SITE MITIGATION 2008 FIELD REPORT
ALICE LODE
VOLUNTARY CLEANUP PROGRAM
ASSISTANCE ID No. C025
PARK CITY, UTAH

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1.0 INTRODUCTION

This Site Mitigation 2008 Field Report presents the operational, construction, and sampling procedures utilized during the mitigation of mine tailings and impacted soils within Alice Lode ("Site") completed from July to September 2008. AMEC Environment & Infrastructure, Inc. (AMEC) (formerly AMEC Earth & Environmental, Inc.) was engaged by King Development Group, LLC (KDG) to implement the approved Site Mitigation Plan and prepare this report on behalf of KDG and Park City Municipal Corporation (PCMC), the current owners and joint Voluntary Cleanup Program (VCP) applicants[1]. The Site Mitigation 2008 Field Report is being completed under the Utah Division of Environmental Response and Remediation (UDERR) VCP.

PCMC requested to be included as a joint applicant to mitigate PCMC property as described in the Mitigation Work Plan. The Mitigation Work Plan proposed nine residential lot lines for the mitigation work applying residential and non-residential UDERR action levels. The remediation completed as part of the field mitigation activities followed the proposed development presented in the Mitigation Work Plan to clean up the Site and allow for nine single family homes and associated utilities and paved streets.

As depicted on **Figure 1**, Vicinity Map, the Site is located in the area of Woodside Gulch at the intersection of King Road and Ridge Avenue in Park City, Utah. The approximate geographical coordinates of the center of the Site are 40° 38' 11" North Latitude and -111° 29' 52" West Longitude. **Figure 1** shows the United States Geological Survey (USGS) Topographic Map in which the Site area has been highlighted in the northeast quarter of Section 21, Township 2 South, Range 4 East, Salt Lake Base and Meridian. The total combined surface area of the KDG and PCMC properties comprising the Site is approximately 10.17 acres shown on **Figure 2.**

2.0 OBJECTIVE

The objective of the VCP mitigation completed in 2008 was to remediate the Site in such a manner that issues relative to human health and the environment were mitigated through removal, capping, or re-vegetation of the Site in accordance with the anticipated plan to develop a nine lot single family home subdivision at or near the locations noted in the VCP application.

The UDERR, through the VCP, established lead and arsenic action levels based on residential and non-residential land use designation. The lead action levels for surface soil are 400

[1] AMEC is aware that PCMC has requested that it be allowed to withdraw from the VCP. However, until a decision has been made, AMEC has assumed that PCMC continues to be a co-applicant with KDG.

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milligrams per kilogram (mg/kg) and 100 mg/kg for arsenic in any areas that may be within the residential area of disturbance (AOD) boundaries. Lead and arsenic levels in the surface soils for areas outside of the residential AOD boundaries was established by the UDERR at 2,100 mg/kg for lead and 190 mg/kg for arsenic. In addition, all efforts were made to meet PCMC's Building Department requirement for minimal loss of trees, minimal destruction and removal of vegetation and hillsides, the Utah Division of Water Rights (DWR) rehabilitation requirements of the ephemeral stream in Woodside Gulch, minimal dust generation, and trucks hauling material through the city.

The Site is comprised of approximately 8.3 acres owned by KDG and approximately 1.8 acres owned by PCMC. A gravel access road to the PCMC water tank and water pipeline traverses the Site. Biking and hiking trails also traverse the Site. An ephemeral stream enters the Site from the southwest and leaves the Site through a culvert at Ridge Avenue. The Site slopes have grades up to 45% and vegetated with native plants; scrub oak, spruce, and aspen. Historic mine tailings were present along the stream and adjacent hillsides. An adit and mine shaft was present on the west side of the gravel road.

3.0 HISTORICAL BACKGROUND

The Alice Lode claim was mined during the 1890s and the early 1900s. A mine shaft and drift were completed during that time period. The location of the mine shaft could not be ascertained until, in 1976, a mine portal was discovered at the Site. The mine shaft extended approximately 300 feet from the portal and dropped at an angle for another 250 feet (*The Park Record, 1976)*.

During a Geotechnical study completed by AMEC in June 2006, an adit and mine shaft was uncovered on the west side of the gravel access road as shown on **Figure 2**. Review of historical data indicates the mine shaft is approximately 500 feet deep and was used for exploration purposes.

Historic aerial photographs were reviewed in an effort to identify the history of development and activities at the Site and the adjacent properties. The photographs available for review cover the years 1966, 1976, 1978, 1979, 1983, 1984, 1987, 1989, 1992, 1995, 1997, 2002, and 2003. During this time period the Site and surrounding properties appear as they did just prior to remediation activities. The water tank and reservoir located to the south of the Site were present in all of the aerial photographs. There did not appear to be any active mining activities during these time periods.

3.1 SUMMARY OF IMPACTED MEDIA

The following is a summary of impacted media identified during investigations completed by PCMC authorized Brownfields assessment in 2003 and subsequent KDG investigations completed through 2006.

3.1.1 Soils

Based on analytical and X-ray fluorescence (XRF) sampling results, visual evidence of mine workings, and color of exposed rock, one area of mine tailings was verified in Woodside Gulch within the Site boundaries. Previous reports indicated two areas of mine tailings. However, further investigation of the material on the south edge of the Site within Woodside Gulch and review of historical documents indicate mine tailings are not present. The elevated lead concentrations detected in the soil in Woodside Gulch in the south area are fluvial flood deposits. The characterization results are discussed in detail in the *Sampling and Analysis Results Report* (SARR)*, Investigation of Soil Contamination, Alice Lode Voluntary Cleanup Program Site, Park City, Utah*, dated March 31, 2006. **Figure 3** is a map showing lead concentrations in the soil prior to mitigation.

The investigations indicate that lead concentrations in soil and mine tailings at the sampling locations ranged from 67.6 to 29,875.2 mg/kg. Arsenic concentrations ranged from less than the Level of Detection (LOD) to 3,897.6 mg/kg. Lead concentrations above 2,100 mg/kg were identified in and alongside Woodside Gulch and on the northwest hillside within the Site boundaries. The recreation trail that runs along the east hillside of Woodside Gulch contained lead concentrations ranging from 67.6 mg/kg to 8,736 mg/kg. Although some of the lead concentrations in the soil along the trail are above the 2,100 mg/kg they do not appear to be mine tailings.

Soils impacted with lead concentrations greater than 400 mg/kg were identified along the east and west slopes of Woodside Gulch within the Site boundaries. The east and west slopes did not have any areas of obvious mine workings or tailings. Lead concentrations in the soil generally decreased with depth at each sample location. Lead concentrations along the slopes of the gulch are likely due to naturally occurring lead concentrations and dust settling along the slopes during historic mining operations.

3.1.2 Groundwater

Groundwater sampling was not undertaken as part of the investigation. Regional groundwater studies in the Park City watershed are being conducted under the direction of the UDERR, Mr. Muhammad Slam. The Alice Lode Site and Woodside Gulch represent a small fraction of the regional groundwater system and it was determined that groundwater sampling would not be part of this VCP investigation and would be addressed within the regional study. However, it is expected that mitigation of lead and arsenic impacted soil will have a positive impact on overall groundwater quality in the watershed.

3.1.3 Air

Wind conditions at the Site vary depending on the time of year and the direction of local storms. Dry and/or dusty conditions could cause impacted subsurface soils to become airborne if the non-impacted layer of soil is removed and/or if excavation should occur. Impacted soil may potentially leave the Site through contact with workers boots, clothing, and construction equipment.

4.0 PRE-MITIGATION ACTIVITIES

The following plans were accepted prior to start of activities:

- Fugitive Dust Control Plan – Utah Division of Air Quality
- Storm Water Pollution Prevention Plan (SWPPP) – Utah Division of Water Quality
- Stream Alteration Permit – Utah Division of Water Quality
- Traffic Control Plan - PCMC

Geary Construction, Inc., the mitigation contractor, had 40 hour HAZWOPER trained staff on-site. Geary Construction, Inc. installed silt fencing and erosion control at appropriate locations to control storm water runoff and erosion to adjoining properties. Approximately six-inches of gravel was placed at the exit to Ridge Avenue to remove soil from trucks as they exited the Site. Ridge Avenue was swept clean with a street cleaner and push brooms to remove soil that may have been left on the road from the haul trucks.

Geary Construction, Inc. closed the Site to public access by installing fencing around the perimeter of the Site and posting signs closing public trails and access roads. The perimeter of the Site was walked daily to ensure that all fencing and posted signs were still in place and were repaired as necessary.

5.0 SITE MONITORING DURING MITIGATION ACTIVITIES

The following is a discussion of monitoring performed on Site during mitigation activities.

5.1 AIR AND DUST MONITORING

All effort was made to control dust during mitigation activities by applying water with a tanker truck, placement of erosion control mats, and slowing track-hoe excavation if excessive dust was generated.

Air monitoring was conducted in accordance with the accepted Fugitive Dust Control Plan. The environmental technician was on-site and utilized a hand held portable pump unit, pDR-1200 particulate monitor, and/or Method 9 Emissions Monitoring to record dust levels generated during mitigation activities. Additionally, a pDR-1200 particulate monitor, stationary unit, was set up on the north Site boundary near adjoining property owners. The monitor was run 8 to 10 hours a day during construction activities and recorded readings for a particulate daily average. **Tables 1** and **2** show the daily recorded air particulate readings for the Site during mitigation activities. The average daily reading from July 21 through September 13, 2008, was 0.075 milligrams per cubic meter (mg/m^3). The highest reading was 0.155 mg/m^3. These concentrations did not exceed the Fugitive Dust Concentration Plan limit of 10 mg/m^3.

At the start of mitigation activities Geary Construction, Inc. employees and AMEC's Environmental Technician were monitored for potential lead and arsenic exposure in the air. The workers were fitted with personal pumps for eight hours the first day. Sample canisters were analyzed for lead and arsenic concentration. The recorded analytical concentrations were below the OSHA eight hour exposure level of 50 microgram per cubic meter ($\mu g/m^3$) for lead

and 10 µg/m^3 for arsenic. Additionally, the on-site workers were monitored again approximately four weeks later for potential air lead and arsenic exposure. **Table 3** shows the personal pump analytical results and laboratory analyses are provided in **Appendix A**.

5.2 STORM WATER MONITORING

Best Management Practices (BMPs) were put in place to mitigate potential storm water runoff to adjoining properties and to the stream during mitigation activities. The BMPs were inspected daily and monitored and/or repaired during and after storm activities to maintain the integrity of the system. Gravel was placed as-needed at the exit to Ridge Avenue to remove soil from trucks as they exited the Site. Ridge Avenue was swept clean with a street cleaner and push brooms to remove soil that may have been left on the road from the haul trucks.

6.0 MITIGATION ACTIVITIES

Mitigation activities commenced from July through September 2008. Mitigation of soils and mine tailings were undertaken through two primary mechanisms. These include:

1. Removal of impacted material and disposal at Richardson Flats depository, and
2. Capping soils exceeding UDERR action levels.

During mitigation activities, public use trails and the gravel road were closed except to authorized personnel. Recreational trail users were re-routed at the south and north property boundary around the Site through the use of signage and fencing.

Figure 3 shows lead concentrations prior to mitigation in the surface soils at the Site. Cleanup areas were assigned numbers or areas configured within the future nine lot single family home subdivision as presented in the Site Mitigation Plan.

- Lower Stream Bed and Mine Tailings area,
- Upper Stream Bed – stream bed south of mine tailings,
- Areas 1 through 12, and
- Gravel Access Road.

6.1 LOWER STREAM BED AND MINE TAILINGS

Visible mine tailings were located on PCMC property within the lower stream bed area, near Areas 1 through 9 which were designated residential in the Mitigation Work Plan. An XRF meter was used to delineate the extent and depth of mine tailings for removal and **Table 4** shows the field XRF readings. XRF readings were used to direct excavation activities and a figure showing reading locations is not included. However, descriptions of the XRF locations are included in **Table 4.** The mine tailings located in the lower stream bed area were removed utilizing a track-hoe and haul trucks to a depth of approximately 10 feet below ground surface (bgs). Approximately 3,100 cubic yards of soil and mine tailings were excavated and exported to Richardson Flats Repository. The daily haul report provided by Geary Construction, Inc. is provided in **Appendix B**.

Once excavation activities were completed initial composite soil samples were collected to evaluate the concentrations of lead and arsenic in the soil left in place. Four grab samples (grab samples are designated as CM 8-1, CM 8-2, CM 8-3, and CM 8-4) were collected every 50 feet and composited (composite samples are designated CM-8). Composite soil samples collected in the lower stream bed, CM-8, CM-9, CM-10, CM-13, CM-14, CM-16, CM-17, and CM-18, contained lead levels ranging from 430 to 6,700 mg/kg and arsenic concentrations ranging from 53 to 570 mg/kg. Initial composite soil sample GPS location points are shown on **Figure 4**. Once initial soil sampling was completed approximately 10 feet of import fill material was placed in the former Mine Tailings lower stream bed area, **Figure 5,** to bring the area to grade. The area outside the streambed was capped with 6-inches of appropriate clay import material, 6-inches of topsoil, covered with erosion control mats, and seeded. The stream bed was capped with 12-inches of a clay import material and imported natural rock rip rap per the stream restoration permit.

Confirmation soil samples were collected after the capping material in mine tailings and the lower stream bed area was placed and analyzed for total lead and arsenic concentrations. Composite samples (**Figure 5)** RCM-8, RCM-9, RCM-10, RCM-13, RCM-14, RCM-17, and RCM-18 contained lead and arsenic concentration below 400 mg/kg and 100 mg/kg, respectively except RCM-16 which had a lead concentration of 730 mg/kg and arsenic of 130.0 mg/kg. RCM-16 is located along the former streambed. The elevated lead and arsenic concentration in the cap at RCM-16 may be due to cross-contamination with material below the cap. This concentration above the residential screening will be addressed in the Site Management Plan (SMP). Composite soil sample GPS locations are shown on **Figure 5**. Laboratory analytical results are provided in **Appendix C**. **Table 6.1.1** below shows the analytical results of samples collected under the cap and of the cap material.

Table 6.1.1 – Lower Stream Bed Area

Composite Sample Identification Numbers	Sample Date	Lead Concentration (mg/kg)	Arsenic Concentration (mg/kg)
Under Cap			
CM-8	8/19/2008	***2,700.0***	91.0
CM-9	8/23/2008	***430.0***	53.0
CM-10	8/23/2008	***2,900.0***	***120.0***
CM-13	9/4/2008	***4,400.0***	***250.0***
CM-14	9/9/2008	***450.0***	30.0
CM-16	9/13/2008	***6,700.0***	***570.0***
CM-17	9/13/2008	***3,800.0***	***270.0***
CM-18	9/13/2008	***890.0***	71.0
Cap at Surface			
RCM-8 (10 ft of fill)	11/17/2008	220.0	20.0
RCM-9	11/17/2008	110.0	14.0
RCM-10 (10 ft of fill)	11/17/2008	77.0	<64.0
RCM-13	11/17/2008	76.0	<6.8
RCM-14	11/17/2008	60.0	<6.8
RCM-16	11/17/2008	***730.0***	***130.0***

Composite Sample Identification Numbers	Sample Date	Lead Concentration (mg/kg)	Arsenic Concentration (mg/kg)
RCM-17	11/17/2008	310.0	21.0
RCM-18 (10 ft of fill)	11/4/2008	81.0	26.0

ft – feet
mg/kg – milligram per kilogram

6.2 UPPER STREAM BED AREA

The upper stream bed area is located south of the proposed residential development and mine tailings and lower stream bed area and extends to the south Site boundary. The upper stream bed area contained soils with lead concentrations greater than 2,100 mg/kg. Mitigation activities included removal of impacted soil and capping soil with concentrations above the residential screening level of 400 mg/kg. Additional removal and capping activities were completed in this area to avoid fencing the area to restrict access to the impacted soils. During mitigation the impacted soils were delineated using an XRF meter and field readings are provided in **Table 4**. Areas along the upper stream bed were mitigated using a track-hoe to remove an average of 12-inches of impacted soil while minimally impacting mature vegetation. The area was then capped with 12-inches of a clay import material and imported natural rock rip rap per the stream restoration permit. The side slopes of the upper stream bed area were mitigated where impacted, capped, and stabilized with grass mats to minimize erosion. Mature evergreen trees on the east side of the upper stream bed area were not removed. All efforts were made to remove and transport soil with excessive lead concentrations greater than 4,000 mg/kg located in the upper stream bed to Richardson Flats Repository.

Flood deposits within the upper stream bed area had lead concentrations greater than 4,000 mg/kg and are shown on **Figure 3.** An access point was cut into the west slope of the stream bed area to access the flood deposits for removal. The impacted soils were removed to approximately two feet bgs totaling approximately 500 cubic yards of export material to Richardson Flats Repository. The streambed area was then capped with 12-inches of clay import material and import natural rock rip rap. The access point and on either side of the streambed was rehabilitated utilizing import material and import natural rock rip rap for reconstruction of the slope, seeded, and covered with erosion control mats.

Once excavation activities were completed initial composite soil samples were collected to evaluate the concentrations of lead and arsenic in the soil left in place. Composite soil samples CM-4, CM-5, CM-6, CM-7, and CM-11 contained lead levels ranging from 130 to 8,900 mg/kg and arsenic concentrations ranging from 14 to 530 mg/kg. Lead and/or arsenic concentrations exceeded the residential and non-residential screening levels at CM-4, CM-5, CM-6, and CM-7. Initial composite soil sample GPS location points are shown on **Figure 4** and soil concentrations of the material under the cap are shown on **Table 6.2.1** below.

Confirmation soil samples were collected of the capping material in the upper stream bed area and analyzed for total lead and arsenic concentrations. Composite samples of the cap material RCM-4, RCM-5, and RCM-6 contained lead and arsenic concentration below the residential and non-residential screening levels. Composite sample RCM-7 contained lead concentration of

890.0 mg/kg which is above the residential screening level and arsenic concentration below the screening level 68.0 mg/kg. Composite cap soil sample GPS locations are shown on **Figure 5**. Laboratory analytical results are provided in **Appendix C**. Cap sampling was not completed at sample point CM-11 as the initial soil composite sample lead concentrations were below 2,100 mg/kg. **Table 6.2.1** below show the analytical results of the material under the cap and of the cap material.

Table 6.2.1 – Upper Stream Bed Area

Composite Sample Identification Numbers	Sample Date	Lead Concentration (mg/kg)	Arsenic Concentration (mg/kg)
Under Cap			
CM-4	8/8/2008	***8,900.0***	***530.0***
CM-5	8/14/2008	***4,200.0***	160.0
CM-6	8/14/2008	***6,600.0***	***270.0***
CM-7	8/14/2008	***6,100.0***	***280.0***
CM-11	10/15/2008	130.0	14.0
Cap at Surface			
RCM-4	11/17/2008	87.0	21.0
RCM-5	11/17/2008	370.0	27.0
RCM-6	11/17/2008	***890.0***	68.0
RCM-7	11/17/2008	330.0	23.0

mg/kg – milligrams per kilogram

6.3 AREAS 1 THROUGH 12

Mitigation activities were conducted in Areas 5, 6, 7, 8, and 9, which were proposed residential lots in the Mitigation Work Plan. Soil lead concentrations in these areas prior to mitigation are shown on **Figure 3**. An XRF was used to delineate lead concentrations greater than 400 mg/kg and arsenic concentrations greater than 100 mg/kg; **Table 4** show XRF field readings. Removal of soils at concentrations greater than the residential screening levels was partially completed in proposed residential Areas 1, 2, 3, 4, 10, 11, and 12 during the July 2008 through September 2008 field season. Additional removal and capping activities in these areas were stopped by the Park City Planning Commission in September 2008. Except for areas on the west side hillside of Woodside Gulch, mitigation was substantially complete except for implementation of the SMP and Environmental Covenant (EC).

Areas 1 through 6

An access point was cut into the west side of the hillside following natural topography to access Areas 2, 3, 4, 5 and 6. Areas 1, 2, 3, and 4 were not mitigated because of the stop mitigation order by the Planning Commission. Areas 5 and 6 were excavated using a track-hoe to remove an average of 12-inches of impacted soil. Approximately 430 cubic yards of impacted soil was removed from Areas 5 and 6. The daily haul report provided by Geary Construction, Inc. is provided in **Appendix B**. Once excavation activities were completed initial composite soil samples were collected, CM-15, CM-19, and CM-20, to evaluate soil lead and arsenic

concentrations left in place. Initial composite soil samples, with corresponding GPS location points, are shown on **Figure 4**.

Once excavation activities were completed the areas were capped with 12-inches of appropriate import material, covered with grass mats for erosion control and seeded. Confirmation samples were not collected because the initial samples under the cap had lead and arsenic concentrations below 400 mg/kg and 100 mg/kg, respective screening levels. Composite soil sample GPS locations are shown of **Figure 5**. Laboratory analytical results are provided in **Appendix C**. The following table shows the analytical results.

Table 6.3.1 – Areas 1 Through 6

Composite Sample Identification Numbers	Sample Date	Lead Concentration (mg/kg)	Arsenic Concentration (mg/kg)
Under Cap			
CM-15	9/13/2008	160.0	42.0
CM-19	9/25/2008	320.0	17.0
CM-20	9/25/2008	240.0	19.0

mg/kg – milligrams per kilogram

Areas 7, 8, and 9

Area 7 was mitigated from an access point that is located on the south side of the mine tailings and lower stream bed area. The access point was cut into the slope following natural slope contours. Areas 8 and 9 were accessed from the lower stream bed area where mine tailings were removed. These areas were excavated using a track-hoe to remove an average of two feet of impacted soil. Approximately 2,220 cubic yards of impacted soil was removed from areas 7, 8, and 9. The daily haul report provided by Geary Construction, Inc. is provided in **Appendix B**. Once excavation activities were completed initial composite soil samples CM-1, CM-2, CM-3, and CM-12 were collected to evaluate the concentrations of lead and arsenic in the soil left in place. Initial composite soil samples, with corresponding GPS location points, are shown on **Figure 4**. Laboratory analytical results are provided in **Appendix C**.

Once initial soil sampling was completed, the areas were capped with 12-inches of appropriate import material and covered with grass mats for erosion control and seeded. A confirmation soil sample was collected of the capping material in Area 7 and Area 8 and analyzed for total lead and arsenic concentrations. Composite soil sample RCM-3 contained lead and arsenic concentration below the UDERR residential action levels of 400 mg/kg and 100 mg/kg, respectively. Composite soil sample locations, with corresponding GPS points, are shown on **Figure 5**. Laboratory analytical results are provided in **Appendix C**. The following table shows the analytical results. Cap sampling was not completed in Areas 8 (except as discussed below) and Area 9 as the initial soil composite samples CM-1 and CM-2 reported lead concentrations were below 400 mg/kg.

Table 6.4.2 – Areas 7, 8, and 9

Composite Sample Identification Numbers	Sample Date	Lead Concentration (mg/kg)	Arsenic Concentration (mg/kg)
Under Cap			
CM-1	8/5/2008	120.0	29.0
CM-1 (UDERR Split Sample)	8/5/2008	290.0	50.0
CM-2	8/5/2008	46.0	20.0
CM-3	8/12/2008	***2,000.0***	90.0
CM-12	9/4/2008	***14,000.0***	***840.0***
Cap at Surface			
RCM-3	11/17/2008	130.0	8.4
RCM-12	11/17/2008	130.0	<7.0

mg/kg – milligram per kilogram

Mature evergreen trees located in Area 8 were not removed (at sample location CM-12). To maintain the health of the evergreen trees AMEC contracted Americon, Inc. to hand-dig approximately six-inches of impacted soil from around the evergreen trees. The impacted soil was disposed at Richardson Flats Repository. Once hand excavation activities were completed initial composite soil samples were collected to evaluate the concentration of lead and arsenic in the soil left in place. Composite soil sample CM-12 contained a lead concentration of 14,000 mg/kg and an arsenic concentration of 840 mg/kg. Initial composite soil samples GPS locations are shown on **Figure 4**. Approximately six-inches of imported material was placed around the trees by hand. Confirmation soil samples were collected of the capping material. Composite soil sample locations, with corresponding GPS points, are shown of **Figure 5**. Laboratory analytical results are provided in **Appendix C**.

6.4 GRAVEL ACCESS ROAD

Soil was excavated adjacent to the existing gravel road at the entrance of the Site. The existing gravel road was re-graded when mitigation was complete.

6.5 MINE SHAFT

The mine shaft was not part of the approved VCP mitigation plan but was mitigated in a manner to be protective of safety. Geary Construction, Inc. was directed by KDG to back-fill the mine shaft with granular material from on-site to within 100 feet bgs. Water was poured into the shaft to increase compaction. The remaining 100 feet of the mine shaft was filled with granular import material. As the material settles additional material will be added to maintain a relatively level ground surface.

7.0 QUALITY ASSURANCE/QUALITY CONTROL

Sampling was completed according to the methods described in the approved Quality Assurance Project Plan (QAPP). The Level 3+ Quality Assurance/Quality Control (QA/QC) reporting package requested from the analytical laboratory (American West Analytical Laboratories [AWAL] and DataChem Laboratories) includes a case narrative, laboratory control sample, matrix spike/matrix spike duplicate (MS/MSD) sample, and method blanks.

All soil samples were labeled with an identification number, date, and time of collection. Field decontamination of sampling equipment was not performed as only disposable sampling devices were utilized. All disposable sampling equipment and personal protective equipment was cleaned, bagged, removed from the area, and properly disposed of as non-hazardous material.

8.0 SUMMARY

Mitigation activities followed the UDERR accepted Site Mitigation Plan except where noted in this report. Any deviations from the accepted plan were discussed with and accepted by the UDERR Project Manager and PCMC Environmental Manager. All stages of mitigation activities were inspected by AMEC, the contractor, and the UDERR Project Manager for acceptance.

Figure 6 shows soil lead concentrations that are present under the capped areas at the completion of mitigation activities in 2008. Lead concentrations greater than the residential action level of 400 mg/kg are present under the cap along the lower streambed area in PCMC and KDG properties. Samples points CM-10, CM-16, and CM-17 are located along the former streambed alignment where approximately one foot of capping material is present. Sample points CM-8, CM-9, CM-13, and CM-14 are located in the area where 10 feet of fill material was imported. The sample CM-12 is located in the area of spruce trees that topsoil was removed until tree roots were encountered. Additional removal of topsoil would likely kill the trees. The upper streambed has four locations CM-4, CM-5, CM-6, and CM-7 with soil lead concentrations under the cap above 400 mg/kg.

Figure 7 shows soil lead concentrations at the ground surface in areas that have been mitigated and areas that have not been mitigated. Lead concentrations greater than the residential action level of 400 mg/kg in the surface soil cap in Area 9 and upper streambed are present at sample locations RCM-6 and RCM-16. This may be due to possible cross-contamination with underlying material during placement of the cap. Lead concentrations in the surface soil above the residential screening level of 400 mg/kg are present in Areas 2, 3, 4, 10, 11, and 12.

A photo log of Site activities was submitted weekly and is not part of this report.

Following the Mitigation Work Plan, extensive mitigation was completed in 2008 which has reduced the impact to human health and the environment while visually enhancing the area and configuring the cleanup within the future nine lot single family home subdivision. Mitigation activities were completed while meeting requirements of storm water, air quality, and traffic permit requirements. By removing mine tailings on the PCMC property and rehabilitating the streambed, surface soil concentrations of lead and arsenic were reduced to below residential

cleanup levels at the ground surface. KDG completed removal and capping activities along the upper stream bed to meet the residential action level to eliminate the need to restrict access to the area. Lead concentrations at the ground surface above the residential action levels are present at the proposed residential lot designated Area 9, and in the non-residential areas designated 10, 11, 12, and upper stream bed. The management of the areas in addition to the lead and arsenic identified under the cap will be addressed in the SMP and EC.

AMEC recommends that UDERR issue a Certificate of Completion for the Site after approving an acceptable form SMP and EC for the Site.

9.0 DISCLAIMER

The report has been prepared for the exclusive use of KDG and their authorized agents and assignees, in accordance with generally accepted professional consulting practices. No warranty, expressed or implied, is made regarding the professional recommendations provided in this report. The findings contained herein are relevant to the dates of AMEC's Site work and should not be relied upon to represent conditions at later dates. In the event that future changes in the nature, usage, or layout of the Site are made, the conclusions and recommendations contained in this report may not be valid.

AMEC Environment & Infrastructure, Inc.

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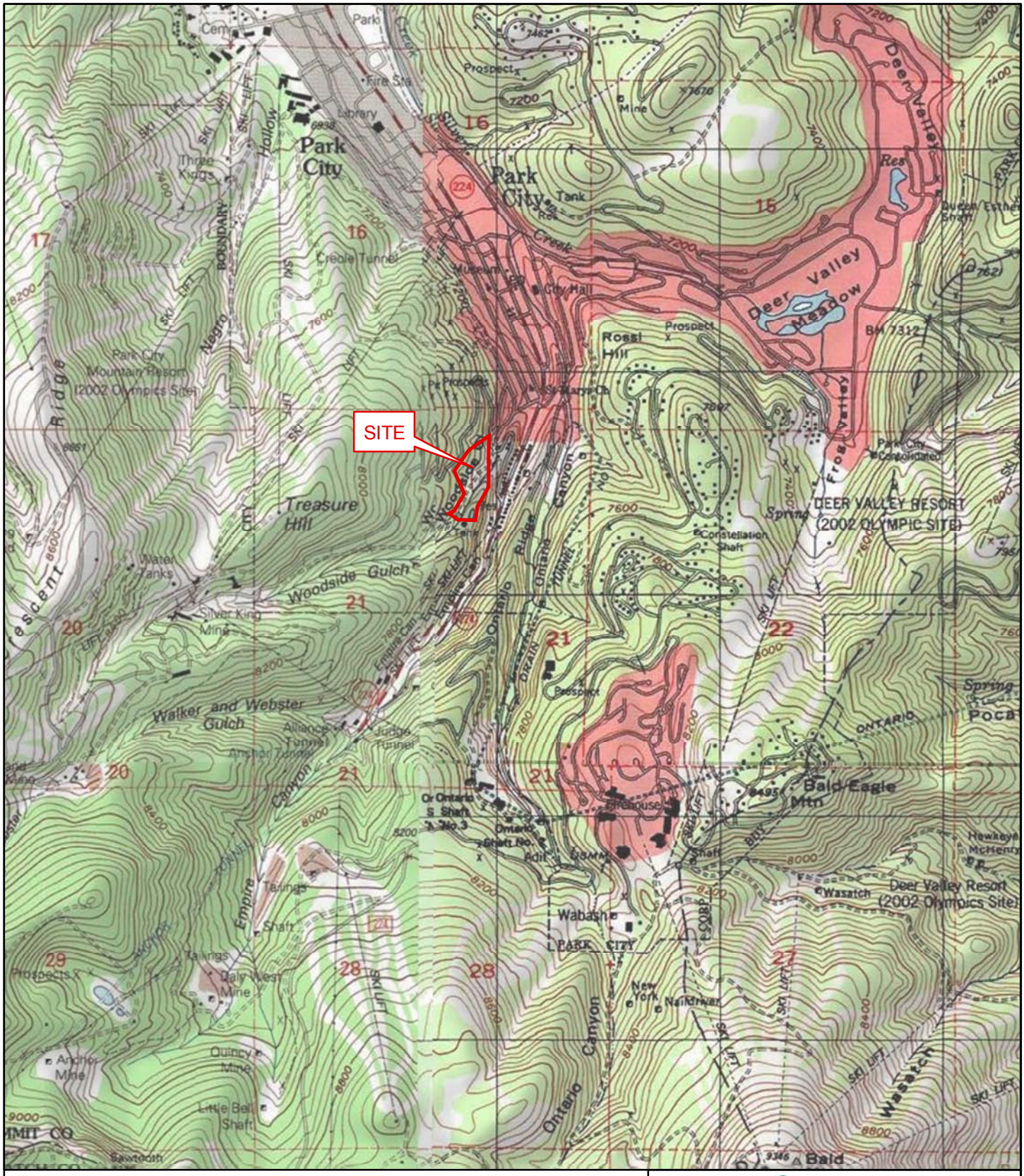
REK/KMH:

FIGURES



Heber City, Brighton, Park City West, and Park City East Quadrangles
USGS 7.5 Minute Series (Topographic)

amec
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Sandy, Utah 84070
Tel: (801) 999-2002
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Figure 1
Vicinity Map

Alice Lode Site
King Development Group, LLC
Park City, Utah

Alice Lode\Drawings\
GIS\Request_121908\
Figure1.mxd
Job No. 5-814-000223

Map Document: (X:\Projects\5-814-000223\MXD\Request_121908\Figure 1 Vicinity Map.mxd) 12/19/2008 -- 11:13:39 AM

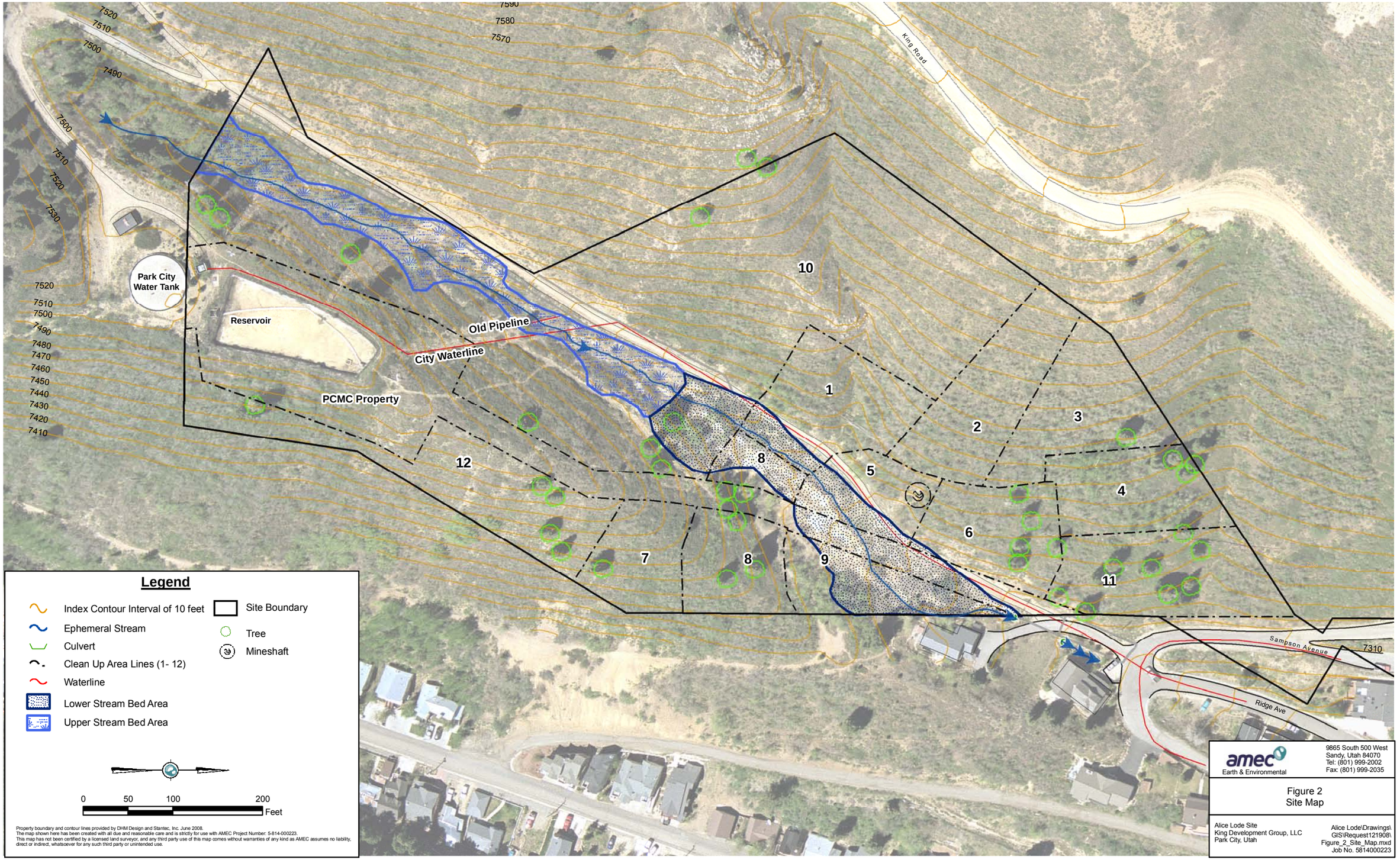

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Figure 2
Site Map

Alice Lode Site
King Development Group, LLC
Park City, Utah

Alice Lode\Drawings\GIS\Request121908\Figure_2_Site_Map.mxd
Job No. 5814000223

Park City Water Tank

Reservoir

PCMC Property

Old Pipeline

City Waterline

King Road

Ridge Ave

7310

1 2 3 4 5 6 7 8 9 10 11 12

Legend

- Index Contour - 10 foot
- Ephemeral Stream
- Culvert
- Road
- Clean Up Areas Lines (1-12)
- Mine Tailings
- Fluvial Deposits (lead concentrations above 2100 mg/kg)
- Concentrations of lead above 4000 mg/kg (outside of mine tailings)
- Concentrations of lead above 2100 mg/kg
- Concentrations of lead above 400 mg/kg
- Site Boundary
- Tree
- Mine Shaft
- 1 - 12 Cleanup Areas

Property boundary and contour lines provided by DHM Design and Stantec, Inc. June 2008.
The map shown here has been created with all due and reasonable care and is strictly for use with AMEC Project Number: 5-814-000223.
This map has not been certified by a licensed land surveyor, and any third party use of this map comes without warranties of any kind as AMEC assumes no liability, direct or indirect, whatsoever for any such third party or unintended use.

0 50 100 200 Feet

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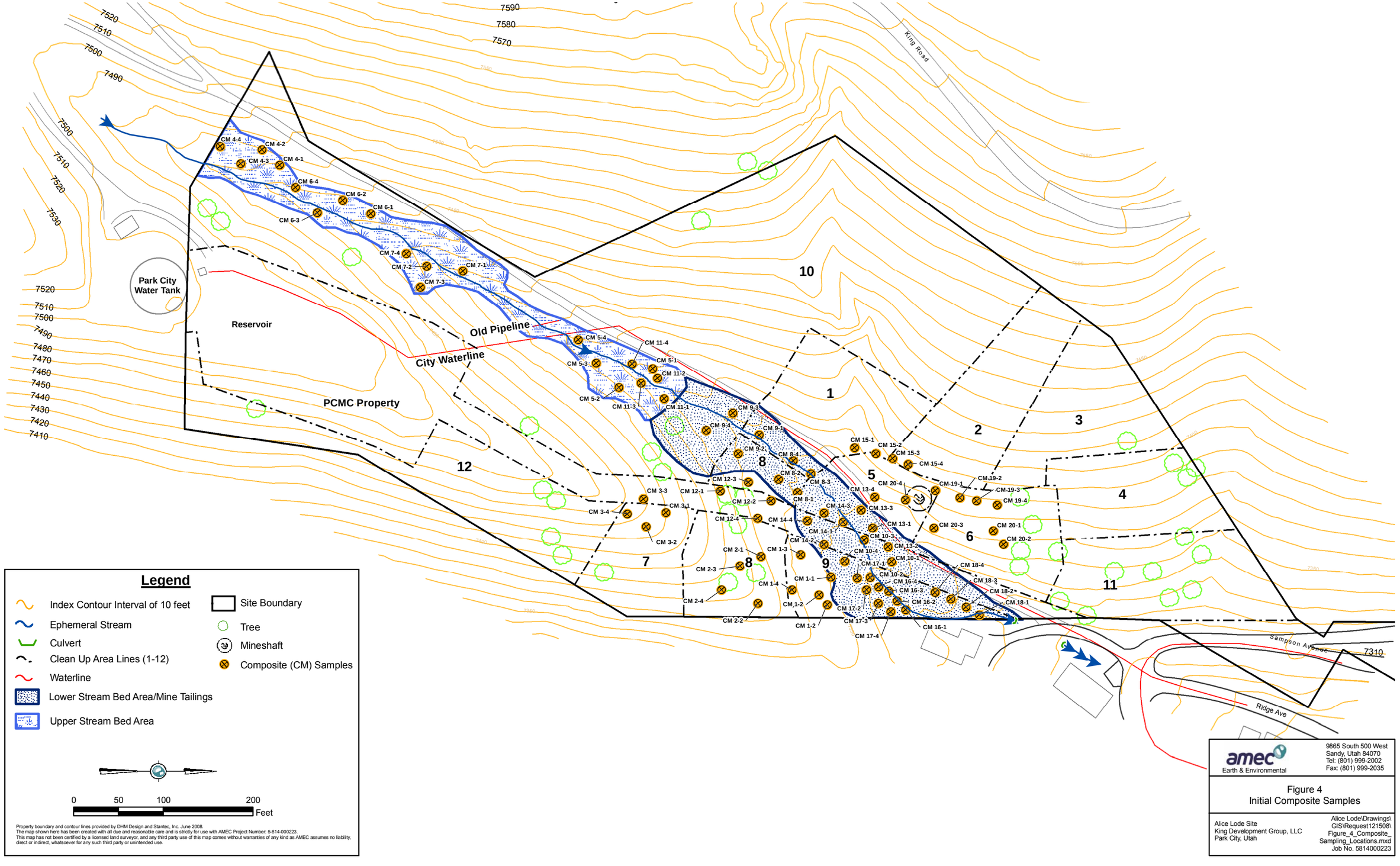
Figure 3
Lead Concentration Map 2006

Alice Lode Site
King Development Group, LLC
Park City, Utah

Alice Lode\Drawings\GIS\Request121908\Figure_3_Lead_Concentration_map.mxd
Job No. 5814000223



Legend

- Index Contour Interval of 10 feet
- Ephemeral Stream
- Culvert
- Clean Up Area Lines (1-12)
- Waterline
- Lower Stream Bed Area/Mine Tailings
- Upper Stream Bed Area
- Site Boundary
- Tree
- Mineshaft
- Composite (CM) Samples

0 50 100 200 Feet

Property boundary and contour lines provided by DHM Design and Stantec, Inc. June 2008.
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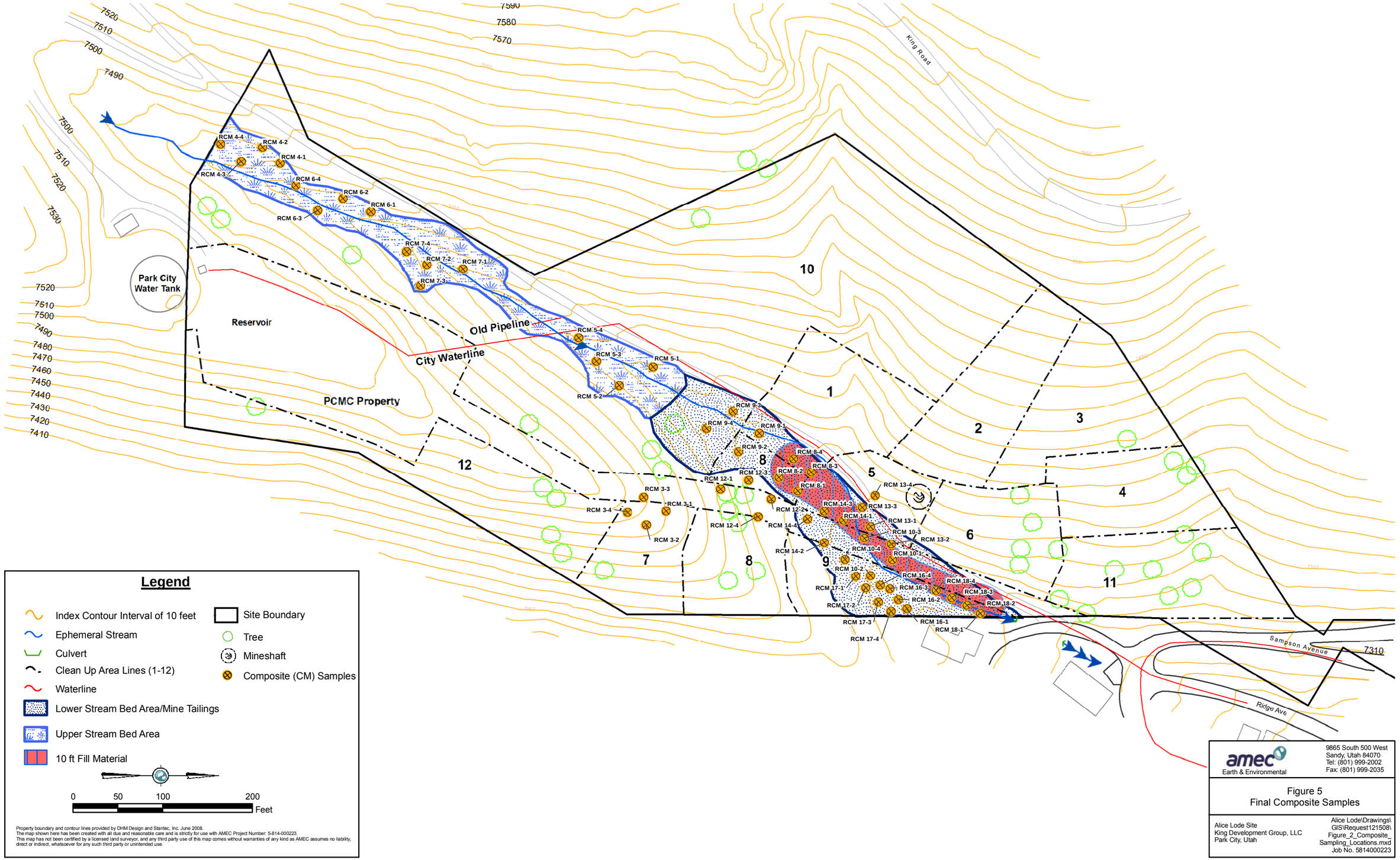
Figure 4
Initial Composite Samples

Alice Lode Site
King Development Group, LLC
Park City, Utah

Alice Lode\Drawings\GIS\Request121508\Figure_4_Composite_Sampling_Locations.mxd
Job No. 5814000223

Map Document: (X:\Projects\5-814-000223\MXD\Request_123008\Figure_4_Composite_Sampling_Location_working.mxd) 1/9/2009 -- 10:03:38 AM



Legend

- Index Contour Interval of 10 feet
- Ephemeral Stream
- Culvert
- Clean Up Area Lines (1-12)
- Waterline
- Lower Stream Bed Area/Mine Tailings
- Upper Stream Bed Area
- 10 ft Fill Material
- Site Boundary
- Tree
- Mineshaft
- Composite (CM) Samples

0 50 100 200 Feet

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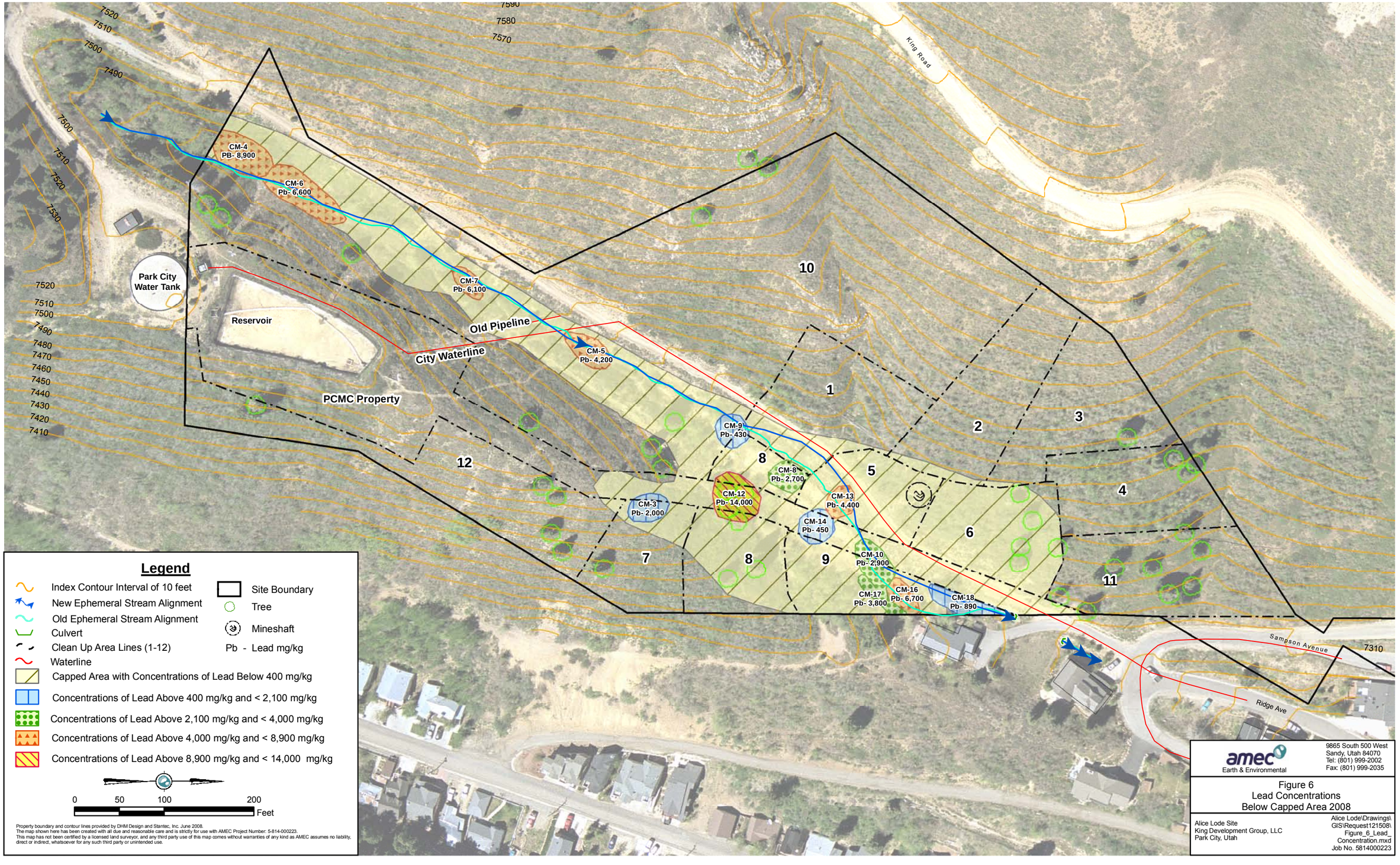
Figure 5
Final Composite Samples

Alice Lode Site
King Development Group, LLC
Park City, Utah

Alice Lode\Drawings\GIS\Request121508\Figure_2_Composite_Sampling_Locations.mxd
Job No. 5814000223

Map Document: (X:\Projects\5-814-000223\MXD\Request_123008\Figure_5_Final_composite_Samples.mxd) 1/9/2009 -- 11:04:33 AM



Legend

- Index Contour Interval of 10 feet
- New Ephemeral Stream Alignment
- Old Ephemeral Stream Alignment
- Culvert
- Clean Up Area Lines (1-12)
- Waterline
- Site Boundary
- Tree
- Mineshaft
- Pb - Lead mg/kg
- Capped Area with Concentrations of Lead Below 400 mg/kg
- Concentrations of Lead Above 400 mg/kg and < 2,100 mg/kg
- Concentrations of Lead Above 2,100 mg/kg and < 4,000 mg/kg
- Concentrations of Lead Above 4,000 mg/kg and < 8,900 mg/kg
- Concentrations of Lead Above 8,900 mg/kg and < 14,000 mg/kg

0 50 100 200 Feet

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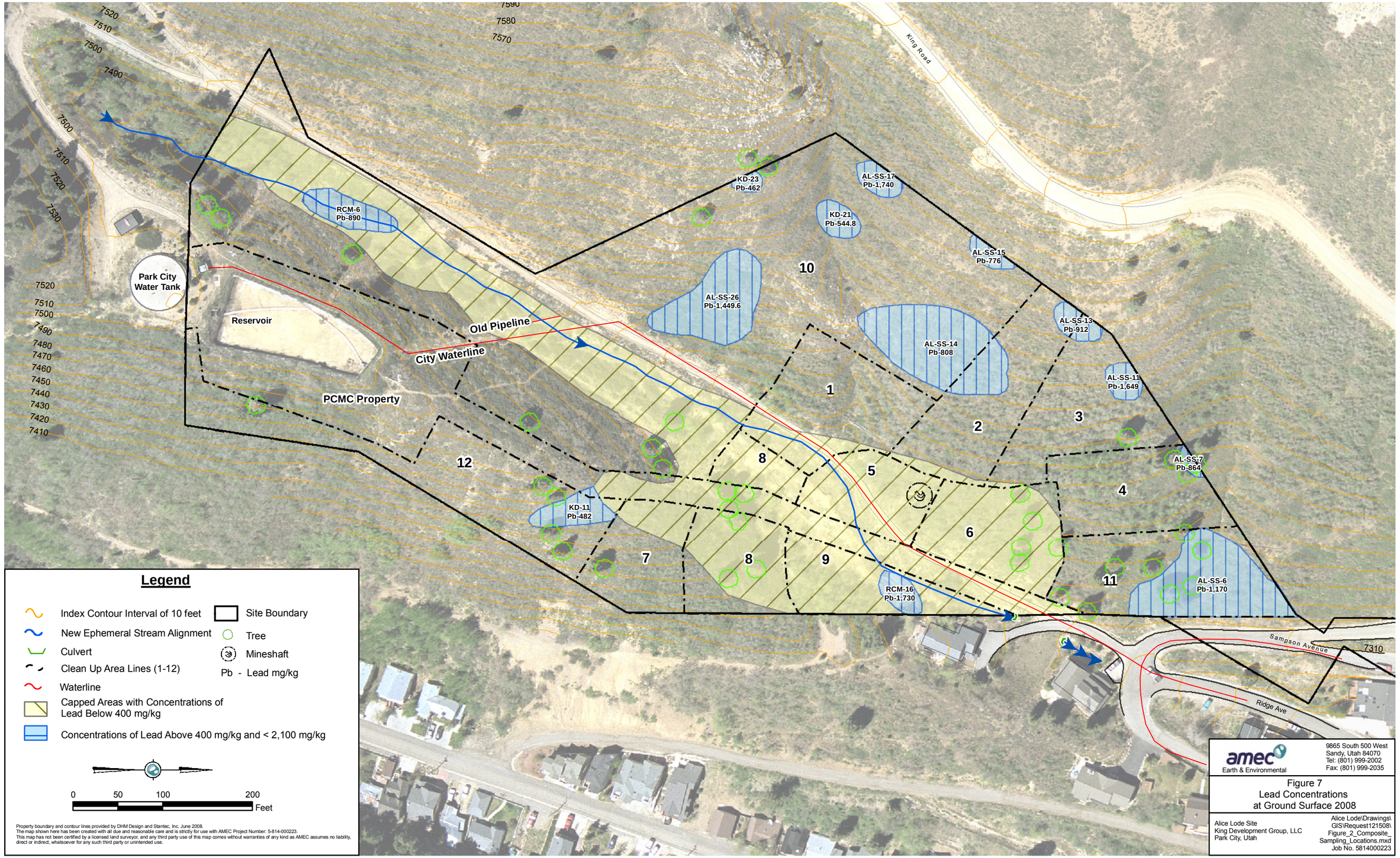
Figure 6
Lead Concentrations
Below Capped Area 2008

Alice Lode Site
King Development Group, LLC
Park City, Utah

Alice Lode\Drawings\GIS\Request121508\Figure_6_Lead_Concentration.mxd
Job No. 5814000223



Legend

- Index Contour Interval of 10 feet
- New Ephemeral Stream Alignment
- Culvert
- Clean Up Area Lines (1-12)
- Waterline
- Capped Areas with Concentrations of Lead Below 400 mg/kg
- Concentrations of Lead Above 400 mg/kg and < 2,100 mg/kg
- Site Boundary
- Tree
- Mineshaft
- Pb - Lead mg/kg

0 50 100 200 Feet

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Figure 7
Lead Concentrations
at Ground Surface 2008

Alice Lode Site
King Development Group, LLC
Park City, Utah

Alice Lode\Drawings\GIS\Request121508\Figure_2_Composite_Sampling_Locations.mxd
Job No. 5814000223