Site Cleanup Plan
Plymouth Mercury Mine

Prepared for:
Westside Brownfields Coalition Assessment Project

Prepared by

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<td>ABCA</td>
<td>Analysis of Brownfield Cleanup Alternatives</td>
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<td>APN</td>
<td>assessor’s parcel numbers</td>
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<tr>
<td>ASTM</td>
<td>American Society for Testing and Materials</td>
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<td>BLM</td>
<td>Bureau of Land Management</td>
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<td>BMP</td>
<td>best management practice</td>
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<td>CCR</td>
<td>California Code of Regulations</td>
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<td>CNDDB</td>
<td>California Natural Diversity Database</td>
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<td>Construction Quality Assurance</td>
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<td>CQC</td>
<td>Construction Quality Control</td>
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<td>DWR</td>
<td>Department of Water Resources</td>
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<td>General Permit</td>
<td>General Permit for Storm Water Associated with Construction Activity</td>
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<td>HASP</td>
<td>Health and Safety Plan</td>
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<td>IRWM</td>
<td>Integrated Regional Water Management</td>
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<tr>
<td>mg/L</td>
<td>milligram per liter</td>
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<td>mg/kg</td>
<td>milligram per kilogram</td>
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<tr>
<td>OSHA</td>
<td>Occupational Safety and Health Administration</td>
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<td>PWQA</td>
<td>Plymouth Mercury Mine</td>
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<td>Project</td>
<td>Westside Brownfields Coalition Assessment Project</td>
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<td>QA</td>
<td>quality assurance</td>
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<td>quality control</td>
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<td>RWQCB</td>
<td>Regional Water Quality Control Board Central Valley Region</td>
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<td>Site</td>
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<td>Storm Water Pollution Prevention Plan</td>
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<td>U.S. Environmental Protection Agency</td>
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<td>USGS</td>
<td>U.S. Geological Survey</td>
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<td>Westside CC</td>
<td>Coordinating Committee of the Westside Subregion of the Proposition 84</td>
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<tr>
<td>WET</td>
<td>Waste Extraction Test</td>
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<tr>
<td>USGS</td>
<td>U.S. Geological Survey</td>
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<td>Westside CC</td>
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1.0 Introduction

This Site Cleanup Plan (Plan) describes cleanup activities recommended in the Analysis of Brownfield Cleanup Alternatives (ABCA) for the inactive Plymouth Mercury Mine (Plymouth Mine) (Burleson Consulting, Inc. 2019). The Coordinating Committee of the Westside Subregion of the Proposition 84 Sacramento River Funding Region (Westside CC) for Integrated Regional Water Management (IRWM) planning requested this Plan. The Westside CC, comprises four participating regional public agencies (Lake County Watershed Protection District, Napa County Flood Control and Water Conservation District, Solano County Water Agency, and Water Resources Association of Yolo County), and represents primarily the Cache Creek and Putah Creek watersheds. The Westside Brownfields Coalition Assessment Project (Project) is a special project of the Westside CC funded by Grant No. 99T30301 from the U.S. Environmental Protection Agency’s (USEPA) Brownfields Assessment Program.

Plymouth Mine consists of about 0.25-acres of disturbed land along Hoffman Creek, a tributary to St. Helena Creek in southern Lake County. Plymouth Mine is located to the southeast of the historical Mirabel Mercury Mine and consists of two adits and one shaft advanced to explore for a continuation of the ore body exploited at the Mirabel Mine. The Plymouth Mine is located within ancestral lands of the Yocha Dehe Wintun Nation.

The tasks described in this Plan are based on information summarized and recommendations in the ABCA. The ABCA includes information from Phase I and Phase II environmental site assessments completed in 2017 and 2018, respectively, on behalf of the Westside CC IRWM by Burleson Consulting.

The property owner is eager to remediate the site; however, they are financially unable to undertake cleanup actions and in no way associated with the legacy mining operations.

The following environmental concerns were noted in the reports referenced above:

1. Humans and biota could be exposed to mercury through inhalation, incidental ingestion and dermal contact at the waste rock pile adjacent to Hoffman Creek.

2. Infiltrating water could also mobilize mercury from waste rock adjacent to Hoffman Creek.

3. Erosion of mercury containing mine waste delivers mercury from the site to downstream waters.

To address these concerns, the ABCA recommended excavation of waste rock from areas adjacent to Hoffman Creek and transport for disposal at a permitted off-site disposal facility. This Site Cleanup Plan provides detailed descriptions of the tasks necessary to complete the recommended cleanup action:

Task 1: Obtain Regulatory Oversight and Permits

Task 2: Remove and Dispose of Waste Rock:

Task 3: Revegetate the Disturbed Areas

Task 4: Monitor and Maintain

1.1 Project Description

The project consists of excavating waste rock and off-site disposal at a permitted facility, site restoration consisting of erosion controls and revegetation of disturbed areas, and monitoring and maintenance. Table 1 summarizes the anticipated cleanup activities, Table 2 is a preliminary cleanup activity work schedule, and Tables 3 through 6 summarize available mine waste analytical data.

Project tasks are described here.
**Task 1 Obtain Regulatory Oversight and Permits:** Meet with DTSC and RWQCB representatives to determine the lead California agency within the Voluntary Cleanup Program. This task also includes completion of biological and cultural surveys necessary to comply with the California Environmental Quality Act (CEQA), and requirements related to working in and near waters of the United States administered by the US Army Corps of Engineers; and waters of the state administered by California Department of Fish and Wildlife, and RWQCB.

**Task 2 Remove and Dispose of Waste Rock:** Remove waste rock from two waste rock piles directly adjacent to Hoffman Creek and tributary, containerize excavated material for off-site transport, characterize containerized material in accordance with disposal facility requirements, transport the containerized material to the permitted disposal site.

**Task 3 Revegetate Disturbed Areas:** Site restoration will be conducted in accordance with the Revegetation Plan (**Appendix A**), and Erosion Control Plan (**Appendix B**). The goals are to minimize erosion and foster establishing vegetation within the disturbed areas. Areas disturbed by excavation along the north bank of Hoffman Creek, and east bank of the tributary at the adit may need to be contoured using clean fill prior to revegetation. A barrier will be installed to prevent vehicle traffic through the disturbed areas.

**Task 4 Monitor and Maintain:** Periodic post-remediation monitoring and maintenance is described in Section 4.0 below. The goals are to detect the need for maintenance; minimize erosion, conduct necessary activities to ensure revegetation of disturbed areas; and document ongoing remedy effectiveness.

### 1.2 Organization of Document

The contents of Sections 2.0 through 5.0 are briefly described here.

- **Section 2.0** describes the remediation tasks. General safety requirements are identified including site controls, communications, and access preparation. Environmental conditions and site restoration measures are described.

- **Section 3.0** describes CQA procedures including how the limits of remediation activity will be documented, and how the remediation activities will be documented in as-built diagrams.

- **Section 4.0** presents the monitoring and maintenance needed to ensure the ongoing effectiveness of the remediation activities.

- **Section 5.0** presents a list of references cited in this Plan.

Figures and tables are presented after the report text.

### 1.3 Site Location and Background

This section presents background information on Plymouth Mine pertinent to this Plan. Information includes a description of the mine location and topography, mine history and features, climate, geology and soils, hydrology and hydrogeology, vegetation and wildlife, significant historical and archaeological features, and land use and population. Figure 1 shows the location of Plymouth Mine and surrounding area.

#### 1.3.1 Location and Topography

Plymouth Mine is accessed by following an unmarked private road off of Highway 29 in Lake County, California, (located approximately 800 feet south of the intersection of Highway 29 and Bradford Road) east for approximately 0.25 mile in and turning right (east-southeast) onto a branch road, and following
the branch about 0.15 mile to a group of private residences. The private residences are about 400 feet north of the northernmost workings of Plymouth Mine.

Plymouth Mine occupies about 0.25 acre of assessor’s parcel numbers (APN) 01-302-817 in Section 24, Township 10 North, Range 7 West (Mount Diablo Base and Meridian). This parcel consists of about 117 acres in total, located in southwestern Lake County, California, about 4 miles south-southwest of Middletown, California (Figure 1).

The site is located on very steep slopes forming the southwest canyon wall near headwaters of the west fork of Sulphur Creek (Figure 2). The site consists of two adits and one shaft, associated waste rock, and about 2,500 feet of underground workings.

1.3.2 History and Features

Ownership and previous use information was obtained as part of a literature search conducted during completion of the Phase I and II environmental site assessments.

The Plymouth Mine was developed prior to 1945. The beginning of mining at Plymouth Mine is not known. According to the 1965 U.S. Bureau of Mines (USBM) report, mining continued through 1945 with minor production of mercury. The Plymouth mine had a small output of mercury, produced by ore processing at the nearby Mirabel Mine. The area around the Plymouth Mine was undeveloped rural land through the early 1990s. The existing residence was constructed beginning in 1993.

The current owner, TAZ Investment, Inc., purchased the property in 2015 unaware of historical mining activities.

1.3.3 Climate

Plymouth Mine is located in a portion of the California Coast Ranges that generally is characterized as a Mediterranean climate with arid, warm summers; relatively wet winters; and moderate temperatures (56-97 °F). However, the area can be subject to freezing temperatures during winter months (Western Regional Climate Center 2012). Precipitation in the area generally occurs as rainfall, but the high elevation areas may receive some snowfall annually. Due to the region’s dynamic topography, noticeable variations in precipitation totals and temperature averages can be experienced over relatively small distances.

1.3.4 Geology and Soils

Plymouth Mine is located in the Coast Range geomorphic province. The area is underlain by serpentinite, which has been hydrothermally altered to silica carbonate rock, at the location of the mine. According to U.S. Bureau of Mines (USBM) (1965), Plymouth Mine consisted of about 2,500 feet of shallow shafts, adits, drifts, and crosscuts used to explore a cinnabar-bearing volume of silica carbonate rock. Figure 2 shows Plymouth Mine site features.

Background soil samples collected from soils developed on the principal rock types (serpentinite, silica carbonate rock) at Plymouth Mine yielded total mercury concentrations of about 1 milligram/kilogram (mg/kg) to 2 mg/kg. Waste rock at the site contained total mercury at up to 1,600 mg/kg.

1.3.5 Hydrology and Hydrogeology

Plymouth Mine is located within the Hoffman Creek canyon approximately 0.3 mile upstream from the confluence of Hoffman Creek and St. Helena Creek. St. Helena Creek flows into Putah Creek approximately 4 miles downstream.
Plymouth Mine is not located within a groundwater basin identified by the California Department of Water Resources (Department of Water Resources [DWR] 2003). The Collayomi Valley (Basin 5-019) occurs about 1.0 mile north-northwest of Plymouth Mine. The Collayomi Valley (Basin 5-019) contains reaches of Saint Helena Creek, of which Hoffman Creek is a tributary, north about 0.3 mile downstream of Plymouth Mine. Hoffman Creek represents a groundwater discharge zone. Thus, groundwater from the site is of limited extent.

**Water Supply Well Survey.** A water supply well survey was conducted by searching the DWR Well Completion Report Application ([https://dwr.maps.arcgis.com/app/wcr](https://dwr.maps.arcgis.com/app/wcr)). No municipal supply wells are known to be located within one mile of the Plymouth Mine. Two residential supply wells are located within about 0.2 miles to the north of the adits across Hoffman Creek, and northwest of the residence. According to the drillers log one of the wells was about 300 feet deep in serpentinite and yielded about 0.03 gallons per minute; and the other well was about 200 feet deep in serpentinite and gray shale and yielded about 2 gallons per minute. These wells are reportedly screened from 20 to 200 feet below ground surface (bgs). Depth to groundwater was not accurately reported on the driller’s logs.

### 1.3.6 Vegetation and Wildlife

Dominant vegetation communities that occur at the site include riparian, mixed serpentine chaparral, and mixed oak woodland. According to the California Natural Diversity Database (CNDDDB), the site potentially supports several special status and rare plant species including Three Peaks jewelweed (*Streptanthus morrisonii ssp. elatus* – California Native Plant Society [CNPS] Rare Plant Rank 1B.2), early jewelweed (*Streptanthus vernalis* – CNPS Rare Plant Rank 1B.2), and Rincon Ridge ceanothus (*Ceanothus confuses* – CNPS Rare Plant Rank 1B.1), adobe-lily (*Fritillaria pluriflora*), San Joaquin spear scale (*Extriplex joaquinana*), and serpentine soil dependent species such as Indian Valley brodiaea (*Brodiaea rosea*).

The site contains suitable habitat for a variety of common mammal, avian, insect, crustacean, reptile, and amphibian species. Typical wildlife of the area are lizards, salamanders, snakes, frogs, toads, burrowing mammals, deer, and raptor/passerine birds. The site supports potential habitat for special status wildlife species. There is a CNDDDB occurrence observation of Townsend’s big-eared bat (*Corynorhinus townsendii* – State Species of Special Concern) documented northwest of the site near St. Helena Creek.

### 1.3.7 Significant Historical and Archeological Features

Cultural resource surveys and consultations with the State Historic Preservation Officer will be undertaken prior to cleanup as necessary.

### 1.3.8 Land Use and Population

Plymouth Mine is located in a rural setting on private land. Nearby parcels are also privately-owned lands.

Public access to Plymouth Mine is limited by gates at the private property boundary west of the mine, and at the boundary with another private parcel east of the mine. In addition to mine-related features, the landowner resides in housing located about 400 feet north of Plymouth Mine and part of the parcel supports agricultural commodities. The remaining area remains undeveloped chaparral and oak woodland.
2.0 Remediation Activities

2.1 Remediation Objectives

The remediation objectives are intended to protect human and ecological receptors and abate discharges into Waters of the State that create or threaten to create a condition of pollution or nuisance.

Based on California Water Code requirements, the following remediation objectives were identified for the remediation areas at Plymouth Mine:

1. Reduce the potential migration of metals and sediment from waste rock to surface water.
2. Reduce the threat of human or ecological exposure to mercury in waste rock.

Attaining these objectives is expected to result in satisfying requirements to protect water quality and public health under California and Federal regulations.

2.2 Remediation Goals

The remediation goals for Plymouth Mine are to reduce the potential risk of water quality degradation posed by mine waste, and reduce the potential for human exposure to mercury in mine waste. These goals will be achieved through completion of the following tasks:

- Remove waste rock from the north bank of Hoffman Creek south of the private residence, and from the east bank of the tributary to Hoffman Creek at the adits; and dispose of the excavated waste rock at an off-site permitted facility.

Implementing these remedial steps is expected to minimize risks to residents, site workers, and site visitors from exposure to waste rock at Plymouth Mine, and is expected to abate potential degradation of surface water beneficial use potentially associated with waste rock in the remediation areas.

2.3 Remediation Tasks

Prior to implementing remediation activities at Plymouth Mine, site safety requirements will be identified, site controls will be established, and equipment and personnel will be mobilized to the site. Mobilization will include establishing a command post and equipment staging area, and preparing safe access to each of the remediation areas.

**Site Safety:** The project-specific Health and Safety Plan (HASP) will be completed as part of the mobilization phase. The HASP specifies the minimum health and safety requirements for job site activities, and the measures and procedures to be employed for protection of on-site personnel as well as visitors. The HASP will be finalized prior to beginning field activities, by the selected contractor during the pre-mobilization phase of work. The HASP will be compliant with US Department of Occupational Safety and Health Administration (OSHA) requirements, California OSHA requirements for hazardous waste site operations.

**Command post:** The command post will be along the old mine road north of the residence (Figure 2) and will provide a check-in location for all personnel entering the site for work and leaving the site at the end of each day, and a meeting location for all site visitors. Equipment inspections will be completed here before use on site. Work crews will assemble at the command post each day prior to work to
participate in daily safety briefings. The command post will also provide a muster point in the event of the need to evacuate the site.

**Staging area:** The staging area will serve as a delivery point and storage area for materials and equipment. The approximate location of the staging area is shown on Figure 2 and is adjacent to the command post. Field offices, temporary facilities, and storage containers will be located in this area. Final determination of the staging area location will be approved by the Field Engineer prior to mobilization.

**Access preparation:** Safe access to each work area for equipment and personnel will be necessary to complete the work. Prior to mobilizing to any of the work areas, the Field engineer will inspect the road from the command post to the area, and recommend any grading necessary for safe equipment and personnel access. At each area there may be a variety of access preparation steps.

Remediation tasks are summarized in Table 1 and the following subsections. A Cleanup Activity Work Schedule is provided in Table 2. The work schedule shows approximate time frames with respect to receipt of project funding and assumes that all parties to the work are able to begin immediately upon project funding. A revised schedule would be prepared after the project is initiated.

### 2.3.1 Task 1 Obtain Regulatory Oversight and Permits

Task 1 consists of entering into a VCP with the appropriate California agency (DTSC or RWQCB), and obtaining regulatory concurrence with the activities described herein. This task includes conducting surveys to determine if special status plants, bats, or cultural resources are present that require protection and/or mitigation associated with the proposed response action. This task also includes regulatory consultation regarding excavation adjacent to a stream channel.

### 2.3.2 Task 2 Remove and Dispose of Waste Rock

Task 2 consists of excavating waste rock as described below.

Remediation tasks for waste rock are:

1) Mobilize equipment and staff necessary to remove the waste rock and revegetate the areas disturbed by waste rock removal.

2) Excavate about 645 cubic yards of in-place waste rock from the north bank of Hoffman Creek, and east bank of the tributary at the adit, Figure 2. Remove waste rock to native soil/rock. Containerize waste rock pending transport for off-site disposal at a permitted facility.

The material will be removed using appropriate mechanized excavation equipment, moving material from the outside edges of the pile inward. This method is intended to minimize spreading of material into the adjacent creek and clean areas, mixing of native material with waste rock, or over-excavation of material. To the extent possible, work will proceed from the furthest downhill location of the waste rock toward the uphill extent of the waste rock. If necessary, the excavated surface will be benched to facilitate waste removal and post removal stabilization.

Waste rock will be loaded directly into bulk transporters or into on-site trucks for transport to a staging area for containerization prior to off-site transport and disposal.

The extent of excavation will be determined in the field as excavation progresses. Excavation will stop where native materials (soil, sediment, or in-place rock) are encountered. If necessary,
the excavated surface will be benched to facilitate waste removal and post removal stabilization.

Trained personnel familiar with local geology and mine waste will evaluate the extent of excavation based on color changes, textural changes, stratification, soil horizons, bedrock, and topography as described in Section 3.0 of this Plan. These lines of evidence will be used to determine when excavation should stop due to encountering native soil, sediment, and/or rock.

3) Collect samples of containerized waste rock for laboratory analysis to characterize the material for off-site disposal as requested by the disposal facility.

4) Transport the excavated waste rock to the off-site permitted disposal facility.

2.3.3 Task 3 Revegetate Disturbed Areas

1) Restore the disturbed area using acceptable fill material per engineer’s design and approval.

Native material spoils from grading and supplementary fill from a borrow area or off-site commercial source will be used to restore the disturbed area by placing and wheel-rolling the material in one-foot lifts to provide adequate substrate in accordance with the revegetation plan (Appendix A). This work will be completed in accordance with applicable permit requirements.

2) Install erosion controls consistent with the project storm water pollution prevention plan (SWPPP) and Erosion Control Plan (Appendix B).

Slopes and filled areas will be stabilized by track rolling with a dozer or other similar and appropriate means, to minimize future erosion, and will be stabilized through hydroseeding (per the Revegetation Plan Appendix A) and fiber mats.

A native seed mix will be used for revegetation. Revegetation will be initiated via hydroseeding the disturbed area using a seed mix consistent with the Revegetation Plan (Appendix A).

Where appropriate, vegetation filter strips may be employed to facilitate stabilization and mitigate sediment transport. A vegetation filter strip is essentially a vegetated buffer zone lying on a flat to gently sloping terrace surface between the toe of the excavated slope and top of the nearby channel bank. Vegetation slows the velocity of sediment-laden runoff, causing sediment to deposit on the surface within the limits of the vegetation coverage before reaching the edge of the stream bank. It relies on a high cover density of grass or grass-like vegetation. The vegetation filter can be formed either by preserving an existing stand of dense vegetative cover (i.e., leaving a buffer zone) or by re-establishing a dense vegetative cover on a newly disturbed surface.

Remediation performance in the short term will be assessed by documenting removal of waste rock, the final grade of the excavated area after waste rock removal, and final grade of restored area, installation of erosion controls, and restoration of the project impacted areas. Photographs will be taken from defined locations for comparison with future monitoring inspections. Pre-remediation photographs are included in Attachment 1, along with a figure showing photo viewpoint locations and coordinates.
2.3.4 Task 4 Monitor and Maintain

Longer-term performance will be documented through routine inspections during monitoring of the remediation area. As described in Section 4.0 of this Plan, inspections will entail photography and visual assessment of surface features and vegetation at the excavated area. Inspections will occur for five years after remediation. Maintenance will occur as described in Section 4.0 of this Plan based on monitoring observations.

3.0 Construction Quality Assurance

CQA provides for quality assurance (QA) and quality control (QC) monitoring necessary to document that the remediation activities are completed using methods and materials that achieve the project objectives. CQA will include monitoring during construction to confirm that the correct equipment and materials are used appropriately (quality assurance) to remove mine waste, restore disturbed areas, and protect the environment. CQA QA/QC monitoring comprises both protection and performance monitoring:

- **Protection monitoring** to confirm that human health and the environment are adequately protected during construction.
- **Performance monitoring** to confirm that the remediation has attained performance standards presented in this document.

Routine inspections described in Section 4.0 include confirmation monitoring and maintenance activities to confirm and sustain the long-term remediation performance.

3.1 Construction Quality Assurance Team

The CQA team should consist of regulatory agency staff, Landowner, Project Sponsor, CQA firm (Consultant), Contractor, and Design Engineer.

**Regulatory Agency.** The regulatory agency is responsible for overseeing and authorizing the remedial action. In this capacity, the regulatory agency will review monitoring plans in the design phase and the Contractor's Construction Quality Control (CQC) Plan to ensure that construction is consistent with the remedial design. An environmental monitor will be designated to exercise project oversight for the agency and to coordinate with the Project Sponsor. The regulatory agency will make final determinations with participation from the Sponsor to resolve unforeseen conditions that may require modifying the planned project components or the manner in which remediation is executed.

**Landowner.** The Landowner is voluntarily undertaking this project to address water quality concerns associated with Plymouth Mine.

The Landowner is responsible for conducting remediation in accordance with this Plan. The Landowner will ensure that remediation activities are completed at Plymouth Mine. The Landowner is supporting the project.

**Project Sponsor.** A Project Sponsor will be determined after funding for the remediation activities is secured. The Project Sponsor will represent the funding organization. The Project Sponsor defines the overall project scope and has the authority to make changes to that scope, if needed (with proper
regulatory coordination). The Project Sponsor is also the key point for regulatory contact. The Construction Manager is the Project Sponsor’s representative on site that will be responsible for contract administration, budget, schedule, and coordination between parties. The Project Sponsor’s Construction Manager will request assistance from the Design Engineer, as needed, to address technical, construction, and regulatory issues.

The Project Sponsor will be responsible for ensuring implementation of CQA as described herein, including required monitoring, sampling, testing, and reporting. Included within this responsibility is monitoring of the Contractor’s QC activities to ensure that project construction is conducted in accordance with contract plans and specifications. These activities may be assigned to subordinate inspectors or conducted by consultants with the requisite expertise and experience.

**Consultant.** During the course of construction, the Sponsor will retain a Consultant to act as CQA Officer and Monitor, to ensure that the remediation objectives are realized and that the project is constructed in accordance with the specifications. The CQA Officer acts as an auditor to verify and document the proper and complete implementation of the QA program. The CQA Officer will be responsible for documenting construction and preparing the final construction report, which will include a statement by the CQA Officer as to whether the construction was performed in general conformance with approved plans and specifications. The CQA Officer, in cooperation with the Design Engineer, must approve all design changes and clarifications to design questions. The CQA Officer will communicate with the Landowner on a regular basis in carrying out his or her responsibilities.

The CQA Monitor represents the Sponsor in observing and testing the Contractor’s work activities, and documents Contractor activities in sufficient detail and with continuity to provide a high level of confidence that the work product follows the intent of construction documents. The CQA Monitor also performs tests, when appropriate, to provide a high level of confidence that the characteristics of the materials and services meet requirements of the construction documents.

Whenever a CQA Monitor performs visual observations or performs tests, he or she is responsible for timely preparation and processing of all required documentation and reports. Accurate and concise reports must be prepared for all monitoring activities and for each test performed. Section 3.3 of this document describes documentation requirements.

**Contractor.** The Contractor will be required to perform the construction activities of excavation and disposal of waste rock, as described herein, and site restoration in accordance with the approved project plans and specifications. These documents contain specific, detailed requirements to achieve overall quality of the remediation project.

The Contractor is responsible for coordinating with subcontractors, scheduling and performing the work within the time frame and budget agreed to in the contract, and performing the work in accordance with the approved project plans and specifications. The Contractor is expected to cooperate with the CQA Monitor to achieve a quality product.

Specifications will require the Contractor to develop and implement a CQC Plan, through which the Contractor ensures compliance with the requirements of the contract. The CQC Plan will identify personnel, procedures, methods, instructions, inspections, records, and formats to make up the CQC system. The CQC Plan must be reviewed and approved by the Project Sponsor. The Contractor’s CQC Manager will have written CQC duties and responsibilities delegated by an officer of the firm. The
Contractor will also employ a Health and Safety Manager to implement the Contractor’s site-specific HASP as required by the contract specifications. Details on documentation required will be presented in the specifications.

The Contractor may employ subcontractors to perform selected phases of the work for which they have special expertise. The subcontractors are responsible to their prime Contractor for the quality of their work and health and safety of their project personnel in accordance with the Contractor’s CQC Plan and HASP. The subcontractors’ principals will designate a job site superintendent or foreman with responsibility to see that the work is conducted in accordance with the contract requirements.

### 3.1.1 Meetings

To facilitate construction and to clearly define construction goals and activities, close coordination between the Landowner, Sponsor, Design Engineer, CQA personnel, and Contractor is essential. To meet this objective, preconstruction, progress, and weekly meetings will be held.

**Preconstruction Meeting.** A preconstruction meeting shall be held at the site within two weeks of commencing construction and be attended by the Landowner, Project Sponsor, Contractor, Design Engineer, CQA Officer, CQA Monitor, and others designated by the Landowner. The purposes will be to:

- Identify key personnel
- Review construction drawings, specifications, CQA program, work area security, health safety and security procedures, and related issues
- Define lines of communication and authority
- Establish reporting and documentation procedures
- Review testing equipment and procedures
- Establish testing protocols and procedures for correcting and documenting construction or nonconformance
- Conduct a site inspection to discuss work areas, staging areas, access roads, haul roads, and related items
- Review the project schedule

The meeting will be documented by the CQA Officer or his representative. Copies of the minutes and relevant documents will be prepared and provided to all parties.

**Progress Meetings.** An informal progress meeting is recommended daily before the start of work. At a minimum, this meeting will be attended by the CQA Monitor and Contractor. The purpose of this meeting is to:

- Discuss problems and resolutions
- Review test data
- Discuss the Contractor’s personnel and equipment assignments for the day
- Review the previous day’s activities and accomplishments

**Weekly Meetings.** Weekly scheduled meetings will be held during active construction phases. The Construction Manager, Project Sponsor, CQA Officer or representative, Contractor, and CQA Monitor will be present. The meetings will be held to discuss progress, problems, construction schedule,
changes, test data, and any other issues necessary. The meetings will be documented by the CQA Monitor.

### 3.1.2 Communications

Figure 4 presents an organization and communication chart depicting relationships of the Landowner, Project Sponsor, Contractor, Design Engineer, and CQA Firm. The purpose of this organization chart is to define reporting and communication responsibilities for the project. Responsibilities of each party are described in Section 3.1.

Only individuals assigned to this project, as defined in the CQA Plan, communicate with the Contractor. When written communications are required, they must be documented on the appropriate forms. Formal letters to the Contractor should normally be signed by the Project Sponsor.

Only those individuals assigned to this project, as defined in the CQA Plan, communicate with the Landowner. All communications must be through the Construction Manager. Communications of an official nature must be written.

### 3.2 Inspection Activities

Sufficient inspections, independent sampling and testing, and monitoring activities will be performed to ensure compliance with the terms and conditions of the contract. The results of these inspections, sampling and testing, and monitoring activities will be documented as specified in Section 3.3. Any work found not to be in accordance with contract requirements will be immediately brought to the attention of the Contractor for correction and annotated on the “Quality Assurance Report,” (see Section 3.3) with the corrective action taken. Any work found not to be in accordance with the approved remedial design plans, specifications, work plans, and/or contract documents shall be brought to the immediate attention of the CQA Manager and Project Sponsor. The Project Sponsor will be notified of any changes to the approved contract documents before being implemented. The following inspection activities will be performed:

- Monitoring will be conducted as necessary during remediation to ensure that worker and public health and safety are protected during construction.
- Verification of the location control (stationing, offset, and elevation) during excavation, repository construction operation and closure, and site restoration activities will be completed through independent means or verification of the Contractor’s CQC checks. These checks are critical to ensure that mine waste is removed, cap materials placed, and restoration elements installed to the limits and depths specified.
- Verification will be performed that imported materials (including but not limited to: backfilling, capping, and restoration substrate materials, steel, concrete, wood, installed restoration elements, and other construction materials) comply with all contract requirements prior to delivery to the job site.

### 3.3 Documentation and Reporting

Prior to beginning work on the project, the Contractor will be required to submit various work plans for approval by Project Sponsor and the CQA Manager. Submittals required of the Contractor prior to, during, and at the completion of different tasks are summarized below.
### 3.3.1 Pre-Construction Submittals

**Construction Plan and Schedule.** For construction activities, the Contractor(s) will be required to submit a Construction Plan and Schedule for approval by Project Sponsor, the CQA Manager, and regulatory agency. No physical work is to be performed at the site until the plan is reviewed and specific authorization to start the work is obtained. The plan will cover potential environmental degradation as a result of the Contractor’s operations. The plan will contain separate sections for contamination prevention, closure, cleanup, and erosion and turbidity control as they pertain to remediation activities. The contractor will obtain a General Permit for this work.

**Construction Quality Control Plan.** The Contractor’s CQC Plan will present the system that will ensure the Contractor will meet the requirements of the contract. The CQC Plan will identify personnel, procedures, methods, instructions, inspections, potential remedies, records, and forms to be used in the CQC system.

The CQC Plan will also include a description of procedures for maintaining and updating activity logs, laboratory records, procedures for reporting emergencies, potential remedies, records for personnel and maintenance, and monthly reports to agencies. The CQC Plan will include a description of how change orders will be reviewed for consistency with specifications.

The Contractor will prepare and maintain a Daily CQC Report which includes results of all inspections, surveys, and monitoring activities and supporting documentation.

**Contractor’s Health and Safety Plan.** The Contractor will submit a HASP that will present the minimum health and safety requirements for job site activities, and the measures and procedures to be employed for protection of on-site personnel, including visitors. The HASP will cover the controls, work practices, personal protective equipment, and other health and safety requirements that will be implemented by the Contractor in connection with the cleanup actions.

### 3.3.2 Construction Documentation

The Contractor is responsible for QC, including daily checks and testing, as documented in the Daily CQC Report. The CQA Manager will provide QA, which is oversight of the Contractor’s QC procedures.

Construction documents are controlled by the Design Engineer. The CQA Officer maintains one or more copies of the most current set of construction documents for use by the CQA Monitor. Upon issuance of new copies or revisions, it is the responsibility of the Sponsor to notify the Contractor and CQA staffs of the revisions, provide revised construction documents, and order the recall of all unrevised copies of the construction documents.

As-built information is controlled by the CQA Monitor and surveyors (hired by the Contractor or by the Project Sponsor). During work progress, the CQA Officer and Design Engineer obtain as-built information from the Contractor, CQA Monitor, surveyors, or others. At the completion of the project, this information is presented to the CQA Consultant. The Contractor will use this information to prepare Record Drawings of the construction. Final as-built drawings will be included with the Construction Certification Report.

Daily report forms, test report forms, and other project forms are controlled by the CQA Monitor, who maintains a master of each form. Upon issuance of a new form, the CQA Monitor must recall and remove all superseded copies along with the master.

Each CQA Monitor writes a daily record of work progress. Daily reports are reviewed by the CQA Officer, who maintains a complete file of daily reports. The CQA Officer will document results of the QA inspections and testing and monitoring activities on a weekly basis in a QA Report, which will include
that week’s Daily CQC Reports (prepared by the Contractor). These reports will be transmitted weekly from the CQA Officer to the Sponsor. An Executive Summary, which summarizes the significant construction activity for the period, will be submitted monthly to the regulatory agency.

Where QA inspections utilize results of the Contractor’s surveys and tests, these results will be summarized and included in the QA Report. If the QA inspections’ tests reveal out-of-specification conditions, the CQA Manager will immediately contact the Contractor’s Superintendent to determine what action will be taken to modify the construction operation and correct the condition. A written memo will follow up this personal contact to the Contractor confirming any oral instructions given. Instructions to the Contractor for any work that does not comply with specifications will be confirmed with the Contractor in writing. Results of these discussions and follow-up corrective actions will be included in the weekly QA report.

### 3.3.3 Nonconformance

Whenever a nonconformance is discovered or observed in the construction process, product, job related materials, documentation, or elsewhere, the CQA Monitor must notify the Construction Manager, Contractor, and CQA Officer as soon as possible.

Whenever a nonconformance is discovered or observed, the CQA Monitor will determine the extent of the nonconformance. The extent of the deficiency may be determined by additional sampling, testing, observations, review of records, or any other means deemed appropriate.

All nonconformance must be documented in writing on the daily records, logs, and elsewhere, as appropriate. Documentation must occur immediately upon determining the extent of the nonconformance. For those nonconformance’s that are considered serious or complex in nature, or that require an engineering evaluation, a nonconformance report will be initiated and issued to the Construction Manager, Project Sponsor, Design Engineer, CQA Officer, and Contractor.

For a simple or routine nonconformance, corrective measures will be determined by specification direction, or if none exists, the CQA Monitor, CQA Officer, Construction Manager, Project Sponsor, and Contractor will discuss standard construction methods to correct the deficiency. For any nonconformance requiring a nonconformance report, the Design Engineer must determine corrective measures. A copy of the nonconformance report, with the corrective measure determination, is forwarded to the CQA Officer and Contractor for implementation of the corrective action.

Upon notification by the Contractor that corrective measures are complete, the CQA Monitor verifies completion. Verification must be accomplished by observations or retesting and photographs. Written documentation of the corrective measures must be made by the CQA Monitor on daily reports, logs and forms, and the nonconformance report. Verification of corrective measures is reviewed by the CQA Officer.

### 3.4 Remedial Action Construction Elements

The Contractor will be required to perform the following activities necessary to implement remedial actions identified in this Plan:

- Establish site access
- Excavate mine waste and complete site grading
- Containerize, transport, and dispose of mine waste at the off-site disposal facility
- Complete site revegetation
All related work will be conducted in strict accordance with project plans and specifications, which contain specific detailed requirements to achieve the project objectives including permit compliance. The following sections present a brief description of each construction element, including discussions of associated CQA monitoring and testing requirements.

3.4.1 Establish Site Access

Access to each excavation area is necessary for safe equipment and materials delivery.

The purpose for QA during establishment of access is to ensure that appropriate areas are addressed, permit conditions are maintained, and proper techniques and procedures are used in accordance with project drawings and specifications.

Performance will be monitored by construction observation that will consist of confirming appropriate locations prior to beginning site work, and visual inspection of the completed site access prior to starting other tasks.

3.4.2 Excavate Waste Rock

Waste rock will be excavated from the north bank of Hoffman Creek, and from the east bank of the tributary to Hoffman Creek at the adit. The purposes for QA during mine waste excavation are to ensure that sufficient material is removed to meet project objectives, minimize disturbance of native materials, confirm that erosion control measures are properly emplaced during the work, and confirm that the excavated material is managed appropriately. Excavated waste rock will be containerized on-site pending transport to the disposal facility.

Performance will be monitored through construction observation, review of Contractor daily reports, and visual inspection of the excavation extent when the Contractor determines that excavation is complete and prior to start of final grading.

Pre-construction surveys of each remediation area will be provided by the Project Sponsor. The Contractor is responsible for conducting surveys during construction and completing post-construction surveys. The Contractor will also record the number of fully and partially loaded trucks used to transport material from excavation areas to the on-site repository.

The CQA Monitor will be familiar with the local geology and mine waste, and will evaluate the extent of excavation based on color changes, textural changes, stratification, soil horizons, bedrock, and topography. These lines of evidence will be used to determine when excavation should stop.

3.4.3 Containerize and Transport Mine Waste to Off-site Disposal Facility

Excavated waste rock will be containerized on-site pending transport to the disposal facility. Containers will consist of roll-off bins with covers, or other containers suitable for transporting waste rock on county, state, and federal roadways in accordance with regulatory requirements. Containers will be staged on site until delivery is scheduled with the disposal facility.

CQA monitoring of containerized waste rock will consist of photographing contents, visual inspection to ensure covers are in place, and recording each container on an inspection form. CQA monitoring will also include collecting samples for laboratory analysis as requested by the disposal facility to gain acceptance of the material at the facility.
3.4.4 Site Restoration

Site restoration consists of installation of erosion control BMPs and initial revegetation efforts at each area disturbed by remediation.

CQA monitoring of site restoration will consist of visual observation to ascertain that BMPs are properly emplaced, confirmation of appropriate seed mix and/or plant list, and confirmation that initial revegetation efforts are completed in accordance with the Revegetation Plan at each area disturbed by remediation.

4.0 Post-remediation Monitoring and Annual Inspection and Maintenance

4.1 Groundwater Monitoring and Surface Water

Groundwater and surface water monitoring are often considered to be necessary to protect water quality.

4.1.1 Groundwater

Waste rock at the Plymouth Mine is located at a groundwater discharge area along Hoffman Creek on the property. Thus, any release of contamination from waste rock is expected to discharge almost immediately to surface water. The resulting limited extent of the groundwater renders groundwater monitoring at Plymouth Mine ineffective because the monitoring results would not provide information contributing to the protection of groundwater quality.

4.1.2 Surface Water

The Water Quality Control Plan for the Sacramento and San Joaquin River Basins (Basin Plan) for the Central Valley RWQCB (Central Valley RWQCB 2018) does not specifically identify Hoffman Creek which is a tributary to St. Helena Creek, a tributary to Putah Creek upstream from Lake Berryessa. The Basin Plan identifies beneficial uses for Lake Berryessa and notes that beneficial uses also apply to tributaries. Surface water beneficial uses identified in the Basin Plan for Lake Berryessa include municipal, agricultural, possible power generation, contact and non-contact recreation, warm and cold-water habitat, warm water spawning, and wildlife habitat. These beneficial uses are associated with numerical limits intended to protect each beneficial use.

Potential federal surface water requirements for tributaries to Lake Berryessa are the Safe Drinking Water Act (SDWA) and the Clean Water Act (CWA) regulations.

Plymouth Mine was identified as a potential source for mercury detected above water quality numerical limits in Hoffman Creek. Surface water at Plymouth Mine consists of seasonal runoff and groundwater discharge. A very small amount of data is available to evaluate water quality in Hoffman Creek. These data suggest that water quality is suitable for beneficial uses described above.

Remediation will include removing waste rock from locations where it can be eroded and transported to surface water, and off-site disposal. This activity may contribute to short term water quality impairment, and is not expected to affect beneficial uses of St. Helena Creek so long as appropriate measures are employed to control erosion. If surface water is flowing in Hoffman Creek during remediation, up-stream and downstream samples will be collected to evaluate potential short-term
degradation. A set of samples will be collected before waste rock excavation, weekly during waste rock excavation and about one week after revegetation activities are complete. Due to the very limited existing data set, these results will provide qualitative information about impacts of the remediation project.

Post-remediation monitoring is focused on confirming that areas disturbed by remediation are stabilized through revegetation, and erosion is minimized as described below.

4.2 Post-remediation Monitoring

Monitoring and maintenance requirements are summarized in Table 7.

This remediation project qualifies for exemption from the General Permit for Storm Water Associated with Construction Activity (Order No. 2009-0009-DWQ as amended). However, the Plymouth remediation project is very similar to construction projects subject to the General Permit. For this reason, post-remediation performance monitoring and maintenance requirements for areas disturbed during remediation at Plymouth Mine were identified in accordance with a Risk Level 2 site as defined in the General Permit.

Risk Level 2 monitoring comprises visual inspections and sample collection. When a Risk Level 2 construction site is active, the visual monitoring consists of quarterly non-storm water discharge inspections, daily site BMP inspections, pre-storm event inspections, daily inspections during storm events, and post storm inspections. Risk Level 2 sampling is necessary if storm water discharges from the site and consists of measuring the pH and turbidity levels in the discharged water.

With respect to monitoring disturbed parts of each remediation area, coverage under the General Permit is terminated in part by installing post-construction storm water management measures and establishing a long-term (5-year) maintenance plan (Section II D of the General Permit). One purpose of the long-term (5-year) monitoring is to demonstrate that final stabilization conditions are satisfied. After making this demonstration, the site could be withdrawn from the General Permit.

Meeting the monitoring requirements of the General Permit for areas disturbed by remediation is expected to demonstrate that remediation goals were attained. This expectation is reasonable because monitoring is intended to demonstrate that the site does not pose any sediment discharge risk beyond that presented before construction, and the project goal is to remove mine waste from locations where it is subject to erosion, and to leave the disturbed areas stabilized by vegetation in place. Removal of the waste rock and demonstrating stabilization of disturbed areas by vegetation would also demonstrate a reduction in the erosion and transport of metal containing mine waste to adjacent water ways.

Post-remediation Monitoring. Post-remediation monitoring will occur for five years after remediation tasks are complete. Post remediation monitoring will consist of two visual inspections per year, one in September before the onset of seasonal rains, and one in April after the seasonal rains cease. Visual inspections will consist of assessing vegetation coverage and BMP performance, and looking for evidence of erosion such as rills and gullies.

Monitoring and maintenance requirements are summarized in Table 7. Visual inspections will be documented on inspection forms and through photography.

Post-remediation Maintenance. Post-remediation maintenance will consist of repairing damaged BMPs, removing BMPs (for example straw wattles) determined to be no longer necessary (for example where vegetation is established), and installing additional BMPs as necessary to mitigate erosion. Vegetation will also be maintained in accordance with the Revegetation Plan.
5.0 References


Tables

(7 Pages)
<table>
<thead>
<tr>
<th>Task</th>
<th>Material to be removed</th>
<th>Access Preparation Steps</th>
<th>Frequency</th>
<th>Post construction</th>
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<tr>
<td><strong>Task 2 Remove and Dispose of Waste Rock</strong></td>
<td>• Collapsed Adit: 950 cubic yards of waste rock  • Former Retort: 350 cubic yards of calcine tailings</td>
<td>• Inspect area  • Remove brush as necessary for safe access.  • Minor grading to provide safe access</td>
<td>• One time at beginning of task.  • Weekly inspection during project  • Grade as needed</td>
<td>• Implement erosion control BMPs to minimize erosion</td>
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<td>• Inspect Road  • Grade to ensure safe personnel and equipment travel</td>
<td>• One time at beginning of task.  • Weekly inspection during project  • Grade as needed</td>
<td>• Revegetate in accordance with revegetation plan  • Emplace barrier to prevent travel along road  • Install appropriate BMPS to minimize erosion</td>
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<td>Not Applicable</td>
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<td>Visual monitoring and maintain BMPS in accordance with erosion control plan.</td>
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Table 2: Cleanup Activity Work Schedule*

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<th>Task</th>
<th>Duration</th>
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<th>Month 2</th>
<th>Month 3</th>
<th>Month 4</th>
<th>Month 5</th>
<th>Month 6</th>
<th>Month 7</th>
<th>Month 8</th>
<th>Month 9</th>
<th>Month 10</th>
<th>Month 11</th>
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*: Schedule is relative to actual start date, and anticipates Month 1 as falling in March or April to avoid work during the fire season that starts in October.
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<th>Sample ID</th>
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<th>Copper</th>
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<td>46/350</td>
<td>5,800</td>
<td>22,000</td>
<td>5,800</td>
<td>5,800</td>
<td>12</td>
<td>5,800</td>
<td>350,000</td>
</tr>
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<td>BLM Wildlife</td>
<td>-</td>
<td>-</td>
<td>275</td>
<td>-</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>136</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>307</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1 = California Department of Toxic Substances Control (DTSC) Human and Ecological Risk Office (HERO) Note 3–April 2019
5 = Elemental mercury/mercury chloride
6 = not provided
BLM = Bureau of Land Management
CEC = cation exchange capacity
CHHSL = California Human Health Screening Levels
US EPA = US Environmental Protection Agency
lb = pounds
mg/kg = milligrams per kilogram
meq = milliequivalents
NA = not analyzed
RSL = regional screening levels
TOC = total organic carbon
bold = exceeded one or more screening criteria
<= = less than
<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Waste Rock</th>
<th>Background</th>
<th>Water Quality Numerical Limits(^1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Slope</td>
<td>Adit</td>
<td>EPA AWQC Fresh AL MCL MCL MCL MCL Ag WQ Limit CTR-Fresh AL EPA AWQC Fresh AL CTR-Fresh AL Ag WQ Limit CTR-Fresh HH CTR-Fresh AL CTR-Fresh HH Ag WQ Limit CTR-Fresh AL</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>mg/L</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.14 &lt;0.041 0.00069 0.85 &lt;0.00043 0.019 &lt;0.0076 &lt;0.0032 3.7 0.0013 0.068 &lt;0.0097 0.0023 0.26 &lt;0.0011 0.00028 &lt;0.00011 &lt;0.003 0.89</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R1</td>
<td>0.056 &lt;0.041 0.0006 0.23 &lt;0.00043 0.0028 &lt;0.0099 &lt;0.02 &lt;0.02 1.5 0.00088 0.012 &lt;0.0097 0.0015 0.057 &lt;0.0011 0.0003 &lt;0.00011 &lt;0.003 0.02</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R2</td>
<td>2.3 &lt;0.041 0.0017 2.7 &lt;0.00043 0.0028 0.12 0.038 0.0073 16 0.0014 0.18 &lt;0.0097 0.0003 1.1 0.002 0.00024 0.00071 0.0037 0.73</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.07 &lt;0.041 0.00058 0.073 &lt;0.00043 0.0028 &lt;0.0099 &lt;0.0076 &lt;0.0032 0.85 0.00048 0.019 &lt;0.0097 &lt;0.00018 0.034 &lt;0.0011 0.00019 &lt;0.00011 &lt;0.003 0.013</td>
</tr>
</tbody>
</table>

Notes:


AqWQ = Aqueous Water Quality

AWQC = Ambient Water Quality Criteria

CTR = California Toxic Rule

DI WET = Deionized Waste Extraction Treatment

HH = Human Health

MCL = Maximum Contamination Level

mg/L milligrams per liter

< = less than

- = not applicable

**bold** = exceeded screening criteria
<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Arsenic</th>
<th>Barium</th>
<th>Cadmium</th>
<th>Chromium</th>
<th>Lead</th>
<th>Mercury</th>
<th>Selenium</th>
<th>Silver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slope Waste Rock</td>
<td>&lt;0.5</td>
<td>&lt;0.5</td>
<td>&lt;0.1</td>
<td>&lt;0.5</td>
<td>&lt;0.5</td>
<td>&lt;0.05</td>
<td>&lt;0.5</td>
<td>&lt;0.5</td>
</tr>
<tr>
<td>Adit Waste Rock</td>
<td>&lt;0.5</td>
<td>&lt;0.5</td>
<td>&lt;0.1</td>
<td>&lt;0.5</td>
<td>&lt;0.5</td>
<td>&lt;0.05</td>
<td>&lt;0.5</td>
<td>&lt;0.5</td>
</tr>
<tr>
<td>TCLP Threshold</td>
<td>5</td>
<td>100</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>0.2</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

Notes:
- mg/L = milligrams per liter
- < = less than
- - = not applicable
<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Antimony</th>
<th>Arsenic</th>
<th>Barium</th>
<th>Beryllium</th>
<th>Cadmium</th>
<th>Chromium</th>
<th>Cobalt</th>
<th>Copper</th>
<th>Lead</th>
<th>Molybdenum</th>
<th>Mercury</th>
<th>Nickel</th>
<th>Selenium</th>
<th>Silver</th>
<th>Thallium</th>
<th>Vanadium</th>
<th>Zinc</th>
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<td>0.097</td>
<td>3.6</td>
<td>&lt;0.00035</td>
<td>&lt;0.002</td>
<td>1</td>
<td>3.2</td>
<td>0.073</td>
<td>0.14</td>
<td>0.093</td>
<td>0.0015</td>
<td>19</td>
<td>&lt;0.0011</td>
<td>0.013</td>
<td>0.001</td>
<td>0.027</td>
<td>9.3</td>
</tr>
<tr>
<td>Adit Waste Rock</td>
<td>0.06</td>
<td>0.1</td>
<td>1.3</td>
<td>&lt;0.5</td>
<td>&lt;0.5</td>
<td>0.77</td>
<td>1.2</td>
<td>0.22</td>
<td>0.3</td>
<td>0.035</td>
<td>0.0038</td>
<td>10</td>
<td>&lt;0.5</td>
<td>0.027</td>
<td>0.0005</td>
<td>0.023</td>
<td>1.3</td>
</tr>
<tr>
<td>Soluble Threshold Limit Concentration</td>
<td>15</td>
<td>5</td>
<td>100</td>
<td>0.75</td>
<td>1</td>
<td>5</td>
<td>80</td>
<td>25</td>
<td>5</td>
<td>350</td>
<td>0.2</td>
<td>20</td>
<td>1</td>
<td>5</td>
<td>7</td>
<td>24</td>
<td>250</td>
</tr>
</tbody>
</table>

Notes:
- mg/L = milligrams per liter
- < = less than
<table>
<thead>
<tr>
<th>Site</th>
<th>Location or Feature</th>
<th>Monitoring</th>
<th>Maintenance Trigger</th>
<th>Maintenance Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>North of Hoffman Creek</td>
<td>North Bank of Hoffman Creek</td>
<td>Two times per year: 1. September before seasonal rains 2. April after seasonal rains</td>
<td>Bare area greater that 2-feet wide between plants.</td>
<td>In Fall before seasonal rains over-seed with native grasses</td>
</tr>
<tr>
<td>Adit Area</td>
<td>East bank of tributary near Adit</td>
<td>Two times per year: 1. September before seasonal rains 2. April after seasonal rains</td>
<td>Presence of rills or other erosion feature</td>
<td>Backfill with local soil compacted in place, and cover with one-inch layer of shredded wood mulch, over-seed with native grasses.</td>
</tr>
</tbody>
</table>
Figures

(3 Pages)
Legend

- Target Property

Westside Brownfields Coalition Assessment Project - Plymouth Mine

Figure 1 - Regional Map

Sources: ESRI Data Server 2017.

Burleson Consulting, Inc.
Figure 2 - Site Features

Sources: ESRI Data Server 2017.

Burleson Consulting, Inc.
Appendices
Appendix A

Revegetation Plan
Appendix A: Revegetation Plan for Plymouth Mercury Mine Site Cleanup Project

Prepared by

Burleson Consulting, Inc.
950 Glenn Drive
Suite 245
Folsom, CA 95630
(916) 984-4651

Prepared for
Westside Brownfields Coalition Assessment Project

July 2019
1.0 REVEGETATION STRATEGY
This Revegetation Plan (plan) details revegetation of about 0.12 acre of disturbed habitats at the Plymouth Mercury Mine Site Cleanup Project (Plymouth Mine). This plan provides guidelines for revegetating Plymouth Mine after site cleanup activities are completed. This plan also contains success criteria and monitoring protocols. After project activities are complete, the goal is to establish native vegetation cover at the disturbed areas within the site. Plants and their habitat are expected to be enhanced through these revegetation efforts. Revegetation should include the placing of topsoil where necessary, the purchase of native plant seeds, and the mulching of seeded areas.

The success of revegetation should depend on proper timing of seeding and weed control. Native plants in the region are specifically adapted to dry summers and mild, wet winters. Native plant communities in the region usually germinate after the first soaking rains and flower and seed in the dryer portions of the year. As a result, seeding should occur during or shortly before the rainy season.

2.0 GOALS AND OBJECTIVES
The site cleanup goals for Plymouth Mine cleanup areas are to reduce the potential risk of water quality degradation posed by mining wastes, and reduce the potential for human exposure to mercury in mine waste.

These goals will be achieved through completion of the following tasks:

- Remove waste rock from the Hoffman Creek north bank, transport waste to an offsite repository, and place clean topsoil where needed to support plant growth or grading
- Remove waste rock from the east bank of the Hoffman Creek tributary downslope of the collapsed adit, transport waste to an offsite repository, and place clean topsoil where needed to support plant growth or grading

The goal of the revegetation is to establish self-sustaining areas of native vegetation communities where clean up activities take place. The specific objective for this plan is to revegetate areas disturbed by cleanup activity through hand broadcast seeding and willow plug staking.

3.0 EXISTING SITE CONDITIONS
The Plymouth Mine consists of about 0.25-acres of disturbed land along Hoffman Creek, a tributary to St. Helena Creek in southern Lake County. The Plymouth Mine is located to the southeast of the historical Mirabel Mercury Mine and consists of adits and shafts advanced to explore for a continuation of the ore body exploited at the Mirabel Mine. It is also located within ancestral lands of the Yocha DeHe Wintun Nation. Site cleanup will occur at two waste rock locations along Hoffman Creek totaling 0.12 acre (Figure 1). These locations are above bankfull of the nearby water body and will require import of fill material to stabilize slopes as well as support vegetation.

Plymouth Mine is located in a portion of the inner California Coast Ranges that generally is characterized as a Mediterranean climate with arid, warm summers; relatively wet winters; and moderate temperatures (33 to 90 °F). However, the area can be subject to freezing temperatures during winter months (Western Regional Climate Center, 2012). Precipitation in the area generally occurs as rainfall, but the high elevation areas may receive some snowfall annually.

Dominant vegetation communities that occur at the site include riparian, mixed serpentine chaparral, and mixed oak woodland. According to the California Natural Diversity Database (CNDDB), the
site potentially supports several special status and rare plant species including Three Peaks jewelflower (Streptanthus morrisonii ssp. elatus – California Native Plant Society [CNPS] Rare Plant Rank 1B.2), early jewelflower (Streptanthus vernalis - CNPS Rare Plant Rank 1B.2), and Rincon Ridge ceanothus (Ceanothus confuses – CNPS Rare Plant Rank 1B.1), adobe-lily (Fritillaria pluriflora), San Joaquin spearscale (Extriplex joaquinana), and serpentine soil dependent species such as Indian Valley brodiaea (Brodiaea rosea).

Native vegetation immediately surrounding the project site should be flagged and all efforts should be made to avoid damaging this vegetation. Work near plants identified to remain in place should be restricted to hand work to prevent damage. However, some shrubs near cleanup areas may need to be removed to complete cleanup activities.

4.0 PROCEDURES

4.1 Revegetation

After the contractor has completed excavations, grading, and recontouring/stabilizing of associated slopes, the areas will be revegetated using a native seed mix. The contactor should determine the planting boundary and locations and these areas should be flagged or marked.

Hand broadcast seeding should be conducted over disturbed areas. The seed mix should contain local native plants. Table 1 presents a recommended list of plants that should be used in this revegetation. Seeds should be broadcast through hand seeding followed by straw mulch. The organic stabilizer/tackifier should be an organic substance supplied in powder form and should be psilium-based and packed in clearly marked bags stating the contents of each package.

4.1.1 Site Seeding

Non-irrigated seeding should be used as the chief means of revegetating the site. The desired plant community should be characteristic of both the adjacent undisturbed habitat and the early seral recovery areas on the site, native grassland. The plant species used in the seed mix includes species that are easily established from seed.

Recommended Seed Mix. Seeds should be purchased from reputable native seed suppliers that meet the pure live seed standards specified for each species. All seed should be in conformance with the California State Seed Law of the Department of Agriculture. Each seed bag should be delivered to the site sealed and clearly marked as to species, purity, percent germination, dealer’s guarantee, and dates of test. In addition, the container should be labeled to clearly reflect the amount of Pure Live Seed (PLS) contained. Table 1 presents a recommended seed mix for Plymouth Mine upland areas. Table 2 presents a recommended seed mix for Plymouth Mine riparian area in the North Bank cleanup area.

Table 1 – Recommended Seed Mix for Plymouth Mine Upland Areas.

<table>
<thead>
<tr>
<th>Native Annual and Perennial Mix 4 lbs/0.1 acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Botanical Name</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Bromus carinatus</td>
</tr>
<tr>
<td>Elymus glaucus</td>
</tr>
</tbody>
</table>
**Frangula californica**  California Coffeeberry  P

**Festuca microstachys**  Small Fescue  A

**Nassella pulchra**  Purple needle grass  A

**Baccharis pilularis**  Coyote Bush  P

**NOTE**: Perennial species listed above will represent 10% of the total seed.

### Table 2 – Recommended Seed Mix for Plymouth Mine Riparian Area.

<table>
<thead>
<tr>
<th>Botanical Name</th>
<th>Common Name</th>
<th>Annual or Perennial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carex nudata</td>
<td>Torrent sedge</td>
<td>P</td>
</tr>
<tr>
<td>Deschampsia caespitosa</td>
<td>Tufted Hairgrass</td>
<td>P</td>
</tr>
<tr>
<td>Juncus oxymeris</td>
<td>Pointed rush</td>
<td>P</td>
</tr>
<tr>
<td>Festuca microstachys</td>
<td>Small fescue</td>
<td>A</td>
</tr>
</tbody>
</table>

Note: approximately 50 willow plugs will be necessary.

**Seed Application.** The seed mix should be applied to the site by hand seeding. Application rates should be provided by the seed supplier. General application rates for the seed mix shown in Tables 1 and 2 are 45 pounds per acre and 80 pounds per acre, respectively.

**Willow Installation.** Willow plugs will be salvaged from willow trees (Salix sp.) located upstream of the project site and used in the as live woody cuttings. These cuttings shall be at least 6 feet long, with a minimum diameter of 3/4 inch.

**4.1.2 Photograph Documentation**
Photos should be taken throughout the duration of the project to document the revegetation activity and progress.

**4.1.3 Irrigation**
No watering or irrigation practices are anticipated to occur for the seeded area. Seeds used at Plymouth Mine are for indigenous species adapted to the anticipated site conditions.

**5.0 SUCCESS CRITERIA**
Success criteria are directly related to the project goals and objectives presented in Section 2.0 of this plan. Success will be measured by identifying when an area has established a minimum 50 percent vegetation cover, is self sustaining, and on a trajectory to reflect similar vegetative types and cover found within the surrounding area.

Plymouth Mine should be considered to have been successfully revegetated when native seed broadcasting and natural recruitment has met the success criteria.
6.0 MONITORING
Revegetated areas should require maintenance monitoring. The monitoring period should begin at the time of the initial plant installation.

**Maintenance and Revegetation Monitoring.** After the revegetation is complete, maintenance and revegetation monitoring should begin. Meandering transects, photo documentation, and general observations and notes will be conducted during each monitoring event. Permanent photo points will document changes at each revegetated area to evaluate success criteria. Observations will also analyze erosion, plant germination, vegetation species, and invasive weeds. Corrective actions will be recommended, if necessary. Monitoring should occur in accordance with the schedule in Section 4.0 of the Remediation Work Plan.

**Assessing Effectiveness and Adaptive Management.** After each monitoring event, the monitoring results should be compared to the success criteria. Areas that meet the success criteria will no longer be monitored. Areas that require corrective measures should continue to be monitored until they meet the success criteria. Specifically, monitoring should continue and corrective measures implemented, until the success criteria are met. In all cases, weed management should continue.

7.0 CORRECTIVE MEASURES
If during the course of the monitoring schedule, the revegetated areas are obviously not progressing toward the success criterion, then corrective measures may be employed. If, at the end of the monitoring schedule, an area has not reached the success criteria, the owner may employ corrective action measures, and continue monitoring until the success criteria are met. Measures should be based on results and observations from the adaptive management approach described above. Corrective action measures may include additional broadcasting of seeds or transplanting of container-grown plants and/or additional amendments (straw, mulch, mycorrhizal inoculates, etc.), and improved erosion controls. Monitoring and corrective measures should be employed until the success criteria are met.

8.0 REPORTING
*Maintenance/ Vegetation Reports*
The post-installation monitoring maintenance period should occur after the end of each rainy season for the first two years after project installation. General observations should be made about the surface water drainage, erosion control, and the progress of the revegetation.

9.0 WEED MANAGEMENT
A determination of the need for weed removal should be conducted during each monitoring event. Removal of large perennial weeds should occur before seed set. No spraying of large weeds should occur before seed set of target annual species.
NOTE: Revegetation seeding and mulching will occur on all areas disturbed by site cleanup activities.
Appendix B

Erosion Control Plan
Appendix B: Erosion Control Plan for Plymouth Mercury Mine Site Cleanup

Prepared by

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Prepared for
Westside Brownfields Coalition Assessment Project

July 2019
1.0 Remediation Area Control Measures

This Erosion Control Plan details erosion control measures that have been developed for the north bank of Hoffman Creek, east bank of the Hoffman Creek tributary at the Adit, and access road and will be implemented on site. Table 1 provides a summary of the erosion control measures that will be used at each remediation area. Additionally, fact sheets for proposed BMPs are included in this plan following remediation area descriptions.

The erosion control measures identified herein are based on the slopes and materials anticipated prior to implementing remediation. Actual erosion control measures should be tailored to the site based on actual site conditions after excavation and any associated backfill is emplaced. If site conditions require significant variation from the erosion control measures identified herein, the project engineer should be consulted prior to implementing suggested changes.

Table 1. Summary of Erosion Control Measures by Remediation Area

<table>
<thead>
<tr>
<th>Erosion Control Measure (CASQA)</th>
<th>North Bank</th>
<th>Tributary East Bank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straw Mulch</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Hand Broadcast seeding</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Live Staking</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Vegetated longitudinal stone toe</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Fiber Rolls (SE-5)</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

1.1 North Bank (0.1 acre)

Remediation activities at this location consist of removing waste rock from the slope between Hoffman Creek and the access road. This area is approximately 0.1 acre with a 150-foot streamside edge. The disturbed area will be regraded to a 3:1 slope or to match the adjoining topography. Additionally, offsite topsoil will likely need to be imported from a nearby location to support seeding activities. Seed broadcast in upland areas should have a topsoil depth of at least 12 inches to improve vegetation success rate. The waste rock nearest the tributary will be removed to create a longitudinal stone toe. Material to form this stone toe may be from removal activities. Willow plugs will be staked in at an angle behind the stone toe. Riparian seed will also be broadcast along the longitudinal stone toe. The upland resurfaced slope will be revegetated with an erosion control native seed mix that will have straw mulch cover to mitigate erosion. Erosion control measures for the North Bank are illustrated in Figure 1 of this plan. Below is a list of erosion controls will be employed:

- Track walk site after import of fill material, if necessary, perpendicular to the slope prior to reseeding.
- Trench for fiber roll placement after track walking.
- Install fiber rolls at the upslope boundary of the area disturbed by remediation and another row of fiber rolls mid-slope. The installation of fiber rolls will be parallel to the contour of the regraded slope, and space fiber rolls each 20 linear feet along slope.
- Emplace longitudinal stone toe with willow plugs
- Hand seed with riparian seed mix and native erosion control seed mix.
• Straw mulch disturbed areas outside of longitudinal toe

1.2 Tributary Bank (0.02 acre)

Remediation activities at this location consist of removing waste rock from the eastern side of a tributary to Hoffman Creek near its confluence. Imported fill material will be required to create a grade of 3:1 slope or to match adjoining native topography. Once the grade is established the site will be track walked perpendicular to the slope. Erosion control measures for the Tributary Bank are illustrated in Figure 1 of this plan. The following erosion control measures will be employed:

• Track walk site after import of fill material, if necessary, perpendicular to the slope prior to reseeding.
• Trench for fiber roll placement after track walking.
• Install fiber rolls at the upslope boundary of the area disturbed by remediation and another row of fiber rolls mid-slope. The installation of fiber rolls will be parallel to the contour of the regraded slope, and space fiber rolls each 20 linear feet along slope. At least a row of fiber roll at the head of the cleanup area and one at the toe.
• Hand seed disturbed area with native erosion control seed mix.
• Straw mulch disturbed area

2.0 Monitoring

Cleanup areas will require maintenance monitoring to ensure that erosion is minimized at the disturbed areas. Erosion monitoring will occur during revegetation monitoring. Indications of erosion include formation of rills, significant accumulation of sediment behind fiber rolls, undercutting of fiber rolls, and offsite transport of sediment.

3.0 Corrective Measures

If during the course of erosion control measure monitoring there is evidence that erosion is occurring at cleanup area, corrective measures will be assessed and employed. Corrective measures may include additional broadcast of seed, soil or additional soil amendments, installation of new or additional fiber rolls, geotextile mats, silt fencing, or additional mulch or riprap. Monitoring and corrective measures will be employed until vegetation is established. Any corrective action will be documented and the appropriate team members notified.
NOTE: Revegetation seeding and mulching will occur on all areas disturbed by site cleanup activities.