Environmental Engineering and Consulting
Remediation and Management Services

ENVIRONMENTAL COMPLETION REPORT

VOLUNTARY CLEANUP PLAN IMPLEMENTATION

VALMONT BUTTE PROPERTY
3000 NORTH 63rd STREET
BOULDER, COLORADO

January 2014

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EXECUTIVE SUMMARY

In April 2012, the City of Boulder initiated remedial activities for the Valmont Butte Property located at 3000 North 63rd Street, Boulder, Colorado (the "Property"). Soils and other materials disturbed during the remediation were managed under a Voluntary Cleanup Plan ("VCUP") approved by the Colorado Department of Public Health and Environment ("CDPHE"). The VCUP summarized the history of the Property, described soil and groundwater investigations previously conducted on the Property, established requirements for performing remedial activities on the Property, set cleanup levels for onsite soil, and established engineering controls for the management and long-term isolation of wastes left on the Property. The goals in entering the Voluntary Cleanup Program were to assure that the Property remediation would be compatible with the CDPHE's Voluntary Cleanup Program and Radiation Control Program and protective of human health and the environment.

This report documents the complete and proper implementation of the VCUP. The general contractor for the project was LVI Environmental Services, Inc. ("LVI"), with all of the excavation activities subcontracted to Arvada Excavating. Prairie dog fencing and stormwater control features were installed by Smith Environmental. Project archeological oversight was conducted by Mr. Gary Brown, the tribal Native American-approved cultural monitor, and Rocky Mountain Consultants. Project management and environmental oversight were provided by Casey Resources, Inc. ("CRI"). Activities that were performed during the VCUP implementation included the following:

- An asbestos assessment determined that asbestos-containing materials ("ACM") were present within some of the onsite buildings. LVI (a certified General Abatement Contractor) abated all buildings that contained asbestos and were planned for demolition, with the exception of the Mill Building, which had undergone asbestos abatement in 2003. LVI obtained the requisite demolition permits from the CDPHE for all buildings with ACM that were to be demolished.

- Except in limited culturally sensitive areas and certain other areas, areas of known metals-impacted soil were remediated by excavating and consolidating the impacted soils in the primary tailings pile. The secondary tailings pile was also consolidated into the primary tailings pile. Areas where residual contamination was left in place were documented and do not pose a threat to humans or the environment. After areas of metals- and petroleum-impacted soil were remediated, the primary tailings pile was then capped with two feet of clean soil (clay) and 1.5 feet of rock, as described in the VCUP.

- All soil-disturbing activities were monitored and final clearance sampling was conducted using field diagnostic equipment, including an X-ray fluorescence ("XRF") device to measure metals concentrations and radiation detection equipment to monitor radiation emissions. These soils disturbance and management activities were performed by qualified field technicians who were CDPHE-certified asbestos building inspectors ("Field Technicians"). Field diagnostics employed were used to guide excavation activities and ensure worker protection.

- In addition to the expected metals-impacted soil remediation, petroleum-contaminated soils were discovered in three discrete locations. The petroleum-impacted soils were characterized, remediated, and placed in a designated cell within the primary tailings pile.

- Buried drums containing liquid waste were discovered in two discrete locations, appropriately sampled and profiled, and then shipped for offsite treatment and disposal. The contents of these drums did not pose a threat to human health or the environment. The drum contents were managed and disposed in accordance with applicable state and federal regulations.

- Upon completion of soil remediation, the remediated areas were graded in accordance with an engineered grading plan to provide effective stormwater drainage.

- Areas where soil was disturbed during remediation, and other areas with sparse natural vegetation, were seeded in accordance with Boulder County's open space specifications.

- Fencing was installed around the remaining buildings on the Property to prevent vandalism and keep unauthorized personnel from entering.

- A vinyl fence (prairie dog fence) was installed around the east, south, and west sides of the Property to control prairie dog migration.

- Stormwater management features (silt fence, hay bales, etc.) were installed prior to start of remediation, maintained and adjusted during remediation, and (where necessary) left in place after remediation to assist with erosion control while vegetation is established.

- A perimeter air monitoring program was initiated prior to the start of remediation and continued through the end of December 2012. By the end of December 2012, the VCUP remedial activities had been completed and placement of the soil cap on the primary tailings area had been completed.

The Property's designated land use is commercial/industrial, and possible uses include equipment maintenance and storage, energy generation, a historical mining museum or commercial use located in the former mill area, and open space for preservation of certain natural features and vistas. Any enclosed structure built on the Property will comply with radon testing and mitigation requirements .

In addition, an Operations Plan is being developed that provides guidance and procedures for the maintenance of the Property. Inspections will be conducted annually, particularly in the spring or early summer after cessation of snowmelt and spring run-off, and after summer storms of measurable precipitation, as needed. The Operations Plan addresses inspection and maintenance of the:

- Soil and rock caps placed on the primary tailings pile;
- Stormwater controls and best management practices utilized at the Property;
- Prairie dog fencing and other controls;
- Security fencing; and
- Onsite buildings, consistent with City of Boulder requirements.

The Operations Plan also addresses the proper monitoring and management of soils in the primary tailings pile or under the Mill Building, should future soil disturbance activities occur in these areas.

All environmental conditions encountered during VCUP implementation activities on the Property have been remediated or otherwise controlled and documented in accordance with the VCUP. Given the scope of the cleanup work completed under the VCUP, there is low probability that any significant environmental conditions remain undocumented on the Property. All VCUP requirements have been addressed. CRI, on behalf of the City of Boulder, requests that a No Action Determination ("NAD") be provided for the Valmont Butte Property.

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LIST OF ACRONYMS AND ABBREVIATIONS

ACM	Asbestos-Containing Material
ACWM	Asbestos-Containing Waste Material
ALARA	As Low As Reasonably Achievable
APCD	Air Pollution Control Division
bgs	Below Ground Surface
BMPs	Best Management Practices (Stormwater)
CCR	Code of Colorado Regulations
CDPHE	Colorado Department of Public Health and Environment
CMU	Concrete Masonry Unit
CRI	Casey Resources, Inc.
CSEV	Colorado Soil Evaluation Values
DRO	Diesel Range Organics
EPA	U.S. Environmental Protection Agency
Field technician	CDPHE-certified asbestos building inspector
Landauer	Landauer, Inc.
LVI	LVI Environmental Services, Inc.
Martin Marietta	Martin Marietta Materials, Inc.
mg/kg	Milligrams per Kilogram
mrem/yr	Millirem per Year
Mill Site	Former Mining Mill Complex
MMP	Materials Management Plan
NAD	No Action Determination
NORM	Naturally Occurring Radioactive Material
ORO	Oil Range Organics
OSHA	Occupational Safety and Health Administration
OSL	Optically Stimulated Luminescence Dosimeters
PAHs	Polynuclear Aromatic Hydrocarbons
pCi/L	Picocuries per Liter
PCBs	Polychlorinated Biphenyls
PID	Photo-ionization Detector

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

PM	Particulate Matter
$PM_{2.5}$	Particulate Matter with Aerodynamic Diameters of 2.5 micrometers or less
PPE	Personal Protective Equipment
ppm	Parts per Million
Property	3000 North 63rd Street, Boulder, Colorado
RCT	Radiological Control Technician
RCRA	Resource Conservation and Recovery Act
Regulation No. 8	Regulation No. 8 – The Control of Hazardous Air Pollutants, Part B – The Control of Asbestos
TLD	Thermo-Luminescent Dosimeter
TPH	Total Petroleum Hydrocarbons
TSP	Total Suspended Particulates
Tusco	Tusco Corporation
URS	URS Operating Services, Inc.
UST	Underground Storage Tank
VCUP	Voluntary Cleanup Plan
VOCs	Volatile Organic Compounds
XRF	X-Ray Fluorescence Spectrometer
µg/L	Micrograms per Liter
$\mu g/m^3$	Micrograms per Cubic Meter
µR/hr	Micro-Roentgens per Hour

1.0 INTRODUCTION

This report documents the implementation of the Voluntary Cleanup Plan ("VCUP") for the Valmont Butte Property located at 3000 North 63rd Street, Boulder, Colorado (the "Property"), which was initially approved by the Colorado Department of Public Health and Environment ("CDPHE") on September 1, 2010. The VCUP outlined the proposed remedial activities at the Property, primarily the excavation of known metals-impacted soil areas and consolidation and capping of these materials in the primary tailings pile. The VCUP was initiated in March 2012 with installation of perimeter air monitoring stations. Because the remedial activities at the Property had not been completed by September 2012, Casey Resources, Inc. ("CRI") on behalf of the City of Boulder requested the CDPHE to extend the VCUP completion date to December 2013. This extension was approved by the CDPHE in a letter dated December 1, 2012.

The Property's designated land use is commercial/industrial, and possible uses include equipment maintenance and storage, energy generation, a historical mining museum or commercial use located in the former Mill area, and open space for preservation of certain natural features, cultural areas and vistas. Any enclosed structure built on the Property will comply with all radon testing and mitigation requirements.

1.1 TAILINGS PILE DEFINITION

The Property was used in the past for the milling and processing of ores as described in Section 1.2 below. The tailings generated from the processing of ores were placed in two tailings impoundments. These impoundments, while active, were referred to as tailings impoundments or tailings ponds. In this report, the inactive dry impoundments are referred to as "tailings piles", except when previous reports using other terminology are quoted. In the following discussions, the two tailings piles are referred to as the primary tailings pile or the secondary tailings pile, or if both are discussed as the primary and secondary tailings piles.

1.2 PROPERTY DESCRIPTION

The Property is located in Boulder County approximately 1.5 miles east of the Foothills Parkway and Pearl Street intersection. The Property in bounded on the north by Valmont Road, on the west by North 63rd Street, and on the east and south by land owned by Xcel Energy as part of the Valmont Power Plant (Figure 1).

The Property occupies approximately 101 acres with most of the land lying on the south side of the Valmont Butte, a volcanic outcrop that trends east to west along the south side of Valmont Road, and north of the Xcel Energy Valmont Power Plant reservoirs (Leggett-Owen and Valmont Reservoirs). The Legal description of the Property is provided in Appendix A.

A former mining mill complex ("Mill Site") is located on the west side of the Property. The Mill Site area extends from the western Property boundary to approximately 900 feet east of the mill building and encompasses an area of approximately 18 acres. Buildings associated with the mill operation included the mill building where gold and fluorspar ores were crushed and concentrated, a garage, laboratory building, office building, and several other miscellaneous buildings. Several of these buildings (Figure 2) were identified as potentially eligible for the National Register of Historical Places. None of the buildings or structures has been used since the City of Boulder purchased the Property in 2000.

The tailings generated from the processing of ores were placed in two tailings piles. The primary tailings pile was located in the central part of the Property and the secondary tailings pile was located on the eastern side of the Property. The areas of the primary tailings pile and the secondary tailings pile were estimated at 12.5 acres and 4.5 acres, respectively (URS Operating Services, Inc. ["URS"], 2005). The primary and secondary tailings piles are approximately 30 feet lower in elevation than the Mill Site located to the west (Figure 3).

The remainder of the Property, approximately 66 acres, is vacant land. This includes the Valmont Butte ridge north to Valmont Road, open land areas east of the primary and secondary tailings piles extending to the eastern Property boundary, and open land to the south of the primary and secondary tailings piles. These outlying areas include well-established vegetated areas and sensitive cultural areas (Figures 3 and 5).

1.3 REPORT ORGANIZATION

The remainder of this report describes the activities that were performed while implementing the VCUP. Section 2.0 provides a brief history of the Property, Section 3.0 describes the implementation of the VCUP including oversight activities and remedial actions conducted, Section 4.0 presents the project conclusions, Section 5.0 provides professional certifications for those personnel involved in oversight activities during the VCUP implementation, and Section 6.0 provides a list of references.

2.0 BACKGROUND

2.1 OPERATIONAL HISTORY

The Property was historically by Native American Indians and early European settlers. In the early 1930s, St. Joseph's Mineral Corporation acquired the Property and built a processing plant there in 1936 to mill gold ore (Ecology & Environment, 1985). Allied Chemical Corporation purchased the processing plant and Property in 1941 and processed fluorspar ore from the

Jamestown District (Alisto Engineering Group, 2000). Because the ore milled at the Property contained fluorspar, which exhibits naturally occurring radioactive material ("NORM"), the residual mine tailings exhibited low radiation levels that in some cases exceeded background concentrations for radium and other radiological constituents.

In 1971, Allied Chemical Corporation obtained approval to allow for the transportation and burial on the Property of approximately 1,500 cubic yards of radium-226 contaminated demolition debris from a remediation project in the City under its Radioactive Materials License issued by the Colorado Department of Health (currently the Colorado Department of Public Health and Environment). This material was reportedly disposed in a 90-foot diameter pit located west of the primary tailings pile (Boulder City-County Health Department, 1976). CRI's review of the 1971 site aerial photograph confirmed that the material was in fact buried in two linear trenches at the western edge of the primary tailings pile. The Radioactive Materials License for the storage of NORM expired in 1980 and was not renewed by Hendricks or Tusco (see below) although a letter from the CDPHE date July 19, 1984 that the license *"remains in force until terminated by the Department."*

Tusco Corporation ("Tusco") purchased the Property in 1974. From approximately 1977 to 1985, Hendricks Mining Company leased the Property from Tusco for processing gold ore. Tailings from the gold ore processing, which consisted primarily of silica sand, were placed on top of the fluorspar tailings in the primary tailings pile, according to the CDPHE (1999b). After milling operations ceased, Tusco placed approximately one to two feet of clean soil on the primary and secondary tailings piles and seeded the area (CDPHE, 1999b). The cap soil was obtained from a borrow pit located on the hillside south of the primary tailings pile.

The Property was purchased by Valmont Butte Corporation in 1994, which leased portions of the Property out to commercial enterprises. During its ownership, Valmont Butte Corporation proposed to remediate the Property through capping the primary and secondary tailings piles with clean fill and attaching covenant restrictions to the Property to protect the remediation cap. Valmont Butte Corporation continued to place fill material over the tailings and completed excavation of impacted soil from around the Property based on radiation surveys conducted by the CDPHE in 1998 and 1999 (CDPHE, 1999a). The CDPHE did not conduct a metals survey. CDPHE (1999b) concluded that the impacted soil areas outside the primary and secondary tailings piles resulted from windblown deposition of fluorspar tailings. This report indicates that most of these impacted areas were excavated and the impacted soils placed in the tailings impoundments. Some areas were capped in place with two or more feet of clean fill. In addition, no remediation was completed in several areas due to "steepness of the area or isolation due to topography." The CDPHE (1999b) report stated, "These areas are located in the hillside south of the Primary and Secondary tailings ponds, the hillside along the Valmont Butte north of

the Primary tailings pond, a drainage on the northwest side of the site below the Valmont Butte and Valmont Road, and an area north of the wood shop and over the slope where an old slurry line from mill operations previously existed. The Department has determined that the areas represent low potential for exposure or environmental impact and were approved by the Department for no further action."

In October 1999, the CDPHE and Valmont Butte Corporation entered into an "*Agreement and Declaration of Covenants*" (CDPHE, 1999c) to ensure protection of public health and the environment through maintenance of the cap covering the primary and secondary tailings piles and through other covenant restrictions. The Radioactive Materials License for the Property was then terminated (CDPHE, 1999b).

The City of Boulder purchased the Property in September 2000. The Property was originally acquired for construction of a Fire Training Center and a Biosolids Recycling Center and for visual open space to protect certain natural features along the ridgeline of the Valmont Butte. Development plans for the Property as a Fire Training Center and a Biosolids Recycling Center were not implemented at this location due to community concerns. While the open space continues to be protected, the Property has not been developed by the City since its purchase.

2.2 ENVIRONMENTAL CONCERNS/HISTORICAL INVESTIGATIONS

In 2005 URS, on behalf of the U.S. Environmental Protection Agency ("EPA"), completed surface soil, subsurface soil, surface water, and groundwater investigations at the Property. The URS report concluded:

- The cap on the primary and secondary tailings piles was compromised by burrowing animals;
- Portions of the primary and secondary tailings piles may not have been appropriately capped;
- Surface soil grab samples from areas outside the primary and secondary tailings piles indicated that there were five areas exhibiting elevated radiation (greater than two times background) and approximately 18 sampling locations that exhibited total lead concentration greater than 400 milligrams per kilogram ("mg/kg");
- Remediation of elevated radiation (greater than two times background) areas along the Valmont Butte hillside was not warranted or recommended; and
- The surface water and groundwater pathways were not complete and determined not to be a concern for the Property.

In order to satisfy its obligations under the "*Agreement and Declaration of Covenants*" (CDPHE, 1999c) and to address the concerns identified by EPA, the City decided to enter the Property into the State of Colorado Voluntary Cleanup Program. In anticipation of filing the application to the Voluntary Cleanup Program and to fill identified data gaps, an extensive site characterization was performed by CRI in 2009 that included both a survey of metals impact in near-surface soils (to a maximum of two feet below ground surface ["bgs"]) and a radiation survey at approximately three feet above ground surface. In addition, the onsite buildings were screened for metals impact and radiation levels.

During the soil survey completed as part of the site characterization, approximately 679,600 square feet (15.6 acres) of the Property outside of the primary tailings pile, secondary tailings pile, and North Slope areas were identified as containing lead concentrations in surficial soils that exceeded the action level of 800 mg/kg for lead (Figure 4). The identified lead impact areas included 16 out of the 18 sampling locations identified by URS (2005) as containing lead concentrations greater than 400 mg/kg and three previously unidentified areas. Sample results from two of the areas previously identified by URS could not be replicated when reassessed in the field. The 2009 site characterization activity established a correlation between lead and other heavy metal constituents, including arsenic, at higher metals concentrations. For this reason, along with the fact that there was good correlation between lead concentrations detected with the X-ray fluorescence ("XRF") spectrometer and confirmed in laboratory analysis, lead was used as the indicator parameter to assess the extent of soil remediation in specific areas.

The site characterization radiation survey was conducted by Steven H. Brown, Inc. of Centennial, Colorado, a subcontractor to CRI. This radiation survey represented the most comprehensive radiation screening conducted at the Property to date and included over 115,000 data points collected over the entire Property. These data were correlated to specific onsite radiation source measurements collected using a High Pressure Ion Chamber.

The survey measured radiation exposure rates at three feet above the ground surface, a standard for human "whole body" radiation exposure. The results confirmed that there were no areas at the Property that exceeded the specified screening level of 68 micro-roentgens per hour ("μR/hr") (48 μR/hr greater than the established background of 20 μR/hr). The screening level of 68 μR/hr was derived from the industrial/commercial exposure scenario, Code of Colorado Regulations ("CCR") Number 6 CCR 1007-1, Part 4, *Standards for Protection Against Radiation, para. 4.14*. Radiological screening levels were based on data collected from nearby Legion Park to establish background levels as defined in the report *Identification and Confirmation of Soils Requiring Long Term Management* (CRI , 2009), in particular Appendix D of that document.

URS (2005) used two times the background of 20 µR/hr as an indicator of elevated radiation, and found five areas with elevated radiation. The 2009 site characterization radiation survey, while it did not identify radiation exposure rates greater than the screening level of 68 µR/hr, did confirm higher radiation rates in the locations identified by URS. The five areas of elevated radiation identified by URS were co-located with areas identified as containing lead concentrations greater than the 800 mg/kg action level.

2.3 REMEDIATION PLANS

The VCUP application was submitted to the CDPHE by CRI in June of 2010. The application required that the Property be remediated to the December 2007 Colorado Soil Evaluation Values ("CSEVs") established by the CDPHE, including 800 mg/kg for lead and radiation levels of 68 µR/hr measured at three feet above the ground .

The VCUP was approved by the CDPHE on September 1, 2010. Additional requirements were later added in an amendment approved by the CDPHE on August 31, 2011. This amendment added requirements to perform perimeter air monitoring and sample sediments in the stormwater detention areas prior to closure and remediate as required. Revegetation consistent with Boulder County open space specifications was to be performed following the completion of work.

In addition to the criteria set in the VCUP application, a Materials Management Plan ("MMP") was submitted with the application. This MMP addressed soils exceeding cleanup action/screening levels and their management during remedial activities.

The VCUP and associated documents outlined the following:

- Removal of onsite prairie dogs from the remediation area;
- Demolition of certain buildings, structures, and other features and placement of concrete and metal rubble into the primary tailings pile. Buildings slated for demolition were identified in the City of Boulder's Limited Impact Special Use Application to the Boulder County Land Use Department;
- Excavation of the 14 soil excavation areas identified in the site characterization completed in 2009 (CRI, 2009), plus the secondary tailings pile, with consolidation of all excavated materials in the primary tailings pile;
- Impacted soil in cultural sensitive areas and along the Valmont Butte north slope would not be remediated, but would be seeded as necessary;

- Grading of consolidated remediation debris and mining residuals within the primary tailings pile to meet the elevation design;

- Import soils and earthwork to construct the primary tailings pile two-foot clean soil cap;

- Import and placement of rock over the primary tailings pile soil cap as a prairie dog exclusion layer;

- Excavation and/or import soils as necessary to grade remaining Property (outside the primary tailings pile) to design elevation contours;

- Seeding of areas affected by remedial activities (outside the primary tailings pile) and areas of sparse natural vegetation;

- The key soil action level for metals was 800 mg/kg lead. Based on data collected, lead concentration would be used as the indicator for metals impact as other metals and radiological constituents were determined to be co-located;

- The correlation between XRF lead concentrations measured in the field, and laboratory confirmation analysis was previously established and considered acceptable for the VCUP implementation;

- Human "whole body" radiation exposure would be measured at three feet above ground surface to assess whether soils required remediation due to radionuclide contamination. The screening level of 68 µR/hr would be used for this purpose. No areas exceeding the radiological screening level were identified during remediation;

- Confirmation sampling for both metals and radiological parameters and comparison to applicable standards;

- Site grading to allow proper drainage; and

- Disposal of two previously discovered overpack drums stored onsite in the garage which contained tailings and coal fines in the primary tailings pile.

3.0 VCUP IMPLEMENTATION

VCUP implementation was initiated in March 2012 and substantially completed in May 2013. The VCUP was implemented by the City and its selected remediation contractor LVI Environmental Services, Inc. ("LVI"). Excavation activities were completed by Arvada Excavating under subcontract to LVI. Excavation of soils and demolition of structures was performed by Arvada Excavating and LVI under CRI's direction. General soil disturbing protocols in the VCUP/MMP required that a CDPHE-certified asbestos building inspector ("field technician") be present for all soil disturbing activities in order to identify and assess environmental conditions as they were encountered. These oversight activities were completed by CRI under contract to the City.

The remedial activities completed during the VCUP implementation included:

- Excavation of impacted soils and the secondary tailings pile and consolidation in the primary tailings pile. Management of impacted soils from the 14 soil excavation areas plus the secondary tailings pile and the associated estimates of volume for each area are presented on the as-built drawings presented in Appendix B;

- Demolition of specific buildings and remediation of residual tailings and metals-impacted soils beneath the buildings, with material placed in the primary tailings pile;

- Construction of retaining walls and grading around existing structures;

- Installation of fencing to protect buildings and cultural areas;

- Placement of an engineered soil cap consisting of two feet of clean clay soil and 18 inches of rock as a prairie dog exclusion layer over the primary tailings pile;

- Localized control of prairie dogs during remediation and post remediation;

- Management of petroleum contamination discovered on the Property;

- Asbestos abatement of structures and building systems permitted under the CDPHE Air Quality Control Commission Regulation 8, Part B- Asbestos;

- Perimeter air quality monitoring;

- Monitoring of personnel radiation exposure;
- Stormwater management in accordance with permits obtained by LVI, including development of a stormwater management plan;
- Breaching and declassification of the St. Joes Dam (primary tailings dam) as a high hazard State Jurisdictional dam;
- Revegetation of areas disturbed during remediation, including areas of sparse natural vegetation in culturally sensitive areas;
- Industrial water well abandonment; and
- Post remediation groundwater sampling.

Prior to contractor mobilization and the initiation of remedial activities, an eight-hour training class was conducted for all site personnel that discussed the potential environmental hazards (metals and radiological constituents) and the cultural resources associated with the Property. Site controls and the approach to remedial activities were discussed and an archaeologist presented information on cultural artifacts that could be encountered during excavation activities.

Later, a follow up pre-construction activity meeting was conducted onsite in advance of remedial activities.

Photographs documenting the various VCUP implementation activities discussed in the following sections can be found in the Photograph section at the end of this report.

3.1 PRELIMINARY ACTIVITIES

Office trailers were mobilized to the Property in March 2012 and set up near the eastern entrance. Solar-powered security cameras were installed onsite at the direction of the City. Security cameras were installed on poles near the south Property entrance and on poles attached to the office trailers. The soil removed for the pole installation was monitored for radiation levels, with results indicating the soil radiation levels were near background.

Perimeter air quality monitoring stations and a meteorological air station were also installed at the Property in March at three pre-approved locations. These air monitoring stations included Site 1 located on the southwest side of the Property near the corner of 63rd Street and Valmont Drive, Site 2 located near the north central portion of the Property along Valmont Road, and

Site 3 located east of the secondary tailings pile and south of the office trailers. Temporary power lines were installed on the eastern side of the Property to supply power to the office trailers and air monitoring station Site 3. Power drops were also installed at air monitoring stations Site 1 and Site 2. Additional information and results of the perimeter air monitoring program are presented in Section 3.10.

Smith Environmental, under subcontract to LVI, installed prairie dog fencing and stormwater best management practices ("BMPs") in accordance with the Stormwater Management Plan and permit. In accordance with those requirements outlined in Section 3.9, radiation monitoring was conducted during the prairie dog fencing installation and prairie dog management activities.

The Property was initially segregated into two areas to eliminate cross-contamination of metals-impacted soils by vehicle and personnel traffic. The site characterization conducted by CRI (2009) indicated that the portion of the Property east of the secondary tailings dam contained no impacted soils and therefore, was established as a "clean" zone. To provide access to the western portion of the Property for refueling vehicles and other logistical uses, a "clean" road was constructed along the north side of the primary and secondary tailings piles using import soil. The remainder of the Property was considered to be metals-impacted. Yellow caution tape was used to mark the boundary between the impacted and clean areas. Personnel or vehicles crossing from the metals-impacted area to the "clean" area were subject to radiation monitoring and, if necessary, decontamination. As remediation efforts progressed the "clean" zone was expanded but the same monitoring and decontamination requirements remained until all of the metals-impacted soils were placed within the primary tailings pile and capped.

3.2 OVERSIGHT MONITORING PROTOCOLS AND SCREENING

CRI provided field technicians to monitor soil disturbing activities during the VCUP implementation. Soil disturbing activities included:

- Excavation of approximately 67,000 cubic yards of metals-impacted soil including the secondary tailings pile and consolidation in the primary tailings pile;
- Demolition of designated buildings and removal of underlying metals-impacted soil;
- Demolition of a previously unknown subsurface concrete vault and an underground storage tank ("UST"); and
- Onsite grading.

3.2.1 General Monitoring Protocols

A field technician and a Radiological Control Technician ("RCT") were onsite to screen soil during all soil disturbing activities with the exception of import soil stockpile activity and soil cap placement. Copies of training certifications for CRI field technicians and RTCs are presented in Appendix C.

The field technician monitored soil disturbing activities using visual and olfactory senses and an XRF spectrometer to assess metals concentrations. The RCT monitored radiation exposure using radiation monitoring equipment. Daily logs were maintained that documented the soil disturbing activities and observations made by the field technician and/or RCT. Daily logs included documentation of environmental samples collected, maps/drawings, photographs, and analytical data. Daily logs are provided in Appendix D.

In general, the response by a field technician per the MMP was as follows:

- If field screening results exceeded the action/screening levels as described in the MMP, that soil was consolidated in the primary tailings pile. In certain but limited impacted soil areas, it was infeasible to remove all of the impacted soils, such as under a building that was not scheduled to be demolished. In these cases the location was documented and the area of impacted soil was noted (Figure 5);

- If the action/screening levels were not exceeded, the soil was used as backfill on the Property; and

- If material was suspected of containing non-friable or friable asbestos, and was below the quantity trigger level for abatement (as defined by CDPHE regulations), the field technician picked up the suspect asbestos-containing material ("ACM") by hand and placed it in a bag labeled for asbestos-containing waste material. This material was then consolidated with the ACM waste from the licensed abatement activities being performed on the Property and later transported and disposed at a certified asbestos landfill.

- When soil was encountered that exhibited potential environmental impact, other than metals or ACM contamination as determined by field screening, the field technician suspended soil disturbing activities in the area and collected a soil sample for laboratory analysis. Disposition of this soil depended on the analytical results. Any soil with contaminants above applicable regulatory limits (in this case only soils containing petroleum constituents) was placed in a segregated area within the primary tailings pile.

3.2.2 Metals and Radiation Screening

Both metals and radiation screening were conducted during the soil remedial activities. The procedures for field screening are discussed briefly in the following sections.

Metals Screening

Lead screening was completed using a field portable XRF spectrometer. The XRF spectrometer used was the Alpha Series XRF manufactured by Innov-X Systems, which was previously used at the Property during the 2009 site characterization completed by CRI. The XRF spectrometer measures concentration in parts per million ("ppm"), which is equivalent to mg/kg. The remedial goal for the Property was to remediate metals-impacted areas to commercial CSEVs. The CSEV for lead of 800 mg/kg was used as the action level to determine whether soils required remediation. This concentration corresponds to the commercial/open space use associated with the Property.

The initial screening process included real-time in-situ measurement for total lead concentration as subsurface soils were exposed during excavation or grading at the Property. In-situ measurements were collected by placing the XRF spectrometer directly on the excavated or newly exposed soil and running the spectrometer for approximately 30 seconds to 60 seconds. The locations for in-situ measurements of the excavation bottom and/or sidewalls were selected at random, generally spaced at 20 feet to 30 feet distance throughout the exposed excavation. The field technician used flagging or spray paint to designate areas that required further excavation.

When XRF spectrometer results were 650 ppm or greater, additional soil was removed to insure that confirmation sampling results for the remediated area would meet the lead action level of 800 mg/kg. This proved to be an effective approach. Very few areas required additional excavation (remediation) after soil confirmation sample results were received.

Radiation Screening

Radiation screening was conducted in real-time using a Ludlum Model 19 µR meter and a Ludlum Model 2221 general purpose ratemeter/scaler with Model 44-10 alpha/beta/gamma) G-M pancake probe. All radiation detection instruments were checked daily by the RCT using cesium-137 and thorium-230 check sources before conducting any radiation surveys. Radiation monitoring was performed throughout the remediation portion of the project to assist in the remediation efforts and to ensure worker safety.

After the soil excavation was cleared for lead concentration by the field technician, the RCT walked the area with the µR meter in transect lines spaced approximately 25 feet apart. The

RCT held the probe at approximately waist level to emulate an effective "whole body" dose rate. If radiation dose rates exceeding the screening level of 68 μR/hr had been observed, the area would have received additional excavation; however, this situation did not occur during the remediation work.

Decontamination of equipment and field screening of demolition debris was completed using the Ludlum Model 2221 general purpose ratemeter/scaler with Model 44-10 alpha/beta/gamma) G-M pancake probe. This instrument measures radioactivity emitting from the material in counts per minute. The ratemeter was set on the fast response rate on the lower scale with the audio switch on. Measurements were taken as close as possible to the material, moving the probe at approximately two inches per second. Readings greater than twice the background with the ratemeter and pancake probe (in counts per minute) were used to indicate whether the equipment or demolition debris was contaminated with radioactive materials.

3.2.3 Negative Exposure Assessment

Due to the potential of metals and radiation exposure, Level C Personal Protective Equipment ("PPE") consisting of Tyvek suits and respirators were initially worn during excavation and monitoring in Area J (Photo 1). In order to assess whether this level of PPE protection was necessary for site conditions, personal air monitoring was conducted in accordance with Occupational Safety and Health Administration ("OSHA") worker protection requirements. Personal air monitors were used to sample the breathing air zone on personnel working in close proximity to the excavation activities to assess if field personnel were being exposed to site metal contaminants and potentially unacceptable inhalation exposure. The metals of concern in the soil monitored were lead, arsenic, and uranium. Personnel air monitoring continued for four days, with the personal air monitor filters collected each day and submitted for laboratory analysis. Multiple work tasks were completed over the four day monitoring period that were representative of the anticipated work tasks and anticipated conditions that were likely to be encountered during the remainder of the project.

Laboratory analytical results indicated that concentrations were all well below the OSHA action levels and/or the permissible exposure levels for the three regulated constituents monitored to determine appropriate PPE: lead, arsenic, and uranium. Based on the personal air monitoring results, it was concluded that respirators and disposable coveralls (Level C) were not necessary in the excavation areas to protect personnel from airborne metal contaminants and that Level D protection (hard hat, safety glasses and steel tipped shoes) was adequate during soil remedial activities. The Negative Exposure Assessment report noted that should future conditions and/or operations vary substantially from those encountered during the air sampling program, additional sampling events would be performed or PPE requirements would be changed to the appropriate

level for the new conditions. The Negative Exposure Assessment report and analytical data are provided in Appendix E.

3.2.4 Radiation Exposure Monitoring

Potential radiation exposure to site personnel was monitored through the use of optically stimulated luminescence ("OSL") dosimeters, which are more sensitive and durable than thermoluminescent dosimeter ("TLD") badges. OSL dosimeter badges were assigned to onsite personnel to be worn while performing site remedial activities. These dosimeters provided a record of worker exposure to radiation and were employed until the consolidated materials in the primary tailings pile were capped with clean soil. Section 3.9 provides additional detail on the dosimeter monitoring.

3.3 CONFIRMATION SOIL SAMPLING

Once each remediation area was judged to be remediated based on XRF spectrometer and radiation instrumentation screening results, confirmation soil sampling was performed. All of the remediated areas required confirmation soil sampling and analysis for metals concentrations. Remediation areas ST, MW, ME, D, F, and G were also sampled and analyzed for the radiological parameters of gross alpha/beta and radium 226/228, consistent with VCUP requirements.

3.3.1 Metals Sampling

Each remediation area was divided into grids of approximately 2,500 square feet and GPS coordinates of the grid corners established. One composite soil sample was taken from each grid as follows:

- Using a decontaminated stainless steel trowel, grab samples from the top six inches of the soil profile were collected near each corner and the center of the grid. Each grab sample was approximately 4 to 8 ounces;

- The five grab samples were placed in a single plastic sealable storage bag and thoroughly mixed (composited); and

- As a quality assurance check, the metals concentrations of the composite sample were measured using the XRF spectrometer. If the XRF spectrometer analysis indicated that the lead concentration was greater than 800 mg/kg, the grid was rejected and further remediation completed prior to re-sampling.

As a quality control measure and in accordance with the Sampling and Analytical Plan, one duplicate sample was taken and analyzed for each 20 confirmation samples submitted to the laboratory for metals analysis. Again, as defined in Section 2.2, the soil lead concentration measured using the XRF was used as the parameter to define the extent of remediation conducted for each area.

3.3.2 Radiation Sampling

As required by the VCUP, confirmation radiation samples were collected from specific areas previously identified by URS in 2005 after those areas were remediated to assure radiation levels were below established CDPHE standards for gross alpha/beta and radium 226/228 in soil. Remediation Area ST (the secondary tailings pile) was divided into grids of approximately 25,000 square feet and GPS coordinates of the grid corners established. One composite soil sample was taken from each grid. Areas MW, ME, D, F, and G were all less than 25,000 square feet and were sampled as one grid each. A grab sample from the top six inches of the soil profile and near the center of the grid was collected using a decontaminated stainless steel trowel. Each grab sample was approximately 200 to 300 grams (sufficient volume for laboratory analysis).

3.4 SOIL EXCAVATION AND CONSOLIDATION

During CRI's 2009 site characterization, 14 areas outside the primary and secondary tailings piles were identified as containing lead concentrations greater than 800 mg/kg (Figure 4). Areas containing metals that exceeded the action level for lead were excavated and consolidated in the primary tailings pile. Remediation of each of the lead-impacted areas is discussed in the following sections. The discussions are presented in the chronological order of the areas' remediation. Radiological screening completed in each of the remediation areas did not identify any areas that emitted exposure dose rates greater than the VCUP screening level of 68 µR/hr; therefore, radiological screening results are not discussed further.

Laboratory analytical reports for confirmation soil samples discussed in the following sections are provided in Appendix F.

3.4.1 Area J Remediation

Area J included the northern end of the secondary tailings pile dam (see Figure 4). Originally this area was listed as Area J in the north and Area CC to the south, but was later combined into one area. The residual metals impact in this area was estimated to be one foot thick over an area of approximately 27,837 square feet (estimated volume of 1,031 cubic yards). Remediation was initiated on the north side of the area and continued on the east side of the secondary tailings pile dam. As soils were removed from the top of the dam, seams of tailings were found interspersed with layers of "clean" soil. During the CRI 2009 site characterization, surficial metals-impacted

soils were detected only on the northern portion of the dam. Because seams of impacted soils were discovered at depth in the northern portion of the dam during remediation, the possibility of impacted soils being present at depth in the remainder of the dam was further evaluated. Five test pits were excavated along the length of the dam. Three of the five test pits contained lead concentrations in excess of the lead action level. Radiation monitoring indicated all readings were less than the screening level.

Based on these test pit results, the secondary tailings pile dam was removed to match the final design grade in the vicinity of the dam. Upon reaching the planned grade, three additional test pits were excavated to approximately six feet. Tailings were again identified in all three test pits. Based on the continued discovery of tailings within the matrix of the secondary tailings pile dam, complete removal of the dam was approved and all dam materials were removed to native soil. Material excavated from the secondary dam was placed in the primary tailings pile.

Based on XRF spectrometer and radiation equipment screening results, the area was judged to be ready for confirmation sampling. The expanded Area J was divided into 33 grids (Figure 6), composite soil samples collected, and samples submitted to the laboratory for metals analysis. Results for Area J confirmation samples met the lead action level for all samples (Table 1) and the remediation of this area was determined to be complete.

3.4.2 Area BB Remediation

Area BB was located immediately south of the secondary tailings pile area (Figure 4). It was estimated that depth of impact was approximately six inches over an area of approximately 70,254 square feet (estimated volume of 1,301 cubic yards). This area was delineated as having near-surface metals-impacted soils that extended up the slope to the southern Property boundary. The portion of this area south of the old prairie dog fence exhibited significant vegetative cover and is part of a larger cultural resource area. The VCUP application noted that the hillside would not be remediated. The CDPHE concurred that this hillside area with vegetation did not require remediation providing the vegetative cover remained undisturbed and those areas of the hillside exhibiting sparser vegetation would be overseeded with the design seed mix and revegetated.

Per the remediation plan, the top six inches of soil was removed from the portion of Area BB not associated with the cultural area. XRF spectrometer screening results indicated that additional removal of metals-impacted soil was required on the west side of Area BB which expanded to include land between Area BB and the secondary tailings pile area.

Once XRF spectrometer and radiation equipment screening results met the action/screening levels, Area BB was gridded per the VCUP requirements (Figure 7) resulting in the collection of 29 confirmation soil samples and two duplicate samples, all of which were analyzed for lead,

arsenic, and uranium. The results for these confirmation samples indicated that the cleanup action levels were met (Table 2). Based on these results, Area BB was remediated in accordance with the MMP and based on the confirmation results, the remediation of this area was determined to be complete.

3.4.3 Secondary Tailings Pile Area (Area ST) Remediation

Area ST was located immediately east of the primary tailings pile and just south of the Valmont Butte (Figure 4). Originally, Area ST was estimated to contain tailings to a depth of seven feet over approximately 160,484 square feet, based on previous drilling completed in the area. Area ST was originally estimated to contain approximately 41,607 cubic yards of metals-impacted soil.

Activities in Area ST were initiated with the removal of trees and brush that would be in the path of remediation and placing the debris in the primary tailings pile. Potholing for a pipe reported to be in the west end of the secondary tailings pile near the primary tailings dam was conducted. Two test pits were excavated to approximately two feet below the bottom of the tailings (five to eight feet bgs). The transition from tailings to native soil was visually evident based on the change in color, grain size, and the presence of cobble in the native soils. Radiation screening and XRF spectrometer readings also indicated the change from tailings to native soils. The subject pipe was not found, but an object that appeared to be a metal exhaust stack section (Photo 2) was found at approximately one foot bgs. The metal cylinder was 15 feet long and 24 inches in diameter. The metal cylinder had flanges on both ends and four metal eyes assumed to be guy wire attachments. This item was transported to the primary tailings pile and placed with other onsite debris.

As remedial activities began, tailings were determined to extend beyond the visually apparent edge of the secondary tailings pile towards Area BB on the southwest end and to the west toward the primary tailings dam. Excavation of tailings to the west extended to the toe of the primary tailings dam. Remediation (removal of tailings) into the dam structure was not necessary because the dam was to be covered by the imported clean soil and rock cap.

After excavation of visible tailings, the depth to native soil across most of Area ST was shallower than the originally anticipated depth of seven feet bgs (Photo3). The actual remediated depth was only three to four feet depending on location. To verify that all tailings had been removed from Area ST, eight test pits were excavated to depths of four to six feet below the remediated grade elevation. No additional tailings were found at depth; however, surface lead contamination was identified at two test pit locations and these areas were further remediated (Photo 4). Eighty-three sample grids were established (Figure 8) and confirmation soil samples were collected (along with four duplicate samples) and analyzed for metals. Soil confirmation

sample results for metals met the soil action levels for metals with the exception of grid number VB-ST-F0 which contained 1,050 mg/kg lead (Table 3). Upon further review, it was determined grid number VB-ST-F0 would be within the primary tailings dam cap area, and therefore, would not require further excavation.

In addition to analyzing for metals in Area ST, the CDPHE requested confirmation soil samples to be collected and analyzed for radium 226/228, and gross alpha/beta and compared to applicable standards. For this radiological sampling, Area ST was separated into eight grids of approximately 25,000 square feet each (Figure 9). Eight confirmation samples were collected from these grids and submitted to ALS Environmental Laboratories in Fort Collins, Colorado. The radiological confirmation sample results indicated adequate remediation, with the potential exception of soil sample ST-RAD2 (Table 4). Sample ST-RAD2 results were determined to be potentially greater than cleanup criteria depending on how the data were evaluated (radium 226 and 228 combined or assessed separately). As a conservative response, an additional six inches of soil from the portion of the RAD2 grid was removed and then re-sampled. Results were received from the laboratory and these results were again greater than the radium-226 standard (Table 4). No additional remediation was completed in grid ST-RAD2, as the primary tailings dam soil and rock cap would cover most of this area and the remainder of the area would be capped with several feet of "clean" soil backfill as part of the final grading. Based on the confirmation results, the remediation of this area was determined to be complete.

3.4.4 Area I Remediation

Area I originally was scheduled to be remediated; however, during a field inspection by the Native American cultural monitor this area was determined to be situated within the culturally sensitive area. This issue was discussed with the CDPHE and it was agreed that no excavation or additional investigation would occur within this area. Hand seeding was performed in this area to promote additional vegetation to reduce erosion and discourage prairie dog migration into the area. Based on the agreed actions for culturally sensitive areas, remediation of Area I is determined to be complete. This area was estimated to have impacts to a depth of 0.5 feet over and area of 10,152 (estimated volume of 188 cubic yards)

3.4.5 Area AA Remediation

Area AA was located to the north of the western half of the Valmont Pioneer Cemetery (Figure 4) and had metal impacts to a depth of 1.5 feet over an approximate area of 58,482 square feet (estimated volume of 3,249 cubic yards). The areal extent of Area AA, estimated in 2009, was based on 200-foot grids with five samples collected per grid, which resulted in one sample for approximately every 8,000 square feet. The cemetery parking lot and area east of the parking lot was included in Area AA as a result of the large sampling grid. Due to the close proximity to the

cemetery, concerns were raised that excavation could potentially unearth cultural features. To reduce the chance of impacting such features, additional sampling was completed to further refine where metals impacts occurred.

This additional sampling was performed in the cemetery parking lot and to the east between the dirt road and the cemetery fence line to further delineate the lateral extent of metals-impacted soils. The subject area was divided into 25 foot by 25 foot grids (Figure 10) and five samples were collected for each grid (near each corner and at the center). The samples were taken with a decontaminated stainless steel trowel from the surface to six inches bgs and placed in a sealed plastic bag. These samples were analyzed for metals using the XRF spectrometer. The results of the XRF analyses are shown in Table 5 along with the adjusted lead and arsenic values using the same formulas used in the CRI 2009 site characterization. These formulas were developed from a regression analysis on XRF and laboratory results from 12 soil samples collected from the Property. This entire procedure mimics the process used during the CRI 2009 site characterization except that the sampling density was increased significantly. In addition to the metals sampling, radiological screening was also completed by the RCT.

Two specific areas north of the cemetery fence and east of the cemetery parking lot (one 10 x 20 foot area and a second 10 x 30 foot area) were determined to require six inches of soils removal (Photo 5). The remainder of the subject area was determined to meet the soils cleanup action level for lead and screening level for radiological constituents. With the project archaeologist present to observe for potential cultural resources, six inches of soil were removed with a mini-excavator from these areas and additional XRF spectrometer screening completed. The XRF spectrometer screening indicated that the remaining soil met the lead action level and no further excavation was completed in these areas. These remediated areas were included in the Area AA remediation area volume calculations. Based on further evaluation of these areas described above, the cemetery parking lot and other undisturbed areas south of the dirt road were determined to meet action/screening levels and excluded from Area AA.

Ten additional samples were collected along the north side of the cemetery parking lot fence. XRF spectrometer results were less than the action level for lead with the exception of two samples located along the north side of the fence at the northwest corner of the parking lot. In this area, soil containing lead concentrations greater than the action level of 800 mg/kg continued under the fence a few inches into the parking lot. A test pit had previously been excavated directly south of the fence in this location in an effort to locate a natural gas pipeline. XRF spectrometer screening of the excavated soil indicated that the soil met the lead action level. These results indicated that the impacted soil discovered at the fence was surficial and did not continue with depth. Based on these results, surficial soil remediation was completed with the fence remaining in place.

An underground concrete structure was discovered in the northeast portion of Area AA during remedial activities. This structure was believed to be a cistern (water storage tank) used during the Mill operation. The City directed the remediation contractor to remove the structure as part of the remediation of Area AA. An excavator was used to remove the top of the vault. Once the top was removed, sediment and water was observed in the bottom of the concrete structure (Photo 6). The bucket of the excavator was used to scoop a sample of this mixture. Upon examination it was determined that the sediment was primarily decomposed organic matter and soil sediment with rust from the pipes in the vault and water (Photo 7). There was no odor and no sheen on the water. As a result of these observations, the sediment and water were not sampled and the sides of the vault were collapsed and the structural remains were covered with soil.

Remediation of Area AA included removal of impacted soil near an eight-inch gas pipeline located across the southern portion of Area AA. An Xcel representative (Site Wise) was present during all excavation activities in the vicinity and immediately around the pipeline. After the initial soil removal in Area AA near the pipeline, a combination of manual and small equipment excavation was performed above and around the pipeline as needed. Soil situated above the high pressure gas pipeline was removed using a mini-excavator. Where necessary, metals-impacted soil along the sides and top of the gas line was removed by hand. This method of remediation was used until the adjacent soils met the lead action level of 800 mg/kg as determined by use of the XRF spectrometer. This remediation was performed on approximately 100 feet of pipe where contamination was discovered below existing grade.

Thirty-two confirmation samples (including two duplicate samples) were collected from Area AA, which was divided into approximate 2,500 square foot grids (Figure 11). With one exception, the lead concentrations in these samples were less than 800 mg/kg (Table 6). The lead concentration reported for the sample collected at Grid B7 was 2,100 mg/kg. An additional 6 inches of soil was removed from this grid, but did not include the area immediately adjacent the high pressure gas pipeline. A second confirmation sample collected from this area contained lead at 106 mg/kg, well below the action level for lead. Based on the confirmation results, the remediation of this area was determined to be complete.

A concrete pit reportedly used previously as a vehicle grease and oil change pit was discovered east of Building 7 in remediation Area AA. The remediation of this pit is addressed in Section 3.6.2.

3.4.6 Area B Remediation

Area B was located west of the primary tailings pile and approximately 75 feet north of the east half of the Valmont Pioneer Cemetery (Figure 4). This area was estimated to contain

approximately 168 cubic yards of metals-impacted soil (9,072 square feet with impacts to a depth of 0.5 foot).

As remediation began on the west side of Area B, a metal 55-gallon drum was uncovered. This drum was empty and subsequently removed. To determine if there were additional drums in this area, exploratory excavation was completed. Five empty, rusted-through drums were discovered, removed, and placed in the primary tailings pile. A sixth drum was encountered that was determined to be nearly full. The contents appeared to be old paint and had separated into an oily brown liquid and a more viscous yellow sludge (Photo 8). The drum was left in place and a sample of the yellow sludge (VB-B-050312-01) and a sample of the oily brown liquid (VB-B-050312-02) were collected. These samples were sent to the lab for analysis of Resource Conservation and Recovery Act ("RCRA") eight metals, volatile organic compounds ("VOCs"), and total petroleum hydrocarbons ("TPH" included diesel range organics ["DRO"], and oil range organics ["ORO"]). The results indicated that both samples contained significant amounts of TPH (the yellow sludge contained approximately 56% TPH and the oily brown liquid approximately 21% TPH). Additional sampling was performed on the yellow sludge material (VB-052112-BD-3 and VB-052212-BD-3) to analyze for polychlorinated biphenyls ("PCBs"), polynuclear aromatic hydrocarbons ("PAHs"), and RCRA hazardous characteristics. The results of these analyses showed that the material in this drum was non-hazardous. The drum containing yellow sludge and brown oily liquid (likely old paint) was placed in an 85-gallon overpack.

Additional excavation was performed to collect confirmation samples and nine additional drums were found and removed. Four of these drums were empty and were disposed in the primary tailings pile. One drum contained a small quantity of solids and each of the remaining four drums contained a small volume of liquid. The liquid in the four drums appeared to be lubricating oil with a total volume in all four drums estimated to be less than 10 gallons. The liquid from these four drums was consolidated into one drum then placed into an 85-gallon overpack drum. Samples of the consolidated oil from the four drums were taken (VB -052112-BD-2) and analyzed for VOCs, RCRA 8 metals, PCBs, PAHs, and RCRA hazardous characteristics. Analytical results indicated that the oil contained small amounts of various VOCs and was ignitable at 140 degrees Fahrenheit rendering the liquid characteristically hazardous and requiring disposal as a hazardous waste.

The contents of the drum containing solids was sampled (VB-052112-BD-1 and VB-052212-BD-1) and analyzed for VOCs, RCRA 8 metals, PCBs, PAHs, and RCRA hazardous characteristics. The drum was placed in an 85-gallon overpack. Analytical results showed that the solids were not hazardous, but did contain 785 mg/kg of benzoic acid.

All three overpack drums were labeled and transported to a staging area north of Building 7 until transportation to a disposal facility could be arranged.

Although there was no visible staining or olfactory evidence of residuals from the buried drums, soil samples were taken from the area where the drums were removed. These soil samples (VB-051712-B1 and -B2) were also sent to the laboratory for analysis and the results showed that there were no contaminants of concern remaining in the soil.

After receipt of the soil sample results, six inches of soil was removed from Area B and screened with the XRF spectrometer. Based on lead levels obtained from the XRF spectrometer the area was deemed ready for confirmation sampling. Two grids were established and two confirmation samples were collected, VB-B-A1 and VB-B-A2 (Figure 12). Lead concentration in both samples was less than the 800 mg/kg action level for lead (see table 7). Based on the confirmation results, remediation of Area B was determined to be complete.

3.4.7 Area C Remediation

Area C was located on the southwest side of the Property and extended from the garage building down the slope to the southwest encompassing an area of approximately 90,565 square feet (Figure 4). The depth of metals contamination was estimated at four feet across the area resulting in an estimated volume of 13,417 cubic yards of metals-impacted soil to be removed.

During remediation of Area C, soils and tailings exhibiting elevated levels of lead (as high as 100,000 mg/kg) and arsenic (as high as 3,500 mg/kg) were encountered at the bottom of the slope (southwest corner of Area C and immediately south of the Mill Building), with depth of impact up to six feet bgs. Based on these elevated lead and arsenic concentrations, additional safety precautions were taken as the metals-impacted soil was removed and consolidated into the primary tailings pile. These precautions included suspension of excavation with scrapers (using only an excavator to better control dust generation), additional water sprayed on the excavation area for dust suppression, and use of air-purifying respirators.

Metals-impacted soils continued under the railroad tracks located on the northwest side of area C (Photo 9), which are associated with the rail spur south of the Mill Building. These soils were initially left in place as the railroad tracks were considered an historical site feature (more discussion of remediation of the railroad track is in section 3.4.15). As described in Section 3.4.15, impacted soils were also removed from around the support guy wire extending south from the exhaust stack on the Mill Building. A mini-excavator and hand laborers were used to remove metals-impacted soil from around the guy wire support in Area C. A temporary support was needed while this work was being performed. This was accomplished by tethering the guy wire support to a truck to ensure that the guy wire did not pull out of the ground as the metals-

impacted soil was removed from around the concrete block. After the metals-impacted soil was removed, clean soil was placed and compacted around the concrete support prior to replacing the guy wire cable.

Area C was divided into 39 grids with each grid representing approximately 2,500 square feet (Figure 13). Thirty-nine soil confirmation samples and two duplicate samples were collected and submitted to the laboratory for metals analysis. Laboratory analytical results (Table 8 for metals results) all met the VCUP cleanup criteria for the project and the remediation of this area was determined to be complete.

3.4.8 Area E Remediation

Area E was located just north of Valmont Road at the corner of 63rd Street and Valmont Road on the west side of the Property (Figure 4). An Xcel Energy natural gas pipeline and utility building are located immediately north and adjacent to Area E. Area E metals impact estimated to be to a depth of four feet over an area of 10,334 square feet (estimated volume of 1,531 cubic yards).

Prior to remedial activities in Area E, soil fill was placed over the existing active gas pipeline located east of Xcel's utility building for protection from heavy equipment traffic. Several gas pipeline connections to the utility building necessitated the Xcel representative be present when excavating near these gas pipelines. In addition, because of overhead power lines in the vicinity, a mini-excavator was used for a portion of the excavation to allow safe clearance between equipment and the power lines. As excavation of metals-impacted soils was being performed it became evident that the impacted soil area extended to the west beyond the planned remediation area. On completion of excavation, the areal extent of Area E had expanded approximately 300 feet to the west of the original planned excavation. The remediated area was sectioned into four grids (Figure 14) and confirmation samples were collected and submitted to the laboratory for metals analysis. The laboratory results of the four composite samples indicated that all lead concentrations were less than the 800 mg/kg action level for lead (Table 9). Based on these results, the remediation was considered complete.

3.4.9 Area MS Remediation

Area MS was located on the south side of the Mill Building (Figure 4) and had had impacts to a depth of 1.5 feet over an approximately area of 3,098 square feet (estimated volume of 459 cubic yards).

Excavation began near the center of the Mill Building's south wall. Initially the depth of metals-impacted soil was fairly shallow, but then increased as excavation moved south. As the depth of

metals-impacted soil increased petroleum contamination (determined visually and by odor) was also encountered. The petroleum impact was attributed to an oil-fired boiler that was formerly situated in the southern portion of the Mill Building adjacent to Area MS. Inspection of the boiler area revealed a floor drain that exhibited oil stains and the presence of absorbent (kitty litter) surrounding the drain. This indicated that oil may have been discharged down the drain. The petroleum-impacted soil immediately south of the foundation was removed down to claystone bedrock, where possible, and placed in a separate designated cell within the primary tailings pile (Figure 15). Petroleum impact beneath the Mill Building foundation was left in place (Photo 10) to avoid compromising the structural integrity of the historic Mill Building.

A sample collected from the petroleum-impacted soil during excavation indicated a DRO (TPH) concentration of 630 mg/kg, which was greater than the Colorado Department of Labor and Employment, Division of Oil and Public Safety cleanup action level of 500 mg/kg for TPH associated with petroleum cleanup sites (sample number VB-MS_PETRO-070512). Additional composite samples of the petroleum-impacted soils were collected after staging the material in the primary tailings pile. The results of these samples (1,800 mg/kg for sample VB-TPH-MS1-071912-DRO and 1,100 mg/kg for VB-TPH-MS2-071912) provided confirmation that the TPH concentrations were still greater than the regulatory TPH action level. In addition to the TPH analysis, the samples were analyzed for RCRA 8 metals (Table 10). These samples exhibited lead levels in excess of the 800 mg/kg lead action level.

After removal of the petroleum-impacted soils, metals-impacted soil excavation continued southward to the edge of the railroad bed. The excavation did not extend into the track area as the tracks were to be left in place as part of the designated historical structures. However, it was evident that impacted soils continued beneath the railroad tracks as described in Section 3.4.15.

Metals-impacted soils were also left in place behind the retaining wall (Photo 11) which was located on the southeast corner of the historic Mill Building. These soils were left in place to protect the structural integrity of the Mill Building.

When remediation of Area MS was complete, based on XRF spectrometer screening results, the area was divided into five grids (Figure 16) and requisite confirmation samples were collected and submitted to the laboratory for metals analysis. The lead concentration for sampleVB-MS-B3 was 868 mg/kg and as such, an additional six inches of soil was removed from the surface of grid B3. This grid was again screened with the XRF spectrometer and re-sampled. The analytical result for this sample indicated that the soil met the cleanup criteria for the project and that no additional remediation of Area MS was necessary. Based on the confirmation results, the remediation of Area MS was determined to be complete.

3.4.10 Area MW Remediation

Area MW was located on the west side of the Mill Building and included an estimated 1,257 cubic yards of metals-impacted soil that required removal (Figure 4). The depth of metals-impacted soil was estimated to be four feet over an 8,485 square foot area.

Prior to remediation of Area MW, it became apparent to field personnel that impacted soils potentially existed up to Building 12, which was located west of the Mill Building. Test pits were excavated to further define the boundary of the metals-impacted soils in the vicinity of Building 12. The results of test pits suggested that metals-impacted soil extended under Building 12 and the 2009 site characterization indicated that metals-impacted soil existed between Building 12 and the Mill Building. The structural integrity of Building 12 was determined to be very poor and removing soil from near the base of the building would create an unacceptable safety hazard. Therefore, based on the *Decision Process for Preservation of Certain Structures/Features* protocol established between the City of Boulder and the Boulder County Historic Preservation Advisory Board (that buildings of historical significance could be removed if the removal was critical to the cleanup effort), the decision was made to demolish Building 12 prior to beginning remediation in this area. Demolition of the building is described in Section 3.5.5.

After Building 12 was removed excavation began next to the Mill Building. The original scope of this remediation area included a concrete pad at the northern edge of the area. However, a retaining wall approximately six feet tall supported the fill under the south edge of the pad. This wall was made of old railroad ties and the pad could not be removed safely without removing this wall. Attached to the wall was a guy wire (Photo 12) from the boiler stack and rather than attempting to re-secure this guy wire elsewhere, the City directed the contractor to leave the concrete pad and retaining wall in place.

As remedial activities proceeded in the subject area, additional metals-impacted soil was encountered immediately outside Area MW (Photo 13). This area was also remediated and added to the area for purposes of confirmation sampling and reporting. Once Area MW was remediated and screened with the XRF spectrometer and radiation detection instrumentation, the area was divided into five grids (Figure 17) and metals confirmation samples were collected and analyzed for metals. In addition, one composite radiation confirmation sample was collected (VB-MW-RAD). Laboratory analytical results (Table 11 for metals results, and Table 4 for radiation results) all met the VCUP cleanup criteria for the project and the remediation of this area was determined to be complete.

3.4.11 Areas ME/A Remediation

Area ME was located east of the Mill Building and had impacts to an estimated depth of four feet over an area of approximately 3,132 square feet (estimated volume of 464 cubic yards). Area A was located adjacent to Area ME to the east and had metals-impacted soil to a depth of 0.5 feet over approximately 5,022 square feet (estimated volume of 93 cubic yards). Area A included Building 2 of the Mill complex. The excavation of these two areas overlapped and are reported as one area (Area ME/A, Figure 4).

Several trees located adjacent to the Mill Building were removed prior to excavation of metals-impacted soils. Oversight personnel noted there was visual evidence that metals-impacted soils extended under Buildings 2 and 3 (Photo 14). Samples were taken of soil at the outside edge of the building foundations. Analytical results of these samples (VB-BLDG2-WEST, VB-BLDG3-WEST, and VB-BLDG3-EAST) indicated lead concentrations that exceeded the lead action level of 800 mg/kg. The buildings were evaluated using the *Decision Process for the Preservation of Certain Structures/Features Protocol* established for the Property and determined that Buildings 2 and 3 could be demolished and the metals-impacted soils lying underneath them remediated. Demolition of the buildings is described in Section 3.5.2

After Buildings 2 and 3 had been removed, excavation was completed. The area was screened with the XRF spectrometer and radiation instrumentation, divided into grids (Figure 18), and confirmation samples for metals and radiation analysis were collected. Seven metals samples and one radiation sample (VB-ME-RAD) were collected and analyzed. Results of all confirmation samples (Table 12 for metals results and Table 4 for radiation results) met cleanup criteria for the project and remediation of this area was determined to be complete.

3.4.12 Area D Remediation

Area D was located north of the Mill Building and, based on descriptions of past milling operations (URS, 2005), was used as a storage site for ore prior to processing at the mill. This relatively flat area is located at the top of the Valmont Butte ridge that runs primarily east and west along the north side of the Property as shown on Figure 4. The northern edge of this area was located off Property but within VCUP boundary for the project, on land owned by LaFarge, Inc. now Martin Marietta Materials, Inc. ("Martin Marietta"), so an access agreement was obtained before excavation was performed in this area. The area of metals-impacted soil was estimated at 9,198 square feet with a depth of impact estimated at 1.5 feet (estimated volume of 511 cubic yards). This area included the former transformer shed (Building 9) that had been abated of ACM and removed prior to excavation. This building demolition is further discussed in Section 3.5.4.

Excavation began near the footprint of the former transformer building. As the remediation proceeded to the east and north, bedrock was encountered. This flat area had been constructed through the volcanic dike rock that forms the Valmont Butte ridge presumably by blasting and rock removal, and then covering the exposed rock with soil to make the area smooth and flat, leaving the bedrock close to the surface. The soil used as cover was potentially tailings materials, and even if not, was impacted by the subsequent stockpiling of ore. Remediation in this area was difficult due to metals-impacted soil being trapped in the jagged crevices and fractures in the underlying rock. In an attempt to more efficiently remediate this area, a mini-excavator was used to remove the metals-impacted soil without disturbing the rock formation. This method was followed up with hand excavation (Photo 15) to finish the remediation effort in this immediate area.

Once XRF spectrometer screening indicated that the area had been adequately remediated, the area was divided into four grids (Figure 19), and metals confirmation samples were collected. Laboratory results indicated that the area had been successfully remediated as lead concentrations met the lead action level of 800 mg/kg (Table 13).

Based on visual observation and confirmed with field XRF screening, additional impacted soil was found to extend farther to the north and over the ridge edge. The impacted soil area extended down the slope to the north for some distance. Because of the potential danger of rocks rolling down the slope onto Valmont Road below, rock-fall barriers were constructed before additional excavation was performed. Excavation proceeded with no complications. After XRF spectrometer screening was completed, a new grid was established (VB-D-B1A) and a confirmation sample was collected (Figure 20). Laboratory results indicated that the new grid met the lead action level (Table 11). Based on the confirmation results, the remediation of Area D was determined to be complete.

3.4.13 Area F Remediation

Area F was located along the south and west side of the old laboratory building as shown in Figure 4. The volume of metals-impacted soil to be removed was estimated to be 627 cubic yards (approximately 16,929 square feet excavated to one foot).

As excavation of Area F proceeded, lead impacted soils extended east to Area G and west across the access road to Area D (where an old tailings slurry pipe was buried under the road), along the north side of Building 4, and to the east side of the Mill Building north of Area ME/A (Figure 18). As contamination was being removed between Building 4 and the Mill Building, a set of buried steam and condensate lines was encountered. Insulation on the pipes (Photo 16) was sampled and determined to be friable ACM. Excavation in this area was suspended until the ACM was abated and the pipe removed (see section 3.6.5 for abatement details).

Along the north Property boundary to the northwest of the area originally designated as Area F (Figure 4), a natural saddle in the ridgeline had been backfilled by previous Property operators with onsite soils. As Area F was remediated the backfill within the saddle was exposed and found to contain lead-impacted soil based on field screening (Photo 17). The City directed the contractor to remove this lead-impacted soil and replace with clean imported fill.

After remediation of the area was deemed to be complete (based on XRF spectrometer and radiation instrumentation screening), the area was divided into grids for confirmation sampling (Figure 21). Thirteen metals samples along with two duplicate samples were collected, and one radiation sample was collected (VB-F-RAD). The laboratory results of these samples confirmed that the area had been successfully remediated (see Table 14 for metals results and Table 4 for radiation results). Based on the confirmation results, the remediation of this area was determined to be complete.

3.4.14 Area G Remediation

Area G was located east of Area F and south of the Valmont Butte ridge (Figure 4). This area was originally thought to contain approximately 10,449 square feet of metals-impacted soil with a maximum depth of impact at approximately four feet bgs. This resulted in an estimate of 1,548 cubic yards of metals-impacted soils.

As excavation began in Area G, a mixture of metals-impacted soils and debris was encountered (Photo 18) that extended much deeper and further to the east than originally delineated in the characterization study. An area approximately 17,500 square feet was excavated to a depth of 10 feet at its deepest point. Because the volume of metals-impacted soil quickly became significantly greater than the estimated quantity, excavation was suspended to determine aerial extent of impacted soil. Site investigations were completed around the periphery of the existing excavation using a geoprobe drilling rig to assess the lateral extent and depth of the impacted soils. A grid was established east of the original excavation and nine boreholes were drilled and sampled (see Figure 22). Knowing that surface soils exceeded the VCUP action level for lead, subsurface samples were collected continuously in four foot intervals. Because of the abundant loose debris and dry soil, recovery of sample material was limited, making evaluation of metals content in the soil difficult. In many cases, no subsurface samples were retrieved and the results of the geoprobe investigation were inconclusive. Subsequently, a mini-excavator was used to excavate test pits at the borehole locations. None of these test pits exposed any contaminated soil. However, the test pit depths were limited to approximately 10 feet bgs because of the reach of the excavator. Based on this information it was anticipated that the metals-impacted soils did not extend substantially beyond the then current excavation. Two options for further remediation were considered. These options including extending the engineered cap being placed on the primary tailings pile over this area or continued excavation of the Area G until action/screening

levels were met. A decision was made to extend the excavation until action/screening levels for the VCUP were met.

During the extended excavation of Area G, six drums were found in the buried debris. With the exception of two drums which contained liquids (Photo 19) all drums were empty or were filled with concrete. The contents of the two drums containing liquid were sampled and submitted for laboratory analysis (VB-G-DRUM-E and VB-G-DRUM-W). Analysis indicated that the contents of the drums contained petroleum hydrocarbons and that PCBs and hazardous constituents were not detected. These drums were placed in 85-gallon overpack drums and stored with the drums found during remediation of Area B (see Section 3.6.1). All work with the liquid filled drums was performed by personnel in the necessary PPE and a Photo-ionization Detector ("PID") was used to monitor the air for volatile vapors.

Based on XRF spectrometer and radiation instrument screening the remediation was completed after approximately 15,000 cubic yards of material was removed and placed in the primary tailings pile. The area was divided into grids and confirmation soil samples (15 metals and one radiation) were collected and submitted to the laboratory for analysis (Figure 23). Analytical results of all samples were less than the lead action level and radiological standards for the Project (see Table 15 for metals results and Table 4 for radiation results). Based on the field screening and confirmation laboratory sample results, remediation in this area was determined to be complete.

3.4.15 Railroad Track Remediation

The railroad tracks were not included in the original estimate of areas requiring remediation. However, based on visual observations and confirmation screening with the XRF during remediation of Area C and Area MS, it became clear that metals-impacted soils extended under the railroad tracks south of the Mill Building. Because the railroad tracks were considered an historical feature to be preserved, Area C and Area MS remediation stopped at the edge of the tracks. Upon further review and with approval of Boulder County, the City directed the contractor to remove the tracks and remediate the impacted soils and replace the rail bed with clean material prior to replacing the tracks.

The railroad tracks were removed from approximately 30 feet north of the historic mobile crane to the end of the spur south and east of the Mill Building (Photo 20). Since the railroad bed had been excluded from the 2009 site characterization, the XRF spectrometer was used to guide the extent of soil remediation. The full length of the removed section of track was remediated (Photo 21). Screening of soils located beneath the historic mobile crane indicated that metals-impacted soils did not occur in this area.

The remediated area was divided into five grids (Figure 24) and metals confirmation samples were collected. Laboratory analysis of these samples (Table 16) confirmed that the area had successfully been remediated to less than 800 mg/kg lead. Based on the confirmation results, the remediation of this area was determined to be complete.

3.4.16 Satellite Areas

Final grading at the Property was initiated, following the remediation of identified impacted soils and before the clean cap was completed on the primary tailings pile. This work was monitored by a field technician using the XRF spectrometer and by the RCT using radiation instrumentation to screen soils. As grading occurred, several smaller areas of previously unknown metals-impacted soils were encountered and remediated in accordance with VCUP requirements.

The first area was between Area BB and Area ST. Following remediation of Area ST, scrapers began cutting and filling operations in the area as part of the design grading for drainage control. Grading in the area between Area BB and Area ST exposed potential contamination based on the soil color. Screening of the soil with the XRF spectrometer confirmed the presence of metals-impacted soil. This area was considered an extension of Area BB, previously discussed in Section 3.4.2. Test pits were excavated along the length of this narrow strip and additional tailings were discovered in one of these test pits and additional remediation was performed. The newly remediated area was divided into grids and confirmation samples were taken (Figure 26). Four samples were collected and sent to the laboratory for analysis. All lead concentrations were less than the 800 mg/kg action level for this area (see Table 2).

An additional eleven test pits were excavated in the northern edge of Area BB and Area BB was expanded to verify that no additional metals-impacted soils were present. Each test pit was excavated to native soil and several XRF spectrometer readings were taken. No impacted soils were identified. Based on the screening and confirmation sample results, the remediation effort for this area was considered complete.

Several small areas of surface impacted soils were discovered between the scale house (Building 7) and Building 4 during grading operations. Each area was approximately five feet by five feet in area. The depth of metals-impacted soil in these areas was shallow (six to 10 inches) and was remediated using a mini-excavator. Due to the small size of these areas, the XRF spectrometer was used to clear the areas and the remediation of these areas were determined to be complete.

3.4.17 Primary Tailings Pile

Except as noted in this report, all excavated impacted soil was transported to and placed on the primary tailings pile. Petroleum-impacted soil was placed in a separate cell located in the north

side of the primary tailings pile. In addition any debris (building demolition debris, empty 55-gallon drums, landfill debris from Area G, removed brush and trees , etc.) that was generated was placed in the west end of the primary tailings pile. After all of the contaminated soil and debris was placed in the primary tailings pile, the surface was graded to allow for a minimum of two feet of clean import soil to be placed as the final soil grade.

Because the primary tailings dam was a State of Colorado Jurisdictional Registered Dam (St. Joes Tailings Dam, DAMID 060217) soil could not be disturbed on the dam or within 200 feet west of the dam. In order to meet these requirements, design plans had the drainage channel for the primary tailings pile placed to the south of the southeast corner of the dam. However, it was later determined that the drainage channel, as planned, encroached on the cultural resource area located on the south side of the Property. In order to protect this cultural resource area, the grading plan design was modified so that the drainage channel could be excavated through the south edge of the dam (Photos 22 and 23). This breaching of the jurisdictional registered dam was approved by the Office of the State Engineer and allowed for the removal of the primary tailings dam from the State of Colorado's jurisdictional registered dam list. Where (based on XRF spectrometer readings) metals-impacted soil was encountered while excavating the drainage channel swale, the area was over excavated to assure that for at least two feet of clean fill was placed over the exposed metals-impacted soils.

The metals-impacted soils and debris piles placed on the primary tailings pile were graded to meet the drainage plans and this surface was surveyed to record an as-built condition. Once completed, a minimum of two feet of clean imported fill soil was placed and again graded to meet the drainage design. Following the soil cap placement, radiation rate instrumentation was used to monitor the primary tailings pile for radiation exposure. The results of this survey are shown on Figure 25 and all radiation rates measured at three feet above the ground were below the 68 µR/hr screening level for the Property. The area just west of the primary tailings dam was not surveyed nor was the surface of the dam. Since no grading was performed in these areas, the survey data documented by SHB, Inc. during the site characterization of 2009 remain valid. This survey showed that the radiation rates across the dam and the entire primary tailings pile were less than the 68 µR/hr background radiation screening level for the Property (CRI, 2009).

After the radiation screen was completed, the soil cap was covered by a minimum of 18 inches of type L rock at the specified gradation for this material. More details of the cap construction are included in section 3.12.

3.4.18 Impacted Soil - Excavation Totals

The total volume of impacted soils removed from areas outside the primary tailings pile were calculated by using the surveyed grade after remediation and comparing to the original ground surface as surveyed by Flatirons on March 7, 2012. The totals are:

- Excavations A, AA, C, D (partial), F, G, Me, Ms – 9/28/2012 survey: = 32,346 cubic yards;
- Excavation B – 10/10/2012 survey: 133 cubic yards;
- Excavations BB, J (w/ secondary tailings dam), ST – 6/25/2012 survey: 43,128 cubic yards;
- Excavation BB (additional, southwest) – 8/20/2012 survey: 1,128 cubic yards;
- Excavation D (additional, further north) – 9/10/2012 survey: 236 cubic yards**
  (**Using Flatirons' 2003 aerial survey for the north approximately 10 feet, as the 2012 survey did not extend far enough north);
- Excavation E – 7/26/2012 survey: 826 cubic yards;
- Excavation I – no survey: 0 cubic yards (left in place);
- Excavation Mw – 7/19/2012 survey: 1,137 cubic yards; and
- Excavation Mw (additional, further west) – 7/19/2012 survey: 37 cubic yards.

The total volume of impacted soils removed from the Property and placed within the primary tailings pile was 78,971 cubic yards. The as-built drawings for the remediation are included in Appendix B. These drawings include final excavation volumes removed from each of the remediated areas.

3.5 BUILDING ACM ABATEMENT AND DEMOLITION

The original site plan called for the following buildings to be retained:

- Building 1 - Mill (eligible for National Historic Register);
- Building 2 - Office and Lab;
- Building 3 - Office and Lab;

- Building 4 - Locker Room;
- Building 5 - Shed;
- Building 7a - Scale House;
- Building 10 - Water Clock Building;
- Building 11 - Cistern;
- Building 12 - Water Treatment;
- Building 13 - Quonset Hut (relocated); and
- Misc. Buildings - Fire Hydrant Sheds.

Buildings 6, 7b, 8, and 9 were scheduled for demolition. This initial list of buildings to be preserved or demolished was based on the City's review of those structures with Boulder County under the Limited Impact Special Use Application review. The County also reviewed and approved a *Decision Process for Preservation of Certain Structure/Features Protocol*, providing the criteria by which the decision to preserve buildings may be changed due to field conditions encountered during remediation.

As discussed previously in Sections 3.4.10 and 3.4.11, Buildings 2, 3, and 12 were added to the building list for demolition after consultation with Boulder County and in accordance with the *Decision Process for Preservation of Certain Structures/Features Protocol*.

Prior to demolition, each building was inspected for ACM and the ACM abated. At the completion of ACM removal, Air Pollution Control Division ("APCD") Demolition Notification Application Forms were prepared and the appropriate field technician certification sections signed for the buildings that were to be demolished. These applications were provided to LVI for securing demolition permits with the APCD. Copies of applications and Demolition Approval Notices can be found in Appendix H.

3.5.1 Building ACM Abatement

Per the remediation planning, some of the buildings on the Property were to be demolished and the resultant debris placed in the primary tailings pile. ACM is defined by regulation as any material containing greater than one percent asbestos and is typically removed from a building prior to its demolition. The original plan as presented in the VCUP was to place all demolition rubble in the primary tailings pile. However, the City determined that all materials containing any detectable concentration of asbestos should be removed from structures and disposed offsite prior to the demolition of the buildings so as to not introduce ACM to the primary tailings pile.

Abatement of ACM in buildings is regulated by the APCD, which has developed Regulation No. 8 – The Control of Hazardous Air Pollutants, Part B – The Control of Asbestos ("Regulation No. 8"). These regulations were followed during the abatement of ACM at the Property.

In January 2012 the buildings planned for demolition were inspected for ACM and Buildings 2, 3, 6, 7b, 8, 9, and 12 were identified as containing ACM requiring abatement, as defined by Regulation No. 8. Building 13 (Quonset Hut) was also inspected and found to contain ACM requiring abatement if demolished or moved. The results of the ACM building inspections can be found in Appendix I. The tables presented in Appendix I were used as the basis for obtaining removal pricing from the General Abatement Contractor. After review, LVI was selected as the General Abatement Contractor.

In April 2012, LVI's ACM abatement services mobilized to the Property with supplies and equipment necessary to perform the required removals. Because of the amount of ACM that required removal, a Regulation No. 8 Project Manager was required to oversee the work. CRI provided the Regulation No. 8 Project Manager and Air Monitoring Specialist, who, after ACM removal, conducted final visual inspections and performed an aggressive air clearance in Building 7b.

The removal of ACM from Buildings 2, 3, 6, 7b, 8, 9, 12, and 13 was completed in May 2012. The majority of the ACM abatements and demolition of buildings was completed without any problems or complications. ACM was disposed offsite at the Tower Road Landfill in Commerce City, Colorado and demolition debris was placed in the west end of the primary tailings pile.

Those ACM abatements activities and demolition that required special procedures or precautions are discussed in the following Sections.

3.5.2 Buildings 2, 3, 6, and 7b

During ACM removal activity, vermiculite was discovered in the concrete masonry unit ("CMU") walls of Buildings 2, 3, 6, and 7b. This vermiculite was found to contain trace levels of asbestos and was removed for offsite disposal. During demolition of Buildings 2, 3, 6, and 7b, special precautions were taken to collect the vermiculite and prevent it from contacting the soil surrounding the subject buildings. These precautions included the use of polyethylene sheeting placed around each building and under the swing radius of the excavator that was loading out demolition debris; the use of extra water as an engineering control to prevent vermiculite from becoming airborne; and inspection of the soil around the buildings after demolition activities were completed.

Buildings 2, 3, and 6 were remediated as above without complications. The resulting ACM debris, including the vermiculite material, was transported to the Tower Road Landfill. All other building debris (not contaminated by vermiculite) was disposed in the primary tailings pile.

Building 7b was a structure added onto the original scale house. As with Buildings 2, 3, and 6, the CMU walls were filled with vermiculite. The surface soil around the foundation was inspected after the walls were removed and no vermiculite was observed at that time; however, as the foundation of the building was being removed, small amounts of vermiculite were found buried in the soil just outside the foundation footprint. Since the vermiculite was not found on the surface, it is likely that it was spilled on the soil outside the building during its construction.

Prior to removing the foundation and slab-on-grade concrete floor, the soil around the outside of the building was removed using an excavator. This soil was stockpiled separately in a secure location and covered with poly sheeting while awaiting shipment to the landfill as asbestos-containing waste. To ensure that the soil did not contain a hazardous component (leachable lead), a sample (VB-VERSOIL-070512) of the vermiculite-contaminated soil was taken and submitted to the laboratory for Toxicity Characteristic Leaching Procedure ("TCLP") analysis. The results of the TCLP analysis verified that the contaminated soil was not hazardous and could be disposed at the Tower Road Landfill as asbestos-containing waste with no hazardous component. Two shipments of the vermiculite waste were made to the Tower Road Landfill. Copies of the manifests for these shipments are provided in Appendix H.

3.5.3 Building 8

Building 8 was previously used as a laboratory and a wood shop. The site characterization completed in 2009 (CRI, 2009) indicated an elevated radiation reading (50 to 60 µR/hr) along the floor in a portion of the building. This suggested that there may have been an area under the floor that contained radioactive waste, perhaps from a drain or sump. Special attention to radiation exposure monitoring was provided by the RCT during the concrete slab floor removal. No specific source of high radiation was detected during the demolition activity in the Building 8 area. However, elevated lead and arsenic readings (greater than 10,000 mg/kg lead and 5,000 mg/kg arsenic) were detected in the soil north of the floor slab and remediated during Area F soil remediation.

A concrete sump measuring approximately 3.0 feet by 4.0 feet by 4.0 feet deep was discovered under the floor in the northwest corner of the building. No liquid was in the sump and the dry material in the sump was analyzed with the XRF and found to be below the action level for lead. This material was also scanned with the radiation instrumentation and no radiation levels above the screening level were measured. The sump was placed along with other demolition debris in the west end of the primary tailings pile.

3.5.4 Building 9

Building 9 was a small building where incoming electrical power was brought to the Property that previously contained transformers and other electrical equipment. All equipment had been removed prior to the VCUP implementation. Although the walls were constructed with CMUs, there was no vermiculite in the walls. The structure was demolished and the debris placed in the primary tailings pile.

3.5.5 Building 12

During the mill operation, Building 12 was used as a water treatment facility and pump house. According to the original VCUP application, it was scheduled to be left in place. However, due to contaminated soil around and under the structure and the poor physical condition of the building, the City made the decision to remove it using the *Decision Process for Preservation of Certain Structures/Features Protocol*. Demolition debris associated with the building were placed in the primary tailings pile. Remediation of the soil under the structure was previously discussed in Section 3.4.10.

The building contained two tanks, pumps, piping, and controls for the water treatment system used in the Mill Building operation. It was discovered that one tank contained ion exchange resin beads (Photo 24). An ion exchange resin manufacturer was contacted and it was determined that it was unlikely that the ion exchange resin would contain hazardous materials. However, as a precaution, a sample of the resin (VB-BLDG12-TANK) was submitted for analysis. The analysis indicated that the resin was not hazardous. The second tank contained dry sediment, pea gravel, and a small quantity of salt crystals. The quantity was considered a de-minimis amount and therefore not sampled. Both tanks and their contents were placed in the primary tailings pile with the building debris.

3.5.6 Building 13

Building 13 was a metal Quonset hut that appeared to have been used as a utility building. The Quonset hut was mounted on an I-beam frame that sat in a level position on the hillside southeast of the Mill Building and along the north edge of Area C. Building 13 contained ACM in caulking associated with sheet metal framing and fabric gasket material contained in a panel and screw conveyor system.

During remediation efforts in Area C, Building 13 was relocated out of Area C to allow for excavation. Upon completion of grading around the Mill Building, the Quonset hut was moved to its current location inside the fenced area around the Mill Building.

3.6 UNANTICIPATED ENVIRONMENTAL CONDITIONS

Several unanticipated environmental conditions were discovered during the planned project tasks. These conditions, their remediation and ultimate disposition are as follows. Laboratory analytical reports for soil and miscellaneous material samples discussed in the following sections are provided in Appendix F.

3.6.1 Buried Drums

Numerous buried drums were found while excavating in remediation Areas B and G (Sections 3.4.6 and 3.4.14 respectively). Most of the drums were empty and were placed in the primary tailings pile. The drums that contained solids or liquids were sampled, placed in 85-gallon overpack drums, and staged until analytical results were available and appropriate disposal could be arranged. Sampling and overpack operations were performed in respirators and disposable coveralls and the breathing zone was monitored for volatile vapors using a PID.

In total, eight 85-gallon overpack drums were appropriately labeled (based on laboratory results) and staged until arrangements were made for shipment and disposal. The overpack drums were removed from the Property by Region 8 Enviro, LLC and shipped for incineration at Clean Harbor's Kimble, Nebraska facility and fuel blending at the RINECO facility in Benton, Arkansas (see non-hazardous waste manifest #43196 and hazardous waste manifest #005290060, respectively, in Appendix J).

Three drums found in Area G were filled with concrete. These drums were scanned for radiation levels since concrete is often used to solidify radioactive waste. None of these drums showed radiation levels above background and they were placed in the primary tailings pile.

3.6.2 Grease Pit Removal

A concrete pit reportedly used previously as a vehicle grease and oil change pit was located east of Building 7 in remediation Area AA. The concrete sides and floor were removed and the concrete placed in the west section of the primary tailings pile. Stained soil was identified beneath the pit area and was sampled and analyzed for TPH. The stained area was not large—approximately four feet by four feet to a depth of approximately one foot, based on visual observation. The results of the soil sample (VB-GP-060612) indicated that the soil exhibited DRO and ORO greater than the 500 mg/kg TPH action level. Based on these data, the petroleum-impacted soil was excavated until no visible staining was present. The excavated soil was placed in the primary tailings pile in the location where the petroleum-impacted soil that had been removed from the south side of the Mill Building was placed. Following this excavation the bottom of the excavation was re-sampled (VB-GP-F072512). The result of this sample

indicated no detectable petroleum contamination and the excavation was backfilled with import soil.

3.6.3 Building 7 Underground Storage Tank

While clearing brush and debris from the east side of Building 7 (Office/Scale House), a vent pipe was discovered that extended along the outside of the building on the northeast corner. Upon further inspection it was determined that this was a vent for an UST. The location of the UST is shown on Figure 27. Olfactory evidence indicated that the UST was a former fuel storage tank. A limited volume of liquid was identified in the UST and was sampled for analysis of TPH (VB-BUILDING7UST). The analytical results showed the liquid contained a very small amount of DRO and the liquid was determined to be primarily water.

During excavation to remove the tank, the soil near the lower portion of the tank had a distinctive petroleum odor; this soil was isolated from the soil removed near the surface. Once removed the tank condition was inspected. Much of the lower portion of the tank had rusted through and during removal the majority of the liquid was released (Photos 25 and 26). Based on the distinct odor emanating from the soil around the bottom of the excavation it was evident that fuel had likely been released in the past as evidenced by the rusted tank bottom. Since there was no recoverable liquid in the tank, the tank was crushed and transported to the primary tailings pile for placement with the building debris. It was estimated that the tank had a capacity of approximately 560 gallons.

Petroleum-impacted soil was removed from the excavation until olfactory evidence indicated that all of the petroleum-impacted soil had been removed with the exception of the west wall of the excavation. This wall could not be excavated further as it extended under the Building 7 foundation and any further excavation would have impacted the structural integrity of the building (Photo 27). All four walls and the floor of the excavation were sampled (VB-UST-S-062912, VB-UST-N-062912, VB-UST-E-062912, VB-UST-W-062912, and VB-UST-F-062912). Analytical results of samples from all but the west wall of the excavation indicated the soil was adequately remediated to less than 500 mg/kg. The west wall sample concentration of 530 mg/kg exceeded the TPH action level. The excavation was backfilled with import soil. Petroleum-impacted soil removed from this excavation was placed in the primary tailings pile along with the petroleum-impacted soil removed from the south side of the Mill Building. The location of petroleum-impacted soils placed in the primary tailings pile was surveyed and documented on the as-built project drawings (Figure 15).

3.6.4 Tar Area

While performing prairie dog control measures a small area of purple stained soil was encountered south of the prairie dog fence and north of the cemetery fence. This area was directly south of remediation Area B and east of remediation Area AA in a cultural resource area (Figure 28). Investigation of the area utilizing the XRF spectrometer showed that the stained soil contained lead concentrations exceeding the 800 mg/kg action level. Adjacent to the purple soil was a small area (approximately three feet by three feet) exhibiting a tar-like material on the surface of the ground (Photo 28). A sample of this material was collected (VB-090412) and submitted for analysis. The results of analysis showed that the material contained less than 500 mg/kg TPH constituents and was not characteristically hazardous by RCRA standards. The results showed that the sample contained several SVOCs that were below the CSEVs and benzo(a)pyrene that was slightly above the CSEV.

It was decided that the area would be excavated and the soil (with the tar-like material and lead contamination) would be placed in the primary tailings pile. The material depth was found to be approximately one foot deep and less than one truckload of the material and adjacent soil was removed and placed in the primary tailings pile. XRF screening and SVOC sample results of the excavation bottom and sidewalls indicated that the impacted soils had been remediated. Laboratory confirmation sampling for metals was not performed due to the small area of remediation.

3.6.5 ACM-Wrapped Pipe

During the removal of metals-impacted soil between Building 4 (Locker Room) and the Mill Building a pair of three-inch diameter steel pipes was encountered. One pipe was wrapped with a friable insulation that was suspect ACM. Once the pipe insulation was identified, the field technician observing the soil disturbing activities halted all operations in the area until the suspect material could be sampled (VB-072712-PIPE) and analyzed. Visible suspect ACM in the soil was removed by hand and placed in a waste bag for disposal as asbestos-containing waste material ("ACWM"). The exposed pipe was covered with polyethylene sheeting and the approximate area of the buried pipe was cordoned off with "caution" tape to keep personnel out and prevent additional soil disturbing activities in the area until the laboratory results were received. The laboratory results confirmed that the insulation contained asbestos and plans were prepared for the abatement of the insulation and asbestos-containing soil associated with the pipe.

Because the ACM-wrapped pipe was considered a facility component, the removal of the ACM was governed by Regulation No. 8. The length of pipe exceeded the Regulation No. 8 quantity trigger level (260 linear feet) and given that the piping would interfere with the approved design

grading in this location, it was decided to abate and remove the pipe. An asbestos Abatement Permit was obtained from the APCD for its removal. Prior to setting up a full containment over the buried pipes, LVI asbestos abatement personnel loaded out approximately 10 cubic yards of potentially ACM-impacted soil that were disturbed before the pipes were encountered. Remediation continued until all suspect soil was removed and no visible ACM remained. Under observation of a field technician, LVI then removed clean soil around the pipes, being careful not to impact the ACM. This effort created a flat working surface and minimized the amount of hand digging that would be required inside the containment to expose and remove the pipes.

The LVI abatement team mobilized to the Property with supplies and equipment necessary to perform the required removal. Because this abatement action was a continuation of removals performed in the buildings discussed previously (which required a certified Project Manager), a Regulation No. 8 Project Manager was assigned to oversee the abatement. CRI personnel performed this oversight function as well as the required air monitoring. After removal was complete, a final visual inspection and an aggressive air clearance were performed.

Documentation of the removal of ACM associated with the direct buried pipes is provided in Appendix K.

3.7 CONTAMINATION LEFT IN PLACE

In several locations at the Property, metals-impacted and/or petroleum-impacted soils were left in place due to existing structures, culturally sensitive location, or steep topography resulting in unacceptable safety hazards to the worker and general public. These locations are shown on Figure 5 and discussed in the following sections. The VCUP noted that impacted soils would be left in place in the case of structures that could not be demolished, culturally sensitive locations on the south side of the Property, areas with established vegetation, and the Valmont Butte ridge and hill slopes.

3.7.1 Metals-Impacted Soil

Metals-impacted soil was left in place at the following locations:

- Metals-impacted soil remains around (within several feet) and under the Mill Building (eligible for National Historic Register) in places due to the risk that soil removal would pose to the structural integrity of the building. In addition to this, the foundation of the Mill Building acts as a cap segregating the soils from the environment;

- Metals-impacted soil filling the natural saddle along the ridge line north of remediation Area G was left in place due to steep topography resulting in unacceptable safety hazards to the worker and the location's inaccessibility to the general public;

- Based on the site characterization performed in 2009 (CRI 2009), the area north of the north access road from the west end of the primary tailings pile to the midpoint of the secondary tailings pile contained metals-impacted soil. This contamination was left in place in accordance with the VCUP, as the steep slopes limit accessibility to the location and the area is well-vegetated; and

- Metals-impacted soil was not remediated in the cultural resource areas on the hillside to the south of the primary tailings pile and the former secondary tailings pile area, as defined in the VCUP. This area is bounded on the west by the Valmont Pioneer Cemetery parking lot, on the east by the former import soil stockpile location for the project, and to the south by the Property fence line (Figure 3). This includes Area I which was originally scheduled to be remediated under the approved VCUP, but was not remediated due to its location within the culturally sensitive area.

3.7.2 Petroleum-Impacted Soil

The VCUP noted that petroleum-impacted soils could be encountered during remediation of the Property. Petroleum-impacted soils were encountered near the Mill Building, the UST area, near Building 7, and the grease pit area. Some petroleum-impacted soils were left place at the following locations:

- Under the south foundation of the Mill Building (eligible for National Historic Register) where a boiler was formerly used. This soil could not be removed without endangering the structural integrity of the building; and

- Under the northeast corner of Building 7 where a former fuel tank was removed. Removing the petroleum-impacted soil at the base of the excavation would undermine the building foundation and was therefore left in place.

3.8 IMPORT SOIL

A total of 140,000 cubic yards of clean soil (as defined by the Import Soils Protocol approved as part of the VCUP) was imported to the Property, with most of this soil placed in a stockpile on the southeast corner of the Property (Figure 3). The remaining imported soil was placed directly on the primary tailings pile as part of the engineered cap construction.

The bulk of the imported soil was received from a road widening project along Arapahoe Road between 75th Avenue and Cherryvale Road. Additional soil was received from a construction project adjacent to and northeast of the Coors Events Center located on the University of Colorado Campus. A small quantity of soil was also imported from an apartment building construction project at 3100 Pearl Street in Boulder.

Prior to import to the Property, soil from these source sites was sampled and analyzed per the import protocol (included in Appendix L). In addition, samples were collected and analyzed periodically during the import process (see Table 17) in accordance with the Import Soils Protocol. Table 17 provides sample locations, dates, and sample results for the import soils. The import soil was visually inspected by CRI field technicians on a routine basis as it was dumped on the stockpile. During the process several loads were rejected based on the amount of debris in the soil. On one occasion, a sample was collected based on staining in the imported soil, and the soil rejected based on the analytical results.

The imported soil was used to construct the two foot thick cap on the primary tailings pile and used as backfill in areas that were excavated during remediation or where the final grading plan called for fill.

3.9 PERSONAL RADIATION EXPOSURE RATE MONITORING

Original plans for the VCUP implementation indicated that TLD badges would be worn by all personnel accessing the Property, with this monitoring providing a permanent record of worker radiation exposure. Dosimeters are used to detect and measure an individual's dose from external radiation. The dosimetry program allowed the project managers to track radiation exposure and to take appropriate action to maintain radiation doses As Low As Reasonably Achievable ("ALARA"). Dosimeters measure external radiation dose and do not provide protection against radiation exposure.

For implementation, OSL badges were selected for radiation exposure monitoring as these are more sensitive and durable than TLD badges. CRI personnel obtained the OSL dosimeters from Landauer, Inc. ("Landauer") of Illinois for project use. The OSL badges were supplied to CRI on a monthly basis for distribution to the project field office. Spent badges were returned to Landauer for analysis and reporting.

All contractor employees who participated in soil disturbing activities such as prairie dog control, demolition, or excavation, and/or remained onsite longer than eight hours per week were required to wear OSL badges. LVI assigned one individual to be the "Badge Coordinator" to control the distribution and use of the OSL badges. The Badge Coordinator was responsible for

providing OSL badges to each contractor for distribution to its employees and verifying that badges were being worn and returned to the field office at the end of the work day. The Badge Coordinator kept a record of time in and time out for each OSL badge distributed.

With each monthly batch of field dosimeters, Landauer supplied one "transit control" and one "deploy control" dosimeter that accompanied the field dosimeters in transit but were not exposed in the field during the monitoring period. The transit control dosimeter provided a measurement of exposure to radiation during transit from Landauer to the project office and back to Landauer. The deploy control dosimeters were placed in storage at the Valmont office trailers until being returned to Landauer for analysis along with the used field dosimeters at the end of the monthly field monitoring period. The deploy control dosimeters represented background exposure (total of transit exposure and onsite non-work area exposure). The "net" dose exposure was calculated by Landauer by subtracting the gross deploy control badge result from each field badge result. This resulted in the net above background dose, which was used to assess radiation exposure to the site workers.

A total of 65 OSL badges were initially ordered from Landauer with the number of badges used modified during each month of the project. Radiation exposure monitoring was initiated in March 2012 and was terminated at the end of October 2012.

Based on the Landauer data reports, no detectable radiation exposure was identified over background (deploy control dosimeters), with the exception of one individual whose exposure for the month of June was 8.0 millirem ("mrem"). However, this result was considered "contaminated" as the individual took the OSL badge offsite and did not return the badge until the following day. The reporting limit for the OSL badges was 1.0 mrem.

The CDPHE Radiation Dose Limit for the public is 100 millirem per year ("mrem/yr") (6 CCR 1007-1 Part 4, *Standards for Protection Against Radiation*, paragraph 4.14). Allowable radiation exposure for radiation workers is 5,000 mrem/yr. Workers on this project were not radiation workers; therefore, the Radiation Dose Limit for the project worker is 100 mrem/yr. As presented above, the radiation dose monitoring did not identify any worker being exposed to radiation greater than a background dose.

3.10 PERIMETER AIR MONITORING PROGRAM (DUST MONITORING)

A perimeter air monitoring program was initiated in accordance with the approved Air Quality Monitoring Plan, which required the monitoring of particulate matter and specific metals of concern at selected locations during VCUP implementation. Dust levels (particulate matter) were sampled by air monitoring equipment at three locations surrounding the Property. Site 1 was the designated upwind site and was located on the southwest corner of the Property. This

station monitored total suspended particulates ("TSP") for arsenic, lead, and uranium analysis, and particulate matter ("PM") with aerodynamic diameters of 2.5 micrometers or greater ($PM_{2.5}$). Temperature, wind speed and wind direction were also monitored at Site 1. Hourly barometric pressure was retrieved from the NOAA.gov web site and used in the concentration calculations. Site 2 was located on the north boundary approximately midway between the west and east Property boundaries. This site was designated a downwind site and monitored for TSP and metals. Site 3, also designated an upwind site, was located near the eastern boundary and included monitoring equipment for TSP, $PM_{2.5}$, and PM_{10}, particulate matter with diameters of 10 micrometers or greater. Site 3 was located immediately upwind of the clean soil import stockpile so particulate matter from the stockpile would not influence measurements of site related activities.

A full discussion of the monitoring methods, equipment, manuals, operating procedures, and operating forms can be found in the Valmont Butte Monitoring plan dated February 2011. The PM, metals, and meteorological data collection began at Site 1 on March 13, 2012. PM and metals monitoring began at Sites 2 and 3 on March 16, 2012. The air sampling was conducted on the EPA's once in three day calendar until October 12, 2012 at which time the schedule was reduced to EPA's once in six day calendar. The perimeter air monitoring was terminated on December 31, 2012.

Ambient Air Quality Standards for $PM_{2.5}$ particulate levels include a 24-hour standard of 35 micrograms per cubic meter ("$\mu g/m^3$") and an annual standard of 15 $\mu g/m^3$. PM_{10} has a 24-hour standard of 150 $\mu g/m^3$. TSP concentrations are no longer regulated; however, the old 24-hour standard of 260 $\mu g/m^3$ was used for comparison purposes.

PM_{10} levels were less than the 24-hour standard for the monitoring period, with the exception of one sampling date (June 5, 2012).

Over the course of the monitoring project, 11 TSP samples exceeded the former 24-hour standard. The cause of the higher TSP readings was a result of high winds and construction traffic from the soil import operation immediately adjacent to Site 3.

The 24-hour standard of 35 $\mu g/m^3$ for $PM_{2.5}$ concentration was exceeded at the upwind sampling station (Site 1) 34 times and 44 times at downwind station (Site 3) over the monitoring period. The primary contribution to $PM_{2.5}$ concentrations is believed to be the Valmont Power Plant (coal burning), vehicle exhaust (air pollution associated with Boulder's high traffic), and wildfires that occurred during the year and is not believed to be associated with earthmoving/remedial activities conducted on the Property during VCUP implementation.

Uranium concentrations were mostly below the analytical detection limit and they did not exceed criteria established for this program during the monitoring period of soil remediation construction activity (April 2012 through December 2012). Arsenic concentrations were generally one order of magnitude lower than the criteria of 0.01 $\mu g/m^3$ established for this program. Lead quarterly averages are at least one order of magnitude lower than the three-month rolling average lead standard of 0.15 $\mu g/m^3$. Overall air quality sampling data recovery for the year was greater than 95.0 percent, which exceeded the CDPHE recommended recovery rate of 75%.

Copies of the quarterly monitoring reports for the year (2012) are provided in Appendix M.

3.11 GRADING

Grading was completed to provide positive surface drainage and was designed to match the surrounding existing grades as closely as possible. Undisturbed soils were not compacted with the exception of the primary tailings pile cap, which was measured at a compaction of greater than 95%. No slopes were graded to exceed 3:1.

3.12 SOIL AND ROCK CAP CONSTRUCTION

The cap extends across the entire primary tailings pile, including the primary tailings dam. The cap consists of a minimum of two feet of clean soil and a minimum of 18 inches of Type L rock covering the clean soil. The bottom and south side of the drainage swale are also covered with rock as an erosion control measure. The bottom and south side of the drainage swale were cleared of metals-impacted soil (or covered with two feet of clean soil) prior to rock placement (see Section 3.4.16).

The access road that runs along the north edge of the primary tailings dam received a minimum of two feet of clean soil cap and approximately 6 inches of Class 5 road base. The rock was placed as a deterrent to burrowing animals, primarily prairie dogs. The road base on the access road replaces the rock cap originally planned for this area. Cap thicknesses were verified by survey data and the rock material was periodically checked for specification compliance through Quality Control reporting from the quarry supplying the rock (Appendix G).

3.13 SEEDING

The Revegetation Plan was to establish vegetation species in the areas of disturbance (except for the area that was capped with rock) and augment inadequate vegetation in areas of prior disturbance in accordance with the Boulder County Open Space Seed Mix Design. Efforts were made to minimize any soil disturbances in areas of established vegetation. The goals of the

revegetation were to establish a native plant species population that could maintain itself and protect the landscape from wind and water erosion. Three primary factors expected to influence the success of this endeavor were climate, soil nutrients, and prairie dog activity. No irrigation was performed or is planned for this revegetation effort. Therefore, low precipitation and high summer temperatures may reduce seed germination and growth especially in the first year after seeding.

The objective of the Revegetation Plan was to establish multi-layered vegetation with a tall grass and shrub component. Seeds planted on the Property were native to the Property and consistent with the Boulder County open space specifications, as provided in the VCUP. This mix was adjusted depending on the results of the topsoil nutrient analysis or other factors such as seed availability. However, only native species were substituted.

Seeding of the culturally sensitive areas along the south central portion of the Property was completed during the summer of 2012. Boulder County's seeding specification called for drill seeding. However, the Native American Cultural Monitor for the project concluded that no vehicle traffic should be allowed in the culturally sensitive areas. As such, a variance was received from the County to hand seed with the stipulation that the seed density would be doubled from the initial requirement.

Approximately 33 acres of the Property required complete revegetation due to soil disturbing activities. Approximately 25 acres of undisturbed areas had sparse vegetation and received overseeding of existing vegetation. Twenty-six acres of the Property exhibited adequate vegetation and were not reseeded.

3.14 PRAIRIE DOG MANAGEMENT

In the areas where remedial activity was conducted, it was necessary to remove black-tailed prairie dog colonies and control the potential migration of prairie dogs from colonies adjacent to the Property. A vinyl fence (prairie dog fence) was constructed around the east, south, and west sides of the Property to control prairie dog migration. Installation of prairie dog fencing on the north boundary of the Property was not necessary because the steep terrain is a natural barrier to prairie dogs.

3.15 STORMWATER AND EROSION CONTROL

Stormwater and erosion control measures were initially installed per the approved Stormwater Permit and engineering BMPs and then modified as necessary. These BMPs included silt fences, straw bales, and straw waddle. At the completion of the project, a review of existing stormwater and erosion control measures was performed and adjustments were made in areas that showed

certain BMPs are needed until vegetation is established. A berm was added at the former location of the secondary tailings dam to increase the stormwater detention capacity of the former secondary tailings area. An 18-inch diameter pipe was installed as a culvert at the invert of the berm to allow for the controlled release of stormwater from this area.

3.16 GROUNDWATER

Groundwater was not encountered during remedial activities associated with the VCUP implementation. Groundwater monitoring wells MW-1, MW-2, MW-4, MW-5, and MW-6, which were previously installed and/or monitored by URS and Terracon in past site assessment activities, were inspected and determined to be in acceptable condition for monitoring (Figure 29). The metal well head cover for monitoring well MW-3, located east of the southeast corner of the primary tailings pile, was apparently struck during remedy construction. The impact caused the polyvinyl chloride ("PVC") casing to break near the ground surface inside of the metal well head cover. Water was measured at 63.55 feet (approximately 40 feet of water column) in monitoring well MW-3; however, this well was reported as dry by Terracon (2003) and containing insufficient groundwater for sampling by URS/EPA (2004). To assess whether the contained water was groundwater or water accumulated from surface infiltration, monitoring well MW-3 was bailed dry and monitored to establish whether groundwater would recharge the well. Monitoring well MW-3 remained dry and it was determined that the water bailed from MW-3 resulted from surface infiltration and was not groundwater. Because the monitoring well was compromised, monitoring well MW-3 was excluded from the groundwater monitoring.

3.16.1 Groundwater Sampling Procedures

Groundwater samples were collected from monitoring wells MW-1, MW-4, MW-5, and MW-6 on July 10, 2013. Monitoring well MW-2 was dry. Prior to groundwater sample collection, the monitoring wells were purged using disposable polyethylene bailers. Three casing volumes of groundwater were removed (purged) from each monitoring well prior to sample collection. Field parameters for specific conductivity, pH, and temperature were recorded while purging (Appendix N). After purging, the water level within the monitoring well was allowed to recover and the groundwater was then sampled for dissolved RCRA eight metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) plus uranium, and radiological parameters of radium 226, radium 228, gross alpha, and gross beta. Samples for dissolved metals analysis were field-filtered using a 0.45 micron filter. All sample bottles contained nitric acid ("HNO_3") as a preservative. Groundwater samples were labeled, placed in a cooler with ice (4° C), and transported to ALS Laboratories in Fort Collins, Colorado, under an executed chain-of-custody ("COC") document (Appendix N).

3.16.2 Groundwater Flow

Monitoring wells MW-1, MW-4, MW-5, and MW-6 are all located in the eastern portion of the Property, within or in the vicinity of a small surface-water drainage channel that is aligned south to north. The surface water and groundwater occurrence within the drainage channel are believed to be infiltration from the nearby Valmont Reservoir.

Groundwater elevations (Table 18) were used to develop a groundwater elevation contour map as illustrated on Figure 29. Based on the groundwater elevations, the groundwater flow in the area is also from south to north with a gradient of 0.03 foot per foot. As illustrated on Table 18, the groundwater elevations are similar to those previously reported by URS/EPA (2004).

3.16.3 Groundwater Sample Results

The analytical results for the groundwater samples for metals are presented on Table 19. The table includes sample results from the Terracon (2003) and URS/EPA (2004) reports for comparison purposes. Terracon (2003) sampled monitoring wells MW-1 and MW-4 in 2003; MW-2 and MW-3 were dry. Terracon analyzed its samples for total metals, but did not analyze for dissolved metals. URS/EPA (2004) sampled monitoring wells MW-1, MW-4, MW-5, and MW-6. URS/EPA analyzed its samples for both dissolved and total metals.

Results for radiological constituents are presented on Table 20. The table includes sample results from the URS/EPA (2004) report for comparison of the radiological parameters. Included is a duplicate sample URS/EPA collected at monitoring well MW-6. Terracon (2003) did not analyze for radium 226/228 or for gross alpha/beta during its investigation; therefore, there are no radiological data presented for 2003.

Applicable CDPHE groundwater standards and EPA maximum contaminant levels ("MCLs") are presented on both tables, also for comparison purposes. Appendix N contains the laboratory analytical reports.

<u>Dissolved RCRA Eight Metals Plus Uranium</u>

Dissolved metals were not detected at concentrations greater than the laboratory reporting limits, with the exception of dissolved barium, selenium, and uranium at certain locations as described below (see Table 19).

- Dissolved barium was only detected in monitoring well MW-4 at 120 micrograms per liter ("µg/L"), which is well below the CDPHE/EPA standard of 2,000 µg/L. URS/EPA (2004) detected dissolved barium in all four of the monitoring wells it sampled (MW-1, MW-4, MW-5, and MW-6); however, the URS/EPA laboratory reporting limit for barium was much

lower than the current reporting limit of 100 µg/L, which accounts for these barium detections;

- Dissolved selenium was detected in all four monitoring wells and ranged in concentration from 33 µg/L at monitoring well MW-5 to 1,300 µg/L at monitoring well MW-6. The concentrations reported for monitoring well MW-1 (310 µg/L), MW-4 (71 µg/L), and MW-6 (1,300 µg/L) all exceeded the CDPHE/EPA standard of 50 µg/L. As shown on Table 19, the concentrations reported are consistent with previous results reported by URS/EPA (2004); and

- Dissolved uranium was detected in all four monitoring wells and ranged in concentration from 45 µg/L at monitoring well MW-6 to 49 µg/L at monitoring well MW-5. All of the concentrations reported exceeded the CDPHE/EPA standard of 30 µg/L. The concentrations reported are similar in magnitude to those reported by URS/EPA (2004).

Radiological Parameters

Results for radium 226/228 and gross alpha/beta are presented on Table 20. The results are compared to MCLs and CDPHE groundwater standards. Radium 226, radium 228, gross alpha, and gross beta do not have established MCLs or CDPHE standards. Radium 226/228 combined has a standard of 5.0 picocuries per liter ("pCi/L"). Corrected gross alpha (contributions from radon and uranium removed) has a standard of 15 pCi/L.

Radium 226/228 and gross alpha/beta were detected in groundwater samples from all four monitoring wells as described in the following paragraphs.

- Radium 226/228 (combined) concentration ranged from 0.84 pCi/L at monitoring well MW-6 to 7.42 pCi/L at monitoring well MW-1. Compared to the URS/EPA (2004) data, radium 226/228 concentrations decreased in all monitoring wells. In 2004, the radium 226/228 concentrations exceeded the CDPHE/EPA standard of 5 pCi/L in all four monitoring wells; however, in 2013, that standard was only exceeded at monitoring well MW-1;

- Gross alpha (not corrected) concentration ranged from 76 ± 17 pCi/L at monitoring well MW-5 to 560 ± 110 pCi/L at monitoring well MW-1. Gross beta concentration ranged from 40 ± 16 pCi/L at monitoring well MW-5 to 690 ± 120 pCi/L at monitoring well MW-1. As compared to the URS/EPA (2004) data, gross alpha and gross beta decreased in concentration in the monitoring wells with the exception of monitoring well MW-1, where the gross alpha concentration increased. Standards for gross alpha and gross beta have not been established; and

- Corrected gross alpha (radon and uranium contribution removed) ranged from 42.68 pCi/L at monitoring well MW-5 to 528 pCi/L at monitoring well MW-1. The corrected gross alpha concentrations exceeded the CDPHE/EPA standard of 15 pCi/L in all four monitoring wells sampled. The corrected gross alpha concentrations reported by URS/EPA (2004) for the four monitoring wells also exceeded the CDPHE/EPA standard of 15 pCi/L. As compared to the URS/EPA (2004) data, the corrected gross alpha decreased in concentration in the monitoring wells with the exception of monitoring well MW-1, where the corrected gross alpha concentration increased.

3.16.4 Groundwater Sampling Conclusions

Dissolved selenium remains at concentrations greater than the CDPHE/EPA standard of 50 µg/L in three of the four monitoring wells sampled under this VCUP. Dissolved uranium also remains at concentrations greater than the CDPHE/EPA standard of 30 µg/L in all four monitoring wells sampled under this VCUP. The concentrations for dissolved selenium and uranium, however, remain essentially unchanged and similar in magnitude to concentrations reported by URS/EPA (2004). The concentrations for dissolved selenium and uranium in the groundwater can be attributed to the marine depositional environment of the source claystone and shale bedrock of the Pierre Formation.

Radium 226/228 was detected in all four monitoring wells; however, the concentrations in all four monitoring wells decreased since the last sampling event conducted by URS/EPA (2004). In 2004, the radium 226/228 concentrations exceeded the CDPHE/EPA standard of 5 pCi/L in all four monitoring wells; however, in 2013, that standard was only exceeded at monitoring well MW-1. Gross alpha and beta concentrations also decreased with the exception of the groundwater sample from monitoring well MW-1, where the gross alpha and beta both increased. This increase is considered an anomaly, as radium 226/228 decreased significantly at the same location. Naturally occurring radioactive materials such as radium, uranium, and potassium-40 in the source claystone/shale are likely sources of gross alpha and beta. Review of previous groundwater data collected from monitoring well MW-1 by Terracon (2003) indicates that gross gamma radiation was reported at 2,820 pCi/L; however, 77% of this concentration was attributable to naturally occurring potassium-40 (2,160 pCi/L) with no contribution from radium or uranium. Based on these results, the potassium-40 is a likely source for the gross beta counts. Terracon (2003) did not measure for gross alpha or gross beta. Based on the results of the 2013 groundwater monitoring, the subject monitoring wells will be closed in accordance with the State of Colorado State Engineer requirements.

Overall, the radiological groundwater quality has improved since the last sampling completed in 2004. The radiological parameters detected are not an indication of tailings impact, but are naturally occurring within the claystone and shale bedrock (Pierre Formation).

3.17 CLOSURE OF EXISTING WATER SUPPLY WELL

An existing water well that had been used to supply the mill with water was located just south of Valmont Road near the center (from east to west) of the Property. Limited information for the water supply well indicated the depth of the well was 90 feet. The water supply well was not registered with the Office of the State Engineer. The VCUP called for the abandonment of this well.

CRI contracted with Boulder GWS LLC, a subsidiary of Groundwater Pump Systems, to properly close and abandon this well. Boulder GWS LLC performed the closure as follows:

- The pump was removed from the top of the casing (Photo 29);
- The pump intake pipes were removed from inside the well casing (Photo 30);
- Enviroplug bentonite 3/8th-inch tablets and chips were used to backfill the well;
- The top of the concrete pump pit was caved in below the ground surface;
- The pit was backfilled with imported soil and graded to match the existing terrain; and
- All resulting debris was removed from the Property.

A detailed field report of the closure is included in Appendix O along with a letter provided to the Office of the State Engineer by Boulder GWS LLC.

4.0 CONCLUSIONS

As part of the VCUP implementation, metals-impacted soil was excavated and consolidated in the primary tailings pile. The initial delineation of areas to be remediated was revised, as necessary, where metals-impacted soil was found outside the limits of those areas identified in the 2009 site characterization. All known metals- and petroleum-impacted soils were remediated, with the exception of a few areas where remediation was not necessary, practical, or appropriate. These areas where contamination was left in place were documented in this report in Section 3.7 (see Figure 5 for metals-impacted soils left in place).

Several onsite buildings and structures were demolished after asbestos abatement, where necessary, and the resulting demolition debris were consolidated and placed in the west end of the primary tailings pile. Three buildings that were not originally identified for demolition were demolished in accordance with the *Decision Process for Preservation of Certain Structures/Features* protocol established between the City of Boulder and the Boulder County Historic Preservation Advisory Board. This document provided the process to be followed so that buildings of potential historical significance could be removed to allow remediation of impacted soil within the footprint of these buildings.

All metals- and petroleum-impacted soils, along with grubbing and demolition debris, were placed in the primary tailings pile. The primary tailings pile and associated primary tailings dam were then capped with a minimum of two feet of clean soil and 18 inches of rock as a deterrent to prairie dog burrowing. Outside the primary tailings pile, remediated areas and areas of sparse vegetation were seeded for erosion control and fenced to control prairie dog encroachment.

Asbestos-containing materials and petroleum constituents discovered in buried drums were screened for radiological parameters, sampled for establishing waste characteristics, profiled, and later removed from the Property and disposed at facilities licensed to receive these materials.

The Property's designated land use is commercial/industrial, and possible uses include equipment and maintenance storage, energy generation, a historical mining museum or commercial use located in the former mill area, and open space for preservation of certain natural features and vistas. Any enclosed structure built on the Property will comply with all radon testing and mitigation requirements applicable to the Property.

In addition, an Operations and Management Plan has been developed that provides guidance and procedures for the maintenance of the Property. Inspections will be conducted annually, particularly in the spring or early summer after cessation of snowmelt and spring run-off, and after summer storms of measurable precipitation, as needed. The Operations and Management Plan addresses inspection and maintenance of the:

- Soil and rock caps placed on the primary tailings pile;
- Stormwater controls and best management practices placed at the Property;
- Prairie dog fencing and other controls;
- Security fencing; and
- Onsite buildings, consistent with City of Boulder requirements.

The Management Plan also addresses the proper monitoring and management of soils on the primary tailings pile or under the Mill Building, should future soil disturbance activities occur in these areas.

Remedial activities were conducted in accordance with the approved VCUP and associated MMP. The consolidation of mining residuals and associated metals-impacted soils in the primary tailings pile has effectively isolated these materials from the environment. The successful implementation of the Valmont Butte VCUP is considered protective of human health, the environment, and proposed future land uses. In addition, an Operations and Management Plan has been developed to ensure that the remedial actions taken are maintained at the Property. As such, CRI, on behalf of the City of Boulder, requests that a No Action Determination be granted for the Valmont Butte Property.

5.0 PROFESSIONAL CERTIFICATION

Based on the observations made by CRI personnel and the information contained within this report, Paul L. Casey, P.E. as a qualified environmental professional, certifies in accordance with Colorado Revised Statutes Section 25-16-306(5) that, to the best of his professional knowledge and belief, the approved VCUP for the Valmont Butte Property at 3000 North 63rd Street, Boulder, Colorado was fully and properly implemented.

Certified By:

Paul L. Casey, P.E.
Principal

Casey Resources, Inc.
4890 Kipling Street
Wheat Ridge, CO 80033

6.0 REFERENCES

Alisto Engineering Group, 2000. *Phase I Environmental Site Assessment of the Valmont Butte Property, 3000 North 63rd Street, Boulder, Colorado.* Dated September 18, 2000.

Bamberg Ecology, LLC, 2011. *Revegetation Plan for the Valmont Butte Property Voluntary Cleanup Operation Boulder, Colorado*. Dated February 2011.

Boulder City-County Health Department, 1976. *Special Environmental Health Report.* Dated November 1, 1976.

Casey Resources, Inc. ("CRI"), 2009. *Identification and Confirmation of Soils Requiring Long Term Management, Valmont Butte Property, 3000 North 63rd Street, Boulder, Colorado*. Dated November 24, 2009.

CRI, 2010a. *Voluntary Cleanup Plan Application for the Valmont Butte Property, 3000 North 63rd Street, Boulder, Colorado*. Dated June 2010.

CRI, 2010b. Letter to Colorado Department of Public Health and Environment regarding *Amendment #1 Voluntary Cleanup Plan Application for the Valmont Butte Property, Boulder, Colorado*. Dated August 30, 2010

CRI, 2010c. Letter to Colorado Department of Public Health and Environment regarding Amendment *#2 - Voluntary Cleanup Application for the Valmont Butte Property Boulder, Colorado*. Dated August 30, 2010

CRI, 2011a. *Valmont Butte Property Stormwater Management Plan.* Dated February 2011.

CRI, 2011b. *City of Boulder Valmont Butte Property Material Management Plan.* Dated February 2011.

CRI, 2011c. *City of Boulder Valmont Butte Property Air Quality Monitoring Plan.* Dated February 2011.

CRI, 2011d. *City of Boulder Valmont Butte Property Dust Control Plan.* February 2011.

City and County of Denver, 2005. *Soil Screening Levels and User's Guide.* Dated September 2005.

Colorado Department of Public Health and Environment ("CDPHE"), Air Quality Control Commission, 2008. *Regulation No. 8, The Control of Hazardous Air Pollutants Part B, The Control of Asbestos, 5 CCR 1001-10, Part B*. Dated January 30, 2008.

CDPHE, 1999a. *Colorado Department of Public Health and Environment Hazardous Materials and Waste Management Division, Uranium and Special Projects Unit, Technical Evaluation of Surface Gamma Radiation Survey, Valmont Butte Corporation Site, Boulder, Colorado*. Dated July 27, 1999.

CDPHE, 1999b. *Decision Analysis: Assurance of Equivalent Protection to Public Health & Environment in the Absence of a Colorado Radioactive License, for Valmont Butte Site, Valmont Butte Corporation, Boulder, Colorado*. Dated October 6, 1999.

CDPHE, 1999c. *Agreement and Declaration of Covenants.* Dated October 12, 1999.

CDPHE 2001. *Uranium Mill Tailings Management Plan for Managing Uranium Mill Tailings Encountered During Construction Activities in Western Colorado.* Dated October 2001.

CDPHE, 2007. *Table 1 Colorado Soil Evaluation Values (CSEV).* Dated December 2007.

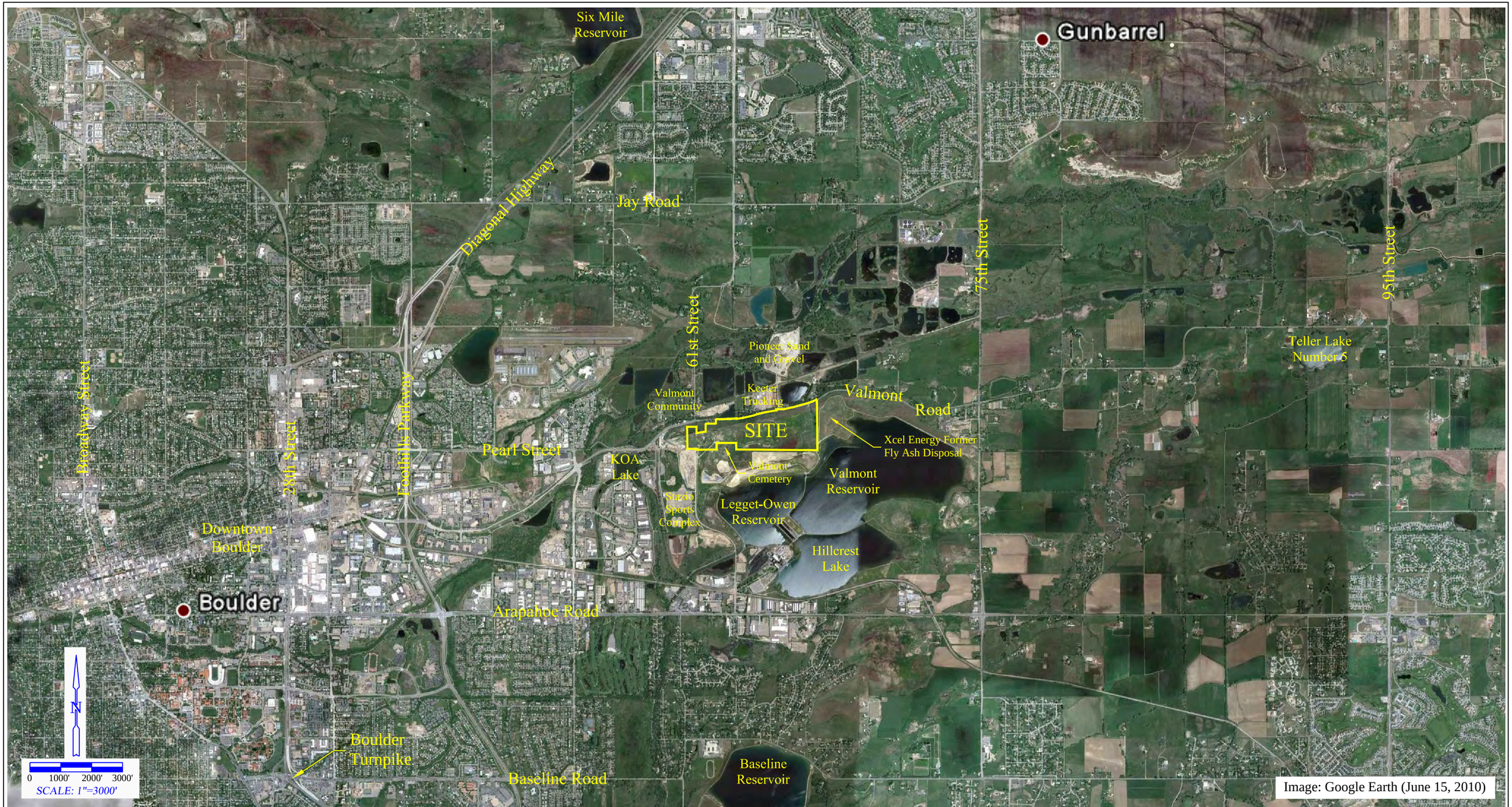
CDPHE, 2008. *6 CCR 1007-1, Rules and Regulations Pertaining to Radiation Control.* Effective January 2008.

Ecology & Environment, 1985. *Sampling Activities Report for the Allied Chemical Tailings Pond, Boulder, Colorado.* Dated March 25, 1985.

Terracon, 2003. *Limited Intrusive Environmental Site Assessment, City of Boulder, Colorado Proposed Biosolids Dewatering and Composting Project, Boulder, Colorado.* Dated July 11, 2003 (Revised September 30, 2003).

URS, 2005. *Analytical Results Report for Site Reassessment, Valmont Butte/Allied Piles, Boulder, Colorado.* Prepared for the U.S. Environmental Protection Agency. Dated January 1, 2005.

FIGURES



CASEY RESOURCES, INC.

VICINITY MAP

VALMONT BUTTE PROPERTY

3000 North 63rd Street
Boulder, Colorado

PROJECT:	069-001
DATE:	11/27/2013
DRAWN:	S.R.S.
CHECKED:	P.L.C
FIGURE NO:	1

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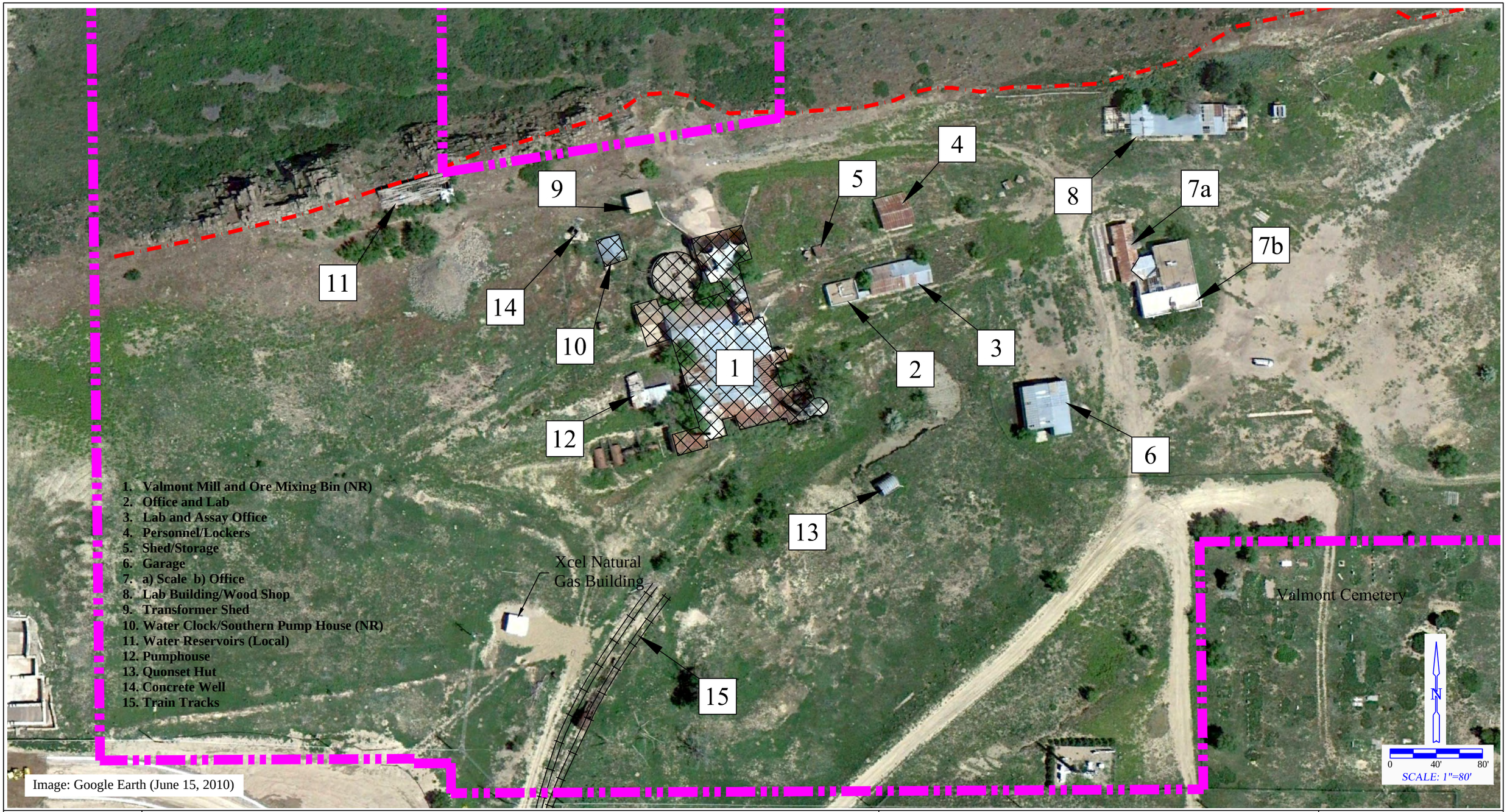

CRI CASEY RESOURCES, INC.

LEGEND

- Property Boundary
- Valmont Butte Ridge
- Eligible for National Register ("NR") as a Historic Building

Valmont Butte Boundary Based On April 14, 2000 Land Survey Plat

HISTORIC BUILDING ELIGIBILITY

VALMONT BUTTE PROPERTY

3000 North 63rd Street
Boulder, Colorado

PROJECT: 069-001
DATE: 11/27/2013
DRAWN: S.R.S.
CHECKED: P.L.C
FIGURE NO: 2

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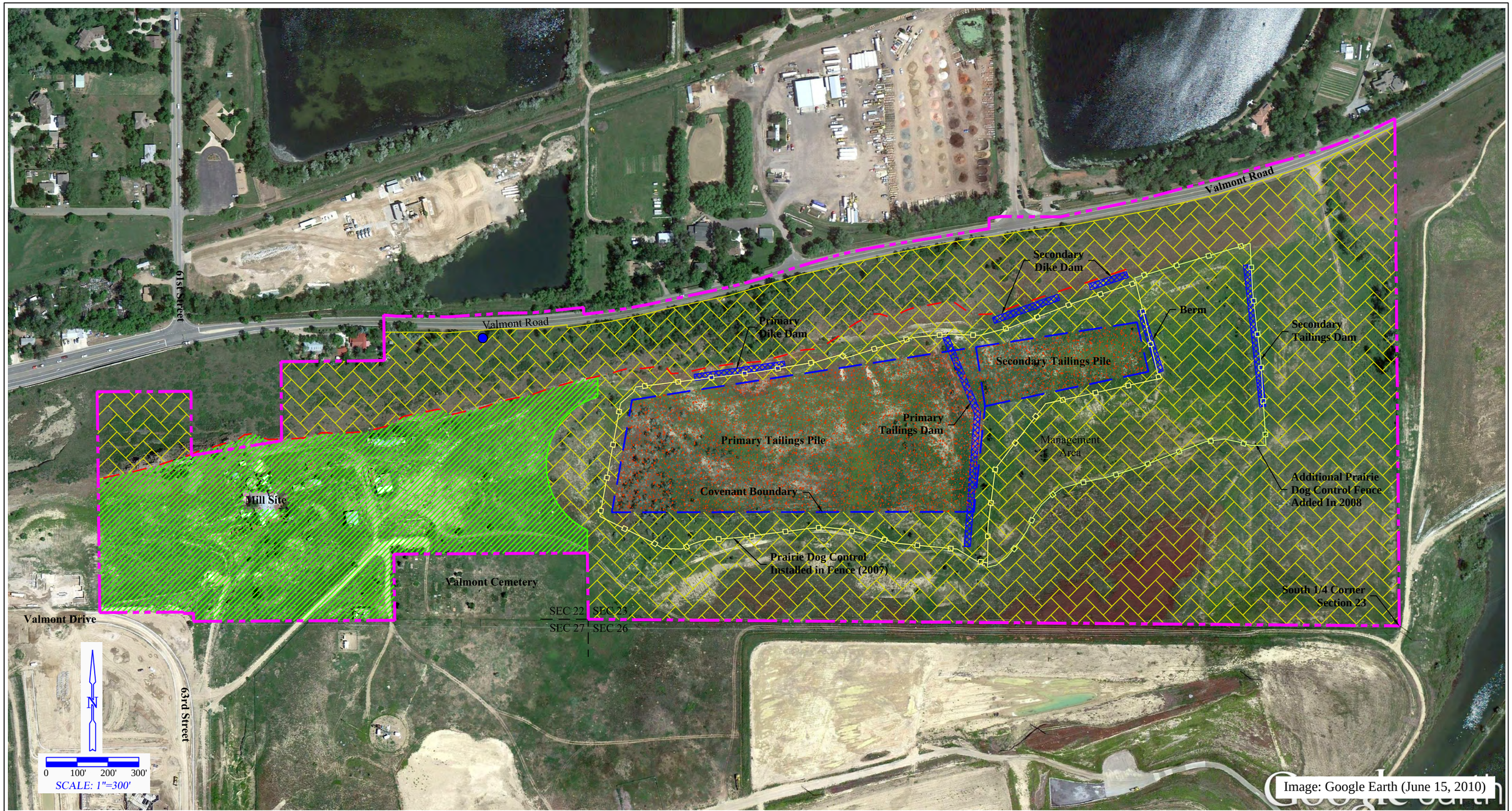


CRI CASEY RESOURCES, INC.

LEGEND

- Property Boundary
- Valmont Butte Ridge
- Prairie Dog Control Fence
- Covenant Boundary
- SEC Section
- Outlying Vacant Area
- Mill Site Area
- Primary and Secondary Tailings (Covenant Controlled Area)
- Former Groundwater Supply Well

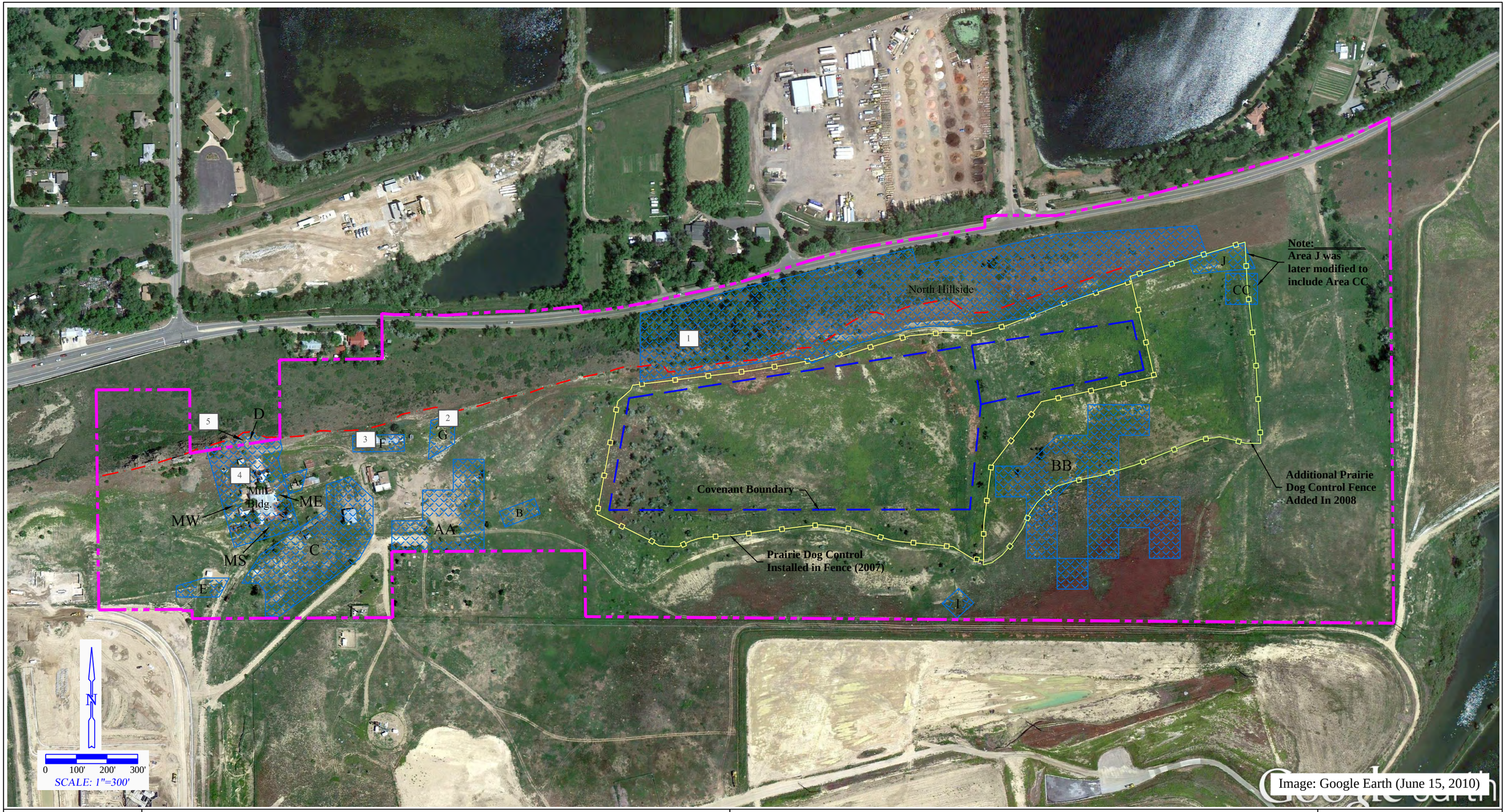
Valmont Butte Boundary Based On April 14, 2000 Land Survey Plat

FACILITY MAP

VALMONT BUTTE PROPERTY

3000 North 63rd Street
Boulder, Colorado

PROJECT: 069-001
DATE: 11/27/2013
DRAWN: S.R.S.
CHECKED: P.L.C
FIGURE NO: 3



CRI CASEY RESOURCES, INC.

LEGEND

- Property Boundary
- Valmont Butte Ridge
- Prairie Dog Control Fence
- Covenant Boundary
- A — Lead Concentration > 800 mg/kg
- 1 — Location of Elevated (> 40 µR/hr) Radiation Readings (URS, 2005)

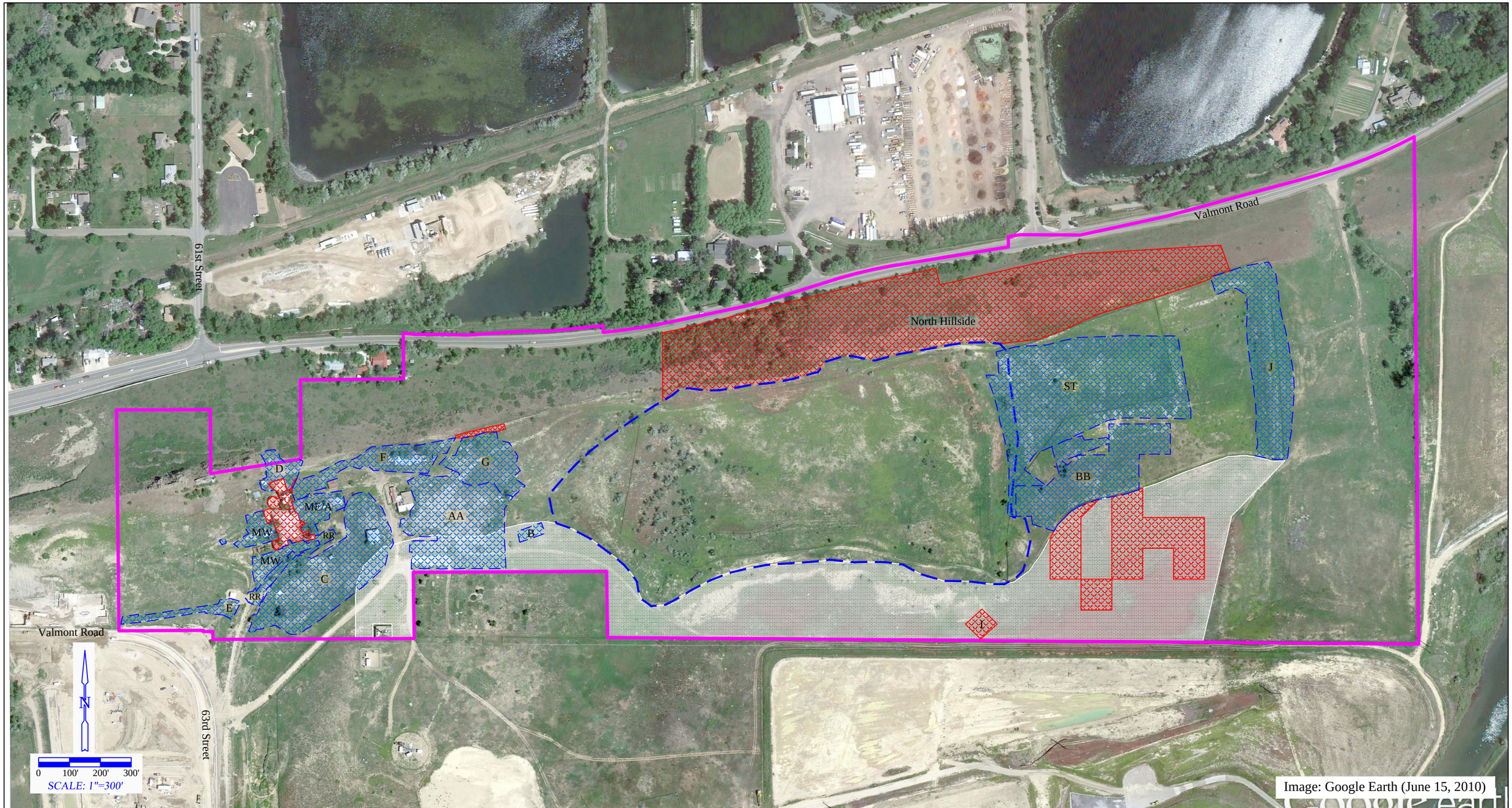
Valmont Butte Boundary Based On April 14, 2000 Land Survey Plat

ESTIMATED MINING RESIDUAL MANAGEMENT AREAS (PRECONSTRUCTION)

VALMONT BUTTE PROPERTY

3000 North 63rd Street
Boulder, Colorado

PROJECT: 069-001
DATE: 11/27/2013
DRAWN: S.R.S.
CHECKED: P.L.C
FIGURE NO: 4



LEGEND

- Property Boundary
- Soil & Rock Cap Boundary
- A — Remediated Area
- A — Metals-Impacted Soil Left-In-Place
- Culturally Sensitive Area

CONFIRMED MINING RESIDUAL MANAGEMENT AREAS

VALMONT BUTTE PROPERTY

3000 North 63rd Street
Boulder, Colorado

PROJECT: 069-001
DATE: 12/30/2013
DRAWN: S.R.S.
CHECKED: P.L.C
FIGURE NO: 5

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CASEY RESOURCES, INC.

LEGEND

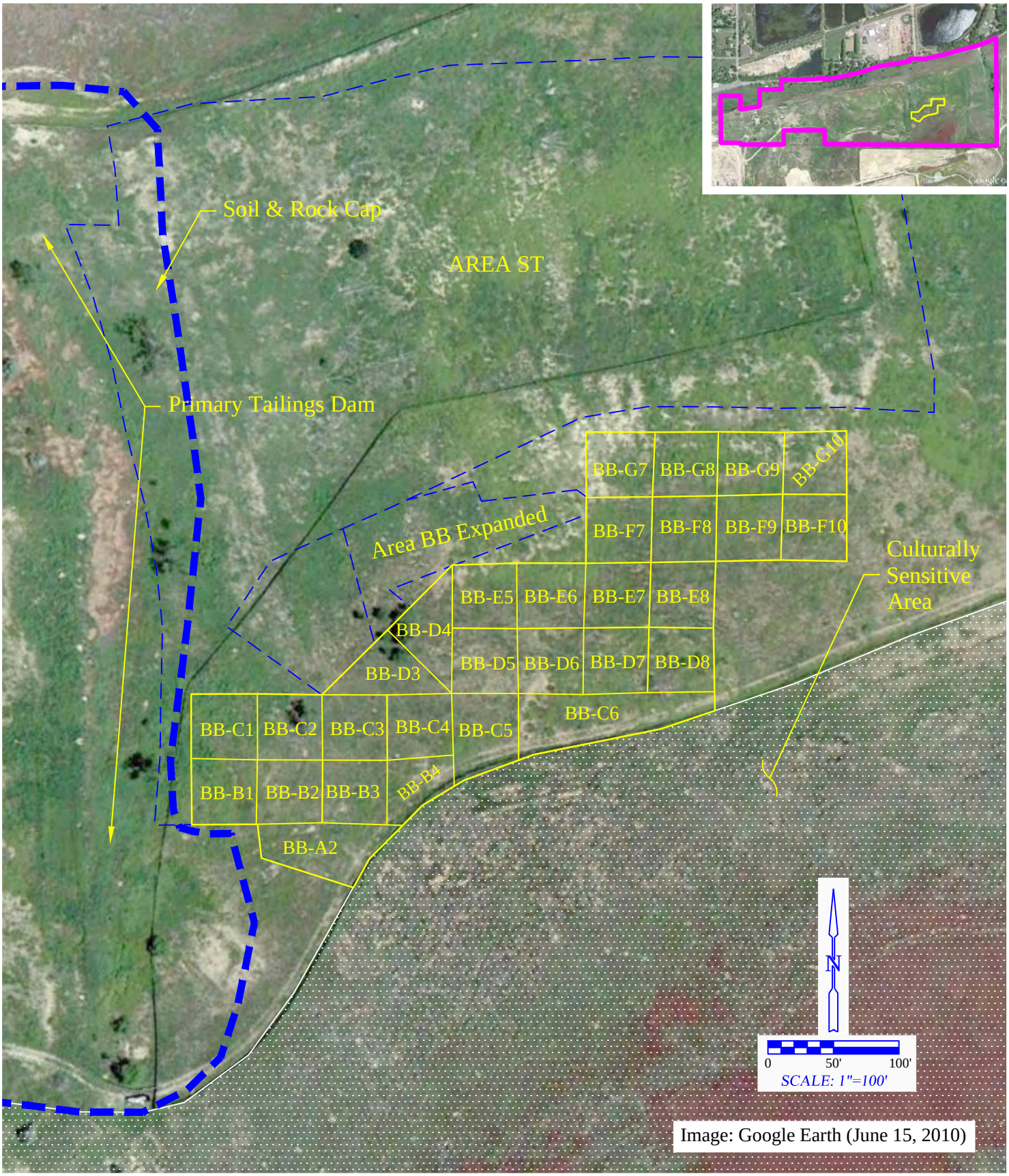
- Property Boundary
- ID — Confirmation Sampling Grids of Approximately 2,500 Square Feet Each
- Remediation Area

AREA J

METALS CONFIRMATION SAMPLE GRIDS

VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

PROJECT:	069-001
DATE:	11/27/2013
DRAWN:	S.R.S.
CHECKED:	P.L.C.
FIGURE NO:	6



CRI CASEY RESOURCES, INC.

LEGEND

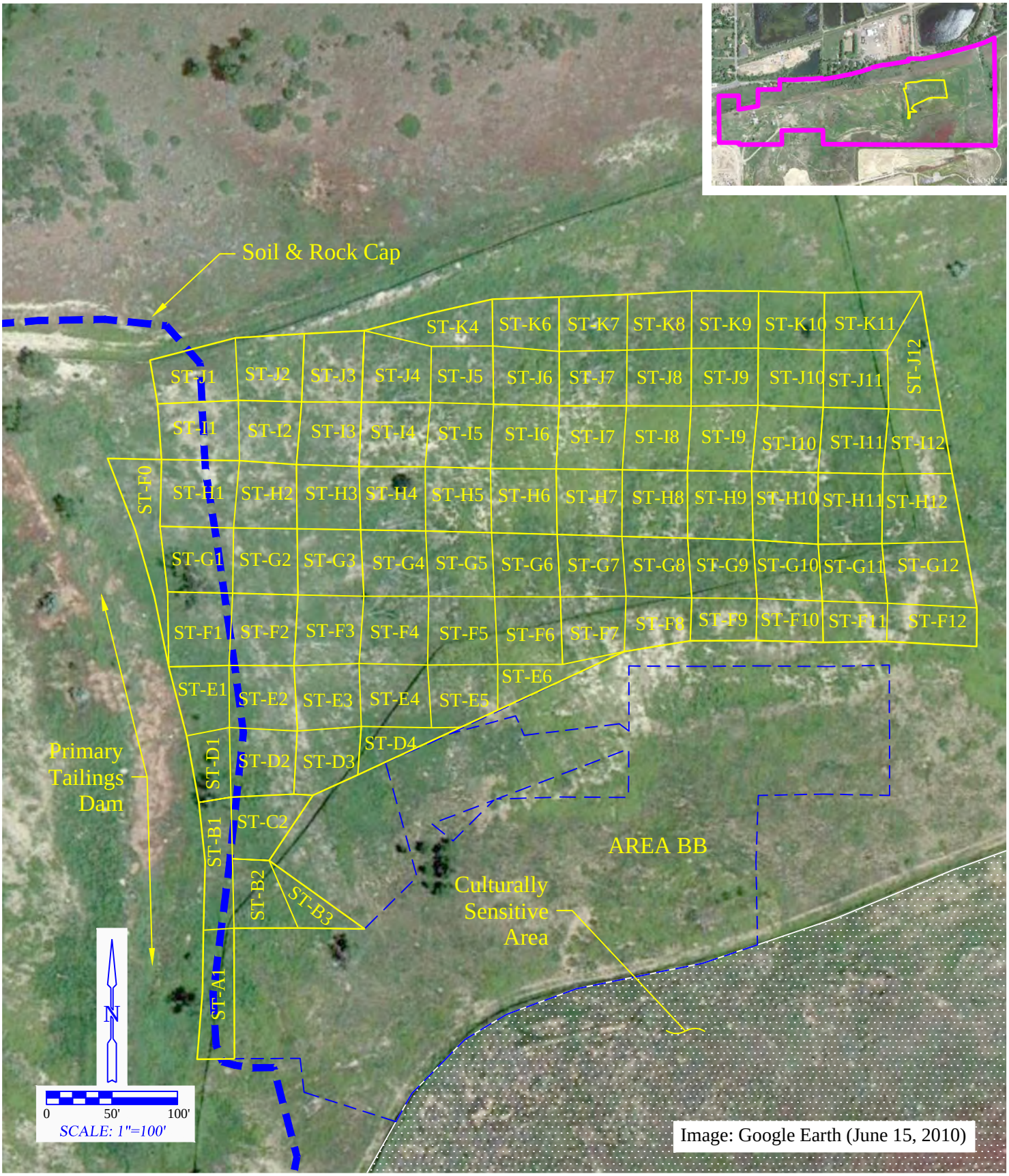
- Property Boundary
- ID — Confirmation Sampling Grids of Approximately 2,500 Square Feet Each
- Remediation Area

AREA BB

METALS CONFIRMATION SAMPLE GRIDS

VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

PROJECT:	069-001
DATE:	11/27/2013
DRAWN:	S.R.S.
CHECKED:	P.L.C.
FIGURE NO:	7



CRI CASEY RESOURCES, INC.

LEGEND

- Property Boundary
- ID — Confirmation Sampling Grids of Approximately 2,500 Square Feet Each
- Remediation Area

AREA ST

METALS CONFIRMATION SAMPLE GRIDS

VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

PROJECT:	069-001
DATE:	11/27/2013
DRAWN:	S.R.S.
CHECKED:	P.L.C.
FIGURE NO:	8

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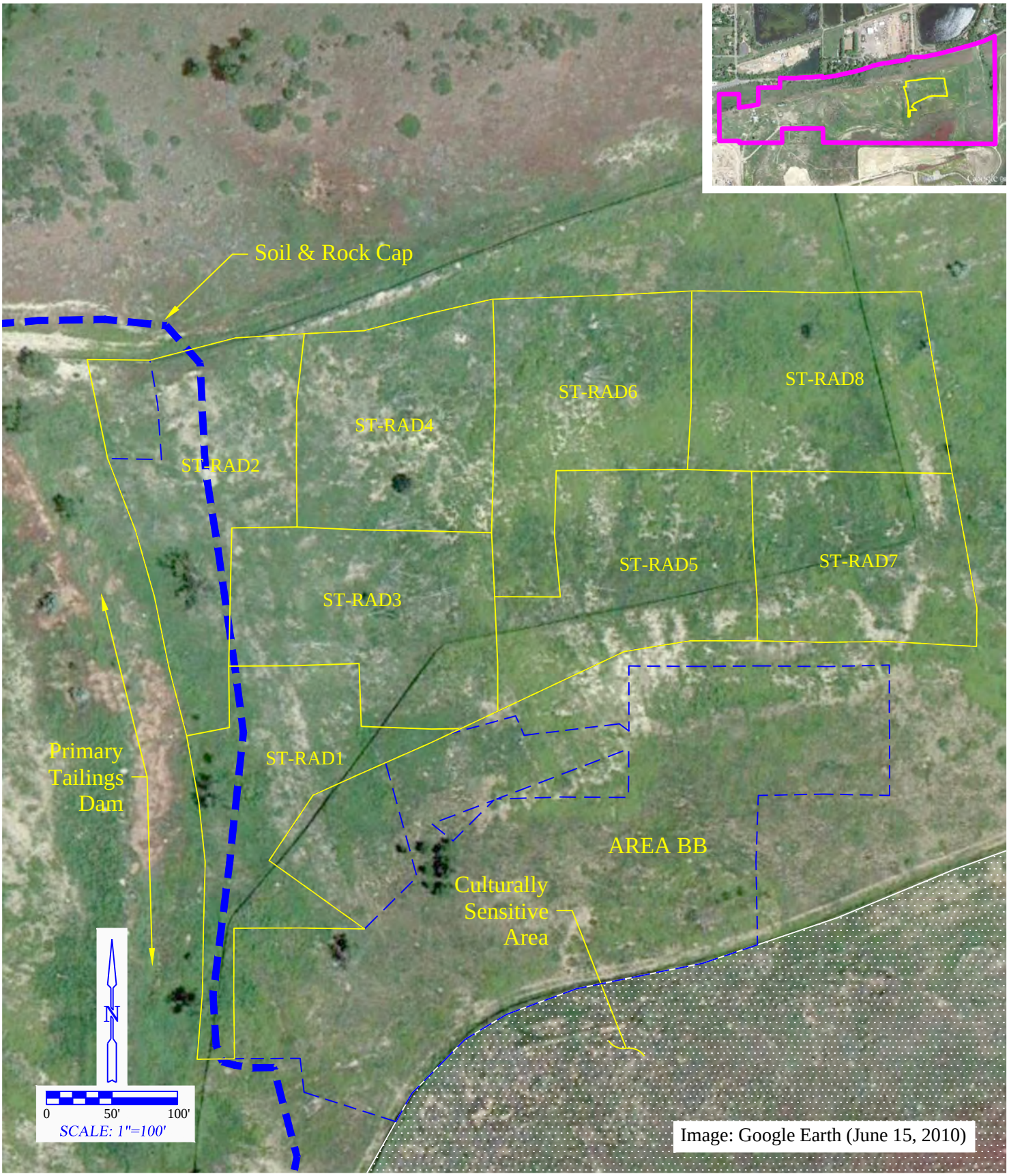


CASEY RESOURCES, INC.

LEGEND

Property Boundary

Remediation Area

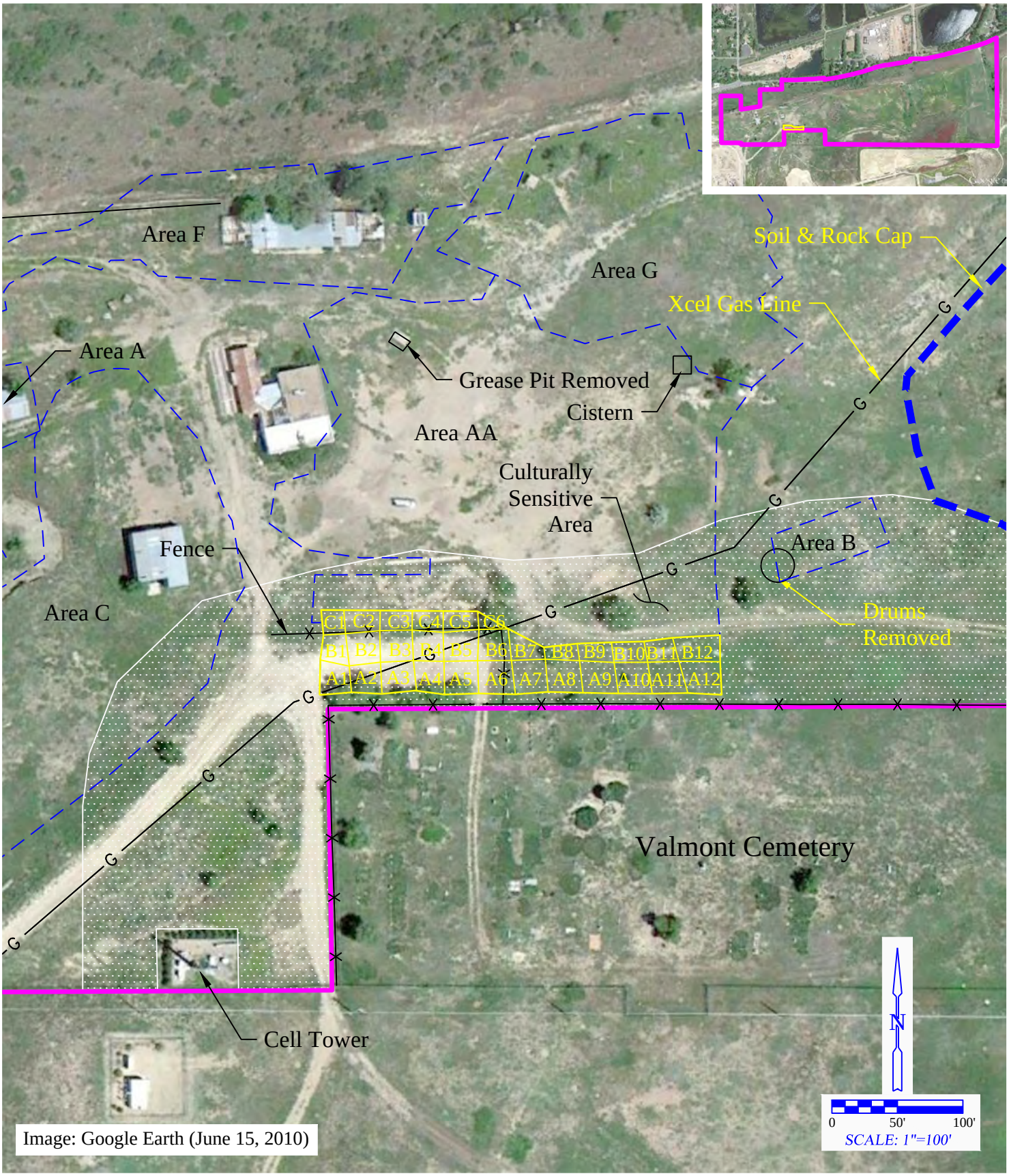
ST-RAD1 Confirmation Sampling Grids of Approximately 25,000 Square Feet Each

AREA ST

RADIATION CONFIRMATION SAMPLE GRIDS

VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

PROJECT: 069-001
DATE: 11/27/2013
DRAWN: S.R.S.
CHECKED: P.L.C.
FIGURE NO: 9



CASEY RESOURCES, INC.

LEGEND

- Property Boundary
- Remediation Area
- ID — XRF Screening Grids of Approximately 625 Square Feet Each

AREA AA

25-FOOT METALS XRF SCREENING GRIDS

VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

PROJECT:	069-001
DATE:	11/27/2013
DRAWN:	S.R.S.
CHECKED:	P.L.C.
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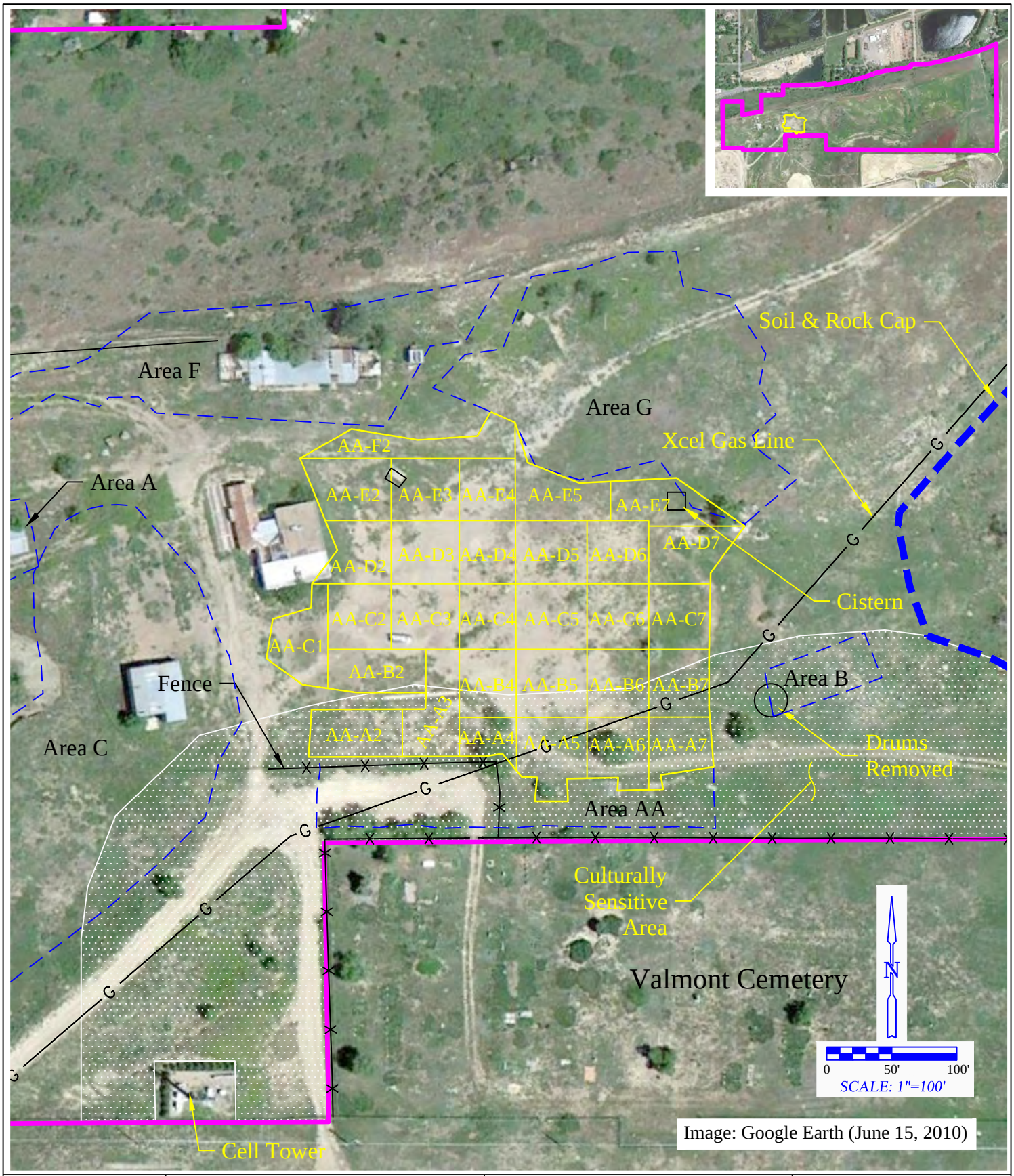

CASEY RESOURCES, INC.

LEGEND

- Property Boundary
- ID — Confirmation Sampling Grids of Approximately 2,500 Square Feet Each
- Remediation Area

AREA AA

METALS CONFIRMATION SAMPLE GRIDS

VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

PROJECT:	069-001
DATE:	11/27/2013
DRAWN:	S.R.S.
CHECKED:	P.L.C.
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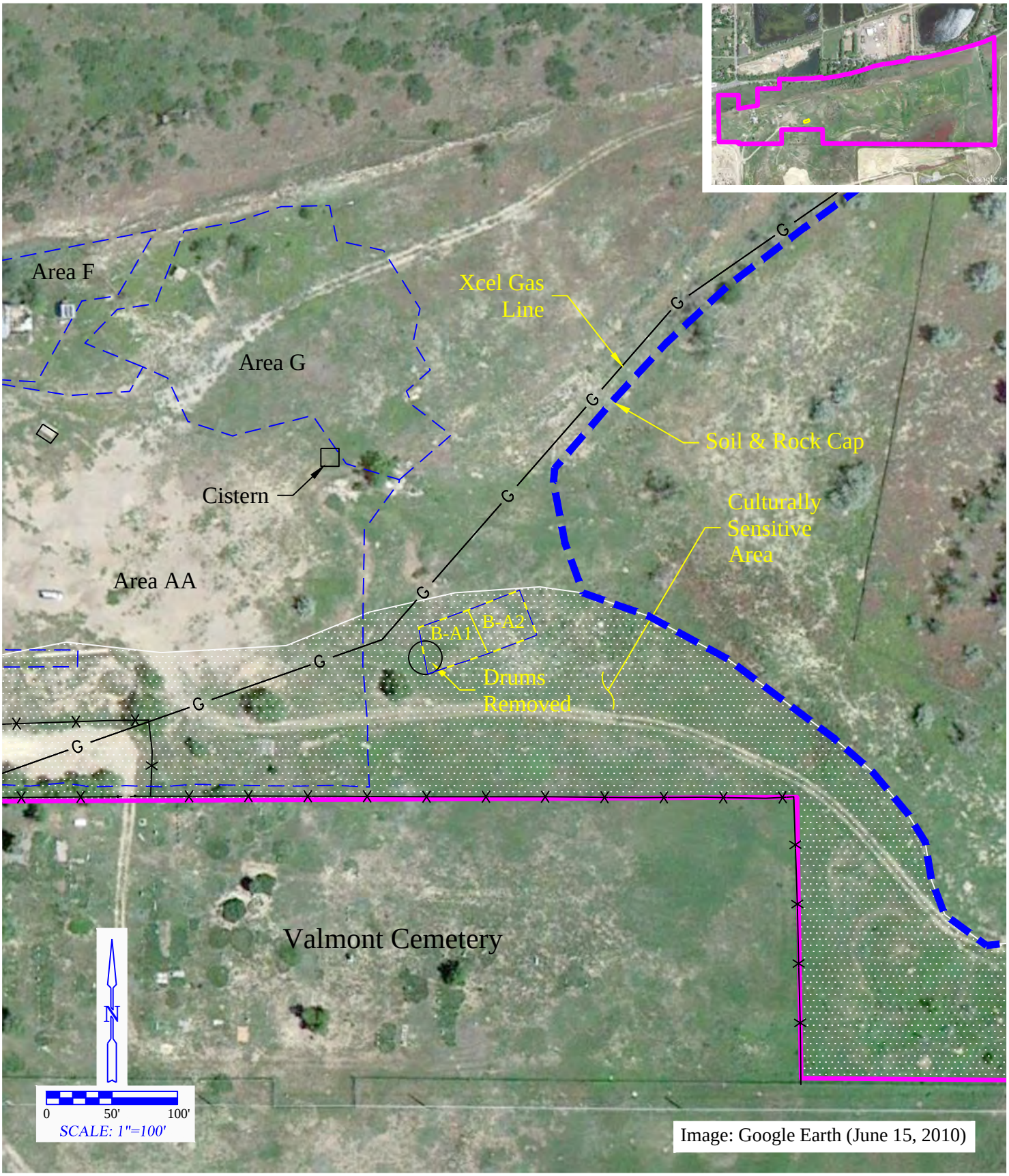

CASEY RESOURCES, INC.

LEGEND

- Property Boundary
- ID — Confirmation Sampling Grids of Approximately 2,500 Square Feet Each
- Remediation Area

AREA B

METALS CONFIRMATION SAMPLE GRIDS

VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

PROJECT:	069-001
DATE:	11/27/2013
DRAWN:	S.R.S.
CHECKED:	P.L.C.
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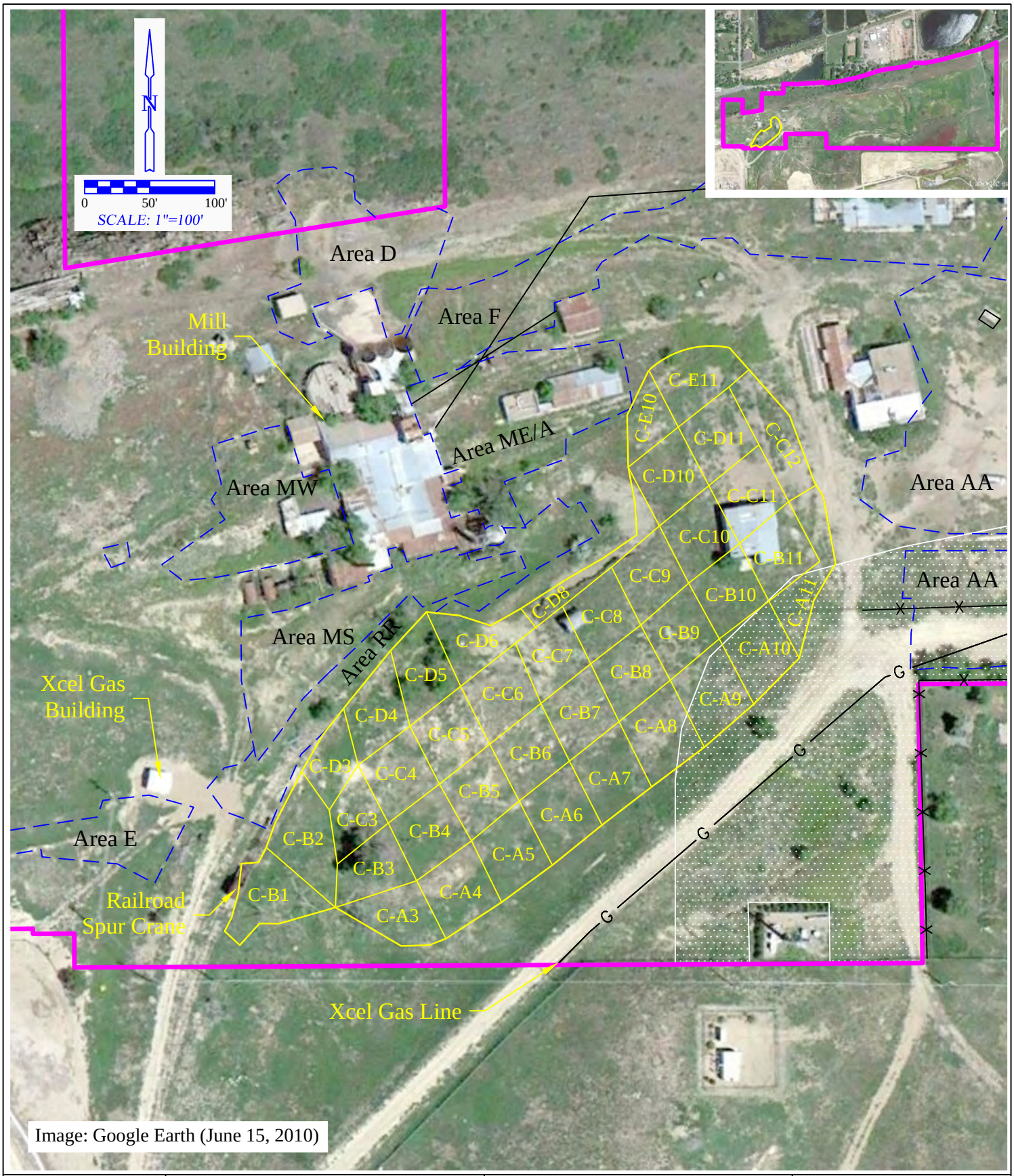


CRI CASEY RESOURCES, INC.

LEGEND

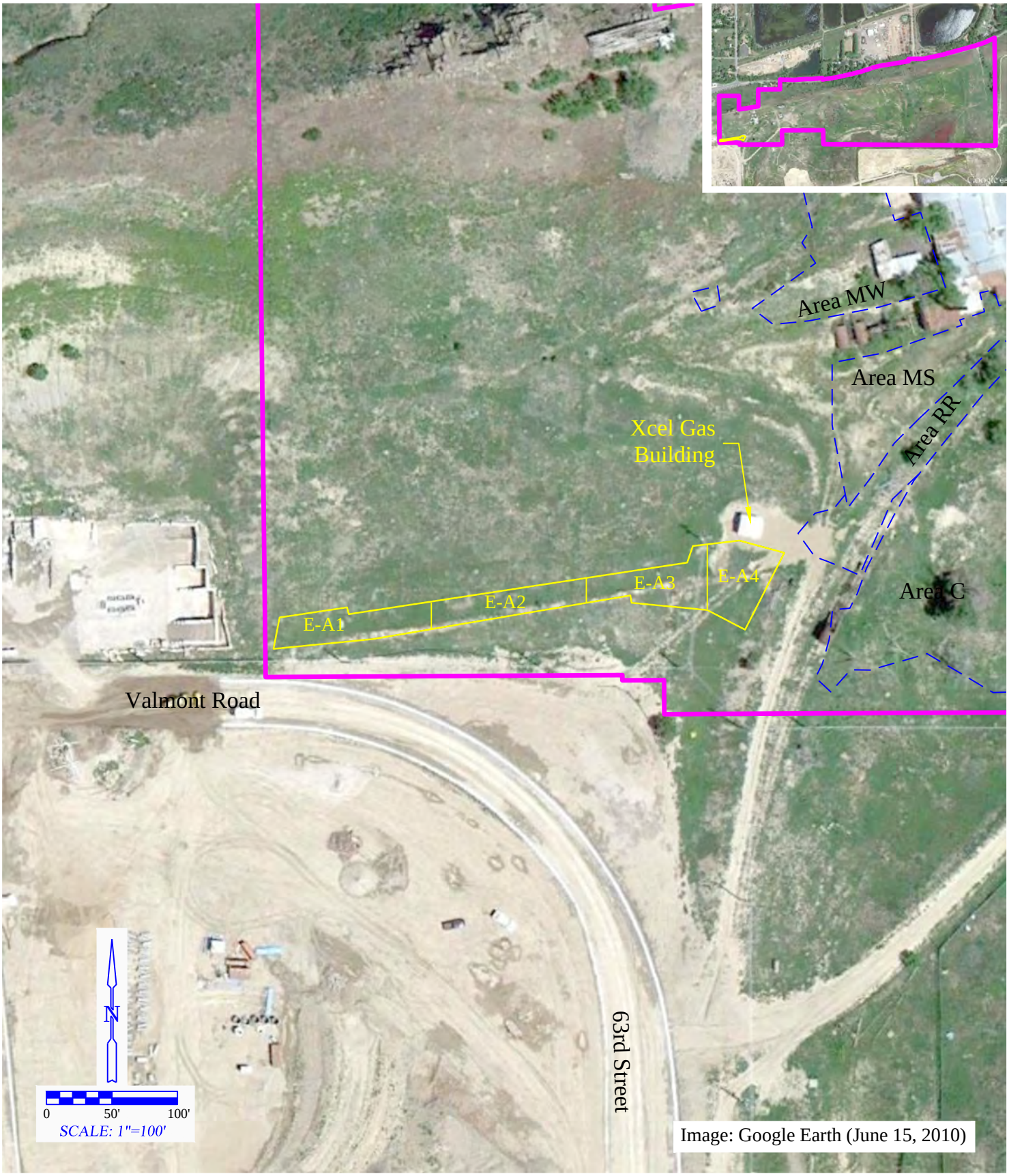
- Property Boundary
- ID — Confirmation Sampling Grids of Approximately 2,500 Square Feet Each
- Remediation Area

AREA C

METALS CONFIRMATION SAMPLE GRIDS

VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

PROJECT:	069-001
DATE:	11/27/2013
DRAWN:	S.R.S.
CHECKED:	P.L.C.
FIGURE NO:	13



CRI CASEY RESOURCES, INC.

LEGEND

- Property Boundary
- ID — Confirmation Sampling Grids of Approximately 2,500 Square Feet Each
- Remediation Area

AREA E

METALS CONFIRMATION SAMPLE GRIDS

VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

PROJECT:	069-001
DATE:	11/27/2013
DRAWN:	S.R.S.
CHECKED:	P.L.C.
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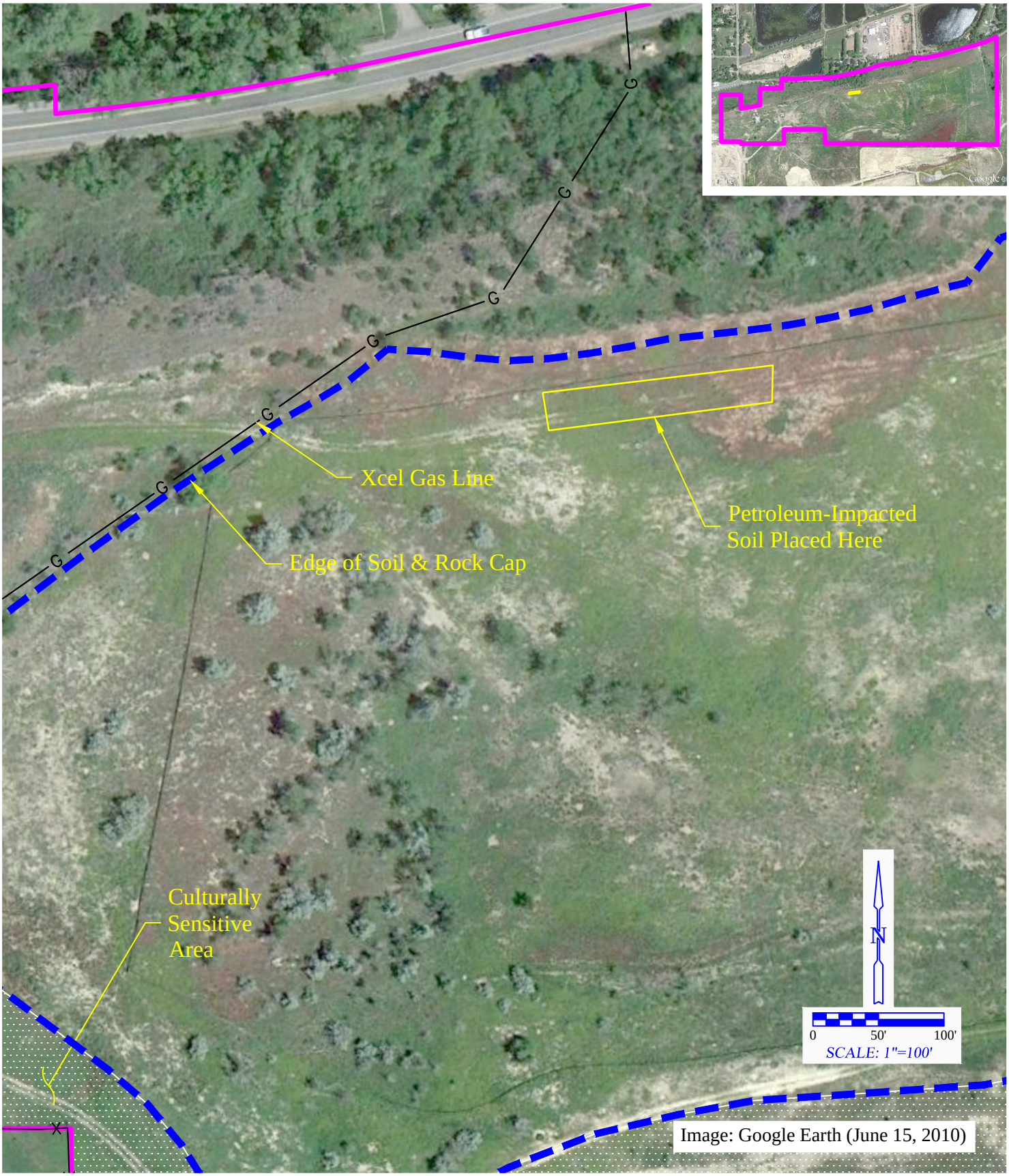

LEGEND

Property Boundary

PETROLEUM-IMPACTED SOIL IN PRIMARY TAILINGS PILE

VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

PROJECT:	069-001
DATE:	12/30/2013
DRAWN:	S.R.S.
CHECKED:	P.L.C.
FIGURE NO:	15

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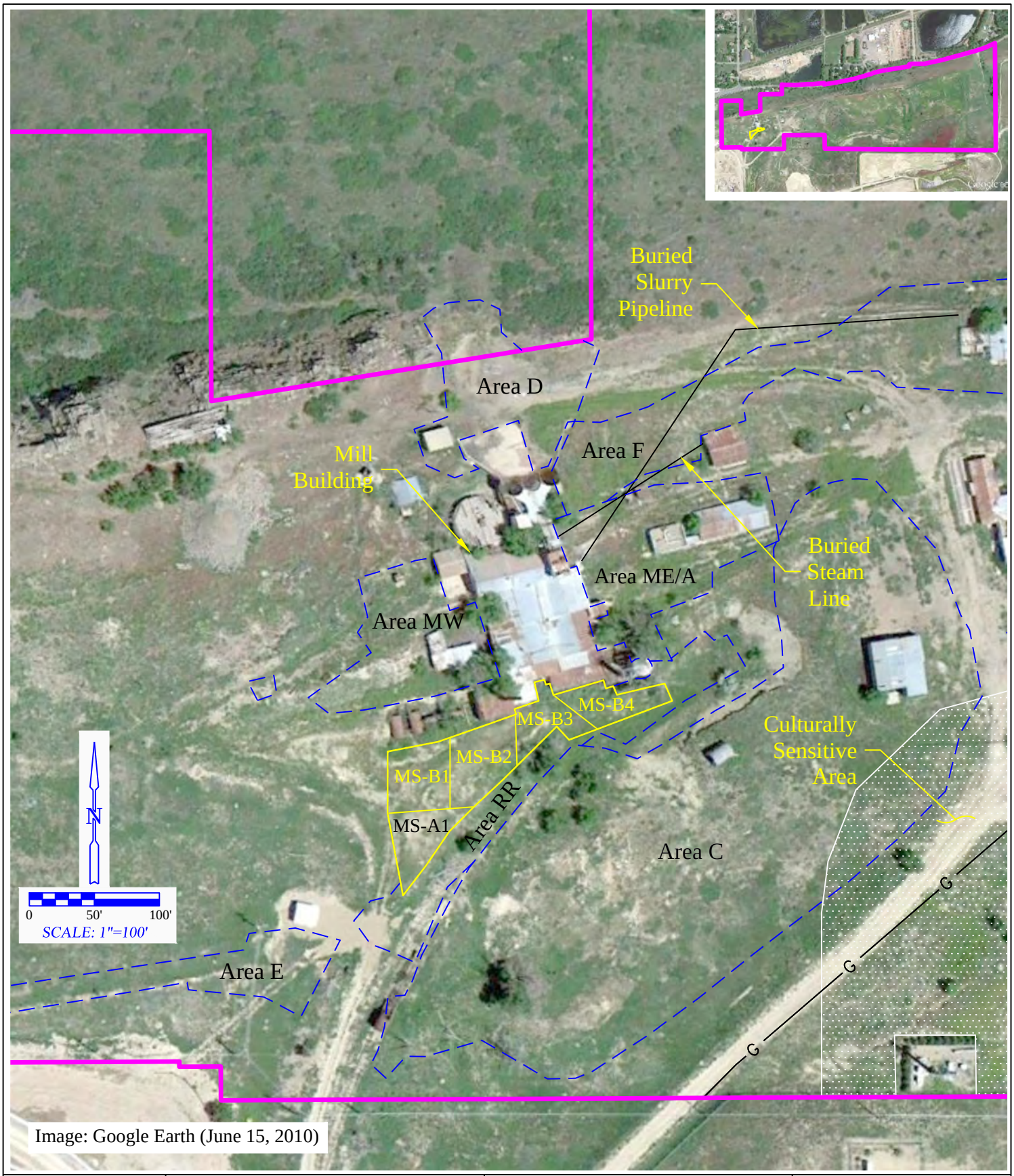

CRI
CASEY RESOURCES, INC.

LEGEND

- Property Boundary
- ID — Confirmation Sampling Grids of Approximately 2,500 Square Feet Each
- Remediation Area

AREA MS

METALS CONFIRMATION SAMPLE GRIDS

VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

PROJECT:	069-001
DATE:	11/27/2013
DRAWN:	S.R.S.
CHECKED:	P.L.C.
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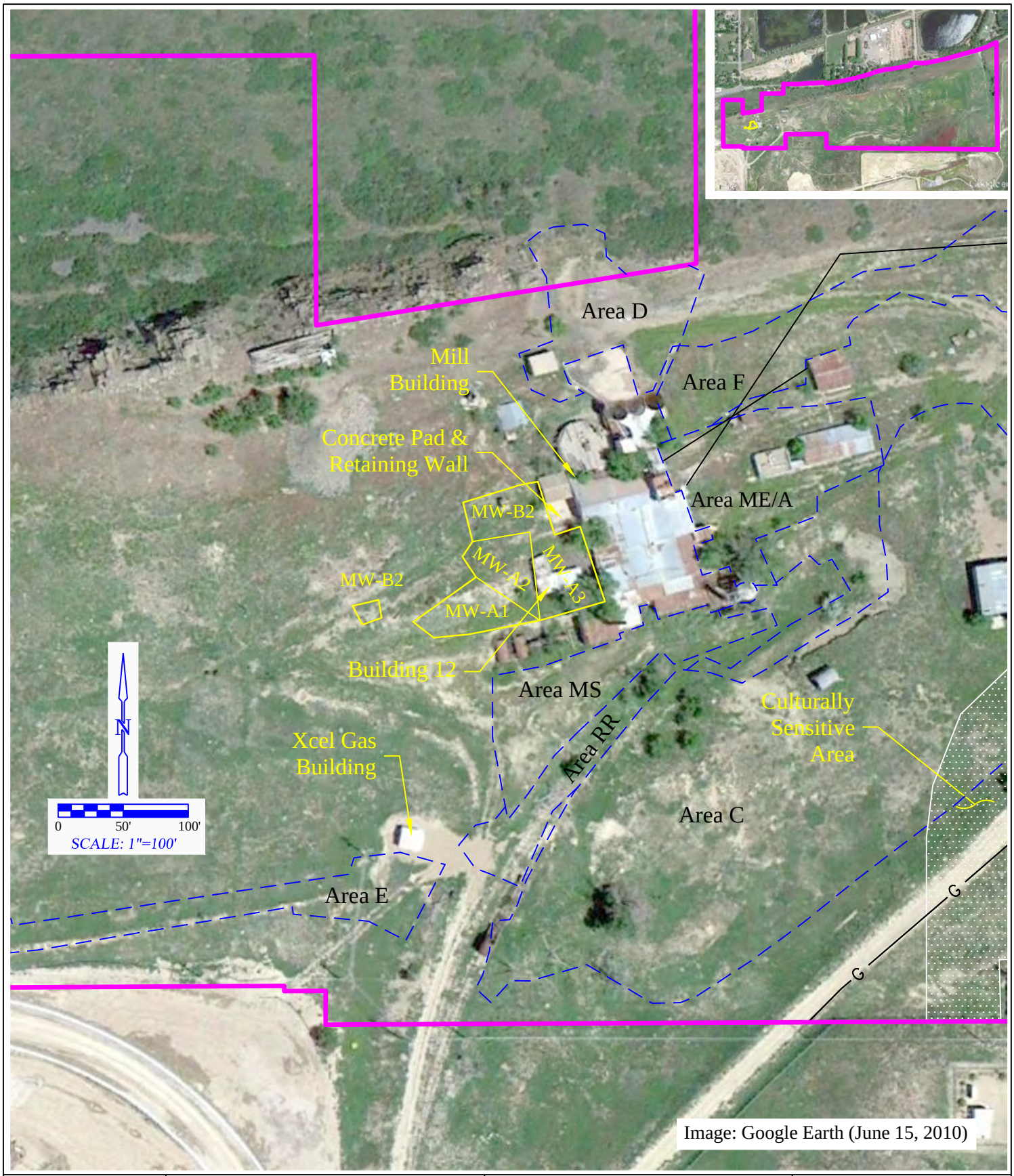


LEGEND

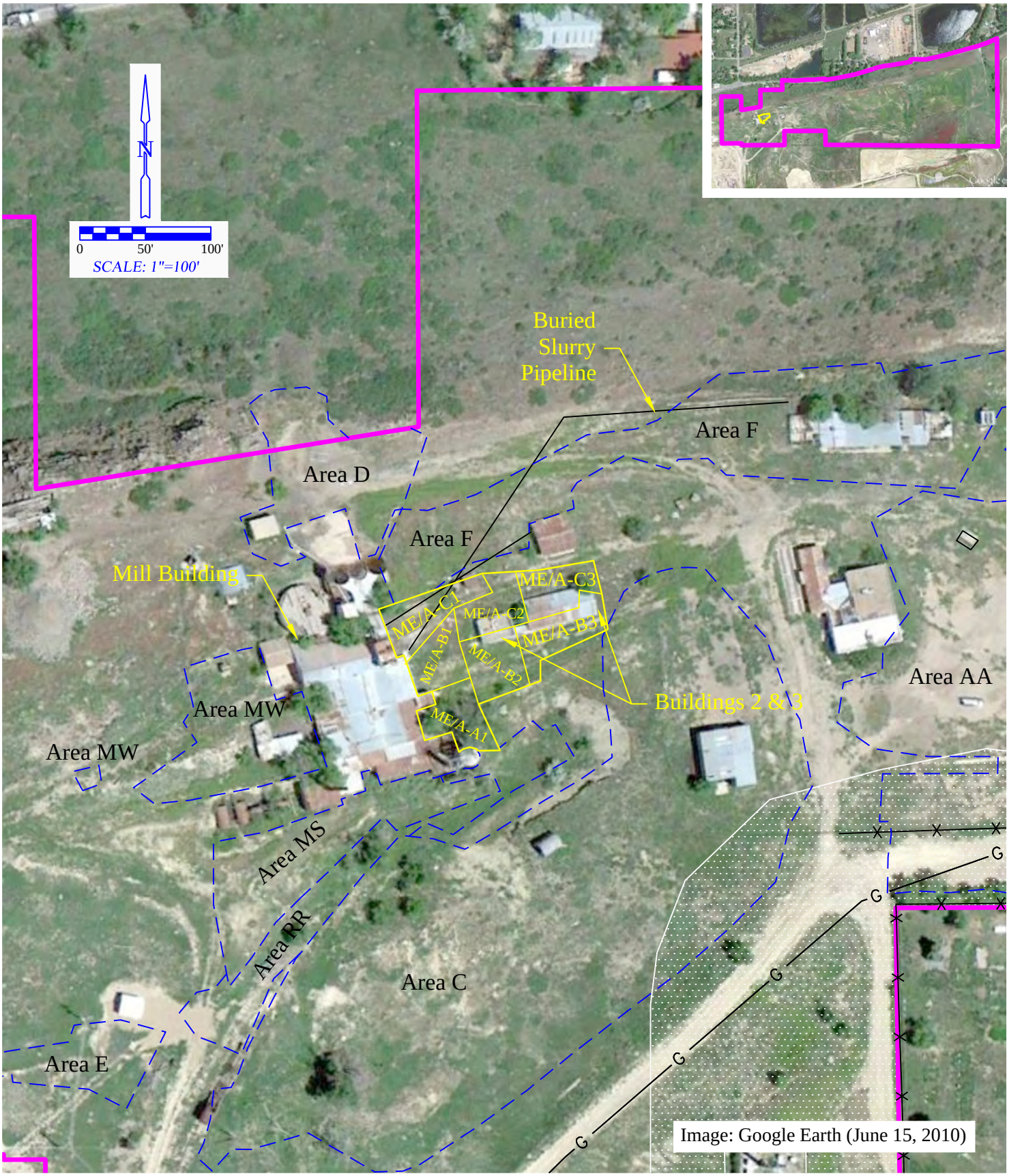
- Property Boundary
- ID — Confirmation Sampling Grids of Approximately 2,500 Square Feet Each
- Remediation Area

AREA MW

METALS CONFIRMATION SAMPLE GRIDS

VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

PROJECT:	069-001
DATE:	11/27/2013
DRAWN:	S.R.S.
CHECKED:	P.L.C.
FIGURE NO:	17



CRI CASEY RESOURCES, INC.

LEGEND

- Property Boundary
- ID — Confirmation Sampling Grids of Approximately 2,500 Square Feet Each
- Remediation Area

AREAS ME/A
METALS CONFIRMATION SAMPLE GRIDS

VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

PROJECT:	069-001
DATE:	11/27/2013
DRAWN:	S.R.S.
CHECKED:	P.L.C.
FIGURE NO:	18

CASEY RESOURCES, INC.

LEGEND

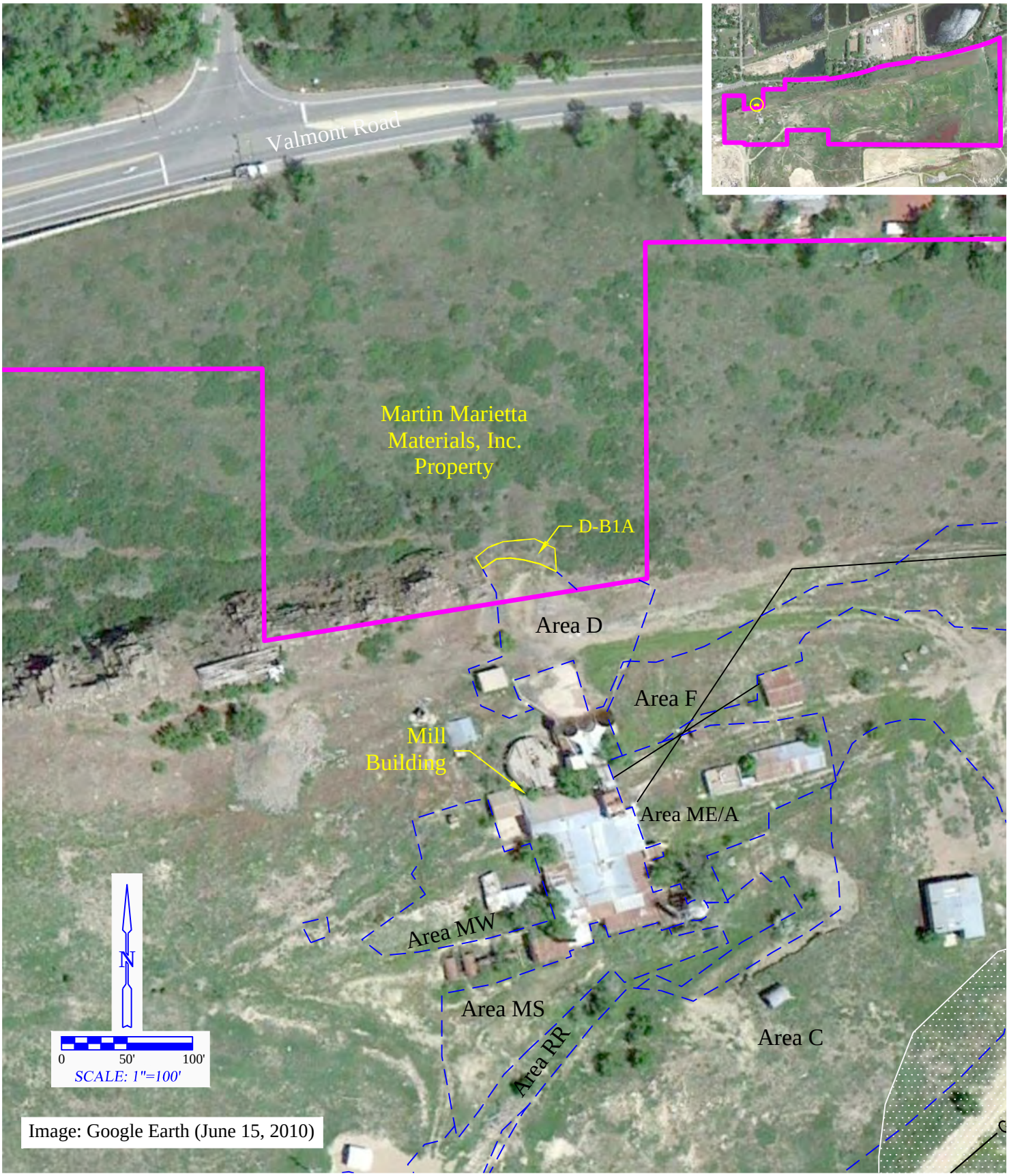
- Property Boundary
- ID — Confirmation Sampling Grids of Approximately 2,500 Square Feet Each
- Remediation Area

AREA D

METALS CONFIRMATION SAMPLE GRIDS

VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

PROJECT:	069-001
DATE:	11/27/2013
DRAWN:	S.R.S.
CHECKED:	P.L.C.
FIGURE NO:	19



CASEY RESOURCES, INC.

LEGEND

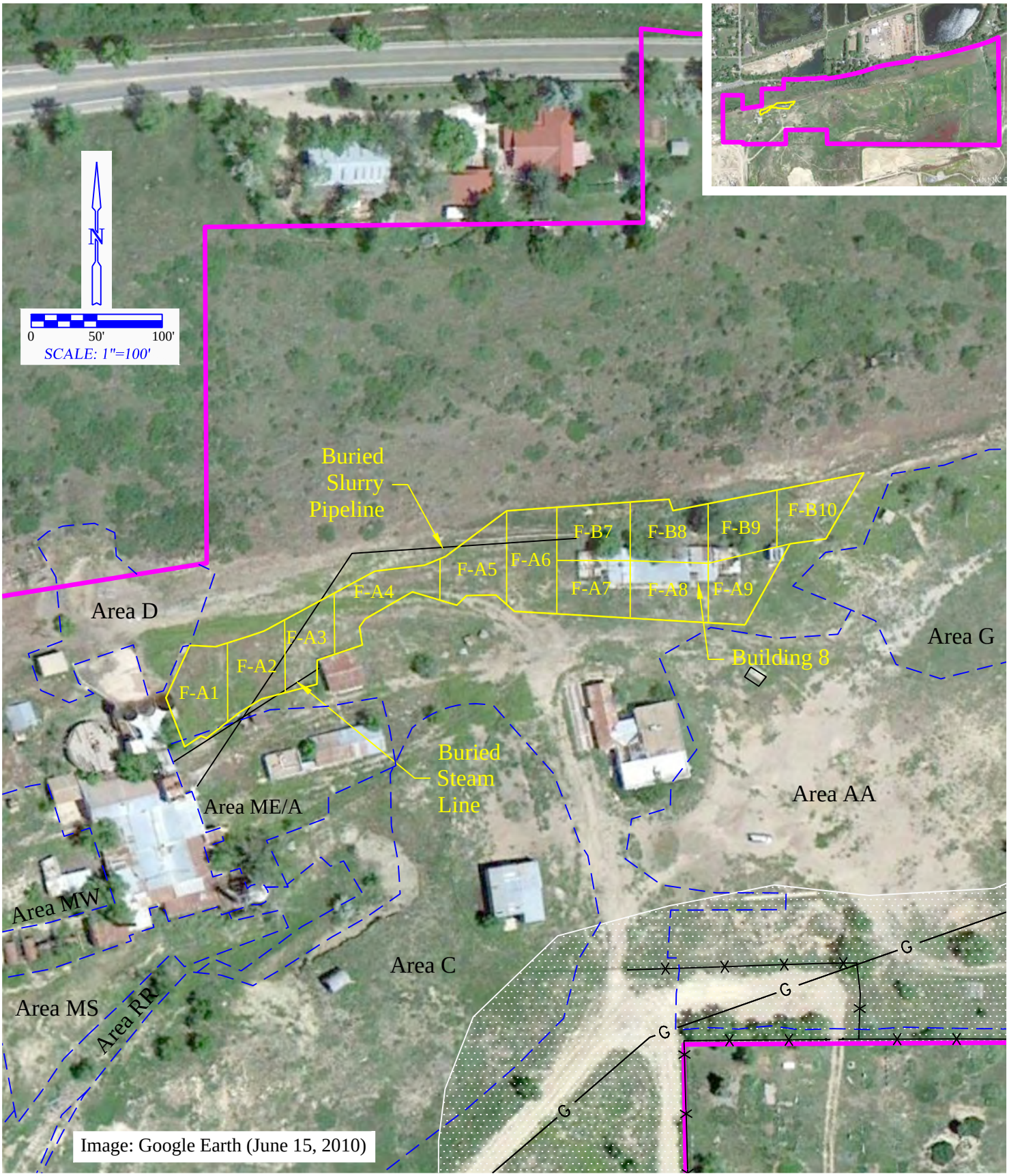
- Property Boundary
- ID — Confirmation Sampling Grids of Approximately 2,500 Square Feet Each
- Remediation Area

AREA D w/ ADDED GRID

METALS CONFIRMATION SAMPLE GRIDS

VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

PROJECT:	069-001
DATE:	11/27/2013
DRAWN:	S.R.S.
CHECKED:	P.L.C.
FIGURE NO:	20



CASEY RESOURCES, INC.

LEGEND

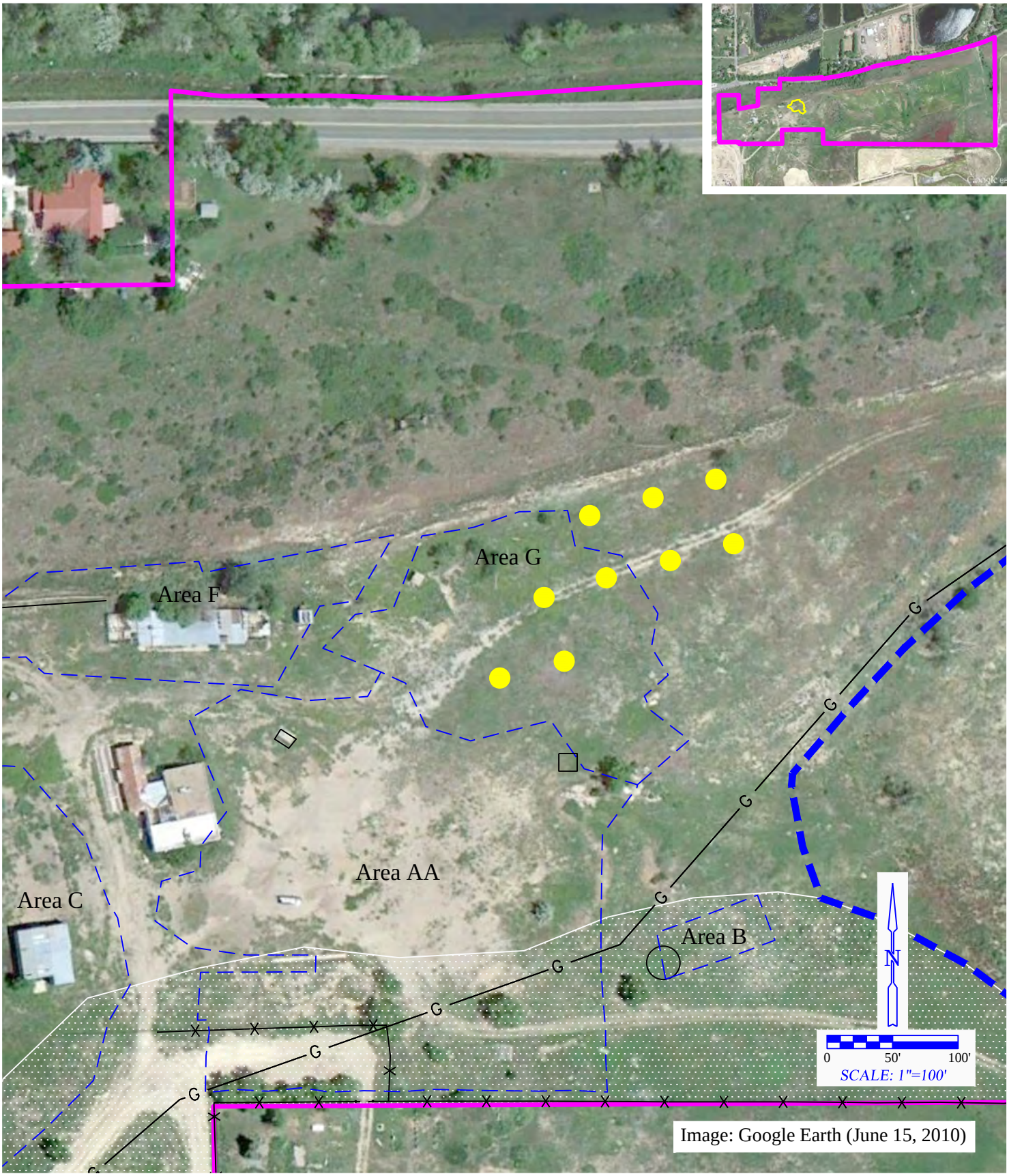
- Property Boundary
- ID — Confirmation Sampling Grids of Approximately 2,500 Square Feet Each
- Remediation Area

AREA F

METALS CONFIRMATION SAMPLE GRIDS

VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

PROJECT:	069-001
DATE:	11/27/2013
DRAWN:	S.R.S.
CHECKED:	P.L.C.
FIGURE NO:	21



CASEY RESOURCES, INC.

LEGEND

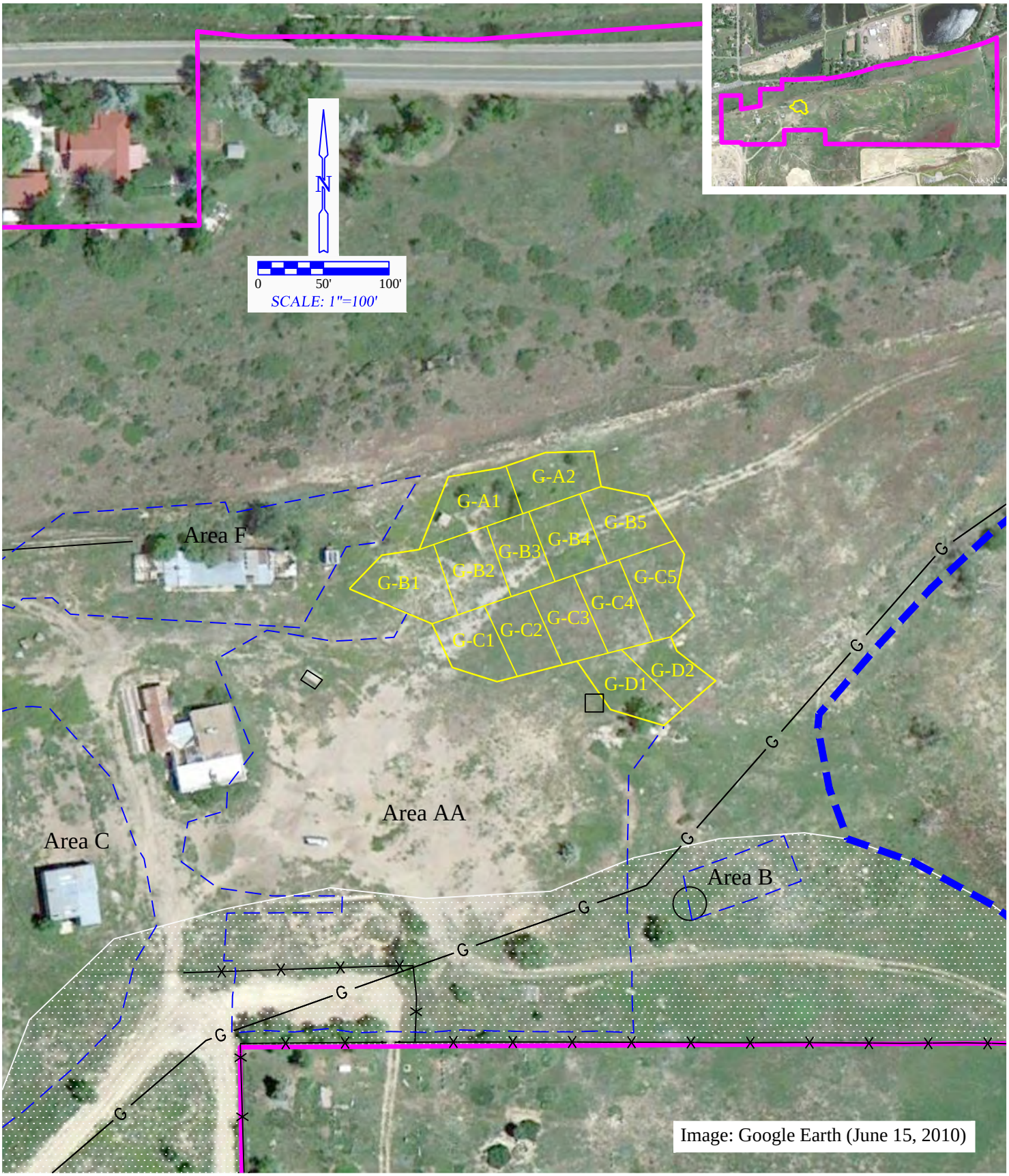
- Property Boundary
- Remediation Area
- Soil & Rock Cap Boundary
- Borehole

AREA G

EXPLORATORY BOREHOLES

VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

PROJECT:	069-001
DATE:	11/27/2013
DRAWN:	S.R.S.
CHECKED:	P.L.C.
FIGURE NO:	22



LEGEND

- Property Boundary
- ID — Confirmation Sampling Grids of Approximately 2,500 Square Feet Each
- Remediation Area

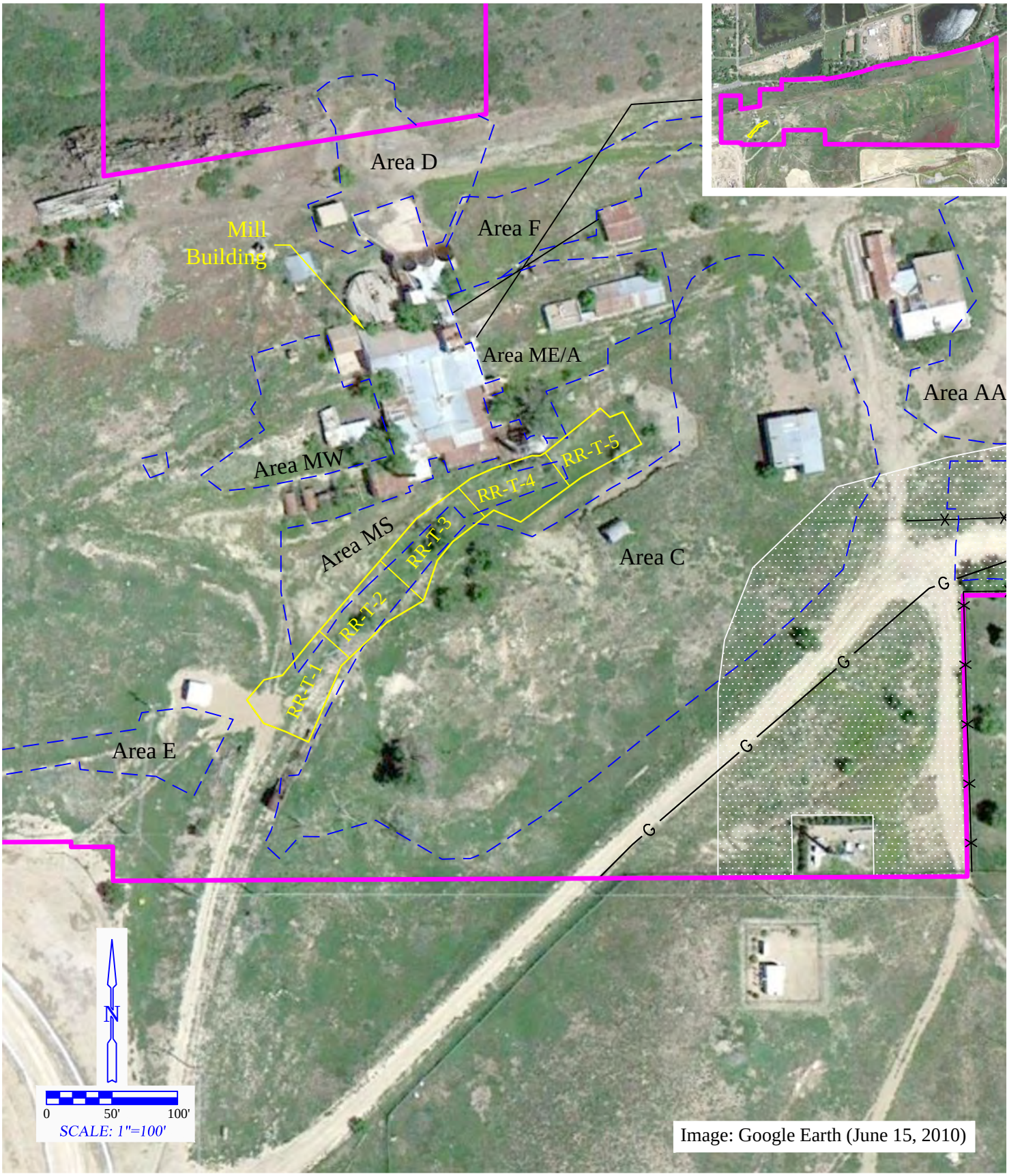
AREA G

METALS CONFIRMATION SAMPLE GRIDS

VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

PROJECT:	069-001
DATE:	11/27/2013
DRAWN:	S.R.S.
CHECKED:	P.L.C.
FIGURE NO:	23

CRI CASEY RESOURCES, INC.
4890 Kipling Street • Wheat Ridge, Colorado 80033 • 303.940.7800 • www.caseyresourcesinc.com



CRI CASEY RESOURCES, INC.

LEGEND

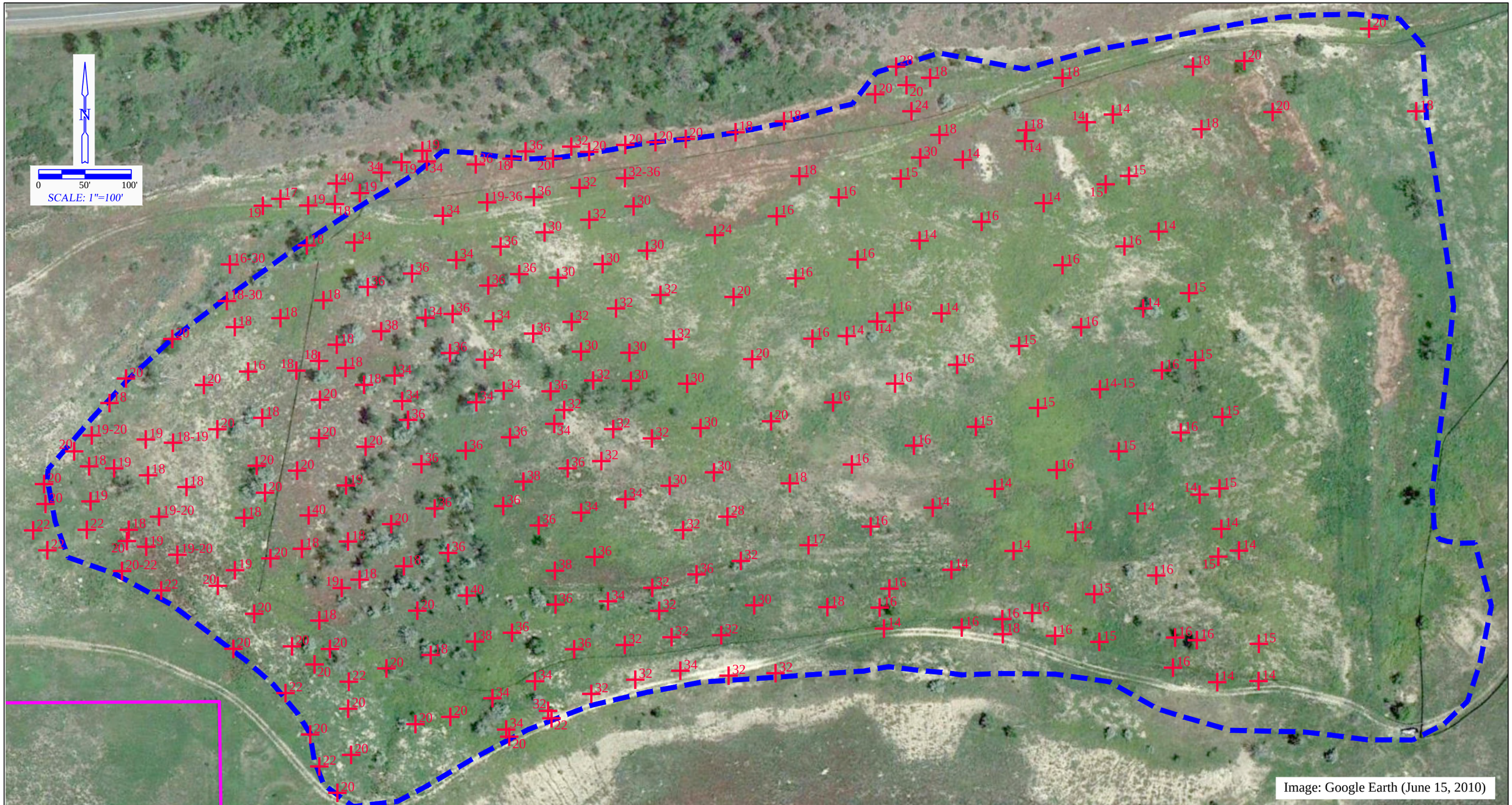
- Property Boundary
- ID — Confirmation Sampling Grids of Approximately 2,500 Square Feet Each
- Remediation Area

RAILROAD TRACK AREA

METALS CONFIRMATION SAMPLE GRIDS

VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

PROJECT:	069-001
DATE:	11/27/2013
DRAWN:	S.R.S.
CHECKED:	P.L.C.
FIGURE NO:	24



LEGEND

- Property Boundary
- Soil & Rock Cap Boundary
- 10 + Radiation Measurement From 3' Above Soil CAP (Micro-Roentgens Per Hour)

RADIATION SCREENING (PRIMARY TAILINGS PILE)

VALMONT BUTTE PROPERTY

3000 North 63rd Street
Boulder, Colorado

PROJECT:	069-001
DATE:	11/27/2013
DRAWN:	S.R.S.
CHECKED:	P.L.C
FIGURE NO:	25

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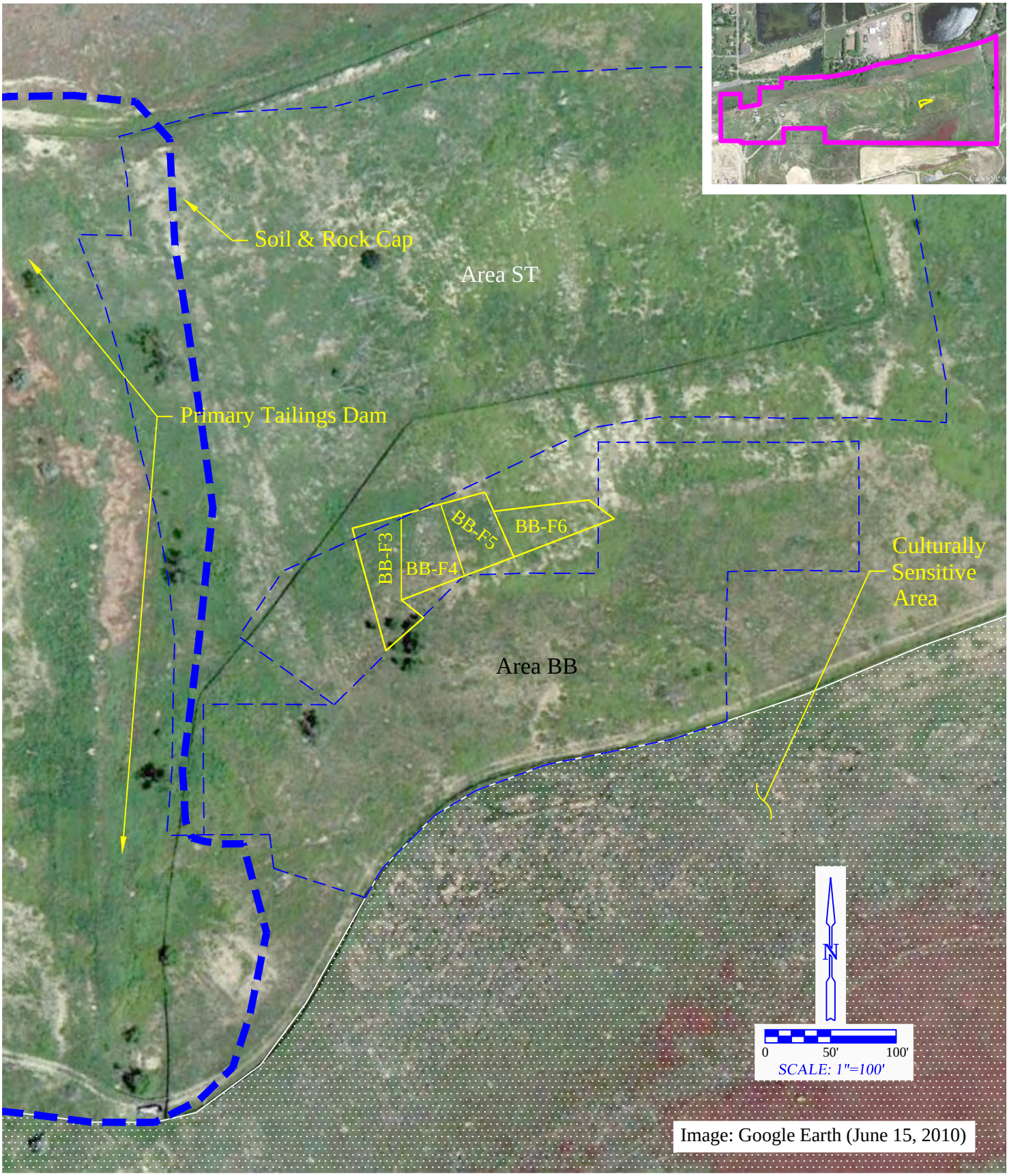


CRI CASEY RESOURCES, INC.

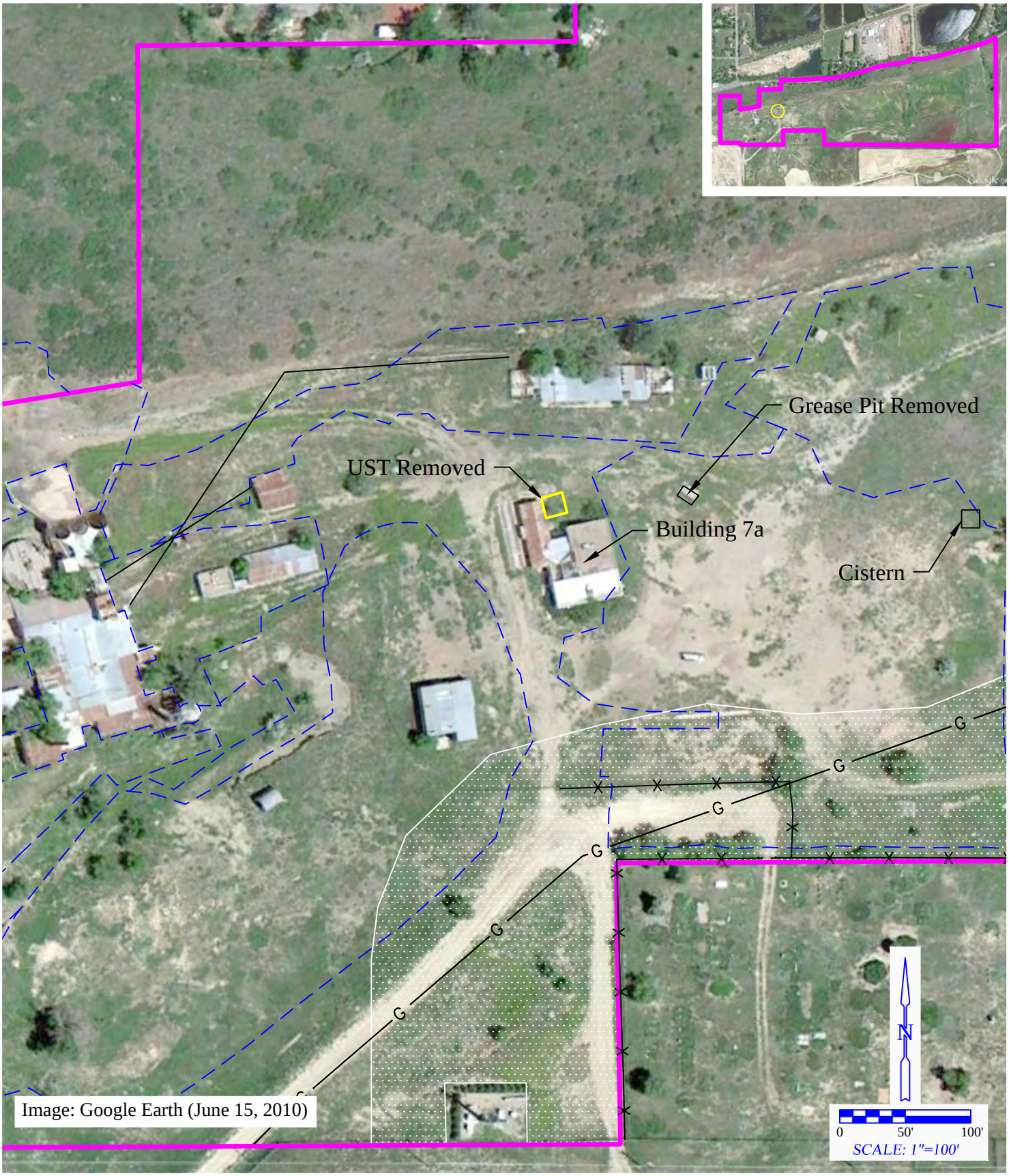
LEGEND

- Property Boundary
- ID — Confirmation Sampling Grids of Approximately 2,500 Square Feet Each
- Remediation Area

AREA BB EXPANDED METALS CONFIRMATION SAMPLE GRIDS

VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

PROJECT:	069-001
DATE:	11/27/2013
DRAWN:	S.R.S.
CHECKED:	P.L.C.
FIGURE NO:	26



CRI
CASEY RESOURCES, INC.

LEGEND

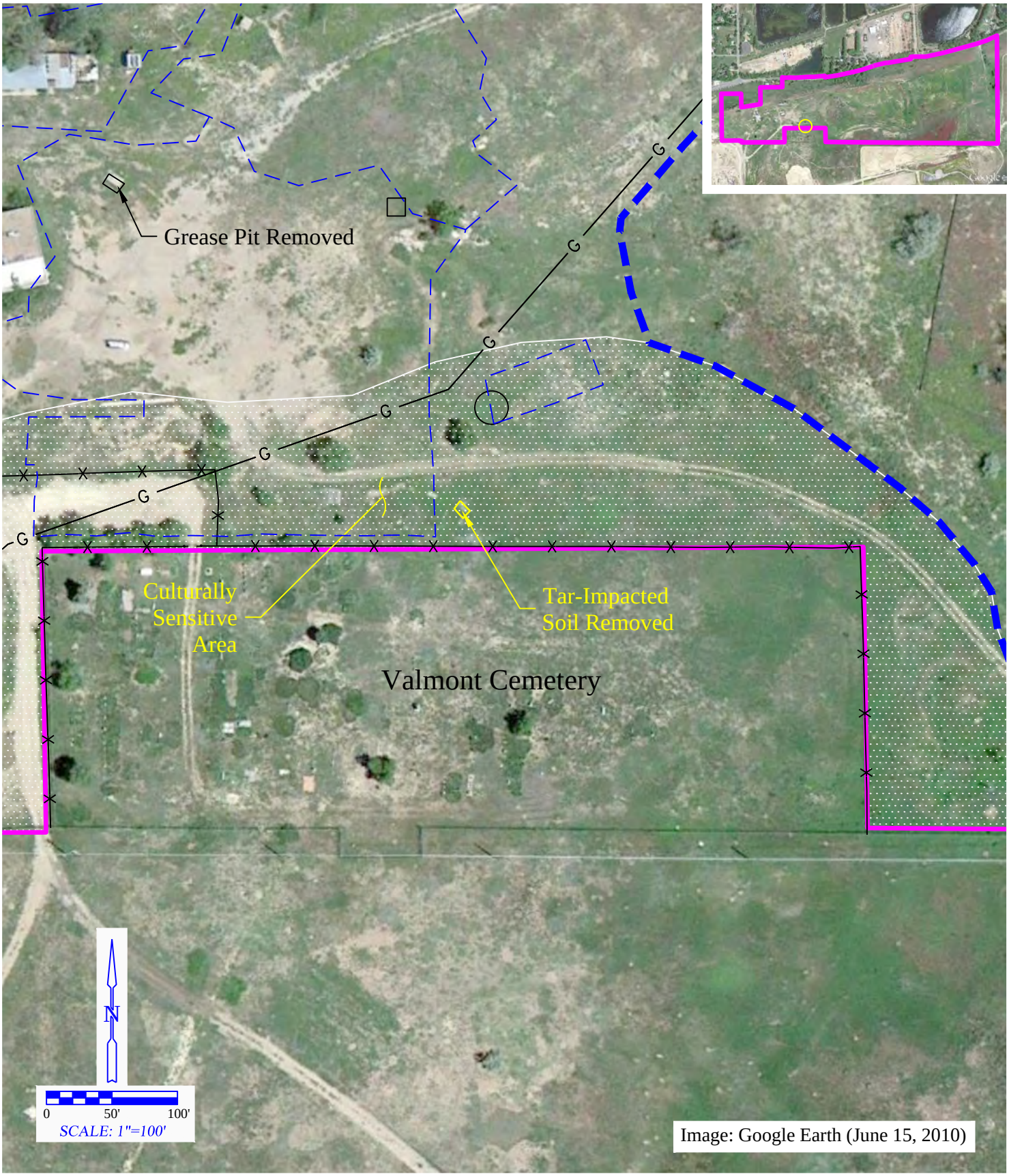
Property Boundary

Remediation Area

UNDERGROUND STORAGE TANK

VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

PROJECT:	069-001
DATE:	11/27/2013
DRAWN:	S.R.S.
CHECKED:	P.L.C.
FIGURE NO:	27



CRI CASEY RESOURCES, INC.

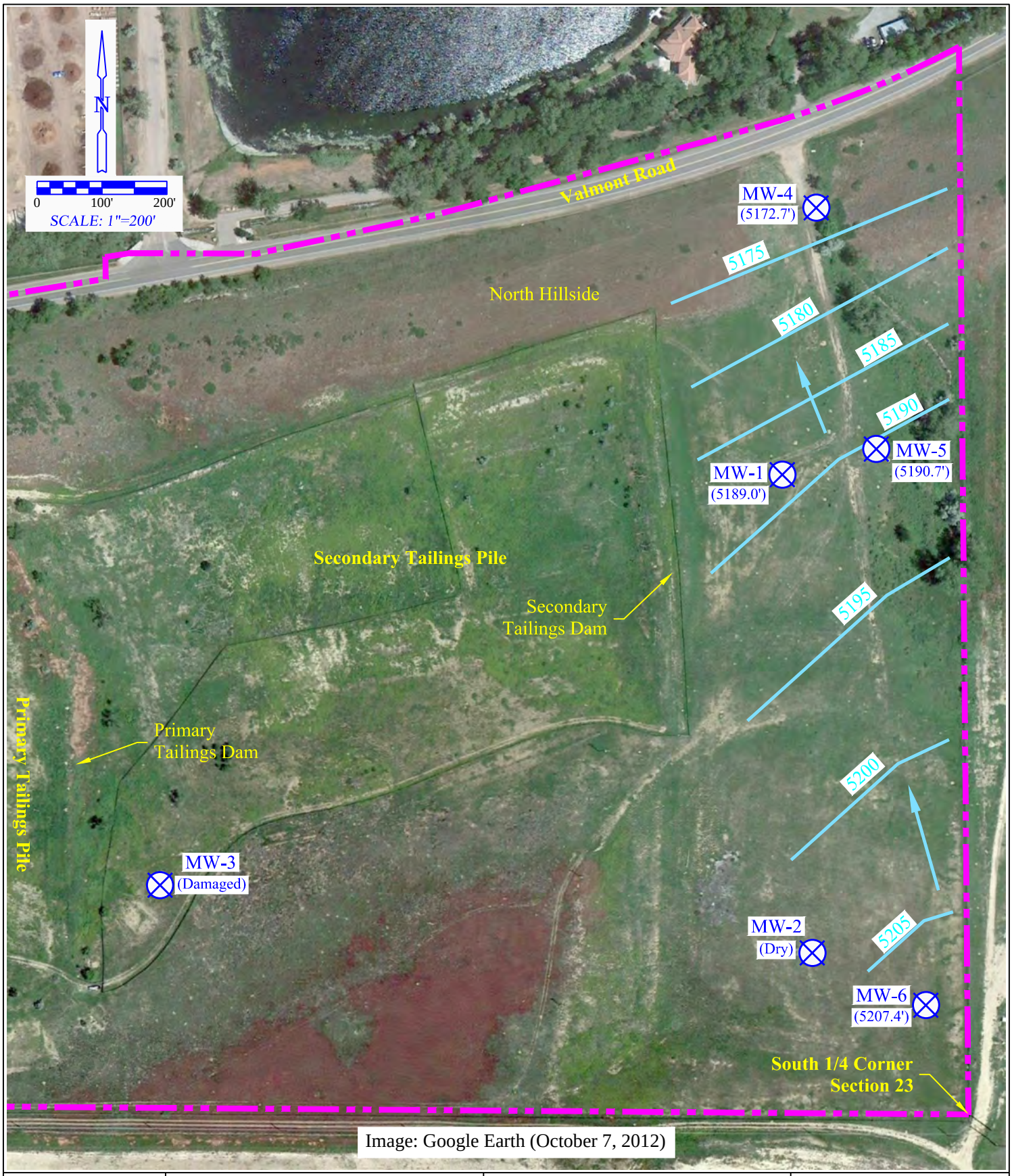
LEGEND

- Property Boundary
- Remediation Area
- Soil & Rock Cap Boundary

TAR CLEANUP AREA

VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

PROJECT:	069-001
DATE:	11/27/2013
DRAWN:	S.R.S.
CHECKED:	P.L.C.
FIGURE NO:	28



CASEY RESOURCES, INC.

LEGEND

- Property Line
- MW-1 (5172.7') Groundwater Monitoring Well (elevation)
- 5190 Groundwater Contour (w/ elevation)

GROUNDWATER ELEVATION MAP
(July 10, 2013)

VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

PROJECT:	069-001
DATE:	11/26/2013
DRAWN:	S.R.S.
CHECKED:	T.O.M.
FIGURE NO:	29

TABLES

TABLE 1

CONFIRMATION SAMPLE RESULTS
REMEDIATION AREA J
VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

Sample ID	Date Sampled	As	RL	Pb	RL	U	RL	Data Package
VB-J-A4	5-Jun-12	6.8	2.7	244.0	5.4	< 27.0	27**	D35120
VB-J-A5	5-Jun-12	6.6	2.7	173.0	5.4	< 5.4	5.4	D35120
VB-J-B4	5-Jun-12	6.9	2.7	164.0	5.3	< 27.0	27**	D35120
VB-J-B5	5-Jun-12	6.0	2.6	145.0	5.2	< 26.0	26**	D35120
VB-J-C4	5-Jun-12	5.6	2.6	150.0	5.2	< 5.2	5.2	D35120
VB-J-C5	5-Jun-12	7.0	2.6	265.0	5.1	< 26.0	26**	D35120
VB-J-D4	5-Jun-12	6.9	2.6	260.0	5.2	< 26.0	26**	D35120
VB-J-D5	5-Jun-12	8.2	2.6	387.0	5.2	< 26.0	26**	D35120
VB-J-E4	5-Jun-12	5.9	2.7	182.0	5.4	< 27.0	27**	D35120
VB-J-E5	5-Jun-12	5.5	2.6	118.0	5.2	< 5.2	5.2	D35120
VB-J-F4	5-Jun-12	8.4	2.7	441.0	5.4	< 27.0	27**	D35120
VB-J-F5	5-Jun-12	5.3	2.6	84.2	5.2	< 5.2	5.2	D35120
VB-J-G4	5-Jun-12	6.7	2.6	289.0	5.2	< 26.0	26**	D35120
VB-J-G5	5-Jun-12	4.8	2.5	106.0	5.1	< 5.1	5.1	D35120
VB-J-H4	5-Jun-12	5.6	2.6	227.0	5.3	< 26.0	26**	D35120
VB-J-H5	5-Jun-12	5.6	2.6	114.0	5.2	< 5.2	5.2	D35120
VB-J-H5FD*	5-Jun-12	4.3	2.5	84.3	5.1	< 25.0	25**	D35120
VB-J-I4	5-Jun-12	5.9	2.7	167.0	5.4	< 27.0	27**	D35120
VB-J-I5	5-Jun-12	7.9	2.7	557.0	5.4	< 27.0	27**	D35120
VB-J-J4	5-Jun-12	4.8	2.6	197.0	5.1	< 26.0	26**	D35120
VB-J-J5	5-Jun-12	5.9	2.5	248.0	5.1	< 25.0	25**	D35120
VB-J-K4	5-Jun-12	4.1	2.7	82.5	5.4	< 5.4	5.4	D35120
VB-J-K5	5-Jun-12	5.2	2.6	161.0	5.3	< 5.3	5.3	D35120
VB-J-L4	5-Jun-12	3.9	2.6	66.1	5.2	< 5.2	5.2	D35120
VB-J-L4FD*	5-Jun-12	3.9	2.6	71.3	5.1	< 5.1	5.1	D35120
VB-J-L5	5-Jun-12	3.9	2.6	95.4	5.2	< 26.0	26**	D35120
VB-J-M4	5-Jun-12	2.8	2.5	27.7	5.1	< 25.0	25**	D35120
VB-J-M5	5-Jun-12	4.5	2.7	136.0	5.3	< 27.0	27**	D35120
VB-J-N4	5-Jun-12	3.9	2.7	78.8	5.4	< 5.4	5.4	D35120
VB-J-N5	5-Jun-12	6.8	2.6	270.0	5.1	< 5.1	5.1	D35120
VB-J-O1	5-Jun-12	6.1	2.7	244.0	5.4	< 5.4	5.4	D35120
VB-J-O2	5-Jun-12	6.8	2.6	281.0	5.2	< 26.0	26**	D35120
VB-J-O3	5-Jun-12	7.6	2.7	241.0	5.4	< 27.0	27**	D35120
VB-J-O4	5-Jun-12	6.1	2.7	229.0	5.4	< 5.4	5.4	D35120
VB-J-O5	5-Jun-12	5.9	2.6	177.0	5.3	< 26.0	26**	D35120

All concentration values are in milligrams per kilogram (mg/kg)

RL - Laboratory Reporting Limit

As - Arsenic, Pb -Lead, U - Uranium

Lead action level - 800 mg/kg (CDPHE, 2007 soil evaluation value for commercial/recreational land use)
per Valmont Butte Property Material Management Plan

* Field Duplicate

**Elevated detection limit due to dilution required for possible matrix interference

TABLE 2

CONFIRMATION SAMPLE RESULTS
REMEDIATION AREA B-B
VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

Sample ID	Date Sampled	As	RL	Pb	RL	U	RL	Data Package
VB-BB-A2	9-May-12	4.5	2.7	9.3	5.4	< 5.4	5.4	D34425
VB-BB-B1	9-May-12	7.1	2.7	94.9	5.3	< 11.0	11**	D34425
VB-BB-B2	9-May-12	7.5	2.7	168.0	5.5	< 5.5	5.5	D34425
VB-BB-B3	9-May-12	5.9	2.6	118.0	5.1	< 5.1	5.1	D34425
VB-BB-B4	9-May-12	4.2	2.6	17.0	5.1	< 5.1	5.1	D34425
VB-BB-C1	9-May-12	6.7	2.7	62.1	5.3	< 5.3	5.3	D34425
VB-BB-C2	9-May-12	6.0	2.6	68.0	5.2	< 10.0	10**	D34425
VB-BB-C3	9-May-12	5.6	2.6	42.7	5.3	< 11.0	11**	D34425
VB-BB-C4	9-May-12	5.7	3.0	65.4	3.0	< 10.0	10**	D34425
VB-BB-C5	9-May-12	6.5	2.6	11.3	5.2	< 5.2	5.2	D34425
VB-BB-C6	9-May-12	5.2	2.7	60.0	5.4	< 5.4	5.4	D34425
VB-BB-D3	9-May-12	5.8	2.6	82.0	5.2	< 10.0	10**	D34425
VB-BB-D3F*	9-May-12	6.2	2.6	127.0	5.2	< 5.2	5.2	D34425
VB-BB-D4	9-May-12	3.3	2.7	18.8	5.4	< 5.4	5.4	D34425
VB-BB-D5	9-May-12	5.1	2.8	25.0	5.5	< 5.5	5.5	D34425
VB-BB-D6	9-May-12	5.7	2.7	13.6	5.4	< 5.4	5.4	D34425
VB-BB-D7	9-May-12	4.8	2.8	55.1	5.5	< 5.5	5.5	D34425
VB-BB-D8	9-May-12	6.0	2.6	84.7	5.2	< 5.2	5.2	D34425
VB-BB-D8F*	9-May-12	5.2	2.7	71.0	5.5	< 5.5	5.5	D34425
VB-BB-E5	9-May-12	4.9	2.7	41.3	5.5	< 5.5	5.5	D34425
VB-BB-E6	9-May-12	4.4	2.7	26.4	5.4	< 5.4	5.4	D34425
VB-BB-E7	9-May-12	5.9	2.8	64.4	5.5	< 28.0	28**	D34425
VB-BB-E8	9-May-12	7.0	2.6	186.0	5.1	< 26.0	26**	D34425
VB-BB-F3	14-Aug-12	6.5	2.7	75.3	5.3	< 5.3	5.3	D37486
VB-BB-F4	14-Aug-12	5.7	2.5	15.8	5.0	< 25.0	25**	D37486
VB-BB-F5	14-Aug-12	4.4	2.6	15.7	5.3	< 5.3	5.3	D37486
VB-BB-F6	14-Aug-12	6.1	2.7	80.8	5.4	< 5.4	5.4	D37486
VB-BB-F7	9-May-12	6.9	2.8	60.0	5.6	< 28.0	28**	D34425
VB-BB-F8	9-May-12	5.7	2.6	65.0	5.3	< 26.0	26**	D34425
VB-BB-F9	10-May-12	5.9	2.8	163.0	5.5	< 5.5	5.5	D34425
VB-BB-F10	10-May-12	5.3	2.8	74.8	5.6	< 28.0	28**	D34425
VB-BB-G7	10-May-12	4.7	2.9	29.3	5.8	< 29.0	29**	D34425
VB-BB-G8	10-May-12	5.2	2.8	18.7	5.6	< 28.0	28**	D34425
VB-BB-G9	10-May-12	6.0	2.8	19.3	5.7	< 28.0	28**	D34425
VB-BB-G10	10-May-12	6.3	2.9	151.0	5.8	< 29.0	29**	D34425

All concentration values are in milligrams per kilogram (mg/kg)
RL - Laboratory Reporting Limit
As - Arsenic, Pb -Lead, U - Uranium
Lead action level - 800 mg/kg (CDPHE, 2007 soil evaluation value for commercial/recreational land use)
per Valmont Butte Property Material Management Plan
* Field Duplicate
**Elevated detection limit due to dilution required for possible matrix interference

TABLE 3

CONFIRMATION SAMPLE RESULTS
REMEDIATION AREA ST
VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

Sample ID	Date Sampled	As	RL	Pb	RL	U	RL	Data Package
VB-ST-A1	23-May-12	5.3	2.7	19.5	5.4	< 5.4	5.4	D34780
VB-ST-B1	23-May-12	5.8	2.7	23.0	5.4	< 5.4	5.4	D34780
VB-ST-B2	23-May-12	5.6	2.8	35.2	5.6	< 5.6	5.6	D34780
VB-ST-B3	23-May-12	9.8	2.9	105.0	5.7	< 29.0	29.0	D34780
VB-ST-C2	23-May-12	7.7	2.7	28.9	5.4	< 5.4	5.4	D34780
VB-ST-D1	23-May-12	6.0	2.8	25.1	5.5	< 5.5	5.5	D34780
VB-ST-D2	23-May-12	5.7	2.7	14.1	5.4	< 5.4	5.4	D34780
VB-ST-D3	23-May-12	5.2	2.7	23.7	5.4	< 5.4	5.4	D34780
VB-ST-D4	23-May-12	3.7	2.7	47.6	5.5	< 5.5	5.5	D34780
VB-ST-E1	23-May-12	7.2	2.7	256.0	5.3	< 5.3	5.3	D34780
VB-ST-E1FD*	23-May-12	7.2	2.7	216.0	5.4	< 5.4	5.4	D34780
VB-ST-E2	23-May-12	6.1	2.7	114.0	5.5	< 5.5	5.5	D34780
VB-ST-E3	23-May-12	5.5	2.6	13.9	5.3	< 5.3	5.3	D34854
VB-ST-E4	23-May-12	5.2	2.6	31.8	5.2	< 5.2	5.2	D34854
VB-ST-E5	25-May-12	4.2	2.7	23.2	5.4	< 5.4	5.4	D34854
VB-ST-E6	25-May-12	5.3	2.9	13.1	5.7	< 5.7	5.7	D34854
VB-ST-F0	1-Jun-12	11.6	2.7	1050***	5.4	< 5.4	5.4	D35030
VB-ST-F1	25-May-12	8.6	2.8	628.0	5.6	< 5.6	5.6	D34853
VB-ST-F2	25-May-12	4.4	2.7	36.4	5.4	< 5.4	5.4	D34854
VB-ST-F3	25-May-12	4.3	2.7	28.3	5.4	< 5.4	5.4	D34854
VB-ST-F4	25-May-12	4.0	2.8	16.5	5.6	< 5.6	5.6	D34854
VB-ST-F5	25-May-12	4.5	2.8	25.5	5.6	< 5.6	5.6	D34854
VB-ST-F6	25-May-12	6.4	2.9	14.9	5.9	< 5.9	5.9	D34854
VB-ST-F7	25-May-12	4.3	2.8	51.5	5.7	< 5.7	5.7	D34854
VB-ST-F8	25-May-12	5.0	2.8	21.2	5.6	< 5.6	5.6	D34854
VB-ST-F9	25-May-12	4.9	2.8	53.5	5.6	< 5.6	5.6	D34854
VB-ST-F10	25-May-12	5.1	2.8	17.3	5.7	< 5.7	5.7	D34854
VB-ST-F11	25-May-12	4.9	2.8	14.0	5.7	< 5.7	5.7	D34854
VB-ST-F12	13-Jun-12	5.6	2.6	12.9	5.2	< 5.2	5.2	D35552
VB-ST-G1	25-May-12	8.3	2.7	596.0	5.4	< 5.4	5.4	D34853
VB-ST-G2	25-May-12	5.0	2.8	24.5	5.5	< 5.5	5.5	D34854
VB-ST-G3	25-May-12	4.6	2.7	46.9	5.3	< 5.3	5.3	D34854
VB-ST-G4	25-May-12	5.1	2.7	34.6	5.3	< 5.3	5.3	D34854
VB-ST-G5	25-May-12	4.2	2.8	18.7	5.7	< 5.7	5.7	D34854
VB-ST-G6	25-May-12	5.2	2.7	26.9	5.4	< 11.0	11**	D34854
VB-ST-G7	25-May-12	5.3	2.6	67.5	5.3	< 5.3	5.3	D34854
VB-ST-G8	25-May-12	5.4	2.8	33.3	5.6	< 5.6	5.6	D34854
VB-ST-G9	25-May-12	5.2	2.6	12.5	5.3	< 5.3	5.3	D34854
VB-ST-G10	25-May-12	4.2	2.7	11.0	5.4	< 5.4	5.4	D34854
VB-ST-G11	25-May-12	4.9	2.8	14.1	5.7	< 5.7	5.7	D34854
VB-ST-G12	13-Jun-12	6.3	2.6	125.0	5.2	< 5.2	5.2	D35552

TABLE 3 (CONTINUED)

CONFIRMATION SAMPLE RESULTS
REMEDIATION AREA ST
VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

Sample ID	Date Sampled	As	RL	Pb	RL	U	RL	Data Package
VB-ST-H1	1-Jun-12	5.4	2.6	113.0	5.3	< 5.3	5.3	D35030
VB-ST-H2	1-Jun-12	5.1	2.8	64.9	5.5	< 5.5	5.5	D35030
VB-ST-H3	1-Jun-12	5.2	2.7	38.7	5.4	< 5.4	5.4	D35030
VB-ST-H4	1-Jun-12	5.7	2.6	32.8	5.2	< 5.2	5.2	D35030
VB-ST-H5	1-Jun-12	4.7	2.8	22.3	5.5	< 5.5	5.5	D35030
VB-ST-H6	1-Jun-12	7.1	2.8	120.0	5.5	< 28.0	28**	D35030
VB-ST-H7	1-Jun-12	6.1	2.8	31.2	5.7	< 5.7	5.7	D35030
VB-ST-H8	1-Jun-12	6.4	2.8	14.9	5.7	< 28.0	28**	D35030
VB-ST-H9	1-Jun-12	6.0	2.8	56.0	5.5	< 5.5	5.5	D35030
VB-ST-H10	1-Jun-12	3.5	2.7	13.1	5.4	< 27.0	27**	D35030
VB-ST-H11	1-Jun-12	4.8	2.6	11.8	5.3	< 26.0	26**	D35030
VB-ST-H12	13-Jun-12	5.7	2.6	84.2	5.3	< 5.3	5.3	D35552
VB-ST-I1	14-Jun-12	5.2	2.6	12.1	5.2	< 5.2	5.2	D35552
VB-ST-I1FD*	14-Jun-12	5.1	2.7	21.0	5.4	< 5.4	5.4	D35552
VB-ST-I2	14-Jun-12	4.9	2.6	45.6	5.1	< 5.1	5.1	D35552
VB-ST-I3	5-Jun-12	4.6	2.7	18.5	5.4	< 5.4	5.4	D35121
VB-ST-I4	5-Jun-12	5.1	2.7	42.7	5.4	< 5.4	5.4	D35121
VB-ST-I5	5-Jun-12	4.7	2.6	10.5	5.2	< 5.2	5.2	D35121
VB-ST-I6	1-Jun-12	5.9	2.8	17.5	5.5	< 5.5	5.5	D35030
VB-ST-I7	1-Jun-12	6.1	2.7	16.2	5.5	< 5.5	5.5	D35030
VB-ST-I8	1-Jun-12	6.6	2.7	13.3	5.5	< 5.5	5.5	D35030
VB-ST-I9	1-Jun-12	6.8	2.8	30.5	5.5	< 5.5	5.5	D35030
VB-ST-I10	1-Jun-12	5.9	2.8	21.2	5.5	< 28.0	28**	D35030
VB-ST-I11	1-Jun-12	5.7	2.8	29.5	5.6	< 28.0	28**	D35030
VB-ST-I12	13-Jun-12	6.7	2.6	170.0	5.2	< 5.2	5.2	D35552
VB-ST-J1	13-Jun-12	4.6	2.6	135.0	5.3	< 5.3	5.3	D35552
VB-ST-J2	13-Jun-12	5.1	2.6	71.9	5.2	< 5.2	5.2	D35552
VB-ST-J3	13-Jun-12	6.4	2.6	127.0	5.1	< 5.1	5.1	D35552
VB-ST-J4	13-Jun-12	5.2	2.6	47.5	5.2	< 5.2	5.2	D35552
VB-ST-J5	13-Jun-12	4.7	2.5	67.2	5.1	< 5.1	5.1	D35552
VB-ST-J6	13-Jun-12	5.3	2.7	40.6	5.3	< 5.3	5.3	D35552
VB-ST-J7	13-Jun-12	5.8	2.6	31.0	5.2	< 5.2	5.2	D35552
VB-ST-J7FD*	13-Jun-12	5.0	2.6	38.9	5.2	< 5.2	5.2	D35552
VB-ST-J8	13-Jun-12	5.3	2.7	42.8	5.3	< 5.3	5.3	D35552
VB-ST-J9	13-Jun-12	5.2	2.5	23.0	5.0	< 5.0	5.0	D35552
VB-ST-J10	13-Jun-12	5.5	2.6	56.2	5.3	< 5.3	5.3	D35552
VB-ST-J11	13-Jun-12	7.0	2.7	128.0	5.3	< 5.3	5.3	D35552
VB-ST-J12	13-Jun-12	7.9	2.6	248.0	5.3	< 5.3	5.3	D35552
VB-ST-K4	13-Jun-12	5.3	2.6	58.2	5.1	< 5.1	5.1	D35552

TABLE 3 (CONTINUED)

CONFIRMATION SAMPLE RESULTS
REMEDIATION AREA ST
VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

Sample ID	Date Sampled	As	RL	Pb	RL	U	RL	Data Package
VB-ST-K6	13-Jun-12	5.1	2.6	47.8	5.2	< 5.2	5.2	D35552
VB-ST-K7	13-Jun-12	5.0	2.5	32.6	5.1	< 5.1	5.1	D35552
VB-ST-K8	13-Jun-12	4.9	2.6	49.5	5.2	< 5.2	5.2	D35552
VB-ST-K9	13-Jun-12	7.1	2.6	36.8	5.2	< 5.2	5.2	D35552
VB-ST-K10	13-Jun-12	6.4	2.5	109.0	5.0	< 5.0	5.0	D35552
VB-ST-K11	13-Jun-12	7.1	2.7	136.0	5.3	< 5.3	5.3	D35552
VB-ST-K11FD*	13-Jun-12	6.8	2.6	125.0	5.2	< 5.2	5.2	D35552

All concentration values are in milligrams per kilogram (mg/kg)
RL - Laboratory Reporting Limit
As - Arsenic, Pb -Lead, U - Uranium
Lead action level - 800 mg/kg (CDPHE, 2007 soil evaluation value for commercial/recreational land use)
per Valmont Butte Property Material Management Plan
* Field Duplicate
**Elevated detection limit due to dilution required for possible matrix interference
***Grid lead level was greater than the action level of 800 mg/kg but it was determined that the grid area will fall within the capped area and therefore was not recleaned and resampled

TABLE 4

RADIOLOGICAL BACKGROUND AND CONFIRMATION SAMPLE RESULTS
VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

Area	Sample No.	Date Collected	Gross Alpha		Gross Beta		Radium 226		Radium 228	
Background Samples	VB-BRR-LP1	7/8/2009	5.2	± 2.3	5.0	± 1.8	1.13	± 0.31	1.54	± 0.52
	VB-BRR-LP2	7/8/2009	6.9	± 2.4	6.9	± 2.1	1.38	± 0.30	2.49	± 0.60
	VB-BRR-LP3	7/8/2009	7.6	± 2.1	5.8	± 1.5	1.39	± 0.29	2.31	± 0.53
	Average						1.30		2.11	
	Clean Up Goal						6.30		7.11	
Secondary Tailings	VB-ST-RAD1	5/24/2012	9.5	± 3.0	12.6	± 3.1	2.12	± 0.43	1.73	± 0.54
	VB-ST-RAD2	5/24/2012	15.4	± 4.4	10.1	± 2.8	4.51	± 0.71	2.29	± 0.77
	VB-ST-RAD2-R1*	7/12/2012	19.8	± 5.2	10.7	± 2.7	7.09	± 0.96	2.72	± 0.65
	VB-ST-RAD3	5/24/2012	5.3	± 1.5	3.9	± 1.3	1.27	± 0.33	1.26	± 0.50
	VB-ST-RAD4	5/24/2012	6.5	± 2.5	7.4	± 2.3	2.57	± 0.50	2.45	± 0.66
	VB-ST-RAD5	5/24/2012	7.5	± 2.8	7.1	± 2.3	2.07	± 0.44	1.67	± 0.65
	VB-ST-RAD6	5/24/2012	4.2	± 1.5	7.8	± 2.3	1.05	± 0.32	1.10	± 0.48
	VB-ST-RAD7	5/24/2012	5.7	± 2.4	3.7	± 1.7	1.24	± 0.30	1.20	± 0.41
	VB-ST-RAD8	5/24/2012	5.7	± 2.1	8.1	± 2.3	2.06	± 0.45	2.40	± 0.62
Mill West	VB-MW-RAD	7/12/2012	6.4	± 2.5	5.5	± 1.9	1.47	± 0.36	1.19	± 0.46
Mill East	VB-ME-RAD	7/12/2012	6.9	± 2.8	3.0	± 1.6	1.56	± 0.34	1.15	± 0.47
Area G	VB-G-RAD	10/1/2012	10.7	± 2.8	10.2	± 2.5	2.32	± 0.45	2.13	± 0.63
Area F	VB-F-RAD	10/1/2012	8.5	± 2.8	8.1	± 2.7	2.35	± 0.40	2.09	± 0.55
Area D	VB-D-RAD	10/1/2012	5.9	± 2.5	5.5	± 2.3	1.56	± 0.37	1.31	± 0.54

All concentrations are in picocuries per gram (pCi/g).

Clean Up Goal for Radium 226 and Radium 228 is the background result plus 5 pCi/g. There is no Clean Up Goal for Gross Alpha or Gross Beta.

*Field Duplicate

TABLE 5

XRF RESULTS FOR 25 FOOT GRID SCREENING
IN AREA A-A (CEMETERY PARKING LOT AND CULTURAL AREA)
VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

Grid Number	Sample Number	Date	As	As +/-	Pb	Pb +/-	As Adjusted	Pb Adjusted
A1								
	C	24-Apr-12	<LOD	14	36	6	12	48
	SW	24-Apr-12	<LOD	26	242	11	23	281
	SE	24-Apr-12	<LOD	22	154	9	19	185
	NE	24-Apr-12	<LOD	13	43	6	11	57
	NW	24-Apr-12	<LOD	15	45	7	13	59
A2								
	C	24-Apr-12	<LOD	28	101	12	25	125
	SW	24-Apr-12	<LOD	26	199	11	23	235
	SE	24-Apr-12	<LOD	25	258	11	22	298
	NE	24-Apr-12	<LOD	13	31	5	11	42
	NW	24-Apr-12	<LOD	13	37	6	11	49
A3								
	C	24-Apr-12	<LOD	16	64	7	14	82
	SW	24-Apr-12	<LOD	12	41	5	11	54
	SE	24-Apr-12	<LOD	23	196	10	20	231
	NE	24-Apr-12	<LOD	16	67	7	14	86
	NW	24-Apr-12	<LOD	25	65	11	22	83
A4								
	C	24-Apr-12	<LOD	16	80	7	14	101
	SW	24-Apr-12	<LOD	14	56	6	12	73
	SE	24-Apr-12	<LOD	15	58	6	13	75
	NE	24-Apr-12	18	5	38	6	16	51
	NW	24-Apr-12	<LOD	14	41	6	12	54
A5								
	C	24-Apr-12	<LOD	17	35	7	15	47
	SW	24-Apr-12	<LOD	11	17	4	10	24
	SE	24-Apr-12	<LOD	23	179	10	20	213
	NE	24-Apr-12	<LOD	25	232	10	22	270
	NW	24-Apr-12	<LOD	17	35	7	15	47
A6								
	C	24-Apr-12	<LOD	24	261	10	21	301
	SW	24-Apr-12	<LOD	22	205	9	19	241
	SE	24-Apr-12	<LOD	22	111	9	19	137
	NE	24-Apr-12	<LOD	27	270	11	24	311
	NW	24-Apr-12	<LOD	23	234	10	20	272

TABLE 5 (Continued)

XRF RESULTS FOR 25 FOOT GRID SCREENING
IN AREA A-A (CEMETERY PARKING LOT AND CULTURAL AREA)
VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

Grid Number	Sample Number	Date	As	As +/-	Pb	Pb +/-	As Adjusted	Pb Adjusted
A7								
	C	24-Apr-12	<LOD	19	131	8	17	159
	SW	24-Apr-12	<LOD	24	210	10	21	247
	SE	24-Apr-12	<LOD	27	321	12	24	365
	NE	24-Apr-12	<LOD	19	131	8	17	159
	NW	24-Apr-12	<LOD	30	359	13	26	405
A8								
	C	24-Apr-12	<LOD	29	352	12	25	398
	SW	24-Apr-12	<LOD	15	66	6	13	84
	SE	24-Apr-12	<LOD	18	117	7	16	143
	NE	24-Apr-12	<LOD	22	176	9	19	209
	NW	24-Apr-12	<LOD	20	136	8	18	165
A9								
	C	24-Apr-12	<LOD	20	155	8	18	186
	SW	24-Apr-12	<LOD	22	188	9	19	223
	SE	24-Apr-12	<LOD	21	169	9	18	202
	NE	24-Apr-12	<LOD	21	174	9	18	207
	NW	24-Apr-12	<LOD	25	228	10	22	266
A10								
	C	24-Apr-12	<LOD	17	98	7	15	122
	SW	24-Apr-12	<LOD	20	146	8	18	176
	SE	24-Apr-12	<LOD	19	133	8	17	162
	NE	24-Apr-12	<LOD	22	178	9	19	212
	NW	24-Apr-12	<LOD	25	217	10	22	254
A11								
	C	24-Apr-12	<LOD	36	363	15	32	409
	SW	24-Apr-12	<LOD	16	77	7	14	97
	SE	24-Apr-12	<LOD	21	155	9	18	186
	NE	24-Apr-12	39	10	300	12	34	343
	NW	24-Apr-12	<LOD	24	194	10	21	229
A12								
	C	24-Apr-12	<LOD	24	209	10	21	245
	SW	24-Apr-12	<LOD	18	157	7	16	188
	SE	24-Apr-12	<LOD	21	158	9	18	189
	NE	24-Apr-12	<LOD	29	332	12	25	377
	NW	24-Apr-12	<LOD	22	192	9	19	227

TABLE 5 (Continued)

XRF RESULTS FOR 25 FOOT GRID SCREENING
IN AREA A-A (CEMETERY PARKING LOT AND CULTURAL AREA)
VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

Grid Number	Sample Number	Date	As	As +/-	Pb	Pb +/-	As Adjusted	Pb Adjusted
B1								
	C	23-Apr-12	<LOD	15	61	7	13	79
	SW	23-Apr-12	<LOD	14	46	6	12	60
	SE	23-Apr-12	<LOD	17	75	7	15	95
	NE	23-Apr-12	<LOD	23	185	10	20	219
	NW	23-Apr-12	<LOD	21	124	8	18	151
B2								
	C	23-Apr-12	<LOD	14	54	6	12	70
	SW	23-Apr-12	<LOD	16	61	7	14	79
	SE	23-Apr-12	<LOD	13	29	5	11	39
	NE	23-Apr-12	<LOD	21	153	9	18	184
	NW	23-Apr-12	<LOD	18	90	7	16	113
B3								
	C	23-Apr-12	<LOD	16	66	7	14	84
	SW	23-Apr-12	<LOD	15	62	6	13	80
	SE	23-Apr-12	<LOD	15	64	7	13	82
	NE	23-Apr-12	<LOD	24	170	10	21	203
	NW	23-Apr-12	<LOD	20	134	8	18	163
B4								
	C	23-Apr-12	<LOD	14	40	6	12	53
	SW	23-Apr-12	<LOD	13	28	6	11	38
	SE	23-Apr-12	<LOD	17	76	7	15	96
	NE	23-Apr-12	<LOD	16	66	7	14	84
	NW	23-Apr-12	<LOD	21	128	8	18	156
B5								
	C	24-Apr-12	<LOD	18	105	8	16	130
	SW	24-Apr-12	<LOD	18	96	7	16	119
	SE	24-Apr-12	<LOD	22	169	9	19	202
	NE	24-Apr-12	<LOD	23	201	10	20	237
	NW	24-Apr-12	<LOD	15	40	6	13	53
B6								
	C	24-Apr-12	<LOD	32	452	14	28	501
	SW	24-Apr-12	<LOD	26	273	11	23	314
	SE	24-Apr-12	<LOD	25	262	11	22	303
	NE	24-Apr-12	<LOD	34	463	14	30	512
	NW	24-Apr-12	<LOD	24	208	10	21	244

TABLE 5 (Continued)

XRF RESULTS FOR 25 FOOT GRID SCREENING
IN AREA A-A (CEMETERY PARKING LOT AND CULTURAL AREA)
VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

Grid Number	Sample Number	Date	As	As +/-	Pb	Pb +/-	As Adjusted	Pb Adjusted
B7								
	SW	24-Apr-12	34	10	336	13	30	381
	SE	24-Apr-12	<LOD	38	591	17	33	642
	NE	24-Apr-12	33	10	332	12	29	377
	NW	24-Apr-12	<LOD	37	284	16	33	326
B8								
	E	24-Apr-12	<LOD	34	455	14	30	504
	W	24-Apr-12	<LOD	36	501	15	32	551
B9								
	E	24-Apr-12	<LOD	27	290	11	24	332
	W	24-Apr-12	<LOD	30	427	13	26	475
B10								
	SW	24-Apr-12	<LOD	24	213	10	21	250
	SE	24-Apr-12	<LOD	26	266	11	23	307
	NE	24-Apr-12	<LOD	31	395	13	27	442
	NW	24-Apr-12	<LOD	23	196	9	20	231
B11								
	SW	24-Apr-12	<LOD	27	290	11	24	332
	SE	24-Apr-12	<LOD	28	249	11	25	289
	NE	24-Apr-12	<LOD	52	1127	24	46	1167
	NW	24-Apr-12	<LOD	25	217	10	22	254
B12								
	C	24-Apr-12	<LOD	28	277	12	25	319
	SW	24-Apr-12	<LOD	24	230	10	21	268
	SE	24-Apr-12	<LOD	24	235	10	21	274
	NE	24-Apr-12	<LOD	25	265	11	22	306
	NW	24-Apr-12	64	19	1420	28	56	1445

mg/kg - milligrams per kilogram
<LOD - Less than the "Level of Detection" As +/- and Pb +/- represent the detection limits associated with the XRF results
As - Arsenic, Pb - Lead
Note: Where the arsenic concentration was less than LOD, the LOD was used to obtain the adjusted value

* Lead concentrations by XRF analysis adjusted to presumed laboratory values via regression analysis formula
** Arsenic concentrations by XRF analysis adjusted to presumed laboratory values via regression analysis formula

TABLE 6

CONFIRMATION SAMPLE RESULTS
REMEDIATION AREA A-A
VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

Sample ID	Date Sampled	As	RL	Pb	RL	U	RL	Data Package
VB-AA-A2	3-Oct-12	2.9	2.6	16.3	5.3	< 5.3	5.3	D39471
VB-AA-A3	3-Oct-12	<2.7	2.7	65.6	5.4	< 5.4	5.4	D39471
VB-AA-A4	3-Oct-12	5.0	2.8	49.4	5.5	< 5.5	5.5	D39471
VB-AA-A5	3-Oct-12	6.4	2.7	61.3	5.5	< 27.0	27**	D39471
VB-AA-A6	3-Oct-12	8.0	2.7	101.0	5.4	< 5.4	5.4	D39471
VB-AA-A7	3-Oct-12	4.7	2.7	19.4	5.4	< 27.0	27**	D39471
VB-AA-B2	3-Oct-12	6.1	2.7	173.0	5.4	< 5.4	5.4	D39471
VB-AA-B2FD*	3-Oct-12	5.2	2.6	106.0	5.3	< 5.3	5.3	D39471
VB-AA-B4	3-Oct-12	4.0	2.6	88.7	5.2	< 5.2	5.2	D39471
VB-AA-B5	3-Oct-12	<2.6	2.6	23.0	5.3	< 110	110**	D39471
VB-AA-B6	3-Oct-12	10.9	2.7	178.0	5.3	< 5.3	5.3	D39471
VB-AA-B7	3-Oct-12	9.8	2.7	2100.0	5.4	< 5.4	5.4	D39471
VB-AA-B7R	11-Oct-12	6.8	2.7	106.0	5.5	< 5.5	5.5	D39761
VB-AA-C1	3-Oct-12	12.7	2.7	229.0	5.4	< 5.4	5.4	D39471
VB-AA-C2	3-Oct-12	6.5	2.6	146.0	5.3	< 26.0	26**	D39471
VB-AA-C3	3-Oct-12	8.9	2.7	432.0	5.4	< 5.4	5.4	D39471
VB-AA-C4	3-Oct-12	5.2	2.6	202.0	5.2	< 5.2	5.2	D39471
VB-AA-C5	3-Oct-12	6.3	2.8	94.6	5.5	< 5.5	5.5	D39471
VB-AA-C6	3-Oct-12	4.7	2.5	374.0	5.1	< 5.1	5.1	D39471
VB-AA-C7	3-Oct-12	6.6	2.6	111.0	5.2	< 26.0	26**	D39471
VB-AA-D2	3-Oct-12	11.3	2.5	229.0	5.1	< 25.0	25**	D39471
VB-AA-D3	3-Oct-12	5.4	2.7	73.4	5.3	< 5.3	5.3	D39471
VB-AA-D4	3-Oct-12	3.6	2.6	29.8	5.3	< 5.3	5.3	D39471
VB-AA-D5	3-Oct-12	4.1	2.7	43.4	5.4	< 5.4	5.4	D39471
VB-AA-D6	3-Oct-12	12.6	2.7	257.0	5.4	< 27.0	27**	D39471
VB-AA-D7	3-Oct-12	9.0	2.7	249.0	5.4	< 5.4	5.4	D39471
VB-AA-E2	3-Oct-12	7.6	2.7	163.0	5.4	< 5.4	5.4	D39471
VB-AA-E2FD*	3-Oct-12	6.9	2.6	114.0	5.2	< 26.0	26**	D39471
VB-AA-E3	3-Oct-12	11.6	2.6	586.0	5.2	< 26.0	26**	D39471
VB-AA-E4	3-Oct-12	9.2	2.7	315.0	5.4	< 27.0	27**	D39471
VB-AA-E5	3-Oct-12	4.9	2.6	97.2	5.2	< 5.2	5.2	D39471
VB-AA-E7	3-Oct-12	8.2	2.8	191.0	5.6	< 5.6	5.6	D39471
VB-AA-F2	3-Oct-12	11.2	2.7	370.0	5.4	< 5.4	5.4	D39471

All concentration values are in milligrams per kilogram (mg/kg)

RL - Laboratory Reporting Limit

As - Arsenic, Pb -Lead, U - Uranium

Lead action level - 800 mg/kg (CDPHE, 2007 soil evaluation value for commercial/recreational land use)
per Valmont Butte Property Material Management Plan

* Field Duplicate

**Elevated detection limit due to dilution required for possible matrix interference

TABLE 7

CONFIRMATION SAMPLE RESULTS
REMEDIATION AREA B
VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

Sample ID	Date Sampled	As	RL	Pb	RL	U	RL	Data Package
VB-B-A1	17-Jul-09	16.7	2.7	162.0	5.4	< 11.0	11**	D34671
VB-B-A2	17-Jul-09	11.0	2.7	567.0	5.5	< 55.0	55**	D34671

All concentration values are in milligrams per kilogram (mg/kg)
RL - Laboratory Reporting Limit
As - Arsenic, Pb -Lead, U - Uranium
Lead action level - 800 mg/kg (CDPHE, 2007 soil evaluation value for commercial/recreational land use)
per Valmont Butte Property Material Management Plan
**Elevated detection limit due to dilution required for possible matrix interference

TABLE 8

CONFIRMATION SAMPLE RESULTS
REMEDIATION AREA C
VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

Sample ID	Date Sampled	As	RL	Pb	RL	U	RL	Data Package
VB-C-A3	1-Aug-12	5.6	2.6	180.0	5.2	< 26.0	26**	D37057
VB-C-A4	1-Aug-12	5.6	2.6	544.0	5.2	< 26.0	26**	D37057
VB-C-A5	1-Aug-12	4.6	2.5	152.0	5.1	< 25.0	25**	D37057
VB-C-A6	1-Aug-12	7.2	2.5	83.6	5.1	< 25.0	25**	D37057
VB-C-A7	1-Aug-12	4.6	2.6	134.0	5.2	< 25.0	25**	D37057
VB-C-A8	1-Aug-12	7.4	2.6	538.0	5.2	< 26.0	26**	D37057
VB-C-A8FD*	1-Aug-12	8.0	2.6	694.0	5.2	< 26.0	26**	D37057
VB-C-A9	1-Aug-12	5.1	2.7	72.2	5.4	< 27.0	27**	D37057
VB-C-A10	1-Aug-12	5.9	2.7	23.4	5.4	< 27.0	27**	D37057
VB-C-A11	1-Aug-12	9.4	2.5	111.0	5.0	< 25.0	25**	D37057
VB-C-B1	1-Aug-12	6.4	2.6	285.0	5.3	< 26.0	26**	D37057
VB-C-B2	1-Aug-12	9.5	2.6	638.0	5.1	< 26.0	26**	D37057
VB-C-B3	1-Aug-12	3.6	2.6	384.0	5.3	< 26.0	26**	D37057
VB-C-B4	1-Aug-12	6.3	2.5	684.0	4.9	< 4.9	4.9	D37057
VB-C-B5	1-Aug-12	6.8	2.5	582.0	4.9	< 25.0	25**	D37057
VB-C-B6	1-Aug-12	7.0	2.6	365.0	5.3	< 26.0	26**	D37057
VB-C-B7	1-Aug-12	7.6	2.6	302.0	5.1	< 26.0	26**	D37057
VB-C-B8	1-Aug-12	6.8	2.7	140.0	5.3	< 27.0	27**	D37057
VB-C-B9	1-Aug-12	5.7	2.7	101.0	5.4	< 27.0	27**	D37057
VB-C-B9FD*	1-Aug-12	6.0	2.7	91.8	5.4	< 27.0	27**	D37057
VB-C-B10	1-Aug-12	7.0	2.5	630.0	5.1	< 5.1	5.1	D37057
VB-C-B11	1-Aug-12	5.4	2.7	74.0	5.3	< 27.0	27**	D37057
VB-C-C3	1-Aug-12	6.0	2.6	328.0	5.1	< 26.0	26**	D37057
VB-C-C4	1-Aug-12	14.2	2.7	670.0	5.3	< 27.0	27**	D37057
VB-C-C5	1-Aug-12	5.7	2.7	126.0	5.3	< 5.3	5.3	D37057
VB-C-C6	1-Aug-12	5.9	2.6	42.2	5.3	< 26.0	26**	D37057
VB-C-C7	1-Aug-12	8.3	2.6	264.0	5.3	< 26.0	26**	D37057
VB-C-C8	1-Aug-12	7.3	2.7	95.7	5.4	< 27.0	27**	D37057
VB-C-C9	1-Aug-12	8.0	2.5	274.0	5.1	< 25.0	25**	D37057
VB-C-C10	1-Aug-12	4.7	2.5	77.7	5.1	< 25.0	25**	D37057
VB-C-C11	1-Aug-12	5.8	2.6	64.5	5.1	< 26.0	26**	D37057
VB-C-C12	1-Aug-12	7.7	2.6	156.0	5.1	< 26.0	26**	D37057
VB-C-D3	1-Aug-12	9.0	2.5	504.0	5.1	< 25.0	25**	D37057
VB-C-D4	1-Aug-12	17.5	2.6	786.0	5.2	< 26.0	26**	D37057
VB-C-D5	1-Aug-12	15.0	2.5	470.0	5.0	< 25.0	25**	D37057

TABLE 8 (Continued)

CONFIRMATION SAMPLE RESULTS
REMEDIATION AREA C
VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

Sample ID	Date Sampled	As	RL	Pb	RL	U	RL	Data Package
VB-C-D6	1-Aug-12	6.3	2.6	190.0	5.2	< 26.0	26**	D37057
VB-C-D8	1-Aug-12	8.1	2.5	64.1	5.1	< 25.0	25**	D37057
VB-C-D10	1-Aug-12	5.0	2.5	52.1	5.0	< 25.0	25**	D37057
VB-C-D11	1-Aug-12	4.1	2.7	35.6	5.5	< 27.0	27**	D37057
VB-C-E10	1-Aug-12	25.0	2.5	392.0	5.1	< 25.0	25**	D37057
VB-C-E11	1-Aug-12	13.9	2.6	449.0	5.2	< 26.0	26**	D37057

All concentration values are in milligrams per kilogram (mg/kg)
RL - Laboratory Reporting Limit
As - Arsenic, Pb -Lead, U - Uranium
Lead action level - 800 mg/kg (CDPHE, 2007 soil evaluation value for commercial/recreational land use)
per Valmont Butte Property Material Management Plan
* Field Duplicate
**Elevated detection limit due to dilution required for possible matrix interference

TABLE 9

CONFIRMATION SAMPLE RESULTS
REMEDIATION AREA E
VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

Sample ID	Date Sampled	As	RL	Pb	RL	U	RL	Data Package
VB-E-A1	22-Jun-12	8.4	2.5	195.0	5.1	< 25.0	25**	D35773
VB-E-A2	22-Jun-12	8.4	2.4	360.0	4.9	< 24.0	24**	D35773
VB-E-A3	22-Jun-12	8.9	2.7	444.0	5.4	< 27.0	27**	D35773
VB-E-A4	22-Jun-12	7.5	2.6	162.0	5.2	< 26.0	26**	D35773

All concentration values are in milligrams per kilogram (mg/kg)
RL - Laboratory Reporting Limit
As - Arsenic, Pb -Lead, U - Uranium
Lead action level - 800 mg/kg (CDPHE, 2007 soil evaluation value for commercial/recreational land use)
per Valmont Butte Property Material Management Plan
**Elevated detection limit due to dilution required for possible matrix interference

TABLE 10

CONFIRMATION SAMPLE RESULTS
REMEDIATION AREA MS
VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

Sample ID	Date Sampled	As	RL	Pb	RL	U	RL	Data Package
VB-MS-A1	3-Jul-12	7.5	2.6	409.0	5.1	< 26.0	26*	D36190
VB-MS-B1	6-Jul-12	5.0	2.6	70.3	5.2	< 26.0	26*	D36190
VB-MS-B2	3-Jul-12	5.7	2.5	185.0	4.9	< 25.0	25*	D36190
VB-MS-B3	3-Jul-12	11.0	2.5	868.0	5.0	< 25.0	25*	D36190
VB-MS-B3-R1**	25-Jul-12	6.3	2.8	52.9	5.6	< 28.0	28*	D36762
VB-MS-B4	6-Jul-12	8.4	2.6	133.0	5.2	< 26.0	26*	D36190

All concentration values are in milligrams per kilogram (mg/kg)
RL - Laboratory Reporting Limit
As - Arsenic, Pb -Lead, U - Uranium
Lead action level - 800 mg/kg (CDPHE, 2007 soil evaluation value for commercial/recreational land use)
per Valmont Butte Property Material Management Plan
*Elevated detection limit due to dilution required for possible matrix interference
**Re-sample following removal of and additional 6 inches of soil in this grid

TABLE 11

CONFIRMATION SAMPLE RESULTS
REMEDIATION AREA MW
VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

Sample ID	Date Sampled	As	RL	Pb	RL	U	RL	Data Package
VB-MW-A1	11-Jul-12	6.2	2.9	37.2	5.7	< 29.0	29*	D36327
VB-MW-A2	11-Jul-12	7.8	2.7	152.0	5.4	< 27.0	27*	D36327
VB-MW-A3	11-Jul-12	6.5	2.8	27.4	5.5	< 28.0	28*	D36327
VB-MW-B2	11-Jul-12	6.6	2.6	72.7	5.1	< 26.0	26*	D36327

All concentration values are in milligrams per kilogram (mg/kg)
RL - Laboratory Reporting Limit
As - Arsenic, Pb -Lead, U - Uranium
Lead action level - 800 mg/kg (CDPHE, 2007 soil evaluation value for commercial/recreational land use)
per Valmont Butte Property Material Management Plan
*Elevated detection limit due to dilution required for possible matrix interference

TABLE 12

CONFIRMATION SAMPLE RESULTS
REMEDIATION AREA ME/A
VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

Sample ID	Date Sampled	As	RL	Pb	RL	U	RL	Data Package
VB-ME/A-A1	6-Jul-12	8.5	2.6	169.0	5.2	< 26.0	26*	D36190
VB-ME/A-B1	6-Jul-12	13.3	2.7	83.1	5.5	< 5.5	5.5	D36190
VB-ME/A-B2	3-Jul-12	13.6	2.5	59.5	5.0	< 5.0	5.0	D36190
VB-ME/A-B3	3-Jul-12	20.0	2.4	134.0	4.9	< 24.0	24*	D36190
VB-ME/A-C1	6-Jul-12	118.0	2.5	92.1	5.1	< 25.0	25*	D36190
VB-ME/A-C2	14-Aug-12	14.6	2.6	89.4	5.3	< 5.3	5.3	D37486
VB-ME/A-C3	14-Aug-12	15.0	2.8	52.6	5.5	< 28.0	28*	D37486

All concentration values are in milligrams per kilogram (mg/kg)
RL - Laboratory Reporting Limit
As - Arsenic, Pb -Lead, U - Uranium
Lead action level - 800 mg/kg (CDPHE, 2007 soil evaluation value for commercial/recreational land use)
per Valmont Butte Property Material Management Plan
*Elevated detection limit due to dilution required for possible matrix interference

TABLE 13

CONFIRMATION SAMPLE RESULTS
REMEDIATION AREA D
VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

Sample ID	Date Sampled	As	RL	Pb	RL	U	RL	Data Package
VB-D-A1	25-Jul-12	9.3	2.7	152.0	5.3	< 27.0	27*	D36762
VB-D-A2	25-Jul-12	6.9	2.5	60.7	5.0	< 25.0	25*	D36762
VB-D-B1	25-Jul-12	5.0	2.6	328.0	5.2	< 16.9	5.2	D36762
VB-D-B1A	23-Aug-12	3.4	2.6	254.0	5.2	< 26.0	26*	D37931
VB-D-B2	25-Jul-12	4.3	2.6	320.0	5.3	< 26.0	26*	D36762

All concentration values are in milligrams per kilogram (mg/kg)
RL - Laboratory Reporting Limit
As - Arsenic, Pb -Lead, U - Uranium
Lead action level - 800 mg/kg (CDPHE, 2007 soil evaluation value for commercial/recreational land use)
per Valmont Butte Property Material Management Plan
*Elevated detection limit due to dilution required for possible matrix interference

TABLE 14

CONFIRMATION SAMPLE RESULTS
REMEDIATION AREA F
VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

Sample ID	Date Sampled	As	RL	Pb	RL	U	RL	Data Package
VB-F-A1	21-Sep-12	11.3	2.7	78.4	5.4	< 5.4	5.4	D39024
VB-F-A2	21-Sep-12	6.7	2.8	142.0	5.5	< 5.5	5.5	D39024
VB-F-A3	21-Sep-12	7.8	2.7	76.5	5.4	< 5.4	5.4	D39024
VB-F-A4	21-Sep-12	6.4	2.7	99.8	5.5	< 5.5	5.5	D39024
VB-F-A5	21-Sep-12	7.1	2.8	122.0	5.5	< 5.5	5.5	D39024
VB-F-A6	21-Sep-12	4.7	2.7	24.1	5.3	< 5.3	5.3	D39024
VB-F-A7	2-Aug-12	6.1	2.7	62.7	5.3	< 27.0	27**	D37057
VB-F-A8	2-Aug-12	7.0	2.7	115.0	5.3	< 27.0	27**	D37057
VB-F-A9	2-Aug-12	9.3	2.6	341.0	5.2	< 5.2	5.2	D37057
VB-F-B7	2-Aug-12	6.9	2.6	63.3	5.1	< 5.1	5.1	D37057
VB-F-B7FD*	2-Aug-12	5.5	2.6	61.2	5.3	< 5.3	5.3	D37057
VB-F-B8	2-Aug-12	7.2	2.5	116.0	5.1	< 25.0	25**	D37057
VB-F-B9	2-Aug-12	6.2	2.5	77.5	5.1	< 5.1	5.1	D37057
VB-F-B9FD*	2-Aug-12	6.0	2.7	91.8	5.4	< 27.0	27**	D37057
VB-F-B10	2-Aug-12	5.8	2.8	43.6	5.6	< 5.6	5.6	D37057

All concentration values are in milligrams per kilogram (mg/kg)
RL - Laboratory Reporting Limit
As - Arsenic, Pb -Lead, U - Uranium
Lead action level - 800 mg/kg (CDPHE, 2007 soil evaluation value for commercial/recreational land use)
per Valmont Butte Property Material Management Plan
* Field Duplicate
**Elevated detection limit due to dilution required for possible matrix interference

TABLE 15

CONFIRMATION SAMPLE RESULTS
REMEDIATION AREA G
VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

Sample ID	Date Sampled	As	RL	Pb	RL	U	RL	Data Package
VB-G-A1	18-Sep-12	6.6	2.7	24.7	5.5	8.1	5.5	D38867
VB-G-A2	18-Sep-12	4.0	2.8	39.4	5.5	7.1	5.5	D38867
VB-G-B1	27-Sep-12	5.9	2.6	85.4	5.3	< 5.3	5.3	D39394
VB-G-B2	27-Sep-12	5.7	2.9	85.4	5.8	< 5.8	5.8	D39394
VB-G-B3	27-Sep-12	5.5	2.8	38.5	5.7	< 5.7	5.7	D39394
VB-G-B4	27-Sep-12	4.8	2.9	97.2	5.8	< 5.8	5.8	D39394
VB-G-B5	27-Sep-12	3.8	2.9	23.3	5.8	< 5.8	5.8	D39394
VB-G-C1	27-Sep-12	7.5	2.7	188.0	5.4	< 5.4	5.4	D39394
VB-G-C2	27-Sep-12	6.1	2.8	165.0	5.6	< 5.6	5.6	D39394
VB-G-C3	27-Sep-12	5.8	2.8	432.0	5.6	< 5.6	5.6	D39394
VB-G-C4	27-Sep-12	4.9	2.8	21.8	5.6	6.4	5.6	D39394
VB-G-C5	27-Sep-12	5.2	2.8	89.8	5.5	< 5.5	5.5	D39394
VB-G-D1	27-Sep-12	11.2	2.9	270.0	5.8	< 29.0	29.0	D39394
VB-G-D2	27-Sep-12	6.3	2.6	79.8	5.2	< 26.0	26.0	D39394

All concentration values are in milligrams per kilogram (mg/kg)
RL - Laboratory Reporting Limit
As - Arsenic, Pb -Lead, U - Uranium
Lead action level - 800 mg/kg (CDPHE, 2007 soil evaluation value for commercial/recreational land use)
per Valmont Butte Property Material Management Plan

TABLE 16

CONFIRMATION SAMPLE RESULTS
RAILROAD TRACK REMEDIATION AREA
VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

Sample ID	Date Sampled	As	RL	Pb	RL	U	RL	Data Package
VB-RR-T-1	3-Oct-12	6.8	2.8	290.0	5.5	< 28.0	28**	D39470
VB-RR-T-2	3-Oct-12	4.0	2.8	54.7	5.7	< 5.7	5.7	D39470
VB-RR-T-3	3-Oct-12	5.6	2.7	82.2	5.4	< 5.4	5.4	D39470
VB-RR-T-4	3-Oct-12	6.6	2.9	180.0	5.8	< 29.0	29**	D39470
VB-RR-T-5	3-Oct-12	6.7	2.8	162.0	5.7	< 28.0	28**	D39470
VB-RR-T-1FD*	3-Oct-12	7.0	2.8	288.0	5.5	< 5.5	5.5	D39470

All concentration values are in milligrams per kilogram
RL - Laboratory Reporting Limit
As - Arsenic, Pb -Lead, U - Uranium
Lead action level - 800 mg/kg (CDPHE, 2007 soil evaluation value for commercial/recreational land use)
per Valmont Butte Property Material Management Plan
* Field Duplicate
**Elevated detection limit due to dilution required for possible matrix interference

TABLE 17

IMPORT SOIL SUMMARY
VALMONT BUTTE PROPERTY
3000 North 63rd Street
Boulder, Colorado

Sample Date	Laboratory Job Identification Number	Sample Identification Number	Import Soil Source Location	Address	Location	Comments
3/7/2012	280-26453-1	Imported Dirt	Arapahoe Road	6977 Arapahoe Rd	North Side	VOCs - ND, SVOCs - ND, Metals - Below CSEVs, TPH - Below SNC
3/27/2012	280-27053-1	Import Material	Arapahoe Road	6850 Arapahoe Rd	South Side	VOCs - Below CSEVs, SVOCs - ND, Metals - Below CSEVs, TPH - Below SNC
4/9/2012	280-27492-1	CEI 17-24	Arapahoe Road	6925 Arapahoe Rd	South Side	VOCs - Below CSEVs, SVOCs - ND, Metals - Below CSEVs, TPH - ND
4/25/2012	280-28184-1	Pearl St #1	3100 Pearl St	3100 Pearl St	Far West Side	VOCs - ND, SVOCs - ND, Metals - Below CSEVs, TPH - ND
4/26/2012	280-28184-1	CEI#25	Arapahoe Road	6925 Arapahoe Rd	South Side	VOCs - Below CSEVs, SVOCs - ND, Metals - Below CSEVs, TPH - ND
5/25/2012	280-29372-1 *	Stockpile	Valmont Site		Import Stockpile	VOCs - ND, SVOCs - Above CSEVs, Metals - Below CSEVs, TPH - Below SNC
6/6/2012	280-29697-1	CEI#26	Arapahoe Road	6855 Arapahoe Rd	North Side	VOCs - ND, SVOCs - ND, Metals - Below CSEVs, TPH - Below SNC
6/7/2012	280-29782-1	CEI#27	Arapahoe Road	6901 Arapahoe Rd	North Side	VOCs - ND, SVOCs - ND, Metals - Below CSEVs, TPH - Below SNC
7/2/2012	280-30731-1	CEI#29	Arapahoe Road	6674 Arapahoe Rd	South Side	VOCs - ND, SVOCs - ND, Metals - Below CSEVs, TPH - Below SNC
7/5/2012	280-30731-1	CEI#31	Arapahoe Road	6674 Arapahoe Rd	South Side	VOCs - ND, SVOCs - ND, Metals - Below CSEVs, TPH - Below SNC
8/24/2012	280-32593-1	CEC 1	Coors Event Center	Boulder, Colorado	Center of Lot	VOCs - ND, SVOCs - ND, Metals - Below CSEVs, TPH - Below SNC
8/24/2012	280-32593-1	CEC 2	Coors Event Center	Boulder, Colorado	South Center of Lot	VOCs - ND, SVOCs - ND, Metals - Below CSEVs, TPH - Below SNC
10/15/2012	280-34631-1	CEC 3	Coors Event Center	Boulder, Colorado	N.W. Side	VOCs - ND, SVOCs - Below CSEVs, Metals - Below CSEVs, TPH - Below SNC

VOC - Volatile Organic Compound
SVOC - Semi-Volatile Organic Compound
Metals - RCRA 8 Metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver)
TPH - Total Petroleum Hydrocarbons
ND - Not Detected
CSEV - Colorado Soil Evaluation Values Published by CDPHE, 2007 for Residential Land Use (with one exception - Arsenic not to exceed 10 mg/kg)
SNC - Stapleton Numeric Criteria for TPH (250 mg/kg), SNC is applied as a conservative action level as there is no CSEV for TPH
* Laboratory Job ID# 29372-1 sampled from the onsite stockpile on 5/25/12 was above CSEVs for Benzo[b]fluoranthene and Benzo[a]pyrene and the affected soil was removed from the stockpile and disposed offsite. No additional import was accepted from that excavation site.

TABLE 18

MONITORING WELL AND GROUNDWATER LEVEL ELEVATIONS
VALMONT BUTTE PROPERTY
3000 63rd Street
Boulder, Colorado

Monitoring Well	Top of PVC Casing Elevation (Feet AMSL)*	2004 Depth to Groundwater (Feet)	2013 Depth to Groundwater (Feet)	2004 Groundwater Elevation (Feet AMSL)	2013 Groundwater Elevation (Feet AMSL)
MW-01	5214.61	25.48	25.60	5189.13	5189.01
MW-02	NA	Dry	-	-	-
MW-03	NA	Damaged	-	-	-
MW-04	5185.28	9.39	12.62	5175.89	5172.66
MW-05	5206.45	17.64	15.78	5188.81	5190.67
MW-06	5237.31	29.50	29.91	5207.81	5207.40

*Top of casing elevations derived from URS/EPA 2004 report Figure 5 and Appendix A Table 3 by taking the reported ground water depth (Table 3) and adding to the plotted groundwater elevation shown on Figure 5.

Depth to groundwater measured from top of well casing.

NA = not available

AMSL = above mean sea level.

TABLE 19

GROUNDWATER QUALITY DATA SUMMARY
TOTAL AND DISSOLVED METALS
TERRACON MONITORING WELLS
VALMONT BUTTE
BOULDER, COLORADO

Analyte	Units	Monitoring Well Number, Location, and Sample Date					CDPHE Groundwater Standards	Maximum Contaminant Level (MCL)
		VB-TW-01 / Terracon Well MW-1 Northeast side of Property						
		Terracon Data 6/4/2003		URS/EPA Data 8/24/2004		CRI 7/10/2013		
		Total	Dissolved	Total	Dissolved	Dissolved		
Arsenic (As)	µg/L	50 U	NA	**16.1**	**10.2**	10 U	10.0	10.0
Barium (Ba)	µg/L	100 U	NA	**609**	**16.3**	100 U	2,000	2,000
Cadmium (Cd)	µg/L	5.0 U	NA	5.1 J	1.0 U	5.0 U	5.0	5.0
Chromium (Cr)	µg/L	50 U	NA	**109**	2.0 UJ	10 U	100	100
Lead (Pb)	µg/L	50 U	NA	**429**	**5**	3 U	50.0	15.0
Mercury (Hg)	µg/L	1 U	NA	0.20 U	0.20 U	0.2 U	2.0	2.0
Selenium (Se)	µg/L	**674**	NA	**46.8***	**531**	**310**	50.0	50.0
Silver (Ag)	µg/L	10 U	NA	2.5 J	1.0 U	10 U	50.0	NE
Uranium (U)	µg/L	NA	NA	82.6 J	58.2 J	**47**	30.0	30.0

TABLE 19 (Continued)

GROUNDWATER QUALITY DATA SUMMARY
TOTAL AND DISSOLVED METALS
TERRACON MONITORING WELLS
VALMONT BUTTE
BOULDER, COLORADO

Analyte	Units	Monitoring Well Number, Location, and Sample Date					CDPHE Groundwater Standards	Maximum Contaminant Level (MCL)
		VB-TW-04 / Terracon Well MW-4 Northeast side of Property						
		Terracon Data 6/4/2003		URS/EPA Data 8/24/2004		CRI 7/10/2013		
		Total	Dissolved	Total	Dissolved	Dissolved		
Arsenic (As)	µg/L	50 U	NA	1.5 UJ	0.88 J	10 U	10.0	10.0
Barium (Ba)	µg/L	**240**	NA	1,350 J	**38.1**	**120**	2,000	2,000
Cadmium (Cd)	µg/L	5.0 U	NA	1.3 J	1.0 U	5.0 U	5.0	5.0
Chromium (Cr)	µg/L	50 U	NA	39.8 J	2.0 U	10 U	100	100
Lead (Pb)	µg/L	50 U	NA	67.2 J	1.0 U	3 U	50.0	15.0
Mercury (Hg)	µg/L	1 U	NA	0.2 UJ	0.20 U	0.2 U	2.0	2.0
Selenium (Se)	µg/L	50 U	NA	5.0 UJ	**13.9**	**71**	50.0	50.0
Silver (Ag)	µg/L	10 U	NA	1.0 UJ	1.0 U	10 U	50.0	NE
Uranium (U)	µg/L	NA	NA	60 UJ	30 UJ	**48**	30.0	30.0

TABLE 19 (Continued)

GROUNDWATER QUALITY DATA SUMMARY
TOTAL AND DISSOLVED METALS
TERRACON MONITORING WELLS
VALMONT BUTTE
BOULDER, COLORADO

Analyte	Units	Monitoring Well Number, Location, and Sample Date			CDPHE Groundwater Standards	Maximum Contaminant Level (MCL)
		VB-TW-05 / Terracon Well MW-5 Northeast side of Property				
		URS/EPA Data 8/24/2004		CRI 7/10/2013		
		Total	Dissolved	Dissolved		
Arsenic (As)	µg/L	**6.1**	**1.7**	10 U	10.0	10.0
Barium (Ba)	µg/L	**132**	**15.5**	100 U	2,000	2,000
Cadmium (Cd)	µg/L	**1.04**	1.0 U	5.0 U	5.0	5.0
Chromium (Cr)	µg/L	**33.8**	2.0 U	10 U	100	100
Lead (Pb)	µg/L	**24.2**	1.0 U	3 U	50.0	15.0
Mercury (Hg)	µg/L	0.20 U	0.20 U	0.2 U	2.0	2.0
Selenium (Se)	µg/L	**27**	**45.0**	**33**	50.0	50.0
Silver (Ag)	µg/L	1.0 UJ	1.0 U	10 U	50.0	NE
Uranium (U)	µg/L	60 UJ	44.9 J	**49**	30.0	30.0

TABLE 19 (Continued)

GROUNDWATER QUALITY DATA SUMMARY
TOTAL AND DISSOLVED METALS
TERRACON MONITORING WELLS
VALMONT BUTTE
BOULDER, COLORADO

Analyte	Units	Monitoring Well Number, Location, and Sample Date					CDPHE Groundwater Standards	Maximum Contaminant Level (MCL)
		VB-TW-06 / Terracon Well MW-6 Far northwest side of Property Data						
		URS/EPA 8/26/2004		URS/EPA 8/26/2004 (Duplicate)		CRI 7/10/2013		
		Total	Dissolved	Total	Dissolved	Dissolved		
Arsenic (As)	µg/L	**24.9**	**24.2**	22.3 J	**21.7**	10 U	10.0	10.0
Barium (Ba)	µg/L	**296**	**17.4**	**235**	**18.8**	100 U	2,000	2,000
Cadmium (Cd)	µg/L	1.0 UJ	1.0 U	1.0 UJ	1.0 U	5.0 U	5.0	5.0
Chromium (Cr)	µg/L	9.2 J	2.0 U	11.9 J	2.1 U	10 U	100	100
Lead (Pb)	µg/L	**89.5**	0.08 J	**156**	0.12 J	3 U	50.0	15.0
Mercury (Hg)	µg/L	0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.0	2.0
Selenium (Se)	µg/L	785 J	**1,330**	873 J	**1,350**	**1,300**	50.0	50.0
Silver (Ag)	µg/L	1.0 UJ	1.0 U	1.0 UJ	1.0 U	10 U	50.0	NE
Uranium (U)	µg/L	60 UJ	44.1 J	60 UJ	43.9 J	**45**	30.0	30.0

Bolded values indicate the compounds were detected at concentrations greater than the laboratory method reporting limits.
Highlighted values indicates the compound concentration reported is greater than the MCL.
URS/EPA Data from "*Analytical Results Report for Site Reassessment Valmont Butte / Allied Piles Boulder County, Colorado* " dated January 6, 2005.
Terracon Data from "*Limited Intrusive Environmental Site Assessment, City of Boulder Proposed Biosolids Dewatering and Composting Project, Boulder, Colorado* ", dated September 30, 2003. This report did not include information on monitoring wells MW-5 and MW-6. Data for monitoring wells MW-5 and MW-6, other than that provided in the URS/EPA report, has not been located.
CRI (Casey Resources, Inc.) samples were collected on July 10, 2013.
MCL = Maximum Contaminant Level. Secondary standards not listed. The MCLs are standards for drinking water.
CDPHE Groundwater Standards - Colorado Department of Public Health and Environment Groundwater Standards, Regulation 41.
J = The associated numerical value is an estimated quantity detected between the laboratory method reporting limit (RL) and the practical quantitation limit (PQL).
U = The analyte was not detected at or above the Contract Required Detection Limit (CRDL) or laboratory RL.
NA = Not analyzed.
NE = Not established.
* = Interference; results of serial dilution indicates probable matrix interference due to muddy sample

TABLE 20

GROUNDWATER QUALITY DATA SUMMARY
RADIOLOGICAL PARAMETERS
TERRACON MONITORING WELLS - URS/EPA DATA
VALMONT BUTTE
BOULDER, COLORADO

Analyte	Units	Monitoring Well Number, Location, and Sample Date (URS/EPA Data)						CDPHE Groundwater Standards	Maximum Contaminant Level (MCL)
		VB-TW-01 / Terracon Well MW-1 Northeast side of Property		VB-TW-04 / Terracon Well MW-4 Northeast side of Property,		VB-TW-05 / Terracon Well MW-5 Northeast side of Property			
		URS/EPA Data 8/24/2004	CRI 7/10/2013	URS/EPA Data 8/24/2004	CRI 7/10/2013	URS/EPA Data 8/24/2004	CRI 7/10/2013		
Radium 226	pCi/L	**17.6 ± 0.708**	**1.92 ± 0.67**	**6.01 ± 0.425**	**0.25 ± 0.20**	**2.56 ± 0.337**	**1.01 ± 0.44**	NE	NE
Radium 228	pCi/L	**20 ± 1.35**	**5.5 ± 1.4**	**12.4 ± 1.1**	**0.88 ± 0.32**	**4.97 ± 0.894**	**2.15 ± 0.58**	NE	NE
Radium 226/228 (calculated)	pCi/L	**37.6**	**7.42**	**18.41**	**1.13**	**7.53**	**3.16**	5	5
Gross Alpha	pCi/L	**82.2 ± 11.2**	**560 ± 110**	**174 ± 41.5**	**128 ± 26**	**95.3 ± 21.5**	**76 ± 17**	NE	NE
Gross Alpha (corrected)	pCi/L	**25**	**528**	**174**	**95.36**	**95.3**	**42.68**	15	15
Gross Beta	pCi/L	**83.7 ± 11.6**	**690 ± 120**	**381 ± 75.5**	**188 ± 34**	**163 ± 33.6**	**40 ± 16**	NE	NE

TABLE 20 (Continued)

GROUNDWATER QUALITY DATA SUMMARY
RADIOLOGICAL PARAMETERS
TERRACON MONITORING WELLS - URS/EPA DATA
VALMONT BUTTE
BOULDER, COLORADO

Analyte	Units	Monitoring Well Number, Location, and Sample Date			CDPHE Groundwater Standards	Maximum Contaminant Level (MCL)
		VB-TW-06 / Terracon Well MW-6 Far northwest side of Property				
		URS/EPA Data 8/26/2012	URS/EPA Data 8/26/2012 (Duplicate)	CRI 7/10/2013		
Radium 226	pCi/L	**2.1 ± 0.342**	**1.66 ± 0.308**	**0.21 ± 0.20**	NE	NE
Radium 228	pCi/L	**1.99 ± 0.646**	**5.95 ± 0.778**	**0.63 ± 0.32**	NE	NE
Radium 226/228 (calculated)	pCi/L	**4.09**	**7.61**	**0.84**	5	5
Gross Alpha	pCi/L	**418 ± 38.1**	**118 ± 21.6**	**97 ± 20**	NE	NE
Gross Alpha (corrected)	pCi/L	**418**	**118**	**66.4**	15	15
Gross Beta	pCi/L	**430 ± 41**	**129 ± 42.8**	**97 ± 21**	NE	NE

Bolded values indicate the compounds were detected at concentrations greater than the laboratory method reporting limits.
Highlighted values indicate the compound concentration reported is greater than the MCL and CDPHE Groundwater Standard.
URS/EPA Data from "*Analytical Results Report for Site Reassessment Valmont Butte / Allied Piles Boulder County, Colorado* " dated January 6, 2005.
CRI (Casey Resources, Inc.) samples were collected on July 10, 2013.
MCL = Maximum Contaminant Level. Secondary standards not listed. The MCLs are standards for drinking water.
CDPHE Groundwater Standards - Colorado Department of Public Health and Environment Groundwater Standards, Regulation 41.
Radium 226/228 (calculated) = Radium 226 plus Radium 228 results. Detection limit is used where no concentration was detected.
Gross Alpha (corrected) = Uranium and radon contribution subtracted.
NE = Not established.

PHOTOGRAPHS

Photo 1 – Excavation Remediation Area "J" at North Edge Looking East

Photo 2 – Smoke Stack Section Found Buried in Secondary Tailings Pile

Photo 3 – Secondary Tailings Pile Remediation Area Southern Side Nearing Completion

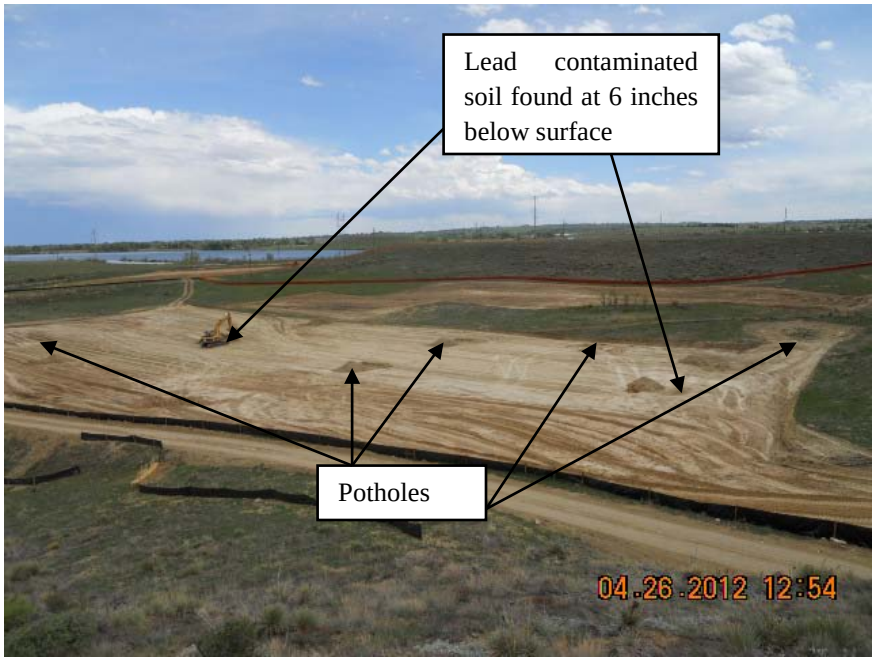


Photo 4 – Potholes in the Secondary Tailings Pile Remediation Area

Photo 5 – Two Cleanup Areas in the Southeast portion of Remediation Area "A-A" (looking east)

Photo 6 – Concrete Vault in Area A-A with Cover Removed

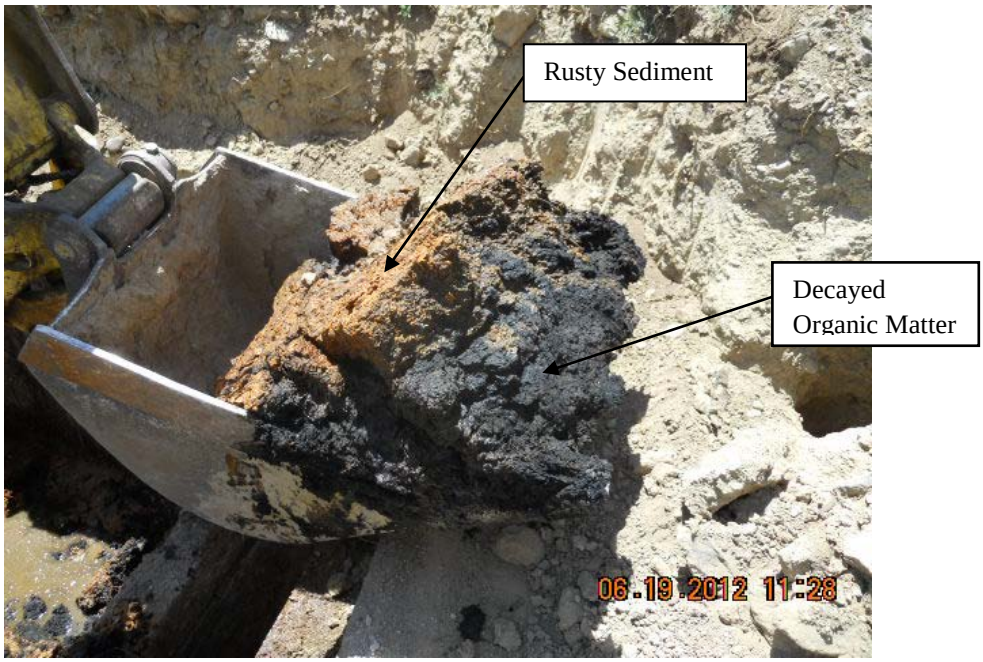


Photo 7 – Sediment from Area A-A Concrete Vault

Photo 8 – "Paint" Drum in Area B

Photo 9 – Contamination Along the Southeast Side of Tracks in Area C

Photo 10 – Area MS Petroleum Stain Under Building

Photo 11 – Retaining Wall at the Southeast Corner of Mill Building

Photo 12 – Retaining Wall in Area MW with Guy Wire Connection

Photo 13 – Small Area of Contamination West of Area MW

Photo 14 – Tailings Layer Under the Foundation of Building 3

Photo 15 – Hand Cleaning Metal Impacted Soil in Area D

Photo 16 – Insulation Associated with Pipe Located East of Mill Building in Remediation Area F

Photo 17 – Removing the Fill in the Saddle Along the North Side of Area F

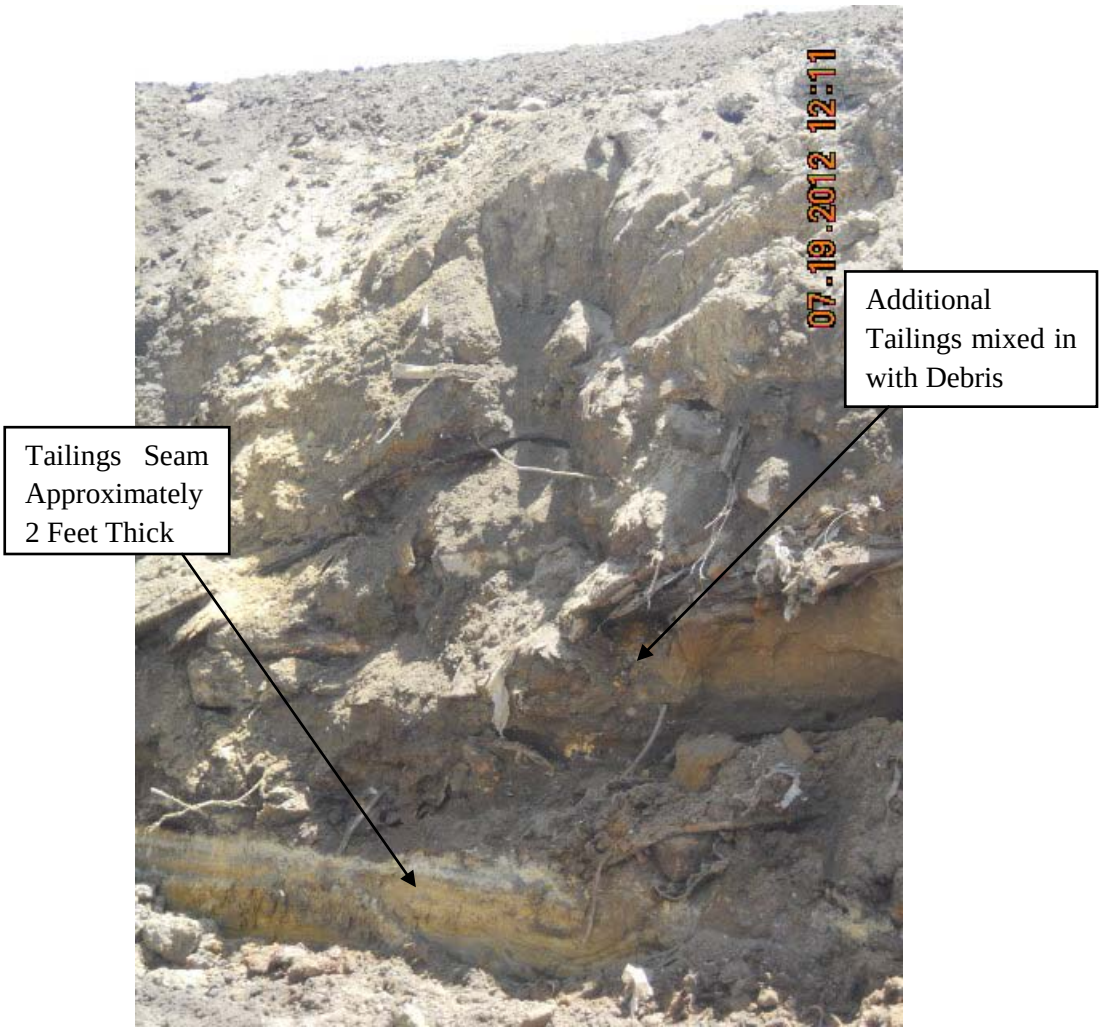


Photo 18 – Closeup of Tailings Seam at approximate14 foot Depth in Area G

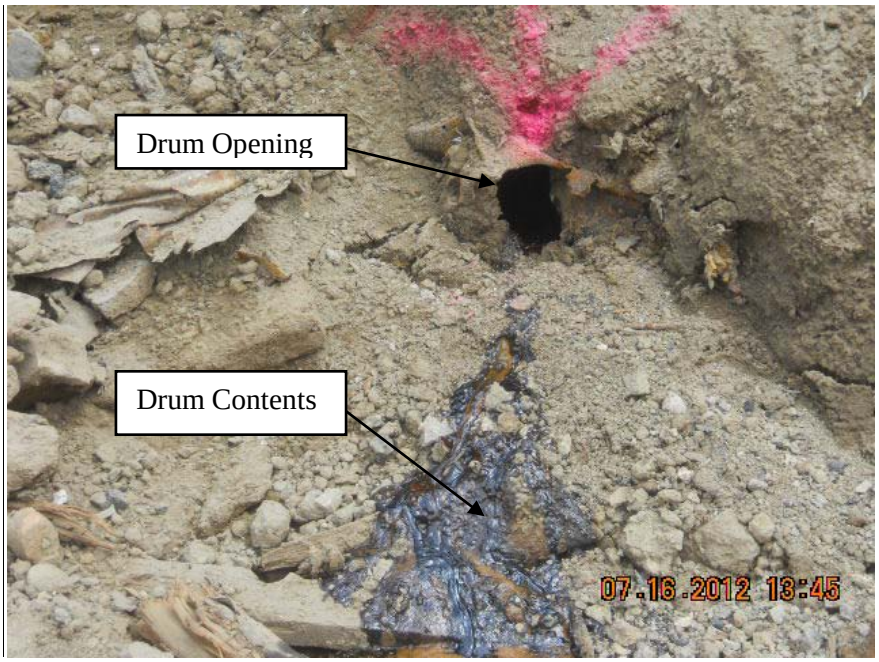


Photo 19 – Punctured Drum in South Sidewall of Area G

Photo 20 – Removing Rail from RR Bed South of Mill Building

Photo 21 – Removing Contaminated Soil from RR Track Bed

Photo 22 – Beginning of Drainage Swale Excavation at the Primary Dam

Photo 23 – Excavation of South Half of Drainage Channel Looking West at Primary Dam

Photo 24 – Resin from Tank in Building 12

Photo 25 – UST East of Building 7

Photo 26 – Holes in UST from East of Building 7

Photo 27 – UST Excavation East of Building 7

Photo 28 – Tar-Like Material Buried east of Area A-A and north of Cemetery

Photo 29 – Water Well Pump Pit with Pump Removed

Photo 30 – Pipe Removed from Water Well on Valmont Road

LIST OF APPENDICES

(INCLUDED ON DIGITAL VERSATILE DISC)

Appendix A Legal Description
Appendix B As-Built Drawings
Appendix C Training Certification
Appendix D Daily Logs
Appendix E Negative Exposure Assessment
Appendix F Laboratory Reports for Soil and Miscellaneous Materials
Appendix G Cap Rock Quality Control Documentation
Appendix H LVI Abatement and Demolition Documentation
Appendix I Asbestos Building Inspection
Appendix J Buried Drum Disposal Documentation
Appendix K Asbestos Abatement Oversight
Appendix L Import Soil Oversight
Appendix M Air Monitoring Reports
Appendix N Groundwater Reports
Appendix O Water Well Closure

APPENDICES