REVEGETATION PLAN FOR SOLEDAD MOUNTAIN PROJECT

Golden Queen Mining Company, LLC

Prepared for:

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1. INTRODUCTION

The Soledad Mountain Project is an open pit, gold/silver, heap leach, mining and aggregate operation (the Project) near Mojave, California (**Figure 1**), which is operated by the Golden Queen Mining Company, LLC. (GQMC). Construction of the Project began in 2014 and full-scale mining commenced in March 2015.

The Project was originally approved by Kern County in 1997, however, mining operations did not commence due to depressed gold prices. In 2012, GQMC received County approval of a smaller project within the footprint of the 1997 project and is currently operating pursuant to that 2010 approval. Two major environmental review processes were completed for the Project in connection with the 1997 and 2012 approvals: 1) a joint National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) analysis completed in 1997 (Kern County and BLM 1997), and 2) a supplemental CEQA process completed in 2010 (Kern County 2010) with County approval in 2012.

The prior environmental reviews were supported by a Revegetation Plan for the Soledad Mountain Project (Bamberg 2007) and an Addendum to the Biological and Soil Resource Evaluation for Soledad Mountain Project. GQMC has been in operation since 2015 and, based on the geology as encountered, is proposing a modification to the existing operations and reclamation plan to support ongoing mining and aggregate operations. The proposed activities and facilities are largely extensions of mining and aggregate activities that are currently permitted by the Bureau of Land Management (BLM) and Kern County (the Project site; **Figure 2**). The BLM has reviewed the proposed activities on BLM lands and made a Determination of NEPA Adequacy (DNA) based on the previous environmental review of the Project. GQMC has met with Kern County to review the proposed changes and the County will assess the appropriate level of review under CEQA.

The original revegetation plan was prepared for the Project as part of the *Reclamation Plan and Revegetation Procedures for the Soledad Mountain Project* (WZI Inc. 1997) and updated in 2007 (Bamberg 2007). The revegetation plan described in this document for the modified project (the Plan) incorporates the standards defined in those earlier plans. Reclamation standards are required by the Surface Mining and Reclamation Act (SMARA) of 1975—passed in 1975, major amendments in 1990, Public Resource Code, Section 2710 *et seq*., and California Code of Regulations, Title 14, Section 3500 *et seq*.—and the Plan is designed to fulfill the regulation requirements. The Plan also follows the guidelines of a SMARA Workshop, *Preparing and Review of Reclamation Plan for Mining Operations* (OMR, 4/19/06), and *Rehabilitation of Disturbed Lands in California*—Special Publication 123, 2003, California Department of Conservation and Geological Survey—and meets the requirements of the Lahontan Regional Water Quality Control Board (Bamberg 2007).

The Plan is intended to be a working document and a practical approach to reclamation in this part of the Mojave Desert with low, unpredictable rainfall. The recommended methods and criteria form the basis for procedures during construction and operations to enhance revegetation and for final revegetation as part of closure and reclamation.

The natural revegetation that has occurred on previously disturbed areas has given an indication of the plant species and topographic features conducive to revegetation. Not all disturbed areas, including the remaining steep slopes in the open pit, can be revegetated due to the slope, dry, desert conditions, and poor substrates.

2. PROJECT OVERVIEW

The Project is an open pit, gold/silver, heap leach mining and aggregate operation near Mojave, California (**Figure 1**) that has been in operation since 2015. The original Plan was completed and accepted in 1997 by Kern County and the BLM as supporting documentation for the Environmental Impact Statement/Environmental Impact Report (EIS/EIR) prepared for the Project. A revision to the Plan that was prepared to support the Supplemental EIS/EIR for an expansion of the Project was approved in 2007 (Bamberg 2007). This Plan is an update of the original and revised revegetation plans to include proposed changes to the Project (**Figure 2**).

2.1. End Land Use

The proposed end land use is open space and wildlife habitat (Bamberg 2007), or commercial-scale renewable energy generation.

2.2. Disturbed Areas

The total Project disturbed area is estimated to be approximately 1,188 acres (**Figure 2**). A breakdown of the disturbed areas by Project component is provided in **Table 1**. An attempt will be made to revegetate all the surface disturbance associated with the Project at final reclamation. Revegetation may not occur in portions of the site with steep slopes, poor topographic conditions, and poor soil substrate conditions, as revegetation attempts were not successful in these locations.

Table 1. Soledad Mountain Project Component Acreages

Project Component Area	Acres Disturbed
Pit	302
Heap Leach Pads 1 and 2	291
Surge Piles	292
Surge Pile Placed on Reclaimed Heap Leach Pad	(115)
Working Areas and Roads	307
Clay Borrow	68
Well Sites	3
Growth Media Stockpiles	2
Revegetation Test Plots	2
Additional Disturbance for Reclamation at 2:1 Slopes	36
TOTAL	**1,188**

3. SITE CHARACTERISTICS

The Project occurs on Soledad Mountain, which is located on the western edge of the Mojave Desert. Soledad Mountain is an isolated, roughly circular volcanic peak approximately three miles in diameter (**Figure 2**). The mountain rises out of the alluvial flats in northwestern Antelope Valley southeast of the Tehachapi Mountains. Elevations range from 2,800 feet above mean sea level (amsl) at the base to 4190 feet amsl at the highest peak. The upper slopes are typically steep with numerous rock outcrops. Residual weathered rock and soil lie below the outcrops. Alluvial slopes and flats surround the mountain on all sides except for the northeast where there are low hills and ridges with a former operating gold mine, the Standard Hill Mine. These site characteristics and other physical and biotic factors described in this section are important to consider for revegetation.

3.1. Climate

The climate is typical for the Mojave Desert, with hot, dry summers and cool winters (Bamberg and Bamberg 1997, 2006). Temperatures range from 70 to 113 degrees Fahrenheit in the summer and 20 to 60 degrees Fahrenheit in the winter (Bamberg and Bamberg 1997, 2006). The average annual precipitation is approximately 6.14 inches per year, with the majority of the rainfall occurring in the winter months (Bamberg and Bamberg 1997, 2006). As the elevation increases on Soledad Mountain, temperatures become cooler and precipitation rates increase. The Project site occurs within a windy area of the Mojave Desert with maximum wind speeds reaching 90 miles per hour (Bamberg and Bamberg 1997, 2006).

3.2. Soils

The desert climate and dry substrate conditions influence the soil and biological resources, as described in detail in the biological and soils evaluation (Bamberg and Bamberg 1997, 2006). Soils within the Project site are generally skeletal rocky or pebbly loams on the slopes, and sandy loams on the alluvial fans and flats (Bamberg and Bamberg 1997, 2006). Soils consist of weathered residual substrates on the mountain grading into undifferentiated alluvium around the base of the mountain (Bamberg and Bamberg 1997, 2006). Rock outcrops and rocky soils characterize the mountain, with predominantly desert shrub-grass species that have been altered by frequent burning, grazing by sheep, recreation, and mine related disturbance.

Suitable growth media has been and will continue to be stockpiled for future revegetation use.

3.3. Vegetation

Vegetation within the Project site consists of a creosote/burrobush type on the flats and lower slopes of Soledad Mountain (Bamberg and Bamberg 1997, 2006). Vegetation on the higher slopes consists of an altered shrub/grass with many introduced plant species (Bamberg and Bamberg 1997, 2006). Wildlife is fairly diverse; however, population densities are low and activity is seasonal (Bamberg and Bamberg 1997, 2006). Previous disturbance on the mountain is from historical and ongoing mining and aggregate activities, wildfire and human activity associated with recreation. With the exception of areas of disturbance from mining and aggregate activities, there has been very little change in vegetation conditions on the mountain due to protection from fires, grazing, and trespass over the past ten years. Historical mining and exploration activities and repeated fires are the two activities that have had most influence on biological and soil resources within the Project site (Bamberg 2007).

Previous vegetation sampling on Soledad Mountain has measured perennial and annual vegetation cover from 0 to about 40 percent in years of low precipitation, and up to 80-percent total canopy cover in years of abundant moisture. This cover is highly dependent on seasonal rainfall, with the maximum vegetation coverage following three years of abundant rainfall in 1996 (Bamberg 2007).

3.4. Summary

The biological and soils resources report for the Project was updated in 2019 to reflect the proposed Project modifications. The results of the biological and soil surveys found high vegetative cover and productivity within the Project site were associated with abundant winter rains (Bamberg and Bamberg 1997, 2006). There have only been minor changes in plant species composition and abundance across the Project site, with annual grasses continuing to be the dominant vegetation on the slopes and ridges, and the creosote/shrub community at the base of the mountain remaining essentially unchanged (Bamberg 2007, Bamberg and Bamberg 1997, 2006).

4. REVEGETATION APPROACH

The approach to revegetation and proposed techniques have been explored through extensive revegetation tests and successes at other desert mines (Bamberg 2007) and soil studies that have been conducted on the Soledad Mountain Project to provide information for soil salvaging, stockpiling, and use (Bamberg, Bamberg, and Golder 2008).

Existing mitigation measures that apply to the salvage of growth media and revegetation would continue to be implemented under the proposed modified Project as described in **Table 2**.

Table 2. Project Mitigation Measures Specific to Salvage of Growth Media and Revegetation

Mitigation Measures	Comments/Progress
Growth media stockpiles will be stabilized by allowing germination of seeds naturally contained in the soil.	GQMC has complied and will continue to comply with this requirement. No change in measure is required.
The feasibility of inoculation of soil with biological components will be investigated in test plots.	This measure has been implemented and monitoring is ongoing
Additional erosion prevention techniques include: (a) Site drainage will be retained onsite; (b) Site roads and drainages will be inspected by project proponent personnel after rainfall events which result in surface flow to ensure erosion prevention is maintained and upgraded as needed; (c) Drainage from the tops of overburden piles will be directed away from the slopes toward the pit; (d) Salvaged growth media will be stockpiled away from areas of concentrated drainage; (e) Reclamation of disturbed areas will occur as soon as possible.	Sespe Consulting prepared a Site Drainage Plan for the Soledad Mountain Project dated September, 2019 (Swerdfeger 2019). This is the fifth update of the site drainage plan for the Project. The underlying engineering assumptions meet the requirements of the California State Water Resources Control Board and the Kern County Engineering, Surveying & Permit Services Department. A Stage I, Surface Water, Sediment and Erosion Control Plan for the construction and early mining phases of the Project is included in the Site Drainage Plan. No change in measure is required.
Mature Joshua trees which may be disturbed will be salvaged and replanted in undisturbed areas within the property boundary.	GQMC has transplanted a number of young Joshua trees and is ongoing as required by this measure. No change in measure is required.
The use of seedlings for revegetation will be investigated in test plots.	Test plots have been prepared to investigate the use of seedlings for revegetation. No change in measure is required.
Fencing around the heap leach pads will remain in place until vegetation is established or as otherwise specified in the Reclamation Plan.	No change in measure is required.
Where surface mining operations result in the compaction of the soil, ripping, disking, or other means shall be used prior to revegetation in accordance with the approved reclamation plan.	Alternative methods were investigated when the reclamation test plots were constructed. No change in measure is required.

Table 2. Project Mitigation Measures Specific to Salvage of Growth Media and Revegetation

Mitigation Measures	Comments/Progress
Topsoil shall be separated and immediately reapplied or stockpiled as necessary for use in reclamation of the site. Reclamation shall require the reapplication of a minimum of four inches of topsoil prior to reseeding. In the event that stockpiled topsoil is insufficient to provide this uniform depth, imported topsoil or soil amendments shall be utilized. Depth of topsoil may be decreased or eliminated altogether if test plots demonstrate to the satisfaction of the Kem County Planning Department that revegetation will occur in accordance with the performance standards identified in the approved reclamation plan.	No change in measure is required.
Site reclamation shall include the shaping of waste materials followed by an application of topsoil to heap and waste rock stockpiles where necessary to achieve final overall slopes in conformance with the approved reclamation plan.	No change in measure is required.
Final reclamation shall not be considered complete until all excavated areas have been graded and/or fenced in accordance with the approved reclamation plan, and accompanying cross sections and all disturbed areas will be replanted or reseeded using plantings or a seed mixture and rate of application as specified in the approved reclamation plan. Pursuant to SMARA 1975, Section 3705, success of revegetation shall be judged based upon the effectiveness of the vegetation for the approved end use, and by comparing the quantified measures of vegetative cover, density, and species richness of the reclaimed mined lands to similar parameters of naturally occurring vegetation in the area. Quantitative standards for success shall be set forth in the approved reclamation plan. Monitoring shall continue until performance standards are met provided that, during the last two years, there has been no human intervention. Standards for success shall be based on expected local recovery rates and presented in the approved reclamation plan.	No change in measure is required.

A revegetation test plot was established in an area surrounding production well PW-2 in May 2006 (**Figure 2a**) as this is a location will not be disturbed as part of the Project. A variety of seed mixtures and ground preparation specific to the site were used in the test plot. The test plot was prepared with three types of surface preparation:

- Ripped and graded with formed micro-basins;
- Ripped only; and
- No surface preparation.

Seed was sown by hand on November 8, 2006. Growth is being monitored to see what effect surface preparation has on growth. No fertilizer has been used and the area has not been watered. The test plot was fenced.

Wildlife habitat and open space will, once again, be the primary land use objective of the reclamation, with the potential for large portions of the Project site to be utilized for commercial-scale renewable energy generation. Reclamation standards for vegetation parameters on the reclaimed surfaces will follow those outlined by Bamberg (2007) and will be established by appropriate sampling of adjacent vegetation types and habitats. The goal is a productive self-sustaining ecosystem given the conditions on the reclaimed site.

4.1. Techniques

Past reclamation attempts at other desert mine facilities have demonstrated that the standard reclamation and revegetation methods used in more temperate climates are unlikely to succeed on the mine site due to the desert conditions in this region (Bamberg 2007). Revegetation test studies have been conducted to test techniques for reclamation in the California Mojave Desert, and the lessons from those tests have been used to inform the updates to the Plan (Bamberg 2007).

The results of test programs and implementation at other desert mines have shown that revegetation of disturbed mine sites in similar desert conditions can be successful (Bamberg 2007). In the desert, water management and utilization are the most important factors in successful revegetation, which is accomplished by microtopographic control of surface runoff into moisture catchment basins (Bamberg 2007). Bamberg (2007) found the use of soil amendments, fertilizer, and supplemental irrigation were not necessary or successful. The success of both test programs and revegetation on a larger scale was determined by years with abundant and appropriately spaced rainfall.

Full-scale implementation of the reclamation/revegetation programs has been completed at several desert mines (Bamberg 2007). The results from those sites inform the following components of the 2007 Plan to:

- Establish stable surface and drainage conditions that are compatible with the surrounding landscape. This will be accomplished during operations by material placement and grading, as well as after closure by final fine grading and contouring (**Section 6.1 Grading the Areas**). The disturbed sites will be revegetated during reclamation by establishing surface drainage control and small catchment basins capable of sustaining vegetation without artificial irrigation.
- Where possible, create surface and substrate conditions conducive to seed germination, natural regeneration, and native plant establishment without irrigation using moisture enhancement catchment basins. The soil surface will be altered through grading and the selective application of seed or appropriate soil material that will act as a seed source (**Section 6.2 Surface Preparation** and **6.3 Soil Salvage, Placement and Amendments**).
- Collect seeds from native plant species on the mine site and from nearby areas for revegetation. Stockpiled growth media will be used to enhance and create microhabitats. Seed will be sown in the catchment basins that will act as loci for continued natural revegetation on the entire reclaimed site, including side slopes, berms, and open pits in which mined material has been replaced (**Section 6.4 Sources of Seed & Seed Collection** and **6.5 Sowing Seed**). The plant communities established on the reclaimed surfaces will be naturalized communities (a desired

plant community) using seeds of local native plants. GQMC has been collecting seeds, establishing growth media stockpiles and conducting revegetation testing with a plot since it began construction in 2011 Growth media stockpiles and the revegetation test plot are mapped in **Figure 2a.**

- Leave occasional slopes, particularly in the waste rock disposal areas and remnant pit slopes, as talus-like slopes to resemble the surrounding rocky hillsides. These surfaces may be recontoured for erosion and drainage control, as well as for slope stability and visual compatibility. Partial revegetation will occur through natural plant establishment from revegetated spots, as has been observed during the other mine closure programs (**Section 7.1 Open Pits and Material Storage** and **7.2 Surge Piles**).

Additionally, the Plan considers public safety through the stabilization of slopes and mined surfaces, removal and/or fencing of structures or landforms that could constitute a public hazard (**Section 7.3 Leached and Rinsed Residues on The Heap Leach Pad** and **7.4 General Working Areas and Roads**). Due to the desert climatic conditions, surface stabilization must be obtained through contouring and drainage control as opposed to revegetation. Stability on natural, undisturbed slopes is provided by landform rather than vegetation, as vegetation cannot be established at a density that would generate slope stability through root mass and penetration. Therefore, the drive for site reclamation focuses initially on physical manipulation of topography for stabilization (as described in the Reclamation Plan), and then incorporates revegetation to provide the benefits of vegetative productivity, aesthetics, and wildlife habitat (as described in this document).

The goal of the reclamation plan is to reclaim all of the areas to be disturbed during the proposed mining and aggregate operation (**Figure 2b**). Revegetation may not occur in portions of the site with steep slopes, poor topographic conditions, and poor soil substrate conditions, as revegetation attempts would not take in these locations.

The goal of this reclamation program is to return the disturbed area of the mine site to a stable, self-sustaining ecosystem. For this reason, irrigation is not recommended, as it is not typically part of a self-sustaining ecosystem in a desert climate, and vegetation that has been irrigated generally does not survive when the irrigation is discontinued (Bamberg 2007). Establishing vegetation without an irrigation system avoids the chronic issue of water availability that has decreased the long-term success at other, climatically similar, mine sites (Bamberg 2007). Instead, post reclamation procedures are designed to use precipitation with surface runoff water management. The likelihood of the long-term success of revegetation increases if plants germinate naturally and survive without artificial watering.

4.2. Revegetation Standards and Monitoring

The topography and soils on the reclaimed site are expected be complex and disturbed, and the vegetation established will be in a successional status (Bamberg 2007). The vegetation is unlikely to be uniform, as it will be composed partly of seeded species, along with hardy and pioneer species that may differ from natural vegetation. The vegetation that has established in areas disturbed by historic mining was observed to differ from the relatively natural vegetation in species composition and cover (Bamberg and Bamberg 2006).

Several surveys to determine existing vegetation cover conditions have been conducted, the results of which are described in biological reports prepared for the Project (Bamberg and Bamberg 1997, 2006, Hidalgo 2018, Hughes 2018). This sampling was conducted on relatively undisturbed areas in the Project site to determine the vegetative cover, densities, and patterns of vegetation in this specific region of California were used as a guide to conditions expect on the reclaimed site, but will not be used for final revegetation standards (Bamberg 2007, Bamberg and Bamberg 2006).

At the time of sampling for release of the reclamation financial assurance, concurrent and comparable vegetation monitoring will be conducted within the same year at undisturbed sites on the mountain and in the reclaimed areas. The linear transects will be run from identified points located on site. The general areas to be surveyed will include the slopes or flats on portions of Soledad Mountain that will not be disturbed by mining or aggregate activities. Similar linear transects will be measured on the reclaimed site using an analogous systematic random location method. Approximately the same number of plots will be sampled on the reclaimed sites and on the adjacent areas.

The linear coupled transects used in the baseline vegetation sampling will also be used to establish a standard for revegetation monitoring (Bamberg 2007). The linear transects will include up to 10 linear plots (typically 2 x 10 meters in size, or longer in the desert) laid end-to-end and oriented parallel to or across environmental gradients. A 30-meter (or 100-foot) steel tape will be stretched between markers, and variables recorded for each 10-meter plot. Vegetative parameters will be recorded in each plot. The transects will be analyzed for the cover, dominant species, type of vegetation, and amounts of bare areas as they relate to topography, soils, and erosional features.

The number of samples will depend on the heterogeneity of the linear plots being surveyed. Sample adequacy for the numbers of factors being measured is generally computed based on statistical validity. Results of the transects will be analyzed for vegetative parameters including percentage cover, density, and diversity.

The standards of success proposed for the reclaimed surfaces are provided in **Table 3**.

Table 3. Standard or Success Criteria (Perennials Only)

Criterion	Lower Fans and Flats below an Elevation of 2,950 ft	Upper Slopes and Ridges above an Elevation of 2,950 ft
Cover	10% (33% of 31.5%)	8% (33% of 24%)
Species Richness	3.5 species/100 m^2 33% of 10.8 species/100 m^2	3.2 species/100 m^2 33% of 9.8 species/100 m^2
Density	12.5 plants/100 m^2 33% of 37.8/100 m^2	19.0 plants/100 m^2 33% of 57.7/100 m^2

These standards will be compared to similar adjacent vegetation measured in comparable Soledad Mountain areas either in undisturbed vegetation, or as compared to vegetation standards based on reclaimed areas. These standards may change as a result of current and future monitoring. The results of the field sampling procedures will be documented prior to completing the final reclamation on the Project and can be repeated during the monitoring phase. It is recommended that the monitoring and bond period for revegetation be set at a maximum of 5 years, or less, if adequate rains occur and plant germination and growth equal the standards.

5. REVEGETATION SCHEDULING

Ongoing monitoring will be conducted at the revegetation test plot. Maintenance activities for progressive revegetation during mining and aggregate operations and on reclaimed areas after closure will depend on current activities and the effects of rainfall and possible storm events.

6. GENERAL RECLAMATION PROCEDURES

The purpose of reclamation planning is to determine practical methods that will encourage both natural revegetation and seeding with minimal use of equipment and materials given the conditions on site. General and specific procedures recommended for reclamation are described in this section with implementation described in **Section 7 Revegetation Implementation**. The reclamation procedures described here were developed for the 2007 revision of the Plan and remain largely unchanged.

6.1. Grading the Areas

Research presented in Bamberg (2007) found that, in this desert climate, basins of about 4,000 square feet to 7,000 square feet in size collect sufficient moisture to support garden spots in the lower parts of the basins. The lower parts of the basins where water will saturate the soil are referred to as garden spots, and these are the areas where seeds will collect both naturally and will be seeded heavily to encourage early plant growth. The shape of the basins can vary from crescents on slopes to coupled, double-ended ovals on flatter tops of surge piles and the leached and rinsed residues (Bamberg 2007).

The initial rough grading will round edges of surge piles and reduce slopes of the leached and rinsed residues if required before final contouring for catchment basins (Bamberg 2007). Control of surface erosion will be an important consideration when designing the shape and size of the small basins. In general, most flat slopes along with some steeper slopes will be graded to a concave configuration with larger water catchments surrounded by higher berms (Bamberg 2007).

6.2. Surface Preparation

The surge piles for aggregate storage are expected to have surface and subsurface conditions similar to those that will be encountered on haul roads and in general working areas (Bamberg 2007). These will be compacted surfaces of rock mixed with varying amounts of soil or highly weathered materials other than coarse alluvium.

Compacted surfaces will be loosened by ripping with a dozer and surfaces in the catchment basins will typically be left in rough condition to enhance seed catchment and water retention and also prevent erosion channels from forming during storm events (Bamberg 2007). Basins can be constructed either by dozing and piling loose material as low ridges to the west or upwind side of basins, or by constructing basins on slopes, as described in **Section 6.1 Grading the Areas**; low ridges will act as wind barriers in prevailing, strong westerly winds. The seed mixture, or transplant material, will be placed or deposited in the basins immediately after construction has been completed when surface foil is loose and seeds are more likely to lodge (Bamberg 2007).

Berms and ditches will be constructed above catchment basins to channel runoff and control erosion (Bamberg 2007).

Deep chiseling of large compacted surfaces such as haul roads or heavily traveled routes, bone yards, and general working areas will also be used. Grading and contouring along the minor washes will slow and redirect runoff to enhance plant survival (Bamberg 2007).

6.3. Soil Salvage, Placement and Amendments

Soils and surface materials on Soledad Mountain were evaluated as plant growth media and a source of seed (Bamberg and Bamberg 1997, 2006). Soledad Mountain was formed as a result of volcanic activity and, therefore, the parent material and soils are of volcanic origin. The principal rock substrates are of three general types (Bamberg and Bamberg 2006):

1. Two kinds of rhyolites (flow and intruded),
2. Pyroclastic debris, tuffs, and breccias, and
3. Quartz alunites and latites.

The soils formed from these substrates vary from weathered rock outcrop to deeper, droughty skeletal soils with a clay loam to sandy loam texture (Bamberg and Bamberg 2006). Soil development has been slow and profile development incomplete or non-existent. The soil surfaces are fairly stable and in some places are old and weathered (Bamberg and Bamberg 2006). Although the slopes on Soledad Mountain are steep, there is little evidence of slope or soil instability in the form of landslides, soil creep or solifluction lobes. The reasons for this stability are unknown; they are, however, most likely related to the weathering of these soils that produce a clay content which binds soil and rock particles into a stable mass (Bamberg and Bamberg 2006). In this dry climate, the soil does not become saturated enough to move on the bedrock, which is rough and without bedding planes (Bamberg 2007).

Based on experience at other desert mines, it is likely that large portions of the reclaimed surfaces will consist of waste rock, which will weather to soils containing fines (Bamberg 2007). During final reclamation, pockets in which plants can become established will be interspersed at varying intervals within the contoured basins. In addition, scattered vegetation can become established within a short time depending on local climatic conditions (rainfall events).

Although mined waste rock may not, in the foreseeable future, support the same type of vegetation which currently exists on the upper slopes, it is anticipated that these areas will probably support a greater vegetative cover than do the rock outcrop and adjacent alluvial fans that currently occupy large portions of the site (Bamberg 2007).

Recent revegetation tests with salvaged desert soils indicate that the salvaged and stockpiled soils provide no better growth medium than the prepared surfaces of surge piles and leached and rinsed residues that remain on the heap leach pads according to the soil resources report for Soledad Mountain (Bamberg and Bamberg 2006). The weathered desert soils are generally poor and lack nutrients required to support vegetation when used as a plant growth medium (Bamberg and Bamberg 2006).

The availability of suitable soils for growth media is limited due to steep topography, and the large amounts of rock rubble and outcrop (Bamberg 2007). Generally, topsoil is nonexistent on the lower slopes and alluvial fans in the Project site due to poor soil development. However, where present, suitable soil materials with variable depth can be salvaged from the leach pad area and lower portions of the surge piles areas as sources of growth media (Bamberg 2007). Growth media with suitable texture will be used in localized areas in irregular mounds as a source of seed, and create a diversity of substrates. Growth media has been extracted from areas within the Project site and has been stockpiled on site for this purpose (**Figure 2a**). The lack of soils will not negatively impact the primary goal of reclamation, which is surface and subsurface stabilization, subsequent revegetation and the re-establishment of a stable area capable of productive land uses (vegetation and wildlife habitat) after the completion of the mining and aggregate operations (Bamberg 2007).

In general, soil amendments have not proved to be necessary or effective in promoting plant growth in the desert environment (Bamberg 2007). Revegetation test programs have included tests with fertilizers, a soil conditioner, water retention crystals, and organic mulch. The use of soil amendments is costly and time consuming, and will not necessarily promote growth and productivity. The results obtained by adding soil amendments have been typically neutral or inconclusive due to extreme and variable growing conditions in the deserts and this is therefore not recommended (Bamberg 2007). It is estimated that good seed germination and plant growth will take place in up to 90 percent of the catchment basins using the techniques described in **Section 6.1 Grading the Areas** and **6.2 Surface Preparation** alone, provided a good seed source is used and rains occur. These techniques are expected to result in revegetation on site over a number of years.

Salvaged soils will be placed first in the lower parts of the catchment basins to form garden spots as described in **Section 6.1 Grading the Areas**, and then distributed over other areas, as available. These garden spots will be seeded heavily to provide quick seed germination and early plant growth (Bamberg 2007). The garden spots can then act as centers for seed production and dispersal in subsequent years.

6.4. Sources of Seed and Seed Collection

Per the 2007 Plan (Bamberg 2007), locally adapted seeds are generally available on site, and include:

1. Seed collected by hand on the property and in the vicinity, and
2. Seed in growth media salvaged primarily during preparation for construction of the heap leach pads.

Seed of the species listed in **Table 4** have been and will continue to be collected. This species list was developed and approved for the 2007 Plan (Bamberg 2007).

Table 4. List of Native Plant Species Suitable for Seed Collections

Scientific Name	Common Name	Scientific Name	Common Name
Trees and Tall Shrubs			
Yucca brevifolia	Joshua tree		
Shrubs			
Acamptopappus sphaerocephalus	goldenhead	*Ericameria linearifolia*	interior goldenbush
Ambrosia dumosa	burrobush	*Eriogonum fasciculatum*	California buckwheat
Atriplex confertifolia	shadscale	*Grayia spinosa*	spiny hop-sage
Atriplex polycarpa	cattle spinach	*Gutierrezia sarothrae*	broom snakeweed
Chrysothamnus nauseosus	rubber rabbitbrush	*Hymenoclea salsola*	cheesebush
Chrysothamnus teretifolius	terete rabbitbrush	*Krascheninnikovia lanata*	winter fat
Encelia virginensis	acton encelia	*Larrea tridentata*	creosote bush
Ephedra nevadensis	joint-fir	*Stephanomeria pauciflora*	wire lettuce
Ericameria cooperi	goldenbush	*Tetradymia glabrata*	felt-thorn
Ericameria laricifolia	turpentine bush	*Xylorhiza tortifolia*	mojave-aster
Herbaceous Perennials and Annuals			
Amsinckia tessellata	fiddleneck	*Malacothrix californica*	desert dandelion
Camissonia brevipes	evening primrose	*Malacothrix coulteri*	snake's head
Chaenactis fremontii	fremont's pincushion	*Mentzelia albicaulis*	small-flower blazing star
Chamaesyce albomarginata	white-fringed sandmat	*Mirabilis bigelovii*	four o'clock
Cryptantha circumscissa	western forget-me-not	*Mirabilis multiflora*	four o'clock
Cryptantha pterocarya	wing-nut forget-me-not	*Oenothera deltoides*	basket evening primrose
Dalea mollis	soft indigo	*Oenothera villosa*	evening primrose
Eriogonum nidularium	whisk broom	*Pectocarya recurvata*	comb-bur
Eriogonum reniforme	kidney-leaved buckwheat	*Pectocarya setos*	comb-bur
Eriogonum trichopes	little trumpet	*Petalonyx thurberi*	sandpaper plant
Eriophyllum multicaule	wooly sunflower	*Phacelia glandulifera*	tackstem phacelia
Eriophyllum pringlei	pringle's sunflower	*Plantago ovata*	plantain
Eriophyllum wallacei	wallace's sunflower	*Platystemon californicus*	cream cups
Gilia tenuiflora	gilia	*Salvia columbariae*	chia
Gilia tricolor	bird's eyes	*Sphaeralcea ambigua*	apricot mallow
Layia glandulosa	white layia	*Stephanomeria spinosa*	skeleton weed
Lupinus brevicaulis	sand lupine		

Seeds have been found in plant debris and organic matter under shrubs and in windrowed furrows around the base of Soledad Mountain (Bamberg 2007). Locations with abundant seeds of several plant species will be determined by visual inspection. This source of seed will typically contain viable seeds from up to 50 species of native perennial shrubs, perennial forbs, and annuals (**Table 4**). This expectation is based upon experience with similar desert conditions at other mines (Bamberg 2007). In addition, long-lived seeds of a variety of annual plants were found to germinate under favorable rain and temperature conditions. Normally few weeds or undesirable seeds are expected, provided seed is collected from areas of undisturbed native vegetation (Bamberg 2007). However, vegetation on Soledad Mountain contains many exotic and weedy species as a result of burns and sheep grazing. The floristic plant species is discussed in the biological and soil resources report (Bamberg and Bamberg 1997, 2006).

Seed collection protocols described in the 2007 Plan (Bamberg 2007) include the following:

- Seeds will be collected from plants and from underneath shrubs using hand tools such as shovels, trowels, or simply hand scoping the surface materials (no more than the top one- half inch) containing the seeds and placed into 5-gallon containers.
- The collected material may at times contain a large percentage of plant litter and organic matter mixed with the seed. Through this method seed can be quickly collected, offsetting the low percentage of viable seed in the plant litter and organic matter.

On previous seed collection programs, a crew of four persons collected approximately 2,000 pounds of screened bulk material with seed comprising about 850 pounds of this material in one week. All of the bulk seed material will be screened twice, first through a large 1-inch screen mesh, and then through a 3/8-inch screen to remove rocks, twigs, and other debris (see Photograph 14 in Bamberg 2007). The dry, screened material can then be stored in 55-gallon drums or large plastic containers and sealed to protect the seed from mice and other vermin.

Collecting seeds by hand does not unduly disturb the native vegetation community since the seeds are not collected all in one place, or from a single surface (Bamberg 2007). This method of seed collection can be used to build up a sufficient bulk of seeds during those years with good seed set and production. Most of the seed will remain viable during the short period of time that the seed is stored, generally from a few days to several years. Seeds of some desert plants are known to remain viable for long periods of time (decades) under favorable conditions. It is not necessary that all seeds of all plant species survive in order to establish good germination, vegetative growth, and productivity during revegetation (Bamberg 2007).

6.5. Sowing Seed

Seeds will be broadcast by hand or will be applied using aerial seeders (Bamberg 2007). The rate of sowing will be adjusted, by volume, depending on the visible seeds present. Generally, about 20 lbs of seed-containing material per catchment basin was sufficient in past trials using this method (Bamberg 2007). As mentioned earlier, seed will be sown immediately following the fine grading of the basins while the soil surface is loose. Subsequent rains and weathering processes cover the seed and prevent washing and blowing.

The seed mix used would be adjusted according to altitude. Based on the vegetation types found in the Soledad Mountain Project area, creosote bush/burrobush shrub vegetation occurs around the base of the mountain and out on the alluvial flats, and a mixed shrub/grass vegetation occurs on the slopes and ridges (Bamberg and Bamberg 1997, 2006). Observations on natural revegetation of historic mining disturbances (**Table 5**) have determined the species to be included in the seed mixes (Bamberg 2007).

Table 5. Natural Revegetation Observed within Soledad Historic Disturbance Areas – May 2006

Scientific Name	Common Name	Below 2,950 ft	Above 2,950 ft
Shrubs			
Acamptopappus sphaerocephalus	goldenhead	x	x
Ambrosia dumosa	burrobush	x	x
Atriplex polycarpa	cattle spinach	x	x
Chrysothamnus nauseosus	rubber rabbitbrush	x	x
Encelia actoni	acton encelia		x
Ephedra nevadensis	joint-fir	x	x
Ericameria cooperi	goldenbush		x
Ericameria laricifolia	turpentine bush		x
Eriogonum fasciculatum	California buckwheat	x	x
Grayia spinosa	spiny hop-sage	x	x
Gutierrezia sarothrae	broom snakeweed	x	x
Hymenoclea salsola	cheesebush	x	
Krascheninnikovia lanata	winter fat		x
Larrea tridentata	creosote bush	x	
Stephanomeria pauciflora	wire lettuce		x
Tetradymia glabrata	felt-thorn	x	
Grasses			
Achnatherum speciosum	desert needlegrass	x	x
Achnatherum hymenoides	indian ricegrass	x	x
Aristida adscensionis	three-awn		x
Elymus elymoides	squirreltail	x	x
Poa secunda	bluegrass		x
Herbaceous Perennials and Annuals			
Amsinckia tessellata	fiddleneck	x	x
Cryptantha pterocarya	wing-nut forget-me-not	x	
Eriogonum trichopes	little trumpet		x
Mirabilis bigelovii	four o'clock	x	
Pectocarya recurvata	comb-bur	x	
Pectocarya setosa	comb-bur		
Phacelia glandulifera	tackstem phacelia	x	
Plantago ovata	plantain	x	
Stephanomeria spinosa	skeleton weed	x	x

Garden spots will receive a higher rate of seed application than the remainder of the prepared catchment basins. The application rate will depend upon the availability of seed.

GQMC will employ a combination of aerial seeding using a crop dusting airplane and hand seeding (Bamberg 2007). Timing of the seeding will be preferably in late fall after plant dormancy but before winter precipitation. Seed will be sown soon after grading and ground preparation while the surface is loose, rough, and soft for seed capturing. Also, this timing eliminates the need to cover seed after dispersion since wind and water splash cover the seed with soil (Bamberg 2007).

6.5.1. Aerial Seeding

Aerial seeding will be the preferred method for seeding large and/or steep slopes on Soledad Mountain, as aerial seeding provides a more accurate seeding rate and coverage over large areas than hand seeding (Bamberg 2007). Hand or mechanical seeding is difficult or impossible on steep slopes that have been graded and roughened. Personnel cannot walk the steep slopes carrying and broadcasting seed at the same time, nor can the area be accurately gridded for walking (Bamberg 2007). Mechanical seeders cannot operate on steep slopes due to rolling hazards, nor can they negotiate the rough, prepared, irregular surfaces of the surge piles or leached and rinsed residues.

Additionally, aerial seeding is preferred (Bamberg 2007) because it:

- Takes advantage of good weather by seeding within a short period of time (about 4-5 hours) after ground preparation has been completed;
- Permits application of seeds while conditions are most favorable for receiving seed and before surface conditions change due to shifts in temperature, precipitation, and freeze/thaw cycles;
- Allows for uniform distribution of seed and good control of seeding rates; and
- Provides the opportunity to seed steep or possibly inaccessible areas that cannot be reached by hand broadcasting or mechanical seeding.

Aerial seeding can be done on the same day the seed mix is prepared; therefore, the application day can be selected for ideal weather conditions. Ideal conditions consist of winds of less than 10 miles per hour, preferably with the following day forecasted to be cloudy, overcast, or with light rain, which will help keep the seeds in place.

The airplanes used in past aerial seeding operation have been a Rockwell S2R Thrush Commander with a 9-cylinder 600 hp engine or a turbo-prop plane with similar horsepower (Bamberg 2007). These planes are designed specifically for crop dusting with 400 to 600-gallon hoppers and a 4,000-pound payload capacity. A full hopper holds up to 420 pounds of seed mix. Seed was disbursed using a Transland spreader with a variable controlled rate of release (Bamberg 2007). The flight patterns were controlled with GPS instrumentation using a SatLoc guidance system. This system allows the pilot to control grid and flight patterns precisely without ground flagging or personnel using a satellite guidance system.

The area to be seeded can be divided into several smaller areas, and patterns flown over each area separately (Bamberg 2007). Rate of seeding can be controlled by the width of the pattern and the amount of seed released from the spreader. The acreage of each area is calculated, and the required number of pounds of seed is loaded into the hopper. The rate will be calibrated by flying specific patterns over each area while assessing the amount of seed applied.

Verification of aerial seeding rates can be tested on the ground by examining dry, flat metal surfaces and moist ground surfaces immediately after the plane passes over. Seeds can be blended and mixed for different areas. Areas to be seeded on the upper slopes will have a different seed mix than the lower bajadas and flats.

6.5.2. Hand Seeding

Seed to be hand sown will be loaded into 5-gallon buckets, and areas to be seeded will be walked by one to four people depending on the width of the area. Seeds will be dispersed by hand after a walking calibration-training period for all seeders. Personnel will sow seeds along linear transects at a consistent rate of approximately 20 pounds per acre. Areas that are observed to have insufficient seed after the aerial seeding will also be hand seeded.

6.5.3. Seeding Locations, Mixes, and Rates

GQMC will design specific seed mixes and calculate application rates by dividing the mine into working areas with allowance for altitudinal zones and determining the size of each area. A map will be created to depict the division of the property into these working areas with information about the size of each area, seed mix selected, method of seeding, seeding rate, and total pounds of seed applied to each area. Areas on the side slopes, ridges and peaks above 2,950 feet elevation will be seeded with a higher altitude mix of shrubs/grasses, and areas to be reclaimed below 2,950 feet on the lower slopes, bajadas, and flats will be sown with a creosote bush/burrobush mix (**Table 6**).

The seed mix may be further adjusted depending upon seed availability during years of higher seed production and seed collection seasons. There may also be other native plant species in the zonal mixes, depending on seed production.

Table 6. List of Plant Species to be Seeded in Altitudinal Zones

Scientific Name	Common Name	Below 2,950 ft Creosote bush	Above 2,950 ft Shrub/grass
Shrubs			
Acamptopappus phaerocephalus	goldenhead	x	x
Ambrosia dumosa	burrobush	x	x
Atriplex polycarpa	cattle spinach	x	x
Chrysothamnus nauseosus	rubber rabbitbrush	x	x
Encelia virginensis	acton encelia		x
Ephedra nevadensis	joint-fir	x	x
Ericameria cooperi	goldenbush		x
Eriogonum fasciculatum	california buckwheat	x	x
Grayia spinosa	spiny hop-sage	x	x
Gutierrezia sarothrae	broom snakeweed	x	x
Hymenoclea salsola	cheesebush	x	
Krascheninnikovia lanata	winter fat		x
Larrea tridentata	creosote bush	x	
Stephanomeria pauciflora	wire lettuce		x
Tetradymia glabrata	felt-thorn	x	
Grasses			
Achnatherum speciosum	desert needlegrass	x	x
Achnatherum hymenoides	indian ricegrass	x	x
Aristida adscensionis	three-awn		x
Elymus elymoides	squirreltail	x	x
Herbaceous Perennials and Annuals			
Amsinckia tessellata	fiddleneck	x	x
Cryptantha pterocarya	wing-nut forget-me-not	x	
Eriogonum trichopes	little trumpet		x
Mirabilis bigelovii	four o'clock	x	
Pectocarya recurvata	comb-bur	x	
Phacelia glandulifera	tackstem phacelia	x	
Plantago ovata	plantain	x	
Stephanomeria spinosa	skeleton weed	x	x

6.6. Transplanting

Bamberg (2007) found the salvage and transplant of perennial plant specimens has not been successful or effective in other desert mine reclamation projects, stating the success rate with transplanting has been less than 25 percent except for some species of cactus or succulents. In particular, Joshua trees have not typically survived transplant well, especially larger specimens over 6 feet tall (Bamberg 2007). There are very few species or specimens of cactus on Soledad Mountain (Bamberg and Bamberg 2006, Hidalgo 2018, Hughes 2018). Many of the perennial shrubs and Joshua trees on the mountain were previously burned, and there are few suitable plants for salvage. Additionally, there are few suitable placement locations where salvaged plants could survive (Bamberg 2007).

Salvage of perennial plants will therefore be tried initially on a limited basis.

7. REVEGETATION IMPLEMENTATION

Mining and aggregate operations on the property will result in four main types of disturbance:

1. Open pits and pits in which mined material has been replaced;
2. Surge piles for aggregate storage;
3. Leached and rinsed residues on the heap leach pad; and
4. General working areas and roads.

Specific reclamation and revegetation considerations are described for each of these disturbances in the following sub-sections.

7.1. Open Pits and Material Storage

Revegetation within the open pits and pits in which mined material has been replaced will be primarily located within pit bottoms and haul roads. Public safety will be the key concern after operations have ended. Twenty-foot high berms will therefore be constructed approximately 15 meters (50 feet) from the pit rims and fences may be required in certain areas. Warning signs will be erected. This work will be done during the mine life and will remain in place after closure and reclamation have been completed (Sespe 2019).

Material stored in the open pits will typically consist of end-dumped (therefore loose and coarse) waste rock, and the approach to reclamation and revegetation will be the same as applied to the surge piles described in **Section 7.2 Surge Piles**.

Any remaining in-pit diversions constructed during mining and aggregate operations to divert surface runoff will be breached. Drainage patterns will be reestablished so that runoff can enter the open pits at the low point on any pit rim. Runoff from the surge piles will be directed into the mined-out phases of the open pit by sloping surfaces inwards and any direct precipitation and runoff will readily seep into the waste rock. It is not expected that water will accumulate in the bottom of the open pits but will drain away via old underground workings where these exist. Occasional standing water will quickly evaporate.

The portion of the open pits used for material storage will be reclaimed, but high walls will be avoided during reclamation and will be left as rock outcrops. Any remaining waste rock on benches along a high wall will be left in a loose, rough condition to aid in moisture retention, decrease wind erosion losses, and encourage establishment of seedlings in small surface crevices. It is also expected that over time some natural encroachment of native species (i.e., goldenbush, joint-fir, sneezeweed, and buckwheats) adapted to rock outcrop habitats already existing on Soledad Mountain will occur in isolated groupings.

Pit bottoms and safe-haul roads will be roughened and contoured into catchment basins and seeded with the appropriate mix according to the altitudinal zone.

7.2. Surge Piles

The tops as well as the sides of the surge piles will be reclaimed upon completion of aggregate sales.

The crests of the surge piles will be reworked with a dozer to eliminate straight lines so that the dumps can blend with the natural topography. Surface cracks can occur along the crest of surge piles due to differential settlement of the mass of material and this is not a stability issue (Sespe 2019).

Surge pile surfaces will consist of mixed rock substrates with little developed soil or highly weathered material. Revegetation tests done on similar sites to date showed that the surfaces of typical surge piles show two types of conditions (Sespe 2019). The first is loose, end-dumped material with undulating surfaces that result from dumping waste rock without dozing or grading. The second is a hard-packed surface left from haul truck traffic and dozing (Sespe 2019). Rough surfaces will be configured into shallow basins with irregular outlines. Compacted surfaces will be ripped with a dozer or scarified with a grader and similar basins will be constructed. Revegetation will proceed as described in **Section 6.4 Sources of Seed & Seed Collection** and **Section 6.5 Sowing Seed**.

7.3. Leached and Rinsed Residues on the Heap Leach Pad

Stacked ores, which have been leached with a dilute sodium cyanide solution to extract gold and silver and neutralized, have been reclaimed successfully elsewhere in the California deserts (Sespe 2019). Therefore, it is expected that reclamation can be completed successfully for the Project (Sespe 2019).

The Phase 1 heap leach pad will be lined area. The leached residue will be neutralized and ultimately reclaimed per the detail provided in the Preliminary Closure and Post-Closure Maintenance Plan, which is part of the Report of Waste Discharge. GQMC anticipates the Regional Water Quality Control Board (the Regional Board) will reclassify the rinsed residues from a Group B Solid Mine Waste to a Group C Solid Mine Waste once the residues have been effectively neutralized and the limits for the residual cyanide content set by the Regional Board have been met. Once the residues qualify as a Group C Solid Mine Waste, reclamation and revegetation can then proceed (Bamberg 2007).

A dozer will be used to rework the crests of the leached and rinsed residues so that these blend with the natural topography. Note again the typical dozing patterns that have been successfully used at other heap leach operations in the California deserts (Bamberg 2007). This has been referred to as micro-contouring or creating micro-basins and these features are designed to trap moisture and seeds and this will be the approach adopted. The prepared areas will have a suitable texture for desert plants.

Revegetation will proceed as described in **Section 6.4 Sources of Seed and Seed Collection** and **Section 6.5 Sowing Seed**. Stockpiled growth media will be added in the lower parts of the micro-basins to create garden spots and applied as mounds to create diversity. Additionally, some mounding will be done on top of the rinsed residues to improve the overall aesthetics. The prepared surface will be seeded.

The initial contouring is designed to provide stable surfaces and to control and minimize erosion. Revegetation will provide longer-term stability, reduce visual contrasts and provide wildlife habitat (Sespe 2019). It is expected that the rinsed residues will blend into Soledad Mountain as background when seen from a distance after reclamation has been completed (Bamberg 2007).

The overflow pond will be decommissioned when it no longer contains any rinse solution. The pond liner will be cut and folded back upon itself, and the pond will be filled with waste rock, growth media applied as mounds, and seeded.

It is expected that post-closure monitoring and post-closure maintenance will be required for a period of five years.

Fencing around the heaps will be removed after vegetation has been reestablished and closing reclamation has been accepted by the regulatory authorities.

7.4. General Working Area and Roads

The general yard areas and haul roads will be ripped or scarified and seeded. Culverts will be removed. Safety berms and ditches will be graded and filled to create contours that blend with the landscape.

Seed will be spread by hand or aerial seeding and by covering portions surfaces with growth media for substrate diversity and as a seed source, as available. The haul road corridors will receive some natural reseeding from nearby undisturbed vegetation.

A large number of the existing exploration roads and drill pads will be removed during operation. It is expected that the remaining exploration roads and drill pads will be reclaimed during the life of the mining and aggregate operation (Sespe 2019). Compacted surfaces will be ripped with a dozer or scarified with a grader. Reclaimed working areas and roads will be seeded by hand which has proven to be effective (Bamberg 2007).

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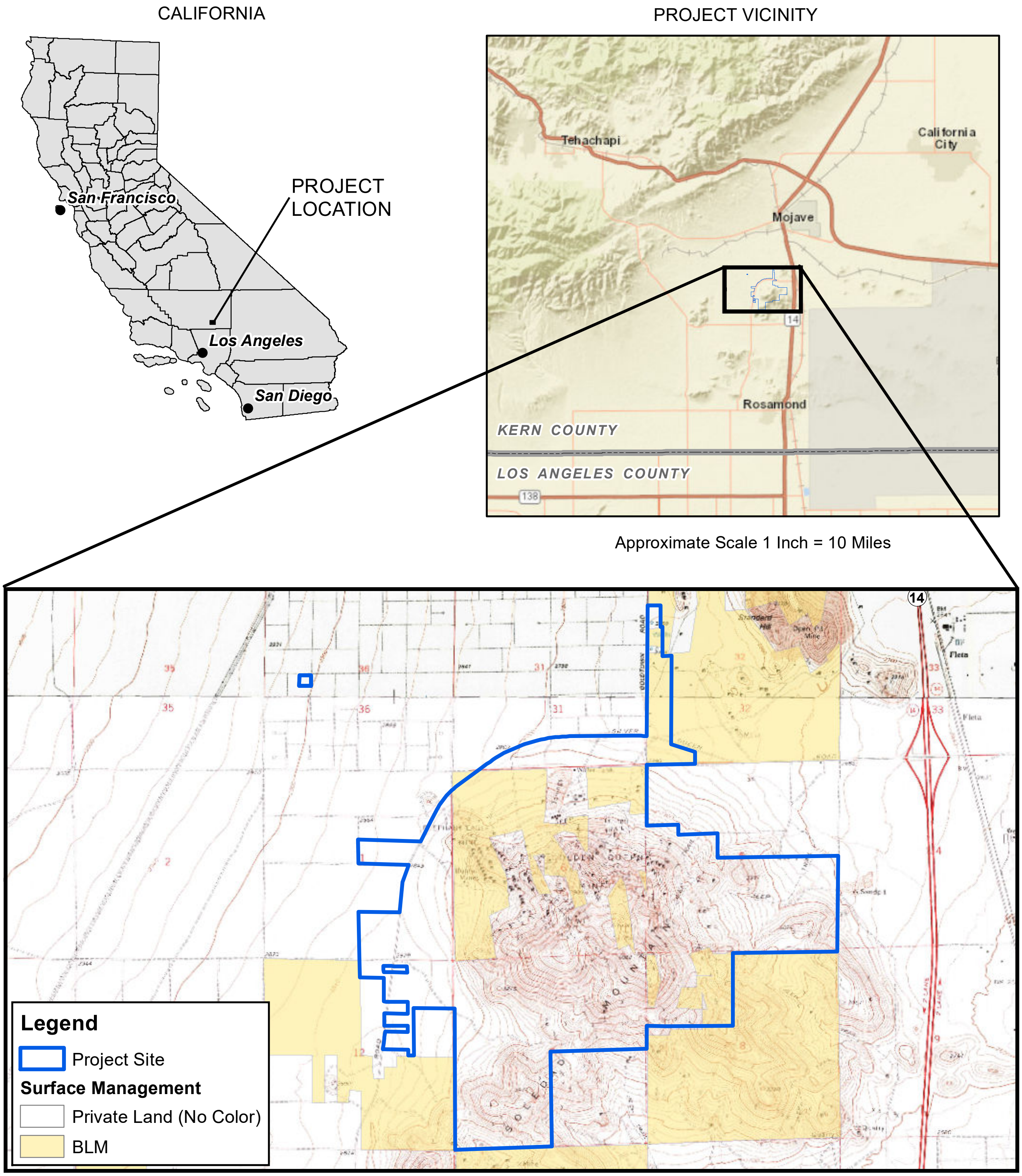
FIGURES



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T10N, R13W, Portions of Sections 1 and 12,
T11N, R12W, Portions of Sections 31 and 32,
T11N, R13W, a Portion of Section 36,
Kern County, California
Mojave and Soledad Mountain USGS 7.5' Quadrangles
Surface Management: BLM 2017, WRI modified 2018
Image Source: ArcGIS Online, World Street Map

WestLand Resources

N

0 2,000 4,000 Feet

0 600 1,200 Meters

GOLDEN QUEEN MINING COMPANY, LLC
Revegetation Plan
Soledad Mountain Project

VICINITY MAP
Figure 1

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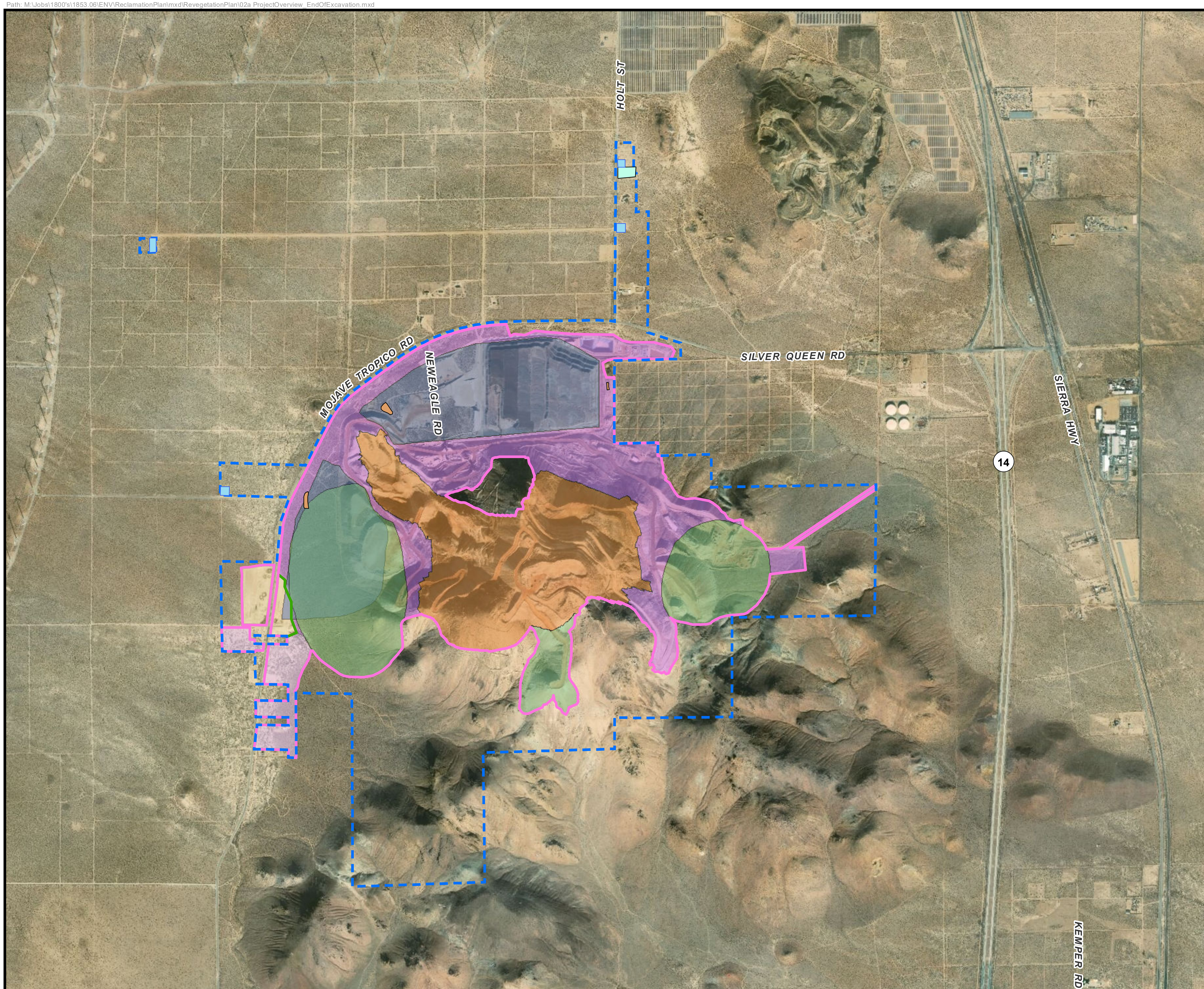

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T11N, R12W, Portions of Sections 31 and 32,
T11N, R13W, a Portion of Section 36,
Kern County, California
Data Source: Soledad Mtn. Golden Queen Mines LTD, Sepse
Reclamation Plan Preferred Alternative 2/19/2019 and 6/7/2019,
End of Mine Life 7/2/2019
Image Source: ArcGIS Online, World Imagery,
07/31/2016 & 03/07/2017

Legend

- Permit Area/Project Site (2009 AC.)
- Total Disturbed Area (1156 AC.)
- Pit (302 AC.)
- Surge Piles (292 AC.)
- Heap Leach Pad (291 AC.)
- Existing Clay Borrow Area (25 AC.)
- Approximate Expanded Clay Borrow Area (43 AC.)
- Working Area and Roads (307 AC.)
- Growth Media Stockpiles (2 AC.)
- Revegetation Test Plot (2 AC.)
- Well Sites (3 AC.)

N

0 1,000 2,000 Feet

0 300 600 Meters

WestLand Resources

GOLDEN QUEEN MINING COMPANY, LLC

Revegetation Plan

Soledad Mountain Project

PROJECT OVERVIEW - END OF EXCAVATION

Figure 2a

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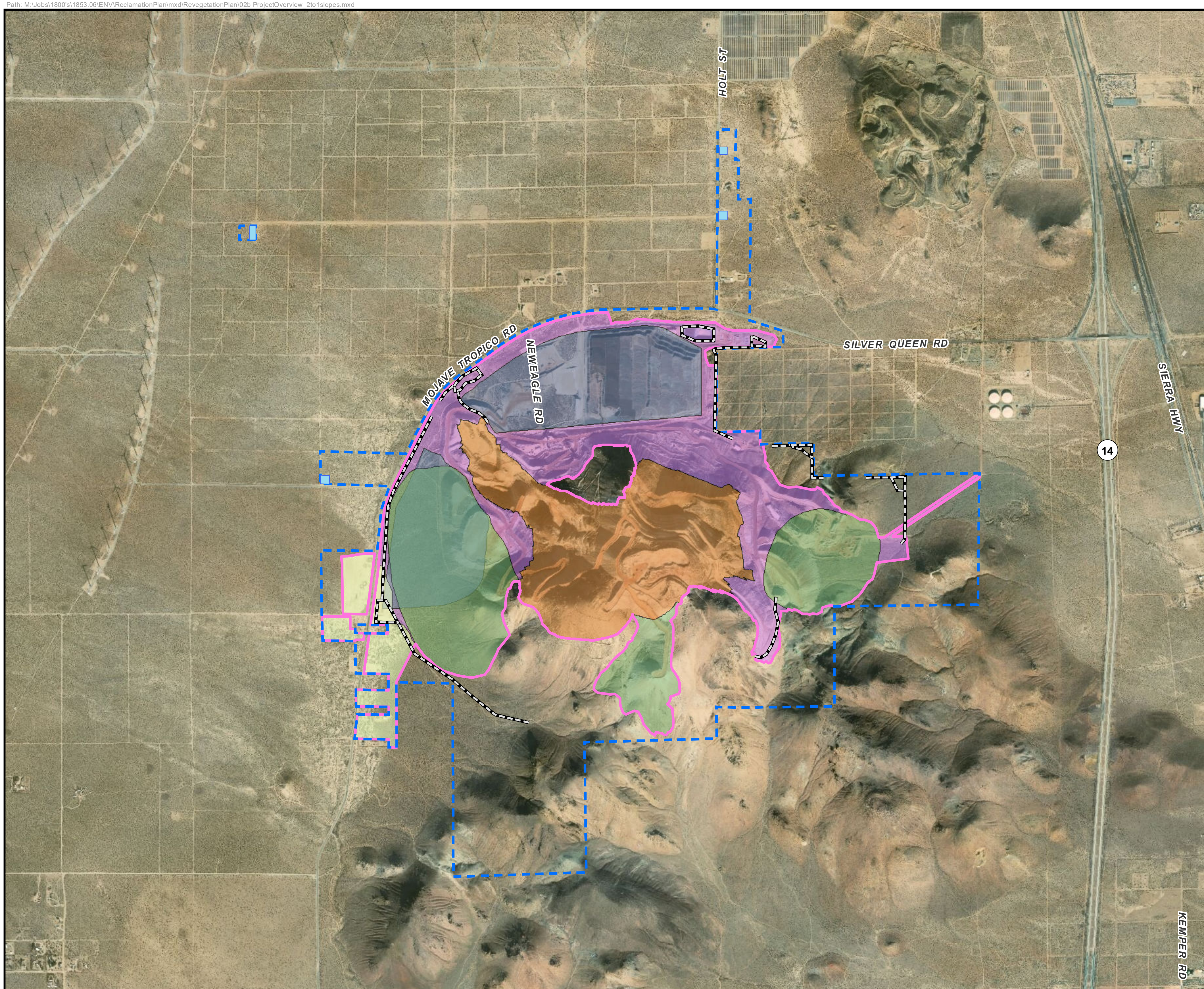

T10N, R12W, Portions of Sections 5-8,
T10N, R13W, Portions of Sections 1 and 12,
T11N, R12W, Portions of Sections 31 and 32,
T11N, R13W, a Portion of Section 36,
Kern County, California
Data Source: Soledad Mtn. Golden Queen Mines LTD, Sepse Reclamation Plan Preferred Alternative 2/19/2019 and 6/7/2019, End of Mine Life 7/2/2019, Sespe Stormwater Ponds and Dtiches, 9/5/2019
Image Source: ArcGIS Online, World Imagery, 07/31/2016 & 03/07/2017

Legend

- Permit Area/Project Site (2009 AC.)
- Conceptual Stormwater Pond
- Conceptual Stormwater Diversion Ditch
- Total Disturbed Area (1188 AC.)
- Partially Backfilled Pit (302 AC.)
- Reclaimed Surge Piles (337 AC.)
- Reclaimed Heap Leach Pad (291 AC.)
- Reclaimed Clay Borrow Area (68 AC.)
- Reclaimed Working Area and Roads (301 AC.)
- Reclaimed Well Sites (3 AC.)

N

0 1,000 2,000 Feet

0 300 600 Meters

WestLand Resources

GOLDEN QUEEN MINING COMPANY, LLC
Revegetation Plan
Soledad Mountain Project
PROJECT OVERVIEW - END OF RECLAMATION
2:1 SLOPES
Figure 2b