outfall 009	NPDES outfall 009	0.00
68.5	A1SW0003	Outfall 009	CM-8 downstream (pre-filter fabric over weir boards) - OLD	0.00
68.5	**A1SW0005**	Outfall 009	CM-9 downstream (pre-filter fabric over weir boards) - OLD	0.00
68.5	HZBMP0002 (HZSW0004)	Outfall 008	DRG downstream	0.00
68.5	BGBMP0007 (LXSW0001)[a]	Outfall 009	Background – CM-3 upstream	0.00
68.5	BGBMP0005	Outfall 009	Background - Sage Ranch near entrance	0.00
68.5	BGBMP0001 (A2SW0007, A2BMP0006)[a]	Outfall 009	Background – CM-1 upstream east tributary	0.00
68.5	A1BMP0002 (A1SW0004)[a]	Outfall 009	CM-9 upstream toward A1LF (pre-A1LF asphalt removal) - OLD	0.00
68.5	A1SW0002[a]	Outfall 009	Background – CM-8 upstream	0.00
68.5	ILSW0003[a]	Outfall 009	IEL-2 upstream	0.00
68.5	ILSW0004-A[a]	Outfall 009	IEL-2 downstream (post-ISRA excavation)	0.00
68.5	LXBMP0009 (LXSW0009)	Outfall 009	LOX, inlet to eastern slope drain	0.00

Notes

- Potential BMP subareas sorted by maximum weight for the POC group, computed as described in Section 5.
- ([a]) These potential BMP subarea monitoring locations are upstream of existing stormwater quality treatment controls
- (**)NPDES outfalls are included for comparison and method testing purposes only; stormwater controls are not being contemplated at these locations.
- The rounding of weights may account for similar weights being ranked differently.
- **Bolded** locations indicate that both the dioxins NPDES permit limit and 95th percentile background particulate strength threshold were exceeded (for at least one dioxin POC).
- Gray text indicates historic subarea monitoring locations that are discontinued.
- Locations with zero samples collected are excluded from this table.

Table 8. TSS Weighting Factor Results, by Subarea

Rank	Potential BMP Subarea (Co-location)	Watershed	Description	TSS Score
4	LXBMP0004	Outfall 009	LOX southwest downstream of sandbag berm	0.50
4	LXBMP0006 (LXSW0010)[a]	Outfall 009	LOX east, runoff along dirt road	0.50
4	B1SW0014-A (B1BMP0006)	Outfall 009	B1 media filter effluent (pre-media filter reconstruction) - OLD	0.50
4	ILSW0004-A[a]	Outfall 009	IEL-2 downstream (post-ISRA excavation)	0.50
4	B1BMP0001 (B1SW0010)[a]	Outfall 009	B1 media filter inlet (post-media filter installation)	0.50
4	EVBMP0006[a]	Outfall 009	2012-2013 Area II Road near ELV ditch	0.50
4	APBMP0001-A	Outfall 009	Area II road runoff, post-ELV stormwater improvements	0.50
10.5	B1SW0002[a]	Outfall 009	Woolsey Canyon Road runoff	0.31
10.5	B1SW0008[a]	Outfall 009	B1 upstream	0.31
10.5	ILSW0003[a]	Outfall 009	IEL-2 upstream	0.31
10.5	HZSW0020 (HZSW0017)	Outfall 008	Background - Happy Valley upstream	0.31
10.5	LPBMP0001[a]	Outfall 009	Lower lot sheetflow (pre-gravel bag berms) - OLD	0.31
10.5	LXBMP0002	Outfall 009	LOX mid - OLD	0.31
14	A1BMP0002-A (A1SW0004)[a]	Outfall 009	CM-9 upstream toward A1LF (post-A1LF asphalt removal)	0.14
16.5	A2BMP0004	Outfall 009	Helipad culvert outlet	0.11
16.5	LFSW0002-A	Outfall 009	CTLI downstream (post-ISRA excavation)	0.11
16.5	EVBMP0001[a]	Outfall 009	ELV culvert inlet (helipad road gutter) - OLD	0.11
16.5	BGBMP0004	Outfall 009	Background - Sage Ranch near CM-5	0.11
19	LXBMP0003[a]	Outfall 009	LOX east tributary - OLD	0.07
20	LXBMP0005	Outfall 009	LOX southeast downstream of sandbag berm	0.05
21.5	A2BMP0005	Outfall 009	A2 u/s of CM-1 confluence	0.04
21.5	BGBMP0002 (LXSW0003)[a]	Outfall 009	Background – CM-3 upstream	0.04
23.5	LPBMP0001-A[a]	Outfall 009	Lower lot sheetflow (post-gravel bag berms)	0.02
23.5	A1SW0009-B	Outfall 009	CM-9 downstream-underdrain outlet (post-filter fabric over weir boards, post-A1LF asphalt removal) - OLD	0.02
25	HZBMP0001 (HZSW0007)	Outfall 008	Happy Valley downstream (pre-improvements) - OLD	0.01
26	EVBMP0001-A[a]	Outfall 009	ELV culvert inlet (helipad road and ELV ditch, composite)	0.01
27	A2BMP0003	Outfall 009	A2 u/s of ND confluence	0.00
28	ILBMP0002[a]	Outfall 009	Road runoff to CM-9	0.00
29	Outfall 008**	Outfall 008	NPDES outfall 008	0.00
30	A1SW0005	Outfall 009	CM-9 downstream (pre-filter fabric over weir boards) - OLD	0.00
32.5	B1BMP0004 (B1SW0015,	Outfall 009	B1 media filter inlet north	0.00

Rank	Potential BMP Subarea (Co-location)	Watershed	Description	TSS Score
	B1BMP0004-5)[a]			
32.5	EVBMP0003[a] (A2SW0001)	Outfall 009	CM-1 upstream west	0.00
32.5	LXSW0002	Outfall 009	CM-3 downstream (pre-filter fabric over weir boards) - OLD	0.00
32.5	A2SW0002-A (A2BMP0007)	Outfall 009	CM-1 effluent (post-filter fabric over weir boards)	0.00
57	LXBMP0009 (LXSW0009)	Outfall 009	LOX, inlet to eastern slope drain	0.00
57	LPBMP0003[a]	Outfall 009	Lower parking lot sediment basin outlet	0.00
57	LPBMP0004	Outfall 009	Lower parking lot biofilter outlet	0.00
57	A1SW0009-A	Outfall 009	CM-9 downstream-underdrain outlet (post-A1LF asphalt removal, pre-filter fabric over weir boards) - OLD	0.00
57	EVBMP0002-A	Outfall 009	Helipad (post-sandbag berms) - OLD	0.00
57	A2SW0002 (A2BMP0007)	Outfall 009	CM-1 effluent (pre-filter fabric over weir boards) - OLD	0.00
57	APBMP0001	Outfall 009	Ashpile culvert/inlet road runoff, pre-ELV improvements - OLD	0.00
57	B1SW0014-C (B1BMP0006)	Outfall 009	B1 media filter effluent (post-media filter reconstruction, post-curb cuts)	0.00
57	A1SW0009-C	Outfall 009	CM-9 downstream-underdrain outlet (post-perforated pipe and upper basin installed)	0.00
57	EVBMP0005[a]	Outfall 009	2012-2013 ELV drainage ditch (pre-ELV-1C ISRA) - OLD	0.00
57	EVBMP0002-B	Outfall 009	Helipad (post-sandbag berms raised, post-drainage holes in asphalt)	0.00
57	LPBMP0002[a]	Outfall 009	Lower parking lot influent to cistern	0.00
57	EVBMP0007[a]	Outfall 009	Influent to ELV treatment BMP	0.00
57	EVBMP0008	Outfall 009	Effluent from ELV treatment BMP	0.00
57	B1SW0014-B (B1BMP0006)	Outfall 009	B1 media filter effluent (post-media filter reconstruction) - OLD	0.00
57	APSW0014	Outfall 009	Surface drainage from Ash Pile/STP areas	0.00
57	B1BMP0007	Outfall 009	B1, vegetated channel	0.00
57	EVBMP0004[a]	Outfall 009	2012-2013 Lower Helipad Road	0.00
57	BGBMP0001 (A2SW0007, A2BMP0006)[a]	Outfall 009	Background – CM-1 upstream east tributary	0.00
57	BGBMP0003	Outfall 009	Background - Sage Ranch near LOX	0.00
57	A1BMP0001[a]	Outfall 009	A1LF downstream - OLD	0.00
57	A1BMP0002 (A1SW0004)[a]	Outfall 009	CM-9 upstream toward A1LF (pre-A1LF asphalt removal) - OLD	0.00
57	A1SW0002[a]	Outfall 009	Background – CM-8 upstream	0.00
57	A1SW0006[a]	Outfall 009	Background – CM-11 upstream	0.00
57	B1BMP0005 (B1SW0013, B1SW0011, B1BMP0004-5)[a]	Outfall 009	B1 media filter inlet south	0.00

Rank	Potential BMP Subarea (Co-location)	Watershed	Description	TSS Score
57	B1BMP0003 (B1BMP0002)	Outfall 009	B1 parking lot / road runoff to culvert inlet	0.00
57	HZBMP0002 (HZSW0004)	Outfall 008	DRG downstream	0.00
57	HZBMP0003 (HZSW0003)	Outfall 008	DRG downstream (furthest downstream)	0.00
57	HZSW0005	Outfall 008	DRG upstream	0.00
57	HZSW0008	Outfall 008	Background - Happy Valley upstream	0.00
57	HZSW0011	Outfall 008	Background - Happy Valley upstream	0.00
57	HZSW0012	Outfall 008	Background - Happy Valley upstream	0.00
57	HZSW0014	Outfall 008	Happy Valley upstream	0.00
57	A1SW0007	Outfall 009	CM-11 downstream (pre-filter fabric over weir boards) - OLD	0.00
57	A2BMP0002	Outfall 009	A2 road runoff	0.00
57	ILBMP0003	Outfall 009	A1LF parking lot - OLD	0.00
57	Outfall 009**	Outfall 009	NPDES outfall 009	0.00
57	A1SW0003	Outfall 009	CM-8 downstream (pre-filter fabric over weir boards) - OLD	0.00
57	BGBMP0005	Outfall 009	Background - Sage Ranch near entrance	0.00
57	BGBMP0006 (A2SW0006)[a]	Outfall 009	Background – CM-1 upstream east tributary (ponded footprint)	0.00
57	BGBMP0007 (LXSW0001)[a]	Outfall 009	Background – CM-3 upstream	0.00
57	EVBMP0002	Outfall 009	Helipad (pre-sandbag berms) - OLD	0.00
57	ILBMP0001[b]	Outfall 009	Lower lot 24" stormdrain outlet	0.00

Notes

- ([a]) These potential BMP subarea monitoring locations are upstream of existing stormwater quality treatment controls
- ([b]) These potential BMP subarea monitoring locations have new planned (i.e., designed and ready for construction) stormwater quality treatment controls.
- (**)NPDES outfalls are included for comparison and method testing purposes only, stormwater controls are not being contemplated at these locations.
- The rounding of weights may account for similar weights being ranked differently.
- Gray text indicates historic subarea monitoring locations that are discontinued.
- Locations with zero samples collected are excluded from this table.

A “multi-constituent” score was then calculated for each potential BMP subarea monitoring location by taking the arithmetic mean of the maximum metals and the maximum dioxins weighting factor values (Table 9). These two pollutant category values were weighted equally for the multi-constituent score based on their very roughly comparable relative exceedance probabilities at Outfalls 008 and 009 -- the dioxins (TCDD TEQ) permit limit exceedance probability is approximately 18% at Outfall 008 and approximately 40% at Outfall 009, while the lead (most problematic metal) permit limit exceedance probability is approximately 40% at Outfall 008 and approximately 20% at Outfall 009. 2,3,7,8-TCDD was not detected in the 2013-2014 water year at any of the sampled locations.

A complete summary of the weights computed by potential BMP subarea monitoring location (including number of samples, number of NDs, median, maximum, comparison to background percentiles, weight, and rank) is included as Appendix A. For purposes of comparison, the Permit limit for TCDD TEQ has also been applied to 2,3,7,8-TCDD results.

Table 9. Subareas Ranked by Multi-Constituent Score

Rank	Potential BMP Subarea (Co-locations)	Watershed	Description	Approximate Upgradient Drainage Area (ac)	Multi-Constituent Score	Rank from Maximum Metal Weighting	Rank from Maximum Dioxins Weighting	Total Number of Events Sampled	Number of Events Sampled in 2013-2014
1	**ILBMP0002**[a]	Outfall 009	Road runoff to CM-9	2.5	0.98	1	5	10	1
2	**EVBMP0003** (A2SW0001)[a]	Outfall 009	CM-1 upstream west	2.3	0.89	3	1	19	2
3	**EVBMP0002**	Outfall 009	Helipad (pre-sandbag berms) - OLD	4.1	0.66	17.5	8	6	0
5	EVBMP0005[a]	Outfall 009	2012-2013 ELV drainage ditch (pre-ELV-1C ISRA) - OLD	11	0.63	21	7	2	0
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	0
5	**APBMP0001-A**	Outfall 009	Area II road runoff, post-ELV stormwater improvements	0.2	0.63	4.5	24.5	1	1
7	EVBMP0004[a]	Outfall 009	2012-2013 Lower Helipad Road	1.8	0.62	2	35.5	3	0
8.5	**LPBMP0002**[a]	Outfall 009	Lower parking lot influent to cistern	4.2	0.60	11.5	12.5	2	1
8.5	**APBMP0001**	Outfall 009	Ashpile culvert/inlet road runoff, pre-ELV improvements- OLD	32.9	0.60	6	24.5	2	0
10	**ILBMP0001**[b]	Outfall 009	Lower lot 24" stormdrain outlet	23	0.58	23	6	18	2
11	**B1BMP0004 (B1SW0015, B1BMP0004-5)**[a]	Outfall 009	B1 media filter inlet north	3.7	0.51	35	2	12	1
15.5	LPBMP0001-A[a]	Outfall 009	Lower lot sheetflow (post-gravel bag berms)	5.1	0.50	37.5	4	6	0
15.5	B1SW0002[a]	Outfall 009	Woolsey Canyon Road runoff	1.3	0.50	11.5	24.5	2	0
15.5	B1BMP0001 (B1SW0010)[a]	Outfall 009	B1 media filter inlet (post-media filter installation)	4.5	0.50	11.5	24.5	3	0
15.5	LXBMP0006 (LXSW0010)[a]	Outfall 009	LOX east, runoff along dirt road	0.43	0.50	11.5	24.5	1	0
15.5	EVBMP0006[a]	Outfall 009	2012-2013 Area II Road near ELV ditch	11	0.50	11.5	24.5	1	0
15.5	LPBMP0003[a]	Outfall 009	Lower parking lot sediment basin outlet	4.2	0.50	11.5	24.5	1	0

Rank	Potential BMP Subarea (Co-locations)	Watershed	Description	Approximate Upgradient Drainage Area (ac)	Multi-Constituent Score	Rank from Maximum Metal Weighting	Rank from Maximum Dioxins Weighting	Total Number of Events Sampled	Number of Events Sampled in 2013-2014
15.5	B1SW0014-A (B1BMP0006)	Outfall 009	B1 media filter effluent (pre-media filter reconstruction) - OLD	4.7	0.50	11.5	24.5	1	0
15.5	LPBMP0001[a]	Outfall 009	Lower lot sheetflow (pre-gravel bag berms) - OLD	5.1	0.50	11.5	24.5	2	0
20	**B1BMP0003 (B1BMP0002)**	Outfall 009	B1 parking lot / road runoff to culvert inlet	5.2	0.49	51	3	18	2
21	**A1SW0009-B**	Outfall 009	CM-9 downstream-underdrain outlet (post-filter fabric over weir boards, post-A1LF asphalt removal) - OLD	16.4	0.45	17.5	24.5	6	0
22	**EVBMP0001-A[a]**	Outfall 009	ELV culvert inlet (helipad road and ELV ditch, composite)	2.5	0.44	29	10	7	2
23	**B1BMP0005 (B1SW0013, B1SW0011, B1BMP0004-5)[a]**	Outfall 009	B1 media filter inlet south	0.8	0.41	52.5	9	16	2
24	LXBMP0002	Outfall 009	LOX mid - OLD	1.5	0.41	21	24.5	2	0
25	**EVBMP0007[a]**	Outfall 009	Influent to ELV treatment BMP	55.3	0.38	67.5	11	1	1
26	**B1SW0008[a]**	Outfall 009	B1 upstream	0.79	0.35	67.5	12.5	2	0
27	**A2BMP0005**	Outfall 009	A2 u/s of CM-1 confluence	35	0.34	32.5	14	4	1
28	**A1BMP0002-A (A1SW0004)[a]**	Outfall 009	CM-9 upstream toward A1LF (post-A1LF asphalt removal)	6.3	0.32	24	24.5	4	1
29	**LFSW0002-A**	Outfall 009	CTLI downstream (post-ISRA excavation)	5.1	0.31	26.5	24.5	3	0
30	**A2SW0002 (A2BMP0007)**	Outfall 009	CM-1 effluent (pre-filter fabric over weir boards) - OLD	52.8	0.29	41.5	15	16	0
31	B1SW0014-B (B1BMP0006)	Outfall 009	B1 media filter effluent (post-media filter reconstruction) - OLD	4.7	0.27	32.5	24.5	4	0
32	LXBMP0004	Outfall 009	LOX southwest downstream of sandbag berm	10.6	0.26	11.5	52.5	5	0
34.5	APSW0014	Outfall 009	Surface drainage from Ash Pile/STP areas	32.3	0.25	67.5	24.5	1	1
34.5	A1SW0009-C	Outfall 009	CM-9 downstream-underdrain outlet (post- perforated pipe and	9.9	0.25	67.5	24.5	1	1

Rank	Potential BMP Subarea (Co-locations)	Watershed	Description	Approximate Upgradient Drainage Area (ac)	Multi-Constituent Score	Rank from Maximum Metal Weighting	Rank from Maximum Dioxins Weighting	Total Number of Events Sampled	Number of Events Sampled in 2013-2014
			upper basin installed)						
34.5	EVBMP0008	Outfall 009	Effluent from ELV treatment BMP	55.3	0.25	67.5	24.5	1	1
34.5	HZSW0020 (HZSW0017)	Outfall 008	Background - Happy Valley upstream	0.2	0.25	11.5	68.5	2	0
37	A2BMP0004	Outfall 009	Helipad culvert outlet	4.2	0.23	26.5	35.5	3	0
38	**A1BMP0001**[a]	Outfall 009	A1LF downstream - OLD	1.2	0.22	19	47	5	0
39	**EVBMP0002-B**[a]	Outfall 009	Helipad (post-sandbag berms raised, post-drainage holes in asphalt)	4.3	0.20	41.5	34	5	1
40.5	LPBMP0004	Outfall 009	Lower parking lot biofilter outlet	4.4	0.16	67.5	37	2	1
40.5	HZSW0011	Outfall 008	Background - Happy Valley upstream	0.1	0.16	21	68.5	2	0
42	**A2SW0002-A (A2BMP0007)**	Outfall 009	CM-1 effluent (post-filter fabric over weir boards)	52.8	0.13	39	38	9	1
43	**B1SW0014-C (B1BMP0006)**	Outfall 009	B1 media filter effluent (post-media filter reconstruction, post-curb cuts)	3.6	0.11	67.5	39	8	2
44	**LXBMP0005**	Outfall 009	LOX southeast downstream of sandbag berm	2.5	0.11	30	40.5	5	0
45.5	EVBMP0001[a]	Outfall 009	ELV culvert inlet (helipad road gutter) - OLD	1.8	0.11	26.5	43.5	3	0
45.5	BGBMP0004	Outfall 009	Background - Sage Ranch near CM-5	81.4	0.11	26.5	43.5	3	0
47	EVBMP0002-A	Outfall 009	Helipad (post-sandbag berms) - OLD	4.1	0.09	41.5	40.5	5	0
48	B1BMP0007	Outfall 009	B1, vegetated channel	47.7	0.07	67.5	42	4	1
49	**A2BMP0003**	Outfall 009	A2 u/s of ND confluence	100	0.05	48	45	8	1
50	**LXBMP0003**[a]	Outfall 009	LOX east tributary - OLD	0.4	0.05	37.5	46	6	0
51	BGBMP0002 (LXSW0003)[a]	Outfall 009	Background – CM-3 upstream	17.2	0.04	32.5	48	4	0
52	**BGBMP0006 (A2SW0006)**[a]	Outfall 009	Background – CM-1 upstream east tributary (ponded footprint)	41.1	0.03	36	49	7	0
53	BGBMP0001	Outfall 009	Background – CM-1 upstream	41.1	0.02	32.5	68.5	4	0

Rank	Potential BMP Subarea (Co-locations)	Watershed	Description	Approximate Upgradient Drainage Area (ac)	Multi-Constituent Score	Rank from Maximum Metal Weighting	Rank from Maximum Dioxins Weighting	Total Number of Events Sampled	Number of Events Sampled in 2013-2014
	(A2SW0007, A2BMP0006)[a]		east tributary						
54.5	**A1SW0006**[a]	Outfall 009	Background – CM-11 upstream	8.3	0.01	67.5	50.5	12	0
54.5	**A1SW0007**	Outfall 009	CM-11 downstream (pre-filter fabric over weir boards) - OLD	8.3	0.01	67.5	50.5	12	0
56.5	BGBMP0003	Outfall 009	Background - Sage Ranch near LOX	23.6	0.01	67.5	52.5	5	0
56.5	**BGBMP0007 (LXSW0001)**[a]	Outfall 009	Background – CM-3 upstream	17.2	0.01	41.5	68.5	7	0
58	**LXSW0002**	Outfall 009	CM-3 downstream (pre-filter fabric over weir boards) - OLD	17.2	0.00	46	54	9	0
59.5	**A1SW0003**	Outfall 009	CM-8 downstream (pre-filter fabric over weir boards) - OLD	2.5	0.00	44.5	68.5	10	0
59.5	**A1SW0002**[a]	Outfall 009	Background – CM-8 upstream	2.5	0.00	44.5	68.5	10	0
61	**A1BMP0002 (A1SW0004)**[a]	Outfall 009	CM-9 upstream toward A1LF (pre-A1LF asphalt removal) - OLD	6.3	0.00	47	68.5	15	0
62	**A1SW0005**	Outfall 009	CM-9 downstream (pre-filter fabric over weir boards) - OLD	16.4	0.00	49	68.5	10	0
63	**HZBMP0001 (HZSW0007)**	Outfall 008	Happy Valley downstream (pre-improvements) - OLD	21.4	0.00	50	55	13	0
64	**HZBMP0003 (HZSW0003)**	Outfall 008	DRG downstream (furthest downstream)	29.6	0.00	67.5	56	15	1
65	Outfall 008**	Outfall 008	NPDES outfall 008	62	0.00	52.5	68.5	32	0
73	HZSW0005	Outfall 008	DRG upstream	21	0.00	67.5	68.5	1	0
73	HZSW0008	Outfall 008	Background - Happy Valley upstream	NA/small	0.00	67.5	68.5	1	0
73	HZSW0012	Outfall 008	Background - Happy Valley upstream	0.4	0.00	67.5	68.5	1	0
73	HZSW0014	Outfall 008	Happy Valley upstream	0.1	0.00	67.5	68.5	3	0
73	ILBMP0003[a]	Outfall 009	A1LF parking lot - OLD	9.5	0.00	67.5	68.5	4	0
73	A2BMP0002	Outfall 009	A2 road runoff	3.6	0.00	67.5	68.5	1	0
73	**Outfall 009****	Outfall 009	NPDES outfall 009	536	0.00	67.5	68.5	71	1
73	HZBMP0002	Outfall 008	DRG downstream	23.2	0.00	67.5	68.5	4	0

Rank	Potential BMP Subarea (Co-locations)	Watershed	Description	Approximate Upgradient Drainage Area (ac)	Multi-Constituent Score	Rank from Maximum Metal Weighting	Rank from Maximum Dioxins Weighting	Total Number of Events Sampled	Number of Events Sampled in 2013-2014
	(HZSW0004)								
73	BGBMP0005	Outfall 009	Background - Sage Ranch near entrance	25	0.00	67.5	68.5	1	0
73	ILSW0003[a]	Outfall 009	IEL-2 upstream	2.4	0.00	67.5	68.5	2	0
73	ILSW0004-A[a]	Outfall 009	IEL-2 downstream (post-ISRA excavation)	2.8	0.00	67.5	68.5	1	0
73	LXBMP0009 (LXSW0009)	Outfall 009	LOX, inlet to eastern slope drain	0.6	0.00	67.5	68.5	1	1

Notes

- Potential BMP subareas sorted by multi-constituent score, computed as described in Section 5.
- ([a]) These potential BMP subarea monitoring locations are upstream of existing stormwater quality treatment controls.
- ([b]) These potential BMP subarea monitoring locations have new planned (i.e., designed and ready for construction) stormwater quality treatment controls.
- (**) NPDES outfalls are included for comparison and method testing purposes only, stormwater controls are not being contemplated at these locations.
- 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 POC.
- 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.

6. RESULTS DISCUSSION

- Dioxins (TCDD TEQ) and lead are the POCs most frequently responsible for producing high dioxins and metals weighting factors, respectively. Permit limit exceedances were only observed at Outfall 009 for these same parameters (TCDD TEQ, no DNQ and lead). Dioxins and lead were observed near background concentrations at Outfall 008, based on data from previous years.
- Table 10 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 B1 area (ranked 11 and 23) are both ranked higher than the B1 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). The vegetated area in the headwater of the CM-9 subbasin (where asphalt was removed and where revegetation has occurred due to the "honeycomb" wattle network installation) will also continue to improve the influent to CM-9 and further stabilize the area, despite low precipitation. B1 parking lot and road runoff have been included to more fully describe improvements in the vegetated area downstream of the B1 media filter B1 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 10 to illustrate a water quality improvement between the recent BMP influent and effluent.
- 2,3,7,8-TCDD was not detected in any samples during the 2013-2014 monitoring season.
- Table 11 summarizes a select subset of locations ranked in the top 20 that are associated with BMP modifications. In most cases, the location rank based on the multi-constituent score fell after the BMP was implemented, demonstrating that BMP implementation has generally resulted in improved water quality.
- Similarly to last year, all CM effluent monitoring locations are ranked lower (i.e., better water quality) than their most impacted influent streams (i.e., where two influent streams enter a CM, the effluent ranking is lower than that of the poorer quality influent), indicating that the CMs are performing well. This finding is consistent with the conclusions of the statistical analysis of influent/effluent data in the 2012 Performance Evaluation Memorandum (Geosyntec and Expert Panel, 2012). This finding is also consistent with the fact that, as part of the intended maintenance program, Boeing has removed substantial quantities of sediment that have accumulated in the CMs illustrating continued CM functionality and pollutant removal. However, this finding may also be associated with dilution by the less impacted influent stream.
- The most highly ranked subareas for TSS include LOX southwest, downstream of the sandbag berm (LXBMP0004), LOX east runoff along dirt road (LXBMP0006), B1 media filter effluent, pre-media filter reconstruction (B1SW0014-A), IEL-2 downstream (post-ISRA excavation) (ILSW0004-

A), B1 media filter inlet (B1BMP0001), ELV area (EVBMP0006), and Area II road runoff post-ELV stormwater improvements (APBMP0001-A). Panel-recommended maintenance structures were installed at the LOX area in 2012 as part of the Northern Drainage RMMP. These BMPs included sand bag diversion berm, slope drains to convey flow from the sandbag berms into the Northern Drainage, and rock stabilization at eroded channels and gullies. Minor repairs have been made to the LOX area maintenance structures following completion of the Northern Drainage RMMP including repairing split sand bags at the LOX area. This past year, actions completed included placement of jute matting on the slope south of the road, installation of fiber rolls along the road and slope to the south, fresh gravel applied along the road, and hydroseed applied to the slope. B1SW0014-A is an old monitoring location which underwent media filter reconstruction and the addition of curb cuts (B1SW0014-C), decreasing the current location's TSS rank to 57. Monitoring location B1BMP0001 is an old influent site to the B1 media filter at the south inlet and B1SW0014-C is the effluent monitoring point to B1BMP0001, showing an improvement in TSS ranking through the media filter.

- The top 11 ranked subareas represent drainage areas with either full or mixed runoff contributions from paved surfaces (mostly parking lots and roads). This may indicate that elevated POC concentrations in the 009 watershed may be derived from asphalt itself, or from atmospheric deposition (which occurs relatively evenly across the site) onto directly connected impervious surfaces (e.g., asphalt) which are more efficient at washing off and transporting contaminants than pervious surfaces.

- The top 20-ranked subareas based on the multi-constituent score include twelve subareas on Boeing property – B1BMP0004 (the B1 media filter inlet north), ILBMP0001 (Lower lot 24" stormdrain outlet), ILBMP0002 (road runoff to CM-9), A1SW0009-A(CM-9 downstream-underdrain outlet (post-A1LF asphalt removal, pre-filter fabric over weir boards) - OLD), LPBMP0001 and LPBMP0001-A (lower lot sheetflow (pre- and post-gravel bag berms)), B1SW0002 (Woolsey Canyon Road runoff), B1BMP0001 (B1 media filter inlet (post-media filter installation)), LPBMP0002 (Lower parking lot influent to cistern), LPBMP0003 (lower parking lot sedimentation basin outlet),B1SW0014-A (B1 media filter effluent (pre-media filter reconstruction)- OLD), and B1BMP0003 (B1 parking lot/road runoff to culvert inlet). These sites already have robust treatment controls (in the case of ILBMP0001, this is treatment of low flows only; and B1BMP0003 is treated in the downstream vegetated channel). Of these subareas, B1BMP0004 is ranked highest for dioxins.

- Eight subareas in the top 20-ranked subareas are located on NASA property and include EVBMP0003 (CM-1 upstream west), EVBMP0002 (Helipad (pre-sandbag berms) - OLD), EVBMP0005 (2012-2013 ELV drainage ditch (pre-ELV-1C ISRA) - OLD), EVBMP0004 (2012-2013 Lower Helipad Road), APBMP0001 and APBMP0001-A (ashpile culvert inlet/road runoff and road runoff post-ELV BMP improvements, respectively), LXBMP0006 (LOX east, runoff along dirt road), and EVBMP0006 (2012-2013 Area II Road near ELV ditch). Four sites, including APBMP0001-A and APBMP0001 (which are highly ranked based on only one and two samples, respectively) and EVBMP0002 (which is an old location), are not upstream of an existing

treatment BMP. Across all eight monitoring locations, EVBMP0003 was ranked highest for dioxins.

- As shown in Figure 2, channel processes appear to be a significant source of TSS for Watershed 008 (based on observations from previous years) and less so for Watershed 009, where outfall TSS concentrations are near background. Northern Drainage and Outfall 008 improvements and stabilization measures are expected to continue providing a water quality benefit to these channels, particularly if the upcoming winter is wetter and helps channel vegetation to grow.
- While the analysis approach is concentration based rather than load based, because such a large percentage of the watersheds (and of the watersheds developed or known impacted areas) are represented by the monitoring locations, the approach roughly addresses load reduction aspects, noting that actual runoff coefficients do vary between subareas.

Table 10. Ranking Comparison of Top Ranked Monitoring Locations and their Pairs

BMP Area	Influent Monitoring Location			Effluent Monitoring Location			Rank Change
	Monitoring Location	Description	Influent Rank	Monitoring Location	Description	Effluent Rank	
CM-9	**ILBMP0002**	Road runoff to CM-9	1	A1SW0009-C	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
B1 Media Filter	**B1BMP0004 (B1SW0015, B1BMP0004-5)**	B1 media filter inlet north	11	B1SW0014-C (B1BMP0006)	B1 media filter effluent (post-media filter reconstruction, post-curb cuts)	43	-32
	B1BMP0005 (B1SW0013, B1SW0011, B1BMP0004-5)	B1 media filter inlet south	23				-20
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
Vegetated Area D/S of B1 Media Filter	**B1BMP0003 (B1BMP0002)**	B1 parking lot / road runoff to culvert inlet	20	B1BMP0007	B1, vegetated channel	48	-28
	B1SW0014-C (B1BMP0006)	B1 media filter effluent (post-media filter reconstruction, post-curb cuts)	43				-5
ELV treatment BMP*	EVBMP0007	Influent to ELV treatment BMP	25	EVBMP0008	Effluent from ELV treatment BMP	34.5	-10.5

NOTES

- **Bolded** locations indicate that the monitoring location is ranked within the top 20 of the multi-constituent table (Table 9).
- Gray text indicates historic subarea monitoring locations that are discontinued.
- (*) Based on a single influent/effluent sample

Table 11. Ranking Comparison of Top Ranked Monitoring Locations 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)	B1 culvert effluent (no media filter) – OLD	N/A[1]	-A	9/1/2011[2]	B1 media filter effluent (pre-media filter reconstruction) - OLD	15.5	-B	12/16/2011	B1 media filter effluent (post-media filter reconstruction) - OLD	31	-C	11/2/2012	B1 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-A1LF asphalt removal, pre-filter fabric over weir boards) - OLD	N/A[1]	-A	9/1/2012[2]	CM-9 downstream-underdrain outlet (post-A1LF 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-A1LF 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 table (Table 9).
- Gray text indicates historic subarea monitoring locations that are discontinued.

7. BMP RECOMMENDATIONS

Subarea Specific Evaluation of Top Ranked Subarea

Based on these analysis results, the following monitoring locations were identified as the highest ranked[20] subareas, with multi-constituent scores ranging from 0.49 to 0.98 out of a maximum score of 1.0 (see Table 9[21]). Scores closer to 1.0 indicate monitoring locations with poorer historic water quality. Besides their multi-constituent scores, the following list is also of significance because it includes:

- Only four of the top twenty monitoring locations (APBMP0001-A, ILBMP0001, and LXBMP0006, B1BMP0003) are either active (i.e., not discontinued or reclassified due to upstream BMP implementation) or are not upstream of an existing BMP (i.e., without downstream stormwater treatment); recommendations for these four sites are provide below;

- Two of the three subareas (ILBMP0002, EVBMP0003, and B1BMP0005, which is the one not highly ranked) where 2,3,7,8-TCDD was detected (but not quantified) in the 2012-2013 wet season (2,3,7,8-TCDD was not detected in any samples collected during the 2013-2014 wet season);
- The top eight highest ranked monitoring locations for dioxins; and
- The top six highest ranked monitoring locations for metals.

In some cases, these results 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 top 20 monitoring locations described below are located in the 009 drainage area, with none in the 008 drainage area. Water quality at stormwater background locations was generally good with no location ranked above 34.5, though there were several instances of concentrations greater than NPDES permit limits at those locations. No flow or exceedances occurred at Outfall 008 during the current season, indicating that retention occurred within the watershed during the small storms observed.

The following list of highest ranked subareas contains some historic subarea monitoring locations that are discontinued, indicated by gray text, and no Expert Panel recommendations are provided for these. Monitoring locations were discontinued for a number of reasons, including location improvements, changes in treatment type, and planned end of monitoring activities. It should also be noted that the 2013-2014 season was unusually dry; therefore, there are relatively few new data this year for updating the location rankings. Recommendations for specific site areas are summarized after the discussion of individual site results.

[20] In the case of ties, the average rank was assigned to both subareas.
[21] Subareas with zero samples have been excluded from Table 9.

1. ILBMP0002 (road runoff to CM-9): This subarea reflects runoff from a 2.5 acre drainage area including paved road and undeveloped hillsides. Based on ten events, this subarea is ranked 1st overall (multi-constituent score = 0.98), 5th for dioxins, 1st for metals, and 28th for TSS. ILBMP0002 drains to CM-9, which filters runoff through a horizontal media bed (sizing is currently estimated to achieve 10% long-term average runoff volume capture[22]). Based on one sampled event since 2013 BMP improvements, the effluent from CM-9 (A1SW0009-C) is ranked 34.5th overall, 24th for dioxins, 67.5th for metals, and 57th for TSS, which reflects a notable improvement in water quality compared to the ILBMP0002 untreated runoff.

2. EVBMP0003 (CM-1 upstream west): This monitoring subarea reflects runoff from 2.3 acres of paved road and undeveloped hillside. Based on 19 events (two events in 2013-2014), this subarea ranks 2nd overall (multi-constituent score = 0.89), 1st for dioxins, 3rd for metals, and 32.5th for TSS. CM-1, to which EVBMP0003 drains, is an existing CM that also treats runoff from a 53 acre undisturbed subwatershed (sizing is estimated to achieve around 7% long-term runoff volume capture under current conditions, with the new ELV treatment BMP in place). Based on nine events, the CM-1 effluent subarea (A2SW0002-A) is ranked 42nd overall (multi-constituent score = 0.13), ranked 38th for dioxins, 39th for metals, and 32.5th for TSS. The ELV area previously drained to EVBMP0003 and CM-1 due to an existing degraded asphalt channel below the ELV hillside that diverted a portion of this runoff onto the Area II Road and to EVBMP0003. This channel was improved and a stormwater treatment system was installed before the start of the 2013-2014 rainy season. The two samples collected this season show improved TSS and generally lower dioxins than in the 2012-2013 monitoring season. Additionally, the sample collected in spring of 2014 reflected runoff from the Helipad, which was diverted to the ELV area due to a plug in the drain under Helipad Road. For this reason, future results at this location are expected to improve.

3. EVBMP0002 (Helipad pre sandbag berms- OLD): This subarea reflects runoff from 4.1 acres of the paved Helipad area, pre-sandbag berms raised and pre-drainage holes in asphalt). Based on six events, this subarea was ranked 3rd overall (multi-constituent score = 0.66), 8th for dioxins, 17.5th for metals, and 57th for TSS. This monitoring location has since been improved (EVBMP0002-B). The improved location ranks 39th overall (multi-constituent score = 0.20), 34rd for dioxins, 41.5th for metals, and 57th for TSS. The improvements caused runoff from this area (EVBMP0002-B) to drain via overland flow through a series of temporary BMPs prior to being discharged via a paved asphalt channel on the east end of the Helipad. The BMPs include two raised sandbag berms that collect and retain the runoff (this is a small amount of the total annual runoff volume). Perforations in the pavement were installed upstream of the sand bag berms in September 2012 to promote infiltration. Captured runoff currently is pumped to the Silvernale treatment facility. Runoff capture efficiency decreased in 2013-2014 since a larger area is now draining toward these berms as a result of recent drainage modifications at the ELV area. Currently the storage volume behind the berms is expected to equate to approximately a 0.6 inch rainfall event, given the larger drainage area.

[22] Overflows also get partial sedimentation through temporary ponding behind weir boards.

5. EVBMP0005 (2012-2013 ELV drainage ditch (pre-ELV-1C ISRA- OLD)): This monitoring point was discontinued after the installation of the ELV treatment BMP before the start of the 2013-2014 rainy season. This monitoring location reflected 11 acres of ELV hillside runoff from the ELV asphalt swale prior to ISRA removal, which was substantially completed by March, 2013. There are no post-ISRA data for this location. Based on two events in 2013-2014, the pre-ISRA subarea is ranked 5th overall (multi-constituent score = 0.63), 7th for dioxins, 21st for metals, and tied for 57th (last) for TSS. Runoff from the upgradient ELV paved areas is now diverted to the Helipad, and ELV hillside runoff is now treated through the ELV treatment BMP.

5. A1SW0009-A (CM-9 downstream underdrain outlet, post-A1LF asphalt removal, pre-filter fabric over weir boards- OLD): Monitoring in this subarea, added during the 2012-13 rainy season and discontinued during the 2013-2014 rainy season, reflects treated runoff (estimated at 10% capture[23]) from a 16.4 acres drainage area, consisting of road runoff (ILBMP0002), a stabilized dirt road, rocky hillsides, and the AILF. Based on one event, this subarea is ranked 5th overall (multi-constituent score = 0.63), 24.5th for dioxins, 4.5th for metals, and tied for 57th (last) for TSS. In January of 2012, filter fabric was installed over the weir boards to reduce and filter seepage flows. Based on six events following this improvement, this subarea (now named A1SW0009-C) is ranked 34.5th overall, 24.5th for dioxins, 67.5th for metals, and 57th for TSS. There has been one sample collected since the most recent BMP improvements completed in March 2013, consisting of the rock berm and flow spreader pipe.

5. APBMP0001-A (Area II road runoff, post-ELV stormwater improvements): This Area II (NASA) subarea is very small, and primarily reflects runoff from a short section of the Area II road. This road runoff drains under the Area II road to the tributary eventually meeting the Northern Drainage. Based on only one event, this subarea is ranked 5th overall (multi-constituent score = 0.63), 24.5th for dioxins, 4.5th for metals, and 4th for TSS. The sample at APBMP0001-A was collected after the ELV treatment BMP was installed, but also after the road was recently resurfaced. This same subarea, based on two events prior to the installation of the media filter system (APBMP0001), is ranked 8.5th overall (multi-constituent score = 0.60), 24.5th for dioxins, 16th for metals, and 57th for TSS. It is anticipated that water quality will be improved at APBMP0001-A in the future as the new pavement surface weathers.

7. EVBMP0004 (2012-2013 Lower Helipad road): This discontinued monitoring location was added during the 2012-2013 rainy season and reflects flow from the 1.8 acre paved Area II (NASA) Helipad Road. The monitoring location was discontinued after the ELV media filter system was installed to treat runoff from this area, among others. Based on three events, this subarea is ranked 7th overall (multi-constituent score = 0.62), 35.5th for dioxins, 2nd for metals, and 57th (last) for TSS.

8.5. LPBMP0002 (Lower parking lot influent to cistern): This monitoring subarea reflects runoff from approximately 4.2 acres of mostly impervious parking lot. The subarea represents untreated stormwater before it is collected in the trench drain that drains to the cistern for pre-treatment

[23] Overflows also get partial treatment by sedimentation through temporary ponding behind weir boards.

before being pumped to the sedimentation basin and biofilter. Based on two events, this subarea is ranked 8.5th overall (multi-constituent score = 0.60), 12.5th for dioxins, 11.5th for metals, and 57th (lowest) for TSS. One sample was collected at the monitoring location during the 2013-2014 rainy season. Soil management and contractor staging activities are planned to occur here, but were not present during the period reflected by this dataset.

8.5. APBMP0001 (Ash Pile culvert inlet/road runoff, pre-ELV improvements- OLD): This Area II (NASA) subarea represents runoff from 32.9 acres, including several flat ISRA areas distributed throughout a relatively flat drainage area, as well as road runoff. Based on two events, this subarea is ranked 8.5th overall (multi-constituent score = 0.60), 24.5th for dioxins, 6th for metals, and 57th (lowest) for TSS. Both samples were collected after the ISRA areas had been partially excavated and covered with plastic.

10. ILBMP0001 (Lower Lot 24" storm drain outlet): This monitoring subarea reflects flow from 23 acres of paved parking areas, building rooftops, paved storage areas, and undeveloped hillsides. Runoff from these areas is conveyed by a storm drain collection system to a 24-inch storm drain located beneath the Lower Parking Lot. This storm drain discharges via a concrete outlet spillway to the Northern Drainage on Sage Ranch property. Based on eighteen events, this subarea is ranked 9th overall (multi-constituent score = 0.58), 6th for dioxins, 23rd for metals, and tied for 57th (lowest) for TSS. A portion of this flow (approximately 30-40% long-term average runoff volume capture) is treated through the Lower Lot Biofilter. Building 1436 is planned for demolition in 2014, and will result in the removal of approximately one acre of impervious area; the demo footprint will be covered with erosion controls, such as wattles and hydroseed. Two detention bioswales are currently being designed to detain runoff from this area before releasing it to the lower lot cistern for treatment through the biofilter.

11. B1BMP0004-5 (B1 media filter inlet north): This monitoring subarea reflects runoff from approximately 3.7 acres of paved road and post-ISRA restored hillside. Based on twelve events, this subarea is ranked 11th overall (multi-constituent score = 0.51), 2nd for dioxins, .35th for metals, and 32.5th for TSS. This subarea drains to a series of rock check dams and the B1 media filter which, after filtering runoff, discharges to a natural vegetated drainage across the main entrance at Facility Road. In 2012, hillside erosion controls were improved and curb cuts were added to even the distribution of inflows to the B1 media filter on the south and north sides. Based on six events, the B1 media filter effluent (B1SW0014-C) is ranked 43rd overall (multi-constituent score = 0.11), 39th for dioxins, 67.5th (last) for metals, and 57th for TSS.

15.5. LPBMP0001-A (Lower lot sheetflow, post-gravel bag berms): This discontinued monitoring subarea, which has been replaced by the cistern influent sample at LPBMP0002, reflects runoff from 5.1 acres of mostly paved parking and road areas, after the gravel bag berms were installed in September of 2011 to slow runoff and allow for some detention. Soil management and contractor staging activities are also planned to occur here, but were not present during the period reflected by this dataset. Based on six events, this subarea is ranked 15.5th overall (multi-constituent score = 0.50), 4th for dioxins, 37.5th for metals, and 23.5th for TSS. This same subarea, based on two events

prior to the installation of the gravel bag berms (LPBMP0001), is also ranked 15.5th overall (multi-constituent score = 0.50), 24.5th for dioxins, 11.5th for metals, and 10.5th for TSS.

15.5. B1SW0002 (Woolsey Canyon Road runoff): This discontinued monitoring subarea, which has been replaced by sampling location B1BMP0004, reflects overland and shallow concentrated runoff from approximately 1.3 acres of mostly paved road at the intersection of Facility Road and Woolsey Canyon Road. Based on two events, this subarea is ranked 15.5th overall (multi-constituent score = 0.50), 24.5th for dioxins, 11.5th for metals, and 10.5th for TSS. This area drains toward the north inlet of the B1 media filter along an earthen channel with rip rap check structures.

15.5. B1BMP0001 (B1 media filter inlet (post-media filter installation)): This discontinued monitoring subarea, which has been replaced by sampling location B1BMP0005, reflects runoff from approximately 4.5 acres of stormwater influent to the B1 media filter. This subarea represents untreated stormwater before being treated through the media bed and then discharged by the media bed. Based on three events, this subarea is ranked 15.5th overall (multi-constituent score = 0.50), 24.5th for dioxins, 11.5th for metals, and 4th for TSS. The TSS ranking increased from 13th in 2012-2013.

15.5. LXBMP0006 (LOX east, runoff along dirt road): This monitoring subarea reflects runoff from approximately 0.43 acres of the LOX area prior to being discharged to the Northern Drainage. Based on one event, this subarea is ranked 15.5th overall (multi-constituent score = 0.50), 24.5th for dioxins, 11.5th for metals, and 4th for TSS. The TSS ranking increased from 13th in 2012-2013. NASA completed ISRA actions in this subarea in November of 2013, including re-contouring, installation of fiber rolls, hay bales, and/or silt fencing, and application of hydroseed mulch.

15.5. EVBMP0006 (2012-2013 Area II Road near ELV ditch): This discontinued monitoring subarea was added during the 2012-2013 water year but discontinued after installation pf the ELV media filter treatment system. This monitoring location reflects runoff from approximately 11 acres of Area II Road to the west of the intersection with Helipad Road. Based on one event, this subarea is ranked 15.5th overall (multi-constituent score = 0.50), 24.5th for dioxins, 11.5th for metals, and 4th for TSS. Runoff from this area drains along the north edge of the Area II road toward CM-1.

15.5. LPBMP0003 (Lower parking lot sediment basin outlet): This monitoring subarea reflects runoff from the lower parking lot sediment basin with a drainage area of 4.2 acres, prior to entering the lower parking lot biofilter. Based on one event from 2012-2013, this subarea is ranked 15.5th overall (multi-constituent score = 0.5), 24.5th for dioxins, 11.5th for metals, and 57th (last) for TSS.

15.5. B1SW0014-A (B1 media filter effluent (pre-media filter reconstruction- OLD)): This discontinued subarea reflects 4.7 acres of treated stormwater runoff from Facility Road that discharged through the originally constructed B1 media filter. This sampling location was discontinued after the B1 media filter was reconstructed with a new underdrain system in December 2011. Based on one event, this subarea is ranked 15.5th overall (multi-constituent score = 0.50), 24.5th for dioxins, 11.5th for metals, and 4th for TSS. This area contributing to this former sampling location was also improved through the addition of improved hillside erosion controls and

curb cuts, which occurred in December of 2011, respectively. Based on eight events, this subarea (now named B1SW0014-C) is now ranked 43rd overall, 39th for dioxins, 67.5th for metals, and 57th (last) for TSS but has been discontinued and replaced with location B1BMP0006, which reflects effluent from the reconstructed B1 media filter.

15.5. LPBMP0001 (Lower lot sheetflow, pre-gravel bag berms- OLD): This discontinued subarea, which has been replaced by the monitoring at the trench drain of the new sedimentation basin and biofilter (LPBMP0002), reflects runoff from 5.1 acres of mostly paved parking and road areas, before the gravel bag berms were installed in September of 2011 to slow runoff and allow for some detention (see LPBMP0001-A discussion above). Based on two events, this subarea ranked 15.5th overall, (multi-constituent score = 0.50), 24.5th for dioxins, 11.5th for metals, and 10.5th for TSS. This area is now being treated with a sedimentation basin and biofilter BMP, in anticipation of future soil stockpile activity.

20. B1BMP0003 (B1BMP0002): This monitoring subarea reflects runoff from the B1 parking lot with a drainage area of 5.2 acres. This flow enters a culvert and then a vegetated channel where it comingles with treated B1 flows. Based on two events from 2012-2013, this subarea is ranked 20th overall (multi-constituent score = 0.49), 3rd for dioxins, 51st for metals, and 57th (last) for TSS. As discussed later in this memo, the monitoring station downstream of this point demonstrates water quality improvement through the vegetated channel.

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. 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 reflects 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 B1 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. **B1 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 B1 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 B1).

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.

8. REFERENCES

CWB, 2010. *Data Collection, Analysis and Nutrient Criteria Development—Progress Report.* Lower Salinas River Watershed Nutrient TMDL. California Water Boards. http://www.swrcb.ca.gov/rwqcb3/water_issues/programs/tmdl/docs/salinas/nutrients/sal_nut_dataanalyrpt_061410.pdf

Geosyntec Consultants and Expert Panel, 2012. Santa Susanna Field Laboratory: Recommendations from Field Investigation of Outfall 008 Watershed.

Geosyntec Consultants and Expert Panel, 2012. ISRA and CM Upgradient and Downgradient Analysis, Santa Susana Site.

Geosyntec Consultants, 2011. *Calibration Results For SSFL 009 Watershed Model*. January 27.

Geosyntec Consultants and Expert Panel, 2011. SSFL Watershed 008 and 009 BMP Subarea Ranking Analysis.

Geosyntec Consultants, 2010. *BMP Subarea Sampling Recommendations for 008/009 BMP Work Plan*. December 16.

Helsel, D.R., and R.M. Hirsch, 1992. *Studies in Environmental Science 49: Statistical methods in water resources*. Elsevier Publ., New York.

MWH, Stormwater Expert Panel, Geosyntec Consultants, Haley & Alrich, and CH2M HILL, 2010. *Best Management Practices (BMP) Plan – Outfalls 008 and 009 Watersheds.* Santa Susana Field Laboratory, Ventura County, California. October. http://www.boeing.com/aboutus/environment/santa_susana/water_quality/isra_10-10-19_BMPPlanOF008and009Watersheds.pdf

Otto et al, 2013. *A new statistical methodology: Using subcatchments monitoring data to prioritize placement of stormwater treatment controls.* Stormwater. September. Pages 36-43.

Santa Susana Site Surface Water Expert Panel and Geosyntec Consultants, 2012. *Santa Susana Site Watershed 008 and 009 BMP Subarea Ranking Analysis.* August 31.

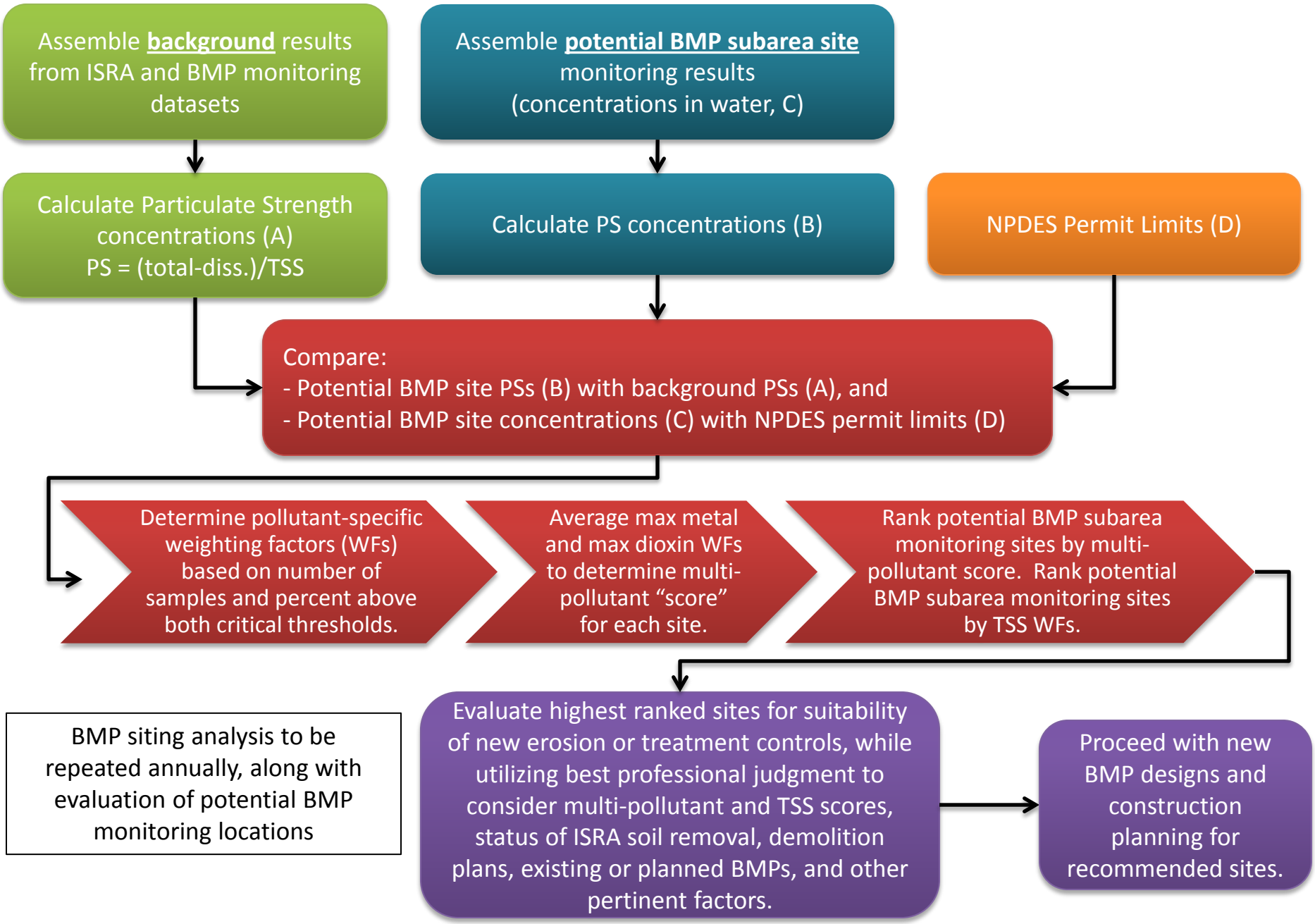
SSFL Stormwater Expert Panel, 2010. *SSFL Stormwater Background Dioxin Report*. March 30. http://www.boeing.com/aboutus/environment/santa_susana/water_quality/tech_reports_100427_dioxins_background_report.pdf

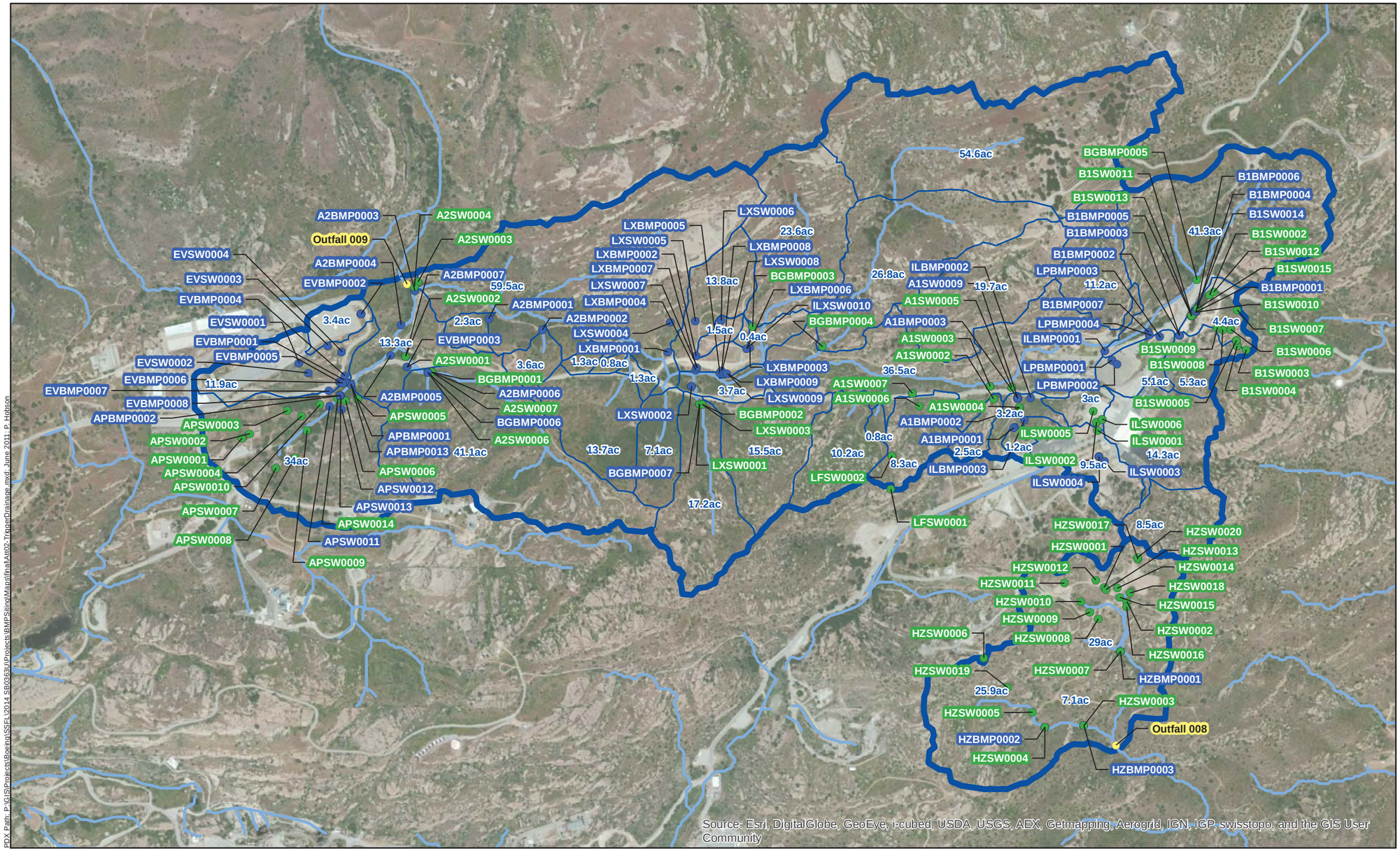
SSFL Stormwater Expert Panel, 2009. *Boeing SSFL Metals Background Report. Sources of Metals in SSFL Watersheds.* November 21. http://www.boeing.com/aboutus/environment/santa_susana/water_quality/tech_reports_100427_metals_background_report.pdf

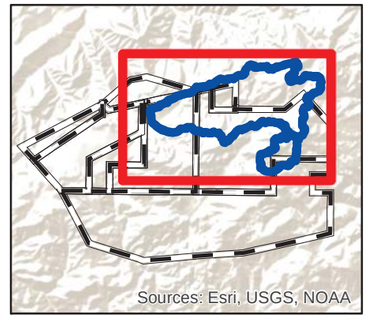
Steets et al. Stormwater Treatment Planning for an Industrial Permit with Numeric Limits. CASQA Conference. September 28, 2011.

WWE, 2011. *Santa Susana Field Laboratory BMP Trigger Assessment—Possible Regulator Precedents for 75th/95th Percentile Values.* April 26.

Attachment 1. Summary Flowchart for BMP Site Ranking Analysis Approach







N

Legend

Location Type

- BMP Subarea
- Background/SW
- NPDES
- Stream
- Outfall watershed boundary

Site Legend

Potential BMP subarea site

Stormwater background site

Outfalls

950 475 0 950

Feet

ATTACHMENT 2

Locations Used in Site Ranking Analysis Outfall 008/009 Watersheds

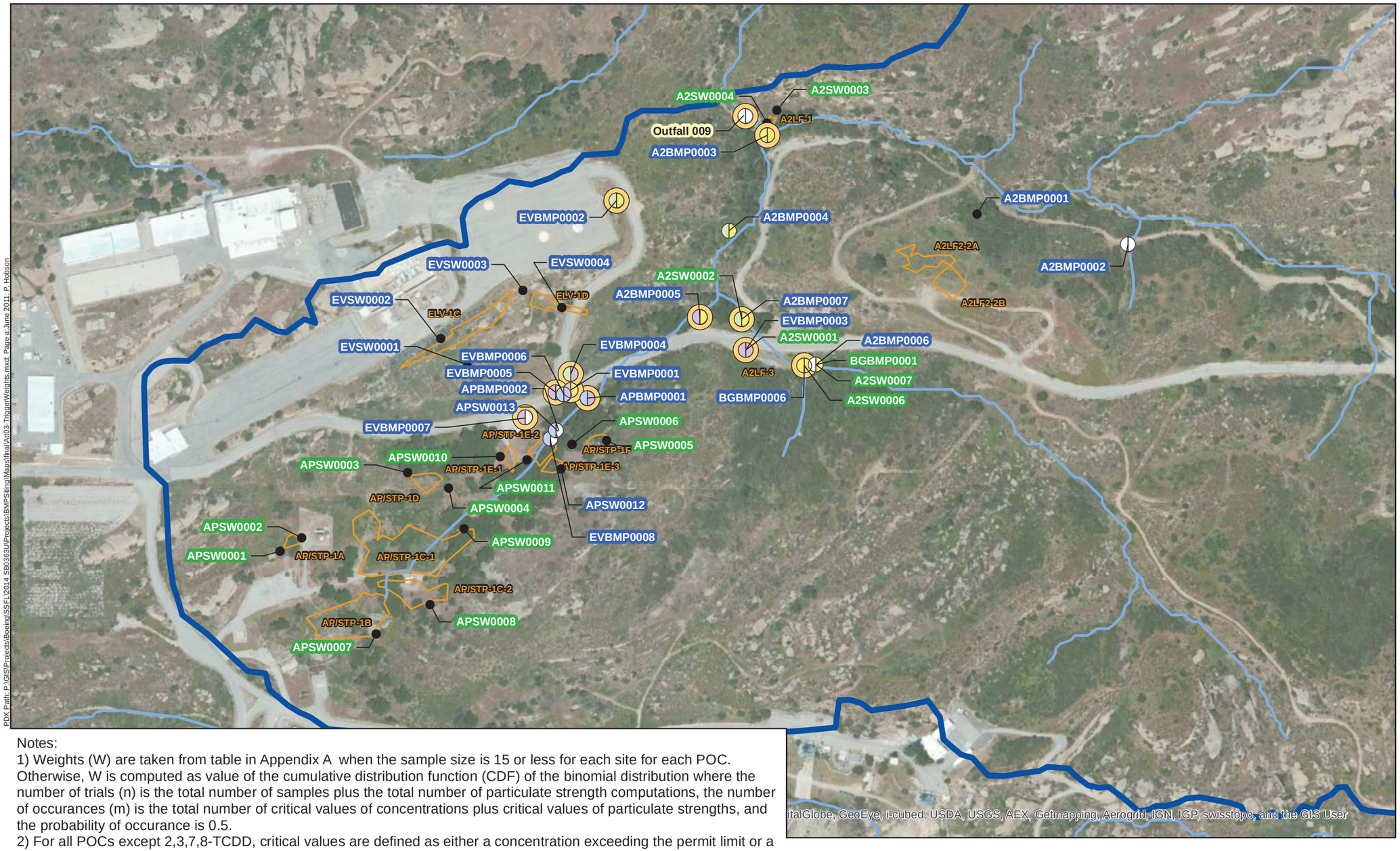
Santa Susana Field Laboratory
Ventura County, CA

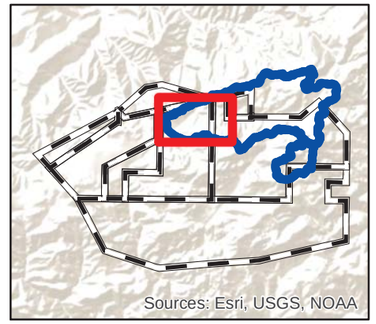
Geosyntec consultants

Portland, OR	July 2014

Notes:
1) NPDES outfalls are included for comparison and method testing purposes only. Stormwater controls are not being contemplated at these locations.

PDX Path: P:\GIS\Projects\Boeing\SSFL\2014_SB0363U\Projects\BMPSiting\Maps\SfmaAtt02-TrainedDrainage.mxd: June 2011: P. Hobson





PDX Path: P:\GIS\Projects\Boeing\NSSFL\2014 SB0363UI\Projects\BMPSting\Maps\Final\Att03-TriggerWeights.mxd; Page a June 2011 P. Hobson

Features Legend

Max. Dioxin Weight

- 0.0
- 0.0 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 1.0

Max. Metals Weight

- 0.0
- 0.0 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 1.0
- Dual exceedance (note 6)
- Site with no data
- Stream
- Outfall watershed boundary
- ISRA boundary

Site Legend

BMP subarea site Outfalls

Stormwater background site

Notes:

1) Weights (W) are taken from table in Appendix A when the sample size is 15 or less for each site for each POC. Otherwise, W is computed as value of the cumulative distribution function (CDF) of the binomial distribution where the number of trials (n) is the total number of samples plus the total number of particulate strength computations, the number of occurances (m) is the total number of critical values of concentrations plus critical values of particulate strengths, and the probability of occurance is 0.5.
2) For all POCs except 2,3,7,8-TCDD, critical values are defined as either a concentration exceeding the permit limit or a particulate strength computation exceeding the 95th percentile background value.
3) For 2,3,7,8-TCDD, any detection is considered a critical value and particulate strengths are not considered.
4) The weights shown on the map are maximum weight of cadmium, copper, and lead for the metals layer and the maximum weight of TCDD TEQ or 2,3,7,8-TCDD for the dioxins layer.
5) NPDES outfalls are included for comparison and method testing purposes only. Stormwater controls are not being contemplated at these locations.
6) Orange halos underneath locations indicate dual exceedances: sites where at least one POC exceeded both the permit limit and 95th percentile background particulate strength.
7) Some site records have been divided into multiple time periods based on maintenance or upgrades to the BMPs. In these instances, locations are labeled with their original site name but their symbols reflect the site's most recent results.

300 150 0 300

Feet

N

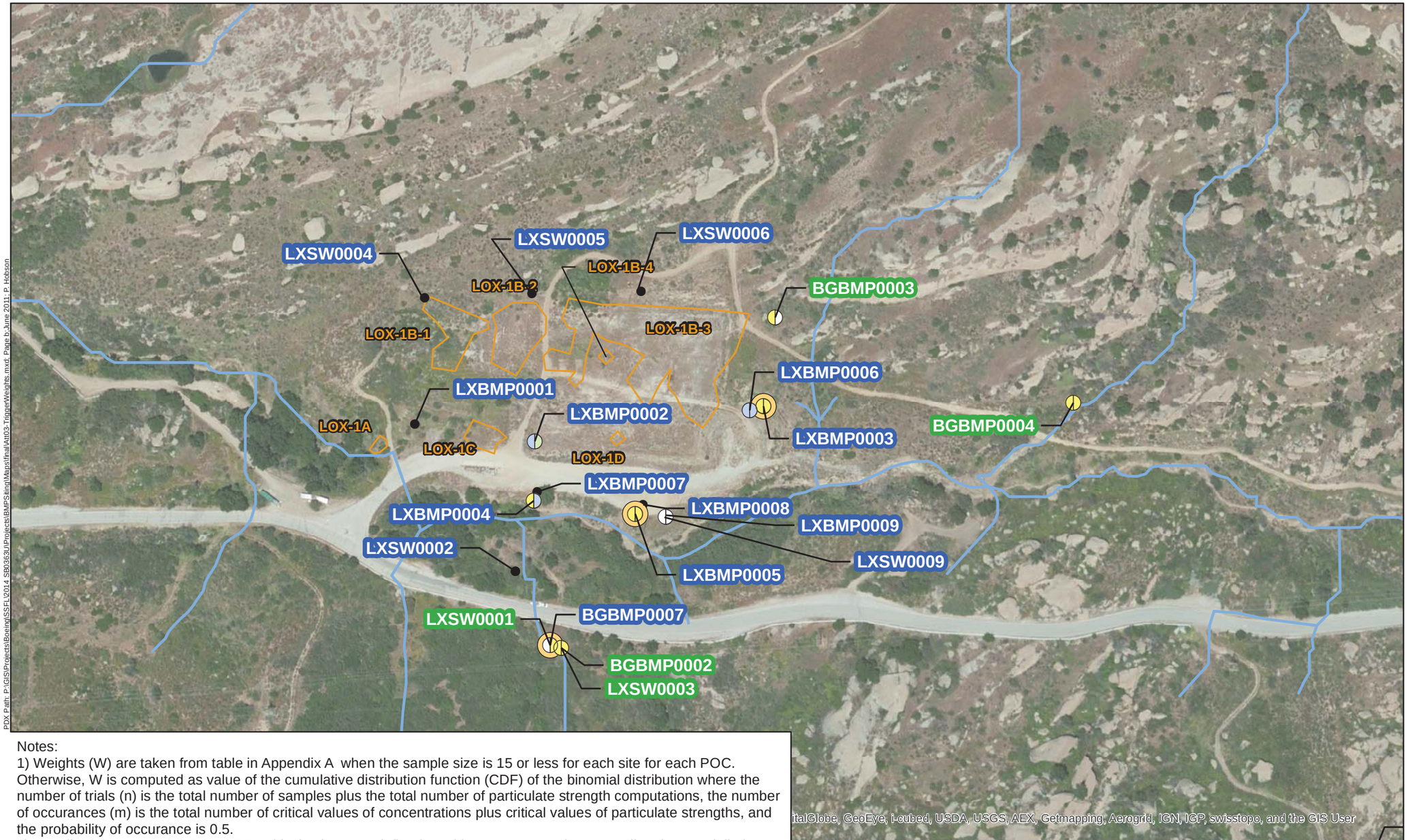
ATTACHMENT 3a

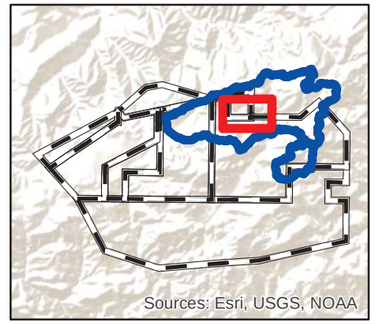
Site Ranking Analysis: Metals and Dioxins in Outfall 009 Watershed (West)

Santa Susana Field Laboratory
Ventura County, CA

Geosyntec consultants

Portland, OR	July 2014





PDX Path: P:\GIS\Projects\Boeing\SSFL\2014 SB0363\UProjects\BMPSting\Maps\final\At103-TriggerWeights.mxd; Page by June 2011 P. Hobson

Features Legend

Max. Dioxin Weight

- 0.0
- 0.0 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 1.0

Max. Metals Weight

- 0.0
- 0.0 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 1.0
- Dual exceedance (note 6)
- Site with no data
- Stream
- Outfall watershed boundary
- ISRA boundary

Site Legend

BMP subarea site Outfalls

Stormwater background site

Notes:

1) Weights (W) are taken from table in Appendix A when the sample size is 15 or less for each site for each POC. Otherwise, W is computed as value of the cumulative distribution function (CDF) of the binomial distribution where the number of trials (n) is the total number of samples plus the total number of particulate strength computations, the number of occurances (m) is the total number of critical values of concentrations plus critical values of particulate strengths, and the probability of occurance is 0.5.
2) For all POCs except 2,3,7,8-TCDD, critical values are defined as either a concentration exceeding the permit limit or a particulate strength computation exceeding the 95th percentile background value.
3) For 2,3,7,8-TCDD, any detection is considered a critical value and particulate strengths are not considered.
4) The weights shown on the map are maximum weight of cadmium, copper, and lead for the metals layer and the maximum weight of TCDD TEQ or 2,3,7,8-TCDD for the dioxins layer.
5) NPDES outfalls are included for comparison and method testing purposes only. Stormwater controls are not being contemplated at these locations.
6) Orange halos underneath locations indicate dual exceedances: sites where at least one POC exceeded both the permit limit and 95th percentile background particulate strength.
7) Some site records have been divided into multiple time periods based on maintenance or upgrades to the BMPs. In these instances, locations are labeled with their original site name but their symbols reflect the site's most recent results.

200 100 0 200
Feet

N

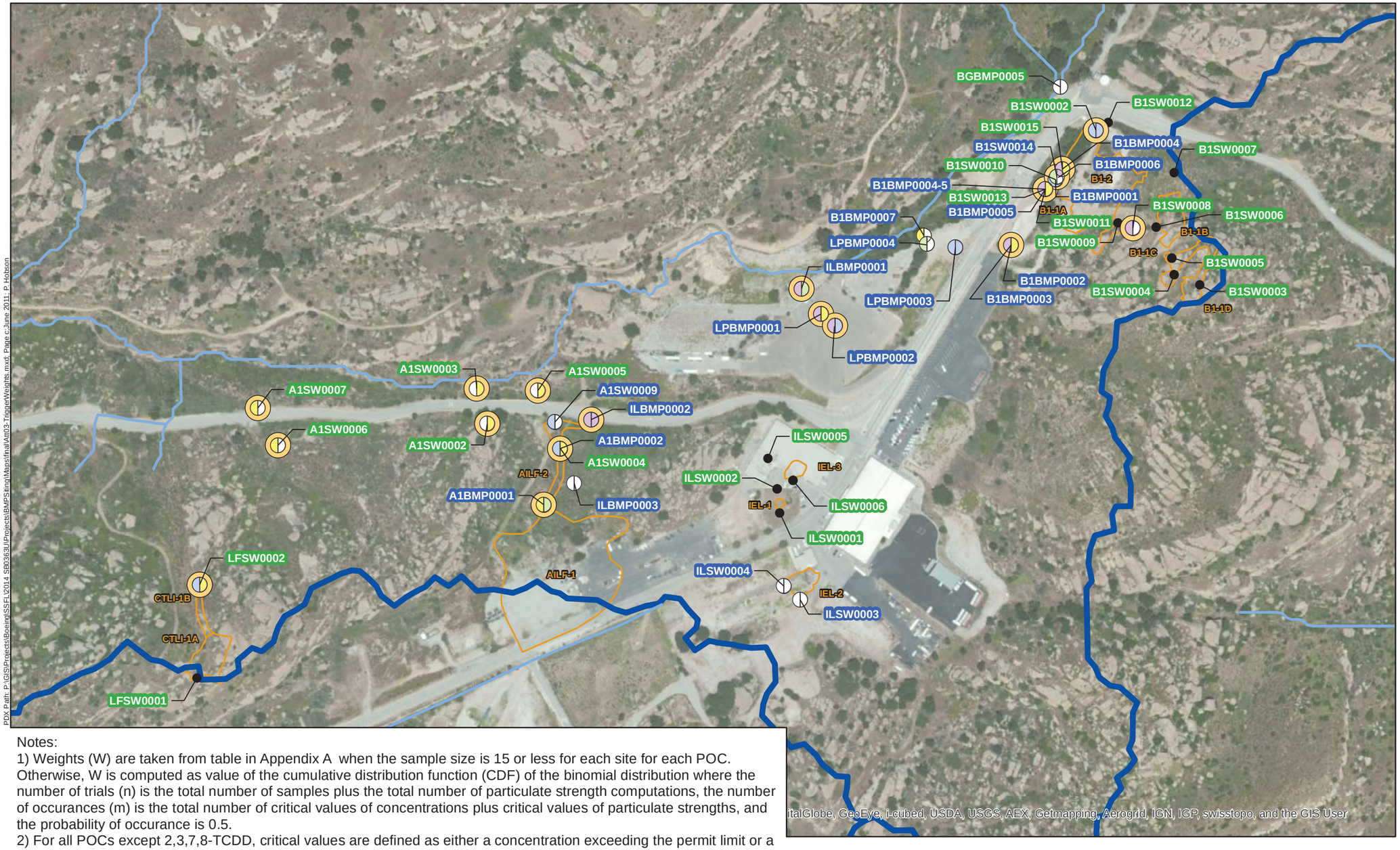
ATTACHMENT 3b

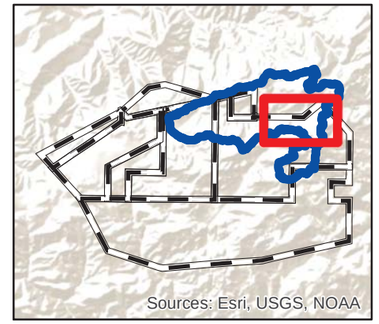
Site Ranking Analysis: Metals and Dioxins in Outfall 009 Watershed (Central)

Santa Susana Field Laboratory
Ventura County, CA

Geosyntec consultants

Portland, OR	July 2014





PDX Path: P:\GIS\Projects\Boeing\NSSFL\2014_SB0363UI\Projects\BMPS\tino\Maps\Final\At103-TriggerWeights.mxd; Page c-June 2011; P. Hobson

Features Legend

Max. Dioxin Weight

- 0.0
- 0.0 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 1.0

Max. Metals Weight

- 0.0
- 0.0 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 1.0
- Dual exceedance (note 6)
- Site with no data
- Stream
- Outfall watershed boundary
- ISRA boundary

Site Legend

BMP subarea site Outfalls

Stormwater background site

300 150 0 300

Feet

N

Notes:

1) Weights (W) are taken from table in Appendix A when the sample size is 15 or less for each site for each POC. Otherwise, W is computed as value of the cumulative distribution function (CDF) of the binomial distribution where the number of trials (n) is the total number of samples plus the total number of particulate strength computations, the number of occurances (m) is the total number of critical values of concentrations plus critical values of particulate strengths, and the probability of occurance is 0.5.

2) For all POCs except 2,3,7,8-TCDD, critical values are defined as either a concentration exceeding the permit limit or a particulate strength computation exceeding the 95th percentile background value.

3) For 2,3,7,8-TCDD, any detection is considered a critical value and particulate strengths are not considered.

4) The weights shown on the map are maximum weight of cadmium, copper, and lead for the metals layer and the maximum weight of TCDD TEQ or 2,3,7,8-TCDD for the dioxins layer.

5) NPDES outfalls are included for comparison and method testing purposes only. Stormwater controls are not being contemplated at these locations.

6) Orange halos underneath locations indicate dual exceedances: sites where at least one POC exceeded both the permit limit and 95th percentile background particulate strength.

7) Some site records have been divided into multiple time periods based on maintenance or upgrades to the BMPs. In these instances, locations are labeled with their original site name but their symbols reflect the site's most recent results.

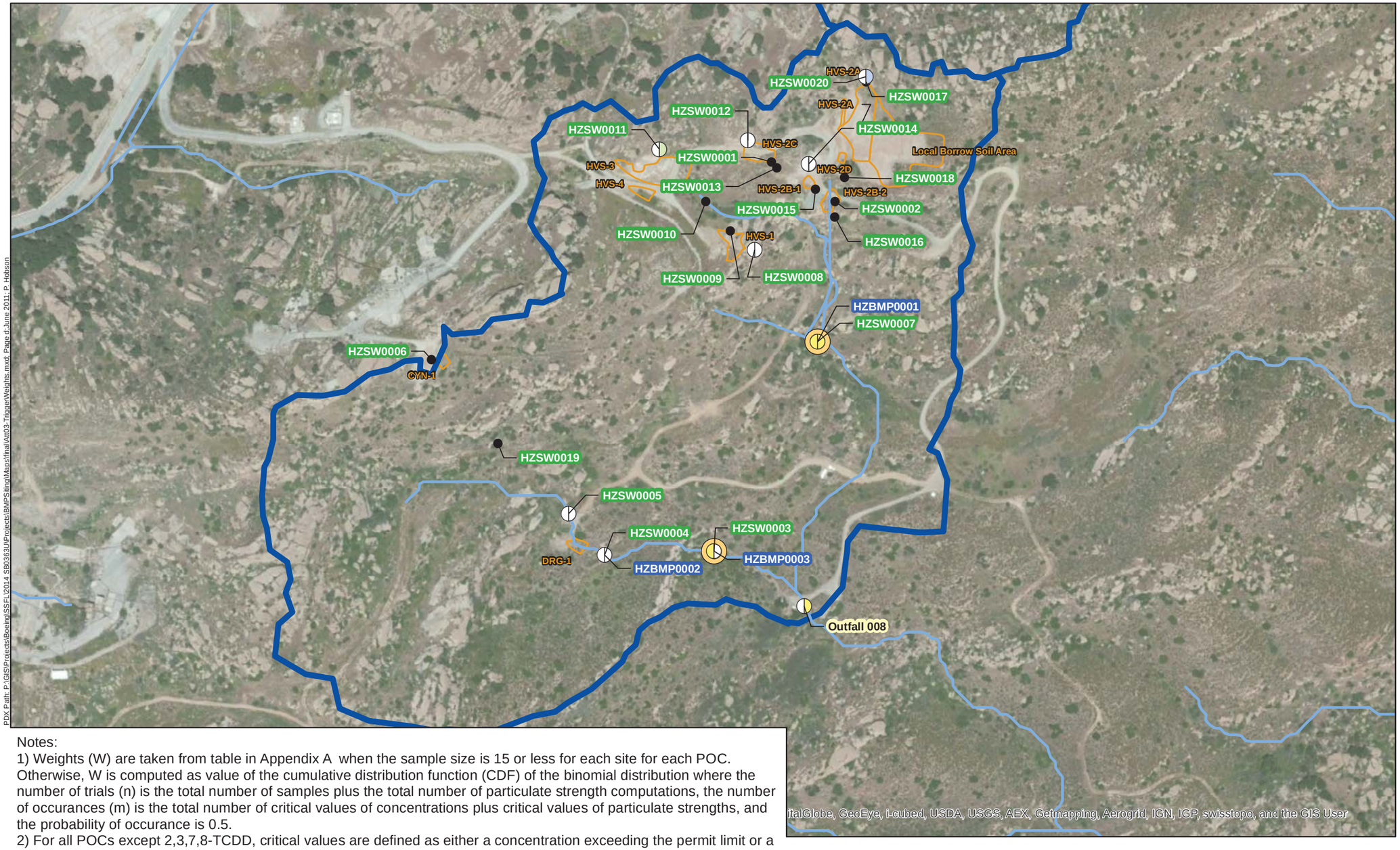
ATTACHMENT 3c

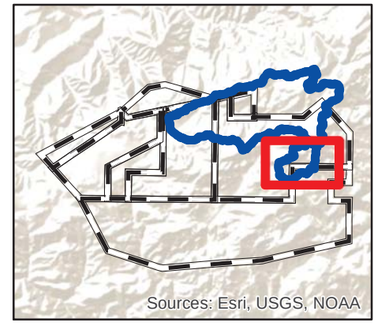
Site Ranking Analysis: Metals and Dioxins in Outfall 009 Watershed (East)

Santa Susana Field Laboratory
Ventura County, CA

Geosyntec consultants

Portland, OR	July 2014





PDX Path: P:\GIS\Projects\Boeing\SSFL\2014 SB0363\UProjects\BMPSting\Mxds\final\At03-TriggerWeights.mxd; Page 0 June 2011 P. Hobson

Features Legend

Max. Dioxin Weight

- 0.0
- 0.0 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 1.0

Max. Metals Weight

- 0.0
- 0.0 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 1.0

- Dual exceedance (note 6)
- Site with no data
- Stream
- Outfall watershed boundary
- ISRA boundary

Site Legend

BMP subarea site Outfalls

Stormwater background site

Notes:

1) Weights (W) are taken from table in Appendix A when the sample size is 15 or less for each site for each POC. Otherwise, W is computed as value of the cumulative distribution function (CDF) of the binomial distribution where the number of trials (n) is the total number of samples plus the total number of particulate strength computations, the number of occurances (m) is the total number of critical values of concentrations plus critical values of particulate strengths, and the probability of occurance is 0.5.
2) For all POCs except 2,3,7,8-TCDD, critical values are defined as either a concentration exceeding the permit limit or a particulate strength computation exceeding the 95th percentile background value.
3) For 2,3,7,8-TCDD, any detection is considered a critical value and particulate strengths are not considered.
4) The weights shown on the map are maximum weight of cadmium, copper, and lead for the metals layer and the maximum weight of TCDD TEQ or 2,3,7,8-TCDD for the dioxins layer.
5) NPDES outfalls are included for comparison and method testing purposes only. Stormwater controls are not being contemplated at these locations.
6) Orange halos underneath locations indicate dual exceedances: sites where at least one POC exceeded both the permit limit and 95th percentile background particulate strength.
7) Some site records have been divided into multiple time periods based on maintenance or upgrades to the BMPs. In these instances, locations are labeled with their original site name but their symbols reflect the site's most recent results.

300 150 0 300
Feet

N

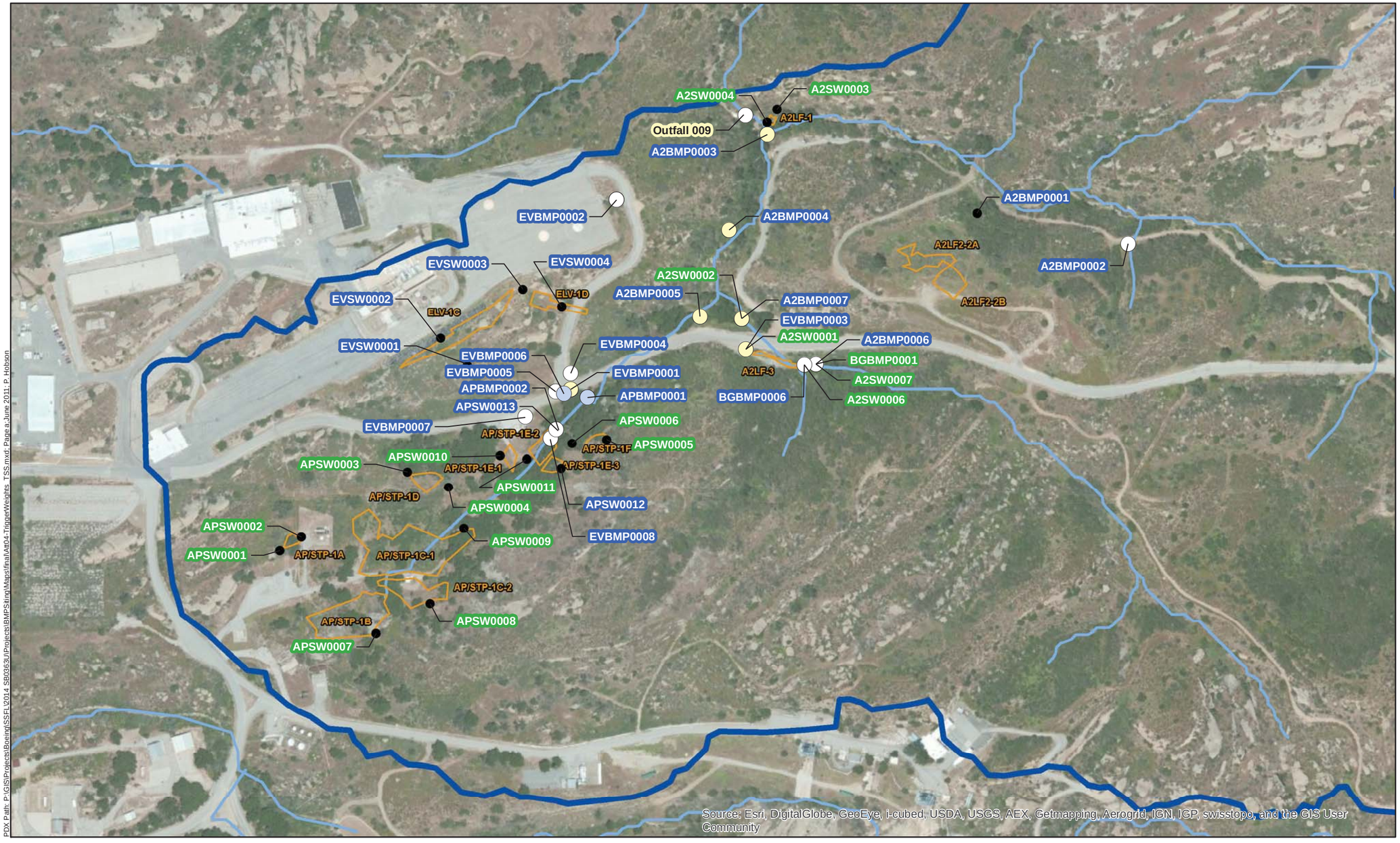
ATTACHMENT 3d

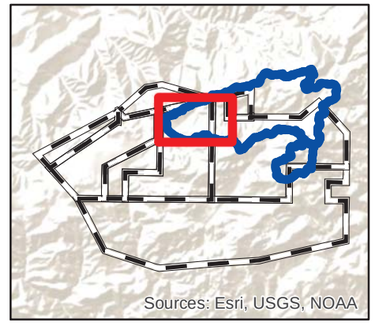
Site Ranking Analysis: Metals and Dioxins in Outfall 008 Watershed

Santa Susana Field Laboratory
Ventura County, CA

Geosyntec consultants

Portland, OR	July 2014





PDX Path: P:\GIS\Projects\Boeing\SSFL\2014_SB03630\UI\Projects\BMP$sing\Maps\final\At04-TriggerWeights_TSS.mxd: Page a June 2011: P. Hobson

Features Legend

TSS Weight

- 0.0
- 0.0 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 1.0
- Site with no data
- ISRA boundary
- Stream
- Outfall watershed boundary

Site Legend

BMP subarea site | Outfalls

Stormwater background site

Notes:

1) Weights (W) are taken from table in Appendix C when the sample size is 14 or less for each site for each POC. Otherwise, W is computed as value of the cumulative distribution function (CDF) of the binomial distribution where the number of trials (n) is the total number of samples; the number of occurances (m) is the total number of critical values of concentrations; and the probability of occurance is 0.5.

2) Critical values are defined as a concentration exceeding the exceeding the 95th percentile background value.

3) NPDES outfalls are included for comparison and method testing purposes only. Stormwater controls are not being contemplated at these locations.

4) Some sites have been divided into multiple time periods based on maintenance or upgrades to the BMPs. In these instances, locations are labeled with their original site name but their symbols reflect the site's most recent results.

300 150 0 300

Feet

N

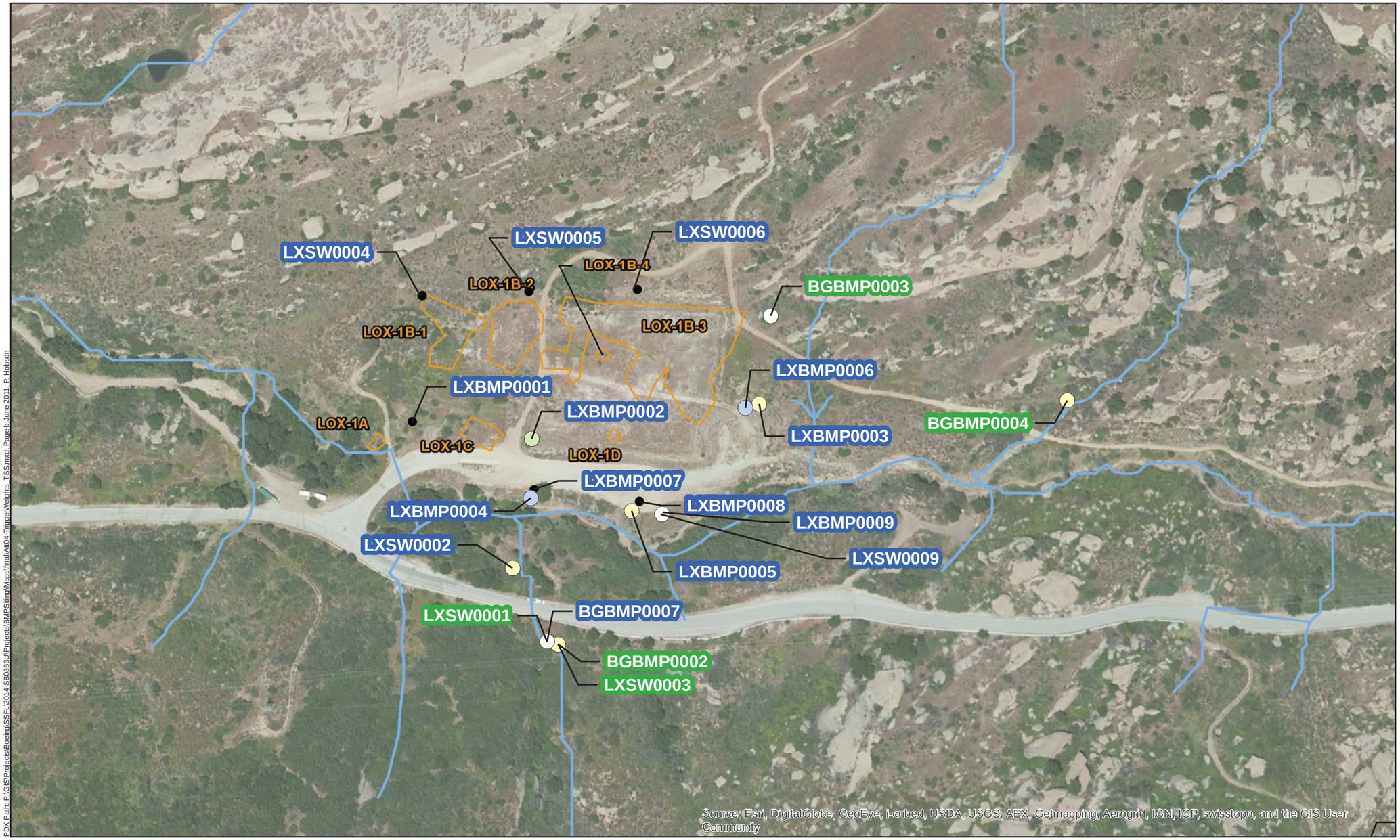
ATTACHMENT 4a

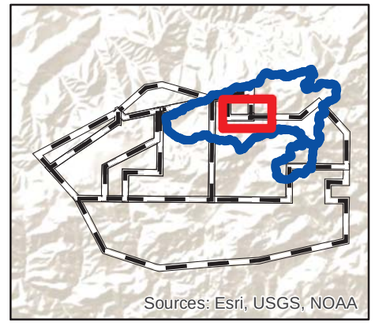
Site Ranking Analysis: Total Suspended Solids in Outfall 009 Watershed (West)

Santa Susana Field Laboratory
Ventura County, CA

Geosyntec consultants
engineers | scientists | innovators

Portland, OR | July 2014





PDX Path: P:\GIS\Projects\Boeing\NSSFL\2014 SB03630J\Projects\BMPSitingMaps\FinalJulAt04-TriggerWeights_TSS.mxd; Page by June 2011; P. Hobson

Features Legend

TSS Weight

- 0.0
- 0.0 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 1.0
- Site with no data
- ISRA boundary
- Stream
- Outfall watershed boundary

Site Legend

BMP subarea site Outfalls

Stormwater background site

Notes:

1) Weights (W) are taken from table in Appendix C when the sample size is 14 or less for each site for each POC. Otherwise, W is computed as value of the cumulative distribution function (CDF) of the binomial distribution where the number of trials (n) is the total number of samples; the number of occurances (m) is the total number of critical values of concentrations; and the probability of occurance is 0.5.

2) Critical values are defined as a concentration exceeding the exceeding the 95th percentile background value.

3) NPDES outfalls are included for comparison and method testing purposes only. Stormwater controls are not being contemplated at these locations.

4) Some sites have been divided into multiple time periods based on maintenance or upgrades to the BMPs. In these instances, locations are labeled with their original site name but their symbols reflect the site's most recent results.

200 100 0 200

Feet

N

ATTACHMENT 4b

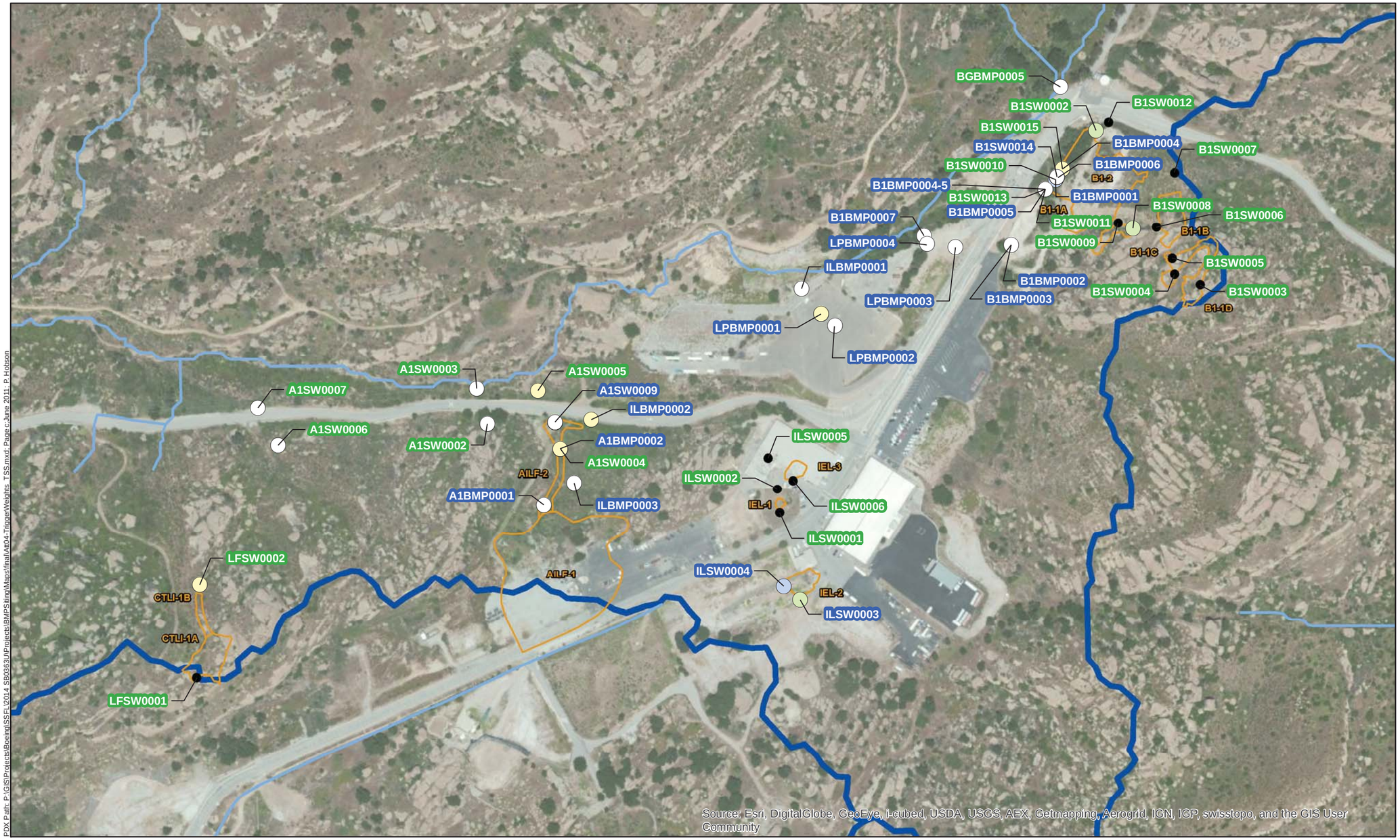
Site Ranking Analysis: Total Suspended Solids in Outfall 009 Watershed (Central)

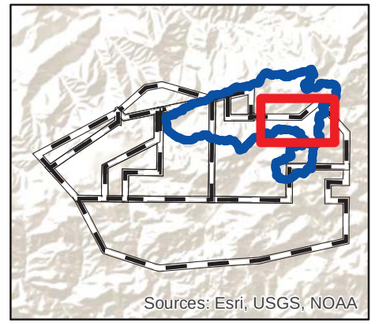
Santa Susana Field Laboratory
Ventura County, CA

Geosyntec consultants

engineers | scientists | innovators

Portland, OR | July 2014





PDX Path: P:\GIS\Projects\Boeing\SSFL\2014_SB0362UI\Projects\BMPRankingMaps\final\Alt04-TriggerWeights_TSS.mxd; Page c;June 2011; P. Hobson

Features Legend

TSS Weight

- 0.0
- 0.0 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 1.0
- Site with no data
- ISRA boundary
- Stream
- Outfall watershed boundary

Site Legend

BMP subarea site Outfalls

Stormwater background site

Notes:
1) Weights (W) are taken from table in Appendix C when the sample size is 14 or less for each site for each POC. Otherwise, W is computed as value of the cumulative distribution function (CDF) of the binomial distribution where the number of trials (n) is the total number of samples; the number of occurances (m) is the total number of critical values of concentrations; and the probability of occurance is 0.5.
2) Critical values are defined as a concentration exceeding the exceeding the 95th percentile background value.
3) NPDES outfalls are included for comparison and method testing purposes only. Stormwater controls are not being contemplated at these locations.
4) Some sites have been divided into multiple time periods based on maintenance or upgrades to the BMPs. In these instances, locations are labeled with their original site name but their symbols reflect the site's most recent results.

300 150 0 300
Feet

N

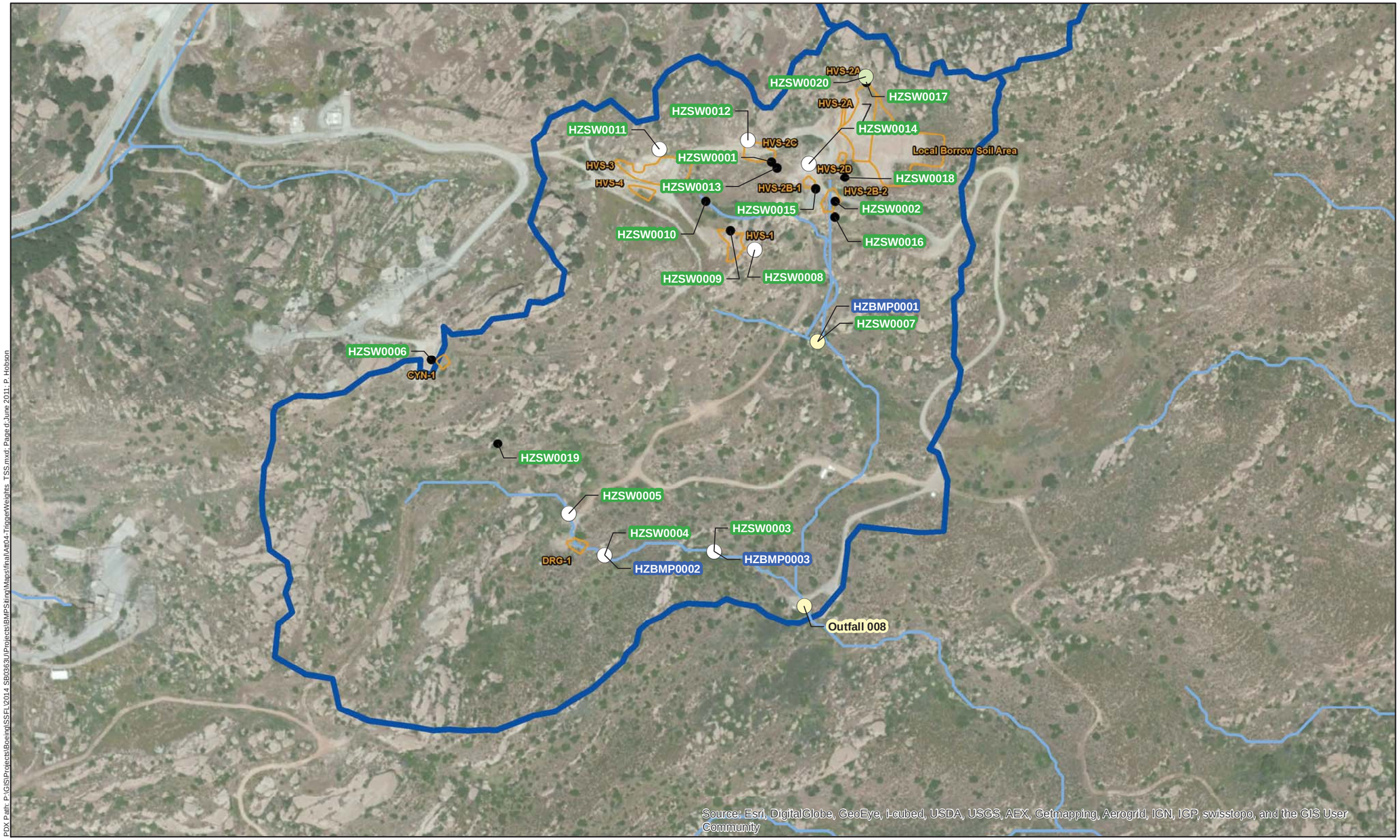
ATTACHMENT 4c

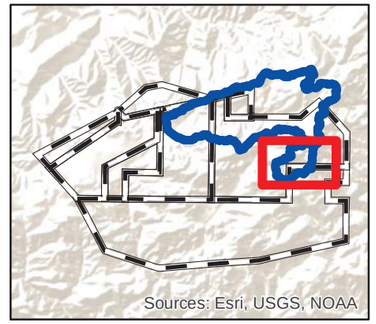
Site Ranking Analysis: Total Suspended Solids in Outfall 009 Watershed (East)

Santa Susana Field Laboratory
Ventura County, CA

Geosyntec consultants
engineers | scientists | innovators

Portland, OR | July 2014





PDX Path: P:\GIS\Projects\Boeing\SSFL\2014 SB0363U\Projects\BMPSiting\Maps\final\Al04-TriggetWeights_TSS.mxd; Paged June 2011; P. Hobson

Features Legend

TSS Weight

- 0.0
- 0.0 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 1.0
- Site with no data
- ISRA boundary
- Stream
- Outfall watershed boundary

Site Legend

BMP subarea site Outfalls

Stormwater background site

Notes:

1) Weights (W) are taken from table in Appendix C when the sample size is 14 or less for each site for each POC. Otherwise, W is computed as value of the cumulative distribution function (CDF) of the binomial distribution where the number of trials (n) is the total number of samples; the number of occurances (m) is the total number of critical values of concentrations; and the probability of occurance is 0.5.

2) Critical values are defined as a concentration exceeding the exceeding the 95th percentile background value.

3) NPDES outfalls are included for comparison and method testing purposes only. Stormwater controls are not being contemplated at these locations.

4) Some sites have been divided into multiple time periods based on maintenance or upgrades to the BMPs. In these instances, locations are labeled with their original site name but their symbols reflect the site's most recent results.

300 150 0 300

Feet

N

ATTACHMENT 4d

Site Ranking Analysis: Total Suspended Solids in Outfall 008 Watershed

Santa Susana Field Laboratory
Ventura County, CA

Geosyntec consultants

engineers | scientists | innovators

Portland, OR	July 2014

Technical Appendix A
Summary of Results by Subarea

Note: All median and maximum values in µg/L except TSS, which is in mg/L.

Location	Rank	POC	Concentration					Particulate Strength					Weight	Both Criteria Exceeded?
			Number of Samples	Number of NDs	Median	Maximum	N > PL	Number of PS	Number of NDs	Median PS	Maximum	N > 95th		
A1BMP0001	1	Cadmium	5	0	0.48	0.51	0	5	0	9.3E-03	0.05	4	0.38	no
	2	TCDD TEQ	5	0	8.8E-10	5.6E-07	1	5	0	4.0E-11	5.6E-07	1	0.05	yes
	3	Copper	5	0	4.2	5.3	0	5	0	0.09	0.30	1	0.01	no
	3	Lead	5	2	0.28	2.5	0	5	2	0.04	0.23	1	0.01	no
	4	Total Suspended Solids	5	0	11.0	22.0	0	--	--	--	--	--	0	no
	4	2,3,7,8-TCDD	5	5	<2.3e-06	<4.4e-06	0	--	--	--	--	--	0	no
A1BMP0002	1	Copper	15	0	4.4	20.0	1	15	0	0.17	2.2	6	2.6E-03	yes
	2	Total Suspended Solids	15	3	8.0	180	0	--	--	--	--	--	0	no
	2	Cadmium	15	0	0.25	0.96	0	15	0	7.0E-04	7.0E-04	1	0	no
	2	Lead	15	3	0.63	11.0	3	15	3	0.10	0.27	1	0	yes
	2	TCDD TEQ	8	0	1.3E-08	2.4E-07	2	15	0	3.6E-09	2.1E-08	0	0	no
	2	2,3,7,8-TCDD	8	8	<7e-07	<3.6e-06	0	--	--	--	--	--	0	no
A1BMP0002-A	1	TCDD TEQ	3	0	2.0E-07	1.8E-06	3	4	0	7.4E-09	3.9E-07	1	0.50	yes
	2	Total Suspended Solids	4	0	164	320	0	--	--	--	--	--	0.14	no
	2	Cadmium	4	2	<0.52	1.4	0	4	2	<0.001	4.2E-03	2	0.14	no
	2	Copper	4	0	11.0	15.0	2	4	0	0.04	0.04	0	0.14	no
	3	Lead	4	2	<4.7	15.0	1	4	2	<0.014	0.05	0	0.04	no
	4	2,3,7,8-TCDD	3	3	<2.1e-06	<4.7e-06	0	--	--	--	--	--	0	no
A1SW0002	1	Lead	10	1	0.58	11.0	3	10	1	0.11	0.31	1	5.9E-03	yes
	2	Total Suspended Solids	10	1	3.0	82.0	0	--	--	--	--	--	0	no
	2	Cadmium	0	0	--	--	0	10	0	--	--	0	0	no
	2	Copper	0	0	--	--	0	10	0	--	--	0	0	no
	2	TCDD TEQ	0	0	--	--	0	10	0	--	--	0	0	no
	2	2,3,7,8-TCDD	0	0	--	--	0	--	--	--	--	--	0	no
A1SW0003	1	Lead	10	2	0.29	7.0	1	10	2	0.18	0.26	3	5.9E-03	yes
	2	Total Suspended Solids	10	2	5.5	33.0	0	--	--	--	--	--	0	no
	2	Cadmium	0	0	--	--	0	10	0	--	--	0	0	no
	2	Copper	0	0	--	--	0	10	0	--	--	0	0	no
	2	TCDD TEQ	0	0	--	--	0	10	0	--	--	0	0	no
	2	2,3,7,8-TCDD	0	0	--	--	0	--	--	--	--	--	0	no
A1SW0005	1	Copper	10	0	4.3	11.0	0	10	0	0.10	1.7	3	1.3E-03	no
	1	Lead	10	1	0.61	15.0	2	10	1	0.08	0.28	1	1.3E-03	yes
	2	Total Suspended Solids	10	1	11.5	100	0	--	--	--	--	--	2.0E-04	no
	3	Cadmium	10	2	0.12	0.43	0	10	2	ND	2.9E-03	1	0	no
	3	TCDD TEQ	5	0	5.5E-09	4.5E-08	1	10	0	1.4E-09	4.5E-08	1	0	yes
	3	2,3,7,8-TCDD	5	5	<6.5e-07	<3.8e-06	0	--	--	--	--	--	0	no
A1SW0006	1	TCDD TEQ	12	2	5.9E-09	8.5E-07	4	12	2	9.0E-10	4.8E-08	2	0.01	yes
	2	Total Suspended Solids	12	2	3.5	19.0	0	--	--	--	--	--	0	no
	2	Cadmium	0	0	--	--	0	12	0	--	--	0	0	no
	2	Copper	0	0	--	--	0	12	0	--	--	0	0	no
	2	Lead	0	0	--	--	0	12	0	--	--	0	0	no
	2	2,3,7,8-TCDD	12	12	<5.4e-07	<2.8e-06	0	--	--	--	--	--	0	no

Location	Rank	POC	Concentration					Particulate Strength					Weight	Both Criteria Exceeded?
			Number of Samples	Number of NDs	Median	Maximum	N > PL	Number of PS	Number of NDs	Median PS	Maximum	N > 95th		
A1SW0007	1	TCDD TEQ	12	0	4.5E-09	1.4E-06	4	12	0	3.0E-09	6.9E-07	2	0.01	yes
	2	Total Suspended Solids	12	3	2.5	24.0	0	--	--	--	--	--	0	no
	2	Cadmium	0	0	--	--	0	12	0	--	--	0	0	no
	2	Copper	0	0	--	--	0	12	0	--	--	0	0	no
	2	Lead	0	0	--	--	0	12	0	--	--	0	0	no
	2	2,3,7,8-TCDD	12	12	<6.9e-07	<1.8e-05	0	--	--	--	--	--	0	no
A1SW0009-A	1	Lead	1	0	9.1	9.1	1	1	0	0.69	0.69	1	0.75	yes
	2	Copper	1	0	7.9	7.9	0	1	0	0.29	0.29	1	0.50	no
	2	TCDD TEQ	1	0	1.8E-07	1.8E-07	1	1	0	1.6E-08	1.6E-08	0	0.50	no
	3	Total Suspended Solids	1	0	11.0	11.0	0	--	--	--	--	--	0	no
	3	Cadmium	1	1	<0.1	<0.1	0	1	1	ND	ND	0	0	no
	3	2,3,7,8-TCDD	1	1	<2.6e-06	<2.6e-06	0	--	--	--	--	--	0	no
A1SW0009-B	1	TCDD TEQ	5	0	1.8E-07	3.2E-06	5	6	0	3.5E-09	1.7E-07	1	0.50	yes
	2	Lead	6	0	12.1	36.0	4	6	0	0.13	0.84	1	0.39	yes
	3	Total Suspended Solids	6	0	33.5	450	0	--	--	--	--	--	0.02	no
	4	Cadmium	6	4	<0.2	0.39	0	6	4	ND	ND	0	0	no
	4	Copper	6	0	8.0	22.0	1	6	0	0.09	0.27	0	0	no
	4	2,3,7,8-TCDD	5	5	<9.2e-07	<8.5e-06	0	--	--	--	--	--	0	no
A1SW0009-C	1	TCDD TEQ	1	0	2.1E-07	2.1E-07	1	1	0	2.1E-08	2.1E-08	0	0.50	no
	2	Total Suspended Solids	1	0	10.0	10.0	0	--	--	--	--	--	0	no
	2	Cadmium	1	1	<0.25	<0.25	0	1	1	ND	ND	0	0	no
	2	Copper	1	0	6.5	6.5	0	1	0	--	--	0	0	no
	2	Lead	1	0	2.3	2.3	0	1	0	0.16	0.16	0	0	no
	2	2,3,7,8-TCDD	1	1	<3.04e-06	<3.04e-06	0	--	--	--	--	--	0	no
A2BMP0002	1	Total Suspended Solids	1	0	3.0	3.0	0	--	--	--	--	--	0	no
	1	Cadmium	1	1	<0.1	<0.1	0	1	1	ND	ND	0	0	no
	1	Copper	1	0	2.4	2.4	0	1	0	0.13	0.13	0	0	no
	1	Lead	1	0	0.29	0.29	0	1	0	0.08	0.08	0	0	no
	1	TCDD TEQ	1	0	1.1E-11	1.1E-11	0	1	0	3.7E-12	3.7E-12	0	0	no
	1	2,3,7,8-TCDD	1	1	<3.4e-06	<3.4e-06	0	--	--	--	--	--	0	no
A2BMP0003	1	TCDD TEQ	8	1	6.8E-08	9.6E-06	4	8	1	8.0E-10	8.7E-07	1	0.11	yes
	2	Total Suspended Solids	8	1	15.5	1400	0	--	--	--	--	--	2.1E-03	no
	2	Cadmium	8	6	<0.2	1.0	0	8	6	ND	6.4E-04	2	2.1E-03	no
	2	Lead	8	0	1.4	68.0	2	8	0	0.06	0.11	0	2.1E-03	no
	3	Copper	8	0	3.6	28.0	1	8	0	0.02	0.07	0	3.0E-04	no
	4	2,3,7,8-TCDD	8	8	<1.3e-06	<2.9e-06	0	--	--	--	--	--	0	no
A2BMP0004	1	TCDD TEQ	3	0	5.7E-08	7.2E-07	2	3	0	1.8E-09	5.5E-09	0	0.34	no
	2	Total Suspended Solids	3	0	31.0	130	0	--	--	--	--	--	0.11	no
	2	Cadmium	3	2	<0.1	0.16	0	3	2	ND	5.5E-04	1	0.11	no
	2	Lead	3	0	4.2	10.0	1	3	0	0.08	0.12	0	0.11	no
	3	Copper	3	0	6.7	7.8	0	3	0	0.05	0.16	0	0	no
	3	2,3,7,8-TCDD	3	3	<1.4e-06	<2.1e-06	0	--	--	--	--	--	0	no

Location	Rank	POC	Concentration					Particulate Strength					Weight	Both Criteria Exceeded?
			Number of Samples	Number of NDs	Median	Maximum	N > PL	Number of PS	Number of NDs	Median PS	Maximum	N > 95th		
A2BMP0005	1	TCDD TEQ	4	0	3.3E-07	1.9E-05	4	4	0	4.9E-09	2.2E-07	1	0.64	yes
	2	Total Suspended Solids	4	0	66.5	86.0	0	--	--	--	--	--	0.04	no
	2	Cadmium	4	3	<0.25	0.12	0	4	3	ND	6.3E-04	1	0.04	no
	2	Lead	4	0	4.5	11.0	1	4	0	0.06	0.12	0	0.04	no
	3	Copper	4	0	4.9	8.7	0	4	0	0.04	0.05	0	0	no
	3	2,3,7,8-TCDD	4	4	<1.6e-06	<2.73e-06	0	--	--	--	--	--	0	no
A2SW0002	1	TCDD TEQ	16	0	9.6E-08	1.0E-05	10	16	0	1.3E-08	5.1E-07	6	0.57	yes
	2	Lead	16	4	1.5	39.0	4	16	4	0.17	1.1	5	0.01	yes
	3	2,3,7,8-TCDD	16	15	<1.1e-06	1.4E-06	1	--	--	--	--	--	3.0E-04	no
	4	Total Suspended Solids	16	3	8.5	610	0	--	--	--	--	--	0	no
	4	Cadmium	0	0	--	--	0	16	0	--	--	0	0	no
	4	Copper	0	0	--	--	0	16	0	--	--	0	0	no
A2SW0002-A	1	TCDD TEQ	9	0	8.2E-08	4.8E-05	5	9	0	5.9E-09	6.4E-07	2	0.24	yes
	2	2,3,7,8-TCDD	9	8	<8.2e-07	7.0E-06	1	--	--	--	--	--	0.02	no
	3	Lead	9	0	3.2	14.0	2	9	0	0.15	0.33	2	0.02	yes
	4	Total Suspended Solids	9	3	14.0	76.0	0	--	--	--	--	--	1.0E-04	no
	5	Cadmium	5	4	<0.1	0.22	0	9	4	ND	9.9E-03	1	0	no
	5	Copper	5	0	3.4	6.8	0	9	0	0.05	0.45	1	0	no
APBMP0001	1	Lead	2	0	18.8	31.0	2	2	0	0.37	0.64	1	0.69	yes
	2	Cadmium	2	0	0.21	0.30	0	2	0	1.9E-03	2.8E-03	2	0.50	no
	2	TCDD TEQ	2	0	5.2E-07	6.3E-07	2	2	0	9.8E-09	1.1E-08	0	0.50	no
	3	Total Suspended Solids	2	0	53.0	58.0	0	--	--	--	--	--	0	no
	3	Copper	2	0	6.6	9.9	0	2	0	0.05	0.06	0	0	no
	3	2,3,7,8-TCDD	2	2	<9.8e-07	<9.8e-07	0	--	--	--	--	--	0	no
APBMP0001-A	1	Copper	1	0	86.0	86.0	1	1	0	1.1	1.1	1	0.75	yes
	1	Lead	1	0	60.0	60.0	1	1	0	0.77	0.77	1	0.75	yes
	2	Total Suspended Solids	1	0	77.0	77.0	0	--	--	--	--	--	0.50	no
	2	TCDD TEQ	1	0	1.1E-06	1.1E-06	1	1	0	1.4E-08	1.4E-08	0	0.50	no
	3	Cadmium	1	1	<1.3	<1.3	0	1	1	ND	ND	0	0	no
	3	2,3,7,8-TCDD	1	1	<3.23e-06	<3.23e-06	0	--	--	--	--	--	0	no
APSW0014	1	TCDD TEQ	1	0	5.5E-07	5.5E-07	1	1	0	1.6E-08	1.6E-08	0	0.50	no
	2	Total Suspended Solids	1	0	35.0	35.0	0	--	--	--	--	--	0	no
	2	Cadmium	1	1	<0.25	<0.25	0	1	1	ND	ND	0	0	no
	2	Copper	1	0	11.0	11.0	0	1	0	0.13	0.13	0	0	no
	2	Lead	1	0	4.2	4.2	0	1	0	0.10	0.10	0	0	no
	2	2,3,7,8-TCDD	1	1	<4.34e-06	<4.34e-06	0	--	--	--	--	--	0	no
B1BMP0001	1	Total Suspended Solids	1	0	270	270	0	--	--	--	--	--	0.50	no
	1	Cadmium	1	0	0.54	0.54	0	1	0	9.0E-04	9.0E-04	1	0.50	no
	1	Copper	1	0	16.0	16.0	1	1	0	0.05	0.05	0	0.50	no
	1	Lead	1	0	15.0	15.0	1	1	0	0.05	0.05	0	0.50	no
	1	TCDD TEQ	1	0	4.8E-08	4.8E-08	1	1	0	1.8E-10	1.8E-10	0	0.50	no
	2	2,3,7,8-TCDD	1	1	<3.2e-06	<3.2e-06	0	--	--	--	--	--	0	no

Location	Rank	POC	Concentration					Particulate Strength					Weight	Both Criteria Exceeded?
			Number of Samples	Number of NDs	Median	Maximum	N > PL	Number of PS	Number of NDs	Median PS	Maximum	N > 95th		
B1BMP0003	1	TCDD TEQ	18	1	1.0E-06	1.4E-05	15	18	1	3.0E-08	5.9E-07	9	0.99	yes
	2	Cadmium	18	11	<0.25	0.22	0	18	11	ND	3.3E-03	7	2.0E-04	no
	3	Total Suspended Solids	18	4	25.0	110	0	--	--	--	--	--	0	no
	3	Copper	18	0	6.4	18.0	3	18	0	0.08	0.50	1	0	yes
	3	Lead	18	1	2.0	7.3	4	18	1	0.07	0.18	0	0	no
	3	2,3,7,8-TCDD	18	18	<1.2e-06	<6.3e-06	0	--	--	--	--	--	0	no
B1BMP0004	1	TCDD TEQ	12	0	4.0E-07	1.9E-05	11	12	0	3.0E-08	4.7E-07	6	0.99	yes
	2	Lead	12	0	4.2	9.6	4	12	0	0.12	0.50	3	0.03	yes
	3	Cadmium	12	5	0.12	0.24	0	12	4	5.0E-04	3.9E-03	6	0.01	no
	4	Total Suspended Solids	12	2	29.5	170	0	--	--	--	--	--	1.0E-04	no
	5	Copper	12	0	5.2	9.0	0	12	0	0.06	0.17	0	0	no
	5	2,3,7,8-TCDD	12	12	<2.1e-06	<1e-05	0	--	--	--	--	--	0	no
B1BMP0005	1	TCDD TEQ	16	1	2.2E-07	2.6E-05	11	16	1	1.8E-08	2.0E-06	7	0.81	yes
	2	2,3,7,8-TCDD	16	14	<2.29e-06	1.9E-06	2	--	--	--	--	--	2.1E-03	no
	3	Cadmium	16	10	<0.25	0.24	0	16	10	ND	3.9E-03	5	1.0E-04	no
	4	Total Suspended Solids	16	3	31.5	170	0	--	--	--	--	--	0	no
	4	Copper	16	0	3.5	8.4	0	16	0	0.05	0.26	0	0	no
	4	Lead	16	0	1.9	9.6	1	16	0	0.05	0.22	0	0	no
B1BMP0007	1	TCDD TEQ	4	0	6.8E-08	3.1E-07	2	4	0	4.7E-09	7.5E-09	0	0.14	no
	2	Total Suspended Solids	4	2	<16.0	41.0	0	--	--	--	--	--	0	no
	2	Cadmium	4	4	<0.2	<0.25	0	4	4	ND	ND	0	0	no
	2	Copper	4	0	4.5	7.5	0	4	0	0.06	0.08	0	0	no
	2	Lead	4	0	1.9	3.0	0	4	0	0.07	0.16	0	0	no
	2	2,3,7,8-TCDD	4	4	<1.82e-06	<2.4e-06	0	--	--	--	--	--	0	no
B1SW0002	1	Lead	2	0	6.8	12.0	1	2	0	0.21	0.33	1	0.50	yes
	1	TCDD TEQ	2	1	<2.34e-05	2.3E-05	1	2	1	<2.13e-07	2.1E-07	1	0.50	yes
	2	Total Suspended Solids	2	0	57.0	110	0	--	--	--	--	--	0.31	no
	2	Copper	2	0	6.7	10.0	0	2	0	0.19	0.34	1	0.31	no
	3	Cadmium	2	0	0.17	0.24	0	2	0	--	--	0	0	no
	3	2,3,7,8-TCDD	2	2	<8e-06	<8e-06	0	--	--	--	--	--	0	no
B1SW0008	1	TCDD TEQ	2	0	8.3E-06	1.6E-05	2	2	0	1.4E-07	2.8E-07	1	0.69	yes
	2	Total Suspended Solids	2	0	168	280	0	--	--	--	--	--	0.31	no
	3	Cadmium	2	1	<0.22	0.22	0	2	1	ND	ND	0	0	no
	3	Copper	0	0	--	--	0	2	0	--	--	0	0	no
	3	Lead	0	0	--	--	0	2	0	--	--	0	0	no
	3	2,3,7,8-TCDD	2	2	<9.8e-07	<9.8e-07	0	--	--	--	--	--	0	no
B1SW0014-A	1	Total Suspended Solids	1	0	80.0	80.0	0	--	--	--	--	--	0.50	no
	1	Lead	1	0	6.9	6.9	1	1	0	0.07	0.07	0	0.50	no
	1	TCDD TEQ	1	0	2.8E-07	2.8E-07	1	1	0	3.5E-09	3.5E-09	0	0.50	no
	2	Cadmium	1	1	<0.1	<0.1	0	1	1	ND	ND	0	0	no
	2	Copper	1	0	5.9	5.9	0	1	0	0.03	0.03	0	0	no
	2	2,3,7,8-TCDD	1	1	<1.9e-06	<1.9e-06	0	--	--	--	--	--	0	no

Location	Rank	POC	Concentration					Particulate Strength					Weight	Both Criteria Exceeded?
			Number of Samples	Number of NDs	Median	Maximum	N > PL	Number of PS	Number of NDs	Median PS	Maximum	N > 95th		
B1SW0014-B	1	TCDD TEQ	3	0	3.3E-07	5.9E-07	3	4	0	1.1E-08	2.2E-08	0	0.50	no
	2	Lead	4	0	2.7	6.7	1	4	0	0.07	0.08	0	0.04	no
	3	Total Suspended Solids	4	0	36.5	71.0	0	--	--	--	--	--	0	no
	3	Cadmium	4	4	<0.1	<0.2	0	4	4	ND	ND	0	0	no
	3	Copper	4	0	3.8	4.1	0	4	0	0.04	0.05	0	0	no
	3	2,3,7,8-TCDD	3	3	<3.9e-06	<5.1e-06	0	--	--	--	--	--	0	no
B1SW0014-C	1	TCDD TEQ	8	0	5.3E-08	1.6E-06	5	8	0	3.2E-09	1.0E-07	1	0.23	yes
	2	Total Suspended Solids	8	0	17.0	41.0	0	--	--	--	--	--	0	no
	2	Cadmium	8	8	<0.1	<0.25	0	8	8	ND	ND	0	0	no
	2	Copper	8	0	2.7	4.7	0	8	0	0.05	0.11	0	0	no
	2	Lead	8	0	1.6	3.0	0	8	0	0.07	0.15	0	0	no
	2	2,3,7,8-TCDD	8	8	<8e-07	<3.1e-06	0	--	--	--	--	--	0	no
BGBMP0001	1	Cadmium	4	3	<0.1	0.16	0	4	3	ND	0.01	1	0.04	no
	1	Copper	4	0	2.5	3.6	0	4	0	0.10	0.31	1	0.04	no
	2	Total Suspended Solids	4	1	5.5	8.0	0	--	--	--	--	--	0	no
	2	Lead	4	1	0.59	0.80	0	4	1	0.07	0.14	0	0	no
	2	TCDD TEQ	4	2	<6.4e-12	7.9E-12	0	4	2	<9.14e-13	7.9E-12	0	0	no
	2	2,3,7,8-TCDD	4	4	<8.7e-07	<2.1e-06	0	--	--	--	--	--	0	no
BGBMP0002	1	Total Suspended Solids	4	0	20.5	750	0	--	--	--	--	--	0.04	no
	1	Cadmium	4	3	<0.2	0.87	0	4	3	ND	1.0E-03	1	0.04	no
	1	Copper	4	0	1.6	19.0	1	4	0	0.02	0.04	0	0.04	no
	1	Lead	4	0	1.3	64.0	1	4	0	0.05	0.09	0	0.04	no
	1	TCDD TEQ	4	2	<6e-10	1.0E-07	1	4	2	<1.2e-10	1.4E-10	0	0.04	no
	2	2,3,7,8-TCDD	4	4	<1.8e-06	<3.4e-06	0	--	--	--	--	--	0	no
BGBMP0003	1	TCDD TEQ	5	3	<1e-10	3.3E-07	1	5	3	ND	6.3E-09	0	0.01	no
	2	Total Suspended Solids	5	2	5.0	53.0	0	--	--	--	--	--	0	no
	2	Cadmium	5	5	<0.1	<0.2	0	5	5	ND	ND	0	0	no
	2	Copper	5	0	3.0	4.7	0	5	0	0.09	0.13	0	0	no
	2	Lead	5	1	0.69	2.8	0	5	1	0.05	0.09	0	0	no
	2	2,3,7,8-TCDD	5	5	<1.9e-06	<4.7e-06	0	--	--	--	--	--	0	no
BGBMP0004	1	Total Suspended Solids	3	0	17.0	240	0	--	--	--	--	--	0.11	no
	1	Lead	3	1	0.91	7.6	1	3	1	0.03	0.04	0	0.11	no
	1	TCDD TEQ	3	0	4.9E-10	4.0E-08	1	3	0	1.2E-10	1.7E-10	0	0.11	no
	2	Cadmium	3	3	<0.1	<0.2	0	3	3	ND	ND	0	0	no
	2	Copper	3	0	2.4	6.6	0	3	0	0.03	0.05	0	0	no
	2	2,3,7,8-TCDD	3	3	<1e-06	<4e-06	0	--	--	--	--	--	0	no
BGBMP0005	1	Total Suspended Solids	1	0	11.0	11.0	0	--	--	--	--	--	0	no
	1	Cadmium	1	1	<0.1	<0.1	0	1	1	ND	ND	0	0	no
	1	Copper	1	0	2.4	2.4	0	1	0	--	--	0	0	no
	1	Lead	1	0	0.84	0.84	0	1	0	--	--	0	0	no
	1	TCDD TEQ	1	0	2.8E-11	2.8E-11	0	1	0	2.6E-12	2.6E-12	0	0	no
	1	2,3,7,8-TCDD	1	1	<3.9e-06	<3.9e-06	0	--	--	--	--	--	0	no

Location	Rank	POC	Concentration					Particulate Strength					Weight	Both Criteria Exceeded?
			Number of Samples	Number of NDs	Median	Maximum	N > PL	Number of PS	Number of NDs	Median PS	Maximum	N > 95th		
BGBMP0006	1	Lead	7	1	1.5	17.0	1	7	1	0.09	1.3	2	0.03	yes
	1	TCDD TEQ	7	0	1.6E-08	2.0E-07	2	7	0	2.3E-09	2.0E-07	1	0.03	yes
	2	Total Suspended Solids	7	1	3.0	250	0	--	--	--	--	--	0	no
	2	Cadmium	1	1	<0.1	<0.1	0	7	1	ND	ND	0	0	no
	2	Copper	1	0	2.9	2.9	0	7	0	5.6E-03	5.6E-03	0	0	no
	2	2,3,7,8-TCDD	7	7	<6.2e-07	<1.8e-06	0	--	--	--	--	--	0	no
BGBMP0007	1	Lead	7	0	1.0	16.0	1	7	0	0.08	0.34	1	0.01	yes
	2	Total Suspended Solids	7	0	7.0	39.0	0	--	--	--	--	--	0	no
	2	Cadmium	7	6	<0.1	0.26	0	7	6	ND	ND	0	0	no
	2	Copper	7	0	1.5	7.5	0	7	0	0.08	0.20	0	0	no
	2	TCDD TEQ	7	3	1.1E-11	1.0E-08	0	7	3	1.8E-12	3.5E-10	0	0	no
	2	2,3,7,8-TCDD	7	7	<8.1e-07	<5.4e-06	0	--	--	--	--	--	0	no
EVBMP0001	1	Total Suspended Solids	3	0	10.0	150	0	--	--	--	--	--	0.11	no
	1	Cadmium	3	2	<0.1	0.16	0	3	2	ND	4.8E-04	1	0.11	no
	1	Lead	3	1	1.9	13.0	1	3	1	0.07	0.16	0	0.11	no
	1	TCDD TEQ	3	1	7.1E-10	7.7E-08	1	3	1	3.6E-10	5.1E-10	0	0.11	no
	2	Copper	3	0	2.5	11.0	0	3	0	0.04	0.06	0	0	no
	2	2,3,7,8-TCDD	3	3	<9e-07	<2.4e-06	0	--	--	--	--	--	0	no
EVBMP0001-A	1	TCDD TEQ	7	0	3.9E-07	2.1E-04	6	7	0	1.4E-08	3.5E-06	3	0.79	yes
	2	Lead	7	0	3.7	41.0	3	7	0	0.11	0.32	1	0.09	yes
	3	2,3,7,8-TCDD	7	6	<3.28e-06	2.2E-05	1	--	--	--	--	--	0.06	no
	4	Total Suspended Solids	7	0	56.0	480	0	--	--	--	--	--	0.01	no
	4	Cadmium	7	5	<0.25	0.41	0	7	5	ND	6.5E-04	2	0.01	no
	5	Copper	7	0	3.8	15.0	1	7	0	0.03	0.06	0	0	no
EVBMP0002	1	TCDD TEQ	6	0	4.4E-07	2.8E-06	6	6	0	4.3E-08	1.4E-06	3	0.93	yes
	2	Cadmium	6	1	0.16	0.28	0	6	1	3.1E-03	0.03	5	0.39	no
	3	Lead	6	0	3.4	26.0	1	6	0	0.28	1.1	3	0.19	yes
	4	Copper	6	0	4.6	13.0	0	6	0	0.12	0.60	2	0.02	no
	5	Total Suspended Solids	6	0	12.0	120	0	--	--	--	--	--	0	no
	5	2,3,7,8-TCDD	6	6	<2.4e-06	<4e-06	0	--	--	--	--	--	0	no
EVBMP0002-A	1	TCDD TEQ	5	0	3.8E-08	7.0E-08	3	5	0	6.2E-10	7.0E-09	0	0.17	no
	2	Cadmium	5	4	<0.1	0.13	0	5	4	ND	2.5E-03	1	0.01	no
	2	Lead	5	0	3.8	4.8	0	5	0	0.19	0.34	1	0.01	no
	3	Total Suspended Solids	5	0	12.0	61.0	0	--	--	--	--	--	0	no
	3	Copper	5	0	3.6	7.7	0	5	0	0.04	0.15	0	0	no
	3	2,3,7,8-TCDD	5	5	<1.1e-06	<5.3e-06	0	--	--	--	--	--	0	no
EVBMP0002-B	1	TCDD TEQ	5	0	9.2E-08	2.8E-06	3	5	0	9.2E-09	2.8E-07	1	0.38	yes
	2	Lead	5	0	2.6	3.4	0	5	0	0.18	0.29	1	0.01	no
	3	Total Suspended Solids	5	3	<10.0	14.0	0	--	--	--	--	--	0	no
	3	Cadmium	5	5	<0.1	<0.25	0	5	5	ND	ND	0	0	no
	3	Copper	5	0	4.1	5.5	0	5	0	0.11	0.15	0	0	no
	3	2,3,7,8-TCDD	5	5	<4.5e-07	<3.33e-06	0	--	--	--	--	--	0	no

Location	Rank	POC	Concentration					Particulate Strength					Weight	Both Criteria Exceeded?
			Number of Samples	Number of NDs	Median	Maximum	N > PL	Number of PS	Number of NDs	Median PS	Maximum	N > 95th		
EVBMP0003	1	TCDD TEQ	19	0	2.7E-06	1.7E-05	18	19	0	2.9E-08	5.2E-07	9	1.00	yes
	2	Lead	19	0	9.0	55.0	13	19	0	0.20	0.66	8	0.79	yes
	3	Cadmium	11	4	0.16	0.73	0	19	4	9.0E-04	4.5E-03	7	2.6E-03	no
	4	2,3,7,8-TCDD	19	16	<1.8e-06	2.3E-06	3	--	--	--	--	--	2.2E-03	no
	5	Total Suspended Solids	19	0	36.0	890	0	--	--	--	--	--	1.0E-04	no
	6	Copper	11	0	7.0	24.0	1	19	0	0.08	0.17	0	0	no
EVBMP0004	1	Lead	3	0	6.8	7.3	3	3	0	0.33	0.42	2	0.89	yes
	2	TCDD TEQ	3	0	1.5E-08	2.1E-06	1	3	0	7.6E-10	5.1E-08	1	0.34	yes
	3	Total Suspended Solids	3	0	20.0	41.0	0	--	--	--	--	--	0	no
	3	Cadmium	3	3	<0.1	<0.1	0	3	3	ND	ND	0	0	no
	3	Copper	3	0	3.0	5.4	0	3	0	0.13	0.15	0	0	no
	3	2,3,7,8-TCDD	3	3	<4.3e-07	<5.7e-07	0	--	--	--	--	--	0	no
EVBMP0005	1	TCDD TEQ	2	0	8.6E-07	1.3E-06	2	2	0	3.9E-08	4.8E-08	2	0.94	yes
	2	Cadmium	2	1	<0.18	0.18	0	2	1	<0.00195	2.0E-03	1	0.31	no
	2	Lead	2	0	3.1	3.1	0	2	0	0.15	0.25	1	0.31	no
	3	Total Suspended Solids	2	1	<41.0	41.0	0	--	--	--	--	--	0	no
	3	Copper	2	0	6.6	9.0	0	2	0	0.07	0.11	0	0	no
	3	2,3,7,8-TCDD	2	2	<6e-07	<6e-07	0	--	--	--	--	--	0	no
EVBMP0006	1	Total Suspended Solids	1	0	200	200	0	--	--	--	--	--	0.50	no
	1	Cadmium	1	0	0.47	0.47	0	1	0	1.8E-03	1.8E-03	1	0.50	no
	1	Copper	1	0	15.0	15.0	1	1	0	0.03	0.03	0	0.50	no
	1	Lead	1	0	12.0	12.0	1	1	0	0.05	0.05	0	0.50	no
	1	TCDD TEQ	1	0	4.8E-06	4.8E-06	1	1	0	2.4E-08	2.4E-08	0	0.50	no
	2	2,3,7,8-TCDD	1	1	<7.9e-07	<7.9e-07	0	--	--	--	--	--	0	no
EVBMP0007	1	TCDD TEQ	1	0	3.9E-06	3.9E-06	1	1	0	1.8E-07	1.8E-07	1	0.75	yes
	2	Total Suspended Solids	1	0	22.0	22.0	0	--	--	--	--	--	0	no
	2	Cadmium	1	1	<0.25	<0.25	0	1	1	ND	ND	0	0	no
	2	Copper	1	0	5.5	5.5	0	1	0	--	--	0	0	no
	2	Lead	1	0	4.1	4.1	0	1	0	0.15	0.15	0	0	no
	2	2,3,7,8-TCDD	1	1	<3.69e-06	<3.69e-06	0	--	--	--	--	--	0	no
EVBMP0008	1	TCDD TEQ	1	0	1.0E-07	1.0E-07	1	1	0	2.7E-09	2.7E-09	0	0.50	no
	2	Total Suspended Solids	1	0	38.0	38.0	0	--	--	--	--	--	0	no
	2	Cadmium	1	1	<0.25	<0.25	0	1	1	ND	ND	0	0	no
	2	Copper	1	0	2.4	2.4	0	1	0	0.01	0.01	0	0	no
	2	Lead	1	0	1.9	1.9	0	1	0	0.04	0.04	0	0	no
	2	2,3,7,8-TCDD	1	1	<4.2e-06	<4.2e-06	0	--	--	--	--	--	0	no
HZBMP0001	1	Total Suspended Solids	13	0	140	600	0	--	--	--	--	--	0.01	no
	2	TCDD TEQ	12	3	3.5E-09	2.4E-05	3	13	3	5.1E-11	3.9E-08	1	5.0E-04	yes
	3	Cadmium	6	4	<0.2	0.60	0	13	4	ND	3.5E-03	2	4.0E-04	no
	4	Copper	13	0	5.7	15.0	1	13	0	0.03	1.1	1	0	yes
	4	Lead	13	1	2.1	19.0	2	13	1	0.02	0.11	0	0	no
	4	2,3,7,8-TCDD	12	11	<2.1e-06	1.1E-06	1	--	--	--	--	--	0	no

Location	Rank	POC	Concentration					Particulate Strength					Weight	Both Criteria Exceeded?
			Number of Samples	Number of NDs	Median	Maximum	N > PL	Number of PS	Number of NDs	Median PS	Maximum	N > 95th		
HZBMP0002	1	Total Suspended Solids	3	1	1.0	12.0	0	--	--	--	--	--	0	no
	1	Cadmium	4	4	<0.1	<0.1	0	3	3	ND	ND	0	0	no
	1	Copper	4	0	1.8	2.3	0	3	0	0.03	0.03	0	0	no
	1	Lead	4	2	<0.65	0.90	0	3	2	ND	0.06	0	0	no
	1	TCDD TEQ	4	3	<1e-10	6.5E-12	0	3	2	ND	6.5E-12	0	0	no
	1	2,3,7,8-TCDD	4	4	<2.4e-06	<5.6e-06	0	--	--	--	--	--	0	no
HZBMP0003	1	TCDD TEQ	15	4	2.9E-11	8.0E-06	4	15	4	4.5E-12	8.0E-07	1	2.0E-04	yes
	2	Total Suspended Solids	15	4	9.0	840	0	--	--	--	--	--	0	no
	2	Cadmium	7	6	<0.1	0.12	0	15	6	ND	0.07	1	0	no
	2	Copper	15	0	2.0	19.0	1	15	0	0.05	3.5	3	0	yes
	2	Lead	15	7	0.40	19.0	2	15	7	0.01	0.40	1	0	yes
	2	2,3,7,8-TCDD	15	15	<1e-06	<6.07e-06	0	--	--	--	--	--	0	no
HZSW0005	1	Total Suspended Solids	1	0	5.0	5.0	0	--	--	--	--	--	0	no
	1	Cadmium	0	0	--	--	0	1	0	--	--	0	0	no
	1	Copper	0	0	--	--	0	1	0	--	--	0	0	no
	1	Lead	0	0	--	--	0	1	0	--	--	0	0	no
	1	TCDD TEQ	1	0	5.6E-09	5.6E-09	0	1	0	1.1E-09	1.1E-09	0	0	no
	1	2,3,7,8-TCDD	1	1	<4e-07	<4e-07	0	--	--	--	--	--	0	no
HZSW0008	1	Total Suspended Solids	1	0	28.0	28.0	0	--	--	--	--	--	0	no
	1	Cadmium	0	0	--	--	0	1	0	--	--	0	0	no
	1	Copper	0	0	--	--	0	1	0	--	--	0	0	no
	1	Lead	1	0	0.40	0.40	0	1	0	0.01	0.01	0	0	no
	1	TCDD TEQ	1	0	2.1E-09	2.1E-09	0	1	0	7.6E-11	7.6E-11	0	0	no
	1	2,3,7,8-TCDD	1	1	<6.2e-07	<6.2e-07	0	--	--	--	--	--	0	no
HZSW0011	1	Copper	2	0	2.7	3.0	0	2	0	0.39	0.62	1	0.31	no
	2	Total Suspended Solids	2	0	4.0	6.0	0	--	--	--	--	--	0	no
	2	Cadmium	0	0	--	--	0	2	0	--	--	0	0	no
	2	Lead	0	0	--	--	0	2	0	--	--	0	0	no
	2	TCDD TEQ	2	0	3.5E-09	7.0E-09	0	2	0	1.8E-09	3.5E-09	0	0	no
	2	2,3,7,8-TCDD	2	2	<5.2e-06	<5.2e-06	0	--	--	--	--	--	0	no
HZSW0012	1	Total Suspended Solids	1	0	7.0	7.0	0	--	--	--	--	--	0	no
	1	Cadmium	0	0	--	--	0	1	0	--	--	0	0	no
	1	Copper	0	0	--	--	0	1	0	--	--	0	0	no
	1	Lead	1	1	<0.2	<0.2	0	1	1	ND	ND	0	0	no
	1	TCDD TEQ	0	0	--	--	0	1	0	--	--	0	0	no
	1	2,3,7,8-TCDD	0	0	--	--	0	--	--	--	--	--	0	no
HZSW0014	1	Total Suspended Solids	3	0	61.0	70.0	0	--	--	--	--	--	0	no
	1	Cadmium	0	0	--	--	0	3	0	--	--	0	0	no
	1	Copper	3	0	6.4	7.9	0	3	0	0.04	0.13	0	0	no
	1	Lead	3	0	3.1	3.7	0	3	0	0.03	0.11	0	0	no
	1	TCDD TEQ	0	0	--	--	0	3	0	--	--	0	0	no
	1	2,3,7,8-TCDD	0	0	--	--	0	--	--	--	--	--	0	no

Location	Rank	POC	Concentration					Particulate Strength					Weight	Both Criteria Exceeded?
			Number of Samples	Number of NDs	Median	Maximum	N > PL	Number of PS	Number of NDs	Median PS	Maximum	N > 95th		
HZSW0020	1	Lead	2	0	9.7	14.0	2	2	0	0.10	0.14	0	0.50	no
	2	Total Suspended Solids	2	0	72.5	76.0	0	--	--	--	--	--	0.31	no
	3	Cadmium	0	0	--	--	0	2	0	--	--	0	0	no
	3	Copper	0	0	--	--	0	2	0	--	--	0	0	no
	3	TCDD TEQ	2	0	4.5E-09	5.0E-09	0	2	0	6.2E-11	6.6E-11	0	0	no
	3	2,3,7,8-TCDD	2	2	<2.6e-06	<2.6e-06	0	--	--	--	--	--	0	no
ILBMP0001	1	TCDD TEQ	18	0	5.1E-07	2.9E-05	16	18	0	1.2E-08	6.8E-07	7	0.97	yes
	2	Cadmium	18	1	0.45	1.3	0	18	1	7.7E-03	0.05	15	0.20	no
	3	Lead	18	0	4.9	12.0	9	18	0	0.12	0.71	4	0.07	yes
	4	Copper	18	0	11.5	27.0	5	18	0	0.12	0.73	2	2.0E-04	yes
	5	Total Suspended Solids	18	0	33.0	180	0	--	--	--	--	--	0	no
	5	2,3,7,8-TCDD	18	18	<1.4e-06	<7.9e-06	0	--	--	--	--	--	0	no
ILBMP0002	1	Lead	10	0	15.5	82.0	8	10	0	0.37	1.0	6	0.98	yes
	1	TCDD TEQ	10	0	3.5E-06	2.4E-05	8	10	0	4.4E-08	7.2E-07	6	0.98	yes
	2	Cadmium	10	5	<0.15	1.1	0	10	5	<0.000556	3.5E-03	5	0.02	no
	3	2,3,7,8-TCDD	10	9	<2.2e-06	3.2E-06	1	--	--	--	--	--	0.01	no
	4	Total Suspended Solids	10	0	29.5	1800	0	--	--	--	--	--	1.3E-03	no
	4	Copper	10	0	9.5	59.0	3	10	0	0.07	0.27	0	1.3E-03	no
ILBMP0003	1	Total Suspended Solids	4	0	4.0	10.0	0	--	--	--	--	--	0	no
	1	Cadmium	4	4	<0.1	<0.1	0	4	4	ND	ND	0	0	no
	1	Copper	4	0	3.9	4.8	0	4	0	0.10	0.27	0	0	no
	1	Lead	4	0	0.67	0.92	0	4	0	0.07	0.13	0	0	no
	1	TCDD TEQ	4	0	2.5E-09	2.7E-08	0	4	0	6.3E-10	9.0E-09	0	0	no
	1	2,3,7,8-TCDD	4	4	<1.7e-06	<6.7e-06	0	--	--	--	--	--	0	no
ILSW0003	1	Total Suspended Solids	2	0	52.5	83.0	0	--	--	--	--	--	0.31	no
	2	Cadmium	2	0	0.46	0.54	0	2	0	--	--	0	0	no
	2	Copper	0	0	--	--	0	2	0	--	--	0	0	no
	2	Lead	2	0	2.8	3.5	0	2	0	0.08	0.13	0	0	no
	2	TCDD TEQ	0	0	--	--	0	2	0	--	--	0	0	no
	2	2,3,7,8-TCDD	0	0	--	--	0	--	--	--	--	--	0	no
ILSW0004-A	1	Total Suspended Solids	1	0	110	110	0	--	--	--	--	--	0.50	no
	2	Cadmium	1	0	0.35	0.35	0	1	0	--	--	0	0	no
	2	Copper	0	0	--	--	0	1	0	--	--	0	0	no
	2	Lead	1	0	2.6	2.6	0	1	0	0.02	0.02	0	0	no
	2	TCDD TEQ	0	0	--	--	0	1	0	--	--	0	0	no
	2	2,3,7,8-TCDD	0	0	--	--	0	--	--	--	--	--	0	no
LFSW0002-A	1	TCDD TEQ	3	0	9.9E-08	9.4E-06	2	3	0	1.5E-09	2.0E-07	1	0.50	yes
	2	Total Suspended Solids	3	0	66.0	87.0	0	--	--	--	--	--	0.11	no
	2	Lead	3	0	3.7	6.7	1	3	0	0.06	0.07	0	0.11	no
	3	Cadmium	0	0	--	--	0	3	0	--	--	0	0	no
	3	Copper	3	0	4.3	7.3	0	3	0	0.03	0.04	0	0	no
	3	2,3,7,8-TCDD	3	3	<2.4e-06	<8.8e-06	0	--	--	--	--	--	0	no

Location	Rank	POC	Concentration					Particulate Strength					Weight	Both Criteria Exceeded?
			Number of Samples	Number of NDs	Median	Maximum	N > PL	Number of PS	Number of NDs	Median PS	Maximum	N > 95th		
LPBMP0001	1	Cadmium	2	0	0.32	0.48	0	2	0	2.1E-03	2.9E-03	2	0.50	no
	1	TCDD TEQ	2	0	2.2E-07	2.4E-07	2	2	0	3.0E-09	4.4E-09	0	0.50	no
	2	Total Suspended Solids	2	0	92.0	130	0	--	--	--	--	--	0.31	no
	2	Lead	2	0	9.8	15.0	1	2	0	0.09	0.11	0	0.31	no
	3	Copper	2	0	9.3	14.0	0	2	0	0.08	0.09	0	0	no
	3	2,3,7,8-TCDD	2	2	<5.2e-07	<5.2e-07	0	--	--	--	--	--	0	no
LPBMP0001-A	1	TCDD TEQ	6	0	5.0E-06	5.0E-05	6	6	0	1.8E-07	1.2E-06	4	0.98	yes
	2	Total Suspended Solids	6	0	37.5	180	0	--	--	--	--	--	0.02	no
	2	Copper	6	0	11.0	21.0	2	6	0	0.06	0.24	0	0.02	no
	2	Lead	6	0	2.6	32.0	2	6	0	0.11	0.17	0	0.02	no
	3	Cadmium	6	4	<0.1	0.35	0	6	4	ND	1.4E-03	1	0	no
	3	2,3,7,8-TCDD	6	6	<1.8e-06	<4.4e-06	0	--	--	--	--	--	0	no
LPBMP0002	1	TCDD TEQ	2	0	6.8E-06	1.3E-05	2	2	0	1.3E-07	2.5E-07	1	0.69	yes
	2	Cadmium	2	0	0.45	0.53	0	2	0	3.7E-03	5.1E-03	2	0.50	no
	3	Copper	2	0	13.0	15.0	1	2	0	0.07	0.08	0	0.31	no
	4	Total Suspended Solids	2	0	50.5	53.0	0	--	--	--	--	--	0	no
	4	Lead	2	0	3.6	4.2	0	2	0	0.06	0.07	0	0	no
	4	2,3,7,8-TCDD	2	2	<3.81e-06	<3.81e-06	0	--	--	--	--	--	0	no
LPBMP0003	1	Cadmium	1	0	0.34	0.34	0	1	0	1.6E-03	1.6E-03	1	0.50	no
	1	TCDD TEQ	1	0	1.6E-07	1.6E-07	1	1	0	2.3E-09	2.3E-09	0	0.50	no
	2	Total Suspended Solids	1	0	69.0	69.0	0	--	--	--	--	--	0	no
	2	Copper	1	0	14.0	14.0	0	1	0	0.04	0.04	0	0	no
	2	Lead	1	0	2.9	2.9	0	1	0	0.04	0.04	0	0	no
	2	2,3,7,8-TCDD	1	1	<5.8e-07	<5.8e-07	0	--	--	--	--	--	0	no
LPBMP0004	1	TCDD TEQ	2	0	8.5E-08	1.5E-07	1	2	0	2.6E-09	4.4E-09	0	0.31	no
	2	Total Suspended Solids	2	0	31.0	34.0	0	--	--	--	--	--	0	no
	2	Cadmium	2	2	<0.25	<0.25	0	2	2	ND	ND	0	0	no
	2	Copper	2	0	6.4	6.4	0	2	0	0.09	0.10	0	0	no
	2	Lead	2	0	3.0	3.4	0	2	0	0.08	0.08	0	0	no
	2	2,3,7,8-TCDD	2	2	<5.84e-06	<5.84e-06	0	--	--	--	--	--	0	no
LXBMP0002	1	TCDD TEQ	2	0	7.6E-08	1.1E-07	2	2	0	2.2E-09	4.1E-09	0	0.50	no
	2	Total Suspended Solids	2	0	156	300	0	--	--	--	--	--	0.31	no
	2	Cadmium	2	1	<0.12	0.12	0	2	1	<0.00018	1.8E-04	1	0.31	no
	2	Lead	2	0	3.8	6.9	1	2	0	0.03	0.04	0	0.31	no
	3	Copper	2	0	9.7	14.0	0	2	0	0.05	0.06	0	0	no
	3	2,3,7,8-TCDD	2	2	<5.1e-06	<5.1e-06	0	--	--	--	--	--	0	no
LXBMP0003	1	Total Suspended Solids	6	0	78.5	1000	0	--	--	--	--	--	0.07	no
	1	TCDD TEQ	6	3	<4.35e-08	1.2E-07	3	6	3	<1.23e-10	1.5E-08	0	0.07	no
	2	Cadmium	6	4	<0.1	0.44	0	6	4	ND	0.02	2	0.02	no
	2	Copper	6	0	3.9	20.0	1	6	0	0.02	3.0	1	0.02	yes
	3	Lead	6	1	0.81	18.0	1	6	1	0.01	0.07	0	0	no
	3	2,3,7,8-TCDD	6	6	<8.8e-07	<8.3e-06	0	--	--	--	--	--	0	no

Location	Rank	POC	Concentration					Particulate Strength					Weight	Both Criteria Exceeded?
			Number of Samples	Number of NDs	Median	Maximum	N > PL	Number of PS	Number of NDs	Median PS	Maximum	N > 95th		
LXBMP0004	1	Total Suspended Solids	5	0	260	520	0	--	--	--	--	--	0.50	no
	1	Lead	5	0	8.8	14.0	5	5	0	0.04	0.10	0	0.50	no
	2	Cadmium	5	1	0.12	0.19	0	5	1	2.8E-04	6.4E-04	4	0.38	no
	3	Copper	5	0	11.0	15.0	1	5	0	0.04	0.09	0	0.01	no
	3	TCDD TEQ	5	0	4.5E-10	2.4E-07	1	5	0	3.8E-12	7.7E-10	0	0.01	no
	4	2,3,7,8-TCDD	5	5	<2.3e-06	<6e-06	0	--	--	--	--	--	0	no
LXBMP0005	1	TCDD TEQ	5	0	2.5E-10	5.8E-06	2	5	0	4.1E-12	2.9E-07	1	0.17	yes
	2	Total Suspended Solids	5	0	54.0	180	0	--	--	--	--	--	0.05	no
	2	Cadmium	5	3	<0.1	0.13	0	5	3	ND	2.9E-03	2	0.05	no
	2	Lead	5	0	4.4	5.5	1	5	0	0.03	0.27	1	0.05	yes
	3	Copper	5	0	8.4	12.0	0	5	0	0.06	0.44	1	0.01	no
	4	2,3,7,8-TCDD	5	5	<1.5e-06	<7.3e-06	0	--	--	--	--	--	0	no
LXBMP0006	1	Total Suspended Solids	1	0	1300	1300	0	--	--	--	--	--	0.50	no
	1	Cadmium	1	0	0.40	0.40	0	1	0	2.3E-04	2.3E-04	1	0.50	no
	1	Copper	1	0	26.0	26.0	1	1	0	0.02	0.02	0	0.50	no
	1	Lead	1	0	24.0	24.0	1	1	0	0.02	0.02	0	0.50	no
	1	TCDD TEQ	1	0	5.6E-08	5.6E-08	1	1	0	4.3E-11	4.3E-11	0	0.50	no
	2	2,3,7,8-TCDD	1	1	<5.1e-07	<5.1e-07	0	--	--	--	--	--	0	no
LXBMP0009	1	Total Suspended Solids	1	0	24.0	24.0	0	--	--	--	--	--	0	no
	1	Cadmium	1	1	<0.25	<0.25	0	1	1	ND	ND	0	0	no
	1	Copper	1	0	4.1	4.1	0	1	0	0.10	0.10	0	0	no
	1	Lead	1	0	1.2	1.2	0	1	0	0.04	0.04	0	0	no
	1	TCDD TEQ	1	0	3.2E-09	3.2E-09	0	1	0	1.3E-10	1.3E-10	0	0	no
	1	2,3,7,8-TCDD	1	1	<4.17e-06	<4.17e-06	0	--	--	--	--	--	0	no
LXSW0002	1	Copper	9	0	1.8	13.0	0	9	0	0.24	1.8	3	3.8E-03	no
	1	TCDD TEQ	9	3	1.2E-09	1.9E-05	2	9	3	3.0E-10	9.8E-08	1	3.8E-03	yes
	2	Lead	9	0	0.34	27.0	1	9	0	0.10	0.23	1	7.0E-04	yes
	3	Total Suspended Solids	9	2	4.0	190	0	--	--	--	--	--	1.0E-04	no
	4	Cadmium	9	8	<0.1	0.91	0	9	8	ND	ND	0	0	no
	4	2,3,7,8-TCDD	8	8	<1.2e-06	<8.8e-06	0	--	--	--	--	--	0	no
Outfall 008	1	Total Suspended Solids	22	1	84.0	1300	0	--	--	--	--	--	6.0E-04	no
	2	Lead	32	0	3.8	120	13	22	0	0.04	0.11	0	1.0E-04	no
	3	Cadmium	26	10	0.03	1.5	0	22	4	ND	8.7E-04	2	0	no
	3	Copper	32	1	5.3	18.0	2	22	0	0.04	0.17	0	0	no
	3	TCDD TEQ	32	5	1.5E-09	2.2E-06	6	22	4	2.2E-11	5.5E-10	0	0	no
	3	2,3,7,8-TCDD	32	32	<9.52e-07	<4.7e-06	0	--	--	--	--	--	0	no
Outfall 009	1	Total Suspended Solids	50	18	6.0	4000	0	--	--	--	--	--	0	no
	1	Cadmium	71	39	<0.11	9.2	1	50	29	ND	0.03	6	0	yes
	1	Copper	71	0	3.9	39.0	3	50	0	0.11	1.2	6	0	yes
	1	Lead	71	6	1.7	260	16	50	4	0.10	1.0	8	0	yes
	1	TCDD TEQ	71	7	9.0E-09	3.7E-04	27	50	5	8.2E-10	2.1E-07	6	0	yes
	1	2,3,7,8-TCDD	71	66	<9e-07	3.4E-05	3	--	--	--	--	--	0	no