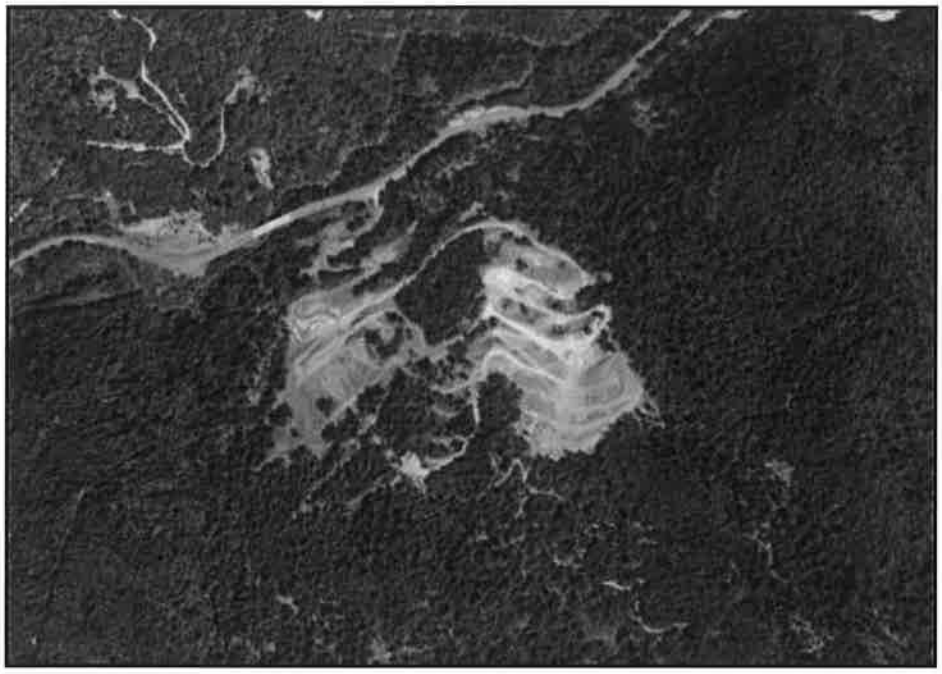
MINING AND RECLAMATION PLAN AMENDMENT
PROPOSED EXPANSION

R. BROWN AND SONS QUARRY
HUMBOLDT COUNTY, CALIFORNIA



Prepared for

R. Brown and Sons Quarry

Prepared by

VESTRA Resources Inc.
5300 Aviation Drive
Redding, California 96002

AUGUST 2016

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71410

AUGUST 2016

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GLOSSARY

AQMD	Air Quality Management District
APN	Assessor's Parcel Number
BMP	Best Management Practice
CESA	California Endangered Species Act
CEQA	California Environmental Quality Act
CDFW	California Department of Fish and Wildlife
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CRLF	California Red Legged Frog
CWHR	California Wildlife Habitat Relationships
DBE	Design Basis Earthquake
DBH	Diameter at Breast Height
DPR	California Department of Pesticide Regulation
ESA	Endangered Species Act
FOS	Factor of Safety
GIS	Geographic Information System
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
SMARA	Surface Mining and Reclamation Act
UBE	Upper-Bound Earthquake
USFWS	U.S. Fish and Wildlife Service

1.0 PROJECT SUMMARY

The original Reclamation Plan for the R. Brown and Sons Quarry was completed, underwent California Environmental Quality Act (CEQA) review, and was approved by Humboldt County in 1990. The County of Humboldt approved Conditional Use Permit CUP-11-90 and Surface Mining Permit SMP-02-90 on April 19, 1990, for a term of ten years. Reclamation Plan No. RP-99-01 and Conditional Use Permit CUP-99-01 were approved on May 16, 2000, extending the life of the site by 15 years. These are both included in Appendices A and B, respectively. A request to renew and extend the Conditional Use Permit was submitted to the Humboldt County Planning Department in July 2014. The request was approved on October 16, 2014, with the revised Conditional Use Permit CUP-14-013X, Surface Mining Permit SMP-14-001X, and Reclamation Plan RP-14-001X. By means of this application, R. Brown and Sons Quarry wishes to expand the mining operation to include additional surface disturbance area.

R. Brown and Sons will continue operating under the original conditions outlined in UP-185-78, CUP-99-01, and SMP-14-001X, as well as RP-14-001X, on Assessor's Parcel Number (APN) 316-061-011. This document amends Reclamation Plan No. 99-01 to include an approximately 39-acre expansion, along with modification of final contours, updates to reclamation requirements to meet current SMARA standards, revised removal volume, and revised number of trucks using the highway each day.

Should discrepancies exist between the two documents, this Reclamation Plan Amendment will supersede Reclamation Plan No. 99-01. CEQA review will be limited to the expansion area, reclamation, removal volume, and traffic and will not include review of other previously reviewed and permitted operations.

The general site location is shown on Figure 1. The boundary of APN 316-061-011 is depicted on Figure 2.

1.1 Project Name

R. Brown and Sons Quarry

1.2 California Mine Identification Number

91-12-0035

1.3 Mine Operator

R. Brown and Sons Quarry
406 Brown Way
Willow Creek, California 95573
(530) 629-3702
Contact Person: Kevin Brown

VESTRA

FIGURE 1
GENERAL SITE LOCATION
R. BROWN AND SONS QUARRY
HUMBOLDT COUNTY, CALIFORNIA

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FIGURE 2
PARCEL LOCATION
R. BROWN AND SONS QUARRY
HUMBOLDT COUNTY, CALIFORNIA

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1.4 Owner of Property and/or Mineral Rights

Roger D. Brown and Nancy A. Brown Trust

1.5 Designated Agent

Kevin Brown/R. Brown and Sons Quarry
406 Brown Way
Willow Creek, California 95573
(530) 629-3702

or

Wendy Johnston/VESTRA Resources
5300 Aviation Drive
Redding, California 96002
(530) 223-2585

1.6 Location

The R. Brown and Sons Quarry is located approximately 3 miles west of the town of Willow Creek, California, along California State Highway 299. The general site location was shown on Figure 1.

1.6.1 Section, Township, and Range

The current mining area and proposed expansion area are located in Sections 1, Township 6 North, Range 4 East, Humboldt Base Meridian.

1.6.2 Latitude and Longitude

The latitude and longitude at the center of the project are 40° 55' 45.95", and -123° 40' 40.37", respectively. In decimal degrees, the latitude and longitude at the center of the project are 40.93° and -123.68°, respectively.

1.6.3 Directions to Site

From Willow Creek, take Highway 299 west towards Eureka. The mine entrance road is located approximately 3.1 miles west of Willow Creek, to the south of the highway.

1.7 Legal Description/Total Parcel Size

This Reclamation Plan addresses mining and reclamation activities within portions of the APN 316-061-011. The parcel is 77 acres and is shown on Figure 2.

1.8 Total Area to be Mined

The current area to be mined is 25 acres. This Reclamation Plan Amendment increases the disturbance and covers existing mining operations within the parcel listed above and an additional expansion of 39 acres, shown on Figure 2. This includes areas that will be mined for rock and areas that will be used for topsoil and overburden storage. The expansion area will be used for rock extraction and a minor amount of overburden storage. Areas not included in the current project area (within CUP-99-01) will not be mined until such time that a final site plan is submitted and approved by Humboldt County and the state Office of Mine Reclamation (OMR).

1.9 Total Area to be Reclaimed

The total area to be reclaimed is 64 acres.

1.10 Quantity and Type of Material to be Mined

Rock of various sizes will continue to be mined. Additional rock removal (25,000 cubic yards annually) is planned. Quantity of material to be mined is highly dependent upon the subsurface basement elevations, the thickness of the rock deposit, and market conditions. Mining has already occurred on approximately 25 acres of the parcel. The total additional disturbed quarry area is estimated to be 19 acres, for a total of 44 acres. The production rate of mining is anticipated to increase over time to a maximum of 25,000 cubic yards of product annually. The maximum depth of mining will be at an elevation of 1450 feet above mean sea level.

1.11 Proposed Startup and Termination Dates

Mining operations were initiated on the site in 1990. The remaining mining activity is estimated to be completed within another 25 years under the current permit. Assuming this Reclamation Plan Amendment is approved in 2017, mining activities are likely to be complete by November 30, 2047. R. Brown and Sons requests an expiration date on the amended Use Permit of 30 years from the date of approval of the amendment.

1.12 Proposed Land Use Following Reclamation

No changes are proposed to the reclamation of the areas already disturbed and covered under the existing Reclamation Plan, where final topography does not change under this Addendum. Additional disturbed areas proposed in the mining and reclamation plan will be restored to a primary use of timber production zone following reclamation of mined lands. Beneficial aspects under this land use will be both economic and ecosystem related, along with forest and shrub habitat with inclusions of riparian habitat along intermittent drainages.

1.13 Introduction and Description of Proposed Activity

The amendment of CUP-99-01 and Reclamation Plan No. 99-01 is to address the proposed 39-acre expansion area. Approximately 19 acres of the total expansion area will be disturbed. The expansion area will be used primarily for removal of material, with the exception of approximately 8 acres that were included to allow additional stockpiling and to clarify the current permit. Stockpiling will occur on previously permitted areas. This amendment also includes revisions to final site topography to address the 39-acre expansion area and current SMARA and Humboldt County requirements. Other minor modifications to the original reclamation and mining plan are proposed, which include language to clarify traffic and mine volume numbers. The project area currently supports mining operations.

This revised Reclamation Plan has been prepared in compliance with Humboldt County requirements (Humboldt County Code, Title III, Division 9, *Mining Operations*) and SMARA, as amended. This plan meets the California Code of Regulations, Title 14, Division 2, Chapter 8, Subchapter 1, Article 9, *Reclamation Standards.*

2.0 SITE CONDITIONS

2.1 General Site Characteristics

The current mine site is located within the western margin of the Klamath Mountains geologic province of northwestern California and southwest Oregon and made up of mostly fractured and weathered rock. The site is located within the Rattlesnake Creek Plate. The plate consists of, in order of decreasing abundance, fine-grained mafic to intermediate igneous rocks, fine to medium-grained greywacke, chert, siliceous argillite, serpentine, and some intrusive rock.

Several in-ditch stormwater detention structures are used for storing stormwater discharge and to settle sediment from stormwater. Concentrated flows are observed during heavy rains. These flows are contained and slowed by berms on the outboard side of roads and benches.

Vegetation within the proposed expansion area collectively represents a mixed montane conifer vegetation community. The majority of the expansion area is represented by poor soil development and exhibits a sparse vegetative cover comprised of Douglas fir (*Psuedotsuga menziesii*), incense cedar (*Calocedrus decurrens*), red alder (*Alnus rubra*), madrone (*Arbutus menziesi*), tan oak (*Notholithocarpus densiflorus var. densiflorus*), canyon live oak (*Quercus chrysolepis*), Oregon white oak (*Quercus garryana var. garryana*), and a variety of shrubs and annual grasses. Historically, commercial timber species may have occurred onsite; however, only remnant individuals remain. The property was logged and merchantable timber removed prior to 1975.

2.1.1 Project Site

The current land use for the current mining operation and the proposed expansion area is mining of rock and aggregate. The operation includes the existing quarry which includes a processing area, truck scales, office, and material stockpiles. The facility also includes various sediment control structures throughout the quarry.

2.1.2 General Plan and Zoning Information

The Humboldt County General Plan has classified the project area, including the active mine site and the area slated for site expansion, as *Timber Production Zone* (TPZ). Zoning for the project area is shown on Figure 3. Additional surrounding areas are zoned as *Timber Production Zone,* or *Unclassified.* The primary purpose of Timberlands is "to actively protect and conserve timberlands for long-term economic utilization and to actively enhance and increase county timber production capabilities." The Humboldt County General Plan land use designations are shown on Figure 4.

2.1.3 Surrounding Land Use

Lands immediately adjacent to the project area are classified by the Humboldt County General Plan as *Timber Production Zone,* and *Unclassified.* Surrounding lands are zoned as *Timber Production Zone, Unclassified,* and *Agriculture Exclusive.* Surrounding landowners include the U.S. Forest Service (USFS).

FIGURE 3
HUMBOLDT COUNTY
ZONING DESIGNATIONS
R. BROWN AND SONS QUARRY
HUMBOLDT COUNTY, CALIFORNIA

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FIGURE 4
HUMBOLDT COUNTY
LAND USE ELEMENT
R. BROWN AND SONS QUARRY
HUMBOLDT COUNTY, CALIFORNIA

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Following reclamation and revegetation of the project area, the land will be converted back to *Timber Production Zone.* The surrounding area is not used for agricultural purposes. The nearest residence occurs approximately 800 feet from the project property boundary to the north across Highway 299W.

2.1.4 Transportation

Materials are transported from the project site by a private road entering onto State Highway 299 pursuant to the original permit. An average of five truck trips per day were approved under the current permit. This level of traffic activity is minor and similar to that for other resource-related uses in the area. Traffic activity was approved under the original use permit.

In order to clarify truck use numbers and accommodate the removal of additionally available material, the average number of truck trips per day has been increased to ten (truck trips per day), averaged over the operating season. This number is still minor relative to truck traffic on Highway 299.

The use of an average is necessary to accommodate fluctuations in daily production and use due to the cyclic and intermittent nature of quarry operations. Quarries operate in response to project-specific demand.

2.1.5 Utilities and Services

The following agencies provide public or private services or utilities to the project site:

- Fire Protection: USDA Forest Service, Willow Creek Volunteer Fire Department
- Law Enforcement: Humboldt County Sheriff
- Electricity: PG&E
- Natural Gas: Not used onsite
- Water: Potable water hauled to site
- Solid Waste: No solid waste onsite
- Telephone: Frontier Communications

Utilities and services were approved under the current use permit and will not change with the proposed expansion.

2.1.6 Aesthetics

The existing visual character of the site is that of forested/brush lands with moderate to steep topography. The project site is located adjacent to Highway 299 and is situated 400 to 1,000 feet from the highway. Due to the steep and forested nature of the area, the majority of the project site is shielded from Highway 299. The quarry is only visible to passing traffic on Highway 299 for brief periods of time. A viewshed analysis was completed and is included in the Initial Study submitted concurrently with this Reclamation Plan Amendment. The site is difficult to see by the public and the surrounding aesthetic value is not affected.

2.2 Geologic Description

Data provided by Trinity Valley Consulting Engineers in the Engineering Geologic Evaluation for R. Brown and Sons Quarry were used to provide the geologic description of the site. The Engineering Geologic Evaluation is included as Appendix C.

2.2.1 Geologic Setting

The site, including the current and proposed expansion area, is located within the western margin of the Klamath Mountains geologic province of northwestern California and southwestern Oregon. The Klamath Mountains province is bordered by the Coast Range province to the west and southwest, Great Valley province to the southeast, and the Cascade Range province to the northeast. The project site is underlain by both Jurassic-age Galice Formation and the Late Paleozoic Triassic-age rocks of the Western Paleozoic and Triassic Belt of the Klamath Mountains province. Surface geology is shown on Figure 5. Individual deposits are described further below.

2.2.1.1 Undifferentiated Surficial Deposits

These deposits are present at the ground surface across most of the site where quarrying has not yet begun. They include regolith soils of both the Western Paleozoic and Triassic Belt rocks. Colluvial materials ranging from cobbles and boulders to large blocks and landslide deposits are also present at the site. Most of the surficial materials exhibited some degree of weathering and common fracturing.

2.2.1.2 Galice Formation (Jg)

The Galice Formation predominately exhibits gray phyllitic metagraywacke, slate, and phyllitic slate. These materials often weather to a light silvery-gray to tan in coloration and are often cut by scattered, thin, meta felsite dikes and sills. At the project site, the materials were observed to be intensely fractured and exhibited foliate structure. Bedding is not distinguishable and failures tend to be structurally controlled by joint sets. The geomorphology of the formation materials on the parcels is a structural incompetence of the underlying rock, where west slopes tend to be very steep with debris slides and small rotational landslides.

2.2.1.3 Western Paleozoic and Triassic Belt "Rattlesnake Creek Terrane"

The project site is located within the Rattlesnake Creek terrain of the Western Paleozoic and Triassic belt. The Rattlesnake Creek terrain consists predominately of serpentinized ultramafic rocks, gabbro, diabase, pillow lava, and other mafic volcanic rocks. The Western Paleozoic and Triassic belt also includes phyllite, thin-bedded radiolarian chert, discontinuous lenses of limestone, and locally interbedded sandstone and pebble conglomerate. These rocks generally are metamorphosed to low greenschist facies, where strata is highly folded and faulted. This unit tends to fail as large, deep-seated rockslides and earthflows, and subsequently fails as smaller debris slides and rockslides which are seen in the project vicinity.

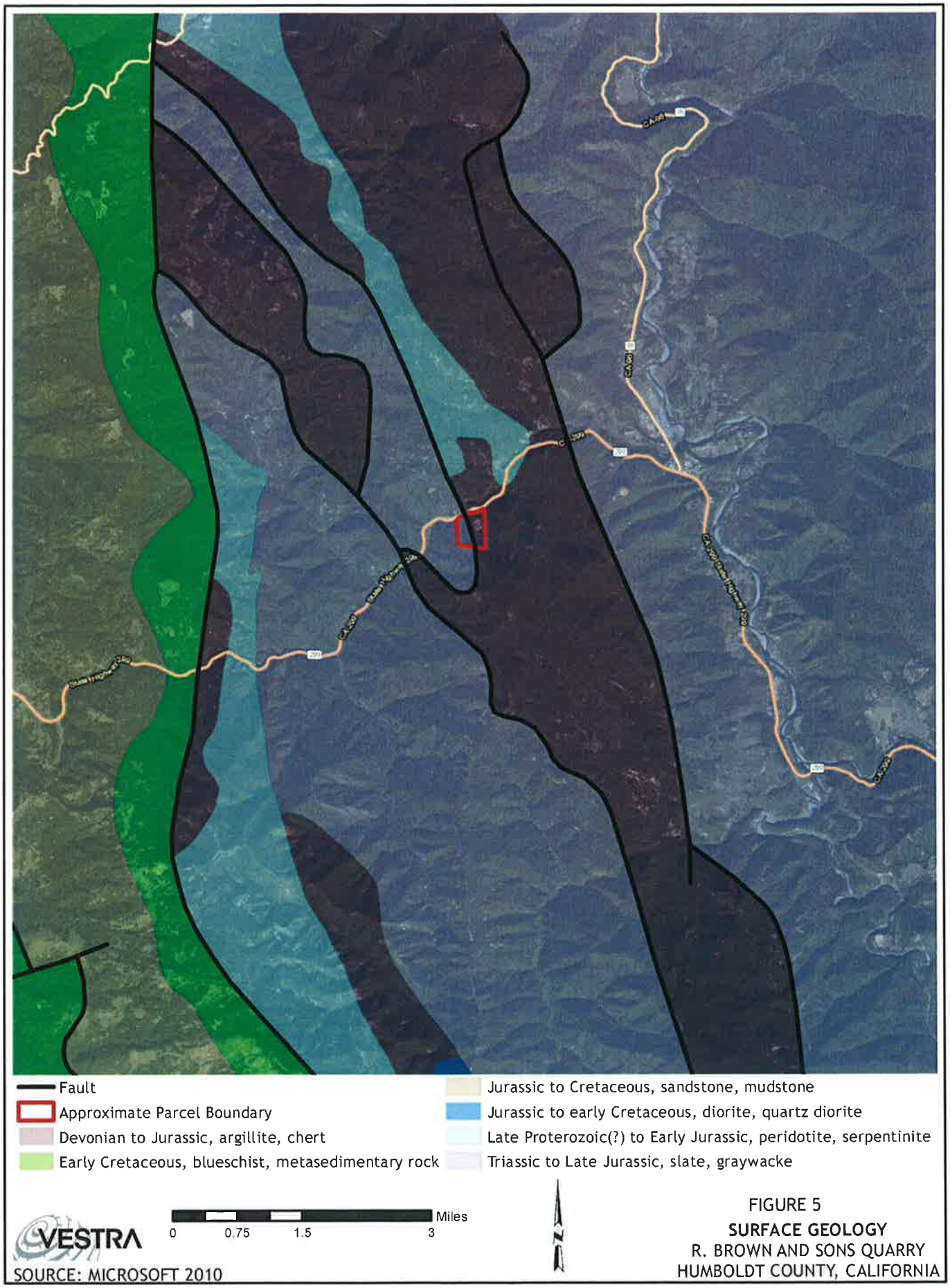

FIGURE 5
SURFACE GEOLOGY
R. BROWN AND SONS QUARRY
HUMBOLDT COUNTY, CALIFORNIA

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2.2.2 Seismic Considerations

An updated geotechnical study was completed for the proposed expansion site by Trinity Valley Consulting Engineers, Inc. The Engineering Geologic Evaluation is included as Appendix C.

No active faults are located within the current or expanded project area or within close proximity to the project site. The most significant faults within the region of the project site are the active Trinidad Fault, the active Big Lagoon-Bald Mountain Fault, and the active Mad River Fault Zone. The Hennessy Ridge Fault is an inactive fault that passes through the project site.

Over the last 100 years, 1,765 earthquakes with a local magnitude (M_L) greater than 3.0 have occurred within a 100-mile radius of the site. Of those, 35 earthquakes had an M_L equal to or greater than 5.0 and 39 had an M_L of 5.5 or greater. The largest earthquake to occur within that same radius was the M_L 7.3 earthquake which occurred 98 miles west-northwest from the project site on January 31, 1922. Peak horizontal ground accelerations using attenuation were estimated by Trinity Valley Consulting Engineers using the Caltrans ARS Online Web-based tool, which determined that the project area may be subjected to horizontal ground accelerations of at least 0.55g from the movement of continental faults. The fault expected to be responsible for the peak horizontal ground accelerations is the Big Lagoon-Bald Mountain fault which is located about five miles northwest of the project site. Probabilistic evaluation of strong horizontal ground motion was determined from the 2008 USGS Seismic Hazard Map for the 5 percent in 50 years' probability of exceedance. The statistical return period for such an event is approximately 975 years.

Liquefaction is of interest and is defined as the reduction in the shear strength of soil due to an abrupt increase in water pressure within the soil pore space that is caused by a seismic event. Liquefaction typically occurs when the following conditions are met: the existence of granular soils such as sand, silty sand, sandy silt, or some gravels; the existence of an elevated groundwater table; or the presence of low-density soils. The potential for liquefaction to occur is estimated to be low because there are minimal amounts of loose alluvial soils within the site, and the groundwater is believed to be perched and discontinuous and associated with fractures and joint planes.

Several landslide features were observed within and adjacent to the parcels. These features are preserved, and/or active, in zones outside of the mining areas. The project site is part of a larger area that has been mapped as an area of Dormant-Young landslide activity and exhibit landforms that are relatively fresh but on which there has been no demonstrable historic movement. Landslide types in the area include rockslides, earthflows, and debris flows.

2.2.3 Engineering Properties of Critical Earth Materials

To perform a slope stability analysis, engineering properties of critical earth materials were identified. Properties of interest were rock/soil strength [cohesion (C) and the angle of internal friction (ø)] and the unit weight of materials analyzed. Soil strength and unit weight data were used from a previous study, plus additional information from a Caltrans foundation investigation report for the Enchilada Curve Improvement Project. For site material, the C-value was determined to be approximately 200 psf and the ø-value approximately 31 degrees. For the decomposed bedrock, the C-value was determined to be approximately300 psf and the ø-value

approximately 35 degrees and, for the slate and greywacke, the C-value was determined to be approximately 2,000 psf and the ø-value approximately 40 degrees.

2.2.4 Discontinuities

Discontinuities are of interest in slope design as rock discontinuities within metamorphic rock masses may influence slope stability via planar failures or wedge failures. Five major discontinuity groupings were observed. Within the five groupings, ten intersections were observed. Using the estimated ø-value of approximately 35 degrees, the potential for either planar or wedge failure was found to be minimal.

2.2.5 Slope Stability

A factor of safety (FOS) against failure of slope stability was calculated for the design of cut or fill slopes. A FOS of greater than 1 is evidence of a stable slope, a FOS less than 1 is indicative of a failing slope, and a FOS equal to 1 indicates that a slope is likely to or is on the verge of failing. Typically, when determining a maximum slope inclination, a FOS of 1.5 (static) and 1.1 (pseudostatic) is used for analyses of slope stability. When designing slope inclinations in a quarry, the FOS may be reduced to 1.25 and 1.05 for static and pseudostatic conditions, respectively. Based on the calculations, the working faces at the project site appear to be stable with a FOS exceeding 1.25 under static conditions and FOS exceeding 1.1 under pseudostatic conditions for slope face inclinations up to 45 degrees. With such a slope face inclination, highwalls with a height of 100 feet and bench widths of 20 feet are acceptable.

More details of the slope stability analysis for the site are included in Appendix C.

2.3 Topography and Landform

Trinity Valley Consulting Engineers completed the topographic mapping for the site. The active project area encompasses approximately 64 acres (including the 39-acre expansion area) and is generally described as steep terrain ranging from 1200 to 2500 feet above mean sea level. Portions of the site have been graded and act as the landings for the processing plant, aggregate stockpile area, office, parking, Caltrans material storage area, and topsoil storage area. The active mine area is steep with the only flat areas being the benches. The northeastern portion of the site is the steepest with existing topography steeper than 1H:1V. The proposed final site topography has been modified to include the revised geotechnical values and recommendations for the expansion area. Figure 6 depicts current site topography.

2.4 Hydrology

2.4.1 Surface Water Characteristics

The project site is located adjacent to Willow Creek, a perennial watercourse known to support populations of sensitive anadromous species. According to the Humboldt County Web GIS maps, the project site is located just outside of the 100-foot setback required by Humboldt County Streamside Management code for perennial watercourses. Surface hydrology is shown on Figure 7.

Major Contour Lines
Existing Contour Lines
Approximate Parcel Boundary

N

0 200 400 800 Feet

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SOURCE: MICROSOFT 2010

FIGURE 6

CURRENT TOPOGRAPHY
R. BROWN AND SONS QUARRY
HUMBOLDT COUNTY, CALIFORNIA

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FIGURE 7
SURFACE HYDROLOGY
R. BROWN AND SONS QUARRY
HUMBOLDT COUNTY, CALIFORNIA

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The project area contains two small watercourses that are located on the eastern and western property boundaries. These watercourses flow northward to Willow Creek and are fed by springs, precipitation, and snowmelt. During the survey conducted by Trinity Valley Consulting Engineers, the streams on the eastern and western boundaries were running in the upper reaches, but were dry in the lower reaches. The intermittent flows, steep gradient, and several potential fish-passage barriers make it unlikely that the watercourses would support fish populations. The active mine site has several erosion and stormwater control features including ditches, culverts, berms, and settling basins. The intermittent stream on the eastern boundary of the site will not be disturbed during quarry expansion and will maintain setbacks required by Humboldt County Code.

The quarry site is made up of mostly fractured and weather rock; therefore, the site is pervious and a majority of stormwater infiltrates. Concentrated flows are observed only during heavy rain events. These flows are contained and slowed by berms on the outboard side of roads and benches and ultimately directed into settling basins prior to discharge from one of the site's two discharge points. In most cases, stormwater is contained and there is no discharge. Discharge from these points is in accordance with National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges Associated with Industrial Activities No. CAS000001 (Order No. 2014-0057-DWQ). Sediment and erosion controls are addressed in the Stormwater Pollution Prevention Plan (SWPPP) for the site. Historically, sampling has consistently been in compliance with permit values.

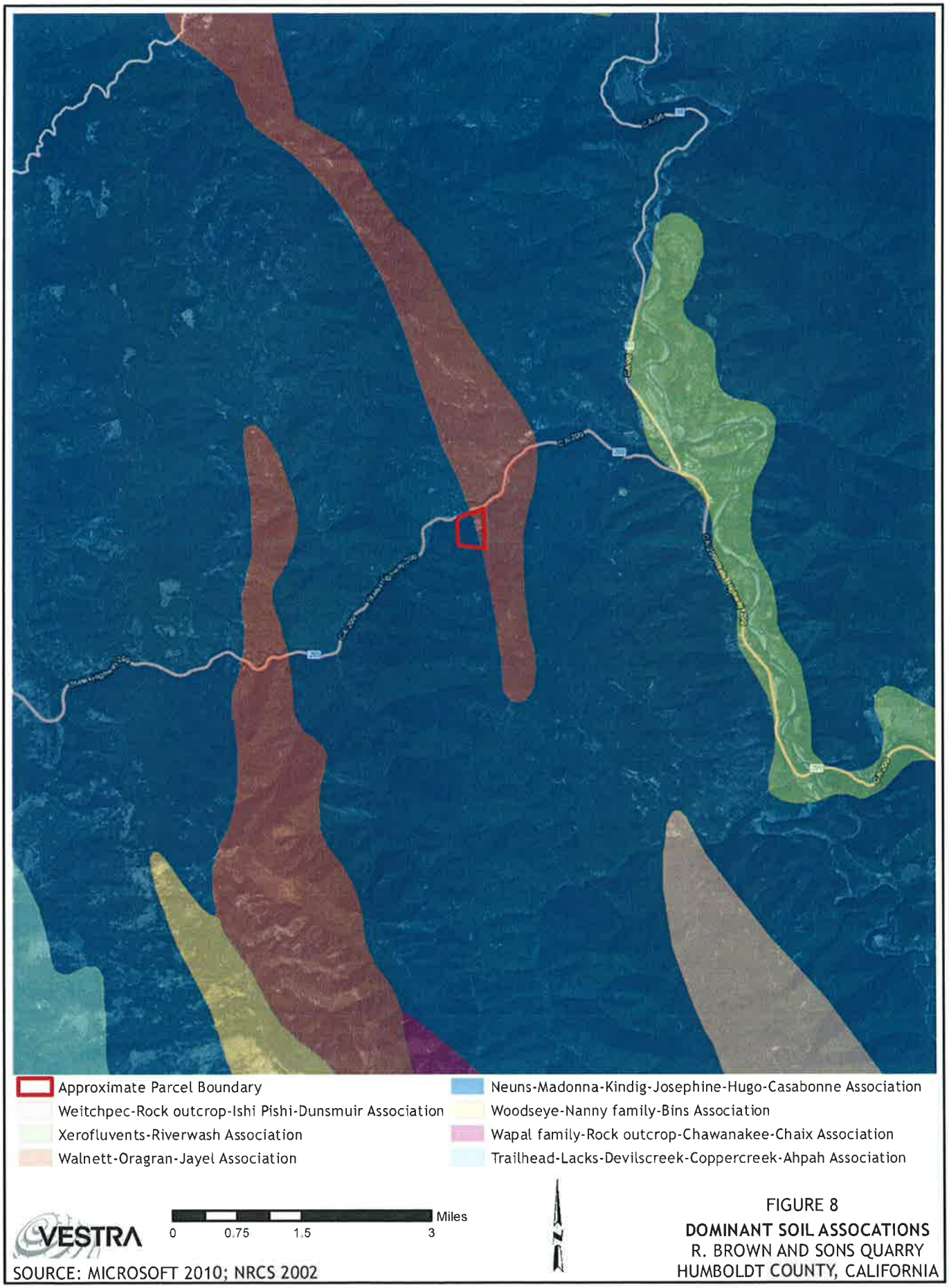
The watershed directly upslope from the mine area has a drainage area of approximately 45 acres. The mine area is on a ridge and is bounded by a perennial stream near the eastern boundary and an ephemeral stream on the western boundary, and composes a portion of the watershed for Willow Creek. Utilizing the rational formula, the flow for the 100-year storm event is 27 cubic feet per second.

2.4.2 Groundwater Characteristics

The predominant source of groundwater recharge of the mine area is percolation through the soil and weathered bedrock into the subsurface. No data is available in regards to groundwater depth. Present mining operations have not encountered groundwater.

2.5 Soils

Detailed soil maps are not available for the project area. General soil data provided by the Natural Resource Conservation Service (NRCS, 2006) for the project vicinity are included on Figure 8. The soils within the project area belong to the Skalan-Kistirn-Holland Families Association, which have developed from metasedimentary rocks. The soils in the Skalan group are characterized by very gravelly loam (0 to 12 inches) and clay loam (12 to 56 inches) above lithic bedrock. The Kistirn group soils are characterized by very gravelly loam (0 to 8 inches), very cobbly silty clay loam (8 to 53 inches), and extremely gravelly clay (53 to 72 inches) above lithic bedrock. The soils in the Holland group are comprised of loam (0 to 6 inches), clay loam (6 to 46 inches), and very gravelly clay loam (46 to 60 inches) above paralithic bedrock. All soils within the project area are well drained with a depth to groundwater of more than 80 inches.



SOURCE: MICROSOFT 2010; NRCS 2002

FIGURE 8
DOMINANT SOIL ASSOCATIONS
R. BROWN AND SONS QUARRY
HUMBOLDT COUNTY, CALIFORNIA

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2.6 Natural Resources

2.6.1 Terrestrial Biological Resources

The botanical survey was completed in 2014 by Trinity Valley Consulting Engineers. Timber and vegetation onsite are composed of Douglas fir (*Pseudotsuga menziseii*) with a tan oak (*Notholithocarpus densiflorus var. densiflorus*) and madrone (*Arbutus menziseii*) component and some scattered pine (*Pinus ponderosa*) and oak (*Quercus chrysolepis*). Understory shrubs include poison oak (*Toxicodendron diversilobum*) and oceanspray (*Holodiscus discolor*). The herbaceous layer on the rocky outcrops and stone formations is predominately *Sedum* sp., with Hooker's fairybell *(Disporum hookeri),* sword fern *(Polystichum munitum)*, and fescue (*Festuca* sp.).

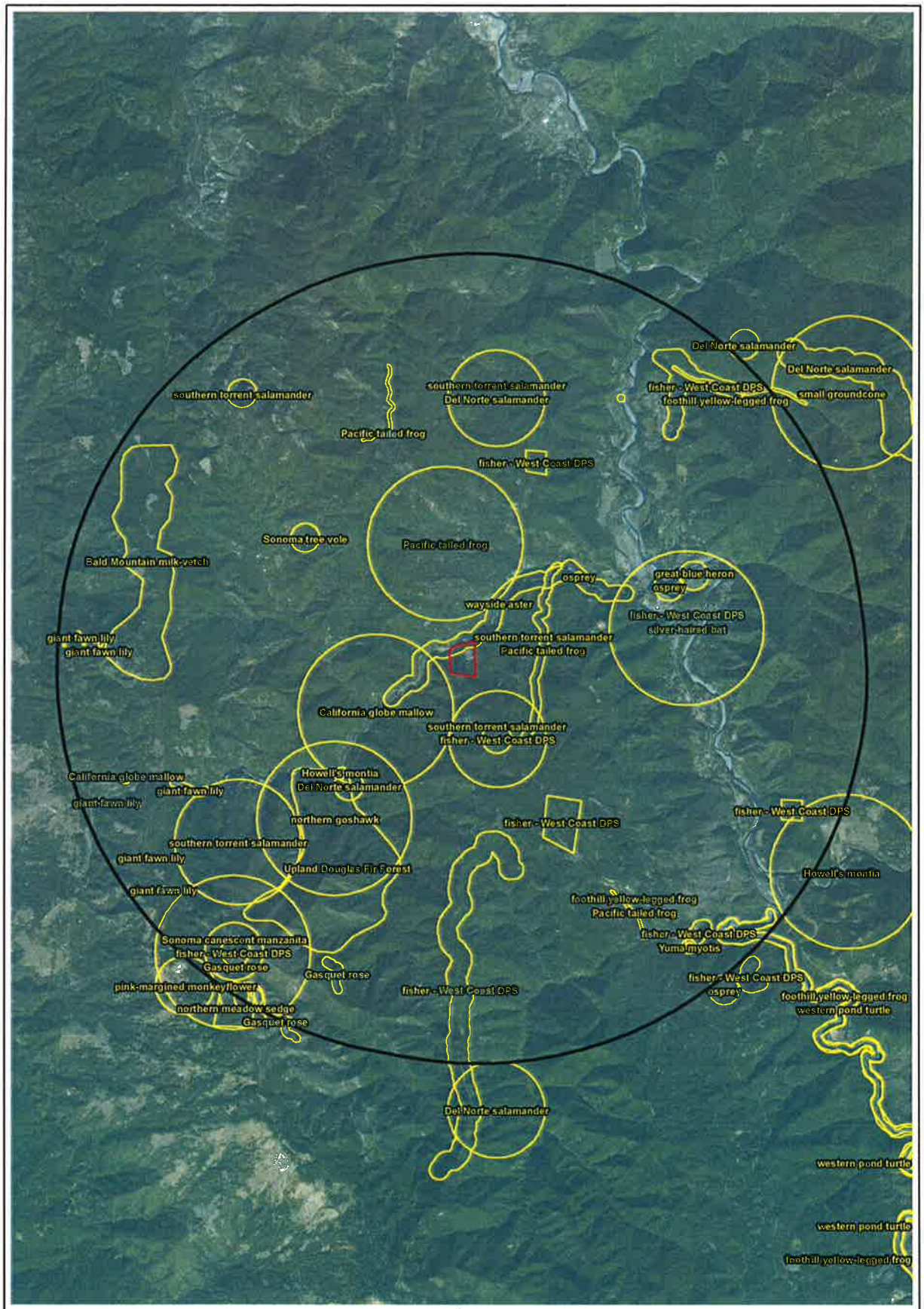
2.6.2 Aquatic Biological Resources

The project area contains two small, intermittent watercourses as well as man-made sediment retention basins. The California Natural Diversity Database (CNDDB) states that the tailed frog (*Ascaphus truei*) and the southern seep salamander (*Rhycotriton varigatus*) were identified during a visual survey one mile from the site as shown on Figure 9. The natural habitat requirement for these species is fast-moving forest streams, which may occur in the project area; however, the project site is quite dry in general and would not support these species. The adjacent streams and wet areas are protected by the sediment controls on the project site.

2.6.3 Special-Status Plants and Wildlife

Trinity Valley Consulting Engineers spent 28 field hours surveying the project area. The survey protocol was based on the California Department of Fish and Wildlife (CDFW) Protocol for Surveying and Evaluating Impacts to Special-Status Native Plant Populations and Natural Communities. The CNDDB and the California Native Plant Society (CNPS) websites were searched for special-status plants previously identified on or near the project site. As shown on Figure 9, no special-status plant or wildlife species have been identified within the proposed expansion area; however, special-status plants do occur within close proximity to the project site. Two special-status plant species were identified through the CNDDB search as occurring adjacent to the site, including wayside aster (*Wucephalis vialis*) and California globe mallow (*Illiamna latibracteata*).

A study of the special-status wildlife in the project area was completed by LBJ Enterprises in 2015. According to CNDDB data, special-status wildlife species occur within five miles of the project site; however, most are unlikely to occur in the vicinity or be potentially impacted by the project. The northern spotted owl (*Strix occidentalis*) has habitat within the project area that will be removed. Prior to removal, the area will be surveyed to confirm absence of the species to ensure that there will be no impact during breeding season. U.S. Fish and Wildlife Service (USFWS) protocol surveys will continue to be completed through 2016. Terrestrial resources are further addressed in the Biological Characterization Report included as Appendix D.



VESTRA

SOURCE: MICROSOFT 2010; CDFW CNDDB FEBRUARY 2015 EDITION

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FIGURE 9
CALIFORNIA NATURAL DIVERSITY DATABASE OCCURRENCES
R. BROWN AND SONS QUARRY
HUMBOLDT COUNTY, CALIFORNIA

2.7 Air Resources/Climatology

Air resources will not be impacted by the addition of the expansion area. Average maximum temperatures approach 90 degrees during the summer months of July and August, as shown on Figure 10. Minimum temperatures are generally above freezing year-round (Willow Creek National Weather Station Cooperative ID 049694; years of record 1968-2015).

Average total precipitation and pan evaporation by month are shown on Figure 11. Average monthly precipitation exceeds 7 inches between November and February and is less than 0.25 inches during the month of July (Willow Creek National Weather Station Cooperative ID 049694; years of record 1968-2015). Evaporation is anti-phased with precipitation; monthly average pan evaporation may exceed 7 inches per month during July (Willow Creek National Weather Station Cooperative ID 049694; years of record 1968-2015). The average precipitation balance (defined by average monthly precipitation minus evaporation) is negative during summer months, reflecting the warm temperatures and sparse precipitation observed during the summer. The 20-year, 24-hour storm event amount is 7 inches.

A wind rose from the Arcata/Eureka Airport Station was developed using data from 1985 to 2015. The wind rose is shown on Figure 12. Predominant wind direction is from the northwest and east, which accounts for approximately 60 percent of the observed data.

Dust has historically not been a problem at the site. Dust will continue to be controlled as necessary through the application of water from a spray truck onto surface roads or through the application of dust palliative agents. Mitigation of dust by the application of water from spray trucks will be in accordance with North Coast Unified Air Quality Management District (NCUAQMD) regulations by meeting General Permit and operating conditions.

At the request of the NCUAQMD, a revised geologic evaluation was prepared for the site due to the proximity of ultramafic deposits. An inspection of quarry materials was completed and the previous geologic evaluation was reviewed. No ultramafic material was identified in the quarry product. A small, isolated, shallow area of serpentinite was identified in the previous geologic evaluation. This serpentinite is located at the base of the mine site. This area will be removed and stockpiled for reclamation purposes.

2.8 Archaeological and Historical Resources

Sonoma State University, Northwest Information Center, stated during the review for the original use permit, that the site has a low possibility of historical resources and that no further review is necessary.

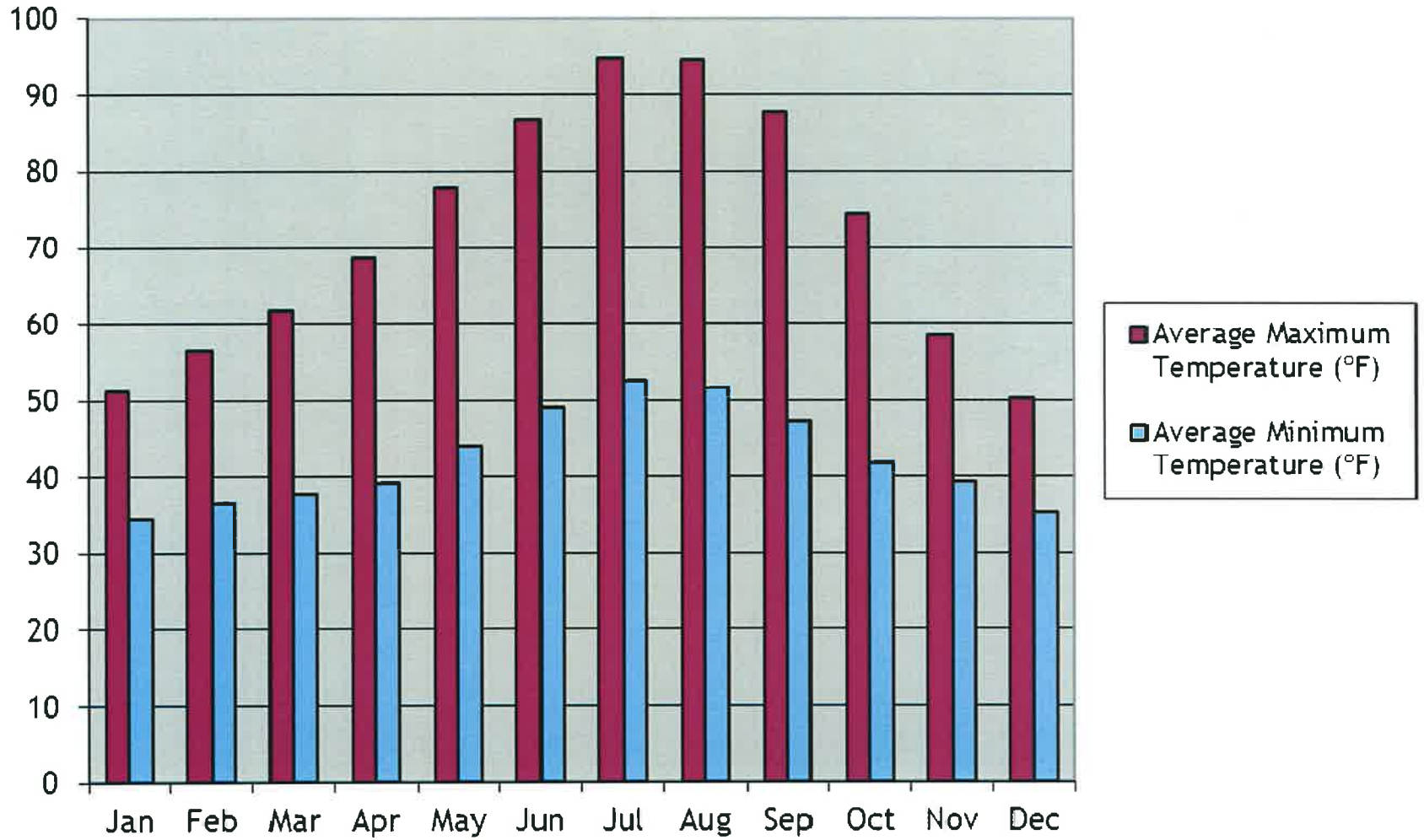
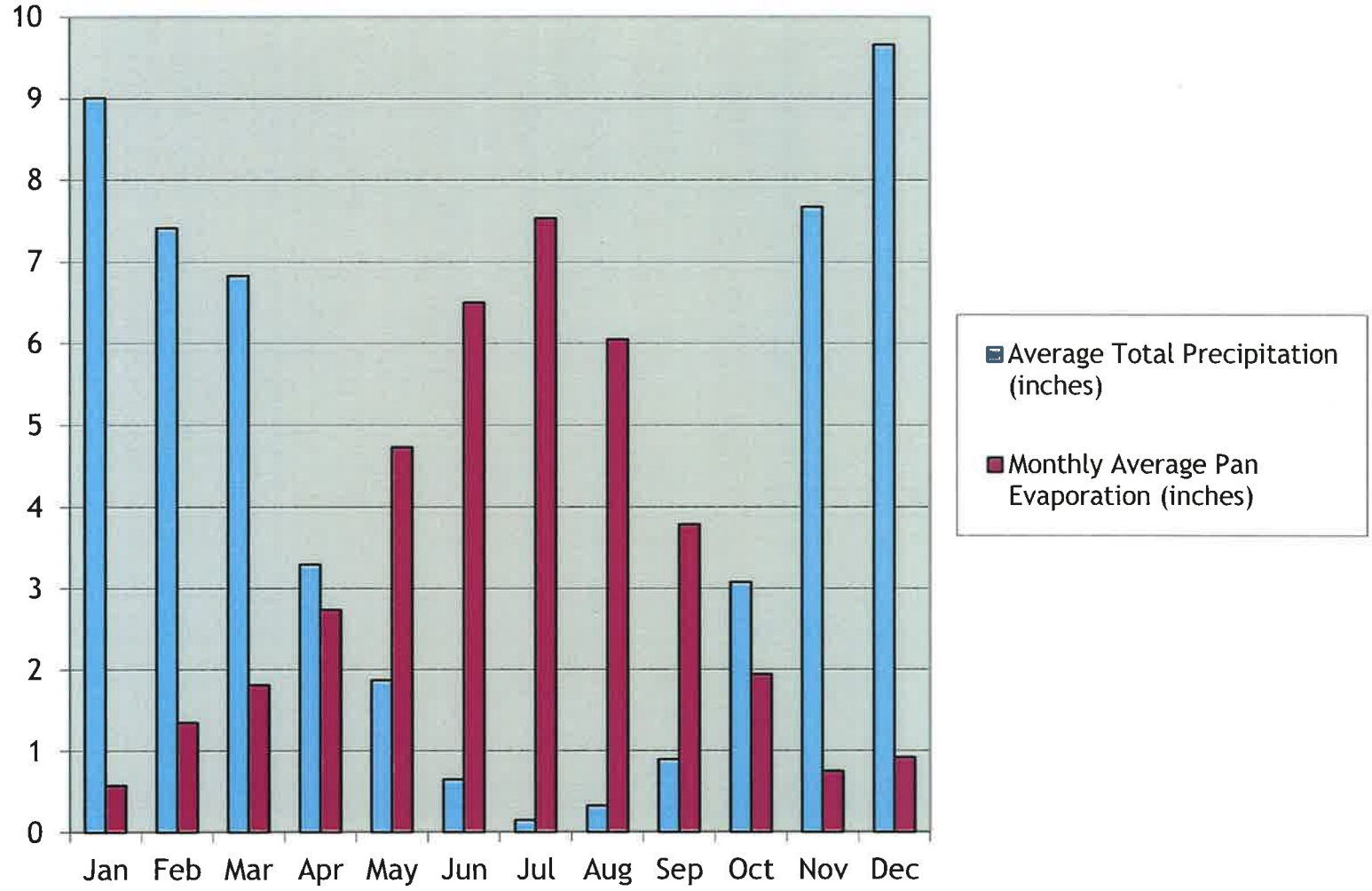


FIGURE 10
AVERAGE DAILY MINIMUM AND MAXIMUM TEMPERATURES
R. BROWN AND SONS QUARRY
HUMBOLDT COUNTY, CALIFORNIA

VESTRA

SOURCE: WILLOW CREEK 1 NW, CALIFORNIA, CLIMATE STATION - 1968 - 2015



VESTRA

SOURCE: WILLOW CREEK 1 NW, CALIFORNIA, CLIMATE STATION (PRECIPITATION) - 1968 TO 2015
WILLOW CREEK 1 NW, CALIFORNIA, CLIMATE STATION (EVAPORATION) - 1968 TO 2005

FIGURE 11
AVERAGE MONTHLY PRECIPITATION AND EVAPORATION
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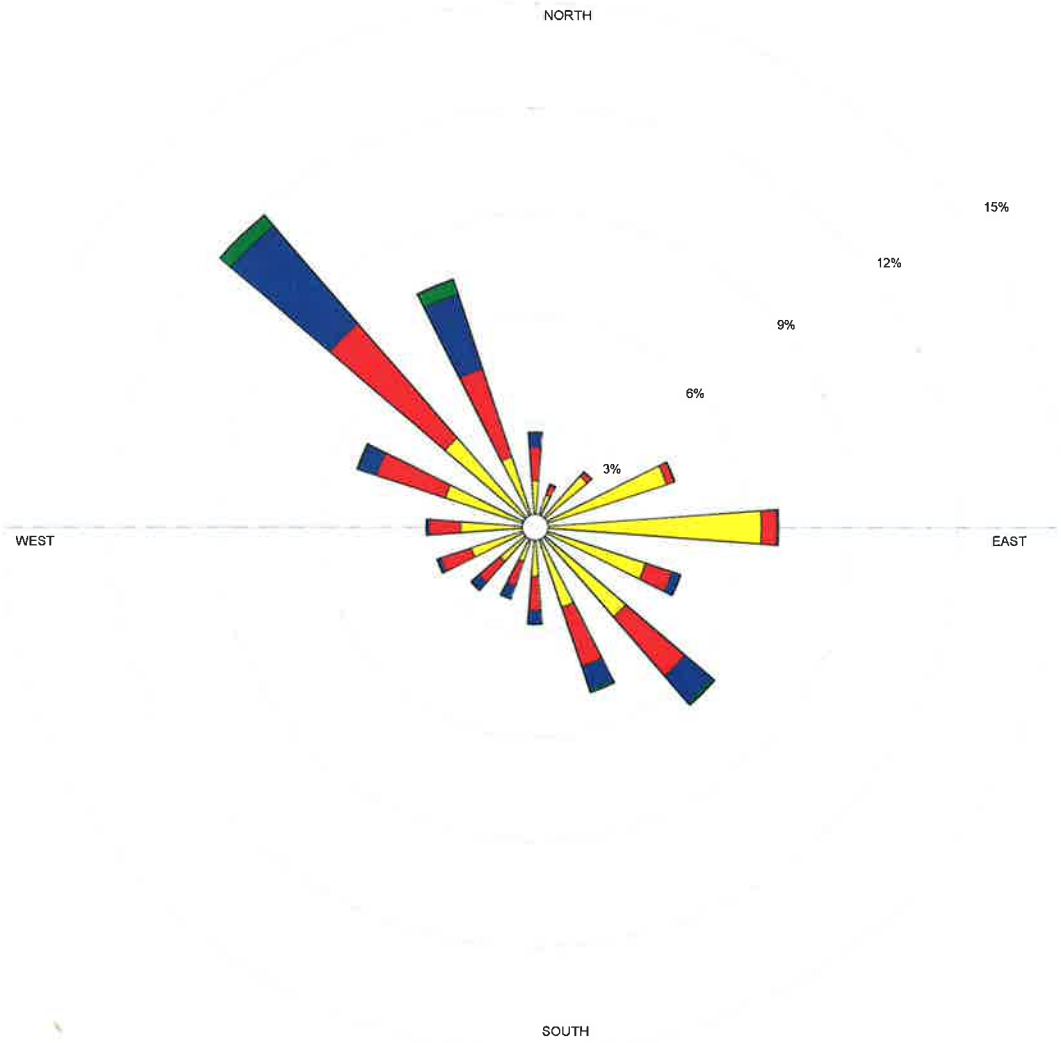
HUMBOLDT COUNTY, CALIFORNIA

WIND ROSE PLOT

Station #24283 - ARCATA/ARPT, CA



Wind Speed (m/s) > 11.06 8.49 - 11.06 5.40 - 8.49 3.34 - 5.40 1.60 - 3.34 0.51 - 1.80	MODELER	DATE **5/16/2003**	COMPANY NAME
	DISPLAY **Wind Speed**	UNIT **m/s**	COMMENTS
	AVG. WIND SPEED **3.77 m/s**	CALM WINDS **28.82%**	
	ORIENTATION **Direction (blowing from)**	PLOT YEAR-DATE-TIME **1984 1985 1987 1989** **Jan 1 - Dec 31** **Midnight - 11 PM**	PROJECT/PLOT NO. **1984-1985, 1987, 1989**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

VESTRA

SOURCE: WESTERN REGIONAL CLIMATE CENTER
ARCATA STATION, PERIOD OF RECORD 1984-1989

FIGURE 12
WIND ROSE
R. BROWN AND SONS QUARRY
HUMBOLDT COUNTY, CALIFORNIA

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3.0 EXCAVATION AND MINING PLAN

The following description of mining will supersede the existing reclamation plan where discrepancies occur.

3.1 Project Activities and Timeline

The current active and proposed expansion areas will include 64 acres of mine footprint. The applicant estimates that mining will take place onsite through 2047 at a rate governed by market demand and depth of rock fields. The estimated timeline may be adjusted based on site conditions.

3.2 Mining Plan

3.2.1 Material Removal

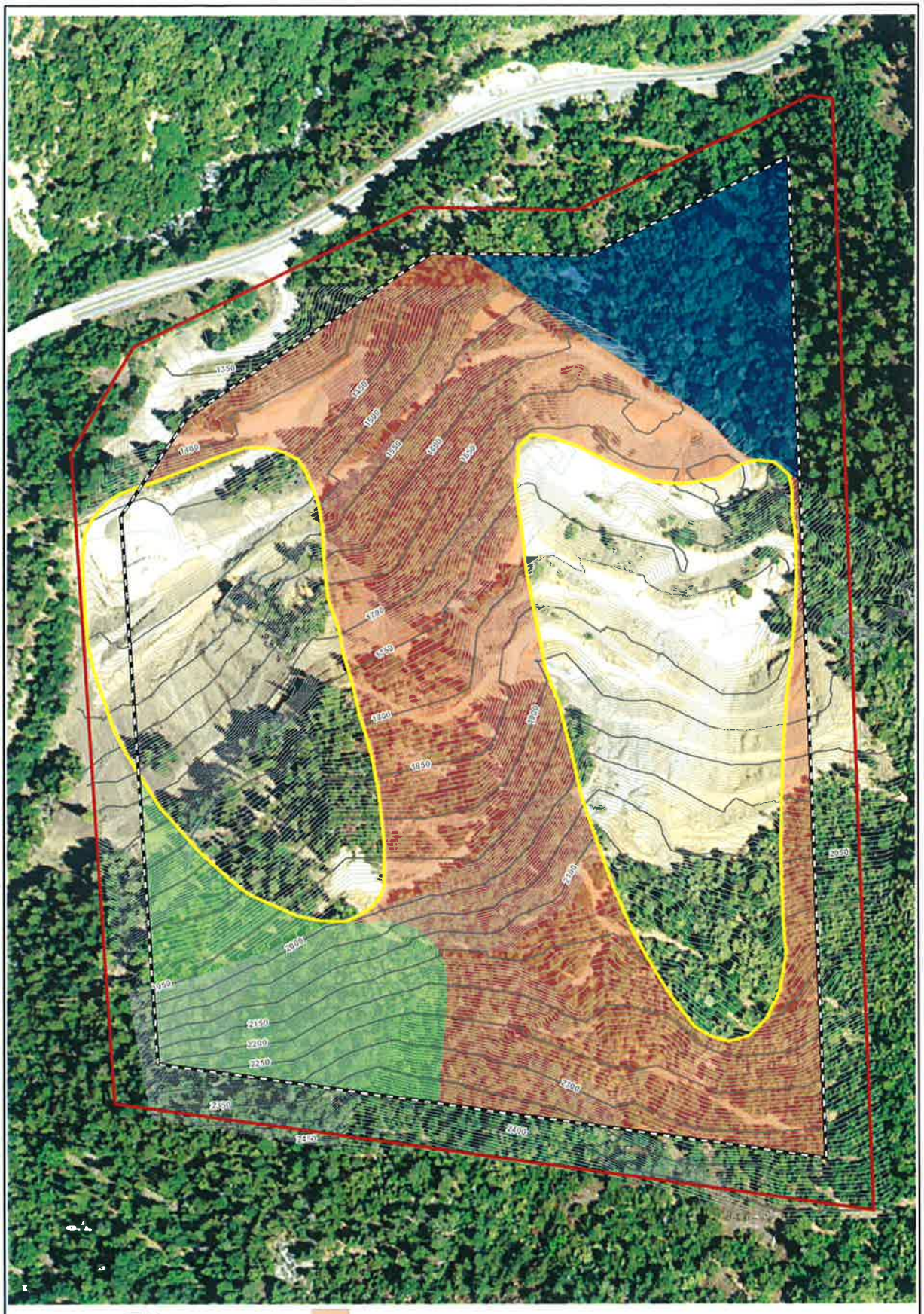
Two methods of surface rock removal will be used: 1) mass rock removal from the rock fields and 2) selective removal of large individual rock generally from surface areas surrounding the rock fields. Equipment to be used include a loader, cat, and excavator. The operation will continue to involve blasting, screening, and crushing operations as approved in the original use permit and amendment.

Minor development will occur in phases determined by the operator throughout the life of the mine. The proposed expansion area is shown on Figure 13. Current topography is shown on Figure 14. Final topography is depicted on Figure 15. Cross-sections of the area are shown on Figure 16.

The current mining operation is comprised of two operating areas: Area 1 to the west and Area 2 to the east. The proposed mine expansion would include an additional area within the current property boundary north of Area 2 and the area between the two existing rock pits, as well as inclusion of the access road.

Mining operations in the expansion area will use the same mining methods currently used onsite. Loader, excavator, and cats will be used to skim the surface rock (mass removal) and selectively harvest rock in adjoining areas where the volume of rock is insufficient for mass removal. Anticipated maximum depth of rock removal in mass removal areas is 25 to 35 feet below the current surface but will decrease closer to the mining boundaries. Mining will be conducted from top to bottom and west to east, and reclamation will begin first on the upper benches of the site.

The expansion area will be mined so that final topography is in benches as shown on Figure 15. In general, benches will be constructed from top to bottom with a maximum 1H:1V slope. Post-mining topography of benches will not exceed a height of 100 feet with 20-foot-wide benches (see recommendation in the Engineering Geologic Evaluation in Appendix C). In order to more cohesively connect the current mining areas (40 feet high with 12-foot benches) to the proposed expansion area, the current benches will be adjusted to match the expansion standards. Areas where existing topography exceeds 1H:1V will not be subject to changes in



VESTRA

SOURCE: NAIP 2014 AERIAL PHOTOGRAPH

FIGURE 13
PROPOSED EXPANSION AREA
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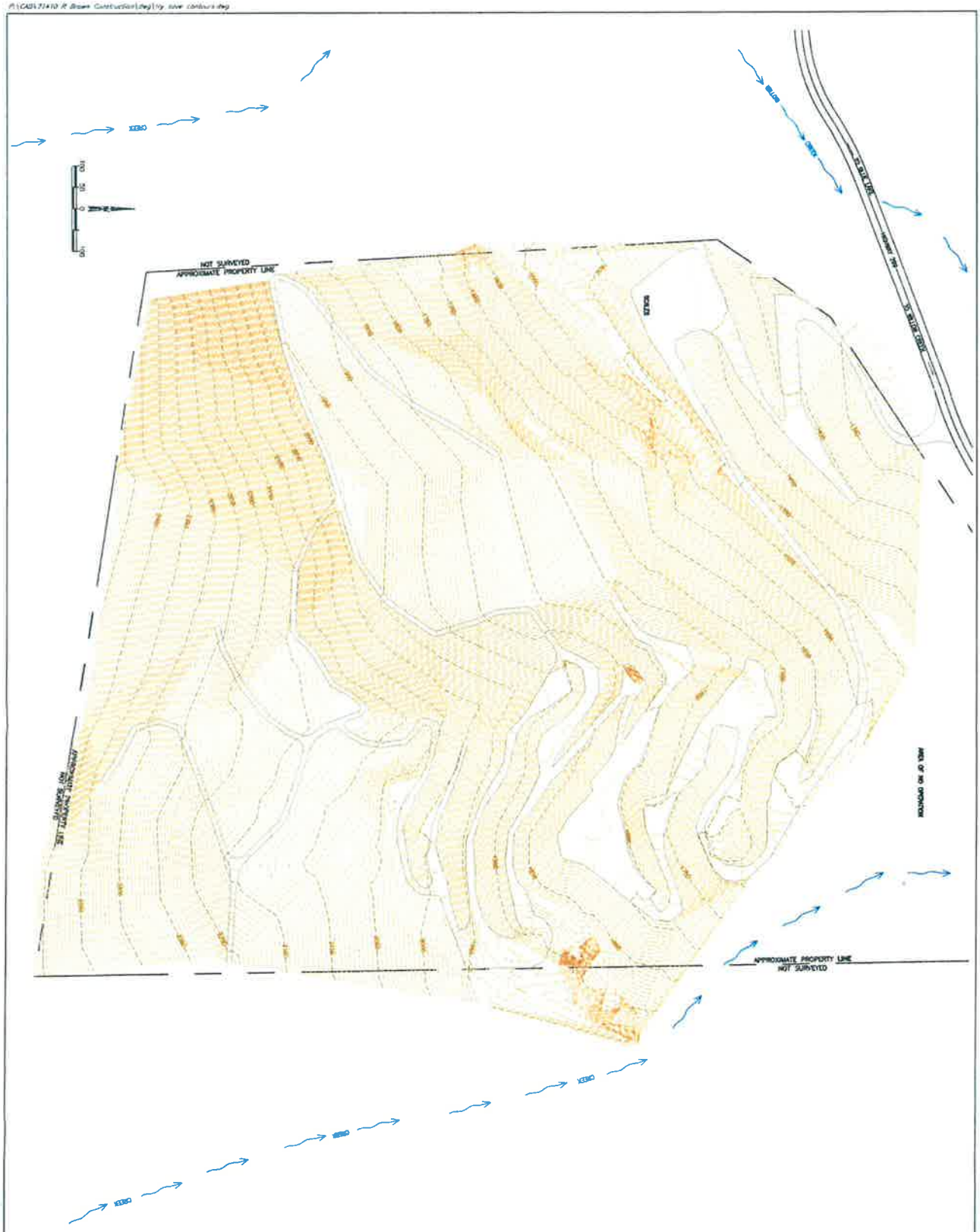

FIGURE 14
CURRENT TOPOGRAPHY
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VERIFY SCALES
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IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

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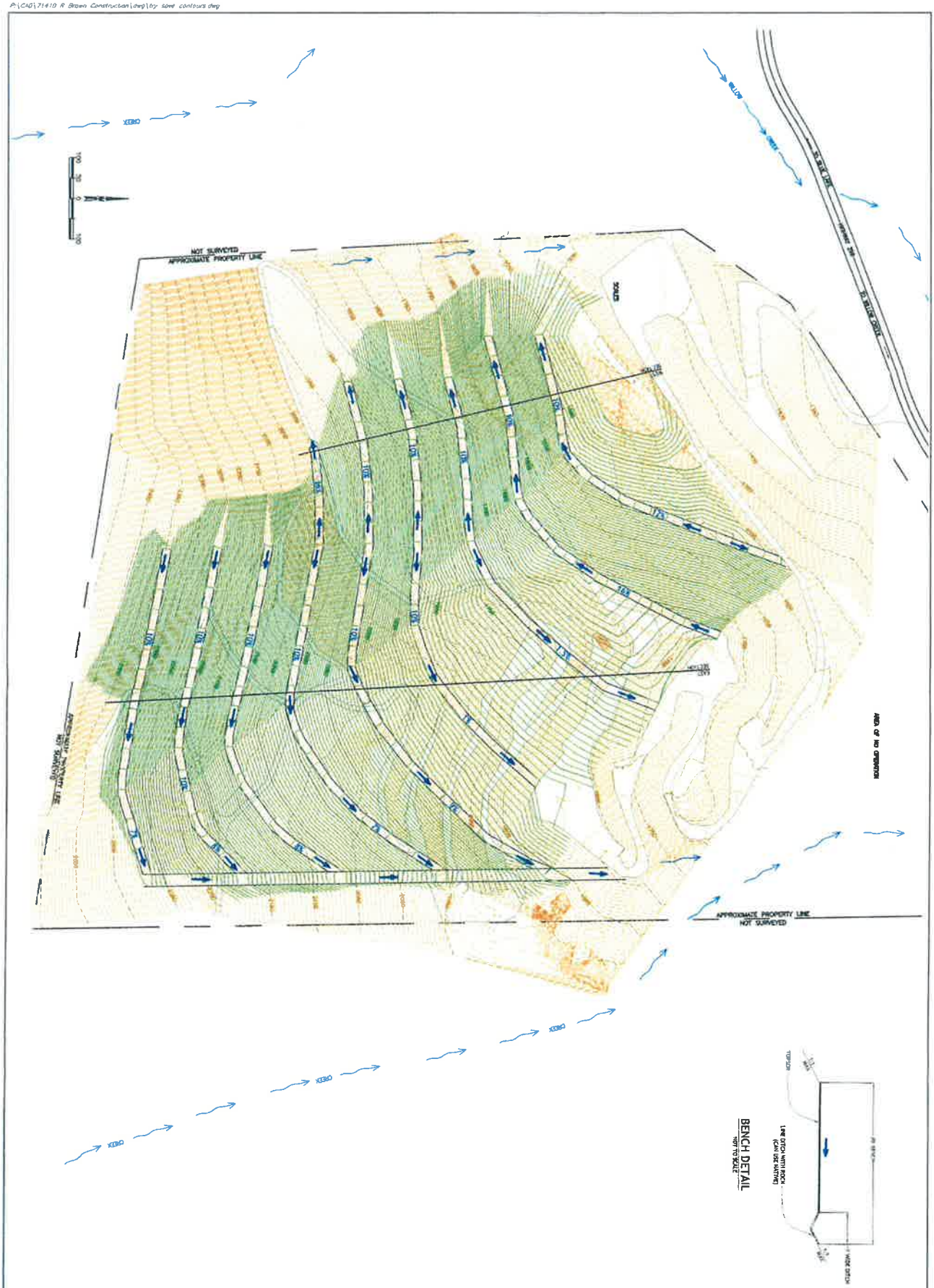

FIGURE 15
FINAL TOPOGRAPHY & DRAINAGE
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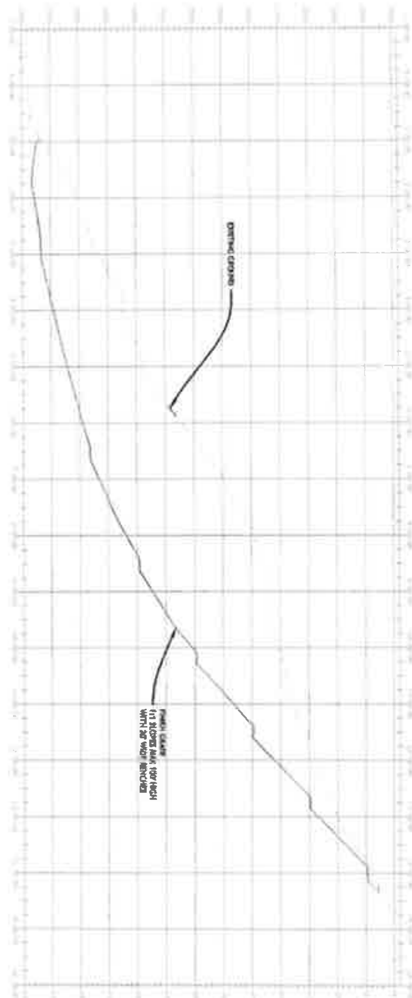
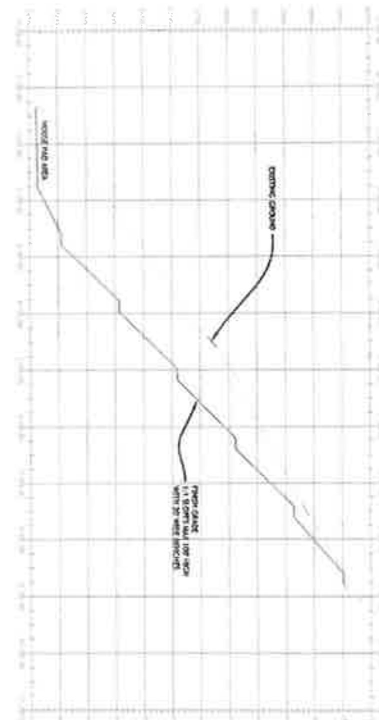
EAST SECTION



WEST SECTION



DSGN SG			
DR SG			
CHK SG			
APVD SG	NO.	DATE	REVISION

FIGURE 16
SECTIONS
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topography. In these areas, individual surface rock removal may occur. The final configuration of benches may be altered during mine operations due to encountered site conditions; however, final mine topography will not exceed 1H:1V with 100-foot-high walls and 20-foot-wide benches.

3.2.2 Soil Erosion Control

Standard soil erosion control protocols are currently practiced throughout the site and will continue during mining operations. These include:

- Use of berms, water bars, or rolling dips
- Diverting run-on from stockpile areas
- Planting vegetation/installing stabilizers as necessary
- Directing runoff within quarry to siltation ponds at the in-slope edge of quarry benches

The facility is covered under General Order 2014-0057-DWQ *General Permit for Storm Water Discharges Associated with Industrial Activities.* The Notice of Intent was filed prior to July 1, 2015, to meet the requirements of the new General Order. Best management practices are in place at the site pursuant to the SWPPP for the site. The SWPPP is included as Appendix G.

3.2.3 Topsoil

Little topsoil is available onsite, as rock is located at the surface. The little topsoil available will be removed using a loader. Topsoil will be imported over the life of the mine. The size of the topsoil stockpile is difficult to estimate because the sources of topsoil are currently unknown, but the overall stockpile height will be maintained relatively low to accommodate planting and stability. The topsoil stockpile will be treated with standard soil erosion practices as necessary.

Where available, topsoil will be salvaged in the expansion area and stockpiled separately from other mined materials at the location shown on Figure 17. The topsoil (and/or other growth media) stockpiles will be clearly signed in the field to prevent inadvertent use. In addition, the location of the soil stockpile in areas not used for other materials will prevent inadvertent use. The topsoil (and/or other growth media) stockpiles will be protected from wind and water erosion by planting with an erosion-control mix, as well as keeping the stockpiles in a low profile with moderate slopes.

Topsoil salvaged will be placed using a cat, excavator, and loader. Surface runoff from the stockpile will be directed to the siltation basin at the in-slope edge of the road. Erosion control measures, such as berming, water bars/rolling dips, straw wattles, and/or straw mulch, will be used to protect water quality.

R. Brown and Sons receives, and will continue to receive, cleanup material from Caltrans sites of slope failure, road cleanup, or other activities. This material will be screened, usable aggregate will be separated for future processing, and soil and organic debris will be stockpiled onsite. Organic debris will be composted and mixed with soil for use as topsoil for reclamation. Wood debris will be chipped onsite or exported for recycling.

VESTRA

SOURCE: MICROSOFT 2010

FIGURE 17
TOPSOIL STOCKPILE
R. BROWN AND SONS QUARRY
HUMBOLDT COUNTY, CALIFORNIA

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3.2.4 Vegetation Removal

Vegetation removal will be completed using an excavator, chainsaws, loader, and dozer. Removed vegetation will be piled onsite and chipped to form a mulch when sufficient quantities are available. Mulch will be used for restoration efforts.

Per request from CDFW, tree removal and vegetation clearing will be conducted outside of bird nesting season, after August 15 or before March 1 of each year.

3.3 Disposal of Mine Waste

The proposed project does not anticipate producing any mine waste. The quarry currently processes and markets all materials removed from the site. Minimal equipment, supplies, and other materials are stored or used onsite. All materials are stored in the local onsite trailer or at offsite locations. All fueling and equipment maintenance is performed using mobile equipment.

The project does not anticipate producing any mine waste with the exception of a small amount of nonspec rock in a small area located at the toe of the current site. This rock will be removed and stored in the topsoil stockpile to await reuse during reclamation. Otherwise, the quarry currently processes and markets all materials removed from the site. All materials are stored and disposed of according to federal, state, and local health and safety ordinances and regulations.

3.4 Water Use

Water from an onsite spring is pumped into a water truck and used to suppress dust during mining activities.

3.5 Water Diversions

Ditches located at the in-slope edge of benches collect drainage from disturbed areas upslope. The majority of the benches will be sloped at 10 percent or less. Two segments of the benches will be sloped at 16 percent and one section of bench will be sloped at 12 percent. The benches will contain an inside ditch to accommodate runoff as shown on Figure 15. The lateral access network on each side of the mine will be sloped to drain offsite. Stormwater exiting these areas will flow through a sediment entrapment channel prior to discharge offsite. The sediment entrapment channels will consist of well-graded rock, which act as energy dissipators to prevent downstream erosion.

3.6 Pollution Prevention

The only potential sources of pollution onsite are the fuels and oils used in equipment and within the processing plant and sediment into waterways. As required by the NPDES permit, the site SWPPP and Spill Prevention, Control, and Countermeasure (SPCC) Plan will be amended to include the expansion areas as necessary. Standard erosion control practices, as detailed in Section 4.3.3, are used to prevent sedimentation to natural waterways.

3.7 Noise Control

The processing plant may operate Monday through Saturday, 6:00 a.m. to 6:00 p.m. The plant actually operates sporadically as material is needed. Drilling and blasting operations may occur Monday through Saturday, 8:00 a.m. to 5:00 p.m.; however, use of blasting is rare. There are no time limits on hauling. Noise levels from operations are mitigated by using boulder blasting in lieu of other explosives. Aggregate processing will be intermittent and shielded by the stockpiling of aggregates to reduce noise levels. Mining operations will conform to Section 391-10 of the Humboldt County Code. Blasting and processing plant operation hours, and noise levels, will not change.

3.8 Crusher Operation

The crusher will operate in the manner approved in the 1990 permit.

3.9 Public Safety

A locked access gate is installed and maintained at the entrance to the facility from Highway 299. Due to the steep topography and nature of the site, access to the operation by another means is unlikely.

4.0 RECLAMATION PLAN

Site reclamation activities were approved in Reclamation Plan No. RP-99-01 and Conditional Use Permit CUP-99-01. The previous Reclamation Plan will apply to the areas that do not change under this Plan. This Reclamation Plan covers expansion areas and areas where operations are modified.

4.1 Overview of Reclamation Process

This Reclamation Plan describes rehabilitation procedures which will restore the site's ecological function for beneficial uses. The overall goal of reclamation is to return the site to a condition similar to pre-mining, or similar to reference sites located on adjacent, undisturbed land established at the time of reclamation.

Reclamation Plan No. 99-01 lists activities to restore areas impacted by mining. The 99-01 Plan reflects different finish-grade contours. The geotechnical report allows for steeper than 1H:1V slopes; however, for reclamation purposes, the slopes will be no more than 1H:1V to further minimize the potential for erosion. Stockpiled material (overburden) will be used to make rough grade. Topsoil will be placed on overburden to allow for vegetation establishment on the finish-grade slopes. Culverts will be removed and drainage channels recreated similar to the historic drainages that were onsite prior to the onset of mining operations.

Mining operations conducted prior to reclamation will result in steep side slopes of quarry areas (1:1) with benches as shown on the basement elevations topographic map. Stockpiles will be restored to timberland after mining operations have ended.

The placement of topsoil and overburden on the reclaimed areas requires grading activities to develop slopes that are stable for vegetative growth. Revegetation will require placement of topsoil, seeding, planting of plug and container species, fertilization, herbicide application, pest control, and additional erosion and drainage control measures. Revegetation is further described in Section 4.7.

4.2 Schedule

Reclamation is to be completed either at the time of mine closure or concurrently with mining operations, depending on what is practicable.

4.3 Engineering Data

Engineering control methods proposed for the reclamation process are described in this section.

4.3.1 Final Slope of Project Area

The final slope of the reclaimed mine site will be 1H:1V as determined by the geotechnical report prepared by Trinity Valley Consulting Engineers. This report calculated a FOS against failure of slope stability for the design of cut or fill slopes at the site. When determining a maximum slope inclination for the reclaimed project area, 1.5 and 1.1 were used as FOS design

criteria for static and pseudostatic values of slope stability. To reach a pseudostatic FOS of 1.1, a slope of 45 degrees is recommended.

An angle of approximately 45 degrees will be used as the final slope of the project area to provide for a more suitable habitat for vegetation to reestablish at a higher success rate during reclamation activities. The geotechnical report stated that highwalls of 100 feet and benches of 20 feet would be adequate to protect the site from slope failure or erosion. Current and final contours, with cross-sectional views of the final slope proposed for the reclaimed mining area at the site, are provided on Figure 14, Figure 15, and Figure 16, respectively.

4.3.2 Reclaimed Land Use

Reclamation will return the area to timber/brush ecosystem similar to the surrounding landscape and/or residential areas. Mined areas, contoured with benches covered with topsoil, will be graded, sloped, and replanted according to this plan.

Culverts will be removed with the exception of those under roadways that will be maintained following mining activities.

Upon completion of mining operations, machinery, waste, scrap, and excess materials will be dismantled and removed from the site. Materials will be recycled or sold. The ground beneath the former processing facilities, access roads, and benches will be ripped to prepare soils for seeding and planting. Stockpiled topsoil will be placed to achieve a minimum suitable depth of growing medium. Land use following reclamation will be timber production.

4.3.3 Erosion and Drainage Control

Erosion and sedimentation will be controlled during and after reclamation activities. Surface runoff will be controlled using appropriate grading along with the implementation of best management practices (BMPs) including the use of:

- Mulches
- Vegetative cover
- Straw wattles
- Water bars/rolling dips
- Rock-lined ditches

Material used for mulch applications will include hydroseed with tackifier sprayed onto slopes and headwalls. Trees will be planted on benches with 10-by-6-foot spacing. Benches will not receive grass plantings. Grasses and forbs will be controlled with herbicide to aid in tree survival.

A chipper will be used onsite when vegetative material is received from Caltrans. The Caltrans waste will be chipped and piled to be used as mulch for erosion control as needed.

Straw wattles and hay bales may be used to intercept, contain, and filter sediment when necessary. Straw wattles and hay bales are temporary and can last for up to two years.

Small catch basins, located within the active quarry and along quarry access roads, are currently used for control of sediment in the active quarry area. These basins will remain in place to control sedimentation until mining activities are complete, at which time they will be removed with final grading of the property.

The steeper benches will include water bars/rolling dips installed to direct runoff to the rocked inside ditches (see Figure 15).

4.3.4 Topsoil Replacement

The little topsoil onsite will be removed from the mining area by excavation and stockpiled as specified in Section 3.2.3. Additional topsoil will be secured when possible. The topsoil will be transferred from the stockpile and into the reclamation area using the same techniques as used during removal from the quarry area. Soil and organic material brought onsite from Caltrans operations will be stockpiled onsite for use as topsoil. When the excavation operations and the construction of embankment slopes have ceased for the proposed area or upon completion of site mining activities, the topsoil will be spread to a uniform depth of 6 inches on benches. The topsoil will be compacted to stabilize the material; however, compaction will not occur to a point where the topsoil is not an effective growing medium. Previously mined areas will be sloped and hydroseeded. Where possible, soil will be placed on headwall slopes. Soil will be placed where slopes are greater than 2:1, but not on 1.5:1 headwalls. These will be hydromulched and seeded as is.

4.3.5 Road Decommissioning

Upper slope roads will be removed during expansion operations as shown on Figure 18. Portions of some roads used during expansion will be turned into benches where the gravel will be removed and road surfaces deep-ripped in order to decompact the soil. Topsoil will be added where needed. One main access road will be maintained following cessation of mining activities and site reclamation for use in monitoring.

4.4 Streambed and Pond Restoration

4.4.1 Reclamation of Diverted Waterways

As discussed previously, two ephemeral streams cross the site. The western drainage, running along the western boundary of the project parcel, and the eastern drainage, which runs along the eastern boundary of the parcel. The eastern drainage will not be impacted by mining activities and no restoration is planned. The western drainage has been diverted away from the processing area. This drainage will be restored and planted as discussed later in this section. Drainages diverted near roads will be restored by removing culverts and other diversions. Any flow from the center of the site will be redirected to the edge of the unit.

4.4.2 Reclamation of Sediment Basins

Sediment basins associated with remaining onsite roads will also remain in place.

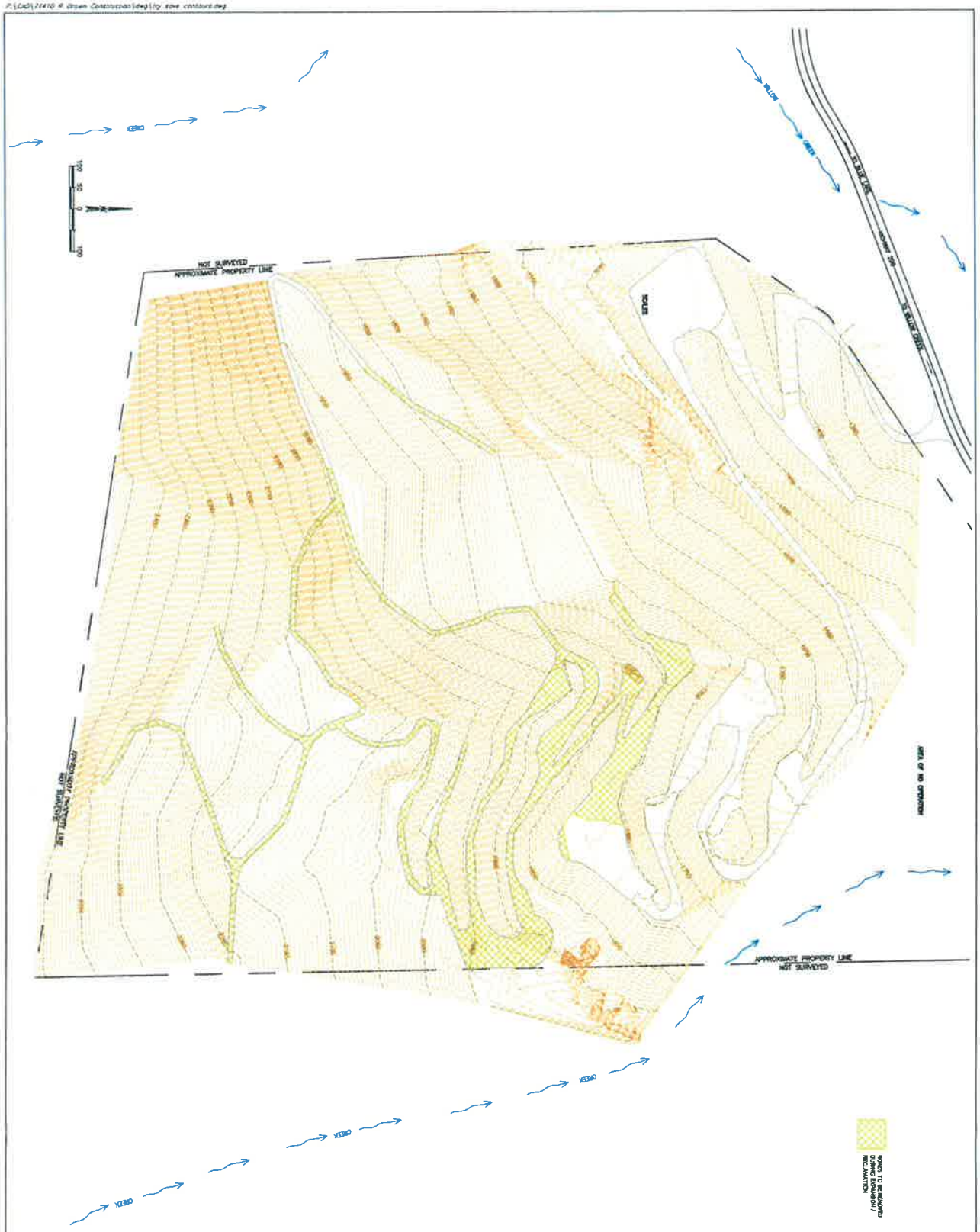

FIGURE 18
ROADS TO BE REMOVED DURING CONSTRUCTION
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4.4.3 Groundwater Quality Protection

No impacts on groundwater due to mining are anticipated.

4.5 Building and Equipment Removal

The scale house and office will be removed. Heavy equipment associated with mining and reclamation will be removed when no longer necessary for reclamation work.

4.6 Soil Analysis

Nutrients required for plant growth include nitrogen (N), phosphorus (P), potassium (K), calcium (Ca), magnesium (Mg), and sulfur (S). These nutrients are listed as exchangeable, as it is important in reclamation work to determine the mobile nutrients available for plant consumption. The soils in the vicinity are characterized with low water-holding capacity and lower fertility. If difficulties occur with regeneration, soil analyses will be performed.

If soil analysis suggests that fertility levels are inadequate to implement the revegetation program, fertilizer or other soil amendments may be required for the growth media. Soil amendments and fertilizers may also be applied experimentally in the test plots. Soil amendments and mulches considered for use include chipped vegetative material and imported compost, which will be evaluated during the test plot work.

4.7 Revegetation Plan Design

4.7.1 Revegetation Overview

The total project area encompasses approximately 64 acres of low site timberland in eastern Humboldt County. Revegetation of the disturbed area will control erosion and establish habitat and refuge for a variety of species. Revegetation will include three vegetative communities including coniferous forest, grass, and riparian.

Conifers will be established on the benches and any portion of the active face that is 2:1 or more. Grass will be established on the headwall slopes, applied with a tackifier. Riparian plants will be established on the lower reaches (last 200 feet) of the ephemeral draw, on the west side of the final slopes where the topography flattens, and in the vicinity of the spring onsite. This is shown on Figure E-2 in Appendix H.

4.7.2 Baseline Studies

Revegetation will include three ecotypes:

- Forest
- Grassland/Herbaceous
- Riparian

Currently, only the forest community and a limited area of grassland herbaceous community exist onsite. The riparian community exists only in buffers along the perennial stream located on the west edge of the site. The riparian plantings will encourage vegetation in two small areas of the site, one along the west boundary where a stormwater diversion trench is located and the other adjacent to a spring located in the southeast center of the site. These locations currently do not support riparian vegetation, but should be able to support a limited riparian community following reclamation of the site. These areas are shown on Figure E-2 in Appendix H.

The site is xeric and vegetation density and diversity is limited. The property was heavily logged in the late 1960s or early 1970s before the advent of the current forest practice rules and prior to the current operator's acquisition of the property. The condition of the site prior to this event is unknown. Most of the onsite roads and landings currently used for material access and material storage were constructed at that time.

Baseline areas were evaluated in August 2016. Two forested sites and one previously disturbed (herbaceous) site were evaluated and are included on Figure E-1 in Appendix H. The sites represent:

1. The area of previous disturbance on the eastern buffer area.
2. The timbered area due north of the previously disturbed area.
3. An area previously undisturbed below the quarry area planned for topsoil storage.

The baseline plot report is included in Appendix H. Results for each plot are included below.

Site: "Herbaceous 1"
Densitometer Readings: 0% at 0 feet; 0% at 15 feet; 0% at 30 feet
Plot Data: Total Plant Cover 30%; Percent Litter 25%; Percent Bare Ground 15%; Percent Exposed Gravel/Cobble 30%

Taxa	Percent Cover	Density/Plot
Poison Oak *(Toxicodendron diversilobum)*	7	39
Gooseberry *(Ribes roezlii)*	2	2
Pacific Madrone *(Arbutus menziesii)*	1	5
Douglas Fir *(Pseudotsuga menziesii)*	>1	7
Canyon Live Oak *(Quercus chrysolepis)*	2	3
Black Cap Raspberry *(Rubus occidentalis)*	>1	1
California Fescue *(Festuca californica)*	5	
Blue Wildrye *(Elymus glaucus)*	10	
Wild Iris *(Iris* spp.)	1	
Klamath Weed *(Hypericum perforatum)*	1	
Aster spp.	>1	
Apiaceae spp.	>1	
Idaho Fescue *(Festuca idahoensis)*	>1	
Common Whipplea *(Whipplea modesta)*	>1	

Site: "Forested 1"
Densitometer Readings: 77% at 0 feet; 62% at 30 feet; 82% at 60 feet
Plot Data: Total Plant Cover 10%; Percent Litter 80%; Percent Bare Ground 5%; Percent Exposed Gravel/Cobble 5%

Taxa	Percent Cover	Density/Plot
Tan Oak *(Notholithocarpus densiflorus)*	4	56
Red Alder *(Alnus rubra)*	1	6
Douglas Fir *(Pseudotsuga menziesii)*	>1	4
Canyon Live Oak *(Quercus chrysolepis)*	1	4
Poison Oak *(Toxicodendron diversilobum)*	1	
Trillium spp.	>1	
Oregon Grape *(Mahonia aquifolium)*	2	
Sword Fern *(Polystichum munitum)*	2	

Site: "Forested 2"
Densitometer Readings: 76.5% at 0 feet; 77.4% at 30 feet; 79% at 60 feet
Plot Data: Total Plant Cover 20%; Percent Litter 50%; Percent Bare Ground 25%; Percent Exposed Gravel/Cobble 5%

Taxa	Percent Cover	Density/Plot
Tan Oak *(Notholithocarpus densiflorus)*	1	21
Ponderosa Pine *(Pinus ponserosa)*	>1	1
Douglas Fir *(Pseudotsuga menziesii)*	>1	5
Canyon Live Oak *(Quercus chrysolepis)*	34	1
Pacific Madrone *(Arbutus menziesii)*	3	2
Sugar Pine *(Pinus lambertiana)*	3	>1
Incense Cedar *(Calocedrus decurrens)*	9	>1
Poison Oak *(Toxicodendron diversilobum)*	2	
Iris spp.	>1	
Oregon Grape *(Mahonia aquifolium)*	5	
Coffeeberry *(Frangula californica)*	2	
California Fescue *(Festuca californica)*	7	

4.7.3 Plant Communities

Conifer: A coniferous forest habitat will be created during reclamation. Species lists for revegetation are included in Table 1 and include potential species to be planted. Actual planting mixes may be dependent upon commercial availability of species at the time of planting.

With respect to trees, smaller plugs are proposed to be used. The reasoning is that smaller trees in smaller plugs will lead to a decrease in foliar surface area. A decrease in foliar surface area means that the trees will have a greater chance of survival during the dry summer months in the first year after planting. Seedlings are proposed to be planted when soil temperatures are warm enough and the soil moisture is sufficient to provide a suitable environment for plant growth; therefore, planting will occur in February or March depending on soil temperatures. Plugs are planned to be grown as container "size 5." Planting will be by hand methods using a "hoedad" or equivalent planting shovel. Spacing will by 6 feet by 6 feet. Benches will be planted. Where accessible, headwall slopes will also be planted. This will depend on accessibility and safety of slopes for planter access. Additional planting information is included in Appendix E.

Table 1 PLANTING LISTS FOR SITE RECLAMATION			
Coniferous Forest Habitat	**Species**	**Type**	**Spacing/Amount**
Douglas fir	*Psuendotsuga menziesii*	Plug	6x6 feet
Canyon live oak	*Quercus chrysolepis*	Plug	12x6 feet
Incense cedar	*Calocedrus decurrens*	Plug	6x6 feet
Tan oak	*Lithocarpus densiflorus*	Plug	12x6 feet
Ponderosa Pine	*Pinus ponserosa*	Plug	6x6 feet
Pacific Madrone	*Arbutus menziesii*	Plug	12x12 feet
Riparian Habitat	**Species**	**Type**	**Spacing/Amount**
Arroyo willow	*Salix lasiolepis*	Stick	3x3 feet
White alder	*Alnus rhombifolia*	Plug	2-3 per riparian area

Ephemeral drainages present within the expansion area generally lack riparian attributes due to steep slopes, shallow soil, and rock substrate in the upper reaches. The coniferous forest habitat is primarily being created for a return to timberland and wildlife habitat. The site will be planted with the species shown in Table 1. Fines and other surface overburden developed during the mining operation and imported topsoil will be distributed over the benches. The depth of topsoil will vary based on the amount of material stored onsite.

Trees and grasses will not be introduced to the same sites at the same time. Grasses species become physiologically active during the late winter and early spring. Grass growth on xeric soil profiles tends to deplete available soil moisture by mid-spring when tree species are becoming physiologically active.

No understory cover is proposed for the forest or riparian habitat types to complement the tree plantings. The site is xeric with poor to no vegetation cover due to shallow soil strata. The introduction of additional competitor species, such as grasses, will negatively affect the establishment of conifer and other larger hardwoods at the site. Commercially available herbicides will be used to control unwanted vegetation for the first three to five years following planting. Following successful establishment of conifers and hardwood plugs, native understory will be allowed to seed. Invasive weeds will be controlled during annual inspections using commercially available herbicides at the time of application. Grass seed will not be applied to these areas until after year five if needed.

Grass: The project area is characterized as having cool, wet winters and warm, dry summers. Seed mixes of appropriate native and naturalized grass species will be planted to control surface erosion on headwall slopes. In order to quickly establish vegetation to prevent erosion of sloped areas, fast-growing naturalized grasses are included in the species lists. These are annual species which, although not native, are not considered invasive and naturally occur throughout the region. Appropriate seeding will result in an herbaceous layer to prevent erosion and restore the site. The seed mix used on the headwall slopes will be applied at the recommended rate for each species using hydroseeding techniques with a tackifier. Grass seed mix is specified in Table 2.

Riparian: Lower reaches of the riparian areas along the east and west boundaries of the site will be planted with local willow "sticks" and alder seedlings at a rate of one plant per 5 feet of channel. Any areas on the face/benches that indicate seepage will also be planted.

Table 2 GRASS SEED MIX		
Species	**Percent**	**Pounds/Acre PLS**
Blue Wild Rye *(Elymus glaucus)*	30	3
California Brome *(Bromus carinatus)*	20	3
Idaho Fescue *(Festuca idahoensis)*	20	4
Bluegrass *(Poa secunda)*	5	4
Yarrow *(Achillea millefolium)*	5	1
Coyote Brush *(Baccharis pilularis)*	5	1
Bush Monkeyflower *(Mimulus aurantiacus)*	5	1
Spanish Lotus *(Acmispon americanus)*	5	2
Tom Cat Clover *(Trifolium willdenovii)*	5	3
Total		**22 pounds/acre**

4.7.4 Plant Procurement and Installation Procedures

Grass seed mixes, cuttings, and containerized stock will be used to vegetate reclaimed areas within the project site. The precise planting palate and the methods and materials used to revegetate the site will be dependent upon availability at the time of installation.

4.7.5 Irrigation

No irrigation is planned.

4.7.6 Test Plots

Unusual treatments may be necessary to develop successful regeneration techniques for the site. The upper benches will serve as test plot areas as mining proceeds from the top down. If simple regeneration efforts are unsuccessful, additional treatments, such as the use of mulches and ripping, will be applied. The individual treatments will be determined at the time of reclamation planting. Treatments may include:

- Chip mulch
- Commercially available mulches
- Ripping
- Fertilizers
- Weed matts/fabrics
- Plant solar protection (cartons)
- Plant deer protection (Vexar tubes)

Test plots were conducted previously under CUP-99-01 and will continue onsite. The purpose of the plots is to determine the effectiveness of using mine waste as a growth medium to support plant life. The site quality is poor and obtaining adequate survival of timber species has been difficult. The riparian planting areas have performed well with good survival.

The test plot site will be planted with nursery-grown seedlings and evaluated for survival and growth rates. The native tree species shown in Table 1 will be included on these test plots.

4.7.7 Reference Sites

Success of the revegetation plan shall be judged based upon the effectiveness of the vegetation for improving wildlife habitat and the ecological and aesthetic value of the area, and by comparing quantified measures of vegetation cover, density, and species richness of revegetated areas to similar parameters of naturally occurring vegetation within the larger project area. Reference areas will be chosen for each specific habitat type: coniferous forest (timberland) and riparian.

4.8 Monitoring and Maintenance

Maintenance of the reclaimed areas during the early stages of plant establishment is essential to the attainment of reclamation objectives and performance criteria. The revegetation areas will be maintained in good condition through regular monitoring to detect problems before they affect the attainment of performance criteria. Maintenance measures include invasive species control, erosion control, and herbivore control (if needed), trash removal, and habitat protection. Each of these issues is addressed below.

Monitoring by a qualified biologist or forester will be conducted following completion of habitat creation until performance criteria have been met for two consecutive years with no human intervention. Corrective or remedial actions will be undertaken if success criteria are not attained in a given monitoring year.

Due to the small size of riparian habitat, 100 percent of the area will be sampled. In the forestry and grassland/herbaceous areas, initial test plots will be evaluated on 100 percent of the area treated. The information will be used to determine the statistical methods needed to meet the 80 percent confidence level on accuracy of results. Vegetation results can be non-normally distributed. If this is the case, to avoid detailed calculations, the minimum 15 sample points will be used per Publication 123. If the number of sample points does not provide the necessary accuracy due to high variability, additional planted area (plots) will be sampled to determine compliance with the performance standards stated above.

4.8.1 Invasive Species

Areas planted with native species will be kept free of excessive vegetative competition and invasive weed species between the months of April and August using the best available methods. Invasive plant species and excessive competition will be controlled via herbicide treatment and manual or mechanical removal. Herbicide treatments will be implemented as needed pursuant to all pertinent California Department of Pesticide Regulation (DPR) requirements.

Scotch broom *(Cytisus scoparius)* and Klamath weed *(Hypericum perforatum)* can be particularly aggressive noxious weeds in the region, as are a number of species of thistle. Neither Scotch broom nor Klamath weed have been identified onsite to date. The operator is diligent with manual vegetation control for invasive species. Both manual and chemical control will be continued both during operation and during reclamation to ensure populations of invasive plants are not established onsite. All Scotch broom will be removed when observed. Klamath weed, thistle, and other weed species will be limited to 10 individuals per 0.5 acre in the reclaimed or disturbed areas.

4.8.2 Erosion Control

During the first two years of plant establishment, vegetative cover may not be adequate to fully control soil erosion. If erosion occurs, areas will be identified and measures to prevent further erosion will be implemented as soon as possible. Erosion control measures may include the addition of mulches, wattles, bales, or replanting (depending upon site conditions). Grading of reclaimed areas to reduce changes in topography that exacerbate erosion has been used successfully throughout the site during the last 30 years.

4.8.3 Herbivory Control

If necessary to ensure the success of reclamation efforts, herbivore damage to young plants will be controlled. Methods of herbivory control will be selected based on the herbivore species causing the damage, the plant species needing protection, and other situation-specific circumstances. Based upon previous site evidence, herbivore damage is not a major concern.

4.8.4 Habitat Protection

Reclaimed portions of the mine site are largely protected from human or unauthorized activities by the remote location of the site and the access gate. Signs will be posted around reclaimed areas indicating that the surrounding area is a sensitive resource and should not be disturbed. Signs, roads, and fences will be inspected semi-annually, once at the beginning of the summer season and once at the beginning of the wet season.

4.8.5 Performance Criteria

Reclamation activities within the proposed expansion area will be considered successful if the following conditions have been met:

- A survival rate of at least 50 percent among timber plantings (including natural recruitment of native vegetation
- Herbaceous cover of 65 percent for headwall habitat
- Riparian habitat will be successful with a survival rate of 70 percent
- No species listed in the Federal Weed List under 7 Code of Federal Regulations 360 or the California Department of Food and Agriculture Noxious Weeds List or that is otherwise known to displace native species in the area is present

4.8.6 Wildlife Monitoring

Wildlife habitat of the proposed expansion area will be restored after mining activities have ceased via revegetation and restoration of ephemeral drainages. Wildlife observed and indications of wildlife use of the area will be recorded during each monitoring period.

4.8.7 Supplemental Planting

If necessary, supplemental plantings will be undertaken in order to attain the standards described in the performance criteria and/or to replace individuals lost as part of a severe disturbance. Reclaimed and revegetated areas will be inspected annually.

After each monitoring period, revegetation methods may change as some techniques are found to be more effective than others. For instance, if monitoring reveals insufficient cover, density, or species richness, the following actions may be taken: introduction of additional species to the reclamation area where needed, substitution of one species for another, or the use of one or more different erosion control techniques.

4.9 Areas Excluded from Revegetation

Several of the access roads will not be revegetated so that access to reclamation activities can be maintained throughout the monitoring period and used for post-mining purposes. The main access road will be maintained onsite.

4.10 Natural Regeneration

Some natural regeneration will occur within portions of the project area. Seeds will be dispersed onto the reclamation area by natural sources (wind, gravity, animals, etc.) and may be transported from relatively long distances. Natural regeneration will produce volunteers of a variety of indigenous species.

The natural revegetation of desired species will be encouraged and allowed to occur. If undesirable species not native to the area begin to invade such that they become a threat to the establishment of desirable native species, these species will be eradicated by hand, mechanical means, controlled burning, use of herbicides, or a combination of these methods.

4.11 Impact on Future Mining

This Reclamation Plan precludes future mining on the site.

4.12 Public Safety

A locked access gate is installed and maintained at the entrance to the site from Highway 299. Due to the topography of the area and forested nature of the area, access to the site by other means is unlikely.

5.0 ADMINISTRATIVE REQUIREMENTS

5.1 Financial Assurance

R. Brown and Sons accepts responsibility for reclamation per Reclamation Plan No. RP-99-01 and this revised Reclamation Plan, and will provide financial assurance for completion of site reclamation in compliance with SMARA, Public Resource Code §2710 et seq. The financial assurance will be prepared following the State Mining and Geology Board Financial Assurance Guidelines and will be maintained for the life of the mining operation or until the site has been reclaimed per the approved plan. The 2016 Financial Assurance Cost Estimate is included as Appendix F.

5.2 Annual Inspections

R. Brown and Sons will allow access to Lead Agency officials for the purpose of annual inspections of the mining project. An annual report will be prepared in conclusion to the annual inspection and provided to the State Mining and Geology Board by July 1 of the following year.

5.3 Reclamation Plan Amendments

An amended reclamation plan will be submitted to the Lead Agency prior to any substantial deviations from approved plans.

5.4 Statement of Responsibility

I, the undersigned, hereby agree to accept full responsibility for reclaiming all mined lands described and submitted herein with any modification required by Shasta County as conditions of approval.

Signed this _____ day of _____, 20____

_____

Roger D. Brown, Owner
R. Brown and Sons Quarry

6.0 REFERENCES

Newton, Gail A. and Claassen, V.P. 2003. *Rehabilitation of Disturbed Lands in California: A Manual for Decision-Making.* Department of Conservation, Office of Mine Reclamation.

NRCS. 2006. State Soils *Geographic (STATSGO) Data Set.* http://SoilDataMart.nrcs.usda.gov/

Office of Mine Reclamation. 2007. Surface Mining and Reclamation Act and Associated Regulations. California Department of Conservation.

2016

FINANCIAL ASSURANCE COST ESTIMATE

FOR

R. BROWN & SONS QUARRY

P.O. Box 406
Willow Creek, CA 95573
(530)629-3702
(530)629-2863 Fax

CA MINE ID# 91-12-0035

Financial Assurance Cost Estimate 2016

I. PRIMARY RECLAMATION ACTIVITIES

Description of Task:
Regrade slopes, benches, landings & roads

Methods to be Used:
Excavator and dozer

Miscellaneous Information (no automatic calculations occur in this area):

Overburden (c.y.):		Topsoil (c.y.)		Acres:				
Production Rate (c.y./hr):	1.		2.		3.		4.	
Haul Distance (feet):	1.		2.		3.		4.	
Factor for Haul Distance	1.		2.		3.		4.	

A. Equipment - List equipment required to complete identified task For large reclamation jobs separate mine areas for ease of accounting

Equipment	$/Hour	# of Hours	Cost ($)
PC300 Excavator	$153.40	8.0	$1,227
D39E Dozer w/Ripper	$50.61	16.0	$810
	$0.00	0.0	$0
	$0.00	0.0	$0

Total Equipment Cost for this Task = $2,037

B. Labor - List all labor categories to complete identified task

Labor Category	$/Hour	of ManHours	Cost ($)
Excavator Operator	$65.28	8.0	$522
Dozer Operator	$65.28	16.0	$1,044
	$0.00	0.0	$0
	$0.00	0.0	$0

Total Labor Cost for this Task = $1,567

C. Materials - List all materials required to complete identified task (include disposal costs)

Item	Quantity	$/Unit	Cost ($)
	0.00	$0.00	$0
	0.00	$0.00	$0
	0.00	$0.00	$0

Total Materials Cost for this Task = $0

D. Direct Cost for this Task

Equipment Cost + Labor Cost + Materials Cost = **$3,604**

Financial Assurance Cost Estimate

II. REVEGETATION

Description of Task:

Plant trees, seed and apply straw mulch. Gather acorns and plant.

Methods to be Used:

Hydroseeder, straw blower and hand planting.

A. Equipment - List equipment required to complete identified task.

Equipment	$/Hour	# of Hours	Cost ($)
Hydroseeder	$19.23	8.0	$154
Straw blower	$22.83	8.0	$183
	$0.00	0.0	$0

Total Labor Cost for this Task = $336

B. Labor - List all labor categories to complete identified task

Labor Category	$/Hour	# of ManHours	Cost ($)
Tree planting / acorn gathering labor	$47.27	32.0	$1,512.6
Apply straw labor	$47.27	16.0	$756.3
Hydroseed labor	$47.27	16.0	$756.3

Total Equipment Cost for this Task = $3,025

C. Materials - List all material required to complete identified task

Item / Plant Species	Unit of Measure	# of Units	$/Unit	Cost ($)
Douglas Fir Seedlings	ea	250.0	$6.00	$1,500
Incense Cedar Seedlings	ea	250.0	$6.00	$1,500
Live Oak Seedlings	ea	100.0	$6.00	$600
Straw Mulch	lb	40.0	$7.50	$300
Seed (erosion grass mix)	lb	100.0	$2.00	$200
		0.0	$0.00	$0
		0.0	$0.00	$0

Total Materials Cost for this Task = $4,100

D. Direct Cost for this Task

Equipment Cost + Labor Cost + Materials Cost = **$7,462**

Financial Assurance Cost Estimate

III. PLANT STRUCTURES AND EQUIPMENT REMOVAL

Description of Task:

There are no permanent buildings or plants at site.

Methods to be Used:

A. Equipment - List equipment required to complete identified task

Equipment	$/Hour	# of Equip Hours	Cost ($)
	$0.00	0.0	$0
	$0.00	0.0	$0
	$0.00	0.0	$0
	$0.00	0.0	$0

Total Labor Cost for this Task $0

B Labor - List all labor categories to complete identified task.

Labor Category	$/Hour	# of ManHours	Cost ($)
	$0.00	0.0	$0
	$0.00	0.0	$0
	$0.00	0.0	$0
	$0.00	0.0	$0

Total Equipment Cost for this Task $0

C Demolition - List all structures and equipment to be dismantled or demolished

Structure / Equipment	Type of Material	Volume (cubic feet)	Unit Cost Basis	Disposal Cost	Cost ($)
		$0.00	0.00	$0.00	$0
		$0.00	0.00	$0.00	$0
		$0.00	0.00	$0.00	$0
		$0.00	0.00	$0.00	$0

Total Materials Cost for this Task $0

D Direct Cost for this Task

Equipment Cost + Labor Cost + Demolition Cost = **$0**

Financial Assurance Cost Estimate

(Sections "C"and "D" have been automated)

E. Surplus / Salvage Value

1. **Total cost to remove plant structures and equip for which salvage value is being claimed (This is obtained from values already entered in A, B, & C above. No entry needed if salvage value is not being claimed)	$0.00
2. Net salvage value of the plant structures and equipment * (no entry if salvage value is not being claimed)	$0
3 Subtract Line 2 from Line 1 (allowable credit for salvage value)	$0
4 Total plant structure and misc structure demo costs	$0

*NOTE This is the value of plant structures, buildings and equipment on a salvage basis -- e.g. after the structures and equipment have been removed for sale or use off-site. In order to include net salvage value in the financial assuranace calculation, the operator must provide a letter of agreement, signed contract, bid, or quote from an independent company which provides industrial dismantling or equipment salvage services, or is in the business of buying and selling scrap metals or similar products.

**Note This value must be obtained by manually adding items previously entered in sections A, B, & C that are related to removal of items for which salvage value is being claimed. This manual step is necessary in order to apply salvage value only towards costs of removing equipment for which salvage is being claimed, not towards other demolition costs.

Financial Assurance Cost Estimate

IV. MISCELLANEOUS COSTS

Examples of this type of cost could include temporary storage of equipment and materials off site, special one-time permits (i.e. transportation permits for extra wide overweight loads, etc.), decommissioning a process mill (i.e. decontamination of equipment), or disposal of warehouse inventories.

Item / Task	Quantity	$/Unit	Cost ($)
	0.0	$0.00	$0
	0.0	$0.00	$0
	0.0	$0.00	$0
	0.0	$0.00	$0
	0.0	$0.00	$0
	0.0	$0.00	$0
	0.0	$0.00	$0
	0.0	$0.00	$0
	0.0	$0.00	$0
	0.0	$0.00	$0

Total Miscellaneous Costs **$0.00**

V. MONITORING

Monitoring Task	$/Visit	# Visits/Year	# of Monitoring Years	Cost ($)
Labor	$94.54	4.0	2.0	$756
	$0.00	0.0	0.0	$0
	$0.00	0.0	0.0	$0
	$0.00	0.0	0.0	$0
	$0.00	0.0	0.0	$0

Total Monitoring Costs **$756**

R. Brown Sons Quarry
Mine ID# 91-12-0035

Financial Assurance Estimate

VII. SUMMARY OF COSTS

Total of all Primary Activities Costs	$3,604
Total of all Revegetation Costs	$7,462
Total of all Plant Structures & Equipment Removal Costs (corrected for salvage)	$0
Total of all Miscellaneous Costs	$0
Total of all Monitoring Costs	$756
Total of Direct Costs	$11,822
Supervision (7%) (based on graph no.1)	$768
Profit/Overhead (14%) (based on graph no. 2)	$1,655
Contingencies (10%) (based on "C" in section VI.)	$1,182
Mobilization (5%) (1% to 5%)	591.09
Total of Indirect Costs	$4,197
Total of Direct and Indirect Costs	$16,018
(calculated at % of Direct Costs) (5%) Lead Agency Administrative Cost* (Determined by the Lead Agency or OMR, SMARA 3802 (b))	$591
Approved Estimated Cost of Reclamation	$16,610
CPI Rate for 2016	1.5%
Total Estimated Cost of Reclamation	$16,859

Attachment 4

Recirculated Mitigated Negative Declaration

Comments and Responses to Comments on the First Draft Mitigated Negative Declaration