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Via Email to [Cassandra.Owens@waterboards.ca.gov](mailto:Cassandra.Owens@waterboards.ca.gov)

September 30, 2014  
In reply refer to SHEA-114961

Ms. Cassandra Owens  
Regional Water Quality Control Board  
Los Angeles Region  
320 West 4<sup>th</sup> Street, Suite 200  
Los Angeles, CA 90013

Dear Ms. Owens:

Subject: 2014 Best Management Practices (BMP) Plan Addendum to the October 2010 Santa Susana Site Outfalls 008/009 Watersheds BMP Plan, Santa Susana Field Laboratory, Ventura County, CA (Order No. R4-2010-0090; NPDES No. CA0001309, CI No. 6027)

Per the requirements of The Boeing Company's (Boeing) National Pollutant Discharge Elimination System (NPDES) Permit (Order No. R402010-0090) adopted by the Regional Water Quality Board on June 3, 2010, Boeing is providing the enclosed 2014 Best Management Practices (BMP) Plan Addendum to the October 2010 Santa Susana Site Outfalls 008/009 Watersheds BMP Plan. This document has been developed with input and in accordance with recommendations from the Santa Susana Site Surface Water Expert Panel and prepared for Boeing. The enclosed report will be posted on the Boeing External website at the following address: [http://www.boeing.com/aboutus/environment/santa\\_susana/isra.page](http://www.boeing.com/aboutus/environment/santa_susana/isra.page).

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

Sincerely,

Paul Costa

Environmental Operations and Compliance Manager

Cc: Mr. Peter Raftery, RWQCB  
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*Prepared for*

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Santa Susana Site  
5800 Woolsey Canyon Road  
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**2014 BMP PLAN ADDENDUM**

**SANTA SUSANA SITE**

**VENTURA COUNTY, CALIFORNIA**

*Prepared by*

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engineers | scientists | innovators

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**The Santa Susana Site Surface Water Expert Panel**

September 30, 2014

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## ABBREVIATIONS AND ACRONYMS

BMP	Best Management Practice
Boeing	The Boeing Company
CM	culvert modification
COC	constituent of concern
DTSC	Department of Toxic Substances Control
ELV	Expendable Launch Vehicle
Expert Panel	Santa Susana Site Surface Water Expert Panel
Geosyntec	Geosyntec Consultants
ISRA	Interim Source Removal Action
LOX	liquid oxygen
MWH	MWH Americas, Inc.
NASA	National Aeronautics and Space Administration
NEL	numeric effluent limit
NPDES	National Pollutant Discharge Elimination System
NRCS	National Resources Conservation Service
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RWQCB	Los Angeles Regional Water Quality Control Board
SAP	sampling and analysis plan
TCDD	tetrachlorobenzo-p-dioxin
TEQ	toxic equivalency
TSS	total suspended solids
USDA	United States Department of Agriculture

## **1. INTRODUCTION**

The document herein describes the conceptual designs for Best Management Practices (BMPs) that were identified based on procedures described in the BMP Plan (MWH et al., 2010a) and an evaluation of potential BMP subarea monitoring data from the 2013/2014 rainy season within the Outfalls 008 and 009 watersheds at the Santa Susana Site, Ventura County, California. The BMP Plan was implemented with the oversight and participation of the Los Angeles Regional Water Quality Control Board (RWQCB) with the objective of meeting the numeric effluent limits (NELs) for Outfalls 008 and 009 established in the National Pollutant Discharge Elimination System (NPDES) Permit (Order R4-2010-0090) adopted by the RWQCB on June 3, 2010 (RWQCB, 2010). Potential BMP subarea monitoring activities were conducted by MWH Americas, Inc. (MWH) on behalf of The Boeing Company (Boeing) and the National Aeronautics and Space Administration (NASA) according to the 2013/2014 BMP and Interim Source Removal Action (ISRA) Performance Monitoring Sampling and Analysis Plan (SAP) (MWH, 2013).

The following Best Management Practices (BMPs) recommendations have been developed by the Santa Susana Site Surface Water Expert Panel (Expert Panel) based on review and evaluation of 2013/2014 NPDES compliance and BMP subarea monitoring results, consideration of Boeing and NASA watershed plans (e.g., ISRA and demolition programs) and field reconnaissance. The Expert Panel, in collaboration with Geosyntec Consultants (Geosyntec), developed these recommendations for Boeing and NASA consideration. Boeing and NASA will consider these recommendations, discuss them with the Expert Panel, and proceed with BMP activities in 2015 based on the outcome of these discussions, new observations, available budget, engineering/constructability constraints, and other relevant factors.

### **1.1 Project Background**

In late 2010, a BMP subarea monitoring program (MWH, 2010) was developed and implemented within the Outfall 008 and 009 watersheds at the Santa Susana Site, as stated in the BMP Plan (MWH et al., 2010). The BMP monitoring program was designed to assess the contribution of constituents of concern (COCs) from the stormwater runoff potential source areas. The program was designed to identify subareas that were most in need of implementation of new or enhanced stormwater controls or BMPs to improve NPDES permit compliance. This program involved the

collection of stormwater samples in proximity to “potential” BMP sites, defined as locations receiving runoff from likely source areas (e.g., ISRA areas, Resource Conservation and Recovery Act [RCRA] Facility Investigation [RFI] areas, or areas where historic industrial activities are known to have occurred) and other infrastructure (e.g., roads, buildings, parking areas). In addition, runoff from “stormwater background” areas<sup>1</sup>, or locations receiving runoff from unimpacted and undeveloped areas, within the Outfall 008 and 009 watersheds were sampled. During the 2013/2014 rainy season, stormwater runoff inspections and sampling were performed at two “potential” BMP sites in the Outfall 008 watershed, nine “potential” BMP sites in the Outfall 009 watershed, two “planned” BMP sites, and 17 locations used to assess BMP performance (MWH et al., 2014).

The Expert Panel’s approach for identifying specific BMP subareas for new stormwater controls was to rank potential BMP subarea monitoring sites based on the results of comparisons between the following measured values and thresholds: (a) stormwater concentrations and NPDES permit limits, and (b) stormwater particulate strengths (i.e., constituent particulate mass per mass of total suspended solids [TSS], which normalizes the particulate-bound constituent concentration by the concentration of TSS in the sample to allow for an evaluation of the constituent “strength” of suspended particles) and particulate strengths measured at onsite stormwater background locations (Expert Panel and Geosyntec, 2011a). A statistical methodology was developed to rank the potential BMP monitoring sites based on these comparison results while accounting for the number of useable data available at each site as well as the number of data observations that fell above the thresholds (i.e., reflecting statistical confidence in how frequently each site will exceed the comparison thresholds). This methodology relied on weighting factors that were calculated for each NPDES COC category (specifically metals [including Cd, Cu, Hg, and Pb], dioxins [including 2,3,7,8-tetrachlorobenzo-p-dioxin {TCDD} and TCDD toxic equivalency factor {TEQ}], and TSS) for each site. In the end, the constituent-specific weighting factors were summed to produce a multi-constituent score (ranging from 0.0 [lowest relative exceedance of thresholds] to 1.0 [highest relative exceedance of thresholds]) to allow for relative ranking amongst the

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<sup>1</sup> The site specific stormwater background dataset is for the assessment of stormwater only and is not considered part of the ongoing soil background sampling activities being conducted under DTSC oversight.

potential BMP sites, with the sites with the highest relative rankings recommended to be further evaluated for new stormwater controls based on site-specific considerations and best professional judgment. Discontinued monitoring sites are included in the ranking to confirm water quality improvement over time as BMPs are implemented throughout the watershed.

In addition to the new proposed controls described in this document, one previously recommended structural control is (as of September 2014) currently being constructed in the Outfall 009 watershed to improve surface water quality, as outlined in the August 2014 Annual Report (MWH et al., 2014). This BMP consists of two detention bioswales in the vicinity of former building 436. The detention bioswales are intended to capture runoff from impervious surfaces within the drainage area and provide storage capacity before slowly releasing the stormwater runoff to an existing stormdrain where an existing low flow diversion routes flow to the Lower Lot biofilter. In addition, Geosyntec is currently completing its second year of ongoing post construction geomorphic monitoring to ensure that the Northern Drainage stabilization measures (installed in 2012) are serving their intended functions, a process that is further detailed in the August 2014 Annual Report (MWH et al., 2014).

## **1.2 Summary of Expert Panel's BMP Recommendations**

Based on the 2014 ranking analysis (MWH et al., 2014), 20 of the 77 subareas evaluated were identified as top-ranked potential BMP locations, all of which were in Outfall 009 (12 of the 20 top ranked sites are actively sampled and the remaining sites have been discontinued). These 20 top-ranked sites were then selected for further evaluation based on site-specific considerations and best professional judgment, which accounted for existing BMPs and new BMP implementation constraints and feasibility. As a result of these assessments, the Expert Panel has selected four sites (encompassing several closely located subareas) for enhancement of existing BMPs. These BMPs are located on both Boeing and NASA property. Potential BMP subarea monitoring will continue during the 2014/2015 rainy season, after which the need for new or enhanced stormwater controls will again be re-evaluated by the Panel.

## 2. BMP RECOMMENDATIONS

In addition to the erosion and sediment controls for the four selected sites, the Panel has developed general inspection, maintenance, and monitoring recommendations as follows:

- Continue inspection, maintenance, and monitoring of:
  - The ELV treatment BMP
  - CM-1
  - CM-9
  - The Helipad sandbag berms and any future BMPs at the Helipad
  - The LOX BMPs
  - The Lower Lot biofilter system
  - The B1 Media Filter and adjacent BMPs
- Collect stormwater samples at the mid-point of the ELV treatment BMP (i.e., between the sedimentation basin and the media filter);
- Review the cistern pump programming at the Lower Lot to prevent future overflows of the biofilter;
- Modify the monitoring program so that a sample at LPBMP0003 (Lower Lot sediment basin outlet) is collected from the sediment basin outlet structure using a sample pole; and
- Record field observations when biofilter effluent samples are collected during periods of overflow or collect effluent samples from the underdrain outlet within the biofilter outlet structure.

The Panel also recommends erosion and sediment control practices and stream channel stabilization measures be implemented throughout the 008 and 009 watersheds, including, where necessary, the stabilization of unpaved roads, implementation of source controls, inspection of culverts for piping (or seepage) evidence, and routine maintenance at CM locations and where sedimentation basins have been constructed.

The remainder of this report discusses the sites that require more robust erosion and sediment controls. Within the four sites where new erosion or sediment controls were recommended are five of the top ten highest ranked subareas actively being monitored (see August 2014 ISRA/BMP Annual Report [MWH et al., 2014] for explanation). Each of these four areas also had dioxin exceedances in the 2013/14 samples, consistent

with the exceedances observed at Outfall 009. Site observations during an August 2014 field visit were also considered. Based on this information, the following new recommendations are made. These recommendations are also mapped in Appendix A.

## **2.1 ELV (NASA)**

### **2.1.1 Drainage Area Description**

The ELV area monitoring locations post construction of the ELV treatment BMP include the ELV culvert inlet/sump overflow (EVBMP0001-A), the influent to the ELV treatment BMP (EVBMP0007), and the effluent from the ELV treatment BMP (EVBMP0008). The ELV culvert inlet/sump overflow receives runoff from 2.5 acres of mostly roadway and the influent/effluent to the ELV treatment BMP locations receive runoff from 55.3 acres of ELV hillside and roadway runoff. Based on two events in 2013-2014, the ELV culvert inlet/sump overflow is ranked 22<sup>nd</sup> overall (multi-constituent score = 0.44), 10<sup>th</sup> for dioxins, 29<sup>th</sup> for metals, and 26<sup>th</sup> for TSS. Based on one event in 2013-2014, the influent to the ELV treatment BMP is ranked 25<sup>th</sup> overall (multi-constituent score = 0.38), 11<sup>th</sup> for dioxins, tied for 67.5<sup>th</sup> (last) for metals, and tied for 57<sup>th</sup> (last) for TSS. Based on one event in 2013-14, the effluent from the ELV treatment BMP ranked 34.5<sup>th</sup> overall (multi-constituent score = 0.25), 24.5<sup>th</sup> for dioxins, tied for 67.5<sup>th</sup> (last) for metals, and tied for 57<sup>th</sup> (last) for TSS. Based on these locations and historical monitoring, the Expert Panel developed the following recommendations.

### **2.1.2 BMP Description**

Recommended actions for the ELV area follow NASA's completion of the treatment system installed in November of 2013. 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 the existing erosion controls. Recommendations included: adding sandbags along the edge of the ELV channel riprap [Recommendation 1] (Figure 1), 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 [Recommendation 2] (Figure 2). In addition, the Panel recommends adding wattles to parallel the slope contours along the hillside north of the ELV channel to slow down the hillside runoff before

entering the channel [Recommendation 3] (Figure 3). It is also important to note that new operational procedures at the Helipad are expected to reduce flows along Helipad road into the ELV channel sump (as compared to the monitored 2013-2014 event), thus improving the ELV treatment capacity.

In addition, based on a site visit in March 2014, the Expert Panel recommended continued inspection and maintenance of the stormwater system. The complete list of Panel recommendations originally made by the Expert Panel in March 2014 is as follows, many of which are still under consideration by NASA:

- Improve erosion control along the earth-bottom portions of the 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 (completed by NASA staff)
- 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. [Note: This recommendation was discussed with NASA during the Panel's August 2014 site visit, and the Panel agreed that this recommendation was no longer necessary.]
- 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 riprap in the drainage channel. NASA will continue to consider the additional recommendations as opportunities arise during future operations and maintenance.

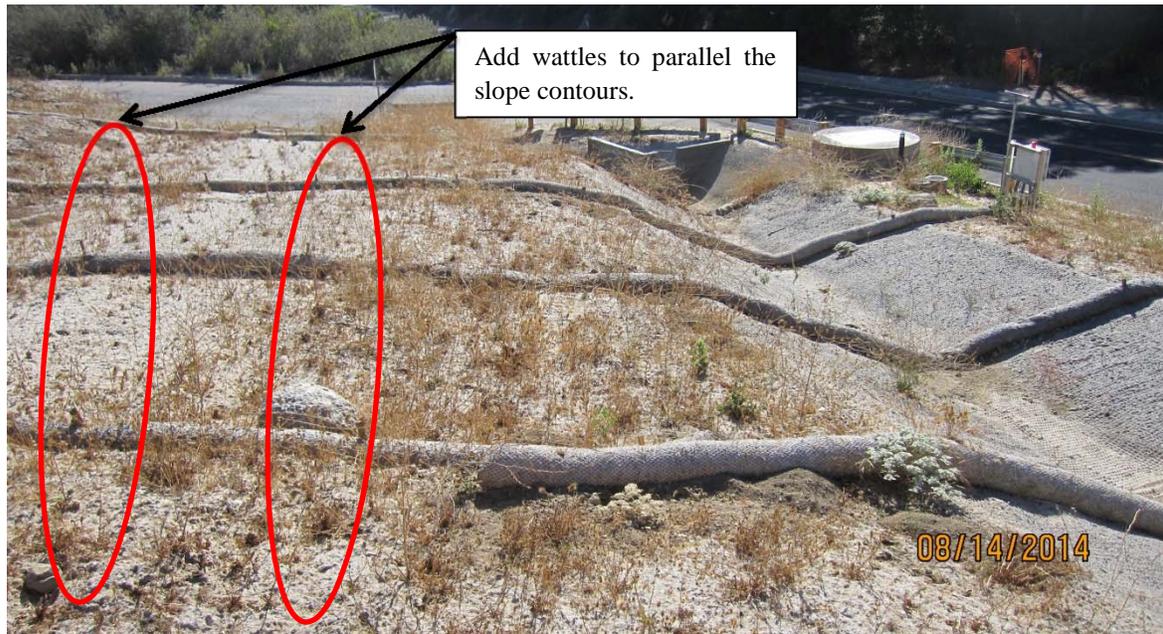
Refer to Figure A1 for additional details on the Expert Panel's recommendations for the ELV area.



**Figure 1: ELV Channel Recommendation 1**



**Figure 2: ELV Channel Recommendation 2**



**Figure 3: ELV Channel Recommendation 3**

## **2.2 CM-1 (NASA)**

### **2.2.1 Drainage Area Description**

The CM-1 monitoring location (EVBMP0003) reflects runoff from 2.3 acres of paved road and undeveloped hillside. Based on 19 events (two events in 2013-2014), this subarea ranks 2<sup>nd</sup> overall (multi-constituent score = 0.89), 1<sup>st</sup> for dioxins, 3<sup>rd</sup> for metals, and 32.5<sup>th</sup> 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 42<sup>nd</sup> overall (multi-constituent score = 0.13), ranked 38<sup>th</sup> for dioxins, 39<sup>th</sup> for metals, and 32.5<sup>th</sup> for TSS. However, historically CM-1 has shown poor performance, specifically for dioxin removal. This past year, the one sample collected at the effluent of CM-1 represents a blend of underdrain flow and seepage through the upstream weir boards, resulting in an exceedance of the permit limit for dioxins (MWH et. al, 2014).

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 lower TSS and lead than in the 2012-2013 monitoring season.

### **2.2.2 BMP Description**

In addition to continued inspection and maintenance at CM-1, the Expert Panel recommends that alternatives for increasing the ponding volume and treatment capacity behind CM-1 should be evaluated. It is recommended that NASA solicit consultant or contractor recommendations for potential alternatives such as increasing the weir and mound/berm heights that will achieve this goal [Recommendation 1] (Figure 4). The Expert Panel also recommends bolstering pretreatment by adding sandbag berms (or equivalent) upstream of the weir boards to create tiered mini-basins along the slope, with spill points mid-berm [Recommendation 2] (Figure 5).

Refer to Figure A1 for additional details on the Expert Panel's recommendations for CM-1.



**Figure 4: CM-1 Recommendation 1**



**Figure 5: CM-1 Recommendation 2**

## **2.3 Helipad Area (NASA)**

### **2.3.1 Drainage Area Description**

The Helipad subarea monitoring location (EVBMP0002-B) reflects runoff from 4.1 acres of the paved Helipad area and includes data post-BMP implementation at the helipad. Based on five total samples and one sample in 2013-2014, this location ranks 39<sup>th</sup> overall (multi-constituent score = 0.20), 34<sup>th</sup> for dioxins, 41.5<sup>th</sup> for metals, and tied for 57<sup>th</sup> (last) for TSS. Runoff from this area (EVBMP0002-B) drains 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 sandbag 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.

### **2.3.2 BMP Description**

The Expert Panel recommends implementing a robust SWPPP around the Helipad building demolition area. The SWPPP should include effective sediment controls, which may include but are not limited to sandbags around debris or soil stockpiles, dust controls, covering stockpiles during storms, and vacuum sweeping before storms. The Expert Panel also made recommendations for the operation of the existing storm drain inlet plug along upper Helipad Road during the August 2014 site visit and in separate email communication to Boeing. Refer to Figure A2 for additional details on the Expert Panel's recommendations for the Helipad area.

## **2.4 B-1 Area (Boeing)**

### **2.4.1 Drainage Area Description**

The northern B-1 monitoring subarea (B1BMP0004 and B1BMP0005) reflects runoff from approximately 3.7 acres of paved road and post-ISRA restored hillside. Based on twelve events, this subarea is ranked 11<sup>th</sup> overall (multi-constituent score = 0.51), 2<sup>nd</sup> for dioxins, 35<sup>th</sup> for metals, and 32.5<sup>th</sup> 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 43<sup>rd</sup> overall (multi-constituent score = 0.11), 39<sup>th</sup> for dioxins, 67.5<sup>th</sup> (last) for metals, and 57<sup>th</sup> for TSS. However, during 2013-2014, one sample exceeded the permit limit for dioxins at this location. Additionally, the BMP Performance Analysis prepared by Geosyntec Consultants and the Expert Panel showed limited removal of dioxins at the B-1 media filter (Geosyntec Consultants et. al., 2014a).

#### **2.4.2 BMP Description**

During a site visit in August 2014, the Expert Panel observed erosion rills at the top of the slope adjacent to and upstream of the B-1 media filter. When evaluating solutions to prevent erosion at this location, extensive reworking of the hillside was considered but deemed infeasible since this would require removing existing vegetation and performing major grading on a very steep slope in close proximity to the B-1 media filter. Therefore, to prevent the rills from expanding and additional erosion from occurring, the Expert Panel recommends the following robust inspection and maintenance procedures (Figure 6):

- Inspect the existing sandbag berm at the top of the slope upstream of the media filter to ensure it has no gaps; repair/replace as necessary [Recommendation 1] (Figure 6).
- Inspect the existing slope protection measures (and condition of any rills beneath the erosion control blanket that can be observed from the surface) and check dams along the channel; repair/replace or perform maintenance as necessary [Recommendation 2] (Figure 7).
- Inspect the existing silt fence around the B-1 media bed and outlet structure; repair/replace as necessary [Recommendation 3].

These inspection recommendations should occur prior to the 2014-2015 rainy season and during significant runoff-producing storm events. Additionally, the Expert Panel recommends that field staff periodically provide photos to document the conditions of the existing measures, including before and after the installation of any significant improvements.

Refer to Figure A3 for additional details on the Expert Panel's recommendations for the B-1 media filter.



**Figure 6: B-1 Media Filter Recommendation 1 (Top of slope)**



**Figure 7: B-1 Media Filter Recommendation 2 (Looking from the B-1 media filter up the adjacent slope)**

### **3. SCHEDULE**

The following is the anticipated schedule of subsequent action. The Panel has recommended that all of its recommended actions be completed prior to the 2014-2015 rainy season. The schedule is subject to modification as Boeing and NASA continue their discussions with the Panel regarding the BMP activities, and as additional information, including observations during the 2014-2015 rainy seasons, is collected and evaluated.

- Fall 2014 – Evaluate and discuss Expert Panel recommendations
- Winter 2014/15 – Summer 2015 – Implement recommended BMPs

### **4. REFERENCES**

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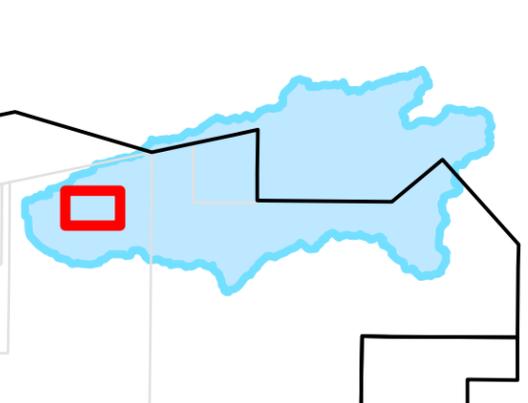
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# APPENDIX A

Figure A1: ELV/CM-1 BMP Recommendations

Figure A2: Helipad BMP Recommendations

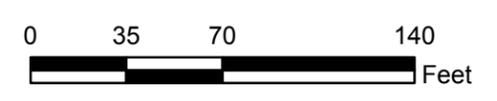
Figure A3: B1 BMP Recommendations



**Legend**

- Top 20 Ranked Discontinued Stormwater Monitoring Location
- Top 20 Ranked Active Stormwater Monitoring Location
- ▭ BMP Recommendations Boundary
- Background Location
- Non-Top 20 Ranked Stormwater Monitoring Locations
- Existing BMPs
- 2014 Proposed BMPs
- ▭ Drainage Area (Approx.)
- ▭ ISRA Areas
- ▭ Property Boundary
- ▭ RFI Site Boundary
- Drainage

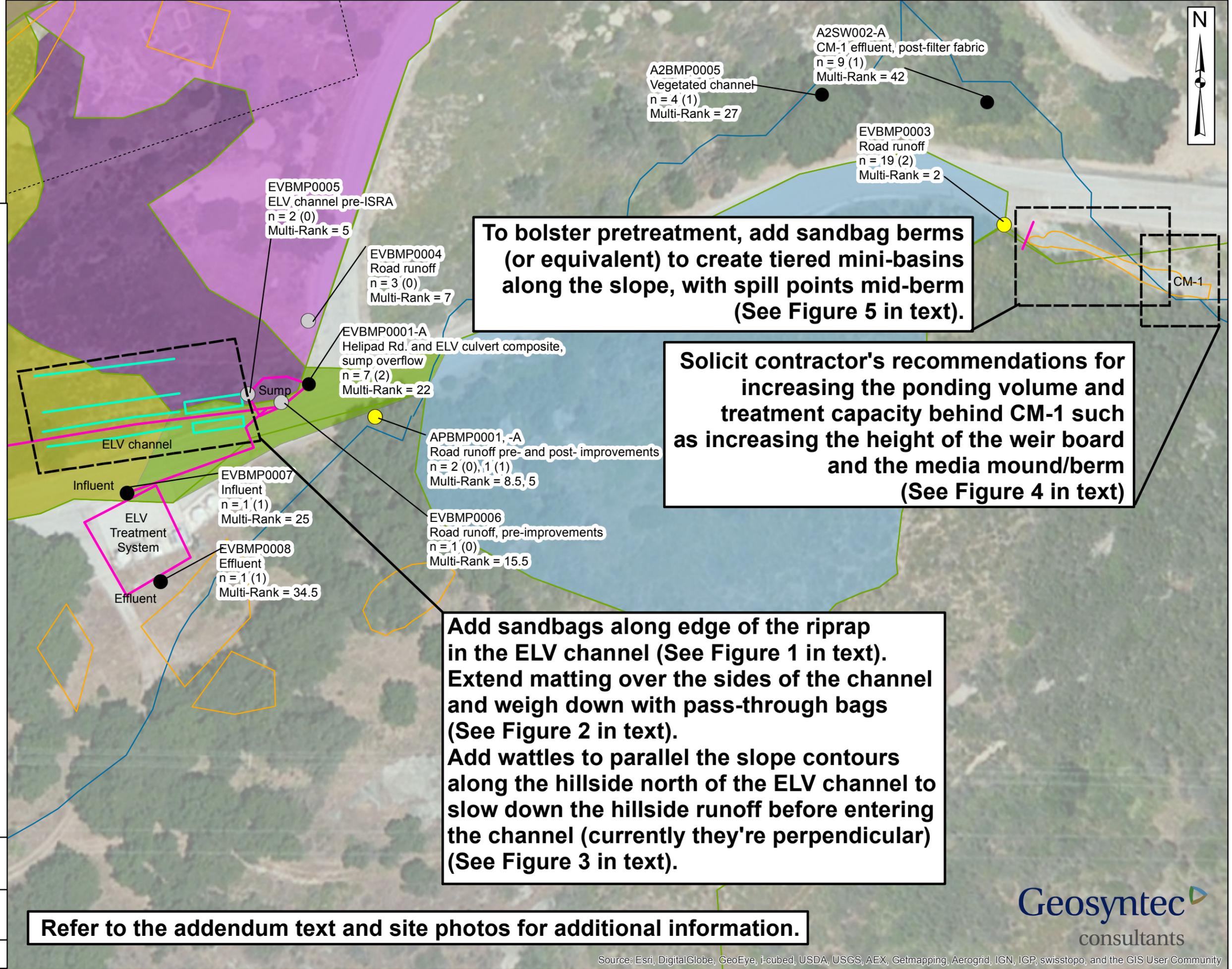
Location Labels:  
 ID  
 Description  
 n = total samples (2013-2014 samples)  
 Multi-Constituent Rank = x



**Figure A1: ELV/CM-1 BMP Recommendations**

Santa Susana Site  
 Ventura County, CA

September 2014

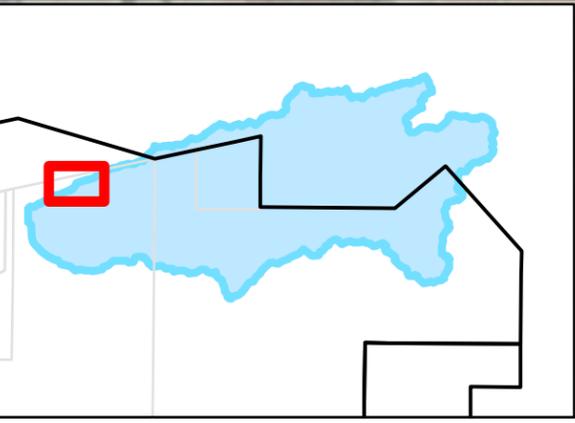


**To bolster pretreatment, add sandbag berms (or equivalent) to create tiered mini-basins along the slope, with spill points mid-berm (See Figure 5 in text).**

**Solicit contractor's recommendations for increasing the ponding volume and treatment capacity behind CM-1 such as increasing the height of the weir board and the media mound/berm (See Figure 4 in text)**

**Add sandbags along edge of the riprap in the ELV channel (See Figure 1 in text). Extend matting over the sides of the channel and weigh down with pass-through bags (See Figure 2 in text). Add wattles to parallel the slope contours along the hillside north of the ELV channel to slow down the hillside runoff before entering the channel (currently they're perpendicular) (See Figure 3 in text).**

**Refer to the addendum text and site photos for additional information.**



**Implement a robust SWPPP around the Helipad building demolition area. The SWPPP should include effective sediment controls, which may include but are not limited to sandbags around debris or soil stockpiles, dust controls, covering stockpiles during storms, and vacuum sweeping before storms.**

- Legend**
- Top 20 Ranked Discontinued Stormwater Monitoring Location
  - Top 20 Ranked Active Stormwater Monitoring Location
  - Non-Top 20 Ranked Stormwater Monitoring Locations
  - Background Location
  - Existing BMPs
  - ISRA Areas
  - Property Boundary
  - RFI Site Boundary
  - Drainage
  - - - Culvert

**Location Labels:**  
 ID  
 Description  
 n = total samples (2013-2014 samples)  
 Multi-Constituent Rank = x



**Figure A2: Helipad BMP Recommendations**

Santa Susana Site  
 Ventura County, CA

September 2014

Sandbag Berms

**EV BMP0002**  
 Helipad runoff (OLD)  
 n = 6 (0)  
 Multi-Rank = 3

**EV BMP0002-B**  
 Helipad runoff, post improvements  
 n = 5 (1)  
 Multi-Rank = 39

Helipad Road

Sandbag Berms

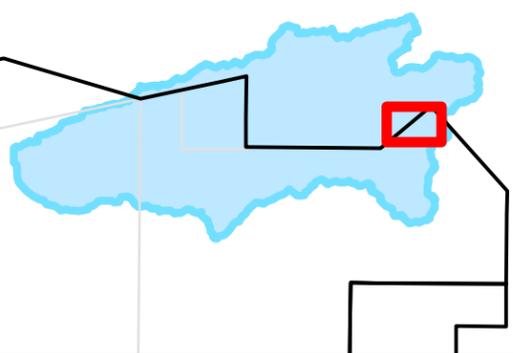
**Operate existing storm drain inlet plug along upper Helipad Road as recommended during the August 2014 site visit (see Figure 6 in text).**

**Refer to the addendum text and site photos for additional information.**



Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

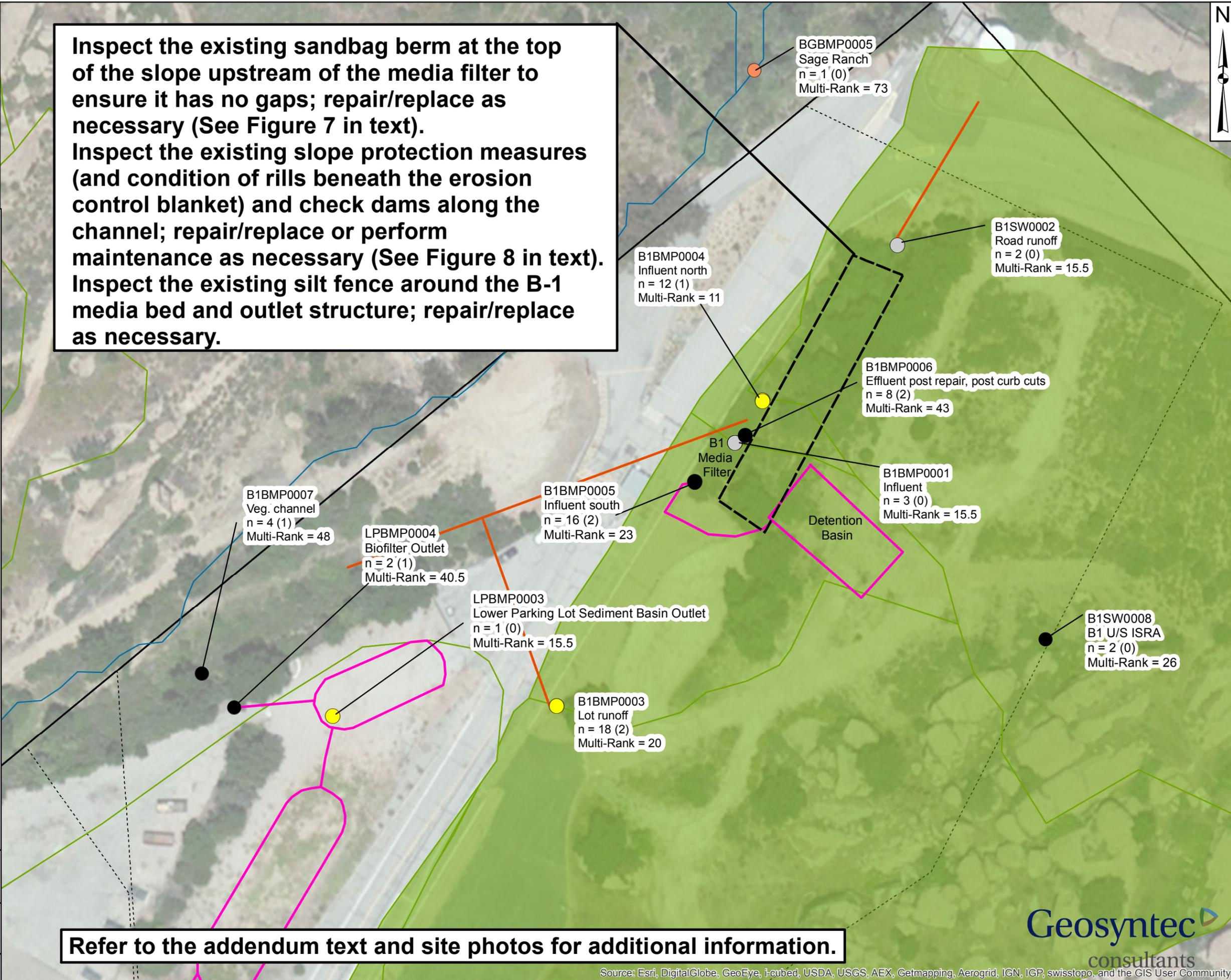
Date: 9/29/2014, Path: P:\GIS\Projects\Boeing\SSFL\Projects\2014 BMP Addendum\2014 - Helipad.mxd, User: MMOtto



**Inspect the existing sandbag berm at the top of the slope upstream of the media filter to ensure it has no gaps; repair/replace as necessary (See Figure 7 in text).  
 Inspect the existing slope protection measures (and condition of rills beneath the erosion control blanket) and check dams along the channel; repair/replace or perform maintenance as necessary (See Figure 8 in text).  
 Inspect the existing silt fence around the B-1 media bed and outlet structure; repair/replace as necessary.**

- Legend**
- Top 20 Ranked Discontinued Stormwater Monitoring Location
  - Top 20 Ranked Active Stormwater Monitoring Location
  - ▭ BMP Recommendations Boundary
  - Non-Top 20 Ranked Stormwater Monitoring Locations
  - Background Location
  - Existing BMPs
  - Drainage Area (Approx.)
  - ▭ Property Boundary
  - ▭ RFI Site Boundary
  - Existing Stormdrain
  - Drainage

**Location Labels:**  
 ID  
 Description  
 n = total samples (2013-2014 samples)  
 Multi-Constituent Rank = x



**Refer to the addendum text and site photos for additional information.**

**Figure A3: B1  
 BMP Recommendations**

Santa Susana Site  
 Ventura County, CA

September 2014

