REPORT

SUPPLEMENTAL SOILS INVESTIGATION

Copper Flat Project

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1.0 INTRODUCTION

The Copper Flat Project (Project) is the proposed re-establishment of a poly-metallic mine and processing facility located near Hillsboro, New Mexico (Figure 1). The Project would consist of an open pit mine, flotation mill, tailings storage facility (TSF), waste rock disposal facility (WRDF), a low grade ore stockpile (LGOS) and ancillary facilities. The Project is owned and operated by the New Mexico Copper Corporation (NMCC), a wholly owned subsidiary of THEMAC Resources Group, Limited (THEMAC). On July 18, 2012 THEMAC submitted a Permit Application Package (PAP) in accordance with the New Mexico Non-Coal Mining Regulations (19.10.6 New Mexico Administrative Code [NMAC]), as promulgated under the statutory authority of the New Mexico Mining Act (NMMA) of 1978 (Section 69-36-4 et. seq).

Golder Associates Inc. (Golder) was retained by NMCC to assist with the preparation of the PAP for the Project including the development of a Mining Operation and Reclamation Plan (MORP). Under NMAC 19.10.6.602.D (13), applicants are required to submit a Baseline Data Report (BDR) to *describe the environment of the proposed permit area and, to the extent practicable, the affected area*. The BDR for the Copper Flat Project was included with the PAP submittal and included (among other things) soil survey and analytical data to support reclamation and post-mining closure (19.10.6.602.D (13)(e) NMAC).

NMCC received MMD's comments on the PAP including the BDR on February 18 2013. Many of MMD's comments were related to soil resources, specifically regarding discrepancies among various reports about the available volume of suitable soils and borrow materials as well as the potential deficit of growth media to salvage.

1.1 Previous Studies

The Copper Flat BDR was prepared by INTERA with support from other consulting firms (2012). Stetson Engineers Inc. (Stetson) completed an Order 1 soil survey for the BDR and made a preliminary evaluation of cover material sources within the TSF and adjacent areas in Greyback Arroyo as well as selected locations in western portions of the permit area. Soil suitability was evaluated based on provisional suitability specifications developed for the soil survey effort (Section 6, BDR). These specifications were adapted from Natural Resources Conservation Service (USDA-NRCS, Soil Survey Staff, 1996) criteria and MMD guidelines (MMD, 1996) relative to soil and landscape properties.

Golder has reviewed Stetson's report (Stetson, 2011) and found that it generally was an accurate Order 1 soil survey given their level of effort and scope. However, the information provided in report is incomplete to fully evaluate cover materials for mine reclamation. First, Stetson provided no characterization data for potential cover materials found below a depth of approximately 200 cm (about 6.5 feet). Moreover, test pits were often terminated when an unsuitable horizon was encountered. Second, the provisional suitability criteria emphasized soil materials with particle size distributions that potentially could lead to the

placement of highly erodible materials on the surface. Golder's reclamation experience indicates that medium- to moderately fine-textured materials (silt loams and clay loams) with low rock contents are not desirable on the final surface, especially in outslope positions (See Section 3.4). Finally, Stetson identified several borrow areas outside the design limits of the mine facilities which would ultimately lead to additional mine-related disturbance.

Golder had the opportunity to describe and collect soil samples from the deeper materials during the geotechnical investigation conducted in December 2012 and January 2013. The geotechnical investigation was conducted in support of the tailing impoundment design; however, the investigation provided an opportunity to gain additional information about potential cover material for reclamation.

1.2 General Environmental Setting

The Copper Flat Project proposed permit area covers 2,189.5 acres within the Mexican Highlands section of the Basin and Range Physiographic Province. The permit area is located in the Hillsboro Mining District in the Animas Hills, formed by a horst on western margin of the Rio Grande rift (INTERA, 2012). The geology of the Hillsboro district is dominated by Cretaceous andesite flows, breccias, and volcaniclastic rocks (McLemore, 2001). The Palomas Basin is immediately east of the Animas uplift and contains a thick sequence of Tertiary and Quaternary alluvial sediments of the Santa Fe Group (INTERA, 2012). The climate is semi-arid, characterized by low rainfall, wide diurnal and annual temperature ranges. The mean annual precipitation is about 12.5 inches and a mean annual temperature is near 58°F (WRCC, 2012). The landscape consists of the hills and piedmont of the Animas Hills, with fan piedmont and arroyo landforms. The site lies within the transition zone between Chihuahuan Desert Scrub and the Desert Grassland Ecotone according to Dick-Peddie (1999). Dominant vegetation within the proposed permit area include: honey mesquite (*Prosopis gladulosa*), creosote (*Larrea tridentata*), tarbush (*Flourensia cernua*), and a mix of warm season grasses.

1.3 Cover Performance Objectives

As part of the Reclamation Plan, soil and borrow materials are to be salvaged and stockpiled for use as cover at closure. The Copper Flat Project reclamation would be designed to achieve a self-sustaining ecosystem appropriate for the climate, environment and land uses of the area. NMCC has selected both grazing and wildlife habitat PMLU for the Copper Flat Project. The cover performance objectives include establishment of a self-sustaining ecosystem, protection of the waste materials from wind and water erosion, and reduction of infiltration of water into the underlying waste materials. The key design criteria related to the cover system are its ability to store and release water, support vegetation, and resist wind and water erosion to the extent practicable.

The intent of this report is to document and quantify soil resources at Copper Flat in support of mine permitting and reclamation planning in accordance with MMD guidelines with consideration of

performance objectives for the soil cover system. This report summarizes supplementary soils data gathered since the MORP submittal. Supplementary data includes samples and field descriptions collected during the geotechnical investigation in and around the footprint of the proposed East Waste Rock Disposal Facility (WRDF) and Tailing Storage Facility (TSF). Additionally, revised suitability criteria are discussed. Information from this investigation will be used to develop salvage strategies for the growth media stockpiles as part of the growth media management plan in conjunction with the construction of the WRDF and TSF. An estimate of the total volume of suitable soil materials available for closure is provided.

2.0 METHODS

Prior to expanding the disposal areas (TSF and WRDF) into the currently undisturbed areas, reclamation cover materials are to be removed and stockpiled for future use in growth media stockpiles (Figure 2). Thus, the focus of this investigation is in the TSF and East WRDF footprints. The field methods employed in this investigation are detailed in Section 2.1. The soil sampling and laboratory methods are summarized in Section 2.2.

2.1 Field Methods

As part of the geotechnical site investigation conducted between December 2012 and January 2013 Golder described 31 test pit excavations in and around the footprint of the proposed WRDF and TSF (Plate 1). Test pits were excavated with a Case CX210B or Terex 7606 hydraulic backhoe to depths up to 20 feet (approximately 610 cm). The soils were described in the field, primarily for geotechnical properties; however, abbreviated descriptions according to national soil survey standards (Soil Survey Division Staff, 1993) were also made. Abbreviated descriptions included depth interval, soil texture, rock fragment content, color, consistence, cementation, and reaction with weak acid. After describing and sampling the soils, all excavations were backfilled and smoothed to match preexisting land conditions.

2.2 Soil Sampling and Laboratory Methods

A total of 48 samples were collected from 12 representative test pits for soil suitability testing. One to five soil intervals were sampled from each excavation and placed into 1-gallon plastic bags. The fine-earth fraction (less than 2 mm) was collected and the larger rock fragments (greater than 75 mm) removed. The samples were shipped to Energy Laboratories in Billings, Montana, for laboratory analyses.

The bulk soil samples collected for fine-earth analysis were air-dried and passed through a 2-mm sieve at the laboratory. The less than 2-mm soil fraction was analyzed for the parameters listed in Table 1. MMD waived sodium adsorption ratio, selenium, and boron analyses as part of this testing program because data presented in the BDR indicated they did not present a problem and they are not normally associated with igneous parent materials (Vinson, 2013). Very fine sand was analyzed to support the estimation of the K-factor (soil erodibility). The soil analyses methods are consistent with the MMD guidelines (1996). The primary references for the analytical techniques include Agricultural Handbook No. 60 (Salinity Laboratory Staff, 1954) and Methods of Soil Analysis (ASA Mono#9, 1982).

3.0 SOIL RESOURCES CHARACTERIZATION

Soil types at Copper Flat vary, as soils are products of the interactions among parent materials, topography, vegetation, climate, and time. Soils are typically described and classified to a depth of 200 cm (Soil Survey Staff, 2010). The Order 1 survey completed by Stetson (2011) described the soils to depths of about 50 to 280 cm (1.6 to 9 feet). The soils were subsequently classified to the family level in the Keys to Soil Taxonomy (Soil Survey Staff, 2010). This data is presented in the BDR. For this report, the soils were evaluated for reclamation suitability to depths up to 20 feet (approximately 610 cm).

3.1 Soils of the Tailing Storage Facility

The soils within the current TSF footprint generally consist of very deep, well drained soils formed in mixed gravelly alluvium. They occur on the fan piedmont with slopes ranging from about 1 to 15 percent. Moving further east, outside of the current TSF footprint, the soils formed in mixed gravelly alluvium on gentler slopes (0-5%) of the fan remnant and the nearly level terrace of Greyback Arroyo.

Twenty six test pits were excavated in the proposed perimeter of the tailing impoundment (Plate 1). Six of these pits were excavated within the disturbance limit of the existing tailing impoundment. The north cell (area north of the splitter dam) contains tailings mined by Quintana in the 1980s. Three test pits were located in the north cell (TP-9, -10, and -11). The north cell has a 1- to 3-foot soil cover over tailings. The tailing thickness is greatest near the starter dam. The soils from the south cell were used to cover the tailings in the north cell. TP-24, -25, and -26 were excavated in the south cell borrow area. The reclaimed borrow area of the south cell occurs at approximately 15 feet below the undisturbed grade. Thus, these three pits exposed the deepest materials (moderately cemented conglomerate). Eight test pits were excavated east of the existing impoundment on the slopes of the undisturbed ridges. The remaining twelve test pits were excavated east of the existing tailing impoundment on the fan remnant and terrace.

The test pit field descriptions are presented in Table 2. In general, soil textures are finer in the upper 5 feet and become coarser with depth. The dominant soil textures are sandy loam, loam and sandy clay loam, though in several locations moderately fine-textured and fine-textured horizons were observed. A deposit of clays weathering in place and extending to a depth of 20 feet was found at TP-15 at the base of the starter dam. The clays are localized, as this was the only test pit that encountered this material. Excluding the tailing horizons, volumetric rock fragment content (> 2 mm diameter) ranges from about 0 to 75 percent. The rock fragments generally occur as gravels and cobbles. Stones are rare, but stones up to 20 inches in diameter were exposed. The deeper materials have greater amounts of rock fragments and varying degrees of silica cementation. The majority of cemented layers were broken by the excavation equipment. The track-mounted excavator was able to break through most cemented horizons, except the deepest horizons due to the confined space of the excavations. Calcium carbonate is present

throughout the profiles as cemented masses, coatings on rock fragments or disseminated. Cemented calcic horizons (petrocalcic) are common in the upper 2 to 3 feet of the soil profiles.

3.2 Soils of the East WRDF

The proposed footprint for the East WRDF occurs on the backslope and footslope of Animas Peak. The slopes range from about 2 to 60 percent. The soils in the proposed footprint are shallow to deep, well drained soils that formed residuum and colluvium from volcanic rock (andesite).

Five test pits were excavated at the proposed East WRDF. TP-6 was located outside of the proposed WRDF footprint but within the footprint of growth media stockpile GM-1. The soils consist of very gravelly/cobbly to extremely gravelly/cobbly sandy loams, loams and sandy clay loams (Table 2). Volumetric rock fragment content ranges from about 30 to 90 percent, predominantly gravels and cobbles. The deepest materials were generally comprised of fracturing andesite (90% rock). Weathering andesite outcrops are visible at the surface on the backslope of Animas peak. Calcium carbonate is present throughout the profiles as cemented masses, coatings on rock fragments or disseminated. Cemented calcic horizons (petrocalcic) are common in the upper 2 to 3 feet of the soil profiles.

3.3 Laboratory Characterization

The laboratory data of selected samples were used to further describe the physical and chemical characteristics of the soil resources at Copper Flat. Laboratory reports are included as Appendix A.

3.3.1 Physical Properties

Soil physical properties determined at the laboratory are presented in Table 3. The soils are moderately coarse-textured to moderately fine-textured. Soil erodibility (K-factors, wind erosion group), and available water capacity were determined from the physical properties and are also included in Table 3.

Soil erodibility determinations of a natural soil body are only made for the surface soil horizon, as this is the layer susceptible to erosive factors (wind and water). Since reclamation activities are likely to involve salvaging and stockpiling soils in a homogenized growth media stockpile, each soil horizon was evaluated for erodibility. The growth media stockpiles are expected to include all soil horizons or a selective subset of the soil horizons.

The fine-earth soil erodibility (Kf) is estimated solely from the less than 2-mm fraction, whereas the whole soil-erodibility (Kw) is estimated by adjusting Kf for the appropriate rock fragment content. K-factors quantify soil detachment by runoff and raindrop impact and are used in the Revised Universal Soil Loss Equation (RUSLE). A larger K-factor implies a greater degree of soil erodibility. RUSLE primarily predicts soil loss associated with sheet erosion (Renard et al., 1997). Soils with rock fragments have an armoring affect, thus Kw reflects the degree of protection provided by those fragments. Kf-factors for the soils at

Copper Flat range from 0.15 to 0.43 with an average around 0.26. The Kw-factors range between 0.03 and 0.33; the average Kw is 0.12.

Increasing silt content (along with very fine sand) increases a soils susceptibility to erosion. The soils at Copper Flat have between 13 and 52 percent silt of the fine-earth fraction (<2 mm). This highlights the importance of rock fragments when evaluating erodibility. For example, samples TP-16 (4-7 ft) and TP-3 (2-7 ft) have similar silt contents and are in the same texture class but have very different rock fragment contents, 10 percent and 65 percent respectively (Table 3). The erodibility on the whole soil basis (Kw) for TP-3 is reduced by nearly 80%, going from a Kf of 0.30 (fine-earth) to a Kw of 0.07 (adjusted for 65% rock fragments). Although the Kf factor for TP-16 is also influenced by the greater amount of very fine sands, the 10% rock fragments found in the sample only account for a 30% reduction in erodibility (Kf 0.41 to Kw 0.28). This relationship emphasizes the significance rock armoring plays in selection of the soil resources salvaged for reclamation.

Wind erosion can be widespread in regions of low rainfall, especially during periods of drought. Susceptibility of a soil to becoming wind-blown was evaluated and the appropriate wind erodibility group was assigned. The Copper Flat soils generally have a moderate wind erodibility hazard.

Available water capacity (AWC) was estimated from soil texture and corrected for rock fragments. Commonly referred to as water retention, it is the amount of water that the soil can hold between field capacity and wilting point pressures. However, in contemporary soil physics the field capacity concept is recognized as somewhat arbitrary and lacks a universal physical basis (Hillel, 2004). Field capacity is defined as the water content at which internal drainage (after redistribution) becomes essentially negligible. The redistribution and drainage process is continuous and highly dependent on depth of wetting and the antecedent water content, plus the presence of impeding layers and/or a water table would affect the rate and extent of redistribution. Similarly, the wilting point pressure if defined simply as the water content at which plants can no longer extract water and wilt is not easy to recognize. The permanent wilting point is more dependent on the soils ability to transmit water rather than the plant's ability to withstand drought. The upper and the lower retention limits are commonly defined at static pressures (-1/10 or -1/3 bar for field capacity and -15 bar for wilting point) regardless of the dynamic nature of soil wetness. The purpose of the AWC estimation is to address the need for a simple criterion to characterize the soils ability to retain water. The AWC concept is typically applied in an agricultural situation for irrigation management, and may not reflect how native plants adapted to a semi-arid climate will respond.

The AWC estimates made for the Copper Flat soils were based off the general relationship between water retention and soil texture. Site-specific soil water characteristic (retention) curves may be required to further evaluate available water capacity with respect to cover design and performance. AWC

estimates made for the Copper Flat soils were calculated on the amount (inches of water) in 1 foot of soil based on the horizon's physical characteristics. This method is intended to characterize the water retention of the soils after salvaging. The estimates of available water capacity for the Copper Flat soils range from about 0.36 to 2.16 inches of water per 1 foot of soil (Table 3). The actual water retention of the salvaged soils will vary based on the types of soil materials that are placed in the growth media stockpiles.

3.3.2 Chemical Properties

Generally, the soils in the Copper Flat Project area have few inherent chemical limitations for growth of native and reclamation plant species. Chemical properties of the soils are listed in Table 4. Laboratory reports are included in Appendix A. The soils are predominantly non-saline (electrical conductivity [EC] less than 2.0 deciSiemens/meter [dS/m]). There are a few test pits that are slightly saline in the deepest horizons (EC 2.0 to 4.5 dS/m). The soils are slightly to moderately alkaline (pH 7.4 to 8.1).

Calcium carbonate ($CaCO_3$) equivalent percent ranges from about 3 to 60%. In general, the $CaCO_3$ content increases with depth up to about 2 or 3 feet where the accumulation from climatic-controlled pedogenic processes occurs. Below about 3 feet the distribution gradually decreases with depth. Weighted averages of the total profile ranges from 11 to 40%. The weighted averages represent $CaCO_3$ content of the whole profile. The suitability of calcareous soils is discussed in more detail in section 3.4. Select soil samples were also analyzed for primary macronutrients. Nitrogen, phosphorus, and potassium are at low to high concentration ranges for nutrient suitability ratings (Table 4).

The ammonium bicarbonate–diethylene-triamine penta-acetic acid (AB-DTPA) extractable metals are listed in Table 5. The AB-DTPA method is an aggressive extraction developed to diagnose trace elements nutrient deficiencies in crop plants and represents both the solution and exchangeable fractions of trace elements in soils. Soil samples had high concentrations of copper and manganese according to the MMD standards (MMD 1996); however, these elements are considered micronutrients, and are essential for plant growth. Toxicity levels are organism-specific and the availability of these nutrients to plants is dependent on pH, redox potential, and degree of weathering. Specifically, copper and manganese solubility (availability to plants) is lower with increasing pH and under aerobic soil conditions. The elevated AB-DTPA extractable metals in native materials, appears to reflect the weathering of the mineralized rock in permit area. Several samples collected from the near surface materials suggests there are no constraints envisioned with elevated metals and the performance of native and adapted plants. The samples collected from TP-9 were from the native soil underlying tailing and have high copper and molybdenum concentrations. The tailing and underlying soils may be used in the construction of the tailing impoundment as evaluated in the geotechnical investigation (Golder, 2013).

The acid-forming potentials of the soil samples were evaluated through static sulfur-speciation tests (Sobek et al., 1978). The soils at Copper Flat have positive acid-base accounts (ABA) and little to no potential to generate acid (Table 6). ABA were calculated from the nitric acid (HNO_3) extractable sulfur, which extracts the acid-producing (pyritic) sulfur forms. Total sulfur concentrations are low (0.01 to 0.07 percent) and are predominantly the non-acid-generating forms (e.g. gypsum). Residual sulfur concentrations are about 0.01 to 0.02 percent. The samples from the soils underlying tailing (TP-9) have 0.01 to 0.02 percent sulfides (pyritic, acid-forming); however, these account for negligible acid generation potential (<1 ton per kiloton). Neutralizing potentials range from about 50 to 600 tons $CaCO_3$ per kiloton of soil.

3.4 Reclamation Suitability

Reclamation suitability is based on the material's ability to provide erosion control, sustain vegetation, and reduce infiltration of stormwater through the underlying materials. The proposed soil cover system for the Copper Flat Project is a store-and-release or evapotranspiration (ET) cover. A store-and-release cover system stores precipitation during wet periods and releases the moisture back to the atmosphere via evapotranspiration during dry periods. The net effect is a significant reduction of drainage into the deeper waste profile, and ultimately seepage. Drainage is water that infiltrates the soil surface that is not subsequently lost through evaporation or transpiration. ET covers have been shown to be effective in limiting drainage in arid and semiarid regions with high net potential ET (Nyhan et al., 1990; ITRC, 2003; Albright et al., 2004).

In general, soils and underlying colluvial and alluvial materials in the permit area are considered suitable and have relatively few limitations for growth of native and adaptive reclamation plant species. On the basis of the laboratory data, the chemical characteristics of the soil samples are suitable with respect to pH, salinity, and specific ion plant toxicity. The ABA data suggest the materials are unlikely to generate excess acidity.

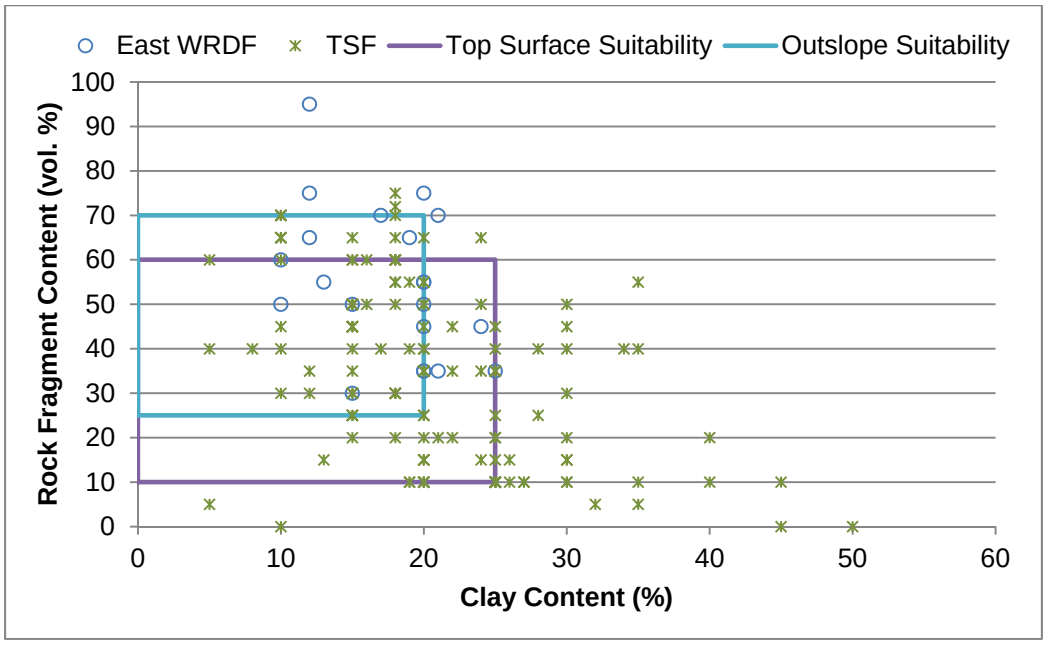
The soils salvaged for reclamation are intended to have physical properties that will enable the cover to meet all three performance objectives: protect against erosion, establish vegetation, and limit drainage. The ability of the soil to meet these cover performance objectives is directly related to the physical properties of the soil, specifically the surface texture and rock fragment content as discussed in Section 3.3.1. Golder's experience with soil covers in the Southwest coupled with extensive long-term soil water balance and erosion modeling have shown the importance of using coarser materials on the soil cover surface. Coarser textured soils were shown to have superior performance as soil covers related to their ability to resist erosion and capture water (high infiltration capacity) associated with the high intensity summer rains that characterize this region. In contrast, medium and fine textured materials have lower infiltration rates that are further reduced by formation of surface crusts. These factors decrease the amount of water that enters the soil resulting in reduced plant performance. The problems associated with

finer textured soils are aggravated because the plant community is dominated by warm-season grasses, which are favored by a summer precipitation regime.

Therefore, the preliminary specification for the Copper Flat project presented here focuses on the texture and rock content of the soils. Cover placed on the outslopes of a reclamation unit would be limited to soils with less than about 20% clay and contain approximately 25 to 70% rock fragments by volume. This type of cover has been successfully implemented at other mine reclamation projects in New Mexico, where outslopes are typically constructed at 3:1 or 4:1 slopes. The constructed top surfaces have less erosion potential due to the nearly level grade; therefore, the cover specification is more flexible, allowing for increase in clay (about 5%) and reduction in volumetric rock fragment content.

Clay content and rock fragments from the Copper Flat test pit investigation are graphed in Chart 1 below. Each point represents data from a single soil horizon. Compared to the preliminary cover specification, the soils at Copper Flat show a wide range of materials that meet the criteria and some material outside of the criteria.

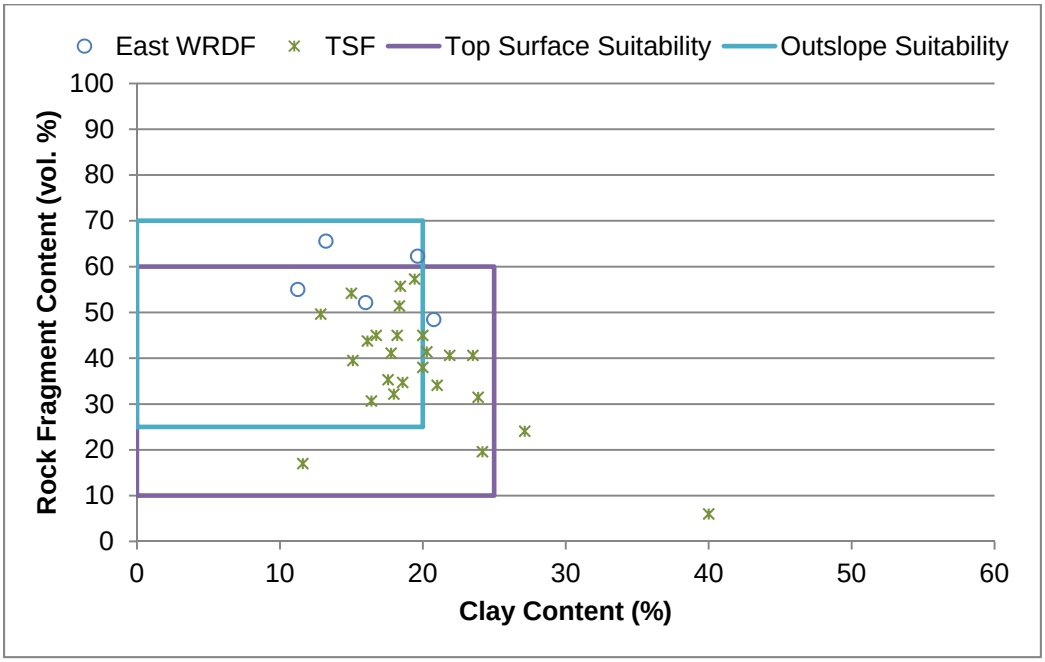
Chart 1: Copper Flat Soils – Clay Content vs. Rock Fragments



Specifically, there are sufficient locations with soil horizons that meet the outslope criteria. There are also soil horizons that would only be suitable for use on the top surfaces. About one fifth of the individual horizons are considered unsuitable due to high clay content and/or low rock fragment content. These unsuitable horizons were generally associated with medium-textured surface soils, argillic (Bt) horizons that occur in the upper 5 feet (150 cm) and the localized clay deposit found at TP-15. On a weighted average basis, the distribution of suitable soils becomes centered around the materials that are both

suitable for use on the top surfaces and the outslopes. Chart 2 illustrates the weighted average clay and rock percent for each test pit evaluated during the supplemental soils investigation.

Chart 2: Copper Flat Soils - Weighted Average Clay vs. Rock Fragments



From a whole profile basis (weighted average), nearly 68% of the test pits meet the soil suitability criteria for outslope cover and 87% meet the specifications for top surface cover. Only two locations (TP-8 and TP-15) had finer textured materials than recommended for use as soil cover. These appear to be relatively local occurrences in relation to nearby test pits, but it highlights the need for oversight during salvage operations.

The provisional suitability criteria presented in the BDR proposed limits on the $CaCO_3$ content in the soils used for cover. Golder understands that the criterion was primarily derived from MMD coal guidelines and similar NRCS soil interpretations rating guidelines indicating that excess lime (soil carbonates) may restrict the growth of some plants (USDA-NRCS, Soil Survey Staff, 1996). Native semi-arid plant communities at Copper Flat and throughout the Southwest are well established on soils with elevated $CaCO_3$ content. The basis for NRCS interpretive rating of “severe” for a soil having greater than 40% $CaCO_3$ equivalent is based the carbonatic mineralogy class. However, the carbonatic mineralogy class lower limit (40%) was set to account for iron chlorosis seen in most agricultural crops at these levels and to define soils with decreased shrink-swell potential and increased compressive strength related to calcium carbonate dominance (Hallmark, 1985).

Studies performed looking at plant growth restrictions from $CaCO_3$ are typically performed for agricultural purposes as carbonates affect pH and nutrient availability (e.g. phosphorous). However, these studies don't typically characterize the responses of native plant species. As discussed in a meeting with MMD on April 25, 2013, comparable reclamation projects in Southwestern New Mexico using soil covers with 40% or greater $CaCO_3$ equivalent show a diverse plant community and dense canopy cover. This reflects the native species ability to adapt to carbonaceous soils. Golder does recognize the hazards associated with calcareous soils in a reclamation setting are related to surface crusting from fine-textured soils. With respect to potential nutrient deficiencies, available phosphorous (and iron) is pH dependent, a relationship that has been studied to develop fertilizer recommendations for agriculture (Brady and Weil, 2002). Phosphorous fixation as calcium phosphate generally occurs near pH 7.5. Similarly, insoluble forms of iron ($Fe[OH]_3$) form as soil pH increases. Soil carbonates react with water and raise soil pH, but because of the limited solubility of $CaCO_3$, the pH does not rise above 8.4. Thus, the dissolution (or precipitation) of $CaCO_3$ controls the soil pH in a range where phosphorus and iron are present in insoluble forms. Phosphorus and iron deficiencies are typically not observed in semi-arid adapted plant species.

Physical limitations of calcareous soils related to the root limiting petrocalcic horizon are recognized in a natural soil body. When salvaged, the petrocalcic horizons (and other cemented horizons) are broken by heavy equipment (e.g. D11 Dozer), resulting in a range of particle sizes including gravel and cobble sized fragments. The rock sized fragments contribute to the rock armor component of the soil cover.

The range of physical and chemical characteristics of available materials within the facility footprints is understood to be well represented by the laboratory data from the 12 test pits. Nominal variations are expected within the facility footprints, but would not affect the suitability.

Therefore, the majority of soil materials within the WRDF and the TSF footprints are expected to be suitable for salvage. Salvage practices that develop the borrow areas from the surface to depths up to 20 feet will result in growth media stockpiles that are suitable for both top surface and outslope cover, giving NMCC greater ability to manage the soil resources effectively. That said, the development of borrow areas will still require oversight by a qualified soil scientist and some selective handling to ensure suitable borrow materials are stockpiled. Soils meeting these suitability criteria should be readily identifiable in the borrow pits.

4.0 COVER VOLUMETRIC ESTIMATES

Where mine wastes are present, 36-inch soil covers were assumed. NMCC may wish to pursue, during operations, an alternate approvable cover design that will resist erosion, sustain vegetation and be equally protective of groundwater but is less than 36-inches thick. In that case, cover performance would be demonstrated using long-term soil water balance model simulations. Other reclamation units including the plant site, roads and other ancillary facilities will require a minimum of 6 inches of cover. An estimated 3.9 million (M) cubic yards (CY) of suitable soil and borrow materials will be required to meet the reclamation cover requirements (Table 7).

Stetson (2011) identified approximately 3.39 M CY of suitable cover materials based on the preliminary suitability criteria outlined in the BDR. As previously mentioned, the suitable materials identified by Stetson were limited to the upper soil horizons above horizons with elevated calcium carbonate or with large quantities of rock fragments. The borrow areas identified by Stetson were primarily located within the existing tailing impoundment and Greyback Arroyo. Furthermore, the provisional suitability criteria used in the BDR put preference on medium-textured soils that could potentially have a high erosion hazard due to limits placed on coarse fragments.

Based on the test pit investigation, suitable soil materials are available within the footprints of proposed mine facilities. The majority of the cover materials required to support revegetation and reclamation efforts are expected to be obtained from within the footprint of the proposed TSF during Phase 1 of mine development, however some materials will be salvaged from ancillary facilities, the pit area and the WRDF. Assuming a 20-foot excavation within the entire TSF footprint, there is approximately 14.8 M CY of cover materials. This volume is a gross estimate of materials assuming the majority (87%) of the area has suitable materials. Nevertheless, oversight and coordination would be required to optimize the handling of suitable cover materials. Golder estimates that within the projected footprint of the WRDF, assuming a 10-foot excavation, there is approximately 2.9 M CY of cover material. To obtain the necessary cover volume (3.9 M CY), a single 121-acre excavation to 20 feet would salvage sufficient materials. The majority of soil materials will be acquired and segregated from engineering materials in several borrow locations that will be developed during the construction of the TSF and WRDF (Golder, 2013). Specific locations to salvage borrow have yet to be identified as they will need to coordinate with engineering needs and be optimized for haul distance to growth media stockpiles. Further discussion of segregation and management of cover resources will be included in the MORP submittal. In addition, a borrow materials management plan will be prepared as the project develops.

In general, the soil materials identified in this investigation are considered suitable for use in the primary or secondary root zone and are assumed to be acceptable for use as soil covers as their physiochemical properties do not present any limitations to meeting the cover performance objectives. Limitations related

to salvage are primarily logistical and can be managed as part of a growth media management plan to be developed as part of the early phases of mine development in conjunction with engineering requirements.

5.0 CLOSING

Information from this investigation is intended to assist NMCC in their efforts to develop salvage strategies for the growth media stockpiles. Golder estimates that sufficient volumes of suitable material should be available at closure within the TSF and East WRDF footprints. The estimate of suitable material is based on the preliminary cover specification discussed in Section 3.4, which may be modified as the project develops.

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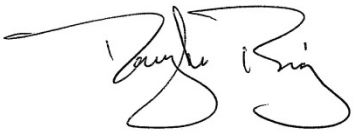

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EC/DR/rrj

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TABLES

Table 1: Analytical Methods for Chemical and Physical Soil Characterization

Analysis	Source-Method
Saturated Paste pH	USDA Handbook 60, Method 2 and 21a
Electrical Conductivity	USDA Handbook 60, Method 3a and 4b
Saturation percentage	USDA Handbook 60, Method 27a
Particle Size Distribution, including very fine sand	ASA Mono#9, Part 1, Method 15-5
Rock Fragment (>2mm)	Dry sieve (No. 10)/gravimetric
Acid-Base Account, Total sulfur1	Modified Sobek (Sobek et al., 1978)
ABDPTA extractable metals (As, Cd, Cu, Hg, Pb, Mn, Mo, Ni)	ASA Mono#9, Part 2, Method 3-5.2
$CaCO_3$ equivalent	USDA Handbook 60, Method 23c
Nitrate	ASA Mono#9, Part 2, Method 33-8.1
Phosphorous (Olsen)	ASA Mono#9, Part 2, Method 24-5.4
Potassium	ASA Mono#9, Part 2, Method 13-3.5

Table 2: Field Descriptions

Pit ID/ Depth (feet)			USDA Texture Class	Field Estimates vol %				Reaction with HCl	Color	Notes
	Sand	Clay		Gravel	Cobble	Stone	Total			
East Waste Rock Dump Facility Soils										
TP1 0-2	60	15	SL	20	30	-	50	Strong	7.5YR 6/2	
TP1 2-4	70	10	SL	25	25	TR	50	Strong	7.5YR 6/3	$CaCO_3$ masses, fracturing andesite
TP1 4-8	65	10	SL	10	25	25	60	Strong	7.5YR 63	Fracturing andesite
TP2 0-1	50	15	SL	25	5	-	30	Strong	7.5YR 4/3	Weak $CaCO_3$ cementation
TP2 1-2	40	20	L	30	5	-	35	Strong	7.5YR 8/2	
TP2 2-6	60	12	SL	45	20	TR	65	Strong	7.5YR 7/2	
TP2 6-7	45	12	L	50	25	-	75	Strong	7.5YR 6/3	Moderate $CaCO_3$ cementation in places
TP2 7-9	45	12	L	45	50	TR	95	Weak	-	Fracturing andesite
TP3 0-1	49	24	SCL	25	20	TR	45	Strong	7.5YR 4/3	
TP3 1-2	48	21	L	20	15	-	35	Strong	7.5YR 8/2	Moderate $CaCO_3$ cementation
TP3 2-7	44	19	L	40	25	TR	65	Strong	7.5YR 7/3	
TP3 7-9	46	21	L	40	25	5	70	Strong	7.5YR 5/3	$CaCO_3$ coatings on coarse fragments
TP3 9-11	50	17	L	50	15	5	70	Strong	7.5YR 5/4	Strong $CaCO_3$ cementation in places, bedrock (andesite)
TP5 0-1	54	20	SCL	30	25	-	55	Strong	10YR 5/4	
TP5 1-3	46	20	L	35	10	-	45	Strong	7.5YR 6/3	Weak $CaCO_3$ cementation in places
TP5 3-7	58	13	SL	40	15	-	55	Strong	7.5YR 6/3	Mod. $CaCO_3$ cementation in places, bedrock (andesite)
TP6 0-1	45	20	L	15	35	TR	50	Strong	10YR 4/3	
TP6 1-3	65	20	SL	20	15	-	35	Strong	10YR 7/3	
TP6 3-5	50	25	SCL	30	5	-	35	Strong	7.5YR 5/6	Moderate $CaCO_3$ cementation in places
TP6 5-7	65	20	SL	40	15	-	55	Weak	7.5YR 6/4	
TP6 7-13	60	20	SL	10	45	20	75	Weak	7.5YR 6/4	Fracturing andesite
Tailing Storage Facility Soils										
TP7 0-1.5	50	26	SCL	15	TR	-	15	Strong	7.5YR 4/4	
TP7 1.5-4	39	35	CL	10	-	-	10	Strong	5YR 4/4	
TP7 4-6	40	20	L	30	5	TR	35	Strong	7.5YR 7/2	Moderate $CaCO_3$ cementation
TP7 6-8	56	22	SCL	35	TR	-	35	Strong	7.5YR 6/2	$CaCO_3$ masses
TP7 8-10	64	19	SL	40	TR	-	40	Weak	7.5YR 5/3	Weakly cemented
TP7 10-12	60	19	SL	45	10	-	55	Weak	7.5YR 5/3	$CaCO_3$ coatings on rock fragments
TP8 0-2	55	27	SCL	10	TR	-	10	Strong	7.5YR 4/2	
TP8 2-5	50	40	SC	20	TR	-	20	Strong	7.5YR 4/3	$CaCO_3$ masses and weakly cemented in places
TP8 5-7	60	25	SCL	10	TR	-	10	Strong	7.5YR 3/8	$CaCO_3$ masses
TP8 7-13	50	25	SCL	20	TR	-	20	Strong	5YR 5/4	Moderate $CaCO_3$ cementation
TP8 13-16	65	20	SL	50	5	-	55	Strong	7.5YR 6/3	$CaCO_3$ Coatings on rock fragments
TP9 0-2	50	30	CL	25	5	-	30	Strong	7.5YR 4/3	Fill
TP9 2-6	95	3	S	-	-	-	0	None	2.5YR 7/3	Tailing
TP9 6-8	54	17	SL	35	5	-	40	Strong	10YR 7/3	$CaCO_3$ masses

Table 2: Field Descriptions

Pit ID/ Depth (feet)			USDA Texture Class	Field Estimates vol %				Reaction with HCl	Color	Notes
	Sand	Clay		Gravel	Cobble	Stone	Total			
TP9 8-10	66	16	SL	45	5	-	50	Strong	10YR 6/3	$CaCO_3$ copatings on rock fragments
TP9 10-11	54	18	SL	40	10	-	50	Strong	7.5YR 6/2	Moderate SiO_2/$CaCO_3$ cementation
TP9 11-14	60	15	SL	35	5	-	40	Strong	7.5YR 6/2	Strong SiO_2/$CaCO_3$ cementation
TP10 0-0.5	45	28	CL	25	2	-	27	Strong	10YR 4/4	Fill
TP10 0.5-3	50	35	CL	30	5	-	35	Strong	10YR 3/3	Fill
TP10 3-6	95	2	S	-	-	-	0	None	2.5Y7/4	Tailing
TP10 6-12	95	2	S	-	-	-	0	None	2.5Y 8/4	Tailing
TP10 12-13	60	20	SL	30	15	TR	45	Strong	10YR 6/3	$CaCO_3$ masses and coatings on rock fragements
TP11 0-0.83	50	28	SCL	15	5	1	21	Strong	10YR 4/3	Fill
TP11 0.83-5	98	1	S	-	-	-	0	Weak	2.5Y 7/2	Tailing
TP11 5-11	98	1	S	-	-	-	0	None	10YR 6/8	Tailing
TP11 11-13	98	1	S	-	-	-	0	None	2.5Y 5/2	Tailing
TP12 0-1	60	19	SL	10	-	-	10	Strong	7.5YR 4/6	
TP12 1-3	30	27	CL	10	-	-	10	Strong	7.5YR 7/3	$CaCO_3$ masses
TP12 3-7	59	18	SL	50	15	10	75	Strong	7.5YR 6/3	
TP12 7-8	65	20	SCL	40	10	-	50	Strong	7.5YR 7/4	Moderate $CaCO_3$
TP12 8-11	66	12	SL	30	5	-	35	Strong	10YR 6/3	Weak SiO_2 cementation
TP12 11-13	52	15	L	25	5	-	30	Strong	10YR 5/4	Moderate SiO_2 cementation
TP12 13-15	60	10	SL	35	25	5	65	Strong	10YR 5/4	Strong SiO_2 cementation
TP13 0-1	30	20	SiL	10	TR	-	10	Strong	7.5YR 4/4	
TP13 1-3	45	25	L	10	TR	-	10	Strong	10YR 6/4	
TP13 3-5	50	25	SCL	10	-	-	10	Strong	7.5YR 6/4	
TP13 5-8	50	30	SCL	10	-	-	10	Weak	7.5YR 5/4	
TP13 8-10	60	15	SL	35	15	TR	50	Strong	10YR 5/4	Moderate SiO_2/$CaCO_3$ cementation
TP13 10-18	70	10	SL	40	25	5	70	Weak	10YR 4/4	
TP14 0-1	35	35	CL	20	20	TR	40	None	5YR 3/4	
TP14 1-4	55	30	SCL	35	15	TR	50	Strong	7.5YR 7/3	
TP14 4-7	65	18	SL	30	TR	-	30	Strong	7.5YR 8/2	Moderate $CaCO_3$ cementation
TP14 7-12	40	20	L	10	-	-	10	Weak	7.5YR 5/4	
TP14 12-14	65	15	SL	45	15	TR	60	Strong	7.5YR 8/2	Conglomerate - strong cementation
TP14 14-16.5	65	15	SL	45	TR	-	45	Strong	7.5YR 6/3	Conglomerate - moderate cementation
TP15 0-2	40	25	L	10	-	-	10	Strong	7.5YR 3/3	
TP15 2-4	55	20	L	15	5	-	20	Strong	7.5YR 7/4	
TP15 4-8	35	30	CL	15	-	-	15	Strong	5YR 6/4	
TP15 8-10	25	45	C	TR	-	-	0	Weak	2.5YR 3/4	Angular blocky, clays weathering in place
TP15 10-20	25	50	C	TR	-	-	0	Weak	2.5YR 3/3	Angular blocky, weathering primary minerals, clay pressure faces
TP16 0-2	53	21	SCL	10	10	-	20	Strong	7.5YR 4/3	

Table 2: Field Descriptions

Pit ID/ Depth (feet)			USDA Texture Class					Reaction with HCl	Color	Notes
				Field Estimates vol %						
	Sand	Clay		Gravel	Cobble	Stone	Total			
TP16 2-4	40	26	L	10	-	-	10	Strong	7.5YR 5/4	
TP16 4-7	48	13	L	15	-	-	15	Strong	7.5YR 5/3	
TP16 7-10	29	19	SiL	10	-	-	10	Strong	7.5YR 6/3	Moderate $CaCO_3$ cementation
TP16 10-17	57	18	SL	45	20	TR	65	Weak	7.5YR 5/3	Weak to strong SiO_2 cementation
TP17 0-1	34	30	CL	10	TR	-	10	Weak	10YR 5/4	
TP17 1-2	30	40	C	10	TR		10	Strong	5YR 4/4	
TP17 2-4	23	32	CL	5	TR	-	5	Strong	7.5YR 7/3	
TP17 4-6	51	20	L	35	TR	-	35	Strong	7.5YR 5/3	
TP17 6-15	77	8	SL	35	5	-	40	Strong	7.5YR 6/3	
TP18 0-2	35	20	L	15	TR	-	15	Strong	7.5YR 4/4	
TP18 2-3	50	20	L	35	TR	-	35	Strong	7.5YR 6/3	
TP18 3-5	55	15	SL	25	TR	-	25	Strong	7.5YR7/3	
TP18 5-7	60	12	SL	30	-	-	30	Strong	5YR 5/3	Moderate SiO_2 cementation
TP18 7-9	65	15	SL	25	-	-	25	Weak	5YR 5/4	Moderate SiO_2 cementation
TP18 9-15	75	5	LS	5	-	-	5	Weak	5YR 5/4	Strong SiO_2 cementation
TP19 0-2	40	35	CL	40	15	-	55	None	5YR 4/4	
TP19 2-3	55	30	SCL	40	5	-	45	None	5YR 4/5	
TP19 3-5	75	5	LS	30	10	-	40	Strong	7.5YR 6/4	Strong $CaCO_3$ cementation
TP19 5-10	75	5	LS	45	15	-	60	Strong	7.5YR 5/3	
TP19 10-11	60	15	SL	25	TR	-	25	Strong	7.5YR 8/1	Moderate $CaCO_3$ cementation
TP19 11-14	65	10	SL	40	5	-	45	Strong	7.5YR 5/3	Moderate $CaCO_3$ cementation
TP20 0-0.5	40	25	L	10	-	-	10	None	7.5YR 4/2	
TP20 0.5-2	40	45	C	10	-	-	10	None	5YR 4/6	
TP20 2-4	55	25	SCL	35	10	-	45	Strong	7.5YR 5/4	Weak $CaCO_3$ cementation
TP20 4-5	55	20	SL	25	TR	-	25	Strong	7.5YR 8/1	
TP20 5-7	60	15	SL	30	5	-	35	Strong	7.5YR 5/3	Weak SiO_2 cementation
TP20 7-11	65	10	SL	55	5	-	60	Strong	7.5YR 5/3	Conglomerate - moderate cementation
TP20 11-18.5	50	15	L	10	10	-	20	Strong	10YR 5/2	Conglomerate - moderate cementation
TP21 0-2	45	20	L	10	5	-	15	Strong	7.5Yr 4/3	
TP21 2-3	40	25	L	35	TR	-	35	Strong	7.5YR 8/1	
TP21 3-5	45	15	L	30	TR	-	30	Strong	7.5YR 5/4	
TP21 5-7	55	15	SL	40	5	-	45	Strong	7.5YR 4/3	
TP21 7-11	51	24	SCL	55	10	-	65	Weak	7.5YR 5/4	Conglomerate - weak cementation
TP21 11-14	51	24	SCL	45	5	-	50	Weak	7.5YR 5/4	Conglomerate - weak cementation
TP21 14-18	49	18	L	30	TR	-	30	Weak	7.5YR 6/4	Conglomerate - moderate cementation
TP22 0-2	40	30	CL	10	5	-	15	Strong	7.5YR 4/3	
TP22 2-3	50	20	L	10	5	-	15	Strong	7.5YR 8/2	Weak $CaCO_3$ cementation

Table 2: Field Descriptions

Pit ID/ Depth (feet)			USDA Texture Class	Field Estimates vol %				Reaction with HCl	Color	Notes
	Sand	Clay		Gravel	Cobble	Stone	Total			
TP22 3-5	60	15	SL	30	15	TR	45	Strong	7.5YR 6/3	
TP22 5-8	60	15	SL	45	20	TR	65	Strong	7.5YR 5/4	
TP22 8-11	55	20	L	45	20	-	65	Strong	7.5YR 4/4	
TP22 11-13	50	18	L	20	-	-	20	Strong	5YR 5/4	
TP22 13-16	75	10	SL	-	-	-	0	Weak	5YR 5/6	Cemented sands
TP23 0-2	40	35	CL	5	TR	-	5	Strong	7.5YR 4/3	
TP23 2-3	50	25	SCL	15	-	-	15	Strong	7.5YR 7/3	
TP23 3-5	55	20	SL	10	-	-	10	Strong	7.5YR 6/3	
TP23 5-8	60	20	SL	10	-	-	10	Strong	7.5YR 4/7	Weak SiO_2/$CaCO_3$ cementation
TP23 8-11	50	25	SCL	35	-	-	35	Strong	7.5YR 7/4	Weak SiO_2/$CaCO_3$ cementation
TP23 11-12	50	20	L	50	5	-	55	Strong	7.5 YR 5/2	Strong SiO_2 cementation
TP24 0-3	35	34	CL	20	20	-	40	Strong	7.5YR 4/4	Fill on top of old borrow area, approx. 15-ft below grade
TP24 3-5	37	28	CL	20	5	-	25	Strong	7.5YR 5/4	
TP24 5-10	45	22	L	20	TR	-	20	Strong	7.5YR 6/3	Weak SiO_2/$CaCO_3$ cementation
TP24 10-14	57	18	SL	45	15	TR	60	Strong	7.5YR 5/3	
TP24 14-16	59	18	SL	50	20	TR	70	Strong	7.5YR 5/3	
TP25 0-2	55	25	SCL	35	5	-	40	Strong	7.5YR 4/4	Fill on top of old borrow area, approx. 15-ft below grade
TP25 2-5	67	18	SL	40	20	TR	60	Strong	7.5YR 5/4	
TP25 5-6	65	15	SL	45	15	TR	60	Strong	7.5YR 6/4	Conglomerate
TP25 6-7	70	10	SL	55	15	-	70	Strong	7.5YR 6/3	Conglomerate
TP26 0-1	50	25	SCL	30	5	-	35	Strong	10YR 5/3	Fill on top of old borrow area, approx. 15-ft below grade
TP26 1-3	40	25	L	20	TR	-	20	Strong	7.5YR 4/3	
TP26 3-4	70	10	SL	55	10	-	65	Strong	ND	Moderate SiO_2 cementation
TP26 4-5	70	15	SL	45	5	-	50	Strong	ND	Conglomerate
TP27 0-2	53	24	SCL	15	TR	-	15	Strong	10YR 3/3	Moderate SiO_2 cementation
TP27 2-3	45	28	CL	30	10	TR	40	Strong	7.5YR 4/3	
TP27 3-7	62	18	SL	45	15	TR	60	Weak	7.5YR 7/2	Moderate SiO_2 cementation
TP27 7-13	67	18	SL	50	20	2	72	Weak	7.5YR 6/2	Strong SiO_2 cementation
TP27 13-14	69	16	SL	50	10	-	60	Weak	7.5YR 6/2	Conglomerate
TP28 0-2	50	20	L	15	10	-	25	Weak	7.5YR 4/2	
TP28 2-4	60	25	SCL	25	TR	-	25	Strong	7.5YR 6/2	
TP28 4-6	70	15	SL	50	TR	-	50	Strong	7.5YR 5/2	Weak SiO_2 cementation
TP28 6-9	70	15	SL	40	10	-	50	Weak	7.5YR 6/4	Moderate SiO_2 cementation
TP28 9-14.5	65	18	SL	40	15	-	55	Weak	7.5YR 6/4	Strong SiO_2 cementation
TP29 0-1	50	25	SCL	10	TR	-	10	Strong	7.5YR 3/3	
TP29 1-2	50	30	SCL	25	15	TR	40	Strong	5YR 4/4	
TP29 2-4	65	18	SL	25	5	-	30	Strong	7.5YR 6/2	

Table 2: Field Descriptions

Pit ID/ Depth (feet)			USDA Texture Class	Field Estimates vol %				Reaction with HCl	Color	Notes
	Sand	Clay		Gravel	Cobble	Stone	Total			
TP29 4-7	70	10	SL	30	TR	-	30	Strong	7.5YR 6/3	
TP29 7-10	70	10	SL	55	10	-	65	Strong	7.5YR 6/3	Refusal at 12 feet - conglomerate
TP30 0-2	40	30	CL	15	5	-	20	Strong	7.5YR 3/3	
TP30 2-4	50	20	L	25	15	-	40	Strong	7.5YR 6/3	
TP30 4-5	70	10	SL	40	TR	-	40	Strong	7.5YR 6/2	
TP30 5-12	70	10	SL	40	25	5	70	Strong	7.5YR 6/3	Weak SiO_2 cementation
TP31 0-1	45	30	CL	20	10	-	30	Strong	7.5YR 5/4	
TP31 1-2	48	24	L	20	15	-	35	Strong	7.5YR 5/3	
TP31 2-5	63	20	SCL	35	TR	-	35	Weak	7.5YR 6/3	
TP31 5-8	67	20	SCL	40	TR	-	40	None	7.5YR 6/3	Moderate SiO_2 cementation
TP31 8-16	61	22	SCL	40	5	-	45	None	7.5YR 5/4	Strong SiO_2 cementation
TP32 0-1	45	25	L	10	TR	-	10	Strong	7.5YR 4/4	
TP32 1-3	50	20	L	30	20	-	50	Strong	7.5YR 7/2	
TP32 3-5	55	15	SL	40	5	-	45	Strong	7.5YR 6/3	
TP32 5-10	60	18	SL	40	20	TR	60	Weak	7.5YR 6/2	Moderate SiO_2 cementation
TP32 10-14	65	18	SL	40	15	-	55	Weak	7.5YR 6/3	Strong SiO_2 cementation

Table 3: Physical Properties and Secondary Interpretations

Pit ID/ Depth (feet)	Particle Size Distribution (%)			USDA Texture Class	Very Fine Sand wt%	Rock Fragments					RUSLE		AWC (in/ft)	Wind Erosion
						Lab.[1] wt %	Field Estimates vol %							
	Sand	Silt	Clay				Gravel	Cobble	Stone	Total	Kf	Kw		
East Waste Rock Dump Facility Soils														
TP3 0-1	49	27	24	SCL	6	35	25	20	TR	45	0.27	0.09	1.0	4L
TP3 1-2	48	31	21	L	0	28	20	15	-	35	0.25	0.11	1.3	4L
TP3 2-7	44	37	19	L	1	35	40	25	TR	65	0.30	0.07	0.7	4L
TP3 7-9	46	33	21	L	4	45	40	25	5	70	0.29	0.06	0.6	4L
TP3 9-11	50	33	17	L	3	46	50	15	5	70	0.29	0.06	0.6	4L
TP5 0-1	54	26	20	SCL	3	37	30	25	-	55	0.26	0.07	0.8	4L
TP5 1-3	46	34	20	L	0	27	35	10	-	45	0.27	0.09	1.1	4L
TP5 3-7	58	29	13	SL	2	36	40	15	-	55	0.24	0.07	0.6	3
Tailing Storage Facility Soils														
TP7 0-1.5	50	24	26	SCL	5	19	15	TR	-	15	0.22	0.15	1.5	4L
TP7 1.5-4	39	26	35	CL	6	14	10		-	10	0.24	0.19	2.2	4L
TP7 6-8	56	22	22	SCL	4	31	35	TR	-	35	0.24	0.10	1.2	4L
TP7 8-10	64	17	19	SL	3	42	40	TR	-	40	0.15	0.06	0.9	3
TP7 10-12	60	21	19	SL	8	41	45	10	-	55	0.21	0.06	0.6	3
TP9 6-8	54	29	17	SL	6	35	35	5	-	40	0.26	0.10	0.9	3
TP9 8-10	66	18	16	SL	6	53	45	5	-	50	0.19	0.06	0.7	3
TP9 10-11	54	28	18	SL	8	42	40	10	-	50	0.27	0.08	0.7	3
TP12 0-1	60	21	19	SL	9	17	10	-	-	10	0.21	0.17	1.3	3
TP12 1-3	30	43	27	CL	4	20	10	-	-	10	0.36	0.28	2.2	4L
TP12 3-7	59	23	18	SL	4	65	50	15	10	75	0.20	0.04	0.4	3
TP12 8-11	66	22	12	SL	10	21	30	5	-	35	0.25	0.11	0.9	3
TP12 11-13	52	33	15	L	10	18	25	5	-	30	0.35	0.17	1.4	4L
TP16 0-2	53	26	21	SCL	6	20	10	10	-	20	0.27	0.17	1.4	4L
TP16 2-4	40	34	26	L	5	19	10	-	-	10	0.29	0.22	1.8	4L
TP16 4-7	48	39	13	L	10	8	15	-	-	15	0.41	0.28	1.7	4L
TP16 7-10	29	52	19	SiL	3	12	10	-	-	10	0.43	0.33	2.2	4L
TP16 10-17	57	25	18	SL	3	55	45	20	TR	65	0.21	0.05	0.5	3
TP17 0-2	34	36	30	CL	1	19	10	TR	-	10	0.28	0.22	2.2	6
TP17 2-4	23	45	32	CL	0	14	10	TR	-	10	0.33	0.25	2.2	4L
TP17 4-6	51	29	20	L	6	28	35	TR	-	35	0.28	0.12	1.3	4L
TP17 6-10	77	15	8	SL	7	40	35	5	-	40	0.19	0.07	0.9	3
TP21 7-11	51	25	24	SCL	6	55	50	10	-	60	0.26	0.07	0.7	5

Table 3: Physical Properties and Secondary Interpretations

Pit ID/ Depth (feet)	Particle Size Distribution (%)			USDA Texture Class	Very Fine Sand wt%	Rock Fragments					RUSLE		AWC (in/ft)	Wind Erosion
						Lab.[1] wt %	Field Estimates vol %							
	Sand	Silt	Clay				Gravel	Cobble	Stone	Total	Kf	Kw		
TP21 11-14	51	25	24	SCL	7	39	40	5	-	45	0.27	0.09	1.0	5
TP21 14-18	49	33	18	L	16	17	20	TR	-	20	0.39	0.24	1.6	5
TP24 0-3	35	31	34	CL	3	35	20	20	-	40	0.25	0.10	1.4	4L
TP24 3-5	37	35	28	CL	3	33	20	5	-	25	0.30	0.16	1.8	4L
TP24 5-10	45	33	22	L	7	15	20	TR	-	20	0.31	0.19	1.6	4L
TP24 10-14	57	25	18	SL	4	36	45	15	TR	60	0.22	0.05	0.6	3
TP24 14-16	59	23	18	SL	4	55	50	20	TR	70	0.20	0.04	0.4	3
TP25 2-5	67	15	18	SL	5	61	40	20	TR	60	0.16	0.04	0.6	3
TP27 0-2	53	23	24	SCL	3	32	15	TR	-	15	0.23	0.16	1.5	4L
TP27 2-3	45	27	28	CL	4	42	30	10	TR	40	0.25	0.10	1.4	4L
TP27 3-7	62	20	18	SL	5	51	45	15	TR	60	0.19	0.05	0.6	3
TP27 7-13	67	15	18	SL	5	59	50	20	2	72	0.16	0.03	0.4	3
TP27 13-14	69	15	16	SL	4	51	50	10	-	60	0.15	0.04	0.6	3
TP31 1-2	48	28	24	L	8	31	20	15	-	35	0.27	0.12	1.3	4L
TP31 2-5	63	17	20	SCL	6	44	35	TR	-	35	0.22	0.10	1.2	5
TP31 5-8	67	13	20	SCL	6	53	40	TR	-	40	0.20	0.08	1.1	5
TP31 8-16	61	17	22	SCL	7	53	40	5	-	45	0.22	0.08	1.0	5

Notes:

[1] Laboratory Rock Fragments on less than 3-inch fraction

Kf = Revised Universal Soil Loss Equation (RUSLE) soil erodibility factor for the fine-earth fraction (<2mm)

Kw = Revised Universal Soil Loss Equation (RUSLE) soil erodibility factor fo the whole soil

Wind erosion group estimated from NRCS 2007 ; 1 is severe, 8 is minimal.

AWC = Available water capacity (corrected for rock fragments)

Profile AWC is the water retention amount for the specified horizon

Table 4: Chemical Properties

Pit ID/ Depth (feet)	Paste pH	Saturated Paste Extract EC (dS/m)	Saturation Percentage	Nitrate as N (mg/kg)	Phosphorus (mg/kg)	Potassium (mg/kg)	$CaCO_3$ Equivalent Percent
East Waste Rock Dump Facility Soils							
TP3 0-1	7.5	0.50	31.4	3	9	96	20.6
TP3 1-2	7.5	0.60	25.3	2	11	45	60.6
TP3 2-7	7.7	1.10	27.3	1	8	57	42.2
TP3 7-9	7.9	1.80	29.6	1	7	91	30.3
TP3 9-11	7.6	4.50	29.8	< 1	7	72	33.1
TP5 0-1	7.4	0.60	29.9	9	10	150	28.6
TP5 1-3	7.5	0.40	30.2	3	7	90	45.6
TP5 3-7	7.6	0.40	30.4	1	7	69	39.4
Tailing Storage Facility Soils							
TP7 0-1.5	7.6	0.40	33.5	NA	NA	NA	4.5
TP7 1.5-4	7.7	0.70	46.1	NA	NA	NA	3.2
TP7 6-8	7.8	0.90	29.4	NA	NA	NA	40.8
TP7 8-10	7.9	0.90	28.4	NA	NA	NA	25.3
TP7 10-12	7.8	1.10	34.4	NA	NA	NA	26.4
TP9 6-8	7.6	2.80	29.9	< 1	6	210	46.4
TP9 8-10	7.7	1.90	27.8	< 1	6	56	37.5
TP9 10-11	7.7	2.70	31.5	1	7	80	29.7
TP12 0-1	7.7	0.50	25.8	5	7	260	4.7
TP12 1-3	7.6	1.40	35.1	4	8	110	40.6
TP12 3-7	7.5	2.80	25.7	3	9	99	19.2
TP12 8-11	7.6	4.60	23.6	1	5	60	14.7
TP12 11-13	7.4	4.80	27.9	1	6	86	22.5
TP16 0-2	7.6	0.60	28.7	6	7	360	11.3
TP16 2-4	7.7	0.60	33.7	2	9	110	33.6
TP16 4-7	7.6	2.10	35.3	1	6	140	15.6
TP16 7-10	7.7	1.50	31.4	5	6	120	18.9
TP16 10-17	7.7	1.20	26.2	4	6	110	11.7
TP17 0-2	7.7	0.50	44.3	NA	NA	NA	16.1
TP17 2-4	7.8	0.30	38.4	NA	NA	NA	61.7
TP17 4-6	7.8	0.30	33.1	NA	NA	NA	36.1
TP17 6-10	7.9	0.40	32.2	NA	NA	NA	37.5
TP21 7-11	7.6	4.50	42.6	NA	NA	NA	6.7
TP21 11-14	7.5	3.30	37.0	NA	NA	NA	10.6
TP21 14-18	7.6	3.20	38.5	NA	NA	NA	20.6
TP24 0-3	7.8	0.50	41.7	NA	NA	NA	14.2
TP24 3-5	7.7	0.80	37.8	NA	NA	NA	26.1
TP24 5-10	7.9	1.30	31.9	NA	NA	NA	39.2
TP24 10-14	7.8	2.00	28.3	NA	NA	NA	24.4
TP24 14-16	7.7	4.00	28.6	NA	NA	NA	20.3
TP25 2-5	8.0	0.30	29.1	NA	NA	NA	11.7
TP27 0-2	7.6	0.50	33.5	6	7	140	11.7
TP27 2-3	7.6	0.70	36.7	3	7	110	20.8
TP27 3-7	7.7	0.70	28.0	2	7	52	26.1
TP27 7-13	8.0	0.60	26.9	< 1	6	42	26.7
TP27 13-14	8.0	0.50	25.0	< 1	5	71	23.1
TP31 1-2	8.1	0.60	39.2	NA	NA	NA	16.9
TP31 2-5	8.0	0.70	31.5	NA	NA	NA	16.1
TP31 5-8	8.0	0.60	30.4	NA	NA	NA	17.8
TP31 8-16	7.9	0.90	33.5	NA	NA	NA	5.2

Notes:

EC - electrical conductivity

dS/m - decisiemens per meter

NA = Not Analyzed

Golder Associates

Table 5: AB-DTPA Extractable Metals for the Soil Samples

Pit ID/ Depth (feet)	AB-DTPA Extractable Metals (mg/kg)							
	Arsenic	Cadmium	Copper	Lead	Manganese	Mercury	Molybdenum	Nickel
East Waste Rock Dump Facility Soils								
TP3 0-1	0.06	< 0.1	1.8	1.0	2.6	< 0.1	< 0.1	< 0.1
TP3 1-2	0.09	< 0.1	0.9	0.9	1.8	< 0.1	< 0.1	< 0.1
TP3 2-7	0.15	< 0.1	0.7	0.4	0.7	< 0.1	< 0.1	< 0.1
TP3 7-9	0.10	< 0.1	0.3	0.3	0.4	< 0.1	< 0.1	< 0.1
TP3 9-11	0.10	< 0.1	0.5	0.3	0.9	< 0.1	< 0.1	< 0.1
TP5 0-1	0.08	< 0.1	8	1.3	6.1	< 0.1	< 0.1	0.1
TP5 1-3	0.09	< 0.1	2.9	0.7	2.4	< 0.1	< 0.1	< 0.1
TP5 3-7	0.11	< 0.1	0.9	0.3	1.1	< 0.1	< 0.1	< 0.1
Tailing Storage Facility Soils								
TP9 6-8	0.06	< 0.1	25.7	0.4	1.8	< 0.1	0.9	< 0.1
TP9 8-10	0.10	< 0.1	10.8	0.3	1.2	< 0.1	0.2	< 0.1
TP9 10-11	0.07	< 0.1	30.5	0.5	1.5	< 0.1	0.3	< 0.1
TP12 0-1	0.08	< 0.1	4.8	1.3	2.6	< 0.1	< 0.1	< 0.1
TP12 1-3	0.10	< 0.1	2.6	0.6	1.2	< 0.1	< 0.1	< 0.1
TP12 3-7	0.12	< 0.1	4.4	0.6	1.4	< 0.1	< 0.1	0.4
TP12 8-11	0.07	< 0.1	1.1	0.3	0.5	< 0.1	< 0.1	< 0.1
TP12 11-13	0.10	< 0.1	1.6	0.5	0.9	< 0.1	< 0.1	< 0.1
TP16 0-2	0.08	< 0.1	4.2	1.0	3.7	< 0.1	< 0.1	0.1
TP16 2-4	0.10	< 0.1	3.9	1.0	2.6	< 0.1	< 0.1	< 0.1
TP16 4-7	0.07	< 0.1	1.4	0.9	0.6	< 0.1	< 0.1	< 0.1
TP16 7-10	0.23	< 0.1	1.3	0.9	0.4	< 0.1	< 0.1	< 0.1
TP16 10-17	0.10	< 0.1	2.2	0.6	1.3	< 0.1	< 0.1	< 0.1
TP27 0-2	0.08	< 0.1	3.5	1.4	2.3	< 0.1	< 0.1	< 0.1
TP27 2-3	0.06	< 0.1	2.2	1.0	1.3	< 0.1	< 0.1	< 0.1
TP27 3-7	0.07	< 0.1	0.8	0.4	0.6	< 0.1	< 0.1	< 0.1
TP27 7-13	0.07	< 0.1	0.6	0.3	0.6	< 0.1	< 0.1	< 0.1
TP27 13-14	0.08	< 0.1	0.5	0.2	0.7	< 0.1	< 0.1	< 0.1

Table 6: Acid-Base Accounts

Pit ID/ Depth (feet)	Paste pH	Pyritic Sulfur Basis			Total Sulfur (%)	Extractable Sulfur Forms			Residual (%)
		ANP (t/kt)	AGP (t/kt)	ABA (t/kt)		Hot Water (%)	HCl (%)	HNO_3 (%)	
East Waste Rock Dump Facility Soils									
TP3 0-1	7.5	206	0	206	0.01	< 0.01	< 0.01	< 0.01	0.01
TP3 1-2	7.5	606	0	606	< 0.01	< 0.01	< 0.01	< 0.01	0.01
TP3 2-7	7.7	422	0	422	< 0.01	< 0.01	< 0.01	< 0.01	0.01
TP3 7-9	7.9	303	0	303	0.01	< 0.01	< 0.01	< 0.01	0.01
TP3 9-11	7.6	331	0	331	0.07	0.06	< 0.01	< 0.01	0.01
TP5 0-1	7.4	286	0	286	0.02	< 0.01	< 0.01	< 0.01	0.01
TP5 1-3	7.5	456	0	456	0.01	< 0.01	< 0.01	< 0.01	0.01
TP5 3-7	7.6	394	0	394	< 0.01	< 0.01	< 0.01	< 0.01	0.01
Tailing Storage Facility Soils									
TP9 6-8	7.6	464	<1	463	0.07	0.04	< 0.01	0.02	0.01
TP9 8-10	7.7	375	<1	375	0.03	< 0.01	< 0.01	0.01	0.01
TP9 10-11	7.7	297	<1	296	0.07	0.03	< 0.01	0.02	0.02
TP12 0-1	7.7	47	<1	47	0.03	< 0.01	< 0.01	0.01	0.02
TP12 1-3	7.6	406	0	406	0.01	< 0.01	< 0.01	< 0.01	0.01
TP12 3-7	7.5	192	0	192	0.02	< 0.01	< 0.01	< 0.01	0.02
TP12 8-11	7.6	147	0	147	0.02	< 0.01	< 0.01	< 0.01	0.02
TP12 11-13	7.4	225	0	225	0.02	< 0.01	< 0.01	< 0.01	0.02
TP16 0-2	7.6	113	0	113	0.01	< 0.01	< 0.01	< 0.01	0.01
TP16 2-4	7.7	336	0	336	< 0.01	< 0.01	< 0.01	< 0.01	0.01
TP16 4-7	7.6	156	0	156	0.02	< 0.01	< 0.01	< 0.01	0.02
TP16 7-10	7.7	189	0	189	0.01	< 0.01	< 0.01	< 0.01	0.02
TP16 10-17	7.7	117	0	117	0.02	< 0.01	< 0.01	< 0.01	0.02
TP27 0-2	7.6	117	0	117	0.01	< 0.01	< 0.01	< 0.01	0.01
TP27 2-3	7.6	208	0	208	0.01	< 0.01	< 0.01	< 0.01	0.01
TP27 3-7	7.7	261	0	261	< 0.01	< 0.01	< 0.01	< 0.01	0.01
TP27 7-13	8.0	267	<1	266	0.01	< 0.01	< 0.01	0.01	0.01
TP27 13-14	8.0	231	0	231	0.02	< 0.01	< 0.01	< 0.01	0.02

Notes:

t/kt = tons $CaCO_3$ per 1,000 tons of soil

ANP = Acid Neutralization Potential, in tons $CaCO_3$ per 1,000 tons of soil

AGP = Acid Generation Potential, in tons $CaCO_3$ per 1,000 tons of soil

ABA = Acid Base Account, in tons $CaCO_3$ per 1,000 tons of soil

Table 7: Estimated Reclamation Cover Requirements

Disturbance Type	Surface Area	Cover Thickness	Reclamation Cover Requirement
	(acres)	(ft)	(yd^3)
Ancillary [a]	273	0.5	219,955
Growth Media Stockpile	69	0.5	55,558
Haul Roads	44	0.5	35,860
Low Grade Ore Stockpile [b]	20	0.5	16,133
Open Pit [c]	12	3	58,080
Plant Site	124	0.5	100,149
Tailing Storage Facility	527	3	2,549,648
Waste Rock Disposal Facility	177	3	857,448
Total	1246		3,892,832

Notes:

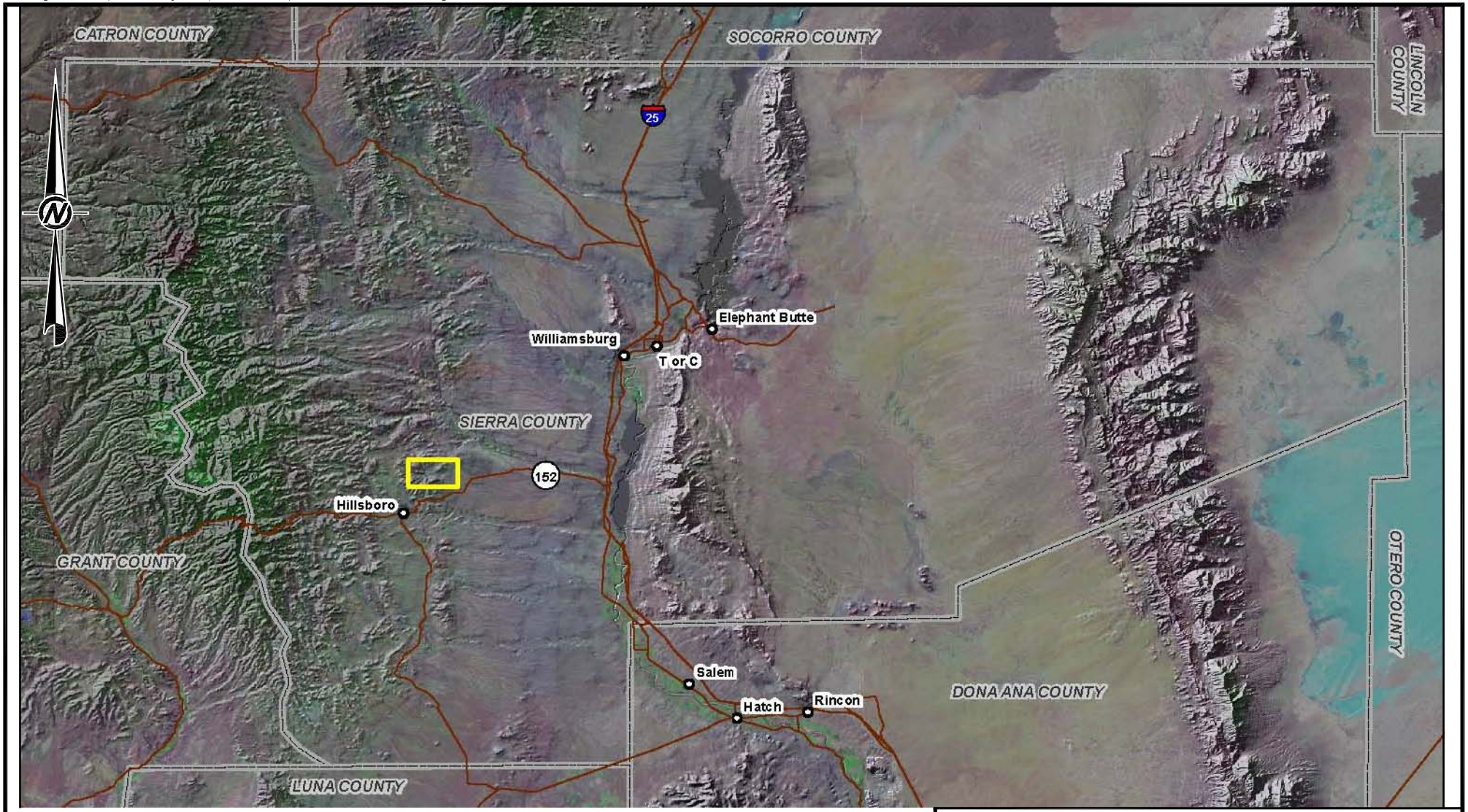
[a]-Includes access roads and other miscellaneous disturbance areas;

[b]-LGOS would be removed at the end of mining and only require topdressing the disturbed areas to facilitate revegetation;

[c]-cover around the projected perimeter of the pit lake and ramp

FIGURES

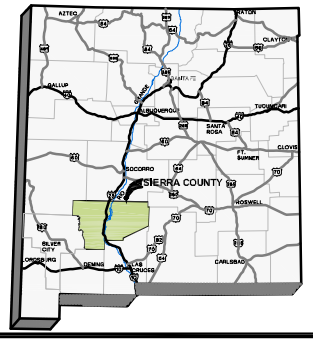
Drawing file: K:\2012 Projects\12380002A\COPPER FLAT FIG01.dwg Jun 25, 2013 – 10:47am



LEGEND

- CITY/TOWN
- SITE LOCATION
- ROAD

12 0 12
SCALE MILES



SOURCE: FIGURE 1-1 (INTERA, 2012). IMAGEERY FROM UNIVERSITY OF MARYLAND NLCD.

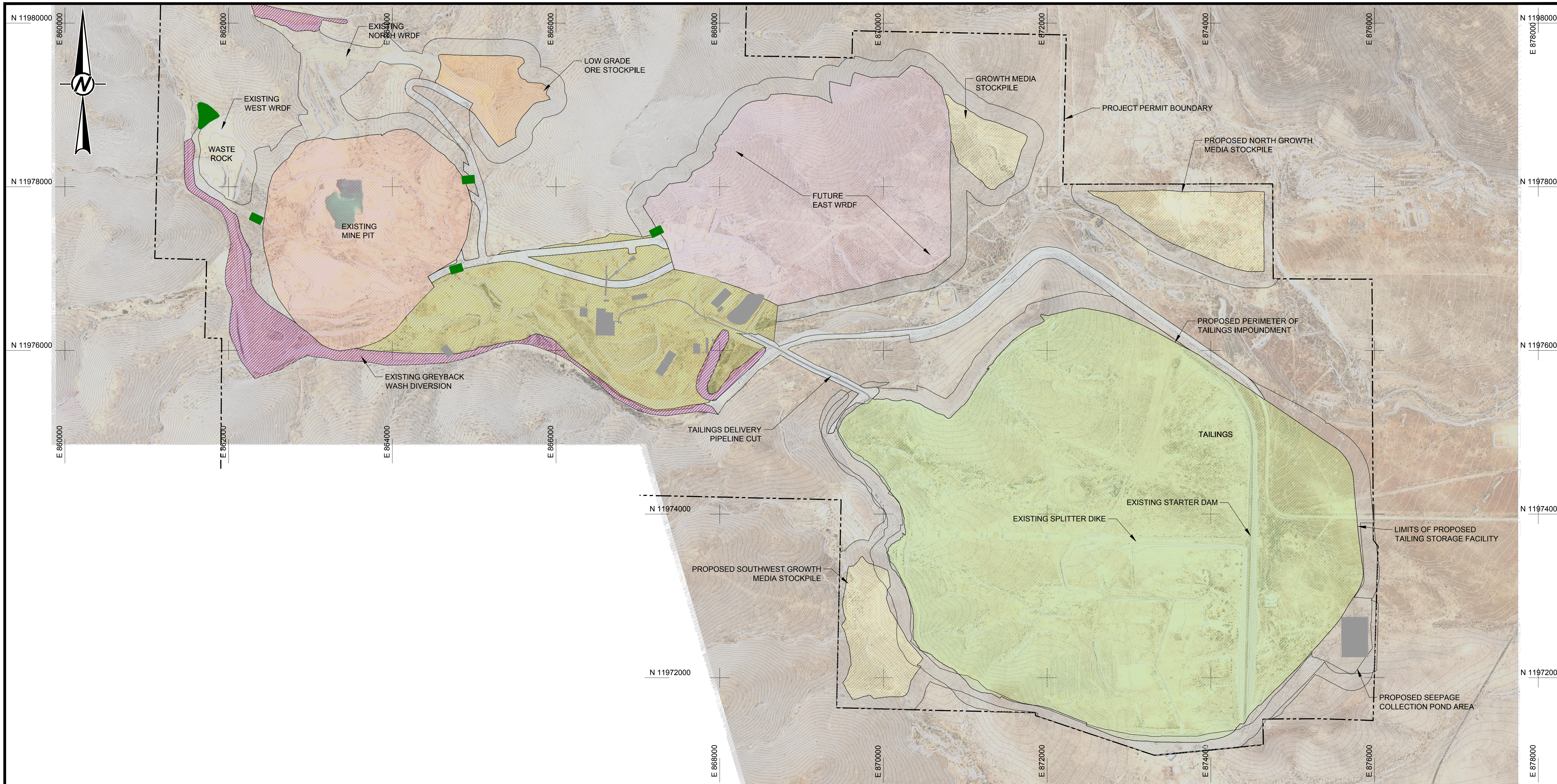
PROJECT
NEW MEXICO COPPER CORPORATION
COPPER FLAT PROJECT
SIERRA COUNTY, NEW MEXICO

TITLE
SITE LOCATION

Golder Associates

PROJECT No.	123-80002A		FILE No.	COPPER FLAT FIG01
DESIGN	EC	06/25/13	SCALE AS SHOWN	REV. 0
CADD	CM	06/25/13		
CHECK	EC	06/25/13		
REVIEW	BN	06/25/13		

FIGURE 1



LEGEND

- PERMIT BOUNDARY
- PLANT FACILITY
- SEDIMENT COLLECTION PONDS
- ANCILLARY
- DIVERSION
- HAUL ROAD

NOTES

1. WRDF - WASTE ROCK DISPOSAL FACILITY.

REFERENCES

1. EXISTING FIVE (5) FOOT TOPOGRAPHY AND PERMIT BOUNDARY PROVIDED BY NEW MEXICO COPPER CORPORATION.
2. TOPOGRAPHY IN THE MINE AREA AND TAILINGS STORAGE FACILITY REPRESENTS EXISTING CONDITIONS AND DISTURBANCE ASSOCIATED WITH QUINTANA 1981-82 MINING OPERATIONS.

NOT FOR CONSTRUCTION

0 600 1200 1800
SCALE FEET

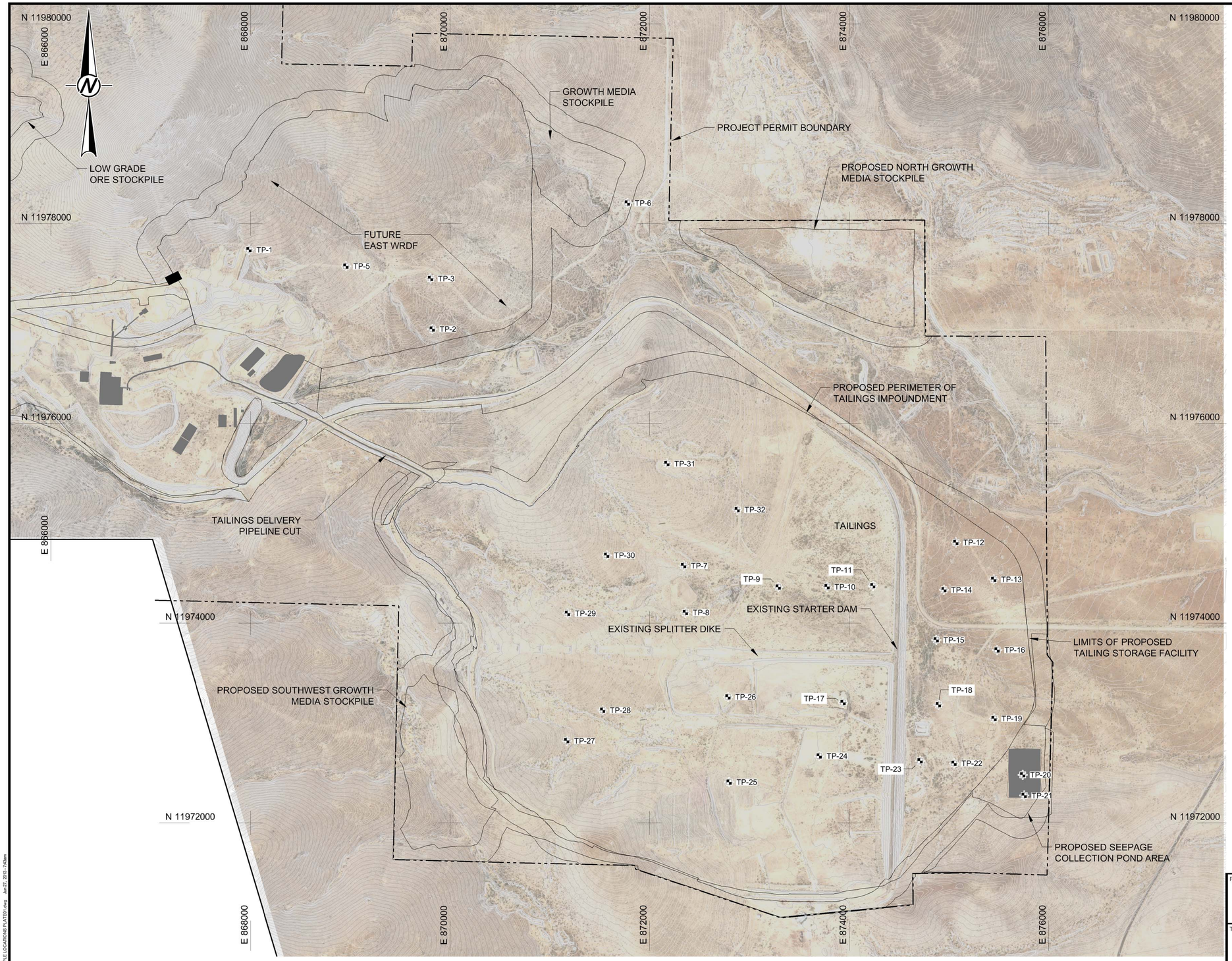
PROJECT
NEW MEXICO COPPER CORPORATION
COPPER FLAT PROJECT
SIERRA COUNTY, NEW MEXICO

TITLE
FACILITY LAYOUT

Golder Associates

PROJECT No.		123-80002A	FILE No.	SITE INVESTIGATION
DESIGN	EC	06/25/13	SCALE AS SHOWN	REV. 0
CADD	CM	06/25/13	DRAWING	
CHECK	EC	06/25/13	FIGURE 2	
REVIEW	DR	06/28/13		

PLATES



NOT FOR CONSTRUCTION

DRAFT

0 500 1000 1500

SCALE FEET

LEGEND

- PERMIT BOUNDARY
- TP-29 TEST PIT

NOTES

1. WRDF - WASTE ROCK DISPOSAL FACILITY.

REFERENCES

1. EXISTING FIVE (5) FOOT TOPOGRA.PHY AND PERMIT BOUNDARY PROVIDED BY NEW MEXICO COPPER CORPORATION.
2. TOPOGRAPHY IN THE MINE AREA AND TAILINGS STORAGE FACILITY REPRESENTS EXISTING CONDITIONS AND DISTURBANCE ASSOCIATED WITH QUINTANA 1981-82 MINING OPERATIONS.

PROJECT

NEW MEXICO COPPER CORPORATION
COPPER FLAT PROJECT
SIERRA COUNTY, NEW MEXICO

TITLE

SAMPLE LOCATIONS

Golder Associates

PROJECT No.		123-80002A	FILE No.	SITE INVESTIGATION
DESIGN	EC	06/25/13	SCALE	AS SHOWN REV. A
CADD	CM	06/25/13	DRAWING	PLATE 1
CHECK	EC	06/25/13		
REVIEW				

APPENDIX A
LABORATORY REPORT

ANALYTICAL SUMMARY REPORT

May 14, 2013

Golder Associates Inc
5200 Pasadena NE Ste C
Albuquerque, NM 87113

Workorder No.: B13050229 Quote ID: B2958

Project Name: 123-80002A Supplemental Soils

Energy Laboratories Inc Billings MT received the following 48 samples for Golder Associates Inc on 5/2/2013 for analysis.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B13050229-001	TP3 0-1	12/21/12 0:00	05/02/13	Soil	ABDPTA extractable metals Metals, NH4OAc Extractable Acid/Base Potential Coarse Fragments Conductivity Nitrate as N, KCL Extract pH, Saturated Paste Phosphorus-Olsen ABDTPA extraction for metals NH4AC Soil Extraction Saturated Paste Extraction Particle Size Analysis Saturation Percentage Sulfur Forms Texture Very Fine Sand
B13050229-002	TP3 1-2	12/21/12 0:00	05/02/13	Soil	Same As Above
B13050229-003	TP3 2-7	12/21/12 0:00	05/02/13	Soil	Same As Above
B13050229-004	TP3 7-9	12/21/12 0:00	05/02/13	Soil	Same As Above
B13050229-005	TP3 9-11	12/21/12 0:00	05/02/13	Soil	Same As Above
B13050229-006	TP5 0-1	01/03/13 0:00	05/02/13	Soil	Same As Above
B13050229-007	TP5 1-3	01/03/13 0:00	05/02/13	Soil	Same As Above
B13050229-008	TP5 3-7	01/03/13 0:00	05/02/13	Soil	Same As Above
B13050229-009	TP7 0-1.5	12/17/12 0:00	05/02/13	Soil	Coarse Fragments Conductivity Lime as CaCO3, % pH, Saturated Paste Saturated Paste Extraction Particle Size Analysis Saturation Percentage Texture Very Fine Sand
B13050229-010	TP7 1.5-4	12/17/12 0:00	05/02/13	Soil	Same As Above
B13050229-011	TP7 6-8	12/17/12 0:00	05/02/13	Soil	Same As Above
B13050229-012	TP7 8-10	12/17/12 0:00	05/02/13	Soil	Same As Above
B13050229-013	TP7 10-12	12/17/12 0:00	05/02/13	Soil	Same As Above

ANALYTICAL SUMMARY REPORT

B13050229-014	TP9 6-8	12/17/12 0:00	05/02/13	Soil	ABDPTA extractable metals Metals, NH4OAc Extractable Acid/Base Potential Coarse Fragments Conductivity Nitrate as N, KCL Extract pH, Saturated Paste Phosphorus-Olsen ABDTPA extraction for metals NH4AC Soil Extraction Saturated Paste Extraction Particle Size Analysis Saturation Percentage Sulfur Forms Texture Very Fine Sand
B13050229-015	TP9 8-10	12/17/12 0:00	05/02/13	Soil	Same As Above
B13050229-016	TP9 10-11	12/17/12 0:00	05/02/13	Soil	Same As Above
B13050229-017	TP12 0-1	01/02/13 0:00	05/02/13	Soil	Same As Above
B13050229-018	TP12 1-3	01/02/13 0:00	05/02/13	Soil	Same As Above
B13050229-019	TP12 3-7	01/02/13 0:00	05/02/13	Soil	Same As Above
B13050229-020	TP12 8-11	01/02/13 0:00	05/02/13	Soil	Same As Above
B13050229-021	TP12 11-13	01/02/13 0:00	05/02/13	Soil	Same As Above
B13050229-022	TP16 0-2	12/20/12 0:00	05/02/13	Soil	Same As Above
B13050229-023	TP16 2-4	12/20/12 0:00	05/02/13	Soil	Same As Above
B13050229-024	TP16 4-7	12/20/12 0:00	05/02/13	Soil	Same As Above
B13050229-025	TP16 7-10	12/20/12 0:00	05/02/13	Soil	Same As Above
B13050229-026	TP16 10-17	12/20/12 0:00	05/02/13	Soil	Same As Above
B13050229-027	TP17 0-2	12/18/12 0:00	05/02/13	Soil	Coarse Fragments Conductivity Lime as CaCO3, % pH, Saturated Paste Saturated Paste Extraction Particle Size Analysis Saturation Percentage Texture Very Fine Sand
B13050229-028	TP17 2-4	12/18/12 0:00	05/02/13	Soil	Same As Above
B13050229-029	TP17 4-6	12/18/12 0:00	05/02/13	Soil	Same As Above
B13050229-030	TP17 6-10	12/18/12 0:00	05/02/13	Soil	Same As Above
B13050229-031	TP21 7-11	12/19/12 0:00	05/02/13	Soil	Same As Above
B13050229-032	TP21 11-14	12/19/12 0:00	05/02/13	Soil	Same As Above
B13050229-033	TP21 14-18	12/19/12 0:00	05/02/13	Soil	Same As Above
B13050229-034	TP24 0-3	12/18/12 0:00	05/02/13	Soil	Same As Above
B13050229-035	TP24 3-5	12/18/12 0:00	05/02/13	Soil	Same As Above
B13050229-036	TP24 5-10	12/18/12 0:00	05/02/13	Soil	Same As Above
B13050229-037	TP24 10-14	12/18/12 0:00	05/02/13	Soil	Same As Above

ANALYTICAL SUMMARY REPORT

B13050229-038	TP24 14-16	12/18/12 0:00	05/02/13	Soil	Same As Above
B13050229-039	TP25 2-5	12/13/12 0:00	05/02/13	Soil	Same As Above
B13050229-040	TP27 0-2	12/19/12 0:00	05/02/13	Soil	ABDPTA extractable metals Metals, NH4OAc Extractable Acid/Base Potential Coarse Fragments Conductivity Nitrate as N, KCL Extract pH, Saturated Paste Phosphorus-Olsen ABDTPA extraction for metals NH4AC Soil Extraction Saturated Paste Extraction Particle Size Analysis Saturation Percentage Sulfur Forms Texture Very Fine Sand
B13050229-041	TP27 2-3	12/19/12 0:00	05/02/13	Soil	Same As Above
B13050229-042	TP27 3-7	12/19/12 0:00	05/02/13	Soil	Same As Above
B13050229-043	TP27 7-13	12/19/12 0:00	05/02/13	Soil	Same As Above
B13050229-044	TP27 13-14	12/19/12 0:00	05/02/13	Soil	Same As Above
B13050229-045	TP31 1-2	01/03/13 0:00	05/02/13	Soil	Coarse Fragments Conductivity Lime as CaCO3, % pH, Saturated Paste Saturated Paste Extraction Particle Size Analysis Saturation Percentage Texture Very Fine Sand
B13050229-046	TP31 2-5	01/03/13 0:00	05/02/13	Soil	Same As Above
B13050229-047	TP31 5-8	01/03/13 0:00	05/02/13	Soil	Same As Above
B13050229-048	TP31 8-16	01/03/13 0:00	05/02/13	Soil	Same As Above

The analyses presented in this report were performed by Energy Laboratories, Inc., 1120 S 27th St., Billings, MT 59101, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

The results as reported relate only to the item(s) submitted for testing.

If you have any questions regarding these test results, please call.

Report Approved By:

Sonya Mallett

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Golder Associates Inc
Project: 123-80002A Supplemental Soils
Workorder: B13050229

Report Date: 05/14/13
Date Received: 05/02/13

	Analysis	Coarse Frags	Sand	Silt	Clay	Very Fine Sand	Texture	pH	Saturation	Cond-Sat Paste	Neut Potential	Acid Potential	Acid/Base Potential	S, Total
	Units	%	%	%	%	wt%		s_u_	%	mmhos/cm	t/kt	t/kt	t/kt	%
Sample ID	Client Sample ID	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results
B13050229-001	TP3 0-1	35	49	27	24	6	SCL	7.50	31.4	0.5	206	0	206	0.01
B13050229-002	TP3 1-2	28	48	31	21	0	L	7.50	25.3	0.6	606	0	606	< 0.01
B13050229-003	TP3 2-7	35	44	37	19	1	L	7.70	27.3	1.1	422	0	422	< 0.01
B13050229-004	TP3 7-9	45	46	33	21	4	L	7.90	29.6	1.8	303	0	303	0.01
B13050229-005	TP3 9-11	46	50	33	17	3	L	7.60	29.8	4.5	331	0	331	0.07
B13050229-006	TP5 0-1	37	54	26	20	3	SCL	7.40	29.9	0.6	286	0	286	0.02
B13050229-007	TP5 1-3	27	46	34	20	0	L	7.50	30.2	0.4	456	0	456	0.01
B13050229-008	TP5 3-7	36	58	29	13	2	SL	7.60	30.4	0.4	394	0	394	< 0.01
B13050229-009	TP7 0-1.5	19	50	24	26	5	SCL	7.60	33.5	0.4				
B13050229-010	TP7 1.5-4	14	39	26	35	6	CL	7.70	46.1	0.7				
B13050229-011	TP7 6-8	31	56	22	22	4	SCL	7.80	29.4	0.9				
B13050229-012	TP7 8-10	42	64	17	19	3	SL	7.90	28.4	0.9				
B13050229-013	TP7 10-12	41	60	21	19	8	SL	7.80	34.4	1.1				
B13050229-014	TP9 6-8	35	54	29	17	6	SL	7.60	29.9	2.8	464	0	463	0.07
B13050229-015	TP9 8-10	53	66	18	16	6	SL	7.70	27.8	1.9	375	0	375	0.03
B13050229-016	TP9 10-11	42	54	28	18	8	SL	7.70	31.5	2.7	297	0	297	0.07
B13050229-017	TP12 0-1	17	60	21	19	9	SL	7.70	25.8	0.5	47	0	47	0.03
B13050229-018	TP12 1-3	20	30	43	27	4	CL	7.60	35.1	1.4	406	0	406	0.01
B13050229-019	TP12 3-7	65	59	23	18	4	SL	7.50	25.7	2.8	192	0	192	0.02
B13050229-020	TP12 8-11	21	66	22	12	10	SL	7.60	23.6	4.6	147	0	147	0.02
B13050229-021	TP12 11-13	18	52	33	15	10	L	7.40	27.9	4.8	225	0	225	0.02
B13050229-022	TP16 0-2	20	53	26	21	6	SCL	7.60	28.7	0.6	113	0	113	0.01
B13050229-023	TP16 2-4	19	40	34	26	5	L	7.70	33.7	0.6	336	0	336	< 0.01
B13050229-024	TP16 4-7	8	48	39	13	10	L	7.60	35.3	2.1	156	0	156	0.02
B13050229-025	TP16 7-10	12	29	52	19	3	SiL	7.70	31.4	1.5	189	0	189	0.01
B13050229-026	TP16 10-17	55	57	25	18	3	SL	7.70	26.2	1.2	117	0	117	0.02
B13050229-027	TP17 0-2	19	34	36	30	1	CL	7.70	44.3	0.5				
B13050229-028	TP17 2-4	14	23	45	32	0	CL	7.80	38.4	0.3				
B13050229-029	TP17 4-6	28	51	29	20	6	L	7.80	33.1	0.3				
B13050229-030	TP17 6-10	40	77	15	8	7	SL	7.90	32.2	0.4				
B13050229-031	TP21 7-11	55	51	25	24	6	SCL	7.60	42.6	4.5				
B13050229-032	TP21 11-14	39	51	25	24	7	SCL	7.50	37.0	3.3				
B13050229-033	TP21 14-18	17	49	33	18	16	L	7.60	38.5	3.2				
B13050229-034	TP24 0-3	35	35	31	34	3	CL	7.80	41.7	0.5				
B13050229-035	TP24 3-5	33	37	35	28	3	CL	7.70	37.8	0.8				
B13050229-036	TP24 5-10	15	45	33	22	7	L	7.90	31.9	1.3				
B13050229-037	TP24 10-14	36	57	25	18	4	SL	7.80	28.3	2.0				
B13050229-038	TP24 14-16	55	59	23	18	4	SL	7.70	28.6	4.0				
B13050229-039	TP25 2-5	61	67	15	18	5	SL	8.00	29.1	0.3				
B13050229-040	TP27 0-2	32	53	23	24	3	SCL	7.60	33.5	0.5	117	0	117	0.01

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Golder Associates Inc
Project: 123-80002A Supplemental Soils
Workorder: B13050229

Report Date: 05/14/13
Date Received: 05/02/13

	Analysis	Coarse Frags	Sand	Silt	Clay	Very Fine Sand	Texture	pH	Saturation	Cond-Sat Paste	Neut Potential	Acid Potential	Acid/Base Potential	S, Total
	Units	%	%	%	%	wt%		s_u_	%	mmhos/cm	t/kt	t/kt	t/kt	%
Sample ID	**Client Sample ID**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**	**Results**
B13050229-041	TP27 2-3	42	45	27	28	4	CL	7.60	36.7	0.7	208	0	208	0.01
B13050229-042	TP27 3-7	51	62	20	18	5	SL	7.70	28.0	0.7	261	0	261	< 0.01
B13050229-043	TP27 7-13	59	67	15	18	5	SL	8.00	26.9	0.6	267	0	266	0.01
B13050229-044	TP27 13-14	51	69	15	16	4	SL	8.00	25.0	0.5	231	0	231	0.02
B13050229-045	TP31 1-2	31	48	28	24	8	L	8.10	39.2	0.6				
B13050229-046	TP31 2-5	44	63	17	20	6	SCL	8.00	31.5	0.7				
B13050229-047	TP31 5-8	53	67	13	20	6	SCL	8.00	30.4	0.6				
B13050229-048	TP31 8-16	53	61	17	22	7	SCL	7.90	33.5	0.9				

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Golder Associates Inc
Project: 123-80002A Supplemental Soils
Workorder: B13050229

Report Date: 05/14/13
Date Received: 05/02/13

	Analysis	S, H2O Extr	S, HCL Extr	S, HNO3 Extr	S, Residual	Lime	Phos, Olsen	Nitrate as N	Potassium	As-ABDTPA	Cd-ABDTPA	Cu-ABDTPA	Hg-ABDTPA	Mn-ABDTPA
	Units	%	%	%	%	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Sample ID	Client Sample ID	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results
B13050229-001	TP3 0-1	< 0.01	< 0.01	< 0.01	0.01		9	3	96	0.06	< 0.1	1.8	< 0.1	2.6
B13050229-002	TP3 1-2	< 0.01	< 0.01	< 0.01	0.01		11	2	45	0.09	< 0.1	0.9	< 0.1	1.8
B13050229-003	TP3 2-7	< 0.01	< 0.01	< 0.01	0.01		8	1	57	0.15	< 0.1	0.7	< 0.1	0.7
B13050229-004	TP3 7-9	< 0.01	< 0.01	< 0.01	0.01		7	1	91	0.10	< 0.1	0.3	< 0.1	0.4
B13050229-005	TP3 9-11	0.06	< 0.01	< 0.01	0.01		7	< 1	72	0.10	< 0.1	0.5	< 0.1	0.9
B13050229-006	TP5 0-1	< 0.01	< 0.01	< 0.01	0.01		10	9	150	0.08	< 0.1	8.0	< 0.1	6.1
B13050229-007	TP5 1-3	< 0.01	< 0.01	< 0.01	0.01		7	3	90	0.09	< 0.1	2.9	< 0.1	2.4
B13050229-008	TP5 3-7	< 0.01	< 0.01	< 0.01	0.01		7	1	69	0.11	< 0.1	0.9	< 0.1	1.1
B13050229-009	TP7 0-1.5					4.5								
B13050229-010	TP7 1.5-4					3.2								
B13050229-011	TP7 6-8					40.8								
B13050229-012	TP7 8-10					25.3								
B13050229-013	TP7 10-12					26.4								
B13050229-014	TP9 6-8	0.04	< 0.01	0.02	0.01		6	< 1	210	0.06	< 0.1	25.7	< 0.1	1.8
B13050229-015	TP9 8-10	< 0.01	< 0.01	0.01	0.01		6	< 1	56	0.10	< 0.1	10.8	< 0.1	1.2
B13050229-016	TP9 10-11	0.03	< 0.01	0.02	0.02		7	1	80	0.07	< 0.1	30.5	< 0.1	1.5
B13050229-017	TP12 0-1	< 0.01	< 0.01	0.01	0.02		7	5	260	0.08	< 0.1	4.8	< 0.1	2.6
B13050229-018	TP12 1-3	< 0.01	< 0.01	< 0.01	0.01		8	4	110	0.10	< 0.1	2.6	< 0.1	1.2
B13050229-019	TP12 3-7	< 0.01	< 0.01	< 0.01	0.02		9	3	99	0.12	< 0.1	4.4	< 0.1	1.4
B13050229-020	TP12 8-11	< 0.01	< 0.01	< 0.01	0.02		5	1	60	0.07	< 0.1	1.1	< 0.1	0.5
B13050229-021	TP12 11-13	< 0.01	< 0.01	< 0.01	0.02		6	1	86	0.10	< 0.1	1.6	< 0.1	0.9
B13050229-022	TP16 0-2	< 0.01	< 0.01	< 0.01	0.01		7	6	360	0.08	< 0.1	4.2	< 0.1	3.7
B13050229-023	TP16 2-4	< 0.01	< 0.01	< 0.01	0.01		9	2	110	0.10	< 0.1	3.9	< 0.1	2.6
B13050229-024	TP16 4-7	< 0.01	< 0.01	< 0.01	0.02		6	1	140	0.07	< 0.1	1.4	< 0.1	0.6
B13050229-025	TP16 7-10	< 0.01	< 0.01	< 0.01	0.02		6	5	120	0.23	< 0.1	1.3	< 0.1	0.4
B13050229-026	TP16 10-17	< 0.01	< 0.01	< 0.01	0.02		6	4	110	0.10	< 0.1	2.2	< 0.1	1.3
B13050229-027	TP17 0-2					16.1								
B13050229-028	TP17 2-4					61.7								
B13050229-029	TP17 4-6					36.1								
B13050229-030	TP17 6-10					37.5								
B13050229-031	TP21 7-11					6.7								
B13050229-032	TP21 11-14					10.6								
B13050229-033	TP21 14-18					20.6								
B13050229-034	TP24 0-3					14.2								
B13050229-035	TP24 3-5					26.1								
B13050229-036	TP24 5-10					39.2								
B13050229-037	TP24 10-14					24.4								
B13050229-038	TP24 14-16					20.3								
B13050229-039	TP25 2-5					11.7								
B13050229-040	TP27 0-2	< 0.01	< 0.01	< 0.01	0.01		7	6	140	0.08	< 0.1	3.5	< 0.1	2.3

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Golder Associates Inc
Project: 123-80002A Supplemental Soils
Workorder: B13050229

Report Date: 05/14/13
Date Received: 05/02/13

	Analysis	S, H2O Extr	S, HCL Extr	S, HNO3 Extr	S, Residual	Lime	Phos, Olsen	Nitrate as N	Potassium	As-ABDTPA	Cd-ABDTPA	Cu-ABDTPA	Hg-ABDTPA	Mn-ABDTPA
	Units	%	%	%	%	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Sample ID	Client Sample ID	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results
B13050229-041	TP27 2-3	< 0.01	< 0.01	< 0.01	0.01		7	3	110	0.06	< 0.1	2.2	< 0.1	1.3
B13050229-042	TP27 3-7	< 0.01	< 0.01	< 0.01	0.01		7	2	52	0.07	< 0.1	0.8	< 0.1	0.6
B13050229-043	TP27 7-13	< 0.01	< 0.01	0.01	0.01		6	< 1	42	0.07	< 0.1	0.6	< 0.1	0.6
B13050229-044	TP27 13-14	< 0.01	< 0.01	< 0.01	0.02		5	< 1	71	0.08	< 0.1	0.5	< 0.1	0.7
B13050229-045	TP31 1-2					16.9								
B13050229-046	TP31 2-5					16.1								
B13050229-047	TP31 5-8					17.8								
B13050229-048	TP31 8-16					5.2								

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Golder Associates Inc
Project: 123-80002A Supplemental Soils
Workorder: B13050229

Report Date: 05/14/13
Date Received: 05/02/13

	Analysis	Mo-ABDTPA	Ni-ABDTPA	Pb-ABDTPA
	Units	mg/kg	mg/kg	mg/kg
Sample ID	Client Sample ID	Results	Results	Results
B13050229-001	TP3 0-1	< 0.1	< 0.1	1.0
B13050229-002	TP3 1-2	< 0.1	< 0.1	0.9
B13050229-003	TP3 2-7	< 0.1	< 0.1	0.4
B13050229-004	TP3 7-9	< 0.1	< 0.1	0.3
B13050229-005	TP3 9-11	< 0.1	< 0.1	0.3
B13050229-006	TP5 0-1	< 0.1	0.1	1.3
B13050229-007	TP5 1-3	< 0.1	< 0.1	0.7
B13050229-008	TP5 3-7	< 0.1	< 0.1	0.3
B13050229-009	TP7 0-1.5			
B13050229-010	TP7 1.5-4			
B13050229-011	TP7 6-8			
B13050229-012	TP7 8-10			
B13050229-013	TP7 10-12			
B13050229-014	TP9 6-8	0.9	< 0.1	0.4
B13050229-015	TP9 8-10	0.2	< 0.1	0.3
B13050229-016	TP9 10-11	0.3	< 0.1	0.5
B13050229-017	TP12 0-1	< 0.1	< 0.1	1.3
B13050229-018	TP12 1-3	< 0.1	< 0.1	0.6
B13050229-019	TP12 3-7	< 0.1	0.4	0.6
B13050229-020	TP12 8-11	< 0.1	< 0.1	0.3
B13050229-021	TP12 11-13	< 0.1	< 0.1	0.5
B13050229-022	TP16 0-2	< 0.1	0.1	1.0
B13050229-023	TP16 2-4	< 0.1	< 0.1	1.0
B13050229-024	TP16 4-7	< 0.1	< 0.1	0.9
B13050229-025	TP16 7-10	< 0.1	< 0.1	0.9
B13050229-026	TP16 10-17	< 0.1	< 0.1	0.6
B13050229-027	TP17 0-2			
B13050229-028	TP17 2-4			
B13050229-029	TP17 4-6			
B13050229-030	TP17 6-10			
B13050229-031	TP21 7-11			
B13050229-032	TP21 11-14			
B13050229-033	TP21 14-18			
B13050229-034	TP24 0-3			
B13050229-035	TP24 3-5			
B13050229-036	TP24 5-10			
B13050229-037	TP24 10-14			
B13050229-038	TP24 14-16			
B13050229-039	TP25 2-5			
B13050229-040	TP27 0-2	< 0.1	< 0.1	1.4

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Golder Associates Inc
Project: 123-80002A Supplemental Soils
Workorder: B13050229

Report Date: 05/14/13
Date Received: 05/02/13

	Analysis	Mo-ABDTPA	Ni-ABDTPA	Pb-ABDTPA
	Units	mg/kg	mg/kg	mg/kg
Sample ID	Client Sample ID	Results	Results	Results
B13050229-041	TP27 2-3	< 0.1	< 0.1	1.0
B13050229-042	TP27 3-7	< 0.1	< 0.1	0.4
B13050229-043	TP27 7-13	< 0.1	< 0.1	0.3
B13050229-044	TP27 13-14	< 0.1	< 0.1	0.2
B13050229-045	TP31 1-2			
B13050229-046	TP31 2-5			
B13050229-047	TP31 5-8			
B13050229-048	TP31 8-16			

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Golder Associates Inc
Project: 123-80002A Supplemental Soils

Report Date: 05/14/13
Work Order: B13050229

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: ASA10-3								Batch: R204392	
Sample ID: B13050229-001A DUP	Sample Duplicate				Run: MISC-SOIL_130510A			05/10/13 09:59	
Conductivity, sat. paste	0.470	mmhos/cm	0.10				2.2	30	
Sample ID: B13050229-011A DUP	Sample Duplicate				Run: MISC-SOIL_130510A			05/10/13 09:59	
Conductivity, sat. paste	0.880	mmhos/cm	0.10				1.1	30	
Sample ID: B13050229-021A DUP	Sample Duplicate				Run: MISC-SOIL_130510A			05/10/13 09:59	
Conductivity, sat. paste	4.90	mmhos/cm	0.10				1.9	30	
Sample ID: B13050229-031A DUP	Sample Duplicate				Run: MISC-SOIL_130510A			05/10/13 09:59	
Conductivity, sat. paste	4.56	mmhos/cm	0.10				2.0	30	
Sample ID: B13050229-041A DUP	Sample Duplicate				Run: MISC-SOIL_130510A			05/10/13 09:59	
Conductivity, sat. paste	0.650	mmhos/cm	0.10				1.5	30	
Sample ID: LCS-1305100959	Laboratory Control Sample				Run: MISC-SOIL_130510A			05/10/13 09:59	
Conductivity, sat. paste	7.00	mmhos/cm	0.10	90	50	150			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Golder Associates Inc
Project: 123-80002A Supplemental Soils

Report Date: 05/14/13
Work Order: B13050229

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: ASA15-5								Batch: R204392	
Sample ID: B13050229-001A DUP	Sample Duplicate				Run: MISC-SOIL_130510A			05/10/13 09:59	
Sand	50	%	1.0				2.0	40	
Silt	27	%	1.0				0.0	40	
Clay	23	%	1.0				4.3	40	
Sample ID: B13050229-011A DUP	Sample Duplicate				Run: MISC-SOIL_130510A			05/10/13 09:59	
Sand	56	%	1.0				0.0	40	
Silt	23	%	1.0				4.4	40	
Clay	21	%	1.0				4.7	40	
Sample ID: B13050229-021A DUP	Sample Duplicate				Run: MISC-SOIL_130510A			05/10/13 09:59	
Sand	53	%	1.0				1.9	40	
Silt	32	%	1.0				3.1	40	
Clay	15	%	1.0				0.0	40	
Sample ID: LCS-1305100959	Laboratory Control Sample				Run: MISC-SOIL_130510A			05/10/13 09:59	
Sand	42	%	1.0	102	50	150			
Silt	34	%	1.0	97	50	150			
Clay	24	%	1.0	100	50	150			
Sample ID: B13050229-001A DUP	Sample Duplicate				Run: MISC-SOIL_130510A			05/13/13 09:17	
Very Fine Sand	7	wt%	1				28	50	
Sample ID: B13050229-011A DUP	Sample Duplicate				Run: MISC-SOIL_130510A			05/13/13 09:17	
Very Fine Sand	4	wt%	1				23	50	
Sample ID: B13050229-021A DUP	Sample Duplicate				Run: MISC-SOIL_130510A			05/13/13 09:17	
Very Fine Sand	10	wt%	1				1.0	50	
Sample ID: LCS-1305130917	Laboratory Control Sample				Run: MISC-SOIL_130510A			05/13/13 09:17	
Very Fine Sand	8	wt%	1	98	50	150			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Golder Associates Inc
Project: 123-80002A Supplemental Soils

Report Date: 05/14/13
Work Order: B13050229

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: ASA15-5								Batch: R204457	
Sample ID: B13050229-025A DUP	Sample Duplicate				Run: MISC-SOIL_130513A			05/13/13 08:54	
Sand	30	%	1.0				3.4	40	
Silt	51	%	1.0				1.9	40	
Clay	19	%	1.0				0.0	40	
Sample ID: B13050229-035A DUP	Sample Duplicate				Run: MISC-SOIL_130513A			05/13/13 08:54	
Sand	37	%	1.0				0.0	40	
Silt	35	%	1.0				0.0	40	
Clay	28	%	1.0				0.0	40	
Sample ID: B13050229-045A DUP	Sample Duplicate				Run: MISC-SOIL_130513A			05/13/13 08:54	
Sand	48	%	1.0				0.0	40	
Silt	28	%	1.0				0.0	40	
Clay	24	%	1.0				0.0	40	
Sample ID: LCS-1305130854	Laboratory Control Sample				Run: MISC-SOIL_130513A			05/13/13 08:54	
Sand	42	%	1.0	102	50	150			
Silt	34	%	1.0	97	50	150			
Clay	24	%	1.0	100	50	150			
Sample ID: B13050229-025A DUP	Sample Duplicate				Run: MISC-SOIL_130513A			05/13/13 08:54	
Very Fine Sand	4	wt%	1				29	50	
Sample ID: B13050229-035A DUP	Sample Duplicate				Run: MISC-SOIL_130513A			05/13/13 08:54	
Very Fine Sand	3	wt%	1				0.0	50	
Sample ID: B13050229-045A DUP	Sample Duplicate				Run: MISC-SOIL_130513A			05/13/13 08:54	
Very Fine Sand	7	wt%	1				13	50	
Sample ID: LCS-1305130854	Laboratory Control Sample				Run: MISC-SOIL_130513A			05/13/13 08:54	
Very Fine Sand	7	wt%	1	88	50	150			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Golder Associates Inc
Project: 123-80002A Supplemental Soils

Report Date: 05/14/13
Work Order: B13050229

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **ASA24-5**									Batch: 130508013
Sample ID: LCS	Laboratory Control Sample				Run: FIA201-B_130508A				05/08/13 10:55
Phosphorus, Olsen	13.8	mg/kg	1.0	103	50	150			
Sample ID: B13050229-001ADUP	Sample Duplicate				Run: FIA201-B_130508A				05/08/13 11:02
Phosphorus, Olsen	8.38	mg/kg	1.0				9.8	30	
Sample ID: B13050229-001AMS	Sample Matrix Spike				Run: FIA201-B_130508A				05/08/13 11:03
Phosphorus, Olsen	19.8	mg/kg	1.0	101	50	150			
Sample ID: B13050229-016ADUP	Sample Duplicate				Run: FIA201-B_130508A				05/08/13 11:22
Phosphorus, Olsen	6.91	mg/kg	1.0				2.3	30	
Sample ID: B13050229-016AMS	Sample Matrix Spike				Run: FIA201-B_130508A				05/08/13 11:23
Phosphorus, Olsen	18.0	mg/kg	1.0	107	50	150			
Sample ID: B13050229-026ADUP	Sample Duplicate				Run: FIA201-B_130508A				05/08/13 11:41
Phosphorus, Olsen	6.23	mg/kg	1.0				2.6	30	
Sample ID: B13050229-026AMS	Sample Matrix Spike				Run: FIA201-B_130508A				05/08/13 11:43
Phosphorus, Olsen	17.3	mg/kg	1.0	107	50	150			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Golder Associates Inc
Project: 123-80002A Supplemental Soils

Report Date: 05/14/13
Work Order: B13050229

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: ASA33-8								Batch: 13050901-NNS2	
Sample ID: LCS	Laboratory Control Sample				Run: FIA201-B_130510A			05/09/13 12:16	
Nitrate as N, KCL Extract	7.03	mg/kg	1.0	95	50	150			
Sample ID: B13042185-001ADUP	Sample Duplicate				Run: FIA201-B_130510A			05/09/13 12:19	
Nitrate as N, KCL Extract	5.43	mg/kg	1.0				3.0	30	
Sample ID: B13042185-001AMS	Sample Matrix Spike				Run: FIA201-B_130510A			05/09/13 12:20	
Nitrate as N, KCL Extract	10.5	mg/kg	1.0	94	50	150			
Sample ID: B13050229-014ADUP	Sample Duplicate				Run: FIA201-B_130510A			05/09/13 12:29	
Nitrate as N, KCL Extract	0.942	mg/kg	1.0					30	
Sample ID: B13050229-014AMS	Sample Matrix Spike				Run: FIA201-B_130510A			05/09/13 12:30	
Nitrate as N, KCL Extract	6.16	mg/kg	1.0	101	50	150			
Sample ID: B13050229-024ADUP	Sample Duplicate				Run: FIA201-B_130510A			05/09/13 12:39	
Nitrate as N, KCL Extract	1.06	mg/kg	1.0				8.8	30	
Sample ID: B13050229-024AMS	Sample Matrix Spike				Run: FIA201-B_130510A			05/09/13 12:39	
Nitrate as N, KCL Extract	6.47	mg/kg	1.0	101	50	150			
Sample ID: B13050347-001BMS	Sample Matrix Spike				Run: FIA201-B_130510A			05/09/13 12:48	
Nitrate as N, KCL Extract	1100	mg/kg-dry	10	97	50	150			
Sample ID: B13050347-001BDUP	Sample Duplicate				Run: FIA201-B_130510A			05/09/13 12:49	
Nitrate as N, KCL Extract	68.4	mg/kg-dry	10				44	30	R

Qualifiers:

RL - Analyte reporting limit.
R - RPD exceeds advisory limit.
ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Golder Associates Inc
Project: 123-80002A Supplemental Soils

Report Date: 05/14/13
Work Order: B13050229

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: ASAM10-3.2									Batch: R204392
Sample ID: B13050229-001A DUP	Sample Duplicate				Run: MISC-SOIL_130510A				05/10/13 09:59
pH, sat. paste	7.50	s.u.	0.10				0.0	10	
Sample ID: B13050229-011A DUP	Sample Duplicate				Run: MISC-SOIL_130510A				05/10/13 09:59
pH, sat. paste	7.80	s.u.	0.10				0.0	10	
Sample ID: B13050229-021A DUP	Sample Duplicate				Run: MISC-SOIL_130510A				05/10/13 09:59
pH, sat. paste	7.50	s.u.	0.10				1.3	10	
Sample ID: B13050229-031A DUP	Sample Duplicate				Run: MISC-SOIL_130510A				05/10/13 09:59
pH, sat. paste	7.60	s.u.	0.10				0.0	10	
Sample ID: B13050229-041A DUP	Sample Duplicate				Run: MISC-SOIL_130510A				05/10/13 09:59
pH, sat. paste	7.60	s.u.	0.10				0.0	10	
Sample ID: LCS-1305100959	Laboratory Control Sample				Run: MISC-SOIL_130510A				05/10/13 09:59
pH, sat. paste	6.90	s.u.	0.10	97	90	110			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Golder Associates Inc
Project: 123-80002A Supplemental Soils

Report Date: 05/14/13
Work Order: B13050229

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: Sobek Modified									Batch: R204457
Sample ID: B13050229-001A DUP	Sample Duplicate				Run: MISC-SOIL_130513A				05/10/13 10:43
Sulfur, Total	0.0148	%	0.010				0.3	50	
Sulfur, Hot Water Extractable	0.00340	%	0.010					50	
Sulfur, HCl Extractable	0.00140	%	0.010					50	
Sulfur, HNO3 Extractable	ND	%	0.010					50	
Sulfur, Residual	0.0100	%	0.010				0.0	50	
Sample ID: B13050229-016A DUP	Sample Duplicate				Run: MISC-SOIL_130513A				05/10/13 11:23
Sulfur, Total	0.0676	%	0.010				2.2	50	
Sulfur, Hot Water Extractable	0.0282	%	0.010				7.4	50	
Sulfur, HCl Extractable	ND	%	0.010					50	
Sulfur, HNO3 Extractable	0.0200	%	0.010				0.0	50	
Sulfur, Residual	0.0200	%	0.010				0.0	50	
Sample ID: B13050229-026A DUP	Sample Duplicate				Run: MISC-SOIL_130513A				05/10/13 12:04
Sulfur, Total	0.0159	%	0.010				0.6	50	
Sulfur, Hot Water Extractable	ND	%	0.010					50	
Sulfur, HCl Extractable	ND	%	0.010					50	
Sulfur, HNO3 Extractable	ND	%	0.010					50	
Sulfur, Residual	0.0200	%	0.010				0.0	50	
Sample ID: LCS-SOL0715130510122	Laboratory Control Sample				Run: MISC-SOIL_130513A				05/10/13 12:22
Sulfur, Total	0.158	%	0.010	98	50	200			
Sulfur, Hot Water Extractable	0.0495	%	0.010	124	50	200			
Sulfur, HCl Extractable	0.00800	%	0.010	80	50	200			
Sulfur, HNO3 Extractable	0.0600	%	0.010	86	50	200			
Sulfur, Residual	0.0400	%	0.010	200	50	200			
Sample ID: B13050229-001A DUP	Sample Duplicate				Run: MISC-SOIL_130513A				05/10/13 10:43
Neutralization Potential	200	t/kt	0.10				1.4	50	
Acid Potential	0	t/kt	1.0					50	
Acid/Base Potential	200	t/kt					1.4	50	
The acid-base potential was calculated from the HNO3 extractable sulfur %									
Sample ID: B13050229-016A DUP	Sample Duplicate				Run: MISC-SOIL_130513A				05/10/13 11:23
Neutralization Potential	300	t/kt	0.10				0.0	50	
Acid Potential	0.62	t/kt	1.0					50	
Acid/Base Potential	300	t/kt					0.0	50	
The acid-base potential was calculated from the HNO3 extractable sulfur %									
Sample ID: B13050229-026A DUP	Sample Duplicate				Run: MISC-SOIL_130513A				05/10/13 12:04
Neutralization Potential	120	t/kt	0.10				0.5	50	
Acid Potential	0	t/kt	1.0					50	
Acid/Base Potential	120	t/kt					0.5	50	
The acid-base potential was calculated from the HNO3 extractable sulfur %									

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Golder Associates Inc
Project: 123-80002A Supplemental Soils

Report Date: 05/14/13
Work Order: B13050229

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: Sobek Modified									Batch: R204457
Sample ID: LCS-SOL0715130510122 Laboratory Control Sample					Run: MISC-SOIL_130513A				05/10/13 12:22
Neutralization Potential	74	t/kt	0.10	92	50	200			
Acid Potential	1.9	t/kt	1.0	94	50	200			
Acid/Base Potential	72	t/kt		95	50	200			

The acid-base potential was calculated from the HNO3 extractable sulfur %

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Golder Associates Inc
Project: 123-80002A Supplemental Soils

Report Date: 05/14/13
Work Order: B13050229

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW6010B									Batch: 71062
Sample ID: LCS-71062	Laboratory Control Sample				Run: ICP201-B_130507A				05/07/13 18:47
Potassium	250	mg/kg	10	81	50	150			
Sample ID: B13050229-001A DUP	Sample Duplicate				Run: ICP201-B_130507A				05/07/13 18:53
Potassium	80	mg/kg	10				18	50	
Sample ID: B13050229-002AMS2	Sample Matrix Spike				Run: ICP201-B_130507A				05/07/13 19:00
Potassium	4800	mg/kg	10	96	70	130			
Sample ID: B13050229-016A DUP	Sample Duplicate				Run: ICP201-B_130507A				05/07/13 19:40
Potassium	81	mg/kg	10				1.1	50	
Sample ID: B13050229-017AMS2	Sample Matrix Spike				Run: ICP201-B_130507A				05/07/13 19:47
Potassium	5200	mg/kg	10	98	70	130			
Sample ID: B13050229-026A DUP	Sample Duplicate				Run: ICP201-B_130507A				05/07/13 20:26
Potassium	99	mg/kg	10				9.9	50	
Sample ID: B13050229-040AMS2	Sample Matrix Spike				Run: ICP201-B_130507A				05/07/13 20:52
Potassium	4800	mg/kg	10	94	70	130			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Golder Associates Inc
Project: 123-80002A Supplemental Soils

Report Date: 05/14/13
Work Order: B13050229

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW6020									Batch: 71085
Sample ID: LCS-71085	Laboratory Control Sample				Run: ICPMS202-B_130508A				05/08/13 13:25
Arsenic	0.210	mg/kg	0.020	66	50	150			
Cadmium	0.108	mg/kg	0.10	108	50	150			
Copper	3.70	mg/kg	0.10	80	50	150			
Lead	2.57	mg/kg	0.10	107	50	150			
Manganese	7.78	mg/kg	0.10	63	50	150			
Molybdenum	0.291	mg/kg	0.10	141	50	150			
Nickel	0.508	mg/kg	0.10	63	50	150			
Sample ID: B13050229-001A DUP	Sample Duplicate				Run: ICPMS202-B_130508A				05/08/13 13:31
Arsenic	0.0572	mg/kg	0.020				0.4	30	
Cadmium	0.0192	mg/kg	0.10					30	
Copper	1.74	mg/kg	0.10				4.4	30	
Lead	0.959	mg/kg	0.10				7.1	30	
Manganese	2.41	mg/kg	0.10				6.6	30	
Mercury	0.000360	mg/kg	0.10					30	
Molybdenum	0.0162	mg/kg	0.10					30	
Nickel	0.0528	mg/kg	0.10					30	
Sample ID: B13050229-002AMS	Sample Matrix Spike				Run: ICPMS202-B_130508A				05/08/13 13:36
Arsenic	0.634	mg/kg	0.020	109	50	150			
Cadmium	0.577	mg/kg	0.10	57	50	150			
Copper	1.52	mg/kg	0.10	57	50	150			
Lead	1.45	mg/kg	0.10	56	50	150			
Manganese	2.35	mg/kg	0.10	57	50	150			
Molybdenum	0.618	mg/kg	0.10	61	50	150			
Nickel	0.614	mg/kg	0.10	56	50	150			
Sample ID: B13050229-016A DUP	Sample Duplicate				Run: ICPMS202-B_130508A				05/08/13 14:15
Arsenic	0.0727	mg/kg	0.020				2.5	30	
Cadmium	0.0106	mg/kg	0.10					30	
Copper	28.4	mg/kg	0.10				7.0	30	
Lead	0.479	mg/kg	0.10				4.3	30	
Manganese	1.45	mg/kg	0.10				4.5	30	
Mercury	0.000380	mg/kg	0.10					30	
Molybdenum	0.305	mg/kg	0.10				3.9	30	
Nickel	0.0340	mg/kg	0.10					30	
Sample ID: B13050229-017AMS	Sample Matrix Spike				Run: ICPMS202-B_130508A				05/08/13 14:21
Arsenic	0.693	mg/kg	0.020	122	50	150			
Cadmium	0.670	mg/kg	0.10	64	50	150			
Copper	5.65	mg/kg	0.10		50	150			A
Lead	2.07	mg/kg	0.10	75	50	150			
Manganese	3.41	mg/kg	0.10	78	50	150			
Molybdenum	0.714	mg/kg	0.10	69	50	150			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

A - The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Golder Associates Inc
Project: 123-80002A Supplemental Soils

Report Date: 05/14/13
Work Order: B13050229

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW6020								Batch: 71085	
Sample ID: B13050229-017AMS	Sample Matrix Spike				Run: ICPMS202-B_130508A			05/08/13 14:21	
Nickel	0.623	mg/kg	0.10	54	50	150			
Sample ID: B13050229-026A DUP	Sample Duplicate				Run: ICPMS202-B_130508A			05/08/13 15:00	
Arsenic	0.101	mg/kg	0.020				1.1	30	
Cadmium	0.00946	mg/kg	0.10					30	
Copper	2.27	mg/kg	0.10				2.9	30	
Lead	0.646	mg/kg	0.10				1.4	30	
Manganese	1.31	mg/kg	0.10				3.9	30	
Mercury	0.000330	mg/kg	0.10					30	
Molybdenum	0.00672	mg/kg	0.10					30	
Nickel	0.0470	mg/kg	0.10					30	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Golder Associates Inc
Project: 123-80002A Supplemental Soils

Report Date: 05/14/13
Work Order: B13050229

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **USDA23c**									Batch: R204392
Sample ID: B13050229-009A DUP	Sample Duplicate				Run: MISC-SOIL_130510A				05/10/13 09:11
Lime as CaCO3	4.50	%	0.10				0.0	30	
Sample ID: B13050229-032A DUP	Sample Duplicate				Run: MISC-SOIL_130510A				05/10/13 09:11
Lime as CaCO3	10.4	%	0.10				1.9	30	
Sample ID: B13050229-046A DUP	Sample Duplicate				Run: MISC-SOIL_130510A				05/10/13 09:11
Lime as CaCO3	16.1	%	0.10				0.0	30	
Sample ID: LCS-1305100911	Laboratory Control Sample				Run: MISC-SOIL_130510A				05/10/13 09:11
Lime as CaCO3	7.50	%	0.10	94	50	150			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Golder Associates Inc
Project: 123-80002A Supplemental Soils

Report Date: 05/14/13
Work Order: B13050229

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: USDA27a									Batch: R204392
Sample ID: B13050229-001A DUP	Sample Duplicate				Run: MISC-SOIL_130510A				05/10/13 09:59
Saturation	30.9	%	0.10				1.6	20	
Sample ID: B13050229-011A DUP	Sample Duplicate				Run: MISC-SOIL_130510A				05/10/13 09:59
Saturation	28.9	%	0.10				1.7	20	
Sample ID: B13050229-021A DUP	Sample Duplicate				Run: MISC-SOIL_130510A				05/10/13 09:59
Saturation	27.7	%	0.10				0.7	20	
Sample ID: B13050229-031A DUP	Sample Duplicate				Run: MISC-SOIL_130510A				05/10/13 09:59
Saturation	42.5	%	0.10				0.2	20	
Sample ID: B13050229-041A DUP	Sample Duplicate				Run: MISC-SOIL_130510A				05/10/13 09:59
Saturation	37.3	%	0.10				1.6	20	
Sample ID: LCS-1305100959	Laboratory Control Sample				Run: MISC-SOIL_130510A				05/10/13 09:59
Saturation	35.9	%	0.10	95	50	150			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

Standard Reporting Procedures

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

Workorder Receipt Checklist

Golder Associates Inc

B13050229

Login completed by: Gina McCartney
Date Received: 5/2/2013

Reviewed by: BL2000\jklier
Received by: lg

Reviewed Date: 5/3/2013
Carrier name: Return-FedEx Ground

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received?	Yes ☐	No ☑	Not Applicable ☐
Container/Temp Blank temperature:	°C No Ice		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	Not Applicable ☑

Contact and Corrective Action Comments:

Container temperature for Cooler 1 was 15.9°C, Cooler 2 was 14.6°C, Cooler 3 was 16.1°C, Cooler 4 was 16.8°C and Cooler 5 was 17.2°C.

Chain of Custody and Analytical Request Record

PLEASE PRINT- Provide as much information as possible.

Page ____ of ____

Company Name: Golder Assoicates Inc.	Project Name, PWS, Permit, Etc.: 123-80002A Supplemental Soils	Sample Origin State: NM	EPA/State Compliance: Yes ☐ No ☐
Report Mail Address: 5200 Pasadena NE Suite C Albuquerque, NM 87113	Contact Name: Emily Clark; Phone/Fax: 505-821-3043; Email: eclark@golder.com		Sampler: (Please Print) Emily Clark
Invoice Address: Same	Invoice Contact & Phone: Toni Sanchez 505-821-3043	Purchase Order:	Quote/Bottle Order: B2958

Special Report/Formats – ELI must be notified prior to sample submittal for the following:

☐ DW ☐ A2LA
☐ GSA ☐ EDD/EDT (Electronic Data) Format:_____
☐ POTW/WWTP ☐ LEVEL IV
☐ State: _____ ☐ NELAC
☐ Other: _____

Number of Containers
Sample Type: A Air W Water S Soils/Solids V Vegetation B Biossay O Other

ANALYSIS REQUESTED

SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	Group 1	Group 2	SEE ATTACHED	Normal Turnaround (TAT)
1 TP3 0-1	12-21-12				X	X	
2 TP3 1-2	"				X	X	
3 TP3 2-7	"				X	X	
4 TP3 7-9	"				X	X	
5 TP3 9-11	"				X	X	
6 TP5 0-1	1/3/13				X	X	
7 TP5 1-3	"				X	X	
8 TP5 3-7	"				X	X	
9 TP7 0-1.5	12-17-12			X		X	
10 TP7 1.5-4	"			X		X	

RUSH

Contact ELI prior to RUSH sample submittal for charges and scheduling – See Instruction Page

Comments:
Cooler #1 15.9
#2 14.6
#3 16.1
#4 16.8
#5 17.2

Collection Dates provided per sample Containers gm 5-2-13

Shipped by: Fed Ex
Cooler ID(s):
Receipt Temp 15.9 °C
On Ice: Yes (No)
Custody Seal (Y) N
Intact (Y) N
Signature Match (Y) N

LABORATORY USE ONLY
1305022900
-002
-003
-004
-005
-006
-007
-008
-009
-010

Custody Record MUST be Signed	Relinquished by (print): Michael Peterson	Date/Time: 09:00 4/30/13	Signature:	Received by (print): / Date/Time: / Signature:
	Relinquished by (print):	Date/Time:	Signature:	Received by (print): / Date/Time: / Signature:
	Sample Disposal: Return to Client: _____ Lab Disposal: _____			Received by Laboratory: Date/Time: 5-2-13 9:00 Signature:

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Visit our web site at www.energylab.com for additional information, downloadable fee schedule, forms, and links.

Chain of Custody and Analytical Request Record

ENERGY LABORATORIES

PLEASE PRINT- Provide as much information as possible.

Page ____ of ____

Company Name: Golder Associates Inc	Project Name, PWS, Permit, Etc.: 123-80002A Supplemental Soils	Sample Origin State: NM	EPA/State Compliance: Yes ☐ No ☐
Report Mail Address: 5200 Pasadena NE Suite C Albuquerque, NM 87113	Contact Name: Emily Clark	Phone/Fax: 505-821-3043	Email: eclark@golder.com
			Sampler: (Please Print) Emily Clark
Invoice Address: Same	Invoice Contact & Phone: Toni Sanchez 505-821-3043	Purchase Order:	Quote/Bottle Order: B2958

Special Report/Formats – ELI must be notified prior to sample submittal for the following:

☐ DW ☐ A2LA
☐ GSA ☐ EDD/EDT (Electronic Data)
☐ POTW/WWTP Format: _____
☐ State: _____ ☐ LEVEL IV
☐ Other: _____ ☐ NELAC

RUSH

Contact ELI prior to RUSH sample submittal for charges and scheduling – See Instruction Page

Shipped by: FedEx Ground

Cooler ID(s):

Receipt Temp: See comments

On Ice: Yes (No)

Custody Seal Intact: Y N

Signature Match: Y N

Comments:
Cooler #1 1.59
#2 14.6
#3 16.1
#4 16.8
#5 17.2

	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	Number of Containers / Sample Type: A W S V B O / Air Water Soils/Solids Vegetation Bioassay Other	Group 1	Group 2	SEE ATTACHED	Normal Turnaround (TAT)	
1	TP7 6-8	12-17-12				X		X		Collection date provided per sample containers gms 5-2-13
2	TP7 8-10	"				X		X		
3	TP7 10-12	"				X		X		
4	TP9 6-8	"					X	X		
5	TP9 8-10	"					X	X		
6	TP9 10-11	"					X	X		
7	TP12 0-1	1-2-13					X	X		
8	TP12 1-3	"					X	X		
9	TP12 3-7	"					X	X		
10	TP12 8-11	"					X	X		

LABORATORY USE ONLY

B13050229-011
-012
-013
-014
-015
-016
-017
-018
-019
-020

Custody Record MUST be Signed

Relinquished by (print):	Date/Time:	Signature:	Received by (print): Date/Time: Signature:
Relinquished by (print):	Date/Time:	Signature:	Received by (print): Date/Time: Signature:
Sample Disposal: Return to Client: _____ Lab Disposal: _____			Received by Laboratory: Date/Time: 5-2-13 9:00 Signature:

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Chain of Custody and Analytical Request Record

ENERGY LABORATORIES

Page ____ of ____

PLEASE PRINT- Provide as much information as possible.

Company Name: Golder Assoicates Inc.	Project Name, PWS, Permit, Etc.: 123-80002A Supplemental Soils	Sample Origin State: NM	EPA/State Compliance: Yes ☐ No ☐
Report Mail Address: 5200 Pasadena NE Suite C Albuquerque, NM 87113	Contact Name: Emily Clark; Phone/Fax: 505-821-3043; Email: eclark@golder.com		Sampler: (Please Print) Emily Clark
Invoice Address: Same	Invoice Contact & Phone: Toni Sanchez 505-821-3043	Purchase Order:	Quote/Bottle Order: B2958

Special Report/Formats – ELI must be notified prior to sample submittal for the following:

☐ DW ☐ GSA ☐ POTW/WWTP ☐ State: ____ ☐ Other: ____
☐ A2LA ☐ EDD/EDT (Electronic Data) Format: ____ ☐ LEVEL IV ☐ NELAC

Number of Containers
Sample Type: A Air W Water S Soils/Solids V Vegetation B Bioassay O Other

ANALYSIS REQUESTED — Group 1, Group 2

SEE ATTACHED

Normal Turnaround (TAT)

RUSH

Contact ELI prior to RUSH sample submittal for charges and scheduling – See Instruction Page

Comments:
Cooler #1 15.9
#2 14.6
#3 16.1
#4 16.8
#5 17.2
Collection Dates provided per Sample Containers gm 5-2-13

Shipped by: Fed Ex Ground
Cooler ID(s):
Receipt Temp: See Comments
On Ice: Yes (No)
Custody Seal Intact: Y N
Signature Match: Y N

	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	Group 1	Group 2	SEE ATTACHED	Normal TAT	RUSH	LABORATORY USE ONLY
1	TP12 11-13	1-2-13				X	X			B1305029-021
2	TP16 0-2	12-20-12				X	X			-022
3	TP16 2-4	"				X	X			-023
4	TP16 4-7	"				X	X			-024
5	TP16 7-10	"				X	X			-025
6	TP16 10-17	"				X	X			-026
7	TP17 0-2	12-18-12			X		X			-027
8	TP17 2-4	"			X		X			-028
9	TP17 4-6	"			X		X			-029
10	TP17 6-10	"			X		X			-030

Custody Record MUST be Signed

Relinquished by (print): Michael Peterson	Date/Time: 9:00 4/30/2013	Signature:	Received by (print): / Date/Time: / Signature:
Relinquished by (print):	Date/Time:	Signature:	Received by (print): / Date/Time: / Signature:
Sample Disposal: Return to Client: ____ Lab Disposal: ____			Received by Laboratory: Date/Time: 5-2-13 9:00 Signature:

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Chain of Custody and Analytical Request Record

ENERGY LABORATORIES

Page _____ of _____

PLEASE PRINT- Provide as much information as possible.

Company Name: Golder Assoicates Inc.	Project Name, PWS, Permit, Etc.: 123-80002A Supplemental Soils	Sample Origin State: NM	EPA/State Compliance: Yes ☐ No ☐
Report Mail Address: 5200 Pasadena NE Suite C Albuquerque, NM 87113	Contact Name: Emily Clark; Phone/Fax: 505-821-3043; Email: eclark@golder.com		Sampler: (Please Print) Emily Clark
Invoice Address: Same	Invoice Contact & Phone: Toni Sanchez 505-821-3043	Purchase Order:	Quote/Bottle Order: B2958

Special Report/Formats – ELI must be notified prior to sample submittal for the following:

☐ DW ☐ A2LA
☐ GSA ☐ EDD/EDT (Electronic Data)
☐ POTW/WWTP Format: _____
☐ State: _____ ☐ LEVEL IV
☐ Other: _____ ☐ NELAC

Number of Containers
Sample Type: A Air, W Water, S Soils/Solids, V Vegetation, B Bioassay, O Other

ANALYSIS REQUESTED

RUSH

Contact ELI prior to RUSH sample submittal for charges and scheduling – See Instruction Page

Comments:
Cooler #1 15.9
#2 14.6
#3 16.1
#4 16.8
#5 17.1
Collection dates provided per Sample Containers 5-2-13

Shipped by: Fed Ex Ground
Cooler ID(s):
Receipt Temp: See Comments
On Ice: Yes (No)
Custody Seal: Intact N / Signature Match N

	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	Group 1	Group 2	SEE ATTACHED	Normal Turnaround (TAT)	LABORATORY USE ONLY
1	TP21 7-11	12-19-12			X		X		B1305229-031
2	TP21 11-14	"			X		X		-032
3	TP21 14-17	"			X		X		-033
4	TP21 0-3	12-18-12			X		X		-034
5	TP24 3-5	"			X		X		-035
6	TP24 5-10	"			X		X		-036
7	TP24 10-14	"			X		X		-037
8	TP24 14-16	"			X		X		-038
9	TP 25 2-5	12-13-12			X		X		-039
10	TP27 0-2	12-19-12				X	X		-040

Custody Record MUST be Signed

Relinquished by (print): Michael Petersen	Date/Time: 5/04/30/13	Signature:	Received by (print): / Date/Time: / Signature:
Relinquished by (print): / Date/Time: / Signature:			Received by (print): / Date/Time: / Signature:
Sample Disposal: Return to Client: _____ Lab Disposal: _____			Received by Laboratory: 5-2-13 9:00

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Chain of Custody and Analytical Request Record

Page _____ of _____

PLEASE PRINT- Provide as much information as possible.

Company Name:	Project Name, PWS, Permit, Etc.	Sample Origin	EPA/State Compliance:
Golder Associates Inc	123-80002A Supplemental Soils	State: NM	Yes ☐ No ☐
Report Mail Address: 5200 Pasadena NE Suite C Albuquerque, NM 87113	**Contact Name:** Emily Clark **Phone/Fax:** 505-821-3043 **Email:** eclark@golder.com		**Sampler: (Please Print)** Emily Clark
Invoice Address: Same	**Invoice Contact & Phone:** Toni Sanchez 505-821-3043	**Purchase Order:**	**Quote/Bottle Order:** B2958

Special Report/Formats – ELI must be notified prior to sample submittal for the following:

☐ DW ☐ GSA ☐ POTW/WWTP ☐ State: _____ ☐ Other: _____
☐ A2LA ☐ EDD/EDT (Electronic Data) Format: _____ ☐ LEVEL IV ☐ NELAC

Number of Containers
Sample Type: A Air W Water S Soils/Solids V Vegetation B Bioassay O Other

ANALYSIS REQUESTED

SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	Group 1	Group 2	SEE ATTACHED	Normal Turnaround (TAT)
1 TP27 2-3	12-19-12				X	XX	
2 TP27 3-7	"				X	XX	
3 TP27 7-13	"				X	XX	
4 TP27 13-14	"				X	XX	
5 TP31 1-2	1-3-13			X		XX	
6 TP31 2-5	"			X		XX	
7 TP31 5-8	"			X		XX	
8 TP31 8-16	"			X		XX	
9						XX	
10						X	

RUSH

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments:
Cooler #1 15.9
#2 14.6
#3 16.1
#4 16.8
#5 17.2
Collection Dates provided per Sample Containers 5-2-13

Shipped by: Fed Ex Ground
Cooler ID(s):
Receipt Temp: See Comments
On Ice: Yes (No)
Custody Seal: (Y) N
Intact: (Y) N
Signature Match: (Y) N

LABORATORY USE ONLY
B305029-041
-042
-043
-044
-045
-046
-047
-048

Custody Record MUST be Signed

Relinquished by (print): Michael Peterson	Date/Time: 5/01/2013 9:00	Signature:	Received by (print): / Date/Time: / Signature:
Relinquished by (print):	Date/Time:	Signature:	Received by (print): / Date/Time: / Signature:
Sample Disposal: Return to Client: _____ Lab Disposal: _____			Received by Laboratory: 5-2-13 9:00

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