Perpetua Resources

STIBNITE GOLD PROJECT

Valley County, Idaho

Refined Proposed Action

ModPRO2

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October 2021

Summary

This document describes Perpetua Resources Idaho Inc.'s (Perpetua Resources, formerly Midas Gold Idaho, Inc. [Midas Gold]) proposed further refinements of the Stibnite Gold Project (SGP) Plan of Restoration and Operations (PRO) (Midas Gold, 2016). The first modification of the PRO – the SGP Modified Proposed Action (ModPRO) – was submitted in September 2019 (Brown and Caldwell 2019) prior to the preparation of the SGP Draft Environmental Impact Statement (DEIS). The SGP PRO and ModPRO were included in the SGP DEIS as Alternatives 1 and 2, respectively. The updated proposed action described herein is Perpetua Resources' second proposed modification to refine and improve the PRO and is referred to as the ModPRO2. A preliminary ModPRO2 was submitted in December 2020 (Midas Gold 2020). This version of the ModPRO2 supersedes that document and should be considered as a final update to Perpetua Resources' proposed action, appropriate for analysis in forthcoming Environmental Impact Statement documents.

The ModPRO2 was developed to further reduce potential environmental impacts in alignment with Perpetua Resources' Core Values as set out in the PRO (Section 2), Conservation Principles (PRO Section 2), its Sustainability Goals (PRO Section 2.4) and its Environmental Goals (PRO Section 6.2). Project refinements included in the ModPRO2: (1) are supported by updated data and analysis; (2) address persistent potential environmental impacts not sufficiently reduced by refinements included in the original ModPRO; (3) are informed by public and reviewing agencies' comments on the DEIS, and (4) align with the National Environmental Policy Act (NEPA) and all applicable federal, state, and local regulations and permit requirements. The ModPRO2 also aligns with the project development approach in the SGP Feasibility Study (M3 Engineering and Technology 2021)

The ModPRO2 presents a smaller footprint. Mining methods, ore processing, exploration activities, water management, and supporting features including structures, access, haul roads and infrastructure are similar to the PRO and/or the ModPRO or are modified to reduce environmental impacts. These refinements align with the purpose and intent of the NEPA. Perpetua Resources considers the ModPRO2 to be the best alternative for developing the SGP.

- **Section 1** describes the evolution of the ModPRO2 from the original proposed action (the PRO) and DEIS alternatives through the ModPRO (DEIS Alternative 2).
- **Section 2** provides the justification and approach for refinements that resulted in the ModPRO2. The technical basis for these refinements includes updated data and analyses.
- **Section 3** provides a detailed description of the SGP ModPRO2. Each aspect of the mine is addressed from construction through operations, reclamation and post-closure with a statement on similarity to the alternatives already analyzed. Additional data and reports supporting this project description are referenced as appropriate. An updated GIS geodatabase for the project described herein will be submitted with this report.
- **Section 4** summarizes the environmental protection measures (mitigation plans) to avoid and minimize potential impacts, and where applicable, compensate for unavoidable adverse impacts on streams, wetlands, riparian areas, fisheries and aquatic resources, upland wildlife habitats, and federally listed terrestrial and aquatic species.
- **Section 5** discusses the environmental monitoring and management plans for all aspects of project activities and environmental resource monitoring.

A comparison of all of the alternatives analyzed in the DEIS to the ModPRO2 is provided as Table A-1.

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LIST OF ABBREVIATIONS

ABBREVIATION	DESCRIPTION
AADT	average annual daily traffic
amsl	above mean sea level
ANFO	ammonium nitrate fuel oil
AP	AP 3477 is dialkyl dithiophosphate; a reagent used in the flotation circuit
APLIC	Avian Power Line Interaction Committee
BC	Brown and Caldwell
BM	ball mill
BMP	best management practice
BNF	Boise National Forest
BO	biological opinion
CCD	countercurrent decantation
CFR	Code of Federal Regulations
CMP	Conceptual Stream and Wetland Mitigation Plan
CWA	Clean Water Act
DEIS	Draft Environmental Impact Statement
DRMP	Development Rock Management Plan
DRSF	development rock storage facility
EFSFSR	East Fork South Fork Salmon River
EIS	Environmental Impact Statement
EMMP	Environmental Monitoring and Management Program
EPA	United States Environmental Protection Agency
EPM	environmental protection measure
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FM	facility monitoring and management
FMP	Fisheries and Aquatic Resources Mitigation Plan
FOMP	Fishway Operations Management Plan
GCL	geosynthetic clay liner
GMS	growth media stockpile
gpm	gallons per minute
HAC	hot arsenic cure
HDPE	high-density polyethylene
HDR	HDR Engineering, Inc.
HPMP	Historic Property Management Plan
HV	heavy vehicle
IDAPA	Idaho Administrative Procedures Act
IDEQ	Idaho Department of Environmental Quality
IDFG	Idaho Fish and Game

IDL	Idaho Department of Lands
IDWR	Idaho Department of Water Resources
IPDES	Idaho Pollutant Discharge Elimination System
ISO	International Organization for Standardization
kg	kilogram
kst	thousand short tons
Kv	kilovolt
LLDPE	linear low-density polyethylene
LRMP	Land Resource Management Plan
LS	limestone
LV	light vehicle
M3	M3 Engineering & Technology Corp.
MBTA	Migratory Bird Treaty Act
Midas Gold	Midas Gold Idaho, Inc.
ModPRO	Modified Plan of Restoration and Operations
OHV	off highway vehicle
OSV	over snow vehicle
MBR	membrane bioreactor
MSGP	Multi-Sector General Permit
NEPA	National Environmental Policy Act
NFS	National Forest System
NIDGS	Northern Idaho Ground Squirrel
NOAA	National Oceanic and Atmospheric Administration
Perpetua Resources	Perpetua Resources Idaho, Inc.
PNF	Payette National Forest
POC	point of compliance
PRO	Plan of Restoration and Operations
QEP	qualified environmental professional
RCP	Reclamation and Closure Plan
RFAI	request for additional information
Rio ASE	Rio Applied Science and Engineering
RIB	rapid infiltration basin
RM	resource monitoring and management
SAG	semi-autogenous grinding
SDEIS	Supplemental Draft EIS
SGLF	Stibnite Gold Logistics Facility
SGMP	Stibnite Gold Mitigation Plan
SGP	Stibnite Gold Project
SODA	Spent Ore Disposal Area
SOP	standard operating procedure
SPCC	Spill Prevention, Control, and Countermeasures

SRK	SRK Consulting, Inc.
SWPPP	storm water pollution prevention plan
TBD	to be determined
TEPC	threatened, endangered, protected, and candidate
TSF	tailings storage facility
USACE	United States Army Corps of Engineers
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Services
VHF	very high frequency
WAD	weak acid dissociable
WHMP	Wildlife Habitat Mitigation Plan
WOTUS	Waters of the United States
WTP	water treatment plant

1 BACKGROUND LEADING TO MODPRO2

Midas Gold Idaho, Inc. (Midas Gold; now Perpetua Resources, Idaho, Inc. [Perpetua Resources]) submitted the *Stibnite Gold Project (SGP) Plan of Restoration and Operations* (PRO or "plan"; Midas Gold 2016) for mining on National Forest System (NFS) lands to the United States Forest Service (USFS) in September 2016, in accordance with USFS regulations for locatable minerals set forth in 36 Code of Federal Regulations (CFR) 228 Subpart A. The proposal included occupying and using NFS lands within the Payette and Boise National Forests for open pit mining and ore processing. Perpetua Resources' purpose and need is to "economically develop and operate a modern gold, antimony, and silver mine to obtain financial return and benefits from its property rights and investment and supply extracted minerals for various uses. The plan would be executed while undertaking cleanup, reclamation, and restoration of legacy mining impacts before, during, and after the proposed mining activities." The SGP (or "Project") was designed in accordance with Perpetua Resources' Core Values as set out in the Plan of Restoration and Operations (PRO; Section 2), Conservation Principles (PRO Section 2), its Sustainability Goals (PRO Section 2.4), and its Environmental Goals (PRO Section 6.2).

The USFS identified issues and developed a range of alternatives and design features that could be determined reasonable and necessary to meet USFS regulations for locatable minerals while meeting the project purpose and need. The development of alternatives considered agency and public scoping comments and agency evaluation criteria: whether the alternative: (1) met the project purpose and need, (2) offered an environmental advantage, (3) was technically feasible, and (4) was economically feasible.

Perpetua Resources continued to refine and improve the environmental performance of the SGP in accordance with the Core Values, Principles, and Goals described in the PRO (Sections 2 and 6.2). More detailed feasibility analyses were completed, and components were reevaluated to further avoid and minimize environmental impacts. The subsequent Modified Proposed Action (ModPRO) was submitted to the USFS in May 2019 (Brown and Caldwell [BC] 2019) and was evaluated in the Draft Environmental Impact Statement (DEIS) as Alternative 2.

The ModPRO and other appropriate supporting technical information were provided so that the USFS could evaluate the alternative in the DEIS. The DEIS analyzed environmental effects for four action alternatives and the No Action Alternative, as follows:

- **Alternative 1**: The original proposed action, based on Midas Gold's PRO (Midas Gold 2016)
- **Alternative 2**: Modified proposed action, summarized in the ModPRO Technical Memorandum (BC 2019)
- **Alternative 3**: An alternative centered around locating the tailings storage facility (TSF) in the upper East Fork of the South Fork of the Salmon River (EFSFSR) drainage
- **Alternative 4**: An alternative based on using existing roads for the primary mine access route, the Yellow Pine Route
- **Alternative 5**: No Action Alternative

After the DEIS was made available for public comment, Perpetua Resources reviewed the public comments submitted, consulted with agencies, evaluated data, and conducted additional analyses to identify more refinements that could reduce the overall project footprint, reduce wetland impacts, improve surface water and groundwater quality, reduce temperature impacts to surface water, reduce air emissions, improve fisheries and wildlife habitat, and improve reclamation and restoration design. Improvements were only considered if they were consistent with the requirements of National Environmental Policy Act (NEPA), Clean Water Act (CWA) Section 404, USFS regulations, the Endangered Species Act (ESA), Section 106 (cultural resources) and other regulatory requirements. These improvements resulted in a further refined proposed action, hereinafter referred to as the "ModPRO2". The USFS will replace Alternative 2 (the ModPRO) with the ModPRO2 in the Supplemental Draft EIS (SDEIS).

2 MODPRO2 DEVELOPMENT AND OVERVIEW

2.1 APPROACH

The ModPRO2 was developed to further reduce potential environmental impacts of the SGP in alignment with Perpetua Resources' Core Values, Principles and Goals. Project refinements included in the ModPRO2: (1) are supported by updated data and analysis that identify opportunities to reduce potential environmental impacts; (2) address persistent potential environmental impacts not sufficiently reduced by project refinements included in the ModPRO; (3) consider public and agency comments on the DEIS, and (4) align with the NEPA, and all applicable federal, state, and local regulations and permit requirements. The ModPRO2 is aligned with the project development approach in the SGP Feasibility Study M3 Engineering and Technology [M3] 2021) and includes additional environmental protection measures (EPMs).

2.1.1 Updated Data and Analysis between the ModPRO and ModPRO2

To the degree practicable, the analyses conducted, and data collected through April 2020 were incorporated into the environmental impact analysis included in the DEIS. However, some studies and analyses results were not completed in time to be fully considered in the DEIS. It was anticipated that further refinements would be incorporated into the subsequent environmental analysis before a Record of Decision was signed. Refinements and updates to key technical studies completed since the DEIS used to refine ModPRO2 include:

a. Updated geological and mineral resource modeling (M3, 2021)

b. Detailed mine planning, analysis of a smaller Hangar Flats pit, and resulting alternative development rock storage facility (DRSF) configurations (M3 2021)

c. Aquifer testing in the Meadow Creek valley and subsequent hydrogeologic modeling changes with revised pit dewatering estimates (BC 2020)

d. Augmented geochemical characterization of development rock and ore, and additional metallurgical testing to confirm geochemical characteristics of tailings (SRK Consulting, Inc. [SRK] 2021)

e. Updated site-wide geochemical modeling for life-of-mine and post-closure, including predictive modeling of mine features to evaluate potential surface water and groundwater quality impacts (SRK 2021)

f. Updated site-wide, life-of-mine water balance modeling (Perpetua Resources 2021c, in progress)

g. A detailed water management plan (BC 2021b)

h. Life-of-mine and post-closure water temperature modeling (BC 2021)

i. Updated air quality analysis (Air Sciences, Inc. [Air Sciences] 2021)

j. Updated site-specific seismic hazard analysis (Golder 2021), resulting in minor improvements to TSF/buttress factors-of-safety

k. Updated tailings tonnage and consolidation modeling to match updated ore processing schedules and include more detailed metallurgical calculations accounting for gypsum formation (M3 2021)

2.2 SUMMARY OF REFINEMENTS IN MODPRO2

ModPRO2 project improvements, combined with the project improvements documented in the ModPRO (BC 2019b), further reduce the potential environmental impacts of the SGP. Relative to the original proposed action, the ModPRO2:

- Reduces overall mined material (ore and development rock) production by 10 percent (44 million tons)

- Reduces the size (volume) of the Hangar Flats pit by 70 percent, allowing for complete backfill
- Reduces the overall area of disturbance from open pits by 7 percent (37 acres)
- Reduces the overall area of on-site disturbance by an additional 168 acres by eliminating the Fiddle development rock storage facility (DRSF)

Project refinements that define the ModPRO2 are summarized below and are preceded by a brief description of the observed condition or analysis that prompted proposed changes to the SGP. A comprehensive description of the ModPRO2 is provided in Section 3. It aligns with the general structure of the DEIS Chapter 2 – Alternatives Description to facilitate incorporating this information into the SDEIS as a refined version of the DEIS Alternative 2. A comparison of all of the alternatives analyzed in the DEIS to the ModPRO2 is provided as Table A-1.

2.2.1 Geosynthetic covers on the TSF, TSF Buttress, Yellow Pine pit backfill, and Hangar Flats pit backfill

The DEIS effects analysis indicated that soil/rock covers without low permeability geosynthetic layers allowed water to infiltrate and interact with development rock or tailings, potentially affecting the quality of water which then would enter groundwater, seep, or otherwise discharge into surface water. The updated site-wide geochemical modeling report (SRK 2021) validated this analysis, and the protectiveness of the proposed geosynthetic covers.

ModPRO2 Change/Benefits: ModPRO2 incorporates synthetic covers over the full surface of the TSF and on the entire surface of the TSF Buttress, the Yellow Pine pit backfill, and the Hangar Flats pit backfill (changes in DRSF/backfill configurations are discussed later). Synthetic covers reduce infiltration, thus reducing interaction of water with development rock or tailings and reducing impacts on water quality. In the case of the Hangar Flats pit backfill, a synthetic cover also facilitates wetland construction, providing increased compensatory wetland mitigation.

2.2.2 Hangar Flats Pit

2.2.2.1 Reduced Footprint

In the previous mine plans, the Hangar Flats pit would have a large influence on the overall site water balance due to the magnitude and duration of the contact water management and pit dewatering, particularly with concurrent mining of the Hangar Flats pit with the Yellow Pine and West End pits. Hangar Flats pit dewatering is the primary cause of predicted reduced streamflow in Meadow Creek. Moreover, updated geological and mineral resource modeling indicated that the north portion of the Hangar Flats pit as envisioned in Alternative 2 would have a very high strip ratio (ratio of development rock needing to be removed compared to ore) when compared to the south portion and would be marginally economic at projected long-term metal prices considering economics from mining through closure, including water management cost.

ModPRO2 Change/Benefits: The disturbance area and volume of the Hangar Flats pit is reduced in the ModPRO2 and offers several project improvements. Adjusting pit sequencing and reducing the size of the Hangar Flats pit would reduce overlapping water management requirements, reduce the overall surface disturbance footprint, allow for the smaller Hangar Flats pit to be completely backfilled, reduce the amount of development rock that requires storage elsewhere, and reduce the likelihood and (if required) the volume of post-closure water management. This project refinement addresses public comments related to the reduction of overall project footprint and provides accordant reductions in impacts to wetlands, Waters of the United States (WOTUS), vegetation resources, and wildlife and fisheries habitat.

2.2.2.2 Hangar Flats Pit Backfill

Despite reducing the overall quantity of development rock that results from a smaller Hangar Flats pit, elimination of the Fiddle DRSF coupled with the elimination of the West End DRSF in the ModPRO led to an overall site-wide deficit of development rock storage capacity. Moreover, the Hangar Flats pit lake would negatively impact water quality in Meadow Creek (metals and stream temperatures) and require substantial water treatment.

ModPRO2 Change/Benefits: Expanding and changing the sequencing of the TSF Buttress[1] and backfilling Hangar Flats pit to the approximate pre-mining valley bottom elevation would resolve the site-wide development rock storage capacity deficit, reduce the overall project footprint, reduce long-term water treatment requirements, decrease post-mining Meadow Creek stream temperatures, and avoid post-mining relocation of the operational Meadow Creek diversion channel/floodplain corridor. Backfilling the pit would also address geotechnical concerns with having the permanent Meadow Creek channel adjacent to the south Hangar Flats pit highwall. Additional development rock would have to be placed in the TSF Buttress, thereby increasing its footprint somewhat. However, relative to the elimination of the Fiddle DRSF and associated water management requirements, this was deemed a reasonable trade-off since it reduces the overall project footprint and uses previously disturbed versus undisturbed areas. This addresses numerous public comments requesting reconsideration of the need for the Fiddle DRSF and comments about long-term water treatment of Hangar Flats pit lake outflow.

2.2.3 Fiddle DRSF

Operating concurrent DRSFs allows for increased operational flexibility; however, it would increase water management and reclamation requirements as well as wetland impacts and associated mitigation. The Fiddle DRSF affects operational and post-closure water management, and geochemical modeling indicated that long-term water treatment for toe seepage may be needed even with a low-permeability closure cover. Furthermore, as has been recognized in comments on the DEIS, the Fiddle DRSF would be in a drainage that is mostly undisturbed.

ModPRO2 Change/Benefits: Elimination of the Fiddle DRSF is a key element of the ModPRO2. Reducing the size of the Hangar Flats pit facilitates this change, along with completely backfilling the Hangar Flats pit. Eliminating the Fiddle DRSF would reduce operational, closure and post-closure water management efforts, costs, and risk. Reducing the overall project footprint would reduce impacts on soil, vegetation, wildlife habitat, and fisheries. Reclamation and mitigation requirements would be reduced through reduced wetland and WOTUS impacts. This project improvement addresses numerous DEIS comments related to the Fiddle DRSF and its potential impacts on water quality, fisheries, and overall disturbance footprint.

2.2.4 Stream Temperature/Fisheries Habitat

Stream temperature modeling conducted for the PRO predicted increased water temperatures for both operational surface water diversions and post-closure restored and enhanced streams due to a combination of the Hangar Flats pit lake and lack of shade. Based on stream temperature modeling, the ModPRO adopted EPMs, including the routing of diverted low flows in buried pipes rather than open channels to prevent warming during mine operations, and post-mine retention of the Meadow Creek diversion around Hangar Flats pit, rather than rerouting Meadow Creek and Blowout Creek through the Hangar Flats pit lake. Although the ModPRO modeling demonstrated that those measures would be successful in reducing the predicted stream temperature increases, particularly during operations, persistent summer maximum stream temperature increases were predicted in post-closure from insufficiently developed vegetation for adequate shade, and the removal of the Yellow Pine pit lake, which presently provides both fisheries

[1] The TSF Buttress was formerly referred to as the Hangar Flats DRSF. To avoid confusion with the naming convention used for the backfilled pits the ModPRO2 renamed the buttress and uses the term Hangar Flats pit backfill for the backfilled Hangar Flats pit.

habitat and stream temperature buffering. The ModPRO also did not fully ameliorate the loss of fisheries habitat due to removal of the Yellow Pine pit lake, with Hangar Flats pit lake being different in character and location to the present Yellow Pine pit lake.

ModPRO2 Change/Benefits: The ModPRO2 proposes additional EPMs to address stream temperature, including wider riparian planting widths on restored and enhanced stream reaches, increased proportion of taller and denser vegetation such as spruce trees, and creation of Stibnite Lake, a feature similar in size to the present Yellow Pine pit lake, within the restored Yellow Pine pit backfill. Shade improvements are predicted to lower stream temperatures generally, and the addition of Stibnite Lake would restore the function of the existing Yellow Pine pit lake in buffering temperature extremes, reducing maximum summer stream temperatures in EFSFSR in and downstream of the Project site, and replacing the bull trout lake habitat currently provided by the Yellow Pine pit lake. These project improvements address DEIS comments related to surface water quality and fisheries habitat loss resulting from the removal of the Yellow Pine pit lake.

2.2.5 Tailings Arsenic Management

Metallurgical and geochemical testing and analyses suggested improvements in ore processing and tailings closure design to prevent arsenic from entering waterways. Metallurgical testing of the autoclave tailings from earlier process flowsheet designs confirmed that a substantial amount of amorphous (unstable) arsenic compounds formed in the pressure oxidation vessel that would result in elevated soluble arsenic in subsequent environmental testing. Additionally, environmental testing completed on representative SGP tailings solids showed some soluble arsenic in the tailings leachate. Geochemical modeling indicated that the levels may result in not meeting water quality standards in water discharging to Meadow Creek during post closure, necessitating long-term water treatment, even with the ModPRO improvements.

ModPRO2 Change/Benefits: Additional metallurgical testing demonstrated that decreasing the free acid levels (increasing the pH) in the autoclave by increasing the ground limestone in the autoclave feed would increase the quantity of crystalline (stable) arsenic compounds in the slurry with a proportional decrease in the quantity of amorphous (unstable) arsenic compounds. Increasing the ground limestone into the unoxidized concentrate as it is fed into the autoclave would not affect the design of the autoclave and would not increase overall limestone consumption as there would be an offsetting decrease in limestone consumption in the subsequent neutralization circuit.

During the initial years of operation, Perpetua Resources would monitor levels of soluble arsenic in the tailings. If soluble arsenic levels were higher than anticipated, Perpetua Resources would treat the oxidized concentrate with hot arsenic cure (HAC) prior to neutralization. Metallurgical testing has shown that keeping the autoclave discharge at 92 degrees Celsius for 5 hours in agitated tanks, with small additions of ground limestone, would further promote the formation of stable, crystalline arsenic compounds. The detoxification of tailings in the ore processing circuit was not necessarily the focus of comments on the DEIS; however, this project improvement does address general comments related to the potential impacts of tailings geochemistry on groundwater quality. Additional improvements are gained from installing a low permeability geosynthetic cover over the entire TSF at closure, rather than only within stream/floodplain corridors. This measure eliminates the remaining potential water quality impact associated with water interaction with tailings solids, after tailings consolidation has ended, and reduces the volume of water requiring treatment after closure.

2.2.6 Ore Processing

Typically, before slurry from the autoclave is neutralized using ground limestone and lime, a solid-liquid-separation step is completed using a process called countercurrent decantation (CCD). This circuit was included in the PRO and ModPRO and involves a number of large tanks to separate the acidic liquid from the oxidized solids, so the acidic liquid can be neutralized and reused in the process plant, and the solids can be sent to the leach circuit to extract the gold and silver. Concurrent to the metallurgical testing discussed in the preceding section, additional metallurgical testing

was completed to determine if the CCD circuit could be eliminated by directly neutralizing the slurry rather than only neutralizing the liquids following the CCD circuit. Separating the materials before neutralization would typically reduce the potential for gold and silver particles to be encapsulated during neutralization, and that encapsulation could reduce overall gold and silver recovery in the leach circuit.

ModPRO2 Change/Benefits: Metallurgical testing confirmed that gold and silver particles were not encapsulated during the slurry neutralization process, and reagent consumptions (including cyanide, limestone, and lime) were unimpacted by removal of the CCD circuit. Consequently, the CCD circuit was eliminated from the process flowsheet to reduce the overall plant footprint. However, as the CCD circuit decreased the temperature of the slurry due to the amount of time the slurry would be exposed to ambient temperatures, removal of the CCD circuit required the addition of a cooling circuit, which would require no material changes to the upstream or downstream ore processing circuits. Thus, elimination of the CCD circuit from the process flowsheet would reduce the overall plant footprint versus that in the PRO or ModPRO. The CCD circuit was not necessarily the focus of comments on the DEIS; however, this project improvement does address general comments related to reducing the project footprint.

3 MODPRO2 DESCRIPTION

3.1 PROJECT LOCATION AND LAND MANAGEMENT

The SGP is located in Valley County, Idaho approximately 98 miles northeast of Boise and approximately 10 miles east of Yellow Pine, Idaho. Figure 3-1 provides a regional map that illustrates the project location and regional-scale project components, and Figure 3-2 through Figure 3-4 present the ModPRO2 site layout. Table 3-1 provides a summary of land management or ownership by project component for the ModPRO2.

Table 3-1 ModPRO2 Land Management and Area by Project Component Crosstabs (acres)

	Perpetua Private	Other Private	Payette National Forest	Boise National Forest	Salmon-Challis National Forest	Bureau of Reclamation	Idaho Department of Lands	Totals
Mine Site	505	0	1170 + 65[2]	0	0	0	0	1740
Off-site Facilities	24	0	0	5	0	0	0	29
Access Roads	2	5	109	356	14	0	0	485
Utilities[1]	4	280	81	572	0	13	62	1011
Totals	535	284	1425	933	14	13	62	3266[3]

Notes:

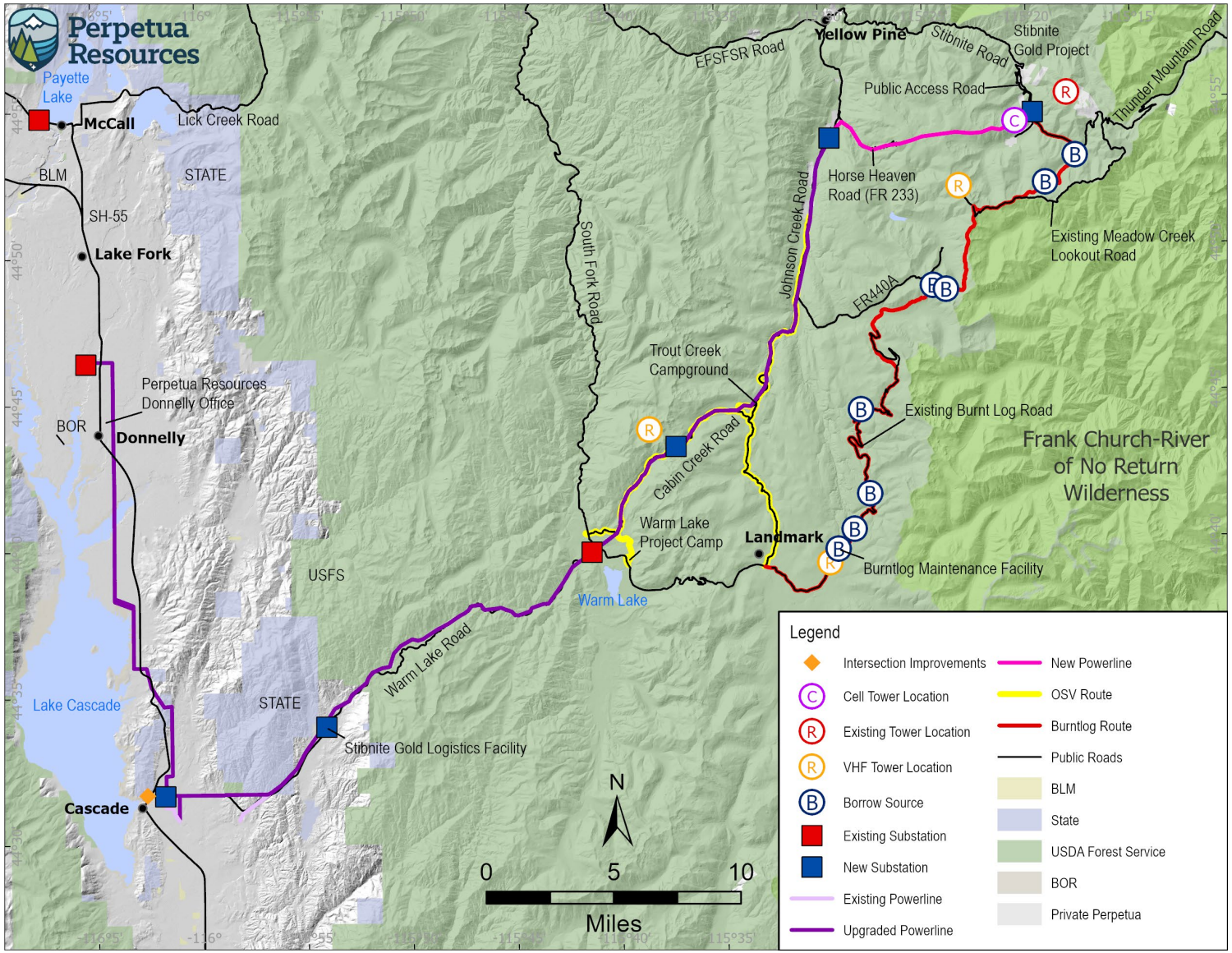
[1] Utilities affected areas include both existing utility corridors and access routes, and new utility corridors and access routes. Some existing utility access routes would be upgraded. Utilities affected areas include upgrades to utilities that are part of the Connected Actions.

[2] Approximately 65 affected acres associated with temporary surface exploration pads and roads (mine site component) have an unknown land ownership because the exact locations of these exploration areas are not yet known. The surface exploration areas are included in the PNF mine site.

[3] Items, subtotals, and totals may not add up to grand total due to rounding.

Abbreviations:

ModPRO2 = Refined Modified Plan of Restoration and Operations


Perpetua Resources
Payette Lake
McCall
Lick Creek Road
BLM
STATE
SH-55
Lake Fork
Perpetua Resources Donnelly Office
BOR
Donnelly
Lake Cascade
STATE
Cascade
USFS
Warm Lake Road
Stibnite Gold Logistics Facility
Warm Lake
Warm Lake Project Camp
Landmark
Trout Creek Campground
Cabin Creek Road
South Fork Road
Johnson Creek Road
EFSFSR Road
Yellow Pine
Stibnite Road
Stibnite Gold Project
Public Access Road
Thunder Mountain Road
Horse Heaven Road (FR 233)
Existing Meadow Creek Lookout Road
FR440A
Existing Burnt Log Road
Burntlog Maintenance Facility
Frank Church-River of No Return Wilderness
N
0
5
10
Miles
Legend
Intersection Improvements
Cell Tower Location
Existing Tower Location
VHF Tower Location
Borrow Source
Existing Substation
New Substation
Existing Powerline
Upgraded Powerline
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OSV Route
Burntlog Route
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BLM
State
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BOR
Private Perpetua

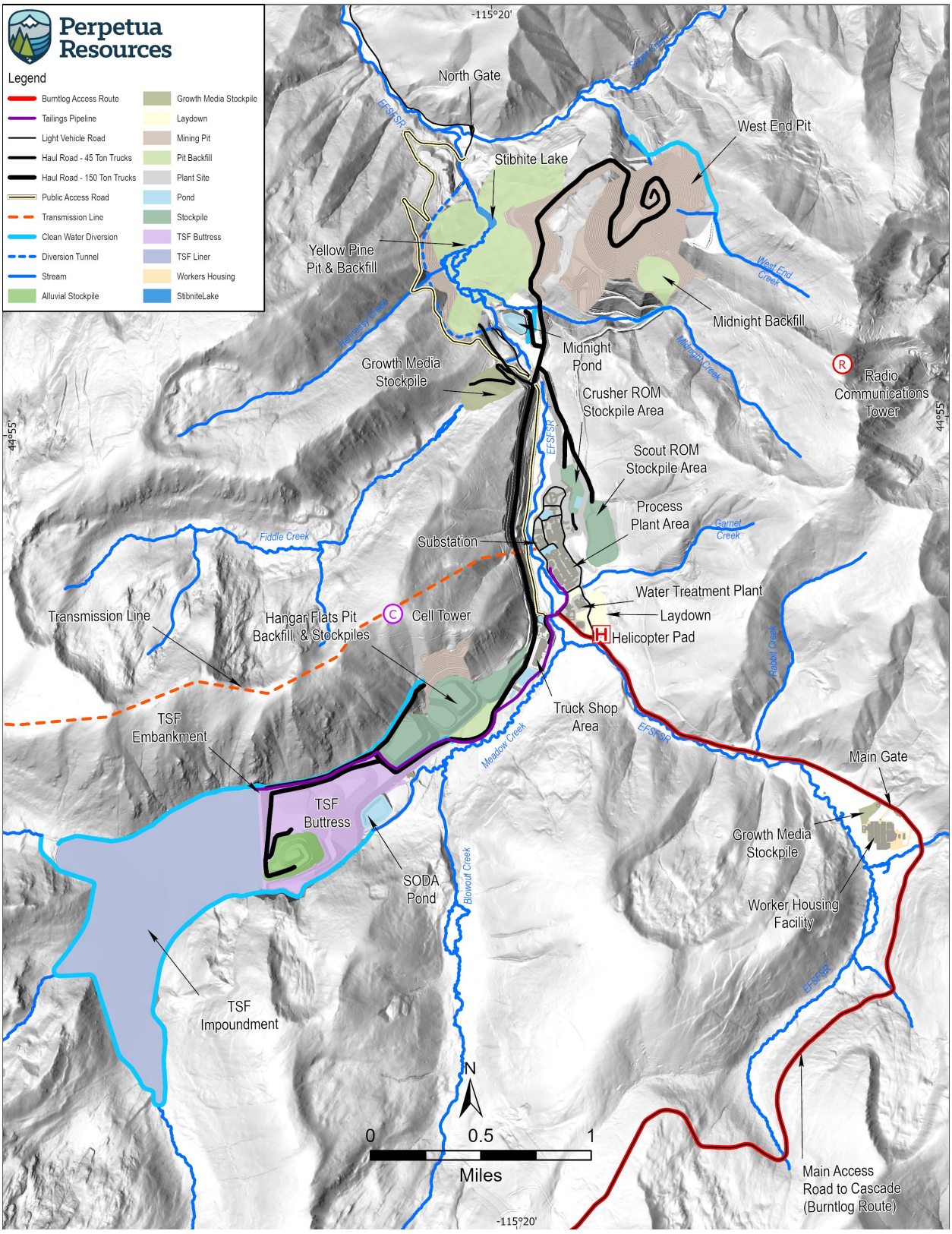


Figure 3-2. ModPRO2 Site Layout Beginning of Mining

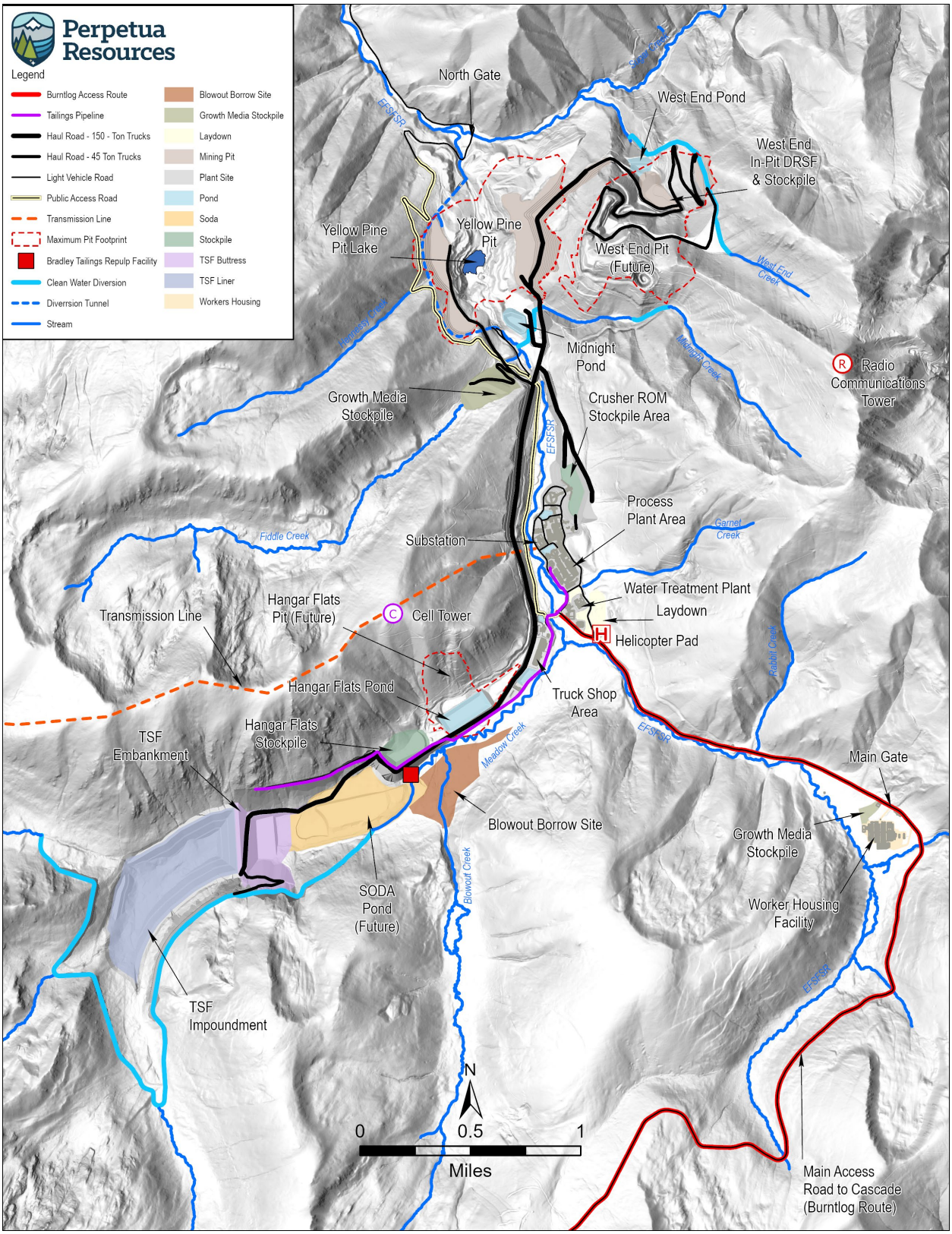


Figure 3-3. ModPRO2 Site Layout During Mining

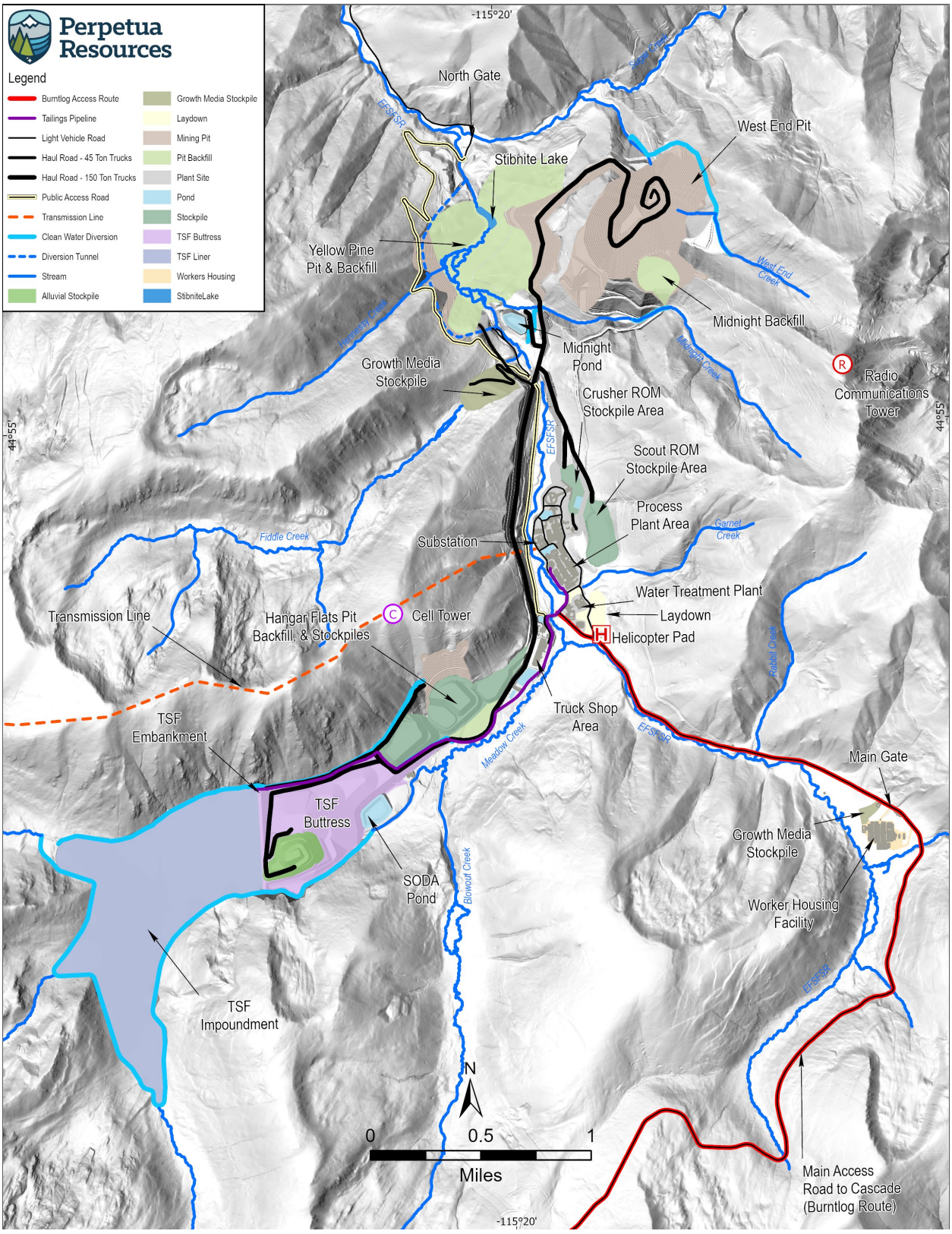


Figure 3-4. ModPRO2 Site Layout End of Mining

3.2 LIFE-OF-MINE SCHEDULE

The ModPRO2 schedule is broadly similar to Alternatives 1, 2, and 3 in the DEIS. The construction and mining schedule is discussed further in Section 3.7.2, and the reclamation and closure period is discussed in Section 3.14. Detailed sequencing of the TSF and TSF Buttress is discussed in Section 3.9.2.

Activities (construction, mining, ore processing, and reclamation/closure) would occur over approximately 20 to 25 years (Figure 3-3), not including the long-term post-closure environmental monitoring or potential long-term water treatment. This Project duration is consistent with what was initially proposed in the PRO (Midas Gold 2016). The phases of the operation are described in subsequent sections and include:

- Construction (approximately 3 years)
- Surface and Underground Exploration (approximately 17 years, beginning during construction and continuing concurrent with operations)
- Mining and Ore Processing Operations (approximately 15 years, including 2 years of post-mining ore processing)
- Mine site Closure and Reclamation (approximately 5 years)

The environmental monitoring phase would continue until full reclamation is demonstrated. Water treatment would continue until metal concentrations from each source have stabilized at levels that meet water quality standards for discharge.

3.3 SITE ACCESS

3.3.1 Johnson Creek Route

The use of the Yellow Pine Route[2] as a project access route during the construction phase of the SGP and minor maintenance upgrades required for such use that are detailed in the DEIS (Alternatives 1, 2, and 3) would not change in ModPRO2. The Yellow Pine Route is hereafter referred to as the Johnson Creek Route.

The Johnson Creek Route refers to an existing route currently used to access the project site. The Johnson Creek Route originates at Landmark at the intersection of Warm Lake Road and Johnson Creek Road (CR-10-413) and extends north on Johnson Creek Road (CR 10-413) for approximately 25 miles to Yellow Pine. From there, the Stibnite Road (CR 50-412) continues eastward to Stibnite and passes through the site and consists of approximately 14 miles of variable width (one-lane to two-lane), native-surfaced (dirt) roadway (Figure 3-1).

During the initial 2 years of construction of the SGP, and concurrent with development of the Burntlog Route (see Section 3.3.2), mine-related traffic would access the mine site via the Johnson Creek Route. Minor surface improvements (e.g., ditch and culvert repair/replacement, adding gravel, winter snow removal, and summer dust suppression) would occur to reduce sediment runoff and dust generation. There would be no road alignment modification or widening of the existing roads.

Perpetua Resources has an agreement with Valley County for maintenance of Stibnite and Johnson Creek roads, including performing maintenance measures to repair segments that have deteriorated. Appropriate revisions to the road maintenance agreement would be established for the use of the Johnson Creek Route as a construction route and to ensure year-round access in accordance with Valley County's public road easement stipulations.

[2] The Yellow Pine Route is renamed as the Johnson Creek Route in this and forthcoming documents. The terms are synonymous and refer to the Project access route that includes Johnson Creek Road (CR-10-413) and Stibnite Road (CR-50-412).

3.3.2 Burntlog Route

The construction and use of the Burntlog Route as the primary mine access route as detailed in the DEIS (Alternatives 1 and 2) would not change in ModPRO2. The alignment of the Burntlog Route for ModPRO2 is most consistent with that proposed in the ModPRO (DEIS Alternative 2), which includes a minor change in alignment in the vicinity of Riordan Creek.

The Johnson Creek Route would be used to access Stibnite during the initial 2 years of SGP construction while Perpetua Resources constructs a safe and reliable project access route; the Burntlog Route. The Burntlog Route would connect the eastern end of Warm Lake Road (at Landmark) to the site (to the northeast) by widening and improving approximately 23 miles of existing roads, including the full length of the existing Burnt Log Road (FR 447) and segments of Meadow Creek Lookout Road (FR 51290) and Thunder Mountain Road (FR 50375). The three road segments would be connected with two new road segments totaling approximately 15 miles.

Improvements required on the existing roads include:

- Straightening tight corners to allow for improved safety and traffic visibility
- Maintaining grades of less than 10 percent in all practicable locations
- Placing sub-base material and surfacing with gravel and localized sections of road with binders to provide a stable long-term roadway and reduce sediment runoff
- Application of a road binding agent in localized segments to increase stability
- Widening the existing road surface to a 20-foot-wide travel way (approximately 26 feet including shoulders)
- Installing side-ditching, culverts, guardrails, and bridges, where necessary, with design features to provide fish passage and limit potential sediment delivery to streams

Figure 3-1 shows the proposed Burntlog Route, which includes the proposed new road construction. The connection between the end of Burnt Log Road (FR 447) and Meadow Creek Lookout Road (FR 51290) is approximately 11 miles and would cross Trapper Creek 0.5 miles east of the intersection of Trapper Creek Road (FR 440) and FR 440A and continue northeast towards Black Lake and on to the Meadow Creek Lookout Road (FR 51290). The second connector between the Meadow Creek Lookout Road (FR 51290) and Thunder Mountain Road (FR 50375) would be approximately 4 miles and links up with Thunder Mountain Road (FR 50375) approximately 2 miles south of SGP. Minor surface improvements (e.g., blading) would occur on the existing Thunder Mountain Road (FR 50375) and Meadow Creek Lookout Road (FR 51290) to provide a safe road surface for transportation of construction equipment required to build the Burntlog Route. There would be no road alignment modification or widening of the existing roads.

Primary Project access would shift from the Johnson Creek Route to the Burntlog Route near the end of the Project construction phase. The Burntlog Route would be compliant with all related usage and approval requirements included in 36 CFR Section 228, Part A. The use of the Burntlog Route as the project access route would avoid environmental and human health and safety risks associated with the Johnson Creek Route which passes through identified areas of large destructive avalanches, landslides, and floods. The Burntlog Route allows another route for project site ingress/egress, decreases project and public traffic interaction with Yellow Pine and Johnson Creek residents and increases the potential for spills adjacent to fish-bearing streams. Upon completion, the Burntlog Route would serve as an alternative public access route to the Thunder Mountain area for the life of the mine until it is decommissioned following mine reclamation and closure.

Up to eight borrow sites would be established along the Burntlog Route to meet construction and ongoing maintenance needs throughout the life of the mine, and to support decommissioning following mine closure. Additionally, those same eight borrow areas would be utilized for staging of equipment and supplies. Three construction camps would be located

within disturbance areas for borrow sources or staging areas. The construction camps would be for trailer parking. Each trailer would be equipped with fresh water and sanitary waste storage facilities.

3.3.3 Public Access

The proposed public access route is the same as Option 1 of the public access route in the DEIS Alternative 2. The Burntlog Route would serve as an alternative public access route from Landmark to Thunder Mountain Road (FR 50375) from the time of its completion until it is decommissioned (including obliteration of new connecting segments). A through-site public access route will replace the current access through the SGP site on Stibnite Road (FR 50375) during mine operations (described below). During mine reclamation and closure, the portion of Stibnite Road (FR 50375) passing through the site will be reestablished east of the EFSFSR, minimizing waterway crossings, and will provide permanent public access through the reclaimed site, and mine site access for post closure monitoring and maintenance.

During construction, public access through the SGP site on Stibnite Road would be restricted for one year or more while a new 4-mile-long, 12-foot-wide gravel road is constructed to provide public access from Stibnite Road (FR 50412) to Thunder Mountain Road (FR 50375). The public access road would be constructed on a widened bench in the Yellow Pine pit, then south of the Yellow Pine pit, this road would pass under the haul road and continue southward, parallel to the mine haul road on a partially revegetated portion of a former haul road. Southwest of the ore processing area, the public access road would connect with Thunder Mountain Road (FR 50375) and continue toward the worker housing facility, exiting the project site to the southeast.

The through-site public access road would provide seasonal access, similar to current conditions. During operations, public access through the mine site would be provided during the snow-free season to all vehicle types. Vehicles passing through the mine site would be required to check-in with mine personnel at the North or South mine site entry points to receive a safety briefing and would also be required to check-out with mine site personnel upon exiting the mine site. For safety purposes, no stopping or deviating from the public access road would be allowed. Mine site access would be restricted during road construction and maintenance, blasting, highwall scaling, mining in the immediate area of the road, and similar operations.

Public access would be separated from other mine site roads by berms, security fencing, and an underpass to allow the public road to pass beneath the mine haul road. The underpass would be in the vicinity of Fiddle Creek. The public access road would not be plowed in the winter (current county maintenance standards) and signs would inform the public of seasonal and temporary closures.

Public access by foot via existing trails or on roads would be restricted from entering the operations boundary shown in the SGP DEIS on Figure 2.3-2. Security personnel, fencing (including wildlife exclusion fencing), and signs would restrict public access to vehicular traffic on the designated public access roadway within the operations boundary.

3.3.4 Over Snow Vehicle Public Access

3.3.4.1 Cabin Creek - Johnson Creek Groomed Over Snow Vehicle Trail

The majority of proposed over-snow vehicle (OSV) public access in DEIS Alternative 2 is the same, except for the additional 0.3-mile OSV route connecting Johnson Creek Road to the Landmark-Stanley Road, the 0.4-mile connecting Paradise Valley Road to North Shoreline Drive, and the resumption of OSV access between Trout Creek Campground and Wapiti Meadows following construction of the Burntlog Route.

Currently, Valley County does not maintain Warm Lake Road for automobile access in the winter beyond Warm Lake Lodge. With adequate snowpack, an 8-mile segment of the Warm Lake Road east of Warm Lake Lodge is used as an OSV route, allowing access into Landmark and points beyond. To provide year-round passenger and delivery truck

access from the onset of construction through the life of the mine, wintertime maintenance east of Warm Lake Lodge will be conducted by Perpetua Resources and will provide the sole route of ingress/egress to the SGP for all mine support traffic. Commitments for wintertime maintenance of Warm Lake Road would be documented in a Road Maintenance Agreement with Valley County.

Due to year-round access to the mine site along Warm Lake Road, an existing approximately 8-mile-long groomed OSV trail from Warm Lake to Landmark would be closed for the life of the project. To replace this recreational use, a dedicated alternative OSV route would be established from the Warm Lake area to Landmark via the Cabin Creek/Trout Creek drainages and Johnson Creek Road.

Near Warm Lake, an approximately 2-acre parking area would be established west of South Fork Road on FR 474B. A new 3.2-mile groomer access trail would be established from the parking area to the USFS Warm Lake Project Camp south of Paradise Valley Road (FR 488) where the groomer would be stored. An approximate 0.1-mile segment would be groomed from the intersection of Paradise Valley Road (FR 488) and FR 488A to Warm Lake Road. Additionally, a 0.3-mile non-groomed OSV route west of Warm Lake Road would provide access to North Shoreline Drive (FR 489). The Cabin Creek Road (FR 467) portion of the groomed OSV trail would extend approximately 13 miles to the Trout Creek Campground on Johnson Creek Road. Portions of Cabin Creek Road (FR 467) would require stream crossing improvements, localized road widening, and surface grading to support the OSV route grooming equipment.

From Trout Creek to Landmark, an approximately 7-mile temporary groomed OSV trail would be maintained on NFS lands adjacent to the west side of Johnson Creek Road (CR 10-413). Portions of the temporary groomed OSV trail would be established using a snowplow wing attachment requiring some vegetation and tree removal to allow for safe snowplowing. The precise location of this trail is not yet determined, and in areas where topography and vegetation prevent using the wing attachment to establish the groomed OSV trail, sections would merge with Johnson Creek Road. A 0.3-mile trail would be maintained south of Warm Lake Road and would connect Johnson Creek Road to the Landmark-Stanley Road (FR 579). Figure 3-1 shows the Cabin Creek/Trout Creek and Johnson Creek Road groomed OSV trail.

OSV access would be temporarily halted between Trout Creek Campground and Wapiti Meadows (17 miles north of Trout Creek Campground on Johnson Creek Road) during construction of the Burntlog Route. Once construction of the Burntlog Route has been completed, the Johnson Creek Route would no longer be used by mine-related traffic and the OSV route would be returned to the unplowed Johnson Creek Road and extended northward to provide approximately 17 miles of groomed OSV access between Landmark and Wapiti Meadows. While the Johnson Creek Route is in use, Perpetua Resources would coordinate with Valley County on the use and maintenance of the route for year-round access in accordance with Valley County's public road easement stipulations.

3.3.4.2 Valley County Over Snow Vehicle Grooming Agreement

Potential modification of OSV grooming agreement is the same as that which was presented in the DEIS Alternative 2.

Under the terms of an agreement between the USFS, Valley County, and the Idaho Department of Parks and Recreation, Valley County is allowed to groom OSV trails on the Boise National Forest (BNF) within State Designated Snowmobile Areas. Groomed snow trails are co-located on underlying Forest Roads and Valley County roads and relocating the current Warm Lake to Landmark route could require amendments to the OSV grooming agreement outside of the approval of the SGP. The grooming of the Cabin Creek-Johnson Creek OSV trail could amend the cost savings agreement (agreement #13-CS11040204-004), and Valley County would maintain the Cabin Creek OSV trail.

3.3.5 State Highway 55 and Warm Lake Road Intersection

Proposed ModPRO2 improvements to the intersection of Warm Lake Road and State Highway 55 are the same as for all DEIS action Alternatives.

Warm Lake Road north of Cascade intersects State Highway 55, which is a major north-south transportation corridor (Figure 3-1). This intersection will be used by all mine-related traffic through all phases of the SGP. Changes to the intersection would improve access for large trucks carrying equipment and supplies to the SGP and would facilitate turns from State Highway 55 onto Warm Lake Road and from Warm Lake Road back onto the State highway. Any changes proposed to the intersection would need to be approved and implemented by the Idaho Transportation Department. Recommended changes to the intersection are: the addition of left and right turning lanes (Parametrix 2018); an intersection modification to accommodate larger trucks; potential relocation of two power poles (HDR Engineering, Inc. [HDR] 2017); and a modification to the westbound approach at Warm Lake Road to improve the view of traffic coming from the north.

3.4 POWER TRANSMISSION AND COMMUNICATIONS SYSTEMS

3.4.1 Power Transmission

Proposed ModPRO2 improvements to the transmission line are the same as DEIS Alternative 2 except for the addition of 3 miles of underground distribution power from the Johnson Creek substation south to Wapiti Meadows, on-site voltage changes from 24.5 kV to 34.5 kV, and the increase in electrical power from 50 megawatts to 60 megawatts required to run the SGP.

The SGP would require approximately 60 megawatts of electrical power. Whereas the current 69-kV transmission line in the area is not capable of supporting this power requirement and does not extend to the SGP site, Idaho Power Company will upgrade and expand their power transmission and distribution system. Changes to the existing system for SGP operations would include:

- Upgrade approximately 63 miles of the existing 12.5-kilovolts (kV) and 69-kV transmission lines between the Lake Fork and Johnson Creek substations to 138-kV service. The right-of-way would be 50 to 100 feet (depending on slope aspect) and existing transmission line support structures would be replaced with taller structures.
- A new 9-mile, 138-kV line would be constructed from the Johnson Creek substation to a new substation at the SGP site, partially within a former transmission line right-of-way. The right-of-way for the new transmission line would be approximately 100 feet wide. At the SGP site, transformers would reduce the voltage from 138-kV to 34.9 -kV for distribution to facilities through overhead distribution lines or underground conduits.
- Upgrade the substations located at Oxbow Dam, Horse Flat, McCall, Lake Fork, and Warm Lake (Figure 3-1).
- New construction of the Scott Valley and Thunderbolt Tap substations, a new switching substation near Cascade (Cascade switching station), and removal of the existing Scott Valley substation.
- A new substation (Johnson Creek substation) south of the Johnson Creek airstrip on NFS lands and will provide low voltage distribution to Yellow Pine, which would no longer be served via the low voltage (12.5-kV) line from the Warm Lake substation.
- Reroute approximately 5.4 miles of transmission line to avoid the Thunder Mountain Estates subdivision. The reroute would parallel Warm Lake Road for approximately 2.4 miles before crossing onto NFS and Idaho State land for approximately 1.7 miles. The portion crossing Idaho State property will require a right-of-way easement. An additional 1 mile of 69-kV transmission would be required along Thunder City Road linking the existing transmission line out of Emmett to the reroute. Approximately 2.7 miles of transmission line would no longer be required and would be removed.
- Reroute approximately 0.9 miles of transmission line to approximately 600 feet north of its current location between Cascade and Donnelly to use an old railroad grade on private property and the existing transmission line would be removed. Install approximately 3 miles of new underground distribution power along Johnson Creek Road from the Johnson Creek substation south to Wapiti Meadows.

Construction, operation, and maintenance of the transmission line would require improvements to the transmission line access roads and construction of new access roads. During construction, the new section of transmission line between the Johnson Creek substation and SGP would require major improvements to Horse Heaven Road (FR 416W), NFS Trail 233 (no name), and approximately 4 miles of new spur roads would be constructed. Minor upgrades to Cabin Creek Road (FR 50467) would also be required.

3.4.2 Communication and Repeater Sites

The cell and very high frequency (VHF) tower locations are similar to the DEIS including optional tower locations. Alternative cell and VHF tower locations included in the DEIS (referenced in request for additional information [RFAI]-7) were removed from consideration in the ModPRO2 as the above locations provide the best performance and are thus preferred siting locations.

A microwave relay tower was installed in 2013 on private land on a 9,000-foot-high peak to the east of SGP for communications. SGP's existing microwave relay (Figure 3-1) was designed and constructed to be scalable to accommodate potential future increases in communication requirements. However, since the microwave relay was constructed the regional hub on Snowbank Mountain reached capacity and will no longer provide the required bandwidth (1,000 megabits per second) to Stibnite. Alternatively, Perpetua Resources in partnership with Idaho Power and local communication providers will add fiber optic cable to the transmission line between Cascade and Stibnite. The existing communication facilities would also need to be expanded at the mine site and along the Burntlog Route to facilitate two-way rapid communication between equipment operators and ground personnel, and to allow broadcast of emergency messages. The two-way radio system would be supported by a series of repeaters placed on public and private land.

A series of VHF radio repeaters would be placed along the Burntlog Route as needed. The repeaters would be placed near the existing Meadow Creek Lookout and Thunderbolt Lookout communication sites, the new Burntlog Maintenance Facility, and on private parcels at the mine site, as needed. The 10-foot-tall towers on 3-foot by 3-foot concrete pads would be supported by solar panels, support hardware, and a backup battery case. Each site would be accessed annually (at a minimum) or as required for maintenance. Given their location at existing or proposed facilities, no additional disturbance for equipment installation or access would be required for their construction and maintenance.

A cell tower also would be installed to facilitate area communications and would improve cell phone coverage for area residents as well as mine personnel (Figure 3-1). The proposed cell tower would be approximately 60 feet tall and would include surface disturbance of approximately 30 feet by 60 feet. The cell tower location would be near the proposed transmission line upslope of the Hangar Flats pit. Locating the cell tower upslope of the Hangar Flats pit would require upgrades to existing roads.

3.5 OTHER OFF-SITE INFRASTRUCTURE

There would be no change in any of the off-site facility required including administrative offices, a transportation hub, warehouse, and an assay laboratory. These activities would occur at the Stibnite Gold Logistics Facility (SGLF). In additional to the support infrastructure located at the SGLF, year-round road maintenance and snow removal activities would be supported from the Burntlog Maintenance Facility.

3.5.1 Stibnite Gold Logistics Facility

The ModPRO2 location of the proposed SGLF is the same as that described in DEIS Alternative 2.

The SGLF would be located along Warm Lake Road on private land (approximately 7 miles northeast of Cascade). The SGLF property (Figure 3-5) is approximately 25 acres and would accommodate employee parking, an assay laboratory building, a core sampling logging storage facility, warehouses, laydown yards, equipment inspection areas,

a truck scale, and an administration building for Perpetua Resources personnel and site safety orientation for personnel. Wetlands on the property would be fenced off and avoided during construction activities of these facilities. The parking and assembly area would accommodate approximately 300 light vehicles for employees using bus or van pooling to the mine site. To the degree practicable, Perpetua Resources would mandate the use of busing and vans for employee and contractor transportation to the mine site and the worker housing facility.

Perpetua Resources would require supply truck drivers to check in at the SGLF and then direct them to either proceed to the mine site or unload at the warehouse for temporary storage and consolidation of their load. A truck scale would be located at the SGLF to verify loads going into or out of the warehouse area. The check-in process would include general safety and road readiness inspection of incoming trucks and equipment being transported to mine site. Heavy equipment transport vehicles would be inspected for items such as presence of weeds, excessive dirt on earth moving equipment, safety equipment, installed and maintained engine brake muffling systems, and general safety checks of equipment.

The SGLF would require a domestic groundwater well to service the facility. This well and associated water right would require permitting through the Idaho Department of Water Resources (IDWR). Stormwater runoff during construction of the facility would be managed under a general permit through the Idaho Department of Environmental Quality (IDEQ).

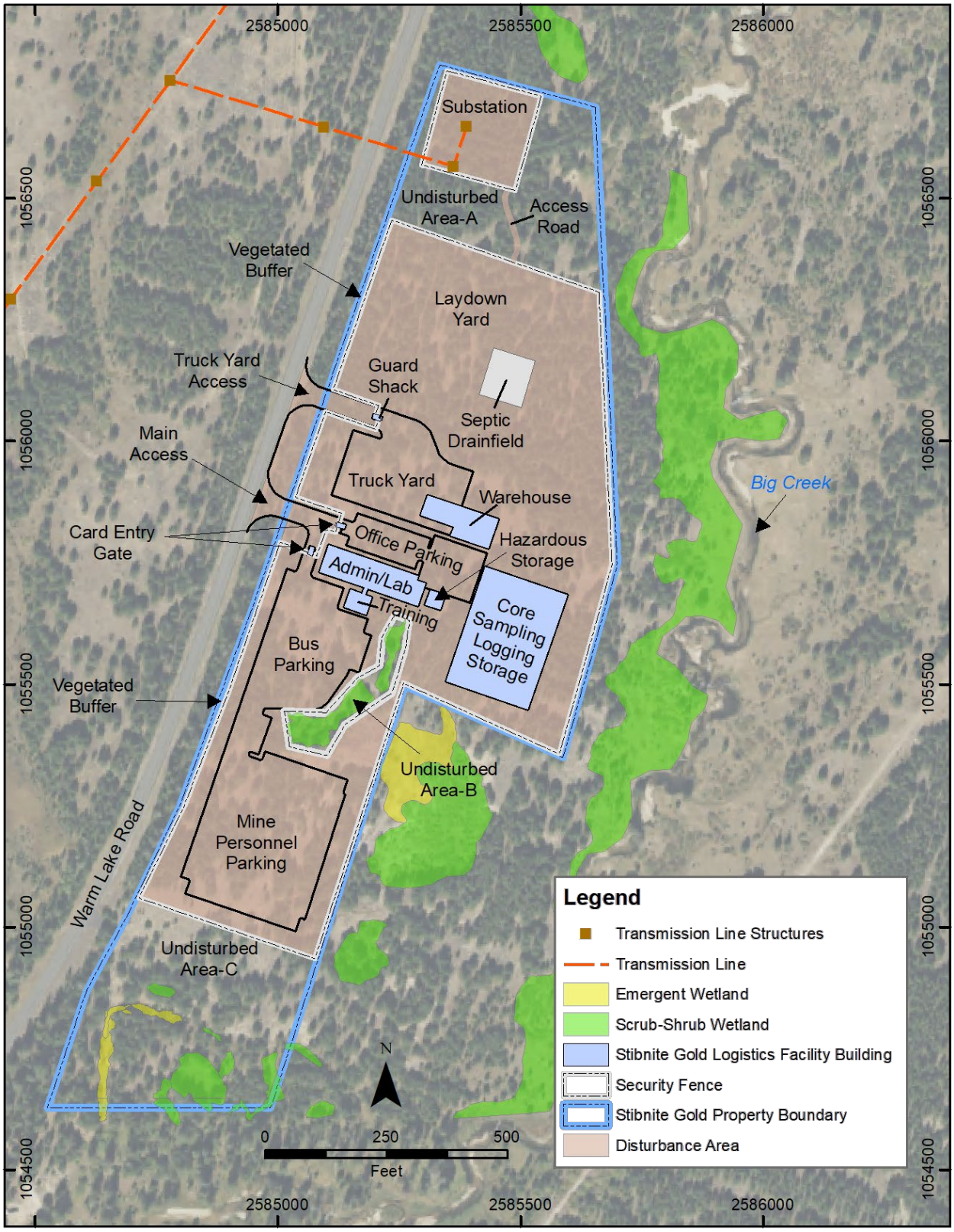


Figure 3-5. Stibnite Gold Logistics Facility Layout

3.5.2 Burntlog Maintenance Facility

The location of the Burntlog Maintenance Facility for ModPRO2 is the same as that proposed in SGP DEIS Alternative 2.

The Burntlog Maintenance Facility (Figure 3-6) would be located on NFS land 4.4 miles east of the intersection of Warm Lake and Johnson Creek Roads and would be accessed via the existing Burnt Log Road (FR 447). The maintenance facility would be located within the footprint of a borrow source established for construction of the Burntlog Route. Facility structures would include a 7,500-square-foot maintenance building; a 7,100-square-foot aggregates storage building; a 4,300-square-foot equipment shelter and an 825-square-foot sleeping quarters. The maintenance building would house sanding/snowplowing trucks, snow blowers, road graders, and support equipment. Additional features of this facility may include covered stockpiles of coarse sand and gravel for winter sanding activities, and communications equipment.

This facility would include a double-contained fuel storage area housing three 2,500-gallon fuel tanks for on-road diesel, off-road diesel, and unleaded gasoline. Additionally, a 1,000-gallon used oil tank would be located inside the maintenance facility and a 1,000-gallon propane tank would be located at the facility for heating. Stormwater runoff during construction of the facility would be managed under a general permit through the IDEQ.

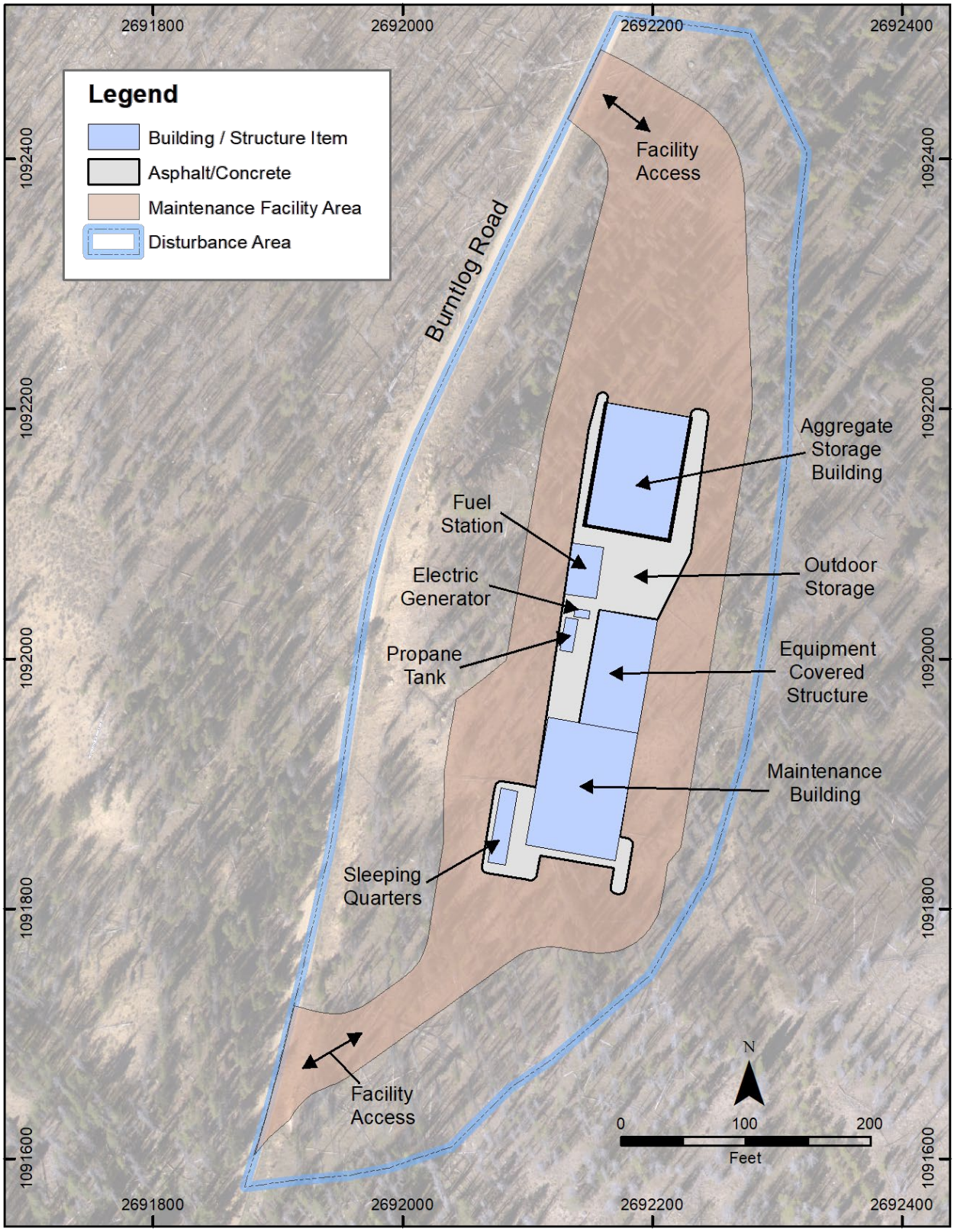


Figure 3-6. Burntlog Maintenance Facility Layout

3.6 SITE PREPARATION AND SUPPORT INFRASTRUCTURE

3.6.1 Overview

The schedule of preparatory construction activity for ModPRO2 is the same as DEIS Alternatives 1 and 2.

The SGP would require construction of surface facilities, mine site haul roads, and water management features. Additionally, removal of some legacy mining features would be initiated during the construction phase. Approximately 15 to 20 temporary trailers would be located on private lands adjacent to the existing exploration camp to accommodate construction crews.

Prior to site preparation and construction of surface facilities, vegetation would be removed from operating areas. Merchantable timber on NFS surface lands could be purchased from the USFS. Non-merchantable trees, deadwood, shrubs, and slash would be removed, and any remaining vegetation would be grubbed using a bulldozer. The resulting material would be saved for future use in reclamation activities. Specifically, the organic matter would be chipped and stockpiled for use as mulch or blended to create a growth media additive. After vegetation removal, growth media would be salvaged and stockpiled. Stockpiles would be stabilized and seeded.

The existing potable water supply system at the existing SGP exploration camp would be used and expanded for the initial construction camp. The existing system would be supplemented with deliveries of potable water, if needed. Supplemental water sources (i.e., water deliveries) would be used by personnel in remote construction areas. Sanitation during construction would be provided through the existing sewage treatment system adjacent to the exploration camp. In addition, portable sanitary facilities would be located throughout the mine site and at remote construction areas.

Construction of the Burntlog Route would occur from both ends of the route at the same time on a seasonal basis (May to November), but construction could occur outside of those months if conditions allow. The southern portion workforce would be housed in three temporary trailer camps located within construction borrow sources or staging areas. The northern portion workforce would be housed at the temporary trailer construction camp at the mine site. Some construction workers could be housed in the town of Cascade.

Pre-construction water management activities would include the installation of surface water management features and implementation of best management practices (BMPs) to reduce erosion and sediment delivery to streams. These water management features and BMPs could include sedimentation ponds; run-on water diversion ditches, trenches, and/or berms; runoff water collection ditches; silt fence; water bars; culverts; energy dissipation structures; terraces; and other features specified in construction permits.

3.6.2 Growth Media Stockpiles

ModPRO2 proposes changes to the location and size of growth media stockpiles (GMSs) relative to the other DEIS alternatives, due to eliminating the Fiddle DRSF, expanding the TSF Buttress, reducing Hangar Flats pit size, consolidating smaller GMSs into a centralized GMS in Fiddle valley, and adding contact water storage ponds.

Suitable growth media material within the area proposed for operations would be salvaged for future reclamation following vegetation clearing and stockpiled either within the Fiddle valley or at the worker housing facility (Figure 3-7). Other short-term GMSs would occur within the footprint of the TSF. GMSs would be stabilized, seeded, and mulched to protect the stockpiles from wind and water erosion. Unconsolidated overburden (chiefly alluvial and glacial materials from Hangar Flats and Yellow Pine pits) would be stored in the upper lift of the TSF Buttress to allow future access for use as cover material for reclamation of the TSF, TSF Buttress, and Hangar Flats pit backfill (Closure Material Stockpile, Figure 3-19).

3.6.3 Mine Site Borrow Sources

The ModPRO2 proposes no changes to the mine site borrow sources relative to DEIS Alternative 2 except that minimal material would be borrowed from the Fiddle valley due to the elimination of the Fiddle DRSF.

Various types of earth and rock material would be used from borrow sources for construction, maintenance, closure and reclamation activities. Most of these materials can be sourced at the mine site from existing development rock dumps, legacy spent heap leach ore, and from development rock removed as part of proposed surface mining and underground exploration activities. However, native materials would be required for some applications. Specific areas within the mine site that have large quantities of high quality native alluvial and glacial granular borrow materials for use include:

- The alluvial and glacial soils in the Meadow Creek valley floor within the footprint of the TSF, TSF Buttress, and Hangar Flats pit
- The outwash soils in the lower Blowout Creek alluvial fan
- Glacial soils in the Fiddle Creek valley walls, within the footprint of the Fiddle GMS

3.6.4 Mine Support Infrastructure

Mine support infrastructure is the same as DEIS Alternative 2 except Fiddle DRSF haul roads are eliminated (with the exception of an access road for the Fiddle GMS), Hangar Flats pit haul roads are reconfigured, EFSFSR haul road crossing is relocated, and the timing of all pit haul roads is modified.

On-site infrastructure to support the SGP mining and ore processing operations would include the following:

- A modular one-story mine administration building that would include offices for site management, environmental staff, and other administrative and technical staff
- A maintenance workshop that would store materials and supplies as discussed in Section 3.11
- A truck wash facility that would include an oil/water separation system and water treatment facilities to enable reuse of the wash water
- A worker housing facility that would be constructed on NFS lands adjacent to Thunder Mountain Road (FR 50375) and would accommodate approximately 500 people (Figure 3-7); the worker housing facility could include indoor multiuse areas and outdoor recreation facilities that could include a sports field and cross-country ski trails across federally administered land
- Haul roads which would be required within the mine site to transport ore, development rock, and reclamation materials from mining or storage areas, and to transport vehicles to the maintenance workshop; a typical haul road would be approximately 87 feet wide (total 81.1 feet of running surface and 5 feet of safety berm width); the haul roads would be built and maintained for year-round access and would be surfaced with gravel aggregate; road maintenance activities would be conducted to manage fugitive dust emissions and maintain stormwater management features
- Culverts would be installed where haul roads cross drainages or to direct stormwater to collection and retention structures; culvert inlets and outlets would be lined with rock riprap, or equivalent, as needed to prevent erosion and protect water quality; crossings of known fish-bearing streams would be constructed to support fish passage, with either appropriately designed and constructed culverts or bridges
- Service roads and trails that would provide an internal access system for employees and visitors to the site; the service roads would typically be 12 to 15 feet wide; some would be covered with gravel aggregate, while others would be dirt, two-track roads; there would be no planned public use of the mine site service roads or trails; the trail system would enable pedestrian traffic to move safely throughout the mine site operating area

- Employee and visitor parking that would be maintained during construction and operations; during construction, the gravel parking areas would be located at the new worker housing facility, near the contractor/construction laydown areas, and at the Scout Portal; as operations are initiated, gravel parking areas would be maintained for buses, vans, and other miscellaneous vehicles for employees, contractors, vendors, and visitors at the new worker housing facility, at the shop area, and near the on-site mine administration office
- Stormwater runoff associated with the above construction would be managed under a general permit through the IDEQ

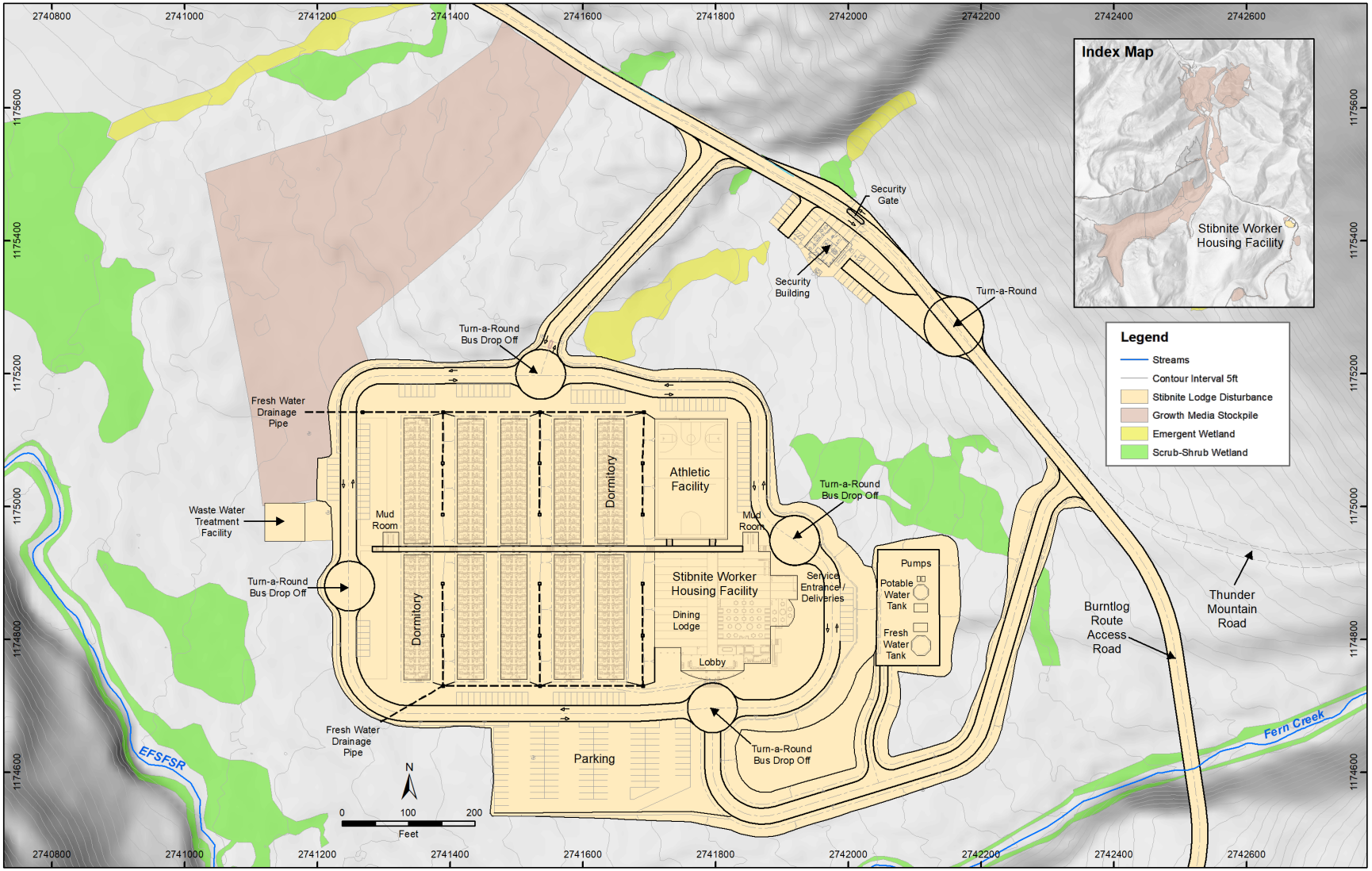


Figure 3-7. Stibnite Worker Housing Facility

3.7 OPERATIONS PHASE

3.7.1 Mining

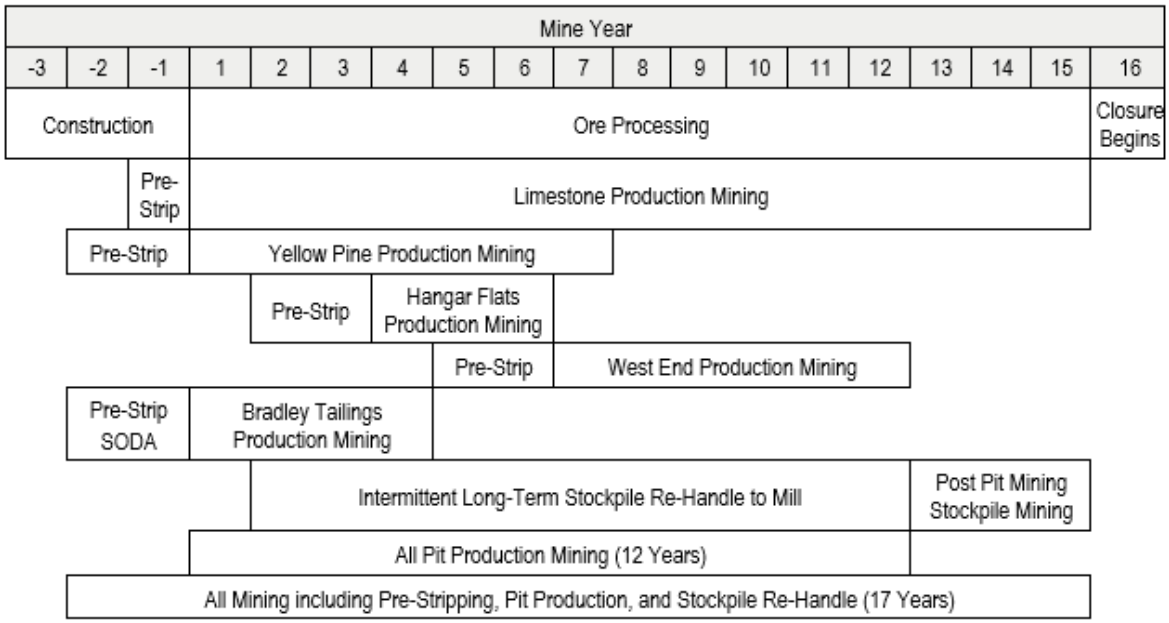
Mining proposed in the ModPRO2 is similar to Alternatives 1 through 4 of the DEIS, with the exception of the reduction in size and backfilling of the Hangar Flats pit, the redistribution of some development rock, and the long-term stockpiling of ore that will be processed after open pit mining operations have ceased.

In general, ore mined from the three open pits would be hauled directly to the primary crusher area; however, during extended periods when the ore tonnage or ore type from the pits exceed the availability of the ore processing plant, the ore would be stockpiled and processed at a future time. Development rock (also commonly referred to as waste rock) would be hauled to the TSF embankment or placed in one of four destinations: the TSF Buttress, the mined-out Yellow Pine open pit, the mined-out Hangar Flats open pit, or the Midnight area within the mined-out West End open pit.

3.7.2 Mining Schedule

The ModPRO2 mining schedule is similar to the mining schedule for all DEIS alternatives, with the exception of post-mining ore processing occurring for nearly 3 years following the cessation of mining operations. Mine construction and operations at the SGP would occur year-round for approximately 18 years (Year -3 to approximately Year 15).

Mine operations would begin with pit pre-stripping during the second year of construction and end in year 15 of operations once the long-term stockpiles have been re-handled to the ore processing plant. Figure 3-8 illustrates the mine operations activities schedule.



3.7.3 Open Pits

The SGP mine plan includes three open pits: Yellow Pine, Hangar Flats and West End (Figure 3-2). Relative to all other DEIS Alternatives, the ModPRO2 represents no change to the number and location of the open pits, and pit design parameters are unchanged. However, the overall tonnage mined is 44 million tons less resulting from an approximately 70% smaller Hangar Flats pit, a 3% smaller Yellow Pine pit and a 20% larger West End pit. This updated mine plan also reduces the time that concurrent mining of multiple pits occurs. Backfilling the Hangar Flats pit would eliminate the Hangar Flats pit lake. The Midnight pit would be backfilled with development rock as proposed in the ModPRO (DEIS Alternative 2).

The existing Yellow Pine pit, in the northern portion of the proposed mine site, would be expanded, including into a shallower mining area to the northeast previously mined as the Homestake pit. The EFSFSR flows through the Yellow Pine pit, forming a small pit lake (Yellow Pine pit lake), initially formed when the EFSFSR flowed into the pit after it was abandoned in the 1950s.

The West End pit would be in the northeast portion of the proposed mine site, east of and at a higher elevation than the Yellow Pine pit, generally situated between Sugar Creek to the north and Midnight Creek to the south. The West End pit would be in the same general location as historical open pit mining where multiple open pits, mine benches, waste rock dumps, and areas of deep backfill exist. The Midnight pit is within the southern portion of the West End pit.

The Hangar Flats pit would be in the central portion of the proposed mine site, generally encompassing steep south and southeast facing slopes and the adjacent Meadow Creek valley floor. Past mining activity in this area was primarily underground but the proposed pit would also encompass the former Bradley mill and smelter area, the Hecla heap leach facility, and some of the Stibnite Mines Inc. leach pads. Table 3-2 provides a summary of the physical characteristics for each pit.

Table 3-2 Summary of Mine Pit Physical Characteristics

Characteristic	Yellow Pine Pit	West End Pit	Hangar Flats Pit
Acres	222	185	66
Pit Bottom Elevation (feet amsl)	5,360	6,180	6,080
Pit Depth Below Pit Spill Elevation[1] (feet)	720	440	460
Highwall Height Above Pit Spill Elevation[1] (feet)	600 for western highwall 900 for eastern highwall	1,000 highwalls	800 for northwestern highwall
Approximate Million Tons Mined	163	198	31
Disposal Location of Development Rock	TSF Embankment, TSF Buttress, Yellow Pine backfill	Yellow Pine backfill, TSF Buttress, Hangar Flats backfill, TSF Embankment, Midnight backfill	TSF Embankment, TSF Buttress, Yellow Pine backfill

Notes:

[1]The Spill Elevation is the theoretical elevation of a water surface where the pit would begin to spill if it were filled with water

Abbreviations:

amsl = above mean sea level

TSF = tailings storage facility

Open pit design parameters such as bench height and pit slope angles were provided by the geotechnical consultant STRATA (2014) and are discussed in the SGP Feasibility Study Technical Report (M3, 2021). A summary of open pit design parameters is provided in Table 3-3.

Table 3-3. Pit Design Parameters

Design Parameter	Value	Comment
Bench height	20 feet 40 feet	Single bench ore mining Double bench waste mining; final pit configuration
Bench face angle	63° 45°	Bedrock Alluvium
Catch bench width	20 feet	-
Inter-ramp angle	36° to 47°	-
150T truck ramp width (2-lane)	102 feet	Including berm and ditch
45T truck ramp width (2-lane)	50 feet	Including berm and ditch
150T truck running surface	81.1 feet	3.5 x truck operating width
Safety berm height	5 feet	½ truck tire height
Safety berm width	16.9 feet 1.9 feet	Width at berm base Width at berm top
Road ditch width	4 feet	-
Maximum ramp gradient	10% 12%	150T haul trucks 45T articulated trucks
Minimum road bend radii	64 feet	-
Minimum production fleet bench width	250 feet	Benches <250 feet wide are mined with the development (45-ton haul truck) fleet

3.7.4 Drilling and Blasting

Drilling and blasting proposed in ModPRO2 would be the same as the alternatives analyzed in the DEIS.

Drilling and blasting would be used to break ore and development rock in the mine pits. Following drilling, blasting would use explosives to break rock into fragments that are suitable for loading into equipment. The predominant explosive used to break rock within the pit would be a mixture of ammonium nitrate fuel oil (ANFO) and emulsion. ANFO consists of 6% fuel oil and 94% ammonium nitrate. Emulsion is similar to ANFO except it is produced as a water-resistant slurry of inorganic oxidizer gelled with a carbonaceous gelling agent. A blend of ANFO and emulsion, referred to as heavy ANFO, would be mixed on-site and loaded into blast holes.

An Explosives and Blasting Management Plan would be prepared as an operations management plan. Explosives storage, transport, handling, and use would comply with Department of Homeland Security, Bureau of Alcohol, Tobacco, Firearms and Explosives; Department of Transportation; and the Mine Safety and Health Administration regulations.

3.7.5 Loading and Hauling

Other than minor changes to the scale and quantity of the loading and hauling equipment, the ore and development rock loading and hauling approach proposed in the ModPRO2 is the same as the alternatives analyzed in the DEIS.

Production mining would be done using a conventional diesel truck and shovel fleet consisting of two 29-cubic yard shovels, approximately sixteen 150-ton class haul trucks, and one 28-cubic yard wheel loader. The wheel loader would be used primarily to load haul trucks during shovel maintenance and to load stockpiled ore as needed. Mine development excavation required to establish haul truck access roads, access limestone, and pre-strip pits prior to production mining would be done using a fleet of medium sized excavators, wheel loaders, and 45-ton class articulated trucks. This development fleet would also be used to salvage growth media and support reclamation activities.

3.7.6 Mine Dewatering

Save for specifics on the number and depth of dewatering wells, owing to differences in the mine plan (mostly the smaller and shorter-duration Hangar Flats pit) and improved groundwater modeling, the approach to mine dewatering is the same as analyzed in the DEIS.

Partial dewatering of the open pits would occur prior and concurrent to mining. Shallow alluvial and deeper bedrock wells would be drilled adjacent to the pits to intercept and pump groundwater before it flows into the pit. During mining operations, groundwater seepage and in-pit surface water runoff would be collected for reuse in the ore processing plant or treatment and discharge, according to whether there was a water deficit or surplus at a given time. Additional details on pit water management can be found in Section 3.10.3.6.

3.7.7 Ore Management

Ore handling is the same as analyzed in the DEIS, except for the expansion of the short-term ore stockpile area near the processing plant, and the segregation, stockpiling, re-handling, and processing of low-grade rock, depending on metal prices.

Ore from the open pits would be hauled and placed directly into the ore processing plant, except during periods when the amount or type exceeds the availability of the ore processing plant, the excess ore would be stockpiled. In the ModPRO2, seven long-term ore stockpiles and one short-term stockpile would be used to manage the excess ore. The long-term ore stockpiles would be located on and near the TSF Buttress and Hangar Flats pit and the short-term stockpiles would be located near the crusher.

Highest-grade ore would be sent directly to the crusher or to the short-term stockpile area near the crusher where it would likely be processed within a few days. Lower-grade ore would be sent to the long-term ore stockpiles where it would remain for months or longer. Some of the ore sent to the low-grade ore stockpiles would be re-handled and processed during active mining operations, and some would be re-handled and processed once open pit mining has ceased. If metal prices do not support processing of some of the long-term stockpiles, the stockpiled material will be covered as part of DRSF closure activities (see Section 3.14 and Figure 3-4).

Three long-term ore stockpiles would be on the TSF Buttress on the north side of the valley. Two stockpiles would be adjacent to the Hangar Flats pit and extended onto the pit footprint after it is backfilled. A stockpile within the West End pit footprint would temporarily store ore mined during West End Road development and pre-stripping. Ore storage in long-term stockpiles peaks in Year 11 with approximately 19 million tons as shown on Figure 3-9 .

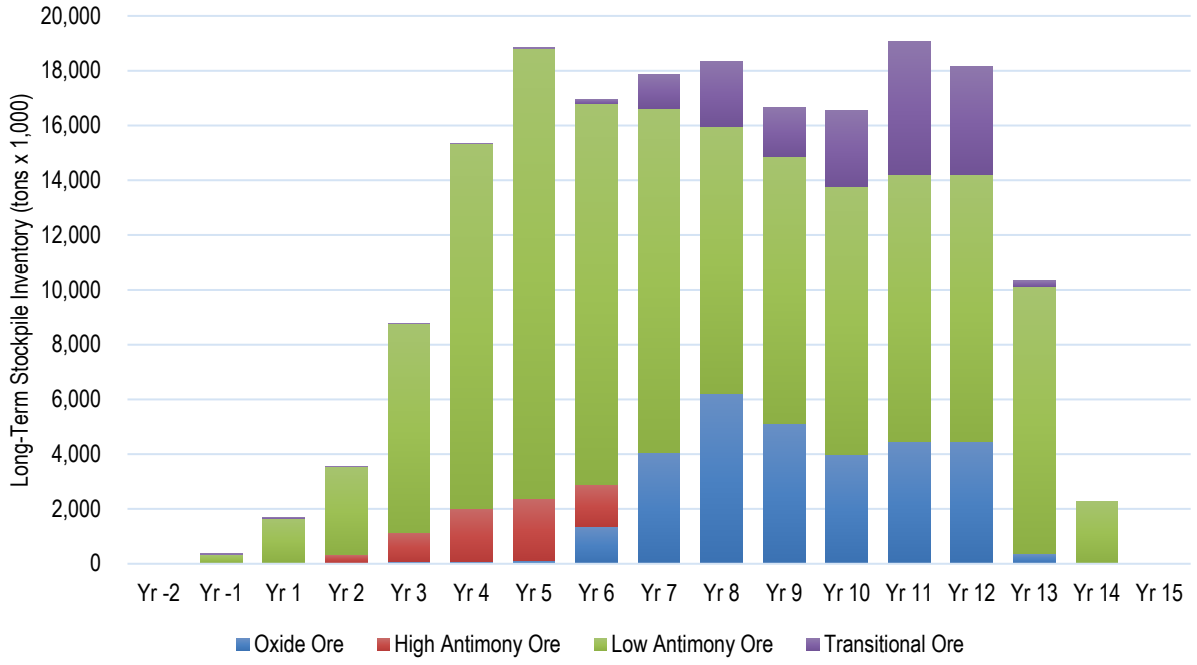


Figure 3-9. End of Year Long-Term Stockpile Inventory by Ore Type

3.7.8 Development Rock Management

The ModPRO2 includes an overall reduction in the cumulative disturbance acreage and volume of open pits; this results in a reduction of approximately 44 million tons of external (i.e., out of pit) development rock storage relative to the tonnage included in Alternatives 1 through 4 of the SGP DEIS. The Fiddle DRSF is eliminated by fully backfilling the Hangar Flats pit, which also eliminates the Hangar Flats pit lake

Development rock production rate would vary based on the mine plan, and the delineation of ore and development rock as determined through production pit mapping and analysis of blast hole cuttings in the grade control program. Approximately 280 million tons of development rock from active mining areas would be used to construct the TSF embankment and buttress and placed in the mined-out pits, as described in Table 3-4 .

Table 3-4 Development Rock Management Summary

Characteristics	TSF Buttress[1]	Hangar Flats Backfill[1]	Midnight Backfill	Yellow Pine Backfill	TSF Embankment[3]
Location	Meadow Creek valley southwest of Hangar Flats pit	Backfill into the Hangar Flats pit	Backfill into south portion of West End pit north of Midnight Creek	Backfill into the Yellow Pine pit	Meadow Creek valley west of the TSF Buttress
Source of Development Rock	Hangar Flats pit, Yellow Pine pit, West End pit	Yellow Pine pit and West End pit	West End pit	West End pit, Yellow Pine pit, and Hangar Flats pit	Hangar Flats pit, Yellow Pine pit, and West End pit, SODA and Hecla heap leach legacy materials
Million tons[2]	81	18	7	113	61
Acres	120	41	18	180	88
Height (feet)	460	460	320	740	Initial embankment: 245 Final embankment: 460
Steepest Surface Grade (Horizontal:Vertical)	Overall 3:1	Approximately 60:1 matching original valley slope	3:1 north (pit) side 2:1 south side matching undisturbed slope	Varies from 5:1 to approximately 2.5:1	2:1 inter-bench (upstream) 2:1 overall (downstream) TSF slopes would be approved as part of the IDWR dam permit

Notes:

[1]The TSF Buttress was formerly referred to as the Hangar Flats DRSF. To be consistent with the naming convention used for the other backfilled pits, the ModPRO2 uses the term Hangar Flats pit backfill for the backfilled Hangar Flats pit.

[2]Limited amounts of development rock would be used to construct haul roads and pad areas for site facilities. In addition, some development rock may be crushed and screened for use as road surfacing material and/or concrete aggregate. The Development Rock Management Plan (Perpetua Resources 2021a) specifies testing to determine which development rock can be used for these applications.

[3]The source of development rock for TSF construction includes material from the Spent Ore Disposal Area (SODA) and the Hecla heap leach facility.

Abbreviations:

IDWR = Idaho Department of Water Resources

SODA = spent ore disposal area

TSF = tailings storage facility

The TSF Buttress would be built by first constructing a ramp along the north side of the valley to access the crest of the TSF embankment and upper portions of the buttress. The TSF Buttress would then be constructed upwards to further access TSF embankment lifts while the base expands down the valley (eastward) as historical spent ore and legacy tailings are removed from the valley bottom. This method of construction would allow for controlled material placement across the valley from the ramp north of the valley to the south side.

After the main portion of the Yellow Pine pit has been mined and mining commences in the northern Homestake portion of the pit, development rock would be end-dumped into the Yellow Pine pit as backfill. The dumped development rock would not be mechanically compacted, except as it nears the final reclaimed surface elevation of the backfilled area. The upper lifts of the backfill would be placed by direct dumping and compaction. The final backfill would be covered with a geosynthetic and soil/rock cover, and the EFSFSR and Stibnite Lake would be established across the backfill in a lined stream/floodplain corridor. The inclusion of Stibnite Lake on the Yellow Pine pit backfill would help buffer temperature extremes in the EFSFSR and replace the fish habitat of the existing Yellow Pine pit lake, as discussed in Section 2.2.4. Development rock to backfill the Yellow Pine pit will be sourced predominantly from the West End pit, with minor quantities originating from the Yellow Pine and Hangar Flats pits. Section 3.14.5 includes additional details of the backfilled pit and final reclamation configuration.

Once mining ceases at the Hangar Flats pit, development rock to backfill the Hangar Flats pit will be sourced predominantly from the West End pit. The Midnight pit, a portion of the West End pit in the southeast corner of the pit near Midnight Creek, would be backfilled concurrent to mining the West End pit, with development rock from the West End pit, once mining in the area to be backfilled is completed.

In addition to the permanent development rock storage described above, a temporary DRSF would be constructed within the West End pit limit during road construction and pre-stripping activities. This temporary DRSF would contain approximately 2.5 million tons and serve as the base for the West End In-Pit stockpile. The purpose of this DRSF is to reduce the need for mixing the smaller development haul truck traffic with production haul truck traffic for safety purposes, and to provide a base for stockpiling ore encountered during road development and pre-stripping within the West End pit. Since this is a temporary DRSF entirely within the footprint of the proposed West End pit, it will be re-handled during regular mining operations at the West End pit and relocated to other facilities for permanent development rock storage.

Surface water and groundwater management for facilities that permanently store development rock are discussed in Section 3.10. A Development Rock Management Plan (DRMP; Perpetua Resources 2021a, in progress), which will describe active management of development rock produced and stored across the mine site during operations will be submitted as a supporting document to this ModPRO2 as part of the project Environmental Monitoring and Management Program (EMMP Appendix FM 1.1); a final DRMP will be prepared as part of the final mine plan.

3.7.9 Spent Ore and Legacy Tailings Removal in Meadow Creek Valley

Handling of legacy spent ore and legacy tailings in the Meadow Creek valley is the same as analyzed in the DEIS Alternative 2.

While the TSF is being built and expanded, Perpetua Resources would remove and reuse approximately 7.5 million tons of spent ore currently in the Spent Ore Disposal Facility (SODA), the Hecla Heap Leach Pad, and the Stibnite Mines Inc. Leach Pads. The SODA and Hecla heap materials would be excavated and hauled to the TSF for use as construction material. During the first 4 or so years of ore processing operations, Perpetua Resources would remove and reprocess the 3 million tons of Bradley tailings underlying the SODA. The legacy tailings would be mixed with water and pumped to the ore processing facility. The temporary water addition and pumping facility would be an enclosed, heated structure located within the limits of the SODA area. Spent ore remaining on the heap leach pads also would be excavated and could be used as construction material.

Physical and chemical testing of the legacy material would determine if the material is suitable for construction uses and final placement of the material. If other legacy materials are encountered during construction they would be removed and hauled off site to an appropriate disposal facility, placed in the TSF, used as pit backfill or construction material, or left in place, depending on testing to determine physical and chemical suitability. An Environmental Legacy Management Plan (ELMP; Perpetua Resources 2021b, in progress) will be submitted as a supporting document to this ModPRO2 as part of the project EMMP (EMMP Appendix FM 2.1).

Legacy development rock excavated as part of mining operations that is not used for TSF construction purposes or reprocessed would be placed in pit backfill or the TSF Buttress. Solid waste encountered such as metal, plastic, or wood would be hauled off site for recycling or disposal in a solid waste disposal facility.

3.7.10 Ore Processing Facility Ore Feed Schedule

The 115 million tons of ore processed (Table 3-5) compares to approximately 100 million tons in Alternatives 1 through 4 of the DEIS. The increase in tonnage results from processing additional low-grade rock that was formerly characterized as development rock, not from materially increasing the size of the open pits. The ModPRO2 includes a 10 percent reduction in the overall tonnage of mined rock in comparison to Alternative 1 through 4 of the DEIS.

Approximately 115 million tons of ore would be processed during the approximately 15-year process facility operation. A summary of ore sources is provided in Table 3-5.

Table 3-5 Processed Ore Source Summary

Ore Source	High Antimony Sulfide Ore (kst)	Low Antimony Sulfide Ore (kst)	Oxide Ore (kst)	Transitional Ore (kst)	Total Ore (kst)
Yellow Pine Pit	15,944	36,798	-	-	52,742
Hangar Flats Pit	4,935	4,176	-	-	9,111
West End Pit	-	5,417	15,963	28,832	50,212
Bradley Tailings	-	3,164	-	-	3,164
Total Ore Processed	20,879	49,554	15,963	28,832	115,228

Abbreviations:

kst = thousand short tons

Ore feed for processing can be sourced from either the open pits, Bradley Tailings, the short-term stockpiles, or long-term stockpiles. Typically, ore would be hauled directly from the pit to the primary crusher whenever the mill is capable of receiving the ore based on grade and metallurgy. If the ore requires short-term stockpiling due to process constraints or haul truck congestion at the primary crusher, it would likely be placed in the short-term stockpile. Ore that is lower value than other ore available at the time of pit mining would be placed in long-term stockpiles. Process facility ore source by year is shown on Figure 3-10 .

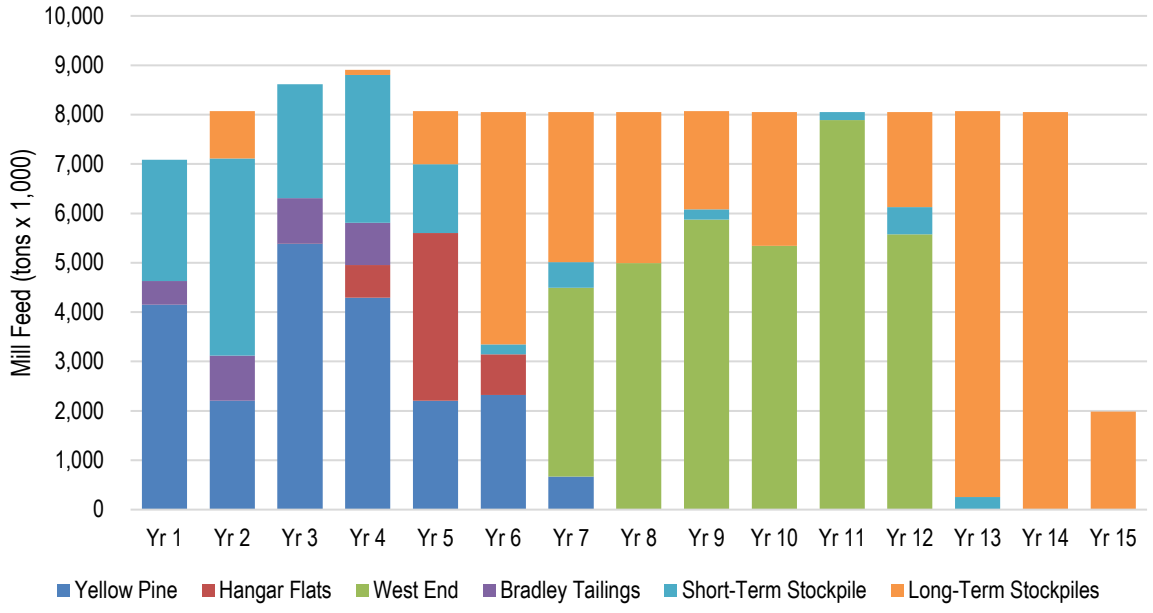


Figure 3-10. Processing Facility Ore Source by Year

3.8 ORE PROCESSING FACILITIES

3.8.1 Ore Processing Overview

Ore processing does not materially change from what was analyzed in the DEIS, except for the addition of a cooling circuit and the elimination of the solid liquid separation circuit, as discussed in Section 3.8.7.

Approximately 115 million tons of ore would be processed through the SGP ore processing plant during the approximately 15-year operational life of the facility. At full operation, the plant would process ore at a rate of 20 to 25 thousand tons per day.

Ore would be hauled to the crusher, either directly from one of the three open pits or from the ore stockpiles and would be crushed and ground to reduce the size of the rock to separate the gold-, silver- and antimony-bearing minerals from the host rock. A layout of the ModPRO2 ore processing facility and associated support infrastructure is shown on Figure 3-11.

The ore processing area would be designed to provide for containment of ore processing materials, chemicals, wastes, and surface runoff. Potentially hazardous chemicals and wastes would be stored within buildings or areas with both primary and secondary containment. Surface runoff within the ore processing area would be directed to a contact water pond for collection. Leaks or spills escaping both primary and secondary containment would flow to the contact water pond for collection and would not discharge off site. Containment for each stage of the ore processing is described below. The ore processing flowsheet is shown on Figure 3-12.

The processing would result in production of an antimony concentrate, gold- and silver-rich doré, tailings, and other waste products. Tailings disposal is discussed in Section 3.9.

3.8.2 Crushing and Grinding

Crushing and grinding does not change from what was analyzed in the DEIS. Mined ore would be hauled to the crusher and typically direct-dumped into the jaw crusher or stockpiled at the uncovered run-of-mine stockpile area near the crusher; stockpiled ore would be loaded into the crusher dump pocket, based on crusher availability, using a loader. Surface water runoff from the run-of-mine ore stockpile area would report to a pond and be used in the ore processing facility, see Section 3.10.1.3.

Following crushing, the crushed ore would report via conveyor to a dome-shaped, covered stockpile. Apron feeders below the crushed ore stockpile would convey the ore to a semi-autogenous grinding mill, followed by a ball mill, for additional size reduction of the ore. Grinding would occur within an enclosed building to reduce noise levels and facilitate maintenance of the milling equipment. Dust emission controls would reduce dust from crushing, conveying, and stockpiling. Grinding would reduce the ore to the size of fine sand for further processing.

3.8.3 On site Lime Generation

On site lime generation would not change from what was analyzed in DEIS Alternative 2.

Ground limestone and lime are needed for pH adjustment in the SGP ore processing plant. Rather than trucking these materials to site from an off-site source, a limestone/marble unit in the West End pit is of suitable quality and quantity to satisfy the life-of-mine SGP requirements. Approximately 130 to 318 thousand tons of limestone/marble would be mined annually, averaging approximately 240 thousand tons per annum. Approximately 25 to 30 percent of the limestone mined would be processed through a kiln to produce metallurgical lime, and the remaining 70 to 75 percent of the material would be crushed and ground for direct use as ground limestone. Both ore and limestone would be

temporarily stored at the short-term ore stockpile area. The use of limestone directly and to create lime represents a beneficial use of what would otherwise be managed as development rock.

On site lime generation equipment located at the ore processing area would include: limestone crusher and conveyor; propane-fired kiln (200 tons per day output capacity); kiln combustion air system including preheat heat exchanger; propane storage tank plus vaporizer; air compressor, receivers, and dryers for plant air and instrument air at kiln area; roll crusher for kiln product discharge; conveyors for moving feed and product materials; off-gas fume filter for kiln discharge; dust collector kiln feed bin; and storage bins for kiln feed material and lime products.

The limestone crusher, screens, conveyors, and feed bins would not be enclosed. Dust would be controlled in a similar manner to the ore crushing and conveying process using water sprays and/or bag house dust collectors.

Figure 3-11. Ore Processing Facility Layout

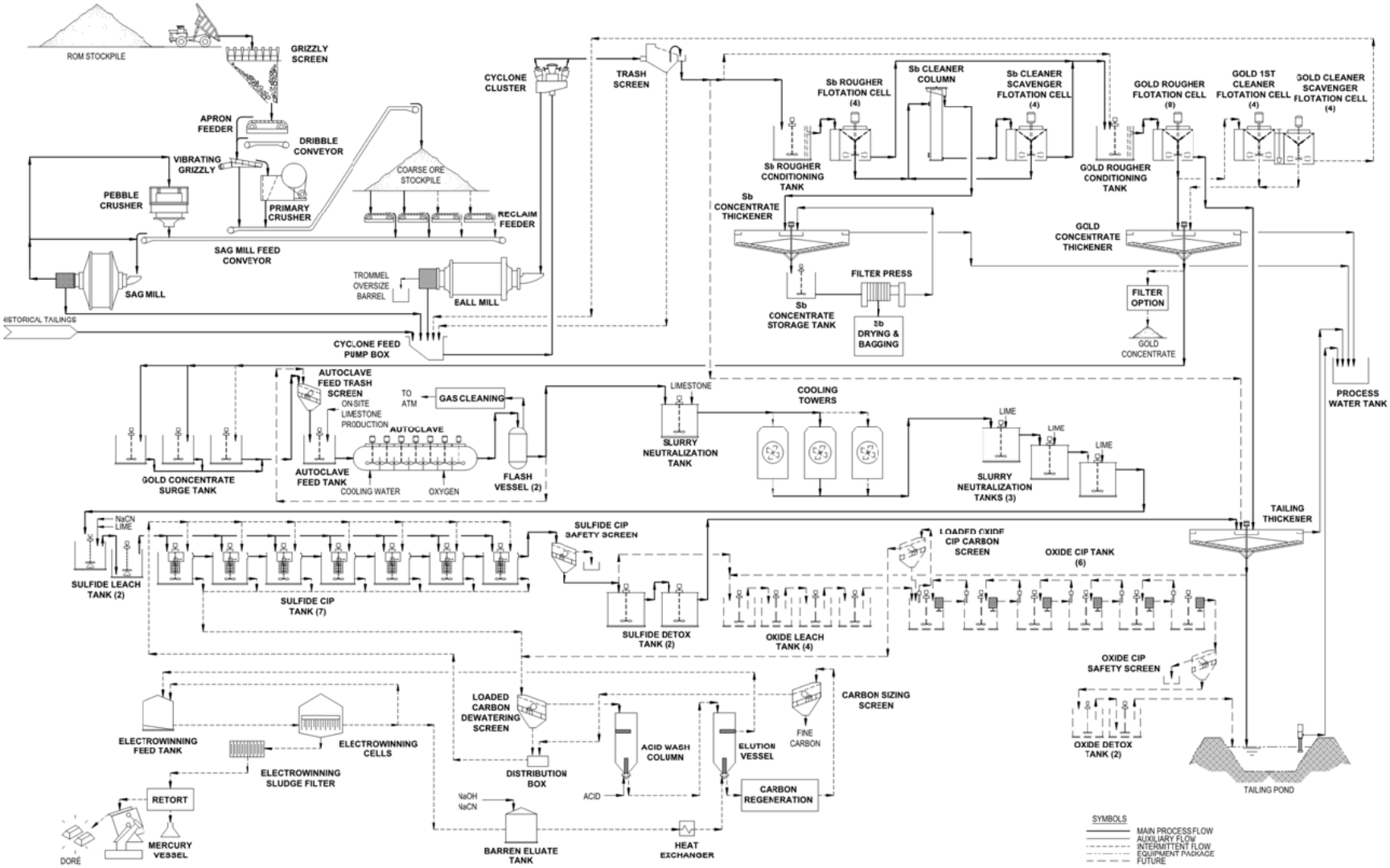


Figure 3-12. Ore Processing Facility Flowsheet

3.8.4 Antimony Concentrate Flotation and Dewatering

The antimony concentrate flotation and dewatering does not change from what was analyzed in the DEIS.

The purpose of the antimony flotation circuit is to selectively separate stibnite (antimony sulfide) from the ground mill feed. An estimated 15 to 20 percent of the total mill feed would contain sufficient antimony grades to warrant this process step. The remaining 80 to 85 percent of the mill feed would be subject to gold and silver recovery methods only (see Section 3.8.6).

Following grinding, the ground ore would be mixed with water, lime, and sodium cyanide or equivalent; the sodium cyanide is added to inhibit flotation of gold-bearing minerals (pyrite, and arsenopyrite) in the antimony flotation circuit. Lead nitrate or equivalent is added and then a sulfur- and phosphate-bearing organic chemical. These chemicals make the antimony-bearing particles hydrophobic where the particles then attach to air bubbles and float to the surface in the agitated flotation tanks. The gold-bearing mineral particles that do not adhere to the bubbles in the flotation tanks would drop to the bottom of the flotation tanks and be routed to the gold flotation circuit for further processing.

At the top of the tanks, the stibnite-laden bubbles form a froth layer, which would be allowed to overflow. The overflow froth would be subjected to one or two additional flotation steps. The resultant antimony-rich concentrate would be thickened, filtered, and the filtered antimony concentrate would be approximately 8 percent water by weight and ready for shipment to an off-site refinery.

3.8.5 Antimony Concentrate Transport

Antimony concentrate transportation does not change from what was analyzed in the DEIS.

The antimony concentrate would contain approximately 55 to 60 percent antimony by weight. The remaining 40 to 45 percent of the concentrate is predominantly sulfur (as sulfide in the stibnite) and common minerals, with trace amounts of gold, silver, and mercury.

The antimony concentrate would be loaded into 2-ton sealed supersacks at site and hauled on flatbed trucks to the SGLF via the Burntlog Route. Approximately one to two truckloads of antimony concentrate would be hauled off site each day. The supersacks would be offloaded at the SGLF, then loaded into 20-foot containers. From there the concentrate would be trucked via State Highway 55 to a commercial truck, train, barge, or ship loading facility depending upon the refinery location. The concentrate, when sold, would likely be shipped to facilities outside of the United States for smelting and refining because there are currently no such facilities operating in the United States with capacity for refining antimony sulfide concentrate. There are United States companies with refining equipment facilities and expertise that could potentially be brought online at some future date to refine antimony sulfide concentrate; however, Perpetua Resources does not have contracts in place with these companies and their ability to handle these concentrates has not been determined.

3.8.6 Gold and Silver Flotation

This represents no change to the flotation of gold and silver detailed in the DEIS for Alternatives 1 through 4.

The purpose of the gold and silver flotation circuit is to separate the gold- and silver-rich minerals (pyrite and arsenopyrite) from the host rock. The circuit would be housed in a steel frame building set on concrete foundations with interior curbing to provide secondary containment; the interior curbing would be high enough to contain 110 percent of the volume of the largest tank. Both the gold and silver, and antimony flotation circuits would be contained in the same building.

Gold and silver flotation is a process similar to that described for antimony flotation using different chemicals to float the pyrite and arsenopyrite. The flotation bubbles, with particles containing gold and silver, are collected and pumped to the concentrate thickener for processing by pressure oxidation. The particles from flotation that do not float become tailings. The gold and silver concentrations of the tailings would be regularly monitored, and if the concentrations are high enough to warrant further processing, they would be sent to the leaching circuit; otherwise, the tailings would be thickened and neutralized then routed to the TSF as described below.

3.8.7 Pressure Oxidation and Neutralization

Mercury emissions controls – Control measures for mercury emissions from ore processing and fugitive dust were not discussed in detail in the PRO, ModPRO or the initial ModPRO2 (December 2020). Updated air quality modeling included in the SGP Air Quality Analysis Addendum (Air Sciences 2021) demonstrated a 60 percent reduction in Project mercury emissions through the implementation of appropriate controls on the ore processing circuit and BMPs to reduce fugitive dust emissions. These EPMs were detailed in the response to RFAI-118 and are incorporated into this ModPRO2 mine plan project description.

There are no changes to the pressure oxidation and neutralization detailed for DEIS Alternatives 1 through 4 except for some minor changes to the ore processing flowsheet, including: (1) increasing the limestone dosage feed in the autoclave, (2) elimination of the CCD circuit, and (3) the addition of a cooling circuit.

Metallurgical testing confirmed that gold and silver particles were not encapsulated during the slurry neutralization process, and reagent consumptions (including cyanide, limestone, and lime) were unimpacted by removal of the CCD circuit. Consequently, the CCD circuit was eliminated from the process flowsheet to reduce the overall plant footprint. However, as the CCD circuit decreased the temperature of the slurry due to the amount of time the slurry would be exposed to ambient temperatures, removal of the CCD circuit required the addition of a cooling circuit, which would require no material changes to the upstream or downstream ore processing circuits. Thus, elimination of the CCD circuit from the process flowsheet would reduce the overall plant footprint versus that in the PRO or ModPRO. The CCD circuit was not necessarily the focus of comments on the DEIS; however, this project improvement does address general comments related to reducing the project footprint.

A pressure vessel (autoclave) system would be used to liberate the gold and silver particles from the pyrite and arsenopyrite flotation concentrate. Before the concentrate is pumped into the autoclave, it would be mixed with appropriate amounts of ground limestone to maintain a constant free acid level of approximately 10 grams per liter in the autoclave. This value was established through bench and pilot-scale metallurgical testing to promote the formation of stable, crystalline arsenic compounds in the autoclave. Oxygen would be injected into the autoclave to promote the oxidation reaction, and the temperature in the autoclave would be maintained at approximately 220 degrees Celsius; water would be injected into the vessel, as needed, to control the temperature. The pressure oxidation process is autothermal once begun, oxidizing the sulfides in the feed, so no supplemental heating is required.

The oxidized concentrate from the pressure oxidation circuit would be neutralized in two steps, first to pH 4.5 with limestone, and then to pH 10.5 with lime. Between the two stages of neutralization, the slurry is cooled in two forced-draft cooling towers where the slurry is sprayed down from the top of the tower and cooled by rising air blown in from the bottom. The neutralized slurry would be sent to the leach circuit for recovery of gold and silver.

When increasing arsenic levels are observed, the slurry would be treated with HAC prior to neutralization. This would involve keeping the autoclave discharge at 92 degrees Celsius for 5 hours in agitated tanks with small additions of limestone. Metallurgical tests showed that this process promotes formation of the stable crystalline form of the arsenic precipitate enhancing environmental stability of arsenic.

3.8.8 Gold and Silver Leaching & Carbon Adsorption

The gold and silver leaching & carbon adsorption portion of the ore processing circuit for the ModPRO2 is similar to what was analyzed in the DEIS Alternatives 1 through 4.

Gold and silver leaching of the oxidized and neutralized concentrate would occur in agitated, steel tanks that would be fully contained to capture, retain, and recycle process solutions. Sodium cyanide would be added to the tanks to promote formation of a gold-silver-cyanide complex; activated carbon would be added to the tanks to promote the adsorption of the gold-silver-cyanide complex onto the carbon particles. The pH of the slurry in the leach circuit would be closely managed to maintain the cyanide in a stable soluble form.

The carbon coated with gold-silver-cyanide complex would be collected on screens and sent to the carbon stripping circuit. The loaded carbon would be washed with an acid solution in enclosed steel tanks to remove impurities, rinsed with fresh water, and stripped of the gold and silver under pressure at approximately 90 degrees Celsius using a hot alkaline solution. The resulting gold- and silver-bearing solution would be transferred to the electrowinning and refinery area.

The acid solution used during carbon stripping would be reused until it loses its effectiveness. The ineffective solution would be neutralized with ground limestone and/or lime and sent to the tailings thickener for pumping to the TSF. Air emissions from the leaching facility would be captured in a series of air pollution controls, and the material collected would be disposed of as a solid waste or a hazardous waste depending on characterization of the waste.

The gold and silver leaching circuit would be designed and operated consistent with the International Cyanide Management Institute Code (https://www.cyanidecode.org) and the Initiative for Responsible Mining Assurance Standard for Responsible Mining (https://responsiblemining.net/resources/). Accordingly, impermeable secondary containment for cyanide unloading, storage, mixing and process tanks shall be sized to hold a volume at least 110 percent of the largest tank within the containment and any piping draining back to the tank, with additional capacity for the design storm event, if applicable. Pipelines containing process water or process solution shall also use secondary containment in combination with audible alarms, interlock systems, and/or sumps as spill control measures.

3.8.9 Gold and Silver Electrowinning and Refining

The gold and silver electrowinning and refining portion of the ore processing circuit for the ModPRO2 is similar to what is described in the DEIS for Alternatives 1 through 4.

The gold and silver electrowinning and refinery facility would be a closed-circuit system enclosed in a steel frame building set on concrete foundations with adequate secondary containment to store a minimum of 110 percent of the volume of the largest vessel.

This circuit takes the product of the carbon stripping circuit and subjects the solution to an electrolytic process called electrowinning. The precipitate generated from the electrowinning process would then be mixed with flux and placed into an induction furnace and heated. The molten material from the induction furnace, principally gold and silver, would be poured into doré bars. The doré bars would be shipped off site to one or more refineries to produce high-purity gold and silver.

Air emissions from the induction furnace would be captured in a series of emission controls. Mercury from the induction furnace would be converted to a liquid metallic state, and then securely stored prior to shipment to a certified hazardous waste disposal facility.

3.8.10 Tailings Neutralization, Dewatering, and Pumping

This represents no change to tailings neutralization, dewatering and pumping versus that detailed in the DEIS for Alternatives 1 through 4.

Cyanide-bearing solutions used in ore processing would be neutralized to approximately 10 milligrams per liter or less weak acid dissociable (WAD) cyanide before the material is pumped to the TSF. Residual cyanide would be treated using a sodium metabisulfite and air system to detoxify the cyanide by oxidation to form cyanate. After neutralization, tailings would be routed to a tailings thickener to partially dewater the tailings. As the tailings are thickened, the tailings thickener overflow water would be recycled and reused within the ore processing facility. The neutralized, thickened tailings slurry would be pumped from the ore processing plant to the TSF.

Lined tailings pipeline maintenance ponds would be located at the truck shop and at the ore processing facility, to which tailings and process water in the tailings distribution or water reclaim pipelines would drain by gravity during maintenance shutdowns or if there is a leak in either pipeline. The ponds would typically be empty except during maintenance or unforeseen problems with the tailings pipeline, pumping system, or TSF. The ponds are designed to contain the contents of the pipelines and the runoff from the pond and open-trench portions of the lined pipeline corridor from a 100-year, 24-hour storm event plus snowmelt.

3.9 TAILINGS STORAGE FACILITY

3.9.1 Tailings Storage Facility Overview

The ModPRO2 TSF design increases the capacity from approximately 100 million tons to 120 million tons from processing additional ore (as discussed in Section 3.7.10), which increases the ultimate dam height by approximately 3 percent (15 feet). It also modifies the diversion profile and impoundment slopes to reduce the overall disturbance footprint by approximately 5 percent (22 acres), with minimal change in the wetlands disturbance versus DEIS Alternative 2.

The TSF would be on NFS lands within the Meadow Creek valley. The TSF impoundment, embankment, and associated water diversions would occupy approximately 423 acres at final buildout with approximately 405 acres of new disturbance. Perpetua Resources has conducted geotechnical and geophysical investigations supporting the design of the TSF and associated buttress. A plan view of the TSF impoundment, embankment, buttress, and water diversion system is shown on Figure 3-13. At the end of operations, the TSF would contain approximately 120 million tons of tailings solids (approximately 115 million tons of ground ore plus approximately 5 million tons of lime, ground limestone and gypsum resulting from the neutralization of oxidized sulfides), the operational water pool, and reserved storage for precipitation runoff up to the 24-hour Probable Maximum Precipitation event of 11.74 inches of rainfall.

3.9.2 Embankment and Buttress

Due to eliminating the Fiddle DRSF, the size of the TSF Buttress has increased. The facility toe is maintained at Meadow Creek, thus retaining the same ultimate valley bottom length as analyzed in DEIS Alternative 2.

The TSF embankment (Figure 3-14 and Figure 3-15) would consist of engineered rockfill sourced from spent ore, development rock and overburden from open pits, and native borrow sources within the impoundment footprint. The facility would be raised at intervals throughout the mine life to align with tailings storage and freeboard requirements, beginning with a starter embankment constructed to a crest elevation of approximately 6,850 feet (or approximately 245 feet above the native ground surface). The final embankment height would be approximately 475 feet at a crest elevation of 7,080 feet. A development rock buttress would be placed on the east side of the TSF embankment to provide additional short- and long-term geotechnical stability. Buttress and embankment phasing are shown on Figure

3-16 and Figure 3-17. Engineered fill would be placed against steep slopes within the impoundment to flatten and smooth slopes to facilitate liner placement.

The SODA and other spent heap leach ore reused as TSF construction material would be placed beneath the TSF liner on the upstream face of the embankment or impoundment slope fill to minimize interaction with infiltrating surface water.

3.9.3 Liner System

The ModPRO2 TSF liner is similar to that which was described in the DEIS for Alternative 1, with the exception of an added overdrain on the liner to reduce hydraulic head on the liner system and reduce excess pore pressure in the tailings.

A cyanide neutralization circuit would be used to treat the tailings before transport to the TSF; however, up to approximately 10 milligrams per liter of WAD cyanide could remain in the tailings. The tailings would also contain metals that could leach into the groundwater system. A composite liner consisting of a 60-mil, single-sided, textured, linear low-density polyethylene (LLDPE) geomembrane over a geosynthetic clay liner (GCL) would be employed to contain the tailings. The impoundment and upstream face of the TSF embankment would be fully lined. Before placement of the liner, the subgrade would be re-worked and compacted, or a minimum of 12 inches of buffer/liner bedding fill would be placed. Geosynthetic overliner drains would be placed above portions of the liner to reduce hydraulic head on the liner and excess pore pressure in the overlying tailings. The drains would report to a sump near the upstream toe of the embankment, and the water then pumped out to the pool or reclaim system for reuse.

Facilities that use cyanide in their mineral extraction process are required to obtain a permit from the IDEQ and follow the Rules for Ore Processing by Cyanidation (Idaho Administrative Procedures Act [IDAPA] 50.01.13). At the request of the Idaho Mining Association, the IDEQ entered into rulemaking on the existing regulations to change the regulatory requirements from prescriptive requirements to performance-based requirements. A temporary Rule went into effect in October 2020, and the final rule was approved by the legislature in 2021. The liner system proposed meets the requirements of the new rule.

3.9.4 Wildlife Protection

This represents no change to wildlife protection versus what was analyzed in the DEIS Alternatives 1 through 4.

Cyanide would be neutralized to levels protective of wildlife, and the TSF would be surrounded by an 8-foot-high, chain-link fence designed to keep wildlife, such as deer and elk, from entering the impoundment area, to prevent either liner damage or wildlife drowning.

Additional information on fish and wildlife EPMs can be found in Section 4.

3.9.5 Underdrain System

This represents no change to the underdrain versus what was analyzed in the DEIS Alternatives 1 through 4.

Underdrains installed during site preparation would collect spring and seep flows beneath the TSF impoundment and embankment and convey the collected water beneath the TSF embankment and buttress. These underdrains would be a series of parallel drains with branching laterals, instead of a single valley bottom drain, due to the broad U-shape of the Meadow Creek valley. Pipes would transition from perforated (able to collect groundwater) to solid-wall (for conveyance only) as they exit their respective collection areas (impoundment, embankment) and flow underneath the buttress to the outlet. Underdrain flows would be collected in a sump downstream of the toe of the buttress, monitored for water quality, then either discharged to surface water through a permitted Idaho Pollution Discharge Elimination

System (IPDES) discharge, or pumped to the ore processing facility or a contact water pond for either treatment and discharge or use as makeup water. Additional underdrains would be installed as a contingency beneath the TSF Buttress to ensure that groundwater does not saturate the base of the fill and potentially lead to water quality impacts or geotechnical instability; however, little if any flow is expected in the buttress underdrains owing to lower groundwater levels in this zone. Underdrain collection sumps and downgradient monitoring wells would be used for TSF leak detection. Underdrains are discussed further in Section 3.10.2.2.

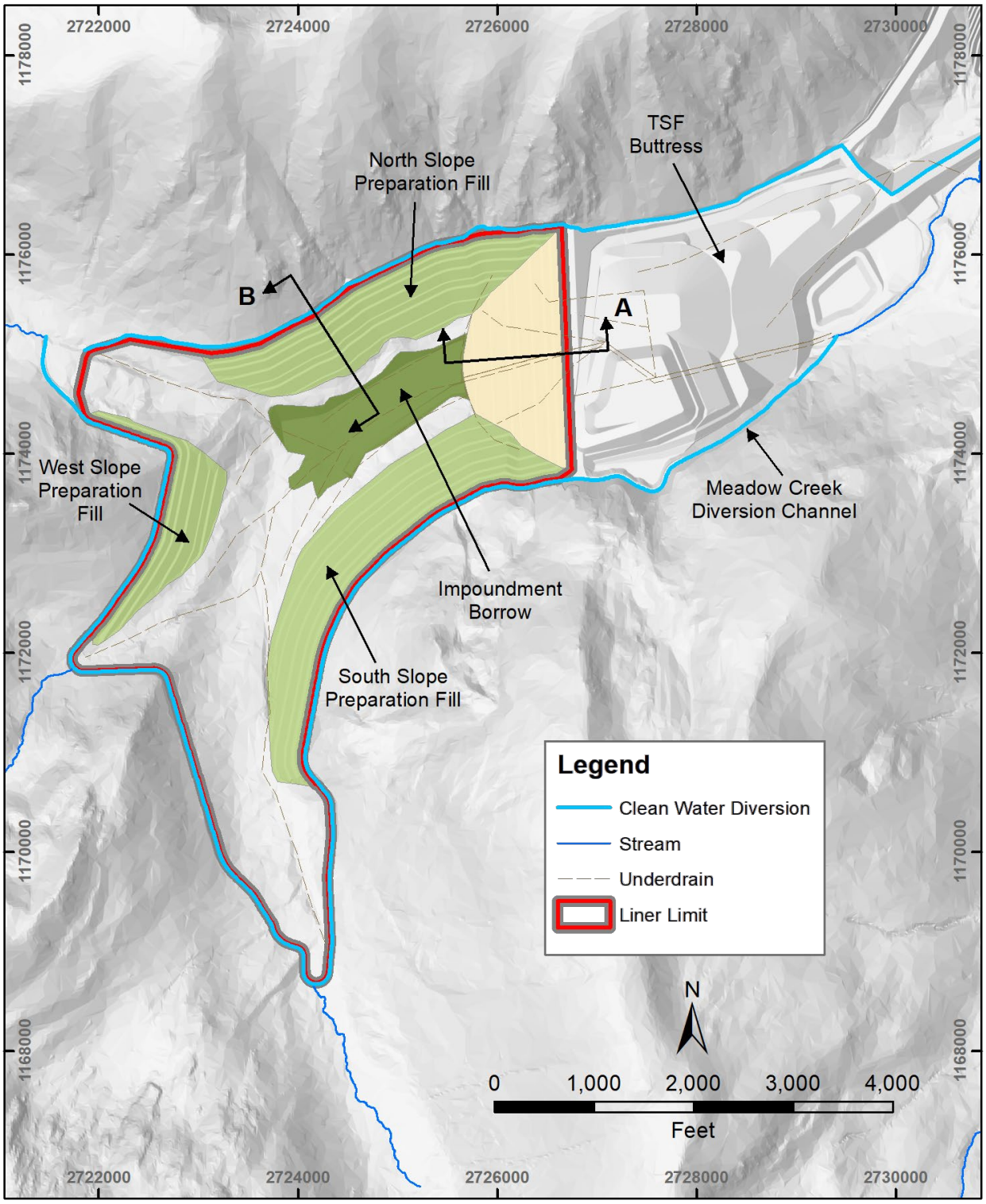
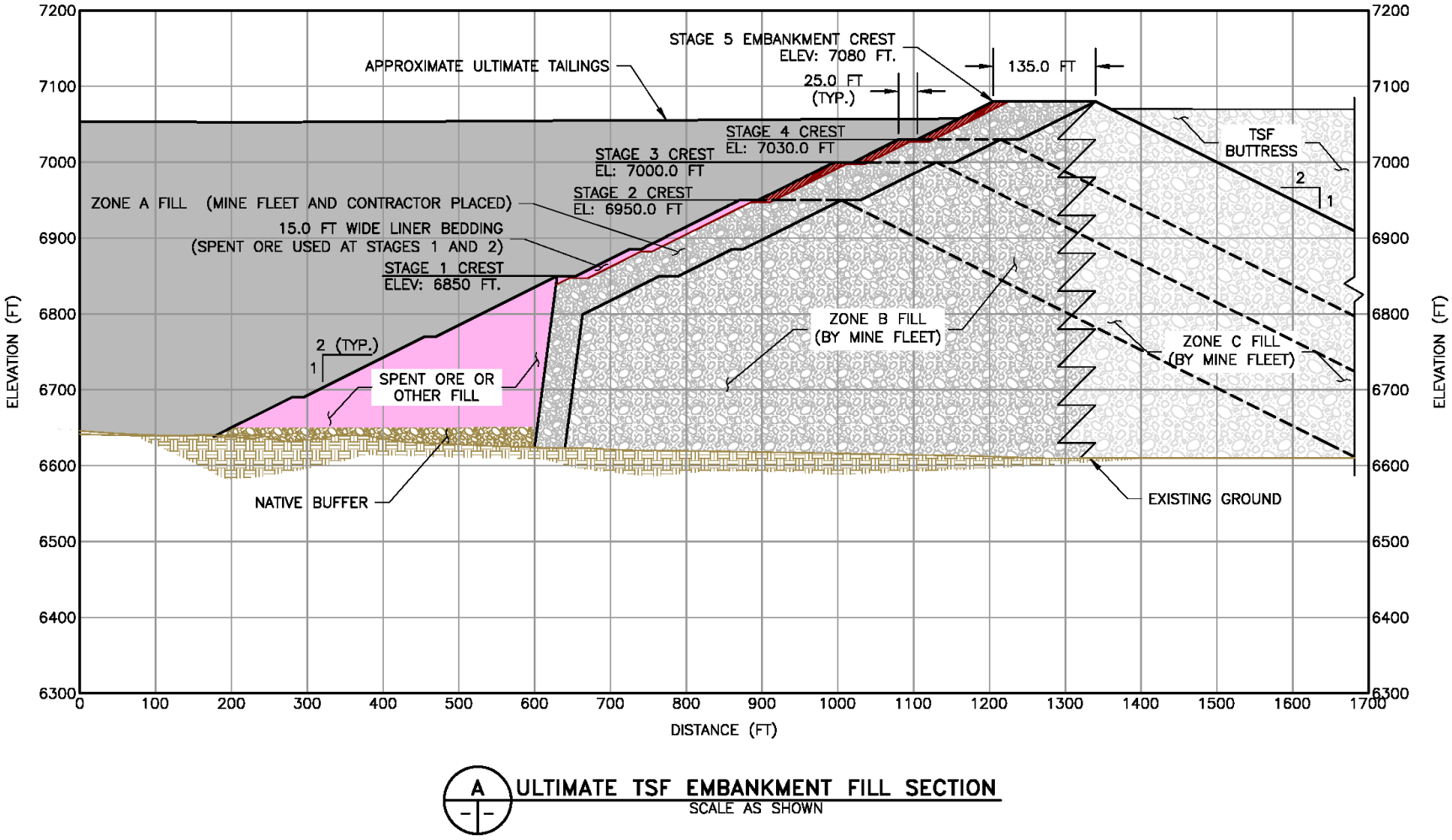
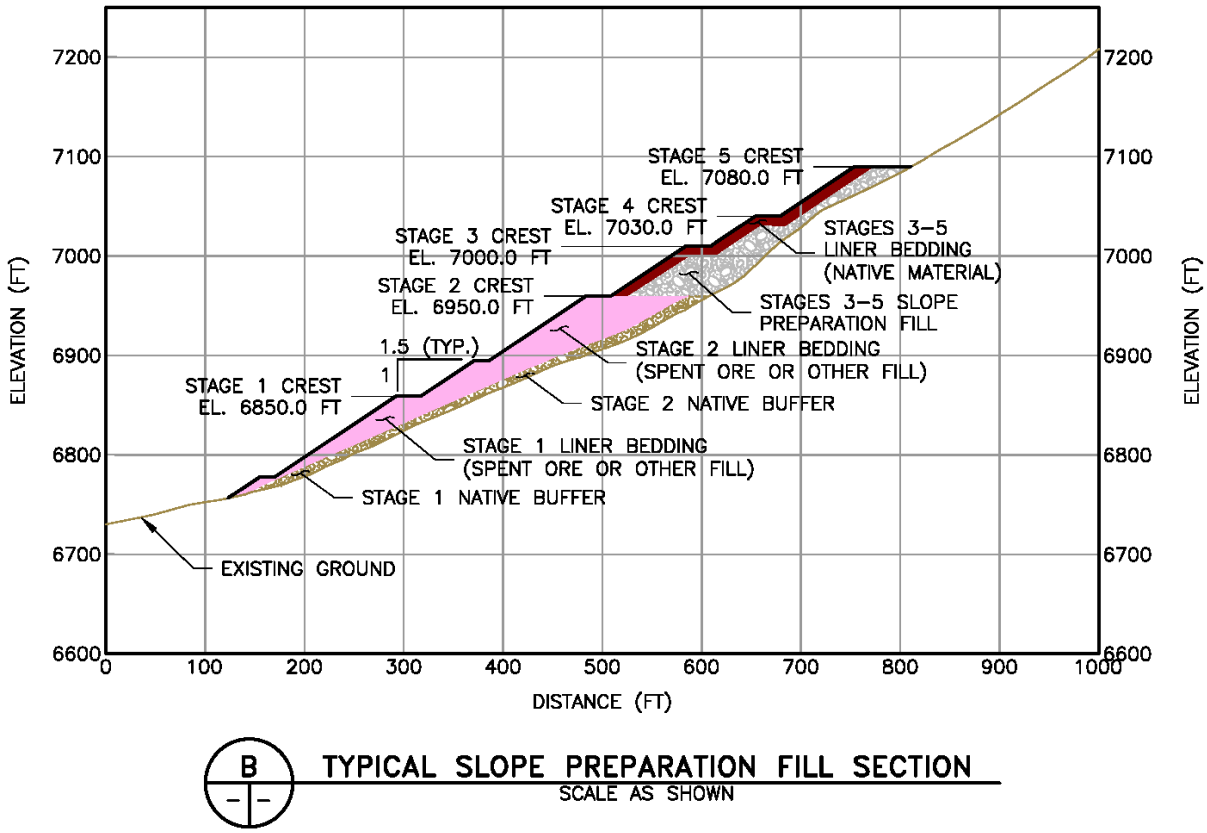


Figure 3-13. Plan View of TSF Impoundment, Embankment, Buttress, and Water Diversions



A ULTIMATE TSF EMBANKMENT FILL SECTION
SCALE AS SHOWN

Figure 3-14. Design Cross Section through TSF Embankment and TSF Buttress



B

TYPICAL SLOPE PREPARATION FILL SECTION

SCALE AS SHOWN

NOTE:

1. SLOPE PREPARATION FILL CREST IS SLOPED. REFERENCED CREST ELEVATION IS THE SLOPE PREPARATION FILL CREST AT THE TSF EMBANKMENT.

Figure 3-15. Design Cross Section through TSF Slope Preparation

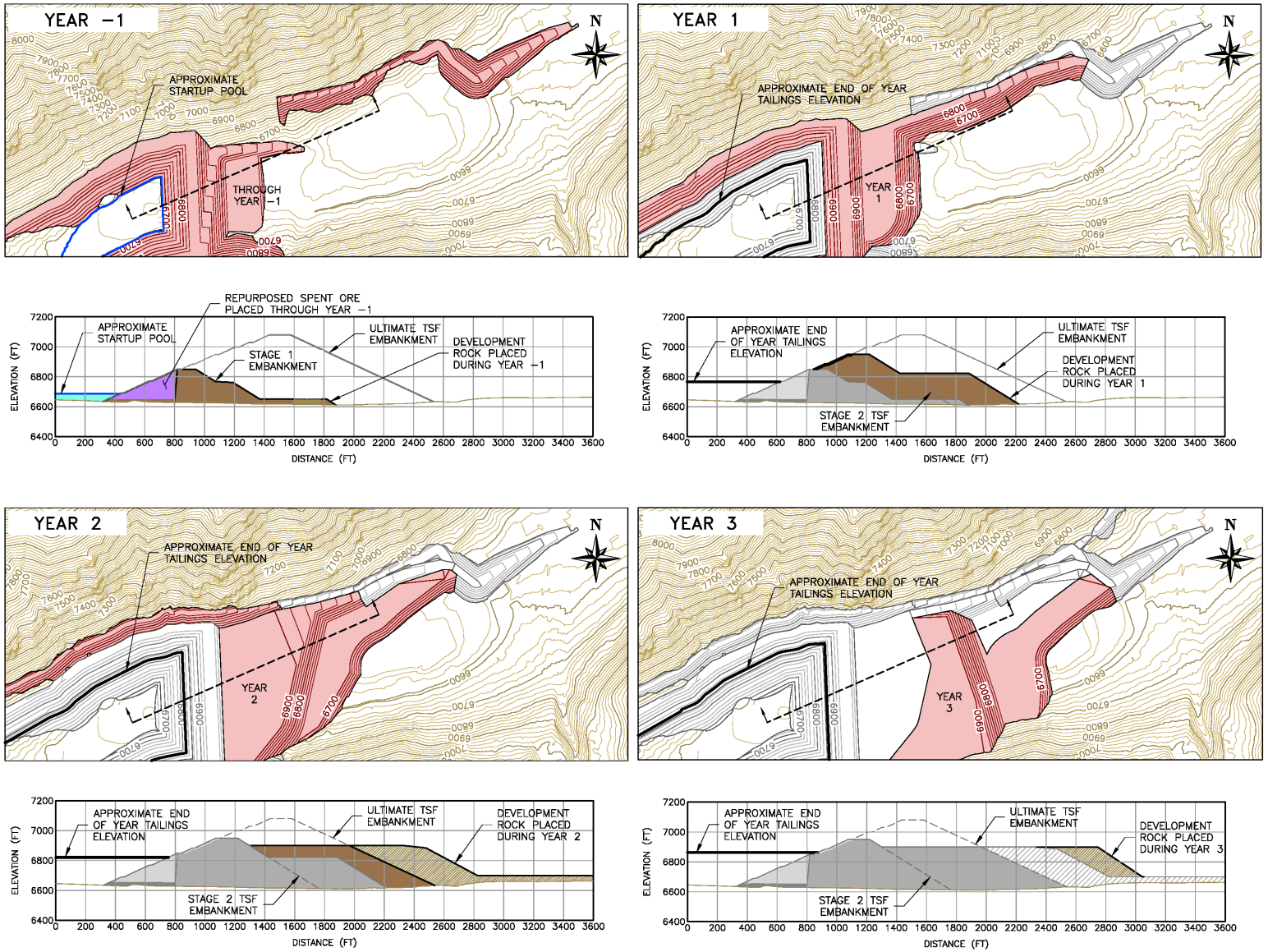


Figure 3-16. TSF Embankment and Buttress Cross Section showing Phasing, Years -1 through 3

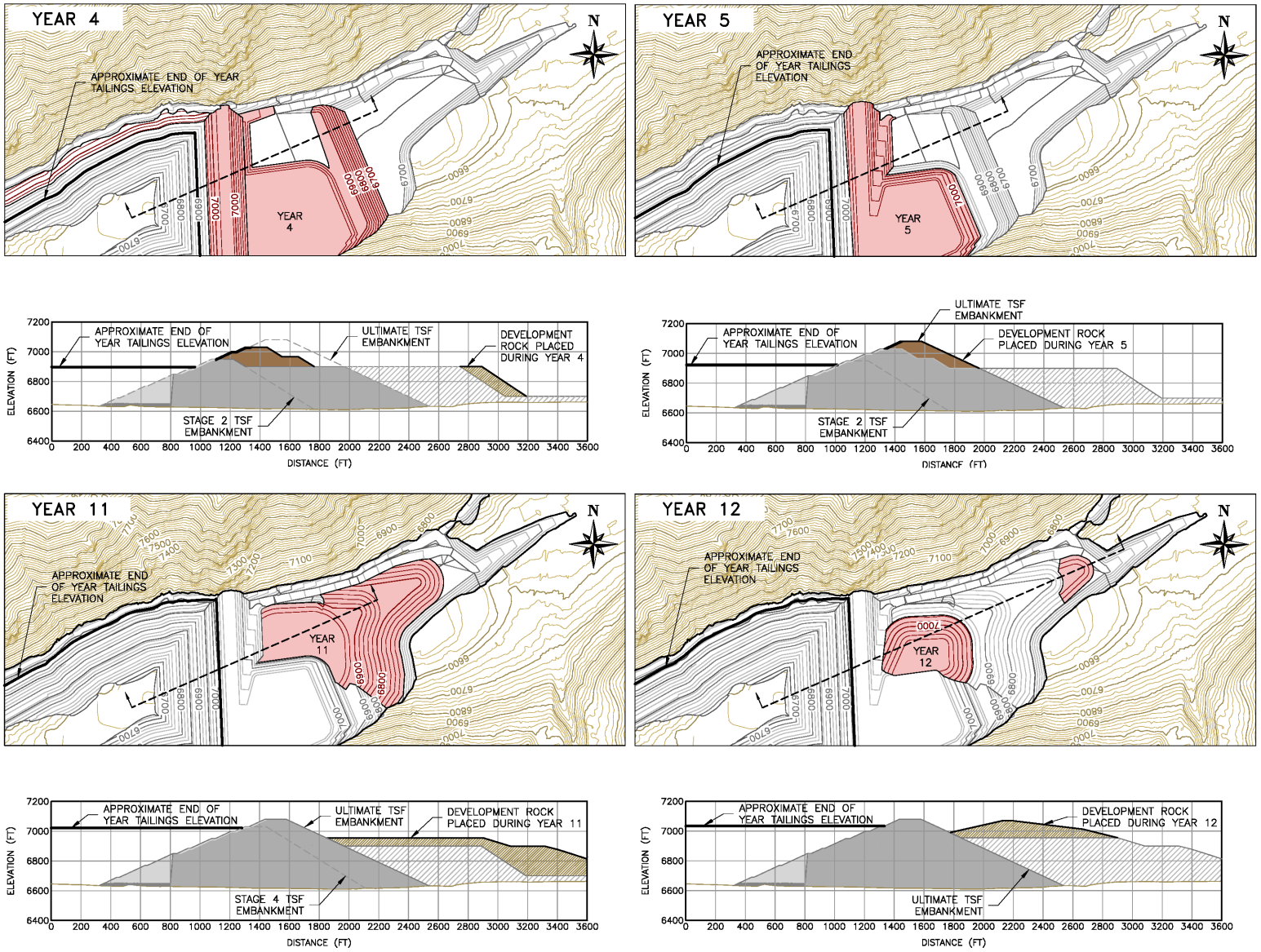


Figure 3-17. TSF Embankment and Buttress Cross Section showing Phasing, Years 4 through 12

3.9.6 Tailings Management Support Facilities

This represents no change to tailings management support facilities versus what was analyzed in the DEIS, except for replacement of most instances of open trench secondary containment with geomembrane wrap, to reduce water and snow management needs associated with open, lined, trenches; and slight reconfiguration of pipeline maintenance ponds.

Light vehicle roads and haul roads would connect the ore processing facility and the TSF; the tailings delivery and reclaim water return pipelines would parallel the roads with secondary containment provided throughout the pipeline length. Secondary containment for pipelines would consist of an open geosynthetic-lined trench, pipe-in-pipe, or backfilled geomembrane-wrapped trench, depending on location, and the pipeline corridor would drain to one of two pipeline maintenance ponds – one at the truck shop and one at the ore processing facility (see Section 3.8.10). Electrically powered pumps would be located at the ore processing facility to pump tailings to the TSF and reclaim pumps (Section 3.10.3.4) would be located at the TSF to return water to the ore processing facility for reuse.

3.9.7 TSF Water Management

This represents no change to TSF water management versus what was analyzed in the DEIS.

The TSF would be designed and operated as a zero-discharge facility meaning no water would be discharged to the surface water or groundwater except in compliance with applicable permits and regulations. Thickened tailings slurry would be pumped to the TSF. Water collected in or falling on the surface of the TSF would drain to the supernatant pool on top of the tailings and be recycled, along with tailings consolidation water, for use in ore processing. As discussed in Section 3.9.3, tailings consolidation water reporting to the overliner drains would be pumped back to the supernatant pool or reclaim system. Cyanide levels in the TSF would be monitored throughout operations to ensure they remain in compliance with issued approvals and permits.

3.10 WATER MANAGEMENT

3.10.1 Surface Water Management

As a result of the elimination of the West End and Fiddle DRSFs and the smaller Hangar Flats pit, plus the backfilling of the Hangar Flats and Midnight pits with development rock, and updated hydrologic models and incorporation of the Stibnite Lake, the ModPRO2 proposes a number of changes to surface water management versus the PRO (DEIS Alternative 1), some of which were already incorporated in the ModPRO (DEIS Alternative 2).These are summarized in the following sections and are tabulated in Appendix A. Broadly, revisions to the plan have reduced water management and treatment needs and lowered stream temperatures relative to the ModPRO.

Project water management designs are focused on managing contact and non-contact water to maintain and improve water quality while supplying sufficient water for mining and ore processing. Contact water is water that flows into, from, or through disturbed areas and mining facilities and could have the potential to introduce increased levels of sediment, metals, and other possible contaminants into surface water and groundwater without proper management. Non-contact water is water that does not contact disturbed areas or mining facilities. The Water Management Plan (BC 2021b in progress; EMMP Appendix FM 5.1) establishes water management objectives for the project; provides an overview of how water will be managed during the construction, operation, and closure and reclamation of the mine; and describes the proposed water management infrastructure and procedures.

A summary of the objectives is:

- To maintain and improve area water quality and aquatic and riparian habitat during operations, and permanently after closure
- To ensure that water discharges meet IPDES permit requirements and applicable water quality standards
- To ensure safe and efficient operating conditions by dewatering work areas
- To supply an adequate quality and quantity of water to support ore processing
- To accomplish these objectives, Perpetua Resources proposes water management features and activities, including:
- Removing or otherwise addressing legacy sources of contamination
- Minimizing erosion and generation of sediment through implementation of engineering controls and BMPs
- Managing non-contact surface water and stormwater flows to minimize the generation of contact water and prevent flooding or instability of mine facilities
- Separating contact from non-contact stormwater runoff
- Using contact stormwater, pit dewatering water, and water accumulated in the TSF for ore processing
- Treating or evaporating contact water which exceeds discharge quality standards that cannot be used in ore processing or other mine needs
- Restoring the Project site to provide a self-sustaining ecosystem with improved water quality

Removal of legacy sources of contamination is addressed in Section 3.7.9. The following paragraphs address engineering controls, management of non-contact surface water and stormwater flows, and management of contact water. Site restoration and long-term water treatment is addressed in Section 3.14.

3.10.1.1 Stream Diversions

ModPRO2 stream diversions are similar to those proposed for all DEIS Alternatives.

Streams that run through areas proposed for mining related disturbance would be diverted to prevent generation of contact water or commingling of contact and non-contact water, keeping clean water clean; and to prevent flooding of mine facilities by runoff generated off site.

Streams would be temporarily diverted around mine site facilities within constructed surface water channels. Diversion channel segments constructed in erodible materials would be lined with riprap or other erosion-resistant lining to prevent erosion. Rock-cut channels would be constructed on steep slopes and in areas with shallow or at-surface bedrock, would have low erosion potential and not require riprap lining. Channel segments constructed over fill or excavated in permeable materials would additionally be lined with a geosynthetic liner to minimize seepage. A geotextile and/or transition layer of sand/gravel followed by riprap or similar would be placed over the liner for erosion protection. Certain diversion sections would be piped as dictated by terrain or the need to limit warming of water.

During mine operations, summer low flows in perennial diversion channels around the TSF impoundment and buttress (Meadow Creek), Yellow Pine pit (Hennessy Creek and EFSFSR tunnel), and West End pit (West End Creek) would be piped underground as a design feature to maintain cold stream temperatures. Eight- to 12-inch-diameter pipes would be installed under the diversion channels in the riprap channel lining or under the adjacent access road to carry low flows. The low-flow pipe would be sized to convey August baseflow. Stream flow would enter pipes through inlets at the same locations stream and tributary inflows are diverted into the constructed channel. Some diversions, such as portions of Hennessy and West End Creeks, and EFSFSR tunnel, would be entirely underground, in which case conduits would be larger and sized for high flows. Figure 3-18 and Figure 3-19 provide plan views of the water

management plans for the northern portion of the site, including the Yellow Pine pit and West End pit area, and for the southern portion of the site, including Meadow Creek, the TSF, and the Hangar Flats pit, respectively.

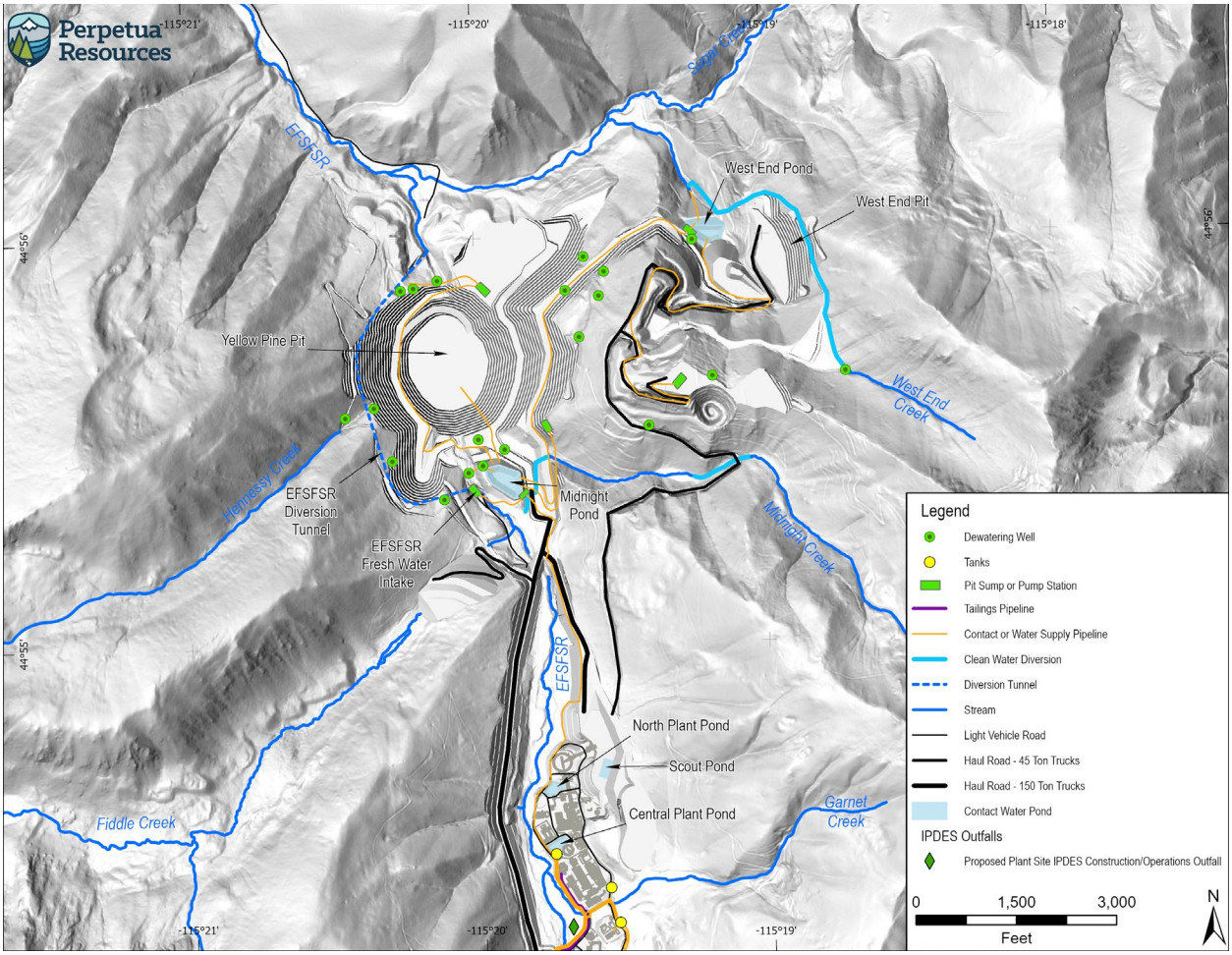


Figure 3-18. Water Management Plan – North

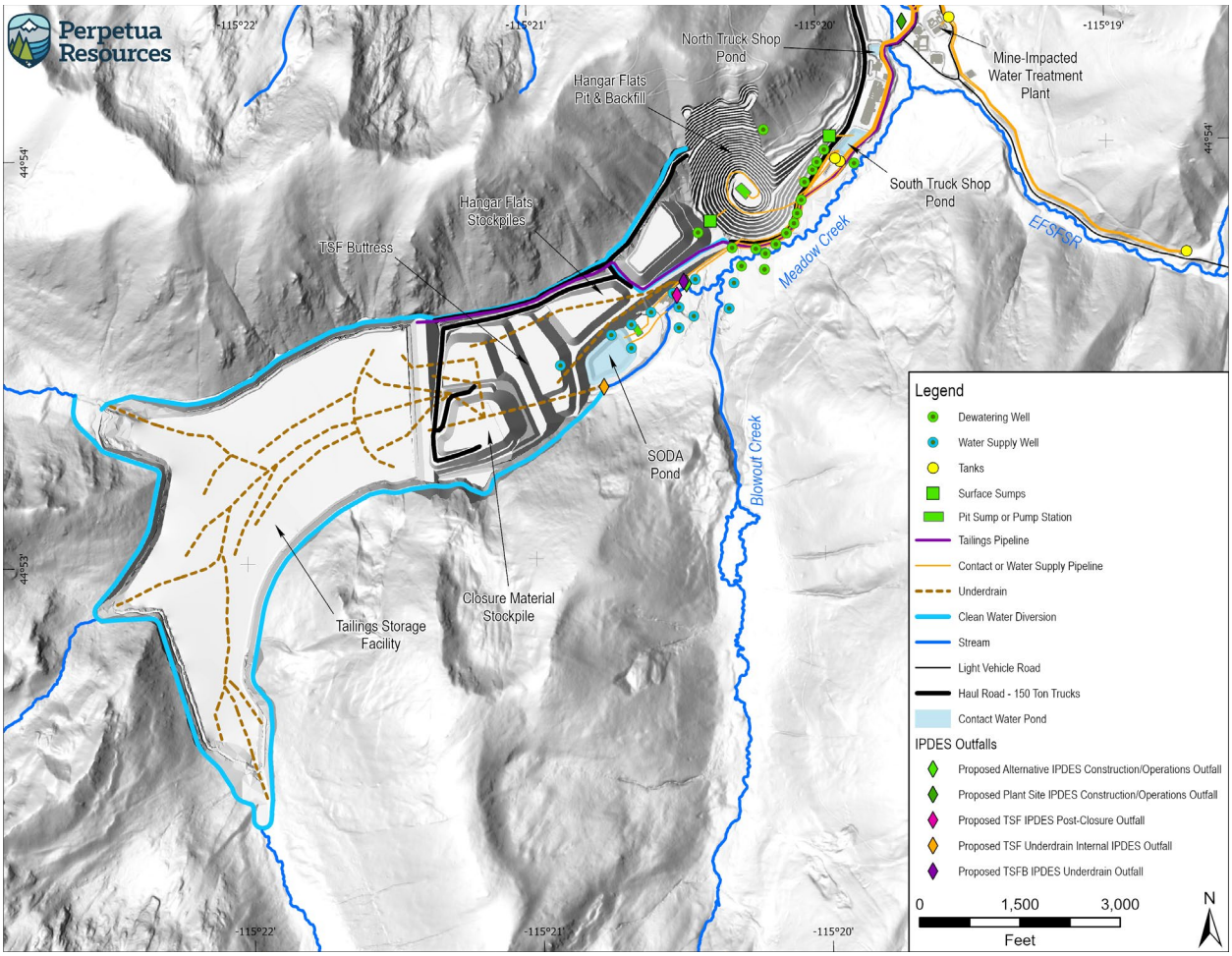


Figure 3-19. Water Management Plan - South

EFSFSR Diversion Tunnel

This represents no change from Alternatives 1 and 2 in the DEIS, other than the addition of a surface water supply intake at the already-planned tunnel headworks.

Currently, the EFSFSR runs through the Yellow Pine pit lake. The cascade at the inflow to the pit lake currently blocks upstream fish passage. A tunnel would be built to direct the EFSFSR around the west side of Yellow Pine pit to allow mining in the pit Figure 3-18 and Figure 3-20. The tunnel would be approximately 0.9 miles long and 15 feet high by 15 feet wide. The tunnel would include a fishway designed to provide for upstream and downstream passage of migratory and anadromous salmonid fish, and a parallel accessway to allow equipment and personnel access for monitoring, inspection, and maintenance. The accessway would function as a floodway for high flows, limiting the operating flow range within the fishway while river and thus total tunnel flows vary more widely.

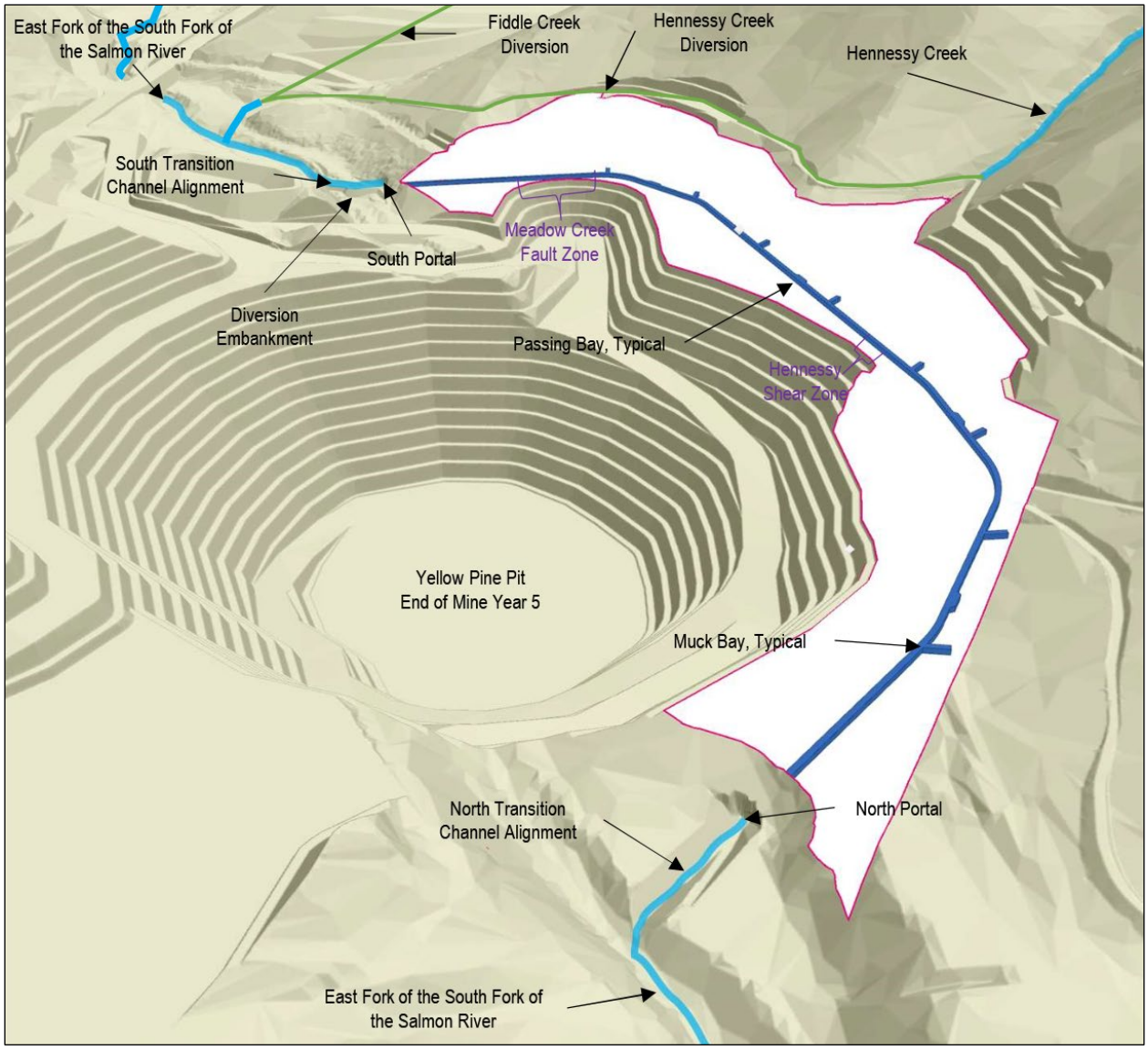


Figure 3-20. Isometric Cutaway View of Fish Passage Tunnel

To encourage fish passage, low-energy lighting would be installed in the tunnel and set on timers to simulate daylight. A trash rack and sediment trap would be constructed near the upstream entrance to the tunnel to prevent large wood, boulders, and other debris from entering the tunnel, and would be cleaned periodically. The spaces between the trash rack bars would be sized to allow passage of adult Chinook salmon. A surface water supply intake (Section 3.10.3) with fish screens would be installed upstream of the control weir to supply raw water for ore processing makeup when necessary.

The tunnel fishway would incorporate concrete weirs designed to produce hydraulic conditions that can be successfully navigated by target fish species.

Midnight Creek

Compared to Alternative 1 in the DEIS, Midnight Creek would be piped under haul roads not a GMS.

The Midnight Creek stream diversion would reroute approximately 0.3 miles of the lower portion of Midnight Creek to the south, away from where it currently enters the Yellow Pine pit lake. The rerouted creek would be piped under haul roads and channelized downstream of the lower haul road to enter the EFSFSR upstream of the proposed tunnel portal (Figure 3-18). The Midnight Creek diversion would manage flows in Midnight Creek during Yellow Pine pit operations and backfill activities until the newly developed EFSFSR alignment (over the backfilled pit) is complete and stabilized as described in Section 3.14.5.

Hennessy Creek

In comparison to the ModPRO (DEIS Alternative 2), Hennessy Creek would be routed south toward Fiddle Creek in a pipe along the public access road during mining and backfill of Yellow Pine pit (instead of an open channel). With the elimination of the Fiddle DRSF, the ultimate outlet configuration of the Hennessy Creek diversion would be changed to a confluence with Fiddle Creek just downstream of the present culvert under Stibnite Road rather than the Fiddle DRSF north diversion channel.

Hennessy Creek would be diverted south of Yellow Pine pit in a pipe along the public access road at the western edge of the pit (Figure 3-18 and Figure 3-20). The diversion would include an impounding structure, overflow weir, and diversion cleanout basin. Diverted flows would be routed to Fiddle Creek downstream of the existing Stibnite Road culvert crossing, ultimately placing Hennessy Creek flows into the EFSFSR upstream of the south tunnel portal and disconnecting flow from the current unlined ditch passing alongside the Northwest Bradley dumps. Overflow, if any, would follow the existing stream channel into the Yellow Pine pit.

Fiddle Creek

In comparison to the ModPRO (DEIS Alternative 2), there would be no Fiddle Creek diversion with elimination of Fiddle DRSF, but there would be a culvert, much shorter than the ModPRO diversions, passing Fiddle Creek underneath roads and the Fiddle GMS (Figure 3-18 and Figure 3-20). Small stormwater diversions would route hillslope runoff around the Fiddle GMS and the culvert would route Fiddle Creek under the GMS, GMS access road, and public access road.

West End Creek

This is similar to the ModPRO (DEIS Alternative 2) except the lower portion of the West End Creek diversion is piped for constructability reasons, rather than being in an open ditch.

The West End Creek stream diversion would reroute the stream around an existing legacy DRSF and West End pit. The approximately 1.5-mile-long diversion would reroute West End Creek around the north side of the legacy upper West End DRSF and cross the upper benches of West End pit (Figure 3-18). The diversion would consist of a lined channel along the upper legacy DRSF, and a pipe in the segments along a steep hillside above the West End pit, within the pit, and along the steep hillside alongside the lower legacy DRSF down to the outlet at the existing stream channel.

Garnet Creek

In comparison to the ModPRO (DEIS Alternative 2), lower Garnet Creek is rerouted and restored during construction instead of at closure.

During Project construction, Garnet Creek would be restored downstream of the ore processing facility to a relocated confluence with the EFSFSR (Figure 3-18). Above the early restoration reach, Garnet Creek would be routed along the upper plant site access road in a riprap channel, then cross under the ore processing facility roads in culverts, with

BMPs to reduce sediment loading to the stream, and to protect water quality. At closure, this segment of Garnet Creek would be restored, along with created wetlands at the plant site.

Meadow Creek

The Meadow Creek diversion corridor on the south side of the Hangar Flats pit is lined with a geosynthetic liner extending farther downstream than Alternative 1, and the operational diversion of Meadow Creek around the Hangar Flats pit is retained as the permanent channel at closure; this is identical to the ModPRO (DEIS Alternative 2). The Meadow Creek diversion at the TSF would not be phased as in the ModPRO/Alternative 2, but rather would be built once during construction.

Approximately 2 miles of Meadow Creek would be diverted around the south side of the TSF and TSF Buttress. The diversion would direct flows back into the existing SODA diversion upstream of the Hangar Flats pit. The new diversion would consist of a rock-cut channel in segments along the steep hillsides above the TSF and buttress, and an excavated channel in alluvium across tributary valley segments. Channel segments excavated in erodible or permeable materials would be lined with rock riprap and a geosynthetic liner to prevent erosion and to minimize seepage where needed. The Meadow Creek diversion channel around the TSF and TSF Buttress would be designed to convey flows from a minimum 100-year storm event with 1 foot of freeboard.

The stream also would be diverted around the Hangar Flats pit. The Meadow Creek channel would be moved away from the pit to the south/southeast toward the valley wall and reconstructed as a sinuous channel and floodplain corridor to allow potential for spawning habitat and establishment of riparian habitat within the floodplain. A liner would be installed under the stream/floodplain corridor (Figure 3-19) to minimize water seepage into the Hangar Flats pit or the pit dewatering well system, and to avoid potential pit wall instability or loss of stream habitat as a result of stream dewatering. The Meadow Creek diversion channel/floodplain corridor around the Hangar Flats pit would be designed to convey flows from a minimum 100-year event with 3 feet of freeboard; as a natural channel design the stream channel itself would be designed for bankfull flows (1.5-year recurrence).

Blowout Creek

This represents no material change to the ModPRO (DEIS Alternative 2), except for potentially earlier timing of the permanent repair.

Blowout Creek (East Fork Meadow Creek) was impacted by the failure of a water storage dam in 1965 creating the steep, eroding chute that conveys Blowout Creek. As part of the Compensatory Mitigation Plan for Streams and Wetlands, Perpetua Resources proposes to stabilize and repair the failed area of Blowout Creek in the actively eroding chute and raise groundwater levels in the meadow upstream of the former dam site to restore wetland hydrology. A retention structure would raise groundwater levels in the meadow and a coarse rock drain would address ongoing erosion of the channel side slopes that currently deliver sediment directly to the creek, while facilitating construction of a permanent surface channel. This would be a voluntary mitigation and restoration effort, as the Blowout Creek chute and upper meadow are unrelated to and unaffected by the proposed mine features. The lower portion of the Blowout Creek alluvial fan would be an important borrow area for this and other restoration projects and is included in Project disturbance.

During construction and early mining, Perpetua Resources would construct grade control and water retention features near the old reservoir water retention dam location to elevate the groundwater level and stream water surface sufficiently to restore wetland hydrology in the surrounding meadow. The retention structure would impound portions of the meadow channel, which would fill with sediment over time.

A coarse rock drain would be constructed within the chute downstream of the failed dam site to isolate the flow of Blowout Creek from the actively eroding chute side slopes and to prevent further erosion of the gully bottom, facilitating subsequent restoration of a surface channel on top of the drain. Figure 3-19 shows the location of the rock drain and surface channels.

As the rock drain fills with sediment, it would become closed off from the stream channel. If the rock drain has not silted-in at the end of mine operations, the rock drain would be disconnected from surface inflow at the upstream end through excavation and replacement with less-permeable materials, or by grouting. The existing alluvial fan in lower Blowout Creek, located adjacent to Meadow Creek, would be removed, mostly during mine operations for borrow materials, and the area restored. A surface diversion would be constructed at the margin of the lower alluvial fan to facilitate borrow excavation, and this stream reach subsequently restored.

3.10.1.2 Non-Contact Stormwater Diversions

This approach to non-contact stormwater diversions is identical to the ModPRO (DEIS Alternative 2), although the specific locations of diversions is modified to reflect the elimination of the Fiddle DRSF.

Non-contact stormwater is meteoric water that does not contact tailings, open pits, DRSFs, spent heap leached ore and tailings from past mining operations, or other mining related surfaces. Stormwater runoff from undisturbed areas upslope of mine features in the major drainages would be captured in the stream diversion channels described above or in other channels that would direct runoff away from disturbed areas. Smaller-scale diversion channels or earthen berms would be used, where necessary, to divert stormwater around other mine infrastructure.

Non-contact water would be managed with features to reduce erosion and sediment delivery to streams within the mine site. Non-contact stormwater diversions would discharge directly into the stream system, with erosion control and energy dissipation features. Where sedimentation is a concern, non-contact water stormwater diversions would be routed to sediment catch basins where the water can evaporate, infiltrate, or discharge into the stream system after settling. Energy dissipation structures would be installed at the non-contact surface water diversion outfalls as needed.

3.10.1.3 Contact Water

The management of contact water would be the same as in the ModPRO (DEIS Alternative 2), but at lower volumes in all phases due to less temporal overlap of disturbance, less dewatering, retention of operational Meadow Creek diversion at Hangar Flats pit, smaller Hangar Flats pit, and backfill eliminating the formation of a Hangar Flats pit lake.

Water that contacts mining disturbances and has the potential to impact water quality is termed contact water. Contact water includes, but is not limited to, runoff from mine facilities such as DRSFs, stockpiles, mine pits, and haul roads constructed of development rock; toe seepage from stockpiles; and underground exploration water. Collection of contact water would begin during the first year of on-site construction and would continue throughout operations and the closure and reclamation phases. Contact water would be captured in runoff collection channels and sumps and routed to the ore processing facility, contact water storage ponds, water treatment, or enhanced evaporation systems. In unusually high runoff periods, excess contact water may be routed to mine pits, or collected water may be allowed to remain in the pits or TSF temporarily. Contact water storage ponds would be lined to minimize leakage. Water in the contact water ponds could be pumped to the ore processing facility for use, treated and discharged in accordance with applicable requirements, or evaporated. Contact water in the mine pits would be directed to in-pit sumps in the lowest part of the pit and piped to the ore processing facility for use as makeup water, to other contact water ponds, to water treatment or evaporation, to the TSF, or into trucks for spraying for dust control within open pits and on stockpiles or DRSFs. Any contact water beneficially used for ore processing or dust control would require a water right permitted through the IDWR prior to use.

Contact water which exceeds discharge water quality limits and that cannot be used during operations would be disposed of through a variety of methods including forced evaporation using sprayers located within the TSF or other managed areas, or active water treatment. Water would be treated to meet IPDES permit limits and treated water would then be discharged to IPDES permitted outfalls. Stormwater runoff (including snowmelt) from roads located inside of or draining into mine pits or development rock storage areas would be managed as discussed above. However, runoff from haul roads and access roads outside of pits, stockpiles, or development rock storage areas may be of sufficiently good quality to be eligible for coverage under the Multi-Sector General Permit (MSGP) for Stormwater Associated with Industrial Activities. Eligibility will depend upon the materials used for road construction and will be determined through coordination with IDEQ with oversight by Environmental Protection Agency (EPA). Runoff covered under the MSGP would be managed with a variety of BMPs and conventional stormwater control measures to ensure the protection of surface water quality.

3.10.1.4 Surface Water Outfalls

The specific number and locations of outfalls will be determined via IPDES permitting through IDEQ. Approximate locations of the anticipated outfalls described below above are shown on Figure 3-18 and Figure 3-19. All outfalls would be required to meet water quality limits for specific constituents, and some outfalls may have discharge volume limits where the permit specifies a loading limit. Not all outfalls would necessarily be active or be permitted in the same permit cycle.

Two IPDES-permitted surface water outfalls are anticipated to discharge treated contact water from active mine pits, the TSF Buttress, pit dewatering, legacy mine materials disturbed by new mining activities, and the plant site and truck shop. One outfall located near the plant site would discharge to the EFSFSR, and a second outfall for treated contact water would discharge to Meadow Creek upstream of Blowout Creek to augment streamflow during pit dewatering. Water from the TSF and TSF Buttress underdrains (Section 3.9.5) may be discharged from these outfalls, depending on whether IPDES discharge limits are met without treatment of the underdrain water (otherwise, underdrain water would be routed to the plant site for use in processing). Discharges from these two outfalls are expected to have a strong seasonal component, with some parts of the year seeing reduced flows, or even no discharge, as contact water is used for ore processing or other mine uses.

An outfall would be permitted on upper EFSFSR for the sanitary wastewater treatment facility at the worker housing facility. That outfall would be active through the operations period and during mine closure until the facility is decommissioned.

An additional outfall is expected to be permitted in a future IPDES permit renewal for closure and post-closure discharge of treated TSF process water. That outfall would be on Meadow Creek upstream of Blowout Creek near the TSF buttress.

Additional permitted outfalls may be necessary during a portion of the operations period for contact water storage pond spillways that could discharge to surface water — although discharge would be very rare or non-existent, only occurring in the event of excessive precipitation or snowmelt. The need for additional outfalls associated with pond spillways and their locations will be determined with IDEQ.

3.10.2 Groundwater Management

Groundwater management would be the same as the ModPRO (DEIS Alternative 2), with direct discharge of treated water, when necessary, instead of rapid infiltration basins (RIBs) for streamflow support.

Groundwater would require management to allow mining in the pits and to redirect seeps and springs from beneath mine facilities. Groundwater also would provide a portion of the water supply for the mine site. Water supply aspects

of the mining operations are described in Section 3.10.3. Any groundwater used within the mine site would require water rights permitting through IDWR prior to use. Depending on the final use or disposal of groundwater, water from wells drilled on the site could be permitted as domestic use, industrial use, or dewatering use and would have applicable water rights, based on their beneficial use.

3.10.2.1 Pit Dewatering

This approach to dewatering is similar to that which is described in the ModPRO (DEIS Alternative 2).

Lowering the water table in and surrounding the pits would increase pit wall stability and provide dry working conditions in the pit bottom. Development of the Yellow Pine and Hangar Flats pits would require partial dewatering of the alluvium of portions of the EFSFSR and Meadow Creek valleys, respectively, to limit groundwater inflow to the pits and maintain stability of the pit slopes. Once the West End pit is mined below the level of West End Creek, the West End pit also would require dewatering.

Dewatering would be accomplished by drilling a series of alluvial and deeper bedrock wells near the pit perimeters to intercept and pump groundwater before the water reaches the pit. Alluvial groundwater at the Yellow Pine and Hangar Flats pits would be managed using a series of vertical wells. The West End pit is primarily in bedrock with only a thin layer of alluvium in the vicinity of the pit and no alluvial dewatering is planned for that pit. Pumps would be installed in each well and would run as necessary to draw down the groundwater and facilitate mining and backfilling operations. Horizontal drain holes may also be considered for depressurizing remnant high pore pressure areas.

Groundwater pumped from the dewatering wells would be considered to be contact water and would be managed through forced evaporation or active water treatment when the volume of pumped water exceeds the ore processing facility demand. Treated water would be discharged to either of two IPDES-permitted outfalls depending on the need for streamflow support in Meadow Creek: either to Meadow Creek or the outfall located on the EFSFSR near the water treatment plant (WTP).

Groundwater not captured by the dewatering wells, and entering the pits as highwall seepage, would be directed to an in-pit sump in the lowest part of the pit where it would combine with stormwater and snowmelt runoff (i.e., contact water) from precipitation falling within the pit. The water would be used for dust control within the pits, and as needed, pumped to the ore processing facility for use as makeup water. In-pit water that cannot be used would be disposed of through forced evaporation or routed to the WTP for treatment then discharged to the EFSFSR or Meadow Creek via IPDES permitted surface outfalls.

3.10.2.2 Groundwater Spring and Seep Control

This approach to groundwater spring and seep control is similar to that which is described in the ModPRO (DEIS Alternative 2).

Underdrains would be constructed beneath the TSF and TSF Buttress to convey groundwater from seeps and springs beneath the facilities and prevent contact with the development rock and tailings. The TSF embankment and buttress underdrains promote geotechnical stability by preventing saturation and excess pore water pressure in the overlying development rock fill. For the TSF impoundment, the underdrain system would protect liner integrity by preventing hydrostatic uplift on the liner. At the buttress, underdrains may flow minimally if at all, but are planned nonetheless as it is extremely difficult to retrofit drains under an existing, active DRSF.

The primary underdrains would be designed to follow major drainages under each facility and would run the length of the facility, with parallel and branching secondary lines owing to the wide valley bottom. Primary underdrains would be constructed of pipe or gravel wrapped with geotextile; secondary drains would be either prefabricated geosynthetic

drains, gravel, or pipe/gravel drains similar to but smaller than the primary drains. Only materials with limited potential to generate acid or leach metals would be used in the underdrain construction. TSF impoundment underdrains would pass under the embankment and buttress in a solid-wall pipe separate from the buttress primary underdrain pipes. The underdrain system would convey spring and seep flows beneath both facilities to collection sumps at the buttress toe where the flows would be monitored for water quality prior to release into the stream system or capture for use in the processing circuit or treatment prior to discharge, depending on water quality. Sampling would be from a dedicated sump (manhole) in-line with the pipe upstream of the outlet.

3.10.2.3 Idaho Point of Compliance Determination

Perpetua Resources is coordinating with the IDEQ to determine one or more Points of Compliance (POCs) pursuant to the Idaho Groundwater Rule (IDAPA 58.01.11.401). This regulatory process is available to mining facilities as a mechanism to ensure compliance with groundwater quality standards. The Groundwater Rule specifies that:

> *"The point(s) of compliance shall be set so that, outside the mining area boundary, there is no injury to current or projected future beneficial uses of ground water and there is no violation of water quality standards applicable to any interconnected surface waters."*

3.10.3 Water Use, Supply, and Balance

The water use, supply and balance components are essentially the same as the ModPRO (DEIS Alternative 2), except for the addition of a surface water intake; however, the relative balance shifted towards more frequent seasonal water deficits and less need for mine-impacted water treatment due to less temporal overlap of disturbance, less dewatering, fewer DRSFs, smaller Hangar Flats pit, and backfill eliminating the formation of a Hangar Flats pit lake while speeding rebound of alluvial groundwater levels.

Figure 3-21 presents a flow diagram that represents the SGP operational water balance. As shown on the figure, there would be five general water classifications during operations, including fresh water, sanitary wastewater, non-contact water, contact water and pit dewatering water, and process water. Fresh water would be supplied from groundwater supply wells (including dewatering wells) and a surface intake on the EFSFSR.

Sanitary wastewater from the worker housing facility, ore processing facility, and administration buildings will be managed using conventional commercial WWTP technology and be discharged to the upper EFSFSR in compliance with permit limits established for that system. The treated discharge will comprise a very small fraction of the ambient stream flow

Non-contact water represents water flowing within the surface streams and precipitation falling onto non-contact areas. Non-contact water will be managed by diverting streams and stormwater around mine features and disturbed areas, to the extent practicable, to avoid generating contact water. This system of non-contact water management would be independent, with no water added from or discharged to the contact and process water systems, other than permitted discharges of treated water.

Contact water consists of stormwater runoff and mine drainage from mine pits, stockpiles, the TSF embankment, legacy material removal sites, and other mine components, and water obtained from dewatering wells. The primary use for contact water would be make-up water for the ore processing system or for dust suppression on stockpiles and in-pit/DRSF haul roads. The ore processing system would be a closed system with zero discharge during operations and includes the process circuit and the TSF. Once contact water is placed into this closed system, it becomes process water and only leaves as process losses (chiefly evaporation, and some chemical combination), within products (antimony concentrate), and as evaporation from the TSF. The process water would be used in ore processing, and ultimately transported to the TSF as part of the tailings slurry where a portion of the water would form a supernatant

pool. Water in the supernatant pool would be pumped back to the ore processing facility, where it would be re-used in the ore processing circuit. It is expected that the volume of contact water would seasonally exceed the combined volume required for ore processing make-up water and for dust suppression. During operations, this excess contact water would be directed to the contact water ponds, evaporation systems, or to a water treatment plant where it would be treated to meet IPDES water quality permit limits before being discharged via a permitted outfall to the EFSFSR or Meadow Creek.

More specific details regarding each of these water systems are presented in the sections below.

3.10.3.1 Water Use, Supply, and Reuse

Water use proposed in the ModPRO2 is informed by refined water modeling and affected by changes to the mine plan. Sources of water required for ore processing, surface and underground exploration, dust control, and potable use for workers remain similar to those analyzed in the DEIS.

Water for industrial and mining uses would be supplied from groundwater pumped from dewatering wells and water supply wells, contact water ponds, a surface water supply intake on the EFSFSR, and process water recycled within the ore processing and tailings circuit. The ModPRO2 adds the option to provide water from a surface water supply intake on the EFSFSR at the tunnel headworks; other supply sources and points of diversion are the same as the ModPRO. Potable water would primarily be drawn from dedicated wells at several locations as discussed in the Water Balance section below. Projected water use for the mining operations is summarized in Table 3-6.

Table 3-6 Estimated Gross Fresh and Recycled Water Usage

Component	Construction and Start-Up (gpm)[1]	Operations (gpm)[1]	Closure and Reclamation (gpm)[1]
Underground and surface exploration	50	50	0
Surface dust control (seasonal basis)	33	66	16.5
Ore processing including tailings storage	0	3,900	0
Potable or domestic use	26	12	4
Sub-Total Use	109	4,028	20.5
Contingency (10%)	11	403	2
Total Estimated Use	120	4,431	22.5

Notes:

[1] Values from Site-Wide Water Balance Modeling Report (Perpetua Resources 2021c)

Abbreviations:

gpm = gallons per minute

As shown in Table 3-6, ore processing facility operations would represent approximately 97 percent of water use associated with the Project. Most of the water used for ore processing would be repeatedly recycled from within the ore processing facility and the supernatant pool at the TSF. The remaining water required for the ore processing facility would be referred to as makeup water. Makeup water would be supplied from the groundwater wells used for pit dewatering, from collected contact water when available, from water supply wells, and from surface water. A separate wellfield of up to four wells would be developed in the EFSFSR drainage adjacent to the worker housing facility to provide potable water for the facility. The use of groundwater from pit dewatering, contact water from precipitation runoff, surface water, and development of separate wellfields for supplemental industrial supply and for potable water at the worker housing facility would require permitting through the IDWR as a new water right or transfer of the point of use for one of Perpetua Resources' existing water rights (see Section 3.10.3).

3.10.3.2 Water Balance

The water balance is an accounting of water inflows, outflows, and storage for various components of the mining and ore processing system. Actual volumes for water balance variables could vary seasonally and annually from the volumes estimated. A water balance flow diagram for the mining and ore processing operations phase is provided on Figure 3-21 showing components of the water balance described below.

3.10.3.3 Water for Ore Processing

Ore processing is the primary driver for water use. Water sources for ore processing include water from pit dewatering and water supply wells, contact water, EFSFSR surface water intake, and water recycled from the TSF. Outflows from ore processing include tailings slurry conveyed to the TSF and evaporative losses from various process components.

The majority of the water needed for ore processing would be recycled (reclaimed) from the TSF. Reclaim water would be pumped from the supernatant pool at the TSF to the reclaim water tank at the ore processing facility. Makeup water would be supplied from pit dewatering wells located around the Hangar Flats, Yellow Pine, and West End pits; water supply wells; contact water; and surface water intake in the EFSFSR. The dewatering water would be pumped from the dewatering wells to freshwater tanks near the ore processing facility site. These tank facilities also could supply water for exploration drilling, development drilling, road dust control, and emergency fire suppression. The freshwater tanks could store approximately 360,000 gallons of water; 240,000 would be available for process uses, and the remaining 120,000 gallons would be held in reserve for fire suppression only. The use of water for mining and ore processing operations would require appropriate permitting and approval of water rights from IDWR.

3.10.3.4 Water at the TSF

Inflows to the TSF include tailings slurry and precipitation. The TSF would store tailings solids, water entrained with the tailings, and free water atop the tailings (supernatant pool). Stormwater falling directly on the TSF and water from the supernatant pool that forms as the tailings consolidate, would be stored in the TSF and reclaimed for ore processing as needed. The volume of available reclaim water would be influenced by the ore processing volumes, precipitation, and evaporation. The reclaim water would be pumped from the TSF to the reclaim water tank located at the ore processing facility. During periods of site-wide water excess, reclaim can be curtailed and contact water can be used directly in ore processing to facilitate emptying the contact water ponds, while retaining water in the TSF for use in an upcoming dry season.

3.10.3.5 Contact Water

Meteoric water that contacts and runs off or seeps from open pits, DRSFs, stockpiles, spent heap leached ore and tailings from past mining operations, and other mining related surfaces would be collected and used, to the extent practical, in mining and ore processing activities as makeup water for the ore processing circuit or for dust control. Contact water that cannot be used would be treated, if necessary, to meet applicable IPDES permit limits prior to discharge. Inflows to the contact water component include DRSF and stockpile runoff and toe seepage, pit wall runoff, water from underground exploration activities, runoff from processing facilities, and direct precipitation on contact water storage ponds. Outflows from the contact water component include makeup water for ore processing, evaporation (including forced evaporation), dust suppression in mine pits and on DRSFs and roads thereon, and discharge following treatment at the WTP. The use of water in the mining and ore processing operations would require appropriate permitting and approval of water rights from IDWR.

3.10.3.6 Pit Dewatering

Development of the mine pits would require dewatering alluvial and bedrock aquifers around the pits to limit groundwater inflow to the pits and maintain stability of the pit slopes. Water from the dewatering wells could be used as makeup water in ore processing operations, used for dust suppression, evaporated, or sent to the WTP for treatment before being discharged to the surface water system via an IPDES permitted outfall.

3.10.3.7 Water for Potable Use

Potable water would be needed for worker consumption and sanitary use. Groundwater would be the primary source of water for potable use at the mine site. An existing well located near the exploration camp in the EFSFSR drainage would be used to supply an independent water circuit, along with a separate wellfield in the EFSFSR drainage adjacent to the worker housing facility. Wells also would be drilled for potable and industrial or commercial water uses at the Landmark Maintenance Facility and the SGLF. Perpetua Resources would obtain appropriate water rights for these wells from IDWR.

3.10.3.8 Other Water Uses

Other water uses associated with the SGP include dust control, exploration, and fire protection. Contact water can be used for dust control within disturbed areas such as the DRSFs, stockpiles, and mine pits; fresh water would be used outside those areas. In some areas, water volumes necessary for road dust suppression would be reduced by using dust control chemicals, such as magnesium chloride or lignin sulfonate. Water also would be used to support both surface and underground exploration activities. Fire suppression would be facilitated through freshwater storage tanks and hydrants.

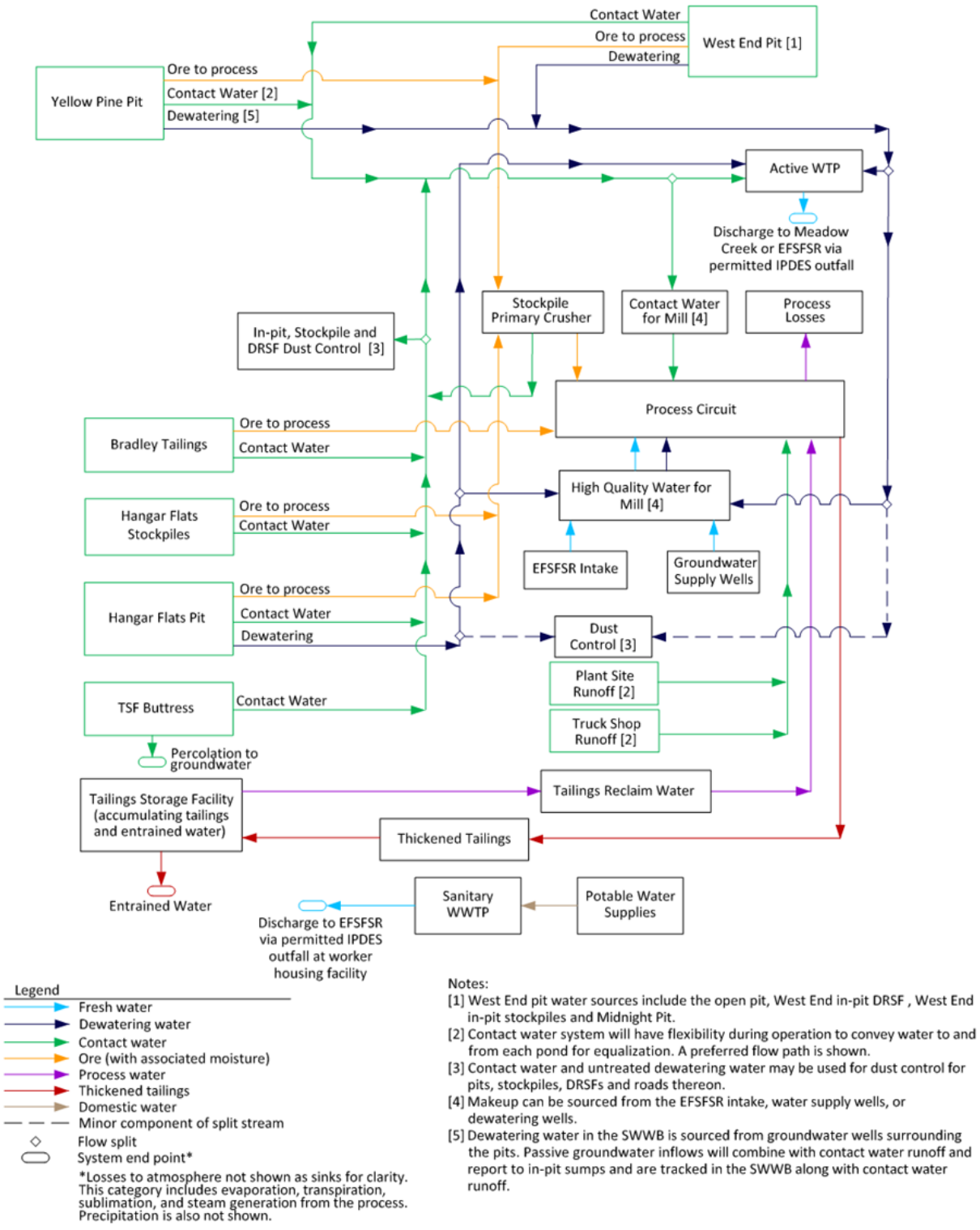


Figure 3-21. Operational Water Balance Flow Diagram

3.10.4 Water Treatment and Disposal

The approach to water treatment during operations would be the same as the ModPRO (DEIS Alternative 2), but at lower volumes in all phases due to revised mine planning and improved water modeling leading to less temporal overlap of disturbance, less dewatering, fewer DRSFs, retention of operational Meadow Creek diversion at Hangar Flats pit, smaller Hangar Flats pit; treatment volumes during reclamation and closure were reduced further via the elimination of Fiddle DRSF, additional backfill eliminating the formation of the Hangar Flats pit lake, and addition of a full geosynthetic cover on the TSF.

Three water types will require treatment over the life of the Project: contact water from mine facilities, which includes dewatering water (construction through closure); process water from the TSF (closure); and sanitary wastewater (construction through early closure). During operations, treating and releasing contact water is generally limited to periods when a significant amount of dewatering water is being produced, or seasonally in wet years. Outside of that time, much of the collected contact water can be put to beneficial use by storing that water into the summer and fall. During construction and at closure, absent a water demand for ore processing, less contact water can be consumed and proportionally more must be disposed of through evaporation or treatment and discharge. From construction through early closure, the camp and offices will produce sanitary wastewater needing treatment.

Specific sources of water that could be expected to require treatment during operations include:

- Contact water from the dewatering of the Hangar Flats, Yellow Pine, and West End pits
- Contact stormwater runoff (including snowmelt) from the pits, TSF Buttress, Bradley tailings, SODA, Hecla heap, run-of-mine ore stockpile area, truck shop, and ore processing facility
- Toe seepage from the TSF Buttress and long-term ore stockpiles
- Sanitary wastewater from the worker housing facility, truck shop, ore processing facility, administrative buildings, and off-site facilities

Water quality permitting discussions are ongoing, but it is likely that the Project will need to adhere to stringent surface water quality standards for arsenic and antimony. Thus, coupled with the timing of water treatment needs with respect to the mining sequence and dewatering excess, treatment methods and capacity will be phased. During construction and early in operations, a modular, mobile, two-stage iron coprecipitation system is planned. Early in operations, this system would be replaced by a two-stage iron coprecipitation system located near the ore processing facility. Residuals from the treatment during construction would be stored in a small impoundment in the TSF footprint or on previously disturbed land at SODA. During operations and closure, the residuals would be stored on-site in the TSF. Due to contact water runoff seasonality, reuse, and equalization storage (i.e., ponds), average treatment rates are often significantly less than nominal treatment capacity, except during Hangar Flats dewatering when a substantial proportion of treated water is from relatively constant dewatering flows.

The total area of the Project that would generate contact water varies though the life of the Project as various facilities come online, expand, and are closed. This is met with a staged water treatment strategy. The construction time period is paired with 300 gallons per minute (gpm) of peak capacity from package iron coprecipitation plants. The first three years of operations would require 1,000 gpm of total treatment capacity, using an iron coprecipitation plant that would remain until closure. During peak simultaneous dewatering of the Yellow Pine pit and the Hangar Flats pit, an additional 1,000 gpm of modular water treatment capacity will be brought online for approximately three years, then treatment capacity would be scaled back to 1,000 gpm for the remainder of operations and early closure.

At closure, the closure water treatment plant would be constructed to accommodate treatment of water from the TSF which will include precipitation chemistry and the application of reverse osmosis membrane treatment. After mine closure and final reclamation of the TSF Buttress and pit backfill surfaces, contact water treatment will no longer be

required; but process water treatment for the TSF (Section 3.14.14) will continue longer, through approximately year 40. The closure treatment plant would be located on the TSF Buttress as the TSF would ultimately be the only remaining water source requiring treatment. Treatment would be continued as needed on private land.

Enhanced evaporation, using snowmaker style misters located over the TSF, ponds, and/or pits, will supplement the treatment system, in particular to prevent surplus process water accumulation in the TSF and eliminate contact water inventory, if necessary, in the Hangar Flats or SODA ponds.

Sanitary wastewater would be treated using membrane bioreactor (MBR) or similar technology. Early in construction, the currently permitted MBR plant at the existing exploration camp would be used, and treated effluent reused for flushing toilets and urinals (as allowed by Perpetua Resources' existing Reuse Permit M-228-02) or discharged to the existing drain field, while the worker housing facility and its associated treatment plant is under construction. During operations and closure, sanitary wastewater from the worker housing facility, ore processing facility, and administration buildings would be treated at a new MBR or similar plant and discharged to the EFSFSR via a permitted IPDES outfall. Vaults or portable toilets would be used at off-site facilities and remote locations on-site (TSF, pits, maintenance facility etc.), and serviced as needed using vacuum trucks. Treatment residuals would be hauled off-site to a permitted sanitary landfill. Vault/portable toilet wastewater would be hauled to the on-site sanitary wastewater treatment plant for treatment.

Permit discharge limits would be developed according to IDEQ, and CWA requirements and the limits would be established by the IPDES permit issued by the IDEQ.

Additional mine water treatment would be required during closure and post-closure as discussed in Section 3.14.14. Anticipated outfalls during mining operations are discussed in Section 3.10.1.4.

3.11 MATERIALS, SUPPLIES, AND CHEMICAL REAGENTS

The ModPRO2 represents no change to the materials, supplies, and chemical reagents versus that detailed in the DEIS for all alternatives, other than greater LOM totals due to extending ore processing an additional 2.25 years, and the use of on-site limestone sources (as in Alternative 2).

Table 3-7 lists the major materials, supplies, and chemical reagents to be used, including fuel, explosives, and ore processing reagents.

A Spill Prevention, Control, and Countermeasures Plan (SPCC) would be developed to establish procedures for responding to accidental spills and releases of petroleum products. In addition, a Hazardous Materials Handling and Emergency Response Plan would be developed to address procedures for responding to accidental spills or releases of hazardous materials to minimize health risks and environmental effects.

3.11.1 Diesel Fuel, Gasoline, and Propane

This represents no change to the diesel fuel, gasoline and propane versus that detailed in the DEIS for Alternatives 1 through 4 and reflects the on site generation of lime using propane to fire the lime kiln (as in the ModPRO). Aboveground storage tanks would be used for fuels and other fluids, including gasoline, diesel fuel, lubricants, coolants, hydraulic fluids, and propane at the mine site, as outlined in a SPCC Plan required for the mine site under Section 311(j)(1)(C) of the CWA. The storage tank facility for gasoline, diesel fuel, and propane would be located near the maintenance workshop with additional propane storage at the ore processing facility area, the underground portal area, and the worker housing facility. Approximate tankage volumes for diesel, gasoline and propane that would be stored at the mine site are included in Table 3-7.

Table 3-7 Proposed Materials, Supplies, and Reagents

Common Name	Units	Annual Use	Delivery Form	Typical Vehicle Payload	On-site Storage Capacity	Storage Method	On Site Mine Uses	Estimated Deliveries per Year
Diesel Fuel	Gallons	5,800,000	Bulk liquid	10,000	200,000	Tanks	Mine Site	580
Lubricants	Gallons	296,000	Bulk liquid	3,000	30,000	Tanks, Totes, Drums	Truck Shop	99
Gasoline	Gallons	500,000	Bulk liquid	5,000	10,000	Tanks	Mine Site	100
Antifreeze	Gallons	40,000	Bulk liquid	3,000	4,000	Tanks, Totes, Drums	Truck Shop	13
Propane-Buildings	Gallons	560,000	Bulk liquid	6,000	30,000	Tanks	Buildings	93
Propane-Lime Plant	Gallons	1,463,000	Bulk liquid	11,000	30,000	Tank	Lime Plant	133
Solvents	Gallons	1,000	Bulk liquid	200	1,000	Totes or Drums	Truck Shop	5
Tires	Each	246	Bulk solid	Variable	59	Laydown	Mining	47
Batteries	Units	Variable	Pallets	Variable	500 units	Pallets	Mining	25
Light Ballasts	Pounds	25	Pallets	Variable	1,000	Pallets	General Operations	5
Pesticides/ Insecticides	Pounds	250	Pallets	Variable	1,000	Pallets, drums	General Operations	1
Herbicides	Pounds	1,000	Pallets	Variable	2,000	Pallets, drums	Environmental	1
Fertilizer	Pounds	2,500	Pallets	Variable	5,000	Pallets, drums	Reclamation	1
Ammonium Nitrate	Tons	7,300	Bulk solid	24	200	Secured Silos	Open Pits - blasting	304
Explosives	Tons	100	Boxes	5	20	Secured Magazines	Open Pits - blasting	20
Grinding media, SAG mill	Tons	4,449	Bulk solid	24	200	Bunkers and Bins	Mine Process Area	186
Grinding media, Ball mill	Tons	3,566	Bulk solid	24	200	Bunkers and Bins	Mine Process Area	149
Grinding media, LS Ball mill	Tons	34	Bulk solid	24	200	Bunkers and Bins	Mine Process Area	2
Primary crusher liners	Tons	62	Set	24	1 set	Laydown	Mine Process Area	3
Pebble crusher liners	Tons	84	Set	24	1 set	Laydown	Mine Process Area	4
SAG liners	Tons	801	Set	24	1 set	Laydown	Mine Process Area	34
BM liners	Tons	1,424	Set	24	1 set	Laydown	Mine Process Area	60

Common Name	Units	Annual Use	Delivery Form	Typical Vehicle Payload	On-site Storage Capacity	Storage Method	On Site Mine Uses	Estimated Deliveries per Year
LS Primary crusher liners	Tons	9.16	Set	24	1 set	Laydown	Mine Process Area	1
LS Secondary crusher liners	Tons	9.32	Set	24	1 set	Laydown	Mine Process Area	1
LS Ball mlll liners	Tons	27.8	Set	24	1 set	Laydown	Mine Process Area	2
Lime Slaker liners	Tons	3.5	Set	24	1 set	Laydown	Mine Process Area	0.25
Sodium Cyanide	Tons	4,000	Bulk containers	24	300	Tanks, bins	Mine Process Area	167
Activated carbon	Tons	500	Supersack solid	22	50	Supersacks	Mine Process Area	23
Copper sulfate	Tons	1,250	Supersacks, 1,000 kg	22	100	Supersacks	Mine Process Area	57
Lead nitrate	Tons	800	Supersacks, 1,000 kg	22	25	Supersacks	Mine Process Area	37
Aerophine 3418A	Gallons	10,500	Bulk liquid	200	400	Tanks	Mine Process Area	53
AP 3477	Gallons	60,000	Bulk Liquid	3,000	6,000	Tanks	Mine Process Area	20
Methyl isobutyl carbonyl	Gallons	120,000	Bulk liquid	3,000	6,000	Tanks	Mine Process Area	40
Flocculant (Unnamed)	Tons	300	Supersacks	22	50	Super Sacks	Mine Process Area	14
Sodium metabisulfite	Tons	2,000	Supersacks	22	200	Supersacks	Mine Process Area	91
Potassium amyl xanthate	Tons	1,350	Bags in boxes	20	40	Stacked Boxes	Mine Process Area	68
Sodium hydroxide	Tons	330	Supersacks	22	40	Supersacks	Mine Process Area	15
Nitric acid	Gallons	65,000	Bulk liquid	3,000	6,000	Tanks	Mine Process Area	22
Scale control reagents	Pounds	5,000	Drums or totes	1000	1,000	Drums or totes	Mine Process Area	5
Hydrogen peroxide	Gallons	7,100	ISO Totes	3,660	10,000	ISO Totes	Mine Process Area	2
Sodium hypochlorite	Gallons	2,000	Totes	1,000	1,000	Totes	Water treatment	2
Magnesium chloride, 33%	Gallons	250,000	Bulk liquid	4,500	20,000	Tanks	Road surfaces	56
Sulfuric acid	Gallons	12,000	Bulk liquid	3,000	8,000	Tank	Water Treatment	5
Ferric Sulfate	Gallons	23,000	Bulk Liquid	3000	6000	Tank	Water treatment	17
Polymer	Gallons	1,000	Drums	200	3	Drums	Water treatment	5
Organic Sulfide	Gallons	1,000	Drums	200	3	Drums	Water treatment	5

Common Name	Units	Annual Use	Delivery Form	Typical Vehicle Payload	On-site Storage Capacity	Storage Method	On Site Mine Uses	Estimated Deliveries per Year
Sodium Bisulfite	Tons	0.2	Drums	-	2	Drums	Water Treatment	1
Lime	Tons	150	Bulk Solid	24	30	Silo	Water Treatment	7
Sodium Carbonate	Tons	430	Bulk Solids	24	30	Silo	Water Treatment	18
Carbon Dioxide	Tons	14	Bulk Liquid	3	3	Tanks	Water Treatment	5
Microsand	Tons	6.58	Bags	-	7	Bags on pallets	Water treatment	1

Abbreviations:

AP = AP 3477 is dialkyl dithiophosphate; a reagent used in the flotation circuit

BM = ball mill

ISO = International intermodal container that is manufactured according to the specifications outlined by the International Organization for Standardization (ISO)

kg = kilogram

LS = limestone

SAG = semi-autogenous grinding

3.11.2 Explosives

This represents no change to the transport, nature, and usage of explosives versus what is detailed in the DEIS for Alternatives 1 through 4.

Ammonium nitrate would be received in bulk in tanker trucks and transferred into storage silos. Other blasting supplies used for mine blasting operations would include blasting emulsion products, detonating cord, cast primers, and blasting caps. These products would be delivered in boxes or other approved containers on trucks. Components of bulk explosive material would be stored in separate and isolated containers, sized and designed to meet Bureau of Alcohol, Tobacco, Firearms and Explosives and Mine Safety and Health Administration requirements. Explosive magazines for detonating cord, cast primers, and blasting caps also would be in a separate, fenced, and gated site away from the diesel fuel oil storage tanks and the ammonium nitrate silos, and other mine surface facilities.

3.11.3 Oils, Solvents, and Lubricants

This represents no change to the transport, nature and usage of oils, solvents, and lubricants versus what is detailed in the DEIS Alternatives 1 through 4.

Motor oils, lubricants, antifreeze, and solvents would be shipped to the mine site on trucks. These would be stored in approved containers located within, or directly adjacent to, the maintenance shop and contained within secondary containments to prevent spills into the environment. All used petroleum products, waste antifreeze, and used solvents would be collected in approved containers, transported off site, and disposed or recycled.

3.11.4 Miscellaneous Consumables

This represents no change to the transport, nature, and usage of miscellaneous consumables versus what is detailed in the DEIS for all alternatives and reflects the increased usage of propane to generate lime on site (as in the ModPRO).

Lime would be produced on-site and would be stored in silos at the ore processing facility. Silos would be equipped with air emission controls. Sodium cyanide would be transported as dry cyanide briquettes to the mine site. Nitric and sulfuric acid would be transported in tanks designed to prevent spills even in the event of rollovers. Nitric and sulfuric acids would be stored in specialized non-corrosive, polyethylene-lined tanks located within the ore processing facility and would have secondary containment.

Miscellaneous consumables would consist of various reagents used in the ore processing facility not already described, along with wear parts for the crushing and grinding circuits. Miscellaneous reagents used in the ore process are shown on Table 3-7. Liquids would be shipped to the mine site in tank trucks designed for spill prevention and escorted to the mine site by pilot cars manned and equipped to handle spills. All reagents would be transported and stored in suitable containers in designated reagent storage areas.

3.12 WASTE MANAGEMENT

Several changes to waste management in the ModPRO2 vary from what is described in the DEIS for Alternatives 1 through 4. Neither the petroleum-contaminated soil landfarm nor the solid waste landfill will be constructed or maintained at the project site; these materials will be transported off-site for disposal.

3.12.1 Recycling

All applicable waste materials that may be recycled, to the extent practical, or disposed of in accordance with applicable regulations. Some of the wastes anticipated to be generated at the mine site include municipal waste, fluorescent bulbs, batteries, empty aerosol containers, and hazardous wastes, which would be managed in accordance with the appropriate regulatory standards.

Used petroleum products would be stored on site in approved containers. Used petroleum products would be transported off site for recycling or disposal in an approved facility.

Other legacy materials may be encountered during construction and operations. If encountered, these materials would be characterized to determine potential for reprocessing, reuse, or off-site disposal.

3.12.2 Sanitary Waste

This represents no change to sanitary waste versus what is detailed in the DEIS for Alternatives 1 through 4.

Sanitary waste handling facilities would be present at the mine site and off-site facilities and would be constructed and operated in accordance with Valley County, IDEQ, and Idaho Department of Health and Human Services standards. Sanitary wastewater treatment is discussed in Section 3.10.4.

3.12.3 Composting

This represents a change to composting versus what is detailed in the DEIS for Alternatives 1 through 4.

A large-scale on-site composting facility is not anticipated due to the lack of available space in the project area. Small scale composting associated with organic materials generated at the worker housing facility may be incorporated within the centralized GMS in the Fiddle valley. Any larger composting facilities deemed necessary to support growth media quality or quantity improvements would be located off-site.

3.12.4 Landfarm

A landfarm (i.e., a biological waste treatment process for treating hydrocarbon contaminated soils via spreading and tilling/aerating) will not be constructed or maintained on site. This represents a change to what is described in the DEIS for Alternatives 1 through 4.

3.12.5 Solid Waste

Solid waste management for the ModPRO2 differs from all preceding DEIS alternatives in that no on-site landfill will be constructed or maintained.

All municipal waste and construction and demolition waste generated at the SGP will be hauled off-site for disposal; a landfill will not be constructed or maintained at the SGP. Concrete foundations would be broken or fractured as required to prevent excessive water retention and covered in-place with a minimum of 2 feet of a combination of 1.5 feet of backfill and 0.5 feet of growth media or would be broken up and buried in the TSF Buttress or pit backfill prior to installation of a geomembrane barrier cover. Solid waste from the worker housing facility, shops, and other work areas that cannot be composted or recycled would be collected in wildlife-resistant receptacles and hauled off-site for disposal in a municipal waste landfill.

3.12.6 Hazardous Waste Handling

This represents no change to hazardous waste handling from what is detailed in the DEIS for Alternatives 1 through 4.

Material that meets the classification of a "hazardous waste" will be collected and stored, per the project Waste Management Plan at specially designed and operated secured satellite collection sites and a main storage site prior to shipment to a Resource Conservation and Recovery Act certified hazardous waste disposal facility.

3.13 SURFACE AND UNDERGROUND EXPLORATION

Exploration and development drilling would occur to evaluate potential mineralized areas outside of the proposed mining areas. New surface and underground exploration activities would be conducted during construction and concurrent with operations. Any additional future expansion of mining activities would require supplemental permitting and approvals, including additional evaluation under NEPA where applicable.

3.13.1 Surface Exploration

This represents no change to the approach, scope and nature of surface exploration versus what is detailed in the DEIS for Alternatives 1 through 4.

Exploration activities conducted during construction and operations could include up to 5 acres of temporary road disturbance and 8 acres of drill site disturbance on NFS lands at the mine site. Exploration sites would be reclaimed after completion of drilling. Reclaimed acres would become available for future exploration, never exceeding 13 acres of disturbance at any one time. Ultimate potential disturbance resulting from surface exploration would total approximately 25 acres of roads and 40 acres of drill pads. Any stream crossings outside of permitted development and operations crossings may require additional permits under Section 404 of the CWA.

The exploration roads and drill pads would be located, as practical, on historical disturbance to avoid any identified cultural resources, other sensitive areas such as wetlands or Riparian Conservation Areas, and disturbance to ESA listed species. Figure 3-22 shows the boundary of the area within which ongoing surface exploration during construction and operations would occur.

Drill pad sizes would vary depending on the type of drilling equipment, number of holes to be drilled from the pad, and depth of drill hole. Drill pad sizes may range from approximately 0.05 to 0.15 acre.

Sumps and/or portable tanks would be used at each drill site to collect drill cuttings and to manage and circulate drilling fluids. Sumps would be constructed with at least one side having a shallow grade for wildlife egress. Sumps would be backfilled and reclaimed when no longer needed for drilling.

Exploration wells would be abandoned with surface completions/seals and be capped consistent with IDAPA 37.03.09 – Well Construction Standards Rules. Pre-collared holes would only be associated with track or truck -mounted drilling equipment.

Areas disturbed for exploration would be contoured to blend into surrounding terrain; water bars and surface water channels would be retained to handle flows through the area. Compacted areas would be de-compacted as necessary prior to fertilizing and seeding.

Depending on the location of the drill site, a variety of drill rigs and equipment would be supported by helicopter or terrestrial vehicle. Some drill holes may exceed 1,500 feet, but the average drill-hole depth would be approximately 800 feet. Drill holes would be both vertical and angled. Drilling activities also may include water exploration, dewatering well installation, and monitoring well installation. Water and non-toxic drilling fluids would be used for all drilling.

3.13.2 Underground Exploration

This represents no change to the approach, scope, and nature of underground exploration versus what is detailed in the DEIS for Alternatives 1 through 4.

Underground exploration activities would be conducted from a one-mile, downward-sloping tunnel (i.e., a decline). The decline would be used to reach the subsurface mineralized zone known as the Scout Prospect. The decline would be accessed from a portal facility known as the Scout Portal, located south of the planned ore processing facility (Figure 3-22). Approximately 100,000 tons of rock would be excavated from the decline for development. Selected cuttings or core would be removed from underground for testing.

To construct the portal facility, the hillside would be cut into to develop a near vertical slope using conventional underground drill and blast operations with mechanized equipment. Explosives would be used in the underground development process to construct the decline. The underground development rock could be used for surface pad construction, hauled to the ore stockpile area, or hauled for storage in a DRSF as appropriate after appropriate testing.

Drilling is used in advance of the decline to ensure unexpected or unmanageable water pressures are not intersected. Water would be used in underground drilling or pumped from the collection point to the surface. Upon reaching the surface, this water would be piped to the ore processing facility and used in the plant.

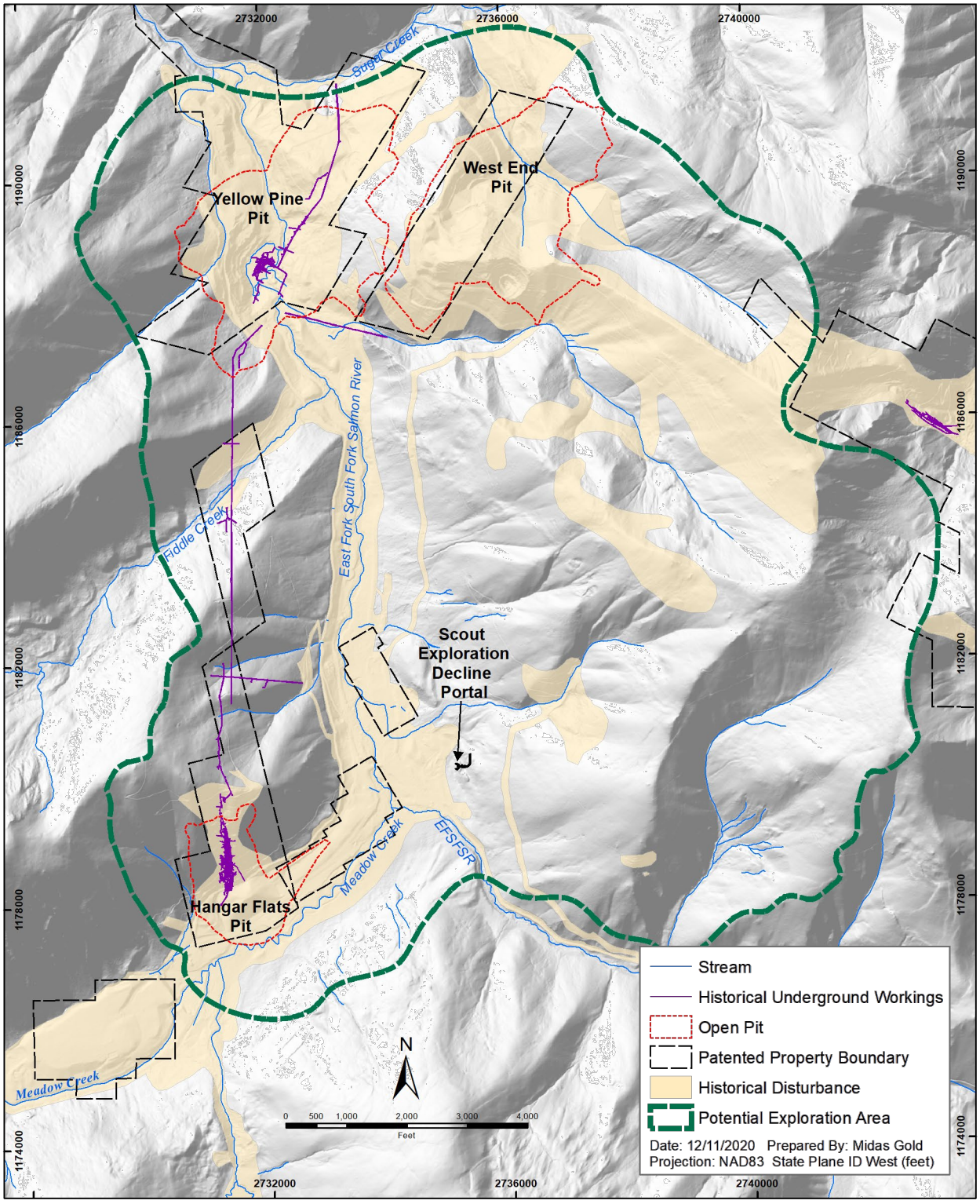


Figure 3-22. Surface Exploration Boundary

3.14 CLOSURE AND RECLAMATION

3.14.1 Overview

The ModPRO2 includes changes to closure and reclamation relative to the DEIS Alternatives. Low permeability geosynthetic liners will be incorporated into the cover systems on the full extent of the surface of the reclaimed Yellow Pine pit, Hangar Flats pit, TSF and TSF Buttress. Also, restoration of the EFSFSR channel across the backfilled Yellow Pine pit will include a widened, deepened section of channel (Stibnite Lake).

Closure and reclamation at the site would include interim, concurrent, and final closure and reclamation (Tetra Tech, 2021b, in progress).

Interim reclamation is intended to provide shorter-term stabilization to prevent erosion of disturbed areas and stockpiles that would be removed or more fully and permanently reclaimed later.

Concurrent reclamation is designed to provide permanent, low-maintenance achievement of final reclamation goals on completed portions of the site prior to the overall completion of mining activities throughout the mine site. Approximately 38 percent of the Project reclamation would be done concurrent to mining and ore processing; remaining reclamation activities would be completed during closure.

Final closure and reclamation would involve removing all structures and facilities; reclamation of those areas that have not been concurrently reclaimed such as the TSF and some backfill surfaces; recontouring and improving drainages; creation of wetlands; reconstructing various stream channels; decommissioning of the EFSFSR diversion tunnel; growth media placement; planting and revegetation on disturbance areas; and reopening Stibnite Road (FR 50412) through the mine site.

Final reclamation of certain facilities could continue beyond the five-year closure and reclamation period. The Burntlog Route would be needed until the TSF is fully reclaimed, after which the newly constructed portions would be decommissioned and reclaimed, with the exception of removal of soil nail walls, and the currently existing portions returned to their prior use.

Closure and reclamation activities would be intended to achieve post-mining land uses of wildlife and fisheries habitat and dispersed recreation at the mine site. Dispersed recreation uses would be accessible by the reopening of Stibnite Road (FR 50412) (including establishment of a permanent public road through the backfilled Yellow Pine pit) that would facilitate recreational traffic and access to Thunder Mountain.

Concurrent and final closure and reclamation for the ModPRO2 are described in greater detail in the following sections. A plan view of the Stibnite area closure surface is presented on Figure 3-23.

This represents no change to the approach to, and scope and nature of closure and reclamation versus what was detailed in the DEIS for Alternatives 1 and 2 except that the smaller Hangar Flats pit, backfill of Hangar Flats pit, larger West End pit, elimination of the Fiddle and West End DRSFs, the replacement of eight GMSs around the site as with one centralized GMS in the Fiddle drainage, and a slightly larger Hangar Flats DRSF (i.e., Hangar Flats pit backfill) will reduce the overall project area to be closed and reclaimed.

3.14.2 Temporary Closure

There are no periods of temporary or seasonal closure currently planned for the SGP; however, a description of temporary closure is required for the Project cyanidation permit. In the event of temporary suspension of mining activities, Perpetua Resources would notify the USFS, United States Army Corps of Engineers (USACE), IDEQ, IDWR, Idaho Department of Lands (IDL), and Valley County in writing with as much advanced warning as possible of the temporary stop of mining activities. This notification would include reasons for the shutdown and the estimated timeframe for resuming production.

During any temporary shutdown, Perpetua Resources would continue to implement operational and environmental maintenance and monitoring activities to meet permit stipulations and requirements for environmental protection.

If ore processing is not occurring, and depending on the time of year, dewatering may be halted, and excess contact water collected from the various facilities may be allowed to remain in pits, stored in ponds, or transferred to the pits or TSF for temporary storage prior to water treatment or later reuse. In the case of a longer-term closure, mobilization of additional water treatment capacity may be necessary to allow discharge to the area streams and prevent filling of the TSF. In no case would the TSF design freeboard or reserved flood storage be exceeded. A plan would need to be developed, reviewed and approved by the appropriate regulatory authorities, and implemented at the time of any longer-term temporary closure.

This represents no change to the approach, scope and nature of temporary closure versus what is detailed in the DEIS for Alternatives 1 through 4.

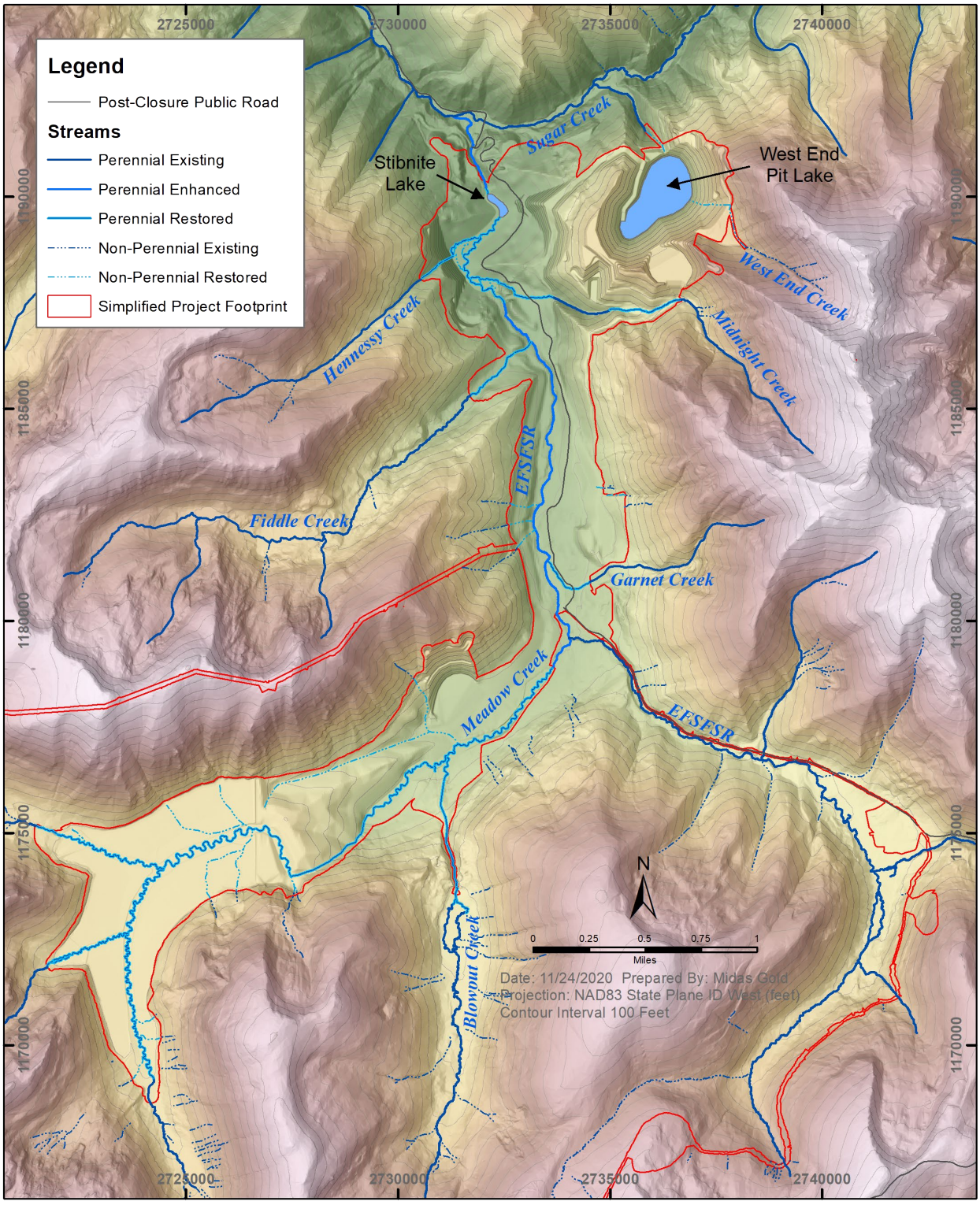


Figure 3-23. Site Closure Plan

3.14.3 Decommissioning, Demolition, and Disposal of Facilities

Facility decommissioning described in the ModPRO2 from that which is described for all DEIS Alternatives as there would be no on-site landfill.

Perpetua Resources would dismantle or demolish structures and facilities not necessary for post-closure water management (e.g., certain culverts, pipelines, and water treatment facilities). The materials from the dismantling or demolition of structures and facilities would be salvaged or disposed of in permitted off-site landfills. All reagents, petroleum products, solvents, and other hazardous or toxic materials would be removed from the site for reuse or would be disposed of according to applicable state and federal regulations. Concrete foundations would be broken or fractured as required to prevent excessive water retention and covered in-place with a minimum of 2 feet of a combination of 1.5 feet of backfill and 0.5 feet of growth media or would be broken up and buried in the TSF Buttress or pit backfill prior to installation of a geomembrane barrier cover. Soil/rock beneath fuel storage areas and chemical storage buildings would be tested for contamination and removed and disposed of appropriately as needed

3.14.4 Underground Exploration and EFSFSR Tunnel Closure and Decommissioning

Exploration activities in the ModPRO2 are similar to those described for all DEIS Alternatives.

Perpetua Resources would decommission and close underground facilities and underground support facilities, including the portals of the EFSFSR Tunnel and Scout decline. To prevent future access to underground workings, the underground portals (i.e., EFSFSR Tunnel and Scout decline) will be closed using a concrete block bulkhead, rockfill, or a combination of rockfill and low-permeability foam. The downstream (north) EFSFSR portal and the Scout decline would be closed with bulkheads inside the portals (where overhead cover was at least 3 times the tunnel height) or backfilled with clean rockfill starting inside the portals and working outward, and up against the portal headwalls. Surface swales would be installed to direct surface water around the backfilled portal, and the exterior backfill, and surrounding disturbance would be graded to blend with adjacent topography, covered with growth media, and revegetated. At the EFSFSR upstream (south) portal, the control weir would be left in place, and the fishway weir notch raised with concrete, creating an approximately 4-foot-high sill to exclude river water or alluvial groundwater, and low-permeability geofoam or similar would be installed inside the portal after the initial backfill or bulkhead, to prevent water entry. Then, the portal area would be filled, regraded, and revegetated as described for the other openings.

This represents no change to the general approach of blocking future access to underground openings but is a potential change in methodology in favor of allowing the option of using earthworks techniques (rockfill and/or geofoam) over structures (bulkheads) versus what is detailed in the DEIS for Alternatives 1 through 4.

3.14.5 Yellow Pine Pit and DRSF

Reclamation of the Yellow Pine pit proposed in the ModPRO2 differs from all DEIS Alternatives. The cover on the entire surface of the Yellow Pine pit backfill (Figure 3-24) will include a low permeability geosynthetic liner to inhibit the infiltration of meteoric water and the interaction of the restored stream channel with the underlying backfill. The restored stream channel will also incorporate a deepened, widened section (Stibnite Lake) to replace fisheries habitat and to reduce summer maximum stream temperature.

The majority of the Yellow Pine pit backfill material (90 percent) will be West End pit development rock. The balance of Yellow Pine pit backfill will include development rock from the West End pit (5 percent) and the Yellow Pine pit (5 percent). The backfill will be placed by end dumping from a number of locations around the pit, including highwall edges

and also direct placement in the base of the pit as the backfill fills the pit. This material will not be compacted beyond any compaction that takes place during placement, subsequent routing of trucks, burial, and consolidation. Portions of the highwalls on the east and west sides of the pit would remain above the backfilled portion of the pit and would not be reclaimed. A sinuous channel would be constructed through the backfilled area for the reconstructed EFSFSR with an average valley gradient approximating the original river gradient (Tetra Tech, 2021b in progress). A low permeability geosynthetic liner will be incorporated into the cover over the entire surface of the backfilled Yellow Pine pit, including the re-constructed channel/ floodplain corridor to reduce the infiltration of meteoric water into backfill material, which could dewater the restored stream channel and result in additional metal leaching from the underlying backfill. Above the geosynthetic cover in the stream corridor, a layer of relatively fine material would be placed to protect the liner from puncture, followed by coarse rock armor to prevent exposure via stream scour, followed by floodplain alluvium at a minimum thickness equal to the maximum estimated scour depth of the proposed stream channel. Growth media will then be placed and revegetated as appropriate. The lined corridor will be wide enough to accommodate future channel migration and evolution. The cover system outside the stream/floodplain corridor would be similar to that described for the TSF Buttress (section 3.14.7).

Hennessy Creek would cascade over the west highwall (approximately 275 feet tall) of the Yellow Pine pit to a restored section of low-gradient channel on the western edge of the reconstructed EFSFSR floodplain before joining the restored EFSFSR channel, and Midnight Creek would be restored across the southeastern portion of the EFSFSR floodplain. After closure of the EFSFSR tunnel, backfilling of the Yellow Pine pit, and restoration of the EFSFSR and Hennessy Creek across the backfill, the Hennessy Creek diversion would be decommissioned and the area reclaimed, along with the adjacent operations-phase public access road.

To accommodate migrating fish, including salmon and bull trout, step pools would be established within the constructed channels. The vertical relief (drop) between successive pools would not exceed published fish passage criteria. High flow events would guide the overall channel and floodplain design and construction, with channel bankfull width approximately 25 to 30 feet, and average depth of approximately 2 feet. Stibnite Lake, of similar size to the current Yellow Pine pit lake, would be constructed within the lined corridor. The Stibnite Lake feature would reduce summer maximum stream temperatures downstream of the site and replace or improve upon the habitat functions of the existing former mine pit.

The operations-phase public access road at the western edge of the pit would be reclaimed, and permanent public access through the site to Thunder Mountain Road (FR 50375) would be reestablished with construction of a road through the backfilled area, replacing segments of Stibnite Road (FR 50412) removed by mining.

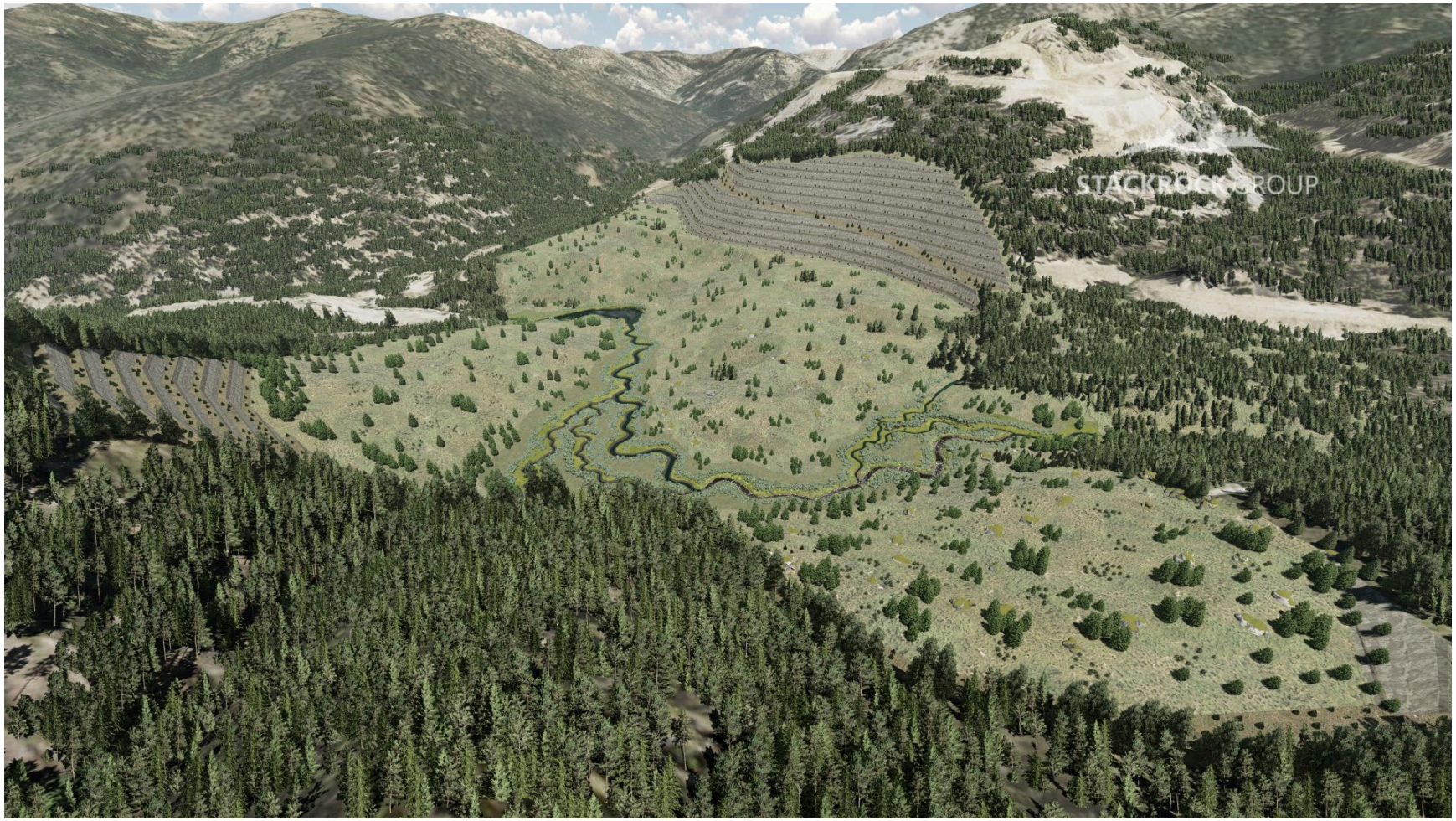


Figure 3-24. Post Closure Oblique View of Yellow Pine Pit Area

3.14.6 West End Pit

Reclamation of the West End pit in the ModPRO2 is similar to that which is described for all DEIS Alternatives. Similar to the ModPRO (DEIS Alternative 2), the Midnight pit portion of the West End pit will be backfilled with development rock. West End Creek would be routed into the West End pit in a rock chute on the highwall adjacent to the upper legacy development rock dump, below which a pit lake is anticipated to form in the main portion of the West End pit. The up to 400-feet-deep West End pit lake will fill gradually, and lake levels will fluctuate seasonally and with longer-term climate variations; however, the lake is not expected to completely fill with water or spill due to the limited catchment area.

To account for model uncertainty, lake levels would be monitored after closure, and a threshold water level would be established, sufficient to contain the predicted runoff volume from a high-snowpack year without discharge. If water levels approach the threshold, either or both surface water diversion and water treatment could be implemented to prevent the lake from spilling. For treatment, a temporary treatment unit would be mobilized to the site to treat and discharge the water until the lake level falls below the threshold level, thus preventing untreated discharge in potential subsequent wet weather years and enabling gradual and predictable water treatment rather than treatment at higher but variable and uncertain peak spring runoff rates. Updated modeling suggests the West End pit lake would not discharge to surface water; therefore, post-closure water treatment is not required.

The Midnight pit, the approximately 6-acre, 100-foot-deep southeastern portion of the overall West End pit within the Midnight Creek catchment, would be backfilled during operations with approximately 6 million tons of development rock from the West End pit. The backfill would be placed to achieve a mounded final reclamation surface to promote drainage away from the West End pit and prevent formation of a pit lake within Midnight pit. Portions of the backfill would be covered with growth media and revegetated, and the remainder covered with talus like development rock to mimic a natural talus slope. The floor of the sidehill pit southwest of the main West End pit would be graded to drain, covered with growth media, and revegetated. No backfilling would occur for the main West End pit. At closure, the remaining road into the pit and access to highwalls would be blocked with large boulders and/or earthen berms to deter motorized vehicle passage into the pit.

3.14.7 Tailings Storage Facility and Buttress

Reclamation of the TSF and TSF Buttress proposed in the ModPRO2 differs from all DEIS Alternatives. A low permeability geosynthetic liner will be placed on the entire surface of the TSF and TSF Buttress to inhibit the interaction of meteoric water with tailings in the TSF and development rock in the TSF Buttress. Unconsolidated overburden and growth media will be placed on the geosynthetic cover and the area will be revegetated.

Reclamation of the TSF would be completed within approximately 9 years after ore processing operations cease. After tailings consolidate sufficiently to use heavy equipment on top of the tailings, starting approximately 3 to 5 years after the end of deposition, Perpetua Resources would begin with placement of cover material, then construct wetlands and restore Meadow Creek and its tributaries within appropriately sized lined floodplain corridors, place growth media, and revegetate the area.

Once ore processing operations have ceased, Perpetua Resources would begin removing the remaining supernatant pool and ongoing accumulation of meteoric water and consolidation water through a combination of spray evaporators (similar to snowmaking misters) operated within the TSF boundary, and active water treatment that meets IPDES

discharge limits, followed by discharge to the EFSFSR or Meadow Creek. Removal of the remaining supernatant water from the TSF would allow the surficial layers of the tailings to dry and gain strength, which would allow equipment to operate on the tailings surface for grading and the placement of the geosynthetic cover, overlain by unconsolidated overburden and growth media. Cover placement and minor grading of tailings would occur as portions of the TSF allow equipment traffic, working inward from the facility perimeter beginning within 3 to 5 years from the end of deposition. The cover material overlying the geosynthetic liner would be sourced from unconsolidated overburden or other appropriate root zone material stored in a closure material stockpile on top of the adjacent TSF Buttress.

Perpetua Resources would restore appropriately designed meandering stream channels (Meadow Creek and tributaries) within a geosynthetic-lined stream and floodplain corridor across the top of the TSF (Rio Applied Science and Engineering [Rio ASE], in progress). Pools and riffles would be constructed within the channel. Measures to create aquatic habitat would include side channels, oxbows, boulder clusters, root wads, and large woody debris. This would allow for the post-closure development of riparian habitat, convey water off the facility, and minimize potential interaction of surface water with the underlying tailings. Given the nature of the surface of the TSF, the constructed channel would have a shallow gradient.

High-flow events would drive the overall channel and floodplain design, which would necessitate the construction of defined channels ranging from approximately 5 to 15 feet in bankfull width, with average bankfull depth reaching approximately 2 feet. A connected floodplain up to 200 feet wide would convey higher flows during a 100-year flood event.

Consolidation of the tailings would continue after cover placement and surface reclamation, at gradually declining rates, until approximately year 40. To prevent tailings consolidation water from mixing with surface water on the cover, potentially leading to water quality impacts if discharged to streams, the consolidation water would be collected for treatment using shallow wells and gravel or geosynthetic drains. Initially, collected flows would be routed to a WTP for treatment and discharge. Treatment would no longer be required after approximately mine year 40, at which time the treatment facility would be decommissioned and the WTP site reclaimed.

Final slopes of the TSF Buttress would be variable, to blend with the surrounding terrain to the extent practicable, produce a permanent and stable landform, provide access for future maintenance on the TSF and buttress, and provide for non-erosive drainage across the reclaimed face of the buttress. Upon completion of final grading of the TSF Buttress, a low permeability geosynthetic cover would be placed over the facility, which would be designed to limit infiltration through the underlying development rock. The geosynthetic liner would be overlain by an inert soil/rock layer (non-PAG/metal leaching development rock, fill, or alluvium) and growth media and revegetated. Similar to that for the TSF, a channel and floodplain corridor would be established for Meadow Creek across the top of the closed buttress, with the stream corridor liner contiguous with the buttress cover. The channel would have a low gradient and wide floodplain across the top of the buttress, then drop more steeply to the valley floor near the south abutment. The steep channel segment would consist of a boulder chute (with underlying liner contiguous with the buttress cover) that would flow through an energy-dissipating basin at the toe of the TSF Buttress before being discharged to a restored Meadow Creek on the valley bottom.

3.14.8 Hangar Flats Pit

The reclamation of the Hangar Flats pit proposed in the ModPRO2 differs from all DEIS Alternatives. Project refinements that are exclusive to the ModPRO2 include: the complete backfill of Hangar Flats pit, reduced pit volume

and reduced disturbance footprint, placement of a low permeability geosynthetic liner over the full surface of the Hangar Flats pit backfill, and improved streamflow and stream temperature in Meadow Creek.

Hangar Flats pit would be backfilled to the valley bottom elevation or slightly higher during mine operations. The already-established Meadow Creek diversion channel and floodplain corridor would be retained around Hangar Flats pit as the final configuration, and the segment of Meadow Creek between the toe of the TSF Buttress and the entrance to the Hangar Flats pit diversion would be restored along with adjacent riparian wetlands. At closure, the entire surface of the backfilled Hangar Flats pit will be covered a low permeability geosynthetic liner overlain with seed bank material to establish approximately 39 acres of palustrine emergent wetlands. Meadow Creek downstream of the Hangar Flats pit diversion, to the confluence with the EFSFSR, would be enhanced during mine operations with large woody debris, boulder cluster habitat structures, and riparian plantings.

Saturation of the Hangar Flats backfill and rebound of the alluvial groundwater is predicted to take approximately 2 years (i.e., by the end of mine year 8) from the end of mining Hangar Flats pit.

As compared to all alternatives in the DEIS, the Hangar Flats pit would be considerably smaller with the mined tonnage decreased approximately 70 percent, reducing the footprint and overlapping water management needs. Further, the Hangar Flats pit would be fully backfilled with development rock and there would be no Hangar Flats pit lake. During mining, streamflow and temperature EPMs would be similar in effect, but rely on direct discharge rather than RIBs, and all else equal or shorter in duration for the case of a smaller, fully backfilled pit as opposed to a larger pit with an ultimate pit lake. Owing to the relatively rapid rebound of groundwater levels, no post-closure streamflow augmentation would be required associated with the Hangar Flats pit.

3.14.9 Transmission Line and Electrical Infrastructure

The Johnson Creek and Stibnite substations would not be decommissioned immediately during mine closure; structures and conductor connecting the substations would remain to provide power to for water treatment at the mine site as part of the post-closure Water Management Plan. Once there is no longer a need for active water treatment, the proponent, in coordination with Idaho Power, would disassemble the approximately 9-mile transmission line from the Johnson Creek substation to the mine site. The substation, switchgear, poles, and distribution lines would be removed from the mine site and the Johnson Creek substation would also be removed. The transmission line right-of-way from Johnson Creek to the mine site, and spur roads used to access power pole structure sites, would be recontoured to match surrounding topography and revegetated. As part of revegetation, the powerline structure pad sites and spur roads would be scarified where necessary and revegetated to establish species that can be expected to result in vegetation comparable to that growing adjacent to the affected area. Revegetation would not be required on affected lands, or portions thereof, where planting is not practicable or reasonable because the soil is composed of excessive amounts of sand, gravel, shale, stone, or other material to such an extent to prohibit plant growth (IDAPA 20.02.02). The reclaimed areas would be seeded with species listed in the Reclamation and Closure Plan (RCP; Tetra Tech 2021b, in progress) or as approved by the USFS. This represents a slight change relative to the ModPRO (DEIS Alternative 2). Transmission line infrastructure would be removed and reclaimed once there is no longer a need for active water treatment, rather than being retained in perpetuity.

3.14.10 Burntlog Route

Once all final mine closure/reclamation work has been completed, Perpetua Resources would reduce the 20-foot-wide travel way of 19.8 miles of Burnt Log Road (FR 447), 1.3 mile of Meadow Creek Lookout Road (FR 51290), and

2.0 miles along Thunder Mountain Road (FR 375) of Burntlog Route to their approximate pre-mining width. Returning approximately 23 miles of existing road to pre-mining condition would entail grading and/or scarification along the outside edges of the road followed by seeding with the species listed in the RCP (Tetra Tech 2021b, in progress) or as approved by the USFS. Perpetua Resources would remove ditches, cross drains, culverts, safety berms, mile markers, guardrails, and signs on roads if these features are no longer needed. These roads would retain their flatter grades and gentler curves constructed for mine operation.

The approximately 15 miles of Burntlog Route connecting to Meadow Creek Lookout Road (FR 51290) and Thunder Mountain Road (FR 50375) would be decommissioned by pulling back and re-contouring road cuts to slopes that are similar to pre-project conditions, and that would be consistent with the surrounding terrain as practicable. Surface water diversions, cross drains, culverts, safety berms, mile markers, guardrails, and signs would be removed. Water bars or other erosion and sediment control structures, armored stream crossings, and stormwater crossings would be included where necessary. The reclaimed areas would be scarified, and growth media, where available, would be placed in upland areas, followed by seeding and certified weed-free mulching on slopes over 30 percent. Revegetation would not be required where affected lands, or portions thereof, where planting is not practicable or reasonable because the soil is composed of excessive amounts of sand, gravel, shale, stone, or other material to such an extent to prohibit plant growth (IDAPA 20.02.02).

This represents no material change to the approach and nature of the Burntlog Route closure and decommissioning versus what is detailed in the DEIS for Alternatives 1, 2 and 3.

3.14.11 Post Closure Public Access

The ModPRO2 represents no material change to the approach, scope, and nature of the post closure public access closure and decommissioning versus what is detailed in the DEIS for Alternatives 1 through 4.

A road would be established over the backfilled Yellow Pine pit to allow public access through the reclaimed site and connect Stibnite Road (FR 50412) to Thunder Mountain Road (FR 50375).

3.14.12 Burntlog Maintenance Facility

The ModPRO2 represents no material change to the approach, scope and nature of the Burntlog Maintenance Facility closure and decommissioning versus what is detailed in the DEIS for Alternatives 1, 2 and 3.

Following mining and ore processing operations, the Burntlog Maintenance Facility buildings would be removed. The sewer system and septic tanks for the Landmark maintenance facility would be decommissioned. Soil/rock beneath fuel storage areas and chemical storage buildings would be tested for contamination. All reagents, petroleum products, solvents, and other hazardous or toxic materials would be removed from the site and disposed of according to applicable state and federal regulations. After demolition of the buildings and facilities, the site would be graded, and drainage restored.

3.14.13 Contouring, Grading, Growth Media Placement, and Seeding

Except for the Hangar Flats pit highwall above the valley bottom, West End pit, and a portion of the Yellow Pine pit highwall above the backfill level, Perpetua Resources would contour and grade disturbed areas to blend into the surrounding topography and terrain.

Compacted areas such as roads, ore stockpile areas, parking lots, fuel storage areas, and building sites would be prepared by ripping or scarification prior to placement of growth media and revegetation. Haul routes and access roads would be re-contoured to establish natural drainage patterns.

A deficit of approximately 815,000 bank cubic yards of growth media would exist. Perpetua Resources would manufacture growth media material using screened fines from glacial till sources mined from the Yellow Pine pit, available mulched vegetation, and off-site composted material.

Planting, seeding, and mulching would be conducted in the fall and early winter to take advantage of snowpack and springtime moisture. Where cover crops are used in lieu of mulch, seeding would occur in the spring or fall followed by seeding of the permanent mixture. The RCP lists the forb, grass species, seed amounts, and the trees and shrubs planned for planting on reclaimed areas (Tetra Tech, in progress [b]). The reclamation seed mixes and rates would require approval by the USFS.

This represents no change to the approach, scope and nature of the contouring, grading, growth media placement, and seeding during post-closure and decommissioning versus what is detailed in the DEIS for Alternatives 1, 2 and 3; only the growth media material balance changed, largely as a consequence of eliminating the Fiddle DRSF.

3.14.14 Post-Closure Water Treatment

Post-closure water treatment flows included in the ModPRO2 differ from what is detailed in the DEIS for Alternatives 1 and 2 due to the backfill of Hangar Flats pit (eliminating the pit lake and associated water treatment), and incorporation of additional low permeability geosynthetic liners into the covers on the TSF, TSF Buttress, and Hangar Flats pit backfill. Both the duration and volume of post-closure water treatment are reduced versus the ModPRO; after closure of the TSF Buttress which is scheduled for the majority of reclaim in years 13, 15, and 19, and the TSF (covered in approximately year 23), post-closure tailings consolidation water would be the only source requiring treatment.

Consolidation of the tailings would continue after cover placement and surface reclamation, at gradually declining rates, and this consolidation water would be withdrawn from beneath the TSF geosynthetic cover using a combination of wells, wicks, and/or gravel drains, and routed to water treatment. Collected flows would be routed to the water treatment plant (WTP) for treatment and discharge. Based on the model results, treatment would no longer be required after approximately 25 years from the end of ore processing (mine year 40), at which time the treatment facility would be decommissioned and the WTP site reclaimed. Water treatment will be provided during the reclamation and closure and post-closure phases until waters requiring treatment are no longer being generated. Life-of-mine water treatment of the TSF and other facilities is discussed in Section 3.10.4.

West End pit lake (Section 3.14.6) is not expected to spill to surface water; however, lake levels would be monitored, and if spillage becomes imminent a portable system could be brought to site to treat and discharge pit lake water to maintain levels below the rim of the lake and prevent uncontrolled release of lake water. Alternatively, surface water diversions could be reestablished to further reduce the inflowing catchment area.

3.14.15 Closure and Reclamation Financial Assurance

The ModPRO2 presents no change in approach to closure and reclamation financial assurance versus that in the DEIS for Alternatives 1 through 4.

As part of the approval of a Plan for the SGP, the Payette National Forest (PNF) Forest Supervisor would require Perpetua Resources to post financial assurance to ensure that NFS lands and resources involved with the mining operation are reclaimed in accordance with the approved Plan and reclamation requirements (36 CFR Parts 228.8 and 228.13). This financial assurance would provide adequate funding to allow the USFS to complete reclamation and post-closure operation, maintenance activities, and necessary monitoring for as long as required to return the site to a stable and acceptable condition in the event Perpetua Resources was unable to do so. The amount of financial assurance would be determined in collaboration with the USFS and would "address all USFS costs that would be incurred in taking over operations because of operator default" (USFS, 2004). The financial assurance would be required in a readily available financial instrument such as a surety bond or trust funds. To ensure the bond can be adjusted as needed to reflect actual costs and inflation, there would be provisions allowing for periodic adjustment on bonds in the final Plan prior to approval. Calculation of the initial bond amount would occur following the record of decision, when enough information is available to adequately and accurately perform the calculation.

In addition to the USFS-required bond, mitigation under Section 404 of the CWA also requires financial assurance. The IDL would require a bond as part of their permitting authority and IDEQ would require a bond for a cyanidation permit. The IDWR is the state agency responsible for design review and approval of the TSF. IDWR also would require a bond so that the TSF can be placed in a safe maintenance-free condition if abandoned by the owner.

3.15 PROJECT TRAFFIC

3.15.1 Construction Traffic

Initial construction activities are estimated to take approximately 2 to 3 years. Traffic associated with construction work would occur year-round, depending upon road and weather conditions. Construction-related traffic and material hauling would be most concentrated from May through November. Since Perpetua Resources would require most personnel to use company provided buses and vans at the SGLF to commute to the SGP, traffic volumes differ between State Highway 55 and the SGLF and between the SGLF and the SGP. Supplies and deliveries for the mine site during construction would access the SGLF using State Highway 55 to Warm Lake Road and would use State Highway 55 through Cascade and McCall, and other communities along State Highway 55 including Banks, Horseshoe Bend, Donnelly, Lake Fork, and New Meadows. The total estimated annual average daily traffic (AADT) for construction activities driving to the SGLF from State Highway 55 are presented in Table 3-8 and Table 3-10. Estimated traffic volumes between the SGLF and the SGP are presented in Table 3-9 and Table 3-11. The estimated traffic volumes between State Highway 55 and the SGLF are new data.

Traffic volume estimates between the SGLF and the SGP represent no material change in construction traffic versus that in the ModPRO (DEIS Alternative 2). Operations Traffic

The estimated traffic volumes between State Highway 55 and the SGLF are new data. Traffic volume estimates between the SGLF and the SGP represent no material change in operations traffic versus that in the ModPRO (DEIS Alternative 2).

Supplies and deliveries for the mine site during operations would access the SGLF using State Highway 55 to Warm Lake Road. Approximately two-thirds of all mine-related traffic would originate south along State Highway 55 through Cascade and other communities including Banks and Horseshoe Bend. Approximately one-third of all mine-related traffic originating north of Warm Lake Road would use State Highway 55 through the communities of Donnelly, Lake Fork, and McCall. Mine-related traffic would generally use Deinhard Lane and Boydstun Street through McCall. The

estimated AADT for vehicles traveling to the SGLF during operations is provided in . Estimated traffic volumes leaving the SGLF heading to the SGP is provided in . The vehicle increase is attributed to employees traveling to and from the SGLF. This is a conservative estimate as Perpetua Resources will encourage employees to use company provided shuttle buses as transport to the SGLF from towns along SH 55. Traffic volumes between State Highway 55 and the SGLF were evaluated in a Traffic Impact Study Addendum (HDR 2020). The purpose of the analysis was to verify the proposed improvement at the intersection of State Highway 55 and Warm Lake Road would adequately serve the proposed travel demand.

Table 3-8 Projected Construction Traffic; State Highway 55 to SGLF

Transport	Vehicle Type	Estimated Average No. of Round Trips Per Period[1]	Period[2]	Scheduled Days per Year[3]	Number of Round Trips per Year[4]	Annual Average Daily Traffic[5]
Crew bus/van transport to site	HV	28	10 days	261	730	4
Crew personal vehicles	LV	37	10 days	261	965	5
Crew Traffic to SGLF	LV	916	10 days	261	23908	131
Salaried employees	LV	5	5 days	261	261	1
Salaried employees bus/van transport	HV	1	7 days	261	52	0.3
SGLF staff	LV	42	5 days	261	2192	12
Steel and Cement	HV	3	1 day	152	456	2
Fuel and miscellaneous supplies	HV	3	1 day	261	655	4
Equipment & supply representatives	LV	2	1 day	261	522	3
Food delivery	HV	2	1 day	261	522	3
Trash & recyclables	HV	3	7 days	365	156	1
Construction supply	HV	11	1 day	261	2,871	16
Miscellaneous traffic	LV	4	1 day	261	1,044	6
Road maintenance	HV	6	1 day	313	1,878	10
Total HV AADT	-	-	-	-	-	30
Total LV AADT	-	-	-	-	-	169
Total AADT	-	-	-	-	-	198

Notes:

1The estimated average number of round trips that would occur within a given time period. All figures have been rounded up to whole numbers.

2The allocated time period.

3Not all transport phases would occur daily; scheduled days per year indicate the days per year when a trip is expected.

4The estimated average number of round trips that would occur in a given year.

5The estimated average number of round trips per period / period x scheduled days per year / 365 days x 2 trips

Abbreviations:

AADT = annual average daily traffic

HV = heavy vehicle

LV = light vehicle

SGLF = Stibnite Gold Logistics Facility

Table 3-9 Projected Construction Traffic; SGLF to SGP

Transport	Vehicle Type	Estimated Average No. of Round Trips Per Period[1]	Period[2]	Scheduled Days per Year[3]	Number of Round Trips per Year[4]	Annual Average Daily Traffic[5]
Crew bus/van transport to site	HV	28	14 days	365	730	4
Crew personal vehicles	LV	37	14 days	365	965	6
Salaried employees	LV	5	7 days	365	261	2
Salaried employees bus/van transport to site	HV	1	7 days	365	52	1
Steel and Cement	HV	3	day	152	456	3
Fuel and miscellaneous supplies	HV	2	day	261	522	3
Machine parts and consumables	HV	4	day	261	1,044	6
Pilot vehicle (fuel and hazardous loads)	LV	2	day	261	522	3
Equipment & supply representatives	LV	2	day	261	522	3
Food delivery	HV	2	day	261	522	3
Trash & recyclables	HV	3	7 days	365	156	1
Construction supply	HV	11	day	261	2,871	16
Miscellaneous traffic	LV	4	day	261	1,044	6
Road maintenance	HV	4	day	365	1,460	8
Total HV AADT	-	-	-	-	-	45
Total LV AADT	-	-	-	-	-	20
Total AADT	-	-	-	-	-	65

Notes:

[1]The estimated average number of round trips that would occur within a given time period. All figures have been rounded up to whole numbers.

[2]The allocated time period.

[3]Not all transport phases would occur daily; scheduled days per year indicate the days per year when a trip is expected.

[4]The estimated average number of round trips that would occur in a given year.

[5]AADT = estimated average number of round trips per period / period x scheduled days per year / 365 days x 2 trips

Abbreviations:

AADT = annual average daily traffic
HV = heavy vehicle
LV = light vehicle
SGLF = Stibnite Gold Logistics Facility
SGP = Stibnite Gold Project

Table 3-10 Projected Operational Traffic; State Highway 55 to SGLF

Transport	Vehicle Type	Estimated Average No. of Round Trips Per Period[1]	Period[2]	Scheduled Days per Year[3]	Number of Round Trips per Year[4]	Annual Average Daily Traffic[5]
Crew bus/van transport to site	HV	11	10 days	261	287	2
Crew personal vehicles	LV	25	10 days	261	653	4

Transport	Vehicle Type	Estimated Average No. of Round Trips Per Period[1]	Period[2]	Scheduled Days per Year[3]	Number of Round Trips per Year[4]	Annual Average Daily Traffic[5]
Crew Traffic to SGLF	LV	533	10 days	261	13911	76
Salaried staff to SGLF	LV	62	5 days	261	3236	18
Salaried employees	LV	8	5 days	261	418	2
Salaried employees bus/van transport	HV	2	5 days	261	104	1
SGLF staff	LV	42	5 days	261	2192	12
Fuel and miscellaneous supplies	HV	3	1 day	261	655	4
Ore processing supplies	HV	9	1 day	261	2436	13
Equipment & supply representatives	LV	2	1 day	261	522	3
Food delivery	HV	2	1 day	261	522	3
Trash & recyclables	HV	3	7 days	365	156	1
Ore concentrate haulage	HV	1	1 day	365	365	2
Miscellaneous traffic	LV	4	1 day	261	1,044	6
Road maintenance	HV	6	1 day	313	1,878	10
Total HV AADT	-	-	-	-	-	25
Total LV AADT	-	-	-	-	-	131
Total AADT	-	-	-	-	-	156

Notes:

[1]The estimated average number of round trips that would occur within a given time period. All figures have been rounded up to whole numbers.

[2]The allocated time period.

[3]Not all transport phases would occur daily; scheduled days per year indicate the days per year when a trip is expected.

[4]The estimated average number of round trips that would occur in a given year.

[5]AADT = estimated average number of round trips per period / period x scheduled days per year / 365 days x 2 trips

Abbreviations:

AADT = annual average daily traffic
HV = heavy vehicle
LV = light vehicle
SGLF = Stibnite Gold Logistics Facility

Table 3-11 Projected Operational Traffic; SGLF to SGP

Transport Phase	Vehicle Type	Estimated Average No. of Round Trips Per Period[1]	Period[2]	Scheduled Days per Year[3]	Number of Round Trips per Year[4]	Annual Average Daily Traffic[5]
Crew bus/van transport to site	HV	11	14 days	365	287	2
Crew personal vehicles	LV	25	14 days	365	652	4
Salaried employees	LV	8	7 days	365	417	2
Salaried employees bus/van transport to site	HV	2	7 days	365	104	1

Transport Phase	Vehicle Type	Estimated Average No. of Round Trips Per Period[1]	Period[2]	Scheduled Days per Year[3]	Number of Round Trips per Year[4]	Annual Average Daily Traffic[5]
Fuel and miscellaneous supplies	HV	3	day	261	655	4
Machine parts and consumables	HV	2	day	365	730	4
Ore processing supplies	HV	9	day	261	2436	13
Pilot vehicle (fuel and hazardous loads)	LV	2	day	261	522	3
Equipment and supply representatives	LV	2	day	261	522	3
Food delivery	HV	2	day	261	522	3
Trash & recyclables	HV	3	7 days	365	156	1
Ore concentrate haulage	HV	1	day	365	365	2
Miscellaneous traffic	LV	4	day	261	1,044	6
Road maintenance	HV	2	day	365	730	4
Total HV AADT	-	-	-	-	-	33
Total LV AADT	-	-	-	-	-	17
Total AADT	-	-	-	-	-	50

Notes:

[1]The estimated average number of round trips that would occur within a given time period. All figures have been rounded up to whole numbers.

[2]The allocated time period.

[3]Not all transport phases would occur daily; scheduled days per year indicate the days per year when a trip is expected.

[4]The estimated average number of round trips that would occur in a given year.

[5]AADT = estimated average number of round trips per period / period x scheduled days per year / 365 days x 2 trips

Abbreviations:

AADT = annual average daily traffic

HV = heavy vehicle

LV = light vehicle

SGLF = Stibnite Gold Logistics Facility

SGP = Stibnite Gold Project

3.15.2 Closure and Reclamation Traffic

Most closure and reclamation traffic would occur May through November. Mine traffic during closure and reclamation is detailed in Table 3-12. This represents no change in closure and reclamation traffic versus that in the DEIS for Alternatives 1 through 4.

Table 3-12 Projected Closure and Reclamation Traffic

Transport Phase	Vehicle Type	Estimated Average No. of Round Trips Per Period[1]	Period[2]	Scheduled Days per Year[3]	Number of Round Trips per Year[4]	Annual Average Daily Traffic[5]
Crew bus/van transport to site	HV	4	14 days	365	104	1
Crew personal vehicles	LV	10	14 days	365	261	2
Salaried employees	LV	10	7 days	365	520	3
Fuel and miscellaneous supplies	HV	1	day	261	261	2
Reclamation supplies	HV	2	day	152	304	2
Pilot vehicle (fuel and hazardous loads)	LV	1	day	261	261	2
Equipment and supply representatives	LV	2	day	261	522	3
Water Treatment Supplies	HV	1	day	261	252	2
Food delivery	HV	1	day	261	261	2
Trash & recyclables	HV	1	7 days	365	52	1
Demolished & dismantled items	HV	3	day	152	456	3
Miscellaneous traffic	LV	1	day	365	365	2
Road maintenance	HV	1	day	365	365	2
Total HV AADT	-	-	-	-	-	15
Total LV AADT	-	-	-	-	-	12
Total AADT	-	-	-	-	-	27

Notes:

[1]The estimated average number of round trips that would occur within a given time period. All figures have been rounded up to whole numbers.

[2]The allocated time period.

[3]Not all transport phases would occur daily; scheduled days per year indicate the days per year when a trip is expected.

[4]The estimated average number of round trips that would occur in a given year.

[5]AADT = estimated average number of round trips per period / period x scheduled days per year / 365 days x 2 trips

Abbreviations:

AADT = annual average daily traffic

HV = heavy vehicle

LV = light vehicle

4 MITIGATION PLANS

Perpetua Resources recognizes the value of environmental resources and is committed to protecting these resources throughout the SGP. This mitigation section presents proactive EPMs included as part of the proposed SGP plan to avoid and minimize possible impacts to environmental resources. These proposed activities are consistent with Perpetua Resources' Core Values, Principles, and Goals described in the PRO.

Perpetua Resources developed a comprehensive mitigation plan for the SGP - the Stibnite Gold Mitigation Plan (SGMP). The goal of the SGMP is to design, construct, and monitor wetland and stream restoration and enhancement, upland wildlife habitat improvements and reforestation, fish passage and access, and water quality improvement projects over the course of mine construction, operation, and closure to achieve a net ecological benefit. The SGMP goes beyond required reclamation measures to create a net benefit on a landscape scale at the Project site after completion of mining and reclamation.

The SGMP includes a Conceptual Stream and Wetland Mitigation Plan (CMP), a Wildlife Habitat Mitigation Plan (WHMP), a Fisheries and Aquatic Resources Mitigation Plan (FMP), and an associated Fishway Operations and Maintenance Plan (FOMP). Together, these documents meet many of the mitigation requirements of the lead federal agency (USFS) for the SGP environmental impact statement (EIS), the compensatory mitigation process and requirements of the USACE, and the reclamation requirements of the IDL. In addition, the FMP represents a proactive effort to incorporate many measures to avoid and minimize potential impacts to species listed under the ESA, and the WHMP represents a represents a proactive voluntary effort to repair historical mining impacts and improve wildlife habitats beyond the requirements under IDL regulations.

The individual plans have been widely distributed, presented, refined, and used in the SGP DEIS. The SGMP still serves its original purpose of showing the connectivity of the component plans, but the document is no longer being updated as the four component plans provide the detail necessary to maintain the connectivity between the plans. The initial draft was distributed for review and comment to the USFS, agencies, and tribes in June 20183. Comments were received and addressed in the Final SGMP published and distributed in April 20194. The SGMP is part of Perpetua Resources' overall mitigation process, which also includes numerous avoidance, minimization, monitoring, and resource protection measures.

Perpetua Resources' approach to mitigation includes the following objectives:

- Provide compensatory mitigation for unavoidable impacts to jurisdictional streams and wetlands due to the SGP as authorized under CWA.
- Offset the SGP's authorized impacts to satisfy mitigation requirements, ensuring there will be no net loss of function of streams and wetlands resulting from construction, operation, and reclamation of the SGP.

[3] Brown and Caldwell, 2018. Draft Stibnite Gold Mitigation Plan. June.

[4] Brown and Caldwell, 2019. Final Stibnite Gold Mitigation Plan. April.

- Repair and rehabilitate habitats adversely affected by historical mining impacts in the SGP area, with the primary goal of producing a net benefit to wetlands, streams, water quality, and fisheries following mining and closure[5].
- Implement mitigation and management measures to avoid and minimize potential ongoing impacts to fish and aquatic organisms during operation and closure, specifically addressing the federally listed species Snake River spring/summer Chinook salmon (*Oncorhynchus tshawytscha*), Snake River Basin steelhead (*Oncorhynchus mykiss*), and bull trout (*Salvelinus confluentus*) and the USFS designated sensitive species Westslope cutthroat trout (*O. clarki lewisi*).
- Provide upland and wildlife habitat restoration and rehabilitation to exceed Idaho standards for mineral mine reclamation and improve long-term habitat conditions for wildlife species of management importance.
- Provide upstream and downstream volitional fish passage and habitat access for anadromous and migratory salmonids (e.g., Chinook salmon, steelhead, bull trout) during mining.
- Restore permanent volitional fish passage in the EFSFSR channel by providing access to historical spawning and rearing areas for Chinook salmon and steelhead currently blocked at the cascade immediately upstream of the Yellow Pine pit lake from historical mining activity.
- Improve habitat connectivity for Chinook salmon, steelhead, bull trout, Westslope cutthroat trout, and other fish species and aquatic organisms by reconnecting critical and important habitats in the upper EFSFSR with the EFSFSR downstream of the impassable cascade at the Yellow Pine pit.
- Implement restoration and mitigation in a manner consistent with the USFS' Land and Resource Management Plans (LRMPs) for the PNF[6] and the BNF[7]and associated management prescriptions in those plans. Accomplish as much on-site mitigation as possible and enhance and restore resources in areas adjacent to where impacts would occur or restore resources after completion of mining activities.
- Conduct monitoring activities to show these objectives are being met, which will be integrated into the Environmental Monitoring and Management Program (EMMP), which will specify the collection, analysis, and reporting of environmental data, and resultant management actions required for the applicable permits, agreements, and regulatory compliance through the duration of Project activities.

Mitigation meeting Council on Environmental Quality CEQ guidelines and USFS definition from the Payette Forest Plan (USFS, 2003) include: (1) design features; (2) requirements for federal, state or local agencies, and (3) potential mitigation actions identified through the NEPA analysis. To clarify, the use of the term "mitigation" in the title of the SGMP and its component plans is not intended to displace the lead agency's determination of appropriate "mitigation measures" in its impact analysis. Rather, the SGMP considers this term in the context of its use in the CEQ NEPA regulations (40 CFR § 1508.20), where "mitigation" includes:

a) Avoiding the impact altogether by not taking a certain action or parts of an action.

[5] Midas Gold, 2016. Stibnite Gold Project Plan of Restoration and Operations, September 2016. Midas Gold, 2020. Refined Proposed Action ModPRO2, December 2020

[6] United States Forest Service, 2003. Payette National Forest Land and Resource Management Plan

[7] United States Forest Service, 2010. Boise National Forest Land and Resources Management Plan.

b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.

c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.

d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.

Or, in the case of unavoidable impacts:

a) Compensating for the impact by replacing or providing substitute resources or environments.

To avoid any confusion around this term, the following description of the SGMP and its component plans will opt for using terminology such as "best management practice", "design feature" or "environmental protection measure" in

4.1 FISHERIES AND AQUATIC RESOURCES MITIGATION AND FISHWAY OPERATIONS AND MANAGEMENT PLANS

The FMP (BC, Rio ASE, and BioAnalysts in progress) describes the measures to minimize and mitigate adverse impacts on fisheries and aquatic resources, with particular attention to fish species listed as threatened under the ESA: Columbia River bull trout (*Salvelinus confluentus*), Snake River spring/summer Chinook salmon (*Oncorhynchus tshawytscha*), and Snake River Basin steelhead (*O. mykiss*). The FMP also addresses Westslope cutthroat trout (*Oncorhynchus clarki lewisi*), considered a sensitive species by the USFS and Idaho Department of Fish and Game (IDFG), and other resident fish species.

The FMP actions begin during construction and continue throughout mine operations and into closure. The FMP is focused on Chinook salmon, steelhead, bull trout, and Westslope cutthroat trout, but will also have benefits for other fish and aquatic species. The FMP includes water quality protection; fish protection, salvage, and relocation during diversions and dewatering activities; a process of protection and salvage for draining of the Yellow Pine pit; measures to avoid impacts during blasting; monitoring streamflow; restoring passage in stream channels with fish passage impediments; and monitoring of fish and aquatic biota. The FMP and its components continue to be refined in consultation with natural resource and regulatory agencies.

In addition, the FOMP outlines the operation of the fishway and monitoring for effective fish passage as well as an adaptive approach to provide for fish trap and haul operations as an alternative, using the same facilities. Fish protection measures for the EFSFSR tunnel and Yellow Pine pit dewatering are outlined as well, such as a temporary fish barrier downstream of the Yellow Pine pit during tunnel construction, carefully sequenced dewatering of the Yellow Pine pit, and start of fishway operations (BC, McMillen Jacobs, and BioAnalysts, in progress).

Measures to avoid, minimize, or mitigate fish habitat are detailed in the FMP and FOMP (BC, Rio ASE, and BioAnalysts, in progress and BC, McMillen Jacobs, and BioAnalysts, in progress). As listed above, these measures including the following:

- Water quality protection - measures designed on managing contact and non-contact water to maintain and improve water quality while supplying sufficient water for mining and ore processing. Diversions, ditches, and other mine facilities would be lined and/or treated and restored riparian corridors to improve stream temperatures. Water treatment would continue during both operations and the post-closure phase.

- Fish protection, salvage, and relocation during dewatering and diversions - measures for screening or excluding of fish from diversion channels, water withdrawals, low-flow pipes, and the Yellow Pine pit dewatering to exclude and protect fish. Work windows have been developed based on fish periodicity to account for the different life stages of the targeted fish species. During diversions and dewatering activities in fish bearing streams, fish handling and salvage protection measures have been identified to safely isolate, collect, handle, and transport the fish.
- Trap and haul protocols at the fishway (if needed) - the primary goal is operating and maintaining the EFSFSR fishway during construction and operations and later in the mine life by restoring the EFSFSR stream channel over the backfilled Yellow Pine pit to provide permanent, volitional upstream and downstream fish passage and access to important stream habitats of the upper EFSFSR and portions of Meadow Creek. If fish aren't able or willing to use the fishway during any period, trap and haul procedures have been developed to safely collect, handle, and move fish upstream of the fishway.
- Avoidance measures during blasting activities - measures to largely avoid or minimize the potential effects from blasting activities using appropriate setback distances from aquatic habitats to limit blast-related air overpressure and ground vibrations to harmless levels. Other additional blasting techniques can also be used to reduce these levels, and BMPs and site-specific modification of methods can further minimize or prevent damage to fish and the aquatic environment
- Monitoring streamflow - activities for maintaining, to the extent practicable, appropriate streamflows and streamflow monitoring in natural or restored channels where fish are present.
- Stream restoration and enhancement - design elements for stream restoration and enhancement based on natural channel design principles intended to restore permanent fish passage at Yellow Pine pit, improve fish habitat site-wide for spawning and rearing salmonids, and provide a net ecological benefit relative to current conditions.
- Restoring passage in stream channels - removing existing passage barriers within the mine site to allow for fish movement between streams and areas of the mine site where access is currently blocked or impeded within the SGP footprint as well as along the Burntlog Route.
- Monitoring fish and aquatic biota - provide the data necessary to evaluate how the various mitigation and protection measures are implemented, and to assess the status and trends and ongoing effectiveness. To address the potential for variances in the outcome of these measures, an adaptive management approach is outlined that would provide the mechanism to modify or adjust these measures or approaches in response to monitoring and evaluation as well as new information or technologies that may become available over the more than 20 years of construction, mining, reclamation, and restoration.

4.2 CONCEPTUAL STREAM AND WETLAND MITIGATION PLAN

Construction would permanently impact wetlands and other (WOTUS subject to regulation under Section 404 of the CWA and requires a Department of the Army permit pursuant to Section 404. The CMP provides detailed descriptions of proposed restoration, establishment, enhancement, and/or preservation of aquatic resources to compensate for unavoidable impacts to WOTUS associated with activities that would be authorized by a permit (Tetra Tech, in progress [a]).

The CMP describes mitigation to address the requirements of the USACE and EPA under the Compensatory Mitigation for Losses of Aquatic Resources under CWA Section 404 (Final Rule). The CMP includes the 12 required elements of compensatory mitigation plans (33 CFR 332.4(c)/40 CFR 230.94(c)): objectives, maintenance plan, site selection,

performance standards, site protection, monitoring requirements, baseline information, long-term management plan, determination of credits, adaptive management plan, mitigation work plan, and financial assurances.

The current CMP (Tetra Tech, in progress [a]) is labeled as conceptual because the actual final impacts of the SGP will not be known until a preferred alternative is identified. The conceptual mitigation plan does demonstrate the feasibility of achieving the amount and types of mitigation to offset the impacts in a manner consistent with the 2008 Mitigation Rule.

The CMP will be revised through the final EIS and with the USACE Regulatory Division—Walla Walla District, Boise Field Office, in compliance with the CWA Section 404/Department of the Army permit, stream and wetland delineations and jurisdictional determinations, development of the stream functional assessment for USACE-approved stream functional analysis, wetland and stream credits and debits determinations, and compliance with USACE's 404(b)(1) Guidelines (40 CFR Part 230).

4.3 WILDLIFE HABITAT MITIGATION PLAN

The Wildlife Habitat Mitigation Plan (Tetra Tech, 2021a) describes Perpetua Resources' plan to rehabilitate, restore and enhance upland wildlife habitats, including those previously disturbed by historical mining and wildfires and those designed to offset unavoidable impacts from the SGP on wildlife habitats. In addition, Perpetua Resources' revised Reclamation and Closure Plan (Tetra Tech 2021b) describes the concurrent reclamation during mining operation and restoration of habitat during closure of the mine as required by USFS and IDL regulations and policies. The WHMP furthers the RCP with the goal of producing a net environmental benefit for wildlife habitat in the mine area by further enhancing the ecological functions and values beyond the reclamation requirements established by the USFS and IDL. The WHMP is not based on regulatory requirements for compensatory mitigation because there is no specific mandated compensatory mitigation for upland wildlife habitats under federal or Idaho regulations and therefore is considered voluntary mitigation proposed by Perpetua Resources.

Perpetua Resources is committed to performing reclamation that will leave the project area in such a condition that both natural vegetation succession and mitigation actions will result in improved habitat functionality compared to what currently exists. Perpetua Resources is required to reclaim lands in the project area affected by mine operations and infrastructure. At minimum, reclamation compliance requires Perpetua Resources to contour and revegetate or rehabilitate disturbed areas to prevent and control off-site damage to the environment.

The RCP (Tetra Tech 2021b) describes the proposed revegetation efforts including seeding and planting. Areas of late snowmelt and potentially higher relative soil moistures will be seeded with a cool aspect seed mix while the remainder of reclaimed areas will be seeded with the general mix. The seed mixes contain grass and forb species. In addition, Perpetua Resources proposes to plant shrubs and trees in varying densities throughout the Project Site, the transmission line, and the Burntlog Route as identified in Table 4-1.

Table 4-1. Reclaimed Acreage by Vegetation Type

Feature	Total Disturbance Acreage	Road	Barron	Grassland (general and cool aspect)	Shrubland	Parkland	Forested	Total Reclaimed Acreage
Mine Site	1561.7	NA	NA	869.8	18.2	199.9	90.0	1,177.9

Feature	Total Disturbance Acreage	Road	Barron	Grassland (general and cool aspect)	Shrubland	Parkland	Forested	Total Reclaimed Acreage
Transmission Line	437.5	138.8	2.8	77.9	23.8	NA	94.5	337.8
Burntlog Route	483.4	143.4	25.7	NA	NA	NA	193.5	362.6
TOTALS	2,482.6	282.2	28.5	947.7	42.0	199.9	379	1,878.3

Abbreviations:

NA = not applicable

4.4 VEGETATION ENVIRONMENTAL PROTECTION MEASURES

The variable and valued vegetation communities in and around the SGP included threatened, endangered, protected, and candidate (TEPC) and sensitive plant species as well as more common forested, upland and riparian species. Protection of vegetation communities begins during construction and continues throughout mine operations and into closure. Vegetative protective measures will continue to be refined in consultation with regulatory agencies in adaptive management practice. Perpetua Resources will utilize the environmental protection measures listed in Table 4-2 to avoid, protect, and minimize impact to these resources.

Table 4-2. Vegetation Environmental Protection Measures

Category 1	Category 2	Environmental Protection Measures
Pre-Construction Environmental Protective Measures	Species-specific Surveys	Impacts to TEPC and sensitive plant species should be avoided if at all possible. All Perpetua Resources employees, contractors, and visitors will receive terrestrial vegetation-related training to recognize and report to certain plant species (poisonous, sensitive, or noxious weeds).
		Impacts to TEPC and sensitive plant species should be avoided if at all possible.
	Whitebark pine	Prior to construction, all known populations and/or individuals of whitebark pine within 300 feet of the Project area will be flagged by the qualified environmental professional (QEP). Any anticipated impacts will be reported to the USFS. To avoid impacts to this species, the following standard operating procedures will be implemented:
		Whenever possible removal or heavy trimming/pruning of whitebark pine will be avoided.
		Restrict use of hazardous substances within 100 feet of whitebark pine trees
	Bentflowered milkvetch	Prior to construction, known populations of bentflowered milkvetch will be identified and flagged by the QEP. Any anticipated impacts to either species will be reported to USFS.
		Prior to drilling in areas with potential populations of bentflowered milkvetch, the USFS botanist will be notified so avoidance and mitigation can be monitored.
		Whenever possible, all disturbance to individual bentflowered milkvetch plants will be avoided.
		The casual trampling of bentflowered milkvetch will be avoided.
		If disturbance cannot be avoided, the plant will be dug up and set aside in a protected area with the topsoil until it can be used in reclamation. The plants will then be replaced at

Category 1	Category 2	Environmental Protection Measures
		their original site if possible before the end of the field season or as soon as possible to avoid desiccation.
		If the plants must be held for extended periods of time, they will be placed in cold storage designed for vegetation or transported to a local nursery with experience in propagating bentflowered milkvetch.
		In exploration areas where this plant is documented or there is potential habitat for it, no seeding or mulching will be conducted, and duff will be raked onto the disturbed area with minimal application of large woody material.
	Idaho Douglasia and Sacajawea's bitterroot	Prior to construction activity in areas with identified populations of Idaho douglasia and Sacajawea's bitterroot, the USFS botanist will be notified so avoidance and mitigation can be monitored.
		Whenever possible, all disturbance to individual Idaho douglasia and Sacajawea's bitterroot plants will be avoided.
	Facility and Plan Design	Minimize the overall disturbance and impacts to undisturbed areas by siting, to the extent practicable, proposed facilities and roads on previously disturbed ground.
		Removal or disturbance of vegetation will be kept to a minimum by limiting the area of disturbance, to the extent practicable, to maintain safe and efficient operations.
		Equipment, materials, and vehicles will be stored at specified work areas or construction yards.
	Noxious Weed Management	Prior to construction, Perpetua Resources and its contractors will be trained on methods for cleaning equipment, identifying problem plant species in the Project area, and procedures to follow when an invasive or noxious weed is located.
		Prior to the mobilization of equipment onto the Project site, all equipment will be cleaned and inspected.
		Seeding will be completed as soon as practicable following growth media/seed bank material application activities to reduce the potential for the spread and establishment of noxious weeds and invasive plants. Reclamation and seeding procedures are described in the RCP.
		All seed mixtures used for reclamation and revegetation will include certified weed-free seed only. All other imported reclamation and erosion and sediment control materials (e.g., straw, mulch) will be certified weed-free.
		Limit preconstruction weed treatments, such as mechanical control and herbicide application, to areas expected to have unavoidable ground-disturbing activities.
		Any herbicide use will be in accordance with the South Fork Salmon River Sub-Basin Noxious and Invasive Weed Management Program (USFS 2010). Specific measures for mixing, loading, and disposal of herbicides as well as response to any spills are described in the Weed Management Plan (Midas Gold 2015).
Construction and Operations Environmental Protective Measures	Vegetation Management	Employ vegetation maintenance for safety along roads, removal of hazard trees, and riparian conservation areas, etc. – coordinate such that wildlife protection and restoration are incorporated during maintenance.
		Use aquatic safe herbicides during vegetation management activities and noxious weed control. Adhere to chemical label restrictions, federal/state rules on usage. Use proper equipment for chemical application by trained personnel.
		Inspect and remove vegetation material (including noxious weeds) from mechanical equipment and properly dispose to minimize the spread of unwanted vegetation.

Category 1	Category 2	Environmental Protection Measures
		Inspection all access routes, drill platforms, pad locations and sump construction sites prior to project-related activities and if they are found to be weed-infested, then treat the weed infestation with herbicides or by manually removing infestations prior to ground disturbing activity.
		Burn any pulled weed in a secure site or bag and remove and dispose of as per County Extension Service recommendations.
		Use certified weed-free seed as part of the interim, concurrent, and final reclamation. All other introduced vegetative construction materials used for the Project, such as straw, mulch, etc., shall also be certified weed-free.
		Use native seed mixtures appropriate for the elevation and habitat for reclamation seeding. Prior to installation, types, locations, and amounts of seed should be approved by the USFS.
	Tree and Vegetation Removal	Downed trees will only be handled by Perpetua Resources employees or contractors who have completed required training associated with the SSHP.
		Vegetation in areas to be disturbed by mining operations, will be cut and put into windrows to be slashed and burned or chipped and used in growth media amendment generation for use in future reclamation.
		Any timber salvaged during construction activities will be stockpiled or chipped and added to the GMS for incorporation into reclamation activities on an as needed basis.
		Organic materials and chipped organics from land clearing and other on-site sources of organic material will be added to the growth media as it is salvaged or in the GMS as organic amendments.
	Vehicles and Traffic	Prior to mobilization of equipment onto USFS lands and the Project site, all equipment will be cleaned and inspected for potential noxious weed seeds and debris. Vehicle cleaning and Operations and Maintenance is discussed in the SWPPP (EMMP Appendix FM-7.1).
		Equipment will be cleaned and inspected again prior to demobilizing off site.
		Project-related traffic will be restricted to existing roadways and Project areas identified in the ModPRO2. Off-road travel in undisturbed areas will be forbidden.
		Project vehicles will be parked in designated parking areas and not along road rights of way.
	Soils Management	Project-related impact to soils will be minimized to the extent practicable.
		Growth media material (topsoil) will be removed, as practicable and where available, from areas that will be affected by the Project operations and surface facilities and stored (stockpiled) for future reclamation and revegetation efforts.
		Growth media will be placed to encourage healthy vegetative growth, which will reduce erosion, sediment run-off, and risks of debris flows and avalanches.
		Vegetation and soil removal will occur in a manner that minimizes erosion and sedimentation.
		Proper dust control will be employed along transportation corridors and active mining areas using aquatic safe dust suppression chemicals and methods to reduce the transmission of particulates to wildlife corridors and natural areas.
		Historically and newly impacted sites will be re-contoured to reduce sediment run off and enhance vegetative growth and habitat development.

Category 1	Category 2	Environmental Protection Measures
		Erosion and sedimentation control measures are discussed in SWPPP. Stabilization and seeding are discussed in the RCP.
Closure, Post-Closure, and Reclamation Environmental Protective Measures	Reclamation Activities and Planting	Activities identified in the RCP are designed to be durable, and limit and/or eliminate long-term monitoring and maintenance following closure. The RCP is designed to achieve overall net benefits and other environmental goals in conjunction with the SGMP (BC 2019a).
		During closure of mining operations, Perpetua Resources will replant where impacted by mining and/or forest fires in order to enhance vegetative cover and wildlife habitat. More information on vegetative reclamation, including a planting plan, is described in the RCP.
	Vegetation Reestablishment	The revegetation plan includes a combination of seeding and planting to establish self-sustaining perennial and desirable plant communities. Seeding and planting plans have been developed to establish grassland, shrub, and tree communities under cool aspect and general site condition treatments (Tetra Tech 2021b). Seeding, planting, and mulching procedures are described in Chapter 3.3 of the RCP.

Abbreviations:

BC = Brown and Caldwell

EMMP = Environmental Monitoring and Management Program

EPM = environmental protection measure

GMS = growth media stockpile

QEP = qualified environmental professions

RCP = Reclamation and Closure Plan

SSHP = Site Safety Health Plan

SWPPP = storm water pollution prevention plan

TEPC = threatened, endangered, protected, candidate

USFS = United States Forest Service

4.5 WILDLIFE ENVIRONMENTAL PROTECTION MEASURES

Wildlife and their associated habitat in and around the SGP include a variety of species. Protection of wildlife and habitat begins during construction, continues throughout mine operations, and into closure. Wildlife and habitat protective measures will continue to be refined in consultation with regulatory agencies in adaptive management practice. Perpetua Resources has identified EPMs related to wildlife and habitat that will reduce the impacts to species and resources to the greatest extent possible. Table 4-3 identifies Perpetua Resources wildlife EPMs pertaining to:

- Construction Related – EPMs tied to pre-construction and construction related activities. These EPMs are wide ranging and involve all levels of SGP personnel associated with the construction, construction oversight and management of the project.
- Facilities Related – EPMs that are tied to specific project facilities. Many of the facilities are in areas of existing disturbance, while others will be associated with new surface disturbance.
- Transportation Related – EPMs that are tied to the transportation route or movement of vehicles, equipment or staff.
- Operations and Maintenance Related – EPMs that are identified to be incorporated across the entire project and are not specific or have seasonality.

Table 4-3. Wildlife Environmental Protection Measures

Category 1	Category 2	Environmental Protection Measures
Construction Related Environmental Protection Measures	Pre-construction Environmental Protection Measures	All Perpetua Resources project site employees, contractors, and visitors will receive annual wildlife-related training to recognize and properly respond to wildlife incidents.
		Migratory bird nest surveys will be completed prior to construction activities. The QEP will mark each active nest within the Project area and identify and flag a construction exclusion buffer to prevent nest impacts.
		Targeted pre-construction NIDGS surveys will be conducted in areas identified in 2018 and 2019 surveys as having the most suitable habitat.
		Prior to construction, Perpetua Resources, in coordination with BNF and PNF, will visit known and record any new denning, nesting, and winter roosting sites within the Project area. These areas will be monitored for wildlife and BNF and PNF recommended avoidance and minimization efforts will be employed.
		If critical wildlife zones or corridors are identified, restricted or seasonal access will be established prior to construction or expansion activities to the extent practicable. Physical barriers and/or signage will be added identifying these areas and site-specific measures will be implemented to minimize impacts.
		Conduct pre-ground clearing nest surveys in modeled species habitat areas, and monitor any active nest identified during construction, operation, and reclamation activities to reduce risk of incidental take of a species protected under the MBTA. This section identifies potential EPMs specific to migratory bird species.
		In areas with previously observed nests and/or expected migratory bird presence, Perpetua Resources will conduct bird nest surveys prior to construction activities. The QEP will record each active nest within the Project area and delineate a construction exclusion buffer to prevent nest impacts.
		To the extent practicable, trees found to contain nesting cavities will not be disturbed or removed. No trees with active nests will be removed.

Category 1	Category 2	Environmental Protection Measures
		Activities will be modified when practicable to maintain key features of nesting/denning habitat or to avoid disruption of nesting/denning activities.
		If critical wildlife zones or corridor are identified, restrict access prior to construction or expansion activities - install physical barriers and/or signage identifying these areas and develop site-specific measures to minimize impacts. Post slower speed limits at known wildlife crossings, as identified, and along defined migratory corridors during migration seasons.
		Perpetua Resources will provide mine personnel, as appropriate, with personal deterrents to avoid conflicts with wildlife (sprays, air horns, etc.).
	Construction Related Environmental Protection Measures	The QEP or qualified contractor will look for evidence of nesting, breeding, and migration of terrestrial wildlife species to avoid and minimize impacts to these species to the extent practicable during ground disturbing construction related activities. Perpetua Resources will include observations to USFS and IDFG in the annual observation report at a minimum.
		Calving and fawning areas will be protected from disturbance during big game calving or fawning. If fawning/calving activity is encountered during construction activities, activity will be modified to the extent practicable in coordination with USFS.
		Perpetua Resources will consult with USFS regarding thermal cover on big game winter ranges per the BNF and PNF LRMP (USFS 2003; 2010).
		Perpetua Resources will consult with USFS on goshawk nesting areas and identify EPMs for mitigating impacts to these areas (USFS 2003; 2010).
		Perpetua Resources will develop a variance procedure for clearing and grubbing activities during the migratory bird nesting season. The variance procedure will be maintained in the EOHS-MS.
		The USFS wildlife biologist will be notified of any occupied sensitive species nests or dens encountered during construction and operation.
		Construction activities will be modified to avoid disruption of nesting/denning activities when and where species are present.
		When necessary, implement seasonal and spatial restrictions during breeding seasons for raptors and other migratory birds.
		Inspect snags and logs for nests or cavities or actual species before removal during maintenance, construction, and operations.
		Identify active nests in construction or expansion areas and maintain species specific agency recommended buffers or work during non-breeding season, if practicable.
		Store equipment, materials, and vehicles at specified areas.
		Construction and operation activities will use chemicals and hazardous materials (such as oil and cyanide). Management of these materials are described in the Waste Management Plan (Midas Gold 2021).
		There will be no hunting or discharge of firearms during construction and operations within the project site.
		The project site will be posted with signs prohibiting hunting and employees will be prohibited from carrying firearms on the project site.
		Perpetua Resources will work with the IDFG and USFWS to notify USFS to arrange for trapping and relocation of nuisance species, when necessary. Relocation of trapped wildlife within the project area will only occur with direction from the state and with the necessary permits.

Category 1	Category 2	Environmental Protection Measures
		Perpetua Resources will use lights based on correlated color temperature and color rendering index.
		Light shields will be placed over outside lights, confining light to the immediate area to further limit visual impacts.
		Perpetua Resources will customize lights to the worksite and job and install them properly.
		Lighting of areas only be done when in use or otherwise necessary.
		Whisper Quiet lights will be used for night exploration operations.
		The ore processing facility building will be enclosed, thereby containing one of the largest sources of noise – the ore grinding equipment.
		Internal combustion engines will be maintained and operated to minimize noise. Measures taken will be based on the type and functionality of the equipment.
		Construction equipment engines will be equipped with adequate mufflers, intake silencers, and engine enclosures to minimize noise generation.
		Appropriate sound dampening and muffling equipment will be utilized to minimize noise excursion from equipment and facilities.
		When practicable, pumps, generators, and engines will be turned off when not in use to avoid unnecessary noise generation and reduce energy consumption.
		When practicable, noisy activities will be scheduled at the same time (e. g., drill site installations using helicopter and alternate site drilling), as additional sources of noise generally do not add significantly to noise.
		Electric line power will be utilized during operations to eliminate diesel generator noise, except in emergency situations when grid power is down, or for temporary use in remote areas where it is not practical to construct power lines.
Facilities Related Environmental Protection Measures	Transmission Line Design and Development	Electric power structures will be designed and constructed to avoid raptor perching on structures for predation purposes and minimize the risk of their being electrocuted.
		Construction and operation of all overhead powerlines/transmission lines and related facilities will be in accordance with Avian Power Line Interaction Committee suggested practices (APLIC 2006).
		Perpetua Resources will work with Idaho Power Company to Implement their Avian Protection Plan for transmission lines, including power lines and poles designed to minimize potential bird mortalities due to electrocution.
	Mine Site Infrastructure	To reduce attractants during construction and operations, trash and other miscellaneous inert (non-hazardous) garbage will be contained in on-site wildlife-resistant containers and hauled to an IDEQ-approved waste disposal facility.
		Garbage and trash will be removed regularly and disposed of in an IDEQ-approved waste disposal facility. Food and garbage will be stored either indoors, in vehicles, or if outside, in bear-proof containers. No garbage will be burned.
		Used oils, solvents, grease, and antifreeze will be handled separately from normal trash and garbage, as directed by the Waste Management Plan (Perpetua Resources, TBD).
		At completion, all equipment, supplies, and refuse will be removed from the project site and disposed of according to established solid and liquid waste management practices and applicable local, state, and federal laws and regulations. Any materials regulated as “hazardous” or “toxic” waste will be disposed of according to state and federal laws and regulations.

Category 1	Category 2	Environmental Protection Measures
	Wildlife Fencing	Fencing will only be employed where necessary to exclude wildlife from certain facilities for the safety of wildlife and workers. Fencing can cause injury and/or mortality to wildlife depending on fencing configuration and design; therefore, wildlife-friendly measures will be incorporated into exclusion fencing (Montana Fish, Wildlife, & Parks 2012). Eight-foot wildlife-exclusion fences will only be used for the minimum area necessary around facilities and not for larger perimeter fencing in areas that include wildlife habitat.
		Perpetua Resources will install a wildlife exclusion fence around the following: • Ore processing facilities (including process ponds and the substation) • TSF • Explosive storage areas • General waste containment • Main security gate(s) and station at the main entrance to the Project site, near Stibnite worker housing facility as well as near the north security gate
		Exclusion fencing will have small spacing in gaps to prevent wildlife passage and to deter wildlife from trying to push through the fence (such as wrought iron, plank, picket, or chain-link fences). (Barbed) wire fencing should not be used to prevent wildlife becoming entangled in fence wires.
		Fences with spikes, pickets, or bars that protrude above the top bar will be avoided. Top rails should be solid and smooth to reduce hazards to wildlife.
		For facilities in areas with big game species, such as deer and elk, a permanent non-electric exclusion fence 8 feet high will be erected around facilities with either wooden slats or woven-wire with posts set at 8- to 20-foot intervals and the wire brought tight to the ground; the top should be highly visible by using a top rail, high-visibility wire, or flagging.
		For facilities in areas with large predator concerns, deterrent fencing can include a 7-wire permanent electric fence 42 to 54 inches high (for bears and wolves); 9-wire or 11-wire fence may also be used.
		Gates in exclusion fencing should remain closed at all times when not in use to prevent wildlife from entering the facility and becoming trapped. Gates opened for worker passage should be monitored for wildlife. When possible, gates should be placed at corners rather than along the sides. An animal that inadvertently finds itself trapped inside is more likely to find escape through an open corner gate than through a side gate
		If electric fencing is installed, warning signs should be hung at regular intervals along the fence. In addition, the voltage of hot wires should be checked regularly with a high-quality voltage tester, especially at midway and the farthest distance from the energizer.
Transportation Related Environmental Protection Measures		Perpetua Resources developed a Transportation Management Plan that describes implementation of appropriate speed limits for the Burntlog Route, site haul roads, and light vehicle access roads.
		Signage will be placed at known wildlife crossings along with suggested reduced speed signs. These locations will be referenced in the training materials along with physical signage alerting workers and public users.
		Project-related traffic will be restricted to project specific roadways and areas identified in the ModPRO2. Off-road travel in previously undisturbed areas will not be allowed. Project vehicles will be parked in designated parking areas and not along road rights-of-way.
		Perpetua Resources will employ proper dust control along transportation corridors and active mining areas using water and agency approved dust suppression chemicals and

Category 1	Category 2	Environmental Protection Measures
		methods to reduce generation of dust particulates. Dust suppression SOPs are also described in the Transportation Management Plan.
		Perpetua Resources will work with Valley County to reduce speed limits and to set standards on the use of truck compression brakes, especially on steep sections of the Project access route and along areas where residences and housing are located.
		Busing and/or vanpooling will be provided for Perpetua Resources and contractor employees to minimize traffic, dust emission, sediment runoff, and greenhouse emissions from vehicles. This practice will also reduce the potential for harmful or fatal collisions between wildlife and Project-related traffic.
Operations and Maintenance Related Environmental Protection Measures		Employ vegetation maintenance for safety along roads, removal of hazard trees, and riparian conservation areas, etc. – coordinate such that wildlife protection and restoration are incorporated during maintenance.
		Use aquatic safe herbicides during vegetation management activities and noxious weed control. Adhere to chemical label restrictions, federal/state rules on usage. Use proper equipment for chemical application by trained personnel.
		Post slower speed limits at known wildlife crossings, as identified, and along defined migratory corridors during migration seasons. Develop a variance procedure for clearing and grubbing activities that need to occur during the migratory bird nesting season for construction and expansion activities.
		Store equipment, materials, and vehicles at specified work areas or construction yards. Good housekeeping in trash disposal and loading areas, trash hauling, areas – minimize loose trash, odors, and access for wildlife to these areas. Prompt removal of trash to avoid attracting wildlife. Secure trash receptacles.
		Provide safe storage of chemicals and petroleum products, a SPCC plan includes measures to avoid inadvertent release of hazardous materials into the environment and describes response and remediation measures to minimize effects of an inadvertent release.
		Manage lighting within active mining areas to avoid unintended lighting of natural, wildlife usage areas.

Abbreviations:

APLIC = Avian Power Line Interaction Committee BNF = Boise National Forest

EMMP = Environmental Monitoring and Management Program

EPM = environmental protection measure

GMS = growth media stockpile

IDEQ = Idaho Department of Environmental Quality

IDFG = Idaho Fish and Game

LRMP = Land Resource Management Plan

MBTA = Migratory Bird Treaty Act

NIDGS = Northern Idaho Ground Squirrel

PNF = Payette National Forest

QEP = qualified environmental professions

RCP = Reclamation and Closure Plan

SPCC = Spill Prevention, Control, and Countermeasures

SSHP = Site Safety Health Plan

SWPPP = storm water pollution prevention plan

TBD = to be determined

TEPC = threatened, endangered, protected, candidate

TSF = tailings storage facility

USFS = United States Forest Service

USFWS = United States Fish and Wildlife Service

5 ENVIRONMENTAL MONITORING AND MANAGEMENT

Monitoring requirements for the ModPRO2 are the same as the DEIS Alternatives 1 through 4, except potential changes in monitoring locations and frequency that may result from modifications to the size and location of proposed mine facilities.

The EMMP (BC, in progress [a]), is a comprehensive framework that introduces the purpose and objectives of component monitoring and management plans implemented over the life of the SGP. Overall, the EMMP goal is to minimize potential adverse effects during Project construction, operation, closure, and post-closure through monitoring and adaptive management. The EMMP covers collection, analysis, and reporting of environmental data, and resultant management actions required for the applicable permits, and agreements, to ensure regulatory compliance throughout project activities.

Each component plan of the EMMP will be finalized upon issuance of the related permit(s) or upon issuance of the final Record of Decision and will contain monitoring and reporting requirements for each permit or authorization. Also included will be applicable management requirements for project activities that incorporate best management practices, EPMs, design features, and mitigation measures. Figure 5-1 illustrates the multiple components of the EMMP.

Figure 5-1. EMMP Components

The objectives of the EMMP are:

1. Provide all necessary information to ensure that project activities are conducted in compliance with federal, state, and local regulations; BMPs; and Perpetua Resources core values and conservation guidance principles as described in the PRO (Midas Gold 2016).

2. Document the effectiveness of EPMs, design features and mitigation measures in mitigating environmental effects by implementing appropriate monitoring programs.

3. Establish a program of structured reporting to meet all applicable regulatory requirements, and to inform adaptive management and continual improvement processes.

5.1 EMMP COMPONENT PLANS

The EMMP is made up of component plans that address each aspect of environmental monitoring and management in the context of (1) mine facilities, (2) environmental resources, and (3) mine activities. Each of these management areas includes specific plans that describe the relevant activities or resources, and how they will be addressed from pre-operational stages through post-closure. Figure 5-2 illustrates the structure of the EMMP and the component plans that comprise each management area. These are described below with their primary objectives, as presented in the EMMP.

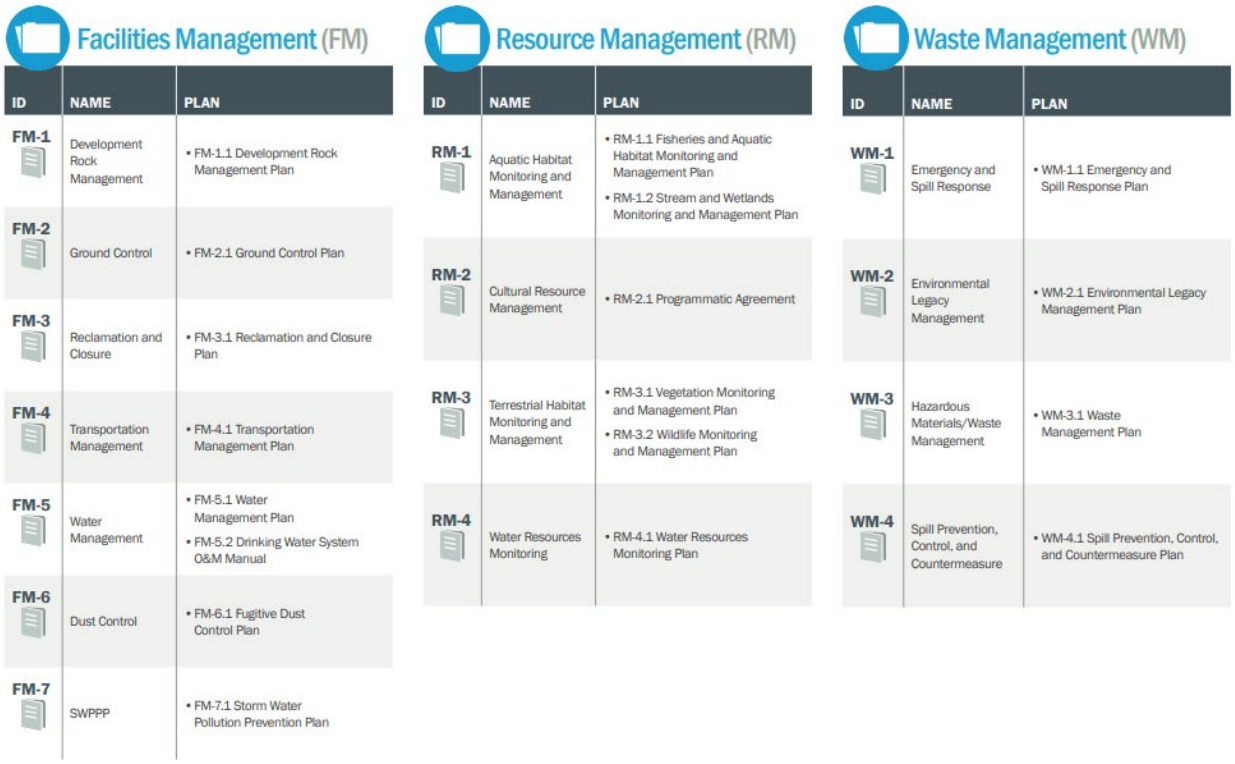


Figure 5-2. EMMP Structure

5.1.1 Facilities Management Plans

The facility monitoring and management (FM) plans describe the set of actions necessary to demonstrate compliance with applicable environmental rules and regulations that apply to operational processes and practices and protects the health and safety of employees, contractors, and visitors, and minimizes the effects on environmental resources. The component (FM) plans specify the monitoring of mining operations and reporting of results to applicable regulatory agencies. The plans describe how monitoring results will be used as the basis for management action, assessing effectiveness, and adaptive management if warranted. Although FM plans are focused on operations, they address

activities from construction through post-closure. Additionally, they are informed by baseline environmental resource data and incorporate approval conditions that are developed through agency review and impacts analysis.

Environmental protection objectives that can be demonstrated by monitoring and management of mine facilities are:

- Completing reclamation and restoration activities concurrent with construction and ongoing mining operations, including cleanup of certain impacts related to legacy activities.
- Minimizing new impacts by locating facilities on previously impacted lands when it fits into mine operations (including appropriate remediation of certain legacy impacts before reusing these areas).
- Stabilizing the TSF, TSF Buttress, and other project-related surface disturbances to minimize erosion by wind and water and off-site transport of sediments, wind-borne dust, and mine waste.
- Protecting the public and wildlife through proper policies, procedures, and practices during construction, operations, site closure, and reclamation.
- Maintaining consistency with applicable provisions of PNF and BNF LRMP, IDL reclamation regulations, and other applicable standards.
- Providing drinking water that meets the requirements of the Safe Drinking Water Act (Title XIV of The Public Health Service Act: Safety of Public Water Systems).
- Minimizing impacts to water quality from Project operations and facilities by preventing contact of freshwater with mine facilities and treating contract water to meet discharge limits.
- Minimizing erosion and sediment transport in stormwater runoff that may impact WOTUS.
- Avoiding any unauthorized discharges of contact stormwater runoff to WOTUS.
- Maintaining stream baseflows.
- Protecting instream habitat and biota and water quality by managing and treating wastewater effluent and contact water to ensure compliance with IPDES requirements.
- Restoring the Project site to a self-sustaining natural ecosystem with enhanced habitat for natural fish and wildlife populations and improved water quality.
- Minimizing fugitive dust through BMPs.

5.1.2 Resource Management Plans

The environmental resource monitoring and management (RM) plans describe the actions to demonstrate compliance with applicable environmental rules and regulations and to minimize undue or reasonably avoidable adverse impacts to environmental resources. Monitoring and management started with baseline studies and continues through the construction, operation, closure, and post-closure of the mine. Implementing these actions protects environmental resources and demonstrates that the project benefits are achieved. Environmental management, based on monitoring, allows proactive assessment of needed changes to respective monitoring plans and activities to meet compliance thresholds.

The component environmental resource plans define data to be collected and specify the analyses and reporting of results to applicable regulatory agencies. Review of monitoring results allows the evaluation of success in achieving compliance with established values or thresholds and forms the basis for management action, assessing effectiveness, and adaptive management if warranted.

The objectives for monitoring and management of aquatic habitats are to:

- Managing operations to protect water quality during mining operations.
- Managing water infrastructure to maintain stream flows to the maximum practicable extent to support aquatic habitat and fish populations.
- Conducting careful fish salvage and relocation prior to stream diversions and dewatering to avoid and minimize impacts to fish.
- Operating the EFSFSR Tunnel and Fishway, and/or trap and haul of fish passage with an adaptive management approach to provide for safe, volitional upstream and downstream fish passage during mining.
- Restoring post-mining hydrologic conditions that will support aquatic habitat, wetland vegetation, and overall wetland function.
- Conducting stream and wetland restoration and enhancement comparable to existing wetlands and/or reference site wetlands that would be sustainable over the long-term with minimal human intervention, concurrently with mining where practicable.

Conduct mitigation monitoring as outlined in the final USACE Section 404 permit.

- Conducting monitoring as specified in the biological opinions by the USFWS and National Oceanic and Atmospheric Administration (NOAA) Fisheries.

For the protection and management of historic properties, the Programmatic Agreement would be in effect during the construction, mining, and reclamation phases of the Project and provide for:

- Establishing a process for properly notifying appropriate authorities and handling historic properties identified that were not previously known in the Historic Property Management Plan (HPMP). If human remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered inadvertently on federal lands, the USFS will follow the provisions of the Native American Graves Protection and Repatriation Act (NAGPRA; 25 United States Code § 3001-13).
- Developing routine protective and management measures for avoidance and/or mitigation for potential impacts to these properties to be included in the HPMP.
- Developing EPMs for known resources and activities associated with mining operations and post-closure restoration efforts to be included in the Historic Property Treatment Plans.

The overall objective for monitoring and management plans is to protect terrestrial habitats over the duration of the Project and facilitate compliance with regulatory guidance and laws and permit requirements. Specific objectives are:

- Protecting wildlife and vegetation during operations and closure activities by reducing their exposure to the Project area through monitoring and maintenance of BMPs and avoidance measures.
- Monitoring the success of repaired or rehabilitated habitats.
- Complying with the biologic opinion (BO) authorized by the USFWS under the ESA Section 7 Consultation Conditions of Approval for the SGP.
- Complying with federal laws and resource management plans including the MBTA, Bald and Golden Eagle Act, and PNF and BNF management plans.
- Managing operations to prevent the spread of noxious weed species during mine construction, operations, and close-out.

- Assuring the success of reclamation revegetation areas to comply with USFS and IDL conditions of approval and permanent closure of the mine.

The objectives of Water Resources Monitoring are:

- Collecting the data necessary to detect and quantify SGP effects on surface water, groundwater quality, and the aquatic habitat.
- Monitoring at surface water and groundwater locations that provides for early detection of potential discharges of cyanide.
- Monitoring at locations to assess treatment efficiency, evaluate effluent and receiving water characteristics, and determine compliance with effluent limits established in IPDES permits.
- Obtaining data from the groundwater monitoring network to assess groundwater quality associated with mining operations at the POCs set by the IDEQ.
- Confirming drinking water standards are being met at drinking water supply wells.
- Documenting the characteristics of groundwater upgradient and downgradient of mine facilities when required to assist in identifying potential mining-related impacts at the POCs.
- Providing a basis for the timely planning and implementation of EPMs, if required.
- Obtaining accurate and defensible data by following a site-specific quality assurance project plan and SOPs.
- Providing accurate and complete reporting of potential mining-related impacts to appropriate regulatory agencies.

5.1.3 Waste Management Plans

Waste management plans included in the EMMP address the set of actions used to safely manage different waste streams at the SGP in compliance with applicable regulations. Implementing these actions protects not only human health and safety, but environmental resources as well. The component plans in this appendix are intended to provide guidance and practices to safely manage solid and hazardous waste and materials.

The overall waste management objectives are:

- Identifying and removing legacy hazardous materials for appropriate disposal.
- Maintaining a high degree of emergency preparedness.
- Minimizing hazardous and non-hazardous materials generation and properly disposing of all wastes.
- Protecting worker health and safety and protecting the environment.
- Managing the use of chemicals and hazardous materials to prevent spills, fires, or explosions, and protecting the existing biological and hydrologic resources of the area during construction, operation, reclamation, and closure.
- Managing and properly disposing of any Project-generated sewage, trash, or hazardous chemicals.

5.2 ADAPTIVE MANAGEMENT

In some cases where environmental outcomes may be uncertain, the EMMP will include adaptive management strategies that will establish performance measures, impact thresholds, operational adjustment options and/or response actions that may be implemented to achieve and demonstrate compliance with applicable permitting requirements and/or consistency with the environmental analysis.

Adaptive management recognizes environmental risks and the dynamic nature of mine operation environments and allows them to be addressed in a comprehensive, systematic, planned, and documented manner through actions, adjustments, and planned responses. The adaptive management framework for the Project is a continuous cycle of implementing EMMP monitoring and management plans, evaluating results, adjusting plans based on results, and reporting and documenting adjustments and results.

The adaptive management approach is applied at the plan level, per the specific plans in the EMMP. Each of the EMMP plans identifies how monitoring data will be used to: (1) determine if performance standards are being achieved as anticipated and (2) whether adjustments are required. If adjustments are necessary, the plan establishes timelines for the implementation of adjustments.

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APPENDIX A. NEPA ALTERNATIVES COMPARISON FOR FEIS

Table A-1. Comparison of Alternatives Analyzed in the Draft EIS and the ModPRO2

SGP Phase	Component/ Subcomponent	Alternative 1 (PRO)	Alternative 2 (ModPRO)	ModPRO21	Alternative 3 (EFSFSR TSF)	Alternative 4 (Yellow Pine Route)[2]
All Phases	SGP timeline	Construction: Approximately 3 years Operations: Approximately 12-15 years Exploration: Approximately 15 years (during construction and operations) Closure: Approximately 5 years Post Closure: As long as needed	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1, except: Construction: Approximately 4-5 years for additional time needed to construct the Yellow Pine route
All Phases	Access Roads	Construction: Yellow Pine route for mine site access during early construction with limited improvements. No longer used when Burntlog Route completed. Operations: Burntlog Route for mine site access during construction, mining and ore processing operations, and through closure and reclamation. Eight borrow areas developed along Burntlog Route for materials needed for road improvements and maintenance. Closure: New sections of Burntlog Route to be decommissioned/obliterated after the closure and reclamation period. Widened/upgraded sections of Burntlog Route returned to original conditions.	Same as Alternative 1, except: Reroute of a 5.3-mile segment of the Burntlog Route (Riordan Creek Segment).	Same as ModPRO (Alt 2)	Same as Alternative 1, except: The Burntlog Route entry into the mine site rerouted through Blowout Creek drainage during operations. Rerouting of the Burntlog Route would eliminate access to two of the eight borrow areas.	Yellow Pine route upgraded and used for combined mine site access and public access throughout life of mine instead of the Burntlog Route. No improvements or construction of new segments for Burntlog Route. Associated borrow sources developed along the Yellow Pine route for materials needed for road improvements and maintenance (borrow source sites not yet identified).
All Phases	Public Access	Construction: Public roads remain open through the mine site with temporary closures as needed to accommodate construction. Off-highway vehicle (OHV) Trail from Horse Heaven/Powerline to Meadow Creek Lookout Road (National Forest System Road [FR] 51290). Groomed over-snow vehicle (OSV) trail on Cabin Creek Road connecting OSV parking area on South Fork Road to Johnson Creek Road via Cabin Creek/Trout Creek drainages. Temporary groomed OSV trail on the west side of Johnson Creek from Trout Creek/Cabin Creek to Landmark while Burntlog Route is constructed. Operations & Closure: Stibnite Road (Forest Route [FR] 50412) / Thunder Mountain Road (FR 50375) closed through the mine site. Public access provided by OHV Trail from Horse Heaven/Powerline to Meadow Creek Lookout Road (FR 51290) and on Burntlog Route to Thunder Mountain Road (FR 50375). Trout Creek/Cabin Creek Road Groomed OSV trail continues to Landmark, now on un-maintained Johnson Creek Road. OSV trail extended to Wapiti Meadows Post Closure:	Construction: Same as Alternative 1, except no OHV Trail from Horse Heaven/Powerline to Meadow Creek Lookout Road (FR 51290). Operations: Same Cabin Creek Groomed OSV trail No OHV trail from Horse Heaven/Powerline to Meadow Creek Lookout Road (FR 51290). Same public access on Burntlog Route as Alternative 1 (at USFS discretion). Public access through the mine site provided by constructing new road to link Stibnite Road (FR 50412) to Thunder Mountain Road (FR 50375) with two options: Option 1 - through Yellow Pine pit and below mine haul road Option 2 - west of Yellow Pine pit and below mine haul road Closure & Post Closure: Same as Alternative 1	Construction: Same as ModPRO (Alt 2) Operations: Same as ModPRO (Alt 2) but with refined public access route through pit. Options no longer considered. Closure & Post Closure: Same as ModPRO (Alt 2)	Construction: Same as Alternative 1. Operations: No public access through the mine site. Public access on Burntlog Route connecting to Meadow Creek Lookout Road (FR 51290). No OHV Trail from Horse Heaven/Powerline to Meadow Creek Lookout Road (FR 51290). Cabin Creek Road groomed OSV trail. Closure & Post Closure: Road established over Yellow Pine DRSF (same as Alt 1) to middle of mine site where public access provided around the TSF using one of two options: 1 - Conversion of the temporary operational TSF access road along the TSF pipeline route to a permanent public access road connecting to the existing road at both ends. 2 - Retention of mine access road for public access.	Construction: Same as Alternative 1 except the OHV Trail not constructed. Also, groomed OSV trail on the west side of Johnson Creek to extend from Wapiti Meadows to Landmark from construction through mine closure. Operations: Public access through the mine site provided by constructing new road to link Stibnite Road (FR 50412) to Thunder Mountain Road (FR 50375) with two options: Option 1 - through Yellow Pine pit and below mine haul road Option 2 - west of Yellow Pine pit and below mine haul road Cabin Creek Road Groomed OSV trail. Groomed OSV trail on the west side of Johnson Creek from Trout Creek to Landmark from construction through mine closure. Closure & Post Closure: Same as Alternative 1

SGP Phase	Component/ Subcomponent	Alternative 1 (PRO)	Alternative 2 (ModPRO)	ModPRO21	Alternative 3 (EFSFSR TSF)	Alternative 4 (Yellow Pine Route)[2]
		New road constructed over the Yellow Pine DRSF (backfilled Yellow Pine pit) connecting Stibnite Road (FR 50412) to Thunder Mountain Road (FR 50375).				
Operations	Development Rock Production and Storage	Four DRSFs: Hangar Flats DRSF Fiddle DRSF West End DRSF Yellow Pine DRSF (pit backfill)	Same as Alternative 1 except: West End DRSF eliminated Development rock used to backfill the Midnight pit portion of the West End pit. Development rock used to partially backfill the Hangar Flats pit.	Same as Alternative 2 except: Fiddle DRSF eliminated. Complete pit backfill of Hangar Flats pit. TSF Buttress (formerly called Hangar Flats DRSF) size increased, but maintains location of toe at Meadow Creek, retaining same ultimate valley bottom length as Alternative 1.	Same as Alternative 1 (four DRSFs), except: Hangar Flats DRSF moved to the EFSFSR drainage to buttress EFSFSR TSF.	Same as Alternative 1.
Operations	TSF	TSF located in Meadow Creek drainage. Tailings liner system[1] as follows: Underdrain of geotextile-wrapped gravel with perforated HDPE pipe as needed. Prepared subgrade of compacted materials or minimum 12-inch buffer/liner bedding fill. Secondary GCL (or equivalent). Primary 60-mil single-sided textured, LLDPE geomembrane liner (or equivalent).	TSF location the same as Alternative 1. Tailings liner system1 as follows: Underdrain system, prepared subgrade and GCL the same as Alternative 1. Liner: 60-mil HDPE AGRU MicroDrain® Liner as a combined secondary liner and leakage collection layer. 60-mil HDPE geomembrane primary liner.	TSF location the same as ModPRO (Alt 2) Tailings liner system as follows: Underdrain system, subgrade, and GCL the same as ModPRO (Alt 2). Geomembrane liner layer(s) above GCL. Liners to be 60-mil LLPE single-sided textured geomembrane primary liner, as in Alternative 1. Overliner drains on TSF floor to reduce hydraulic head on the liner system and reduce excess pore pressure in the tailings.	TSF relocated to EFSFSR drainage. Tailings liner system the same as Alternative 1.	TSF location the same as Alternative 1. Tailings liner system in compliance with Idaho Administrative Procedure Act (IDAPA) 50.01.13ID: Underdrain system the same as Alternative 1; A prepared subbase and a compacted soil layer a minimum of 12 inches thick; A secondary liner of a minimum thickness of 80 mil HDPE with a maximum coefficient of permeability of 10-11 cm/s; A leak detection and collection system to prevent greater than 12 inches of hydraulic head pressure on the primary liner. A primary liner of a minimum thickness of 80 mil HDPE with a maximum coefficient of permeability of 10-11 cm/s
Operations	Growth Media Stockpiles (GMSs)	10 GMSs located in close proximity to project facilities.	Same as Alternative 1.	Changes to the location, size, or number of GMSs because of eliminated Fiddle DRSF, expanded TSF Buttress (former Hangar Flats DRSF), reduced Hangar Flats pit, and added contact water storage ponds.	Changes the location of 2 GMSs because of relocated TSF, DRSF and worker housing facilities.	Same as Alternative 1.
Operations	Ore Stockpiles	1 run-of-mine stockpile area at ore processing facility.	Same as Alternative 1.	Same as Alternative 2, plus: Seven additional long-term run-of-mine ore stockpiles located as follows: 3 on the TSF Buttress on the north side of Meadow Creek valley; 2 adjacent to the Hangar Flats pit and extended onto the pit footprint after it is backfilled; 1 within the West End pit footprint. Also, the short-term stockpile at the ore processing facility would be extended to the south for additional capacity near the crusher.	Same as Alternative 1.	Same as Alternative 1.
Operations	Ore Processing	Crushing and Grinding Circuits Antimony Flotation Circuit Gold and Silver Flotation Circuit Gold/Silver Leaching and Carbon Adsorption Circuit Gold and Silver Electrowinning and Refining Circuit Tailings Neutralization Circuit	Same as Alternative 1 with addition of: Limestone crushing plant Associated lime generation equipment including lime kiln, lime stockpiles, conveyors, and air quality controls.	Same as Alternative 2 except: Some minor changes in the process flowsheet including; increased limestone dosage in the autoclave feed, eliminating the CCD circuit and adding a cooling circuit.	Same as Alternative 1.	Same as Alternative 1.
Operations	Reprocessing of Legacy Tailings	Reprocessing of legacy tailings in Meadow Creek drainage.	Same as Alternative 1.	Same as Alternative 2	No reprocessing of legacy tailings in Meadow Creek drainage.	Same as Alternative 1.
Operations	Mine Support Infrastructure	Mine Administration Building	Same as Alternative 1 except for the following changes:	Same as Alternative 2 except for the following:	Most support infrastructure the same as Alternative 1 with the following changes:	Same as Alternative 1.

SGP Phase	Component/ Subcomponent	Alternative 1 (PRO)	Alternative 2 (ModPRO)	ModPRO21	Alternative 3 (EFSFSR TSF)	Alternative 4 (Yellow Pine Route)[2]
		Maintenance Workshop Worker Housing Facility Haul Roads Fuel and Explosive Storage Service Roads and Trails	Haul road locations modified to accommodate DRSF changes and hauling of limestone from the West End pit including: Elimination of West End DRSF haul roads. Addition of haul road for limestone from the West End pit to the processing facilities.	Haul road locations modified to accommodate DRSF changes, pit and backfill changes, and hauling of limestone from the West End pit including: Elimination of Fiddle DRSF haul roads. Re-configuration of Hangar Flats pit haul roads. Relocation of EFSFSR haul road crossing. Revision to timing of all pit haul roads.	Relocation of worker housing facility to Blowout Creek due to EFSFSR TSF/DRSF. Changes to haul roads, service roads, and trails to accommodate relocated TSF/DRSF and relocated worker housing.	
Operations	Surface Water Management – Stream Diversions	During operations, management of contact and non-contact water via stream and stormwater diversions and Idaho Pollutant Discharge Elimination System (IPDES)-permitted outfalls. EFSFSR routed around the Yellow Pine pit in a tunnel during operations with enhanced design for fish passage. Midnight Creek piped under GMS to enter EFSFSR upstream of the tunnel. Hennessy Creek diverted through several boreholes into the EFSFSR tunnel. Fiddle Creek diverted to a surface diversion around the Fiddle DRSF. West End Creek diverted to a surface diversion around the north side of the legacy West End development rock dumps, West End pit, and West End DRSF. Garnet Creek maintained in current alignment with culverts as needed. Meadow Creek diverted around the TSF and Hangar Flats DRSF on the south side and a smaller channel on the north side to catch runoff. Sinuous channel around Hangar Flats pit with enhancements for aquatic species and to create floodplains. Floodplain corridor lined with a geosynthetic material to prevent loss of flow. The channel of the East Fork of Meadow Creek (structure with a retention structure upstream to raise the upgradient water table and prevent further head cutting.	Same as Alternative 1 except for the following: Hennessy Creek routed south toward Fiddle Creek in a surface diversion channel during mining. With the elimination of the West End DRSF, the West End Creek diversion starts farther downstream. The Meadow Creek diversion channel on the south side of the Hangar Flats pit lined with a geosynthetic liner extending farther down the drainage than Alternative 1. Low flows in stream diversions around the DRSFs, TSF, and Hangar Flats pit piped to prevent warming. Closure and reclamation: Meadow Creek and Blowout Creek combined stream flows above 5 cfs diverted into the Hangar Flats pit lake until the pit lake fills to accelerate pit lake filling. Operational diversion of Meadow Creek around the Hangar Flats pit retained as the reclaimed channel.	Same as Alternative 2 except for the following: Midnight Creek piped under haul roads, not GMS. No Fiddle Creek surface diversion with elimination of Fiddle DRSF; Fiddle Creek piped under the much smaller Fiddle GMS. Lower portion of West End Creek diversion is piped for constructability reasons. Lower Garnet Creek rerouted and restored during construction. Closure and reclamation: No Hangar Flats pit lake Stibnite Lake constructed in the Yellow Pine backfill floodplain to mitigate stream temperatures. West End pit lake is not expected to fill and spill. Freshwater intake for ore processing makeup water at upstream portal of fish tunnel.	The same as Alternative 1 except for the following changes: Surface water management of EFSFSR around the relocated TSF/DRSF. No diversion of Meadow Creek upstream of Hangar Flats pit.	Same as Alternative 1 except for the following changes during operations: Step pools created in Blowout Creek in place of the rock drain. The EFSFSR routed in a tunnel designed to pass flows and sediment/debris but not enhanced for fish passage. Meadow Creek routed around Hangar Flats pit using a pipeline.
Operations	Groundwater Management	Dewatering of Yellow Pine and Hangar Flats pits via wells and sumps. Use of two rapid infiltration basins (RIBs) and IDPES surface outfalls to manage dewatering water.	Same as Alternative 1 with the following change: The Yellow Pine pit dewatering wells continue to operate and send water to the RIBs during seasonal low flows after the completion of mining in the Yellow Pine pit until the Hangar Flats pit lake is filled.	Same as Alternative 2 except: Direct discharge of treated water instead of RIBs and no need for continued streamflow management.	Same as Alternative 1.	Same as Alternative 1.
All Phases	Mine Impacted Water Treatment	Mine life: Collection and storage, reuse, and/or treatment of contact water (including pit dewatering) as needed to meet water quality standards, with discharge to surface outfalls. Construction: water from active pit/DRSF areas and legacy materials disturbed by construction. Operations: water from pits, dewatering, DRSFs, portions of plant site including ore stockpiles. Closure: TSF pool/runoff/consolidation water, approx. 30 years; Fiddle DRSF seepage and Hangar Flats pit lake in perpetuity.	Same as Alternative 1, but less water at closure due to routing Meadow Creek around Hangar Flats pit lake.	Same as Alternative 1, but less water in all phases due to less overlap of disturbance, less dewatering, fewer DRSFs, retention of operational Meadow Creek diversion at Hangar Flats pit, smaller Hangar Flats pit, and backfill eliminating Hangar Flats lake and eliminating the need for post-closure streamflow support and pumping/treating groundwater associated with it. Long-term treatment limited to TSF water for approximately 25 years after end of operations.	Same as Alternative 1.	Same as Alternative 1.

SGP Phase	Component/ Subcomponent	Alternative 1 (PRO)	Alternative 2 (ModPRO)	ModPRO21	Alternative 3 (EFSFSR TSF)	Alternative 4 (Yellow Pine Route)[2]
Operations and Reclamation	Sanitary and Solid Waste	Sanitary waste treatment Solid waste collection areas On-site landfill Composting facilities Recycling On-site landfarm	Same as Alternative 1.	Same as Alternative 2 except: No on-site landfill or landfarm. Materials from the dismantling or demolition of structures and facilities would be salvaged or disposed of in permitted off-site landfills. Concrete foundations would be broken or fractured and covered in-place with a minimum of 2 feet of a combination of 1.5 feet of backfill and 0.5 feet of growth media or would be broken up and buried a in the TSF Buttress or pit backfill prior to installation of a geomembrane barrier cover.	Mostly the same as Alternative 1 with the following changes: Relocation of worker housing sanitary wastewater treatment facility and composting facilities due to relocation of worker housing facility to Blowout Creek. Relocation of wastewater outfall to Meadow Creek drainage instead of EFSFSR drainage due to relocation of worker housing sanitary wastewater treatment facility.	Same as Alternative 1.
Operations	Mine Site Borrow Sources	Legacy spent heap leach ore Development rock in mine pits and from underground exploration. Alluvial soils within the TSF and Hangar Flats pit footprints (within Meadow Creek valley). Outwash soils in lower Blowout Creek. Glacial materials in Fiddle Creek valley within footprint of Fiddle DRSF.	Same as Alternative 1.	Same as Alternative 2 except: Minimal borrow materials from Fiddle Creek Valley due to elimination of Fiddle DRSF.	Same as Alternative 1 with the following exceptions: Alluvial soils within footprint of the Meadow Creek valley TSF not used. Legacy spent heap leach not removed. Additional material obtained from the granular alluvial and colluvial materials within the EFSFSR, TSF, and DRSF footprints.	Same as Alternative 1.
Operations	Utilities - Transmission Lines	Upgrades to 42 miles of existing 69 kV line and 21.5 miles of existing 12.5 kV line. New 8.3-mile-long 138 kV line 34.9 kV lines within the mine site	Same as Alternative 1 with two realignments: Reroute approximately 5.4 miles of upgraded transmission line to avoid the Thunder Mountain Estates subdivision. Reroute approximately 0.9 miles of upgraded transmission line to use an old railroad grade.	Same as Alternative 2 except: 3 miles of underground distribution from the Johnson Creek Substation south to Wapiti Meadows	Same as Alternative 1, except: With relocation of TSF to EFSFSR valley, 2.5 miles of the new 8.3-mile-long 138 kV transmission line realigned to be coincident with a minimally developed access road in the Meadow Creek drainage. 34.9 kV lines within the mine site to accommodate relocated TSF, DRSF, and worker housing facility.	Same as Alternative 1.
Operations	Utilities - Electrical Substations	Upgrades to existing substations. New Johnson Creek and mine site substations. New Scott Valley and Thunderbolt Tap substations and new Cascade switching station.	Same as Alternative 1 with the following change: The proposed Cascade Switching station moved from the intersection of Thunder City Road and Weant Lane to Warm Lake Road due to reroute of the transmission line to avoid Thunder Mountain Estates subdivision.	Same as Alternative 2	Same as Alternative 1.	Same as Alternative 1.
Operations	Utilities – Communication Towers and Repeater Sites	Cell towers (three location options with associated access roads). VHF repeater sites Communication site at the Stibnite Gold Logistics Facility (SGLF) Upgrades to existing communication site	Same as Alternative 1.	Same as Alternative 2 except for the following: Reduced the number of cell tower options from three to one; North of the Hangar Flats pit. Eliminated alternative VHF repeater sites.	Same as Alternative 1.	Same as Alternative 1 but constructed and maintained using helicopter (instead of constructing access roads) for cell tower sites within Inventoried Roadless Areas managed for Backcountry/Restoration.
Operations	Off-site Road Maintenance Facility	Landmark Road Maintenance Facility located near intersection of Warm Lake Road at Johnson Creek)	Road Maintenance Facility relocated to one of the access roads borrow source locations (4.4 miles east of the junction of Johnson Creek Road and Warm Lake Road along the proposed Burntlog Route).	Same as Alternative 2	Same as Alternative 1.	Relocation of Road Maintenance Facility to the west of Landmark on south side of Warm Lake Road.
Operations	Off-site Stibnite Gold Logistics Facility	Located along Warm Lake Road, approximately 7 miles east of Cascade	Same as Alternative 1.	Same as Alternative 2	Same as Alternative 1.	Same as Alternative 1.
Reclamation/ Closure	Mine Pits	Three open pits: Yellow Pine pit backfilled with development rock. Hangar Flats pit lake created; once pit lake established, Meadow Creek routed through the pit.	Same as Alternative 1 except for the following changes: Hangar Flats pit partially backfilled with development rock to reduce the depth of the pit lake. Meadow Creek not routed through the partially backfilled Hangar Flats pit.	Same as Alternative 2 except for the following: Hangar Flats pit mined tonnage decreased approximately 70%, Yellow Pine pit decreased about 3% and West End pit increased 20%, and pit sequencing changed slightly, reducing footprint and overlapping water management needs. Total Project	Same as Alternative 1.	Same as Alternative 1.

SGP Phase	Component/ Subcomponent	Alternative 1 (PRO)	Alternative 2 (ModPRO)	ModPRO21	Alternative 3 (EFSFSR TSF)	Alternative 4 (Yellow Pine Route)[2]
		West End pit (which includes the Midnight Pit) fills with water; a spillway provides for overflow into West End Creek. Midnight pit fills with water and spills into Midnight Creek.	The Midnight pit backfilled with development rock.	tonnage mined decreased approximately 44 million tons (10%). Hangar Flats pit fully backfilled with development rock. No Hangar Flats pit lake.		
Reclamation/ Closure	DRSFs	Closure of four DRSFs: West End DRSF, Fiddle DRSF, Yellow Pine pit DRSF (backfill), Hangar Flats DRSF (TSF buttress DRSFs graded, 12 inches of growth medium placed. Backfilled Yellow Pine pit regraded with 12 inches of growth medium placed.	Closure of three DRSFs (West End DRSF eliminated): Same as Alternative 1 for remaining DRSFs, except: Low permeability geosynthetic placed over the top and side of Fiddle DRSF and over the top of Hangar Flats DRSF, followed by a layer of soil/rock and growth media.	Same as Alternative 2, except: Fiddle DRSF eliminated and Hangar Flats pit completely backfilled Low permeability geosynthetic placed over the entire surface of the TSF Buttress (formerly called Hangar Flats DRSF), Hangar Flats pit backfill, and Yellow Pine pit backfill prior to placement of overlying alluvium/development rock and growth media.	Closure of four DRSFs the same as Alternative 1, except that for the Hanger Flats DRSF, these activities would be relocated to the EFSFSR drainage.	Same as Alternative 1.
TSF	Surface Reclamation	Stream channels restored on surface of TSF following tailings consolidation; riparian corridors lined to prevent intermingling of surface water and tailings. Remaining TSF surface covered with development rock and growth media.	Same as Alternative 1	Same as Alternative 1, except: Full surface of the TSF overlain with geosynthetic liner prior to placement of overlying alluvium/development rock and growth media.	Same as Alternative 1, except that stream restoration occurs on the TSF relocated to the EFSFSR drainage.	Same as Alternative 1
Reclamation/ Closure	Surface Water Management – Stream Diversions	EFSFSR channel reestablished in a surface channel routed across the reclaimed Yellow Pine pit backfill. Hennessy Creek reestablished in a surface channel. Fiddle Creek reestablished in a surface channel routed over the reclaimed Fiddle DRSF. West End Creek reestablished in a surface channel routed over the reclaimed West End DRSF. Meadow Creek reestablished in a surface channel routed over the reclaimed TSF and Hangar Flats DRSF. Meadow Creek flows routed into the Hangar Flats pit lake, pit lake discharges into lower Meadow Creek.	Meadow Creek and Blowout Creek combined stream flows above 5 cfs diverted into the Hangar Flats pit lake until the pit lake fills to accelerate pit lake filling. Operational diversion of Meadow Creek around the Hangar Flats pit retained as the reclaimed channel.	Same as Alternative 2 except: Fiddle Creek no longer diverted due to elimination of Fiddle DRSF; shorter pipe at Fiddle GMS instead. Hangar Flats pit lake eliminated. Stibnite Lake constructed in the Yellow Pine backfill floodplain to mitigate stream temperatures and replace fisheries habitat from Yellow Pine pit lake.	Same as Alternative 1.	Same as Alternative 1.

Notes:

[1] An initial description of the ModPRO2 was submitted in December 2020. Project refinements included in this revised ModPRO2 document are reflected in this table.

[2] The term "Yellow Pine Route" is used in the SGP DEIS for Alternative 4 and thus is maintained here.

Abbreviations:

cfs = cubic feet per second

cm/s = centimeter per second

DRSF = development rock storage facility

EFSFSR = East Fork of the South Fork of the Salmon River

FR = forest route

GCL = geosynthetic clay liner

GMS = growth media stockpiles

HDPE = high-density polyethylene

IDAPA = Idaho Administrative Procedures Act

IPDES = Idaho Pollutant Discharge Elimination System

kV = kilovolt

Abbreviations:

OHV = off-highway vehicle

OSV = over-snow vehicle

RIB = rapid infiltration basin

SGLF = Stibnite Gold Logistics Facility

TSF = tailings storage facility