Bull River Mine

PROJECT DESCRIPTION

Phase 1

Ore Stockpile Milling and Tailings Storage Facility Development

Prepared by:

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April 2021

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ABA	Acid-based Accounting
ANFO	Ammonium nitrate-fuel oil
AOA	Archaeological Overview Assessment
ARD	Acid Rock Drainage
BC ENV	BC Ministry of Environment and Climate Change Strategy
BC MEM	BC Ministry of Energy, Mines and Low Carbon Innovation
BEC	Biogeoclimatic ecosystem classification
BRM	Bull River Mine
BRMC	Bul River Mineral Corporation
CABIN	Canadian Aquatic Biomonitoring Network
CAC	Criteria air contaminants
CAF	Cut and Fill
CCME	Canadian Council of Ministers of the Environment
CLI	Canada Land Inventory
EMA	Environmental Management Act
GBRM	Gallowai Bul River Mine
GHG	Greenhouse Gas
IDZ	Initial dilution zone
LOM	Life of mine
MDRC	Mine Development Review Committee
MIBC	Methyl isobutyl carbinol
ML	Metal Leaching
MMPO	Major Mines Permitting Office
MRC	Mine Review Committee
NAG	Non-acid generating
NPR	Neutralization Potential Ratio
OGMA	Old Growth Management Areas
PAX	potassium amyl xanthate
PBM	Purcell Basin Minerals Inc.
SARA	Species at Risk Act
SMG	Stanfield Mining Group
SWQM	Surface water quality monitoring
TEM	Terrestrial ecosystem mapping
TSF	Tailings Storage Facility
UTM	Universal Transverse Mercator
UWR	Ungulate Winter Range

1. INTRODUCTION

Bul River Mineral Corporation (BRMC), a British Columbia corporation owned by Braveheart Resources Inc. ("Braveheart"), is proposing to re-start the Bull River Mine (BRM) (the Project). The BRM is an existing brownfield mineral exploration, development and production site located on private land approximately 50 km by road from Cranbrook, British Columbia, in Electoral Area C of the Central Sub Region of the Regional District of East Kootenay. The Project is located in a development area zoned for mining activities.

Access to the BRM from Cranbrook is via British Columbia Provincial Highway 3 to the paved, all-weather Wardner-Fort Steele Road and then the gravel, all-weather Bull River Road to the mine access road (Figure 1-1). The approximate centre of the BRM property is within National Topographic Series Map reference 82G/11W at longitude 115° 22' 54" west and latitude 49° 30' 15" north. Universal Transverse Mercator (UTM) coordinates for the Project centre, utilizing projection North American Datum (NAD) 83 Zone 11, are approximately 616,952 m east and 5,484,446 m north.

There is significant existing infrastructure at the BRM site remaining from previous mining operations (Dalton Mine and Gallowai Bul River Mine) that occurred from 1971 to 2009. Surface development includes two open pits (one has been backfilled with waste rock, the other is used as the primary settling pond for contact water); waste rock storage facilities; a tailings management facility; pads for baseline testing of acid rock drainage; a 700 tonne per day conventional mill with an adjoining crusher building, fine ore bin, and concentrate storage area; and administration, security, assay and metallurgical laboratory, and equipment maintenance buildings. Underground infrastructure includes 22,000 metres of underground developments on seven levels, and the mine is being maintained in a dewatered condition.

Braveheart plans to advance the BRM Project in a phased approach. This Project Description focuses on Phase 1. During Phase 1, the existing ore stockpile (stored within the waste rock dump) will be processed through the mill, and filtered tailings will be stored on the surface in a new Tailings Storage Facility (TSF) using filtered tailings or dry stack tailings as a Best Available Technology.

Without any planned expansion of the current M33 Permit boundary, infrastructure on the surface will be upgraded to support the milling of an existing 165,000 tonne Potentially Acid Generating ("PAG") stockpile of mineralized copper-bearing material. Braveheart intends to use ore sorting technology as part of its grade control strategy wherein X-Ray Sensory Technology ("XRT") will be used to separate economic mineralized material from non-economic waste material. The mill will produce an estimated 40 wet metric tonnes of copper concentrate daily for a period of approximately eight months. The concentrate will be shipped to Asian smelters for final processing.

Waste material from the ore sorting process, which will be primarily non-acid generating ("NAG"), will be co-mingled with the filtered tailings material from the milling process. Co-mingling coarse waste material with filtered tailings will enhance the stability of the TSF and reduce the potential for slumping.

During Phase 1, the underground workings will be maintained in a dewatered condition. Underground activities will be restricted to pumping and potentially some exploration drilling. Active mining will not occur in Phase 1.

Phase 1 of the Project will employ approximately 30 full-time personnel.

BRM currently holds a Mines Act permit, M-33, issued on August 9, 1979, and last amended on August 5, 2019). To facilitate Phase 1 milling operations, BRMC requires an amendment to M-33 to authorize surface placement of approximately 200,000 tonnes of tailings in the TSF.

BRM's Waste Management permit, PE-16034, issued on January 26, 2000, and last amended on January 3, 2007, authorizes effluent discharge from underground mine exploration operations. Due to the limited scope of Phase 1 operations, BRMC proposes to continue to utilize the current Waste Management permit during the Phase 1 milling activities and ongoing dewatering of the underground operations.

The current conditional water license, C121423, issued by the BC Ministry of Environment (BC ENV), would remain in place and not require modification of conditions.

Based on consultation and permitting discussions with regulatory agencies, it is BRMC's understanding that Phase 1 of the Project does not meet criteria described in the Reviewable Projects Regulation (Government of British Columbia, 2002) or the Regulations Designating Physical Activities SOR/2012-147 (Government of Canada, 2014) pursuant to the Canadian Environmental Assessment Act 2012 (CEAA 2012) (Government of Canada , 2012), and therefore is not expected to require an Environmental Assessment Certificate. BRMC anticipates that the integrated mine permitting process through the Major Mines Permitting Office (MMPO) will be utilized for the BRM re-start application. In preparation, BRMC has initiated a joint application for amendments to the *Mines Act* permit and *Environmental Act* waste management permit under the *Environmental Management Act (EMA).*

Phase 2, which will involve a subsequent permit application process, includes the resumption of underground mining operations, with a planned mining rate of 700 tonnes per day for an initially projected mine life of 6.5 years. To re-start mine operations, BRMC will require authorization to increase the mining production rate from the currently permitted 205 tonnes per day and place tailings in the TSF.

Once in production, the mine will provide more than 80 full-time jobs for the local communities.

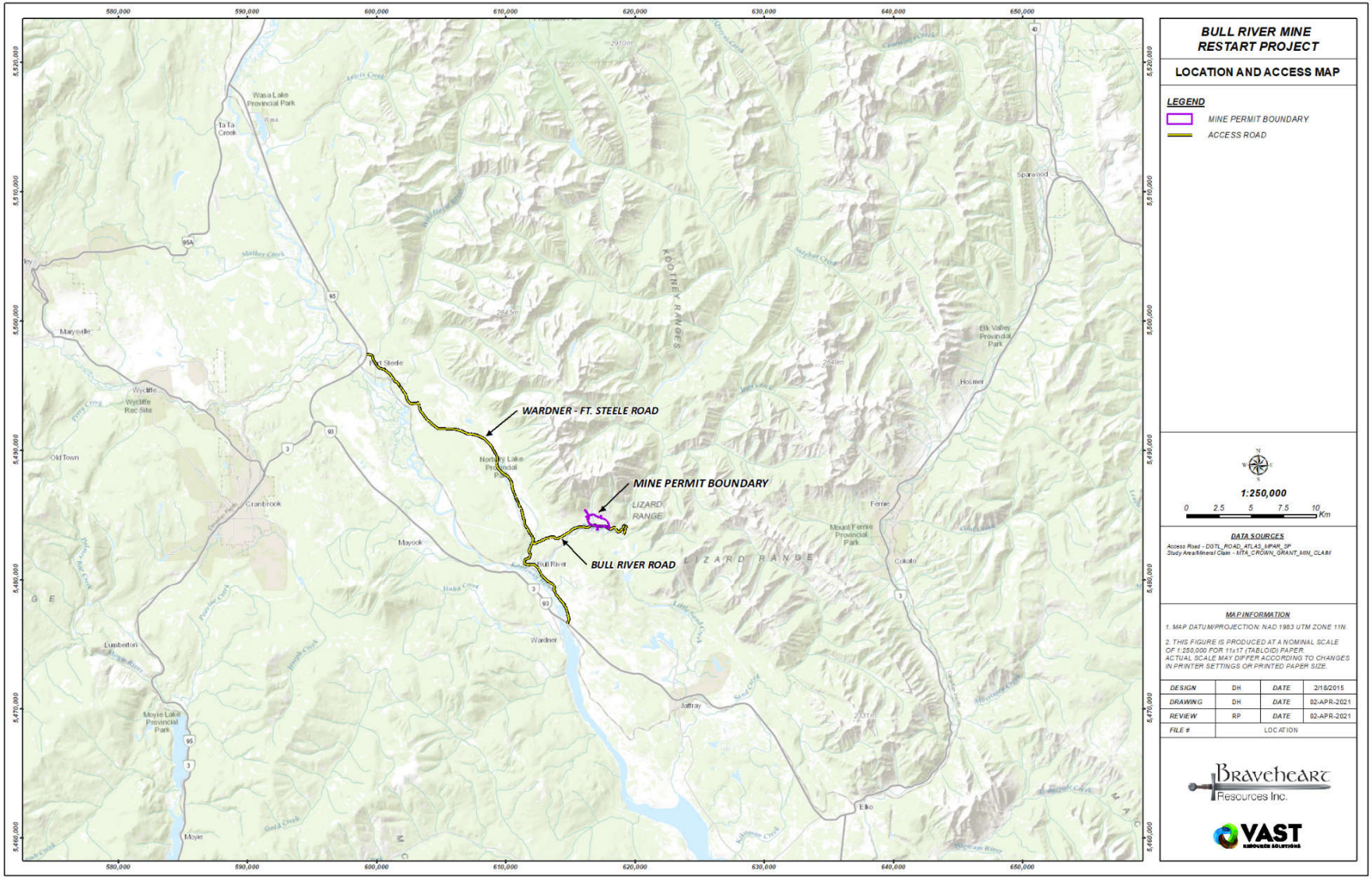

Figure 1-1. BRM location and access map

2. PROPONENT

Braveheart Resources Inc. acquired Bul River Mineral Corporation (BRMC) and all its subsidiaries and assets, including the BRM property, in January of 2019. Headquartered in Calgary, Alberta, Braveheart is a development-stage mining company engaged in the acquisition, exploration and development of minerals in the East and West Kootenay regions of British Columbia and Northern Ontario. Braveheart is a publicly-traded company listed on the TSX Venture Exchange (CVE: BHT). Additional corporate information can be viewed online at https://braveheartresources.com/.

The BRM Project will be operated through Bul River Mineral Corporation, headquartered at the mine site near Cranbrook, BC.

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3. PROPERTY HISTORY

Several mine claims were located in the vicinity of Burntbridge Creek in about 1896, including the Silver Chief, Silver Reef, Silver Buckeye, and Sirdar claims. Development work was done in a 30-metre crosscut adit and 4.5-metre shaft. The Daisy Fr. claim was developed by shallow pits and open cuts. The Silver Chief and Sirdar were Crown-granted in 1899. No further activity was reported until 1927 when ownership of the Silver Chief, Sirdar, and Khedive claims changed. The workings at that time included a crosscut adit about 40 metres in length. The ground was subsequently restaked, but no further activity was reported until 1968.

Placid Oil Company (Placid) optioned the property in 1968 and carried out geological mapping, a magnetometer survey, trenching and stripping. Several old pits and 460 metres of old adit were cleaned out. The property was expanded to include 62 located claims. Exploration work during 1969 included soil sampling, induced polarization and electromagnetic surveys, and diamond drilling. This work indicated two orebodies amenable to open pit mining. A 750-tonne per day mill was built, and milling operations commenced on October 1, 1971. Overburden removal and mining of Pit 2 began in 1971 and was completed in April 1973. Pre-production stripping of Pit 1 began in 1972. Pit 2 was almost completely backfilled with material from Pit 1. Mining ceased in March 1974 because of the depletion of open pit ore reserves. Milling of stockpiled ore continued until June 1974, when operations ceased. During the Dalton Mine's operations, Placid produced 16 million lbs. of copper, 204,274 ounces of silver and 4,055 ounces of gold from two open pits (Government of British Columbia, Ministry of Energy, Mines and Petroleum Resources, 2019).

R.H. Stanfield and Associates acquired the property from Placid on March 5, 1976, and transferred the assets to Bul River Mineral Corporation on March 17, 1976. Gallowai Metal Mining Corp., also owned by Stanfield, earned a 50 % interest in the property by raising and spending exploration dollars. The Gallowai Bul River Mine (GBRM) name reflected the joint ownership by the two companies. Over the next several years, exploration drilling at the GBRM indicated the possibility of further resources below the excavated pits. A portal was collared in 1997, and exploration development commenced allowing for a more detailed drilling program.

In May 2011, the Stanfield Mining Group (SMG), including GBRM, was placed under creditor protection. New management oversaw the preparation of two NI-43-101 compliant mineral resource estimates. The work included extensive QA/QC to bring the information into compliance. New drilling results and channel samples were used to support the 2013 report. A mine scoping study was completed in 2013 by Moose Mountain Technical Services.

In December 2014, a restructuring plan was approved by the BC Supreme Court and SMG creditors. The restructuring plan included the transfer of all ("SMG") mining properties and assets, including 139 mineral claims, two mining leases and a worker's campsite, to Purcell Basin Minerals Inc. (PBM). In January 2016, PBM submitted a Mines Act permit application for the re-start of the BRM. PBM was subsequently placed under creditor protection, and the Mines Act permitting process was placed on hold. The BRM has been under "Care and Maintenance" status since 2014. Annual reclamation reports have been filed with the Ministry of Energy, Mines and Petroleum Resources (MEMPR). A geotechnical inspection was completed in August 2016, and compliance inspections for electrical and health/safety were completed in March 2018.

Braveheart Resources Inc. acquired Bul River Mineral Corporation and all its subsidiaries and assets, including the BRM property, in January of 2019. With most of the original infrastructure still in place and the expected modest capital requirements to mill existing ore stockpiles at the BRM, BRMC is actively working on submitting amendments to the *Mines Act,* and *Environmental Management Act* permits.

4. DEVELOPMENT SCHEDULE

Given the advanced state of the BRM Project in regards to both on-site infrastructure and previous permitting work, development timelines will largely be dictated by the BC Ministry of Energy, Mines and Low Carbon Innovation (BC MEM), BC Ministry of Environment and Climate Change Strategy (BC ENV), and First Nation interactions, and the requirements of the integrated mine permitting process through the MMPO. Braveheart/BRMC is currently preparing permit amendment applications for Phase 1 ore stockpile milling and tailings placement to meet BC MEM and BC ENV joint application information requirements and other authorizations required for major mining projects.

Concurrent with the permit amendment application, Braveheart has initiated engineering design and procurement of surface infrastructure required to re-start the mill. Refurbishment or replacement of worn or damaged components includes:

- installation of a 10MVA transformer and associated switchgear;
- installation of new flotation circuit in the mill;
- installation of a filtration circuit to filter tailings;
- civil works associated with the initial construction of the TSF; and
- engineering repairs to the existing 3300-tonne fine ore bin.

It is expected that less than six months are needed to complete this work.

Once operational, the upgraded mill will process the existing 165,000-tonne surface stockpile of mineralized material, producing an estimated 40 wet metric tonnes of copper concentrate daily for a period of approximately eight months.

Defined indicated resources suggest a 6.5-year life of mine (LOM) with an anticipated production rate of 700 tonnes per day. There is an opportunity to extend the LOM as the formation is open at depth, and underground drilling has confirmed that mineralization continues down dip. Further drilling and drifting would be required to develop this resource.

Mine closure, reclamation and monitoring would be completed in accordance with permit conditions and requirements under the BC *Mines Act* and *Environmental Management Act*.

5. PROJECT RATIONALE

The BRM is an existing brownfield site; all the necessary surface and underground infrastructure are in place to support a phased re-start. Milling the surface ore stockpile will provide BRMC with valuable information on the grade and recovery of the mineralized material and eliminate a principal source of potential ML/ARD on the property, which currently represents a reclamation liability for BRMC or any future owner of the property.

Estimated capital costs for Phase 1 are less than $6M. Given the project's advanced state, a favourable economic return can be achieved with marginal new disturbance. The initial creation of 30 jobs during Phase 1 and over 80 jobs should Braveheart move to Phase 2 would substantially boost the local economy. There is also the opportunity to expand the current resource and LOM with little change to the existing level of disturbance.

6. PROJECT DESCRIPTION

Mine permit M-33, issued by BC MEM under the British Columbia *Mines Act*, permits the BRM to produce a maximum of 75,000 tonnes of ore per year; tailings deposition is not permitted. BRMC is applying to amend M-33 to allow placement of tailings on the surface in a newly-constructed TSF. The mill will operate at its current design capacity of 700 tonnes per day for approximately eight months to process the existing stockpile of mineralized material currently stored within the existing waste rock dump. Minor amendments to existing permits and new approvals for related works are also contemplated. Anticipated permits are listed in Section 11.

6.1. Major Components and Infrastructure

Currently, the primary assets and facilities (with estimated areas) associated with BRM include:

- An administrative building (690 m^2) containing dry facilities.
- An assay and water testing laboratory (242 m^2).
- A metallurgical laboratory (141 m^2).
- A 700 tonne per day conventional mill (2,020 m^2) with adjoining crusher building (280 m^2), fine ore bin (165 m^2), and concentrate storage facility (130 m^2).
- Mine shops (660 m^2), electrical shop (140 m^2), core shack (80 m^2), fire hall (75 m^2), and mine rescue building (120 m^2).
- The site for a 10MVA electrical substation connected to a 69 kV electrical transmission line (the substation was destroyed by fire in 2013).
- Water wells and septic system.
- Underground infrastructure, including a mine ramp, ventilation raises and fans, sumps, and mobile equipment fleet.
- Access by paved, all-weather roads.
- A mine effluent discharge and settling system (currently using the old Placid pit).

The assets and existing Bull River infrastructure are displayed in Figure 6-1 and Figure 6-2. Figure 6-3 shows the mine site layout map with all major facilities identified.

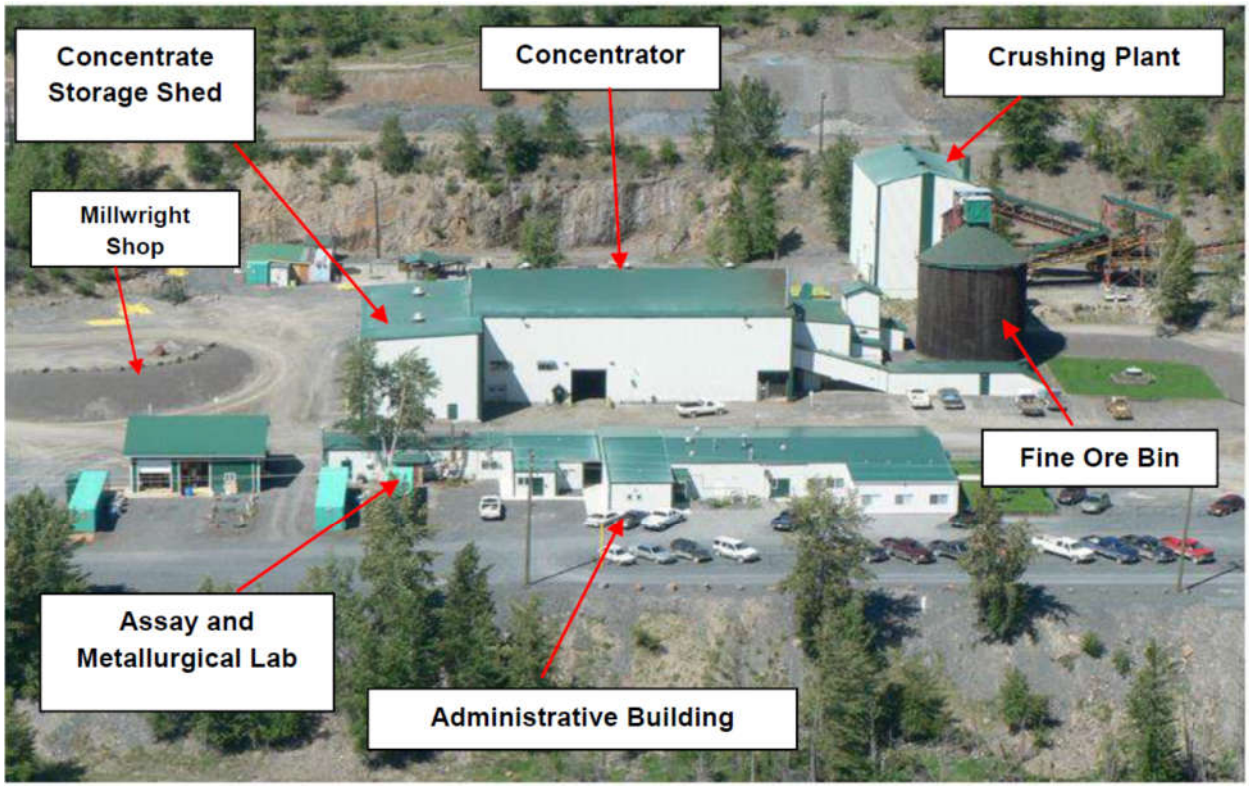

Figure 6-1. Existing BRM infrastructure; administration and mill area.

Figure 6-2. Existing BRM infrastructure; mine portal area.

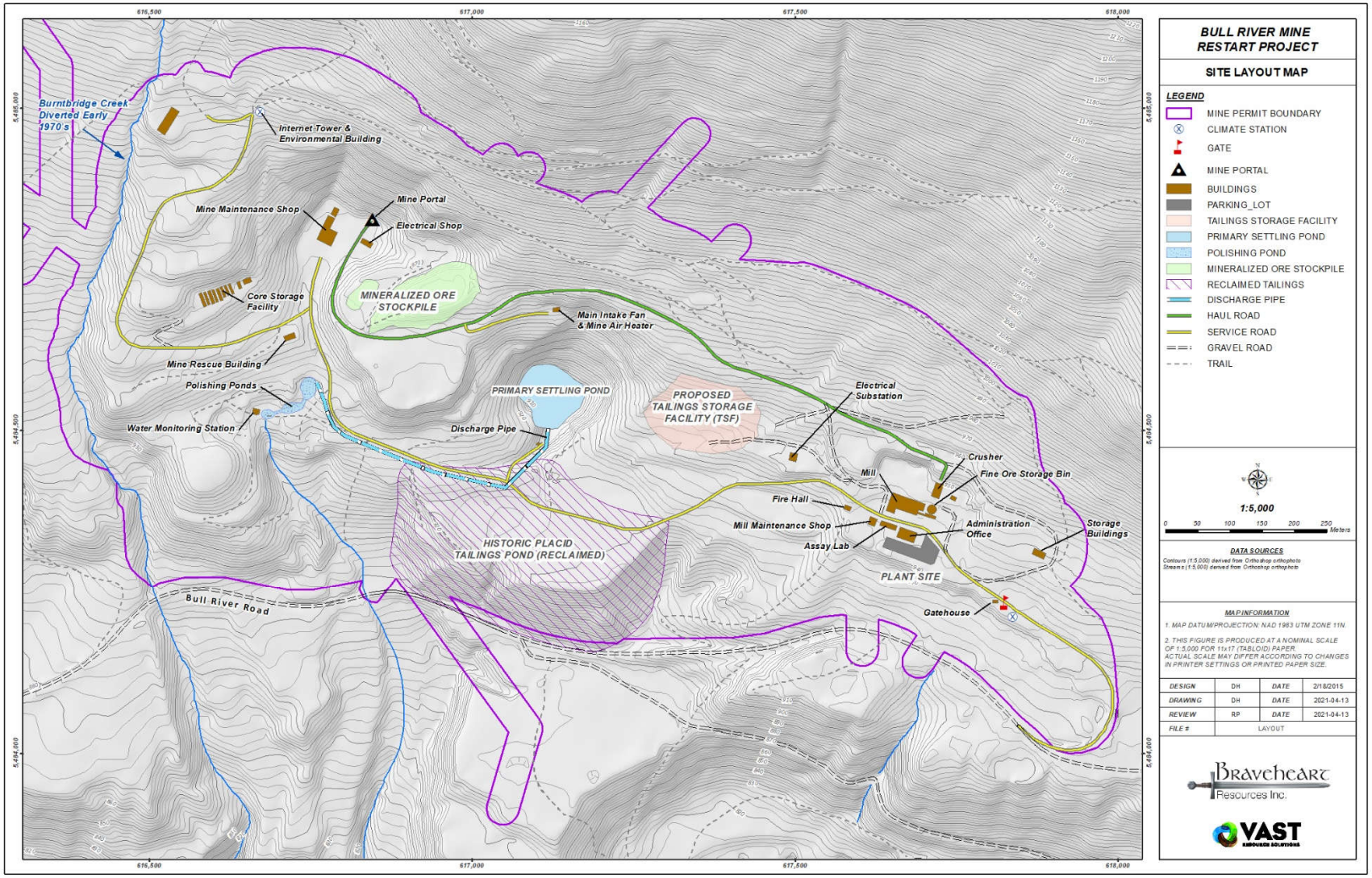

Figure 6-3. BRM site layout map

6.1.1. Water Supply

Currently, the mine is discharging water from the underground workings daily. During Phase 1 processing of stockpiled ore, process water will be supplied to the mill via a four-inch discharge line located in the 3 Level escapeway. The estimated supply capacity is 23 gallons per minute. During low flow months (August-March), supplemental water from a well located adjacent to the mill will be used as a backup. Based on available water volumes and flow rates, it is expected that the discharge of effluent to the receiving environment will be significantly reduced or eliminated when the mill is operational.

Wells for potable water and a septic system are already established from previous operations.

6.1.2. Power Supply

The BRM substation, connected by a 69kV electrical transmission line to the main power grid, was destroyed by fire in 2013. The 69kV line was decommissioned, and a smaller service line was run to the property from a power line south of the access road. This service line powers a small transformer that meets the property's current needs while in Care and Maintenance. BRMC has purchased a new 10 MVA transformer to install at the new substation, connected to the main grid power via a 69kV line, to supply the necessary operations power.

A 4160 V cable is installed down the decline to the main electrical substation on 7 Level. A 1000 kVA substation on 7 Level feeds 600 V power to levels 3, 4, 5, 6 and 7. A second electrical substation on 9 Level supplies 600 V power to levels 8 and 9 through a 750 kVA transformer. A second 4160 V cable will be established from surface to 7 Level through a service hole as a redundant backup. Power cables will be suspended from the back of development headings. All power will be three-phase, except lighting and convenience receptacles, which will be single-phase 120 V power.

6.1.3. Explosives

There are currently no explosives stored on site. There will not be any requirement to utilize explosives

6.2. Mine Plan

6.2.1. Mining

No underground mining will occur during Phase 1. The underground will continue to be maintained in a dewatered condition. Exploration drilling may be conducted from the underground to define the down-dip extension of the current resource.

An underground mine plan was filed with the MEMPR in 2007, and subsequent underground work was completed following the plan's parameters. Work underground continued until 2009, when operations were suspended due to a lack of funds. BRM personnel have reported that excavation models of the underground workings are current to the suspension of mining in 2009. Approximately 22,000 metres of underground development have occurred, including exposure of the mineralized structures on seven levels along access drives and crosscuts. Mapping and sampling of these headings were conducted by BRM personnel and independent consultants. Some material has been processed in test batches using an on-site pilot mill, but the mine has not engaged in production stoping.

6.2.2. Processing/Metallurgy

The mill is not currently operational. During Phase 1, the mill will be refurbished and used to recover payable metals from the mineralized material by crushing and grinding, followed by flotation. The final product will be a granular concentrate composed primarily of copper sulphide, with silver and gold. This will represent approximately 5% of the material fed into the mill; the remaining 95% of the mill feed will be waste tailings. The tailings will be dewatered and placed on the surface in a dry stack TSF.

The process plant will include conventional crushing and grinding operations and conventional froth flotation to recover a mineral concentrate of chalcopyrite (copper sulphide), with minor gold and silver from the ground ore (Figure 6-4). The concentrate will be transported to designated smelters worldwide for subsequent reduction into copper metal.

Mill throughput is approximately 700 dry tonnes per operating day. During Phase 1, the plant will operate two 12 hour shifts per day with an assumed process plant availability of 92%. A 25% grade copper sulphide concentrate at over 90% recovery of the copper, gold and silver metals will be produced.

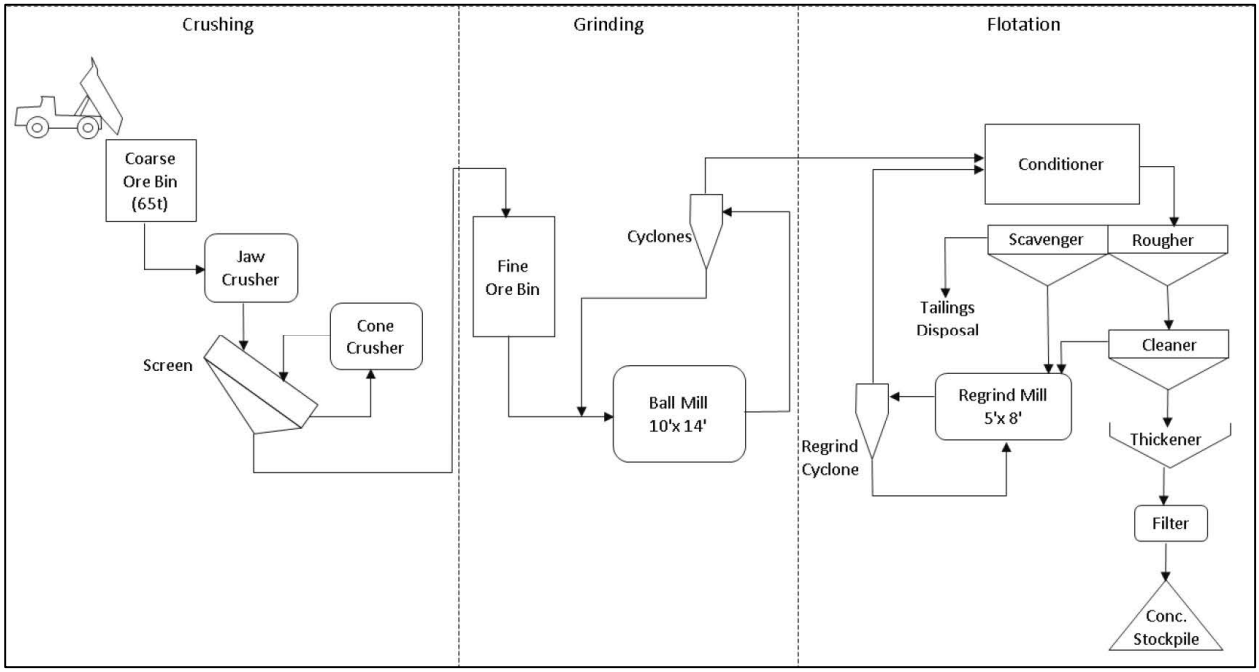

Figure 6-4. BRM simplified mill process flowsheet

The major process unit operations at BRM include:

- Ore sorting pad for grade control using XRT;
- Primary & secondary crushing;
- Closed-circuit ball mill grinding with cyclone classification;
- Copper rougher and three-stage cleaner flotation to produce a concentrate;
- Copper rougher concentrate regrind;
- Copper concentrate dewatering through thickening, filtration and drying;
- Tailings thickening and drying for deposition of dry stack tailings to the TSF;
- Process water, fresh/fire water, potable water distribution;
- Utility compressed air distribution;
- Concentrate storage area;
- Reagent storage and mixing; and
- Assay laboratory.

Except for flotation and tailings dewatering, the crushing and process plant buildings and unit operation equipment are existing and will be reused. New and ancillary equipment will be purchased for the flotation and tailings dewatering circuits. Reagents required for flotation and dewatering include methyl isobutyl carbinol (MIBC) frother, potassium amyl xanthate (PAX) collector, pH modifier (lime) and agglomerate (flocculant).

Tailings thickener overflow water will be reused in the grinding and rougher flotation circuits as launder and make-up water. Concentrate thickener overflow water will be used in the regrind and cleaner circuits as launder and make-up water. Fresh water will be required for reagent mixing and gland water.

6.2.3. Concentrate Shipment

Copper concentrates will be produced at a rate of approximately 40 wet metric tonnes per day. It is expected that approximately 8,400 wet metric tonnes of concentrates will be produced from milling the surface stockpile. Concentrates will be bulk bagged and transported in 27-tonne containers to Vancouver by either freight trucks or rail. The final destination will be an Asian smelter. BRMC has entered into a concentrate purchase agreement with Ocean Partners.

6.2.4. Tailings Storage Facility

A dry stack tailings storage facility (TSF) will be constructed directly east adjacent to the historic open pit now used as the primary settling pond (refer to Figure 6-3). The TSF will be operated dry with no ponding water. Surface water runoff that seeps through the dry stack will be captured at the southern toe of the facility and be directed into a ditch for gravity flow into the open pit. Metal leaching (ML)/Acid rock drainage (ARD) assessment of tailings will be completed regularly, and the results will be used to inform the tailings management plan.

6.3. Reclamation and Closure

Phase 1 reclamation activities will focus on ground disturbances associated with the construction of the TSF. Soils within the proposed TSF footprint will be characterized for their reclamation values. A detailed soil management plan will be developed to govern stripping and salvage operations, stockpiling practices, erosion and sediment control measures, weed and invasive plant species control, and soil replacement and revegetation techniques.

To the extent practical during Phase 1 operations, TSF reclamation will occur progressively, commencing on the lower lift and progressing upwards as lifts are completed and become available. All reclamation activities will be in accordance with requirements stipulated in M-33.

All buildings constructed for the exploration and operation program are considered permanent buildings (i.e., they are considered capital assets of BRMC) and will remain intact. Other pre-exploration program structures (i.e., those purchased from Placid and not subject to their reclamation program) will also be retained. Secondary structures such as powder and detonator magazines, electric switch houses, ventilation houses, and other minor sub-structures will be removed and their respective areas reclaimed during final reclamation and closure. Features that may be retained include key diversion ditches and ponds required to meet long-term water management objectives.

6.3.1. Projected Disturbance Area

Projected disturbances during Phase 1 will be related to the development of the TSF. There will be negligible new disturbance on the site from the construction of the modified TSF footprint proposed. Construction is planned to occur within an area that has been identified as disturbed.

According to the 2020 annual reclamation report, the overall BRM footprint is 96.7 ha, with 94.24 ha disturbed by previous mining activities. Of the disturbed area, 34.84 ha has been reclaimed. The remaining disturbed areas include roads, waste rock dumps, infrastructure, and discharge ponds.

6.3.2. Reclamation Objectives

Reclamation will be conducted with the goal of establishing ecological functionality, topographic features, and self-sustaining vegetation communities that will provide forage and shelter to sustain wildlife habitat use (ungulates, large carnivores and avifauna), as well as domestic cattle grazing. The reclamation plan will also ensure that all mine facilities will be closed so that human health and ecological risks are mitigated and long-term maintenance and monitoring requirements are minimized.

Ongoing consultation with First Nations regarding traditional and cultural uses of the BRM site will inform further development of reclamation objectives and end land use plans.

6.3.3. Projected End Land Use

End land use objectives for the Project include a mosaic of wildlife habitats, grasslands for cattle grazing, and forestry based on pre-development site capability and uses. Canada Land Inventory (CLI) capability maps were reviewed for the Project area. The current CLI land use classification is primarily non-productive woodland (Class U) and, secondarily, rough grazing and rangeland (Class K). The rough grazing classification includes natural grasslands, sedge meadows, and grassy open woodlands.

The post-mining landscape will include topography similar to pre-disturbance conditions, with possible additional features to address the multi-use nature that has been prescribed for the area. Methods to achieve specific end land use and capability objectives include:

- Decommissioning of all buildings constructed for previous and proposed mining upon completion of mining activities;
- Removal of secondary structures (e.g., ventilation houses, powder and detonator magazines, etc.) and equipment as identified in the decommissioning and closure plan;
- Partial or full resloping of remaining waste rock dumps to an angle of 2H:1V at mine decommissioning and closure;
- Coverage of mined waste rock stored within the confines of old pits with suitable overburden or cover soil (A and B horizons), followed by seeding and planting according to specified end land uses; and
- Intentional reduction of the slope angle of waste rock dump toes at the point of contact with the undisturbed slopes to facilitate access for wildlife onto the revegetated waste rock dumps and produce features that are aesthetically compatible with the adjacent landscape.

The BRM re-start requires no new disturbance outside of the existing 96.7 ha brownfield site. Therefore, effects on land use capabilities will be minimal.

7. PHYSICAL SETTING

The Project site lies within the Ponderosa Pine and Interior Douglas-fir biogeoclimatic zones. The portal elevation is approximately 950 MASL, with elevations within the BRMC holdings ranging from 760 MASL to 2,600 MASL. Grass and ground cover is dominated by rough fescue, pinegrass, Richardson's needlegrass, Idaho fescue, northwest sedge, and bluebunch wheatgrass. Shrubs found in the area include bearberry, saskatoon and bitterbrush (Ross, 2001). Further description of climatic and biogeoclimatic classifications is provided in Sections 10.1 and 10.6.

7.1. Location

The BRM site is situated approximately 50 km east by road of Cranbrook, BC (see Figure 1-1), on the southern facing slopes of the Steeples Mountains, above the Bull River as it exits the gorge from the Aberfeldie Reservoir. The nearest community is the hamlet of Bull River, which lies to the south of the Bull River immediately below its confluence with the Kootenay River.

7.2. Access

Access to the BRM property from Cranbrook is by driving northeast approximately 10 km via British Columbia Provincial Highway 3 (Crowsnest Highway) and then bearing southeast toward Fernie, British Columbia, for approximately 26 km to the paved, all-weather Wardner-Fort Steele Road. The Wardner-Fort Steele Road is followed north for eight kilometres, where it intersects the all-weather gravel Bull River Road. Direct access to the mine site is via the Bull River Road to the mine access road.

7.3. Tenure

The BRM site is underlain by Mineral Tenures 515055, 515057, and 515066 and Mining Lease 212493 (Figure 7-1), which covers 486.03 ha and includes surface and mineral rights. The Mining Lease was granted in February 1972 and expires in February 2023.

7.4. Land Use

There are two private residences/ranches to the west of the BRM site and the north of Bull River, approximately 5 km away. To the east and southeast are BC Hydro's Aberfeldie Dam and power generating station, several ranches and a commercial venture (SnoCat Skiing). The closest ranch is 4 km east of BRM's eastern boundary on the Lizard front range slopes. The "Bull River Guest Ranch" is located 5 km from the mine area's southeasterly boundary.

Other licensed land use tenures in the Project area include mineral resources, forest resources, registered trap lines, guide outfitter areas, commercial recreation areas, and grazing leases. All current tenure holders will require consultation and possible accommodation due to the Project's potential impacts on their operations.

Non-tenured land use in and adjacent to the Project area include hiking, camping, hunting, fishing, skiing, motorized recreation with all-terrain vehicles and snowmobiles, and cattle grazing.

Based on a review of Canada Inventory (CLI) maps (Government of Canada, 2013), existing land use in the BRM area includes agriculture, forestry, fisheries, wildlife, recreation, industrial, and commercial and residential use. The current CLI land use classification for the BRM study area is primarily non-productive woodland (Class U) and, secondarily, rough grazing and rangeland (Class K). The rough grazing classification includes natural grasslands, sedge meadows, and grassy open woodlands.

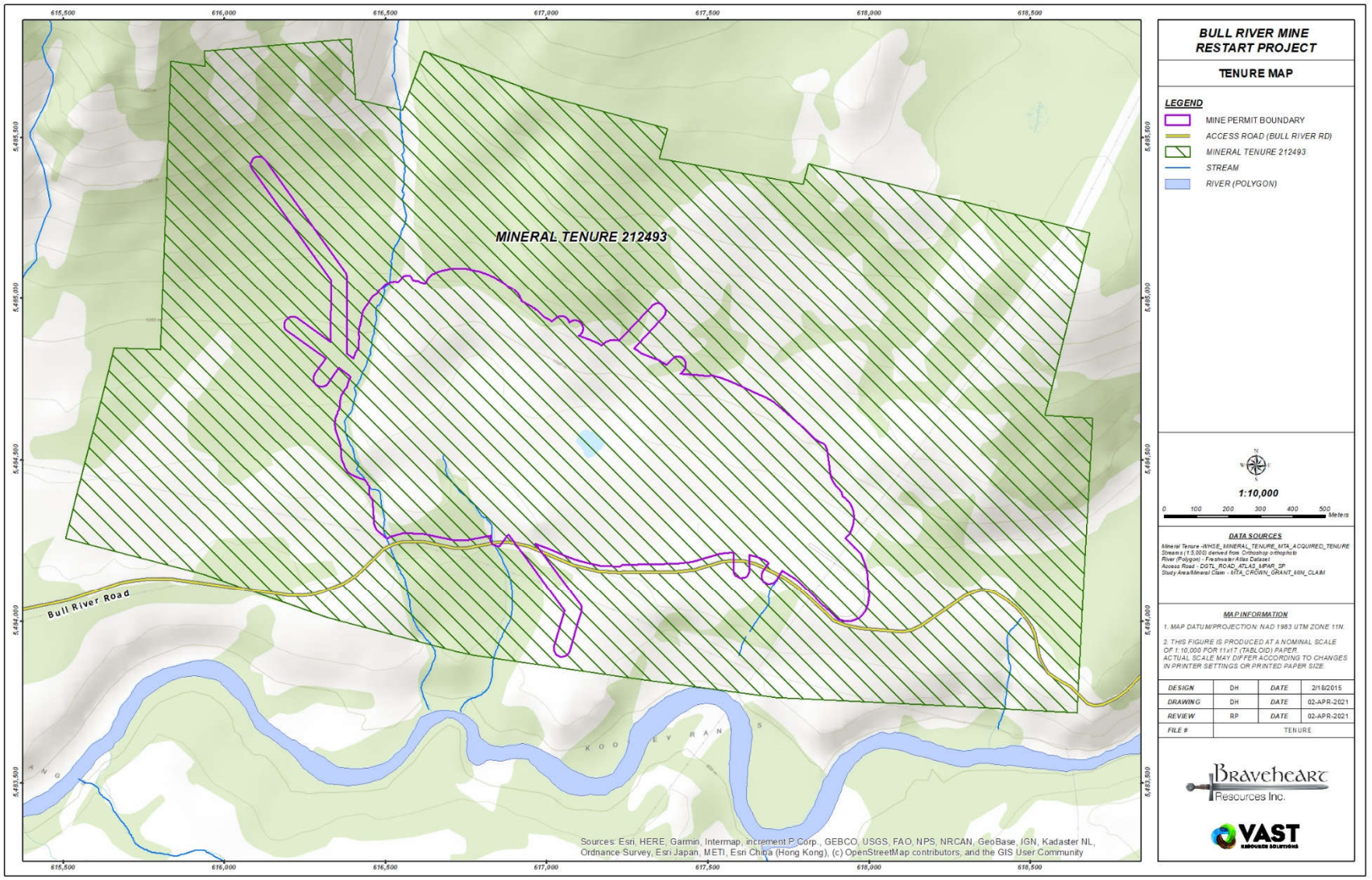

Figure 7-1. BRM tenure map

7.5. Land Use Planning

The BRM is in a development area zoned for mining activities (Galloway area). It is assumed that the Project would not require zoning modifications by local communities or the Regional District of East Kootenay. Due to the proximity to the Bull River/Kootenay River and the Canada/US border, the high wildlife and fisheries values, and the public and commercial use of the area, impact management and communication with potentially affected stakeholders will require significant time and diligence. All current tenure holders will be consulted as the mine progresses and predicted impacts on their operations are identified. The Ktunaxa First Nation will be engaged and consulted as traditional users of the BRM site and adjacent lands.

The existing infrastructure and Project footprint are on private property and adjacent to lands that have been zoned in the East Kootenay Land Use Plan for resource use and development, including mining. Under the Kootenay-Boundary Land Resource Management Plan Implementation Strategy (Kootenay Inter-Agency Management Committee, 1997), the BRM is within the Integrated Land Use Zone designation, defined as an area where a range of land uses are accepted.

7.6. First Nations

The Project lies within Ktunaxa traditional territory. The Ktunaxa Nation has occupied the lands adjacent to, and including the Kootenay and Columbia Rivers, for more than 10,000 years. The Ktunaxa Nation territory is roughly 70,000 km^2 within the Kootenay region of southeastern BC and parts of Alberta, Montana, Washington and Idaho (Figure 7-2).

The Ktunaxa Nation comprises six members in BC, Idaho and Montana, and is currently undergoing land claim negotiations with the BC and Canadian governments. An important component of Project approval will be the requirement to consult and accommodate the impact to identified First Nations Communities in the Project area. Although consultation is the government's duty, certain aspects of the consultation process may be delegated to BRMC. BRMC will engage with the Ktunaxa through written correspondence and in-person meetings and work toward building a relationship of information sharing and open exchange. Braveheart is currently negotiating an engagement agreement with the Ktunaxa Nation.

7.7. Public Consultation

During the previous re-start application process in 2014-2015, the proponent conducted a public open house event and outreach activities with the City of Cranbrook, Regional District of East Kootenay, and Kootenay Trout Hatchery (Freshwater Fisheries Society of BC). No known opposition to the Project was documented at that time.

BRMC will hold an open house forum to provide the public and any stakeholders with a complete overview of the Project and its proposed operations. The Project Description and any other pertinent information will be made available to the public through, but not limited to, open house events, the local public library and BRMC's website. Consultation and communication will be ongoing through the regulatory process.

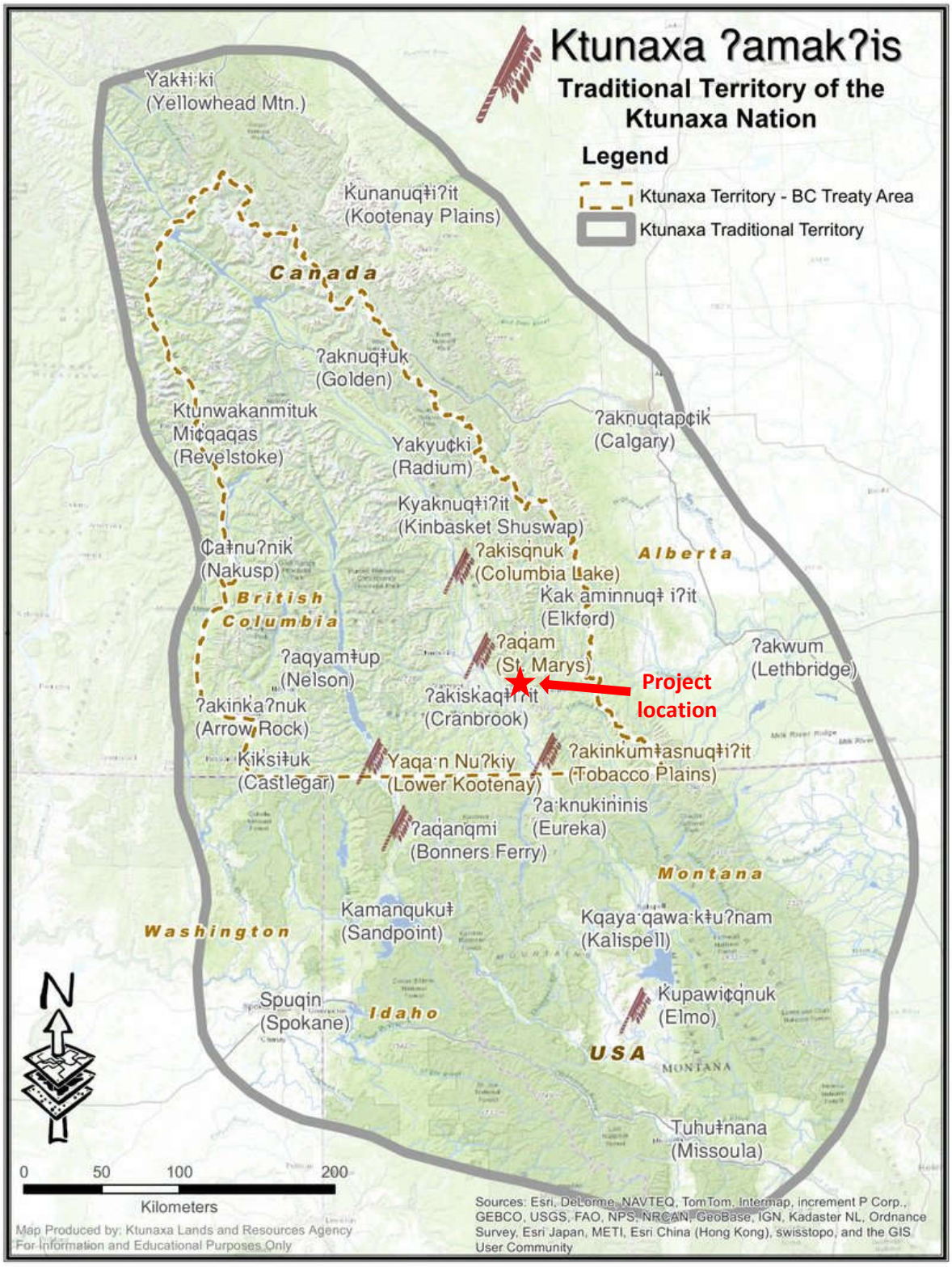

Figure 7-2. Traditional territory of the Ktunaxa Nation; approx. Project location highlighted

8. GEOLOGY

The BRM is located within the Purcell Basin, a Meso-Proterozoic intracontinental rift filled by marine and fluviatile sediments that comprise the Purcell Supergroup. The western Rocky Mountains represent the Purcell anticlinorium's eastern edge that abuts the Rocky Mountain thrust belt. Three tectonostratigraphic terranes subdivide the area covered by the BRM.

BRM lies within the Rocky Mountain trench, which forms the valley of the Kootenay River system in the area, and is contained within the Hosmer thrust sheet east of the inferred trace of the Rocky Mountain trench fault. The Hosmer thrust sheet is the structurally highest thrust package in the Western Range of the Rocky Mountains. The Rocky Mountain trench fault is a west-side-down Tertiary normal fault with a minimum of 5 km of vertical displacement. Structure in the area is dominated by broad, open, east-plunging folds (Höy, Smyth, & Lett, 2000). In the vicinity of BRM, the trench is synclinal with major west-dipping faults on its east side (Masters, General Geology of the Gallowai Property British Columbia: A Tecto-Stratigraphic Classification. , 1990).

The BRM deposit is hosted within the Aldridge Formation that lies at the base of the Purcell Supergroup. Within an approximate 30 km radius of Cranbrook, BC, the Aldridge Formation also hosts the Sullivan, Estella, Kootenay King, and St. Eugene mineral deposits (Allen, 1989). The Aldridge Formation is characterized by thick successions of graded sandy turbidites and interbedded laminated siltstones and argillites. The turbidites are intruded by the dioritic to gabbroic Moyie sills and dykes. To the east, the Upper Aldridge rocks, composed of argillites and siltites, overlie the turbidites. Mineralization is typically fine-grained pyrite and pyrrhotite, up to several percent, that oxidizes when exposed on the surface.

Regionally, the Moyie sills display the thrust and fold structures of the Late Jurassic to Early Cretaceous fault system that later cut the Tertiary-age Rocky Mountain trench fault (van de Veldon & Cook, 1996). Extensional faulting and sporadic magmatism occurred from about 1,500 Ma to 1,320 Ma and is at least partially coincident with the East Kootenay Orogeny. The East Kootenay Orogeny reflects burial metamorphism of the thick sedimentary pile in the high geothermal gradient of an actively rifting environment. Syn-sedimentary faulting associated with rifting resulted in the rift-fill thicknesses of turbidites and intercalated sills of the Aldridge sequence of up to 12 km. Two directions of syn-sedimentary faulting have been recognized: north to northwest trending rift-parallel (extensional) and east to northeast-trending transfer faults. Examples of the former include faults that control the north-trending Sullivan Corridor and the Iron Range fault northeast of Creston. Examples of the latter include precursors to the Moyie-Dibble Creek fault, which lies north of BRM, and the St. Mary- Boulder Creek fault system (Lyndon, 2007).

Beginning with the East Kootenay Orogeny, the northwest portion of the Purcell Basin appears to have been subjected to east-west faulting and magmatic generation along its western boundary. During the subsequent Goat River Orogeny, the Purcell anticlinorium was formed as a result of crustal shortening. Further east, the Creston Formation is exposed. Creston Formation rocks comprise a shallow-water platform and fan-delta succession of predominantly quartzites and siltites. South of the Bull River, Creston Formation rocks are overlain by Kitchener Formation carbonate rocks.

8.1. Regional Geology

The BRM deposit is hosted within poorly exposed graded turbidite beds of the middle Aldridge Formation of the Middle Proterozoic Purcell Supergroup. Interbedded quartzites, siltstones, and argillites make up a turbidite sequence whose bedding plane strikes approximately east-west and dips 20° to 30° to the north (Baldys, 2001). The deposit's host rocks are a northward pinching series of anticlines and synclines (de Souza, Morton, Dixon, & Anderson, 2000).

The quartzite unit is described by Baldys (2001) as, in fact, thickly bedded quartz arenite and quartz wacke. Sand-size fragments of quartz dominate the quartz arenite, while the quartz wacke consists of poorly sorted mineral and rock fragments in a clay and fine silt matrix. These arenite and wacke beds are up to one metre in thickness and are massive to graded, fining upward. Arenaceous beds are medium to thickly bedded and are commonly separated by thin layers of argillaceous siltstone.

Laminated siltstone is composed of organic carbon, biotite, feldspar, detrital quartz, sphene, tourmaline, apatite and, diagenetic pyrite and pyrrhotite. Wispy or disseminated pyrrhotite is common and, along with pyrite, makes up less than two percent of the unaltered rock.

The Aldridge Formation is intruded by a series of dykes varying in composition from diorite to gabbro, known as the Moyie intrusive suite. The mid-Proterozoic Moyie dykes trend approximately east-west and dip at 30° to 80° to the south and are composed predominantly of hornblende and plagioclase phenocrysts in a fine-grained groundmass of plagioclase, quartz, hornblende, chlorite and epidote (Baldys, 2001). These dykes have been traced from the Bull River eastward to the flank of Iron Mountain, where they form the target of two adits (de Souza, Morton, Dixon, & Anderson, 2000).

Overburden consists of Pleistocene glaciofluvial and colluvial sediments and varies in thickness across the BRM property up to 200 metres in thickness as defined by gravity surveys conducted in 2006.

8.2. Deposit Description

The Bul River deposit has been described as a Churchill-type vein copper-silver deposit (Lefebure, 1996). The deposit type displays relatively low tonnage characteristics (typically range from 10 kt to 1 Mt) but high-grade (typically range from 1% to 4% Copper). Frequently occurring in Proterozoic-age extensional sedimentary basins, Churchill-type deposits are associated with rifting, can comprise single vein to complicated vein systems that vary from centimetres to tens of metres in width, and can extend hundreds of metres along strike and down dip. Commonly hosted in clastic meta-sediments, veins and vein systems are often spatially associated with mafic dykes and sills. The veins are generally associated with major faults related to a crustal extension that controls the ascent of hydrothermal fluids to favourable sites for metal deposition. Fluids are believed to be derived from those mafic intrusives that are associated with the vein systems.

8.3. Mineralization

The BRM mineralized zones comprise a vertical to sub-vertical network of sulphide-bearing quartz-carbonate veins striking approximately east-west hosted in sheared and brecciated Aldridge Formation sediments. The vein systems form complex networks within, and adjacent to the shear zone and often encompass crushed, deformed and brecciated host rocks (Baldys, 2001). Host rocks are either partly silicified and chloritized argillites, argillaceous quartzites and quartzites (Masters, 1990). The veins pinch and swell, forming stockworks or thick tabular bodies often cut by smaller veins and stringers of quartz and quartz-siderite.

The main vein structure and associated stringer zones can range from a few centimetres to 30 m wide. Masters (1991) defined five zones subparallel to en echelon "vein systems" and differentiated them from the Pit Zone that lies within the footwall. Mineralization consists of pyrite, pyrrhotite, and chalcopyrite with minor local galena, sphalerite, arsenopyrite, and cobaltite and traces of tetrahedrite and native gold. Sulphides range from massive, irregular bodies within the vein system to thin discontinuous veins, veinlets, and disseminations in the host rock (Höy, Smyth, & Lett, 2000).

Gangue mineralogy of the veins is variable, with the eastern parts of the deposit consisting of quartz and siderite. The western part of the vein system is dominated by siderite (Baldys, 2001).

9. SOCIOECONOMICS

The Kootenay Regional District has a long history of mining activity, with mining suppliers and contractors being locally available. Both skilled and general labour is readily accessible from the City of Cranbrook with approximately 20,000 inhabitants and other surrounding areas within the East Kootenay with approximately 40,400 additional inhabitants (Government of Canada , 2016). Former BRM employees still live in the surrounding area. Kimberley is a potential source of experienced underground miners due to the former Sullivan Mine operations. The nearby Elk Valley has many experienced operators working with Teck's coal operations.

9.1. Workforce

Four mine facilities will be upgraded or constructed prior to Phase 1 operations:

- on-site electric substation;
- flotation cells, a new thickener, and tailings filters will be added to upgrade the mill;
- engineering repairs to the fine ore bin; and,
- the first cell of the dry stack TSF will be prepared.

This work will require approximately six months, and an average of 20 workers will be on site during this period. Subsequent Phase 1 milling and TSF development operations will require at least 30 full-time employees for a projected 8-month timeframe.

A localized workforce is preferred, as it provides the mine with workforce stability, community acceptance and alliances, and reduces operating costs due to the elimination of worker travel expenses. The mine is relatively close to several moderately sized communities with a long history of mining. It is anticipated that many of the highly skilled/industry-specific positions, including electricians, millwrights, mechanics and heavy equipment operators, will be supplied from the local communities. Formal and informal training will be an ongoing component of operations, offering hiring opportunities to unskilled workers who can be developed into skilled workers to combat workforce attrition.

9.2. Socio-Economic Benefits

The proposed re-start of operations during Phase 1 will provide more than 30 full-time jobs at the mine site, and the company will give preference to the local workforce. Because of the advanced state of the mine infrastructure, no major building construction is anticipated at this time. However, BRMC will make every effort to use local suppliers in its day-to-day operations to enhance the local economy and create additional value-added jobs throughout the region. Apprenticeship programs are expected to be offered for qualifying individuals from the proposed workforce. Initially, the expectation is for electrician apprentices with potential future opportunities, including millwrights, welders and mechanics.

Other opportunities for training will come from the underground program, mill operations, and exploration programs. A summer student program for geology and engineering students is also expected to be offered once formalized meetings with post-secondary institutions are established.

9.3. Capital and Operating Costs

The main infrastructure capital items include refurbishing the existing mill infrastructure to a full production rate of 700 tonnes/day, replacing an electrical substation, and constructing the first cell of the dry stack tailings storage facility. An allowance is assumed for working capital to carry operations through the first few months of production until a steady revenue stream is generated. Current owner costs are added to the capital costs and are ongoing until the mill starts production. A breakdown of the total

Project capital costs is shown in Table 9-1, and a breakdown of projected average LOM operating costs is shown in Table 9-2.

Table 9-1. BRM Total Project Start-up Capital Costs

Capital Cost Item	Cost ($M)
Mill Refurbishment	1.046
Other Infrastructure (substation, TSF, etc.)	2.800
Engineering Studies, Drilling and Permitting	0.417
Owner's Costs	0.915
Working Capital	0.500
Contingency	0.852
TOTAL START-UP CAPITAL (including contingency)	**6.530**

Table 9-2. Average LOM Operating Costs ($/tonne processed)

Operating Costs	Phase 1 Stockpile Processing and TSF Development	Phase 2 Underground Mining
Re-handle	0.51	0.00
Mining (includes development and backfill)	0.00	60.26
Processing	19.25	19.25
General and Administrative expenses	7.22	7.22
Total Operating Costs	**26.98**	**86.73**

9.4. Taxes

Bul River Mineral Corporation, through its subsidiaries, carries tax loss credits of over $152 million. These credits would be used to offset provincial and federal taxes. Property taxes paid to the Kootenay Land District are currently $46,885. A total of $9,720 is spent on maintaining Mining Lease 212493.

9.5. Local Services

The mine site is centrally located between Cranbrook and Fernie and near Kimberley, Sparwood and the Elk Valley. Suppliers in these communities are capable of providing a majority of the goods and services that will be required for general mine operations. The mine site is located near the Aberfeldie power generating station and is provided electricity from BC Hydro. Highway access to the mine site is via Hwy 3 and Hwy 93/95, and the Wardner - Fort Steele Road. Direct access to the mine site is via the Bull River Road (gravel road). Major infrastructure upgrades that are anticipated are described in Section 9.

10. ENVIRONMENTAL BASELINE, ASSESSMENT AND MANAGEMENT

Under previous management and ownership, environmental baseline and related studies were initiated in 2014, and a Mines Act permit application for re-starting the BRM was submitted in January 2016.

10.1. Meteorology

The mean annual air temperature in the BRM area is 8.5 °C. Mean high air temperatures occur in July and August, averaging 18 °C, and lows in December averaging -7 °C. Precipitation data from Environment Canada between 1971 and 2000 for Cranbrook shows average annual precipitation of 403 mm (expressed in mm of water), with the highest average precipitation in June (53 mm) and lowest in March (20 mm). There is an average of 69 days a year with rainfall and 32 days of snow. Snowfall is recorded between October and May, with an annual mean of 13 mm (expressed in mm of water). The most snow falls in December, which has a mean snowfall of four millimetres (expressed in mm of water).

Two weather stations were installed on the BRM mine site to collect site-specific meteorological data.

Detailed climatological data including daily temperature variations, rainfall accumulation, and average wind speed and direction are recorded, dating back to 2015. Partisol Airborne Dust Measurements were collected between November 2005 and October 2009. BRMC added a programable outdoor camera to photograph a measuring staff at the weather stations in the winter of 2020 to track snowfall accumulations at the mine.

10.2. Hydrology/Hydrogeology

The Project is located on the north valley slope of the Bull River within the Burntbridge Creek watershed. The Bull River is one of the primary tributaries for the Kootenay River, which flows into the United States approximately 65 kilometres to the south. The Bull River and its tributaries are characterized as snowmelt-dominated watersheds, with the highest streamflows typically occurring in June. Snowmelt recharges regional groundwater systems, which provide sustained sources of water during the low flow period.

Ground elevations across the mine site range between 900 and 1000 MASL. The surrounding area slopes to the south, where the elevation of the Bull River adjacent to the site is approximately 790 MASL. Burntbridge Creek flows along the western edge of the BRM site and discharges to the Bull River. In the 1970s, due to the construction of the old waste dump, Burntbridge Creek was relocated west of its current position. The former creek drainage path still receives water from a spring located at the toe of the old waste dump. The old Burntbridge Creek channel also receives drainage and pumped water from the underground mine and flows south approximately 0.7 km to its confluence with the Bull River. All upslope water is diverted off-site without facility contact. Two groundwater wells provide water for the administration building and mine shops.

The mine's underground infrastructure is not remotely dewatered; instead, water seeping into the underground mine through the walls is pumped from collection sumps at several depths within the mine. Water pumped from the mine is passed through a flocculent chemical treatment system and then into a primary settling pond and three polishing ponds located on site. The flocculent chemical treatment system is used only during periods of high turbidity; the system has only been used on two occasions (during the springs of 2001 and 2002). This usage was primarily due to mine drilling operations. Following the settling pond, mine water is discharged to Burntbridge Creek under Permit PE-16034 to a maximum of 3,270 m^3/day. Permit PE-16034 stipulates that the discharge water meets specified water quality guidelines for TSS/Turbidity during discharge pumping, concentrations of Cu, Cd, PB and Zinc at bi-weekly intervals, and quarterly toxicity sampling for Rainbow Trout and Daphnia. BRM plans to continue using Permit PE-16034 during Phase 1 milling of the surface stockpile.

A long-term (1914 to present) Water Survey Canada hydrometric monitoring site on the Bull River near Wardner (08NG002) will be used to describe the long-term variance in seasonal streamflow regionally. Past mine operators have been collecting flow data from the outlet weir on the property. These data sets are available for the period from 2006 to 2013 and describe the baseline condition.

10.2.1. Surface Water

Surface water quality monitoring (SWQM) has been conducted at BRM for many years, focusing on the effluent discharge parameters identified in Waste Management Permit PE-16034. In the fall of 2019, an expanded SWQM program was initiated to characterize baseline physico-chemical conditions in the receiving environment before the Bull River Mine Project re-start. Sampling was conducted in November and December 2019 and January 2020, then discontinued when the permitting process was paused. Sampling resumed in March 2021. Baseline data will be used to assess the BRM's potential impacts on the receiving environment and monitor compliance with provincial guidelines and effluent discharge permit conditions throughout the life of the mine. The program targets 15 monitoring stations on the mine site, New Burntbridge Creek, Old Burntbridge Creek, the Bull River, and the Kootenay River. Figure 10-1 shows the aquatic resource monitoring program, including the groundwater well sampling sites. Surface monitoring stations can be grouped into three categories based on specific sampling objectives:

- Effluent Monitoring: To characterize water quality conditions of mine contact water prior to discharge in the receiving environment;
- Receiving Environment – Near Field: These stations are located in the receiving environment upstream and downstream of effluent discharge points. They serve as compliance monitoring locations during the life of the mine;
- Receiving Environment – Far Field: These stations are located further downstream of the mine and are used to quantify impacts in the receiving environment if a pollution event is detected at compliance sampling points.

Water samples are collected from the river's edge by trained professionals following standard methods described in the BC Field Sampling Manual. Routine monitoring occurs at monthly intervals. High-frequency sampling (5 samples in 30 days) will be completed 3 times a year during periods of extreme high and low flows (spring freshet, summer low flows, and winter low flows). Field parameters, including temperature, pH, conductivity, and dissolved oxygen (DO), are measured using a water quality meter appropriately calibrated following the manufacturer's guidelines.

An adaptive management strategy will be used to assess if adjustments in sampling frequency are required, or if additional sites should be added based on observed variabilities in water quality/quantity parameters and changes to water flow patterns.

10.2.2. Groundwater

Groundwater flow is assumed to follow the steep topographic gradient toward the Bull River, located south of the BRM. As is the case with most rivers in the Rocky Mountains, the Bull River is fed by local groundwater discharge originating as precipitation and snowmelt at higher altitudes. The new Burntbridge Creek and other drainage features at the BRM exhibit connectivity to local groundwater systems. This connectivity is reaffirmed through observations of episodic losses and gains from the groundwater environment. These conditions are likely representative of enhanced exchanges in regions of thick overburden and slower exchanges with the less permeable bedrock.

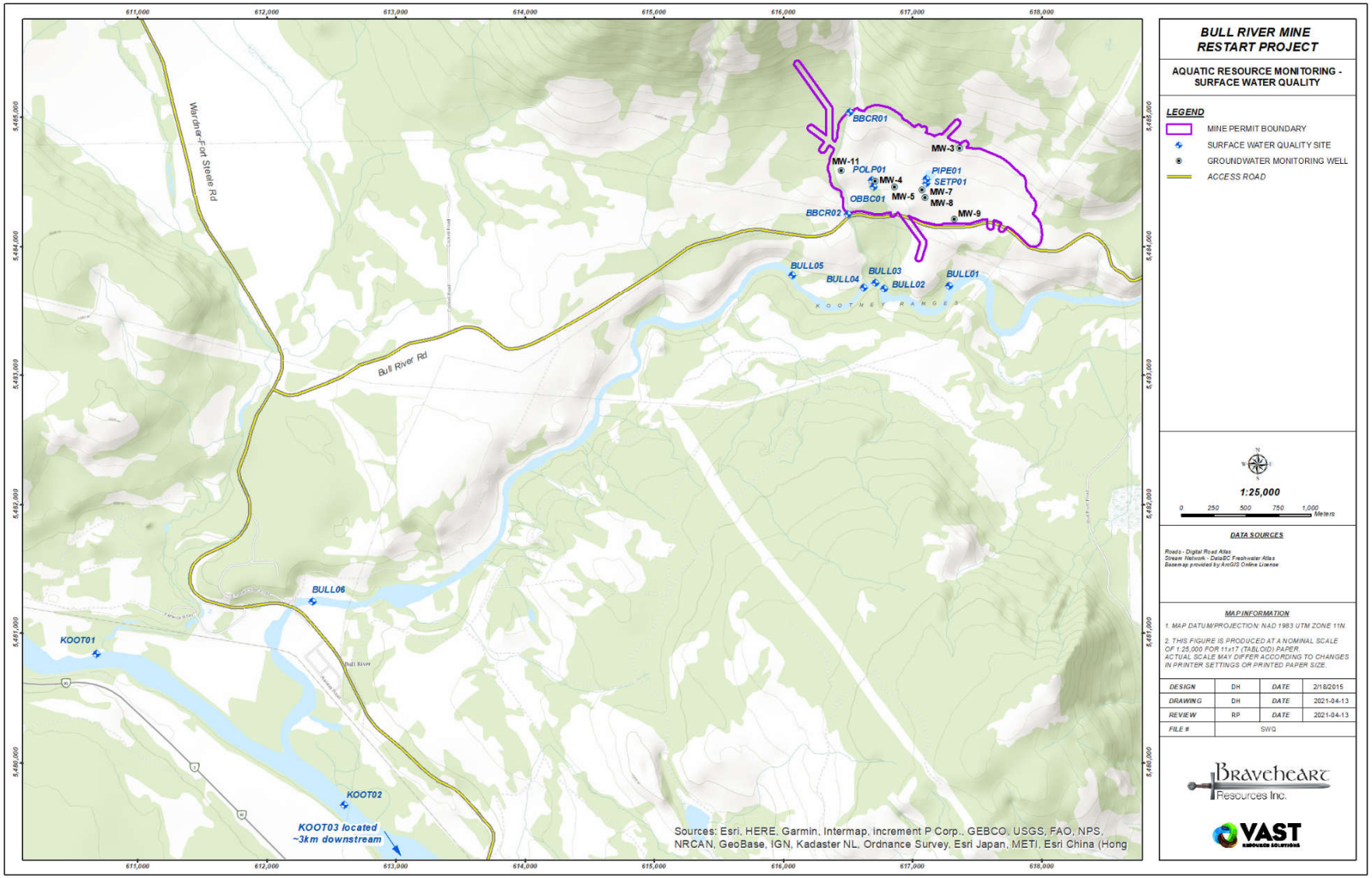

Figure 10-1. BRM detailed water monitoring program

Baseline groundwater quantity and quality characterization are monitored using the network of seven groundwater wells installed during the fall of 2019 (refer to Figure 10-1). Well locations were selected to meet baseline data requirements and include one upgradient site to assess groundwater conditions before interaction with mine facilities and six sites downgradient of key mine features, including the waste rock dump, mine shop, TSF, settling pond, and upper mine site. The groundwater monitoring schedule includes four quarterly sampling events per year to assess seasonal variation in groundwater flow. Sampling events are scheduled to target the periods of high (spring freshet) and low water levels with typically at least 60 days between two consecutive sample collections.

Groundwater quantity
Water level recorders have been deployed in each well for continuous recording of water level over time and identification of hydrograph trends over time. Automated data will typically be collected during the quarterly sampling events, and manual measurements will confirm water levels during these sampling events for quality control purposes. Pumping or slug tests will be conducted to characterize hydraulic properties and inform numerical models, as per BC regulatory guidelines.

Groundwater quality
Samples will be collected at each location according to the quarterly schedule. Protocols for groundwater sample collection (including blanks and duplicates), handling (such as filtration and preservation), and holding times will follow applicable government guidelines. Field parameters, including dissolved oxygen (DO), pH, redox potential, specific conductance, temperature, and turbidity, will be measured during each sample collection with properly calibrated equipment and reported following BC regulatory guidelines.

10.3. Air Quality

The BRM Restart Project was assessed for baseline air quality and climate and the emissions associated with the mining and processing of 700 tonnes per day. The assessment supports an application for an amendment to permit M-33 which would allow for the construction and operation of the dry stack tailings facility and the operation of the processing plant (at 700 t/d).

Air emissions of criteria air contaminants (CAC) and greenhouse gases (GHG) were assessed over a full year. Combustion-related emissions were found to be low due to most of the mining operations occurring underground. Fugitive dust emissions were higher, which is typical of mining operations that include activities associated with storing, moving and processing ore.

Given the remote location of the mine, emissions are not considered to be problematic. While there is potential for ambient dust concentrations to exceed the provincial objectives near the property boundary, this would not be expected to be frequent or to extend any significant distance. In addition, the proponent's mitigation actions to limit dust emissions during adverse conditions would reduce this potential. These actions could include:

- Regular maintenance of the crushing plant Medusa scrubber to ensure performance is optimal;
- Use of water spray (or chemical compound) on the gravel roads during dry conditions; and
- Seeding or applying gravel over the TSF to reduce the 'active area' where the tailings may be exposed to the wind.

Permanent control mitigation measures for control of fugitive dust emissions from tailings will involve placement of cover soil or constructed growth materials and revegetation. The cover placement is intended to provide a better growth substrate for revegetation and somewhat isolate the potential upward movement of elements by separating the primary rooting zone of the plants from the tailings.

An air quality monitoring station will be installed before Phase 1 operations.

10.4. Fish and Aquatic Life Resources and Habitat

BRM's aquatic resource monitoring program involves sampling for benthic invertebrates and periphyton and surveys of fish and fish habitat at key sites on pertinent watercourses to establish baseline conditions before active mining. The intent is to develop a sufficient baseline database to encompass watercourses in the attendant mine area that would evaluate potential impacts. Aquatic resource monitoring will continue during mine development and operation to address potential ongoing impacts.

10.4.1. Benthic Invertebrates and Periphyton

Benthic invertebrates were sampled in fall 2014 following Canadian Aquatic Biomonitoring Network (CABIN) protocols. The benthic invertebrate community comprised of Coleoptera (beetles), Diptera (true flies), Ephemeroptera (mayflies), Plecoptera (stoneflies), Trichoptera (caddisflies), and Acari (mites). Preliminary benthic invertebrate results indicate that baseline community composition is similar to historical data collected by BC Hydro from 2005 to 2012 for the BC Hydro Aberfeldie Redevelopment Project.

Periphyton communities were assessed for the BC Hydro Aberfeldie Redevelopment Project and provide preliminary baseline information for the mine Project. Diatoms accounted for most of the periphyton composition, with>95% of the total algal biovolume observations.

10.4.2. Fish and Fish Habitat

A thorough review of existing fisheries information for watercourses in the Project area was conducted. Provincial databases, available fish and fish habitat surveys and previous permit applications for the BRM were reviewed. Based on the literature review, fisheries information is relatively sparse for lower Bull River and Burntbridge Creeks. Even though several studies have been conducted on the Bull River, sampling efforts have primarily concentrated upstream of the Aberfeldie Dam. The upper Bull River is renowned for having a world-class sport fishery for native Westslope Cutthroat Trout (*Oncorhynchus clarki lewisi*). Located upstream of a barrier, the isolated population is being managed from an ecological and conservation standpoint. Few pure strain and isolated populations of native Westslope Cutthroat Trout remain in the East Kootenay, as most native populations co-exist and hybridize with Rainbow Trout.

Fish and fish habitat surveys in Burntbridge Creek and lower Bull River were completed in the fall of 2014 to generate sufficient fisheries baseline data to support future regulatory permit applications and monitoring. The program focused on the lower Bull River and watercourses in the immediate vicinity of the Purcell Basin Minerals mine (i.e., "old" and "new" Burntbridge creeks). Habitat characterization and fish sampling were conducted for each watercourse. Given the lower Bull River's magnitude, fish data were collected via snorkel surveys and minnow traps. Smaller watercourses (i.e., Burntbridge Creek) were only sampled with minnow traps.

Downstream of the Aberfeldie Dam, available fisheries resources describe the lower Bull River as a watercourse with high fisheries values and used by many species. Species of fish include:

- Bull Trout (*Salvelinus confluentus*) a blue-listed species (British Columbia Conservation Data Centre, 2014) and a Species of Concern (COSEWIC, 2012).
- Kokanee (*O. nerka*).
- Rainbow Trout (*O. mykiss*) a non-native species.
- Westlope Cutthroat Trout (*O. clarki lewisi*) a blue-listed species (British Columbia Conservation Data Centre, 2014) and a Species of Concern (COSEWIC, 2016).
- Mountain Whitefish (*Prosopium williamsoni*).
- Longnose Sucker (*Catostomus catostomus*).

- Largescale Sucker (*C. macrocheilus*).
- Sculpin sp. (*Cottidae sp*).
- Longnose Dace (*Rhinichthys cataractae*).
- Northern Pikeminnow (*Ptychocheilus oregonensis*).
- Redside Shiner (*Richardsonius balteatus*).

Unlike the pure strain Cutthroat population upstream, the lower Bull River population is primarily composed of Cutthroat/Rainbow Trout hybrids.

Limited information is available for the two small watercourses located on the west side of the BRM property; Burntbridge Creek – old channel and Burntbridge Creek – new channel. Both watercourses have been documented as potentially providing fish habitat, but the presence of high gradients near the mine site would limit fish access.

Fish were not captured in baited minnow traps or observed in either "new" or "old" Burntbridge creeks during the stream survey. Based on the habitat data collected during the stream survey, both creeks are potentially non-fish bearing. Based on the October 2014 program findings, both of the creeks surveyed are considered potentially non-fish bearing due to the steep gradient, lack of water, and marginal habitat quality. As per fish collection permit conditions, minnow traps were the only acceptable sampling method at the time of the study. The lack of depth made it difficult to sample shallow watercourses efficiently, and only a small number of traps could be deployed.

10.5. Cultural and Heritage Resources

The present application to re-start the BRM does not anticipate any new disturbance outside the existing mine permit boundary. The mine site's existing approved disturbances date back to the late 1960s and include both surface and underground mining, waste disposal, and associated infrastructure. An Archaeological Desktop Review conducted in 2019 concluded that the potential for recovering precontact archaeological material from or immediately adjacent to the Project area is considered to be extremely low, and no further archaeological assessment is required provided the anticipated disturbance footprint is not revised.

From an archaeological perspective, there is little opportunity to discover cultural materials on the site, other than by chance find. Accordingly, BRMC has developed a Chance Find Procedure, which will be adopted as company policy, included in required training for all employees.

10.6. Vegetation

The biogeoclimatic ecosystem classification (BEC) system of BC places the Project in the East Kootenay Trench Ecosection, part of the Southern Rocky Mountain Trench Ecoregion. The Project is located at 900 to 1000 m elevation and lies within the Kootenay variant dry mild Interior Douglas-fir (IDFdm2) biogeoclimatic subzone. Directly above (north of) the Project, at elevations above 1200 m, is the Elk variant dry cool Montane Spruce (MSdk1) biogeoclimatic subzone. Brief descriptions of these two subzones are provided below:

Interior Douglas-fir Dry Mild Kootenay Variant (IDFdm2)

The IDFdm2 occurs on valley bottoms and lower slopes of the Rocky Mountain Trench at elevations between 800 and 1200 m. The IDFdm2 is characterized by a dry climate, with hot, very dry summers and cool winters with very light snowfall. Lack of soil moisture and frost are major limitations to tree growth on most sites. Dominant tree species in the IDFdm2 include interior douglas-fir (*Pseudotsuga menziesii var. glauca*), western larch (*Larix occidentalis*) and lodgepole pine (*Pinus contorta*). The understory is typically dominated by pinegrass (*Calamagrostis rubescens*), with a high cover of shrubs, such as birch-leaved spirea (*Spiraea betulifolia*), common juniper (*Juniperus communis*), Soopolallie (*Shepherdia canadensis*), saskatoon (*Amelanchier alnifolia*), and common snowberry (*Symphoricarpos albus*). Species in the herb layer, apart from pinegrass, may include bluebunch wheatgrass (*Agropyron spicatum*), wild sarsaparilla (*Aralia nudicaulis*), twinflower (*Linnaea borealis*), and bunchberry (*Cornus canadensis*).

Montane Spruce Dry Cool Elk Variant (MSdk1)

The MSdk1 occupies mid-slopes in the Rock Mountain Trench at elevations between 1200 and 1650 m. The MSdk1 occurs north of the IDFdm2 and shares the dry climatic region and the soil moisture and frost limitations, having warm, dry summers and cold winters with light snowfall. Dominant tree species in the MSdk1 on zonal sites include hybrid white spruce (*Picea engelmannii x glauca*) and subalpine fir (*Abies lasiocarpa*), with minor amounts of interior douglas-fir. Lodgepole pine is common in seral stands. Common understory shrubs are false azalea (*Menziesia ferruginea*), Utah honeysuckle (*Lonicera utahensis*), and soopolallie and common herb species include grouseberry (*Vaccinium scoparium*), twinflower, pinegrass, and heart-leaved arnica (*Arnica cordifolia*).

Forest characteristics in the IDFdm2 and MSdk1 have changed through frequent wildfires and extensive selective logging, resulting in very few old-growth stands. There are no Old Growth Management Areas (OGMAs) near the Project; the nearest is located 2 km to the northeast, near the Koocanusa reservoir.

Terrestrial ecosystem mapping (TEM) conducted in 2005 indicated the IDFdm2 surrounding the Project is dominated by seral stands of structural stages 3a (low shrub), 3b (tall shrub) and 4 (pole sapling), with increasing young and mature forests (structural stages 5 and 6) at higher elevations in the MSkd1 north of the Project. The TEM mapped the following plant communities (site series) in the immediate area surrounding the Project

- Douglas-fir/Lodgepole Pine – Pinegrass – Twinflower (01);
- Douglas-fir – Snowberry – Balsamroot (03);
- Douglas-fir/Western Larch – Spruce – Pinegrass (04); and
- Hybrid Spruce/Trembling Aspen – Sarsaparilla (05).

In 2015, further refinements were made to the mine site and adjacent ecosystem mapping completed in 2004. The IDFdm2 – Fd / Common Snowberry / Arrowleaf Balsamroot (03 | DS) site series is the dominant ecosystem within the vicinity of the mine, with the zonal FdPl / Pinegrass / Twinflower (01 | DT) site series the next most common non-anthropogenic ecosystem in the study area. Reclaimed disturbances (Reclaimed Mine [00 | RY]) seeded to agronomic grasses are the dominant ecosystem on the mine.

The ecosystems within and adjacent to the BRM are subjected to heavy browsing and grazing pressure, so successional progression and structural stage development are constrained. The most prominent structural stages (stand physiognomy) are shrub/graminoid.

Due to the anthropogenic influence and dominant early successional structural stages (shrub and herb), the likelihood for ecological communities at risk to be present within the Project footprint is considered nil. Previous assessments have not observed plant communities at risk within the Project footprint and adjacent area. Ten ecological communities at risk have the potential to occur in the IDFdm2 and MSdk1

subzones. Two ecosystems associated with red-listed plant communities at risk occur in the Project footprint.Douglas-fir/common snowberry/arrowleaf balsamroot (*Pseudotsuga menziesii/Symphoricarpos albus/Balsamorhiza sagittata*) has a likelihood of occurring on the north and east side of the Project footprint, covering 21.6 ha (22.4% of the footprint). Antelope-brush/bluebunch wheatgrass (*Purshia tridentata/Pseudoroegneria spicata*) may occur in a very small area along the east footprint boundary, covering 0.02 ha (<0.1% of the footprint). One other ecosystem associated with a plant community at risk has been mapped in the wider study area, outside of the Project footprint: hybrid white spruce/trembling aspen/wild sarsaparilla (*Picea engelmannii x glauca – Populus tremuloides/Aralia nudicaulis*).

A Vegetation Management Plan was developed in 2019 and will be included in the application submission for an amended Mines Act permit.

10.7. Wildlife

The BRM is located in an area that supports various wildlife species dependent on a mix of forest and grassland and early seral stands. Both subzones provide important fall and early winter habitats for ungulate populations. The area surrounding the Project is designated as Ungulate Winter Range (UWR) for white-tailed deer (*Odocoileus virginianus*), mule deer (*Odocoileus hemionus*), elk (*Cervus elaphus*), bighorn sheep (*Ovis canadensis*) and mountain goat (*Oreamnos americanus*), with mountain goat winter range in the steep rocky terrain of higher elevations to the north. Many of the ungulates described above migrate to lower elevations where the BRM is located to escape deeper snow.

The habitat upslope of the BRM provides important habitat for grizzly bears. Grizzly bears (*Ursus arctos*) and black bears (*Ursus americanus*) may travel through the mine site infrequently. Coyotes (*Canis latrans*) and foxes (*Vulpes vulpes*) have been observed near the water tower upslope of the processing plant.

The open forests around the BRM support various bird species and furbearers. Birds known to occur in the forested areas surrounding the mine property include northern pygmy-owl (*Glaucidium gnoma*), blue grouse (*Dendragapus obscurus*), pileated woodpecker (*Drycopus pileatus*), Clark's nutcracker (*Nucifraga columbiana*), red-naped sapsucker (*Sphyrapicus nuchalis*), red-breasted nuthatch (*Sitta canadensis*), and ruffed grouse (*Bonasa umbellus*). Occurrences of American badger (*Taxidea taxus*) have been mapped in the general area. American badger may occur in open grassland-dominated habitats surrounding the Project. High elevation rocky habitats upslope of the BRM may provide habitat for yellow-bellied marmot (*Marmota flaviventris*) and common pika (*Ochotona princeps*).

Wildlife habitat suitability mapping was completed by SNC Lavalin (2015). TEM mapping described above was conducted within the BRM study area for bighorn sheep, elk, mule deer, white-tailed deer, black bear, and grizzly bear. Moderately-high suitability habitat is present primarily for white-tailed deer and secondarily for black and grizzly bears. Moderate suitability habitat for elk, mule deer, and white-tailed deer is also present. No high suitability habitat was mapped for the selected species.

Anecdotal observations by mine personnel included bighorn sheep, elk and deer. The mine property has been used to access the northern upper slopes above the mine and the Bull River. East-to-west travel by ungulates may occur but is restricted due to range-control fencing in the Bull River valley west of the mine site. Ungulates have been reported to use habitats north of the mine for bedding. Bighorn sheep use the pit highwall north of the water treatment pond and ore pile; rocks that contain carbonates are used as a mineral source by bighorn sheep. Deer utilize the mine from February to late May, but once the females have given birth, they make greater use of secure habitats adjacent to the mine. Elk feed on reclaimed areas and calve in open forested areas such as the old septic field located north of the tailings pond.

A Wildlife Management Plan was developed in 2019 and will be included in the application submission for an amended Mines Act permit.

10.8. Species at Risk

According to the British Columbia Conservation Data Centre (BC CDC), no known mapped locations of rare plants have been identified in or around the study area; however, 82 rare plant species potentially occur in IDFdm2 and MSdk1. The nearest known historical location of a rare plant species, Sandberg's desert-parsley (*Lomatium sandbergii*), is at a high elevation (>1900 m) approximately 5 km north of the study area.

The majority of the 82 plant species at risk are provincially listed (37 are Red-listed, and 45 are Blue-listed). Two plant species are also listed as Endangered in Schedule 1 of the *Species at Risk Act* (SARA); these are southern maiden-hair (*Adiantum capillus-veneris*) and whitebark pine (*Pinus albicaulis*). Southern maiden-hair only occurs in habitats around hot springs and is therefore not likely to be present in the study area. Whitebark pine occurs in high elevation forests at or close to the treeline and is not expected to be present in the study area.

Based on the refined BC CDC search, there are 26 wildlife species at risk (including 14 bird, four mammals, two amphibia, two reptile and four invertebrate species) with a potential to occur in the study area (Appendix 2); however, the occurrence would be limited by the availability of suitable habitat.

Nine of 14 bird species are listed in Schedule 1 of the SARA as Endangered, Threatened or Special Concern (Government of Canada, 2013). Western screech-owl (*Megascops kennicotti macfarlanei*) and Williamson's sapsucker (*Sphyrapicus thyroideus thyroideus*) are listed as Endangered; common nighthawk (*Chordeiles minor*), olive-sided flycatcher (*Contopus cooperi*) and Lewis's woodpecker (*Melanerpes lewis*) are Threatened; and short-eared owl (*Asio flammeus*), peregrine falcon (*Falco peregrinus anatum*), long-billed curlew (*Numenius americanus*), and flammulated owl (*Psiloscops flammeolus*) are of Special Concern.

Twelve of the 14 bird species are also provincially listed (seven are blue-listed and five red-listed). Red-listed species include: Swainson's hawk (*Buteo swainsoni*), Peregrine falcon, western screech-owl, Lewis's woodpecker, and Brewer's sparrow (*Spizella breweri breweri*); blue-listed species include: great-blue heron (*Ardea herodias herodias*), short-eared owl, olive-sided flycatcher, bobolink (*Dolichonyx oryzivorus*), barn swallow (*Hirundo rustica*), long-billed curlew, and flammulated owl.

Badgers in the East Kootenay are part of Badger Population 2 (BC Conservation Data Centre 2017), which corresponds to the federally recognized jeffersonii Badger East population (COSEWIC 2012). Federally, the population is listed as Endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2012). The federal Species at Risk Act lists jeffersonii badger on Schedule 1 as Endangered. A badger assessment will be conducted within the mine permit boundary in 2021.

Provincially blue-listed species include bighorn sheep, grizzly bear, and Townsend's big-eared bat.

Western toad (*Anaxyrus boreas*) and Rocky Mountain tailed frog (*Ascaphus montanus*) are SARA listed as Special Concern and Endangered, respectively. Rocky Mountain tailed frog is also provincially red-listed, while the western toad is blue-listed.

Both reptile species at risk, northern rubber boa (*Charina bottae*) and western skink (*Plestiodon skiltonianus*) are SARA listed as Special Concern, and western skink is also provincially blue-listed.

None of the invertebrate species are SARA listed. One butterfly species – Dione copper (*Lycaena dione*) – is provincially red-listed; one land snail – Coeur d'Alene Oregonian (*Cryptomastix mullani*) is blue-listed, and two butterfly species – silver-spotted skipper (*Epargyreus clarus clarus*) and checkered skipper (*Pyrgus communis*) – are blue-listed.

The presence of any wildlife species at risk in the Project footprint or study area is unknown.

10.9. Potential for Metal Leaching and Acid Rock Drainage

Geochemical characterization has classified the waste rock material as non-acid generating (NAG) with a low potential for metal leaching. The acid-base accounting (ABA) results for the 63 samples of waste rock material analyzed to date indicate the potential of acid generation from the waste rock material is unlikely due to typically low sulphide values and the neutralization potential available in the rocks as a result of elevated carbonate contents.

Tailings material has been classified as NAG based on the results of static testing analysis. The two tailings samples analyzed to date are classified as NAG, based on Sobek Neutralization Potential Ratio (NPR) and Carbonate NPR values greater than 2. The Sobek NPR values are 2.99 and 3.23, respectively, and the Carbonate NPR values are 3.64 and 3.54. Although static testing indicates the tailings material is classified as NAG, it is important to be aware of neutral metal leaching developing from the tailings material. Whole-rock elemental analysis indicates that concentrations of As, Zn, Mn, Cu, Co, Ag may be elevated relative to average crustal abundance. Shake flask and humidity cell results indicate low levels of dissolved metals in the leachate analysis. Due to the potential for neutral metal leaching and associated sulphide oxidation, the tailings material has been identified as a key Project component and requiring specific focus in the management strategy. Tailings are a new mine component on the brownfield site. They occupy a new footprint on the surface within the Project boundary and are introduced to the underground environment.

A ML/ARD Management Plan was developed in 2019 and will be included in the application submission for an amended Mines Act permit.

10.10. Terrain Hazard and Avalanche Risk

Terrain Hazard and Avalanche Risk Assessments are scheduled for Q2 of 2021.

11. PERMITS, LICENSES & APPROVALS

Table 11-1 presents the principal provincial authorizations, licenses, and permits (both new and amended) anticipated for Phase 1 construction and operation.

Table 11-1: Anticipated provincial authorizations, licenses, and permits.

Administering Agency	Legislation	Permit
BC Ministry of Environment and Climate Change Strategy	*Environmental Management Act*	Waste Discharge Permit(s)
		Refuse Permit
		Sewage Disposal Facility Registration
		Hazardous Waste Registration
		Fuel Storage Registration
BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development	*Wildfire Act*	Burning Permit
	Water Act	Notification for Changes in or About a Stream
BC Ministry of Energy, Mines and Low Carbon Innovation	*Mines Act*	Mines Act Permit
	Mineral Tenure Act	Mining Lease
Interior Health Authority	*Drinking Water Protection Act*	Waterworks Construction Permit
		Operating Permit
Natural Resources Canada-Explosives Division		
Fisheries and Oceans Canada	*Fisheries Act (Section 35 & 36); Metal Mining Effluent Regulation (MMER)*	Authorization to Deposit Effluent

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