



Mine and Resource Planning

Imerys Performance Minerals Americas

July 25, 2023

Carmen Rose
State of New Mexico
Energy, Minerals and Natural Resources Department
Mining and Minerals Division
1220 South St. Francis Drive
Santa Fe, NM 87505

Dear Carmen,

Please find enclosed the No Agua Perlite Mine, Permit TA005RE 5-year Closeout Plan Revision. Per our previous conversations, the submission does not include the reclamation cost estimate as this may change depending upon Revision approval. Also not included is the Post Closeout Topographical Map as Imerys considers this confidential. This map will be provided to MMD under separate cover. Please feel free to contact me with any questions or concerns.

Sincerely,

A handwritten signature in blue ink that reads "Todd Whitacre".

Todd Whitacre
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Imerys Performance Minerals Americas

Enclosures: 2023 Closeout Plan Revision
Imerys Check in the Amount of \$6000.00

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Mine Closeout Plan

Imerys Perlite USA, Inc.
No Agua, New Mexico

Permit Number: TA005RE

July 25, 2023

Prepared by:

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Prepared for:

Mining Act Reclamation Program
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Table of Contents

1.0 Project Description

- 1.1 Introduction
- 1.2 History

2.0 Site-Specific Characteristic

- 2.1 Impacted Areas
- 2.2 Past, Current, and Planned Mining
- 2.3 Watershed Inventories/Water Quality
- 2.4 Improvements
- 2.5 Hazardous Mine Equipment or Facilities
- 2.6 Industrial or Residential Waste
- 2.7 Highwalls
- 2.8 Other Site Aspects - Vertical Openings, Portals, Unstable Piles or Embankments, Unstable Impoundments, Slope Failures, Subsidence, Recurrent Flooding or Ground Saturation, Polluted Water
- 2.9 Cultural Resources
- 2.10 Hydrology
- 2.11 Soils
- 2.12 Vegetation
- 2.13 Wildlife
- 2.14 Geology

3.0 Post Closure Land Use

4.0 Waiver from Self-Sustaining Ecosystem

5.0 Description of Closeout Activities

- 5.1 Facilities Removal
 - 5.2 Roads
 - 5.3 Waste Dumps
 - 5.4 Quarries and Pits
 - 5.5 Watershed and Catch Basins
 - 5.6 Erosion Control
 - 5.7 Topsoil
 - 5.8 Revegetation
-

6.0 Environmental Standards Compliance

6.1 Reference Areas

6.2 Cover

7.0 Monitoring

7.1 Slope Stability Analysis

7.2 Water Quality Monitoring

7.3 Revegetation Monitoring Program

8.0 Closeout Plan Permitting Requirements

9.0 Post-Closeout Map

10.0 Cost Estimate for Closeout

11.0 Closeout and Reclamation Schedule

List of Tables

- Table 1 - Representative Vegetation Species
- Table 2 - Vegetation Specific to No Agua Mine Site
- Table 3 – Vegetation Production Percentages
- Table 4 - Wildlife Observed
- Table 5 - Surveyed Wildlife
- Table 6 – Reclamation Seed List
- Table 7 – Reclamation Tree List
- Table 8 – State Water Quality Standards
- Table 9 – Operating Permits

List of Figures

- Figure 1 – Permit and Disturbance Area Map
- Figure 2 – Regional Location Map
- Figure 3 – Post Reclamation Topographic Map
- Figure 4 – Reference Area Locations

List of Appendices

- Appendix A – Historic Preservation Division Correspondence
 - Appendix B – USDA Web Soil Survey for No Agua Soils
 - Appendix C - Clayton Shonk Wildlife Report
 - Appendix D – New Mexico Wildlife of Concern
 - Appendix E – Reclamation Cost Estimate
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1.0 Project Description

1.1 Introduction

This revised Closeout Plan is being submitted pursuant to New Mexico Mining Act Rules, Subpart 5, Section 506. This Plan follows the Mining Bureau's Draft Closeout Plan Guidelines for Existing Mines dated April 30, 1996.

1.2 History

Imerys Perlite USA, Inc. (FKA Harborlite Corporation) in No Agua, NM is a perlite surface mining and processing operation. In 1994, application for permit was made to New Mexico Energy, Mining and Minerals Division. Permit TA005RE was issued at that time.

The No Agua site processes perlite ore that is used primarily in the industrial and commercial construction and retrofitting business. Expanded perlite is used in roofing systems, acoustical tile, low temperature insulation vessels, and other applications relying on its unique physical and chemical properties. It is also used as an additive in thermal, fireproofing, and sound barrier materials.

2.0 Site Specific Characteristics

2.1 Impacted Areas

The original Closeout Plan prepared in 1999 was based on mine closure in 20 years. In the event mining continued beyond this planned closure, or if the nature of mining described in the Plan changed significantly, Imerys would submit a modification to the Closeout Plan. In 2016 just such a change was identified. Imerys owns 1590 acres at the No Agua Mine, of which 590 acres are permitted for mining. In 1999 the estimated disturbance was 274 acres, and this was the assumption until 2016. At that time it was determined that the disturbance was 402.9 acres. The 2017 modification to the Closeout Plan addressed this change in disturbance. The current 2023 Closeout Plan Revision assumes a 20 year mine life measured from July, 2023. If mining extends beyond this period, a modification/revision will be submitted to the Mining Act Reclamation Bureau

extending the closure date, and/or modifying the proposed reclamation methodologies. Figure 1 shows a current map including the Permit Boundary, current disturbance, Design Limit, and anticipated 5 year disturbance.

2.2 Past, Current, and Planned Mining

The No Agua Mine and mill are located approximately 7 miles north of Tres Piedras, New Mexico in Taos County. The mine is located about one mile east of Highway 285, and is situated in Township 29 North, Range 9 East, portions of Sections 11, 12, 13, 14, and 23. The facility has been in continuous operation since 1951 under the business names Harborlite, World Minerals, and is currently owned by Imerys Perlite USA, Inc. The regional location of the mine is shown in Figure 2.

2.3 Watershed Inventories/Water Quality

See Section 2.10 Hydrology

2.4 Improvements

The No Agua mine has stockpiles both its fines dump material and overburden dump material into two separate dump areas. A third dump area may be added in the future, if required.

2.5 Hazardous Mine Equipment or Facilities

All hazardous mine equipment and facilities including buildings, structures, equipment, and machinery are operated and maintained by Mine Safety and Health Administration (MSHA) trained professionals. “Private Property” signs and locked gates are used to discourage unauthorized access.

2.6 Industrial and Residential Waste

All solid waste generated by the facility, consisting of office and lunchroom trash, is burned and disposed of on-site. Sewage is treated via an underground septic system.

2.7 Highwalls

Highwalls have existed at the site since its opening in 1951 with no record of failure. Existing highwalls range in height from 15 to 60 feet with 15 foot wide catch basins. This and other similar perlite deposits are known to be highly stable in this configuration.

Since 2005 all highwalls constructed have used a design specification of 15 foot wide benches and 35 foot bench height. All highwalls constructed going forward will use this specification.

2.8 Other Site Aspects

Other site aspects typically considered, but not applicable to the No Agua mine are vertical openings, portals, unstable piles or embankments, unstable impoundments, slope failures, subsidence, recurrent flooding or ground saturation, and polluted water. None of these aspects is found at the No Agua site.

2.9 Cultural Resources

A request was submitted to the New Mexico Office of Cultural Affairs, Historic Preservation Division (HPD) for a list of archaeological sites on the sections where the mine is located. To date, no such archaeological sites have been identified on the Sections where the mine lies. However, there are many sites that have been identified within the four topographic quadrangles surrounding the mine. Due to this fact, the HPD suggests that there is a, “very high probability of significant archaeological sites on the Harborlite property.” If any artifacts or other evidence of previous Native American occupation are found during mining or related activities, work will cease and the HPD office will be contacted. Appendix A provides a copy of the HPD correspondence regarding this issue.

2.10 Hydrology

Runoff water from the mine and processing area results exclusively from precipitation and does not contain any hazardous materials. The ore milling is dry. No water, chemicals, or other additives are used except during minor maintenance activities. The only potential impact to runoff is fine particles of perlite, a naturally occurring substance. Four catch basins function to prevent this material from exiting the mine area. No water quality problems have been identified at the operation throughout its history.

There are approximately eight natural drainages leaving the site. Precipitation runoff from active mining areas on South Hill and West Hill drains to the south of the property into a catch basin next to the overburden waste dump. From the center of the four hills, runoff is collected in an additional holding area below the perlite fines waste dump. This holding area has proven highly effective and requires routine removal/redistribution of the fines material collected here. The two basins have been installed below the unconsolidated waste materials to prevent sediment-laden runoff from leaving the site.

Precipitation runoff from the mill on the northwest part of the property flows to the north on either side of the main entrance road. There it is deposited into one of two natural ponding basins where it evaporates. Following precipitation events, some runoff may leave the property from the north and west following the secondary entrance road, ultimately discharging into the Arroyo Aguaje de Petaco. This water is primarily natural runoff from the north end of West Hill.

Routine inspection of the holding areas and ponding basins confirm that they are dry for eight or more months per year.

2.11 Soils

According to the Soil Conservation Service Soil Survey of Taos County and Parts of Rio Arriba and Mora Counties, the soil at the No Agua Mine is identified as Raton-rock outcrop complex. The Raton soil is dark grayish brown very stony silt loam and found at the higher elevations of volcanic cones. Typical thickness of this soil is 10-20 inches. Rock outcrop of volcanic origin accounts for most of the remainder of the area. It consists of folded and broken volcanic flows.

Primary uses for this soil complex are as woodland and native grazing land for domestic livestock and wildlife. In these capacities, it only has moderate potential due to its low available water capacity and rapid runoff. Used for grazing, this soil complex benefits from proper grazing of the understory vegetation, which results in woodland maintenance, improved plant cover, accumulation of plant residue, and reduced erosion. Additionally, grazing will benefit from a management system that alternates grazing and resting which allows critical plants to complete their growth cycle without risk of damage.

Appendix B includes the USDA Web Soil Survey of the No Agua area.

2.12 Vegetation

Four vegetation habitat types are present at the No Agua Mine. They are rabbit brush, big-sage, piñon-juniper, and Ponderosa pine. The original preparation of this Closeout Plan from 1999 included a general vegetation species list (Table 1).

Table 1 - Representative Vegetation Species

Common Name	Type
big sage	shrub
blue grama	grass
curly dock	forb
douglas fir	tree
foxtail barley	grass
fringed sage	shrub
gamble oak	shrub
gooseberry	forb
Greene's rabbit brush	shrub
gum weed	forb
hairy golden aster	forb
Indian rice grass	grass
mountain mahogany	forb
oneseed juniper	tree
piñon pine	tree
Ponderosa pine	tree
rocky mountain pine	tree
rubber rabbit brush	shrub
sand dropseed	grass
slender wheatgrass	grass
squirrel tail	grass
starvation cactus	forb
wax currant	forb
wild buckwheat	grass
wild tarragon	forb
yucca	forb

Since 1999, Imerys has performed vegetation surveys of four reference plots on the property, as well as nearly annual vegetation surveys of its three test plots from 2008-2017. These surveys have provided a comprehensive list of vegetation found at the site (Table 2).

Table 2 - Vegetation Specific to No Agua Mine Site

Common Name	Type
biennial wormwood	forb
big sage	shrub
blue gramma	grass
Crandall's beardtongue	forb
crested wheatgrass	grass
cushion buckwheat	forb
fineleaf hymenopappus	forb
fringed fage	shrub
Greene's rabbit brush	shrub
ground clover	forb
hairy false goldenaster	forb
hoary tansyaster	forb
Hopi tea greenthread	forb
Indian ricegrass	grass
James buckwheat	grass
oneseed juniper	tree
little sagebrush	shrub
mountain mahogany	tree
mountain muhly	grass
nodding buckwheat	forb
nylon hedgehog cactus	forb
pine dropseed	grass
piñon pine	tree
Ponderosa pine	tree
prickly pear cactus	forb
ragleaf bahia	forb
rubber rabbit brush	shrub
scarlet gilia	forb
silvery lupine	forb
slender wheatgrass	grass
spike muhly	grass
squirreltail	grass
threadleaf ragwort	forb
vegetative grass	grass
Virginia pepperweed	forb
wax currant	forb
western wheatgrass	grass
wild tarragon	forb
yellow sweetclover	forb

The Soil Conservation Service suggests that total annual vegetation production for this soil type is in the range 150 to 400 pounds per acre depending on growing conditions. Typical percentages of production per species are shown in Table 3 (Percentage totaling more than 100% assumed to be due to rounding).

Table 3 – Vegetation Production Percentages

Characteristic Vegetation	Percentage of Production
piñon pine	35%
Rocky Mountain juniper	20%
western wheatgrass	15%
oneseed juniper	15%
Gambel oak	5%
Arizona fescue	5%
mountain muhly	5%
muttongrass	5%
piñon ricegrass	5%

2.13 Wildlife

The wildlife present on the No Agua Mine site is representative of the typical wildlife in the area. Visual observations by employees confirm the presence of the species listed in Table 4.

Table 4 - Wildlife Observed

Deer	Elk	Coyote	Cottontail rabbit
Antelope	Jackrabbit	Ground squirrel	Rattlesnake
Townsend solitaire	Horned lark	Raven	Rough-legged hawk
Red-tailed hawk	Junco	Turkey vulture	

In 2001, a biology consultant was commissioned to perform a wildlife survey of the No Agua Mine site. His full report appears as Appendix C. A summary of the species identified appears below (Table 5).

Table 5 - Surveyed Wildlife

Mule deer	Elk	Porcupine	Dusky flycatcher
Sapsucker	Broad-tailed hummingbird	Black headed grosbeak	Hepatic tanager
Song sparrow	Lark sparrow	Meadowlark	Mountain bluebird
Gray vireo	Cottontail rabbit	American crow	Common raven
Black-capped chickadee			

In addition to the common wildlife species at the mine site, species of concern due to rarity are an additional consideration. A current (as of preparation of this document) Biota Information System of New Mexico report detailing the threatened and endangered species in Taos County is included (Appendix D). None of the species listed have been identified on the mine property at any time. If at any time, one of these species is observed, state and federal officials will be notified.

2.14 Geology

The No Agua perlite deposit consists of two distinct domes formed from the intrusive volcanic rhyolite flows 4 to 5 million years ago. Over time the domes have eroded to form four hills. These are referred to as North Hill, South Hill, West Hill, and East Hill. The rate of cooling and water absorption following the volcanic flow determined whether the rhyolite formed perlite or another mineral form. Perlite is found on the top and outer flank of all four hills.

The No Agua deposit is part of the Taos Plateau volcanic field. This field is bounded on the west by the eastward, gently dipping strata of the Tusas Mountains. It is bounded on the east by the western, north-south-trending fault scarp of the Sangre de Cristo Mountain range. The volcanic field is made up of a compositionally diverse assemblage of the late Cenozoic (2-7 million year old) volcanic rock covering approximately 1,500 square kilometers of the Rio Grande rift system.

3.0 Post Closure Land Use

Post Mining Land Use (PMLU), as defined by the Mining Act Rules (§19.10.1.7.P(5)), is “a beneficial use or multiple uses which will be established on a permit area after completion of a mining project. The post-mining land use may involve active management of the land. The use shall be selected by the owner of the land and approved by the Director. The uses which maybe be approved as post-mining land uses may include agriculture, commercial or ecological uses that would ensure compliance with Federal, State or local laws, regulations and standards and which are feasible.”

Additional considerations were to make the PMLU compatible with the surrounding land, make use of the existing infrastructure if possible, and maintain economic viability for the nearby communities.

The PMLU originally proposed in 1999 for the No Agua Mine following closure was range management for livestock grazing and wildlife habitat. This still represents the most logical and beneficial use based on the above factors.

4.0 Waiver from Self-Sustaining Ecosystem

No waiver from self-sustaining ecosystem is being requested at this time. If the partial reclamation of pits and highwalls proposed in this Closeout Plan are not acceptable to the State of New Mexico, a waiver may be requested at a later date.

5.0 Description of Closeout Activities

The following sections provide a detailed description of mine closeout activities. All activities intend to restore the mine site to a self-sustaining ecosystem as similar to pre-mining conditions as possible. Wherever feasible the remaining man-made features associated with ore extraction will be removed, “softened,” or disguised. Whenever possible, vegetation species used for reclamation will be native to the site. Post closeout monitoring programs are discussed in Section 7.

5.1 Facilities Removal

Closeout will include the complete dismantling of all structures. Functioning equipment with economic value will be sold or transported to other Imerys facilities for reuse. Asbestos abatement will be performed by a licensed contractor who will obtain appropriate permits. Remaining non-hazardous scrap material and concrete foundations may be broken up and/or buried on the site under a minimum of three feet of overburden. Following removal of structures, the facility area will be reclaimed in the same manner as other disturbance areas.

5.2 Roads

Upon closure, all roads will be removed from the site with the exception of those unpaved access roads necessary for monitoring. The monitoring roads have been indicated on the Post Reclamation Topographic Map, Figure 2. Information on this map is considered highly confidential. Road removal will include ripping where necessary to remove compaction.

5.3 Waste Dumps

Upon closeout, three dumps of unconsolidated material will remain at the facility. The first pile consists of processed, fine waste perlite. This pile is enclosed on two of three sides by hills. The third side will be constructed to, or at closeout contoured to, a maximum slope of 3:1. This third side will be capped with overburden and rock to mitigate erosion. The remaining two piles consist of overburden material and rock. Slopes on these piles will be re-contoured to no greater than 3:1. Stability of all slopes will be monitored during the five year monitoring period following closure.

5.4 Quarries and Pits

Due to the significant quantity of perlite ore being removed from the deposit, there will be three main surface depressions remaining at closeout. As much as is feasible, overburden and rock will be deposited in the mined areas. Where necessary fencing, berms, and/or signage will be installed to address safety concerns.

The solid, unconsolidated rock highwalls of the pits, ranging in height from 15-60 feet with 15 foot wide catch benches, will be left in place and partially reclaimed. Slope stability and monitoring are not proposed because there have been no significant failure in the history of this and similar sites.

5.5 Watershed and Catch Basins

At closeout, there will be no changes in the locations or directions of the drainage at the property boundaries. The site's final internal watershed configuration may change prior to and during closeout, however it will remain in a productive and stable condition. There are no anticipated impacts to off-site water users. Water quality will be monitored during the five year period as proposed later in this document. Constructed basins may be left in place following the post-closeout period if they have revegetated and blended with the natural surroundings. This will minimize further impacts of re-disturbance.

5.6 Erosion Control

To the fullest extent feasible, all drainages will be directed inward towards one of the three pits. Accepted methods of contouring, water bars, berming, and installation of hay bales and straw wattles will be employed to address any erosion problems. Revegetation will also play a key role in mitigation of erosion. No permanent mechanical structures will be installed, as they have not been found necessary during active mining.

5.7 Topsoil

As previously described, the topsoil at the mine site is very limited with depths ranging from 0-20 inches. To the fullest extent possible, a topsoil/overburden blend will be removed from the overburden dump and deposited in areas devoid of any unconsolidated material. Overburden material will not be removed from dump areas that have stabilized and revegetated naturally to prevent re-disturbance.

In areas where the topsoil/overburden blend is not applied, the surface will be ripped prior to planting. Additionally these areas may receive amendments if necessary.

No addition of the topsoil/overburden blend, ripping, or fertilization will occur on highwalls or highwall benches due to infeasibility. Basins and pit bottoms will also not receive these treatments as they are expected to contain sufficient topsoil and nutrient content collected as runoff from various disturbed and undisturbed areas of the mine.

5.8 Revegetation

This revegetation plan aims to re-establish self-sustaining vegetation following mine closure. The ideal vegetation will be both equivalent to pre-mining conditions and suitable for the Post Mine Land Use of range management for livestock grazing and wildlife habitat.

The seed mix specified in Table 6 is one that was recently used for inter-seeding of the test plots at the mine site. This list represents a suitable mix of life forms and species native to the No Agua Mine site and surrounding areas. It also represents seeds that are readily available from seed vendors and a seed mix that the vendor recommends for No Agua climate and soil type. The broadcast rate for bare ground seeding is 1.5 times (Granite Seed recommendation) the rate for the interseeding project.

Table 6 - Seed List

Broadcast Rate (lbs/acre)	Species Name	Common Name	Life Form
0.3	<i>Sphaeralcea coccinea</i>	scarlet globemallow	forb
0.08	<i>Artemisia frigida</i>	fringed sage	forb
3.0	<i>Lupinus argenteus</i>	silvery Lupine	forb
0.3	<i>Penstemon strictus</i>	Rocky Mountain penstemon	forb
3.0	<i>Elymus elymoides</i>	bottlebrush squirreltail	grass-Cool
3.0	<i>Elymus trachycaulus</i>	slender wheatgrass	grass-Cool
2.25	<i>Hesperostipa comata</i>	needle and thread	grass-Cool
0.38	<i>Muhlenbergia montana</i>	mountain muhly	grass-Cool
3.75	<i>Achnatherum hymenoides</i>	Indian ricegrass	grass-Warm
0.8	<i>Bouteloua gracilis</i>	blue gramma	grass-Warm
1.5	<i>Amelanchier utahensis</i>	Utah serviceberry	shrub
0.38	<i>Ericameria nauseosa</i>	rubber rabbitbrush	shrub
1.5	<i>Vicia americana</i>	American vetch	Legume
20.24	Total Pounds per Acre		

The revegetation plan will address five specific mine areas in distinct manners.

Flat Areas (dump tops, facility areas, road, etc.) – These areas will be seeded with the above seed mix. Application techniques will vary depending on the surface soil type. Examples are topsoil/overburden blend, unconsolidated or ripped unconsolidated material, and consolidated material. A combination of drill, mechanical broadcast, and hand seeding will be used.

Waste Dump Faces – The perlite fines dump and the two topsoil/overburden dumps will be contoured to no greater than a 3:1 slope. At this slope it will be possible to seed using drill, mechanical broadcast, and hand seeding techniques.

Highwall Benches – Accessible highwall benches will be hand broadcast seeded.

Low to Moderate Slope Areas – These areas will be seeded with the above seed mix by means of drill seeding, mechanical broadcast, and/or hand seeding as appropriate.

Pits and Basins – Pits and basins will be hand seeded with the above seed mix.

Random islands of bare root trees will be planted in suitable locations with the exception of dump faces. Small berms will be constructed around the trees to aid in precipitation retention. Trees to be planted and rates are indicated in Table 7.

Table 7 – Revegetation trees

Species Name	Common Name	Rate
<i>Pinus ponderosa</i>	Ponderosa pine	4 stems/acre
<i>Juniperus scopulorum</i>	Rocky Mountain juniper	10 stems/acre

6.0 Environmental Standards Compliance

Determination of revegetation success will be assessed through comparison of reclaimed areas and reference plots that are located in undisturbed areas of the mine.

6.1 Reference Areas

The previous iteration of the Closeout Plan specified comparison to four Reference Areas delineated by a consultant in 1999. Since that time, it has become apparent that Reference Area 1 and Reference Area 2 are dissimilar to the areas of the mine requiring reclamation. Both Areas 1 and 2 are located on the flat to the south of the mine, and both are devoid or nearly devoid of trees. Hence, the standard going forward will be based only on Reference Area 3 and Reference Area 4. Figure 4 shows the location of all four original Reference Areas.

6.2 Cover

The line intercept method will be used to estimate cover in a minimum of five, 100 foot long, randomly placed transects in each of the Reference Areas. This method is most appropriate to the site as the reference vegetation is relatively sparse and low growing. Percent cover will be obtained by summing the relative lengths of transects that are covered by vegetation. Species that do not appear in the seed mix will be included. Noxious weeds will not be counted as coverage.

The vegetation standard for reclamation areas within the 1999 Design Limit as specified in the original 1999 Closeout Plan will be 70% of the coverage of the Reference Areas. For those areas outside the 1999 Design Limit (approximately 62.8 acres) due to additional disturbance, the vegetation standard is specified by 508 rules as 90% of Reference Plot cover. The 508 governed areas are indicated in Figure 4.

7.0 Monitoring

At mine closeout, several monitoring programs will be implemented to ensure closeout success.

7.1 Slope Stability Analysis

A Slope Stability Monitoring Program (SSMP) will confirm the stability of Imerys' two unconsolidated waste material dumps. The program will be conducted by a licensed geotechnical engineering firm during the five year period following mine closure. It will confirm the stability of the final dump configuration and sizes.

7.2 Water Quality Monitoring

A Water Quality Monitoring Program (WQMP) will be conducted during the five year period following closure prior to bond release. This program will demonstrate the maintenance of state water quality standards at the site's permanent impoundments (pit bottoms and catch basins). The WQMP will involve water quality sampling of the impoundments twice per year for the first two years and twice during the final year prior to bond release. Samples will be collected, and preserved as necessary, in accordance with procedures approved by the US Environmental Protection Agency. A certified laboratory will analyze the samples for the constituents listed in Table 8 below.

If at any time during the program, samples values are outside the water quality standards, the state will be contacted immediately. Measures will be taken to improve erosion/runoff control structures as soon as possible. Additionally, adequate fencing may be installed around impoundments to preclude wildlife access until the water quality can be restored as confirmed by additional testing. At the conclusion of the WQMP, a report will be provided to the state including all the testing data.

Table 8 – State Water Quality Standards

Constituent	Unit	Standard	Citation	CAS #	Use
dissolved aluminum	mg/l	5.0	NMAC 20.6.4.900 J.(1)	7429-90-5	IRR - Irrigation
dissolved arsenic	mg/l	0.2	NMAC 20.6.4.900 J.(1)	7440-38-2	LW – Livestock Watering
dissolved boron	mg/l	5.0	NMAC 20.6.4.900 J.(1)	7440-42-8	LW –Livestock Watering
dissolved cadmium	mg/l	0.05	NMAC 20.6.4.900 J.(1)	7440-43-9	LW –Livestock Watering
dissolved chromium	mg/l	1.0	NMAC 20.6.4.900 J.(1)	7440-47-3	LW –Livestock Watering
dissolved cobalt	mg/l	1.0	NMAC 20.6.4.900 J.(1)	7440-48-4	LW –Livestock Watering
dissolved copper	mg/l	0.5	NMAC 20.6.4.900 J.(1)	7440-50-8	LW –Livestock Watering
dissolved lead	mg/l	0.1	NMAC 20.6.4.900 J.(1)	7439-92-1	LW –Livestock Watering
total mercury	ug/l	10.0	NMAC 20.6.4.900 J.(1)	7439-97-6	LW –Livestock Watering
total selenium	ug/l	5.0	NMAC 20.6.4.900 J.(1)	7782-49-2	WH – Wildlife Habitat
dissolved vanadium	mg/l	0.1	NMAC 20.6.4.900 J.(1)	7440-62-2	LW –Livestock Watering
dissolved zinc	mg/l	25.0	NMAC 20.6.4.900 J.(1)	7440-66-6	LW –Livestock Watering
chlorine, residual	ug/l	11.0	NMAC 20.6.4.900 J.(1)	7782-50-3	WH – Wildlife Habitat
Ra-226 + Ra-228	pCi/l	30.0	NMAC 20.6.4.900 J.(1)	N/A	LW –Livestock Watering
tritium	pCi/l	20,000	NMAC 20.6.4.900 J.(1)	N/A	LW –Livestock Watering
Gross Alpha	pCi/l	15	NMAC 20.6.4.900 J.(1)	N/A	LW –Livestock Watering

7.3 Revegetation Monitoring Program

A Revegetation Monitoring Program will begin following mine closure and completion of earth work. Per §19.8.20.2065 NMAC, the liability period will be not less than ten years. During this time, vegetation success will be monitored annually using the methods identified in Section 6.0 and measured against the success metrics also specified here. If interim monitoring so indicates, interseeding campaigns maybe used over the entire reclamation area or portions as needed.

8.0 Closeout Plan Permitting Requirements

In addition to the New Mexico Mining and Reclamation Bureau permit, Imerys currently operates under the three permits specified in Table 9 below. The stormwater permit will be maintained until bond release. The other permits will be terminated when mining and processing ceases. The permit for asbestos removal will be obtained by a licensed asbestos removal contractor.

Table 9 – Operating Permits

Issuing Agency	Permit Number	Permit Type
New Mexico Environmental Department	71A	Air Quality
New Mexico Environment Protection Agency	98 115 3075	Reclaimed Oil Burning
US Environmental Protection Agency	NMR00A818	Stormwater Discharge

9.0 Post-Closeout Map

Figure 3 shows a topographic representation of the area following closeout. Information on this map is considered highly confidential.

10.0 Cost Estimate for Closeout

A current Reclamation Cost Estimate based on the information provided in this Closeout Plan is provided as Appendix E. Upon approval of this estimate, Imerys will adjust its existing surety bond from the current value of \$1,863,272.00 to the new value of **\$X,XXX,XXX**.

11.0 Closeout and Reclamation Schedule

Below is an anticipated schedule for the closeout and reclamation tasks to be completed at mine closure.

Facilities removal – one year

Contouring and covering all waste dumps – six months

Backfilling and contouring open pits – six months

Revegetation of all disturbed areas – two years

Road removal – four months

Figure 1

Permit and Disturbance Area Map

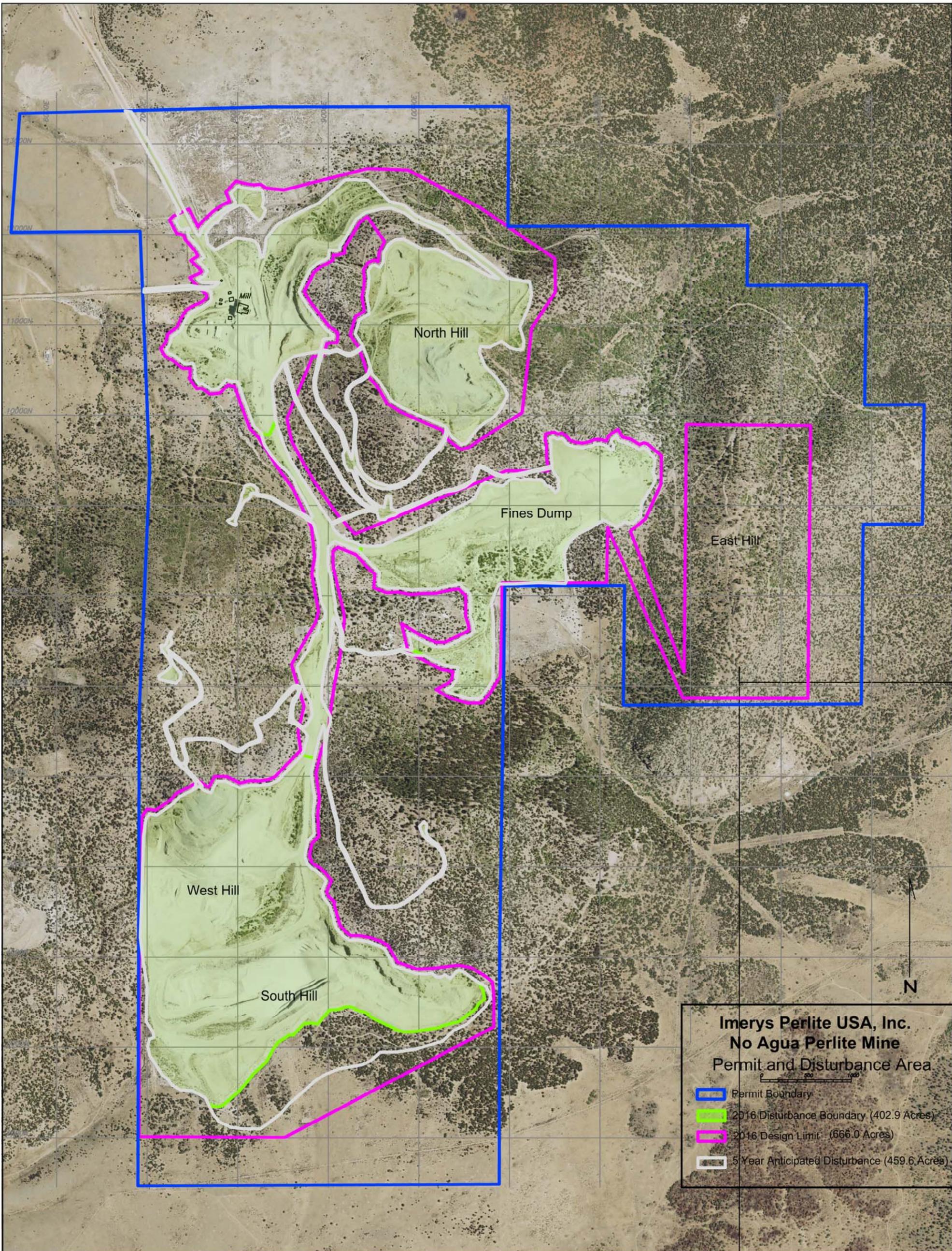


Figure 2

Regional Location Map

No Agua Mine Regional Location

No Agua Mine

Tres Piedras

Taos

Los Alamos
Los Alamos

Santa Fe



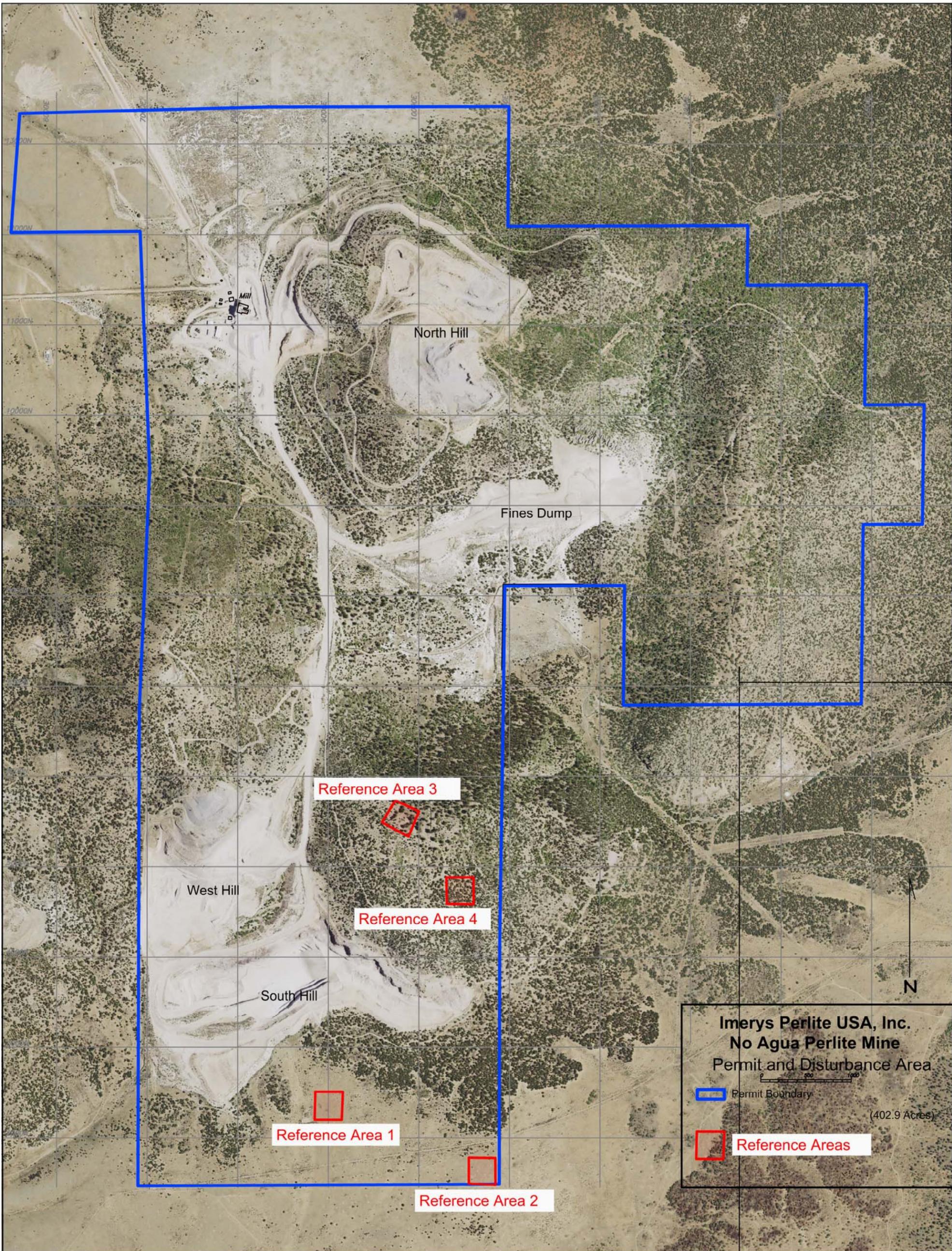
Figure 3

Post Reclamation Topographic Map

Imerys has requested that this map be treated as confidential. It will be delivered separately.

Figure 4

Reference Area Locations



Appendix A

New Mexico Office of Cultural Affairs
Historic Preservation Division Correspondence



RY E. JOHNSON
GOVERNOR

STATE OF NEW MEXICO
OFFICE OF CULTURAL AFFAIRS
HISTORIC PRESERVATION DIVISION

VILLA RIVERA BUILDING
228 EAST PALACE AVENUE
SANTA FE, NEW MEXICO 87501
(505) 827-6320

March 19, 1998

Ms. Amy Carpenter
World Minerals, Inc.
2500 Miguelito Road
Lompac, CA 93436

Re: Harborlite Mine close-out plan -- archeological concerns

Dear Ms. Carpenter:

As you requested, I have checked our records for known archeological sites in the Harborlite property. My initial database query was conducted for an area defined as T29N, R9E, Sections 11, 12, 13, 14, 23, 24, NMPM. No archeological sites were returned by the query. As we discussed on the phone, this does not mean there are no archeological sites on the Harborlite line property, only that we do not *know* of any.

I checked further into our records, and I believe that there is a very high probability of significant archeological sites on the Harborlite property. I queried an area defined by four USGS 7.5' Topographic Quadrangles surrounding the mine (Codes: 36105-F8, 36105-G8, 36106-F1, 36106-G1). The results of that query suggest the following:

- the area has received considerable attention from archeologists as part of nearby US Forest Service and Bureau of Land Management activities. Although I could find no evidence of any survey actually conducted on the Harborlite Mine, a total of 110 surveys have been conducted in the larger query area.
- we have records for a total of 122 archeological sites in the 4 quadrangle area, many of which appear eligible to the National Register of Historic Places and NM Register of Cultural Properties. Most sites reflect use of the area during the Archaic (ca. 5500 BC -- AD 500) and Historic (late 19th/early 20th century) periods.

These facts suggest that a survey of undisturbed sections of the Harborlite Mine would have a high probability of encountering significant archeological sites.

If you have need for any additional information, please contact us.

Sincerely,

Timothy J. Seaman
ARMS Program Manager

Appendix B

USDA Web Soil Survey for No Agua Soils

Taos County and Parts of Rio Arriba and Mora Counties, New Mexico

RRE—Rock outcrop-Raton complex, moderately steep

Map Unit Setting

National map unit symbol: k1h3
Elevation: 6,400 to 10,000 feet
Mean annual precipitation: 9 to 23 inches
Mean annual air temperature: 42 to 52 degrees F
Frost-free period: 90 to 140 days
Farmland classification: Not prime farmland

Map Unit Composition

Rock outcrop: 45 percent
Raton and similar soils: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rock Outcrop

Setting

Landform: Volcanic cones

Typical profile

R - 0 to 60 inches: bedrock

Properties and qualities

Depth to restrictive feature: 0 inches to lithic bedrock
Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 2.05 in/hr)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: Unranked

Description of Raton

Setting

Landform: Volcanic cones
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Eolian deposits derived from sandstone and shale and/or residuum weathered from basalt

Typical profile

H1 - 0 to 4 inches: very stony silt loam
H2 - 4 to 18 inches: very stony silty clay loam
R - 18 to 22 inches: bedrock

Properties and qualities

Slope: 15 to 30 percent

Depth to restrictive feature: 6 to 20 inches to lithic bedrock

Natural drainage class: Well drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Very
low to moderately high (0.00 to 0.20 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0
to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 1.0

Available water storage in profile: Very low (about 1.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: D

Ecological site: Mountain Malpais (R048AY005NM)

Hydric soil rating: No

Minor Components

Orthents

Percent of map unit:

Ecological site: Breaks (R051XA006NM)

Hydric soil rating: No

Stunner

Percent of map unit:

Ecological site: Stony Loam (R036XB018NM)

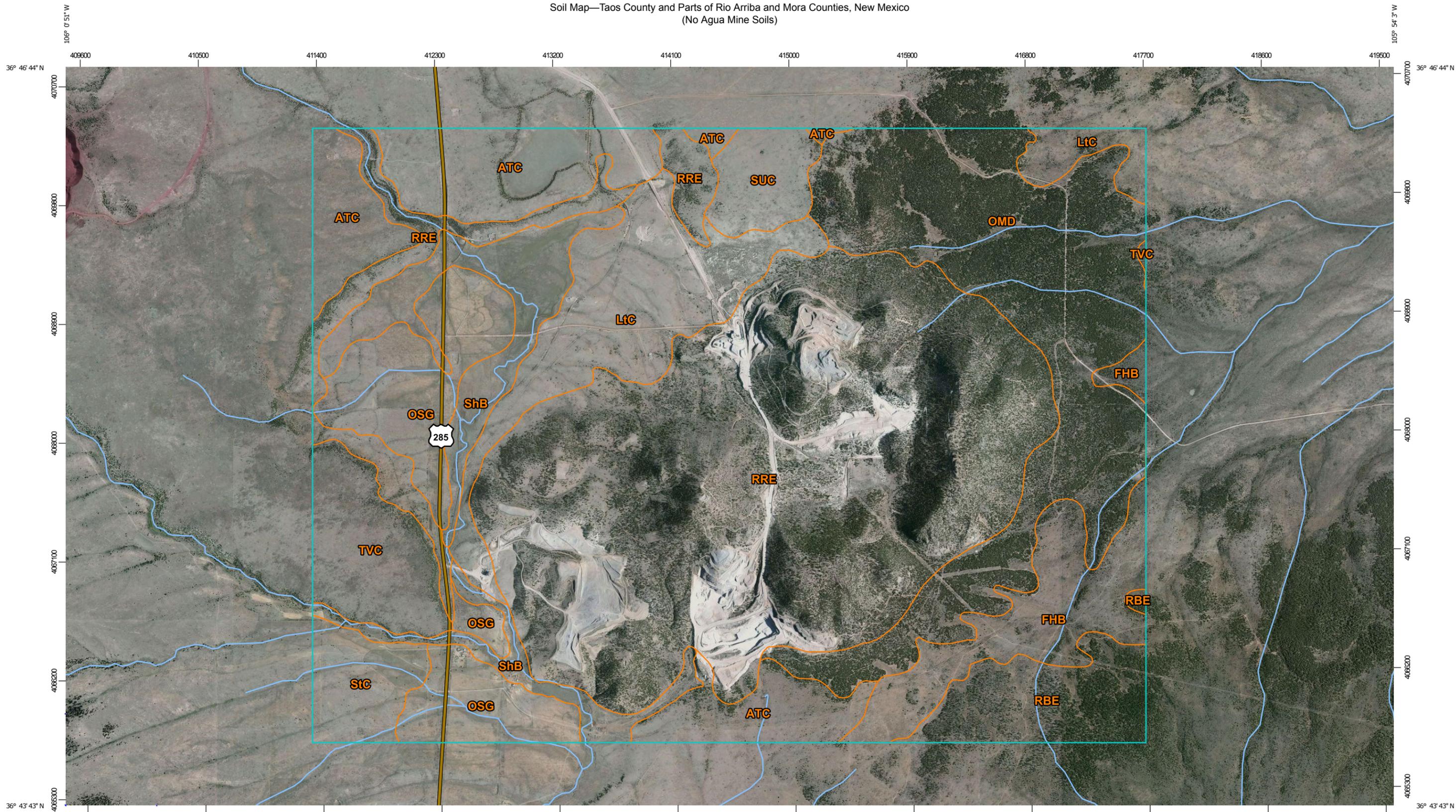
Hydric soil rating: No

Data Source Information

Soil Survey Area: Taos County and Parts of Rio Arriba and Mora Counties, New
Mexico

Survey Area Data: Version 11, Nov 24, 2015

Soil Map—Taos County and Parts of Rio Arriba and Mora Counties, New Mexico
(No Agua Mine Soils)



Map Scale: 1:27,300 if printed on B landscape (17" x 11") sheet.
0 400 800 1600 2400 Meters
0 1000 2000 4000 6000 Feet
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

Soil Map—Taos County and Parts of Rio Arriba and Mora Counties, New Mexico
(No Agua Mine Soils)

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features

Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Taos County and Parts of Rio Arriba and Mora Counties, New Mexico
Survey Area Data: Version 11, Nov 24, 2015

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 22, 2011—Apr 25, 2012

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Taos County and Parts of Rio Arriba and Mora Counties, New Mexico (NM670)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
ATC	Antonito-Travelers association, gently sloping	641.7	8.8%
FHB	Fernando-Hernandez association, nearly level	371.0	5.1%
LtC	Luhon-Travelers complex, 3 to 7 percent slopes	591.8	8.1%
OMD	Orejas-Montecito association, strongly sloping	1,174.3	16.0%
OSG	Orthents-Calciorthids association, very steep	514.5	7.0%
RBE	Raton-Stunner association, moderately steep	265.7	3.6%
RRE	Rock outcrop-Raton complex, moderately steep	2,795.2	38.1%
ShB	Shawa clay loam, 0 to 3 percent slopes	417.5	5.7%
StC	Stunner cobbly loam, 1 to 5 percent slopes	157.7	2.2%
SUC	Stunner-Luhon association, gently sloping	137.3	1.9%
TVC	Travelers very stony loam, 1 to 8 percent slopes	263.0	3.6%
Totals for Area of Interest		7,329.8	100.0%

Appendix C

Clayton Shonk Wildlife Report

Clayton W. Shonk, student of biology
Biology Consulting
133 Sandia Cir C.R. 520
Bayfield, CO 81122

Survey of Wildlife and Wildlife Activity at the No Agua, Harborlite Perlite Mine, New Mexico

Introduction

Wildlife and evidence of wildlife on the Harborlite property was surveyed from May 11, 2001 to June 9, 2001. Bird species were counted and recorded, identified by sight, song, and nesting sights. Mammals were identified by sight and physical evidence such as tracks, pellet, counts, and bedding sights. These observations were gathered using a line transect method. This technique was used to gather information from disturbed and undisturbed areas, as determined by the mine, on the Harborlite property.

The Harborlite Property consists of a wide variety of vegetational habitats including temperate woodland and shrubland along with low altitude conifer and brush forest on 1590 acres. This produces a wide selection of mammalian and bird wildlife.

Methods

The line transect method was used to observe and collect evidence of animals on the Harborlite property. All animals flushed or otherwise encountered were recorded. Any evidence of wildlife along the transect such as tracks or droppings were also recorded. Four line transects were marked off on the undisturbed plots designated by the Harborlite Corporation. Three were designated in disturbed areas for a total of seven line transects. Each line transect was placed in a random bearing with a random starting point for 200 meters. The line was then cleared of any evidence of wildlife. Droppings and tracks were cleared to determine recent activity of wildlife. Transect 1 was placed in reference plot 3 which was dominated by ponderosa pine and oak. Transect 2 was located within reference plot 4 which was dominated by pinyon and juniper. Transect 3 was located within reference plot 2 which was dominated by pinyon and juniper. Transect 4 was located within reference plot 1 which was dominated by grass and sage brush. Transect 5 was placed on the north side of North Hill. Transect 6 was placed on the east side of West hill. Transect 7 was located on the west side of East hill (Map 1).

Observations

A wide variety of birds and mammals were observed. Birds, browsing mammals, and tree dwelling mammals were observed (Table 1). Browsing mammals and birds were identified on transect 2 (Table 2). Small, ground dwelling mammals and birds were viewed on transect 3 (Table 3). Evidence of browsing mammals and birds were identified on transect 4 (Table 4). Evidence of birds and browsing mammals were observed on transect 5 (Table 5). Browsing and ground dwelling mammals were observed on transect 6 (Table 6). Birds and evidence of browsing mammals were found on transect 7 (Table 7). Travelling between the line transects many other birds, animals, and a nest were observed (Table 8).

Table 1. Line transect 1 starting at north boundary of reference plot 3 at a bearing of 110° off of magnetic north

Animal	Number observed	Behavior	Identification
Mule deer (<i>Odocoileus hemionus</i>)	2	N/A	Pellet piles consisting of ~ 150 pellets each
Elk (<i>Cervus canadensis</i>)	2	N/A	Pellet piles consisting of ~ 225 pellets each
Mule deer (<i>Odocoileus hemionus</i>)	1	N/A	shed antler
Porcupine (<i>Erethizon dorsatum</i>)	1	feeding	bark chew
Dusky flycatcher (<i>Empidonax oboerholseri</i>)	1	perched	visual sighting
Sapsucker (<i>Shyrapicus ?</i>)	1	pecking	holes in tree
Broad tailed hummingbird (<i>Selasphorus platycercus</i>)	2	flying	visual and sound
Black headed grosbeak (<i>Pheucticus melanocephalus</i>)	1	feeding	visual sighting

Table 2. Line transect 2 starting at north east boundary corner of reference plot 4 at a bearing of 132° off of magnetic north

Animal	Number observed	Behavior	Identification
Mule deer (<i>Odocoileus hemionus</i>)	1	N/A	hoof tracks
Elk, female (<i>Cervus canadensis</i>)	3	feeding	visual sighting
Hepatic tanager (<i>Piranga flava</i>)	1	singing	sound
Common nighthawk (<i>Chordeiles minor</i>)	1	roosted	visual sighting

Table 3. Line transect 3 starting at northwest corner boundary of reference plot 2 at a bearing of 187° off of magnetic north

Animal	Number observed	Behavior	Identification
Song sparrow (<i>Melospiza melodia</i>)	1	singing	sound
Lark sparrow (<i>Chondestes grammacus</i>)	1	singing	sound
Meadow lark (<i>Sturnella neglecta</i>)	3	singing	sound
Mountain bluebird (<i>Sialia currucoides</i>)	2	perched, singing	visual sighting, sound
Gray vireo (<i>Vireo vicinior</i>)	1	flushed	visual sighting
Cottontail rabbit (<i>Sylvilagus ?</i>)	1	flushed	visual sighting
Porcupine (<i>Erethizon dorsatum</i>)	1	feeding	bark chew
Mule deer (<i>Odocoileus hemionus</i>)	1	N/A	Pellet pile consisting of 75 pellets

Table 4. Line transect 4 starting at the south east boundary corner of reference plot 1 at a bearing of 284° off of magnetic north

Animal	Number observed	Behavior	Identification
American crow (<i>Corvus brachyrhynchos</i>)	3	singing, flying	sound, visual sighting
Meadowlark (<i>Sturnella neglecta</i>)	2	singing	sound
Song sparrow (<i>Melospiza melodia</i>)	4	singing, perched, feeding	sound, visual sighting
Common Raven (<i>Corvus corax</i>)	1	flying	visual sighting
Mountain bluebird (<i>Sialia currucoides</i>)	1	perched	visual sighting
Mule Deer (<i>Odocoileus hemionus</i>)	2	N/A	Pellet piles consisting of 96 and 104 pellets
Cottontail Rabbit (<i>Sylvilagus ?</i>)	1	N/A	Pellet pile consisting of 84 pellets

Table 5. Line transect 5 on the north aspect of North Hill running east to west.

Animal	Number observed	Behavior	Identification
Mule deer (<i>Odocoileus hemionus</i>)	5	N/A	pellet piles consisting of 75, 102, 140, 94 pellets
black capped chickadee (<i>Poecile atricapillus</i>)	1	singing	sound
Song sparrow (<i>Melospiza melodia</i>)	1	singing	sound

Table 6. Line transect 6 on the east aspect of West hill running east to west

Animal	Number observed	Behavior	Identification
Cottontail rabbit (<i>Sylvilagus ?</i>)	1	feeding	visual sighting
Mule deer (<i>Odocoileus hemionus</i>)	5	flushed out of beds	visual, tracks, beds
Hepatic tanager (<i>Piranga flava</i>)	1	singing	sound

Table 7. Line transect 7 on the west aspect of East Hill running east to west

Animal	Number observed	Behavior	Identification
Elk (<i>Cervus canadensis</i>)	2	N/A	tracks
Common raven (<i>Corvus corax</i>)	2	gliding	visual sighting
Cavity dwelling bird in dead pinyon tree	N/A	N/A	sighting of the nest

Table 8. Observations outside line transects

Common raven nest (*Corvus corax*) on the south aspect of South hill on a cavity in a cliff. Three chicks were observed. Two active adults feeding the chicks and on lookout around the nest.

Bushtit (*Psaltriparus minimus*) perched on the south aspect of South hill.

Black headed grosbeak (*Pheucticus melanocephalus*) flying.

Mountain bluebird (*Sialia currucoides*) flying.

Two Turkey vultures (*Cathartes aura*) full soar.

Three chipmunks (*Sciuridae* ?) feeding.

Appendix D

New Mexico Wildlife of Concern



Biota Information System of New Mexico

Report County TES Table For Taos

NEW MEXICO WILDLIFE OF CONCERN

For complete up-dated information on federal-listed species, including plants, click here for the [US Fish & Wildlife Service Planning and Conservation website](#)

For information on state-listed plants, contact the NM Energy, Minerals & Natural Resources Dept, Division of Forestry, or go to <http://nmrareplants.unm.edu/>. If your project is on Bureau of Land Management property, contact the local BLM Field Office for species of particular concern. If your project is on National Forest, please contact the Forest Supervisor's office for species information.

E=Endangered; T=Threatened; SOC=Species of Concern; C=Candidate; Exp= Experimental non-essential population; P=Proposed

Common Name	Scientific Name	NMGF	US FWS	Critical Habitat
Canada Lynx	Lynx canadensis		T	
Pacific Marten	Martes caurina	T		
Meadow Jumping Mouse	Zapus hudsonius luteus	E	E	Y
White-tailed Ptarmigan	Lagopus leucura	E		
Common Black Hawk	Buteogallus anthracinus	T		
Bald Eagle	Haliaeetus leucocephalus	T		
Peregrine Falcon	Falco peregrinus	T		
Arctic Peregrine Falcon	Falco peregrinus tundrius	T		
Yellow-billed Cuckoo (western pop)	Coccyzus americanus occidentalis		T	
Boreal Owl	Aegolius funereus	T		
Mexican Spotted Owl	Strix occidentalis lucida		T	Y
White-eared Hummingbird	Hylocharis leucotis	T		
Southwestern Willow Flycatcher	Empidonax traillii extimus	E	E	Y
Gray Vireo	Vireo vicinior	T		
Baird's Sparrow	Ammodramus bairdii	T		
Sangre De Cristo Peaclam	Pisidium sanguinichristi	T		

Appendix E

No Agua Mine 2017 Reclamation Cost Estimate