INFORMATION HANDOUT

For Contract No. 08-0M2804
At 08-Sbd-15-171.8/ 173.8

Identified by
Project ID 0800000472

WATER QUALITY

California Regional Water Quality Control Board:

Lahontan Regional Water Quality Control Board Notice of Applicability for General Waste Discharge Requirements for Small Construction, Including Utility, Public Works, and Minor Streambed/Lakebed Alteration Projects (General Board Order No. R6T-2003-004 and Waste Discharge Identification No. 6B361409019)

AGREEMENTS

California Department of Fish and Wildlife:
Notification Without an Agreement, Attachments Included, Notification No. 1600-2014-0135-R6

MATERIALS INFORMATION

Asbestos Containing Materials and Lead-Based Paint Survey Report

Aerially Deposited Lead Investigation Report

Preliminary Site Investigation Report (PSI) Wheaton Wash and Cenda Ditch - Chemical and Radiological Impacts PN: 08-00000-4721

Foundation Report for Cenda Ditch Bridge (Replace), Calif. Dept. of Transportation, April 9, 2014

Final Hydraulic Report, Cenda Ditch Bridge, Calif. Dept. of Transportation, April 1, 2014

Foundation Report for Wheaton Wash Bridge (Widen), Calif. Dept. of Transportation, April 28, 2014

Final Hydraulic Report, Wheaton Wash Bridge, Calif. Dept. of Transportation, April 15, 2014

M E M O R A N D U M

WDID No. 6B361409019
Dredge and Fill

TO: Ricardo Caraig
California Department of Transportation District 12
3347 Michelson Drive, Suite 100
Irvine, CA 92612
Email: Ricardo.caraig@dot.ca.gov

(for)

FROM: PATTY Z. KOUYOUMDJIAN
EXECUTIVE OFFICER

DATE: December 29, 2014

SUBJECT: **NOTICE OF APPLICABILITY FOR GENERAL WASTE DISCHARGE REQUIREMENTS FOR SMALL CONSTRUCTION, INCLUDING UTILITY, PUBLIC WORKS, AND MINOR STREAMBED/LAKEBED ALTERATION PROJECTS, BOARD ORDER NO. R6T-2003-0004, I-15 CENDA DITCH AND WHEATON WASH WIDENING AND REPLACEMENT PROJECT, SAN BERNARDINO COUNTY**

California Regional Water Quality Control Board, Lahontan Region (Water Board) staff received an application for Waste Discharge Requirements (WDRs) for dredge and fill in waters of the state (WOS) for the I-15 Cenda Ditch and Wheaton Wash Widening and Replacement Project (Project) on September 22, 2014. Supplemental information in support of the application was last received by Water Board staff on November 6, 2014. The U.S. Army Corps of Engineers (USACOE) has determined that the Project is not subject to Clean Water Act (CWA) section 404 requirements. While the proposed Project is not subject to CWA section 401 water quality certification, it does require coverage under the General Waste Discharge Requirements for Small Construction, Including Utility, Public Works, and Minor Streambed/Lakebed Alteration Projects, Board Order (General Board Order) No. R6T-2003-0004.

The California Department of Transportation, District 12 (Applicant) is hereby assigned General Board Order No. R6T-2003-0004-225 and Waste Discharge Identification (WDID) No. 6B361409019 for this Project. By this Notice of Applicability (NOA), the fill- and excavation-related discharges to WOS associated with the Project are authorized and subject to compliance with the General Board Order. A copy of the General Board Order is enclosed (Enclosure 1). Please use the above-referenced WDID number in future correspondence regarding this Project.

Any person aggrieved by this action of the Water Board may petition the State Water Resources Control Board (State Water Board) to review the action in accordance with Water Code section 13320 and California Code of Regulations (CCR), title 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.

PROJECT DESCRIPTION

This NOA is based upon the information you provided. Project details are summarized in the following table.

Table of Project Information:

WDID Number	6B361409019
Applicant	California Department of Transportation District 12 3347 Michelson Drive, Suite 100 Irvine, CA 92612
Agent	Chris Waterston, Caltrans District 12
Project Name	I-15 Cenda Ditch and Wheaton Wash Widening and Replacement Project
Project Purpose and Description	The Project is to replace and rehabilitate existing bridges at Cenda Ditch and Wheaton Wash on the southbound Interstate 15 near Mountain Pass in San Bernardino County. The majority of Project impacts will occur within the existing footprint of the structures (see Enclosures 2 and 3).
Project Type	Transportation, Roads and Highways
Project Address or other Locating Information	Southbound Interstate 15, approximately 14 miles south of the Nevada State Line, between Bailey Road and Nipton Road, Mountain Pass, San Bernardino County
Latitude/Longitude	Latitude: 35.4686 Longitude: -115.5174 (Cenda Ditch Bridge) Latitude: 35.4676 Longitude: -115.4873 (Wheaton Wash Bridge)
Hydrologic Unit(s)	Ivanpah Hydrologic Unit 612.00
Project Area	3.8 acres
Receiving Water(s) Name	Wheaton Wash and Cenda Ditch, tributaries to Ivanpah Dry Lake
Water Body Type(s)	Minor surface waters
Designated Beneficial Uses	MUN, AGR, GWR, REC-1, REC-2, COMM, WARM, COLD, WILD
Potential Water Quality Impacts to WOS	Hydrogeomorphic changes in the flow regime on the Project site may result in downstream erosion, sedimentation, and/or siltation.

Table of Project Information:

Project Impacts (Fill) to WOS	**Waterbody Type**	**Permanent**			**Temporary**		
		Acres	Linear Feet	Cubic Yards	Acres	Linear Feet	Cubic Yards
	Cenda Ditch	0.44	247	10,500	0.59	260	0
	Wheaton Wash	0.06	97	1,750	0.38	234	0
	Total	**0.50**	**344**	**12,250**	**0.97**	**494**	**0**
Federal Permit(s)	None required. USACOE has determined that the Project site does not contain waters of the United States (WOUS) (June 14, 2012).						
Non-Compensatory Mitigation	The Applicant will follow Best Management Practices (BMPs) including construction storm water controls designed to minimize the short-term degradation of water quality in accordance with the BMP plan provided as part of the Project description.						
Compensatory Mitigation	All temporary impact areas will be restored (regraded and recontoured) to match pre-Project conditions. All excess soils will be removed from the Project site.						
Application Fee	$11,313 (838 linear feet of discharge x $13.50 per linear foot)						
Fees Received	$11,313						
Annual Active Discharge Fee[1]	$600 (an annual active discharge fee will be assessed each fiscal year or portion of a fiscal year during which discharges occur until the Water Board issues a Notice of Completion of Discharges Letter to the Applicant)						

[1] The actual Annual Active Discharge Fee will be calculated using the fee schedule in effect at the time the annual fee is assessed per California Code of Regulations, Title 23, section 2200(a)(3).

CEQA COMPLIANCE

The California Department of Transportation prepared an Initial Study and Mitigated Negative Declaration (IS/MND) for the Project. The IS/MND was prepared pursuant to the California Environmental Quality Act (CEQA Public Resources Code 21000, et seq.) and circulated under State Clearinghouse No. 2012031040. The IS/MND was certified on June 29, 2012, following public review.

The Water Board, acting as a CEQA Responsible Agency in compliance with CCR, title 14, section 15096, has considered the IS/MND for the Project and the potential water quality impacts. As a result of the analysis, the Water Board finds potential water quality impacts are less than significant.

GENERAL INFORMATION

1. The Project must be constructed and operated in accordance with the Project description in the information provided to the Water Board. Deviation from the Project's description constitutes a violation of the conditions upon which this NOA was granted.

2. Neither Project construction activities nor operation of the Project may cause a violation of the *Water Quality Control Plan for the Lahontan Region* (Basin Plan), may cause a condition or threatened condition of pollution or nuisance, or cause any other violation of the Water Code.

3. Any discharge to surface waters within the Project area must be in accordance with the requirements contained in the General Board Order. Failure to abide by the conditions of the General Board Order and this NOA may result in enforcement action as authorized by the provisions of the Water Code.

REVOCATION PROCEDURES

As stated in the General Board Order, coverage shall continue until revoked in writing by the Water Board. The Applicant is responsible for notifying the Water Board in writing that the Project is complete, certifying that the required conditions are met, and requesting revocation of coverage. Coverage for the specific Project will be revoked provided the following conditions are met.

1. The Project is complete, soil stabilization measures and permanent BMPs are in place and functioning, and onsite mitigation and monitoring requirements are completed.

2. Information required in section B of the Monitoring and Reporting Program for the General Board Order has been submitted.

3. Water Board staff have verified that the conditions of the General Board Order have been met, which may also include a field inspection by Water Board staff.

Thank you for your efforts to protect water quality. If you have any questions regarding this letter, please contact Jan Zimmerman, Engineering Geologist, at (760) 241-7376 jan.zimmerman@waterboards.ca.gov, or Patrice Copeland, Senior Engineering Geologist, at (760) 241-7404 patrice.copeland@waterboards.ca.gov.

Enc: (1) General Board Order and Monitoring and Reporting Program No. R6T-2003-0004
(2) Cenda Ditch Bridge Bed Impacts
(3) Wheaton Wash Bridge Bed Impacts

ecc: Chris Waterston, Caltrans District 12 (chris.waterston@dot.ca.gov)
Ali Aghili, CA Department of Fish and Wildlife (ali.aghili@wildlife.ca.gov)
SWRCB, Division of Water Quality (stateboard401@waterboards.ca.gov)

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Enclosure 1

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

BOARD ORDER NO. R6T-2003-0004

GENERAL WASTE DISCHARGE REQUIREMENTS
FOR

SMALL CONSTRUCTION PROJECTS, INCLUDING UTILITY, PUBLIC WORKS, AND MINOR STREAMBED/LAKEBED ALTERATION PROJECTS IN THE LAHONTAN REGION EXCLUDING THE LAKE TAHOE HYDROLOGIC UNIT

The California Regional Water Quality Control Board, Lahontan Region (Regional Board) finds:

1. In accordance with Section 13260 of the California Water Code, the discharge of storm water runoff and products of erosion from small construction projects, including utility, public works, within certain sensitive watersheds in the Lahontan Region, and discharges associated with minor streambed/lakebed alteration projects in the Lahontan Region is considered to be a discharge of waste that could affect the quality of waters of the State.

2. The Regional Board may prescribe requirements for any proposed discharge, in accordance with Section 13263 of the California Water Code.

3. Implementation of temporary best management practices (BMPs) is an effective and economical means of preventing or minimizing the discharge of the products of erosion, sediment-laden storm water, and minor waste material spills from small construction projects.

4. Implementation of permanent best management practices (BMPs) after construction is an effective means of treating storm water runoff from impervious surfaces and of preventing erosion following construction of small sites.

5. This General Permit regulates: 1) discharges associated with minor streambed/lakebed alteration projects in the Lahontan Region; and 2) storm water discharges from small construction activity that enter surface waters either directly or indirectly through drainage conveyances or municipal separate storm sewer facilities within the following Hydrologic Units/Areas in the Lahontan Region (see Attachments "A", "B", and "C"):

    a. Little Truckee River Hydrologic Unit (HU No. 636.00)
    b. Truckee River Hydrologic Area (HU No. 635.20)
    c. West Fork Carson River Hydrologic Unit (HU No. 633.00)
    d. East Fork Carson River Hydrologic Unit (HU No. 632.00)
    e. Mono Hydrologic Unit (HU No. 601.00)
    f. Long Hydrologic Area (HU No. 603.10)

6. Small construction projects located within the jurisdiction of local agencies that have entered into a Memorandum of Understanding (MOU) with the Regional Board to implement a storm water construction pollution control program in accordance with the *Water Quality Control Plan for the Lahontan Region* (Basin Plan) are not subject to this General Permit. The Town of Mammoth Lakes has entered into such an MOU with the Regional Board and upon adoption of this Permit the Regional Board waives requirements for submitting Reports of Waste Discharge for small construction activity, as defined in Finding 9, within the Mammoth Lakes jurisdiction. Subsequent to the adoption of this Order, other jurisdictions may enter into MOUs with the Regional Board and qualify for a similar waiver.

7. Discharges of storm water runoff and products of erosion from certain construction projects in the Lake Tahoe Hydrologic Unit are regulated under separate General Waste Discharge Requirements and are not covered under this permit.

8. This General Permit does not preempt or supersede the authority of local storm water management agencies to prohibit, restrict, or control storm water discharges to separate storm sewer systems or other watercourses within their jurisdiction, as allowed by State and Federal law.

9. For purposes of this Order, a "small construction project" includes construction activity that results in land disturbance of 10,000 square feet or more and is not covered under the State Water Resources Control Board (SWRCB) Water Quality Order 99-08-DWQ (Statewide Construction General Permit). Land disturbance is clearing, grading, or disturbances to the ground, including excavation and stockpiling, within the footprint of the structure to be constructed, and any staging and access areas that disturb native soil conditions. Only the actual area of land disturbance is considered when determining whether a project must be covered under this Permit. For example, if a 1-acre parcel (43,560 square feet) is to be developed, but only 9,000 square feet of soil will be disturbed within the project site, coverage under this Permit is not required. Small construction projects also include utility projects proposed by a public or private utility and public works projects proposed by a public entity that involve 10,000 square feet or more of land disturbance.

   The Statewide Construction General Permit currently covers projects involving one acre or more of land disturbance. Small construction activity that results in land disturbances of less than 10,000 square feet is subject to this General Permit if the construction activity is part of a larger common plan of development that, as a whole, encompasses 10,000 square feet, but less than 1 acre of soil disturbance. For example, a single development that is completed in two separate phases, with each phase disturbing 8,000 square feet, would require coverage under this Permit because the total land disturbance associated with the project as a whole is 16,000 square feet. For purposes of this Order, Construction activity does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of the facility, nor does it include emergency construction activities required to protect public health and safety.

10. For purposes of this order, a "minor streambed/lakebed alteration project" is one that includes soil disturbing work, including maintenance dredging, within the high water mark of any water body in the Lahontan Region or the 100-year floodplain in the Truckee and Little Truckee River Hydrologic Units, and is not regulated by the Army Corps of Engineers under Clean Water Act (CWA) Section 404.

11. This General Permit does not authorize discharges of fill or dredged material regulated by the U.S. Army Corps of Engineers under CWA Section 404 and does not constitute a state water quality certification under CWA Section 401.

12. To obtain authorization for proposed storm water discharges associated with land disturbing activities to ground and/or surface waters pursuant to this General Permit, the Discharger must submit a Notice of Intent (NOI – Attachment "D") to comply with the General Permit and a filing fee to the Regional Board prior to commencement of construction activities. The NOI must include a description of specific temporary and permanent Best Management Practices (BMPs) to be implemented to prevent or minimize the discharge of waste from the project site during and after construction (see Attachment "E"). For proposed construction activity on easements or on nearby property by agreement or permission, the entity responsible for the construction activity must submit the NOI and filing fee and shall be responsible for development and implementation of the BMPs. Coverage under the General Permit shall begin upon written notification from the Regional Board or 30 days following Regional Board receipt of an NOI if the applicant receives no response from the Regional Board.

13. If an individual National Pollutant Discharge Elimination System (NPDES) Permit is issued to a discharger for activities otherwise subject to this General Permit, or if an alternative general or individual permit is subsequently adopted which covers storm water discharges regulated by this General Permit, the applicability of this General Permit to such discharges is automatically terminated on the effective date of the individual permit or the date of approval for coverage under the subsequent General Permit.

14. Potential pollutant discharges from projects covered under this General Permit consist of products of erosion, construction waste materials, dewatering waste, turbid water and waste earthen materials from work within surface waters, and small amounts of petroleum products from construction equipment.

15. The Regional Board adopted and the State Water Resources Control Board (SWRCB) approved the *Water Quality Control Plan for the Lahontan Region* (Basin Plan). This General Permit implements the Basin Plan. Dischargers regulated by this General Permit must comply with the water quality standards, guidelines, and prohibitions in the Basin Plan, and subsequent amendments thereto.

16. Runoff from the project sites will potentially enter either ground or surface waters of the Hydrologic Units/Areas listed in Finding 5.

17. The beneficial uses of ground and surface waters within the Hydrologic Units/Areas listed in Finding 5 are provided in Chapter 2 of the Basin Plan. There are a variety of designated beneficial uses for individual water bodies that are too numerous to list in this General Permit. The pertinent information is available from the Basin Plan at the Regional Board offices and may be found at the following website - http://www.swrcb.ca.gov/rwqcb6/files.htm

18. A Negative Declaration for the adoption of this General Permit was certified by the Regional Board on January 8, 2003 (Resolution No. R6T-2003-0004) in accordance with the California Environmental Quality Act (Public Resources Code Section 21000 et seq.).

19. The projects regulated by this General Permit are typically nonrecurring and short-term construction projects that will normally be completed within two construction seasons. The applicability of these requirements to the specific project may be revoked pursuant to Administrative Provisions – Section IV.D.

20. The Regional Board has notified the interested agencies and persons of its intent to adopt general waste discharge requirements for small construction projects and has provided them with an opportunity to submit their written views and recommendations.

21. The Regional Board in a public meeting heard and considered all comments pertaining to the requirements.

IT IS HEREBY ORDERED that all dischargers submitting an NOI, applicable fee, and BMP plan in accordance with this permit shall comply with the following:

I. DISCHARGE PROHIBITIONS

A. The discharge of waste[1], including but not limited to, waste earthen materials (such as soil, silt, sand, clay, rock, or other organic or mineral material) that causes violation of any narrative water quality objective contained in the Basin Plan, including the Nondegradation Objective, is prohibited.

B. The discharge of waste that causes violation of any numeric water quality objective contained in the Basin Plan is prohibited.

C. Where any numeric or narrative water quality objective contained in the Basin Plan is already being violated, the discharge of waste that causes further degradation or pollution is prohibited.

D. The discharge, attributable to human activities, of solid or liquid waste materials, including but not limited to soil, silt, clay, sand, or other organic or earthen material, to surface waters of the Truckee River and Little Truckee River Hydrologic Units, is prohibited.

E. The discharge or threatened discharge, attributable to human activities, of solid or liquid waste materials, including but not limited to soil, silt, clay, sand, or other organic or earthen material, to lands within the 100-year floodplain of the Little Truckee River and Truckee River, or any tributary to the Little Truckee and Truckee Rivers, is prohibited. A summary of the waste discharge prohibitions and exception criteria is presented in Attachment "F."

F. Unless specifically granted, authorization pursuant to this General Permit does not constitute an exemption to applicable discharge prohibitions prescribed in the Basin Plan.

G. Unless otherwise authorized by a separate waste discharge permit, discharges of material other than storm water, including dewatering waste, to a separate storm sewer system or waters of the state are prohibited. Discharge of dewatering waste to land is covered under this General Permit providing that there are no pollutants present that could degrade groundwater quality. If no land disposal alternatives exist for dewatering waste, the Discharger may seek coverage to discharge dewatering waste to surface waters under a separate NPDES permit by submitting a separate Report of Waste Discharge.

H. Discharges of non-storm water are allowed only when necessary for performance and completion of construction projects and where they do not cause or contribute to a violation of any water quality standard. Such discharges must be described in the BMP plan (see Provision III – Best Management Practices). Wherever feasible, alternatives that do not result in the discharge of non-storm water, or that discharge any non-storm water to land, shall be implemented.

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[1] CWC Section 13050(d): "Waste" includes sewage and any and all other waste substances, liquid, solid, gaseous, or radioactive, associated with human habitation, or of human or animal origin, or from any producing, manufacturing, or processing operation, including waste placed within containers of whatever nature prior to, and for purposes of, disposal.

I. Storm water discharges regulated by this General Permit shall not contain a hazardous substance equal to or in excess of a reportable quantity listed in 40 CFR Part 117 and/or 40 CFR Part 302.

J. Except under emergency conditions, land disturbance between October 15 of any year and May 1 of the following year is prohibited in the Little Truckee River and Truckee River Hydrologic Units. Where it can be shown that granting a variance would not cause or contribute to the degradation of water quality, an exception to the dates stated above may be granted in writing by the Executive Officer.

K. The discharge of fresh concrete or grout to surface waters is prohibited, unless the discharge is confined to the work area and isolated from flowing streams or water bodies.

L. The discharge of oil, gasoline, diesel fuel, any petroleum derivative, any toxic chemical, or hazardous waste is prohibited.

M. The discharge of waste, including wastes contained in storm water, shall not cause a pollution, threatened pollution, or nuisance as defined in Section 13050 of the California Water Code.

II. RECEIVING WATER LIMITATIONS

A. Storm water discharges and authorized nonstorm water discharges to any ground water or surface water shall not adversely impact human health or the environment.

B. The discharge of storm water from the project area to surface waters shall not cause or contribute to a violation of any narrative or numeric water quality objective contained in the Basin Plan. Where any numeric or narrative water quality objective contained in the Basin Plan is already being violated, the discharge of waste that causes further degradation or pollution is prohibited. A complete listing of water quality objectives is presented in the Basin Plan, Chapter 3 and can be found at the following website - http://www.swrcb.ca.gov/rwqcb6/files.htm

Water quality objectives that apply to all surface waters within the Lahontan Region include, but are not limited to, the following construction-related pollutants.

Oil and Grease
Waters shall not contain oils, greases, waxes or other materials in concentrations that result in a visible film or coating on the surface of the water or on objects in the water, that cause nuisance, or that otherwise adversely affect the water for beneficial uses.

For natural high quality waters, the concentration of oils, greases, or other film or coat generating substances shall not be altered.

pH
In fresh waters with designated beneficial uses of COLD or WARM, changes in normal ambient pH levels shall not exceed 0.5 pH units. For all other waters of the Region, the pH shall not be depressed below 6.5 nor raised above 8.5.

The Regional Board recognizes that some waters of the Region may have natural pH levels outside of the 6.5 to 8.5 range. Compliance with the pH objective for these waters will be determined on a case-by-case basis.

Sediment
The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect the water for beneficial uses.

Settleable Materials
Waters shall not contain substances in concentrations that result in deposition of material that causes nuisance or that adversely affects the water for beneficial uses. For natural high quality waters, the concentration of settleable materials shall not be raised by more that 0.1 milliliter per liter.

Turbidity
Waters shall be free of changes in turbidity that cause nuisance or adversely affect the water for beneficial uses. For all waters, increases in turbidity shall not exceed natural levels by more than 10 percent. Additionally for the Little Truckee Hydrologic Unit and Truckee River Hydrologic Area, turbidity shall not be raised above 3 Nephelometric Turbidity Units (NTU) mean of monthly means. Additionally for the West Fork Carson River Hydrologic Unit, the turbidity shall not be raised above a mean of monthly means value of 2 NTU.

Toxicity
All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life.

C. Should it be determined by the Discharger or Regional Board staff that storm water discharges and/or authorized nonstorm water discharges are causing or contributing to a violation of an applicable water quality standard, the Discharger shall:

1. Implement corrective measures immediately following discovery that water quality standards were violated, followed by notification to the Regional Board by telephone as soon as possible but no later than 48 hours after the discharge has been discovered. This notification shall be followed by a report within 14 calendar days to the Regional Board, unless otherwise directed by the Regional Board, describing (1) the nature and cause of the water quality standard violation; (2) the BMPs currently being implemented; (3) any additional BMPs which will be implemented to prevent or reduce pollutants that are causing or contributing to the violation of water quality standards; and (4) any maintenance or repair of BMPs. This report shall include an implementation schedule for corrective actions and shall describe the actions taken to reduce the pollutants causing or contributing to the violation.

2. The Discharger shall revise storm water pollution control measures and monitoring procedures to incorporate: 1) the additional BMPs that have been, and will be implemented; 2) the implementation schedule; and 3) any additional monitoring needed.

3. Nothing in this section shall prevent the Regional Board from enforcing any provisions of this General Permit while the Discharger prepares and implements the above report.

III. BEST MANAGEMENT PRACTICES (BMPs)

A. Prior to the initiation of any construction related activities, the Discharger shall develop a BMP implementation plan and install temporary erosion control facilities to prevent transport of earthen materials and other wastes off the property. Guidance for developing the BMP plan is provided in Attachment "E."

B. All land disturbing activities shall be conducted in accordance with the Lahontan Region Project Guidelines for Erosion Control (Attachment "G").

C. If the Regional Board determines that the proposed BMPs will not achieve the applicable standards and receiving water objectives, the Discharger may be required to implement additional or alternative BMPs.

IV. ADMINISTRATIVE PROVISIONS

A. Applicability and Timing

1. Upon receipt of the applicable filing fee, an NOI to comply with the provisions of this General Permit, and an adequate BMP plan, the Discharger will be issued a written Notice of Applicability (NOA). The Regional Board reserves the right to request additional information if the NOI and/or BMP plan is deemed inadequate.

2. The Discharger shall submit a NOI, a BMP plan, and the appropriate fee at least 30 days prior to the proposed date of construction. Additional time (up to 120 days) will be required for projects that propose disturbance to flood plains or waters of the state. Construction may not begin until a written NOA is received from the Regional Board or 30 days have elapsed from the date the NOI was received by the Regional Board. If the Discharger is notified in writing that the NOI and/or BMP plan is incomplete, the Discharger must provide the additional information requested in the notice and the Regional Board may take up to 30 days to respond with an NOA or request for additional information.

3. All Dischargers must implement the BMP plan and the Monitoring and Reporting Program upon commencement of construction.

4. Projects may be brought to the Regional Board for consideration of adoption of an individual WDR when the Executive Officer deems it necessary to achieve water quality protection.

5. The conditions of this General Permit do not exempt the Discharger from compliance with any other laws, regulations, or ordinances which may be applicable, do not legalize land treatment and disposal facilities, and leave unaffected any further restraints on those facilities which may be contained in other statutes or required by other regulatory agencies.

B. Provisions

1. All Dischargers must comply with the lawful requirements of municipalities, counties, drainage districts, and other local agencies regarding discharges of storm water to drainage systems or other water courses under their jurisdiction.

2. The Discharger shall at all times fully comply with the engineering plans, specifications, and technical reports developed for the project and/or submitted with the NOI. The Discharger shall at all times fully comply with the BMP Plan.

3. The Discharger must comply with the Standard Provisions for Waste Discharge Requirements contained in Attachment "H", which is made part of this General Permit.

4. Pursuant to California Water Code Section 13267, the Discharger shall comply with Monitoring and Reporting Program No. **R6T-2003-0004** hereby made a part of this General Permit.

5. The owners of property subject to this General Permit shall have a continuing responsibility for ensuring compliance with the General Permit. The Discharger identified in the NOA shall remain liable for General Permit violations until an NOI is received from the new owner/operator. Notification of applicable General Permit requirements shall be furnished to the new owners and/or operators and a copy of such notification shall be sent to the Regional Board. This General Permit is transferable to the new owner. Any change in the ownership and/or operation of property subject to this General Permit shall be reported to the Regional Board. The new owner must comply with the General Permit, including the Monitoring and Reporting Program.

C. Revocation Procedures

Coverage under the General Permit shall continue until revoked in writing by the Regional Board staff. The Discharger is responsible for notifying the Regional Board in writing that the project is complete, certifying that the required conditions are met, and requesting revocation of coverage under the General Permit. The General Permit for the specific project will be revoked provided the following conditions are met: 1) the construction project is complete and soil stabilization measures are in place and functioning; 2) permanent BMPs have been installed and are functional; 3) information required by the attached Monitoring and Reporting Program has been submitted; and 4) Regional Board staff have inspected the site, if deemed necessary.

I, Harold J. Singer, Executive Officer, do hereby certify that the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, Lahontan Region, on January 8, 2003.

HAROLD J. SINGER
EXECUTIVE OFFICER

Attachment A: Map of Little Truckee River Hydrologic Unit and Truckee River Hydrologic Area

Attachment B: Map of West and East Forks Carson River Hydrologic Units

Attachment C: Map of Mono Hydrologic Unit and Long Hydrologic Area

Attachment D: Notice of Intent Form

Attachment E: Best Management Practices Plan

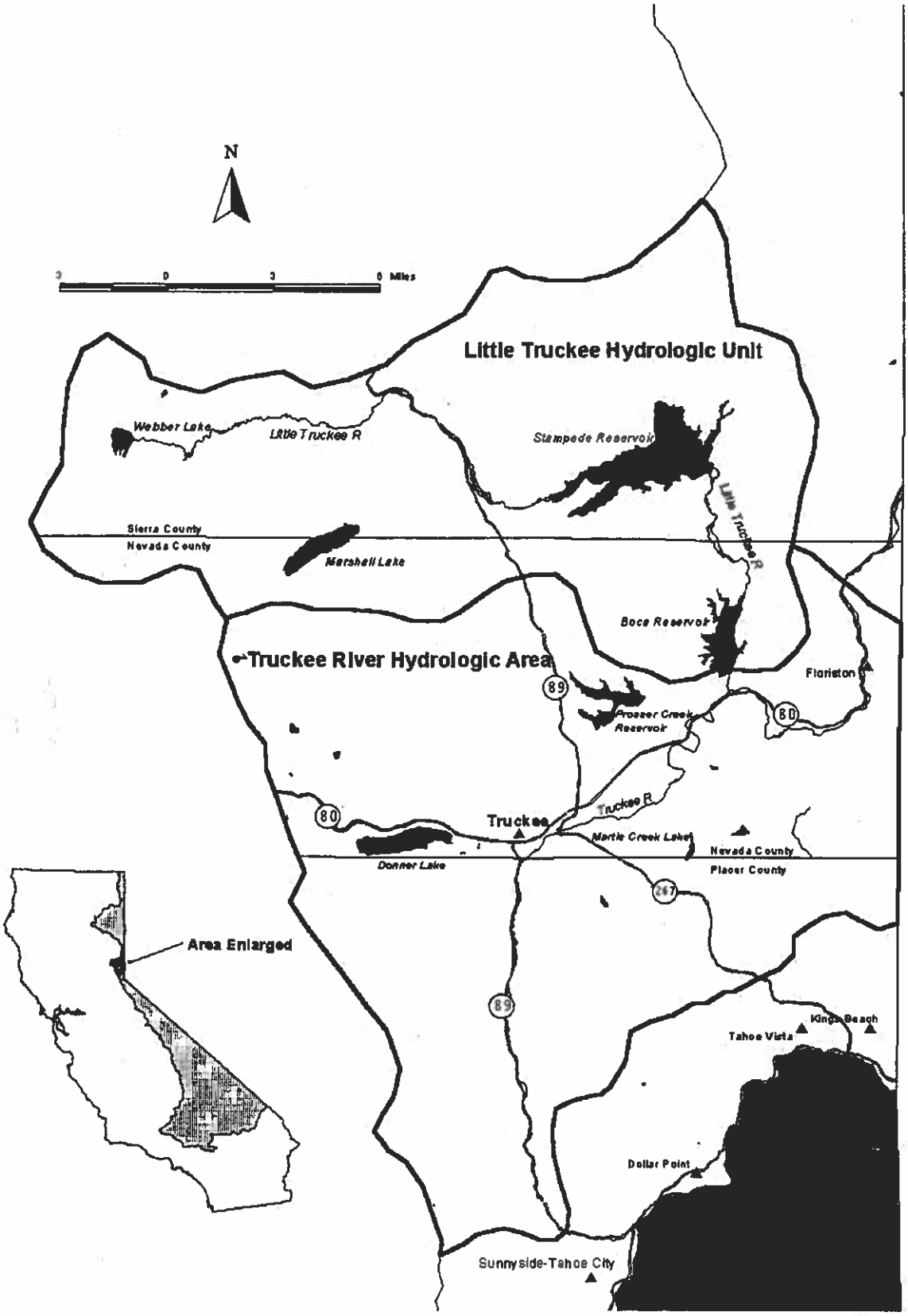
Attachment F: Waste Discharge Prohibitions and Exception Criteria for Projects within the Truckee River Hydrologic Unit

Attachment G: Lahontan Region Project Guidelines for Erosion Control

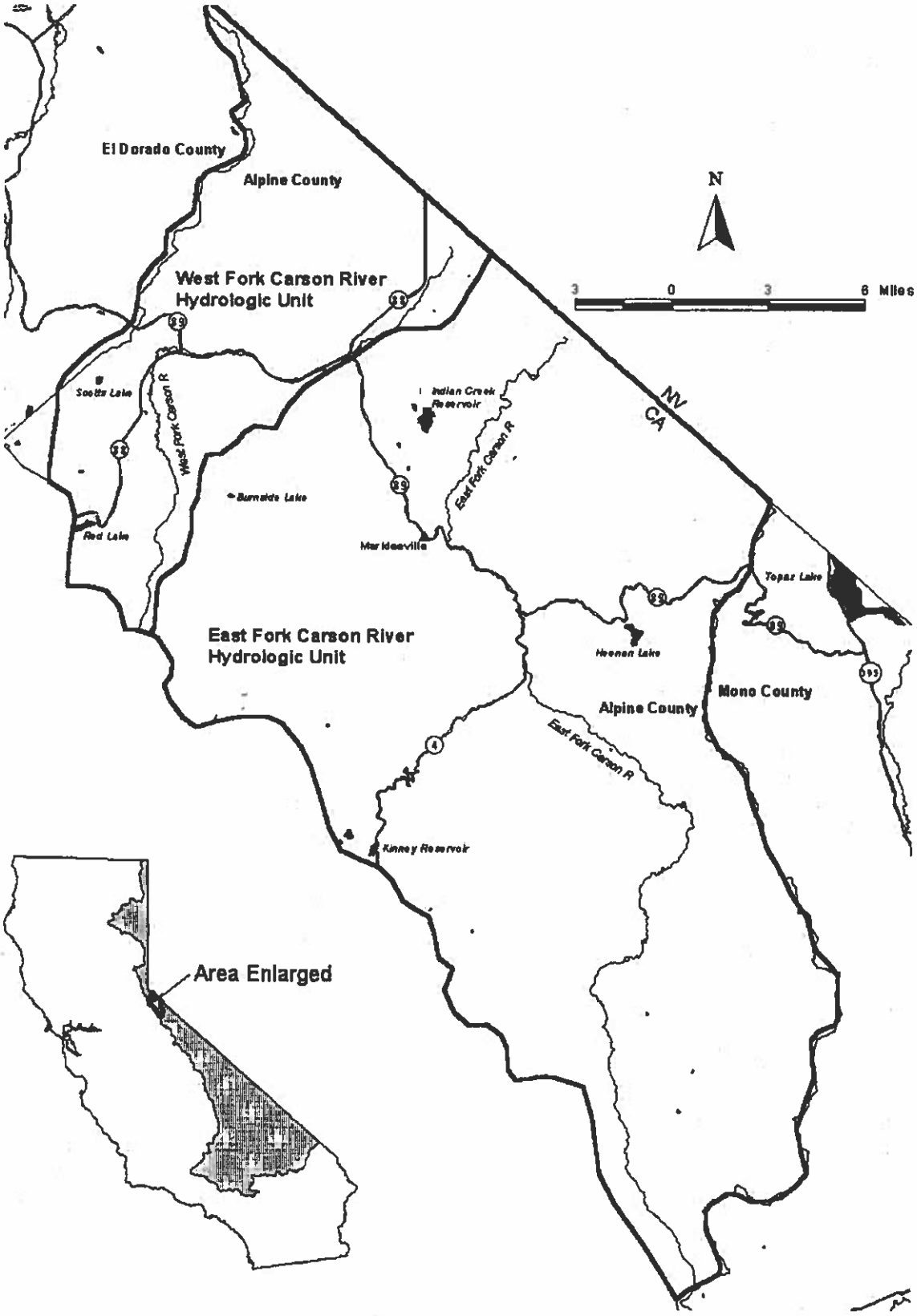
Attachment H: Standard Provision for Waste Discharge Requirements

BA/cgT: Small Construction General Permit WDR

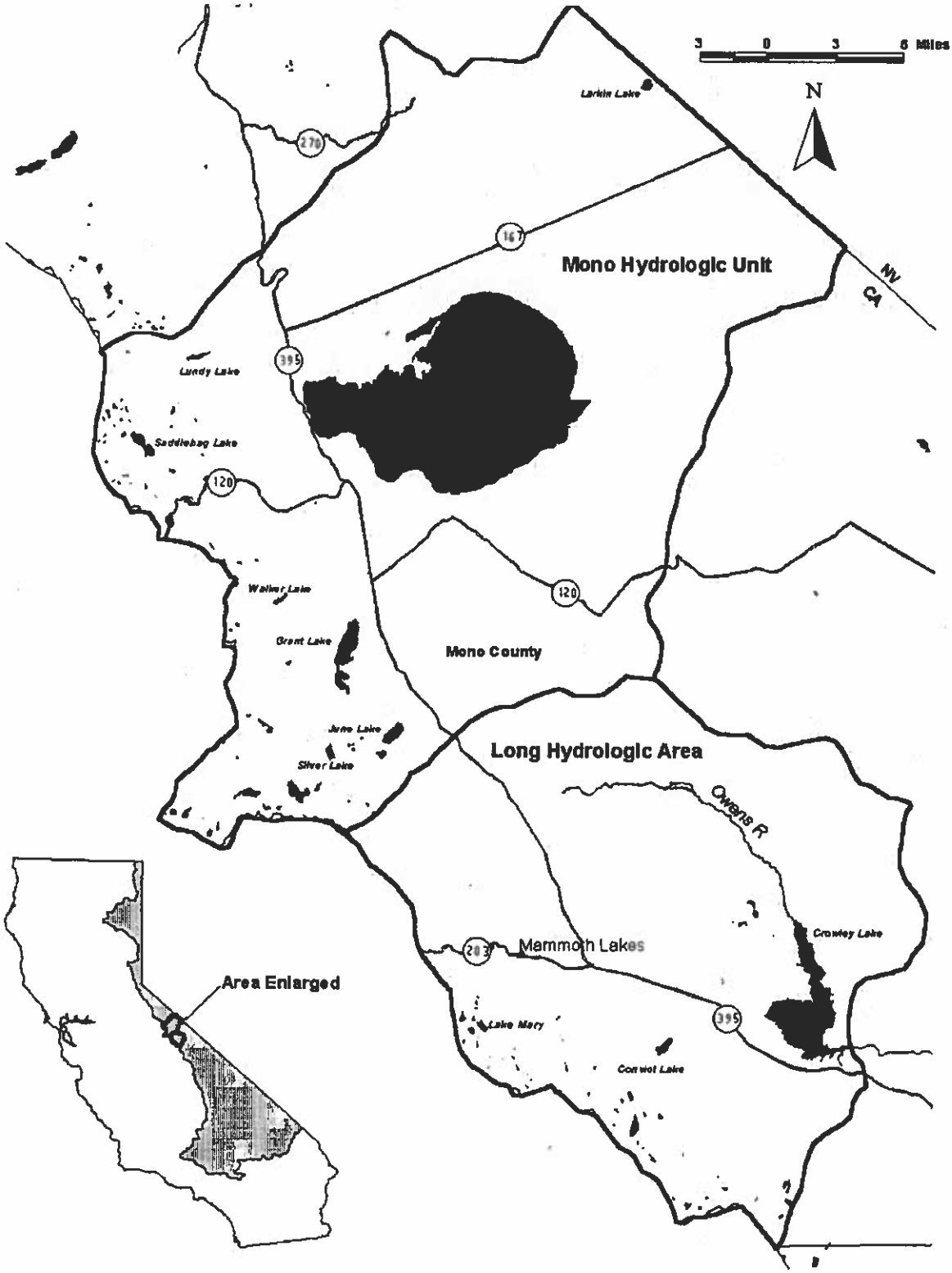
Attachment "A"
Little Truckee River Hydrologic Unit
And
Truckee River Hydrologic Area



Attachment "B"
West and East Fork Carson River
Hydrologic Units



Attachment "C"
Mono Hydrologic Unit
And
Long Hydrologic Area



ATTACHMENT "D"
California Regional Water Quality Control Board – Lahontan Region
NOTICE OF INTENT
TO COMPLY WITH THE TERMS OF THE GENERAL WASTE DISCHARGE REQUIREMENTS FOR SMALL CONSTRUCTION PROJECTS, INCLUDING UTILITY, PUBLIC WORKS, AND MINOR STREAMBED/LAKEBED ALTERATION PROJECTS IN THE LAHONTAN REGION EXCLUDING THE LAKE TAHOE HYDROLOGIC UNIT
(WQ ORDER No. R6T-2003-0004)

I. NOI STATUS (SEE INSTRUCTIONS)

MARK ONLY ONE ITEM 1. ☐ New Construction 2. ☐ Change of Information for WDID# _____

II. PROPERTY OWNER

Name	Contact Person		
Mailing Address	Title		
City	State	Zip	Phone ( ) –

III. DEVELOPER/CONTRACTOR INFORMATION

Developer/Contractor	Contact Person		
Mailing Address	Title		
City	State	Zip	Phone ( ) –

IV. CONSTRUCTION PROJECT INFORMATION

Site/Project Name	Site Contact Person		
Physical Address/Location	Latitude ____°	Longitude ____°	County
City (or nearest City)	Zip	Site Phone Number ( ) –	Emergency Phone Number ( ) –

A. Total size of construction site area: _____ Acres

B. Total area to be disturbed: _____ Acres (% of total _____)

C. Percent of site imperviousness (including rooftops):
Before Construction: _____%
After Construction: _____%

D. Tract Number(s): _____, _____

E. Mile Post Marker: _____

F. Is the construction site part of a larger common plan of development or sale?
☐ YES ☐ NO

G. Name of plan or development:

H. Construction commencement date: ____/____/____

I. % of site to be mass graded: _____

J. Projected construction dates:
Complete grading: ____/____/____ Complete project: ____/____/____

K. Type of Construction (Check all that apply):

1. ☐ Residential 2. ☐ Commercial 3. ☐ Industrial 4. ☐ Reconstruction 5. ☐ Transportation
6. ☐ Utility Description: _____ 7. ☐ Other (Please List): _____

V. BILLING INFORMATION

SEND BILL TO:	Name	Contact Person	
☐ OWNER (as in II. above)			
☐ DEVELOPER (as in III. above)	Mailing Address	Phone/Fax	
☐ OTHER (enter information at right)	City	State	Zip

VI. REGULATORY STATUS

A. Has a local agency approved a required erosion/sediment control plan? ☐ YES ☐ NO

Does the erosion/sediment control plan address construction activities such as infrastructure and structures? ☐ YES ☐ NO

Name of local agency: _____ Phone: ( ) --

B. Is this project or any part thereof, subject to conditions imposed under a CWA Section 404 permit or 401 Water Quality Certification? ☐ YES ☐ NO

If yes, provide details: _____

VII. RECEIVING WATER INFORMATION

A. Does the storm water runoff from the construction site discharge to (Check all that apply):

1. ☐ **Indirectly to waters of the State**
2. ☐ **Storm drain system - Enter owner's name:** _____
3. ☐ **Directly to waters of State (e.g. , river, lake, creek, stream, wetlands)**

B. Name of receiving water: (river, lake, creek, stream, wetlands): _____

VIII. BEST MANAGEMENT PRACTICES (BMP) PLAN AND FEE

Have you included a BMP Plan with this submittal? ☐ YES ☐ NO

Have you included payment of the annual fee with this submittal? ☐ YES ☐ NO

X. CERTIFICATIONS

"I certify under penalty of law that this document and all attachments were prepared under my direction and supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment. In addition, I certify that the provisions of the permit, including the development and implementation of a Storm Water Pollution Prevention Plan and a Monitoring Program Plan will be complied with."

Printed Name: _____

Signature: _____ **Date:** _____

Title: _____

ATTACHMENT "E"

BEST MANAGEMENT PRACTICES PLAN

The purpose of the Best Management Practices (BMP) plan is to evaluate potential sources of sediment and other pollutants at the construction site and put controls in place that will effectively prevent pollutant discharges to surface and ground waters. The following general pollution control elements should be addressed in the BMP Plan:

1. retain soil and sediment on the construction site;
2. prevent non-storm water discharges that would discharge pollutants off site;
3. prevent the discharge of other pollutants associated with construction activities to land or surface waters;
4. permanently stabilize disturbed soils; and
5. minimize the effects of increased storm water runoff from impervious surfaces.

For detailed information on construction related BMPs, the EPA document Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices may be found at the following website:
http://cfpub.epa.gov/npdes/pkeyword.cfm?keywords=BMPs&program_id=0

Additional information may be also be obtained by contacting the Lahontan Regional Water Quality Control Board.

Specific guidance for completing the Best Management Practices (BMP) Plan is provided below. The BMP Plan must be submitted with the Notice of Intent (NOI) to obtain coverage under the General Permit. Use the attached form for preparing the BMP plan.

Temporary Erosion Control

This element of the BMP Plan addresses temporary erosion control or soil stabilization measures to be implemented during the time while active construction and land disturbing work is active. The most efficient way to address erosion control is to preserve existing vegetation where feasible, limit disturbance, and stabilize and revegetate disturbed areas as soon as possible after grading or construction. Use of temporary erosion control measures is especially important on large graded sites where soil exposure to rainfall and wind can cause significant soil loss if left unprotected during the time active construction activities are conducted. Some of these measures may overlap with the permanent soil stabilization measures discussed later in the section. Until permanent vegetation is established, temporarily covering the soil is the most cost-effective and expeditious method to prevent and minimize erosion.

Indicate on the BMP Plan what methods will be used to prevent erosion from cut and fill slopes and other disturbed areas after grading activities are completed, but before permanent soil stabilization measures can be implemented. Options may include, but are not limited to:

- **Covering with mulch**
- **Temporary seeding or planting**
- **Applying soil stabilizers or binders (tackifier)**

- **Placing fiber rolls/logs on bare slopes**
- **Covering surfaces with erosion control blankets**
- **Diverting run off around disturbed areas using stabilized conveyances**

Sediment Control

Sediment control BMPs are required at appropriate locations along the site perimeter and at all internal inlets to the storm drain system. Sediment controls used in combination with the erosion controls described above can effectively prevent the discharge of pollutants off site. Effective filtration devices, barriers, and settling devices shall be selected, installed and maintained properly. The sediment control plan must also include provisions to temporarily stabilize construction access points such that soil, sediment, and other construction related materials are not tracked out beyond the site perimeter.

Indicate on the BMP Plan what sediment controls will be used at the site. Options may include, but are not limited to:

Filter barriers -
- **fiber rolls/logs**
- **silt fence**
- **straw bale barriers**
- **gravel inlet filters**

Retention structures -
- **sediment traps**
- **settling basins**

Stabilized access points/good housekeeping –
- **crushed rock**
- **mulch**
- **landing mats**
- **frequent sweeping**

Stabilization

All disturbed areas of the construction site must be stabilized once construction is complete. Disturbed areas include drainage ditches or channels. Stabilization means implementing permanent rather than temporary erosion controls. It is recommended to stabilize disturbed areas in inactive (no further land disturbance planned) portions of the site as soon as feasible. Final stabilization for the purposes of submitting a Notice of Termination (NOT) is satisfied when all soil disturbing activities are completed AND EITHER OF THE TWO FOLLOWING CRITERIA ARE MET:

1. A uniform vegetative cover with 70 percent coverage has been established OR:

2. equivalent stabilization measures have been employed. These measures include the use of such BMPs as mulch, erosion blankets, rip rap, fiber treatments, or other erosion resistant soil coverings or treatments.

Where background native vegetation covers less than 100 percent of the surface, such as in arid areas, the 70 percent coverage criteria is adjusted as follows: if the native vegetation on adjacent undisturbed areas covers 50 percent of the ground surface, 70 percent of 50 percent (.70 X .50=.35) would require 35 percent total uniform surface coverage.

Indicate on the BMP Plan what stabilization measures will be used at the site. Options may include, but are not limited to:

- **Seeding and/or planting (including hydro mulching/seeding)**
- **Mulching (wood chips, gravel, other) in combination with seeding/planting**
- **Installing erosion blankets (typically used on steeper disturbed slopes or unlined drainage ditches in combination with permanent seeding/planting)**
- **Placing rip rap**

Non-Storm Water Management

Non-storm water discharges should be eliminated or reduced to the extent feasible. Certain non-storm water discharges (e.g. irrigation of vegetative erosion control measures, pipe flushing and testing) may be necessary for the completion of some construction projects and are authorized by this General Permit. Other non-storm water discharges such as concrete washout, and driveway and street washing that would flush sediment or other pollutants to storm drains or surface waters are not allowed and would be a violation of this General Permit. De-watering waste should be discharged to land and infiltrated. A separate permit may be necessary if de-watering waste must be discharged to surface waters due to site constraints.

Indicate on the BMP Plan how unauthorized non-storm water discharges will be controlled. Options include, but are not limited to:

- **Approved off-site wash-out and wash-down areas**
- **Lined wash-out containment basins/traps**
- **De-watering waste infiltration or containment**

Spill Prevention and Control

The BMP Plan must describe measures to prevent and control potential leaks/spills of petroleum products such as fuels and lubricating materials, and other potentially hazardous materials. Secured storage areas for fuels and chemicals should be established and sufficient spill cleanup materials should be at the site to respond to accidental spills.

Indicate on the BMP Plan what spill prevention and control measures will be used. Options include, but are not limited to:

- **Covered material storage**
- **Material storage containment (berms, lined surfaces, secondary containment devices etc.)**
- **Regular equipment leak inspections**
- **Drip pans**
- **Absorbents**

Post-Construction Storm Water Management

Post-construction storm water controls are needed to reduce the impacts of adding impervious surfaces to the landscape and adding potential pollutant sources within storm water drainage areas. Additional impervious surfaces reduce storm water infiltration and storage and increase the volume and velocity of run off down stream from developed sites. Whenever possible, use of infiltration and treatment devices is encouraged. Specific requirements for infiltration or treatment of storm water runoff volume from a 20-year, 1-hour storm from all impervious surfaces in the Truckee River, Little Truckee River, and Mammoth Lakes watersheds must be met (see Attachment "G") Design approaches that limit overall land disturbance and reduce the amount of impervious surfaces are encouraged. Additional post-construction BMPs should also be incorporated into projects as appropriate and be properly maintained.

Indicate on the BMP Plan what post-construction BMPs will be implemented. Options include, but are not limited to:

- **Infiltration structures**
- **Detention/retention basins**
- **Storm water treatment vaults**
- **Biofilter BMPs (typically vegetated swales, strips, and buffers)**
- **Energy dissipation devices (structures designed to prevent erosion and slow water velocity associated with conveyance systems**
- **Efficient irrigation systems**
- **Proper drain plumbing (e.g. ensuring that interior drains are not connected to a storm sewer system)**

Maintenance, Inspection, and Repair

BMPs implemented at the site must be properly maintained to be effective. The BMP plan shall include provisions to inspect and maintain all BMPs identified in the plan throughout the duration of the project. Sites that are inactive and winterized through the wet season should be checked periodically to ensure the site remains stable. For sites where construction activity is conducted through the wet season, the Discharger must ensure that BMPs remain effective.

Indicate on the BMP Plan how BMPs will be inspected and repaired in accordance with the following minimum program:

For inactive construction sites during wet season -

- **Cease construction through wet season and winterize (see Attachment "G")**

For active construction sites during wet season -

- **Inspect BMPs before and after storm events**
- **Inspect BMPs once each 24-hour period during extended storm events**
- **Implement repairs or design changes as soon as feasible depending upon worker safety and field conditions**
- **Have provisions to respond to failures and emergencies**

BEST MANAGEMENT PRACTICES PLAN

Discharger Name: _____

Site Name: _____

Street Address: _____

City: _____

County: _____

Use the template provided below to identify BMPs to be implemented at the construction site. Check the boxes next to the BMPs that will be used. If other BMPs will be used, describe them in the space provided for "Other BMP." Attach additional sheets if needed.

TEMPORARY EROSION CONTROL

Erosion from graded or disturbed areas, including cut and fill slopes, will be temporarily protected once soil disturbing activities are completed by the following method(s):

- ☐ **Covering with mulch**
- ☐ **Temporary seeding or planting**
- ☐ **Applying soil stabilizers or binders (tackifier)**
- ☐ **Placing fiber rolls/logs on bare slopes**
- ☐ **Covering surfaces with erosion control blankets**
- ☐ **Diverting run off around disturbed areas using stabilized conveyances**
- ☐ **Other (describe below)**

BEST MANAGEMENT PRACTICES PLAN

SEDIMENT CONTROL

Excess sediment will be prevented from running off the site or to storm drain inlets by the following method(s):

Filter barriers -

- ❑ **fiber rolls**
- ❑ **silt fence**
- ❑ **straw bale barriers**
- ❑ **gravel inlet filters**

Retention structures -

- ❑ **sediment traps**
- ❑ **settling basins**

Stabilized access points/good housekeeping –

- ❑ **crushed rock**
- ❑ **mulch**
- ❑ **landing mats**
- ❑ **frequent sweeping**

❑ **Other (describe below)**

BEST MANAGEMENT PRACTICES PLAN

STABILIZATION

Disturbed soil areas not covered with impervious surfaces will be permanently stabilized by the following method(s):

- ☐ **Seeding and/or planting (including hydro mulching/seeding)**
- ☐ **Mulching (wood chips, gravel, other) in combination with seeding/planting**
- ☐ **Installing erosion blankets (typically used on steeper disturbed slopes or unlined drainage ditches in combination with permanent seeding/planting)**
- ☐ **Placing rip rap (describe location)**
- ☐ **Other (describe below)**

NON-STORM WATER MANAGEMENT

Unauthorized non-storm water discharges will be controlled using the following method(s):

- ☐ **Approved off-site wash-out and wash-down areas (describe location)**
- ☐ **Lined wash-out containment basins/traps (describe location)**
- ☐ **De-watering waste infiltration or containment (describe location)**
- ☐ **Other (describe below)**

BEST MANAGEMENT PRACTICES PLAN

POST-CONSTRUCTION STORM WATER MANAGEMENT

The following post-construction BMPs will be implemented to reduce impacts from additional impervious surfaces and pollutant sources (include design calculations used to size BMPs):

- ❑ **Infiltration structures**
- ❑ **Detention/retention basins**
- ❑ **Storm water treatment vaults**
- ❑ **Biofilter BMPs (typically vegetated swales, strips, and buffers)**
- ❑ **Energy dissipation devices (structures designed to prevent erosion and slow water velocity associated with conveyance systems**
- ❑ **Efficient irrigation systems**
- ❑ **Proper plumbing design (e.g. ensuring that interior drains are not connected to a storm sewer system)**
- ❑ **Other (describe below)**

MAINTENANCE, INSPECTION, AND REPAIR

BMPs will be inspected and repaired in accordance with the following minimum program:

For inactive construction sites during wet season (October 15 – May 1) –

- ☐ **Cease construction through wet season and winterize (see Attachment "G")**

For active construction sites during wet season (October 15 – May 1) –

- ☐ **Inspect BMPs, and repair if needed, before and after storm events**
- ☐ **Inspect BMPs once each 24-hour period during extended storm events**
- ☐ **Implement repairs or design changes as soon as feasible depending upon worker safety and field conditions**
- ☐ **Have provisions to respond to failures and emergencies**
- ☐ **Other (describe below)**

ATTACHMENT "F"

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

WASTE DISCHARGE PROHIBITIONS
AND
EXCEPTION CRITERIA
FOR PROJECTS WITHIN THE TRUCKEE RIVER HYDROLOGIC UNIT

The *Water Quality Control Plan for the Lahontan Region* (Basin Plan) prohibits the discharge or threatened discharge, attributable to human activities, of solid or liquid waste[1] materials (including, but not limited to, soil, silt, clay, sand and other organic and earthen materials) to lands within the 100-year floodplain of the Truckee River or within the 100-year floodplain of any tributary[2] to the Truckee River. The Regional Board may grant exceptions to the prohibition for repair or replacement of existing structures provided that a loss of additional floodplain area or volume does not occur, and Best Management Practices and mitigation measures are used to minimize any potential soil erosion and/or surface runoff problems.

The Regional Board may also grant exceptions to the prohibition for the following types of new projects:

(1) Projects solely intended to reduce or mitigate existing sources of erosion or water pollution, or to restore the functional value to previously disturbed floodplain areas.

(2) Bridge abutments, approaches, or other essential transportation facilities identified in an approved county general plan.

(3) Projects necessary to protect public health or safety, or to provide essential public services.

(4) Projects necessary for public recreation.

(5) Projects that will provide outdoor public recreation within portions of the 100-year flood plain that have been substantially altered by grading and/or filling activities which occurred prior to June 26, 1975.

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1 Waste includes earthen material placed in a water body or carried to waters by erosive forces. Construction activity involving ground disturbance within 100-year floodplain areas is generally considered to constitute a threat of discharge.

2 Tributaries include: perennial surface waters (rivers. streams, lakes, wetlands) and ephemeral (seasonal) watercourses exhibiting evidence of the occurrence of flowing water, and having the potential to transport water and/or sediment to another water body, including, but not limited to, named and unnamed streams, wetlands, and lakes.

The Basin Plan allows an exception to the prohibitions for new projects only when the Regional Board makes all of the following findings:

- The project is included in one or more of the five categories listed above.
- There is no reasonable alternative to locating the project or portions of the project within the 100-year flood plain.
- The project, by its very nature, must be located within the 100-year flood plain. (The determination of whether a project, by its very nature, must be located in a 100-year flood plain shall not apply to projects in category (5), above, and shall be based on the type of project proposed, not the particular site proposed.)
- The project incorporates measures which will ensure that any erosion and surface runoff problems caused by the project are mitigated to levels of insignificance.
- The project will not individually or cumulatively with other projects, directly or indirectly, degrade water quality or impair beneficial uses of water.
- The project will not reduce the flood flow attenuation capacity, the surface flow treatment capacity, or the ground water flow treatment capacity from existing conditions. All 100-year flood plain areas and volumes lost as a result of the project must be completely mitigated by restoration of previously-disturbed floodplain within or as close as practical to the project site.[3] The restored, new, or enlarged floodplain shall be of sufficient area and volume to more than compensate for the flood flow attenuation capacity, surface flow treatment capacity and ground water flow treatment capacity which are lost as a result of the project.

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[3] This finding will not be required for new projects necessary to protect public health and safety. For new projects necessary to provide essential public services, this finding will not be required when the Regional Board finds mitigation measures to be infeasible because the financial resources of the project proponent are severely limited.

ATTACHMENT "G"

LAHONTAN REGION
PROJECT GUIDELINES FOR EROSION CONTROL

In the interest of protecting surface water quality from unnatural or accelerated erosion caused by land development, the following guidelines shall be followed:

Guidelines Applicable To: **Little Truckee River Hydrologic Unit (HU No. 636.00)**
Truckee River Hydrologic Area (HU No. 635.20)
West Fork Carson River Hydrologic Unit (HU No. 633.00)
East Fork Carson River Hydrologic Unit (HU No. 632.00)
Mono Hydrologic Unit (HU No. 601.00)
Long Hydrologic Area (HU No. 603.10)

Temporary Construction BMPs

1. Surplus or waste materials shall not be placed in drainage ways or within the 100-year flood plain of surface waters.

2. All loose piles of soil, silt, clay, sand, debris, or earthen materials shall be protected in a reasonable manner to prevent discharge of pollutants to waters of the State. Material stockpiles should be placed on the upgradient side of excavation whenever possible. Stockpiles may also be protected by covering to prevent contact with precipitation and by placing sediment barriers around the stockpiles.

3. Dewatering shall be done in a manner so as to prevent the discharge of pollutants, including earthen materials, from the site. The first option is to discharge dewatering waste to land. A separate permit may be required if, due to site constraints, dewatering waste must be discharged to surface waters. Contact the Regional Board for information on discharging to surface waters.

4. All disturbed areas shall be stabilized by appropriate erosion and/or sediment control measures by October 15 of each year.

5. All work performed between October 15th and May 1st of each year shall be conducted in such a manner that the project can be winterized within 48 hours. Winterized means implementing erosion and/or sediment controls that will prevent the discharge of earthen materials from the site and the controls will remain effective throughout the rainy/snow season without requiring maintenance. In general, this requires stabilizing bare disturbed soils with mulch, erosion protection blankets, or other suitable materials, and installing perimeter sediment controls such as fiber logs or other similar materials that will remain effective during significant rain and snow events.

6. After completion of a construction project, all surplus or waste earthen material shall be removed from the site and deposited at a legal point of disposal.

7. All non-construction areas (areas outside of the construction zone that will remain undisturbed) shall be protected by fencing or other means to prevent unnecessary encroachment outside the active construction zone.

8. During construction, temporary erosion control facilities (e.g., impermeable dikes, filter fences, weed-free straw bales, etc.) shall be used as necessary to prevent discharge of earthen materials from the site during periods of precipitation or runoff.

9. Control of run-on water from offsite areas shall be managed (protected, diverted, treated, etc.) to prevent such water from degrading before it discharges from the site.

10. Where construction activities involve the crossing and/or alteration of a stream channel, such activities require a prior written agreement with the California Department of Fish and Game and shall be timed whenever possible to occur during the period in which streamflow is expected to be lowest for the year. Other control measures may be used as necessary to prevent adverse effects from work in surface waters.

Permanent Construction BMPs

1. Impervious surfaces should be constructed with infiltration trenches or comparable infiltration structures along downgradient sides to infiltrate the increase in runoff resulting from the new impervious surfaces. Infiltration structures should also be constructed to accept runoff from structural (roof top) drip lines. Other control measures may be considered if design and/or site constraints are such that construction of infiltration devices is infeasible. Additional specific design specifications are required for the Truckee, Little Truckee and Long Hydrologic Units/Areas (see specific requirements below).

2. Where possible, existing drainage patterns shall not be significantly modified.

3. Drainage swales disturbed by construction activities shall be stabilized by the addition of crushed rock or riprap, as necessary, or other appropriate stabilization methods.

4. Revegetated areas shall be regularly and continually maintained in order to assure adequate growth and root development. Physical erosion control measures (controls other than live vegetation) shall be placed on a routine maintenance and inspection program to provide continued erosion control integrity.

Additional Requirements for Specific Watersheds

Truckee River Hydrologic Area and Little Truckee Hydrologic Unit

1. Runoff from impervious surfaces shall be treated or contained onsite. For purposes of this requirement, the volume of water to be contained or treated is the 20-year, one-hour storm, which is equal to 0.7 inches of rain.

2. Except in the event of emergencies, land disturbance associated with project construction is prohibited between October 15th and May 1st of the following year. Exemptions may be granted by the Executive Officer on a case by case basis.

Long Hydrologic Area

Policy: (Contact the Regional Water Quality Control Board for information on permitting requirements delegated to the Town of Mammoth Lakes under a Memorandum of Understanding)

1. For Mammoth Lakes watershed at an elevation above 7,000 feet, drainage collection, retention, and infiltration facilities shall be constructed and maintained to prevent transport of the runoff from a 20-year, 1-hour design storm from the project site. A 20-year, 1-hour design storm for the Mammoth Lakes area is equal to 1.0 inch of rainfall.

ATTACHMENT "H"

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

STANDARD PROVISIONS
FOR WASTE DISCHARGE REQUIREMENTS

1. Inspection and Entry

The discharger shall permit Regional Board staff:

a. to enter upon premises in which an effluent source is located or in which any required records are kept;

b. to copy any records relating to the discharge or relating to compliance with the waste discharge requirements;

c. to inspect monitoring equipment or records; and

d. to sample any discharge.

2. Reporting Requirements

a. Pursuant to California Water Code 13267(b), the discharger shall immediately notify the Regional Board by telephone whenever an adverse condition occurred as a result of this discharge; written confirmation shall follow within two weeks. An adverse condition includes, but is not limited to, spills of petroleum products or toxic chemicals, or damage to control facilities that could affect compliance.

b. Pursuant to California Water Code Section 13260 (c), any proposed material change in the character of the waste, manner or method of treatment or disposal, increase of discharge, or location of discharge, shall be reported to the Regional Board at least 120 days in advance of implementation of any such proposal. This shall include, but not be limited to, all significant soil disturbances.

c. The owner(s) of, and discharger upon, property subject to waste discharge requirements shall be considered to have a continuing responsibility for ensuring compliance with applicable waste discharge requirements in the operations or use of the owned property. Pursuant to California Water Code Section 13260(c), any change in the ownership and/or operation of property subject to the waste discharge requirements shall be reported to the Regional Board. Notification of applicable waste discharge requirements shall be furnished in writing to the new owners and/or operators and a copy of such notification shall be sent to the Regional Board.

d. If a discharger becomes aware that any information submitted to the Regional Board is incorrect, the discharger shall immediately notify the Regional Board, in writing, and correct that information.

e. Reports required by the waste discharge requirements, and other information requested by the Regional Board, must be signed by a duly authorized representative of the discharger. Under Section 13268 of the California Water Code, any person failing or refusing to furnish technical or monitoring reports, or falsifying any information provided therein, is guilty of a misdemeanor and may be liable civilly in an amount of up to one thousand dollars ($1000) for each day of violation.

f. If the discharger becomes aware that their waste discharge requirements are no longer needed (because the project will not be built or the discharge will cease) the discharger shall notify the Regional Board in writing and request that their waste discharge requirements be rescinded.

3. Right to Revise Waste Discharge Requirements

The Board reserves the privilege of changing all or any portion of the waste discharge requirements upon legal notice to and after opportunity to be heard is given to all concerned parties.

4. Duty to Comply

Failure to comply with the waste discharge requirements may constitute a violation of the California Water Code and is grounds for enforcement action or for permit termination, revocation and reissuance, or modification.

5. Duty to Mitigate

The discharger shall take all reasonable steps to minimize or prevent any discharge in violation of the waste discharge requirements which has a reasonable likelihood of adversely affecting human health or the environment.

6. Proper Operation and Maintenance

The discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the discharger to achieve compliance with the waste discharge requirements. Proper operation and maintenance includes adequate laboratory control, where appropriate, and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems that are installed by the discharger, when necessary to achieve compliance with the conditions of the waste discharge requirements.

7. Waste Discharge Requirement Actions

The waste discharge requirements may be modified, revoked and reissued, or terminated for cause. The filing of a request by the discharger for waste discharge requirement

modification, revocation and reissuance, termination, or a notification of planned changes or anticipated noncompliance, does not stay any of the waste discharge requirements conditions.

8. Property Rights

The waste discharge requirements do not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

9. Enforcement

The California Water Code provides for civil liability and criminal penalties for violations or threatened violations of the waste discharge requirements including imposition of civil liability or referral to the Attorney General.

10. Availability

A copy of the waste discharge requirements shall kept and maintained by the discharger and be available at all times to operating personnel.

11. Severability

Provisions of the waste discharge requirements are severable. If any provision of the requirements is found invalid, the remainder of the requirements shall not be affected.

12. Public Access

General public access shall be effectively excluded from treatment and disposal facilities.

13. Transfers

Providing there is no material change in the operation of the facility, this Order may be transferred to a new owner or operation. The owner/operator must request the transfer in writing and receive written approval from the Regional Board Executive Officer.

14. Definitions

a. "Surface waters" as used in this Order, include, but are not limited to, live streams, either perennial or ephemeral, which flow in natural or artificial water courses and natural lakes and artificial impoundments of waters. "Surface waters" does not include artificial water courses or impoundments used exclusively for wastewater disposal.

b. "Ground waters" as used in this Order, include, but are not limited to, all subsurface waters being above atmospheric pressure and the capillary fringe of these waters.

15. Storm Protection

All facilities used for collection, transport, treatment, storage, or disposal of waste shall be adequately protected against overflow, washout, inundation, structural damage or a significant reduction in efficiency resulting from a storm or flood having a recurrence interval of once in 100 years.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

MONITORING AND REPORTING PROGRAM NO. R6T-2003-0004
GENERAL WASTE DISCHARGE REQUIREMENTS

FOR

SMALL CONSTRUCTION PROJECTS, INCLUDING UTILITY, PUBLIC WORKS, AND MINOR STREAMBED/LAKEBED ALTERATION PROJECTS
LAHONTAN REGION
EXCLUDING THE LAKE TAHOE HYDROLOGIC UNIT

A. An inspection of the construction site shall be made daily during active construction and monthly during long periods of inactivity (e.g. winter), by the Discharger, resident engineer, superintendent, general contractor, or equivalent. The purpose of the inspection is to discover potential water quality problems at the construction site so that the Discharger can implement corrective measures. The following items should be inspected at the site, as applicable:

1. Damaged containment dikes or erosion fencing
2. Unauthorized access by vehicles and/or sediment tracking off the site
3. Boundary fence damage or removal
4. Disturbed areas with no erosion control protection
5. Evidence of any sediment leakage through erosion control fencing or containment dikes
6. Soil piles unprotected or located in drainage ways
7. Spilled chemicals, paints, fuels, oils, sealants, etc.
8. Upstream runoff diversion structures in place and operational
9. Any signs of downstream erosion from runoff discharges
10. Sediment accumulation within onsite storm water drainage facilities

B. Following completion of project construction, the Discharger shall submit a notice of completion and request for revocation of coverage under the permit. The notice of completion should include the following information:

1. Details on any modification from the construction plans to the proposed stormwater collection, treatment, or disposal facilities.

2. Details on any changes to the amount of impervious coverage for this project.

3. Any significant problems which occurred during project construction and remedial measures taken.

4. Statement that onsite stabilization/revegetation measures have been completed.

5. Certification that project is in compliance with the requirements of the General Permit.

The final report shall contain the name of the project and shall be signed and dated by the property owner or his legal representative. The report shall be submitted to the Regional Board office in South Lake Tahoe.

Ordered by Harold J. Singer Date: Jan 8, 2003
HAROLD J. SINGER
EXECUTIVE OFFICER

BA/cgT: Small Construction M&R

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
08	SBd	15	171.8/172.4, 173.8		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

RICARDO R. CARAIG JR. No. C57809 Exp. 03/31/15 CIVIL STATE OF CALIFORNIA REGISTERED PROFESSIONAL ENGINEER

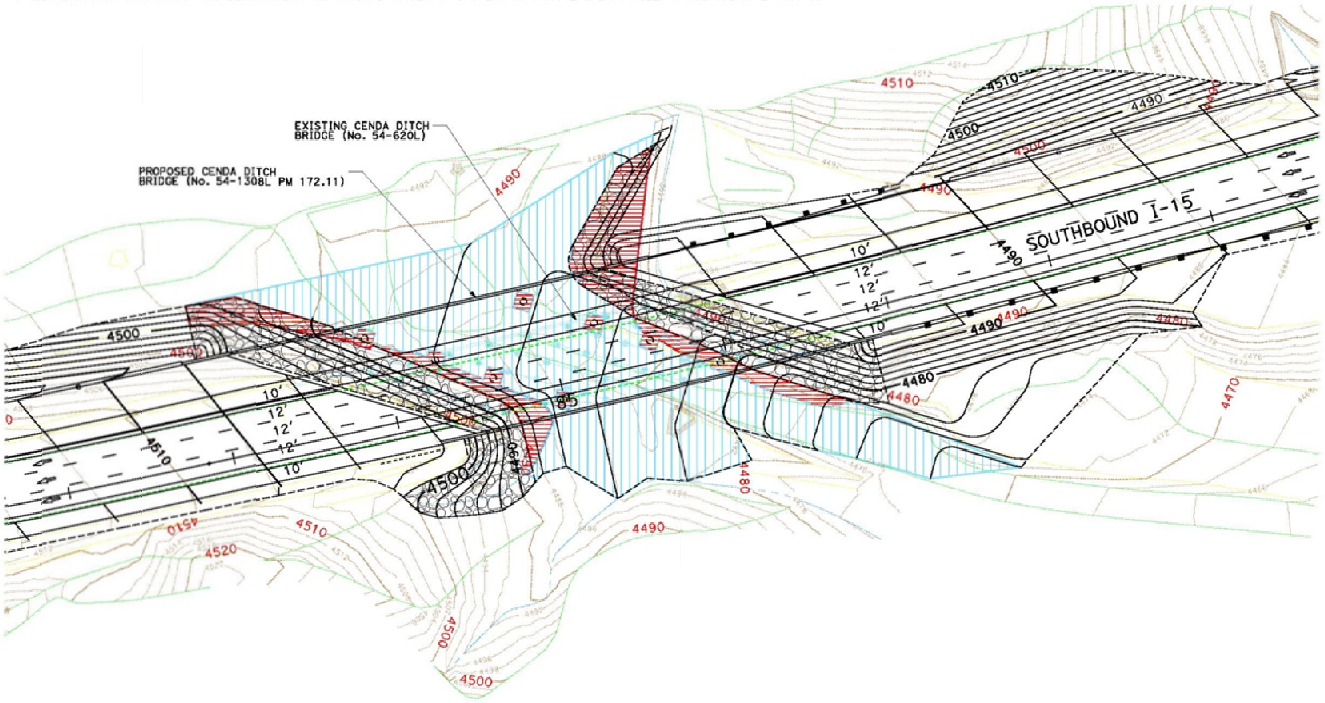
LEGEND

TOTAL AREA OF PERMANENT IMPACTS OF THE DITCH BED AT PROPOSED CENDA DITCH BRIDGE = 19367 SF (0.44 AC)

TOTAL AREA OF TEMPORARY IMPACTS OF THE DITCH BED AT PROPOSED CENDA DITCH BRIDGE = 25859 SF (0.59 AC)

NOTE:

1. THE TEMPORARY IMPACTS OF THE BED CONSISTS OF MINIMAL GRADING AND DOES NOT CHANGE THE PROFILE OF THE ORIGINAL GROUND.



CENDA DITCH BRIDGE BED IMPACTS

SCALE: 1"=30'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

12-DESIGN

FUNCTIONAL SUPERVISOR: SON NGUYEN

CALCULATED-DESIGNED BY: RICARDO R. CARAIG JR.

CHECKED BY: BANG NGUYEN

REVISED BY: RRCJR RRCJR RRCJR

DATE REVISED:

LAST REVISION DATE PLOTTED => 24-JUN-2014 TIME PLOTTED => 07:46

00-00-00

BORDER LAST REVISED 7/2/2010

USERNAME => s128089

DGN FILE => Total Disturbed Soil Areas @ Cenda Ditch and Wash Wash 08000004721ea.dgn IS IN INCHES

RELATIVE BORDER SCALE 0 1 2 3

UNIT 3000

PROJECT NUMBER & PHASE 08000004721

Enclosure 2

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
08	SBd	15	171.8/172.4, 173.6		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

RICARDO R. CARAIG JR. No. C57809 Exp. 03/31/16 CIVIL STATE OF CALIFORNIA

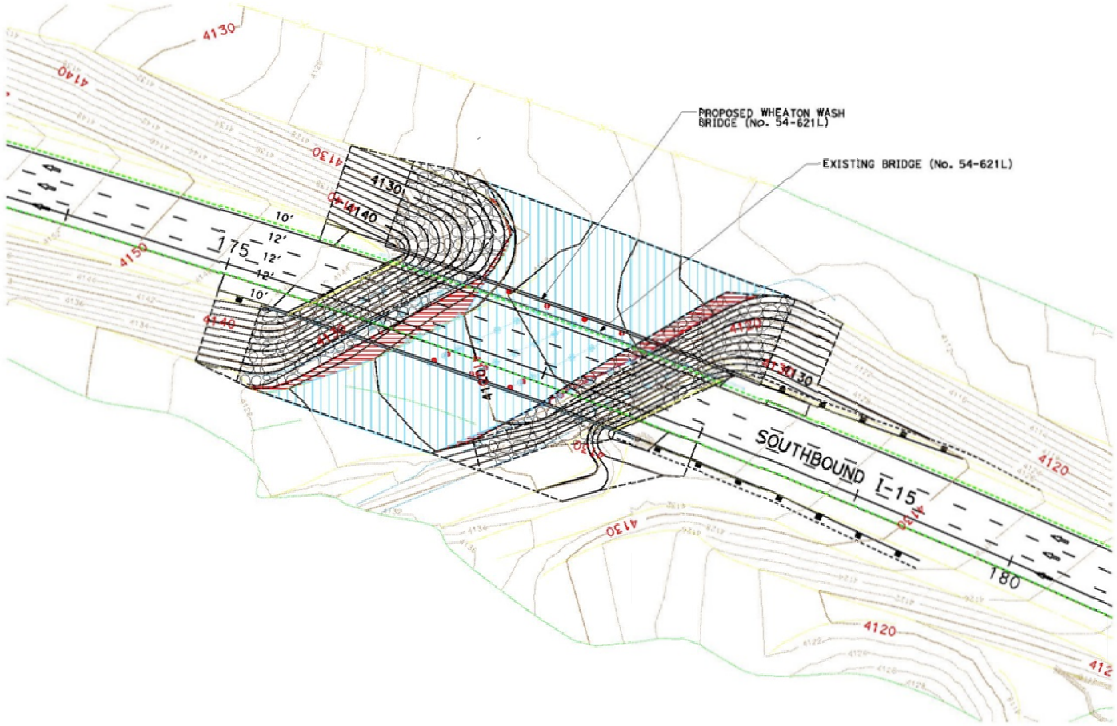
LEGEND

TOTAL AREA OF PERMANENT IMPACTS OF THE WASH BED AT PROPOSED WHEATON WASH BRIDGE = 2512 SF (0.06 AC)

TOTAL AREA OF TEMPORARY IMPACTS OF THE WASH BED AT PROPOSED WHEATON WASH BRIDGE = 16016 SF (0.38 AC)

NOTE:

1. THE TEMPORARY IMPACTS OF THE BED CONSISTS OF MINIMAL GRADING AND DOES NOT CHANGE THE PROFILE OF THE ORIGINAL GROUND.



WHEATON WASH BRIDGE BED IMPACTS

SCALE: 1"=30'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

12-DESIGN

FUNCTIONAL SUPERVISOR: SON NGUYEN

CALCULATED-DESIGNED BY: RICARDO R. CARAIG JR.

CHECKED BY: BANG NGUYEN

REVISED BY: RRCJR RRCJR RRCJR

DATE REVISED

LEGAL BLOCKER 00-00-00 DATE PLOTTED => 24-JUN-2014 TIME PLOTTED => 09:09

BORDER LAST REVISED 7/2/2010

USERNAME => s128048
DGN FILE => WHEATON WASH BRIDGE WASH BED IMPACTS.dgn

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 3000

PROJECT NUMBER & PHASE 08000004721

Enclosure 3

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Inland Deserts Region
3602 Inland Empire Blvd, Suite C-220
Ontario, CA 91764
www.wildlife.ca.gov

EDMUND G. BROWN, Jr., Governor
CHARLTON H. BONHAM, Director

November 14, 2014

Ricardo Caraig
California Department of Transportation
3347 Michelson Drive, Suite #100
Irvin, CA 92612

Subject: Notification of Lake or Streambed Alteration No. 1600-2014-0135-R6
Interstate 15 Cenda and Wheaton Wash Bridge Replacement/Widening Project

Dear Mr. Caraig,

The California Department of Fish and Wildlife (Department) had until November 3, 2014 to submit a draft Lake or Streambed Alteration Agreement (Agreement) to you or inform you that an Agreement is not required. The Department did not meet that date. As a result, by law, you may now complete the project described in your notification without an Agreement.

Please note that pursuant to Fish and Game Code section 1602(a)(4)(D), if you proceed with this project, it must be the same as described and conducted in the same manner as specified in the notification and any modifications to that notification received by the Department in writing prior to August 5, 2014. This includes completing the project within the proposed term and seasonal work period and implementing all avoidance and mitigation measures to protect fish and wildlife resources specified in the notification. If the term proposed in your notification has expired, you will need to re-notify the Department before you may begin your project. Beginning or completing a project that differs in any way from the one described in the notification may constitute a violation of Fish and Game Code section 1602.

Also note that while you are entitled to complete the project without an Agreement, you are still responsible for complying with other applicable local, state, and federal laws. These include, but are not limited to, the state and federal Endangered Species Acts and Fish and Game Code sections 5650 (water pollution) and 5901 (fish passage).

Finally, if you decide to proceed with your project without an Agreement, you must have a copy of this letter and your notification with all attachments available at all times at the work site. If you have any questions regarding this matter, please contact Rebecca Jones at 661- 285-5867 or **Rebecca.Jones@wildlife.ca.gov**.

Sincerely,

Ali Aghili
Senior Environmental Scientist (Supervisor)

cc: Rebecca Jones

CORE

FOR DEPARTMENT USE ONLY				
Date Received	Amount Received	Amount Due	Date Complete	Notification No.
	$	$		

STATE OF CALIFORNIA

DEPARTMENT OF FISH AND WILDLIFE

NOTIFICATION OF LAKE OR STREAMBED ALTERATION

Complete EACH field, unless otherwise indicated, following the enclosed instructions and submit ALL required enclosures. Attach additional pages, if necessary.

1. APPLICANT PROPOSING PROJECT

Name	Ricardo Caraig		
Business/Agency	California Department of Transportation		
Street Address	3347 Michelson Drive Suite #100		
City, State, Zip	Irvine, CA, 92612		
Telephone	(949) 724-2544	Fax	
Email	ricardo.caraig@dot.ca.gov		

2. CONTACT PERSON (*Complete only if different from applicant*)

Name	Chris Waterston		
Street Address	3347 Michelson Drive Suite #100		
City, State, Zip	Irvine, CA, 92612		
Telephone	(949) 724-2850	Fax	
Email	chris.waterston@dot.ca.gov		

3. PROPERTY OWNER (*Complete only if different from applicant*)

Name	Bureau of Land Management		
Street Address	22835 Calle San Juan de los Lagos		
City, State, Zip	Moreno Valley, CA 92553		
Telephone	(951) 697-5200	Fax	
Email			

4. PROJECT NAME AND AGREEMENT TERM

A. Project Name	Interstate 15 Cenda and Wheaton Wash Bridge Replacement/Widening Project			
B. Agreement Term Requested	☑ Regular (*5 years or less*) ☐ Long-term (*greater than 5 years*)			
C. Project Term		D. Seasonal Work Period		E. Number of Work Days
Beginning (*year*)	Ending (*year*)	Start Date (*month/day*)	End Date (*month/day*)	
2016	2017	UNK	UNK	

5. AGREEMENT TYPE

Check the applicable box. If box B, C, D, or E is checked, complete the specified attachment.		
A.	☑ Standard *(Most construction projects, excluding the categories listed below)*	
B.	☐ Gravel/Sand/Rock Extraction (*Attachment A*)	*Mine I.D. Number:* _____
C.	☐ Timber Harvesting (*Attachment B*)	THP *Number:* _____
D.	☐ Water Diversion/Extraction/Impoundment (*Attachment C*)	*SWRCB Number:* _____
E.	☐ Routine Maintenance (*Attachment D*)	
F.	☐ CDFW Fisheries Restoration Grant Program (FRGP)	*FRGP Contract Number* _____
G.	☐ Master	
H.	☐ Master Timber Harvesting	

6. FEES

Please see the current fee schedule to determine the appropriate notification fee. Itemize each project's estimated cost and corresponding fee. ***Note: The Department may not process this notification until the correct fee has been received.***

	A. Project	B. Project Cost	C. Project Fee
1	Interstate 15 Cenda and Wheaton Wash Bridge Replacement/Widening Project	$15.9 Million	4,912.25
2			
3			
4			
5			
		D. Base Fee *(if applicable)*	
		E. TOTAL FEE ENCLOSED	4,912.25

7. PRIOR NOTIFICATION OR ORDER

A. Has a notification previously been submitted to, or a Lake or Streambed Alteration Agreement previously been issued by, the Department for the project described in this notification?

☐ Yes (*Provide the information below*) ☑ No

Applicant: _____ Notification Number: _____ Date: _____

B. Is this notification being submitted in response to an order, notice, or other directive ("order") by a court or administrative agency (including the Department)?

☑ No ☐ Yes (*Enclose a copy of the order, notice, or other directive. If the directive is not in writing, identify the person who directed the applicant to submit this notification and the agency he or she represents, and describe the circumstances relating to the order.*)

☐ *Continued on additional page(s)*

8. PROJECT LOCATION

A. Address or description of project location.

(*Include a map that marks the location of the project with a reference to the nearest city or town, and provide driving directions from a major road or highway*)

Cenda Ditch (Br No. 54-620L PM 172.11) and Wheaton Wash (Br No. 54-621L PM 173.84)
San Bernardino, CA on Interstate 15 approximately 14 miles south of the Nevada State Line between Nipton and Bailey Road.
Map Attached

☐ *Continued on additional page(s)*

B. River, stream, or lake affected by the project.	Ivanpath Dry Lake
C. What water body is the river, stream, or lake tributary to?	
D. Is the river or stream segment affected by the project listed in the state or federal Wild and Scenic Rivers Acts?	☐ Yes ☑ No ☐ Unknown
E. County	San Bernardino

F. USGS 7.5 Minute Quad Map Name	G. Township	H. Range	I. Section	J. ¼ Section
Cenda Ditch Bridge (Mescal Range)	16N	14E	31	
Wheaton Wash Bridge (Mineral Hill)	16N	14E	31	

☐ *Continued on additional page(s)*

K. Meridian (*check one*) ☐ Humboldt ☐ Mt. Diablo ☑ San Bernardino

L. Assessor's Parcel Number(s)

N/A

☐ *Continued on additional page(s)*

M. Coordinates (*If available, provide at least latitude/longitude or UTM coordinates and check appropriate boxes)*

Latitude/Longitude	*Latitude:* 35/28/6.99	*Longitude:* 115/31/2.49	
	☑ Degrees/Minutes/Seconds	☐ Decimal Degrees	☐ Decimal Minutes
UTM	*Easting:*	*Northing:*	☐ Zone 10 ☐ Zone 11
Datum used for Latitude/Longitude or UTM	☐ NAD 27	☑ NAD 83 or WGS 84	

9. PROJECT CATEGORY AND WORK TYPE *(Check each box that applies)*

PROJECT CATEGORY	NEW CONSTRUCTION	REPLACE EXISTING STRUCTURE	REPAIR/MAINTAIN EXISTING STRUCTURE
Bank stabilization – bioengineering/recontouring	☐	☐	☐
Bank stabilization – rip-rap/retaining wall/gabion	✓	✓	✓
Boat dock/pier	☐	☐	☐
Boat ramp	☐	☐	☐
Bridge	✓	✓	✓
Channel clearing/vegetation management	☐	☐	☐
Culvert	☐	☐	☐
Debris basin	☐	☐	☐
Dam	☐	☐	☐
Diversion structure – weir or pump intake	☐	☐	☐
Filling of wetland, river, stream, or lake	☐	☐	☐
Geotechnical survey	☐	☐	☐
Habitat enhancement – revegetation/mitigation	☐	☐	☐
Levee	☐	☐	☐
Low water crossing	☐	☐	☐
Road/trail	☐	☐	☐
Sediment removal – pond, stream, or marina	☐	☐	☐
Storm drain outfall structure	☐	☐	☐
Temporary stream crossing	☐	☐	☐
Utility crossing : Horizontal Directional Drilling	☐	☐	☐
Jack/bore	☐	☐	☐
Open trench	☐	☐	☐
Other *(specify)*:	☐	☐	☐

10. PROJECT DESCRIPTION

A. Describe the project in detail. Photographs of the project location and immediate surrounding area should be included.

- Include any structures (e.g., rip-rap, culverts, or channel clearing) that will be placed, built, or completed in or near the stream, river, or lake.
- Specify the type and volume of materials that will be used.
- If water will be diverted or drafted, specify the purpose or use.

Enclose diagrams, drawings, plans, and/or maps that provide all of the following: site specific construction details; the dimensions of each structure and/or extent of each activity in the bed, channel, bank or floodplain; an overview of the entire project area (i.e., "bird's-eye view") showing the location of each structure and/or activity, significant area features, and where the equipment/machinery will enter and exit the project area.

This project proposes to replace and rehabilitate existing bridges at Cenda Ditch (Br No. 54-620L PM 172.11) and Wheaton Wash (Br No. 54-621L PM 173.84), located in San Bernardino County on southbound (SB) Interstate 15 approximately 14 miles south of the Nevada State Line between Bailey Road and Nipton Road. The existing bridges will be replaced and rehabilitated to fix extensive abutment, soffit, and bent cap cracking. The recommended proposal to improve the deteriorating bridges is to replace completely Cenda Ditch bridge with a new bridge and replace the existing widened portion of Wheaton Wash Bridge with a new widened structure and rehabilitate the remaining original structure. Both bridges do not have standard shoulders; therefore, additional bridge width will be required.

☐ *Continued on additional page(s)*

B. Specify the equipment and machinery that will be used to complete the project.

Graders, Concrete Pumps, Concrete Vibrators, Asphalt Pavers, Fork Lift Trucks, Hammers, Traffic Control Safety Devices, Scrapers, Sand Blasting Equipment, Rollers, Pavement Grinders, Loaders, Hydraulic Cranes, Excavators, Air Tools, Augers, Compactors, Concrete Mixers, Electric Generators, Electric Powered Hand Tools, Pumps, Saws, Tractors, Welding Equipment, Trailers, Shovels, and Leads.

☐ *Continued on additional page(s)*

C. Will water be present during the proposed work period (specified in box 4.D) in the stream, river, or lake (specified in box 8.B).	☐ Yes ☑ No (*Skip to box 11*)
D. Will the proposed project require work in the wetted portion of the channel?	☐ Yes (*Enclose a plan to divert water around work site*) ☐ No

11. PROJECT IMPACTS

A. Describe impacts to the bed, channel, and bank of the river, stream, or lake, and the associated riparian habitat. Specify the dimensions of the modifications in length (linear feet) and area (square feet or acres) and the type and volume of material (cubic yards) that will be moved, displaced, or otherwise disturbed, if applicable.

See Attached Description

☐ *Continued on additional page(s)*

B. Will the project affect any vegetation? ☑ Yes (*Complete the tables below*) ☐ No

Vegetation Type	Temporary Impact	Permanent Impact
Mojave Mixed Woody Scrub/Blackbush Scrub	Linear feet: _____ Total area: 1.0 acre (estimate)	Linear feet: _____ Total area: 0.94 acre (estimate)
Mojave Mixed Woody Scrub/Creosote Bush Scrub	Linear feet: _____ Total area: 0.70 acre (estimate)	Linear feet: _____ Total area: 0.65 acre (estimate)

Tree Species	Number of Trees to be Removed	Trunk Diameter (range)

☐ *Continued on additional page(s)*

C. Are any special status animal or plant species, or habitat that could support such species, known to be present on or near the project site?

☑ Yes *(List each species and/or describe the habitat below)* ☐ No ☐ Unknown

Desert tortoise (Gopherus agassizii)

☐ *Continued on additional page(s)*

D. Identify the source(s) of information that supports a "yes" or "no" answer above in Box 11.C.

Biological Assessment 2012 and USFWS Letter of Concurrence 2012

☐ *Continued on additional page(s)*

E. Has a biological study been completed for the project site?

☑ Yes (*Enclose the biological study*) ☐ No

Note: A biological assessment or study may be required to evaluate potential project impacts on biological resources.

F. Has a hydrological study been completed for the project or project site?

☑ Yes (*Enclose the hydrological study*) ☐ No

Note: A hydrological study or other information on site hydraulics (e.g., flows, channel characteristics, and/or flood recurrence intervals) may be required to evaluate potential project impacts on hydrology.

12. MEASURES TO PROTECT FISH, WILDIFE, AND PLANT RESOURCES

A. Describe the techniques that will be used to prevent sediment from entering watercourses during and after construction.

Caltrans standard best management practices (BMPs) will be incorporated into the Project in order to avoid impacting the Wheaton Dry Wash during construction. Furthermore, slopes will be stabilized with 1/2 ton rock and vegetation will be planted to aid in erosion control of the abutment slopes leading up to both the Wheaton and Cenda Bridges.

☐ *Continued on additional page(s)*

B. Describe project avoidance and/or minimization measures to protect fish, wildlife, and plant resources.

This Project will comply with mitigation measures outlined in the Ventura USFWS Letter of Concurrence (LOC) dated May 24th, 2012. (Attached)

☐ *Continued on additional page(s)*

C. Describe any project mitigation and/or compensation measures to protect fish, wildlife, and plant resources.

See Attached USFWS LOC

☐ *Continued on additional page(s)*

13. PERMITS

List any local, state, and federal permits required for the project and check the corresponding box(es). Enclose a copy of each permit that has been issued.

A. Notice of Intent (NOI) CA State Water Quality Control Board, Region 6 Lahontan — ☑ Applied ☐ Issued

B. USFWS Letter of Concurrence (LOC) May 2012, Ventura Office — ☐ Applied ☑ Issued

C. _____ — ☐ Applied ☐ Issued

D. Unknown whether ☐ local, ☐ state, or ☐ federal permit is needed for the project. (*Check each box that applies*)

☐ *Continued on additional page(s)*

14. ENVIRONMENTAL REVIEW

A. Has a draft or final document been prepared for the project pursuant to the California Environmental Quality Act (CEQA), National Environmental Protection Act (NEPA), California Endangered Species Act (CESA) and/or federal Endangered Species Act (ESA)?

☑ Yes (*Check the box for each CEQA, NEPA, CESA, and ESA document that has been prepared and enclose a copy of each*)

☐ No (*Check the box for each CEQA, NEPA, CESA, and ESA document listed below that will be or is being prepared*)

☐ Notice of Exemption	☑ Mitigated Negative Declaration	☐ NEPA document (*type*): CE
☑ Initial Study	☐ Environmental Impact Report	☐ CESA document (*type*): IS/MND
☐ Negative Declaration	☐ Notice of Determination *(Enclose)*	☑ ESA document (*type*): BA/LOC
☐ THP/ NTMP	☐ Mitigation, Monitoring, Reporting Plan	

B. State Clearinghouse Number (*if applicable*)			
C. Has a CEQA lead agency been determined?	☑ Yes (*Complete boxes D, E, and F*)	☐ No (*Skip to box 14.G*)	
D. CEQA Lead Agency	Caltrans		
E. Contact Person	Paul Cochran	F. Telephone Number	(949) 724-2861

G. If the project described in this notification is part of a larger project or plan, briefly describe that larger project or plan.

☐ *Continued on additional page(s)*

H. Has an environmental filing fee (Fish and Game Code section 711.4) been paid?

☑ Yes (*Enclose proof of payment*) ☐ No (*Briefly explain below the reason a filing fee has not been paid)*

Note: If a filing fee is required, the Department may not finalize a Lake or Streambed Alteration Agreement until the filing fee is paid.

15. SITE INSPECTION

Check one box only.

☑ In the event the Department determines that a site inspection is necessary, I hereby authorize a Department representative to enter the property where the project described in this notification will take place at any reasonable time, and hereby certify that I am authorized to grant the Department such entry.

☐ I request the Department to first contact (*insert name*) _____ at (*insert telephone number*) _____ to schedule a date and time to enter the property where the project described in this notification will take place. I understand that this may delay the Department's determination as to whether a Lake or Streambed Alteration Agreement is required and/or the Department's issuance of a draft agreement pursuant to this notification.

16. DIGITAL FORMAT

Is any of the information included as part of the notification available in digital format (i.e., CD, DVD, etc.)?

☐ Yes (Please enclose the information via digital media with the completed notification form)

☑ No

17. SIGNATURE

I hereby certify that to the best of my knowledge the information in this notification is true and correct and that I am authorized to sign this notification as, or on behalf of, the applicant. I understand that if any information in this notification is found to be untrue or incorrect, the Department may suspend processing this notification or suspend or revoke any draft or final Lake or Streambed Alteration Agreement issued pursuant to this notification. I understand also that if any information in this notification is found to be untrue or incorrect and the project described in this notification has already begun, I and/or the applicant may be subject to civil or criminal prosecution. I understand that this notification applies only to the project(s) described herein and that I and/or the applicant may be subject to civil or criminal prosecution for undertaking any project not described herein unless the Department has been separately notified of that project in accordance with Fish and Game Code section 1602 or 1611.

Signature of Applicant or Applicant's Authorized Representative

07/14/2014
Date

RICARDO R. CARAIG JR.
Print Name

ASBESTOS CONTAINING MATERIALS AND LEAD-BASED PAINT SURVEY REPORT

REPLACE WHEATON WASH, BRIDGE NO. 54-0621L
REPLACE CENDA DITCH, BRIDGE NO. 54-0620L
08-SBD-15-PM 173.6/174 AND 171.8/172.4
SAN BERNARDINO COUNTY, CALIFORNIA
PN: 08-0000-04721 (EA#0M2801)
TASK ORDER #16
CONTRACT 08A2047

PREPARED FOR:

CALIFORNIA DEPARTMENT OF TRANSPORTATION, DISTRICT 8
464 WEST FOURTH STREET, 6TH FLOOR
SAN BERNARDINO, CALIFORNIA 92401-1400

June 30, 2013

PREPARERS

This asbestos containing materials (ACM) and lead-based paint (LBP) survey report has been prepared under the direction of the following environmental professionals:

- Kevin K. Miskin, P.E.,
  Stantec Consulting Corporation,
  M.S., Civil Engineering, Purdue University, West Lafayette, Indiana.
  ACM/LBP Report Senior Reviewer.

- Tammy Lapp,
  Stantec Consulting Corporation,
  Certified Asbestos Consultant/Cal-DOSH,
  Lead-Related Construction Inspector/Cal DHS.,
  ACM/LBP Investigation Report Author.

If you have any questions or comments regarding the information enclosed herein, please contact the undersigned at your convenience.

Respectfully submitted,
Stantec Consulting Services Inc.

Tammy Lapp, CAC 91-2969
Stantec Task Order Manager
Certified Asbestos Consultant/Cal-DOSH
LRCIA No. 12810
Tel: 909.754.1688
Email: Tammy.Lapp@stantec.com

Kevin K. Miskin, PE C48458
Stantec Project Manager
Tel: 909.255.8210
Email: Kevin.Miskin@stantec.com

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LIST OF ACRONYMS

ACM –	Asbestos Containing Material
ACCM –	Asbestos-Containing Construction Material
AHERA –	Asbestos Hazard Emergency Response Act
Cal-DHS –	California Department of Health Services
Cal-DOSH –	California Division of Occupational Safety and Health
Cal-OSHA –	California Division of Occupational Safety and Health Administration
Caltrans –	California Department of Transportation, District 8
CCR –	California Code of Regulations
CERCLA –	Comprehensive Environmental Response, Compensation and Liability Act
CFR –	Code of Federal Regulations
DTSC –	Department of Toxic Substances Control
ELAP –	Environmental Laboratory Accreditation Program
EMC –	Environmental Management Consultant
HUD –	Department of Housing and Urban Development
LBP –	Lead-Based Paint
Mg/kg –	Milligrams per Kilogram
Mg/L –	Milligrams per Liter
ND –	None Detected
NESHAP –	National Emission Standard for Hazardous Air Pollutants
NVLAP –	National Voluntary Laboratory Accreditation Program
O&M –	Operations & Management
PEL –	Permissible Exposure Limit
PLM –	Polarized Light Microcopy
ppm –	parts per million
QA/QC –	Quality Assurance/Quality Control
RACM –	Regulated Asbestos-Containing Material
RCRA -	Resource Conservation and Recovery Act
MDAQMD –	Mojave Desert Air Quality Management District
SOP –	Standard of Procedure
TCLP –	Toxicity Leaching Characteristic Procedure
TSI –	Thermal System Insulation
US EPA –	United States Environmental Protection Agency

1.0 EXECUTIVE SUMMARY

This document describes the results of an asbestos containing materials (ACM) and lead-based paint (LBP) survey performed at the request of Caltrans for the Cenda Ditch Bridge (Bridge #54-0620L) and Wheaton Wash Bridge (Bridge #54-0621L) located along Interstate 15, in the unincorporated area of Mountain Pass, in the county of San Bernardino, state of California. The ACM/LBP surveys were performed to support Caltrans proposed demolition and reconstruction of the existing Cenda Ditch and Wheaton Wash Bridges.

Suspected ACMs were sampled and analyzed using Polarized Light Microscopy (PLM) techniques in accordance with methodology approved by the United States Environmental Protection Agency (US EPA). According to the US EPA, ACM is defined as material containing more than one percent asbestos. The lower limit of reliable detection for asbestos using the PLM method is approximately one percent by volume; however, California Division of Occupational Safety and Health Administration (Cal-OSHA) defines ACMs as those materials having an asbestos content greater than one-tenth of one percent (>0.1%).

In addition, an LBP survey was conducted by collecting samples of suspect paint and analyzing them by Environmental Management Consultant's Standard of Procedure (EMC SOP) Method #L01/1, after US EPA SW-846 Method 7420. The US EPA defines Lead-Based Paint as: paint, varnish, shellac, or other coating on surfaces that contains 0.5 percent or more lead by weight.

The following is a description of materials that contain greater than one-percent asbestos (US Environmental Protection Agency (USEPA), Regulated Asbestos Containing Materials (RACM), or Category 1 materials), that may become friable if disturbed (such as during demolition activities).

Cenda Ditch Bridge (54-0620L):
Guardrail Post Shims

- 25 guardrail posts were observed on each side of the bridge (50 total)
- Approximately 37 leveling shims were observed on the bridge (shims measured ~8 inches by 8 inches)
- A total estimated area of approximately 16.4 square feet of asbestos containing shim material.

Wheaton Wash Bridge (54-0621L):
Guardrail Post Shims

- 24 guardrail posts were observed on each side of the bridge (48 total)
- Approximately 16 leveling shims were observed on the bridge
- A total estimated area of approximately 7.1 square feet of asbestos containing shim material.

The following materials were sampled and no asbestos was detected. (This list should not be construed as being a complete listing of all building materials observed within the structures.)

- Structural Concrete (Structural bridge, deck and Pillars/Columns)
- Roadway Asphalt

- Expansion Joint felt
- Structural mastic

Prior to demolition activities, a licensed asbestos abatement firm should be contracted to remove and dispose of identified asbestos containing materials. This work should be completed in accordance with the Mojave Desert Air Quality Management District (MDAQMD) guidelines.

An inspection of the bridge components was conducted to evaluate the location and condition of painted surfaces and random surfaces suitable for LBP sampling. No surfaces on the bridge structure were observed to be painted. Samples of both yellow and white roadway striping were collected at random locations on each bridge for lead analysis.

Because representative paint chip samples collected and analyzed from both the Cenda Ditch and Wheaton Wash Bridges were below the action levels of 0.5 percent lead by weight and 5,000 ppm, no special requirements pertaining to lead-based paint would apply during future demolition or construction/improvements to the bridge. However, if Caltrans intends to strip the paint, additional testing should be performed to evaluate whether the paint itself qualifies as a hazardous waste.

In general, total lead concentrations in excess of 50 mg/kg are suspected to exhibit soluble concentrations in excess of the California STLC (STLC = 5 mg/L) when extracted using the California Waste Extraction Test. Similarly, total concentrations in excess of 100 mg/kg are suspected to exhibit soluble concentrations in excess of the federal toxicity characteristic level (TCLP = 5 mg/L) when analyzed by the toxicity characteristic leaching potential (TCLP) method. The lead concentrations in the paint striping were reported at less than 100 mg/Kg. Consequently, it is unlikely that the paint would qualify as a RCRA hazardous waste but could potentially qualify as a California Hazardous waste.

If the paint is stripped separately from the asphalt/concrete, the paint should be containerized, tested, and profiled for disposition to evaluate whether the paint qualifies as a California hazardous waste based on soluble lead concentrations. If structural components are disposed with paint coating intact it is unlikely that such wastes will qualify as a hazardous waste based on the volume of other structural components with respect to the volume of lead-based paint.

Attempts were made to access all areas of the structure; however, during demolition activities, suspect ACM/LBP materials may be uncovered or discovered in areas that are currently not readily accessible. If found, these ACM/LBP materials should be sampled and analyzed prior to disturbance.

2.0 SITE DESCRIPTION AND FORMER REPORT REVIEW

2.1 SITE DESCRIPTION

At the time of Stantec's inspection, the Cenda Ditch and Wheaton Wash Bridges were functional two-lane overpass bridges along Interstate 15 (I-15; Figure 1). The bridges are located just north of the Bailey Road exit off I-15 in the unincorporated community of Mountain Pass in San Bernardino County, California. Stantec understands that Caltrans is proposing to remove the existing bridges and replace them with new structures. The project will require demolition of the existing Cenda Ditch and Wheaton Wash bridges.

According to the California *Log of Bridges on State Highways, District 8* prepared by Caltrans, dated January 2013, the bridge construction information is as follows:

POST MILE	BRIDGE NUMBER(1)	BRIDGE NAME	STRUCTURE TYPE(2)	LENGTH (meters/ feet)	WIDTH (meters/ feet)	YEAR BUILT	YEAR WIDENED
172.11	54-0620L	Cenda Ditch	201	67.1/220.1	16.2/53.1	1963	1969
173.84	54-0621L	Wheaton Wash	201	64.9/212.9	16.2/53.1	1963	1969

NOTES:

(1) L=left bridge

(2) Structure type coding: 2=concrete continuous, 01=slab

A photographic log of building components and current Site conditions is provided as Section 6.0.

2.2 FORMER REPORT REVIEW

No former reports were provided for review nor was there any indication of former asbestos or lead-based paint related documents pertaining to the Cenda Ditch and Wheaton Wash bridges.

3.0 INTRODUCTION

This document describes the results of an ACM and LBP survey performed at the request of Caltrans for the Cenda Ditch and Wheaton Wash Bridges located along I-15, approximately 98 miles north of Barstow, in the unincorporated area of Mountain Pass in the county of San Bernardino, state of California. The ACM/LBP surveys were performed to support Caltrans proposed demolition and reconstruction of the existing Cenda Ditch and Wheaton Wash bridges.

The objectives of the surveys were to identify, estimate quantities of, and assess the condition/friability of asbestos within the building components, and the content of lead on painted surfaces of the Site structures. These objectives were met by completing the following tasks:

- Perform a visual inspection and destructive sampling for asbestos following criteria outlined in the Asbestos Hazard Emergency Response Act (AHERA) to identify sources of friable and non-friable ACMs.
- Collect bulk samples of suspect asbestos containing materials.
- Collect paint chip samples off painted surfaces.
- Submit bulk samples to a certified laboratory for analysis.
- Compile the findings into a report.
- Ensure the technical quality of all work by using AHERA-accredited Inspectors and Management Planners, Certified Consultants, and a proven Quality Assurance/Quality Control (QA/QC) Program.

The ACM/LBP survey field activities consisted of a visual inspection and sampling of existing representative building materials to identify potential ACMs and LBP.

Bulk samples of suspect ACMs and LBP were collected using destructive techniques in selected representative locations. The visual inspection, bulk sampling, and survey documentation was performed by Mr. Jason Stagno. Mr. Stagno is accredited by the California Division of Occupational Safety and Health (Cal-DOSH) as a Certified Asbestos Consultant, No. 12-4949 and by the State of California Department of Public Health (CDPH) as a Lead Inspector/Assessor No. 19068. The procedures followed, sampling activities, and reporting were conducted under the oversight of Ms. Tammy Lapp. Ms. Lapp is accredited by the Cal-DOSH as a Certified Asbestos Consultant, No. 91-2969 and by the CDPH as a Lead Inspector/Assessor and Project Monitor No. 12810. Qualifications are presented in Appendix A.

Attempts were made to access all areas of the structures, however, during demolition activities if any suspect ACM/LBP materials are uncovered that were not previously sampled, representative samples should be collected and analyzed prior to disturbance.

4.0 ASBESTOS SURVEY

4.1 BACKGROUND

Asbestos is a common term for a group of naturally occurring mineral fibers. Due to its durability and insulating quality, it was used in a wide variety of building products including structural fireproofing, pipe and duct insulation, plasters, roofing, floor tile, and vinyl floor sheeting. Adverse health effects have been associated with the inhalation of airborne asbestos fibers by asbestos industry workers. The asbestos fibers that are tightly bound in building materials do not represent an exposure hazard unless disturbed in such a way that releases airborne fibers (i.e., cutting, drilling, or sanding). By June of 1978, the US EPA had effectively banned the use of asbestos in spray application products such as structural fireproofing and acoustic ceilings, pipe-lagging, joint compounds, and spackles. Asbestos is still used in the manufacture of non-friable products such as vinyl floor tile and roofing materials.

4.2 CURRENT REGULATIONS

The following sections summarize current state and federal regulations which contain requirements related to the performance of building surveys for asbestos. These summaries are not intended to be all inclusive and do not contain every aspect of the regulations discussed. Regulations pertaining to the removal and disposal of ACMs are not included.

4.2.1 Environmental Protection Agency National Emission Standard for Hazardous Air Pollutants

Under the National Emission Standard for Hazardous Air Pollutants (NESHAP), regulation 40 CFR Part 61, no visible emissions are allowed during building demolition or renovation activities which involve RACMs. For this reason, all buildings must be surveyed for ACMs prior to demolition or renovation. The US EPA and/or the local air quality management district which implements US EPA actions must be notified prior to any building demolition even if no ACMs are present. RACM is defined as any material with an asbestos content of greater than one percent and is friable, or Category I non-friable ACM that has or will become friable, or Category II friable ACM that may become or will become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation.

According to NESHAP, ACM is material containing more than one percent asbestos as determined using the methods specified in Appendix A, Subpart E, 40 CFR Part 763, Section 1, PLM. The NESHAP classifies ACM as friable or non-friable. Friable ACM is ACM that contains more than one percent asbestos and when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.

Non-friable ACM also contains more than one percent asbestos and is further classified as either Category I ACM or Category II ACM. The materials are distinguished by their potential to release fibers when damaged. Category I ACMs are much more likely to release fibers when damaged. Examples of Category I ACM include acoustical ceilings. Category II materials are less likely to release fibers. Examples of Category II ACM include other non-friable ACM; such as transite pipe and transite boards or panels.

In accordance with the US EPA's NESHAP regulation, facilities planned for renovation or demolition must be surveyed for the total amount of RACM, Category I Non-friable Asbestos Containing Materials, and Category II Non-friable Asbestos Containing Materials prior to the planned renovation or demolition.

4.2.2 Mojave Desert Air Quality Management District

The Mojave Desert Air Quality Management District (MDAQMD) is a government agency that regulates sources of air pollution within the area of the Cenda Ditch and Wheaton Wash Bridges. The District's regulating and enforcement authority comes from state law and, in certain cases, federal law. In response to the NESHAP requirements, MDAQMD implemented procedures that pertain to demolition/renovation activities including the removal and associated disturbance of ACMs. These requirements for demolition and renovation activities include notification, ACM removal procedures, time schedules, ACM handling and cleanup procedures, storage, disposal, and landfill requirements for asbestos-containing waste materials. These procedures are applicable to owners and operators of any demolition or renovation activity and associated disturbance of ACMs. Failure to comply could result in violations that carry daily penalties (penalties assessment is based upon the size of the project and severity of noncompliance).

4.2.3 Asbestos Hazard Emergency Response Act

The Asbestos Hazard Emergency Response Act (AHERA) requires performance of asbestos surveys and the development of Asbestos Management Plans for all of the nation's primary and secondary schools. The general procedures mandated under AHERA are considered the industry standard and are applied to all surveys performed.

4.2.4 California Occupational Safety and Health Administration (Cal-OSHA)

Per Cal-OSHA standards, 1926.1101, Asbestos-Containing Construction Materials (ACCMs) are defined as any material with an asbestos content greater than one-tenth of one percent (>0.1%). Cal-OSHA sets forth work requirements for disturbance of ACCMs including removal operations for all types of ACCMs. The requirements have been classified as Class I, Class II, Class III, or Class IV Asbestos related work. The classes are distinguished by their potential to release fibers. Cal-OSHA prescribes specific engineering controls and work practices for each Class of Asbestos related Work.

- ❑ Class I – This Class refers to removal of ACMs identified as Thermal System Insulation (TSI) or surfacing (sprayed-on or troweled-on) materials. These materials are generally considered friable.
- ❑ Class II – This Class refers to removal of ACMs identified that are not TSI or surfacing materials. These materials are generally considered non-friable.
- ❑ Class III – This Class refers to repair and maintenance operations of all identified ACMs.
- ❑ Class IV – This Class refers to incidental contact with identified ACMs such as custodial staff.

4.2.5 California Health and Safety Code

The California Health and Safety Code 25915 (former Connelly Bill) requires all building owners in the State of California to provide written notification to employees, tenants, and contractors of the presence and location of ACCMs within their buildings. Some exclusion to the notification rule for restricted access areas is allowed. All documentation related to asbestos surveys (and air monitoring) must be made available to employees, tenants, or contractors for review. ACCMs are defined as any materials with an asbestos content greater than one-tenth of one percent (>0.1%).

The California Health and Safety Code also require that a seller with any knowledge of ACMs on a property disclose such information or knowledge to other parties involved in a real estate transaction.

4.3 ASBESTOS REMOVAL AND BUILDING DEMOLITION/RENOVATION

In accordance with the US EPA's NESHAPs regulation and the MDAQMD, all structures planned for renovation or demolition must be surveyed for ACMs prior to the planned renovation or demolition. Subsequent removal of identified ACMs is also required. Removal involves, to the greatest extent practical, the complete removal, disposal, and replacement, if necessary, of the ACMs. Removal usually also requires encapsulation of the remaining structure to lock down residual fibers which may exist. Removal of ACMs is required prior to renovation and/or demolition activities.

The US EPA and MDAQMD require removal of all ACMs prior to demolition or renovation. RACMs and Category I and II ACMs include friable and non-friable materials which have or will become friable by demolition or renovation activities.

4.4 ACM SURVEY METHODOLOGY

4.4.1 Visual Inspection

Building materials were visually inspected for asbestos using the methods presented in the Federal AHERA regulations (40 CFR, Part 763) as a guideline. The principles presented under the US EPA Asbestos-Containing Materials in Schools, Final Rule and Notice is generally accepted as the industry standard for ACM inspections. Potential ACMs were also physically assessed for friability, condition, and disturbance factors.

Reasonable efforts were made to locate and sample materials representative of the entire site. However, for any structure the existence of unique or concealed materials or debris is a possibility. It is common practice to collect additional bulk samples during actual abatement or demolition activities when hidden suspect ACMs are discovered.

4.4.2 Bulk Sampling for Asbestos

Bulk samples of all homogeneous materials containing suspect ACMs were collected. A homogeneous material is defined as a surfacing material, thermal system insulation, or miscellaneous material that is uniform in use, color, and texture.

Bulk samples were collected to evaluate if there is any asbestos in representative materials. The sample result identifies the percentage of each type of asbestos detected.

AHERA sample criteria guidelines are followed to evaluate the number of samples collected off each homogeneous area as identified in the table below.

AHERA Sample Criteria	
Type of Material (Homogeneous area)	*AHERA Recommended Number of Samples (per Homogeneous Material)*
Surfacing (sprayed/troweled) ex. acoustical ceilings: Less than 1000 ft^2 1000 – 5000 ft^2 Greater than 5000 ft^2	 Three Five Seven
Thermal System Insulation such as pipe insulation and wrap	Three
Miscellaneous Materials such as (but not limited to) floor tile, drywall, and roofing.	Number of samples is the discretion of the Building Inspector. Typically two to three samples collected.

A sample approximately one-half square inch in size was collected off each suspect ACM. The sample was collected by removing the material using a chisel or other sharp instrument to cut a representative piece away. No attempt was made to replace or repair these materials. However, the removal of small pieces of building materials does not typically compromise structural integrity. A plastic bag was used to contain the sample of suspect material and quickly sealed to prevent the escape of the material or the introduction of contamination from outside sources. A unique sample number was assigned to each sample.

4.4.3 Asbestos Laboratory Testing

EMC Analytical Laboratories of Phoenix, Arizona, analyzed select samples. EMC is accredited under the National Institute of Standards and Technology's National Voluntary Laboratory Accreditation Program (NVLAP), and the State of Arizona and California Department of Health Services Environmental Laboratory Accreditation Program (ELAP) for the analysis of asbestos in bulk building material samples.

All samples were analyzed using PLM techniques in accordance with methodology approved by the US EPA. According to the US EPA, ACM is defined as material containing more than one percent asbestos. The lower limit of reliable detection for asbestos using the PLM method is approximately one percent by volume; however, Cal-OSHA defines ACMs as those materials having an asbestos content greater than one-tenth of one percent (>0.1%).

When "None Detected" (ND) appears in this report, it should be interpreted as meaning no asbestos was observed in the sample material above the reliable limit of detection for the PLM method which is material dependent and is something less than one percent.

5.0 LEAD-BASED PAINT SURVEY

5.1 BACKGROUND

Lead is a pliable, soft metal that is used in the construction of pipes, rods, and containers. Before 1978, lead was a common ingredient in paint because it added strength, shine and extended the life of the paint. Lead-based paint is recognized as a potential health risk due to the known toxic effects of lead exposure (primarily through ingestion) on the central nervous system, kidneys, and blood stream. Concern for lead-based paint is primarily related to residential structures, which in addition, may apply to commercial structures. The risk of lead toxicity of lead-based paint varies based upon the condition of the paint and the year of its application. The Department of Housing and Urban Development (HUD) has identified the following risk factors, based on the age of the structure:

- The maximum risk is from paint applied before 1950.
- There is severe risk from paint applied before 1960.
- There is moderate risk from deteriorated paint applied before 1970.
- There is a slight risk from paint that is intact but applied before 1977.
- Paint applied in 1977 or later is not expected to contain lead at elevated levels.

5.2 CURRENT REGULATIONS

The following sections summarize current state and federal regulations which contain requirements regarding lead-based paint. These summaries are not intended to be all inclusive and do not contain every aspect of the regulations discussed. Regulations pertaining to the removal and disposal of lead-based paint are not included.

5.2.1 Department of Housing and Urban Development

The *Guidelines for the Evaluation and Control of Lead-based Paint Hazards in Housing,* HUD, 1995 (revised September 1997) *Lead Requirements for Lead-based Paint Activities in Target Housing and Child-Occupied Facilities: Final Rule*, (40 CFR Part 745), US EPA, 29 August 1996, define Lead-Based Paint as: paint, varnish, shellac, or other coating on surfaces that contain 1.0 mg/cm^2, 5,000 ppm, or more of lead or 0.5 percent or more lead by weight.

5.2.2 California Occupational Safety and Health Administration

Cal-OSHA governs all construction work where an employee may be occupationally exposed to lead (Construction Lead Standard, CCR Title 8, Section 1432.1). The Cal-OSHA Construction Lead Standard was effective as of November 4, 1993.

The Lead Standard states that work which involves the disturbance of materials containing more than 0.50 percent lead by weight must be conducted in accordance with the standard. In addition, Cal-OSHA regulations (Standards – 29CFR 1926.62 App A) would apply to workers exposed to lead through inhalation. The permissible exposure limit (PEL) set by the standard is 50 micrograms of lead per cubic meter of air, averaged over an 8-hour workday.

As outlined in the Cal-OSHA Construction Lead Standard, construction work (of lead-containing material) includes, but is not limited to the following:

- Demolition or salvage of structures
- Removal or encapsulation
- New construction, alteration, repair or renovation
- Installation of products
- Lead contamination/emergency cleanup
- Transportation, disposal, storage or containment
- Maintenance operations.

Painted surfaces which are in good condition do not require any action. However, if the painted surfaces are disturbed so as the paint delaminates or becomes flaking or peeling, the above Standard applies.

5.2.3 State of California Department of Health Services

California regulation; Title 17, CCR, Division 1, Chapter 8, requires notification to the Cal-DHS when a lead hazard evaluation survey is conducted at a Site. A copy of the Lead Hazard Evaluation Report for the Site is included in Appendix C.

5.2.4 Hazardous Waste Regulations

Waste materials containing lead may be subject to regulations controlling the transportation and disposal of such materials. In California, the Department of Toxic Substances Control (DTSC) regulates the generation, transportation, treatment, storage and disposal of lead containing wastes that qualify as hazardous waste. Lead containing wastes may be classified as a hazardous waste based on toxicity characteristic by any one of the following Federal (RCRA) or State thresholds (California Code of Regulations, Title 22, Section 66261.24),

- Federal:
  - Toxicity Threshold = 5 mg/L (Toxicity Leaching Characteristic Procedure [TCLP])
- California:
  - Total Threshold Limit Concentration = 1,000 mg/kg
  - Soluble Threshold Limit Concentration = 5 milligrams per liter (mg/L) (California Waste Extraction Test)

In general, bulk demolition wastes do not exhibit sufficient lead concentration to be classified as a hazardous waste based on the above criteria as result of the bulk weight of the waste in comparison to the weight of lead in the painted surface. However, if the paint is stripped, the paint and stripping media may be classified as a hazardous waste and regulations controlling the generation, storage, treatment, transportation and disposal of lead containing hazardous waste will need to be implemented and observed. Additional health and safety requirements and protocols may also be required to prevent exposure and spreading of the waste material.

Where possible, materials containing lead over 50 mg/kg should be disposed of as a bulk waste to avoid the generation of hazardous waste.

5.3 LEAD PAINT REMOVAL REQUIREMENTS

The Cal-OSHA Lead Standard states that work which involves the disturbance of materials containing more than 0.5 percent lead by weight, or if the permissible exposure limit of airborne lead particulate of 50 micrograms per cubic meter of air is exceeded, then the work must be conducted in accordance with the standard. HUD and Cal-OSHA have defined lead-based paint as any paint which contains more than 0.5 percent lead by weight.

LBP noted to be in a good, non-flaky condition that would be removed with the paint intact, would require no special handling of the painted surface prior to renovations or demolition. However, it would be recommended that identified LBP in good condition be encapsulated by a paint film stabilizer prior to demolition. If the LBP paint would be disturbed and rendered in a flaky condition during demolition, removal of the paint prior to demolition would be required.

5.4 LBP SURVEY METHODOLOGY

5.4.1 Visual Inspection

Building materials were visually inspected for evidence of blistered or peeling paint. No painted surfaces exhibited evidence of peeling or blistering. All paint surfaces appeared degraded (from daily traffic wear) but intact.

5.4.2 Bulk Sampling for LBP

Representative bulk samples of paint were collected from the various types of paint and painted surfaces. Where possible, a sample approximately one-half square inch in size was collected from each painted surface. The sample was collected by removing the paint using a chisel or other sharp instrument to cut a representative piece away. No attempt was made to replace or repair these materials. However, the removal of small pieces of building materials does not typically compromise structural integrity.

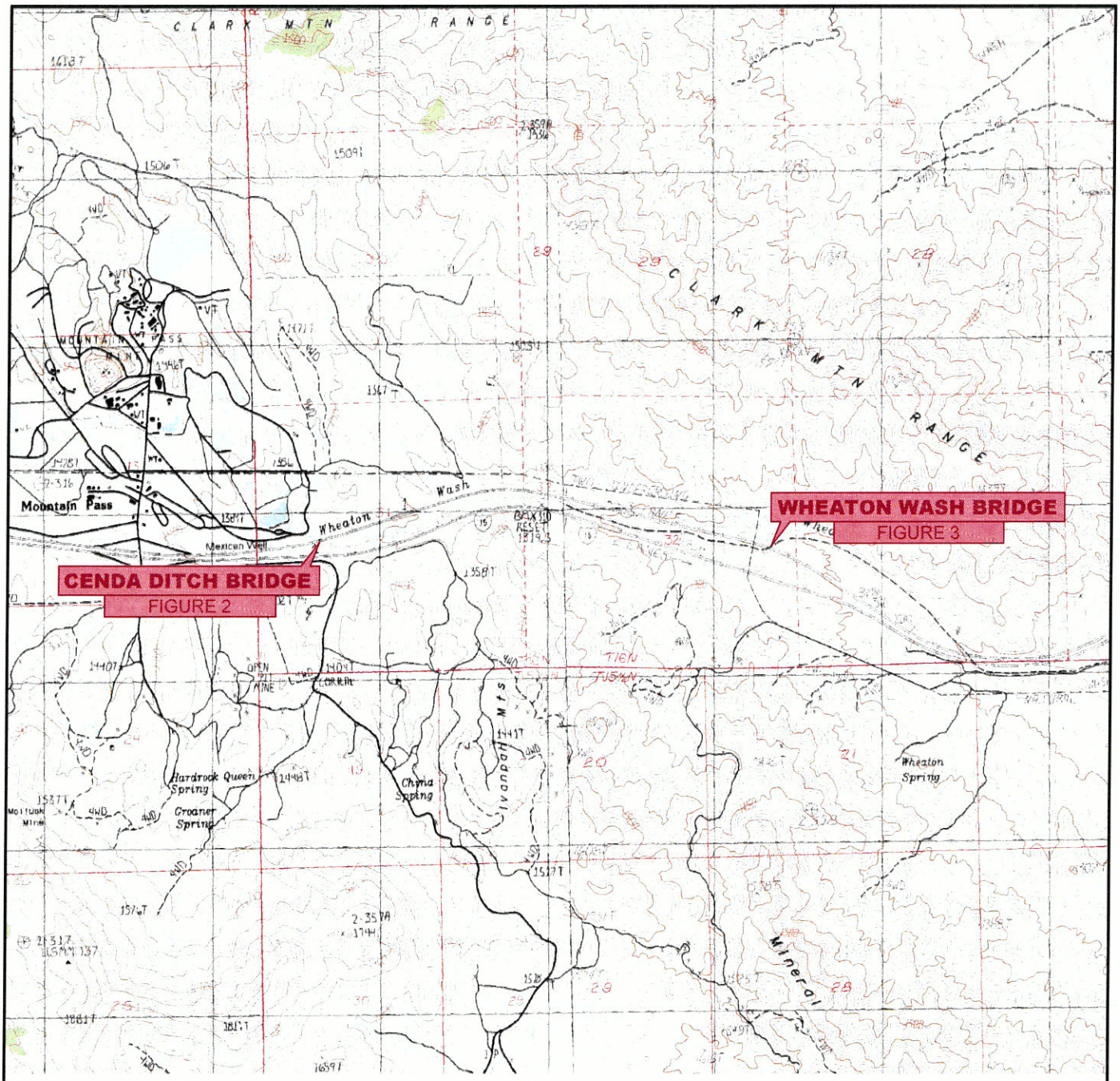
Each sample was placed in a Ziploc® plastic resealable bag and labeled (sample date, unique identifying number, sampler name, and job site), recorded on a chain of custody sheet and securely packaged for delivery to the laboratory. The sample number, location, material type, etc. were also recorded on field logs.

5.4.3 LBP Laboratory Testing

EMC Analytical Laboratories of Phoenix, Arizona, analyzed select samples. EMC is accredited under the National Institute of Standards and Technology's NVLAP, and the State of Arizona and California Department of Health Services ELAP for the analysis of LBP.

Samples were analyzed by EMC SOP Method #L01/1, after US EPA SW-846 Method 7420. US EPA, defines Lead-Based Paint as: paint, varnish, shellac, or other coating on surfaces that contains 0.5 percent or more lead by weight.

6.0 FIGURES



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SCALE IN FEET

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Block o34117e3, Downloaded 11/20/09

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FOR:
Cenda Ditch Bridge (BR #54-620L 172.11)
Wheaton Wash Bridge(BR #54-621L 173.84)
District 08 - SBD - 15 (PM 172.11 & 173.84)
SAN BERNARDINO COUNTY, CA
08-0M280-0800000472

SITE LOCATION MAP
WHEATON WASH BRIDGE
& CENDA DITCH BRIDGE

FIGURE: 1

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
?_____?	J. RESENDIZ	D. MONGE		JUNE 2013

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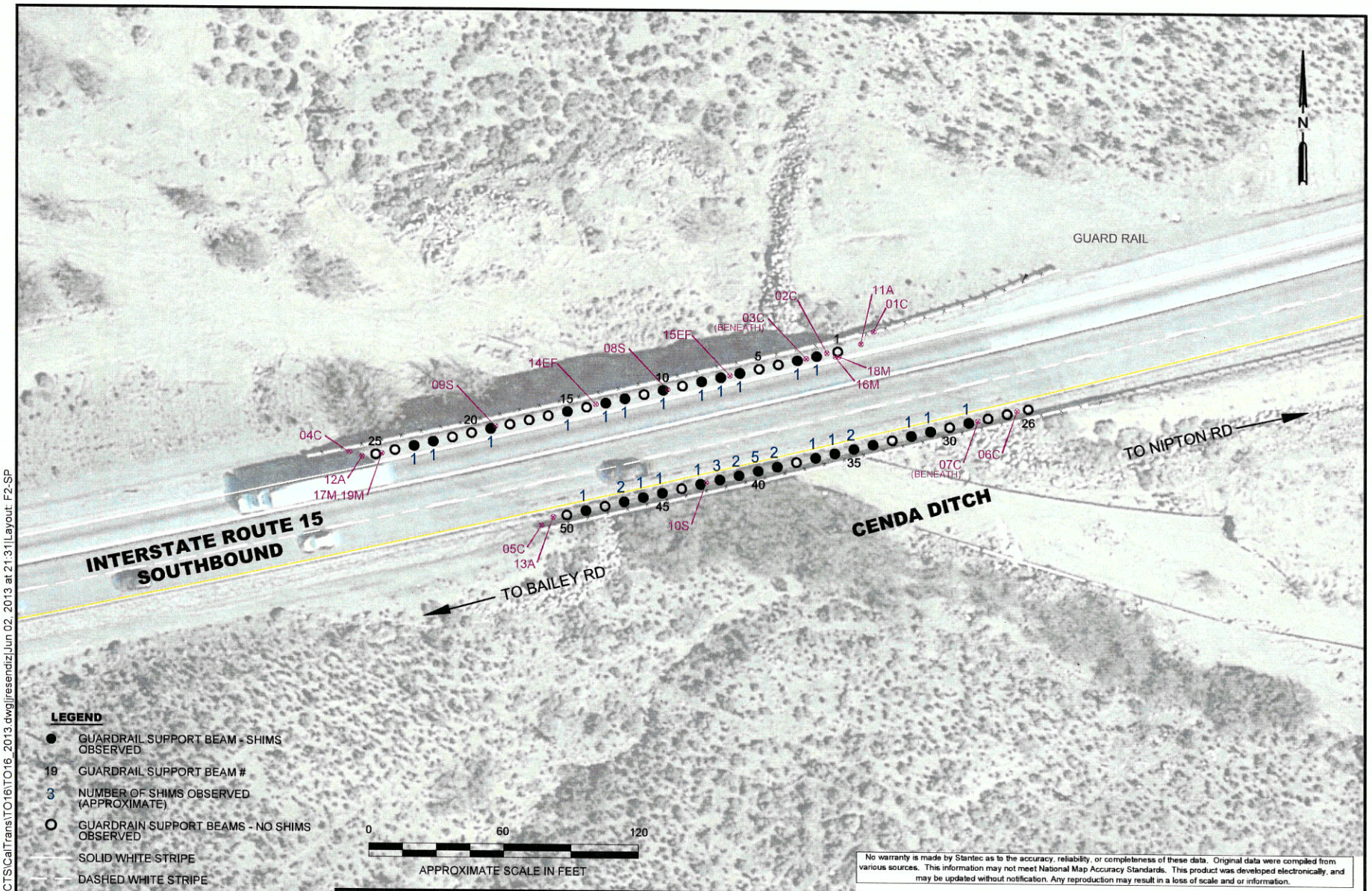

LEGEND

- ● GUARDRAIL SUPPORT BEAM - SHIMS OBSERVED
- 19 GUARDRAIL SUPPORT BEAM #
- 3 NUMBER OF SHIMS OBSERVED (APPROXIMATE)
- O GUARDRAIN SUPPORT BEAMS - NO SHIMS OBSERVED
- SOLID WHITE STRIPE
- DASHED WHITE STRIPE
- SOLID YELLOW STRIPE
- PC PAINT CHIP SAMPLE FOR LBP ANALYSIS
- A ASPHALT SAMPLE FOR ACM ANALYSIS
- C CONCRETE SAMPLE FOR ACM ANALYSIS
- S SHIM SAMPLE FOR ACM ANALYSIS
- M

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Wheaton Wash Bridge(BR #54-621L 173.84)
District 08 - SBD - 15 (PM 172.11 & 173.84)
SAN BERNARDINO COUNTY, CA
08-0M280-0800000472

SITE PLAN
CENDA DITCH BRIDGES

FIGURE: 2

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
?_____?	J. RESENDIZ	D. MONGE		JUNE 2013

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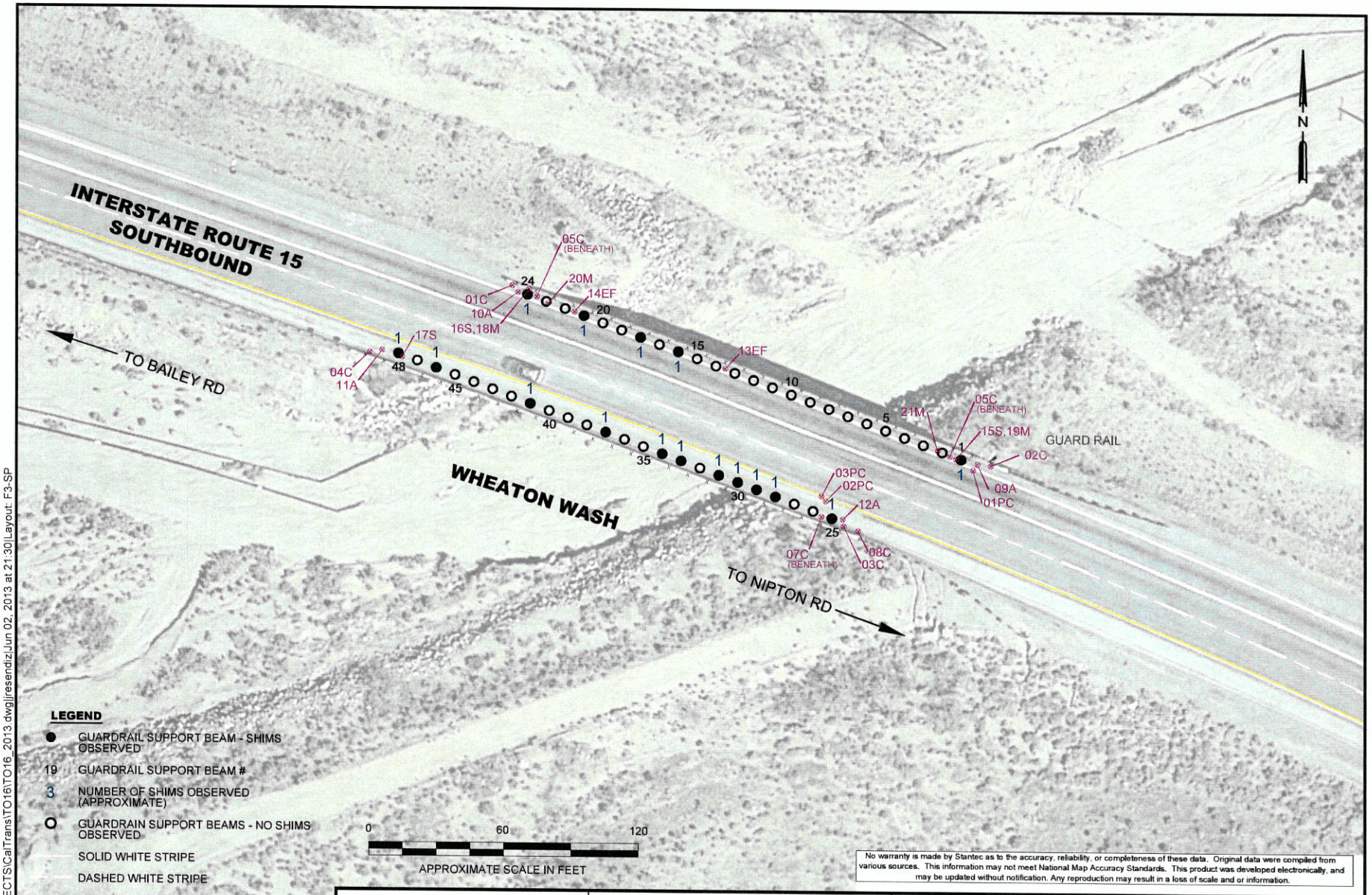

LEGEND

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- 19 GUARDRAIL SUPPORT BEAM #
- 3 NUMBER OF SHIMS OBSERVED (APPROXIMATE)
- O GUARDRAIN SUPPORT BEAMS - NO SHIMS OBSERVED
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- DASHED WHITE STRIPE
- SOLID YELLOW STRIPE
- PC PAINT CHIP SAMPLE FOR LBP ANALYSIS
- A ASPHALT SAMPLE FOR ACM ANALYSIS
- C CONCRETE SAMPLE FOR ACM ANALYSIS
- S SHIM SAMPLE FOR ACM ANALYSIS
- M

No warranty is made by Stantec as to the accuracy, reliability, or completeness of these data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed electronically, and may be updated without notification. Any reproduction may result in a loss of scale and or information.

Stantec
25864-F BUSINESS CENTER DRIVE
REDLANDS, CALIFORNIA 92374
PHONE: (909) 335-6116 FAX: (909) 556-6516

FOR:
Cenda Ditch Bridge (BR #54-620L 172.11)
Wheaton Wash Bridge(BR #54-621L 173.84)
District 08 - SBD - 15 (PM 172.11 & 173.84)
SAN BERNARDINO COUNTY, CA
08-0M280-0800000472

SITE PLAN
WHEATON WASH BRIDGES

FIGURE: 3

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
?_____?	J. RESENDIZ	D. MONGE		JUNE 2013

FILEPATH:P:\CADD\PROJECTS\CalTrans\TO16\TO16_2013.dwg|jresendiz|Jun 02, 2013 at 21:30|Layout: F3-SP

7.0 PHOTOGRAPHIC LOG

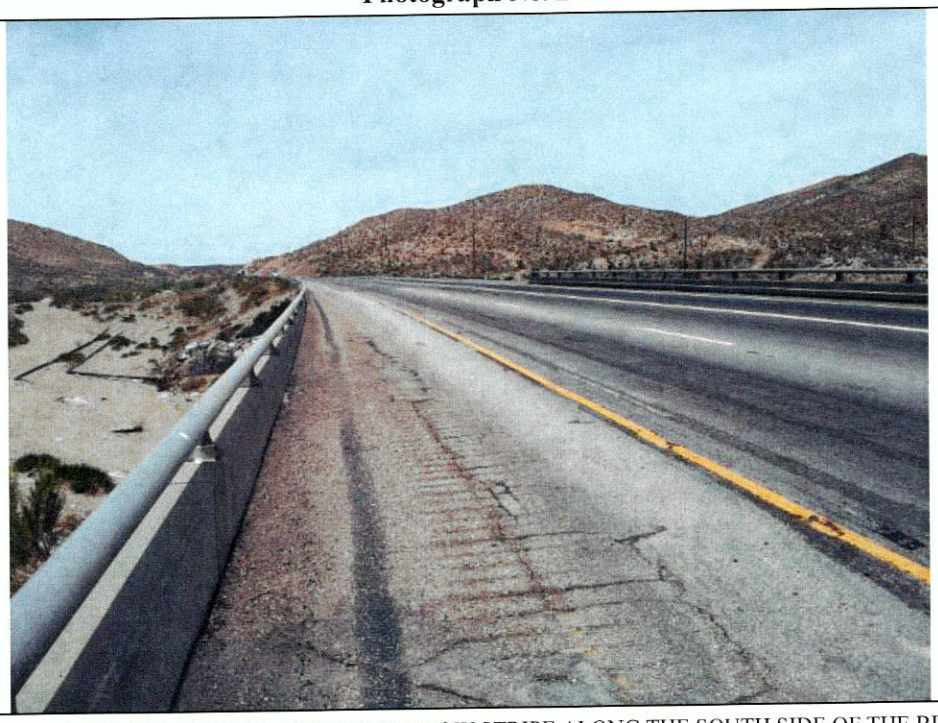
STANTEC CONSULTING SERVICES, INC
PHOTOGRAPHIC RECORD

Client: Calif. Department of Transportation, District 8	**Job Number:** 185802872
Site Name: Task Order #16 – Wheaton Wash and Cenda Ditch Bridges	**Location:** Mountain Pass, CA
Photographer: Dion Monge	**Date:** May 28, 2013

Photograph No. 1

WHEATON WASH BRIDGE: FACING WEST AT THE WHEATON WASH LEFT BRIDGE.

Photograph No. 2



WHEATON WASH BRIDGE: VIEW OF YELLOW STRIPE ALONG THE SOUTH SIDE OF THE BRIDGE.

STANTEC CONSULTING SERVICES, INC
PHOTOGRAPHIC RECORD

Client: Calif. Department of Transportation, District 8	**Job Number:** 185802872
Site Name: Task Order #16 – Wheaton Wash and Cenda Ditch Bridges	**Location:** Mountain Pass, CA
Photographer: Dion Monge	**Date:** May 28, 2013

Photograph No. 3

WHEATON WASH BRIDGE: TYPICAL VIEW OF GRAY AND BLACK MASTICS PRESENT ON VARIOUS GUARDRAIL POSTS.

Photograph No. 4

WHEATON WASH BRIDGE: VIEW OF TYPICAL GUARDRAIL WITH LEVELING SHIM. SHIMS ARE ACM.

STANTEC CONSULTING SERVICES, INC
PHOTOGRAPHIC RECORD

Client: Calif. Department of Transportation, District 8	**Job Number:** 185802872
Site Name: Task Order #16 – Wheaton Wash and Cenda Ditch Bridges	**Location:** Mountain Pass, CA
Photographer: Dion Monge	**Date:** May 28, 2013

Photograph No. 5

WHEATON WASH BRIDGE: VIEW OF BRIDGE DECK AND CONCRETE SUPPORT COLUMNS BENEATH THE BRIDGE.

Photograph No. 6

CENDA DITCH BRIDGE: VIEW OF CENDA DITCH BRIDGE LABEL.

STANTEC CONSULTING CORPORATION
PHOTOGRAPHIC RECORD

Client: Calif. Department of Transportation, District 8	**Job Number:** 185802872
Site Name: Task Order #16 – Wheaton Wash and Cenda Ditch Bridges	**Location:** Mountain Pass, CA
Photographer: Dion Monge	**Date:** May 28, 2013

Photograph No. 7

CENDA DITCH BRIDGE: VIEW OF BRIDGE DECK AND CONCRETE SUPPORT COLUMNS BENEATH THE BRIDGE.

Photograph No. 8

CENDA DITCH BRIDGE: VIEW OF BLACK AND GRAY MASTICS AND LEVELING SHIM (SEE RED ARROW). SHIMS ARE ACM.

STANTEC CONSULTING SERVICES, INC PHOTOGRAPHIC RECORD	
Client: Calif. Department of Transportation, District 8	**Job Number:** 185802872
Site Name: Task Order #16 – Wheaton Wash and Cenda Ditch Bridges	**Location:** Mountain Pass, CA
Photographer: Dion Monge	**Date:** May 28, 2013

Photograph No. 9

CENDA DITCH BRIDGE: VIEW OF YELLOW LANE STRIPE.

8.0 ASSESSMENT RESULTS

8.1 ASBESTOS SURVEY

An inspection of the accessible portions of each bridge structure was conducted to evaluate whether suspect ACMs were present. As part of the asbestos survey, representative bulk material samples were collected of suspect ACM containing materials.

Collected building material samples were submitted to EMC Analytical Laboratories. EMC is accredited under the National Institute of Standards and Technology's NVLAP, and the States of Arizona and California Department of Health Services ELAP for the analysis of asbestos in bulk building material samples.

All samples were analyzed using PLM techniques in accordance with methodology approved by the US EPA. According to the US EPA, ACM is defined as material containing more than one percent asbestos. According to Cal-OSHA, ACBM is identified as 0.1 percent asbestos. The lower limit of reliable detection for asbestos using the PLM method is approximately 1 percent by volume. However, the PLM technique can identify Cal-OSHA ACBMs. Although PLM methodology cannot quantify the exact percentage of asbestos detected below 1 percent, if a sample had any quantity of asbestos above 0.1 percent, the laboratory, using PLM techniques, would identify these materials as "Trace" amounts of asbestos (< 1 percent). Only materials containing no fibers are identified as "None Detected".

As part of the asbestos survey, bulk material samples were collected from representative homogeneous building materials on the structure. The sample locations and laboratory results are provided in the table section (Table 1). The sample locations are shown on the attached Figure 2 in Section 6.0.

The materials submitted for ACM analysis from both the Cenda Ditch and Wheaton Wash bridges included concrete samples, shim samples, asphalt samples, expansion joint samples, and bridge mastic samples. The concrete, asphalt, expansion joint, and mastic samples submitted reported non-detect concentrations of asbestos. Of the materials submitted, only the leveling shims on both bridges tested positive for asbestos.

Fibrous shims were used beneath selected guardrail posts for leveling purposes. The shims measure approximately 8-inches x 8-inches and estimated to be about 1/8-inch thick. The shims were observed to be in good condition, but due to their fibrous nature, are considered a friable ACM Material.

The following is a description of materials that contain greater than one-percent asbestos (US Environmental Protection Agency (USEPA), Regulated Asbestos Containing Materials (RACM), or Category 1 materials), that may become friable if disturbed (such as during demolition activities).

Cenda Ditch Bridge (54-0620L):
Guardrail Post Shims

- 25 guardrail posts observed on each side of the bridge (50 total)

- Approximately 37 leveling shims were observed on the bridge (shims measured ~8 inches by 8 inches)
- A total estimated area of approximately 16.4 square feet of asbestos containing shim material.

Wheaton Wash Bridge (54-0621L):
Guardrail Post Shims

- 24 guardrail posts observed on each side of the bridge (48 total)
- Approximately 16 leveling shims were observed on the bridge
- A total estimated area of approximately 7.1 square feet of asbestos containing shim material.

The following materials were sampled and no asbestos was detected. (This list should not be construed as being a complete listing of all building materials observed within the structures.)

- Structural Concrete (Structural bridge, deck and Pillars/Columns)
- Roadway Asphalt
- Expansion Joint felt
- Structural mastic

8.2 ASBESTOS HAZARD ASSESSMENT

The hazard assessment is based upon the physical assessment of ACMs for condition of the material and potential disturbance. The physical assessment usually includes the following considerations:

- Location and amount of material.
- Condition of the material which includes damage; the severity of the damage; the extent of the damage over large areas.
- Whether the material is accessible.
- Potential for future disturbance or future damage (air erosion, vibration, water).

The following table includes identified ACMs at the Site and the hazard ranking for each material.

ACM HAZARD ASSESSMENT							
Material Description	***S/T/M****	***Material Location***	***F/NF*****	***Condition Code******	***Accessibility***	***Potential for Disturbance***	***Quantity on Each Bridge***
Cenda Ditch Bridge (54-0620L)							
Leveling Shims	M	Beneath Guardrail Posts	F	Good	Low (Located Beneath Guardrails)	Low (Removal, Demolition, Maintenance)	~37
Wheaton Wash Bridge (54-0621L)							
Leveling Shims	M	Beneath Guardrail Posts	F	Good	Low (Located Beneath Guardrails)	Low (Removal, Demolition, Maintenance)	~16

* **S** = Surface Material; **T** = Thermal System Insulation; **M** = Miscellaneous Material

** **F** = Friable; **NF** = Non-Friable

*****Good** = < 5% Damage; **D**amage = 5-25% local or 10% General Damage; **S**ignificant **D**amage = 25% local or >10% General Damage

Because the identified ACM materials were observed to be in good condition and have low potential for disturbance, there appears to be no urgent health hazards that would require immediate action. However, any signs of damage should be immediately reported and the material should be repaired or removed by a licensed asbestos abatement contractor.

8.3 ASBESTOS RECOMMENDATIONS

Any action that disturbs ACMs is subject to Federal, State, and local regulations. "Disturbance" means activities that disrupt the matrix of ACM or presumed ACM (PACM), or generate visible debris from ACM or PACM. Therefore, prior to demolition activities, a licensed asbestos abatement firm be contracted to remove the identified ACM leveling shim materials from the structure. The identified ACMs will require removal in accordance with the USEPA NESHAP and the local Mojave Desert Air Quality Management District (MDAQMD) Rule 1002. The asbestos abatement contractor should comply with Rule 1403 and provide at least a 10-day notification prior to asbestos removal.

Asbestos is not listed as a Resource Conservation and Recovery Act (RCRA) hazardous waste. However, asbestos is listed as a hazardous waste under the Toxic Substances Control Act. The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA or "Superfund") also includes asbestos in its list. Some wastes are not considered "hazardous", but are regulated. In general, California regulations are more stringent than federal regulations regarding the handling of asbestos. Therefore, the asbestos abatement contractor should dispose of ACMs in accordance with all state and federal applicable laws.

8.4 LEAD-BASED PAINT SURVEY

The Cal-OSHA Lead Standard (the "Standard") states that work which involves the disturbance of materials containing more than 0.5 percent lead by weight, or 5,000 mg/Kg, or if the permissible exposure limit of airborne lead particulate of 50 micrograms per cubic meter of air is exceeded, then the work must be conducted in accordance with the Standard.

A site specific Health and Safety Plan was prepared and implemented during field sampling activities. Sampling activities occurred on the roadway striping located along both the Cenda Ditch and Wheaton Wash bridge decks and no lane closure was required. Delineators and a two-man traffic watch team were utilized for traffic control along the road and shoulder of the bridge during field sampling activities when necessary.

An inspection of each bridge was conducted to evaluate the location, and condition of painted surfaces and random surfaces suitable for lead-based paint sampling. No surfaces on the bridge structures were observed to be painted. Samples of both the yellow and white roadway striping were collected at random locations for lead analysis. Table 2 and the attached Figures identify the areas where lead-based paint samples were collected.

Paint chips were removed to the substrate and sent to EMC Analytical Laboratories of Phoenix, Arizona, for analysis. All samples were analyzed by EMC SOP Method #L01/1, after US EPA SW-846 Method 7420.

Laboratory results (see Appendix B) indicate that none of the representative paint chip samples collected from both the Cenda Ditch and Wheaton Wash bridge roadway striping exceeded the laboratory reporting limits (<100 mg/kg) and were well below the HUD/Cal-OSHA action levels of 0.5 percent lead by weight, or 5,000 parts per million (ppm).

8.5 LEAD-BASED PAINT RECOMMENDATIONS

Because representative paint chip samples collected and analyzed from both the Cenda Ditch and Wheaton Wash Bridges were below the action levels of 0.5 percent lead by weight and 5,000 ppm, no special requirements pertaining to lead-based paint would apply during future demolition or construction/improvements to the bridge. However, if Caltrans intends to strip the paint, additional testing should be performed to evaluate whether the paint itself qualifies as a hazardous waste.

In general, total lead concentrations in excess of 50 mg/kg are suspected to exhibit soluble concentrations in excess of the California STLC (STLC = 5 mg/L) when extracted using the California Waste Extraction Test. Similarly, total concentrations in excess of 100 mg/kg are suspected to exhibit soluble concentrations in excess of the federal toxicity characteristic level (TCLP = 5 mg/L) when analyzed by the toxicity characteristic leaching potential (TCLP) method. The lead concentrations in the paint striping were reported at less than 100 mg/Kg. Consequently, it is unlikely that the paint would qualify as a RCRA hazardous waste but could potentially qualify as a California Hazardous waste.

If the paint is stripped separately from the asphalt/concrete, the paint should be containerized, tested, and profiled for disposition to evaluate whether the paint qualifies as a California hazardous waste based on soluble lead concentrations. If structural components are disposed with paint coating intact it is unlikely that such wastes will qualify as a hazardous waste based on the volume of other structural components with respect to the volume of lead-based paint.

9.0 REFERENCES

California Department of Transportation (Caltrans), 2013. *California Log of Bridges on State Highways, District 8,* dated January 2013.

Victor Ramirez – Mojave Desert Air Quality Management District, Asbestos Program. vramirez@mdaqmd.ca.gov direct line (760) 245-1661 ext. 1806.

National Emission Standard for Hazardous Air Pollutants (NESHAP), regulation 40 CFR Part 61.

The California Health and Safety Code 25915 (former Connelly Bill).

Asbestos Hazard Emergency Response Act (AHERA)Cal-OSHA standards, 1926.1101

Guidelines for the Evaluation and Control of Lead-based Paint Hazards in Housing, HUD, 1995 (revised September 1997) *Lead Requirements for Lead-based Paint Activities in Target Housing and Child-Occupied Facilities: Final Rule*, (40 CFR Part 745), US EPA, 29 August 1996

10.0 CLOSURE

The conclusions and recommendations contained in this report/assessment are based upon professional opinions with regard to the subject matter. These opinions have been arrived at in accordance with currently accepted engineering standards and practices applicable to this location and are subject to the following inherent limitations:

The data and findings presented in this report are valid as of the dates when the investigations were performed. The passage of time, manifestation of latent conditions or occurrence of future events may require further exploration at the site, analysis of the data, and reevaluation of the findings, observations, and conclusions expressed in the report.

The data reported and the findings, observations, and conclusions expressed in the report are limited by the Scope of Work outlined in the Work Plan dated May 16, 2013.

Unless otherwise stated in the report, because of the limitations stated above, the findings observations, and conclusions expressed in this report are not, and should not be, considered an opinion concerning the compliance of any past or present owner or operator of the site with any federal, state or local law or regulation.

No warranty or guarantee, whether express or implied, is made with respect to the data or the reported findings, observations, and conclusions, all of which, however, accurately reflect site conditions in existence at the time of investigation.

This report presents professional opinions and findings of a scientific and technical nature. While attempts were made to relate the data and findings to applicable environmental laws and regulations, the report shall not be construed to offer legal opinion as to the requirements of, nor compliance with, environmental laws, rules, regulations or policies of federal, state or local governmental agencies. Any use constitutes acceptance of the limits of liability. The report preparer's liability extends only to those parties contracted to complete this project and not to any other parties who may obtain the Report. Issues raised by the report should be reviewed by appropriate legal counsel.

This report is based, in part, on unverified information supplied to the report preparer by third-party sources. While efforts have been made to substantiate this third-party information, the report preparer cannot guarantee its completeness or accuracy.

APPENDIX A
QUALIFICATIONS

Certifications
Jason J. Stagno

State of California
Division of Occupational Safety and Health
Certified Asbestos Consultant

Jason J Stagno
Name

Certification No. **12-4949**

Expires on **11/14/13**

This certification was issued by the Division of Occupational Safety and Health as authorized by Sections 7180 et seq. of the Business and Professions Code.

State of California Department of Public Health

Lead-Related Construction Certificate

Certificate Type	Expiration Date
Inspector/Assessor	07/31/2013

Jason J. Stagno ID # **19068**

APPENDIX B
ANALYTICAL LABORATORY REPORTS AND CHAIN-OF-CUSTODY RECORDS

EMC LABS, INC.

9830 S. 51st Street, Suite B109, Phoenix, AZ 85044
Phone: 800-362-3373 or 480-940-5294 - Fax: (480) 893-1726

Laboratory Report
0127121

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client:	STANTEC CONSULTING	Job# / P.O. #:	185802872
Address:	25867-F BUSINESS CENTER DRIVE	Date Received:	05/30/2013
	REDLANDS CA 92374	Date Analyzed:	06/03/2013
Collected:	05/28/2013	Date Reported:	06/03/2013
Project Name:	TO 16-WHEATON WASH BRIDGE	EPA Method:	EPA 600/R-93/116
Address:		Submitted By:	DION MONGE
		Collected By:	

Lab ID Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents	
0127121-001 01C	NW	Concrete, Beige/ Gray	No	None Detected		
					Carbonates Quartz Gypsum Binder/Filler	100%
0127121-002 02C	NE	Concrete, Beige/ Gray	No	None Detected		
					Carbonates Quartz Gypsum Binder/Filler	100%
0127121-003 03C	SE	Concrete, Beige/ Gray	No	None Detected		
					Carbonates Quartz Gypsum Binder/Filler	100%
0127121-004 04C	SW	Concrete, Beige/ Gray	No	None Detected		
					Carbonates Quartz Gypsum Binder/Filler	100%
0127121-005 05C	BENEATH NE	Concrete, Beige/ Gray	No	None Detected		
					Carbonates Quartz Binder/Filler	100%
0127121-006 06C	SUPPORT COLUMN NW	Concrete, Beige/ Gray	No	None Detected		
					Carbonates Quartz Gypsum Binder/Filler	100%

EMC LABS, INC.

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Project Name:	TO 16-WHEATON WASH BRIDGE	EPA Method:	EPA 600/R-93/116
Address:		Submitted By:	DION MONGE
		Collected By:	

Lab ID Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents	
0127121-007 07C	SUPPORT COLUMN SE	Concrete, Beige/ Gray	No	None Detected		
					Carbonates Quartz Gypsum Binder/Filler	100%
0127121-008 08C	SE	Concrete, Beige/ Gray	No	None Detected		
					Carbonates Quartz Gypsum Mica Binder/Filler	100%
0127121-009 09A	NE	Asphalt, Black	No	None Detected		
					Carbonates Quartz Binder/Filler	100%
0127121-010 10A	NW	Asphalt, Black	No	None Detected		
					Carbonates Quartz Binder/Filler	100%
0127121-011 11A	SW	Asphalt, Black	No	None Detected		
					Carbonates Quartz Mica Binder/Filler	100%
0127121-012 12A	SE	Asphalt, Black	No	None Detected		
					Carbonates Quartz Binder/Filler	100%
0127121-013 13EF	N. END	Expansion Felt, Black	No	None Detected	Cellulose Fiber	60%
					Carbonates Binder/Filler	40%

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Project Name:	TO 16-WHEATON WASH BRIDGE	EPA Method:	EPA 600/R-93/116
Address:		Submitted By:	DION MONGE
		Collected By:	

Lab ID Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type	(%)	Non-Asbestos Constituents	
0127121-014 14EF	NW	Expansion Felt, Black	No	None Detected		Cellulose Fiber	60%
						Carbonates Binder/Filler	40%
0127121-015 15S	1	Shim, Gray	Yes	Chrysotile	50%		
						Carbonates Quartz Binder/Filler	50%
0127121-016 16S	24	Shim, Gray	Yes	Chrysotile	50%		
						Carbonates Quartz Binder/Filler	50%
0127121-017 17S	48	Shim, Gray	Yes	Chrysotile	50%		
						Carbonates Quartz Binder/Filler	50%
0127121-018 18M	GUARDRAIL NW	Mastic, Black	No	None Detected			
						Carbonates Quartz Binder/Filler	100%
0127121-019 19M	GUARDRAIL NE	Mastic, Black	No	None Detected			
						Carbonates Quartz Binder/Filler	100%
0127121-020 20M	GUARDRAIL	Mastic, Gray	No	None Detected			
						Carbonates Gypsum Quartz Binder/Filler	100%

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Project Name:	TO 16-WHEATON WASH BRIDGE	EPA Method:	EPA 600/R-93/116
Address:		Submitted By:	DION MONGE
		Collected By:	

Lab ID Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents	
0127121-021 21M	GUARDRAIL 2	Mastic, Gray	No	None Detected		
					Carbonates	
					Gypsum	
					Quartz	
					Binder/Filler	100%

Analyst - Kenneth Scheske

Signatory - Lab Director - Kurt Kettler

Distinctly stratified, easily separable layers of samples are analyzed as subsamples of the whole and are reported separately for each discernible layer. All analyses are derived from calibrated visual estimate and measured in area percent unless otherwise noted. The report applies to the standards or procedures identified and to the sample(s) tested. The test results are not necessarily indicated or representative of the qualities of the lot from which the sample was taken or of apparently identical or similar products, nor do they represent an ongoing quality assurance program unless so noted. These reports are for the exclusive use of the addressed client and that they will not be reproduced wholly or in part for advertising or other purposes over our signature or in connection with our name without special written permission. The report shall not be reproduced except in full, without written approval by our laboratory. The samples not destroyed in testing are retained a maximum of thirty days. The laboratory measurement of uncertainty for the test method is approximately less than 1 by area percent. Accredited by the National Institute of Standards and Technology, Voluntary Laboratory Accreditation Program for selected test method for asbestos. The accreditation or any reports generated by this laboratory in no way constitutes or implies product certification, approval, or endorsement by the National Institute of Standards and Technology. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government. Polarized Light Microscopy may not be consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials.

EMC LABS, INC.

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Phone: 800-362-3373 or 480-940-5294 - Fax: (480) 893-1726

Laboratory Report
0127122

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client:	STANTEC CONSULTING	Job# / P.O. #:	185802872
Address:	25867-F BUSINESS CENTER DRIVE	Date Received:	05/30/2013
	REDLANDS CA 92374	Date Analyzed:	06/03/2013
Collected:	05/28/2013	Date Reported:	06/03/2013
Project Name:	TO 16-CENDA DITCH BRIE	EPA Method:	EPA 600/R-93/116
Address:		Submitted By:	DION MONGE
		Collected By:	

Lab ID Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents	
0127122-001 01C	NE	Concrete, Gray	No	None Detected		
					Carbonates Quartz Binder/Filler	100%
0127122-002 02C	NE	Concrete, Gray	No	None Detected		
					Carbonates Quartz Binder/Filler	100%
0127122-003 03C	BENEATH NE	Concrete, Gray	No	None Detected		
					Carbonates Quartz Binder/Filler	100%
0127122-004 04C	NW	Concrete, Gray	No	None Detected		
					Carbonates Quartz Binder/Filler	100%
0127122-005 05C	SW	Concrete, Gray	No	None Detected		
					Carbonates Quartz Gypsum Binder/Filler	100%
0127122-006 06C	BENEATH SE	Concrete, Gray	No	None Detected		
					Carbonates Quartz Gypsum Mica Binder/Filler	100%

EMC LABS, INC.

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Project Name:	TO 16-CENDA DITCH BRIE	EPA Method:	EPA 600/R-93/116
Address:		Submitted By:	DION MONGE
		Collected By:	

Lab ID Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type	(%)	Non-Asbestos Constituents	
0127122-007 07C	SUPPORT COLUMN SE	Concrete, Gray	No	None Detected			
						Carbonates Quartz Gypsum Mica Binder/Filler	100%
0127122-008 08S	10	Shim, Dk. Gray	Yes	Chrysotile	50%		
						Carbonates Quartz Binder/Filler	50%
0127122-009 09S	19	Shim, Dk. Gray	Yes	Chrysotile	50%		
						Carbonates Quartz Binder/Filler	50%
0127122-010 10S	43	Shim, Dk. Gray	Yes	Chrysotile	50%		
						Carbonates Quartz Binder/Filler	50%
0127122-011 11A	NE	Asphalt, Black	No	None Detected			
						Carbonates Quartz Mica Binder/Filler	100%
0127122-012 12A	NW	Asphalt, Black	No	None Detected			
						Carbonates Quartz Mica Binder/Filler	100%

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Address:		Submitted By:	DION MONGE
		Collected By:	

Lab ID Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents	
0127122-013 13A	SW	Asphalt, Black	No	None Detected		
					Carbonates	
					Quartz	
					Mica	
					Binder/Filler	100%
0127122-014 14EF	N	Expansion Joint, Dk. Brown	No	None Detected	Cellulose Fiber	80%
					Gypsum	
					Carbonates	
					Binder/Filler	20%
0127122-015 15EF	NE	Expansion Joint, Dk. Brown	No	None Detected	Cellulose Fiber	80%
					Gypsum	
					Carbonates	
					Binder/Filler	20%
0127122-016 16M	GUARDRAIL	Mastic, Black	No	None Detected		
					Carbonates	
					Quartz	
					Binder/Filler	100%
0127122-017 17M	NW	Mastic, Black	No	None Detected	Cellulose Fiber	<1%
					Carbonates	
					Quartz	
					Binder/Filler	99%
0127122-018 18M	GUARDRAIL NE	Mastic, Lt. Gray	No	None Detected		
					Gypsum	
					Carbonates	
					Binder/Filler	100%
0127122-019 19M	GUARDRAIL NW	Mastic, Lt. Gray	No	None Detected		
					Carbonates	
					Binder/Filler	100%

EMC LABS, INC.

9830 S. 51st Street, Suite B109, Phoenix, AZ 85044
Phone: 800-362-3373 or 480-940-5294 - Fax: (480) 893-1726

Laboratory Report
0127122

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client:	STANTEC CONSULTING	Job# / P.O. #:	185802872
Address:	25867-F BUSINESS CENTER DRIVE	Date Received:	05/30/2013
	REDLANDS CA 92374	Date Analyzed:	06/03/2013
Collected:	05/28/2013	Date Reported:	06/03/2013
Project Name:	TO 16-CENDA DITCH BRIE	EPA Method:	EPA 600/R-93/116
Address:		Submitted By:	DION MONGE
		Collected By:	

Lab ID Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents

Analyst - Kenneth Scheske

Signatory - Lab Director - Kurt Kettler

Distinctly stratified, easily separable layers of samples are analyzed as subsamples of the whole and are reported separately for each discernible layer. All analyses are derived from calibrated visual estimate and measured in area percent unless otherwise noted. The report applies to the standards or procedures identified and to the sample(s) tested. The test results are not necessarily indicated or representative of the qualities of the lot from which the sample was taken or of apparently identical or similar products, nor do they represent an ongoing quality assurance program unless so noted. These reports are for the exclusive use of the addressed client and that they will not be reproduced wholly or in part for advertising or other purposes over our signature or in connection with our name without special written permission. The report shall not be reproduced except in full, without written approval by our laboratory. The samples not destroyed in testing are retained a maximum of thirty days. The laboratory measurement of uncertainty for the test method is approximately less than 1 by area percent. Accredited by the National Institute of Standards and Technology, Voluntary Laboratory Accreditation Program for selected test method for asbestos. The accreditation or any reports generated by this laboratory in no way constitutes or implies product certification, approval, or endorsement by the National Institute of Standards and Technology. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government. Polarized Light Microscopy may not be consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials.

EMC LABS, INC.

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emclab@emclabs.com

LEAD (Pb) IN PAINT CHIP SAMPLES

EMC SOP METHOD #L01/1 EPA SW-846 METHOD 7420

EMC LAB #:	L49046	**DATE RECEIVED:**	05/30/13
CLIENT:	Stantec	**REPORT DATE:**	05/31/13
		DATE OF ANALYSIS:	05/31/13
CLIENT ADDRESS:	25864-F Business Center Drive Redland, CA 92374	**P.O. NO.:**	
PROJECT NAME:	TO 16 – Wheaton Wash Bridge	**PROJECT NO.:**	185802872

EMC # L49046-	SAMPLE DATE /13	CLIENT SAMPLE #	DESCRIPTION	REPORTING LIMIT IN PPM	Pb IN PPM	REPORTING LIMIT (%Pb by weight)	%Pb BY WEIGHT
1	05/28	01PC	White Paint	100	BRL	0.010	BRL
2	05/28	02PC	Yellow Paint (Older)	100	BRL	0.010	BRL
3	05/28	03PC	Yellow Paint (New)	100	BRL	0.010	BRL

^ = Dilution Factor Changed * = Excessive Substrate May Bias Sample Results **BRL** = Below Reportable Limits # = Very Small Amount Of Sample Submitted, May Affect Result

This report applies to the standards or procedures identified and to the samples tested only. The test results are not necessarily indicative or representative of the qualities of the lot from which the sample was taken or of apparently identical or similar products, nor do they represent an ongoing quality assurance program unless so noted. Unless otherwise noted, all quality control analyses for the samples noted above were within acceptable limits.
Where it is noted that a sample with excessive substrate was submitted for laboratory analysis, such analysis may be biased. The lead content of such sample may, in actuality, be greater than reported. EMC makes no warranty, express or implied, as to the accuracy of the analysis of samples noted to have been submitted with excessive substrate. Resampling is recommended in such situations to verify original laboratory results.
These reports are for the exclusive use of the addressed client and are rendered upon the condition that they will not be reproduced wholly or in part for advertising or other purposes over our signature or in connection with our name without special written permission. Samples not destroyed in testing are retained a maximum of sixty (60) days.

ANALYST: Jason Thompson

QA COORDINATOR: Kurt Kettler

EMC LABS, INC.

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emclab@emclabs.com

LEAD (Pb) IN PAINT CHIP SAMPLES

EMC SOP METHOD #L01/1 EPA SW-846 METHOD 7420

EMC LAB #:	L49047	**DATE RECEIVED:**	05/30/13
CLIENT:	Stantec	**REPORT DATE:**	05/31/13
		DATE OF ANALYSIS:	05/31/13
CLIENT ADDRESS:	25864-F Business Center Drive Redland, CA 92374	**P.O. NO.:**	
PROJECT NAME:	TO 16 – Cenda Ditch Bridge	**PROJECT NO.:**	185802872

EMC # L49047-	SAMPLE DATE /13	CLIENT SAMPLE #	DESCRIPTION	REPORTING LIMIT IN PPM	Pb IN PPM	REPORTING LIMIT (%Pb by weight)	%Pb BY WEIGHT
1	05/28	01PC	White Paint	100	BRL	0.010	BRL
2	05/28	02PC	Yellow Paint	100	BRL	0.010	BRL

^ = Dilution Factor Changed * = Excessive Substrate May Bias Sample Results **BRL** = Below Reportable Limits # = Very Small Amount Of Sample Submitted, May Affect Result

This report applies to the standards or procedures identified and to the samples tested only. The test results are not necessarily indicative or representative of the qualities of the lot from which the sample was taken or of apparently identical or similar products, nor do they represent an ongoing quality assurance program unless so noted. Unless otherwise noted, all quality control analyses for the samples noted above were within acceptable limits.
Where it is noted that a sample with excessive substrate was submitted for laboratory analysis, such analysis may be biased. The lead content of such sample may, in actuality, be greater than reported. EMC makes no warranty, express or implied, as to the accuracy of the analysis of samples noted to have been submitted with excessive substrate. Resampling is recommended in such situations to verify original laboratory results.
These reports are for the exclusive use of the addressed client and are rendered upon the condition that they will not be reproduced wholly or in part for advertising or other purposes over our signature or in connection with our name without special written permission. Samples not destroyed in testing are retained a maximum of sixty (60) days.

ANALYST: Jason Thompson

QA COORDINATOR: Kurt Kettler

APPENDIX C
LEAD HAZARD EVALUATION FORM

LEAD HAZARD EVALUATION REPORT

Section 1 — Date of Lead Hazard Evaluation May 28, 2013

Section 2 — Type of Lead Hazard Evaluation (Check one box only)

☐ Lead Inspection ☐ Risk assessment ☐ Clearance Inspection ☑ Other (specify) Paint Chip Samples

Section 3 — Structure Where Lead Hazard Evaluation Was Conducted

Address [number, street, apartment (if applicable)]	City	County	Zip Code
Cenda Ditch, Bridge No. 54-0620L - Interstate 15	Unincorporated Mountain Pass	San Bernardino	

Construction date (year) of structure	Type of structure		Children living in structure?
1963	☐ Multi-unit building ☐ Single family dwelling	☐ School or daycare ☑ Other Interstate Bridge	☐ Yes ☑ No ☐ Don't Know

Section 4 — Owner of Structure (if business/agency, list contact person)

Name	Telephone number
State of California - California Department of Transportation, District 8	

Address [number, street, apartment (if applicable)]	City	State	Zip Code
464 West Fourth Street, 6th Floor	San Bernardino	California	92401

Section 5 — Results of Lead Hazard Evaluation (check all that apply)

☑ No lead-based paint detected ☐ Intact lead-based paint detected ☐ Deteriorated lead-based paint detected

☐ No lead hazards detected ☐ Lead-contaminated dust found ☐ Lead-contaminated soil found ☐ Other

Section 6 — Individual Conducting Lead Hazard Evaluation

Name	Telephone number
Jason Stagno	(805) 719-9392

Address [number, street, apartment (if applicable)]	City	State	Zip Code
290 Conejo Ridge Avenue	Thousand Oaks	California	93063

CDPH certification number	Signature	Date
19068		August 2, 2013

Name and CDPH certification number of any other individuals conducting sampling or testing (if applicable)

Section 7 — Attachments

A. A foundation diagram or sketch of the structure indicating the specifc locations of each lead hazard or presence of lead-based paint;
B. Each testing method, device, and sampling procedure used;
C. All data collected, including quality control data, laboratory results, including laboratory name, address, and phone number.

First copy and attachments retained by inspector

Second copy and attachments retained by owner

Third copy only (no attachments) mailed or faxed to:

California Department of Public Health
Childhood Lead Poisoning Prevention Branch Reports
850 Marina Bay Parkway, Building P, Third Floor
Richmond, CA 94804-6403
Fax: (510) 620-5656

LEAD HAZARD EVALUATION REPORT

Section 1 — Date of Lead Hazard Evaluation May 28, 2013

Section 2 — Type of Lead Hazard Evaluation (Check one box only)

☐ Lead Inspection ☐ Risk assessment ☐ Clearance Inspection ☑ Other (specify) Paint Chip Samples

Section 3 — Structure Where Lead Hazard Evaluation Was Conducted

Address [number, street, apartment (if applicable)]	City	County	Zip Code
Wheaton Wash, Bridge No. 54-0621L - Interstate 15	Unincorporated Mountain Pass	San Bernardino	

Construction date (year) of structure	Type of structure		Children living in structure?
1963	☐ Multi-unit building ☐ Single family dwelling	☐ School or daycare ☑ Other Interstate Bridge	☐ Yes ☑ No ☐ Don't Know

Section 4 — Owner of Structure (if business/agency, list contact person)

Name	Telephone number
State of California - California Department of Transportation, District 8	

Address [number, street, apartment (if applicable)]	City	State	Zip Code
464 West Fourth Street, 6th Floor	San Bernardino	California	92401

Section 5 — Results of Lead Hazard Evaluation (check all that apply)

☑ No lead-based paint detected ☐ Intact lead-based paint detected ☐ Deteriorated lead-based paint detected

☐ No lead hazards detected ☐ Lead-contaminated dust found ☐ Lead-contaminated soil found ☐ Other

Section 6 — Individual Conducting Lead Hazard Evaluation

Name	Telephone number
Jason Stagno	(805) 719-9392

Address [number, street, apartment (if applicable)]	City	State	Zip Code
290 Conejo Ridge Avenue	Thousand Oaks	California	93063

CDPH certification number	Signature	Date
19068		August 2, 2013

Name and CDPH certification number of any other individuals conducting sampling or testing (if applicable)

Section 7 — Attachments

A. A foundation diagram or sketch of the structure indicating the specifc locations of each lead hazard or presence of lead-based paint;
B. Each testing method, device, and sampling procedure used;
C. All data collected, including quality control data, laboratory results, including laboratory name, address, and phone number.

First copy and attachments retained by inspector

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California Department of Public Health
Childhood Lead Poisoning Prevention Branch Reports
850 Marina Bay Parkway, Building P, Third Floor
Richmond, CA 94804-6403
Fax: (510) 620-5656

TABLES

TABLE 1
ASBESTOS SAMPLE LOG AND ANALYSIS RESULTS
WHEATON WASH BRIDGE #54-0621L
CENDA DITCH, BRIDGE #54-0620L
08-SBD-15-PM 173.6/174 AND 171.8/172.4
SAN BERNARDINO COUNTY, CALIFORNIA
PN: 08-0000-04721; EA#0M2801
TASK ORDER #16; CONTRACT 08A2047

FIELD SAMPLE ID	SAMPLE DATE	LABORATORY SAMPLE ID	SAMPLE LOCATION	MATERIAL DESCRIPTION	ANALYSIS RESULTS	CONDITION FRIABLE YES/NO	IF ACM, ESTIMATED SQUARE FOOTAGE	HAZARD RATING
CENDA DITCH BRIDGE								
01C	5/28/2013	0127122-001	NE	Concrete, Gray	ND	NO	--	NA
02C	5/28/2013	0127122-002	NE	Concrete, Gray	ND	NO	--	NA
03C	5/28/2013	0127122-003	Beneath NE	Concrete, Gray	ND	NO	--	NA
04C	5/28/2013	0127122-004	NW	Concrete, Gray	ND	NO	--	NA
05C	5/28/2013	0127122-005	SW	Concrete, Gray	ND	NO	--	NA
06C	5/28/2013	0127122-006	Beneath SE	Concrete, Gray	ND	NO	--	NA
07C	5/28/2013	0127122-007	Support Column SE	Concrete, Gray	ND	NO	--	NA
08S	5/28/2013	0127122-008	10	Shim, Dr. Gray	50% Chrysotile	YES	Approximately 37 total shims (~16.4 sq. ft)	LOW
09S	5/28/2013	0127122-009	19	Shim, Dk. Gray	50% Chrysotile	YES		
10S	5/28/2013	0127122-010	43	Shim, Dk. Gray	50% Chrysotile	YES		
11A	5/28/2013	0127122-011	NE	Asphalt, Black	ND	NO	--	NA
12A	5/28/2013	0127122-012	NW	Asphalt, Black	ND	NO	--	NA
13A	5/28/2013	0127122-013	SW	Asphalt, Black	ND	NO	--	NA
14EF	5/28/2013	0127122-014	N	Expansion Joint, Dk. Brown	ND	NO	--	NA
15EF	5/28/2013	0127122-015	NE	Expansion Joint, Dk. Brown	ND	NO	--	NA
16M	5/28/2013	0127122-016	Guardrail	Mastic, Black	ND	NO	--	NA
17M	5/28/2013	0127122-017	NW	Mastic, Black	ND	NO	--	NA
18M	5/28/2013	0127122-018	Guardrail NE	Mastic, Lt. Gray	ND	NO	--	NA
19M	5/28/2013	0127122-019	Guardrail NW	Mastic, Lt. Gray	ND	NO	--	NA
WHEATON WASH BRIDGE								
01C	5/28/2013	0127121-001	NW	Concrete, Beige/Gray	ND	NO	--	NA
02C	5/28/2013	0127121-002	NE	Concrete, Beige/Gray	ND	NO	--	NA
03C	5/28/2013	0127121-003	SE	Concrete, Beige/Gray	ND	NO	--	NA
04C	5/28/2013	0127121-004	SW	Concrete, Beige/Gray	ND	NO	--	NA
05C	5/28/2013	0127121-005	Beneath NE	Concrete, Beige/Gray	ND	NO	--	NA
06C	5/28/2013	0127121-006	Support Column NW	Concrete, Beige/Gray	ND	NO	--	NA
07C	5/28/2013	0127121-007	Support Column SE	Concrete, Beige/Gray	ND	NO	--	NA
08C	5/28/2013	0127121-008	SE	Concrete, Beige/Gray	ND	NO	--	NA
09A	5/28/2013	0127121-009	NE	Asphalt, Black	ND	NO	--	NA
10A	5/28/2013	0127121-010	NW	Asphalt, Black	ND	NO	--	NA
11A	5/28/2013	0127121-011	SW	Asphalt, Black	ND	NO	--	NA
12A	5/28/2013	0127121-012	SE	Asphalt, Black	ND	NO	--	NA
13EF	5/28/2013	0127121-013	N. End	Expansion Felt, Black	ND	NO	--	NA
14EF	5/28/2013	0127121-014	NW	Expansion Felt, Black	ND	NO	--	NA
15S	5/28/2013	0127121-015	1	Shim, Gray	50% Chrysotile	YES	Approximately 16 total shims (~7.1 sq. ft)	LOW
16S	5/28/2013	0127121-016	24	Shim, Gray	50% Chrysotile	YES		
17S	5/28/2013	0127121-017	48	Shim, Gray	50% Chrysotile	YES		
18M	5/28/2013	0127121-018	Guardrail NW	Mastic, Black	ND	NO	--	NA
19M	5/28/2013	0127121-019	Guardrail NE	Mastic, Black	ND	NO	--	NA
20M	5/28/2013	0127121-020	Guardrail	Mastic, Black	ND	NO	--	NA
21M	5/28/2013	0127121-021	Guardrail 2	Mastic, Gray	ND	NO	--	NA

NOTES:
ND = No asbestos detected.
Asbestos sample locations are depicted on attached Figures.
Bulk sample analyses completed by polarized light microscopy (PLM).
Number of shims is approximate – many shims overlapped others or were concealed by the bridge concrete and post setting
NA = Not applicable since no asbestos was detected
Analytical documentation is in Appendix B

TABLE 2
LEAD BASED PAINT SAMPLE LOG
AND ANALYSIS RESULTS
WHEATON WASH BRIDGE #54-0621L
CENDA DITCH, BRIDGE #54-0620L
08-SBD-15-PM 173.6/174 AND 171.8/172.4
SAN BERNARDINO COUNTY, CALIFORNIA
PN: 08-0000-04721; EA#0M2801
TASK ORDER #16; CONTRACT 08A2047

FIELD SAMPLE ID	SAMPLE DATE	LABORATORY SAMPLE ID	MATERIAL DESCRIPTION	PB (MG/KG)	% PB BY WEIGHT
CENDA DITCH BRIDGE					
01PC	5/28/2013	L49047-1	White Paint	<100	<0.010
02PC	5/28/2013	L49047-2	Yellow Paint	<100	<0.010
WHEATON WASH BRIDGE					
01PC	5/28/2013	L49046-1	White Paint	<100	<0.010
02PC	5/28/2013	L49046-2	Yellow Paint (Older)	<100	<0.010
03PC	5/28/2013	L49046-3	Yellow Paint (New)	<100	<0.010

NOTES:

Analytical documentation is in Appendix B. Paint Chip sample locations are depicted on the attached Figure.

Sample analyses completed by EMC SOP Method #L01/1, US EPA SW-846 Method 7420

AERIALLY DEPOSITED LEAD (ADL) INVESTIGATION REPORT

REPLACE WHEATON WASH, BRIDGE NO. 54-0621L
REPLACE CENDA DITCH, BRIDGE NO. 54-0620L
08-SBD-15-PM 173.6/174 AND 171.8/172.4
SAN BERNARDINO COUNTY, CALIFORNIA
PN: 08-0000-04721 (EA#0M2801)
TASK ORDER #16
CONTRACT 08A2047

PREPARED FOR:

CALIFORNIA DEPARTMENT OF TRANSPORTATION, DISTRICT 8
464 WEST FOURTH STREET, 6TH FLOOR
SAN BERNARDINO, CALIFORNIA 92401-1400

JUNE 30, 2013

EXECUTIVE SUMMARY

At the request of the California Department of Transportation (Caltrans) District 8, an Aerially Deposited Lead (ADL) survey was conducted to support the proposed construction associated with the replacement of the Cenda Ditch and Wheaton Wash bridges located along Interstate Highway 15 (I-15), located within the unincorporated area of Mountain Pass, in San Bernardino County, state of California (Figure 1). The purpose of this task order was to evaluate the magnitude and distribution of ADL concentrations on the north shoulder of the southbound bridge abutments at the Cenda Ditch bridge (#54-0620L) and Wheaton Wash bridge (#54-0621L) as directed by Caltrans (Figures 2 through 5). All survey work was limited to the existing right-of-way along the unpaved shoulder of I-15.

Three (3) soil samples were collected from 20 borings (10 at each bridge) at depths of 0.5-1, 1-1.5 and 1.5-2 feet bgs, and submitted to the laboratory for analysis of total and soluble lead. Laboratory data indicate that total lead concentrations were reported in the range of 4.6 to 340 mg/kg, with a mean concentration of 32.2 mg/kg. Soluble lead concentrations in samples exhibiting the highest total lead concentrations ranged from <0.20 mg/L to 2.2 mg/L—well below the STLC of 5 mg/L.

None of the lead concentrations exceeded the California Hazardous Waste TTLC and STLC or the United States Environmental Protection Agency (USEPA) Commercial Regional Screening Level (RSL) of 800 mg/Kg. However, one of the samples did exceed the California Human Health Screening Level (CHHSL) of 320 mg/kg (see Table 1).

Based on these data, the following are concluded:

1. ADL is present at various locations at the Site
2. The reported lead concentrations do not exceed California hazardous waste thresholds (TTLC and STLC).
3. Total lead concentrations did not exceed the USEPA commercial RSL for lead.
4. Total lead in one of the samples exceeded the commercial CHHSL.

Based on the findings and conclusions presented herein, the following are recommended:

1. In consideration of total lead and soluble lead concentrations, soil may be managed as non-hazardous or reused onsite without restrictions.

2. Surplus soil within the study zone may be released to the Contractor for disposition. However, the soil should not be used on residential properties.

3. A site-specific lead compliance plan and dust control plan should be developed to address health and safety of construction workers and public.

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APPENDICES

Appendix A Analytical Laboratory Reports and Chain-of-Custody Records
Appendix B Photolog

1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION AND OBJECTIVES

At the request of the California Department of Transportation (Caltrans) District 8, an Aerially Deposited Lead (ADL) survey was conducted to support the proposed construction associated with the replacement of the Cenda Ditch and Wheaton Wash bridges located along Interstate Highway 15 (I-15), located within the unincorporated area of Mountain Pass, in San Bernardino County, state of California (Figure 1). The purpose of this task order was to evaluate the magnitude and distribution of ADL concentrations on the north shoulder of the southbound bridge abutments at the Cenda Ditch bridge (#54-0620L) and Wheaton Wash bridge (#54-0621L) as directed by Caltrans (Figures 2 through 5). All survey work was limited to the existing right-of-way along the unpaved shoulder of I-15.

The overall objective of this investigation was to evaluate lead concentrations in the subsurface soil profile within the construction zone and to make recommendations for any special handling or disposal of lead-impacted soil. The ADL survey was performed in accordance with Caltrans District 8 protocols for similar sites in San Bernardino County.

1.2 SCOPE-OF-WORK

The scope of the ADL survey consisted of the following general elements:

- Pre-field Activities
- Field Sampling Activities
- Laboratory Analysis
- Investigative results, data evaluation and report development

Each of these is discussed in detail in the following subsections.

1.2.1 Pre-Field Activities

From information obtained through consultation with the District 8 and District 12 Hazardous Waste Coordinators, Rosanna Roa and Wayne Chiou, respectively, potential sample locations were designated on Department provided site plans. In addition, a site-specific HASP was developed in accordance with California Occupational Safety and Health Administration (Cal OSHA) requirements to guide field activities.

1.2.2 Field Sampling Activities

Field sampling activities included the following general tasks:

- Advance twenty (20) shallow hand-auger borings along accessible portions of the bridge abutment approaches within the proposed construction area to a maximum depth of two (2) feet below ground surface (bgs);

- Collect three (3) soil samples at the 0.5-1, 1-1.5 and 1.5-2.0 feet bgs for ADL analysis.

1.2.3 Laboratory Analyses

A total of sixty (60) soil samples were submitted under chain-of-custody to Pat-Chem Laboratories (Pat-Chem). Pat-Chem is certified by the California Environmental Laboratory Accreditation Program (ELAP) to perform the laboratory tests required in this task order. Selected samples were analyzed for the following analytes:

- Total Lead by EPA test method 6010B,
- Soluble lead by the California Waste Extraction Test (Cal WET – Citric; EPA method 3010/6010B), and
- Soluble lead by the CAL WET modified deionized water (DI) extraction method.

1.2.4 Report Preparation

This report presents the methodology, findings, and recommendations of the ADL survey and investigation. Also included with this are laboratory test results and recommendations for lead-contaminated soil management during construction. This report was prepared in accordance with the work plan and proposal dated May 13, 2013.

1.3 PREVIOUS SITE INVESTIGATIONS

Additional information was not provided relative to previous aerially deposited lead studies within the study area.

2.0 ADL SURVEY METHODOLOGY

The field methods used during this site investigation project were consistent with the work plan submitted to Caltrans dated May 13, 2013. The proposed borings were located along the Cenda Ditch and Wheaton Wash bridge abutment approaches of the I-15 freeway in the unincorporated area of Mountain Pass, in San Bernardino County, California. The following subsections describe the methodology for conducting the ADL survey.

2.1 FIELD INVESTIGATIONS

Twenty (20) hand-auger borings were advanced along accessible areas within the proposed construction zone on the southbound bridge abutment approaches along I-15.

Three (3) soil samples were collected from each of the borings at depths of 0.5-1, 1-1.5 and 1.5-2 feet bgs.

The sample depths represent the bottom depth of a three to six-inch thick sample collected using a hand-auger. Soil samples were discharged directly from the hand-auger bailer into a plastic zipper lock bag and manually homogenized in the field to minimize sample heterogeneity. Homogenized soil was then discharged to eight-ounce laboratory provided glass jars. Each sample jar was labeled with a specific sample I.D., boring I.D., project I.D., sample date, and sample time. Samples were also recorded on chain-of-custody forms and delivered to an environmental laboratory for analysis in accordance with the methods described in Section K 17 of Attachment 1 within Agreement 08A2047.

Accessible areas are defined as those areas that allow work vehicles and personnel to work safely at distances no closer than six feet from paved portions of the roadway. No samples were collected from areas that would have required workers to work within six feet of paved shoulders. Where possible, sample locations falling within inaccessible areas were moved to locations that could be safely sampled. The sample locations are indicated on Figures 2a/b and 3a/b.

All sample locations were plotted on a field map with a unique boring identification (I.D.) number to represent each borehole.

Prior to sampling at each sample interval, sample equipment was decontaminated in non-phosphate detergent solution and double rinsed with distilled water. Excess soil cuttings were replaced in the borehole.

2.2 LABORATORY ANALYSIS

Sixty (60) soil samples were submitted under chain-of-custody to Pat-Chem. Each of the samples was analyzed by EPA test method 6010B for total lead. The lab was directed to perform the following additional analyses based on the detected total lead concentrations:

- Cal WET-Citric soluble lead analysis on all samples exhibiting total lead concentrations greater than 25 milligrams per kilogram (mg/kg). Cal WET-Citric is used to assess soluble lead concentrations with respect to California Soluble Threshold Limit Concentrations (STLC).
- TCLP soluble lead analysis on all Cal WET-Citric samples exhibiting soluble lead concentrations greater than five (5) milligrams per liter (mg/L).
- pH on all TCLP analyzed samples.
- Cal WET-DI analysis in the following order of preference:
    - TCLP samples where the 95 percent upper confidence level of the mean of the TCLP data is greater than 0.5 mg/L; or
    - Ten percent of the sample population biasing the Cal WET-DI analyses to samples that required Cal WET-Citric analysis; or
    - Ten percent of the sample population biasing the Cal WET-DI analyses to samples that exhibited the highest concentrations of total lead.

These analyses were performed for statistical evaluation of data against state and federal hazardous waste limits and with the conditions of Caltrans' variance.

3.0 INVESTIGATIVE RESULTS

3.1 SUBSURFACE CONDITIONS

The soils encountered during sampling were generally light brown in color and consisted primarily of medium grained sands with fine gravels and coarse cobbles. Groundwater was not encountered in any of the boreholes and not expected to be present in the upper 10 feet.

3.2 ANALYTICAL RESULTS

A summary of the analytical results are presented in Table 1. Boring global positioning system (GPS) coordinates are attached as Table 2. Copies of the laboratory reports and chain-of-custody forms are included in Appendix A. A photo log of the sampling area is included as Appendix B.

3.2.1 Total Lead

Sixty (60) soil samples were analyzed for total lead by EPA test method 6010B. Total lead concentrations ranged from 4.6 to 340 mg/kg with a mean concentration of 32.2 mg/kg (see Table 1).

Total lead concentrations did not exceed the Total Threshold Limit Concentrations (TTLC) of 1,000 mg/kg in any of the samples.

3.2.2 Soluble Lead (Cal WET- Citric)

Soil samples with total lead concentrations in excess of 25 mg/Kg were analyzed for soluble lead using the Cal WET soluble lead analysis. Twenty-one samples were submitted for soluble lead analysis and reported concentrations ranging from <0.20 mg/L to 2.2 mg/L with a mean concentration of 1.2 mg/L (see Table 1).

Soluble lead concentrations did not exceed the Soluble Threshold Limit Concentration (STLC) of 5.0 mg/L in any of the samples.

3.2.3 Toxicity Characteristic Leaching Procedure (TCLP)

TCLP for lead analyses were not performed due to the fact that all Cal WET-citric samples reported concentrations below the STLC of 5.0 mg/L.

3.2.4 Soluble Lead (Cal WET- DI)

The Caltrans variance allows for reuse of materials exceeding the STLC for lead if the soluble concentrations do not exceed 1.5 mg/L using a less rigorous extraction test that incorporates distilled water as the solvent rather than the Cal WET citric acid or TCLP acetic acid extractant. This method is often identified as the DHS modified Cal WET-DI test.

Soluble lead analyses by the Cal WET – DI extraction method were performed on the 20 samples analyzed by Cal WET-citric extraction. The reported concentrations did not exceed the laboratory reporting limit of 0.2 mg/L.

3.2.5 pH Results

Samples were not analyzed for pH since TCLP analysis was not required for any samples.

3.3 DATA VALIDATION

Prior to submitting soil samples to the laboratory, the chain-of-custody documentation was reviewed for accuracy and completeness. The laboratory reports were cross-checked with the chain-of-custody forms to confirm accurate transposing of sample information. Field and Laboratory quality assurance and quality control (QA/QC) data (equipment blanks, method blanks, laboratory control samples and duplicates, matrix spike samples and duplicates) were also reviewed for compliance with QA/QC objectives. Based on this validation process, the data contained herein are adequate for the purposes of this study. Copies of the laboratory reports and chain-of-custody forms are included as Appendix A.

4.0 STATISTICAL DATA EVALUATION

4.1 CORRELATION BETWEEN TOTAL LEAD AND SOLUBLE LEAD

Total lead concentrations were reported in the range of 4.6 to 340 mg/kg, with a mean concentration of 32.2 mg/kg. CAL WET-citric soluble lead concentrations ranged from <0.20 mg/L to 2.2 mg/L in samples exhibiting the highest total lead concentrations. All Cal WET-citric soluble lead concentrations were reported well below the STLC of 5.0 mg/L and no further statistical analyses were necessary.

4.2 LINEAR REGRESSION ANALYSIS

Linear regression analysis to evaluate the correlation between soluble and total lead were not necessary, as Cal WET-citric lead concentrations were not reported above the STLC of 5.0 mg/L.

4.3 STATISTICAL DATA EVALUATION

Due to the low concentrations of total lead in soil samples, statistical data evaluations were not necessary.

5.0 CONCLUSIONS

At the request of the California Department of Transportation (Caltrans) District 8, an Aerially Deposited Lead (ADL) survey was conducted to support the proposed construction associated with the replacement of the Cenda Ditch and Wheaton Wash bridges located along Interstate Highway 15 (I-15), located within the unincorporated area of Mountain Pass, in San Bernardino County, state of California (Figure 1). The purpose of this task order was to evaluate the magnitude and distribution of ADL concentrations on the north shoulder of the southbound bridge abutments at the Cenda Ditch bridge (#54-0620L) and Wheaton Wash bridge (#54-0621L) as directed by Caltrans (Figures 2 through 5). All survey work was limited to the existing right-of-way along the unpaved shoulder of I-15.

Three (3) soil samples were collected from 20 borings (10 at each bridge) at depths of 0.5-1, 1-1.5 and 1.5-2 feet bgs, and submitted to the laboratory for analysis of total and soluble lead. Laboratory data indicate that total lead concentrations were reported in the range of 4.6 to 340 mg/kg, with a mean concentration of 32.2 mg/kg. Soluble lead concentrations in samples exhibiting the highest total lead concentrations ranged from <0.20 mg/L to 2.2 mg/L—well below the STLC of 5 mg/L.

None of the lead concentrations exceeded the California Hazardous Waste TTLC and STLC or the United States Environmental Protection Agency (USEPA) Commercial Regional Screening Level (RSL) of 800 mg/Kg. However, one of the samples did exceed the California Human Health Screening Level (CHHSL) of 320 mg/kg (see Table 1).

Based on these data, the following are concluded:

5. ADL is present at various locations at the Site
6. The reported lead concentrations do not exceed California hazardous waste thresholds (TTLC and STLC).
7. Total lead concentrations did not exceed the USEPA commercial RSL for lead.
8. Total lead in one of the samples exceeded the commercial CHHSL.

6.0 RECOMMENDATIONS

Based on the findings and conclusions presented herein, the following are recommended:

4. In consideration of total lead and soluble lead concentrations, soil may be managed as non-hazardous or reused onsite without restrictions.

5. Surplus soil within the study zone may be released to the Contractor for disposition. However, the soil should not be used on residential properties.

6. A site-specific lead compliance plan and dust control plan should be developed to address health and safety of construction workers and public.

7.0 LIST OF PREPARERS

This ADL survey report has been prepared under the direction of the following environmental professionals.

Preparers:

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  ADL Investigation Report Senior Reviewer

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  M.S., Geology, University of California, Riverside, California
  ADL Investigation Report Author

If you have any questions or comments regarding the information enclosed herein, please contact the undersigned at your convenience.

Respectfully submitted,
Stantec Consulting Corporation

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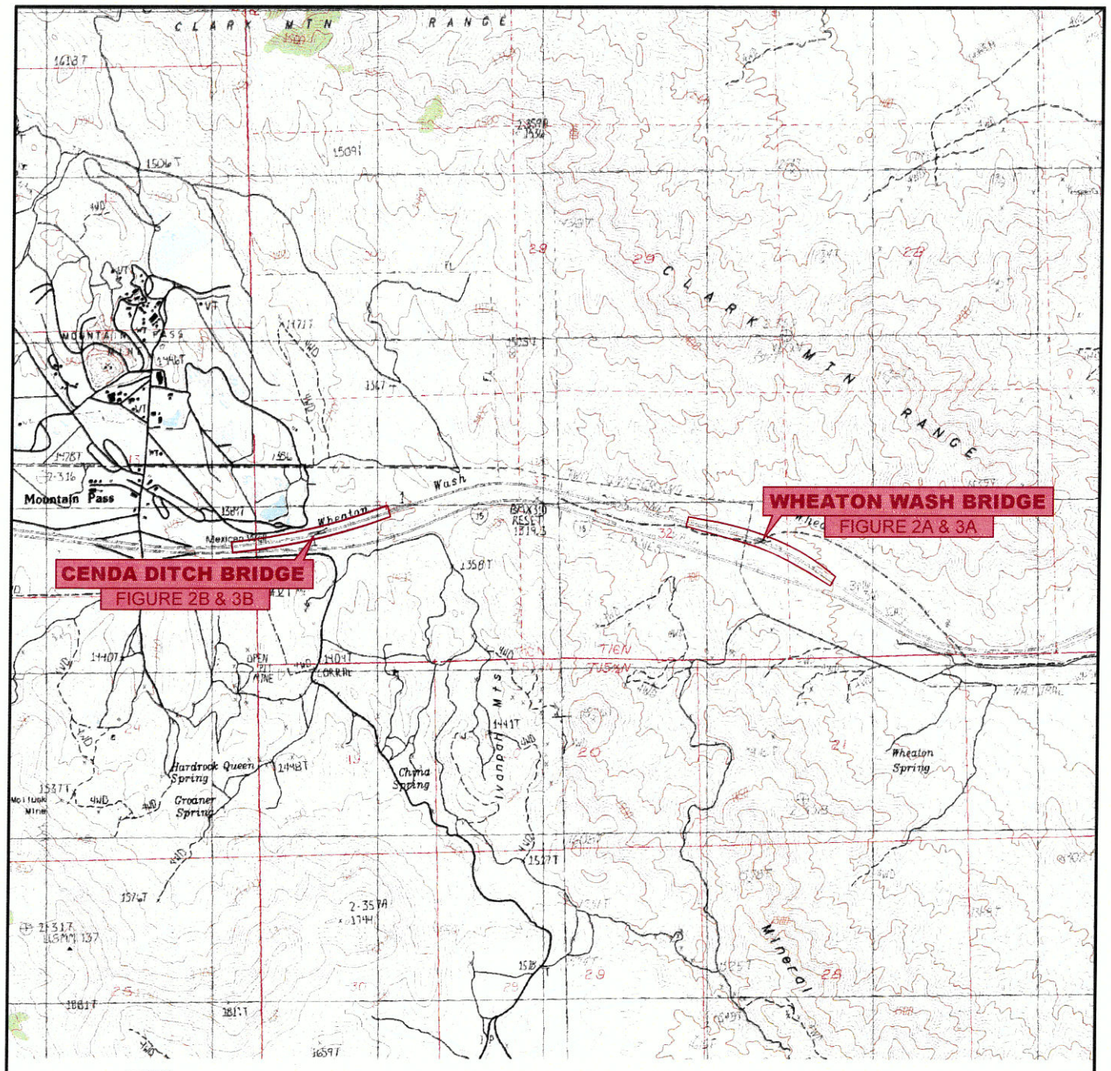
TABLES

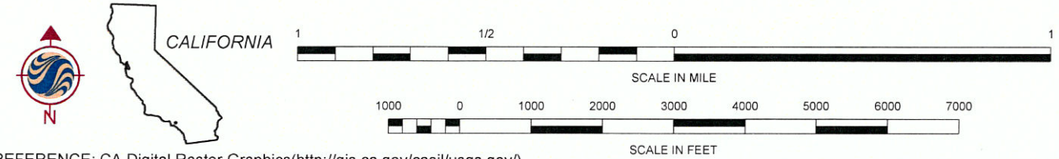
TABLE 1 - ADL
REPLACE WHEATON WASH, BRIDGE NO. 54-0621L
REPLACE CENDA DITCH, BRIDGE NO. 54-0620L
08-SBD-15-PM 173.6/174 AND 171.8/172.4
SAN BERNARDINO COUNTY, CALIFORNIA
PN: 08-0000-04721 (EA#0M2801)
TASK ORDER #16; CONTRACT 08A2047

	Sample ID	Total Lead (1) (mg/kg)	Soluble Lead (1) Cal WET-Citric (mg/L)	Soluble Lead (1) Cal WET-DI (mg/L)	Soluble Lead (1) TCLP (mg/L)	pH (2)
WHEATON WASH	HA-1-0.5-1.0	**9.6**	--	--	--	--
	HA-1-1.0-1.5	**7.6**	--	--	--	--
	HA-1-1.5-2.0	**5.7**	--	--	--	--
	HA-2-0.5-1.0	**12**	--	--	--	--
	HA-2-1.0-1.5	**6.0**	--	--	--	--
	HA-2-1.5-2.0	**4.6**		--	--	--
	HA-3-0.5-1.0	**18**	--	--	--	--
	HA-3-1.0-1.5	**12**	--	--	--	--
	HA-3-1.5-2.0	**15**	--	--	--	--
	HA-4-0.5-1.0	**18**	--	--	--	--
	HA-4-1.0-1.5	**16**			--	--
	HA-4-1.5-2.0	**12**		--	--	--
	HA-5-0.5-1.0	**94**	1.9	<0.20	--	--
	HA-5-1.0-1.5	**64**	1.6	<0.20	--	--
	HA-5-1.5-2.0	**31**	1.3	<0.20	--	--
	HA-6-0.5-1.0	**23**	--	--	--	--
	HA-6-1.0-1.5	**17**	--	--	--	--
	HA-6-1.5-2.0	**120**	1.8	<0.20	--	--
	HA-7-0.5-1.0	**18**	--	--	--	--
	HA-7-1.0-1.5	**23**	--	--	--	--
	HA-7-1.5-2.0	**9.7**	--	--	--	--
	HA-8-0.5-1.0	**11**	--	--	--	--
	HA-8-1.0-1.5	**20**	--	--	--	--
	HA-8-1.5-2.0	**13**	--	--	--	--
	HA-9-0.5-1.0	**23**	--	--	--	--
	HA-9-1.0-1.5	**8.6**	--	--	--	--
	HA-9-1.5-2.0	**24**				
	HA-10-0.5-1.0	**17**	--	--	--	--
	HA-10-1.0-1.5	**14**			--	--
	HA-10-1.5-2.0	**17**	--	--	--	--
CENDA DITCH	HA-11-0.5-1.0	**25**	<0.20	<0.20	--	--
	HA-11-1.0-1.5	**28**	<0.20	<0.20	--	--
	HA-11-1.5-2.0	**29**	<0.20	<0.20	--	--
	HA-12-0.5-1.0	15	--	--	--	--
	HA-12-1.0-1.5	**29**	0.49	<0.20	--	--
	HA-12-1.5-2.0	**53**	0.20	<0.20	--	--
	HA-13-0.5-1.0	**32**	0.98	--	--	--
	HA-13-1.0-1.5	**18**	--	--	--	--
	HA-13-1.5-2.0	**27**	0.92	<0.20	--	--
	HA-14-0.5-1.0	46	0.21	<0.20	--	--
	HA-14-1.0-1.5	**32**	0.90	<0.20	--	--
	HA-14-1.5-2.0	15	--	--	--	--
	HA-15-0.5-1.0	**43**	--	--	--	--
	HA-15-1.0-1.5	**340**	2.2	<0.20	--	--
	HA-15-1.5-2.0	**120**	0.60	<0.20	--	--
	HA-16-0.5-1.0	**37**	1.4	<0.20	--	--
	HA-16-1.0-1.5	45	2.1	<0.20	--	--
	HA-16-1.5-2.0	46	2.1	<0.20	--	--
	HA-17-0.5-1.0	**24**		--	--	--
	HA-17-1.0-1.5	**19**		--	--	--
	HA-17-1.5-2.0	**25**	0.48	<0.20	--	--
	HA-18-0.5-1.0	14	--	--	--	--
	HA-18-1.0-1.5	**32**	0.37	<0.20	--	--
	HA-18-1.5-2.0	23	--	--	--	--
	HA-19-0.5-1.0	**22**			--	--
	HA-19-1.0-1.5	**17**	--	--	--	--
	HA-19-1.5-2.0	**11**		--	--	--
	HA-20-0.5-1.0	**18**	--	--	--	--
	HA-20-1.0-1.5	21	--	--	--	--
	HA-20-1.5-2.0	40	1.5	<0.20	--	--
	Minimum	4.6	0.20	--	--	--
	Maximum	340	2.2	--	--	--
	Mean	32.2	1.2	--	--	--
	Standard Deviation	46.6	0.7	--	--	--
Threshold Limits	California Hazardous Waste	1,000	5	--	--	--
	RCRA Hazardous Waste	--	--	--	5	<2 or >12.5
	California Human Health Screening Level for Commercial/Industrial Soils	320	--	--	--	--
	Regional Screening Level for Commercial/Industrial Soils	800	--	--	--	--
	California Background Levels (range/mean)	12.4-97.1/23.9	--	--	--	--
	Y1	1,411	--	1.5	5	>5.5
	Y2	3,397	--	150	5	>5

Notes:
(1) Total Lead, Soluble Threshold Limit Concentration (STLC or "Soluble Lead"), and Toxicity Characteristic Leaching Procedure (TCLP) analysis done using EPA method 6010B. Extraction methods vary.
(2) pH determined with EPA method 9045B.
(3) Raw statistics are provided for the entire data set. UCL_{90} represents the one-tailed statistic and is equivalent to the SW-846 Chapter 9 UCL_{80}
mg/kg = milligrams per kilogram
mg/L = milligrams per liter
-- = Not analyzed or not applicable
Bold = Exceeds threshold limit

FIGURES





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REDLANDS, CALIFORNIA 92374
PHONE: (909) 335-6116 FAX: (909) 556-6516

FOR: AERIALLY DEPOSITED LEAD INVESTIGATION WORK PLAN
Agreement No. 08A2047
Task Order NO. 08-0M2800-16
Location : 1-15; Mountain Pass
San Bernardino County, California
PN: 08000004720 (EA08-0M2800)

SITE LOCATION MAP

FIGURE: 1

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
	J. RESENDIZ	A. PEREZ		JUNE 2013

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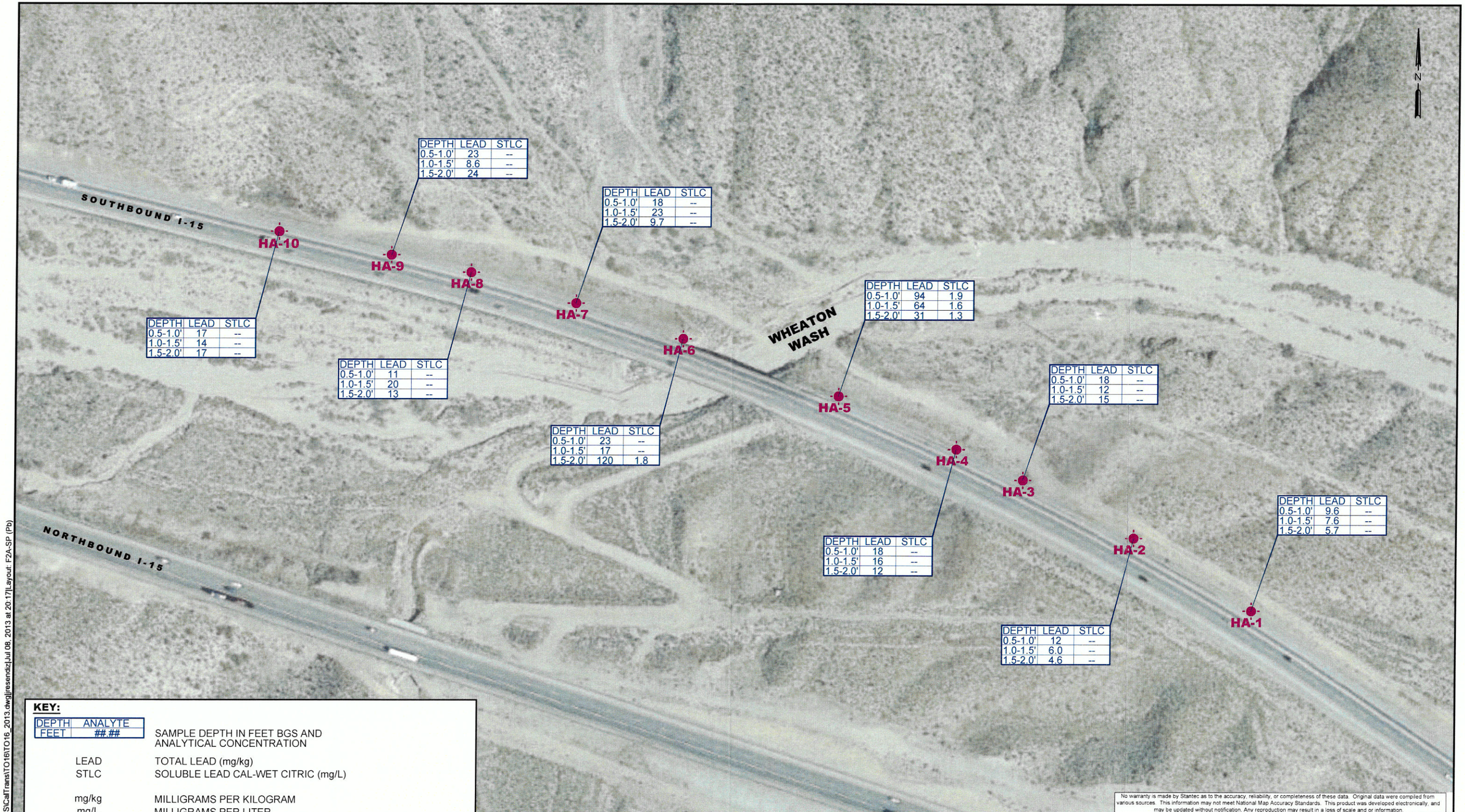

KEY:

DEPTH FEET	ANALYTE ##.##

SAMPLE DEPTH IN FEET BGS AND ANALYTICAL CONCENTRATION

LEAD	TOTAL LEAD (mg/kg)
STLC	SOLUBLE LEAD CAL-WET CITRIC (mg/L)
mg/kg	MILLIGRAMS PER KILOGRAM
mg/L	MILLIGRAMS PER LITER
<	ANALYTE NOT REPORTED AT OR ABOVE STATED LABORATORY METHOD DETECTION LIMIT (MDL)
NA	NOT ANALYZED
J	CONCENTRATION WAS REPORTED BETWEEN PQL AND THE MDL
PQL	PRACTICAL QUANTITATION LIMIT
MDL	METHOD DETECTION LIMIT

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REDLANDS, CALIFORNIA 92374
PHONE: (909) 335-6116 FAX: (909) 556-6516

FOR:
Cenda Ditch Bridge (BR #54-620L 172.11)
Wheaton Wash Bridge(BR #54-621L 173.84)
District 08 - SBD - 15 (PM 172.11 & 173.84)
SAN BERNARDINO COUNTY, CA
08-0M280-0800000472

SITE MAP
WHEATON WASH

FIGURE: 2A

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
?_____?	J. RESENDIZ	D. MONGE		JUNE 2013

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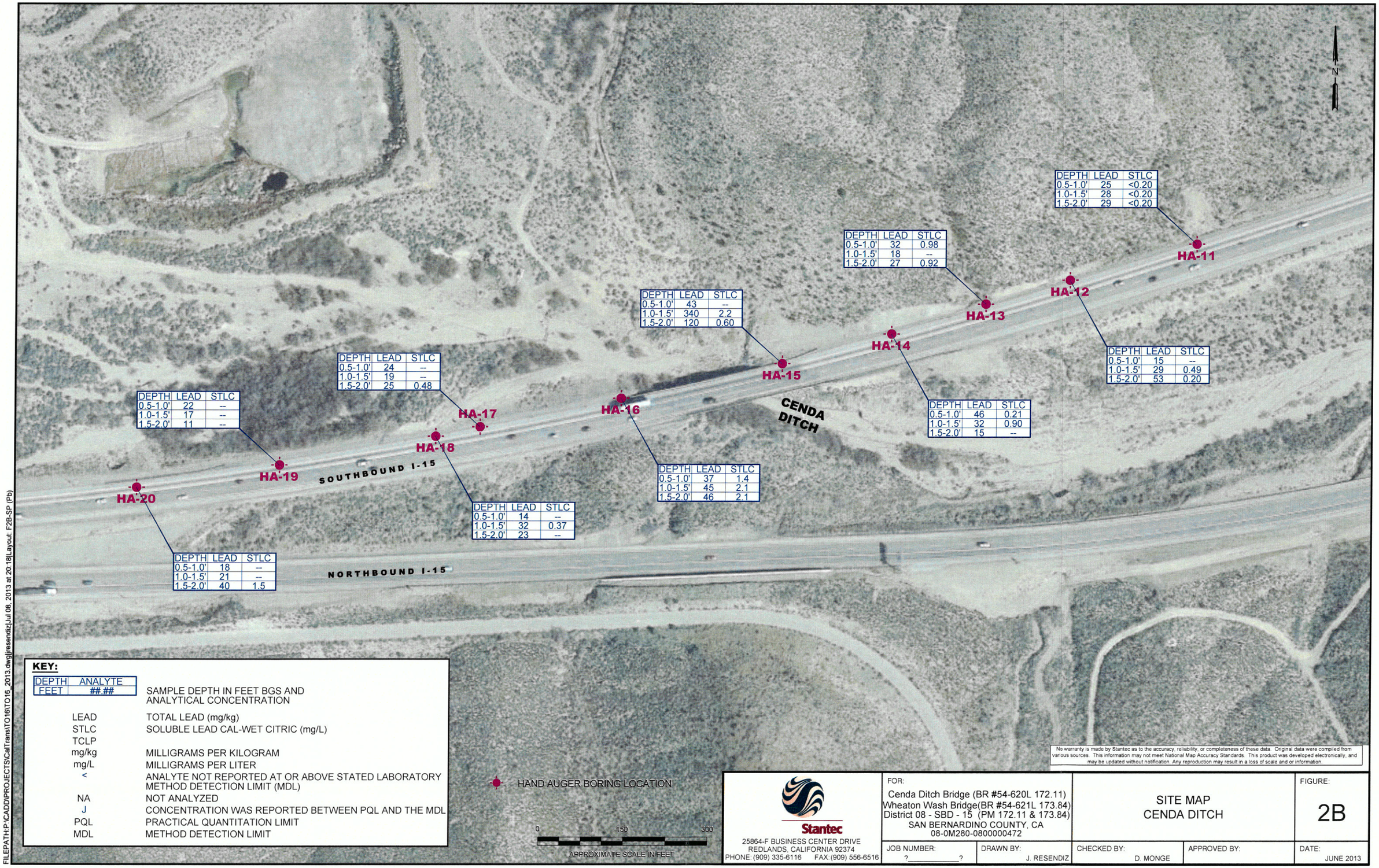

DEPTH	LEAD	STLC
0.5-1.0'	25	<0.20
1.0-1.5'	28	<0.20
1.5-2.0'	29	<0.20

DEPTH	LEAD	STLC
0.5-1.0'	32	0.98
1.0-1.5'	18	--
1.5-2.0'	27	0.92

DEPTH	LEAD	STLC
0.5-1.0'	43	--
1.0-1.5'	340	2.2
1.5-2.0'	120	0.60

DEPTH	LEAD	STLC
0.5-1.0'	15	--
1.0-1.5'	29	0.49
1.5-2.0'	53	0.20

DEPTH	LEAD	STLC
0.5-1.0'	46	0.21
1.0-1.5'	32	0.90
1.5-2.0'	15	--

DEPTH	LEAD	STLC
0.5-1.0'	24	--
1.0-1.5'	19	--
1.5-2.0'	25	0.48

DEPTH	LEAD	STLC
0.5-1.0'	22	--
1.0-1.5'	17	--
1.5-2.0'	11	--

DEPTH	LEAD	STLC
0.5-1.0'	37	1.4
1.0-1.5'	45	2.1
1.5-2.0'	46	2.1

DEPTH	LEAD	STLC
0.5-1.0'	14	--
1.0-1.5'	32	0.37
1.5-2.0'	23	--

DEPTH	LEAD	STLC
0.5-1.0'	18	--
1.0-1.5'	21	--
1.5-2.0'	40	1.5

KEY:

DEPTH FEET	ANALYTE ##.##	
		SAMPLE DEPTH IN FEET BGS AND ANALYTICAL CONCENTRATION
	LEAD	TOTAL LEAD (mg/kg)
	STLC	SOLUBLE LEAD CAL-WET CITRIC (mg/L)
	TCLP	
	mg/kg	MILLIGRAMS PER KILOGRAM
	mg/L	MILLIGRAMS PER LITER
	<	ANALYTE NOT REPORTED AT OR ABOVE STATED LABORATORY METHOD DETECTION LIMIT (MDL)
	NA	NOT ANALYZED
	J	CONCENTRATION WAS REPORTED BETWEEN PQL AND THE MDL
	PQL	PRACTICAL QUANTITATION LIMIT
	MDL	METHOD DETECTION LIMIT

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Wheaton Wash Bridge(BR #54-621L 173.84)
District 08 - SBD - 15 (PM 172.11 & 173.84)
SAN BERNARDINO COUNTY, CA
08-0M280-0800000472

SITE MAP
CENDA DITCH

FIGURE: 2B

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
?_____?	J. RESENDIZ	D. MONGE		JUNE 2013

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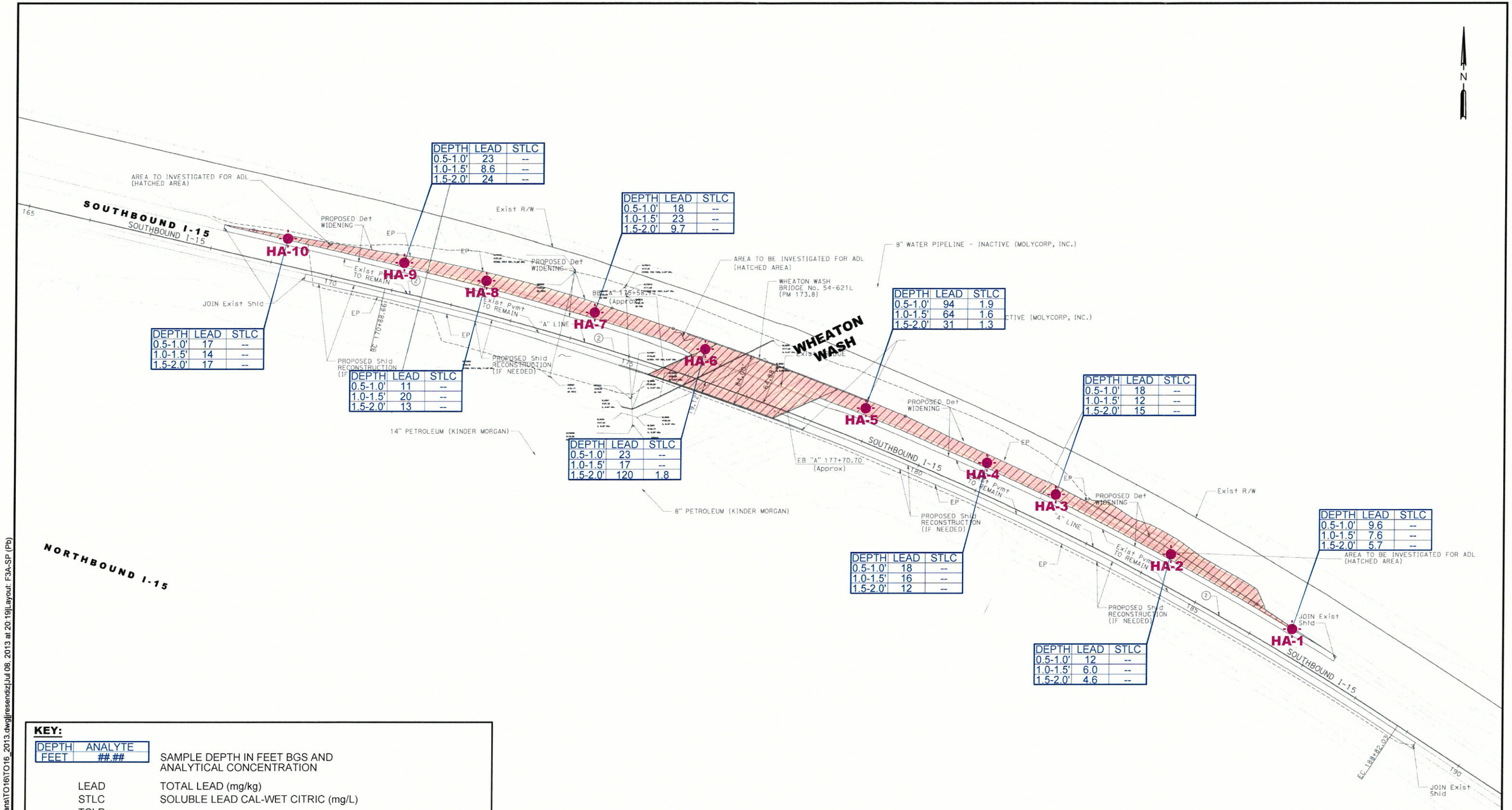

KEY:

DEPTH FEET	ANALYTE ##.##	
		SAMPLE DEPTH IN FEET BGS AND ANALYTICAL CONCENTRATION
	LEAD	TOTAL LEAD (mg/kg)
	STLC	SOLUBLE LEAD CAL-WET CITRIC (mg/L)
	TCLP	
	mg/kg	MILLIGRAMS PER KILOGRAM
	mg/L	MILLIGRAMS PER LITER
	<	ANALYTE NOT REPORTED AT OR ABOVE STATED LABORATORY METHOD DETECTION LIMIT (MDL)
	NA	NOT ANALYZED
	J	CONCENTRATION WAS REPORTED BETWEEN PQL AND THE MDL
	PQL	PRACTICAL QUANTITATION LIMIT
	MDL	METHOD DETECTION LIMIT

HAND AUGER BORING LOCATION

0 150 300

APPROXIMATE SCALE IN FEET

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FOR:
Cenda Ditch Bridge (BR #54-620L 172.11)
Wheaton Wash Bridge(BR #54-621L 173.84)
District 08 - SBD - 15 (PM 172.11 & 173.84)
SAN BERNARDINO COUNTY, CA
08-0M280-0800000472

SITE MAP
WHEATON WASH

FIGURE: 3A

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
?_____?	J. RESENDIZ	D. MONGE		JUNE 2013

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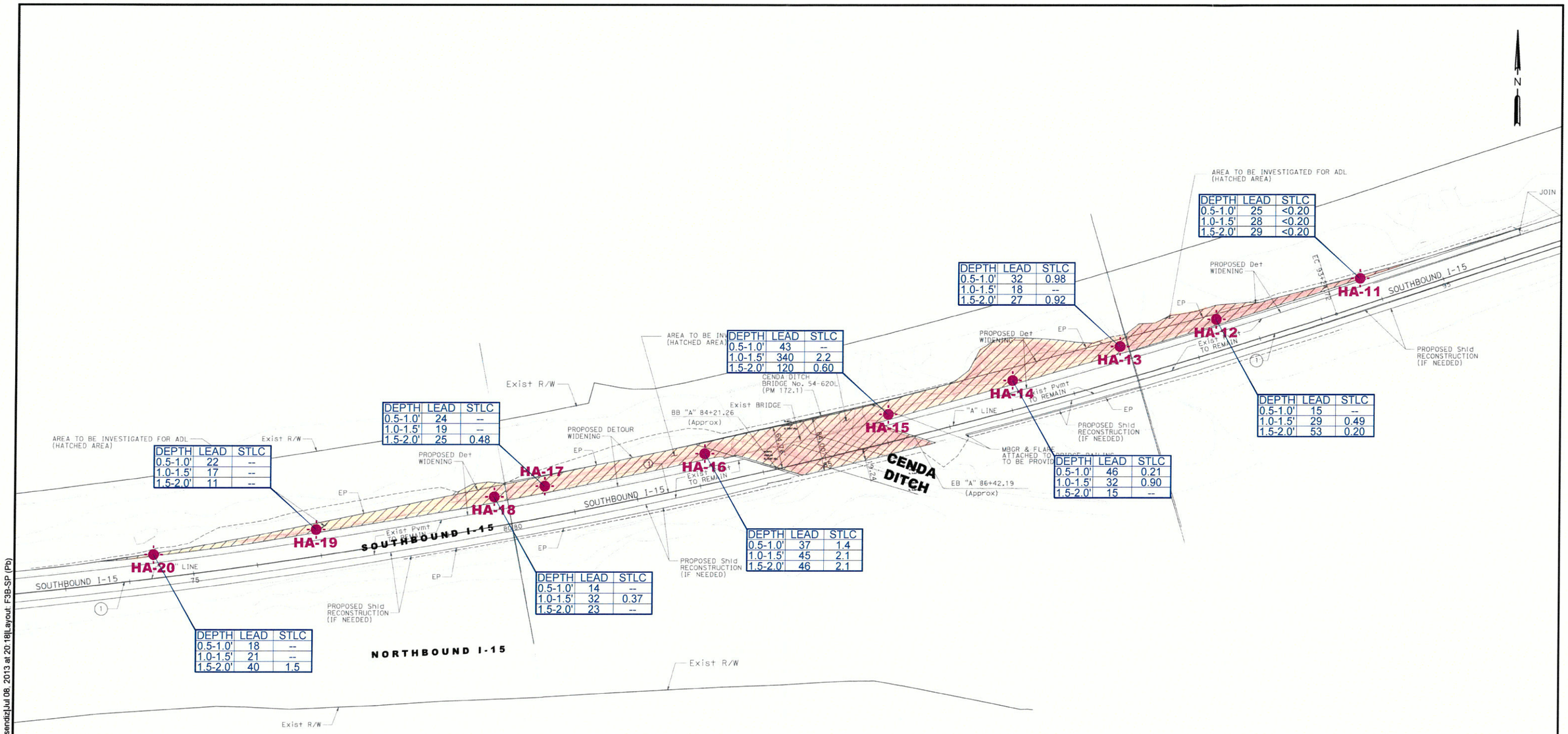

DEPTH	LEAD	STLC
0.5-1.0'	22	--
1.0-1.5'	17	--
1.5-2.0'	11	--

DEPTH	LEAD	STLC
0.5-1.0'	24	--
1.0-1.5'	19	--
1.5-2.0'	25	0.48

DEPTH	LEAD	STLC
0.5-1.0'	43	--
1.0-1.5'	340	2.2
1.5-2.0'	120	0.60

DEPTH	LEAD	STLC
0.5-1.0'	32	0.98
1.0-1.5'	18	--
1.5-2.0'	27	0.92

DEPTH	LEAD	STLC
0.5-1.0'	25	<0.20
1.0-1.5'	28	<0.20
1.5-2.0'	29	<0.20

DEPTH	LEAD	STLC
0.5-1.0'	15	--
1.0-1.5'	29	0.49
1.5-2.0'	53	0.20

DEPTH	LEAD	STLC
0.5-1.0'	46	0.21
1.0-1.5'	32	0.90
1.5-2.0'	15	--

DEPTH	LEAD	STLC
0.5-1.0'	37	1.4
1.0-1.5'	45	2.1
1.5-2.0'	46	2.1

DEPTH	LEAD	STLC
0.5-1.0'	14	--
1.0-1.5'	32	0.37
1.5-2.0'	23	--

DEPTH	LEAD	STLC
0.5-1.0'	18	--
1.0-1.5'	21	--
1.5-2.0'	40	1.5

KEY:

DEPTH FEET	ANALYTE ##.##	SAMPLE DEPTH IN FEET BGS AND ANALYTICAL CONCENTRATION
LEAD		TOTAL LEAD (mg/kg)
STLC		SOLUBLE LEAD CAL-WET CITRIC (mg/L)
TCLP		
mg/kg		MILLIGRAMS PER KILOGRAM
mg/L		MILLIGRAMS PER LITER
<		ANALYTE NOT REPORTED AT OR ABOVE STATED LABORATORY METHOD DETECTION LIMIT (MDL)
NA		NOT ANALYZED
J		CONCENTRATION WAS REPORTED BETWEEN PQL AND THE MDL
PQL		PRACTICAL QUANTITATION LIMIT
MDL		METHOD DETECTION LIMIT

HAND AUGER BORING LOCATION

0 150 300

APPROXIMATE SCALE IN FEET

No warranty is made by Stantec as to the accuracy, reliability, or completeness of these data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed electronically, and may be updated without notification. Any reproduction may result in a loss of scale and or information.

Stantec
25864-F BUSINESS CENTER DRIVE
REDLANDS, CALIFORNIA 92374
PHONE: (909) 335-6116 FAX: (909) 556-6516

FOR:
Cenda Ditch Bridge (BR #54-620L 172.11)
Wheaton Wash Bridge(BR #54-621L 173.84)
District 08 - SBD - 15 (PM 172.11 & 173.84)
SAN BERNARDINO COUNTY, CA
08-0M280-0800000472

SITE MAP
CENDA DITCH

FIGURE: 3B

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
?_____?	J. RESENDIZ	D. MONGE		JUNE 2013

FILEPATH:P:\CADD\PROJECTS\CalTrans\TO16\TO16_2013.dwg\jresendiz\Jul 08, 2013 at 20:18\Layout: F3B-SP (Pb)

APPENDIX A
ANALYTICAL LABORATORY REPORTS and CHAIN-OF-CUSTODY RECORDS

PAT-CHEM LABORATORIES

11990 Discovery Ct. • Moorpark, CA 93021 • Ph. (805) 532-0012 • Fax (805) 532-0016

Customer: **Stantec**
25864 F Business Center Drive
Redlands CA, 92374

Attention: Anne Perez
Report Date: 06-Jun-13 11:13
Subject: Soil Samples

Project/P.O.#: 185802872, 08-0M2801-16 Mountain Pass

PARAMETER	METHOD	QC BATCH	REPORTING LIMIT	ANALYZED (ANALYST)		RESULT	NOTE
EBQC-20130528 (Sample I.D.# : 1305339-01) Collected: 28-May-13 By MB/MB							
Lead	EPA 6010B	AE33106	0.02	31-May-13 (AF)	<	0.02 mg/l	
HA-1-0.5-1.0 (Sample I.D.# : 1305339-02) Collected: 28-May-13 By MB/MB							
Lead	EPA 6010B	AE33013	1.0	30-May-13 (AF)		9.6 mg/kg	
HA-1-1.0-1.5 (Sample I.D.# : 1305339-03) Collected: 28-May-13 By MB/MB							
Lead	EPA 6010B	AE33013	1.0	30-May-13 (AF)		7.6 mg/kg	
HA-1-1.5-2.0 (Sample I.D.# : 1305339-04) Collected: 28-May-13 By MB/MB							
Lead	EPA 6010B	AE33013	1.0	30-May-13 (AF)		5.7 mg/kg	
HA-2-0.5-1.0 (Sample I.D.# : 1305339-05) Collected: 28-May-13 By MB/MB							
Lead	EPA 6010B	AE33013	1.0	30-May-13 (AF)		12 mg/kg	
HA-2-1.0-1.5 (Sample I.D.# : 1305339-06) Collected: 28-May-13 By MB/MB							
Lead	EPA 6010B	AE33013	1.0	30-May-13 (AF)		6.0 mg/kg	
HA-2-1.5-2.0 (Sample I.D.# : 1305339-07) Collected: 28-May-13 By MB/MB							
Lead	EPA 6010B	AE33013	1.0	30-May-13 (AF)		4.6 mg/kg	
HA-3-0.5-1.0 (Sample I.D.# : 1305339-08) Collected: 28-May-13 By MB/MB							
Lead	EPA 6010B	AE33013	1.0	30-May-13 (AF)		18 mg/kg	
HA-3-1.0-1.5 (Sample I.D.# : 1305339-09) Collected: 28-May-13 By MB/MB							
Lead	EPA 6010B	AE33013	1.0	30-May-13 (AF)		12 mg/kg	
HA-3-1.5-2.0 (Sample I.D.# : 1305339-10) Collected: 28-May-13 By MB/MB							
Lead	EPA 6010B	AE33013	1.0	30-May-13 (AF)		15 mg/kg	
HA-4-0.5-1.0 (Sample I.D.# : 1305339-11) Collected: 28-May-13 By MB/MB							
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)		18 mg/kg	
HA-4-1.0-1.5 (Sample I.D.# : 1305339-12) Collected: 28-May-13 By MB/MB							
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)		16 mg/kg	
HA-4-1.5-2.0 (Sample I.D.# : 1305339-13) Collected: 28-May-13 By MB/MB							
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)		12 mg/kg	
HA-5-0.5-1.0 (Sample I.D.# : 1305339-14) Collected: 28-May-13 By MB/MB							
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)		94 mg/kg	

Respectfully Submitted,

Pat Brueckner

Pat Brueckner 6/6/2013
Laboratory Director

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25864 F Business Center Drive
Redlands CA, 92374

Attention: Anne Perez
Report Date: 06-Jun-13 11:13
Subject: Soil Samples

Project/P.O.#: 185802872, 08-0M2801-16 Mountain Pass

PARAMETER	METHOD	QC BATCH	REPORTING LIMIT	ANALYZED (ANALYST)	RESULT	NOTE
HA-5-0.5-1.0 (Sample I.D.# : 1305339-14) Collected: 28-May-13 By MB/MB						
Lead	EPA 6010B(STLC)	AF30514	0.20	05-Jun-13 (AF)	1.9 mg/l	
HA-5-1.0-1.5 (Sample I.D.# : 1305339-15) Collected: 28-May-13 By MB/MB						
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)	64 mg/kg	
Lead	EPA 6010B(STLC)	AF30514	0.20	05-Jun-13 (AF)	1.6 mg/l	
HA-5-1.5-2.0 (Sample I.D.# : 1305339-16) Collected: 28-May-13 By MB/MB						
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)	31 mg/kg	
Lead	EPA 6010B(STLC)	AF30514	0.20	05-Jun-13 (AF)	1.3 mg/l	
HA-6-0.5-1.0 (Sample I.D.# : 1305339-17) Collected: 28-May-13 By MB/MB						
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)	23 mg/kg	
HA-6-1.0-1.5 (Sample I.D.# : 1305339-18) Collected: 28-May-13 By MB/MB						
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)	17 mg/kg	
HA-6-1.5-2.0 (Sample I.D.# : 1305339-19) Collected: 28-May-13 By MB/MB						
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)	120 mg/kg	
Lead	EPA 6010B(STLC)	AF30514	0.20	05-Jun-13 (AF)	1.8 mg/l	
HA-7-0.5-1.0 (Sample I.D.# : 1305339-20) Collected: 28-May-13 By MB/MB						
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)	18 mg/kg	
HA-7-1.0-1.5 (Sample I.D.# : 1305339-21) Collected: 28-May-13 By MB/MB						
Lead	EPA 6010B	AE33013	1.0	30-May-13 (AF)	23 mg/kg	
HA-7-1.5-2.0 (Sample I.D.# : 1305339-22) Collected: 28-May-13 By MB/MB						
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)	9.7 mg/kg	
HA-8-0.5-1.0 (Sample I.D.# : 1305339-23) Collected: 28-May-13 By MB/MB						
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)	11 mg/kg	
HA-8-1.0-1.5 (Sample I.D.# : 1305339-24) Collected: 28-May-13 By MB/MB						
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)	20 mg/kg	
HA-8-1.5-2.0 (Sample I.D.# : 1305339-25) Collected: 28-May-13 By MB/MB						
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)	13 mg/kg	
HA-9-0.5-1.0 (Sample I.D.# : 1305339-26) Collected: 28-May-13 By MB/MB						
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)	23 mg/kg	

Respectfully Submitted,

Pat Brueckner

Pat Brueckner 6/6/2013
Laboratory Director

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Customer: **Stantec**
25864 F Business Center Drive
Redlands CA, 92374

Attention: Anne Perez
Report Date: 06-Jun-13 11:13
Subject: Soil Samples

Project/P.O.#: 185802872, 08-0M2801-16 Mountain Pass

PARAMETER	METHOD	QC BATCH	REPORTING LIMIT	ANALYZED (ANALYST)		RESULT	NOTE
HA-9-1.0-1.5 (Sample I.D.# : 1305339-27) Collected: 28-May-13 By MB/MB							
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)		8.6 mg/kg	
HA-9-1.5-2.0 (Sample I.D.# : 1305339-28) Collected: 28-May-13 By MB/MB							
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)		24 mg/kg	
HA-10-0.5-1.0 (Sample I.D.# : 1305339-29) Collected: 28-May-13 By MB/MB							
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)		17 mg/kg	
HA-10-1.0-1.5 (Sample I.D.# : 1305339-30) Collected: 28-May-13 By MB/MB							
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)		14 mg/kg	
HA-10-1.5-2.0 (Sample I.D.# : 1305339-31) Collected: 28-May-13 By MB/MB							
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)		17 mg/kg	
HA-11-0.5-1.0 (Sample I.D.# : 1305339-32) Collected: 29-May-13 By MB/MB							
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)		25 mg/kg	
Lead	EPA 6010B(STLC)	AF30514	0.20	05-Jun-13 (AF)	<	0.20 mg/l	
HA-11-1.0-1.5 (Sample I.D.# : 1305339-33) Collected: 29-May-13 By MB/MB							
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)		28 mg/kg	
Lead	EPA 6010B(STLC)	AF30514	0.20	05-Jun-13 (AF)	<	0.20 mg/l	
HA-11-1.5-2.0 (Sample I.D.# : 1305339-34) Collected: 29-May-13 By MB/MB							
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)		29 mg/kg	
Lead	EPA 6010B(STLC)	AF30514	0.20	05-Jun-13 (AF)	<	0.20 mg/l	
HA-12-0.5-1.0 (Sample I.D.# : 1305339-35) Collected: 29-May-13 By MB/MB							
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)		15 mg/kg	
HA-12-1.0-1.5 (Sample I.D.# : 1305339-36) Collected: 29-May-13 By MB/MB							
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)		29 mg/kg	

Respectfully Submitted,

Pat Brueckner

Pat Brueckner 6/6/2013
Laboratory Director

PAT-CHEM LABORATORIES
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Customer: **Stantec**
25864 F Business Center Drive
Redlands CA, 92374

Attention: Anne Perez
Report Date: 06-Jun-13 11:13
Subject: Soil Samples

Project/P.O.#: 185802872, 08-0M2801-16 Mountain Pass

PARAMETER	METHOD	QC BATCH	REPORTING LIMIT	ANALYZED (ANALYST)		RESULT	NOTE
HA-12-1.0-1.5 (Sample I.D.# : 1305339-36) Collected: 29-May-13 By MB/MB							
Lead	EPA 6010B(STLC)	AF30514	0.20	05-Jun-13 (AF)		0.49 mg/l	
HA-12-1.5-2.0 (Sample I.D.# : 1305339-37) Collected: 29-May-13 By MB/MB							
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)		53 mg/kg	
Lead	EPA 6010B(STLC)	AF30514	0.20	05-Jun-13 (AF)	<	0.20 mg/l	
HA-13-0.5-1.0 (Sample I.D.# : 1305339-38) Collected: 29-May-13 By MB/MB							
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)		32 mg/kg	
Lead	EPA 6010B(STLC)	AF30514	0.20	05-Jun-13 (AF)		0.98 mg/l	
HA-13-1.0-1.5 (Sample I.D.# : 1305339-39) Collected: 29-May-13 By MB/MB							
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)		18 mg/kg	
HA-13-1.5-2.0 (Sample I.D.# : 1305339-40) Collected: 29-May-13 By MB/MB							
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)		27 mg/kg	
Lead	EPA 6010B(STLC)	AF30514	0.20	05-Jun-13 (AF)		0.92 mg/l	
HA-14-0.5-1.0 (Sample I.D.# : 1305339-41) Collected: 29-May-13 By MB/MB							
Lead	EPA 6010B	AE33013	1.0	30-May-13 (AF)		46 mg/kg	
Lead	EPA 6010B(STLC)	AF30514	0.20	05-Jun-13 (AF)		0.21 mg/l	
HA-14-1.0-1.5 (Sample I.D.# : 1305339-42) Collected: 29-May-13 By MB/MB							
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)		32 mg/kg	
Lead	EPA 6010B(STLC)	AF30514	0.20	05-Jun-13 (AF)		0.90 mg/l	
HA-14-1.5-2.0 (Sample I.D.# : 1305339-43) Collected: 29-May-13 By MB/MB							
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)		15 mg/kg	
HA-15-0.5-1.0 (Sample I.D.# : 1305339-44) Collected: 29-May-13 By MB/MB							
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)		43 mg/kg	

Respectfully Submitted,

Pat Brueckner

Pat Brueckner 6/6/2013
Laboratory Director

PAT-CHEM LABORATORIES
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Customer: **Stantec**
25864 F Business Center Drive
Redlands CA, 92374

Attention: Anne Perez
Report Date: 06-Jun-13 11:13
Subject: Soil Samples

Project/P.O.#: 185802872, 08-0M2801-16 Mountain Pass

PARAMETER	METHOD	QC BATCH	REPORTING LIMIT	ANALYZED (ANALYST)	RESULT	NOTE
HA-15-0.5-1.0 (Sample I.D.# : 1305339-44) Collected: 29-May-13 By MB/MB						
Lead	EPA 6010B(STLC)	AF30514	0.20	05-Jun-13 (AF)	3.8 mg/l	
HA-15-1.0-1.5 (Sample I.D.# : 1305339-45) Collected: 29-May-13 By MB/MB						
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)	340 mg/kg	
Lead	EPA 6010B(STLC)	AF30514	0.20	05-Jun-13 (AF)	2.2 mg/l	
HA-15-1.5-2.0 (Sample I.D.# : 1305339-46) Collected: 29-May-13 By MB/MB						
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)	120 mg/kg	
Lead	EPA 6010B(STLC)	AF30514	0.20	05-Jun-13 (AF)	0.60 mg/l	
HA-16-0.5-1.0 (Sample I.D.# : 1305339-47) Collected: 29-May-13 By MB/MB						
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)	37 mg/kg	
Lead	EPA 6010B(STLC)	AF30514	0.20	05-Jun-13 (AF)	1.4 mg/l	
HA-16-1.0-1.5 (Sample I.D.# : 1305339-48) Collected: 29-May-13 By MB/MB						
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)	45 mg/kg	
Lead	EPA 6010B(STLC)	AF30514	0.20	05-Jun-13 (AF)	2.1 mg/l	
HA-16-1.5-2.0 (Sample I.D.# : 1305339-49) Collected: 29-May-13 By MB/MB						
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)	46 mg/kg	
Lead	EPA 6010B(STLC)	AF30514	0.20	05-Jun-13 (AF)	2.1 mg/l	
HA-17-0.5-1.0 (Sample I.D.# : 1305339-50) Collected: 29-May-13 By MB/MB						
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)	24 mg/kg	
HA-17-1.0-1.5 (Sample I.D.# : 1305339-51) Collected: 29-May-13 By MB/MB						
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)	19 mg/kg	
HA-17-1.5-2.0 (Sample I.D.# : 1305339-52) Collected: 29-May-13 By MB/MB						
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)	25 mg/kg	

Respectfully Submitted,

Pat Brueckner

Pat Brueckner 6/6/2013
Laboratory Director

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Customer: **Stantec**
25864 F Business Center Drive
Redlands CA, 92374

Attention: Anne Perez
Report Date: 06-Jun-13 11:13
Subject: Soil Samples

Project/P.O.#: 185802872, 08-0M2801-16 Mountain Pass

PARAMETER	METHOD	QC BATCH	REPORTING LIMIT	ANALYZED (ANALYST)	RESULT	NOTE
HA-17-1.5-2.0 (Sample I.D.# : 1305339-52) Collected: 29-May-13 By MB/MB						
Lead	EPA 6010B(STLC)	AF30514	0.20	05-Jun-13 (AF)	0.48 mg/l	
HA-18-0.5-1.0 (Sample I.D.# : 1305339-53) Collected: 29-May-13 By MB/MB						
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)	14 mg/kg	
HA-18-1.0-1.5 (Sample I.D.# : 1305339-54) Collected: 29-May-13 By MB/MB						
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)	32 mg/kg	
Lead	EPA 6010B(STLC)	AF30514	0.20	05-Jun-13 (AF)	0.37 mg/l	
HA-18-1.5-2.0 (Sample I.D.# : 1305339-55) Collected: 29-May-13 By MB/MB						
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)	23 mg/kg	
HA-19-0.5-1.0 (Sample I.D.# : 1305339-56) Collected: 29-May-13 By MB/MB						
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)	22 mg/kg	
HA-19-1.0-1.5 (Sample I.D.# : 1305339-57) Collected: 29-May-13 By MB/MB						
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)	17 mg/kg	
HA-19-1.5-2.0 (Sample I.D.# : 1305339-58) Collected: 29-May-13 By MB/MB						
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)	11 mg/kg	
HA-20-0.5-1.0 (Sample I.D.# : 1305339-59) Collected: 29-May-13 By MB/MB						
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)	18 mg/kg	
HA-20-1.0-1.5 (Sample I.D.# : 1305339-60) Collected: 29-May-13 By MB/MB						
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)	21 mg/kg	
HA-20-1.5-2.0 (Sample I.D.# : 1305339-61) Collected: 29-May-13 By MB/MB						
Lead	EPA 6010B	AE33013	1.0	31-May-13 (AF)	40 mg/kg	

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Pat Brueckner

Pat Brueckner 6/6/2013
Laboratory Director

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Customer: **Stantec**
25864 F Business Center Drive
Redlands CA, 92374

Attention: Anne Perez
Report Date: 06-Jun-13 11:13
Subject: Soil Samples

Project/P.O.#: 185802872, 08-0M2801-16 Mountain Pass

PARAMETER	METHOD	QC BATCH	REPORTING LIMIT	ANALYZED (ANALYST)		RESULT	NOTE
HA-20-1.5-2.0 (Sample I.D.# : 1305339-61) Collected: 29-May-13 By MB/MB							
Lead	EPA 6010B(STLC)	AF30514	0.20	05-Jun-13 (AF)		1.5 mg/l	
EBQC-20130529 (Sample I.D.# : 1305339-62) Collected: 29-May-13 By MB/MB							
Lead	EPA 6010B	AE33106	0.02	31-May-13 (AF)	<	0.02 mg/l	

Respectfully Submitted,

Pat Brueckner

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Report Date: 06-Jun-13 11:13
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Project/P.O.#: 185802872, 08-0M2801-16 Mountain Pass

Metals by EPA 6000/7000 Series Methods - Quality Control

Parameter	Result	Rep. Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Note
Batch AE33013 - EPA 3050B										
Blank (AE33013-BLK1)				Prepared & Analyzed: 30-May-13						
Lead	ND	1.0	mg/kg							
Blank (AE33013-BLK2)				Prepared & Analyzed: 30-May-13						
Lead	ND	1.0	mg/kg							
Blank (AE33013-BLK3)				Prepared & Analyzed: 30-May-13						
Lead	ND	1.0	mg/kg							
LCS (AE33013-BS1)				Prepared & Analyzed: 30-May-13						
Lead	22.9	1.0	mg/kg	25.0		91.7	80-120			
LCS (AE33013-BS2)				Prepared & Analyzed: 30-May-13						
Lead	23.0	1.0	mg/kg	25.0		92.2	80-120			
LCS (AE33013-BS3)				Prepared & Analyzed: 30-May-13						
Lead	23.1	1.0	mg/kg	25.0		92.5	80-120			
LCS Dup (AE33013-BSD1)				Prepared & Analyzed: 30-May-13						
Lead	22.4	1.0	mg/kg	25.0		89.8	80-120	2.15	20	
LCS Dup (AE33013-BSD2)				Prepared & Analyzed: 30-May-13						
Lead	23.5	1.0	mg/kg	25.0		94.1	80-120	2.04	20	
LCS Dup (AE33013-BSD3)				Prepared & Analyzed: 30-May-13						
Lead	24.2	1.0	mg/kg	25.0		96.9	80-120	4.64	20	
Duplicate (AE33013-DUP1)		**Source: 1305339-02**		Prepared & Analyzed: 30-May-13						
Lead	9.71	1.0	mg/kg		9.59			1.24	20	

Respectfully Submitted,

Pat Brueckner

Pat Brueckner 6/6/2013
Laboratory Director

PAT-CHEM LABORATORIES
11990 Discovery Ct. • Moorpark, CA 93021 • Ph. (805) 532-0012 • Fax (805) 532-0016

Customer: **Stantec**
25864 F Business Center Drive
Redlands CA, 92374

Attention: Anne Perez
Report Date: 06-Jun-13 11:13
Subject: Soil Samples

Project/P.O.#: 185802872, 08-0M2801-16 Mountain Pass

Metals by EPA 6000/7000 Series Methods - Quality Control

Parameter	Result	Rep. Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Note
Batch AE33013 - EPA 3050B										
Duplicate (AE33013-DUP2)		**Source: 1305339-21**		Prepared & Analyzed: 30-May-13						
Lead	23.2	1.0	mg/kg		23.1			0.198	20	
Duplicate (AE33013-DUP3)		**Source: 1305339-41**		Prepared & Analyzed: 30-May-13						
Lead	45.7	1.0	mg/kg		46.2			1.01	20	
Matrix Spike (AE33013-MS1)		**Source: 1305339-02**		Prepared & Analyzed: 30-May-13						
Lead	199	1.0	mg/kg	250	9.59	75.8	75-125			
Matrix Spike (AE33013-MS2)		**Source: 1305339-21**		Prepared & Analyzed: 30-May-13						
Lead	223	1.0	mg/kg	250	23.1	80.1	75-125			
Matrix Spike (AE33013-MS3)		**Source: 1305339-41**		Prepared & Analyzed: 30-May-13						
Lead	247	1.0	mg/kg	250	46.2	80.3	75-125			
Matrix Spike Dup (AE33013-MSD1)		**Source: 1305339-02**		Prepared & Analyzed: 30-May-13						
Lead	206	1.0	mg/kg	250	9.59	78.4	75-125	3.31	20	
Matrix Spike Dup (AE33013-MSD2)		**Source: 1305339-21**		Prepared & Analyzed: 30-May-13						
Lead	223	1.0	mg/kg	250	23.1	79.9	75-125	0.233	20	
Matrix Spike Dup (AE33013-MSD3)		**Source: 1305339-41**		Prepared & Analyzed: 30-May-13						
Lead	284	1.0	mg/kg	250	46.2	95.2	75-125	14.0	20	
Batch AE33106 - EPA 200 Series										
Blank (AE33106-BLK1)				Prepared & Analyzed: 31-May-13						
Lead	ND	0.02	mg/l							

Respectfully Submitted,

Pat Brueckner

Pat Brueckner 6/6/2013
Laboratory Director

PAT-CHEM LABORATORIES
11990 Discovery Ct. • Moorpark, CA 93021 • Ph. (805) 532-0012 • Fax (805) 532-0016

Customer: **Stantec**
25864 F Business Center Drive
Redlands CA, 92374

Attention: Anne Perez
Report Date: 06-Jun-13 11:13
Subject: Soil Samples

Project/P.O.#: 185802872, 08-0M2801-16 Mountain Pass

Metals by EPA 6000/7000 Series Methods - Quality Control

Parameter	Result	Rep. Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Note
Batch AE33106 - EPA 200 Series										
LCS (AE33106-BS1)				Prepared & Analyzed: 31-May-13						
Lead	0.511	0.02	mg/l	0.500		102	80-120			
LCS Dup (AE33106-BSD1)				Prepared & Analyzed: 31-May-13						
Lead	0.504	0.02	mg/l	0.500		101	80-120	1.24	20	
Duplicate (AE33106-DUP1)		**Source: 1305339-01**		Prepared & Analyzed: 31-May-13						
Lead	ND	0.02	mg/l		ND				20	
Matrix Spike (AE33106-MS1)		**Source: 1305339-01**		Prepared & Analyzed: 31-May-13						
Lead	0.985	0.02	mg/l	1.00	ND	98.5	80-120			
Matrix Spike Dup (AE33106-MSD1)		**Source: 1305339-01**		Prepared & Analyzed: 31-May-13						
Lead	0.961	0.02	mg/l	1.00	ND	96.1	80-120	2.43	20	

Respectfully Submitted,

Pat Brueckner

Pat Brueckner 6/6/2013
Laboratory Director

PAT-CHEM LABORATORIES
11990 Discovery Ct. • Moorpark, CA 93021 • Ph. (805) 532-0012 • Fax (805) 532-0016

Customer: **Stantec**
25864 F Business Center Drive
Redlands CA, 92374

Attention: Anne Perez
Report Date: 06-Jun-13 11:13
Subject: Soil Samples

Project/P.O.#: 185802872, 08-0M2801-16 Mountain Pass

STLC Metals by 6000/7000 Series Methods - Quality Control

Parameter	Result	Rep. Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Note
Batch AF30514 - TCLP Metals										
Blank (AF30514-BLK1)				Prepared & Analyzed: 05-Jun-13						
Lead	ND	0.02	mg/l							
Blank (AF30514-BLK2)				Prepared & Analyzed: 05-Jun-13						
Lead	ND	0.02	mg/l							
LCS (AF30514-BS1)				Prepared & Analyzed: 05-Jun-13						
Lead	0.554	0.02	mg/l	0.500		111	80-120			
LCS (AF30514-BS2)				Prepared & Analyzed: 05-Jun-13						
Lead	0.513	0.02	mg/l	0.500		103	80-120			
LCS Dup (AF30514-BSD1)				Prepared & Analyzed: 05-Jun-13						
Lead	0.528	0.02	mg/l	0.500		106	80-120	4.79	20	
LCS Dup (AF30514-BSD2)				Prepared & Analyzed: 05-Jun-13						
Lead	0.509	0.02	mg/l	0.500		102	80-120	0.787	20	
Duplicate (AF30514-DUP1)		**Source: 1305339-14**		Prepared & Analyzed: 05-Jun-13						
Lead	1.92	0.20	mg/l		1.88			2.02	20	
Duplicate (AF30514-DUP2)		**Source: 1305339-15**		Prepared & Analyzed: 05-Jun-13						
Lead	1.54	0.20	mg/l		1.56			1.05	20	
Matrix Spike (AF30514-MS1)		**Source: 1305339-14**		Prepared & Analyzed: 05-Jun-13						
Lead	10.7	0.20	mg/l	10.0	1.88	88.4	80-120			
Matrix Spike (AF30514-MS2)		**Source: 1305339-15**		Prepared & Analyzed: 05-Jun-13						
Lead	10.4	0.20	mg/l	10.0	1.56	88.0	80-120			

Respectfully Submitted,

Pat Brueckner

Pat Brueckner 6/6/2013
Laboratory Director

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11990 Discovery Ct. • Moorpark, CA 93021 • Ph. (805) 532-0012 • Fax (805) 532-0016

Customer: **Stantec**
25864 F Business Center Drive
Redlands CA, 92374

Attention: Anne Perez
Report Date: 06-Jun-13 11:13
Subject: Soil Samples

Project/P.O.#: 185802872, 08-0M2801-16 Mountain Pass

STLC Metals by 6000/7000 Series Methods - Quality Control

Parameter	Result	Rep. Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Note
Batch AF30514 - TCLP Metals										
Matrix Spike Dup (AF30514-MSD1)		**Source: 1305339-14**		Prepared & Analyzed: 05-Jun-13						
Lead	10.9	0.20	mg/l	10.0	1.88	90.3	80-120	1.72	20	
Matrix Spike Dup (AF30514-MSD2)		**Source: 1305339-15**		Prepared & Analyzed: 05-Jun-13						
Lead	10.5	0.20	mg/l	10.0	1.56	89.4	80-120	1.38	20	

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis

Respectfully Submitted,

Pat Brueckner

Pat Brueckner 6/6/2013
Laboratory Director

#1305339

Stantec

CHAIN OF CUSTODY

25864-F Business Center Dr. Redlands, CA 92374
Office: (909) 335-6116 Fax: (909) 335-6120

Client Name/Address
Stantec Consulting Services
25864-F Business Center Drive
Redlands, CA 92374

Laboratory:
PAT-CHEM
11990 DISCOVERY CT.
MOORPARK, CA 93021
800-400-5227

Project Manager: ANNE PEREZ
E-Mail Address: anne.perez@stantec.com
Sampler Name: M. Bohn / M. Baernstine
Project Number: 185802872
Project: 08-0M2801-16 - Mountain Pass

Turn Around Time:
Normal TAT: ___
72 Hour: ___
48 Hour ___
24 Hour X
Same Day: ___
Other: ___
Sample Temp °C: ___

Analysis Required

Sample Description/Identification	Sample Matrix	Preservative (see below)	# of Cont.	Sample Date	Sample Time	Filtered Sample	TTLC 6010B	Cal WET-citric 3010	Cal WET-DI mod 3010	TCLP 1311	pH 9045C						Special Instructions
EBQC-20130528	WATER	1,4	1	05/28/13	1000		X										
HA-1-0.5-1.0	SOIL	1	1	05/28/13	1013		X										
HA-1-1.0-1.5	SOIL	1	1	05/28/13	1017		X										
HA-1-1.5-2.0	SOIL	1	1	05/28/13	1020		X										
HA-2-0.5-1.0	SOIL	1	1	05/28/13	1031		X										
HA-2-1.0-1.5	SOIL	1	1	05/28/13	1035		X										
HA-2-1.5-2.0	SOIL	1	1	05/28/13	1040		X										
HA-3-0.5-1.0	SOIL	1	1	05/28/13	1052		X										
HA-3-1.0-1.5	SOIL	1	1	05/28/13	1054		X										
HA-3-1.5-2.0	SOIL	1	1	05/28/13	1056		X										
HA-4-0.5-1.0	SOIL	1	1	05/28/13	1105		X										
HA-4-1.0-1.5	SOIL	1	1	05/28/13	1109		X										
HA-4-1.5-2.0	SOIL	1	1	05/28/13	1112		X										
HA-5-0.5-1.0	SOIL	1	1	05/28/13	1122		X										
HA-5-1.0-1.5	SOIL	1	1	05/28/13	1124		X										

Sample Preservative: 1=ICE · 2=HCl · 3=H_2SO_4 · 4=HNO_3 · 5=NaOH · 6=Other:

Special Instructions: Samples >25mg/Kg TTLC -> Cal WET-citric ~~[illegible]~~ Cal-WET-DI. Samples >5mg/L Cal WET-Citric -> TCLP. Contact Anne Perez for further clarification.
only select samples +pH

Relinquished By:	Date	Time	Received By + Company Name:	Date	Time
[signature]	5/29/13	1545	[signature] Pat Chem	5/30/13	1140
Relinquished By + Company Name: [signature] PCL	5/30/13	1415	Received By + Company Name:	Date	Time
Relinquished By + Company Name:	Date	Time	Received By + Company Name: [signature]	Date 5/30/13	Time 1140

CHAIN OF CUSTODY

Stantec

25864-F Business Center Dr. Redlands, CA 92374
Office: (909) 335-6116 Fax: (909) 335-6120

Client Name/Address	Project Manager: ANNE PEREZ
Stantec Consulting Services 25864-F Business Center Drive Redlands, CA 92374	E-Mail Address: anne.perez@stantec.com
	Sampler Name: M. Bohn / M. Baernstine
Laboratory: PAT-CHEM 11990 DISCOVERY CT. MOORPARK, CA 93021 800-400-5227	Project Number: 185802872
	Project: 08-0M2801-16 - Mountain Pass

Turn Around Time:
Normal TAT: ____
72 Hour: ____
48 Hour ____
24 Hour X
Same Day: ____
Other: ____
Sample Temp °C: ____

Sample Description/Identification	Sample Matrix	Preservative (see below)	# of Cont.	Sample Date	Sample Time	Filtered Sample	TTLC 6010B	Cal WET-citric 3010	Cal WET-DI mod 3010	TCLP 1311	pH 9045C						Special Instructions
HA-5-1.5-2.0	SOIL	1	1	05/28/13	1127		X										
HA-6-0.5-1.0	SOIL	1	1	05/28/13	1148		X										
HA-6-1.0-1.5	SOIL	1	1	05/28/13	1154		X										
HA-6-1.5-2.0	SOIL	1	1	05/28/13	1200		X										
HA-7-0.5-1.0	SOIL	1	1	05/28/13	1216		X										
HA-7-1.0-1.5	SOIL	1	1	05/28/13	1217		X										
HA-7-1.5-2.0	SOIL	1	1	05/28/13	1218		X										
HA-8-0.5-1.0	SOIL	1	1	05/28/13	1233		X										
HA-8-1.0-1.5	SOIL	1	1	05/28/13	1235		X										
HA-8-1.5-2.0	SOIL	1	1	05/28/13	1238		X										
HA-9-0.5-1.0	SOIL	1	1	05/28/13	1249		X										
HA-9-1.0-1.5	SOIL	1	1	05/28/13	1251		X										
HA-9-1.5-2.0	SOIL	1	1	05/28/13	1255		X										
HA-10-0.5-1.0	SOIL	1	1	05/28/13	1309		X										
HA-10-1.0-1.5	SOIL	1	1	05/28/13	1326		X										

Sample Preservative: 1=ICE - 2=HCl - 3=H_2SO_4 - 4=HNO_3 - 5=NaOH - 6=Other: ____

Special Instructions: Samples >25mg/Kg TTLC -> Cal WET-citric, pH and Cal-WET-DI. Samples >5mg/L Cal WET-Citric -> TCLP. Contact Anne Perez for further clarification.

See pg. 1

Relinquished By:	Date	Time	Received By + Company Name:	Date	Time
[illegible]	5/29/13	1545	[illegible] Patchem	5/30/13	1140
Relinquished By + Company Name: [illegible] GCL	Date 5/30/13	Time 1415	Received By + Company Name:	Date	Time
Relinquished By + Company Name:	Date	Time	Received By + Company Name: [illegible]	Date 5/30/13	Time 1140

#1565339

CHAIN OF CUSTODY

Stantec

25864-F Business Center Dr. Redlands, CA 92374
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Client Name/Address
Stantec Consulting Services
25864-F Business Center Drive
Redlands, CA 92374

Laboratory:
PAT-CHEM
11990 DISCOVERY CT.
MOORPARK, CA 93021
800-400-5227

Project Manager: ANNE PEREZ
E-Mail Address: anne.perez@stantec.com
Sampler Name: M. Bohn / M. Baernstine
Project Number: 185802872
Project: 08-0M2801-16 - Mountain Pass

Turn Around Time:
Normal TAT: ✓
72 Hour:
48 Hour
24 Hour X
Same Day:
Other:
Sample Temp °C:

Sample Description/Identification	Sample Matrix	Preservative (see below)	# of Cont.	Sample Date	Sample Time	Filtered Sample	TTLC 6010B	Cal WET-citric 3010	Cal WET-DI mod 3010	TCLP 1311	pH 9045C						Special Instructions
HA-10-1.5-2.0	SOIL	1	1	05/28/13	1338		X										
HA-11-0.5-1.0	SOIL	1	1	05/29/13	0802		X										
HA-11-1.0-1.5	SOIL	1	1	05/29/13	0807		X										
HA-11-1.5-2.0	SOIL	1	1	05/29/13	0810		X										
HA-12-0.5-1.0	SOIL	1	1	05/29/13	0820		X										
HA-12-1.0-1.5	SOIL	1	1	05/29/13	0831		X										
HA-12-1.5-2.0	SOIL	1	1	05/29/13	0844		X										
HA-13-0.5-1.0	SOIL	1	1	05/29/13	0858		X										
HA-13-1.0-1.5	SOIL	1	1	05/29/13	0900		X										
HA-13-1.5-2.0	SOIL	1	1	05/29/13	0910		X										
HA-14-0.5-1.0	SOIL	1	1	05/29/13	0920		X										
HA-14-1.0-1.5	SOIL	1	1	05/29/13	0925		X										
HA-14-1.5-2.0	SOIL	1	1	05/29/13	0929		X										
HA-15-0.5-1.0	SOIL	1	1	05/29/13	0938		X										
HA-15-1.0-1.5	SOIL	1	1	05/29/13	0941		X										

Sample Preservative: 1=ICE - 2=HCl - 3=H_2SO_4 - 4=HNO_3 - 5=NaOH - 6=Other:

Special Instructions: Samples >25mg/Kg TTLC -> Cal WET-citric, pH and Cal-WET-DI. Samples >5mg/L Cal WET-Citric -> TCLP. Contact Anne Perez for further clarification.

See page 1

Relinquished By:	Date	Time	Received By + Company Name:	Date	Time
[signature]	5/29/13	1545	[signature] Patchem	5/30/13	1140
Relinquished By + Company Name: [signature] PCL	5/30/13	1445	Received By + Company Name:	Date	Time
Relinquished By + Company Name:	Date	Time	Received By + Company Name: [signature]	5/30/13	1140

CHAIN OF CUSTODY

Stantec

#1305339

25864-F Business Center Dr. Redlands, CA 92374
Office: (909) 335-6116 Fax: (909) 335-6120

Client Name/Address
Stantec Consulting Services
25864-F Business Center Drive
Redlands, CA 92374

Laboratory:
PAT-CHEM
11990 DISCOVERY CT.
MOORPARK, CA 93021
800-400-5227

Project Manager: ANNE PEREZ
E-Mail Address: anne.perez@stantec.com
Sampler Name: M. Bohn / M. Baernstine
Project Number: 185802872
Project: 08-0M2801-16 - Mountain Pass

Analysis Required

Turn Around Time:
Normal TAT: ~~X~~
72 Hour:
48 Hour
24 Hour: X
Same Day:
Other:
Sample Temp °C:

Sample Description/Identification	Sample Matrix	Preservative (see below)	# of Cont	Sample Date	Sample Time	Filtered Sample	TTLC 6010B	Cal WET-citric 3010	Cal WET-DI mod 3010	TCLP 1311	pH 9045C						Special Instructions
HA-15-1.5-2.0	SOIL	1	1	05/29/13	0949		X										
HA-16-0.5-1.0	SOIL	1	1	05/29/13	1002		X										
HA-16-1.0-1.5	SOIL	1	1	05/29/13	1006		X										
HA-16-1.5-2.0	SOIL	1	1	05/29/13	1011		X										
HA-17-0.5-1.0	SOIL	1	1	05/29/13	1026		X										
HA-17-1.0-1.5	SOIL	1	1	05/29/13	1032		X										
HA-17-1.5-2.0	SOIL	1	1	05/29/13	1035		X										
HA-18-0.5-1.0	SOIL	1	1	05/29/13	1047		X										
HA-18-1.0-1.5	SOIL	1	1	05/29/13	1050		X										
HA-18-1.5-2.0	SOIL	1	1	05/29/13	1052		X										
HA-19-0.5-1.0	SOIL	1	1	05/29/13	1104		X										
HA-19-1.0-1.5	SOIL	1	1	05/29/13	1106		X										
HA-19-1.5-2.0	SOIL	1	1	05/29/13	1117		X										
HA-20-0.5-1.0	SOIL	1	1	05/29/13	1130		X										
HA-20-1.0-1.5	SOIL	1	1	05/29/13	1136		X										

Sample Preservative: 1=ICE - 2=HCl - 3=H_2SO_4 - 4=HNO_3 - 5=NaOH - 6=Other:

Special Instructions: Samples >25mg/Kg TTLC -> Cal WET-citric, pH and Cal-WET-DI. Samples >5mg/L Cal WET-Citric -> TCLP. Contact Anne Perez for further clarification.

See page 1

Relinquished By	Date	Time	Received By + Company Name:	Date	Time
[signature]	5/29/13	1545	[signature] PatChem	5/30/13	1140
Relinquished By + Company Name:	Date	Time	Received By + Company Name:	Date	Time
[signature]	5/30/13	1415			
Relinquished By + Company Name:	Date	Time	Received By + Company Name:	Date	Time
[signature]	5/30/13		[signature]	5/30/13	1140

4 1-355539

Stantec

CHAIN OF CUSTODY

25864-F Business Center Dr. Redlands, CA 92374
Office: (909) 335-6116 Fax: (909) 335-6120

Client Name/Address:
Stantec Consulting Services
25864-F Business Center Drive
Redlands, CA 92374

Laboratory:
PAT-CHEM
11990 DISCOVERY CT.
MOORPARK, CA 93021
800-400-5227

Project Manager: ANNE PEREZ
E-Mail Address: anne.perez@stantec.com
Sampler Name: M. Bohn / M. Baernstine
Project Number: 185802872
Project: 08-0M2801-16 - Mountain Pass

Analysis Required

Turn Around Time:
Normal TAT: ____
72 Hour: ____
48 Hour ____
24 Hour X
Same Day: ____
Other: ____
Sample Temp °C: ____

Sample Description/Identification	Sample Matrix	Preservative (see below)	# of Cont.	Sample Date	Sample Time	Filtered Sample	TTLC 6010B	Cal WET-citric 3010	Cal WET-DI mod 3010	TCLP 1311	pH 9045C						Special Instructions
HA-20-1.5-2.0	SOIL	1	1	05/29/13	1142		X										
EBQC-20130529	WATER	1,4	1	05/29/13	1147		X										

Sample Preservative: 1=ICE · 2=HCl · 3=H_2SO_4 · 4=HNO_3 · 5=NaOH · 6=Other:

Special Instructions: Samples >25mg/Kg TTLC -> Cal WET-citric, pH and Cal-WET-DI. Samples >5mg/L Cal WET-Citric -> TCLP. Contact Anne Perez for further clarification.

See page 1

Relinquished By	Date	Time	Received By + Company Name	Date	Time
[signature]	5/29/13	1545	[signature] Patchem	5/30/13	1140
Relinquished By + Company Name: [signature]	5/30/13	1418	Received By + Company Name:	Date	Time
Relinquished By + Company Name:	Date	Time	Received By + Company Name: [signature]	5/30/13	1140

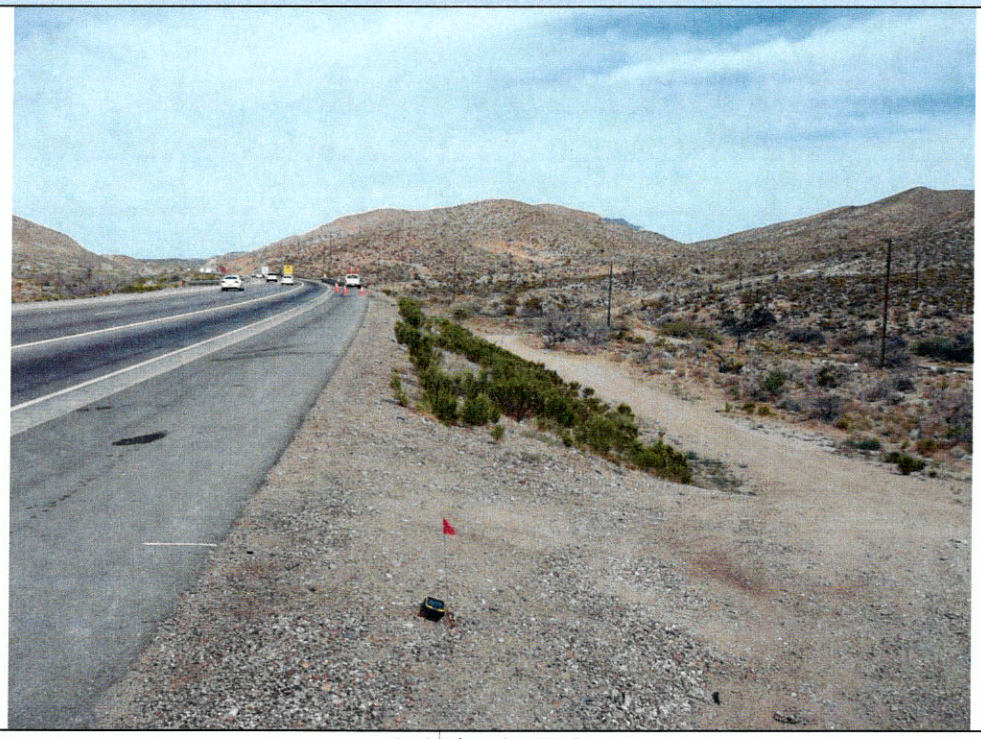
APPENDIX B
PHOTOLOG

STANTEC CONSULTING SERVICES INC. PHOTOGRAPHIC RECORD	
Client: Calif. Department of Transportation, District 8	**Job Number:** 185802872
Site Name: Mountain Pass	**Location:** I-15 Fwy, Mountain Pass, CA
Photographer: Melissa Baernstein/Mitchell Bohn	**Date:** May 28 & 29, 2013

Photographs No. 1&2

Boring location HA-1.

Photograph No. 3



Boring location HA-2.

STANTEC CONSULTING SERVICES INC. PHOTOGRAPHIC RECORD	
Client: Calif. Department of Transportation, District 8	**Job Number:** 185802872
Site Name: Mountain Pass	**Location:** I-15 Fwy, Mountain Pass, CA
Photographer: Melissa Baernstein/Mitchell Bohn	**Date:** May 28 & 29, 2013

Photograph No. 4

Boring location HA-3.

Photographs No. 5&6

Boring location HA-4.

STANTEC CONSULTING SERVICES INC. PHOTOGRAPHIC RECORD	
Client: Calif. Department of Transportation, District 8	**Job Number:** 185802872
Site Name: Mountain Pass	**Location:** I-15 Fwy, Mountain Pass, CA
Photographer: Melissa Baernstein/Mitchell Bohn	**Date:** May 28 & 29, 2013

Photograph No. 7

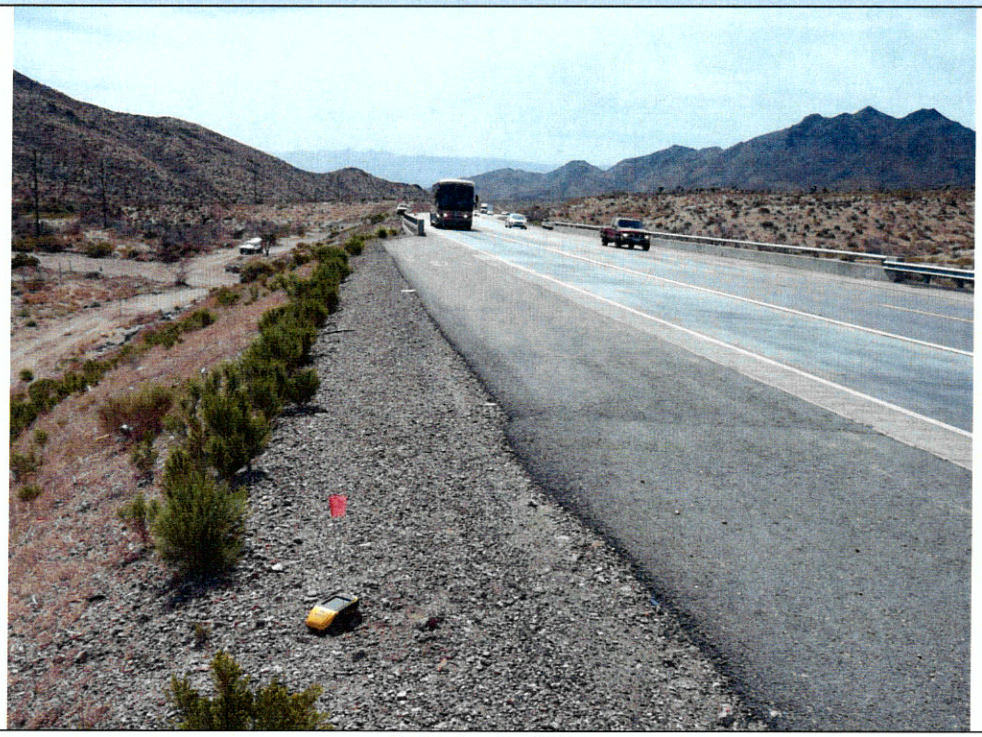
Boring location HA-5.

Photograph No. 8

Boring location HA-6.

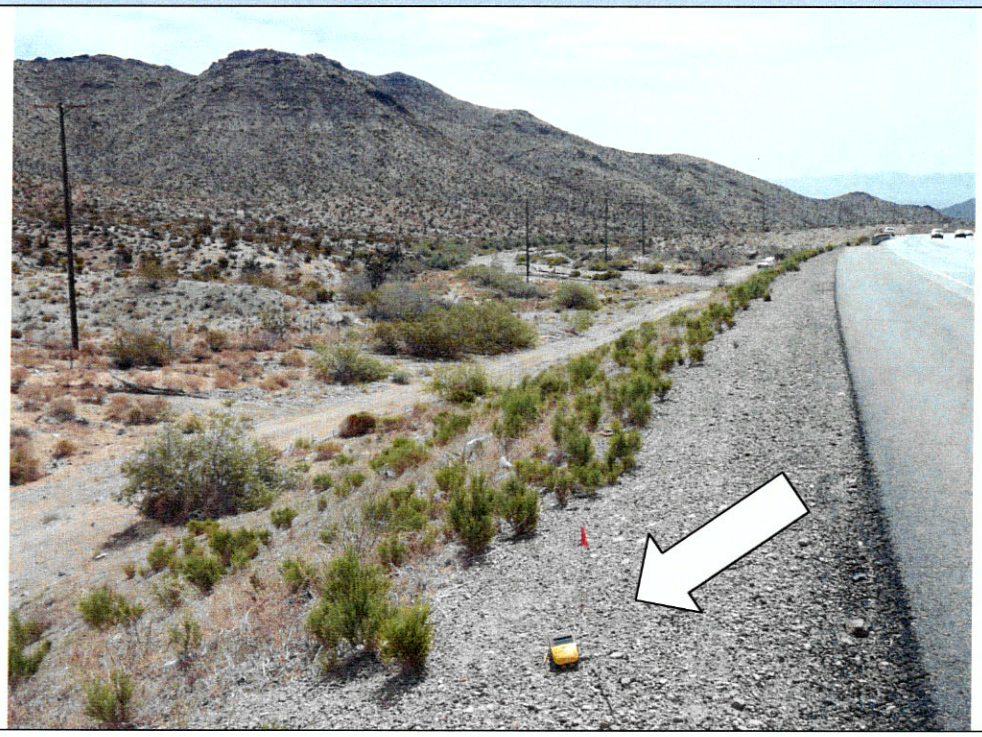
STANTEC CONSULTING SERVICES INC. PHOTOGRAPHIC RECORD	
Client: Calif. Department of Transportation, District 8	**Job Number:** 185802872
Site Name: Mountain Pass	**Location:** I-15 Fwy, Mountain Pass, CA
Photographer: Melissa Baernstein/Mitchell Bohn	**Date:** May 28 & 29, 2013

Photograph No. 8



Boring location HA-7.

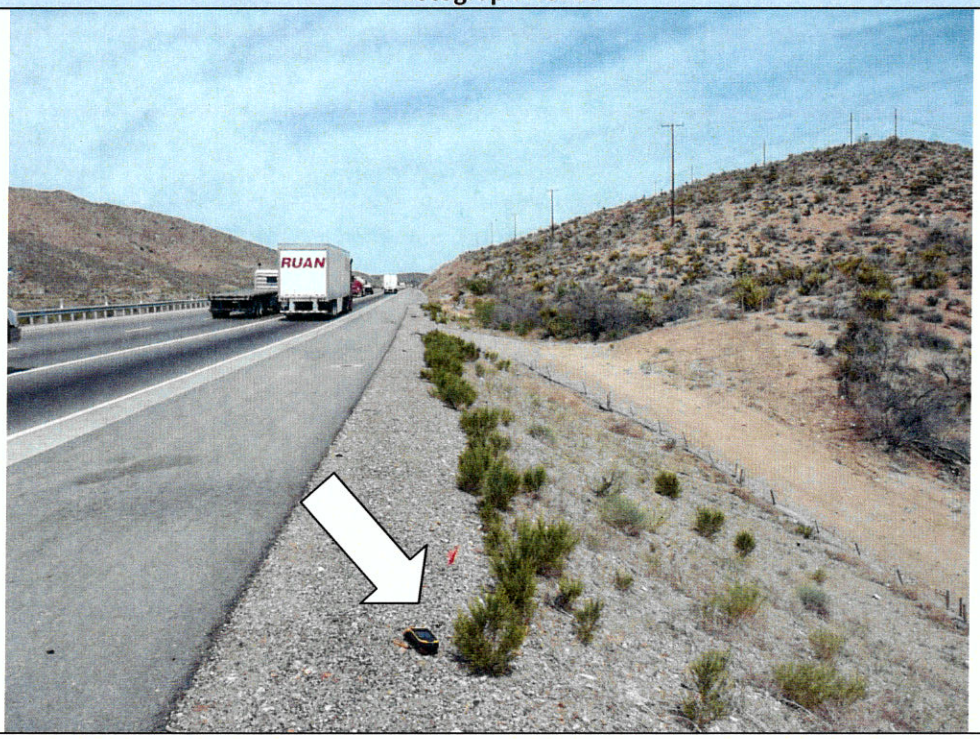
Photograph No. 9



Boring location HA-8.

STANTEC CONSULTING SERVICES INC. PHOTOGRAPHIC RECORD	
Client: Calif. Department of Transportation, District 8	**Job Number:** 185802872
Site Name: Mountain Pass	**Location:** I-15 Fwy, Mountain Pass, CA
Photographer: Melissa Baernstein/Mitchell Bohn	**Date:** May 28 & 29, 2013

Photograph No. 10



Boring location HA-9.

Photograph No. 11

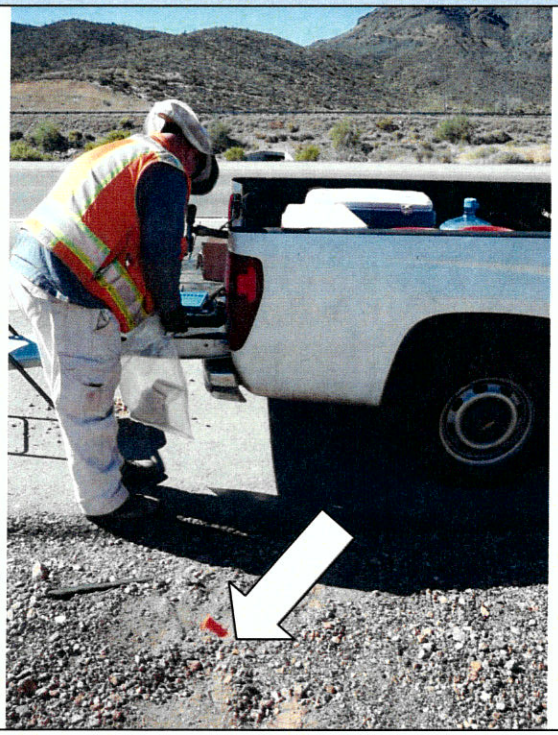
Boring location HA-10.

STANTEC CONSULTING SERVICES INC. PHOTOGRAPHIC RECORD	
Client: Calif. Department of Transportation, District 8	**Job Number:** 185802872
Site Name: Mountain Pass	**Location:** I-15 Fwy, Mountain Pass, CA
Photographer: Melissa Baernstein/Mitchell Bohn	**Date:** May 28 & 29, 2013

Photographs No. 12 & 13

Boring location HA-11.

Photograph No. 14



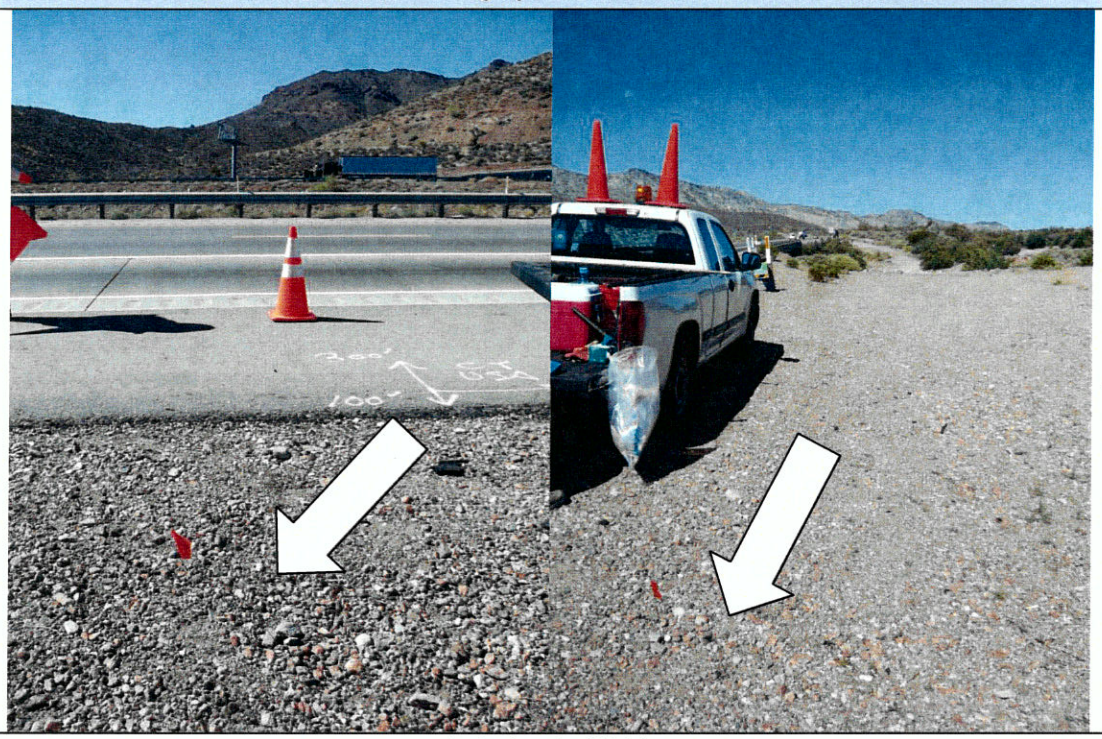
Boring location HA-12.

STANTEC CONSULTING SERVICES INC. PHOTOGRAPHIC RECORD	
Client: Calif. Department of Transportation, District 8	**Job Number:** 185802872
Site Name: Mountain Pass	**Location:** I-15 Fwy, Mountain Pass, CA
Photographer: Melissa Baernstein/Mitchell Bohn	**Date:** May 28 & 29, 2013

Photograph No. 15

Boring location HA-13.

Photographs No. 16 & 17



Boring location HA-14.

STANTEC CONSULTING SERVICES INC. PHOTOGRAPHIC RECORD	
Client: Calif. Department of Transportation, District 8	**Job Number:** 185802872
Site Name: Mountain Pass	**Location:** I-15 Fwy, Mountain Pass, CA
Photographer: Melissa Baernstein/Mitchell Bohn	**Date:** May 28 & 29, 2013

Photograph No. 18

Boring location HA-15.

Photograph No. 19

Boring location HA-16.

STANTEC CONSULTING SERVICES INC. PHOTOGRAPHIC RECORD	
Client: Calif. Department of Transportation, District 8	**Job Number:** 185802872
Site Name: Mountain Pass	**Location:** I-15 Fwy, Mountain Pass, CA
Photographer: Melissa Baernstein/Mitchell Bohn	**Date:** May 28 & 29, 2013

Photograph No. 20

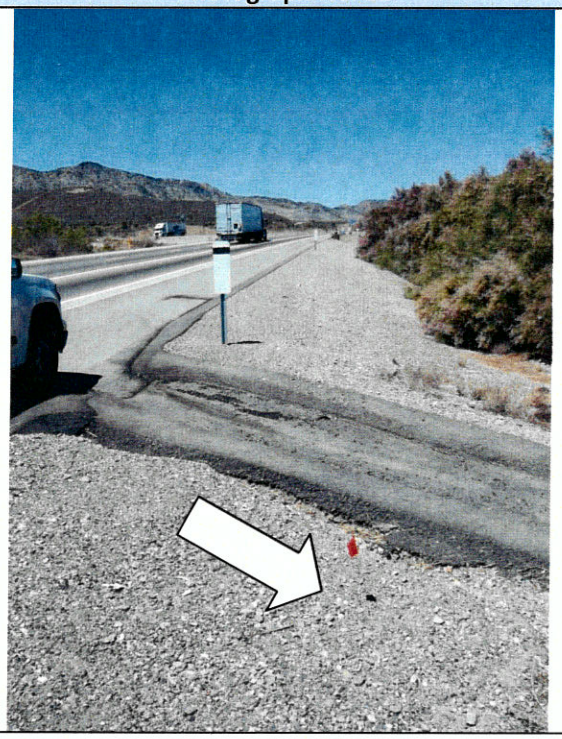
Boring location HA-17.

Photograph No. 21

Boring location HA-18.

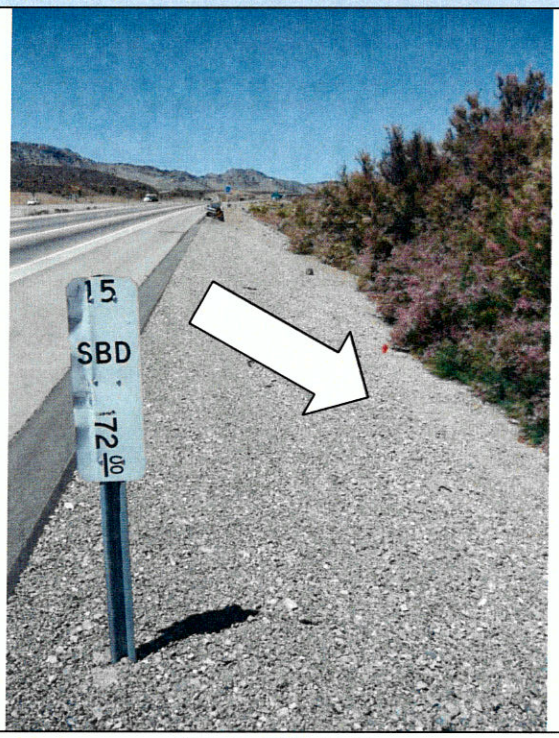
STANTEC CONSULTING SERVICES INC. PHOTOGRAPHIC RECORD	
Client: Calif. Department of Transportation, District 8	**Job Number:** 185802872
Site Name: Mountain Pass	**Location:** I-15 Fwy, Mountain Pass, CA
Photographer: Melissa Baernstein/Mitchell Bohn	**Date:** May 28 & 29, 2013

Photograph No. 22



Boring location HA-19.

Photograph No. 23



Boring location HA-20.

PRELIMINARY SITE INVESTIGATION (PSI) REPORT
WHEATON WASH AND CENDA DITCH
08-SBd-15-PM 173.6/174 AND 171.8/172.4
SAN BERNARDINO COUNTY, CALIFORNIA
PN: 08-00000-4721 (EA#0M2801)
TASK ORDER #17
CONTRACT 08A2047

PREPARED FOR:

CALIFORNIA DEPARTMENT OF TRANSPORTATION, DISTRICT 8
464 WEST FOURTH STREET, 6TH FLOOR
SAN BERNARDINO, CALIFORNIA 92401-1400

OCTOBER 7, 2014

EXECUTIVE SUMMARY

At the request of the California Department of Transportation (Caltrans) District 8, a preliminary Site investigation (PSI) was conducted at the Wheaton Wash Bridge (#54-0621L) and Cenda Ditch Bridge (#54-0620L) located along the southbound State Route 15 (SR15), in San Bernardino County, California (Site; Figure 1 and 2). The purpose of this PSI was to evaluate potential chemical and radiological impacts in surface and subsurface soils and to make recommendations for handling and/or disposal of potentially impacted soil excavated during construction and replacement of the two bridges.

A waste water pipeline transported radioactive waste water from the mine, located immediately up gradient of Cenda Ditch Bridge, down Wheaton Wash under the SR15 bridges to evaporation ponds in Ivanpah Playa. The pipeline repeatedly ruptured during pipeline cleaning activities to remove scale. The scale was identified to be elevated in thorium and radium, which occur naturally in local mineral formations. As a result of pipeline leaks, remedial actions were undertaken to remove sediments impacted by process waste water releases in the wash up and down gradient of Cenda Ditch and Wheaton Wash Bridges. Remedial investigations, remedial actions and pipeline removals were conducted in 2010 and 2011 (Arcadis, June 13, 2012). Three exploratory trenches were excavated at each bridge. Based on the investigation and remediation data, adverse impacts to sediments at the bridges resulting from releases from the process waste water pipeline are considered low.

Between May 13 and 23, 2013, URS conducted radiation health and safety monitoring during geotechnical investigations at 10 locations around the drill rig at four borings in Wheaton Wash Bridge and four borings at Cenda Ditch Bridge. Periodic dose monitoring was conducted throughout the work day at each of the 10 designated monitoring points. For comparison purposes, periodic monitoring was conducted at a reference location outside the wash. In addition, URS scanned drill cuttings and mud during the drilling process (URS, May 29, 2013).

The results of the URS investigation at Wheaton Wash Bridge reported dose measurements ranging from 7 to 48 microRoentgens per hour (uR/hr) (typically between 15 and 25 uR/hr) and reference area measurements ranging from 12 to 34 uR/hr. At Cenda Ditch Bridge, the reported dose measurements ranged from 9 to 61 uR/hr (typically 19 to 30 uR/hr), and the reference area measurements ranged from 13 to 30 uR/hr. It is noted some of the highest activity levels are near the rip rap along the banks of the wash.

To confirm the results of these investigations and to evaluate potential excess soil characteristics, surface walk-over surveys, surface soil sampling and soil borings were conducted at reference areas and in the wash in the planned construction zone for the bridge replacements. It is noted that the surface soils in the areas surveyed outside the wash for reference and comparison to the wash, were different than those in the wash. Surface soil in the reference areas generally contained more silt and may have been influenced by grading or erosion of the SR15 embankment fill. Surface soils in the wash consisted of coarse sands, gravels, cobbles and boulders derived from sources up gradient of the bridges. Consequently, direct comparison of activities in the reference area to the wash would not be appropriate. A discussion of the results is provided below.

- **Walk-over Survey**

    - *Cenda Ditch*: the mean 2"x2" sodium iodine detector (NaI) integrated one minute counts in the Bridge Construction Wash area (29,123 counts per minute [cpm]) were 49 percent higher than the Reference Area (19,558 cpm). Geometric reflection from the large boulders, uneven ground surface, and bridge columns may be partially responsible for higher counts in the wash area. Field personnel noted elevated walk-over counts on certain rocks and boulders that appeared to be related to natural mineralogy in rock. The highest of these was 122,193 cpm on rock near rip rap near the Cenda Ditch Bridge

    - *Wheaton Wash*: the mean 2"x2" NaI integrated one minute counts in the Bridge Construction Wash area (19,549 cpm) were indistinguishable from Reference Area (19,213 cpm).

- **Surface Soil Samples**

    - *Cenda Ditch*: The gamma spectroscopy results indicate that the mean potassium 40 (K40) and uranium 238 (U238) concentrations were similar in both Reference Area and Bridge Construction Wash samples, while the mean radium 226 (Ra226) (0.939 picocuries per gram [pCi/g]) and thorium 232 (Th232; 5.234 pCi/g) concentrations in the Bridge Construction Wash surface samples are slightly elevated in comparison to the Reference Area surface soil samples (0.661 pCi/g Ra226 and 2.003 pCi/g Th232). The results are consistent with the walk-over survey results. Based on field observations, the elevated activities appeared to be associated with natural rock in the wash. Consistent with Arcadis' remediation findings, no physical evidence of mine process wastes were observed in the wash.

- *Wheaton Wash*: The gamma spectroscopy results indicate that the mean K40, Ra226, Th232 and U238 concentrations in the Bridge Construction Wash samples were less than the mean Reference Area mean concentration plus two standard deviations. That said, the mean Th232 concentrations are slightly more elevated in the Bridge Construction Wash samples (3.29 pCi/g) than in the Reference Area (2.13 pCi/g. It is also noted that the Ra226, Th232 and U238 concentrations in surface soil samples in the wash at Wheaton Wash Bridge appear to be lower than those at Cenda Ditch Bridge.

- **Soil Boring Samples**

  Due to the limited depth of soil borings in the Reference Areas at each bridge, the Reference Area boring sample data were combined into a single population for assessment of statistical parameters.

  - *Cenda Ditch*: Consistent with the surface walk-over survey, the pancake, uR, and 2"x2" NaI scans of the drill cuttings indicate higher counts in the Bridge Construction Wash Area than in the Reference Area,
    - 101 to 170 cpm (Pancake), 20 to 24 uR/hr (uR meter) and 19,806 to 21,190 cpm (2"x2" NaI) in Reference Area drill cuttings, and
    - 121 to 174 cpm (Pancake), 28 to 31 uR/hr (uR meter) and 24,115 to 35,207 cpm (2"x2" NaI) in the Cenda Ditch Bridge Construction Wash drill cuttings.

    The gamma spectroscopy results indicate slightly elevated mean K40 in Bridge Construction Wash samples (28.7 pCi/g) in comparison to the Reference Area (21.75 pCi/g). The K40 could be related to storm water runoff from asphalt surfaces at the highway. The Ra226, Th232 and U238 concentrations were much lower in drill cuttings suggesting that the slightly elevated Th232 concentrations in surface samples is characteristic of surface sediments but not underlying soil below the surface.

  - *Wheaton Wash*: Consistent with the surface walk-over survey, the pancake, uR, and 2"x2" NaI scans of the drill cuttings indicate similar counts in the Reference Areas and Bridge Construction Wash Area,
    - 74 to 125 cpm (Pancake), 17 to 22 uR/hr (uR meter) and 15,924 to 19,107 cpm (2"x2" NaI) in Reference Area. drill cuttings
    - 64 to 131 cpm (Pancake), 16 to 20 uR/hr (uR meter) and 15,410 to 19,727 cpm (2"x2" NaI) in Wheaton Wash Bridge Construction Wash drill cuttings.

The gamma spectroscopy results indicate that the mean K40, Ra226, Th232 and U238 concentrations in the Bridge Construction Wash drill cuttings are similar to Reference Area drill cuttings (less than mean Reference Area plus two standard deviations).

It is noted that the isotopic thorium and uranium alpha spectroscopy results were largely consistent with the gamma spectroscopy results. Differences are attributed to normal sample heterogeneity, the method aliquot size and differences in method sensitivity to the various radionuclides.

Chemical characterization of the drilling cuttings reported concentrations well below hazardous waste thresholds.

Based on the findings and results of this and other investigations described in this report, the following are concluded:

- Surface soil and rock in the wash exhibit slightly elevated activities with the highest activities in the construction zone at Cenda Wash Bridge. The elevated activities may be attributed to slightly elevated radionuclide concentrations, such as Th232, known to be present in naturally occurring minerals in the area. The highest activities were identified on specific rock fragments related to rip rap placed to prevent erosion of the bridge embankment. Although the source of slightly elevated activity is not known, the source could be from one or more the following sources:

    - natural formation materials eroded and transported by natural erosional forces into the wash,
    - fill materials placed in the wash (rip rap, remedial excavation backfill, etc.)
    - mine overburden or ore transported by storm water into the wash.
    - No evidence of process waste residue was observed in surface or subsurface soils.

- The measured dose rates from this investigation and those reported in the URS geotechnical study (URS, 2013) would not result in an exceedance of the worker protection allowable dose rate set by the NRC TEDE limit of 5,000 millirem per year (10 CFR § 20.1201 Occupational Dose Limits for Adults). Conservatively using the highest dose rate documented in this, and previous investigations by URS (2013) of 61 uR/hr and assuming a 12-hour work day, six days per week for an entire year would result in a dose of approximately 200 millirem per year, well below the NRC allowable limit of 5,000 millirem.

- Soil samples collected from the wash exhibit characteristics of non-hazardous waste.

Based on the findings and conclusions presented in this report, the following are recommended:

1. Given the history of releases from the mine waste water pipeline and in an abundance of caution, workers should exercise normal hygienic activities such as washing before eating and drinking, and not eating, drinking, smoking or chewing gum while working in the wash.

2. Soil excavated in the wash should be placed back into the wash or behind abutments near the wash, but should not be transported to other areas of the project.

3. Excess soil generated from the wash that cannot be placed back in the wash should be profiled as nonhazardous waste and disposed to an appropriate municipal landfill.

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ACRONYMS

Amsl	Above mean sea level
ATL	Advanced Technologies Laboratory
Bgs	Below the ground surface
Cal OSHA	California Occupational Safety and Health Administration
Caltrans	California Department of Transportation
CDMG	California Division of Mines and Geology
CHHSL	California Human Health Screening Level
CoC	Chain of Custody
Cpm	Counts per minute
DTSC	Department of Toxic Substances Control
ELAP	California Environmental Laboratory Accreditation Program
FEMA	Federal Emergency Management Agency
G-M	Geiger – Mueller
GPS	Global Positioning System
HASP	Health and Safety Plan
I.D.	Identification
K40	Potassium 40
MDL	Method Detection Limit
uR	MicroRoentgens
uR/hr	MicroRoentgens per hour
MCL	Maximum contaminant level
mg/Kg	Milligrams per kilogram
mg/L	Milligrams per liter
NaI	Sodium Iodine
NRC	Nuclear Regulatory Commission
Pancake	Pancake Geiger-Mueller detector
PCBs	Polychlorinated biphenyls

pCi/g	picocuries per gram
PSI	Preliminary Site Investigation
QA/QC	Quality Assurance/Quality Control
Ra226	Radium 226
rem	Roentgen equivalent man
ROW	Right of Way
RSL	Regional Screening Level
SR15	State Route 15
TDS	Total dissolved solids
TEDE	total effective dose equivalent
TPH	Total petroleum hydrocarbons
Th232	Thorium 232
U238	Uranium 238
USEPA	United Stated Environmental Protection Agency
VOCs	Volatile organic compounds
2"x2" NaI	2 inch by 2 inch sodium iodine detector

1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

At the request of the California Department of Transportation (Caltrans) District 8 (Contract No. 08A2047), a Preliminary Site Investigation (PSI) was conducted at the Wheaton Wash Bridge (#54-0621L) and Cenda Ditch Bridge (#54-0620L) located along the southbound State Route 15 (SR15), in San Bernardino County, California (Site; Figure 1 and 2). The PSI was conducted in support of Caltrans' request to investigate potential impacts to soil at the bridges that may have resulted from historical mining operations. The data from the site investigation will be used to evaluate the proper handling and disposal of soil excavated for bridge foundation construction. The work was performed pursuant to the provisions in Stantec's Agreement 08A2047, and with the Task Order No. 17 request dated May 21, 2014.

1.2 PURPOSE AND OBJECTIVES

The purpose of this PSI was to evaluate potential chemical and radiological impacts in surface and subsurface soils in the proposed bridge construction zone that may have resulted from historical mining operations at Molycorp Rare Earth Mountain Pass Mine, and to make recommendations for handling and/or disposal of potentially impacted soil excavated during construction of the bridge pile foundations.

1.3 BACKGROUND

According to the Task Order No. 17 Request, dated May 21, 2014, Caltrans is planning to replace the Wheaton Wash and Cenda Ditch Bridges located on the southbound SR15. Due to the close proximity and environmental history of the Mountain Pass Molycorp mine, Caltrans requested that an investigation be conducted to evaluate the potential presence of radiological and other non-radiological constituents in the planned construction excavation areas at the Wheaton Wash and Cenda Ditch bridges. The planned excavation areas will be at the areas of either new bridge footing and around the existing bridge footings to a depth of approximately 20 feet bgs at Cenda Ditch and approximately 40 feet bgs at Wheaton Wash. Former evaporation ponds and mining activities were performed immediately northwest of the wash near Cenda Ditch Bridge.

Beginning in the 1980s, mine process waste water from the Molycorp mine was piped from the mine through the wash which is crossed by the Cenda Ditch and Wheaton Wash bridges to evaporation ponds located within the Ivanpah Playa. The pipeline repeatedly ruptured during pipeline cleaning activities to remove scale that was identified to be elevated in thorium and radium, which occur naturally in the mineral formations. As a result of pipeline leaks, remedial actions were undertaken to remove sediments impacted by process waste water releases in the wash. Remedial actions and pipeline removals were conducted in three phases. Cenda Ditch Bridge and the

Wheaton Wash Bridge are located in Phase II which stretches from the southeast corner of the mine (just west of Cenda Ditch Bridge) to down gradient of the Wheaton Wash Bridge. Based on information provided in the *Summary Report—Phase II & III Waste Water Discharge Pipeline Report* (Arcadis, June 13, 2012), 42 locations within Phase II were investigated and sampled. Remedial excavations were conducted at 17 of the investigation areas from September 2010 to April 2011. Remedial excavations were conducted in the wash up and down gradient of both bridges.

Three exploratory trenches were excavated at each bridge. Based on the results of the investigations, no remedial actions were required at the Cenda Ditch Bridge. A pipeline repair was conducted down gradient of Wheaton Wash Bridge (Trench 31) that resulted in the removal and disposal of 4.25 tons of soil. Remedial actions were not required in the trenches immediately up gradient from and at the Wheaton Wash Bridge. According to Arcadis, the excavations were largely backfilled with material from the wash.

Based on the findings and data presented in the Arcadis report, adverse impacts to sediments at the bridges resulting from releases from the process waste water pipeline are considered low. The relevant portions of the Arcadis report are attached as Appendix A.

Between May 13 and 23, 2013, URS conducted radiation health and safety monitoring during geotechnical investigations at 10 locations around the drill rig at four borings in Wheaton Wash Bridge and four borings at Cenda Ditch Bridge. Periodic dose monitoring was conducted throughout the work day at each of the 10 designated monitoring points. For comparison purposes, periodic monitoring was conducted at a reference location outside the wash. In addition, URS scanned drill cuttings and mud during the drilling process (URS, *Technical Memorandum—Radiation Monitoring – Cenda Ditch and Wheaton Wash Bridge (I15)*, May 29, 2013).

At Wheaton Wash Bridge dose measurements ranged from 7 to 48 microRoentgens per hour (uR/hr) (typically between 15 and 25 uR/hr) and the reference area measurements ranged from 12 to 34 uR/hr. At Cenda Ditch Bridge, the reported measurements ranged from 9 to 61 uR/hr (typically 19 to 30 uR/hr), and the reference area measurements ranged from 13 to 30 uR/hr. It is noted some of the highest activity levels are near the rip rap along the banks of the wash. URS noted that the highest dose rates did not exceed the URS worker protection allowable dose rate of 100 uR/hr, which was set one order of magnitude lower than the United States Nuclear Regulatory Commission (NRC) total effective dose equivalent (TEDE) limit of 5,000 millirem per year (10 CFR § 20.1201 Occupational Dose Limits for Adults) [URS, May 29, 2013].

2.0 PROJECT SETTING

This section describes the project setting including a basic description of the study area, the physiographic setting of the study area, the geology and hydrogeology, and a description of the site vicinity.

2.1 SITE DESCRIPTION

The field study was conducted at the Wheaton Wash Bridge (Bridge No. 54-0621L) and Cenda Ditch Bridge (Bridge No. 54-0620L) located on the southbound 15 freeway approximately 173.6/174 and 171.8/172.4 miles respectively, near Mountain Pass, unincorporated community, San Bernardino County, California. The site investigation was conducted below, and in close proximity to each of the bridges in the dry wash. The wash was accessed by unpaved dirt access roads that connect to the southbound I-15.

2.2 PHYSIOGRAPHIC SETTING

The project was conducted at two separate bridge locations separated by approximately 1.5 miles: Cenda Ditch Bridge and Wheaton Wash Bridge (Figure 1 and 2). Cenda Ditch is located at an approximate elevation of 4,480 feet above mean sea level (amsl) and Wheaton Wash is located at an elevation of approximately 4,120 feet amsl. Both study areas are located in the Wheaton Wash drainage system that source immediately north of the Cenda Ditch Bridge at the Molycorp Mine near the Mountain Pass unincorporated community, and flows in a generally easterly direction to its terminus in the Ivanpah Valley Basin.

2.3 REGIONAL GEOLOGY AND HYDROGEOLOGY

The site is located in eastern San Bernardino County, near the unincorporated community of Mountain Pass, and is situated at elevations ranging between approximately 4,120 feet amsl (Wheaton Wash Bridge) and 4,480 feet amsl (Cenda Ditch Bridge). The field study areas are located within the topographic pass between the Clark Mountains to the north and the Mescal and Mineral Mountain ranges to the South. The pass forms a divide between the Upper Kingston Groundwater Basin to the west and the Ivanpah Valley Groundwater Basin to the East. Both study areas are located in Wheaton Wash which flows in an easterly direction towards the Ivanpah Valley Basin.

The Mountain Pass geology consists primarily of Precambrian carbonatite intruded into gneiss. Gangue minerals include calcite, barite and dolomite. The area is home to one of the richest rare earth mineral deposits in the world with 8 to 12 percent rare earth oxides (lanthanides and actinides); mostly contained in the mineral bastnasite which are currently mined at the active Molycorp mine located hydrologically up gradient from Wheaton Wash and the bridge sites. The enriched mineral deposit was discovered by a prospector in 1949 who noticed the anomalously high natural levels of radioactivity.

Enriched rare earth metals found in the natural mineral deposits include, cerium, lanthanum, neodymium, europium, uranium and thorium.

Based on reports reviewed for the nearby Molycorp Mine Site available on Geotracker, groundwater ranges between 11 feet bgs at Cenda Ditch Bridge to approximately 55 feet in the vicinity of the Wheaton Wash Bridge, but is expected to vary considerably depending on precipitation and runoff. Groundwater occurs beneath the Site in alluvial deposits and semi-consolidated debris flow deposits and within fracture zones in the Precambrian bedrock. Interflow between the soil/ bedrock interface has also been reported. Groundwater flow is reported to generally follow surface topography and flow easterly towards the Ivanpah Valley Groundwater Basin.

Geotracker water quality records were reviewed for two monitoring wells in the wash, SRK-19 which is located immediately up gradient of Cenda Ditch Bridge and WW-11 which is located approximately one half mile down gradient of Wheaton Wash. According to Geotracker records, groundwater is brackish with total dissolved solids (TDS) concentrations as high as 3,500 mg/L, chloride at up to 780 mg/L and sulfate at up to 340 mg/L. Radium and gross alpha exceeded their respective maximum contaminant levels from time to time at WW-11 down gradient of Wheaton Wash Bridge, but not at SRK-19 (up gradient of Cenda Ditch Bridge. Nickel was also reported above its MCL at 350 ug/L.

3.0 SCOPE OF WORK

The scope of the PSI consisted of the following general elements:

- Pre-field activities:
  - Development of a project work plan to guide task order activities;
  - Development of a site specific health and safety plan; and,
  - Demarcation of planned soil boring locations and notification of Underground Service Alert (USA).

- Field Investigations:
  - Perform utility clearance of all proposed soil boring locations using a subcontracted geophysical locating service;

  - Conduct surface radiological walkover surveys using a 2"x2" sodium iodide scintillation detector (Ludlum Model 44-10; 2"x2" NaI). The survey included the following areas:

    - Reference Area Survey: Surface walk over survey of nearby soils in locations elevated above the washes to provide reference activity levels for comparison; and,

    - Bridge Wash Survey: Surface walk over survey extending 30 feet beyond the bridge footprints in the wash.

  - Collect surface sediment samples from each bridge area at locations where elevated activities were reported in the surface radiological walkover surveys;

  - Collect surface soil samples from reference areas located outside of the drainage at each of the two washes;

  - Advance four soil borings to depths up to 50 feet bgs in Wheaton Wash, or refusal. One soil boring was advanced in the established background/ reference location and four soil borings were advanced in the wash proper.

    - Collect soil samples continuously for lithologic description and for radiological scanning using a 2"x2" NaI, a micro-Roentgen (uR meter, Ludlum Model-19), and a Pancake Geiger-Mueller (G-M) Detector (Ludlum Model 44-9); and,

        - Collect soil samples at approximate five-foot intervals for laboratory analysis.

    - Advancement of three soil borings in Cenda Ditch, up to 20 feet bgs, or refusal. One (1) soil boring was advanced in the background/ reference location and two soil borings were advanced in the wash proper.

        - Collect soil samples continuously for lithologic description and for radiological scanning using a 2"x2" NaI, a uR, and Pancake detector; and,

        - Collect soil samples at approximate five-foot intervals for laboratory analysis.

    - Boring location survey using global positioning system (GPS);
    - Boring abandonment.

- Laboratory analysis of all soil samples pursuant to the requirements of Task Order No. 17 for:
    - Gamma spectroscopy by EPA 901.1 modified
    - Isotopic Uranium by EML-U-02 modified (alpha spectroscopy)
    - Isotopic Thorium by EMP-Th-01 modified (alpha spectroscopy)
- Data evaluation and preparation of this report.

4.0 SOIL INVESTIGATION METHODOLOGY

The soil investigation was conducted in accordance with the methods and requirements of Contract 08A2047, Task Order 17. The following subsections summarize the methodology implemented in completing the required scope of work. In addition, any deviations from the scope of work are also identified in the following subsections.

4.1 PRE-FIELD ACTIVITIES

Prior to initiating the field work, the scope of work was reviewed and approved by Caltrans. Proposed sample locations designated on Site plans by Caltrans were checked for accessibility in the field through Site reconnaissance by Stantec staff. At this time, the Site was marked with white paint and USA was notified to clear utilities in the investigation area.

Prior to scheduling the field investigation, permits were procured from the California Department of Fish and Wildlife and the Regional Water Quality Control Board by Caltrans.

As required by the Task Order, a site-specific Health and Safety Plan (HASP) was developed in accordance with California Occupational Safety and Health Administration (Cal OSHA) requirements to guide field sampling activities. The HASP describes health and safety procedures and was submitted to Caltrans for review and approval prior to initiating field activities. A pre-field tail gate health and safety meeting was conducted prior to beginning work each day. During the tail gate meeting, daily work activities and health and safety issues were discussed, including the following:

- Field tasks to be conducted throughout the day,
- Project schedule,
- Hazard awareness,
- General health and safety practices, procedures and issues,
- Specific health and safety issues related to the day's work,
- Health and Safety procedures, controls, etc.;
- Engineering controls; personal protective equipment and monitoring;
- Traffic control and railway safety;
- Emergency procedures and contacts.

Field documentation of health and safety meetings and monitoring were maintained throughout the duration of field activities.

4.2 FIELD INVESTIGATION METHODOLOGY

Field investigations were conducted between July 22 and July 25, 2014. Weather conditions were hot and sunny with no weather-related restrictions during the field investigation. The investigation areas were monitored by a Caltrans field biologist throughout the duration of field activities. The following subsections describe field investigation methodology and procedures.

4.2.1 Utility Clearance

Prior to initiating field drilling activities, all proposed drilling locations were cleared by Spectrum Geophysics, an underground utility locating subcontractor. Spectrum performed surface walkovers of the proposed drilling locations using ground penetrating radar (GPR), a magnetometer and a metal detector. No underground utility conflicts were identified at the proposed drilling locations.

4.2.2 Surface Walkover Survey

A surficial radiological activity survey was conducted at each of the washes using a 2"x2" NaI probe. The surface scan was performed at each bridge at the following locations:

1. Reference Area: an area outside the wash and influence area of the mine waste water pipeline for comparison with survey results inside the wash, and

2. Bridge Construction Wash Area: Footprint of the proposed bridge construction area plus 30 feet in the wash area.

At each bridge location, the walk over survey area was conducted on an approximately 10-meter grid (or less) spacing at both the reference and wash study areas (Figure 3 and 4). Accessible locations within the grid were surveyed by suspending the 2"x2" NaI detector approximately 2.5 inches above the ground surface and slowly swinging the probe from side to side while walking forward at a rate of 0.5 meters per second. In addition, one minute integrated counts were collected at the center of each grid. The one-minute integrated count and the maximum count were recorded for each grid.

All radiological scanning equipment was calibrated by the supplier prior to field usage. Copies of the calibration sheets are included in the Appendix B. In addition, daily field checks were performed using field calibration check-sources prior to each day's work.

4.2.3 Surface Soil Sampling

Representative surface soil samples were collected from both the Reference and Bridge Construction Wash areas for radiological analysis based on the results of the surface scan walkover. Surface sediment samples were generally collected from grid

locations that yielded the highest one-minute integrated count using the 2"X 2" NaI detector. Surface samples were collected using a spade to scrape surface samples into a gallon-sized re-sealable sampling bag.

Following collection of the samples, the sample bag was labeled with a specific sample I.D., project I.D., sample date, and sample time. Each sample was also recorded on a CoC form and delivered to the environmental laboratory for radiological analysis in accordance with the methods described in Contract 08A2047, Task Order 17.

4.2.4 Soil Borings

Soil borings were drilled to evaluate radiological conditions in subsurface soils/ sediments within the planned pile foundation construction depth interval.

Three soil borings were drilled at Cenda Ditch Bridge at the locations depicted on Figure 5. One soil boring (CD-SB-01) was drilled in a background/ reference area located out of the main wash channel, and two (2) borings (CD-SB-02 and CD-SB-03) were drilled in the main wash channel. Borings were limited to a maximum of 13 feet below ground surface due to refusal on bedrock.

Four soil borings were drilled at Wheaton Wash Bridge at the locations depicted on Figure 6. One (1) soil boring (WW-SB-01) was drilled in a background/ reference area located outside of the main wash channel and three (3) soil borings (WW-SB-02 through WW-SB-04) were drilled in the main wash channel. Soil borings were drilled to a maximum depth of 50 feet bgs.

Due to access limitations, the soil borings were drilled using a track-mounted limited access hollow stem auger drilling rig equipped with 8-inch diameter hollow stem augers. Soils were initially sampled using a split spoon sampler, but due to very poor sample penetration and recovery (typically less than two inches), the borehole samples were obtained from drill cuttings. Similarly, borehole logs were developed based on drill cuttings. Copies of the interpreted boring logs are included in Appendix C.

Drill cuttings were laid out on to 6-mil thick sheet plastic. The cutting intervals were marked by depth, and then scanned for radiological activity using a 2"X2" NaI detector, pancake probe, and uR-meter. In addition, samples were collected at approximate five-foot intervals into one gallon resealable sampling bags for potential laboratory analysis. Following collection of the samples, the sample bag was labeled with a specific sample I.D., project I.D., sample date, and sample time. Each sample was also recorded on a CoC form and delivered to an environmental laboratory for radiological analysis in accordance with the methods described in Contract 08A2047, Task Order 17.

4.2.5 Boring Locations

Boring locations were identified and plotted on a field map with a unique boring identification (I.D.) number to represent each borehole/location. In addition, the spatial coordinates for each borehole were obtained using a handheld field GPS Trimble unit and recorded on field data sheets. The boring locations are shown on Figure 5 and 6. The GPS latitude and longitude for each boring are provided in Table 1.

4.2.6 Decontamination and Waste Disposal

Prior to drilling, all drilling rods or augers were decontaminated using high pressure spray. All samplers, spades and instruments that might come in contact with sampled media were decontaminated in a non-phosphate scrub solution followed by a deionized water double rinse.

All soil cuttings and decontamination fluids were contained in DOT approved 55-gallon drums and appropriately labeled pending waste characterization, profiling and disposal.

4.2.7 Borehole Abandonment

Following the completion of drilling and sampling, the boreholes were abandoned by removing the drilling tools from the borehole and backfilling the open borehole with bentonite slurry via tremmie pipe and placing medium bentonite chips to within one foot of the surface. Native soil was placed in the remaining borehole annulus to match existing grade.

4.3 FIELD DEVIATIONS FROM SCOPE OF WORK

The following narrative describes deviations from the proposed scope of work:

- Soil Boring Samples: The work plan called for soil samples to be continuously sampled using a large diameter core barrel, however due to poor sample penetration and recovery with the core barrel sampler, samples were collected from the cuttings generated during the drilling process.

- Equipment Blanks: Equipment blanks were not collected from split spoon samplers because sub-surface soils could not be sampled with split spoon samplers.

5.0 LABORATORY ANALYSIS

Soil samples were delivered under chain of custody to Pat-Chem Laboratories (Pat-Chem) for chemical and radiological analysis of selected soil samples. Radiological analysis was subcontracted by Pat-Chem to TestAmerica Inc. Both Pat-Chem and TestAmerica are certified through the California Environmental Laboratory Accreditation Program (ELAP) to conduct the analyses required in this task order. The laboratory was directed to perform the following analyses on selected soil samples based on Caltrans' Task Order No. 17 request:

- Gamma Spectroscopy EPA 901.1 Modified
- Isotopic Uranium EML U-02 Modified
- Isotopic Thorium EMP Th-01 Modified

In addition, two composite soil samples were analyzed for the following constituents for waste profiling purposes:

- *TPH (EPA test method 8015B)*—all samples were analyzed for total petroleum hydrocarbons as gasoline (TPH-g; C4-C12), TPH as diesel (TPH-d: C13-C22), and TPH as oil (TPH-o: C23-C23).
- *VOCs (EPA test method 8260B)*
- *Title 22 metals (EPA test method 6010B/7470)*
- *PCBs (EPA test method 8082)*

Copies of the laboratory CoCs and analytical reports are attached in Appendix D.

6.0 INVESTIGATIVE RESULTS

The following sections describe the findings of field investigations conducted at Cenda Ditch Bridge and Wheaton Wash Bridge.

6.1 FIELD FINDINGS

Variable lithology was encountered during drilling and field sampling activities at Cenda Ditch and Wheaton Wash. Soils encountered, consisted primarily of alluvium consisting of well graded sands, gravel, cobble and boulders. Imported limestone and granitic boulders were observed in rip-rap fills along the wash banks in the vicinity of the bridges. Course-grained sediments consisted of primarily of granitic-gneiss, felsic volcanics with minor limestone.

The surface soils in the Reference Areas at both bridges were distinctly different than the surface sediments in the washes. Surface soils in the Reference Areas were observed to consist of well-graded sand, silty sand and variable sand-silt mixtures with minor gravels and may have been influenced by fill soils eroded from the highway embankments.

Surface sediments in the wash were considerably coarser and consisted of a heterogeneous mixture of limestone, granitic-gneiss and volcanics with varying degrees of alteration and veining. The particle size distribution was observed to be much coarser in the Cenda Ditch Bridge area than at Wheaton Wash Bridge.

6.2 Surface Walkover Scanning Results

6.2.1 Cenda Ditch

Reference Area Surface Walk-Over Survey

A walk-over survey was conducted at locations located outside the main wash channel at Cenda Ditch Bridge (Figure 5) for comparison with activity levels in the Bridge Construction Wash Area. The survey was conducted using a 2"X2" NaI detector over six approximately equal area grids located east and west of the main wash channel (Figure 5). Surface soils observed in the scan consisted primarily of well-graded sand, silty sand and variable sand-silt mixtures with minor gravels.

Surface scanning results are presented in Table 2. The following table summarizes walk-over survey results, based on one minute integrated counts conducted at the center of each sampling grid (Figure 3).

Minimum (cpm)	Maximum (cpm)	Mean (cpm)	Standard Deviation (1 σ) (cpm)
16,689	21,398	19,558	1,834

Bridge Construction Area Walk-Over Survey

A surface walk over was conducted in the Cenda Ditch wash following the methodologies outlined in Section 4.0. Prior to performing the walkover, a grid was constructed across the wash using the surveyed bridge support columns as reference points (Figure 3). The grid consisted of 56 approximately equal area grid sections. Grids overlying rip-rap, steep slopes or insufficient clearance were not scanned. Survey results in the wash were influenced by geometric effects of reflection resulting from highly uneven surfaces, including steep slopes, banks, boulders, rip rap, and structural columns. Surface sediments in the wash were heterogeneous, and consisted of limestone, granitic-gneiss and volcanics with varying degrees of alteration and veining. Several of the rocks, boulders and rip rap in the wash exhibited elevated activity counts (up to 122,000 counts per minute [cpm]), while most rocks in the wash had significantly lower activity levels. The rocks and boulders did not appear to be chemically altered and the activity levels appear to the result of naturally elevated activity levels.

Surface scanning results are presented in Table 2. The following table summarizes walk-over survey results, based on one minute integrated counts conducted at the center of each sampling grid using a 2"X2" NaI detector (Figure 3).

Minimum (cpm)	Maximum (cpm)	Mean (cpm)	Standard Deviation (1 σ) (cpm)
24,720	41,216	29,123	4,066

6.2.2 Wheaton Wash

Reference Area Surface Walk-Over Survey

A walk-over survey was conducted at locations located outside the main wash channel at Wheaton Wash Bridge (Figure 4) for comparison with activity levels in the Bridge Construction Wash Area. The survey was conducted using a 2"X2" NaI detector over six approximately equal area grids located east and west of the main wash channel (Figure 6). Surface soils observed in the scan consisted primarily of well-graded sand, silty sand and variable sand-silt mixtures with minor gravels.

Surface scanning results are presented in Table 2. The following table summarizes walk-over survey results, based on one minute integrated counts conducted at the center of each sampling grid using a 2"X2" NaI detector (Figure 4).

Minimum cpm)	Maximum (cpm)	Mean (cpm)	Standard Deviation (1 σ) (cpm)
18,485	20,318	19,213	756

Bridge Construction Area Walk-Over Survey

A surface walk over was conducted in the Wheaton Wash Bridge Construction Wash area following the methodologies outlined in Section 4.0. Prior to performing the walkover, a grid was constructed across the wash using the surveyed bridge support columns as reference points (Figure 4). The grid consisted of 20 approximately equal area grid sections. Grids overlying rip-rap, steep slopes or insufficient clearance were not scanned. Survey results in the wash were influenced by geometric effects of reflection resulting from highly uneven surfaces, including steep slopes, banks, boulders, rip rap, and structural columns. Surface sediments in the wash were heterogeneous, and consisted of limestone, granitic-gneiss and volcanics with varying degrees of alteration and veining.

Surface scanning results are presented in Table 2. The following table summarizes walk-over survey results, based on one minute integrated counts conducted at the center of each sampling grid using a 2"X2" NaI detector (Figure 4).

Minimum (cpm)	Maximum (cpm)	Mean (cpm)	Standard Deviation (1 σ) (cpm)
17,373	21,897	19,549	1,251

6.3 SURFACE SAMPLE ANALYTICAL RESULTS

Surface samples were collected and analyzed from the Reference Areas and from Bridge Construction Wash areas at both the Cenda Ditch Bridge and Wheaton Wash Bridge construction areas. The following subsections summarize surface soil analytical results. Sample locations are shown on Figures 3 through 6; Analytical results are tabulated in Table 3; and laboratory reports, including QA/QC documentation are included in Appendix D.

6.3.1 Cenda Ditch Bridge

Reference Area Surface Samples

Six reference area samples were collected from areas located outside of the main wash channel (Figure 5). Samples were collected and analyzed by Gamma Spectroscopy.

A summary of the analytical results is presented in Table 3. Sample locations are shown on Figure 5. Copies of the laboratory reports and CoC forms are included in Appendix D. The results are summarized in the following table:

Radionuclide	Minimum (pCi/g)	Maximum (pCi/g)	Mean (pCi/g)	Mean		St Dev Uncertainty (+/- pCi/g)
				Mean Uncertainty (+/- pCi/g)	Standard Deviation (1 σ) (pCi/g)	
Potassium 40 (K40)	21.7	23.6	22.72	2.6	0.87	0.11
Radium 226 (Ra226)	0.533	0.797	0.661	0.11	0.0999	0.0165
Thorium 232 (Th232)	1.25	3.37	2.003	0.298	0.736	0.0857
Uranium 238 (U238)	0.362 U	0.998	0.745	0.388	0.218	0.0331

Notes: U Qualifier – analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/ Mda/ Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software. Statistics were calculated using the reported activity level.

Isotopic thorium and uranium analysis were conducted on one sample analyzed by alpha spectroscopy. The results are generally consistent with gamma spectroscopy results as shown on Table 3. Differences may be attributed to aliquot size, differences in the analytical methods and the sensitivity of the methods in identifying specific radionuclides.

Bridge Construction Wash Surface Samples

Twelve surface sediment samples were collected from grids within the main wash channel at the Cenda Ditch Bridge (Figure 3). Sample locations were selected based on the highest integrated counts measured during the walk-over survey.

Gamma and alpha spectroscopy results are tabulated in Table 3. Copies of the laboratory reports and CoC forms are included in Appendix D. The results are summarized in the following table:

Radionuclide	Minimum (pCi/g)	Maximum (pCi/g)	Mean		Standard Deviation (1 σ) (pCi/g)	St Dev Uncertainty (+/- pCi/g)
			Mean (pCi/g)	Mean Uncertainty (+/- pCi/g)		
K40	19.9	23.5	21.75	2.592	1.607	0.214
Ra226	0.673	1.13	0.939	0.152	0.196	0.0303
Th232	3.11	7.86	5.234	0.715	1.281	0.184
U238	0.107U	2.01U	0.826	0.788	0.513	0.464

Notes: U Qualifier – analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/ Mda/ Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software. Statistics were calculated using the reported activity level.

Isotopic thorium and uranium analysis were conducted on two samples analyzed by alpha spectroscopy. The results are generally consistent with gamma spectroscopy results as shown on Table 3. Differences may be attributed to aliquot size, differences in the analytical methods and the sensitivity of the methods in identifying specific radionuclides.

6.3.2 Wheaton Wash Bridge

Reference Area Surface Samples

Six reference area samples were collected from areas located outside of the main wash channel (Figure 6). Samples were collected and analyzed by Gamma Spectroscopy.

A summary of the analytical results is presented in Table 3. Sample locations are shown on Figure 6. Copies of the laboratory reports and CoC forms are included in Appendix D. The results are summarized in the following table:

Radionuclide	Minimum (pCi/g)	Maximum (pCi/g)	Mean		Standard Deviation (1 σ) (pCi/g)	St Dev Uncertainty (+/- pCi/g)
			Mean (pCi/g)	Mean Uncertainty (+/- pCi/g)		
K40	21.7	24.9	22.72	2.74	1.20	0.244
Ra226	0.486	0.866	0.712	0.12	0.146	0.0213
Th232	1.42	2.83	2.13	0.341	0.538	0.0626
U238	0.608 U	1.1	0.917	0.557	0.314	0.49

Notes: U Qualifier – analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/ Mda/ Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software. Statistics were calculated using the reported activity level.

Bridge Construction Wash Surface Samples

Ten surface sediment samples were collected from grids within the main wash channel at the Wheaton Wash Bridge (Figure 4). Sample locations were selected based on the highest integrated counts measured during the walk-over survey.

Gamma and alpha spectroscopy results are tabulated in Table 3. Copies of the laboratory reports and CoC forms are included in Appendix D. The results are summarized in the following table:

Radionuclide	Minimum (pCi/g)	Maximum (pCi/g)	Mean		Standard Deviation (1 σ) (pCi/g)	Stn Dev Uncertainty (+/- pCi/g)
			Mean (pCi/g)	Mean Uncertainty (+/- pCi/g)		
K40	19.0	23.1	21.0	2.5	1.32	0.156
Ra226	0.52	1.32	0.85	0.133	0.248	0.0315
Th232	1.72	7.32	3.29	0.465	1.816	0.201
U238	0.0464U	0.974	0.679	0.611	0.271	0.342

Notes: U Qualifier – analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/ Mda/ Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software. Statistics were calculated using the reported activity level.

Isotopic thorium and uranium analysis were conducted on one sample analyzed by alpha spectroscopy. The results are generally consistent with gamma spectroscopy results as shown on Table 3. Differences may be attributed to aliquot size, differences in the analytical methods and the sensitivity of the methods in identifying specific radionuclides.

6.4 SOIL BORING ANALYTICAL RESULTS

Soil borings were advanced in the Reference and Construction Wash areas at each bridge for the purpose of evaluating the distribution of select radionuclides in the soil profile. The cuttings were scanned with the 2"x2" NaI, uR and pancake detectors. The soil boring cutting and sample scan results are included in Table 4 and 5. Interpreted boring logs are included in Appendix C. Up to three soil samples were selected from each boring based on location in the boring profile and on field scanning results. Select soil samples were analyzed for both gamma and alpha spectrospcopy.

6.4.1 Reference Area Soil Borings

For comparative purposes, samples were collected from two soil borings, one from the area of Cenda Ditch Bridge (CD-SB-01) and one from the area of Wheaton Wash Bridge (WW-SB-01) outside of the wash and expected influence of the mine waste water pipeline. The Cenda Ditch boring (CD-SB-01) was attempted two times, but met refusal on bedrock at a depth of 8.5 feet below ground surface (bgs). A second reference boring was drilled at Wheaton Wash (WW-SB-01) at a location outside of the

influence of the main wash channel to a depth of 50 feet bgs. Samples were collected from cuttings laid out on clean plastic sheeting at approximate five-foot intervals.

Prior to sampling the soil cuttings were laid out on plastic for scanning. Soil cutting scan results are tabulated in Table 4. Scan results were similar throughout the depth of the borings and ranged from,

- 101 to 170 cpm (Pancake), 20 to 24 uR/hr (uR meter) and 19,806 to 21,190 cpm (2"x2" NaI) at Cenda Ditch Bridge Reference Area, and

- 74 to 125 cpm (Pancake), 17 to 22 uR/hr (uR meter) and 15,924 to 19,107 cpm (2"x2" NaI) at Wheaton Wash Bridge Reference Area.

Gamma and alpha spectroscopy results are tabulated in Table 3 for each boring. Sample locations are shown on Figure 5 and 6. Copies of the laboratory reports and CoC forms are included in Appendix D. The sample results for both borings were combined for statistical analysis as summarized in the following table.

Radionuclide	Minimum (pCi/g)	Maximum (pCi/g)	Mean		Standard Deviation (1 σ) (pCi/g)	Stn Dev Uncertainty (+/- pCi/g)
			Mean (pCi/g)	Mean Uncertainty (+/- pCi/g)		
K40	20.2	28.2	22.88	2.8	3.609	0.424
Ra226	0.452	0.789	0.647	0.115	0.141	0.00577
Th232	1.71	2.72	2.258	0.395	0.518	0.0351
U238	0.186U	0.933	0.559	0.838	0.305	0.352

Notes: U Qualifier – analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/ Mda/ Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software. Statistics were calculated using the reported activity level.

Isotopic thorium and uranium analysis were conducted on two samples from the Wheaton Wash Bridge Reference Area. The results are generally consistent with gamma spectroscopy results as shown on Table 3. Differences may be attributed to aliquot size, differences in the analytical methods and the sensitivity of the methods in identifying specific radionuclides.

6.4.2 Bridge Construction Wash Soil Borings

Soil borings were advanced in the wash near each bridge to assess the vertical distribution of radioactivity select radionuclides. The following paragraphs describe the results of soil sample analyses at each bridge.

Cenda Ditch Bridge Construction Wash Soil Borings

Two soil borings were drilled in the main drainage of Cenda Ditch Wash (CD-SB-02 and CD-SB-03) on the north and south sides of the bridge, respectively (Figure 5). Soil borings were limited to a maximum depth of 10 feet bgs, due to refusal on bedrock. Samples were collected from cuttings laid out on clean plastic sheeting at approximate five-foot intervals. Selected samples were analyzed by gamma spectroscopy and alpha spectroscopy.

Prior to sampling the soil cuttings were laid out on plastic for scanning. Soil cutting scan results are tabulated in Table 4. Scan results were similar throughout the depth of the borings and ranged from 121 to 174 cpm (Pancake), 28 to 31 uR/hr (uR meter) and 24,115 to 35,207 cpm (2"x2" NaI).

Gamma and alpha spectroscopy results are tabulated in Table 3. Boring locations are shown on Figure 5. Copies of the laboratory reports and CoC forms are included in Appendix D. The gamma spectroscopy results are summarized in the following table:

Radionuclide	Minimum (pCi/g)	Maximum (pCi/g)	Mean		Standard Deviation (1 σ) (pCi/g)	Stn Dev Uncertainty (+/- pCi/g)
			Mean (pCi/g)	Mean Uncertainty (+/- pCi/g)		
K40	25.7	32.2	28.7	3.5	3.279	0.265
Ra226	0.422	0.83	0.63	0.122	0.204	0.0366
Th232	2.57	3.36	2.88	0.47	0.422	0.0529
U238	0.321U	0.545U	0.447	1.083	0.115	0.126

Notes: U Qualifier – analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/ Mda/ Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software. Statistics were calculated using the reported activity level.

Isotopic thorium and uranium analysis were conducted on one sample analyzed by alpha spectroscopy. The results are generally consistent with gamma spectroscopy results as shown on Table 3. Differences may be attributed to aliquot size, differences in the analytical methods and the sensitivity of the methods in identifying specific radionuclides.

Wheaton Wash Bridge Construction Soil Borings

Three soil borings were drilled in the main drainage of Wheaton Wash (WW-SB-02 through WW-SB-04) on the north and south sides of the bridge, respectively (Figure 6). Soil borings were drilled to a maximum depth up to 50 feet bgs. Samples were collected from the cuttings at approximate five-foot depth intervals for potential analysis. Selected samples were analyzed by gamma spectroscopy and alpha spectroscopy.

Prior to sampling the soil cuttings were laid out on plastic for scanning. Soil cutting scan results are tabulated in Table 4. Scan results were similar throughout the depth of the borings and ranged from 64 to 131 cpm (Pancake), 16 to 20 uR/hr (uR meter) and 15,410 to 22,541 cpm (2"x2" NaI).

Gamma and alpha spectroscopy results are tabulated in Table 2. Sample locations are shown on Figure 6. Copies of the laboratory reports and chain-of-custody forms are included in Appendix D. The gamma spectroscopy results are summarized in the following table:

Radionuclide	Minimum (pCi/g)	Maximum (pCi/g)	Mean		Standard Deviation (1 σ) (pCi/g)	Stn Dev Uncertainty (+/- pCi/g)
			Activity (pCi/g)	Mean Uncertainty (+/- pCi/g)		
K40	21.4	29.8	21.63	2.516	7.505	0.876
Ra226	0.0546	0.572	0.454	0.0833	0.158	0.0275
Th232	0.158 J	2.57	1.695	0.263	0.659	0.0957
U238	-0.0251	0.651	0.388	0.43	0.287	0.308

Notes: U Qualifier – analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/ Mda/ Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software. Statistics were calculated using the reported activity level.

Isotopic thorium and uranium analysis were conducted on one sample analyzed by alpha spectroscopy. The results are generally consistent with gamma spectroscopy results as shown on Table 3. Differences may be attributed to aliquot size, differences in the analytical methods and the sensitivity of the methods in identifying specific radionuclides.

6.5 INVESTIGATION DERIVED WASTE

Composite soil samples were collected from the drill cuttings for waste characterization purposes. The samples were analyzed for total petroleum hydrocarbons (TPH) following EPA test method 8015B, polychlorinated biphenyl's (PCBs) following EPA test method 8082A, volatile organic compounds (VOCs) following EPA method 8260B, and Title 22 metals following EPA test methods 6010B/ 7471A. The analytical results are summarized on Table 7 and laboratory reports along with CoCs are provided in Appendix D. Based on the results, the waste cuttings exhibit the characteristics of non-hazardous waste.

6.6 DATA VALIDATION

6.6.1 Field and Laboratory QA/QC

Prior to submitting soil samples to the laboratory, the CoC documentation was reviewed for accuracy and completeness. The laboratory reports were cross-checked

with the chain-of-custody forms to confirm accurate transposing of sample information. Field and laboratory quality assurance and quality control (QA/QC) data (method blanks, laboratory control samples and duplicates, matrix spike samples and duplicates) were also reviewed for compliance with QA/QC objectives. In addition, selected samples analyzed by gamma spectroscopy were confirmed by isotopic analysis using alpha spectroscopy. The results of the analysis showed close agreement between the two test methods. Minor variation in the analytical results is attributed to the much smaller sample aliquot used in alpha spectroscopy and differences in the analytical methods. Based on this validation process, the data contained herein are adequate for the purposes of this study. Copies of the laboratory reports and CoC forms are included as Appendix D.

7.0 CONCLUSIONS

At the request of the Caltrans District 8, a PSI was conducted at the Wheaton Wash Bridge (#54-0621L) and Cenda Ditch Bridge (#54-0620L) located along the southbound State Route 15 (SR15), in San Bernardino County, California (Site; Figure 1 and 2). The purpose of this PSI was to evaluate potential chemical and radiological impacts in surface and subsurface soils and to make recommendations for handling and/or disposal of potentially impacted soil excavated during construction and replacement of the two bridges.

A waste water pipeline transported radioactive waste water from the mine, located immediately up gradient of Cenda Ditch Bridge, down Wheaton Wash under the SR15 bridges to evaporation ponds in Ivanpah Playa. The pipeline repeatedly ruptured during pipeline cleaning activities to remove scale. The scale was identified to be elevated in thorium and radium, which occur naturally in local mineral formations. As a result of pipeline leaks, remedial actions were undertaken to remove sediments impacted by process waste water releases in the wash up and down gradient of Cenda Ditch and Wheaton Wash Bridges. Remedial investigations, remedial actions and pipeline removals were conducted in 2010 and 2011 (Arcadis, June 13, 2012). Three exploratory trenches were excavated at each bridge. Based on the investigation and remediation data, adverse impacts to sediments at the bridges resulting from releases from the process waste water pipeline are considered low.

Between May 13 and 23, 2013, URS conducted radiation health and safety monitoring during geotechnical investigations at 10 locations around the drill rig at four borings in Wheaton Wash Bridge and four borings at Cenda Ditch Bridge. Periodic dose monitoring was conducted throughout the work day at each of the 10 designated monitoring points. For comparison purposes, periodic monitoring was conducted at a reference location outside the wash. In addition, URS scanned drill cuttings and mud during the drilling process (URS, May 29, 2013).

The results of the URS investigation at Wheaton Wash Bridge reported dose measurements ranging from 7 to 48 microRoentgens per hour (uR/hr) (typically between 15 and 25 uR/hr) and reference area measurements ranging from 12 to 34 uR/hr. At Cenda Ditch Bridge, the reported dose measurements ranged from 9 to 61 uR/hr (typically 19 to 30 uR/hr), and the reference area measurements ranged from 13 to 30 uR/hr. It is noted some of the highest activity levels are near the rip rap along the banks of the wash.

To confirm the results of these investigations and to evaluate potential excess soil characteristics, surface walk-over surveys, surface soil sampling and soil borings were conducted at reference areas and in the wash in the construction zone for the bridge replacements. It is noted that the surface soils in the areas surveyed outside the wash for reference and comparison to the wash, were different than those in the wash. Surface soil in the reference areas generally contained more silt and may have been influence by grading or erosion of the SR15 embankment fill. Surface soils in the wash consisted of coarse sands, gravels, cobbles and boulders derived from sources up gradient of the bridges. Consequently, direct comparison of activities in the reference area to the wash would not be appropriate. A discussion of the results is provided below.

- **Walk-over Survey**

    - *Cenda Ditch*: the mean 2"x2" NaI integrated one minute counts in the Bridge Construction Wash area (29,123 cpm) were 49 percent higher than the Reference Area (19,558 cpm). Geometric reflection from the large boulders, uneven ground surface, and bridge columns may be partially responsible for higher counts in the wash area. Field personnel noted elevated walk-over counts on certain rocks and boulders that appeared to be related to natural mineralogy in rock. The highest of these was 122,193 cpm on rock near rip rap near the Cenda Ditch Bridge

    - *Wheaton Wash*: the mean 2"x2" NaI integrated one minute counts in the Bridge Construction Wash area (19,549 cpm) were indistinguishable from Reference Area (19,213 cpm).

- **Surface Soil Samples**

    - *Cenda Ditch*: The gamma spectroscopy results indicate that the mean K40 and U238 concentrations were similar in both Reference Area and Bridge Construction Wash samples, while the mean Ra226 (0.939 pCi/g) and Th-232 (5.234 pCi/g) concentrations in the Bridge Construction Wash surface samples are slightly elevated in comparison to the Reference Area surface soil samples (0.661 pCi/g Ra226 and 2.003 pCi/g Th232). The results are consistent with the walk-over survey results. Based on field observations, the elevated activities appeared to be associated with natural rock in the wash. Consistent with Arcadis' remediation findings, no physical evidence of mine process wastes were observed in the wash.

- *Wheaton Wash*: The gamma spectroscopy results indicate that the mean K40, Ra226, Th232 and U238 concentrations in the Bridge Construction Wash samples were less than the mean Reference Area mean concentration plus two standard deviations. That said, the mean Th232 concentrations are slightly more elevated in the Bridge Construction Wash samples (3.29 pCi/g) than in the Reference Area (2.13 pCi/g. It is also noted that the Ra226, Th232 and U238 concentrations in surface soil samples in the wash at Wheaton Wash Bridge appear to be lower than those at Cenda Ditch Bridge.

- **Soil Boring Samples**

  Due to the limited depth of soil in the Reference Areas at each bridge, the Reference Area boring sample data were combined into a single population for assessment of statistical parameters.

  - *Cenda Ditch*: Consistent with the surface walk-over survey, the pancake, uR, and 2"x2" NaI scans of the drill cuttings indicate higher counts in the Bridge Construction Wash Area than in the Reference Area,
    - 101 to 170 cpm (Pancake), 20 to 24 uR/hr (uR meter) and 19,806 to 21,190 cpm (2"x2" NaI) in Reference Area drill cuttings, and
    - 121 to 174 cpm (Pancake), 28 to 31 uR/hr (uR meter) and 24,115 to 35,207 cpm (2"x2" NaI) in the Cenda Ditch Bridge Construction Wash drill cuttings.

    The gamma spectroscopy results indicate slightly elevated mean K40 in Bridge Construction Wash samples (28.7 pCi/g) in comparison to the Reference Area (21.75 pCi/g). The K40 could be related to storm water runoff from asphalt surfaces at the highway. The Ra226, Th232 and U238 concentrations were much lower in drill cuttings suggesting that the slightly elevated Th232 concentrations in surface samples is characteristic of surface sediments but not underlying soil below the surface.

  - *Wheaton Wash*: Consistent with the surface walk-over survey, the pancake, uR, and 2"x2" NaI scans of the drill cuttings indicate similar counts in the Reference Areas and Bridge Construction Wash Area,
    - 74 to 125 cpm (Pancake), 17 to 22 uR/hr (uR meter) and 15,924 to 19,107 cpm (2"x2" NaI) in Reference Area. drill cuttings
    - 64 to 131 cpm (Pancake), 16 to 20 uR/hr (uR meter) and 15,410 to 19,727 cpm (2"x2" NaI) in Wheaton Wash Bridge Construction Wash drill cuttings.

    The gamma spectroscopy results indicate that the mean K40, Ra226, Th232 and U238 concentrations in the Bridge Construction Wash drill cuttings are similar to Reference Area drill cuttings (less than mean Reference Area plus two standard deviations).

It is noted that the isotopic thorium and uranium alpha spectroscopy results were largely consistent with the gamma spectroscopy results. Differences are attributed to normal sample heterogeneity, the method aliquot size and differences in method sensitivity to the various radionuclides.

Chemical characterization of the drilling cuttings reported concentrations well below hazardous waste thresholds.

Based on the findings and results of this and other investigations described in this report, the following are concluded:

- Surface soil and rock in the wash exhibit slightly elevated activities with the highest activities in the construction zone at Cenda Wash Bridge. The elevated activities may be attributed to slightly elevated radionuclide concentrations, such as Th232, known to be present in naturally occurring minerals in the area. The highest activities were identified on specific rock fragments related to rip rap placed to prevent erosion of the bridge embankment. Although the source of slightly elevated activity is not known, the source could be from one or more the following sources:

    - natural formation materials eroded and transported by natural erosional forces into the wash,
    - fill materials placed in the wash (rip rap, remedial excavation backfill, etc.)
    - mine overburden or ore transported by storm water into the wash.

    No evidence of process waste residue was observed in surface or subsurface soils.

- The measured dose rates from this investigation and those reported in the URS geotechnical study (URS, 2013) would not result in an exceedance of the worker protection allowable dose rate set by the NRC TEDE limit of 5,000 millirem per year (10 CFR § 20.1201 Occupational Dose Limits for Adults). Conservatively using the highest dose rate documented in this, and previous investigations by URS (2013) of 61 uR/hr and assuming a 12-hour work day, six days per week for an entire year would result in a dose of approximately 200 millirem per year, well below the NRC allowable limit of 5,000 millirem.

- Soil samples collected from the wash exhibit characteristics of non-hazardous waste.

8.0 RECOMMENDATIONS

Based on the findings and conclusions presented in this report, the following are recommended:

1. Given the history of releases from the mine waste water pipeline and in an abundance of caution, workers should exercise normal hygienic activities such as washing before eating and drinking, and not eating, drinking, smoking or chewing gum while working in the wash.

2. Soil excavated in the wash should be placed back into the wash or behind abutments near the wash, but should not be transported to other areas of the project.

3. Excess soil generated from the wash that cannot be placed back in the wash should be profiled as nonhazardous waste and disposed to an appropriate municipal landfill.

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10.0 CLOSURE

The conclusions presented in this report are professional opinions based on data described in this report. The opinions of this report have been arrived at in accordance with currently accepted hydrogeologic and engineering standards and practices applicable to this location, and are subject to the following inherent limitations. Stantec makes no other warranty, either expressed or implied, concerning the conclusions and professional advice that is contained within the body of this report.

Inherent in most projects performed in a heterogeneous subsurface environment, continuing excavation and assessments may reveal findings that are different than those presented herein. This facet of the environmental profession should be considered when formulating professional opinions on the limited data collected on these projects.

This report has been issued with the clear understanding that it is the responsibility of the owner, or their representative, to make appropriate notifications to regulatory agencies. It is specifically not the responsibility of Stantec to conduct appropriate notifications as specified by current County and State regulations.

The information presented in this report is valid as of the date our exploration was performed. Site conditions may degrade with time; consequently, the findings presented herein are subject to change.

In the event of any conflict between the terms and conditions of this report and the terms and conditions of the consulting services agreement between the State of California Department of Transportation, District 8, and Stantec Consulting Services Inc., the consulting services agreement shall control.

11.0 LIST OF PREPARERS

This PSI report has been prepared under the direction of the following environmental professionals.

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TABLES

TABLE 1 - GPS DATA

TO-17: CENDA DITCH BRIDGE AND WHEATON WASH BRIDGE

PROJECT NAME: 08-00000-4721

STANTECT PROJECT NUMBER: 185802873

Borings ID	Latitude (°N)	Longitude (°W)	Elevation (ft MSL)
Cenda Ditch			
CD-SB-01-STEP OUT	35.46874687	115.5179100	4,486.19
CD-SB-02	35.46871908	115.5172155	4,480.03
CD-SB-03	35.46856984	115.516938	4,465.68
Wheaton Wash			
WW-SB-01	35.46784751	115.4872124	4,115.48
WW-SB-02	35.46774161	115.4872368	4,129.85
WW-SB-03	35.46768534	115.4871065	4,122.62
WW-SB-04	35.46757342	115.4874782	4,121.43

Locations data recorded as decimal degree

GPS Unit: Trimble GeoXT Geoexplorer 6000 Series

Datum: WGS 1984

TABLE 2 - SUMMARY OF SURFACE RADIOLOGICAL SCANNING RESULTS
TO-17: CENDA DITCH BRIDGE AND WHEATON WASH BRIDGE
PROJECT NAME: 08-00000-4721
STANTECT PROJECT NUMBER: 185802873

Grid Number	1-Minute Integrated Count 2x2 NaI (cpm)	Maximum Count (cpm)	Notes
Cenda Ditch			
Background Area	21,899	25,189	
CD-SS-BKG01	21,011	23,617	Background area grid
CD-SS-BKG02	20,724	22,875	Background area grid
CD-SS-BKG03	21,398	24,081	Background area grid
CD-SS-BKG04	19,245	23,390	Background area grid
CD-SS-BKG05	18,282	21,314	Background area grid
CD-SS-BKG06	16,689	19,590	Background area grid
Mean	19,558	22,478	
Standard Dev.	1,834	1,706	
Sample Area			
1	27,842	122,193	Rip rap and brush. High count on toe of rip rap
2	25,627	30,646	Area covered by brush and trees
3	32,328	32,857	Pipeline with heavy brush and rip rap
4	25,058	29,333	Gully
5	27,090	29,235	Gully along pipeline
6	25,408	27,798	Gully along pipeline
7	26,682	41,980	Near rip rap. High readings adjacent to rip rap
8	--	--	Area covered in rip rap material
9	29,792	51,689	rip rap, high hits on rocks
10	37,822	62,613	Piepline; along rip rap, some scattered rocks
11	26,263	34,699	Gully
12	34,741	39,490	Gully, near pipeline and boulders
13	40,469	42,059	Gully
14	29,486	34,061	Half of area is rip rap
15	--	--	Rip rap
16	41,216	78,146	Rip rap material with brush. High hits on boulders
17	27,930	42,976	Pipeline with boulders
18	26,731	27,898	Gully
19	26,670	44,806	Gully; pipeline and rip rap
20	31,872	37,981	Gully; toe of rip rap
21	--	--	Rip rap
22	--	--	Rip rap
23	32,806	43,236	Some rip rap
24	30,281	44,182	Pipeline with rip rap. High hit counts on rocks
25	26,030	28,848	Along edge in gully
26	26,262	38,040	Gully; along pipeline with some rip rap
27	24,270	32,416	Gully; toe of rip rap
28	--	--	Rip rap embankment
29	--	--	Rip rap embankment
30	28,418	30,182	Some rip rap
31	31,380	42,386	Some rip rap
32	25,018	32,086	Out of gully
33	26,576	37,896	Gully; pipeline and rip rap
34	29,006	67,523	Gully; top of rip rap. High hit counts near rock
35	--	--	Rip rap embankment
36	--	--	Rip rap embankment
37	--	--	Rip rap embankment
38	--	--	Some rip rap
39	26,589	32,303	Gulley, edge of ledge
40	31,060	34,494	Gully; pipeline and rip rap
41	26,701	28,523	Gully; top of rip rap with some rocks
42	--	--	Rip rap embankment
43	--	--	Rip rap embankment
44	--	--	Rip rap embankment with brush
45	--	--	Rip rap embankment with brush
46	29,332	29,651	Gully; edge of ledge with high hits counts
47	29,620	30,525	Guly; pipeline near rocks
48	25,413	29,062	Gully; toe of rip rap
49	--	--	Rip rap embankment
50	--	--	Rip rap with heavy brush
51	--	--	Rip rap with heavy brush
52	--	--	Rip rap with heavy brush
53	28,780	29,761	Gully; edge of ledge
54	29,685	31,282	Gully; pipeline
55	27,299	29,868	Gully; toe of rip rap. High hits near rocks
56	--	--	Rip rap embankment
Mean	29123*	40,074	
Standard Dev.	4066*	17,944	

Wheaton Wash			
Background Area	18,442	19,724	
BKG01	18,485	20,731	Background area grid
BKG02	18,494	20,630	Background area grid
BKG03	18,723	21,367	Background area grid
BKG04	20,318	23,344	Background area grid
BKG05	19,668	21,757	Background area grid
BKG06	19,587	24,838	Background area grid
Mean	19,213	22,111	
Standard Dev.	756	1,657	
Sample Area			
1	18,887	27,070	Pipeline; along rip rap
2	18,944	20,106	Pipeline; some isolated rocks
3	19,288	20,122	Gully
4	18,111	20,311	Gully
5	18,026	19,122	Gully, toe of rip rap
6	20,664	20,730	Pipeline; along rip rap, some scattered rocks
7	20,362	22,765	Pipeline; some isolated rocks
8	19,952	27,852	Gully
9	17,373	19,601	Gully
10	17,633	18,908	Gully along rip rap edge
11	19,413	22,400	Pipeline; along rip rap
12	20,979	22,316	Pipeline; some isolated rocks
13	21,897	22,702	Gully
14	18,502	25,980	Gully
15	18,971	20,367	Gully along rip rap edge
16	20,037	20,106	Pipeline; along rip rap
17	20,572	23,216	Pipeline; some isolated rocks
18	20,003	22,104	Gully
19	19,993	21,307	Gully along rip rap edge
20	21,365	23,784	Gully along rip rap edge
Mean	19,549	22,043	
Standard Dev.	1,251	2,551	

Refer to figures for sample locations

* - Statistical results indicate data is not normally distributed

TABLE 3 - SUMMARY OF SOIL SAMPLE RADIOLOGICAL RESULTS
RADIONUCLIDES
TO-17: CENDA DITCH BRIDGE AND WHEATON WASH BRIDGE
PROJECT NAME: 08-00000-4721
STANTECT PROJECT NUMBER: 185802873

			Gamma Spectroscopy								Isotopic Thorium						Isotopic Uranium					
			K-40 (pCi/g)		RA-226 (pCi/g)		TH-232 (pCi/g)		U-238 (pCi/g)		Th-228 (pCi/g)		Th-230 (pCi/g)		Th-232 (pCi/g)		U-234 (pCi/g)		U-235 (pCi/g)		U-238 (pCi/g)	
	Sample ID	Sample Date	Activity	Uncertainty	Activity	Uncertainty	Activity	Uncertainty	Activity	Uncertainty	Activity	Uncertainty	Activity	Uncertainty	Activity	Uncertainty	Activity	Uncertainty	Activity	Uncertainty	Activity	Uncertainty
CENDA DITCH BRIDGE	**Reference Surface Soils**																					
	CD-SS-BKG01	7/24/2104	23.5	2.7	0.797	0.13	3.37	0.45	0.998	0.45	--	--	--	--	--	--	--	--	--	--	--	--
	CD-SS-BKG02	7/24/2104	22.0	2.5	0.615	0.097	2.1	0.3	0.686	0.37	--	--	--	--	--	--	--	--	--	--	--	--
	CD-SS-BKG03	7/24/2104	22.1	2.5	0.533	0.097	1.53	0.24	0.84	0.38	0.8 J	0.2	0.192 J	0.083	0.686 J	0.18	0.448 J	0.12	0.0117 U	0.017	0.612 J	0.15
	CD-SS-BKG04	7/24/2104	23.6	2.7	0.761	0.13	1.97	0.33	0.362 U	0.4	--	--	--	--	--	--	--	--	--	--	--	--
	CD-SS-BKG05	7/24/2104	23.4	2.7	0.65	0.11	1.8	0.26	0.86	0.36	--	--	--	--	--	--	--	--	--	--	--	--
	CD-SS-BKG06	7/24/2104	21.7	2.5	0.608	0.095	1.25	0.21	0.725	0.37	--	--	--	--	--	--	--	--	--	--	--	--
	Mean		22.72	2.6	0.661	0.11	2.003	0.298	0.745	0.388	--	--	--	--	--	--	--	--	--	--	--	--
	Standard Deviation		0.87	0.11	0.0999	0.0165	0.736	0.0857	0.218	0.0331	--	--	--	--	--	--	--	--	--	--	--	--
	Surface Soils																					
	CD-SS-G10	7/24/2104	22.4	2.6	1.06	0.16	4.03	0.51	0.997	0.43	--	--	--	--	--	--	--	--	--	--	--	--
	CD-SS-G13	7/24/2104	22.0	2.6	0.988	0.15	5.56	0.68	0.705	0.47	--	--	--	--	--	--	--	--	--	--	--	--
	CD-SS-G16	7/24/2104	23.5	2.7	0.863	0.13	4.56	0.58	1.1	0.49	6.16	1.0	0.953 J	0.21	4.65	0.78	0.765 J	0.19	0.0182 U	0.024	0.706 J	0.18
	CD-SS-G18	7/24/2104	21.6	2.5	0.777	0.12	4.31	0.56	1.04	0.44	--	--	--	--	--	--	--	--	--	--	--	--
	CD-SS-G20	7/24/2104	19.9	2.3	0.854	0.14	7.86	1.0	0.511 U	0.49	--	--	--	--	--	--	--	--	--	--	--	--
	CD-SS-G23	7/24/2104	23.0	2.8	0.783	0.14	6.6	0.97	0.107 U	1.5	--	--	--	--	--	--	--	--	--	--	--	--
	CD-SS-G24	7/24/2104	22.2	2.6	1.35	0.19	6.21	0.73	0.943	0.41	--	--	--	--	--	--	--	--	--	--	--	--
	CD-SS-G24 DUP	7/24/2104	22.1	2.9	1.45	0.23	6.99	0.98	1.43 U	1.1	--	--	--	--	--	--	--	--	--	--	--	--
	CD-SS-G3	7/24/2104	17.6	2.1	0.673	0.12	3.11	0.42	0.567	0.35	--	--	--	--	--	--	--	--	--	--	--	--
	CD-SS-G31	7/24/2104	21.6	2.5	1.03	0.16	5.22	0.64	1.19	0.47	--	--	--	--	--	--	--	--	--	--	--	--
	CD-SS-G32	7/24/2104	22.3	2.7	1.04	0.15	5.87	0.82	2.01 U	1.4	--	--	--	--	--	--	--	--	--	--	--	--
	CD-SS-G40	7/24/2104	23.2	2.8	0.719	0.13	4.54	0.71	0.583 U	1.3	--	--	--	--	--	--	--	--	--	--	--	--
	CD-SS-G41	7/24/2104	21.7	2.6	1.13	0.16	4.94	0.7	0.16 U	1.4	6.8	1.1	1.35	0.27	6.46	1.1	1.09	0.24	0.0334 J	0.03	1.09	0.24
	Mean		21.75	2.592	0.939	0.152	5.234	0.715	0.826	0.788	--	--	--	--	--	--	--	--	--	--	--	--
	Standard Deviation		1.607	0.214	0.196	0.0303	1.281	0.184	0.513	0.464	--	--	--	--	--	--	--	--	--	--	--	--
	Reference Soil Boring																					
	CD-SB01-5	7/24/2104	21.4	2.5	0.789	0.11	2.72	0.37	0.933	0.38	--	--	--	--	--	--	--	--	--	--	--	--
	Soil Borings																					
	CD-SB02-10	7/24/2104	32.2	3.8	0.637	0.12	2.57	0.45	0.545 U	1.2	--	--	--	--	--	--	--	--	--	--	--	--
	CD-SB02-5	7/24/2104	25.7	3.3	0.83	0.16	3.36	0.53	0.321 U	0.95	2.71	0.5	0.48 J	0.14	2.24	0.42	0.437 J	0.12	0.0237 J	0.024	0.42 J	0.12
	CD-SB03-5	7/24/2104	28.2	3.4	0.422	0.087	2.71	0.43	0.475 U	1.1	--	--	--	--	--	--	--	--	--	--	--	--
	Mean		28.7	3.5	0.63	0.122	2.88	0.47	0.447	1.083	--	--	--	--	--	--	--	--	--	--	--	--
	Standard Deviation		3.279	0.265	0.204	0.0366	0.422	0.0529	0.115	0.126	--	--	--	--	--	--	--	--	--	--	--	--

TABLE 3 - SUMMARY OF SOIL SAMPLE RADIOLOGICAL RESULTS
RADIONUCLIDES
TO-17: CENDA DITCH BRIDGE AND WHEATON WASH BRIDGE
PROJECT NAME: 08-00000-4721
STANTECT PROJECT NUMBER: 185802873

WHEATON WASH BRIDGE

		Gamma Spectroscopy								Isotopic Thorium						Isotopic Uranium					
		K-40 (pCi/g)		RA-226 (pCi/g)		TH-232 (pCi/g)		U-238 (pCi/g)		Th-228 (pCi/g)		Th-230 (pCi/g)		Th-232 (pCi/g)		U-234 (pCi/g)		U-235 (pCi/g)		U-238 (pCi/g)	
Sample ID	Sample Date	Activity	Uncertainty	Activity	Uncertainty	Activity	Uncertainty	Activity	Uncertainty	Activity	Uncertainty	Activity	Uncertainty	Activity	Uncertainty	Activity	Uncertainty	Activity	Uncertainty	Activity	Uncertainty
Reference Surface Soils																					
WW-SS-BKG01	7/24/2104	22.9	2.6	0.486	0.1	1.42	0.24	0.795	0.35	--	--	--	--	--	--	--	--	--	--	--	--
WW-SS-BKG02	7/24/2104	22.9	2.8	0.605	0.097	1.59	0.31	1.43 U	1.1	--	--	--	--	--	--	--	--	--	--	--	--
WW-SS-BKG03	7/24/2104	24.9	3.2	0.866	0.16	2.21	0.43	0.944 J	0.15	--	--	--	--	--	--	--	--	--	--	--	--
WW-SS-BKG03 DUP	7/24/2104	23.6	2.8	0.781	0.12	1.76	0.32	0.876 J	0.14	--	--	--	--	--	--	--	--	--	--	--	--
WW-SS-BKG04	7/24/2104	23.5	2.8	0.807	0.12	2.22	0.36	0.623 U	1.1	--	--	--	--	--	--	--	--	--	--	--	--
WW-SS-BKG05	7/24/2104	21.7	2.5	0.817	0.13	2.83	0.4	0.608 U	0.57	--	--	--	--	--	--	--	--	--	--	--	--
WW-SS-BKG06	7/24/2104	21.7	2.5	0.69	0.11	2.51	0.33	1.1	0.49	--	--	--	--	--	--	--	--	--	--	--	--
Mean		22.93	2.743	0.712	0.12	2.13	0.341	0.917	0.557	--	--	--	--	--	--	--	--	--	--	--	--
Standard Deviation		1.203	0.244	0.146	0.0213	0.538	0.0626	0.314	0.49	--	--	--	--	--	--	--	--	--	--	--	--
Surface Soils																					
WW-SS-G12	7/24/2104	22.2	2.7	0.701	0.11	2.49	0.42	0.935 U	1.1	--	--	--	--	--	--	--	--	--	--	--	--
WW-SS-G13	7/24/2104	19.5	2.4	0.977	0.14	4.71	0.67	0.572 U	1.3	7.67	1.3	2.02	0.39	7.54	1.2	1.59	0.32	0.0489 J	0.036	1.45	0.3
WW-SS-G16	7/24/2104	21.1	2.5	0.832	0.13	3.03	0.46	0.755	0.41	--	--	--	--	--	--	--	--	--	--	--	--
WW-SS-G17	7/24/2104	21.3	2.5	0.827	0.13	2.43	0.35	0.802	0.43	--	--	--	--	--	--	--	--	--	--	--	--
WW-SS-G18	7/24/2104	23.1	2.7	0.52	0.094	1.72	0.26	0.489	0.36	--	--	--	--	--	--	--	--	--	--	--	--
WW-SS-G20	7/24/2104	21.1	2.4	0.617	0.099	1.78	0.28	0.709	0.4	--	--	--	--	--	--	--	--	--	--	--	--
WW-SS-G5	7/24/2104	22.3	2.6	0.663	0.11	2.03	0.29	0.639	0.37	--	--	--	--	--	--	--	--	--	--	--	--
WW-SS-G6	7/24/2104	20.7	2.4	1.32	0.18	7.32	0.88	0.974	0.47	--	--	--	--	--	--	--	--	--	--	--	--
WW-SS-G7	7/24/2104	19.0	2.2	1.16	0.18	4.98	0.62	0.873	0.44	--	--	--	--	--	--	--	--	--	--	--	--
WW-SS-G9	7/24/2104	19.7	2.6	0.883	0.16	2.41	0.42	0.0464 U	0.83	--	--	--	--	--	--	--	--	--	--	--	--
Mean		21	2.5	0.85	0.133	3.29	0.465	0.679	0.611	--	--	--	--	--	--	--	--	--	--	--	--
Standard Deviation		1.32	0.156	0.248	0.0315	1.816	0.201	0.271	0.342	--	--	--	--	--	--	--	--	--	--	--	--
Reference Soil Boring																					
WW-SB01-5	7/24/2104	21.7	2.8	0.452	0.12	1.92	0.42	0.186 U	0.77	2.21	0.41	0.324 J	0.1	1.76	0.34	0.338 J	0.11	0.0072 J	0.02	0.325 J	0.11
WW-SB01-5 DUP	7/24/2104	20.9	2.4	0.413	0.092	1.71	0.25	0.524	0.36	--	--	--	--	--	--	0.353 J	0.11	0.00173 U	0.013	0.319 J	0.1
WW-SB01-25	7/24/2104	20.2	2.5	0.671	0.11	1.71	0.36	0.562 U	1	--	--	--	--	--	--	--	--	--	--	--	--
WW-SB01-50	7/24/2104	28.2	3.4	0.675	0.12	2.68	0.43	0.555 U	1.2	--	--	--	--	--	--	--	--	--	--	--	--
Mean		23.37	2.775	0.599	0.1105	2.103	0.365	0.434	0.833	--	--	--	--	--	--	--	--	--	--	--	--
Standard Deviation		4.252	0.45	0.128	0.013	0.51	0.083	0.215	0.361	--	--	--	--	--	--	--	--	--	--	--	--
Soil Borings																					
WW-SB02-20	7/24/2104	23.2	2.7	0.479	0.091	1.75	0.26	0.402	0.29	--	--	--	--	--	--	--	--	--	--	--	--
WW-SB02-40	7/24/2104	23.9	2.7	0.518	0.093	1.96	0.28	0.561	0.35	--	--	--	--	--	--	--	--	--	--	--	--
WW-SB02-5	7/24/2104	21.4	2.5	0.536	0.097	1.84	0.26	0.374	0.3	--	--	--	--	--	--	--	--	--	--	--	--
WW-SB03-20	7/24/2104	2.67	0.34	0.0546	0.011	0.158 J	0.034	-0.0251 U	0.082	--	--	--	--	--	--	--	--	--	--	--	--
WW-SB03-40	7/24/2104	29.8	3.6	0.409	0.084	1.38	0.32	0.528 U	0.94	--	--	--	--	--	--	--	--	--	--	--	--
WW-SB03-5	7/24/2104	22.9	2.6	0.554	0.095	1.87	0.28	0.725	0.32	--	--	--	--	--	--	--	--	--	--	--	--
WW-SB04-25	7/24/2104	24.8	2.8	0.572	0.098	2.04	0.29	0.651	0.33	1.66	0.33	0.31 J	0.1	1.8	0.35	0.183 J	0.075	0.00551 U	0.013	0.29 J	0.099
WW-SB04-25 DUP	7/24/2104	--	--	--	--	--	--	--	--	2.43	0.45	0.459 J	0.13	2.32	0.43	--	--	--	--	--	--
WW-SB04-45	7/24/2104	23.8	2.7	0.511	0.094	1.69	0.25	0.397	0.29	--	--	--	--	--	--	--	--	--	--	--	--
WW-SB04-5	7/24/2104	22.2	2.7	0.452	0.087	2.57	0.39	-0.117 U	0.97	--	--	--	--	--	--	--	--	--	--	--	--
Mean		21.63	2.516	0.454	0.0833	1.695	0.263	0.388	0.43	--	--	--	--	--	--	--	--	--	--	--	--
Standard Deviation		7.505	0.876	0.158	0.0275	0.659	0.0957	0.287	0.308	--	--	--	--	--	--	--	--	--	--	--	--

Qualifiers:
J - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

Notes:
* - Insufficient sample population

TABLE 4 - SOIL BORING CUTTINGS RADIOLOGICAL SCANING RESULTS
TO-17: CENDA DITCH BRIDGE AND WHEATON WASH BRIDGE
PROJECT NAME: 08-00000-4721
STANTECT PROJECT NUMBER: 185802873

	Boring ID	Depth Interval (feet bgs)	Instrument		
			Pancake Detector (range-cpm)	µR Meter (range - µR/ hour)	1-Minute Integrated Count 2x2 NaI (range - cpm)
CENDA DITCH BRIDGE	**Reference Soil Boring**				
	CD-SB-01	0-5	101-137	20	19806-21105
		5-8	127-170	24	20110-21190
	Soil Borings				
	CD-SB-02	0-5	121-151	30-31	24115-35207
		5-10	121-174	28-30	24119-27274
	CD-SB-03	0-5	121-151	29-30	25164-28624
WHEATON WASH BRIDGE	**Reference Soil Boring**				
	WW-SB-01	1.5-5	106-118	18-22	16908-18480
		5-10	79-114	18-20	15924-18932
		10-15	79-125	19-20	17532-18296
		15-20	77-101	18-19	17496-18445
		20-25	74-107	19-20	17693-18591
		25-30	78-113	18.5-20	17277-18997
		30-35	74-116	17-18	17623-19104
		35-40	91-122	18-19	17124-19107
		40-45	76-105	19	17341-18956
		45-50	79-112	18-20	17011-18756
	Soil Borings				
	WW-SB-02	3-5	99-114	17-18.5	16260-17180
		5-10	75-104	18-19	17642-19122
		10-15	104-111	16-19	17554-18615
		15-20	79-131	18-19.5	17205-18944
		20-25	86-112	18-20	17205-18944
		25-30	77-102	19-20	17504-19727
		30-35	81-114	16-18	16808-18756
		35-40	90-106	18-19	17104-18105
		40-44	80-98	18-19.5	18111-19608
	WW-SB-03	0-5	97-118	16-17	15760-16974
		5-10	72-126	16.5-18	15660-17120
		10-15	75-125	16-17	15994-17880
		15-20	71-104	16	15502-17701
		20-25	82-121	16	16102-17405
		25-30	64-95	16.5-17	15044-17771
		30-35	91-130	16-17	16193-17515
		35-40	68-114	18	15410-16988
	WW-SB-04	0-5	NR	NR	NR
		5-10	75-120	18	19780-21060
		10-15	74-112	19-20	19966-21010
		15-20	96-124	19	19980-20966
		20-25	88-118	19.5-20.5	19641-21114
		25-30	79-115	19.5-20	20119-22119
		30-35	77-114	19-20	18389-21705
		35-40	81-97	21-22	20117-22194
		40-45	84-106	20-21	21916-22541
		45-48	65-106	20-21	20118-21465

TABLE 5 - SOIL BORING SAMPLE RADIOLOGICAL SCANNING RESULTS
TO-17: CENDA DITCH BRIDGE AND WHEATON WASH BRIDGE
PROJECT NAME: 08-00000-4721
STANTECT PROJECT NUMBER: 185802873

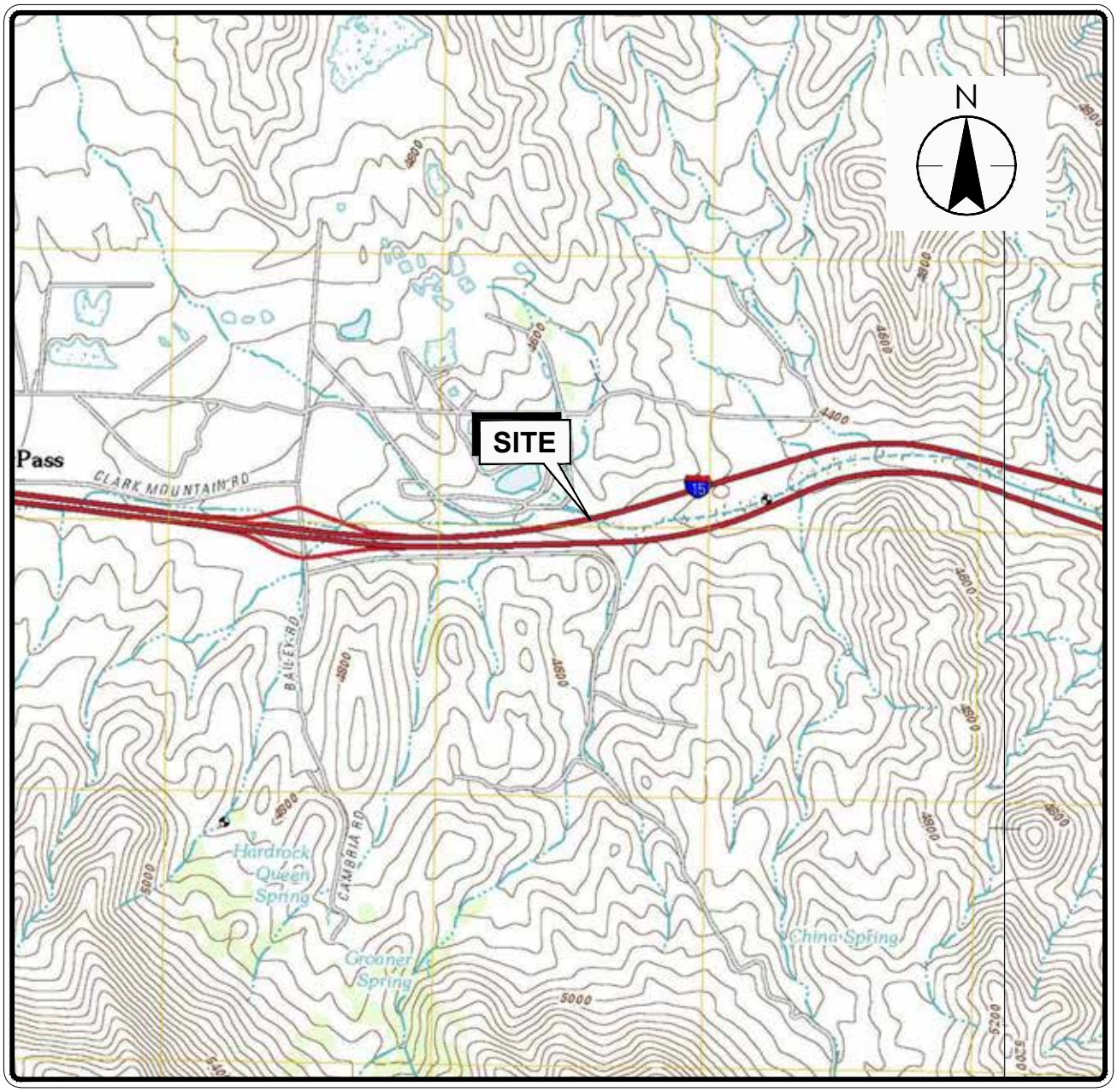
Sample ID	Sample Date	Sample Depth	Instrument		
			Pancake Detector (cpm)	µR Meter (µR/ hour)	1-Minute Integrated Count 2x2 NaI (cpm)
Cenda Ditch					
CD-SB-01-05	7/24/2014	5	125	20	19,919
CD-SB-02-05	7/24/2014	5	122	30	27,297
CD-SB-02-10	7/24/2014	10	139	29	26,161
CD-SB-03-05	7/24/2014	5	144	30	28,119
Wheaton Wash					
WW-SB-01-05	7/23/2014	5	117	18	18,037
WW-SB-01-10	7/23/2014	10	110	18	17,434
WW-SB-01-15	7/23/2014	15	122	19.5	17,823
WW-SB-01-20	7/23/2014	20	100	18.5	17,447
WW-SB-01-25	7/23/2014	25	123	19.5	17,659
WW-SB-01-30	7/23/2014	30	109	19	17,867
WW-SB-01-35	7/23/2014	35	121	17.5	17,435
WW-SB-01-40	7/23/2014	40	104	19	17,908
WW-SB-01-45	7/23/2014	45	99	19	17,844
WW-SB-01-50	7/23/2014	50	111	18	17,816
WW-SB-02-05	7/23/2014	5	103	18	16,064
WW-SB-02-10	7/23/2014	10	103	18	19,162
WW-SB-02-15	7/23/2014	15	105	18	18,217
WW-SB-02-20	7/23/2014	20	114	19	17,959
WW-SB-02-25	7/23/2014	25	11	19	17,285
WW-SB-02-30	7/23/2014	30	131	19	17,957
WW-SB-02-35	7/23/2014	35	112	18	17,579
WW-SB-02-40	7/23/2014	40	103	18	17,376
WW-SB-03-05	7/23/2014	5	109	16.5	17101
WW-SB-03-10	7/23/2014	10	105	17	17167
WW-SB-03-15	7/23/2014	15	122	16.5	17,038
WW-SB-03-20	7/23/2014	20	103	16	17,333
WW-SB-03-25	7/23/2014	25		16	17,107
WW-SB-03-30	7/23/2014	30	93	16.5	17,477
WW-SB-03-35	7/23/2014	35	95	17	17,336
WW-SB-03-40	7/23/2014	40	81	18	16,927
WW-SB-04-05	7/23/2014	5	100	19	17,664
WW-SB-04-10	7/23/2014	10	115	18	17,604
WW-SB-04-15	7/23/2014	15	124	19	17,667
WW-SB-04-20	7/23/2014	20	117	19	17,431
WW-SB-04-25	7/23/2014	25	116	20	17,541
WW-SB-04-30	7/23/2014	30	108	19.5	17,509
WW-SB-04-35	7/23/2014	35	115	19.5	17,607
WW-SB-04-40	7/23/2014	40	105	20	17,434
WW-SB-04-45	7/23/2014	45	106	20	17,741

TABLE 6 - SUMMARY OF INVESTIGATION DERIVED WASTE ANALYSIS
TPH/ PCBS/ VOCS/ TITLE 22 METALS
TO-17: CENDA DITCH BRIDGE AND WHEATON WASH BRIDGE
PROJECT NAME: 08-00000-4721
STANTECT PROJECT NUMBER: 185802873

		Total Petroleum Hydrocarbons by 8015M (mg/kg) (1)			Polychlorinated Biphenyls by 8082 (mg/kg) (1)	Volatile Organic Compounds By 8260B (ug/kg)	Metals by 6010B (mg/kg) (1)																7471A (mg/kg) (1)
California DTSC Waste Classification Thresholds		TPH-g	TPH-d	TPH-o	Various	Others	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Mercury
STLC (mg/L)		NA	NA	NA	NA	NA	15	5.0	100	0.75	1.0	5.0	80.0	25.0	5.0	350.0	20	1.0	5.0	7.0	24.0	250.0	0.2
10x STLC		NA	NA	NA	NA	NA	150	50	1,000	8	10	50	800	250	50	3,500	200	10	50	70	240	2,500	2.0
TTLC (Wet Weight)		NA	NA	NA	NA	NA	500	500	10,000	75	100	500	8,000	2,500	1,000	3,500	2,000	100	500	700	2,400	5,000	20
Sample ID	Sample Data																						
CD-Composite	7/24/2014	<0.050	<2.5	<10.0	<varies	<varies	<5.0	28	750	<1.0	2.4	33	8.6	13	50	<2.5	20	<5.0	<1.0	<5.0	60	38	0.12
WW-Composite	7/23/2014	<0.050	<2.5	<10.0	<varies	<varies	<5.0	20	920	<1.0	3.0	27	4.2	16	30	7.7	14	<5.0	<1.0	<5.0	48	42	<0.050

Notes:
NA - Not Available
< - Analyte not detected below detection limit
(1) - EPA Test Method

FIGURES



QUADRANGLE LOCATION

0 1000 2000

1 INCH = 2000 FEET

Reference: U.S.G.S., 2012 Mescal Range, California Quadrangle. 7.5–Minute Topographic Map.

Note: Coordinate system; NAD 83 California State Planes, Zone V (Ft).

CALTRANS TASK ORDER No. 17 SITE INVESTIGATION UNDER WHEATON WASH BRIDGE No. 54-0621L CENDA DITCH BRIDGE No. 54-0620L 08-SBD-15-PM 173.6/174 AND 171.8/172.4 PN: 08-00000-4721 (EA# 0M2801) CONTRACT 08A2047	PREPARED FOR: CALIFORNIA DEPARTMENT OF TRANSPORTATION, DISTRICT 8 464 WEST FOURTH STREET, 6TH FLOOR SAN BERNARDINO, CALIFORNIA 92401-1400	SITE LOCATION MAP CENDA DITCH	FIGURE: 1

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
185802873	RO	BV		09/24/2014

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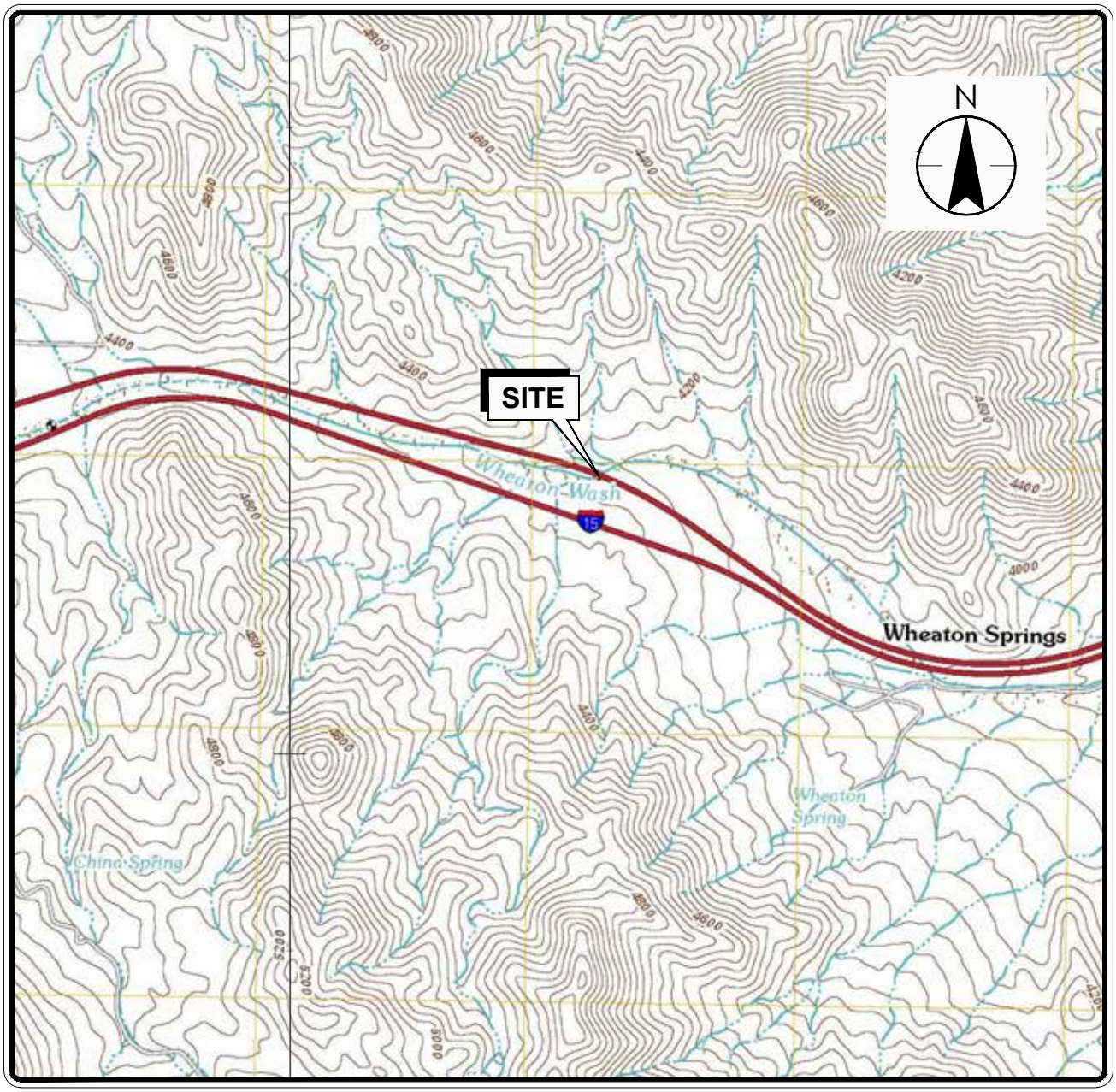

QUADRANGLE LOCATION

0 1000 2000

1 INCH = 2000 FEET

Reference: U.S.G.S., 2012 Mescal Range, California Quadrangle. 7.5–Minute Topographic Map.

Note: Coordinate system; NAD 83 California State Planes, Zone V (Ft).

CALTRANS TASK ORDER No. 17 SITE INVESTIGATION UNDER WHEATON WASH BRIDGE No. 54-0621L CENDA DITCH BRIDGE No. 54-0620L 08-SBD-15-PM 173.6/174 AND 171.8/172.4 PN: 08-00000-4721 (EA# 0M2801) CONTRACT 08A2047	PREPARED FOR: CALIFORNIA DEPARTMENT OF TRANSPORTATION, DISTRICT 8 464 WEST FOURTH STREET, 6TH FLOOR SAN BERNARDINO, CALIFORNIA 92401-1400	SITE LOCATION MAP WHEATON WASH	FIGURE: 2

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
185802873	RO	BV		09/24/2014

V:\2118\ACTIVE_CADD\GIS-US1331\PROJECTS 2014\OTHER OFFICES\REDLANDS\CALTRANS_TASK_NO_17\1-CALTRANS_T.O._17_WHEATON_WASH_FIG1_SITE_LOCATION_MAP_(USGS_2012).DWG
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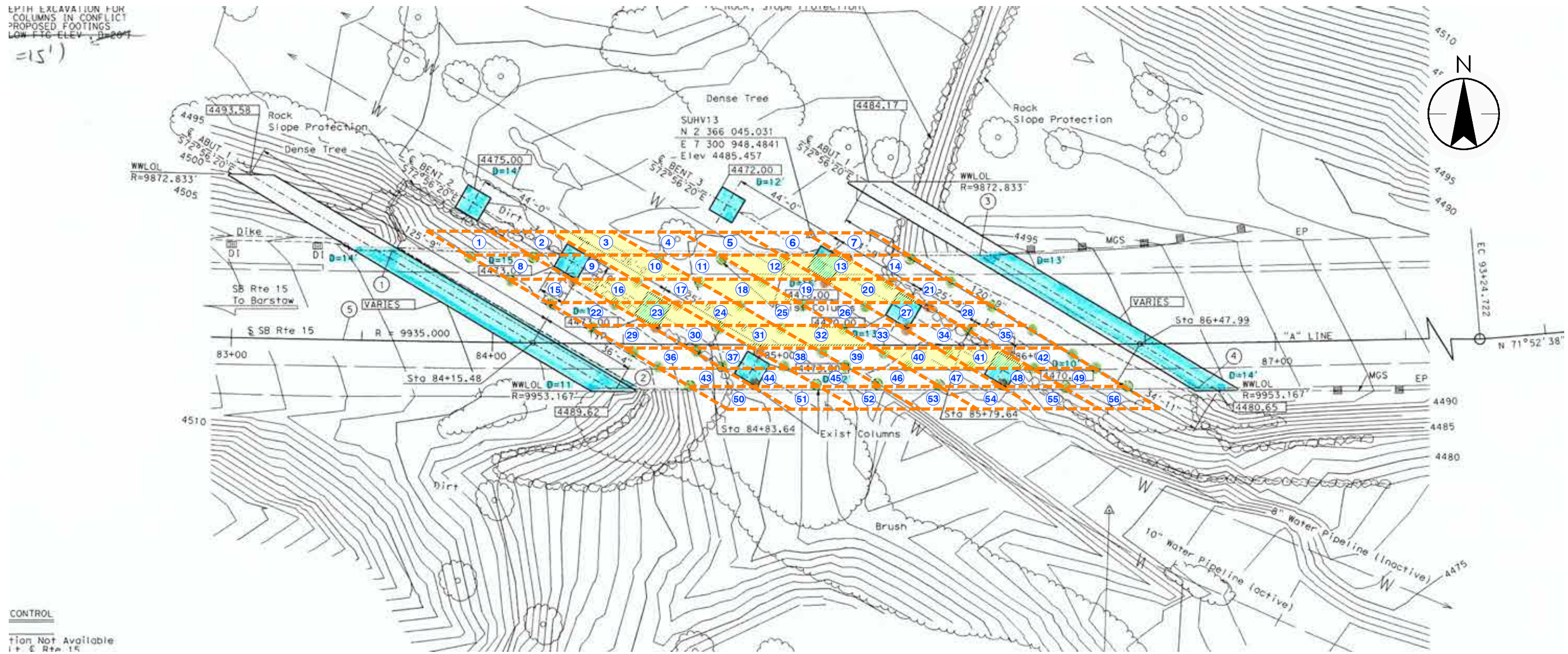

LEGEND:

GRID LINE

GRID CELL ID

SAMPLED CELL

0 40 80

APPROXIMATE SCALE IN FEET

Reference:
Base map provided by Caltrans.

CALTRANS TASK ORDER No. 17 SITE INVESTIGATION UNDER WHEATON WASH BRIDGE No. 54-0621L CENDA DITCH BRIDGE No. 54-0620L 08-SBD-15-PM 173.6/174 AND 171.8/172.4 PN: 08-00000-4721 (EA# 0M2801) CONTRACT 08A2047	PREPARED FOR: CALIFORNIA DEPARTMENT OF TRANSPORTATION, DISTRICT 8 464 WEST FOURTH STREET, 6TH FLOOR SAN BERNARDINO, CALIFORNIA 92401-1400	**CENDA DITCH SCANNING AND SAMPLING GRID**		FIGURE: **3**
JOB NUMBER: 185802873	DRAWN BY: RO	CHECKED BY: BV	APPROVED BY:	DATE: 09/24/2014

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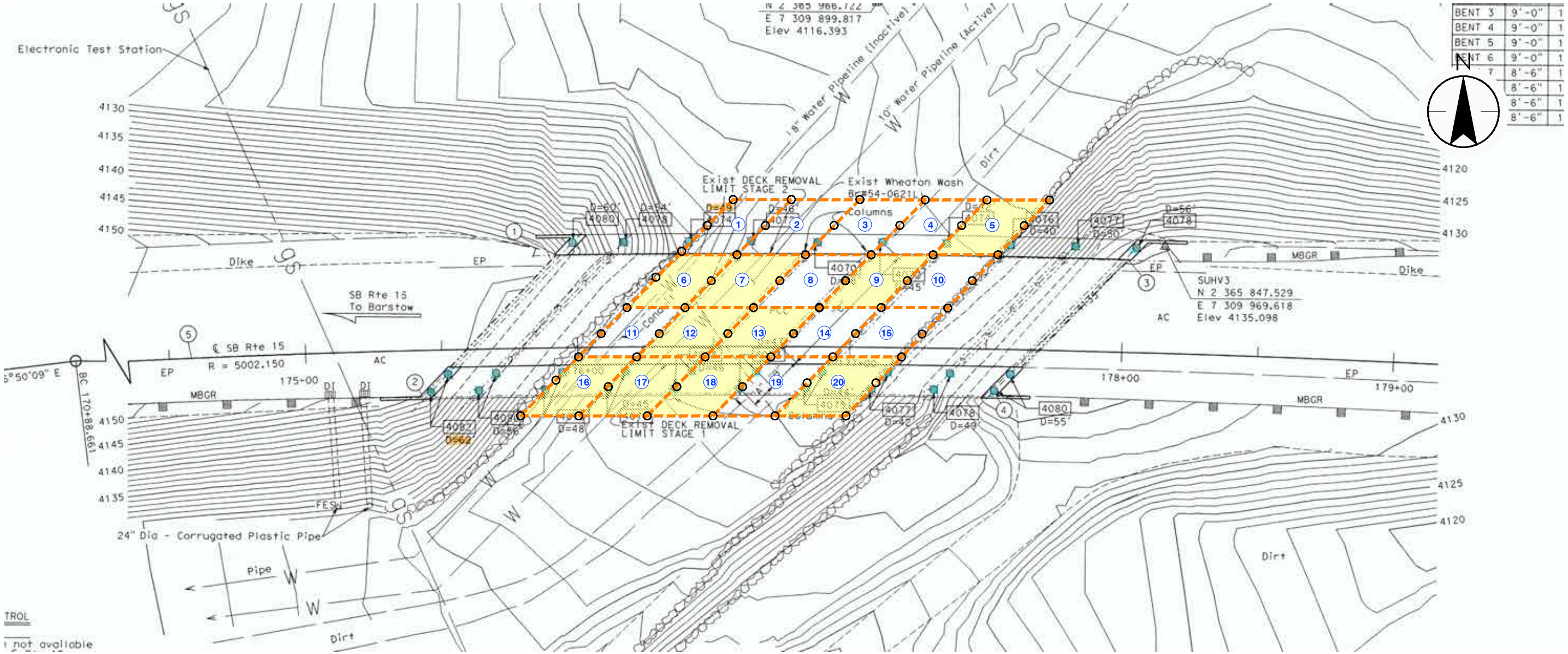

BENT 3	9'-0"	1
BENT 4	9'-0"	1
BENT 5	9'-0"	1
BENT 6	9'-0"	1
7	8'-6"	1
	8'-6"	1
	8'-6"	1
	8'-6"	1

LEGEND:

- GRID LINE
- (3) GRID CELL ID
- SAMPLED CELL

0 40 80

APPROXIMATE SCALE IN FEET

Reference:
Base map provided by Caltrans.

CALTRANS TASK ORDER No. 17 SITE INVESTIGATION UNDER WHEATON WASH BRIDGE No. 54-0621L CENDA DITCH BRIDGE No. 54-0620L 08-SBD-15-PM 173.6/174 AND 171.8/172.4 PN: 08-00000-4721 (EA# 0M2801) CONTRACT 08A2047	PREPARED FOR: CALIFORNIA DEPARTMENT OF TRANSPORTATION, DISTRICT 8 464 WEST FOURTH STREET, 6TH FLOOR SAN BERNARDINO, CALIFORNIA 92401-1400	**WHEATON WASH SCANNING AND SAMPLING GRID**	FIGURE: **4**

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
185802873	RO	BV		09/24/2014

FILEPATH:V:\2118\active_CADDIGIS-US1331\Projects 2014\other offices\Redlands\Caltrans_task_no_17\caltrans_t.o._17_wheaton_wash_(grid_samples).dwg | rocampo | Sep 30, 2014 at 16:09 | Layout: fig_2

LEGEND:

CD-SS-BKG-01 ●	APPROXIMATE SAMPLE LOCATION AND ID
CD-SB-01 ⊙	APPROXIMATE SOIL BORING LOCATION AND ID
▬ ▬ ▬ ▬	APPROXIMATE BACKGROUND SAMPLING GRID

Reference:
Google Earth Professional, Image dated 03/22/2013.

0 80 160
APPROXIMATE SCALE IN FEET

CALTRANS TASK ORDER No. 17	PREPARED FOR:	CENDA DITCH SOIL BORING LOCATIONS	FIGURE:
SITE INVESTIGATION UNDER WHEATON WASH BRIDGE No. 54-0621L CENDA DITCH BRIDGE No. 54-0620L 08-SBD-15-PM 173.6/174 AND 171.8/172.4 PN: 08-00000-4721 (EA# 0M2801) CONTRACT 08A2047	CALIFORNIA DEPARTMENT OF TRANSPORTATION, DISTRICT 8 464 WEST FOURTH STREET, 6TH FLOOR SAN BERNARDINO, CALIFORNIA 92401-1400		5

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
185802873	RO	BV		09/24/2014

FILEPATH:V:\2118\active_CADDIGIS-US1331\Projects 2014\other offices\Redlands\Caltrans_task_no_17\caltrans_t.o._17_cenda_ditch_(2010_acad).dwg|rocampo|Sep 30, 2014 at 15:58|Layout: fig_2

N

LEGEND:

WW-SS-BKG-01	APPROXIMATE SAMPLE LOCATION AND ID
WW-SB-01	APPROXIMATE SOIL BORING LOCATION AND ID
	BACKGROUND SAMPLING GRID

Reference:
Google Earth Professional.

0 80 160
APPROXIMATE SCALE IN FEET

CALTRANS TASK ORDER No. 17 SITE INVESTIGATION UNDER WHEATON WASH BRIDGE No. 54-0621L CENDA DITCH BRIDGE No. 54-0620L 08-SBD-15-PM 173.6/174 AND 171.8/172.4 PN: 08-00000-4721 (EA# 0M2801) CONTRACT 08A2047	PREPARED FOR: CALIFORNIA DEPARTMENT OF TRANSPORTATION, DISTRICT 8 464 WEST FOURTH STREET, 6TH FLOOR SAN BERNARDINO, CALIFORNIA 92401-1400	**WHEATON WASH SOIL BORING LOCATIONS**	FIGURE: **6**

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
185802873	RO	BV		09/24/2014

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APPENDIX A
HISTORICAL REPORTS

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Mr. George Meckfessel
Bureau of Land Management
1303 S. Highway 95
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ENVIRONMENTAL

Subject:
Submittal of Phase II & III Summary Report
Waste Water Discharge Pipeline Removal Project
Mountain Pass, California

Date:
June 13, 2012

Contact:
Mr. Allen C. Just, P.E.

Phone:
714.508.2677

Email:
Allen.Just@arcadis-us.com

Our ref:
B0047803.0000.00003

Dear Mr. Whalon:

On behalf of Chevron Environmental Management Company (CEMC), ARCADIS U.S., Inc. (ARCADIS) has prepared the enclosed *Phase II & III Summary Report* for the Waste Water Discharge Pipeline Removal project, located in Mountain Pass, San Bernardino County, California. This report documents the removal of approximately 9.8 miles of the pipeline that was used to convey waste water from the former Molycorp, Inc. Mine (currently operated by Molycorp Minerals LLC) to two evaporation pond facilities located within the Ivanpah Playa. The approximately 9.8 miles of pipeline was removed from the Bureau of Land Management and Molycorp Minerals LLC property between September 2010 and March 2012. The report also documents the removal of waste water pipescale and waste water-impacted soils.

Please let me know if you have any questions concerning this report.

Sincerely,

ARCADIS U.S., Inc.

Allen C. Just, P.E.
Principal Engineer

Copies:
David Burdette – NPS
Lawrence J. Whalon – NPS
Christy Hunter – Regional Board
Rebecca Jones – CADFG
Jeff Wong – CDPH-RHB

Brian P. Bergeron, CEMC
Robert Dover – AECOM
Michael Schierman – ERG
Scott Honan – Molycorp Minerals

Imagine the result

Chevron Environmental Management Company

Summary Report - Phase II & III Waste Water Discharge Pipeline Removal Project

Mountain Pass, California

June 2012

ARCADIS

REGISTERED PROFESSIONAL ENGINEER
ALLEN C. JUST
No. 57358
EXPIRES 12-31-13
CIVIL
STATE OF CALIFORNIA

Allen C. Just, P.E.
Principal Engineer

FOR

Andrew R. Johnson, P.E., CPESC
Staff Environmental Engineer

Summary Report - Phase II & III Waste Water Discharge Pipeline Report

Mountain Pass, California

Prepared for:
Chevron Environmental Management Company

Prepared by:
ARCADIS U.S., Inc.
320 Commerce, Suite 200
Irvine, California 92602
Tel 714 730 9052
Fax 714 730 9345

Our Ref.:
B0047803.0000.00003

Date:
June 13, 2012

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Executive Summary

Chevron Environmental Management Company (CEMC) completed Phase II and III of the Waste Water Discharge Pipeline Removal project between September 20, 2010 and March 17, 2012. The work was completed in general accordance with the May 8, 2001 *Pipeline Reclamation Plan* prepared by Clayton Group Services, Inc., and the March 13, 2007 *Decision Record* between the United States Department of Interior Bureau of Land Management and Molycorp, Inc., a wholly owned subsidiary of Chevron Corporation.

The remedial actions resulted in:

- Excavating and removing approximately 51,555 feet (9.8 miles) of waste water discharge pipeline (containing an estimated 85 tons of residual pipe scale).
- Excavating and removing approximately 4,665 feet (0.9 miles) of abandoned steel freshwater pipeline (roughly 1,835 feet of which was wrapped with a corrosion protection wrap containing asbestos).
- Excavating and removing approximately 1,056 tons (700 cubic yards) of impacted soil from United States Department of Interior Bureau of Land Management and Molycorp Minerals, LLC managed/owned properties.
- Eradicating (removing) approximately 2.7 acres of Desert Tamarisk, an invasive species, from the Wheaton Wash.
- Abandoning four groundwater monitoring wells located within Wheaton Wash.
- Repairing and/or replacing various sections of two fresh water steel pipelines (8 and 10 inches in diameter) owned by Molycorp Minerals, LLC.
- Restoring the pipeline right-of-way, which included re-seeding the disturbed area with native seeds, installing permanent storm water management controls using native rock along parts of the access road to control runoff, stabilize the access road, and protect the restored area.

All Phase II and III activities were conducted under the supervision of BLM representatives. The removed waste water discharge pipeline and impacted soils were properly managed and transported to a CEMC-approved disposal facility.

1. Introduction

ARCADIS U.S., Inc. (ARCADIS), on behalf of Chevron Environmental Management Company (CEMC), has prepared this *Phase II & III Summary Report – Waste Water Discharge Pipeline Removal Project,* covering the excavation and removal of approximately 9.8 miles of waste water discharge pipeline near Mountain Pass, San Bernardino County, California (Figure 1). The pipeline, constructed of high density polyethylene (HDPE), was used by Molycorp, Inc. (Molycorp) to convey process waste water from the Mountain Pass Mine to two evaporation ponds located within the Ivanpah Playa, referred to as the Old Ivanpah Evaporation Ponds (OIEP) and the New Ivanpah Evaporation Ponds (NIEP) (Figure 2). Pipeline removals, soil removals, and right-of-way (ROW) restoration activities were completed in general accordance with the following documents:

- United States Department of Interior Bureau of Land Management (BLM) *Decision Record* dated March 13, 2007;
- California Department of Fish and Game (CDFG) *Streambed Alteration Permit* issued on February 25, 2008;
- United States Fish and Wildlife Service (USFWS) *Biological Opinion* dated June 5, 2006;
- California Regional Water Quality Control Board (CRWQCB) site-specific *Storm Water Pollution Prevention Plans* (SWPPP) for Phase II and Phase III dated June 2010 and March 2011, respectively; and
- California Department of Public Health (CDPH) Radiological Health Branch (RHB) *Radioactive Materials License* (RML) Number 7747-36.

Excavation and removal of the waste water discharge pipeline and associated restoration actions was divided into three phases, based on the primary land stakeholder and sequencing. The three project phases are as follows:

Phase I

- Primary Land Stakeholders: National Park Services (NPS) and Molycorp Minerals, LLC (current operator of the mine).

- Start Point: NPS property boundary for the Mojave National Preserve located within the Wheaton Springs Wash on the south side of Wheaton Springs Bridge (Figure 3).
- End Point: Molycorp Minerals, LLC property near the intersections of Nipton and Ivanpah Roads (Figure 3).
- Approximate Distance: 5 miles.

Phase II

- Primary Land Stakeholders: BLM and Molycorp Minerals, LLC.
- Start Point: Molycorp Minerals, LLC mine located on Bailey Road in Mountain Pass, California (Figure 4).
- End Point: Wheaton Springs Wash at the Wheaton Springs Bridge (Figure 4).
- Approximate Distance: 3.7 miles.

Phase III

- Primary Land Stakeholders: BLM and Molycorp Minerals, LLC.
- Start Point: Molycorp Minerals, LLC property near the intersection of Nipton and Ivanpah Roads (Figure 5).
- Intermediate Point: OIEP owned by Chevron Mining Inc. (CMI), which was the discharge point for the wastewater pipeline between 1980 and 1987 (Figure 5).
- End Point: CMI's NIEP, which was the discharge point for the wastewater pipeline between 1987 and 1998 (see Figure 5).
- Approximate Distance: 6.1 miles.

The purpose of this report is to provide further documentation on Phase II and III actions, which included excavating and removing the waste water discharge pipeline,

excavating and removing soil impacted by scale containing naturally occurring radioactive materials (NORM), removing abandoned fresh water steel pipelines, and pipeline ROW restoration actions. This summary report supplements the information previously provided in weekly email updates and Soil Removal Plans prepared and submitted by ARCADIS on behalf of CEMC.

The remainder of the report includes a discussion of the following:

- Project Team and Roles;
- Project Initiation;
- Regulatory Agency Oversight;
- *Decision Record* Minor Modifications/Clarifications;
- Phase II & III Pipeline Removal Activities;
- Phase II & III Soil Sampling and Results;
- Phase II & III Impacted Soil Removal Actions;
- Phase II Desert Tamarisk Removal Actions;
- Phase II Freshwater Pipeline Section Upgrades and Replacement;
- Phase II Groundwater Monitoring Well Abandonment;
- Phase II & III Waste Characterization and Management; and
- Phase II & III Biological/Restoration Activities.

2. Project Team and Roles

ARCADIS project team consisted of six companies and typically 15 crew members in the field on a daily basis (Monday through Thursday). Although not discussed in detail, CMI was part of the project team, as CMI delegated their responsibilities on the project to CEMC. Below is a brief description of the project team and their role on the project.

1.) **Chevron Environmental Management Company (CEMC):** CEMC, at CMI's request, is managing CMI's retained environmental liabilities on and off of the Mountain Pass Mine.

2.) **ARCADIS U.S., Inc. (ARCADIS):** ARCADIS managed the project on behalf of CEMC, and provided day-to-day project management, health and safety oversight, documentation and recordkeeping, an onsite Field Contact Representative (FCR), and a biological monitor(s). At least two ARCADIS project members (an FCR and a biological monitor) were onsite at all times during the field activities.

ARCADIS' responsibilities included:

- Primary contact for the interested parties;
- Submittal of weekly updates to the interested parties;
- Assisting with daily tailgate safety meetings;
- Assisting with project scheduling and management of field operations;
- Providing project-related training;
- Communicated the permit requirements to team members;
- Provided a biological monitor(s) to support the Authorized Biologist's activities described under Section 4 below;
- Directing the sampling and analysis of potentially impacted areas;
- Preparing Soil Removal Plans based on soil sample results;

- Ensuring compliance of SWPPP permit requirements;

- Tamarisk removal operations conducted in Wheaton Wash during Phase II by ARCADIS' subcontractor, RDM Environmental (RDM);

- Asbestos abatement activities on abandoned fresh water pipelines and Molycorp Minerals, LLC-owned freshwater pipelines present in Wheaton Wash during Phase II by ARCADIS' subcontractor, American Technologies, Inc. (ATI);

- Well abandonment activities in Wheaton Wash during Phase II by ARCADIS' subcontractor, Cascade Drilling, L.P. (Cascade);

- Properly managing the project-derived waste streams (waste profile development, preparation of disposal notification packages, coordination with transporters and disposal facilities); and

- Preparing a summary report detailing the results of the pipeline removals, remedial actions, and pipeline ROW restoration.

3.) **Sturgeon Services International, Inc. (SSI):** SSI, a California-licensed general contractor, under contract to CEMC, excavated, removed and processed the waste water discharge pipeline, abandoned steel fresh water pipelines, and excavated and removed identified impacted soil. SSI provided the necessary personnel (typically nine onsite staff) and equipment to complete the pipeline removal project.

SSI's responsibilities included:

- Delineation of work area using t-posts and orange snow fencing;

- Trenching and exposing pipeline(s) using an excavator or backhoe;

- Dust suppression during ground disturbing activities using a water truck;

- Cutting and processing the pipeline into approximately 14.5 foot long segments using a backhoe with a hydraulic shear attachment;

- Loading pipe segments into lined and covered roll-off bins;
- Backfilling and re-grading activities using a loader;
- Performing soil removal activities using an excavator or other equipment in accordance with agency approved Soil Removal Plans;
- Installation and maintenance of stormwater best management practices (BMP's) per the SWPPP;
- Installation, repair, and maintenance activities on sections of Molycorp Minerals, LLC's freshwater pipelines;
- Assisting ATI with asbestos abatement activities for freshwater steel pipelines and abandoned pipelines; and
- Assisting Cascade with well abandonment activities.

4.) **Environmental Restoration Group, Inc. (ERG):** ERG, under contract to ARCADIS, provided radiological safety oversight and support services to ensure compliance with the RML and the project's Radiation Protection Plan (RPP). Two project members were onsite at all times during the field activities.

ERG's responsibilities included:

- Providing a Radiation Safety Officer (RSO) who is responsible for RML and RPP compliance;
- Radiation safety monitoring, including delineation of the exclusion zone (EZ), access control, and personnel and equipment surveys (i.e., scanning all personnel and equipment prior to leaving the EZ);
- Developing and implementing an air monitoring program, including personal lapel sampler distribution, filter collection, filter counting, and data analysis and management;
- Conducting external dose monitoring program using Optically Stimulated Luminescent (OSL) dosimeters;

- Performing geographic positioning system (GPS) gamma surveys of trenches and spoil piles exposed during excavation and comparing results to project action levels;

- Scanning every segment of wastewater pipeline removed and recording pipescale content and any noteworthy differences, if any;

- Conducting exposure rate surveys of bin storage areas;

- Conducting surface contamination surveys of ERG work/break/office areas;

- Managing radiological equipment, including daily pre- and post-work operational checks, control charting, maintenance, and change out;

- Performing radiological tasks involved in all shipments of pipe, pipescale and soil in accordance with U.S. Department of Transportation (DOT) requirements, including conducting surveys of trucks laden with radioactive materials, preparation of waste manifests; and shipping pipescale and soil samples to analytical laboratories;

- Conducting routine inspections of project records generated from the site;

- Performing independent As Low As Is Reasonably Achievable (ALARA) audits of the RPP;

- Providing subject matter expertise on radiation issues when needed or required; and

- Providing recommendation on proper disposition of various materials depending on radiological components and amounts.

5.) **Southern Nevada Environmental, Inc. (SNEI):** SNEI, under contract to ARCADIS, provided an Authorized Biologist, approved by USFWS and BLM, to ensure compliance with the various permit requirements related to the desert tortoise, and other protected plants and animals. One Authorized Biologist was onsite at all times.

SNEI's responsibilities included:

- Biological oversight during all ground-disturbing activities;
- Biological clearance surveys to identify protected plants and animals prior to and during construction activities per the permit requirements;
- Transplanting protected plants when necessary;
- Implementing all aspects of desert tortoise mitigation measures as outlined in the permits, including identification of tortoise burrows, handling and relocating tortoise (if necessary), documentation, and reporting;
- Prepare desert tortoise sighting reports (location, size, health, behavior, etc.) for submission to CFDG and the California Natural Diversity Database (CNDDB);
- Assisting with avian surveys during the nesting bird season;
- Assisting with vehicle escorts for heavy equipment and trucks;
- Providing biological training, including "Desert Tortoise Awareness", to all crew members and site visitors; and
- Preparing weekly biological monitoring updates (e.g. transplant information, desert tortoise encounters, etc.).

6.) **AECOM:** AECOM was the environmental consulting firm selected to represent the agency stakeholders, primarily the BLM and NPS. At a minimum, one AECOM member (i.e., agency representative) was onsite at all times to ensure compliance with all agency permit requirements.

AECOM's responsibilities included:

- Providing input to improve the pipeline removal process;
- Assisting to resolve non-routine issues;

- Observing and documenting the field activities for the BLM;
- Collecting split soil samples at an approximate rate of 10% and submitting them to an agency-approved analytical laboratory;
- Working with ARCADIS to develop and secure agency approval for minor procedural modifications to the *Decision Record*;
- Reviewing and approving Soil Removal Plans on behalf of the agencies;
- Providing recommendations to the agencies with respect to closure of wastewater-impacted soils; and
- Preparing a summary report.

3. Project Initiation

Prior to beginning Phase II and Phase III, CEMC conducted kick-off meetings on September 20, 2010, and March 10, 2011, respectively, to provide health and safety, radiation awareness, cultural resources awareness, SWPPP, and biological and desert tortoise training; review BLM permit requirements outlined in the *Decision Record;* review safety procedures and processes; review Molycorp Minerals, LLC., and Mine Safety and Health Administration (MSHA) requirements (for Phase II); and, review "lessons learned" from each phase.

Pre-construction surveys were conducted along the pipeline ROW before each phase to identify protected plant and animal species. All native desert riparian trees, cactus, and desert tortoise burrows were recorded using GPS, flagged for avoidance, and communicated to agency and project personnel. In addition, elevated areas of surface radioactivity were identified from the 2008 GPS-based gamma survey of the pipeline ROW. Field personnel inspected each of the areas, in preparation for the construction crew. The elevated readings areas occurred primarily where the pipeline was exposed at or near the ground surface due to surface water erosion; the exceptions were flagged for avoidance until the construction crew arrived.

Appropriate notifications to all agencies were provided in accordance with the permit requirements.

4. Agency Oversight

As stated previously, at least one agency representative from AECOM was onsite at all times during field activities to ensure compliance with all agency requirements. ARCADIS, on behalf of CEMC, provided weekly e-mail updates to all interested parties throughout each phase of the pipeline removal project. CEMC also requested that an agency representative be onsite for the sections of waste water discharge pipeline that crossed private property owned by Molycorp Minerals, LLC. This included a 0.8 mile section during Phase II and a 1.0 mile section during Phase III.

BLM staff also conducted site inspections toward the end of the two project phases. Mr. George Meckfessel, Planning and Environmental Coordinator for the BLM, inspected the Phase II work area on January 26, 2011 and the Phase III work area on April 5, 2012 to make final recommendations prior to completion. Any remaining concerns were addressed at that time by CEMC.

5. Minor Modifications/Clarifications

Minor modifications/clarifications to the BLM *Decision Record* were proposed by CEMC and approved by the BLM prior to commencing work. The purpose of the minor modifications was to allow for safer work practices, increased efficiency, and to address unforeseen project conditions that were not considered during the preparation of the Work Plan. The following modifications/clarifications were approved and are included under Appendix A:

#1 – Utilize Caltrans Right-Of-Way as Additional Access Road

#2 – Work with Lengths of Pipe Shorter than 40 feet

#3 – Use of Steel Containment to Contain Waste and Liquids

#4 – Use of New Ivanpah Evaporation Pond (NIEP) as Staging Area

#5 – Checking Pipeline for Liquids Daily

#6 – Daily Capping of Exposed Pipeline Section

#7 – Loading, Transportation, and Storage of Removed Pipe Sections

#8 – Default Background Radiation Levels

#9 – Use of Hydraulic Cutting Device to Cut Pipe Sections

#10 – Use of Additional Staging Areas

#11 – Use of Track Mounted Excavator

#12 – Open Trenches

#13 – Temporary Exclusion Fencing

#14 – Procedures for Pipeline Removal

#15 – Additional Staging Area at the OIEP

#16 – Use of Turnaround / Designated Parking Areas

#17 – Temporary Use of Existing Access Route (ROW Grant No. CA40948)

#18 – Road Improvements to Re-establish Drainage Patterns

6. Phase II & III Waste Water Discharge Pipeline Removals

Phase II

Phase II project activities began on September 20, 2010 and were completed on April 28, 2011. During this time, approximately 19,460 feet (3.7 miles) of waste water discharge pipeline was excavated and removed from properties managed/owned by BLM and Molycorp Minerals, LLC. This total includes: roughly 11,730 feet of 8 inch diameter pipe; roughly 7,355 feet of 6 inch diameter pipe; roughly 70 feet of 4 inch diameter pipe; and roughly 305 feet of 2 inch diameter pipe. As part of pipeline removals, approximately 61 tons of residual pipescale (contained within the pipeline) was properly managed.

During Phase II, roughly 4,665 feet (0.9 miles) of abandoned steel freshwater pipeline (4, 6, and 8 inches in diameter) was removed from land owned/managed by BLM and Molycorp Minerals, LLC. All abandoned steel pipelines were scanned for indications of gamma radiation, using a Ludlum Model 2 inch by 2 inch sodium iodide detector. No elevated levels of gamma radiation were observed. Based on process knowledge and these scans, the abandoned steel pipes were determined to be free of pipescale-related radioactivity and removed from the pipeline ROW. The corrosion protection wrap present on the pipelines was sampled for the presence of asbestos. Approximately 1,835 feet of steel pipe was wrapped with asbestos containing material (ACM), while the remaining 2,830 feet did not contain ACM.

The waste water discharge pipeline was exposed using a track-mounted excavator equipped with a relatively narrow bucket (2 feet wide). In an effort to minimize disturbance to BLM land, only one side of the pipeline and along the top of the pipeline was exposed. Although the permits allowed for disturbing the full width of the pipeline ROW (50 feet), pipeline removal activities were typically kept within a 20-foot wide disturbance area, and every effort was made to protect and avoid the desert tortoise burrows and native vegetation.

Phase III

Phase III project activities began on March 24, 2011 and were completed on March 14, 2012. During this time, approximately 32,095 feet (6.1 miles) of waste water discharge pipeline was excavated and removed from properties managed/owned by BLM and Molycorp Minerals, LLC. This total includes: roughly 28,085 feet of 8 inch diameter pipe; roughly 3,995 feet of 6 inch diameter pipe; and roughly 15 feet of 2 inch diameter

pipe. As part of pipeline removals, approximately 24 tons of residual pipescale and approximately 68,000 gallons of residual wastewater (both contained within the pipeline) were properly managed. No freshwater pipelines or abandoned steel pipelines were present in the pipeline ROW.

During Phase III, the waste water discharge pipeline was exposed using a mini track-mounted excavator equipped with a relatively narrow bucket (1.5 feet wide). Consistent with Phase II, only one side and the top of the pipeline were exposed in an effort to minimize disturbance to critical desert tortoise habitat on land owned/managed by BLM and Molycorp Minerals, LLC. Since the pipeline was typically located on the one side of the ROW access road, operations were sequenced such that the spoil piles could be placed on the road to avoid disturbing habitat. Although the permits allowed for disturbing the full width of the pipeline ROW (50 feet), pipeline removal activities were typically kept within a 10-foot wide disturbance area, and every effort was made to protect and avoid the desert tortoise burrows and native vegetation.

7. Phase II & III Soil Sampling and Results

Per the BLM *Decision Record*, there were three scenarios that triggered collecting soil samples at a given location: (1) an area where a suspected pipe repair or repairs may have occurred; (2) elevated radiological readings were recorded, emanating from soils in or adjacent to the pipeline removal trench; or, (3) visible pipe scale was observed in soils in or adjacent to the pipeline removal trench.

Phase II

Forty-two locations were identified during Phase II pipeline removal activities that required sampling and analysis. This included 16 pipe repair locations, 14 abandoned pipe sections (i.e., relatively short sections [<50 feet in length] of pipe that were encountered in close proximity to the waste discharge pipeline), seven locations exhibiting elevated radiological readings, and five vent locations. These findings resulted in a total of 42 "trench locations" that were sampled accordingly to determine potential impacts (Figure 6). Sample results for each trench are summarized in Table 1A.

Seventeen of the 42 trenches required soil removals (Trench #2, Trench #9, Trench #16, Trench #17, Trench #20, Trench #22, Trench #24, Trench #25, Trench #26, Trench #27, Trench #28, Trench #31, Trench #32, Trench #33, Trench #35, Trench #39, and Trench #41). The remaining 25 trenches were determined not to be impacted and were backfilled and closed-out. Soil removal activities are summarized in the next section.

Phase III

Thirty-one locations were identified during Phase III pipeline removal activities that required sampling and analysis. This included 22 pipe repair locations, four locations exhibiting elevated radiological readings, four vent locations, and one location at the endpoint of the pipeline at the NIEP. These findings resulted in a total of 31 "trench locations" that were sampled accordingly to determine potential impacts (Figure 7). Sample results for each trench are summarized in Table 1B.

Ten of the 31 trenches required soil removals (Trench #4, Trench #8, Trench #14, Trench #15, Trench #18, Trench #19, Trench #20, Trench #21, Trench #26, and Trench #30). The remaining 21 trenches were determined not to be impacted and

were backfilled and closed-out. Soil removal activities are summarized in the next section.

8. Phase II & III Soil Removal Actions

Remedial actions (soil removals) were performed at locations along the pipeline removal route exhibiting elevated radiological readings (above background levels), and where chemical analysis of collected soil samples indicated a cerium to lanthanum (Ce/La) ratio below 1.4. Based on an extensive data set obtained during earlier remedial actions along the pipeline ROW, a relatively low Ce/La ratio (<1.4) suggested that identified impacts were the result of a release of waste water from the pipeline and not from naturally occurring host rock or from weathering of host rock over time.

Phase II

Between September 20, 2010 and April 28, 2011, approximately 677 tons (451 cubic yards) of impacted soil was removed from the pipeline ROW. Soil removal activities occurred at 17 locations - see below. The list is arranged from greatest volume of soil removed (Trench #20) to the least volume of soil removed (Trenches #28 & #31).

- Trench #20 - 203.97 tons
- Trench #39 - 85.05 tons
- Trench #2 - 79.12 tons
- Trench #17 - 74.40 tons
- Trench #35 - 52.34 tons
- Trench #27 - 36.24 tons
- Trench #41 - 27.73 tons
- Trench #25 - 27.33 tons
- Trench #16 - 23.23 tons
- Trench #26 - 21.80 tons
- Trench #9 - 11.22 tons

- Trench #22 - 10.57 tons
- Trench #24 - 5.23 tons
- Trench #32 - 5.15 tons
- Trench #33 - 5.15 tons
- Trench #28 - 4.25 tons
- Trench #31 - 4.25 tons

Details, including bin ID's, removal dates, and the volume of soil removed are presented in Table 2A. As stated previously, the Phase II Trench locations are shown on Figure 6.

It should be noted that Trench #2, located on Molycorp Minerals, LLC property, was the only trench that was not closed out (identified impacted soils not fully removed). Trench #2 is located topographically downgradient of several active and closed impoundments located at the Mountain Pass Mine. Additionally, there is a surface depression trending southeast from former sewage lagoon P-19 toward Trench #2.

Approximately 80 tons of impacted soil was excavated and removed from Trench #2 during repeated remedial actions – see below. Additionally, five exploratory excavations (potholes) were advanced around Trench #2 to identify the limits of soil impact.

During remedial actions, groundwater was observed seeping into the excavation at about 4 feet below grade. The groundwater was assumed to be leakage from the upslope impoundments that was flowing across the soil-bedrock interface encountered at approximately 4 to 6 feet below grade.

Based on the obtained field and laboratory results, it appears that the impacts detected northwest and southeast of Trench #2 are not associated with discharges from the waste water pipeline, but are associated with impacted groundwater migrating down slope from the mine impoundments along the top of the soil-bedrock interface. CEMC requested that no further action be required for Trench #2 as part of the wastewater pipeline removal project. The CRWQCB and BLM concurred with the assessment and granted CEMC approval to backfill and close-out Trench #2. The CRWQCB

subsequently notified Molycorp Minerals, LLC, via e-mail, on June 28, 2011 that they needed to include Trench #2 in their soils Site Investigation (SI) cleanup work plan as an area of concern and that the work would fall under the Cleanup and Abatement Order for the Mountain Pass Mine site.

A summary of the remediation activities completed at Trench #2 between October 2010 and May 2011 are presented below.

- October 21, 2010 – five soil samples collected from Trench #2 and three soil samples collected from stockpiled soils. The sample Ce/La ratios ranged from 1.1 to 1.5.

- November 29 and 30, 2010 – approximately 53 tons of soil was excavated and 12 confirmation soil samples were collected. The sample Ce/La ratios ranged from 0.5 to 2.2.

- February 10, 2011 – approximately 26 tons of soil was excavated and five confirmation soil samples were collected. The Ce/La sample ratios ranged from 0.2 to 1.3. Samples C0003 and C0005 had Ce/La ratios of 0.2, which is exceptionally low.

- May 26, 2011 – advanced five exploratory excavations (potholes) to identify limits of impacted soil: Potholes #1 and #2 - located southeast (downgradient) of Trench #2; and, Potholes #3, #4, and #5 - located northwest (upgradient) of Trench #2. Attempted to collect soil samples at the approximate depths of 3 and 6 feet below grade from each pothole. Bedrock encountered at roughly 4 feet at Pothole #2. Soil samples were subsequently collected at the soil-bedrock interface and at a location approximately 3 feet to the north of Pothole #2 at approximately 5 feet below grade (soil-bedrock interface). Sample Ce/La ratios ranged from 0.4 to 7.4. Soil samples P007 and P009 were collected at approximately 6 feet below grade had Ce/La ratios of 0.4 (Table 1A).

Phase III

Between March 24, 2011 and March 14, 2012, approximately 379 tons (253 cubic yards) of impacted soil was removed from the pipeline ROW. Soil removal activities occurred at 10 trench locations - see below. The list is arranged from the greatest volume of soil removed (Trench #4) to the least volume of soil removed (Trench #26).

- Trench #4 - 157.55 tons
- Trench #30 - 58.13 tons
- Trench #14 - 42.47 tons
- Trench #18 - 30.38 tons
- Trench #15 - 29.90 tons
- Trench #8 - 20.97 tons
- Trench #19 - 15.78 tons
- Trench #21 - 8.59 tons
- Trench #20 - 7.84 tons
- Trench #26 - 7.10 tons

Details, including bin ID's, removal dates, and the volume of soil removed are presented in Table 2B. The Phase III Trench locations are shown on Figure 7.

9. Phase II Freshwater Pipeline Section Upgrades and Replacement

CEMC, on behalf of Molycorp Minerals, LLC, completed work on two freshwater pipelines in general accordance with the Work Plan. The two pipelines are 8 inches and 10 inches in diameter, respectively, and were co-located with the waste water discharge pipeline in the same ROW. The pipelines, each approximately 9 miles in length, connect the Mountain Pass Mine to a series of water supply wells owned by Molycorp Minerals, LLC located on the west and east side of Ivanpah Road near Nipton Road. Two Booster Stations (Booster Station #1 and Booster Station #2), also owned by Molycorp Minerals, LLC, are used to pump the water from the supply wells to the mine. The pipelines were inactive at the time the work was completed, but Molycorp Minerals, LLC intends to use them in the future when they expand operations at the mine.

The following information presents a summary of CEMC's work completed on the two freshwater pipelines located in Wheaton Wash as part of Phase II of the project.

8 inch Pipeline

- Abated asbestos containing corrosion protection wrap from approximately 1,165 linear feet of pipe.
- Coated approximately 900 linear feet of pipe with nano-marine armor.
- Re-wrapped approximately 100 linear feet of pipe with canusa wrap.
- Removed approximately 500 linear feet of degraded steel pipe between Bridges #1 and #2 (one section was 325 feet in length, the other 175 feet in length).
- Installed approximately 500 linear feet of new HDPE pipe at the locations where the degraded steel pipe was removed (one section was 325 feet in length, the other 175 feet in length) (Figure 8).
- Installed approximately 240 linear feet of new steel pipe under Bridge #3 (Figure 8). This section of pipeline had been previously removed during the Caltrans Interstate 15 (I-15) project.
- Reburied approximately 2,070 linear feet of pipe.
- Repaired three elbow joints. Each elbow consisted of two welds (six welds total). Repair work included cutting the original mitered connections, inserting pre-cast elbows, then welding the sections back together.

- Provided engineering oversight and biological monitoring to comply with the BLM requirements.

10-inch Pipeline

- Removed degraded plastic coating from approximately 2,170 linear feet of pipe.
- Coated approximately 2,170 linear feet of pipe with nano-marine armor.
- Reburied approximately 2,170 linear feet of pipe.
- Installed approximately 340 linear feet of new HDPE pipe under Bridge #3 (Figure 8). This section of pipeline had been previously removed during the Caltrans I-15 project.
- Repaired three elbow joints. Each elbow consisted of two welds (six welds total). Repair work included cutting the original mitered connections, inserting pre-cast elbows, then welding the sections back together.
- Provided engineering oversight and biological monitoring to comply with the BLM requirements.

10. Phase II Desert Tamarisk Removal Actions

As part of Phase II project work, CEMC agreed to eradicate approximately 2.7-acres of Desert Tamarisk (tamarisk), an invasive plant species, located in Wheaton Wash east of Bridge #1 (Figure 9). The removal actions were conducted twice by ARCADIS' subcontractor, RDM. The first removal operation was completed between March 22, 2010 and March 29, 2010 (2010 removal). The second removal operation was completed between June 16, 2011 and June 17, 2011 (2011 removal).

Prior to commencing work, ARCADIS conducted biological surveys for nesting birds, desert tortoise, riparian trees, cactus, and any other sensitive species. There were no tortoises or nesting birds observed in the area and any cactus or riparian trees were flagged for avoidance. Equipment included two excavators, a water truck, a roller/compactor, eight dump trucks, and a skid loader. Removal operations consisted of pulling the tamarisk out of the ground (and removing the root system when possible) using the excavators and loading them into the dump trucks for disposal at either the Mountain Pass Mine or the OIEP. Project oversight, biological monitoring during ground disturbing activities, and vehicle escorts were provided by ARCADIS.

During the 2010 removal, 115 truckloads of tamarisk was removed from Wheaton Wash and transported to the Mountain Pass Mine open pit to be burned by Molycorp Minerals, LLC at a later date. During the 2011 removal, the goal was to remove tamarisk that re-sprouted in the area and remove other invasive species such as Russian thistle (tumbleweed) that were beginning to become established in the area. Approximately eight truckloads of tamarisk were removed and transported to CMI's OIEP to be buried in a disposal cell during the site maintenance activities completed in September 2011. The area was then graded using a skid loader to remove the Russian thistle and any smaller tamarisk plants.

11. Phase II Groundwater Monitoring Well Abandonment

Five groundwater monitoring wells (Well B, C, D, F, and SRK-21) located within Wheaton Wash between Bridges #1 and #2 were scheduled for abandonment per the Work Plan. CEMC properly abandoned four of these wells (B, D, F, and SRK-21) in May 2010, but was unable to locate well C. A small amount of concrete debris was discovered in the area of well C, which may indicate that it was previously destroyed.

Prior to commencing work, ARCADIS secured well abandonment permits from San Bernardino County and contracted Cascade, a California-licensed drilling company, to perform the work. The wells were constructed of metal and/or polyvinyl chloride (PVC) casing with depths ranging from 10 to 15 feet below ground surface (bgs). The well casings and concrete were removed from the ground and the holes were backfilled with native soil because they are located within an active stormwater wash (Wheaton Wash). Copies of the well abandonment permits are included under Appendix C.

12. Phase II & III Waste Characterization and Management

Project-derived waste included two primary waste streams: (1) HDPE pipe and residual pipescale; and (2) soil and residual pipescale. Waste profiles were developed for the Phase II and III waste streams, and were approved by US Ecology, Inc. (US Ecology) for disposal at their Beatty, Nevada facility or their Grand View, Idaho facility (Attachment B). The Beatty, Nevada facility accepts wastes containing radium-226 concentrations of up to 5 picocuries per gram (pCi/g). The Grand View, Idaho facility accepts wastes containing radium-226 concentrations that average below 500 pCi/g over the conveyance.

Prior to shipment, the waste in each roll-off bin was characterized by collecting one composite sample of either soil and residual pipescale, or residual pipescale from the waste water discharge pipeline. The samples were relinquished to ALS Group, located in Fort Collins, Colorado, and analyzed for the following:

- Total ICP-MS Metals by Environmental Protection Agency (EPA) Method SW6020A;
- Total Mercury by EPA Method SW7471A;
- Radium-226 by EPA Method E901.1M;
- Radium-228 by EPA Method E901.1M;
- Isotopic Thorium (Th) by Alpha Spectroscopy (PAI 714 Rev 11);
- Isotopic Uranium (U) by Alpha Spectroscopy (PAI 714 Rev 11);
- TCLP Barium (Ba) by EPA Methods SW13111/SW6010B/SW7470A; and
- TCLP Lead (Pb) by EPA Methods SW13111/SW6010B/SW7470A.

ARCADIS prepared "disposal notification packages" for review by AECOM. Each notification package included the identification number on each bin to be transported, mass calculations, data summary tables, laboratory data reports, and copies of the chain-of-custody records. After review and concurrence from AECOM, ARCADIS finalized each disposal notification package and forwarded the packages to US

Ecology's Beatty, Nevada facility or Grand View, Idaho facility for final review and approval prior to shipment.

Phase II

Ninety-six roll-off bins of NORM-containing waste materials were generated during Phase II of the project, between September 20, 2010 and April 28, 2011. This total included 28 bins containing HDPE pipe and residual pipe scale, and 68 bins containing soil and residual pipescale.

The disposal notification packages for the 96 bins were sent to US Ecology, Beatty, Nevada or US Ecology, Grand View, Idaho for approval on the following dates:

- April 14, 2011 (Beatty, NV)
- May 12, 2011 (Beatty, NV)
- June 3, 2011 (Beatty, NV)
- June 28, 2011 (Grand View, ID)
- July 11, 2011 (Grand View, ID)
- July 12, 2011 (Beatty, NV)
- July 28, 2011 (Beatty, NV)

Bin mass calculations, waste characterization sampling dates, and US Ecology arrival dates are summarized in Table 3A. Copies of the waste manifests are included as Appendix D.

Other project-derived waste included approximately 4,665 linear feet (0.9 miles) of abandoned steel pipeline (approximately 1,835 feet of which was wrapped with non-friable ACM), approximately 151 tons of concrete debris (dead weights) used to secure (anchor down) the waste water discharge pipeline within the Wheaton Wash, and non-regulated trash and debris. Prior to removal, all abandoned steel pipes and concrete debris were scanned for indications of gamma radiation, using a Ludlum Model 2 inch by 2 inch sodium iodide detector. No elevated levels of gamma radiation were observed. Based on process knowledge and these scans, the abandoned steel pipe

was determined to be free of pipescale–related radioactivity and removed from the pipeline ROW. The abandoned steel pipes were taken by Silver Dollar Recyclers located in Las Vegas, Nevada for recycling. The non-regulated trash and debris was transported to a Las Vegas, Nevada area landfill.

The abandoned steel freshwater pipe, not wrapped with ACM, (roughly 2,830 linear feet) was transported to Silver Dollar Recyclers located in Las Vegas, Nevada for recycling. The abandoned steel freshwater pipe, wrapped with non-friable ACM, (roughly 1,835 linear feet) was loaded into two separate roll-off bins and transported to the Clean Harbors facility located in Buttonwillow, CA for disposal. The concrete debris was transported to the OIEP and used as the core for a new storm water diversion berm constructed thereon.

Phase III

Eighty-three roll-off bins of NORM-containing waste materials were generated during Phase III between March 24, 2011 and March 14, 2012. This total includes 46 bins containing HDPE pipe and residual pipe scale, 36 bins containing soil and residual pipescale, and one bin containing plastic and decontamination materials.

The disposal notification packages for the 83 bins were sent to US Ecology, Beatty, Nevada or US Ecology, Grand View, Idaho facility for approval on the following dates:

- June 30, 2011 (Beatty, NV)
- July 12, 2011 (Beatty, NV)
- July 27, 2011 (Grand View, ID)
- July 28, 2011 (Beatty, NV)
- September 20, 2011 (Beatty, NV)
- November 9, 2011 (Grand View, ID)
- November 17, 2011 (Beatty, NV)
- November 28, 2011 (Grand View, ID)

- November 28, 2011 (Beatty, NV)
- November 29, 2011 (Grand View, ID)
- December 16, 2011 (Grand View, ID)
- December 21, 2011 (Grand View, ID)
- December 21, 2011 (Beatty, NV)
- January 5, 2012 (Grand View, ID)
- January 5, 2012 (Beatty, NV)
- January 11, 2012 (Grand View, ID)
- January 19, 2012 (Grand View, ID)
- January 26, 2012 (Grand View, ID)
- February 3, 2012 (Grand View, ID)
- February 6, 2012 (Grand View, ID)
- February 17, 2012 (Beatty, NV)
- March 2, 2012 (Grand View, ID)

Bin mass calculations, waste characterization sampling dates, and US Ecology arrival dates are summarized in Table 3B. Copies of the waste manifests are included as Appendix D.

Other project-derived waste included approximately 68,000 gallons of residual waste water (contained within the pipeline), and non-regulated trash and debris. The wastewater was properly managed and discharged at the lined evaporation ponds located at the Mountain Pass Mine. The non-regulated trash and debris was transported to a Las Vegas, Nevada area landfill.

13. Phase II & III Land Disturbance Estimates

Phase II

Disturbance to habitat during Phase II of the project was estimated on a weekly basis. For the roughly 3.7 miles of pipeline removed, the estimated total disturbance was approximately 8.9 acres – 7.0 acres for the 2.9 miles of pipeline removed from BLM managed land, and 1.9 acres for the 0.8 miles of pipeline removed from Molycorp Mineral, LLC owned land. This estimate was based on an average width of disturbance of 20 feet.

Phase III

Disturbance to habitat during Phase III of the project was estimated, based on pre- and post-construction GPS surveys conducted by ARCADIS' subcontractor, ERG. The estimated total disturbance was approximately 7.1 acres – 6.0 acres for the 5.1 miles of pipeline removed from BLM managed land, and 1.2 acres for the 1.0 mile of pipeline removed from Molycorp Minerals, LLC owned land. A breakdown of the total disturbance by property owner/manager and critical habitat areas is provided below:

- BLM managed land – Approximately 6.0 acres for 5.1 miles of pipeline removed.
    - 2.5 acres in Desert Tortoise critical habitat.
    - 2.2 acres in non-critical Desert Tortoise habitat.
    - 1.3 acres in the Ivanpah Playa (dry lakebed).
- Molycorp Minerals, LLC owned land – 1.2 acres.

The reduction in total disturbance to the Phase III work area versus the Phase II work area was a combination of using a mini excavator, planning and sequencing operations to utilize the existing access road to stockpile soils (since the pipeline was consistently located on the east side), and the absence of freshwater pipelines and abandoned steel pipelines.

14. Phase II & III Biological / Restoration Activities

Phase II

Fifty-one plants (41 native desert riparian trees, 8 cactus plants, 1 yucca plant, and 1 Joshua tree) were temporarily removed and transplanted back to their original location the same day of excavation. Information on each plant, including GPS coordinates, height and diameter is presented in Table 4A. CEMC will monitor the survival of these plants in accordance with the BLM *Decision Record* and the CDFG *Streambed Alteration Permit*.

No Desert Tortoises were observed in or near the Phase II work area during pipeline removals and restoration actions.

Per the BLM *Decision Record*, restoration of the disturbed work areas for Phase II of the project included the following:

- Backfilling open trenches with existing soils in Wheaton Wash and re-grading the work areas (surface) to their original contours; and

- Backfilling one trench (Trench #20), which required substantial soil removals and subsequent backfill with clean fill material (approximately 90 tons). The fill materials were obtained from the California Department of Transportation (Caltrans) excess soil and rock pile left over from their I-15 widening project, following approval from AECOM.

Phase III

Thirty-three cacti were temporarily removed and transplanted back to their original location the same day of excavation. No native desert riparian trees were removed from the Phase III work areas. Information on each cactus, including GPS coordinates and height, is presented in Table 4B. CEMC will monitor the survival of these cacti in accordance with the *Decision Record*.

Four Desert Tortoises were observed in or near the Phase III work areas during pipeline removal and restoration actions. There was no take of any tortoise during this project. When a tortoise was observed, Stop Work Authority was implemented immediately, and the Authorized Biologist and FCR were notified. Work activities were modified and proper mitigation measures were taken to ensure that the tortoise was

not harmed. The appropriate regulatory agencies were notified after each sighting and a notification package was submitted to the CNDDB.

In addition, Phase III work activities were planned around the active tortoise season in an effort to avoid working in sensitive areas of critical habitat during this time. For example, during the warm months of September and October (i.e., active tortoise season), CEMC, with concurrence from BLM, moved the pipeline operations to the NIEP and worked across the unvegetated Ivanpah Playa during these months. Then went back to the critical habitat areas after the weather cooled and the tortoises went back into hibernation.

Per the BLM *Decision Record*, restoration of the disturbed work areas for Phase III of the project included the following:

- Backfilling open trenches with existing soils and re-grading the work areas (surface) to their original contours;

- Backfilling Trench #4, which required substantial soil removals and subsequent backfill with clean fill material (approximately 120 tons). The fill materials were obtained from a borrow area owned by Molycorp Minerals, LLC that was previously used for material to cap and close the OIEP, following approval from AECOM;

- Backfilling Trench #30, which required substantial soil removals and subsequent backfill with clean fill material (approximately 50 tons). The fill materials consisted of excess gravel and soil left over from earlier remedial actions along the pipeline ROW by Molycorp, following approval from AECOM;

- Scarifying and raking the disturbed work areas to a depth of approximately 6 inches using a spiked-tooth harrow in preparation for re-seeding activities;

- Re-seeding the disturbed work areas in February 2012 using native seeds collected from the project area;

- Restoring original drainage patterns across the pipeline ROW access road; and

- Importing approximately 180 tons of crushed rock from a nearby quarry to construct engineered "waterbars" in accordance with Minor Procedural Modification #18 (Appendix A) to re-establish the significant natural stormwater flow patterns across the access road and the pipeline ROW.

15. Phase II & III Summary

Phase II

During Phase II (September, 2010 through April 28, 2011), CEMC completed the following tasks:

- Removed approximately 19,460 feet (3.7 miles) of waste water discharge pipeline;
- Recovered an estimated 61 tons of residual pipescale present within the waste water discharge pipeline;
- Removed approximately 4,665 feet (0.9 miles) of abandoned steel freshwater pipeline (1,835 feet of the pipeline wrapped with ACM);
- Excavated and removed approximately 677 tons (451 cubic yards) of waste water-impacted soil from BLM and Molycorp Minerals, LLC property;
- Removed approximately 2.7 acres of tamarisk, an invasive species, from Wheaton Wash;
- Abandoned four groundwater monitoring wells located within Wheaton Wash; and
- Repaired and/or replaced various sections of Molycorp Minerals, LLC, 8 inch and 10 inch steel freshwater pipelines.

Phase III

During Phase III (March 24, 2011 through March 14, 2012), CEMC completed the following tasks:

- Removed approximately 32,095 feet (6.1 miles) of waste water discharge pipeline;
- Recovered an estimated 24 tons of residual pipescale present within the waste water discharge pipeline;
- Excavated and removed approximately 379 tons (253 cubic yards) of waste water-impacted soil from BLM and Molycorp Minerals, LLC property; and

- Completed restoration activities, which included re-seeding the disturbed area with native seeds and installing permanent stormwater management controls using native rock along parts of the access road to control runoff, stabilize the access road, and to protect the restored area.

All Phase II and III activities were conducted under the supervision of BLM representatives. The removed waste water discharge pipeline and impacted soils were properly managed and transported to a CEMC-approved disposal facility.

ARCADIS

Tables

TABLE 1A
MOLYCORP LABORATORY RESULTS
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE II
MOUNTAIN PASS, CALIFORNIA

Sample ID	Sample Description	ICP-MS_U Uranium ppm	XRF Ba ppm	XRF Ce ppm	XRF La ppm	XRF Nd ppm	XRF Pb ppm	Ce/La Ratio
Tailing Sample								
ARCADIS-092010-002	Tailing Sample collected at the start location	17	99,731.2	13,114.6	8,194.1	3,396.2	2,608.6	**1.6**
ARCADIS-092010-001	Tailing Sample collected at the start location	<10	102,509.0	14,311.3	8,714.2	3,653.5	2,608.6	**1.6**
Trench #1 (Pipe Repair #1) - *Closed*								
093010-MM-T1-R001	Beneath Pipe Repair #1 at the Sprint/AT&T fiber optic line	<10	10,233.0	2,808.5	1,330.2	746.1	232.1	**2.1**
Trench #2 (Elevated Radiological Readings #1) - *Closed*								
102110-MM-T2-E001_180232	10' upgrdient from point with most elevated radiation	<10	6272.4	2263.1	2063.4	1157.8	176.4	**1.1**
102110-MM-T2-E002_180233	10' downgrdient from point with most elevated radiation	<10	6828.0	2206.1	1594.5	909.1	213.5	**1.4**
102110-MM-T2-E003_180234	East side wall at point with most elevated radiation	<10	7105.7	1774.7	1193.7	986.3	176.4	**1.5**
102110-MM-T2-E004_180235	West side wall at point with most elevated radiation	<10	6899.6	2222.4	1577.4	1080.6	222.8	**1.4**
102110-MM-T2-E005_180236	Point with the most elevated radiation	<10	6845.9	2116.6	1858.8	1209.3	194.9	**1.1**
102110-MM-T2-S1_180237	Spoil pile 10' upgradient from point with elevated radiation	<10	5143.4	1685.1	1330.2	926.2	194.9	**1.3**
102110-MM-T2-S2_180238	Spoil pile 10' downgradient from point with elevated radiation	<10	5421.1	3077.2	1995.2	1226.4	157.8	**1.5**
102110-MM-T2-S3_180239	Spoil pile at point with the most elevated radiation	<10	7302.9	3272.5	2455.7	1389.4	194.9	**1.3**
11.30.10-MM-T2-C001-182345	See Trench #2 Sketch	<10	5869.2	2157.3	1261.9	977.7	287.8	**1.7**
11.30.10-MM-T2-C002-182346	See Trench #2 Sketch	38.8	3127.2	1286.2	878.2	874.8	2376.5	**1.5**
11.30.10-MM-T2-C003-182347	See Trench #2 Sketch	<10	6218.6	2759.7	1867.3	1175.0	167.1	**1.5**
11.30.10-MM-T2-C004-182348	See Trench #2 Sketch	<10	7939.1	2776.0	5218.3	2349.9	334.2	**0.5**
11.30.10-MM-T2-C005-182349	See Trench #2 Sketch	<10	4704.3	1864.2	835.6	814.8	130.0	**2.2**
11.30.10-MM-T2-C006-182606	See Trench #2 Sketch	35.8	7159.5	7741.8	9132.0	4476.8	612.7	**0.8**
11.30.10-MM-T2-C007-182607	See Trench #2 Sketch	<10	2249.1	464.0	1014.7	694.7	167.1	**0.5**
11.30.10-MM-T2-C008-182608	See Trench #2 Sketch	<10	6962.4	3142.3	2063.4	1080.6	176.4	**1.5**
11.30.10-MM-T2-C009-182609	See Trench #2 Sketch	32.0	10609.3	16305.8	12858.1	5686.1	900.5	**1.3**
11.30.10-MM-T2-C010-182610	See Trench #2 Sketch	<10	2652.3	968.7	1287.5	1080.6	167.1	**0.8**
11.30.10-MM-T2-C011-182611	See Trench #2 Sketch	10.0	8655.9	2873.7	4766.4	2401.4	334.2	**0.6**
11.30.10-MM-T2-C012-182612	See Trench #2 Sketch	<10	7078.9	2898.1	1773.5	1063.5	213.5	**1.6**
02.10.11-MM-T2-C001-184481	See Trench #2 Sketch	<10	6209.7	1123.4	1748.0	1046.3	74.3	**0.6**
02.10.11-MM-T2-C002-184482	See Trench #2 Sketch	<10	4014.3	1302.5	1031.7	857.6	92.8	**1.3**
02.10.11-MM-T2-C003-184483	See Trench #2 Sketch	<10	4390.7	2002.6	12201.6	5077.2	232.1	**0.2**
02.10.11-MM-T2-C004-184484	See Trench #2 Sketch	<10	3772.4	1424.6	2447.1	1440.8	120.7	**0.6**
02.10.11-MM-T2-C005-184485	See Trench #2 Sketch	<10	2114.7	2979.5	18826.7	8928.0	352.8	**0.2**

TABLE 1A
MOLYCORP LABORATORY RESULTS
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE II
MOUNTAIN PASS, CALIFORNIA

Sample ID	Sample Description	ICP-MS_U Uranium ppm	XRF Ba ppm	XRF Ce ppm	XRF La ppm	XRF Nd ppm	XRF Pb ppm	Ce/La Ratio
052611-MM-T2-P001-188484	Pothole #1 at 3' bgs - See Sketch	*Pending*	5935.5	2337.2	1159.6	813.0	127.2	**2.0**
052611-MM-T2-P002-188485	Pothole #1 at 6' bgs - See Sketch	*Pending*	2563.6	663.5	1343.8	915.1	402.9	**0.5**
052611-MM-T2-P003-188486	Pothole #2 at 3' bgs - See Sketch	*Pending*	2658.6	412.7	<85.3	385.1	<46.4	**4.8**
052611-MM-T2-P004-188487	Pothole #2 at 4' bgs - See Sketch	*Pending*	1480.3	442.0	<85.3	368.8	<46.4	**5.2**
052611-MM-T2-P005-188488	Pothole #2 (expanded) at 5' bgs - See Sketch	*Pending*	1751.8	629.3	<85.3	440.8	141.1	**7.4**
052611-MM-T2-P006-188489	Pothole #3 at 3' bgs - See Sketch	*Pending*	8241.9	5209.2	5191.0	2440.0	321.2	**1.0**
052611-MM-T2-P007-188490	Pothole #3 at 6' bgs - See Sketch	*Pending*	5773.3	3179.7	8773.9	3558.3	448.4	**0.4**
052611-MM-T2-P008-188491	Pothole #4 at 3' bgs - See Sketch	*Pending*	5001.8	3002.3	2982.6	1431.4	123.5	**1.0**
052611-MM-T2-P009-188492	Pothole #4 at 6' bgs - See Sketch	*Pending*	3569.9	2123.9	5078.4	1675.8	113.3	**0.4**
052611-MM-T2-P010-188493	Pothole #5 at 3' bgs - See Sketch	*Pending*	4865.6	2325.0	2395.1	1276.2	138.3	**1.0**
052611-MM-T2-P011-188494	Pothole #5 at 6.5' bgs - See Sketch	*Pending*	5448.0	2873.7	2302.2	1226.4	157.8	**1.2**
Trench #3 (Abandoned Pipe Section) - *Closed*								
102610-BLM-T3-R001_180240	10' upgradient from open end of 6" diameter pipe	<10	3754.5	1025.7	417.8	583.2	46.4	**2.5**
102610-BLM-T3-R002_180241	10' downgradient from open end of 6" diameter pipe	<10	5233.0	2157.3	1210.8	1003.4	111.4	**1.8**
102610-BLM-T3-R003_180242	Beneath open end of 6" diameter pipe	<10	6702.5	1326.9	750.3	711.8	74.3	**1.8**
Trench #4 (Elevated Radiological Readings #2) - *Closed*								
102610-BLM-T4-E001_180243	Upgradient top	18	65896.1	14913.7	9592.4	4511.1	3481.2	**1.6**
102610-BLM-T4-E002_180244	Upgradient bottom	18	32276.0	7986.0	4792.0	2427.1	2358.0	**1.7**
102610-BLM-T4-E003_180245	Middle top	19	46460.6	9956.0	6011.3	3044.6	2144.4	**1.7**
102610-BLM-T4-E004_180246	Middle bottom	10	20752.7	5169.3	3325.4	1835.3	891.2	**1.6**
102610-BLM-T4-E005_180247	Downgradient middle	10	11200.7	3386.5	2072.0	1235.0	417.7	**1.6**
102610-BLM-T4-E006_180248	Furthest downgradient	<10	10681.0	3150.4	2174.3	1303.6	389.9	**1.4**
Trench #5 (Abandoned Pipe Section) - *Closed*								
102710-BLM-T5-R001_180249	10' upgradient from open end of 6" diameter pipe	<10	4605.7	1904.9	1219.3	840.5	130.0	**1.6**
102710-BLM-T5-R002_180250	10' downgradient from open end of 6" diameter pipe	<10	6998.2	1457.2	733.3	669.0	74.3	**2.0**
102710-BLM-T5-R003_180251	Beneath open end of 6" diameter pipe	<10	5537.6	1839.8	1006.1	814.8	148.5	**1.8**
Trench #6 (Abandoned Pipe Section) - *Closed*								
11.02.10-BLM-T6-R001_180466	10' upgradient from open end of 6" diameter pipe	<10	6155.9	1180.4	554.2	626.1	92.8	**2.1**
11.02.10-BLM-T6-R002_180467	10' downgradient from open end of 6" diameter pipe	<10	3288.5	781.5	460.4	634.6	55.7	**1.7**
11.02.10-BLM-T6-R003_180468	North side wall at open end of 6" diameter pipe	<10	3718.6	748.9	443.4	548.9	27.8	**1.7**
11.02.10-BLM-T6-R004-180469	South side wall at open end of 6" diameter pipe	<10	6487.5	2189.8	1398.4	977.7	157.8	**1.6**
11.02.10-BLM-T6-R005-180470	Beneath open end of 6" diameter pipe	<10	4677.4	1253.7	639.5	651.8	83.5	**2.0**
11.02.10-BLM-T6-S1-180471	10' upgradient spoils	<10	4095.0	838.5	622.4	583.2	74.3	**1.3**

TABLE 1A
MOLYCORP LABORATORY RESULTS
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE II
MOUNTAIN PASS, CALIFORNIA

Sample ID	Sample Description	ICP-MS_U Uranium ppm	XRF Ba ppm	XRF Ce ppm	XRF La ppm	XRF Nd ppm	XRF Pb ppm	Ce/La Ratio
11.02.10-BLM-T6-S2-180472	10' downgradient spoils	<10	5268.8	936.2	613.9	643.2	46.4	**1.5**
11.02.10-BLM-T6-S3-180473	Open end spoils	<10	5645.2	1473.5	690.7	720.4	46.4	**2.1**
Trench #7 (Abandoned Pipe Section) - *Closed*								
11.02.10-BLM-T7-R001-180671	10' upgradient from open end of 6" diameter pipe	<10	1774.2	521.0	179.1	437.4	<46.4	**2.9**
11.02.10-BLM-T7-R002-180672	10' downgradient from open end of 6" diameter pipe	<10	4471.3	976.9	426.3	540.3	<46.4	**2.3**
11.02.10-BLM-T7-R003-180548	North side wall at open end of 6" diameter pipe	<10	5394.3	879.2	443.4	608.9	<46.4	**2.0**
11.02.10-BLM-T7-R004-180549	South side wall at open end of 6" diameter pipe	<10	6451.6	1172.3	682.1	643.2	<46.4	**1.7**
11.02.10-BLM-T7-R005-180550	Beneath open end of 6" diameter pipe	<10	5501.8	1066.4	562.8	617.5	55.7	**1.9**
11.02.10-BLM-T7-S1-180547	10' upgradient spoils	<10	3942.7	1090.8	631.0	626.1	<46.4	**1.7**
11.02.10-BLM-T7-S2-180474	10' downgradient spoils	<10	4489.2	1156.0	682.1	651.8	65.0	**1.7**
11.02.10-BLM-T7-S3-180673	Open end spoils	<10	4829.7	1213.0	682.1	669.0	46.4	**1.8**
Trench #8 (Abandoned Pipe Section) - *Closed*								
11.04.10-BLM-T8-R001_180674	Upgradient end of 6" diameter pipe	<10	3664.9	1121.8	452.8	618.4	<46.4	**2.5**
11.04.10-BLM-T8-R002_180675	Downgradient end of 6" diameter pipe	<10	3102.2	1252.0	576.4	680.1	61.3	**2.2**
11.04.10-BLM-T8-R003_180676	Vent line connection	<10	2249.1	676.5	332.5	544.6	<46.4	**2.0**
11.04.10-BLM-T8-R004_180677	Near stand pipe	<10	4012.5	1442.5	831.3	771.0	72.4	**1.7**
Trench #9 (Pipe Repair #2) - *Closed*								
11.09.10-BLM-T9-R001_182144	10' upgradient from repair	<10	4700.7	1734.0	1038.5	822.5	156.0	**1.7**
11.09.10-BLM-T9-R002_182145	10' downgradient from repair	<10	4091.4	1463.7	919.2	664.7	103.0	**1.6**
11.09.10-BLM-T9-R003_182146	North side wall	<10	3672.0	1401.8	1047.9	747.9	137.4	**1.3**
11.09.10-BLM-T9-R004_182147	South side wall	<10	5382.6	1703.0	1104.2	777.0	164.3	**1.5**
11.09.10-BLM-T9-R005_182148	Beneath repair	<10	5242.8	1996.9	1535.6	970.0	143.0	**1.3**
11.09.10-BLM-T9-S1_182149	10' upgradient spoils	<10	5448.9	1799.9	1034.3	819.0	198.7	**1.7**
11.09.10-BLM-T9-S2_182150	10' downgradient spoils	<10	6009.0	1982.3	1361.7	864.5	197.7	**1.5**
11.09.10-BLM-T9-S3_182151	Repair spoils	<10	5719.5	1936.7	1277.3	835.3	212.6	**1.5**
01.04.11-BLM-T9-C003_183172	North Sidewall	<10	2317.2	79.0	254.9	2170.7	<46.4	**0.3**
01.04.11-BLM-T9-C005_183171	Under Pipe Repair	<10	3378.1	885.7	555.9	966.6	<46.4	**1.6**
Trench #10 (Abandoned Pipe Section) - *Closed*								
11.09.10-BLM-T10-R001_182152	10' upgradient from open end of 6" diameter pipe	<10	4065.4	910.1	382.8	609.8	59.4	**2.4**
11.09.10-BLM-T10-R002_182153	At upgradient open end of 6" diameter pipe	<10	6540.3	2013.2	1290.9	917.7	172.7	**1.6**
11.09.10-BLM-T10-R003_182154	Middle of 6" diameter pipe section	<10	3584.2	1033.1	573.0	664.7	80.8	**1.8**
11.09.10-BLM-T10-R004_182155	At downgradient open end of 6" diameter pipe	11	4681.0	3194.4	1854.5	1373.9	98.4	**1.7**
11.09.10-BLM-T10-R005_182156	10' downgradient from open end of 6" diameter pipe	<10	3537.6	1248.0	542.3	578.0	69.6	**2.3**

TABLE 1A
MOLYCORP LABORATORY RESULTS
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE II
MOUNTAIN PASS, CALIFORNIA

Sample ID	Sample Description	ICP-MS_U Uranium ppm	XRF Ba ppm	XRF Ce ppm	XRF La ppm	XRF Nd ppm	XRF Pb ppm	Ce/La Ratio
Trench #11 (Abandoned Pipe Section) - *Closed*								
11.10.10-BLM-T11-R001_182157	10' upgradient from open end of 6" diameter pipe	<10	2862.0	801.0	218.3	470.8	<46.4	**3.7**
11.10.10-BLM-T11-R002_182158	At upgradient open end of 6" diameter pipe	<10	3074.4	841.7	262.6	413.4	49.2	**3.2**
11.10.10-BLM-T11-R003_182159	Middle of 6" diameter pipe section	<10	2715.9	1035.5	307.8	410.8	71.5	**3.4**
11.10.10-BLM-T11-R004_182160	At downgradient open end of 6" diameter pipe	<10	6802.9	2311.1	1215.9	928.0	60.3	**1.9**
11.10.10-BLM-T11-R005_182161	10' downgradient from open end of 6" diameter pipe	<10	3051.1	1030.6	451.9	585.8	82.6	**2.3**
Trench #12 (Abandoned Pipe Section) - *Closed*								
11.10.10-BLM-T12-R001_182162	10' upgradient from open end of 6" diameter pipe	<10	1539.4	407.0	<85.3	409.9	<46.4	**4.8**
11.10.10-BLM-T12-R002_182163	At upgradient open end of 6" diameter pipe	<10	2604.8	635.8	333.4	534.3	<46.4	**1.9**
11.10.10-BLM-T12-R003_182164	Middle of 6" diameter pipe section	<10	1862.9	460.8	<85.3	495.7	<46.4	**5.4**
11.10.10-BLM-T12-R004_182165	At downgradient open end of 6" diameter pipe	<10	1973.1	492.5	108.3	421.1	48.3	**4.5**
11.10.10-BLM-T12-R005_182166	10' downgradient from open end of 6" diameter pipe	<10	3302.0	774.2	432.3	561.7	<46.4	**1.8**
Trench #13 (Abandoned Pipe Section) - *Closed*								
11.10.10-BLM-T13-A001_182167	10' upgradient from open end of 6" diameter pipe	<10	2019.7	560.9	266.0	511.1	<46.4	**2.1**
11.11.10-BLM-T13-A002_182168	At upgradient open end of 6" diameter pipe	<10	2096.8	626.8	136.4	446.0	<46.4	**4.6**
11.11.10-BLM-T13-A003_182169	Middle of 6" diameter pipe section	<10	2034.1	578.0	255.8	480.3	<46.4	**2.3**
11.11.10-BLM-T13-A004_182170	At downgradient open end of 6" diameter pipe	<10	2876.3	521.0	<85.3	497.4	<46.4	**6.1**
11.11.10-BLM-T13-A005_182171	10' downgradient from open end of 6" diameter pipe	<10	2016.1	976.9	443.4	463.1	<46.4	**2.2**
Trench #14 (Abandoned Pipe Section) - *Closed*								
11.11.10-BLM-T14-A001_182172	10' upgradient from open end of 6" diameter pipe	<10	1362.0	276.8	<85.3	446.0	<46.4	**3.2**
11.11.10-BLM-T14-A002_182173	At upgradient open end of 6" diameter pipe	<10	1863.8	545.4	238.7	454.5	<46.4	**2.3**
11.11.10-BLM-T14-A003_182174	Middle of 6" diameter pipe section	<10	1980.3	407.0	<85.3	488.9	<46.4	**4.8**
11.11.10-BLM-T14-A004_182175	At downgradient open end of 6" diameter pipe	<10	2562.7	431.5	119.4	497.4	<46.4	**3.6**
11.11.10-BLM-T14-A005_182176	10' downgradient from open end of 6" diameter pipe	<10	2258.1	390.8	102.3	497.4	<46.4	**3.8**
Trench #15 (Abandoned Pipe Section) - *Closed*								
11.11.10-BLM-T15-A001_182177	10' upgradient from open end of 6" diameter pipe	<10	3378.1	1571.1	827.1	711.8	83.5	**1.9**
11.11.10-BLM-T15-A002_182178	At upgradient open end of 6" diameter pipe	<10	1433.7	504.7	238.7	523.2	<46.4	**2.1**
11.11.10-BLM-T15-A003_182179	Middle of 6" diameter pipe section	<10	3046.6	814.1	383.7	617.5	<46.4	**2.1**
11.11.10-BLM-T15-A004_182180	At downgradient open end of 6" diameter pipe	<10	3306.5	985.0	733.3	669.0	102.1	**1.3**
11.11.10-BLM-T15-A005_182181	10' downgradient from open end of 6" diameter pipe	<10	3405.0	1188.5	665.1	677.5	55.7	**1.8**

TABLE 1A
MOLYCORP LABORATORY RESULTS
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE II
MOUNTAIN PASS, CALIFORNIA

Sample ID	Sample Description	ICP-MS_U Uranium ppm	XRF Ba ppm	XRF Ce ppm	XRF La ppm	XRF Nd ppm	XRF Pb ppm	Ce/La Ratio
Trench #16 (Vent Pipe Outlet) - *Closed*								
11.15.10-BLM-T16-A001_182182	Vent Pipe Outlet	<10	2419.4	1074.6	818.6	677.5	<46.4	**1.3**
01.04.11-BLM-T16-C001_183447	Vent Pipe Outlet	<10	4802.9	675.7	767.4	1157.8	<46.4	**0.9**
04.28.11-BLM-T16-C001-187098	Dowgradient soil at groundwater monitoring well	<10	2204.3	618.7	366.6	488.9	<46.4	**1.7**
Trench #17 (Elevated Radiological Readings #3) - *Closed*								
11.17.10-BLM-T17-E001_182183	White Pipescale Sample	<10	29184.6	2116.6	4988.1	1638.1	7157.4	**0.4**
11.17.10-BLM-T17-DUP_182184	White Pipescale Sample	<10	28163.1	2035.2	4860.2	1843.9	6730.4	**0.4**
11.18.10-BLM-T17-E001_182185	Sample for Background Correlation	<10	4417.6	610.6	417.8	617.5	306.3	**1.5**
11.18.10-BLM-T17-E002_182186	Sample for Background Correlation	<10	6657.7	960.6	724.8	686.1	557.0	**1.3**
11.18.10-BLM-T17-E003_182187	Sample for Background Correlation	<10	9722.2	1099.0	690.7	669.0	287.8	**1.6**
11.30.10-BLM-T17-C001-182299	See Trench #17 Sketch	<10	1155.9	<81.4	<85.3	360.2	<46.4	**ND/ND**
11.30.10-BLM-T17-C002-182300	See Trench #17 Sketch	<10	4856.6	1017.6	503.1	669.0	83.5	**2.0**
11.30.10-BLM-T17-C003-182301	See Trench #17 Sketch	<10	1030.5	162.8	<85.3	291.6	<46.4	**1.9**
11.30.10-BLM-T17-C004-182302	See Trench #17 Sketch	<10	7759.9	675.7	230.2	506.0	83.5	**2.9**
11.30.10-BLM-T17-C005-182303	See Trench #17 Sketch	<10	3593.2	993.2	400.8	677.5	55.7	**2.5**
11.30.10-BLM-T17-C006-182304	See Trench #17 Sketch	<10	1424.7	187.2	<85.3	360.2	<46.4	**2.2**
11.30.10-BLM-T17-C007-182305	See Trench #17 Sketch	<10	4471.3	944.3	673.6	686.1	204.2	**1.4**
11.30.10-BLM-T17-C008-182306	See Trench #17 Sketch	<10	3503.6	879.2	307.0	497.4	46.4	**2.9**
11.30.10-BLM-T17-C009-182307	See Trench #17 Sketch	<10	4596.8	822.2	571.3	497.4	454.9	**1.4**
11.30.10-BLM-T17-C010-182308	See Trench #17 Sketch	<10	2302.9	928.0	477.5	514.6	92.8	**1.9**
11.30.10-BLM-T17-C011-182309	See Trench #17 Sketch	<10	3844.1	1172.3	596.9	720.4	<46.4	**2.0**
11.30.10-BLM-T17-C012-182310	See Trench #17 Sketch	<10	5009.0	830.3	443.4	591.8	194.9	**1.9**
11.30.10-BLM-T17-C013-182341	See Trench #17 Sketch	<10	994.6	252.4	<85.3	351.6	<46.4	**3.0**
11.30.10-BLM-T17-C014-182342	See Trench #17 Sketch	<10	1397.8	244.2	<85.3	317.3	<46.4	**2.9**
11.30.10-BLM-T17-C015-182343	See Trench #17 Sketch	<10	3440.9	675.7	289.9	497.4	83.5	**2.3**
11.30.10-BLM-T17-C016-182344	See Trench #17 Sketch	<10	1863.8	341.9	<85.3	437.4	102.1	**4.0**
Trench #18 (Abandoned Pipe Section) - *Closed*								
11.22.10-BLM-T18-A001_182207	10' upgradient from open end of 6" diameter pipe	<10	8476.7	1213.0	699.2	608.9	102.1	**1.7**
11.22.10-BLM-T18-A002_182208	At upgradient open end of 6" diameter pipe	<10	3629.0	561.7	85.3	454.5	<46.4	**6.6**
11.22.10-BLM-T18-A003_182209	Middle of 6" diameter pipe section	<10	3933.7	871.1	247.3	566.0	55.7	**3.5**
11.22.10-BLM-T18-A004_182210	At downgradient open end of 6" diameter pipe	<10	6819.0	1164.1	596.9	686.1	111.4	**2.0**
11.22.10-BLM-T18-A005_182211	10' downgradient from open end of 6" diameter pipe	<10	7867.4	1269.9	665.1	729.0	111.4	**1.9**

TABLE 1A
MOLYCORP LABORATORY RESULTS
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE II
MOUNTAIN PASS, CALIFORNIA

Sample ID	Sample Description	ICP-MS_U Uranium ppm	XRF Ba ppm	XRF Ce ppm	XRF La ppm	XRF Nd ppm	XRF Pb ppm	Ce/La Ratio
Trench #19 (Abandoned Pipe Section) - *Closed*								
12.06.10-BLM-T19-A001-182613	10' upgradient from open end of 6" diameter pipe	<10	4758.1	862.9	469.0	523.2	<46.4	**1.8**
12.06.10-BLM-T19-A002-182614	At upgradient open end of 6" diameter pipe	<10	6469.5	1245.5	673.6	626.1	65.0	**1.8**
12.06.10-BLM-T19-A003-182615	Middle of 6" diameter pipe section	<10	5869.2	1050.1	494.5	583.2	74.3	**2.1**
12.06.10-BLM-T19-A004-182616	At downgradient open end of 6" diameter pipe	<10	5698.9	1107.1	451.9	548.9	83.5	**2.4**
12.06.10-BLM-T19-A005-182617	10' downgradient from open end of 6" diameter pipe	<10	5403.2	1042.0	579.8	566.0	65.0	**1.8**
Trench #20 (Elevated Radiological Readings #4) - *Closed*								
12.16.10-BLM-T20-C001-182804	See Trench #20 Sketch - Lower Section	<10	1164.9	<81.4	<85.3	1200.7	<46.4	**ND/ND**
12.16.10-BLM-T20-C002-182805	See Trench #20 Sketch - Lower Section	<10	1451.6	97.7	153.5	574.6	1717.4	**0.6**
12.16.10-BLM-T20-C003-182806	See Trench #20 Sketch - Lower Section	<10	869.2	<81.4	93.8	1166.4	<46.4	**0.9**
12.16.10-BLM-T20-C004-182807	See Trench #20 Sketch - Lower Section	<10	1093.2	130.3	383.7	746.1	<46.4	**0.3**
12.16.10-BLM-T20-C005-182808	See Trench #20 Sketch - Lower Section	<10	2912.2	512.9	383.7	823.3	<46.4	**1.3**
12.16.10-BLM-T20-C006-182809	See Trench #20 Sketch - Lower Section	<10	2625.4	244.2	127.9	737.6	<46.4	**1.9**
12.16.10-BLM-T20-C007-182810	See Trench #20 Sketch - Lower Section	<10	4784.9	407.0	255.8	874.8	<46.4	**1.6**
12.16.10-BLM-T20-C008-182811	See Trench #20 Sketch - Lower Section	<10	5519.7	439.6	613.9	4099.5	<46.4	**0.7**
12.16.10-BLM-T20-S001-182812	See Trench #20 Sketch - Lower Section	<10	4310.0	105.8	409.3	2324.2	<46.4	**0.3**
12.16.10-BLM-T20-S002-182813	See Trench #20 Sketch - Lower Section	<10	5645.2	781.5	707.7	1312.2	<46.4	**1.1**
12.28.10-BLM-T20-C001_183442	See Trench #20 Sketch - Upper Section - *Closed*	<10	7652.3	1432.8	997.6	1903.9	<46.4	**1.4**
12.28.10-BLM-T20-C002_183443	See Trench #20 Sketch - Upper Section - *Closed*	<10	10421.1	1750.2	1151.1	1140.7	<46.4	**1.5**
12.28.10-BLM-T20-C003_183444	See Trench #20 Sketch - Upper Section - *Closed*	<10	2150.5	472.2	486.0	643.2	<46.4	**1.0**
12.28.10-BLM-T20-C004_183445	See Trench #20 Sketch - Upper Section - *Closed*	<10	4883.5	1839.8	1057.3	1072.0	<46.4	**1.7**
12.28.10-BLM-T20-S001_183446	See Trench #20 Sketch - Upper Section - *Closed*	<10	7688.2	1302.5	818.6	969.1	46.4	**1.6**
02.23.11-BLM-T20-C001-185479	Furthest Downgradient Sample - Lower Section	<10	752.7	447.7	136.4	291.6	<46.4	**3.3**
Trench #21 (Abandoned Pipe Section) - *Closed*								
12.09.10-BLM-T21-A001-182618	10' upgradient from open end of 6" diameter pipe	<10	3709.7	553.6	298.4	480.3	65.0	**1.9**
12.09.10-BLM-T21-A002-182619	At upgradient open end of 6" diameter pipe	<10	3933.7	781.5	358.1	471.7	65.0	**2.2**
12.09.10-BLM-T21-A003-182620	Middle of 6" diameter pipe section	<10	4032.3	830.3	392.2	531.7	65.0	**2.1**
12.09.10-BLM-T21-A004-182621	At downgradient open end of 6" diameter pipe	<10	3817.2	911.8	477.5	566.0	<46.4	**1.9**
12.09.10-BLM-T21-A005-182622	10' downgradient from open end of 6" diameter pipe	<10	4614.7	944.3	409.3	548.9	65.0	**2.3**
Trench #22 (Pipe Repair #3) - *Closed*								
12.28.10-BLM-T22-R001_183366	See Trench #22 Sketch	<10	4489.2	830.3	460.4	454.5	46.4	**1.8**
12.28.10-BLM-T22-R002_183367	See Trench #22 Sketch	<10	2410.4	480.3	443.4	420.2	46.4	**1.1**

TABLE 1A
MOLYCORP LABORATORY RESULTS
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE II
MOUNTAIN PASS, CALIFORNIA

Sample ID	Sample Description	ICP-MS_U Uranium ppm	XRF Ba ppm	XRF Ce ppm	XRF La ppm	XRF Nd ppm	XRF Pb ppm	Ce/La Ratio
12.28.10-BLM-T22-R003_183368	See Trench #22 Sketch	<10	2177.4	561.7	187.6	428.8	<46.4	**3.0**
12.28.10-BLM-T22-R004_183369	See Trench #22 Sketch	<10	3136.2	635.0	375.2	437.4	65.0	**1.7**
12.28.10-BLM-T22-R005_183370	See Trench #22 Sketch	<10	3064.5	862.9	298.4	403.1	<46.4	**2.9**
12.28.10-BLM-T22-R006_183371	See Trench #22 Sketch	<10	2473.1	1725.8	844.1	686.1	<46.4	**2.0**
12.28.10-BLM-T22-S001_183372	See Trench #22 Sketch	<10	3279.6	1066.4	1483.6	617.5	<46.4	**0.7**
12.28.10-BLM-T22-S002_183373	See Trench #22 Sketch	<10	3494.6	586.1	417.8	548.9	<46.4	**1.4**
12.28.10-BLM-T22-S003_183374	See Trench #22 Sketch	<10	4552.0	911.8	571.3	711.8	55.7	**1.6**
02.23.11-BLM-T22-C001-185480	See Trench #22 Sketch	<10	2715.1	521.0	145.0	437.4	<46.4	**3.6**
Trench #23 (Pipe Repair #4) - *Closed*								
12.28.10-BLM-T23-R001_183376	See Trench #23 Sketch	<10	3718.6	838.5	511.6	566.0	<46.4	**1.6**
12.28.10-BLM-T23-R002183377	See Trench #23 Sketch	<10	3745.5	667.5	460.4	531.7	<46.4	**1.4**
12.28.10-BLM-T23-R003_183409	See Trench #23 Sketch	<10	2034.1	732.7	281.4	548.9	<46.4	**2.6**
12.18.10-BLM-T23-R004_183410	See Trench #23 Sketch	<10	3853.0	944.3	417.8	694.7	<46.4	**2.3**
12.18.10-BLM-T23-R005_183411	See Trench #23 Sketch	<10	4121.9	936.2	631.0	548.9	<46.4	**1.5**
12.28.10-BLM-T23-S001_183375	See Trench #23 Sketch	<10	3467.7	635.0	409.3	952.0	<46.4	**1.6**
Trench #24 (Pipe Repair #5) - *Closed*								
12.28.10-BLM-T24-R001_183426	See Trench #24 Sketch	<10	2750.9	578.0	366.6	420.2	<46.4	**1.6**
12.28.10-BLM-T24-R002_183427	See Trench #24 Sketch	<10	2544.8	830.3	469.0	506.0	46.4	**1.8**
12.28.10-BLM-T24-R003_183428	See Trench #24 Sketch	<10	4310.0	1009.4	520.1	557.5	<46.4	**1.9**
12.28.10-BLM-T24-R004_183429	See Trench #24 Sketch	<10	3163.1	578.0	358.1	583.2	<46.4	**1.6**
12.28.10-BLM-T24-R005_183430	See Trench #24 Sketch	<10	2016.1	464.0	324.0	617.5	<46.4	**1.4**
12.28.10-BLM-T24-R006_183431	See Trench #24 Sketch	<10	1272.4	366.3	358.1	437.4	<46.4	**1.0**
12.28.10-BLM-T24-S001_183412	See Trench #24 Sketch	<10	3288.5	586.1	272.9	471.7	<46.4	**2.1**
12.28.10-BLM-T24-S002_183413	See Trench #24 Sketch	<10	4417.6	822.2	469.0	471.7	<46.4	**1.8**
12.28.10-BLM-T24-S003_183414	See Trench #24 Sketch	<10	3010.8	643.1	272.9	514.6	<46.4	**2.4**
12.28.10-BLM-T24-S004_183415	See Trench #24 Sketch	<10	9982.1	4070.3	2779.7	1578.0	194.9	**1.5**
02.23.11-BLM-T24-C001-185481	See Trench #24 Sketch	<10	2455.2	333.8	<85.3	420.2	<46.4	**3.9**
Trench #25 (Pipe Repair #6) - *Closed*								
01.05.11-BLM-T25-R001_183451	5' upgradient from repair	<10	6326.2	1383.9	1108.5	1132.1	<46.4	**1.2**
01.05.11-BLM-T25-R002_183452	10' downgradient from repair	11	7096.8	1278.1	869.7	952.0	<46.4	**1.5**
01.05.11-BLM-T25-R003_183482	North side wall	<10	2571.7	138.4	682.1	2298.5	<46.4	**0.2**
01.05.11-BLM-T25-R004_183483	South side wall	<10	4767.0	537.3	775.9	2392.8	<46.4	**0.7**
01.05.11-BLM-T25-R005_183484	Beneath repair	10	6917.6	1172.3	852.7	891.9	<46.4	**1.4**

TABLE 1A
MOLYCORP LABORATORY RESULTS
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE II
MOUNTAIN PASS, CALIFORNIA

Sample ID	Sample Description	ICP-MS_U Uranium ppm	XRF Ba ppm	XRF Ce ppm	XRF La ppm	XRF Nd ppm	XRF Pb ppm	Ce/La Ratio
01.05.11-BLM-T25-S1_183448	10' upgradient spoils	<10	7258.1	1115.3	733.3	1149.2	46.4	**1.5**
01.05.11-BLM-T25-S2_183449	10' downgradient spoils	<10	5457.0	854.8	656.5	1003.4	<46.4	**1.3**
01.05.11-BLM-T25-S3_183450	Repair spoils	<10	3467.7	805.9	579.8	583.2	<46.4	**1.4**
04.28.11-BLM-T25-C001-187095	Upgradient center bottom of trench	<10	3458.8	960.6	596.9	531.7	<46.4	**1.6**
04.28.11-BLM-T25-C002-187096	North side wall	<10	3082.4	797.8	417.8	480.3	<46.4	**1.9**
04.28.11-BLM-T25-C003-187097	South side wall	<10	2885.3	919.9	733.3	591.8	83.5	**1.3**
Trench #26 (Pipe Repair #7) - *Closed*								
01.06.11-BLM-T26-R001_183488	10' upgradient from repair	<10	3915.8	740.8	460.4	480.3	<46.4	**1.6**
01.06.11-BLM-T26-R002_183489	10' downgradient from repair	<10	4086.0	447.7	332.5	814.8	<46.4	**1.3**
01.06.11-BLM-T26-R003_183490	North side wall	10	3647.0	740.8	571.3	1046.3	<46.4	**1.3**
01.06.11-BLM-T26-R004_183582	South side wall	<10	1532.3	537.3	272.9	488.9	46.4	**2.0**
01.06.11-BLM-T26-R005_183583	Beneath repair	<10	2374.6	<81.4	443.4	2375.6	<46.4	**0.2**
01.06.11-BLM-T26-S1_183485	10' upgradient spoils	<10	6075.3	1164.1	477.5	677.5	102.1	**2.4**
01.06.11-BLM-T26-S2_183486	10' downgradient spoils	<10	5107.5	862.9	434.9	874.8	<46.4	**2.0**
01.06.11-BLM-T26-S3_183487	Repair spoils	<10	4596.8	919.9	562.8	660.4	46.4	**1.6**
04.26.11-BLM-T26-C001-187089	Upgradient bottom of trench	<10	5349.5	1188.5	741.8	557.5	55.7	**1.6**
04.26.11-BLM-T26-C002-187090	Downgradient bottom of trench	<10	4310.0	879.2	417.8	463.1	<46.4	**2.1**
Trench #27 (Pipe Repair #8) - *Closed*								
01.10.11-BLM-T27-R001_183618	10' upgradient from repair	<10	3369.2	708.2	486.0	1243.6	<46.4	**1.5**
01.10.11-BLM-T27-R002_183619	10' downgradient from repair	<10	2437.3	675.7	307.0	608.9	<46.4	**2.2**
01.10.11-BLM-T27-R003_183620	North side wall	<10	10591.4	1563.0	937.9	1046.3	<46.4	**1.7**
01.10.11-BLM-T27-R004_183621	South side wall	12	33736.6	4518.1	2805.3	1560.9	167.1	**1.6**
01.10.11-BLM-T27-R005_183622	Beneath repair	<10	7768.8	1188.5	588.3	917.7	<46.4	**2.0**
01.10.11-BLM-T27-S1_183584	10' upgradient spoils	<10	5707.9	716.4	477.5	891.9	<46.4	**1.5**
01.10.11-BLM-T27-S2_183585	10' downgradient spoils	<10	6281.4	757.1	571.3	1072.0	<46.4	**1.3**
01.10.11-BLM-T27-S3_183586	Repair spoils	12	10564.5	2075.9	1611.5	1243.6	120.7	**1.3**
Trench #28 (Pipe Repair #9) - *Closed*								
01.10.11-BLM-T28-R001_183696	10' upgradient from repair	<10	5009.0	830.3	494.5	651.8	55.7	**1.7**
01.10.11-BLM-T28-R002_183697	10' downgradient from repair	<10	5537.6	1506.0	912.3	789.0	46.4	**1.7**
01.10.11-BLM-T28-R003_183698	North side wall	<10	1971.3	716.4	443.4	574.6	<46.4	**1.6**
01.10.11-BLM-T28-R004_183699	South side wall	<10	7509.0	814.1	494.5	643.2	55.7	**1.6**
01.10.11-BLM-T28-R005_183700	Beneath repair	<10	2213.3	569.8	486.0	857.6	<46.4	**1.2**
01.10.11-BLM-T28-S1_183693	10' upgradient spoils	<10	5743.7	838.5	375.2	986.3	<46.4	**2.2**

TABLE 1A
MOLYCORP LABORATORY RESULTS
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE II
MOUNTAIN PASS, CALIFORNIA

Sample ID	Sample Description	ICP-MS_U Uranium ppm	XRF Ba ppm	XRF Ce ppm	XRF La ppm	XRF Nd ppm	XRF Pb ppm	Ce/La Ratio
01.10.11-BLM-T28-S2_183694	10' downgradient spoils	<10	5896.1	1318.8	494.5	583.2	74.3	**2.7**
01.10.11-BLM-T28-S3_183695	Repair spoils	<10	5250.9	830.3	341.1	506.0	46.4	**2.4**
03.15.11-BLM-T28-C001-185113	Bottom Center Under Former Repair Location	<10	1747.3	309.3	196.1	626.1	<46.4	**1.6**
Trench #29 (Pipe Repair #10) - *Closed*								
01.12.11-BLM-T29-R001_183714	10' upgradient from repair	12	9623.7	1408.3	972.0	1132.1	<46.4	**1.4**
01.12.11-BLM-T29-R002_183715	10' downgradient from repair	<10	4704.3	846.6	400.8	540.3	46.4	**2.1**
01.12.11-BLM-T29-R003_183716	North side wall	11	7455.2	1440.9	861.2	1140.7	<46.4	**1.7**
01.12.11-BLM-T29-R004_183717	South side wall	<10	5367.4	879.2	409.3	669.0	<46.4	**2.1**
01.12.11-BLM-T29-R005_183718	Beneath repair	<10	4731.2	1123.4	469.0	643.2	46.4	**2.4**
01.12.11-BLM-T29-S1_183719	10' upgradient spoils	<10	4740.1	724.5	503.1	1072.0	<46.4	**1.4**
01.12.11-BLM-T29-S2_183720	10' downgradient spoils	11	6415.8	1172.3	656.5	591.8	55.7	**1.8**
01.12.11-BLM-T29-S3_183721	Repair spoils	<10	3915.8	529.1	255.8	789.0	<46.4	**2.1**
Trench #30 (Vent Pipe Outlet) - *Closed*								
01.12.11-BLM-T30-V001_183754	Vent Pipe Outlet	12	9103.9	1807.2	929.4	771.9	83.5	**1.9**
Trench #31 (Pipe Repair #11) - *Closed*								
01.12.11-BLM-T31-R001_183755	10' upgradient from repair	<10	3503.6	919.9	460.4	634.6	<46.4	**2.0**
01.12.11-BLM-T31-R002_183756	10' downgradient from repair	<10	3109.3	1213.0	613.9	540.3	<46.4	**2.0**
01.12.11-BLM-T31-R003_183757	North side wall	11	17078.9	2482.9	1415.4	960.5	130.0	**1.8**
01.12.11-BLM-T31-R004_183758	South side wall	<10	2589.6	895.5	1372.8	746.1	<46.4	**0.7**
01.12.11-BLM-T31-R005_183759	Beneath repair	11	9668.5	1685.1	1117.0	840.5	55.7	**1.5**
01.12.11-BLM-T31-S1_183857	10' upgradient spoils	<10	3736.6	814.1	520.1	497.4	<46.4	**1.6**
01.12.11-BLM-T31-S2_183858	10' downgradient spoils	<10	6541.2	1302.5	750.3	754.7	55.7	**1.7**
01.12.11-BLM-T31-S3_183859	Repair spoils	<10	2302.9	675.7	1244.9	711.8	<46.4	**0.5**
Trench #32 (Vent Pipe Outlet) - *Closed*								
01.13.11-BLM-T32-V001_183860	Vent Pipe Outlet	<10	2517.9	496.6	486.0	1209.3	<46.4	**1.0**
03.15.11-BLM-T32-C001-185111	Vent Pipe Outlet	<10	1648.7	626.8	324.0	523.2	<46.4	**1.9**
03.15.11-BLM-T32-S001-185112	Vent Pipe Spoils	<10	2777.8	830.3	477.5	626.1	<46.4	**1.7**
Trench #33 (Pipe Repair #12) - *Closed*								
01.13.11-BLM-T33-R001_183904	10' upgradient from repair	<10	2365.6	578.0	358.1	874.8	<46.4	**1.6**

TABLE 1A
MOLYCORP LABORATORY RESULTS
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE II
MOUNTAIN PASS, CALIFORNIA

Sample ID	Sample Description	ICP-MS_U Uranium ppm	XRF Ba ppm	XRF Ce ppm	XRF La ppm	XRF Nd ppm	XRF Pb ppm	Ce/La Ratio
01.13.11-BLM-T33-R002_183905	10' downgradient from repair	<10	2697.1	545.4	366.6	531.7	<46.4	**1.5**
01.13.11-BLM-T33-R003_183906	North side wall	<10	3862.0	659.4	349.6	651.8	<46.4	**1.9**
01.13.11-BLM-T33-R004_183907	South side wall	<10	7517.9	1229.2	707.7	986.3	<46.4	**1.7**
01.13.11-BLM-T33-R005_183908	Beneath repair	<10	3225.8	773.4	494.5	660.4	<46.4	**1.6**
01.13.11-BLM-T33-S1_183861	10' upgradient spoils	<10	3100.4	569.8	409.3	831.9	<46.4	**1.4**
01.13.11-BLM-T33-S2_183862	10' downgradient spoils	<10	4713.3	626.8	486.0	1200.7	<46.4	**1.3**
01.13.11-BLM-T33-S3_183863	Repair spoils	<10	3844.1	716.4	528.6	883.4	<46.4	**1.4**
Trench #34 (Elevated Radiological Readings #5 - Naturally Occuring) - *Closed*								
02.08.11-BLM-T34-E001_184279	Upgradient Section of Trench	<10	3032.3	2065.3	1189.5	843.1	87.3	**1.7**
02.08.11-BLM-T34-E002_184280	Middle Section of Trench	11	3626.3	2974.6	1760.7	1213.6	115.1	**1.7**
02.08.11-BLM-T34-E003_184281	Bottom Section of Trench	<10	2645.2	1219.5	677.9	771.0	43.6	**1.8**
Trench #35 (Pipe Repair #13) - *Closed*								
1.13.11-BLM-T35-R001_183953	10' upgradient from repair	10	4471.3	1042.0	758.9	746.1	<46.4	**1.4**
1.13.11-BLM-T35-R002_183954	10' downgradient from repair	<10	5161.3	1221.1	929.4	840.5	<46.4	**1.3**
1.13.11-BLM-T35-R003_183955	North side wall	12	3288.5	1172.3	1696.8	960.5	<46.4	**0.7**
1.13.11-BLM-T35-R004_183956	South side wall	10	2768.8	1595.6	2114.6	1192.1	<46.4	**0.8**
1.13.11-BLM-T35-R005_183957	Beneath repair	<10	2446.2	1261.8	1330.2	926.2	<46.4	**0.9**
1.13.11-BLM-T35-S1_183958	10' upgradient spoils	11	5241.9	1359.5	1048.8	780.4	46.4	**1.3**
1.13.11-BLM-T35-S2_183959	10' downgradient spoils	13	5313.6	1880.5	1108.5	883.4	55.7	**1.7**
1.13.11-BLM-T35-S3_183960	Repair spoils	12	5698.9	1872.4	1321.6	857.6	74.3	**1.4**
04.27.11-BLM-T35-C001-187091	Upgradient center of trench bottom	<10	2795.7	1115.3	2737.0	934.8	<46.4	**0.4**
04.27.11-BLM-T35-C002-187092	Downgradient center of trench bottom	<10	1998.2	366.3	<85.3	377.4	<46.4	**4.3**
04.27.11-BLM-T35-C003-187093	South side wall	<10	3548.4	757.1	349.6	506.0	55.7	**2.2**
04.27.11-BLM-T35-C004-187094	North side wall	<10	4417.6	944.3	494.5	506.0	74.3	**1.9**
052611-BLM-T35-C001-188482	Upgradient center of trench bottom	Pending	2905.0	814.9	561.1	343.1	64.1	**1.5**
052611-BLM-T35-C002-188483	Middle center of trench bottom	Pending	4946.2	1755.9	2081.3	937.4	52.0	**0.8**
052611-BLM-T35-C003-188539	Downgradient center of trench bottom	Pending	2238.4	796.2	2363.6	847.3	<46.4	**0.3**
Trench #36 (Vent Pipe Outlet) - *Closed*								
01.18.11-BLM-T36-V001_184175	Vent Line Crossing	<10	3385.3	826.3	309.5	577.2	<46.4	**2.7**
01.18.11-BLM-T36-V002_184176	Surface Where Vent Line Daylights	16	15653.2	2813.4	1653.3	1191.3	<46.4	**1.7**

TABLE 1A
MOLYCORP LABORATORY RESULTS
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE II
MOUNTAIN PASS, CALIFORNIA

Sample ID	Sample Description	ICP-MS_U Uranium ppm	XRF Ba ppm	XRF Ce ppm	XRF La ppm	XRF Nd ppm	XRF Pb ppm	Ce/La Ratio
Trench #37 (Pipe Repair #14) - *Closed*								
01.20.11-BLM-T37-R001_184162	See Trench #37 Sketch	<10	2392.5	546.2	225.1	414.2	<46.4	**2.4**
01.20.11-BLM-T37-R002_184163	See Trench #37 Sketch	<10	4444.4	727.8	301.8	639.8	<46.4	**2.4**
01.20.11-BLM-T37-R003_184164	See Trench #37 Sketch	<10	2919.4	1046.9	579.0	658.7	<46.4	**1.8**
01.20.11-BLM-T37-R004_184165	See Trench #37 Sketch	<10	1850.4	720.4	285.6	619.2	<46.4	**2.5**
01.20.11-BLM-T37-R005_184166	See Trench #37 Sketch	<10	4207.0	705.8	366.6	572.9	<46.4	**1.9**
01.20.11-BLM-T37-R006_184167	See Trench #37 Sketch	<10	5991.9	1863.4	893.6	726.4	67.8	**2.1**
01.20.11-BLM-T37-R007_184168	See Trench #37 Sketch	<10	5507.2	880.8	440.0	484.6	46.4	**2.0**
01.20.11-BLM-T37-R008_184169	See Trench #37 Sketch	<10	3541.2	757.1	228.5	476.8	<46.4	**3.3**
01.20.11-BLM-T37-R009_184170	See Trench #37 Sketch	<10	1997.3	504.7	207.2	552.3	<46.4	**2.4**
01.20.11-BLM-T37-R010_184171	See Trench #37 Sketch	<10	4109.3	799.4	398.2	585.8	<46.4	**2.0**
01.20.11-BLM-T37-R011_184173	See Trench #37 Sketch	<10	2066.3	552.8	183.3	514.6	<46.4	**3.0**
01.20.11-BLM-T37-R012_184174	See Trench #37 Sketch	<10	2379.0	581.2	223.4	614.9	<46.4	**2.6**
01.20.11-BLM-T37-S1_184120	See Trench #37 Sketch	<10	4336.9	887.3	511.6	909.1	<46.4	**1.7**
01.20.11-BLM-T37-S2_184121	See Trench #37 Sketch	<10	4677.4	732.7	469.0	1020.6	<46.4	**1.6**
01.20.11-BLM-T37-S3_184122	See Trench #37 Sketch	<10	6335.1	952.5	613.9	1106.3	<46.4	**1.6**
01.20.11-BLM-T37-S4_184123	See Trench #37 Sketch	11	5419.4	984.2	405.9	571.2	<46.4	**2.4**
01.20.11-BLM-T37-S5_184125	See Trench #37 Sketch	12	6843.2	1036.3	671.0	595.2	<46.4	**1.5**
01.20.11-BLM-T37-S6_184126	See Trench #37 Sketch	<10	8120.1	1308.2	542.3	695.5	64.1	**2.4**
Trench #38 (Pipe Repair #15) - *Closed*								
01.20.11-BLM-T38-R001_184214	See Trench #38 Sketch	<10	2236.6	499.8	145.8	351.6	<46.4	**3.4**
01.20.11-BLM-T38-R002_184215	See Trench #38 Sketch	<10	2670.3	566.6	137.3	521.4	<46.4	**4.1**
01.20.11-BLM-T38-R003_184216	See Trench #38 Sketch	<10	5713.3	995.6	484.3	711.8	<46.4	**2.1**
01.20.11-BLM-T38-R004_184217	See Trench #38 Sketch	<10	1687.3	264.6	<85.3	384.2	<46.4	**3.1**
01.20.11-BLM-T38-R005_184218	See Trench #38 Sketch	<10	2874.6	445.3	<85.3	723.8	<46.4	**5.2**
01.20.11-BLM-T38-S1_184177	See Trench #38 Sketch	<10	2362.9	439.6	146.7	470.8	<46.4	**3.0**
01.20.11-BLM-T38-S2_184178	See Trench #38 Sketch	<10	6033.2	1095.7	413.5	697.3	<46.4	**2.6**
01.20.11BLM-T38-S3_184179	See Trench #38 Sketch	<10	4510.8	870.2	312.1	461.4	<46.4	**2.8**
Trench #39 (Elevated Radiological Readings #6) - *Closed*								
02.01.11-BLM-T39-E001_184272	See Trench #39 Sketch	<10	1025.1	124.6	<85.3	464.0	<46.4	**1.5**
02.01.11-BLM-T39-E002_184273	See Trench #39 Sketch	<10	1326.2	165.3	<85.3	429.7	<46.4	**1.9**
02.01.11-BLM-T39-E003_184274	See Trench #39 Sketch	<10	905.0	129.4	<85.3	405.7	<46.4	**1.5**
02.01.11-BLM-T39-E004_184275	See Trench #39 Sketch	<10	1207.9	347.6	<85.3	396.2	<46.4	**4.1**
02.01.11-BLM-T39-E005_184276	See Trench #39 Sketch	<10	3137.1	2455.2	1630.3	1128.6	78.0	**1.5**
02.01.11-BLM-T39-E006_184277	See Trench #39 Sketch	<10	2536.7	591.0	403.3	615.8	88.2	**1.5**
02.01.11-BLM-T39-E007_184278	See Trench #39 Sketch	<10	1729.4	459.9	131.3	400.5	<46.4	**3.5**

TABLE 1A
MOLYCORP LABORATORY RESULTS
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE II
MOUNTAIN PASS, CALIFORNIA

Sample ID	Sample Description	ICP-MS_U Uranium ppm	XRF Ba ppm	XRF Ce ppm	XRF La ppm	XRF Nd ppm	XRF Pb ppm	Ce/La Ratio
Trench #40 (Pipe Repair #16 / Vent Pipe Outlet) - *Closed*								
01.31.11-BLM-T40-V001_184219	Vent Pipe Outlet	<10	1133.5	470.5	178.2	367.1	<46.4	**2.6**
01.31.11-BLM-T40-R001_184267	10' upgradient from repair	<10	4270.6	601.6	274.6	528.3	<46.4	**2.2**
01.31.11-BLM-T40-R002_184268	10' downgradient from repair	<10	4269.7	764.4	324.9	540.3	<46.4	**2.4**
01.31.11-BLM-T40-R003_184269	North side wall	<10	4518.8	575.5	283.1	759.9	<46.4	**2.0**
01.31.11-BLM-T40-R004_184270	South side wall	<10	2486.6	504.7	153.5	476.8	<46.4	**3.3**
01.31.11-BLM-T40-R005_184271	Beneath repair	<10	4766.1	857.2	316.3	608.9	<46.4	**2.7**
01.31.11-BLM-T40-S001_184220	10' upgradient spoils	<10	4182.8	753.8	415.2	523.2	<46.4	**1.8**
01.31.11-BLM-T40-S002_184221	10' downgradient spoils	<10	4062.7	637.4	208.0	529.2	<46.4	**3.1**
01.31.11-BLM-T40-S003_184222	Repair spoils	<10	4895.2	928.9	420.4	681.0	<46.4	**2.2**
Trench #41 (Elevated Radiological Readings #7) - *Closed*								
02.07.11-BLM-T41-E001-184476	See Trench #41 Sketch	<10	1523.3	382.6	298.4	583.2	<46.4	**1.3**
02.07.11-BLM-T41-E002-184477	See Trench #41 Sketch	<10	1245.5	1074.6	1739.4	1149.2	74.3	**0.6**
02.07.11-BLM-T41-E003-184478	See Trench #41 Sketch	<10	2338.7	1538.6	2941.7	1964.0	139.2	**0.5**
02.07.11-BLM-T41-E004-184480	See Trench #41 Sketch	21	39659.5	6716.1	4246.2	2101.2	259.9	**1.6**
Trench #42 (Vent Pipe Outlet) - *Closed*								
02.17.11-BLM-T42-V001-185482	Vent Outlet	<10	5000.0	748.9	392.2	540.3	<46.4	**1.9**

TABLE 1B
MOLYCORP LABORATORY RESULTS
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE III
MOUNTAIN PASS, CALIFORNIA

Sample ID	Sample Description	ICP-MS_U Uranium ppm	XRF Ba ppm	XRF Ce ppm	XRF La ppm	XRF Nd ppm	XRF Pb ppm	Ce/La Ratio
Trench #1 (Pipe Repair #1) - *Closed*								
03.29.11-MM-T1-R001_185857	See Trench #1 Sketch	*<10*	594.1	393.2	<85.3	317.3	<46.4	**4.6**
03.29.11-MM-T1-R002_185858	See Trench #1 Sketch	*<10*	669.4	176.7	<85.3	276.2	<46.4	**2.1**
03.29.11-MM-T1-R003_185859	See Trench #1 Sketch	*<10*	567.2	311.0	<85.3	340.5	<46.4	**3.6**
03.29.11-MM-T1-R004_185860	See Trench #1 Sketch	*14*	644.3	276.0	<85.3	470.8	<46.4	**3.2**
03.29.11-MM-T1-R005_185861	See Trench #1 Sketch	*<10*	483.9	241.0	<85.3	248.7	<46.4	**2.8**
03.29.11-MM-T1-R006_185862	See Trench #1 Sketch	*18*	699.8	235.3	<85.3	410.8	<46.4	**2.8**
03.29.11-MM-T1-R007_185863	See Trench #1 Sketch	*<10*	614.7	331.3	<85.3	293.3	<46.4	**3.9**
03.29.11-MM-T1-R008_185864	See Trench #1 Sketch	*16*	578.9	290.6	<85.3	350.8	<46.4	**3.4**
03.29.11-MM-T1-R009_185865	See Trench #1 Sketch	*<10*	684.6	168.5	<85.3	263.3	<46.4	**2.0**
03.29.11-MM-T1-R010_185866	See Trench #1 Sketch	*<10*	731.2	315.0	<85.3	305.3	<46.4	**3.7**
03.29.11-MM-T1-S1_185867	See Trench #1 Sketch	<10	509.9	202.7	<85.3	300.2	<46.4	**2.4**
03.29.11-MM-T1-S2_185868	See Trench #1 Sketch	12.51	447.1	309.3	<85.3	282.2	<46.4	**3.6**
03.29.11-MM-T1-S3_185869	See Trench #1 Sketch	13.54	458.8	229.6	<85.3	287.3	<46.4	**2.7**
03.29.11-MM-T1-S4_185870	See Trench #1 Sketch	9.686	680.1	275.2	<85.3	313.0	<46.4	**3.2**
03.29.11-MM-T1-S5_185871	See Trench #1 Sketch	<10	706.1	266.2	<85.3	339.6	<46.4	**3.1**
Trench #2 (Pipe Repair #2) - *Closed*								
03.31.11-MM-T2-R001_186055	See Trench #2 Sketch	<10	752.7	220.6	<85.3	259.0	<46.4	**2.6**
03.31.11-MM-T2-R002_186056	See Trench #2 Sketch	<10	622.8	128.6	<85.3	319.9	<46.4	**1.5**
03.31.11-MM-T2-R003_186057	See Trench #2 Sketch	<10	394.3	184.0	<85.3	307.9	<46.4	**2.2**
03.31.11-MM-T2-R004_186058	See Trench #2 Sketch	12	575.3	206.0	<85.3	319.0	<46.4	**2.4**
03.31.11-MM-T2-R005_186059	See Trench #2 Sketch	<10	569.0	151.4	<85.3	337.9	<46.4	**1.8**
03.31.11-MM-T2-R006_186060	See Trench #2 Sketch	<10	600.4	96.1	<85.3	300.2	<46.4	**1.1**
03.31.11-MM-T2-R007_186061	See Trench #2 Sketch	15	401.4	192.9	<85.3	276.2	<46.4	**2.3**
03.31.11-MM-T2-R008_186063	See Trench #2 Sketch	<10	549.3	227.1	<85.3	283.9	<46.4	**2.7**
03.31.11-MM-T2-R009_186064	See Trench #2 Sketch	<10	650.5	200.3	<85.3	334.5	<46.4	**2.3**
03.31.11-MM-T2-R010_186065	See Trench #2 Sketch	<10	649.6	226.3	<85.3	306.2	<46.4	**2.7**
03.31.11-MM-T2-R011_186066	See Trench #2 Sketch	<10	777.8	242.6	<85.3	342.2	<46.4	**2.8**
03.31.11-MM-T2-R012-186138	See Trench #2 Sketch	<10	583.3	151.4	<85.3	295.0	<46.4	**1.8**
03.31.11-MM-T2-R013-186139	See Trench #2 Sketch	<10	557.3	173.4	<85.3	331.0	<46.4	**2.0**
03.31.11-MM-T2-S1_186067	See Trench #2 Sketch	<10	609.3	202.7	<85.3	398.8	<46.4	**2.4**
03.31.11-MM-T2-S2_186068	See Trench #2 Sketch	<10	524.2	135.9	<85.3	303.6	<46.4	**1.6**
03.31.11-MM-T2-S3_186069	See Trench #2 Sketch	<10	702.5	153.0	<85.3	331.9	<46.4	**1.8**
03.31.11-MM-T2-S4_186070	See Trench #2 Sketch	<10	563.6	203.5	<85.3	289.0	<46.4	**2.4**

TABLE 1B
MOLYCORP LABORATORY RESULTS
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE III
MOUNTAIN PASS, CALIFORNIA

Sample ID	Sample Description	ICP-MS_U Uranium ppm	XRF Ba ppm	XRF Ce ppm	XRF La ppm	XRF Nd ppm	XRF Pb ppm	Ce/La Ratio
Trench #3 (Pipe Repair #3) - *Closed*								
04.04.11-MM-T3-R001-186140	10' upgradient from repair	11	523.3	138.4	<85.3	300.2	<46.4	**1.6**
04.04.11-MM-T3-R002-186141	10' downgradient from repair	<10	733.0	209.2	<85.3	291.6	<46.4	**2.5**
04.04.11-MM-T3-R003-186142	North side wall	<10	741.9	163.6	<85.3	317.3	<46.4	**1.9**
04.04.11-MM-T3-R004-186143	South side wall	13	563.6	293.1	<85.3	292.5	<46.4	**3.4**
04.04.11-MM-T3-R005-186144	Beneath repair	<10	473.1	241.0	<85.3	289.9	<46.4	**2.8**
04.04.11-MM-T3-S1-186145	10' upgradient spoils	<10	596.8	122.9	<85.3	251.3	<46.4	**1.4**
04.04.11-MM-T3-S2-186146	10' downgradient spoils	<10	565.4	135.1	<85.3	343.1	<46.4	**1.6**
04.04.11-MM-T3-S3-186147	Repair spoils	<10	492.8	199.4	<85.3	271.0	<46.4	**2.3**
Trench #4 (Elevated Radiological Readings #1) - *Closed*								
051911-MM-T4-E001-188099	See Trench #4 Sketch	15	942.7	109.9	<85.3	331.0	<46.4	**1.3**
051911-MM-T4-E002-188103	See Trench #4 Sketch	16	769.7	243.4	<85.3	331.9	<46.4	**2.9**
051911-MM-T4-E003-188106	See Trench #4 Sketch	18	697.1	238.5	<85.3	299.3	<46.4	**2.8**
051911-MM-T4-E004-188107	See Trench #4 Sketch	14	581.5	253.2	<85.3	325.0	<46.4	**3.0**
051911-MM-T4-E005-188108	See Trench #4 Sketch	14	784.9	362.3	<85.3	357.6	<46.4	**4.2**
051911-MM-T4-E006-188109	See Trench #4 Sketch	13	1201.6	263.8	<85.3	343.9	<46.4	**3.1**
051911-MM-T4-E007-188110	See Trench #4 Sketch	23	544.8	265.4	<85.3	334.5	<46.4	**3.1**
051911-MM-T4-E008-188111	See Trench #4 Sketch	13	692.7	236.1	<85.3	351.6	<46.4	**2.8**
051911-MM-T4-E009-188112	See Trench #4 Sketch	10	684.6	185.6	<85.3	339.6	<46.4	**2.2**
051911-MM-T4-E010-188113	See Trench #4 Sketch	<10	546.6	165.3	<85.3	353.3	<46.4	**1.9**
052411-MM-T4-C001-188231	Surface Soil Sample Around Trench #4 - See Sketch	<10	526.9	292.3	<85.3	337.9	<46.4	**3.4**
052411-MM-T4-C002-188232	Surface Soil Sample Around Trench #4 - See Sketch	<10	635.3	250.7	<85.3	234.1	217.2	**2.9**
052411-MM-T4-C003-188233	Surface Soil Sample Around Trench #4 - See Sketch	<10	431.9	181.5	<85.3	252.1	<46.4	**2.1**
052411-MM-T4-C004-188234	Surface Soil Sample Around Trench #4 - See Sketch	<10	611.1	219.0	<85.3	265.9	<46.4	**2.6**
052411-MM-T4-C005-188235	Surface Soil Sample Around Trench #4 - See Sketch	<10	575.3	110.7	<85.3	264.2	<46.4	**1.3**
052411-MM-T4-C006-188236	Surface Soil Sample Around Trench #4 - See Sketch	<10	344.1	172.6	<85.3	249.6	<46.4	**2.0**
052411-MM-T4-C007-188237	Surface Soil Sample Around Trench #4 - See Sketch	<10	630.8	181.5	<85.3	295.9	<46.4	**2.1**
052411-MM-T4-C008-188238	Surface Soil Sample Around Trench #4 - See Sketch	<10	525.1	120.5	<85.3	284.7	<46.4	**1.4**
052411-MM-T4-C009-188239	Surface Soil Sample Around Trench #4 - See Sketch	<10	715.1	188.9	<85.3	300.2	<46.4	**2.2**
052411-MM-T4-C010-188240	Surface Soil Sample Around Trench #4 - See Sketch	<10	582.4	162.0	<85.3	263.3	65.0	**1.9**
052411-MM-T4-C011-188241	Surface Soil Sample Around Trench #4 - See Sketch	<10	585.1	75.7	<85.3	280.4	211.7	**0.9**
052411-MM-T4-C012-188242	Surface Soil Sample Around Trench #4 - See Sketch	<10	547.5	152.2	<85.3	301.0	<46.4	**1.8**
052411-MM-T4-C013-188243	Surface Soil Sample Around Trench #4 - See Sketch	14	679.2	118.9	<85.3	350.8	<46.4	**1.4**
052411-MM-T4-C014-188244	Surface Soil Sample Around Trench #4 - See Sketch	11	417.6	258.9	<85.3	319.9	<46.4	**3.0**

TABLE 1B
MOLYCORP LABORATORY RESULTS
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE III
MOUNTAIN PASS, CALIFORNIA

Sample ID	Sample Description	ICP-MS_U Uranium ppm	XRF Ba ppm	XRF Ce ppm	XRF La ppm	XRF Nd ppm	XRF Pb ppm	Ce/La Ratio
052411-MM-T4-C015-188245	Surface Soil Sample Around Trench #4 - See Sketch	14	583.3	131.1	<85.3	305.3	<46.4	**1.5**
052411-MM-T4-C016-188246	Surface Soil Sample Around Trench #4 - See Sketch	14	517.0	219.8	<85.3	294.2	<46.4	**2.6**
052411-MM-T4-C017-188247	Surface Soil Sample Around Trench #4 - See Sketch	11	649.6	128.6	<85.3	283.9	<46.4	**1.5**
052411-MM-T4-C018-188248	Surface Soil Sample Around Trench #4 - See Sketch	12	548.4	109.9	<85.3	277.9	<46.4	**1.3**
052411-MM-T4-C019-188249	Surface Soil Sample Around Trench #4 - See Sketch	12	569.0	259.7	<85.3	305.3	<46.4	**3.0**
052411-MM-T4-C020-188250	Surface Soil Sample Around Trench #4 - See Sketch	<10	506.3	245.8	<85.3	240.1	<46.4	**2.9**
052411-MM-T4-C021-188251	Surface Soil Sample Around Trench #4 - See Sketch	13	633.5	220.6	<85.3	341.3	<46.4	**2.6**
052411-MM-T4-C022-188252	Surface Soil Sample Around Trench #4 - See Sketch	11	600.4	215.7	<85.3	267.6	<46.4	**2.5**
052411-MM-T4-C023-188253	Surface Soil Sample Around Trench #4 - See Sketch	12	460.6	95.2	<85.3	247.0	<46.4	**1.1**
052411-MM-T4-C024-188254	Surface Soil Sample Around Trench #4 - See Sketch	10	540.3	211.7	<85.3	293.3	<46.4	**2.5**
052411-MM-T4-C025-188255	Surface Soil Sample Around Trench #4 - See Sketch	12	577.1	163.6	<85.3	272.7	50.1	**1.9**
052411-MM-T4-C026-188256	Surface Soil Sample Around Trench #4 - See Sketch	13	644.3	99.3	<85.3	235.0	<46.4	**1.2**
052411-MM-T4-C027-188257	Surface Soil Sample Around Trench #4 - See Sketch	<10	761.6	159.6	<85.3	281.3	<46.4	**1.9**
Trench #5 (Pipe Repair #4) - *Closed*								
04.05.11-MM-T5-R001-186201	10' upgradient from repair	<10	693.5	206.0	<85.3	279.6	<46.4	**2.4**
04.05.11-MM-T5-R002-186202	10' downgradient from repair	11	612.9	131.1	<85.3	296.7	<46.4	**1.5**
04.05.11-MM-T5-R003-186203	North side wall	12	612.0	204.3	<85.3	313.0	<46.4	**2.4**
04.05.11-MM-T5-R004-186204	South side wall	<10	493.7	133.5	<85.3	325.0	<46.4	**1.6**
04.05.11-MM-T5-R005-186205	Beneath repair	<10	510.8	87.9	<85.3	307.0	<46.4	**1.0**
04.05.11-MM-T5-S1-186206	10' upgradient spoils	23	623.7	109.1	<85.3	289.9	<46.4	**1.3**
04.05.11-MM-T5-S2-186207	10' downgradient spoils	<10	483.9	255.6	<85.3	252.1	<46.4	**3.0**
04.05.11-MM-T5-S3-186208	Repair spoils	10	601.3	104.2	<85.3	283.0	<46.4	**1.2**
Trench #6 (Vent Pipe Outlet) - *Closed*								
04.05.11-MM-T6-V001-186209	Vent Pipe Outlet	28	654.1	302.8	<85.3	309.6	<46.4	**3.6**
Trench #7 (Pipe Repair #5) - *Closed*								
04.05.11-MM-T7-R001_186210	See Trench #7 Sketch	<10	688.2	194.6	<85.3	229.0	<46.4	**2.3**
04.05.11-MM-T7-R002_186211	See Trench #7 Sketch	12	771.5	158.7	<85.3	290.7	<46.4	**1.9**
04.05.11-MM-T7-R003_186212	See Trench #7 Sketch	11	627.2	256.4	<85.3	289.9	<46.4	**3.0**
04.05.11-MM-T7-R004_186213	See Trench #7 Sketch	23	776.9	340.3	<85.3	379.9	<46.4	**4.0**
04.05.11-MM-T7-R005_186214	See Trench #7 Sketch	21	589.6	271.1	86.1	246.1	<46.4	**3.1**
04.05.11-MM-T7-R006_186215	See Trench #7 Sketch	14	776.0	215.7	<85.3	345.6	<46.4	**2.5**
04.05.11-MM-T7-R007_186216	See Trench #7 Sketch	12	752.7	322.4	<85.3	325.0	<46.4	**3.8**

TABLE 1B
MOLYCORP LABORATORY RESULTS
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE III
MOUNTAIN PASS, CALIFORNIA

Sample ID	Sample Description	ICP-MS_U Uranium ppm	XRF Ba ppm	XRF Ce ppm	XRF La ppm	XRF Nd ppm	XRF Pb ppm	Ce/La Ratio
04.05.11-MM-T7-R008_186217	See Trench #7 Sketch	18	814.5	139.2	<85.3	326.8	<46.4	**1.6**
04.05.11-MM-T7-S1_186218	See Trench #7 Sketch	11	516.1	168.5	<85.3	337.0	<46.4	**2.0**
04.05.11-MM-T7-S2_186219	See Trench #7 Sketch	11	621.0	192.9	<85.3	280.4	<46.4	**2.3**
04.05.11-MM-T7-S3_186220	See Trench #7 Sketch	<10	622.8	346.8	<85.3	310.5	<46.4	**4.1**
04.05.11-MM-T7-S4_186221	See Trench #7 Sketch	12	716.8	311.0	<85.3	295.9	<46.4	**3.6**
Trench #8 (Elevated Radiological Readings #2) - *Closed*								
052511-MM-T8-C001_188457	See Trench #8 Sketch	12	594.1	188.9	<85.3	295.0	<46.4	**2.2**
052511-MM-T8-C002_188458	See Trench #8 Sketch	13	590.5	273.5	<85.3	329.3	<46.4	**3.2**
052511-MM-T8-C003_188459	See Trench #8 Sketch	13	641.6	314.2	<85.3	369.6	<46.4	**3.7**
052511-MM-T8-C004_188460	See Trench #8 Sketch	12	676.5	235.3	<85.3	310.5	<46.4	**2.8**
052511-MM-T8-C005_188461	See Trench #8 Sketch	13	566.3	194.6	<85.3	292.5	<46.4	**2.3**
052511-MM-T8-C006_188462	See Trench #8 Sketch	13	628.1	236.1	<85.3	323.3	<46.4	**2.8**
052511-MM-T8-C007_188463	See Trench #8 Sketch	10	651.4	223.1	<85.3	266.7	<46.4	**2.6**
Trench #9 (Pipe Repair #6) - *Closed*								
04.06.11-MM-T9-R001_186222	10' upgradient from repair	14	572.6	130.3	<85.3	261.6	<46.4	**1.5**
04.06.11-MM-T9-R002_186223	10' downgradient from repair	25	630.8	211.7	<85.3	253.9	<46.4	**2.5**
04.06.11-MM-T9-R003_186224	North side wall	30	636.2	300.4	<85.3	295.9	<46.4	**3.5**
04.06.11-MM-T9-R004_186225	South side wall	14	661.3	136.8	<85.3	265.9	<46.4	**1.6**
04.06.11-MM-T9-R005_186226	Beneath repair	10	533.2	215.7	109.1	362.8	<46.4	**2.0**
04.06.11-MM-T9-S1_186227	10' upgradient spoils	24	537.6	203.5	<85.3	324.2	<46.4	**2.4**
04.06.11-MM-T9-S2_186228	10' downgradient spoils	<10	647.0	184.8	<85.3	249.6	<46.4	**2.2**
04.06.111-MM-T9-S3_186229	Repair spoils	<10	539.4	<81.4	<85.3	335.3	<46.4	**ND/ND**
Trench #10 (Vent Pipe Outlet) - *Closed*								
04.11.11-MM-T10-V001_186466	Vent Pipe Outlet	12	503.6	166.9	<85.3	333.6	<46.4	**2.0**
Trench #11 (Vent Pipe Outlet) - *Closed*								
04.13.11-MM-T11-V001_186507	Vent Pipe Outlet	11	798.4	182.4	<85.3	356.8	<46.4	**2.1**
Trench #12 (Pipe Repair #7) - *Closed*								
04.13.11-MM-T12-R001_186508	10' upgradient from repair	<10	589.6	223.1	<85.3	261.6	<46.4	**2.6**

TABLE 1B
MOLYCORP LABORATORY RESULTS
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE III
MOUNTAIN PASS, CALIFORNIA

Sample ID	Sample Description	ICP-MS_U Uranium ppm	XRF Ba ppm	XRF Ce ppm	XRF La ppm	XRF Nd ppm	XRF Pb ppm	Ce/La Ratio
04.13.11-MM-T12-R002_186509	10' downgradient from repair	<10	560.0	95.2	<85.3	318.2	<46.4	**1.1**
04.13.11-MM-T12-R003_186510	North side wall	<10	715.9	168.5	<85.3	213.6	<46.4	**2.0**
04.13.11-MM-T12-R004_186511	South side wall	12	685.5	376.9	<85.3	302.7	<46.4	**4.4**
04.13.11-MM-T12-R005_186512	Beneath repair	11	773.3	311.8	<85.3	306.2	<46.4	**3.7**
04.13.11-MM-T12-S1_186515	10' upgradient spoils	<10	533.2	123.7	<85.3	310.5	<46.4	**1.5**
04.13.11-MM-T12-S2_186516	10' downgradient spoils	<10	678.3	251.5	<85.3	333.6	<46.4	**2.9**
04.13.11-MM-T12-S3_186517	Repair spoils	<10	681.9	155.5	<85.3	253.0	<46.4	**1.8**
Trench #13 (Pipe Repair #8) - *Closed*								
04.13.11-MM-T13-R001_186518	10' upgradient from repair	12	596.8	<81.4	<85.3	253.0	<46.4	**ND/ND**
04.13.11-MM-T13-R002_186519	10' downgradient from repair	<10	680.1	<81.4	<85.3	291.6	<46.4	**ND/ND**
04.13.11-MM-T13-R003_186520	North side wall	<10	485.7	158.7	<85.3	313.9	<46.4	**1.9**
04.13.11-MM-T13-R004_186521	South side wall	<10	690.9	197.8	<85.3	240.1	<46.4	**2.3**
04.13.11-MM-T13-R005_186523	Beneath repair	<10	715.1	152.2	<85.3	223.8	<46.4	**1.8**
04.13.11-MM-T13-S1_186524	10' upgradient spoils	<10	582.4	<81.4	<85.3	296.7	<46.4	**ND/ND**
04.13.11-MM-T13-S2_186525	10' downgradient spoils	<10	595.0	122.1	<85.3	320.8	<46.4	**1.4**
04.13.11-MM-T13-S3_186526	Repair spoils	<10	546.6	210.0	<85.3	292.5	<46.4	**2.5**
Trench #14 (Elevated Radiological Readings #3) - *Closed*								
052511-BLM-T14-E001_188464	See Trench #14 Sketch	11	1046.6	240.1	165.4	367.9	<46.4	**1.5**
052511-BLM-T14-E002_188465	See Trench #14 Sketch	<10	755.4	294.7	<85.3	319.0	<46.4	**3.5**
052511-BLM-T14-E003_188466	See Trench #14 Sketch	13	988.4	333.0	197.0	443.4	<46.4	**1.7**
052511-BLM-T14-E004_188467	See Trench #14 Sketch	<10	790.3	270.3	85.3	373.1	<46.4	**3.2**
052511-BLM-T14-E005_188468	See Trench #14 Sketch	<10	1264.3	313.4	188.4	463.1	<46.4	**1.7**
052511-BLM-T14-E006_188469	See Trench #14 Sketch	14	888.9	81.4	<85.3	364.5	<46.4	**1.0**
062811-BLM-T14-R001_189664	Upgradient end of Trench #14 - See Sketch	*<10*	773.3	341.1	<85.3	300.2	<46.4	**4.0**
062811-BLM-T14-R002_189665	Upgradient end of Trench #14 - See Sketch	*<10*	717.7	171.0	<85.3	307.9	<46.4	**2.0**
062811-BLM-T14-R003_189666	Upgradient end of Trench #14 - See Sketch	*<10*	1086.0	172.6	163.7	324.2	<46.4	**1.1**
062811-BLM-T14-R004_189667	Upgradient end of Trench #14 - See Sketch	*<10*	666.7	250.7	<85.3	300.2	<46.4	**2.9**
072611-BLM-T14-C001-191059	Sidewall	*Pending*	465.9	309.3	<85.3	283.0	<46.4	**3.6**
Trench #15 (Pipe Repair #9) - *Closed*								
041911-BLM-T15-R001_186787	10' upgradient from repair	<10	803.8	246.7	190.1	307.9	<46.4	**1.3**

TABLE 1B
MOLYCORP LABORATORY RESULTS
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE III
MOUNTAIN PASS, CALIFORNIA

Sample ID	Sample Description	ICP-MS_U Uranium ppm	XRF Ba ppm	XRF Ce ppm	XRF La ppm	XRF Nd ppm	XRF Pb ppm	Ce/La Ratio
041911-BLM-T15-R002_186788	10' downgradient from repair	<10	632.6	101.8	<85.3	304.5	<46.4	**1.2**
041911-BLM-T15-R003_186789	North side wall	<10	642.5	268.6	155.2	289.9	<46.4	**1.7**
041911-BLM-T15-R004_186790	South side wall	<10	796.6	414.4	725.6	559.2	<46.4	**0.6**
041911-BLM-T15-R005_186791	Beneath repair	10	800.2	349.2	227.7	365.4	<46.4	**1.5**
041911-BLM-T15-S1_186792	10' upgradient spoils	14	649.6	339.5	89.5	345.6	<46.4	**3.8**
041911-BLM-T15-S2_186793	10' downgradient spoils	10	828.9	464.0	89.5	361.9	<46.4	**5.2**
041911-BLM-T15-S3_186794	Repair spoils	15	549.3	302.0	90.4	364.5	<46.4	**3.3**
062711-BLM-T15-C001_189659	Sidewall of Trench #15 after removals - See Sketch	*<10*	632.6	193.7	<85.3	312.2	<46.4	**2.3**
062711-BLM-T15-C002_189660	Sidewall of Trench #15 after removals - See Sketch	*<10*	640.7	200.3	<85.3	325.0	<46.4	**2.3**
062711-BLM-T15-C003_189661	Sidewall of Trench #15 after removals - See Sketch	*<10*	659.5	168.5	<85.3	302.7	<46.4	**2.0**
062711-BLM-T15-C004_189662	Sidewall of Trench #15 after removals - See Sketch	*<10*	623.7	306.1	<85.3	315.6	<46.4	**3.6**
062711-BLM-T15-C005_189663	Sidewall of Trench #15 after removals - See Sketch	*<10*	828.9	117.2	<85.3	289.9	<46.4	**1.4**
Trench #16 (Vent Pipe Outlet) - *Closed*								
041911-BLM-T16-V001_186795	Vent Pipe Outlet	<10	599.5	121.3	<85.3	309.6	<46.4	**1.4**
Trench #17 (6-Inch Wastewater Pipeline Endpoint) - *Closed*								
050211-BLM-T17-A001-187647	Pipeline Endpoint	<10	600.4	154.7	<85.3	377.4	<46.4	**1.8**
Trench #18 (Elevated Radiological Readings #4) - *Closed*								
061311-BLM-T18-E001_189124	See Trench #18 Sketch	<10	745.5	284.9	<85.3	353.3	<46.4	**3.3**
061311-BLM-T18-E002_189125	See Trench #18 Sketch	<10	672.0	214.9	<85.3	363.6	<46.4	**2.5**
061311-BLM-T18-E003_189126	See Trench #18 Sketch	11	587.8	333.0	<85.3	298.5	<46.4	**3.9**
061311-BLM-T18-E004_189127	See Trench #18 Sketch	<10	524.2	196.2	<85.3	294.2	<46.4	**2.3**
061311-BLM-T18-E005_189128	See Trench #18 Sketch	<10	501.8	150.6	<85.3	286.4	<46.4	**1.8**
061311-BLM-T18-E006_189129	See Trench #18 Sketch	<10	672.9	279.2	<85.3	249.6	<46.4	**3.3**
061311-BLM-T18-E007_189130	See Trench #18 Sketch	18	675.6	227.9	<85.3	389.4	<46.4	**2.7**
061311-BLM-T18-E008_189131	See Trench #18 Sketch	13	692.7	346.0	148.4	342.2	<46.4	**2.3**
Trench #19 (Pipe Repair #10 - Cut and Capped At Both Ends) - *Closed*								
100511-BLM-T19-R001-194104	10' upgradient from repair	24.5	905.0	480.3	622.4	506.0	<46.4	**0.8**
100511-BLM-T19-R002-194105	10' downgradient from repair	70.1	591.4	284.9	<85.3	377.4	<46.4	**3.3**
100511-BLM-T19-R003-194106	East side wall	<10	931.9	244.2	<85.3	308.7	<46.4	**2.9**

TABLE 1B
MOLYCORP LABORATORY RESULTS
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE III
MOUNTAIN PASS, CALIFORNIA

Sample ID	Sample Description	ICP-MS_U Uranium ppm	XRF Ba ppm	XRF Ce ppm	XRF La ppm	XRF Nd ppm	XRF Pb ppm	Ce/La Ratio
100511-BLM-T19-R004-194107	West side wall	<10	851.3	203.5	<85.3	351.6	<46.4	**2.4**
100511-BLM-T19-R005-194108	Beneath repair	<10	1129.0	366.3	<85.3	308.7	<46.4	**4.3**
100511-BLM-T19-R006-194109	20' upgradient from repair	19.2	672.0	211.7	136.4	437.4	<46.4	**1.6**
100311-BLM-T19-BIN 6094-194103	Trench spoils placed into Bin #6094 (composite sample)	15.9	842.3	236.1	<85.3	368.8	<46.4	**2.8**
102711-BLM-T19-C001-195246	West side wall after removals - See Sketch	<10	976.7	284.9	<85.3	634.6	<46.4	**3.3**
102711-BLM-T19-C002-195247	East side wall after removals - See Sketch	12.9	752.7	276.8	<85.3	377.4	<46.4	**3.2**
102711-BLM-T19-C003-195248	10' upgradient from repair after removals - See Sketch	24.9	609.3	333.8	<85.3	308.7	<46.4	**3.9**
Trench #20 (Pipe Repair #11) - *Closed*								
100611-BLM-T20-R001-194312	10' upgradient from repair	*17.1*	833.3	309.3	<85.3	591.8	<46.4	**3.6**
100611-BLM-T20-R002-194313	10' downgradient from repair	*<10*	654.1	415.2	<85.3	857.6	<46.4	**4.9**
100611-BLM-T20-R003-194314	East side wall	*16.0*	1012.5	667.5	1006.1	660.4	<46.4	**0.7**
100611-BLM-T20-R004-194315	West side wall	*11.7*	618.3	260.5	<85.3	377.4	<46.4	**3.1**
100611-BLM-T20-R005-194316	Beneath repair	*14.0*	725.8	341.9	93.8	351.6	<46.4	**3.6**
100611-BLM-T20-S1-194317	10' upgradient spoils	*<10*	430.1	146.5	<85.3	403.1	<46.4	**1.7**
100611-BLM-T20-S2-194318	10' downgradient spoils	*<10*	788.5	227.9	<85.3	360.2	<46.4	**2.7**
100611-BLM-T20-S3-194319	Repair spoils	*<10*	439.1	244.2	<85.3	94.3	<46.4	**2.9**
102711-BLM-T20-C001-195249	East side wall after removals - See Sketch	*25.0*	627.2	252.4	<85.3	265.9	<46.4	**3.0**
Trench #21 (Pipe Repair #12) - *Closed*								
100611-BLM-T21-R001-194320	10' upgradient from repair	98.4	681.0	366.3	<85.3	274.4	<46.4	**4.3**
100611-BLM-T21-R002-194321	10' downgradient from repair	<10	564.5	317.5	<85.3	291.6	<46.4	**3.7**
100611-BLM-T21-R003-194322	East side wall	<10	716.8	195.4	<85.3	343.1	<46.4	**2.3**
100611-BLM-T21-R004-194323	West side wall	11.2	770.6	138.4	<85.3	291.6	<46.4	**1.6**
100611-BLM-T21-R005-194324	Beneath repair	14.0	743.7	293.1	102.3	283.0	<46.4	**2.9**
100611-BLM-T21-S1-194325	10' upgradient spoils	20.3	1120.1	358.2	<85.3	394.5	<46.4	**4.2**
100611-BLM-T21-S2-194326	10' downgradient spoils	23.3	940.9	480.3	<85.3	411.7	<46.4	**5.6**
100611-BLM-T21-S3-194327	Repair spoils	16.4	833.3	309.3	<85.3	420.2	<46.4	**3.6**
Trench #22 (Pipe Repair #13) - *Closed*								
101111-BLM-T22-R001-194405	See Trench #22 Sketch	32.8	618.3	187.2	<85.3	506.0	<46.4	**2.2**
101111-BLM-T22-R002-194406	See Trench #22 Sketch	<10	663.1	252.4	<85.3	343.1	<46.4	**3.0**
101111-BLM-T22-R003-194407	See Trench #22 Sketch	<10	869.2	317.5	<85.3	334.5	<46.4	**3.7**
101111-BLM-T22-R004-194408	See Trench #22 Sketch	<10	770.6	154.7	<85.3	317.3	<46.4	**1.8**
101111-BLM-T22-R005-194410	See Trench #22 Sketch	<10	636.2	195.4	<85.3	283.0	<46.4	**2.3**

TABLE 1B
MOLYCORP LABORATORY RESULTS
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE III
MOUNTAIN PASS, CALIFORNIA

Sample ID	Sample Description	ICP-MS_U Uranium ppm	XRF Ba ppm	XRF Ce ppm	XRF La ppm	XRF Nd ppm	XRF Pb ppm	Ce/La Ratio
101111-BLM-T22-R006-194411	See Trench #22 Sketch	<10	698.9	407.0	<85.3	343.1	<46.4	**4.8**
101111-BLM-T22-R007-194412	See Trench #22 Sketch	31.6	761.6	236.1	<85.3	265.9	<46.4	**2.8**
101111-BLM-T22-R008-194413	See Trench #22 Sketch	<10	672.0	252.4	<85.3	351.6	<46.4	**3.0**
101111-BLM-T22-S1-194414	See Trench #22 Sketch	<10	860.2	398.9	<85.3	300.2	<46.4	**4.7**
101111-BLM-T22-S2-194416	See Trench #22 Sketch	<10	1819.0	651.3	127.9	394.5	<46.4	**5.1**
101111-BLM-T22-S3-194417	See Trench #22 Sketch	<10	681.0	211.7	<85.3	300.2	<46.4	**2.5**
101111-BLM-T22-S4-194418	See Trench #22 Sketch	<10	1550.2	521.0	119.4	454.5	<46.4	**4.4**
Trench #23 (Pipe Repair #14) - *Closed*								
101111-BLM-T23-R001-194419	10' upgradient from repair	10.1	869.2	252.4	<85.3	334.5	<46.4	**3.0**
101111-BLM-T23-R002-194420	10' downgradient from repair	<10	707.9	244.2	<85.3	317.3	<46.4	**2.9**
101111-BLM-T23-R003-194421	East side wall	<10	609.3	122.1	<85.3	317.3	<46.4	**1.4**
101111-BLM-T23-R004-194422	West side wall	<10	824.4	122.1	<85.3	300.2	<46.4	**1.4**
101111-BLM-T23-R005-194423	Beneath repair	<10	457.0	162.8	<85.3	291.6	<46.4	**1.9**
101111-BLM-T23-S1-194424	10' upgradient spoils	<10	582.4	309.3	<85.3	308.7	<46.4	**3.6**
101111-BLM-T23-S2-194425	10' downgradient spoils	<10	725.8	219.8	<85.3	463.1	<46.4	**2.6**
101111-BLM-T23-S3-194426	Repair spoils	<10	716.8	130.3	<85.3	300.2	<46.4	**1.5**
Trench #24 (Pipe Repair #15) - *Closed*								
101111-BLM-T24-R001-194427	10' upgradient from repair	14.9	663.1	227.9	<85.3	300.2	<46.4	**2.7**
101111-BLM-T24-R002-194428	10' downgradient from repair	<10	770.6	252.4	<85.3	300.2	<46.4	**3.0**
101111-BLM-T24-R003-194429	East side wall	<10	716.8	309.3	<85.3	265.9	<46.4	**3.6**
101111-BLM-T24-R004-194430	West side wall	12.7	824.4	<81.4	<85.3	291.6	<46.4	**ND/ND**
101111-BLM-T24-R005-194431	Beneath repair	<10	725.8	464.0	<85.3	325.9	<46.4	**5.4**
101111-BLM-T24-S1-194432	10' upgradient spoils	<10	528.7	260.5	<85.3	308.7	<46.4	**3.1**
101111-BLM-T24-S2-194433	10' downgradient spoils	15.9	573.5	122.1	<85.3	274.4	<46.4	**1.4**
101111-BLM-T24-S3-194434	Repair spoils	<10	609.3	350.0	<85.3	274.4	<46.4	**4.1**
Trench #25 (Pipe Repair #16) - *Closed*								
101911-BLM-T25-R001-194786	10' upgradient from repair	<10	869.2	138.4	<85.3	420.2	<46.4	**1.6**
101911-BLM-T25-R002-194787	10' downgradient from repair	<10	546.6	195.4	<85.3	291.6	<46.4	**2.3**
101911-BLM-T25-R003-194788	East side wall	<10	609.3	260.5	<85.3	360.2	<46.4	**3.1**
101911-BLM-T25-R004-194789	West side wall	<10	761.6	236.1	<85.3	360.2	<46.4	**2.8**
101911-BLM-T25-R005-194790	Beneath repair	<10	591.4	219.8	<85.3	317.3	<46.4	**2.6**

TABLE 1B
MOLYCORP LABORATORY RESULTS
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE III
MOUNTAIN PASS, CALIFORNIA

Sample ID	Sample Description	ICP-MS_U Uranium ppm	XRF Ba ppm	XRF Ce ppm	XRF La ppm	XRF Nd ppm	XRF Pb ppm	Ce/La Ratio
Trench #26 (Pipe Repair #17) - *Closed*								
101911-BLM-T26-R001-194791	10' upgradient from repair	14.7	761.6	187.2	<85.3	360.2	<46.4	**2.2**
101911-BLM-T26-R002-194792	10' downgradient from repair	13.1	851.3	293.1	<85.3	283.0	<46.4	**3.4**
101911-BLM-T26-R003-194793	East side wall	<10	851.3	122.1	<85.3	368.8	<46.4	**1.4**
101911-BLM-T26-R004-194794	West side wall	<10	788.5	130.3	<85.3	343.1	<46.4	**1.5**
101911-BLM-T26-R005-194795	Beneath repair	15.2	698.9	309.3	775.9	377.4	<46.4	**0.4**
111711-BLM-T26-C001-195895	Beneath repair after removals - See Sketch	<10	510.8	162.8	<85.3	334.5	<46.4	**1.9**
Trench #27 (Pipe Repair #18) - *Closed*								
110311-BLM-T27-R001-195506	10' upgradient from repair	<10	985.7	333.8	<85.3	240.1	<46.4	**3.9**
110311-BLM-T27-R002-195507	10' downgradient from repair	<10	752.7	211.7	<85.3	317.3	<46.4	**2.5**
110311-BLM-T27-R003-195508	East side wall	<10	985.7	398.9	<85.3	325.9	<46.4	**4.7**
110311-BLM-T27-R004-195509	West side wall	<10	1039.4	268.6	<85.3	308.7	<46.4	**3.1**
110311-BLM-T27-R005-195510	Beneath repair	<10	896.1	219.8	<85.3	274.4	<46.4	**2.6**
Trench #28 (Pipe Repair #19) - *Closed*								
120611-BLM-T28-R001-196730	10' upgradient from repair	<10	896.1	512.9	136.4	514.6	<46.4	**3.8**
120611-BLM-T28-R002-196731	10' downgradient from repair	<10	922.9	431.5	93.8	454.5	<46.4	**4.6**
120611-BLM-T28-R003-196732	West side wall	<10	1066.3	700.1	324.0	591.8	<46.4	**2.2**
120611-BLM-T28-R004-196733	East side wall	<10	922.9	423.3	<85.3	411.7	<46.4	**5.0**
120611-BLM-T28-R005-196734	Beneath repair	<10	1111.1	724.5	409.3	523.2	<46.4	**1.8**
120611-BLM-T28-S1-196735	10' upgradient spoils	<10	1057.3	618.7	409.3	523.2	<46.4	**1.5**
120611-BLM-T28-S2-196736	10' downgradient spoils	<10	1209.7	659.4	204.6	514.6	<46.4	**3.2**
120611-BLM-T28-S3-196737	Repair spoils	<10	994.6	700.1	187.6	454.5	<46.4	**3.7**
Trench #29 (Pipe Repair #20 - "Former G28 Remediation Area") - *Closed*								
121911-BLM-T29-R001-197227	See Trench #29 Sketch	<10	994.6	284.9	<85.3	325.9	<46.4	**3.3**
121911-BLM-T29-R002-197228	See Trench #29 Sketch	<10	672.0	309.3	<85.3	377.4	<46.4	**3.6**
121911-BLM-T29-R003-197229	See Trench #29 Sketch	<10	851.3	293.1	<85.3	385.9	<46.4	**3.4**
121911-BLM-T29-R004-197230	See Trench #29 Sketch	<10	1030.5	130.3	<85.3	291.6	<46.4	**1.5**
121911-BLM-T29-R005-197231	See Trench #29 Sketch	<10	922.9	325.6	<85.3	325.9	<46.4	**3.8**
121911-BLM-T29-R006-197232	See Trench #29 Sketch	<10	994.6	309.3	<85.3	128.6	<46.4	**3.6**
121911-BLM-T29-R007-197233	See Trench #29 Sketch	<10	896.1	89.5	<85.3	325.9	<46.4	**1.0**

TABLE 1B
MOLYCORP LABORATORY RESULTS
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE III
MOUNTAIN PASS, CALIFORNIA

Sample ID	Sample Description	ICP-MS_U Uranium ppm	XRF Ba ppm	XRF Ce ppm	XRF La ppm	XRF Nd ppm	XRF Pb ppm	Ce/La Ratio
Trench #30 (Pipe Repair #21 - "Former G28 Remediation Area") - *Closed*								
122011-BLM-T30-R001-197274	See Trench #30 Sketch	<10	1084.2	358.2	102.3	394.5	<46.4	**3.5**
122011-BLM-T30-R002-197275	See Trench #30 Sketch	<10	1093.2	781.5	784.4	583.2	<46.4	**1.0**
122011-BLM-T30-R003-197276	See Trench #30 Sketch	<10	1173.8	602.4	690.7	523.2	<46.4	**0.9**
122011-BLM-T30-R004-197277	See Trench #30 Sketch	<10	770.6	374.5	<85.3	308.7	<46.4	**4.4**
122011-BLM-T30-R005-197278	See Trench #30 Sketch	<10	940.9	211.7	<85.3	343.1	<46.4	**2.5**
122011-BLM-T30-R006-197279	See Trench #30 Sketch	<10	967.7	350.0	153.5	403.1	<46.4	**2.3**
122011-BLM-T30-R007-197280	See Trench #30 Sketch	<10	806.5	325.6	<85.3	325.9	<46.4	**3.8**
122011-BLM-T30-R008-197281	See Trench #30 Sketch	<10	681.0	537.3	<85.3	377.4	<46.4	**6.3**
122011-BLM-T30-R009-197282	See Trench #30 Sketch	10.1	878.1	626.8	699.2	591.8	<46.4	**0.9**
122011-BLM-T30-R010-197283	See Trench #30 Sketch	<10	1272.4	716.4	537.2	480.3	<46.4	**1.3**
122011-BLM-T30-R011-197284	See Trench #30 Sketch	11.5	1075.3	716.4	733.3	591.8	<46.4	**1.0**
122011-BLM-T30-S1-197285	See Trench #30 Sketch	<10	905.0	366.3	196.1	437.4	<46.4	**1.9**
122011-BLM-T30-S2-197286	See Trench #30 Sketch	<10	878.1	407.0	145.0	308.7	<46.4	**2.8**
122011-BLM-T30-S3-197287	See Trench #30 Sketch	<10	806.5	341.9	238.7	334.5	<46.4	**1.4**
010412-BLM-T30-R012-197940	See Trench #30 Sketch	<10	931.9	398.9	<85.3	394.5	<46.4	**4.7**
010412-BLM-T30-R013-197941	See Trench #30 Sketch	<10	914.0	382.6	<85.3	394.5	<46.4	**4.5**
010412-BLM-T30-R014-197942	See Trench #30 Sketch	<10	940.9	244.2	<85.3	325.9	<46.4	**2.9**
010412-BLM-T30-R015-197943	See Trench #30 Sketch	<10	887.1	284.9	<85.3	265.9	<46.4	**3.3**
010412-BLM-T30-R016-197944	See Trench #30 Sketch	<10	797.5	415.2	<85.3	291.6	<46.4	**4.9**
010412-BLM-T30-R017-197945	See Trench #30 Sketch	<10	976.7	431.5	<85.3	385.9	<46.4	**5.1**
010412-BLM-T30-R018-197946	See Trench #30 Sketch	<10	806.5	447.7	136.4	454.5	<46.4	**3.3**
010412-BLM-T30-R019-197947	See Trench #30 Sketch	16.2	985.7	1074.6	1577.4	917.7	<46.4	**0.7**
010412-BLM-T30-R020-197948	See Trench #30 Sketch	<10	734.8	374.5	<85.3	317.3	<46.4	**4.4**
010412-BLM-T30-R021-197949	See Trench #30 Sketch	<10	770.6	244.2	<85.3	283.0	<46.4	**2.9**
010412-BLM-T30-R022-197950	See Trench #30 Sketch	<10	869.2	236.1	<85.3	317.3	<46.4	**2.8**
010412-BLM-T30-R023-197951	See Trench #30 Sketch	<10	842.3	382.6	238.7	334.5	<46.4	**1.6**
010412-BLM-T30-R024-197952	See Trench #30 Sketch	<10	806.5	333.8	<85.3	308.7	<46.4	**3.9**
010412-BLM-T30-R025-197953	See Trench #30 Sketch	10.2	725.8	333.8	<85.3	334.5	<46.4	**3.9**
010412-BLM-T30-R026-197954	See Trench #30 Sketch	<10	985.7	284.9	<85.3	377.4	<46.4	**3.3**
Trench #31 (Pipe Repair #22) - *Closed*								
122911-BLM-T31-R001-197746	10' upgradient from repair	<10	842.3	268.6	<85.3	394.5	<46.4	**3.1**
122911-BLM-T31-R002-197747	10' downgradient from repair	<10	1388.9	651.3	196.1	497.4	<46.4	**3.3**

TABLE 1B
MOLYCORP LABORATORY RESULTS
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE III
MOUNTAIN PASS, CALIFORNIA

Sample ID	Sample Description	ICP-MS_U Uranium ppm	XRF Ba ppm	XRF Ce ppm	XRF La ppm	XRF Nd ppm	XRF Pb ppm	Ce/La Ratio
122911-BLM-T31-R003-197748	East side wall	<10	860.2	578.0	<85.3	411.7	<46.4	**6.8**
122911-BLM-T31-R004-197749	West side wall	<10	663.1	488.4	<85.3	394.5	<46.4	**5.7**
122911-BLM-T31-R005-197750	Beneath repair	<10	743.7	268.6	<85.3	368.8	<46.4	**3.1**
122911-BLM-T31-S1-197751	10' upgradient spoils	<10	869.2	504.7	136.4	377.4	<46.4	**3.7**
122911-BLM-T31-S2-197752	10' downgradient spoils	<10	1478.5	398.9	<85.3	394.5	<46.4	**4.7**
122911-BLM-T31-S3-197753	Repair spoils	<10	636.2	317.5	<85.3	351.6	<46.4	**3.7**

TABLE 2A
SOIL REMOVAL ACTIVITIES
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE II
MOUNTAIN PASS, CALIFORNIA

TRENCH #2 (ELEVATED RADIOLOGICAL READINGS #1)			
Bin ID	**Date**	**Soil Removed (lbs)**	**Soil Removed (tons)**
25657	11/29/2010	21,360	10.68
25867	11/29/2010	19,460	9.73
25916	11/29/2010	13,640	6.82
25926	11/29/2010	13,160	6.58
251473	11/29/2010	14,200	7.10
251251	11/30/2010	12,780	6.39
251205*	11/30/2010	11,600	5.80
5731*	2/10/2011	12,036	6.02
5953	2/10/2011	21,480	10.74
6142	2/10/2011	18,520	9.26

TRENCH #2 TOTAL (TONS) =	79.12

TRENCH #9 (PIPE REPAIR #2)			
Bin ID	**Date**	**Soil Removed (lbs)**	**Soil Removed (tons)**
5342	1/4/2011	18,420	9.21
5731*	2/10/2011	4,012	2.01

TRENCH #9 TOTAL (TONS) =	11.22

TRENCH #16 (VENT PIPE OUTLET)			
Bin ID	**Date**	**Soil Removed (lbs)**	**Soil Removed (tons)**
5418*	1/4/2011	8,900	4.45
25951	4/28/2011	20,080	10.04
251132	4/28/2011	17,480	8.74

TRENCH #16 TOTAL (TONS) =	23.23

TABLE 2A
SOIL REMOVAL ACTIVITIES
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE II
MOUNTAIN PASS, CALIFORNIA

TRENCH #17 (ELEVATED RADIOLOGICAL READINGS #3)			
Bin ID	**Date**	**Soil Removed (lbs)**	**Soil Removed (tons)**
25876	11/18/2010	19,180	9.59
25806	11/18/2010	18,300	9.15
25814	11/18/2010	19,320	9.66
25827	11/18/2010	20,480	10.24
251214	11/18/2010	20,260	10.13
25777	11/18/2010	23,920	11.96
251229	11/30/2010	15,460	7.73
CHHP20904	11/30/2010	11,880	5.94

TRENCH #17 TOTAL (TONS) =	74.40

TRENCH #20 (ELEVATED RADIOLOGICAL READINGS #4)			
Bin ID	**Date**	**Soil Removed (lbs)**	**Soil Removed (tons)**
20060	12/13/2010	22,840	11.42
251072	12/13/2010	19,040	9.52
251349	12/14/2010	24,220	12.11
251522	12/14/2010	20,760	10.38
251132	12/14/2010	21,880	10.94
25951	12/14/2010	26,300	13.15
25881	12/14/2010	21,060	10.53
25912	12/14/2010	17,700	8.85
25971	12/15/2010	21,380	10.69
251228	12/15/2010	21,120	10.56
6176	12/16/2010	17,730	8.87
6188	12/16/2010	18,850	9.43
6134	12/16/2010	16,970	8.49
6170	12/16/2010	17,750	8.88
5397	12/27/2010	14,680	7.34
5531	12/27/2010	16,820	8.41
5400	12/27/2010	17,580	8.79
6149*	2/23/2011	10,680	5.34
6172	2/23/2011	20,300	10.15
6068	2/23/2011	19,400	9.70
5854	3/15/2011	20,880	10.44

TRENCH #20 TOTAL (TONS) =	203.97

TABLE 2A
SOIL REMOVAL ACTIVITIES
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE II
MOUNTAIN PASS, CALIFORNIA

TRENCH #22 (PIPE REPAIR #3)			
Bin ID	**Date**	**Soil Removed (lbs)**	**Soil Removed (tons)**
6174*	2/23/2011	10,460	5.23
6149*	2/23/2011	10,680	5.34

TRENCH #22 TOTAL (TONS) =	10.57

TRENCH #24 (PIPE REPAIR #5)			
Bin ID	**Date**	**Soil Removed (lbs)**	**Soil Removed (tons)**
6174*	2/23/2011	10,460	5.23

TRENCH #24 TOTAL (TONS) =	5.23

TRENCH #25 (PIPE REPAIR #6)			
Bin ID	**Date**	**Soil Removed (lbs)**	**Soil Removed (tons)**
251205*	4/26/2011	11,800	5.90
251473*	4/27/2011	9,400	4.70
251229	4/27/2011	19,780	9.89
5785*	5/26/2011	13,680	6.84

TRENCH #25 TOTAL (TONS) =	27.33

TRENCH #26 (PIPE REPAIR #7)			
Bin ID	**Date**	**Soil Removed (lbs)**	**Soil Removed (tons)**
25912	4/26/2011	22,400	11.20
25657	4/26/2011	21,200	10.60

TRENCH #26 TOTAL (TONS) =	21.80

TRENCH #27 (PIPE REPAIR #8)			
Bin ID	**Date**	**Soil Removed (lbs)**	**Soil Removed (tons)**
251205*	4/26/2011	11,800	5.90
25867	4/20/2011	20,072	10.04
CHHP20904	4/21/2011	18,800	9.40
25971	4/26/2011	21,800	10.90

TRENCH #27 TOTAL (TONS) =	36.24

TABLE 2A
SOIL REMOVAL ACTIVITIES
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE II
MOUNTAIN PASS, CALIFORNIA

TRENCH #28 (PIPE REPAIR #9)			
Bin ID	**Date**	**Soil Removed (lbs)**	**Soil Removed (tons)**
5782*	3/15/2011	8,500	4.25

TRENCH #28 TOTAL (TONS) =	4.25

TRENCH #31 (PIPE REPAIR #11)			
Bin ID	**Date**	**Soil Removed (lbs)**	**Soil Removed (tons)**
5782*	3/15/2011	8,500	4.25

TRENCH #31 TOTAL (TONS) =	4.25

TRENCH #32 (VENT PIPE OUTLET)			
Bin ID	**Date**	**Soil Removed (lbs)**	**Soil Removed (tons)**
5712*	3/15/2011	10,290	5.15

TRENCH #32 TOTAL (TONS) =	5.15

TRENCH #33 (PIPE REPAIR #12)			
Bin ID	**Date**	**Soil Removed (lbs)**	**Soil Removed (tons)**
5712*	3/15/2011	10,290	5.15

TRENCH #33 TOTAL (TONS) =	5.15

TRENCH #35 (PIPE REPAIR #13)			
Bin ID	**Date**	**Soil Removed (lbs)**	**Soil Removed (tons)**
25814	4/27/2011	27,580	13.79
25718	4/27/2011	20,000	10.00
251251	4/27/2011	22,080	11.04
5785*	5/26/2011	13,680	6.84
25867	6/13/2011	21,340	10.67

TRENCH #35 TOTAL (TONS) =	52.34

TABLE 2A
SOIL REMOVAL ACTIVITIES
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE II
MOUNTAIN PASS, CALIFORNIA

TRENCH #39 (ELEVATED RADIOLOGICAL READINGS #6)			
Bin ID	**Date**	**Soil Removed (lbs)**	**Soil Removed (tons)**
5418*	2/1/2011	14,860	7.43
5768	2/1/2011	19,960	9.98
5646	2/1/2011	25,580	12.79
6059	2/1/2011	21,060	10.53
6078	2/1/2011	23,360	11.68
5861	2/3/2011	19,540	9.77
5995	2/3/2011	21,520	10.76
5476	2/3/2011	24,220	12.11

TRENCH #39 TOTAL (TONS) =	85.05

TRENCH #41 (ELEVATED RADIOLOGICAL READINGS #7)			
Bin ID	**Date**	**Soil Removed (lbs)**	**Soil Removed (tons)**
6192	2/7/2011	20,500	10.25
5785	2/7/2011	25,560	12.78
251473*	4/27/2011	9,400	4.70

TRENCH #41 TOTAL (TONS) =	27.73

LEGEND:
* = Partial bin used during soil removal activities. Amount of soil removed based on field estimates.

NOTES:
(1) All soil bins were weighed at the Molycorp Minerals Mine.
(2) A total of 677 tons (451 yd^3) of soil was removed during Phase II.

TABLE 2B
SOIL REMOVAL ACTIVITIES
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE III
MOUNTAIN PASS, CALIFORNIA

TRENCH #4 (ELEVATED RADIOLOGICAL READINGS #1)			
Bin ID	**Date**	**Soil Removed (lbs)**	**Soil Removed (tons)**
5768	5/16/2011	16,040	8.02
5587	5/16/2011	22,900	11.45
5418	5/16/2011	17,280	8.64
5397	5/17/2011	18,340	9.17
5342	5/17/2011	21,020	10.51
5646	5/17/2011	20,200	10.10
6176	5/19/2011	21,920	10.96
5531	5/19/2011	22,440	11.22
6188	5/19/2011	17,780	8.89
5953	5/23/2011	25,000	12.50
6134	5/23/2011	25,740	12.87
6142	5/23/2011	20,700	10.35
6192	5/23/2011	23,900	11.95
6170	5/23/2011	26,340	13.17
6172*	5/24/2011	15,500	7.75

TRENCH #4 TOTAL (TONS) =	157.55

TRENCH #8 (ELEVATED RADIOLOGICAL READINGS #2)			
Bin ID	**Date**	**Soil Removed (lbs)**	**Soil Removed (tons)**
6172*	5/24/2011	5,160	2.58
6149	5/24/2011	18,840	9.42
5476	5/24/2011	17,940	8.97

TRENCH #8 TOTAL (TONS) =	20.97

TRENCH #14 (ELEVATED RADIOLOGICAL READINGS #3)			
Bin ID	**Date**	**Soil Removed (lbs)**	**Soil Removed (tons)**
6068	5/25/2011	15,840	7.92
5712	5/25/2011	19,100	9.55
5854	5/25/2011	21,780	10.89
5400	5/25/2011	16,140	8.07
5953	7/26/2011	12,080	6.04

TRENCH #14 TOTAL (TONS) =	42.47

TABLE 2B
SOIL REMOVAL ACTIVITIES
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE III
MOUNTAIN PASS, CALIFORNIA

TRENCH #15 (PIPE REPAIR #9)			
Bin ID	**Date**	**Soil Removed (lbs)**	**Soil Removed (tons)**
25657	6/27/2011	31,600	15.80
251205	6/27/2011	28,200	14.10

TRENCH #15 TOTAL (TONS) =	29.90

TRENCH #18 (ELEVATED RADIOLOGICAL READINGS #4)			
Bin ID	**Date**	**Soil Removed (lbs)**	**Soil Removed (tons)**
5995*	5/12/2011	14,200	7.10
CHHP20904	6/13/2011	24,900	12.45
25971	6/13/2011	21,660	10.83

TRENCH #18 TOTAL (TONS) =	30.38

TRENCH #19 (PIPE REPAIR #10)			
Bin ID	**Date**	**Soil Removed (lbs)**	**Soil Removed (tons)**
6094	10/3/2011	21,100	10.55
5953*	10/27/2011	10,460	5.23

TRENCH #19 TOTAL (TONS) =	15.78

TRENCH #20 (PIPE REPAIR #11)			
Bin ID	**Date**	**Soil Removed (lbs)**	**Soil Removed (tons)**
5953*	10/27/2011	15,680	7.84

TRENCH #20 TOTAL (TONS) =	7.84

TRENCH #21 (PIPE REPAIR #12)			
Bin ID	**Date**	**Soil Removed (lbs)**	**Soil Removed (tons)**
5712	10/6/2011	17,180	8.59

TRENCH #21 TOTAL (TONS) =	8.59

TABLE 2B
SOIL REMOVAL ACTIVITIES
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE III
MOUNTAIN PASS, CALIFORNIA

TRENCH #26 (PIPE REPAIR #17)			
Bin ID	**Date**	**Soil Removed (lbs)**	**Soil Removed (tons)**
5418*	11/17/2011	14,200	7.10

TRENCH #26 TOTAL (TONS) =	7.10

TRENCH #30 (PIPE REPAIR #21)			
Bin ID	**Date**	**Soil Removed (lbs)**	**Soil Removed (tons)**
5983	1/16/2012	24,000	12.00
6192	1/16/2012	23,960	11.98
5397	1/16/2012	23,000	11.50
6011	1/16/2012	22,600	11.30
5357	1/17/2012	22,700	11.35

TRENCH #30 TOTAL (TONS) =	58.13

LEGEND:
* = Partial bin used during soil removal activities. Amount of soil removed based on field estimates.

NOTES:
(1) All soil bins were weighed at the Molycorp Minerals Mine.
(2) A total of 379 tons (253 yd^3) of soil was removed during Phase III.

TABLE 3A
BIN MASS CALCULATIONS AND US ECOLOGY ARRIVAL DATES
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE II
MOUNTAIN PASS, CALIFORNIA

Bin ID	Bin Contents	Date(s) Sampled	Weight of Pipe or Soil (tons)[1,2,3]	Weight of Scale (tons)[4]	Total Weight of Bin (tons)[5]	US Ecology Arrival Date
PIPE AND PIPESCALE BINS						
251262	HDPE Pipe (8") and Pipescale	09/28/10	1.38	2.40	3.78	7/19/2011
25968	HDPE Pipe (8") and Pipescale	10/04/10	1.58	1.17	2.74	7/19/2011
251115	HDPE Pipe (8") and Pipescale	10/06/10	1.63	1.15	2.78	7/19/2011
25949	HDPE Pipe (6" and 8") and	10/11/10	1.92	1.50	3.42	7/6/2011
25989	HDPE Pipe (4",6" and 8")	10/19/10	2.41	1.36	3.77	7/6/2011
251002	HDPE Pipe (8") and Pipescale	10/21/2010	2.20	2.27	4.47	7/19/2011
251498	HDPE Pipe (8") and Pipescale	10/21/2010	3.56	2.17	5.73	7/21/2011
251037	HDPE Pipe (6" and 8") and	10/27/2010	2.74	3.72	6.46	7/21/2011
251234	HDPE Pipe (8") and Pipescale	10/28/2010	2.79	3.27	6.06	7/21/2011
25863	HDPE Pipe (6" and 8") and	11/2/2010	3.30	3.47	6.77	7/28/2011
251348	HDPE Pipe (6" and 8") and	11/9/2010	2.69	2.94	5.63	7/26/2011
25988	HDPE Pipe (6" and 8") and	11/11/2010	2.18	1.95	4.13	7/26/2011
25805	HDPE Pipe (2" and 8") and Pipescale	11/16/2010	2.78	2.38	5.16	7/26/2011
25764	HDPE Pipe (8") and Pipescale	11/17/2010	2.97	2.60	5.57	7/26/2011
25825	HDPE Pipe (6" and 8") and Pipescale	11/22/2010	2.16	1.69	3.85	7/28/2011
251252	HDPE Pipe (8") and Pipescale	12/2/2010	2.43	1.01	3.44	7/28/2011
251474	HDPE Pipe (6" and 8") and Pipescale	12/6/2010	2.79	1.32	4.11	7/28/2011
251126	HDPE Pipe (8") and Pipescale	12/7/2010	2.22	1.71	3.93	7/28/2011
251215	HDPE Pipe (6" and 8") and Pipescale	12/8/2010	2.08	1.63	3.71	7/28/2011

TABLE 3A
BIN MASS CALCULATIONS AND US ECOLOGY ARRIVAL DATES
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE II
MOUNTAIN PASS, CALIFORNIA

Bin ID	Bin Contents	Date(s) Sampled	Weight of Pipe or Soil (tons)[1,2,3]	Weight of Scale (tons)[4]	Total Weight of Bin (tons)[5]	US Ecology Arrival Date
251075	HDPE Pipe (6" and 8") and Pipescale	1/6/2011	2.26	2.26	4.52	7/28/2011
5592	HDPE Pipe (6" and 8") and Pipescale	1/5/2011	1.21	1.95	3.16	8/2/2011
5530	HDPE Pipe (6") and Pipescale	1/11/2011	1.11	2.37	3.48	8/2/2011
5357	HDPE Pipe (6") and Pipescale	1/12/2011	1.12	2.27	3.39	8/2/2011
5495	HDPE Pipe (6") and Pipescale	1/17/2011	1.05	2.58	3.63	8/2/2011
6011	HDPE Pipe (6") and Pipescale	1/25/2011	1.20	2.54	3.74	8/2/2011
6055	HDPE Pipe (6") and Pipescale	1/20/2011	1.29	2.60	3.89	8/2/2011
5676	HDPE Pipe (6") and Pipescale	1/26/2011	1.41	2.90	4.31	8/4/2011
6023	HDPE Pipe (2" and 6") and Pipescale	1/31/2011	1.01	2.15	3.16	8/4/2011
SOIL BINS						
25876	99% Soil and 1% Pipescale	11/18/2010	9.49	0.10	9.59	07/19/11
25806	99% Soil and 1% Pipescale	11/18/2010	9.06	0.09	9.15	07/19/11
25814	99% Soil and 1% Pipescale	11/18/2010	9.56	0.10	9.66	04/19/11
25827	99% Soil and 1% Pipescale	11/18/2010	10.14	0.10	10.24	07/19/11
251214	99% Soil and 1% Pipescale	11/18/2010	10.03	0.10	10.13	07/19/11
25777	99% Soil and 1% Pipescale	11/18/2010	11.84	0.12	11.96	07/21/11
25657	99% Soil and 1% Pipescale	11/29/2010	10.57	0.11	10.68	04/18/11
25867	99% Soil and 1% Pipescale	11/29/2010	9.63	0.10	9.73	04/18/11
25916	99% Soil and 1% Pipescale	11/29/2010	6.75	0.07	6.82	07/21/11
25926	99% Soil and 1% Pipescale	11/29/2010	6.51	0.07	6.58	07/21/11
251473	99% Soil and 1% Pipescale	11/29/2010	7.03	0.07	7.10	04/19/11

TABLE 3A
BIN MASS CALCULATIONS AND US ECOLOGY ARRIVAL DATES
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE II
MOUNTAIN PASS, CALIFORNIA

Bin ID	Bin Contents	Date(s) Sampled	Weight of Pipe or Soil (tons)[1,2,3]	Weight of Scale (tons)[4]	Total Weight of Bin (tons)[5]	US Ecology Arrival Date
251251	99% Soil and 1% Pipescale	11/30/2010	6.33	0.06	6.39	04/19/11
251205	99% Soil and 1% Pipescale	11/30/2010	5.74	0.06	5.80	04/18/11
251229	99% Soil and 1% Pipescale	11/30/2010	7.65	0.08	7.73	06/16/11
CHHP20904	99% Soil and 1% Pipescale	11/30/2010	5.88	0.06	5.94	04/18/11
20060	99% Soil and 1% Pipescale	12/13/2010	11.31	0.11	11.42	07/21/11
251072	99% Soil and 1% Pipescale	12/13/2010	9.42	0.10	9.52	07/26/11
251349	99% Soil and 1% Pipescale	12/14/2010	11.99	0.12	12.11	07/26/11
251522	99% Soil and 1% Pipescale	12/14/2010	10.28	0.10	10.38	07/26/11
251132	99% Soil and 1% Pipescale	12/14/2010	10.83	0.11	10.94	04/20/11
25951	99% Soil and 1% Pipescale	12/14/2010	13.02	0.13	13.15	04/20/11
25881	99% Soil and 1% Pipescale	12/14/2010	10.42	0.11	10.53	07/26/11
25912	99% Soil and 1% Pipescale	12/14/2010	8.76	0.09	8.85	04/21/11
25971	99% Soil and 1% Pipescale	12/15/2010	10.58	0.11	10.69	04/21/11
251228	99% Soil and 1% Pipescale	12/15/2010	10.45	0.11	10.56	05/17/11
6176	99% Soil and 1% Pipescale	12/16/2010	8.78	0.09	8.87	05/17/11
6188	99% Soil and 1% Pipescale	12/16/2010	9.33	0.09	9.43	05/17/11
6134	99% Soil and 1% Pipescale	12/16/2010	8.40	0.08	8.49	05/17/11
6170	99% Soil and 1% Pipescale	12/16/2010	8.79	0.09	8.88	05/17/11
5397	99% Soil and 1% Pipescale	12/27/2010	7.27	0.07	7.34	04/18/11
5531	99% Soil and 1% Pipescale	12/27/2010	8.33	0.08	8.41	05/18/11
5400	99% Soil and 1% Pipescale	12/27/2010	8.70	0.09	8.79	05/18/11
5342	99% Soil and 1% Pipescale	1/4/2011	9.12	0.09	9.21	04/18/11

TABLE 3A
BIN MASS CALCULATIONS AND US ECOLOGY ARRIVAL DATES
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE II
MOUNTAIN PASS, CALIFORNIA

Bin ID	Bin Contents	Date(s) Sampled	Weight of Pipe or Soil (tons)[1,2,3]	Weight of Scale (tons)[4]	Total Weight of Bin (tons)[5]	US Ecology Arrival Date
5418	99% Soil and 1% Pipescale	2/1/2011	11.76	0.12	11.88	04/18/11
5768	99% Soil and 1% Pipescale	2/1/2011	9.88	0.10	9.98	04/19/11
5646	99% Soil and 1% Pipescale	2/1/2011	12.66	0.13	12.79	04/19/11
6059	99% Soil and 1% Pipescale	2/1/2011	10.42	0.11	10.53	04/20/11
6078	99% Soil and 1% Pipescale	2/1/2011	11.56	0.12	11.68	04/20/11
5861	99% Soil and 1% Pipescale	2/3/2011	9.67	0.10	9.77	04/21/11
5995	99% Soil and 1% Pipescale	2/3/2011	10.65	0.11	10.76	04/21/11
5476	99% Soil and 1% Pipescale	2/3/2011	11.99	0.12	12.11	05/18/11
6192	99% Soil and 1% Pipescale	2/7/2011	10.15	0.10	10.25	05/18/11
5785	99% Soil and 1% Pipescale	2/7/2011	12.65	0.13	12.78	05/19/11
5731	99% Soil and 1% Pipescale	2/10/2011	7.94	0.08	8.02	5/19/2011
5953	99% Soil and 1% Pipescale	2/10/2011	10.63	0.11	10.74	5/19/2011
6142	99% Soil and 1% Pipescale	2/10/2011	9.17	0.09	9.26	5/19/2011
6174	99% Soil and 1% Pipescale	2/23/2011	10.36	0.10	10.46	5/23/2011
6149	99% Soil and 1% Pipescale	2/23/2011	10.56	0.11	10.67	5/23/2011
6172	99% Soil and 1% Pipescale	2/23/2011	10.05	0.10	10.15	5/23/2011
6068	99% Soil and 1% Pipescale	2/23/2011	9.60	0.10	9.70	5/24/2011
5854	99% Soil and 1% Pipescale	3/15/2011	10.34	0.10	10.44	5/24/2011
5712	99% Soil and 1% Pipescale	3/15/2011	10.19	0.10	10.29	5/24/2011
5782	99% Soil and 1% Pipescale	3/15/2011	8.42	0.09	8.50	5/25/2011
25867	99% Soil and 1% Pipescale	4/20/2011	9.94	0.10	10.04	6/6/2011
CHHP20904	99% Soil and 1% Pipescale	4/21/2011	9.31	0.09	9.40	6/7/2011

TABLE 3A
BIN MASS CALCULATIONS AND US ECOLOGY ARRIVAL DATES
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE II
MOUNTAIN PASS, CALIFORNIA

Bin ID	Bin Contents	Date(s) Sampled	Weight of Pipe or Soil (tons)[1,2,3]	Weight of Scale (tons)[4]	Total Weight of Bin (tons)[5]	US Ecology Arrival Date
25971	99% Soil and 1% Pipescale	4/26/2011	10.79	0.11	10.90	6/8/2011
25912	99% Soil and 1% Pipescale	4/26/2011	11.09	0.11	11.20	6/9/2011
25657	99% Soil and 1% Pipescale	4/26/2011	10.49	0.11	10.60	6/13/2011
251205	99% Soil and 1% Pipescale	4/26/2011	11.68	0.12	11.80	6/13/2011
25814	99% Soil and 1% Pipescale	4/27/2011	13.65	0.14	13.79	6/14/2011
25718	99% Soil and 1% Pipescale	4/27/2011	9.90	0.10	10.00	6/14/2011
251473	99% Soil and 1% Pipescale	4/27/2011	9.23	0.09	9.32	6/15/2011
251251	99% Soil and 1% Pipescale	4/27/2011	10.93	0.11	11.04	6/15/2011
251229	99% Soil and 1% Pipescale	4/27/2011	9.79	0.10	9.89	6/16/2011
25951	99% Soil and 1% Pipescale	4/28/2011	9.94	0.10	10.04	6/16/2011
251132	99% Soil and 1% Pipescale	4/28/2011	8.65	0.09	8.74	6/22/2011
5785	99% Soil and 1% Pipescale	5/26/2011	13.54	0.14	13.68	8/4/2011
25867	99% Soil and 1% Pipescale	6/13/2011	10.56	0.11	10.67	8/4/2011

NOTES:

(1) Weight of pipe in pipe bins is calculated as the length of HDPE pipe the bin contains time the known lbs/ft weight of the pipe. The 8" diameter HDPE pipe weighs 8.38 lbs/ft, 6" diameter HDPE pipe weighs 2.91 lbs/ft, 4" diameter HDPE pipe weighs 1.94 lbs/ft, and 2" pipe weighs 1lb/ft.

(2) The following bins contain pipe of different weight than above:

-Bins 251262, 25968, and 251115 contain 8" diameter HDPE pipe that weighs 5.25 lbs/ft.

-Bin 25949 contains 215 feet of 8" diameter HDPE pipe that weighs 5.25 lbs/ft, and 385 feet of 8" diameter HDPE pipe that weighs 8.38 lbs/ft.

(3) Soil accounts for 99% of actual net weight of bin.

(4) Weight of pipe scale in pipe bins is calculated as the difference in weight between the actual net weight of the bin and the weight of the pipe it contains. Weight of pipe scale in soil bins accounts for 1% of actual net weight of the bin.

(5) Actual net weight of bin contents.

TABLE 3B
BIN MASS CALCULATIONS AND US ECOLOGY ARRIVAL DATES
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE III
MOUNTAIN PASS, CALIFORNIA

Bin ID	Bin Contents	Date(s) Sampled	Weight of Pipe or Soil (tons)[1,2]	Weight of Scale (tons)[3]	Total Weight of Bin (tons)[4]	Scheduled Arrival Date
PIPE AND PIPESCALE BINS						
5583	HDPE Pipe (6" and 8") and	3/29/2011	1.44	1.13	2.57	8/4/2011
5888	HDPE Pipe (6" and 2") and	4/4/2011	0.95	0.95	1.90	8/4/2011
5928	HDPE Pipe (6" and 2") and	4/6/2011	1.46	0.61	2.07	8/9/2011
5878	HDPE Pipe (6" and 2") and	4/12/2011	1.54	0.50	2.04	8/9/2011
6214	HDPE Pipe (6") and Pipescale	4/14/2011	1.43	0.23	1.66	8/9/2011
6078	HDPE Pipe (8") and Pipescale	5/4/2011	1.92	0.74	2.66	8/9/2011
5861	HDPE Pipe (8") and Pipescale	5/9/2011	2.10	0.41	2.51	8/11/2011
6059	HDPE Pipe (8") and Pipescale	5/11/2011	2.04	0.55	2.59	8/11/2011
6174	HDPE Pipe (8") and Pipescale	6/1/2011	2.37	0.63	3.00	8/11/2011
5782	HDPE Pipe (8") and Pipescale	6/3/2011	2.27	0.67	2.93	8/11/2011
5731	HDPE Pipe (8") and Pipescale	6/9/2011	2.12	0.48	2.59	8/11/2011
5960	HDPE Pipe (8") and Pipescale	6/15/2011	2.16	0.59	2.75	8/11/2011
5998	HDPE Pipe (8") and Pipescale	6/20/2011	2.33	0.73	3.05	11/11/2011
6173	HDPE Pipe (8") and Pipescale	6/23/2011	1.59	0.95	2.54	11/11/2011
6149	HDPE Pipe (8") and Pipescale	9/20/2011	1.85	0.48	2.32	12/6/2011
6078	HDPE Pipe (8") and Pipescale	9/28/2011	1.70	0.60	2.29	12/6/2011
6142	HDPE Pipe (8") and Pipescale	10/6/2011	2.07	0.63	2.7	12/8/2011
5987	HDPE Pipe (8") and Pipescale	10/11/2011	2.04	0.24	2.28	12/8/2011
6214	HDPE Pipe (8") and Pipescale	10/13/2011	2.27	0.26	2.52	11/29/2011
5587	HDPE Pipe (8") and Pipescale	10/17/2011	2.01	0.44	2.45	11/29/2011

TABLE 3B
BIN MASS CALCULATIONS AND US ECOLOGY ARRIVAL DATES
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE III
MOUNTAIN PASS, CALIFORNIA

Bin ID	Bin Contents	Date(s) Sampled	Weight of Pipe or Soil (tons)[1,2]	Weight of Scale (tons)[3]	Total Weight of Bin (tons)[4]	Scheduled Arrival Date
5768	HDPE Pipe (8") and Pipescale	10/19/2011	2.27	0.27	2.53	12/20/2011
6055	HDPE Pipe (8") and Pipescale	10/20/2011	2.04	0.11	2.15	12/20/2011
5983	HDPE Pipe (8") and Pipescale	10/25/2011	2.30	0.26	2.55	12/22/2011
5530	HDPE Pipe (8") and Pipescale	10/27/2011	2.13	0.40	2.53	12/22/2011
5357	HDPE Pipe (8") and Pipescale	11/2/2011	1.98	0.28	2.26	12/28/2011
6011	HDPE Pipe (8") and Pipescale	11/7/2011	2.19	0.64	2.83	12/28/2011
5397	HDPE Pipe (8") and Pipescale	11/8/2011	2.18	0.51	2.68	1/10/2012
6192	HDPE Pipe (8") and Pipescale	11/10/2011	2.07	0.68	2.75	1/10/2012
5854	HDPE Pipe (8") and Pipescale	11/15/2011	2.16	0.47	2.63	1/17/2012
6134	HDPE Pipe (8") and Pipescale	11/21/2011	2.03	0.64	2.66	1/17/2012
5712	HDPE Pipe (8") and Pipescale	11/28/2011	2.54	0.43	2.96	1/19/2012
5998	HDPE Pipe (8") and Pipescale	11/29/2011	2.09	0.52	2.60	1/19/2012
5531	HDPE Pipe (8") and Pipescale	12/5/2011	1.91	0.42	2.32	1/24/2012
6173	HDPE Pipe (8") and Pipescale	12/6/2011	1.86	0.73	2.59	1/24/2012
5878	HDPE Pipe (8") and Pipescale	12/7/2011	1.92	0.49	2.41	1/27/2012
5928	HDPE Pipe (8") and Pipescale	12/8/2011	2.28	0.56	2.84	1/27/2012
6142	HDPE Pipe (8") and Pipescale	12/14/2011	1.65	0.67	2.32	1/31/2012
5987	HDPE Pipe (8") and Pipescale	12/15/2011	1.62	0.46	2.08	1/31/2012
5587	HDPE Pipe (8") and Pipescale	12/20/2011	2.09	0.57	2.65	2/2/2012
6214	HDPE Pipe (8") and Pipescale	12/22/2011	2.25	0.59	2.84	2/2/2012
6078	HDPE Pipe (8") and Pipescale	12/28/2011	2.12	0.53	2.64	2/9/2012

TABLE 3B
BIN MASS CALCULATIONS AND US ECOLOGY ARRIVAL DATES
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE III
MOUNTAIN PASS, CALIFORNIA

Bin ID	Bin Contents	Date(s) Sampled	Weight of Pipe or Soil (tons)[1,2]	Weight of Scale (tons)[3]	Total Weight of Bin (tons)[4]	Scheduled Arrival Date
6149	HDPE Pipe (8") and Pipescale	12/29/2011	2.31	0.66	2.97	2/9/2012
5530	HDPE Pipe (8") and Pipescale	1/4/2012	2.00	0.45	2.44	2/14/2012
5953	HDPE Pipe (8") and Pipescale	1/5/2012	1.62	0.53	2.15	2/14/2012
6055	HDPE Pipe (8") and Pipescale	1/9/2012	1.80	0.57	2.37	2/16/2012
5768	HDPE Pipe (8") and Pipescale	1/10/2012	1.08	0.27	1.35	2/16/2012
SOIL BINS						
5995	99% Soil and 1% Pipescale	5/12/2011	8.64	0.09	8.73	8/4/2011
5768	99% Soil and 1% Pipescale	5/16/2011	7.94	0.08	8.02	7/18/2011
5587	99% Soil and 1% Pipescale	5/16/2011	11.34	0.11	11.45	7/18/2011
5418	99% Soil and 1% Pipescale	5/16/2011	8.55	0.09	8.64	7/19/2011
5397	99% Soil and 1% Pipescale	5/17/2011	9.08	0.09	9.17	7/19/2011
5342	99% Soil and 1% Pipescale	5/17/2011	10.40	0.11	10.51	8/1/2011
5646	99% Soil and 1% Pipescale	5/17/2011	10.00	0.10	10.10	8/4/2011
6176	99% Soil and 1% Pipescale	5/19/2011	10.85	0.11	10.96	7/20/2011
5531	99% Soil and 1% Pipescale	5/19/2011	11.11	0.11	11.22	8/9/2011
6188	99% Soil and 1% Pipescale	5/19/2011	8.80	0.09	8.89	7/20/2011
5953	99% Soil and 1% Pipescale	5/23/2011	12.38	0.13	12.50	7/25/2011
6134	99% Soil and 1% Pipescale	5/23/2011	12.74	0.13	12.87	7/25/2011
6142	99% Soil and 1% Pipescale	5/23/2011	10.25	0.10	10.35	7/26/2011
6192	99% Soil and 1% Pipescale	5/23/2011	11.83	0.12	11.95	7/26/2011
6170	99% Soil and 1% Pipescale	5/23/2011	13.04	0.13	13.17	7/27/2011
6172	99% Soil and 1% Pipescale	5/24/2011	10.23	0.10	10.33	7/27/2011

TABLE 3B
BIN MASS CALCULATIONS AND US ECOLOGY ARRIVAL DATES
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE III
MOUNTAIN PASS, CALIFORNIA

Bin ID	Bin Contents	Date(s) Sampled	Weight of Pipe or Soil (tons)[1,2]	Weight of Scale (tons)[3]	Total Weight of Bin (tons)[4]	Scheduled Arrival Date
6149	99% Soil and 1% Pipescale	5/24/2011	9.33	0.09	9.42	8/9/2011
5476	99% Soil and 1% Pipescale	5/24/2011	8.88	0.09	8.97	8/2/2011
6068	99% Soil and 1% Pipescale	5/25/2011	7.84	0.08	7.92	8/3/2011
5712	99% Soil and 1% Pipescale	5/25/2011	9.45	0.10	9.55	8/8/2011
5854	99% Soil and 1% Pipescale	5/25/2011	10.78	0.11	10.89	8/9/2011
5400	99% Soil and 1% Pipescale	5/25/2011	7.99	0.08	8.07	8/10/2011
CHHP20904	99% Soil and 1% Pipescale	6/13/2011	12.33	0.12	12.45	8/9/2011
25971	99% Soil and 1% Pipescale	6/13/2011	10.72	0.11	10.83	8/1/2011
25657	99% Soil and 1% Pipescale	6/27/2011	15.64	0.16	15.80	8/2/2011
251205	99% Soil and 1% Pipescale	6/27/2011	13.96	0.14	14.10	8/3/2011
5953	99% Soil and 1% Pipescale	7/26/2011	5.98	0.06	6.04	9/22/2011
6094	99% Soil and 1% Pipescale	10/3/2011	10.44	0.11	10.55	11/30/2011
5712	99% Soil and 1% Pipescale	10/6/2011	8.50	0.09	8.59	11/21/2011
5953	99% Soil and 1% Pipescale	10/27/2011	12.94	0.13	13.07	12/29/2011
5418	99% Soil and 1% Pipescale	11/17/2011	8.51	0.09	8.60	1/11/2012
5983	99% Soil and 1% Pipescale	1/16/2012	11.88	0.12	12.00	2/21/2012
6192	99% Soil and 1% Pipescale	1/16/2012	11.86	0.12	11.98	2/22/2012
5397	99% Soil and 1% Pipescale	1/16/2012	11.39	0.12	11.50	2/23/2012
6011	99% Soil and 1% Pipescale	1/16/2012	11.19	0.11	11.30	2/27/2012
5357	99% Soil and 1% Pipescale	1/17/2012	11.24	0.11	11.35	2/28/2012

TABLE 3B
BIN MASS CALCULATIONS AND US ECOLOGY ARRIVAL DATES
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE III
MOUNTAIN PASS, CALIFORNIA

Bin ID	Bin Contents	Date(s) Sampled	Weight of Pipe or Soil (tons)[1,2]	Weight of Scale (tons)[3]	Total Weight of Bin (tons)[4]	Scheduled Arrival Date
PLASTIC/DECON MATERIALS BIN						
5418	Plastic and Decon Materials	1/24/2012	0.48	0.03	0.50	3/14/2012

NOTES:

(1) Weight of pipe in pipe bins is calculated as the length of HDPE pipe the bin contains times the known lbs/ft weight of the pipe. The 8" diameter HDPE pipe weighs 6.00 lbs/ft, 6" diameter HDPE pipe weighs 2.91 lbs/ft, and 2" diameter HDPE pipe weighs 1 lb/ft.

(2) Soil accounts for 99% of actual net weight of bin.

(3) Weight of pipe scale in pipe bins is calculated as the difference in weight between the actual net weight of the bin and the weight of the pipe it contains. Weight of pipe scale in soil bins accounts for 1% of actual net weight of the bin.

(4) Actual net weight of bin contents.

TABLE 4A
CACTUS AND NATIVE DESERT RIPARIAN TREE TRANSPLANTS
WASTE WATER DISCHRARGE PIPELINE REMOVAL PROJECT - PHASE II
MOUNTAIN PASS, CALIFORNIA

Common Name	Scientific Name	Location		Height	Average Stem Diameter (inches)
		Latitude	Longitude	(inches)	
Buckhorn Cholla	*Cylindropuntia acanthocarpa var coloradensis*	35.46981	-115.52196	35	N/A
Banana Yucca	*Yucca baccata var baccata*	35.46980	-115.52198	38	N/A
Beavertail cactus	*Opuntia basilaris var basilaris*	35.46981	-115.52197	7	N/A
Desert Willow	*Chilopsis linearis*	35.46915	-115.51992	22	0.75
Desert Willow	*Chilopsis linearis*	35.46914	-115.51990	7	0.50
Desert Willow	*Chilopsis linearis*	35.46919	-115.51925	36	0.80
Catclaw	*Acacia greggii*	35.46850	-115.51575	60	1.00
Catclaw	*Acacia greggii*	35.46851	-115.51569	37	0.25
Beavertail cactus	*Opuntia basilaris var basilaris*	35.46853	-115.51488	5	N/A
Catclaw	*Acacia greggii*	35.46845	-115.51532	45	0.50
Catclaw	*Acacia greggii*	35.46851	-115.51432	30	0.50
Catclaw	*Acacia greggii*	35.46873	-115.51379	32	0.25
Catclaw	*Acacia greggii*	35.46881	-115.51359	28	0.25
Catclaw	*Acacia greggii*	35.46924	-115.51003	115	3.00
Catclaw	*Acacia greggii*	35.46926	-115.50997	67	1.00
Catclaw	*Acacia greggii*	35.46923	-115.51001	41	0.12
Buckhorn Cholla	*Cylindropuntia acanthocarpa var coloradensis*	35.46954	-115.50927	5	N/A
Catclaw	*Acacia greggii*	35.46952	-115.50929	25	0.13
Catclaw	*Acacia greggii*	35.46952	-115.50931	30	0.25
Catclaw	*Acacia greggii*	35.47008	-115.50840	17	0.25
Catclaw	*Acacia greggii*	35.47009	-115.50838	43	0.25
Beavertail cactus	*Opuntia basilaris var basilaris*	35.47030	-115.50807	8	N/A
Beavertail cactus	*Opuntia basilaris var basilaris*	35.47032	-115.50798	5.5	N/A
Catclaw	*Acacia greggii*	35.47051	-115.50597	7	0.06
Catclaw	*Acacia greggii*	35.47051	-115.50597	26	0.25
Catclaw	*Acacia greggii*	35.47052	-115.50592	23	0.13
Catclaw	*Acacia greggii*	35.47052	-115.50592	5	0.13

TABLE 4A
CACTUS AND NATIVE DESERT RIPARIAN TREE TRANSPLANTS
WASTE WATER DISCHRARGE PIPELINE REMOVAL PROJECT - PHASE II
MOUNTAIN PASS, CALIFORNIA

Common Name	Scientific Name	Location		Height (inches)	Average Stem Diameter (inches)
		Latitude	Longitude		
Catclaw	*Acacia greggii*	35.47052	-115.50591	17.5	0.13
Catclaw	*Acacia greggii*	35.47053	-115.50589	3	0.06
Catclaw	*Acacia greggii*	35.47058	-115.50570	3.5	0.06
Joshua Tree	*Yucca brevifolia*	35.46872	-115.49525	6	N/A
Catclaw	*Acacia greggii*	35.46811	-115.49027	54	1.00
Catclaw	*Acacia greggii*	35.46809	-115.49023	16	0.25
Catclaw	*Acacia greggii*	35.46807	-115.49005	41	0.50
Desert Willow	*Chilopsis linearis*	35.46808	-115.48991	47	1.00
Catclaw	*Acacia greggii*	35.46295	-115.47567	10	0.25
Buckhorn Cholla	*Cylindropuntia acanthocarpa var coloradensis*	35.46807	-115.48672	6	N/A
Buckhorn Cholla	*Cylindropuntia acanthocarpa var coloradensis*	35.46807	-115.48673	8	N/A
Catclaw	*Acacia greggii*	35.46812	-115.48663	27	0.13
Desert Willow	*Chilopsis linearis*	35.46815	-115.48654	37	1.00
Desert Willow	*Chilopsis linearis*	35.46815	-115.48651	36	0.75
Desert Willow	*Chilopsis linearis*	35.46815	-115.48647	64	1.25
Catclaw	*Acacia greggii*	35.46691	-115.48109	18	0.25
Catclaw	*Acacia greggii*	35.46666	-115.48068	16	0.25
Catclaw	*Acacia greggii*	35.46625	-115.47999	45	0.75
Desert Willow	*Chilopsis linearis*	35.46814	-115.49022	36	0.75
Desert Willow	*Chilopsis linearis*	35.46811	-115.49002	65	1.00
Catclaw	*Acacia greggii*	35.46580	-115.47925	18	0.25
Catclaw	*Acacia greggii*	35.46814	-115.49026	31	0.13
Catclaw	*Acacia greggii*	35.46580	-115.47925	60	1.00
Catclaw	*Acacia greggii*	35.46763	-115.48267	56	0.65

TABLE 4A
CACTUS AND NATIVE DESERT RIPARIAN TREE TRANSPLANTS
WASTE WATER DISCHRARGE PIPELINE REMOVAL PROJECT - PHASE II
MOUNTAIN PASS, CALIFORNIA

Common Name	Scientific Name	Location		Height	Average Stem
		Latitude	Longitude	(inches)	Diameter (inches)

Notes:
1. Transplanting of native plants within Phase II occurred between 9/20/2010 and 4/27/2011.
2. Plants were transplanted to a planting hole adjacent to the pipeline removal work area (exclusion zone).
Planting holes were watered at the time of plant relocation.
3. Coordinate system: NAD83, State Plane California Zone 5, feet.

TABLE 4B
CACTUS TRANSPLANTS
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT - PHASE III
MOUNTAIN PASS, CALIFORNIA

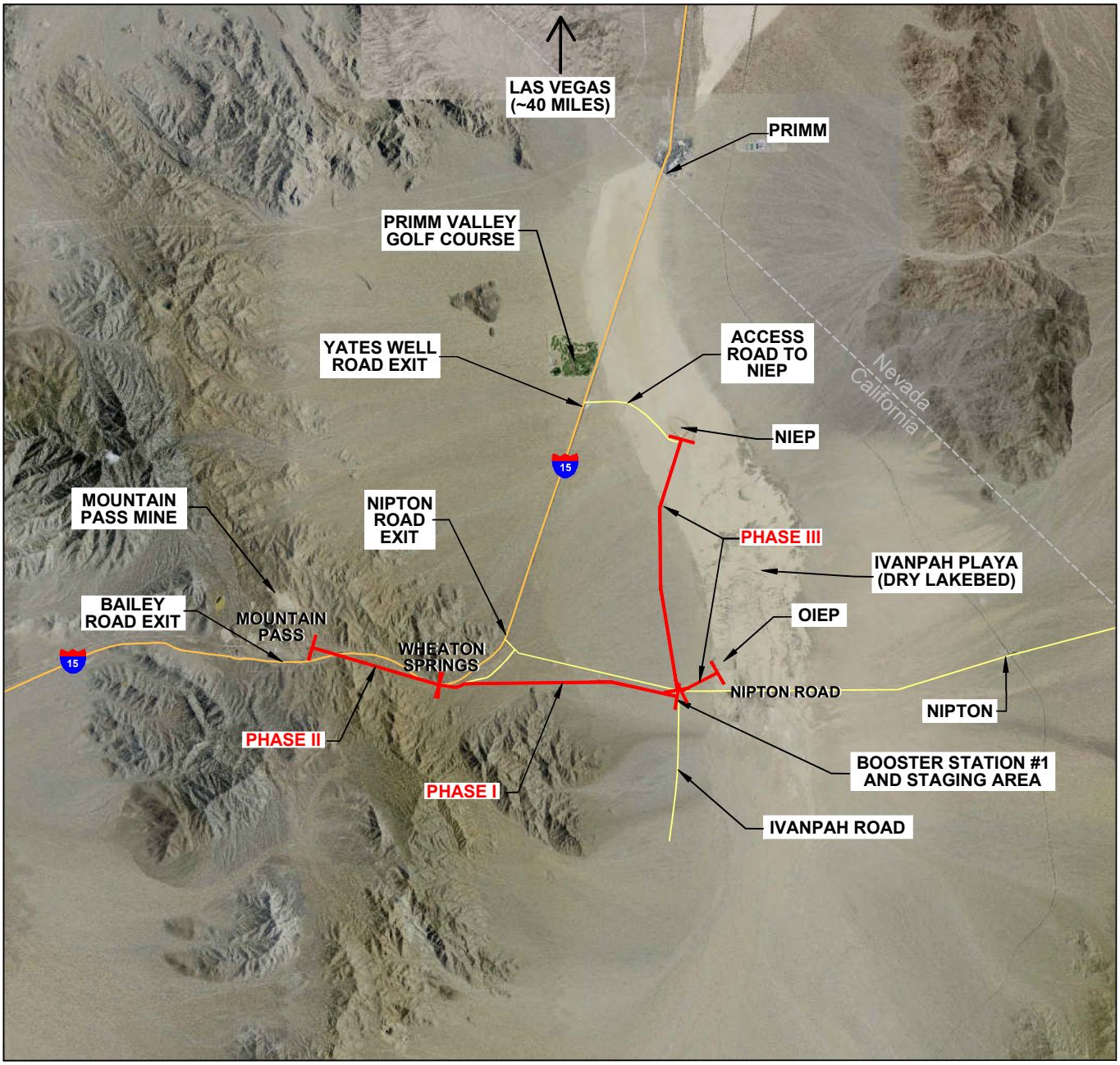
Common Name	Scientific Name	Location		Height
		Latitude	Longitude	(inches)
Diamond cholla	*Cylindropuntia ramosissima*	35.46470	-115.39044	1.5
Diamond cholla	*Cylindropuntia ramosissima*	35.46560	-115.39078	11
Silver cholla	*Cylindropuntia echinocarpa*	35.46668	-115.39067	10
Silver cholla	*Cylindropuntia echinocarpa*	35.46841	-115.39097	8.5
Silver cholla	*Cylindropuntia echinocarpa*	35.46859	-115.39101	8
Silver cholla	*Cylindropuntia echinocarpa*	35.46774	-115.39088	8.25
Silver cholla	*Cylindropuntia echinocarpa*	35.46927	-115.39117	9.5
Silver cholla	*Cylindropuntia echinocarpa*	35.46982	-115.39122	6
Diamond cholla	*Cylindropuntia ramosissima*	35.47260	-115.39166	10
Silver cholla	*Cylindropuntia echinocarpa*	35.47385	-115.39184	4
Silver cholla	*Cylindropuntia echinocarpa*	35.47503	-115.39202	6
Diamond cholla	*Cylindropuntia ramosissima*	35.47564	-115.39218	16
Silver cholla	*Cylindropuntia echinocarpa*	35.47574	-115.39225	6
Silver cholla	*Cylindropuntia echinocarpa*	35.47703	-115.39233	5
Diamond cholla	*Cylindropuntia ramosissima*	35.47669	-115.39229	12
Diamond cholla	*Cylindropuntia ramosissima*	35.47715	-115.39232	13.5
Diamond cholla	*Cylindropuntia ramosissima*	35.47722	-115.39233	3
Diamond cholla	*Cylindropuntia ramosissima*	35.48013	-115.39271	23
Silver cholla	*Cylindropuntia echinocarpa*	35.48039	-115.39270	3
Diamond cholla	*Cylindropuntia ramosissima*	35.48045	-115.39276	13
Silver cholla	*Cylindropuntia echinocarpa*	35.48141	-115.39286	6
Silver cholla	*Cylindropuntia echinocarpa*	35.48169	-115.39298	8
Silver cholla	*Cylindropuntia echinocarpa*	35.48180	-115.39299	17.5
Silver cholla	*Cylindropuntia echinocarpa*	35.48257	-115.39303	11
Diamond cholla	*Cylindropuntia ramosissima*	35.48136	-115.39292	9.5
Silver cholla	*Cylindropuntia echinocarpa*	35.48299	-115.39310	13
Beavertail cactus	*Opuntia basilaris var basilaris*	35.48350	-115.39322	2
Silver cholla	*Cylindropuntia echinocarpa*	35.48468	-115.39333	11
Silver cholla	*Cylindropuntia echinocarpa*	35.48502	-115.39335	5.5
Silver cholla	*Cylindropuntia echinocarpa*	35.48561	-115.39370	3
Beavertail cactus	*Opuntia basilaris var basilaris*	35.48567	-115.39370	4
Silver cholla	*Cylindropuntia echinocarpa*	35.48806	-115.39398	6
Silver cholla	*Cylindropuntia echinocarpa*	35.49353	-115.39494	5

Notes:

1. Transplanting of native plants within Phase III occurred between 6/2/11 and 12/14/11.
2. Plants were transplanted to a planting hole adjacent to the pipeline removal work area (exclusion zone). Planting holes were watered at the time of plant relocation.
3. Coordinate system: NAD83.
4. There were no native desert riparian trees encountered during Phase III.

ARCADIS

Figures



0 5000' 10000'

GRAPHIC SCALE

NOTE:

1. CALIFORNIA IMAGERY DOWNLOADED FROM CAL-ATLAS GEOSPATIAL CLEARING HOUSE AT http://atlas.ca.gov AND NEVADA IMAGERY DOWNLOADED FROM THE W.M. KECK EARTH SCIENCES & MINING RESEARCH INFORMATION CENTER AT http://keck.library.unr.edu

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
SAN RAMON, CALIFORNIA
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT
SAN BERNARDINO COUNTY, CALIFORNIA

PROJECT LOCATION

ARCADIS

FIGURE
1

CITY: PETALUMA, CA DIV/GROUP: ENV DB: J. HARRIS/K. SINSABAUGH LAYOUT: 1 SAVED: 5/2/2012 10:42 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: SETUP1 PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 5/14/2012 9:30 AM BY: HARRIS, JESSICA
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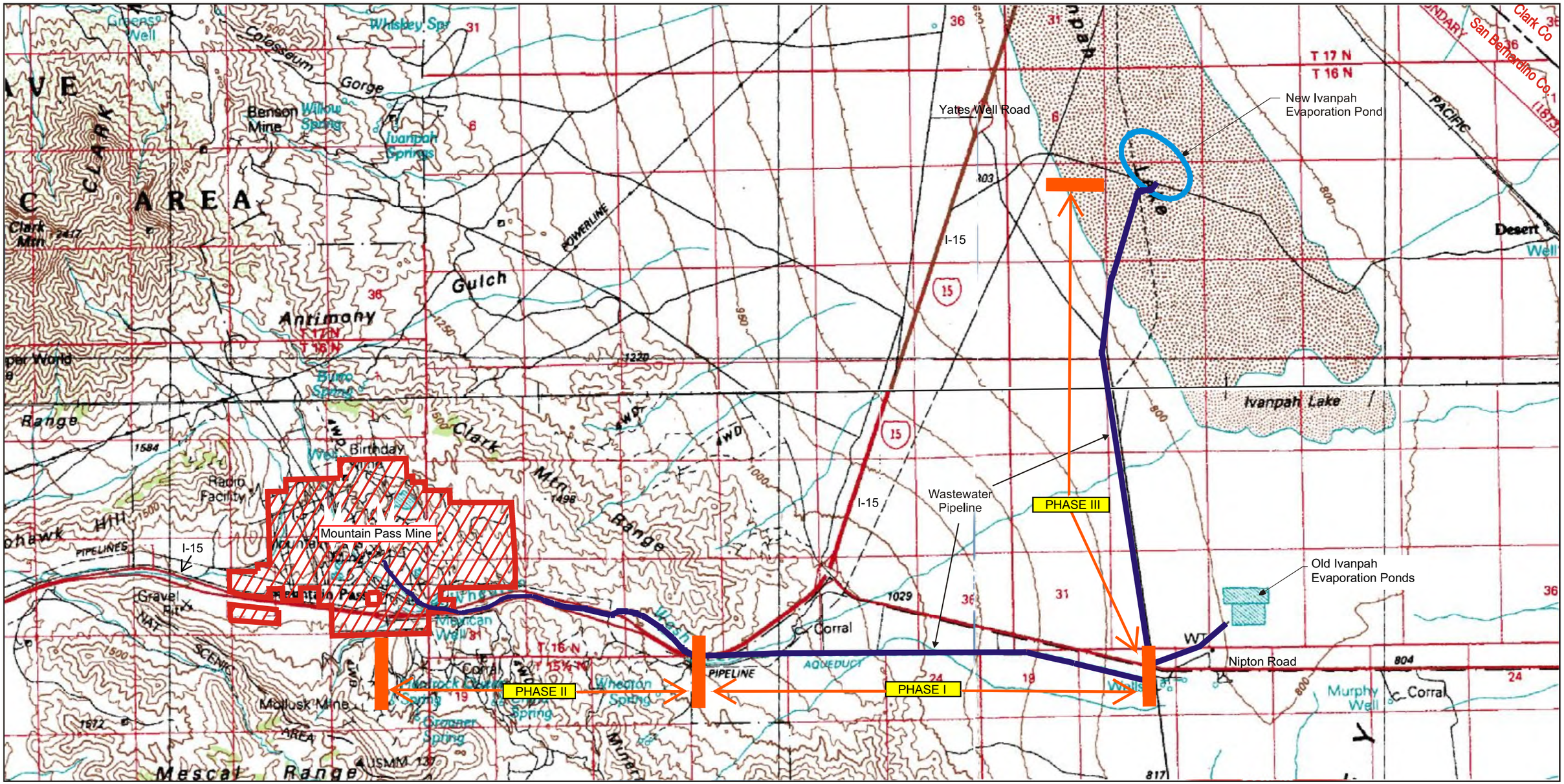


REFERENCE: BASE MAP SOURCE USGS 7.5 MIN. TOPO. QUAD., MESCAL RANGE, CALIFORNIA, 1983

0 1 2 Miles

APPROXIMATE GRAPHIC SCALE:
1 INCH = 1 MILE

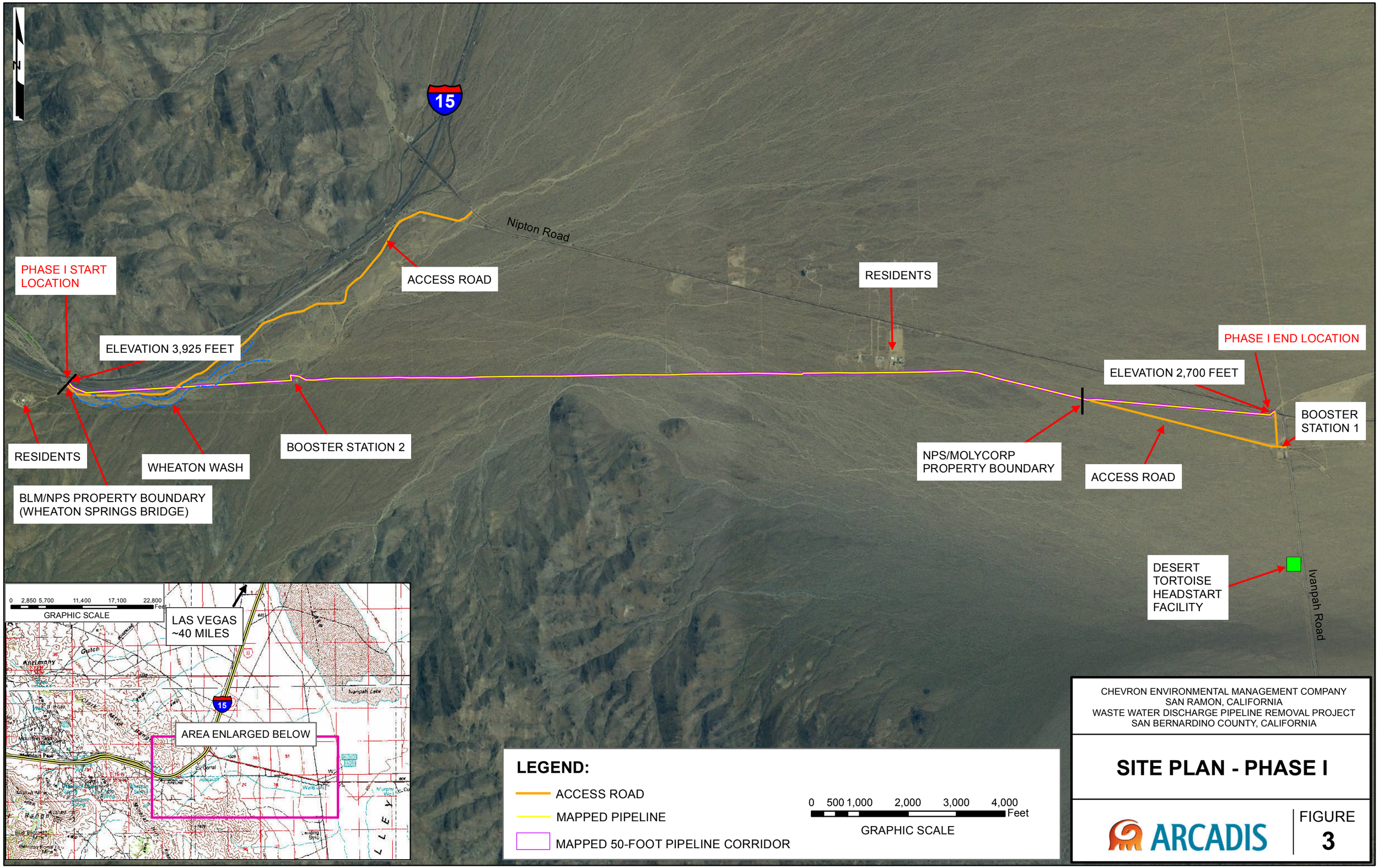
AREA LOCATION
CALIFORNIA

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
SAN RAMON, CALIFORNIA
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT
SAN BERNARDINO COUNTY, CALIFORNIA

TOPOGRAPHIC MAP OF SITE LOCATION AND VICINITY

ARCADIS

FIGURE
2

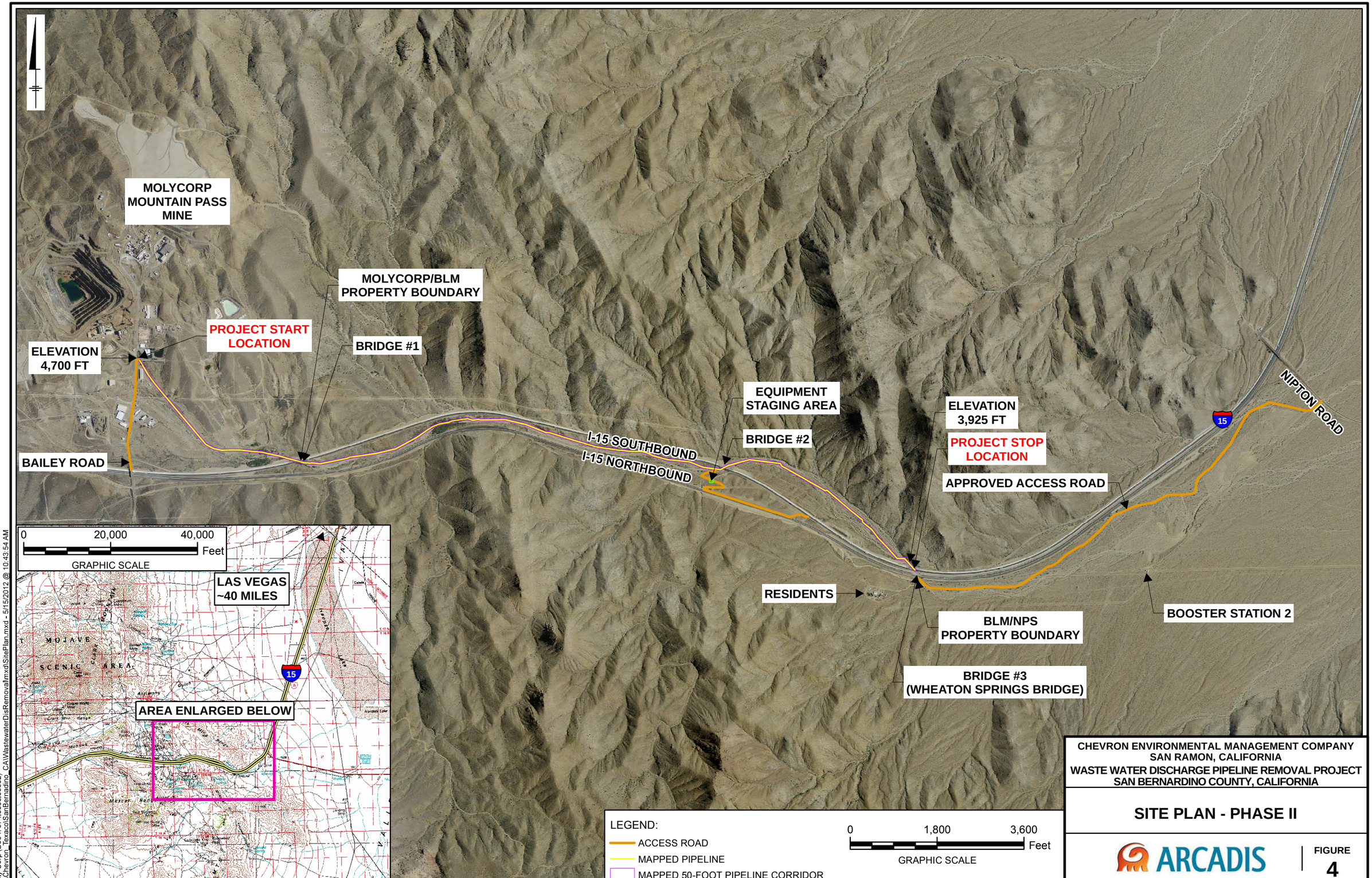


CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
SAN RAMON, CALIFORNIA
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT
SAN BERNARDINO COUNTY, CALIFORNIA

SITE PLAN - PHASE I

ARCADIS

FIGURE 3



CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
SAN RAMON, CALIFORNIA
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT
SAN BERNARDINO COUNTY, CALIFORNIA

SITE PLAN - PHASE II

ARCADIS

FIGURE 4

CITY: SYR DIV/GROUP: AIT DB: KES LD: PIC: PM: TM: TR:
Moly Corp (B0047074.0000.00002)
Q:\Chevron_Texaco\SanBernadino_CA\WastewaterDisRemovalmxd\SitePlan.mxd - 5/15/2012 @ 10:43:54 AM

Yates Well Road

New Ivanpah Evaporation Pond

Elevation 2,605 ft.

Staging Area

Project End Location

15

Playa Transition

BLM Gate

Ivanpah Playa (Dry Lake Bed)

Desert Tortoise Critical Habitat End

Old Ivanpah Evaporation Pond

Wheaton Wash

Nipton Road

OIEP Gate

BLM Gate

BLM Gate

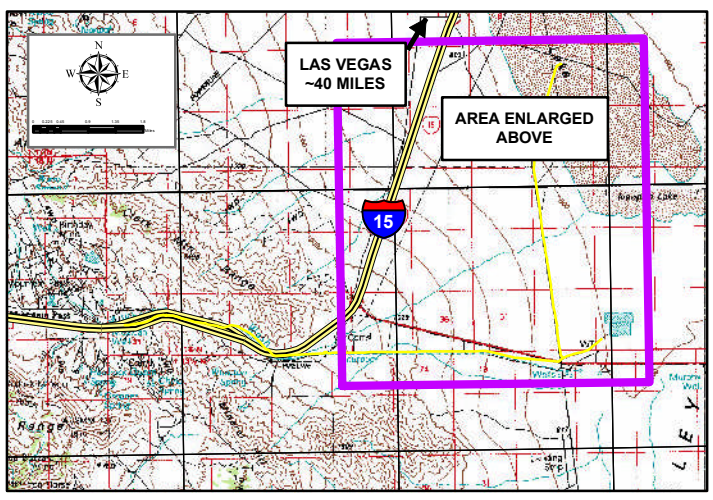
Staging Area

Project Start Location

Elevation 2,700 ft.

Booster Station #1

Ivanpah Road



Legend:

- Mapped Pipeline
- Access Road
- Mapped 50-foot Pipeline Corridor

NAD 83 Zone 11N

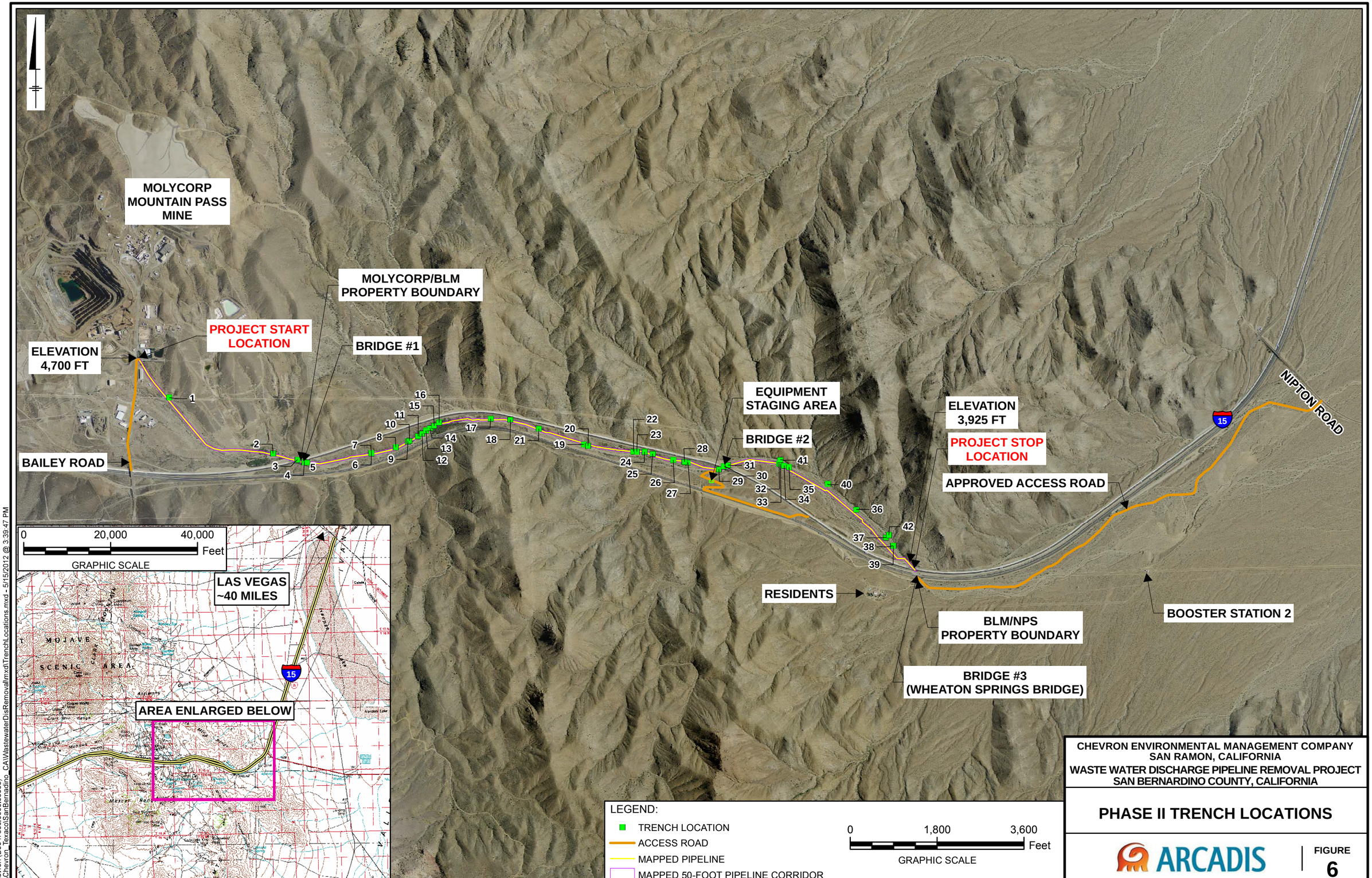
0 0.15 0.3 0.6 0.9 1.2 Miles

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
SAN RAMON, CALIFORNIA
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT
SAN BERNARDINO COUNTY, CALIFORNIA

SITE PLAN - PHASE III

ARCADIS

FIGURE 5



CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
SAN RAMON, CALIFORNIA
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT
SAN BERNARDINO COUNTY, CALIFORNIA

PHASE II TRENCH LOCATIONS

ARCADIS

FIGURE 6

CITY: SYR DIV/GROUP: IM DB: KES J.RAPP K. SINSABAUGH LD: PIC: PM: TM: TR:
Chevron (B0047803.0000.00003)
Q:\Chevron_Texaco\SanBernadino_CA\WastewaterDisRemovalImxd\TrenchLocations.mxd - 5/15/2012 @ 3:39:47 PM

YATES WELL ROAD

NEW IVANPAH EVAPORATION POND

ELEVATION 2,605 FT

STAGING AREA

PROJECT END LOCATION

22 23 24 19 20 21

25 26

PLAYA TRANSITION

27

15

30 29 30

IVANPAH PLAYA (DRY LAKE BED)

31

BLM GATE

28

OLD IVANPAH EVAPORATION POND

OIEP GATE

WHEATON WASH

NIPTON ROAD

BLM GATE

ELEVATION 2,700 FT

18 16 8 13 12 9 11 17 15 14 10 7 6 5 4 3 2 1

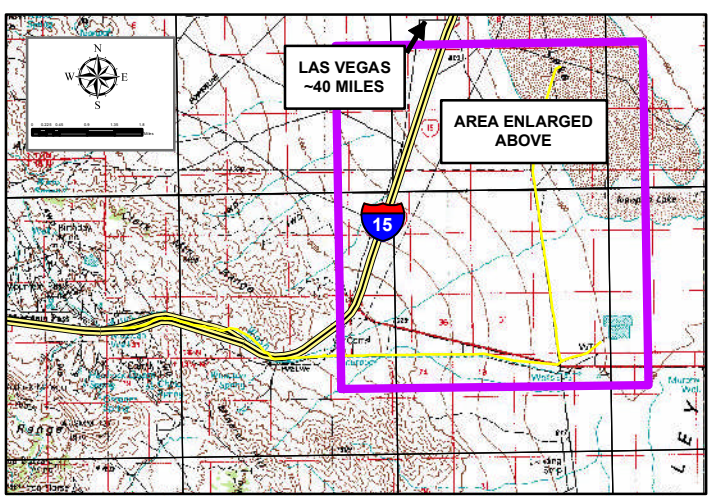
STAGING AREA

BLM GATE

PROJECT START LOCATION

BOOSTER STATION #1

IVANPAH ROAD



LEGEND:

- TRENCH LOCATION
- ACCESS ROAD
- MAPPED PIPELINE
- MAPPED 50-FOOT PIPELINE CORRIDOR

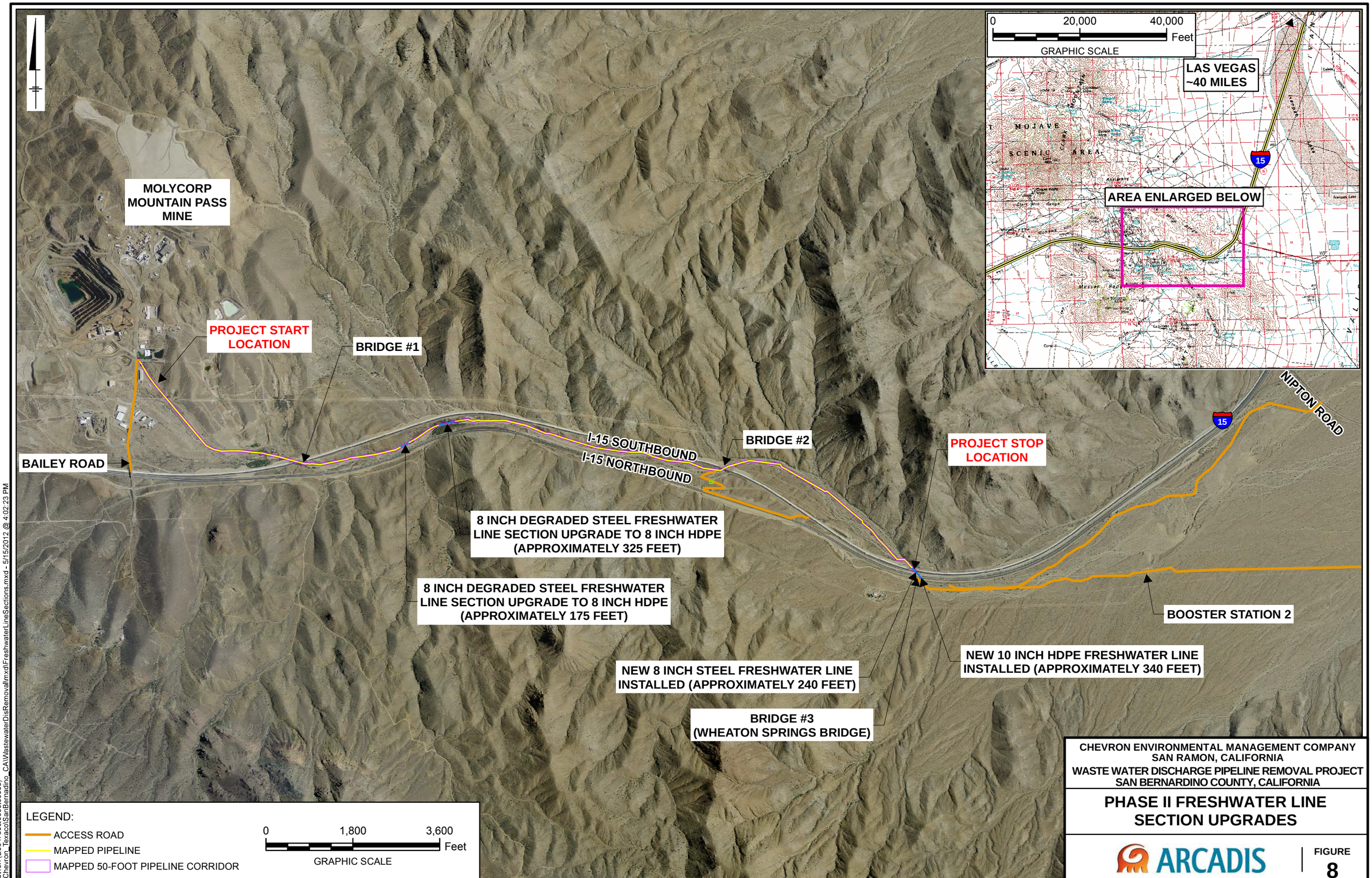
0 0.5 1 Miles

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
SAN RAMON, CALIFORNIA
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT
SAN BERNADINO COUNTY, CALIFORNIA

PHASE III TRENCH LOCATIONS

ARCADIS

FIGURE 7



CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
SAN RAMON, CALIFORNIA

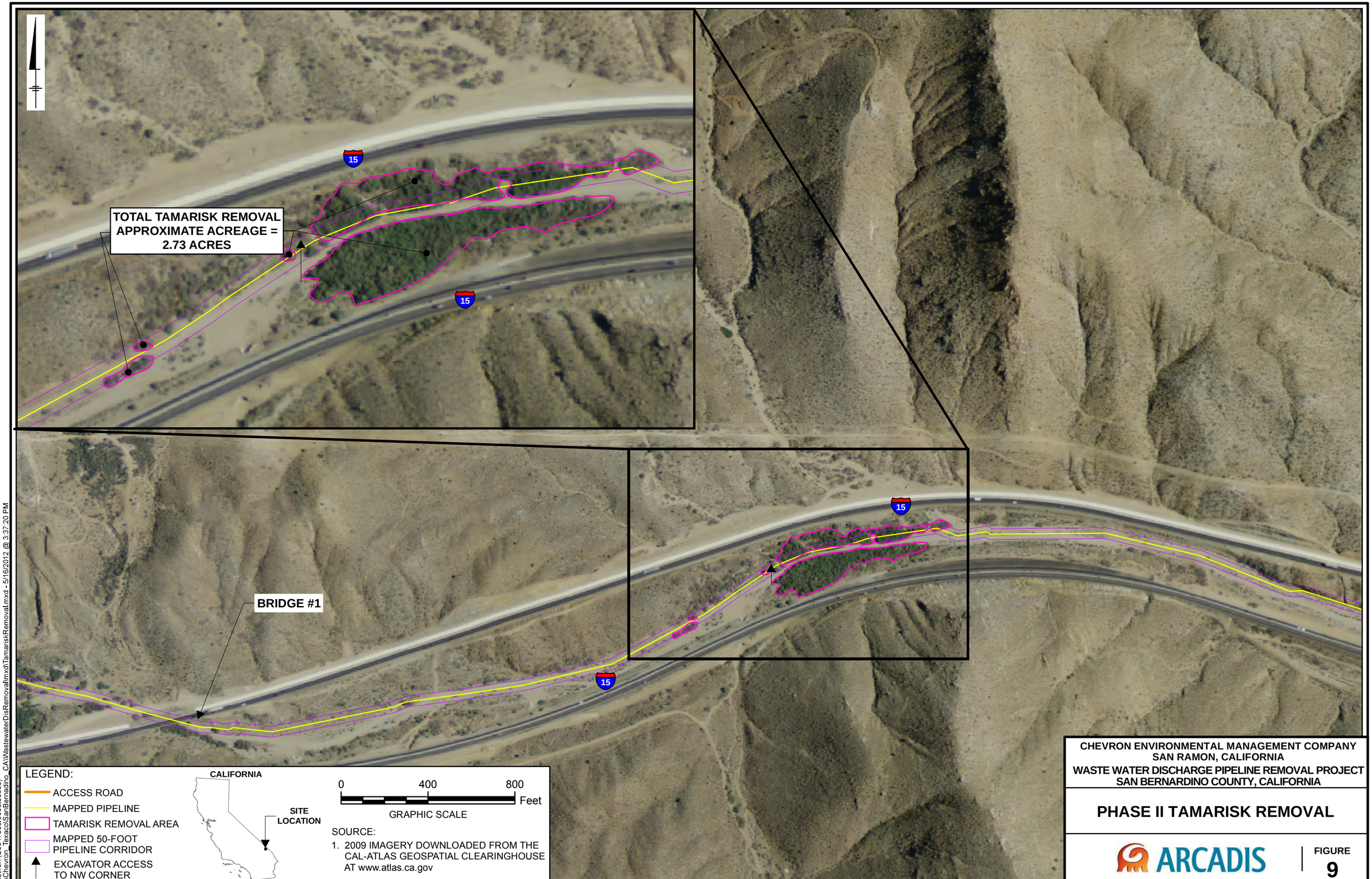
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT
SAN BERNARDINO COUNTY, CALIFORNIA

PHASE II FRESHWATER LINE SECTION UPGRADES

ARCADIS

FIGURE 8

CITY: SYR DIV/GROUP: IM DB: K. SINSABAUGH LD: PIC: PM: TM: TR:
Chevron (B0047803.0000.00003)
Q:\Chevron_Texaco\SanBernadino_CA\WastewaterDisRemovalmxd\FreshwaterLineSections.mxd - 5/15/2012 @ 4:02:23 PM



CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
SAN RAMON, CALIFORNIA
WASTE WATER DISCHARGE PIPELINE REMOVAL PROJECT
SAN BERNARDINO COUNTY, CALIFORNIA

PHASE II TAMARISK REMOVAL

ARCADIS

FIGURE
9

CITY: SYR DIV/GROUP: IM DB: K. SINSABAUGH LD: PIC: PM: TM: TR:
Chevron (B0047803.0000.00003)
Q:\Chevron_Texaco\SanBernadino_CA\WastewaterDisRemoval\mxd\TamariskRemoval.mxd - 5/16/2012 @ 3:37:20 PM

Technical Memorandum

Date: May 29, 2013

To: Erich Neupert - Task Order Manager (Caltrans)

From: Derek Rector P.G.– Field Geologist (URS)

Subject: **Radiation Monitoring - Cenda Ditch Bridge and Wheaton Wash Bridge (I15)**

URS performed subsurface explorations for Caltrans along the I15 corridor near the border of California and Nevada in the vicinity of the Cenda Ditch Bridge and Wheaton Wash Bridge. Based on historic activities, the work areas were anticipated to have a “low potential for contact with radioactive wastewater.” URS field staff implemented Safe Work Practices as outlined in our Health And Safety Plan (HASP) for the duration of the fieldwork. An excerpt from the HASP regarding Radiation Health and Safety practices is attached.

The fieldwork took place between May 13, 2013 and May 23, 2013. Prior to accessing the site and beginning any work URS personnel pre-surveyed the work area and recorded the results. All personnel who entered the site were made aware of the readings. Ten survey locations were laid out in the vicinity of each exploratory boring, including the boring location itself. An additional *background* location was also surveyed. All eleven locations were monitored throughout the as well as subsurface samples removed from the borings and the drilling mud. The results were recorded in tabular format on a regular basis, and all field personnel were notified of the reading levels. A graphical sketch of the survey locations and a table of results were created for each exploratory location. These data are attached to this Memorandum.

The survey device used for all measurements was a Fluke Biomedical Pressurized Ion Chamber Survey Meter (Model: Victoreen 451P-RYR, Serial No: 4804). The device was rented from Argus-Hazco and was calibrated in the lab on March 22, 2013 prior to shipment to URS. A copy of the calibration is attached to this Memorandum.

All radiation measurements for the duration of the project were below the URS action levels and well below the Maximum Permissible Concentration for Continuous Occupational Exposure, in accordance with the US Department of Commerce, National Bureau of Standards Handbook.

Site Radioactivity.
Below is a summary table of the four radioactivity tests performed on the water samples broken down by site location.

Radiation Test	WW-11 (pCi/L)	SRK-19 (pCi/L)	2004-2MW (pCi/L)	Mexican Well (pCi/L)
Gross Alpha	11.4	11.2	6	7.8
Gross Beta	17.6	6.1	6.8	5.2
Radium	1.74	0.65	0	1.05
Radium-228	6.7	2.36	0	2.44

Uranium is an alpha emitter, which decays through a series of radioactive decays into successive radioactive elements, including radium. Four radioactive isotopes of radium exist: three are alpha emitters and the fourth is a beta emitter. The entire radioactive decay series includes alpha, beta, and gamma emitters. Thus, workers on this project have the potential to be exposed to all three types of radiation.

The “gross alpha” and “gross beta” reflect the bulk of the radiation at the sites, which is expected to be primarily from uranium and radium, the two longest-lived isotopes in the decay series. While specific contributions from uranium isotopes are not known, the gross radioactivity present at the site is the more important factor from a health and safety perspective.

Regulatory Exposure Limitations
The Maximum Permissible Concentration for Continuous Occupational Exposure, per the US Department of Commerce, National Bureau of Standards, Handbook 69 is 1×10^{-7} microCuries per Liter, which equates to 100 picoCuries per Liter (pCi/L). All of the values in the table above are well under this level. In addition, while WW-11 and SRK-19 sites do have elevated levels, the sum of radioactive sources at each site is below this limit.

However, URS' internal radiation protection program (See SMS 52) is much more conservative than the national standards. URS includes a factor of 10 safety factor compared to the NRC limits. For example, the NRC imposes a 5 rem (5,000 millirem) annual dose limit, but URS implements a 500 millirem limit internally.

URS Radiation H&S Practices
URS will implement the following procedures onsite to monitor and minimize radiation exposure:

1. URS policies regarding radiation exposure can be found in SMS 52.
2. All personnel will wear the following PPE while engaged in work activities within the work zone: nitrile gloves, OSHA Level D, solid shoes, and safety shields.
3. Smoking, eating, drinking, and chewing gum in the work areas is strictly prohibited.
4. Personnel will use a radiation detector capable of detecting gamma and beta radiation at a minimum onsite to identify any areas of elevated radiation, and if found, personnel will demarcate these areas with signs and barricades.
5. Personnel using the radiation detector will be trained on how to use the device.
6. An initial radiation survey of the entire work area will be performed and documented on a map before work begins. The survey will also document background radiation levels off-site.
7. A minimum of daily radiation surveys will be conducted and documented to determine if radiation levels have changed at the site. Daily surveys will be compared to both (a) previous day’s rates and (b) action levels (see below). If readings are markedly higher than the readings from the

previous day and/or if readings exceed action levels, steps must be taken before work can commence.

8. Radiation surveys of any extracted material will be performed (ie, drill water, drill cuttings) and compared to action levels (see below).
9. Proper decontamination procedures will be observed, including proper laundering of work clothing, disposal of nitrile gloves, and proper cleaning and rinsing of boots and tools before exiting the work area.
10. Employees shall survey their clothing, tools, and boots for radiological contamination before exiting the work area. Should contamination be present, the item(s) will be further cleansed and rinsed, and a subsequent radiation survey will be conducted to verify that the contamination has been removed.

Survey Meter

The survey meter used for this project will have the capability of reading in dose rate, either millirem (mrem) or microSievert (μSv). The survey meter will be in current calibration and will be allowed to warm up for at least 1 minute before surveys are conducted with the meter. Surveys will be conducted using the following protocol:

1. Perform a battery test to verify proper operation of the meter.
2. Hold the meter approximately 1 foot from the surface of the area being surveyed.
3. Wait for 30 seconds and record the highest reading within that time frame.
4. Compare readings against the action levels (see below).
5. Record all readings on a site map. Date and sign.

Action Levels

Reading	Action	PPE
Background Levels	Continue working.	OSHA Level D, nitrile gloves, safety glasses
≥1.0 μSv/hr	Continue working. Increase frequency of monitoring to every hour until reading levels decrease. Use dust control measures to minimize inhalation of dust in work area.	OSHA Level D, nitrile gloves, safety glasses
≥1.7 μSv/hr	Don additional PPE. Increase frequency of monitoring to every hour until reading levels decrease. Use dust control measures to minimize inhalation of dust in work area. Seal all cuttings in Visqueen plastic.	Tyvex coveralls, long nitrile gloves, safety glasses
≥17 μSv/hr	Stop work. Evacuate Area.	

Rector, Derek

From: Nicoll, Gayle
Sent: Friday, May 10, 2013 12:38 PM
To: Rector, Derek
Subject: action table with conversions

		Reading	Action	PPE
		Background Levels	Continue working.	OSHA Level D, nitrile gloves, safety glasses
100 μR/hr	0.1 mR/hr	≥1.0 μSv/hr	Continue working. Increase frequency of monitoring to every hour until reading levels decrease. Use dust control measures to minimize inhalation of dust in work area.	OSHA Level D, nitrile gloves, safety glasses
170 μR/hr	0.17 mR/hr	≥1.7 μSv/hr	Don additional PPE. Increase frequency of monitoring to every hour until reading levels decrease. Use dust control measures to minimize inhalation of dust in work area. Seal all cuttings in Visqueen plastic.	Tyvex coveralls, long nitrile gloves, safety glasses
1700 μR/hr	1.7 mR/hr	≥17 μSv/hr	Stop work. Evacuate Area.	

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2902

FLUKE.
Biomedical

GCL Calibration Certificate

Report No: AC-4804-20664
Calibration: As Calibrated
Results: In Tolerance

Fluke Biomedical: Pressurized Ion Chamber Survey Meter
Model: 451P-RYR Serial No: 4804 Asset No: 2902

Customer: ARGUS HAZCO
434 ALEXANDERSVILLE RD

MIAMISBURG, OH 45342

PO: 01011998 BO/SO: 287075

Date Received: 21-Mar-13
Date Calibrated: 22-Mar-13
Manufacturer's Recommended Due Date: 22-Mar-14

Temperature: 21.39 degrees Celsius
Pressure: 730.99 mmHg
Humidity: 38.5 % Relative Humidity

NOTES

This calibration is traceable to the National Institute of Standards and Technology. This report must not be used to claim product recertification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

The calibration is warranted to be within specified accuracy limits, at the time of calibration. In the event of a calibration error, our liability is limited to standard recalibration cost.

Proper function and reliability of the instrument described in this document are highly dependent upon handling and use. It is recommended the user establish a technique to monitor the constancy of the instrument response before and after its return to the manufacturer.

This certificate shall not be reproduced except in full, without the written approval of the calibration laboratory.

If there are any problems with the calibration of the instrument, please contact the Calibration Laboratory Director.

Calibrated by: Kay, Rodger Date: 22-Mar-13
Technician

Reviewed by: Richard Abbott Date: 22-Mar-13
Richard Abbott, Technical Services Manager

Fluke Biomedical
6045 Cochran Road Cleveland, OH 44139.3303 USA
Telephone 440.248.9300
Facsimile 440.349.2307
Internet www.flukebiomedical.com

FLUKE. Biomedical

Report No: AC - 4804-20664

Check Source Reading	N/A

Rate Calibration							
Source	Distance (cm)	No. of Atten	UUT Range	Units	Reference Rate	UUT Rate	% Error
20 Ci Cs-137	935.95	5	0 to 500	uR/hr	180	182.7	1.50 - Pass
20 Ci Cs-137	911.33	4	0 to 500	uR/hr	360	358.9	-0.31 - Pass
20 Ci Cs-137	907.84	3	0 to 5	mR/hr	1.8	1.81	0.56 - Pass
20 Ci Cs-137	887.12	2	0 to 5	mR/hr	3.6	3.525	-2.08 - Pass
20 Ci Cs-137	897.39	1	0 to 50	mR/hr	18	17.89	-0.61 - Pass
20 Ci Cs-137	906.77	0	0 to 50	mR/hr	36	35.97	-0.08 - Pass
2000 Ci Cs-137	779.21	3	0 to 500	mR/hr	180	180.8	0.44 - Pass
2000 Ci Cs-137	763.88	2	0 to 500	mR/hr	360	356.8	-0.89 - Pass
2000 Ci Cs-137	780.62	0	0 to 5	R/hr	3.6	3.588	-0.33 - Pass

Dose Calibration					
Integration Calibration Point	UUT Range	Units	Reference Exposure	UUT Exposure	% Error
2000 Ci Cs-137, 100 sec	0 to 50	mR	10	10	0.00 - Pass

Calibration Procedure: CAL-450-451.pdf

Calibration Description: The 451P-RYR has an operating range of 0 to 5 R/hr. The unit is exposed through the side of the detector and calibrated on all ranges. All readings were corrected for background. The % Error was calculated using Equation 1.

Envioronmental Constraints: The 451P-RYR survey meter is designed to read accurately from -20 to 50C. The unit is pressurized, therefore, requires no air density corrections.

Calibration Uncertainty: 3.6% with 2.2% associated with the uncertainty of the source.

Accuracy Requirement: 10% of Reading

Equation 1: $$\%Error = \frac{100*(UUT - Reference)}{Reference}$$

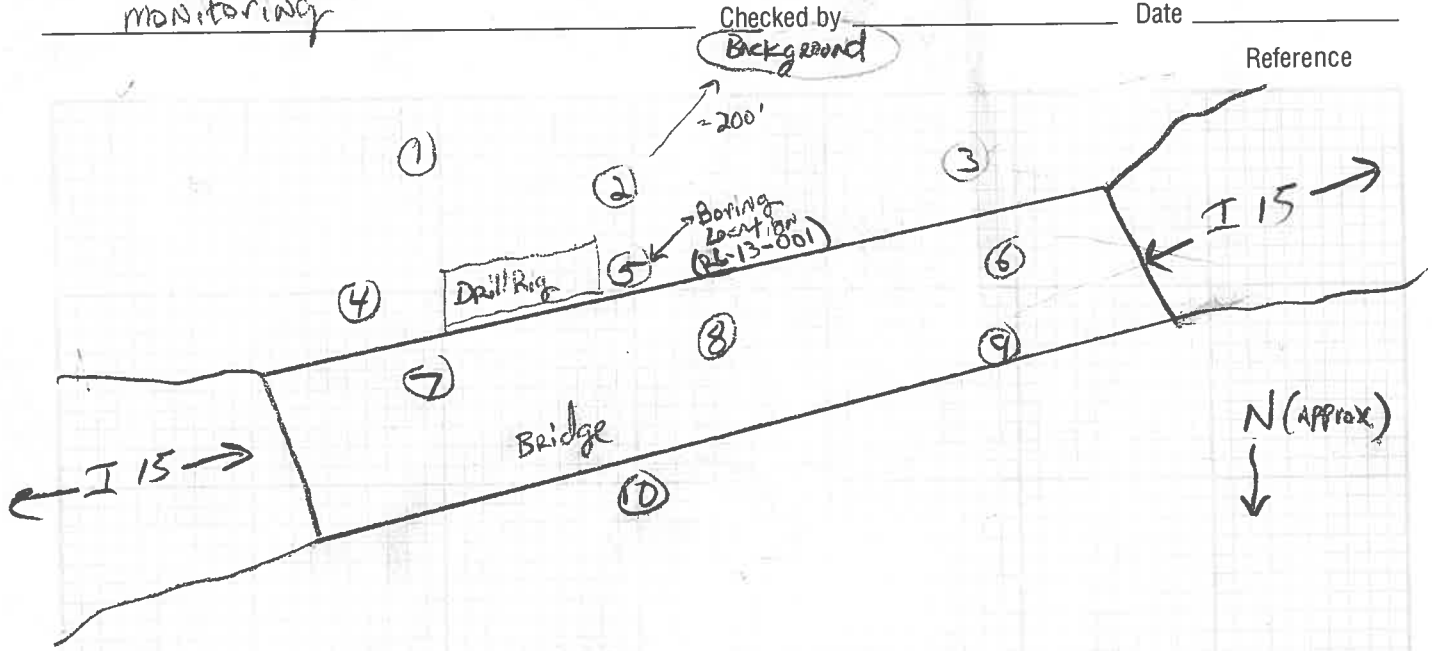
Fluke Biomedical
6045 Cochran Road Cleveland, OH 44139.3303 USA
Telephone 440.248.9300
Facsimile 440.349.2307
Internet www.flukebiomedical.com

URS

Job: Wheaton Wash Bridge (Boring RC-13-001)
Description: Geiger Counter/Radiation monitoring

Project No. 30989852.82240
Computed by: D. Rector
Checked by:

Page 1 of
Sheet of
Date
Date



	Time	Sample	1	2	3	4	5	6	7	8	9	10	Background
5/14/13	9:30		21 µ	15 µ	13 µ	17 µ	10 µ	14 µ	13 µ	13 µ	13 µ	20 µ	15 µ
	10:30	12 µ											
5/15/13	8:00		26 µ	13 µ	13 µ	48 µ	10 µ	21 µ	13 µ	14 µ	19 µ	25 µ	23 µ
	8:37	10 µ											
	9:15	11 µ				22 µ	13 µ						
	9:55	16 µ											
	10:15	18 µ					11 µ						
	11:30	13 µ					13 µ						
	12:50	10 µ	16 µ	15 µ	20 µ	15 µ	10 µ	18 µ	16 µ	17 µ	19 µ	18 µ	19 µ
	1:30	10 µ					10 µ						
	2:30	13 µ					09 µ						
	3:30	11 µ					11 µ						
	4:30	14 µ					13 µ						
	5:30	12 µ					11 µ						
	6:00		12 µ	16 µ	16 µ	14 µ	11 µ	20 µ	17 µ	17 µ	15 µ	15 µ	14 µ
	7:10		15 µ	14 µ	17 µ	15 µ	9 µ	10 µ	15 µ	10 µ	7 µ	14 µ	15 µ

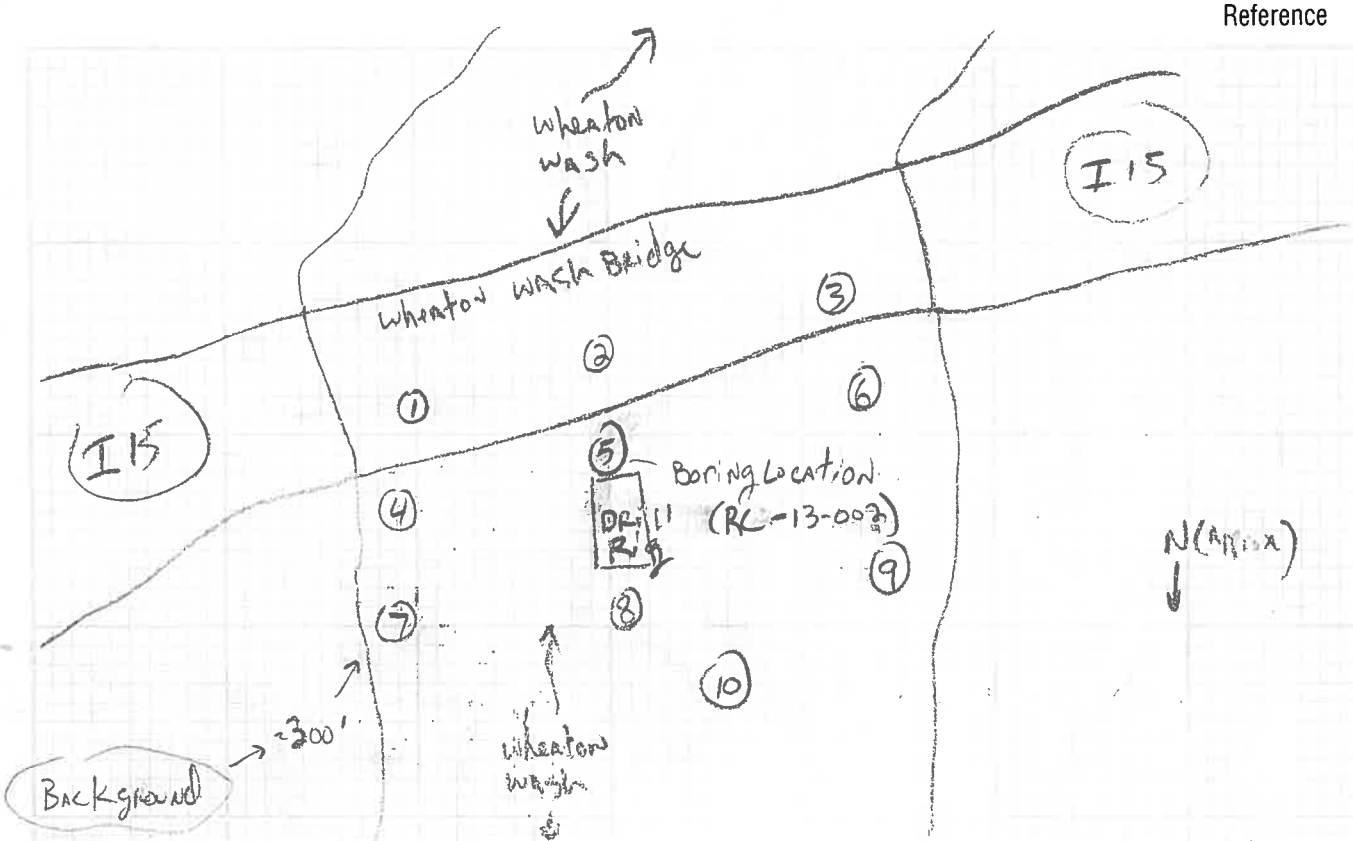
URS

Job Wheaton Wash Bridge (RC-13-002) Project No. 30989852.82240 Page 1 of 1

Description Radio activity Surveys Computed by D. Rector Sheet ___ of ___

Checked by ___ Date 5/16/13 Date ___

Reference



Time	Sample	1	2	3	4	5	6	7	8	9	10	Background
8:00		13μ	11μ	22μ	17μ	13μ	20μ	17μ	18μ	16μ	23μ	25μ
9:00	14μ					9μ						
10:10	11μ					18μ						
11:00	12μ					14μ						
11:45	12μ					11μ						
1:15	13μ	11μ	16μ	15μ	10μ	12μ	22μ	14μ	13μ	22μ	13μ	18μ
2:45	10μ					9μ						

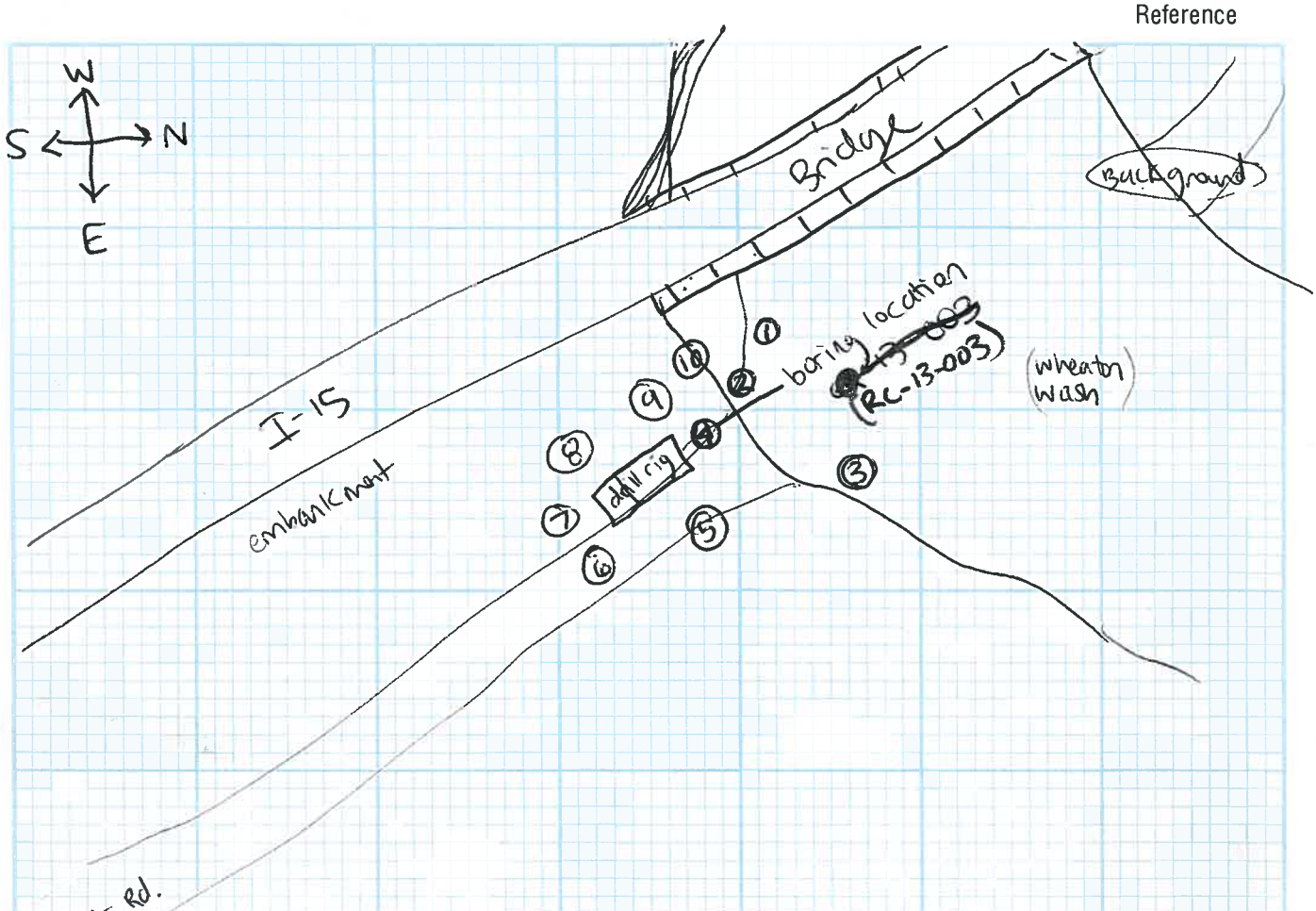
URS

Job Wheaton Wash Bridge (RC-13-003) Project No. 30989852.8240 Page 1 of ____ Sheet ____ of ____

Description Radio Activity Surveys Computed by J. Stout Date 5/17/13

Checked by ____ Date ____

Reference



measurements are in μR/h unless otherwise noted

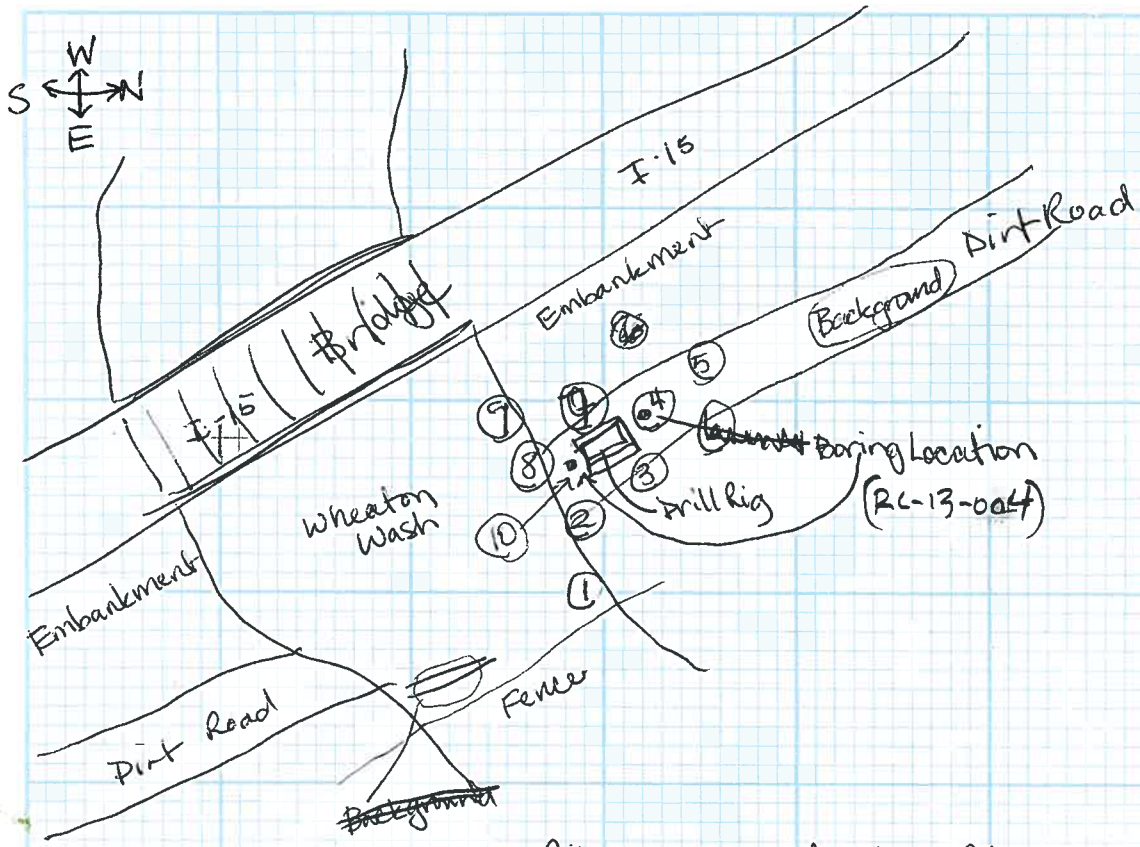
	Time	Sample	1	2	3	4	5	6	7	8	9	10	Background
5/17/13	1050	19	17	21	13	13	9	20	17	12	17	24	20
	1145	~~[illegible]~~ 19				13							18
	1330	12	13	14	8	14	18	15	12	21	19	14	22
	1445	11				20							19
	1545	14				8							12
5/18/13	0956	14	16	19	17	17	24	16	25	21	24	18	12
	1335	7	11	17	19	21	17	12	14	18	20	13	21
	1614	14	19	20	15	18	13	20	16	16	17	10	13

URS

Job Wheaton Wash Bridge
Description Radio Activity Surveys

Project No. 30989852.82240
Computed by H. Rothbard
Checked by

Page 2 of
Sheet of
Date
Date
Reference



All measurements in μR/h

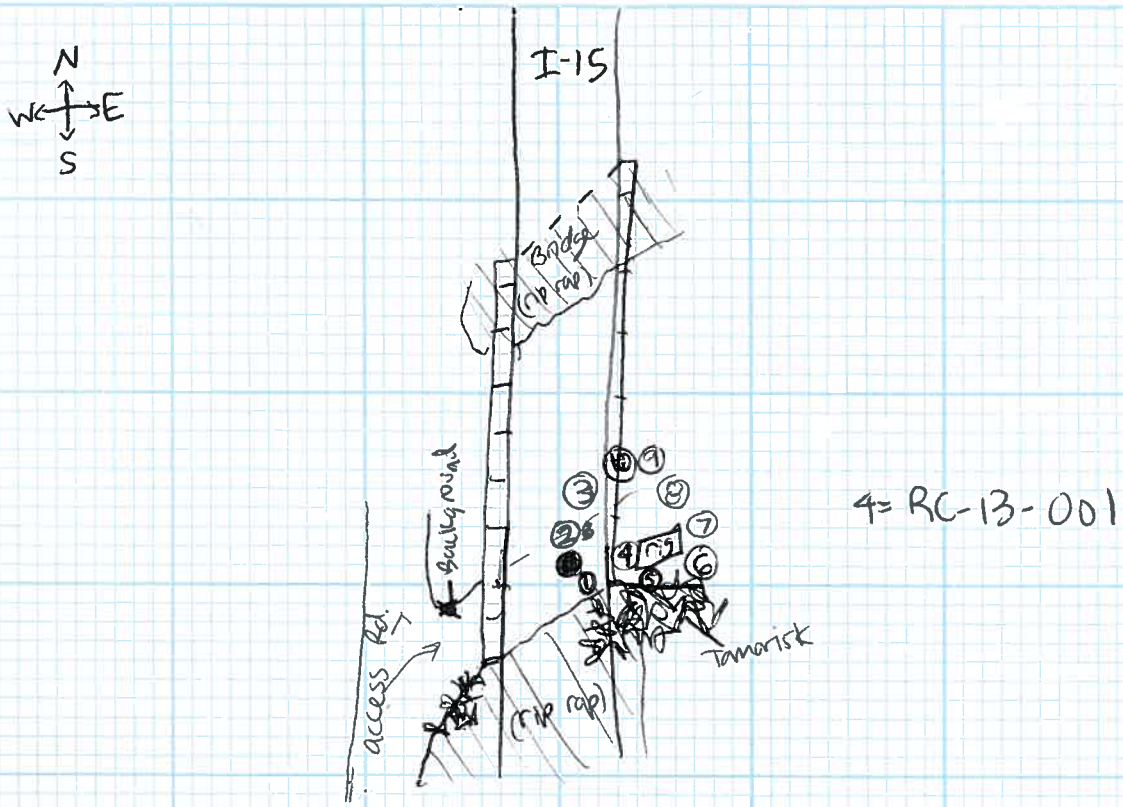
Date	Time	Sample	1	2	3	4	5	6	7	8	9	10	Background
5/19/2013	0742	—	24	28	22	19	18	23	24	22	30	22	21
	0930	10	22	25	14	21	20	22	29	16	18	17	34
	1111	12	—	—	—	—	—	—	—	—	—	—	—
	1300	16	19	18	12	21	22	16	15	22	20	18	14
	1512	23	15	18	14	14	28	15	18	15	17	10	18
	1705	10	13	18	8	19	23	21	22	22	19	18	14

URS

Job Cenda Ditch Drilling
Description Radio Activity Surveys
RC-13-001

Project No. 30989852.82240
Computed by J. Stout
Checked by

Page 1 of 1
Sheet of
Date 5/20/13
Date
Reference



All measurments in μ R/h

Time	Sample	1	2	3	4	5	6	7	8	9	10	Background
900	NA	27	29	20	23	31	29	26	25	25	20	26
945	23	25	23	21	19	24	36	29	23	28	32	28
1100	20	20	15	20	11	26	24	29	21	16	27	27
1200	24	19	21	20	14	17	26	12	18	24	33	28
1320	21	19	22	23	22	21	34	31	24	26	36	27
1420	25				24							27

URS

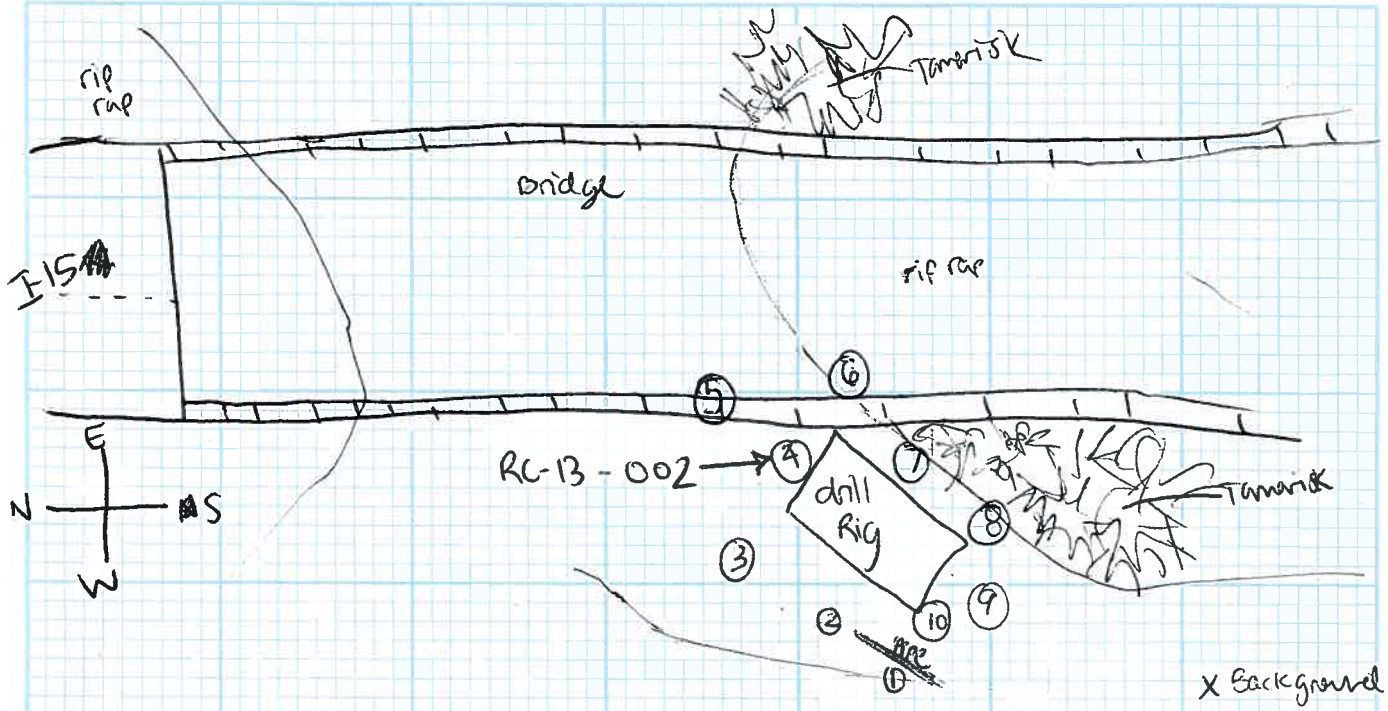
Job Cenda Ditch Drilling (RC-13-002) Project No. 30984852.02246 Page 1 of 1

Description Radio Activity Surveys Computed by J. Stout Sheet ___ of ___

RC-13-002 Checked by ___ Date 5/21/13

Date ___

Reference



All measurements in μR/h

Time	Sample	1	2	3	4	5	6	7	8	9	10	Background
800	16	28	24	24	18	18	28	42	24	31	21	27
930	28	23	20	19	19	18	17	34	20	21	32	20
1100	24				11							22
1200	21	19	15	22	15	19	22	23	18	22	20	21
1330	18				20							14

URS

Job Cenda Ditch Drilling (RC-13-003) Project No. 30984852.82240

Page 1 of 1

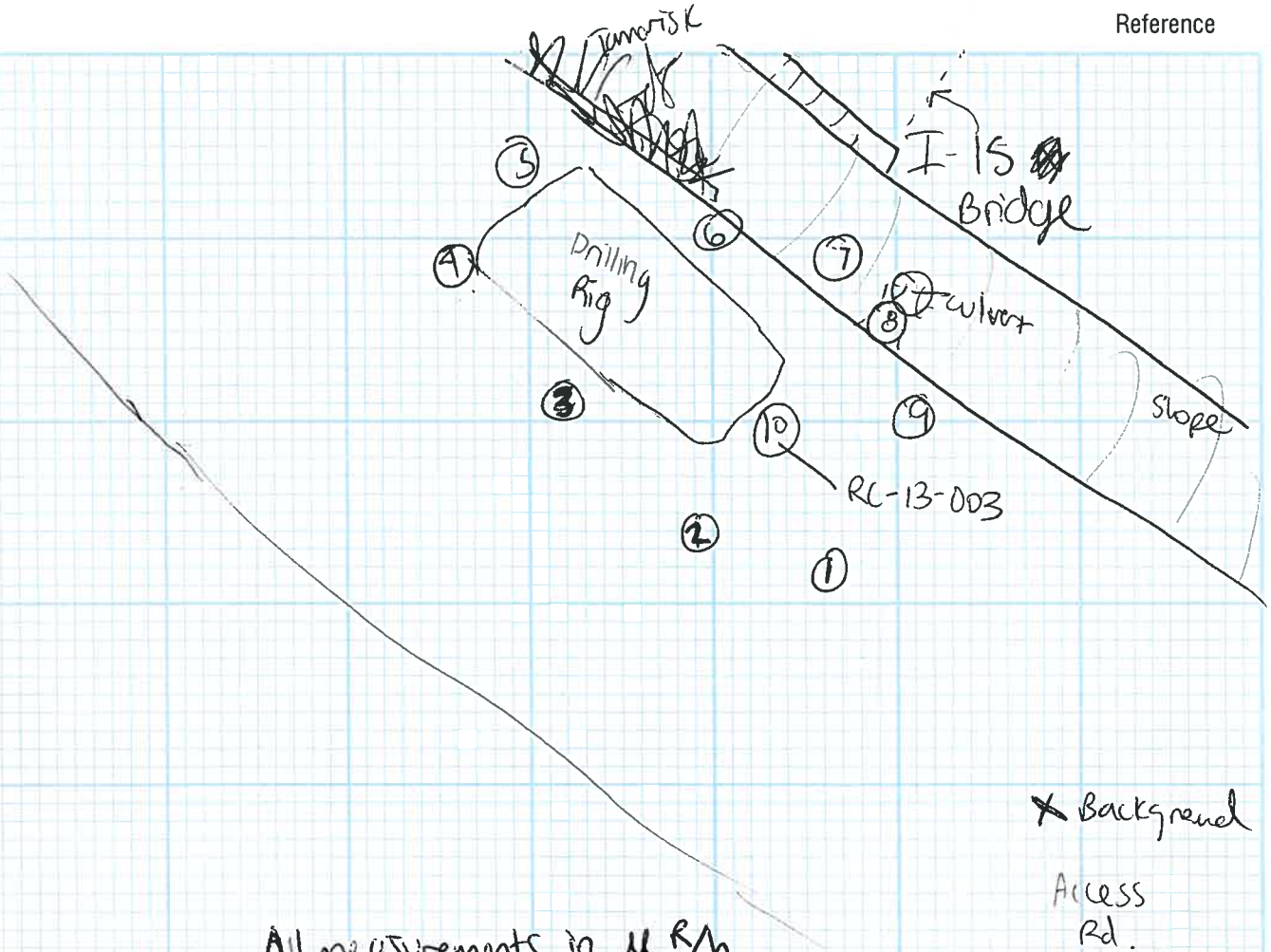
Sheet ____ of ____

Description Radio Activity Surveys RC-13-003

Computed by J. Stout Date 5/21/13 - 5/22

Checked by ____ Date ____

Reference



All measurements in μR/h

Date	Time	Sample	1	2	3	4	5	6	7	8	9	10	Background
5/21/13	1445	9	17	15	11	21	22	18	16	47	16	13	13
5/22/13	0730	25	21	25	14	15	23	32	16	48	25	14	30
	0840	16	24	21	18	16	18	19	17	61	22	9	21
	0945	27	24	14	20	18	19	24	21	58	16	18	21
	1045	10										15	28
	1100	13	17	16	16	21	19	22	19	52	11	35	22

URS

Job Cenda Ditch Drilling (RC-13-004)

Description Radio Activity Surveys RC-13-004

Project No. 30989852.82240

Computed by J. Stout

Checked by

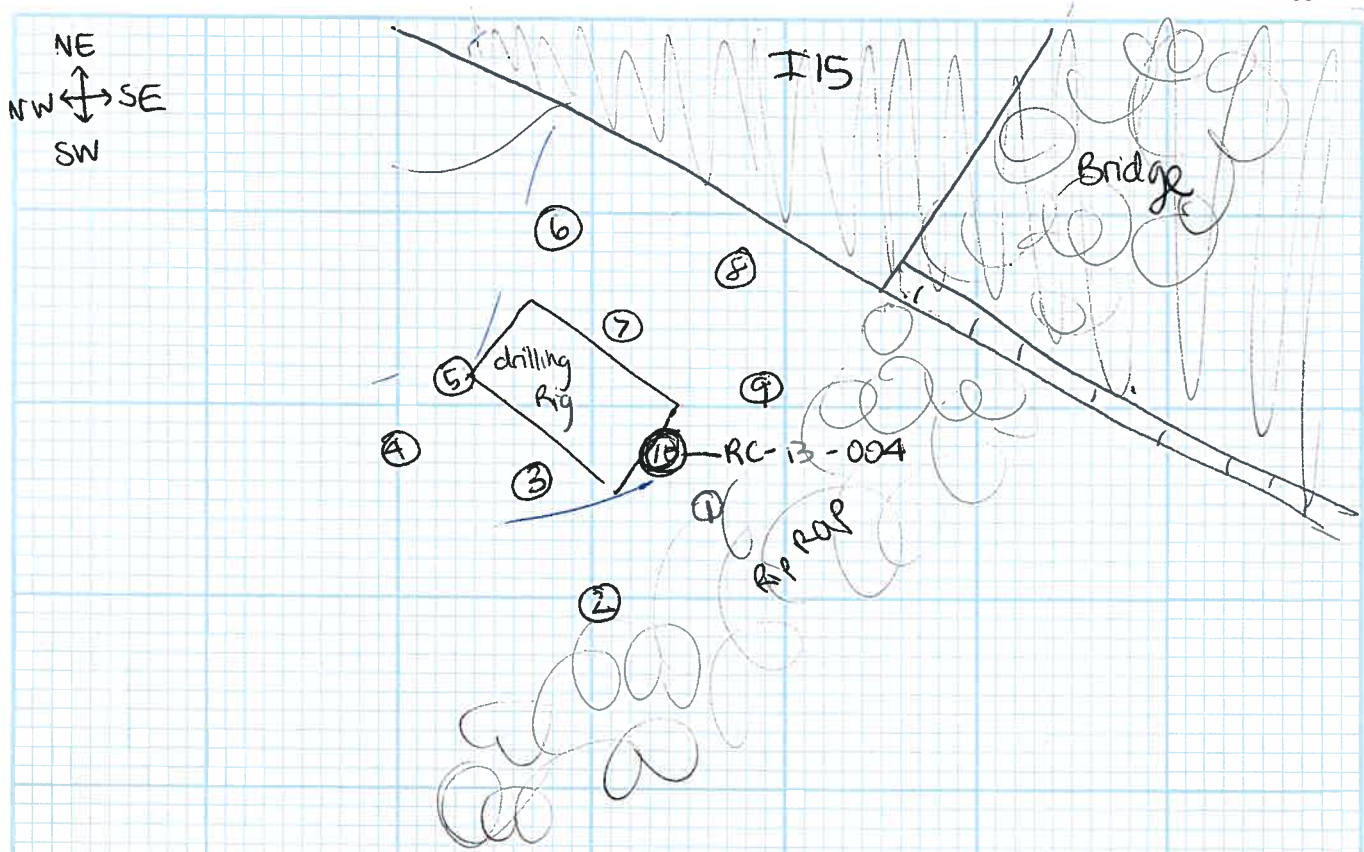
Page 1 of

Sheet of

Date 5/22/13

Date

Reference



	Time	Sample	1	2	3	4	5	6	7	8	9	10	Background
5/22/13	1345	NA	14	11	16	13	16	10	11	21	16	16	20
	1445	21	15	17	14	9	16	15	18	23	15	11	23
	1550	20	10	13	15	9	14	17	10	16	13	25	21
5/23/13	0730	NA	12	18	24	23	16	23	28	23	26	31	22
	1010	18	15	22	16	21	10	20	25	18	25	15	25
	1230	21	15	16	20	14	12	17	16	20	22	19	27

APPENDIX B
CALIBRATION DOCUMENTATION

Environmental Restoration Group, Inc.
8809 Washington NE, Ste. 150
Albuquerque, NM 87113

ph: 505.298.4224
fax: 505.797-1404
web: www.ERGOffice.com

EQUIPMENT PACKING SLIP

Company Name: Stantec - CA
Contact Name: Brian Viggiano
Contact Telephone: 909-226-7651

Order Number: 2721
P.O. or Reference Number: 185802873

Date Ordered: 07/17/2014
Date Shipped: 07/17/2014
Date of Delivery: 07/18/2014

Shipping Method: Fedex Standard Overnight
Shipping Number: 1380-0277-2

Ship To Information:
Brian Viggiano
Stantec - CA
25864-F Business Center Drive
Redlands, CA 92374
909-226-7651

Billing Address:
Stantec - CA
Briam Viggiano
25864-F Business Center Drive
Redlands, CA 92374

Equipment Enclosed:

Instrument	***Serial Number***
Ludlum 19	144790
Ludlum 19	111333
Ludlum 2221r	282973
Ludlum 2221r	262328
Ludlum 2221r	268647
Ludlum 2221r	282982
Ludlum 44-10	PR321856
Ludlum 44-10	PR321859
Ludlum 44-9	PR251740
Ludlum 44-9	PR112190
Eberline Cs-137	4054-02
Eberline Tc-99	5444-05

Special Instructions:

Order continued on next page

Environmental Restoration Group, Inc.
8809 Washington NE, Ste. 150
Albuquerque, NM 87113

ph: 505.298.4224
fax: 505.797-1404
web: www.ERGOffice.com

EQUIPMENT PACKING SLIP

Order Number: 2721

None

EBERLINE SERVICES

CERTIFICATE OF CALIBRATION

Gamma Standard

S.O.# 3951
P.O.# N/A

Description of Standard:

Model No. CS-7AS Serial No. 4054-02 Isotope Cs-137

The source of gamma radiation is mounted on a 2.54 cm diameter PLASTIC disc, 3 mm thick and sealed in a PLASTIC RESIN.

Measurement Method:

The gamma ray emission rate was compared with a similar standard, which was calibrated by NIST S/N 2752-91. The comparison of relative gama ray emission rates was accomplished using a high resolution gamma-ray detector (nominal active volume 100 cm^3) and a multichannel pulse height analyzer.

Measurement Result:

The gamma ray activity of the standard on 10-03-2002 was 8.5 µCi. The uncertainty of the measurement is 5 %, which is the sum of the uncertainty assigned to the NIST reference (2.2 %), random counting error at the 99% confidence level, and the estimated upper limit of systematic errors.

Calibrated by: ART REUST Reviewed by:

Calibration Technician: Art Reust Q.A. Representative: Anthony W. Toth

Calibration Date: 10-03-2002 Reviewed Date: 10-4-02

Analytical Services
7021 Pan American Freeway NE
Albuquerque, New Mexico 87109-4238
(505) 345-3461 Fax (505) 761-5416
Toll Free (866) RAD-LABS (723-5227)
www.eberlineservices.com

EBERLINE SERVICES

CERTIFICATE OF CALIBRATION

Electroplated Beta Standard

S.O.# 6984
P.O.# N/A

Description of Standard:

Model No. DNS-12 Serial No. 5444-05 Isotope Tc-99

Electroplated on polished SS disc, 0.79 mm thick.

Total diameter of 4.77 cm and an active diameter of 4.45 cm.

The radioactive material is permanently fixed to the disc by heat treatment without any covering over the active surface.

Measurement Method:

The 2pi beta emission rate was measured using an internal gas flow proportional chamber. Absolute counting of beta particles emitted in the hemisphere above the active surface was verified by counting above, below, and at the operative voltage. The calibration is traceable to NIST by reference to an NIST calibrated beta source S/N 75323-201.

Measurement Result:

The observed beta count rate from the surface of the disc per minute (cpm) on the calibration date was:

7,240 ± 217

The total disintegration rate (dpm) assuming 25 % backscatter of beta particles from the surface of the disc, was:

11,600 ± 347 (0.005 μCi)

The uncertainty of the measurement is 3 %, which is the sum of random counting error at the 99% confidence level, and the estimated upper limit of systematic error in this measurement.

Calibrated by: ART REUST Reviewed by: [signature]

Calibration Technician: [signature] Q.A. Manager: [signature]

Calibration Date: 3-24-2010 Reviewed Date: 3-24-10

Source Manufacturing Lab
7021 Pan American Freeway NE
Albuquerque, New Mexico 87109-4238
(505) 761-5413 Fax (505) 761-5416
areust@eberlineservices.com

Designer and Manufacturer of Scientific and Industrial Instruments

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.
501 Oak Street
325-235-5494
Sweetwater, TX 79556, U.S.A.

☐ 10744 Dutchtown Road
865-392-4601
Knoxville, TN 37932, U.S.A.

CUSTOMER ERG ORDER NO. 20244003/405694

Mfg. Ludlum Measurements, Inc. Model 19 Serial No. 111333

Mfg. Model Serial No.

Cal. Date 30-Apr-14 Cal Due Date 30-Apr-15 Cal. Interval 1 Year Meterface 202-016

Check mark ☑ applies to applicable instr. and/or detector IAW mfg. spec. T. 75 °F RH 20 % Alt 703.8 mm Hg

☐ New Instrument Instrument Received ☑ Within Toler. +-10% ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

☑ Mechanical ck. ☑ Meter Zeroed ☐ Background Subtract ☐ Input Sens. Linearity
☑ F/S Resp. ck ☑ Reset ck. ☐ Window Operation ☑ Geotropism
☑ Audio ck. ☐ Alarm Setting ck. ☑ Batt. ck. (Min. Volt) 2.2 VDC

☐ Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. ☑ Calibrated in accordance with LMI SOP 14.9 rev 02/07/97.

Instrument Volt Set 500 V Input Sens. 33 mV Det. Oper. V at mV Threshold Dial Ratio = mV

☐ HV Readout (2 points) Ref./Inst. / V Ref./Inst. / V

COMMENTS:

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
5000	4000 µR/hr	4000	4000
5000	1000 µR/hr	1000	1000
500	400 µR/hr = 74000 gm	410	400
500	100 µR/hr	105	100
250	200 µR/hr = 37000 gm	200	200
250	100 µR/hr	100	100
50	7400 cpm	42	40
50	1850 cpm	10.2	10
25	3700 cpm	20	20
25	920 cpm	5	5

*Uncertainty within ± 10% C.F. within ± 20%

50, 25 **Range(s) Calibrated Electronically**

	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*		REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
Digital Readout				Log Scale			

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques
The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978 State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources: Cs-137 S/N: ☐ 059 ☐ 280 ☐ 720 ☐ 734 ☐ 781 ☐ 1131 ☐ 1616 ☐ 1696 ☐ 1909 ☐ 1916CP ☐ 5105 ☐ 5717CO ☐ 5719CO
☐ 60646 ☐ 70897 ☐ 73410 ☐ E552 ☐ G112 ☑ M565 ☐ S-394 ☐ S-1054 ☐ T879 ☐ T10081 ☐ T10082 Neutron Am-241 Be S/N: ☐ T-304 Ra-226 S/N: ☐ Y982

☐ Alpha S/N ☐ Beta S/N ☐ Other

☑ m 500 S/N 189506 ☐ Oscilloscope S/N ☑ Multimeter S/N 93870637

Calibrated By: Dwayne Ackom Date 30-Apr-14

Reviewed By: [illegible] Date 30 Apr 14

This certificate shall not be reproduced except in full, without the written approval of Ludlum Measurements, Inc
FORM C22A 11/22/2013 Page 1 of 1

AC Inst Only ☐ Passed Dielectric (Hi-Pot) and Continuity Test ☐ Failed:

Designer and Manufacturer of Scientific and Industrial Instruments

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.
501 Oak Street
325-235-5494
Sweetwater, TX 79556, U.S.A.

☐ 10744 Dutchtown Road
865-392-4601
Knoxville, TN 37932, U.S.A.

CUSTOMER ERG ORDER NO. 20244003/405694

Mfg. Ludlum Measurements, Inc. Model 19 Serial No. 144790

Mfg. Model Serial No.

Cal. Date 30-Apr-14 Cal Due Date 30-Apr-15 Cal. Interval 1 Year Meterface 202-016

Check mark ☑ applies to applicable instr. and/or detector IAW mfg. spec. T. 75 °F RH 20 % Alt 703.8 mm Hg

☐ New Instrument Instrument Received ☑ Within Toler. +-10% ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

☑ Mechanical ck. ☑ Meter Zeroed ☐ Background Subtract ☐ Input Sens. Linearity
☑ F/S Resp. ck ☑ Reset ck. ☐ Window Operation ☑ Geotropism
☑ Audio ck. ☐ Alarm Setting ck. ☑ Batt. ck. (Min. Volt) 2.2 VDC

☐ Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. ☑ Calibrated in accordance with LMI SOP 14.9 rev 02/07/97.

Instrument Volt Set 600 V Input Sens. 31 mV Det. Oper. V at mV Threshold Dial Ratio = mV

☐ HV Readout (2 points) Ref./Inst. / V Ref./Inst. / V

COMMENTS:

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
5000	4000 µR/hr	4000	4000
5000	1000 µR/hr	1000	1000
500	400 µR/hr = 76300 gpm	400	400
500	100 µR/hr	100	100
250	200 µR/hr = 37700 gpm	200	200
250	100 µR/hr	100	100
50	7630 cpm	39.5	40
50	1900 cpm	10	10
25	3770 cpm	20	20
25	940 cpm	5	5

*Uncertainty within ± 10% C.F. within ± 20%

50, 25 **Range(s) Calibrated Electronically**

	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*		REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
Digital Readout				Log Scale			

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978

State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources: Cs-137 S/N: ☐ 059 ☐ 280 ☐ 720 ☐ 734 ☐ 781 ☐ 1131 ☐ 1616 ☐ 1696 ☐ 1909 ☐ 1916CP ☐ 5105 ☐ 5717CO ☐ 5719CO
☐ 60646 ☐ 70897 ☐ 73410 ☐ E552 ☐ G112 ☑ M565 ☐ S-394 ☐ S-1054 ☐ T879 ☐ T10081 ☐ T10082 Neutron Am-241 Be S/N: ☐ T-304 Ra-226 S/N: ☐ Y982

☐ Alpha S/N ☐ Beta S/N ☐ Other

☑ m 500 S/N 189506 ☐ Oscilloscope S/N ☑ Multimeter S/N 93870637

Calibrated By: Duane Aldon Date 30-Apr-14

Reviewed By: Date 30 Apr 14

This certificate shall not be reproduced except in full, without the written approval of Ludlum Measurements, Inc
FORM C22A 11/22/2013 Page 1 of 1

AC Inst Only ☐ Passed Dielectric (Hi-Pot) and Continuity Test ☐ Failed:

Certificate of Calibration

Calibration and Voltage Plateau

Environmental Restoration Group, Inc.
8809 Washington St NE, Suite 150
Albuquerque, NM 87113
(505) 298-4224
www.ERGoffice.com

Meter:	Manufacturer:	Ludlum	Model Number:	2221r	Serial Number:	262328
Detector:	Manufacturer:	Ludlum	Model Number:	44-10	Serial Number:	PR321859

- ☑ Mechanical Check
- ☑ F/S Response Check
- ☑ Geotropism
- ☑ Meter Zeroed
- ☑ THR/WIN Operation
- ☑ Reset Check
- ☑ Audio Check
- ☑ Battery Check (Min 4.4 VDC)

HV Check (+/- 2.5%): ☑ 500 V ☑ 1000 V ☑ 1500 V

Cable Length: ☑ 39-inch ☐ 72-inch ☐ Other:

Source Distance: ☐ Contact ☑ 6 inches ☐ Other:

Source Geometry ☑ Side ☐ Below ☐ Other:

Threshold: 10 mV

Window:

Barometric Pressure: 24.57 inches Hg

Temperature: 76 °F

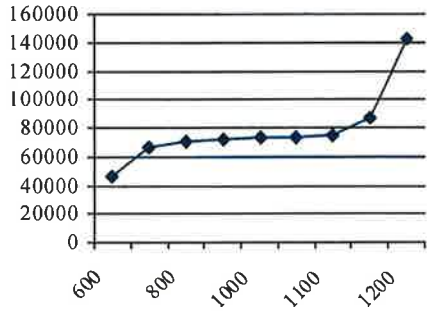
Relative Humidity: 20 %

Instrument found within tolerance: ☑ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"	Meter Reading	Integrated 1-Min. Count	Log Scale Count
x 1000	400	400	400	400663	400
x 1000	100	100	100		100
x 100	40	400	400	40064	400
x 100	10	100	100		100
x 10	4	400	400	4006	400
x 10	1	100	100		100
x 1	400	400	400	400	400
x 1	100	100	100		100

High Voltage	Source Counts	Background
700	66091	
800	70528	
900	71922	
1000	73700	
1050	73115	10265
1100	75027	
1150	86359	
1200	141940	
600	46284	

Voltage Plateau



Comments: HV Plateau Scaler Count Time = 1-min. Recommended HV = 1050

Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☑ 201932

Fluke multimeter serial number: ☐ 8749012

☐ Alpha Source: Th-230 @ 12,800 dpm (1/4/12) sn: 4098-03

☑ Gamma Source Cs-137 @ 5.2 uCi (1/4/12) sn: 4097-03

☐ Beta Source: Tc-99 @ 17,700 dpm (1/4/12) sn: 4099-03

☐ Other Source:

Calibrated By: [signature]

Calibration Date: 7/17/14 Calibration Due 7/17/15

Reviewed By: [signature]

Date: 7/17/14

ERG Form ITC. 101.A

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323A - 1997

Certificate of Calibration

Calibration and Efficiency Determination

Environmental Restoration Group, Inc.
8809 Washington St NE, Suite 150
Albuquerque, NM 87113
(505) 298-4224
www.ERGoffice.com

Meter: Manufacturer: Ludlum Model Number: 2221r Serial Number: 282982

Detector: Manufacturer: Ludlum Model Number: 44-9 Serial Number: PR112190

☑ Mechanical Check ☑ THR/WIN Operation HV Check (+/- 2.5%): ☑ 500 V ☑ 1000 V ☑ 1500 V

☑ F/S Response Check ☑ Reset Check Cable Length: ☑ 39-inch ☐ 72-inch ☐ Other:

☑ Geotropism ☑ Audio Check

☑ Meter Zeroed ☑ Battery Check (Min 4.4 VDC) Barometric Pressure: 24.54 inches Hg

Source Distance: ☑ Contact ☐ 6 inches ☐ Other: Threshold: 40 mV Temperature: 77 °F

Source Geometry: ☐ Side ☑ Below ☐ Other: Window: Relative Humidity: 20 %

Instrument found within tolerance: ☑ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"		Meter Reading		Integrated 1-Min. Count	Log Scale Count	
x 1000	400	400	kcpm	400	kcpm	400499	400	kcpm
x 1000	100	100	kcpm	100	kcpm		100	kcpm
x 100	400	400	kcpm	400	kcpm	40050	400	kcpm
x 100	100	100	kcpm	100	kcpm		100	kcpm
x 10	400	400	kcpm	400	kcpm	4005	400	kcpm
x 10	100	100	kcpm	100	kcpm		100	kcpm
x 1	400	400	cpm	400	cpm	401	400	cpm
x 1	100	100	cpm	100	cpm		100	cpm

Gross Tc-99 counts (cpm): 2786 Gross Sr/Y-90 counts (cpm)

Background counts (cpm): 50 Background counts (cpm):

Net Tc-99 Counts (cpm): 2736 Net Sr/Y-90 counts (cpm):

Comments: HV 900

Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☑ 201932 Fluke multimeter serial number: ☐ 8749012

☐ Alpha Source: Th-230 @ 12,800 dpm (1/4/12) sn: 4098-03 ☐ Gamma Source Cs-137 @ 5.2 uCi (1/4/12) sn: 4097-03

☑ Beta Source: Tc-99 @ 17,700 dpm (1/4/12) sn: 4099-03 ☐ Other Source:

Calibrated By: T. Tokan Calibration Date: 07/17/2014 Calibration Due: 7/17/15

Reviewed By: Michael Schu Review Date: 7/17/14

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323A - 1997

Certificate of Calibration

Calibration and Efficiency Determination

Environmental Restoration Group, Inc.
8809 Washington St NE, Suite 150
Albuquerque, NM 87113
(505) 298-4224
www.ERGoffice.com

Meter:	Manufacturer:	Ludlum	Model Number:	2221r	Serial Number:	268647
Detector:	Manufacturer:	Ludlum	Model Number:	44-9	Serial Number:	PR251740

☑ Mechanical Check ☑ THR/WIN Operation HV Check (+/- 2.5%): ☑ 500 V ☑ 1000 V ☑ 1500 V
☑ F/S Response Check ☑ Reset Check Cable Length: ☑ 39-inch ☐ 72-inch ☐ Other:
☑ Geotropism ☑ Audio Check
☑ Meter Zeroed ☑ Battery Check (Min 4.4 VDC) Barometric Pressure: 24.54 inches Hg

Source Distance: ☑ Contact ☐ 6 inches ☐ Other: Threshold: 40 mV Temperature: 77 °F
Source Geometry: ☐ Side ☑ Below ☐ Other: Window: Relative Humidity: 20 %

Instrument found within tolerance: ☑ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"		Meter Reading		Integrated 1-Min. Count	Log Scale Count	
x 1000	400	400	kcpm	400	kcpm	400755	400	kcpm
x 1000	100	100	kcpm	100	kcpm		100	kcpm
x 100	400	400	kcpm	400	kcpm	40073	400	kcpm
x 100	100	100	kcpm	100	kcpm		100	kcpm
x 10	400	400	kcpm	400	kcpm	4008	400	kcpm
x 10	100	100	kcpm	100	kcpm		100	kcpm
x 1	400	400	cpm	400	cpm	400	400	cpm
x 1	100	100	cpm	100	cpm		100	cpm

Gross Tc-99 counts (cpm):	3128	Gross Sr/Y-90 counts (cpm)	
Background counts (cpm):	74	Background counts (cpm):	
Net Tc-99 Counts (cpm):	3054	Net Sr/Y-90 counts (cpm):	

Comments: HV 900

Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☑ 201932 Fluke multimeter serial number: ☐ 8749012
☐ Alpha Source: Th-230 @ 12,800 dpm (1/4/12) sn: 4098-03 ☐ Gamma Source Cs-137 @ 5.2 uCi (1/4/12) sn: 4097-03
☑ Beta Source: Tc-99 @ 17,700 dpm (1/4/12) sn: 4099-03 ☐ Other Source:

Calibrated By: T. Hakan Calibration Date: 07/17/2014 Calibration Due: 7/17/15

Reviewed By: Michael [illegible] Review Date: 7/17/14

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323A - 1997

Certificate of Calibration

Calibration and Voltage Plateau

Environmental Restoration Group, Inc.
8809 Washington St NE, Suite 150
Albuquerque, NM 87113
(505) 298-4224
www.ERGoffice.com

Meter:	Manufacturer:	Ludlum	Model Number:	2221r	Serial Number:	282973
Detector:	Manufacturer:	Ludlum	Model Number:	44-10	Serial Number:	PR321856

- [x] Mechanical Check
- [x] F/S Response Check
- [x] Geotropism
- [x] Meter Zeroed
- [x] THR/WIN Operation
- [x] Reset Check
- [x] Audio Check
- [x] Battery Check (Min 4.4 VDC)

HV Check (+/- 2.5%): [x] 500 V [x] 1000 V [x] 1500 V

Cable Length: [x] 39-inch [ ] 72-inch [ ] Other:

Source Distance: [ ] Contact [x] 6 inches [ ] Other:

Source Geometry [x] Side [ ] Below [ ] Other:

Threshold: 100 mV

Window:

Barometric Pressure: 24.54 inches Hg

Temperature: 76 °F

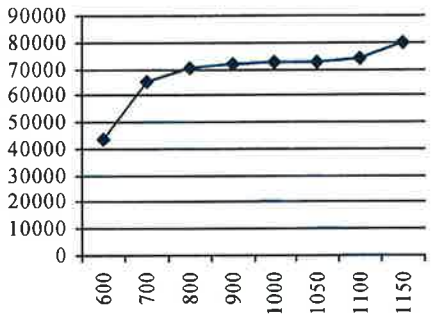
Relative Humidity: 20 %

Instrument found within tolerance: [x] Yes [ ] No

Range/Multiplier	Reference Setting	"As Found Reading"	Meter Reading	Integrated 1-Min. Count	Log Scale Count
x 1000	400	400	400	400811	400
x 1000	100	100	100		100
x 100	40	400	400	40081	400
x 100	10	100	100		100
x 10	4	400	400	4008	400
x 10	1	100	100		100
x 1	400	400	400	400	400
x 1	100	100	100		100

High Voltage	Source Counts	Background
700	65104	
800	70144	
900	72141	
1000	72621	10055
1050	72514	
1100	73899	
1150	80103	
600	43690	

Voltage Plateau



Comments: HV Plateau Scaler Count Time = 1-min. Recommended HV =1000

Reference Instruments and/or Sources:

Ludlum pulser serial number: [ ] 97743 [x] 201932

[ ] Alpha Source: Th-230 @ 12,800 dpm (1/4/12) sn: 4098-03

[ ] Beta Source: Tc-99 @ 17,700 dpm (1/4/12) sn: 4099-03

Fluke multimeter serial number: [ ] 8749012

[x] Gamma Source Cs-137 @ 5.2 uCi (1/4/12) sn: 4097-03

[ ] Other Source:

Calibrated By: T. [signature]

Calibration Date: 7/17/14

Calibration Due 7/17/15

Reviewed By: [signature]

Date: 7/17/14

ERG Form ITC. 101.A

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323A - 1997

APPENDIX C
BORING LOGS

PROJECT: **Caltrans District 8, Task Order No. 17**
LOCATION: **Wheaton Wash and Cenda Ditch, Mountain Pass, CA**
PROJECT NUMBER: **185802873**

WELL / PROBEHOLE / BORECHOLE NO:
CD-SB-01
PAGE 1 OF 1

DRILLING: STARTED: **7/24/2014** COMPLETED: **7/24/2014**
INSTALLATION: STARTED: **7/24/2014** COMPLETED: **7/24/2014**
DRILLING COMPANY: **ABC Drilling**
DRILLING EQUIPMENT: **Limited Access Rig**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Split Spoon**

NORTHING (ft):
LATITUDE: **35° 28' 7.4022"**
GROUND ELEV (ft): **4,487.25**
INITIAL DTW (ft): **NE**
STATIC DTW (ft): **NA**
WELL CASING DIAMETER (in): **NA**
LOGGED BY: **K. Toro/B. Vigiano**

EASTING (ft):
LONGITUDE: **115° 31' 4.483"**
TOC ELEV (ft):
BOREHOLE DEPTH (ft): **8.5**
WELL DEPTH (ft): **NA**
BOREHOLE DIAMETER (in): **6**
CHECKED BY:

Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count/ft	Headspace PID (ppm)	Depth (feet)	Borehole Backfill
		SM	SM; Silty SAND with some Gravel, yellowish brown (10YR 5/4), fine to coarse-grained sand, more than 25% fines, some fine to coarse gravel (up to 1.5" dia, subangular-rounded), slightly moist, very dense, no hydrocarbon (HC) odor or staining			0.5	50/6"			
		SP	SP; Poorly graded, gravelly SAND, brown (10YR 5/3), fine to coarse-grained sand, more than 25% fine to coarse gravel (up to 1" dia, subangular-subrounded)			2.0	17 20 25 30			Backfilled with hydrated bentonite chips
5						1.5	12 15 20		5	
			Trace of clayey fines			0.5	50/6"			
			Increasing drilling difficulties							
			Borehole terminated at 8.5 feet bgs.							
10									10	
15									15	
20									20	
25									25	

PROJECT: **Caltrans District 8, Task Order No. 17**
LOCATION: **Wheaton Wash and Cenda Ditch, Mountain Pass, CA**
PROJECT NUMBER: **185802873**

WELL / PROBEHOLE / BOREHOLE NO: **CD-SB-02** PAGE 1 OF 1

DRILLING: STARTED: **7/24/2014** COMPLETED: **7/24/2014**
INSTALLATION: STARTED: **7/24/2014** COMPLETED: **7/24/2014**
DRILLING COMPANY: **ABC Drilling**
DRILLING EQUIPMENT: **Limited Access Rig**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Split Spoon**

NORTHING (ft):
LATITUDE: **35° 28' 7.3884"**
GROUND ELEV (ft): **4,480.03**
INITIAL DTW (ft): **NE**
STATIC DTW (ft): **NA**
WELL CASING DIAMETER (in): **NA**
LOGGED BY: **K. Toro/B. Vigiano**

EASTING (ft):
LONGITUDE: **115° 31' 1.978"**
TOC ELEV (ft):
BOREHOLE DEPTH (ft): **13.0**
WELL DEPTH (ft): **NA**
BOREHOLE DIAMETER (in): **6**
CHECKED BY:

Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count/ft	Headspace PID (ppm)	Depth (feet)	Borehole Backfill
		SP	In gulley SP; Poorly graded, gravelly SAND, brown (10YR 5/3), fine to coarse-grained sands, more than 25% fine gravel (up to 3/4" dia., subangular-rounded gravel), few to some fines, slightly moist, very dense, no hydrocarbon (HC) odor or staining			0.5	50/6"			
			Increasing moisture content			2.0	12 15 19 22			
5			Trace of clayey fines				50/4"		5	
		GW	GW; Sandy GRAVEL, fine to coarse-grained gravel (up to 1" dia., angular-rounded); more than 25% fine to coarse-grained sands, very dense, moist, no HC odor or staining			0.25	50/3"			Backfilled with hydrated bentonite chips
			Increasing drilling difficulties			2.0	14 17 20 22			
10			Same as above			1.5	12 17 19		10	
			Refusal at 13 feet Borehole terminated at 13 feet bgs.							
15									15	
20									20	
25									25	

PROJECT: **Caltrans District 8, Task Order No. 17**
LOCATION: **Wheaton Wash and Cenda Ditch, Mountain Pass, CA**
PROJECT NUMBER: **185802873**

WELL / PROBEHOLE / BOREHOLE NO:
CD-SB-03
PAGE 1 OF 1

DRILLING: STARTED: **7/24/2014** COMPLETED: **7/24/2014**
INSTALLATION: STARTED: **7/24/2014** COMPLETED: **7/24/2014**
DRILLING COMPANY: **ABC Drilling**
DRILLING EQUIPMENT: **Limited Access Rig**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Split Spoon**

NORTHING (ft):
LATITUDE: **35° 28' 6.8514"**
GROUND ELEV (ft): **4,465.68**
INITIAL DTW (ft): **NE**
STATIC DTW (ft): **NA**
WELL CASING DIAMETER (in): **NA**
LOGGED BY: **K. Toro/B. Vigiano**

EASTING (ft):
LONGITUDE: **115° 31' 0.976"**
TOC ELEV (ft):
BOREHOLE DEPTH (ft): **5.0**
WELL DEPTH (ft): **NA**
BOREHOLE DIAMETER (in): **6**
CHECKED BY:

Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count/ft	Headspace PID (ppm)	Depth (feet)	Borehole Backfill
		SP	In gulley SP; Gravelly SAND (SP), yellowish brown (10YR 5/4), fine to coarse-grained sands, more than 25% fine to coarse-gravel (up to 1" dia., angular-rounded), trace fines, slightly moist, very dense, no hydrocarbon (HC) odor or staining				50/6"			Backfilled with hydrated bentonite chips
			Increasing moisture content Increasing drilling difficulties							
5			Refusal at 5 feet bgs. Broken, damaged auger at cutter head CD - Composite at 1145 Borehole terminated at 5 feet bgs.				50/0"		5	
10									10	
15									15	
20									20	
25									25	

PROJECT: **Caltrans District 8, Task Order No. 17**
LOCATION: **Wheaton Wash and Cenda Ditch, Mountain Pass, CA**
PROJECT NUMBER: **185802873**

WELL / PROBEHOLE / BOREHOLE NO:
WW-SB-01

DRILLING: STARTED: **7/23/2014** COMPLETED: **7/23/2014**
INSTALLATION: STARTED: **7/23/2014** COMPLETED: **7/23/2014**
DRILLING COMPANY: **ABC Drilling**
DRILLING EQUIPMENT: **Limited Access Rig**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Split Spoon**

NORTHING (ft):
LATITUDE: **35° 28' 4.251"**
GROUND ELEV (ft): **4,115.48**
INITIAL DTW (ft): **NE**
STATIC DTW (ft): **NA**
WELL CASING DIAMETER (in): **NA**
LOGGED BY: **K. Toro/B. Vigiano**

EASTING (ft):
LONGITUDE: **115° 29' 13.965"**
TOC ELEV (ft):
BOREHOLE DEPTH (ft): **50.0**
WELL DEPTH (ft): **NA**
BOREHOLE DIAMETER (in): **6**
CHECKED BY:

Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count/ft	Headspace PID (ppm)	Depth (feet)	Borehole Backfill
		SP	In gulley SP; Poorly Graded, Gravelly SAND, pale brown (10YR 6/3), fine to coarse-grained sands, more than 25% fine to coarse gravel (subrounded-subangular, up to 1 1/2" dia.,), trace fines, dry, medium dense, no hydrocarbon (HC) odor or staining			1.5	10 11 17			
						2.0	17 18 21 30			
5			Same as above, slightly moist at 5 feet bgs			1.5	27 30 35		5	
						1.5	18 25 34			
						2.0	15 19 31 35			
10			Same as above, trace few fines			1.5	19 21 25		10	
						1.5	14 17 22			
		SM	SM; Poorly Graded, Gravelly SAND with some Silt, yellowish brown (10YR 5/6), fine to coarse-grained sands, more than 25% fine gravel (up to 1/2" dia., subangular-subrounded), some fines, moist, very dense, no HC odor or staining			2.0	22 25 29 30			
15						1.5	15 21 25		15	
			Same as above, fine to coarse gravel (subangular-subrounded, up to 1" dia.)			1.5	18 23 33			
						2.0	27 30 35 36			
20			Coarse gravel up to 2" dia.			1.5	18 19 25		20	
							50/6"			
25			Same as above Coarse gravel up to 2.5" dia. (subangular-subrounded), soil cuttings appeared to have contained rock fragments and rock powder Difficult drilling conditions, poor recoveries, changed to loggin from soil cuttings shoveled at every 2 feet			0.5	50/6"		25	Backfilled with hydrated bentonite chips

PROJECT: **Caltrans District 8, Task Order No. 17**
LOCATION: **Wheaton Wash and Cenda Ditch, Mountain Pass, CA**
PROJECT NUMBER: **185802873**

WELL / PROBEHOLE / BOREHOLE NO: **WW-SB-01** PAGE 2 OF 2

DRILLING: STARTED: **7/23/2014** COMPLETED: **7/23/2014**
INSTALLATION: STARTED: **7/23/2014** COMPLETED: **7/23/2014**
DRILLING COMPANY: **ABC Drilling**
DRILLING EQUIPMENT: **Limited Access Rig**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Split Spoon**

NORTHING (ft):
LATITUDE: **35° 28' 4.251"**
GROUND ELEV (ft): **4,115.48**
INITIAL DTW (ft): **NE**
STATIC DTW (ft): **NA**
WELL CASING DIAMETER (in): **NA**
LOGGED BY: **K. Toro/B. Vigiano**

EASTING (ft):
LONGITUDE: **115° 29' 13.965"**
TOC ELEV (ft):
BOREHOLE DEPTH (ft): **50.0**
WELL DEPTH (ft): **NA**
BOREHOLE DIAMETER (in): **6**
CHECKED BY:

Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count/ft	Headspace PID (ppm)	Depth (feet)	Borehole Backfill
		SM	Same as above Coarse gravel up to 2.5" dia., (subangular-subrounded), soil cuttings appeared to contain rock fragments and rock powder			0.5	50/5"			
35			Same as above Fine to coarse gravel up to 2" dia. (subangular-subrounded)			1.0	39 50/6"		35	
			Same as above, brown (10YR 5/3) Fine to coarse gravel up to 1.5" dia.							
			Fine to coarse gravel up to 1.0" dia.							
40			Same as above Poor recovery, hard drilling conditions, rock powder			0.5	50/6"		40	
			Same as above Fine to coarse gravel up to 3/4" dia. (angular-subangular)							
45			Same as above Fine to coarse gravel up to 1.5" dia. (subrounded)			0.25	50/3"		45	
			Fine to coarse gravel up to 2" dia. (subangular-subrounded)							
			Same as above Fine to coarse gravel up to 2" dia., rounded			0.25	50/3"			
50			Borehole terminated at 50 feet bgs.						50	
55									55	

PROJECT: **Caltrans District 8, Task Order No. 17**
LOCATION: **Wheaton Wash and Cenda Ditch, Mountain Pass, CA**
PROJECT NUMBER: **185802873**

WELL / PROBEHOLE / BOREHOLE NO:
WW-SB-02

DRILLING: STARTED: **7/23/2014** COMPLETED: **7/23/2014**
INSTALLATION: STARTED: **7/23/2014** COMPLETED: **7/23/2014**
DRILLING COMPANY: **ABC Drilling**
DRILLING EQUIPMENT: **Limited Access Rig**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Split Spoon**

NORTHING (ft):
LATITUDE: **35° 28' 3.8712"**
GROUND ELEV (ft): **4,129.85**
INITIAL DTW (ft): **NE**
STATIC DTW (ft): **NA**
WELL CASING DIAMETER (in): **NA**
LOGGED BY: **K. Toro/B. Vigiano**

EASTING (ft):
LONGITUDE: **115° 29' 14.053"**
TOC ELEV (ft):
BOREHOLE DEPTH (ft): **44.0**
WELL DEPTH (ft): **NA**
BOREHOLE DIAMETER (in): **6**
CHECKED BY:

Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count/ft	Headspace PID (ppm)	Depth (feet)	Borehole Backfill
		SP	In gulley SP; Poorly Graded SAND with some Gravel, yellowish brown (10YR 5/6), fine to coarse-grained sands, some fine gravel (up to 1/4" in diameter, subangular-subrounded), trace fines, dry to slightly moist, no hydrocarbon (HC) odor or staining, very dense			0.5	50/6"			
5						0.5	50/6"		5	
		SP	Increasing amount of gravel SP; Poorly Graded, Gravelly SAND, yellowish brown (10YR 5/6), fine to coarse-grained sands, more than 25% fine to coarse gravel (up to 1" in diameter, subangular-subrounded), trace fines, slightly moist, very dense, no HC odor or staining							
10			Same as above Fine to coarse, up to 3/4', increasing amount of gravel			0.5	50/6"		10	
			Fine to coarse gravel, up to 2" in diameter							
			Fine to coarse gravel up to 2.5"							
15			Fine to coarse gravel up to 2"			0.25	50/3"		15	
			Fine to coarse gravel up to 1.5"							
			Increasing amount of fines and moisture							
20			Same as above Fine to coarse gravel (up to 2", subangular-subrounded), some fines, moist, very dense, no HC odor or staining			1.5	19 23 30		20	Backfilled with hydrated bentonite chips
			Fine to coarse gravel (up to 1" dia.)							
25						1.5	20 23 30		25	
			Fine to coarse gravel, up to 3" dia., subangular-subrounded, trace cobbles up to 4" dia, subangular							

PROJECT: **Caltrans District 8, Task Order No. 17**
LOCATION: **Wheaton Wash and Cenda Ditch, Mountain Pass, CA**
PROJECT NUMBER: **185802873**

WELL / PROBEHOLE / BOREHOLE NO:
WW-SB-02

DRILLING: STARTED: **7/23/2014** COMPLETED: **7/23/2014**
INSTALLATION: STARTED: **7/23/2014** COMPLETED: **7/23/2014**
DRILLING COMPANY: **ABC Drilling**
DRILLING EQUIPMENT: **Limited Access Rig**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Split Spoon**

NORTHING (ft):
LATITUDE: **35° 28' 3.8712"**
GROUND ELEV (ft): **4,129.85**
INITIAL DTW (ft): **NE**
STATIC DTW (ft): **NA**
WELL CASING DIAMETER (in): **NA**
LOGGED BY: **K. Toro/B. Vigiano**

EASTING (ft):
LONGITUDE: **115° 29' 14.053"**
TOC ELEV (ft):
BOREHOLE DEPTH (ft): **44.0**
WELL DEPTH (ft): **NA**
BOREHOLE DIAMETER (in): **6**
CHECKED BY:

Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count/ft	Headspace PID (ppm)	Depth (feet)	Borehole Backfill
		SP				1.0	28 50/6"			
			Gravel up to 3" (subangular-subrounded)							
			Trace cobbles up to 4.5" dia. (subangular-subrounded), decreasing coarse gravel content, fine gravel up to 1/2")			1.5	23 28 32			
35									35	
		GP	GP; Sandy GRAVEL, fine to coarse gravel up to 3/4" dia. (subangular-subrounded), more than 25% fine to coarse sands, non-trace fines, moist, very dense, no HC odor or staining							
			Increasing sand content			0.5	50/6"			
40									40	
			Borehole terminated at 44 feet bgs.							
45									45	
50									50	
55									55	

PROJECT: **Caltrans District 8, Task Order No. 17**
LOCATION: **Wheaton Wash and Cenda Ditch, Mountain Pass, CA**
PROJECT NUMBER: **185802873**

WELL / PROBEHOLE / BOREHOLE NO:
WW-SB-03

DRILLING: STARTED: **7/23/2014** COMPLETED: **7/23/2014**
INSTALLATION: STARTED: **7/23/2014** COMPLETED: **7/23/2014**
DRILLING COMPANY: **ABC Drilling**
DRILLING EQUIPMENT: **Limited Access Rig**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Split Spoon**

NORTHING (ft):
LATITUDE: **35° 28' 3.666"**
GROUND ELEV (ft): **4,122.62**
INITIAL DTW (ft): **NE**
STATIC DTW (ft): **NA**
WELL CASING DIAMETER (in): **NA**
LOGGED BY: **K. Toro/B. Vigiano**

EASTING (ft):
LONGITUDE: **115° 29' 13.581"**
TOC ELEV (ft):
BOREHOLE DEPTH (ft): **42.0**
WELL DEPTH (ft): **NA**
BOREHOLE DIAMETER (in): **6**
CHECKED BY:

Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count/ft	Headspace PID (ppm)	Depth (feet)	Borehole Backfill
		SP	SP; Poorly Graded, Gravelly SAND, yellowish brown (10YR 5/6), fine to coarse sands, more than 25% fine to coarse gravel (up to 1" dia., subangular-subrounded), trace fines, slightly moist to moist, very dense, no hydrocarbon (HC) odor or staining			0.5	50/6"			
5			Fine to coarse gravel, (up to 2.5" subangular-subrounded)			1.5	9 15 18		5	
10			Fine to coarse gravel (up to 1 3/4", subangular-subrounded)			1.0	40 50/6"		10	
			Fine to coarse gravel (up to 2" subangular-subrounded)							
15						1.0	47 50/6"		15	
			Fine to coarse gravel (up to 1 1/2", subangular-subrounded) Trace cobbles (up to 4" dia., subangular-subrounded)							
			Fine to coarse gravel (up to 2" dia., subangular-subrounded)							
20						1.5	17 21 30		20	Backfilled with hydrated bentonite chips
25						1.0	24 50/6"		25	
			Fine to coarse gravel (up to 2 1/2", subangular-rounded)							
			Fine to coarse gravel (up to 2 3/4" dia., subangular-rounded)							

PROJECT: **Caltrans District 8, Task Order No. 17**
LOCATION: **Wheaton Wash and Cenda Ditch, Mountain Pass, CA**
PROJECT NUMBER: **185802873**

WELL / PROBEHOLE / BOREHOLE NO:
WW-SB-03

DRILLING: STARTED: **7/23/2014** COMPLETED: **7/23/2014**
INSTALLATION: STARTED: **7/23/2014** COMPLETED: **7/23/2014**
DRILLING COMPANY: **ABC Drilling**
DRILLING EQUIPMENT: **Limited Access Rig**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Split Spoon**

NORTHING (ft):
LATITUDE: **35° 28' 3.666"**
GROUND ELEV (ft): **4,122.62**
INITIAL DTW (ft): **NE**
STATIC DTW (ft): **NA**
WELL CASING DIAMETER (in): **NA**
LOGGED BY: **K. Toro/B. Vigiano**

EASTING (ft):
LONGITUDE: **115° 29' 13.581"**
TOC ELEV (ft):
BOREHOLE DEPTH (ft): **42.0**
WELL DEPTH (ft): **NA**
BOREHOLE DIAMETER (in): **6**
CHECKED BY:

Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count/ft	Headspace PID (ppm)	Depth (feet)	Borehole Backfill
		SP				1.0	37 50/6"			
			Increasing gravel content Fine to coarse gravel (up to 3" dia., subangular-rounded)							
35						0.5	50/6"		35	
			Fine to coarse gravel (up to 2" dia., subangular-subrounded)							
40			Increasing drilling difficulty Fine to coarse gravel (up to 2 1/4" dia., subangular-rounded)			.167	50/2"		40	
			Refusal at 42 feet bgs							
			Borehole terminated at 42 feet bgs.							
45									45	
50									50	
55									55	

PROJECT: **Caltrans District 8, Task Order No. 17**
LOCATION: **Wheaton Wash and Cenda Ditch, Mountain Pass, CA**
PROJECT NUMBER: **185802873**

WELL / PROBEHOLE / BOREHOLE NO:
WW-SB-04

DRILLING: STARTED: **7/23/2014** COMPLETED: **7/23/2014**
INSTALLATION: STARTED: **7/23/2014** COMPLETED: **7/23/2014**
DRILLING COMPANY: **ABC Drilling**
DRILLING EQUIPMENT: **Limited Access Rig**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Split Spoon**

NORTHING (ft):
LATITUDE: **35° 28' 3.2628"**
GROUND ELEV (ft): **4,121.43**
INITIAL DTW (ft): **NE**
STATIC DTW (ft): **NA**
WELL CASING DIAMETER (in): **NA**
LOGGED BY: **K. Toro/B. Vigiano**

EASTING (ft):
LONGITUDE: **115° 29' 14.92"**
TOC ELEV (ft):
BOREHOLE DEPTH (ft): **48.0**
WELL DEPTH (ft): **NA**
BOREHOLE DIAMETER (in): **6**
CHECKED BY:

Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count/ft	Headspace PID (ppm)	Depth (feet)	Borehole Backfill
		SP	In gulley SP; Gravelly SAND, yellowish brown (10YR 5/6), fine to coarse-grained sand, more than 25% fine to coarse gravel (up to 3/4", subangular-rounded), trace fines, moist, very dense, no hydrocarbon (HC) odor or staining							
5			Same as above, poor recovery Fine to coarse gravel up to 1-2" dia., subangular-rounded			0.5	50/6"		5	
10			Same as above Fine to coarse gravel up to 1.5-2.5" dia., subangular-rounded			1.5	15 21 30		10	
15			Same as above Fine to coarse gravel up to 1.0"-2.5", subangular-subrounded			1.5	20 24 33		15	
20			No recovery Fine to coarse gravel up to 2-3" dia., subangular-subrounded			No recovery	50/0"		20	
25			Same as above Fine to coarse gravel up to 2-3" subangular-rounded, trace cobbles up to 4" subangular-rounded No cobbles, decreasing amount of gravel			1.0	28 50/6"		25	Backfilled with hydrated bentonite chips

PROJECT: **Caltrans District 8, Task Order No. 17**
LOCATION: **Wheaton Wash and Cenda Ditch, Mountain Pass, CA**
PROJECT NUMBER: **185802873**

WELL / PROBEHOLE / BOREHOLE NO: **WW-SB-04** PAGE 2 OF 2

DRILLING: STARTED: **7/23/2014** COMPLETED: **7/23/2014**
INSTALLATION: STARTED: **7/23/2014** COMPLETED: **7/23/2014**
DRILLING COMPANY: **ABC Drilling**
DRILLING EQUIPMENT: **Limited Access Rig**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Split Spoon**

NORTHING (ft):
LATITUDE: **35° 28' 3.2628"**
GROUND ELEV (ft): **4,121.43**
INITIAL DTW (ft): **NE**
STATIC DTW (ft): **NA**
WELL CASING DIAMETER (in): **NA**
LOGGED BY: **K. Toro/B. Vigiano**

EASTING (ft):
LONGITUDE: **115° 29' 14.92"**
TOC ELEV (ft):
BOREHOLE DEPTH (ft): **48.0**
WELL DEPTH (ft): **NA**
BOREHOLE DIAMETER (in): **6**
CHECKED BY:

Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count/ft	Headspace PID (ppm)	Depth (feet)	Borehole Backfill
		SP	Same as above, poor recovery			0.167	50/2"			
			Increasing gravel content							
35			Same as above Fine gravel up to 1/2" dia., few to some fines (crushed granitic material) Same as above Fine to coarse gravel up to 2.5-3", subangular-rounded			7	12 18		35	
40			Same as above, poor recovery			0.5	50/6"		40	
			Fine to coarse gravel up to 2" dia., subangular-rounded							
45			No recovery			No recovery	50/0"		45	
		GP	GP; Sandy GRAVEL, fine to coarse gravel (up to 1" dia., subangular-rounded), 30-40% fine to coarse sand, moist, very dense, no HC odor or staining			No recovery	50/0"			
			Borehole terminated at 48 feet bgs.							
50									50	
55									55	

APPENDIX D
LABORATORY REPORT AND QA/QC DOCUMENTATION

Analytical Data Package Prepared For

Pat-Chem Laboratories

Radiochemical Analysis By

TestAmerica Inc

2800 G.W. Way, Richland Wa, 99354, (509)-375-3131.

Assigned Laboratory Code:

Data Package Contains 90 ***Pages***

Report No.: 62553

Results in this report relate only to the sample(s) analyzed.

SDG No.	Order No.	Client Sample ID (List Order)	Lot-Sa No.	Work Order	Report DB ID	Batch No.
48684		CD-SB01-5	J4I020424-13	M4T931AA	9M4T9310	4247040
		CD-SB02-10	J4I020424-15	M4VAF1AA	9M4VAF10	4247040
		CD-SB02-5	J4I020424-14	M4VAD1AE	9M4VAD10	4247040
		CD-SB02-5	J4I020424-14	M4VAD1AA	9M4VAD10	4247043
		CD-SB02-5	J4I020424-14	M4VAD1AH	9M4VAD10	4247044
		CD-SB03-5	J4I020424-16	M4VAG1AA	9M4VAG10	4247040
		CD-SS-BKG01	J4I020424-45	M4VDD1AA	9M4VDD10	4247042
		CD-SS-BKG02	J4I020424-46	M4VDE1AA	9M4VDE10	4247042
		CD-SS-BKG03	J4I020424-47	M4VDF1AE	9M4VDF10	4247042
		CD-SS-BKG03	J4I020424-47	M4VDF1AA	9M4VDF10	4247043
		CD-SS-BKG03	J4I020424-47	M4VDF1AH	9M4VDF10	4247044
		CD-SS-BKG04	J4I020424-48	M4VDG1AA	9M4VDG10	4247042
		CD-SS-BKG05	J4I020424-49	M4VDH1AA	9M4VDH10	4247042
		CD-SS-BKG06	J4I020424-50	M4VDJ1AA	9M4VDJ10	4247042
		CD-SS-G10	J4I020424-18	M4VAR1AA	9M4VAR10	4247040
		CD-SS-G13	J4I020424-28	M4VCA1AA	9M4VCA10	4247041
		CD-SS-G16	J4I020424-19	M4VAV1AE	9M4VAV10	4247040
		CD-SS-G16	J4I020424-19	M4VAV1AA	9M4VAV10	4247043
		CD-SS-G16	J4I020424-19	M4VAV1AH	9M4VAV10	4247044
		CD-SS-G18	J4I020424-23	M4VA21AA	9M4VA210	4247041
		CD-SS-G20	J4I020424-27	M4VA91AA	9M4VA910	4247041
		CD-SS-G23	J4I020424-20	M4VAW1AA	9M4VAW10	4247040
		CD-SS-G24	J4I020424-21	M4VAX1AA	9M4VAX10	4247041
		CD-SS-G3	J4I020424-17	M4VAJ1AA	9M4VAJ10	4247040
		CD-SS-G31	J4I020424-22	M4VA11AA	9M4VA110	4247041
		CD-SS-G32	J4I020424-24	M4VA41AA	9M4VA410	4247041

Report No.: 62553

Results in this report relate only to the sample(s) analyzed.

SDG No.	Order No.	Client Sample ID (List Order)	Lot-Sa No.	Work Order	Report DB ID	Batch No.
48684		CD-SS-G40	J4I020424-25	M4VA51AA	9M4VA510	4247041
		CD-SS-G41	J4I020424-26	M4VA71AE	9M4VA710	4247041
		CD-SS-G41	J4I020424-26	M4VA71AA	9M4VA710	4247043
		CD-SS-G41	J4I020424-26	M4VA71AH	9M4VA710	4247044
		WW-SB01-25	J4I020424-2	M4T9L1AA	9M4T9L10	4247040
		WW-SB01-5	J4I020424-1	M4T9K1AE	9M4T9K10	4247040
		WW-SB01-5	J4I020424-1	M4T9K1AA	9M4T9K10	4247043
		WW-SB01-5	J4I020424-1	M4T9K1AH	9M4T9K10	4247044
		WW-SB01-50	J4I020424-3	M4T9M1AA	9M4T9M10	4247040
		WW-SB02-20	J4I020424-5	M4T9R1AA	9M4T9R10	4247040
		WW-SB02-40	J4I020424-6	M4T9T1AA	9M4T9T10	4247040
		WW-SB02-5	J4I020424-4	M4T9N1AA	9M4T9N10	4247040
		WW-SB03-20	J4I020424-8	M4T9W1AA	9M4T9W10	4247040
		WW-SB03-40	J4I020424-9	M4T9X1AA	9M4T9X10	4247040
		WW-SB03-5	J4I020424-7	M4T9V1AA	9M4T9V10	4247040
		WW-SB04-25	J4I020424-11	M4T911AE	9M4T9110	4247040
		WW-SB04-25	J4I020424-11	M4T911AA	9M4T9110	4247043
		WW-SB04-25	J4I020424-11	M4T911AH	9M4T9110	4247044
		WW-SB04-45	J4I020424-12	M4T921AA	9M4T9210	4247040
		WW-SB04-5	J4I020424-10	M4T901AA	9M4T9010	4247040
		WW-SS-BKG01	J4I020424-39	M4VC41AA	9M4VC410	4247041
		WW-SS-BKG02	J4I020424-40	M4VC51AA	9M4VC510	4247041
		WW-SS-BKG03	J4I020424-41	M4VC61AA	9M4VC610	4247042
		WW-SS-BKG04	J4I020424-42	M4VC81AA	9M4VC810	4247042
		WW-SS-BKG05	J4I020424-43	M4VC91AA	9M4VC910	4247042
		WW-SS-BKG06	J4I020424-44	M4VDA1AA	9M4VDA10	4247042
		WW-SS-G12	J4I020424-33	M4VCN1AA	9M4VCN10	4247041
		WW-SS-G13	J4I020424-34	M4VCR1AE	9M4VCR10	4247041
		WW-SS-G13	J4I020424-34	M4VCR1AA	9M4VCR10	4247043
		WW-SS-G13	J4I020424-34	M4VCR1AH	9M4VCR10	4247044
		WW-SS-G16	J4I020424-35	M4VCV1AA	9M4VCV10	4247041
		WW-SS-G17	J4I020424-36	M4VCW1AA	9M4VCW10	4247041
		WW-SS-G18	J4I020424-37	M4VC21AA	9M4VC210	4247041
		WW-SS-G20	J4I020424-38	M4VC31AA	9M4VC310	4247041
		WW-SS-G5	J4I020424-29	M4VCD1AA	9M4VCD10	4247041
		WW-SS-G6	J4I020424-30	M4VCJ1AA	9M4VCJ10	4247041
		WW-SS-G7	J4I020424-31	M4VCK1AA	9M4VCK10	4247041
		WW-SS-G9	J4I020424-32	M4VCM1AA	9M4VCM10	4247041

Certificate of Analysis

September 30, 2014

Pat-Chem Laboratories
11990 Discovery Court
Moorpark, CA 93021

Attention: Theresa Trevizo

Date Received at Lab	:	August 6, 2014
Sample Type	:	Fifty (50) Soils
SDG Number	:	48684

CASE NARRATIVE

I. Introduction

On August 6, 2014, fifty soil samples were received at TestAmerica's Richland laboratory for radiochemical analysis. Upon receipt, the samples were assigned the TestAmerica identification numbers as described on the cover page of the Analytical Data Package report form. The samples were assigned to Lot Numbers J4I020424.

II. Sample Receipt

The samples were received in good condition, however, we did not receive sample #12, WW-SB02-10. Except as noted, no other anomalies were noted upon check-in.

III. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information; analytical results and the appropriate associated statistical uncertainties.

The analyses requested were:

Gamma Spectroscopy
Gamma Spec by method RL-GAM-001
Alpha Spectroscopy
Thorium-228, -230, -232 by method RL-ALP-001
Uranium-234, -235, -238 by method RL-ALP-004

IV. Quality Control

The analytical result for each analysis performed includes a minimum of one laboratory control sample (LCS), and one reagent blank sample analysis. Any exceptions have been noted in the "Comments" section.

V. Comments

Gamma Spectroscopy

Gamma Spec:
Samples were analyzed in three batches.

Batch 4247040:
The LCS, batch blank, samples and sample duplicate results are within acceptance limits.

Batch 4247041:
The LCS, batch blank, samples and sample duplicate results are within acceptance limits.

Batch 4247042:
The LCS, batch blank, samples and sample duplicate results are within acceptance limits.

Alpha Spectroscopy

Thorium-228, -230, -232:
The LCS, batch blank, samples and sample duplicate results are within acceptance limits.

Uranium-234, -235, -238:
The LCS, batch blank, samples and sample duplicate results are within acceptance limits.

I certify that this Certificate of Analysis is in compliance with the SOW and/or NELAC, both technically and for completeness, for other than the conditions detailed above. The Laboratory Manager or a designee, as verified by the following signature has authorized release of the data contained in this hard copy data package.

Reviewed and approved:

Robin Ebert Mays
Robin Ebert-Mays
Project Manager

Drinking Water Method Cross References

	DRINKING WATER ASTM METHOD CROSS REFERENCES	
Referenced Method	**Isotope(s)**	**TestAmerica Richland's SOP No.**
EPA 901.1	Cs-134, I-131	RL-GAM-001
EPA 900.0	Alpha & Beta	RL-GPC-001
EPA 00-02	Gross Alpha (Coprecipitation)	RL-GPC-002
EPA 903.0	Total Alpha Radium (Ra-226)	RL-RA-002
EPA 903.1	Ra-226	RL-RA-001
EPA 904.0	Ra-228	RL-RA-001
EPA 905.0	Sr-89/90	RL-GPC-003
ASTM D5174	Uranium	RL-KPA-003
EPA 906.0	Tritium	RL-LSC-005

Results in this report relate only to the sample(s) analyzed.

Uncertainty Estimation

TestAmerica Richland has adopted the internationally accepted approach to estimating uncertainties described in “NIST Technical Note 1297, 1994 Edition”. The approach, "Law of Propagation of Errors", involves the identification of all variables in an analytical method which are used to derive a result. These variables are related to the analytical result (R) by some functional relationship, R = constants * f(x,y,z,...). The components (x,y,z) are evaluated to determine their contribution to the overall method uncertainty. The individual component uncertainties (u_i) are then combined using a statistical model that provides the most probable overall uncertainty value. All component uncertainties are categorized as type A, evaluated by statistical methods, or type B, evaluated by other means. Uncertainties not included in the components, such as sample homogeneity, are combined with the component uncertainty as the square root of the sum-of-the-squares of the individual uncertainties. The uncertainty associated with the derived result is the combined uncertainty (u_c) multiplied by the coverage factor (1,2, or 3).

When three or more sample replicates are used to derive the analytical result, the type A uncertainty is the standard deviation of the mean value (S/?n), where S is the standard deviation of the derived results. The type B uncertainties are all other random or non-random components that are not included in the standard deviation.

The derivation of the general "Law of Propagation of Errors" equations and specific example are available on request.

Report Definitions

Action Lev	An agreed upon activity level used to trigger some action when the final result is greater than or equal to the Action Level. Often the Action Level is related to the Decision Limit.
Batch	The QC preparation batch number that relates laboratory samples to QC samples that were prepared and analyzed together.
Bias	Defined by the equation (Result/Expected)-1 as defined by ANSI N13.30.
COC No	Chain of Custody Number assigned by the Client or TestAmerica.
Count Error (#s)	Poisson counting statistics of the gross sample count and background. The uncertainty is absolute and in the same units as the result. For Liquid Scintillation Counting (LSC) the batch blank count is the background.
Total Uncert (#s) ***u_c – Combined Uncertainty.***	All known uncertainties associated with the preparation and analysis of the sample are propagated to give a measure of the uncertainty associated with the result, *u_c the combined uncertainty*. The uncertainty is absolute and in the same units as the result.
(#s), Coverage Factor	The coverage factor defines the width of the confidence interval, 1, 2 or 3 standard deviations.
CRDL (RL)	Contractual Required Detection Limit as defined in the Client's Statement Of Work or TestAmerica "default" nominal detection limit. Often referred to the reporting level (RL)
Lc	Decision Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume associated with the sample. The Type I error probability is approximately 5%. Lc=(1.645 * Sqrt(2*(BkgrndCnt/BkgrndCntMin)/SCntMin)) * (ConvFct/(Eff*Yld*Abn*Vol) * IngrFct). For LSC methods the batch blank is used as a measure of the background variability. Lc cannot be calculated when the background count is zero.
Lot-Sample No	The number assigned by the LIMS software to track samples received on the same day for a given client. The sample number is a sequential number assigned to each sample in the Lot.
MDC|MDA	Detection Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume with a Type I and II error probability of approximately 5%. MDC = (4.65 * Sqrt((BkgrndCnt/BkgrndCntMin)/SCntMin) + 2.71/SCntMin) * (ConvFct/(Eff * Yld * Abn * Vol) * IngrFct). For LSC methods the batch blank is used as a measure of the background variability.
Primary Detector	The instrument identifier associated with the analysis of the sample aliquot.
Ratio U-234/U-238	The U-234 result divided by the U-238 result. The U-234/U-238 ratio for natural uranium in NIST SRM 4321C is 1.038.
Rst/MDC	Ratio of the Result to the MDC. A value greater than 1 may indicate activity above background at a high level of confidence. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result.
Rst/TotUcert	Ratio of the Result to the Total Uncertainty. If the uncertainty has a coverage factor of 2 a value greater than 1 may indicate activity above background at approximately the 95% level of confidence assuming a two-sided confidence interval. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result.
Report DB No	Sample Identifier used by the report system. The number is based upon the first five digits of the **Work Order** Number.
RER	The equation Replicate Error Ratio = (S-D)/[sqrt($TPUs^2$ + $TPUd^2$)] as defined by ICPT BOA where S is the original sample result, D is the result of the duplicate, TPUs is the total uncertainty of the original sample and TPUd is the total uncertainty of the duplicate sample.
SDG	Sample Delivery Group Number assigned by the Client or assigned by TestAmerica upon sample receipt.
Sum Rpt Alpha Spec Rst(s)	The sum of the reported alpha spec results for tests derived from the same sample excluding duplicate result where the results are in the same units.
Work Order	The LIMS software assign test specific identifier.
Yield	The recovery of the tracer added to the sample such as Pu-242 used to trace a Pu-239/40 method.

Sample Results Summary

Date: 30-Sep-14

TestAmerica Inc

Ordered by Method, Batch No., Client Sample ID.

Report No. : 62553 **SDG No:** 48684

Batch	Client Id Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Tracer Yield	MDL	CRDL	RER2
4247043 C0SR									
CD-SB02-5									
	M4VAD1AA	U-234	4.37E-01 +- 1.2E-01	J	pCi/g	97%	2.96E-02	1.00E+00	
		U-235	2.37E-02 +- 2.4E-02	J	pCi/g	97%	1.61E-02	1.00E+00	
		U-238	4.20E-01 +- 1.2E-01	J	pCi/g	97%	2.71E-02	1.00E+00	
CD-SS-BKG03									
	M4VDF1AA	U-234	4.48E-01 +- 1.2E-01	J	pCi/g	104%	2.91E-02	1.00E+00	
		U-235	1.17E-02 +- 1.7E-02	U	pCi/g	104%	1.58E-02	1.00E+00	
		U-238	6.12E-01 +- 1.5E-01	J	pCi/g	104%	2.67E-02	1.00E+00	
CD-SS-G16									
	M4VAV1AA	U-234	7.65E-01 +- 1.9E-01	J	pCi/g	87%	3.38E-02	1.00E+00	
		U-235	1.82E-02 +- 2.4E-02	U	pCi/g	87%	3.62E-02	1.00E+00	
		U-238	7.06E-01 +- 1.8E-01	J	pCi/g	87%	4.80E-02	1.00E+00	
CD-SS-G41									
	M4VA71AA	U-234	1.09E+00 +- 2.4E-01		pCi/g	86%	3.78E-02	1.00E+00	
		U-235	3.34E-02 +- 3.0E-02	J	pCi/g	86%	1.81E-02	1.00E+00	
		U-238	1.09E+00 +- 2.4E-01		pCi/g	86%	3.06E-02	1.00E+00	
WW-SB01-5									
	M4T9K1AA	U-234	3.38E-01 +- 1.1E-01	J	pCi/g	85%	7.56E-02	1.00E+00	
		U-235	7.20E-03 +- 2.0E-02	U	pCi/g	85%	5.03E-02	1.00E+00	
		U-238	3.25E-01 +- 1.1E-01	J	pCi/g	85%	7.49E-02	1.00E+00	
WW-SB01-5 DUP									
	M4T9K1AK	U-234	3.53E-01 +- 1.1E-01	J	pCi/g	95%	7.45E-02	1.00E+00	0.2
		U-235	1.73E-03 +- 1.3E-02	U	pCi/g	95%	4.13E-02	1.00E+00	0.5
		U-238	3.19E-01 +- 1.0E-01	J	pCi/g	95%	6.22E-02	1.00E+00	0.1
WW-SB04-25									
	M4T911AA	U-234	1.83E-01 +- 7.5E-02	J	pCi/g	96%	3.00E-02	1.00E+00	
		U-235	5.51E-03 +- 1.3E-02	U	pCi/g	96%	3.00E-02	1.00E+00	
		U-238	2.90E-01 +- 9.9E-02	J	pCi/g	96%	4.64E-02	1.00E+00	
WW-SS-G13									
	M4VCR1AA	U-234	1.59E+00 +- 3.2E-01		pCi/g	95%	3.70E-02	1.00E+00	
		U-235	4.89E-02 +- 3.6E-02	J	pCi/g	95%	2.85E-02	1.00E+00	
		U-238	1.45E+00 +- 3.0E-01		pCi/g	95%	4.41E-02	1.00E+00	
4247044 L8S1									
CD-SB02-5									
	M4VAD1AH	Th-228	2.71E+00 +- 5.0E-01		pCi/g	89%	4.59E-02	1.00E+00	
		Th-230	4.80E-01 +- 1.4E-01	J	pCi/g	89%	3.73E-02	1.00E+00	
		Th-232	2.24E+00 +- 4.2E-01		pCi/g	89%	2.81E-02	1.00E+00	
CD-SS-BKG03									

TestAmerica Inc

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RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.

U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

Sample Results Summary

Date: 30-Sep-14

TestAmerica Inc

Ordered by Method, Batch No., Client Sample ID.

Report No. : 62553 **SDG No:** 48684

Batch	Client Id Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Tracer Yield	MDL	CRDL	RER2
4247044 L8S1									
CD-SS-BKG03									
	M4VDF1AH	Th-228	8.00E-01 +- 2.0E-01	J	pCi/g	93%	4.08E-02	1.00E+00	
		Th-230	1.92E-01 +- 8.3E-02	J	pCi/g	93%	3.54E-02	1.00E+00	
		Th-232	6.86E-01 +- 1.8E-01	J	pCi/g	93%	4.37E-02	1.00E+00	
CD-SS-G16									
	M4VAV1AH	Th-228	6.16E+00 +- 1.0E+00		pCi/g	102%	4.26E-02	1.00E+00	
		Th-230	9.53E-01 +- 2.1E-01	J	pCi/g	102%	2.85E-02	1.00E+00	
		Th-232	4.65E+00 +- 7.8E-01		pCi/g	102%	2.85E-02	1.00E+00	
CD-SS-G41									
	M4VA71AH	Th-228	6.80E+00 +- 1.1E+00		pCi/g	106%	4.20E-02	1.00E+00	
		Th-230	1.35E+00 +- 2.7E-01		pCi/g	106%	5.28E-02	1.00E+00	
		Th-232	6.46E+00 +- 1.1E+00		pCi/g	106%	4.47E-02	1.00E+00	
WW-SB01-5									
	M4T9K1AH	Th-228	2.21E+00 +- 4.1E-01		pCi/g	106%	3.03E-02	1.00E+00	
		Th-230	3.24E-01 +- 1.0E-01	J	pCi/g	106%	2.51E-02	1.00E+00	
		Th-232	1.76E+00 +- 3.4E-01		pCi/g	106%	2.51E-02	1.00E+00	
WW-SB04-25									
	M4T911AH	Th-228	1.66E+00 +- 3.3E-01		pCi/g	98%	2.71E-02	1.00E+00	
		Th-230	3.10E-01 +- 1.0E-01	J	pCi/g	98%	2.55E-02	1.00E+00	
		Th-232	1.80E+00 +- 3.5E-01		pCi/g	98%	1.72E-02	1.00E+00	
WW-SB04-25 DUP									
	M4T911AJ	Th-228	2.43E+00 +- 4.5E-01		pCi/g	95%	4.26E-02	1.00E+00	2.8
		Th-230	4.59E-01 +- 1.3E-01	J	pCi/g	95%	1.75E-02	1.00E+00	1.8
		Th-232	2.32E+00 +- 4.3E-01		pCi/g	95%	2.61E-02	1.00E+00	1.9
WW-SS-G13									
	M4VCR1AH	Th-228	7.67E+00 +- 1.3E+00		pCi/g	101%	4.25E-02	1.00E+00	
		Th-230	2.02E+00 +- 3.9E-01		pCi/g	101%	3.42E-02	1.00E+00	
		Th-232	7.54E+00 +- 1.2E+00		pCi/g	101%	2.03E-02	1.00E+00	
4247040 RL-GAM-001									
CD-SB01-5									
	M4T931AA	K-40	2.14E+01 +- 2.5E+00		pCi/g		2.40E-01		
		RA-226	7.89E-01 +- 1.1E-01	J	pCi/g		5.13E-02	1.00E+00	
		TH-232	2.72E+00 +- 3.7E-01		pCi/g		1.72E-01	1.00E+00	
		U-238	9.33E-01 +- 3.8E-01		pCi/g		4.71E-01		
CD-SB02-10									
	M4VAF1AA	K-40	3.22E+01 +- 3.8E+00		pCi/g		2.92E-01		
		RA-226	6.37E-01 +- 1.2E-01	J	pCi/g		7.57E-02	1.00E+00	
		TH-232	2.57E+00 +- 4.5E-01		pCi/g		2.93E-01	1.00E+00	

TestAmerica Inc **RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.**

rptTALRchSaSummary2 V5.3.4 A2002 **J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.**

Sample Results Summary

Date: 30-Sep-14

TestAmerica Inc

Ordered by Method, Batch No., Client Sample ID.

Report No. : 62553 **SDG No:** 48684

Batch	Client Id Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Tracer Yield	MDL	CRDL	RER2
4247040 RL-GAM-001									
CD-SB02-10									
	M4VAF1AA	U-238	5.45E-01 +- 1.2E+00	U	pCi/g		1.88E+00		
CD-SB02-5									
	M4VAD1AE	K-40	2.57E+01 +- 3.3E+00		pCi/g		3.56E-01		
		RA-226	8.30E-01 +- 1.6E-01	J	pCi/g		8.66E-02	1.00E+00	
		TH-232	3.36E+00 +- 5.3E-01		pCi/g		3.11E-01	1.00E+00	
		U-238	3.21E-01 +- 9.5E-01	U	pCi/g		1.56E+00		
CD-SB03-5									
	M4VAG1AA	K-40	2.82E+01 +- 3.4E+00		pCi/g		2.53E-01		
		RA-226	4.22E-01 +- 8.7E-02	J	pCi/g		5.50E-02	1.00E+00	
		TH-232	2.71E+00 +- 4.3E-01		pCi/g		2.03E-01	1.00E+00	
		U-238	4.75E-01 +- 1.1E+00	U	pCi/g		1.84E+00		
CD-SS-G10									
	M4VAR1AA	K-40	2.24E+01 +- 2.6E+00		pCi/g		2.95E-01		
		RA-226	1.06E+00 +- 1.6E-01		pCi/g		5.82E-02	1.00E+00	
		TH-232	4.03E+00 +- 5.1E-01		pCi/g		1.69E-01	1.00E+00	
		U-238	9.97E-01 +- 4.3E-01		pCi/g		3.95E-01		
CD-SS-G16									
	M4VAV1AE	K-40	2.35E+01 +- 2.7E+00		pCi/g		2.75E-01		
		RA-226	8.63E-01 +- 1.3E-01	J	pCi/g		5.76E-02	1.00E+00	
		TH-232	4.56E+00 +- 5.8E-01		pCi/g		1.96E-01	1.00E+00	
		U-238	1.10E+00 +- 4.9E-01		pCi/g		5.07E-01		
CD-SS-G23									
	M4VAW1AA	K-40	2.30E+01 +- 2.8E+00		pCi/g		3.38E-01		
		RA-226	7.83E-01 +- 1.4E-01	J	pCi/g		1.02E-01	1.00E+00	
		TH-232	6.60E+00 +- 9.7E-01		pCi/g		3.97E-01	1.00E+00	
		U-238	1.07E-01 +- 1.5E+00	U	pCi/g		2.55E+00		
CD-SS-G3									
	M4VAJ1AA	K-40	1.76E+01 +- 2.1E+00		pCi/g		3.18E-01		
		RA-226	6.73E-01 +- 1.2E-01	J	pCi/g		5.72E-02	1.00E+00	
		TH-232	3.11E+00 +- 4.2E-01		pCi/g		1.91E-01	1.00E+00	
		U-238	5.67E-01 +- 3.5E-01		pCi/g		4.38E-01		
WW-SB01-25									
	M4T9L1AA	K-40	2.02E+01 +- 2.5E+00		pCi/g		2.49E-01		
		RA-226	6.71E-01 +- 1.1E-01	J	pCi/g		6.78E-02	1.00E+00	
		TH-232	1.71E+00 +- 3.6E-01		pCi/g		2.60E-01	1.00E+00	
		U-238	5.62E-01 +- 1.0E+00	U	pCi/g		1.73E+00		
WW-SB01-5									

TestAmerica Inc

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RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

Sample Results Summary

Date: 30-Sep-14

TestAmerica Inc

Ordered by Method, Batch No., Client Sample ID.

Report No. : 62553 **SDG No:** 48684

Batch	Client Id Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Tracer Yield	MDL	CRDL	RER2
4247040 RL-GAM-001									
WW-SB01-5									
	M4T9K1AE	K-40	2.17E+01 +- 2.8E+00		pCi/g		3.09E-01		
		RA-226	4.52E-01 +- 1.2E-01	J	pCi/g		7.48E-02	1.00E+00	
		TH-232	1.92E+00 +- 4.2E-01		pCi/g		2.58E-01	1.00E+00	
		U-238	1.86E-01 +- 7.7E-01	U	pCi/g		1.26E+00		
WW-SB01-5 DUP									
	M4T9K1AJ	K-40	2.09E+01 +- 2.4E+00		pCi/g		2.18E-01		0.4
		RA-226	4.13E-01 +- 9.2E-02	J	pCi/g		4.60E-02	1.00E+00	0.5
		TH-232	1.71E+00 +- 2.5E-01		pCi/g		1.41E-01	1.00E+00	0.9
		U-238	5.24E-01 +- 3.6E-01		pCi/g		4.07E-01		0.8
WW-SB01-50									
	M4T9M1AA	K-40	2.82E+01 +- 3.4E+00		pCi/g		2.86E-01		
		RA-226	6.75E-01 +- 1.2E-01	J	pCi/g		5.51E-02	1.00E+00	
		TH-232	2.68E+00 +- 4.3E-01		pCi/g		2.11E-01	1.00E+00	
		U-238	5.55E-01 +- 1.2E+00	U	pCi/g		2.03E+00		
WW-SB02-20									
	M4T9R1AA	K-40	2.32E+01 +- 2.7E+00		pCi/g		2.39E-01		
		RA-226	4.79E-01 +- 9.1E-02	J	pCi/g		4.33E-02	1.00E+00	
		TH-232	1.75E+00 +- 2.6E-01		pCi/g		1.34E-01	1.00E+00	
		U-238	4.02E-01 +- 2.9E-01		pCi/g		3.25E-01		
WW-SB02-40									
	M4T9T1AA	K-40	2.39E+01 +- 2.7E+00		pCi/g		2.22E-01		
		RA-226	5.18E-01 +- 9.3E-02	J	pCi/g		4.66E-02	1.00E+00	
		TH-232	1.96E+00 +- 2.8E-01		pCi/g		1.46E-01	1.00E+00	
		U-238	5.61E-01 +- 3.5E-01		pCi/g		4.35E-01		
WW-SB02-5									
	M4T9N1AA	K-40	2.14E+01 +- 2.5E+00		pCi/g		3.09E-01		
		RA-226	5.36E-01 +- 9.7E-02	J	pCi/g		4.90E-02	1.00E+00	
		TH-232	1.84E+00 +- 2.6E-01		pCi/g		1.55E-01	1.00E+00	
		U-238	3.74E-01 +- 3.0E-01		pCi/g		3.72E-01		
WW-SB03-20									
	M4T9W1AA	K-40	2.67E+00 +- 3.4E-01		pCi/g		3.58E-02		
		RA-226	5.46E-02 +- 1.1E-02	J	pCi/g		8.06E-03	1.00E+00	
		TH-232	1.58E-01 +- 3.4E-02	J	pCi/g		2.57E-02	1.00E+00	
		U-238	-2.51E-02 +- 8.2E-02	U	pCi/g		1.32E-01		
WW-SB03-40									
	M4T9X1AA	K-40	2.98E+01 +- 3.6E+00		pCi/g		2.49E-01		
		RA-226	4.09E-01 +- 8.4E-02	U	pCi/g		1.05E-01	1.00E+00	

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Sample Results Summary

Date: 30-Sep-14

TestAmerica Inc

Ordered by Method, Batch No., Client Sample ID.

Report No. : 62553 **SDG No:** 48684

Batch	Client Id Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Tracer Yield	MDL	CRDL	RER2
4247040 RL-GAM-001									
WW-SB03-40									
	M4T9X1AA	TH-232	1.38E+00 +- 3.2E-01		pCi/g		2.41E-01	1.00E+00	
		U-238	5.28E-01 +- 9.4E-01	U	pCi/g		1.57E+00		
WW-SB03-5									
	M4T9V1AA	K-40	2.29E+01 +- 2.6E+00		pCi/g		2.20E-01		
		RA-226	5.54E-01 +- 9.5E-02	J	pCi/g		4.82E-02	1.00E+00	
		TH-232	1.87E+00 +- 2.8E-01		pCi/g		1.58E-01	1.00E+00	
		U-238	7.25E-01 +- 3.2E-01		pCi/g		4.22E-01		
WW-SB04-25									
	M4T911AE	K-40	2.48E+01 +- 2.8E+00		pCi/g		3.22E-01		
		RA-226	5.72E-01 +- 9.8E-02	J	pCi/g		5.12E-02	1.00E+00	
		TH-232	2.04E+00 +- 2.9E-01		pCi/g		1.65E-01	1.00E+00	
		U-238	6.51E-01 +- 3.3E-01		pCi/g		4.19E-01		
WW-SB04-45									
	M4T921AA	K-40	2.38E+01 +- 2.7E+00		pCi/g		2.49E-01		
		RA-226	5.11E-01 +- 9.4E-02	J	pCi/g		4.52E-02	1.00E+00	
		TH-232	1.69E+00 +- 2.5E-01		pCi/g		1.29E-01	1.00E+00	
		U-238	3.97E-01 +- 2.9E-01		pCi/g		3.24E-01		
WW-SB04-5									
	M4T901AA	K-40	2.22E+01 +- 2.7E+00		pCi/g		2.25E-01		
		RA-226	4.52E-01 +- 8.7E-02	J	pCi/g		5.19E-02	1.00E+00	
		TH-232	2.57E+00 +- 3.9E-01		pCi/g		1.76E-01	1.00E+00	
		U-238	-1.17E-01 +- 9.7E-01	U	pCi/g		1.68E+00		
4247041 RL-GAM-001									
CD-SS-G13									
	M4VCA1AA	K-40	2.20E+01 +- 2.6E+00		pCi/g		3.81E-01		
		RA-226	9.88E-01 +- 1.5E-01	J	pCi/g		7.08E-02	1.00E+00	
		TH-232	5.56E+00 +- 6.8E-01		pCi/g		2.42E-01	1.00E+00	
		U-238	7.05E-01 +- 4.7E-01		pCi/g		5.41E-01		
CD-SS-G18									
	M4VA21AA	K-40	2.16E+01 +- 2.5E+00		pCi/g		2.65E-01		
		RA-226	7.77E-01 +- 1.2E-01	J	pCi/g		6.06E-02	1.00E+00	
		TH-232	4.31E+00 +- 5.6E-01		pCi/g		1.92E-01	1.00E+00	
		U-238	1.04E+00 +- 4.4E-01		pCi/g		4.96E-01		
CD-SS-G20									
	M4VA91AA	K-40	1.99E+01 +- 2.3E+00		pCi/g		3.31E-01		
		RA-226	8.54E-01 +- 1.4E-01	J	pCi/g		8.99E-02	1.00E+00	
		TH-232	7.86E+00 +- 1.0E+00		pCi/g		2.99E-01	1.00E+00	

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Sample Results Summary

Date: 30-Sep-14

TestAmerica Inc

Ordered by Method, Batch No., Client Sample ID.

Report No. : 62553 **SDG No:** 48684

Batch	Client Id Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Tracer Yield	MDL	CRDL	RER2
4247041 RL-GAM-001									
CD-SS-G20									
	M4VA91AA	U-238	5.11E-01 +- 4.9E-01	U	pCi/g		8.08E-01		
CD-SS-G24									
	M4VAX1AA	K-40	2.22E+01 +- 2.6E+00		pCi/g		3.76E-01		
		RA-226	1.35E+00 +- 1.9E-01		pCi/g		7.36E-02	1.00E+00	
		TH-232	6.21E+00 +- 7.3E-01		pCi/g		2.26E-01	1.00E+00	
		U-238	9.43E-01 +- 4.1E-01		pCi/g		5.13E-01		
CD-SS-G24 DUP									
	M4VAX1AC	K-40	2.21E+01 +- 2.9E+00		pCi/g		4.36E-01		0.1
		RA-226	1.45E+00 +- 2.3E-01		pCi/g		1.07E-01	1.00E+00	0.6
		TH-232	6.99E+00 +- 9.8E-01		pCi/g		3.87E-01	1.00E+00	1.3
		U-238	1.43E+00 +- 1.1E+00	U	pCi/g		1.86E+00		0.8
CD-SS-G31									
	M4VA11AA	K-40	2.16E+01 +- 2.5E+00		pCi/g		2.96E-01		
		RA-226	1.03E+00 +- 1.6E-01		pCi/g		6.54E-02	1.00E+00	
		TH-232	5.22E+00 +- 6.4E-01		pCi/g		2.03E-01	1.00E+00	
		U-238	1.19E+00 +- 4.7E-01		pCi/g		4.01E-01		
CD-SS-G32									
	M4VA41AA	K-40	2.23E+01 +- 2.7E+00		pCi/g		3.16E-01		
		RA-226	1.04E+00 +- 1.5E-01		pCi/g		6.91E-02	1.00E+00	
		TH-232	5.87E+00 +- 8.2E-01		pCi/g		2.62E-01	1.00E+00	
		U-238	2.01E+00 +- 1.4E+00	U	pCi/g		2.40E+00		
CD-SS-G40									
	M4VA51AA	K-40	2.32E+01 +- 2.8E+00		pCi/g		3.11E-01		
		RA-226	7.19E-01 +- 1.3E-01	J	pCi/g		8.77E-02	1.00E+00	
		TH-232	4.54E+00 +- 7.1E-01		pCi/g		3.26E-01	1.00E+00	
		U-238	5.83E-01 +- 1.3E+00	U	pCi/g		2.16E+00		
CD-SS-G41									
	M4VA71AE	K-40	2.17E+01 +- 2.6E+00		pCi/g		3.48E-01		
		RA-226	1.13E+00 +- 1.6E-01		pCi/g		6.64E-02	1.00E+00	
		TH-232	4.94E+00 +- 7.0E-01		pCi/g		2.50E-01	1.00E+00	
		U-238	1.60E-01 +- 1.4E+00	U	pCi/g		2.21E+00		
WW-SS-BKG01									
	M4VC41AA	K-40	2.29E+01 +- 2.6E+00		pCi/g		1.91E-01		
		RA-226	4.86E-01 +- 1.0E-01	J	pCi/g		4.70E-02	1.00E+00	
		TH-232	1.42E+00 +- 2.4E-01		pCi/g		1.47E-01	1.00E+00	
		U-238	7.95E-01 +- 3.5E-01		pCi/g		4.22E-01		
WW-SS-BKG02									

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Sample Results Summary

Date: 30-Sep-14

TestAmerica Inc

Ordered by Method, Batch No., Client Sample ID.

Report No. : 62553 **SDG No:** 48684

Batch	Client Id Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Tracer Yield	MDL	CRDL	RER2
4247041 RL-GAM-001									
WW-SS-BKG02									
	M4VC51AA	K-40	2.29E+01 +- 2.8E+00		pCi/g		2.70E-01		
		RA-226	6.05E-01 +- 9.7E-02	J	pCi/g		5.54E-02	1.00E+00	
		TH-232	1.59E+00 +- 3.1E-01		pCi/g		1.89E-01	1.00E+00	
		U-238	1.43E+00 +- 1.1E+00	U	pCi/g		1.86E+00		
WW-SS-G12									
	M4VCN1AA	K-40	2.22E+01 +- 2.7E+00		pCi/g		3.12E-01		
		RA-226	7.01E-01 +- 1.1E-01	J	pCi/g		7.49E-02	1.00E+00	
		TH-232	2.49E+00 +- 4.2E-01		pCi/g		2.75E-01	1.00E+00	
		U-238	9.35E-01 +- 1.1E+00	U	pCi/g		1.83E+00		
WW-SS-G13									
	M4VCR1AE	K-40	1.95E+01 +- 2.4E+00		pCi/g		2.86E-01		
		RA-226	9.77E-01 +- 1.4E-01	J	pCi/g		6.13E-02	1.00E+00	
		TH-232	4.71E+00 +- 6.7E-01		pCi/g		2.35E-01	1.00E+00	
		U-238	5.72E-01 +- 1.3E+00	U	pCi/g		2.25E+00		
WW-SS-G16									
	M4VCV1AA	K-40	2.11E+01 +- 2.5E+00		pCi/g		2.93E-01		
		RA-226	8.32E-01 +- 1.3E-01	J	pCi/g		6.86E-02	1.00E+00	
		TH-232	3.03E+00 +- 4.6E-01		pCi/g		2.24E-01	1.00E+00	
		U-238	7.55E-01 +- 4.1E-01		pCi/g		6.57E-01		
WW-SS-G17									
	M4VCW1AA	K-40	2.13E+01 +- 2.5E+00		pCi/g		3.48E-01		
		RA-226	8.27E-01 +- 1.3E-01	J	pCi/g		5.72E-02	1.00E+00	
		TH-232	2.43E+00 +- 3.5E-01		pCi/g		1.73E-01	1.00E+00	
		U-238	8.02E-01 +- 4.3E-01		pCi/g		4.20E-01		
WW-SS-G18									
	M4VC21AA	K-40	2.31E+01 +- 2.7E+00		pCi/g		2.68E-01		
		RA-226	5.20E-01 +- 9.4E-02	J	pCi/g		5.00E-02	1.00E+00	
		TH-232	1.72E+00 +- 2.6E-01		pCi/g		1.48E-01	1.00E+00	
		U-238	4.89E-01 +- 3.6E-01		pCi/g		4.02E-01		
WW-SS-G20									
	M4VC31AA	K-40	2.11E+01 +- 2.4E+00		pCi/g		2.33E-01		
		RA-226	6.17E-01 +- 9.9E-02	J	pCi/g		5.02E-02	1.00E+00	
		TH-232	1.78E+00 +- 2.8E-01		pCi/g		1.64E-01	1.00E+00	
		U-238	7.09E-01 +- 4.0E-01		pCi/g		4.11E-01		
WW-SS-G5									
	M4VCD1AA	K-40	2.23E+01 +- 2.6E+00		pCi/g		2.66E-01		
		RA-226	6.63E-01 +- 1.1E-01	J	pCi/g		4.58E-02	1.00E+00	

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Date: 30-Sep-14

TestAmerica Inc

Ordered by Method, Batch No., Client Sample ID.

Report No. : 62553 **SDG No:** 48684

Batch	Client Id Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Tracer Yield	MDL	CRDL	RER2
4247041 RL-GAM-001									
WW-SS-G5									
	M4VCD1AA	TH-232	2.03E+00 +- 2.9E-01		pCi/g		1.45E-01	1.00E+00	
		U-238	6.39E-01 +- 3.7E-01		pCi/g		3.95E-01		
WW-SS-G6									
	M4VCJ1AA	K-40	2.07E+01 +- 2.4E+00		pCi/g		2.88E-01		
		RA-226	1.32E+00 +- 1.8E-01		pCi/g		7.26E-02	1.00E+00	
		TH-232	7.32E+00 +- 8.8E-01		pCi/g		2.33E-01	1.00E+00	
		U-238	9.74E-01 +- 4.7E-01		pCi/g		5.18E-01		
WW-SS-G7									
	M4VCK1AA	K-40	1.90E+01 +- 2.2E+00		pCi/g		3.03E-01		
		RA-226	1.16E+00 +- 1.8E-01		pCi/g		6.61E-02	1.00E+00	
		TH-232	4.98E+00 +- 6.2E-01		pCi/g		2.17E-01	1.00E+00	
		U-238	8.73E-01 +- 4.4E-01		pCi/g		5.55E-01		
WW-SS-G9									
	M4VCM1AA	K-40	1.97E+01 +- 2.6E+00		pCi/g		4.02E-01		
		RA-226	8.83E-01 +- 1.6E-01	J	pCi/g		8.00E-02	1.00E+00	
		TH-232	2.41E+00 +- 4.2E-01		pCi/g		2.72E-01	1.00E+00	
		U-238	4.64E-02 +- 8.3E-01	U	pCi/g		1.36E+00		
4247042 RL-GAM-001									
CD-SS-BKG01									
	M4VDD1AA	K-40	2.35E+01 +- 2.7E+00		pCi/g		2.99E-01		
		RA-226	7.97E-01 +- 1.3E-01	J	pCi/g		5.61E-02	1.00E+00	
		TH-232	3.37E+00 +- 4.5E-01		pCi/g		1.80E-01	1.00E+00	
		U-238	9.98E-01 +- 4.5E-01		pCi/g		4.38E-01		
CD-SS-BKG02									
	M4VDE1AA	K-40	2.20E+01 +- 2.5E+00		pCi/g		1.99E-01		
		RA-226	6.15E-01 +- 9.7E-02	J	pCi/g		4.87E-02	1.00E+00	
		TH-232	2.10E+00 +- 3.0E-01		pCi/g		1.49E-01	1.00E+00	
		U-238	6.86E-01 +- 3.7E-01		pCi/g		4.06E-01		
CD-SS-BKG03									
	M4VDF1AE	K-40	2.21E+01 +- 2.5E+00		pCi/g		2.01E-01		
		RA-226	5.33E-01 +- 9.7E-02	J	pCi/g		4.48E-02	1.00E+00	
		TH-232	1.53E+00 +- 2.4E-01		pCi/g		1.44E-01	1.00E+00	
		U-238	8.40E-01 +- 3.8E-01		pCi/g		3.91E-01		
CD-SS-BKG04									
	M4VDG1AA	K-40	2.36E+01 +- 2.7E+00		pCi/g		2.46E-01		
		RA-226	7.61E-01 +- 1.3E-01	J	pCi/g		6.13E-02	1.00E+00	
		TH-232	1.97E+00 +- 3.3E-01		pCi/g		2.15E-01	1.00E+00	

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Date: 30-Sep-14

TestAmerica Inc

Ordered by Method, Batch No., Client Sample ID.

Report No. : 62553 **SDG No:** 48684

Batch	Client Id Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Tracer Yield	MDL	CRDL	RER2
4247042 RL-GAM-001									
CD-SS-BKG04									
	M4VDG1AA	U-238	3.62E-01 +- 4.0E-01	U	pCi/g		6.65E-01		
CD-SS-BKG05									
	M4VDH1AA	K-40	2.34E+01 +- 2.7E+00		pCi/g		3.17E-01		
		RA-226	6.50E-01 +- 1.1E-01	J	pCi/g		5.28E-02	1.00E+00	
		TH-232	1.80E+00 +- 2.6E-01		pCi/g		1.62E-01	1.00E+00	
		U-238	8.60E-01 +- 3.6E-01		pCi/g		3.93E-01		
CD-SS-BKG06									
	M4VDJ1AA	K-40	2.17E+01 +- 2.5E+00		pCi/g		2.23E-01		
		RA-226	6.08E-01 +- 9.5E-02	J	pCi/g		4.80E-02	1.00E+00	
		TH-232	1.25E+00 +- 2.1E-01		pCi/g		1.33E-01	1.00E+00	
		U-238	7.25E-01 +- 3.7E-01		pCi/g		3.67E-01		
WW-SS-BKG03									
	M4VC61AA	K-40	2.49E+01 +- 3.2E+00		pCi/g		3.39E-01		
		RA-226	8.66E-01 +- 1.6E-01	J	pCi/g		8.23E-02	1.00E+00	
		TH-232	2.21E+00 +- 4.3E-01		pCi/g		2.87E-01	1.00E+00	
		U-238	9.44E-01 +- 1.5E-01	J	pCi/g		8.24E-02	1.00E+00	
WW-SS-BKG03 DUP									
	M4VC61AC	K-40	2.36E+01 +- 2.8E+00		pCi/g		2.74E-01		0.6
		RA-226	7.81E-01 +- 1.2E-01	J	pCi/g		5.39E-02	1.00E+00	0.8
		TH-232	1.76E+00 +- 3.2E-01		pCi/g		1.99E-01	1.00E+00	1.7
		U-238	8.76E-01 +- 1.4E-01	J	pCi/g		5.73E-02	1.00E+00	0.7
WW-SS-BKG04									
	M4VC81AA	K-40	2.35E+01 +- 2.8E+00		pCi/g		2.69E-01		
		RA-226	8.07E-01 +- 1.2E-01	J	pCi/g		5.28E-02	1.00E+00	
		TH-232	2.22E+00 +- 3.6E-01		pCi/g		1.99E-01	1.00E+00	
		U-238	6.23E-01 +- 1.1E+00	U	pCi/g		1.87E+00		
WW-SS-BKG05									
	M4VC91AA	K-40	2.17E+01 +- 2.5E+00		pCi/g		2.50E-01		
		RA-226	8.17E-01 +- 1.3E-01	J	pCi/g		6.46E-02	1.00E+00	
		TH-232	2.83E+00 +- 4.0E-01		pCi/g		2.20E-01	1.00E+00	
		U-238	6.08E-01 +- 5.7E-01	U	pCi/g		6.73E-01		
WW-SS-BKG06									
	M4VDA1AA	K-40	2.17E+01 +- 2.5E+00		pCi/g		3.27E-01		
		RA-226	6.90E-01 +- 1.1E-01	J	pCi/g		5.54E-02	1.00E+00	
		TH-232	2.51E+00 +- 3.3E-01		pCi/g		1.67E-01	1.00E+00	
		U-238	1.10E+00 +- 4.9E-01		pCi/g		4.04E-01		

TestAmerica Inc

rptTALRchSaSummary2 V5.3.4 A2002

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.

U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

Sample Results Summary

Date: 30-Sep-14

TestAmerica Inc

Ordered by Method, Batch No., Client Sample ID.

Report No. : 62553 **SDG No:** 48684

Batch	Client Id Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Tracer Yield	MDL	CRDL	RER2

No. of Results: 260

TestAmerica Inc **RER2** **- Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.**

rptTALRchSaSum mary2 V5.3.4 A2002

QC Results Summary

Date: 30-Sep-14

TestAmerica Inc

Ordered by Method, Batch No, QC Type,.

Report No. : 62553 **SDG No.:** 48684

Batch Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Tracer Yield	LCS Recovery	Bias	MDL
C0SR								
4247043 BLANK QC,								
M4WCA1AA	U-234	1.05E-02 +- 1.7E-02	U	pCi/g	94%			2.97E-02
	U-235	-1.43E-03 +- 1.2E-02	U	pCi/g	94%			2.97E-02
	U-238	3.09E-02 +- 3.0E-02	U	pCi/g	94%			4.09E-02
4247043 LCS,								
M4WCA1AC	U-234	1.60E+00 +- 3.2E-01		pCi/g	87%	103%	0.0	3.11E-02
	U-238	1.77E+00 +- 3.4E-01		pCi/g	87%	108%	0.1	2.66E-02
L8S1								
4247044 BLANK QC,								
M4WCH1AA	Th-228	7.84E-01 +- 1.9E-01	J	pCi/g	105%			3.63E-02
	Th-230	1.84E-01 +- 7.6E-02	J	pCi/g	105%			2.76E-02
	Th-232	7.52E-01 +- 1.8E-01	J	pCi/g	105%			2.76E-02
4247044 LCS,								
M4WCH1AC	Th-230	2.17E+00 +- 4.2E-01		pCi/g	74%	104%	0.0	4.44E-02
RL-GAM-001								
4247040 BLANK QC,								
M4WA21AA	K-40	-5.69E-01 +- 3.2E-01	U	pCi/g				6.25E-01
	RA-226	7.72E-02 +- 6.0E-02	U	pCi/g				7.73E-02
	TH-232	-3.52E-02 +- 1.1E-01	U	pCi/g				1.63E-01
	U-238	1.77E-02 +- 4.5E-01	U	pCi/g				7.16E-01
4247040 LCS,								
M4WA21AC	CS-137	1.03E+00 +- 1.4E-01		pCi/g		103%	0.0	2.51E-02
	RA-226	9.08E-01 +- 1.4E-01		pCi/g		80%	-0.2	4.08E-02
	RA-228	5.65E-01 +- 1.4E-01		pCi/g		91%	-0.1	8.12E-02
	U-238	9.14E-01 +- 1.2E-01		pCi/g		76%	-0.2	4.17E-02
RL-GAM-001								
4247041 BLANK QC,								
M4WA31AA	K-40	-4.88E-01 +- 2.8E-01	U	pCi/g				5.65E-01
	RA-226	8.56E-02 +- 5.0E-02	U	pCi/g				6.39E-02
	TH-232	-1.03E-02 +- 7.0E-02	U	pCi/g				1.22E-01
	U-238	1.68E-02 +- 1.5E-01	U	pCi/g				2.55E-01
4247041 LCS,								
M4WA31AC	CS-137	1.01E+00 +- 1.2E-01		pCi/g		101%	0.0	2.59E-02
	RA-226	8.80E-01 +- 1.3E-01		pCi/g		77%	-0.2	4.84E-02
	RA-228	5.29E-01 +- 1.4E-01		pCi/g		86%	-0.1	8.58E-02
	U-238	9.30E-01 +- 1.4E-01		pCi/g		77%	-0.2	5.31E-02
RL-GAM-001								
4247042 BLANK QC,								
M4WA71AA	K-40	-2.03E-01 +- 2.2E-01	U	pCi/g				4.58E-01
	RA-226	5.48E-02 +- 3.3E-02	U	pCi/g				4.87E-02

TestAmerica Inc **Bias - (Result/Expected)-1 as defined by ANSI N13.30.**

rptSTLRchQcSummary V5.3.4 A2002

J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

QC Results Summary

Date: 30-Sep-14

TestAmerica Inc

Ordered by Method, Batch No, QC Type,.

Report No. : 62553 **SDG No.:** 48684

Batch Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Tracer Yield	LCS Recovery	Bias	MDL
M4WA71AA	TH-232	4.45E-02 +- 5.2E-02	U	pCi/g				9.06E-02
	U-238	3.01E-01 +- 1.8E-01	U	pCi/g				1.85E-01
4247042 LCS, M4WA71AC	CS-137	1.00E+00 +- 1.4E-01		pCi/g		100%	0.0	2.54E-02
	RA-226	8.85E-01 +- 1.3E-01		pCi/g		78%	-0.2	3.74E-02
	RA-228	6.39E-01 +- 1.3E-01		pCi/g		104%	0.0	8.26E-02
	U-238	9.75E-01 +- 1.3E-01		pCi/g		81%	-0.2	4.07E-02

No. of Results: 33

TestAmerica Inc

rptSTLRchQcSummary V5.3.4 A2002

Bias - (Result/Expected)-1 as defined by ANSI N13.30.

U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/24/2014 9:07:00 AM
Lot-Sample No.:	**J4I020424-13**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**CD-SB01-5**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247040	RL-GAM-001			**Work Order:** M4T931AA			**Report DB ID:** 9M4T9310					
K-40	**2.14E+01**		2.5E+00	2.5E+00	2.40E-01	pCi/g		*(89.2)*	9/22/14 02:22 p		397.4	GER18$1
						1.21E-01		*(17.4)*			g	
RA-226	**7.89E-01**	J	1.1E-01	1.1E-01	5.13E-02	pCi/g		*(15.4)*	9/22/14 02:22 p		397.4	GER18$1
						2.57E-02	1.00E+00	*(14.1)*			g	
TH-232	**2.72E+00**		3.7E-01	3.7E-01	1.72E-01	pCi/g		*(15.8)*	9/22/14 02:22 p		397.4	GER18$1
						8.62E-02	1.00E+00	*(14.7)*			g	
U-238	**9.33E-01**		3.8E-01	3.8E-01	4.71E-01	pCi/g		*(2.)*	9/22/14 02:22 p		397.4	GER18$1
						2.36E-01		*(4.9)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/24/2014 10:49:00 AM
Lot-Sample No.:	**J4I020424-15**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**CD-SB02-10**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247040	RL-GAM-001			**Work Order:**	M4VAF1AA		**Report DB ID:**	9M4VAF10				
K-40	**3.22E+01**		3.8E+00	3.8E+00	2.92E-01	pCi/g		*(110.1)*	9/22/14 05:54 p		379.2	GER10$1
						1.47E-01		*(16.7)*			g	
RA-226	**6.37E-01**	J	1.2E-01	1.2E-01	7.57E-02	pCi/g		*(8.4)*	9/22/14 05:54 p		379.2	GER10$1
						3.79E-02	1.00E+00	*(10.7)*			g	
TH-232	**2.57E+00**		4.5E-01	4.5E-01	2.93E-01	pCi/g		*(8.8)*	9/22/14 05:54 p		379.2	GER10$1
						1.47E-01	1.00E+00	*(11.5)*			g	
U-238	**5.45E-01**	U	1.2E+00	1.2E+00	1.88E+00	pCi/g		*0.29*	9/22/14 05:54 p		379.2	GER10$1
						9.41E-01		*0.92*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/24/2014 10:22:00 AM
Lot-Sample No.:	**J4I020424-14**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**CD-SB02-5**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247040	RL-GAM-001			**Work Order:**	M4VAD1AE		**Report DB ID:**	9M4VAD10				
K-40	**2.57E+01**		3.3E+00	3.3E+00	3.56E-01	pCi/g		*(72.2)*	9/22/14 05:54 p		364.0	GER7$1
						1.79E-01		*(15.6)*			g	
RA-226	**8.30E-01**	J	1.6E-01	1.6E-01	8.66E-02	pCi/g		*(9.6)*	9/22/14 05:54 p		364.0	GER7$1
						4.34E-02	1.00E+00	*(10.4)*			g	
TH-232	**3.36E+00**		5.3E-01	5.3E-01	3.11E-01	pCi/g		*(10.8)*	9/22/14 05:54 p		364.0	GER7$1
						1.56E-01	1.00E+00	*(12.6)*			g	
U-238	**3.21E-01**	U	9.5E-01	9.5E-01	1.56E+00	pCi/g		*0.21*	9/22/14 05:54 p		364.0	GER7$1
						7.80E-01		*0.68*			g	
Batch: 4247043	C0SR			**Work Order:**	M4VAD1AA		**Report DB ID:**	9M4VAD10				
U-234	**4.37E-01**	J		1.2E-01	2.96E-02	pCi/g	97%	*(14.8)*	9/19/14 02:53 p		1.02	ALP8
						7.44E-03	1.00E+00	*(7.1)*			g	
U-235	**2.37E-02**	J		2.4E-02	1.61E-02	pCi/g	97%	*(1.5)*	9/19/14 02:53 p		1.02	ALP8
						3.96E-03	1.00E+00	*(2.)*			g	
U-238	**4.20E-01**	J		1.2E-01	2.71E-02	pCi/g	97%	*(15.5)*	9/19/14 02:53 p		1.02	ALP8
						6.59E-03	1.00E+00	*(7.)*			g	
							Ratio U-234/238 = 1.0					
Batch: 4247044	L8S1			**Work Order:**	M4VAD1AH		**Report DB ID:**	9M4VAD10				
Th-228	**2.71E+00**			5.0E-01	4.59E-02	pCi/g	89%	*(59.)*	9/23/14 04:31 a		0.98	ALP116
						1.24E-02	1.00E+00	*(10.9)*			g	
Th-230	**4.80E-01**	J		1.4E-01	3.73E-02	pCi/g	89%	*(12.9)*	9/23/14 04:31 a		0.98	ALP116
						9.62E-03	1.00E+00	*(7.)*			g	

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/24/2014 10:22:00 AM
Lot-Sample No.:	**J4I020424-14**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**CD-SB02-5**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Th-232	**2.24E+00**			4.2E-01	2.81E-02	pCi/g	89%	*(79.7)*	9/23/14 04:31 a		0.98	ALP116
						6.53E-03	1.00E+00	*(10.6)*			g	

No. of Results: 10 **Comments:**

TestAmerica Inc

rptSTLRchSample V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/24/2014 11:40:00 AM
Lot-Sample No.:	**J4I020424-16**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**CD-SB03-5**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247040	RL-GAM-001			**Work Order:**	M4VAG1AA		**Report DB ID:**	9M4VAG10				
K-40	**2.82E+01**		3.4E+00	3.4E+00	2.53E-01	pCi/g		*(111.3)*	9/22/14 05:55 p		383.7	GER11$1
						1.27E-01		*(16.8)*			g	
RA-226	**4.22E-01**	J	8.7E-02	8.7E-02	5.50E-02	pCi/g		*(7.7)*	9/22/14 05:55 p		383.7	GER11$1
						2.75E-02	1.00E+00	*(9.7)*			g	
TH-232	**2.71E+00**		4.3E-01	4.3E-01	2.03E-01	pCi/g		*(13.4)*	9/22/14 05:55 p		383.7	GER11$1
						1.01E-01	1.00E+00	*(12.6)*			g	
U-238	**4.75E-01**	U	1.1E+00	1.1E+00	1.84E+00	pCi/g		*0.26*	9/22/14 05:55 p		383.7	GER11$1
						9.22E-01		*0.9*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/29/2014 11:35:00 AM
Lot-Sample No.:	**J4I020424-45**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**CD-SS-BKG01**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247042	RL-GAM-001			**Work Order:**	M4VDD1AA		**Report DB ID:**	9M4VDD10				
K-40	**2.35E+01**		2.7E+00	2.7E+00	2.99E-01	pCi/g		*(78.8)*	9/29/14 09:41 a		379.3	GER17$1
						1.50E-01		*(17.5)*			g	
RA-226	**7.97E-01**	J	1.3E-01	1.3E-01	5.61E-02	pCi/g		*(14.2)*	9/29/14 09:41 a		379.3	GER17$1
						2.81E-02	1.00E+00	*(12.5)*			g	
TH-232	**3.37E+00**		4.5E-01	4.5E-01	1.80E-01	pCi/g		*(18.7)*	9/29/14 09:41 a		379.3	GER17$1
						9.02E-02	1.00E+00	*(14.8)*			g	
U-238	**9.98E-01**		4.5E-01	4.5E-01	4.38E-01	pCi/g		*(2.3)*	9/29/14 09:41 a		379.3	GER17$1
						2.19E-01		*(4.4)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/29/2014 11:38:00 AM
Lot-Sample No.:	**J4I020424-46**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**CD-SS-BKG02**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247042	RL-GAM-001			**Work Order:** M4VDE1AA			**Report DB ID:** 9M4VDE10					
K-40	**2.20E+01**		2.5E+00	2.5E+00	1.99E-01	pCi/g		*(110.1)*	9/29/14 09:41 a		408.4	GER18$1
						1.00E-01		*(17.5)*			g	
RA-226	**6.15E-01**	J	9.7E-02	9.7E-02	4.87E-02	pCi/g		*(12.6)*	9/29/14 09:41 a		408.4	GER18$1
						2.44E-02	1.00E+00	*(12.6)*			g	
TH-232	**2.10E+00**		3.0E-01	3.0E-01	1.49E-01	pCi/g		*(14.1)*	9/29/14 09:41 a		408.4	GER18$1
						7.46E-02	1.00E+00	*(14.2)*			g	
U-238	**6.86E-01**		3.7E-01	3.7E-01	4.06E-01	pCi/g		*(1.7)*	9/29/14 09:41 a		408.4	GER18$1
						2.03E-01		*(3.7)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/29/2014 11:40:00 AM
Lot-Sample No.:	**J4I020424-47**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**CD-SS-BKG03**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247042	RL-GAM-001			**Work Order:**	M4VDF1AE		**Report DB ID:**	9M4VDF10				
K-40	**2.21E+01**		2.5E+00	2.5E+00	2.01E-01	pCi/g		*(109.9)*	9/29/14 09:42 a		418.2	GER19$1
						1.01E-01		*(17.5)*			g	
RA-226	**5.33E-01**	J	9.7E-02	9.7E-02	4.48E-02	pCi/g		*(11.9)*	9/29/14 09:42 a		418.2	GER19$1
						2.24E-02	1.00E+00	*(11.)*			g	
TH-232	**1.53E+00**		2.4E-01	2.4E-01	1.44E-01	pCi/g		*(10.6)*	9/29/14 09:42 a		418.2	GER19$1
						7.23E-02	1.00E+00	*(13.)*			g	
U-238	**8.40E-01**		3.8E-01	3.8E-01	3.91E-01	pCi/g		*(2.2)*	9/29/14 09:42 a		418.2	GER19$1
						1.95E-01		*(4.5)*			g	
Batch: 4247043	C0SR			**Work Order:**	M4VDF1AA		**Report DB ID:**	9M4VDF10				
U-234	**4.48E-01**	J		1.2E-01	2.91E-02	pCi/g	104%	*(15.4)*	9/20/14 01:46 a		1.01	ALP8
						7.32E-03	1.00E+00	*(7.3)*			g	
U-235	**1.17E-02**	U		1.7E-02	1.58E-02	pCi/g	104%	*0.74*	9/20/14 01:46 a		1.01	ALP8
						3.90E-03	1.00E+00	*(1.4)*			g	
U-238	**6.12E-01**	J		1.5E-01	2.67E-02	pCi/g	104%	*(22.9)*	9/20/14 01:46 a		1.01	ALP8
						6.49E-03	1.00E+00	*(8.)*			g	
							Ratio U-234/238 = 0.7					
Batch: 4247044	L8S1			**Work Order:**	M4VDF1AH		**Report DB ID:**	9M4VDF10				
Th-228	**8.00E-01**	J		2.0E-01	4.08E-02	pCi/g	93%	*(19.6)*	9/23/14 04:33 a		1.0	ALP127
						1.03E-02	1.00E+00	*(7.9)*			g	
Th-230	**1.92E-01**	J		8.3E-02	3.54E-02	pCi/g	93%	*(5.4)*	9/23/14 04:33 a		1.0	ALP127
						8.61E-03	1.00E+00	*(4.6)*			g	

TestAmerica Inc
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V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/29/2014 11:40:00 AM
Lot-Sample No.:	**J4I020424-47**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**CD-SS-BKG03**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Th-232	**6.86E-01**	J		1.8E-01	4.37E-02	pCi/g	93%	*(15.7)*	9/23/14 04:33 a		1.0	ALP127
						1.15E-02	1.00E+00	*(7.7)*			g	

No. of Results: 10 **Comments:**

TestAmerica Inc

rptSTLRchSample V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/29/2014 11:16:00 AM
Lot-Sample No.:	**J4I020424-48**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**CD-SS-BKG04**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247042	RL-GAM-001			**Work Order:**	M4VDG1AA		**Report DB ID:**	9M4VDG10				
K-40	**2.36E+01**		2.7E+00	2.7E+00	2.46E-01	pCi/g		*(95.8)*	9/29/14 01:13 p		364.6	GER15$1
						1.24E-01		*(17.3)*			g	
RA-226	**7.61E-01**	J	1.3E-01	1.3E-01	6.13E-02	pCi/g		*(12.4)*	9/29/14 01:13 p		364.6	GER15$1
						3.07E-02	1.00E+00	*(12.)*			g	
TH-232	**1.97E+00**		3.3E-01	3.3E-01	2.15E-01	pCi/g		*(9.2)*	9/29/14 01:13 p		364.6	GER15$1
						1.08E-01	1.00E+00	*(11.8)*			g	
U-238	**3.62E-01**	U	4.0E-01	4.0E-01	6.65E-01	pCi/g		*0.55*	9/29/14 01:13 p		364.6	GER15$1
						3.33E-01		*(1.8)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/29/2014 11:20:00 AM
Lot-Sample No.:	**J4I020424-49**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**CD-SS-BKG05**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247042	RL-GAM-001			**Work Order:**	M4VDH1AA		**Report DB ID:**	9M4VDH10				
K-40	**2.34E+01**		2.7E+00	2.7E+00	3.17E-01	pCi/g		*(73.8)*	9/29/14 01:12 p		394.8	GER16$1
						1.59E-01		*(17.4)*			g	
RA-226	**6.50E-01**	J	1.1E-01	1.1E-01	5.28E-02	pCi/g		*(12.3)*	9/29/14 01:12 p		394.8	GER16$1
						2.65E-02	1.00E+00	*(12.2)*			g	
TH-232	**1.80E+00**		2.6E-01	2.6E-01	1.62E-01	pCi/g		*(11.1)*	9/29/14 01:12 p		394.8	GER16$1
						8.12E-02	1.00E+00	*(14.)*			g	
U-238	**8.60E-01**		3.6E-01	3.6E-01	3.93E-01	pCi/g		*(2.2)*	9/29/14 01:12 p		394.8	GER16$1
						1.97E-01		*(4.8)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/29/2014 11:22:00 AM
Lot-Sample No.:	**J4I020424-50**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**CD-SS-BKG06**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247042	RL-GAM-001			**Work Order:** M4VDJ1AA			**Report DB ID:** 9M4VDJ10					
K-40	**2.17E+01**		2.5E+00	2.5E+00	2.23E-01	pCi/g		*(97.4)*	9/29/14 01:12 p		377.9	GER17$1
						1.12E-01		*(17.4)*			g	
RA-226	**6.08E-01**	J	9.5E-02	9.5E-02	4.80E-02	pCi/g		*(12.7)*	9/29/14 01:12 p		377.9	GER17$1
						2.41E-02	1.00E+00	*(12.8)*			g	
TH-232	**1.25E+00**		2.1E-01	2.1E-01	1.33E-01	pCi/g		*(9.4)*	9/29/14 01:12 p		377.9	GER17$1
						6.66E-02	1.00E+00	*(11.7)*			g	
U-238	**7.25E-01**		3.7E-01	3.7E-01	3.67E-01	pCi/g		*(2.)*	9/29/14 01:12 p		377.9	GER17$1
						1.84E-01		*(3.9)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/24/2014 12:28:00 PM
Lot-Sample No.:	**J4I020424-18**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**CD-SS-G10**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247040	RL-GAM-001			**Work Order:** M4VAR1AA			**Report DB ID:** 9M4VAR10					
K-40	**2.24E+01**		2.6E+00	2.6E+00	2.95E-01	pCi/g		*(76.1)*	9/22/14 05:57 p		403.1	GER17$1
						1.48E-01		*(17.4)*			g	
RA-226	**1.06E+00**		1.6E-01	1.6E-01	5.82E-02	pCi/g		*(18.3)*	9/22/14 05:57 p		403.1	GER17$1
						2.91E-02	1.00E+00	*(13.5)*			g	
TH-232	**4.03E+00**		5.1E-01	5.1E-01	1.69E-01	pCi/g		*(23.8)*	9/22/14 05:57 p		403.1	GER17$1
						8.46E-02	1.00E+00	*(15.7)*			g	
U-238	**9.97E-01**		4.3E-01	4.3E-01	3.95E-01	pCi/g		*(2.5)*	9/22/14 05:57 p		403.1	GER17$1
						1.97E-01		*(4.7)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/24/2014 1:02:00 PM
Lot-Sample No.:	**J4I020424-28**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**CD-SS-G13**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247041	RL-GAM-001			**Work Order:**	M4VCA1AA		**Report DB ID:**	9M4VCA10				
K-40	**2.20E+01**		2.6E+00	2.6E+00	3.81E-01	pCi/g		*(57.7)*	9/23/14 08:33 a		367.5	GER16$1
						1.91E-01		*(17.2)*			g	
RA-226	**9.88E-01**	J	1.5E-01	1.5E-01	7.08E-02	pCi/g		*(14.)*	9/23/14 08:33 a		367.5	GER16$1
						3.54E-02	1.00E+00	*(13.1)*			g	
TH-232	**5.56E+00**		6.8E-01	6.8E-01	2.42E-01	pCi/g		*(22.9)*	9/23/14 08:33 a		367.5	GER16$1
						1.21E-01	1.00E+00	*(16.5)*			g	
U-238	**7.05E-01**		4.7E-01	4.7E-01	5.41E-01	pCi/g		*(1.3)*	9/23/14 08:33 a		367.5	GER16$1
						2.70E-01		*(3.)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/24/2014 12:32:00 PM
Lot-Sample No.:	**J4I020424-19**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**CD-SS-G16**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247040	RL-GAM-001			**Work Order:**	M4VAV1AE		**Report DB ID:**	9M4VAV10				
K-40	**2.35E+01**		2.7E+00	2.7E+00	2.75E-01	pCi/g		*(85.5)*	9/22/14 05:57 p		400.6	GER18$1
						1.38E-01		*(17.5)*			g	
RA-226	**8.63E-01**	J	1.3E-01	1.3E-01	5.76E-02	pCi/g		*(15.)*	9/22/14 05:57 p		400.6	GER18$1
						2.88E-02	1.00E+00	*(13.5)*			g	
TH-232	**4.56E+00**		5.8E-01	5.8E-01	1.96E-01	pCi/g		*(23.2)*	9/22/14 05:57 p		400.6	GER18$1
						9.82E-02	1.00E+00	*(15.8)*			g	
U-238	**1.10E+00**		4.9E-01	4.9E-01	5.07E-01	pCi/g		*(2.2)*	9/22/14 05:57 p		400.6	GER18$1
						2.54E-01		*(4.5)*			g	
Batch: 4247043	C0SR			**Work Order:**	M4VAV1AA		**Report DB ID:**	9M4VAV10				
U-234	**7.65E-01**	J		1.9E-01	3.38E-02	pCi/g	87%	*(22.6)*	9/19/14 02:53 p		0.99	ALP9
						8.51E-03	1.00E+00	*(8.1)*			g	
U-235	**1.82E-02**	U		2.4E-02	3.62E-02	pCi/g	87%	*0.5*	9/19/14 02:53 p		0.99	ALP9
						9.34E-03	1.00E+00	*(1.5)*			g	
U-238	**7.06E-01**	J		1.8E-01	4.80E-02	pCi/g	87%	*(14.7)*	9/19/14 02:53 p		0.99	ALP9
						1.35E-02	1.00E+00	*(7.9)*			g	
							Ratio U-234/238 = 1.1					
Batch: 4247044	L8S1			**Work Order:**	M4VAV1AH		**Report DB ID:**	9M4VAV10				
Th-228	**6.16E+00**			1.0E+00	4.26E-02	pCi/g	102%	*(144.7)*	9/23/14 04:31 a		0.98	ALP117
						1.17E-02	1.00E+00	*(12.1)*			g	
Th-230	**9.53E-01**	J		2.1E-01	2.85E-02	pCi/g	102%	*(33.4)*	9/23/14 04:31 a		0.98	ALP117
						6.93E-03	1.00E+00	*(9.)*			g	

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/24/2014 12:32:00 PM
Lot-Sample No.:	**J4I020424-19**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**CD-SS-G16**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Th-232	**4.65E+00**			7.8E-01	2.85E-02	pCi/g	102%	*(163.2)*	9/23/14 04:31 a		0.98	ALP117
						6.93E-03	1.00E+00	*(11.9)*			g	

No. of Results: 10 **Comments:**

TestAmerica Inc

rptSTLRchSample V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/24/2014 12:48:00 PM
Lot-Sample No.:	**J4I020424-23**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**CD-SS-G18**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247041	RL-GAM-001			**Work Order:** M4VA21AA			**Report DB ID:** 9M4VA210					
K-40	**2.16E+01**		2.5E+00	2.5E+00	2.65E-01	pCi/g		*(81.6)*	9/22/14 10:15 p		397.0	GER18$1
						1.33E-01		*(17.4)*			g	
RA-226	**7.77E-01**	J	1.2E-01	1.2E-01	6.06E-02	pCi/g		*(12.8)*	9/22/14 10:15 p		397.0	GER18$1
						3.03E-02	1.00E+00	*(13.4)*			g	
TH-232	**4.31E+00**		5.6E-01	5.6E-01	1.92E-01	pCi/g		*(22.5)*	9/22/14 10:15 p		397.0	GER18$1
						9.59E-02	1.00E+00	*(15.5)*			g	
U-238	**1.04E+00**		4.4E-01	4.4E-01	4.96E-01	pCi/g		*(2.1)*	9/22/14 10:15 p		397.0	GER18$1
						2.48E-01		*(4.7)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/24/2014 1:00:00 PM
Lot-Sample No.:	**J4I020424-27**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**CD-SS-G20**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247041	RL-GAM-001			**Work Order:** M4VA91AA			**Report DB ID:** 9M4VA910					
K-40	**1.99E+01**		2.3E+00	2.3E+00	3.31E-01	pCi/g		*(60.2)*	9/23/14 08:34 a		392.7	GER15$1
						1.66E-01		*(17.1)*			g	
RA-226	**8.54E-01**	J	1.4E-01	1.4E-01	8.99E-02	pCi/g		*(9.5)*	9/23/14 08:34 a		392.7	GER15$1
						4.50E-02	1.00E+00	*(12.1)*			g	
TH-232	**7.86E+00**		1.0E+00	1.0E+00	2.99E-01	pCi/g		*(26.2)*	9/23/14 08:34 a		392.7	GER15$1
						1.50E-01	1.00E+00	*(15.8)*			g	
U-238	**5.11E-01**	U	4.9E-01	4.9E-01	8.08E-01	pCi/g		*0.63*	9/23/14 08:34 a		392.7	GER15$1
						4.04E-01		*(2.1)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
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U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/24/2014 12:35:00 PM
Lot-Sample No.:	**J4I020424-20**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**CD-SS-G23**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247040	RL-GAM-001			**Work Order:**	M4VAW1AA		**Report DB ID:**	9M4VAW10				
K-40	**2.30E+01**		2.8E+00	2.8E+00	3.38E-01	pCi/g		*(68.)*	9/22/14 10:11 p		376.1	GER10$1
						1.69E-01		*(16.4)*			g	
RA-226	**7.83E-01**	J	1.4E-01	1.4E-01	1.02E-01	pCi/g		*(7.7)*	9/22/14 10:11 p		376.1	GER10$1
						5.10E-02	1.00E+00	*(11.6)*			g	
TH-232	**6.60E+00**		9.7E-01	9.7E-01	3.97E-01	pCi/g		*(16.6)*	9/22/14 10:11 p		376.1	GER10$1
						1.99E-01	1.00E+00	*(13.6)*			g	
U-238	**1.07E-01**	U	1.5E+00	1.5E+00	2.55E+00	pCi/g		*0.04*	9/22/14 10:11 p		376.1	GER10$1
						1.28E+00		*0.14*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/24/2014 12:39:00 PM
Lot-Sample No.:	**J4I020424-21**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**CD-SS-G24**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247041	RL-GAM-001			**Work Order:** M4VAX1AA			**Report DB ID:** 9M4VAX10					
K-40	**2.22E+01**		2.6E+00	2.6E+00	3.76E-01	pCi/g		*(58.9)*	9/22/14 10:13 p		405.1	GER16$1
						1.89E-01		*(17.2)*			g	
RA-226	**1.35E+00**		1.9E-01	1.9E-01	7.36E-02	pCi/g		*(18.4)*	9/22/14 10:13 p		405.1	GER16$1
						3.68E-02	1.00E+00	*(14.2)*			g	
TH-232	**6.21E+00**		7.3E-01	7.3E-01	2.26E-01	pCi/g		*(27.5)*	9/22/14 10:13 p		405.1	GER16$1
						1.13E-01	1.00E+00	*(17.)*			g	
U-238	**9.43E-01**		4.1E-01	4.1E-01	5.13E-01	pCi/g		*(1.8)*	9/22/14 10:13 p		405.1	GER16$1
						2.57E-01		*(4.6)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/24/2014 12:25:00 PM
Lot-Sample No.:	**J4I020424-17**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**CD-SS-G3**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247040	RL-GAM-001			**Work Order:** M4VAJ1AA			**Report DB ID:** 9M4VAJ10					
K-40	**1.76E+01**		2.1E+00	2.1E+00	3.18E-01	pCi/g		*(55.3)*	9/22/14 05:56 p		428.9	GER16$1
						1.59E-01		*(17.)*			g	
RA-226	**6.73E-01**	J	1.2E-01	1.2E-01	5.72E-02	pCi/g		*(11.8)*	9/22/14 05:56 p		428.9	GER16$1
						2.86E-02	1.00E+00	*(11.7)*			g	
TH-232	**3.11E+00**		4.2E-01	4.2E-01	1.91E-01	pCi/g		*(16.2)*	9/22/14 05:56 p		428.9	GER16$1
						9.58E-02	1.00E+00	*(14.9)*			g	
U-238	**5.67E-01**		3.5E-01	3.5E-01	4.38E-01	pCi/g		*(1.3)*	9/22/14 05:56 p		428.9	GER16$1
						2.19E-01		*(3.2)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/24/2014 12:44:00 PM
Lot-Sample No.:	**J4I020424-22**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**CD-SS-G31**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247041	RL-GAM-001			**Work Order:** M4VA11AA			**Report DB ID:** 9M4VA110					
K-40	**2.16E+01**		2.5E+00	2.5E+00	2.96E-01	pCi/g		*(73.1)*	9/22/14 10:14 p		402.0	GER17$1
						1.48E-01		*(17.3)*			g	
RA-226	**1.03E+00**		1.6E-01	1.6E-01	6.54E-02	pCi/g		*(15.7)*	9/22/14 10:14 p		402.0	GER17$1
						3.27E-02	1.00E+00	*(12.9)*			g	
TH-232	**5.22E+00**		6.4E-01	6.4E-01	2.03E-01	pCi/g		*(25.7)*	9/22/14 10:14 p		402.0	GER17$1
						1.02E-01	1.00E+00	*(16.2)*			g	
U-238	**1.19E+00**		4.7E-01	4.7E-01	4.01E-01	pCi/g		*(3.)*	9/22/14 10:14 p		402.0	GER17$1
						2.01E-01		*(5.)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/24/2014 12:50:00 PM
Lot-Sample No.:	**J4I020424-24**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**CD-SS-G32**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247041	RL-GAM-001			**Work Order:** M4VA41AA			**Report DB ID:** 9M4VA410					
K-40	**2.23E+01**		2.7E+00	2.7E+00	3.16E-01	pCi/g		*(70.6)*	9/22/14 10:16 p		381.9	GER11$1
						1.58E-01		*(16.5)*			g	
RA-226	**1.04E+00**		1.5E-01	1.5E-01	6.91E-02	pCi/g		*(15.1)*	9/22/14 10:16 p		381.9	GER11$1
						3.46E-02	1.00E+00	*(14.)*			g	
TH-232	**5.87E+00**		8.2E-01	8.2E-01	2.62E-01	pCi/g		*(22.4)*	9/22/14 10:16 p		381.9	GER11$1
						1.31E-01	1.00E+00	*(14.2)*			g	
U-238	**2.01E+00**	U	1.4E+00	1.4E+00	2.40E+00	pCi/g		*0.83*	9/22/14 10:16 p		381.9	GER11$1
						1.20E+00		*(2.9)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/24/2014 12:54:00 PM
Lot-Sample No.:	**J4I020424-25**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**CD-SS-G40**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247041	RL-GAM-001			**Work Order:**	M4VA51AA		**Report DB ID:**	9M4VA510				
K-40	**2.32E+01**		2.8E+00	2.8E+00	3.11E-01	pCi/g		*(74.6)*	9/23/14 08:32 a		378.3	GER10$1
						1.56E-01		*(16.5)*			g	
RA-226	**7.19E-01**	J	1.3E-01	1.3E-01	8.77E-02	pCi/g		*(8.2)*	9/23/14 08:32 a		378.3	GER10$1
						4.39E-02	1.00E+00	*(11.3)*			g	
TH-232	**4.54E+00**		7.1E-01	7.1E-01	3.26E-01	pCi/g		*(13.9)*	9/23/14 08:32 a		378.3	GER10$1
						1.63E-01	1.00E+00	*(12.9)*			g	
U-238	**5.83E-01**	U	1.3E+00	1.3E+00	2.16E+00	pCi/g		*0.27*	9/23/14 08:32 a		378.3	GER10$1
						1.08E+00		*0.9*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/24/2014 12:58:00 PM
Lot-Sample No.:	**J4I020424-26**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**CD-SS-G41**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247041	RL-GAM-001			**Work Order:**	M4VA71AE		**Report DB ID:**	9M4VA710				
K-40	**2.17E+01**		2.6E+00	2.6E+00	3.48E-01	pCi/g		*(62.4)*	9/23/14 08:32 a		374.7	GER11$1
						1.74E-01		*(16.5)*			g	
RA-226	**1.13E+00**		1.6E-01	1.6E-01	6.64E-02	pCi/g		*(17.)*	9/23/14 08:32 a		374.7	GER11$1
						3.32E-02	1.00E+00	*(14.1)*			g	
TH-232	**4.94E+00**		7.0E-01	7.0E-01	2.50E-01	pCi/g		*(19.8)*	9/23/14 08:32 a		374.7	GER11$1
						1.25E-01	1.00E+00	*(14.2)*			g	
U-238	**1.60E-01**	U	1.4E+00	1.4E+00	2.21E+00	pCi/g		*0.07*	9/23/14 08:32 a		374.7	GER11$1
						1.11E+00		*0.23*			g	
Batch: 4247043	C0SR			**Work Order:**	M4VA71AA		**Report DB ID:**	9M4VA710				
U-234	**1.09E+00**			2.4E-01	3.78E-02	pCi/g	86%	*(28.8)*	9/19/14 02:53 p		1.0	ALP12
						9.94E-03	1.00E+00	*(9.)*			g	
U-235	**3.34E-02**	J		3.0E-02	1.81E-02	pCi/g	86%	*(1.8)*	9/19/14 02:53 p		1.0	ALP12
						4.47E-03	1.00E+00	*(2.2)*			g	
U-238	**1.09E+00**			2.4E-01	3.06E-02	pCi/g	86%	*(35.6)*	9/19/14 02:53 p		1.0	ALP12
						7.44E-03	1.00E+00	*(9.)*			g	
							Ratio U-234/238 = 1.0					
Batch: 4247044	L8S1			**Work Order:**	M4VA71AH		**Report DB ID:**	9M4VA710				
Th-228	**6.80E+00**			1.1E+00	4.20E-02	pCi/g	106%	*(162.1)*	9/23/14 04:32 a		0.99	ALP118
						1.15E-02	1.00E+00	*(12.3)*			g	
Th-230	**1.35E+00**			2.7E-01	5.28E-02	pCi/g	106%	*(25.7)*	9/23/14 04:32 a		0.99	ALP118
						1.57E-02	1.00E+00	*(9.9)*			g	

TestAmerica Inc
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V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/24/2014 12:58:00 PM
Lot-Sample No.:	**J4I020424-26**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**CD-SS-G41**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Th-232	**6.46E+00**			1.1E+00	4.47E-02	pCi/g	106%	*(144.6)*	9/23/14 04:32 a		0.99	ALP118
						1.27E-02	1.00E+00	*(12.3)*			g	

No. of Results: 10 **Comments:**

TestAmerica Inc

rptSTLRchSample V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/23/2014 12:05:00 PM
Lot-Sample No.:	**J4I020424-2**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SB01-25**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247040	RL-GAM-001			**Work Order:** M4T9L1AA			**Report DB ID:** 9M4T9L10					
K-40	**2.02E+01**		2.5E+00	2.5E+00	2.49E-01	pCi/g		*(81.3)*	9/22/14 10:45 a		402.8	GER10$1
						1.25E-01		*(16.3)*			g	
RA-226	**6.71E-01**	J	1.1E-01	1.1E-01	6.78E-02	pCi/g		*(9.9)*	9/22/14 10:45 a		402.8	GER10$1
						3.39E-02	1.00E+00	*(12.6)*			g	
TH-232	**1.71E+00**		3.6E-01	3.6E-01	2.60E-01	pCi/g		*(6.6)*	9/22/14 10:45 a		402.8	GER10$1
						1.30E-01	1.00E+00	*(9.5)*			g	
U-238	**5.62E-01**	U	1.0E+00	1.0E+00	1.73E+00	pCi/g		*0.32*	9/22/14 10:45 a		402.8	GER10$1
						8.65E-01		*(1.1)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/23/2014 11:09:00 AM
Lot-Sample No.:	**J4I020424-1**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SB01-5**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247040	RL-GAM-001			**Work Order:** M4T9K1AE		**Report DB ID:** 9M4T9K10						
K-40	**2.17E+01**		2.8E+00	2.8E+00	3.09E-01	pCi/g		*(70.2)*	9/22/14 10:45 a		409.7	GER7$1
						1.55E-01		*(15.6)*			g	
RA-226	**4.52E-01**	J	1.2E-01	1.2E-01	7.48E-02	pCi/g		*(6.1)*	9/22/14 10:45 a		409.7	GER7$1
						3.74E-02	1.00E+00	*(7.8)*			g	
TH-232	**1.92E+00**		4.2E-01	4.2E-01	2.58E-01	pCi/g		*(7.4)*	9/22/14 10:45 a		409.7	GER7$1
						1.29E-01	1.00E+00	*(9.1)*			g	
U-238	**1.86E-01**	U	7.7E-01	7.7E-01	1.26E+00	pCi/g		*0.15*	9/22/14 10:45 a		409.7	GER7$1
						6.28E-01		*0.49*			g	
Batch: 4247043	C0SR			**Work Order:** M4T9K1AA		**Report DB ID:** 9M4T9K10						
U-234	**3.38E-01**	J		1.1E-01	7.56E-02	pCi/g	85%	*(4.5)*	9/19/14 02:53 p		1.0	ALP3
						2.35E-02	1.00E+00	*(6.)*			g	
U-235	**7.20E-03**	U		2.0E-02	5.03E-02	pCi/g	85%	*0.14*	9/19/14 02:53 p		1.0	ALP3
						1.43E-02	1.00E+00	*0.72*			g	
U-238	**3.25E-01**	J		1.1E-01	7.49E-02	pCi/g	85%	*(4.3)*	9/19/14 02:53 p		1.0	ALP3
						2.33E-02	1.00E+00	*(5.9)*			g	
							Ratio U-234/238 = 1.0					
Batch: 4247044	L8S1			**Work Order:** M4T9K1AH		**Report DB ID:** 9M4T9K10						
Th-228	**2.21E+00**			4.1E-01	3.03E-02	pCi/g	106%	*(73.)*	9/23/14 04:29 a		1.01	ALP110
						7.37E-03	1.00E+00	*(10.7)*			g	
Th-230	**3.24E-01**	J		1.0E-01	2.51E-02	pCi/g	106%	*(12.9)*	9/23/14 04:29 a		1.01	ALP110
						5.83E-03	1.00E+00	*(6.3)*			g	

TestAmerica Inc
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V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/23/2014 11:09:00 AM
Lot-Sample No.:	**J4I020424-1**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SB01-5**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Th-232	**1.76E+00**			3.4E-01	2.51E-02	pCi/g	106%	*(70.)*	9/23/14 04:29 a		1.01	ALP110
						5.83E-03	1.00E+00	*(10.4)*			g	

No. of Results: 10 **Comments:**

TestAmerica Inc

rptSTLRchSample V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/23/2014 12:55:00 PM
Lot-Sample No.:	**J4I020424-3**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SB01-50**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247040	RL-GAM-001			**Work Order:** M4T9M1AA			**Report DB ID:** 9M4T9M10					
K-40	**2.82E+01**		3.4E+00	3.4E+00	2.86E-01	pCi/g		*(98.7)*	9/22/14 10:46 a		352.6	GER11$1
						1.43E-01		*(16.7)*			g	
RA-226	**6.75E-01**	J	1.2E-01	1.2E-01	5.51E-02	pCi/g		*(12.2)*	9/22/14 10:46 a		352.6	GER11$1
						2.76E-02	1.00E+00	*(11.5)*			g	
TH-232	**2.68E+00**		4.3E-01	4.3E-01	2.11E-01	pCi/g		*(12.7)*	9/22/14 10:46 a		352.6	GER11$1
						1.06E-01	1.00E+00	*(12.4)*			g	
U-238	**5.55E-01**	U	1.2E+00	1.2E+00	2.03E+00	pCi/g		*0.27*	9/22/14 10:46 a		352.6	GER11$1
						1.02E+00		*0.96*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/23/2014 2:24:00 PM
Lot-Sample No.:	**J4I020424-5**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SB02-20**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247040	RL-GAM-001			**Work Order:** M4T9R1AA			**Report DB ID:** 9M4T9R10					
K-40	**2.32E+01**		2.7E+00	2.7E+00	2.39E-01	pCi/g		*(97.)*	9/22/14 10:46 a		405.1	GER17$1
						1.20E-01		*(17.5)*			g	
RA-226	**4.79E-01**	J	9.1E-02	9.1E-02	4.33E-02	pCi/g		*(11.1)*	9/22/14 10:46 a		405.1	GER17$1
						2.17E-02	1.00E+00	*(10.5)*			g	
TH-232	**1.75E+00**		2.6E-01	2.6E-01	1.34E-01	pCi/g		*(13.1)*	9/22/14 10:46 a		405.1	GER17$1
						6.71E-02	1.00E+00	*(13.4)*			g	
U-238	**4.02E-01**		2.9E-01	2.9E-01	3.25E-01	pCi/g		*(1.2)*	9/22/14 10:46 a		405.1	GER17$1
						1.62E-01		*(2.8)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/23/2014 2:50:00 PM
Lot-Sample No.:	**J4I020424-6**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SB02-40**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247040	RL-GAM-001			**Work Order:** M4T9T1AA			**Report DB ID:** 9M4T9T10					
K-40	**2.39E+01**		2.7E+00	2.7E+00	2.22E-01	pCi/g		*(107.5)*	9/22/14 10:46 a		385.9	GER18$1
						1.12E-01		*(17.5)*			g	
RA-226	**5.18E-01**	J	9.3E-02	9.3E-02	4.66E-02	pCi/g		*(11.1)*	9/22/14 10:46 a		385.9	GER18$1
						2.33E-02	1.00E+00	*(11.1)*			g	
TH-232	**1.96E+00**		2.8E-01	2.8E-01	1.46E-01	pCi/g		*(13.4)*	9/22/14 10:46 a		385.9	GER18$1
						7.32E-02	1.00E+00	*(14.)*			g	
U-238	**5.61E-01**		3.5E-01	3.5E-01	4.35E-01	pCi/g		*(1.3)*	9/22/14 10:46 a		385.9	GER18$1
						2.18E-01		*(3.2)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/23/2014 1:45:00 PM
Lot-Sample No.:	**J4I020424-4**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SB02-5**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247040	RL-GAM-001			**Work Order:** M4T9N1AA			**Report DB ID:** 9M4T9N10					
K-40	**2.14E+01**		2.5E+00	2.5E+00	3.09E-01	pCi/g		*(69.2)*	9/22/14 10:46 a		422.1	GER16$1
						1.55E-01		*(17.4)*			g	
RA-226	**5.36E-01**	J	9.7E-02	9.7E-02	4.90E-02	pCi/g		*(11.)*	9/22/14 10:46 a		422.1	GER16$1
						2.45E-02	1.00E+00	*(11.1)*			g	
TH-232	**1.84E+00**		2.6E-01	2.6E-01	1.55E-01	pCi/g		*(11.8)*	9/22/14 10:46 a		422.1	GER16$1
						7.77E-02	1.00E+00	*(14.1)*			g	
U-238	**3.74E-01**		3.0E-01	3.0E-01	3.72E-01	pCi/g		*(1.)*	9/22/14 10:46 a		422.1	GER16$1
						1.86E-01		*(2.5)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/23/2014 3:57:00 PM
Lot-Sample No.:	**J4I020424-8**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SB03-20**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247040	RL-GAM-001			**Work Order:** M4T9W1AA			**Report DB ID:** 9M4T9W10					
K-40	**2.67E+00**		3.4E-01	3.4E-01	3.58E-02	pCi/g		*(74.6)*	9/22/14 02:20 p		3941.0	GER7$1
						1.80E-02		*(15.8)*			g	
RA-226	**5.46E-02**	J	1.1E-02	1.1E-02	8.06E-03	pCi/g		*(6.8)*	9/22/14 02:20 p		3941.0	GER7$1
						4.04E-03	1.00E+00	*(9.5)*			g	
TH-232	**1.58E-01**	J	3.4E-02	3.4E-02	2.57E-02	pCi/g		*(6.1)*	9/22/14 02:20 p		3941.0	GER7$1
						1.29E-02	1.00E+00	*(9.2)*			g	
U-238	**-2.51E-02**	U	8.2E-02	8.2E-02	1.32E-01	pCi/g		*-0.19*	9/22/14 02:20 p		3941.0	GER7$1
						6.61E-02		*-0.61*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/23/2014 4:25:00 PM
Lot-Sample No.:	**J4I020424-9**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SB03-40**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247040	RL-GAM-001			**Work Order:** M4T9X1AA			**Report DB ID:** 9M4T9X10					
K-40	**2.98E+01**		3.6E+00	3.6E+00	2.49E-01	pCi/g		*(119.5)*	9/22/14 02:20 p		404.6	GER10$1
						1.25E-01		*(16.7)*			g	
RA-226	**4.09E-01**	U	8.4E-02	8.4E-02	1.05E-01	pCi/g		*(3.9)*	9/22/14 02:20 p		404.6	GER10$1
						5.27E-02	1.00E+00	*(9.7)*			g	
TH-232	**1.38E+00**		3.2E-01	3.2E-01	2.41E-01	pCi/g		*(5.7)*	9/22/14 02:20 p		404.6	GER10$1
						1.21E-01	1.00E+00	*(8.6)*			g	
U-238	**5.28E-01**	U	9.4E-01	9.4E-01	1.57E+00	pCi/g		*0.34*	9/22/14 02:20 p		404.6	GER10$1
						7.85E-01		*(1.1)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/23/2014 3:40:00 PM
Lot-Sample No.:	**J4I020424-7**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SB03-5**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247040	RL-GAM-001			**Work Order:** M4T9V1AA			**Report DB ID:** 9M4T9V10					
K-40	**2.29E+01**		2.6E+00	2.6E+00	2.20E-01	pCi/g		*(103.9)*	9/22/14 10:47 a		410.3	GER19$1
						1.11E-01		*(17.5)*			g	
RA-226	**5.54E-01**	J	9.5E-02	9.5E-02	4.82E-02	pCi/g		*(11.5)*	9/22/14 10:47 a		410.3	GER19$1
						2.41E-02	1.00E+00	*(11.6)*			g	
TH-232	**1.87E+00**		2.8E-01	2.8E-01	1.58E-01	pCi/g		*(11.9)*	9/22/14 10:47 a		410.3	GER19$1
						7.89E-02	1.00E+00	*(13.6)*			g	
U-238	**7.25E-01**		3.2E-01	3.2E-01	4.22E-01	pCi/g		*(1.7)*	9/22/14 10:47 a		410.3	GER19$1
						2.11E-01		*(4.5)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/23/2014 5:30:00 PM
Lot-Sample No.:	**J4I020424-11**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SB04-25**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247040	RL-GAM-001			**Work Order:**	M4T911AE		**Report DB ID:**	9M4T9110				
K-40	**2.48E+01**		2.8E+00	2.8E+00	3.22E-01	pCi/g		*(76.8)*	9/22/14 02:21 p		393.2	GER16$1
						1.62E-01		*(17.5)*			g	
RA-226	**5.72E-01**	J	9.8E-02	9.8E-02	5.12E-02	pCi/g		*(11.2)*	9/22/14 02:21 p		393.2	GER16$1
						2.56E-02	1.00E+00	*(11.6)*			g	
TH-232	**2.04E+00**		2.9E-01	2.9E-01	1.65E-01	pCi/g		*(12.4)*	9/22/14 02:21 p		393.2	GER16$1
						8.25E-02	1.00E+00	*(14.)*			g	
U-238	**6.51E-01**		3.3E-01	3.3E-01	4.19E-01	pCi/g		*(1.6)*	9/22/14 02:21 p		393.2	GER16$1
						2.10E-01		*(3.9)*			g	
Batch: 4247043	C0SR			**Work Order:**	M4T911AA		**Report DB ID:**	9M4T9110				
U-234	**1.83E-01**	J		7.5E-02	3.00E-02	pCi/g	96%	*(6.1)*	9/19/14 02:53 p		0.99	ALP7
						7.30E-03	1.00E+00	*(4.9)*			g	
U-235	**5.51E-03**	U		1.3E-02	3.00E-02	pCi/g	96%	*0.18*	9/19/14 02:53 p		0.99	ALP7
						7.30E-03	1.00E+00	*0.83*			g	
U-238	**2.90E-01**	J		9.9E-02	4.64E-02	pCi/g	96%	*(6.2)*	9/19/14 02:53 p		0.99	ALP7
						1.31E-02	1.00E+00	*(5.8)*			g	
							Ratio U-234/238 = 0.6					
Batch: 4247044	L8S1			**Work Order:**	M4T911AH		**Report DB ID:**	9M4T9110				
Th-228	**1.66E+00**			3.3E-01	2.71E-02	pCi/g	98%	*(61.3)*	9/23/14 04:30 a		1.01	ALP111
						6.29E-03	1.00E+00	*(10.1)*			g	
Th-230	**3.10E-01**	J		1.0E-01	2.55E-02	pCi/g	98%	*(12.2)*	9/23/14 04:30 a		1.01	ALP111
						5.92E-03	1.00E+00	*(6.2)*			g	

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/23/2014 5:30:00 PM
Lot-Sample No.:	**J4I020424-11**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SB04-25**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Th-232	1.80E+00			3.5E-01	1.72E-02	pCi/g	98%	*(104.8)*	9/23/14 04:30 a		1.01	ALP111
						4.23E-03	1.00E+00	*(10.4)*			g	

No. of Results: 10 **Comments:**

TestAmerica Inc

rptSTLRchSample V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/23/2014 6:00:00 PM
Lot-Sample No.:	**J4I020424-12**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SB04-45**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247040	RL-GAM-001			**Work Order:** M4T921AA			**Report DB ID:** 9M4T9210					
K-40	**2.38E+01**		2.7E+00	2.7E+00	2.49E-01	pCi/g		*(95.5)*	9/22/14 02:21 p		389.8	GER17$1
						1.25E-01		*(17.5)*			g	
RA-226	**5.11E-01**	J	9.4E-02	9.4E-02	4.52E-02	pCi/g		*(11.3)*	9/22/14 02:21 p		389.8	GER17$1
						2.27E-02	1.00E+00	*(10.9)*			g	
TH-232	**1.69E+00**		2.5E-01	2.5E-01	1.29E-01	pCi/g		*(13.1)*	9/22/14 02:21 p		389.8	GER17$1
						6.44E-02	1.00E+00	*(13.5)*			g	
U-238	**3.97E-01**		2.9E-01	2.9E-01	3.24E-01	pCi/g		*(1.2)*	9/22/14 02:21 p		389.8	GER17$1
						1.62E-01		*(2.7)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/23/2014 5:04:00 PM
Lot-Sample No.:	**J4I020424-10**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SB04-5**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247040	RL-GAM-001			**Work Order:** M4T901AA			**Report DB ID:** 9M4T9010					
K-40	**2.22E+01**		2.7E+00	2.7E+00	2.25E-01	pCi/g		*(98.7)*	9/22/14 02:21 p		402.1	GER11$1
						1.13E-01		*(16.6)*			g	
RA-226	**4.52E-01**	J	8.7E-02	8.7E-02	5.19E-02	pCi/g		*(8.7)*	9/22/14 02:21 p		402.1	GER11$1
						2.60E-02	1.00E+00	*(10.4)*			g	
TH-232	**2.57E+00**		3.9E-01	3.9E-01	1.76E-01	pCi/g		*(14.6)*	9/22/14 02:21 p		402.1	GER11$1
						8.82E-02	1.00E+00	*(13.2)*			g	
U-238	**-1.17E-01**	U	9.7E-01	9.7E-01	1.68E+00	pCi/g		*-0.07*	9/22/14 02:21 p		402.1	GER11$1
						8.40E-01		*-0.24*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
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U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/29/2014 10:25:00 AM
Lot-Sample No.:	**J4I020424-39**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SS-BKG01**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247041	RL-GAM-001			**Work Order:** M4VC41AA			**Report DB ID:** 9M4VC410					
K-40	**2.29E+01**		2.6E+00	2.6E+00	1.91E-01	pCi/g		*(119.8)*	9/24/14 06:58 a		353.4	GER19$1
						9.63E-02		*(17.4)*			g	
RA-226	**4.86E-01**	J	1.0E-01	1.0E-01	4.70E-02	pCi/g		*(10.3)*	9/24/14 06:58 a		353.4	GER19$1
						2.35E-02	1.00E+00	*(9.6)*			g	
TH-232	**1.42E+00**		2.4E-01	2.4E-01	1.47E-01	pCi/g		*(9.6)*	9/24/14 06:58 a		353.4	GER19$1
						7.38E-02	1.00E+00	*(11.9)*			g	
U-238	**7.95E-01**		3.5E-01	3.5E-01	4.22E-01	pCi/g		*(1.9)*	9/24/14 06:58 a		353.4	GER19$1
						2.11E-01		*(4.5)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/29/2014 10:28:00 AM
Lot-Sample No.:	**J4I020424-40**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SS-BKG02**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247041	RL-GAM-001			**Work Order:** M4VC51AA			**Report DB ID:** 9M4VC510					
K-40	**2.29E+01**		2.8E+00	2.8E+00	2.70E-01	pCi/g		*(84.7)*	9/25/14 06:58 a		351.7	GER11$1
						1.36E-01		*(16.5)*			g	
RA-226	**6.05E-01**	J	9.7E-02	9.7E-02	5.54E-02	pCi/g		*(10.9)*	9/25/14 06:58 a		351.7	GER11$1
						2.77E-02	1.00E+00	*(12.4)*			g	
TH-232	**1.59E+00**		3.1E-01	3.1E-01	1.89E-01	pCi/g		*(8.5)*	9/25/14 06:58 a		351.7	GER11$1
						9.44E-02	1.00E+00	*(10.3)*			g	
U-238	**1.43E+00**	U	1.1E+00	1.1E+00	1.86E+00	pCi/g		*0.77*	9/25/14 06:58 a		351.7	GER11$1
						9.30E-01		*(2.7)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/29/2014 10:32:00 AM
Lot-Sample No.:	**J4I020424-41**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SS-BKG03**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247042	RL-GAM-001			**Work Order:** M4VC61AA			**Report DB ID:** 9M4VC610					
K-40	**2.49E+01**		3.2E+00	3.2E+00	3.39E-01	pCi/g		*(73.6)*	9/29/14 09:40 a		347.4	GER7$1
						1.70E-01		*(15.5)*			g	
RA-226	**8.66E-01**	J	1.6E-01	1.6E-01	8.23E-02	pCi/g		*(10.5)*	9/29/14 09:40 a		347.4	GER7$1
						4.12E-02	1.00E+00	*(10.6)*			g	
TH-232	**2.21E+00**		4.3E-01	4.3E-01	2.87E-01	pCi/g		*(7.7)*	9/29/14 09:40 a		347.4	GER7$1
						1.44E-01	1.00E+00	*(10.3)*			g	
U-238	**9.44E-01**	J	1.5E-01	1.5E-01	8.24E-02	pCi/g		*(11.5)*	9/29/14 09:40 a		347.4	GER7$1
						4.12E-02	1.00E+00	*(12.5)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/29/2014 10:35:00 AM
Lot-Sample No.:	**J4I020424-42**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SS-BKG04**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247042	RL-GAM-001			**Work Order:**	M4VC81AA		**Report DB ID:**	9M4VC810				
K-40	**2.35E+01**		2.8E+00	2.8E+00	2.69E-01	pCi/g		*(87.3)*	9/29/14 09:40 a		383.1	GER11$1
						1.35E-01		*(16.6)*			g	
RA-226	**8.07E-01**	J	1.2E-01	1.2E-01	5.28E-02	pCi/g		*(15.3)*	9/29/14 09:40 a		383.1	GER11$1
						2.64E-02	1.00E+00	*(13.2)*			g	
TH-232	**2.22E+00**		3.6E-01	3.6E-01	1.99E-01	pCi/g		*(11.2)*	9/29/14 09:40 a		383.1	GER11$1
						9.95E-02	1.00E+00	*(12.2)*			g	
U-238	**6.23E-01**	U	1.1E+00	1.1E+00	1.87E+00	pCi/g		*0.33*	9/29/14 09:40 a		383.1	GER11$1
						9.36E-01		*(1.1)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/29/2014 10:38:00 AM
Lot-Sample No.:	**J4I020424-43**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SS-BKG05**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247042	RL-GAM-001			**Work Order:**	M4VC91AA		**Report DB ID:**	9M4VC910				
K-40	**2.17E+01**		2.5E+00	2.5E+00	2.50E-01	pCi/g		*(87.)*	9/29/14 09:42 a		379.5	GER15$1
						1.26E-01		*(17.1)*			g	
RA-226	**8.17E-01**	J	1.3E-01	1.3E-01	6.46E-02	pCi/g		*(12.7)*	9/29/14 09:42 a		379.5	GER15$1
						3.23E-02	1.00E+00	*(12.4)*			g	
TH-232	**2.83E+00**		4.0E-01	4.0E-01	2.20E-01	pCi/g		*(12.9)*	9/29/14 09:42 a		379.5	GER15$1
						1.10E-01	1.00E+00	*(14.)*			g	
U-238	**6.08E-01**	U	5.7E-01	5.7E-01	6.73E-01	pCi/g		*0.9*	9/29/14 09:42 a		379.5	GER15$1
						3.37E-01		*(2.1)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/29/2014 10:40:00 AM
Lot-Sample No.:	**J4I020424-44**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SS-BKG06**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247042	RL-GAM-001			**Work Order:** M4VDA1AA			**Report DB ID:** 9M4VDA10					
K-40	**2.17E+01**		2.5E+00	2.5E+00	3.27E-01	pCi/g		*(66.5)*	9/29/14 09:41 a		415.1	GER16$1
						1.64E-01		*(17.4)*			g	
RA-226	**6.90E-01**	J	1.1E-01	1.1E-01	5.54E-02	pCi/g		*(12.5)*	9/29/14 09:41 a		415.1	GER16$1
						2.77E-02	1.00E+00	*(13.)*			g	
TH-232	**2.51E+00**		3.3E-01	3.3E-01	1.67E-01	pCi/g		*(15.)*	9/29/14 09:41 a		415.1	GER16$1
						8.37E-02	1.00E+00	*(15.1)*			g	
U-238	**1.10E+00**		4.9E-01	4.9E-01	4.04E-01	pCi/g		*(2.7)*	9/29/14 09:41 a		415.1	GER16$1
						2.02E-01		*(4.5)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/25/2014 8:30:00 AM
Lot-Sample No.:	**J4I020424-33**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SS-G12**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247041	RL-GAM-001			**Work Order:**	M4VCN1AA		**Report DB ID:**	9M4VCN10				
K-40	**2.22E+01**		2.7E+00	2.7E+00	3.12E-01	pCi/g		*(71.3)*	9/24/14 06:57 a		370.5	GER10$1
						1.56E-01		*(16.5)*			g	
RA-226	**7.01E-01**	J	1.1E-01	1.1E-01	7.49E-02	pCi/g		*(9.4)*	9/24/14 06:57 a		370.5	GER10$1
						3.75E-02	1.00E+00	*(12.6)*			g	
TH-232	**2.49E+00**		4.2E-01	4.2E-01	2.75E-01	pCi/g		*(9.1)*	9/24/14 06:57 a		370.5	GER10$1
						1.38E-01	1.00E+00	*(11.9)*			g	
U-238	**9.35E-01**	U	1.1E+00	1.1E+00	1.83E+00	pCi/g		*0.51*	9/24/14 06:57 a		370.5	GER10$1
						9.18E-01		*(1.7)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/25/2014 8:32:00 AM
Lot-Sample No.:	**J4I020424-34**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SS-G13**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247041	RL-GAM-001			**Work Order:**	M4VCR1AE		**Report DB ID:**	9M4VCR10				
K-40	**1.95E+01**		2.4E+00	2.4E+00	2.86E-01	pCi/g		*(68.2)*	9/24/14 06:57 a		368.4	GER11$1
						1.43E-01		*(16.3)*			g	
RA-226	**9.77E-01**	J	1.4E-01	1.4E-01	6.13E-02	pCi/g		*(15.9)*	9/24/14 06:57 a		368.4	GER11$1
						3.07E-02	1.00E+00	*(14.3)*			g	
TH-232	**4.71E+00**		6.7E-01	6.7E-01	2.35E-01	pCi/g		*(20.)*	9/24/14 06:57 a		368.4	GER11$1
						1.18E-01	1.00E+00	*(14.1)*			g	
U-238	**5.72E-01**	U	1.3E+00	1.3E+00	2.25E+00	pCi/g		*0.25*	9/24/14 06:57 a		368.4	GER11$1
						1.13E+00		*0.87*			g	
Batch: 4247043	C0SR			**Work Order:**	M4VCR1AA		**Report DB ID:**	9M4VCR10				
U-234	**1.59E+00**			3.2E-01	3.70E-02	pCi/g	95%	*(42.9)*	9/20/14 01:45 a		1.05	ALP7
						9.89E-03	1.00E+00	*(10.)*			g	
U-235	**4.89E-02**	J		3.6E-02	2.85E-02	pCi/g	95%	*(1.7)*	9/20/14 01:45 a		1.05	ALP7
						6.93E-03	1.00E+00	*(2.7)*			g	
U-238	**1.45E+00**			3.0E-01	4.41E-02	pCi/g	95%	*(33.)*	9/20/14 01:45 a		1.05	ALP7
						1.24E-02	1.00E+00	*(9.8)*			g	
							Ratio U-234/238 = 1.1					
Batch: 4247044	L8S1			**Work Order:**	M4VCR1AH		**Report DB ID:**	9M4VCR10				
Th-228	**7.67E+00**			1.3E+00	4.25E-02	pCi/g	101%	*(180.6)*	9/23/14 04:33 a		1.05	ALP119
						1.09E-02	1.00E+00	*(12.2)*			g	
Th-230	**2.02E+00**			3.9E-01	3.42E-02	pCi/g	101%	*(59.)*	9/23/14 04:33 a		1.05	ALP119
						8.33E-03	1.00E+00	*(10.3)*			g	

TestAmerica Inc
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V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/25/2014 8:32:00 AM
Lot-Sample No.:	**J4I020424-34**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SS-G13**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Th-232	**7.54E+00**			1.2E+00	2.03E-02	pCi/g	101%	*(371.6)*	9/23/14 04:33 a		1.05	ALP119
						5.01E-03	1.00E+00	*(12.3)*			g	

No. of Results: 10 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/25/2014 8:35:00 AM
Lot-Sample No.:	**J4I020424-35**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SS-G16**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247041	RL-GAM-001			**Work Order:**	M4VCV1AA		**Report DB ID:**	9M4VCV10				
K-40	**2.11E+01**		2.5E+00	2.5E+00	2.93E-01	pCi/g		*(72.)*	9/24/14 06:58 a		376.0	GER15$1
						1.47E-01		*(17.1)*			g	
RA-226	**8.32E-01**	J	1.3E-01	1.3E-01	6.86E-02	pCi/g		*(12.1)*	9/24/14 06:58 a		376.0	GER15$1
						3.43E-02	1.00E+00	*(12.9)*			g	
TH-232	**3.03E+00**		4.6E-01	4.6E-01	2.24E-01	pCi/g		*(13.5)*	9/24/14 06:58 a		376.0	GER15$1
						1.12E-01	1.00E+00	*(13.2)*			g	
U-238	**7.55E-01**		4.1E-01	4.1E-01	6.57E-01	pCi/g		*(1.1)*	9/24/14 06:58 a		376.0	GER15$1
						3.29E-01		*(3.6)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/25/2014 8:37:00 AM
Lot-Sample No.:	**J4I020424-36**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SS-G17**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247041	RL-GAM-001			**Work Order:** M4VCW1AA			**Report DB ID:** 9M4VCW10					
K-40	**2.13E+01**		2.5E+00	2.5E+00	3.48E-01	pCi/g		*(61.3)*	9/24/14 06:57 a		376.5	GER16$1
						1.74E-01		*(17.2)*			g	
RA-226	**8.27E-01**	J	1.3E-01	1.3E-01	5.72E-02	pCi/g		*(14.4)*	9/24/14 06:57 a		376.5	GER16$1
						2.87E-02	1.00E+00	*(13.1)*			g	
TH-232	**2.43E+00**		3.5E-01	3.5E-01	1.73E-01	pCi/g		*(14.1)*	9/24/14 06:57 a		376.5	GER16$1
						8.64E-02	1.00E+00	*(14.)*			g	
U-238	**8.02E-01**		4.3E-01	4.3E-01	4.20E-01	pCi/g		*(1.9)*	9/24/14 06:57 a		376.5	GER16$1
						2.10E-01		*(3.8)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/25/2014 8:40:00 AM
Lot-Sample No.:	**J4I020424-37**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SS-G18**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247041	RL-GAM-001			**Work Order:** M4VC21AA			**Report DB ID:** 9M4VC210					
K-40	**2.31E+01**		2.7E+00	2.7E+00	2.68E-01	pCi/g		*(86.2)*	9/24/14 06:58 a		337.5	GER17$1
						1.35E-01		*(17.3)*			g	
RA-226	**5.20E-01**	J	9.4E-02	9.4E-02	5.00E-02	pCi/g		*(10.4)*	9/24/14 06:58 a		337.5	GER17$1
						2.51E-02	1.00E+00	*(11.1)*			g	
TH-232	**1.72E+00**		2.6E-01	2.6E-01	1.48E-01	pCi/g		*(11.6)*	9/24/14 06:58 a		337.5	GER17$1
						7.42E-02	1.00E+00	*(13.3)*			g	
U-238	**4.89E-01**		3.6E-01	3.6E-01	4.02E-01	pCi/g		*(1.2)*	9/24/14 06:58 a		337.5	GER17$1
						2.01E-01		*(2.7)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/25/2014 8:42:00 AM
Lot-Sample No.:	**J4I020424-38**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SS-G20**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247041	RL-GAM-001			**Work Order:**	M4VC31AA		**Report DB ID:**	9M4VC310				
K-40	**2.11E+01**		2.4E+00	2.4E+00	2.33E-01	pCi/g		*(90.7)*	9/24/14 06:58 a		349.5	GER18$1
						1.17E-01		*(17.3)*			g	
RA-226	**6.17E-01**	J	9.9E-02	9.9E-02	5.02E-02	pCi/g		*(12.3)*	9/24/14 06:58 a		349.5	GER18$1
						2.51E-02	1.00E+00	*(12.4)*			g	
TH-232	**1.78E+00**		2.8E-01	2.8E-01	1.64E-01	pCi/g		*(10.9)*	9/24/14 06:58 a		349.5	GER18$1
						8.20E-02	1.00E+00	*(12.8)*			g	
U-238	**7.09E-01**		4.0E-01	4.0E-01	4.11E-01	pCi/g		*(1.7)*	9/24/14 06:58 a		349.5	GER18$1
						2.06E-01		*(3.5)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/25/2014 8:20:00 AM
Lot-Sample No.:	**J4I020424-29**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SS-G5**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247041	RL-GAM-001			**Work Order:**	M4VCD1AA		**Report DB ID:**	9M4VCD10				
K-40	**2.23E+01**		2.6E+00	2.6E+00	2.66E-01	pCi/g		*(84.)*	9/23/14 08:33 a		394.6	GER17$1
						1.33E-01		*(17.4)*			g	
RA-226	**6.63E-01**	J	1.1E-01	1.1E-01	4.58E-02	pCi/g		*(14.5)*	9/23/14 08:33 a		394.6	GER17$1
						2.30E-02	1.00E+00	*(12.4)*			g	
TH-232	**2.03E+00**		2.9E-01	2.9E-01	1.45E-01	pCi/g		*(14.)*	9/23/14 08:33 a		394.6	GER17$1
						7.24E-02	1.00E+00	*(14.)*			g	
U-238	**6.39E-01**		3.7E-01	3.7E-01	3.95E-01	pCi/g		*(1.6)*	9/23/14 08:33 a		394.6	GER17$1
						1.98E-01		*(3.5)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/25/2014 8:22:00 AM
Lot-Sample No.:	**J4I020424-30**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SS-G6**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247041	RL-GAM-001			**Work Order:** M4VCJ1AA			**Report DB ID:** 9M4VCJ10					
K-40	**2.07E+01**		2.4E+00	2.4E+00	2.88E-01	pCi/g		*(71.9)*	9/23/14 08:34 a		411.4	GER18$1
						1.44E-01		*(17.3)*			g	
RA-226	**1.32E+00**		1.8E-01	1.8E-01	7.26E-02	pCi/g		*(18.1)*	9/23/14 08:34 a		411.4	GER18$1
						3.64E-02	1.00E+00	*(14.8)*			g	
TH-232	**7.32E+00**		8.8E-01	8.8E-01	2.33E-01	pCi/g		*(31.4)*	9/23/14 08:34 a		411.4	GER18$1
						1.17E-01	1.00E+00	*(16.7)*			g	
U-238	**9.74E-01**		4.7E-01	4.7E-01	5.18E-01	pCi/g		*(1.9)*	9/23/14 08:34 a		411.4	GER18$1
						2.59E-01		*(4.1)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/25/2014 8:25:00 AM
Lot-Sample No.:	**J4I020424-31**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SS-G7**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247041	RL-GAM-001			**Work Order:** M4VCK1AA			**Report DB ID:** 9M4VCK10					
K-40	**1.90E+01**		2.2E+00	2.2E+00	3.03E-01	pCi/g		*(62.7)*	9/23/14 08:34 a		389.2	GER19$1
						1.52E-01		*(17.2)*			g	
RA-226	**1.16E+00**		1.8E-01	1.8E-01	6.61E-02	pCi/g		*(17.6)*	9/23/14 08:34 a		389.2	GER19$1
						3.31E-02	1.00E+00	*(13.1)*			g	
TH-232	**4.98E+00**		6.2E-01	6.2E-01	2.17E-01	pCi/g		*(23.)*	9/23/14 08:34 a		389.2	GER19$1
						1.08E-01	1.00E+00	*(16.)*			g	
U-238	**8.73E-01**		4.4E-01	4.4E-01	5.55E-01	pCi/g		*(1.6)*	9/23/14 08:34 a		389.2	GER19$1
						2.78E-01		*(4.)*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
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FORM I

SAMPLE RESULTS

Date: 30-Sep-14

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/25/2014 8:27:00 AM
Lot-Sample No.:	**J4I020424-32**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SS-G9**	**COC No. :**		**Matrix:**	SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247041	RL-GAM-001			**Work Order:**	M4VCM1AA		**Report DB ID:**	9M4VCM10				
K-40	**1.97E+01**		2.6E+00	2.6E+00	4.02E-01	pCi/g		*(49.1)*	9/24/14 06:56 a		386.5	GER7$1
						2.02E-01		*(15.3)*			g	
RA-226	**8.83E-01**	J	1.6E-01	1.6E-01	8.00E-02	pCi/g		*(11.)*	9/24/14 06:56 a		386.5	GER7$1
						4.01E-02	1.00E+00	*(11.1)*			g	
TH-232	**2.41E+00**		4.2E-01	4.2E-01	2.72E-01	pCi/g		*(8.9)*	9/24/14 06:56 a		386.5	GER7$1
						1.36E-01	1.00E+00	*(11.4)*			g	
U-238	**4.64E-02**	U	8.3E-01	8.3E-01	1.36E+00	pCi/g		*0.03*	9/24/14 06:56 a		386.5	GER7$1
						6.81E-01		*0.11*			g	

No. of Results: 4 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

FORM II

Date: 30-Sep-14

DUPLICATE RESULTS

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/24/2014 12:39:00 PM
Lot-Sample No.:	**J4I020424-21**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**CD-SS-G24 DUP**	**COC No. :**		**Matrix:**	SOIL

Parameter	Result, Orig Rst	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, CRDL	Yield	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247041	RL-GAM-001			**Work Order:**	M4VAX1AC	**Report DB ID:**	M4VAX1CR		**Orig Sa DB ID:** 9M4VAX10			
K-40	2.21E+01		2.9E+00	2.9E+00	4.36E-01	pCi/g		(50.6)	9/23/14 08:32 a		405.1	GER7$1
	2.22E+01		**RER2 0.1**					(15.5)			g	
RA-226	1.45E+00		2.3E-01	2.3E-01	1.07E-01	pCi/g		(13.6)	9/23/14 08:32 a		405.1	GER7$1
	1.35E+00		**RER2 0.6**			1.00E+00		(12.5)			g	
TH-232	6.99E+00		9.8E-01	9.8E-01	3.87E-01	pCi/g		(18.1)	9/23/14 08:32 a		405.1	GER7$1
	6.21E+00		**RER2 1.3**			1.00E+00		(14.2)			g	
U-238	1.43E+00	U	1.1E+00	1.1E+00	1.86E+00	pCi/g		0.77	9/23/14 08:32 a		405.1	GER7$1
	9.43E-01		**RER2 0.8**					(2.6)			g	

No. of Results: 4 **Comments:**

TestAmerica Inc

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RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.

U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

FORM II

Date: 30-Sep-14

DUPLICATE RESULTS

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/23/2014 11:09:00 AM
Lot-Sample No.:	**J4I020424-1**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SB01-5 DUP**	**COC No. :**		**Matrix:**	SOIL

Parameter	Result, Orig Rst	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, CRDL	Yield	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247040	RL-GAM-001			**Work Order:** M4T9K1AJ		**Report DB ID:** M4T9K1JR			**Orig Sa DB ID:** 9M4T9K10			
K-40	2.09E+01		2.4E+00	2.4E+00	2.18E-01	pCi/g		(95.9)	9/22/14 02:19 p		409.7	GER19$1
	2.17E+01		**RER2 0.4**					(17.4)			g	
RA-226	4.13E-01	J	9.2E-02	9.2E-02	4.60E-02	pCi/g		(9.)	9/22/14 02:19 p		409.7	GER19$1
	4.52E-01	J	**RER2 0.5**			1.00E+00		(9.)			g	
TH-232	1.71E+00		2.5E-01	2.5E-01	1.41E-01	pCi/g		(12.2)	9/22/14 02:19 p		409.7	GER19$1
	1.92E+00		**RER2 0.9**			1.00E+00		(13.6)			g	
U-238	5.24E-01		3.6E-01	3.6E-01	4.07E-01	pCi/g		(1.3)	9/22/14 02:19 p		409.7	GER19$1
	1.86E-01	U	**RER2 0.8**					(2.9)			g	
Batch: 4247043	C0SR			**Work Order:** M4T9K1AK		**Report DB ID:** M4T9K1KR			**Orig Sa DB ID:** 9M4T9K10			
U-234	3.53E-01	J		1.1E-01	7.45E-02	pCi/g	95%	(4.7)	9/19/14 02:53 p		1.04	ALP4
	3.38E-01	J	**RER2 0.2**			1.00E+00		(6.3)			g	
U-235	1.73E-03	U		1.3E-02	4.13E-02	pCi/g	95%	0.04	9/19/14 02:53 p		1.04	ALP4
	7.20E-03	U	**RER2 0.5**			1.00E+00		0.27			g	
U-238	3.19E-01	J		1.0E-01	6.22E-02	pCi/g	95%	(5.1)	9/19/14 02:53 p		1.04	ALP4
	3.25E-01	J	**RER2 0.1**			1.00E+00		(6.1)			g	

Ratio U-234/238 = 1.1 ***Alpha Spec Result Sum = 6.7E-01***

No. of Results: 7 **Comments:**

TestAmerica Inc

rptSTLRchDupV5.3.4 A2002

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.

J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.

U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

FORM II

Date: 30-Sep-14

DUPLICATE RESULTS

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/23/2014 5:30:00 PM
Lot-Sample No.:	**J4I020424-11**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SB04-25 DUP**	**COC No. :**		**Matrix:**	SOIL

Parameter	Result, Orig Rst	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, CRDL	Yield	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247044 L8S1				**Work Order:** M4T911AJ		**Report DB ID:** M4T911JR			**Orig Sa DB ID:** 9M4T9110			
Th-228	2.43E+00			4.5E-01	4.26E-02	pCi/g	95%	(57.1)	9/23/14 04:30 a		1.0	ALP115
	1.66E+00		**RER2 2.8**			1.00E+00		(10.8)			g	
Th-230	4.59E-01	J		1.3E-01	1.75E-02	pCi/g	95%	(26.2)	9/23/14 04:30 a		1.0	ALP115
	3.10E-01	J	**RER2 1.8**			1.00E+00		(7.1)			g	
Th-232	2.32E+00			4.3E-01	2.61E-02	pCi/g	95%	(88.9)	9/23/14 04:30 a		1.0	ALP115
	1.80E+00		**RER2 1.9**			1.00E+00		(10.8)			g	

Alpha Spec Result Sum = 5.2E+00

No. of Results: 3 **Comments:**

TestAmerica Inc
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RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.
MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.

FORM II

Date: 30-Sep-14

DUPLICATE RESULTS

Lab Name:	**TestAmerica Inc**	**SDG:**	48684	**Collection Date:**	7/29/2014 10:32:00 AM
Lot-Sample No.:	**J4I020424-41**	**Report No. :**	62553	**Received Date:**	8/6/2014 9:45:00 AM
Client Sample ID:	**WW-SS-BKG03 DUP**	**COC No. :**		**Matrix:**	SOIL

Parameter	Result, Orig Rst	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, CRDL	Yield	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247042	RL-GAM-001			**Work Order:**	M4VC61AC	**Report DB ID:**	M4VC61CR		**Orig Sa DB ID:** 9M4VC610			
K-40	2.36E+01		2.8E+00	2.8E+00	2.74E-01	pCi/g		(86.4)	9/29/14 01:11 p		347.4	GER11$1
	2.49E+01		**RER2 0.6**					(16.6)			g	
RA-226	7.81E-01	J	1.2E-01	1.2E-01	5.39E-02	pCi/g		(14.5)	9/29/14 01:11 p		347.4	GER11$1
	8.66E-01	J	**RER2 0.8**			1.00E+00		(12.5)			g	
TH-232	1.76E+00		3.2E-01	3.2E-01	1.99E-01	pCi/g		(8.8)	9/29/14 01:11 p		347.4	GER11$1
	2.21E+00		**RER2 1.7**			1.00E+00		(11.1)			g	
U-238	8.76E-01	J	1.4E-01	1.4E-01	5.73E-02	pCi/g		(15.3)	9/29/14 01:11 p		347.4	GER11$1
	9.44E-01	J	**RER2 0.7**			1.00E+00		(13.)			g	

No. of Results: 4 **Comments:**

TestAmerica Inc

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RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.

J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.

FORM II

BLANK RESULTS

Date: 30-Sep-14

Lab Name: TestAmerica Inc **SDG:** 48684

Matrix: SOIL **Report No. :** 62553

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Lc	Rpt Unit, CRDL	Yield	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4247040	RL-GAM-001			**Work Order:**	M4WA21AA		**Report DB ID:**	M4WA21AB				
K-40	-5.69E-01	U	3.2E-01	3.2E-01	6.25E-01	pCi/g		-0.91	9/22/14 10:12 p		348.0	GER7$1
					3.13E-01			-(3.5)			g	
RA-226	7.72E-02	U	6.0E-02	6.0E-02	7.73E-02	pCi/g		1.	9/22/14 10:12 p		348.0	GER7$1
					3.87E-02	1.00E+00		(2.6)			g	
TH-232	-3.52E-02	U	1.1E-01	1.1E-01	1.63E-01	pCi/g		-0.22	9/22/14 10:12 p		348.0	GER7$1
					8.20E-02	1.00E+00		-0.66			g	
U-238	1.77E-02	U	4.5E-01	4.5E-01	7.16E-01	pCi/g		0.02	9/22/14 10:12 p		348.0	GER7$1
					3.58E-01			0.08			g	
Batch: 4247041	RL-GAM-001			**Work Order:**	M4WA31AA		**Report DB ID:**	M4WA31AB				
K-40	-4.88E-01	U	2.8E-01	2.8E-01	5.65E-01	pCi/g		-0.86	9/25/14 07:00 a		348.0	GER15$1
					2.83E-01			-(3.4)			g	
RA-226	8.56E-02	U	5.0E-02	5.0E-02	6.39E-02	pCi/g		(1.3)	9/25/14 07:00 a		348.0	GER15$1
					3.20E-02	1.00E+00		(3.4)			g	
TH-232	-1.03E-02	U	7.0E-02	7.0E-02	1.22E-01	pCi/g		-0.08	9/25/14 07:00 a		348.0	GER15$1
					6.12E-02	1.00E+00		-0.29			g	
U-238	1.68E-02	U	1.5E-01	1.5E-01	2.55E-01	pCi/g		0.07	9/25/14 07:00 a		348.0	GER15$1
					1.28E-01			0.22			g	
Batch: 4247042	RL-GAM-001			**Work Order:**	M4WA71AA		**Report DB ID:**	M4WA71AB				
K-40	-2.03E-01	U	2.2E-01	2.2E-01	4.58E-01	pCi/g		-0.44	9/29/14 01:12 p		348.0	GER18$1
					2.30E-01			-(1.8)			g	
RA-226	5.48E-02	U	3.3E-02	3.3E-02	4.87E-02	pCi/g		(1.1)	9/29/14 01:12 p		348.0	GER18$1
					2.44E-02	1.00E+00		(3.3)			g	

TestAmerica Inc
rptSTLRchBlank
V5.3.4 A2002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

FORM II

BLANK RESULTS

Date: 30-Sep-14

Lab Name: TestAmerica Inc **SDG:** 48684

Matrix: SOIL **Report No. :** 62553

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Lc	Rpt Unit, CRDL	Yield	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
TH-232	4.45E-02	U	5.2E-02	5.2E-02	9.06E-02	pCi/g		0.49	9/29/14 01:12 p		348.0	GER18$1
					4.54E-02	1.00E+00		(1.7)			g	
U-238	3.01E-01	U	1.8E-01	1.8E-01	1.85E-01	pCi/g		(1.6)	9/29/14 01:12 p		348.0	GER18$1
					9.27E-02			(3.3)			g	
Batch: 4247043	C0SR			**Work Order:**	M4WCA1AA	**Report DB ID:**	M4WCA1AB					
U-234	1.05E-02	U		1.7E-02	2.97E-02	pCi/g	94%	0.35	9/20/14 01:46 a		1.04	ALP9
					7.46E-03	1.00E+00		(1.2)			g	
U-235	-1.43E-03	U		1.2E-02	2.97E-02	pCi/g	94%	-0.05	9/20/14 01:46 a		1.04	ALP9
					7.46E-03	1.00E+00		-0.24			g	
U-238	3.09E-02	U		3.0E-02	4.09E-02	pCi/g	94%	0.76	9/20/14 01:46 a		1.04	ALP9
					1.14E-02	1.00E+00		(2.1)			g	
							Ratio U-234/238 = 0.3					
Batch: 4247044	L8S1			**Work Order:**	M4WCH1AA	**Report DB ID:**	M4WCH1AB					
Th-228	7.84E-01	J		1.9E-01	3.63E-02	pCi/g	105%	(21.6)	9/23/14 04:35 a		1.05	ALP128
					9.13E-03	1.00E+00		(8.4)			g	
Th-230	1.84E-01	J		7.6E-02	2.76E-02	pCi/g	105%	(6.7)	9/23/14 04:35 a		1.05	ALP128
					6.40E-03	1.00E+00		(4.9)			g	
Th-232	7.52E-01	J		1.8E-01	2.76E-02	pCi/g	105%	(27.3)	9/23/14 04:35 a		1.05	ALP128
					6.40E-03	1.00E+00		(8.5)			g	

No. of Results: 18 **Comments:**

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U or < qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

FORM II

LCS RESULTS

Date: 30-Sep-14

Lab Name: TestAmerica Inc **SDG:** 48684

Matrix: SOIL **Report No. :** 62553

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL	Report Unit	Yield	Expected	Expected Uncert	Recovery, Bias	Analysis, Prep Date	Aliquot Size	Primary Detector
Batch: 4247040	RL-GAM-001			**Work Order:**	M4WA21AC		**Report DB ID:**	M4WA21CS					
CS-137	1.03E+00		1.4E-01	1.4E-01	2.51E-02	pCi/g		1.00E+00	1.0E-02	103%	9/22/14 10:12 p	350.1	GER19$1
							Rec Limits:	75	125	0.0		g	
RA-226	9.08E-01		1.4E-01	1.4E-01	4.08E-02	pCi/g		1.14E+00	1.2E-02	80%	9/22/14 10:12 p	350.1	GER19$1
							Rec Limits:	75	125	-0.2		g	
RA-228	5.65E-01		1.4E-01	1.4E-01	8.12E-02	pCi/g		6.18E-01	6.4E-03	91%	9/22/14 10:12 p	350.1	GER19$1
							Rec Limits:	75	125	-0.1		g	
U-238	9.14E-01		1.2E-01	1.2E-01	4.17E-02	pCi/g		1.20E+00	1.2E-02	76%	9/22/14 10:12 p	350.1	GER19$1
							Rec Limits:	75	125	-0.2		g	
Batch: 4247041	RL-GAM-001			**Work Order:**	M4WA31AC		**Report DB ID:**	M4WA31CS					
CS-137	1.01E+00		1.2E-01	1.2E-01	2.59E-02	pCi/g		1.00E+00	1.0E-02	101%	9/25/14 10:29 a	350.1	GER11$1
							Rec Limits:	75	125	0.0		g	
RA-226	8.80E-01		1.3E-01	1.3E-01	4.84E-02	pCi/g		1.14E+00	1.2E-02	77%	9/25/14 10:29 a	350.1	GER11$1
							Rec Limits:	75	125	-0.2		g	
RA-228	5.29E-01		1.4E-01	1.4E-01	8.58E-02	pCi/g		6.18E-01	6.4E-03	86%	9/25/14 10:29 a	350.1	GER11$1
							Rec Limits:	75	125	-0.1		g	
U-238	9.30E-01		1.4E-01	1.4E-01	5.31E-02	pCi/g		1.20E+00	1.2E-02	77%	9/25/14 10:29 a	350.1	GER11$1
							Rec Limits:	75	125	-0.2		g	
Batch: 4247042	RL-GAM-001			**Work Order:**	M4WA71AC		**Report DB ID:**	M4WA71CS					
CS-137	1.00E+00		1.4E-01	1.4E-01	2.54E-02	pCi/g		1.00E+00	1.0E-02	100%	9/29/14 01:12 p	350.1	GER19$1
							Rec Limits:	75	125	0.0		g	
RA-226	8.85E-01		1.3E-01	1.3E-01	3.74E-02	pCi/g		1.14E+00	1.2E-02	78%	9/29/14 01:12 p	350.1	GER19$1
							Rec Limits:	75	125	-0.2		g	
RA-228	6.39E-01		1.3E-01	1.3E-01	8.26E-02	pCi/g		6.17E-01	6.4E-03	104%	9/29/14 01:12 p	350.1	GER19$1
							Rec Limits:	75	125	0.0		g	

TestAmerica Inc **Bias** **- (Result/Expected)-1 as defined by ANSI N13.30.**

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V5.3.4 A2002

FORM II

Date: 30-Sep-14

LCS RESULTS

Lab Name: **TestAmerica Inc** **SDG:** 48684

Matrix: SOIL **Report No. :** 62553

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL	Report Unit	Yield	Expected	Expected Uncert	Recovery, Bias	Analysis, Prep Date	Aliquot Size	Primary Detector
U-238	9.75E-01		1.3E-01	1.3E-01	4.07E-02	pCi/g		1.20E+00	1.2E-02	81%	9/29/14 01:12 p	350.1	GER19$1
							Rec Limits:	75	125	-0.2		g	
Batch: 4247043	C0SR			**Work Order:**	M4WCA1AC		**Report DB ID:**	M4WCA1CS					
U-234	1.60E+00			3.2E-01	3.11E-02	pCi/g	87%	1.56E+00	4.8E-02	103%	9/20/14 01:46 a	1.13	ALP12
							Rec Limits:	75	125	0.0		g	
U-238	1.77E+00			3.4E-01	2.66E-02	pCi/g	87%	1.64E+00	5.1E-02	108%	9/20/14 01:46 a	1.13	ALP12
							Rec Limits:	75	125	0.1		g	
Batch: 4247044	L8S1			**Work Order:**	M4WCH1AC		**Report DB ID:**	M4WCH1CS					
Th-230	2.17E+00			4.2E-01	4.44E-02	pCi/g	74%	2.10E+00	2.2E-02	104%	9/23/14 04:35 a	1.09	ALP129
							Rec Limits:	75	125	0.0		g	

No. of Results: 15 **Comments:**

TestAmerica Inc **Bias** **- (Result/Expected)-1 as defined by ANSI N13.30.**

rptSTLRchLcs
V5.3.4 A2002

FINAL REPORT

CHAIN OF CUSTODY RECORD

Phone (805) 532-0012
Fax (805) 532-0016

Pat-Chem Laboratories
11990 Discovery Court
Moorpark, CA 93021

Pat-Chem Laboratories

	Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Sampling Time	Preservatives	Isotopic Uranium (EML U-02 Mod)	Isotopic Thorium (EMP TH-01 Mod)	Gamma Spectroscopy (EPA 901.1 Mod)	TPH g/d/mo (EPA 8015)	VOCs (EPA 8260B)	Title 22 Metals (EPA 6010B)	PCBs (EPA 8032)	Gamma Spec Lab DuP		Special Instructions
01	WW-SB01-5	Soil	Sample Bag	1	7/23/14	1109	n/a	X	X	X					X		M4T9K
02	[redacted]					[redacted]											
03	[redacted]					[redacted]											
04	[redacted]					[redacted]											
05	WW-SB01-25					1205				X							M4T9L
06	[redacted]					[redacted]											
07	[redacted]					[redacted]											
08	[redacted]					[redacted]											
09	[redacted]					[redacted]											
10	WW-SB01-50					1255				X							M4T9M
11	WW-SB02-5					1345				X	M4T9N						~~F9N~~ JF 9/3/14
12	WW-SB02-10					1412											
13	[redacted]					[redacted]											

J4I020424

Relinquished By:	Date/Time	Received By:	Date/Time:
[signature]	7/29/14, 1700	[signature]	7/30/14 1042 AM
[signature]	7/30/14 1630	[signature]	7/30/14 1630
[signature]	8/1/14 1130	Received in Lab By: [signature] TALR	Date/Time: 8-6-14 0945

Turn Around Time:
RUSH
Sameday
24 hours
48 hours
72 hours
5 days
normal

Sample Integrity: (Check)
intact _____ on ice ____

Note: By relinquishing samples, client agrees to pay for the services requested on this chain of custody form and any additional analyses performed on this project. Payment for services is due within 30 days from the date of invoice. Sample(s) will be disposed of after 30 days.

J4I020424
48684
Due 9/19/14

~~J4I120404~~ JF 9/2/14
~~48670~~ JF 9/2/14
~~Due 9/26/14~~ JF 9/2/14

J4I020424
48684

CHAIN OF CUSTODY RECORD

Phone (805) 532-0012
Fax (805) 532-0016

Pat-Chem Laboratories
11990 Discovery Court
Moorpark, CA 93021

J4I020424
48684

Pat-Chem Laboratories

	Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Sampling Time	Preservatives	Isotopic Uranium (EML U-02 Mod)	Isotopic Thorium (EMP TH-01 Mod)	Gamma Spectroscopy (EPA 901.1 Mod)	TPH g/d/mo (EPA 8015)	VOCs (EPA 8260B)	Title 22 Metals (EPA 6010B)	PCBs (EPA 8032)			Special Instructions
14	WW-SB02-20	Soil	Sample Bag	1	7/23/14	1424	n/a			X							M4T9R
15	[redacted]					[redacted]											
16	[redacted]					[redacted]											
17	[redacted]					[redacted]											
18	WW-SB02-40					1450				X							M4T9T
19	WW-SB03-5					1540				X							M4T9V
20	[redacted]					[redacted]											
21	[redacted]					[redacted]											
22	WW-SB03-20					1557				X							M4T9W
23	[redacted]					[redacted]											
24	[redacted]					[redacted]											
25	[redacted]					[redacted]											
26	WW-SB03-40					1625				X							M4T9X

J4I020424

Relinquished By:	Date/Time	Received By:	Date/Time:
[signature]	7-29-14 / 1700	[signature]	7/30/14 1042 Am
[signature]	7/30/14 1630	[signature]	7/30/14 1630
[signature]	8/1/14 1130	[signature] TALR	Date/Time: 8-6-14 0945

Turn Around Time:
RUSH
Sameday
24 hours
48 hours
72 hours
5 days
normal

Sample Integrity: (Check)
Intact ____ on ice ____

Note: By relinquishing samples, client agrees to pay for the services requested on this chain of custody form and any additional analyses performed on this project. Payment for services is due within 30 days from the date of invoice. Sample(s) will be disposed of after 30 days.

J4I020424
48684

CHAIN OF CUSTODY RECORD

Phone (805) 532-0012
Fax (805) 532-0016

Pat-Chem Laboratories
11990 Discovery Court
Moorpark, CA 93021

J4I020424
48684

Pat-Chem Laboratories

	Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Sampling Time	Preservatives	Isotopic Uranium (EML U-02 Mod)	Isotopic Thorium (EMP TH-01 Mod)	Gamma Spectroscopy (EPA 901.1 Mod)	TPH g/d/mo (EPA 8015)	VOCs (EPA 8260B)	Title 22 Metals (EPA 6010B)	PCBs (EPA 8032)	Gamma Spec Lab Dup		Special Instructions
27	WW-SB04-5	Soil	Sample Bag	1	7/23/14	1704	n/a			X							M4T90
28	[redacted]					[redacted]											
29	[redacted]					[redacted]											
30	[redacted]					[redacted]											
31	WW-SB04-25					1730		X	X	X					X		M4T91
32	[redacted]					[redacted]											
33	[redacted]					[redacted]											
34	[redacted]					[redacted]											
35	WW-SB04-45					1800				X							M4T92
36	CD-SB01-5				7/24/14	0907				X							M4T93
37	CD-SB02-5					1022		X	X	X					X		M4VAD
38	CD-SB02-10					1049				X							M4VAF
39	CD-SB03-5					1140				X							M4VAG

Relinquished By:	Date/Time	Received By	Date/Time:	Turn Around Time:
[signature]	7-29-14 1700	[signature]	7/30/14 1043 AM	RUSH / Sameday / 24 hours / 48 hours / 72 hours / 5 days / normal
Relinquished By: [signature]	Date/Time 7/30/14 1630	Received By: [signature]	Date/Tim: 7/30/14 1630	
Relinquished By: [signature]	Date/Time 8/1/14 1130	Received in Lab By: Beck TALK	Date/ Time: 8-6-14 0945	Sample Integrity: (Check) intact ____ on ice ____

Note: By relinquishing samples, client agrees to pay for the services requested on this chain of custody form and any additional analyses performed on this project. Payment for services is due within 30 days from the date of invoice. Sample(s) will be disposed of after 30 days.

J4I020424
48684

CHAIN OF CUSTODY RECORD

Phone (805) 532-0012
Fax (805) 532-0016

Pat-Chem Laboratories
11990 Discovery Court
Moorpark, CA 93021

J4I020424
48684

Pat-Chem Laboratories

	Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Sampling Time	Preservatives	Isotopic Uranium (EML U-02 Mod)	Isotopic Thorium (EMP TH-01 Mod)	Gamma Spectroscopy (EPA 901.1 Mod)	TPH g/d/mo (EPA 8015)	VOCs (EPA 8260B)	Title 22 Metals (EPA 6010B)	PCBs (EPA 8032)	Gamma Spec Lab Dup		Special Instructions
40	CD-SS-G3	Soil	Sample Bag	1	7/24/14	1225	n/a			X							~~M4VAC~~ JF 9/2/14
41	CD-SS-G10					1228				X							M4VAR
42	CD-SS-G16					1232		X	X	X					X		M4VAV
43	CD-SS-G23					1235				X							M4VAW
44	CD-SS-G24					1239				X							M4VAX
45	CD-SS-G31					1244				X							M4VA1
46	CD-SS-G18					1248				X							M4VA2
47	CD-SS-G32					1250				X							M4VA4
48	CD-SS-G40					1254				X							M4VA5
49	CD-SS-G41					1258		X	X	X					X		M4VA7
50	CD-SS-G20					1300				X							M4VA9
51	CD-SS-G13					1302				X							M4VCA
52	WW-SS-G5				7/25/14	0820				X							M4VCD

Relinquished By:	Date/Time	Received By:	Date/Time:
	7-29-14 1700		7/30/14 1042
Relinquished By:	Date/Time	Received By:	Date/Tim:
	7/30/14 1630		7/30/14 1630
Relinquished By:	Date/Time	Received in Lab By:	Date/ Time:
	8/1/14 1130	TALK	8-6-14 0945

Turn Around Time: RUSH Sameday 24 hours 48 hours; 72 hours 5 days normal

Sample Integrity: (Check) intact ____ on ice ____

Note: By relinquishing samples, client agrees to pay for the services requested on this chain of custody form and any additional analyses performed on this project. Payment for services is due within 30 days from the date of invoice. Sample(s) will be disposed of after 30 days.

J4I020424
48684

CHAIN OF CUSTODY RECORD

Phone (805) 532-0012
Fax (805) 532-0016

Pat-Chem Laboratories
11990 Discovery Court
Moorpark, CA 93021

J4I020424
48684

Pat-Chem Laboratories

	Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Sampling Time	Preservatives	Isotopic Uranium (EML U-02 Mod)	Isotopic Thorium (EMP TH-01 Mod)	Gamma Spectroscopy (EPA 901.1 Mod)	TPH g/d/mo (EPA 8015)	VOCs (EPA 8260B)	Title 22 Metals (EPA 6010B)	PCBs (EPA 8032)	Gamma Spec Lab Dup		Special Instructions
53	WW-SS-G6	Soil	Sample Bag	1	7/25/14	0822	n/a			X							M4VCJ
54	WW-SS-G7					0825				X							M4VCK
55	WW-SS-G9					0827				X							M4VCM
56	WW-SS-G12					0830				X							M4VCN
57	WW-SS-G13					0832		X	X	X					X	JF 9/2/14	~~M4VCP~~ M4VCR ~~M4VCQ~~ JF 9/2/14
58	WW-SS-G16					0835				X							M4VCV
59	WW-SS-G17					0837				X							M4VCW
60	WW-SS-G18					0840				X							M4VC2
61	WW-SS-G20					0842				X							M4VC3
62	[redacted]																
63	[redacted]																
64	WW-SS-BKG01		Sample Bag		7/29/14	1025	N/A			X							M4VC4
65	WW-SS-BKG02					1028				X							M4VC5

Relinquished By:	Date/Time	Received By:	Date/Time:	Turn Around Time:
	7-29-14 1700		7/31/14 1042 Am	RUSH / Sameday / 24 hours / 48 hours / 72 hours / 5 days / normal
Relinquished By:	Date/Time	Received By:	Date/Tim:	
	7/31/14 1630		7/30/14 1630	
Relinquished By:	Date/Time	Received In Lab By:	Date/ Time:	Sample Integrity: (Check)
	8/1/14 1130		8-6-14 0945	intact ____ on ice ____

Note: By relinquishing samples, client agrees to pay for the services requested on this chain of custody form and any additional analyses performed on this project. Payment for services is due within 30 days from the date of invoice. Sample(s) will be disposed of after 30 days.

CHAIN OF CUSTODY RECORD

Phone (805) 532-0012
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Pat-Chem Laboratories
11990 Discovery Court
Moorpark, CA 93021

J4I020424
48684

Page 6 of 6

J4I020424
48684

Pat-Chem Laboratories

	Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Sampling Time	Preservatives	Isotopic Uranium (EML U-02 Mod)	Isotopic Thorium (EMP TH-01 Mod)	Gamma Spectroscopy (EPA 901.1 Mod)	TPH g/d/mo (EPA 8015)	VOCs (EPA 8260B)	Title 22 Metals (EPA 6010B)	PCBs (EPA 8032)	Gamma Spec Lab Dup		Special Instructions
66	WW-SS-BKG03	Soil	Sample Bag	1	7/29/14	1032	n/a			X							M4VC6
67	WW-SS-BKG04	↓	↓	↓	↓	1035	↓			X							M4VC8
68	WW-SS-BKG05	↓	↓	↓	↓	1038	↓			X							M4VC9
69	WW-SS-BKG06	↓	↓	↓	↓	1040	↓			X							M4VDA
70	CD-SS-BKG01	↓	↓	↓	↓	1135	↓			X							M4VDD
71	CD-SS-BKG02	↓	↓	↓	↓	1138	↓			X							M4VDE
72	CD-SS-BKG03	↓	↓	↓	↓	1140	↓	X	X	X					X		M4VDF
73	CD-SS-BKG04	↓	↓	↓	↓	1116	↓			X							M4VDG
74	CD-SS-BKG05	↓	↓	↓	↓	1120	↓			X							M4VDH
75	CD-SS-BKG06	↓	↓	↓	↓	1122	↓			X							M4VDJ
						KT											

Analysis Required

Relinquished By:	Date/Time	Received By:	Date/Time:
KT	7-29-14 / 1700	[signature]	7/30/14 1042am
[signature]	7/30/14 1430	[signature]	7/30/14 1630
[signature]	8/1/14 1130	[signature] TALK	Date/ Time: 8-6-14 0945

Turn Around Time:
RUSH
Sameday
24 hours
48 hours
72 hours
5 days
normal

Sample Integrity: (Check)
Intact _____ on ice ____

Note: By relinquishing samples, client agrees to pay for the services requested on this chain of custody form and any additional analyses performed on this project. Payment for services is due within 30 days from the date of invoice. Sample(s) will be disposed of after 30 days.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Sample Check-in List

Date/Time Received: 8-6-14 / 0945 Container GM Screen Result: (Airlock) 40 cpm Initials [B]
Sample GM Screen Result (Sample Receiving) 40 cpm Initials [B]

Client: ~~COD~~ PCH JF 9/2/14 SDG #: ~~48670~~ 48684 SAF #: NA [B]

Lot Number: ~~J4H2904449~~ J4I020424

Chain of Custody #

Shipping Container ID or Air Bill Number : NA [B]

Samples received inside shipping container/cooler/box Yes [B] Continue with 1 through 4. Initial appropriate response.
No [ ] Go to 5, add comment to #16.

1. Custody Seals on shipping container intact? Yes [ ] No [ ] No Custody Seal [B]
2. Custody Seals dated and signed? Yes [ ] No [ ] No Custody Seal [B]
3. Cooler temperature: _____°C NA [B]
4. Vermiculite/packing materials is NA [ ] Wet [ ] Dry [B]

Item 5 through 16 for samples. Initial appropriate response.

5. Chain of Custody record present? Yes [B] No [ ]
6. Number of samples received (Each sample may contain multiple bottles): 50
7. Containers received: 50 x 500mLp
8. Sample holding times exceeded? NA [ ] Yes [ ] No [B]
9. Samples have: ____tape ____hazard labels ____custody seals [B] appropriate sample labels
10. Matrix: [B] A (FLT, Wipe, Solid, Soil) ____I (Water) ____S (Air, Niosh 7400) ____T (Biological, Ni-63)
11. Samples:
    [B] are in good condition ____are leaking ____are broken
    ____have air bubbles (Only for samples requiring no head space) ____Other
12. Sample pH appropriate for analysis requested Yes [ ] No [ ] NA [B]
    (If acidification is necessary go to pH area & document sample ID, initial pH, amount of HNO_3 added and pH after addition on table)
13. Were any anomalies identified in sample receipt? Yes [B] ~~No [B]~~ [B] 8-6-14
14. Description of anomalies (include sample numbers): NA [ ] Sample #12 WW-SB02-10 was not received.
15. Sample Location, Sample Collector Listed on COC? * Yes [ ] No [B]
    *For documentation only. No corrective action needed.
16. Additional Information: N/A

[ ] Client/Courier denied temperature check. [ ] Client/Courier unpack cooler.

Sample Check-in List completed by Sample Custodian:
Signature: [signature] Date: 8-6-14

Client Notification needed? Yes [ ] No [ ] Date:
By:
Person contacted:

[B] No action necessary, process as is

Project Manager [signature] Date 9/4/14

LS-023 Rev. 17, 05/13

PAT-CHEM LABORATORIES
11990 Discovery Ct. • Moorpark, CA 93021 • Ph. (805) 532-0012 • Fax (805) 532-0016

Customer: **Stantec**
25864 F Business Center Drive
Redlands CA, 92374

Attention: Erin Baily
Report Date: 07-Aug-14 16:16
Subject: Soil/Misc. Samples

Project/P.O.#: Caltrans TO-17, 185802873

PARAMETER	METHOD	QC BATCH	REPORTING LIMIT	ANALYZED (ANALYST)		RESULT	NOTE
WW-Composite (Sample I.D.# : 1407460-62) Collected: 23-Jul-14 By Stantec							
Diesel	EPA 8015M	AH40106	2.5	04-Aug-14 (SM)	<	2.5 mg/kg	
Motor Oil	EPA 8015M	AH40106	10.0	04-Aug-14 (SM)	<	10.0 mg/kg	
Surrogate: o-Terphenyl	*EPA 8015M*	*AH40106*		*04-Aug-14 (SM)*		*76.5 % (55-120)*	
Silver	EPA 6010B	AH40101	1.0	04-Aug-14 (AF)	<	1.0 mg/kg	
Arsenic	EPA 6010B	AH40101	5.0	04-Aug-14 (AF)		20 mg/kg	
Barium	EPA 6010B	AH40101	1.0	04-Aug-14 (AF)		920 mg/kg	
Beryllium	EPA 6010B	AH40101	1.0	04-Aug-14 (AF)	<	1.0 mg/kg	
Cadmium	EPA 6010B	AH40101	1.0	04-Aug-14 (AF)		3.0 mg/kg	
Cobalt	EPA 6010B	AH40101	1.0	04-Aug-14 (AF)		4.2 mg/kg	
Chromium	EPA 6010B	AH40101	1.0	04-Aug-14 (AF)		27 mg/kg	
Copper	EPA 6010B	AH40101	1.0	04-Aug-14 (AF)		16 mg/kg	
Molybdenum	EPA 6010B	AH40101	2.5	04-Aug-14 (AF)		7.7 mg/kg	
Nickel	EPA 6010B	AH40101	1.0	04-Aug-14 (AF)		14 mg/kg	
Lead	EPA 6010B	AH40101	1.0	04-Aug-14 (AF)		30 mg/kg	
Antimony	EPA 6010B	AH40101	5.0	04-Aug-14 (AF)	<	5.0 mg/kg	
Selenium	EPA 6010B	AH40101	5.0	04-Aug-14 (AF)	<	5.0 mg/kg	
Thallium	EPA 6010B	AH40101	5.0	04-Aug-14 (AF)	<	5.0 mg/kg	
Vanadium	EPA 6010B	AH40101	1.0	04-Aug-14 (AF)		48 mg/kg	
Zinc	EPA 6010B	AH40101	1.0	04-Aug-14 (AF)		42 mg/kg	
Mercury	EPA 7471A	AH40102	0.050	01-Aug-14 (AA)	<	0.050 mg/kg	
Aroclor 1016	EPA 8082	AH40107	167	04-Aug-14 (SM)	<	167 ug/kg	
Aroclor 1221	EPA 8082	AH40107	167	04-Aug-14 (SM)	<	167 ug/kg	
Aroclor 1232	EPA 8082	AH40107	167	04-Aug-14 (SM)	<	167 ug/kg	
Aroclor 1242	EPA 8082	AH40107	167	04-Aug-14 (SM)	<	167 ug/kg	
Aroclor 1248	EPA 8082	AH40107	167	04-Aug-14 (SM)	<	167 ug/kg	
Aroclor 1254	EPA 8082	AH40107	167	04-Aug-14 (SM)	<	167 ug/kg	
Aroclor 1260	EPA 8082	AH40107	167	04-Aug-14 (SM)	<	167 ug/kg	

Respectfully Submitted,

Steve Jefferson 8/7/2014
Laboratory Director

PAT-CHEM LABORATORIES
11990 Discovery Ct. • Moorpark, CA 93021 • Ph. (805) 532-0012 • Fax (805) 532-0016

Customer: **Stantec**
25864 F Business Center Drive
Redlands CA, 92374

Attention: Erin Baily
Report Date: 07-Aug-14 16:16
Subject: Soil/Misc. Samples

Project/P.O.#: Caltrans TO-17, 185802873

PARAMETER	METHOD	QC BATCH	REPORTING LIMIT	ANALYZED (ANALYST)		RESULT	NOTE
WW-Composite (Sample I.D.# : 1407460-62) Collected: 23-Jul-14 By Stantec							
Dichlorodifluoromethane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Chloromethane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Vinyl chloride	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Bromomethane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Chloroethane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Trichlorofluoromethane (Freon 11)	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Trichlorotrifluoroethane (Freon 113)	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,1-Dichloroethene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Acetone	EPA 8260B	AH40418	5.0	04-Aug-14 (SJ)	<	5.0 ug/kg	
Isopropyl alcohol	EPA 8260B	AH40418	10.0	04-Aug-14 (SJ)	<	10.0 ug/kg	
Methylene chloride	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Tert-butyl alcohol	EPA 8260B	AH40418	2.0	04-Aug-14 (SJ)	<	2.0 ug/kg	
Methyl tert-butyl ether	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
t-1,2-Dichloroethene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,1-Dichloroethane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Di-isopropyl ether	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Vinyl acetate	EPA 8260B	AH40418	10.0	04-Aug-14 (SJ)	<	10.0 ug/kg	
Ethyl tert-butyl ether	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
2-Butanone (MEK)	EPA 8260B	AH40418	5.0	04-Aug-14 (SJ)	<	5.0 ug/kg	
2,2-Dichloropropane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
c-1,2-Dicholoroethene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Bromochloromethane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Chloroform	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,1,1-Trichloroethane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Carbon tetrachloride	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,1-Dichloropropene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Benzene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,2-Dichloroethane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Tert-amyl methyl ether	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Trichloroethene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,2-Dichloropropane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	

Respectfully Submitted,

Steve Jefferson 8/7/2014
Laboratory Director

PAT-CHEM LABORATORIES
11990 Discovery Ct. • Moorpark, CA 93021 • Ph. (805) 532-0012 • Fax (805) 532-0016

Customer: **Stantec**
25864 F Business Center Drive
Redlands CA, 92374

Attention: Erin Baily
Report Date: 07-Aug-14 16:16
Subject: Soil/Misc. Samples

Project/P.O.#: Caltrans TO-17, 185802873

PARAMETER	METHOD	QC BATCH	REPORTING LIMIT	ANALYZED (ANALYST)		RESULT	NOTE
WW-Composite (Sample I.D.# : 1407460-62) Collected: 23-Jul-14 By Stantec							
Dibromomethane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Bromodichloromethane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
2-Chloroethylvinyl ether	EPA 8260B	AH40418	10.0	04-Aug-14 (SJ)	<	10.0 ug/kg	
c-1,3-Dichloropropene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Methyl isobutyl ketone	EPA 8260B	AH40418	5.0	04-Aug-14 (SJ)	<	5.0 ug/kg	
Toluene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
t-1,3-Dichloropropene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,1,2-Trichloroethane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Tetrachloroethene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,3-Dichloropropane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
2-Hexanone	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Dibromochloromethane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,2-Dibromoethane (EDB)	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Chlorobenzene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Ethylbenzene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,1,1,2-Tetrachloroethane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
m,p-Xylene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
o-Xylene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Styrene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Bromoform	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Isopropylbenzene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Bromobenzene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,1,2,2-Tetrachloroethane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
n-Propylbenzene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,2,3-Trichloropropane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
2-Chlorotoluene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,3,5-Trimethylbenzene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
4-Chlorotoluene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
tert-Butylbenzene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,2,4-Trimethylbenzene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
sec-Butylbenzene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	

Respectfully Submitted,

Steve Jefferson 8/7/2014
Laboratory Director

PAT-CHEM LABORATORIES
11990 Discovery Ct. • Moorpark, CA 93021 • Ph. (805) 532-0012 • Fax (805) 532-0016

Customer: **Stantec**
25864 F Business Center Drive
Redlands CA, 92374

Attention: Erin Baily
Report Date: 07-Aug-14 16:16
Subject: Soil/Misc. Samples

Project/P.O.#: Caltrans TO-17, 185802873

PARAMETER	METHOD	QC BATCH	REPORTING LIMIT	ANALYZED (ANALYST)		RESULT	NOTE
WW-Composite (Sample I.D.# : 1407460-62) Collected: 23-Jul-14 By Stantec							
1,3-Dichlorobenzene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
p-Isopropyltoluene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,4-Dichlorobenzene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
n-Butylbenzene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,2-Dichlorobenzene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,2-Dibromo-3-chloropropane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,2,4-Trichlorobenzene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Hexachlorobutadiene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Naphthalene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,2,3-Trichlorobenzene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Surrogate: Dibromofluoromethane	*EPA 8260B*	*AH40418*		*04-Aug-14 (SJ)*		*105 % (75-125)*	
Surrogate: Toluene-d8	*EPA 8260B*	*AH40418*		*04-Aug-14 (SJ)*		*99.3 % (75-125)*	
Surrogate: Bromofluorobenzene	*EPA 8260B*	*AH40418*		*04-Aug-14 (SJ)*		*101 % (75-125)*	
Gasoline	EPA 8015M	AH40516	0.050	05-Aug-14 (KH)	<	0.050 mg/kg	
Surrogate: 1-chloro-4-fluorobenzene	*EPA 8015M*	*AH40516*		*05-Aug-14 (KH)*		*99.7 % (60-140)*	
CD-Composite (Sample I.D.# : 1407460-63) Collected: 24-Jul-14 By Stantec							
Diesel	EPA 8015M	AH40106	2.5	04-Aug-14 (SM)	<	2.5 mg/kg	
Motor Oil	EPA 8015M	AH40106	10.0	04-Aug-14 (SM)	<	10.0 mg/kg	
Surrogate: o-Terphenyl	*EPA 8015M*	*AH40106*		*04-Aug-14 (SM)*		*73.2 % (55-120)*	
Silver	EPA 6010B	AH40101	1.0	01-Aug-14 (AF)	<	1.0 mg/kg	
Arsenic	EPA 6010B	AH40101	5.0	01-Aug-14 (AF)		28 mg/kg	
Barium	EPA 6010B	AH40101	1.0	01-Aug-14 (AF)		750 mg/kg	
Beryllium	EPA 6010B	AH40101	1.0	01-Aug-14 (AF)	<	1.0 mg/kg	
Cadmium	EPA 6010B	AH40101	1.0	01-Aug-14 (AF)		2.4 mg/kg	
Cobalt	EPA 6010B	AH40101	1.0	01-Aug-14 (AF)		8.6 mg/kg	
Chromium	EPA 6010B	AH40101	1.0	01-Aug-14 (AF)		33 mg/kg	
Copper	EPA 6010B	AH40101	1.0	01-Aug-14 (AF)		13 mg/kg	
Molybdenum	EPA 6010B	AH40101	2.5	01-Aug-14 (AF)	<	2.5 mg/kg	
Nickel	EPA 6010B	AH40101	1.0	01-Aug-14 (AF)		20 mg/kg	
Lead	EPA 6010B	AH40101	1.0	01-Aug-14 (AF)		50 mg/kg	
Antimony	EPA 6010B	AH40101	5.0	01-Aug-14 (AF)	<	5.0 mg/kg	

Respectfully Submitted,

Steve Jefferson 8/7/2014
Laboratory Director

PAT-CHEM LABORATORIES
11990 Discovery Ct. • Moorpark, CA 93021 • Ph. (805) 532-0012 • Fax (805) 532-0016

Customer: **Stantec**
25864 F Business Center Drive
Redlands CA, 92374

Attention: Erin Baily
Report Date: 07-Aug-14 16:16
Subject: Soil/Misc. Samples

Project/P.O.#: Caltrans TO-17, 185802873

PARAMETER	METHOD	QC BATCH	REPORTING LIMIT	ANALYZED (ANALYST)		RESULT	NOTE
CD-Composite (Sample I.D.# : 1407460-63) Collected: 24-Jul-14 By Stantec							
Selenium	EPA 6010B	AH40101	5.0	01-Aug-14 (AF)	<	5.0 mg/kg	
Thallium	EPA 6010B	AH40101	5.0	01-Aug-14 (AF)	<	5.0 mg/kg	
Vanadium	EPA 6010B	AH40101	1.0	01-Aug-14 (AF)		60 mg/kg	
Zinc	EPA 6010B	AH40101	1.0	01-Aug-14 (AF)		38 mg/kg	
Mercury	EPA 7471A	AH40102	0.050	01-Aug-14 (AA)		0.12 mg/kg	
Aroclor 1016	EPA 8082	AH40107	167	04-Aug-14 (SM)	<	167 ug/kg	
Aroclor 1221	EPA 8082	AH40107	167	04-Aug-14 (SM)	<	167 ug/kg	
Aroclor 1232	EPA 8082	AH40107	167	04-Aug-14 (SM)	<	167 ug/kg	
Aroclor 1242	EPA 8082	AH40107	167	04-Aug-14 (SM)	<	167 ug/kg	
Aroclor 1248	EPA 8082	AH40107	167	04-Aug-14 (SM)	<	167 ug/kg	
Aroclor 1254	EPA 8082	AH40107	167	04-Aug-14 (SM)	<	167 ug/kg	
Aroclor 1260	EPA 8082	AH40107	167	04-Aug-14 (SM)	<	167 ug/kg	
Dichlorodifluoromethane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Chloromethane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Vinyl chloride	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Bromomethane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Chloroethane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Trichlorofluoromethane (Freon 11)	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Trichlorotrifluoroethane (Freon 113)	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,1-Dichloroethene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Acetone	EPA 8260B	AH40418	5.0	04-Aug-14 (SJ)	<	5.0 ug/kg	
Isopropyl alcohol	EPA 8260B	AH40418	10.0	04-Aug-14 (SJ)	<	10.0 ug/kg	
Methylene chloride	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Tert-butyl alcohol	EPA 8260B	AH40418	2.0	04-Aug-14 (SJ)	<	2.0 ug/kg	
Methyl tert-butyl ether	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
t-1,2-Dichloroethene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,1-Dichloroethane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Di-isopropyl ether	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Vinyl acetate	EPA 8260B	AH40418	10.0	04-Aug-14 (SJ)	<	10.0 ug/kg	
Ethyl tert-butyl ether	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
2-Butanone (MEK)	EPA 8260B	AH40418	5.0	04-Aug-14 (SJ)	<	5.0 ug/kg	

Respectfully Submitted,

Steve Jefferson 8/7/2014
Laboratory Director

PAT-CHEM LABORATORIES
11990 Discovery Ct. • Moorpark, CA 93021 • Ph. (805) 532-0012 • Fax (805) 532-0016

Customer: **Stantec**
25864 F Business Center Drive
Redlands CA, 92374

Attention: Erin Baily
Report Date: 07-Aug-14 16:16
Subject: Soil/Misc. Samples

Project/P.O.#: Caltrans TO-17, 185802873

PARAMETER	METHOD	QC BATCH	REPORTING LIMIT	ANALYZED (ANALYST)		RESULT	NOTE
CD-Composite (Sample I.D.# : 1407460-63) Collected: 24-Jul-14 By Stantec							
2,2-Dichloropropane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
c-1,2-Dicholoroethene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Bromochloromethane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Chloroform	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,1,1-Trichloroethane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Carbon tetrachloride	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,1-Dichloropropene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Benzene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,2-Dichloroethane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Tert-amyl methyl ether	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Trichloroethene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,2-Dichloropropane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Dibromomethane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Bromodichloromethane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
2-Chloroethylvinyl ether	EPA 8260B	AH40418	10.0	04-Aug-14 (SJ)	<	10.0 ug/kg	
c-1,3-Dichloropropene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Methyl isobutyl ketone	EPA 8260B	AH40418	5.0	04-Aug-14 (SJ)	<	5.0 ug/kg	
Toluene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
t-1,3-Dichloropropene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,1,2-Trichloroethane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Tetrachloroethene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,3-Dichloropropane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
2-Hexanone	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Dibromochloromethane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,2-Dibromoethane (EDB)	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Chlorobenzene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Ethylbenzene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,1,1,2-Tetrachloroethane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
m,p-Xylene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
o-Xylene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Styrene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	

Respectfully Submitted,

Steve Jefferson 8/7/2014
Laboratory Director

PAT-CHEM LABORATORIES
11990 Discovery Ct. • Moorpark, CA 93021 • Ph. (805) 532-0012 • Fax (805) 532-0016

Customer: **Stantec**
25864 F Business Center Drive
Redlands CA, 92374

Attention: Erin Baily
Report Date: 07-Aug-14 16:16
Subject: Soil/Misc. Samples

Project/P.O.#: Caltrans TO-17, 185802873

PARAMETER	METHOD	QC BATCH	REPORTING LIMIT	ANALYZED (ANALYST)		RESULT	NOTE
CD-Composite (Sample I.D.# : 1407460-63) Collected: 24-Jul-14 By Stantec							
Bromoform	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Isopropylbenzene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Bromobenzene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,1,2,2-Tetrachloroethane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
n-Propylbenzene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,2,3-Trichloropropane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
2-Chlorotoluene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,3,5-Trimethylbenzene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
4-Chlorotoluene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
tert-Butylbenzene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,2,4-Trimethylbenzene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
sec-Butylbenzene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,3-Dichlorobenzene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
p-Isopropyltoluene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,4-Dichlorobenzene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
n-Butylbenzene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,2-Dichlorobenzene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,2-Dibromo-3-chloropropane	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,2,4-Trichlorobenzene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Hexachlorobutadiene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Naphthalene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
1,2,3-Trichlorobenzene	EPA 8260B	AH40418	0.5	04-Aug-14 (SJ)	<	0.5 ug/kg	
Surrogate: Dibromofluoromethane	*EPA 8260B*	*AH40418*		*04-Aug-14 (SJ)*		*104 % (75-125)*	
Surrogate: Toluene-d8	*EPA 8260B*	*AH40418*		*04-Aug-14 (SJ)*		*100 % (75-125)*	
Surrogate: Bromofluorobenzene	*EPA 8260B*	*AH40418*		*04-Aug-14 (SJ)*		*99.4 % (75-125)*	
Gasoline	EPA 8015M	AH40516	0.050	06-Aug-14 (KH)	<	0.050 mg/kg	
Surrogate: 1-chloro-4-fluorobenzene	*EPA 8015M*	*AH40516*		*06-Aug-14 (KH)*		*101 % (60-140)*	

Respectfully Submitted,

Steve Jefferson 8/7/2014
Laboratory Director

PAT-CHEM LABORATORIES
11990 Discovery Ct. • Moorpark, CA 93021 • Ph. (805) 532-0012 • Fax (805) 532-0016

Customer: **Stantec**
25864 F Business Center Drive
Redlands CA, 92374

Attention: Erin Baily
Report Date: 07-Aug-14 16:16
Subject: Soil/Misc. Samples

Project/P.O.#: Caltrans TO-17, 185802873

*** DEFAULT GENERAL METHOD *** - Quality Control

Parameter	Result	Rep. Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Note
Batch AH40106 - Solvent Extraction										
Blank (AH40106-BLK1)				Prepared & Analyzed: 01-Aug-14						
Surrogate: o-Terphenyl	*1.75*		*mg/kg*	*2.50*		*70.0*	*55-120*			
Diesel	ND	2.5	"							
Motor Oil	ND	10.0	"							
LCS (AH40106-BS1)				Prepared & Analyzed: 01-Aug-14						
Surrogate: o-Terphenyl	*1.89*		*mg/kg*	*2.50*		*75.7*	*55-120*			
Diesel	18.6	2.5	"	20.0		92.9	55-120			
LCS Dup (AH40106-BSD1)				Prepared & Analyzed: 01-Aug-14						
Surrogate: o-Terphenyl	*1.93*		*mg/kg*	*2.50*		*77.4*	*55-120*			
Diesel	18.6	2.5	"	20.0		92.9	55-120	0.0172	30	
Matrix Spike (AH40106-MS1)		**Source: 1408001-01**		Prepared & Analyzed: 01-Aug-14						
Surrogate: o-Terphenyl	*1.79*		*mg/kg*	*2.50*		*71.6*	*55-120*			
Diesel	17.5	2.5	"	20.0	ND	87.7	55-120			
Matrix Spike Dup (AH40106-MSD1)		**Source: 1408001-01**		Prepared & Analyzed: 01-Aug-14						
Surrogate: o-Terphenyl	*1.75*		*mg/kg*	*2.50*		*70.0*	*55-120*			
Diesel	17.8	2.5	"	20.0	ND	89.2	55-120	1.79	30	

Respectfully Submitted,

Steve Jefferson 8/7/2014
Laboratory Director

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11990 Discovery Ct. • Moorpark, CA 93021 • Ph. (805) 532-0012 • Fax (805) 532-0016

Customer: **Stantec**
25864 F Business Center Drive
Redlands CA, 92374

Attention: Erin Baily
Report Date: 07-Aug-14 16:16
Subject: Soil/Misc. Samples

Project/P.O.#: Caltrans TO-17, 185802873

Metals by EPA 6000/7000 Series Methods - Quality Control

Parameter	Result	Rep. Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Note
Batch AH40101 - EPA 3050B										
Blank (AH40101-BLK1)				Prepared & Analyzed: 01-Aug-14						
Selenium	ND	5.0	mg/kg							
Thallium	ND	5.0	"							
Zinc	ND	1.0	"							
Cadmium	ND	1.0	"							
Lead	ND	1.0	"							
Chromium	ND	1.0	"							
Nickel	ND	1.0	"							
Molybdenum	ND	2.5	"							
Copper	ND	1.0	"							
Antimony	ND	5.0	"							
Beryllium	ND	1.0	"							
Cobalt	ND	1.0	"							
Barium	ND	1.0	"							
Arsenic	ND	5.0	"							
Silver	ND	1.0	"							
Vanadium	ND	1.0	"							
LCS (AH40101-BS1)				Prepared & Analyzed: 01-Aug-14						
Thallium	25.3	5.0	mg/kg	25.0		101	80-120			
Molybdenum	23.6	2.5	"	25.0		94.3	80-120			
Nickel	24.9	1.0	"	25.0		99.8	80-120			
Vanadium	23.6	1.0	"	25.0		94.4	80-120			
Selenium	24.4	5.0	"	25.0		97.4	80-120			
Copper	25.1	1.0	"	25.0		101	80-120			
Chromium	24.7	1.0	"	25.0		98.8	80-120			
Cobalt	24.9	1.0	"	25.0		99.7	80-120			

Respectfully Submitted,

Steve Jefferson 8/7/2014
Laboratory Director

PAT-CHEM LABORATORIES
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Customer: **Stantec**
25864 F Business Center Drive
Redlands CA, 92374

Attention: Erin Baily
Report Date: 07-Aug-14 16:16
Subject: Soil/Misc. Samples

Project/P.O.#: Caltrans TO-17, 185802873

Metals by EPA 6000/7000 Series Methods - Quality Control

Parameter	Result	Rep. Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Note
Batch AH40101 - EPA 3050B										
LCS (AH40101-BS1)				Prepared & Analyzed: 01-Aug-14						
Lead	25.0	1.0	"	25.0		99.9	80-120			
Cadmium	24.2	1.0	"	25.0		96.8	80-120			
Beryllium	24.1	1.0	"	25.0		96.6	80-120			
Antimony	24.2	5.0	"	25.0		96.8	80-120			
Arsenic	20.6	5.0	"	25.0		82.3	80-120			
Barium	25.2	1.0	"	25.0		101	80-120			
Zinc	23.8	1.0	"	25.0		95.4	80-120			
Silver	11.4	1.0	"	12.5		91.1	80-120			
LCS Dup (AH40101-BSD1)				Prepared & Analyzed: 01-Aug-14						
Molybdenum	21.2	2.5	mg/kg	25.0		84.8	80-120	10.6	20	
Thallium	26.1	5.0	"	25.0		105	80-120	3.33	20	
Silver	12.2	1.0	"	12.5		97.7	80-120	7.04	20	
Copper	26.3	1.0	"	25.0		105	80-120	4.36	20	
Vanadium	24.7	1.0	"	25.0		98.9	80-120	4.64	20	
Zinc	24.9	1.0	"	25.0		99.4	80-120	4.16	20	
Beryllium	25.0	1.0	"	25.0		100	80-120	3.61	20	
Cobalt	25.9	1.0	"	25.0		104	80-120	3.95	20	
Barium	26.2	1.0	"	25.0		105	80-120	3.97	20	
Arsenic	22.0	5.0	"	25.0		87.9	80-120	6.59	20	
Selenium	21.1	5.0	"	25.0		84.4	80-120	14.3	20	
Cadmium	25.3	1.0	"	25.0		101	80-120	4.56	20	
Nickel	26.0	1.0	"	25.0		104	80-120	4.07	20	
Lead	26.1	1.0	"	25.0		104	80-120	4.28	20	
Antimony	25.2	5.0	"	25.0		101	80-120	4.20	20	
Chromium	25.9	1.0	"	25.0		103	80-120	4.60	20	

Respectfully Submitted,

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Redlands CA, 92374

Attention: Erin Baily
Report Date: 07-Aug-14 16:16
Subject: Soil/Misc. Samples

Project/P.O.#: Caltrans TO-17, 185802873

Metals by EPA 6000/7000 Series Methods - Quality Control

Parameter	Result	Rep. Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Note
Batch AH40101 - EPA 3050B										
Duplicate (AH40101-DUP1)		**Source: 1407460-62**		Prepared: 01-Aug-14 Analyzed: 04-Aug-14						
Selenium	ND	5.0	mg/kg		ND				20	
Thallium	ND	5.0	"		ND				20	
Antimony	ND	5.0	"		ND				20	
Vanadium	46.6	1.0	"		48.0			2.93	20	
Cobalt	4.04	1.0	"		4.25			4.96	20	
Cadmium	2.48	1.0	"		3.00			19.0	20	
Beryllium	0.779	1.0	"		0.794			1.91	20	
Barium	891	1.0	"		918			3.03	20	
Arsenic	17.8	5.0	"		19.5			9.45	20	
Lead	29.0	1.0	"		30.2			4.04	20	
Chromium	26.2	1.0	"		27.0			3.12	20	
Copper	15.7	1.0	"		16.2			3.35	20	
Molybdenum	7.14	2.5	"		7.66			6.96	20	
Zinc	40.4	1.0	"		42.3			4.59	20	
Silver	ND	1.0	"		ND				20	
Nickel	13.5	1.0	"		13.9			2.96	20	
Matrix Spike (AH40101-MS1)		**Source: 1407460-62**		Prepared: 01-Aug-14 Analyzed: 04-Aug-14						
Cobalt	125	1.0	mg/kg	125	4.25	96.6	75-125			
Thallium	119	5.0	"	125	ND	95.4	75-125			
Lead	153	1.0	"	125	30.2	97.9	75-125			
Selenium	75.5	5.0	"	125	ND	60.4	34.3-90.5			
Vanadium	173	1.0	"	125	48.0	100	75-125			
Copper	142	1.0	"	125	16.2	101	75-125			
Zinc	162	1.0	"	125	42.3	95.8	75-125			
Cadmium	124	1.0	"	125	3.00	96.8	75-125			

Respectfully Submitted,

Steve Jefferson 8/7/2014
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Customer: **Stantec**
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Report Date: 07-Aug-14 16:16
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Project/P.O.#: Caltrans TO-17, 185802873

Metals by EPA 6000/7000 Series Methods - Quality Control

Parameter	Result	Rep. Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Note
Batch AH40101 - EPA 3050B										
Matrix Spike (AH40101-MS1)		**Source: 1407460-62**		Prepared: 01-Aug-14 Analyzed: 04-Aug-14						**QM-4X**
Barium	998	1.0	"	125	918	64.0	75-125			
Chromium	147	1.0	"	125	27.0	95.7	75-125			
Molybdenum	83.1	2.5	"	125	7.66	60.4	34.8-86.2			
Beryllium	129	1.0	"	125	0.794	102	75-125			
Nickel	132	1.0	"	125	13.9	94.8	75-125			
Arsenic	122	5.0	"	125	19.5	82.3	75-125			
Silver	59.9	1.0	"	62.5	ND	95.8	75-125			
Antimony	88.4	5.0	"	125	ND	70.7	29.8-116			
Matrix Spike Dup (AH40101-MSD1)		**Source: 1407460-62**		Prepared: 01-Aug-14 Analyzed: 04-Aug-14						
Beryllium	132	1.0	mg/kg	125	0.794	105	75-125	2.21	20	
Molybdenum	90.9	2.5	"	125	7.66	66.6	34.8-86.2	8.96	20	
Nickel	134	1.0	"	125	13.9	96.3	75-125	1.45	20	
Cadmium	126	1.0	"	125	3.00	98.6	75-125	1.79	20	
Thallium	119	5.0	"	125	ND	95.2	75-125	0.241	20	
Barium	1010	1.0	"	125	918	70.9	75-125	0.862	20	
Antimony	91.6	5.0	"	125	ND	73.3	29.8-116	3.60	20	
Lead	152	1.0	"	125	30.2	97.1	75-125	0.620	20	
Copper	144	1.0	"	125	16.2	102	75-125	1.15	20	
Cobalt	125	1.0	"	125	4.25	96.7	75-125	0.0539	20	
Arsenic	126	5.0	"	125	19.5	85.6	75-125	3.29	20	
Vanadium	172	1.0	"	125	48.0	98.8	75-125	0.966	20	
Silver	61.5	1.0	"	62.5	ND	98.3	75-125	2.62	20	
Zinc	161	1.0	"	125	42.3	95.3	75-125	0.320	20	
Chromium	146	1.0	"	125	27.0	95.3	75-125	0.338	20	
Selenium	81.7	5.0	"	125	ND	65.4	34.3-90.5	7.87	20	

Respectfully Submitted,

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Report Date: 07-Aug-14 16:16
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Project/P.O.#: Caltrans TO-17, 185802873

RCRA Metals by EPA 6000/7000 Series Methods - Quality Control

Parameter	Result	Rep. Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Note
Batch AH40102 - EPA 7470A										
Blank (AH40102-BLK1)				Prepared & Analyzed: 01-Aug-14						
Mercury	ND	0.050	mg/kg							
LCS (AH40102-BS1)				Prepared & Analyzed: 01-Aug-14						
Mercury	1.03	0.050	mg/kg	1.00		103	85-115			
LCS Dup (AH40102-BSD1)				Prepared & Analyzed: 01-Aug-14						
Mercury	1.04	0.050	mg/kg	1.00		104	85-115	0.328	15	
Duplicate (AH40102-DUP1)		**Source: 1407460-62**		Prepared & Analyzed: 01-Aug-14						
Mercury	0.0259	0.050	mg/kg		0.0268			3.44	20	
Matrix Spike (AH40102-MS1)		**Source: 1407460-62**		Prepared & Analyzed: 01-Aug-14						
Mercury	1.03	0.050	mg/kg	1.00	0.0268	99.8	70-120			
Matrix Spike Dup (AH40102-MSD1)		**Source: 1407460-62**		Prepared & Analyzed: 01-Aug-14						
Mercury	1.07	0.050	mg/kg	1.00	0.0268	104	70-120	4.01	20	

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Project/P.O.#: Caltrans TO-17, 185802873

Polychlorinated Biphenyls by EPA Method 8082 - Quality Control

Parameter	Result	Rep. Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Note
Batch AH40107 - Solvent Extraction										
Blank (AH40107-BLK1)				Prepared: 01-Aug-14 Analyzed: 04-Aug-14						
Aroclor 1016	ND	25.0	ug/kg							
Aroclor 1221	ND	25.0	"							
Aroclor 1232	ND	25.0	"							
Aroclor 1242	ND	25.0	"							
Aroclor 1248	ND	25.0	"							
Aroclor 1254	ND	25.0	"							
Aroclor 1260	ND	25.0	"							
LCS (AH40107-BS1)				Prepared: 01-Aug-14 Analyzed: 04-Aug-14						
Aroclor 1260	438	25.0	ug/kg	400		109	60-140			
LCS Dup (AH40107-BSD1)				Prepared: 01-Aug-14 Analyzed: 04-Aug-14						
Aroclor 1260	370	25.0	ug/kg	400		92.4	60-140	16.9	40	
Matrix Spike (AH40107-MS1)		**Source: 1408001-02**		Prepared: 01-Aug-14 Analyzed: 04-Aug-14						
Aroclor 1260	464	25.0	ug/kg	400	ND	116	60-140			
Matrix Spike Dup (AH40107-MSD1)		**Source: 1408001-02**		Prepared: 01-Aug-14 Analyzed: 04-Aug-14						
Aroclor 1260	400	25.0	ug/kg	400	ND	99.9	60-140	14.8	40	

Respectfully Submitted,

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Report Date: 07-Aug-14 16:16
Subject: Soil/Misc. Samples

Project/P.O.#: Caltrans TO-17, 185802873

Volatile Organic Compounds by EPA Method 8260B - Quality Control

Parameter	Result	Rep. Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Note
Batch AH40418 - Volatiles										
Blank (AH40418-BLK1)				Prepared & Analyzed: 04-Aug-14						
Surrogate: Dibromofluoromethane	*51.4*		*ug/kg*	*50.0*		*103*	*75-125*			
Surrogate: Toluene-d8	*49.9*		*"*	*50.0*		*99.7*	*75-125*			
Surrogate: Bromofluorobenzene	*50.0*		*"*	*50.0*		*100*	*75-125*			
Dichlorodifluoromethane	ND	0.5	"							
Chloromethane	ND	0.5	"							
Vinyl chloride	ND	0.5	"							
Bromomethane	ND	0.5	"							
Chloroethane	ND	0.5	"							
Trichlorofluoromethane (Freon 11)	ND	0.5	"							
Trichlorotrifluoroethane (Freon 113)	ND	0.5	"							
1,1-Dichloroethene	ND	0.5	"							
Acetone	ND	5.0	"							
Isopropyl alcohol	ND	10.0	"							
Methylene chloride	ND	0.5	"							
Tert-butyl alcohol	ND	2.0	"							
Methyl tert-butyl ether	ND	0.5	"							
t-1,2-Dichloroethene	ND	0.5	"							
1,1-Dichloroethane	ND	0.5	"							
Di-isopropyl ether	ND	0.5	"							
Vinyl acetate	ND	10.0	"							
Ethyl tert-butyl ether	ND	0.5	"							
2-Butanone (MEK)	ND	5.0	"							
2,2-Dichloropropane	ND	0.5	"							
c-1,2-Dicholoroethene	ND	0.5	"							
Bromochloromethane	ND	0.5	"							

Respectfully Submitted,

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Volatile Organic Compounds by EPA Method 8260B - Quality Control

Parameter	Result	Rep. Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Note
Batch AH40418 - Volatiles										
Blank (AH40418-BLK1)				Prepared & Analyzed: 04-Aug-14						
Chloroform	ND	0.5	"							
1,1,1-Trichloroethane	ND	0.5	"							
Carbon tetrachloride	ND	0.5	"							
1,1-Dichloropropene	ND	0.5	"							
Benzene	ND	0.5	"							
1,2-Dichloroethane	ND	0.5	"							
Tert-amyl methyl ether	ND	0.5	"							
Trichloroethene	ND	0.5	"							
1,2-Dichloropropane	ND	0.5	"							
Dibromomethane	ND	0.5	"							
Bromodichloromethane	ND	0.5	"							
2-Chloroethylvinyl ether	ND	10.0	"							
c-1,3-Dichloropropene	ND	0.5	"							
Methyl isobutyl ketone	ND	5.0	"							
Toluene	ND	0.5	"							
t-1,3-Dichloropropene	ND	0.5	"							
1,1,2-Trichloroethane	ND	0.5	"							
Tetrachloroethene	ND	0.5	"							
1,3-Dichloropropane	ND	0.5	"							
2-Hexanone	ND	0.5	"							
Dibromochloromethane	ND	0.5	"							
1,2-Dibromoethane (EDB)	ND	0.5	"							
Chlorobenzene	ND	0.5	"							
Ethylbenzene	ND	0.5	"							
1,1,1,2-Tetrachloroethane	ND	0.5	"							
m,p-Xylene	ND	0.5	"							

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Volatile Organic Compounds by EPA Method 8260B - Quality Control

Parameter	Result	Rep. Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Note
Batch AH40418 - Volatiles										
Blank (AH40418-BLK1)				Prepared & Analyzed: 04-Aug-14						
o-Xylene	ND	0.5	"							
Styrene	ND	0.5	"							
Bromoform	ND	0.5	"							
Isopropylbenzene	ND	0.5	"							
Bromobenzene	ND	0.5	"							
1,1,2,2-Tetrachloroethane	ND	0.5	"							
n-Propylbenzene	ND	0.5	"							
1,2,3-Trichloropropane	ND	0.5	"							
2-Chlorotoluene	ND	0.5	"							
1,3,5-Trimethylbenzene	ND	0.5	"							
4-Chlorotoluene	ND	0.5	"							
tert-Butylbenzene	ND	0.5	"							
1,2,4-Trimethylbenzene	ND	0.5	"							
sec-Butylbenzene	ND	0.5	"							
1,3-Dichlorobenzene	ND	0.5	"							
p-Isopropyltoluene	ND	0.5	"							
1,4-Dichlorobenzene	ND	0.5	"							
n-Butylbenzene	ND	0.5	"							
1,2-Dichlorobenzene	ND	0.5	"							
1,2-Dibromo-3-chloropropane	ND	0.5	"							
1,2,4-Trichlorobenzene	ND	0.5	"							
Hexachlorobutadiene	ND	0.5	"							
Naphthalene	ND	0.5	"							
1,2,3-Trichlorobenzene	ND	0.5	"							
LCS (AH40418-BS1)				Prepared & Analyzed: 04-Aug-14						

Respectfully Submitted,

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Volatile Organic Compounds by EPA Method 8260B - Quality Control

Parameter	Result	Rep. Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Note
Batch AH40418 - Volatiles										
LCS (AH40418-BS1)				Prepared & Analyzed: 04-Aug-14						
Surrogate: Dibromofluoromethane	*51.8*		*ug/kg*	*50.0*		*104*	*75-125*			
Surrogate: Toluene-d8	*50.6*		*"*	*50.0*		*101*	*75-125*			
Surrogate: Bromofluorobenzene	*50.2*		*"*	*50.0*		*100*	*75-125*			
1,1-Dichloroethene	22.3	0.5	"	25.0		89.2	80-120			
Benzene	23.8	0.5	"	25.0		95.2	80-120			
Trichloroethene	24.6	0.5	"	25.0		98.5	80-120			
Toluene	24.4	0.5	"	25.0		97.6	80-120			
Chlorobenzene	23.8	0.5	"	25.0		95.4	80-120			
LCS Dup (AH40418-BSD1)				Prepared & Analyzed: 04-Aug-14						
Surrogate: Dibromofluoromethane	*51.5*		*ug/kg*	*50.0*		*103*	*75-125*			
Surrogate: Toluene-d8	*50.0*		*"*	*50.0*		*100*	*75-125*			
Surrogate: Bromofluorobenzene	*50.7*		*"*	*50.0*		*101*	*75-125*			
1,1-Dichloroethene	25.1	0.5	"	25.0		100	80-120	11.7	20	
Benzene	25.8	0.5	"	25.0		103	80-120	7.99	20	
Trichloroethene	26.6	0.5	"	25.0		107	80-120	7.84	20	
Toluene	26.3	0.5	"	25.0		105	80-120	7.34	20	
Chlorobenzene	25.9	0.5	"	25.0		103	80-120	8.17	20	
Matrix Spike (AH40418-MS1)		**Source: 1407460-62**		Prepared & Analyzed: 04-Aug-14						
Surrogate: Dibromofluoromethane	*52.4*		*ug/kg*	*50.0*		*105*	*75-125*			
Surrogate: Toluene-d8	*50.4*		*"*	*50.0*		*101*	*75-125*			
Surrogate: Bromofluorobenzene	*50.7*		*"*	*50.0*		*101*	*75-125*			
1,1-Dichloroethene	22.4	0.5	"	25.0	ND	89.6	75-125			
Benzene	24.8	0.5	"	25.0	ND	99.2	75-125			
Trichloroethene	24.7	0.5	"	25.0	ND	98.9	75-125			

Respectfully Submitted,

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PAT-CHEM LABORATORIES
11990 Discovery Ct. • Moorpark, CA 93021 • Ph. (805) 532-0012 • Fax (805) 532-0016

Customer: **Stantec**
25864 F Business Center Drive
Redlands CA, 92374

Attention: Erin Baily
Report Date: 07-Aug-14 16:16
Subject: Soil/Misc. Samples

Project/P.O.#: Caltrans TO-17, 185802873

Volatile Organic Compounds by EPA Method 8260B - Quality Control

Parameter	Result	Rep. Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Note
Batch AH40418 - Volatiles										
Matrix Spike (AH40418-MS1)		**Source: 1407460-62**		Prepared & Analyzed: 04-Aug-14						
Toluene	24.9	0.5	"	25.0	ND	99.8	75-125			
Chlorobenzene	24.5	0.5	"	25.0	ND	98.1	75-125			
Matrix Spike Dup (AH40418-MSD1)		**Source: 1407460-62**		Prepared & Analyzed: 04-Aug-14						
Surrogate: Dibromofluoromethane	*52.9*		*ug/kg*	*50.0*		*106*	*75-125*			
Surrogate: Toluene-d8	*50.2*		*"*	*50.0*		*100*	*75-125*			
Surrogate: Bromofluorobenzene	*50.8*		*"*	*50.0*		*102*	*75-125*			
1,1-Dichloroethene	24.9	0.5	"	25.0	ND	99.6	75-125	10.5	25	
Benzene	25.9	0.5	"	25.0	ND	104	75-125	4.26	25	
Trichloroethene	26.4	0.5	"	25.0	ND	105	75-125	6.34	25	
Toluene	25.6	0.5	"	25.0	ND	102	75-125	2.61	25	
Chlorobenzene	25.3	0.5	"	25.0	ND	101	75-125	3.05	25	

Respectfully Submitted,

Steve Jefferson 8/7/2014
Laboratory Director

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TVPH by GC FID - Quality Control

Parameter	Result	Rep. Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Note
Batch AH40516 - General Prep										
Blank (AH40516-BLK1)				Prepared & Analyzed: 05-Aug-14						
Surrogate: 1-chloro-4-fluorobenzene	*0.0241*		*mg/kg*	*0.0250*		*96.3*	*60-140*			
Gasoline	ND	0.050	"							
LCS (AH40516-BS1)				Prepared & Analyzed: 05-Aug-14						
Surrogate: 1-chloro-4-fluorobenzene	*0.0257*		*mg/kg*	*0.0250*		*103*	*60-140*			
Gasoline	0.0885	0.050	"	0.100		88.5	80-120			
LCS Dup (AH40516-BSD1)				Prepared & Analyzed: 05-Aug-14						
Surrogate: 1-chloro-4-fluorobenzene	*0.0244*		*mg/kg*	*0.0250*		*97.7*	*60-140*			
Gasoline	0.0842	0.050	"	0.100		84.2	80-120	4.95	20	
Matrix Spike (AH40516-MS1)		**Source: 1407460-62**		Prepared: 05-Aug-14 Analyzed: 06-Aug-14						
Surrogate: 1-chloro-4-fluorobenzene	*0.0255*		*mg/kg*	*0.0250*		*102*	*60-140*			
Gasoline	0.0894	0.050	"	0.100	ND	89.4	70-130			
Matrix Spike Dup (AH40516-MSD1)		**Source: 1407460-62**		Prepared: 05-Aug-14 Analyzed: 06-Aug-14						
Surrogate: 1-chloro-4-fluorobenzene	*0.0251*		*mg/kg*	*0.0250*		*100*	*60-140*			
Gasoline	0.0807	0.050	"	0.100	ND	80.7	70-130	10.2	20	

Respectfully Submitted,

Steve Jefferson 8/7/2014
Laboratory Director

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Customer: **Stantec**
25864 F Business Center Drive
Redlands CA, 92374

Attention: Erin Baily
Report Date: 07-Aug-14 16:16
Subject: Soil/Misc. Samples

Project/P.O.#: Caltrans TO-17, 185802873

Notes and Definitions

QM-4X	The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis

Respectfully Submitted,

Steve Jefferson 8/7/2014
Laboratory Director

State of California

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: MR. DAN ADAMS
Structure Design
Office of Bridge Design-South 2
Bridge Design Branch 10

Attention: Mr. Larry Wu

Date: April 9, 2014

File: 08-SBD-15-PM 172.11
08-0M2801
PID: 0800000472
Cenda Ditch Bridge
(Replace)
Br. #54-1308L

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
GEOTECHNICAL SERVICES
OFFICE OF GEOTECHNICAL DESIGN – SOUTH 2
DESIGN BRANCH B, MS #5

Subject: Foundation Report For Cenda Ditch Bridge (Replace)

This report presents foundation recommendations for the proposed replacement of the Cenda Ditch Bridge (Br. No. 54-1308L) and supersedes all previously generated Preliminary Foundation Reports for this structure. The following report is based on information gathered during a subsurface investigation conducted by URS in May 2013, as well as a review of "As-built" Log of Test Boring (LOTB) data from a 1960 foundation investigation; "As-built" foundation recommendations from 1960 and 1967; foundation reviews from 1961 and 1967; and Final Seismic Design Recommendations dated March 26, 2014. All elevations referenced in this memorandum are in feet, and are referenced to the 1929 National Geodetic Vertical Datum (NGVD29).

Project Description

The bridge site is located on Interstate 15 in San Bernardino County, approximately 14 miles west of the California/Nevada state line, and spans Cenda Ditch. For several years, the Bridge Inspection Reports have documented the abutments and the soffit having diagonal/vertical cracks with heavy efflorescence and AC binder stains. As well, the bent caps were noted as having severe diagonal/pattern cracks with efflorescence and AC binder stains with spalling at some locations. The Bridge Inspection Report, dated April 10, 2008, noted that the structure appears to have settled significantly at the easterly (Abutment 10) end of the bridge.

A Peer Review Fact Sheet, dated August 26, 2008, indicates that a Structure Maintenance & Investigation Peer Review was convened on August 26, 2008 to discuss possible repair strategies for the Cenda Ditch Bridge. The fact sheet mentions the presence of reactive aggregates in the bridge concrete, as well as abutment settlement. The Peer Review had recommended that District 8 remove and replace the concrete slab and abutment on the widened portion of the bridge, rather than replacing the bridge. On April 6, 2009, staff from the Office of Geotechnical Design, South 2 visited the bridge site and significant settlement was also noted at Abutment 10 of the bridge. The Office of Geotechnical Design- South 2 determined for both the original and widened portion of the bridge, the estimated allowable bearing capacity for the

existing 2.5 ft wide abutment footing is 1.0 tsf. The abutment design footing pressures for the original and widened structures are 2.0 tsf and 1.5 tsf, respectively. By current design standards, the existing 2.5 ft wide abutment footings are inadequate. Therefore, it has been decided to completely replace the bridge.

The proposed Cenda Ditch replacement bridge is to consist of a three span, cast-in-place, reinforced concrete, box-girder structure on seat abutments. The new structure is proposed to be 80 ft-4 in wide and 242 ft long.

Geology

The bridge site is located in the eastern part of the Mojave Desert, and within the Clark Mountain Range. The geologic map of California, Kingman Sheet (Jennings, 1961) shows that the bridge site is located on Quaternary alluvium in the streambed, which is underlain by Precambrian metamorphic bedrock.

A subsurface investigation was performed in May 2013 which consisted of four mud rotary borings. Boring RC-13-001 was drilled on the south side of the bridge near the center of the wash. In that boring about 4 feet of alluvial material, consisting of a medium dense to dense, well-graded sand with gravel, extends down to about elevation 4475 ft, where metamorphic bedrock was encountered. The metamorphic bedrock (Gneiss) is moderately weathered, moderately hard to hard, and moderately to intensely fractured to the maximum depth drilled in boring RC-13-001 (30 ft, elev. 4448.9 ft).

Boring RC-13-002 was drilled on the north side of the bridge near the center of the wash. In that boring about 8 feet of alluvial material, consisting of a medium dense well-graded sand with gravel, extends down to about elevation 4477.5 ft, where metamorphic bedrock was encountered. The metamorphic bedrock (Granulite) ranges from slightly weathered to decomposed, moderately hard to very soft, slightly to intensely fractured to the maximum depth drilled in boring RC-13-002 (35 ft, elev. 4450.5 ft).

Boring RC-13-003 was drilled north of the left side of existing Abutment 1. In that boring about 7 feet of alluvial material, consisting of a medium dense clayey sand with gravel, extends down to about elevation 4483 ft, where metamorphic bedrock was encountered. The metamorphic bedrock (Gneiss) ranges from moderately to intensely weathered, moderately hard to moderately soft, moderately to intensely fractured to the maximum depth drilled in boring RC-13-003 (35 ft, elev. 4455.1 ft).

Boring RC-13-004 was drilled north of the left side of existing Abutment 10. In that boring about 5 feet of fill material overlays 17 feet of alluvial material consisting of a medium dense clayey sand with gravel. Beneath the alluvial material, at about elevation 4475.5 ft, metamorphic bedrock was encountered. The metamorphic bedrock (Gneiss) ranged from slightly to moderately weathered, extremely hard to moderately hard, slightly to moderately fractured to the maximum depth drilled in boring RC-13-004 (40 ft, elev. 4452.5 ft).

Ground Water

Due to the Cenda Ditch Bridge being located in an extremely arid environment, it is anticipated that ground and surface water would only be present during brief wet periods. On December 10, 2013 a small amount of surface water was observed flowing in Cenda Ditch, and water was measured in boring RC-13-001 at the ground surface (elev. 4478.9 ft). Ground water levels indicated in this report reflect the measured ground water level in the borehole on the specified date. Ground water elevations are subject to seasonal fluctuations and will be encountered at higher or lower elevations depending on current conditions.

Scour Potential

The bridge is located in a desert area where there is the potential for flash-flooding in the creek channel during and after severe storm events, therefore, there is scour potential at the site. The Office of Structure Hydraulics and Hydrology has provided a Hydraulics Report, dated April 1, 2014, which states that the depth of potential scour at the site is 17 feet below the ground surface. The Hydraulics Report states that scourable channel bed material was used for the scour calculations. However, due to metamorphic bedrock underlying the bridge site just below the ground surface, it is unlikely that scour would extend below the top of bedrock elevation during the lifespan of the bridge. The bent footings are at least two feet into the bedrock, therefore any scour should be above the top of the bent footings.

Corrosion

Three soil samples were collected for corrosion testing during the 2013 subsurface investigation. Corrosion test results for those samples are shown below in Table 1. Based on current Caltrans' standards, the site is considered to be non-corrosive.

Table 1 – Corrosion Test Summary

Location	Minimum Resistivity (Ohm-Cm)	pH	Chloride Content (ppm)	Sulfate Content (ppm)
Boring RC-13-003 (Elev. 4485.1 – 4484.1 ft)	650	8.8	225	72
Boring RC-13-004 (Elev. 4487.5 – 4486.5 ft)	1420	8.1	60	60
Boring RC-13-004 (Elev. 4482.5 – 4477.5 ft)	1250	8.1	225	57

Note: Caltrans currently defines a corrosive environment as an area where the soil has either a chloride concentration of 500 ppm or greater, a sulfate concentration of 2000 ppm or greater, or has a pH of 5.5 or less.

Fault and Seismic Data

The structure site is potentially subject to ground motions from nearby earthquake sources during the design life of the new structure. The Office of Geotechnical Design-South 2 has provided Final Seismic Design Recommendations in a memorandum dated March 26, 2014. For the deterministic procedure, the controlling fault for the site is the Garlock (East) fault (Fault ID: 227, strike-slip, dip=90°) with a maximum credible earthquake M_{max}=7.7, located approximately 26 miles west of the bridge site. For this site, the design response spectrum is controlled by a minimum deterministic response spectrum for periods below 1-second, and

probabilistic response spectrum beyond the period of 1-second. The corresponding peak horizontal ground acceleration (PGA) at the site is 0.21g.

Surface Rupture Potential

Surface rupture potential at the bridge site is considered low, due to no active fault passing beneath the bridge site.

Liquefaction Potential / Lateral Spreading / Seismic Settlement

The Final Seismic Design Recommendations, dated March 26, 2014, state that due to the bedrock being located at or just below the ground surface at the bridge site, liquefaction and lateral spreading potential at this site is considered low. Seismic settlement due to strong ground motion is less than one inch.

"As-built" Information

The existing Cenda Ditch Bridge consists of a nine-span, cast-in-place, slab bridge. The original bridge was constructed in 1963, and then was widened by approximately 12 feet on the right side in 1969. Abutments 1 and 10 are end-diaphragm abutments and are supported on spread footings placed in approximately 20 feet of embankment fill material. Bents 2 through 9 are supported on seven columns (5 for the original structure, and 2 for the widening) on spread footings founded on the underlying bedrock. The original Foundation Report from 1960 recommended footing pressures of 2.0 tsf at the abutments, founded on compacted fill, and recommended footing pressures of 5.0 tsf for the bent footings, placed five feet or more below stream grade. The 1961 foundation review recommended placing the bent footings at or below elevation 4475.0 ft. The 1967 Foundation Report, for the widening, also recommended the abutments may be placed at any elevation in the 95% relative compacted embankments with a design load of 2.0 tsf, and the bent footings be placed at or below elevation 4475.0 ft at a design load of 5.0 tsf. The "As-built" spread footing bottom of footing elevations and design loads for the original bridge and the right-side widening are shown below in Tables 2 and 3.

Table 2: Original Construction "As-built" Bottom of Footing Elevations and Design Loads

Location	"As-built" Bottom of Footing Elevations	"As-built" Design Loads
Abutment 1	4499.10 ft on left to 4496.91 ft on right	2.0 tsf
Pier 2	4475.0 ft	5.0 tsf
Pier 3	4475.0 ft	5.0 tsf
Pier 4	4475.0 ft	5.0 tsf
Pier 5	4475.0 ft	5.0 tsf
Pier 6	4474.0 ft	5.0 tsf
Pier 7	4473.0 ft	5.0 tsf
Pier 8	4472.0 ft	5.0 tsf
Pier 9	4475.0 ft	5.0 tsf
Abutment 10	4490.77 ft on left to 4488.70 ft on right	2.0 tsf

Table 3: Right Side Widening, "As-built" Bottom of Footing Elevations and Design Loads

Location	"As-built" Bottom of Footing Elevations	"As-built" Design Loads
Abutment 1	4496.9 ft on left to 4496.3 ft on right	1.5 tsf
Pier 2 left column Pier 2 right column	4475.1 ft 4476.5 ft	4.0 tsf
Pier 3 left column Pier 3 right column	4474.8 ft 4475.5 ft	4.0 tsf
Pier 4 left column Pier 4 right column	4475.0 ft 4475.0 ft	4.0 tsf
Pier 5 left column Pier 5 right column	4473.4 ft 4474.4 ft	4.0 tsf
Pier 6 left column Pier 6 right column	4473.3 ft 4473.7 ft	4.0 tsf
Pier 7 left column Pier 7 right column	4470.5 ft 4473.5 ft	4.0 tsf
Pier 8 left column Pier 8 right column	4473.2 ft 4474.2 ft	4.0 tsf
Pier 9 left column Pier 9 right column	4473.4 ft 4473.5 ft	4.0 tsf
Abutment 10	4488.7 ft on left to 4488.1 ft on right	1.5 tsf

Foundation Recommendations

The following recommendations are for the Cenda Ditch Bridge (Br. No. 54-1308L) replacement, as shown on the General Plan dated February 18, 2014.

Abutments 1 and 4 Footing Locations

At Abutments 1 and 4 support locations spread footings are recommended for support. The proposed Abutment 1 and 4 footings may be founded in structure backfill material compacted to 95% relative compaction. At Abutments 1 and 4 support locations it is recommended to excavate and replace the existing fill material with structure backfill material compacted to 95% relative compaction prior to constructing the new footings. Table 4 below, presents Abutments 1 and 4 spread footing design information provided by the structure designer.

Table 4: Cenda Ditch Bridge (Br. #54-1308L) Abutments 1 and 4 Footings Spread Footing Design Information Provided by the Structure Designer

Support Location	Bottom of Footing Elevation	Footing Size		Permissible Settlement Under Service Load	Service Limit State I						
					Total Load				Permanent Load		
					Vertical Load	Effective Dimensions		Horizontal Load in Long. Direction	Vertical Load	Effective Dimensions	
		B	L			B'	L'			B'	L'
Abutment 1	Varies 4493.58 to 4489.62 ft	9.0 ft	162.0 ft	1 in	3920 kips	6.5 ft	162.0 ft	1070 kips	3500 kips	7.0 ft	162.0 ft
Abutment 4	Varies 4484.17 to 4480.65 ft	9.0 ft	156.0 ft	1 in	3820 kips	6.5 ft	156.0 ft	1070 kips	3400 kips	7.0 ft	156.0 ft

The recommended Allowable Bearing Capacities and bottom of footing elevations are listed below in Table 5.

Table 5: Cenda Ditch Bridge (Br. #54-1308L)
Abutments 1 and 4 Footings Foundation Design Recommendations

Support Location	Effective Footing Size		Bottom of Footing Elevation	Bottom of Subexcavation Elevation	Minimum Footing Embedment Depth	Total Permissible Support Settlement	WSD (LRFD Service I Limit State Load Combination)	
	B'	L'					Permissible Gross Contact Stress	Allowable Gross Bearing Capacity
Abutment 1	6.5 ft	162.0 ft	Varies 4493.58 to 4489.62 ft	4486.0 ft	5.0 ft	1.0 in	N/A*	5.0 ksf
Abutment 4	6.5 ft	156.0 ft	Varies 4484.17 to 4480.65 ft	4477.0 ft	5.0 ft	1.0 in	N/A*	5.0 ksf

Notes: 1) Recommendations are based on the foundation geometry and the load provided by the structure designer. The footing contact area is taken as equal to the effective footing area, where applicable.
*Settlement is N/A due to bottom of footing founded on fill material overlying shallow metamorphic bedrock

The recommended Allowable Gross Bearing Capacities to be used for design, provided in Table 5, above, are based on the following design criteria:

1) The spread footings have minimum widths (B) as shown in Table 4.

2) The spread footings are to be constructed at or below the recommended bottom of footing elevations shown in Table 5.

3) At Abutments 1 and 4 support locations, where the existing fill material is to be excavated and replaced with 95% compacted structure backfill material, the minimum limits of fill removal and replacement are to conform to the limits specified for relative compaction of embankments under retaining wall footings without piles as defined in section 19-5.03B of the Standard Specifications.

4) At Abutments 1 and 4 locations, the abutment footings that will be constructed on the embankment slope are to be positioned such that they have a minimum horizontal footing embedment of 4 feet, measured from the top of footing to the face of the finished slope.

If any of the above loading conditions are changed, minimum footing widths or embedment depths are reduced, or bottom of footing elevations raised, the Office of Geotechnical Design-South 2, Branch B, is to be contacted for reevaluation.

Bents 2 and 3 Footing Locations

At Bents 2 and 3 support locations, spread footings are recommended for support. Bents 2 and 3 footings may be supported on the underlying metamorphic bedrock. Tables 6 and 7 below, present Bents 2 and 3 spread footing design information provided by the structure designer.

Table 6: Cenda Ditch Bridge (Br. #54-1308L)
Bents 2 and 3 Spread Footing Design Information Provided by Structure Designer

Support Location*	Bottom of Footing Elevation	Footing Size		Permissible Settlement Under Service Load	Service Limit State I					
					Total Load			Permanent Load		
					Vertical Load	Effective Dimensions		Vertical Load	Effective Dimensions	
		B	L			B'	L'		B'	L'
Bent 2 Column 1	4475.0 ft	10.0 ft	10.0 ft	1 in	1050 kips	10.0 ft	10.0 ft	960 kips	10.0 ft	10.0 ft
Bent 2 Column 2	4473.0 ft	10.0 ft	10.0 ft	1 in	1100 kips	10.0 ft	10.0 ft	1010 kips	10.0 ft	10.0 ft
Bent 2 Column 3	4473.0 ft	10.0 ft	10.0 ft	1 in	1080 kips	10.0 ft	10.0 ft	990 kips	10.0 ft	10.0 ft
Bent 2 Column 4	4473.0 ft	10.0 ft	10.0 ft	1 in	1000 kips	10.0 ft	10.0 ft	910 kips	10.0 ft	10.0 ft
Bent 3 Column 1	4472.0 ft	10.0 ft	10.0 ft	1 in	1050 kips	10.0 ft	10.0 ft	960 kips	10.0 ft	10.0 ft
Bent 3 Column 2	4470.0 ft	10.0 ft	10.0 ft	1 in	1100 kips	10.0 ft	10.0 ft	1010 kips	10.0 ft	10.0 ft
Bent 3 Column 3	4470.0 ft	10.0 ft	10.0 ft	1 in	1080 kips	10.0 ft	10.0 ft	990 kips	10.0 ft	10.0 ft
Bent 3 Column 4	4470.0 ft	10.0 ft	10.0 ft	1 in	1000 kips	10.0 ft	10.0 ft	910 kips	10.0 ft	10.0 ft

*Columns are numbered from left to right

Table 7: Cenda Ditch Bridge (Br. #54-1308L)
Bents 2 and 3 Spread Footing Design Information Provided by Structure Designer

Support Location*	Strength Limit State (Controlling Group)			Extreme Limit State (Controlling Group)		
	Vertical Load	Effective Dimension		Vertical Load	Effective Dimension	
		B'	L'		B'	L'
Bent 2 Column 1	1710 kips	10 ft	10 ft	1220 kips	10.0 ft	10.0 ft
Bent 2 Column 2	1750 kips	10 ft	10 ft	1280 kips	10.0 ft	10.0 ft
Bent 2 Column 3	1730 kips	10 ft	10 ft	1260 kips	10.0 ft	10.0 ft
Bent 2 Column 4	1680 kips	10 ft	10 ft	1180 kips	10.0 ft	10.0 ft
Bent 3 Column 1	1710 kips	10 ft	10 ft	1220 kips	10.0 ft	10.0 ft
Bent 3 Column 2	1750 kips	10 ft	10 ft	1280 kips	10.0 ft	10.0 ft
Bent 3 Column 3	1730 kips	10 ft	10 ft	1260 kips	10.0 ft	10.0 ft
Bent 3 Column 4	1680 kips	10 ft	10 ft	1180 kips	10.0 ft	10.0 ft

*Columns are numbered from left to right.

The recommended Factored Gross Nominal Bearing Resistances and bottom of footing elevations for Bents 2 and 3 are listed below in Table 8.

Table 8: Cenda Ditch Bridge (Br. #54-1308L)
Bents 2 and 3 LRFD Spread Footing Recommendations

Support Location*	Controlling Case Effective Footing Size (ft)**		Bottom of Footing Elevation (ft)	Minimum Footing Embedment Depth (ft)	Total Permissible Support Settlement (in)	Service Limit State	Strength Limit State (φ_b=0.45)	Extreme Event Limit State (φ_b=1.0)
	B'	L'				Permissible Net Contact Stress[1] (ksf)	Factored Gross Nominal Bearing Resistance[2] (ksf)	Factored Gross Nominal Bearing Resistance[2] (ksf)
Bent 2 Column 1	10.0 ft	10.0 ft	4475.0 ft.	4.0 ft.	1 in	N/A	18.0 ksf	40.0 ksf
Bent 2 Column 2	10.0 ft	10.0 ft	4473.0 ft.	4.0 ft.	1 in	N/A	18.0 ksf	40.0 ksf
Bent 2 Column 3	10.0 ft	10.0 ft	4473.0 ft.	4.0 ft.	1 in	N/A	18.0 ksf	40.0 ksf
Bent 2 Column 4	10.0 ft	10.0 ft	4473.0 ft.	4.0 ft.	1 in	N/A	18.0 ksf	40.0 ksf
Bent 3 Column 1	10.0 ft	10.0 ft	4472.0 ft.	4.0 ft.	1 in	N/A	18.0 ksf	40.0 ksf
Bent 3 Column 2	10.0 ft	10.0 ft	4470.0 ft.	4.0 ft.	1 in	N/A	18.0 ksf	40.0 ksf
Bent 3 Column 3	10.0 ft	10.0 ft	4470.0 ft.	4.0 ft.	1 in	N/A	18.0 ksf	40.0 ksf
Bent 3 Column 4	10.0 ft	10.0 ft	4470.0 ft.	4.0 ft.	1 in	N/A	18.0 ksf	40.0 ksf

*Columns are numbered from left to right

**Controlling case was Strength Limit State

1. For Service-I Limit State, controlling load combination is the one resulting in the highest ratio of the Net Uniform Bearing Stress($q_{n,u}$) divided by the Permissible Net Contact Stress (q_{pn}) for foundations on soil, or the Net Maximum Bearing Stress ($q_{n,max}$) divided by the Permissible Net Contact Stress (q_{pn}) for foundations on rock. Settlement is N/A due to bottom of footing founded on dense metamorphic bedrock.
2. For Strength and Extreme Limit States, the controlling load combination is the one resulting in the highest ratio of the Gross Uniform Bearing Stress ($q_{g,u}$) divided by the Factored Gross Nominal Bearing Resistance (q_R) for foundations on soil, or the Gross Maximum Bearing Stress ($q_{g,max}$) divided by the Factored Gross Nominal Bearing Resistance (q_R) for foundations on rock. Factored Gross Nominal Bearing Resistances were calculated for controlling load combinations.

In Table 8, above, the Factored Gross Nominal Bearing Resistances (q_R) to be used for design, are based on the following design criteria:

1) The final designed spread footing will have an effective width (B') such that the Gross Uniform Bearing Stress ($q_{g,u}$) does not exceed the recommended design values for the Factored Gross Nominal Bearing Resistances (q_R) for Strength and Extreme Limit States.

At Bents 2 and 3 the spread footings are to be constructed at or below the recommended bottom of footing elevation shown in Table 8.

If any of the above loading conditions are changed, minimum footing widths or embedment depths are reduced, or bottom of footing elevations raised, the Office of Geotechnical Design-South 2, Branch B, is to be contacted for reevaluation.

The Spread Footing Data Table is presented in Table 9, below.

Table 9: Cenda Ditch Bridge (Br. #54-1308L)
Spread Footing Data Table

Support Location*	Working Stress Design (WSD)		Load and Resistance Factor Design (LRFD)		
	Permissible Gross Contact Stress	Allowable Gross Bearing Capacity	Service Limit State	Strength Limit State (φ_b=0.45)	Extreme Event Limit State (φ_b=1.0)
			Permissible Net Contact Stress (ksf)	Factored Gross Nominal Bearing Resistance (ksf)	Factored Gross Nominal Bearing Resistance (ksf)
Abutment 1	N/A*	5.0 ksf	N/A	N/A	N/A
Bent 2 Column 1	N/A	N/A	N/A*	18.0 ksf	40.0 ksf
Bent 2 Column 2	N/A	N/A	N/A*	18.0 ksf	40.0 ksf
Bent 2 Column 3	N/A	N/A	N/A*	18.0 ksf	40.0 ksf
Bent 2 Column 4	N/A	N/A	N/A*	18.0 ksf	40.0 ksf
Bent 3 Column 1	N/A	N/A	N/A*	18.0 ksf	40.0 ksf
Bent 3 Column 2	N/A	N/A	N/A*	18.0 ksf	40.0 ksf
Bent 3 Column 3	N/A	N/A	N/A*	18.0 ksf	40.0 ksf
Bent 3 Column 4	N/A	N/A	N/A*	18.0 ksf	40.0 ksf
Abutment 4	N/A*	5.0 ksf	N/A	N/A	N/A

*Settlement is N/A due to bottom of footing founded on dense metamorphic rock at the Bent locations, and on fill material overlying shallow metamorphic rock at the Abutment locations.

General Notes:

1) All support locations are to be plotted in plan view on the Log of Test Borings as stated in "Memo to Designers" 4-2. The plotting of support locations should be made prior to requesting a final foundation review.

Construction Considerations:

1) At Abutments 1 and 4 support locations it is recommended to excavate the existing fill material down to the elevations shown in Table 5, and backfill up to the bottom of footing elevations with structure backfill material compacted to 95% relative compaction prior to constructing the new footings. The minimum limits of fill removal and replacement are to

conform to the limits specified for relative compaction of embankments under retaining wall footings without piles as defined in section 19-5.03B of the Standard Specifications.

2) At Abutments 1 and 4 support location, concrete for the proposed support footings shall be placed neat against the undisturbed structure backfill material on the bottom of the footing excavation. Should the bottom of the footing excavation be disturbed, then the disturbed soils shall be recompacted to 95% relative compaction prior to placement of concrete for the structure support footings.

3) At Bents 2 and 3 support locations, concrete for the proposed support footings shall be placed neat against the undisturbed metamorphic bedrock at the bottom of the footing excavations. Should the bottom of the footing excavations be disturbed, then the bottom of the footing excavations shall be extended down at 0.5 ft intervals until undisturbed metamorphic bedrock material is observed and approved by the Engineer. The subexcavated material is to be replaced with lean concrete.

4) At the abutment and bent spread footing support locations of the Cenda Ditch left bridge, the footing excavations are to be inspected and approved by a representative of the Office of Geotechnical Design-South 2, Branch B, prior to placing any steel and/or structural or lean concrete. The required inspection is to verify that the concrete is placed on top of undisturbed fill material at the abutment locations, and on undisturbed metamorphic bedrock at the bent locations. Once the excavation has been completed to the specified elevations, the contractor is to allow the Office of Geotechnical Design–South 2, Branch B, seven (7) contract days to perform the inspection. The structures representative is to provide the Office of Geotechnical Design–South 2, Branch B, a one-week notification prior to beginning the seven-day contractor waiting period.

This Foundation Report is based on specific project information regarding structure type and location that have been provided by the Office of Bridge Design-South 2. If any conceptual changes are made during final project design, the Office of Geotechnical Design-South 2, Design Branch B should review those changes to determine if this report is still applicable. Any questions regarding the above report should be directed to the attention of Erich Neupert, (916) 227-4565, or Mark DeSalvatore, (916) 227-5391 at the Office of Geotechnical Design-South 2, Branch B.

Prepared by: Date: 4/9/14

Erich Neupert

Erich Neupert, P.G., 8137
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Reviewed by: Date: 4/9/14

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cc: R.E. Pending File
Gudmund Setberg-Specs & Estimates
Leo Chen-Dist. 8 Project Manager
Bruce Kean-Dist. 8 Materials Engineer
Abbas Abghari – OGDS 2
Mark DeSalvatore – OGDS 2 FDH for MD
Geotechnical Archive

State of California – Department of Transportation
Division of Engineering Services
Structure Design Services

FINAL HYDRAULIC REPORT

Cenda Ditch Bridge

(Replace 54-0620L)
New Bridge No. 54-1308L
08 – SBD – 015 – PM 172.11
EA No. 08-0M2801
EFIS No. 0800000472

Prepared by:

Genaro M. Doria, PE
Structure Hydraulics and Hydrology
April 1, 2014

REGISTERED PROFESSIONAL ENGINEER
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General:

The proposed replacement bridge location is on Interstate 15 in San Bernardino County, approximately 14 miles west of the California/Nevada state line. The existing Cenda Ditch Bridge consists of a nine-span cast-in-place slab bridge. The original bridge was constructed in 1963 and widened 1969. Abutments 1 and 10 are end-diaphragm abutments and are supported on spread footings placed in approximately 20 feet of embankment fill material. Bents 2 through 9 are supported on seven columns on spread footings founded on the underlying bedrock.

According to the maintenance records and design recommendations this structure does not meet the current design and safety standards. The existing Cenda Ditch Bridge will be removed and replaced with a new bridge numbered 54-1308L for this reason.

The proposed Cenda Ditch replacement bridge is to consist of a three span cast-in-place reinforced concrete box-girder structure on seat type abutments. The new structure is proposed to be 80 ft-4 in wide and 242 ft long.

All elevations given are referenced to the data provided by Structures Design and Preliminary Investigations Surveys-South, using the NAVD 88 Vertical Datum and NAD 83 Horizontal Datum.

Basin:

The bridge site is located in the eastern section of the Mojave Desert and is fed by the Clark Mountain Range. The Cenda Ditch watershed is near 5.5 square miles and is mainly located on the north side of Interstate 15. The watersheds main reach starts at the south/east side of the Clark Mountain Range and flows southerly, spreading across a sparsely vegetated alluvial fan. Elevations range from approximately 6800 feet at the highest range of the watershed to approximately 4485 feet at the bridge site location. A small percentage of the watershed is located on the south side of Interstate 15. The watershed begins from north/east side of the Mescal Mountain Range and flows northerly to meet the main watershed area.

The watershed near the bridge site is mainly undeveloped desert area. Vegetation types are predominately creosote bush and desert wash scrub. The watersheds mean annual precipitation is near 9 inches.

Streambed:

The natural channel bed material to a depth 4 to 8 feet below grade consists of alluvium ranging from well graded sand to sandy gravel to coarse grained gravel. The material below the 4 to 8 foot alluvium consists of Metamorphic Rock (Grueiss and Granulito). This material is classified as soft to hard and moderately to intensely fractured rock. The existing bridge foundations (Br. No. 54-0620L) sit on bedrock. It

is possible that the proposed foundations will be embedded and doweled into bedrock as well. A structure foundations report will determine whether the proposed foundations will sit on scour resistant bedrock. A scourable channel bed material is used for scour calculations until it is determined in the Foundation Report that the proposed foundations will be on bedrock. The recommended foundation elevations will be adjusted once the foundation report defines scour resistant rock elevations.

At the bridge site, the channel slope is mildly steep with a gradient of approximately 0.042 ft/ft. The potential for channel migration exists for both bents and are considered in the recommendations made in this report.

Discharge:

The Cenda Ditch basin is an ungaged site, so no information for a flood of record could be found. The HEC-1 module within Watershed Modeling System (WMS) version 9.1 was used to assist in the estimation of the 100-year and 50-year frequency discharges. A temporal unit hydrograph was developed using the San Bernardino County S-Graph for desert areas. The 6-hour (thunderstorm) and 24-hour duration 100-year precipitation was analyzed to determine which would produce the highest peak discharges. The highest peak discharge was produced by the 6-hour storm. The estimated Q100 and Q50 discharges are 3300 cfs and 2660 cfs, respectively.

Hydraulic Analysis:

The channel hydraulics was modeled using the Army Corps of Engineers HEC-RAS modeling program, version 4.1.0, utilizing survey data and Digital Terrain Model data. A manning's roughness coefficient of 0.03 for both river and overbank areas was used as part of the parameters in the hydraulic analysis. Therefore, the calculated 100-year flow average velocities through the bridge are 13.0 feet per second.

For the 100-year and 50-year event, the proposed 3-span structure has approximate water surface elevations, on the upstream side bridge, of 4493 feet and 4492 feet, respectively. The proposed new soffit elevation at the lowest point on the upstream northeast corner is near 4494.2 feet. The proposed structure soffit on the EB side has 1 foot of freeboard in a 100-year event and near 10.7 of freeboard at the begin bridge side. For the 100-year and 50-year event, the proposed 3-span structure has approximate water surface elevations, on the downstream side bridge, of 4484 feet and 4483 feet, respectively. The proposed new soffit elevation at the lowest point on the downstream southeast corner is near 4490.4 feet. The proposed structure soffit on the EB side has 6 foot of freeboard in a 100-year event and near 15.8 of freeboard at the begin bridge side. Worst case scenario is only 1 foot of freeboard on the upstream side of proposed bridge.

Scour Analysis:

Scour was estimated utilizing the methods set forth in the FHWA HEC-18, "Evaluating Scour at Bridges." All scour elevations are based on the 100-year discharge.

Based on a comparison of historical channel cross-sections taken at the existing Interstate 15 structure, aerial photographs and HEC-RAS modeling the channel degradation and contraction scour calculated are 1.5 feet and 3.5 feet respectively.

The local pier scour depth was calculated to be 12 feet for a total potential scour of 17 feet. The top of footing elevation for column 1 and 2 (upstream side) for bents 2 and 3 should be place at 4468 feet. The top of footing elevation for column 3 and 4 (downstream side) for bents 2 and 3 should be placed at 4462.3 feet. An existing channel thalweg elevation of 4484.6 feet on the upstream side and existing channel thalweg elevation of 4479.3 feet on the downstream side was used. A potential for channel migration was considered to calculate the local pier scour elevations for both upstream and downstream. Top of footing elevation should be as mentioned above, unless scour resistant bedrock is reached at a higher elevation.

Structure Hydraulics does not have any Abutment Scour concerns due to the abutments being located outside of waterway area. Structure Foundations and Geology will need to be consulted on the design elevations for the abutment foundations.

Drift:

Historical records do not indicate a major problem with drift. The freeboard is sufficient to pass drift under the structure.

Bank Protection:

District Design will be responsible for bank protection. District should maintain the protection to ensure bank stability. The slope protection design will protect abutments from abutment scour.

Demolition

The existing piers should be completely removed.

Summary Table:

Below are summaries of key design parameters based on the hydrology and hydraulic analyses performed for the structure:

Hydrologic Summary for Cenda Ditch Bridge, 54-1308L			
Drainage Area: 5.5 mi^2			
Frequency	**Design Flood**	**Base Flood**	**Channel Capacity**
	50-year	100-year	N/A
Discharge	2660 cfs	3300 cfs	N/A
Water Surface Elevation at Bridge	4492.0 ft	4493.0 ft	N/A
Flood plain data are based upon information available when the plans were prepared and are shown to meet federal requirements. The accuracy of said information is not warranted by the State and interested or affected parties should make their own investigation.			
Minimum Soffit Elevation	4494.2 ft		
Local Pier Scour Depth* Scour Depth at Abutments**	17 ft N/A		
Local Pier Scour Elevation Abutment Scour Elevation	Bent 2&3 columns 1&2 4468 feet Bent 2&3 columns 3&4 4462 feet N/A		

* Pending Geotechnical Foundation Report recommendations. This depth also includes long term scour depth for contraction and degradation scour (3.5' and 1.5' respectively). ** Slope protection design is expected to protect the abutments and this is the reason no abutment scour was considered.

This report has been prepared under my direction as the professional engineer in responsible charge of the work, in accordance with the provisions of the Professional Engineers Act of the State of California.

State of California

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: MR. DAN ADAMS
Structure Design
Office of Bridge Design-South 2
Bridge Design Branch 10

Attention: Mr. Larry Wu

Date: April 28, 2014

File: 08-SBD-15-PM 173.84
08-0M2801
Proj. ID: 0800000472
Wheaton Wash Bridge
(Widen)
Br. #54-0621L

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services
Office of Geotechnical Design – South 2 MS #5
Design Branch B

Subject: Foundation Report for Wheaton Wash Bridge (Widen)

This report presents foundation recommendations for the proposed rehabilitation of the Wheaton Wash Bridge (Br. No. 54-0621L) and supersedes all previously generated Preliminary Foundation Reports for this structure. The rehabilitation for this structure will include replacing the previous right side widening, and widening of the left side of the structure. The following report is based on information gathered during a subsurface investigation conducted by URS Corporation (URS) in May 2013, as well as a review of "As-built" Log of Test Boring (LOTB) data from a 1960 foundation investigation; "As-built" Foundation Recommendations from 1960, 1961 and 1967; Foundation Reviews from 1961 and 1967; Pile Driving Records from 1968; and Final Seismic Design Recommendations dated March 26, 2014. All elevations referenced in this memorandum are in feet, and are referenced to the 1929 National Geodetic Vertical Datum (NGVD29).

Project Description

The bridge site is located on Interstate 15 in San Bernardino County, approximately 12 miles west of the California/Nevada state line, and spans Wheaton Wash. For several years, the Bridge Inspection Reports have documented the abutments and the soffit having diagonal/vertical cracks with heavy efflorescence and AC binder stains. As well, the bent caps were noted as having severe diagonal/pattern cracks with efflorescence and AC binder stains with spalling at some locations.

A Peer Review Fact Sheet, dated August 26, 2008, indicates that a Structure Maintenance & Investigation Peer Review was convened on August 26, 2008 to discuss possible repair strategies for Wheaton Wash Bridge. The fact sheet mentions the presence of reactive aggregates in the bridge concrete. On April 6, 2009, staff from the Office of Geotechnical Design, South 2 visited the bridge site and made note of the conditions. Currently, Structure Design has decided to leave the original bridge in place, and to replace the right side widened portion with a new structure to be 11 ft-6 inches wide, and to widen the left side of the original

bridge by 7 ft-3 inches. All structures will be 212 ft-10 inches long. Both the left and right side widenings will be nine span, cast-in-place, reinforced concrete slab bridges on end-diaphragm abutments.

Geology

The bridge site is located in the eastern part of the Mojave Desert, and within the Clark Mountain Range. The geologic map of California, Kingman Sheet (Jennings, 1961) shows that the bridge site is located on Quaternary alluvium in the streambed, which at depth is underlain by Precambrian metamorphic bedrock. The metamorphic bedrock is shown as being exposed on the hillsides to the north and south of Wheaton Wash Bridge site.

The subsurface investigation performed by URS Corporation in 2013 consisted of four mud rotary borings drilled at the bridge site. RC-13-001 was drilled in the wash on the south side of the bridge; RC-13-002 was drilled in the wash on the north side of the bridge; RC-13-003 was drilled north of Abutment 10; and RC-13-004 was drilled north of Abutment 1. The LOTB's from the investigation show that the site is underlain by alluvial material overlying metamorphic rock. The alluvial material ranged in thickness from approximately 30 ft. in RC-13-003 to approximately 41 ft. in RC-13-001 and consisted of medium dense to very dense sand, gravel, cobbles, and sporadic boulders. The underlying metamorphic bedrock consisted of Gneiss, which ranged from decomposed and very soft to moderately weathered and hard. The lowest explored elevation during this subsurface investigation was to elevation 4033.3 feet.
For site-specific soils and rock information from the 2013 subsurface investigation, refer to the Log of Test Boring sheets.

Ground Water

No ground water was encountered at the site during the 1960 subsurface investigation. Ground water was encountered during the 2013 subsurface investigation and measured in boring RC-13-002 at 48.3 feet deep (elevation 4068.4 ft) on May 16, 2013, and at 41.3 feet deep (elevation 4075.4 ft) on December 12, 2013.

Due to the Wheaton Wash Bridge being located in an extremely arid environment, it is anticipated that surface water would only be present during brief wet periods. Ground water levels indicated in this report reflect the measured ground water level in the borehole on the specified date. Ground water elevations are subject to seasonal fluctuations and will be encountered at higher or lower elevations depending on current conditions.

Scour Potential

The bridge is located in a desert area where there is the potential for flash-flooding in the creek channel during and after severe storm events, therefore, there is scour potential at the site. The Office of Structure Hydraulics and Hydrology has provided a Hydraulics Report, dated April 15, 2014, which states that the depth for total potential scour at the site is 12 feet below the ground surface. Therefore, the scour elevations are to elev. 4107 ft on the upstream side, and elev. 4103 ft on the downstream side of the bridge.

Corrosion

Corrosion testing was included as a part of laboratory testing performed on soil samples collected during the 2013 subsurface investigation. Results of the corrosion testing are provided in Table 1. Based on current Caltrans corrosion guidelines the alluvial soils at this site are considered to be non-corrosive.

Table 1: Corrosion Summary

Boring Number	Sample Depth (ft)	Minimum Resistivity (ohm-cm)	pH	Chloride Content (ppm)	Sulfate Content (ppm)
RC-13-002	5 ft (Elev. 4111.7 ft)	1900	8.6	60	Not detected
RC-13-002	15 ft (Elev. 4101.7 ft)	4700	7.9	75	21
RC-13-002	25 ft (Elev. 4091.7 ft)	4300	7.6	105	60

Note: Caltrans currently defines a corrosive environment as an area where the soil has either a chloride concentration of 500 ppm or greater, a sulfate concentration of 2000 ppm or greater, or has a pH of 5.5 or less.

Fault and Seismic Data

The structure site is potentially subject to ground motions from nearby earthquake sources during the design life of the new structure. The Office of Geotechnical Design – South 2 has provided Final Seismic Design Recommendations in a memorandum dated March 26, 2014. For the deterministic procedure, the controlling fault for the site is the Garlock (East) fault (Fault ID: 227, strike-slip, dip=90°) with a maximum credible earthquake M_{max}=7.7, located approximately 27.3 miles west of the bridge site. For this site, the design response spectrum is controlled by a minimum deterministic response spectrum for periods below 1-second, and probabilistic response spectrum beyond the period of 1-second. The corresponding peak horizontal ground acceleration (PGA) at the site is 0.22g.

Surface Rupture Potential

Surface rupture potential at the bridge site is considered low, due to no active fault passing beneath the bridge site.

Liquefaction Potential / Seismic Settlement

The Final Seismic Design Recommendations, dated March 26, 2014, state that due to the dense nature of the underlying soils, the potential for soil liquefaction due to strong ground shaking at the proposed bridge site is considered low. Seismic settlement due to strong ground motion is less than one inch.

History

The existing Wheaton Wash Bridge consists of a nine-span, cast-in-place, reinforced concrete, slab bridge, with seven column bents (5 for the original structure, and 2 for the widening). The original bridge was completed in 1963 and widened by approximately 12 feet on the right side in 1969. Abutments 1 and 10 of the original bridge are end-diaphragm abutments and are supported on spread footings placed in approximately 15-20 feet of embankment fill material. Abutments 1 and 10 of the widening, and Bents 2 through 9, for both the original bridge and the widening, are supported on 10BP42 steel "H" piles, with a design loading of 45 tons.

The original Foundation Report, dated November 4, 1960 had recommended cast-in-drilled-hole (CIDH) piles at all support locations. A supplemental foundation report, dated January 25, 1961, superseded the original report, and recommended spread footings or steel "H" piles at all support locations. The foundation report for the widening dated June 26, 1967, recommended spread footings for support at the abutments, and steel "H" piles for support at the bent support locations. The foundation review for the widening dated November 7, 1967, recommended also using steel "H" piles at the abutment locations. Ultimately, spread footings were used at Abutments 1 and 10 for the original bridge, and steel "H" piles were used at the bent locations. For the widening, steel "H" piles were used at all support locations.

As-built records indicate that at Bent 8 of the original bridge, two initial "H" piles were driven to determine driving conditions. After the first two piles were driven, it was decided to write a contract change order (CCO) to drive the rest of the "H" piles with lugs installed to control erratic driving. All the subsequent "H" piles driven for the original construction and the right-side widening were driven with lugs installed.

The As-built spread footing and pile information for the original bridge and the right-side widening are shown below in Tables 2 through 4.

Table 2: Original Bridge, Abutment 1 and 10
As-built Bottom of Footing Elevations and Design Loads

Location	As-built Bottom of Footing Elevations	As-built Design Loads
Abutment 1	4138.36 ft on left to 4139.31 ft on right	2.0 tsf
Abutment 10	4129.79 ft on left to 4130.60 ft on right	2.0 tsf

Table 3: Original Bridge, Bents 2 through 9, As-built Data for 45 Ton Design Load Piles

Location	Pile Type	Specified Pile Tip Elevation	Minimum As-built Pile Tip Elevation	Average As-built Pile Tip Elevation	Maximum As-built Pile Tip Elevation
Bent 2	10BP42 "H" Pile	4100.0 ft	4099.1 ft	4099.6 ft	4099.9 ft
Bent 3	10BP42 "H" Pile	4100.0 ft	4099.4 ft	4099.7 ft	4099.9 ft
Bent 4	10BP42 "H" Pile	4100.0 ft	4099.7 ft	4099.9 ft	4100.1 ft
Bent 5	10BP42 "H" Pile	4100.0 ft	4099.3 ft	4099.7 ft	4100.0 ft
Bent 6	10BP42 "H" Pile	4100.0 ft	4099.5 ft	4099.6 ft	4099.9 ft
Bent 7	10BP42 "H" Pile	4100.0 ft	4099.5 ft	4099.7 ft	4100.0 ft
Bent 8	10BP42 "H" Pile	4100.0 ft	4074.7 ft	4092.4 ft	4100.0 ft
Bent 9	10BP42 "H" Pile	4100.0 ft	4099.5 ft	4099.6 ft	4099.8 ft

Table 4: Right-side Widening, As-built Data for 45 Ton Design Load Piles

Location	Pile Type	Specified Pile Tip Elevation	As-built Pile Tip Elevation
Abutment 1	10BP42 "H" Pile	4100.0 ft	Left Column: 4113.2 ft Right Column: 4085.1 ft
Bent 2	10BP42 "H" Pile	4100.0 ft	Left Column: 4092.5 ft Right Column: 4085.0 ft
Bent 3	10BP42 "H" Pile	4100.0 ft	Left Column: 4084.8 ft Right Column: 4084.2 ft
Bent 4	10BP42 "H" Pile	4100.0 ft	Left Column: 4085.6 ft Right Column: 4086.3 ft
Bent 5	10BP42 "H" Pile	4100.0 ft	Left Column: 4084.4 ft Right Column: 4084.5 ft
Bent 6	10BP42 "H" Pile	4100.0 ft	Left Column: 4102.0 ft Right Column: 4102.4 ft
Bent 7	10BP42 "H" Pile	4100.0 ft	Left Column: 4099.0 ft Right Column: 4086.3 ft
Bent 8	10BP42 "H" Pile	4100.0 ft	Left Column: 4099.7 ft Right Column: 4086.6 ft
Bent 9	10BP42 "H" Pile	4100.0 ft	Left Column: 4086.2 ft Right Column: 4085.4 ft
Abutment 10	10BP42 "H" Pile	4100.0 ft	Left Column: 4096.6 ft Right Column: 4099.5 ft

Foundation Recommendations

At all support locations of the Wheaton Wash Bridge left and right side widenings, 30-in diameter Cast-In-Steel-Shell (CISS) Piles are recommended for support. Tables 5 and 6, below, show the foundation design data for Abutments 1 and 10, provided by the Office of Bridge Design Branch 10.

Abutments 1 and 10 Locations

Table 5: General Foundation Information Provided by Structure Designer (Br. #54-0621L)

Support Location	Pile Type	Finished Grade Elevation	Pile Cut-off Elevation	Pile Cap Size (ft)		Permissible Settlement Under Service Load	Number of Piles per Support
				B	L		
Abutment 1 Left	30" Dia. CISS Pile	4135.0 ft	N/A	3.5 ft	10.5 ft	1.0 in	1
Abutment 1 Right	30" Dia. CISS Pile	4135.0 ft	N/A	3.5 ft	16.0 ft	1.0 in	2
Abutment 10 Left	30" Dia. CISS Pile	4135.0 ft	N/A	3.5 ft	10.5 ft	1.0 in	1
Abutment 10 Right	30" Dia. CISS Pile	4135.0 ft	N/A	3.5 ft	16.0 ft	1.0 in	2

Table 6: Foundation Design Loads Provided by Structure Designer (Br. #54-0621L)

Support Location	Service 1 Limit State			Strength Limit State (Controlling Group)				Extreme Event Limit State (Controlling Group)			
	Total Loads		Permanent Loads	Compression		Tension		Compression		Tension	
	Per Support	Max Per Pile	Per Support	Per Support	Max Per Pile	Per Support	Max Per Pile	Per Support	Max Per Pile	Per Support	Max Per Pile
Abutment 1 Left	90 kips	90 kips	61 kips	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Abutment 1 Right	132 kips	70 kips	92 kips	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Abutment 10 Left	100 kips	100 kips	64 kips	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Abutment 10 Right	144 kips	80 kips	98 kips	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

The specified pile tip elevations for Abutments 1 and 10 are shown below in Table 7.

Table 7: Foundation Design Recommendations for Abutments 1 and 10 (Br. #54-0621L)

Support Location	Pile Type	Cut-Off Elevation	LRFD Service-I Limit State Load per Support		LRFD Service-I Limit State Total Load per Pile (Compression)	Nominal Resistance	Design Tip Elevation	Specified Tip Elevation	Nominal Driving Resistance
			Total	Permanent					
Abutment 1 Left	30" Dia. CISS Pile	N/A	90 kips	61 kips	90 kips	180 kips	4080.0 ft (a)	4080.0 ft	180 kips
Abutment 1 Right	30" Dia. CISS Pile	N/A	132 kips	92 kips	70 kips	140 kips	4082.0 ft (a)	4082.0 ft	140 kips
Abutment 10 Left	30" Dia. CISS Pile	N/A	100 kips	64 kips	100 kips	200 kips	4078.0 ft (a)	4078.0 ft	200 kips
Abutment 10 Right	30" Dia. CISS Pile	N/A	144 kips	98 kips	80 kips	160 kips	4080.0 ft (a)	4080.0 ft	160 kips

Note: 1) Design tip elevation is controlled by: (a) Compression

Bents 2 and 3 Locations

Tables 8 and 9, below, show the foundation design data for Bents 2 through 9, provided by the Office of Bridge Design Branch 10.

Table 8: General Foundation Information Provided by Structure Designer (Br. #54-0621L)

Support Location	Design Method	Pile Type	Finished Grade Elevation	Pile Cut-off Elevation	Pile Cap Size (ft)		Permissible Settlement Under Service Load	Number of Piles per Support
					B	L		
Bent 2 Left	LRFD	30" Dia. CISS Pile	4134.0 ft	N/A	N/A	N/A	1 in	1
Bent 2 Right	LRFD	30" Dia. CISS Pile	4135.0 ft	N/A	N/A	N/A	1 in	2
Bent 3 Left	LRFD	30" Dia. CISS Pile	4124.0 ft	N/A	N/A	N/A	1 in	1
Bent 3 Right	LRFD	30" Dia. CISS Pile	4127.0 ft	N/A	N/A	N/A	1 in	2
Bent 4 Left	LRFD	30" Dia. CISS Pile	4119.0 ft	N/A	N/A	N/A	1 in	1
Bent 4 Right	LRFD	30" Dia. CISS Pile	4122.0 ft	N/A	N/A	N/A	1 in	2
Bent 5 Left	LRFD	30" Dia. CISS Pile	4117.0 ft	N/A	N/A	N/A	1 in	1
Bent 5 Right	LRFD	30" Dia. CISS Pile	4121.0 ft	N/A	N/A	N/A	1 in	2
Bent 6 Left	LRFD	30" Dia. CISS Pile	4117.0 ft	N/A	N/A	N/A	1 in	1
Bent 6 Right	LRFD	30" Dia. CISS Pile	4120.0 ft	N/A	N/A	N/A	1 in	2
Bent 7 Left	LRFD	30" Dia. CISS Pile	4116.0 ft	N/A	N/A	N/A	1 in	1
Bent 7 Right	LRFD	30" Dia. CISS Pile	4119.0 ft	N/A	N/A	N/A	1 in	2
Bent 8 Left	LRFD	30" Dia. CISS Pile	4116.0 ft	N/A	N/A	N/A	1 in	1
Bent 8 Right	LRFD	30" Dia. CISS Pile	4119.0 ft	N/A	N/A	N/A	1 in	2
Bent 9 Left	LRFD	30" Dia. CISS Pile	4127.0 ft	N/A	N/A	N/A	1 in	1
Bent 9 Right	LRFD	30" Dia. CISS Pile	4127.0 ft	N/A	N/A	N/A	1 in	2

Table 9: Foundation Design Loads Provided by Structure Designer (Br. #54-0621L)

Support Location	Service 1 Limit State			Strength Limit State (Controlling Group)				Extreme Event Limit State (Controlling Group)			
	Total Loads		Permanent Loads	Compression		Tension		Compression		Tension	
	Per Support	Max Per Pile	Per Support	Per Support	Max Per Pile	Per Support	Max Per Pile	Per Support	Max Per Pile	Per Support	Max Per Pile
Bent 2 L	200 kips	N/A	115 kips	250 kips	250 kips	0 kips	0 kips	190 kips	190 kips	0 kips	0 kips
Bent 2 R	310 kips	N/A	180 kips	343 kips	190 kips	0 kips	0 kips	240 kips	140 kips	0 kips	0 kips
Bent 3 L	200 kips	N/A	115 kips	250 kips	250 kips	0 kips	0 kips	210 kips	210 kips	0 kips	0 kips
Bent 3 R	310 kips	N/A	180 kips	343 kips	190 kips	0 kips	0 kips	255 kips	150 kips	0 kips	0 kips
Bent 4 L	200 kips	N/A	115 kips	250 kips	250 kips	0 kips	0 kips	210 kips	210 kips	0 kips	0 kips
Bent 4 R	310 kips	N/A	180 kips	343 kips	190 kips	0 kips	0 kips	255 kips	150 kips	0 kips	0 kips
Bent 5 L	200 kips	N/A	115 kips	250 kips	250 kips	0 kips	0 kips	210 kips	210 kips	0 kips	0 kips
Bent 5 R	310 kips	N/A	180 kips	343 kips	190 kips	0 kips	0 kips	255 kips	150 kips	0 kips	0 kips
Bent 6 L	200 kips	N/A	115 kips	250 kips	250 kips	0 kips	0 kips	210 kips	210 kips	0 kips	0 kips
Bent 6 R	310 kips	N/A	180 kips	343 kips	190 kips	0 kips	0 kips	255 kips	150 kips	0 kips	0 kips
Bent 7 L	200 kips	N/A	115 kips	250 kips	250 kips	0 kips	0 kips	210 kips	210 kips	0 kips	0 kips
Bent 7 R	310 kips	N/A	180 kips	343 kips	190 kips	0 kips	0 kips	255 kips	150 kips	0 kips	0 kips
Bent 8 L	200 kips	N/A	115 kips	250 kips	250 kips	0 kips	0 kips	210 kips	210 kips	0 kips	0 kips
Bent 8 R	310 kips	N/A	180 kips	343 kips	190 kips	0 kips	0 kips	255 kips	150 kips	0 kips	0 kips
Bent 9 L	221 kips	N/A	128 kips	280 kips	280 kips	0 kips	0 kips	200 kips	200 kips	0 kips	0 kips
Bent 9 R	345 kips	N/A	204 kips	384 kips	220 kips	0 kips	0 kips	264 kips	150 kips	0 kips	0 kips

The specified pile tip elevations for Bents 2 through 9 are shown below in Table 10.

Table 10: Foundation Design Recommendations for Bents 2 through 9 (Br. #54-0621L)

Support Location	Pile Type	Cut-Off Elevation	Service-I Limit State Load per Support (Total Load)	Total Permissible Support Settlement	Required Nominal Resistance				Design Tip Elevation*	Specified Tip Elevation	Nominal Driving Resistance
					Strength Limit		Extreme Event				
					Comp. (φ=0.7)	Tension (φ=0.7)	Comp. (φ=1)	Tension (φ=1)			
Bent 2 L	30" Dia. CISS Pile	N/A	200 kips	1 in	360 kips	0 kips	190 kips	0 kips	4078.0 ft (a-I) 4081.0 ft (a-II)	4078.0 ft	360 kips
Bent 2 R	30" Dia. CISS Pile	N/A	310 kips	1 in	280 kips	0 kips	140 kips	0 kips	4080.0 ft (a-I) 4083.0 ft (a-II)	4080.0 ft	280 kips
Bent 3 L	30" Dia. CISS Pile	N/A	200 kips	1 in	360 kips	0 kips	210 kips	0 kips	4074.0 ft (a-I) 4077.0 ft (a-II)	4074.0 ft	360 kips
Bent 3 R	30" Dia. CISS Pile	N/A	310 kips	1 in	280 kips	0 kips	150 kips	0 kips	4078.0 ft (a-I) 4081.0 ft (a-II)	4078.0 ft	280 kips
Bent 4 L	30" Dia. CISS Pile	N/A	200 kips	1 in	360 kips	0 kips	210 kips	0 kips	4072.0 ft (a-I) 4075.0 ft (a-II)	4072.0 ft	360 kips
Bent 4 R	30" Dia. CISS Pile	N/A	310 kips	1 in	280 kips	0 kips	150 kips	0 kips	4077.0 ft (a-I) 4080.0 ft (a-II)	4077.0 ft	280 kips
Bent 5 L	30" Dia. CISS Pile	N/A	200 kips	1 in	360 kips	0 kips	210 kips	0 kips	4070.0 ft (a-I) 4073.0 ft (a-II)	4070.0 ft	360 kips
Bent 5 R	30" Dia. CISS Pile	N/A	310 kips	1 in	280 kips	0 kips	150 kips	0 kips	4075.0 ft (a-I) 4078.0 ft (a-II)	4075.0 ft	280 kips
Bent 6 L	30" Dia. CISS Pile	N/A	200 kips	1 in	360 kips	0 kips	210 kips	0 kips	4072.0 ft (a-I) 4075.0 ft (a-II)	4072.0 ft	360 kips
Bent 6 R	30" Dia. CISS Pile	N/A	310 kips	1 in	280 kips	0 kips	150 kips	0 kips	4073.0 ft (a-I) 4076.0 ft (a-II)	4073.0 ft	280 kips
Bent 7 L	30" Dia. CISS Pile	N/A	200 kips	1 in	360 kips	0 kips	210 kips	0 kips	4074.0 ft (a-I) 4077.0 ft (a-II)	4074.0 ft	360 kips
Bent 7 R	30" Dia. CISS Pile	N/A	310 kips	1 in	280 kips	0 kips	150 kips	0 kips	4075.0 ft (a-I) 4078.0 ft (a-II)	4075.0 ft	280 kips
Bent 8 L	30" Dia. CISS Pile	N/A	200 kips	1 in	360 kips	0 kips	210 kips	0 kips	4076.0 ft (a-I) 4079.0 ft (a-II)	4076.0 ft	360 kips
Bent 8 R	30" Dia. CISS Pile	N/A	310 kips	1 in	280 kips	0 kips	150 kips	0 kips	4077.0 ft (a-I) 4080.0 ft (a-II)	4077.0 ft	280 kips
Bent 9 L	30" Dia. CISS Pile	N/A	230 kips	1 in	400 kips	0 kips	200 kips	0 kips	4077.0 ft (a-I) 4080.0 ft (a-II)	4077.0 ft	400 kips
Bent 9 R	30" Dia. CISS Pile	N/A	350 kips	1 in	320 kips	0 kips	150 kips	0 kips	4078.0 ft (a-I) 4081.0 ft (a-II)	4078.0 ft	320 kips

Notes: Design tip elevations are controlled by (a-I) Compression (Strength Limit), (a-II) Compression (Extreme Event)
*Design tips are predominantly end-bearing in metamorphic bedrock

The Pile Data Table for Abutments 1 and 10, as well as Bents 2 through 9 is presented in Table 11, below. The ultimate geotechnical pile capacity for the CISS piles will meet or exceed the required nominal resistance in compression.

Table 11: Pile Data Table (Br. #54-0621L)

Location	Pile Type	Nominal Resistance		Design Tip Elevation*	Specified Tip Elevation	Nominal Driving Resistance
		Compression	Tension			
Abutment 1 Left	30" Dia. CISS Pile	180 kips	0 kips	4080.0 ft (a)	4080.0 ft	180 kips
Abutment 1 Right	30" Dia. CISS Pile	140 kips	0 kips	4082.0 ft (a)	4082.0 ft	140 kips
Bent 2 Left	30" Dia. CISS Pile	360 kips	0 kips	4078.0 ft (a-I) 4081.0 ft (a-II)	4078.0 ft	360 kips
Bent 2 Right	30" Dia. CISS Pile	280 kips	0 kips	4080.0 ft (a-I) 4083.0 ft (a-II)	4080.0 ft	280 kips
Bent 3 Left	30" Dia. CISS Pile	360 kips	0 kips	4074.0 ft (a-I) 4077.0 ft (a-II)	4074.0 ft	360 kips
Bent 3 Right	30" Dia. CISS Pile	280 kips	0 kips	4078.0 ft (a-I) 4081.0 ft (a-II)	4078.0 ft	280 kips
Bent 4 Left	30" Dia. CISS Pile	360 kips	0 kips	4072.0 ft (a-I) 4075.0 ft (a-II)	4072.0 ft	360 kips
Bent 4 Right	30" Dia. CISS Pile	280 kips	0 kips	4077.0 ft (a-I) 4080.0 ft (a-II)	4077.0 ft	280 kips
Bent 5 Left	30" Dia. CISS Pile	360 kips	0 kips	4070.0 ft (a-I) 4073.0 ft (a-II)	4070.0 ft	360 kips
Bent 5 Right	30" Dia. CISS Pile	280 kips	0 kips	4075.0 ft (a-I) 4078.0 ft (a-II)	4075.0 ft	280 kips
Bent 6 Left	30" Dia. CISS Pile	360 kips	0 kips	4072.0 ft (a-I) 4075.0 ft (a-II)	4072.0 ft	360 kips
Bent 6 Right	30" Dia. CISS Pile	280 kips	0 kips	4073.0 ft (a-I) 4076.0 ft (a-II)	4073.0 ft	280 kips
Bent 7 Left	30" Dia. CISS Pile	360 kips	0 kips	4074.0 ft (a-I) 4077.0 ft (a-II)	4074.0 ft	360 kips
Bent 7 Right	30" Dia. CISS Pile	280 kips	0 kips	4075.0 ft (a-I) 4078.0 ft (a-II)	4075.0 ft	280 kips
Bent 8 Left	30" Dia. CISS Pile	360 kips	0 kips	4076.0 ft (a-I) 4079.0 ft (a-II)	4076.0 ft	360 kips
Bent 8 Right	30" Dia. CISS Pile	280 kips	0 kips	4077.0 ft (a-I) 4080.0 ft (a-II)	4077.0 ft	280 kips
Bent 9 Left	30" Dia. CISS Pile	400 kips	0 kips	4077.0 ft (a-I) 4080.0 ft (a-II)	4077.0 ft	400 kips
Bent 9 Right	30" Dia. CISS Pile	320 kips	0 kips	4078.0 ft (a-I) 4081.0 ft (a-II)	4078.0 ft	320 kips
Abutment 10 Left	30" Dia. CISS Pile	200 kips	0 kips	4078.0 ft (a)	4078.0 ft	200 kips
Abutment 10 Right	30" Dia. CISS Pile	160 kips	0 kips	4080.0 ft (a)	4080.0 ft	160 kips

Notes: Design tip elevations are controlled by (a) Compression (Service I Limit), (a-I) Compression (Strength Limit), (a-II) Compression (Extreme Event) *Design tips are predominantly end-bearing in metamorphic bedrock

General Notes:

1) All support locations are to be plotted in plan view on the Log of Test Borings as stated in "Memo to Designers" 4-2. The plotting of support locations should be made prior to requesting a final foundation review.

2) When applicable, the structure engineer shall show on the plans, in the pile data table, the design pile tip elevation required to meet the lateral load demands. If the design pile tip elevation required to meet lateral load demands exceeds the specified pile tip elevations given within this report, the Office of Geotechnical Design-South 2, Branch B shall be contacted for further recommendations.

Construction Considerations:

1) The calculated geotechnical capacity of the CISS piles is based predominantly on end-bearing.

2) Pile acceptance is to be based on Standard Specifications 49-2.01A(4)(b) "Pile Driving Acceptance Criteria". Any pile that achieves 1½ times the required nominal resistance in compression, as shown on the contract plans, within 5 feet of the specified pile tip elevation, may be considered satisfactory and cut off with written approval from the engineer. Table 12, below, shows 1½ times the nominal resistance in compression at Abutments 1 and 10, and Bents 2 through 9 support locations.

Table 12:
1½ times Nominal Resistance in Compression at
Abutments 1 and 10, and Bents 2 through 9 support locations

Location	1½ times Nominal Resistance in Compression
Abutment 1 Left	270 kips
Abutment 1 Right	210 kips
Bent 2 Left	540 kips
Bent 2 Right	420 kips
Bent 3 Left	540 kips
Bent 3 Right	420 kips
Bent 4 Left	540 kips
Bent 4 Right	420 kips
Bent 5 Left	540 kips
Bent 5 Right	420 kips
Bent 6 Left	540 kips
Bent 6 Right	420 kips
Bent 7 Left	540 kips
Bent 7 Right	420 kips
Bent 8 Left	540 kips
Bent 8 Right	420 kips
Bent 9 Left	600 kips
Bent 9 Right	480 kips
Abutment 10 Left	300 kips
Abutment 10 Right	240 kips

3) Due to the possibility that the top of bedrock may be deeper than anticipated below the site, or the bedrock may be softer than anticipated, an additional 2 feet was added to the specified pile tip elevations.

4) At the contractor's option, drilling to assist driving may be utilized prior to driving each CISS pile at Abutments 1 and 10, and Bents 2 through 9 locations. The drilling to assist driving shall be in accordance with Standard Specification Section 49-2.01C(3) "Drilling". Drilling to assist driving shall not extend beyond the elevations shown in Table 13, below.

Table 13: Bottom of Drill to Assist Driving Hole Elevations

Location	Bottom of Drill to Assist Driving Hole Elevations
Abutment 1 Left	4087.0 ft
Abutment 1 Right	4088.0 ft
Bent 2 Left	4085.0 ft
Bent 2 Right	4086.0 ft
Bent 3 Left	4083.0 ft
Bent 3 Right	4085.0 ft
Bent 4 Left	4080.0 ft
Bent 4 Right	4084.0 ft
Bent 5 Left	4077.0 ft
Bent 5 Right	4082.0 ft
Bent 6 Left	4080.0 ft
Bent 6 Right	4080.0 ft
Bent 7 Left	4082.0 ft
Bent 7 Right	4082.0 ft
Bent 8 Left	4083.0 ft
Bent 8 Right	4084.0 ft
Bent 9 Left	4084.0 ft
Bent 9 Right	4085.0 ft
Abutment 10 Left	4085.0 ft
Abutment 10 Right	4086.0 ft

5) Due to variations of the top of bedrock elevation as well as the hardness and degree of weathering of the bedrock material beneath the site, at all support locations hard and erratic driving of the CISS piles should be anticipated, and the contractor should anticipate that piles will require cutting-off in the field.

6) Due to anticipated hard driving in the underlying metamorphic bedrock, and to prevent the damage to the CISS piles, all piles shall be reinforced by welding on open ended cutting shoes to the pile tips.

7) The wall thicknesses of the CISS piles should be specified such that the pile is able to withstand the lateral demands and axial loads equal to 1½ times the nominal resistance in compression.

This Foundation Report is based on specific project information regarding structure type and location that have been provided by Structure Design, Office of Bridge Design – South 2. If any conceptual changes are made during final project design, the Office of Geotechnical Design-South 2, Design Branch B, should review those changes to determine if these foundation recommendations are still applicable. Any questions regarding the above recommendations should be directed to the attention of Erich Neupert, (916) 227-4565, or Mark DeSalvatore, (916) 227-5391, at the Office of Geotechnical Design-South 2, Branch B.

Prepared by: Date: 4/28/14

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Abbas Abghari – OGDS-2
Mark DeSalvatore – OGDS-2 FDH for MD
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Division of Engineering Services
Structure Design Services

FINAL HYDRAULIC REPORT

Wheaton Wash Bridge

Widen 54-0621L
08 – SBD – 015 – PM 173.84
EA No. 08-0M2801
EFIS No. 0800000472

Prepared by:

Genaro M. Doria, PE
Structure Hydraulics and Hydrology
April 15, 2014

REGISTERED PROFESSIONAL ENGINEER
GENARO M DORIA
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General:

The proposed bridge widening is on Interstate 15 in San Bernardino County, approximately 12 miles west of the California/Nevada state line. The existing Wheaton Wash Bridge consists of a nine-span cast-in-place reinforced concrete slab. The original bridge was constructed in 1963 and widened 12 feet in 1969. The original abutments are end-diaphragm type on spread footings with approximately 20 feet of embankment fill material. The widened section of abutments are on encased steel H-piles. The column bents consist of five columns for the original section of bridge and two columns for the widened section. The columns are encased steel H-piles.

According fact sheets dated August 2008, the existing bridge has reactive aggregates in the bridge concrete as well as some abutment settlement. Structure Design has decided to widen and repair the existing bridge. The original widening in 1969 will be removed and re-widened. The bridge will be widened on both sides with large diameter 30 inch columns by approximately 11.5 feet on the upstream side and 7 feet on the downstream side.

All elevations given are referenced to the data provided by Structures Design and Preliminary Investigations Surveys-South, using the NGVD 29 Vertical Datum and NAD 83 Horizontal Datum.

Basin:

The bridge site is located in the eastern section of the Mojave Desert and is fed by the Clark Mountain Range, Mescal Mountain Range and the Mineral Hill Mountain Range. The Wheaton Wash watershed is near 11.5 square miles and is mainly located on the north side of Interstate 15. The watersheds main reach starts at the south/east side of the Clark Mountain Range and flows south easterly, spreading across a sparsely vegetated alluvial fan. Elevations range from approximately 6800 feet at the highest range of the watershed to approximately 4115 feet at the bridge site location. A small percentage of the watershed is located on the south side of Interstate 15. The watershed begins from north/east side of the Mescal Mountain Range and flows northerly to meet the main watershed area.

The watershed near the bridge site is mainly undeveloped desert area. Vegetation types are predominately creosote bush and desert wash scrub. The watersheds mean annual precipitation is near 9 inches.

Streambed:

The natural channel bed material based on the January 9, 2014 Preliminary Foundation Memo, and a geologic map of California, Kingman Sheet (Jennings, 1962) shows that the bridge site is located on Quaternary alluvium. The LOTB's define this alluvium depth to be 30 feet. This alluvium consists of medium dense to

very dense sand, gravel, cobbles and sporadic boulders. The material below the 30 feet alluvium consists of Metamorphic Bedrock (Grueiss and Granulito). This material is classified as decomposed and very soft to moderately weathered and hard.

A preliminary structure foundations report determined that this site has scour potential. A scourable channel bed material is used for scour calculations until it is determined in the Foundation Report that the proposed foundations will be on bedrock. The recommended foundation elevations will be adjusted once the foundation report defines scour resistant rock elevations.

At the bridge site, the channel slope is steep with a gradient of approximately 0.069 ft/ft. The potential for channel migration exists for all bents and are considered in the recommendations made in this report. Both abutments should be protected with rock slope protection.

Discharge:

The Wheaton Wash basin is an ungaged site, so no information for a flood of record could be found. The HEC-1 module within Watershed Modeling System (WMS) version 9.1 was used to assist in the estimation of the 100-year and 50-year frequency discharges. A temporal unit hydrograph was developed using the San Bernardino County S-Graph for desert areas. The 6-hour (thunderstorm) and 24-hour duration 100-year precipitation was analyzed to determine which would produce the highest peak discharges. The highest peak discharge was produced by the 6-hour storm. The estimated Q100 and Q50 discharges are 6380 cfs and 5350 cfs, respectively.

Hydraulic Analysis:

The channel hydraulics was modeled using a two-dimensional Surface-water Modeling System version 11.1, utilizing the survey data. A manning's roughness coefficient of 0.03 for both river and overbank areas was used as part of the parameters in the hydraulic analysis.

For the 100-year and 50-year event, the proposed 9-span structure has approximate water surface elevations, on the upstream side bridge, of 4133.5 feet and 4132 feet, respectively. The proposed new soffit elevation at the lowest point on the upstream southeast corner is near 4134.9 feet. The proposed structure soffit on the EB side has 1.4 feet of freeboard in a 100-year event and near 10 feet of freeboard at the BB side.

For the 100-year flows the calculated peak velocities are at 12.0 feet per second.

Scour Analysis:

Scour was estimated utilizing the methods set forth in the FHWA HEC-18, "Evaluating Scour at Bridges." All scour elevations are based on the 100-year discharge.

Based on a comparison of historical channel cross-sections taken at the existing Interstate 15 structure, aerial photographs and HEC-RAS modeling the channel degradation and contraction scour calculated are 1.0 feet and 5.0 feet respectively.

The local pier scour depth was calculated to be 6 feet for a total potential scour of 12 feet. The existing channel thalweg elevation on the upstream side is 4119 feet and 4115 feet on the downstream side. A potential for channel migration was considered to calculate the local pier scour elevations for both upstream and downstream. Therefore, the proposed column upstream scour elevation is 4107 feet and the proposed column downstream scour elevation is 4103 feet. All bents should be designed to these potential scour elevations.

Structure Hydraulics does not have any Abutment Scour concerns due to the abutments being located outside of waterway area. Structure Foundations and Geology will need to be consulted on the design elevations for the abutment foundations.

Drift:

Historical records do not indicate a major problem with drift. The freeboard is sufficient to pass drift under the structure.

Bank Protection:

District Design will be responsible for bank protection. District should maintain the protection to ensure bank stability.

Summary Table:

Below are summaries of key design parameters based on the hydrology and hydraulic analyses performed for the structure:

Hydrologic Summary for Wheaton wash Bridge, 54-0621L			
Drainage Area: 11.5 mi^2			
Frequency	**Design Flood**	**Base Flood**	**Channel Capacity**
	50-year	100-year	N/A
Discharge	5350 cfs	6380 cfs	N/A
Water Surface Elevation at Bridge	4132 ft	4133.5 ft	N/A
Flood plain data are based upon information available when the plans were prepared and are shown to meet federal requirements. The accuracy of said information is not warranted by the State and interested or affected parties should make their own investigation.			
Minimum Soffit Elevation	4134.9 ft		
Local Pier Scour Depth* Scour Depth at Abutments**	12 ft N/A		
Local Pier Scour Elevation Abutment Scour Elevation	Bent 2-9 columns u/s 4107 feet Bent 2-9 columns d/s 4103 feet N/A		

* Pending Geotechnical Foundation Report recommendations. This depth also includes long term scour depth for contraction and degradation scour (5' and 1' respectively). ** Slope protection design is expected to protect the abutments and this is the reason no abutment scour was considered.

This report has been prepared under my direction as the professional engineer in responsible charge of the work, in accordance with the provisions of the Professional Engineers Act of the State of California.