# Draft
# Reclamation Plan
# Preferred Alternative

**Report Prepared for**

RESOLUTION COPPER

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# Reclamation Plan
# Preferred Alternative

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**PRESENTED TO**

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# ACRONYMS/ABBREVIATIONS

| Abbreviation | Unit or Term |
|---|---|
| AAC | Arizona Administrative Code |
| ADEQ | Arizona Department of Environmental Quality |
| AMLRA | Arizona Mined Land Reclamation Act |
| amsl | above mean sea lever |
| APP | Aquifer Protection Permit |
| A.R.S. | Arizona Revised Statute |
| ASMI | Arizona State Mine Inspector |
| AZPDES | Arizona Pollutant Discharge Elimination System |
| CFR | Code of Federal Regulations |
| EIS | Environmental Impact Statement |
| EPS | East Plant Site |
| ERU | Ecological Response Unit |
| FSH | Forest Service Handbook |
| FSM | Forest Service Manual |
| GPO | General Plan of Operations |
| H | Horizontal |
| kV | Kilovolts |
| MARRCO | Magma Arizona Railroad Company |
| NFS | National Forest System |
| NPAG | Non- Potentially Acid Generating |
| NRCS | Natural Resources Conservation Service |
| PAG | Potentially Acid Generating |
| PLS | Pure Live Seed |
| PMLU | Post-Mining Land Use |
| ROW | Right-of-Way |
| SRCE | Standardized Reclamation Cost Estimator |
| SWPPP | Stormwater Pollution Prevention Plan |
| TNF | Tonto National Forest |
| TSF | Tailings Storage Facility |
| USFS | United States Forest Service |
| U.S.C. | United States Code |
| V | Vertical |
| WPS | West Plant Site |
| WRCC | Western Regional Climate Center |

# 1 INTRODUCTION

Resolution Copper proposes to construct and operate an underground copper mine with associated facilities on a combination of private, federal, and state lands in Arizona.

Resolution Copper submitted a proposed plan of operations (General Plan of Operations [GPO] (Resolution Copper, 2020b)) to the United States Forest Service (USFS) for consideration in an environmental impact statement (EIS). As the analysis progressed, and in response to public scoping comments and consultation throughout the EIS, the Skunk Camp alternative tailings storage facility (TSF) location was identified as the "preferred alternative" (USFS, 2019), which differs from the GPO originally submitted. Resolution Copper will revise their plan of operations to include the Skunk Camp TSF and support facilities. The TSF will require a pipeline to transport tailings from the processing facility and associated power. This plan considers the "northern route" of the tailings pipeline as identified in the Final EIS and updated to account for public and agency comments.

Resolution Copper estimates that the Preferred Alternative would have an operational life of approximately 40 years, not including initial site construction and final reclamation. Construction is expected to take approximately 10 years and reclamation is projected to take 5 to 10 years. Post-closure monitoring would continue beyond closure.

The Tonto National Forest (TNF) prepared a Draft EIS which included a mitigation measure (**Table 1**), that established some requirements for a reclamation and closure plan prior to issuing the Final EIS.

**Table 1. FS-226 Requirements for Preparation of a Detailed Reclamation Plan**

| **FS-226 Preparation of detailed reclamation plans for the Preferred Alternative** |
|---|
| **Description/overview:**<br>Information derived from the soil surveys, vegetation surveys, and soil testing would be used to develop detailed reclamation plans for the Preferred Alternative. These reclamation plans would be more specific than those included in the GPO, and would include such details as: maps of the post-closure landform depicting the type of final closure cover for each area (depth of material, type of material, anticipated source of material and preparation methods like crushing or sorting, and need for/presence of armoring); anticipated reclamation techniques such as surface preparation, seeding, planting, watering (if any), soil amendments; soil salvage storage locations and storage management techniques; maps of the post-closure landform or the landform over time, depicting phasing of revegetation or reclamation activities; monitoring details including proposed success criteria and the potential use of comparison reference plots. The detailed reclamation plans would also include more specific information on post-closure stormwater controls, the anticipated longevity of engineered control systems, and criteria for when stormwater would be deemed appropriate for release back to the downstream drainages. The appropriate level of detail for the final reclamation plans would be determined in conjunction with the Tonto National Forest. The Forest Service is requiring that these plans be prepared between the Draft EIS and Final EIS. |
| **Source of measure:**<br>Forest Service |
| **Resource affected/impacts being mitigated:**<br>This statement seeks to mitigate impacts on long-term reclamation and vegetation. |
| **Applicable alternatives:**<br>Preferred Alternative |
| **Authority to require:**<br>While the footprint of the Preferred Alternative may not involve Forest Service surface resources, other aspects of the project still involve Forest Service surface resources, and the information collected under this measure is considered necessary to support the final mining plan of operations. |
| **Additional ground disturbance:**<br>No additional ground disturbance anticipated. |

## 1.1 PURPOSE OF THE REPORT

This Reclamation Plan has been prepared as per DEIS mitigation measure FS-226 to outline the reclamation and closure measures and establish the basis for the reclamation cost estimate and financial assurance. It is designed to return land disturbed by Resolution Copper's mining activities to a near natural condition and ensure the site does not pose any long-term risk to the people or surrounding environment. An overarching goal of this plan is to establish specific reclamation practices that would enable future land uses and meet the applicable requirements of federal and state regulatory programs. **Attachment A** of this plan specifically addresses the Skunk Camp TSF reclamation (KCBCL, 2020a). Although the mine plan and all components cover multiple jurisdictions, the entire closure and reclamation plan has been written consistent with the requirements of Title 36 of the Code of Federal Regulations (CFR) Part 228, Subpart A – U.S. Department of Agriculture, Forest Service rules and procedures for locatable and leasable minerals.

# 2 PROJECT DESCRIPTION

The Preferred Alternative is largely within eastern Pinal County, Arizona. The TSF is partially in Gila County.

This section includes a brief summary of the activities proposed in the Preferred Alternative to provide a summary of the facilities and their locations.

The proposed underground mine, ore processing operation, and associated facilities identified as the Preferred Alternative (shown on **Figure 1**) are described below:

- East Plant Site (EPS) (**Figure 2**);
- West Plant Site (WPS) (**Figure 3**);
- Magma Arizona Railroad Company (MARRCO) corridor (**Figure 4**, **Figure 5**, and **Figure 6**);
- Filter Plant and Loadout Facility (**Figure 7**);
- Pipeline and power line corridor between WPS and TSF (**Figure 11**); and
- Skunk Camp TSF and facilities (**Figure 12**), discussed in **Attachment A**.

## 2.1 LAND USE AND OWNERSHIP

The Preferred Alternative is on National Forest System (NFS) Lands (federal), Arizona State Lands (state) and Resolution Copper (private) lands. During project implementation, some lands may be purchased from ASLD resulting in a change in the acres from Arizona State Lands to private. The land uses can be summarized as low-density cattle grazing, historic mining, public recreation, and wildlife habitat.

**Table 2** provides a breakdown of surface ownership acres, based on the ownership now and assuming the land exchange is implemented at EPS. **Table 3** itemizes the disturbance acres by facility. Both tables show acreage estimates by land ownership post-land exchange. Disturbance acres shown below are based on the following assumptions for power lines and pipelines:

- 115 kilovolt (kV) power line + pipeline corridor = 200 feet of construction disturbance where the pipeline is placed in a trench and buried, except in the following areas: tunnel section in Silver King area, trenchless beneath US60, bridge/span over Queen Creek and Devil's Canyon, and trenchless beneath Mineral creek/proposed critical habitat for Yellow Billed Cuckoo and critical habitat for Gila Chub.
- 230kV power line (WPS to EPS) = 70 feet of construction disturbance
- 230 kV power line (Silver King to WPS) = 70 feet of construction disturbance

**Table 2: Preferred Alternative Disturbance Acres by Surface Owner**

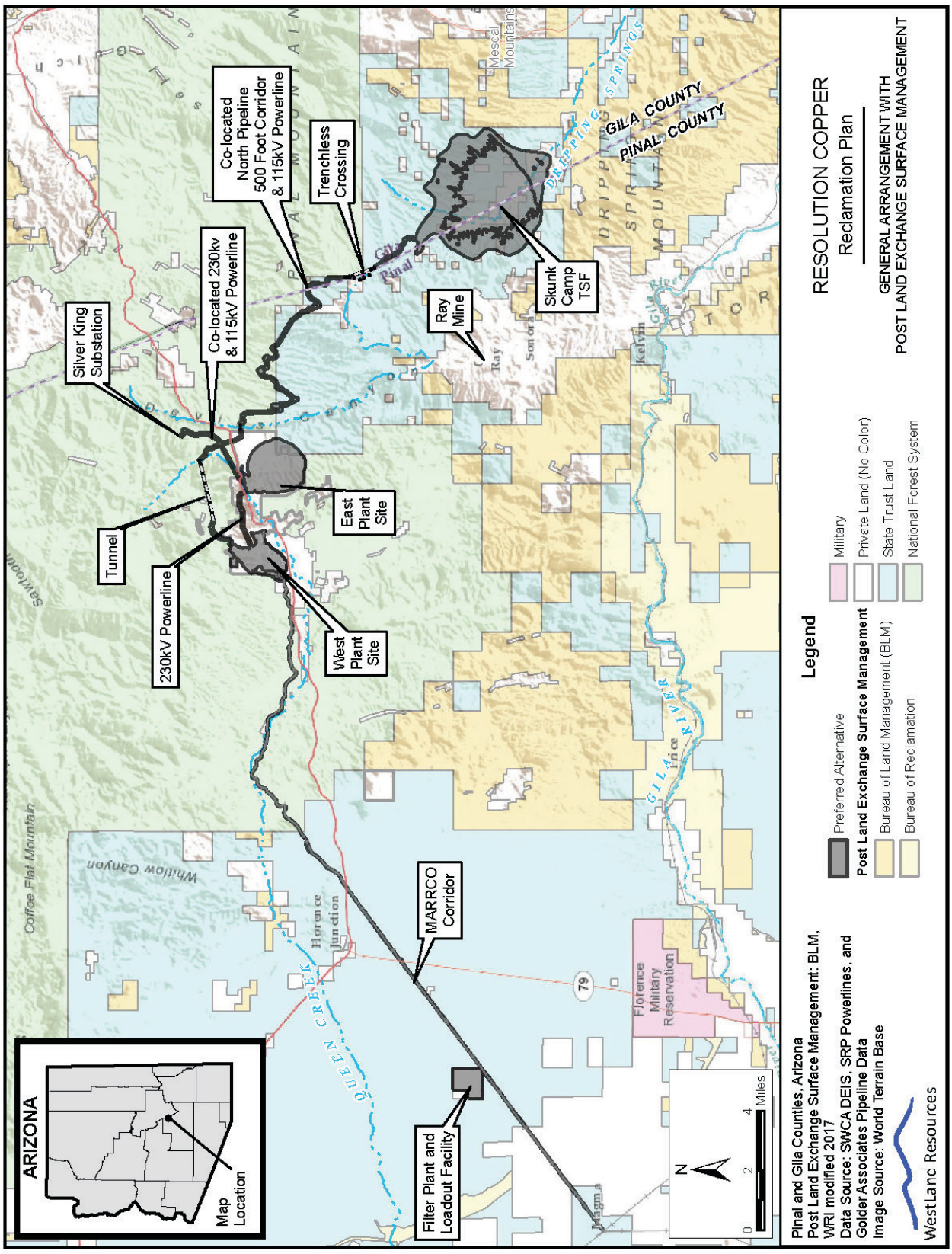
| Surface Ownership | Type | EPS | WPS | TSF | Filter Plant and Loadout Facility | MARRCO (new) | Pipeline/ Power Line | Total |
|---|---|---|---|---|---|---|---|---|
| TNF | Federal | - | - | - | - | 65 | 607 | 672 |
| Resolution Copper | Private | 1,560 | 470 | 1,578 | 533 | 23 | 356 | **4,520** |
| State Trust Lands | State | 118 | - | 2,855 | - | 81 | 475 | **3,529** |
| Total | | 1,678 | 470 | 4,433 | 533 | 169 | 1,438 | **8,721** |

**Table 3. Preferred Alternative Disturbance Acres by Landowner and Reclamation Regulatory Authority**

| Project Feature | TNF (36 CFR 228) | Private (ASMI and APP) | State Trust Lands (ASMI and APP) |
|---|---|---|---|
| TSF | - | 1,560 | 2,442 |
| Seepage Dam | - | 2 | 12 |
| Diversions | - | 4 | - |
| Toe Collection Pond | - | 2 | - |
| Borrow Area 1 | - | 6 | 173 |
| Borrow Area 2 | - | - | 214 |
| Facilities and Buildings | - | 4 | 14 |
| **TSF and Facilities Subtotal*** | - | **1,578** | **2,855** |
| EPS and Mine Area | - | - | - |
| Facilities and Roads | - | 99 | - |
| Subsidence | - | 1,461 | 118 |
| **EPS and Mine Area Subtotal** | **-** | **1,560** | **118** |
| **WPS** | **-** | **470** | **-** |
| **Filter Plant and Concentrate Loadout Facility** | **-** | **533** | **-** |
| **MARRCO Corridor** | **65** | **23** | **81** |
| Power Lines and Pipelines Between Facilities | - | - | - |
| Pipeline (EPS to 115kV) | 134 | 22 | 0 |
| Pipeline and 115 kV to TSF | 285 | 98 | 475 |
| 230 kV Power Line Silver King to Oak Flat | 182 | 35 | 0 |
| 230kV Superior to Oak Flat | 6 | 201 | 0 |
| **Power Line and Pipelines Subtotal** | **607** | **356** | **475** |
| **TOTALS** | **672** | **4,520** | **3,529** |

ASMI = Arizona State Mine Inspector, APP – Aquifer Protection Permit.
* Acres may differ from **Attachment A** for the TSF based on differing assumptions and calculations methods. Discrepancies will be resolved in the final Reclamation and Closure Plan following the Forest Service record of decision.

**Figure 1. General Arrangement with Post Land Exchange Surface Management**



## 2.2 EPS FACILITIES

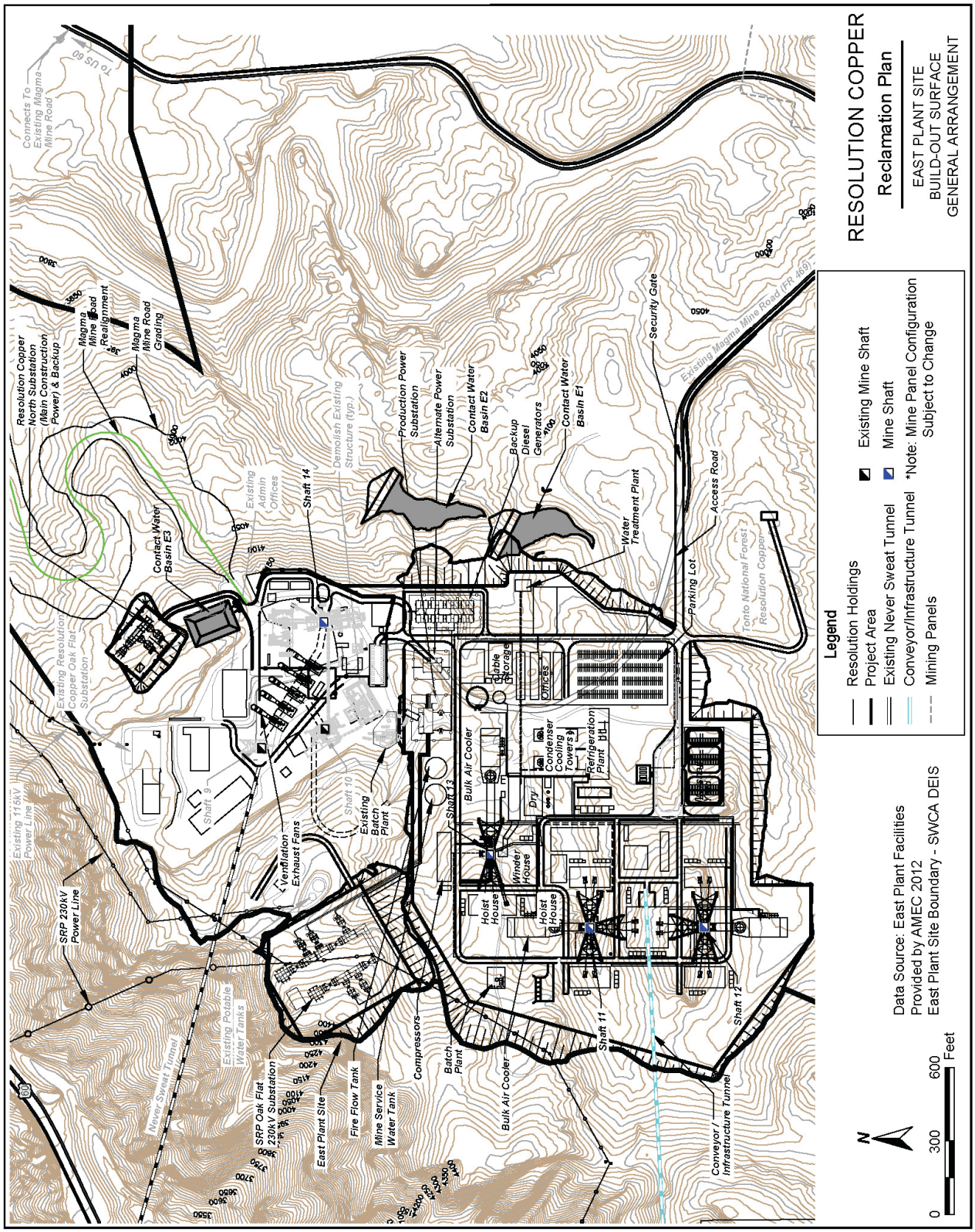
The EPS encompasses the proposed underground mine, access shafts and ore handling systems, and surface support facilities. The EPS facilities are illustrated in **Figure 2**.

- Water tanks (Fire Flow, Mine Service)
- Compressor building
- Batch plants
- Bulk air coolers
- Mine Shafts 9, 10, 11, 12, 13, and 14
- Portal to conveyor tunnel
- Magma Mine Road
- Batch Plant
- Electrical and mechanical building
- Wastewater treatment plant
- 230kV power line from existing Silver King Substation to new Oak Flat Substation – steel lattice or tubular structures with concrete foundations
- 115kV power line – steel lattice or tubular structures with concrete foundations
- 115kV and 230kV Oak Flat substations
- Resolution Copper North substation
- Production Power substation
- 230kV power line from Oak Flat to Superior (see WPS Facilities below) – steel lattice or tubular structures with concrete foundations
- Refrigeration plant and Condenser Cooling Towers
- Employee facilities, administration building, storage and maintenance, security, first aid, wash by, and training buildings
- Never Sweat Tunnel ventilation exhaust fans
- Laydown yards
- Offices and Canteen and parking lot
- Explosive storage area
- Chemical storage
- Fuel tanks
- Contact stormwater basins

At the time of closure, some facilities may have a post closure use and would remain, however for the purpose of this plan, it is assumed that all surface support facilities would be removed, and the land reclaimed, except for functional NFS Roads.

The underground mining at the EPS would cause ground subsidence. The subsidence area would not be actively reclaimed due to access. Closure measures are detailed further under Section 5.

**Figure 2. EPS Overview**



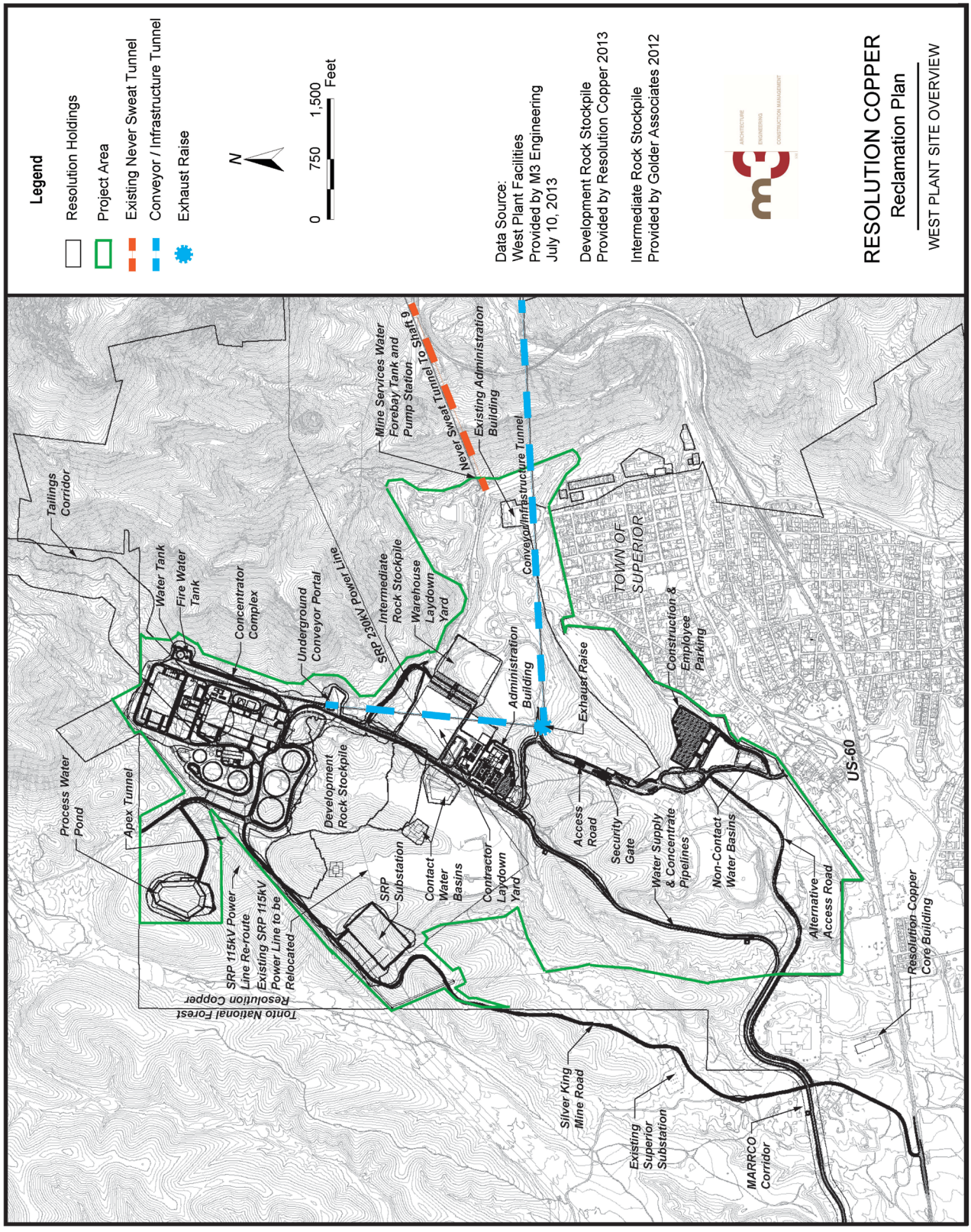
## 2.3 WPS FACILITIES

Several important features would be located on existing disturbance at the WPS, including enclosed development rock stockpiles, new ore processing facilities (Concentrator Complex), conveyor systems, process water pond, and associated surface infrastructure to support the underground development and mining occurring at the EPS. WPS features are shown in **Figure 3**.

- Administration buildings, security building and gates
- Chemical Storage building
- Apex tunnel stormwater diversion
- Parking lots
- Water tank
- Water supply pipelines
- 115kV Trask substation
- 115kV power line – steel lattice or tubular structures with concrete foundations
- 230kV Superior substation
- 230kV power lines (from Silver King substation and existing transmission lines west of WPS) – steel lattice or tubular structures with concrete foundations
- Laydown yards
- Roads, including NFS Roads 229 (Silver King Mine Road) and NFS Road 1010
- Never Sweat Tunnel substation
- Never Sweat Tunnel ventilation
- Never Sweat Tunnel portal
- Concentrator Complex (grinding mills, flotation circuit)
- Water treatment plant
- Water retention and contact water ponds
- Process water ponds and storage tank
- Freshwater storage tank
- Roads necessary to access the above facilities, buildings, and infrastructure; or to provide access for security patrols to the overall industrial site.

Similar to facilities at the EPS, at the time of closure some facilities may have a post closure use and would remain, however for the purpose of this plan, it is assumed that all the facilities will be removed, and land reclaimed, with the exception of the cooling tower which is a historical feature, and existing NFS Road 229 (Silver King Mine Road), NFS Road 8, and NFS Road 3152.

**Figure 3. WPS Overview**



## 2.4 MARRCO CORRIDOR AND FILTER PLANT AND LOADOUT FACILITIES

Resolution Copper owns the MARRCO railroad, which includes approximately 30 miles of track from Magma Junction (near San Tan Valley) to the town of Superior (**Figure 4**). The MARRCO railroad right-of-way (ROW) currently includes Arizona Water Company facilities (water treatment plant site, wells, and a 12-inch water main which would be upgraded to a 20-inch line, and associated booster station) and an 18-inch water line from the WPS to the New Magma Irrigation & Drainage District. The MARRCO ROW also contains a buried Qwest fiber optic line, a buried El Paso Natural Gas pipeline, and two 69kV power lines overhead and a telephone line from the existing Abel substation.

The Preferred Alternative would continue to use the MARRCO corridor. Additional facilities would include:

- Desert Wellfield (a number of wells appropriately spaced ) (Montgomery & Associates, 2018) (**Figure 4**);
- A pump station, installed between Desert Wellfield and WPS (**Figure 7 and Figure 10**);
- A 36-inch water pipeline for water supply and return water (**Figure 5**, **Figure 6,** and **Figure 8**);
- Two 8-inch high-density polyethylene-lined steel pipelines (largely buried with the exception of crossings to span major drainages like Queen Creek) to deliver the concentrate from the WPS to the Filter Plant and Loadout Facility (**Figure 5**, **Figure 6,** and **Figure 8**); and
- Power lines from the existing Abel substation (**Figure 6**).

The Filter Plant and Loadout facility would have a new rail loop, buildings, concrete containment, an electrical substation, laydown yards, and a parking lot (**Figure 7**).

Similar to facilities at the EPS and WPS, at the time of closure some facilities may have a post closure use and would remain, however for the purpose of this plan, it is assumed that the Resolution Copper facilities in the MARRCO corridor and the Filter Plant and Loadout facility would be removed, and the land reclaimed, as would the Desert Wellfield, pump station water pipeline, and concentrate pipeline. The power lines, railroad, Arizona Water Company line, and roads that support the post-mining land use (PMLU) and access control gates would remain.

**Figure 4. MARRCO**

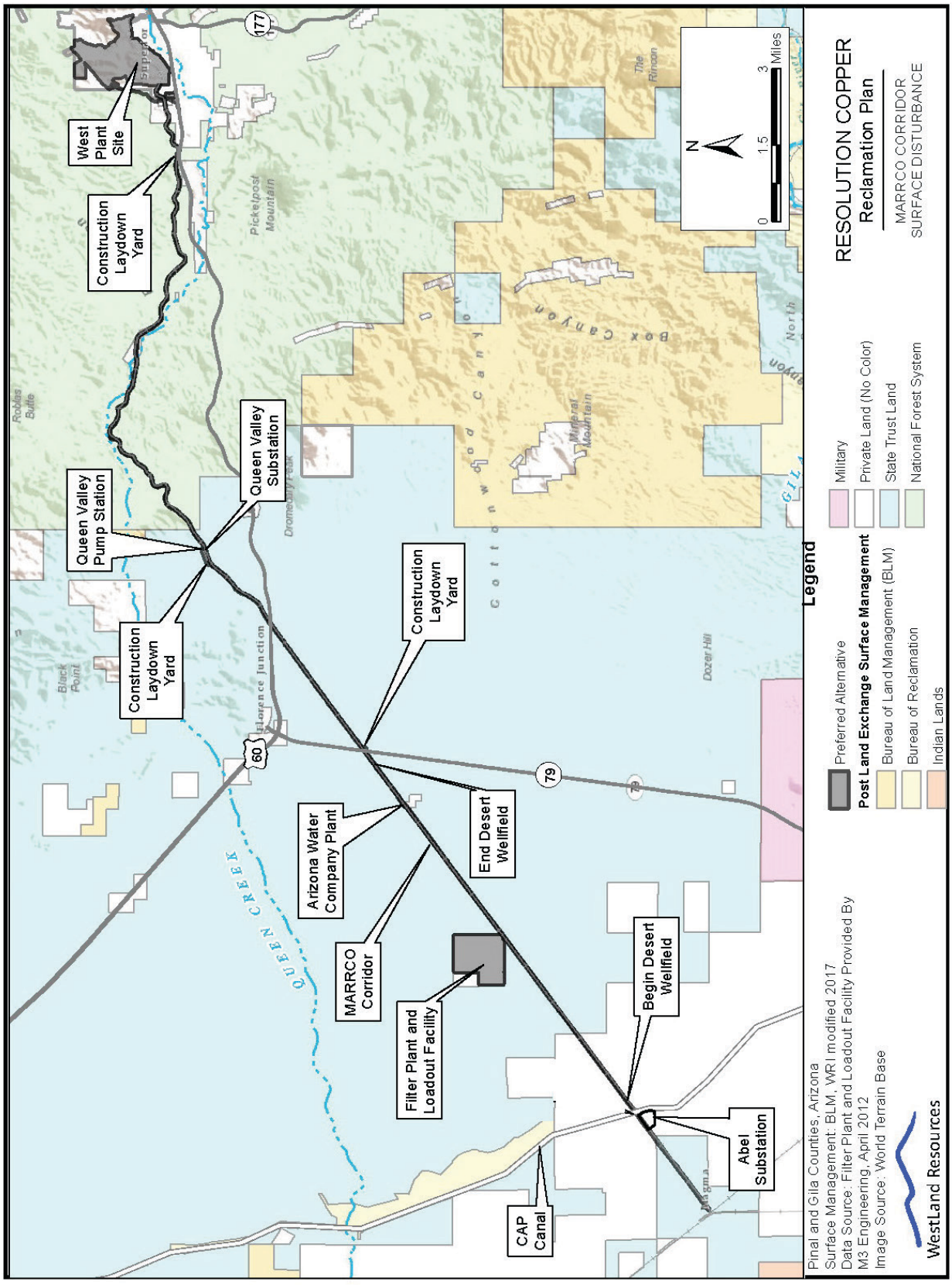


**Figure 5. Typical ROW with Concentrate Pipeline (WPS to Filter Plant)**

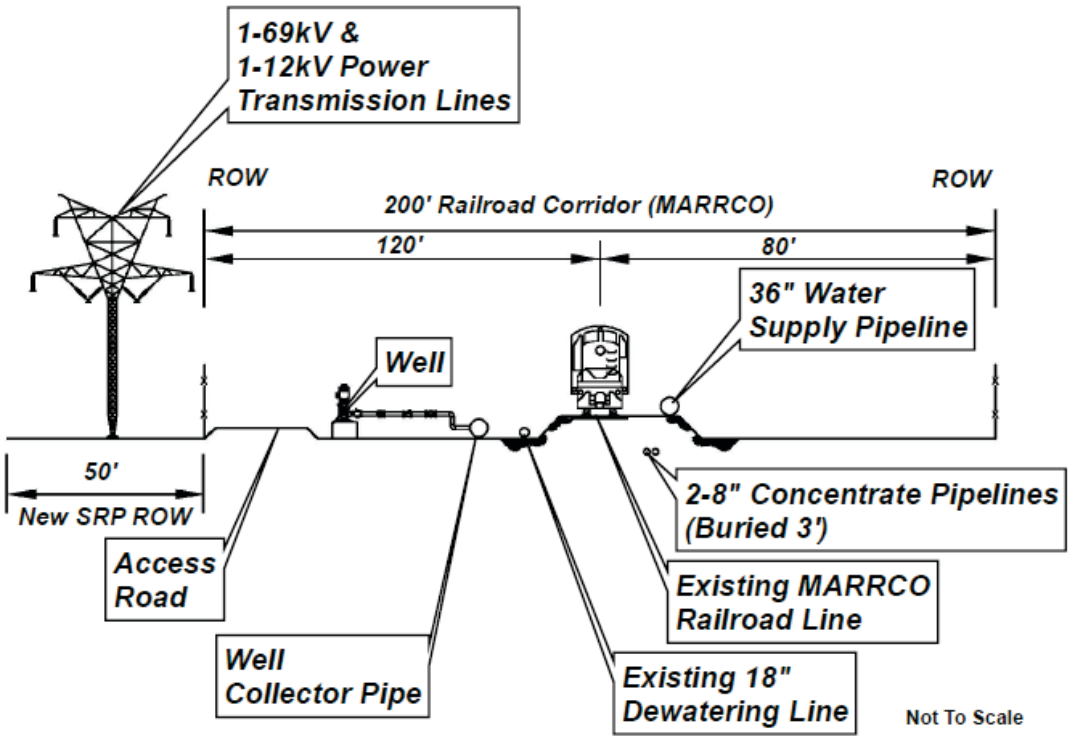



**Figure 6. Typical ROW without concentrator pipelines (Filter Plant to Magma Junction)**

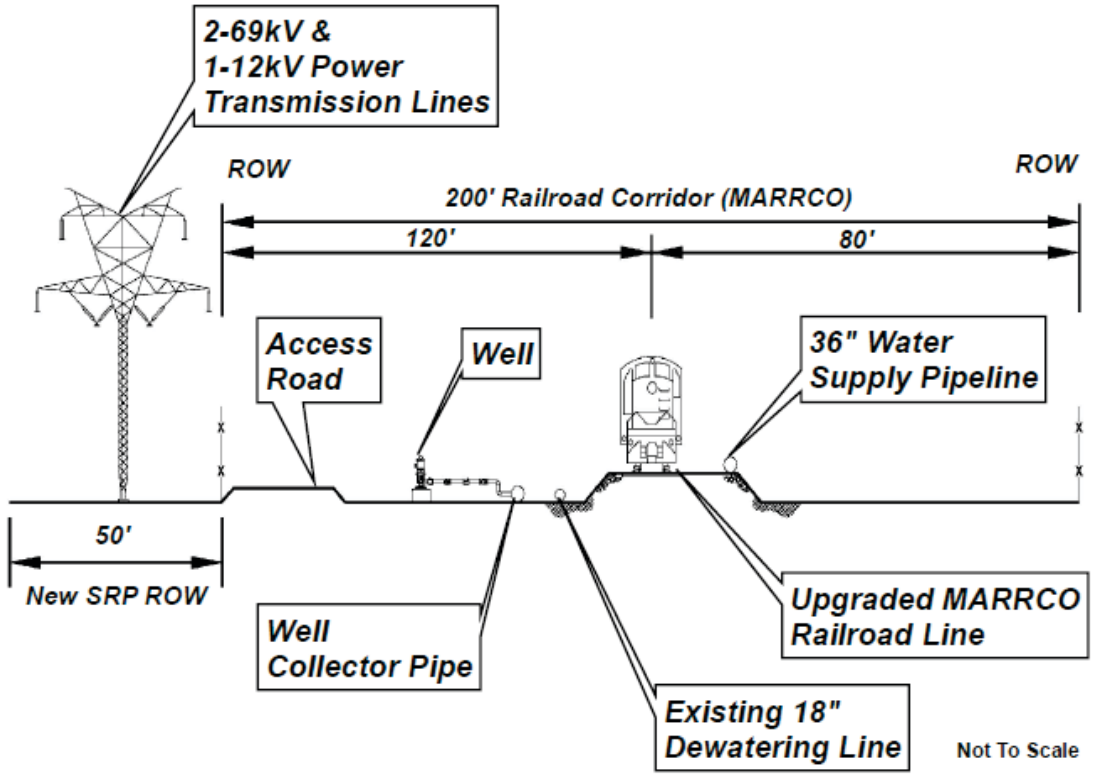


**Figure 7. Filter Plant and Loadout Facility Layout**

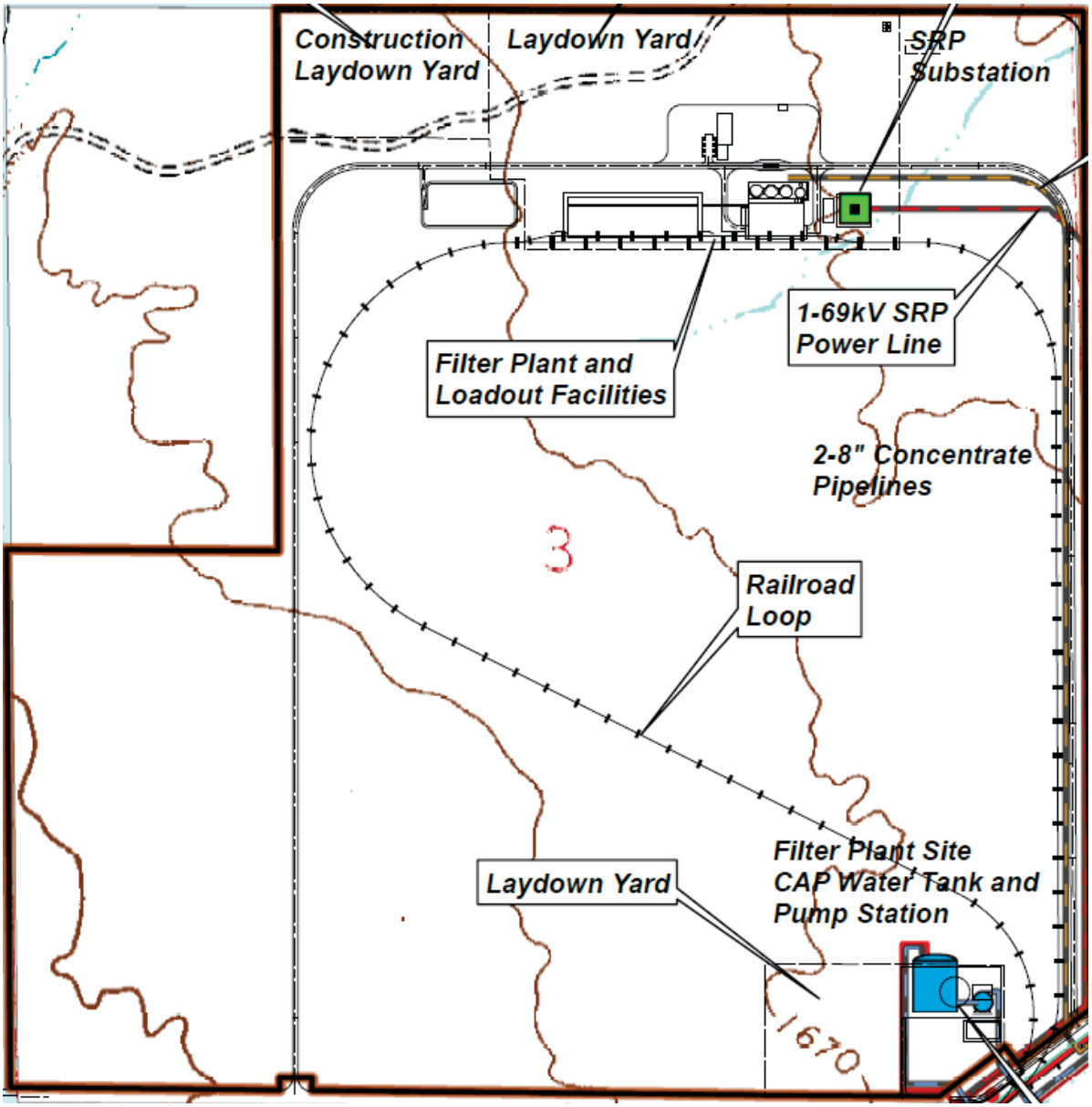


**Figure 8. Typical ROW layout with well site**

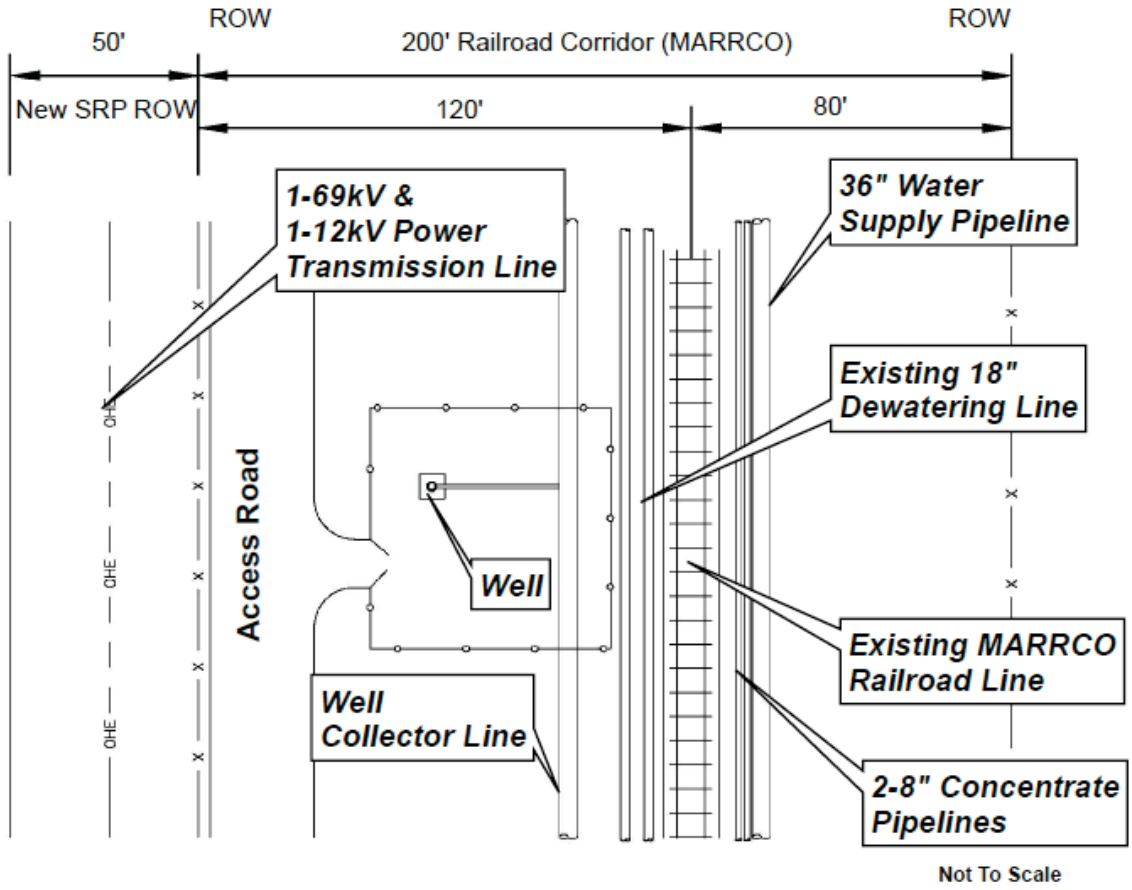



**Figure 9. Typical Well Site**

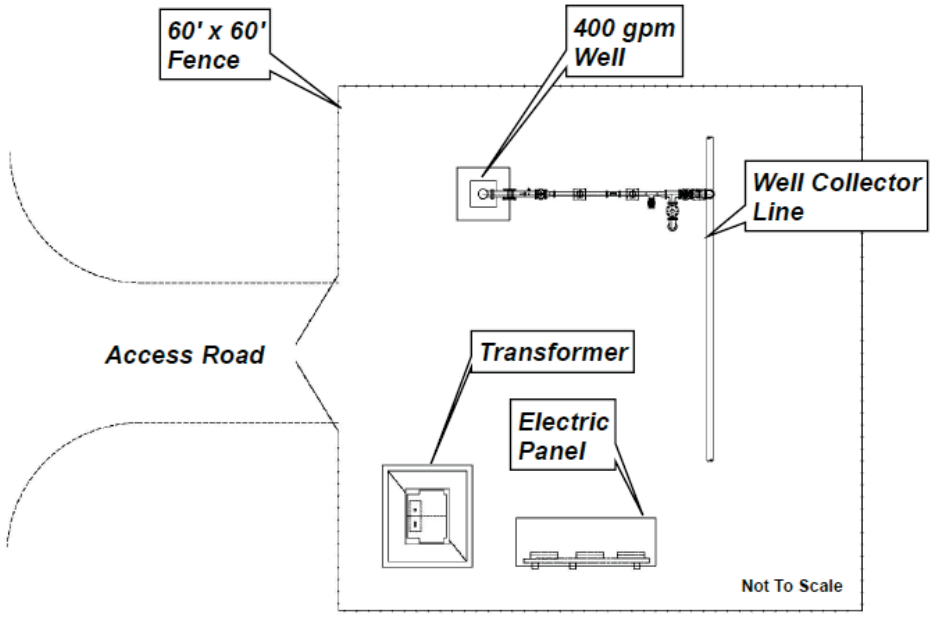
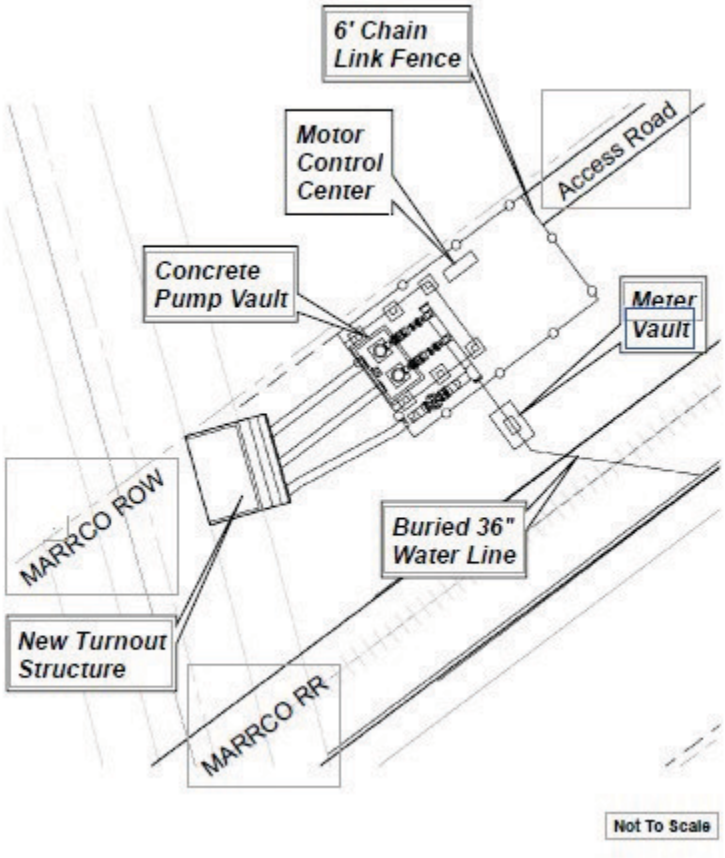


**Figure 10. Pump Station Layout**




## 2.5 CORRIDOR TO TSF AND TSF AUXILIARY FACILITIES

The corridor to Skunk Camp (**Figure 11**) will contain:

- Pipelines for pyrite tailings and scavenger tailings lines between the processing plant and the TSF. Pipelines would vary from 10 to 34 inches in diameter. The pipelines will be subsurface and/or buried everywhere except for bridge spans over Queen Creek and Devil's Canyon.
- A 16-inch diameter water pipeline for the collection and return water to WPS. The pipeline will be buried everywhere except for bridge spans over Queen Creek and Devil's Canyon.
- A power line to power the pump stations, the cyclone processing system, and administrative buildings.
- Access roads for construction, maintenance and reclamation of the pipeline and powerline infrastructure

In addition to the embankments, underdrains, catchments, diversion channels and dikes, seepage collection ponds, and seepage dam that are discussed in **Attachment A;** the TSF will contain auxiliary facilities including cyclone processing system (buildings and tanks), choke station, fines thickener building, electrical substation, power lines, and administration and equipment storage building (**Figure 12**).

The auxiliary facilities will be removed, and the land reclaimed. Access roads and access controls will be maintained for monitoring and maintenance.

**Figure 11. TSF Corridor**

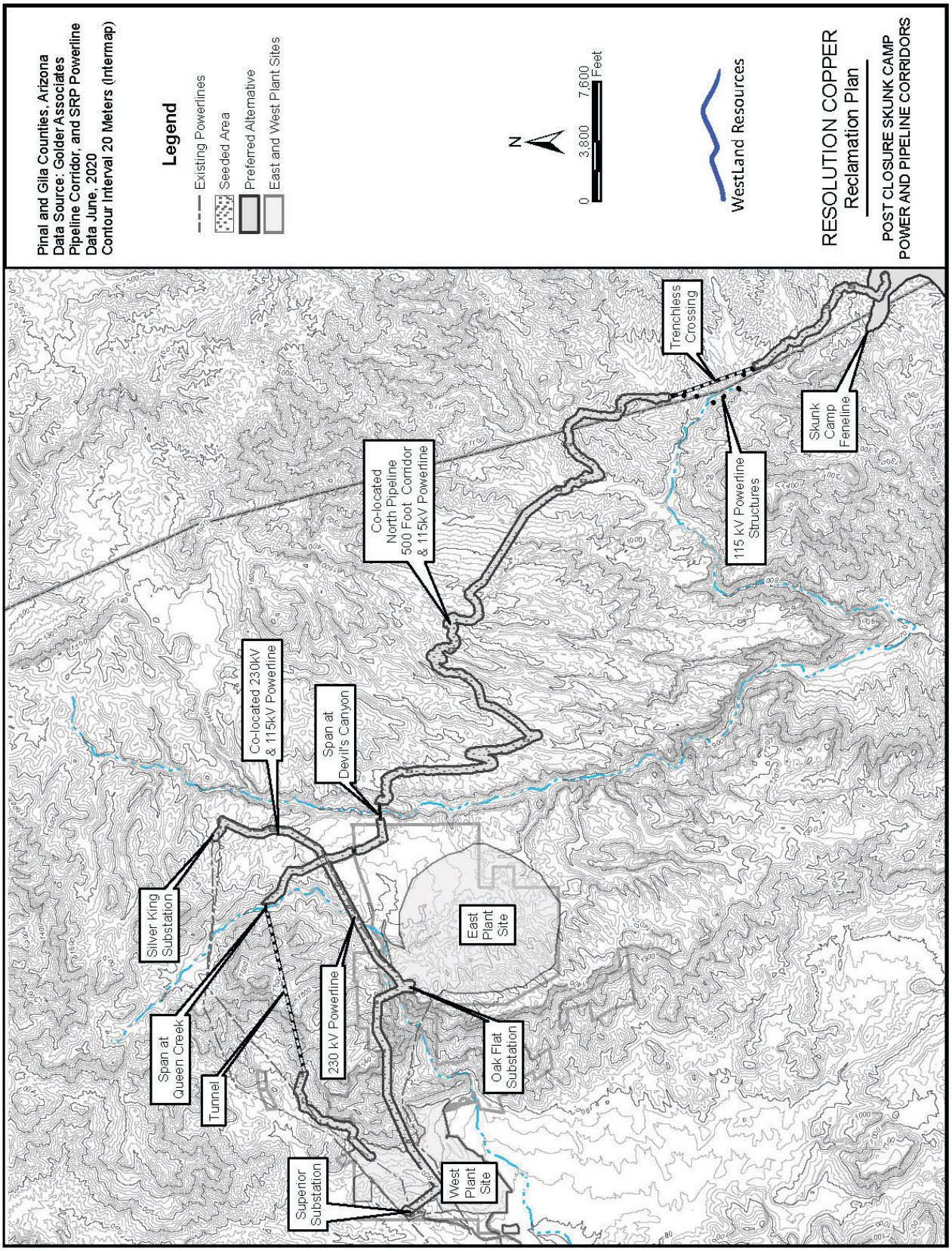
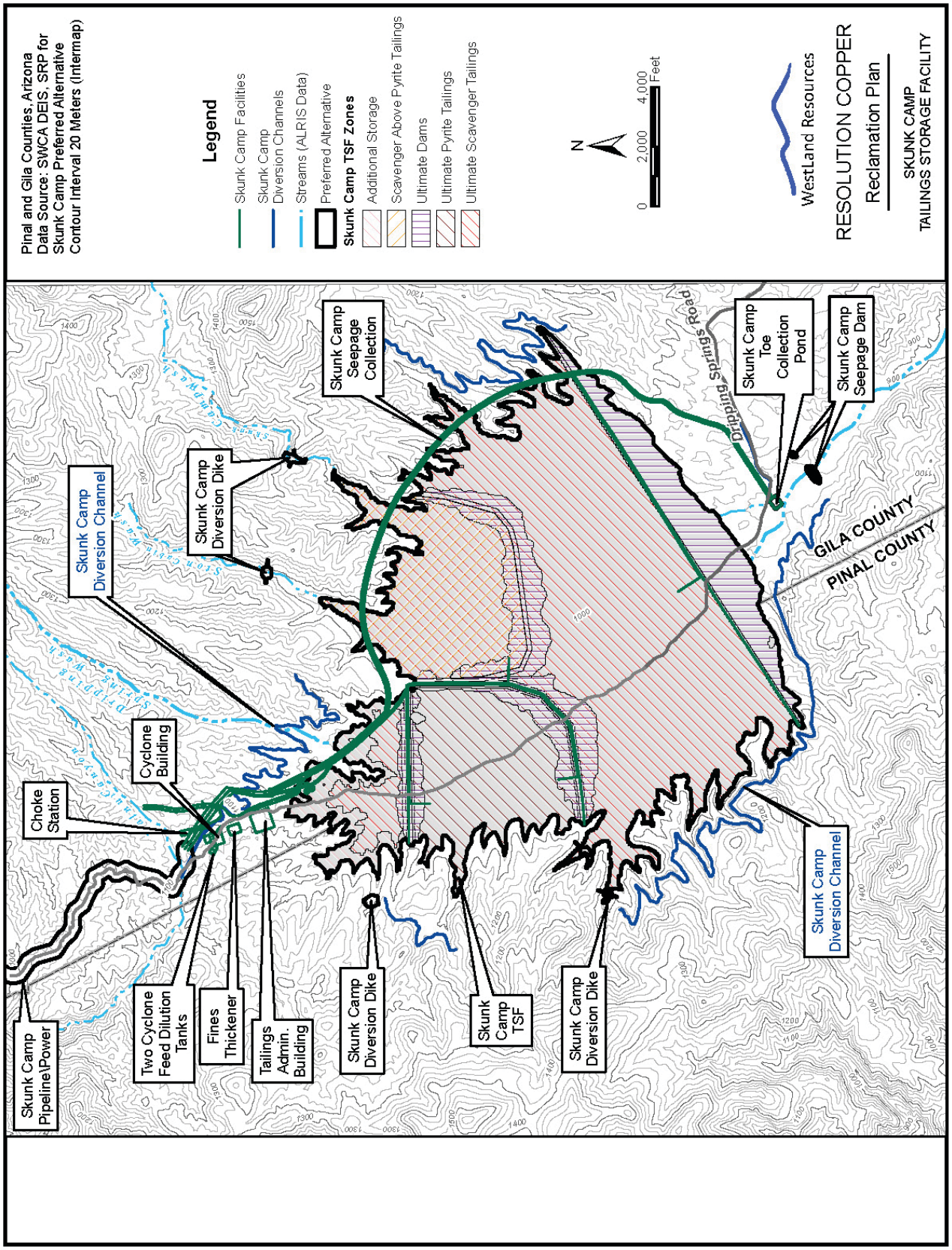


**Figure 12. TSF**



# 3 LEGAL REQUIREMENTS AND OTHER OBLIGATIONS

As stated in Section 1.1, this plan is intended to meet the regulatory requirements of federal and state regulatory programs. The Preferred Alternative is subject to the following regulatory programs, policies, statutes, and rules:

- Title 36 of the Code of Federal Regulations (CFR) Part 228, Subpart A – U.S. Department of Agriculture, Forest Service rules and procedures for locatable and leasable minerals;
- Forest Service Manual (FSM) 2800 – Minerals and Geology WO [Washington Office] Amendment 2800-90-1, Chapter 2840 – Reclamation (effective June 1, 1990) (USFS, 1990);
- Training Guide for Reclamation Bond Estimation and Administration for Mineral Plans of Operation authorized and administered under 36 CFR Part 228, Subpart A – April 2004 (USFS, 2004);
- Arizona Mined Land Reclamation Act (AMLRA), enacted in 1994, Arizona Revised Statute (A.R.S.) Title 27-901 et seq., as amended;
- Arizona State Mine Inspector (ASMI) – Mined Land Reclamation Rules Arizona Administrative Code (AAC) Title 11 Chapter 2, effective January 6, 1997;
- Arizona Aquifer Protection Permit (APP) Program (A.R.S. Title 49, Chapter 2, Article 3 and AAC Title 18, Chapter 9, Articles 1 through 7); and
- Arizona Pollutant Discharge Elimination System (AZPDES) permit requirements (A.R.S. Title 49, Chapter 2, Article 3.1 and AAC Title 18, Chapter 9, Articles 9 and 10)

These regulations as they relate to the reclamation design basis are described in greater detail in Sections 3.1.1 through 3.1.3.

The Arizona Corporation Commission has jurisdiction on the power line (A.R.S. Title 40, Chapter 2, Article 6.2). A Certificate of Environmental Compatibility is required for above-ground transmission lines designed for 115kv or higher. The Arizona Power Plant and Transmission Line Siting Committee will make recommendations to the Arizona Corporation Commission regarding reclamation and closure stipulations associated with the power line certificate, who will then make a final determination on the stipulations and certificate issuance.

Requirements related to the certificate and Arizona State Lands Department are summarized in Section 5.3.8**.** However, any requirements from the certificate or Arizona State Lands Department are considered covered by the USFS, ASMI, and APP Programs listed above.

## 3.1 FOREST SERVICE RECLAMATION REQUIREMENTS

The following regulations provide the USFS the authority to manage surface resources in conjunction with mineral exploration and development on NFS lands (USFS, 2012a):

- 36 CFR 219. These regulations implement the National Forest Management Act of 1976 (16 U.S.C. 1600 et seq.), require consideration of the relationship of nonrenewable resources, such as minerals, to renewable resources, and set forth the minimum requirements for integrating the nonrenewable mineral resource into a forest plan.
- 36 CFR 228. These regulations set forth rules and procedures governing use of the surface of NFS lands in conjunction with operations authorized by the general mining laws, oil and gas leasing, and mineral material disposal laws.

**Forest Service Manual (FSM) 2842 - RECLAMATION COMPONENTS FOR PLANS OF OPERATIONS.** Forest Supervisors shall ensure the following administrative and environmental components are adequately addressed in each Plan of Operations when applicable. **Table 4** shows where each requirement is addressed.

**Table 4. FSM 2842 Requirements and Where Address in Reclamation and Closure Plan**

| Requirement | Location the Reclamation and Closure Plan | Location in 9Attachment A |
|---|---|---|
| 1. Administrative Components. | | |
| a. Timing, kind, and amount of reclamation to be accomplished concurrently with mineral activities. | Section 7.1 | Section 9 |
| b. Reclamation requirements for interim shutdown, including seasonal shutdown. | Section 7.2 | Section 10 |
| c. The maximum allowable time in the event of interim shutdown before final reclamation measures will be required. | Section 7.2 | NA |
| d. Concurrent and final reclamation of transportation facilities, such as roads, railways, tramways, power line corridors, and pipelines. | Section 7.2 | Section 9 |
| e. Removal of facilities and reclamation of the site. | Section 5.2.1 | NA |
| f. Timeframes for periodic review and updating of the Plan of Operations, including reclamation performance requirements and financial guarantees. | Section 8.1 | Section 9 |
| g. Procedures for ensuring interim and final stability of waste embankments, including dumps, tailings dams, or impoundments. | Sections 5.2.2 and 7.2.1.1 | Sections 5 and 7 |
| 2. Environmental Components. | | |
| a. Final configuration of the disturbed areas, including such items as roads, pits, waste embankments, ponds, leach pads, drill holes, and facility sites. | **Figure 1** | Sections 4 and 7 |
| b. Revegetation of disturbed areas, including timing, kind, and amount. | Sections 5.2 and 5.2.6.4 | Sections 8.2 and 9 |
| c. Topsoil management, including growth media salvage and reapplication (FSM 2550 and Forest Service Handbook (FSH) 2509.15) (not applicable). | Sections 4.2.5.2, 4.2.6, and 5.2.4 | Section 8 |
| d. Air quality management during and after operations (FSM 2580 and FSH 2509.19). | Section 5.2.8 | Section 10.3 |
| e. Watershed management, including runoff and erosion control, and riparian and wetland protection (FSM 2520 and FSH 2509.15). | Section 5.3 | Section 7 |
| f. Water quality management, including physical and chemical characteristics of surface and subsurface water during and after operations (FSM 2530 and FSH 2509.15). | Sections 6.3 and 5.2.3 | Section 7 |
| g. Visual resource management during and after operations (FSM 2380 and FSH 2309.22). | Section 4.2.2 | NA |
| h. Potential for the occurrence and control of hazardous or toxic substances, including acid mine drainage, that may contaminate air, water or soil. | Section 7.2.1.2 | Sections 5, 7, and 11 |

| Requirement | Location the Reclamation and Closure Plan | Location in 9Attachment A |
|---|---|---|
| h. Fish and wildlife habitat reclamation or mitigation (FSM 2630 and FSH 2609.11). | Section 5.2.7 | Section 8.2 |
| i. Tailings and associated tailings facilities. | Section 5.3.5 | All |
| j. Stream diversions, reservoirs, ditches, or canals. | Section 5.2.3.1 | Sections 7 and 11 |

**2842 - RECLAMATION PERFORMANCE STANDARDS.** In addition to a consideration of appropriate reclamation components (FSM 2841), a Plan of Operation shall include measurable performance standards for all reclamation requirements in the plan. Develop performance standards for at least the following items listed in **Table 5**.

**Table 5. FSM 2842 Performance Standards and Where They Are Addressed in the Reclamation and Closure Plan**

| Requirement | Location the Reclamation and Closure Plan | Location in 9Attachment A |
|---|---|---|
| 1. Revegetation | Section 6.2 | Section 5, 8.2 |
| 2. Soil and water conservation measures. | Section 6.3 | Sections 7.1, 7.4, and 7.5, Appendix III |
| 3. Mass stability of overburden or other waste embankments. | Section 5.3.5 | Section 5 |
| 4. Concurrent reclamation. | Section 7.2 | Section 9 |
| 5. Post-mining land configuration. | Section 3.6 and 5.2.2 | Section 8.2 |

Regions or Forests should develop Region-wide or Forest-wide reclamation performance standards for common reclamation practices.

Use performance standards in determining the amount of the reclamation bond, surety, or other financial guarantee and as criteria for release of these instruments.

**2843 - RECLAMATION BONDING.** Tie dollar amounts of bonds or other financial guarantees to specific reclamation activities or standards to facilitate full or partial release of the instruments. Release bonds or other guarantees as satisfactory reclamation is performed and completed, and the area stabilized.

Avoid multiple or excessive bonding. See FSM 2846 for direction on bonding when other agencies with bonding authority are involved in the administration of mineral activities on NFS lands.

The USFS will require a bond for reclamation and ongoing post-closure monitoring. The amount of the reclamation bond will be revisited every three (3) years. Post-closure monitoring may be adjusted based on the potential impact to resources from planned development activities during the next bonding increment. Monitoring may also be extended as needed to achieve the stated success criteria for a particular mitigation measure, such as revegetation (see **Section 6**).

The bond calculations, made by SRK Consulting USA, will be submitted separately as requested by the Forest Service after the objection period and before a final ROD is issued with a revised reclamation and closure plan.

**2844 - RECLAMATION MONITORING.** Regional Foresters and Forest Supervisors shall determine those sites that need monitoring to assess the condition and environmental quality of reclaimed sites following release of bonds or other financial guarantees. Base monitoring priorities on the degree of risk to human health and safety or on long-term environmental effects (**Section 6**).

Reclaimed sites or structures that might require monitoring include, but are not limited to, revegetated areas, large waste embankments, tailing dams and impoundments, French-drains, stream diversions, dam structures on permanent water impoundments, and water treatment facilities.

Resolution Copper will provide the TNF with detailed as-built drawings for completed structures on NFS lands covered by this plan.

## 3.2 ARIZONA MINED LAND RECLAMATION REQUIREMENTS

The AMLRA program is administered by the ASMI and applies to reclamation of surface disturbance from mining operations on state and private lands in Arizona. The ASMI sets reclamation requirements, the primary function of which is to leave a mining operation in a safe and stable condition that is appropriate for a specified PMLU and approves the project proponent's Mined Land Reclamation Plan. Additionally, AMLRA requires the project proponent to submit an estimate of the cost of executing the proposed reclamation plan and financial assurance to cover that cost. The requirements governing the submission and contents of a reclamation plan are provided in A.R.S 27-971 et seq. and AAC R11-2-501 through R11-2-504.

PMLUs are determined based on the opportunities afforded for future use of the land while still ensuring public safety. These land use determinations are based in part on the type, density, and diversity of vegetation that is appropriate and technically and economically practicable given the specific characteristics of the site.

A reclamation plan must include topographic information, regrading of disturbed areas, surface water routing and impoundments, and information on structures to be left at the site. A.R.S. 27-971(B) (9) (a through d) requires the reclamation include measures necessary to achieve the PMLU including:

a. The measures that will be taken to restrict public access to pits, adits, shafts and other surface features that may be a hazard to public safety.
b. The measures that will be taken to address erosion control and stability.
c. The measures that will be taken to address revegetation, conservation and the care and monitoring of revegetated areas.
d. For surface disturbances where the proposed PMLU objective is designated as grazing, fish or wildlife habitat, forestry or recreation, include the type of wildlife or fish habitat to be encouraged and those measures that will be taken to encourage that type of wildlife or fish habitat, and insure that those measures will not be incompatible with the fish or wildlife habitat on adjacent lands.

The AMLRA works with federal reclamation and bonding programs to eliminate duplicative inspection, bonding, enforcement, and planning requirements. If plans administered by a federal agency are consistent with the requirements in the AMLRA, the federal requirements and bonding supersede the AMLRA.

Standards in AAC R11-2-601 through R11-2-705 for reclamation include:

- Public Safety - reduce hazards to public safety by removing the hazard or restricting public access;
- Erosion Control and Topographic Contouring - stable conditions with regard to erosion and seismic activity; grading to establish stable, suitable landforms for the PMLU; permanent piles of mining materials should not restrict surface drainages or contribute to excessive erosion.
- Roads - traffic controlled on the reclamation area; appropriate drainage shall be established; bridges and culverts removed or protected; and roadbeds ripped, plowed, scarified, and reseeded as necessary to achieve the PMLU.
- Revegetation - planned revegetation is required and the techniques, methods, controls, or measures to be used are defined; surfaces shall be prepared to produce a suitable root zone in preparation for planting which should be completed during favorable times of the year; plant species must be chosen to support the PMLU.

- Soil Conservation - Land should be treated to eliminate excess compaction and to reduce the potential for slippage of placed soil. If off-site soil is used, it must be suitable for the vegetation and provide a stable growing surface.

### 3.2.1 Arizona Financial Assurance

Financial assurance is developed from the final approved reclamation plan. Where overlap exists between state reclamation requirements and federal requirements, such as those described above for the USFS, the federal requirements and bonding supersede the state requirements on a project-specific basis as long as they are consistent with or more stringent than what would be required by ASMI. The AMLRA (A.R.S. 27-991 et seq. and AAC R11-2-801 through R11-2-822) requires bonding in a sufficient amount for the implementation and execution of the reclamation plan. This must include earthmoving activities; revegetation; demolition; maintenance; equipment mobilization and demobilization; contractor profit; and administrative overhead.

Resolution Copper currently has a reclamation and closure plan with associated financial assurance on file with the State Mine Inspector covering historic mining facilities located at the WPS (Golder, 2014) and the EPS (Arcadis, 2014).

## 3.3 AQUIFER PROTECTION PERMIT (APP) REQUIREMENTS

Resolution Copper would obtain an APP for new facilities that discharge or have the potential to discharge to groundwater. The APP Program is administered by the Arizona Department of Environmental Quality (ADEQ). The APP Program requirements that pertain to closure are provided in AAC R18-9-A209. The APP Program requires that a closure/post-closure strategy be drafted and submitted with the APP application to the ADEQ for approval. In general, the closure/post-closure strategy and plan must include the management of discharges from the APP permitted facilities, maintenance procedures for maintaining aquifer quality, and monitoring. This state program also requires a separate financial assurance, which is developed from the approved closure/post-closure plan.

Resolution Copper currently has an APP that includes a closure and reclamation plan with the ADEQ covering historic facilities with the potential to discharge to groundwater on private lands (ADEQ, 2012). This plan specifically covers legacy tailings and other facilities at the WPS. Financial assurance, in the form of a letter of credit, has been obtained for the associated reclamation of those facilities. During National Environmental Policy Act review, and prior to issuance of a final GPO, an updated APP with the required financial assurance to cover the cost of closure and reclamation and post-closure monitoring would be filed with the ADEQ to cover facilities with the potential to discharge to groundwater (e.g., TSF, process ponds, stormwater ponds, etc.) on both National Forest and private lands. It is recognized that there may be duplicative regulatory oversight for closure, reclamation, and post-closure monitoring of the TSF, as it falls under the jurisdiction of both the ADEQ and the USFS.

An APP will cover the protection of groundwater and requires routine groundwater monitoring and facility inspections throughout operations and closure. Engineered drawing of the built facilities is required. Monitoring of potential discharge and implementation of specific contingency actions in the event of an unauthorized discharge or exceedance of an operational limit or of any Arizona Aquifer Water Quality Standards will be included in the APP.

A detailed closure/post-closure plan must be submitted to ADEQ. The closure plan must eliminate, to the greatest extent practicable, any reasonable probability of further discharge from the facility and of exceeding Arizona water quality standards, or further degrading the aquifer, at the applicable point of compliance wells.

The Resolution Copper Project is required to employ Best Available Demonstrated Control Technology for the following facilities (ADEQ, 2004), which are described in **Section 1**:

- Surface impoundments (holding, storage settling, treatment or disposal pits, ponds and lagoons)

- Solid waste disposal facilities
- Mine tailings piles and ponds
- Wastewater treatment facilities
- Point source discharges to navigable waters.

Stormwater controls would also follow the Stormwater Pollution Prevention Plan (SWPPP).

### 3.3.1 APP Financial Assurance Requirements

Financial assurance for the APP permit program is spelled out in A.A.C. R18-9-A203 which requires that an entity applying for an individual APP shall demonstrate the financial capability to construct, operate, close, and ensure proper post-closure care of the facility. The bond amount will be finalized with submittal of an acceptable financial assurance instrument to ADEQ before issuance of a final APP permit to Resolution Copper.

## 3.4 REVEGETATION REQUIREMENTS

Revegetation is a significant aspect of this reclamation plan and is designed to satisfy the regulations, policies, and plans briefly summarized in **Table 6** with their relevance to revegetation planning.

**Table 6. Summary of Revegetation Legal Requirements**

| Guidance | Summary | Project-specific Application |
|---|---|---|
| Forest Service Manual 2000 – National Forest Resource Management (USFS, 2008) | Chapter 2070 (Vegetation Ecology) provides guidelines on the use of native plant materials in revegetation, rehabilitation, and restoration of ecosystems on NFS lands. | Areas will be reclaimed and revegetated as soon as practicable after disturbance. Where possible, reclamation and revegetation activities will be conducted concurrent with construction and mining operations, with monitoring and maintenance following completion of reclamation and revegetation. |
| TNF Land and Resource Management Plan (USFS, 1985) | Establishes the long-term management of the TNF. The plan accommodates multiple use, maximizes long-term net public benefits in an environmentally sound manner through sustained yield of goods and services from the Forest. | Reclamation, including revegetation, will return National Forest land uses to approved activities, including low intensity grazing and wildlife habitat, recreation, and access to "maximize long-term net public benefits in an environmentally sound manner through sustained yield of goods and services from the Forest." |
| Federal Noxious Weed Act of 1974 (U.S. 1974, Amended 1990) | Pursuant to the Act, the U.S. Secretary of Agriculture has the authority to declare plants "noxious weeds" and limit the interstate spread of such plants. The Act directs federal agencies to prevent introduction of noxious and invasive species. | Federal noxious weeds are documented. A secondary goal of revegetation is limiting establishment of noxious weeds in reclaimed areas. This plan and the Resolution Copper Project Noxious Weed and Invasive Species Management Plan on National Forest System Lands (Resolution Copper, 2019) provide measures to prevent invasion of invasive species and encourage establishment and growth of native species. |
| Native Plant Materials Policy: A Strategic Framework (USFS, 2012b) | Establishes guidelines for use of native plants for land management projects, including reclamation and restoration efforts. | Application of native seed mixes or direct planting will be used for revegetation as soon as practicable following cessation of mining activities, reclamation grading or placement of cover growth media*. |

| Guidance | Summary | Project-specific Application |
|---|---|---|
| Terrestrial Ecological Unit Inventory Technical Guide (USFS, 2005) | Provides national standards, suggested methods, and a list of criteria for defining, describing, and classifying terrestrial ecological units and types. | A total of nine vegetation communities occur within the analysis area. These were associated with TNF Ecological Response Units (ERUs), which have qualitative, quantitative, and measurable vegetation targets that could be used as vegetation performance criteria or standards for bond release. A 'static' vegetation performance criterion or standard for bond release is proposed based on the ERUs, cover material and underlying mined-material properties, climate, and PMLU goals. |
| Arizona State Mine Inspector Mined Land Reclamation (1997) | A reclamation plan shall include procedures to aid in the development of vegetation consistent with the PMLU objective for surface disturbances where the PMLU objective is grazing, wildlife habitat, or forestry. The type, density, and diversity of vegetation proposed shall depend on what is technically and economically practicable given site-specific characteristics such as climate and the availability and quality of growth media. | This plan includes procedures to aid in the development of vegetation consistent with the proposed PMLU objectives of grazing, public recreation, and wildlife habitat and proposes a type, density, and diversity of vegetation based on site-specific characteristics such as climate and the availability and quality of growth media or cover material and seed mixes. |
| Arizona Native Plant Law (A.R.S. Sec. 3-904) | Establishes a list of protected plants in Arizona and prohibits removal or destruction of wild-growing, protected plants without a permit. | Protected plants on Arizona State Trust land under Alternative 6 will be documented prior to disturbance for reclamation and closure. A Native Plant Inventory Report will be prepared, and a fee submitted to the Arizona State Land Department to acquire a permit. |
| State of Arizona Noxious Weed Statute (A.R.S. 3-4-244 to 3-4-244), Regulated and Restricted Noxious Weeds, Prohibited Noxious Weeds | Establishes regulation for the management of restricted and prohibited noxious weeds in the state of Arizona | Invasion of noxious weed species, including all those classified by the Arizona Department of Agriculture, on revegetated slopes will be prevented or strictly limited using measures delineated in this plan and the Noxious Weed and Invasive Species Management Plan on National Forest System Lands (Resolution Copper, 2019). |

* Substrate composed primarily of mineral matter that is capable of supporting plant growth with or without the addition of growth media amendments or fertilizers. Cover growth media may include amended or un-amended and screened or unscreened A, B, and C horizons of the growth media column, as well as regolith, geologic material, and mine waste with physical and chemical properties (e.g. texture, density, water holding capacity, pH, soluble salts and metal content, base status, organic matter, and cation exchange capacity) that are not limiting to plant growth.

## 3.5 RESOLUTION COPPER ENVIRONMENTAL POLICIES AND STANDARDS

Environmental stewardship and conservation are key components of Resolution Copper's development strategy. Resolution Copper is committed to minimizing its impact on the surrounding environment and

draws on its experience of operating and reclaiming mines all over the world, and on advice and input from environmental experts, regulatory agencies and the local community. This approach has helped Resolution Copper to develop a range of practical and best practice technological expertise that reduce potential environmental impacts and has also allowed Resolution Copper to form partnerships with conservation groups to further increase awareness and protection of the natural environment. Respect for the environment is an integral part of the Project development strategy, and under the corporate Rio Tinto requirements, Resolution Copper must conform to internal policies, guidelines, frameworks, manuals, standards (i.e. Rio Tinto's *Closure Standard*), and any other relevant documentation that helps reduce its environmental impacts as described in the following sections, and included in Rio Tinto's *Health, Safety, and Environmental Standards* presented in Appendix S of the GPO (Resolution Copper, 2020b).

## 3.6 POST-MINING LAND USE

One of the main objectives of the applicable regulations and policies is to ensure that disturbed lands are returned to a use that is consistent with the PMLUs. PMLUs are expected to be similar to current land uses. Reclamation practices in this plan were established to foster future land uses, while protecting public safety, and establishing self-sustaining native vegetation and the original pre-mining contour (as appropriate) and self-sustaining drainage. Individual PMLUs by facility are shown in **Table 7**. For this plan, Resolution Copper assumed that all areas would be returned to these uses, however, the final reclamation land use will be determined nearer to the closure period and will depend on landowner preference.

**Table 7. Additional PMLU by Facility**

| Facility | PMLU |
|---|---|
| EPS facilities (except subsidence crater) | Wildlife habitat, grazing, recreation and access, historic preservation |
| Subsidence Crater | protect human safety, wildlife habitat |
| WPS (except historic cooling tower) | Wildlife habitat and grazing with recreation access as appropriate |
| Historic Cooling Tower | Historical Preservation |
| MARRCO (including the Filter Plant and Loadout Facility but except railroad ROW) | Wildlife habitat and grazing, recreation |
| Railroad ROW | Railroad ROW |
| Corridor to TSF (Pipelines, Power Lines, Roads) | Grazing and wildlife habitat available for recreational use |
| TSF and TSF Auxiliary Facilities | Wildlife habitat and grazing, recreation and access. |

### Protect Public Safety and Environmental Protection

All reclaimed areas will have a PMLU to protect the public and the environment from unstable or contaminated conditions. Brush or rock piles may be used to reduce erosion, by providing a rougher surface for slowing water movement and trap weathered material for vegetation establishment.

### Grazing and Wildlife Habitat

Portions historically used for grazing of domestic range animals will be reestablished to suitable environment for incidental grazing and wildlife use. The PMLU would be achieved through removing structures and fences, recontouring to stabilize slopes and return terrain similar to pre-mining conditions, and revegetation with native species. Wildlife habitat enhancement features (e.g., brush piles or rock

piles) may be constructed in some areas to enhance local biodiversity by providing habitat for reptiles and small mammals and build structural diversity.

### Recreation and Access

Depending on landowner preference, areas will also be reclaimed to be suitable for recreational activities or access through reclaimed areas to lands beyond the reclaimed area. Recreation activities that may be appropriate could include motorized or non-motorized transportation similar to current uses. To the extent possible, while meeting requirements for safety and erosion, areas will mimic a naturally appearing visual condition. These include recreational uses (i.e., hunting, hiking, horseback riding, camping, rock climbing) and traditional uses (gathering traditional materials). The PMLU would be achieved through removing facilities, roads, and barriers unless a landowner prefers they remain. In the case where facilities or roads are to remain, Resolution Copper would ensure facilities are stable and self-draining.

### Railroad Right-of-Way (ROW)

The railroad ROW PMLU will provide for the operation and maintenance of the railroad while maintaining public safety. Portions of the railroad are currently available for public use with identified crossings (Arizona Trail, USFS recreational roads) and transportation routes (State Road SR79 and US60). It is possible that the ROW will have a post mining rail use and/or other public, recreational and access uses.

### Historical Preservation

A few facilities (identified below) would be preserved because they are eligible or are listed on the National Register of Historic Places. The PMLU of these facilities is historic preservation.

# 4 RECLAMATION AND CLOSURE DESIGN BASIS AND DESIGN STANDARDS

## 4.1 CLOSURE OBJECTIVES

The general goals of reclamation are to:

- Stabilize areas of surface disturbance;
- Control erosion and landslides;
- Isolate, remove, or control mineral waste materials;
- Implement protections for employees and public health and safety;
- Minimize disturbance to the extent practicable;
- Implement protections for water quality;
- Control water runoff;
- Limit duration of active post closure water management;
- Implement interim and concurrent reclamation as practicable;
- Where possible and practicable, return the disturbed areas to near-natural conditions;
- Salvage growth media resources during surface-disturbing activities so that they can be used for reclamation;
- Design facilities and reclaimed sites for long-term stability;
- Reduce visual impacts by recontouring to a natural appearing topography, and revegetating with native vegetation at a density of cover to blend with surrounding landscape;
- Minimize or eliminate long-term air, land, and water management requirements;
- Monitor to ensure that reclamation and closure standards and objectives are met;
- To the extent practicable, reclaim for land uses consistent with the Forest Plan (TNF, 1985);

- Ensure that reclamation is consistent with the approvals and permits from state and federal agencies;
- Initiate and complete final reclamation and closure upon permanent cessation of operations; and
- Establish financial assurance with the regulatory agencies to cover the costs of reclamation and closure, including post-closure monitoring.

The project-specific reclamation goals are as follows:

- Stabilize the project area;
- Establish proactive post-closure water management; and
- Establish a vegetative community for future wildlife use.

The following guidelines would be considered to determine the successful revegetation of disturbed areas:

- Successful establishment of the desired species;
- Evidence of vegetative reproduction processes;
- Evidence of overall site stability; and
- Indication that the revegetation cover of the reclaimed sites trending towards and/or matching the vegetation cover found in the adjacent reference areas. This guideline will apply to the TSF to extent practicable, although some flexibility will be needed, based on demonstrated results.

## 4.2 ENVIRONMENTAL CONSIDERATIONS AFFECTING CLOSURE

The design of closure and reclamation success standards were developed based on environmental conditions. These conditions are briefly described.

### 4.2.1 Climate and Topography

The project is in an arid to semi-arid climate, with a mean annual precipitation of 18.60 inches in Superior, Arizona at 2,841 feet above mean sea level (amsl) (WRCC, 2020a) and 24.80 inches 2 miles east-northeast of Superior at approximately 4,200 feet amsl (WRCC, 2020b). Precipitation falls in a bimodal pattern: most of the annual rainfall within the region occurs during two main seasons, the cool season and the warm season. The annual average temperature in Superior is 69°F and daily temperatures typically range from 40°F to 100°F.

The cool season, from October through March, produces approximately 60% of the annual precipitation in Superior largely in the form of low-intensity rainfall events driven by the flow of continental air masses. Snow fall does not typically accumulate in the region. The warm season (locally termed the monsoon season), from July through September, produces approximately 33% of the annual precipitation largely in the form of high-intensity rainfall events driven by convective air flow that produces thunderstorms. This shorter duration, high-intensity nature of storms is a consideration for erosion, revegetation, facility stability, and net infiltration on closure covers. Only 7% (approximately) of the total mean annual precipitation falls during the three months of April, May, and June. Average maximum temperatures in Superior are in the 60s from November to March and in the 90s from June to September.

Annual average potential evaporation from stations of record in the proximity ranges from 107.42 inches at Sacaton to 95.78 inches at Winkleman to 91.30 inches at San Carlos Reservoir (WRCC, 2020c). The annual average potential evaporation within the area likely ranges from approximately 105 inches in the San Tan Valley to 85 inches atop the Apache Leap.

The climate's high potential evapotranspiration to precipitation ratio is conducive to a reclamation strategy of using store and release covers on the tailings (KCB, 2016).

Elevations range from 1,565 feet in the southwest to 5,394 feet in the northeast. The wide range of elevations coupled with the high-intensity summer storms would have an impact on erosion, revegetation, and facility stability.

### 4.2.2 Visual Resources

The mine site is in an area of varied landscape vegetation types. Reclamation of the area would reduce the post-closure visual (aesthetic) impacts by removing structures, rounding slope crests, blending slopes into surrounding topography, and revegetating disturbed areas with plant communities similar to undisturbed areas. To the extent practicable, areas initially constructed or completed to their final configuration during operations would be concurrently reclaimed during operations.

### 4.2.3 Land Use

Currently, portions of the project area are located within grazing allotments. Reclamation activities would need to be consistent with the approved land uses in the TNF Forest Plan, State Land requirements, and any other affected landowners depending on where each facility is located.

### 4.2.4 Water Resources

Investigations have mapped riparian vegetation, ordinary high-water mark and drainage and flow characteristics of the streams and tributaries (i.e., ephemeral, intermittent, or perennial). The Dripping Spring Wash, the Stone Cabin Wash, and the Skunk Camp Wash, are in the vicinity of the TSF site and no natural ponds are present. The TSF corridor crosses or passes beneath Mineral Creek, Devil's Canyon and Queen Creek. Mineral Creek and Devils' Canyon both have continually saturated reaches, but project infrastructure crossings are located away from those areas. The EPS and the WPS are largely within drainages that report to Queen Creek. No natural ponds are present at the WPS. Legacy impoundments (tailings ponds) from historical ore processing are present at the WPS, although closure activities have recently reclaimed all but one of these impoundments, which is on track for completion by end of 2020. A few man-made ephemeral ponds from the construction of check dams by the Civilian Conservation Corps and ranchers are present at the EPS. No natural ponds are present in the EPS.

Water would flow along the stretches of the pre-existing creek beds and washes. Stormwater diversion structures are constructed around and upgradient of the WPS, EPS, and TSF to allow stormwater passage around the facility. At the EPS, WPS, and TSF, facilities have been designed to maintain and hold contact stormwater during operations. Seepage collection features at the TSF incorporate Best Available Demonstrated Control Technologies such as low permeability layers and liners for pyrite tailings, blanket and finger drains, fines sealing along the foundation, leading edge thickened thin lift tailings deposition, grout curtain and cutoff wall system with lined seepage collection ponds. For further discussion related to water resources and closure, please see individual facilities in Section 4.

#### 4.2.4.1 Underground Workings

At closure, both the underground ventilation and pumping systems would be turned off. Acid generation risks posed by the residual mineralized rock at the bottom of the block cave would be controlled in perpetuity by its burial beneath 2,000 to 5,000 feet of geochemically benign rock and by its eventual saturation by reflooding waters. Post closure the underground mine area will be a sink approximately 1,000 years as analyzed by the EIS. Hydraulic containment within the underground mine will be established for a very long period into the future. Also see Section 5.3.9.

## 4.2.5 Vegetation

### 4.2.5.1 Goals

The primary goal of revegetation is to return disturbed areas that will be reclaimed to as close to pre-disturbance vegetation conditions as possible that are consistent with the PMLU goals of low-intensity grazing, public recreation, and wildlife habitat. This goal is anticipated to be achieved within the 5-year closure period following completion of revegetation activities using the standard industry best practices presented in this plan. Following this period, plant canopy cover and species diversity are expected to improve over time, as natural vegetation communities become reestablished on Project-related disturbed areas that will be reclaimed.

In some cases, due to many decades of fire suppression, grazing, and/or invasion of non-native species, an earlier successional phase may be desired compared to the pre-disturbance condition, as outlined in the current TNF Forest Plan revision process. An earlier successional phase may include, for example, less woody species (e.g., one-seed juniper and mesquite) and more native perennial grass species cover.

The secondary goals of revegetation are to limit growth media erosion, sediment transport, and noxious and invasive weed growth and spread. Achieving these goals is also critical to achieving the primary revegetation goal, as stated above.

### 4.2.5.2 Vegetation and Growth Media

Resolution Copper has completed a survey and baseline study to characterize vegetation at the TSF and utility corridor (WestLand Resources, Inc., 2020). Four vegetation communities cover approximately 90 percent of the total project area (USFS, 2019, pp. 176-177) as follows (from greatest to least acreage) and shown in **Figure 13**.

Project features within western portions located in lower elevation areas, including the Filter Plant and Loadout Facility, MARRCO Corridor, and the WPS, occur within the Upland and Lower Colorado River Sonoran Desertscrub communities. Project features at higher elevations include the EPS, which is mainly within the Interior Chaparral biotic community. Riparian is present along some of the main drainages within Upland and Interior Chaparral, including portions of Queen Creek, Roblas Canyon, Potts Canyon, and small areas near water sources in the EPS. Lists of representative plants and animals from these communities are provided in Brown (Brown, 1994) and in Table 3.6-2 of the GPO (Resolution Copper, 2020b). Common species are likely to be widely distributed across these biotic communities, with the exception of the highly disturbed sites in the existing mining areas. Vegetation within these communities varies.

One federally listed plant species under the Endangered Species Act (ESA), Arizona Hedgehog Cactus (AHC) occurs in the vicinity of the East Plant site (mine area and portions of the pipeline and powerlines). Its known range extends from the Superstition Wilderness south to Devils Canyon, east along US 60 to Top of the World and south to the Mescal and Pinal mountains (AGFD 2003, Baker 2013, Viert 1996, WestLand 2013b) AHC occurs from 3,300 ft to 5,700 ft (AGFD 2003) in Interior Chaparral and Madrean Evergreen Woodland habitats as mapped by Brown and Lowe (1980).

*Vegetation Alliances*

Within the TSF, utility corridor and borrow areas, the Semi-desert Grassland, Interior Chaparral, and Arizona Upland Subdivision of Sonoran Desertscrub biotic communities were identified through field survey. The discrete vegetation alliances are Juniper Woodland Alliance, Shrubland Alliance and Sparsely Vegetated Areas, Mesquite-Catclaw Acacia Alliance, Deciduous Riparian Alliance and Pondweed Dominated Earthen Tank. The descriptions of these alliances can be found in the vegetation assessment report (WestLand Resources, Inc., 2020). These alliances can be used to further refine the final vegetation success guideline listed in Section 4.1.

*Upland Sonoran Desertscrub*

As defined by Brown (Brown, 1994), this community dominates upper bajadas and lower mountain slopes between 2,000 and 3,500 feet in elevation and covers approximately 32 percent of the Preferred Alternative Area, largely west and south of the Apache Leap (USFS, 2019, pp. 99.176-177). Ocotillo (*Fouquieria splendens*), saguaro (*Carnegia gigantea*), foothill palo verde (*Parkinsonia microphylla*), ironwood (*Olneya tesota*), creosote bush (*Larrea tridentata*), triangle leaf bursage (*Ambrosia deltoidea*), blue palo verde (*Parkinsonia florida*), jojoba (*Simmondsia chinensis*), chain fruit cholla (*Opuntia fulgida*), and teddy bear cholla (*Opuntia bigelovii*) are common shrub species. Bush muhly (*Muhlenbergia porteri*) occurs on some sites. Species diversity and percent cover are greater than the more arid Lower Colorado Desertscrub.

*Semi-Desert Scrub/Grassland*

As defined by Brown (Brown, 1994), this community dominates lower mountain slopes between 3,500 and 4,500 feet in elevation and covers approximately 22 percent of the Preferred Alternative Area, largely to the southeast including Skunk Camp (USFS, 2019, pp. 99.176-177). Black grama (*Bouteloua eriopoda*), tobosa grass (*Pleuraphis mutica*), threeawns (*Aristida* spp.), Arizona cotton top (*Digitaria californica*), bottlebrush squirreltail (*Elymus elymoidies*), and curly mesquite (*Hilaria berlangeri*) are common grasses (Brown, 1994) (Simonin, 2000) (Innes, 2012). Sotol (*Dasylirion wheeleri*), beargrass (*Nolina microcarpa*), turpentine bush *(Ericameria laricifolia),* snakeweed *(Gutierrezia sarothrae),* banana yucca (*Yucca baccata*), soaptree yucca (*Yucca elata*), mesquite (*Prosopis glandulosa, P. juliflora*), whitethorn acacia (*Vachellia constricta),* and catclaw acacia *(Senegalia greggii)* are common shrubs.

*Interior Chaparral*

As defined by Brown (Brown, 1994), this community dominates upper mountain slopes between 4,000 and 5,500 feet in elevation and covers approximately 18 percent of the Preferred Alternative Area, largely atop the Apache Leap (USFS, 2019, pp. 176-177). Shrub live oak *(Quercus turbinella),* Wright's silktassel *(Garrya wrightii),* pointleaf manzanita *(Arctostaphylos pungens),* Emory oak *(Quercus emoryi),* one-seed juniper (*Juniperus monosperma),* sugar sumac *(Rhus ovata),* barberry *(Berberis haematocarpa),* Englemann's hedgehog *(Echinocereus engelmannii*), Englemann's prickly pear *(Opuntia engelmannii),* crucifixion thorn (*Canotia holacantha*), desert ceanothus (*Ceanothus greggii),* and mountain mahogany *(Cercocarpus ledifolus)* are common shrubs (Brown, 1994) (League, 2005). Grasses include black grama (*Bouteloua eriopoda*), hairy grama (*Bouteloua hirsuta*), sideoats grama (*Bouteloua curtipendula*), threeawns, lemon grass (*Cymbopogon citratus*), and bull muhly (*Muhlenbergia emersleyi*).

*Lower Colorado River Sonoran Desertscrub*

As defined by Brown (Brown, 1994), this community dominates lower elevation plains and hills below 2,000 feet in elevation and covers approximately 18 percent of the Preferred Alternative Area, largely to the west of the Preferred Alternative Analysis Area (USFS, 2019, pp. 176-177). The primary shrub species are creosote bush (*Larrea tridentata*), white bursage (*Ambrosia dumosa*), saltbush (*Atriplex polycarpa*), brittlebush (*Encelia farinosa*), white ratany (*Krameria grayi*), beavertail cactus (*Opuntia basilaras*), and silver cholla (*Opuntia echinocarpa*) (Brown, 1994) (Marshall, Ambrosia dumosa. In: Fire Effects Information System, [Online]., 1994) (Marshall, Larrea tridentata. In: Fire Effects Information System, [Online]., 1995). These are commonly widely spaced given the limited water availability. Ocotillo, saguaro, foothill palo verde, ironwood, western honey and velvet mesquite (*Prosopis glandulosa* and *P. velutina*), smoketree (*Psorothamnus spinosus*), desert broom (*Baccharis sarothroides*), burrobrush (*Hymenoclea salsola*), and desert willow (*Chilopsis linearis*) can occur in limited numbers but primarily in small washes and runnels where more water is available. Big galleta (*Pleuraphis rigida*) is common on sandy substrates.

*Great Basin Conifer Woodland*

This woodland is dominated by Rocky Mountain pinyon pine (*Pinus edulis*) and one-seed juniper (*Juniperus monosperma*). Alligator juniper (*Juniperus deppeana*) and Madrean Oak Woodland species

such as Emory oak (*Quercus emoryii*) and Arizona white oak (*Quercus arizonica*) can also occur. Typical understory grass species include blue grama (*Bouteloua gracilis*) and several muhleys (*Muhlenbergia* sp.*).* Shrubs include snakeweed (*Gutierrezia sarothrae*), Gambel oak (*Quercus gambelii*), cliffrose (*Purshia mexicana*), and Interior Chaparral species such as canyon live oak (*Quercus turbinella*) and Wright's silktassel (*Garrya wrightii*). Cacti include hedgehogs such as Engelmann hedgehog (*Opuntia engelmannii*) and prickly pears such as beavertail cactus (*Opuntia basilaris*).

*Madrean Oak Woodland*

This woodland is dominated by Emory oak (*Quercus emoryii*) and Arizona white oak (*Quercus arizonica*). Silverleaf oak (*Quercus hypoleucoides*), alligator juniper (*Juniperus deppeana*), and madrone (*Arbutus arizonica*) may also be present. Typical understory grass species include several muhleys (*Muhlenbergia* sp.), cane bluestem (*Bothriochloa barbinodis*), side-oats grama (*Bouteloua curtipendula*), and plains lovegrass (*Eragrostis intermedia*). Shrubs and forbs include lupines (*Lupinus* sp.), penstemons (*Penstemon* sp.), indigobushes (*Dalea* sp.), buckwheats (*Eriogonum* sp.), and Interior Chaparral species such as pointleaf manzanita (*Arctostaphalos pungens*) and alderleaf mountain mahogany (*Cercocarpus montanus*). Cacti and leaf succulents include barrel cactus (*Ferocactus wislizeni*) and desert prickly pear (*Opuntia phaecantha*) and Palmer agave (*Agave palmerii*) and beargrass (*Nolina microcarpa*).

*Riparian*

Riparian communities occur between 3,000 and 5,000 feet in elevation and cover approximately 1 percent of the Preferred Alternative Area, largely in Devils Canyon, Queen Creek associated with crossings that span over (outside the ordinary high-water mark) the creeks and Mineral Creek. Xeroriparian communities occur between 1,500 and 5,000 feet in elevation and cover approximately 2 percent of the Preferred Alternative Analysis Area, largely along Queen Creek and Dripping Spring Wash. Pinyon-juniper woodland covers approximately 1 percent of the analysis area and pine-oak woodland covers approximately 0.3 percent, both largely above 4,500 feet. Mesquite, rock, and water combined account for 0.01 percent of the analysis area. The remaining approximately 5 percent of the analysis area is mapped as "human-dominated".

### 4.2.5.3 Revegetation Goals

This section identifies the revegetation goals and describes planned revegetation activities. This section includes growth media management plans that guided development of the revegetation plan.

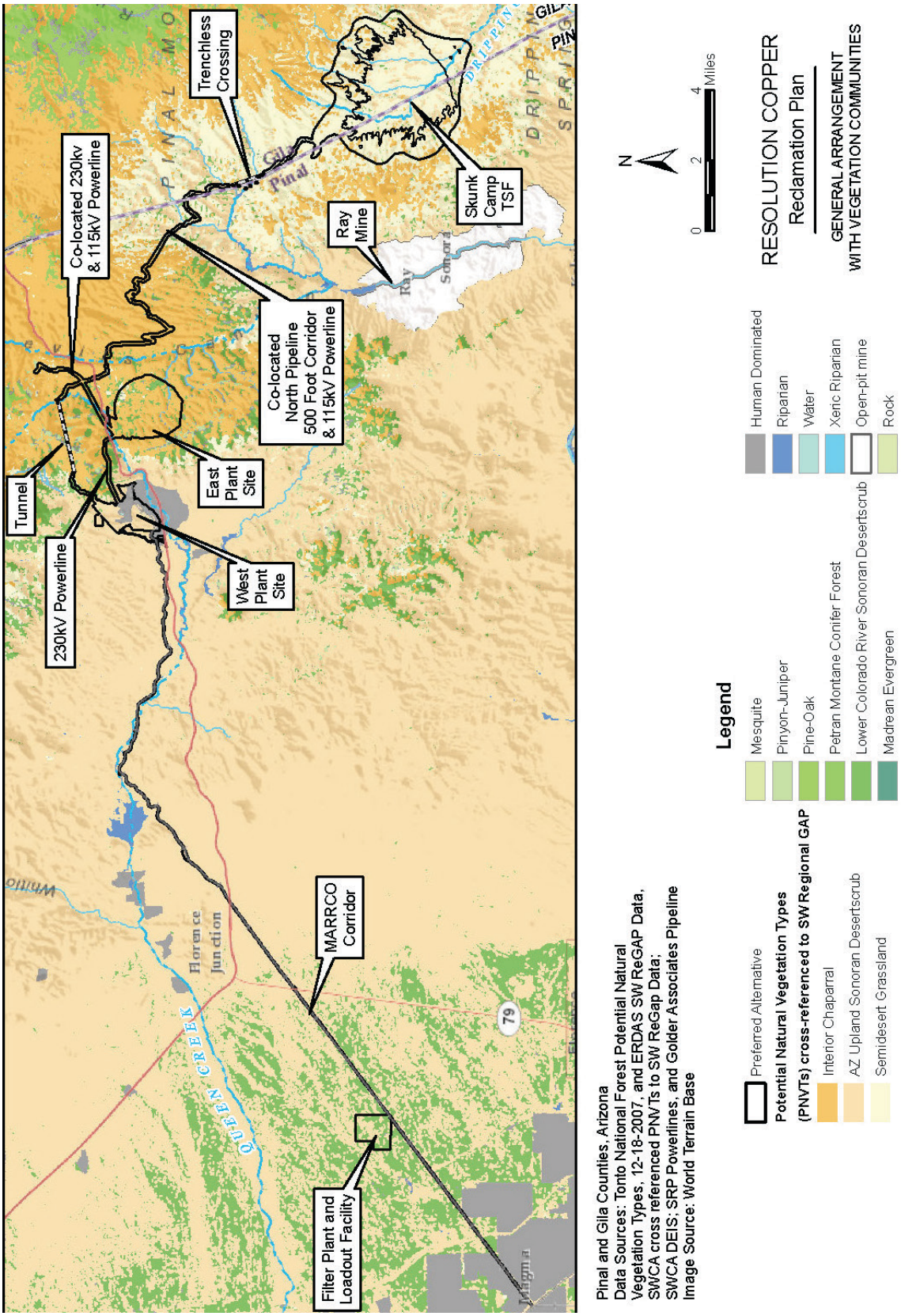
#### Revised Forest Plan Desired Future Conditions

The *TNF Land and Resource Management Plan* provides direction regarding vegetation management (USFS, 1985). However, desired future conditions for vegetation were informed by recent work on the revised TNF Plan (USFS, 2019). These desired future conditions are based on Ecological Response Units (ERUs), which are mapped ecosystem types that represent the range of conditions that occur under natural disturbance regimes such as fire, which are not necessarily representative of disturbances regimes associated with mining. The distribution and condition of ERUs are tied to growth media health, climate, topography, and other environmental factors.

*Desert Ecosystems ERU*

The Desert Ecosystems ERU includes both the Lower Colorado River Sonoran Desertscrub and Upland Sonoran Desertscrub (USFS, 2019). The desired future conditions include a vegetation community composition and structure of 10 to 25 percent perennial grass and cacti cover (i.e., canopy cover), presence of saguaro and mesquite that provide habitat for cavity-nesting birds, and limited infestation of non-native grasses (ideally less than 1 percent cover) to mitigate fine-fuel potential to increase fire susceptibility.

**Figure 13. Vegetation Communities within the Preferred Alternative Analysis Area**



*Semi-Desert Grassland ERU*

The desired future conditions of the Semi-Desert Grassland ERU include a vegetation community composition and structure that includes a variety of cool- and warm-season understory plants, less than 10 percent tree and shrub canopy cover, and limited non-native species cover (USFS, 2019). Native herbaceous vegetation cover provides fine fuels to support stand-replacing fires; however, non-native annual vegetation should be limited to mitigate the spread, intensity, and severity of uncharacteristic fire.

*Interior Chaparral ERU*

The desired future conditions of the Interior Chaparral ERU include a vegetation community composition and structure of 40 percent cover on dry sites and 80 percent cover on wet sites dominated by shrub live oak, annual regeneration of native grasses and forbs during most years, and low cover of non-native annual species (USFS, 2019).

*Millsite Allotment Environmental Assessment (USFS, 2010) Desired Future Conditions*

- Maintain a minimum of 30 percent effective ground cover (i.e., litter, rock, or vegetation canopy cover) for watershed protection and forage production. Where less than 30 percent exists, it will be the management goal to obtain a minimum of 30 percent effective ground cover.
- Increase cover of native herbaceous species compared to existing conditions with a goal of achieving ecosystem potential.
- Increase plant basal area and litter compared to existing conditions.
- In Sonoran Desert communities, allow for increased reproduction of jojoba compared to existing conditions.
- In grasslands, increase the foliar canopy coverage, basal cover, and vigor of grass species that decrease under grazing pressure compared to existing conditions.
- In chaparral, increase the foliar canopy cover and vigor of shrub species preferred by grazing animals compared to existing conditions. They are referred to as “A” species in FSH 2209.21 R-3 and include but are not limited to desert ceanothus, mountain mahogany, and Wright silktassel.
- Contain and eventually eliminate infestations of buffelgrass, fountain grass, Malta star thistle, and Saharan mustard. Reduce salt cedar where feasible compared to existing conditions and where no conflict exists with endangered species habitat.

### 4.2.6 Growth Media

The project is in an area largely controlled by bedrock; thus, very little growth media is present in the area. The growth media that is present is poorly developed, which may affect closure. Site-specific growth media data were collected, and soil maps were generated from U.S. Department of Agriculture Natural Resources Conservation Service soil surveys. Soil survey data were not available for the entire project area. Soil data are not available from the Natural Resources Conservation Service or the TNF for part of the MARRCO Corridor and the majority of the EPS; however, a detailed site characterization study was completed for WPS (Golder, 2011) the TSF as part of the TSF Site Investigation Report (KCBCL, 2019). Although “soil” is not present, the area does contain alluvial sand and gravel as well as Gila Conglomerate all of which can be used as growth media for cover design. This approach was used at the WPS for reclamation where crushed Apache Leap Tuff and White Tail Conglomerate containing no sulfides was used as cover material over the historic Magma Copper Tailings and supports a vegetative cover.

During construction, growth media would be segregated to maintain integrity and avoid mixing better growth media with unsuitable media.

### 4.2.7 Wildlife Habitat

Common wildlife species expected to occur are typical of those associated with the existing vegetation communities. Mammals in Interior Chaparral include cottontail rabbit, various mice, and mule deer; birds include scrub jay, several towhees, and canyon wren; and reptiles include various rattlesnakes, kingsnake, and fence lizard (Brown 1994). Mammals in Semi-Desert Grassland include black-tailed jack rabbit, spotted ground squirrel, and kangaroo rat; birds include quail, flycatcher, and raven; and reptiles include various lizards, toads, and snakes (Brown 1994). Mammals in the Upland Sonoran Desertscrub include javelina, gray fox, and wood rat; birds include white-winged dove, several woodpeckers, and elf owl; and reptiles include Gila monster, Arizona coral snake, and western whiptail (Brown 1994). Mammals in the Lower Colorado Sonoran Desertscrub include desert bighorn sheep, kit fox, and antelope squirrel; birds include phainopepla, curve-billed thrasher, and cactus wren; and reptiles include chuckwalla, sidewinder, and various lizards (Brown 1994). Extensive baseline biological studies have been conducted. Wildlife surveys have included group-specific surveys for bats, raptors, passerine birds, reptiles, and amphibians.

Wildlife has been monitored using motion-sensitive cameras since 2008 (WestLand Resources, Inc., 2018a). Species detected include javelina (*Tayassu tajacu)*, raccoon (*Procyon lotor*), Gambel's quail (*Callipepla gambelii*), white-tailed deer (*Odocoileus virginianus)*, white-nosed coati (*Nasua narica*), rock squirrel (*Otospermophilus variegatus*), gray fox (*Urocyon cinereoargenteus*), and mountain lion (*Puma concolor),* Sonoran desert toad (*Incilius alvarius*), American badger (*Taxidea taxus*), Gila monster (*Heloderma suspectum*), western diamondback rattlesnake (*Crotalus atrox*), and Steller's jay (*Cyanocitta stelleri*). Audubon Arizona conducted Yellow-billed cuckoo surveys in 2019 in the vicinity of the TSF and pipeline corridor areas. Cuckoos were not detected, and 57 other species that were encountered, nine of which have special conservation status (Purple Martin, Gila Woodpecker, Gilded Flicker, Bell's Vireo, Abert's Towhee, Costa's Hummingbird, Willow Flycatcher, Gray Vireo, and Lucy's Warbler) were reported. A full list of birds observed during the 2019 Resolution survey is in the report (Prager & Wise, 2019).

Surveys for amphibian and reptile species associated with aquatic features were conducted (WestLand Resources, Inc., 2018b). WestLand observed lowland leopard frogs, sunfish, cray fish, juvenile bullfrogs, black-necked gartersnake (*Thamnophis cyrtopsis*), Sonoran desert toad (*Incilius alvarius*), Sonora mud turtle (*Kinosternon sonoriense*), canyon treefrog (*Hyla arenicolor*), and red-spotted toad (*Anaxyrus punctatus*).

### 4.2.8 Cultural Resources

Class III archaeological surveys have been completed for the area of potential effects. Final determinations regarding the National Register of Historic Places eligibility of the resources identified will be made by the USFS in consultation with the Arizona State Historic Preservation Office.

Reclamation activities would avoid historic properties (i.e. register-eligible sites) located outside the identified disturbance corridors and footprints. No impacts to cultural resources are expected during closure/post-closure.

# 5 CLOSURE ACTION PLAN

Closure activities represent the proposed approach based on site-specific conditions, industry practice, and legal and other requirements at the time of preparation (2020). Closure actions are based on the project environmental considerations and design basis described in Section 4.

Reclamation practices and technology are constantly evolving and improving. Reclamation practices discussed here have proven successful at other mineral operations. Future opportunities to incorporate new reclamation technologies or implement improved reclamation measures will be considered during periodic reclamation and closure plan reviews with state and federal agencies.

## 5.1 HEALTH AND SAFETY HAZARDS STANDARDS

During closure, hazards from closure-specific activities include heavy vehicle traffic, falls, electrical, chemical, weather, air quality, water, material handling, suspended overhead loads, processing chemicals, and hazardous wastes. Some of the facilities from the historic mining operations are old and may contain previously undiscovered lead-based paint or asbestos. Decontamination of equipment and buildings could generate additional wastewater that may require treatment before disposal. TSF closure will require personnel and equipment on the tailings surface which may not be fully consolidated. The Resolution Copper health and safety program will identify these hazards and train closure staff accordingly. Post-closure health and safety hazards may be present for monitoring activities and security.

### 5.1.1 Physical Barriers and Warning Signs

Physical barriers or fencing would be placed in areas accessible to the public where final contours are not regraded to 3H:1V slopes or less (such as the subsidence crater). Weather-resistant warning signs would be placed at regular intervals.

### 5.1.2 Shaft Closure

Mine openings would be secured and made inaccessible to unauthorized access. Shaft closure would include construction of bat-accessible structures where applicable. Other openings would be permanently closed using designs previously approved and employed at other Arizona mine sites including the closure work Resolution Copper completed for historic workings in the vicinity of the historic Magma Copper Mine.

### 5.1.3 Stability Considerations

Existing slopes would be reduced to a final slope angle which would minimize erosion and would result in geotechnical stability for these features, generally a maximum slope of 3H:1V. Erosional stability may be enhanced through establishment of vegetation, engineered channels to drain stormwater from reclaimed areas, and possibly placement of erosion-resistant cover materials. See **Attachment A** for specific stability considerations for the TSF.

### 5.1.4 Debris Management

Debris (trash, scrap metal, wood, etc.) from mine reclamation that poses a threat to public safety or creates a public nuisance would be disposed or recycled in accordance with applicable state and federal regulations, consistent with the PMLU.

Any potentially hazardous materials encountered during demolition would be analyzed to determine appropriate remediation and disposal methods. Any hazardous materials would be handled and disposed or recycled in accordance with applicable state and federal regulations.

## 5.2 GENERAL DESIGN STANDARDS

### 5.2.1 Decommissioning and Demolishing Facilities

Resolution Copper will demolish, remove, and reclaim the surface of all existing or new facilities used by the Resolution Copper Project, except the following:

- Historic cooling towers at EPS,
- MARRCO Railroad,
- Facilities needed for the PMLU, and
- Facilities owned by others, such as Arizona Water Company or Salt River Project.

Resolution Copper would recover and remove salvageable equipment, unused chemical reagents, fuel, instrumentation, furnishings, and other salvageable material not required for post-closure monitoring. Removed equipment would be shipped to buyers, recyclers, or approved waste disposal facilities.

Storage containers for materials, supplies, and reagents would be emptied, cleaned, demolished, and disposed of off-site or salvaged (**Table 8** and **Table 9**).

Areas would be tested for contamination before structures and facilities are removed. Areas of potential contamination would be analyzed and evaluated to determine if remediation is required, and if so, excavated, and removed. Removed material would be disposed of on- or off- site, depending on the results of the evaluation.

**Table 8. Materials and Supplies – EPS and WPS**

| Material/Supply | Delivered Form | Storage Method |
|---|---|---|
| Diesel Fuel | Liquid | Tanks |
| Propane | Gas | Tanks |
| Oil/Lubricants | Liquid | Sealed Drums/Totes |
| Antifreeze | Liquid | Individual Containers |
| Solvents | Liquid | Individual Containers |
| Explosives (Emulsion Product) | Solid | Locked Magazines |
| Explosives (Blasting Detonators) | Solid | Locked Magazines |
| Welding Cylinders (argon gas, acetylene, etc.) | Gas | Cylinder storage corral |
| Hardware | Solid | General Stores Shelving |
| Carpentry Supplies | Solid | General Stores Shelving |
| Office Supplies | Solid | Individual Containers |
| Propane | Gas | Tanks |
| Grinding Balls | Bulk | In-ground Bins |
| Lab Chemicals | Liquid/Solid | Individual Containers |

**Table 9. Reagents – WPS**

| Reagent (brands may vary) | Delivered Form | Storage Method |
|---|---|---|
| Dithiophosphate/monothiosulfate (Cytec 8989; collector) or equivalent copper collector | Bulk truck (liquid) | Storage tank |
| Sodium Isopropyl Xanthate (SIPX; collector) | Drums or superstacks (dry) | Drums on pallets |
| Methyl Isobutyl Carbinol (MIBC; frother) | Bulk truck (liquid) | Storage tank |
| MCO (Non-polar flotation oil; molybdenum collector) or #2 Diesel Fuel | Bulk truck (liquid) | Storage tank |
| Sodium Hydrosulfide (NaHS; copper mineral depressant) | Bulk truck (liquid 30% concentration) | Storage tank |
| Flocculant (settling agent) | Bags or super sacks (dry) | Bags or sacks on pallets |
| Lime (90% CaO; pH modifier) | Bulk truck (dry) | Dry storage silos |
| Antiscalant (water treatment) | Dry (drums) or liquid (totes) | Tanks |

## 5.2.2 Recontouring

Resolution Copper has established design criteria to control ponding, runoff, and erosion. The top surface and outslopes, as well as disturbed surfaces, would be recontoured to:

- Appear natural (size, shape, transition) compared to surrounding terrain;
- Prevent water from creating ponds, thereby reducing the potential for infiltration to underlying materials;
- Control runoff, thereby reducing the potential for erosion and creation of ponds; and
- Improve stability, thereby reducing the potential for mass movements.

Final reclamation slopes for earthworks would generally be a maximum of 3H:1V. Compacted areas would be cross-ripped along the topographic contour, regraded, and recontoured to provide for erosion control and to blend into the surrounding topography and terrain to promote post-mining visual quality, land use, and revegetation. Final slopes would depend on constraints (such as, property boundary lines or other linear features). Slope lengths would generally be limited to 300 feet, although exceptions may be made (such as property boundaries). For slope lengths longer than 300 feet, intermediate benches with V-ditches would be installed to control runoff.

Post-reclamation conditions would assume current material and pore water conditions and long-term drained conditions. Resolution Copper's design criteria for stability require a minimum factor of safety for slope stability of 1.5 for static conditions and 1.1 for pseudostatic conditions.

Recontouring would be accomplished by local cut-to-fill, importing clean fill, or importing mass grading fill. Clean fill would consist of the same material as used for the closure covers placed in lifts and compacted. Mass grading fill would consist of mine materials and/or natural materials from multiple on-site locations and easily handled.

## 5.2.3 Water Quality Management

### 5.2.3.1 Surface Water/Stormwater Management Plans Following Closure

Water management would focus on reaching a steady state for groundwater surrounding the facilities with the potential to discharge (i.e. WPS and Filter Plant and Loadout Facility) and that reclamation has been completed to allow for stormwater discharge. Additional post-closure stormwater management information is discussed within the context of closure of the individual facilities. Post-mining TSF water management is discussed in **Attachment A**.

## 5.2.4 Closure Covers (Growth Media)

Cover materials for other areas with mine materials and/or impacted mass grading fill (e.g., pond deposits, impacted sediment, development rock, etc.) would receive closure covers of a single, 1- to 3-foot-thick layer, store-and-release cover of growth media placed uncompacted on the top surfaces. The cover would:

- Provide a rooting layer for vegetation;
- Limit infiltration; and
- Protect the underlying materials from erosion.

Areas of native ground, areas reclaimed immediately after construction, areas where buildings were demolished, areas where facilities were removed, and areas containing non-acid generating materials, would not receive closure covers.

Compaction, low-water holding capacity, bulk density, deficiency of micro and macro nutrients, and associated rooting restrictions are the major factors limiting the productivity of reclaimed growth media (Sheoran, Sheoran, & Poonia, 2010). However, productivity of salvaged growth media and cover materials can be increased by adding various amendments such as hay, saw dust, wood chips, bark

mulch, animal manure, or biochar, as they stimulate microbial activity (bacteria and mycorrhiza) which provides nutrients (nitrogen and phosphorus) and organic carbon. The cover for the TSF is discussed in detail in **Attachment A**.

#### 5.2.4.1 Cover Material Availability

Structural fill and low permeability fill are occasionally used in certain reclamation activities. Resolution Copper has an onsite borrow source for structural fill at the former Able Earth Quarry and for low-permeability fill at the Clay Pit/Silt Ridge area. These materials are non-mineralized and have been tested for geotechnical suitability.

Cover material for EPS areas needing cover will be sourced from locally obtained surface bedrock (Apache Leap Tuff).

In the MARRCO Corridor, growth media and/or alluvial fill would be obtained from and stockpiled at WPS (Resolution Copper, 2014).

Suitable cover growth media can be practicably salvaged from linear disturbances (i.e., the tailings pipeline to the TSF) using standard earth moving equipment. The suitable growth cover will be salvaged, stored, and reapplied on areas that have been prepared for reclamation. If the phasing of construction, material handling, and reclamation allow, growth media will be 'live handled'[1], the period of growth media storage will be limited to the extent practicable, or when long-term storage of growth media is necessary, growth media will be placed in stockpiles that maximize the area of the stockpile surface. This can effectively limit the volume of imported Gila Conglomerate and the amount of growth media amendment necessary for the revegetation of linear disturbances.

The growth media cover for the TSF is described in Section 8 of **Attachment A**.

##### Gila Conglomerate

The Gila Conglomerate cover material is approximately 50 percent gravel, 40 percent sand, and 10 percent silt/clay. The conglomerate is a type of sedimentary rock composed of pre-existing rocks that have been cemented together, including sandstone, carbonates, argillite, hornfels, granitic rocks, and quartz and feldspar (Lawson, 2011). Gila Conglomerate is relatively easy to excavate and handle using standard earth moving equipment. It is non-potentially acid generating, contains an excess of neutralization potential and readily weathers into finer-grained material for plant growth media. At Skunk Camp, electrical conductivities (an indirect measure of salt concentrations, growth media, pore water, and water) are generally low and range from 248 to 528 µS/cm. Organic matter ranges from 0.1 percent to 2.2 percent based on a loss on ignition method which is within the range of organic matter measured in natural surface growth media in the area (KCBCL, 2019). Two Gila Conglomerate cover materials are proposed: a coarse and a fine "growth media-like" material (Resolution Copper, 2020a).

A technical memorandum reviewing studies regarding the suitability of Gila Conglomerate as a cover material prepared by (Bengtson, 2019) indicated the following:

- "*Revegetation efforts using Gila Conglomerate bedrock as a capping material or revegetating surface soils derived from Gila Conglomerate have been generally successful in mining reclamation projects in southwestern New Mexico and southeastern Arizona.*"
- "*Laboratory data indicate that Gila Conglomerate is a neutral to slightly alkaline material (a pH from 7 to 8.2), is not potentially acid generating, and has a high net neutralization potential. It has a high saturated hydraulic conductivity and low water-holding capacity.*"

1 Refers to the removal of growth media from an area prior to the initiation of mining and related activities and the haulage and immediate placement of the cover growth media onto another area of disturbance that is prepared for permanent reclamation.

- "*The degree of revegetation success varies depending on the nature of the Gila Conglomerate-derived material, reclamation and revegetation treatments, and elapsed time since revegetation/reclamation treatment. For Gila Conglomerate-derived soils, vegetation cover has been shown to range from 2.8% to 26% less than 1 year after treatments were applied* (Lawson, 2011). *For surfaces capped by crushed Gila Conglomerate, vegetation cover varied from 11% to 71% one year after treatment, and by year 12, vegetation cover ranged from 23% to 77%* (Milczarek, 2011)*."*
- *"Areas with steep slopes or drainages may require some surface mulch or rip-rap to prevent erosional losses of Gila Conglomerate* (Lawson, 2011)*."*

### Composite Covers

For areas other than the TSF, the generally coarse nature of the Gila Conglomerate, the low fines content, and the high rock fragment content will likely provide good erosion protection on slopes. The Gila Conglomerate is suitable as a cover material when blended with scavenger tailings (with the tailings comprising at a minimum 25 percent of the composite cover material), in which the Gila Conglomerate improves erosion resistance and the tailings improve moisture retention.

### Underlying Materials

Underlying materials should be sampled and analyzed to maximize effectiveness of post closure, including sampling to understand pH and salinity conditions, degree of compaction and grain size distribution. Depending on the potential conditions encountered, standard practice remedies may include application of limestone and nutrients, capillary barriers, deep cross ripping, select additional placement of growth media materials (coarse or fine).

### Revegetation Plan

Dressen (2008) identified factors that are key components to successful revegetation using native grasses in arid southwest environments. These factors, which are also applicable to seeding of native forbs, shrubs, and trees, are as follows:

- Seed Depth – Emergence versus moisture. The depth of seed placement is a critical factor; the goal is to balance shallow seeding depths to allow high rates of emergence versus better growth media moisture conditions found with increasing depth, which are critical to seedling survival.
- Dormancy – An advantageous trait for seed to persist for later precipitation events or future years. If less than optimal moisture conditions have allowed most seed to germinate but then die of desiccation, the presence of some dormant seed can provide a viable seed reserve.
- Growth Media Compaction – Survival depends on rapid root extension. The ability of seedling roots to follow the downward drying front is inhibited by shallow compaction zones or claypans.
- Seed-to-Growth Media Contact – To facilitate imbibition of growth media moisture by seed. Large growth media voids can prevent adequate seed-to-growth media contact and reduce upward capillary movement of growth media moisture that can retard germination and growth
- Moisture Relations and Growth Media Texture – Infiltration depth versus water holding capacity. The most important factor in arid ecoregions is growth media moisture. The influence of growth media texture on the depth of moisture penetration can be a key variable in seeding success.
- Mulch – Essential in arid regions. A layer of mulch reduces evaporation and wind and water erosion, and aids infiltration; it provides the maximum benefit from the small amount of precipitation received in arid climates. Application of the proper amount of weed-free material is important.
- Weed Control – Limit the weed seed bank. Dense stands of annual and perennial weeds can out-compete seedling grasses for growth media moisture, light, and nutrients, and prevent establishment. Weeds are an undesirable plant type for revegetation success.

- Grass Types and Planting Dates – The type of photosynthetic pathway determines the optimal temperatures (70-75°F for cool season and 85-95°F for warm season) and temperature limitations (40°F for cool season and 55°F for warm season) for growth and germination.

These and other factors influenced development of the seed mixtures (**Attachment B**, seeding, seedbed preparation and amendment, mulching, and weed management plans.

## 5.2.5 Seedbed Preparation

Seedbed preparation will include pocketing and/or roughening of the surface to create microsites, which facilitate vegetation establishment and growth through improved shading and moisture conditions within cover growth media. Establishment of these microsites should also facilitate adequate burial of applied seed with cover growth media. If seeds are not adequately buried with cover growth media, seeded areas will be deeply cross ripped along the contour, pitted, chain-dragged or harrowed as long as microsites are maintained.

### 5.2.5.1 Growth Media Amendments

To promote vegetation establishment, growth media amendments would be applied immediately prior to seeding, consisting of mulch, biochar, certified-weed free compost, or other commercially available growth media amendments. These amendments would increase the nutrient availability, erosion resistance, and water holding capacity of cover growth media.

Growth media fertilizer will be applied sparingly, if at all, to encourage the establishment and diversity of native plants and to prevent establishment of noxious weeds. The objective of growth media fertilization is a short-term nutrient supply to promote the establishment and growth of desirable plants. Subsequently, long-term nutrient requirements will be satisfied through the development of natural nutrient cycling and plant communities that are not fertilizer dependent. Use will be based on local climate, vegetation nutrient requirements, growth media nutrient deficiencies as determined by sampling and analysis, and vegetation response to cultural treatments. If invasive or noxious weeds are prevalent in the area, nitrogenous fertilizers may not be applied or only applied after emergence of native perennial plants.

### 5.2.5.2 Mulches

Certified noxious and invasive weed-free mulch will be applied to the surface of the cover growth media only when it does not delay the emergence of seedlings and when it is affixed to the surface of cover growth media by crimping, co-application with tackifier, surface netting and staking, or other methods. Mulch is important to the revegetation success because it:

- simulates plant litter under natural conditions and its benefits appear to be greatest in arid climates (Lawson, 2011);
- provides one of the few opportunities to preserve limited growth media moisture and can increase infiltration (Dressen, 2008); and
- limits growth media loss attributable to rain splash.

Native grass hay is an effective material for mulching large seeding projects. Mulch will be applied at a rate of 1 to 2 tons per acre. Erosion-control fabric and other erosion control practices instead of or in addition to mulching will be applied to erosion-prone areas as appropriate.

## 5.2.6 Reclamation Seed Mixes

The proposed long-term vegetation community seed mixes are provided in **Attachment B.** The criteria for each species in the seed mixes include demonstrated erosion control capacity, existing or alternative desired vegetation dominance, commercial availability, contribution to wildlife habitat, and livestock palatability.

All mixes will be certified weed free. Selection of species for each seed mixture can be modified in the future based on revegetation success, growth media and climatic conditions, and availability.

The reclamation seed mixes will be applied per the slope, aspect, and elevation of the reclaimed surfaces and erosion control needs and the previously identified vegetation community (see **Attachment A**). The seed mixtures are listed by location.

The exact seed mixes applied may differ from the proposed mixtures depending on commercial availability from year to year. Modification to the seed mixes may also be made based on the performance of interim and concurrent reclamation. The performance of individual species on reclaimed sites will be considered and seed mixtures and their application locations modified to better meet reclamation and PMLU goals.

#### 5.2.6.1 Seeding Rate and Quality

When broadcasting seeding, higher rates are usually needed because fewer of the seed will land at an optimal burial depth (Dressen, 2008). A recommended total seeding rate for a mix of pure live seed (PLS) per acre is shown in **Attachment B**. The proportion of each species will depend on the species composition of the desired plant community, seedling vigor (competition between species), seed size, seed dormancy, and PLS seed cost. Seeds would be tested for purity, and percent live seed prior to use.

#### 5.2.6.2 Seed Application Methods

Dry broadcast seeding will be the primary seeding method and will be accomplished using a hydroseeder, hand-operated cyclone-type seeder, or mechanical broadcast seeder followed by raking.

#### 5.2.6.3 Vegetation Salvage and Transplanting

In Upland Sonoran Desertscrub, saguaros less than 25 feet in height and other select cacti would be salvaged and transplanted to the extent practicable and if encountered in the project footprint. There is a low survival rate for transplanted saguaros taller than 20 feet and transplanting success is much higher for “spears” (saguaros without arms) less than 10 feet tall. Best management practices for saguaro transplanting developed by the Arizona Game and Fish Department (Arizona Game and Fish Department, 2019) would be implemented.

#### 5.2.6.4 Timing of Revegetation Activities

Disturbed areas that will be reclaimed will be seeded as soon as practicable following completion of cover growth media application and seedbed preparation. Seeding is optimally completed prior to the most reliable precipitation of the year, which in the bimodal climate is the monsoonal precipitation of July, August, and early September. Optimally, seedbed preparation will occur as close to mid-to-late June as possible in anticipation of these warm season rains. Optimally, seed will be applied immediately thereafter in late June or early July. Depending on success, seedbed preparation and seeding could also be conducted in October following the monsoonal rains and prior to late fall/winter precipitation, although this would be considered a secondary option as precipitation during this time is typically not as reliable as that of the monsoon season.

Three types of reclamation, in terms of timing, will be conducted as part of the project and can be defined as follows:

- Interim Reclamation: Temporary reclamation of land disturbed by construction and mining that will be re-disturbed by mining, or concurrent or final reclamation (see definitions below); cannot be permanently reclaimed concurrent with mining; and where temporary stabilization of disturbed ground would limit growth media erosion, sediment transport and noxious weed establishment and spread. Interim reclamation activities may include creation of micro-topographic features; sowing of interim reclamation seed mixture(s); application of mulch or erosion control fabric on

erosion-prone areas; and installation and maintenance of best management practices. Examples of areas where interim reclamation may occur include road cut and fill slopes.

- Concurrent Reclamation: Final or permanent reclamation of land disturbed by construction and mining that will not be re-disturbed during mining or final reclamation and can be permanently reclaimed concurrent with mining.
- Final or Permanent Reclamation: Final or permanent reclamation of land disturbed by construction and mining that cannot be reclaimed until mining is completed.

Interim revegetation efforts will emphasize erosion control, weed management and sustaining growth media productivity. Interim revegetation will occur on growth media (and potentially woody debris) stockpiles, and on road and operation yard cut and fill slopes.

Seeding would occur when weather conditions are favorable for germination, emergence, and seedling survival. Planting and seeding would likely be conducted annually in June to take advantage of the July through August rainy season.

#### 5.2.6.5 Noxious and Invasive Plant Management

Growth of noxious and invasive plants would be prevented as part of revegetation activities during reclamation. Surveys for noxious, invasive, and non-native species were conducted within and adjacent to the Preferred Alternative Analysis Area. A total of 31 invasive plant species are known to or could possibly occur. Tamarisk (*Tamarix* sp.), Bermuda grass (*Cynodon dactylon*), buffel grass (*Pennisetum ciliare*), and fountain grass (*Pennisetum setaceum*) were all observed within some of the larger drainage systems. Filaree (*Erodium cicutarium*) and Sahara mustard (*Brassica tournefortii*) were found in some upland areas. Red brome (*Bromus rubens*) is a ubiquitous groundcover.

Of the non-native invasive species identified, the most important to revegetation is red brome due to its ability to invade and displace desirable vegetation and its effect on wildfires in desert scrub and grassland communities.

To prevent the proliferation of the noxious and invasive weeds, Resolution Copper will implement the *Noxious Weed and Invasive Species Management Plan on National Forest System Lands* (Resolution Copper, 2019). The plan will focus on the following:

- Preventing the introduction of non-native species;
- Controlling the spread of existing populations; and
- Preventing the introduction of noxious weeds using integrated weed management techniques.

Integrated weed management techniques involve a combination of weed control strategies. The four strategies of weed control are cultural, biological, physical, and chemical.

- Cultural control would be accomplished by educating site employees on the identification and importance of weeds and by developing a revegetation seed mix that promotes native plant competition. Competitive native plants are included in the reclamation seed mixtures.
- Physical control may involve hand pulling, cutting, or mowing in areas of low-density infestations. Tilling would also be used in high-density areas.
- Chemical controls (herbicides) would be timed with the application of physical controls to maximize their effect (chemical methods will be used on NFS only with prior approval from the USFS, including type, rate, frequency and total quantity of application).
- Biological controls have not been developed for most invasive plants possibly invading disturbed areas and are not likely to be used as part of the integrated weed management. However, treatments that include seeding of natives can be effective.

Control of noxious and invasive weeds would be limited through successful revegetation. Mulch, compost, erosion control materials and other reclamation materials used on-site would be certified weed-free. Seed mixes would be approved by the USFS and all seed used would be tested for the presence of noxious

and invasive weeds. If invasive or noxious weeds are prevalent in the area, nitrogenous fertilizers may not be applied or only applied after emergence of native perennial plants.

Equipment and materials used for closure, reclamation, and monitoring will be inspected to ensure undesirable weed plants, seeds, and propagules are not transported to the site. To eliminate vectors for weed propagation, all contractors will wash and clean all equipment and containers prior to entry to the site or at the Resolution Copper light vehicle wash facilities.

Vehicle wash facilities will be fitted with air and water wash systems to accommodate the weed management protocol described here. The air wash system will be used specifically for Sahara mustard (*Brassica tournefortii*) weed control. The air and water wash system will be used to clean commercial and contractor vehicles to reduce the potential introduction of other noxious and invasive weeds.

As roadsides and recently disturbed areas are most vulnerable to weed infestations, undesirable weed control will focus on these areas. Annual weed monitoring would be conducted during the growing season to determine the presence and location of individual and populations of undesirable weeds.

#### 5.2.6.6 Revegetation Success Monitoring and Adaptive Management

Annual monitoring of revegetated sites will be used to adjust and improve management decisions regarding seedbed preparation, seed mix, and timing. The accumulation of understanding and subsequent adaptation of management strategies depends on feeding the monitoring and assessment results back into the decision-making process. This plan's monitoring and assessment efforts are designed to ensure that key resource parameters are adequately measured and appropriately focused to contribute to any changes needed to achieve success.

### 5.2.7 Wildlife Habitat Reclamation

As one of the identified PMLUs, wildlife habitat is supported by the early successional vegetation after reclamation, the post-mining topography, and access. Early successional habitat is characterized primarily by grasses and forbs, often with shrubs pioneering into the site over time. This type of structure and cover is essential for a variety of wildlife species in the desertscrub, semi-desert grassland, and interior chaparral biotic communities. An essential component of early successional habitat for many wildlife species is native warm-season grasses. As opposed to non-native cool-season grasses that grow well during the spring and fall, warm-season grasses grow during June, July, and August. They are typically bunch grasses that grow in clumps and are especially beneficial to ground-feeding birds as they allow mobility between the clumps. Early successional habitat provides cover and structure for wildlife to use for food and shelter.

The reclamation plan has incorporated measures in addition to the revegetation practices outlined above to meet this objective. These include wildlife habitat enhancement features (e.g., brush piles or rock piles) in some areas to enhance local biodiversity by providing habitat for reptiles and small mammals and build structural diversity.

### 5.2.8 Air Quality Management

During closure activities (i.e. grading, demolition, cover placement), Resolution Copper would continue to implement control measures defined by their operational air quality permit and management plan.

Resolution Copper would take reasonable precautions to minimize fugitive dust emissions from dust-generating activities as required by Pinal County. Resolution Copper has identified sources of fugitive dust emissions and developed control measures and strategies to be implemented prior to and during dust-generating activities. Fugitive dust emissions would be visually monitored in accordance with required opacity protocols and standards.

A dust-suppression program would continue to be implemented for the gravel roads, which includes periodic watering and/or chemical treatment to control fugitive dust generation. A water truck would run

periodically in the drier months, wetting the unpaved roads, and a motor grader would remove any rock, silt, or other debris from the unpaved roads. Speed limits would be in place on access roads to reduce fugitive dust.

**Attachment A** includes specific measures for the management of fugitive dust during closure and reclamation of the TSF.

### 5.2.9 Visual Resource Management

To the extent that the engineering design and stability requirements permit, Resolution Copper would vary slope angles, avoid long linear features and overly simple geometric forms, and revegetate with an approved seed mix, to reduce the visual contrast with the surrounding landscape.

## 5.3 AREA-SPECIFIC CLOSURE AND RECLAMATION

### 5.3.1 EPS Closure and Reclamation

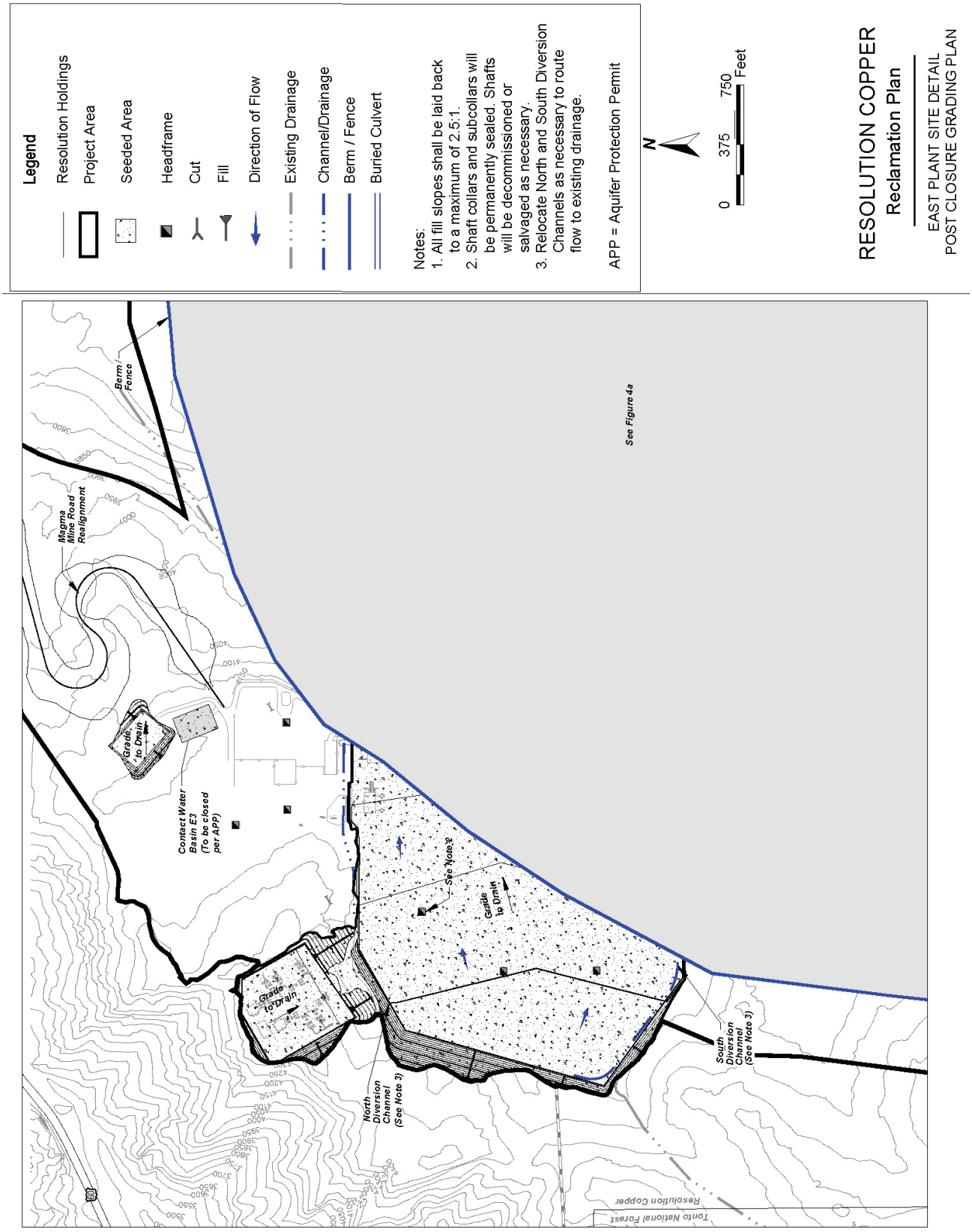
The EPS structures and facilities (i.e., shafts, hoist houses, administrative buildings, maintenance areas) would be decommissioned and demolished. The EPS post-closure map is shown on **Figure 14**. Ancillary buildings and facilities at the EPS which supported the former mining and exploration operations would be demolished during reclamation or incorporated into PMLUs. Concrete foundations from demolished buildings or below-grade concrete work would be covered to a depth of 3 feet below ground surface with fill materials developed from site re-grading to enhance stability. Buried concrete foundations with the potential to hold or retain infiltrated surface water would be broken in place to prevent water accumulation.

The EPS consists of several terraces surrounded by rugged terrain. At closure, the land surfaces (including paved and graveled areas) would be regraded and reseeded. Final grading plans would be developed at reclamation. In order to minimize erosion, the following erosion control measures are planned:

- Slopes of unconsolidated material would be graded to a slope of 3H:1V or less. Native rock formations would be left in their original configuration and incorporated into the landscape.
- Catchment channel protection would be placed along slope crests or where natural, undisturbed slopes meet flat or gently sloping reclaimed materials. These features are intended to eliminate the formation of nick points along the slope crests and along native slope toes. Where appropriate, riprap would be utilized to protect the slopes of these channels and other drainage structures.
- Vegetated terrace channels would be constructed at regular intervals down the slope using a suitable grade. These features are intended to minimize slope runoff, thus minimizing sheet erosion.
- The catchment and gradient terrace channels would intersect regularly spaced, slope-face collection channels. These channels are intended to concentrate and convey water off the slopes, thus controlling downcutting.
- A berm, topography and/or a fencing would be constructed, monitored, and maintained along the entire perimeter of the subsidence zone to prevent access. No additional reclamation activities are planned for this area, however, to the extent practicable, surface water diversions would be constructed to move stormwater away from the subsidence zone into natural drainages.
- Shaft collars and subcollars would be permanently sealed and headframes would be decommissioned or salvaged as necessary.

Buildings that are not designated for re-use would be demolished, along with their foundations, as described above. Aboveground storage tanks would be emptied, cleaned out, demolished, and disposed of off-site or salvaged. Steel tanks would be cleaned and salvaged.

**Figure 14. EPS Detail Post Closure Grading Plan**



The explosives magazines would be decommissioned and removed in accordance with Bureau of Alcohol, Tobacco, Firearms and Explosives requirements and procedures. The facility footprint would be recontoured and reclaimed in conjunction with nearby surface facilities.

Water treatment and cooling facilities that are not designated for re-use would be demolished as described above. Refrigerant and glycol would be removed from the cooling system and disposed of at an approved facility. The bulk coolers and ducts located underground would have the refrigerant and glycol removed and disposed of or salvaged through a third party with facilities and systems approved to handle these materials. Duct and cooling systems underground would be cleaned prior to abandonment as part of the underground closure plan. Hazardous or regulated materials would be removed prior to abandonment. Headframes and hoists that would not be used during closure monitoring would be decommissioned, disassembled, and salvaged.

As described above, the subsidence zone would have a berm, topography and/or fence constructed, monitored, and maintained to prevent public access. No additional reclamation is anticipated in the block cave zone, as equipment and people would not be able to safely access the area to perform reclamation activities. To the extent practicable, surface water diversions would be constructed to move stormwater away from the subsidence zone and into natural drainages.

Stormwater management systems at the EPS would be maintained through closure. Certain diversion channels and discharge points would be closed in accordance with APP and AZPDES permit requirements, while others would be reconfigured to carry water following natural topography through and off the site. The North and South Diversion Channels would be relocated, as necessary, to route flow to existing drainages. Contact Water Basins E1, E2, and E3 would be closed per permit requirements.

#### 5.3.1.1 Domestic Waste Disposal Facilities

The small unitized domestic sewage treatment plant is a below-grade concrete structure that has been previously decommissioned on site and replaced by polyethylene tanks within the concrete structure of the decommissioned facility. The plant and septic storage tanks would be cleaned according to applicable standards and dismantled and demolished, as required. Any remaining mechanical components would either be salvaged or taken to an appropriate solid waste disposal facility. The concrete structure would be covered to a depth of 3 feet below ground surface, with excess fill materials developed for the site stability re-grading. Buried structures with the potential to hold or retain infiltrated surface water would be broken in place to prevent subsurface water accumulation.

### 5.3.2 WPS Closure and Reclamation

The WPS facilities would be decommissioned and the land surfaces would be contoured and graded, as necessary, to blend into the surrounding topography and terrain, and reseeded with appropriate seed mixes. Activities would include:

- All fill slopes shall be laid back to a maximum of 3H:1V.
- The West Diversion Channel, the East Stormwater Channel, and an onsite channel would remain in place to route flow through a new diversion channel to the Apex Tunnel, from where it would flow to existing drainages (e.g., Silver King Wash).
- The Process Water Pond and Contact Water Basins W1 through W5, would be closed per APP requirement.
- The emergency overflow ditch from Contact Water Basin W1 would remain in place.
- Non-contact Water Basins W6 through W9 would be reconfigured to free drain.
- The CP105 Pond, located at the southern portion of the WPS, would be reconfigured to free drain.

Roads on Resolution Copper private land at the WPS would be reclaimed unless needed for post closure monitoring as described in Section 5.3.7.

Resolution Copper would decommission stationary mining equipment by removing hydraulic fluids, oils, electrical switches, wiring, etc. Buildings and structures that are not designated as historical would be demolished. Concrete foundations would be removed or broken up and buried. Resolution Copper would remove scrap metal, wood, trash, and other debris. All of these materials would be handled by a licensed waste management contractor for proper disposal. Demolition would follow decommissioning with removal and salvage of pumps, rails, metal, etc., as appropriate. Non-salvageable inert materials (e.g., concrete, asphalt, wood, glass, and brick) would be disposed of on-site.

Water and fire suppression water tanks located on the eastern side of the Concentrator would be emptied, cleaned out, demolished, and disposed of off-site or salvaged. Reagent tanks both internal and external to the Concentrator building would be decommissioned, cleaned, demolished, and salvaged. Steel fuel tanks near the Concentrator and fuel station would also be decommissioned, cleaned, demolished, and salvaged. Secondary containment structures would be removed and disposed of in an approved third-party facility specifically regulated to handle hydrocarbon containment materials.

The primary conveyor from the ore discharge pocket would be removed from the ore transport decline. The access raises for ventilation and maintenance shaft accesses would be decommissioned, covered, and reclaimed on the surface. The portal for the decline would be backfilled 100 feet from the portal, and a concrete plug would be installed. The plug would be covered with fill material, and growth media would be placed to reclaim the portal area to a natural state.

The covered dust control frame and tripper conveyor would be dismantled and removed. The feed system would be dismantled and the ground surface regraded and reseeded.

The two scavenger thickeners, two copper molybdenum thickeners, the pyrite thickener, and concentrate thickener would be demolished. The components would be removed, and the concrete thickening tanks demolished and disposed of at an appropriate facility. These excavations would be filled, and the surface reclaimed and vegetated.

### 5.3.3 MARRCO Corridor Closure and Reclamation

The ultimate ownership of the MARRCO Corridor ROW would be determined prior to closure. The selected closure strategy would depend on the intended post-closure use of the railroad and utility lines.

The concentrate pipeline and water pipeline for return water would be removed and slopes recontoured and revegetated. The fresh water supply and distribution facilities such as pipelines, pump stations, and water tanks will be removed unless they have a post-mining use. For example, the 36-inch diameter freshwater pipeline and associated infrastructure may be transferred to a third-party utility or community, if needed for water transport in the Superior Basin. Water supply wells may be transferred to a third party for usage or abandoned following Arizona Department of Water Resources abandonment procedures.

The MARRCO Corridor passes through rugged terrain in the segment along Queen Creek. Necessary slope stabilization improvements made during construction of the concentrate pipeline may include slope cut back where possible inside the 200-foot ROW and welded wire netting, shotcrete, or other stabilization methods where required.

The surface would be recontoured and revegetated. Utility lines present along the corridor would be left in place or managed as appropriate during railroad bed reclamation.

The Desert Wellfield will be abandoned per Arizona Department of Water Resources requirements and the pads regraded and revegetated. The pump station will be removed and reclaimed.

### 5.3.4 Filter Plant and Loadout Facility Closure and Reclamation

Structures at the Filter Plant and Loadout Facility site, including the rail loop, buildings, concrete containment, electrical substation, laydown yards, and parking lot would be demolished, and the land reclaimed. The closure of tanks would be completed in accordance with APP and AZPDES requirements. Security gates on roads that remain for PMLU will be maintained after closure.

### 5.3.5 TSF Closure and Reclamation

The plan for closure and reclamation of the TSF facility itself is included in **Attachment A**.

### 5.3.6 Process Ponds

Process water ponds would be backfilled, regraded, and revegetated.

### 5.3.7 Roads

Asphalt and other paved surfaces would be demolished. Asphalt and other paved surfaces would be segregated from other demolition debris, and debris would be disposed of at an approved facility. Bridges and culverts would be stabilized or removed. Water bars would be installed on steeper segments to control runoff and erosion.

Construction roads that are no longer needed during operations or post closure for monitoring would be closed and reclaimed concurrently. Roads that would not be used to access post-closure monitoring sites would be closed during final closure. This would include placing barriers at road entrances such as boulders and berms, roughing and cross-ripping the road along the natural contour, scarification, and reseeding with an approved seed mix. Reclaimed roadbeds would provide open areas and travel lanes for wildlife.

Roads that remain following reclamation would be those required as part of the PMLUs and for monitoring. The primary access road to the EPS, Magma Mine Road, would be left intact for access to NFS lands and recreational purposes. Other roads will be managed as follows:

- Roads at the WPS, EPS sites, Filter Plant, and Loadout Facility are assumed to not be required for the PMLU and would be reclaimed.
- The road in the MARRCO Corridor would not be required for the PMLU and would be removed and reclaimed.
- The road between the WPS and the TSF for the pipeline would not be required for the PMLU and would be reclaimed. Access for the powerline to the TSF would be reclaimed if the power line is removed and has no post closure use.

### 5.3.8 TSF Power and Utility Line Corridors

All fences would be removed. Culverts would be taken out. The concentrate pipelines, well collector pipeline, and water supply pipeline would be removed.

All pipelines in the TSF corridor will be removed and hauled to a recycler or disposed of at an approved site. Removal of the pipeline will be similar to the construction, with a similar amount of disturbance, equipment used, and timeframe.

The electrical system infrastructure includes overhead transmission lines serving the EPS and substations. Transmission lines and substations owned by electric utilities would be left in place or removed at the discretion of the utility provider. Transmission lines which are owned by Resolution Copper would be removed during facility demolition activities.

#### 5.3.8.1 Power Transmission Facilities

Power transmission facilities that include electrical substations, transmission lines, and power centers would be removed as part of the reclamation program, unless a PMLU identified would require retaining them. Salt River Project would own the power lines and may have a PMLU for ongoing power transmission in the area.

#### 5.3.8.2 Water Supply Facilities and Tailings Pipelines

The fresh water supply and distribution facilities such as pipelines, pump stations, and water tanks will be removed unless they have a post-mining use. Facilities that would not have a post-mining use, such as tailings slurry lines (in the Tailings Corridor), and associated pump stations with electrical power, would be decommissioned and removed. Pipelines (including buried) would be scrapped and salvaged. The alignments would be recontoured and reseeded as described above. Along the MARRCO Corridor, pipelines would be salvaged prior to reclaiming the MARRCO railroad bed, as described above.

Vegetation that has grown in over the pipelines or adjacent to access roads that would be removed will be disposed of in accordance with applicable regulations, in consultation with the TNF and state. Disposal locations will be identified prior to vegetation removal. Protected native plants will be removed and replaced per applicable guidelines.

### 5.3.9 Underground Facilities

Except for the removal of equipment for salvage, all underground workings would remain as-is. No filling of tunnels and shafts is planned. For safety purposes, all mine openings would be covered or made inaccessible to the public and bat-accessible structures would be constructed, where appropriate. Portals would be plugged, dewatering wells would be abandoned, and the underground workings would fill with groundwater.

All entrances to underground workings, shafts, and/or adits would be closed to prohibit access and reclaimed. No closure activities for facilities underground would occur. Adits, emergency entrances, exits, and ventilation shafts would be capped and/or backfilled at closure.

### 5.3.10 Subsidence Zone

Resolution Copper would restrict access to the subsidence zone for public safety. Warning signs would be erected, as necessary. It is assumed the entire crater including the fracture zone will be fenced and fences would be inspected and maintained annually. Subsidence monitoring will be required and will be ongoing as required (Resolution Copper, 2020b).

Diversion channels surrounding the EPS will be retained and to the extent practicable may be implemented at closure to divert stormwater from entering the crater.

No other reclamation of the subsidence zone is planned.

### 5.3.11 Block Cave Acid Generation and Post-Closure Water Management

The strategy for post-closure management of potential block cave acid generation focuses on the exclusion of oxygen from the residual caved mineralized rock mass to control the risk and maintenance of hydraulic containment for approximately 1,000 years. At closure, all ventilation would be discontinued to the underground workings. The production level and the overlying mineralized rock would rapidly become anoxic. Oxidation reactions and acid generation (if any) within the caved, mineralized rock mass would become negligible. Once access to the shafts is no longer needed, all shaft collars and subcollars would be permanently sealed preventing any subsequent oxygen diffusion.

Reflooding to near pre-mining groundwater levels is anticipated to take approximately 1,000 years, and radial flow towards the underground workings and the caved rock zone would persist for centuries, maintaining the underground workings as a hydraulic sink. Water would enter the immediate area of the caved rock zone via direct precipitation, lateral inflow from the Apache Leap aquifer and lateral, yet limited, inflow from the deep bedrock. Based on short- and long-term laboratory leaching tests, the Apache Leap Tuff and White Tail Conglomerate would carry alkalinity to the infiltrating water and deliver it to the mineralized rock zone and the recovering water table. After approximately 1,000 years, water levels would recover to near their pre-mining levels. Additional detail is provided in Appendix R of the GPO -

*Overview of Acid Rock Drainage Operational and Post-Closure Water Management Strategies at Resolution Copper Mining for the Protection of Groundwater and Surface Water* (Resolution Copper, 2020b) and the EIS groundwater impact analysis section.

### 5.3.12 Open Pit Reclamation

The Preferred Alternative does not include open pit mining. Therefore, pit reclamation is not applicable.

### 5.3.13 Waste Dump Reclamation

A small amount of development rock generated during early construction phases will be temporarily placed at the WPS and processed through the concentrator during start-up operations. Besides the development rock, which will be consumed in early production years, no waste rock will be brought to the surface during mining operations. Therefore, waste rock dump reclamation is not applicable.

### 5.3.14 Land Application Disposal

No land application of neutralized process solution/mine water would occur.

### 5.3.15 Heap Leach Pad Reclamation

The Project will not have a heap leach pad and no leaching activities are part of the plan. Therefore, heap leach pad reclamation is not applicable.

## 5.4 TRANSFER OF OWNERSHIP

Some of the constructed facilities may have a post mining land use or some other beneficial use/Brownfield re-use. Transfer of these assets to other parties may occur in the future, but this would not be determined until closer to closure.

At this time, no specific assets have been identified for transfer of ownership to a third party at closure.

# 6 RECLAMATION PERFORMANCE STANDARDS AND RESOLUTION COPPER MONITORING

To ensure that objectives are met, measurable performance standards are based on regulatory requirements and recommendations. AMLRA establishes performance standards for reclamation, which include public safety, erosion control and topographic contouring, road revegetation, and growth media conservation. The APP Program contains prescriptive requirements for tailings facilities, process water ponds, and non-process water ponds.

The Forest Service Manual 2842 directs that a Plan of Operations will include measurable performance standards for all reclamation requirements in the plan. Title 36 CFR 228A lists measures to prevent or control damage to the environment. The USFS does not identify specific standards but does require that all reclamation requirements include measurable performance standards and that performance standards be developed at a minimum for:

1. Revegetation;
2. Soil and water conservation measures;
3. Mass stability of overburden or other waste embankments;
4. Concurrent reclamation; and
5. Post-mining land configuration.

## 6.1 RECLAMATION MONITORING

Project-specific reclamation monitoring programs will be designed and implemented for each reclamation task. Reclamation performance monitoring will commence immediately after the reclamation works have been completed. Detailed performance standards and associated reclamation performance monitoring will be determined closer to the actual reclamation period. General guidelines are stipulated in this plan. As information on the success of closure methods becomes available from monitoring concurrent and interim reclamation projects, the design of closure projects would be refined, and the monitoring requirements better understood. In particular, further details of closure and post-closure monitoring need to be developed for the planned revegetation of covers and other disturbances, long-term water quality (both surface and ground), and long-term physical and erosional stability.

Resolution Copper would monitor reclamation success for at least 5 years following site decommissioning and final reclamation according to USFS and Arizona permit requirements. Reclaimed areas would be monitored for growth media erosion and revegetation success. Resolution Copper would evaluate vegetative cover and species composition during the first, third, and fifth years after final reclamation. Adjacent undisturbed vegetation communities and vegetation reference areas would be established to serve as a means of comparing project revegetation and natural vegetation. The reference area would be selected from representative undisturbed plant communities adjacent to areas of disturbance.

## 6.2 REVEGETATION SUCCESS

The first year's performance goal will be to establish vegetation cover sufficient to limit erosion. Following the first year, the performance goal will be to attain the desired plant communities. Revegetation monitoring methods and erosion and slope stability monitoring methods are described below.

Revegetation success will be determined based on statistically valid estimates of percent plant canopy cover, species diversity, and non-native plant species composition of logical reclamation management units in the project site in comparison to an appropriate reference site and/or desired future condition.

### 6.2.1 Reclamation Performance Standards

Recovery of ground-clearing disturbances requires more time than non-ground-clearing disturbances because the former can severely compact growth media and remove seedbanks, microbial communities, and nutrients (Abella, 2010).

Vegetation reference areas that will not be disturbed by mining activities can be found adjacent to the planned surface disturbance within or adjacent to the project site. These reference areas generally reflect characteristic vegetation communities, pre-disturbance conditions, and desired PMLU conditions.

These criteria may be satisfied by plant communities established on a disturbed site where vegetation cover, diversity, and composition of non-native plant species meet or exceed the primary and secondary revegetation goals.

Reclamation maintenance will initially be based on vegetation data collected during the first 4 years following completion of final reclamation activities and qualitative monitoring results as previously discussed. These practices will be focused on meeting perennial vegetation cover values as close to the bond release criteria as possible. The data collected in year 5 will be discussed with the appropriate regulatory agency and, if deemed necessary, remedial measures will be devised and implemented.

Revegetation of project-related disturbed areas that will be reclaimed will be considered successful if vegetation is native and self-sustaining, and revegetated lands could support land use goals (i.e., low-intensity grazing, public recreation, and use as habitat for native wildlife). The prevalence of invasive and noxious weeds would need to be similar to or less than that found in reference sites.

Agency input on the revegetation plans and success criteria described in this section will be considered in the development and refinement of the final revegetation plans.

### Desert Ecosystems

Based on the proposed seed mix and previously noted reclamation projects in southeastern Arizona and southwestern New Mexico with similar vegetation communities and climate, and where Gila Conglomerate was used as a cover growth media, successful revegetation would be considered as the establishment of two to three shrub species, one to two grass species, one to two forb species, and one to two succulents. An example might be establishment of brittlebush, saltbush, and creosote bush; purple three awn and sand dropseed; desert marigold and desert trumpet; and silver cholla and beavertail cactus. Desirable plant canopy cover would range from 5 percent to 15 percent for year 1 and from 10 percent to 30 percent for year 5. The influences of growth media amendments, mulch and other inputs to the reclaimed system on vegetation growth will last longer than 5 years and it may take far longer for some of the warm season grasses and shrubs to establish from seed. In addition, to be considered "self-sustaining," the vegetation on reclamation lands must experience at least one drought cycle. Therefore, 5 years, or more, is likely required before attainment of these cover values and diversity standards and a determination of "self-sustaining."

### Semi-Desert Grassland

Based on the proposed seed mix and previously noted reclamation projects in southeastern Arizona and southwestern New Mexico with similar vegetation communities and climate, and where Gila Conglomerate was used a cover growth media, successful revegetation would be considered establishment of two to three grass species, one shrub species, one to two forb species, and one to two succulents. An example might be establishment of tobosa grass, black grama, and squirreltail; four-wing saltbush; Mexican golden poppy and desert marigold; and Palmer's century plant and sotol. Desirable plant canopy cover would range from 5 percent to 15 percent for year 1 and from 10 percent to 30 percent for year 5.

### Interior Chaparral

Based on the proposed seed mix and previously noted reclamation projects in southeastern Arizona and southwestern New Mexico with similar vegetation communities and climate, and where Gila Conglomerate was used as a cover growth media, successful revegetation would be considered establishment of two to three shrub species, one to two grass species, one to two forb species, and one to two succulents. An example might be establishment of shrub live oak, Wright's silktassel, and mountain mahogany; sideoats grama and blue grama (*Bouteloua gracilis*); bladderpod (*Lesquerella* spp.) and globemallow (*Sphaeralcea* spp.); Palmer's century plant and beargrass. Desirable plant canopy cover would range from 10 percent to 25 percent for year 1 and from 20 percent to 50 percent for year 5. As in natural succession, all reclaimed sites are expected to undergo seral stage changes until they reach a stable or climax plant community, which could take many decades or even hundreds of years.

## 6.3 SOIL AND WATER QUALITY (SURFACE AND GROUND)

Surface drainage channels on reclaimed areas will be inspected for indication of instability, headcutting, or reduced capacity to safely pass the design storm event or retain transported sediments. The location, dimensions and connectivity of significant erosion, slope failures, and channel scour and sedimentation features will be documented. Documented sites will be revisited in following years to determine if new accretion, erosion, or movement has occurred since last observed.

Water quality monitoring of surface runoff and groundwater wells would continue in the post-closure period until such time that Resolution Copper has demonstrated that the water resources at the designated points of compliance meet state water quality standards.

The Subsidence Monitoring & Management Plan (Resolution Copper, 2020b), contains a post-closure monitoring and measurement plan for the underground mine and subsidence area. and a mitigation and monitoring plan for groundwater and surface water as described in the EIS which contains Groundwater monitoring wells installed in the vicinity to measure depth to water and water quality in the various geologic units once mining has ceased. A groundwater monitoring and protection plan for the

post-closure period is contained in Appendix R of the GPO (Resolution Copper, 2020b) and the mitigation and monitoring plan as described in Appendix F of the EIS.

The long-term chemical stability of surface and groundwater discharging from the TSF is of paramount importance to Resolution Copper. As described in the EIS, post closure impacts to groundwater and surface water have been projected 400 years into the future and compliance, well beyond the 40-year mine life and compliance with groundwater and surface water standards are maintained throughout that period. See **Attachment A**, the Skunk Camp TSF Seepage Assessment (KCBCL, 2020b) and Montgomery & Associates (2020) for detail.

### 6.3.1 Erosion and Sediment Control Monitoring

Soil stability will be estimated for all reclaimed areas using the qualitative descriptors shown in **Table 10**. A reclamation specialist will observe each reclaimed area and assign one of the qualitative descriptors twice annually for erosion control purposes, once in the spring and once in the fall for 5 years for performance monitoring purposes. The observations will be made at the same time the vegetation performance observations are made. The monitoring results will be used to aid in determining the cause of any failures which are encountered and to locate problem areas before erosion becomes widespread enough to affect reclamation success.

Any reclaimed area larger than 100 feet by 100 feet receiving an evaluation score (**Table 10**) of Class 3 or lower that persists more than 1 year will be investigated. Areas receiving a score of Class 2 or lower will receive treatment to correct the erosion immediately. If the vegetative cover, riprap, or other erosion control measures are found to be inadequate, the measures will be revised or redone. Any obvious reasons for the failure will be noted and rectified. Climatic data for the time period involved will also be considered while making a determination of the cause of the failure.

**Table 10. Qualitative Descriptors of Soil Surface Status**

| Characteristic | Soil movement | Flow patterns | Rills and gullies |
|---|---|---|---|
| Class 1 | Subsoil exposed over much of area | Flow patterns are numerous and readily noticeable; may have large barren fan deposits | May be present at depths of over 3 inches, sharply incised gullies cover most of the area, and 50 percent are actively eroding |
| Class 2 | Soil and debris deposited against minor obstructions | Flow patterns contain silt, sand deposits, and alluvial fans | Rills at depths of 1 to 3 inches occur in exposed areas at intervals of 60 inches; gullies are numerous and well developed, with active erosion along 10 to 50 percent of their lengths or a few well-developed gullies with active erosion along more than 50 percent of their length |
| Class 3 | Moderate movement of soil is visible and recent | Well defined small, and few with intermittent deposits | Rills at depths less than 6 inches occur in exposed places at intervals of less than 100 inches; gullies present, with active erosion along less than 10 percent of their length; some vegetation may be present |
| Class 4 | Some movement of soil particles | Evidence of deposition of particles | Evidence of some rills in at infrequent intervals of over 100 inches; evidence of gullies that show little bed or slope erosion; some vegetation is present on slopes |
| Class 5 | No visual evidence of movement | No visual evidence of flow patterns | No visual evidence of rills; may be present in stable condition; vegetation on channel bed and side slopes |

### 6.3.2 Slope Stability Monitoring

Inspections will be conducted to gauge slope movement, cut slope and rock face failures, and other indications of deep-set slope instability. Indications of slope failure may include, but are not limited to, surficial fractures that progressively widen and elongate, and/or surface cracks that are located above prominent, recently observed surface bulges.

Slope stability will be monitored during the vegetation and erosion inspections. A trained inspector will look for signs of slope movement, cut slope and rock face failures, and other indications of deep-set slope instability. The location and dimensions of significant surficial cracks and fill-slope bulges will be monitored. This information will be used to determine if surface cracks are the result of deferential settling or slope instability. Surficial fractures which progressively widen and elongate, or surface cracks which are located above a prominent, recently observed surface bulge will be considered an indication of slope failure. Appropriate corrective actions will be taken.

Air quality, groundwater and surface water monitoring locations are shown on **Figure 15** and additional monitoring will likely be added through completion of the state APP), surface water and air permits.

## 6.4 MASS STABILITY OF OVERBURDEN OR OTHER WASTE EMBANKMENTS

No overburden will be stored above ground. The TSF embankment is included in **Attachment A**.

## 6.5 CONCURRENT RECLAMATION SUCCESS

The goals of concurrent reclamation are to ensure soil stability, protect water and air quality, and initiate revegetation. These goals will be measured as described in Sections 6.2, 6.3, and 6.4. Following completion of concurrent reclamation until final bond release, maintenance activities will occur to satisfy performance guidelines above. Maintenance activities may include one or more of the following:

- Sediment removal from sediment basins and stormwater drainage channels and diversions as necessary to maintain their design capacity;
- Diverting surface water away from reclaimed areas where erosion jeopardizes attainment of reclamation standards;
- Stabilizing rills, gullies, other erosion features or slope failures that have exposed mine waste;
- Noxious weed control; and
- Reseeding or re-applying reclamation treatments will occur in areas where it is determined through monitoring and agency consultation that reclamation will unequivocally not meet reclamation standards.

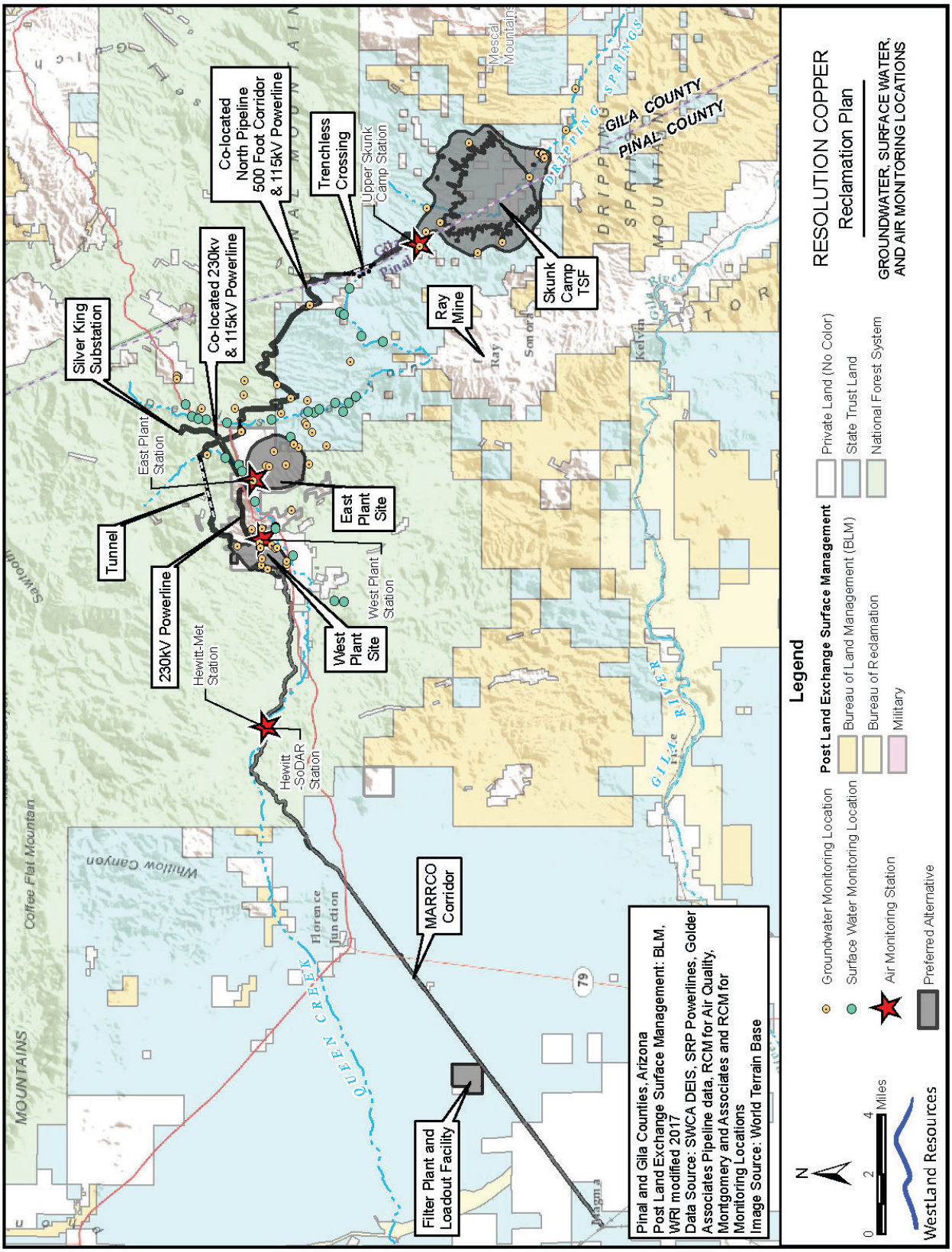
## 6.6 POST MINING LAND CONFIGURATION

Post mining configuration is described in Section 5.2.2. Success criteria are defined in Sections 6.2, 6.3, and 6.4.

## 6.7 MASS STABILITY OF SURFACE FACILITIES

Dam safety reviews of the TSF would be completed as described in **Attachment A**. Annual inspections of the rest of the reclaimed facilities would be completed post-closure for at least 5 years and longer consistent with permits and associated post closure monitoring requirements with the USFS, ADEQ and/or ASMI. Structures would be inspected to identify conditions that could adversely impact the long-term performance geotechnical stability during the post-closure period. Annual inspection reports would be prepared and submitted to the jurisdictional authorities (USFS, ADEQ, ASMI).

**Figure 15. Groundwater, Surface Water, and Air Monitoring Locations**



## 6.8 LONG-TERM OPERATION, MAINTENANCE AND MONITORING

Resolution Copper would apply to the agencies for release of the financial assurance upon successful completion of reclamation. Reclamation and closure success would be determined by the standards and performance criteria specified in this Plan, the APP, AMLRA, and other permits. This may include requests for partial release of one-off construction items (i.e., removal of a building or facility) as well as full bond release upon final determination of revegetation success.

### 6.8.1 Long-Term Maintenance

Resolution Copper expects that post-closure maintenance of site facilities may be necessary for a limited period following initial reclamation. Vegetation, stormwater control features, and covers specifically associated with the TSF may require maintenance for many years post closure (per Appendix A).

#### 6.8.1.1 Buildings and Structures

If any buildings and structures remain after site closure, they would be maintained in a manner consistent with the long-term PMLU.

#### 6.8.1.2 Utility and Process Distribution Infrastructure

Potable water distribution pipelines, cellular service, and electricity would be needed at the project for those facilities that would remain open during closure activities. Facilities that would need power include buildings, wells, water and sewage treatment pumps, etc. All facilities would eventually be decommissioned, unless they are necessary for PMLU objectives.

#### 6.8.1.3 Roads

Required access roads would be maintained after closure by Resolution Copper as required for post-reclamation maintenance.

#### 6.8.1.4 Fences

Maintenance of all fences would be performed on an as-needed basis during standard maintenance routines.

#### 6.8.1.5 TSF Water Treatment

The details of the closure design of the TSF is in **Attachment A**.

Seepage may require active management for up to 80 years. Active management would consist of recirculation, forced evaporation, and treatment.

# 7 SCHEDULE

The proposed schedules for concurrent, interim, and final reclamation are described below. Resolution Copper is committed to adaptive management to make improvements to reclamation and closure based on both the evolution of new technologies and the monitoring results of concurrent and final reclamation.

## 7.1 CONCURRENT RECLAMATION

Concurrent reclamation is a key component of this reclamation plan, as is monitoring the effectiveness of both concurrent and final reclamation actions. Concurrent reclamation are final reclamation activities that occur on facilities during the operation phase. Concurrent reclamation is typically implemented on facilities (or parts of facilities) that are either constructed in their final (closure) configuration or are no

longer needed during operations. Concurrent reclamation would occur within construction footprints outside ultimate as-built facilities and on the outer slope of the TSF embankment beginning after year ten of construction.

Where practicable, growth medium would be removed from areas to be affected by surface facilities. This material would be stockpiled for use during final reclamation (except the TSF) at WPS or the Filter Plant and Loadout Facility.

Timing, kind, and amount of reclamation to be accomplished concurrently with mineral activities includes:

- Construction roads that are no longer needed during operations
- Well construction pads, which will be reclaimed immediately after well construction
- Areas initially constructed or completed to their final configuration during operations would be concurrently reclaimed during operations to the extent practicable

## 7.2 INTERIM RECLAMATION AND INTERIM SHUTDOWN

Interim reclamation would be completed on disturbed areas that are not needed for active operations. The principal focus of interim reclamation would be to reduce erosion and sedimentation, and limit fugitive dust emissions. Interim reclamation will take place after construction, following startup, and during operations.

A shutdown would be considered interim or temporary if mining and processing operations cease for more than 90 days, but not more than three years. During an interim or temporary shutdown, reclamation will be completed to reduce erosion and sedimentation to protect water quality.

The areas subject to interim reclamation would include construction laydown areas, development rock stockpiles designated for processing through the Concentrator, road or pad cuts and fills, stabilization of certain sites, tailings surfaces (temporary covers, vegetation, or polymers to control wind and water erosion, thus limiting dust), and rock stockpiles salvaged for beneficial use. Other areas would include access roads used for construction, but no longer needed during operations.

Reclamation measures could include seeding, fertilizing, and mulching in accordance with the USFS, state of Arizona, and private landowners.

Revegetation test plots may be developed upon interim reclaimed areas, as necessary. Interim vegetation test plots would be tested to determine the appropriateness and effectiveness of the chosen seed mixes and plantings, as well as cover thickness and material types.

It is possible that, due to mechanical or technical difficulties, unfavorable economic conditions, or other unforeseen events, mining and processing may be temporarily suspended. In the event of an unplanned temporary closure, the following plan would be implemented:

- The USFS would be notified within 30 days of the temporary closure of the mine process facilities. The State of Arizona would be notified concurrently with the USFS. This notification would include a description of the procedures and controls that have been, or would be, initiated to maintain the process components in accordance with all permit conditions during the temporary closure period.
- Resolution Copper would supply the USFS and the State of Arizona with a list of supervisory personnel who would oversee the mine facility during the temporary closure period. This list also would include the number of support staff required in each department to maintain the facility during the closure period. Standard security procedures would remain in place for the duration of the temporary closure period.
- Resolution Copper would maintain personnel on site for mine dewatering, the care and maintenance of equipment and infrastructure, and to provide for ongoing environmental monitoring and reporting activities, studies, and reclamation. Care and maintenance activities are

required during a shutdown so that operations may be efficiently resumed when appropriate. Personnel would remain on site in order to conduct routine maintenance and inspections and maintain compliance with requirements in environmental permits and GPO, as well as exercise key equipment and infrastructure. Environmental activities performed by Resolution Copper personnel (such as monitoring, continuing stormwater best management practices, and reporting) are required by both Arizona and federal permits even during reduced, suspended, or standby operations.

- Roads would be maintained as necessary to allow access to project site facilities. Utilities, such as electricity, water, and gas that are needed for the operation would continue to function.
- WPS – All activities associated with the WPS that would not be active during temporary shutdown would be disengaged but maintained as appropriate for the expected duration of the shutdown. The existing water treatment plant at the WPS would remain in operation. If the development rock stockpiles are still in place and have not been beneficially used, the development rock stockpiles would remain in place during temporary shutdown and would be monitored as part of the SWPPP inspection program and any APP requirements.
- MARRCO Corridor – In the event of a temporary shutdown, components of the MARRCO Corridor, such as the railroad track and water supply pipelines, would be maintained for the expected duration of the shutdown. The other utility lines would remain operational, including water delivery to New Magma Irrigation & Drainage District and the existing Arizona Water Company delivery pipeline that supplies water to the town of Superior.
- Filter Plant and Loadout Facility – In the event of a temporary shutdown, filtrate would be pumped back to EPS and WPS, as is done during operations. The Filter Plant itself would not be active during temporary shutdown and would be maintained for the expected duration of the shutdown. Concentrate would be shipped off site for further processing, as is done during operations. The concentrate stockpile would not remain in place during temporary shutdown. Ancillary support facilities that would not be active during temporary shutdown would be maintained as appropriate for the expected duration of the shutdown. Infrastructure required for monitoring the site, such as access roads and security gates and fencing, would be maintained.
- TSF – The TSF would remain in place during temporary shutdown and would be monitored as described in **Attachment A**.

Current plans do not include seasonal closure; however, if closure is necessary in response to other unfavorable weather events, the operation would be temporarily closed in accordance with the following plan elements:

- In the event of a seasonal closure, the USFS and State of Arizona would be notified within 30 days of such a seasonal closure. The notification would include a description of the procedures and controls that have been or would be carried out to maintain the process components during the closure period.
- Solution processing operations would be discontinued. The addition of make-up water to the processing circuit would be halted.

#### 7.2.1.1 Measures to Stabilize Excavations and Workings

No additional measures would be necessary to stabilize excavations and workings during an unplanned temporary closure. Interim reclamation procedures would be implemented, as necessary, to stabilize disturbed sites during the temporary closure period. These procedures would be coordinated with the USFS and the State of Arizona. Adequate storage capacity would be maintained in the process components to accommodate run-off resulting from the 25-year, 24-hour storm event.

Excavations and workings would be stabilized by inspecting and maintain walls and slopes and preventing stormwater erosion of or run-off into these features.

Compliance with Mine Safety and Health Administration's safety regulations would continue. Regular inspections are expected to continue. The security measures would remain in effect. Public access would be controlled by signage, fencing, gates, or berms to warn the public of hazards associated with open excavations or highwalls, underground mine openings, and unsafe buildings or facilities where chemicals, petroleum products, or reagents are stored.

#### 7.2.1.2 Measures to Isolate or Control Toxic or Deleterious Materials

Use of toxic or deleterious materials is not expected. Explosives would continue to be stored and handled according to federal and state regulations. Hazardous materials would continue to be stored, handled, and disposed of according to federal, state, and local regulations.

#### 7.2.1.3 Storage or Removal of Equipment, Supplies, and Structures

In the event of a temporary closure, equipment, supplies, and structures would not be removed or placed into storage. Some mobile equipment or bulk commodities may be relocated into buildings or covered with tarps to protect them from exposure to the weather. In addition, the following steps would be taken:

- Additional reagents would not be introduced into process components during the temporary unplanned closure period. Process piping and pumps would be drained if the process circuits are shut down. Stored equipment would be clearly identified as having contained process solutions.
- Mine equipment remaining in operation during the temporary closure would continue to be maintained according to standard company procedure and manufacturer's recommendations.
- Following the temporary closure period, the integrity of the entire fluid management system would be evaluated before start-up is initiated. Solution tanks, pumps, and piping would be visually inspected and repaired, as necessary. The mineral processing circuit would be charged with process solution and visually inspected for evidence of leaks. Mine equipment would be inspected for compliance with appropriate federal and state mining regulations before mining activities re-commence. Mining activities should not be affected by a temporary closure.
- Facilities covered by the AZPDES would be maintained and monitored as required by the AZDPES permit. The mine dewatering system would remain in operation. Dewatering water would undergo treatment in the WPS water treatment plant and delivery to the New Magma Irrigation & Drainage District; and/or treatment in the WPS water treatment plant and delivery to the TSF for use as supplemental dust control or to maintain pond levels for saturation of the pyrite tailings; and/or discharged per AZPDES permit AZ0020389.

#### 7.2.1.4 Monitoring During Periods of Non-Operation

All provisions of other regulatory requirements would continue to be met during the temporary closure period. This would include all monitoring, notifications, and report submittals. Site monitoring and monitoring of leak detection systems for vessels and piping containing process solution would continue throughout the temporary closure period.

## 7.3 FINAL RECLAMATION

Final reclamation activities would be implemented upon cessation of underground mining and ore processing and is expected to take 5 to 10 years. Post closure monitoring of the TSF is expected to continue beyond that timeframe.

| Years | List of activities |
|---|---|
| 0-1 | • Initial inspection and evaluation of all above ground structures,<br>• Plan for and initiate demolition and removal.<br>• Agreements with other owners as to need for facilities for post mining land use (roads, powerlines, etc.).<br>• Closure and inspection of pipelines.<br>• Recontouring of reclamation sites to post-closure contours.<br>• Initiation of TSF closure and reclamation.<br>• Installation of erosion control measures<br>• Reseeding<br>• Erosion monitoring |
| 1-5 | • Demolition and salvage/recycling/disposal of all above ground facilities.<br>• Removal/salvage/recycling/disposal of pipelines,<br>• Recontouring of roads and transmissions lines not needed for post-mining land use.<br>• TSF reclamation complete<br>• Monitoring and revegetation as needed<br>• Erosion control monitoring and mitigation |
| 5-18 | • Seepage monitoring and mitigation<br>• Decommissioning of TSF seepage management, drainage as monitoring allows<br>• Vegetation success monitoring and mitigation<br>• Erosion monitoring and mitigation |
| 18+ | • TSF Active Care (see Table 9.1 in **Attachment A**). |
| Final Closure[1] | • TSF Passive Care (see Table 9.1 in **Attachment A**). |

Notes:
1 Once monitoring indicates this stage is appropriate.

## 7.4 POST-CLOSURE CARE AND MAINTENANCE

Post-closure care and maintenance would continue as necessary to meet regulatory requirements, and would focus on water management, land usage, and mitigation requirements.

# 8 MINE RECLAMATION AND CLOSURE COSTS

## 8.1 RECLAMATION FINANCIAL ASSURANCE

Resolution Copper is required to establish and maintain sufficient financial assurance for agencies to properly reclaim areas disturbed by the Preferred Alternative. A detailed cost estimate will be submitted to the USFS, ADEQ, and ASMI as required (before a final USFS ROD, concurrent with APP applications and within ASMI reclamation and closure plan).

For facilities on NFS lands, closure and financial assurance would be covered under the 36 CFR 228 regulations. For facilities on private lands, financial assurance would be determined under the AMLRA and APP. Regardless of landownership, reclamation and financial assurance for facilities with the potential to discharge to groundwater (tailings storage facilities, process ponds, and stormwater ponds) would be covered under the APP Program.

This plan will be finalized prior to the issuing of mining permits and approvals, and will be reviewed and revised as needed, along with the calculation of the bond amount on a regular frequency established by each federal and state regulatory agency.

## 8.2 METHODOLOGY

### 8.2.1 Model to Be Used

SRK Consulting will complete a reclamation and closure cost estimate to accompany this closure and reclamation plan.

For estimating reclamation and closure costs, Version 1.4.1 Build 16c of the Standardized Reclamation Cost Estimator (SRCE) was used. The SRCE is spreadsheet software developed as part of a cooperative effort between the Nevada Division of Environmental Protection, Bureau of Mining Regulation and Reclamation, the U.S. Department of Interior, BLM and the Nevada Mining Association (NvMA) to facilitate accuracy, completeness and consistency in the calculation of costs for Mine Site reclamation. The SRCE model is available in the public domain and hosted on the web site: http://www.nvbond.com.

The SRCE model was selected for the estimation of closure costs for the following reasons:

- Provides a standardized and systematic methodology for mine closure cost estimates. The routines provided in the model cover different operation units and aspects of mining projects.
- Uses widely accepted first principles methods to estimate quantities (lengths, areas, and volumes), productivities, and work hours required for various closure tasks based on input from the user.
- Facility dimensions are defined by the user.
- Equipment productivities are taken directly from Caterpillar Performance Handbook (2019).
- Personnel and other relevant productivities are established through the use of Means Heavy Construction Cost Data (2019).
- Utilization of realistic values derived from field experiences in mine closure studies for specific tasks such as well plugging, which are not directly available in any publication.
- Cost estimation flexibility, allowing utilization of local unit costs.
- Has been accepted by the USFS and Arizona state agencies in the past.

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# ATTACHMENT A
# SKUNK CAMP TSF RECLAMATION PLAN

# ATTACHMENT B
# RESOLUTION PROJECT AREA SEED MIX JUNE 2020

# Resolution Project Area Seed Mix

**Mark Taylor**
**Tonto National Forest**
**June 2020**

The purpose of this document is to provide recommendations of suitable vegetative seed species for upland reclamation within the Resolution Copper Project Area. The Project Area (PA) covers a broad expanse of eco-types, ranging in elevation from about 1650 – 4200ft, covering roughly 8400 acres. General project location spans from the San Tan Valley in the west, to the vicinity of Superior, AZ, Oak Flat, and south into the Dripping Springs Mountains in Central AZ. For greater detail of project location, please refer to the Resolution Copper General Plan of Operations (https://www.resolutionmineeis.us/sites/default/files/project-files/resolution-copper-gpo-vol-1-20160509.pdf). Biotic communities present within the PA were considered when developing seed mixes. The following eco-types are known to occur within the PA, beginning with the lowest elevation: Lower Colorado River Sonoran Desert, Upper Sonoran Desert, Semi-desert scrub/grass, Interior Chaparral, Madrean Oak Woodland, and a small extent of Great Basin Conifer Woodland. Seed mixes for riparian species are not provided in this document due to the limited extent of footprint within both perennial and intermittent reaches (< 12ac total) and the likelihood of local species regenerating over short durations as influenced by localized (hydric) conditions.

Species consist of a selection of annual and perennial herbaceous (grass/forb) plants known to be native and supportive within each eco-type. Local knowledge, prior experience, and observational accounts of past performance, has been very useful in establishing proposed seed mixes. Native shrub/tree life forms have been excluded from primary seed lists due to often re-establishing under natural conditions over short durations. This becomes beneficial because of maintaining local genetics and adaptions, within these unique environments. If necessary in the future, shrub and tree species may certainly be considered. One area in the PA where such an issue may present itself, is Skunk Camp Tailings Storage Facility. Potential challenges associated with this site may include lacking or degraded soil properties and substrate issues. Thought should also be taken into consideration underneath and near powerline corridors. If shrubs and trees are planned to be utilized, we suggest waiting a couple years following initial efforts to determine extent of natural regeneration. If these life forms are deemed to be lacking, plug and/or pole plantings may be desirable for certain species (e.g., legumes) and when possible, obtained from the project vicinity or local growers. Plug and pole plantings are known to enhance establishment of these life forms while aiding in creating a more advanced seral stage, providing added benefit to understory species. Attempting to sow seed of certain shrub and tree species, to include members of the legume family, may result in low success, partly due to a combination of lacking or improper seed scarification and predation.

Other considerations influencing success include a mix of biotic and abiotic factors such as: timing of work, soils, geology, aspect, elevation, land use, adaptations of proposed species, purity of seed lots, rate of use, availability of seed, influx of weeds, and other factors beyond our control such as weather (rainfall). Seeding during the cool season can be beneficial because it may allow growth to begin prior to the warm season with adequate rainfall. Multiple seeding efforts as well as adjustments to species use and seeding rates (lbs. /ac) may be necessary to enhance results. Due to the extended duration of this project, no set time interval is provided to conduct additional seeding efforts. A few other useful concepts to consider in conjunction with seeding to *potentially* improve success, include the following: utilization of weed free mulch and/or straw to enhance nutrient content and improve moisture holding capacities, mycorrhiza for improved root/plant health and growth, erosion wattles and mats to reduce erosion and create microhabitats, tilling and/or drilling where terrain permits for seed bed preparation, weed management, and hydro-seeding as a form of broadcasting. Relative to hydro-seeding; adding tackifier (glue) is a common ingredient which aids in temporarily holding seed and fertilizer in place and is particularly useful along slopes.

A list of prospective native seed sources are provided in Appendix A. Although not always possible to obtain, seed from local growers should initially be pursued due to the greater likelihood of obtaining more localized genetics, which can lead to improved success. Of similar importance, seed lots need to be reviewed to certify noxious weed free content prior to purchase. Occasionally, seed lots may be rejected due to the presence of other undesirable weed species, therefore, prior review is important. Guidelines covering the certified weed free process are included below in Appendix B as well as the noxious weeds of Tonto National Forest in Appendix C. Currently, Tonto National Forest along with partners, are in the initial stages of obtaining local native seed stock to be grown for reclamation use. Since this project is in its infancy, very limited stock is presently on hand. Over time, it is anticipated that a greater diversity of local species and quantity will be available.

Generalized seed lists below take into consideration project locations, elevation and eco-type. Unfortunately, soils data is lacking. A number of species selected, result from past success, are known to cover broad eco-types, and are relatively common. Additional species have been added in some cases due to potential future availability issues. A separate alternative list containing shrubs and trees has been provided, should future needs dictate. One other option to consider and not included in seed lists, is to utilize cuttings from neighboring cacti species (prickly pear and cholla species) and locally salvaged plants. Following adaptive management concepts, it is expected that future modifications may be appropriate considering availability, revegetation success, purity of seed, growth media, rate of use, climatic conditions, and other unforeseen circumstances. An attempt was made to consider plant palatability for wildlife and desirability to pollinator species.

The following lists are specific to the major project components with supplementary use stated for corridors (MARRCO, pipelines, and powerlines).

Filter Plant and Loadout Facility Species Seed List

| Grass | Scientific Name | PLS pounds/acre |
|---|---|---|
| Six weeks needle grama | *Bouteloua aristidoides* | 2.0 |
| Purple Three-awn | *Aristida purpurea* | 1.0 |
| Spider Grass | *Aristida ternipes* | 0.5 |
| Forbs | Scientific Name | PLS pounds/acre |
| Desert Senna | *Cassia covesii* | 0.5 |
| Desert Marigold | *Baileya multiradiata* | 0.5 |
| Indian Wheat | *Plantago patagonica* | 0.5 |
| Coulter's Globemallow | *Sphaeralcea coulteri* | 0.5 |
| Globemallow | *Sphaeralcea ambigua* | 0.25 |
| Fiddleneck | *Amsinckia intermedia* | 0.25 |
| AZ poppy | *Kallstroemia grandiflora* | 0.25 |

Filter Plant and Loadout Facility Alternative Species Seed List

| Grass | Scientific Name | PLS pounds/acre |
|---|---|---|
| Big galleta | *Hilaria rigida* | 0.5 |
| Arizona panicgrass | *Urochloa arizonica* | 0.5 |
| Six weeks grama | *Bouteloua barbata* | 0.5 |
| Forbs | Scientific Name | PLS pounds/acre |
| Brownfoot | *Acourtia wrightii* | 0.5 |
| Cinchweed | *Pectis papposa* | 0.5 |
| Lupine | *Lupinus sparsiflorus* | 0.5 |
| White tackstem | *Calycoseris wrightii* | 0.25 |
| Whoolly daisy | *Eriophyllum lanosum* | 0.25 |
| Shrubs and Trees | Scientific Name | PLS pounds/plugs/poles/acre |
| Brittle bush | *Encelia farinosa* | 1.0 |
| Chuckwallas delight | *Bebbia juncea* | 0.5 |
| Triangleleaf bursage | *Ambrosia deltoide* | 0.5 |
| Wire lettuce | *Stephanomeria exigua* | 0.25 |
| Graythorn | *Ziziphus obtusifolia* | 0.25 |
| Desert hackberry | *Celtis pallida* | 0.25 |
| Desert milkweed | *Asclepias subulata* | 5 + Plug |
| Mesquite | *Prosopis velutina* | 5 – 10 Plug/pole |
| Blue Palo Verde | *Parkinsonia florida* | 5 – 10 Plug/pole |
| Ironwood | *Olneya tesota* | 5 – 10 Plug/pole |

The Filter Plant and Loadout Facility list will suffice for the MARRCO Corridor up to approximately the forest boundary. Shrubs and trees have been added if deemed necessary to utilize. Recommendations for tree species, hackberry and milk weed:

- Utilize plug/pole plantings when possible for the species noted above.
- Consider selecting micro-habitats, particularly for trees, and desert hackberry along larger natural drainage courses or around edges of areas where storm water may collect. These species serve as common xeric riparian plants in lower elevations along drainages in the vicinity.
- Milkweed may be planted in association with microhabitats containing other lower growing herbaceous and subshrub species and along edges of smaller drainages. This is considered a very desirable pollinator species.

Baseline Species Seed List

| Grass | Scientific Name | PLS pounds/acre |
|---|---|---|
| Six weeks needle grama | *Bouteloua aristidoides* | 2.0 |
| Purple Threeawn | *Aristida purpurea* | 1.0 |
| Sand dropseed | *Sporobolus cryptandrus* | 0.5 |
| Forbs | Scientific Name | PLS pounds/acre |
| Mexican Gold Poppy | *Eschscholzia californica ssp. mexicana* | 1 |
| Globemallow | *Sphaeralcea ambigua* | 0.5 |
| Indian Wheat | *Plantago patagonica* | 0.5 |
| Desert Senna | *Cassia covesii* | 0.25 |
| Desert Marigold | *Baileya multiradiata* | 0.25 |

The Baseline seed mix has been utilized in recent project work without the need to incorporate shrub/tree life forms. Local shrub and tree species have quickly regenerated under natural conditions, avoiding need to incorporate. This list will also suffice for the Magma Arizona Railroad Company (MARRCO) Corridor on forest, up to the West Plant.

West Plant Species Seed List

| Grass | Scientific Name | PLS pounds/acre |
|---|---|---|
| Six weeks needle grama | *Bouteloua aristidoides* | 2.0 |
| Purple Threeawn | *Aristida purpurea* | 1.0 |
| Sand dropseed | *Sporobolus cryptandrus* | 0.5 |
| AZ cottontop | *Digitaria californica* | 0.5 |
| Fluff grass | *Erioneuron pulchellum* | 0.5 |
| Forbs | Scientific Name | PLS pounds/acre |
| Mexican Gold Poppy | *Eschscholzia mexicana* | 1 |
| Globemallow | *Sphaeralcea ambigua* | 0.5 |
| Indian Wheat | *Plantago patagonica* | 0.5 |

| | | |
|---|---|---|
| Desert Senna | *Cassia covesii* | 0.5 |
| Desert Marigold | *Baileya multiradiata* | 0.5 |
| AZ poppy | *Kallstroemia grandiflora* | 0.5 |
| Lupine | *Lupinus sparsiflorus* | 0.5 |
| Chia | *Salvia columbariae* | 0.5 |
| Brownfoot | *Acourtia wrightii* | 0.5 |

West Plant Alternative Species Seed List

| Grass | Scientific Name | PLS pounds/acre |
|---|---|---|
| Curly mesquite | *Hilaria belangeri* | 0.5 |
| Bush muhly | *Muhlenbergia porteri* | 0.5 |
| Slim tridens | *Tridens muticus* | 0.5 |
| Six weeks grama | *Bouteloua barbata* | 0.5 |
| Forbs | Scientific Name | PLS pounds/acre |
| Fiddleneck | *Amsinckia intermedia* | 0.5 |
| Tanseyleaf aster | *Machaeranthera tanacetifolia* | 0.5 |
| Desert chicory | *Rafinesquia neomexicana* | 0.25 |
| White tackstem | *Calycoseris wrightii* | 0.25 |
| Shrub and Trees | Scientific Name | PLS pounds/plugs/poles/acre |
| Brittle bush | *Encelia farinosa* | 0.25 |
| Trixis | *Trixis californica* | 0.25 |
| Fairy duster | *Calliandra eriophylla* | 0.25 |
| Twin berry | *Menodora scabra* | 0.25 |
| Chuckwallas delight | *Bebbia juncea* | 0.25 |
| Wire lettuce | *Stephanomeria exigua* | 0.25 |
| Hop bush | *Dodonaea viscosa* | 0.25 |
| Four-wing saltbush | *Atriplex canescens* | 0.25 |
| Mesquite | *Prosopis velutina* | 5 – 10 Plug/pole |
| Foothills Palo Verde | *Parkinsonia microphylla* | 5 – 10 Plug/pole |
| Blue Palo Verde | *Parkinsonia florida* | 5 – 10 Plug/pole |

The West Plant seed list may also suffice for work near the Silver King vicinity, particularly lower lying areas below ~ 3500ft. Four-wing saltbush would be best utilized along legacy tailings/waste rock areas.

East Plant Species Seed List

| Grass | Scientific Name | PLS pounds/acre |
|---|---|---|
| Six weeks needle grama | *Bouteloua aristidoides* | 2.0 |

| | | |
|---|---|---|
| Sideoats grama | *Bouteloua curtipendula* | 1.0 |
| Canebeard grass | *Bothriochloa barbinodis* | 0.5 |
| Squirrel tail | *Elymus elymoides* | 0.5 |
| Sprangeltop | *Leptochloa dubia* | 0.5 |
| Plains Lovegrass | *Eragrostis intermedia* | 0.5 |
| Sand Dropseed | *Sporobolus cryptandrus* | 0.5 |
| Forbs | Scientific Name | PLS pounds/acre |
| Desert Marigold | *Baileya multiradiata* | 0.5 |
| Globemallow | *Spharalcea ambigua* | 0.5 |
| Desert Senna | *Cassia covesii* | 0.5 |
| Whorled milkweed | *Asclepias subverticillata* | 0.25 |
| Goodding's Verbena | *Glandularia gooddingii* | 0.25 |
| Tanseyleaf aster | *Machaeranthera tanacetifolia* | 0.25 |
| Parry penstemon | *Penstemon parryi* | 0.25 |

East Plant Alternative Species Seed List

| Grass | Scientific Name | PLS pounds/acre |
|---|---|---|
| Hairy grama | *Bouteloua hirsuta* | 1.0 |
| Purple Threeawn | *Aristida purpurea* | 1.0 |
| Plains birstlegrass | *Setaria macrostachya* | 1.0 |
| Six weeks grama | *Bouteloua barbata* | 0.5 |
| Bull muhly | *Muhlenbergia emersleyi* | 0.5 |
| Forbs | Scientific Name | PLS pounds/acre |
| Lupine | *Lupinus sparsiflorus* | 0.5 |
| Western mugwort | *Artemisia ludoviciana* | 0.5 |
| Narrowleaf penstemon | *Penstemon linarioides* | 0.5 |
| Fleabane | *Erigeron divergens* | 0.25 |
| Blue flax | *Linum Lewisii* | 0.25 |
| Shrubs and Trees | Scientific Name | PLS pounds/plugs/poles/acre |
| Fairy duster | *Calliandra eriophylla* | 0.25 |
| Twin berry | *Menodora scabra* | 0.25 |
| Turbinella oak | *Quercus turbinella* | 0.25 |
| Wire lettuce | *Stephanomeria exigua* | 0.25 |
| Red-berry juniper | *Juniperus coahuilensis* | 5 – 10 Plug/pole |
| Sugar sumac | *Rhus ovata* | 5 – 10 Pug/pole |

The East Plant mix may be used for the higher elevations (~ 3500ft +) along the tailings pipeline and power line corridors. This list will also suffice for what some may refer to as juniper woodland type.

Skunk Camp Tailings Storage Facility Species Seed List

| Grass | Scientific Name | PLS pounds/acre |
|---|---|---|
| Six weeks needle grama | *Bouteloua aristidoides* | 2.0 |
| Purple Threeawn | *Aristida purpurea* | 1.0 |
| Sideoats grama | *Bouteloua curtipendula* | 0.5 |
| Sand Dropseed | *Sporobolus cryptandrus* | 0.5 |
| AZ Cottontop | *Digitaria californica* | 0.25 |
| Fluffgrass | *Erioeuron pulchellum* | 0.25 |
| Sixweeks fescue | *Vulpia octoflora* | 0.25 |
| Forbs | Scientific Name | PLS pounds/acre |
| Desert Marigold | *Baileya multiradiata* | 0.5 |
| Desert Senna | *Cassia covesii* | 0.5 |
| Globemallow | *Spharalcea ambigua* | 0.5 |
| Mexican Gold Poppy | *Eschscholzia mexicana* | 0.5 |
| AZ poppy | *Kallstroemia grandiflora* | 0.25 |
| Fiddleneck | *Amsinckia intermedia* | 0.25 |
| Deer-vetch | *Lotus rigidus* | 0.25 |
| Indian wheat | *Plantago patagonica* | 0.25 |
| Tanseyleaf aster | *Machaeranthera tanacetifolia* | 0.25 |

Skunk Camp Tailings Storage Facility Alternative Species Seed List

| Shrubs and Trees | Scientific Name | PLS pounds/plugs/poles/acre |
|---|---|---|
| Turbinella oak | *Quercus turbinella* | 0.5 |
| Four-wing saltbush | *Atriplex canescens* | 0.5 |
| Hop bush | *Dodonaea viscosa* | 0.25 |
| Trixis | *Trixis californica* | 0.25 |
| Twin berry | *Menodora scabra* | 0.25 |
| Fairy duster | *Calliandra eriophylla* | 0.25 |
| Jojoba | *Simmondsia chinensis* | 0.25 |
| Chuckwallas delight | *Bebbia juncea* | 0.25 |
| Mesquite | *Prosopis velutina* | 5 – 10 Plug/pole |
| Sugar sumac | *Rhus ovata* | 5 – 10 Plug/pole |
| Red-berry juniper | *Juniperus coahuilensis* | 5 – 10 Plug/pole |

Important to consider placement/use within habitat for the following species: Turbinella oak, sugar sumac, red-berry juniper. North facing slopes or areas of increased levels of moisture

would be more suitable for these species due to the transitioning of habitat in this area. Saltbush is known to uptake toxic properties in soils, particularly in tailings and waste rock sites.

**Appendices**

Appendix A – Prospective native seed and plant producer contact information:

Brett Bamert: bbamert@bamertseed.com

TJ Curtis: tj@curtisseed.com

Tren Hagman: tren@graniteseed.com

Forrest Smith (Texas Natives): Forrest.Smith@tamuk.edu

**Apache Junction**

Shady Way Garden
566 W Superstition Blvd.
Apache Junction, AZ 85220
480-288-9655

**Chandler**

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1619 South Arizona Avenue
Chandler, AZ 85248
480-963-1061

**Clarkdale**

Arizona Botanical
Jason Lavelle
1601 Hwy 89-A
PO Drawer 160
Clarkdale, AZ 86324

928-634-2166
1-800-428-7936
email

**Flagstaff**

**The Arboretum at Flagstaff**
**4001 S. Woody Mountain Road**
**Flagstaff, AZ 86001**
**928-774-1442**

**Flagstaff Native Plant and Seed**
**400 E. Butler Ave.**
**Flagstaff, AZ 86001**
**928-773-9406**
**email**

Warner's Nursery & Garden Center
1101 E Butler
Flagstaff, AZ 86001
928-774-1983

**Marana**

Kelly Green Trees
14399 N. Wentz Road
Marana, AZ 85653
520-682-2616

**Payson**

Plant Fair Nursery
97 E. AZ Hwy 260

Payson, AZ 85541
928-474-6556
email

**Phoenix**

Armenta Seed
700 N. Neely St. Ste 2
Gilbert, AZ 85233

**Desert Botanical Gardens**
**1201 North Galvin Parkway**
**Phoenix, AZ 85008**
**480-941-1225**

Desert Gardens Nursery
21222 N. Cave Creek Road
Phoenix, AZ 85024-5501
602-569-1300

**Desert Tree Farms**
**2744 East Utopia Road**
**Phoenix, AZ 85050**
**602-569-6604**

Mountain States Wholesale Nursery
10020 W. Glendale Avenue
Glendale, AZ 85307
800-840-8509 or 623-247-8509

Native Resources International, Inc.
1540 W Happy Valley Rd.
Phoenix 85085
623-869-6757

Phoenix Desert Nursery
3525 E. Southern Ave.
Phoenix, AZ 85040
602-305-9275

**Signature Botanica LLC**
**Julie and Steve Plath**
**PO Box 512**
**Morristown, AZ 85342**
**623-238-3341**
**email**

Western Tree Company
3401 East Southern Avenue
Phoenix, AZ 85040
602-243-6125

**Prescott Area**

**Highlands Center for Natural History**
**1375 Walker Rd**
**Prescott AZ 86303**
**928-776-9550**

The Native Garden
602 Montezuma Street
Prescott, AZ 86303
928-237-5560
email

Terroir Seeds
P O Box 4995
Chino Valley AZ 86323
888-878-5247

Watters Garden Center
1815 W. Iron Springs Road
Prescott, AZ 86305
928-445-4159
email

**Queen Creek**

**Arid Zone Trees**
**PO Box 167**
**Queen Creek, AZ 85242**
**480-987-9094**
**email**

**Superior**

**Boyce-Thompson Arboretum**
**37615 U.S. Highway 60**
**Superior, AZ 85273**
**520-689-2723**

**Tempe**

Wild Seed Inc.
Rita Jo Anthony
PO Box 27751
Tempe, AZ 85285-7751
602-276-3536

**Tucson**

**Arid Adaptations**
**PO Box 90678**
**Tucson, AZ 85752**
**520-289-4083**

B&B Cactus Farm Inc.
11550 E. Speedway Boulevard
Tucson, AZ 85748
520-721-4687

Bach's Greenhouse Cactus Nursery
8602 N. Thornydale Road
Tucson, AZ 85742
520-744-3333

**Civano Nursery**
**5301 S. Houghton Road**
**Tucson, AZ 85747**
**520-546-9200 x 16**
**email**

**Desert Seed Source**
**Chuck LeFevre**
**P.O. Box 1479**
**Oracle, AZ 85623**
**520-896-0671 or email**

**Desert Survivors Nursery**
**1020 W. Starr Pass Boulevard**
**Tucson, AZ 85713**
**520-884-8806**

Harlow Gardens
5620 E. Pima St.
Tucson, AZ 85712
520-298-3303
email

Landscape Cacti
7711 Bopp Road
Tucson, AZ 85735
Jon Weeks
520-883-0020
email

The Magic Garden Nursery
7909 E. 22nd St
Tucson, AZ 85710
520-885-7466
email

Native Seeds/SEARCH (Southwestern Endangered Arid Land Resources Clearing House)
3061 N Campbell
Tucson, AZ 85719
520-622-5591

**Nighthawk Natives Nursery (seeds)**
**Gary Maskarinec**
**email**

**Wildlands Restoration (plants)**
**Bernadette Jilka**
**2944 N. Castro Ave.**
**Tucson, AZ 85705**
**520-882-0969**
**email**

Plants for the Southwest
50 E. Blacklidge Drive
Tucson, AZ 85705
520-628-8773

Rillito Nursery & Garden Center
6303 N. La Cholla Boulevard
Tucson, AZ 85741
520-575-0995

Silverbell Nursery
2730 N. Silverbell Road
Tucson, AZ 85745
520-622-3894

Starr Nursery
3340 W. Ruthann Road
Tucson, AZ 85745
520-743-7052

**Tohono Chul Park Tohono Chul Plant Database**
**7366 N. Paseo del Norte**
**Tucson, AZ 85704**
**520-742-6455**

Tucson Cactus and Succulent Society
P.O. Box 64759
Tucson, AZ 85704
520-742-6455

Tucson Botanical Gardens Nursery
2150 N. Alvernon Way
Tucson, AZ 85712
520-326-9686

Tucson Plant Materials Center
3241 North Romero Rd
Tucson, AZ 85705
520-292-2999

**Vail**

Wild Desert Nursery
Deborah Hendzel
PO Box 232
Vail, AZ 85641
520-971-2581
email

**Yucca**

Destination: Forever Ranch and Gardens
PO Box 306
Yucca, AZ 86438

**Elgin**

**Arizona Revegetation and Monitoring Company**
**Jim Koweek**
**HC1 Box 389**
**Elgin, AZ 85611**
**520-455-5780**
**email**

**Flagstaff**

**EnvironSystems Management, Inc.**
**23 East Fine Ave.**
**Flagstaff, AZ86001**

**928-226-0236**
**email**

**Flagstaff Native Plant and Seed**
400 E. Butler Ave.
Flagstaff, AZ 86001
928-773-9406
**email**

Landscape Design Evolved
Flagstaff: 928-526-1429
Sedona: 928-254-3892
email

**Phoenix**

Palo Verde Designs
Lisa Kelk
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Phoenix, AZ 85044-5515
602-471-7350
email

**Tucson**

Bobcat Garden Design
Alan Tasky
6350 N Bobcat Lane
Tucson, AZ 85743-9278
520-907-8809
email

**Desert Seed Source**
**Chuck LeFevre**
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**Oracle, AZ 85623**
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**email**

**Gardening Insights**
**520-603-2703**
**email**

**Sonoran Gardens, Inc.**
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**Tucson, AZ 85741**
**520-579-9411**

**Tohono Chul Park**
**7366 N Paseo del Norte**
**Tucson, AZ 85704**

Turner Design, LLC
4930 N. Calle la Vela
Tucson AZ 85718
520-405-4633
email

**Wheat Scharf Associates**
**442 N 6th Avenue**
**Tucson, AZ 85705**
**520-884-7911**
**email**

**Yucca**

Destination: Forever Ranch and Gardens
PO Box 306
Yucca, AZ 86438

Appendix B - Summary of Guidelines for Weed-Free Seed, Forage, Mulch, and Fill Materials in Region 3

To ensure that invasive weed species are not introduced during projects involving NFS lands in Region 3, the following set of guidelines should be implemented for (1) seed testing for invasive weed seed and (2) inspection, testing, and/or certification of forage, mulch (straw or wood), and fill materials.

The Regional guidelines may be modified on a case-by-case basis.

Tests for Pure Live Seed (PLS) and percentages of plant species present in the seed mixture should show compliance with contracted seed specifications. Seed tests should also indicate whether seed from noxious, prohibited, restricted, or forest-prohibited weed species is present also utilizing state noxious weed lists. .

**Weed-free specifications**

Seed lots should not contain any appreciable amount of cheatgrass (*Bromus tectorum*), Japanese brome (*Br. japonicus*), Russian thistle (any *Salsola* species), or any weed species prohibited by a national forest unless specifically authorized by the COR (Contracting Officer's Representative). For all other weed species, the combined total weight of seed from such species should not exceed 0.5% in a seed lot. In addition, the seed lot should contain no more than 2% by weight (total) of other types of non-weedy seed which includes seed from agronomic crops and native, non-weedy plant species other than those specified in the contracted seed mix.

**Seed testing**

A number of seed labs (State-affiliated and private) in the Southwest perform seed testing according to Association of Official Seed Analysts (AOSA) standards. Further information on seed labs can be found at these websites:

1. AOSA contact list for seed labs (http://www.aosaseed.com/members_directory)
2. Colorado Seed Laboratory (http://seedlab.colostate.edu/testing_info.html)
3. New Mexico State Seed Laboratory (http://www.nmda.nmsu.edu/seed-lab/)

Randomly select seed bags to sample, doing no more than 30 in a lot.

Utilize AOSA standards to determine purity, germination, moisture, inert materials, non-contractual types of crop seed, and weed seed.

**Purchase Orders or Contractor-Furnished Items and Services**

The following should be included as part of (1) a seed purchase order or (2) the items listed in a contract for meeting special equipment, ground support, and documentation needs:

1. All bags used for seed or seed stored in bulk lots should meet appropriate State seed law labeling requirements and have the following information listed on tags or transportation paperwork as appropriate:

    a) Name and variety of each seed component in excess of five percent of the whole; hybrids should be labeled as such when present.

    b) Lot number or other lot identification.

c) Origin (State or County, if known) – This includes information on yellow certification tags used for the *Source Identified Seed* class when requested by a task order. If origin is unknown, that fact should be stated.

d) Net weight – Percentage by weight of all Pure Live Seed (PLS).

e) Percentage by weight of inert matter.

f) Percentage by weight of all other crop seeds.

g) The name and rate of occurrence per pound of weed seed present.

h) The name and rate of occurrence per pound of each kind of noxious weed seed present.

i) Test results for percent germination or tetrazolium for each seed species.

j) The calendar month and year the test was completed.

k) Name and address of the company or person responsible for analysis of seed.

l) Name and address of the company selling the seed.

Appendix C – Tonto National Forest Noxious Weed Species List.

| Latin name | Common name | AZ Dept. of Agriculture Weed List* | APHIS (Federal Weed List) | On neighboring states' weed lists? | Tonto category** | AZ-WIPWG class *** |
|---|---|---|---|---|---|---|
| *Acroptilon repens* | Russian knapweed | P, Res. | | CA, CO, NM, NV,UT | A | H |
| *Aegilops cylindrica* | Jointed goatgrass | P, Res. | | CA, CO, NM | B | L |
| *Ailanthus altissima* | Tree of heaven | | | | C | |
| *Alhagi maurorum* | Camelthorn | P, Res. | | CA, CO, NM, NV, | A | M |
| *Arundo donax* | Giant reed | | | | B | H |
| *Asphodelus fistulosus* | Onionweed | | x | NM | A | L |
| *Avena fatua* | Wild oats | | | CO | C | M |
| *Brassica nigra* | Black mustard | | | | B | |
| *Brassica tournefortii* | Asian mustard | | | | C | M |
| *Bromus catharticus* | Rescuegrass | | | | C | |

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|---|---|---|---|---|---|---|
| *Bromus diandrus* | Ripgut brome | | | | C | M |
| *Bromus japonicus* | Japanese brome | | | | C | |
| *Bromus rubens* | Red brome | | | | C | H |
| *Bromus tectorum* | Downy brome | | | CO | C | H |
| *Cardaria draba* | Globe-podded hoary cress | P, Res. | | CA, CO, NM, NV UT | A | M |
| *Cardaria pubescens* | Hairy white-top | P | | CA, | A | M |
| *Carduus acanthoides* | Plumeless thistle | P | | CA, CO | A | |
| *Carduus nutans* | Musk thistle | | | CA, CO, NM, NV, UT | A | M |
| *Cenchrus echinatus* | Southern sandbur | P, Reg. | | CA, | A | |
| *Cenchrus spinifex* | Field sandbur | P, Reg. | | CA, | A | |
| *Centaurea biebersteinii* | Spotted knapweed | P, Res. | | CA, CO, NM, NV, UT | A | M |
| *Centaurea diffusa* | Diffuse knapweed | P, Res. | | CA, NM, NV, UT | B | M |
| *Centaurea melitensis* | Malta starthistle | | | NM, NV | C | M |
| *Centaurea solstitialis* | Yellow starthistle | P, Res. | | CA, CO, NM, NV, UT | C | H |
| *Chondrilla juncea* | Rush skeletonweed | P | | CA, CO, NV | A | M |
| *Chorispora tenella* | Blue mustard | | | CA, CO | A | |
| *Cirsium arvense* | Canada thistle | P | | CA, CO, NM, NV, UT | A | M |
| *Cirsium vulgare* | Bull thistle | | | CO, NM | C | |
| *Convolvulus arvensis* | Field bindweed | P, Reg. | | CA, CO, NM, UT | C | M |
| *Dimorphotheca cuneata* | White bietou | | | | A | |
| *Dipsacus fullonum* | Common teasel | | | CO, NM | B | |
| *Eleagnus angustifolia* | Russian olive | | | CO, NM | A | H |
| *Elymus repens* | Quackgrass | P, Res. | | CA, CO, UT | B | L |
| *Eragrostis curvula* | Weeping lovegrass | | | | C | L |
| *Eragrostis Lehmanniana* | Lehmann's lovegrass | | | | C | H |
| *Euphorbia esula* | Leafy spurge | P | | CA, CO, NM, NV, UT | A | H |
| *Euryops subcarnosus* | Sweet resinbush | | | | A | H |
| *Isatis tinctoria* | Dyer's woad | P | | CA, CO, NM, NV, UT | A | |
| *Kochia scoparia* | Kochia | | | | A | |
| *Leucanthemum vulgare* | Oxeye daisy | | | CO | A | L |
| *Linaria dalmatica* | Dalmatian toadflax | P, Res. | | CA, CO, NM, NV | A | M |
| *Linaria vulgaris* | Yellow toadflax | | | CO, NM, NV | A | M |
| *Lythrum salicaria* | Purple loosestrife | P | | CA, CO, NM, NV, UT | A | |
| *Melilotus officinalis* | Yellow sweetclover | | | | C | M |
| *Nerium oleander* | Oleander | | | | B | |
| *Oncosiphon piluliferum* | Globe chamomile | | | | B | |
| *Onopordum acanthium* | Scotch thistle | P, Res. | | CA, CO, NM, NV, UT | B | L |
| *Peganum harmala* | African rue | P | | CA, CO, NM, NV | A | |
| *Pennisetum ciliare* | Buffelgrass | P, Reg. | | | C | H |
| *Pennisetum setaceum* | Fountain grass | | | | C | H |
| *Pentzia incana* | Karoo bush | | | | A | |
| *Polygonum cuspidatum* | Japanese knotweed | | | CA, | A | |

| | | | | | | |
|---|---|---|---|---|---|---|
| *Potentilla recta* | Sulfur cinquefoil | | | CO, NV | A | |
| *Pyracantha sp.* | Pyracantha | | | | B | |
| *Rhus lancea* | African sumac | | | | B | M |
| *Salsola kali & S. tragus* | Russian thistle | | | | C | |
| *Salvia aethiopis* | Mediterranean sage | | | CA, CO, NV | A | |
| *Schismus arabicus* | Arabian schismus | | | | C | M |
| *Schismus barbatus* | Mediterranean grass | | | | C | M |
| *Sinapis arvensis* | Wild mustard | | | CO | B | |
| *Tamarix chinensis* | Five-stamen tamarisk | | | NM | C | H ? |
| *Tamarix parviflora* | Smallflower tamarisk | | | CO, NM, NV | C | H ? |
| *Tamarix ramosissima* | Saltcedar | | | CO, NM, NV | C | H ? |
| *Ulmus pumila* | Siberian elm | | | NM | A | M |
| *Vinca major* | Periwinkle | | | | B | M |

**Definitions: *Arizona State Dept. of Agriculture Weed List: P= Prohibited.** These weeds are prohibited from entry into the state. **Reg. = Regulated**. These weeds **MAY** be controlled or quarantined if found within the state, to prevent further infestation. **Res. = Restricted.** These weeds **SHALL** be controlled or quarantined if found within the state. **Tonto Weed List: Class A weeds** are of limited distribution in Arizona, or unrecorded in the state. They pose a serious threat. Management goal is eradication. **Class B weeds** are of limited distribution in Arizona, common in some places in the state. Management goal is to contain their spread, decrease population size, then eliminate. **Class C weeds** have spread beyond our capability to eradicate them. Management goal is to contain spread to present size, then decrease the population if possible.

***AZ-WIPWG = Arizona Wildland Invasive Plant Working Group rating. H = High.** These species have severe ecological impacts on ecosystems; invasiveness attributes are conducive to moderate to high rates of dispersal and establishment; species are usually widely distributed. **M = Medium.** These species have substantial and apparent ecological impacts on ecosystems; invasiveness attributes are conducive to moderate to high rates of dispersal, often enhanced by disturbance; ecological amplitude and distribution range from limited to widespread. **L = Low.** These species have minor yet detectable ecological impacts; invasiveness attributes result in low to moderate rates of invasion; ecological amplitude and distribution are generally limited, but the species can be problematic locally.

? = Additional designation for some species whose current ecological amplitude and distribution are limited. Species are capable of invading unexploited natural communities, based on initial, localized observations or behavior in similar ecosystems/communities elsewhere.

## Victoria Boyne

**From:** ResolutionProjectRecord
**Subject:** FW: Response to DEIS Action Item FS-226 and SR-6
**Attachments:** DraftReclamationClosurePlanFinal_06.26.2020.pdf

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**From:** Peacey, Victoria (RC) <Victoria.Peacey@riotinto.com>
**Sent:** Friday, June 26, 2020 5:12 PM
**To:** Rasmussen, Mary C -FS <mary.rasmussen@usda.gov>
**Cc:** Donna Morey <dmorey@swca.com>; Chris Garrett <cgarrett@swca.com>
**Subject:** Response to DEIS Action Item FS-226 and SR-6



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Hi Mary,

As a follow-up to the submittal on 6/12/2020 (KCB TSF closure and reclamation plan), please see the attached Reclamation and Closure Plan for the entire mine plan. The plan is submitted in relation to FS226 and per Soils/Vegetation/Reclamation action item **SR-6 "Include revegetation details: native species, techniques, monitoring (invasives, success, use of reference sites)."**

Thanks,

Vicky Peacey
Senior Manager Permitting and Approvals

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