

APPENDIX A
REGULATORY CORRESPONDENCE

APPENDIX A – Regulatory Correspondence

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1. RWQCB, 2008. California Water Code Section 13304 Order to Perform Interim/Source Removal Action of Soil in the Areas of Outfalls 008 and 009 Drainage Areas, The Boeing Company Santa Susana Field Laboratory, Unincorporated Ventura County, California (SCP No. 1111, Site ID No. 2040109). December 3.

Correspondence Related to 2010 ISRA Work Plan Addendum

2. A. Fischl, MWH, 2010. 2010 ISRA Work Plan Addendum Comments, Email to B. King, DTSC, and P. Raftery, RWQCB. May 25.

P. Raftery, RWQCB, 2010. Re: 2010 ISRA Work Plan Addendum Comments, Email to A. Fischl, MWH. May 26.
3. B. King, DTSC, 2010. Re: 2010 ISRA Work Plan Addendum Comments, Email to L. Blair, Boeing, and A. Fischl, MWH. May 26.
4. MWH, 2010. Response to RWQCB and DTSC comments on the 2010 Interim Source Removal Action (ISRA) Work Plan Addendum Submitted in Response to California Water Code Section 13304 Order (NPDES NO. CA0001309, CI NO. 6027, SCP NO. 1111, Site ID NO. 2040109). June 14.
5. S. Unger, RWQCB, 2010. Comments on 2010 Interim Source Removal Action (ISRA) Work Plan Addendum Submitted in Response to a California Water Code Section 13304 Order - The Boeing Company, Santa Susana Field Laboratory, Canoga Park, CA (NPDES No. CA0001309, CI No. 6027, SCP No. 1111, Site ID No. 2040109), Letter to T. Gallacher, Boeing. June 30.

Correspondence Related to Streambed Alteration Agreement

6. CDFG, 2003. Streambed Alteration Agreement No. 1600-2003-5052-R5. October 7.
7. J. Humble, California Natural Resources Agency Department of Fish and Game, 2009. Streambed Alteration Agreement No. 1600-2003-5052-R5 Extension, Letter to P. Costa, Boeing. December 10.

Correspondence Related to 2010 ISRA Biological Surveys

8. Padre Associates, Inc., 2010. Biological Resources Study for the Interim Source Removal Action Areas for Outfall 009 - Santa Susana Field Laboratory. June.
9. C. Dunn, Padre Associates, Inc., 2010. Addendum to Biological Resources Study for ISRA Outfall 009 - Pre-Activity Biological Survey Results for Proposed Soil Borrow Area adjacent to RD-47, Letter to L. Blair, Boeing. August 28.
10. C. Dunn, Padre Associates, Inc., 2011. Santa Susana Field Laboratory Outfall 009 ISRA Biological Survey and Construction Monitoring Report - June 2010 to February 2011, Letter to A. Lenox, Boeing. February 28.

Correspondence Related to Department of the Army Nationwide Permit 38 (Section 404 Permit)

11. Boeing, 2010. U.S. Army Permit Application Submittal for NWP 38, Continued Interim Source Removal Action - Outfall 009 Watershed, Santa Susana Field Laboratory, Ventura County, California. May 17.
12. ACOE, 2010. Department of the Army Nationwide Permit Authorization. June 21.

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13. Boeing, 2010. Pre-Certified 401 Notification, Continuing Interim Source Removal Action - Outfall 009 Watershed, The Boeing Company, Santa Susana Field Laboratory, Ventura County, California. May 17.

Correspondence Related to 2010 Ventura County Grading Permit

14. Ventura County, 2010. County of Ventura Grading Permit No. 10270. July 13.
15. J. Pratt, Ventura County, 2010. Santa Susana Field Lab (SSFL) - Grading Permit Issuance, Email to J. Zaragoza, K. Long, L. Parks, P. Foy, and S. Bennett, Ventura County. July 14.
16. A. Fischl, MWH, 2010. SSFL (Boeing) ISRA Grading Permit #10270, Email to Bryan Tapping, Ventura County. November 9.

Correspondence Related to 2010 Ventura County Oak Tree Exemption

17. Padre Associates, Inc., 2010. Oak Tree Assessment for the Interim Source Removal Action Areas within the Outfall 009 Watershed, Boeing Santa Susana Field Laboratory, Ventura County, California. May 20.

18. T. Newman, Ventura County, 2010. Letter of Exemption: Removal of contaminated soil from the protected zones of 25 oak trees as required by the Los Angeles Regional Water Quality Control Board (RWQCB). Removal Action Areas located within the Outfall 009 Watershed, Boeing Santa Susana Field Lab, (Ref.: CUP248, APN# 685-0-051-100 and 685-0-051-120), Letter to D. Rodrigues, Pacific Horticulture. June 9.
19. C. Dunn, Padre Associates, Inc., 2010. Soil excavation beneath oaks at SSFL B1-2, Email to D. Rodrigues, Pacific Horticulture. December 1.
20. D. Rodrigues, Pacific Horticulture, 2010. Soil excavation beneath Oaks at Boeing ISRA site SSFL B1-2, Letter to C. Dunn, Padre Associates. December 8.
21. C. Dunn, Padre Associates, Inc., 2010. B1-2 Additional Excavation/Confirmation Sampling, Email to D. Rodrigues, Pacific Horticulture, and S. Valenzuela, MWH. December 16.

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22. SWRCB, 2009. Receipt of Your Notice of Intent (NOI). July 21.

Correspondence Related to 2010 Addendum to the Soil Management Plan

23. MWH, 2010. ISRA 2010 Boeing Soil Borrow Area. July 23.
24. S. Unger, RWQCB, 2010. Approval of the Interim Source Removal Action (ISRA) 2010 Boeing Soil Borrow Area Submitted in Response to California Water Code Section 13304 Order (NPDES No. CA0001309, CI No. 6027, SCP No. 1111, Site ID No. 2040109), Letter to T. Gallacher, Boeing. September 23.
25. Telephone conversation between D. Greenly, DTSC, and L. Blair, Boeing, October 5, 2010, 12:15 p.m.

Correspondence Related to 2010 Addendum to the Transportation Plan

26. T. Gallacher, Boeing, 2010. 2010 Addendum to the Final Interim Source Removal Action (ISRA) Transportation Plan submitted in response to California Water Code Section 13304 Order (NPDES No. CA0001309, CI No. 6027, SCP No. 1111, Site ID No. 2040109) [Addition of McKittrick Waste Treatment Site], Letter to P. Raftery, RWQCB. August 4.

Correspondence Related to Site Restoration Plans

27. SSFL Surface Water Expert Panel, 2010. Expert Panel Recommendations for Erosion Control Hydroseeding Methods and Culvert Modification Areas for ISRA Excavation Areas in Outfall 009 Watersheds. July 21.
28. SSFL Surface Water Expert Panel, 2010. Technical Memorandum: Recommended Procedures for Road Closures in the Outfall 008 and Outfall 009 Watersheds. November 2.

Correspondence Related to 2010-2011 Performance Monitoring Plan

29. S. Unger, RWQCB, 2010. Approval of the Plan for Environmental Sampling of Dioxins and Other Low Solubility Pollutants at Part-per-Billion and Lower Concentrations, Report for the Final Interim Source Removal Action (ISRA) Submitted in Response to California Water Code Section 13304 Order (NPDES No. CA0001309, CI No. 6027, SCP No. 1111, Site ID No. 2040109), Letter to T. Gallacher, Boeing. October 6.
30. T. Gallacher, Boeing, 2011. Letter Addendum to Field Protocols for Collecting SSFL ISRA Performance Monitoring RWQCB Split Samples using the Dekaport Cone Splitter, Letter to C. Owens, RWQCB. January 26.

Correspondence Related to Confirmation Sampling Results and Completion of Excavation

31. C. Owens, RWQCB, 2010. Confirmation for Boeing ISRA areas B1-1A, -1B, -1C; CTL1-B and IEL-1, Email to L. Blair, Boeing. October 19.
32. C. Owens, RWQCB, 2010. Confirmation for Boeing ISRA areas B1-1D and CTLI-1A, Email to L. Blair, Boeing, B. King, DTSC, M. Ali, RWQCB, and P. Raftery, RWQCB. October 27.
33. C. Owens, RWQCB, 2010. Confirmation for Boeing ISRA areas AP/STP 1D and 1F, Email to L. Blair, Boeing, B. King, DTSC, M. Ali, RWQCB, and P. Raftery, RWQCB. November 24.
34. C. Owens, RWQCB, 2010. RE: Confirmation for Boeing ISRA areas: Partial B1-2 area - pending discussion with Buck King and concurrence email from Cassandra Owens, Email to L. Blair, Boeing, B. King, DTSC, M. Ali, RWQCB, and P. Raftery, RWQCB. December 7.
35. P. Raftery, RWQCB, 2011. Final Confirmation sample results for B1-2, Email to L. Blair, Boeing. January 10.



California Regional Water Quality Control Board

Los Angeles Region



Linda S. Adams
Cal/EPA Secretary

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Arnold Schwarzenegger
Governor

December 3, 2008

Mr. Thomas D. Gallacher, Director
SSFL – Safety, Health & Environmental Affairs
The Boeing Company
Santa Susana Field Laboratory
5800 Woolsey Canyon Road
Canoga Park, CA 91304-1148

Certified Mail
Return Receipt Requested
Claim No. 7008 1830 0004 3360 0939

CALIFORNIA WATER CODE SECTION 13304 ORDER TO PERFORM INTERIM/SOURCE REMOVAL ACTION OF SOIL IN THE AREAS OF OUTFALLS 008 AND 009 DRAINAGE AREAS, THE BOEING COMPANY SANTA SUSANA FIELD LABORATORY, UNINCORPORATED VENTURA COUNTY, CALIFORNIA (SCP NO. 1111, SITE ID NO. 2040109)

Dear Mr. Gallacher:

The California Regional Water Quality Control Board, Los Angeles Region (Regional Board), is the public agency with primary responsibility for the protection of ground and surface water quality for all beneficial uses within major portions of Los Angeles and Ventura County, including the above-referenced project site.

The Santa Susana Field Laboratory (SSFL) occupies approximately 2,850 acres and is located at the top of Woolsey Canyon Road in the Simi Hills, Ventura County, California. The SSFL is jointly owned by The Boeing Company (Boeing) and the United States of America. The National Aeronautics and Space Administration (NASA) administers the portion of the property owned by the federal government. The site is divided into four administrative areas (Areas I, II, III, and IV) and undeveloped land areas to both the north and south. The NASA property includes a portion of Area I and all of Area II. Ninety acres of Areas IV are leased to the United States Department of Energy (DOE).

Boeing and its predecessors' operations at SSFL since 1950 include research, development, assembly, disassembly, and testing of nuclear reactors, rocket engines, and chemical lasers. NASA operations included rocket engine assembly and testing, and propellant and fuel storage and loading. DOE conducted past operations in research and development of energy related programs, and seismic testing experiments. Current DOE activities onsite are solely related to facility closure, environmental remediation, and restoration.

Regional Board Order R4-2004-0111 and previous orders originally permitted discharges of excess water at the SSFL from its groundwater treatment system, industrial activities, onsite wastewater reclamation system, and rainfall runoff that has the potential to contain pollutants from the facilities. Most recently, the only wastewater generated onsite and discharged to the streambeds is treated groundwater which is associated with activities that are being regulated by the Department of Toxic Substances Control (DTSC) under the Resource Conservation and Recovery Act (RCRA). All other wastewater discharges have been terminated. However, storm water traversing the site had yielded exceedances of water quality based effluent limits in the National Pollutant Discharge Elimination System (NPDES) Permit for the facility.

California Environmental Protection Agency



Our mission is to preserve and enhance the quality of California's water resources for the benefit of present and future generations.

Only storm water is discharged through Outfalls 008 and 009 (see attached map):

- Discharge Outfall 008 – This outfall captures storm water runoff from an area that has previously been used for operations that involved perchlorate and other contaminants of concern. Storm water from Happy Valley flows to Dayton Canyon Creek. The flow from Dayton Canyon Creek joins Chatsworth Creek, which flows south to Bell Creek southwest of the intersection of Shoup Avenue and Sherman Way. Bell Creek flows east to the Los Angeles River. This area has since undergone an “interim measure cleanup”, which was completed in September 2004, under the direction of DTSC.
- Discharge Outfall 009 – The watershed that drains into Outfall 009 is on Boeing and NASA property and begins near the entrance to the property and traverses several potential areas of concern. The Outfall collects storm water runoff from the Area 1 and Area 2 Landfills, and the former LOX plant located on NASA owned property. In addition, Outfall 009 picks up storm water run on from Sage Ranch where agricultural operations took place and a gun shooting range was located. This outfall drains to Arroyo Simi.

Boeing has violated Waste Discharge Requirements contained in Order No. R4-2004-0111, as amended by Order Nos. R4-2006-0008, R4-2006-0036, and R4-2007-0055 (hereinafter Order No. R4-0111) by discharging storm water and/or permitting storm water to be discharged to waters of the State, which contains wastes that have chronically exceeded effluent limitations for 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) toxic equivalent (TEQ), heavy metals (e.g., copper, lead, and cadmium), and other pollutants (e.g., oil and grease and pH) at Outfalls 008 and 009 from 2005 through 2008.

The Regional Board has determined that an order pursuant to Water Code section 13304 is the most appropriate manner to achieve compliance with the requirements of Order No. R4-2004-0111. The Regional Board's objective is that contaminated soil are to be removed in order to eliminate the contaminants that have resulted in violations of effluent limitations and are an ongoing source of contaminants, creating a condition of pollution or nuisance. Site-wide cleanup of soil, soil vapor, and groundwater will continue under regulatory oversight by the DTSC.

Therefore, pursuant to Section 13304 of the Water Code, Boeing is hereby ordered to cleanup and abate the waste that are discharging to waters of the State, minimize impacts to the streambed adjacent habitat during the cleanup, protect the water quality during and after the cleanup, and restore the streambed and surrounding habitat following the cleanup.

Compliance with this order shall include, but not be limited to completing the requirements listed below. Boeing shall:

1. Commence activities necessary to undertake source removal of wastes that are causing or contributing to violations of limitations contained in Order No. R4-2004-0111 at Outfalls 008 and 009, subject to Regional Board approval of the plans required by paragraphs 2 and 3, below.
2. Submit work plans to develop and select the appropriate treatment technologies to be used during source removal, including identification and delineation of the lateral and vertical extents of contaminants in soil, by **February 15, 2009** for the Regional Board's approval.
3. Submit for the Regional Board's approval an interim source removal action (ISRA) plan by **May 1, 2009**.
4. Submit a report documenting compliance with the removal process and detailing the results of confirmation soil samples following the completion of the interim source removal of impacted soil from the areas for Outfalls 008 and 009 watersheds. The Regional Board will determine the submittal due date for this report upon approval of the ISRA.
5. Reimburse the Regional Board for all reasonable costs incurred by the Regional Board staff to oversee soil cleanup, abatement of the effects thereof, or other remedial actions.
6. Communicate and work cooperatively with NASA for the proposed ISRA necessary for the NASA Area I and II property located within the Outfall 009 Drainage Area. The Regional Board understands that Boeing may undertake the actions under this order on the NASA property only with the approval of NASA.
7. All proposed projects located within state or federal jurisdictional waters must comply with the applicable sections of the federal Clean Water Act (CWA) and California's Porter Cologne Water Quality Control Act (Porter Cologne). The United States Army Corps of Engineers (USACOE) (CWA Section 404 permitting) and the Regional Board (CWA Section 401 water quality certifications) may permit fill activities in waters of the United States under the CWA. The Regional Board may also permit fill activities in waters of the State of California under Porter Cologne by issuing Waste Discharge Requirements (WDR). Further, the California Department of Fish and Game (F&G), through streambed alteration agreements, also has jurisdiction over fill projects that affect waters of the State. These agencies must be notified of any plans that could impact these waters to determine if permitting will be required.

Failure to comply with this Order may result in imposition of civil liabilities, either administratively by the Regional Board or judicially by the Superior Court in accordance with Section 13350 of the California Water Code, and/or referral to the Attorney General of the State of California for such action as he may deem appropriate.

Any person aggrieved by this action of the Regional Water Board may petition the State Water Board to review the action in accordance with Water Code section 13320 and California Code of Regulations, title

California Environmental Protection Agency



Mr. Thomas D. Gallacher
The Boeing Company

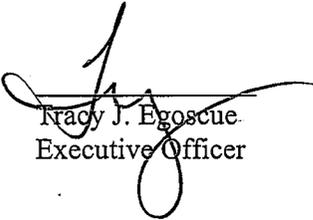
- 4 -

December 3, 2008

23, sections 2050 and following. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date of this Order, except that if the thirtieth day following the date of this Order falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at: http://www.waterboards.ca.gov/public_notices/petitions/water_quality or will be provided upon request.

If you have any questions, please contact Mr. David Bacharowski at (213) 576-6607.

Sincerely,



Tracy J. Egoscue
Executive Officer

California Environmental Protection Agency

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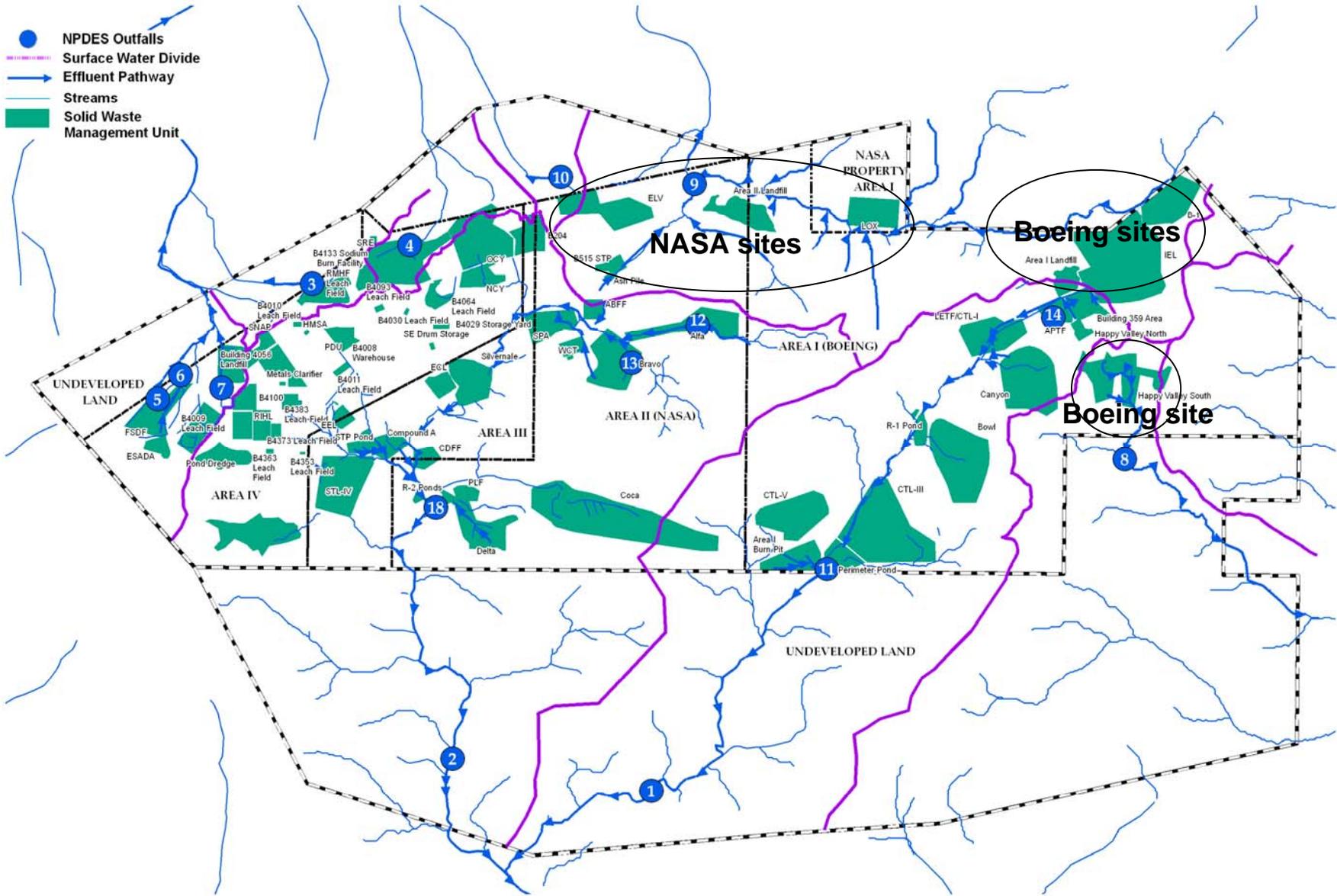
Our mission is to preserve and enhance the quality of California's water resources for the benefit of present and future generations.

cc: Honorable Fran Pavley, Senator
Honorable Julia Brownley, Assemblymember
Ms. Rondi Guthrie, c/o Assemblywoman Audra Strickland
U. S. Environmental Protection Agency, Region 9, Permits Branch (WTR-5)
Mr. Thomas Kelly, Environmental Protection Agency, Region 9, (WTR-5)
Environmental Protection Agency, Region 9, Office of Radiation Programs
Mr. Michael Lopez, U.S.D.O.E., Oakland
Mr. Thomas Johnson, ETEC Project Manager, United States Department of Energy
Ms. Rebecca Tadesse, Branch Chief of Materials Decommissioning, U.S. Nuclear Regulatory Commission
U.S. Army Corps of Engineers
NOAA, National Marine Fisheries Service
Department of Interior, U.S. Fish and Wildlife Service
Mr. William Paznokas, Department of Fish and Game, Region 5
Mr. Norm Riley, Department of Toxic Substances Control, Sacramento
Mr. Jim Pappas, Department of Toxic Substances Control, Sacramento
Mr. Gerard Abrams, Department of Toxic Substances Control, Sacramento
California Coastal Commission, South Coast District
Department of Health Services, Public Water Supply Branch
Los Angeles County, Department of Public Works, Environmental Programs Division
Los Angeles County, Department of Health Services
City of Los Angeles, Bureau of Engineering, Wastewater Systems Engineering Division
ULARA Watermaster
Water Replenishment District of Southern California
Ventura County Air Pollution Control District
Ventura County Public Works
Ventura County Environmental Health Division
Ms. Linda Parks, Ventura County Board of Supervisors
City Manager, City of Simi Valley
Dr. Mark Gold, Heal the Bay
Mr. David Beckman, NRDC
Mr. Mati Waiya, Wishtoyo Foundation
Friends of the Los Angeles River
Los Angeles and San Gabriel Rivers Watershed Council
Bell Creek Homeowners Association, c/o Michael Bubman
Bell Creek Homeowners Association, c/o Jerry Murphy
Ms. Carol Henderson, Office Manager, Bell Canyon Association
Ms. Barbara Johnson, Susana Knolls Homeowners, Inc.
Ms. Gayle Demirtas, Simi Valley Library
Mr. Howard Kaplan and Mr. Arthur Pinchey, Brandeis-Bardin Institute
Dr. Joseph K. Lyou, Executive Director, Committee to Bridge the Gap (CBG)
Mr. Dan Hirsch, CBG
Mr. Jerome Raskin, Pierce College
Mr. Sheldon Plotkin, SCFS

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California State University, Northridge
Mr. Evan Rose, L.A.U.S.D.
Mr. Cybil Zeppieri
Mr. Lori Zinkan
Ms. Christina Walsh
Ms. Teresa Jordan
Ms. Mary Wisebrock
Masry & Vititoe Law Offices
Mr. Jonathan Parfrey, Executive Director, Physicians for Social Responsibility
Mr. Matt Hagemann, Soil/Water/Air Protection Enterprise
Ms. Bonnie Klea
Ms. Laura Plotkin, c/o Senator Sheila Kuehl
Mr. John Farrow, M. R. Wolfe & Associates, P.C.
Mr. Anthony Zepeda
Ms. Lorraine Scott
Florence and Dorri Raskin
Ms. Kirsten James, MESM, Staff Scientist, Heal the Bay
Ms. Elizabeth Crawford, Senior Environmental Specialist, Physicians for Social
Responsibility
Paul Costa, Boeing
Ms. Sharon Rubalcava, Weston, Benshoof, Rochefort, Rubalcava, MacCuish, LLP
Ms. Darlene Ruiz, Hunter Ruiz Research, Consulting and Advocacy
Mr. Jack M. Wallace
Mr. Jae Kim, TetraTech

-  NPDES Outfalls
-  Surface Water Divide
-  Effluent Pathway
-  Streams
-  Solid Waste Management Unit



From: Peter Raftery [praftery@waterboards.ca.gov]
Sent: Wednesday, May 26, 2010 1:13 PM
To: Alexander Fischl
Cc: Cassandra Owens; Mazhar Ali
Subject: Re: 2010 ISRA Work Plan Addendum Comments

Alex:

Your response adequately addresses my comments.

Peter

>>> Alexander Fischl <Alexander.Fischl@us.mwhglobal.com> 5/25/2010 7:07 PM >>>
Peter / Buck,

Below is a summary of the comments you both provided to us on the 2010 ISRA Work Plan Addendum during the weekly call last Wednesday, May 19th.

Also included below is a description how we plan to respond to each comment. Please review and confirm these are complete and our planned responses appear acceptable.

1. Include a summary of each former operational site (RFI Site) which is collocated with or located near a 2010 ISRA Area.

- A new appendix will be prepared that presents a summary of available information on the RFI Sites associated with 2010 ISRA Areas, including the B-1 Area, the Instrument and Equipment Laboratories (IEL), the Area I Landfill (A1LF), the Component Testing Laboratory I (CTL-I), the former LOX Plant, the Area II Landfill (A2LF), and the Incinerator Ash Pile/Sewage Treatment Plant (AP/STP) Area. The summary for each area will be pulled from the Preliminary ISRA Work Plan, and will include references to reports where additional information can be found.

2. Work Plan text on Page 2-1, 1st paragraph, states "Four of the ISRA PEAs are located in the eastern portion of the Outfall 009 watershed and four are located in the western portion of the Outfall 009 watershed, shown in Figures 1-3 and 1-4." However, Figure 1-4 shows 5 ISRA PEAs in the western portion of Outfall 009.

- A revised page 2-1 will be prepared that includes the correct number of ISRA PEAs (5) located in the western portion of Outfall 009 as shown on Figure 1-4.

3. Work Plan text states bedrock was encountered at approximately 1.5 feet bgs within the AP/STP-1 ISRA area (page 2-13, 1st paragraph), please confirm this is true.

- A review of boring logs will be performed to assess the depth of bedrock at AP/STP-1 and, if necessary, a revised page 2-13 will be prepared that includes the correct average depth to bedrock within the AP/STP-1 ISRA area.

4. Work Plan Table 1-1 has incorrect units for the Outfall 008 NPDES permit limit exceedance (mg/L instead of µg/L).

- A revised Table 1-1 will be prepared that has the correct units.

5. Work Plan Tables 2-1 and 2-4 do not include TCE as a non-RCRA risk driver for the IEL-2 ISRA Area, please confirm this is true.

- A review of TCE data and sample depths near IEL-2 will be performed and, if necessary, a revised Table 2-1 and 2-4 will be prepared that includes TCE as a non-RCRA risk driver.

6. Work Plan Figure 2-14 (Refined Preliminary ISRA Evaluation Areas Outfall 009 - LOX-1) represents dioxin data with black triangles, but black triangles are not identified in the legend.

- A revised Figure 2-14 will be prepared that has the correct colored triangles.

These revisions will be compiled into an errata package and is planned to be submitted by the end of next week. Please let me know if you expect to have any additional comments, so that we may include them in this submittal.

Thank you,

[\[cid:image001.jpg@01CAFC26.123D3B40\]](#)

Alex Fischl, P.M.P
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BUILDING A BETTER WORLD

From: Buck King [BKing@dtsc.ca.gov]
Sent: Wednesday, May 26, 2010 3:35 PM
To: Lori N Blair; Alexander Fischl
Cc: Gerard Abrams; Mark Malinowski; Cassandra Owens; Peter Rafferty
Subject: Re: 2010 ISRA Work Plan Addendum Comments

Alex,

I have reviewed the summary of the previous comments and response strategies and find them to be acceptable.

Please add the following 3 additional comments to the list of comments to be addressed in 2010 ISRA Work Plan Errata.

New Comment 1 Page 2-11 description of PEA-LOX-1 states that 34 samples were collected from 41 locations and analyzed for metals. Please check the number of locations associated with the 34 samples and correct as necessary.

New Comment 2 Please double check the average depth to bedrock indicated in the report text descriptions for PEA-LOX-1 (0.5 ft, page 2-11), PEA-LOX-2 (2 ft, page 2-12), and PEA-A2LF-2 (1 ft, page 2-12). These depths are either inconsistent with the planned excavation depths described in Table 2-1 or inconsistent with my understanding of site conditions.

New Comment 3 Page 2-18, First full paragraph, Typo error in description of Area 1 Landfill ISRA area as "A2LF-1". Text should be corrected to indicate A1LF-1.

I have concluded my review of the 2010 ISRA Workplan Addendum and have no additional comments. If you have any questions please call or email.

Buck King, PG, CHG
Senior Engineering Geologist
(510) 540-3955 Fax (510) 540-3937
bking@dtsc.ca.gov

>>> Alexander Fischl <Alexander.Fischl@us.mwhglobal.com> 5/25/2010 7:07

PM >>>

Peter / Buck,

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Also included below is a description how we plan to respond to each comment. Please review and confirm these are complete and our planned responses appear acceptable.

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and the Incinerator Ash Pile/Sewage Treatment Plant (AP/STP) Area. The summary for each area will be pulled from the Preliminary ISRA Work Plan, and will include references to reports where additional information can be found.

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Thank you,

[\[cid:image001.jpg@01CAFC26.123D3B40\]](#)

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BUILDING A BETTER WORLD



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Certified Mail

June 14, 2010
In reply refer to SHEA-110063

Regional Water Quality Control Board
Los Angeles Region
320 West 4th Street, Suite 200
Los Angeles, CA 90013

Attention: Mr. Peter Rafferty

Subject: Response to RWQCB and DTSC comments on the 2010 Interim Source Removal Action (ISRA) Work Plan Addendum Submitted in Response to California Water Code Section 13304 Order (NPDES NO. CA0001309, CI NO. 6027, SCP NO. 1111, SITE ID NO. 2040109)

Dear Mr. Rafferty:

The Boeing Company (Boeing), on behalf of Boeing and the National Aeronautics and Space Administration (NASA), is providing the attached responses to Regional Water Quality Control Board (RWQCB) and Department of Toxic Substances Control (DTSC) comments on the 2010 ISRA Work Plan Addendum. This submittal includes an errata package for the 2010 Work Plan addendum consisting of revised pages of text, tables, figure and a new appendix that incorporate the responses to RWQCB and DTSC comments.

If you have any questions or require anything further, please contact Lori Blair at 818-466-8741.

Very truly yours,

Tom Gallacher
Director, Santa Susana Field Laboratory
Environment, Health, and Safety

LNB:bjc

Attachment: Response to RWQCB and DTSC Comments Memorandum



Mr. P. Rafferty, RWQCB (SHEA-110063)
June 14, 2010
Page 2

cc: Ms. Cassandra Owens, RWQCB
Mr. Rick Brausch, DTSC
Mr. Buck King, DTSC
Mr. Allen Elliott, NASA
Mr. Steve Slaten, NASA

TO: Art Lenox/Lori Blair, Boeing
Allen Elliott/Steve Slaten, NASA

DATE: June 11, 2010

CC: Randy Dean, CH2M HILL

REF: 1008208/1008209

FROM: Dixie Hambrick/Alex Fischl, MWH

SUBJECT: Response to RWQCB and DTSC Comments on the 2010 ISRA Work Plan
Addendum

This memorandum provides responses to Regional Water Quality Control Board (RWQCB) and Department of Toxic Substances Control (DTSC) comments on the 2010 Interim Source Removal Action (ISRA) Work Plan Addendum (Work Plan Addendum) (MWH, 2010). The Work Plan Addendum summarizes the results of the ISRA evaluation process and presents recommended remedial actions to control releases of constituents of concern (COCs) to surface water for the remaining areas within the Outfall 009 watershed at the Santa Susana Field Laboratory (SSFL). The Work Plan Addendum supplements the Preliminary ISRA Work Plan (MWH, 2009a), the Final ISRA Work Plan (MWH, 2009b) along with other work plan addenda (MWH 2009c, MWH 2009d, MWH 2009e, and NASA, 2009). The Work Plan Addendum was prepared by MWH and CH2M HILL on behalf of The Boeing Company (Boeing) and the National Aeronautics and Space Administration (NASA) pursuant to a California Water Code Section 13304 Cleanup and Abatement Order (CAO) issued by the Los Angeles Regional Water Quality Control Board (RWQCB) dated December 3, 2008 (RWQCB, 2008).

This memorandum was prepared to respond to RWQCB and DTSC comments on the Work Plan Addendum. RWQCB and DTSC comments were provided verbally to Boeing and NASA during a teleconference on May 19, 2010. DTSC provided additional comments in an email on May 26, 2010. Comments from the RWQCB and DTSC on the Work Plan Addendum are reproduced below in their entirety, and a response is provided below each comment. An errata package for the Work Plan Addendum is provided as an attachment to this memorandum. The errata package includes five revised pages of text, two revised tables, one revised figure, and a new

appendix that incorporate the responses to RWQCB and DTSC comments and other inaccuracies identified since publication of the Work Plan Addendum, as described below.

1) RESPONSE TO COMMENTS

Comment #1: Work Plan Table 1-1 has incorrect units for the Outfall 008 NPDES permit limit exceedance (mg/L instead of µg/L).

Response: Table 1-1 should have listed µg/L as the units for the Outfall 008 NPDES permit limit exceedance results and the 2009 Benchmark limit. Table 1-1 has been revised and is included in the errata package attached to this memorandum.

Comment #2: Work Plan Addendum text on Page 2-1, 1st paragraph, states “Four of the ISRA PEAs are located in the eastern portion of the Outfall 009 watershed and four are located in the western portion of the Outfall 009 watershed, shown in Figures 1-3 and 1-4.” However, Figure 1-4 shows five ISRA PEAs in the western portion of Outfall 009.

Response: This text should have stated that there are five ISRA PEAs located in the western portion of Outfall 009. Page 2-1 has been revised and is included in the errata package attached to this memorandum.

Comment #3: Page 2-11 description of PEA-LOX-1 states that 34 samples were collected from 41 locations and analyzed for metals. Please check the number of locations associated with the 34 samples and correct as necessary.

Response: This text should have stated that 34 samples collected from 32 locations were analyzed for metals. Page 2-11 has been revised and is included in the errata package attached to this memorandum.

Comment #4: Please double check the average depth to bedrock indicated in the report text descriptions for PEA-LOX-1 (0.5 ft, page 2-11), PEA-LOX-2 (2 ft, page 2-12), and PEA-A2LF-2 (1 ft, page 2-12). These depths are either inconsistent with the planned excavation depths described in Table 2-1 or inconsistent with my understanding of site conditions.

Response: The text has been revised to clarify the depth bedrock was encountered during the ISRA investigation at PEA-LOX-1 (varies from 0.25 feet to greater than 5.0 feet), PEA-LOX-2 (varies from 1.5 feet to 6.5 feet), and PEA-A2LF-1 (varies from 0.25 feet to greater than 5.0 feet). Pages 2-11 and 2-12 have been revised and are included in the errata package attached to this memorandum.

Comment #5: Work Plan Figure 2-14 (Refined Preliminary ISRA Evaluation Areas Outfall 009 - LOX-1) represents dioxin data with black triangles, but black triangles are not identified in the legend.

Response: The black triangles on Figure 2-14 should have been yellow. Figure 2-14 has been revised and is included in the errata package attached to this memorandum.

Comment #6: Work Plan text states bedrock was encountered at approximately 1.5 feet bgs within the AP/STP-1 ISRA area (page 2-13, 1st paragraph), please confirm this is true.

Response: The text has been revised to clarify the depth bedrock was encountered during the ISRA investigation at PEA-AP/STP-1 (varies from 0.4 feet to greater than 5.0 feet). Page 2-13 has been revised and is included in the errata package attached to this memorandum.

Comment #7: Page 2-18, First full paragraph, Typo error in description of Area 1 Landfill ISRA area as "A2LF-1". Text should be corrected to indicate A1LF-1.

Response: The text should have stated A1LF-1 instead of A2LF-1. Page 2-18 has been revised and is included in the errata package attached to this memorandum.

Comment #8: Work Plan Tables 2-1 and 2-4 do not include TCE as a non-ISRA COC for the IEL-2 ISRA Area, please confirm this is true.

Response: Tables 2-1 and 2-4 should have included TCE as a non-ISRA COC for IEL-2. In addition, the list of non-ISRA COCs for A1LF-1 on Table 2-4 was incorrect and should have matched the list presented on Table 2-1. Tables 2-1 and 2-4 have been revised and are included in the errata package attached to this memorandum.

Comment #9: Include a summary of each former operational site (RFI Site) which is collocated with or located near a 2010 ISRA Area.

Response: A summary of available information on the RFI Sites associated with ISRA Areas recommended for action in the Work Plan Addendum, including the B-1 Area, the Instrument and Equipment Laboratories (IEL), the Area I Landfill (A1LF), the Component Testing Laboratory I (CTL-I), the former LOX Plant, the Area II Landfill (A2LF), and the Incinerator Ash Pile/Sewage Treatment Plant (AP/STP) Area have been compiled and are included in the errata package attached to this memorandum as a new appendix (Appendix C) to the Work Plan Addendum. In addition, Figure 1-2 has been revised to show the location of CTL-I.

ATTACHMENT

2010 ISRA Work Plan Addendum Errata Package

REFERENCES

- MWH, 2009a. Preliminary Interim Source Removal Action (ISRA) Work Plan, Santa Susana Field Laboratory, Ventura County, California. February.
- MWH, 2009b. Final Interim Source Removal Action (ISRA) Work Plan, Santa Susana Field Laboratory, Ventura County, California. May.
- MWH, 2009c. Addendum to the Final Interim Source Removal Action (ISRA) Work Plan Submitted in Response to California Water Code Section 13304 Order (NPDES NO. CA0001309, CI NO. 6027, SCP NO. 1111, Site ID NO. 2040109); Response to RWQCB and DTSC Comments on the Final ISRA Work Plan, Letter to RWQCB. June 19.
- MWH, 2009d. HVS-2A Soil Collapse Feature and Pipeline Removal Summary and Plan, Letter Amendment to the Final Interim Source Removal Action (ISRA) Work Plan, California Water Code Section 13304 Order (NPDES NO. CA0001309, CI NO. 6027, SCP NO. 1111, Site ID NO. 2040109). September 18.
- MWH, 2009e. Happy Valley South Underground Septic Tank Removal Plan, California Water Code Section 13304 Order (NPDES No. CA0001309, CI No. 6027, SCP NO. 1111, Site ID NO. 2040109), Letter to RWQCB. October 9.
- MWH, 2010. 2010 Interim Source Removal Action (ISRA) Work Plan Addendum, Santa Susana Field Laboratory, Ventura County, California. April.
- NASA, 2009. Additional Removals [Areas in the Outfall 009 Watershed], Email to RWQCB. September 18.

Attachment 1**Work Plan Addendum Errata Package****Text**

Page iii, (List of Appendices), list was revised to indicate revised tables, figures and the addition of Appendix C.

Page 2-1, (Section 2.0 Outfall 009 ISRA Area Identification and Remedial Planning) first paragraph, text revised to state the correct number of ISRA PEAs (5) located in the western portion of Outfall 009 as shown on Figure 1-4.

Page 2-11, (Section 2.1.2, Sampling Results) fourth paragraph, text revised to clarify depth bedrock encountered during the ISRA investigation at PEA-LOX-1; fifth paragraph, text revised to state that 34 samples collected from 32 locations were analyzed for metals.

Page 2-12, (Section 2.1.2, Sampling Results) first paragraph, text revised to clarify depth bedrock encountered during the ISRA investigation at PEA-LOX-2; fifth paragraph, text revised to clarify depth bedrock encountered during the ISRA investigation at PEA-A2LF-2.

Page 2-13, (Section 2.1.2, Sampling Results) first paragraph, text revised to clarify depth bedrock encountered during the ISRA investigation at PEA-AP/STP-1.

Page 2-18, (Section 2.3, Remedial Alternative Evaluation and Plan) first full paragraph, text revised to state A1LF-1 instead of A2LF-1.

Tables

Table 1-1 was revised to list $\mu\text{g/L}$ as the units for the Outfall 008 NPDES permit limit exceedance results and the 2009 Benchmark limit.

Table 2-1 was revised to include TCE as a non-ISRA COC for IEL-2.

Table 2-4 was revised to include TCE as a non-ISRA COC for IEL-2.

Figures

Figure 1-2 has been revised to show the location of CTL-I.

Figure 2-14 was revised to replace the black triangles with yellow triangles.

Appendices

Appendix C is a new appendix that provides a summary of available information on the RFI Sites associated with 2010 ISRA Areas.

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Appendix B Memorandum, SSFL Outfall 009 Sediment Yield Analysis for Remaining ISRA PEAs (Geosyntec, 2010)

Appendix C Overview of Historical Operations within Outfall 009 (New Addition)

ABBREVIATIONS AND ACRONYMS

AL1F	Area 1 Landfill
ASTM	American Society for Test and Materials
bgs	below ground surface
Boeing	The Boeing Company
CAO	Cleanup and Abatement Order
CDFG	California Department of Fish and Game
CM	culvert maintenance
COC	constituents of concern
CWA	Clean Water Act
cy	cubic yards
DTSC	Department of Toxic Substances Control
ELV	Expendable Launch Vehicle
EPA	United States Environmental Protection Agency
Geosyntec	Geosyntec Consultants, Inc.
HSP	health and safety plan
ISRA	Interim Source Removal Action
LOX	liquid oxygen
mg/kg	milligrams per kilogram
NASA	National Aeronautics and Space Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NWP	Nationwide Permit
MRCA	Mountains Recreation Conservancy Authority
PCBs	polychlorinated biphenyls
PEA	preliminary evaluation area
pg/g	picograms per gram
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RUSLE	Revised Universal Soil Loss Equation, Version 2
RWQCB	Los Angeles Regional Water Quality Control Board

2.0 OUTFALL 009 ISRA AREA IDENTIFICATION AND REMEDIAL PLANNING

There are eight ISRA PEAs that were identified in the Preliminary ISRA Work Plan (MWH, 2009a) based on available soil data, but have not been evaluated in previous work plans and work plan addenda. Four of the ISRA PEAs are located in the eastern portion of the Outfall 009 watershed and five are located in the western portion of the Outfall 009 watershed, shown in Figures 1-3 and 1-4. Although these figures display only surface soil data, subsurface soil data were also considered in the identification of ISRA PEAs in the Preliminary ISRA Work Plan; all subsurface soil COC detections above SRGs were collocated with surficial COC impacts.

As described in previous work plans, the ISRA PEAs identified in the Preliminary ISRA Work Plan were highly generalized and approximate due to data limitations. Additional soil samples have been collected at and near these ISRA PEAs to further delineate areas exceeding SRGs for the ISRA COCs, and assess concentrations of ISRA COCs near and/or down-gradient of former operational areas previously not investigated (see Section 2.1). This section summarizes the sampling activities and results, the ISRA area identification results, the remedial alternatives evaluation results, and the recommended remedial action for each ISRA area identified within the remaining ISRA PEAs within the Outfall 009 watershed. Descriptions in the following sections use the term “COC” to include both ISRA COCs and collocated non-ISRA COCs, including RCRA risk drivers.

2.1 SOURCE DELINEATION AND DATA GAP SAMPLING

An evaluation of previous soil sample locations and analytical results was performed to identify locations for source delineation and data gap sampling. Source delineation soil sampling was performed to further refine the extent and magnitude of soil COCs within ISRA PEAs. Data gap sampling was performed near and/or down-gradient of former operational areas where the absence of a COC had not been verified by previous sampling. The sampling approach, plan, methods, and results of the source delineation and data gap sampling performed within the eight remaining ISRA PEAs located within the Outfall 009 watershed are described below.

2.1.1 Sampling Approach and Plan

Source delineation and data gap soil sampling in the vicinity of the eight remaining ISRA PEAs was performed to further refine the extent and magnitude of COCs within the Outfall 009 watershed. Source delineation and step out sampling locations performed between June 2009 and March 2010 are shown on Figures 2-1 to 2-6.

In general, the sampling approach and methods followed those presented in the Final ISRA Work Plan (MWH, 2009b). Source delineation and step out samples were collected approximately 25 to 50 feet from previous sample location(s) with COCs exceeding SRGs and approximately 25 to 50 feet from other source delineation sample locations. The sample spacing considered the surface area of the impact and the likely depositional method, with greater spacing for larger areas and those possibly impacted by air dispersion. Source delineation samples were also collected proximate to existing sample locations for which the vertical extent required assessment. Data gap samples were collected near and/or down-gradient of former operational areas where the absence of a COC had not been verified by previous sampling. Generally within drainages, source delineation and data gap assessment was performed by collecting 3 to 5 samples along transects aligned perpendicular to the surface water flow pathway, with a 5- to 10-foot spacing within each transect. This sampling approach was designed to characterize soil from the middle of the drainage, the banks of the drainage, and the overbanks area.

At each source delineation and data gap sample location, a surface soil sample and a subsurface soil sample were collected, if soil depth allowed. The analytical suite for source delineation samples was chosen based on constituents known from previous sampling to be associated with a potential source area, and included both ISRA COCs and RCRA risk drivers. The analytical suite for data gap samples was chosen based on the analytes for which the data gap existed. Soil samples from step out locations and subsurface soil samples were placed on hold at the laboratory and only analyzed if needed for source delineation. Source delineation and data gap sample analysis included one or more of the following:

- Metals by United States Environmental Protection Agency (EPA) 6010B/6020/7471A;

(cadmium, copper, lead, and mercury) and dioxins are presented in Appendix A. The following is a summary of the results:

- **Metals.** Of the 10 soil samples (19 surface samples and 1 duplicate sample) analyzed for one or more of the metals listed above, 4 samples contained lead above the SRG of 34 mg/kg. Lead was detected up to 79.9 mg/kg at ENBS0133.
- **Dioxins.** Of the 17 soil samples (16 surface samples and 1 duplicate sample) analyzed for dioxins, 3 samples contained dioxins above the SRG of 3.0 pg/g. Dioxins were detected up to 7.2 pg/g at ENBS0121.

PEA-LOX-1

Forty-two borings were advanced during source delineation sampling at PEA-LOX-1. A total of 44 soil samples (41 surface samples, 2 subsurface samples, and 1 split sample) were collected from 42 sampling locations and analyzed for ISRA COCs. The source delineation sampling locations are shown on Figure 2-6. Sampling depths varied from refusal on sandstone at 0.25 feet bgs to 5.0 feet bgs with no refusal.

Thirty four soil samples collected from 32 locations were analyzed for metals and 36 soil samples collected from 34 locations were analyzed for dioxins. Results of chemical testing for metals (cadmium, copper, and lead) and dioxins are presented in Appendix A, and shown on Figure 2-14. The following is a summary of the results:

- **Metals.** Of the 34 soil samples (32 surface samples, 2 subsurface samples) analyzed for one or more of the metals listed above, 8 soil samples contained lead above the SRG of 34 mg/kg and 8 soil samples contained copper above the SRG of 29 mg/kg. Lead was detected up to 203 mg/kg at LXBS1051 and copper was detected up to 121 mg/kg at LXBS1066.
- **Dioxins.** Of the 36 soil samples (34 surface samples, 2 subsurface) analyzed for dioxins, 29 soil samples contained dioxins above the SRG of 3.0 pg/g. Dioxins were detected up to 340 pg/g at LXBS1046.

PEA-LOX-2

Thirty-seven borings were advanced during source delineation sampling at PEA-LOX-2. A total of 12 soil samples (11 surface samples and 1 duplicate sample) were collected from 11 sampling locations and analyzed for ISRA COCs. Twenty-five of the sampling locations (ENBS0081,

ENBS0162 to ENBS0165, ENBS0167 to ENBS0170, ENBS0172 to ENBS0174, ENBS0176 to ENBS0179, ENBS0181 and ENBS0184, ENBS0186 to ENBS0189, and ENBS0194) did not have a sample analyzed either because samples were not collected due to refusal prior to reaching the desired sample depth, or analysis of collected samples was not needed for source delineation. The source delineation sampling locations are shown on Figure 2-4. PEA-LOX-2 consists of four drainages which are labeled CM-2, CM-3, CM-4 and CM-10 after the culvert maintenance activities. The average depth of all four drainages was 1.5 feet bgs, and the maximum depth to bedrock was located in the CM-2 drainage basin up to 6.5 feet bgs.

Two soil samples collected from 2 locations were analyzed for lead and 11 soil samples collected from 10 locations were analyzed for dioxins. Results of chemical testing for lead and dioxins are presented in Appendix A. The following is a summary of the results:

- **Metals.** Of the 2 soil samples (surface samples) analyzed for lead, 1 soil sample contained lead above the SRG of 34 mg/kg. Lead was detected up to 124 mg/kg at ENBS0195.
- **Dioxins.** Of the 11 soil samples (10 surface samples and 1 duplicate sample) analyzed for dioxins, no samples contained dioxins above the SRG.

PEA-A2LF-2

Eleven borings were advanced during source delineation sampling at PEA-A2LF-2. A total of 11 soil samples (10 surface samples, and 1 subsurface samples) were collected from 11 sampling locations and analyzed for ISRA COCs. The source delineation sampling locations are shown on Figure 2-6. Sampling depths varied from refusal on sandstone at 0.25 feet bgs to 5.0 feet bgs with no refusal.

Eleven soil samples collected from 11 locations were analyzed for metals. Results of chemical testing for metals (lead and mercury) are presented in Appendix A, and shown on Figure 2-15. The following is a summary of the results:

- **Metals.** Of the 11 soil samples (10 surface samples, 1 subsurface sample) analyzed for one or more of the metals listed above, 4 soil samples contained mercury above the SRG of 0.09 mg/kg. Mercury was detected up to 0.174 mg/kg in A2BS1081.

PEA-AP/STP-1

Sixty-nine borings were advanced during source delineation sampling at PEA-AP/STP-1. A total of 87 soil samples (66 surface samples, and 21 subsurface samples) were collected from 69 sampling locations and analyzed for ISRA COCs. The source delineation sampling locations are shown on Figure 2-6. Sampling depths varied from refusal on sandstone at 0.4 feet bgs to 5.0 feet bgs with no refusal.

Ten soil samples collected from 8 locations were analyzed for metals and 82 soil samples collected from 66 locations were analyzed for dioxins. Results of chemical testing for metals (cadmium, lead, and mercury) and dioxins are presented in Appendix A, and shown on Figure 2-16. The following is a summary of the results:

- **Metals.** Of the 10 soil samples (8 surface samples and 2 subsurface samples) analyzed for one or more of the metals listed above, 2 samples contained cadmium above the SRG of 1.0 mg/kg, 1 sample contained lead above the SRG of 34 mg/kg, and 3 samples contained mercury above the SRG of 0.09 mg/kg. Cadmium was detected up to 3.42 mg/kg at APBS1029. Lead was detected up to 115 mg/kg at APBS1029, and mercury was detected up to 0.399 mg/kg at APBS1029.
- **Dioxins.** Of the 82 soil samples (66 surface samples and 16 subsurface samples) analyzed for dioxins, 53 soil samples contained dioxins above the SRG of 3.0 pg/g. Dioxins were detected up to 610 pg/g at APBS1042.

The objective of the sampling was to refine the estimated extent and magnitude of soil COC areas within each ISRA PEA, and identify new ISRA PEAs if data gap samples collected outside the identified ISRA PEAs exceeded SRGs. As described in the results summary above, select ISRA PEAs were subdivided into two or more PEAs based on previous sample results prior to performing source delineation sampling. Based on source delineation sample results, ISRA PEAs were subdivided further and boundaries refined. The boundaries of the refined ISRA PEAs that are evaluated in the ISRA area identification process (Section 2.2) are shown on Figures 2-7 through 2-16, and are listed below.

- PEA-A1LF-1 was subdivided into PEA-A1LF-1 and -2;
- PEA-B1-1 was subdivided into PEA-B1-1 and -2;
- PEA-CTLI-1 was subdivided into PEA-CTLI-1, -2;
- PEA-IEL-1 was subdivided into PEA-IEL-1, -2, -3, -4, -5; and -6;

- PEA-AP/STP-1 was subdivided into PEA-AP/STP-1A, -1B, -1C, -1D, -1E, and -1F;
- PEA-A2LF-2; and
- PEA-LOX-1 was subdivided into PEA-LOX-1A, -1B, -1C, -1D.

Of the 23 ISRA PEAs listed above, additional source delineation sampling is ongoing at six, including PEA-B1-2, PEA-CTLI-1, PEA-A1LF-2, PEA-LOX-1, PEA-A2LF-2, and PEA-AP/STP-1. Although the final excavation boundaries of these six PEAs are still pending, an expected boundary for each PEA is shown on the figures. Following completion of the ongoing delineation sampling, appropriate tables and figures in this report will be revised and submitted to the RWQCB for review and approval.

The six ISRA PEAs that are not in the list above include PEA-A1LF-3, PEA-CTLI-3, PEA-CTLI-4, PEA-IEL-7, PEA-IEL-8, and PEA-LOX-2. Four of these ISRA PEAs is located upgradient of a culvert: PEA-A2LF-3 is upgradient of CM-8, PEA-CTLI-3 is upgradient of CM-7, PEA-CTLI-4 is upgradient of CM-11, and PEA-LOX-2 is upgradient of CM-3. The location of CM-3 is shown on Figure 2-5, the locations of CM-7 and CM-11 are shown on Figure 2-4, and the location of CM-8 is shown Figure 2-3. This summer, accumulated sediment upgradient of each of these culverts is planned to be removed as part of the surface water maintenance program. Because of this planned removal action, these ISRA PEAs will not undergo further evaluation in this work plan addendum. Following completion of the culvert maintenance (CM) activities, the effectiveness of the CM will be evaluated by the results of performance monitoring samples, similar to the process for completed ISRA areas. CM-3, CM-8, and CM-11 have been part of the performance monitoring program since the 2009/2010 rainy season. CM-7 will be added to the performance monitoring program in the 2010/2011 rainy season. PEA-IEL-7 was identified to delineate a surface soil sample at ILBS0280 that contained dioxins above the SRG of 3.0 pg/g. The sample was collected as part of the demolition program to characterize base foundation material from Building 1989. The foundation base material was removed during 2009 demolition activities. Since ISRA delineation sample results at PEA-IEL-7 did not detect dioxins above the SRG, this PEA is not recommended for further evaluation. PEA-IEL-8 was identified as a data gap for dioxins. Since ISRA data gap sample results did not detect dioxins above the SRG, this PEA is not recommended for further evaluation.

were assumed to have concentrations of ISRA COCs equal to the greatest concentration detected within that particular PEA. The analysis also assumed background concentrations for sediments within the watershed.

Based on the analysis, all but 5 of the 23 ISRA PEAs are believed to contribute less than 6% of the annual pollutant yield within the watershed for the ISRA COCs (Geosyntec, 2010). The model indicates PEA-A1LF-1 and PEA-B1-1 contribute the most to the annual COC yield of the watershed, including 1.5% for cadmium and 46% for lead from PEA-A1LF-1, and more than 100% for mercury and dioxins from PEA-B1-1. Other PEAs that contribute more than 6% of the annual pollutant yield with the watershed for the ISRA COCs include PEA-AP/STP-1C (14% for dioxins), PEA-AP/STP-1E (32% for dioxins), and PEA-LOX-1B (24% for dioxins). These results are conservative and likely biased high because, as mentioned above, the sediments within each PEA were assumed to have concentrations of ISRA COCs equal to the greatest concentration detected within that particular PEA.

2.2.3 ISRA Area Identification Summary

The contaminant migration criteria evaluation resulted in 18 of the 23 refined ISRA PEAs with a total rank above a value of 20. Based on the contaminant migration ranking and RUSLE model results, these 18 refined ISRA PEAs are the highest priority areas for ISRA implementation. The five refined ISRA PEAs with a total rank below a value of 20 are the lowest priority areas for ISRA implementation and, at this time, remedial action is not recommended. Two of these five refined ISRA PEAs are covered completely with an impermeable layer, including IEL-3 and IEL-6. If the impermeable layer was removed from each of these PEAs, the total rank of IEL-6 would remain below a value of 20, but IEL-3 would increase to above a value of 20. To remove the potential COCs sources that may be affecting the water quality at the Outfall 009 NPDES monitoring point, the 18 refined ISRA PEAs with a total rank above a value of 20 are considered ISRA areas and are carried forward for the remedial alternatives evaluation. In addition, since PEA-IEL-3 would have a total rank above a value of 20 if the impermeable surface were removed, it is also considered an ISRA area and is carried forward for the remedial alternatives evaluation. The remaining four ISRA PEAs that had a total rank below a value of 20, including

PEA-CTLI-2, PEA-IEL-4, PEA-IEL-5, and PEA-IEL-6, are not considered ISRA areas and will not be carried forward for the remedial alternatives evaluation.

2.3 REMEDIAL ALTERNATIVES EVALUATION AND PLAN

In the Final ISRA Work Plan, a remedial action alternatives analysis was performed for the ISRA project to identify potential source removal alternatives that achieve the remedial objectives and requirements of the CAO. The potential alternatives identified by the analysis were excavation with offsite disposal, capping with a clay cap, and construction of diversion and collections structures. Excavation was ranked highest in meeting the CAO objectives and is considered the default approach to source removal unless circumstances at specific ISRA areas render another alternative more feasible or cost-effective. With the exception of the ISRA areas associated with the Area I Landfill (A1LF-1 and A1LF-2), the ISRA areas identified in Section 2.2 for remedial action are similar in physical, chemical, and geochemical characteristics. In addition, there are relatively small volumes of material to be removed from each area, and there are no known site constraints that render excavation less feasible. Therefore, excavation and offsite disposal is the recommended remedial alternative for these ISRA areas. Although excavation and offsite disposal is the recommended remedial alternative for ISRA Area IEL-3, it is currently covered by asphalt and implementation of the remedial action at this location will be postponed until the asphalt is removed. A summary of the ISRA area remedial plans, including COCs and SRGs, is presented in Table 2-4. Remedial action planning and implementation activities are summarized in Section 3.

The remedial alternatives analysis for the Area I Landfill (A1LF-1) and Area I Landfill drainage (A1LF-2) is more complex than the other ISRA areas due to the relatively large volume of material (~40,000 cy), the permitting requirements, and the involvement of multiple regulatory agencies. Therefore, a separate work plan addendum will be prepared that summarizes the remedial alternatives analysis and identifies the recommended remedial action for the Area I Landfill and the Area I Landfill drainage.

Table 1-1
Summary of NPDES Permit Limit Exceedances - Outfalls 008 and 009
 (Page 1 of 1)

Analyte	Sample Date	Result	Units	2009		Data Type
				Benchmark Limit	Units	
<i>Outfall 008, Happy Valley Drainage</i>						
Copper	18-Feb-05	15	g/L	14.0	g/L	Monitoring-only
Lead	20-Oct-04	9.8	g/L	5.2	g/L	Monitoring-only
Lead	27-Oct-04	9	g/L	5.2	g/L	Monitoring-only
Lead	28-Dec-04	6.4	g/L	5.2	g/L	Monitoring-only
Lead	18-Feb-05	13	g/L	5.2	g/L	Monitoring-only
Lead	18-Oct-05	120	g/L	5.2	g/L	Monitoring-only
Lead	1-Jan-06	20	g/L	5.2	g/L	Monitoring-only
Lead	15-Apr-06	18	g/L	5.2	g/L	Compliance
Lead	25-Jan-08	6.3	g/L	5.2	g/L	Benchmark
Dioxins / TCDD TEQ	18-Feb-05	4.46E-08	g/L	2.80E-08	g/L	Monitoring-only
Dioxins / TCDD TEQ	28-Feb-06	3.19E-07	g/L	2.80E-08	g/L	Monitoring-only
<i>Outfall 009, WS-13 Drainage</i>						
Cadmium	17-Oct-05	9.2	g/L	4.0	g/L	Monitoring-only
Copper	17-Oct-05	39	g/L	14	g/L	Monitoring-only
Copper	18-Feb-06	22	g/L	14	g/L	Monitoring-only
Copper	4-Apr-06	26	g/L	14	g/L	Compliance
Lead	28-Dec-04	11	g/L	5.2	g/L	Monitoring-only
Lead	18-Feb-05	10	g/L	5.2	g/L	Monitoring-only
Lead	17-Oct-05	260	g/L	5.2	g/L	Monitoring-only
Lead	18-Feb-06	33	g/L	5.2	g/L	Monitoring-only
Lead	4-Apr-06	64	g/L	5.2	g/L	Compliance
Lead	22-Sep-07	8.6	g/L	5.2	g/L	Compliance
Lead	3-Feb-08	6.0	g/L	5.2	g/L	Benchmark
Lead	15-Dec-08	19	g/L	5.2	g/L	Benchmark
Lead	6-Feb-09	7.5	g/L	5.2	g/L	Benchmark
Lead	13-Feb-09	20	g/L	5.2	g/L	Benchmark
Lead	7-Dec-09	5.7	g/L	5.2	g/L	Benchmark
Mercury	4-Jan-05	0.20	g/L	0.13	g/L	Monitoring-only
Mercury	17-Oct-05	0.21	g/L	0.13	g/L	Monitoring-only
Oil & Grease	11-Jan-05	16	mg/L	15	mg/L	Compliance
pH	17-Oct-05	8.80	pH units	6.5 - 8.5	pH units	Compliance
Dioxins / TCDD TEQ	4-Jan-05	1.72E-06	g/L	2.80E-08	g/L	Monitoring-only
Dioxins / TCDD TEQ	18-Feb-05	5.20E-08	g/L	2.80E-08	g/L	Monitoring-only
Dioxins / TCDD TEQ	17-Oct-05	9.10E-04	g/L	2.80E-08	g/L	Monitoring-only
Dioxins / TCDD TEQ	9-Nov-05	6.14E-07	g/L	2.80E-08	g/L	Monitoring-only
Dioxins / TCDD TEQ	18-Feb-06	1.56E-05	g/L	2.80E-08	g/L	Monitoring-only
Dioxins / TCDD TEQ	4-Apr-06	1.77E-05	g/L	2.80E-08	g/L	Compliance
Dioxins / TCDD TEQ	19-Feb-07	7.64E-07	g/L	2.80E-08	g/L	Compliance
Dioxins / TCDD TEQ	22-Sep-07	3.13E-06	g/L	2.80E-08	g/L	Compliance
Dioxins / TCDD TEQ	3-Feb-08	3.58E-07	g/L	2.80E-08	g/L	Benchmark
Dioxins / TCDD TEQ	26-Nov-08	3.99E-07	g/L	2.80E-08	g/L	Benchmark
Dioxins / TCDD TEQ	15-Dec-08	1.83E-06	g/L	2.80E-08	g/L	Benchmark
Dioxins / TCDD TEQ	6-Feb-09	9.55E-07	g/L	2.80E-08	g/L	Benchmark
Dioxins / TCDD TEQ	13-Feb-09	1.22E-05	g/L	2.80E-08	g/L	Benchmark
Dioxins / TCDD TEQ	14-Oct-09	1.60E-06	g/L	2.80E-08	g/L	Benchmark
Dioxins / TCDD TEQ	7-Dec-09	1.10E-07	g/L	2.80E-08	g/L	Benchmark

Notes:

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

Dioxins / TCDD TEQ - A sum of 17 dioxin / furan congener results adjusted for toxicity. The TEQ is calculated by multiplying the result of each congener by its respective World Health Organization's (1998 WHO's) toxic equivalency factor (TEF), which is based on the relative potency of the congener to cause a toxic response relative to 2,3,7,8-TCDD. TCDD TEQ values do not include laboratory data not quantified (DNQ) as specified in the NPDES permit.

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

**Table 2-1
Outfall 009 ISRA PEA Chemical and Physical Characteristics
(Page 1 of 5)**

Table 2-1 (Revised)

Site Name	ISRA COCs Exceeding Soil Remediation Goals in Soil < 2 ft bgs ^a	Non-ISRA COCs Exceeding Screening Levels in Soil < 2 ft bgs ^{b,c}	ISRA COCs Exceeding Soil Remediation Goals in Soil 2-10 ft bgs ^a	Non-ISRA COCs Exceeding Screening Levels in Soil 2-10 ft bgs ^{b,c}	Surface Area, Range of Exceedance Depth, Average Exceedance Depth, and Volume Estimate ^d	Surface Conditions ^e	Other Physical Parameters of ISRA Area ^{f,g,h}
PEA-A1LF-1	Cadmium: 5.4x SRG (4) Copper: 1.6x SRG (1) Lead: 160x SRG (1) Mercury: 5.8x SRG (4)	Arsenic: 1.0x BG (1) Zinc: 8.0x BG (3) Aroclor 1254: 3.9x Eco RBSL (4)	Cadmium: 66x SRG (11) Copper: 2.9x SRG (4) Lead: 97x SRG (5) Mercury: 8.2x SRG (10)	Arsenic: 2.5x BG (7) Cobalt: 2.1x BG (2) Manganese: 2.1x BG (4) Nickel: 4.6x BG (1) Silver: 270x BG (3) Vanadium: 2.1x BG (2) Zinc: 440x BG (11) Aroclor 1254: 13x Eco RBSL (8) Aroclor 1260: 1.7x Eco RBSL (2)	Surface Area = 11,900 yd ² Depth Range = 0 - ~25 ft bgs Depth Average = 9.8 ft bgs Volume = 38,870 cy	Impermeable Cover = 15 % Vegetated Cover = 85 % Type of Vegetation = Bare Soil Surface Relief = Smooth	Soil Texture = Medium-Fine Slope Length = 120 feet Elevation Change = 54 feet % Slope = 45% Distance from Drainage = 0 feet Depth to Groundwater = > 10 feet
PEA-A1LF-2	Cadmium: 2.6x SRG (7) Dioxins: 3.5x SRG (4) Lead: 1.3x SRG (1) Mercury: 6.3x SRG (3)	Silver: 13x BG (11) Zinc: 1.1x BG (1) Total Aroclors: 4.1x Eco RBSL (8)	Cadmium: 2.8x SRG (6) Mercury: 3.7x SRG (1)	Silver: 2.7x BG (1) Zinc: 1.4x BG (3)	Surface Area = 914 yd ² Depth Range = 0 - 2 ft bgs Depth Average = 2 ft bgs Volume = 610 cy	Impermeable Cover = 5 % Vegetated Cover = 95 % Type of Vegetation = Bushes Surface Roughness = Dissected	Soil Texture = Medium-Fine Slope Length = 270 feet Elevation Change = 25 feet % Slope = 9% Distance from Drainage = 0 feet Depth to Groundwater = > 10 feet
PEA-A2LF-2	Mercury: 1.9x SRG (2)	PAHs: 2.3x Res HH RBSL (6)	--	--	Surface Area = 2,711 yd ² Depth Range = 0 - 2 ft bgs Depth Average = 2 ft bgs Volume = 1,810 cy	Impermeable Cover = 0 % Vegetated Cover = 100 % Type of Vegetation = Bushes Surface Roughness = Smooth	Soil Texture = Medium Slope Length = 250 feet Elevation Change = 81 feet % Slope = 32% Distance from Drainage = 191 feet Depth to Groundwater = > 10 feet
PEA-AP/STP-1A	Dioxins: 11x SRG (1)	--	--	--	Surface Area = 106 yd ² Depth Range = 0 - 2 ft bgs Depth Average = 2 ft bgs Volume = 70 cy	Impermeable Cover = 0 % Vegetated Cover = 60 % Type of Vegetation = Bushes Surface Roughness = Smooth	Soil Texture = Medium-Fine Slope Length = 46 feet Elevation Change = 3 feet % Slope = 7% Distance from Drainage = 278 feet Depth to Groundwater = > 10 feet
PEA-AP/STP-1B	Cadmium: 4.9x SRG (4) Copper: 1.8x SRG (1) Lead: 88x SRG (3)	--	--	--	Surface Area = 2,293 yd ² Depth Range = 0 - 2 ft bgs Depth Average = 2 ft bgs Volume = 1,530 cy	Impermeable Cover = 0 % Vegetated Cover = 100 % Type of Vegetation = Bushes Surface Roughness = Smooth	Soil Texture = Medium Slope Length = 115 feet Elevation Change = 14 feet % Slope = 12% Distance from Drainage = 0 feet Depth to Groundwater = > 10 feet

Table 2-1
Outfall 009 ISRA PEA Chemical and Physical Characteristics
 (Page 2 of 5)

Table 2-1 (Revised)

Site Name	ISRA COCs Exceeding Soil Remediation Goals in Soil < 2 ft bgs ^a	Non-ISRA COCs Exceeding Screening Levels in Soil < 2 ft bgs ^{b,c}	ISRA COCs Exceeding Soil Remediation Goals in Soil 2-10 ft bgs ^a	Non-ISRA COCs Exceeding Screening Levels in Soil 2-10 ft bgs ^{b,c}	Surface Area, Range of Exceedance Depth, Average Exceedance Depth, and Volume Estimate ^d	Surface Conditions ^e	Other Physical Parameters of ISRA Area ^{f,g,h}
PEA-AP/STP-1C	Cadmium: 1.3x SRG (2) Copper: 1.3x SRG (1) Dioxins: 79x SRG (43) Lead: 2.8x SRG (3) Mercury: 1.1x SRG (1)	--	--	--	Surface Area = 8,111 yd ² Depth Range = 0 - 2 ft bgs Depth Average = 2 ft bgs Volume = 5,410 cy	Impermeable Cover = 6 % Vegetated Cover = 94 % Type of Vegetation = Bushes Surface Roughness = Smooth	Soil Texture = Medium Slope Length = 345 feet Elevation Change = 17 feet % Slope = 5% Distance from Drainage = 0 feet Depth to Groundwater = > 10 feet
PEA-AP/STP-1D	Dioxins: 17x SRG (2)	--	--	--	Surface Area = 483 yd ² Depth Range = 0 - 2 ft bgs Depth Average = 2 ft bgs Volume = 320 cy	Impermeable Cover = 0 % Vegetated Cover = 100 % Type of Vegetation = Bushes Surface Roughness = Smooth	Soil Texture = Medium Slope Length = 80 feet Elevation Change = 6 feet % Slope = 8% Distance from Drainage = 116 feet Depth to Groundwater = > 10 feet
PEA-AP/STP-1E	Dioxins: 700x SRG (7)	--	--	--	Surface Area = 2,369 yd ² Depth Range = 0 - 2 ft bgs Depth Average = 2 ft bgs Volume = 1,580 cy	Impermeable Cover = 4 % Vegetated Cover = 96 % Type of Vegetation = Bushes Surface Roughness = Smooth	Soil Texture = Medium Slope Length = 196 feet Elevation Change = 10 feet % Slope = 5% Distance from Drainage = 0 feet Depth to Groundwater = > 10 feet
PEA-AP/STP-1F	Dioxins: 4.5x SRG (2)	--	--	--	Surface Area = 1,160 yd ² Depth Range = 0 - 2 ft bgs Depth Average = 2 ft bgs Volume = 770 cy	Impermeable Cover = 0 % Vegetated Cover = 100 % Type of Vegetation = Bushes Surface Roughness = Smooth	Soil Texture = Medium Slope Length = 90 feet Elevation Change = 28 feet % Slope = 31% Distance from Drainage = 56 feet Depth to Groundwater = > 10 feet
PEA-B1-1	Cadmium: 3.7x SRG (2) Dioxins: 270x SRG (12) Mercury: 830x SRG (8)	--	Dioxins: 7.9x SRG (1)	--	Surface Area = 3,323 yd ² Depth Range = 0 - 5 ft bgs Depth Average = 3 ft bgs Volume = 3,320 cy	Impermeable Cover = 5 % Vegetated Cover = 95 % Type of Vegetation = Bushes Surface Roughness = Hummocky	Soil Texture = Medium-Fine Slope Length = 540 feet Elevation Change = 94 feet % Slope = 17% Distance from Drainage = 230 feet Depth to Groundwater = > 10 feet
PEA-B1-2	Cadmium: 7.7x SRG (7) Copper: 2.4x SRG (7) Dioxins: 34x SRG (5) Lead: 14x SRG (9)	Selenium: 1.1x BG (1)	Cadmium: 1.1x SRG (1) Lead: 1.2x SRG (1)	--	Surface Area = 911 yd ² Depth Range = 0 - 5 ft bgs Depth Average = 5 ft bgs Volume = 1,520 cy	Impermeable Cover = 10 % Vegetated Cover = 90 % Type of Vegetation = Bushes Surface Roughness = Hummocky	Soil Texture = Medium-Fine Slope Length = 112 feet Elevation Change = 4 feet % Slope = 4% Distance from Drainage = 0 feet Depth to Groundwater = 5 feet

**Table 2-1
Outfall 009 ISRA PEA Chemical and Physical Characteristics
(Page 3 of 5)**

Table 2-1 (Revised)

Site Name	ISRA COCs Exceeding Soil Remediation Goals in Soil < 2 ft bgs ^a	Non-ISRA COCs Exceeding Screening Levels in Soil < 2 ft bgs ^{b,c}	ISRA COCs Exceeding Soil Remediation Goals in Soil 2-10 ft bgs ^a	Non-ISRA COCs Exceeding Screening Levels in Soil 2-10 ft bgs ^{b,c}	Surface Area, Range of Exceedance Depth, Average Exceedance Depth, and Volume Estimate ^d	Surface Conditions ^e	Other Physical Parameters of ISRA Area ^{f,g,h}
PEA-CTLI-1	Copper: 66x SRG (3) Dioxins: 31x SRG (3) Lead: 13x SRG (12)	Benzo(a)pyrene: 810x Res HH RBSL (15) Zinc: 6.9x BG (17)	--	--	Surface Area = 1,248 yd ² Depth Range = 0 - 5 ft bgs Depth Average = 3 ft bgs Volume = 1,250 cy	Impermeable Cover = 10 % Vegetated Cover = 90 % Type of Vegetation = Bushes Surface Roughness = Dissected	Soil Texture = Medium Slope Length = 180 feet Elevation Change = 50 feet % Slope = 28% Distance from Drainage = 0 feet Depth to Groundwater = > 10 feet
PEA-CTLI-2	Lead: 1.5x SRG (3)	--	--	--	Surface Area = 160 yd ² Depth Range = 0 - 2 ft bgs Depth Average = 2 ft bgs Volume = 110 cy	Impermeable Cover = 10 % Vegetated Cover = 90 % Type of Vegetation = Bushes Surface Roughness = Hummocky	Soil Texture = Medium-Fine Slope Length = 46 feet Elevation Change = 14 feet % Slope = 30% Distance from Drainage = 51 feet Depth to Groundwater = > 10 feet
PEA-IEL-1	Mercury: 17x SRG (1)	--	--	--	Surface Area = 91 yd ² Depth Range = 0 - 2 ft bgs Depth Average = 2 ft bgs Volume = 60 cy	Impermeable Cover = 0 % Vegetated Cover = 100 % Type of Vegetation = Grasses Surface Roughness = Smooth	Soil Texture = Medium-Fine Slope Length = 43 feet Elevation Change = 2 feet % Slope = 5% Distance from Drainage = 103 feet Depth to Groundwater = > 10 feet
PEA-IEL-2	Cadmium: 2.8x SRG (3) Lead: 4.1x SRG (3) Mercury: 50x SRG (5)	TCE: 590x Res HH RBSL (2)	Mercury: 3.7x SRG (2)	TCE: 27x Res HH RBSL (1)	Surface Area = 524 yd ² Depth Range = 0 - 5.5 ft bgs Depth Average = 5 ft bgs Volume = 870 cy	Impermeable Cover = 0 % Vegetated Cover = 100 % Type of Vegetation = Bare Soil Surface Roughness = Berms	Soil Texture = Medium-Fine Slope Length = 63 feet Elevation Change = 5 feet % Slope = 8% Distance from Drainage = 360 feet Depth to Groundwater = > 10 feet
PEA-IEL-3	Cadmium: 4.8x SRG (1) Copper: 10x SRG (1) Lead: 9.4x SRG (1) Mercury: 1.3x SRG (2)	Benzo(a)pyrene: 1.1x Res HH RBSL (1)	Mercury: 2.1x SRG (1)	--	Surface Area = 258 yd ² Depth Range = 0 - 5 ft bgs Depth Average = 3 ft bgs Volume = 260 cy	Impermeable Cover = 100 % Vegetated Cover = 0 % Type of Vegetation = N/A Surface Roughness = Smooth	Soil Texture = Medium-Fine Slope Length = 49 feet Elevation Change = 1 feet % Slope = 2% Distance from Drainage = 51 feet Depth to Groundwater = > 10 feet
PEA-IEL-4	Copper: 1.2x SRG (1)	--	--	--	Surface Area = 119 yd ² Depth Range = 0 - 1 ft bgs Depth Average = 1 ft bgs Volume = 40 cy	Impermeable Cover = 0 % Vegetated Cover = 100 % Type of Vegetation = Bare Soil Surface Roughness = Berms	Soil Texture = Medium-Fine Slope Length = 36 feet Elevation Change = 3 feet % Slope = 8% Distance from Drainage = 548 feet Depth to Groundwater = > 10 feet

**Table 2-1
Outfall 009 ISRA PEA Chemical and Physical Characteristics
(Page 4 of 5)**

Table 2-1 (Revised)

Site Name	ISRA COCs Exceeding Soil Remediation Goals in Soil < 2 ft bgs ^a	Non-ISRA COCs Exceeding Screening Levels in Soil < 2 ft bgs ^{b,c}	ISRA COCs Exceeding Soil Remediation Goals in Soil 2-10 ft bgs ^a	Non-ISRA COCs Exceeding Screening Levels in Soil 2-10 ft bgs ^{b,c}	Surface Area, Range of Exceedance Depth, Average Exceedance Depth, and Volume Estimate ^d	Surface Conditions ^e	Other Physical Parameters of ISRA Area ^{f,g,h}
PEA-IEL-5	Lead: 1.2x SRG (1)	--	--	--	Surface Area = 44 yd ² Depth Range = 0 - 1 ft bgs Depth Average = 1 ft bgs Volume = 10 cy	Impermeable Cover = 0 % Vegetated Cover = 100 % Type of Vegetation = Bare Soil Surface Roughness = Berms	Soil Texture = Medium-Fine Slope Length = 20 feet Elevation Change = 0 feet % Slope = 0% Distance from Drainage = 637 feet Depth to Groundwater = > 10 feet
PEA-IEL-6	Mercury: 1.1x SRG (1)	--	--	--	Surface Area = 25 yd ² Depth Range = 0 - 1.5 ft bgs Depth Average = 1.5 ft bgs Volume = 10 cy	Impermeable Cover = 100 % Vegetated Cover = 0 % Type of Vegetation = N/A Surface Roughness = Smooth	Soil Texture = Medium-Fine Slope Length = 15 feet Elevation Change = 0 feet % Slope = 0% Distance from Drainage = 30 feet Depth to Groundwater = > 10 feet
PEA-LOX-1-A	Copper: 4.8x SRG (1)	--	--	--	Surface Area = 256 yd ² Depth Range = 0 - 2 ft bgs Depth Average = 2 ft bgs Volume = 170 cy	Impermeable Cover = 0 % Vegetated Cover = 100 % Type of Vegetation = Bushes Surface Roughness = Smooth	Soil Texture = Medium Slope Length = 62 feet Elevation Change = 22 feet % Slope = 35% Distance from Drainage = 10 feet Depth to Groundwater = > 10 feet
PEA-LOX-1-B	Copper: 2.9x SRG (7) Dioxins: 390x SRG (32) Lead: 2.1x SRG (4)	TCE: 19x Res HH RBSL (2)	Dioxins: 6.0x SRG (8)	TCE: 64,000x Res HH RBSL (5)	Surface Area = 10,583 yd ² Depth Range = 0 - 2 ft bgs Depth Average = 2 ft bgs Volume = 7,060 cy	Impermeable Cover = 0 % Vegetated Cover = 100 % Type of Vegetation = Bushes Surface Roughness = Smooth	Soil Texture = Medium Slope Length = 631 feet Elevation Change = 6 feet % Slope = 1% Distance from Drainage = 133 feet Depth to Groundwater = > 10 feet
PEA-LOX-1-C	Copper: 120x SRG (9)	--	--	--	Surface Area = 638 yd ² Depth Range = 0 - 2 ft bgs Depth Average = 2 ft bgs Volume = 430 cy	Impermeable Cover = 10 % Vegetated Cover = 90 % Type of Vegetation = Bushes Surface Roughness = Smooth	Soil Texture = Medium Slope Length = 88 feet Elevation Change = 5 feet % Slope = 6% Distance from Drainage = 93 feet Depth to Groundwater = > 10 feet
PEA-LOX-1-D	Copper: 1.2x SRG (2)	--	--	TCE: 43x Res HH RBSL (2)	Surface Area = 823 yd ² Depth Range = 0 - 2 ft bgs Depth Average = 2 ft bgs Volume = 550 cy	Impermeable Cover = 0 % Vegetated Cover = 60 % Type of Vegetation = Bushes Surface Roughness = Smooth	Soil Texture = Medium-Fine Slope Length = 95 feet Elevation Change = 4 feet % Slope = 4% Distance from Drainage = 118 feet Depth to Groundwater = > 10 feet

**Table 2-1
Outfall 009 ISRA PEA Chemical and Physical Characteristics
(Page 5 of 5)**

Table 2-1 (Revised)

Site Name	ISRA COCs Exceeding Soil Remediation Goals in Soil < 2 ft bgs ^a	Non-ISRA COCs Exceeding Screening Levels in Soil < 2 ft bgs ^{b,c}	ISRA COCs Exceeding Soil Remediation Goals in Soil 2-10 ft bgs ^a	Non-ISRA COCs Exceeding Screening Levels in Soil 2-10 ft bgs ^{b,c}	Surface Area, Range of Exceedance Depth, Average Exceedance Depth, and Volume Estimate ^d	Surface Conditions ^e	Other Physical Parameters of ISRA Area ^{f,g,h}
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General Notes:

1.6x SRG (3) - Within the ISRA PEA, the maximum detection of a specific analyte is approximately 1.6 times the stated screening level, in this case the SRG, and a total of 3 samples exceeded the SRG.

a - SRGs are established only for ISRA COCs and are based on 2005 background comparison concentrations (MWH, 2005). SRGs are consistent with or near 2005 background comparison concentrations for metals and within approximately 3 times 2005 background comparison concentrations for organics. COCs were given in the Final ISRA Work Plan (MWH, 2009): Dioxins (TCDD TEQ) = 3.0 pg/g Cadmium = 1 mg/kg Copper = 29 mg/kg Lead = 34 mg/kg Mercury = 0.09 mg/kg

b - Non-ISRA COCs are analytes that exceeded screening levels, including BG for non-ISRA metals, and the lower of the Eco or Res RBSL for other constituents.

c - The following non-ISRA COCs are RCRA risk drivers or contributors at the ISRA PEA indicated based on the Group 1A RFI Report (MWH, 2009a) and Group 2 RFI Report (CH2M HILL, 2008): A1LF-1: metals, Aroclor 1254, and Aroclor 1260 A1LF-2: silver, zinc, and total aroclors A2LF-2: PAHs (multiple PAHs, however, benzo(a)pyrene in particular) B1-2: selenium CTLI-1: benzo(a)pyrene and zinc IEL-3: benzo(a)pyrene LOX-1-B and LOX-1-D: VOCs (multiple VOCs, however, TCE in particular)

d - Surface area represents the area of the refined ISRA PEA shown on Figures 2-7 through 2-16. Depth range represents maximum range between which material containing ISRA COCs exceeding SRGs, material containing non-ISRA COCs exceeding screening levels, and/or debris exist within the ISRA PEA. Depth average represents the average maximum depth of material containing ISRA COCs exceeding SRGs, material containing non-ISRA COCs exceeding screening levels, and/or debris exist within the ISRA PEA. Volume estimate is calculated using the surface area and depth average.

e - Surface relief represents relief as it contributes to potential for erosion: berms (cross-slope relief obstructs surface water flow; ponding); smooth relief (surface water flows as low-velocity sheet flow); hummocky relief (pits and mounds, potential for rill formation during high rainfall); dissected (rills or gullies indicate active erosion).

f - Soil texture represents the typical soil texture within the ISRA PEA, described as coarse (gravels; poorly-graded coarse sands), medium (poorly-graded and well-graded fine and medium sands), medium-fine (fine-grained silty sands), or fine (silts; clays).

g - Slope length, elevation change, and percent slope refer to the steepest slope segment along the path of surface water flow to evaluate the maximum erosion potential within each ISRA PEA.

h - Distance from drainage represents the distance from the boundary of the ISRA PEA to the nearest focused surface water flow pathway, or to the nearest storm drain that discharges into the Northern Drainage (IEL PEAs).

Acronyms:

- BG - Background comparison concentration
- COC - constituent of concern
- cy - cubic yards
- DTSC - Department of Toxic Substances Control
- Eco RBSL - Ecological Risk-based Screening Level
- ft bgs - feet below ground surface
- PAHs - polycyclic aromatic hydrocarbons
- PEA - preliminary evaluation area
- RCRA - Resource Conservation and Recovery Act
- Res HH RBSL - Residential Human Health Risk-Based Screening Level
- RFI - RCRA Facility Investigation
- SRG - soil remediation goal
- TCDD TEQ - tetrachlorobenzo-p-dioxin toxic equivalent (normalized to 2,3,7,8-TCDD)
- TCE - trichloroethene
- VOC - volatile organic compound
- yd² - square yards

References:

- CH2M Hill, 2008. Draft RCRA Facility Investigation, Santa Susana Field Laboratory, Ventura County, California. November.
- MWH, 2005. Standardized Risk Assessment Methodology (SRAM) Work Plan, Revision 2. SSFL, Ventura County. September.
- MWH, 2009a. Group 1A - Northeastern Portion of Area I, RCRA Facility Investigation Report, Santa Susana Field Laboratory, Ventura County, California. February.
- MWH, 2009b. Final Interim Source Removal Action (ISRA) Work Plan, Santa Susana Field Laboratory, Ventura County, California. May.

**Table 2-4
Outfall 009 ISRA Area Remedial Action Summary
(Page 1 of 4)**

Table 2-4 (Revised)

Site Name	ISRA COCs Exceeding Soil Remediation Goals ^a	Non-ISRA COCs Exceeding Screening Levels ^{b,c}	Surface Area, Range of Exceedance Depth, Average Exceedance Depth, and <i>Ex Situ</i> Volume Estimate ^d	Remedial Action	Soil Remediation Goals
A1LF-1	Cadmium Copper Lead Mercury	Arsenic Cobalt Manganese Nickel Silver Vanadium Zinc Aroclor 1254 Aroclor 1260	Surface Area = 11,900 yd ² Depth Range = 0 - ~25 ft bgs Depth Average = 9.8 ft bgs (3.3 yards) Volume = 50,530 cy	In development	Cadmium = 1 mg/kg Copper = 29 mg/kg Lead = 34 mg/kg Mercury = 0.09 mg/kg
A1LF-2	Cadmium Dioxins Lead Mercury	Silver Zinc Total Aroclors	Surface Area = 914 yd ² Depth Range = 0 - 2 ft bgs Depth Average = 2 ft bgs (0.7 yards) Volume = 790 cy	In development	Cadmium = 1 mg/kg Dioxins = 3 pg/g Lead = 34 mg/kg Mercury = 0.09 mg/kg
A2LF-2	Mercury	PAHs	Surface Area = 2,711 yd ² Depth Range = 0 - 2 ft bgs Depth Average = 2 ft bgs (0.7 yards) Volume = 2,350 cy	Excavation	Mercury = 0.09 mg/kg
AP/STP-1A	Dioxins	--	Surface Area = 106 yd ² Depth Range = 0 - 2 ft bgs Depth Average = 2 ft bgs (0.7 yards) Volume = 90 cy	Excavation	Dioxins = 3 pg/g
AP/STP-1B	Cadmium Copper Lead	--	Surface Area = 2,293 yd ² Depth Range = 0 - 2 ft bgs Depth Average = 2 ft bgs (0.7 yards) Volume = 1,990 cy	Excavation	Cadmium = 1 mg/kg Copper = 29 mg/kg Lead = 34 mg/kg
AP/STP-1C	Cadmium Copper Dioxins Lead Mercury	--	Surface Area = 8,111 yd ² Depth Range = 0 - 2 ft bgs Depth Average = 2 ft bgs (0.7 yards) Volume = 7,030 cy	Excavation	Cadmium = 1 mg/kg Copper = 29 mg/kg Dioxins = 3 pg/g Lead = 34 mg/kg Mercury = 0.09 mg/kg
AP/STP-1D	Dioxins	--	Surface Area = 483 yd ² Depth Range = 0 - 2 ft bgs Depth Average = 2 ft bgs (0.7 yards) Volume = 420 cy	Excavation	Dioxins = 3 pg/g

**Table 2-4
Outfall 009 ISRA Area Remedial Action Summary
(Page 2 of 4)**

Table 2-4 (Revised)

Site Name	ISRA COCs Exceeding Soil Remediation Goals ^a	Non-ISRA COCs Exceeding Screening Levels ^{b,c}	Surface Area, Range of Exceedance Depth, Average Exceedance Depth, and <i>Ex Situ</i> Volume Estimate ^d	Remedial Action	Soil Remediation Goals
AP/STP-1E	Dioxins	--	Surface Area = 2,369 yd ² Depth Range = 0 - 2 ft bgs Depth Average = 2 ft bgs (0.7 yards) Volume = 2,050 cy	Excavation	Dioxins = 3 pg/g
AP/STP-1F	Dioxins	--	Surface Area = 1,160 yd ² Depth Range = 0 - 2 ft bgs Depth Average = 2 ft bgs (0.7 yards) Volume = 1,000 cy	Excavation	Dioxins = 3 pg/g
B1-1	Cadmium Dioxins Mercury	--	Surface Area = 3,323 yd ² Depth Range = 0 - 5 ft bgs Depth Average = 3 ft bgs (1.0 yards) Volume = 4,320 cy	Excavation	Cadmium = 1 mg/kg Dioxins = 3 pg/g Mercury = 0.09 mg/kg
B1-2	Cadmium Copper Dioxins Lead	Selenium	Surface Area = 911 yd ² Depth Range = 0 - 5 ft bgs Depth Average = 5 ft bgs (1.7 yards) Volume = 1,980 cy	Excavation	Cadmium = 1 mg/kg Copper = 29 mg/kg Dioxins = 3 pg/g Lead = 34 mg/kg
CTLI-1	Copper Dioxins Lead	Benzo(a)pyrene Zinc	Surface Area = 1,248 yd ² Depth Range = 0 - 5 ft bgs Depth Average = 3 ft bgs (1.0 yards) Volume = 1,630 cy	Excavation	Copper = 29 mg/kg Dioxins = 3 pg/g Lead = 34 mg/kg
CTLI-2	Lead	--	Surface Area = 160 yd ² Depth Range = 0 - 2 ft bgs Depth Average = 2 ft bgs (0.7 yards) Volume = 140 cy	No Action	Lead = 34 mg/kg
IEL-1	Mercury	--	Surface Area = 91 yd ² Depth Range = 0 - 2 ft bgs Depth Average = 2 ft bgs (0.7 yards) Volume = 80 cy	Excavation	Mercury = 0.09 mg/kg
IEL-2	Cadmium Lead Mercury	TCE	Surface Area = 524 yd ² Depth Range = 0 - 5.5 ft bgs Depth Average = 5 ft bgs (1.7 yards) Volume = 1,130 cy	Excavation	Cadmium = 1 mg/kg Lead = 34 mg/kg Mercury = 0.09 mg/kg

**Table 2-4
Outfall 009 ISRA Area Remedial Action Summary
(Page 3 of 4)**

Table 2-4 (Revised)

Site Name	ISRA COCs Exceeding Soil Remediation Goals ^a	Non-ISRA COCs Exceeding Screening Levels ^{b,c}	Surface Area, Range of Exceedance Depth, Average Exceedance Depth, and <i>Ex Situ</i> Volume Estimate ^d	Remedial Action	Soil Remediation Goals
IEL-3	Cadmium Copper Lead Mercury	Benzo(a)pyrene	Surface Area = 258 yd ² Depth Range = 0 - 5 ft bgs Depth Average = 3 ft bgs (1.0 yards) Volume = 340 cy	Excavation (Post-Demolition)	Cadmium = 1 mg/kg Copper = 29 mg/kg Lead = 34 mg/kg Mercury = 0.09 mg/kg
IEL-4	Copper	--	Surface Area = 119 yd ² Depth Range = 0 - 1 ft bgs Depth Average = 1 ft bgs (0.3 yards) Volume = 50 cy	No Action	Copper = 29 mg/kg
IEL-5	Lead	--	Surface Area = 44 yd ² Depth Range = 0 - 1 ft bgs Depth Average = 1 ft bgs (0.3 yards) Volume = 10 cy	No Action	Lead = 34 mg/kg
IEL-6	Mercury	--	Surface Area = 25 yd ² Depth Range = 0 - 1.5 ft bgs Depth Average = 1.5 ft bgs (0.5 yards) Volume = 10 cy	No Action	Mercury = 0.09 mg/kg
LOX-1-A	Copper	--	Surface Area = 256 yd ² Depth Range = 0 - 2 ft bgs Depth Average = 2 ft bgs (0.7 yards) Volume = 220 cy	Excavation	Copper = 29 mg/kg
LOX-1-B	Copper Dioxins Lead	TCE	Surface Area = 10,583 yd ² Depth Range = 0 - 2 ft bgs Depth Average = 2 ft bgs (0.7 yards) Volume = 9,180 cy	Excavation	Copper = 29 mg/kg Dioxins = 3 pg/g Lead = 34 mg/kg
LOX-1-C	Copper	--	Surface Area = 638 yd ² Depth Range = 0 - 2 ft bgs Depth Average = 2 ft bgs (0.7 yards) Volume = 560 cy	Excavation	Copper = 29 mg/kg
LOX-1-D	Copper	TCE --	Surface Area = 823 yd ² Depth Range = 0 - 2 ft bgs Depth Average = 2 ft bgs (0.7 yards) Volume = 720 cy	Excavation	Copper = 29 mg/kg

**Table 2-4
Outfall 009 ISRA Area Remedial Action Summary
(Page 4 of 4)**

Table 2-4 (Revised)

Site Name	ISRA COCs Exceeding Soil Remediation Goals ^a	Non-ISRA COCs Exceeding Screening Levels ^{b,c}	Surface Area, Range of Exceedance Depth, Average Exceedance Depth, and <i>Ex Situ</i> Volume Estimate ^d	Remedial Action	Soil Remediation Goals
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General Notes:

a - SRGs are established only for ISRA COCs and are based on 2005 background comparison concentrations (MWH, 2005). SRGs are consistent with or near 2005 background comparison concentrations for metals and within approximately 3 times 2005 background comparison concentrations for dioxins. The 2005 soil background data are being re-evaluated by DTSC and, as necessary, the SRGs may be revised. SRGs for ISRA COCs were given in the Final ISRA Work Plan (MWH, 2009): Dioxins (TCDD TEQ) = 3.0 pg/g Cadmium = 1 mg/kg Copper = 29 mg/kg Lead = 34 mg/kg Mercury = 0.09 mg/kg

b - Non-ISRA COCs are shown for the depth range 0-10 ft bgs. Non-ISRA COCs are analytes that exceeded screening levels, including BG for non-ISRA metals, and the lower of the Eco or Res RBSL for other constituents.

c - The following non-ISRA COCs are RCRA risk drivers or contributors at the ISRA PEA indicated based on the Group 1A RFI Report (MWH, 2009) and Group 2 RFI Report (CH2M HILL, 2008): A1LF-1: metals, Aroclor 1254, and Aroclor 1260 A1LF-2: sliver, zinc, and total aroclors A2LF-2: PAHs (multiple PAHs, however, benzo(a)pyrene in particular) B1-2: selenium CTL1-1: benzo(a)pyrene and zinc IEL-3: benzo(a)pyrene LOX-1-B and LOX-1-D: VOCs (multiple VOCs, however, TCE in particular)

d - Surface area represents the area of the refined ISRA PEA shown on Figures 2-7 through 2-16. Depth range represents maximum range between which material containing ISRA COCs exceeding SRGs, material containing non-ISRA COCs exceeding screening levels, and/or debris exist within the ISRA PEA. Depth average represents the average maximum depth of material containing ISRA COCs exceeding SRGs, material containing non-ISRA COCs exceeding screening levels, and/or debris exist within the ISRA PEA. Volume estimate is calculated using the surface area and depth average.

Acronyms:

- BG - Background comparison concentration
- COC - constituent of concern
- cy - cubic yards
- DTSC - Department of Toxic Substances Control
- Eco RBSL - Ecological Risk-based Screening Level
- ft bgs - feet below ground surface
- mg/kg - milligrams per kilogram
- PAHs - polycyclic aromatic hydrocarbons
- PEA - preliminary evaluation area
- pg/g - picograms per gram
- RCRA - Resource Conservation and Recovery Act
- Res HH RBSL - Residential Human Health Risk-Based Screening Level
- RFI - RCRA Facility Investigation
- SRG - soil remediation goal
- TCDD TEQ - tetrachlorobenzo-p-dioxin toxic equivalent (normalized to 2,3,7,8-TCDD)
- TCE - trichloroethene
- VOC - volatile organic compound
- yd² - square yards

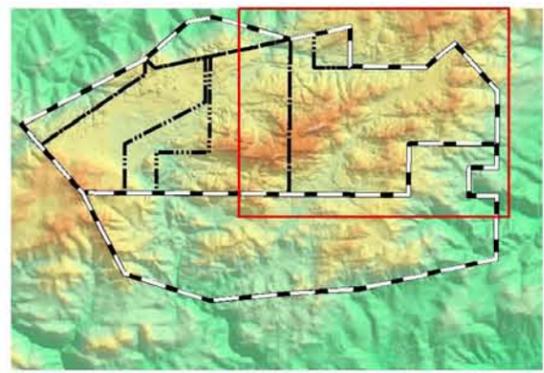
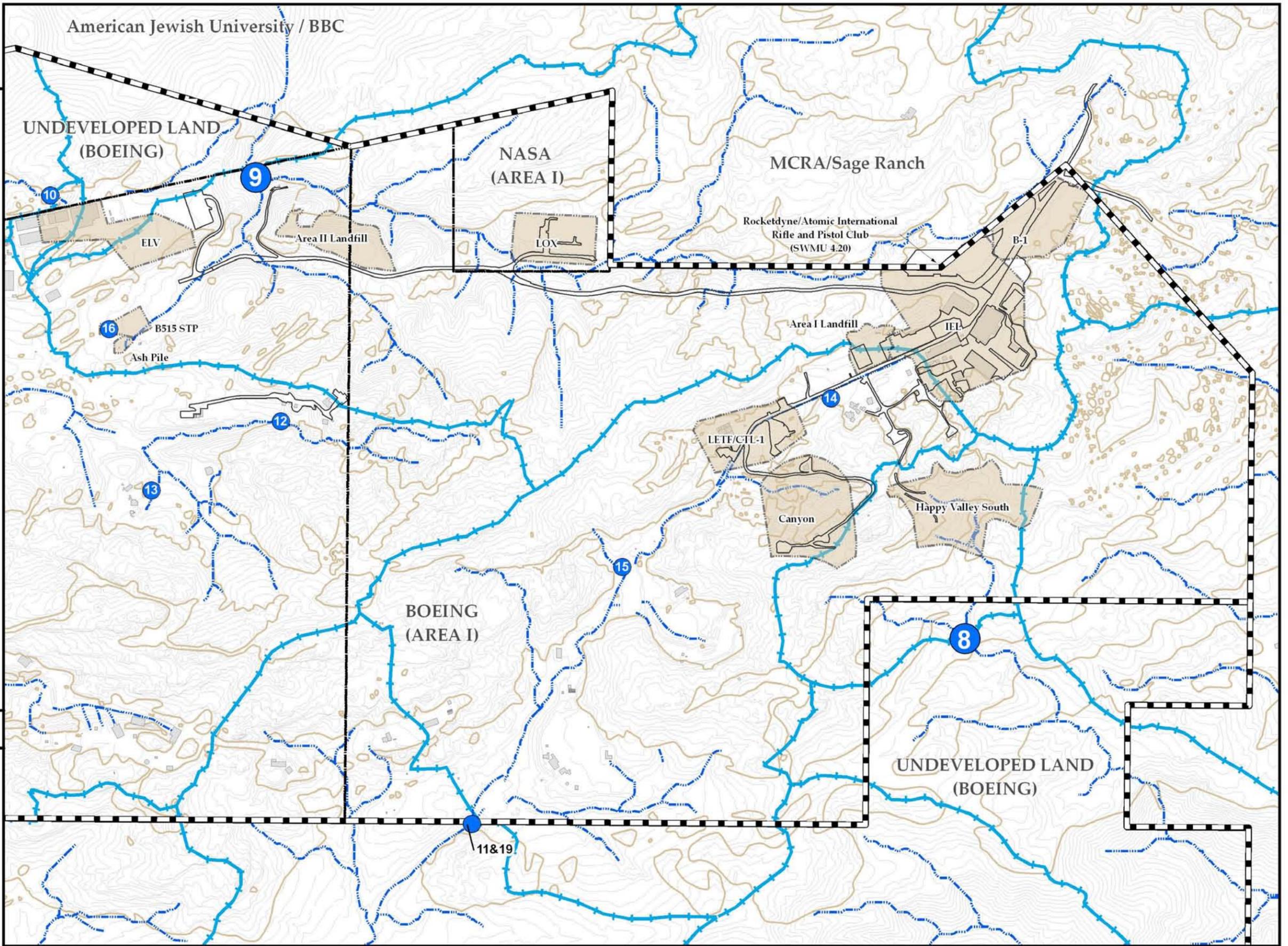
References:

- CH2M Hill, 2008. Draft RCRA Facility Investigation, Santa Susana Field Laboratory, Ventura County, California. November.
- MWH, 2005. Standardized Risk Assessment Methodology (SRAM) Work Plan, Revision 2. SSFL, Ventura County. September.
- MWH, 2009a. Group 1A - Northeastern Portion of Area I, RCRA Facility Investigation Report, Santa Susana Field Laboratory, Ventura County, California. February.
- MWH, 2009b. Final Interim Source Removal Action (ISRA) Work Plan, Santa Susana Field Laboratory, Ventura County, California. May.

Outfalls 008 and 009 Location Map

Base Map Legend

-  Administrative Area Boundary
-  Historical Operations Areas (RFI Sites) Within Outfalls 008 and 009
-  Surface Water Drainage
-  Surface Water Divide
-  NPDES Outfall
-  Existing Building or Structure
-  Rocks
-  Paved Roads
-  Elevation Contour



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



NOTE:
Soil concentrations of parameters exceeding the 009 Outfall NPDES Discharge Permit Limits were compared to their respective background levels:

Cadmium (1 mg/kg)
Copper (29 mg/kg)
Dioxin (0.87 pg/g)
Lead (34 mg/kg)
Mercury (0.09 mg/kg)

Dioxin values represent the TCDD TEQ (ND=0) 2005 WHO

The boundaries of the potential excavation areas are based on samples with below background detections or are based on topographical changes.

Legend

Dioxin Surface Soil Sample Location

- ▲ Exceeds 3.0 ppt (pg/g)
- ▲ Exceeds Background, below 3.0 ppt (pg/g)
- ▲ Below Background

Dioxin Subsurface Soil Sample Location

- ◆ Exceeds 3.0 ppt (pg/g)
- ◆ Exceeds Background, below 3.0 ppt (pg/g)
- ◆ Below Background

Metals Subsurface Soil Sample Location

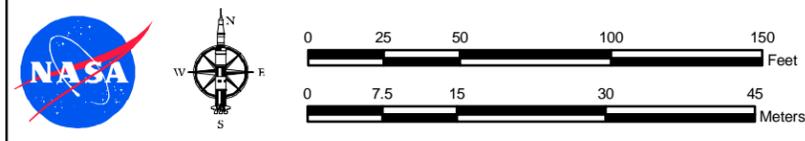
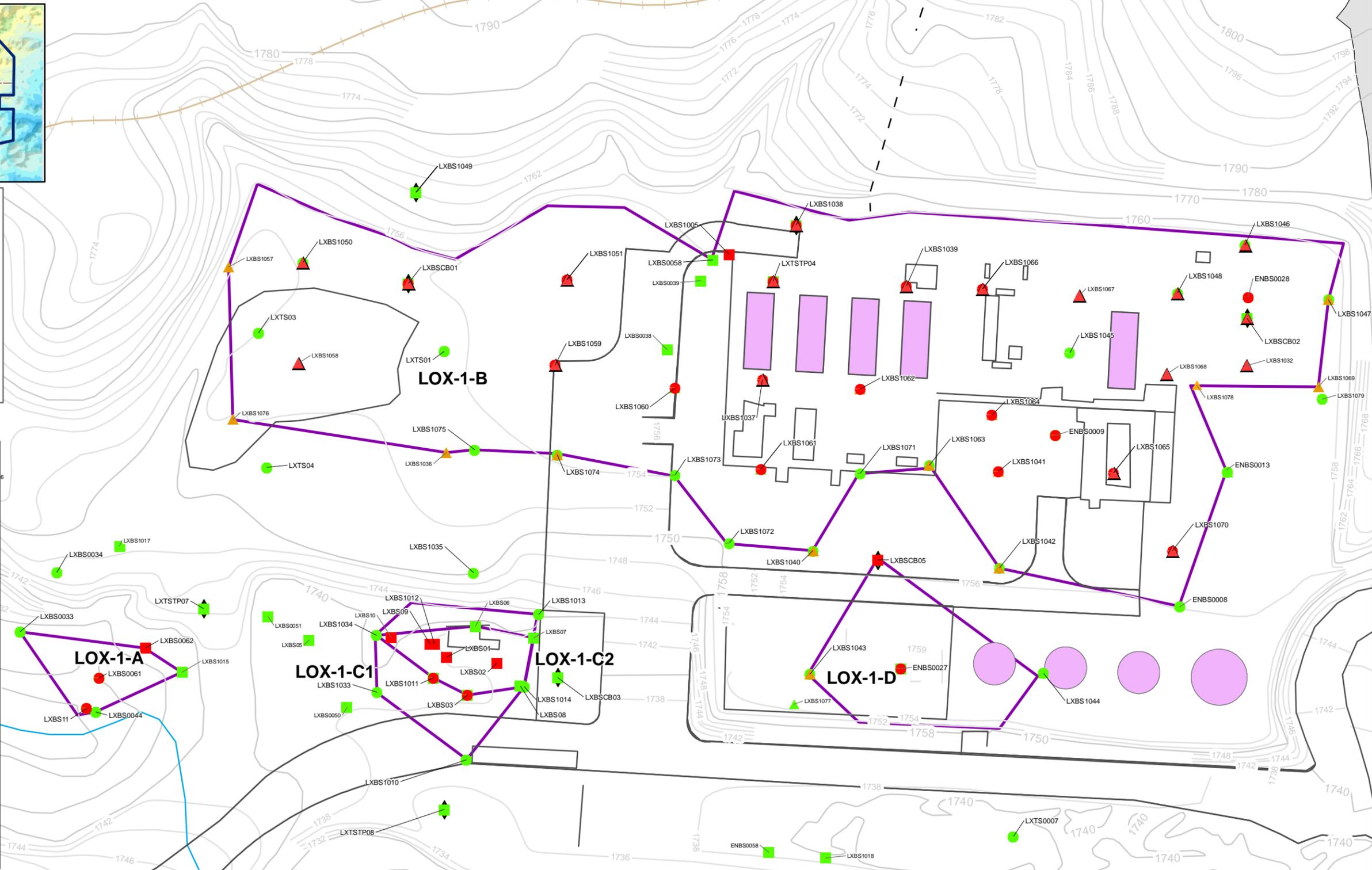
- Exceeds Background
- Below Background

Metals Surface Soil Sample Location

- Exceeds Background
- Below Background

— Rock Outcrop
— Pipeline
— Road and Paving
— Contour
— Stream

▭ Refined ISRA PEA
▭ Pavement/Gravel Area
▭ Site Areas
▭ SSFL Boundary



8-JUN-2010
Drawn By:
Alberta Cooley

Figure 2-14 (Revised)
Refined Preliminary ISRA Evaluation Areas
LOX-1 PEA, Outfall 009
Santa Susana Field Laboratory

APPENDIX C

**OVERVIEW OF HISTORICAL OPERATIONS WITHIN
OUTFALL 009 (NEW ADDITION)**

APPENDIX C

OVERVIEW OF HISTORICAL OPERATIONS IN THE VICINITY OF ISRA AREAS RECOMMENDED FOR ACTION

The 19 Interim Source Removal Action (ISRA) Areas recommended for remediation in the 2010 ISRA Work Plan Addendum are located within or in the vicinity of one of the following seven historical operational areas, including the B-1 Area, the Instrument and Equipment Laboratories (IEL), the Area I Landfill (A1LF), the Component Test Laboratory I (CTL-I), the former Liquid Oxygen (LOX) Plant, the Area II Landfill (A2LF), and the Incinerator Ash Pile/Sewage Treatment Plant (AP/STP) Area (Figure 1-2). These seven areas are being investigated as part of the Resource Conservation Recovery Act (RCRA) Facility Investigation (RFI). A brief historical operational summary of these seven RFI sites is provided below. A more comprehensive description of these features is provided in the Group 1A and Group 2 RFI Reports (MWH, 2009; NASA, 2008).

B-1. The B-1 Area is an approximate 7.7-acre area that used to test jet engines using jet propellant (JP)-4, at three test stands, and using “exotic” fuels at a fourth test stand between the early 1950s and the mid 1970s. JP-4 is a mixture of gasoline and diesel fuels, and “exotic” materials were not defined, but may have included hydrazine or pentaborane fuels. Engines were flushed with solvents following testing. Support facilities, such as fuel and waste storage tanks, machine shops/workshops and explosive and equipment storage, were also present at the site. Following use as an engine test facility, the B-1 Area was used for equipment and document storage until the site was dismantled in early 2000. Other operational facilities included a warehouse, pump houses/stations, cooling towers, transformers, and drum storage.

IEL. The IEL RFI Site is an approximate 25-acre area primarily used for the service, repair, assembly, cleaning, and testing of engine valves, manifolds, and instruments. Chemicals used included solvents, acids, lubricant and hydraulic oils, and petroleum-based cleaners. Support facilities, such as a trichloroethane (TCA) distillation area, solvent supply and waste tanks / pipelines, an acid wash bay, test cells and structures, machine shops, and a hydraulic pump

house, were also present at the site. Other operations and supporting facilities included a chemistry laboratory, photographic laboratories, paint shop and storage, fuel tanks, tower / test structure for a sodium mockup facility experiment and igniter development, a propellant laboratory and possible industrial dry well, LOX/fuel safety demonstration area, and equipment storage areas.

A1LF. The A1LF is an approximate 2.4-acre area that was used for disposal of materials generated during construction activities in Area I, including excess fill soils, bedrock, and construction debris, such as asphalt, concrete, timber, and scrap metal. Primary landfill use occurred in the 1950s through 1970. The area on top of the landfill has also been used as a fuel truck staging area and for equipment storage, and included various storage buildings (now removed). Also, a leach field was identified in the eastern portion of the landfill.

CTL-I. The CTL-I Area is included in the LETF/CTL-I RFI Site due to the proximity and related historical operations and together the Laser Engineering Test Facility (LETF)/CTL-I RFI Site consists of approximately 8.1 acres located in the central portion of Area I. The CTL-I was constructed to perform turbo pump, bearing, and seal testing for testing rocket engine components. Building 1309 within CTL-I was used as a component testing laboratory for rocket engines in the 1950s and 1960s, laser diagnostic studies from the 1970s through 1995, and has been utilized as a machine shop since 1996 (Boeing, 2005). The Building 1309 Leach Field, located east of Building 1309, was used for sanitary waste disposal (SAIC, 1994). The northern septic leach field served the northern portion of Building 1309 prior to the workshop building addition in 1956. Three 50,000 gallon water tanks were sited on a 150 foot hillside north of the CTL-I area that supplied water to CTL-I.

LOX. The LOX Plant was located on 42 acres in the northern part of Area I, with the plant buildings occupying approximately 6 acres. LOX was produced using a cryogenic process in which air is liquefied and the oxygen is separated from the nitrogen. The LOX Plant buildings and tanks were removed in the early 1970s. A former waste oil sump and clarifier were located north of the driveway leading to the LOX Plant. A suspected leach pit was identified while the sump and clarifier were being excavated during the LOX Plant removal. As part of an accelerated cleanup program in 1993, the sump, clarifier, and leach pit were excavated and

removed. The plant's concrete foundations were removed in 1996. None of the primary buildings remain at the former LOX Plant location. A truck scale and affiliated controls building are the only remaining structures at the site.

A2LF. The A2LF is an approximate 5.5-acre site that is located in the northern portions of Areas I and II. It was active from approximately 1955 to 1980, but the years of primary use were between 1965 and 1978. The A2LF received unused fill materials, vegetation, some drums of unknown content, and construction debris, including asphalt, timber, vegetation, piping cement, glass, and steel.

AP/STP. The Incinerator AP/STP Area was operational from the mid-1950s through the 1970s. The incinerator portion of the site consisted of a brick structure with a metal smokestack and waste storage pad. The Incinerator was used to burn non hazardous wastes, primarily trash, photographs, and paper. The incinerator and associated structures were demolished in 2006. All concrete foundations, electrical, water, and gas lines also were removed and the area was regraded to the natural slope. The STP was operational from 1961 to 1987 and is now inactive on standby. The site is an approximately 0.5-acre area located north of the Alfa and Bravo Areas. Sewage from Area II flows to the STP, where it is pumped to the STP in Area III. From there it is pumped by vacuum truck and is trucked offsite for treatment. None of the structure has been removed, and the STP still consists of a below grade, concrete-lined unit that includes a accumulator, a source aeration unit, and a clarifier.

REFERENCES

- Boeing, 2005. CTL-I / LETF Test Site Summaries. Santa Susana Field Laboratory, Ventura County, CA. HDMS00242137.
- MWH, 2009. RCRA Facility Investigation, Group 1A RFI Report, Santa Susana Field Laboratory. February.
- NASA, 2008. Draft RCRA Facility Investigation, Group 2 RFI Report, Santa Susana Field Laboratory, Ventura County. November.
- SAIC, 1994. Final RCRA Facility Assessment (RFA) Report. Prepared for Rockwell International Corporation, Rocketdyne Division, Santa Susana Field Laboratory, Ventura County, California. May. HDMS00008191.

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California Regional Water Quality Control Board

Los Angeles Region



Linda S. Adams
Agency Secretary

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Arnold Schwarzenegger
Governor

June 30, 2010

Mr. Thomas D. Gallacher
Director, SSFL – Environment, Health & Safety
The Boeing Company
Santa Susana Field Laboratory
5800 Woolsey Canyon Road
Canoga Park, CA 91304-1148

COMMENTS ON 2010 INTERIM SOURCE REMOVAL ACTION (ISRA) WORK PLAN ADDENDUM SUBMITTED IN RESPONSE TO A CALIFORNIA WATER CODE SECTION 13304 ORDER – THE BOEING COMPANY, SANTA SUSANA FIELD LABORATORY, CANOGA PARK, CA (NPDES NO. CA0001309, CI NO. 6027, SCP NO. 1111, SITE ID NO. 2040109)

Dear Mr. Gallacher:

Los Angeles Regional Water Quality Control Board (Regional Board) staff have reviewed the April 2010, *2010 Interim Source Removal Action (ISRA) Work Plan Addendum Santa Susana Field Laboratory Ventura County, California* (Addendum) submitted in response to a California Water Code Section 13304 Order dated December 3, 2008. The Addendum, prepared for you by MWH Americas, Inc., was received by the Regional Board on April 30, 2010. During recent conference calls and in recent emails Regional Board and California Department of Toxic Substances Control (DTSC) staff provided comments on the Addendum. The comments were addressed in the June 14, 2010, document with the subject *Responses to RWQCB and DTSC comments on the 2010 Interim Source Removal Action (ISRA) Work Plan Addendum Submitted in Response to California Water Code Section 13304 Order (NPDES No. CA0001309, CI No. 6027, SCP No. 1111, Site ID No. 2040109)* (Comments). The Comments included an errata package. The contents of the errata package were inserted into the Addendum. The Comments and associated errata package fully addressed the issues raised by the Regional Board and the DTSC.

Based on the aforesaid, the Addendum, as revised on June 14, 2010, is approved, subject to the following:

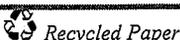
Health and Safety Plan: All work shall be performed in accordance with a Health and Safety Plan, as specified in Section 3.1 of the Addendum.

Erosion Control Plan: All work shall be performed in accordance with a site-specific Storm Water Pollution Prevention Plan (SWPPP), as specified in section 3.1 of the Addendum, which shall include appropriate best management practices (BMPs) for erosion control.

Soil Management Plan: All work shall be performed in accordance with a Soil Management Plan that will provide procedures for characterization, handling, storage, disposal, and documentation of soil generated during construction activities, as specified in section 3.1 of the Addendum.

Transportation Plan: All work shall be performed in accordance with a Transportation Plan which defines procedures for transporting personnel, equipment, and materials to facilitate safe and efficient traffic flow within the facility and on public roadways, as specified in section 3.1 of the Addendum.

California Environmental Protection Agency



Our mission is to preserve and enhance the quality of California's water resources for the benefit of present and future generations.

Biological and Archeological Surveys: Biological and archeological surveys shall be performed prior to and/or during the implementation of remedial actions, as specified in section 3.2 of the Addendum. Environmentally sensitive areas (ESAs) shall be identified before the performance of any work, and a qualified biologist or archeological monitor shall be on site during the performance of any work that could disturb any ESAs.

Streambed Alteration Agreement: All work shall adhere to the requirements of Streambed Alteration Agreement No. 1600-2003-5052-R5 (September 11, 2007), as amended, with the California Department of Fish and Game, as specified in section 3.2 of the Addendum.

Clean Water Act (CWA) Section 404 permit and Section 401 certification: All work shall adhere to the requirements of CWA Nationwide Permit 38 from the U.S. Army Corp of Engineers and CWA Section 401 water quality certification from the Regional Board, as specified in sections 3.2 of the Addendum.

In addition, the discharger shall coordinate the timing, design, construction, and implementation of any BMPs or engineered natural treatment systems (ENTS) with Regional Board staff as part of project implementation. Regional Board staff shall address any BMPs or ENTS, whether proposed by the discharger or required by the Regional Board, comprehensively as part of the ISRA.

Please telephone Mr. Peter Raftery at (213) 576-6724 or email him at praftery@waterboards.ca.gov if you have any questions.

Sincerely,


Samuel Unger
Interim Executive Officer

cc: Honorable Alex Padilla, Senator 20th District
Honorable Fran Pavley, Senator, 23rd District
Honorable Tony Strickland, Senator 19th District
Assemblymember Bob Blumenfield, Assemblymember 40th District Assembly
Assemblymember Pedro Nava, Assemblymember 35th District
Assemblymember Audra Strickland, Assemblymember 37th District
Mr. Jarrod Degonia, c/o Assemblymember Cameron Smyth
Ms. Rondi Guthrie, c/o Assemblywoman Audra Strickland
Ms. Samantha Stevens, c/o Assemblymember Bob Blumenfield
Mr. Aron Miller, c/o Senator Fran Pavley
Ms. Linda Parks, Ventura County Board of Supervisors
Ms. Louise Rishoff, c/o Assembly member Julia Brownley
Mr. Damon Wing, c/o Ms. Linda Parks, Ventura County Board of Supervisors
Mr. Gerard Abrams, Department of Toxic Substances Control, Sacramento

cc list continues on next page

California Environmental Protection Agency



cc list continued

Mr. David Beckman, National Resources Defense Council
Mr. Damon Wing, c/o Ms. Linda Parks, Ventura County Board of Supervisors
Mr. Gerard Abrams, Department of Toxic Substances Control, Sacramento
Mr. David Beckman, National Resources Defense Council
Ms. Lori Blair, Boeing
Mr. William Bowling
Mr. Michael Bubman, c/o Bell Creek Homeowners Association
Ms. Jeannie Chari
Mr. Paul Costa, Boeing
Mr. Craig Cooper, Environmental Protection Agency, Region 9
Mr. Daniel Cooper, Lawyers for Clean Water
Mr. David Cooper, Environmental Protection Agency, Region 9
Ms. Elizabeth Crawford
Ms. Nicole Doner, Ventura County Planning Division
Ms. Ginn Doose
Mr. Allen Elliott, National Aeronautics and Space Administration
Mr. John Farrow, M. R. Wolfe & Associates, P.C.
Ms. Merrilee Fellows, National Aeronautics and Space Administration
Mr. Tom Ford, Santa Monica Bay Keeper
Dr. Mark Gold, Heal the Bay
Mr. A. J. Greenstein
Mr. Matt Hagemann, Soil/Water/Air Protection Enterprise
Ms. Carol Henderson, Office Manager, Bell Canyon Homeowners Association
Mr. Dan Hirsch, Committee to Bridge the Gap
Ms. Heather L. Hoecherl Esq., Director of Science and Policy, Heal the Bay
Mr. Philip Isorena, State Water Resources Control Board, Division of Water Quality
Ms. Kirsten James, MESM, Staff Scientist, Heal the Bay
Ms. Stephanie Jennings, United States Department of Energy
Ms. Barbara Johnson, Susana Knolls Homeowners, Inc.
Dr. Michael Josselyn, WRA, Inc.
Mr. Thomas Johnson, ETEC Project Manager, United States Department of Energy
Ms. Teresa Jordan
Mr. Thomas Kelly, Environmental Protection Agency, Region 9, (WTR-5)
Dr. Jae Kim, Tetra Tech
Mr. Buck King Department of Toxic Substances Control, Sacramento
Ms. Bonnie Klea
Mr. Wayne Lee
Mr. Michael Levy, State Water Resources Control Board, Office of Chief Counsel
Mr. Michael Lopez, U.S. Department of Energy, Oakland
Mr. John Luker
Ms. Carissa Marsh, The Simi Valley Acorn
Ms. Marie Mason

cc list continues on next page

California Environmental Protection Agency



cc list continued

Mr. Daniel Maccabee, Brandeis-Bardin Institute
Mr. Nicole Moutoux, Environmental Protection Agency, Region 9
Mr. Jerry Murphy, c/o Bell Creek Homeowners Association
Mr. Jim Pappas, Department of Toxic Substances Control, Sacramento
Mr. William Paznokas, Department Of Fish and Game, Region 5
Mr. Sheldon Plotkin, Southern California Federation of Scientists'
Ms. Bunny Raskin
Mr. Norm Riley, Department of Toxic, Substances Control, Sacramento
Ms. Chris Rowe
Ms. Sharon Rubalcava, Weston, Benshoof, Rochefort, Rubalcava, MacCuish, LLP
Ms. Darlene Ruiz, Hunter Ruiz Research, Consulting and Advocacy
Mr. Adam Salkin
Mr. Mathew Sanders, Paul, Hastings, Janofsky & Walker LLP
Ms. Lorraine Scott
Mr. Joseph Smith, Department of Toxic Substances Control, Office of Legal Counsel
Sacramento
Dr. Michael Stenstrom, SSFL Stormwater Expert Panel
Ms. Rebecca Tadesse, Branch Chief of Materials Decommissioning, U.S. Nuclear Regulatory
Commission
Ms. Stephanie Trotter, State Water Resources Control Board
Mr. Rick Verguitz, Water & Environmental Resources Section, Ventura County Watershed
Protection District
Mr. Mati Waiya, Wishtoyo Foundation
Mr. Jack M. Wallace
Ms. Christina Walsh
Ms. Marge Weems
Ms. Darla Weiss, Ventura County Watershed Protection District
Ms. Mary Wiesbrock
Dr. Daniel Wiseman, West Hills Neighborhood Council-Santa Monica Mountains Area
Committee
Mr. Anthony Zepeda
Mr. Cybil Zeppieri
Mr. Lori Zinkan
Ms. Elizabeth Zlotnik
California Coastal Commission, South Coast District
California State University, Northridge
City Manager, City of Simi Valley
City of Los Angeles, Bureau of Engineering, Wastewater Systems Engineering Division
Department of Health Services, Public Water Supply Branch
Department of Interior, U.S. Fish and Wildlife Service
Environmental Protection Agency, Region 9, Office of Radiation Programs
Environmental Protection Agency, Region 9, Permits Branch (WTR-5)

cc list continues on next page

California Environmental Protection Agency



Mr. Thomas D. Gallacher
The Boeing Company

- 5 -

June 30, 2010

cc list continued

Friends of the Los Angeles River
Los Angeles and San Gabriel Rivers Watershed Council
Los Angeles County, Department of Health Services
Los Angeles County, Department of Public Works, Environmental Programs Division
Masry & Vititoe Law Offices
NOAA, National Marine Fisheries Service
Simi Valley Library
The Boeing Company Santa Susana Field Laboratory
U.S. Army Corps of Engineers
ULARA Watermaster
Ventura County Air Pollution Control District
Ventura County Environmental Health Division
Ventura County Public Works
Water Replenishment District of Southern California

California Environmental Protection Agency

 *Recycled Paper*

Our mission is to preserve and enhance the quality of California's water resources for the benefit of present and future generations.



DEPARTMENT OF FISH AND GAME

http://www.dfg.ca.gov
4949 Viewridge Avenue
San Diego, CA 92123
(858) 467-4201



October 07, 2003

The Boeing Company
Attn: Paul Costa
6633 Canoga Avenue, MC T4-87
Canoga Park, CA 91309-7299

Dear Mr. Costa:

Enclosed is Streambed Alteration Agreement # 1600-2003-5052-R5 that authorizes work on the Interim Measures for Remediation and Removal of Perchlorate at Happy Valley project impacting an unnamed tributary to Dayton Creek in Ventura County. This action is authorized under Section 1600 of the Fish and Game Code and has been approved by the California Department of Fish and Game. Pursuant to the requirements of the California Environmental Quality Act (CEQA), the Department filed a Notice of Exemption (NOE) on the project on 10/07/03. Under CEQA regulations, the project has a 35-day statute of limitations on court challenges of the Department's approval under CEQA.

The Department believes that the project fully meets the requirements of the Fish and Game Code and CEQA. However, if court challenges on the NOE are received during the 35-day period, then an additional review or even modification of the project may be required. If no comments are received during the 35-day period, then any subsequent comments need not be responded to. This information is provided to you so that if you choose to undertake the project prior to the close of the 35-day period, you do so with the knowledge that additional actions may be required based on the results of any court challenges that are filed during that period.

Please contact Natasha Lohmus at (805) 684-6281 if you have any questions regarding the Streambed Alteration Agreement.

Sincerely,

C.F. Raysbrook
Regional Manager

Enclosure

cc: Natasha Lohmus

CALIFORNIA DEPARTMENT OF FISH AND GAME

1933 Cliff Drive, Suite 9
Santa Barbara, CA 93109

Notification No. 1600-2003-5052-R5.

Page 1 of 12

AGREEMENT REGARDING PROPOSED STREAM OR LAKE ALTERATION

THIS AGREEMENT, entered into between the State of California, Department of Fish and Game, hereinafter called the Department, and Paul Costa, Operator of Boeing Company, 6633 Canoga Ave. Canoga Park, State of California, hereinafter called the Operator, is as follows:

WHEREAS, pursuant to Section 1603 of California Fish and Game Code, the Operator, on the 20th day of August, 2003, notified the Department that they intend to divert or obstruct the natural flow of, or change the bed, channel, or bank of, or use material from the streambed(s) of the following water(s): unnamed tributary to Dayton Creek in the Santa Susana Mountains, Ventura County, California.

WHEREAS, the Department (represented by Natasha Lohmus) has made an inspection of subject area on the 17th day of July, 2003, and has determined that such operations may substantially adversely affect existing fish and wildlife resources including: fishes (n/a), amphibians (n/a), reptiles (silvery legless and coast horned lizard, fence lizard), songbirds (quail, crow, jays, various), raptors (golden eagle, red-tail, vulture, kestrel), mammals (deer, bobcat, coyote, rabbit), native plants (Santa Susana tarplant, Plummer's mariposa lily, mulefat, sage, coyote bush, yerba santa, toyon, poison oak, laural sumac, chamise, interior and coast live oak) and other aquatic and wildlife resources in the area.

THEREFORE, the Department hereby proposes measures to protect fish and wildlife resources during the Operator's work. The Operator hereby agrees to accept the following measures/conditions as part of the proposed work.

If the Operator's work changes from that stated in the notification specified above, this Agreement is no longer valid and a new notification shall be submitted to the Department of Fish and Game. Failure to comply with the provisions of this Agreement and with other pertinent code sections, including but not limited to Fish and Game Code Sections 5650, 5652, 5901, 5931, 5937, and 5948, may result in prosecution.

Nothing in this Agreement authorizes the Operator to trespass on any land or property, nor does it relieve the Operator of responsibility for compliance with applicable federal, state, or local laws or ordinances. A consummated Agreement does not constitute Department of Fish and Game endorsement of the proposed operation, or assure the Department's concurrence with permits required from other agencies.

This Agreement becomes effective on the Departments signature and the construction portion terminates on 12/1/04. This Agreement shall remain in effect until the Operator satisfies the mitigation/maintenance terms/conditions of this Agreement.

STREAMBED ALTERATION CONDITIONS FOR NOTIFICATION NUMBER: 2003-5052

1. The following provisions constitute the limit of activities agreed to and resolved by this Agreement. The signing of this Agreement does not imply that the Operator is precluded from doing other activities at the site. However, activities not specifically agreed to and resolved by this Agreement, shall be subject to separate notification pursuant to Fish and Game Code Sections 1600 et seq.
2. The Operator proposes to alter the streambed to remove soils, rock and sediments containing perchlorate and then replace the contaminated soil with clean soil, impacting an approximately 4170 linear feet in three areas, but the actual area is unknown, due to incomplete testing. The contaminated material will be bio-remediated or removed and disposed of in a licenced facility. Storm water sampling stations will be constructed, with temporary basins within the channels, to catch water for testing. The two basins will consist of swale-like depressions, about 4 by 12 feet, and will be gunited. Two retention structures will either be made from a manufactured barrier such as "Aqua Barrier", a plastic pillow, or an earthen dike. The earthen dikes will be 7 feet high, contain 5 feet of water, and will be 36 feet wide. The area consists of upland vegetation and mulefat. This project is required by the DTSC and Regional Water Quality Control Board because perchlorate may have entered the surface water in the drainage.
3. The agreed work includes activities associated with No. 2 above. The project area is located in **Ventura** County, at the Boeing Company facility, on top of the ridge of the Santa Susana Mountains, approximately 29 miles northwest of downtown Los Angeles, northwest of Canoga Park and south of Simi Valley. Specific work areas and mitigation measures are described on/in the plans and documents submitted by the Operator and shall be implemented as proposed, unless directed differently by this agreement. Contact **William McIlvaine** of Boeing, at **Phone: 818-568-9228** for additional information.
4. **COPIES OF THIS AGREEMENT AND ALL REQUIRED PERMITS AND SUPPORTING DOCUMENTS, PROVIDED WITH NOTIFICATION OR REQUIRED BY THIS AGREEMENT SHALL BE READILY AVAILABLE AT WORK SITES AT ALL TIMES DURING PERIODS OF ACTIVE WORK.**
5. The Operator may request an extension of this agreement prior to its termination. Extensions may be granted for up to 12 months from the date of termination of the agreement and are subject to Departmental approval. The extension request and fees shall be submitted to the Department's Region 5 Office at the above address. If the Operator fails to request the extension prior to the agreement's termination, then the Operator shall submit a new notification with fees and required information to the Department. Any activities conducted under an expired agreement are a violation of Fish and Game Code Section 1600 et. seq.

<<WORK AREAS AND VEGETATION REMOVAL>>

6. Disturbance or removal of vegetation shall not exceed the limits approved by the Department. The disturbed portions of any stream channel or lake margin, within the high water mark of the stream or lake, shall be restored to their original condition under the

direction of the Department.

7. Restoration shall include the revegetation of stripped or exposed work and/or mitigation areas with vegetation native to the area.
8. Vegetation removed from the stream shall not be stockpiled in the stream bed or on its bank. The sites selected on which to push this material out of the stream should be selected in compliance with the other provisions of this Agreement. Where possible brush piles shall be left outside the channel in upland areas to provide wildlife habitat.
9. No living native vegetation shall be removed from the channel, bed, or banks of the stream, except as otherwise provided for in this agreement.
10. A complete inventory of trees, by species and Diameter at Breast Height (DBH), which will be removed shall be submitted to the Department within 30 days of signing this Agreement.
11. No equipment shall be operated or parked within the dripline of oaks, if possible. Protective fencing shall be placed outside the dripline of oaks to prevent compaction of the root zone.
12. Any oaks, CA black walnuts and sycamores which are damaged/removed during construction operations shall be replaced in kind at a 10:1 ratio. Valley oaks shall be replaced in kind at a 15:1 ratio. Elderberry, cottonwood, and willows shall be replaced at 5:1.

<<EQUIPMENT AND ACCESS>>

13. Staging/storage areas for equipment and materials shall be located outside of the stream/lake.
14. Vehicles shall not be driven or equipment operated in water covered portions of a stream or lake, or where wetland vegetation, riparian vegetation, or aquatic organisms may be destroyed, except as otherwise provided for in the Agreement and as necessary to complete authorized work.
15. Access to the work site shall be via existing roads and access ramps. If no ramps are available in the immediate area, the Operator may construct a ramp in the footprint of the project. Any ramp shall be removed and revegetated upon completion of the project.

<<FILL AND SPOIL>>

16. Fill length, width, and height dimensions shall not exceed those of the original installation or the original naturally occurring topography, contour, and elevation. Fill shall be limited to the minimal amount necessary to accomplish the agreed activities. Fill material shall consist of native soil and rock. None native materials may be used for temporary structures.
17. Spoil storage sites shall not be located within a stream/lake, where spoil can be washed

back into a stream/lake, or where it will cover aquatic or riparian vegetation. All contaminate material shall be removed from site.

<<STRUCTURES>>

18. The Operator shall construct an effective water velocity dissipation device at the downstream of the dam structure to minimize erosion. This shall consist of clean ungrouted rock.

19. Any temporary dam or other artificial obstruction, shall only be built from materials such as clean gravel or covered soil, which will cause little or no siltation, or an Aqua Barrier pillow like structure, and shall be approved by the Department prior to construction.

20. The retention basins and water sampling stations shall be temporary, and shall be removed upon completion and all the agencies have signed off on the project. All grout/gunite shall also be removed at that time.

<<CLEAN UP>>

21. Structures and associated materials not designed to withstand high water flows shall be moved to areas above high water before such flows occur.

22. Any materials placed in seasonally dry portions of a stream or lake that could be washed downstream or could be deleterious to aquatic life shall be removed from the project site prior to inundation by high flows.

23. Areas of disturbed soils with slopes toward a stream or lake shall be stabilized to reduce erosion potential. Planting, seeding and mulching is conditionally acceptable. Where suitable vegetation cannot reasonably be expected to become established, non-erodible materials, such as coconut fiber matting, shall be used for such stabilization. Any installation of non-erodible materials not described in the original project description shall be coordinated with the Department. Coordination may include the negotiation of additional Agreement provisions for this activity.

<<POLLUTION, SEDIMENTATION, AND LITTER>>

24. No debris, soil, silt, sand, bark, slash, sawdust, rubbish, construction waste, cement or concrete or washings thereof, oil or petroleum products or other organic or earthen material from any logging, construction, or associated activity of whatever nature shall be allowed to enter into or placed where it may be washed by rainfall or runoff into, waters of the State. When operations are completed, any excess materials or debris shall be removed from the work area. No rubbish shall be deposited within 150 feet of the high water mark of any stream or lake. Fish and Game Code sections 5650 and 5652 prohibits the deposition of any waste material within 150 of any waters of the state, at any time, even after this Agreement expires.

STREAMBED ALTERATION CONDITIONS FOR NOTIFICATION NUMBER: 2003-5052

25. The Operator shall comply with all litter and pollution laws. All contractors, subcontractors and employees shall also obey these laws and it shall be the responsibility of the operator to insure compliance.
26. The Operator shall mark/sign/stencil all storm drains warning that dumping is illegal and all storm drains drain to creeks/rivers or ocean.
27. Any equipment or vehicles driven and/or operated within or adjacent to the stream/lake shall be checked and maintained daily, to prevent leaks of materials that if introduced to water could be deleterious to aquatic life.
28. Stationary equipment such as motors, pumps, generators, and welders, located within or adjacent to the stream/lake shall be positioned over drip pans.
29. No equipment maintenance shall be done within or near any stream channel or lake margin where petroleum products or other pollutants from the equipment may enter these areas under any flow.
30. The clean-up of all spills shall begin immediately. The Department shall be notified immediately by the Operator of any spills and shall be consulted regarding clean-up procedures.
31. Raw cement/concrete or washings thereof, asphalt, paint, construction waste, or other coating material, oil or other petroleum products, or any other substances which could be hazardous to aquatic life, resulting from project related activities, shall be prevented from contaminating the soil and/or entering the waters of the state. Any of these materials, placed within or where they may enter a stream or lake, by the Operator or any party working under contract, or with the permission of the Operator, shall be removed immediately.
32. Equipment shall not be operated in wetted areas (including but not limited to ponded, flowing, or wetland areas) without the prior written approval of the Department.
33. Precautions to minimize turbidity/siltation shall be taken into account during project planning and shall be installed **prior** to construction. This shall require that the work site be isolated and that water be diverted around the work area by means of a barrier, temporary culvert, new channel, or other means approved by the Department. **A row of straw bales shall be placed across the channel, prior to, and immediately downstream of any work done within the creek.** Precautions shall also include placement of silt fencing, straw bales, sand bags, and/or the construction of silt catchment basins, so that silt, or other deleterious materials are not allowed to pass to downstream reaches. The method used to prevent siltation shall be monitored and cleaned/repared weekly. The placement of any structure or materials in the stream for this purpose, not included in the original project description, or Department approved water pollution/water diversion plan shall be coordinated with the Department. Coordination shall include the negotiation of additional Agreement provisions.
34. Upon Department determination that turbidity/siltation levels resulting from project related activities constitute a threat to aquatic life, activities associated with the turbidity/siltation, shall be halted until effective Department approved control devices are installed, or abatement

procedures are initiated.

35. Water containing mud, silt, or other pollutants from equipment washing or other activities, shall not be allowed to enter a lake or flowing stream or placed in locations that may be subjected to high storm flows.

36. If a stream's low flow channel, bed or banks/lake bed or banks have been altered, these shall be returned as nearly as possible to their original configuration and width, without creating future erosion problems.

37. Rock, gravel, and/or other materials shall not be imported to, taken from or moved within the bed or banks of the stream, except as otherwise addressed in this Agreement.

<<RESTORATION/MITIGATION>>

38. The Operator shall submit to the Department for review and approval, a plan which includes all of the conditions of this Agreement describing mitigation, revegetation, maintenance, monitoring, and reporting activities related to the proposed project. This plan shall be submitted to the Department by December 30, 2003.

39. MITIGATION FOR AREAS OF TEMPORARY DISTURBANCE--No more than the area of contamination within the banks, bed, and channel of the stream and/or riparian habitat shall be temporarily disturbed/impacted due to the proposed operations. Restoration shall include the revegetation of stripped or exposed work areas within the banks, bed, and channel of the stream (including construction areas, access roads, etc.) with native vegetation local to the area at a ratio of 3:1, or 2:1 if approved in the mitigation/monitoring plan.

40. No restoration/mitigation shall occur in fuel modification zones, future project areas or areas of maintenance.

41. If native trees have been removed from the stream's banks, they shall be replaced in-kind, and maintained until established, under the direction of a Department representative.

42. In order to determine if the revegetation techniques used have been successful, any plant species required that are listed below shall achieve the minimum growth at the end of three and five years. If the minimum growth is not achieved, then the Operator shall be responsible for taking the appropriate corrective measures as determined by Department representatives. The Operator shall be responsible for any cost incurred during the revegetation or in subsequent corrective measures.

SPECIES	SIZE AT PLANTING (GALLONS)	PLANTING CENTERS	HEIGHT	
			3 years	5 years
Arroyo Willow	1 gallon	8 ft	10 ft	15 ft

Canyon live oak	1 gallon	20 ft	3 ft	6 ft
Scrub	1 gallon	20 ft	2 ft	4 ft
All Shrub species	1 gallon			

43. Planting, maintenance, monitoring and reporting activities shall be overseen by a specialist familiar with restoration of native plants.

44. All planting shall have a minimum of 80% survival, by species, the first year and 100% survival thereafter and/or shall attain 75% cover after 3 years and 90% cover after 5 years, as compared to the existing cover, for the life of the project. Prior to the mitigation site(s) being determined successful, they shall be entirely without supplemental irrigation for a minimum of 2 years. No single species shall constitute more than 50% of the vegetative cover, no woody invasive species shall be present, and herbaceous invasive species shall not exceed 5% cover. If the survival and cover requirements have not been met, the Operator is responsible for replacement planting to achieve these requirements. Replacement plants shall be monitored with the same survival and growth requirements for 5 years after planting.

45. An annual report shall be submitted to the Department by Jan. 1 of each year for 5 years after planting. This report shall include the survival, % cover, and height by species of both trees and shrubs. The number by species of plants replaced, an overview of the revegetation and exotic plant control efforts, and the method used to assess these parameters shall also be included. Photos from designated photo stations shall be included.

46. All planting should be done, after the first wetting rains between October 1 and February 1 to take advantage of the winter rainy season, dormancy of foliage, and rooting period to ensure optimum survival of plantings. Should the Operator be required to plant during other times of the year, chances of survival are diminished. To compensate for decreased survival rates, the Operator shall be required to augment the specified planting density by 25 % to account for the likelihood of increased mortality of plantings. Any restoration/planting shall be completed by 2/1/04.

47. The Operator shall provide irrigation when natural moisture conditions are inadequate to ensure survival of plants. Irrigation shall be provided for a period of at least two years from planting. Irrigation shall be phased out during the fall/winter of second year unless unusually severe conditions threaten survival of plantings. All plants must survive and grow for at least three years without supplemental water for the restoration phase of the project to be eligible for acceptance by the Department.

48. Plant material for revegetation shall be derived from cuttings, materials salvaged from disturbed areas, and/or seeds obtained from randomly selected native trees and shrubs occurring locally within the same drainage. Any replacement tree/shrub stock, which cannot be grown from cuttings or seeds, shall be obtained from a native plant nursery, and be ant free. The Operator shall provide a list of all materials which must be obtained from other than onsite sources.

STREAMBED ALTERATION CONDITIONS FOR NOTIFICATION NUMBER: 2003-5052

49. A structure to provide drinking water for wildlife (guzzler) may be installed in Happy Valley, and shall provide a minimum of 10 available gallons of fresh water at all times. A self filling system, such as in a toilet, shall be designed and placed in a shaded area where wildlife can access the guzzler. The exposed water container shall have at least one sloped side to enable small animals to avoid entrapment.

<<REMOVING NON-NATIVE VEGETATION>>

50. The Operator shall remove any non-native vegetation (tree tobacco, castor bean, giant cane, etc.) from the work area and shall dispose of it in a manner and a location which prevents its reestablishment. Removal shall be done at least twice annually during the spring/summer season, as needed, through the term of restoration.

51. Whenever possible, invasive species shall be removed by hand or by hand-operated power tools rather than by chemical means. No herbicides shall be used on native vegetation unless specifically authorized, in writing, by the Department.

<<PERMITTING AND SAFEGUARDS>>

52. If permits/certification are required from the Corps of Engineers/California Coastal Commission/Regional Water Quality Control Board for this project, copies of the permits shall be submitted to the Department.

53. The Operator did not provide a copy of documents certifying that the project is in compliance with the requirements of the California Environmental Quality Act (CEQA). A final certified CEQA document shall be provided to the Department prior to execution of this Agreement. Any/all biological mitigation requirements specified in the final certified CEQA document, more restrictive/inclusive than in this agreement shall, by reference, become a part of this agreement and shall be enforceable by the Department.

<<PROTECTION FOR WILDLIFE AND AQUATIC SPECIES>>

54. The Operator shall not remove or otherwise disturb vegetation or conduct any other project activities on the project site from March 1 to September 15 to avoid impacts to breeding/nesting birds. OR, Prior to construction or site preparation activities, the Operator shall have a qualified biologist survey all breeding/nesting habitat within the project site and adjacent to the project site for breeding/nesting birds. Surveys shall begin no later than June 1. Surveys shall be conducted every 7 days for 8 consecutive weeks until at least July 1. Documentation of findings, including a negative finding must be submitted to the Department for review and concurrence. If no breeding/nesting birds are observed and concurrence has been received from the Department, site preparation and construction activities may begin. If breeding activities and/or an active bird nest is located and concurrence has been received from the Department, the breeding habitat/nest site shall be fenced a minimum of 300 feet (500 feet for raptors) in all directions, and this area shall not be disturbed until the nest

STREAMBED ALTERATION CONDITIONS FOR NOTIFICATION NUMBER: 2003-5052

becomes inactive, the young have fledged, the young are no longer being fed by the parents, the young have left the area, and the young will no longer be impacted by the project.

If threatened or endangered species are observed in the area, no work shall occur during the breeding season (March 1 through September 15) to avoid direct or indirect (noise) take of listed species and State and/or Federal threatened/endangered species permits may be required prior to commencing project activities. This Agreement does not authorize take of species listed as Threatened and/or Endangered.

Be advised, migratory nongame native bird species are protected by international treaty under the Federal Migratory Bird Treaty Act (MBTA) of 1918(50 C.F.R. Section 10.13). Sections 3503, 3503.5 and 3513 of the California Fish and Game Code prohibit take of all birds and their active nests including raptors and other migratory nongame birds (as listed under the Federal MBTA). This Agreement does not allow the Operator, any employees, or agents to destroy or disturb any active bird nest (Section 3503 Fish and Game Code) or any raptor nest (Section 3503.5) at any time of the year.

55. Any lighting at night on adjacent buildings, shall be shielded downward to prevent glare into the riparian areas or shall be automatically turned off after 2300 hours.

56. The Operator's activities within the stream course shall be limited to the dry period of the year from May 1 to December 1 or when the stream is not actively flowing and no measurable rain is forecasted within 24 hours. If measurable rain is predicted within 24 hours during construction, all activities shall cease, and protective measures to prevent siltation/erosion shall be implemented/maintained. Activities may resume no sooner than 24 hours after the storm has past. All protective materials and equipment shall be on site.

57. If **Coast horned or silvery legless lizards, Santa Susana tarplant, Plummer's mariposa lily**, or any other rare, threatened or endangered species occur within 500 of the project site, the Operator shall submit, for Department review and approval, a plan to ensure that no **rare, threatened or endangered** species are disturbed during project implementation. The plan shall be approved by the Department prior to initiation of any work. All populations of the tarplant shall be fenced or flagged, prior to any construction.

58. Should **Coast horned or silvery legless lizards, Santa Susana tarplant, Plummer's mariposa lily**, or any other federally listed threatened/endangered (T/E) species occur in the area or will be impacted by the work proposed, the Department herein advises the Operator that a Federal Endangered Species Permit may be required to address possible impacts on the Least Bell's Vireo and/or any other T/E species. Should such a permit(s) be required, the Operator shall provide copies to the Department. All conditions contained therein, shall become a part of this agreement and shall be enforceable by the Department.

59. A qualified biological monitor, having the appropriate permits, shall be on site during operations and shall survey for species prior to construction. If any species are found in the path of construction, the monitor shall relocate the species to a safe location. Relocation areas shall be identified prior to the start of construction, and are subject to the Department's approval. Exclusionary fencing shall be erected to prevent the migration into or the return of species into the work site. Field notes shall be kept and submitted to the Department after the

<<MAINTENANCE>>

60. Except as otherwise permitted in this Agreement, the removal of soil, vegetation, and vegetative debris from the stream bed or stream banks is prohibited. The Operator shall remove all human generated debris, such as lawn and farm cuttings, garbage and trash. The Operator shall remove washed out culverts, and other construction materials, that the Operator places within, or where they may enter the stream.

<<ADMINISTRATIVE-MISC.>>

61. All provisions of this Agreement remain in force throughout the term of the Agreement. Any provisions of the Agreement may be amended or the Agreement may be terminated at any time provided such amendment and/or termination is agreed to in writing by both parties. Mutually approved amendments become part of the original Agreement and are subject to all previously negotiated provisions.

62. If the Operator or any employees, agents, contractors and/or subcontractors violate any of the terms or conditions of this agreement, all work shall terminate immediately and shall not proceed until the Department has taken all of its legal actions.

63. The Operator shall **provide a copy of this Agreement, to all contractors, subcontractors, and the Operator's project supervisors. COPIES OF THIS AGREEMENT AND ALL REQUIRED PERMITS AND SUPPORTING DOCUMENTS, SHALL BE READILY AVAILABLE AT WORK SITES AT ALL TIMES DURING PERIODS OF ACTIVE WORK** and must be presented to any Department personnel, or personnel from another agency upon demand. **ALL CONTRACTORS SHALL READ AND BECOME FAMILIAR WITH THE CONTENTS OF THIS AGREEMENT.**

64. A pre-construction meeting/briefing shall be held involving all the contractors and subcontractors, concerning the conditions in this Agreement.

65. The Operator shall notify the Department, **in writing, at least five (5) days prior to initiation of construction (project) activities (**)** and **at least five (5) days prior to completion of construction (project) activities.** Notification shall be sent to the Department at 4949 Viewridge Avenue, San Diego 92123, Attn: ES. FAX Number (858) 467-4235). **(**)** **The Department's signature on this agreement shall suffice for 5 day notice of intent to commence activities under this agreement if work is to commence within 15 days of signature.**

66. The Operator herein grants to Department employees and/or their consultants (accompanied by a Department employee) the right to enter the project site at any time, to ensure compliance with the terms and conditions of this Agreement and/or to determine the impacts of the project on wildlife and aquatic resources and/or their habitats.

67. The Department reserves the right to cancel this Agreement, after giving notice to the Operator, if the Department determines that the Operator has breached any of the terms or conditions of the Agreement.

Title

California Department of Fish and Game



10/07/03
Date

C. F. Raysbrook
Regional Manager

1600-2003-5052



California Natural Resources Agency
DEPARTMENT OF FISH AND GAME

Jeff Humble
P.O. Box 1179
Ventura, CA 93002
(805) 652-1868
<http://www.dfg.ca.gov>

109426
ARNOLD SCHWARZENEGGER, Governor
DONALD KOCH, Director



December 10, 2009

Mr. Paul Costa
The Boeing Company
5800 Woosley Caynon Road, MC 055-T487
Canoga Park, CA 91304-1148

Streambed Alteration Agreement 1600-2003-5052-R5 Extension

Dear Mr. Costa:

The Department has reviewed and approved your request to extend Lake or Streambed Alteration Agreement # **1600-2003-5052-R5**. The new expiration date for the Lake or Streambed Alteration Agreement is **December 1st, 2010**. The project described in the Streambed Alteration Agreement (Agreement) and amendments must be conducted in the same manner as described. That includes completing the project within the originally approved and proposed term and seasonal work period and implementing all mitigation and avoidance measures to protect fish and wildlife resources.

If your project differs from the one described in the existing Agreement at the time of implementation, you may be in violation of Fish and Game Code section 1602, and you should contact Department to discuss the possibility of amending the Agreement or submitting a new notification.

Please provide us notice (written, e-mail or phone message) of your intent to commence project activities at least 5 days in advance.

The Department thanks you for your cooperation in this matter. If you have any questions regarding this matter, please contact Jeff Humble at (805) 652-1868 or via e-mail at jhumble@dfg.ca.gov

Sincerely,

Jeff Humble
Environmental Scientist



The Boeing Company
Santa Susana Field Laboratory
5800 Woolsey Canyon Road
Canoga Park, CA 91304-1148

Via FedEx

July 1, 2010
In reply refer to SHEA-110111

Regional Water Quality Control Board
Los Angeles Region
320 West 4th Street, Suite 200
Los Angeles, CA 90013

Attention: Mr. Peter Raftery

Subject: June 2010 Biological Resources Study for Outfall 009
Final Interim Source Removal Action (ISRA) Work Plan submitted in
response to California Water Code Section 13304 Order
(NPDES No. CA0001309, CI No. 6027, SCP No. 1111, Site ID No. 2040109)

Dear Mr. Raftery:

The Boeing Company (Boeing), on behalf of Boeing and the National Aeronautics and Space Administration (NASA), wishes to provide the attached ISRA June 2010 Biological Resources Study for Outfall 009, as referenced in the May 1, 2009 Final ISRA Work Plan, for your review.

If you have any questions or require anything further, please contact Lori Blair at 818-466-8741.

Sincerely,

Tom Gallacher
Director, Santa Susana Field Laboratory
Environment, Health, and Safety

LNB:bjc

Attachment: June 2010 Biological Resources Study for ISRA Areas for Outfall 009

cc: Ms. Cassandra Owens, RWQCB (w/attachment)
Mr. Buck King, DTSC (w/attachment)
Mr. Allen Elliott, NASA (w/o attachment)
Ms. Donna Holland, NASA (w/attachment)

**BIOLOGICAL RESOURCES STUDY
FOR THE INTERIM SOURCE REMOVAL
ACTION AREAS FOR OUTFALL 009 -
SANTA SUSANA FIELD LABORATORY**

Prepared for:

The Boeing Company
5800 Woolsey Canyon Road
Canoga Park, California 91304

Prepared by:

Padre Associates, Inc.
1861 Knoll Drive
Ventura, California 93003
805/644-2220, 805/644-2050 (fax)

June 2010

Project No. 0902-1043

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1.0 SUMMARY OF FINDINGS AND CONCLUSIONS

The proposed project is located within the watershed for Outfall 009 at the Santa Susana Field Laboratory (SSFL), which is located in southeastern Ventura County, near the crest of the Simi Hills at the western border of the San Fernando Valley (see Figure 1 below). The SSFL is divided into four administrative areas (Areas I, II, III, and IV). The SSFL is bordered by the Bell Canyon residential development on the south, the Santa Monica Mountains Conservancy's Sage Ranch Park and the Brandeis-Bardin Institute on the north; several residential ranches and two mobile home parks on the east; and Meier and Runkle Canyons on the west.

The proposed project involves the evaluation and remediation of Interim Source Removal Action (ISRA) areas located within a portion of SSFL's Outfall 009 watershed as directed by the Cleanup and Abatement (Order) issued by the Los Angeles Regional Water Quality Control Board (LARWQCB) on December 3, 2008 (RWQCB, 2008). Work activities for the project are also authorized under California Department of Fish and Game (CDFG) Streambed Alteration Agreement (SAA) No. 1600-2003-5052-R5 (and its extensions and amendments). The ISRA activities for Outfall 009 addressed in this Biological Resources Study (Study) are proposed to be completed in 2010 or 2011.

The purpose of this Study is to provide information on biological resources that are known or have the potential to occur at SSFL, and more specifically, at or near the ISRA Areas within the Outfall 009 watershed. The Study references past survey data (2005 to 2009) and provides recent survey data from 2010, in addition to literature research and database queries. A brief evaluation of the potential impacts on biological resources from the proposed project, along with conservation measures consistent with and to ensure compliance with the aforementioned SAA are also provided in the Study.

No plant or animal species listed as threatened or endangered were observed at or near the ISRA areas. Special-status plants observed within the ISRA areas included Santa Susana tarplant (*Deinandra minthornii*, a CDFG rare plant and California Native Plant Society [CNPS] list 1b.2 species) and coast live oak (*Quercus agrifolia*, a species covered under the County Oak Tree Protection Ordinance). Special-status wildlife species observed during field surveys throughout SSFL that have the potential to occur at the ISRA Areas included Cooper's hawk (*Accipiter cooperi*, a CDFG Watch List species), southern California rufous-crowned sparrow (*Aimophila ruficeps* ssp. *canescens*, a CDFG Watch List species), white-tailed kite (*Elanus caeruleus*, a California fully protected species), yellow warbler (*Dendroica petechia* ssp. *brewsteri*, a California species of special concern while nesting), coast horned lizard (*Phrynosoma coronatum* ssp. *frontale*, a California species of special concern), silvery legless lizard (*Anniella pulchra* ssp. *pulchra*, a California species of special concern), coastal western whiptail (*Aspidoscleis tigris* ssp. *stejnegeri*, a CDFG special animal), two-striped garter snake (*Thamnophis hammondi*, a California species of special concern) and San Bernardino ring-neck snake (*Diadophis punctatus* ssp. *modustus*, a U.S. Forest Service sensitive species). Habitats for additional special-status plants and wildlife species are present at the ISRA Areas, and are described below.

2.0 INTRODUCTION

The proposed project involves the evaluation and remediation of impacted soils (Interim Source Removal Action, or ISRA) as directed by the Cleanup and Abatement Order (Order) adopted by the Los Angeles Regional Water Quality Control Board (LARWQCB) on December 3, 2008 (RWQCB, 2008). The Order was issued to Boeing and requires the evaluation, selection, and implementation of cleanup activities at areas within Outfall 009. Constituents of concern include cadmium, copper, lead, mercury, and dioxins. Work activities for the project are also authorized under California Department of Fish and Game (CDFG) Streambed Alteration Agreement No. 1600-2003-5052-R5 (and its extensions and amendments).

The SSFL is located in southeastern Ventura County, near the crest of the Simi Hills at the western border of the San Fernando Valley. The SSFL is bordered by the Bell Canyon residential development on the south, the Santa Monica Mountains Conservancy's Sage Ranch Park and the Brandeis-Bardin Institute on the north; several residential ranches and two mobile home parks on the east; and Meier and Runkle Canyons on the west. The ISRA project is located on property owned by Boeing and the United States Government. Boeing has secured consent from the National Aeronautics and Space Administration (NASA), who administers the property owned by the federal government for evaluating and implementing remedial actions on impacted soils on SSFL's NASA Area I and Area II.

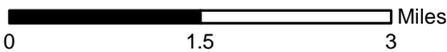
This Study specifically addresses the subject ISRA Areas planned for remedial actions in 2010 or 2011 located both on Boeing and NASA properties (see Figures 2A and 2B below). Please refer to the 2010 ISRA Work Plan Addendum (MWH, 2010) for a complete discussion on proposed work activities. The ISRA Areas within the Outfall 009 watershed are listed in Table 1 below:

**Table 1. Interim Source Removal Action Areas (ISRA Areas)
 for Outfall 009 Watershed**

Historical Operations Areas	ISRA Areas	Watershed	Property Owner/SSFL or Other Area
B-1	B1-1A, B1-1B, B1-1C, B1-1D B1-2	009	Boeing/Area I
IEL	IEL-1, IEL-2	009	Boeing/Area I
Area I Landfill (1)	A1LF-1, A1LF-2	009	Boeing/Area I
CTL-I	CTL1-1A, CTL1-1B	009	Boeing/Area I
LOX	LOX-1-A, LOX-1-B, LOX-1-C1, LOX-1-C2, LOX-1-D	009	NASA/Area I
Area II Landfill	A2LF-2	009	NASA/Area II
Ash Pile, B515 STP	AP/STP-1A through AP/STP-1F	009	NASA/Area II



1 inch = 1.5 miles



SANTA SUSANA FIELD LABORATORY

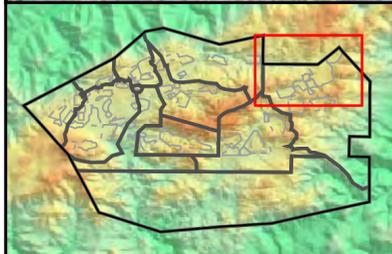
Document: ISRA_Plots_WP_Regional_Map.mxd

Date: Jun 21, 2010

Regional Map

FIGURE
1-1

Please Note: The original version of this figure includes colored features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented.



Base Map Legend

- Administrative Area Boundary
- RFI Site Boundary
- Surface Water Divide
- Drainage
- Non Jurisdictional Surface Water Pathway
- Elevation Contour

ISRA Evaluation Areas

-

Outfall 009 Preliminary ISRA Evaluation Areas
SANTA SUSANA FIELD LABORATORY

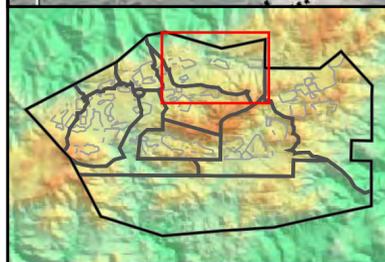
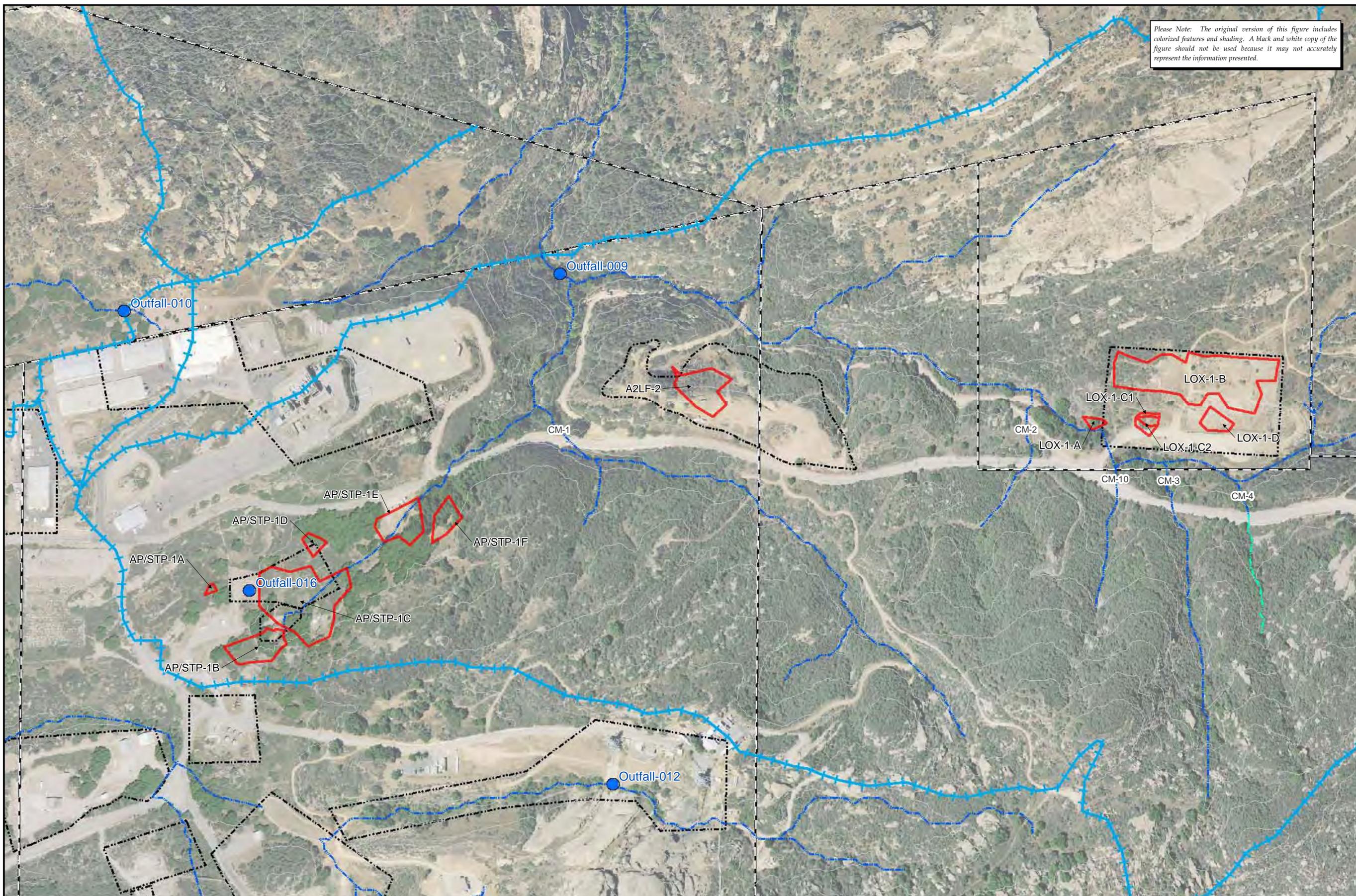
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1 inch = 250 feet

0 250 500 Feet

MWH **FIGURE 2A**

Please Note: The original version of this figure includes colorized features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented.



Base Map Legend

- Administrative Area Boundary
- RFI Site Boundary
- Surface Water Divide
- Drainage
- Non Jurisdictional Surface Water Pathway
- Elevation Contour

ISRA Evaluation Areas

- ISRA Evaluation Area

Outfall 009 Preliminary ISRA Evaluation Areas
SANTA SUSANA FIELD LABORATORY

Document: ISRA_Plots_SP_Bio_Aerial_NASA.mxd Date: Jun 21, 2010

1 inch = 250 feet

0 250 500 Feet

MWH **FIGURE 2B**

2.1 REPORT PURPOSE

The purpose of this Study is to document biological resources that are known or have the potential to occur at SSFL, and more specifically, at or near ISRA Areas within the Outfall 009 Watershed. A brief evaluation of the potential impacts on biological resources from the proposed project is also provided in the Study, along with conservation measures consistent with and to ensure compliance with the CDFG SAA.

3.0 STUDY METHODOLOGY

Biological resources of the project area were assessed based upon literature research, aerial photograph analysis, and field surveys. Botanical surveys were conducted to identify all plant species encountered, determine the presence or absence of special-status plants known to occur in the region, and assess the prevalence of plant communities within the vicinity of each ISRA Area. Vegetation communities were mapped by aerial photography analysis and ground-truthed during field surveys to determine known or potential impacts within the ISRA Areas. Field surveys for wildlife were conducted by walking transects of opportunity through all habitat types, and included the use of 10x50 binoculars for the visual identification of bird or other wildlife species. Auditory cues for birds or other animals were also utilized for compiling a species list. Finally, indications of breeding/nesting bird activity (nest material collection, observation of active or abandoned nests, food collection and deliveries, etc.) were also noted, if observed.

Field surveys specific to the ISRA project were conducted by Chris Dunn, Padre Associates Project Biologist, on March 24, 25, and 26, and April 15 and 16, 2010. Additional data was collected during the June 2, 2010 bidder's job walk. This document is also based on the results of numerous other biological surveys conducted at, or in close proximity to the ISRA Areas throughout SSFL from 2004 through April 2010 by Mr. Dunn, Ken Gilliland, Padre Associates' Staff Biologist, and Matt Ingamells, Padre Associates' Senior Biologist.

The literature research included reviewing the following documents:

- California Native Plant Society Inventory of Rare and Endangered Vascular Plants of California (6th Edition, 2001);
- Personal computer version (RAREFIND 3) of the CDFG Natural Diversity Data Base (NDDDB, 2010); and,
- Past biological survey reports prepared by Padre Associates, Inc. (Padre) in 2005, 2006, 2007, 2008, and 2010 throughout SSFL (Padre, 2005; Padre 2006a & b; Padre, 2007a, b, & c; Padre, 2008a & b; Padre, 2009a & b; Padre, 2010).

Special attention was also paid to information in an October 5, 2009 letter addressed to Craig Cooper of the U.S. Environmental Protection Agency from Chris Dellith, Senior Biologist for the U.S. Fish and Wildlife Service (USFWS), providing a list of federally threatened or endangered species that may occur at or near Area IV and two undeveloped areas of SSFL. Although the ISRA project is located outside of these portions of SSFL, information in the document may be relevant based on the close proximity of each area within SSFL.

4.0 ENVIRONMENTAL SETTING

The SSFL is located at the top of Woolsey Canyon in the Simi Hills, Ventura County, California (see Figure 1). SSFL includes approximately 2,800 acres of land, of which 1,200 acres is undeveloped (RWQCB, 2008). SSFL is divided into four administrative areas (Areas I through IV). The Outfall 009 drainage begins near the SSFL entrance and collects stormwater runoff from the Area I and Area II Landfills and the former Liquid Oxygen Plant (LOX) located on U.S. Government property administered by NASA in Area I. In addition, the drainage handles stormwater runoff from Sage Ranch, currently a park with hiking trails, and a small area of open space owned by the Brandeis-Bardin Institute. Thirty-five percent of the Outfall 009 watershed area is owned by Boeing (188.5 acres), 25 percent (135 acres) is owned by the U.S. Government and administered by NASA, 37 percent (198 acres) is owned by Sage Ranch, and a small portion (14.5 acres) is owned by the Brandeis-Bardin Institute. The property boundaries are shown on Figure 1.

Watershed 009 consists primarily of open space, encompasses approximately 536 acres, and is composed primarily of chaparral, coastal sage scrub, riparian woodland, and grassland vegetation, unpaved roads, as well as some developed areas. The geology at SSFL consists mainly of shallow alluvium underlain by bedrock. The depth of alluvium varies with location throughout SSFL.

Watershed 009 (also known as the Northern Drainage) is part of the Calleguas Creek Watershed (including the Northern Drainage, Meier Canyon, Arroyo Simi, Calleguas Creek, and Mugu Lagoon at its confluence with the Pacific Ocean). This watershed is regulated by the RWQCB, and its receiving water has beneficial uses of wildlife habitat and as a wildlife movement/migration corridor, with Calleguas Creek also identified as rare, threatened, or endangered species habitat. Intermittent beneficial uses include groundwater recharge, contact and non-contact recreation, warm freshwater habitat, industrial process supply, and freshwater replenishment.

5.0 DESCRIPTION OF BIOLOGICAL RESOURCES

5.1 VEGETATION

Vegetation throughout SSFL is composed of various coastal sage scrub and chaparral plant communities, oak woodland, mulefat scrub, and annual grassland or other disturbed areas. At the subject ISRA Areas, vegetation is composed of thick leaf yerba santa (*Eriodictyon crassifolium*) scrub, chamise-black sage (*Adenostoma fasciculatum-Salvia mellifera*) scrub, chaparral bush mallow (*Malacothamnus fasciculatus* ssp. *fasciculatus*) scrub, deerweed (*Lotus scoparius*) scrub, canyon sunflower (*Venegasia carpesioides*) scrub, laurel sumac (*Malosma laurina*) scrub, mulefat (*Baccharis salicifolia*) thicket, arroyo willow (*Salix lasiolepis*) thicket, hairy leaf ceanothus (*Ceanothus oliganthus* var. *oliganthus*) chaparral, coyote brush (*Baccharis pilularis*) scrub, California sagebrush (*Artemisia californica*) scrub, coast live oak (*Quercus agrifolia*) riparian and upland woodland, and annual grassland. Portions of the ISRA Areas also exhibit bare soil, rock outcrops, and asphalt and gravel areas.

Evidence of recent fire is present within the ISRA Areas, with trees and shrubs exhibiting regeneration from individual stumps, and shrubby vegetation recolonizing portions of these areas in dense thickets. Table 7 in Section 7 provides an acreage calculation of potential impacts to each vegetation type at the ISRA Areas, including access routes.

Native species commonly observed within the ISRA Areas included coast live oak, yerba santa, deerweed, canyon sunflower, hairy ceanous, laurel sumac, holly leaf cherry (*Prunus ilicifolia* ssp. *ilicifolia*), chaparral bush mallow, chamise, mulefat, coyote brush, California aster (*Lessingia filaginifolia*), bush monkeyflower (*Mimulus aurantiacus*), black sage, California sagebrush, sawtooth goldenbush (*Hazardia squarrosa*), California buckwheat (*Eriogonum fasciculatum*), poison oak (*Toxicodendron diversilobum*), caterpillar phacelia (*Phacelia cicutaria* var. *hispida*), branching phacelia (*Phacelia ramossisima*), purple nightshade (*Solanum xanthii*), our lord's candle (*Yucca whipplei*), silver lotus (*Lotus argophyllus* var. *argophyllus*), large-flowered cryptantha (*Cryptantha intermedia*), and pygmy weed (*Crassula connata*).

Non-native species included summer mustard (*Hirschfeldia incana*), Italian thistle (*Carduus pycnocephalus*), tree tobacco (*Nicotiana glauca*), tocalote (*Centaurea melatensis*), redstem filaree (*Erodium cicutarium*), yellow sweet clover (*Melilotus officinalis*), ripgut brome (*Bromus diandrus*), red brome (*Bromus madritensis*), slender wild oats (*Avena barbata*), smilo grass (*Piptatherum miliaceum*) and other annual grasses. A total of 145 vascular plant species were observed within or adjacent to the Outfall 009 ISRA evaluation areas, including 114 native species (see Appendix A).

5.2 WILDLIFE

The following section provides information on habitat suitability for wildlife and observations of wildlife species at or near the ISRA Areas. Additional information on special-status species listed below and other special-status species that may be expected to occur at or near the ISRA Areas are discussed further in Section 6.

5.2.1 Habitat

Approximately 1,200 acres within SSFL are currently undeveloped, in addition to almost the entire 625-acre Sage Ranch Park, located immediately to the north, and approximately 2,000-acre open space area immediately south of the developed portion of SSFL. Portions of each ISRA Area are located within previously developed areas that have become recolonized by native and non-native vegetation, and many of the ISRA Areas are at the edges of mostly undisturbed areas supporting various wildlife habitat types.

Habitat for fish, including perennial surface flows or remnant pools, is absent from the ISRA Areas. Accordingly, no fish species were observed at any of the sites. However, other creek drainages within SSFL are known to support non-native mosquitofish (*Gambusia affinis*), and Arroyo Simi (located approximately 3 miles downstream) is known to support arroyo chub (*Gila orcutti*), mosquitofish, brown bullhead (*Ameiurus nebulosus*), green sunfish (*Lepomis cyanellus*), and blunt-nosed minnow (*Pimephales notatus*), but none of these drainages are within or near the project limits.

Habitat quality for amphibians is considered low due to the absence of perennial water or remnant pools, and presence of suitable upland habitat. Amphibians observed at the ISRA Areas were limited to Pacific chorus frog (*Pseudacris regilla*), but other non-special-status species including California tree frog (*Pseudacris cadaverina*) and western toad (*Bufo boreas*) have been observed at various upland and riparian locations throughout SSFL and Sage Ranch Park. In addition, coast range newt (*Taricha torosa torosa*, a California species of special concern) has been observed in at least four (4) pools in the boulder-cascade portion of the Northern Drainage on the Brandeis Bardin Institute property (located approximately 1,500 feet downstream of Outfall 009), but is not expected to occur at the ISRA Areas due to lack of pool habitat.

Habitat quality for reptiles is considered moderate to high due to the presence of suitable riparian and upland vegetation types, a thick duff layer beneath oak trees (where present), rock outcrops and crevices, and the relatively undisturbed or recolonized condition of portions of the ISRA Areas. Reptiles observed during field surveys of the Outfall 009 ISRA Areas included western fence lizard (*Sceloporus occidentalis*), striped racer (or chaparral whipsnake [Stebbins, 2003], *Masticophis lateralis lateralis*) and coastal western whiptail (*Aspidoscleis tigris stegnegeri*, a CDFG special animal). However, side-blotched lizard (*Uta stansburiana*), southern Pacific rattlesnake (*Crotalus viridis helleri*), racer (*Coluber constrictor*), coast horned lizard (*Phrynosoma coronatum* ssp. *frontale*, a California species of special concern), common king snake (*Lampropeltis getula*), gopher snake (*Pituophis catenifer*), ringneck snake (*Diadophis punctatus*) and common garter snake (*Thamnophis sirtalis*) have also been observed during past surveys at various locations throughout SSFL or Sage Ranch Park (Padre various obs., 2004 to 2010). Silvery legless lizard (*Anniella pulchra*, a California species of special concern) has also been observed in the Northern Drainage (Padre obs. 2008 & 2009), and may have a moderate to high potential to occur at ISRA Areas supporting oak woodlands (i.e., moist soils beneath oak tree duff). Two-striped garter snake (*Thamnophis hammondi*, a California species of special concern) has been observed in Perimeter Pond in Outfall 011 (Padre obs., February 2010).

Habitat quality for birds is considered moderate to high due to the presence of native chaparral or other scrub-dominated hillsides. As indicated in Table 2 below, 68 bird species have been observed during the field surveys and past surveys at SSFL or Sage Ranch Park. However, this is likely not an exhaustive list of every bird species that may be expected to occur during some portion of the year at SSFL.

The U.S. Fish and Wildlife Service (USFWS) administers the federal Migratory Bird Treaty Act (MBTA) of 1918 (16 United States Code [USC] 703-711). The purpose of the MBTA is the “establishment of a federal prohibition, unless permitted by regulations, to pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention for the protection of migratory birds, or any part, nest or egg of any such bird” (16 USC 703). Implementing regulations at 50 Code of Federal Regulations (CFR) 10 lists the migratory birds covered under the MBTA.

Sixty-six (66) of the 68 bird species listed in Table 2 are protected by the MBTA when nesting (regardless of any special-status species protection), with European starling being afforded no specific protection. In addition, all special-status bird species (discussed in Section 6 below) are also protected by the MBTA when nesting. Additional bird species protected by the MBTA when nesting may also be expected to occur at or near the ISRA Areas. CDFG Code (Sections 3503 and 3503.5) provides similar protection for most nesting birds, and defers to the MBTA list of protected birds. In addition, golden eagle (*Aquila chrysaetos*), discussed below in Section 6, is protected under the Bald Eagle and Golden Eagle Protection Act of 1940 (as amended 1990).

Table 2. Bird Species* observed at SSFL and Sage Ranch Park**

Acorn woodpecker	Common raven	Red-shouldered hawk
American crow	Common yellowthroat	Red-tailed hawk
American goldfinch	Cooper's hawk***	Red-winged blackbird
American kestrel	European starling	Rock pigeon
Anna's hummingbird	Golden-crowned sparrow	Rock wren
Ash-throated flycatcher	Great horned owl	Ruby-crowned kinglet
Barn owl	Greater roadrunner	Say's phoebe
Barn swallow	Hooded oriole	Snowy egret
Belted kingfisher	House finch	Song sparrow
Bewick's wren	House wren	S. California rufous-crowned sparrow***
Black-headed grosbeak	Killdeer	Spotted towhee
Black phoebe	Lark sparrow	Turkey vulture
Blue-gray gnatcatcher	Lazuli bunting	Western kingbird
Blue grosbeak	Lesser goldfinch	Western meadowlark
Bullock's oriole	Lawrence's goldfinch	Western scrub-jay
Bushtit	Mallard	White-crowned sparrow
California quail	Mourning dove	White-tailed kite****
California thrasher	Northern flicker	White-throated swift
California towhee	Northern mockingbird	Wilson's warbler
Canvasback	Northern rough-winged swallow	Wrentit
Canyon wren	Nuttall's woodpecker	Yellow-rumped warbler
Cassin's kingbird	Oak titmouse	Yellow warbler*****
Cliff swallow	Phainopepla	

*: Common species names only (no scientific names) are provided in Table 2 according to generally satisfactory naming practices of the American Ornithological Union's standardized bird species list.

** : All species listed in Table 2 are protected by the MBTA when nesting, with exception to European starling.

***: CDFG Watch List species

****: CDFG Fully Protected species

*****: California species of special concern (when nesting)

Habitat quality for mammals is considered moderate to high due the presence of native woodland and chaparral-dominated plant communities, and significant expanses of adjacent open space areas (see Section 5.2.2 Wildlife Corridors below). Mammals observed during the field surveys and past surveys at SSFL or Sage Ranch Park included woodrat (*Neotoma* sp., nest), Audubon's cottontail (*Sylvilagus audubonii*), brush rabbit (*Sylvilagus bachmani*), black-tailed deer (*Odocoileus hemionus*), coyote (*Canis latrans*), gray fox (*Urocyon cinereoargenteus*), California ground squirrel (*Spermophilus beecheyi*), western gray squirrel (*Sciurus griseus*), California vole (*Microtus californicus*), and deer mouse (*Peromyscus maniculatus*). In addition, the following wildlife sightings were reported by Padre biologists, or on-site personnel:

- A cougar (*Puma concolor*) sighting in NASA/Area II on April 5, 2010;
- Cougar tracks observed near monitoring well PZ-003 (Boeing Area 1) on May 26, 2010;
- Several bobcat (*Lynx rufus*) and cougar sightings were reported by work crew personnel in 2008 and 2009 at various locations throughout SSFL and Sage Ranch Park; and,
- Unidentified bat sightings were reported in 2009 in Happy Valley (Watershed 008) by work crew personnel.

Habitat quality for invertebrates is considered variable depending on the species. A variety of species in the phylum Arthropoda (including, but not limited to bugs, beetles, flies, moths, butterflies, bees, wasps, bristletails, spiders, ticks, centipedes, and water fleas) have been observed, but not necessarily identified to species at SSFL. Of note was the recent observation of versatile fairy shrimp (*Branchinecta lindahli*) in several seasonal sandstone pools located in Areas I and IV. A mid-season survey of each pool was conducted by Sarah Powell, Padre Project Biologist, on March 19, 2010 upon receiving authorization from USFWS to collect and identify fairy shrimp. Data including GPS location, pool size, depth, water temperature, pH, and electrical conductivity were collected at each pool location. Each pool was photographed to depict pool conditions at the time of sampling. Voucher specimens were fixed with preservative and taken back to the laboratory for observation under a microscope and identification to species. All specimens collected during these surveys were determined to be the versatile fairy shrimp, which is not a special-status species. The report documenting these survey findings anticipated that many more of these pool complexes are present in sandstone rock outcrop areas throughout the SSFL. Additionally, there may be other types of vernal pools present within the SSFL (Padre, 2010b). However, vernal pool habitat was not observed within any of the ISRA areas.

5.2.2 Wildlife Corridors

Wildlife migration corridors are generally defined as connections between habitat patches that allow for physical and genetic exchange between otherwise isolated animal populations. Migration corridors may be local, such as between foraging and nesting or denning areas, or they may be regional in nature. Migration corridors are not unidirectional access routes; however, reference is usually made to source and receiver areas in discussions of wildlife movement networks. "Habitat linkages" are migration corridors that contain contiguous strips of native vegetation between source and receiver areas. Habitat linkages provide cover and forage sufficient for temporary inhabitation by a variety of ground-dwelling animal species. Wildlife migration corridors are essential to the regional ecology of an area as they provide avenues of genetic exchange and allow animals to access alternative territories as fluctuating dispersal pressures dictate.

Native habitat areas within or in close proximity to several of the ISRA Areas may play an important role as a wildlife migration corridor, connecting habitat areas throughout the Simi Hills. These habitat areas may be especially critical where human activities would otherwise prohibit or impair the movement of species between habitat areas. Of notable importance was the frequent observation of wildlife tracks at several of the ISRA Areas and unpaved access roads throughout SSFL and at Sage Ranch Park. In addition, according to the South Coast Wildlands Missing Linkages Project (2008)¹, the Santa Monica-Sierra Madre Landscape Linkage connects the Santa Monica Mountains to the south along the ocean and the Sierra Madre Ranges of the Los Padres National Forest to the north, and includes the Simi Hills. SSFL and the ISRA Areas are located within the eastern strand of the Santa Monica-Sierra Madre Landscape Linkage. However, developed portions of SSFL are located at, or surround the ISRA Areas, which exhibit barriers to wildlife movement such as fencing or other structures, and large, exposed asphalt areas absent of suitable cover. Therefore, wildlife movement is likely mainly limited to undeveloped portions of SSFL or adjacent properties.

5.3 LEVEL OF DISTURBANCE

The level of disturbance at the ISRA Areas varies from low to high based on historical and current disturbances of the SSFL property, which includes former aerospace development activities, large expanses of pavement or buildings throughout Areas I and II Service Areas, and water quality monitoring stations and well installations throughout Outfall 009. Some of the ISRA Areas are completely paved over or otherwise disturbed, while others support mostly undisturbed or recolonized native vegetation exhibiting a moderate to high level of disturbance. Areas adjacent to many of the ISRA Areas are relatively undisturbed, supporting intact native plant communities and wildlife habitats.

¹ The South Coast Wildlands Missing Linkages Project is a collaborative inter-agency effort to identify and conserve the highest priority linkages in the South Coast Ecoregion, from Santa Barbara County to Baja California.

6.0 IMPORTANT BIOLOGICAL RESOURCES

6.1 SPECIAL-STATUS PLANT SPECIES

Special-status plant species are either listed as endangered or threatened under the Federal or California Endangered Special Acts, or rare under the California Native Plant Protection Act, or considered to be rare or of scientific interest (but not formally listed) by Ventura County, resource agencies, professional organizations (e.g., Audubon Society, California Native Plant Society [CNPS], The Wildlife Society), and the scientific community. Species listed as threatened or endangered under the Federal or California Endangered Species Acts may require permits for take of one or more of these species, in addition to consideration under the California Environmental Quality Act (CEQA). All other (non-listed) special-status species are given consideration under CEQA.

For the purposes of this project, special-status plant species are defined in Table 3. The literature search and field surveys conducted for this impact analysis indicates that 25 plant species of concern have the potential to occur in the project region. Table 4 lists these species, their current status, and the nearest known location relative to the ISRA Areas.

Table 3. Definitions of Special-Status Plant Species

Special-Status Plant Species
<ul style="list-style-type: none">➤ Plants listed or proposed for listing as threatened or endangered under the Federal Endangered Species Act (50 CFR 17.12 for listed plants and various notices in the Federal Register for proposed species).➤ Plants that are candidates for possible future listing as threatened or endangered under the Federal Endangered Species Act (Federal Register, November 9, 2009).➤ Plants that meet the definitions of rare or endangered species under the CEQA (<i>State CEQA Guidelines</i>, Section 15380).➤ Plants considered by the CNPS to be "rare, threatened, or endangered" in California (Lists 1B and 2 in CNPS, 2001).➤ Plants listed by CNPS as plants about which we need more information and plants of limited distribution (Lists 3 and 4 in CNPS, 2001).➤ Plants listed or proposed for listing by the State of California as threatened or endangered under the California Endangered Species Act (14 California Code of Regulations [CCR] 670.5).➤ Plants listed under the California Native Plant Protection Act (California Fish and Game Code 1900 et seq.).➤ Plants considered sensitive by other Federal agencies (i.e., U.S. Forest Service, Bureau of Land Management), state and local agencies or jurisdictions.➤ Plants on the Special Vascular Plants, Bryophytes, and Lichens List (California Department of Fish and Game, Natural Diversity Database, April 2010 Quarterly publication).➤ Trees protected under Ventura County Ordinance no. 4092 (Zoning Ordinance Section 8107-25).

Table 4. Special Status Plant Species of the Project Region

Common Name	Scientific Name	Habitat	Status	Nearest Known Location
Slender-horned spineflower	<i>Dodecahema leptoceras</i>	Chaparral, coastal scrub, flood deposited terraces	FE, SE, List 1B.2	Ahmanson Ranch, 4.5 miles to the south
San Fernando Valley spineflower	<i>Chorizanthe parryi</i> var. <i>fernandina</i>	Coastal scrub	FC, SE, List 1B.1	Ahmanson Ranch, 4.5 miles to the south
Spreading navarretia	<i>Navarretia fossalis</i>	Vernal pools	FT, List 1B.1	Ventura County, unspecified
Round-leaved filaree	<i>Erodium</i> (= <i>California</i>) <i>macrophyllum</i>	Valley and foothill grassland	List 1B.1	Vicinity of Reagan Library, 9 miles to the west
Santa Susana tarplant	<i>Deinandra minthornii</i>	Chaparral, coastal scrub	SR, List 1B.2	Onsite B1-2, A1LF-1 and LOX-1-B. Adjacent to CTL1-1 and AP/STP-1B.
Lyon's pentachaeta	<i>Pentachaeta lyonii</i>	Chaparral, valley and foothill grassland	SE, FE, List 1B.1	North of Wood Ranch Reservoir, 7 miles to the west
Southern California black walnut	<i>Juglans californica</i> var. <i>californica</i>	Riparian corridors, mesic hillsides	List 4	Various locations throughout SSFL
Coast live oak	<i>Quercus agrifolia</i>	Riparian corridors, mesic hillsides	TPO	Onsite at B1-1, B1-2, A1LF-1, A1LF-3, AP/STP-1B, 1C, 1E & 1F, A2LF2-2 Adjacent to A1LF-2, AP/STP-1A & 1D, LOX-1-A
Chaparral nolina	<i>Nolina cismontane</i>	Chaparral, coastal scrub	List 1B.2	Palo Comado Canyon, 4 miles to the southwest
Dune larkspur	<i>Delphinium parryi</i> ssp. <i>blochmaniae</i>	Chaparral, coastal dunes	List 1B.2	Lake Eleanor, 11 miles to the southwest
Conejo buckwheat	<i>Eriogonum crocatum</i>	Chaparral, coastal scrub, valley and foothill grassland	List 1B.2	Lake Eleanor, 11 miles to the southwest
Conejo dudleya	<i>Dudleya parva</i>	Coastal scrub, valley and foothill grassland in clayey or volcanic soils and rocky hillsides	FT, List 1B.2	Norwegian Grade, 10 miles to the west
Many-stemmed dudleya	<i>Dudleya multicaulis</i>	Chaparral, coastal scrub, valley and foothill grassland	List 1B.2	Chatsworth Reservoir, 2 miles to the east
Santa Monica Mountains dudleya (inclusive of Agoura Hills dudleya)	<i>Dudleya cymosa</i> ssp. <i>ovatifolia</i> (inclusive of <i>Dudleya cymosa</i> ssp. <i>agourensis</i>)	Chaparral	FT, List 1B.2	Cornell Corners, 7 miles to the southwest
Marcrescent dudleya	<i>Dudleya cymosa</i> ssp. <i>marcescens</i>	Chaparral	FT, SR, List 1B.2	Cornell Road, 8.5 miles to the southwest
Blochman's dudleya	<i>Dudleya blochmaniae</i> ssp. <i>blochmaniae</i>	Coastal scrub, coastal bluff scrub, and valley and foothill grassland	List 1B.2	Near Chatsworth Reservoir, 1.5 miles to the east
Braunton's milkvetch	<i>Astragalus brauntonii</i>	Closed cone coniferous forest, chaparral, coastal scrub, valley and foothill grassland	FE, List 1B.1	Southeast corner of SSFL Area IV, 1 mile to the southwest
Ocellated Humboldt lily	<i>Lilium humboldtii</i> ssp. <i>ocellatum</i>	Oak canyons	List 4	Northern Drainage at former ISRA Area A2LF-1, 0.1 miles to the northwest (Padre, 2009d).
Slender mariposa lily	<i>Calochortus clavatus</i> var. <i>gracilis</i>	Chaparral, coastal scrub	List 1B.2	Santa Monica Mountains, south of Woolsey Canyon Road, approximately 0.5 miles to the east
Catalina mariposa lily	<i>Calochortus catalinae</i>	Chaparral	List 4	Long Canyon, 5.9 miles to the west (Padre obs., 2010)
Plummer's mariposa lily	<i>Calochortus plummerae</i>	Chaparral	List 1B.2	SSFL Delta Area, 0.7 miles to the south (Padre obs., 2007)

Table 4. Continued

Common Name	Scientific Name	Habitat	Status	Nearest Known Location
Crowned forget-me-not	<i>Cryptantha corollata</i>	Oak woodland, foothill woodland, valley grassland	LC	Santa Susana Mountains (exact distance unspecified)
Tiny poppy	<i>Meconella denticulata</i>	Chaparral, coastal sage scrub, shaded canyons	LC	Ventura County, unspecified
Trask yerba santa	<i>Eriodictyon traskiae</i>	Chaparral	LC	Ventura County, unspecified
California Orcutt grass	<i>Orcuttia californica</i>	Vernal pools	SE, FE, List 1B.1	Thousand Oaks, 8 miles to the southwest

Status Codes: FC Federal Candidate (USFWS) FE Federal Endangered SE State Endangered
 FT Federal Threatened LC Species of Local Concern (Ventura Co.) SR State Rare
 List 1B Plants considered rare or endangered in California and elsewhere (CNPS, 2001)
 List 2 Plants considered rare or endangered in California, more common elsewhere (CNPS, 2001)
 List 3 Plants for which more information is needed, review list (CNPS, 2001)
 List 4 Limited distribution, watch list (CNPS, 2001)
 TPO Ventura County Tree Protection Ordinance

6.1.1 Braunton's Milkvetch

Braunton's milkvetch (*Astragalus brauntonii*) is a federally endangered species known to occur in limited distribution at SSFL. As indicated in Section 3, numerous biological surveys have recently been conducted for various activities at SSFL and Sage Ranch Park. These surveys have resulted in no observations of Braunton's milkvetch within or near the ISRA Areas. The nearest known population of this species at SSFL is in USFWS-designated Critical Habitat Unit 1d at the southwest corner of Area IV, approximately 1 mile to the southwest of the ISRA Areas. An estimate of this population is approximately 18,500 individuals, with a majority of the plants being in the species' largest class size (>70 cm), or fully mature (HydroGeoLogic, Inc. & Envicom Corporation, 2009).

6.1.2 Santa Susana Tarplant

Santa Susana tarplant (*Deinandra minthornii*) is categorized as a State rare species by CDFG that commonly occurs throughout SSFL and Sage Ranch Park. It has been observed mainly in rock outcrop areas or disturbed areas (e.g., abandoned parking lots). A recent Santa Susana tarplant study and survey estimates that 4,635 to 8,000 plants are located throughout Area I and approximately 110 acres of the adjacent undeveloped area of SSFL, and an additional 4,000 plants are likely present throughout the remainder of SSFL (Padre, 2008). More recent observations in 2010 of Santa Susana tarplant at various locations throughout SSFL indicate that the population is stable, if not increasing. Santa Susana tarplant is present in low density within or immediately adjacent to several of the ISRA Areas. Individuals located within or on the edges of the ISRA areas were flagged with pink ribbon during the biological surveys. All approximations of Santa Susana tarplants observed onsite or adjacent (including unflagged individuals) to the ISRA Areas are as follows:

Boeing	<ul style="list-style-type: none"> • B1-1 (19 individuals onsite, 58 individuals adjacent); • A1LF-1 (1 individual onsite); • CTL1-1 (1 individual adjacent);
NASA	<ul style="list-style-type: none"> • LOX-1-B (2 individuals onsite); and, • AP/STP-1B (13 individuals adjacent).

6.1.3 Ocellated Humboldt Lily

Ocellated Humboldt lily is a CNPS List 4 species that occurs in canyon bottoms. Observations of ocellated Humboldt lily at SSFL included several individuals in the Northern Drainage near the Outfall 009 flume in 2009, several individuals in an adjacent unnamed tributary to the south (approximately 200 feet upstream of Outfall 009) in 2009, and approximately 100 individuals in the tributary to Bell Canyon, approximately 1.1 miles to the southwest (Padre obs., 2009 and 2010).

6.1.4 Plummer's Mariposa Lily

Plummer's mariposa lily (*Calochortus plummerae*) is a CNPS List 1B.2 species that typically occurs in chaparral. Numerous biological surveys have recently been conducted for various activities at SSFL and Sage Ranch Park resulting in no observations of Plummer's mariposa lily. Past surveys of various locations within SSFL resulted in observations of individual Plummer's mariposa lilies at the SSFL Delta area (Padre obs., 2007), approximately 0.8 miles to the southwest of the ISRA Areas, and at the lower end of Happy Valley, approximately 1.6 miles to the southeast (observed by MWH in 2004).

6.1.5 Coast Live Oak

Coast live oak trees in excess of 9.5 inches in girth (circumference = 3 inches in diameter) at breast height (4.5 feet) are protected by the Ventura County Tree Protection Ordinance. Coast live oak commonly occurs throughout SSFL, mainly either as individual trees in and around bedrock outcrops or as woodlands or forests along creek drainages. Coast live oak is present at the following ISRA Areas, with the approximate numbers of trees at each area:

Boeing	<ul style="list-style-type: none"> • B1-1 (2 trees onsite); • B1-2 (21 trees onsite, 1 tree adjacent); • A1LF-1 (1 tree onsite);
NASA	<ul style="list-style-type: none"> • A2LF2-2 (1 tree onsite); • AP/STP-1B (6 trees onsite or adjacent); • AP/STP-1C (17 oaks onsite or adjacent); • AP/STP-1D (5 oaks adjacent); • AP/STP-1E (16 oaks onsite or adjacent); • AP/STP-1F (22 oaks onsite or adjacent); and, • LOX-1-A (5 oaks onsite or adjacent).

6.1.6 Other Special-Status Plant Species

Special-status plants including State and federal listed species such as slender-horned spineflower (*Dodecahema leptocerus*), San Fernando Valley spineflower (*Chorizanthe parryi* var. *fernandina*), round-leaved filaree (*Erodium [=California] macrophyllum*), Lyon’s pentachaeta (*Pentachaeta lyonii*), spreading navarretia (*Navarettia fossalis*), southern California black walnut (*Juglans californica* var. *californica*), chaparral nolina (*Nolina cismontane*), dune larkspur (*Delphinium parryi* ssp. *blochmaniae*), Conejo buckwheat (*Eriogonum crocatum*), Conejo dudleya (*Dudleya parva*), many-stemmed dudleya (*Dudleya multicaulis*), Agoura Hills dudleya (*Dudleya cymosa* ssp. *agourensis*), Marcescent dudleya (*Dudleya cymosa* ssp. *marcescens*), Blochman’s dudleya (*Dudleya blochmaniae* ssp. *blochmaniae*), crowned forget-me-not (*Cryptantha corollata*), tiny poppy (*Meconella denticulata*), Trask yerba santa (*Eriodictyon traskiae*), slender mariposa lily (*Calochortus clavatus* var. *gracilis*), Catalina mariposa lily (*Calochortus catalinae*), and California Orcutt grass (*Orcuttia californica*) are known in the project region, but have not been observed during spring botanical surveys (March and April 2010; results provided in Appendix A). In addition, none of these species were observed during past spring botanical surveys (May to June 2008 and 2009), and numerous other recent surveys of each ISRA Area, or various other portions of SSFL and Sage Ranch Park. Therefore, these species are not expected to occur at the ISRA Areas.

6.2 SENSITIVE HABITATS OR LOCALLY IMPORTANT COMMUNITIES

The CDFG Vegetation Classification and Mapping Program (CDFG, 2009) provides a list of all California vegetation alliances, and ranks each alliance from 1 through 5 (Global and State). If an alliance is marked with a G1 through a G3 code, this means that all of the associations within it will also be considered of high inventory priority (CDFG, 2009). If marked as G4 or G5, these alliances are generally considered common enough to not be of concern (i.e., this habitat is apparently secure); however, it does not mean that certain associations contained within them are not rare, particularly within the State (CDFG, 2009). Vegetation alliances (or provisional alliances [vegetation types that CDFG has 10 or fewer stands sampled, but are expected to prove to be more widespread]) within the ISRA Areas that have been ranked G3 and/or S3 (i.e., “vulnerable”) include thick leaf yerba santa scrub (provisional alliance, YSS), hairy leaf ceanothus chaparral (HLCC), and canyon sunflower scrub (CnSS):

Boeing	<ul style="list-style-type: none"> • A1LF-1 (YSS); • A1LF-2 (YSS); • B1-1 (YSS); • CTL1-1 (YSS);
NASA	<ul style="list-style-type: none"> • AP/STP-1B (YSS); • AP/STP-1C (YSS); • A2LF-2 (YSS and CnSS); and, • LOX-1-B (YSS).

No vegetation alliances within the ISRA areas are ranked G1 and G2, or S1 and S2 (critically imperiled or imperiled). All other vegetation types at the ISRA Areas are ranked as G4S4, G5S4, G5S5 or are unranked, and are not considered sensitive.

6.3 SPECIAL-STATUS WILDLIFE SPECIES

Special-status wildlife species are defined in Table 5. The potential for these species to occur in the project area was determined by completion of various biological surveys throughout SSFL, review of sight records from other environmental documents and range maps including Zeiner et al. (1988, 1990a, 1990b). Table 6 lists special-status wildlife species that have the potential to occur in the project region for at least a portion of their life cycle.

Table 5. Definitions of Special-Status Wildlife Species

Special-Status Wildlife Species
<ul style="list-style-type: none">➤ Animals listed or proposed for listing as threatened or endangered under the Federal Endangered Species Act (50 CFR 17.11 for listed animals and various notices in the Federal Register for proposed species).➤ Animals protected by the Bald Eagle and Golden Eagle Protection Act (16 USC 668-688), prohibiting the taking or possession of bald and golden eagles, their eggs, or their nests without a permit from the USFWS.➤ Animals that are candidates for possible future listing as threatened or endangered under the Federal Endangered Species Act (Federal Register, November 9, 2009).➤ Animals that meet the definitions of rare or endangered species under the CEQA (<i>State CEQA Guidelines</i>, Section 15380).➤ Animals listed or proposed for listing by the State of California as threatened and endangered under the California Endangered Species Act (14 CCR 670.5).➤ Animal species of special concern to the CDFG (Shuford and Gardali, 2008 for birds; Williams, 1986 for mammals; Moyle et al. 1989 for fish; and Jennings and Hayes; 1994 for amphibians and reptiles).➤ Animal species that are fully protected in California (California Fish and Game Code, Section 3511 [birds], 4700 [mammals], and 5050 [reptiles and amphibians]).➤ Animals listed on the CDFG Special Animals List (CDFG Biogeographic Data Branch, Natural Diversity Database, January 2010).

Table 6. Special-Status Wildlife Species of the Project Region

Common Name	Scientific Name	Habitat	Status	Nearest Known Location
Fish				
Arroyo chub	<i>Gila orcutti</i>	Slow water streams with mud or sand bottoms	CSC	Arroyo Simi, 10 miles to the northwest (NDDB, 2010)
Amphibians				
California red-legged frog	<i>Rana aurora draytonii</i>	Stream pools, vegetated ponds	FT, CSC	East Las Virgenes Creek (Ahmanson Ranch), 4.8 miles to the southeast (NDDB, 2010)
Arroyo toad	<i>Anaxyrus californicus</i>	Semi-arid regions near intermittent streams	FE, CSC	Chatsworth Creek, 4 miles to the east (historical sighting, NDDB, 2010)
Western spadefoot	<i>Spea hammondi</i>	Vernal pools	CSC	SSFL CTL-III detention basin, 0.9 miles to the south-southeast (Padre obs., 2010)
Coast range newt	<i>Taricha torosa torosa</i>	Riverine, riparian, riparian scrub, grassland, and coastal scrub (overwintering and dispersal)	CSC	Northern Drainage, 0.3 miles to the northwest (Padre obs., 2008)
Reptiles				
Silvery legless lizard	<i>Anniella pulchra</i> ssp. <i>pulchra</i>	Woodlands under leaf litter	CSC	Northern Drainage, 150 feet north of A1LF-2 and various locations (Padre obs., 2008 & 2009).
Southwestern pond turtle	<i>Actinemys marmorata</i> ssp. <i>pallida</i>	Stream pools, vegetated ponds	USFSS, CSC	Arroyo Conejo, 10 miles to the west (Padre obs., 2004)
Two-striped garter snake	<i>Thamnophis hammondi</i>	Streams	CSC	Perimeter Pond, 0.7 miles to the southwest of CTL1-1 (Padre obs., 2010)
Coastal western whiptail	<i>Aspidoscleis tigris</i> ssp. <i>stejnegeri</i>	Scrubland, grassland, or woodlands	SA	Observed along northern boundary of LOX-1-B ISRA Area by Padre on June 2, 2010
Coast horned lizard	<i>Phrynosoma coronatum</i> ssp. <i>frontale</i>	Scrubland, grassland, or woodlands	CSC	Various locations throughout SSFL (Padre obs., 2008-2010)
San Bernardino ring-neck snake	<i>Diadophis punctatus</i> ssp. <i>modestus</i>	Woodlands, streambanks	USFSS	SSFL Area II Landfill (onsite or adjacent to A2LF-2) (Padre obs. 2004)
Coast patch-nosed snake	<i>Salvadora hexilepis</i> ssp. <i>virgultea</i>	Grasslands, chaparral	CSC	Santa Monica Mountains: 12 miles to the southwest (De Lisle et al., 1986)

Table 6. Continued

Common Name	Scientific Name	Habitat	Status	Nearest Known Location
Birds				
Least Bell's vireo	<i>Vireo belli</i> ssp. <i>pusillus</i>	Willow and other riparian habitats	FE, SE	Arroyo Simi, 10 miles to the northwest (NDDDB, 2010)
Southwestern willow flycatcher	<i>Empidonax trailii</i> <i>extimus</i>	Willow and other riparian habitats	FE, SE	Fillmore Fish Hatchery, 16 miles to the northwest (Greaves, 2003)
Western yellow-billed cuckoo	<i>Coccyzus americanus</i> <i>occidentalis</i>	Willow and other riparian habitats	FC, SE	Santa Clara River, 12 miles to the northwest (NDDDB, 2010)
White-tailed kite	<i>Elanus caeruleus</i>	Grasslands, meadows, farmlands	FP	Onsite at various locations throughout SSFL (Padre obs. 2009)
Cooper's hawk	<i>Accipiter cooperi</i>	Woodlands near riparian zones	WL (nesting)	Onsite at various locations throughout SSFL (Padre obs. 2009)
Sharp-shinned hawk	<i>Accipiter striatus</i>	Woodlands near riparian zones	WL (nesting)	Unknown, non-breeding transient or visitor
Golden eagle	<i>Aquila chrysaetos</i>	Rolling foothill mountain areas	FP, WL (nesting & wintering), BEPA	Palo Comado Canyon, 4 miles to the southwest (NDDDB, 2010)
Yellow warbler	<i>Dendroica petechia</i> ssp. <i>brewsteri</i>	Riparian woodlands	CSC (nesting)	Northern Drainage, 250 feet to the northeast of CTL1-4 (Padre obs., 2010)
Yellow-breasted chat	<i>Icteria virens</i>	Riparian woodlands	CSC (nesting)	Arroyo Simi, 11 miles to the northwest (Montgomery Watson, 1995)
Loggerhead shrike	<i>Lanius ludovicianus</i>	Woodlands, shrublands	CSC	Near Moorpark College, 11 miles to the northwest (Padre, 2004)
California gnatcatcher	<i>Polioptila californica</i> ssp. <i>californica</i>	Coastal sage scrub	FT, CSC	North end of Las Virgenes Road, 5 miles to the south; Moorpark, 12 miles to the northwest (NDDDB, 2010)
Tri-colored blackbird	<i>Agelaius tricolor</i>	Cattail and bulrush thickets, open water	CSC	Chatsworth Reservoir, 2 miles to the east (NDDDB, 2010)
Southern California rufous-crowned sparrow	<i>Aimophila ruficeps</i> ssp. <i>canescens</i>	Chaparral, coastal sage scrub	WL	Various locations throughout SSFL (Padre obs., 2008-2010)
Bank swallow	<i>Riparia riparia</i>	Vertical streambanks	ST (nesting)	Lake Sherwood, 12 miles to the southwest (NDDDB, 2010)
Bell's sage sparrow	<i>Amphispiza belli</i> ssp. <i>belli</i>	Chaparral, coastal sage scrub	WL (nesting)	Tierra Rejada Road, 7 miles to the northwest (MWD, 1994)
Burrowing owl	<i>Athene cunicularia</i>	Open, dry annual or perennial grasslands, deserts or scrublands	CSC (burrow sites and some wintering sites)	Laskey Mesa, 3.8 miles to the south (NDDDB, 2010)

Table 6. Continued

Common Name	Scientific Name	Habitat	Status	Nearest Known Location
Mammals				
California mastiff bat	<i>Eumops perotis</i> ssp. <i>californicus</i>	Roosting: Crevices in cliff faces, caves, buildings, etc. Foraging: Woodlands, coastal scrub, grasslands, chaparral	CSC	China Flat, 3.3 miles to the west (NDDDB, 2010)
Western small-footed myotis	<i>Myotis ciliolabrum</i>	Roosting: Crevices in cliff faces, caves, buildings, etc. Foraging: Woodlands, water sources	WBWG	China Flat, 3.3 miles to the west (NDDDB, 2010)
Pallid bat	<i>Antrozous pallidus</i>	Roosting: Crevices in cliff faces, caves, buildings, etc. Foraging: Woodlands, coastal scrub, grasslands, chaparral	CSC	China Flat, 3.3 miles to the west (NDDDB, 2010)
San Diego desert woodrat	<i>Neotoma lepida</i> ssp. <i>intermedia</i>	Chaparral and other habitats, building houses at base of tree or cliffs	CSC	Old Santa Susana Pass Road, Simi Hills, 0.5 miles to the northeast (NDDDB, 2010), potentially at or adjacent to B1-1, B1-2, and A2LF-2 (Padre, 2010)
San Diego black-tailed jackrabbit	<i>Lepus californicus</i> ssp. <i>bennettii</i>	Chaparral or other early-stage forest habitats	CSC	Oak Park, 8 miles to the northwest (Scott & Wier, 1982)
American badger	<i>Taxidea taxus</i>	Open shrubby, forest or herbaceous habitats with friable soils	CSC	West Simi Valley, 7 miles to the west (Marsh, 1981)
Ringtail	<i>Bassariscus astutus</i>	Riparian and other shrubby habitats	FP	Unknown
Invertebrates				
Quino checkerspot	<i>Euphydryas editha quino</i>	Coastal sage scrub, chaparral, meadows	FE	Historically known to occur in the Santa Monica Mountains
Vernal pool fairy shrimp	<i>Branchinecta lynchi</i>	Vernal pools	FT	Ventura County (NDDDB, 2010)

Status Codes: ABC American Bird Conservancy
 AWL Audubon Watch List
 BEPA Bald Eagle and Golden Eagle Protection Act (USFWS)
 CSC California Species of Special Concern (CDFG)
 FP Fully protected (Fish and Game Code)
 WL Watch List (CDFG)
 FE Federal Endangered (USFWS)
 FT Federal Threatened (USFWS)
 FT-PD Federal Threatened, proposed for de-listing (USFWS)

FC	Federal Endangered Species Act Candidate (USFWS)
Status Codes (cont.): SA	Special Animal: refers to a taxon that the NDDB is interested in tracking, regardless of legal or protection status (CDFG)
SE	State Endangered (CDFG)
ST	State Threatened (CDFG)
USBC	U.S. Bird Conservation Watch List
WBWG	Western Bat Watch Group List
USFSS	Sensitive (U.S. Forest Service)

6.3.1 Fish

Habitat for fish (surface flow, pools and runs) is absent from the ISRA Areas. Therefore, special-status fish species including arroyo chub (*Gila orcutti*) are not expected to occur at any of the ISRA Areas.

6.3.2 Amphibians

Habitat quality for special-status amphibians including California red-legged frog (*Rana aurora draytonii*, a federally threatened species and California species of special concern) and coast range newt (*Taricha torosa torosa*, a California species of special concern) is low or absent from each of the ISRA Areas due to the absence of surface water or pools. California red-legged frog has been observed in Las Virgenes Creek (NDDB, 2010) in a separate watershed approximately 4.8 miles to the south, which is the only known population in eastern Ventura County. According to the Revised Critical Habitat for the California Red-Legged Frog; Proposed Rule (50 CFR Part 17) (USFWS, 2008), Upper Las Virgenes Canyon is designated as proposed critical habitat unit VEN-3, but is located in a separate watershed approximately 1.6 miles to the southwest of the ISRA Areas at VEN-3's nearest, northerly edge. Coast range newt has been observed in pools within the Northern Drainage on the Brandeis-Bardin Institute property to the north (Padre, 2008). Both species are known to occupy upland habitats for a portion of their life cycle. However, due to absence of suitable aquatic habitat, presence of geographic barriers, and substantial distance from proposed critical habitat (for California red-legged frog), California red-legged frog and coast range newt are not expected to occur at the ISRA Areas.

Western spadefoot (*Spea hammondi*, a California species of special concern) was recently discovered within the SSFL, breeding in a detention basin at CTL-III. Due to the absence of any suitable breeding pools in the immediate vicinity, western spadefoot is not expected to occur at the ISRA Areas.

Arroyo toad (*Anaxyrus californicus*, a federally endangered species and California species of special concern) has historically been documented in Chatsworth Creek below Chatsworth Reservoir (NDDB, 2010). However, suitable habitat for arroyo toad (large, widespread, intermittent streambeds with sandbars) is absent from SSFL (including the ISRA Areas) and Sage Ranch Park, and geographic or manmade barriers exist between SSFL and Chatsworth Reservoir. Therefore, arroyo toad is not expected to occur at the ISRA Areas. Accordingly, no special-status amphibians are expected to occur at the ISRA Areas.

6.3.3 Reptiles

Habitat quality for special-status reptiles is moderate to high at the ISRA Areas, including scrub or woodland areas, rock outcrops, and pockets of vegetative litter (duff). Two coastal western whiptails were observed during field surveys conducted for this project along the northern boundary of ISRA Area LOX-1-B, and may occur at other ISRA Areas. Coast horned lizard has been observed in various locations at SSFL and Sage Ranch Park (Padre obs., 2008-2010) and may be expected to occur at the ISRA Areas. San Bernardino ring-neck snake has been observed at Area 2 Landfill (north of A2LF-2) (Padre obs. 2004), and this species may be expected to occur at the ISRA Areas. Silvery legless lizard was observed (Padre obs., 2008 and 2009) in the Northern Drainage approximately 150 feet north of A1LF-2, at a northern tributary to the Northern Drainage on Sage Ranch Park approximately 0.2 miles to the northwest of CTL1-1A, and in the Northern Drainage adjacent to the Outfall 009 flume, approximately 0.1 miles northwest of A2LF-2. Therefore, silvery legless lizard may be expected to occur at several of the ISRA Areas providing suitable habitat (moist soils beneath oak tree duff).

Coast patch-nosed snake (*Salvadora hexilepis* ssp. *virgultea*, a California species of special concern) has been observed in the Santa Monica Mountains to the south, and may have the potential to occur at or along the edges of the ISRA Areas due to the presence of suitable scrubland habitat.

Aquatic habitat (streams, pools, and vegetated ponds) for southwestern pond turtle (*Actinemys marmorata* ssp. *pallida*, a California species of special concern) and two-striped garter snake have not been observed at the ISRA Areas, nor do sight records exist for southwestern pond turtle at or near SSFL or Sage Ranch Park. However, these species are known to migrate over upland areas to adjacent aquatic habitats. Due to the lack of sight records and substantial distance from suitable habitat, southwestern pond turtle is not expected to occur at the ISRA Areas. Two-striped garter snake has been observed in Perimeter Pond, approximately 0.7 miles southwest of CTL1-1. Based on the observation of two-striped garter snake at SSFL, and substantial rainfall during the 2009-2010 winter season (resulting in ephemeral ponding of water within the Northern Drainage [however, mostly dry as of May 6, 2010]), two-striped garter snake may have a low likelihood to occur at the ISRA Areas in close proximity to the Northern Drainage.

Due to the lack of NDDB records and any observations or documentations during numerous biological surveys completed at SSFL by Padre biologists over the last 6 years, no California or federal threatened or endangered reptile species are anticipated to occur at any of the ISRA Areas.

6.3.4 Birds

Habitat for shrub/scrub or woodland-dependent bird species is prevalent at or near the ISRA Areas. Special-status birds observed during current or past field surveys included Cooper's hawk (a CDFG watch list species protected while nesting) and white-tailed kite (a fully protected species), which may be expected to forage or nest within adjacent woodland areas or open grassland areas, respectively, and southern California rufous-crowned sparrow (a CDFG watch list species), which may be expected to forage or nest within chaparral areas at the ISRA Areas. In addition, yellow warbler was observed in the Northern Drainage (Padre obs., 2010), approximately 800 feet to the northeast of CTL1-1A, and may be expected to forage, but not likely to nest at many of the ISRA Areas located in close proximity to the Northern Drainage. Based on similar habitat requirements as yellow warbler, yellow-breasted chat (*Icteria virens*, a California species of special concern while nesting) may also be expected to forage, but not likely to nest at many of the ISRA areas located in close proximity to the Northern Drainage.

Due to the prevalence of chaparral habitats, and known sight records within 7 miles of the ISRA Areas, Bell's sage sparrow (*Amphispiza belli* ssp. *belli*, a CDFG watch list species) may be expected to forage or nest at or adjacent to the ISRA Areas. Other woodland or shrubland-dependent species such as loggerhead shrike (*Lanius ludovicianus*, a California species of special concern), and sharp-shinned hawk (*Accipiter striatus*, a CDFG watch list species) may also be expected to forage or nest near the ISRA Areas.

Coastal California gnatcatcher (*Poliioptila californica* ssp. *californica*, a federally threatened species and California species of special concern) is a year-round resident of coastal southern California and Baja California. Coastal California gnatcatcher prefers open coastal sage scrub with California sagebrush as a dominant or co-dominant species at elevations from sea level to 1650 feet, but mostly below 990 feet (Mock, 2004). Small, now disjunct populations have been documented in Ventura and Los Angeles Counties (Mock, 2004), including Las Virgenes Canyon, approximately 4.5 miles to the south, and in Moorpark, approximately 12 miles to the northwest (NDDDB, 2010). In addition, coastal California gnatcatcher was recently observed in 2010 along the western boundary of the Santa Monica Mountains; an area in Ventura County in which the species was previously not known to occur (Rincon, 2010).

According to the Revised Designation of Critical Habitat for the Coastal California Gnatcatcher; Final Rule (50 CFR Part 17) (USFWS, 2007), Critical Habitat Unit 13 encompasses approximately 57,737 acres in eastern Ventura and western Los Angeles Counties along the southern and eastern slopes of the Santa Susana Mountains and a portion of the interior foothills of the San Gabriel Mountains. Unit 13 has been designated because it is currently occupied by this species, contains the Primary Constituent Elements (PCEs,) required by this species and serves as an essential linkage between the two isolated populations: the core population in the Moorpark area in Ventura County and the pairs documented in the foothills of the San Gabriel Mountains in Los Angeles County (USFWS, 2007). These PCEs include [1] Venturan coastal sage scrub and coastal sage-chaparral scrub providing space for individual and population growth, normal behavior, breeding, reproduction, nesting, dispersal and foraging; and [2] Non-sage scrub habitats such as chaparral, grassland, riparian areas, in proximity to sage scrub habitats that provide space for dispersal, foraging, and nesting. At its closest point, Unit 13 (in the Simi Hills, north of SR118) is located approximately 2.7 miles to the

northeast of ISRA Area B1-1, and habitat types described above are present at many of the ISRA Areas. However, based on the lack of sight records in the immediate vicinity (including completion of numerous, non-protocol level breeding bird surveys throughout the last 6 years by Padre biologists) and in the Simi Hills, coastal California gnatcatcher is not likely to occur at the ISRA Areas.

Willow riparian-dependent species such as least Bell's vireo (*Vireo belli* ssp. *pusillus*, a federal and California endangered species), southwestern willow flycatcher (*Empidonax trailii extimus*, a federal and California endangered species), and western yellow-billed cuckoo (*Coccyzus americanus occidentalis*, a federal candidate and California endangered species) are not expected to occur at the ISRA Areas based on the absence of suitable habitat and local sight records. Bank swallow (*Riparia riparia*, a California threatened species while nesting) is also unlikely to occur at the ISRA Areas based on absence of vertical streambanks and local sight records.

As stated above in Section 5, all special-status bird species are also afforded separate protection under the MBTA when nesting, and golden eagle is protected under the Bald Eagle and Golden Eagle Protection Act of 1940 (as amended 1990). Golden eagle (a California fully protected species), which is dependent on mountainous areas and rolling foothills, may be expected to forage at or near the ISRA Areas based on local sight records from Palo Comado Canyon to the south, and their ability to forage over large areas (many square miles). Golden eagle may be expected to nest on nearby rocky cliffs or ledges, but is not expected to nest directly within any of the ISRA Areas due to the absence of significant cliff areas within each area and lack of site records at SSFL. Marginally suitable habitat for burrowing owl (*Athene cunicularia*, a California species of special concern at burrow sites and some wintering sites) in the form of grassland and other open scrubland areas is present in portions of SSFL. However, based on the lack of site records at SSFL, there is a low likelihood for burrowing owl to occur at the ISRA Areas.

6.3.5 Mammals

No confirmed observations of special-status mammals were concluded during field surveys at the ISRA Areas. However, San Diego desert woodrat (*Neotoma lepida* ssp. *intermedia*, a California species of special concern) has been observed in the Simi Hills, approximately 1.5 miles to the northeast, and suitable habitat (chaparral) for this species is present at the ISRA Areas. Potentially active woodrat (*Neotoma* sp.) nesting activities were noted at B1-1, B1-2, and A2LF-2, several of which may conservatively be considered to house San Diego desert woodrat. San Diego black-tailed jackrabbit (*Lepus californicus* ssp. *bennettii*, a California species of special concern) may also be expected to occur in grassland or open scrub areas. Habitat for American badger (*Taxidea taxus*, a California species of special concern) is moderately suitable based on the presence of shrub or woodland habitats with friable soils. However, based on the lack of local sight records or observations of dens during past surveys, this species is not likely to occur at the ISRA Areas. Suitable riparian woodland or shrubland habitats for ringtail (*Bassariscus astutus*, a California fully protected species) are present within or adjacent to the ISRA Areas; however, no known records exist for this species at or near SSFL. Therefore, ringtail is not likely to occur at the ISRA Areas

Foraging habitat (woodlands and chaparral) for bat species including California mastiff bat (*Eumops perotis* spp. *californicus*, a California species of special concern), western small-

footed myotis (*Myotis ciliolabrum*, a Western Bat Watch Group species), and pallid bat (*Antrozus pallidus*, a California species of special concern) is present at the ISRA Areas. However, only marginally suitable roosting habitat (cliff faces, caves, buildings, and to a lesser degree, in tree hollows or other crevices) is present at the ISRA Areas, and is mainly limited to areas outside of each ISRA Area. Therefore, bat species could occur for brief periods, but are not expected to roost at the ISRA Areas. No California or federally threatened or endangered mammals are anticipated to occur at the ISRA Areas.

6.3.6 Invertebrates

As stated above, an USFWS-authorized mid-season fairy shrimp survey was conducted at several selected sandstone pools on March 19, 2010. All specimens collected during this survey were determined to be the versatile fairy shrimp, which is not a special-status species (Padre, 2010b). However, the report documenting these survey findings concluded that the potential exists for threatened or endangered fairy shrimp (including, but not limited to vernal pool fairy shrimp [*Branchinecta lynchi*], a federally threatened species) to occur in these and other vernal pool habitats potentially present at SSFL. Nonetheless, vernal pool habitat is absent from the ISRA areas, and no impacts to listed fairy shrimp and associated vernal pool habitats are anticipated.

Quino checkerspot (*Euphydryas editha quino*, a federally endangered species), is a medium sized butterfly in the Nymphalidae (brush-foot) butterfly family, with a wingspread of about 3 cm. The dorsal surface of the wings is a checkerboard of brown, red and yellow spots. The Quino checkerspot once thrived in the entire area from the Santa Monica Mountains south to the northern parts of Baja California. There are now only six known U.S. populations in southwestern Riverside and San Diego counties, and one population near Tecate, Mexico (Xerces Society, undated). The larvae may use either dwarf plantain (*Plantago erecta*) or exserted Indian paintbrush (*Castilleja exserta*), both of which may be common in meadows and upland sage scrub/chaparral habitat. No known focused surveys for Quino checkerspots have been conducted at or near SSFL, but based on the absence site records and the absence of these host plants, Quino checkerspot is not anticipated to occur at the ISRA Areas.

7.0 PROJECT IMPACTS

The subject ISRA project is located at areas within SSFL that provide important biological resources and habitats. These areas may undergo impacts through vegetation and soil removal, and increased human activity. However, these impacts are considered temporary as the general topography and vegetation composition would be replaced or allowed to naturally regenerate throughout each ISRA Area. Additionally, conservation measures will be implemented to ensure compliance with the CDFG SAA, and minimize or avoid any impacts to biological resources, including special-status plant and wildlife species.

7.1 VEGETATION

Impacts to vegetation were approximated based on the planned implementation of activities at each ISRA Area, and are considered only temporary (with no permanent impacts). Direct impacts on vegetated areas through ISRA remedial activities, and construction and establishment of temporary access routes at each ISRA area are considered temporary due to plans to restore these areas in accordance with the project's CDFG SAA. Existing bare ground, unpaved access roads or rock outcrops are not included in the calculation.

Plant communities within the ISRA Areas were characterized according to the California Vegetation Classification and Mapping Program's list of vegetation alliances (CDFG, 2009). Area calculations of these plant communities located within the ISRA Areas are provided in Table 7 and are summarized as follows:

Direct temporary vegetation impacts within the ISRA Areas total approximately 7.98 acres, including:

- 5.35 acres of (in descending order) thick-leaf yerba santa scrub, coyote brush scrub, coast live oak woodland (upland), deerweed scrub, chamise-black sage chaparral, and other scrub or thicket communities including the following areas regulated by the CDFG SAA:
 - 0.01 acre of riparian coast live oak woodland;
 - 0.03 acre of arroyo willow thicket; and,
 - 0.07 acre of mulefat thicket.
- 2.63 acres of annual brome grasslands and undifferentiated exotic vegetation (typically stands of summer mustard, tocalote, redstem filaree, yellow sweet clover, and slender wild oats).

No permanent impacts to vegetation are anticipated.

Table 7. Temporary Impacts to Plant Communities for the ISRA Areas (in acres)

Vegetation Alliance	Misc.	Rarity Ranking	Condition	ISRA Areas	Comments
Bush Mallow Scrub (<i>Malacothamnus fasciculatus</i> ssp. <i>fasciculatus</i>)		G4S4	Intact, burned	0.25	
Thick Leaf Yerba Santa Scrub (<i>Eriodictyon crassifolium</i> , provisional)		G3S3	Intact, burned	1.31	Former ranking: G4S4. New provisional alliance ranking provided.
Chamise-Black Sage Chaparral (<i>Adenostoma fasciculatum</i> - <i>Salvia mellifera</i>)		G5S5	Intact, burned	0.53	
Coast Live Oak Woodland (<i>Quercus agrifolia</i> , upland)		G5S4	Intact, burned	1.04	
Coast Live Oak Woodland (<i>Quercus agrifolia</i> , riparian)		G4S4	Intact, burned	0.01	
Canyon Sunflower Scrub (<i>Venegasia carpesioides</i>)		G3S3	Intact	0.03	
Deerweed Scrub (<i>Lotus scoparius</i>)		G5S5	Intact, disturbed	0.68	
Laurel Sumac Scrub (<i>Malosma laurina</i>)		G4S4	Intact, burned	0.06	
Mulefat Thicket (<i>Baccharis salicifolia</i>)		G5S4	Intact	0.07	
Arroyo Willow Thicket (<i>Salix lasiolepis</i>)		G4S4	Intact	0.03	
California Sagebrush Scrub (<i>Artemisia californica</i>)		G5S5	Intact, disturbed	0.06	Marginal, recolonized on top of landfill materials at A2LF.
Coyote Brush Scrub (<i>Baccharis pilularis</i>)		G5S5	Intact, disturbed	1.27	Mainly in recolonized areas at AP/STP & LOX
Annual Brome Grassland (<i>Bromus</i> sp.)		Unranked	Intact, disturbed	2.01	
	Undifferentiated Exotic Vegetation	n/a	Disturbed	0.62	Non-natives typically including stands of summer mustard, tocalote, redstem filaree, yellow sweet clover and slender wild oats.
Totals				7.98	

7.2 SPECIAL-STATUS PLANT SPECIES

Based on field surveys conducted in March, April and June 2010, special-status plant species observed within of adjacent to the ISRA Areas are limited to Santa Susana tarplant and coast live oak. Potential impacts to Santa Susana tarplant from grading activities may include trampling, burial or complete removal of several to approximately 22 individuals. Loss of Santa Susana tarplant, a State Rare and CNPS List 1B.2 species would likely require implementation of project-incorporated or long-term mitigation measures to ensure that no substantial impacts to this species occur. Recommended protection and avoidance strategies are provided in Section 8 below.

Other special-status species noted at various locations throughout SSFL including ocellated Humboldt lily, Braunton's milkvetch, Plummer's mariposa lily, and southern California black walnut were not observed at the ISRA Areas during the spring botanical surveys (March and April 2010). Therefore, these species are not expected to occur at the ISRA Areas and no impacts to these species are anticipated.

Special-status plants including slender-horned spineflower, San Fernando Valley spineflower, round-leaved filaree, Lyon's pentachaeta, spreading navarretia, chaparral nolina, dune larkspur, Conejo buckwheat, Conejo dudleya, many-stemmed dudleya, Agoura Hills dudleya, marcescent dudleya, Blochman's dudleya, crowned forget-me-not, tiny poppy, Trask yerba santa, slender mariposa lily, Catalina mariposa lily, and California Orcutt grass are known in the project region, but have not been observed during spring botanical surveys (March and April 2010), nor during numerous other recent surveys throughout SSFL and Sage Ranch Park. Therefore, impacts on these species are not expected to occur at the ISRA Areas. Accordingly, no impacts to California or federal threatened or endangered plant species are anticipated to occur with the ISRA project.

County Zoning Ordinance no. 8107-25 (Tree Protection Regulations) considers oak trees (including coast live oak) at least 9.5 inches (single trunk) or 6.25 inches (multi-trunk) in circumference (3 or 2 inches in diameter, respectively) as County protected trees. In addition, trees with a circumference of 90 inches (29 inches in diameter) or greater are considered to be "heritage" trees. Oak tree protection regulations extends not only to the removal of oak trees, but invasion (encroachment) of the tree's protected zone by activities including trenching, digging, or placement of heavy equipment, vehicles, or materials within the protected zone. The protected zone is defined as the surface and subsurface area within the dripline and extending a minimum of five (5) feet outside the dripline, or 15 feet from the trunk of the tree, whichever is greater. The County Tree Protection Ordinance also protects western sycamore (*Platanus racemosa*), which are absent from the ISRA Areas. Therefore, no impacts to western sycamore will occur.

Encroachment, and limb and root pruning of up to 25 coast live oak trees on Boeing property, and 73 coast live oak trees on NASA property may occur as a result of the ISRA project. Complete removal of any of these trees is not anticipated at this time. However, should remedial activities expand beyond the planned project limits, impacts may also include removal of one or more trees. Based on the federal ownership of the ISRA Areas on NASA property, only the trees located on Boeing property are subject to the County Tree Protection Regulations. Nonetheless, tree protection strategies described in a January 26, 2010 memorandum to Lori Blair (Boeing) from MWH and Padre will be implemented at the NASA ISRA Areas. A separate Oak Tree Assessment has been prepared for oak trees located at the Boeing ISRA Areas, and is provided in Appendix B. This Oak Tree Assessment will be submitted to the County of Ventura as part of a tree permit application packet for the subject project.

7.3 SENSITIVE HABITATS OR LOCALLY IMPORTANT COMMUNITIES

As stated above, sensitive habitats or locally important communities located at the ISRA Areas include thick leaf yerba santa scrub (a provisional alliance according to CDFG) and canyon sunflower scrub. According to Table 7 above, impacts to these plant communities are temporary and would measure approximately 1.31 acres and 0.03 acres, respectively. No permanent impacts to sensitive habitats would occur from the project. Based on the temporary design of the project, proposed conservation measures described below, and local abundance of these plant communities at SSFL, no substantial impacts to sensitive habitats would occur.

7.4 WILDLIFE

Construction activities would be conducted within suitable habitat areas for wildlife common to the region, and may have the potential to crush or bury small mammals and reptiles. In addition, ISRA investigation and remediation activities may affect non-special-status birds protected by the MBTA and CDFG Code (Sections 3503 and 3503.5) when nesting (which protects nearly all of the bird species listed in Table 2, and most other species that may be expected to occur at SSFL when nesting) in the form of direct mortality (to eggs or fledglings) and/or reduced breeding bird activity through vegetation removal or encroachment. However, impacts to wildlife habitat are considered temporary, and proposed conservation measures described below will ensure that impacts to wildlife in the area are avoided or minimized in accordance with the CDFG SAA. In addition, based on the intent of the ISRA to remove impacted soils, improve surface water and groundwater quality, and restore native vegetation throughout the disturbed areas, long-term impacts on wildlife habitat are considered beneficial.

7.5 SPECIAL-STATUS WILDLIFE SPECIES

7.5.1 Fish

Special-status fish species or their habitat are absent from the ISRA Areas. Therefore, no impacts to special-status fish species are anticipated.

7.5.2 Amphibians

Due to absence of suitable habitats for any special-status amphibians (including California red-legged frog, coast range newt, western spadefoot, and arroyo toad), presence of geographic barriers between the ISRA Areas and the nearest known sighting locations for each species, and substantial distance from suitable habitat for dispersing animals (including proposed critical habitat for California red-legged frog), special-status amphibians are not expected to occur at the ISRA Areas. Therefore, no impacts to special-status amphibians, including California or federal threatened or endangered amphibian species are anticipated.

7.5.3 Reptiles

Special-status reptiles including silvery legless lizard, coast horned lizard, western whiptail, coast patch-nosed snake, San Bernardino ring-neck snake, and to a lesser degree, two-striped garter snake have the potential to occur at the ISRA Areas. Impacts to special-status reptiles in the form of direct mortality during construction may occur. However, impacts to suitable reptile habitat are considered temporary, and proposed conservation measures below will ensure that impacts to special-status reptiles in the area are avoided in accordance with the CDFG SAA. In addition, based on the intent of the ISRA to remove impacted soils, improve surface water and groundwater quality, and restore native vegetation throughout the disturbed areas, potential impacts on wildlife habitat for special-status reptiles are considered beneficial. No impacts to California or federal threatened or endangered reptile species are anticipated to occur with the ISRA project.

7.5.4 Birds

Special-status birds observed at various locations throughout SSFL that may occur within the ISRA Areas include yellow warbler, southern California rufous-crowned sparrow, white-tailed kite, and Cooper's hawk. Other special-status birds that may occur at or near the ISRA Areas include Bell's sage sparrow, loggerhead shrike, golden eagle, and sharp-shinned hawk. However, impacts to suitable bird nesting or foraging habitat are considered temporary, and conservation measures described below will ensure that impacts to special-status birds in the area are avoided in accordance with the CDFG SAA.

Suitable habitat for coastal California gnatcatcher including coastal sage scrub, coastal sage-chaparral scrub and adjacent non-sage scrub habitats such as chaparral, grassland, riparian areas is present at SSFL. However, based on the lack of sight records in the immediate vicinity and in the Simi Hills, and absence of observations during numerous non-protocol level breeding bird surveys over the last 6 years, coastal California gnatcatcher is not likely to occur at the ISRA Areas. Therefore, no impacts to coastal California gnatcatcher or other California or federal threatened or endangered bird species are anticipated to occur with the ISRA project.

7.5.5 Mammals

Special-status mammals including San Diego desert woodrat and San Diego black-tailed jackrabbit may occur within or adjacent to the ISRA Areas. In addition, foraging habitat for California mastiff bat, western small-footed myotis, and pallid bat is present at the ISRA Areas, but roosting habitat is only marginally present, and is mainly limited to areas outside of each ISRA Area. Due to the lack of permanent impact areas and the project's intent to restore native vegetation upon completion of remedial activities, temporary loss of foraging habitats for these species will be avoided or minimized through implementation of conservation measures described below in accordance with the CDFG SAA. No impacts to California threatened, endangered or fully protected mammals, or federal threatened or endangered mammals are anticipated to occur with the ISRA project.

7.6 WILDLIFE MIGRATION CORRIDORS

Native habitat areas within close proximity to the ISRA Areas may play an important role as a wildlife migration corridor, connecting habitat areas throughout the Simi Hills. The ISRA Areas are located within the eastern strand of the Santa Monica-Sierra Madre Landscape Linkage. However, project activities will not substantially interfere with the use of the subject area by wildlife, result in the erection of substantial physical barriers, or permanently eliminate native vegetation. In addition, many of the ISRA Areas are located near or are surrounded by developed areas of SSFL, which currently exhibit barriers to wildlife movement such as buildings, fencing, and large, exposed asphalt areas absent of suitable cover.

Nonetheless, the project may result in wildlife behavioral changes due to temporary construction and increased human presence. These impacts are localized to each ISRA Area, representing a small percentage of the overall available habitat area at SSFL, and are short-term in duration. Potential impacts on wildlife migration corridors including the Santa Monica-Sierra Madre Landscape Linkage will therefore be minimized through implementation of proposed conservation measures described below in accordance with the CDFG SAA.

8.0 CONSERVATION MEASURES

8.1 VEGETATION

Temporary loss of approximately 5.35 acres of thick-leaf yerba santa scrub, coyote brush scrub, coast live oak woodland, deerweed scrub, chamise-black sage chaparral, and other scrub or thicket communities within the ISRA Areas will be restored according to conditions set forth in the CDFG SAA. In addition, approximately 2.63 acres of annual brome grasslands and undifferentiated exotic vegetation within the ISRA Areas will also be restored with erosion control best management practices (BMPs, including straw wattles and hydromulching), and allowed to be recolonized by adjacent native vegetation. The following are conditions set forth in the SAA that will be implemented for the restoration of the ISRA Areas:

- Disturbance or removal of vegetation shall not exceed the limits approved by CDFG. The disturbed portions of the stream channel or margin, within the high water mark of the stream, shall be restored to its original condition in accordance with the SAA and CDFG-approved mitigation and monitoring plan.
- Restoration shall include the revegetation of stripped or exposed work and/or mitigation areas with vegetation native to the area (refer to Section 5.1, Table 7, and Appendix A of this Study).
- Any oaks, California black walnuts and sycamores that are damaged/removed during construction operations shall be replaced in kind at a 10:1 ratio. Elderberry, cottonwood, and willows shall be replaced at a 5:1 ratio.
- Planting, maintenance, monitoring and reporting activities shall be overseen by a specialist familiar with restoration of native plants.
- Non-native vegetation (e.g., tree tobacco, castor bean, and various non-native thistles, if present) shall be removed from the work area (by hand or hand-operated power tools, and without the use of herbicides), and be disposed of in a manner and in a location which prevents its reestablishment. Removal shall be done at least twice annually during the spring/summer season, as needed, through the term of the restoration.
- Efforts to avoid the spread of non-native plants (including seeds) into the areas being revegetated including cleaning boots, tools, and vehicles should be implemented.

8.2 SPECIAL-STATUS PLANT SPECIES

Approximately 22 Santa Susana tarplants are located within the ISRA Areas and may have the potential to be impacted. Therefore, Santa Susana tarplant located at or immediately adjacent to the ISRA Areas will be avoided by the placement of temporary construction fencing around each plant or group of plants. Periodic construction monitoring will be completed as necessary (likely twice weekly) by a qualified biologist throughout the duration of the project to ensure compliance with permit conditions. Work crews will be notified of the plant's presence and need for avoidance. Any impacted plants would be tabulated for consideration in a site-wide SSFL Santa Susana tarplant mitigation activity, if deemed necessary by CDFG. A follow-up post construction survey will be conducted at the completion of the ISRA project to identify the condition of the ISRA Areas and appropriate restoration activities.

Removal of oak trees within the ISRA Areas will be avoided by limiting removal of soil within the dripline to vacuum extraction (super-sucker, or equivalent). Excavation within oak tree driplines using heavy equipment will be prohibited. Oak tree roots exposed by soil removal will be backfilled within one week of exposure.

Encroachment, or limb and root pruning of up to 25 coast live oak trees on Boeing property, and 73 coast live oak trees on NASA property may occur as a result of the ISRA project. If feasible, these oak trees, along with other oaks immediately adjacent to the ISRA Areas will be protected in place with the placement of temporary construction fencing outside each tree's dripline. Trimming of any limbs or roots (where required) will be coordinated and monitored by a qualified arborist or biologist experienced in tree care and protection. Pursuant to the CDFG SAA, removal or damage of oak trees within the bed, banks or channel of CDFG-regulated streambeds shall result in the replacement at a 10:1 ratio. For project activities around oak trees on Boeing property, all measures described in the anticipated County Tree Permit will be implemented. For project activities around oak trees on NASA property, all measures described in a January 26, 2010 memorandum to Boeing from MWH and Padre will be implemented, but without specific County oversight.

8.3 WILDLIFE (INCLUDING SPECIAL-STATUS SPECIES)

General biological surveys will be conducted at each site within one week prior to construction to determine the presence or absence of wildlife. Periodic construction monitoring will be completed as necessary (likely twice weekly) by a qualified biologist throughout the duration of the project to conduct any necessary wildlife relocations and provide recommendations to ensure compliance with permit conditions. A follow-up post construction survey will be conducted at the completion of the ISRA project to identify the condition of the ISRA Areas and appropriate restoration activities.

Although no impacts to federally or state threatened or endangered reptile species are anticipated to occur, biological surveys for other special-status reptiles including, but not limited to silvery legless lizard, coast horned lizard, western whiptail, coast patch-nosed snake, San Bernardino ring-neck snake, and two-striped garter snake will be conducted within one week prior to construction activities. A qualified biologist will monitor the project and conduct any necessary reptile relocations or have the authority to temporarily shut-down work activities until all special-status reptiles are absent from the site.

Based on lack of suitable habitat and/or sightings during field surveys, no impacts to federally or state threatened or endangered bird species are anticipated to occur.

Breeding bird surveys for special-status birds including, but not limited to Cooper's hawk, white-tailed kite, southern California rufous-crowned sparrow, Bell's sage sparrow, loggerhead shrike, golden eagle, sharp-shinned hawk, yellow warbler, and other non-special-status species protected by the MBTA (and CDFG Code), will be conducted prior to construction activities if planned between March 1 and August 15. Should any MBTA-protected (including special-status and non-special-status) nesting birds be observed at or near the ISRA Areas, project activities shall be postponed until the birds have fledged the nest, and it is determined the fledglings are independent from the nest or nest tree. In addition, although not expected, any active or inactive gold eagle nests will be protected regardless of time of year, and also not expected, should coastal California gnatcatcher be observed during breeding bird surveys, consultation by NASA with USFWS would be required. Project activities would then be postponed until consultation with USFWS was completed and work is authorized to begin.

Potentially active woodrat nesting sites, which may house San Diego desert woodrat shall be marked off limits prior to initiation of work activities. A qualified biologist will monitor the nest to identify the species and note any woodrat activity, especially if work activities are planned during its breeding season from October to May. Should obvious behavioral changes occur as a result of project activities, a buffer may be required or work activities may be required to be postponed in close proximity to the nesting site until after the breeding season.

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**APPENDIX A. VASCULAR PLANT FLORA OBSERVED
WITHIN OR ADJACENT TO THE OUTFALL 009 ISRA
EVALUATION AREAS, SANTA SUSANA FIELD
LABORATORY
VENTURA COUNTY, CALIFORNIA**

Appendix A

Vascular Plant Flora Observed within or adjacent to the Outfall 009 ISRA Evaluation Areas, Santa Susana Field Laboratory, Ventura County, California

Scientific Name	Common Name	Habit	Family
<i>Adenostoma fasciculatum</i>	Chamise	S	Rosaceae
<i>Ambrosia acanthicarpa</i>	Annual bursage	AH	Asteraceae
<i>Amsinckia menziesii</i> var. <i>intermedia</i>	Fiddleneck	AH	Boraginaceae
<i>Anagallis arvensis</i>	Scarlet pimpernel	AH	Myrsinaceae
<i>Antirrhinum multiflorum</i>	Rose snapdragon	PH	Plantaginaceae
<i>Artemisia californica</i>	California sagebrush	S	Asteraceae
<i>Artemisia douglasiana</i>	Mugwort	PH	Asteraceae
<i>Asclepias fascicularis</i>	Narrow-leaf milkweed	AH	Asclepiadaceae
<i>Avena barbata</i> *	Slender wild oats	AG	Poaceae
<i>Baccharis pilularis</i>	Coyote brush	S	Asteraceae
<i>Baccharis salicifolia</i>	Mule fat, seep-willow	S	Asteraceae
<i>Brickellia californica</i>	California brickellbush	S	Asteraceae
<i>Bromus diandrus</i> *	Rippgut grass	AG	Poaceae
<i>Bromus hordeaceus</i> *	Soft chess	AG	Poaceae
<i>Bromus madritensis</i> ssp. <i>rubens</i> *	Red brome	AG	Poaceae
<i>Camissonia californica</i>	Mustard evening primrose	AH	Onagraceae
<i>Camissonia micrantha</i>	Small evening primrose	AH	Onagraceae
<i>Capsella bursa-pastoris</i>	Shepherd's purse	AH	Brassicaceae
<i>Carduus pycnocephalus</i> *	Italian thistle	AH	Asteraceae
<i>Carpobrotus edulis</i> *	Hottentot fig	PH	Aizoaceae
<i>Ceanothus cuneatus</i>	Buckbrush	S	Rhamnaceae
<i>Ceanothus oliganthus</i> var. <i>oliganthus</i>	Hairy ceanothus	S	Rhamnaceae
<i>Centaurea melitensis</i>	Tocalote	AH	Asteraceae
<i>Cercocarpus betuloides</i> var. <i>betuloides</i>	Birch-leaf mountain mahogany	S	Rosaceae
<i>Chenopodium californicum</i>	Soap plant	AH	Chenopodiaceae
<i>Cirsium occidentale</i>	Cobweb thistle	BH	Asteraceae
<i>Chamomilla suaveolens</i>	Pineapple weed	AH	Asteraceae
<i>Chorizanthe staticoides</i>	Turkish rugging	AH	Polygonaceae
<i>Cryptantha intermedia</i>	Large-flowered cryptantha	AH	Boraginaceae
<i>Cryptantha micromeres</i>	Cryptantha	AH	Boraginaceae
<i>Clarkia purpurea</i> ssp. <i>quadrivulnera</i>	Four spot	AH	Onagraceae
<i>Clarkia unguiculata</i>	Elegant clarkia	AH	Onagraceae
<i>Claytonia perfoliata</i>	Miner's lettuce	AH	Portulacaceae
<i>Collinsia heterophylla</i>	Chinese houses	AH	Scrophulariaceae
<i>Conyza canadensis</i>	Horseweed	AH	Asteraceae
<i>Crassula connata</i>	Pygmy weed	AH	Crassulaceae
<i>Cuscuta</i> sp.	Dodder	PV	Convolvulaceae
<i>Deinandra minthorni</i>	Santa Susana tarplant	S	Asteraceae
<i>Dichelostemma capitatum</i>	Blue dicks	PH	Liliaceae
<i>Dodecatheon clevelandii</i> ssp. <i>clevelandii</i>	Shooting star	PH	Primulaceae
<i>Dudleya lanceolata</i>	Lanceleaf dudleya	PH	Crassulaceae
<i>Dudleya pulverulenta</i>	Chalk dudleya	PH	Crassulaceae
<i>Emmanthe penduliflora</i>	Whispering bells	AH	Hydrophyllaceae
<i>Encelia californica</i>	California bush sunflower	S	Asteraceae
<i>Epilobium canum</i> ssp. <i>latifolium</i>	California fuschia	PH	Onagraceae
<i>Eremocarpus setigerus</i>	Turkey mullein	AH	Euphorbiaceae
<i>Eriastrum saphirinum</i>	Eriastrum	AH	Polemoniaceae
<i>Ericameria palmeri</i> var. <i>pachylepis</i>	Palmer's goldenbush	S	Asteraceae
<i>Eriodictyon crassifolium</i>	Yerba santa	S	Hydrophyllaceae
<i>Eriogonum fasciculatum</i> ssp. <i>fasciculatum</i>	California buckwheat	S	Polygonaceae
<i>Eriophyllum confertiflorum</i>	Golden yarrow	S	Asteraceae
<i>Erodium botrys</i> *	Storks-bill	AH	Geraniaceae
<i>Erodium cicutarium</i>	Redstem filaree	AH	Geraniaceae
<i>Erysimum capitatum</i> var. <i>capitatum</i>	Western wallflower	PH	Brassicaceae
<i>Eschscholzia californica</i>	California poppy	AH	Papaveraceae
<i>Eucrypta chrysanthemifolia</i>	Eucrypta	AH	Hydrophyllaceae
<i>Euthamia occidentalis</i>	Western goldenrod	PH	Asteraceae
<i>Festuca arundinacea</i> *	Tall fescue	PG	Poaceae
<i>Filago californica</i>	Filago	AH	Asteraceae
<i>Galium angustifolium</i>	Bedstraw	AH	Rubiaceae
<i>Gilia achillifolia</i>	Gilia	AH	Polemoniaceae
<i>Gnaphalium bicolor</i>	Two-tone everlasting	AH	Asteraceae
<i>Gnaphalium californicum</i>	Green everlasting	AH	Asteraceae
<i>Gnaphalium canescens</i> ssp. <i>microcephalum</i>	White everlasting	BH	Asteraceae

Appendix A

Vascular Plant Flora Observed within or adjacent to the Outfall 009 ISRA Evaluation Areas, Santa Susana Field Laboratory, Ventura County, California

Scientific Name	Common Name	Habit	Family
<i>Hazardia squarrosa</i> var. <i>grindelioides</i>	Sawtooth goldenbush	S	Asteraceae
<i>Helianthemum scoparium</i>	Peak rush-rose	PH	Cistaceae
<i>Heteromeles arbutifolia</i>	Toyon	T	Rosaceae
<i>Heterotheca grandiflora</i>	Telegraph weed	PH	Asteraceae
<i>Hirschfeldia incana</i> *	Summer mustard	BH	Brassicaceae
<i>Hordeum murinum</i> *	Barley	AG	Poaceae
<i>Juncus macrophyllus</i>	Rush	PH	Juncaceae
<i>Keckiella cordifolia</i>	Heart-leaved penstemon	S	Scrophulariaceae
<i>Lactuca serriola</i> *	Prickly lettuce	AH	Asteraceae
<i>Lamarckia aurea</i> *	Goldentop	AG	Poaceae
<i>Lasthenia californica</i>	Goldfields	AH	Asteraceae
<i>Lepidodactylon californicum</i>	Prickly phlox	S	Polemoniaceae
<i>Lessingia filaginifolia</i>	California aster	PH	Asteraceae
<i>Leymus condensatus</i>	Giant wild rye	PG	Poaceae
<i>Leymus triticoides</i>	Creeping wild rye	PG	Poaceae
<i>Lithophragma affine</i>	Woodland star	AH	Saxifragaceae
<i>Lomatium</i> sp.	Lomatium	PH	Apiaceae
<i>Lotus argophyllus</i> var. <i>argophyllus</i>	Silver lotus	PH	Fabaceae
<i>Lotus purshianus</i>	Spanish clover	AH	Fabaceae
<i>Lotus scoparius</i> var. <i>scoparius</i>	Deerweed, California broom	PH	Fabaceae
<i>Lotus strigosus</i>	Strigose lotus	AH	Fabaceae
<i>Lupinus bicolor</i>	Miniature lupine	AH	Fabaceae
<i>Lupinus hirsutissimus</i>	Stinging lupine	AH	Fabaceae
<i>Lupinus truncatus</i>	Collar lupine	AH	Fabaceae
<i>Malacothamnus fasciculatus</i> ssp. <i>fasciculatus</i>	Chaparral bush mallow	S	Malvaceae
<i>Malacothrix saxatilis</i> var. <i>tenuifolia</i>	Cliff aster	PH	Asteraceae
<i>Malosma laurina</i>	Laurel sumac	S	Anacardiaceae
<i>Marah macrocarpus</i>	Wild cucumber	PV	Cucurbitaceae
<i>Marrubium vulgare</i> *	Horehound	PH	Lamiaceae
<i>Medicago polymorpha</i> *	Bur clover	AH	Fabaceae
<i>Melica imperfecta</i>	Melic	PG	Poaceae
<i>Melilotus indicus</i> *	Yellow sweet clover	BH	Fabaceae
<i>Mimulus aurantiacus</i>	Bush monkeyflower	S	Scrophulariaceae
<i>Mirabilis californica</i>	Wishbone bush	PH	Nyctaginaceae
<i>Nassella</i> sp.	Needlegrass	PG	Poaceae
<i>Nicotiana glauca</i> *	Tree tobacco	S	Solanaceae
<i>Paeonia californica</i>	Wild peony	PH	Paeoniaceae
<i>Pectocarya linearis</i> ssp. <i>ferocula</i>	Sagebrush combseed	AH	Boraginaceae
<i>Pellaea mucronata</i> var. <i>mucronata</i>	Bird's-foot fern	PF	Pteridaceae
<i>Pennisetum setaceum</i> *	Fountain grass	PG	Poaceae
<i>Phacelia cicutaria</i> var. <i>hispidæ</i>	Caterpillar phacelia	AH	Hydrophyllaceae
<i>Phacelia grandiflora</i>	Large-flowered phacelia	AH	Hydrophyllaceae
<i>Phacelia ramossissima</i> var. <i>ramossissima</i>	Branching phacelia	PH	Hydrophyllaceae
<i>Pholistoma auritum</i> var. <i>auritum</i>	Fiesta flower	AH	Boraginaceae
<i>Piptatherum miliaceum</i> *	Smilo grass	PG	Poaceae
<i>Plagiobothrys</i> sp.	Popcorn flower	AH	Boraginaceae
<i>Polypodium californicum</i>	California polypody	PF	Polypodiaceae
<i>Prunus ilicifolia</i> ssp. <i>ilicifolia</i>	Holly-leaved cherry	S/T	Rosaceae
<i>Quercus agrifolia</i> var. <i>agrifolia</i>	Coast live oak	T	Fagaceae
<i>Ribes indecorum</i>	White chaparral currant	S	Grossulariaceae
<i>Ribes malvaceum</i>	Chaparral currant	S	Grossulariaceae
<i>Rhus integrifolia</i>	Lemonade berry	S	Anacardiaceae
<i>Rumex crispus</i> *	Curly dock	PH	Polygonaceae
<i>Ranunculus californicus</i>	Buttercup	PH	Ranunculaceae
<i>Salix lasiolepis</i>	Arroyo willow	T	Salicaceae
<i>Salvia columbariae</i>	Chia	S	Lamiaceae
<i>Salvia leucophyllæ</i>	Purple sage	S	Lamiaceae
<i>Salvia mellifera</i>	Black sage	S	Lamiaceae
<i>Sambucus mexicana</i>	Blue elderberry	T	Caprifoliaceae
<i>Sanicula crassicaulis</i>	Pacific sanicle	PH	Apiaceae
<i>Senecio vulgaris</i> *	Common groundsel	AH	Asteraceae
<i>Sidalcea malvaeflora</i> ssp. <i>sparsifolia</i>	Few-leaved checkerbloom	PH	Malvaceae
<i>Silene gallica</i> *	Windmill pink	AH	Caryophyllaceae
<i>Silybum marianum</i> *	Milk thistle	AH	Asteraceae

Appendix A

Vascular Plant Flora Observed within or adjacent to the Outfall 009 ISRA Evaluation Areas, Santa Susana Field Laboratory, Ventura County, California

Scientific Name	Common Name	Habit	Family
<i>Sisymbrium altissimum</i>	Tumble mustard	AH	Brassicaceae
<i>Solanum xanti</i>	Purple nightshade	PH	Solanaceae
<i>Sonchus oleraceus</i> *	Common sow thistle	AH	Asteraceae
<i>Stephanomeria virgata</i> ssp. <i>virgata</i>	Twiggy wreath plant	AH	Asteraceae
<i>Stylocline gnaphaloides</i>	Everlasting nest straw	AH	Asteraceae
<i>Thysanocarpus curvipes</i>	Lace pod	AH	Brassicaceae
<i>Toxicodendron diversilobum</i>	Poison oak	S	Anacardiaceae
<i>Trichostema lanatum</i>	Woolly blue curls	S	Lamiaceae
<i>Trifolium ciliolatum</i>	Hairy clover	AH	Fabaceae
<i>Trifolium willdenovii</i>	Tomcat clover	AH	Fabaceae
<i>Uropappus lindleyi</i>	Silver puffs	AH	Asteraceae
<i>Venegasia carpesioides</i>	Canyon sunflower	PH	Asteraceae
<i>Vicia benghalensis</i> *	Mediterranean vetch	AV	Fabaceae
<i>Vicia sativa</i> *	Common vetch	AV	Fabaceae
<i>Viola pedunculata</i>	Johnny-jump-up	AH	Violaceae
<i>Vulpia microstachys</i>	Vulpia	AG	Poaceae
<i>Yucca whipplei</i>	Our lord's candle	S	Agavaceae

Notes:

Scientific nomenclature follows Hickman (1993).

An "*" indicates non-native species which have become naturalized or persist without cultivation.

Habit Definitions:

- AF = annual fern or fern ally.
- AG = annual grass.
- AH = annual herb.
- BH = biennial herb.
- PF = perennial fern or fern ally.
- PG = perennial grass.
- PH = perennial herb.
- PV = perennial vine.
- S = shrub.
- T = tree.

**APPENDIX B. OAK TREE ASSESSMENT FOR BOEING
OUTFALL 009 WATERSHED ISRA AREAS,
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA**



 ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

May 20, 2010
Project No. 0902-1042

Terry Newman
Ventura County Planning Division
800 S. Victoria Avenue
Ventura, CA 93009

Subject:

Oak Tree Assessment for the Interim Source Removal Action Areas within the Outfall 009 Watershed, Boeing Santa Susana Field Laboratory, Ventura County, California

Purpose:

Submittal to the County of Ventura Planning Division Required Permits for Removals and Encroachments

Site Information:

Assessor Parcel Nos. 685-0-051-100 & 685-0-051-120
Permit No. CUP248
Property Owner: Boeing North America
100 North Riverside, Chicago, IL

Understanding of the Project

The proposed project is located within the watershed for Outfall 009 at the Santa Susana Field Laboratory (SSFL), which is located in southeastern Ventura County, near the crest of the Simi Hills at the western border of the San Fernando Valley (see Figure 1). The proposed project involves the evaluation and remediation of impacted soils (Interim Source Removal Action, or ISRA) as directed by the Cleanup and Abatement Order (Order) adopted by the Los Angeles Regional Water Quality Control Board (LARWQCB) on December 3, 2008 (RWQCB, 2008). The Order requires Boeing to evaluate, select, and implement cleanup activities at areas within Outfall 009. Work activities for the project are also authorized under California Department of Fish and Game (CDFG) Streambed Alteration Agreement No. 1600-2003-5052-R5 (and its extensions and amendments).

This Oak Tree Assessment has been prepared to address the specific tree impacts as directly related to the ISRA project, and as part of the required documentation for oak tree permit submittal to the County of Ventura Planning Department. County Zoning Ordinance no. 8107-25 (Tree Protection Regulations) considers oak trees (including coast live oak) at least 9.5 inches (single trunk) or 6.25 inches (multi-trunk) in circumference (3 or 2 inches in diameter, respectively) as County protected trees. In addition, trees with a circumference of 90 inches (29

inches in diameter) or greater are considered to be “heritage” trees. Oak tree protection regulations extends not only to the removal of oak trees, but invasion (encroachment) of the tree’s protected zone by activities including trenching, digging, or placement of heavy equipment, vehicles, or materials within the protected zone. The protected zone is defined as the surface and subsurface area within the dripline and extending a minimum of five (5) feet outside the dripline, or 15 feet from the trunk of the tree, whichever is greater. The County Tree Protection Ordinance also protects western sycamore (*Platanus racemosa*), which are absent from the ISRA Areas. Therefore, no impacts to western sycamore will occur.

Encroachment, and limb and root pruning of up to 25 coast live oak trees on Boeing property may occur as a result of the ISRA project. Complete removal of any of these trees is not anticipated at this time. For project activities around oak trees on Boeing property, all measures described in the County’s Tree Protection and Preservation Guidelines provided below will be implemented.

Discussion

Field biological evaluations of 25 trees were conducted by Chris Dunn, Padre Associates, Inc. Biologist on March 24, 25, and 26, and April 15 and 16, 2010, and included photographic documentation of each tree and their location. Table 1 below provides data on each tree including diameter, height, width, an evaluation rating (vigor-health-aesthetics rated as 1 being the highest and 5 being the lowest rating), specific observations on condition, and anticipated impacts associated with the ISRA project. Photographs of each tree are provided in a separate appendix below.

Table 1. Coast Live Oak Tree Data at the Boeing ISRA Areas

Tree Number	Diameter (inches)	Height (feet)	Width (feet)	Evaluation Rating* (Vigor-Health-Aesthetics)	Condition	Anticipated Impact
ISRA Area B1-1						
B1-1-CLO1	3.5, 3.5	18	8	2-2-4	Vigorous new growth	Temporary encroachment, potential root zone impacts
B1-1-CLO2	6, 7	22	15	4-4-4	Deadwood, thinning crown, dieback, broken branches	Temporary encroachment, potential root zone impacts

Table 1. Continued

Tree Number	Diameter (inches)	Height (feet)	Width (feet)	Evaluation Rating* (Vigor-Health-Aesthetics)	Condition	Anticipated Impact
ISRA Area B1-2						
B1-2-CLO1	8, 16	25	35	2-2-2	Vigorous new growth, low branching	Possible avoidance, temporary encroachment, potential root zone impacts
B1-2-CLO2	6	15	16	2-3-2	Vigorous new growth, dieback	Temporary encroachment, pruning, potential root zone impacts
B1-2-CLO3	5, 6	18	20	2-2-2	Deadwood	Temporary encroachment, pruning, potential root zone impacts
B1-2-CLO4	3	10	4	2-4-3	Lopsided canopy, ants	Temporary encroachment, pruning, potential root zone impacts
B1-2-CLO5	7, 6	20	18	3-3-3	Dieback, low branching deadwood	Temporary encroachment, pruning, potential root zone impacts
B1-2-CLO6	5	18	6	3-3-4	Low branching	Temporary encroachment, pruning, potential root zone impacts
B1-2-CLO7	6	18	12	3-3-3	Low branching	Temporary encroachment, pruning, potential root zone impacts
B1-2-CLO8	4	16	4	4-4-4	Shaded	Temporary encroachment, pruning, potential root zone impacts
B1-2-CLO9	12	25	20	4-4-3	Wound, low branching, lopsided canopy	Temporary encroachment, pruning, potential root zone impacts
B1-2-CLO10	21	30	35	2-2-2	Lopsided canopy, low branching, deadwood	Temporary encroachment, pruning, potential root zone impacts
B1-2-CLO11	10, 14	32	35	2-2-2	Low branching, deadwood	Temporary encroachment, pruning, potential root zone impacts
B1-2-CLO12	15, 15	28	38	2-2-2	Woodpecker drilling, galls, dieback	Temporary encroachment, pruning, potential root zone impacts

Table 1. Continued

Tree Number	Diameter (inches)	Height (feet)	Width (feet)	Evaluation Rating* (Vigor-Health-Aesthetics)	Condition	Anticipated Impact
B1-2-CLO13	10, 12, 14	28	35	2-2-2	Dieback, steep slope	Temporary encroachment, pruning, potential root zone impacts
B1-2-CLO14	2.5	12	3	3-3-4	Fungus, low branching, deadwood	Temporary encroachment, pruning, potential root zone impacts
B1-2-CLO15	2.5	12	3	3-3-4	Fungus, low branching, deadwood	Temporary encroachment, pruning, potential root zone impacts
B1-2-CLO16	4	12	4	3-3-4	Fungus, low branching, deadwood	Temporary encroachment, pruning, potential root zone impacts
B1-2-CLO17	6	18	15	2-2-3	Low branching, steep slope	Temporary encroachment, pruning, potential root zone impacts
B1-2-CLO18	6	21	12	2-2-3	Low branching, dieback, steep slope	Temporary encroachment, pruning, potential root zone impacts
B1-2-CLO19	8	25	15	3-3-4	Lopsided canopy, poison oak vine	Temporary encroachment, potential root zone impacts
B1-2-CLO20	5	20	8	3-3-4	Lopsided canopy	Temporary encroachment, potential root zone impacts
B1-2-CLO21	6	20	8	3-3-4	Lopsided canopy	Temporary encroachment, potential root zone impacts
B1-2-CLO22	4	12	10	2-2-3	Low branching	Temporary encroachment, potential root zone impacts
ISRA Area A1LF-1						
A1LF-1-CLO1	7	25	15	3-4-4	Deadwood, low branching, fire damage	Temporary encroachment, potential root zone impacts

Evaluation Rating: Vigor-Health-Aesthetic Value, each on a numerical scale of 1 to 5 (1 or 2: excellent or good, 3: average, 4: poor, 5: very poor or dead)

m: multi-trunk, as indicated by > 1 diameter measurement

** : Heritage tree (diameter is > 29 inches)

As noted in Table 1 above, branch dieback, deadwood, lopsided canopies, historical fire damage, low branching, and herbaceous or animal pests are common conditions of the trees inspected at the ISRA Areas. However, substantial new vegetative growth and flowering was observed on many of these trees, indicating that many of these trees have recovered from fire

damage in 2005, and are relatively healthy. No heritage trees were noted within the Boeing ISRA Areas. Based on the project plans to protect all trees in place (resulting in no tree removals, and requiring no tree replacements), appraised tree values are not provided at this time, but can be provided upon request.

Enclosed is a copy of the Preservation and Protection Guidelines applicable to this project that shall be included in all documents relative to the direct on site project work. Also, a copy is required to be available on site prior to commencement of any work and shall be maintained on site until the project is approved as completed.

All work within the protected zone of any preserved oak trees shall be monitored by the project Biologist and/or Certified Arborist. All monitoring shall require a 48-hour minimum advanced notice to the project Biologist and/or the Certified Arborist. This may be provided by telephone or email. Work may not proceed until the appropriate staff is present to monitor the work. Field notes will be taken daily, and a post-construction report will be completed and filed with all the responsible parties directly involved requiring notifications and documentations.

The oak tree report above, along with all field data and photographs have been reviewed and approved by the following ISA Certified Arborist:



Donald F. Rodrigues
Horticulture Consultant
ISA Certified Arborist 272

Should you have any questions regarding this Report, please contact me at your earliest convenience at (805) 644-2220, extension 12.

Sincerely,

Padre Associates, Inc.



Chris Dunn
Project Biologist

TREE PROTECTION AND PRESERVATION GUIDELINES

TREE PROTECTION AND PRESERVATION GUIDELINES

1. All persons working on the project shall exercise extreme awareness and care to protect existing trees to be preserved. Tree protection conditions shall be posted in a conspicuous location on-site.
2. All tree reports, tree location and numbering maps, approved permitted conditions, and the City, County or other jurisdictional agencies or organizations Tree Protection and Preservation Guidelines and/or Ordinances shall be maintained on-site during all phases of grading and construction.
3. The Project Superintendent shall be responsible for instructing all site workers of the tree preservation requirements and shall be responsible for enforcement of the tree protection guidelines and/or ordinances.
4. Protective fencing shall be placed prior to grading and construction per the tree evaluation report and plans. Fencing shall meet the requirements of the municipality protection ordinance. Generally, chain link fencing is required a minimum of 5' outside of the drip line. Weather proof informative signs are required every 50' on the fencing. The required sign wording is generally described in the guidelines or ordinance. The fence shall be placed prior to grading and shall remain in place until the completion of construction. The fence may not be moved, altered or removed without the written consent of the responsible permitting agency and/or the project ISA Certified Arborist.
5. A pre-construction meeting shall be held with the contractor, construction supervisor, project arborist, landscape architect and responsible permit approval jurisdictional representative prior to construction to review the tree protection specifications and the preservation protocol.
6. No excavation, grading or construction shall be allowed inside the protected zone of any tree without an approved encroachment permit from the City, County or other jurisdictional agencies or organizations. All approved work shall be conducted with hand equipment only. All roots over 2" in diameter shall be saved and immediately covered with a minimum of 6" clean washed sand. Those roots to be severed shall be clean cut with pruning tools to the edge of the excavation and immediately covered with soil then provided irrigation. Roots to be in

- direct contact with concrete shall be wrapped in styrofoam prior to pouring the concrete. All work under any preserved tree shall be under the direct on-site observation of the project ISA Certified Arborist. All work conducted shall be certified to the Jurisdictional permitting party by the ISA Certified project Arborist as having been completed per the approved project conditions and permits.
7. The project ISA Certified Arborist and Jurisdictional permitting party shall be notified 48 hours in advance of any proposed work within the protected zone of any tree. Work may not proceed until the appropriate staff is present to monitor the work.
 8. The project ISA Certified Arborist shall be responsible for monitoring all preserved trees for compliance with the mitigations and protection requirements. A filed report shall be prepared for each site visit and submitted to the project owner and the responsible Jurisdictional party within 48 hours of the completed site observations.
 9. All pruning shall be accomplished by a qualified arborist and work shall conform to the requirements of the Jurisdictional permitting party. Pruning specifications shall equal or exceed those recommended by the International Society of Arboriculture. Deadwood may be removed as needed. Live wood pruning over 2” in diameter requires an arborist report and approved permit from the Jurisdictional party. All pruning of live wood shall be under the direct on-site observation and direction of the project ISA Certified Arborist.
 10. No materials shall be nailed or staked to any preserved tree. No materials or equipment shall be stored within the protected zone of any site preserved tree. No oil, gasoline, chemicals, paints or other deleterious materials may be used, dumped or stored under the protected zone of any preserved tree. No substance shall be deposited into the soil, including waste water that can drain or leach into any preserved tree root zone.
 11. All grading within the location of any preserved tree shall be constructed in a manner to prevent water from runoff or draining that can accumulate under the protected zone of any preserved tree.
 12. Trees requiring specific disease, insect or rodent control shall have the work completed upon a written recommendation by a California Pest Control Advisor and the work shall be completed by a licensed California Pest Control Operator registered in the county for which the work is to be performed.

13. Landscape planting, irrigation systems and/or utilities shall not be designed and/or installed within the protected zone of any tree unless approved by the jurisdictional party.
14. During all phases of construction, the health of the tree(s) shall be monitored and maintained as required to ensure continued survival.
15. Any changes in the project will require review by the project ISA Certified Arborist to ensure that the conditions of these guidelines continue to be valid.
16. Prior to issuance of a grading permit, the applicant's ISA Certified Arborist, Architect and Landscape Architect shall review the grading plans and acknowledge in writing to the jurisdictional parties that the proper mitigations and measures have been designed into the plans. The standard protection measures shall be listed on the grading plans.
17. The contractor and/or project owner shall be liable for tree damages due to his/her operations or neglect of these provisions as determined by the project ISA Certified Arborist and the Jurisdictional party.
18. If accidental damage occurs to any protected tree, the project superintendent shall immediately notify the project ISA Certified Arborist and shall perform all remedial work as determined and directed by the ISA Certified Arborist.
19. Where feasible, the protected zone of all trees shall be provided a 3" layer of wood chip mulch. The mulch shall be placed 36" from the tree trunk and spread throughout the protected zone in a uniform stratum.

Note: These Tree protection and preservation guidelines may be modified by Individual development planer's and jurisdictional agency parties as required to meeting their specific requirements or site conditions.

End

Pacific Horticulture Consultants
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Ventura, California 93001
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SITE LOCATION MAP

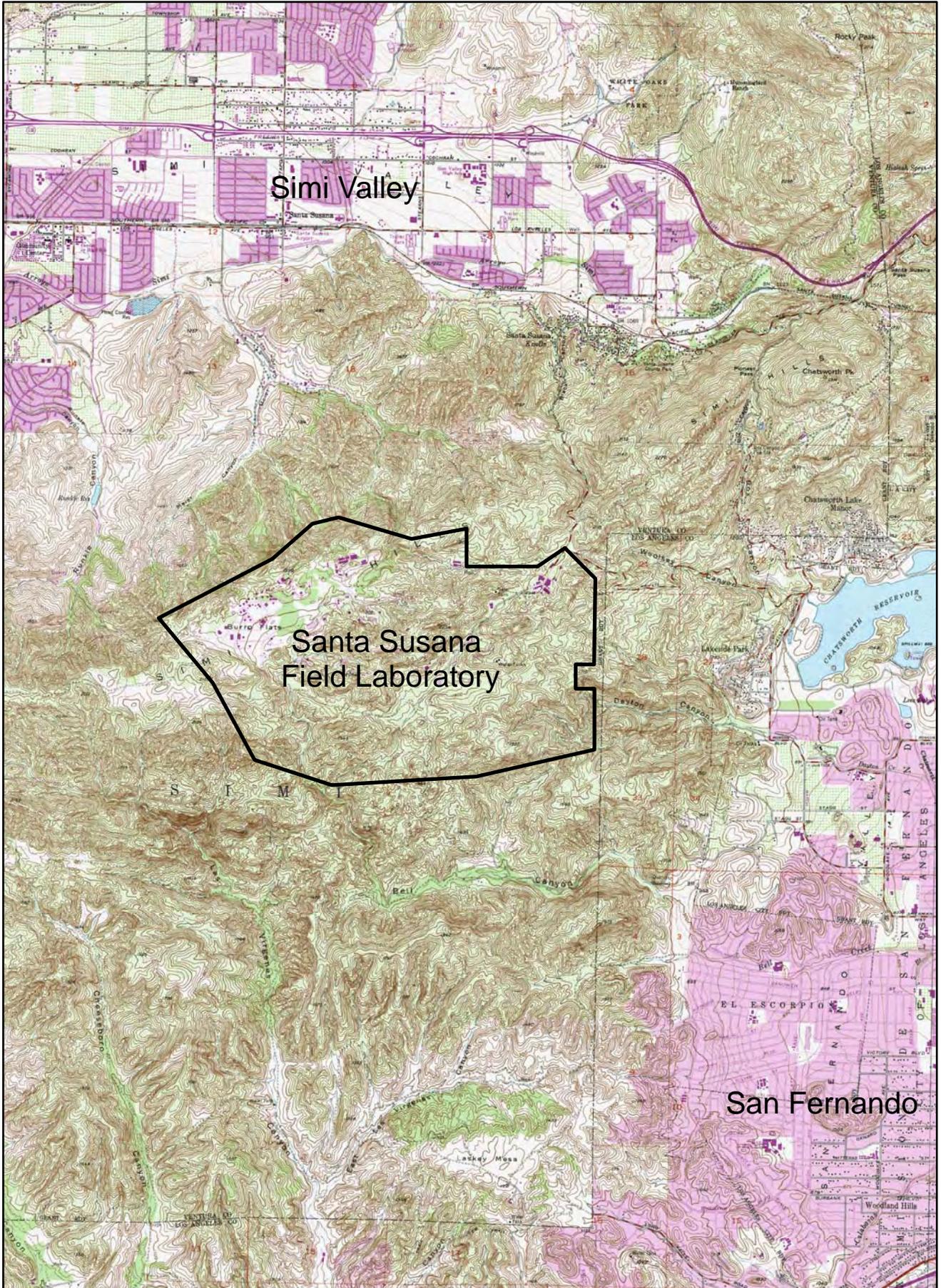


Figure 1
Project Site Location
Santa Susana Field Laboratory

OAK TREE PHOTOGRAPHS



Tree B1-1-CLO1



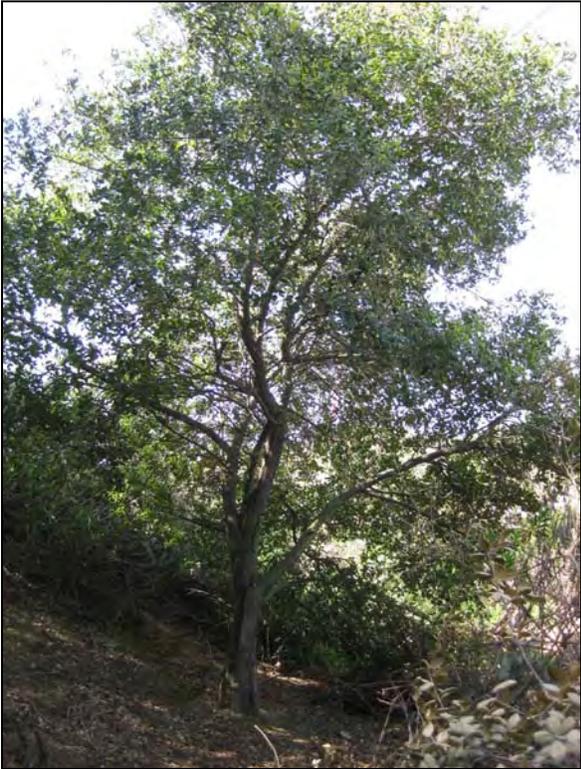
Tree B1-1-CLO2



Tree B1-2-CLO1



Tree B1-2-CLO2



Tree B1-2-CLO3



Trees B1-2-CLO4, 5, 6, 7, and 8



Tree B1-2-CLO9



Tree B1-2-CLO10



Tree B1-2-CLO11



Tree B1-2-CLO12



Tree B1-2-CLO13



Trees B1-2-CLO14, 15, 16, 17, and 18



Tree B1-2-CLO19, 20, and 21



Tree B1-2-CLO22



Tree A1LF-1-CLO1