



Project Description  
for the  
Confirmation and Exploration Program  
Pine Point District, Northwest Territories

Version 1

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## Appendices

### Appendix A

List of Mineral Claims and Leases for this Permit Application

### Appendix B

Photo Appendix

### List of Abbreviations

Abbreviation	Definition
AEMP	Aquatic Effects Monitoring Program
CEP	Confirmation and Exploration Program
AN	ammonium nitrate
ANFO	ammonium nitrate fuel oil
HDPE	high-density polyethylene
LPG	liquefied petroleum gas
LUP	Land Use Permit
MBR	membrane bioreactor
MRE	Mineral Resource Estimate
MVLWB	Mackenzie Valley Land and Water Board
NEMA	National Electrical Manufacturers Association
NTPC	Northwest Territories Power Corporation
NWT	Northwest Territories
PPML	Pine Point Mining Limited
RBC	rotating biological contactor
WWTP	Waste Water Treatment Plant

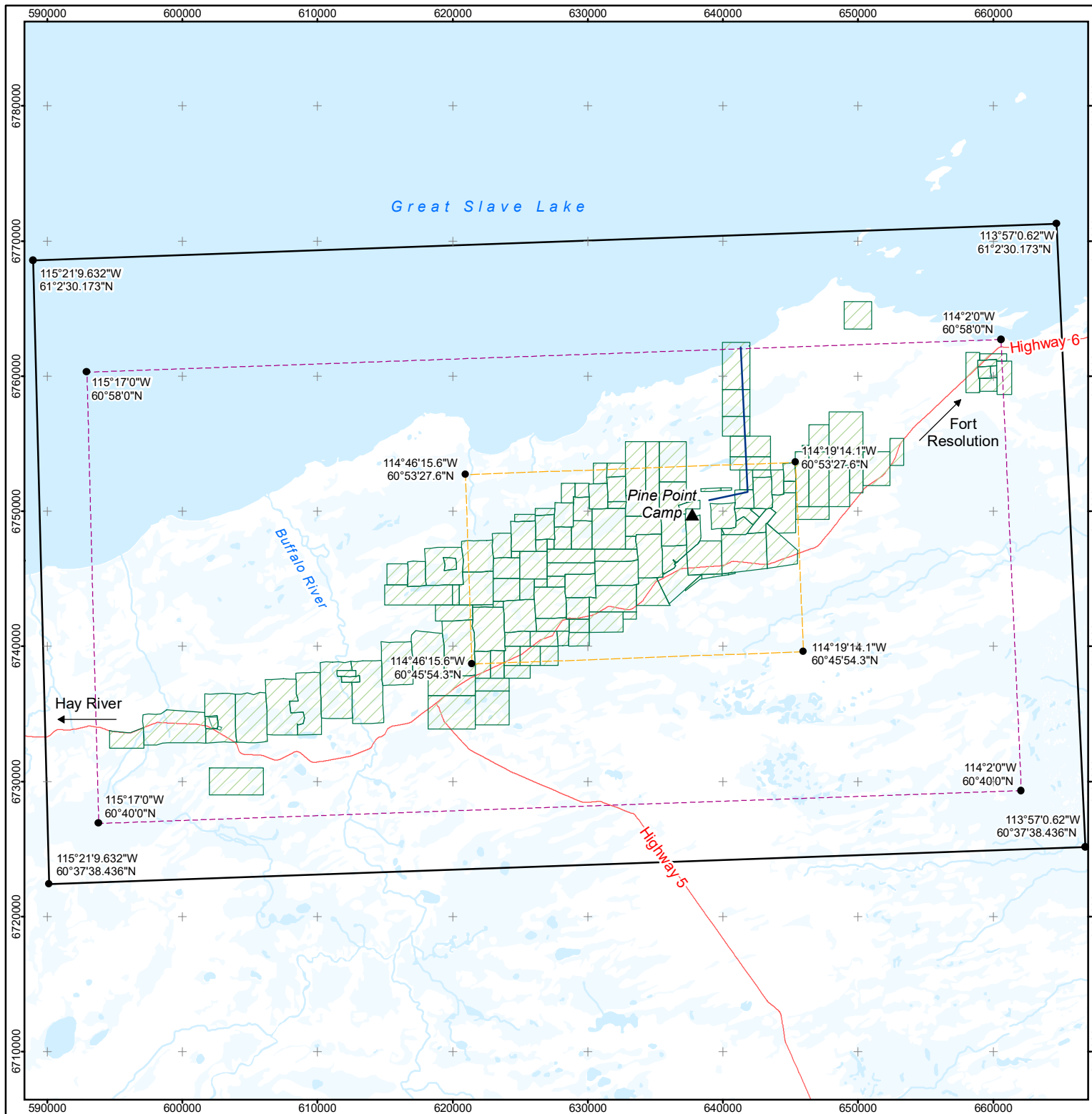
### List of Units

Abbreviation	Definition
#	number
%	percent
~	approximately
Ha	Hectare
hrs	hours
kg	kilograms
km	kilometres
L	litres
lb	pounds
m	metres
m <sup>2</sup>	square metres
m <sup>3</sup>	cubic metres
m <sup>3</sup> /day	cubic metres per day
mm	millimetres
Mt	Million tonnes (metric)

## 1.0 Proponent and Project Location

Pine Point Mining Limited (PPML), a wholly owned subsidiary of Osisko Metals Incorporated (Osisko Metals), is investigating the historic Pine Point Mine area with the objective of recommencing mining of the lead and zinc deposits in the area. Osisko Metals head office is located at 1100 Ave Des Canadiens de Montreal, Bureau 300, Montreal, Quebec, H3B 2S2.

PPML is preparing to undertake a Confirmation and Exploration Program (CEP) to obtain information for ongoing engineering studies. The CEP will cover mineral leases and claims between Hay River and Fort Resolution, NWT (Figure 1). The CEP is situated about 10 km south of the Great Slave Lake. Access to the claims and leases is mainly via existing roads and trails that can be accessed from the public Highway. The mineral leases are situated mostly north of the Territorial Highways 5 and 6 that connects Hay River to the west of the former Pine Point town and Highway 6 which continues eastward towards the hamlet of Fort Resolution.

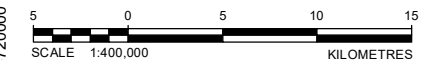


#### LEGEND


- Proposed Potable Water Line
- Proposed Area of Activity
- MV2017C0024 Area of Activity
- MV2018C0005 Area of Activity
- PPML Mineral Tenure and Surface Leases
- Main Road
- Waterbody
- Watercourse
- Wetland

#### REFERENCE

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FILE ID: PPM-20201019-PP\_Confirmation\_and\_Exploration\_Program

PROJECT	PINE POINT MINING LIMITED		
TITLE	CONFIRMATION AND EXPLORATION PROGRAM		
	PROJECT	PPM-20031-NT	
	DESIGN	RM	06/04/2017
	CHECK	JM	19/11/2020
	REVIEW	SM	26/11/2020
SCALE AS SHOWN			

## 2.0 Mineral Rights Tenure

### 2.1 Pine Point Mining Mineral Claims and Leases

PPML has 40 mineral leases, 106 mineral claims, and 4 surface leases for a total area of 46,473 hectares (ha) (Appendix A).

This permit application includes all the activities currently permitted under Mackenzie Valley Land and Water Board (MVLWB) Land Use Permit (LUP) 2017C0024, LUP MV2018C0005 and Water Licence MV2020L2-0008 (previously MV2018L2-0003). This application, once authorised, is intended to replace authorisations MV2017C00024, MV2018C0005 and MV2020L2-0008.

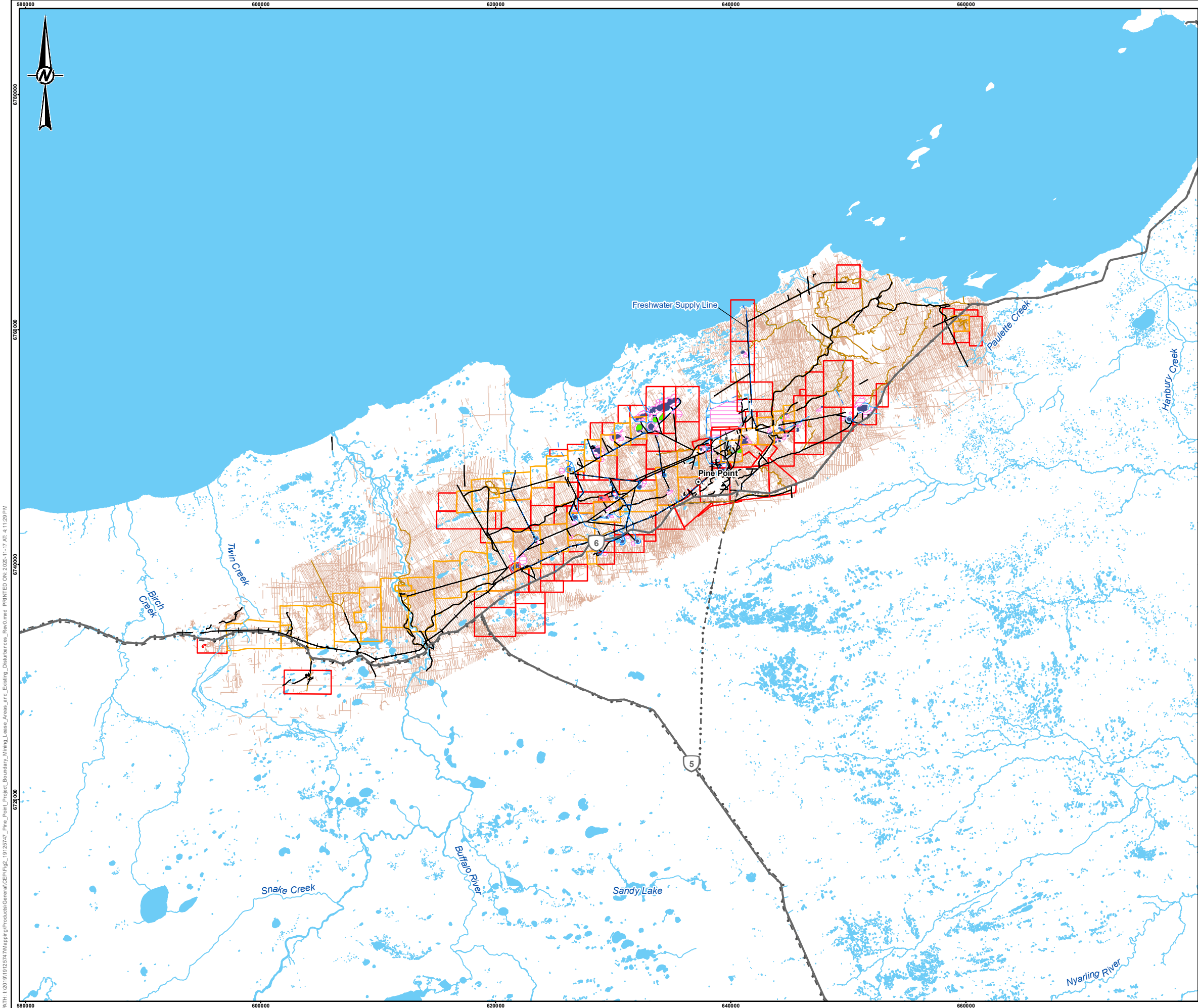
### 2.2 Other Rights Holders

Permits for quarrying operations that are active in the area are MV2016Q0014 (Reliable Group of Companies), MV2017Q0025 and MV2014Q0019 (Rowes Construction), MV2017Q0025 (West End Enterprises), MV2018Q0008 (Hay River Disposals), MV2016Q0027 (Trade Show Direct) and MV2017X0007 (GNWT-Department of Infrastructure). Teck Metals Ltd. holds a mining and milling Water Licence MV2017L2-0007 and LUP MV2019X0006 over the historical tailings management facility. There is also a wood operations permit, MV2015W0011 (Timberworks Inc.), and one miscellaneous permit, MV2017X0007 (GNWT Infrastructure). There are no known settlements or private lands in the project area (MVLWB 2020). The Pine Point railbed remains a federally managed area. The Pine Point mineral claims and leases are surrounded by surface and subsurface land withdrawals related to land claims negotiations. The Hay River Reserve is approximately 17 km from the Pine Point mineral claims and leases, at the nearest point.

## 3.0 Description of the Current Site Conditions

A camp has been established on previously disturbed ground approximately 3 km north of the former Pine Point town site (1). The camp is permitted for the accommodation of 49 people (MV2017C0024). Infrastructure includes structures for workspace, accommodation, nutrition, hygiene, and camp support. Fresh water is delivered by truck. Greywater is deposited in a covered sump adjacent to the camp. Latrines are of a waterless incinerating type. Solid waste is removed by subcontractors for disposal off site.





**LEGEND**

- FORMER PINE POINT TOWN SITE
- BUSH ROAD
- CUTLINE
- DRAINAGE DITCH
- HISTORIC RAILBED
- HIGHWAY
- MINE ROAD
- TRANSMISSION LINE
- WATERCOURSE
- ACTIVE MINERAL LEASE
- ACTIVE MINERAL CLAIM
- CUTBLOCK
- WATERBODY

**PINE POINT EXISTING MINING DISTURBANCE**

- BACKFILLED PIT
- MINED PIT
- WASTE PILE

**KEY MAP**

**REFERENCE(S)**

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PROJECTION: UTM ZONE 11N DATUM: NAD83

**CLIENT**

PINE POINT MINING LTD.

**PROJECT**

PINE POINT CONFIRMATION AND EXPLORATION PROGRAM

**TITLE**

**PINE POINT PROJECT BOUNDARY, MINING LEASE AREAS, AND EXISTING DISTURBANCES**

CONSULTANT	YYYY-MM-DD	2020-11-17
	DESIGNED	JV
	PREPARED	MM/PMT
	REVIEWED	DP
	APPROVED	DP

PROJECT NO.	CONTROL	REV.	FIGURE
19125747		0	2

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The Pine Point District contains approximately 100 known zinc and lead deposits, distributed along three trends which extend in aggregate along approximately 65 km of strike and 7 km of width (Figure 2, Photos in Appendix B). Historic exploration work has been conducted throughout the District since active prospecting began in 1900. Since the 1960's, prospecting has consisted predominantly of geophysical surveying and diamond drilling. Previous mining and exploration activities were undertaken in the area by Teck/Cominco. Teck/Cominco ceased mining and milling operations in 1987. Pine Point Mines Ltd. (Cominco) mined 52 of these deposits from 1964 to 1988 extracting 64 million tonnes of ore, two of which were mined underground and the remaining 50 were mined as open pits. The mined deposits lie along a 35 km trend and included a mill and a full town site at Pine Point which were removed at the end of mining.

The area east of the Buffalo River is predominantly a brownfield site (Appendix B). The open pits remain and in many cases the pits have naturally filled with water (a combination of groundwater and surface water). Adjacent to the open pits are waste rock dumps (predominantly dolomite, a form of limestone). Each of the open pit sites were accessed by roads constructed with a crushed dolomite surface and which connect back to the central processing plant and the former townsite of Pine Point. The tailings management facility adjacent to the former processing plant is subject to a current Water Licence and Land Use Permit held by Teck Metals Ltd. (MV2017L2-0007 and MV2019X0006). Historic access for exploration in the area has been extensive, consisting of bulldozed and hand cut lines extending throughout the region (Figure 2). The extent of the previous activity can be viewed in air photo imagery (e.g., Google Earth, Bing Maps).

## 4.0 Proposed Activities

The recent completion of a Preliminary Economic Assessment (PEA) concluded that the project has technical and financial merit and was sufficient to make the decision to advance to a feasibility study. The PEA recommended that additional work to advance the discovery of new deposits, increase the existing mineral resources by conducting further delineation drilling, conduct additional studies, sampling and test work for engineering design, metallurgical testing and groundwater testing.

Based on the recommendations from the PEA, a Confirmation and Exploration Program (the CEP) is proposed that will collect samples and provide information as recommended by the PEA. The information will be used to support a feasibility study and for detailed engineering design of mining and processing, including infrastructure requirements needed for the construction and operation of a mine. The work is expected to be ongoing as input requirements to the design and engineering are further refined.

The Confirmation and Exploration Program (CEP) will consist of:

- exploration by drilling/pitting to find additional mineral deposits;
- definition core drilling of the known mineral deposits to establish the extent and grade of the mineralization;
- geotechnical investigations by core drilling and test pitting;
- collection of metallurgical test samples of rock by small scale quarrying and collection of pit water samples;

## Project Description

- establishing groundwater recharge and discharge rates for existing pits and water reinjection wells;
- use of heavy machinery and vehicles;
- construction and maintenance of camps; and
- fuel storage.

### 4.1 Environmental Management Plans

The proposed activities will be monitored and managed through the following environmental management plans:

- Waste Management Plan, describing each waste stream and how the waste will be stored and managed
- Spill Contingency Plan, describing methods of fuel transfer, measures in place to avoid and respond to spills of hazardous materials
- Water Withdrawal Plan, providing a list of all possible water sources, maximum withdrawal volumes from each, and other mitigation to protect fish and the aquatic environment
- Wildlife Protection Plan, providing details on how impacts to wildlife will be mitigated, to be implemented as the Project develops
- Groundwater Management Plan, describing how groundwater will be monitored, stored, and returned to aquifers if the groundwater tests proceed
- Bedrock Sampling Management Plan, describing how waste rock will be stored and seepage monitored if test pitting proceeds, and the storage of explosives and how blasting operations will be completed.
- Engagement Plan and Record, indicating how each stakeholder will be engaged and providing a record of all issues discussed and resolved.

## 5.0 Ongoing Exploration for New Deposits

Ongoing work to test exploration targets for the presence of mineralization will consist of normal prospecting activities including, for example, geological mapping, prospecting, soil and rock sampling, airborne and ground geophysics, diamond core drilling, geological logging and sampling of core, and may include pitting to acquire samples.

Exploration targets interpreted from these data will be used to target diamond drilling and small pitting to determine if mineralization is present. It is anticipated that the targets can be closely accessed via existing trails and lines from which access trail extensions will be cleared to the target site.

The drill core and other samples will be processed in the geological core shed on site and may include core cutting and small-scale crushing and screening prior to shipment to an off-site laboratory. Core and other material not shipped offsite will be stored onsite as required. The work is expected to be carried out more or less continuously throughout the year.

Methods of accessing, preparing, and reclaiming the core drilling sites, water and diesel resupply, and drill cuttings disposal are described below (Section 6.0).

## 6.0 Resource Definition and Exploration Core Drilling

Defining the extent and volume of mineralization at each deposit site for development of future mining plans will require diamond drilling on the currently known deposit locations over several years. It is estimated that between 50 and 100 deposits will require diamond drilling to obtain continuous rock cores. This drilling will be used to determine the depth and thickness of mineralized zones and the core samples will be tested for the presence of metals. It is estimated that up to 3,000 drill sites are to be drilled. This may increase if additional information is needed. The drill core will be collected at the site and transported regularly to the nearest core logging facility on the site. For preliminary processing and measuring of core, drill logging trailers or movable structures may be positioned near the drill rigs to process the core before it is shipped to the central core logging location.

The drill hole locations will be accessed by clearing a path to the target area, utilizing the nearest existing previously cleared access trail. New access trails will consider the requirements of the Northern Land Use Guidelines, Access: Roads and Trails (GNWT 2015a) and will be as short as is practical. The brush may be cleared by hand using power tools or by using heavy equipment such as a dozer, grader and loader or similar equipment pieces. Felled trees will be bucked and placed on the ground near the access trail to be subsequently spread back over the drill site and access trail during the reclamation of the drill site. The new access trails will be approximately 10 m wide. Drainage control measures, where necessary, will be installed to keep the road dry and reduce erosion. The route will be investigated for areas of potential for archaeological resources and mitigation will be implemented in resources are found. Water crossings will be minimised and constructed according to the Northern Land Use Guidelines (GNWT 2015a).

At each drill site, a drill pad will be cleared that is approximately 30 m by 30 m. In some cases, adjacent drill pads may overlap or be on adjoining sites requiring a greater aggregate area to be cleared. The overburden (soils and organics) may be pushed to one side of the cleared area and used to cover the reclaimed area when drilling is completed at the site. All the drilling equipment required to operate the drills will be placed on the pads and includes drill rods, mud tanks, shelter tent/workshop, spares and other ancillary equipment.

This drilling will determine the depth and thickness of each of the mineralized zones and the drills will be capable of reaching depths of 500 m, if required.

Water required for drilling will be obtained from the nearest surface waterbody or watercourse, either human-made or natural, as per the Water Withdrawal Plan, or from groundwater. If necessary, a pump will be placed near the water source and a water line will bring water to the rig location. Depending on the distance and time of year, heating units may be placed at points along the water line. In some cases, the rig water may be supplied using water trucks. The volumes of water withdrawn shall be estimated by the most practical means for the location, for example water tank volumes, flow meters or similar methods. Drill cuttings will be placed in the nearest natural sump, existing human-made depression or pit, interred in a completed drill hole within the overburden zone and/or above a plugged/cemented casing. In addition, if necessary, a shallow sump may be required, located near the drill site, and will be prepared using earth moving equipment to create a sump approximately 1 m wide, 2 m long and up to 1 m deep. The disposal location will be at least 100 m from any natural waterbody or watercourse. If a

sump is constructed, the sump will be covered back over with the set aside overburden when drilling is completed at each site. The estimated volume of water to be used by the CEP is summarized Section 11.

On the completion of drilling at a site, if the hole is not required for ongoing monitoring, the casing will be removed and the top of the hole capped below the existing ground surface. Soil will be spread over the hole as closely as possible to the same level as the immediate surrounding grade. All garbage will be collected and removed from the site. The site location will be marked using a wooden stake. If ongoing monitoring is required, the hole will be finished to allow the monitoring and to mitigate interactions with people or wildlife. If the hole is to be required for ongoing monitoring, the cap installed will be removable to allow ready access in the future and will allow gases to dissipate.

## 7.0 Geotechnical Program

### 7.1 Drilling

Drill cores are required for geotechnical investigations of future open pits, underground operations, and for sites of future surface infrastructure.

Coring into the overburden and underlying bedrock formations will be undertaken using diamond or Sonic drills. The process of setting up the sites, the drilling and collection of cores, and the restoration of the drill hole sites will be the same as for the Resource Definition and Exploration Core Drilling (refer to Section 6.0).

The geotechnical core drilling program will require approximately 10,000 - 40,000 m per year of drilling at the currently known deposit locations and any future deposits discovered by the exploration team. The metres of drilling required will depend on the geometry of the target zones and may be increased if additional information is needed. It is estimated that up 300 drill sites may be drilled. Core may be examined at a temporary core logging facility set up close to the drill site before being moved to a central facility for completion of descriptive logging, measurements, and selection of samples for material testing. Water requirements of the core drill rigs are summarized in Table 1.

Cores of the overburden materials are also required. For this purpose, a Sonic drill rig will be used. The Sonic drilling rig recovers a “core” of the overburden materials into a plastic sleeve that can be transported to a logging facility for descriptive logging, sampling and material test work. The rig will drill until the target depth is reached or a refusal is encountered. If possible, the hole may be further drilled a few metres with a standard coring bit to obtain a bedrock sample of 4 to 10 m. The Sonic drilling program will require 4,000 to 6,000 m of drilling, spread over 180 or more drill holes. The holes will be located in areas that are potential future sites for infrastructure (e.g., powerhouse, crushing area, process plant), in areas that stockpiles may be developed (e.g., near the process plant, at waste rock and overburden piles beside future pits) and potential future open pits. Up to 100 sites will be tested, requiring access to the drill sites, with clearance and restoration of drill site locations in the same way as the core drilling (section 6). Future infrastructure locations are anticipated to be largely in locations disturbed by previous mining activities, although some new sites are anticipated. Other locations will be adjacent to proposed new mining locations. The expected water usage is summarized in Section 11.

## 7.2 Test Pitting

Characterization of surface and shallow subsurface materials will be obtained via samples taken from shallow pits at various locations throughout the area. These pits will be used to assess the availability of construction materials (e.g., gravel, sand) at approximately 200 to 300 sites around the Project area and in some cases provided samples of bedrock. For geotechnical testing, approximately 10 kilograms (kg) of sample of the materials at each site will be collected for subsequent material characterisation in the laboratory. Each of the pits will be dug using dozers, excavators, loaders and dump trucks. Typically, the pits will be 3 to 5 m deep, 5 to 6 m long, and 1.5 to 2.0 m wide but may be smaller or larger depending on the local conditions. The disturbed area at each site will be approximately 20 m by 20 m in extent. In some cases, if the bedrock is close to surface, the depth of the pits will be down to bedrock (up to 5 m depth). The samples collected will be shipped offsite. Once the samples have been collected, the pits will be back filled with the remaining excavated material, graded to restore the natural drainage to the extent possible, overburden will be spread over the disturbed area and finally saved organic material will be distributed over the site.

Minimal water (less than or equal to 1 cubic metre [ $\text{m}^3$ ]) is expected to be used at each test pit. This is included in the summary of water use in Section 11. The water may be brought to site in water tanker or via a pump and pipeline from the nearest accessible approved water source.

## 8.0 Metallurgical Sampling

### 8.1 Bedrock Sampling

Sampling of mineralised bedrock is required to understand the future operational blasting parameters and to obtain samples for comminution (crushing/grinding) testing. A sample for comminution testing of approximately 5 tonnes is required from each of up to twenty separate sites. This sample will be obtained by passing blasted bedrock material over a sizing screen. The retained fraction will be placed in 1  $\text{m}^3$  sample bags to transport off-site to a testing facility. To produce the required 5 tonnes of sample, it is expected that the total amount of blasted material will need to be 10 to 30 tonnes per site. At each site, multiple blasts may be undertaken to obtain information on the blasting parameters for future operational requirements.

The area to be cleared for each blast will be approximately 100 m by 100 m. The area will be cleared beginning by removing the surface organic material from the area and storing it in a pile beside the cleared area. Larger timbers will be bucked and stacked on the ground to the side of the cleared area. To expose the bedrock, the overburden materials (typically soils, clays, and gravels) will be cleared from the area and stockpiled at the side of the cleared area together with the stockpiled organic materials and bucked lumber for use during reclamation.

The bedrock material may be extracted by different methods depending on the local conditions. Use of a rock breaker attachment on an excavator may be used where blasting tests are not required. In locations that require blasting, a pattern of drill holes will be drilled to approximately 20 m below the bedrock surface. The drill pattern design may be varied for each blast to obtain the required blasting information for future blast designs.

The holes will be loaded with explosives and local materials (drill cuttings, gravels, and soils) used as stemming in the holes. The procedures to be used when loading the blastholes, executing a blast and post-blast clearance of the site will be described in the Bedrock Sampling Management Plan, to be provided at least 90 days prior to initiating test pitting.

Equipment required for this program includes a drilling rig capable of drilling a hole ranging from 96 to 406 millimetres (mm) in diameter, in which the explosives and stemming will be placed. Drill cuttings will be collected at the hole site and will be re-used as stemming where possible. After blasting, front-end loaders, excavators, and dozers will be used to move the blasted rock. The material will be fed over the sizing screens and the sample will be collected for transport offsite to a testing facility.

After the sample has been collected, the remaining excavated material will be back filled into the excavated area and the surface graded to restore the natural drainage. Overburden material stockpiled adjacent to the blasted area will be spread over the disturbed area. The organic material, stockpiled adjacent to the blasted area, will be placed on top of the overburden material, with larger timbers set in place in a random pattern over the top of the organics. All garbage will be removed from the site for proper disposal. Waste rock will be managed as per the Bedrock Sampling Management Plan.

## 8.2 Explosives Storage and Handling

Explosives storage magazines and, if required, an ammonium nitrate (AN) storage pad, an AN loading facility and an emulsion plant will be constructed. These areas will be sited at an appropriate distance from the camp as per National Standard of Canada Quantity-Separation Distances (CAN/BNQ 2910-510/2015). The access to the explosive storage areas (accessible on an existing road) will have control gates at the entrances to maintain security and prevent unauthorized traffic from entering the restricted areas.

The explosives contractor will be responsible for handling the explosives. The contractor may utilize a licensed bulk explosive delivery truck to provide ammonium nitrate fuel oil (ANFO) or emulsion to the blast-hole. The truck shall include a pump and hose reel for delivering the product. The truck operator will take periodic density samples to ensure quality control. The truck will have an onboard electronic metering system for tracking consumption.

The blaster will sign off delivery sheets after each delivery to ensure that accurate tracking is maintained. Equipment condition reports will be completed by each operator and checked by the supervisor for deficiencies daily. All explosives delivery trucks will be regularly maintained to ensure mechanical deficiencies are dealt with expeditiously and all safety systems are fully operational.

Two explosives magazines will be placed on a pad at an appropriate distance from the AN pad area. The magazines will be dedicated to storing packaged explosives to be used as the primary explosive source except when ANFO is required, as well as related products such as boosters, delays, detonating cord, and detonators. The detonators and delays will be stored in a separate magazine as required by regulations.

The AN storage area pads will hold doubled bagged totes. The pads will be constructed to provide for level storage and handling areas. A Bedrock Sampling Management Plan will be provided at least 90 days prior to the initiation of Bedrock Sampling will provide additional details on the design of this facility.

The bulk explosive handling facilities will consist of a Loading Facility and the mixing/delivery Truck Shelter. The Loading Facility will comprise a temporary building (either fold-away or tent type building) sufficiently sized to accommodate loading a 10 tonne mixing/delivery truck. The facility will include a 2 tonne pneumatic auger equipped with a bag breaker, waste storage for disposed bags, and other small equipment. The building will also be sized to allow for a loader to deliver the AN totes to the feed hopper. The facility will be enclosed to mitigate AN dust propagation.

The bulk explosive mixing/delivery Truck Shelter will comprise a temporary building sufficiently sized to accommodate the ANFO delivery truck. This building will consider the following:

- heating the building for truck storage when temperatures are below freezing;
- vehicle washing with a high-pressure/low-volume spray washer predominately used prior to performing routine maintenance on the truck and as needed;
- alternate vehicle maintenance space if unable to complete at an offsite maintenance shop.

The truck shelter structure will be suitably equipped with electrical power and lighting. All electrical components will be explosion proof and designed for National Electrical Manufacturers Association (NEMA) 4 rating.

The vehicle wash area will be lined to capture wash water and direct the flow to a suitable sump. The wash water will be removed from the liner/sump by means of the on-site vacuum truck and treated for hydrocarbons, when applicable, using an oil/water separator on site, before being discharged as per the Waste Management Plan. The bulk delivery truck will be washed only when the truck is required to return to a populated area, for example for major repairs. From February through to September, it is expected that minimal washing will be required, and that AN wash water quantity is expected to be less than 5 m<sup>3</sup> annually.

### 8.3 Water

A water sample for metallurgical testing consisting of up to 10 m<sup>3</sup> spread over up to twenty locations will be obtained from the existing open pits. The water will be stored in tanks, such as 1,000 litre (1 m<sup>3</sup>) IBC totes, for transport offsite.



## 9.0 Groundwater Tests

Historical mining in the Pine Point area encountered groundwater during mining of the deposits that flowed into the open pits unless mitigated. The purpose of the groundwater testing is to obtain values for hydrogeological parameters that will enable quantitative models of groundwater movement to be developed and flow rates for the aquifers to be determined. This information will be used in the development of the water management plan for the Pine Point Project.

### 9.1 Groundwater Pumping

Up to 10 different potential mining resource areas will be investigated for the purposes of understanding and predicting the efforts needed to manage water during future mining operations. There are two methods proposed for the groundwater testing depending on where the testing is located.

The first test method involves pumping pit water from an existing open pit to another pit sufficiently far away that it will not interfere with the source pit groundwater. Many of the open pits in the Pine Point area have naturally filled to some extent with water since the end of mining (groundwater and surface water). These tests will be undertaken where pit water from one pit will be pumped into a nearby adjacent pit. This will provide the rate at which the source pit water levels recover through groundwater recharge and the rate at which water levels in the destination pit return to the pre-pumping levels. Water will be pumped directly from one pit to the other using the pumping and piping methodology described below.

The second type of test will use boreholes installed near a mineral deposit to draw down the water table in the location of that deposit and then move the water into a nearby existing open pit or re-inject the water via a second borehole. The second borehole will be located sufficiently far enough away for there to be no, or very limited interaction of the groundwater between the two sites.

For each location for the second type of test, one or more representative aquifer tests will be performed by pumping from the source to the destination borehole. Specifically:

- Drawing of water from an aquifer by means of wells drilled into the aquifer.
- Each aquifer test location within 2 km of a historic open pit will require:
  - Installation of a temporary pipeline to convey pumped water from the test well to the nearest historic open pit location.
- Each aquifer test location greater than 2 km from a historic open pit will require:
  - Establishment groundwater re-injection wells by drilling of similar diameter to the source wells. The location of this well is to be located sufficiently far from the source well that the reinjected water will not interfere with groundwater at the source well.
  - Installation of a temporary pipeline to convey pumped water from the test well to the re-injection well.

For both types of test, monitoring wells will be established (Section 9.4). Each of the monitoring wells will be installed at different distances from the planned draw down and reinjection sites and are anticipated to be located at intervals that will provide sufficient data on the groundwater response. It is estimated that up to five monitoring wells per test site may be required.

Due to the uncertain nature of the economics for each potential resource area, the exact locations and number of tests will be provided in the Groundwater Monitoring Plan at least 90 days prior to initiating the groundwater tests. A Conceptual Groundwater Monitoring Plan is provided with this application. Due to the wet and marshy nature of much of the terrain located remotely from the existing historical mining infrastructure, it is anticipated that a number of the test wells will need to be established during the winter period. Pump testing of these wells will then be undertaken in the summer-fall period to avoid potential issues related to freezing of water in pipelines and soft soil.

To test the groundwater of the Chinchaga Formation, a single monitoring well location will be drilled to penetrate the carbonates in the underlying Chinchaga Formation, a sequence of evaporite based stratigraphy from which groundwater with higher salinity and dissolved salts may affect the quality of groundwater inflows to future open pits. A monitoring well will be installed with a screen of approximately 20 m length to collect water samples from the Chinchaga. The results of water quality analysis of these samples are anticipated to represent a critical input for calibration of a three-dimensional groundwater flow model, needed for mine planning.

## 9.2 Groundwater Test Drilling

Drilling of the larger diameter pump test and re-injection wells will be carried out with a rotary drilling rig using either reverse circulation or direct circulation methods. Drilling will require the construction of a drill pad of up to 100 m by 200 m in the area for the purposes of staging and laying-down equipment, management of drilling supplies and vehicles. Additionally, access trails will need to be developed in a similar manner to the access trails developed for core drilling between the nearest existing road and the drilling location.

The drilling will typically involve the installation of 16 to 20 inch casing through the overburden into the top of the bedrock, followed by 15 to 18 inch casing to a depth of 150 to 200 m, into which perforated and unperforated well liners will be installed, surrounded by any necessary filter media. The wells will be pumped using electrically driven slimline borehole submersible pumps installed in the bottom of the well. All wells developed will be completed to permit ongoing monitoring and water sampling after the initial tests are completed.

The large diameter drilling program is anticipated to use approximately 49 cubic metres per day ( $\text{m}^3/\text{day}$ ) of water, from a nearby water source, natural or human-made, and supplied by a water truck or via a pipeline. In addition, a heavy product such as bentonite clay, which is inert, may be used to increase the viscosity of the drilling water to keep the borehole from collapsing, lubricate and cool the cutting tools, and lift cuttings to the surface.

Following removal of the drill cuttings, the drill water will be recirculated for the duration of the well drill being drilled. The drill cuttings produced are anticipated to be disposed of in a nearby natural depression or in a constructed sump.

Monitoring wells will be established by drilling 8 to 10-inch diameter boreholes with the installation of a 4 inch monitoring well in each borehole, at a similar installation depth as were used for the larger-diameter well.

### 9.3 Temporary Water Pipeline

The temporary pipeline to be used for conveying groundwater to the re-injection wells or to the nearest historical open pit will be 8-inch diameter high-density polyethylene (HDPE -DR 17 mid-range pressure pipe or larger as appropriate to convey the volumes of water).

This product will be heat-fused in the field using a heat fuser in the winter and 1 km lengths of the pipeline will be towed into position on the surface along the cleared right-of-way using a backhoe or other suitable piece of equipment. Thus, it is anticipated that for a 3 km long pipeline, the heat fuser will need to be repositioned up to three times.

HDPE pipeline can be cut up and reconstructed at a new location using the same heat fusing equipment. The great advantage of this product is that this process can be repeated as often as needed.

Construction of a 3 km pipeline is anticipated to take approximately 18 days to complete. As the pipeline will need to be installed in the winter period when the terrain remains frozen, the fusion technician will work inside an 8 foot x 20 foot shipping container with doors on both ends. This shelter will allow the tech to keep the machine, pipe and themselves relatively warm in the winter conditions.

A suitably sized booster pump will be used to pump the water from the test well to the discharge site. During engineering design, the necessary hydrological analysis will be performed to determine the size of pump required.

### 9.4 Monitoring Wells

Monitoring wells will be installed at various locations around the property that will be used to monitor baseline groundwater conditions both in response the pump tests and within the Project area. It is estimated that up to 12 such monitoring wells, in addition to those installed for the pump tests, will be required. Monitoring equipment will be installed in the wells to allow for monitoring of physical and chemical characteristics. The wells will remain in place for the several years. Various types of equipment may be installed in the wells to accomplish the monitoring. The wells will be capped at surface to prevent accidental infilling into the well or animal injuries and to facilitate ongoing maintenance requirements.

## 10.0 Site Infrastructure for the Confirmation and Exploration Program

### 10.1 Current Camp Site

The present camp on the site is located approximately 3 km north of the former Pine Point town site (Figure 1) and is permitted for 49 people. This tent camp will continue to be utilized and will remain in operation generally being especially available for periods of low occupancy or for emergency accommodation including a need for enhanced physical isolation as required by COVID-19 protocols. The tent camp may also be moved as required to other locations on approval by the Land Use Inspector.

## 10.2 New Mobile Camps

Accommodation for up to 249 people will be required at the site to undertake the CEP. The main accommodations will continue to be at the location of the existing camp, but some of this capacity may be at satellite camps.

The sites for the camp or camps will be in previously disturbed area with sufficient space for the camp and the movement of people and vehicles around the camp. An area to be demarcated for vehicle parking adjacent to the camp site. The area will also include water treatment, workshops, fuel storage areas and power distribution equipment. The site currently under consideration is the area to the south of the Teck tailings facility, for example in the location of the previous process plant or disturbed areas in the vicinity. However, other sites will be considered in consultation with the Land Use Inspector, the mobile camp provider and taking into account logistical considerations. Using the previously disturbed areas in the vicinity of the historical Cominco Process Plant site leaves the former townsite accessible for local community use. Camp location, construction and operation will consider the Northern Land Use Guidelines for Camps and Support Facilities (GNWT 2015b).

The new mobile camp will be installed with sleeping quarters for approximately 200 occupants (depending on the actual camp design, and in addition to the 49 beds currently at the camp), bathrooms, offices, first aid room, recreational room, kitchen, and dining area. The modules of the camp will be connected with corridors, if possible.

The new camp may be equipped with flush toilets and/or incinerating toilets, showers, dishwashers, and other water consuming fixtures. A typical Canadian household uses 318 litres (L) of water per day<sup>1</sup>, resulting in an estimated water use of 56 m<sup>3</sup> per day for the camp; however, efforts will be made to limit consumption as far as possible (e.g., low flow shower heads and faucet flow diffusers)

Drainage and erosion control structures, where necessary, will be installed to manage water runoff around the camp.

Potable water will be sourced from Great Slave Lake north of the old Pine Point Mill site, utilizing the old Cominco T-37 road (Figure 3) or sourced from offsite locations, such as the Hamlet of Fort Resolution or the Town of Hay River. Water will be stored in tanks within an insulated structure and, if necessary, heat traced water lines will be run to the camp and other buildings requiring running water (e.g., the dry). Water for domestic non-potable use may be sourced from Great Slave Lake as well, however the option of sourcing this water from local water sources, including groundwater, is also possible.

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<sup>1</sup> Environment Canada: <https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/residential-water-use.html#ftn3-ref>

## Project Description

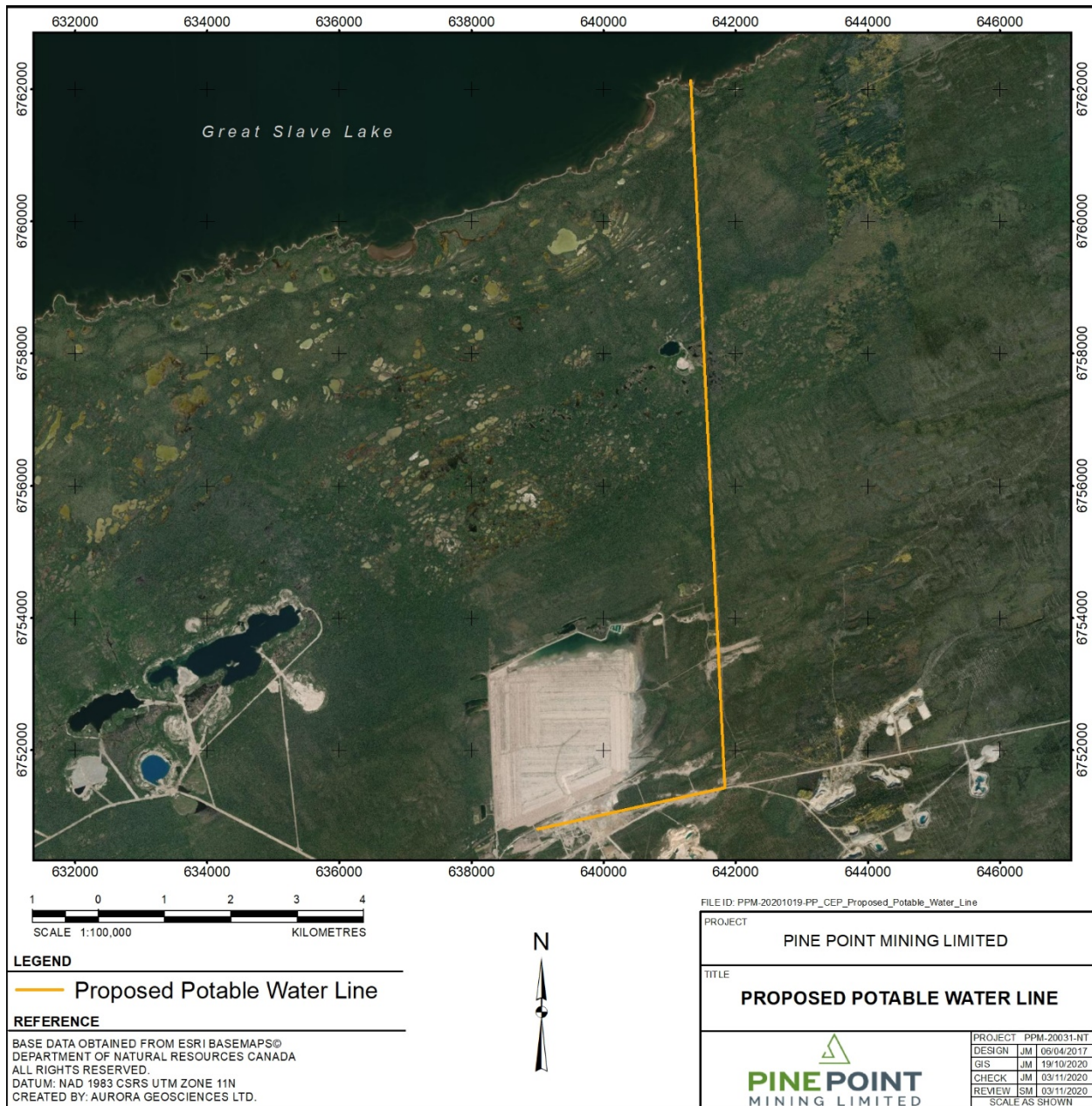


Figure 3: Approximate Location of the Water Supply Line



### 10.3 Wastewater Treatment

Depending on the camp and wastewater treatment method employed, the options that will be considered include:

1. Separate handling of sewage and greywater. Greywater will be discharged to a sump near the camp(s) while sewage is disposed of at the point of production through use of incinerating toilets and/or flush toilets. Sewage would be transported off site to an approved receiving facility.
2. Separate handling of sewage and greywater. Greywater will be discharged to a sump near the camp(s) while sewage will be treated by the WWTP. Treated water from the WWTP will be discharged to the sump.
3. Both water types are treated through the WWTP and treated water is discharged to the sump.
4. Wastewater (both types) are taken off site to a licensed facility.
5. A combination of options one through four.

The treatment sludge would either be trucked to the nearest facility with sufficient capacity. Temporary effluent storage, if required, will be in mobile containers rather than engineered holding ponds.

There are different potential options for the wastewater treatment such as a septic system, rotating biological contactor (RBC) type treatment plant, a membrane bioreactor (MBR) type treatment plant, or other type of applicable technology. Locating and recommissioning of the old Pine Point Town sewage lagoon is also a possibility. The final decision on the type of treatment process will be based on considerations of reliability, capacity and ability to produce the quality of effluent required for discharge. The Waste Management Plan will be updated once the details have been finalised and it be submitted for approval.

### 10.4 Workshops

A geological core shed will be established and used for the geological and geotechnical logging of the drill cores, sample collection and packaging for shipment to respective laboratories.

A workshop for mechanical repairs will be established. This workshop will include necessary tools and equipment to undertake equipment maintenance and repairs. A cold storage tent or foldaway building will be located near the workshop.

A laydown area will be used for the temporary storage of equipment and vehicles when not in use. The laydown will be in a previously disturbed area. Drip trays will be placed under vehicles that are stationary for longer than 2 hours for equipment that contains hydrocarbons, antifreeze, or other chemicals.

### 10.5 Power Supply

Power for the camp will be sourced from the existing Northwest Territories Power Corporation substation at the site. A backup generator system based on diesel or liquefied or compressed petroleum gas fuel, or a combination, will be available in case of the power outage. Portable generators will be deployed where needed (e.g., lighting, heating).

## 10.6 Fuel Storage and Refuelling

Vessels used for storage of gasoline and diesel will include containers such as jerry cans and drums, engineered tanks such as tidy tanks and enviro tanks. Tanks and storage systems will be compliant with the appropriate Transport Canada and/or Environment and Climate Change Canada Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations. Using a variety of container and tank sizes provides the ability to maintain fuel quantities on site appropriate to differing uses and the immediate forecast fuel requirements.

Equipment may be refuelled from tidy tanks mounted in the back of pickups. These tanks will be refilled at the fuel storage facility and secondary containment will be employed to contain possible spills. Dedicated fuel trucks will also be used when practical to do so to refill the fuel storage tanks and deliver fuel to worksites.

Oils such as engine oil and hydraulic oil will be stored in bottles, pails or totes as supplied by manufacturers, and where practical, may also be stored in tanks up to 2,500 L in size.

Propane will also be used and stored at the camp. Vessel sizes may range from portable to larger stationary tanks. The maximum quantity of fuels and storage types is provided in Table 1.

**Table 1: Maximum Fuel Volumes**

Fuel	Volume	Typical Storage Type	Location
Diesel	275,000 litres (increase from 38,480 litres)	5 litre to 205 litre containers; tanks up to 100,000 litres in compliance with applicable Transport Canada and/or Environment and Climate Change Canada regulations	Camp / Drill / Fuel Cache
Gasoline	28,000 litres (increase from 6,850 litres)	5 litre to 205 litre containers; tanks up to 15,000 litres in compliance with applicable Transport Canada and/or Environment and Climate Change Canada regulations	Camp / Drill / Fuel Cache
Aviation Fuel	28,000 litres (increase from 4,000 litres)	205 litre containers	Camp / Fuel Cache
Propane	100,000 lbs (increase from 9,800 lbs)	20 lb to 2,000 gallon cylinder/tank	Camp / Drill / Fuel Cache



## 10.7 Equipment

Equipment proposed to be used for the CEP are listed in Table 2.

**Table 2: Equipment List**

Quantity	Type (or similar)	Size (weight in tonnes)	Description / Typical use proposed
6	Water truck	Up to 65 tonnes	Water supply
2	Booster pump	Up to 5 tonnes	Trailer/truck or skid mounted pump to move water from the test well to the discharge site
12	Mobile pump unit (diesel, NG or electric)	Up to 3 tonnes	Pumping water for various uses including hose for runs of up to 2,000 m. May be enclosed in shacks including heating and associated fuel supply equipment.
12	Coring rig (percussion and rotary)	Up to 15 tonnes per drill rig; larger rigs may be required if greater depths or larger hole diameters are required. Includes all support equipment	Skid or track mounted; drilling of 47 to 96 mm cores; support equipment is all equipment normally required to undertake drilling e.g. rod trailer, casing trailer, genset, pump station, piping, steam generator, mud tanks, cuttings tanks, fuel tanks
1	Blast hole drill rig	Up to 68 tonnes	Blasthole drilling. Includes associated equipment.
1	Drilling rig	Up 45 tonnes or larger if drilling conditions require. Includes all associated equipment.	Rig to drill 270 - 406 millimetres (mm) diameter holes, groundwater extraction and injection holes and bedrock sampling
2	Sonic drill rig and support equipment	Up to 20 tonnes;	Overburden material coring
4	Dozer (D6 and D8)	Up to 45 tonnes	Earthmoving
2	Grader	Up to 40 tonnes	Earthmoving
4	Loader	Up to 99 tonnes	Materials handling
4	Excavator/backhoe or similar	Up to 60 tonnes	Excavate soil and rock; includes attachments such as bucket, pneumatic chisel etc.
2	Telescoping lift	Up to 10 tonnes	Materials handling
4	Skidder	Up to 25 tonnes	Materials handling and earthmoving
4	Mulcher or similar clearing equipment	Up to 35 tonnes	Clearing cut-lines, access trails and drill pads
50	Pickup Truck of various sizes	Up to 6.5 tonnes	People and materials movement; may include supplementary fuel apparatus; vehicle counts will vary depending on site staffing and operations
1	Welding truck/workshop	Up 15 tonnes	Repairs and light fabrication
1	Parts truck	Up to 15 tonnes	Repair and maintenance
2	Vacuum truck	Up to 55 tonnes	Liquid handling

**Table 2: Equipment List**

Quantity	Type (or similar)	Size (weight in tonnes)	Description / Typical use proposed
4	Dump truck	Up to 60 tonnes	Moving rock and overburden and snow clearing
4	Transport truck with trailer or lowboy	Up to 70 tonnes	Moving equipment and supplies
4	Marooka or similar	Up to 30 tonnes	Moving equipment and supplies
3	Skid steer loader or similar	Up to 5 tonnes	Light earthmoving, freight handling
2	Kubota tractor or similar	Up to 3 tonnes	Light earthmoving, clearing, freight handling
16	Quad	Up to 600kg	People movement
12	Side-by-side	Up to 3 tonnes	People and small freight movement.
2	Swamp buggies	Up to 35 tonnes	People and small freight movement.
12	Argo	Up to .7 tonnes	People and small freight movement.
16	Snowmobile and sled	Up to .6 tonnes	People and small freight movement.
4	Snowcat	Up to 10 tonnes	
1	Explosives storage magazines	Up to 20 tonnes	Storing packaged explosives, boosters, delays, detonating cord, and detonators.
1	ANFO/emulsion truck including product load/offload support equipment	Up to 15 tonnes	Deliver bulk ammonium nitrate fuel oil and/or emulsion explosives
1	High pressure/low-volume spray washer	Up to 5 tonnes	Routine cleaning; truck, trailer or skid mounted
1	Mobile screen	Up to 40 tonnes	Bedrock sampling and wells sampling
1	Mobile crusher	Up to 75 tonnes	Bedrock sampling
6	Diesel generator	Up to 10 tonnes	Camp power generation
10	Portable generator	Up to 10 tonnes	Worksite power generation
12	Portable light tower	Up to 1 tonne	
2	Fuel truck	Up to 65 tonnes	Deliver fuel to worksite and refill fuel storage tanks
4	Mobile geotech logging unit	Up to 10 tonnes	Skid, truck or trailer mounted geotechnical core logging unit
12	Sloop for equipment	Up to 5 tonnes	
2	Equipment and supply shack	Up to 10 tonnes	
2	Insulated heat shack for water lines with fuel tank and propane bottles	Up to 3 tonnes	

**Table 2: Equipment List**

Quantity	Type (or similar)	Size (weight in tonnes)	Description / Typical use proposed
4	Water storage tank	Up to 10 tonnes	
4	Mobile support unit	Up to 15 tonnes	Skid or trailer mounted support unit with one or more of generator, light plant, fuel tank, latrine, waste storage, equipment storage
4	Central drill water storage unit	Up to 15 tonnes	Skid or trailer mounted unit with one or more of water storage tank, heater, pump, fuel tank, light plant, generator
4	Mobile medic unit	Up to 10 tonnes	Skid, trailer or truck mounted medical unit
2	Helicopter	Up to 2.5 tonnes	
2	Incinerator	Up to 2 tonne	
2	Crew bus	Up to 15 tonnes	
1	Roll off truck	Up to 15 tonnes	
1	Crane	Up to 65 tonnes	Moving and setup of equipment and buildings
90	Camp building		Tents, trailers and temporary structures related to crew accommodations, boarding, storage and project operations

## 11.0 Water Withdrawal and Use

Anticipated water use for the various activities is summarised in Table 3. Water will be sourced from Great Slave Lake and various other natural and man-made waterbodies as described in the Water Withdrawal Plan.

**Table 3: Anticipated Maximum Daily Water Volumes**

	Number of Units	Anticipated Daily Volume per Unit (m <sup>3</sup> )	Total Daily Volume (m <sup>3</sup> )	Notes
Core Drilling	8	33	264	Deposited in sumps
Sonic Drilling	2	5	10	Deposited in sumps
Blast Hole Drilling	1	1	1	Deposited in sumps
Large Diameter Drilling	1	49	49	Deposited in sumps
Camp(s)			56	Deposited in sumps or otherwise as per the Waste Management Plan
<b>Sub-total</b>			<b>380</b>	<b>Daily volume Water Use Fee Calculator</b>
Groundwater Test*			3600	Diverted and returned to source
<b>Total</b>			<b>3980</b>	

\*As the Waters Regulations Section 8(5) state that fees are not payable for a diversion of water that is not otherwise used, water use fees do not apply to the groundwater test. The duration of these tests will be as short as possible to achieve the test objectives.

## 12.0 References

MVLWB (Mackenzie Valley Land and Water Board). 2020. Active Authorizations web viewer. Available at <https://mvlwb.com/mackenzie-valley-land-and-water-board-maps>. Accessed 14 June 2020.

MVLWB/GNWT (Government of the Northwest Territories). Guidelines for Aquatic Effects Monitoring Programs. March 2019. Available at [https://mvlwb.com/sites/default/files/aemp\\_guidelines\\_-\\_mar\\_5\\_19.pdf](https://mvlwb.com/sites/default/files/aemp_guidelines_-_mar_5_19.pdf).

GNWT (Government of the Northwest Territories). 2015a. Northern Land Use Guidelines. Access: Roads and Trails. Accessed from [https://www.lands.gov.nt.ca/sites/lands/files/resources/nlug\\_roadstrails\\_2015\\_english\\_16\\_sept\\_2015.pdf](https://www.lands.gov.nt.ca/sites/lands/files/resources/nlug_roadstrails_2015_english_16_sept_2015.pdf).

GNWT. 2015b. Northern Land Use Guidelines. Camp and Support Facilities. Accessed from [https://www.lands.gov.nt.ca/sites/lands/files/resources/nlug\\_roadstrails\\_2015\\_english\\_16\\_sept\\_2015.pdf](https://www.lands.gov.nt.ca/sites/lands/files/resources/nlug_roadstrails_2015_english_16_sept_2015.pdf).

Project Description



## Appendix A

### List of Mineral Claims and Leases for this Permit Application

Project Description

Lease #	Tag Number	Claim Name
4873	F69560	W85
4858	F69561	G3H2A
4859	F69562	G3H2B
5246	F73123	S 1
4860	F73124	R190
5262	F73125	M 3
5248	F73126	M 4
5249	F73127	M 5
5250	F73128	M 6
5251	F73129	M 7
5252	F73130	M 8
5253	F73131	M 9
5254	F73132	M 10
5255	F73133	M 11
5256	F73134	M 12
5257	F73135	M 13
5258	F73136	M 14
5259	F73137	M 15
5260	F73138	M 16
5261	F73139	S 17
4861	F73140	M18
4862	F73141	M19
4863	F73142	M20
5239	F73143	N 1
5240	F73144	N 2
5241	F73145	N 3
5242	F73146	N 4
5243	F73147	N 5
4868	F73148	N6
4869	F73149	N7
4870	F73150	N8
4871	F73151	N9
4872	F73152	N10
4864	F73153	M21
4865	F73154	M22
4866	F73155	M23
4867	F73156	M24
5247	F73157	M 2
5245	F75690	N 17

Project Description

Lease #	Tag Number	Claim Name
5244	F75732	N 18
85B/11-15-2	KM 42, NWT Highway #5	Settling Pond
85B/11-16-2	KM 42, NWT Highway #5	Mine Site
85B/11-18-2	KM 42, NWT Highway #5	Settling Pond - indenture
85B/11-19-2	KM 42, NWT Highway #5	Mine Site - indenture
	K15913	D1
	K15914	D2
	K15915	D3
	K15916	D5
	K15917	D4
	M10191	PPM 1
	M10192	PPM 2
	M10296	D8
	M10297	D7
	M10298	D6
	M10299	D9
	M10300	D10
	M10301	D11
	M10302	D12
	M10303	D13
	M10426	PPM 3
	M10427	PPM 4
	M10514	PP 81
	M10515	PP 82
	M10516	PP 83
	M10517	PP 84
	M10518	PP 85
	M10519	PP 86
	M10520	PP 87
	M10550	PP 90
	M10551	PP 91
	M10552	PP 92
	M10553	PP 93
	M10554	PP 94
	M10555	PP 95
	M10653	PPM 5
	M10654	PPM 6
	M10658	PPM 7
	M10659	PPM 8



Project Description

Lease #	Tag Number	Claim Name
	M10660	PPM 9
	M10801	PP 1
	M10802	PP 2
	M10803	PP 3
	M10804	PP 4
	M10805	PP 5
	M10806	PP 6
	M10807	PP 7
	M10808	PP 8
	M10809	PP 9
	M10810	PP 10
	M10811	PP 11
	M10812	PP 12
	M10813	PP 13
	M10814	PP 14
	M10815	PP 15
	M10816	PP 16
	M10817	PP 17
	M10818	PP 18
	M10819	PP 19
	M10820	PP 20
	M10821	PP 21
	M10822	PP 22
	M10823	PP 23
	M10824	PP 24
	M10825	PP 25
	M10826	PP 26
	M10827	PP 27
	M10828	PP 28
	M10829	PP 29
	M10830	PP 30
	M10831	PP 31
	M10832	PP 32
	M10833	PP 33
	M10834	PP 34
	M10835	PP 35
	M10837	PP 37
	M10838	PP 38
	M10839	PP 39

Project Description



Lease #	Tag Number	Claim Name
	M10840	PP 40
	M10841	PP 41
	M10842	PP 42
	M10843	PP 43
	M10844	PP 44
	M10845	PP 45
	M10846	PP 46
	M10847	PP 47
	M10848	PP 48
	M10849	PP 49
	M10850	PP 50
	M10851	PP 51
	M10852	PP 52
	M10853	PP 53
	M10854	PP 54
	M10855	PP 55
	M10856	PP 56
	M10857	PP 57
	M10858	PP 58
	M10859	PP 59
	M10860	PP 60
	M10861	PP 61
	M10862	PP 62
	M10863	PP 63
	M10865	PP 65
	M10866	PP 66
	M10868	PP 68
	M10869	PP 69
	M10870	PP 70
	M10877	PP 77
	M10878	PP 78
	M10879	PP 79
	M10880	PP 80

Project Description



Appendix B

Photo Appendix



**Image of open pit N42**



**Existing haul road at Pine Point mine**





**Existing exploration camp at Pine Point mine**



**Road and sidewalk at the old Pine Point townsite**





**Image of open pit L-37**



**Photo : One of the many existing roads at Pine Point**





**Photo: Drill core from historic drilling programs**