IRON ORE COMPANY OF CANADA SHERWOOD NORTH PIT PROJECT, LABRADOR WEST

Environmental Assessment Registration

Pursuant to the *Newfoundland & Labrador Environmental Protection Act (Part X)*

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List of Acronyms

ACCDC	Atlantic Canada Conservation Data Centre
AGL	Above Ground Level
AMEC	AMEC Environment & Infrastructure
ARD	Acid Rock Drainage
ATO	Automatic Train Operation
BRRP	Business Resilience and Recovery Program
CAC	Criteria air contaminants
CAP	Community Advisory Panel
CH4	Methane
CO	Carbon Monoxide
CO2	Carbon Dioxide
CO2eq	Carbon Dioxide Equivalent
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CWS	Canadian Wildlife Service of Environment Canada
DFLR	Department of Fisheries and Land Resources
DTCII	Department of Tourism, Culture, Industry and Innovation
EA	Environmental Assessment
EMS	Environmental Management System
EPP	Environmental Protection Plan
ERRP	Emergency Response and Reporting Plan
GIS	Geographical Information System
GHG	Greenhouse gases
GNL	Government of Newfoundland and Labrador
GPM	Gallons per minute
GPS	Global Positioning System
Ha	Hectares
HSEQ MS	Health, Safety and Environmental and Quality Management System
HSEMS	Health, Safety and Environmental Management System (same as above)
IOC	Iron Ore Company of Canada
kBcm	Thousand Banked cubic meters
km	Kilometer
km/h	Kilometres per Hour
kt	Kilotonne
LIF	Lower Iron Ore Formation
MAC	Mining Association Canada
MASL	Meters Above Sea Level
MBCA	Migratory Birds Convention Act
m	Meter
m^3/d	Cubic metres per Day
mbgs	Meters Below Ground Surface
MIF	Middle Iron Ore Formation
mm	Millimeter

MMER	Metal Mining Effluent Regulations
Mm3	Million Cubic Meters
mRL	Metres Relative Level
Mtpa	Million tonnes per annum
Mt	Million tons
MW	Megawatt
N_2O	Nitrous oxide
NAG	Non-acid generating
NCC	NunatuKavut Community Council
NLDNR	Newfoundland and Labrador Department of Natural Resources
NLDMAE	Newfoundland and Labrador Department of Municipal Affairs and Environment
NNK	Naskapi Nation of Kawawachikamach
NL EPA	Newfoundland and Labrador Environmental Protection Act
NL ESA	Newfoundland and Labrador Endangered Species Act
NLSA	Newfoundland and Labrador Statistics Agency
NPG	Neutralizing Potential Ratio
PAG	Potentially Acid Generating
NOX	Nitrogen Oxides
PAO	Provincial Archaeology Office
PM	Particulate Matter
PM2.5	Particulate matter less than 2.5 microns
PM10	Particulate matter less than 10 microns
QNS&L	Quebec North Shore and Labrador
RTF	Regional Task Force
S	Sulphur
SAR	Species at Risk
SARA	Species at Risk Act
SEM	Sikumiut Environmental Management
SO_2	Sulfur dioxide
TLH	Trans Labrador Highway
TMF	Tailings Management Facilities
TPM	Total Particulate Matter
UIF	Upper Iron Ore Formation
USGPM	US Gallons per Minute
WNS	White-nose Syndrome

1.0 Introduction

Project Name: The Sherwood North Pit Project

The Iron Ore Company of Canada (IOC) plans to develop a new open pit mine as an extension to its existing operations in Labrador West. IOC has been operating the Carol Project in Labrador West since the early 1960's and the Sherwood North Pit (the Project) is an extension of the existing Sherwood Pit, which is part of the Humphrey Main/West/Sherwood mining area.

The proposed Sherwood North Pit is situated within IOC's existing mining lease and encompasses approximately 150 hectares of land. Activities associated with the proposed Project will involve vegetation/tree clearing, overburden removal and stockpiling, road construction, drilling and blasting, waste rock removal, diversion of surface and ground water and transporting ore to existing on-site facilities for processing. Contractors will be used for the initial pit development and IOC's existing workforce, equipment and infrastructure will be utilized during the operations phase of the proposed Project. The proposed open pit mining operations in the Sherwood North Pit will be carried out as per IOC's existing mining practices. The majority of overburden removed will be used to rehabilitate a historical waste rock pile located adjacently at Steven's Lake. IOC will utilize ore mined from the Sherwood North Pit to maintain critical production levels until the new Wabush 3 Pit becomes fully operational.

This Environmental Assessment (EA) Registration document has been prepared in relation to the proposed Sherwood North Pit by IOC, with assistance from GEMTEC Limited. The document format follows the guidance for Project Registration under the Newfoundland and Labrador EA process.

1.1 Proponent Information

IOC is a major producer of iron ore in Canada, and a leading global supplier of iron ore pellets and concentrate.

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Labrador City Operations Address:	2 Avalon Drive, Labrador City, NL Canada A2V 2Y6
President and Chief Executive Officer:	Mr. Clayton Walker
Principal Contact Person for the Purposes of EA	Mr. Patrick Lauzière Manager, Environment & Sustainable Development 1 Retty Street, Sept-Îles, QC Canada G4R 3C7 Tel. (418) 968-7400 (Ext 7513) Email. Patrick.Lauziere@ironore.ca

IOC currently operates open pit mines, a concentrator and a pellet plant in Labrador West, and transports its products along a 418 km railway to its port facilities in Sept-Îles, Quebec on the St Lawrence Seaway. Approximately 1,707 persons are employed in permanent positions at IOC's Labrador West facilities.

The company's existing mining operations in Labrador West consist of five active open pits (Luce, Sherwood, Humphrey Main, Humphrey South and Lorraine South), one existing pit to be reactivated (Spooks), and is in the early operational stages of a new open pit (Wabush 3) (Figure 1). IOC's Labrador West properties also contain significant quantities of additional iron ore reserves for future development.

IOC's concentrator has an annual production capacity of approximately 23 million tonnes of iron ore concentrate, which is a 5 million tonne increase since the recent completion of the Concentrator Expansion Program. Of that amount, approximately 9 to 13 million tonnes are pelletized and the balance is sold directly as iron ore concentrate.

After processing at the Labrador City facilities, the iron ore concentrate and pellets are transported south via the Quebec North Shore and Labrador (QNS&L) railway, a wholly owned subsidiary of IOC, to the company's shipping terminal and deep water port in Sept-Îles, Quebec, which handles ore carriers up to 255,000 tonnes. IOC exports its concentrate and pellet products to major North American, European and Asian steel makers.

IOC has a comprehensive Health, Safety and Environmental and Quality Management System (HSEQ MS) with associated health, safety and environmental standards, work practices and procedures in place for its construction and operational activities. These have been developed and implemented, and are continuously updated, in accordance with IOC's corporate Health, Safety, Environment, Communities and Quality Policy, other relevant corporate requirements and guidelines, and with a view to meeting, and seeking to surpass, the provisions of applicable legislation and regulations. As part of its HSEQ MS, IOC has a comprehensive Environmental Management System (EMS), including plans and procedures designed to avoid or reduce the environmental effects of its activities. Associated with its HSEQ MS, IOC has a very rigorous internal and external auditing process which annually evaluates the management systems' performance with the objective of continuous improvement. Rio Tinto's *Iron Ore Health, Safety, Environment and Quality Policy* is provided in Appendix A of this report.

The Project, as it develops through its various phases from conception to closure, will be evaluated to ensure that it fully conforms to IOC's internal standards and complies with all applicable legislation. Risk evaluation is required through each phase of the Project and mitigative measures will be identified and implemented to minimize or eliminate risks. IOC's major shareholder and operator, Rio Tinto, has developed world class standards in the area of health, safety, and environment and community relations.

1.2 Rationale for the Undertaking

The Sherwood North Pit targets the north-western limb of the Humphrey Main/West/Sherwood orebody, the southern part of which is currently being exploited by IOC.

The proposed Project will be implemented as part of on-going work associated with IOC's Labrador City Operations. The current design of the proposed Sherwood North Pit contains approximately 34 million tonnes of ore and 61 million tonnes of waste. Although a new pit, the exploitation of Sherwood North Pit will not materially impact IOC's overall planned development sequence. Development activity at the Sherwood North Pit will be undertaken progressively over two phases, (Phases 1 and 2 of Sherwood North, also called Phases D and G of the overall Humphrey Main/West/Sherwood development) and will include site clearing, removal of overburden (glacial till), drilling and blasting of the exposed rock and construction of haul roads.

The Project will be fully integrated with IOC's overall Labrador City Operations, and will utilize its existing:

- Mining equipment;
- Labour force;
- Maintenance facilities;
- Ore delivery systems;
- Processing plants; and
- Tailings management facilities (TMF).

Development of the Sherwood North Pit is critical to IOC achieving and maintaining production goals. While decreasing production risks, development of the Sherwood North Pit at this time also maintains efficient use of available mine equipment and ensures that IOC's operations remain profitable in difficult market conditions. Phase 1 (Humphrey Phase D) of the proposed Project involves development and mining of an approximately 50 hectare area that requires minimal stripping over the first two to three years. Although adjacent to the proposed Phase 1 (Humphrey Phase D) development area, IOC does not intend to exploit the Phase 2 (Humphrey Phase G) area until potentially several decades in the future, as late as 2060. The information presented in this Registration document is partly conceptual for the Phase 2 (Humphrey Phase G) development. The rationale for this approach is primarily to ensure competitiveness in the world markets. Gaining access to the Sherwood North orebody (Phase 1 – Humphrey Phase D) as quickly as possible will allow IOC to maintain production levels until the nearby Wabush 3 Pit can be brought into production. This strategy is essential to ensuring IOC can remain competitive in the industry and continue to contribute in positive ways to the local and provincial economy. The proposed Project will utilize IOC's existing labour force and as such, a smooth and efficient transition from EA release to construction and production will minimize any pitfalls to the local economy. This Registration document does not describe detailed activities associated with Phase 2 (Humphrey Phase G) of the Sherwood North Pit, nor does it predict potential negative environmental or socioeconomic effects of this later phase. IOC will consult with the Government of Newfoundland and Labrador (GNL) prior to any activity associated with the Phase 2 (Humphrey Phase G) development.

1.3 Environmental Assessment Process and Requirements

The Newfoundland and Labrador *Environmental Protection Act* (NL EPA) requires anyone who plans a project that could have a significant effect on the natural, social or economic environment (an "Undertaking") to present it for examination through the provincial EA process.

Under the NL EPA (definitions), an Undertaking "includes an enterprise, activity, project, structure, work or proposal and a modification, abandonment, demolition, decommissioning, rehabilitation and an extension of them that may, in the opinion of the minister, have a significant environmental effect".

The associated *Environmental Assessment Regulations* (Part 3) list those projects (potentially including proposed modifications and extensions of same) that require registration and review. These include, for example:

> *"33(2) An undertaking that will be engaged in the mining, beneficiating and preparing of a mineral as defined in the Mineral Act whether or not these operations are to be performed in conjunction with a mine or at mills that will be operated separately."*

Following public, Indigenous and governmental review of this EA Registration, the Minister of Municipal Affairs and Environment will determine whether the Project may proceed, subject to any terms and conditions and other applicable legislation, or whether further assessment is required.

2.0 Project Description

The following sections describe the Project location, geographic setting and land tenure.

2.1 Property Description and Location

The proposed Sherwood North Pit is located adjacent to Humphrey Pit in Western Labrador within IOC's existing mining property boundaries. (Figure 1). The approximate coordinates of the proposed open pit are 53.0241°N 66.5811°W at an elevation of 820-840 metres above sea level (MASL). The area is not accessible to the public and has been surrounded by mining activities since the early 1960s.

Figure 1: Site Overview

The proposed Sherwood North Pit area has a surface area of 150 ha that will be developed in two phases. The first phase has a surface area of 50 ha, has a low strip ratio, and is anticipated to be mined within three years. The haul roads, overburden stockpile and other infrastructure also account for approximately 15 ha. The second phase has a surface area of 85 ha and may not be developed for a number of years, potentially not until 2060.

The Sherwood North Pit is bounded on the north by low-lying vegetation and the Steven's Lake waste rock dump. The waste rock dump for Phase 1 (Humphrey Phase D) of the Sherwood North Pit is planned for the western side of the open pit and located at a distance greater than 100 m from Carol Lake. The Sherwood Pit is located to the south and the Humphrey Main Pit to the east (Figure 2).

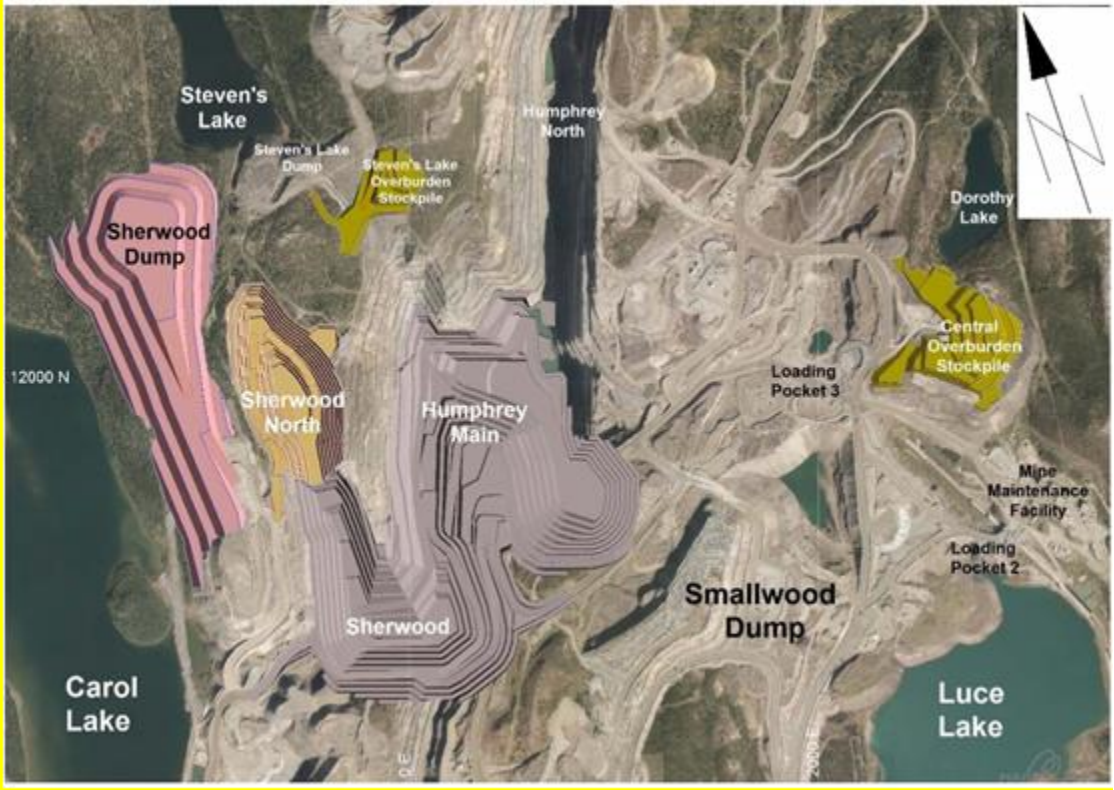

Figure 2: Sherwood North Pit Area – Project Components

There are two small wetlands in the area of the North Sherwood proposed development totaling less than 2 hectares. These are very likely to be perched and not groundwater dependent. There is a small waterbody referred to as Sherwood Pond (Figure 3 and 8) located in the southern section of Phase G of the Project site. This pond currently collects runoff from the site and seasonally requires active discharge to prevent water from entering adjacent operations.

Figure 3: Sherwood Pond Looking South

2.2 Land Tenure

The proposed Project is located entirely within the IOC's Labrador West operating site and is taking place on land that is covered by an existing mining lease (Mining Lease 13, Block 22-3), which was issued in the early 1960s and re-issued for an additional 30 year term in the 2012. The next lease renewal will extend tenure to 2052, after which mineral tenure will be governed by the *Mineral Act*, with lease extensions of up to 10 years. IOC also currently holds surface rights for the planned footprint of the project (Figures 4 and 5).

Figure 4: Mineral Tenure - Sherwood North Pit (mine Grid)

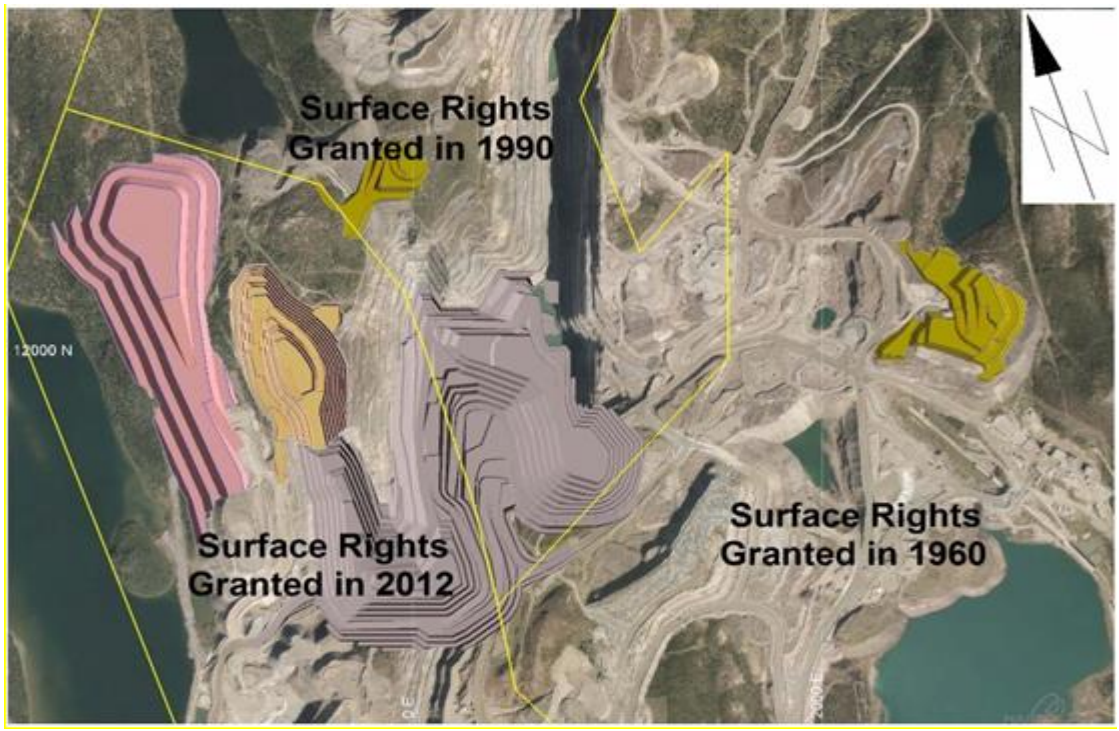

Figure 5: Surface Rights - Sherwood North Pit (Mine Grid)

2.3 Alternatives to the Project

The alternatives to the proposed Project are a delay of the Project or the development of other iron deposits within the IOC leases. Neither is feasible to maintaining IOC's production levels. The former would not satisfy the current and near-future needs to provide flexibility in mine production to more consistently meet concentrator production capacity. The latter would also cause delays as additional exploration drilling and delineation is needed at the other potential sources. In addition, the Sherwood North pit is located on a site that is already partially disturbed by historic mining activities and abuts currently operating pits. As such, it will have a lower impact on the surrounding environment than development of an alternative ore deposit.

IOC has considered alternative means of carrying out the Project, however as this is simply an extension of an existing mining area, there are few alternative activities available for consideration. The method of mining - stripping, drilling and blasting, hauling/conveying - is industry standard for iron ore mining activities and IOC has been improving these methods for many years based on cost, schedule and environmental considerations. The open pit footprint is developed based on the economic model for the pit, and as per the *Mining Act* requirements, must exploit all economical ore from the ore body. There are alternatives to the waste rock disposal location, and it would obviously be preferable to deposit these materials in an existing, mined-out open pit. However, there are no completed mined out open pits within reasonable proximity to the Sherwood North Pit based on the sterilization requirements associated with the *Mining Act*. IOC will attempt to minimize the extent of future waste rock dump by placing waste rock back into an exhausted area of the Sherwood North Pit where possible. Finally, the stripped organics and overburden will be used for progressive rehabilitation of an historical waste rock dump, and stockpiled for future rehabilitation work which is the best use of these materials.

2.4 Project Components

The proposed Project involves permitting, construction, operations, closure and rehabilitation, and post-closure monitoring activities.

Phase 1 (Humphrey Phase D) of the proposed Sherwood North Pit includes the following physical components (Figure 6):

1. An open pit mine;
2. Overburden stockpile adjacent to and east of the open pit and/or in an existing overburden storage stockpile;
3. A waste rock storage site, adjacent to and west of the open pit;
4. A haulage road to the south of the open pit, linking it with the proposed waste rock dump and overburden stockpile area(s), and existing ore delivery system and concentrator facilities;
5. Power lines connecting the existing power distribution network with the open pit area;
6. A groundwater extraction system and associated pipelines (as required); and
7. A mine surface water management system and associated pipelines, as required.

Each of these key components are discussed in the following sections.

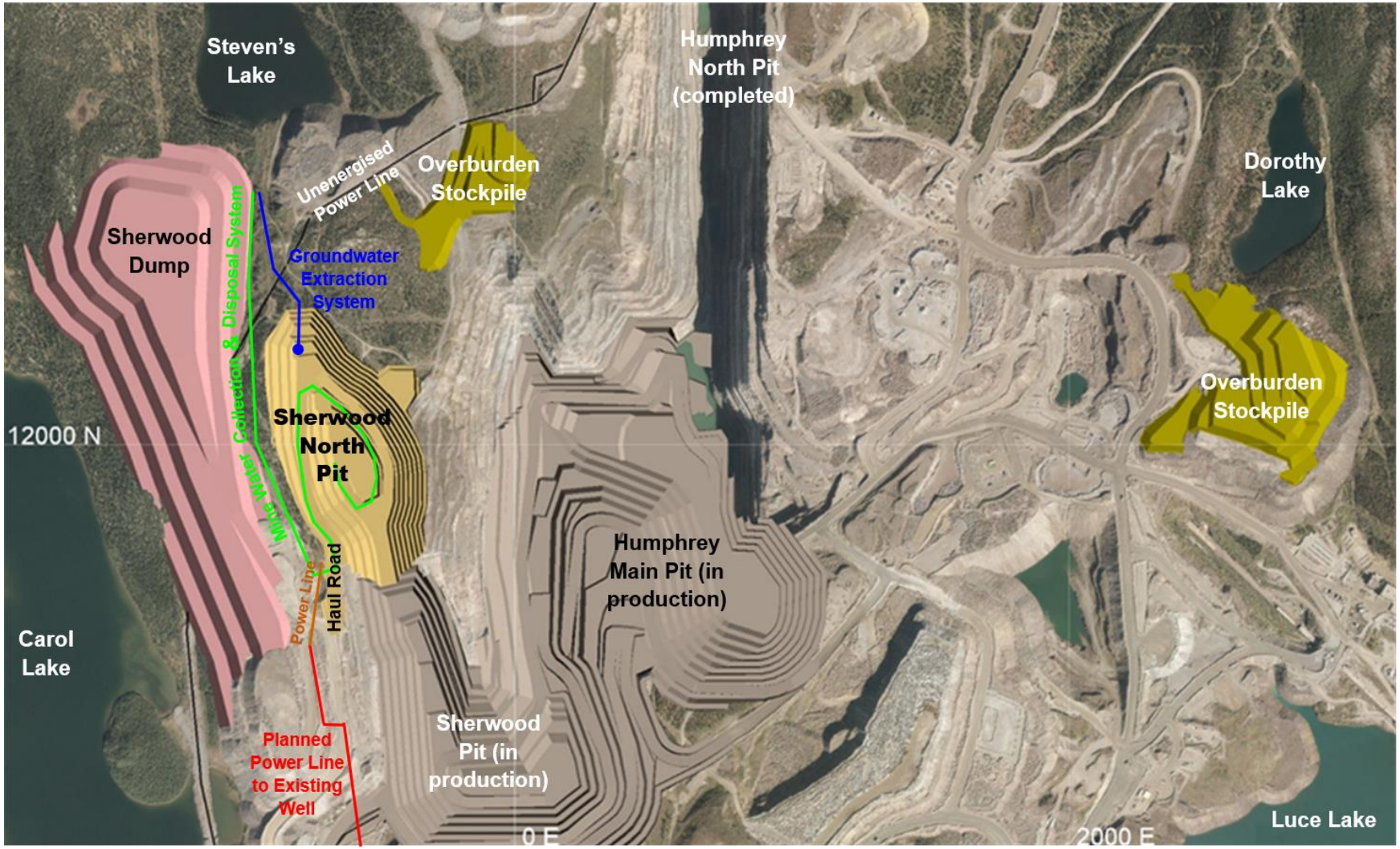

Figure 6: Overall Project Infrastructure Layout

2.4.1 Open Pit Mine

Sherwood North Pit will be a conventional open pit mine with associated components and activities, which are being designed to support flexible ore feed to IOC's existing production facilities. The Sherwood North Pit targets the north-western limb of the Humphrey Main/West/Sherwood orebody, the southern part of which is currently being exploited by IOC.

Standard open pit drilling and blasting techniques will be used to break the rock mass and allow excavation and movement of the rock materials. Waste and feed material will be separated at the dig face by the shovels and loaders with waste material being moved to the waste rock dump area and the ore transported to the mill for processing.

The proposed Sherwood North Pit has been designed for development in two phases (Phase I and 2 or Humphrey Phase D and G) (Figure 7 and 8), based on pit optimizations carried out in March 2017. These phases are part of the global phasing of the Humphrey Main pit, which has seven phases named A through G (Figure 7). Phase 1 of Sherwood North is designated as Humphrey Main, Phase D (Figures 8 and 9) and targets the outcropping ore at the northern end of the deposit. This yields the lowest strip ratio ore. A single, in-pit haulage road will access the pit at the south end, directing haulage trucks and equipment into the pit parallel to the western wall of the pit. The northern section of the pit will be mined to the final lateral limits, with the southern portion of the pit being left stepped in from Phase 2 (Humphrey Phase G) limits (Figures 8 and 10).

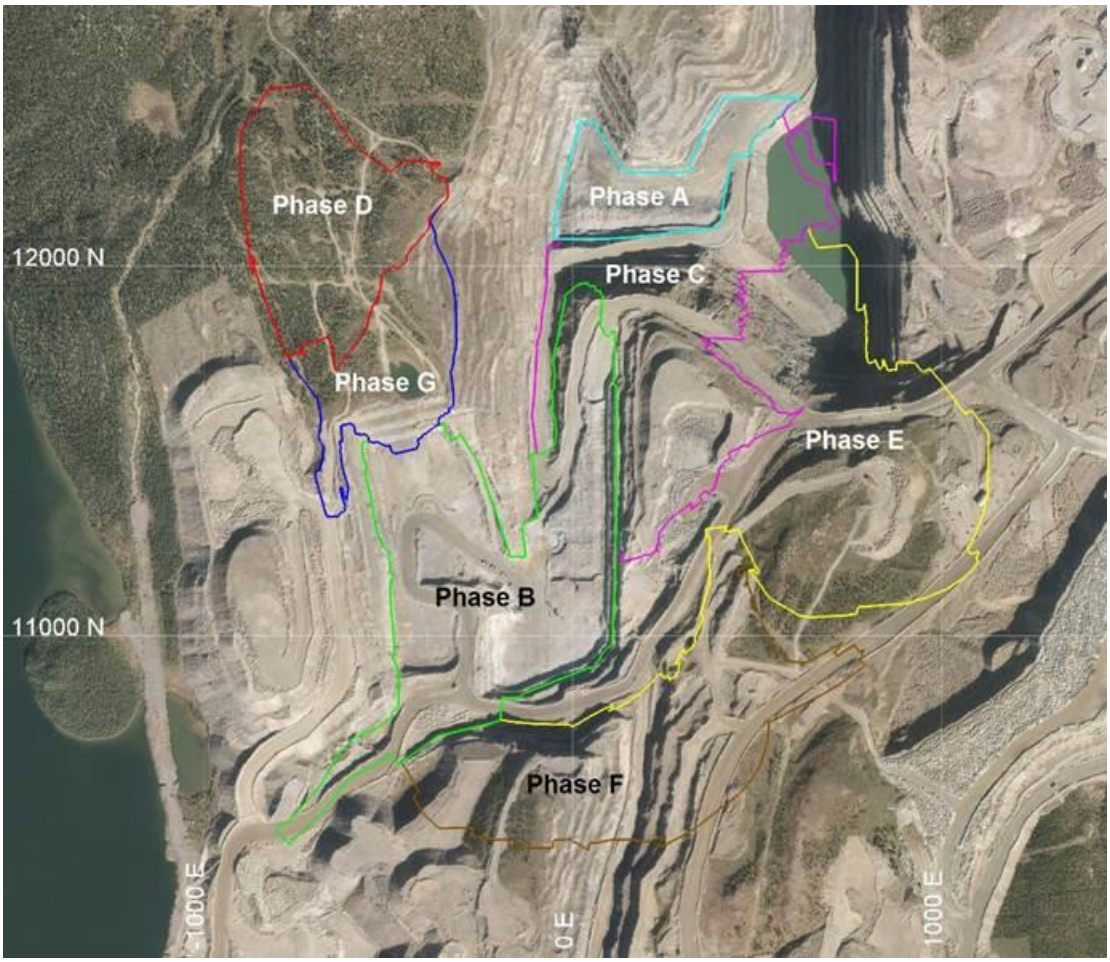

Figure 7: Phases A-G of the Humphrey Main Development

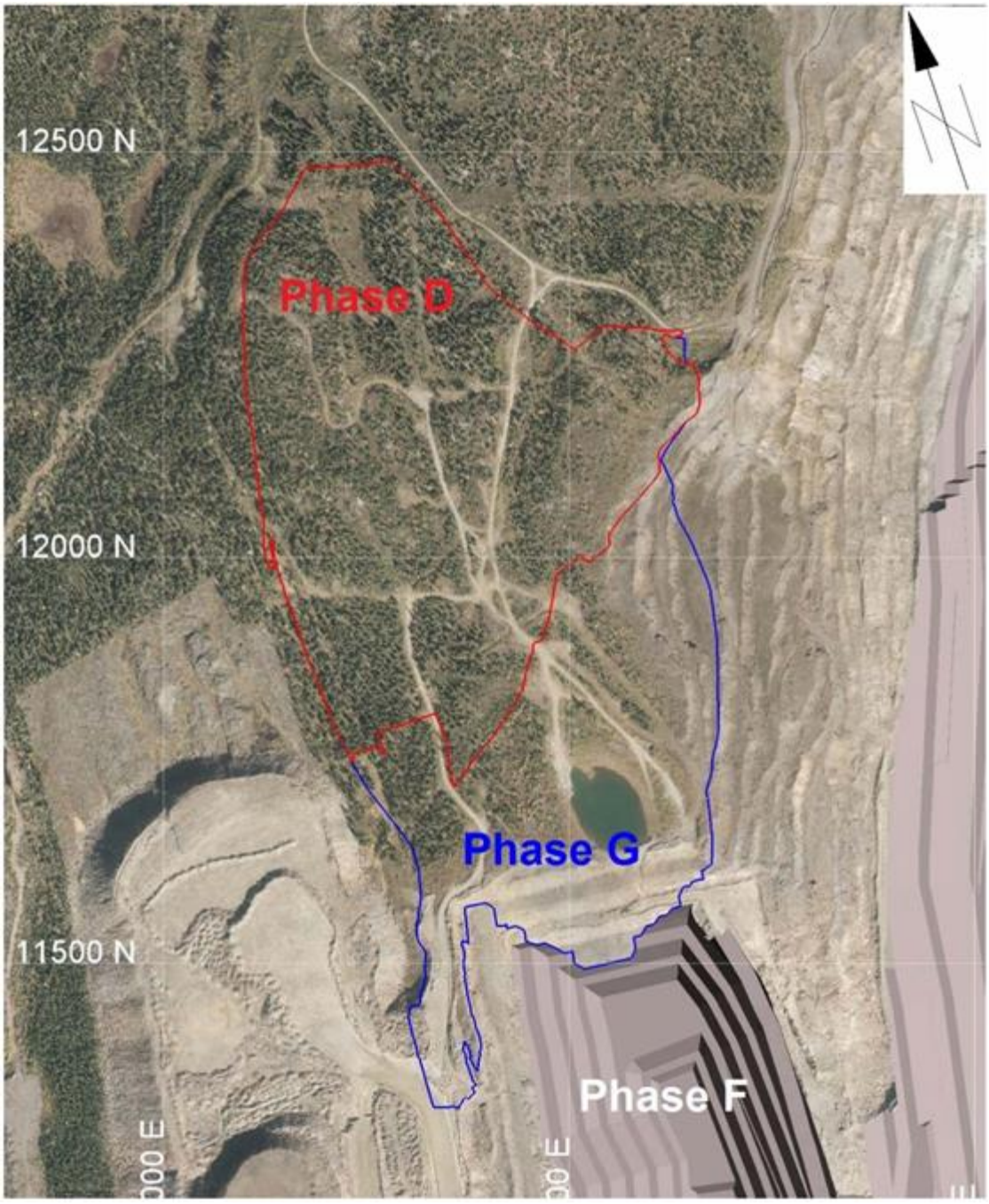

Figure 8: Phase D and G Limits

Phase 2 of Sherwood North Pit (Humphrey Phase G) develops the southern area of the pit to the full economic limit, laterally and vertically, defined by the pit optimization (Figure 10). The second phase will require a new in-pit ramp which will be switched back to the south and will run parallel to the eastern wall of pit. The east wall is pushed back to final limits, pushing the southern wall back into higher strip ratio material. The zone of limonitic waste that forms the northern limit of the Sherwood Pond pit (Phases B and F) will be removed to access less altered material at depth Figure 9).

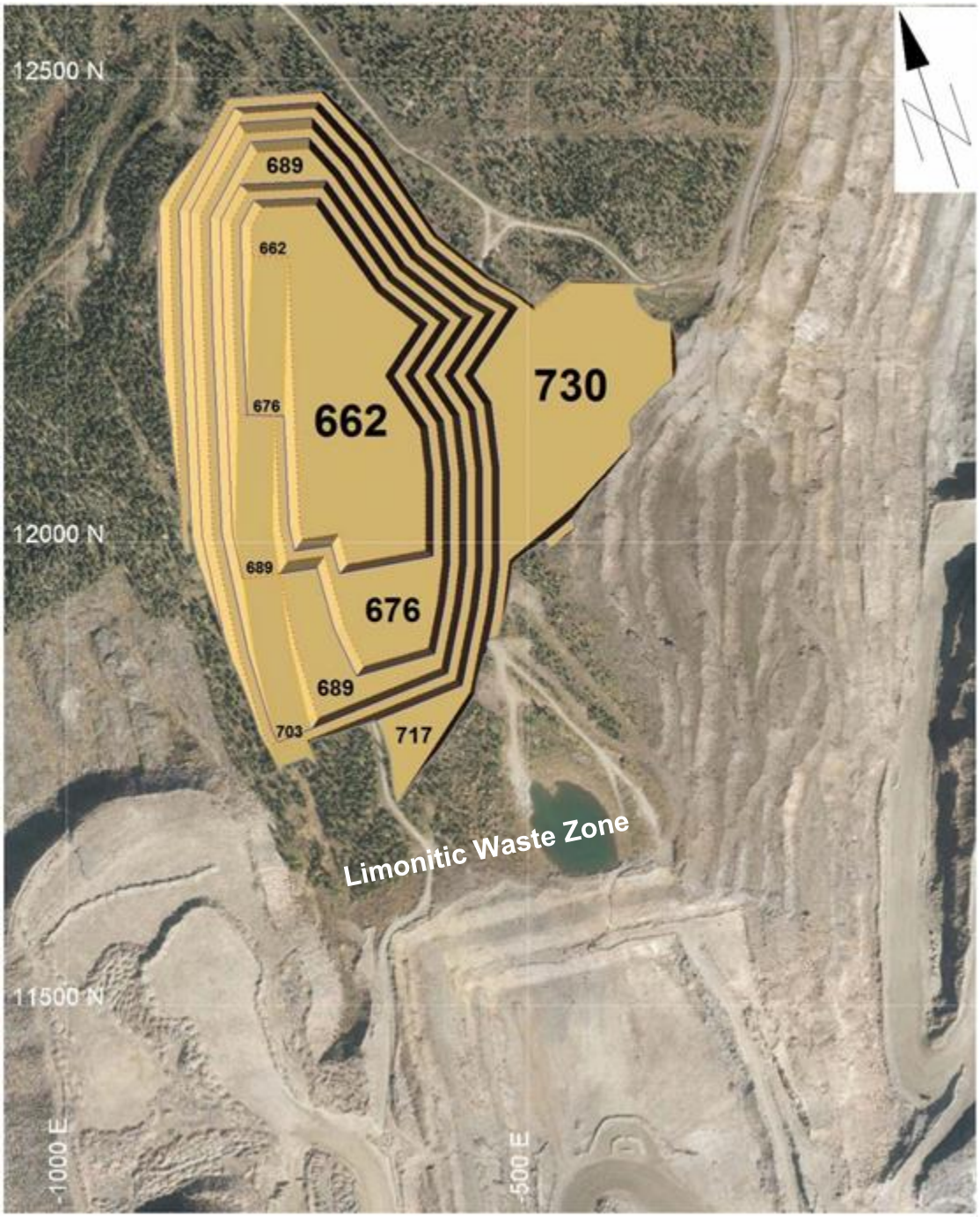

Figure 9: Sherwood North Phase 1 (Humphrey Main Phase D)

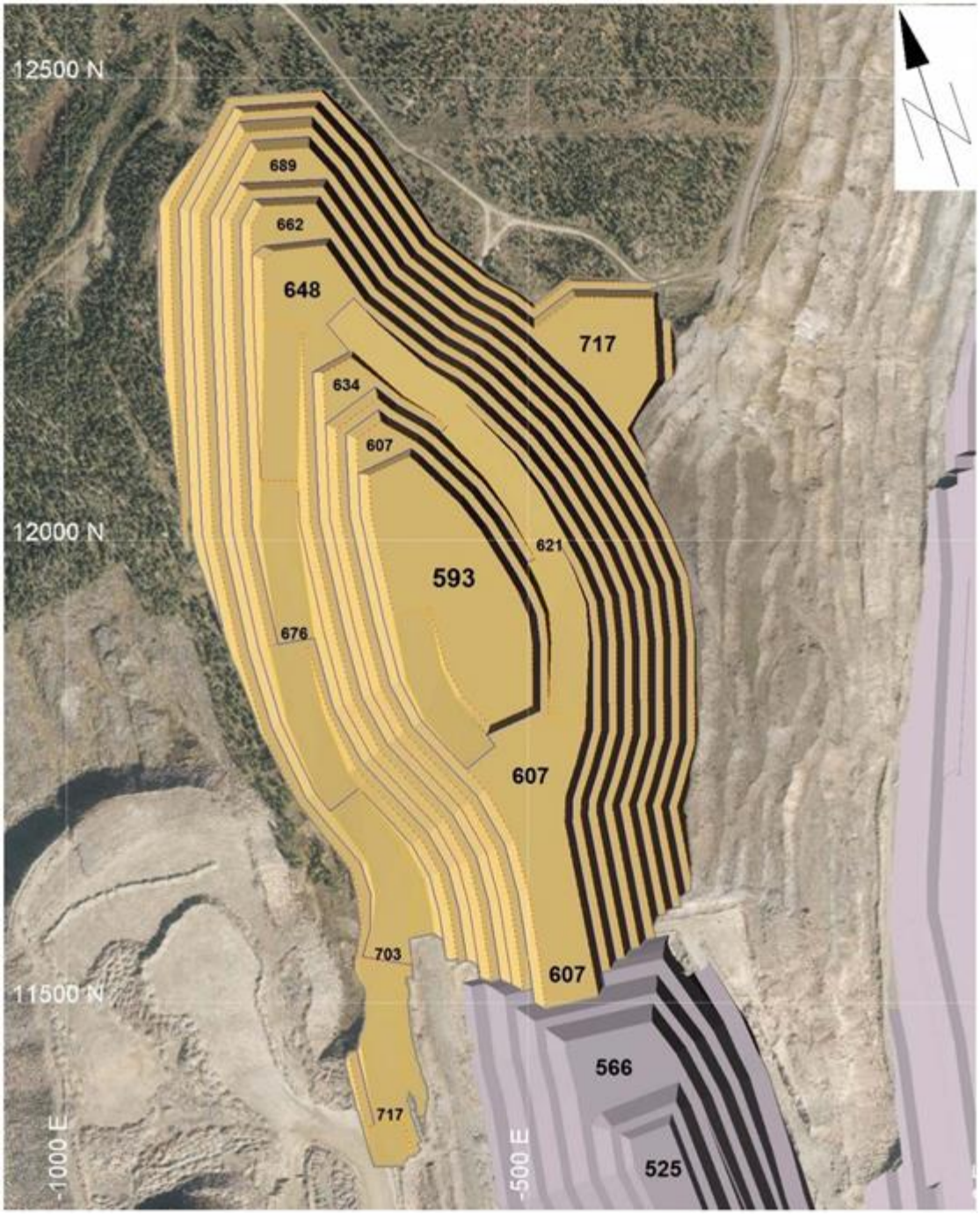

Figure 10: Sherwood North Phase 2 (Humphrey Main Phase G)

2.4.2 Overburden Handling and Storage

Prior to commencing overburden removal from both the open pit and waste rock dump areas, the site will be cleared of any brush, shrubs or trees. Trees in the area of the pit and the waste dump will be cut (if > 100 mm diameter) or mulched (if < 100 mm diameter).

The overburden from Phase 1 (Humphrey Phase D) of the Sherwood North Pit will be used to rehabilitate the adjacent Steven's Lake waste rock dump. The remainder will be hauled to a new overburden stockpile to be built adjacent to the Steven's Lake dump and/or to the existing Central overburden stockpile located 3 kilometers east of the pit and within IOC's main mining complex.

Organic rich material (peat/topsoil/mulched vegetation) in the pit area will be segregated from the underlying glacial till and either placed directly onto rehabilitation areas or stockpiled separately from the glacial till soils. The thickness of organic rich material has been assumed to be 0.2 m.

The location and design of the overburden stockpiles are shown in Figures 11 and 12.

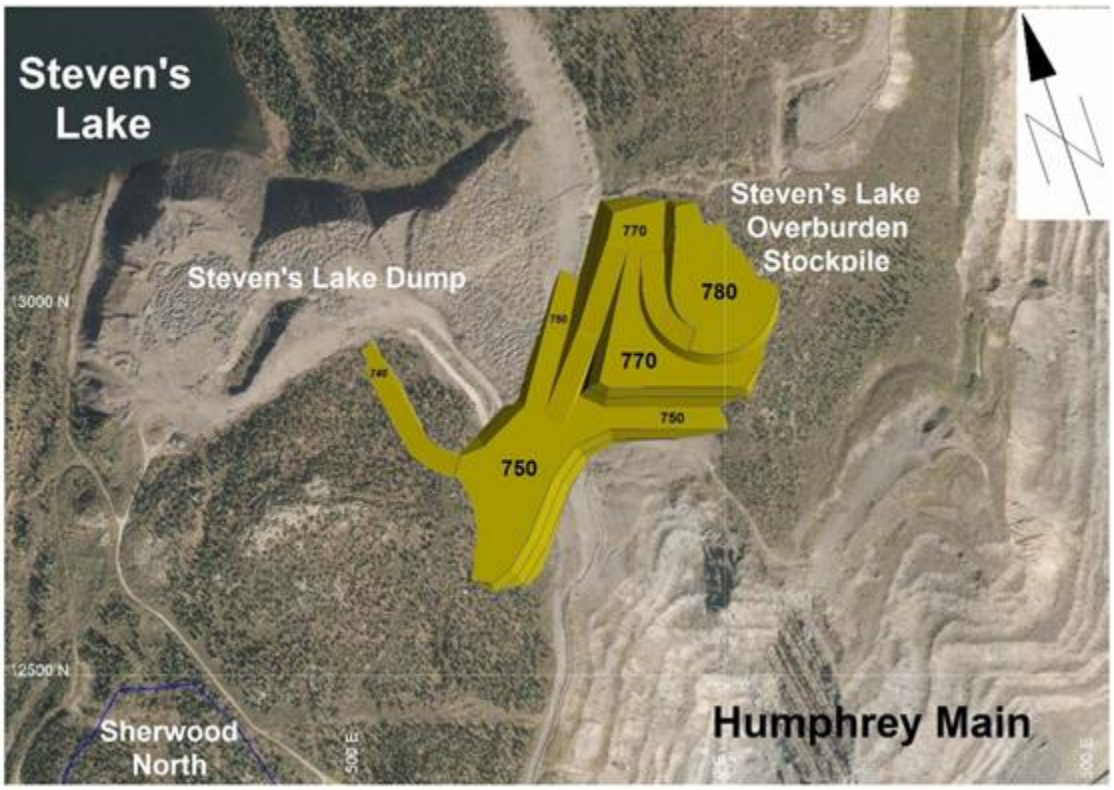

Figure 11: Steven's Lake Overburden Stockpile and Dump

Estimated overburden volumes by phase, for both the pit area (till and organics) and the waste dump area (organics only) are listed in Table 1. The overall depth of the overburden in Sherwood North has been estimated from casing depths on core drilling holes and adjusted to match depths determined from test pits dug in the project area. Overburden thicknesses determined from test pits were, in general, appreciably lower than the casing thicknesses, due to the soft nature of the

underlying alteration zones (soft/altered bedrock). Dumped material is assumed to have a 20% swell (volume increase from in-situ after excavation and dumping).

Table 1: Estimated Overburden Volumes and Tonnages

Sherwood North Pit Phase	Humphrey Main Phase	Pit Overburden		Waste Dump Organics
		Till	Organics	
		Mm^3	Mm^3	Mm^3
1	D	0.077	0.051	0.042
2	G	0.028	0.018	0.132
Total		**0.105**	**0.069**	**0.174**

The Central overburden stockpile has a capacity of 3.9 Mm^3 and the Steven's Lake overburden stockpile has a capacity of 1.5 Mm^3, both of which provide sufficient capacity for the amount of overburden associated with Sherwood North Pit.

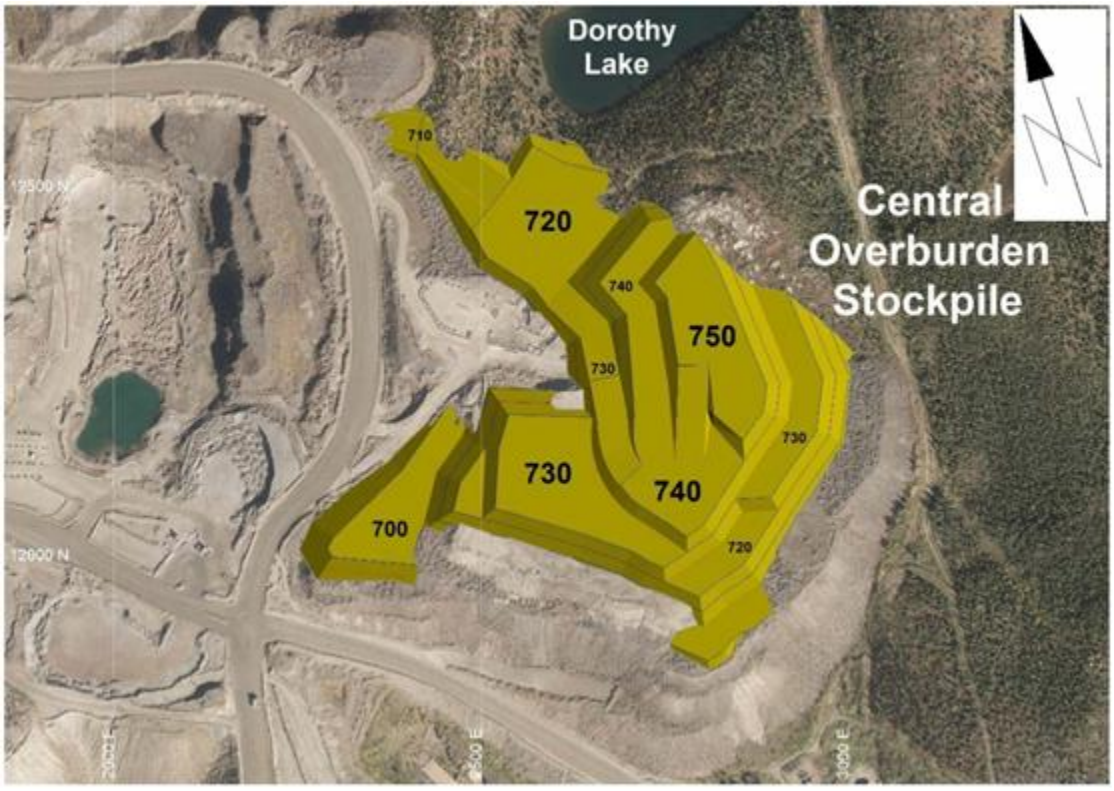

Figure 12: Central Overburden Stockpile

2.4.3 Waste Rock Disposal

Estimated waste rock volumes and tonnages by phase are listed in Table 2. The waste rock from the Phase 1 (Humphrey Phase D) will be dumped in an extension to the existing Sherwood dump to the west of the pit (Figure 13). This dump has been designed to extend up to the existing power line and has sufficient capacity to accommodate the Phase 1 waste rock.

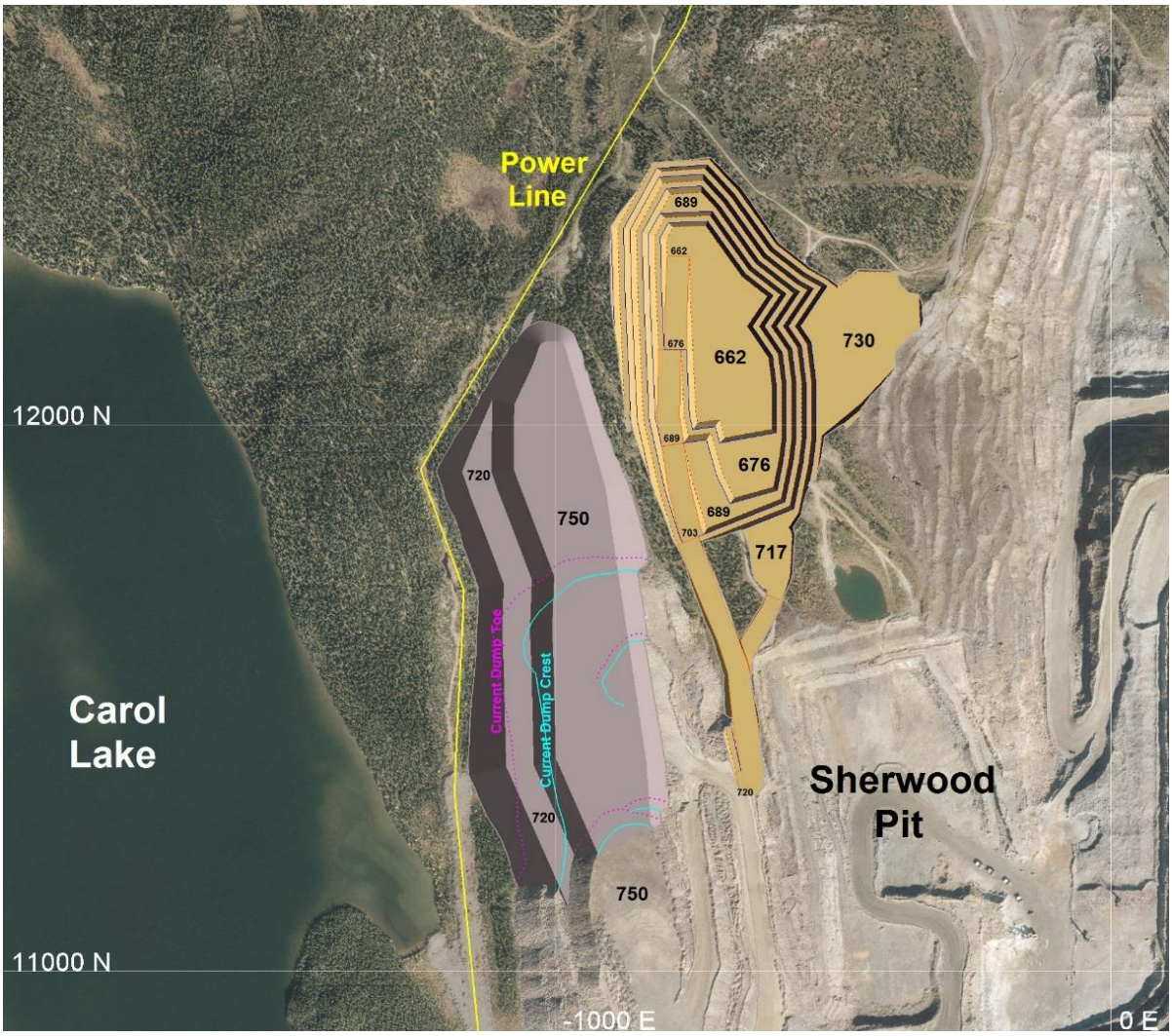

Figure 13: Sherwood Waste Rock Dump – Constrained to the Power Line

If the power line is not required beyond the Phase 1 (Humphrey Phase D) pit, the Sherwood dump could be extended further north, to accommodate the additional waste rock from Phase G (Figure 14). If the power line is required in the longer term, the Phase 2 (Humphrey Phase G) waste rock can be hauled to one of IOC's other existing permitted waste dumps.

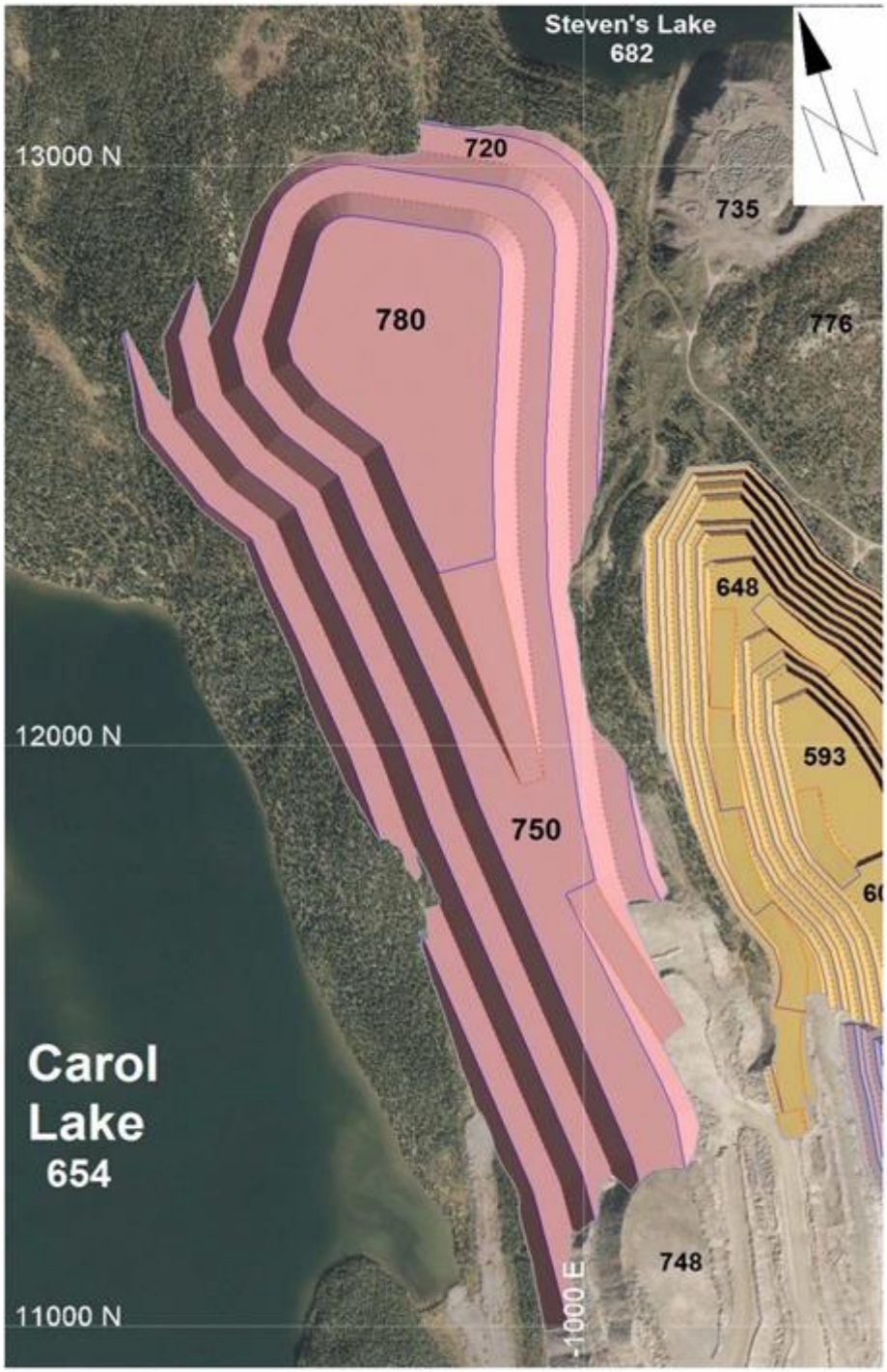

Figure 14: Sherwood Waste Rock Dump – No Power Line to Constrain

It is planned to progressively rehabilitate the western side of the Sherwood waste rock dump. Face angles will be cut back to 20^0 and overburden will be reclaimed from the stockpile and spread over the flattened faces and revegetated. There is a possibility that the completed Sherwood North Pit could be backfilled from the eastern side of the Sherwood dump.

Consequently, the eastern side of the dump will not be rehabilitated until it is clear that there will be no more waste rock dumped in that area.

Table 2: Estimated Waste Rock Volumes and Tonnages

Sherwood North Phase	Humphrey Main Phase	Mined Waste		Dumped Waste (25% swell)
		Mm^3	Mt	Mm^3
1	D	5.9	19.5	7.3
2	G	12.5	41.5	15.7
Total		**18.4**	**61.0**	**23.0**

The extension to the Sherwood waste rock dump up to the power line (Figure 13) has a capacity of 7.3 Mm^3, which is sufficient to accommodate the Phase 1 (Humphrey Phase D) pit waste rock. The extension to the Sherwood waste rock dump beyond the power line (Figure 14) has a total capacity of 27.9 Mm^3, which is sufficient to accommodate all of the waste planned from the entire Sherwood North Pit. It has been assumed that waste rock increases in volume ("swells") by approximately 25% when excavated.

A geological assessment of the portion of the Sherwood waste rock dump up to the power line has indicated that this area is unlikely to contain economic mineralization. The four holes drilled in this area have returned predominantly gabbro and the small amount of oxide mineralized iron formation intersected was fibrous and, therefore, not suitable for processing.

Further drilling is required to assess the mineralization potential of the remainder of the waste rock dump area. The dump will be phased to correspond with progressive assessment of mineralization potential. If potentially economic material is encountered within the waste rock dump footprint, either that material will be mined and fed to the concentrator, to allow the dump to progress, or the dump will be terminated before the mineralization and the remaining waste will be redirected to one of IOC's other operational waste rock dumps (probably the Carol Waste Dump). Use of a more distant dump will require the pit design to be re-optimized to account for the higher costs of the longer waste hauls. Since a number of details associated with the exploitation of Phase 2 (Humphrey Phase G) of Sherwood North Pit have yet to be finalized, IOC will ensure the Development Plan is updated as new information becomes available and as Phase 1 (Humphrey Phase D) nears completion. IOC will also consult with the GNL in order to determine if proposed Phase 2 (Humphrey Phase G) activities will require any additional review.

All trees within the waste rock dump footprint will be cut or mulched (depending on size) and all organic rich material (vegetation and topsoil) will be recovered for use in rehabilitation work.

2.4.4 Ex-Pit Haul Roads

Prior to the start of mining operations in Sherwood North Pit, an initial haul road will be developed, approximately 40 m in width, connecting the existing Sherwood Pit waste rock dump haul road with the top bench (744 mRL) of the planned Sherwood North Pit (Figure 15). The existing light

vehicle road, labeled Road to Steven's Lake Waste Dump, (Figure 15) between the planned stripping area and the Steven's Lake waste rock dump will be widened (approx. 23 m) to allow the 85 tonne haul truck to haul the overburden to the Steven's Lake waste rock dump. Clearing required for the widening of the light vehicle road will be encompassed during clearing associated with the pit and dump (Figure 19).

Figure 15: Initial Haul Road

IOC will mitigate the risk of collision between pieces of heavy equipment and light vehicles by maintaining conservative road widths and by constructing minimal intersections and switchbacks (Figure 16). There are no intersections planned for the proposed Project and only one switchback will be required out of the pit.

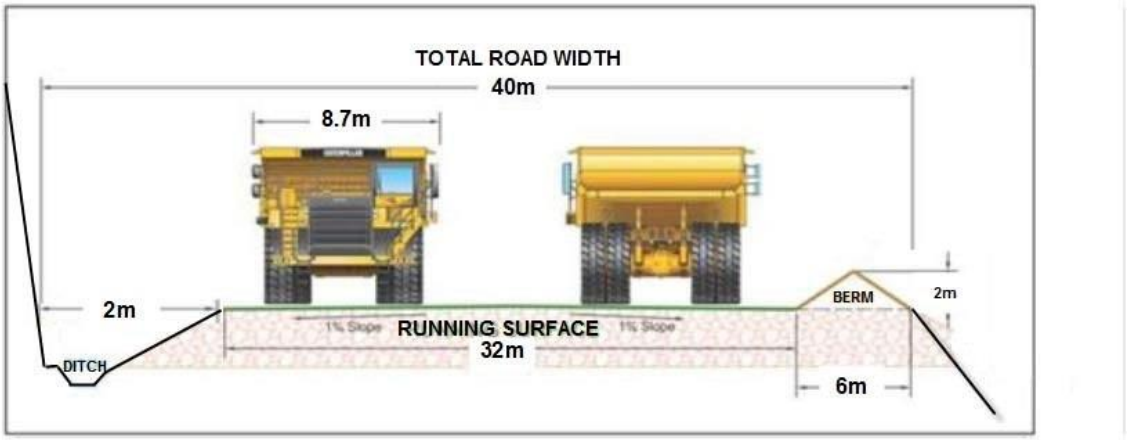

Figure 16: Haul Road Configuration

2.4.5 Power Lines

Three options exist for providing electrical power to the Sherwood North Pit (Figure 17).

An existing, un-energised power line crosses the north end of the Sherwood North Pit. Some refurbishment of this line would be required before the line could be put into use again. This line could be refurbished and re-energized to provide power to the Sherwood North Pit area from the North (Option 1), or from the South West, via the Carol Lake causeway (Option 2).

Alternatively, the existing, energised power line feed into Humphrey Main could be extended across the south of the Sherwood Pit to feed into the Sherwood North Pit (Option 3). No significant work is required for either Option 1 or Option 2 power supply options.

IOC currently plans to extend the existing power line to Humphrey Main across the south of the Sherwood Pit (i.e., Option 3) later in 2017 to provide independent power to the in-pit #11 dewatering well (Figure 19 and 20). This upgraded power supply to the well will also be available to provide power to the Sherwood North Pit, but the other two power supply options listed above are still being assessed as possible redundant power supplies.

The existing earthing grid is suitable for use with the Sherwood North Pit power distribution system.

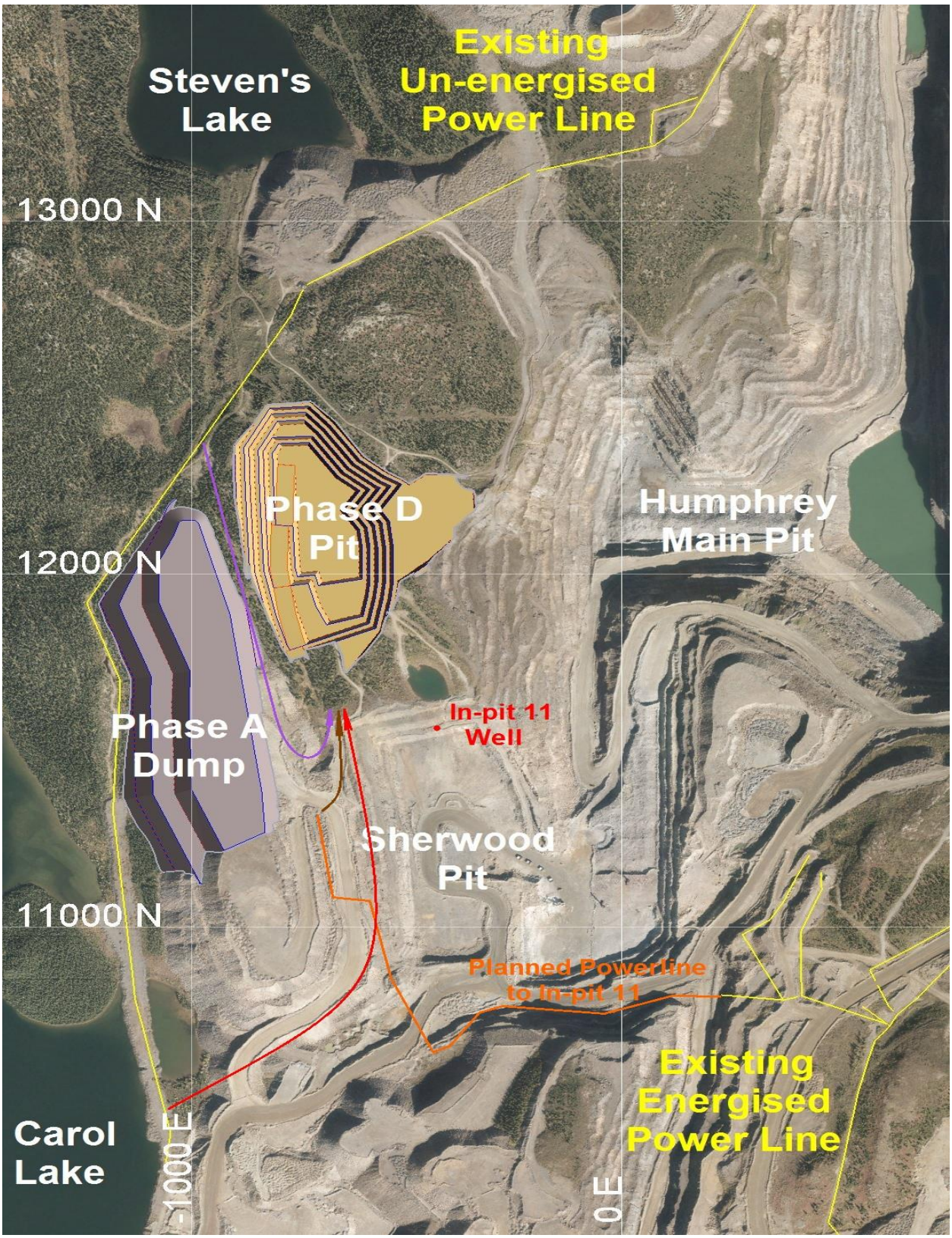

Figure 17: Power Supply Options

2.4.6 Groundwater Management

A permeable, limonite altered zone of broken ground follows the eastern (hanging wall) side of the Sherwood North Pit ore zone. An existing and active dewatering well, In-pit # 11, is currently exploiting this zone on the north wall of the existing Sherwood Pit (Humphrey Main Phase B), adjacent to the proposed Sherwood North Pit (Figure 18 and 19). The influence of this well is expected to extend far enough to the north to sufficiently lower the water table below the bottom of Phase 1 (Humphrey Phase D) of the Sherwood North Pit. It is anticipated that a new well will be required to advance dewater Phase 2 (Humphrey Phase G), partly because it will extend deeper than Phase 1 (Humphrey Phase D), and also because Phase 2 (Humphrey Phase G) will mine out the existing In-pit # 11 well. A potential location for a replacement well has been identified and this target, which is located just outside the perimeter of the Phase 1 (Humphrey Phase D) pit will be drilled and assessed later in 2017 (Figure 20). It targets the same permeable zone as the existing In-pit # 11 well. Construction of a well here will be considered if indications are that the In-pit # 11 well will not sufficiently advance dewater the area prior to the end of Phase 1 (Humphrey Phase D).

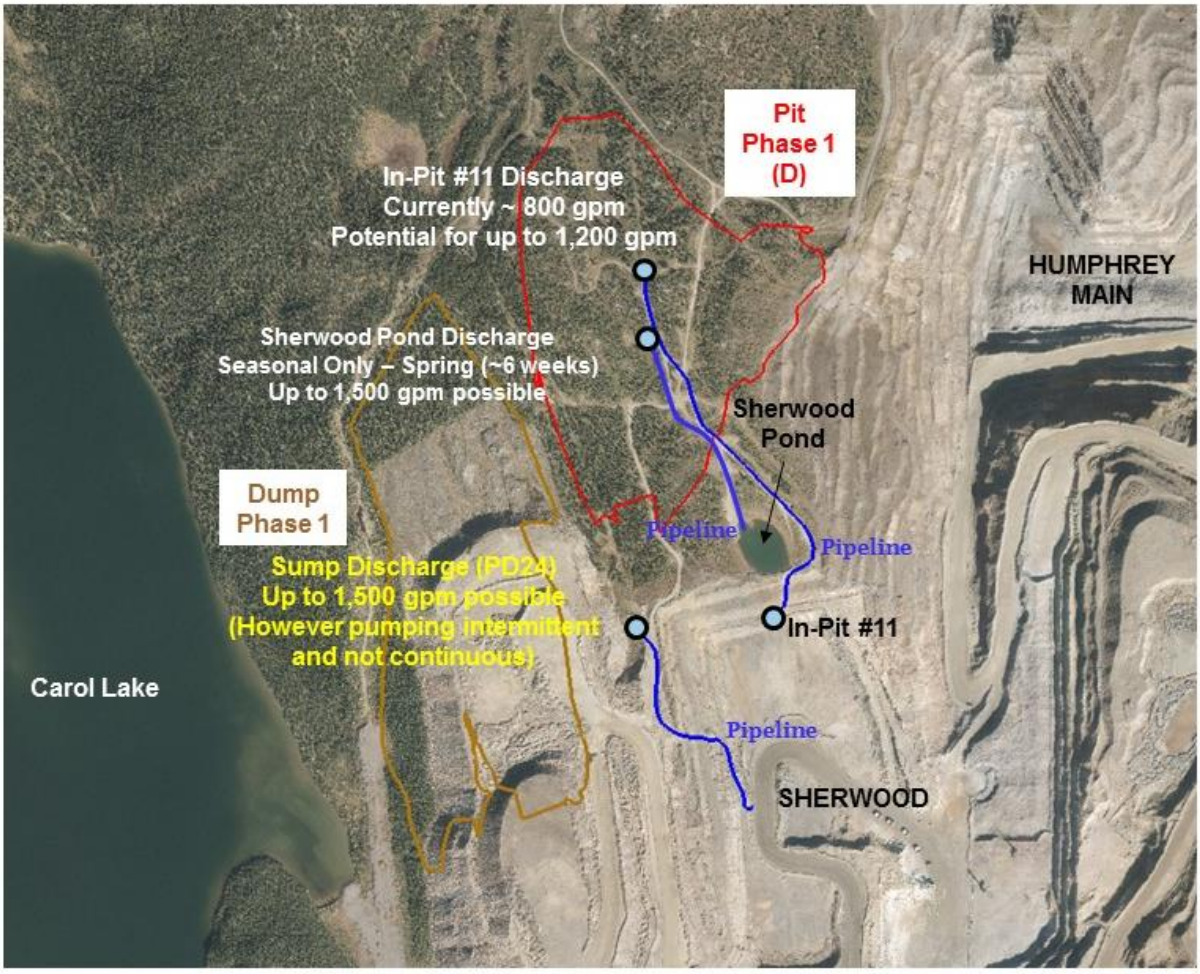

Figure 18: Current Dewatering Infrastructure

Vibrating wire piezometers have recently been installed in the Sherwood North Pit area. This will allow IOC to better understand the aquifer characteristics and will allow future groundwater pumping requirements to be better understood as the water table is influenced by the current well, (In-pit # 11). Discharge from any potential dewatering well(s) will be pumped to a discharge point within a nearby undisturbed forest. The discharge point will be a vegetated area more than 100 m from a waterbody or stream, to allow filtering of suspended solids through a natural vegetative filter, as has been successfully done in other small mining areas at IOC. Discharge points will be designed to prevent erosion. It is intended that the two discharge points (i.e., for ground water and surface water) will be located near each other, to facilitate the on-going monitoring of both discharges.

2.4.7 Mine Water Management

Precipitation and surface run-off entering the Sherwood North Pit and groundwater entering the pit via seepage through the pit walls will be captured via in-pit sumps and pumped to a discharge point in an undisturbed forested area. As indicated above, the sump discharge point will be a vegetated area more than 100 m from a waterbody or stream and the water will discharge freely from the pipe onto a prepared rock surface. The rock is sized accordingly to the flow to avoid any erosion from the discharge. These discharges are monitored to ensure that they do not destroy any vegetation or make a direct channel to any lakes or streams. Minimal in-pit groundwater seepage is anticipated during the Phase 1 (Humphrey Phase D) operations.

The mine development for Phase I (Humphrey Phase D) waste dump will stop at the existing power line. Consequently, it is anticipated that the initial discharge point will be located a short distance north of the power line (Figure 19). If the waste dump is extended beyond the power line for Phase 2 (Humphrey Phase G) development, the discharge point be progressively moved ahead of the dump development (Figure 20). The positioning of the discharge points will be selected to ensure that the discharge does not saturate the foundations of the waste dump.

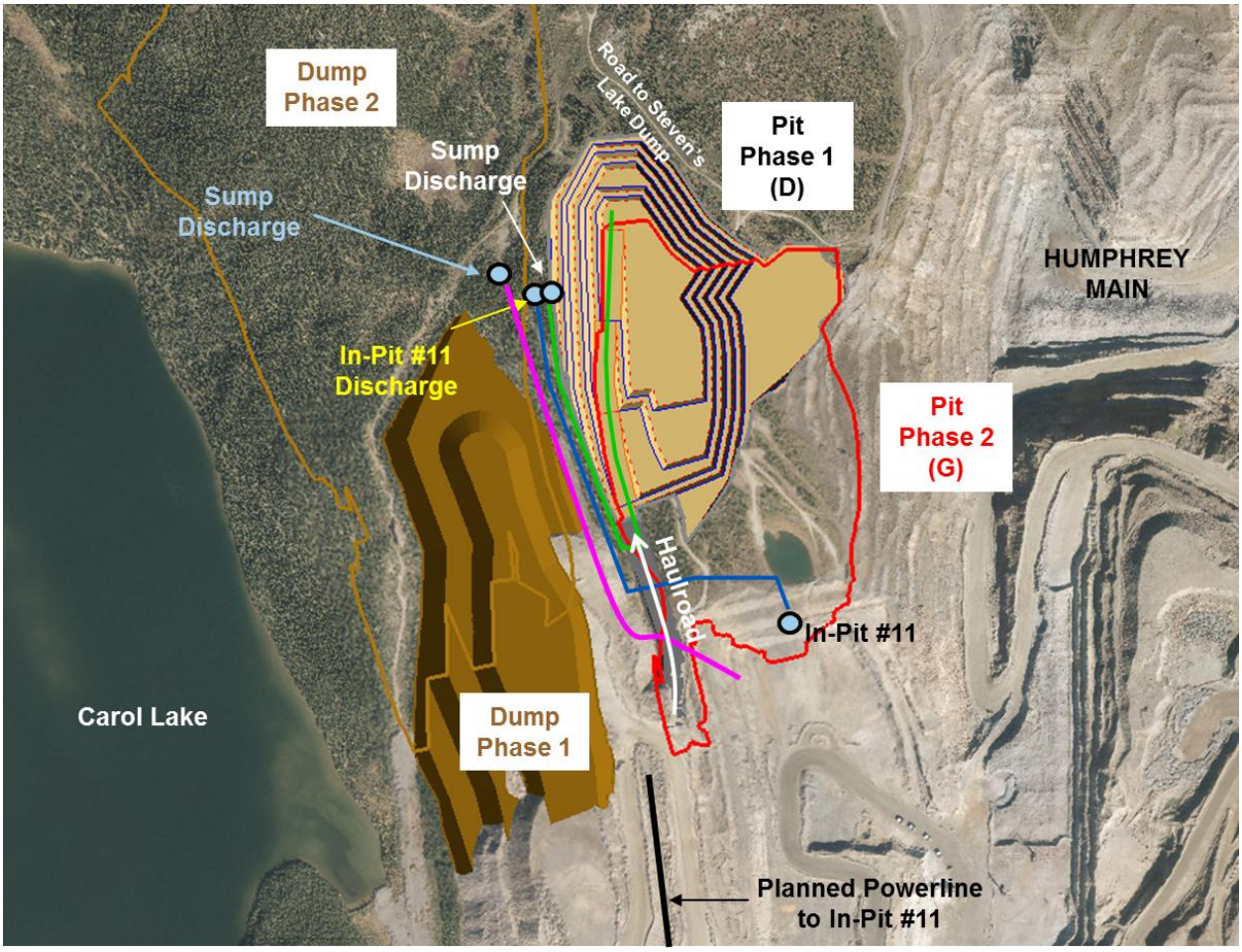

Figure 19: Sherwood North Dewatering - Phase D Infrastructure

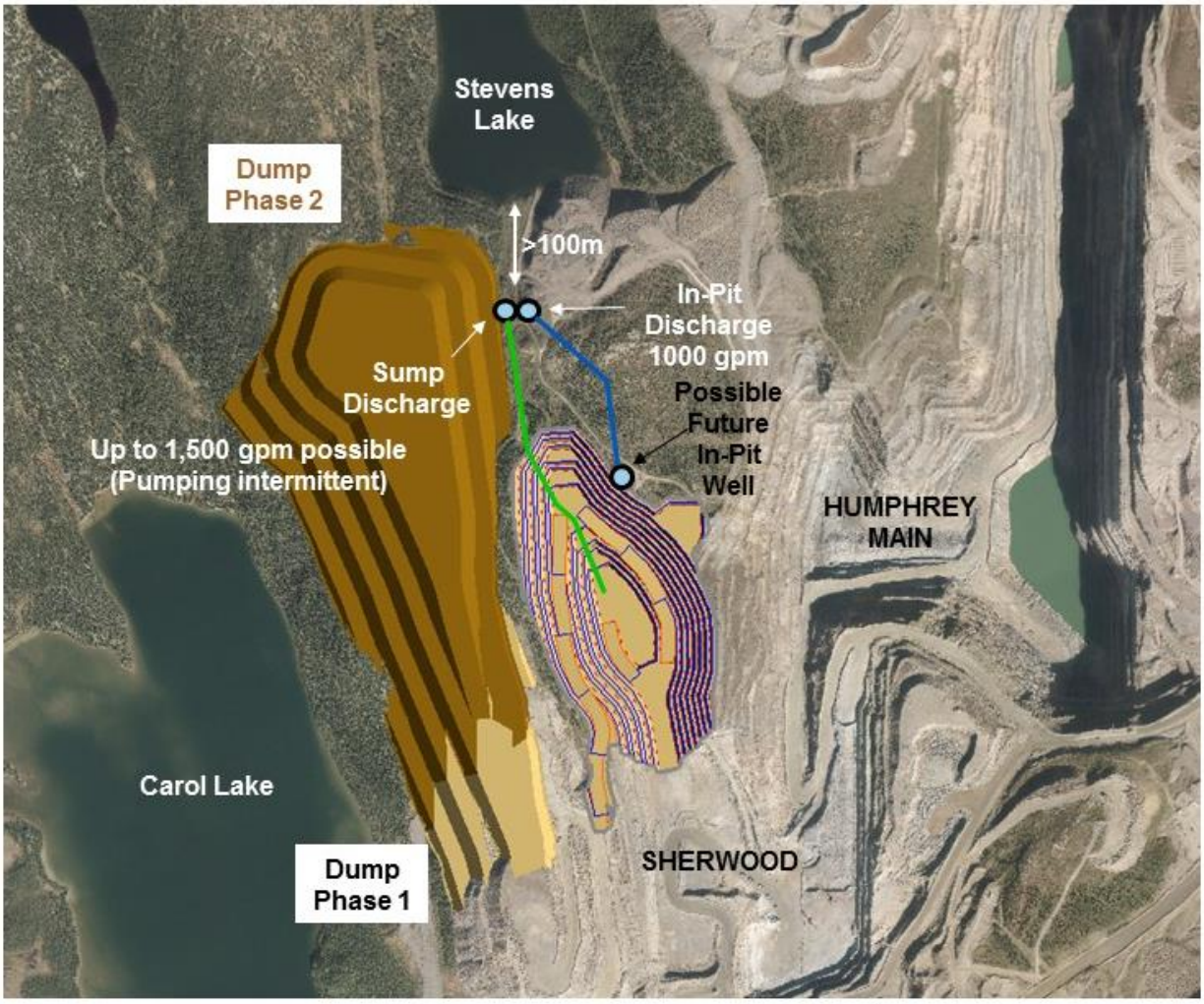

Figure 20: Sherwood North Dewatering - Phase G Infrastructure

2.5 Construction

The planned date for the start of construction activities is October 1, 2017. This date is dependent on the Minister of Municipal Affairs and Environment issuing a release decision on or around September 15, 2017. In addition, other regulatory approvals and permits are required prior to the start of construction activities. IOC will work to ensure those approvals and permits are complete and submitted to the appropriate regulators as soon as possible in order to ensure an efficient transition to the construction phase.

In preparation for overburden stripping, the top of the Steven's Lake waste rock dump (Figure 21) will be smoothed with dozers and selected slopes will be flattened to 15-20 degrees prior to the start of Sherwood North Pit development works. The flattening of slopes will minimize the potential for soil erosion and potentially decrease water stress in growing vegetation. Trees in the area of the pit and the waste dump will be cut (if > 100 mm diameter) or mulched (if < 100 mm diameter). Overburden from the pit area will be spread on the existing Steven's Lake waste rock dump and

organic rich material from the Sherwood North Pit waste dump footprint will be spread on selected areas of the waste dump. Once the overburden and organic material placement for the rehabilitation trial has been completed, the remaining material from the initial pit and waste dump development will be stockpiled on the Steven's Lake overburden stockpile and/or the Central overburden stockpile. Refer to Figures 11 and 12 for exiting overburden stockpiles locations.

Approximately 50 ha will be cleared for Phase 1 (Humphrey Phase D) and waste dump development (Figure 21), with a further 85 ha planned to be cleared for the Phase 2 (Humphrey Phase G) of development; mainly for the waste dump expansion (Figure 22).

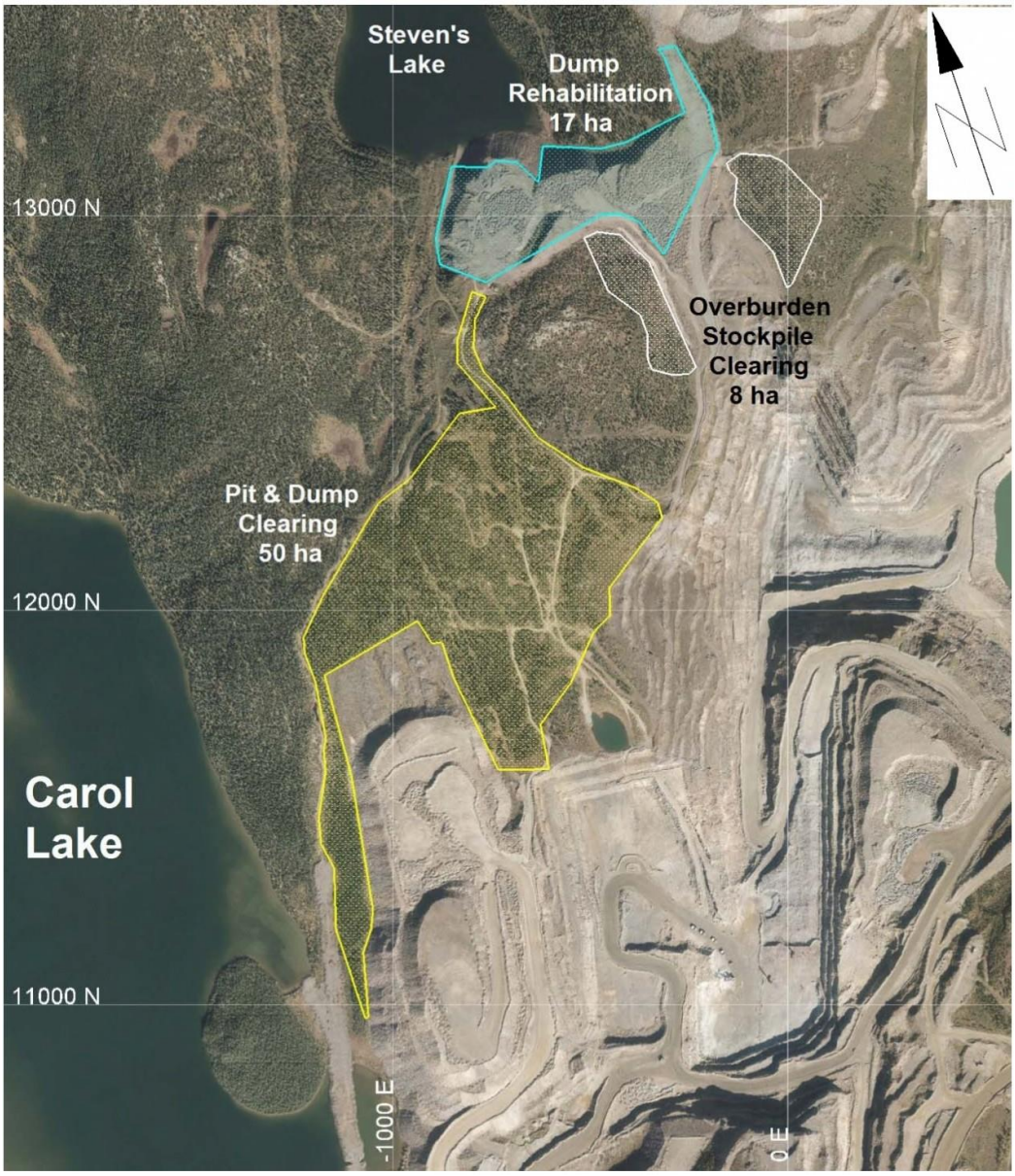

Figure 21: Initial Clearing Areas (Phase D Development)

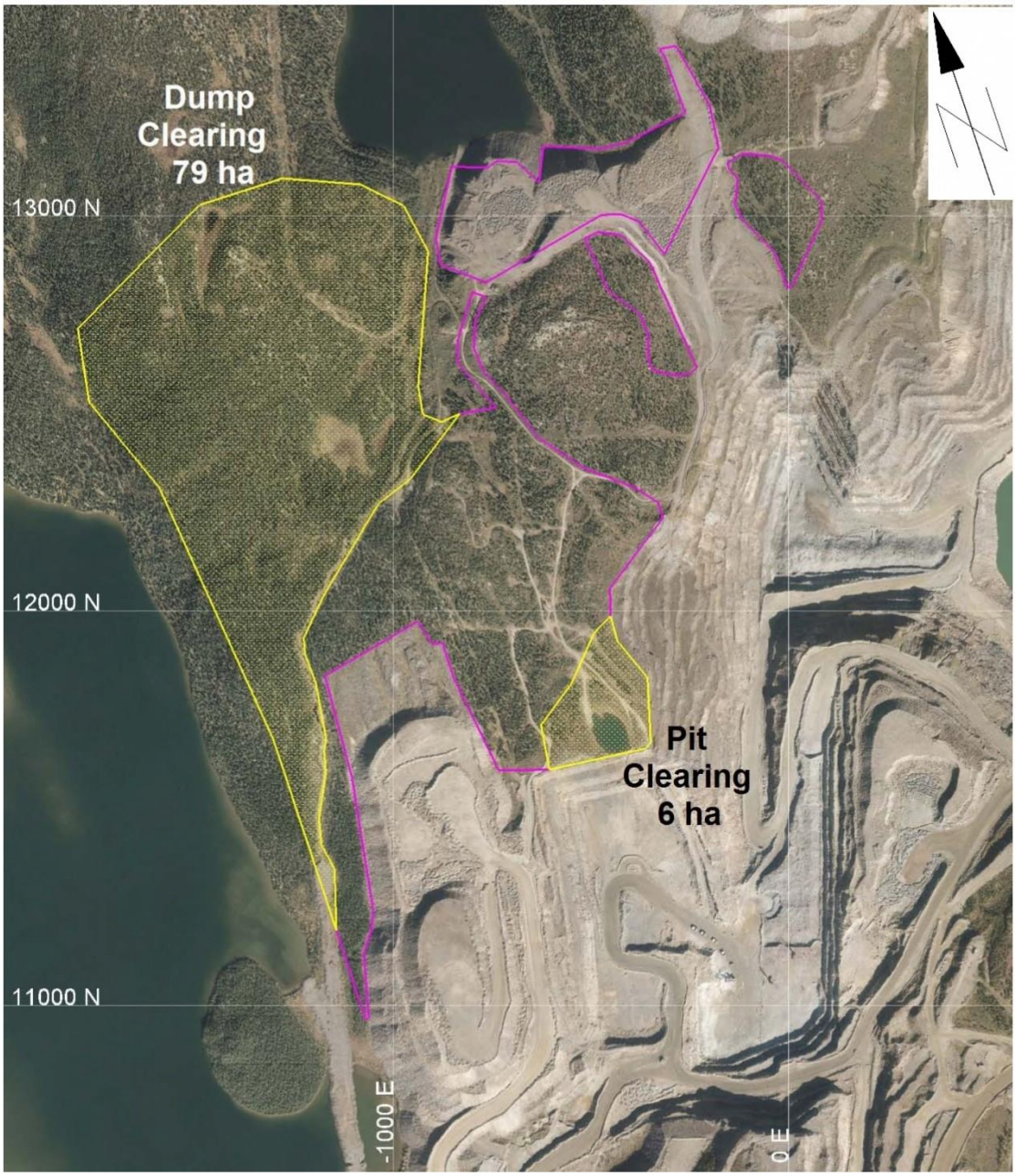

Figure 22: Second Phase Clearing Areas (Phase G Development)

Pit development drilling and blasting will follow overburden stripping in the pit area and will be coordinated by a mine contractor. The material from the top bench will be removed by the contractor fleet, to allow continuous operation of a mining shovel.

Initial development volumes (for the development of Phase 1 – Humphrey Phase D) are listed in Table 3. The clearing area listed is the planned area of pit and dump. Some of this area, however, is un-vegetated due to either rock outcrops or previous clearing (e.g., for roads or drill sites) so the actual clearing area will be somewhat less than listed below.

Table 3: Development Volumes – Phase 1 (Humphrey Phase D)

	Material	Area (ha)	Volume (kbcm)	Mass (kt)
Clearing (Pit & Dump)		**50**		
Contractor Load & Haul	**Total**		**468**	**1,323**
	Overburden		170	358
	Ore		46	164
	Waste		252	802
Contractor Drill & Blast			**2,137**	**7,274**

Prior to the start of mining operations in Sherwood North Pit, a haul road will be developed connecting the existing Sherwood waste dump haul road with the top bench (744 m RL) of the planned Sherwood North Pit (Figure 15).

Construction activities associated with the Project include the following:

1. Haulage Road construction;
2. Vegetation clearing and grubbing;
3. Overburden removal and storage;
4. Progressive rehabilitation of the Steven's Lake waste rock dump;
5. Waste rock removal and storage; and
6. Power line installation.

2.6 Operations and Maintenance

Once the Sherwood North Pit has received all required approvals, open pit mining activities will begin. Sherwood North will be operated in the same manner as all of IOC's existing pits. Contractors will be used to clear vegetation, strip organic material and glacial till and carry out the initial drilling and blasting. The contractors will also build the initial haul road and remove some ore and waste from the initial mining benches. Once the pit has been developed to the point where IOC's larger mining equipment can operate efficiently, the contractors will be replaced by IOC's mining fleet, which will be moved from other areas of the operation. Ore from the Sherwood North pit will be hauled to IOC's Automatic Train Operation (ATO) for transportation to the concentrator.

Current depth to groundwater has been determined to be approximately 60 m - 80 m below ground level. As the pit level is lowered, ongoing dewatering will be required to manage groundwater ingress, precipitation, snow melt runoff and surface runoff. The mine water management system described above will be used.

2.7 Possible Accidents and Malfunctions

Human health and safety and environmental protection will be paramount considerations by IOC in the planning and detailed design of the Project. In the construction, operation and maintenance of the Project, established safety procedures specific to human health and environmental protection will be strictly adhered to. IOC has a site wide EPP (Appendix B) whose policies and procedures will be applicable to all aspects of the Project. In addition there are comprehensive Health, Safety and Environmental Management Systems and associated plans and procedures in place for all of IOC's operations in Lab West. These will be updated as required for the proposed Project. In addition, the construction and operation of the Sherwood North Pit will be designed in compliance with relevant legislation, regulations, standards and guidelines. Emergency response and spill response procedures are captured in existing IOC plans and procedures. Potential accidental events or malfunctions that may occur include, but are not limited to, the following:

- An accidental spill of chemicals, fuels or other deleterious substances;
- A fire or explosion of equipment;
- Equipment failure; and
- Traffic mishaps.

2.8 Closure and Decommissioning

Exploitation of the Sherwood North Pit will occur in two phases. Phase 1 (Humphrey Phase D) that mines the top section corresponding to a low strip ratio is anticipated to take 2-3 years. Phase 2 (Humphrey Phase G) is not expected to be mined in the current five year plan and may not be targeted until 2060. Phase 2 (Humphrey Phase G) will be operated for the life of the resource, estimated to be 4 years, and will depend on mining rates.

IOC submitted a site wide Rehabilitation and Closure Plan for its existing mining, processing and product delivery infrastructure on July 21, 2010, which was subsequently accepted by the provincial government. An update to the site wide Rehabilitation and Closure Plan was submitted on February 21, 2017, and is still undergoing review by the NL government.

Upon completion of Phase 1 (Humphrey Phase D) operations at Sherwood North Pit, continued mine water management will be carried out as required by any regulatory requirement. The rehabilitation of the Sherwood North Pit, Phase 1 (Humphrey Phase D), will be added to the IOC's overall Rehabilitation and Closure Plan for their Labrador West operations. The estimated rehabilitation costs will be calculated and appropriate financial assurances will be put in place through the Newfoundland and Labrador Department of Natural Resources (NLDNR). The Rehabilitation and Closure Plan will also address Phase 2 (Humphrey Phase G) closure activities once those activities are better defined by IOC.

The incremental rehabilitation plan for both Phase 1 and Phase 2 of the Sherwood North Pit development (pit and dump) will comprise:

- Dismantling and removal of all powerlines, pipelines, pumps and associate facilities and removal of all material from site, in a manner consistent with the approved closure plan;

- Flattening of waste dump faces to 20 degrees or less;
- Stabilization of the abandoned pit slopes;
- Construction of a perimeter bund around the abandoned pit;
- Revegetation of disturbed areas, in a manner consistent with the approved closure plan; and
- The waste dumps will be progressively reshaped and revegetated where feasible.

The above rehabilitation prescription is consistent with the updated site-wide Rehabilitation and Closure Plan submitted to the NLDNR in February 2017.

Figure 23 shows the conceptual rehabilitated landform of the Sherwood waste dump along with the Sherwood North pit. There will be an opportunity to backfill the Sherwood North Pit, by extending the Sherwood dump to the east, particularly if the Phase 2 (Humphrey Phase G) pit is completed before the Phase F pit is mined.

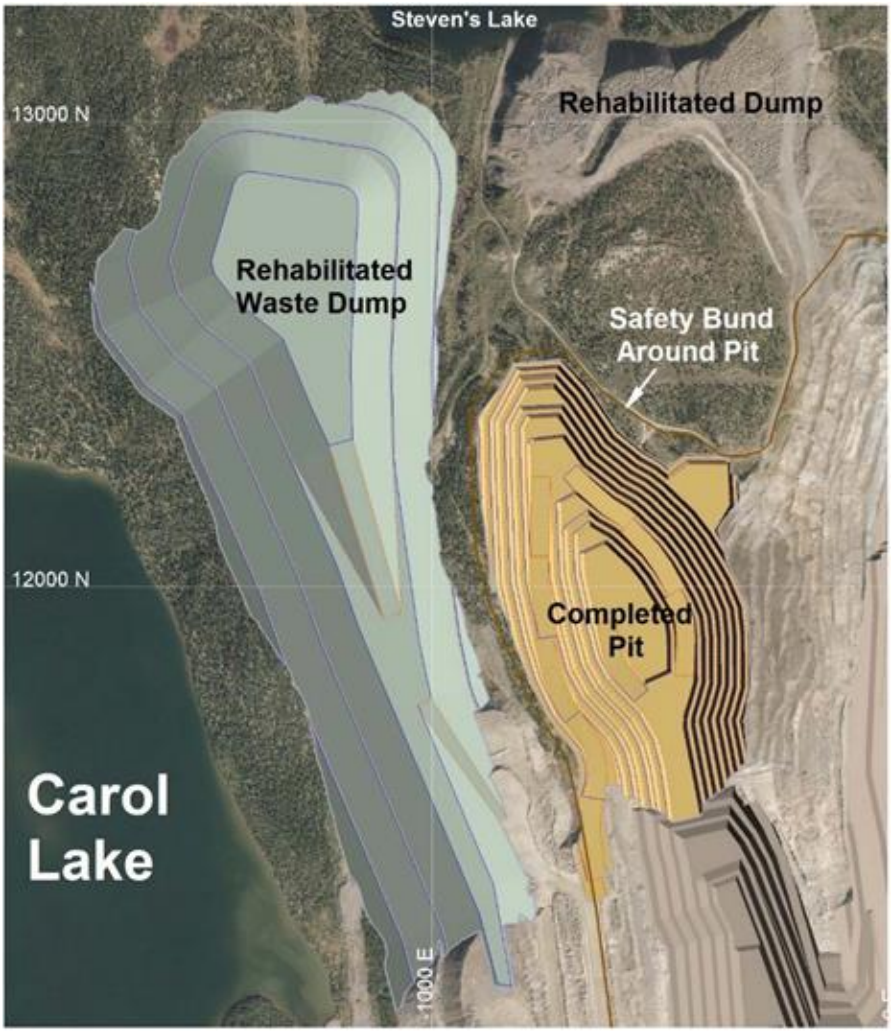

Figure 23: Conceptual Rehabilitated Project Site

2.8.1 Stevens Lake Waste Rock Dump Rehabilitation

Given the close proximity of the Stevens Lake waste rock dump to Sherwood North Pit and the availability of organic material, IOC will undertake to rehabilitate this former waste rock dump site as part of their commitment to progressive rehabilitation of their overall Labrador West site.

The top of the Steven's Lake dump (Figure 21) will be smoothed with dozers and selected slopes will be flattened to 15-20 degrees prior to the start of Sherwood North Pit development works.

Overburden removed from the Sherwood North Pit area will be spread on the Steven's Lake waste rock dump and organic rich material from the Sherwood North Pit waste dump footprint will be spread on selected areas of the Steven's Lake waste rock dump. A series of rehabilitation revegetation trials will be undertaken at this location to determine optimal species and rehabilitation techniques for IOC's Labrador West operations.

2.9 Effects of the Environment on the Project

The regional topography, climate, existing development and hydrogeological conditions primarily influenced the design of the Project. IOC is hopeful that construction activities for the Project can be advanced significantly during the fall of 2017 so that operations can begin as soon as possible. The primary anticipated impact from the environment on the Project is water inflow into the pit. No specific or special mitigation measures, beyond normal water management strategies, are proposed relative to the possible effects of the environment on the Project.

2.10 Project Reports

A number of baseline studies have been conducted which are relevant to the Project and have been referenced in this registration document. These reports are available upon request.

2.11 Project Schedule

IOC is anticipating an early October 2017 start of construction activities, assuming release from EA and the receipt of all other required environmental approvals and permits. Open pit mining operations would follow as soon as pit construction activities are completed, by January 2018. Refer to Table 4 for brief schedule outline of the development phase of the Project. The operations component of Phase 1 (Humphrey Phase D) will last two to three years. Phase 2 (Humphrey Phase G) will last four to five years, but, as indicated above, there will be a delay of uncertain duration between the two phases. Closure and rehabilitation of the site will take place after the completion of the second phase.

Table 4: Development Schedule as of July 2017

Activity Name	2017										2018		
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
EA Release													
Kick-off meeting with Contractor, and mobilisation													
Tree Clearing / Mulching													
Roadway construction for overburden haulage													
Overburden Stripping													
Drill and Blast, bench access development													
Pipeline Installation													
Powerline Refurbishment													
Contractor demobilisation													
Mining shovel commences production													

2.12 Environmental Management and Protection

The proposed Project would be constructed and operated as part of on-going and long-standing work associated with IOC's Labrador West operations. The company has in place a comprehensive HSEMS and associated environmental plans and procedures for its development and operational activities. These have been developed and are being implemented and continuously updated in accordance with its corporate Health, Safety, Environment and Quality Policy (Appendix A), other relevant corporate requirements and guidelines, and with a view to meeting, and seeking to surpass, the provisions of applicable legislation and regulations.

As part of its existing systems and processes, IOC has in place a comprehensive EMS including various associated plans and procedures designed to avoid or reduce the environmental effects of its activities. The proposed Project will be constructed and operated in accordance with applicable legislation and regulations, including the environmental protection and planning measures defined through this EA review, and in compliance with IOC policies, procedures and standards.

Table 5 provides a list of some of IOC's existing environmental plans for its Labrador West development activities and operations. A review and updating of these and other existing procedures will be carried out as Project planning and implementation progress, including the

incorporation of the proposed Project activities into IOC's overall integrated management system.

Table 5 Select IOC Environmental Management Plans

Title of Plan
Contaminated Soil Management
Spills of Toxic or Hazardous Materials
Environmental Reporting
IOC Lab City – Operational and Development Environmental Protection Plan
Hazardous materials and non-mineral waste control and minimization
Water Quality Protection and Water Management Standard
Land and Watercourse Disturbance Permits
Land Disturbance Control and Rehabilitation Standard
Spill Response Reporting

2.12.1 Environmental Protection Plan

Environmental protection planning is an integral part of IOC's construction, operations and maintenance programs. As a corporation with significant experience in constructing, operating and maintaining mining related infrastructure and activities in Labrador West and elsewhere, IOC has proven policies and procedures related to environmental protection and management which will be implemented during the construction and operation of the Project.

An EPP is an important tool for consolidating project-specific environmental information and procedures in a format that provides sufficient detail for the implementation of environmental protection measures in the field. An EPP provides concise instructions to personnel regarding protection procedures and descriptions of techniques to reduce potential environmental effects associated with a specific construction or operations activity.

IOC has developed and implemented a site wide EPP for its Labrador West mining activities. This EPP has been updated to reflect components and activities associated with construction and operations at the proposed Sherwood North Pit.

The EPP includes procedures and measures relative to activities such as vegetation clearing, grubbing, storage and handling of fuel, blasting, quarrying, dust control, waste and sewage disposal, work in or near water, as well as contingency plans for unplanned events such as spills, rehabilitation and compliance monitoring. A copy of IOC's current site wide EPP is included in Appendix B.

2.12.2 Emergency Response and Reporting Plan

IOC proactively identifies potential emergency situations and develops Emergency Response and Reporting Plans (ERRP), the purposes of which are to identify responsibilities and procedures in the event of an unplanned incident, such as an incident that may affect human health or safety, or the accidental release of hazardous material, and to provide the information and procedures required for the effective response and reporting of such an incident.

There are comprehensive incident prevention, response and reporting plans and procedures in place for IOC's overall Labrador West mining operations.

IOC has established a Business Resilience and Recovery Program (BRRP) that has identified high emergency risks and has developed detailed plans to mitigate. The BRRP is to ensure that the appropriate resources and incident response plans are prepared, practiced and available. The plans provide an effective response for the mitigation, control and recovery from incidents which can affect or disrupt the business at IOC. Activities associated with the Project will be evaluated under BRRP. The BRRP is routinely tested and audited to ensure it meets the ongoing needs of IOC.

2.13 Other Required Environmental Approvals

In addition to approval under the provincial EA process, the proposed Project may require a number of other permits and authorizations. IOC will obtain all required permits.

3.0 Environmental Baseline

The sections below provide an overview of the existing biophysical and socioeconomic environments for the proposed Project.

3.1 Natural Environment

The area surrounding the Sherwood North Pit is an area that has been affected by IOC's mining operations for the past five decades. Many components of the natural environment have been affected by this previous work to varying degrees.

3.1.1 Atmospheric Environment

Iron ore mining forms the industrial base for the Towns of Labrador City and Wabush and is the main industry affecting the quality of the local atmospheric environment. Releases of air contaminants are generally classified into criteria air contaminants (CACs) and greenhouse gases (GHGs). CAC's are a set of criteria pollutants that cause smog, acid rain and other health hazards, and include particulate matter (PM), sulfur dioxide (SO2), nitrogen oxides (NOX), and carbon monoxide (CO). Table 6 provides a list of typical sources of CAC emissions from iron ore operations.

Table 6: Iron Ore Mining Sources of CAC Emissions

Source of Emissions	Type of Emission
Use of large trucks and excavators to mine iron ore	Particulate, NO_2, SO_2 and CO
Blasting	Particulate, NO_X and SO_2
Fugitive emissions from active quarries and tailings piles	Particulate
Rock crushers	Particulate
Concentrator Plants	Particulate, metals, NO_2, SO_2 and CO
Pelletizing Plants	Particulate, metals, NO_2, SO_2 and CO
Transport – Rail	Particulate, NO_2, SO_2 and CO
Use of smaller service trucks onsite	Particulate, NO_2, SO_2 and CO

Mining operations at IOC are typical of other open pit mining operations in the area. Blasting is conducted to free the crude ore by drilling holes into the rock and filling them with emulsion explosives product. Ore and waste rock are mined using large front end loaders and electrical shovels. Haul trucks, the automatic train operation and the overland conveyor system transport the rock to the primary crushers. The ore is reduced in size in the crushers and then sent to the concentrator where it is ground to a fine sand size to separate the iron ore from the waste or tailings. The tailings are slurried and piped to the tailings disposal areas. At IOC, a portion of the concentrate is pelletized with additional grinding and drying in a furnace. Pellets and concentrate are loaded and transported by rail to Sept Îles for export.

The main contributor to negative air quality at IOC's Labrador West operations is the pelletizing operation. IOC has improved the air quality of their operations over the past 20 years through pollution abatement projects. There has also been a large reduction in particulate emissions with the replacement of dry mill processes with wet grinding mills.

Air Quality Monitoring

IOC maintains three air quality monitoring stations at their Labrador West operations that are in close proximity to the local community and to recreational facilities (Figure 24). Data from these monitoring stations is compiled by the Newfoundland and Labrador Department of Municipal Affairs and Environment (NLDMAE) and the results compiled and published in annual Air Quality Reports. These reports can be viewed at the following web address:

http://www.mae.gov.nl.ca/publications/env_protection/2016%20Air%20Quality%20Annual%20Report.pdf

Figure 24: Air Quality Monitoring Stations at Labrador West Operations

Results from the 2015 and 2016 monitoring programs indicate no exceedances of SO_2, NOX, or $PM_{2.5}$ at any established monitoring locations. IOC believes that given the distance of the Sherwood North Pit from both Labrador City and Wabush, there are unlikely to be any negative effects to the air quality data during construction or operation of the Sherwood North Pit. Air quality monitoring will however continue and the data analyzed in order to verify these predictions. No new or modified air quality monitoring/modeling is planned given the results of on-going air quality monitoring and also given the distance of the proposed Sherwood North Pit from residential areas (Figure 25).

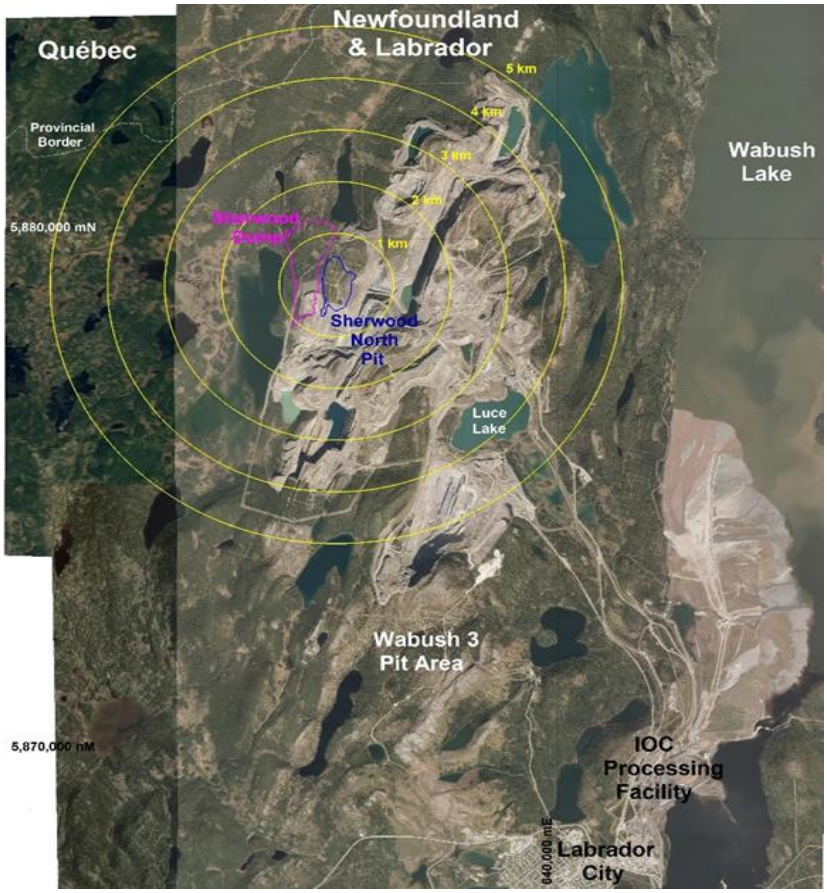

Figure 25: Sherwood North Pit Relative to the Town of Labrador City

Fugitive Dust

IOC has continued efforts to carry out annual rehabilitation and revegetation of inactive sections of their TMF and this has led to large reductions in fugitive dust. IOC has also installed a dust suppression system to mitigate the fugitive dust in the pellet plant loadout area. Mitigations such as regular road watering also contributes to significantly reducing fugitive dust levels at the mine site and in the neighboring Towns. All applicable mitigations will be implemented as necessary, during development and operations of the Sherwood North Pit.

Greenhouse Gas Emissions

GHGs including carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) can be emitted from a number of natural and anthropogenic sources. The 2015 total Newfoundland and Labrador GHG's expressed as carbon dioxide equivalent (CO_2 eq) is 10.3 Mt CO_2 eq (Environment and Climate Change Canada 2015), an increase of 2.1 % from the 2005 level. On average, normal IOC Carol operations (mining, transport, processing) produce approximately 1.0 Mt CO_2 eq annually, which account for approximately 10% of the CO_2 eq emissions for the province.

The 2015 total Canada GHG's expressed as CO_2 eq is 722 Mt, a decrease of 2.2 % from the 2005 level (Environment and Climate Change Canada 2015). A comparison of the total CO_2 eq

emissions for Canada with CO_2 eq emissions from the existing IOC operations indicates that IOC emissions represent approximately 0.14 % of the CO_2 eq emissions for Canada.

Since both construction and operations activities associated with Sherwood North Pit will utilize existing equipment and employment resources, and no net increase in ore production is anticipated, no additional GHGs will be produced as a result of this new development.

Noise and Vibration

IOC has established noise and vibration monitors in the Labrador City area to monitor noise and vibration from blasting operations (Figure 26). These monitors will continue to record data from IOC's Labrador West blasting operations, however, given the distance of the proposed Sherwood North Pit from recreational and residential areas, it is highly unlikely that any negative effects will be felt at these locations as a result of proposed activities at the Project site.

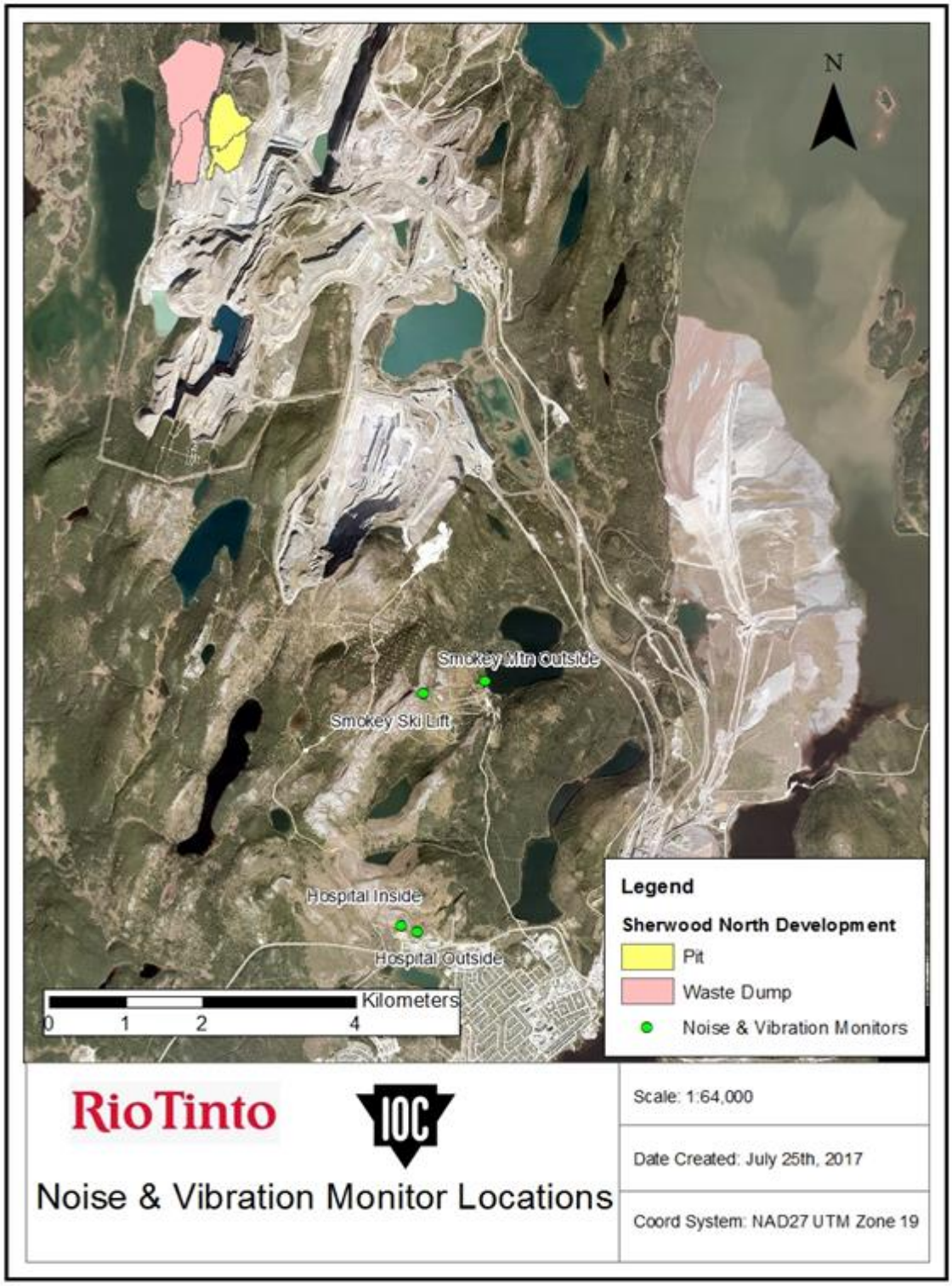

Figure 26: Noise and Vibration Monitor Locations

3.1.2 Regional Climate

The Sherwood North Pit is located in Western Labrador, within IOC's existing Labrador City mine site. The site is located within the extensive *Mid Subarctic Forest* ecoregion (Meades 1989; 1990), which encompasses the upland plateaus of central and western Labrador. This area has a continental, subarctic climate with cool, short summers and long cold winters. At Wabush Airport daily average temperatures range from - 22.7 ^{o}C in January to + 13.7 ^{o}C in July, with 482.6 mm of rainfall and 445.7 cm of snowfall per year and prevailing westerly winds (Environment Canada 2004).

Climate information for the Project area presented in Table 7 is based on data recorded from 1981-2010 at the Wabush Lake Airport climate station (Environment and Climate Change Canada 2016). The Project area, at an elevation of 820-840 MASL, is located approximately 8 km northwest of the Wabush Airport, which is located at an elevation of 551 MASL.

Table 7: Wabush Airport Climate Normals (1981-2010)

Parameter	Unit	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Rainfall	mm	0.6	1.6	2.6	12.1	40.4	80.6	113.9	103.4	92.3	42	10.9	2.5	502.9
Snow	cm	63.8	50.9	65.9	44.3	14.4	2.1	0.0	0.1	4.4	39	77.5	66.2	428.7
Precipitation	mm	49.2	40.3	54.1	48.8	53.5	82.7	113.9	103.5	96.5	75.7	70.9	50.4	839.5
Average Temperature	o C	-22.2	-20.6	-13.3	-4.3	4.0	10.3	13.8	12.5	7.6	0.5	-8.2	-17.5	-3.1

Source: Environment and Climate Change Canada http://climate.weather.gc.ca/climate_normals/results_1981_2010

The average monthly temperature in the area is -3.1°C. The average monthly temperature range from October to April is 0.5 to -27°C and 4.0 to 7.6°C from May to September. (Environment and Climate Change Canada 2016).

Monthly precipitation from May to September ranges from 53.5 to 96.5 mm and monthly average snowfall ranges from 42 to 75 cm in the winter months. Almost half of the annual precipitation falls in the June to September period.

3.1.3 Geology and Topography

The topography of the Sherwood North area is typical of the larger, surrounding region, and is largely bedrock controlled and somewhat rugged with rolling hills and valleys.

The Sherwood North Pit is situated in the Labrador Trough, which comprises a thick Proterozoic sedimentary sequence. This area is part of the Grenville Orogeny and has undergone medium to high-grade metamorphism and extensive multi-phase deformation to form a terrain that is characterized by thrusting and non-cylindrical folding. Like the other iron ore deposits at IOC, the Humphrey deposit, of which Sherwood North Pit is included, is locally referred to as a meta-taconite and may be classified as a metamorphosed version of the "Lake Superior-Minnesota Type".

As with all of IOC's reserves and resources, the Humphrey deposit lies within the Sokoman Iron formation, which consists of a lower waste unit (LIF), overlain by a middle ore-bearing unit (MIF), which is, in turn, overlain by an upper waste unit (UIF) (Table 8). The MIF unit is also cut by internal waste units of quartz-carbonate, fibre, limonite, and metagabbro.

Table 8: Bedrock Geology of the Carol Lake Operation, Stratigraphically Upwards

Formation		Primary Rock Types
Shabagomo		Metagabbro gneiss dykes and sills with lesser amphibolite schist
Menihek		Youngest formation of Knob Lake Group comprising mainly quartz-feldspar-mica-graphite schist
Sokomon (previously Wabush)	Upper Iron Ore Fm (UIF)	Light brown/white quartz-carbonate (siderite) gneiss with variable amounts of magnetite, hematite, grunerite, tremolite, and actinolite
	Middle Iron Ore Fm (MIF)	Quartz-magnetite, and/or quartz-specular hematite-magnetite, and/or quartz-specular hematite-magnetite-carbonate, and/or quartz-specular hematitite-magnetite-anthophyllite gneiss and schist units
	Lower Iron Ore Fm (LIF)	Light brown/white quartz-carbonate (siderite) gneiss with variable amounts of magnetite, hematite, grunerite, tremolite, and actinolite-quartz-carbonate, and/or quartz-carbonatemagnetite, and/or quartz-carbonate-silicate, and/or quartzcarbonate-silicate-magnetite, and/or quartz-magnetitespecular hematite units
Wishart (previously Carol)		White massive to foliated quartzite
Attikamagen (previously Katsao)		The oldest formation of the Knob Lake Group comprising medium to coarse grained quartz-feldspar-biotite-muscovite schist and lesser gneiss

The Humphrey Main major fold structures consist of an overturned syncline with thin limbs of ore but a thickened fold hinge where the ore limbs have been folded onto one another and are doubled up. Dips of the fold limbs and fold axis are approximately 40 degrees east but do vary throughout the model area. There are four structural domains used to control the grade estimation process. The major folds plunge to the south in the Sherwood North Pit area.

The ore body within Sherwood North Pit sits within a tight syncline and broad anticline formation. The anticline is asymmetrical and forms the eastern wall of the pit.

3.1.4 Vegetation

Black spruce is the dominant tree species in the area, with intermittent hardwoods and open lichen woodlands also being common and characteristic. The area around the proposed Sherwood North Pit has been impacted by mining-related activities since the 1960s and is characterized by patches of mixed wood forest interspersed with areas of moss, lichen cover and exposed rock and earth, with roads, trails and other previously disturbed and developed areas

being present throughout the area. In 2002, IOC commissioned a botanical survey of the Carol Project mine site in order to identify which local and/or native plant species showed the best promise for reclamation purposes (Cossette 2002)). A map showing the survey locations for that work is presented in Figure 27.

The area of the proposed Sherwood North Pit was surveyed for that study. A listing of those species are presented in Table 9. The 2002 study was an addendum to a previous 1999 study that recorded all common vegetation species occurring in IOC's Carol Project area.

The species identified in Table 9 include a number of native willow species, i.e., *Salix planifolia*, *Salix bebbiana*, *Salix discolor*, *Salix humilis* and *Salix vestita*, which have a demonstrated ability to grow directly on mining waste and overburden material (Figure 28). In the rehabilitation work planned for the Steven's Lake waste rock dump, IOC intends to carry out reclamation using plant species identified as robust pioneer species.

Figure 27: Map of Botanical Survey Locations - 2002

Figure 28: A Coppice of Pioneer Willows Growing Directly on Mining Waste / Overburden Material

Table 9: Common Species Found in the Sherwood North Pit Area

Common Name	Scientific Name	Common Name	Scientific Name
Balsam Fir	*Abies balsamea*	Leatherleaf	*Chamaedaphne calyculata*
Common Yarrow	*Achillea millefolium*	Fireweed	*Chamerion angustifolium*
Red Baneberry	*Actaea rubra*	Clinton Lily	*Clintonia borealis*
Speckled Alder	*Alnus incana*	Marsh Cinquefoil	*Comarum palustre*
Bartram Shadbush	*Amelanchier bartramiana*	Goldthread	*Coptis trifolia*
Bog Rosemary	*Andromeda polifolia*	Bunch Berry	*Cornus Canadensis*
Alpine Bearberry	*Arctostaphylos alpine*	Tickle Grass	*Deschampsia cespitosa*
Tundra Dwarf Birch	*Betula glandulosa*	Deep-Root Clubmoss	*Diphasiastrum tristachyum*
Dwarf White Birch	*Betula minor*	Roundleaf Sundew	*Drosera rotundifolia*
Paper Birch	*Betula papyrifera*	Mountain Wood-Fern	*Dryopteris campyloptera*
Heart-Leaved Paper Birch	*Betula papyrifera var. Cordifolia*	Spinulose Shield Fern	*Dryopteris carthusiana*
Blue-Joint Reedgrass	*Calamagrostis Canadensis*	Black Crowberry	*Empetrum nigrum*

Common Name	Scientific Name	Common Name	Scientific Name
Brownish Sedge	*Carex brunnescens ssp. Brunnescens*	Hairy Willow-Herb	*Epilobium ciliatum*
Little Prickly Sedge	*Carex echinata subsp. Echinata*	Hornemann's Willow-Herb	*Epilobium hornemannii*
Coast Sedge	*Carex exilis*	Water Horsetail	*Equisetum fluviatile*
Mud Sedge	*Carex limosa*	Woodland Horsetail	*Equisetum sylvaticum*
Boreal Bog Sedge	*Carex magellanica ssp. Irrigua*	Cotton Grass	*Eriophorum angustifolium ssp. Angustifolium*
Black Sedge	*Carex nigra*	Russet Cotton-Grass	*Eriophorum chamissonis*
Few-Flowered Sedge	*Carex pauciflora*	Tussock Cotton-Grass	*Eriophorum vaginatum*
Three-Seed Sedge	*Carex trisperma*	Rough-Leaved Aster	*Eurybia radula*
Inflated Sedge	*Carex vesicaria*	Sweet-Scent Bedstraw	*Galium triflorum*
Alpine Chickweed	*Cerastium alpinum*	Creeping Snowberry	*Gaultheria hispidula*
Alpine Azalea	*Loiseleuria procumbens*	Northern Comandra	*Geocaulon lividum*
Small-Flowered WoodRush	*Luzula parviflora*	Northern Oak Fern	*Gymnocarpium dryopteris*
Stiff Clubmoss	*Lycopodium annotinum*	Narrow-Panicled Rush	*Juncus brevicaudatus*
Wild Lily of the Valley	*Maianthemum Canadensis*	Thread Rush	*Juncus filiformis*
Three-Leaf Solomon's Plume	*Maianthemum trifolium*	Pale Laurel	*Kalmia polifolia*
Bog Buckbean	*Menyanthes trifoliate*	Larch	*Larix laracina*
Mountain Sandwort	*Minuartia groenlandica*	Lesser Duckweed	*Lemna minor*
Naked Miterwort	*Mitella nuda*	Twinflower	*Linnaea borealis*
One-Flower Wintergreen	*Moneses uniflora*	Heartleaf Twayblade	*Listera cordata var. Cordata*
Sweet Coltsfoot	*Petasites frigidus var. Palmatus*	Dwarf Red Raspberry	*Rubus pubescens*
Northern Beech Fern	*Phegopteris connectilis*	Bebb's Willow	*Salix bebbiana*
White Spruce	*Picea glauca*	Pussy Willow	*Salix discolour*
Black Spruce	*Picea mariana*	New England Dwarf Willow	*Salix herbacea*
Leafy White Orchid	*Platanthera dilatata var. Dilatata*	Prairie Willow	*Salix humilis*
Small Northern Bog-Orchid	*Platanthera obtusata*	Meadow Willow	*Salix petiolaris*

Common Name	Scientific Name	Common Name	Scientific Name
Greenish-Flowered Wintergreen	*Pyrola chlorantha*	Rock Willow	*Salix vestita*
Lesser Wintergreen	*Pyrola minor*	Canada Burnet	*Sanguisorba canadensis*
Common Labrador Tea	*Rhododendron groenlandicum*	Pod Grass	*Scheuchzeria palustris*
Swamp Red Currant	*Ribes triste*	Large-Leaf Goldenrod	*Solidago macrophylla*
Cloudberry	*Rubus chamaemorus*	Bog goldenrod	*Solidago uliginosa*
Swamp Dewberry	*Rubus hispidus*	Northern Mountain-Ash	*Sorbus decora*
Hooded Ladies'-Tresses	*Spiranthes romanzoffiana*	Swamp Aster	*Symphyotrichum puniceum var. Puniceum*
Clasping Twisted-Stalk	*Streptopus amplexifolius*	Seven-Angled Pipewort	*Trichophorum cespitosum*
Common Bog Arrow-Grass	*Triglochin maritime*	Northern Starflower	*Trientalis borealis*
Late Lowbush Blueberry	*Vaccinium angustifolium*	Alpine Bilberry	*Vaccinium uliginosum*
Small Cranberry	*Vaccinium oxycoccos*	Mountain Cranberry	*Vaccinium vitis-idaea*
		Squashberry	*Viburnum edule*

(Cossette 1999, 2002)

3.1.5 Hydrology

Hydrological information for the area is mainly limited to IOC's Carol Operations. An understanding of the existing hydrology of the area is based on climate, drainage, geology and topography. All surface water run-off from the Sherwood North Pit will be captured via sumps and either pumped or gravity fed via ditches to ensure runoff reports directly to vegetated areas and does not flow directly to any natural waterbodies, e.g., Steven's Lake. The discharge point (Figure 29) for any surface water collected will be in a vegetated area more than 100 m from a waterbody or stream. The catchment area of Steven's Lake is approximately 320 ha. After completion of the Sherwood North Pit, this catchment area will be reduced by 16 ha or 3%, that being the part of the pit which lies within the current catchment of Steven's Lake, which will drain toward Carol Lake after excavation. During operations however, all runoff within the pit will be pumped to a vegetative filter within the Steven's Lake catchment, which will effectively increase the catchment area of Steven's Lake by 16 ha or 5% in Phase I (Humphrey Phase D) and by 33 ha or 10% in Phase 2 (Humphrey Phase G). The increased discharge from Steven's Lake resulting from this pit water is not likely to materially alter the stream ecosystem.

Figure 29: Typical Discharge Scenario for Water Management at Sherwood North Pit

3.1.6 Hydrogeology

In 2002, Piteau Associates (Piteau) undertook a review of the hydrogeology of current and historic operations of the IOC Carol Operation in the area of the proposed Sherwood North pit. That review provides information on the basic hydrostratigraphy that occurs at the existing and historic IOC mine operations to the north of Labrador City. An important aspect of the hydrostratigraphy is the occurrence of deep pre-glacial weathering that occurs at depth. According to Piteau (2002), the most permeable hydrostratigraphic unit is the LIF, which has the highest content of carbonate materials. The relatively high hydraulic conductivity of this unit is caused by weathering associated with leaching of silica and carbonate and/or oxidation of iron minerals (magnetite and specularite) to goethite and limonite. The weathering is noted to be strong along fractures in the LIF and is more prevalent in open pits operating at lower elevation (e.g., Humphrey Main) where the weathering has not been removed by glacial action. The hydraulic conductivities of the weathered zones are noted as being as high as 1×10^{-4} to 1×10^{-3} m/s, which suggests that the LIF and possibly the base of the MIF is a reasonable aquifer capable of providing baseflow to local streams/rivers and supporting flows to lakes where occurrence is at appropriate elevations.

When mining progresses below water table, groundwater ingress to open pits results. A previous hydrogeological investigation (Piteau 2002) assessing IOC's open pits estimated groundwater seepage into each pit at that time for mitigation purposes. Reported groundwater ingress estimates ranged from as low as 80 USGPM (~440 m^3/d) for Humphrey South Pit up to 1,000 USGPM (~5,400 m^3/d) for the Humphrey Main Pit. At Spooks Pit groundwater ingress was estimated at 1,740 USGPM (~9,500 m^3/d) and was primarily associated throughflow in the weathered eastern face from Lake Lorraine (Piteau 2002).

Further investigation is currently being undertaken to refine the understanding of groundwater occurrence in the area of the proposed Sherwood North Pit; however the existing pumping well, In-pit # 11, is currently expected to sufficiently lower the water table below the deepest exposed bench associated with Phase 1 (Humphrey Phase D) by the time that this phase is complete. The installation of vibrating wire piezometers around the proposed pit perimeter will inform a later decision on the potential location of a second dewatering well and the timing of its construction and commissioning. One target will be investigated later in 2017.

3.1.7 Regional Wildlife

The interior of Western Labrador, with its myriad forest types and extensive wetlands, provides habitats for a range of wildlife that are typical of boreal forest ecosystems. During the summer of 2017, Sikimiut Environmental Management (SEM) carried out field surveys within the footprint of the proposed Sherwood North Pit to better understand the habitat types and the wildlife species using them.

Habitat types encountered include: wetlands, mixed age coniferous, mixed age mixedwood, mature coniferous, young mixed/mature coniferous, young coniferous, clearcut, young coniferous and shrub, and young mixedwood.

Species at Risk

There are three mammal Species at Risk (SAR) that could potentially occur in Labrador West, as determined from the Newfoundland and Labrador *Endangered Species Act* (ESA) (2001) and the federal *Species at Risk Act* (SARA) Public Registry (2017), including Wolverine, Woodland Boreal Caribou and the Little Brown Bat. Each are discussed below.

Wolverine (*Gulo gulo*) is listed as Endangered in the federal SARA registry, and under the provincial ESA, but it has not been verified in Labrador since 1950, and there is no evidence to suggest this species exists in the vicinity of Sherwood North Pit or any other IOC mining property in Labrador West. Wolverines have extremely large home ranges and require relatively pristine and unfragmented habitat.

Similarly, the Woodland Boreal Caribou (*Rangifer tarandus*), currently listed as Threatened under the provincial ESA and under the federal SARA, would be unlikely to inhabit lands in such close proximity to mining operations. A study by Weir et al. (2007) determined that caribou avoid mine areas by as much as 4 km, and group sizes were impacted up to 6 km from mine sites. The Project is not anticipated to overlap or interact with the current ranges of the Woodland Boreal

Caribou in Western Labrador, specifically the Lac Joseph herd which is known to occur to the south and east of the Project area (Schmelzer 2011).

Current information also indicates that the migratory George River Herd is known to occur to the north and northeast of the Project area. A February 2012 aerial survey completed for IOC by SNC confirmed this as the survey did not find any caribou within a 40 x 40 km (1,600 km^2) regional study area that encompassed IOC's Labrador West operations (SNC 2012).

SEM identified one SAR (Little Brown Bat), protected under SARA that could potentially occur in the study area. The Little Brown Bat, (*Myotis lucifugus*), was given an emergency listing of "Endangered" under SARA in 2014 because of rapid population declines in Canada due to a deadly wildlife disease known as White-nose Syndrome (WNS). According to Environment and Climate Change Canada, "The population decline that has been documented for this species is considered by some experts to be the most rapid decline of mammals ever documented anywhere in the world." (Environment Canada 2014).

Regional Wildlife Surveys

SEM carried out baseline wildlife surveys during the week of July 4-7, 2017. Transects were surveyed on foot along the routes between point count stations during the avifauna surveys, and additional transects were added on all trails and transmission lines, to ensure adequate coverage and wildlife evidence detection. Transects bisected all habitat types present in the proposed Sherwood North Pit, ensuring sufficient representation of all habitats.

Along the transects wildlife biologists recorded all evidence of wildlife, including evidence of small mammals, furbearers, black bear (*Ursus americanus*), ungulates, birds, and amphibians. Evidence of the presence of these animals consisted of observations of tracks, scat, auditory detections, etc. by biologists trained and experienced in the identification of animal sign, bird vocalizations, and amphibians. Tracks in close proximity (<50 m) of each other were counted as one track if the age of the track was equivalent. Transect data were combined with information from literature searches to give a comprehensive list of wildlife species that use, or may use, the Sherwood North Pit area.

Evidence of a variety of wildlife species (36) was detected on the trails and forests of the proposed Sherwood North Pit, including mammals, birds, and amphibians and are discussed below.

Results of Field Survey

Mammal species detected during the surveys included black bear, Canada lynx (*Lynx canadensis*), gray wolf (*Canis lupus*), moose (*Alces alces*), muskrat (*Ondatra zibethicus*), red fox (*Vulpes vulpes)*, and red squirrel (*Tamiasciurus hudsonicus*). These species were primarily detected from scat and tracks along the transmission line transects, except for red squirrel, which was detected eleven times on avian point count surveys. Moose, wolf and red squirrel were the most commonly detected mammal species in the Sherwood North Pit area.

Other mammals that may be found in the area, but were not detected on surveys, include beaver (*Castor canadensis*), marten (*Martes americana*), American mink (*Neovison vison*), cinereus shrew (*Sorex cinereus)*, pygmy shrew (*Sorex hoyi*), Eastern heather vole (*Phenacomys ungava*), rock vole (*Microtus chrotorrhinus*), ermine (*Mustela erminea*), least weasel (*Mustela nivalis*), little brown bat (*Myotis lucifugus*), meadow jumping mouse (*Zapus hudsonius*), meadow vole (*Microtus pennsylvanicus*), deermouse (*Peromyscus maniculatus*), otter (*Lontra canadensis*), porcupine (*Erethizon dorsatum*), northern bog lemming (*Synaptomys borealis*), northern flying squirrel (*Glaucomys sabrinus*), southern red-backed vole (*Clethrionomys gapperi*), snowshoe hare (*Lepus americanus*), and star-nosed mole (*Condylura cristata*).

A furbearers survey was also conducted within the Wabush 3 footprint area during the winter of 2012. The survey found evidence of eight mammal species in the area; red fox (*Vulpes vulpes),* wolf (*Canis lupus),* snowshoe hare (*Lepus americanus),* marten (*Martes Americana),* short-tailed weasel (*Mustela ermine),* red squirrel (*Tamiasciurus hudsonicus),* northern flying squirrel *(Glaucomys sabrinus)* and porcupine (*Erethizon dorsatum)* (AMEC 2012).

From the 2017 wildlife survey list, it is possible that the little brown bat, marten, mink, snowshoe hare, and some of the vole and mouse species are using or residing in the proposed Sherwood North Pit area. To detect the presence/abundance of several of these species, specialized dedicated surveys would likely be required, such as the use of bat detectors, small mammal trapping grids, hair traps, etc. It is unlikely that beaver or otter are using the Project area given there are only two wetlands present, and both are likely maintained by perched shallow groundwater underlain by relatively impermeable material. Being shallow and without any inflows or outflows, these are unsuitable as beaver or otter habitat and do not provide fish habitat.

Evidence of two amphibian species was detected during surveys. Tadpoles of American Toad (*Anaxyrus americanus*) and Wood Frog (*Lithobates sylvaticus*) were observed in two small wet areas along the western transmission line. Detections of amphibian species may have been more prevalent in early to mid-June when frogs and toads would have been calling more frequently. Detection by sound is a more effective method for surveying frogs and toads than visual surveys.

Conclusions

Overall, the proposed Sherwood North Pit area appears to have abundant wildlife species and diversity, and the transmission lines bisecting the area seem to be used frequently as travel corridors for several mammal species. The bird assemblages found in the coniferous habitat types and young second growth forests are typical of the species list for similar areas across southern Labrador. No evidence of SAR were detected in the Sherwood North Pit area during wildlife transect surveys, however, it is possible that the little brown bat, a federally Endangered species, is using the area.

3.1.8 Avifauna

Existing Information

Common resident and migratory species of birds in the interior of Western Labrador include raptors, waterfowl, passerines and upland game birds. In 2012 and 2014, AMEC carried out a number of avifauna surveys to support the Wabush 3 EA, a pit located approximately 7 km south of the proposed Sherwood North Pit. A winter survey found few wintering bird species (seen or heard), and no avian SAR. Common raven, pine grosbeak, boreal chickadee, spruce grouse and grey jay were the most commonly observed winter species (AMEC 2012, AMEC 2014).

Breeding bird surveys at that time detected a total of 48 species seen or heard and breeding evidence was observed for 46 of those species (AMEC 2012). Species most frequently detected during the breeding surveys were white-throated sparrow, American robin, Swainson's thrush, dark-eyed junco, fox sparrow, hermit thrush, yellow-rumped warbler, Lincoln's sparrow, red-breasted nuthatch, yellow warbler and common raven.

Fall migration bird surveys were also carried out and they identified 16 bird species. Species identified included boreal chickadee, common raven, dark-eyed junco, American pipit, ruby-crowned kinglet and American robin (AMEC 2012, AMEC 2014).

Raptors

Raptors are protected by the Newfoundland and Labrador *Wild Life Act,* which prohibits the hunting, taking, killing, or possessing of any eagle, falcon, hawk, osprey, or owl.

There are a number of raptor species that are known in the Labrador City area, including:

1. American Kestrel (Falco sparverius)
2. Bald Eagle (Haliaeetus leucocephalus)
3. Boreal Owl (Aegolius funereus)
4. Golden Eagle (Aquila chrysaetos)
5. Great-horned Owl (Bubo virginianus)
6. Merlin (Falco columbarius)
7. Northern Goshawk (Accipiter gentilis)
8. Northern Harrier (Circus cyaneus)
9. Northern Hawk owl (Surnia ulula)
10. Osprey (Pandion haliaetus)
11. Red-tailed Hawk (Buteo jamaicensis)
12. Rough-legged Hawk (Buteo lagopus)
13. Short-eared Owl (*Asio flammeus*)

SEM conducted avifauna surveys and an aerial raptor survey in June 2017 for the Wabush 3 Project and noted observations of red-tailed hawk, rough-legged hawk, osprey, bald eagle, northern goshawk, and American kestrel. No nests were discovered for these species at the Wabush 3 site.

Other raptor species that may exist in the vicinity of the proposed Sherwood North Pit include the sharp-shinned hawk (*Accipiter striatus*) and gyrfalcon (*Falco rusticolis*). The sharp-shinned hawk is on the northern threshold of its range in the Labrador City area and, although not observed, it is a possible breeder in the Sherwood North Pit area. The gyrfalcon, the largest of the falcons, and a ptarmigan specialist, is typically a non-breeder in the Labrador City area, preferring more northerly climes above the tree line. It could possibly occur in the Labrador City area but very unlikely to be found at the proposed Sherwood North Pit given its habitat preferences (open tundra). Similarly, the golden eagle is unlikely to breed in the area of IOC's Labrador West operations given its intolerance for disturbance and development.

There is potential for one raptor SAR to occur in the Project area. The short-eared owl (*Asio flammeus*) is protected by the federal SARA and the Provincial ESA and prefers vast, open habitats, including meadows, marshes, bogs, tundra, heathlands, agricultural areas, and rehabilitated mine sites. Short-eared owl populations tend to cycle with their mammalian prey, notably voles and mice. There are no population estimates for this species in Labrador and accurate estimates of North American populations have eluded biologists. Data from the North American Breeding Bird Survey (Sauer et al. 2016) suggests that although this species has undergone a long-term population decline across Canada, its numbers remain stable in the Atlantic Provinces. Habitat loss has been implicated as the major contributor to declining populations of short-eared owls.

Waterfowl

Waterfowl species are protected federally by the Migratory *Birds Convention Act* (1994) *(*MBCA*)*. Some of the species known to occur in the Labrador City area include:

1. American black duck (*Anas rubripes*)
2. Canada goose (Branta canadensis)
3. Common goldeneye (Bucephala clangula)
4. Common loon (Gavia immer)
5. Common merganser (Mergus merganser)
6. Green-winged teal (Anas crecca)
7. Northern pintail (Anas acuta)
8. Red-breasted merganser (Mergus serrator)
9. Ring-necked duck (Aythya collaris)

Waterfowl surveys conducted in 2012 and 2014 by AMEC, (AMEC 2012, AMEC 2014), noted observations of common goldeneye, ring-necked duck, and red-breasted merganser.

Suitable habitat for waterfowl is very scarce in the Project area as only two small wetlands totaling less than 2 hectares exist in the proposed Sherwood North Pit area. The area is comprised primarily of mature spruce forest and mixed age spruce forest.

2017 Avifauna Surveys

Field survey maps were generated by SEM for the Sherwood North Pit study area using geographical information systems (GIS), with boundaries outlined for both development phases.

A habitat assessment was completed to determine the avian species and any raptor and waterfowl SAR species that could potentially occur in the Sherwood North Pit area, based on the habitat types available and the spatial extent of each.

From the habitat assessment it was determined that the Sherwood North Pit area would be unsuitable habitat for most avian SAR that may exist in western Labrador. However, the habitat in the area would be suitable for Olive-sided Flycatcher (*Contopus cooperi*) and the Rusty Blackbird (*Euphagus carolinus*).

Field surveys for avifauna were conducted using three approaches in the study area as follows:

1. Point count surveys were conducted on the ground for avifauna on the mornings of July 4-7, 2017. This approach can be used to determine the presence of less conspicuous and forest-nesting raptors such as the northern goshawk. In addition "flyovers" of waterfowl are recorded during these surveys.
2. Wildlife transects were conducted on foot along trails and exposed areas for observations of all wildlife species and sign, including owl pellets, and binocular scans of treetops, cliffs, lakes, wetlands and the skyline; and
3. A helicopter survey was carried out to observe potential nesting sites of conspicuous raptors (i.e., bald eagle and osprey), and waterfowl on waterbodies in or adjacent to the proposed Sherwood North Pit area.

Point Count Surveys

Point count surveys are used to estimate species abundance and species richness of breeding birds (mostly songbirds) in pre-determined geographic locations. Surveys are conducted primarily by identifying bird songs/calls by ear, as birds vocalize frequently during breeding season. These surveys can only be completed in the morning and in fair conditions (i.e., without strong winds or significant precipitation).

Point count surveys were conducted in the study area between sunrise and approximately 10:30 am from July 4-7, 2017. Locations were spaced apart by 250 m. Observers recorded all the individuals of each species observed during the ten-minute period, as well as the breeding evidence codes for each observation (e.g., singing male, pair observed, fledged young, etc.). Additionally, every individual observed was recorded in one of three distance bands (<50 m, 50-100 m, 100+). In all, twenty-four (24) point count surveys were conducted throughout the study area. Data was recorded on point count datasheets, and was entered into a spreadsheet after fieldwork each day.

A total of 29 bird species were identified during the point count surveys at the study area. The most commonly observed species from the point count surveys was the White-throated Sparrow, a frequently singing habitat generalist that was detected in all of the habitat types. Ruby-crowned Kinglet, a coniferous specialist, was the second most detected species. Other commonly detected species included the Dark-eyed Junco (habitat generalist), the Yellow-rumped Warbler (coniferous generalist), Swainson's Thrush (coniferous generalist), American Robin (habitat generalist), and Yellow-bellied Flycatcher (coniferous specialist). Other species detected during point counts included Tennessee Warbler, White-winged Crossbill, Fox Sparrow, Northern Waterthrush, Wilson's Snipe, Gray Jay, Common Raven, Winter Wren, Orange-crowned

Warbler, Alder Flycatcher, White-crowned Sparrow, Tree Swallow, Northern Goshawk, Hermit Thrush, Bohemian Waxwing, Boreal Chickadee, Wilson's Warbler, Three-toed Woodpecker, Pine Grosbeak, Herring Gull, and American Black Duck.

There were no SAR detected during the point count surveys. Point counts would be appropriate for observing both the provincially and federally listed Olive-sided Flycatcher and the Rusty Blackbird, if they existed in the Sherwood North Pit study area.

Wildlife Surveys

Bird species observed during the wildlife surveys included Alder Flycatcher, Boreal Chickadee, Brown Creeper, Common Loon, Common Raven, Dark-eyed Junco, Fox Sparrow, Gray Jay, Great-horned Owl, Hermit Thrush, Magnolia Warbler, Northern Flicker, Northern Waterthrush, Orange-crowned Warbler, Ruby-crowned Kinglet, Solitary Sandpiper, Spruce Grouse, Swainson's Thrush, Tennessee Warbler, Three-toed Woodpecker, White-crowned Sparrow, Wilson's Snipe, Wilson's Warbler, White-throated Sparrow, Yellow-rumped Warbler, and Yellow Warbler. With the exception of the Common Loon, these species are all possible breeders within the boundaries of the Phase 1 and 2 developments.

Aerial Surveys

A helicopter survey for raptors and waterfowl was carried out on July 6, 2017 from 12:05 to 12:50 pm. The AS350 B2 ("A-Star") helicopter was flown at ~100-150 m above ground level (AGL) at ~90 km/h. The safety of any nesting birds was considered a key priority, and the surveys were planned to minimize such disturbance and to maintain adequate distance from nests. Two observers and the pilot scanned the treetops, cliffs, and high points along transects spaced 250 m apart. Lakes, wetlands, and other waterbodies inside and outside the proposed Sherwood North Pit footprint were targeted for observations of waterfowl. A total of 14 transects were flown in the proposed Sherwood North Pit and adjacent areas, and observations were recorded directly into a Garmin ground positioning system (GPS).

Results

From the GIS mapping exercise, it was determined that the likelihood of significant waterfowl habitat occurring in the Sherwood North Pit study area was low. Only two relatively small wetlands were identified in the area, with a total areal extent of about 2 hectares. Similarly, it was determined from the habitat types available that there was likely insufficient habitat for certain raptors like the golden eagle and the short-eared owl.

The northern goshawk was the only raptor species detected during the avian point count surveys. This species was detected at two different point count locations but in relatively close proximity to each other (~350 m). It is unknown if these observations represent a breeding pair or the same bird at two different times of the morning. The northern goshawk's territory can equate to hundreds of hectares.

There were no raptors observed during the wildlife transect surveys. However, one owl pellet was discovered on the transmission line in the southwestern section of the area, along with one dismembered Herring Gull (*Larus argentatus*), which resembled an owl kill.

There were no raptors or raptor nests observed during the aerial raptor survey.

Only one observation of waterfowl was made during the point count surveys – one American black duck flew over the southwest section of the proposed Project footprint adjacent to Carol Lake. Additionally, no waterfowl were observed in either of the two wetlands in the proposed Sherwood North Pit. No nesting waterfowl were detected from the aerial surveys, and only one pair of Common Loons was observed on Stevens Lake.

Conclusions

The low number of waterfowl and raptor observations recorded during this field program was expected given the results of the habitat assessment carried out prior to initiating field work. The bird assemblages found in the coniferous habitat types and young second growth forests are typical of the species list for similar areas across southern Labrador. The imagery indicated there was very little habitat available for waterfowl within the boundaries of the proposed Sherwood North Pit and this was borne out by the field results. Additionally, the Sherwood North Pit area does not include desirable habitat for several raptor species; especially those that prefer open habitats.

It should be noted that any birds residing in the proposed Sherwood North Pit area would be somewhat accustomed to noise associated with mining, such as from blasting activities and loud machinery that has been occurring in the area since the 1960s.

3.1.9 Wetlands

Wetlands are defined as areas of land that are saturated or covered by water for some time during the growing season, have poorly drained soils, and host predominantly hydrophytic (i.e., water-loving) vegetation. Wetlands are environmentally significant for several reasons, including: water filtration, water storage (water recharge), flood reduction and control, carbon absorption, erosion control, and wildlife habitat (Freshwater Wetlands, Government of Nova Scotia).

A review of the proposed Sherwood North Pit area for wetlands identified two located within the Project footprint (Figure 30) with a combined areal extent of less than two hectares. Although the wetlands are located within the Project footprint, they are not located within the proposed Sherwood North Pit perimeter. Depending on the geotechnical assessment of the resulting dump foundations, they may not be affected by operations associated with the Project. If they need to be removed, the timing will be during Phase 2 (Humphrey Phase G) activities, and IOC will consult with the GNL to ensure any permits or authorizations are in place prior to any work being carried out.

If as a result of construction activities for the proposed Sherwood North Pit, the two wetlands located in the Project footprint are lost, the functions and values these wetlands provide are expected to be lost as well. Operations activities are unlikely to lead to any indirect loss of wetlands outside the Project area due to changes in drainage and local hydrology. As such no functional changes in wetlands are expected outside the Project area.

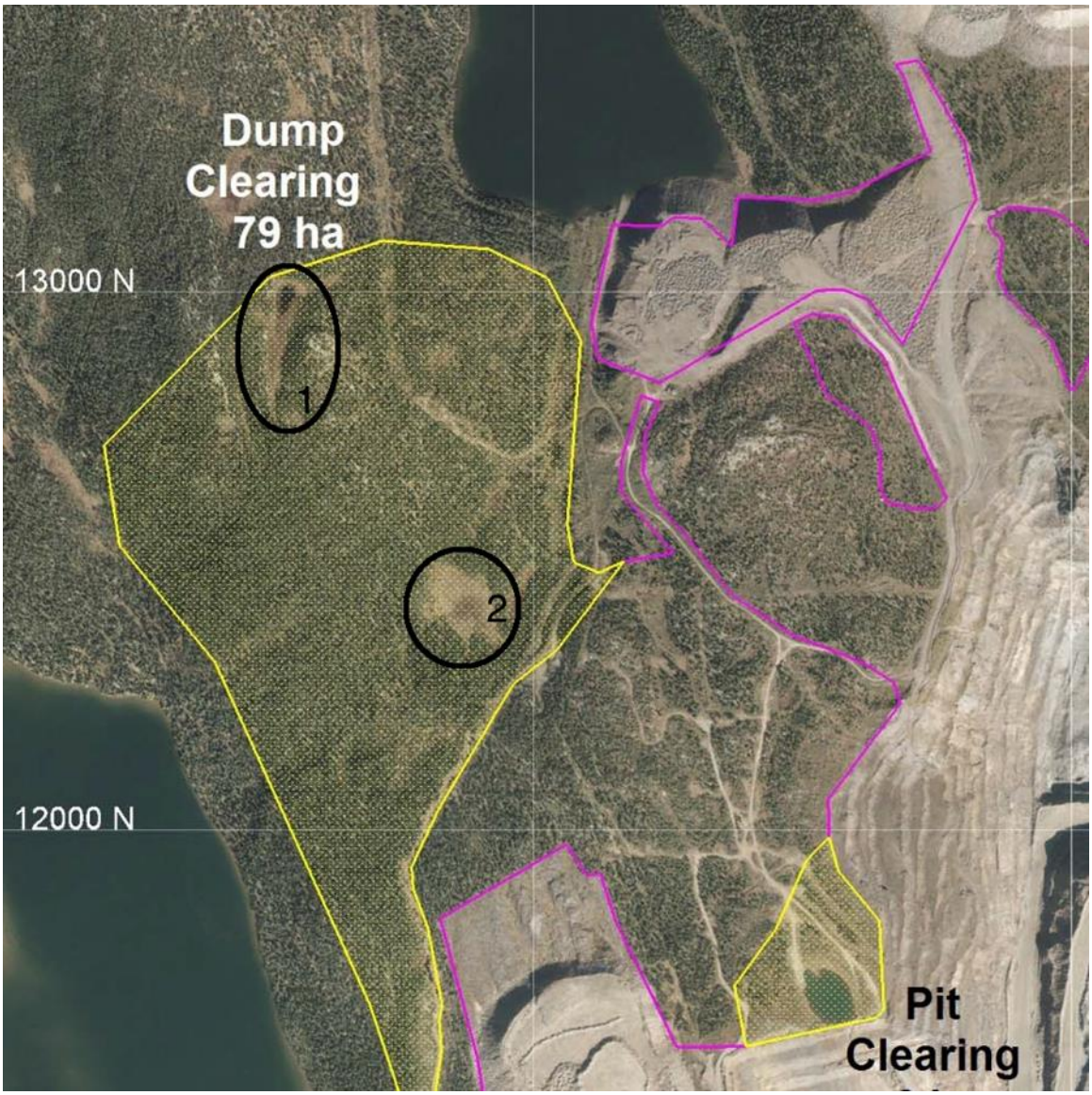

Figure 30: Image Depicting the Locations of the two Wetlands within the Boundaries of the Proposed Sherwood North Development Area

The first wetland is located at approximately UTM 635560N, 5880361E and is primarily a floating fen with an area of open water (Figure 31). It is maintained by perched shallow groundwater underlain by relatively impermeable material, and transitions into a treed spruce bog on the southern end.

Some of the vegetation species surveyed in the wetland included:

1. *Sphagnum* spp.
2. Bog Laurel (*Kalmia polifolia*)
3. Lily-of-the-Valley (*Maianthemum canadense*)
4. Eastern Larch (*Larix laricina*)
5. Labrador Tea (*Ledum groenlandicum*)

6. Bakeapple (*Rubus chamaemorus*)
7. Sweetgale (*Myrica gale*)
8. *Poaceae* spp.
9. *Carex* spp.

Figure 31: Wetland Number 1 Occurring in the Sherwood North Pit Development Area

Several bird species were identified near the wetland (see below), but only the Wilson's Snipe was using the wetland; in this case, for courtship displays.

1. American Robin
2. Dark-eyed Junco
3. Gray Jay (two adults, one fledgling)
4. Pine Grosbeak
5. Ruby-crowned Kinglet
6. Wilson's Snipe
7. Yellow-rumped Warbler

A survey was conducted along the water's edge for amphibians, as well as a scan for waterfowl. No amphibians or waterfowl were observed in this wetland.

The second wetland occurring in the proposed Sherwood North Pit footprint is also an acidic floating fen that is also fed by perched groundwater with no visible inflow or outflow streams. The UTM coordinates of this wetland are approximately 635808N, 5879858E (Figure 32).

Figure 32: Wetland Number 2 Occurring in the Sherwood North Pit Footprint

Some of the vegetation species surveyed in this wetland included:

1. Sweetgale (*Myrica gale*)
2. *Poaceae* spp.
3. *Eriophorum* spp.
4. Eastern Larch (*Larix laricina*)
5. *Carex* spp.
6. *Sphagnum* spp.
7. *Dicranum* spp.
8. *Equisetum* spp.
9. *Drosera* spp.

No waterfowl or amphibians were observed at this wetland nor does it appear to be suitable fish habitat. The shallow characteristic of both wetlands render them improbable as suitable fish habitat, given they will freeze solid in the winter.

3.1.10 Acid Rock Drainage Potential

An Acid Rock Drainage (ARD) assessment was completed for the Sherwood Pond Pit (i.e., Humphrey Main phase B) in 2010, which indicated that there was no acid generating or potentially acid generating material in the Sherwood Pond mining area (Lorax 2010). It was also determined that each of the samples tested had sufficient neutralizing potential to buffer any acid generating reactions.

An assessment of all drill hole samples taken from the Sherwood North pit area, however, indicates that 350 samples show some ARD potential based on static test work (i.e., Neutralizing Potential Ratio <2). These samples with ARD potential had an average sulphur grade of 0.038% and a maximum sulphur grade of 0.101%. The average CO_2 grade of the samples with ARD

potential was 0.08% with a maximum CO_2 grade of 3.35%. By comparison, the average sulphur grade of all samples was 0.025% and the average CO_2 grade of all samples was 7.0%.

The identified potentially acid generating (PAG) material is limonitically altered material with significantly depleted carbonates. There is clearly significant carbonate buffering capacity in the unaltered material in Sherwood North Pit and the acid generation potential (i.e., sulphur grade) of the PAG material is low. Consequently, the ARD risk in Sherwood North Pit can be effectively managed by either encapsulating the potentially acid generating waste with high carbonate waste, or ensuring good mixing of acid generating and acid neutralising wastes. Coincidently, encapsulation of altered waste with unaltered waste are the two strategies currently being used in IOC's operations to ensure that the low strength limonitic waste does not lead to waste dump instability.

The acid-base analysis protocol being developed to assess ARD potential in the Wabush 3 pit will also be used in Sherwood North Pit to ensure that PAG waste is either encapsulated by, or mixed with, acid neutralising waste.

No ARD has been observed to date in any of IOC's operating pits, waste dumps or tailings disposal areas. Studies carried out for the Wabush 3 deposit indicated that the large gabbro unit in this Pit has potential for acid drainage, albeit at very low sulphur grades (approximately 0.15%S) and, hence, low acid generation rates. Although there is a large gabbro unit to the west of the Sherwood North Pit deposit, there is no gabbro modelled in the planned pit. Consequently, the sulphur grades of the PAG material in Sherwood North Pit are significantly lower than those of the potentially acid generating material in Wabush 3 (0.038% vs 0.15%). The very low acid production from any acid generating waste makes neutralisation of that acid drainage relatively easy with the high carbonate waste from the pit.

To date, IOC has not encountered any metal contents in mine effluent which approach the Metal Mining Effluent Regulations (MMER) limits. The similarity of the Sherwood North Pit metal contents to those in the rest of Humphrey Main indicates that there are unlikely to be problematic metal levels in Sherwood North Pit mine water discharges. As noted, none of the gabbro associated with the Wabush 3 pit is found in the Sherwood North Pit.

Although all indications are that IOC's operating pits, waste dumps and tailings disposal areas contain all non-potentially acid generating (non-PAG) material and are not expected to be an ARD concern, IOC will continue to carry out water quality monitoring at all stages of construction, development and operations of the Sherwood North Pit to ensure compliance.

3.2 Human Environment

3.2.1 Historic and Heritage Resources

SEM conducted a review of existing archaeology reports to determine whether the Project would result in disturbance to any historic or heritage resources that could be present in the proposes development area. The Provincial Archaeology Office (PAO) of the Department of Tourism, Culture, Industry and Innovation (DTCII) did advise that the potential for findings in the area was low, and that no comprehensive field study of the Project area was warranted.

SEM's report (SEM 2017) outlines the cultural and historical sequence of historic occupation in western Labrador and adjacent parts of Québec during the Pre-contact, historic and contemporary periods as well as a listing and discussion of any archaeological and/or contemporary sites or materials discovered within, or close to the proposed development area. The report also addresses the overall historic and archaeological resources potential of the proposed development area based on its general location, its hydrographic and topographic features, as well as other factors, as determined through an analysis of aerial imagery and topographic mapping.

The results of the review (SEM 2017) indicated that many archaeological and contemporary sites have been discovered in the western Labrador region and in adjacent parts of Quebec; however, only one Pre-contact period artifact of Maritime Archaic Indian origin, of uncertain provenience, is known for the Labrador City area. Additionally, no historic period materials or sites have been identified or reported on in historic sources. The resources that have been recorded and registered with the PAO for the area are of relatively recent origin and appear to be associated with harvesting activities along road and/or railway corridors.

The proposed Project site is predominantly a heavy wooded landscape with some wetlands on elevated points of ground. In addition, approximately 30% of the terrain has areas has relatively excessive slope (i.e., > 10 degrees). As a result, this segment of the area would not have been well-suited for past human settlement by small groups of Indigenous hunters/gatherers or non-Indigenous peoples. A final key factor indicated by imagery is that the Project area is located at least 100 m from the shorelines of the area's principal waterbodies. Past archaeological research conducted in the interior of Labrador and Quebec has shown that it is the shorelines of lakes and rivers where occupation would typically be expected to occur, and not at a considerable distance in the forest away from the water's edge. These landscape attributes render the site as having Low potential for historic or archaeological resources (Figure 33).

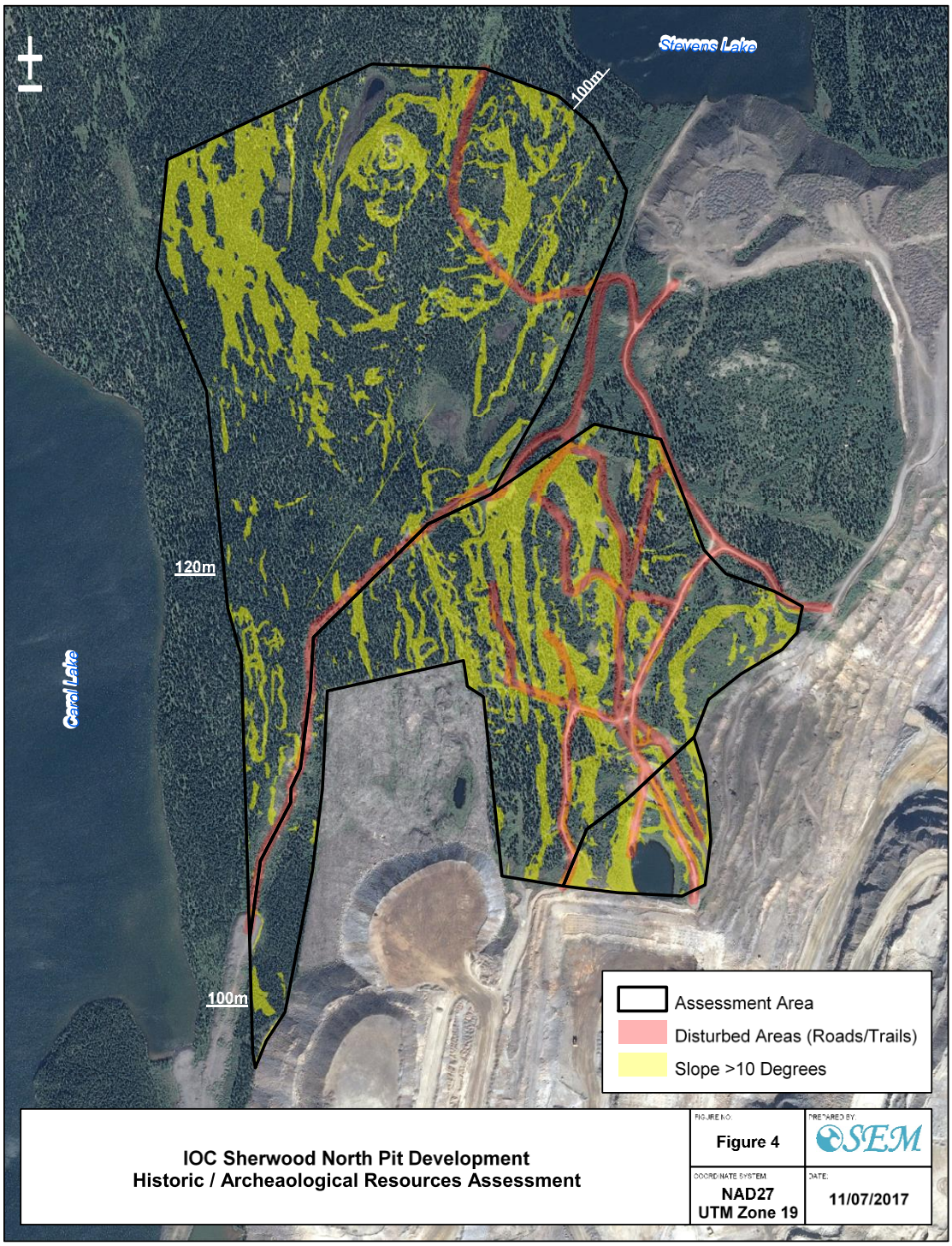

Figure 33: Historic / Archaeology Resources Potential Map for the Project Area

3.2.2 Socioeconomic Considerations

The Labrador West region includes the communities of Labrador City (38.83 km^2) and Wabush (46.25 km^2), which had a combined population of 10,528 residents and 4,424 residences in 2016 (Statistics Canada 2016).

Mining and mineral processing, together with related support industries, have always been the backbone of the economy in Labrador West where a boom and bust economy has challenged both industry and the local communities. The year 2010 saw an economic boom resulting from high iron ore prices and this put pressure on local services and amenities. Five years later the price of iron ore declined and, as a result, Wabush Mines closed with a loss of approximately 500 jobs. IOC continued production through the bust period and remains the largest employer in the region.

In 2010 the region had a total labour force of 4,590 workers, of which 1,670 (36 percent) worked in “mining and quarrying”. In that year, the region had a labour force participation rate of 73.6 percent, an unemployment rate of 5.2 percent (Statistics Canada 2010). The average family income in these communities in 2010 was approximately $130,318.

Phase I (Humphrey Phase D) development of the proposed Sherwood North Pit will require modest and short term employment through the hiring of contractors for site clearing. No new employment will result from the operation of the Sherwood North Pit as employees for operations will be redeployed from other IOC operating mines.

The proposed Sherwood North Pit is located within IOC’s existing mining project site. Public access to the site is therefore restricted and land and resource uses and other public activities do not currently take place in the immediate area (Figure 34).

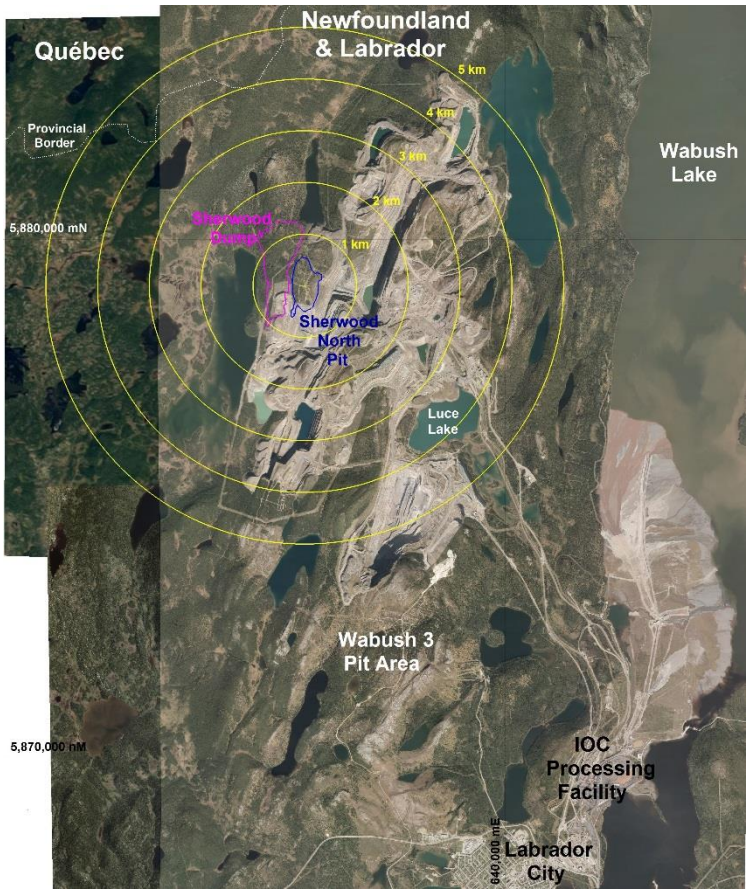

Figure 34: Sherwood North Pit relative to Labrador City

3.2.3 Indigenous Groups and Traditional Activities

Several Indigenous groups have asserted Indigenous rights within, or overlap with, the Labrador West region including the:

1. Labrador Innu (Sheshatshiu and Natuashish, Labrador, as represented by Innu Nation);
2. NunatuKavut Community Council (Labrador);
3. Innu of Uashat mak Mani-Utenam (Québec);
4. Innu of Matimekush-Lac John (Québec); and
5. Naskapi Nation of Kawawachikamach (Québec).

The land claims of these groups are at varying stages of acceptance, negotiation and settlement. Figure 35 shows locations of the Indigenous communities in Labrador and Québec.

Indigenous traditional uses are often considered to refer to the practices, traditions and customs that distinguish the distinctive culture of an Indigenous group and which were practiced prior to European contact and control, and can include, for example, hunting or fishing for food and ceremonial purposes. Section 35 of the *Canadian Constitution Act* (1982) recognizes and affirms the existing Indigenous and treaty rights of the Indian, Inuit, and Métis peoples of Canada, the nature, scope and existence of which have been further defined through various legal decisions

as well as through Land Claims and other agreements (treaties) between governments and particular Indigenous groups in specific areas.

The following sections provide an overview of these Indigenous groups.

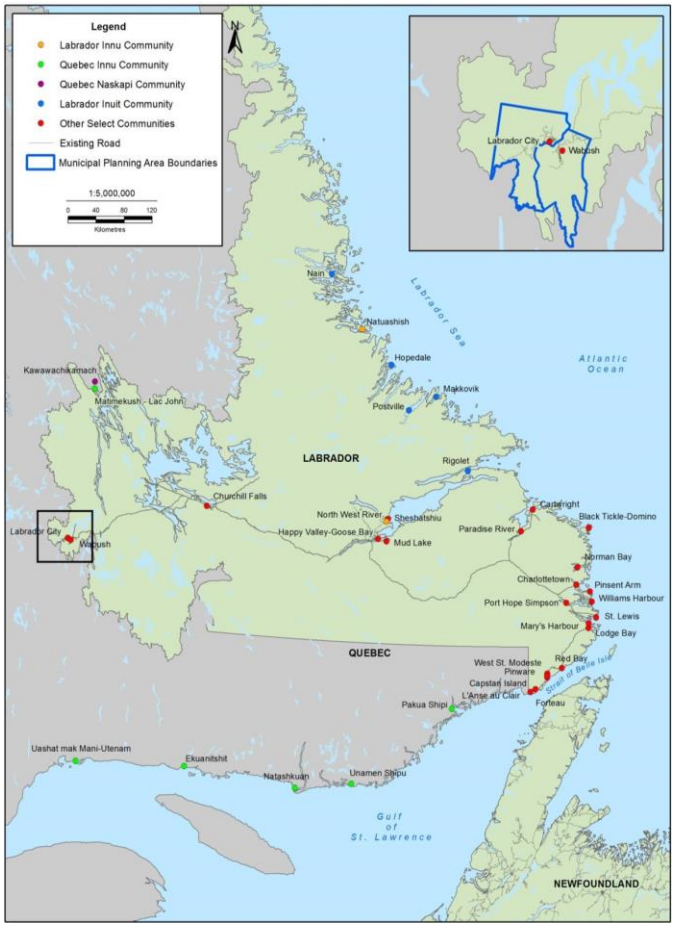

Figure 35: Indigenous Communities in Labrador and Quebec

Labrador Innu

The Innu are indigenous inhabitants of an area they refer to as Nitassinan, an area which comprises much of the Québec-Labrador Peninsula. The Labrador Innu were traditionally a nomadic people, whose movements responded to the seasons and to the migrations of the animals they relied upon.

The Labrador Innu currently number about 2,200 and reside primarily in two communities - Sheshatshiu in Central Labrador and Natuashish on the Labrador North Coast. Small numbers of Innu also reside in Happy-Valley-Goose Bay, Labrador and elsewhere. Both communities are represented by Innu Nation in land claims negotiations and on other matters of common interest.

NunatuKavut

The NunatuKavut Community Council (NCC) reports a membership of over 6,000 persons who reside primarily in southeastern and central Labrador and who are descendants of Inuit and Europeans who traveled to Labrador in the 1700-1800s (NCC 2012).The NCC's membership live throughout Labrador and elsewhere, particularly in the communities along the southeast coast from Hamilton Inlet south to the Labrador Straits, including the towns of Cartwright, Charlottetown, Port Hope Simpson, St. Lewis and Mary's Harbour and the communities of Paradise River, Black Tickle-Domino, Norman Bay, Pinsent's Arm, Williams Harbour and Lodge Bay, as well as in Central and Western Labrador and elsewhere.

Québec Innu and Naskapi Groups

A number of Québec Indigenous groups, including Innu and Naskapi communities that reside in the Schefferville area and along the Québec North Shore, claim Indigenous rights and / or title to parts of Labrador, including several groups that claim lands and / or assert such rights in or near the areas of Western Labrador.

The land claims asserted by Québec First Nations for territory in Labrador have not been accepted for negotiation by the Government of Newfoundland and Labrador.

Matimekush - Lac John First Nation

The Innu of Matimekush - Lac John currently reside in two communities on Lac Pearce near Schefferville, Quebec and number approximately 800 persons. The Innu of Matimekush - Lac John share close ties with the Innu of Uashat mak Mani-Utenam, including a vast traditional territory that covers much of the Québec - Labrador Peninsula and extends down to the coast of the Québec North Shore.

Innu of Uashat Mak Mani-Utenam

The Innu of Uashat mak Mani-Utenam reside on two First Nations reserves located in the Sept Îles area. Uashat is a 177 hectare reserve, located on the western outskirts of Sept-Îles, and the Mani-Utenam Reserve is located 16 km east of Sept-Îles and comprises an area of 527 hectares.

The Innu of Uashat mak Mani-Utenam number approximately 3200 persons and are descendants of an Indigenous population that has occupied parts of the Québec-Labrador peninsula for centuries. The traditional territory of this First Nation encompasses much of Eastern Québec and Western Labrador, and extends along the rivers from the coast of the Québec North Shore into the Québec-Labrador interior (Hydro-Québec 2007).Traditionally, this group was involved in nomadic hunting and fishing.

Naskapi Nation of Kawawachikamach (NNK)

The Naskapi Nation of Kawawachikamach (NNK) of Québec number approximately 1056 persons and is located approximately 16 km northeast of Schefferville on the Québec-Labrador border. (http://www.naskapi.ca/en/Overview-1)

The NNK traditionally followed the migration patterns of the George River caribou herd across the Québec-Labrador Peninsula (Weiler 1992). Land and resource use activities such as hunting, trapping and fishing remain important to the culture and economy of the NNK.

Summary

The area that encompasses the proposed Project has seen on-going mining activity since the 1960s. As a result of the significant and long-standing industrial activity surrounding the proposed Project area, and the public site access restrictions that have been in place on IOC's mining property since that time, traditional land and resource use activities do not occur in this area.

4.0 Consultation

Effective consultation is a cornerstone of the EA process. A number of consultation activities have been undertaken to date in relation to the proposed Project. These include the provision of information (e.g., Draft Project Development Plan), and discussions with relevant government departments and agencies, Indigenous groups and regional stakeholder groups.

4.1 Regulatory Consultation

IOC and their consultants had consultation meetings with government agencies at different stages during project development and prior to the submission of this Registration document. On April 11, 2017, IOC submitted to the EA Division a brief project description for the Sherwood North Pit development for purposes of determining whether registration under the NL EPA was required. On June 21, 2017, the EA Division advised IOC that registration was required. IOC and GEMTEC met with NL government representatives on July 6, 2017 to discuss the proposed Project and how to move as efficiently as possible through the EA process. IOC and its consultants will continue to consult with government officials during the EA review process. It is understood the Project may require permitting in the post-EA phase and this process will allow for additional consultation between IOC and relevant regulatory departments and agencies. IOC will apply for and adhere to all required permits and other authorizations for Project construction and operations.

NLDNR reviewed the draft development plan and provided comments to IOC. These comments are incorporated into the revised development plan appended to this document.

4.2 Indigenous Consultation

IOC recognizes that indigenous consultation is an integral part of the EA process. As such, during the provincial EA process, this registration document will be made available to five Indigenous groups, for their information, review and comment. IOC will also endeavor to communicate with Indigenous groups after filing the registration document and to answer relevant questions relative to the Project as well as to gather any comments and concerns specific to the Project. IOC will inform the appropriate government agencies relative to their consultation efforts through a Consultation Report document.

Prior to being advised that this proposed Project would require registration under the NL EPA, IOC circulated a draft Project Development Plan (required under Section 6 of Chapter M-15.1 of the *Mining Act*) for the Project to five Indigenous groups on May 19, 2019 for review and comment. The Consultation Report is included as Appendix C and shows a response was received from the NNK on June 13, 2017. The revised Development Plan is included as Appendix C in this document.

4.3 Public Consultation

Public engagement is also an integral part of the EA process. IOC has been operating in Labrador West since the early 1960s, and has maintained a long-standing presence and has been a contributor to the local communities and overall region. IOC has a number of established consultative forums in place, through which it regularly communicates and discusses ongoing business objectives and project changes/developments with stakeholders.

In 2006, IOC formed a Community Advisory Panel (CAP), consisting of representatives of the town councils of Labrador City and Wabush as well as local community stakeholders. The CAP meets quarterly to discuss issues of common interest in the region. IOC also established the Labrador West Regional Task Force (RTF) in 2011. The RTF's mandate is to bring regional mining companies together with provincial and local government representatives to discuss and address socioeconomic challenges associated with ongoing and future mining operations.

IOC will continue to consult with local communities and stakeholders on its operations, including the proposed Project, through these and other forums.

5.0 Environmental Effects & Analysis

5.1 Natural Environment

The Natural Environment is comprised of relevant components of the biophysical environment that may interact with the Project, including vegetation, soils, avifauna, wildlife, air quality, water resources and wetlands.

5.1.1 Construction

Project construction will involve site clearing activities covering an overall area of approximately 50 ha during Phase 1 (Humphrey D). The Project area is characterized by patches of mixed wood forest interspersed with areas of moss, lichen cover and exposed rock and earth. There are no listed or rare plant species that are known to occur within or near the proposed Project area.

Vegetation and Soils

The proposed project area is within IOC's existing lease and the surrounding areas have been subject to previous development and disturbance. Vegetation clearing and other ground disturbance activities will be confined to those areas where it is required and limits of clearing will be marked in advance. Clearing for Phase 1 (Humphrey Phase D) will be completed in compliance with relevant permits and regulations, and any merchantable timber will be salvaged.

When Phase 2 (Humphrey Phase G) work is contemplated, it will be necessary to carry out additional vegetation and overburden removal.

Wildlife, Avifauna and Species at Risk

Mining activity has been occurring around the Project area for the past five decades. Recent studies have confirmed that the area is not within the current range of the migratory and sedentary caribou populations that occur in Western and Central Labrador and Quebec, and therefore the Project will not likely result in any adverse effects upon caribou.

Baseline studies have shown that a number of wildlife species do travel through the area via transmission lines, but given the proposed Sherwood North Pit's proximity to industrial mining activity, it is unlikely that this is an area of key importance for many species. Wildlife, including avifauna that use the area, have likely habituated to on-going human activity. The potential for interactions between the Project and regional wildlife is therefore limited. There are no listed SAR that are documented as occurring within or near the proposed Project area.

A number of measures will be implemented during the construction phase of the Project to further reduce the potential for interactions between Project activities and any wildlife that may occur in the area:

- Construction areas will be kept clear of garbage;
- Construction personnel will not hunt of harass wildlife while on site;
- Pets will not be permitted on the construction site;
- Equipment and vehicles will yield the right-of-way to wildlife; and
- Any nuisance animals will be dealt with in consultation with the NL Wildlife Division.

IOC anticipates initial clearing of the Project site to begin by early October 2017. Given that this late season clearing will not coincide with the bird breeding season, IOC does not anticipate any negative interactions between Project construction activities and avifauna in 2017. If further clearing is required in 2018 and beyond, relative to Phase 1 or 2 activities, IOC will ensure the following mitigations specific to avifauna:

- Monitoring for bird nests will be conducted in advance of site clearing during the breeding season (May 1st to August 15th) and efforts will be made to avoid trees with nests during that time. Non-intrusive surveys for nests will be conducted, in accordance with the Specific Considerations Related to Determining the Presence of Nests (Environment Canada 2012).
- The MBCA protects most bird species and their nests, with the exception of the following groups: certain game birds (grouse, quail, pheasants and ptarmigan), raptors (hawks, owls, eagles and falcons), cormorants, pelicans, crows, jays and kingfishers, and some species of blackbirds (starlings, mynas).
- Should a nest of a migratory bird be found, the following steps will be taken (in accordance with guidelines outlined in the MBCA)*:*
    - all activities in the nesting area should be halted until nesting is completed (*i.e.,* the young have left the vicinity of the nest);

- any nest found should be protected with a buffer zone appropriate for the species and the surrounding habitat until the young have left their nest; and
- nests should not be marked using flagging tape or other similar material as these increase the risk of nest predation.

- Raptors, although not protected under the MBCA, are protected under Newfoundland and Labrador's *Wild Life Act*. In accordance with provincial guidelines, should a nest of a raptor be found, the following steps will be taken:
  - a buffer zone of 800 m should be maintained while the nest is active;
  - after the young have left their nest, a buffer zone of 250 m should be maintained; and
  - if work within the appropriate buffer zone cannot be avoided, the Newfoundland Department of Fisheries and Land Resources (DFLR) should be contacted for advice on how to minimize disturbance of the nest.

Wetlands

The two small, perched groundwater fed fens (<2 ha) located in the Project footprint may be removed during Phase 2 (Humphrey Phase G) of the Project. Field surveys in 2017 indicated these wetlands provide marginal wildlife habitat. Wetlands are fairly common outside the Project area thus providing highly functioning wetland habitat in close proximity to the Project area. It is therefore unlikely that the removal, if necessary, of these two small wetlands would be considered limiting to wildlife currently living in or moving through the Project area.

Water Management

Water management activities during construction will be focused on managing mostly surface runoff from clearing and pit development. As required, ditching will be utilized to direct any surface water via gravity feed, away from mine infrastructure and any natural water bodies, e.g., Steven's Lake, and to a discharge area in a nearby undisturbed forest. Also as required, vegetative filters will be utilized to ensure any surface water is filtered prior to discharge. If required, any sumps created from surface water collection will be filtered and dewatered via pumps or gravity feed in undisturbed forest. There is an existing dewatering well in Sherwood Pit, (In-pit #11), and this will continue to operate during the construction period for Phase 1 (Humphrey Phase D). No additional in-pit dewatering wells are currently anticipated for the construction phase; however this will be re-assessed later in 2017.

Air Quality

Air quality monitors will be in operation during the construction phase of the Sherwood North Pit and the results analysed to determine if these activities are contributing to a reduction in air quality for the area. Given the distance and routine nature of the activities associated with the Phase 1 construction phase, it is not anticipated that there will be any cumulative increases in emissions at the mine site due to construction activities.

No negative interactions or adverse effects on the Natural Environment are therefore anticipated during the construction of Phase 1 (Humphrey Phase D) of the Sherwood North Pit.

5.1.2 Operation

During the mining operations phase of the proposed Project, it is unlikely there will be many interactions with the biophysical environment (vegetation and soils, wildlife, avifauna, water resources, air quality and wetlands). Operational activities will be characterized primarily by the movement of materials to and from the site and associated activities. Phase 1 (Humphrey Phase D) of the Sherwood North Pit will be mined using existing equipment and personnel. The activities will not be any noisier or otherwise more disruptive than normal in this area of long-standing and on-going industrial activity. As previously indicated, Phase 2 (Humphrey Phase G) may not be developed until 2060 and prior to any activity associated with the operation of this Phase, IOC will consult with relevant regulators to determine whether any additional review is required.

Vegetation and Soils

During operations of Phase 1 (Humphrey Phase D), there will be no additional soil or vegetation disturbance, therefore, little or no potential for further effects to these biophysical components are anticipated. Future activities associated with the development of Phase 2 (Humphrey Phase G) will result in additional soil and vegetation disturbance.

Wildlife, Avifauna and Species at Risk

As the area will be cleared during construction, is expected that wildlife and avifauna species will avoid areas of major disturbance and relocate to adjacent undisturbed areas. Blasting has been occurring at IOC's Labrador West operations for decades and in varying pit locations. Wildlife and avifauna that live in the general area have presumably become acclimatized to this source and level of noise.

Air Quality

Air quality monitors will continue to be operated and the results analysed to monitor any changes over time to the air quality in the vicinity of IOC's Labrador West's operations. Given that there will be no net increase in operations activities as a result of the Sherwood North Pit, it is not anticipated that there will be any cumulative increases in emissions.

Noise

Noise monitoring equipment will also be maintained at established sites to monitor mine blasting noise, but given the routine nature of the proposed Project activities and the distance from residential areas, it is not anticipated that there will be any negative effects from Project activities.

Wetlands

It is unlikely that operation activities will lead to any indirect loss of wetlands outside of the Project area due to changes in drainage and local hydrology. Any dewatering of the deeper more regional groundwater source is unlikely to impact wetlands and fens in the area which would be dependent upon discreet perched groundwater sources of limited areal extent.

Water Management

Water management activities during operations will primarily involve dewatering well(s) and in-pit pumps to dewater the pit as necessary. If required, the use of sumps may be required seasonally to manage any surface water runoff. As required, ditching will be utilized to direct any surface water, via pumps and gravity feed, away from mine infrastructure and any water bodies, e.g., Steven's Lake, and to a discharge area in an undisturbed forested area. Also as required, vegetative filters will be utilized to ensure that any surface water is filtered prior to discharge. There is an existing dewatering well in Sherwood Pit (In-pit #11) and this will continue to operate during the operations period for Phase 1 (Humphrey Phase D). As the Sherwood North Pit progresses, a new dewatering well is likely to be required as In-pit #11 will be removed during Phase 2 (Humphrey Phase G) of Sherwood North. A probable location for this new dewatering well is discussed earlier in this document.

Accidental Events

Spills or releases of hazardous substances (e.g., fuels, oils and lubricants) from accidents or malfunctions of vehicles and equipment are possible during all Project phases. Such accidental events have the potential to result in adverse environmental effects to soil and water.

The likelihood of occurrence of an accidental spill or release of hazardous substances, and extent of resulting environmental effects, is minimized through adherence to applicable mitigation measures throughout all Project phases. Fuel and other hazardous materials are securely stored, vehicles and equipment are refueled at designated areas. Equipment and vehicles are inspected and maintained in good working order, and any leaks are addressed immediately. Emergency spill kits are onsite at all times. Mitigation measures to avoid collisions such as adhering to posted speed limits, and respecting established radio communication protocols will reduce the likelihood of an accidental spill or release.

Potential accidental events or malfunctions during Project construction and/or operations such as a fire or a spill of fuel or other chemicals could affect vegetation, soils and/or other aspects of the Natural Environment in or around the Project area. The resulting environmental effects of such an incident would depend on the nature and magnitude of the event.

As indicated above, IOC has various measures, plans and procedures in place to prevent potential accidents and malfunctions, such as a fire, spill, or other associated event, as well as to respond to such an accident should one occur. These measures will be applied to (and refined as required for) the Project, and will be further reinforced through the various provincial government permits, other authorizations and regulations, and compliance standards that will be relevant to the construction and operation of the Project.

IOC currently has procedures in place for the management of solid and hazardous wastes at its Labrador City operations, which will apply to the construction and operations phases of the proposed Project. Waste materials generated through construction activities that cannot be reused or recycled will be removed from the area and disposed of at an approved site. Non-hazardous construction refuse will be stored in covered metal receptacles, and will be disposed of on an as-needed basis at an approved landfill site, as per IOC's on-going operations and practices. Under no circumstances will solid wastes be buried onsite.

Any hazardous wastes will be stored in sealed, labelled containers and disposed of according to applicable regulations and IOC practice. These include procedures for the characterization, identification, storage, inspection, labelling and transportation of hazardous wastes produced at the facility, as well as emergency preparedness/prevention and training. There will therefore be no adverse interaction between construction waste materials and the environment.

5.1.3 Cumulative Environmental Effects

The proposed Project will have an effect on vegetation and soils within the construction footprint as a result of clearing and excavation activities during the construction phase. To minimize the overall mining footprint tin the area, IOC will be progressively rehabilitating areas during Project construction and operations phases. The clearing and excavation activities at the Sherwood North Pit will not overlap or interact cumulatively with those of other projects and activities in the area.

The operation of the Project will not result in an increase in overall production of iron concentrate or pellets. Therefore, the discharge of tailings to the TMF will not increase or change in metallurgical or chemical composition and thereby not contribute to any cumulative environmental effects.

The water quality of discharges or runoff from the Project will be controlled with treatment systems designed to comply with any Federal and Provincial requirements. Potential effects to water quality caused by the Project would likely be restricted to water bodies near the operation, such as Steven's Lake. There is potential for cumulative environmental effects with respect to changes in surface and groundwater flows in the Sherwood North Pit area. There will likely be an overall increase in the flows into Steven's Lake. This may have an effect on the aquatic environment which may influence associated species.

The Project will not affect listed or rare species, and will therefore not have any effect on overall biodiversity in the region, nor will it affect caribou populations or other wildlife. The Sherwood North Pit development is unlikely to contribute measurably to any overall, negative cumulative environmental effects to the wildlife, SAR or avifauna in the region.

The development and operation of the Sherwood North Pit is not likely to contribute to any reduction in overall air quality or increase in noise levels in the area. Given that neither the Kami Iron Ore mine nor the Scully Mine are currently operating, there is a very low potential for any cumulative effects to noise or air quality to be felt in the vicinity of Labrador City or Wabush. If these facilities or others begin operations, there is a potential for cumulative effects to be felt relative to noise and air quality. However, given that ongoing monitoring has indicated that CAC"s measured have generally been within Provincial ambient air quality standards, the addition of other mining projects to the area may not change the regional air quality to the level of regulatory exceedance.

5.1.4 Environmental Effects Analysis: Natural Environment

A summary of potential environmental interactions, identified mitigation measures, and any residual environmental effects of the proposed Project on the Natural Environment is provided in Table 10.

Table 10: Table of Environmental Effects Analysis – Natural Environment

Environmental Component	Project Phase / Potential Interaction			Key Considerations and Environmental Mitigation	Residual Effects
	Construction	Operations	Issues / Interactions		
Wildlife	x	x	• Travel corridors currently through Sherwood North • Loss of habitat due to vegetation clearing	• Mitigations in place for both phases of Project • Additional baseline may be required once a timeline for Phase 2 construction is determined • IOC will monitor all wildlife sightings in or near the Project site	NS
Avifauna	x	x	• Loss of habitat due to vegetation clearing for Phase 1 • Phase 2 vegetation clearing is not anticipated until potentially 2060 • Additional baseline will be needed at that time	• Construction of Phase 1 will occur outside the bird breeding season • Mitigations in place should disturbance activities occur in breeding season • Avifauna observations to be recorded by IOC staff, including raptors, waterfowl and other avifauna	NS
Species at Risk			• Potential for Little Brown Bat to use the area.	• None documented in or near the Project area • Any observances will be recorded and appropriate mitigations determined from consultation with appropriate regulators • Monitoring for avifauna and other wildlife SAR is ongoing at IOC mine site	N

Environmental Component	Project Phase / Potential Interaction			Key Considerations and Environmental Mitigation	Residual Effects
	Construction	Operations	Issues / Interactions		
Wetlands	x		• Located outside the pit perimeter. • Fed from a perched water table in glacial till • Potential change in hydrology of wetlands within Project footprint	• Two small fens may be affected in Phase 2 (< 2ha) • Avoidance if possible • If removal is necessary in Phase 2, obtain necessary permits and consult with GNL • Avoid any interaction with wetlands outside the Project area	NS
Air Quality	x	x	• No additional emissions predicted from either construction or operations activities • Monitors to determine any changes in air quality • Additional mitigations can be implemented should data indicate a reduction in air quality	• Significant distance from residential areas & no increased levels of site wide emissions predicted • Ongoing mitigations for fugitive dust control • Existing mitigations for construction and operations activities • Follow EPP • Continue with progressive rehabilitation measures such as revegetation	NS
Noise	x	x	• No additional noise predicted	• Significant distance from residential areas & no increased levels of site wide noise predicted • Follow EPP recommendations to be followed • QC program in place re blasting program • Blast noise monitors in place	NS

Environmental Component	Project Phase / Potential Interaction			Key Considerations and Environmental Mitigation	Residual Effects
	Construction	Operations	Issues / Interactions		
Surface Water	x	x	• Potential accidental spills • Increase in surface area runoff for Steven's Lake watershed	• Compliance with regulations and permits • Design mitigation (erosion and sediment control plan, spill containment, etc.) • Accidental event prevention and response • Water quality monitoring prior to discharge to environment	NS
Groundwater (Quantity and Quality)	x	x	• Discharge rate • Potential accidental spills	• Compliance with regulations and permits • Design mitigation (pump down plan, spill containment, controlled pumping rate, etc.) • Accidental event prevention and response • Discharge of extracted groundwater within the surface watershed of the Sherwood North Pit • Water quality monitoring prior to discharge to the environment	NS
Vegetation & Soils	x		• Removal during Phase 1 will be a direct loss • Removal during Phase 2 (2060) will be a direct loss	• Compliance with regulations and permits • Accidental event prevention and response • Only necessary clearing will be carried out • Progressive rehabilitation will be carried out wherever possible • Overburden will be stockpiled for rehabilitation purposes	N

Key:

X	Potential Project Interaction (by Phase)
N	No likely adverse residual environmental effect
NS	Not significant adverse residual environmental effect
S	Significant adverse residual environmental effect
P	Positive residual environmental effect

Closure and Rehabilitation

The estimated life production duration of the Sherwood North ore deposit is 6-8 years, however, there is expected to be a significant time lag between the development of Phase 1 and Phase 2. There is limited scope for executing closure provisions after the completion of Phase 1, since Phase 2 operations will impact all areas of the Sherwood North project area. When Phase 2 operations are completed, closure and rehabilitation of the project site will take place in accordance with the approved Closure and Rehabilitation Plan at that time. Some closure activities will occur for Phase 1 once resources are exhausted in the Phase 1 portion of the Pit and, at that time, IOC will follow commitments in its site wide Closure and Rehabilitation Plan (February 2017). IOC is also committed to following all guidelines outlined by permitting agencies for closure and rehabilitation activities. IOC undertakes progressive rehabilitation wherever and whenever possible at their Labrador West site and it is their goal to remediate the area to end-states that are safe and stable as well as to preserve local biodiversity. IOC also understands that a final Closure and Rehabilitation Plan for their Labrador West site may be required to be reviewed by the EA Division prior to the decommissioning of all infrastructure and activities at their Labrador West site.

5.2 Human Environment

The Human Environment includes relevant components of the human and cultural environments, including historic and heritage resources, human health and well-being, land and resource use, community services, employment and the economy.

5.2.1 Construction

Historic and heritage resources include sites, objects or other materials of historic and archaeological, paleontological, architectural, cultural and/or spiritual importance. In Newfoundland and Labrador, such resources are protected under provincial legislation and valued by Indigenous and other people in the province. Construction activities and associated ground disturbance have the potential to disturb or destroy archaeological sites and other historic and heritage resources.

There are no known historic and heritage resources within the proposed project area. A desktop assessment was carried out by SEM and they determined that, given the location, levels of existing disturbance, and topographic features at the Project site, there was little potential that the area contains, or that the Project will result in the disturbance or destruction of, historic and heritage resources.

During Project construction however, standard precautionary and reporting procedures will be implemented. Should an accidental discovery of historic resources occur, all work will cease in the immediate area of the discovery until authorization is given for the resumption of the work. Any archaeological materials encountered will be reported to the PAO, including information on the nature of the material discovered and the location and date of the find.

The proposed Project area is located within IOC's existing mining leases in Labrador West and on IOC mining property. Public access to the site is restricted so use of the area for hunting,

gathering and other activities do not occur in the area. No negative interactions with, or adverse effects upon land and resource use, e.g., municipal, traditional or recreational, in the area are anticipated.

In addition, since the proposed Project will be located approximately 9 km from any residential areas, it is not anticipated that the Project will have any negative effects on human health and well-being for the local communities or elsewhere.

The Project is meant to provide a consistent feed to the IOC mill in order to ensure critical production rates are maintained. Consistent operations at IOC's Labrador West facility provides assurance of job stability and economic benefits for the region as a whole. Therefore, the Project will make positive contributions to the socioeconomic environment of the region and province.

5.2.2 Operation

Once construction of Phase 1 (Humphrey Phase D) of the Project has been completed, there will be no additional ground disturbance until Phase 2 (Humphrey Phase G) is contemplated, as late as 2060. The assessment area for historic and heritage resource potential included both Phases of the Sherwood North Pit. Therefore, the potential for further negative effects to historic and heritage resources are not anticipated. The precautionary and reporting procedures implemented for construction will be maintained throughout the life of the Project.

No negative interactions with local commercial, municipal, traditional or recreational land and resource use activities are anticipated, nor are there any implications for human health and well-being.

The operations workforce that will be needed for the proposed Project will be redistributed from IOC's existing operations workforce. In addition, no additional demands on community infrastructure or services are anticipated during this phase of the Project.

5.2.3 Accidental Events

An accidental event or malfunction during any phase of the Project could affect the Human Environment through, for example, an effect on human health and well-being or through an increased demand for local safety and health services. The probability of such events occurring is low, and any potential effects would depend upon the specific nature and magnitude of the event.

IOC has various measures, plans and procedures in place to prevent and respond to, a fire, explosion or other associated event at its Labrador West operations.

5.2.4 Cumulative Environmental Effects

The proposed Project will occur during a slow economic period in Labrador West. Given the scale and timing of this Project, it is unlikely that the proposed Project will negatively affect the socioeconomic environment of the region, rather, it will contribute positively to the local economy by extending the mine life.

5.2.5 Environmental Effects Analysis

A summary of potential environmental interactions, identified mitigation measures, and any residual environmental effects of the Project on the Human Environment is provided in Table 11.

Table 11: Environmental Effects Analysis – Human Environment

Environmental Component	Project Phase / Potential Interaction			Key Considerations and Environmental Mitigation	Residual Effects
	Construction	Operations	Issues / Interactions		
Historic and Heritage Resources	x		• Ground disturbance	• Localized and short-term construction activity • Low potential for historic and heritage resources • Standard precautionary and reporting procedures	N
Land and Resource Use			• None	• Currently a restricted area, on IOC mining property • No public use of the site	N
Human Health and Well-Being	x	x	• Possible accidents affecting human health	• Distance from and minimal interaction with communities • Accidental event prevention and response	N
Communities and Economy	x	x	• Employment and business opportunities	• Positive effects (direct and indirect)	P

Key:

x	Potential Project Interaction (by Phase)
N	No likely adverse residual environmental effect
NS	Not significant adverse residual environmental effect
S	Significant adverse residual environmental effect
P	Positive residual environmental effect

6.0 Environmental Monitoring & Follow-up

IOC has strong environmental, health and safety management systems and associated plans, practices and procedures in place for their Labrador West operations. Any potential environmental or human health effects which may be associated with the proposed Project will be addressed and mitigated through the application of these established practices and procedures. Any potential effects can be further addressed through specific permitting requirements and compliance standards and guidelines which will apply to the proposed Project.

Once operational, the Project will be subject to regular inspections and maintenance as required. The existing monitoring, measuring and auditing processes will be extended to include the Sherwood North Pit.

As part of its regular and ongoing construction and operations procedures, IOC will conduct ambient air, and end of pipe water quality monitoring with programs that are described throughout this Project Registration document.

7.0 Summary & Conclusion

The scope of the proposed Project includes construction and operation of Phase 1 (Humphrey Phase D) of the Sherwood North Pit, a groundwater extraction system, a waste rock disposal area, an overburden stockpile area and haulage roads to connect the mine to an existing transportation system. The transportation system, moves ore to the concentrator plant waste rock and overburden to their respective disposal/stockpile areas. The proposed Project does not require any additional infrastructure as the existing ore processing, tailings management, ore and final product transportation systems and equipment maintenance facilities already exist. The Project will not result in any increase in ore, concentrate, pellet or and tailings production, rather it will ensure critical production targets are achieved.

The operation of the Sherwood North Pit will not result in an increase in the labour force at IOC's Labrador West operations; rather the operational plan will be to redeploy existing equipment and personnel to Sherwood North Pit from other current operational areas.

The proposed Project will be planned and implemented in accordance with IOC's environmental and health and safety policies, plans and practices, to help ensure that it is constructed and operated in a safe and responsible manner. IOC has a comprehensive environmental management system including various associated plans and procedures designed to avoid or reduce any negative environmental effects of its activities.

Rio Tinto has a number of established community policies and standards within its Communities and Social Performance Framework that each of its operating companies, including IOC, must follow. As a member of the MAC, IOC follows MAC's social policies and guidelines, performance measures and protocols.

The proposed Project will be constructed and operated in accordance with applicable provincial legislation and regulations and in compliance with IOC policies, procedures and standards. IOC is committed to complying with all relevant legislation and regulations, and any conditions associated with environmental assessment release.

The proposed Project should not pose any negative significant effects for the following environmental and social components:

- Air quality within the communities of Labrador City or Wabush;
- Vegetation and soils;
- Wetlands of the region;
- Wildlife, including SAR;
- Avifauna, including SAR;

- Historic and heritage resources;
- Communities and economies;
- Human health and well-being; and
- Land and resource use.

IOC has been, and will continue to, consult as required with all relevant government, community and Indigenous organizations throughout the EA process, and will continue as required through all stages of mine life.

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Appendix A

Health, Safety, Environment and Quality Policy

Rio Tinto

IOC

Iron Ore Health, Safety, Environment, Communities and Quality Policy

The global Iron Ore group is comprised of mining and processing operations in Australia and Canada with dedicated sales offices in Asia, Canada and Europe and a global marine freight management network.

The business is diverse and covers:
- Operations and expansion projects in the Pilbara, Western Australia and at the Iron Ore Company of Canada
- Rio Tinto Marine
- Service and Support functions in our central offices globally
- Major development opportunity at Orissa

Andrew Harding, Chief executive Iron Ore 20 June 2013

We are an organization that cares about our people's needs both at work and at home, supporting our business's overall goal of achieving zero harm.

We aim to be industry leaders in health, safety, environmental and community performance. Our belief is that quality engagement with contractors, suppliers, customers, communities and government regarding our strategies and plans is essential to building robust relationships and is fundamental to our long term success.

Through effective leadership we continuously strive to improve our HSECQ performance and our success requires shared dedication and active participation by each of us.

We will endeavour to meet our commitments by:

- Making sure no one is harmed or hurt while they are at work
- Living and working by the standards of conduct defined in The Way We Work"
- Communicating the vision of our business, linked to our annual plan priorities
- Contributing to the health and well-being of local communities
- Being open and transparent with local stakeholders, respecting their culture and diversity and considering their interests in the company's management decisions
- Recognizing our customers' needs with product and pricing options
- Ensuring the service and technical support we are providing to our suppliers and customers is responsive, fair, courteous and timely
- Identifying climate change improvement solutions through dedicated optimization work programmes
- Prioritizing research and implementation programmes through technology to reduce impacts to land, enhancing our contribution to biodiversity and improving our efficiency in water and energy use
- Identifying and managing business risk and fully implementing business resilience capability
- Ensuring leadership encourages effective employee, contractor, supplier and community participation in achieving our goals
- Implementing and improving systems to identify, control and monitor HSECQ risks across the business
- Providing and developing adequate resources and expertise to manage HSECQ performance
- Reporting regularly to all stakeholders on our performance and seek their feedback to further improve HSECQ

This policy shall be communicated to all Iron Ore group employees, service providers and internal and external stakeholders and made available to the public.

Appendix B

Operational and Development Environmental Protection Plan

IOC Labrador City - Operations

Operational Environmental Protection Plan

Iron Ore Company of Canada
P.O. Box 1000
1 Avalon Drive
Labrador City, NL
A2V 2L8

Issued

IOC HEALTH, SAFETY AND ENVIRONMENT POLICY

Rio Tinto

Iron Ore Health, Safety, Environment, Communities and Quality Policy

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- Being open and transparent with local stakeholders, respecting their culture and diversity and considering their interests in the company's management decisions
- Recognizing our customers' needs with product and pricing options
- Ensuring the service and technical support we are providing to our suppliers and customers Is responsive, fair, courteous and timely
- Identifying climate change improvement solutions through dedicated optimization work programmes
- Prioritizing research and implementation programmes through technology to reduce impacts to land, enhancing our contribution to biodiversity and improving our efficiency in water and energy use
- Identifying and managing business risk and fully implementing business resilience capability
- Ensuring leadership encourages effective employee, contractor, supplier and community participation in achieving our goals
- Implementing and improving systems to identify, control and monitor HSECQ risks across the business
- Providing and developing adequate resources and expertise to manage HSECQ performance
- Reporting regularly to all stakeholders on our performance and seek their feedback to further improve HSECQ

This policy shall be communicated to all Iron Ore group employees, service providers and internal and external stakeholders and made available to the public.

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1.0 INTRODUCTION

The Iron Ore Company of Canada (IOC[1]) is one of Canada's leading producers of iron ore. Our product is in demand around the world for its quality, consistency and chemistry. IOC has operated mines and associated processing facilities at the Carol Project property near Labrador City, Newfoundland and Labrador, since 1962.

1.1 Purpose of the Environmental Protection Plan

This EPP outlines practical procedures required for all project personnel (i.e., IOC employees, contractors and suppliers) to reduce or eliminate the potential environmental effects associated with the operations and decommissioning phases of the Carol Mining Project – Operational and Development Sites. This EPP also:

- ensures that commitments to reduce environmental effects are met;
- documents environmental concerns and appropriate protection measures;
- provides a reference document for personnel when planning and/or conducting specific activities;
- provides direction for developing contingency plans for accidental events;
- communicates changes in the program through the revision process;
- provides a reference to and instructions for IOC to understand applicable legal and other requirements;
- includes a quick reference for both project personnel and regulators to monitor compliance and recommend improvements; and
- provides direction at the corporate level for ensuring commitments made in policy statements are implemented and monitored.

Any deviation from the procedures and commitments outlined in the EPP must first be discussed with, and approved by, the Manager Environment & Sustainable Development.

In addition to outlining required environmental protection procedures for the Operational and Development Sites, this EPP was required by the Department of Fisheries and Oceans prior to issuance of a Section 35(2) Authorization under the *Fisheries Act*, and as a condition of release

[1] Refer to Appendix A for a list of all abbreviations and acronyms used in this Environmental Protection Plan.

of the project from assessment requirements under the *Newfoundland Environmental Assessment Act*.

1.2 Environmental Protection Plan Organization

This EPP has been developed for specific activities to be conducted in support of the Operational and Development Sites. It provides instructions for addressing both planned and unplanned activities/events associated with the project. This EPP contains the following sections:

- **Section 1.0** provides an introduction to the EPP. It outlines the EPP purpose and organization, roles and responsibilities and environmental orientation.
- **Section 2.0** provides an overview of the undertaking.
- **Section 3.0** lists the permits, approvals and authorizations required for the undertaking, and provides an overview of compliance monitoring.
- **Section 4.0** describes environmental concerns and environmental protection procedures for planned project activities.
- **Section 5.0** outlines the contingency plans for potential unplanned and accidental events.
- **Section 6.0** describes procedures for making revisions to the EPP.
- **Section 7.0** contains a list of key project and regulatory contacts.
- **Section 8.0** lists references cited in the EPP, as well as a number of sources of further information.

1.3 Roles and Responsibilities

The Iron Ore Company of Canada will:

- provide final approval for the EPP and any subsequent revisions;
- in consultation with the Operational and Development Site Project Managers, designate the Environmental Advisors for the undertaking;
- monitor and inspect the work being carried out; and
- liaise with relevant government agencies and community interest groups as required

The designated Environmental Advisors will:

- ensure the implementation of the EPP;
- be IOC's representative on-site;
- review revision requests;
- conduct a review of the EPP on an as-needed basis;
- ensure revisions are distributed to EPP holders;
- maintain document control;
- report to the Manager Environment;
- hold an environmental orientation session for the contractor and its personnel, and any other personnel to be involved in the project on an as-needed basis;
- ensure EPP holders and their staff are familiar with the EPP and its procedures;
- ensure that all applicable approvals, authorisations and permits are obtained;
- monitor or designate a representative to monitor project work to ensure compliance with the EPP, and all regulatory requirements and commitments; and
- report to the Operational and Development Site Project Managers, Manager Environment, and/or appropriate agency all incidents of non-compliance.

The contractor and site personnel will:

- familiarize themselves with the EPP;
- implement the EPP commitments;
- ensure all personnel and subcontractors comply with the EPP, all requirements of the contract and with all applicable laws and regulations;
- maintain a training record;
- maintain regular contact with the Environmental Advisor, including, but not limited to:
  - immediately reporting concerns to the Environmental Advisor over any aspect of the EPP, and
  - immediately reporting any spills or other event that may have an effect on human or environmental health and/or safety;
- obtain all applicable approvals, authorizations and permits;
- ensure the implementation of any conditions outlined in approvals, authorizations and permits; and
- carry out clean-up, reclamation or restorative measures as directed by the Operational and Development Sites Project Managers, Environmental Advisors and/or appropriate

government agency.

All EPP Holders will:

- keep their copy of the EPP current and ensure all revisions are entered on the revision control record;
- familiarize themselves and their personnel with the EPP and any revisions; and
- initiate changes to improve the quality of the plan.

1.4 Environmental Orientation

Through orientation and ongoing awareness training throughout the undertaking, IOC will ensure that all project personnel are competent to do their jobs properly. Employees will understand their roles and responsibilities, as well as the potential environmental effects of the overall project and their specific work activities. All workers will receive an environmental orientation prior to the start of any new activity and thereafter on an as-needed basis.

2.0 PROJECT OVERVIEW

Development activities represent a continuation of ongoing IOC operations at the Carol Lake Mining Project within its original mining lease. All development activities shall be within the constraints of the original lease agreements. Any extensions to the lease should be recorded.

It is currently proposed to continue mining using existing methods, infrastructure, and processing facilities, with some modification to on-site haulage roads and transmission lines.

2.1 Construction

With regards to activities relating to the construction of any Operational Development, this EPP only outlines the environmental protection measures associated with the operations and decommissioning of the project.

2.2 Operations

This EPP outlines the environmental protection measures associated with any operational developments at the Iron Ore Company of Canada, including site preparation activities (e.g., clearing of trees, earth moving, dewatering, etc.) and mining activities.

2.2.1 Ongoing Site Preparation Activities

Ongoing site preparation activities and development work (i.e., preparation for material removal) include those activities required to support the continued mining of any Operational Development such as extension of roads, power lines, construction of physical features and environmental assessments. Operational Development areas that require tree clearing prior to any development activities, should reference Section 4.2, 4.3, and 4.4 of this Environmental Protection Plan.

Where required, an environmental assessment shall be conducted at the planned Operational and Development Sites, by IOC Environment Department. Any obsolete infrastructure and utilities (ie. disengaged power lines, poles, dewatering pipes) shall be removed prior to any operational development activity.

.

Overburden and Waste Rock Removal

Unconsolidated material or overburden that covers the Operational Development area will be removed to the hard rock surface in preparation for mining. Overburden will be placed in designated storage areas as determined by IOC. Site preparation also involves the development of terraces within the operational development area by drilling and blasting the sloped natural ground to specified bench elevations in 13.7 m increments for IOC production equipment. Waste rock will be dumped at waste rock dumps located at IOC Mine Site, with the exception of those quantities to be used as construction material. This material may be used to upgrade the existing network or on-site haul roads. Alternatively, waste rock could be placed in the pits using conventional backfill techniques.

Waste rock and overburden piles will be sloped and bermed to prevent pooling of surface water. Structures such as silt fences will be used as a means of sediment control as required, and collection ditches and settling ponds will be used as required to manage surface runoff and any groundwater flows.

For further information please see the E13- Chemically Reactive Mineral Waste Control Standard.

Roadways

Operational Development areas will require both new road construction and upgrading of existing roads. All roads will require grading, culvert installation, adequate drainage, dust control, and maintenance, all of which are subject to specific guidelines and regulations. The location and extent of these roads will be finalized at the detailed design stage.

Marshalling and Storage Areas

Marshalling areas will be located at various locations on the project site to facilitate the receiving and storage of materials and equipment such as piping and culverts. Existing facilities at the Carol Mining Project will be used wherever possible.

Associated Facilities and Infrastructure

Maintenance facilities, equipment and processing facilities will be used during the operational phase. If required, transmission lines will generally follow road rights-of-way. Lunchroom/washroom facilities shall be used at the workforce area.

2.2.2 Mining Activities at IOC (typical)

Mining activities at the Iron Ore Company of Canada will proceed from the highest bench elevation to the lowermost planned bench. The nominal bench height will be 13.7 m. Bench accesses will initially be developed using waste rock as mining proceeds downwards. The haulage pit ramps will be 40 m wide, with a maximum gradient of 8%. The bench face angle will be 35 to 90 degrees, and the overall pit slope angle will be 30 to 58 degrees.

2.3 Decommissioning

A rehabilitation and closure plan has been developed in accordance with the *Newfoundland Mining Act*. A sustainable closure configuration will be implemented throughout the operational life as appropriate.

In general, the reclamation systems and abandonment facilities will be designed for long term stability, allowing for gradual erosion and deformation at a geomorphic rate comparable to that of the natural environment. Structures will be designed to remain functional for the long term (+1,000 years).

Progressive Reclamation: The reclamation of the mine area will be staged over the life of the facility, resulting in minimal reclamation investment at the end of the mine life. Progressive reclamation activities will include contouring and re-vegetating inactive mine areas.

Decommissioning: The primary decommissioning criterion is to ensure a maintenance-free facility after mine closure.

3.0 REGULATORY REQUIREMENTS AND COMMITMENTS

3.1 Approvals, Authorizations and Permits

The approvals, authorizations and permits required for development activities are listed in Table 3.1.

Table 3.1: Regulatory Requirements – Permits and Authorizations

Permit/ Approval	Legislation/ Guidelines	Activity Requiring Compliance	Responsible Agency	Comment
Federal Government Requirements				
Release from the *Canadian Environmental Assessment Act*	*Canadian Environmental Assessment Act*	Activities that fall under Section 35(2) of the *Fisheries Act* and the *Navigable Waters Protection Act*.	Habitat Management, DFO	
Authorization pursuant to Section 35(2) of the *Fisheries Act*	*Fisheries Act*	Activities that may affect fish habitat	Habitat Management, DFO	A Fish Habitat Compensation Plan has to be approved by DFO. A monitoring program shall be implemented to measure the program's effectiveness. Other activities having potential impact should be reviewed with Area Habitat office in GooseBay.
Provincial Government Requirements				
Release from the *Environmental Assessment Act*	*Environmental Assessment Act* and *Regulations*	Any Development Activity	Environmental Assessment Division, Dept of Municipal Affairs & Environment	
Certificate of Approval for drawdown of Development Area Waterbody.	*Environment Act*	Drawdown of a lake, pond.	Water Resources Division, Dept of Municipal Affairs & Environment	A Certificate of Approval must be obtained.

Permit/ Approval	Legislation/ Guidelines	Activity Requiring Compliance	Responsible Agency	Comment
Compliance standard; no permit required	*Wildlife Regulations* pursuant to the *Wildlife Act*	Presence of personnel	Wildlife Division, Department of Tourism, Culture and Recreation	It is unlawful to take or destroy the eggs or nest of any wild bird. IOC and contractor personnel will not harass or disturb wildlife, or remove or destroy nests or eggs. Clearing of vegetation may result in the loss of nests.
Permit to Burn	*Forestry Act* and *Forest Fire Regulations*	Any burning required during the project.	Department of Forest Resources and Agrifoods	A permit is required to light fires outdoors between April and December. Permits are not issued during forest fire season. IOC will comply with the Environmental Code of Practice for Open Burning
Mill Licence	*Mining Act*	Operating of mill	Department of Municipal Affairs and Environment	Operating a mill requires a mill licence for a term of 5 years or longer.
Mineral Rights	*Minerals Act*	Mining Leases	Department of Municipal Affairs and Environment	A mining lease shall be filed with government within 6 months of date of application.
Procedural and financial obligations	*Aboriginal Consultation Policy*	Minimization of any potential adverse impacts of projects and developments on the asserted rights of Indigenous groups	Department of Municipal Affairs and Environment	Consultation and accommodation with associated aboriginal groups
Permit to Infill	*Water Resources Act*	Infilling of water body	Department of Municipal Affairs and Environment	A permit is required to infill a body of water.
Permit to Alter a Body of Water	*Water Resources Act*	Develop of wetlands	Department of Municipal Affairs and Environment	A permit is required to develop wetlands requiring special conditions and alterations.

Permit/ Approval	Legislation/ Guidelines	Activity Requiring Compliance	Responsible Agency	Comment
Compliance standard	*Endangered Species Act*	Any activity that may affect and endangered or threatened species	Department of Municipal Affairs and Environment	Provide protection to endangered and threatened species and protection of their habitats
Permit of Investigation	*Historic Resources Act*	If any archaeological objects are uncovered	Department of Municipal Affairs and Environment	An investigation permit is required to perform an archaeological investigation

3.2 Compliance Monitoring

Inspections and monitoring ensure the implementation of the environmental protection measures that are specified in this document and that will be specified in the applicable contracts and other relevant permits, approvals and authorizations. Monitoring will also ensure that all development project activities comply with applicable regulatory requirements and that mitigation measures are being employed effectively.

The Environment Department is responsible for environmental compliance monitoring on-site; and on the environment-related general, special and technical clauses to be implemented as part of the contracts.

Compliance monitoring will be required for various activities during the undertaking. Federal and provincial government compliance standards that apply to the project include but are not limited to those listed in Table 3.2. Project personnel will comply with relevant approvals, authorizations, permits and legislation.

Table 3.2: Compliance Standards

Legislation/ Guidelines	Activity Requiring Compliance	Responsible Agency	Comment
Federal Regulations			
Fisheries Act, Section 35(2), Harmful Alteration, Disruption, or Destruction of Fish Habitat	There will be follow-up (compliance) monitoring to verify the effectiveness of fish habitat compensation provisions.	Department of Fisheries and Oceans	Monitoring requirements and schedule are detailed in the Fish Habitat Compensation Agreement that is attached to the authorization issued by the Minister.
Fisheries Act, Section	Any run-off from the project	Environment and	Any deposited substance or discharge must

Legislation/ Guidelines	Activity Requiring Compliance	Responsible Agency	Comment
36(3), Deleterious Substances	site being discharged to receiving waters (freshwater or marine).	Climate Change Canada	not be deleterious (i.e., must be acutely non-lethal). Liquid effluents that enter freshwater or marine waters must comply with the Act.
Migratory Birds Convention Act and Regulations	Mortality of migratory birds, and endangered species and any species under federal authority.	Canadian Wildlife Service, Environment Canada	CWS should be notified about the mortality of any migratory bird in the project area, including passerine (songbirds), seabird and waterfowl species. Harmful substances (e.g., oil, wastes, etc.) that are harmful to migratory birds must not be deposited into waters that are frequented by them. Nests, eggs, nest shelters, eider duck shelters or duck boxes of migratory birds must not be disturbed or destroyed. Notice should also be given about the mortality of any species known to be endangered or under federal authority, including polar bears, wolverine and marine mammals.
Transportation of Dangerous Goods Act and Regulations	Handling and transporting of dangerous goods.	Transport Canada	If the materials are transported and handled fully in compliance with the regulations, a permit is not required. A Permit of Equivalent Level of Safety is required if a variance from the regulations is necessary.
Canadian Environmental Protection Act	Activities that have the potential to interact with the environment and human health.	Environment Climate Change Canada	CEPA provides a framework for setting environmental quality objectives, guidelines and codes of practice, pollution prevention plans, regulation of toxic substances, controlling pollution of other wastes and environmental emergency plans.
Federal Policy on Wetland Conservation	Activities that have the potential to affect wetlands	Environment Climate Change Canada	If wetland will be affected due to mining an offset must be established to remedy the difference.
Explosives Act	Activities surrounding blasting using explosives	Environment Climate Change Canada	Must comply with the storage and use of all explosives on site as per regulations.
Provincial Regulations			
Waste Material Disposal Act	Any Development Operation.	Pollution Prevention Division, Dept of Municipal Affairs & Environment	All waste material shall be considered prior to disposal, for reuse, resale or recycling. All waste materials associated with the construction and operation, shall be disposed at an approved waste disposal site.
Occupational Health and Safety Act	Project personnel.	Workplace Health and Safety, Department of Labour	Outlines minimum requirements for workplace health and safety. Workers have the right to refuse dangerous work and must be informed of potential hazards they may be exposed to during work. All workers must be provided with and use appropriate

Legislation/ Guidelines	Activity Requiring Compliance	Responsible Agency	Comment
			personal protective equipment.
Storage and Handling of Gasoline and Associated Products Regulations	Storage, handling and disposal of gasoline and other fuels.	Pollution Prevention Division, Dept of Municipal Affairs & Environment	A spill contingency plan should be developed that includes emergency response contacts/support and access to spill response equipment.
Workplace Hazardous Materials Information System, under the *Occupational Health and Safety Act*	Handling and storage of hazardous materials.	Operations Division, Department of Government Services	Outlines procedures for handling hazardous materials and provides details on various hazardous materials.
Dangerous Goods Transportation Act and *Regulations*	Transporting fuel to the site.	Department of Works, Services and Transportation	Transporting goods considered dangerous to public safety must comply with regulations.
Historic Resources Act	General project activities.	Cultural Heritage, Department of Tourism, Culture and Recreation	All archaeology sites and artefacts are considered to be the property of the Crown and must not be disturbed. Any archaeology materials encountered must be reported to the Provincial Archaeology Office.
Cutting of Timber Regulations	Cutting or Removal of Timber.	Department of Natural Resources.	Cutting and Removal of Timber shall be approved by the IOC Environment Department.
Wildlife Act	Activities that have the potential to interact with wildlife	Department of Municipal Affairs and Environment	Sighting of any wildlife in the area the Dept. of Natural Resources must be contacted for removal.
Air Pollution Control Regulations	Maintain good air quality levels as prescribed in regulations	Department of Municipal Affairs and Environment	Burning is prohibited for certain materials listed in Schedule E of the regulations. In addition, certain fuels are prohibited as well.
Water Resources Act Environmental Control Water & Sewage Regulations	Discharging sewage and other materials into a body of water or public sewer shall comply with standards, condition and provisions in these regulations	Department of Municipal Affairs and Environment	Effluent samples and receiving water samples using analytical procedures.
Urban & Rural Planning Act	Established the province's land use planning system	Department of Municipal Affairs and Environment	Consultation with public and municipal governments so that development decisions can be subjected to independent reviews.
Management of Greenhouse Gas Act	Monitor and record all emissions related to GHG	Department of Municipal Affairs and Environment	Submission of an annual report regarding the greenhouse gas emissions released with 3rd party verification.

3.3 Reporting

3.3.1 Internal Communication

Environmental performance and issues at any Operational and Development Site or area will be communicated internally as required. The Operational and Development Site Project Managers are responsible for communicating IOC policies and procedures and legal and other requirements to project personnel. Project personnel will communicate all environmental incidents and near misses to the Environmental Advisors as per CR-E-E-PRO Environmental Reporting.

3.3.2 External Communication

When required, IOC will report on environmental issues relating to the development site to the Newfoundland and Labrador Department of Environment and Conservation. Issues which may be communicated include but are not necessarily limited to:

- Stream crossings;
- Burrow Sites;
- Dust;
- Erosion;
- Historic resources;
- Wildlife encounters; and
- Permits and authorizations.

Any spills of petroleum products or other hazardous materials will be reported to the **IOC Emergency Services and Security** (709) 944-8400, ext. 8320, who will report the incident to the IOC Environment Department.

Any activity having the potential environmental impact to fish and fish habitat outside the realm of the compensation agreement (such as stream crossings and culvert installations) should be forwarded to the IOC Environment Department, who will consult the Fisheries and Oceans Area Habitat office in Goose Bay for review and subsequent issuance of appropriate Letters of Advice.

Other compliance reporting required by permits or through compliance requirements not listed above will also be submitted to the IOC Department of Environment, or appropriate departments at IOC.

Reporting results of Environmental Effects Monitoring and/or Fish Habitat Compensation Plan monitoring will be provided to DFO and other appropriate agencies as required.

4.0 ENVIRONMENTAL PROTECTION PROCEDURES

This Section provides a description of environmental protection procedures for the following anticipated project-related activities:

4.1 Marshalling and Storage Areas
4.2 Clearing Vegetation
4.3 Grubbing and Overburden Removal
4.4 Erosion Prevention and Siltation Controls
4.5 Buffer Zones
4.6 Drilling
4.7 Blasting
4.8 Water Course Crossings
4.9 Dewatering Work Areas and Site Drainage
4.10 Equipment Use and Maintenance
4.11 Handling and Transfer of Fuel and Other Hazardous Material
4.12 Solid Waste Disposal
4.13 Mineral Waste Rock and Overburden
4.14 Vehicle Traffic
4.15 Dust Control
4.16 Hazardous Waste Disposal
4.17 Road Maintenance
4.18 Trenching
4.19 Surveying
4.20 Public Traffic and Activity

When required, this EPP will be revised to include new or amended environmental protection procedures to ensure that activities conducted at the developing site are completed properly and that the site's significant environmental aspects are well managed.

4.1 Marshalling and Storage Areas

Environmental Concerns

Areas will be required for storing and maintaining equipment and supplies through the development and operational phases of the Carol Lake Project. Concerns include:

- Vegetation and soil disturbance may cause erosion and run-off of sediment into nearby water bodies.
- Spills/leaks of hydrocarbons from storing and maintenance activities

Environmental Protection Procedures

a) Existing marshalling and storage areas will be used outside the development site, where feasible.

b) Any new marshalling, maintenance or storage areas required for the project will only be established within the IOC Labrador City property.

c) Establishing any new marshalling or storage areas will follow the procedures for vegetation clearing (Section 4.2), grubbing and overburden removal (Section 4.3), and erosion prevention (Section 4.4).

d) Any marshalling or storage areas shall be located at least 100 m from a waterbody

e) External storage areas will be placed on level terrain and kept free of ponding or run-off.

f) Drainage from areas of exposed fill will be controlled by grade or ditching and directing run-off away from water bodies.

g) Any maintenance work completed on equipment must have the appropriate spill material available and dip pans must be used

h) Secondary containment required where hazardous products are stored. The size of the containment should be a minimum 110% of the material volume.

i) Marshalling and storage areas not required during operations will be rehabilitated.

4.2 Clearing Vegetation

Environmental Concerns

Vegetation clearing (e.g., trees, shrubs, etc.) will be required in advance of site preparation activities. Concerns include habitat loss, impact to nesting birds, erosion and sedimentation into vegetative areas and waterbodies, uncontrolled burning of slash, impact to historical/archeological sites, and stockpiling vegetation in or near watercourses.

Environmental Protection Procedures

a) Clearing activities will comply with the requirements of all applicable permits. A Site Clearance Permit must be completed and submitted to the Environment Department.

b) Clearing or removal of trees will be restricted to only those areas designated by IOC.

c) Project footprint should be minimized wherever possible and clearing limits and work areas must be clearly marked

d) Avoid ecologically sensitive areas such as hardwoods and aquatic habitats wherever possible and practical

e) Clearing will consist of cutting to within 15 cm of the ground and disposing of all standing trees, as well as removing all shrubs, debris and other perishable materials from the area indicated on the engineering/survey drawings.

f) Where practical, vegetation will be stored so that it can be later used as a seed source, moisture retention aid, and shade for new growth during reclamation.

g) Reasonable effort will be made to dispose of usable timber by either using it in project related construction, or by providing the timber for local use off-site. Otherwise, timber will be mulched and mixed with the overburden.

h) Slash and any other construction material or debris will not be permitted to enter any watercourse, and will be piled above spring flood levels. No burning is permitted on-site unless proper approvals acquired.

i) Trees will be either sawed or mulched using mechanized cutting /mulching equipment. The use of mechanical clearing methods, such as bulldozers, will not occur except where it can be demonstrated that there is no merchantable timber, and where the resulting terrain disturbance and erosion will not result in the loss of topsoil or the sedimentation of water bodies.

j) A 100 m buffer zone of undisturbed vegetation will be maintained between **all water bodies and watercourses on the Carol Project.** If this buffer cannot be maintained, the Environment Department must be consulted to determine the appropriate buffer requirement and approve additional mitigations.

k) Timber shall be felled inward toward the work area to avoid damaging any standing trees within the immediate work area.

l) Workers will not destroy or disturb any features indicative of a cultural or archaeological site. Such features should be avoided until a report has been made to the Provincial Archaeology Office and clearance to proceed has been received (see Section 5.7).

m) IOC is aware of the value of wetlands and will attempt to avoid such disturbance of wetlands outside of the work areas where feasible.

n) All equipment used will be handled and maintained according to the procedures in Section 4.10.

o) Firefighting tools and water delivery systems must be available

p) Where feasible, vegetation clearing will be scheduled to avoid disturbance during the critical nesting period, from May to August. If clearing is scheduled between May and August, conduct nest searches in advance of vegetation clearing to avoid active nests during breeding season.

q) No clearing shall take place within 800 m of an active raptor nest between May 15 and August 15. If a nest is encountered during clearing activities, the area is to be demarcated and clearing is to be avoided until the Environmental Department determines that work may continue in consultation with the NL Wildlife Division.

r) Should additional nests/dens be identified during clearing activities, work must stop and the Environmental Advisor contacted immediately to establish buffer zones.

s) If identified during construction, IOC will relocate any Species at Risk (SAR) or Species of Conservation Concern (SCC).

4.3 Grubbing and Overburden Removal

Environmental Concerns

The principle concerns associated with grubbing and disposal of related debris are the potential adverse effects on freshwater ecosystems and water quality through the release of sediment into watercourses, as well as the potential for disturbing historic resources.

Environmental Protection Procedures

a) Grubbing of the organic material and/or the upper soil horizons will be restricted to the minimum area required. The organic material must be removed separately from the upper soil horizon material.

b) The organic vegetation material and upper soil horizon material that has been grubbed will be spread in a manner to cover inactive exposed areas.

c) Any surplus of such material will be stored or stockpiled for site rehabilitation and re-vegetation purposes. Organic material will be stockpiled separately from the upper soil horizon material. The location of the stockpiles will be recorded and accessible for future rehabilitation purposes.

d) If stockpiled material is to be disturbed, the site is to be inspected by the Environmental Advisor to ensure that bank swallow nests, if present, are not impacted (May 15 to end July)

e) Measures will be implemented to reduce and control runoff of sediment-laden water during grubbing, and the re-spreading and stockpiling of grubbed materials. Where grubbed materials are re-spread or stockpiled, as many stumps and roots as possible will be left on the ground surface to maintain soil cohesion, dissipate the energy of runoff and promote natural re-vegetation.

f) Runoff of sediment laden water during grubbing will be minimized by using such measures as settling ponds, ditch blocks, interception ditches and filter fabrics. Erosion control measures such as rip rap, filter fabrics, drainage channels and gravel, hay bales or wood chip mulches will be implemented in areas prone to soil loss.

g) Where erosion into a water body is a concern, the length of time that inactive grubbed areas will be left exposed to the natural elements will be minimized to prevent unnecessary erosion.

h) Grubbing activities will adhere to the buffer zone requirements outlined in Section 4.5.

i) During grubbing, care will be taken to ensure that grubbed material will not be pushed into areas that are to be left undisturbed. Grubbing material will be mixed with the overburden for future rehabilitation.

j) Discovery of historic resources will be handled according to the procedures outlined in Section 5.6.

k) IOC is aware of the value of wetlands and will attempt to avoid such disturbance of wetlands outside of the work areas where feasible.

l) All equipment used will be handled and maintained according to the procedures in Section 4.10.

m) There should be avoidance of grubbing in high slope areas near water bodies.

n) Dust control is to be provided during clearing and grubbing operations as outlined in Section 4.15.

4.4 Erosion Prevention and Siltation Controls

Environmental Concerns

Eroded material may alter drainage patterns, increase stream velocities, cause siltation in water bodies and, subsequently, decrease suitable habitat for aquatic and terrestrial animals.

Environmental Protection Procedures

a) All work in the vicinity of the developing site, will be conducted according to the conditions set out in the permits and/or approvals and authorizations from the Newfoundland and Labrador Municipal Affairs & Environment (NL MAE), and DFO.

b) Areas to be disturbed should be minimized where possible and practical. Vegetative buffers will be maintained around waterbodies and sensitive areas.

c) Drainage ditches will be stabilized (e.g., lining with vegetation or rock, terracing, interceptor swales, installation of rock check dams) to reduce soil erosion. Any such measures will be properly maintained following installation.

d) Excavation, embankment construction and grading in the vicinity of stream crossings will be done in a manner that avoids or reduces erosion and sedimentation of watercourses or bodies.

e) All areas of exposed erodible soil will be stabilized by back-blading, grading and/or compacting to meet engineered slope requirements. Roughening slopes with horizontal depressions will also reduce the risk of erosion.

f) Where there is potential for erosion along exposed erodible slopes and a natural vegetation buffer of less than 20 m from the high water mark exists between erodible areas and water bodies, a settling pond or silt fence will be constructed to control silt runoff. Engineering requirements will vary depending on the locations of the silt fence and will take into consideration such factors as drainage/surface area of exposed soil and time of year that the silt fences are used.

g) If an environmental inspection reveals that silt is entering a watercourse, further mitigative measures will be implemented, such as temporary drainage ditches, siltation

control (settling) ponds, ditch blocks/check dams or sediment dam traps, to intercept run-off. The necessary or appropriate measures will be determined in the field.

h) All stream bank sections that contain loose or erodible materials will be stabilized.

i) All areas will be monitored for erosion and appropriate repair action taken as necessary.

j) Existing or new siltation control structures used in this work will be monitored regularly by the Environmental Advisors for excessive accumulation of sediment. Accumulated sediment from control structures will be removed as necessary to ensure the effectiveness of the systems.

k) Remove excess water from siltation control systems prior to excavation of sediment. Trucks will be equipped with liners when required to prevent loss of wet sediment during transport.

4.5 Buffer Zones

Environmental Concerns

Buffer zones are vegetated boundaries maintained along water bodies. Without adequate buffer zone vegetation, streams, ponds and lakes can become laden with silt from run-off. Vegetation also provides cover for fish. Streamside vegetation may:

- Provide shade thereby helping to regulate water temperature;
- Provide stream bank stability thereby preventing erosion and subsequent introduction of sediment into the water;
- Intercept precipitation, and through evaporation and transpiration, regulate the amount of water discharged into the stream;
- Provide insect drop which is a food source for fish;
- Introduce leaf litter and decaying vegetative matter into the stream which provides food for aquatic organisms on which fish feed.

Environmental Protection Procedures

a) A minimum buffer zone of 100 m of undisturbed natural vegetation is to be maintained and clearly marked between work areas and all water bodies and sensitive areas. Where buffer zones cannot be maintained, the buffer requirement will be discussed and determined in consultation with the Environmental Advisor.

b) In areas where the slope is greater than 30%, the minimum width of the buffer zone will be calculated by the following formula: Buffer Width (m) = 20 m + 1.5 x slope (%), as recommended by DFO.

c) Any work within 15 m of a water body will require a permit under the Water Resources Act.

d) Sediment control structures are to be placed outside of the buffer requirements.

e) Bulk fuel storage will maintain a minimum buffer zone of 100 m from high water marks of waterbodies and ecologically sensitive areas.

4.6 Drilling

Environmental Concerns

Drilling for both development and production has the potential to impact the environment. The environmental concerns associated with drilling are disposal of drilling fluids and cuttings, generation of dust & noise, destruction of historic resources, impacts on air quality and impacts to aquatic ecosystems.

Environmental Protection Procedures

a) Due to the nature of drilling activities (quicksnaps, couplings) oil drops and leaks may occur. The area shall be cleaned up at every opportunity and all rigs shall be equipped with spill kits (as outlined in Section 6.13).

b) In the event of a hose rupture or loss of hydraulic fluid, the Environmental Contingency Plan shall be followed.

c) Disposal of all drilling materials and associated solid wastes shall be undertaken in accordance with the procedures in Section 6.18.

d) Fuel shall be stored, handled and transported according to Section 6.17.

e) Water applications shall be used to control dust. Water-based drilling dust suppression systems may require anti-freeze in winter months, which shall be approved by NL ENVC. The use of water for dust control or coring/wash boring shall be undertaken in a manner that ensures return water does not enter watercourses.

f) Drilling equipment shall have muffled exhaust to minimize noise.

g) No person shall deposit or permit deposition of oil, oil wastes or any other substance harmful to fish or migratory birds in any waters or areas frequented by fish or migratory birds.

4.7 Blasting

Environmental Concerns

Blasting will be undertaken in association with a number of the work elements. The principal environmental concerns associated with blasting on land include:

- Destruction of vegetation outside the pit and development area limits;
- Noise disturbances to wildlife;
- Effects to fish and aquatic animals;
- Disturbance of historical/archeological resources;
- Dust and fume generation;
- Water quality; and
- Potential introduction of silt and ammonia into the water column.

Environmental Protection Procedures

a) All blasting will be done in compliance with the appropriate permits and approvals. All blasters will have a Blasters Safety Certificate. All magazines for explosive storage have the appropriate approvals.

b) The handling, transportation, storage and use of explosives and all other hazardous materials will be conducted in compliance with all applicable laws, regulations, and orders of the Newfoundland and Labrador Departments of Labour and Mines and Energy, and the *Dangerous Goods Transportation Act*.

c) Blasting pattern and procedures will be used which reduce shock or instantaneous peak noise levels.

d) Time delay blasting cycles will be used if necessary, to control the scatter of blasted material.

e) Blasting will not occur in the vicinity of fuel storage facilities.

f) Use of explosives will be restricted to authorized personnel who have been trained in their use.

g) There are separate magazines on site; a magazine for explosives and a smaller cap magazine for dynamite blasting caps.

h) All personnel must comply with the safe blasting procedures established by IOC as described in the Mine Orientation training course.

i) The immediate area of the site will be surveyed within three hours prior to a blast to ensure no members of the public are within the blast area.

j) Historical resources and features will not be disturbed during blasting. Any historic discoveries will be reported to the relevant government agencies.

On Land

a) The immediate area of the site will be surveyed within three hours prior to a blast and operations will be curtailed if sensitive animals (e.g. black bears, caribou, moose) are observed within 100 m. Any other animal sightings will be reported to the Environmental Advisor. Blasting may be delayed in such circumstances until wildlife have been allowed to leave the area.

In Close Proximity to Water

a) In order to reduce the potential effect of blasting operations on the aquatic environment, blasting within 150 m of a water body will only occur in situations where such operations are deemed necessary and will comply with the following:

   i. When blasting operations are within 200 m of a waterbody occupied by fish, the operations shall be carried out in accordance with DFO guidelines.
   ii. Drilling and blasting activities will be done in a manner that ensures that the magnitude of explosions is limited to that which is absolutely necessary.
   iii. Three hours prior to any blasting within 150 m of a water body, a visual reconnaissance of the area will be undertaken to ensure that there are no waterfowl or aquatic furbearers present. Blasting will be delayed in such circumstances until they have been allowed to leave the area of their own accord. Under no circumstances will noise or other devices be used to harass or otherwise disturb these animals to encourage them to leave the area of the proposed blast.

4.8 Watercourse Crossings

Environmental Concerns

The project will involve upgrading of existing roads and on-site trails. The environmental concerns associated with stream crossings and culvert installations include erosion/siltation, disturbance of waterfowl, potential mortality of fish, and loss of fish habitat.

All watercourses and water bodies will be examined on a site-specific basis in order to evaluate the specific mitigations required. When fish are present at a proposed watercourse crossing, the nature (water depth, flow, and substrate type) and quantity of fish habitat at the site will be noted and reported by the Environmental Advisors. The type of crossing (fording, culvert, or bridge) and design will also be noted by the monitor for the purpose of establishing regulatory requirements.

Also, an evaluation of soil erosion potential will be conducted at each of the stream crossings. This assessment of erosion risk will assist in the development of specific erosion stabilization methods and effective sedimentation control practices on a site-specific basis.

Proposed crossing of a watercourse visible on a 1:50,000 topographic map shall require a permit from NL MAE. The Environment Department should be consulted on all crossings to ensure proper permits and mitigations are established prior to conducting any work.

Environmental Protection Procedures

Stream crossings will be constructed in compliance with the required Culvert Approval and Letters of Advice from the Newfoundland and Labrador Department of Environment and Conservation, and DFO, respectively. IOC will consult with DFO to develop mitigation strategies to reduce effects of in-stream work during sensitive periods.

The following measures will be implemented to reduce the potential effects of stream crossings:

a) If fish are present at a stream crossing, construction activities between September 1 and June 15 will be undertaken under the direct supervision of the Environmental Advisor.

b) Work will be performed in such a way as to ensure deleterious substances including, but not limited to, materials such as sediment, fuel and oil do not enter watercourses and water bodies.

c) The number of water crossings will be minimized.

d) Procedures for buffer zones that are outlined in Section 4.5 will be followed.

Culverts

In those locations where culverts are required, application will be made to the Newfoundland and Labrador Department of Environment and Conservation, and DFO. The culverts used will be sized to handle the 1 in 10 year return period flood and will be constructed in accordance with all provincial requirements.

The following measures will also be implemented:

a) Install culvert(s) in accordance with **best** engineering and environmental practices.

b) Unless otherwise indicated, all work should take place in dry conditions, either by the use of cofferdams or by diverting the stream.

c) In the event of fish being present, installation of cylindrical culverts shall be counter sunk such that the culvert bottom is 15% the diameter below the streambed (for culverts greater than 2000 mm in diameter), and 300 mm for culverts up to 2000 mm in diameter.

d) In multiple (gang) culvert installations, install one culvert at an elevation lower than the others.

e) Ensure that the natural low flow regime of the watercourse is not altered.

f) A culvert will not be installed before site specific information such as localized stream gradient, fish habitat type and species present have been evaluated. Culverts are to be installed according to DFO guidelines.

g) Use riprap outlets and inlets to prevent erosion of fill slopes.

h) Use culverts of sufficient length to extend a short distance (minimum of 300 mm) beyond the toe of the fill material.

i) Use backfilling material which is of a texture that shall support the culvert and limit seepage and subsequent washing out.

j) Align culverts such that the original direction of stream flow is not significantly altered.

k) Remove fill and construction debris from the culvert area to a location above the peak flow level to prevent its entry into the stream.

l) Confine construction activity to the immediate area of the culvert.

m) Fill material shall not be removed from streambeds or banks except when installing a culvert when removal of material is necessary to ensure a flat foundation.

n) Limit and restrict the use of heavy equipment in and near watercourses; an excavator will be used from shore rather than a bulldozer in the watercourse. Where it is absolutely necessary to do so, in-stream work will be performed by rubber tired vehicles only, and will only be done in compliance with approvals from the Newfoundland and Labrador Department of Environment and Conservation, and DFO, respectively.

o) As required, cofferdams of non-erodible material shall be used to separate work areas from the watercourse when excavating for culverts and footings.

p) Cofferdams shall be removed upon completion of construction and the streambed returned as closely as possible to its original condition.

Fording

Fording of watercourses will be avoided as much as possible and where necessary will be limited to situations of a single round trip (i.e., multiple use of a site will be facilitated by a temporary bridge). When fording any watercourse, all relevant guidelines/regulations will be adhered to including the NL MAE Environmental Guidelines for Fording and the DFO fact sheet for Temporary Fording sites. Before and after photos should be taken at the fording location to document conditions.

The following will be applied to any fording activity:

a) In the unlikely event that fording is required in fish-bearing water, areas of spawning habitat will be avoided.

b) Crossings shall be restricted to a single location and crossings made at right angles to the watercourse.

c) Equipment activity within the watercourse shall be reduced by limiting the number of crossings.

d) Ensure that all equipment is mechanically sound to avoid leaks of oil, gasoline and hydraulic fluids.

e) Stabilize the entire fording area using vegetation mats, corduroy roads or coarse material (125 mm diameter or greater) when such material is available from a reasonably close location within the right-of-way, and the ford area is not natural bedrock, or is easily disturbed by fording. When the substrate of the ford area is not subject to easy disturbance by fording, or coarse material is not easily available within the right-of-way, then fording under existing substrate conditions may occur under the direction of the Environmental Advisors.

f) Ensure that fording activities are halted during high flow periods.

g) Stabilize all bank sections which contain loose or erodible materials. If banks must be sloped for stabilization, no material shall be deposited within the watercourse. Sloping shall be accomplished by back-blading and the material removed shall be deposited above the high water mark of the watercourse.

h) Fording activities shall not decrease the depth of the watercourses to less than 20 cm. Where the existing depth is less than 20 cm, that depth shall be maintained.

i) All fording activities will comply with the required approvals from the Newfoundland and Labrador Department of Environment and Conservation and DFO.

4.9 Dewatering Work and Site Drainage

Please note an environmental assessment of the water body at the developing site is required prior to discharging it.

Environmental Concerns

The major concerns associated with site dewatering and the drainage of any water body at a developing site are potential siltation and direct fish mortality and/or habitat destruction for freshwater species.

Environmental Protection Procedures

a) Filtration or other suitable measures, such as settling ponds, silt fences and dykes, will be provided to remove silt from, and reduce the turbidity of, water pumped from work areas before discharging.

b) Site water may be discharged to vegetated work areas to further reduce any potential effects on watercourses.

c) The area of settling ponds will be gauged to accommodate the anticipated volume of discharged water.

d) Discharged water will be encouraged to follow natural surface drainage patterns.

e) Perform water treatment and quality monitoring prior to discharge to the environment, in compliance with applicable federal and provincial regulatory requirements.

f) For fish relocation: Use methods for live capture of fish that are established and recognized in Newfoundland and Labrador and documented in a Fish Removal Plan (to be developed on case by case basis).

4.10 Equipment Use and Maintenance

Environmental Concerns

A variety of vehicles and heavy equipment will be used throughout the project, as well as in accompanying support and supply facilities and activities. Environmental concerns associated with operating and using such equipment includes noise, air emissions, accidental spills, artificial lighting and leaks that may contaminate on-site water bodies or sensitive receptors.

Environmental Protection Procedure

a) Pre-use inspections are to be completed on all equipment. All equipment shall be regularly maintained and inspected. If problems are identified the equipment will be serviced to prevent the risk of a spill/leak.

b) Construction equipment will be on good operating condition, free of leaks and with all appropriate emission filters

c) All pieces of equipment will have exhaust systems that are regularly inspected and properly functioning to manufacturers specifications.

d) Spill kits will be strategically located on site, clearly labelled and regularly maintained.

e) Drip pans will be placed underneath pumps.

f) Hoses and connections on equipment will be inspected routinely for leaks and drips.

g) Equipment maintenance and fuelling activities will be performed at sites designated by the Environmental Advisor and in compliance with applicable regulations.

h) All maintenance on the mobile fleet (e.g., haul trucks) will be performed at the Mine Maintenance Facility or at a designated area.

i) Only minor repairs and maintenance (e.g., lubrication) of ‘non-mobile’ equipment, such as the shovel or drilling equipment, will be performed on-site. All major repairs are to be performed at the Mine Maintenance Facility.

j) All leaks will be repaired and reported immediately to Security, who will notify the Environmental Department.

k) All fuel and other hazardous materials will be handled according to the procedures in Section 4.11.

l) Vehicles and equipment will be stored at designated areas a minimum of 100 m from water bodies when not in use.

All equipment (e.g. diesel generator, etc.) shall meet requirements of the NL Air Pollution Control Regulations under the Environmental Protection Act, as required.

4.11 Storage, Handling and Transfer of Fuel and Other Hazardous Material

Typical hazardous substances that may be used on site include, but are not necessarily limited to:

- chlorinated and non-chlorinated solvents (*e.g.*, cleaner-degreasers);
- flammable gases (*e.g.*, acetylene);
- waste petroleum products (*e.g.*, used engine oil);
- corrosives (*e.g.*, battery acid);
- glycol (*e.g.*, antifreeze); and/or
- ozone-depleting gases (*e.g.*, freon);
- petroleum, oil and lubricants

Environmental Concerns

The primary concern with using hazardous substances is that there may be an uncontrolled release to the environment through spillage, and subsequent adverse effects on terrestrial and aquatic habitat and species, soil, groundwater quality, and human health and safety.

Environmental Protection Procedures

a) The *Workplace Hazardous Materials Information System (WHMIS) Regulations* under the *Occupational Health and Safety Act* will apply to all handling and storage of

hazardous materials. All relevant current Safety Data Sheets (SDS) will be readily available on site.

b) All necessary precautions will be taken to prevent and reduce the spillage, misplacement or loss of fuels and other hazardous materials. In the event of a spill on-land or in the freshwater environment, the Canadian Coast Guard will be contacted immediately at 1-800-563-9089.

c) Satellite fuel storage tanks (and associated fuelling equipment) will largely be replaced with a mobile fuelling truck, which will be responsible for re-fuelling mobile equipment. Personnel transferring fuel from tank trucks to mobile units will inspect transfer equipment prior to product transfer.

d) All fuel storage systems will be registered and comply with the *Storage and Handling of Gasoline and Associated Products (GAP) Regulations*. Verification of the storage tank approval will be retained for IOC.

e) Only persons who are qualified and trained in handling these materials as stated in the manufacturer's instructions and government laws and regulations will handle fuel and other hazardous materials.

f) Fuel truck drivers will be in attendance for the duration of refuelling operations.

g) Fuel and other hazardous materials will be stored at least 100 m from any surface water.

h) Handling and fuelling procedures will comply with the *GAP Regulations* and any additional requirements put forth by the Newfoundland and Labrador Municipal Affairs & Environment in order to limit potential contamination of soil or water.

i) Appropriate fuel spill control and clean up material must be available during fueling activities.

j) Any above-ground fuel container, with the exception of those exempted under the *GAP Regulations*, will be surrounded by an impervious dyke of sufficient height (minimum height 0.6 m) to contain:

i) where a dyked area contains only one storage tank, the dyked area shall retain not less than 110% of the capacity of the tank

ii) where a dyked area contains more than one storage tank, the dyked area shall retain not less than 110% of the capacity of the largest tank or 100% of the capacity of the largest tank plus 10% of the aggregate capacity of all the other tanks whichever is greater. Otherwise approved self-dyked storage tanks will be used where required.

iii) all dykes of earthwork construction will have a flat top not less than 0.6 m wide, and be constructed and maintained to be liquid tight to a permeability of 25 L/m^2/day. The distance between a storage tank shell and the centre line of a dyke will be at least one half the tank height.

k) Fuel storage areas and non-portable transfer lines will be clearly marked or barricaded to ensure that they are not damaged by moving vehicles. The markers will be visible under all weather conditions. Barriers will be constructed in compliance with the *GAP Regulations*.

l) Waste oils, lubricants, and other used oil will be retained in a tank or closed container, and disposed of in accordance with the *Waste Material Disposal Act*.

m) Any soil contaminated by small leaks of oil or grease from equipment will be disposed of according to the *Waste Material Disposal Act*.

n) All storage tank systems will be inspected on a regular basis by the Environmental Advisor as per Section 18 of the *GAP Regulations*. This involves, but is not limited to, gauging or dipping, reconciliation of records, and the proper maintenance of reconciliation records for a period of two years.

o) Contracted fuel suppliers will, before transporting or positioning fuel or oil, have on file at IOC a copy of their fuel and hazardous material spills contingency plan which is required under *GAP Regulations* and which is acceptable to IOC. The fuel and hazardous material spills contingency plan for IOC is provided in Section 5.3.

p) Transportation of hazardous and dangerous materials shall be conducted in accordance with provincial, territorial and federal transportation regulations. Transportation

documents shall be retained in a retrievable filing system and stored for the duration of the undertaking.

q) Smoking will be prohibited within 10 m of a fuel storage area.

r) Fuelling or servicing of mobile equipment will be conducted in designated areas.

s) Drum storage areas will not be located within 100 m of a water body. Drums containing hydrocarbon or other hazardous materials will be transported, stored, handled and disposed of such that spillage or leakage does not occur. Drums will be tightly sealed against corrosion and rust and surrounded by an impermeable barrier in a dry building with an impermeable floor. The location of drum storage areas must be approved by IOC.

t) Small quantities of hazardous material (drums, cans and other containers under 20 L volume) will be stored in a secure location protected from weather and freezing, as well as vehicular traffic.

u) Where hazardous materials are to be stored outdoors, a designated area will be established, graded and fitted with an impermeable membrane covered with local soil and surrounded by an earth berm.

v) Within thirty (30) days of decommissioning of a storage tank system, the system will be emptied of all products, the tank and associated piping will be removed (including any contaminated soil) and the area will be cleaned and the site restored.

w) Decommissioning of any temporary storage tank system will be conducted according to the *Environmental Code of Practice for Aboveground Storage Tank Systems Containing Petroleum Products* (CCME 1994).

x) Bulk fuel storage facilities will be dipped on a weekly basis in order to accurately gauge fuel consumption. These consumption rates will allow for visually undetectable sources of contamination to be identified and corrected.

y) If required, a hazardous waste storage area will be constructed in compliance with all applicable federal and provincial legislation.

z) All petroleum and chemicals must be stored on a secondary containment.

4.12 Solid Waste Disposal

Environmental Concerns

Solid waste (e.g., domestic and industrial wastes, paper, cardboard and wood), if not properly controlled and disposed of, will be unsightly and could cause human safety and health concerns. It could also attract wildlife leading to the potential for human-wildlife conflicts.

Environmental Protection Procedures

a) All solid waste will be handled according to the provincial *Waste Material Disposal Act*.

b) Solid waste produced by site personnel and operations will be regularly collected and disposed of at the IOC Landfill.

c) Waste accumulated on site prior to disposal will be confined so that it does not pose an environmental or health hazard.

d) Work areas will be kept clear of waste and litter to reduce the potential for attracting wildlife and reducing potential interactions with wildlife (see procedures in Section 5.5 for handling wildlife encounters).

e) Any waste that may attract animals (i.e., food) will be stored in covered, wildlife-proof containers.

f) Burning of waste is not permitted.

g) All hazardous wastes generated, as a result of the treatment alternatives, will be handled according to the procedures for handling fuel and hazardous materials (Section 4.11).

4.13 Mineral Waste Rock and Overburden

Environmental Concerns

The principal concern associated with the placement of waste mineral rock and overburden is siltation of the aquatic environment, pertaining to water quality and substrate, as well as loss of habitat and displacement of wildlife. Potential for dust generation from exposed soil/rock may also be a concern.

Environmental Protection Procedures

a) Waste rock and overburden storage areas will be located at least 100 meters from a water body.

b) Overburden and separate organic stockpile locations and volumes will be recorded from salvage to placement.

c) Structures such as silt fences will be used as a means of sediment control, and collection ditches and settling ponds will be used to manage surface runoff and any groundwater flows.

d) Waste rock and overburden piles will be sloped and bermed to prevent pooling of surface water.

e) Waste rock and overburden storage areas will be secured as appropriate and marked with signs to ensure the safety of employees and the public.

f) Stabilize stockpiles with vegetative cover or temporary covers of mulch or similar until vegetative cover can be established in order to reduce erosion and dust generation.

g) Implement progressive rehabilitation measures when areas are available.

4.14 Vehicle Traffic

Environmental Concerns

Vehicular traffic can result in interactions with wildlife, fugitive dust emissions, noise and historical resources. IOC is committed to the proper operation and maintenance of its vehicles to reduce environmental effects.

Environmental Protection Procedures

a) All vehicle and equipment use, including use of all-terrain vehicles, will be restricted to designated routes within and between work, marshalling, maintenance and storage areas.

b) All vehicles and equipment will be properly maintained to meet emissions standards.

c) Travel in areas outside designated work areas will not be permitted.

d) All vehicles and equipment will yield to wildlife (see procedures in Section 5.4 for handling wildlife encounters).

e) Chasing and/or harassing wildlife with vehicles and equipment will not be permitted.

f) Maintaining and refuelling vehicles will be restricted to designated areas (See Section 4.10).

g) Heavy equipment (e.g., dump trucks and front-end loaders) will only be used in work areas.

h) Site roads will be monitored for signs of erosion and appropriate action will be taken to repair roads, when necessary.

i) All personnel driving in the pit are required to have a valid pit permit. Personnel must comply with the requirements dictated in the Pit Permit training course.

4.15 Dust Control

Environmental Concern

The environmental concerns associated with dust include human health effects and potential effects on aquatic ecosystems and vegetation.

Environmental Protection Procedures

a) Plan activities to minimize dust emissions and implement dust control procedures.

b) Dust from operating activities will be controlled using water. In the event of excessive dust, water will be applied to travel and work surfaces. Waste oil will not be used for dust control, but other agents such as calcium chloride may be used with the approval of the appropriate regulatory agencies.

c) Dust suppression on site roads will be done by watering the roads as part of IOC's ongoing fugitive dust reduction measures.

d) Dust will be controlled by retaining trees and shrubs to act as windbreaks and natural erosion prevention. The amount of vegetation to be cleared will be minimized.

e) Confinement of vehicular traffic to established access routes and lower speed limits will be implemented to reduce dust generation.

f) Re-vegetation of inactive exposed areas to be completed as directed by the Environment Department.

g) Use damp feed when crushing rock for road aggregate.

h) Drills must utilize appropriate dust suppression equipment to prevent dust generation.

4.16 Hazardous Waste Disposal

Environmental Concerns

The primary concern with disposing of hazardous substances is that there may be an uncontrolled release to the environment through leakage or accidental spillage, and subsequent adverse effects on terrestrial and aquatic habitat and species, soil, groundwater quality, and human health and safety.

Environmental Protection Procedures

a) All hazardous waste will be handled according to the provincial *Waste Material Disposal Act*. Waste classified as "hazardous" or "special" that can not be disposed of in regular landfill sites will be sent for disposal at an approved hazardous waste management company.

b) All necessary precautions will be taken to prevent and reduce the spillage, misplacement or loss of fuels and other hazardous materials.

c) Hazardous waste materials will only be handled by persons who are qualified and trained in handling these materials as stipulated in government laws and regulations.

d) Waste accumulated on site prior to disposal will be confined so that it does not pose an environmental or health hazard.

e) Waste material will not be disposed of on-site or in a body of water.

f) Burning of waste is not permitted.

g) Where hazardous waste materials are to be stored outdoors, a designated area will be established, graded and fitted with an impermeable membrane covered with local soil and surrounded by an earth berm.

h) Waste oils, lubricants, and other used oil will be retained in a tank or closed container, and disposed of in accordance with the *Waste Material Disposal Act*.

i) Any soil contaminated by small leaks of oil or grease from equipment will be disposed of according to the *Waste Material Disposal Act*.

j) All hazardous wastes generated, as a result of the treatment alternatives, will be handled according to the procedures for handling fuel and hazardous materials (Section 4.11).

4.17 Road Maintenance

Environmental Concern

Routine grading and maintenance of the haulage and development roads may result in material entering roadside ditches, diversions and culvert areas.

Environmental Protection Procedures

a) All grader operators and loader operators involved in road maintenance are to be informed of proper road maintenance techniques.

b) All culverts crossing roadways must be clearly marked. Grading or pushing material in these areas is strictly forbidden.

c) The diversion channel parallel to the main haulage road must also be clearly marked to prevent accidental in-filling from grading operations.

4.18 Trenching

Environmental Concerns

Environmental concerns associated with trenching include potential runoff of sediment-laden water, which could affect freshwater fish habitat and water quality, lower the quality of water and destroy historic resources.

Environmental Protection Procedures

a) Topsoil and excavated overburden will be stored in stockpiles for later use during rehabilitation.

b) Any unsuitable material will be disposed of in a disposal area approved by the Environmental Advisor.

c) Excavators and backhoes should be used to excavate trenches in areas around overburden and waste rock stockpiles to minimize land disturbance. The use of bulldozers should be avoided.

d) If required, dewatering of trenches will make use of measures to reduce and control the release of sediment laden water with filtration through erosion control devices, settling ponds, straw bales, geotextiles or other devices.

e) When feasible, trenches should be backfilled and the finished grade is to be level with the surrounding surface.

f) If a historic/archeological site is encountered, all work must cease in the area and the Environment Department will consult with the relevant regulatory agencies to determine buffer requirements.

4.19 Surveying

Environmental Concerns

Surveying activities may disturb wildlife species, vegetation and historic resources.

Environmental Protection Procedures

a) Width of survey lines will be limited to that which is necessary for line of sight and unobstructed passage.

b) Whenever possible, cutting lines to the boundary between trees and open areas will be avoided.

c) Cutting of survey lines will be kept to a minimum. Where possible, alternate areas not requiring cut lines will be used.

d) All trees not exactly on transit lines shall be left standing.

e) When surveying the development area limit, areas that will be cleared require a modified adherence to the above, except trees, shrubs and areas to be saved or left natural as noted on the plans or marked in the field.

f) No attempt to harass or disturb wildlife will be made by any person (refer to Section 5.4).

g) Vehicles will yield the right-of-way to wildlife

Traversing

a) Access by heavy equipment to sensitive areas such as wetlands will only be through established right-of-ways.

b) All-terrain vehicles (ATVs) will not be allowed off the right-of-way except as approved by the on site manager/supervisor. The use of ATVs will be restricted to designated trails, thus minimizing ground disturbance. ATV use will comply with the Motorized Snow Mobile and All-Terrain Vehicle Regulations, 1996 under the Motorized Snow Mobile

and All-Terrain Vehicle Act and the Environmental Guidelines for Stream Crossings by All-Terrain Vehicles issued by Municipal Affairs & Environment.

c) No motorized vehicles will enter the areas designated as sensitive without notification and approval of the Site Manager, for establishing targets, permanent benchmarks and transponder locations.

d) In normal ground conditions a 15mm x 400mm long rebar is driven approximately 350mm into the surface with an 8-lb sledgehammer. When bedrock or a large boulder is encountered less than 300mm below the ground surface, a 15mm x 150mm long rebar is cemented in a in a hole drilled in the rock. The rebar will be set into the rock a minimum distance of 80mm.

e) No attempt to harass or disturb wildlife will be made by any person (refer to Section 5.4).

4.20 Public Traffic and Activity

Environmental Concerns

Development activities, such as quarry mining, exploration, surveying, drilling and blasting, or activities that involve the clearing or removal of the existing land, may affect the public (ie. private roads, private cabins, etc) in and around the developing areas.

Environmental Protection Procedures

a) All operating activities will comply with federal and provincial regulations.

b) Public notice will identify the schedule and nature of activities and to recommend precautions.

c) Development Area boundaries will be clearly marked.

5.0 CONTINGENCY PLANS

Contingency plans to address accidents and unplanned situations have been developed, and will be modified as required throughout the project. Notwithstanding the existence of these contingency plans, a policy to implement preventative measures as the first line of defence against the possibility of accidents will be adopted.

5.1 Culvert Failure

The two main causes for failure of a properly installed culvert are a blockage or exceptionally high discharges. Regular inspection and maintenance will avoid blockages, by debris or ice. Failure due to exceptionally high flows cannot be avoided once the culvert is installed and sustained high flows will often limit the ability to mitigate a failure.

Environmental Concerns

The environmental effects of culvert failure are usually a massive release of suspended fine sediment and larger substrate material into the stream. The suspended and finer materials can be transported for considerable distances downstream where fish habitat and fish eggs may be covered and smothered while fish fry and food organisms may be smothered, disturbed, or displaced from their habitat. Introduced coarse substrate may fill pools, disturb spawning gravel, and change or deflect flows, which may lead to additional erosion downstream.

Environmental Protection Procedures

Preventative Measures

a) All culvert installation will comply with federal and provincial regulations (Section 4.8, Watercourse Crossings). All necessary permits and authorization will be obtained for culvert installation.

b) Culverts that are installed will be sized appropriately to reduce the risk of washout due to high flows.

c) Culverts will be inspected regularly and measures will be taken to ensure stability of the installation, remove debris, and prevent ice blockage.

Response Measures

d) There is often little that can safely be done to address culvert failure from high flow once the failure begins. However, high flows are often episodic and short-lived, so it is appropriate to prepare for remedial measures that can be done when flow subsides.

e) Following a culvert failure, measures will be taken to stabilize the roadbed and stream bank to reduce the risk of additional erosion.

f) As soon as high flow subsides and it is safe to do so, large debris such as concrete, culvert pipe or newly fallen trees will be removed from the stream and placed where there is no risk of reintroduction into the stream.

g) Provincial and federal authorities are to be notified (Section 7.0 Contact List) and further remedial work in the stream will only proceed following consultation with DFO.

h) All necessary provincial and federal permits and authorizations will be obtained prior to conducting any additional in-stream work to restore the stream channel or fish habitat.

5.2 Road Washout

Road washout can occur due to flooding, poorly installed culverts, poorly installed and maintained ditches, or failure of the shoulder or roadbed.

Environmental Concerns

The environmental effects of road washout are the same as for culvert failure. This usually includes a massive release of suspended fine sediment and larger substrate material into the stream. The suspended and finer materials can be transported for considerable distances downstream where fish habitat and fish eggs may be covered and smothered while fish fry and food organisms may be smothered, disturbed, or displaced from their habitat. Introduced coarse substrate may fill pools, disturb spawning gravel, and change or deflect flows, which may lead to additional erosion downstream.

Environmental Protection Procedures

Preventative Measures

a) Ditching and site drainage will be inspected regularly and measures will be taken to ensure stability of the installations, remove debris, and prevent ice blockage.

Response Measures

b) There is often little that can safely be done to address a road washout from high flow once the failure begins. However, high flows are often episodic and short-lived, so it is appropriate to prepare for remedial measures that can be taken when flow subsides.

c) Following a road washout, measures will be taken to stabilize the roadbed and adjacent stream banks to reduce the risk of additional erosion.

d) As soon as high flow subsides and it is safe to do so, large debris such as guard-rails, concrete footings, culvert pipe or newly fallen trees will be removed from the stream and placed where there is no risk of reintroduction into the stream.

e) Provincial and federal authorities are to be notified (Section 7.0 Contact List) and further

remedial work in the stream will only proceed following consultation with DFO.

f) All necessary provincial and federal permits and authorizations will be obtained prior to conducting any additional instream work to restore the stream channel or fish habitat.

5.3 Fuel and Hazardous Material Spills

Environmental Concerns

Fuel and hazardous materials can be damaging to vegetation, soil, surface water, ground water, wildlife, aquatic organisms, historic resources and human health and safety.

Environmental Protection Procedures

Response Measures

a) All spills are to be immediately reported to Security, who will contact the Coast Guard at 1-800-563-9089.

b) Spills are to be immediately confined and cleaned up as per CR-E-E-PRO Spill Response & Reporting.

c) All contaminated material is to be transported to the IOC Waste Transfer Building for off-site disposal as per the Waste Material Disposal Act.

5.4 Wildlife Encounters

Environmental Concerns

Wildlife encounters pose a risk for stress or injury to both the wildlife and site personnel. Control measures and environmental protection procedures have been put in place to reduce this risk to wildlife and humans. As a protection measure, hunting, trapping or fishing by project personnel is not permitted at the site.

Environmental Protection Procedures

Prevention

The following procedures are to be implemented in order to prevent wildlife encounters:

a) Site and working areas will be kept clean of food scraps and garbage.

b) Waste will be collected for disposal in wildlife/bear-resistant containers. Waste will be transferred to the on-site landfill routinely as needed.

Response Actions

All project personnel will abide by the following rules in the case of wildlife encounters:

a) No attempt will be made by any person at the project site to chase, catch, divert, follow or otherwise harass wildlife by vehicle or on foot.

b) Equipment and vehicles will yield the right-of-way to wildlife.

c) No personal pets, domestic or wild, will be allowed on the site.

d) All personnel should be aware of the potential for encounters with wildlife (black bears, wolves, foxes, etc.) and instructed to immediately report all sightings to Security. At their discretion, the IOC Environmental Department will notify the Newfoundland and Labrador Department of Natural Resources (DNR).

e) When nuisance animals (e.g. black bear) are identified in the project area, the Environmental Advisor will be responsible for all subsequent actions. Responsive actions will also be the responsibility of the Environmental Advisor, who may consult with DNR. All actions must comply with Wildlife Division regulations and permits.

f) The Environmental Advisor will authorize the use of deterrent measures for wildlife.

g) All incidents that result in the displacement or killing of wildlife must be reported to Security.

h) Under provincial wildlife regulations, the displacement and release of any animal is the sole jurisdiction of NL DNR and is to be undertaken only under appropriate supervision.

i) If the nest of any raptor or other bird is encountered during development, activity in the vicinity of the nest is to be curtailed until NL DNR is contacted and appropriate mitigation is applied.

5.5 Forest Fires

Environmental Concerns

Activities related to the project could result in a fire, which could spread to the surrounding area. Such events could be damaging to vegetation and wildlife, as well as human health and safety.

Environmental Protection Procedures

IOC or the contractor will take all precautions necessary to prevent fire hazards when working at the site. These include but are not limited to:

a) Disposal of all flammable waste on a regular basis.

b) Smoking will be permitted in designated areas only.

c) IOC or the contractor making available, in proper operating condition, sufficient fire fighting equipment to suit its labour force and fire hazards. Such equipment will comply with, and be maintained to the manufacturer's standards and personnel are to be trained in the use of such equipment.

d) In the event of a forest fire, IOC or the contractor will take immediate steps to contain or extinguish the fire.

e) IOC will appoint a supervisory staff member as On-Scene-Commander for the purpose of fighting any forest fires.

f) Fires shall be reported immediately to Security, the Wabush Forestry office (709) 282-6881 and ultimately to the Forest Management Unit office in Corner Brook (709) 637-2408. The following information will be provided:
    i) name of the reporter and phone number;
    ii) time of detection of the fire;
    iii) size of the fire;
    iv) location of the fire; and
    iv) The police will also be notified immediately at (709) 944-7602.

5.6 Discovery of Historic Resources or Archeological Sites

Environmental Concerns

Historic resource material that is disturbed, destroyed or improperly removed from a site represents a cultural loss of information and history that could otherwise be handled and interpreted in an efficient and appropriate manner.

Environmental Protection Procedures

In case of a suspected discovery of historic or archeological sites, the following procedures shall apply;

a) Stop all work in the immediate area of the discovery until authorized personnel from IOC, having consulted with the Provincial Archaeologist, permit resumption of the work.

b) Under the Historic Resources Act, RSNL 1990 c.H-4, all archeological sites and artefacts are the property of the Crown, and shall not be disturbed.

c) Report the find immediately to the Environmental Advisor.

d) Mark the site's visible boundaries. Personnel will not move or remove any artifacts or associated material unless the integrity of the material is threatened.

e) The Environmental Advisor will report the find with the following information to the Provincial Archaeology Office, Historic Resources Division, Department of Tourism and Culture, St. John's, and comply with the instruction provided:

    i) nature of the find;

    ii) precise descriptive and map location and the time of the find;

    iii) nature of the activity resulting in the find;

    iv) identity of the person(s) making the find;

v) present location of the material, if moved, and any protective measures initiated for the material and the site; and,

vi) any extenuating circumstances.

6.0 ENVIRONMENTAL PROTECTION PLAN CONTROL REVISIONS

Holders of controlled copies (i.e., those versions which contain all of the up-to-date procedures) of the EPP are included in Appendix B.

EPPs are revised as necessary to reflect site-specific environmental protection requirements, and allow updates as work progresses. All EPP holders may initiate revisions by forwarding proposed revisions to the Environmental Advisor. The following information will be provided on the Revision Request Form (see Appendix C) for all revision requests:

- section to be revised;
- nature of the revision;
- rationale for the revision (*i.e.*, environment/worker safety); and
- who submitted the revision request.

The Environmental Advisors will seek approval for revisions from the Manager Environment & Sustainable Development. When the Environmental Advisor receives approval for the revision request, details of the revision will be distributed to all EPP holders and will be documented in the Revision History Log (Appendix D). Each revision will be accompanied by:

- revision instructions;
- list of sections being superseded; and
- an updated Table of Contents indicating the current status of each section in the EPP.

When EPP Holders receive a revision, they will, within two working days:

- read the text of the revision;
- check the control sheet to ensure that all the listed pages have been received;
- remove and destroy the superseded pages from their copy of the EPP;
- insert the revised pages in the proper place in their copy of the EPP;
- page check the EPP, using the updated table of contents to ensure the EPP is complete and current;
- enter the revision number and date entered on the Revision Control Record;
- incorporate the revision into the area of responsibility, as appropriate; and
- ensure that their personnel are familiar with the revisions.

7.0 CONTACT LIST

IRON ORE COMPANY OF CANADA
Patrick Lauziere
Manager Environment & Sustainable Development
Labrador City, Newfoundland
Tel: (418) 968-7400 ext 7513
Cell: (418) 960-4331

ENVIRONMENT & CLIMATE CHANGE CANADA – CANADIAN COAST GUARD
Newfoundland and Labrador Regional Office
Tel: (709) 772-2083 or 1-800-563-9089

FISHERIES AND OCEANS CANADA
Happy Valley Goose Bay, NL
Tel. (709) 896-6150
Fax: (709) 896-8419

GOVERNMENT SERVICES CENTRE
Happy Valley-Goose Bay, Labrador
Tel. (709) 896-5428
Fax. (709) 896-4340

ROYAL NEWFOUNDLAND CONSTABULARY
417 Booth Street
Labrador City, NL
Tel: (709) 944-7602

DEPARTMENT OF NATURAL RESOURCES – FORESTRY SERVICES
District Office
Wabush, NL
Tel: (709) 282-6881

DEPARTMENT OF MUNICIPAL AFFAIRS AND ENVIRONMENT
Wildlife Division
General Enquiries
T: (709) 637-2025

8.0 REFERENCE MATERIAL

Canadian Council of Ministers of the Environment. 1994. Environmental Code of Practice for Aboveground Storage Tank Systems Containing Petroleum Products.

Department of Municipal Affairs and Environment. Water Resources Management Division. Chapter 3A. Environmental Guidelines for Stream Crossings by All-Terrain Vehicles.

Department of Municipal Affairs and Environment. RSN1990 C W-4 Waste Material Disposal Act.

Department of Municipal Affairs and Environment. 2003. Storage and Handling of Gasoline and Associated Products Regulations.

Department of Municipal Affairs and Environment. RSNL 1990 c.H-4 Historic Resources Act

Department of Municipal Affairs and Environment. SNL2002 C W-4.01 Water Resources Act

Services Newfoundland & Labrador. Fisheries and Land Resources. Motorized Snow Vehicles and All-Terrain Vehicles Act

Department of Natural Resources. Environmental Guidelines for Construction and Mineral Exploration Companies.

Department of Fisheries and Oceans. 1994. Factsheets Vol. 1-26, including:

- Factsheet No. 2 Blasting – Fish and Fish Habitat Protection
- Factsheet No. 4 Temporary Fording Sites
- Factsheet No. 21 Freshwater Intake End-of-Pipe Fish Screen
- Factsheet No. 26 Culvert Installations

Department of Fisheries and Oceans. 1995. Freshwater Intake End-of-Pipe Fish Screen Guideline.

Gosse, M.M., A.S. Power, D.E. Hyslop, and S.L. Pierce. 1998. Guidelines for Protection of Freshwater Fish Habitat in Newfoundland and Labrador. Fisheries and Oceans, St. John's, NF. X + 105 pp., 2 appendices.

Iron Ore Company of Canada. CR-E-E-PRO Spill Response & Reporting.

Rio Tinto Standards. E13- Chemically Reactive Mineral Waste Control Standard.

Wright, D.G., and G.E. Hopky. 1998. Guidelines for the use of explosives in or near Canadian Fisheries Waters. Can. Tech. Rep. Fish. Aquat. Sci. 2107: iv+34p.

APPENDIX A

LIST OF ABBREVIATIONS AND ACRONYMS

LIST OF ABBREVIATIONS AND ACRONYMS

CCME	–	Canadian Council of Ministers of the Environment
DNR	–	Department of Natural Resources
DFO	–	Department of Fisheries and Oceans
EPP	–	Environmental Protection Plan
GAP	–	Storage and Handling of Gasoline and Associated Products
IOC	–	Iron Ore Company of Canada
NL MAE	–	Newfoundland & Labrador Municipal Affairs and Environment
SDS	–	Safety Data Sheet
NEAA	–	Newfoundland Environmental Assessment Act
WHMIS	–	Workplace Hazardous Materials Information System

APPENDIX B

EPP COPY DISTRIBUTION LIST

CONTROLLED COPY DISTRIBUTION LIST

Department or Organization	Individual or Location
Environment Department	Environment N:/ DirectorySystem
Manager Environment & Sustainable Development	Patrick Lauziere
Manager Mine Operation	William Shand
Manager Mine Technical Services	Shana Blakeley
Manager Mine Maintenance	Scott Melvin
General Manager, Mine & Ore Delivery	Scott Barney

APPENDIX C

REVISION REQUEST FORM

REVISION REQUEST FORM

SECTION TO BE REVISED:

NATURE OF REVISION:

RATIONALE FOR REVISION:
(i.e., environment/worker safety, etc.)

SUBMITTED BY:

Please submit request to the Environmental Advisor

APPENDIX D

REVISION HISTORY LOG

REVISION HISTORY LOG

Version	Date Issued	Name of Last Issuer	Revision Notes
Version	**Date Issued**	**Name of Last Issuer**	**Revision Notes**
0.1	June 9, 2003	Lee Preziosi	Draft EPP (Version 0.1) for review
0.2	July 4, 2003	Lee Preziosi	Draft EPP (Version 0.2) for review
01	July 4, 2003	Lee Preziosi	Final EPP (Version 01) Issued
02	February 16, 2004	Lee Preziosi	Revised taking into consideration DFO's Regional Habitat Co-ordinator's comments. Changes made are in bold.
03	May 16, 2005	Sonya Flynn	Revised with new ESH Policy, removed Call-out procedure, new IOC Logo added, update of names, Note on Draining of Hakim Lake
04	July 31, 2007	Jody Clark	Annual review; revised Environmental Administrator to Environment Advisor.
05	April 1, 2008	Garry Greene	Annual review. Revised Garry Greene to Primary Ore Environmental Advisor. In Appendix B changed Arn Do to Kresho Galovich. Revised Department of Forestry Resources and Agrifoods to Department of Natural Resources Forestry and Wildlife Division. Revised Jody Clark Environment Manager to Patrick Lauziere Superintendent Environment.
06	October 28, 2010	Garry Greene	Consolidated all three EPP's., (Luce, Sherwood, Plateau Quarry) into general EPP that covers the entire IOC Labrador City Operations.
07	July 21, 2017	Danielle Kinsman	Review and update of EPP for the Sherwood North Development Project

Appendix C

Development Plan Consultation Report – Indigenous Groups

Rio Tinto

IOC

IRON ORE COMPANY OF CANADA

IOC

INDIGENOUS PEOPLES CONSULTATION REPORT SHERWOOD NORTH

JULY 10, 2017

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1 INTRODUCTION

The Iron Ore Company of Canada (IOC) has prepared a consultation report on the proposed development of the Sherwood North pit. The Sherwood North pit is an extension of the existing Sherwood Pit, which is part of the Humphrey Main/West/Sherwood mining area adjacent to existing operations. This development will provide increased operational flexibility and contribute to extending IOC's mine life.

The Sherwood North area was not included in the Humphrey Main/West/Sherwood pit design used in the Development Plan submitted by IOC in March 2016 to support the Wabush 3 pit development. Consequently, this development plan was submitted to the Newfoundland and Labrador Government in accordance with the requirements of section 6 (2) of the Mining Act (1999), which requires an amended Development Plan to be submitted when "a significant alteration or addition to a project" is proposed.

This Indigenous Consultation Report has been prepared to document IOC's consultation efforts with the following Labrador and Québec-based Indigenous peoples:

- Innu Nation representing Labrador Innu (Sheshatshiu and Natuashish);
- NunatuKavut Community Council (NCC) of Labrador;
- Conseil de la Nation Innu de Matimekush-Lac John (MLJ) of Québec;
- Naskapi Nation of Kawawachikamach (NNK) of Québec; and
- Innu Takuaikan Uashat Mak Mani-Utenam (ITUM) of Québec.

IOC makes considerable efforts to engage with the above Indigenous peoples to provide and receive information on development projects and other initiatives. The key objectives and elements of Indigenous engagement include:

- Providing Indigenous peoples with information on proposed initiatives, including purpose, location, activities and schedule;
- Identifying and documenting and responding to any questions or concerns about initiatives and potential environmental and socioeconomic effects;
- Collecting and sharing information on contemporary land use activities by Indigenous peoples in Labrador West, as well as relevant Indigenous knowledge about the area and its environment;
- Discussing potential approaches and mitigation measures to avoid or reduce any likely effects of initiatives on Indigenous peoples, their interests and activities and on the environment in general;
- Supporting requests from Indigenous peoples for consultation agreements to review plans and permit applications;
- Establishing a positive working relationship and open communications;
- Continuing to encourage Indigenous peoples to engage in the consultation process.

2 INDIGENOUS PEOPLES CONSULTATION

Packages containing copies of the cover letter and related Sherwood North development plan were sent to each Indigenous group and their identified consultants and advisors for a 30-day consultation period from May 19, 2017 to June 18, 2017.

These packages were delivered by email shown in the following table.

Innu Nation and IOC have signed a Resource Development Agreement (2014).

IOC has signed a Community Partnership Agreement with NunatuKavut Community Council (NCC) (2014).

Table 2.1 Consultation dates-

Indigenous Group	Contacts	DATE	
Innu Nation	Grand Chief Anastasia Qupee	May 19, 2017	Packages emailed to Indigenous Peoples and Consultants
	Paula Reid	May 19, 2017	Packages emailed to Indigenous Peoples and Consultants
NunatuKavut Community Council (NCC)	Todd Russell, President	May 19, 2017	Packages emailed to Indigenous Peoples and Consultants
	George Russell Jr.	May 19, 2017	Packages emailed to Indigenous Peoples and Consultants
Conseil de la Nation Innu de Matimekush-Lac John (MLJ)	Chef Tshani Ambroise	May 19, 2017	Packages emailed to Indigenous Peoples and Consultants
	Georges Roy	May 19, 2017	Packages emailed to Indigenous Peoples and Consultants
	André-A. Michel	May 19, 2017	Packages emailed to Indigenous Peoples and Consultants
	Benoît Théberge	May 19, 2017	Packages emailed to Indigenous Peoples and Consultants
	M. Francois Lesveque	May 19, 2017	Packages emailed to Indigenous Peoples and Consultants
Naskapi Nation of Kawawachikamach (NNK)	Chief Noah Swappie	May 19, 2017	Packages emailed to Indigenous Peoples and Consultants

Indigenous Group	Contacts	DATE	
	Curtis Tootoosis	May 19, 2017	Packages emailed to Indigenous Peoples and Consultants
		June 14, 2017	Comment letter received from NNK. Does not object to the development. Letter attached as separate document with this report.
	Christopher Coggan	May 19, 2017	Packages emailed to Indigenous Peoples and Consultants
	Caroline Briand	May 19, 2017	Packages emailed to Indigenous Peoples and Consultants
Innu Takuaikan Uashat Mak Mani-Utenam (ITUM)	Chief Mike McKenzie	May 19, 2017	Packages emailed to Indigenous Peoples and Consultants
	Jean-Claude Pinette	May 19, 2017	Packages emailed to Indigenous Peoples and Consultants
	Raoul Vollant	May 19, 2017	Packages emailed to Indigenous Peoples and Consultants
	Morgan Kendall	May 19, 2017	Packages emailed to Indigenous Peoples and Consultants

3 SUMMARY

As part of the proposed development of the Sherwood North pit, an extension of the existing Sherwood Pit, which is part of the Humphrey Main/West/Sherwood mining area adjacent to existing operations, IOC has undertaken consultation with relevant Indigenous peoples, as summarized below:

- IOC forwarded information on the proposed development plan to Indigenous peoples and their consultants on May 19, 2017 and invited their comments and questions for 30 days. All packages were sent via email.
- Consultation activities have resulted in NNK having no objection to the proposed development.
- IOC did not receive any correspondence from the other four Indigenous groups.

IOC is committed to meaningful consultation and has informed the Indigenous peoples of its interest in discussing the proposed development. IOC appreciates comments it receives and will continue to engage and consult with Indigenous peoples and is committed to full and fair consideration of their comments on the proposed Sherwood North Development.

Appendix D

Sherwood North Revised Development Plan

Iron Ore Company of Canada
Carol Lake Project

Development Plan

Sherwood North

Amendment

July 2017

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1 Introduction

The Iron Ore Company of Canada (IOC) plans to develop a new mine pit (the Sherwood North pit) adjacent to its existing operations to provide increased operational flexibility and to extend mine life.

The Sherwood North pit is an extension of the existing Sherwood Pit, which is part of the Humphrey Main/West/Sherwood mining area. This area was not included in the Humphrey Main/West/Sherwood pit design used in the Development Plan submitted by IOC in March 2016 to support the Wabush 3 pit development. Consequently, this report is submitted to the Newfoundland and Labrador Government in accordance with the requirements of section 6 (2) of the Mining Act (1999), which requires an amended Development Plan to be submitted when "a significant alteration or addition to a project" is proposed.

The existing Sherwood pit terminates in a zone of intense limonitic alteration, which renders the iron formation un-processable. This zone of limonitic alteration continues north to the outcrop of the iron formation. The alteration does not have such a significant impact on the processability of the ore in this northern section, since the more intensely altered area moves from the oxide mineralised Middle Iron Formation (ie the ore zone) immediately north of the Sherwood pit to the carbonate mineralised Lower Iron Formation (ie waste zone) further north. In addition, recent experience in the Luce and Magy Lake pits has indicated that higher levels of limonite alteration can be successfully processed than was previously the case. Additional drilling has confirmed that the geometry and alteration state of the Sherwood North deposit are amenable to exploitation. Consequently, IOC plans to develop the Sherwood North deposit in 2017.

This report is an addendum to the Development Plan submitted in March 2016, and thus only addresses specifics of the Sherwood North pit. The currently designed Sherwood North pit contains approximately 34 million tonnes of ore and 61 million tonnes of waste. The mining and processing of these tonnages will not materially impact IOC's overall development sequence as presented in the March 2016 Development Plan. For details on IOC's existing operations and more general information on geological setting, mineral resource and reserve estimation and classification, processing, product delivery, and workforce, the reader is directed to the March 2016 report.

All plans in this document are in Mine Grid coordinates unless otherwise stated. All north points refer to true north.

As requested by the Department of Natural Resources, IOC will submit an updated Development Plan for its Carol Lake operations at a minimum of every five years or whenever there is a significant change to the project.

The contents of this report shall remain confidential.

2 Overview

The Sherwood North area is located in the Labrador West operations of IOC, adjacent to Labrador City (Figure 1) and its overall additional disturbance footprint (including the open pit, waste rock disposal and overburden storage areas, haulage roads and other infrastructure) will cover a total area of approximately 150 ha (Figure 2).

Figure 1: Site Overview

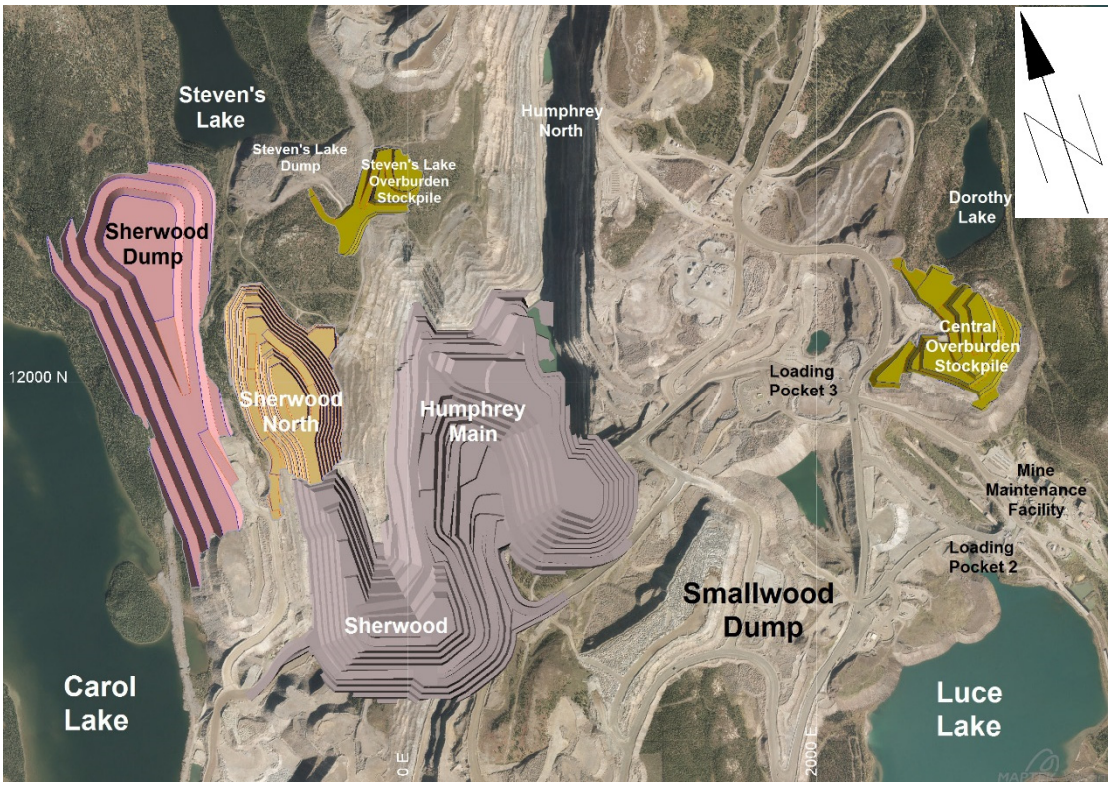


Figure 2: Project Components and Layout

Sherwood North will be a conventional open pit mine with associated components and activities, which are being designed to support flexible ore feed to IOC's existing production facilities. The Project will consist of the following key components:

- An open pit mine;
- Overburden storage adjacent to and east of the open pit and/or in an existing overburden storage area 3 kilometers to the east of the open pit;
- A waste rock disposal site, adjacent to and west of the open pit;
- A haulage road to the south of the open pit, linking it with the waste rock storage pile, overburden storage area, ore delivery system and concentrator facilities;
- Power lines connecting the existing power distribution network with the open pit;
- A groundwater extraction system and associated pipelines (as required); and
- A mine water collection and disposal system and associated pipelines.

The Sherwood North pit targets the north-western limb of the Humphrey Main/West/Sherwood orebody, the southern part of which is currently being exploited by IOC. The Sherwood North pit will be mined in two phases, and

these phases are part of the global phasing of the Humphrey Main pit, which has seven phases named A through G (Figure 3). The first phase of Sherwood North is designated as Humphrey Main, Phase D. The second phase of Sherwood North is Humphrey Main, Phase G. The western side of Humphrey Main (Phases B and F) is referred to as "Sherwood Pond" or simply "Sherwood" and the extension to the north is referred to as "Sherwood North". Although the Sherwood North pit will break through into the Sherwood pit (Humphrey Main Phases B and F), the Sherwood North pit is distinct from the rest of Humphrey Main, has its own separate ramp system, and thus its mining sequence is not dependent on that of the rest of Humphrey Main. Note that as a consequence of the insertion of the Sherwood North phases into the Humphrey Main pit design, the phase naming for Humphrey Main has been changed since the Wabush 3 Development Plan and the Rehabilitation and Closure Plan submitted in February 2017.

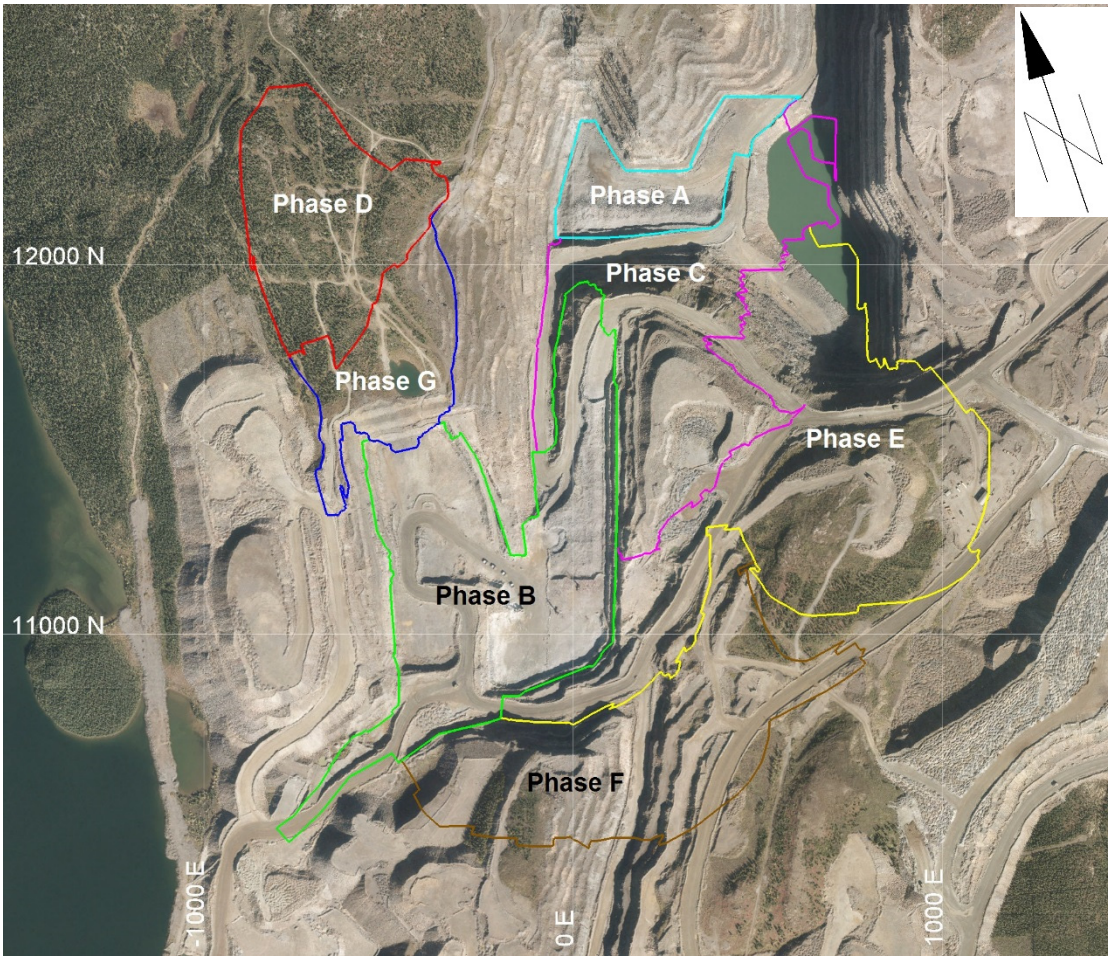


Figure 3: Humphrey Main Phase Naming

A detailed schedule of all development activities for the Sherwood North project is provided in Appendix B.

Development activity will be undertaken progressively over two phases, and will include site clearing, removal of overburden, (glacial till) drilling and blasting of the exposed rock and construction of haul roads. Once operational, the pit will utilize conventional open pit mining techniques for the extraction of iron ore and waste rock.

The Project will be fully integrated into IOC's overall Labrador City Operations, and will utilize its existing:

- Mining equipment;
- Labour force;
- Maintenance facilities;
- Ore delivery systems;
- Processing plants; and
- Tailings management facilities.

3 Tenements and Permitting

The proposed Sherwood North pit and waste dump are located on Mining Lease 13 (Block 22-3) (Table 1 and Figure 4). This lease is held by the Labrador Iron Ore Royalty Corporation (LIORC), and IOC holds a sub-lease agreement with LIORC to operate this lease. LIORC holds the surface rights over the areas of the planned pit, waste dump and overburden stockpile (Table 2 and Figure 5), which are also sub-leased to IOC.

Anticipated regulatory approvals, permits, authorisations, licenses and agreements for Sherwood North are listed in Table 3. Sherwood North is an extension of the Humphrey pit, which was first developed in the 1970s.

Lease Number	Block Number	Deposit, Mine or Location	Area (Hectares)	Expiry
13	22-3	Carol West (Humphrey South), Humphrey West, Sherwood Pond, Sherwood North	2044	10 Jul 2022

Table 1: Mining Lease Details

Description	Area (Hectares)	Expiry
Surface Rights for Mining and Processing; Granted 1960, Amended 1964 & 1970	5347	No expiry date
Surface Rights For Mining; Granted 1990	1209	12 Jul 2020
Surface Rights for Mining; Granted 2012	1470	12 Jul 2020

Table 2: Surface Rights Details

Activity	Permit- Preliminary List (to be refined once more detail is available)	Department	Comment
Sump/ Sedimentation Pond and associated infrastructure *(If required)*	Alterations to a Body of Water- culvert	NL DOEC Water Resources	
	Alterations to a Body of Water- Miscellaneous Works	NL DOEC Water Resources	Work within 15 m buffer- sed pond discharge
	Alterations to a Body of Water- dam	NL DOEC Water Resources	Sed pond/ Sump
	Alterations to a Body of Water- Miscellaneous Works	NL DOEC Water Resources	Sump wetland disturbance
	Amendment for Certificate of Approval to include additional sampling points for changed pit discharges	NL DOEC PP	
	MMER FDP	Fisheries Act	Application to be submitted 60 days prior to operations, if required
GW Well and associated piping *(If required)*	Application for Permit for Constructing a Non-Domestic Well	NL DOEC Water Resources	
General Earthworks (tree clearing/ haul road development, etc)	Alterations to a Body of Water- Miscellaneous Works	NL DOEC Water Resources	Possibly required for small wetlands to be impacted by pit and dump development
	Land Disturbance Permit	IOC	Required when a new area or rehabilitated area is being cleared for new development
	Commercial Cutting permit	NL Forestry and Wildlife	Covered under a Site wide cutting permit for IOC 17-22-00430
General	Certificate of Approval- Construction	NL DOEC PP	Covered under existing C of A
	Surface Rights	NL DNR NL DNR	Existing
	Development Plan and Closure and Rehabilitation Plan	NL DNR	

Table 3: Permit Requirements

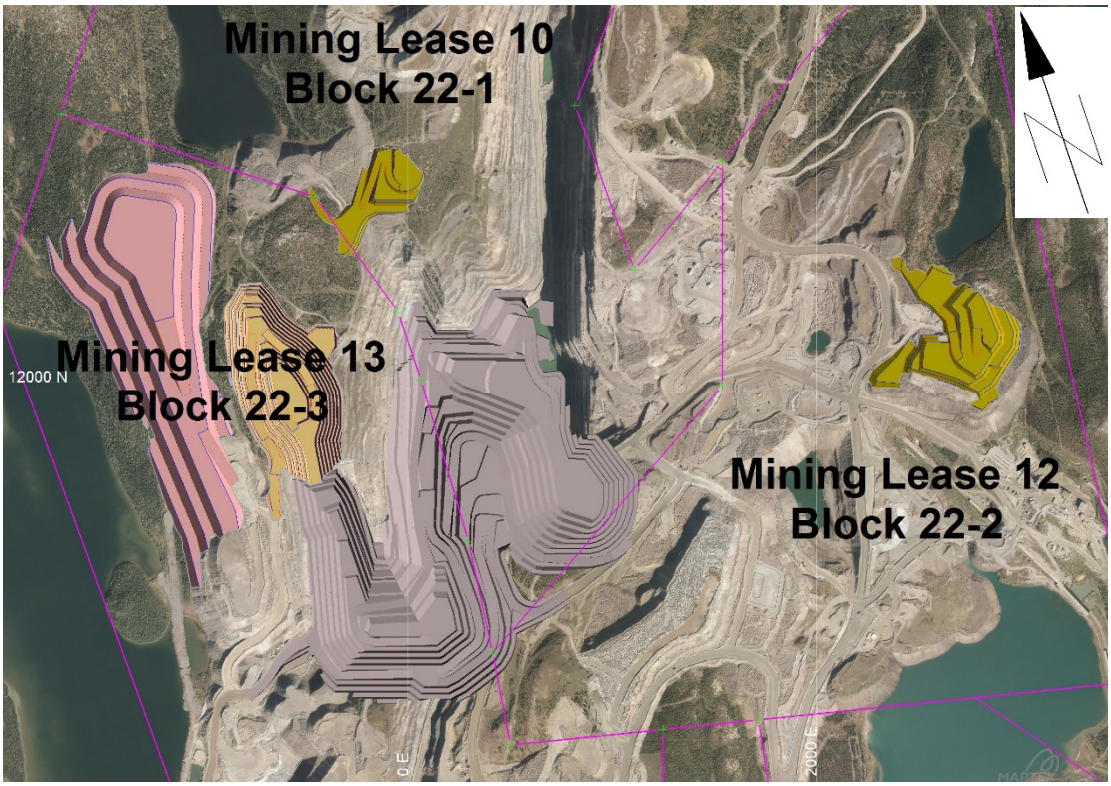


Figure 4: Mineral Tenure Photo – Sherwood North Project (Mine Grid)

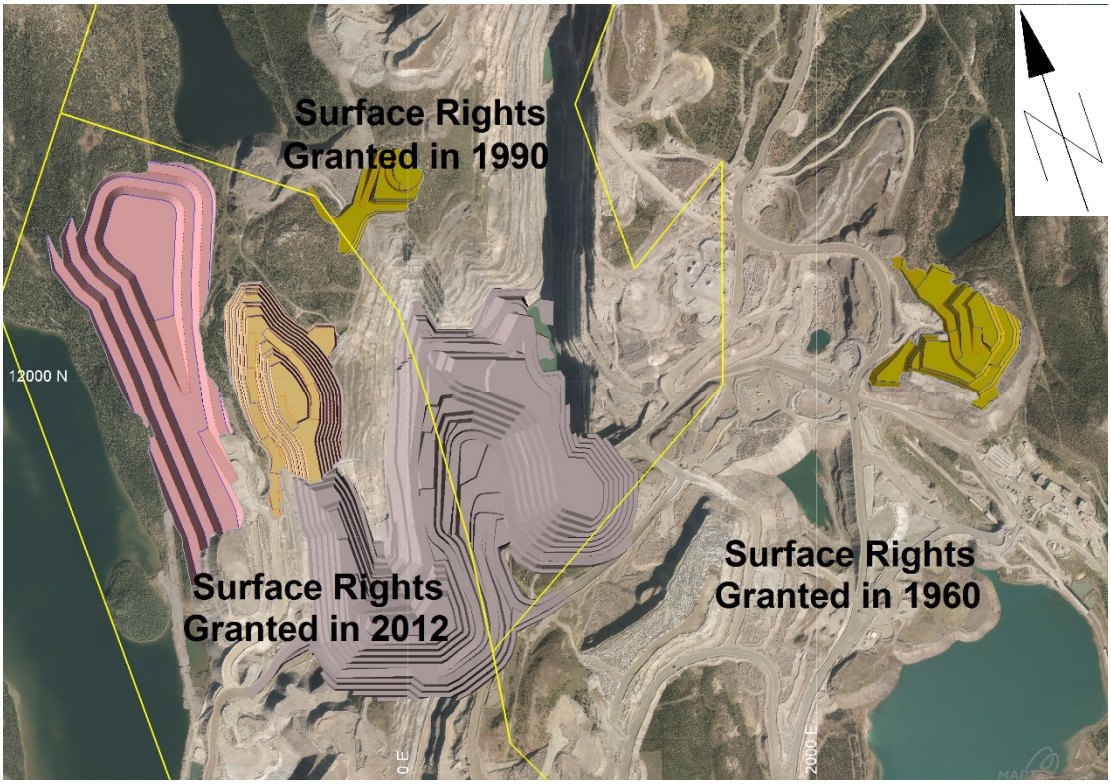


Figure 5: LIORC Surface Rights Photo–Sherwood North Project (Mine Grid)

4 Geology

The Sherwood North deposit targets an extension of the western limb of the Humphrey deposit. Like the other iron ore deposits at IOC, the Humphrey deposit is locally referred to as a meta-taconite and may be classified as a metamorphosed version of the "Lake Superior-Minnesota Type". The Humphrey deposit follows the same stratigraphy described in the March 2016 Development Plan.

As with all of IOC's reserves and resources, the Humphrey deposit lies within the Sokoman Iron formation, which consists of a lower waste unit (LIF), overlain by a middle ore-bearing unit (MIF), which is, in turn, overlain by an upper waste unit (UIF). The MIF unit is also cut by internal waste units of quartz-carbonate, fibre, limonite, and metagabbro.

Figure 6 shows the location of a long section and seven cross sections. The long section is oblique to the grid system and follows the strike of the mineralisation. The cross sections are East-West at 200m intervals, from 11,400 mN to 12,600 mN. Figure 7 shows the long section and Figure 8 to Figure 14 show the cross sections. The sections show the final Sherwood North pit (Humphrey Main Phase G) and the long section also shows the final Sherwood Pond pit (Humphrey Main Phase F).

The Humphrey Main major fold structures consist of an overturned syncline with thin limbs of ore but a thickened fold hinge where the ore limbs have been folded onto one another and are doubled up. Dips of the fold limbs and fold axis are approximately 40 degrees east but do vary throughout the model area. There are four structural domains used to control the grade estimation process. The major folds plunge to the south in the Sherwood North area.

The ore body within Sherwood North sits within a tight syncline and broad anticline formation. The anticline is asymmetrical and forms the eastern wall of the pit.

The fold system is modelled, but no faults have been included. However, with such a tight synform system, and from examining the existing Sherwood Pond pit (north wall) N-S faulting is evident and not unexpected.

Supergene limonitic alteration occurred within this deposit as a result of ground water altering siderite, hematite, and magnetite to limonite, goethite +/- martite. Alteration zones of the Sherwood North deposit are generally to the east along the hanging wall zone of the geological structure. Limonitic alteration is more intense in the in the Sherwood North area than the remainder of the Humphrey Main deposit.

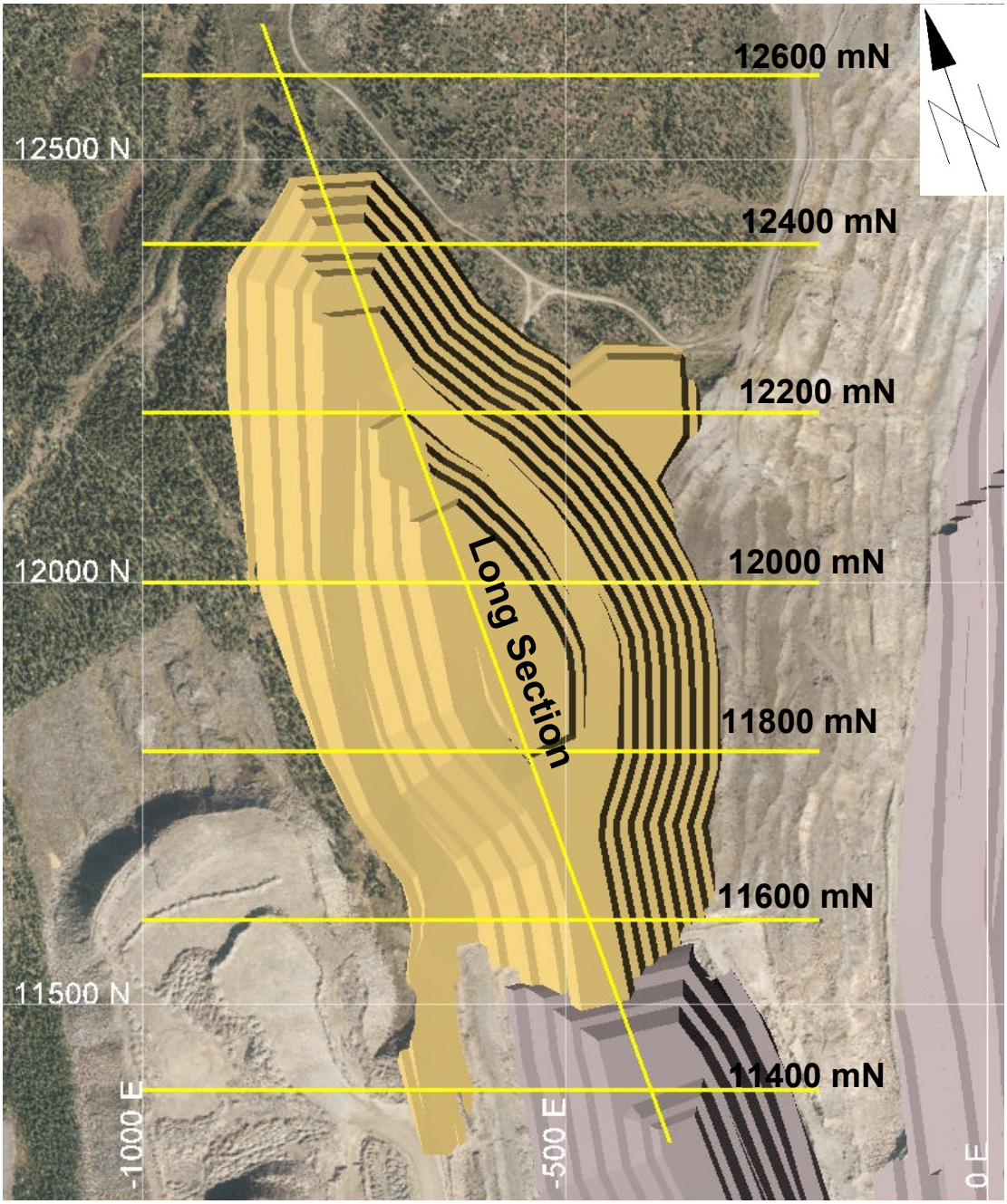


Figure 6: Location of Section Lines

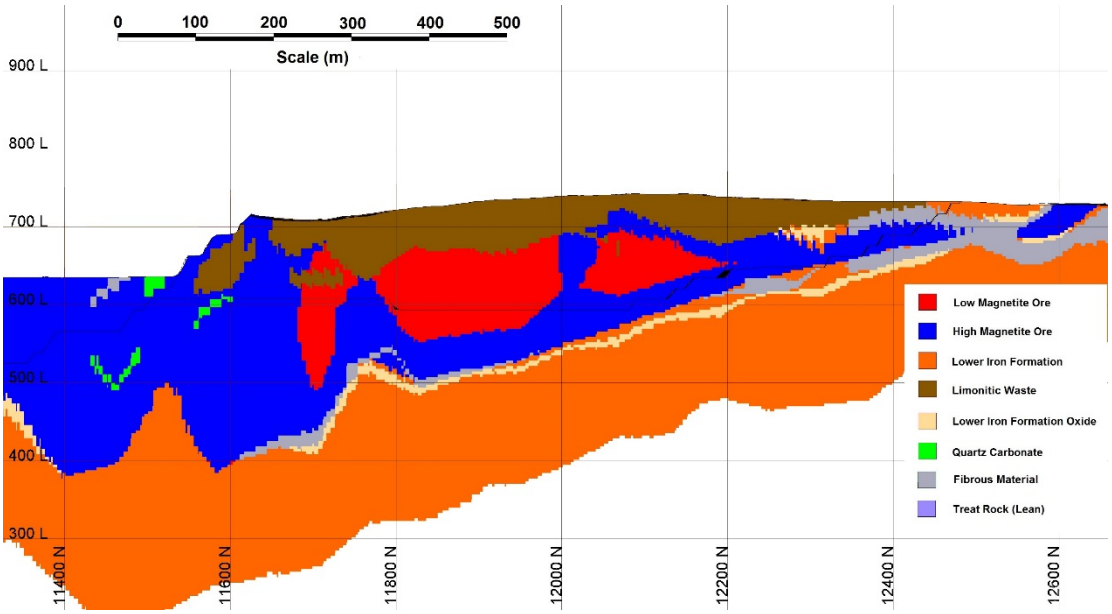


Figure 7: Long Section

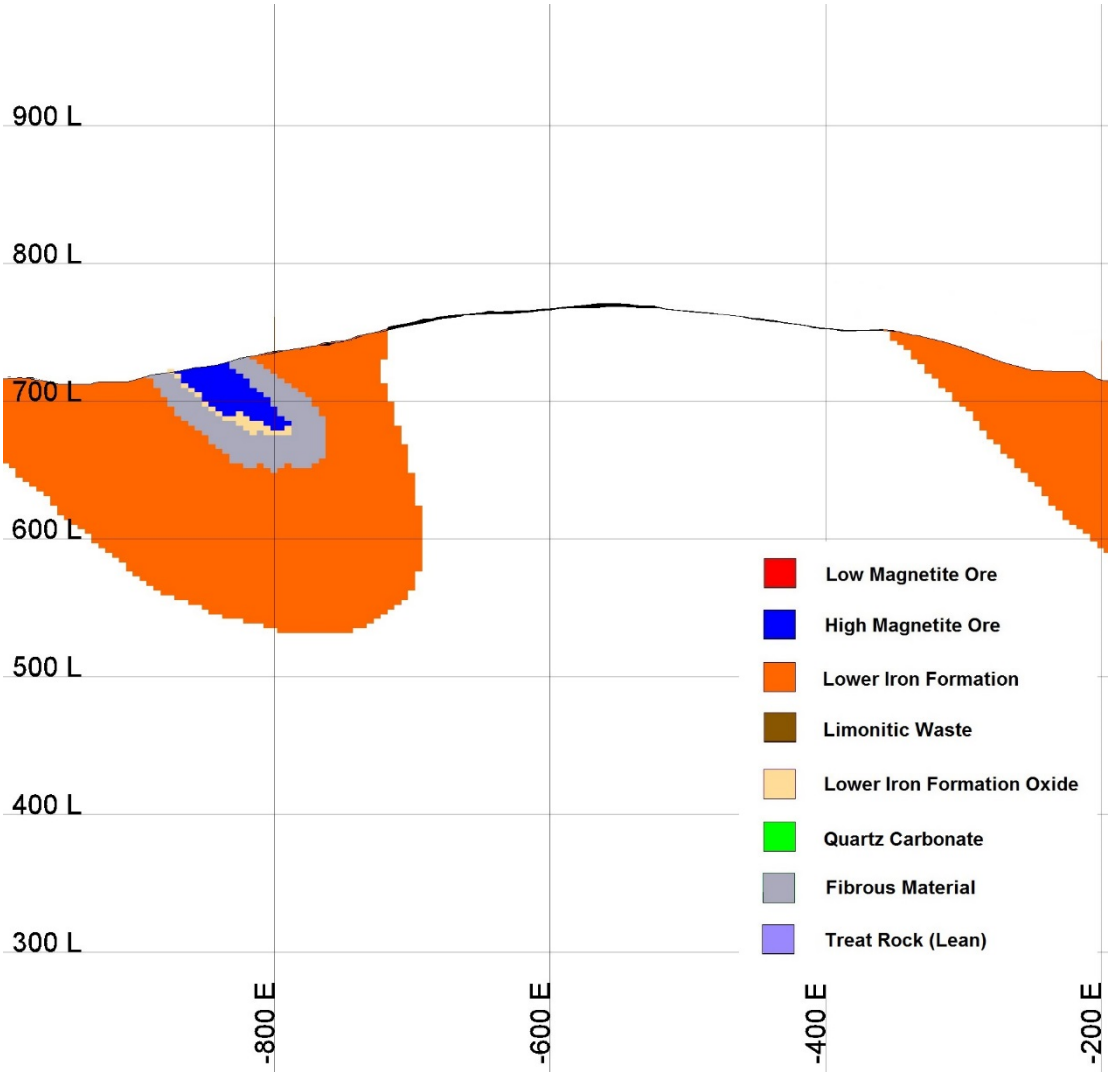


Figure 8: Cross Section 12600mN

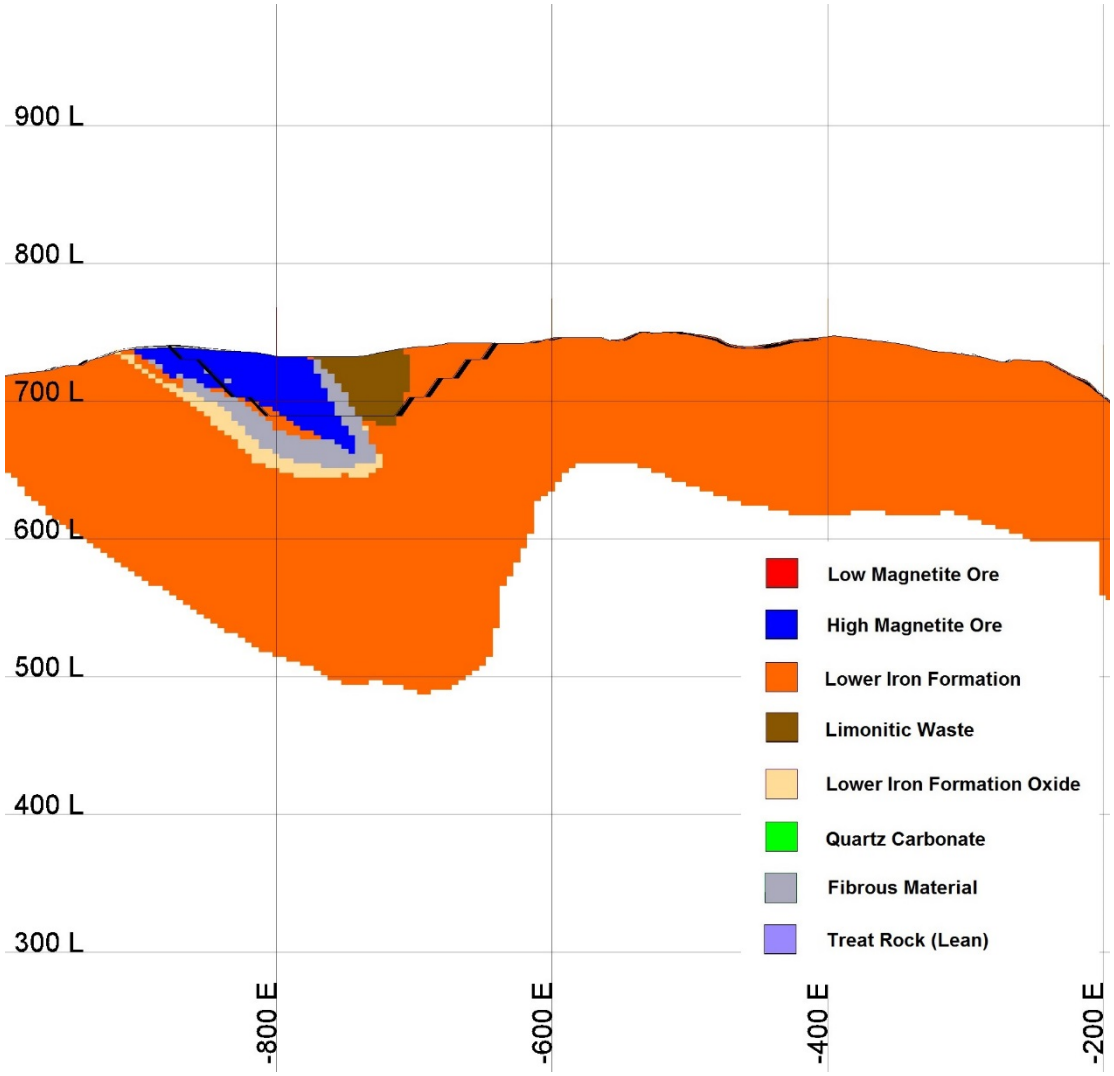


Figure 9: Cross Section 12400mN

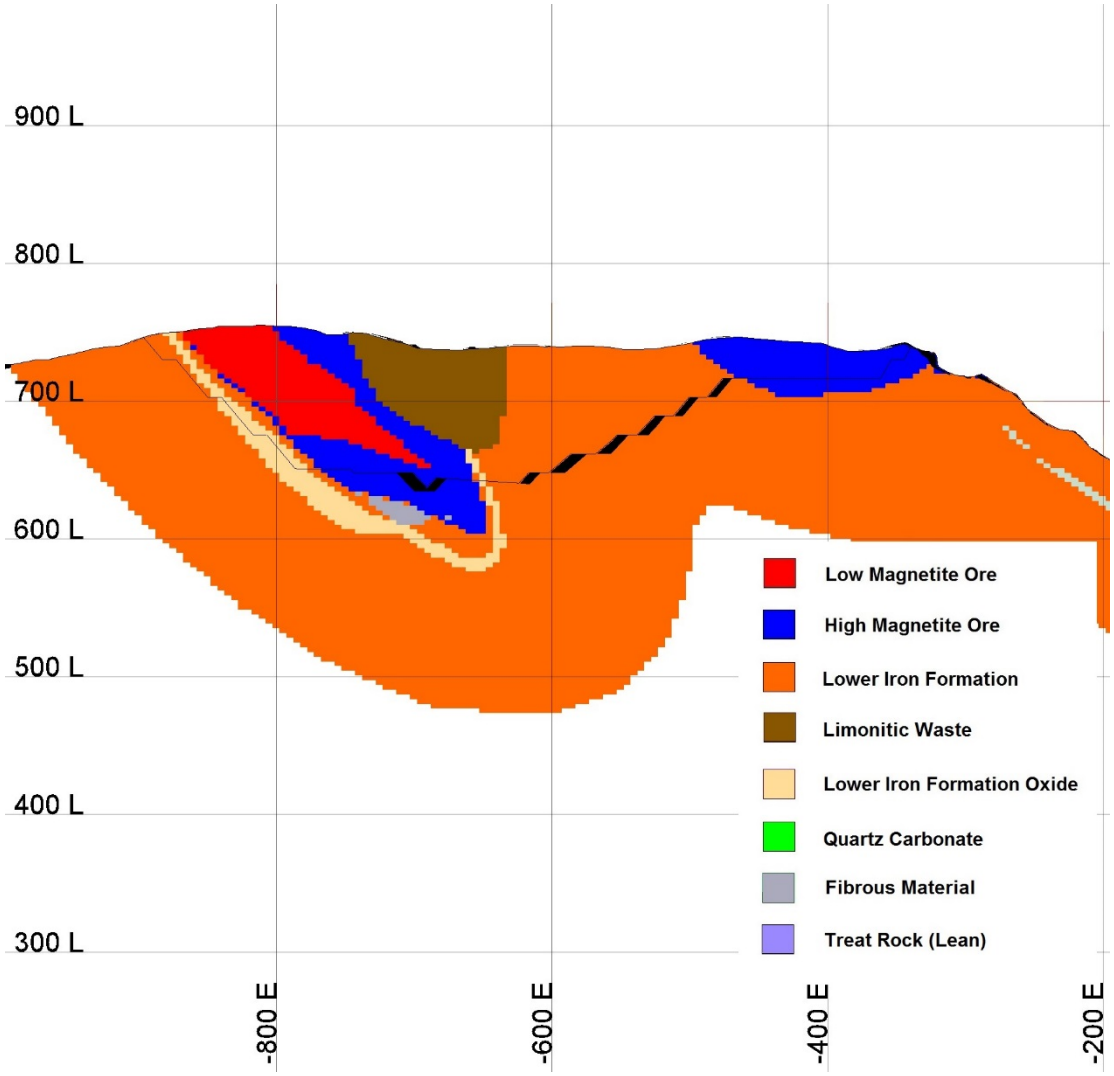


Figure 10: Cross Section 12200mN

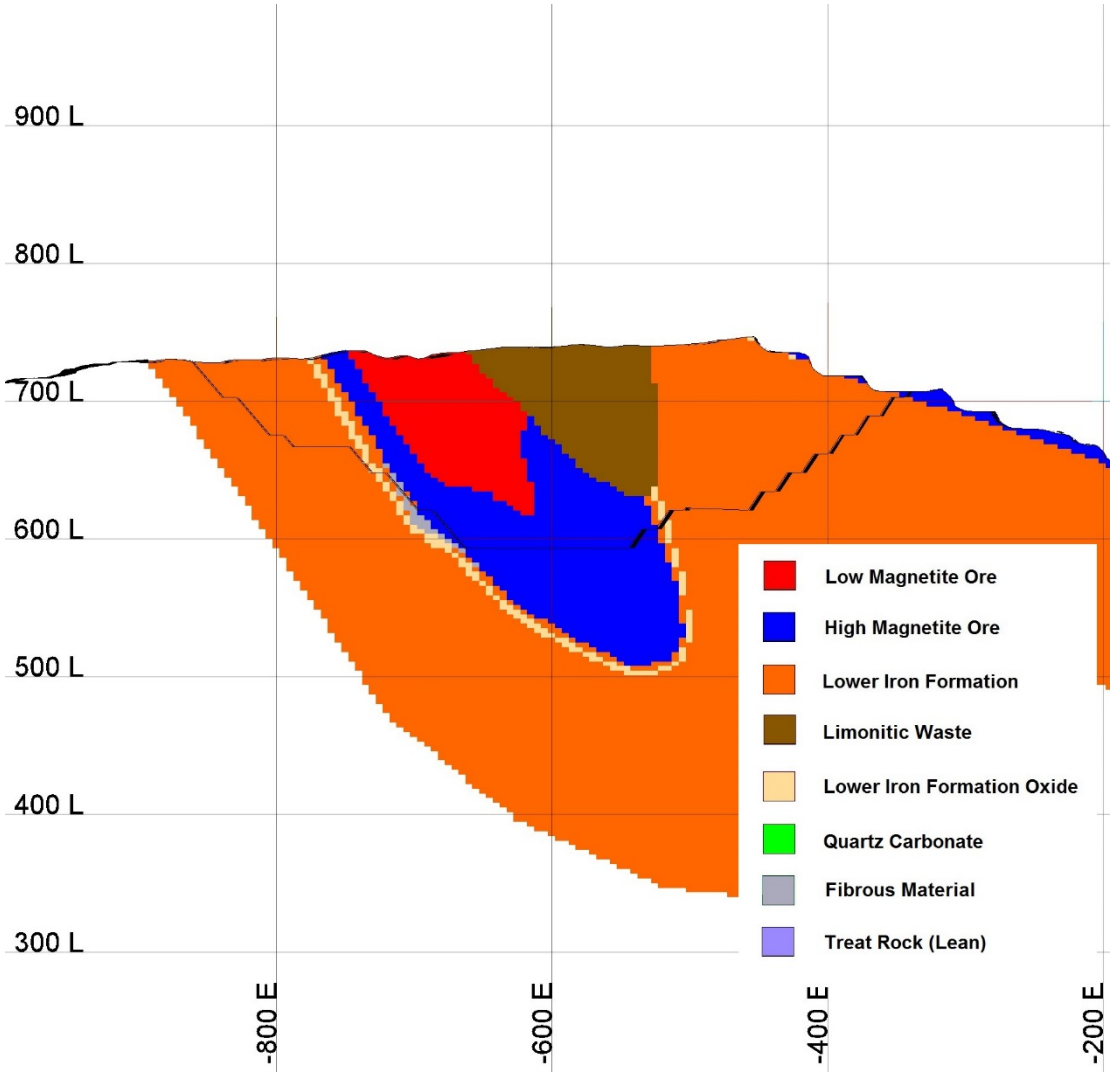


Figure 11: Cross Section 12000mN

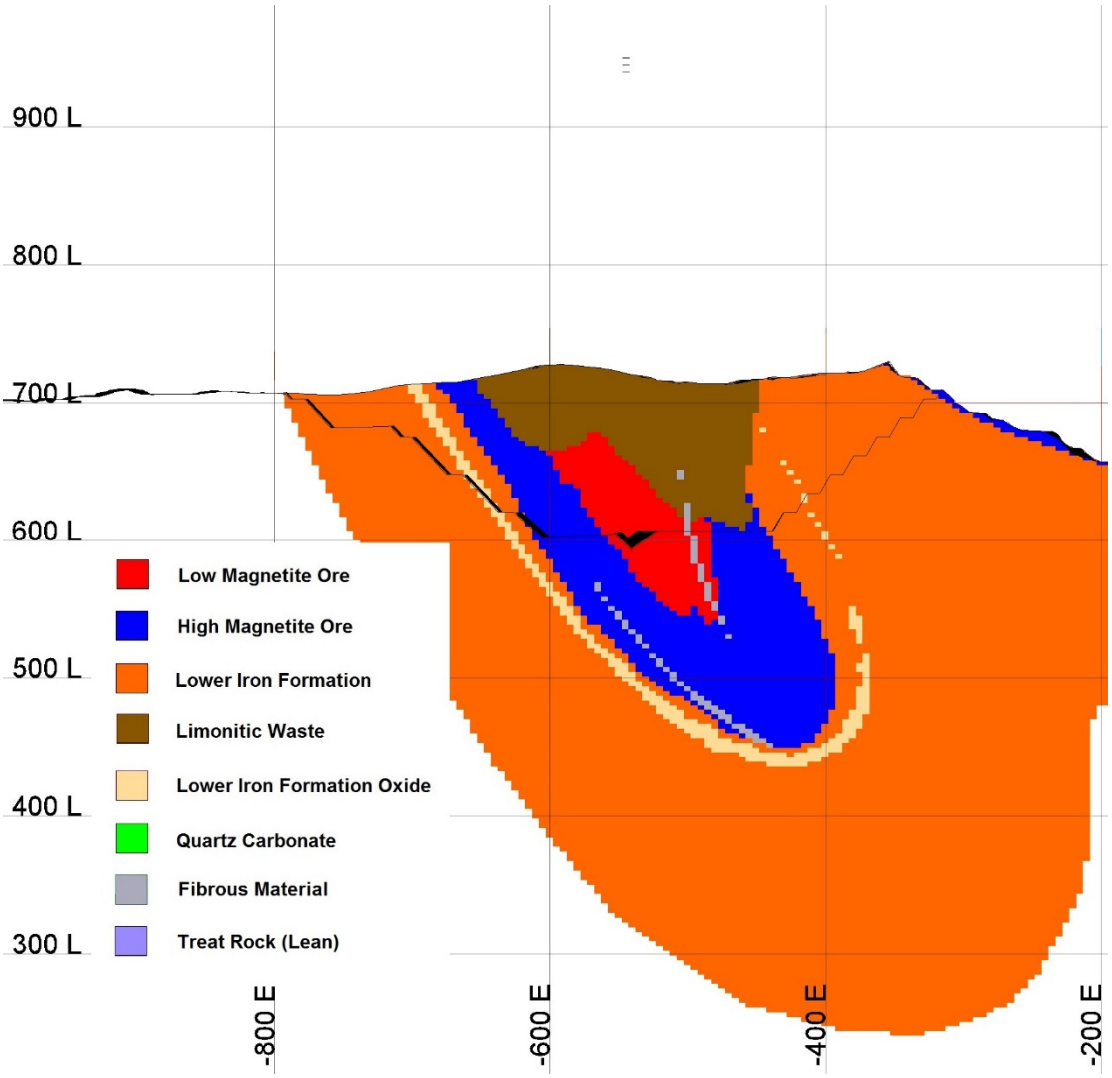


Figure 12: Cross Section 11800mN

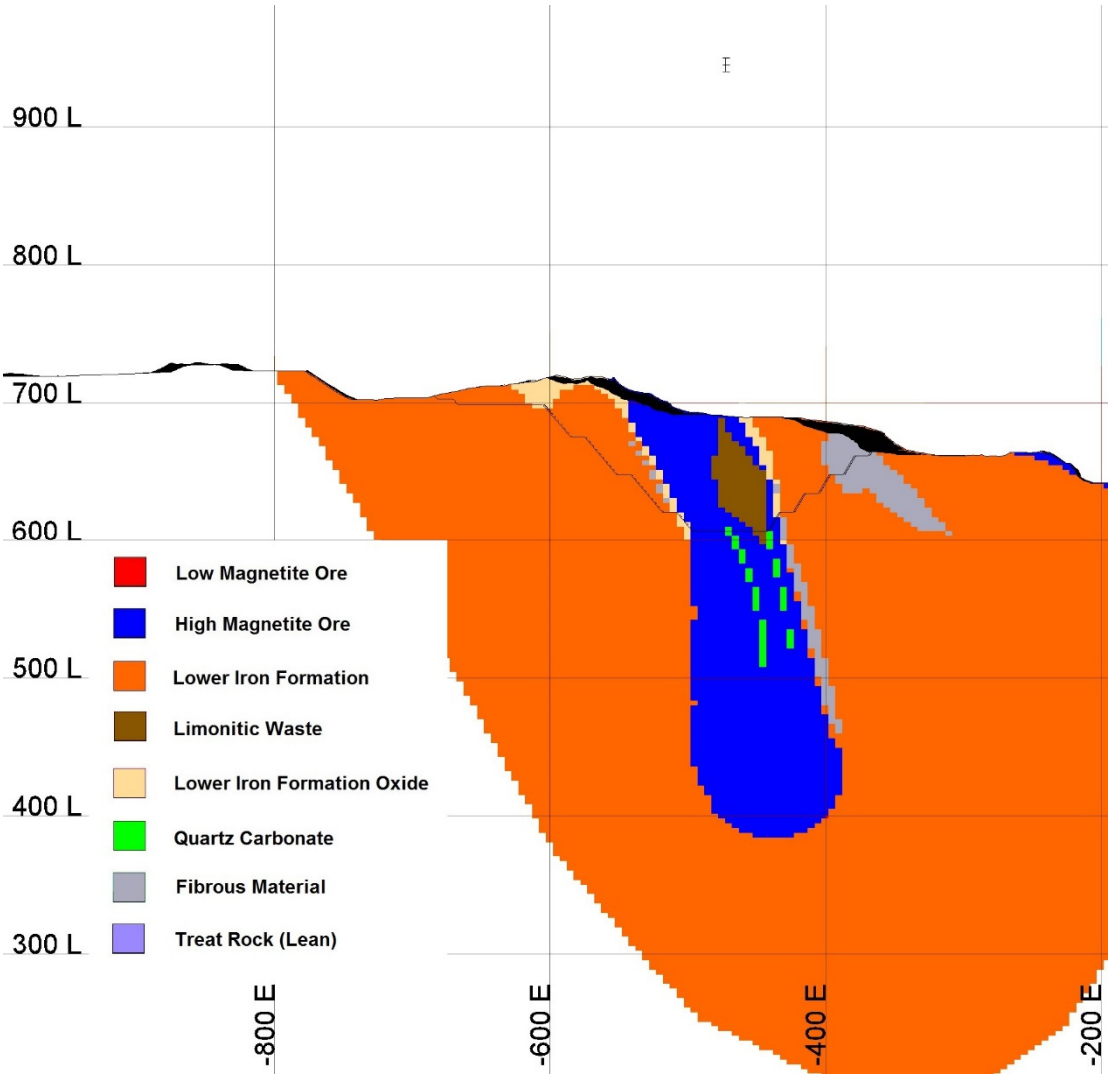


Figure 13: Cross Section 11600mN

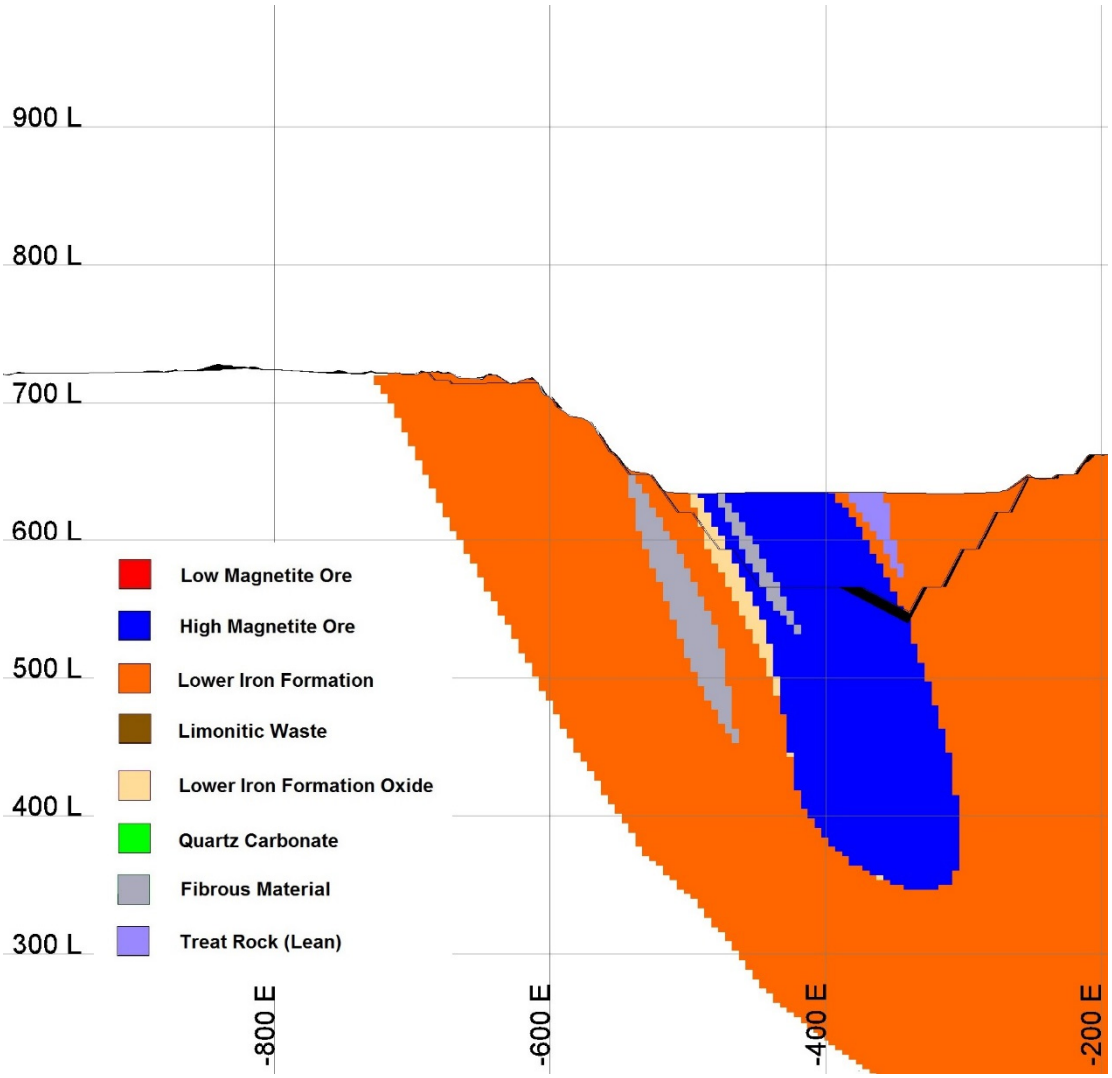


Figure 14: Cross Section 11400mN

5 Resource Drilling

All of IOC's exploration and resource definition drilling is diamond cored. Core is required for metallurgical testing, which cannot be carried out on RC chips. A range of hole sizes have been used historically, but IOC currently drills NQ sized holes for resource definition and generally HQ sized holes for geotechnical and hydrogeological analysis (although NQ holes are sometimes used). All core in or close to the ore zones is assayed and metallurgically tested.

Table 4 summarises the diamond drilling carried out in the Sherwood North zone, defined here as the zone in Mine Grid co-ordinates from -1200 E to -200 E and 11400 N to 13200 N. There are 142 holes for a total of 15,347 meters. These holes are shown in Figure 15 along with the Phase G pit design.

A further 4 NQ sized resource definition holes (approximately 500 meters) are planned in the Sherwood North area in 2017 along with 4 geotechnical HQ sized holes (approximately 600 meters).

Year	# of Holes	Total Meters	Hole Name
1971-1983	38	2,598	C0101C to C0857A
1976-1981	40	4,730	S0016 to S0078
2008	1	75	HW-08-01 to HW-08-20
2009	11	1,087	SW-09-23 to SW-09-64
2010	23	3,244	HW-10-21 to HW-10-86
2012	7	760	SW-12-87 to SW-12-94
2013	7	1,024	HM-13-138 to HM-13-143
2014	2	486	SW-14-101 to SW-14-110
2016	13	1,343	SW-16-111 to SW-16-121
Total:	**142**	**15,347**	

Table 4: Drilling Summary

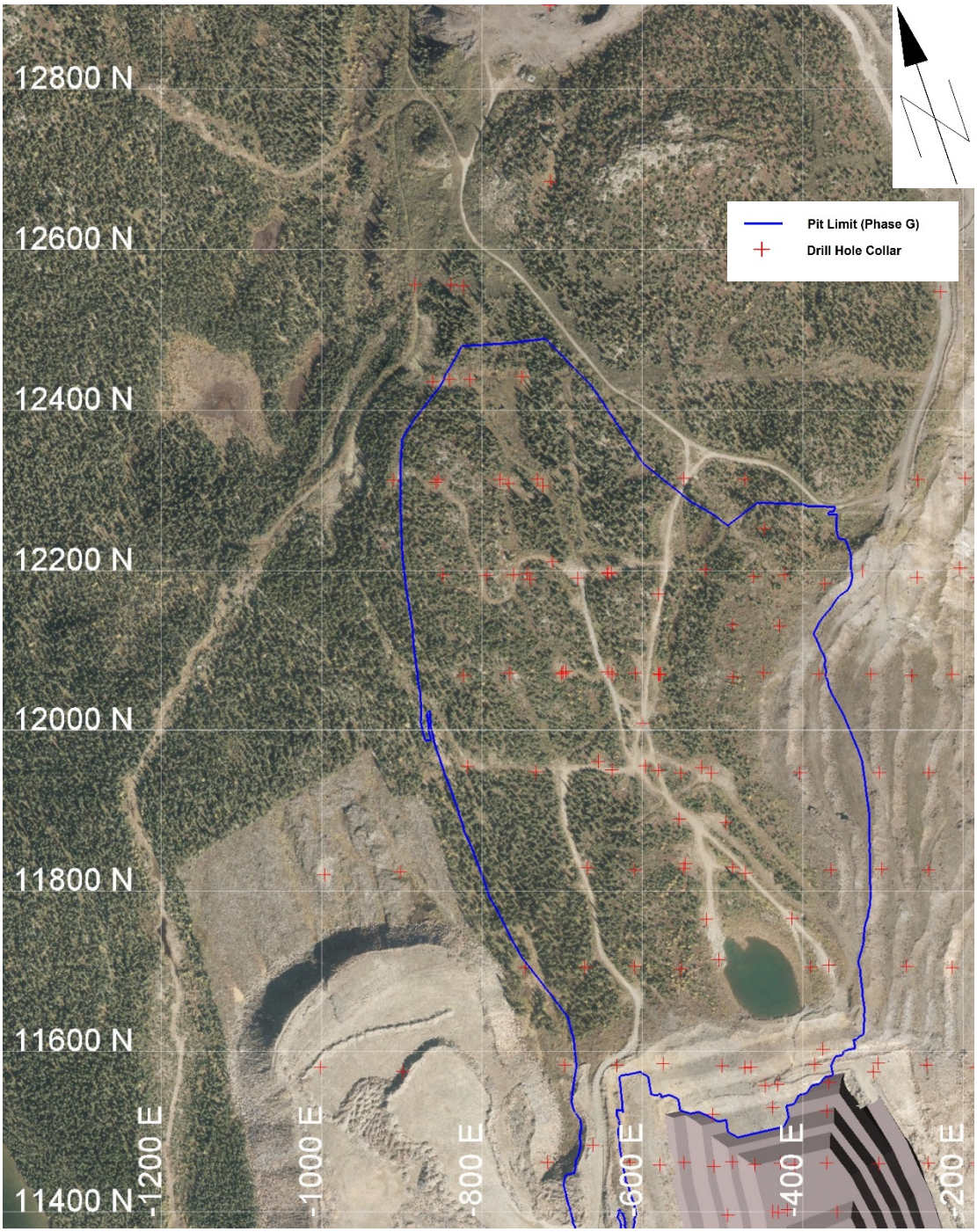


Figure 15: Drilling locations

6 Mining

6.1 Infrastructure

Three options exist for providing electrical power to the Sherwood North pit (Figure 16). An existing, un-energised power line crosses the north end of the Sherwood North pit. Some refurbishment of this line would be required before the line could be put into use again. This line could be refurbished and re-energized to provide power to Sherwood North from the North, or from the South West (via the Carol Lake causeway). Alternatively, the existing, energised power line feed into Humphrey Main could be extended across the south of the Sherwood pit to feed into Sherwood North. No significant work is required for either of these power supply options.

IOC currently plans to extend the existing power line to Humphrey Main across the south of the Sherwood pit later in 2017 to provide independent power to the existing in-pit 11 water bore. This independent power supply to the bore will also be used to provide power to Sherwood North, but the other two power supply options listed above are still being assessed as possible redundant power supplies.

The existing earthing grid is suitable for use with the Sherwood North power distribution system.

Sherwood North is located in the middle of IOC's existing operations, and not adjacent to any publicly accessed areas. No perimeter fencing or signage is planned or required.

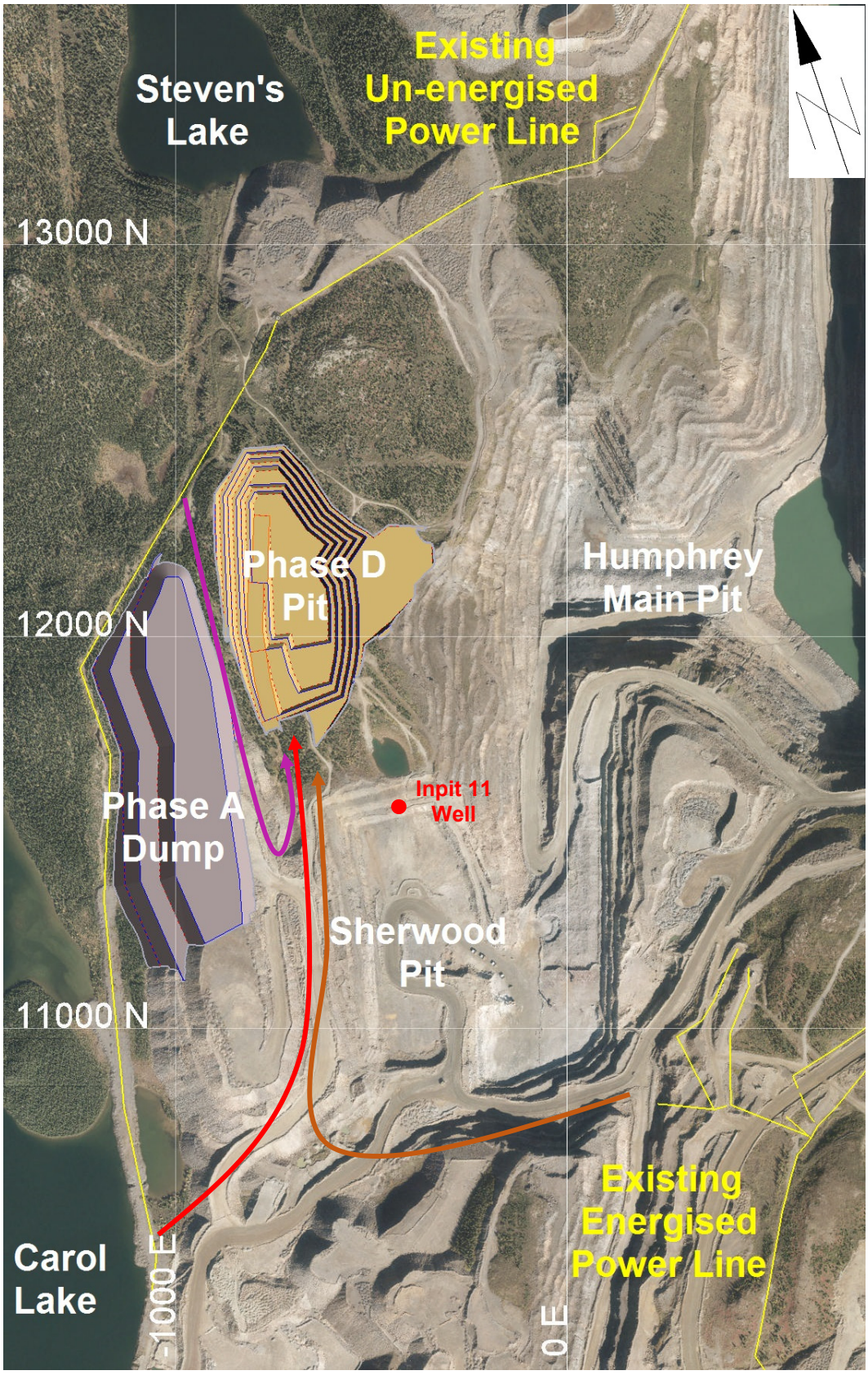


Figure 16: Power Supply Options

6.2 Pit Slopes

IOC's geotechnical department has identified key geotechnical risks and made pre-feasibility level recommendations for the design of slopes at Sherwood North. These recommendations are summarised in Table 5. They have also identified areas where further work is required to bring the designs through feasibility study to operational level. Planned work includes geotechnical drilling, lab testing and televiewer surveys into, and behind, the walls of Sherwood North pit.

The pre-feasibility level slope recommendations provided by IOC's geotechnical department have been used for the current Sherwood North phase designs. Interim walls have been designed at a 37^0 inter-ramp angle (70^0 bench face angle with 13.5 meter berms).

The Sherwood North pit will be re-designed using final (operational) slope design recommendations and submitted to the Newfoundland and Labrador Department of Natural Resources before excavation commences.

Wall Section	Bench Height (m)	Berm Width (m)	Bench Face Angle (deg)	Max Stack Height (m)	Inter Ramp Angle (deg)	Comments
East (Hanging Wall)	13.7	9	60	120	39	IRA is constrained by weak altered limonite, which is expected in the east wall. Flexural toppling may also be a risk, depending on how influential the bedding is compared to the rock mass strength. Single benching required to manage toppling risk, as well as sloughing and erosion of the limonite
West (Foot Wall)	27.4	10	50	120	40	Wall Controlled predominantly by bedding dip and potential fault zones behind the wall. The lower bound bedding dip is used for the bench face angle. A 10m berm width is used to contain potential planar failures, as per the Humphrey Main design
North (End Wall)	27.4	10	65	120		For guidance when blending footwall and hanging wall designs

Table 5: Slope Design Recommendations

6.3 Pit Design

The Sherwood North pit has been designed for development in two phases, based on pit optimisations carried out in March 2017. The first phase targets the outcropping ore at the northern end of the deposit. The second phase develops the pit to the economic limit defined by the pit optimisation. Figure 17 shows the limits of each phase. Large scale drawings of each phase are attached in Appendix A.

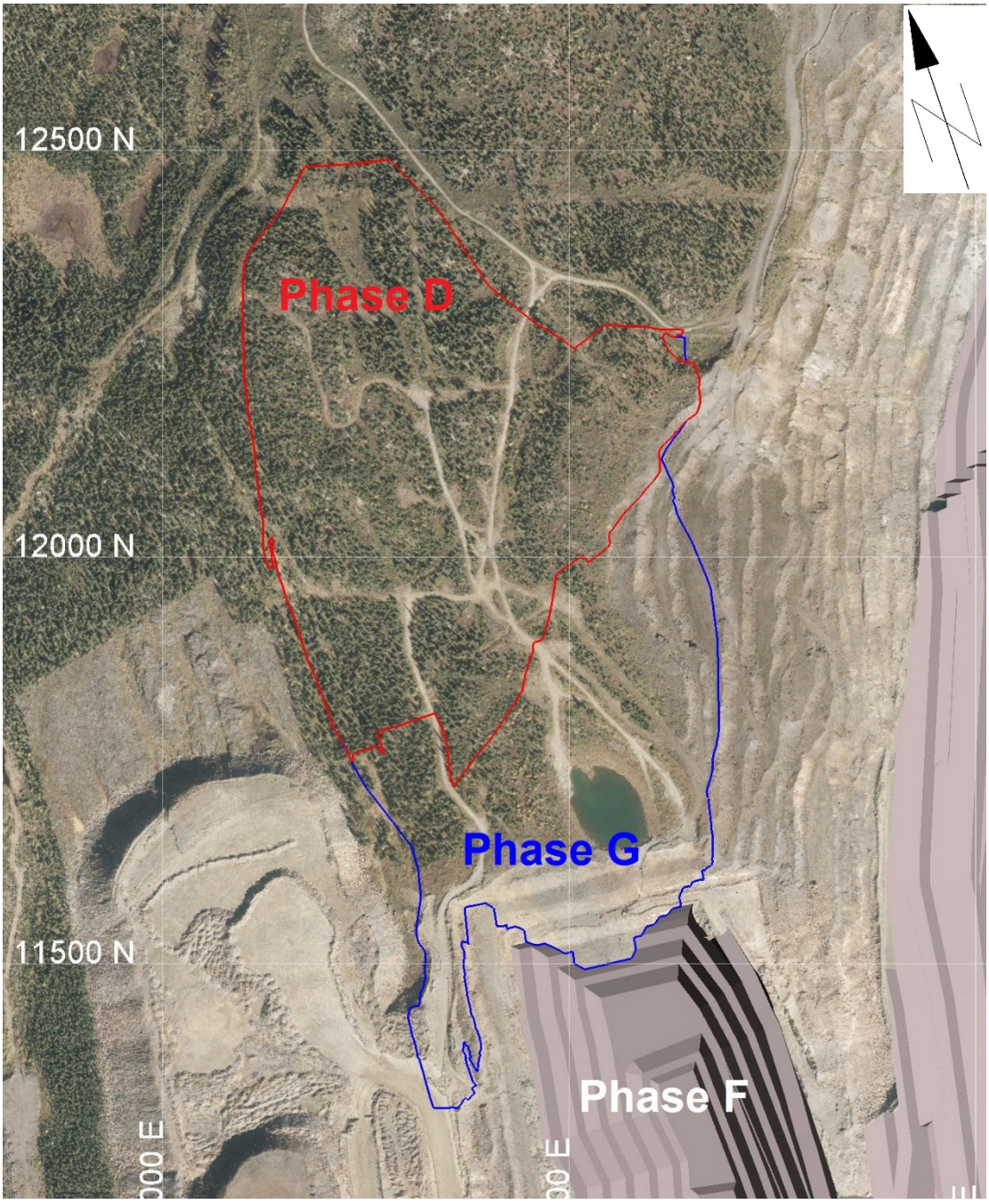


Figure 17: Phase Limits

Table 6 summarises the material inventory for the two phases. The pit inventory in Table 6 is quoted on an as-mined basis (i.e. net of dilution and ore losses) and includes all resource classifications (including inferred resources). It does not comply with NI 43-101 and cannot be publicly reported. Sherwood North is currently included in IOC's resource inventory (as publicly reported by Rio Tinto and LIORC). No Sherwood North material has been included in reserves to date.

The "Ore" tonnages listed in Table 6 comprises only unaltered ore. Altered (ie limonitic) ore (listed as "Limore" in Table 6) is not reported in IOC's reserves, but has been successfully processed from the Luce and Magy Lake (Humphrey South Phase A) pits. The Sherwood North pit optimisations were based on the inclusion of Limonitic Ore in the concentrator feed.

		Mass	Fe	Mag	SpWY	Grind	CaO	MgO	Mn	H2O
		Mt	%	%	%	kWh/t	%	%	%	%
Phase D	Ore	11.3	42.4%	12.8%	37.7%	3.02	0.4%	0.3%	0.3%	0.4%
	Limore	5.0	43.5%	12.5%	39.2%	3.07	0.2%	0.2%	0.2%	0.8%
	Total Feed	16.3	42.7%	12.7%	38.2%	3.04	0.4%	0.2%	0.3%	0.5%
	Waste	19.5								
	Total Mined	35.9								
	Strip Ratio (w:o)	1.20								
Phase G	Ore	10.9	41.8%	13.3%	37.8%	2.97	0.3%	0.2%	0.3%	0.5%
	Limore	6.6	42.4%	15.4%	38.7%	3.03	0.2%	0.2%	0.3%	0.9%
	Total Feed	17.6	42.1%	14.1%	38.2%	2.99	0.3%	0.2%	0.3%	0.6%
	Waste	41.5								
	Total Mined	59.1								
	Strip Ratio (w:o)	2.36								
Total Sherwood North	Ore	22.3	42.1%	13.0%	37.8%	3.00	0.4%	0.2%	0.3%	0.4%
	Limore	11.7	42.9%	14.1%	38.9%	3.05	0.2%	0.2%	0.3%	0.8%
	Total Feed	33.9	42.4%	13.4%	38.2%	3.01	0.3%	0.2%	0.3%	0.6%
	Waste	61.0								
	Total Mined	95.0								
	Strip Ratio (w:o)	1.80								

Table 6: Pit Inventory

The first phase (Sherwood North Phase 1, Humphrey Main Phase D; Figure 18) targets the deposit outcrop. This yields the lowest strip ratio ore. A single haulage access slots into the pit along the footwall. The footwall and the northern part of the hanging wall are cut to final limits, with the southern part of the hanging wall being stepped in from the final (Phase G) limits.

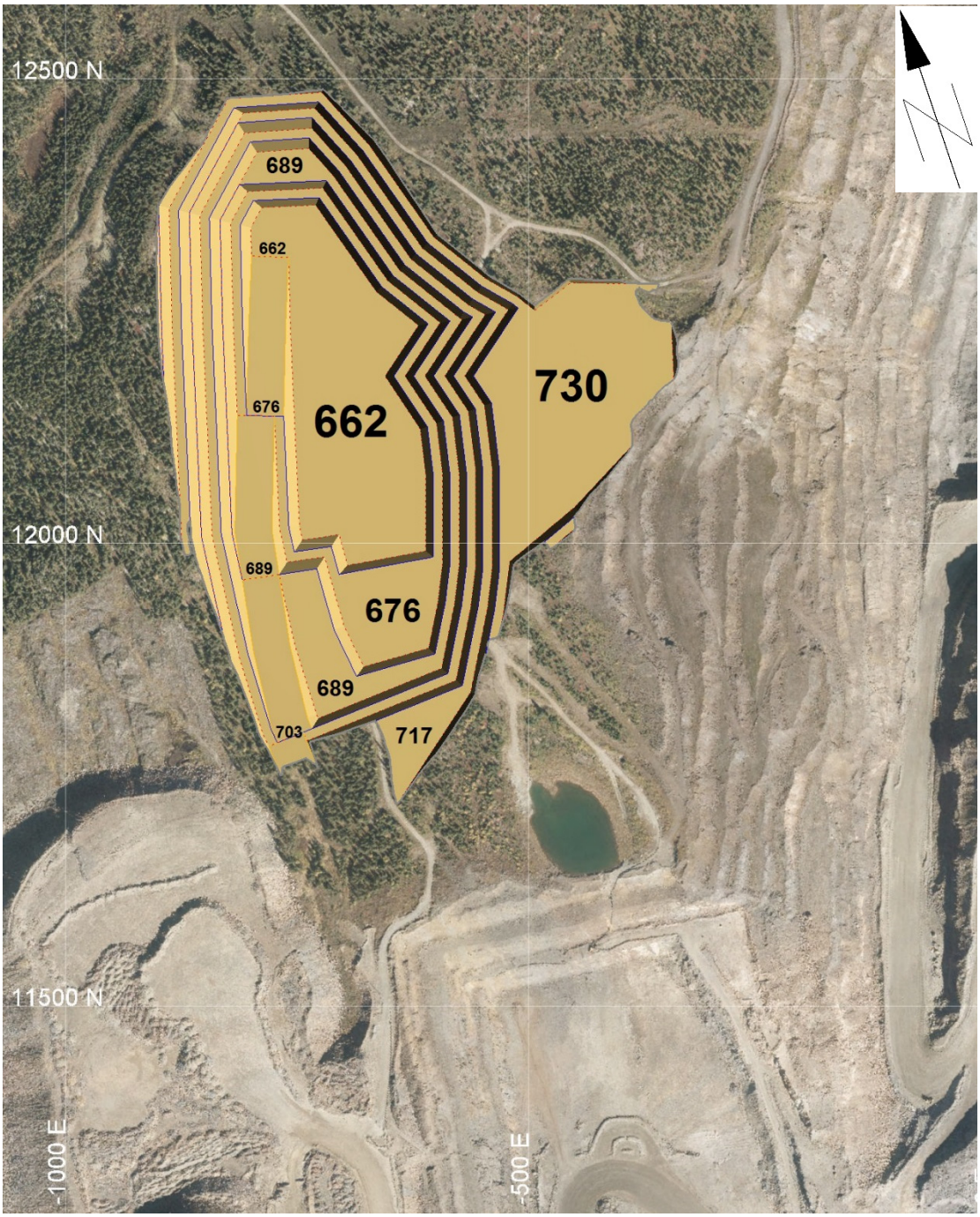


Figure 18: Sherwood North Phase 1 (Humphrey Main Phase D)

The second phase (Sherwood North Phase 2, Humphrey Main Phase G; Figure 19) cuts a new ramp down the foot (west) wall until a switchback at 648 mRL that puts the remainder of the ramp on the east wall. The east wall is pushed back to final limits and pushes the southern wall back into higher strip ratio material. The zone of limonitic waste that forms the northern limit of the Sherwood Pond pit (Phases B and F) is removed to access less altered material at depth. Phase 2 is effectively a down plunge pushback on Phase 1.

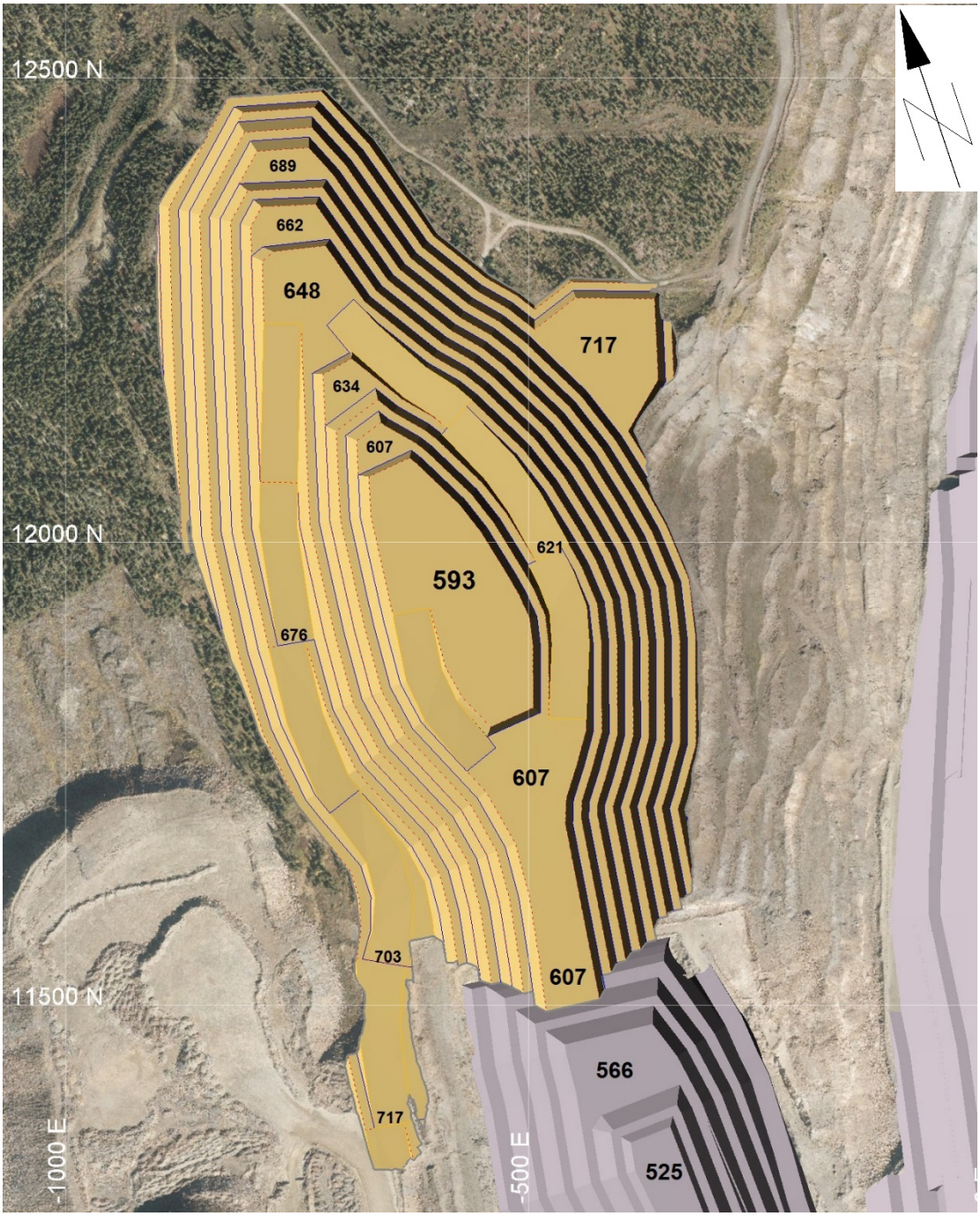


Figure 19: Sherwood North Phase 2 (Humphrey Main Phase G)

6.4 Waste Dump

The waste rock from the initial Sherwood North mining phase (Phase D) will be dumped in an extension to the existing Sherwood dump to the west of the pit (Figure 20). This dump has been designed to extend up to the existing power line and has sufficient capacity to accommodate the Phase D waste.

If the power line is not required beyond the Phase D pit, the Sherwood dump could be extended further north, to accommodate the additional waste from Phase G (Figure 21). If the power line is required in the longer term, the Phase G waste can be hauled to one of the other waste dumps indicated in the March 2016 Development Plan (probably the CWD Sth dump).

It is planned to progressively rehabilitate the western side of the Sherwood dump. Face angles will be cut back to 20º and overburden will be reclaimed from the stockpile and spread over the flattened faces and revegetated. There is a possibility that the completed Sherwood North pit could be backfilled from the eastern side of the Sherwood dump. Consequently, the eastern side of the dump will not be rehabilitated until it is clear that there will be no more waste rock dumped in that area.

Waste volumes and tonnages by phase are listed in Table 7. The dumped volumes assume 25% swell in the dumped waste.

Sherwood North Phase	Humphrey Main Phase	Mined Waste		Dumped Waste (25% swell)
		Mm^3	Mt	Mm^3
1	D	5.9	19.5	7.3
2	G	12.5	41.5	15.7
Total		**18.4**	**61.0**	**23.0**

Table 7: Waste Movement

The extension to the Sherwood waste dump up to the power line (Figure 20) has a capacity of 7.3 Mm^3, which is sufficient to accommodate the phase D pit waste. The extension to the Sherwood waste beyond the power line (Figure 21) has a total capacity of 27.9 Mm^3, which is sufficient to accommodate all of the waste planned from Sherwood North.

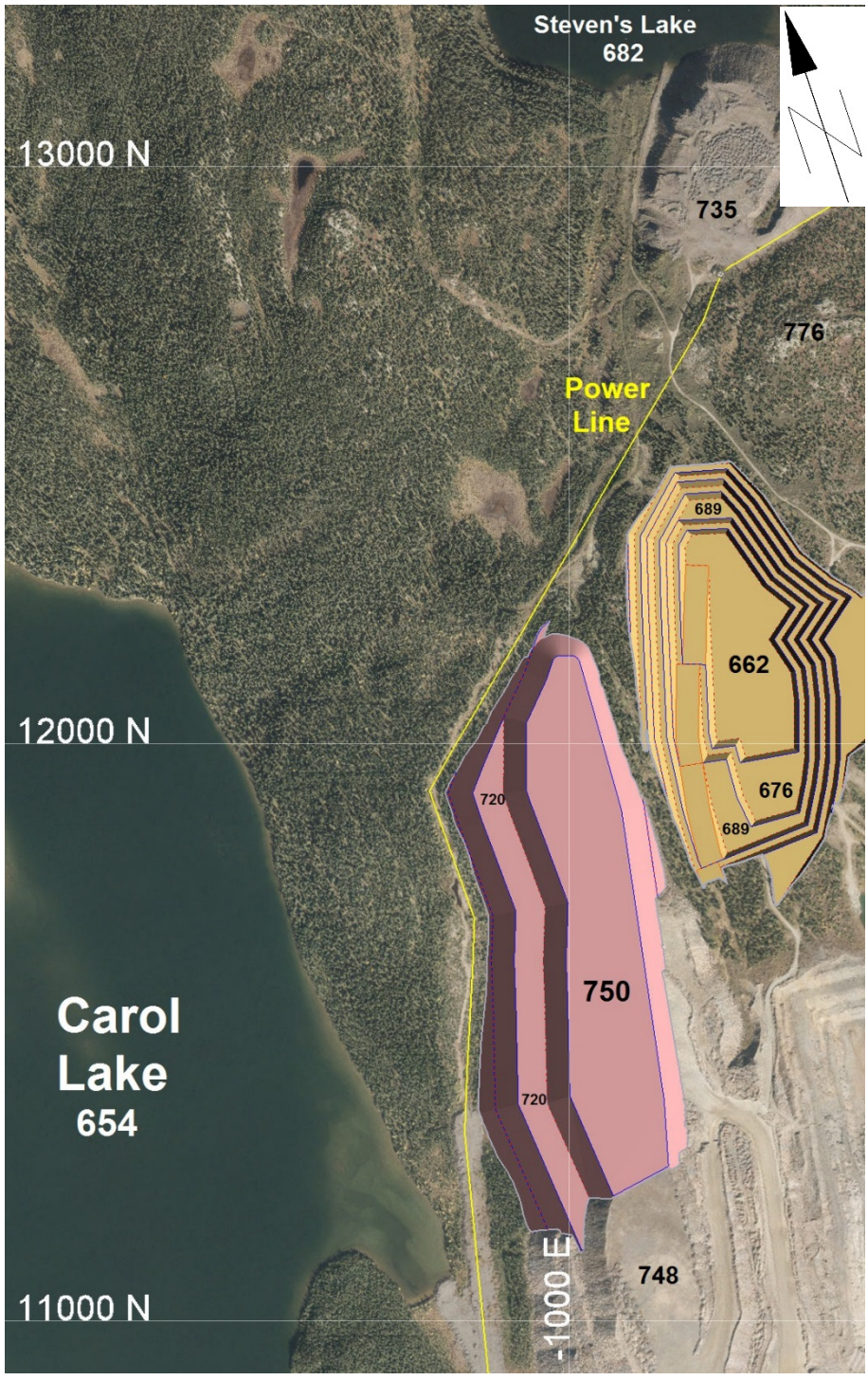


Figure 20: Sherwood Waste Dump –Constrained to Power Line

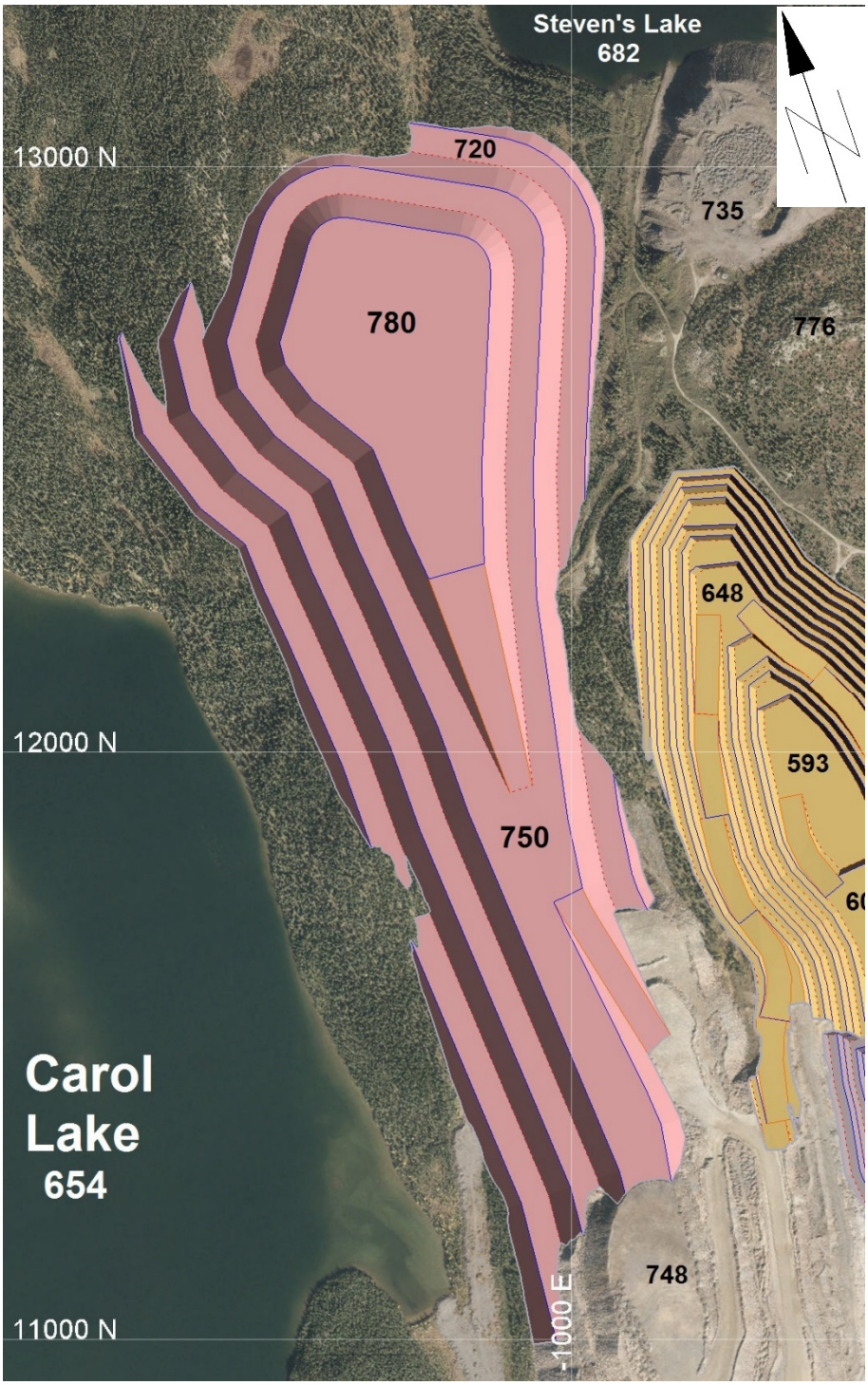


Figure 21: Sherwood Waste Dump – No Power Line Constraint

A geological assessment of the portion of the Sherwood dump up to the power line (Figure 20) has indicated that this area is unlikely to contain economic mineralization. The four holes drilled in this area have returned predominantly gabbro and the small amount of oxide mineralised iron formation intersected was fibrous and, therefore, unprocessable. Fibrous rock from one of these holes is shown in Figure 22. A condemnation report will be completed before dumping extends into this area.

Further drilling is required to assess the mineralisation potential of the remainder of the dump. The dump will be phased to correspond with progressive assessment of mineralisation potential. If potentially economic material is encountered within the dump footprint, either that material will be mined and fed to the concentrator, to allow the dump to progress, or the dump will be terminated before the mineralisation and the remaining waste will be redirected to one of IOC's other operational dumps (probably the CWD south dump). Use of a more distant dump will require the pit design to be re-optimised to account for the higher costs of the longer waste hauls.

Dump condemnation reports will be prepared and submitted to and be to the satisfaction of the Newfoundland and Labrador Department of Natural Resources (NLDNR) prior to the development of any new waste dumping area. The currently condemned area (up to the power line) is sufficient to contain all of the waste from Phase D.

Dump design criteria for the Sherwood dump to be used for the initial Sherwood North waste are listed in Table 8.

Figure 22: Fibrous rock north of the existing Sherwood waste dump

Waste Dump Design Criteria	
Lift Height	30m
Berm Width	48m
Overall Slope Angle	20°
Face Angle	37°
Road Width	40m
Road Grade	8%

Table 8: Waste Dump Design Criteria

All trees with the waste dump footprint will be cut or mulched (depending on size) and all organic rich material (vegetation and topsoil) will be recovered for use in rehabilitation works.

6.5 Overburden Stockpile

Estimated overburden volumes by phase, for both the pit (till and organics) and the waste dump area (organics only) are listed in Table 9. The overall depth of the overburden in Sherwood North has been estimated from casing depths on core drilling holes, adjusted to match depths determined from test pits dug in the project area. Overburden thicknesses determined from test pits were, in general, appreciably lower than the casing thicknesses, due to the soft nature of the underlying alteration zones. Dumped material is assumed to have a 20% swell.

The initial overburden from Sherwood North will be used to rehabilitate the adjacent Steven's Lake waste dump. The remainder will be hauled to a new overburden stockpile to be built adjacent to the Steven's Lake dump and/or to the existing Central overburden stockpile located 3 kilometers east of the pit and within IOC's main mining complex.

The Central overburden stockpile has a capacity of 3.9 Mm^3 and the Steven's Lake overburden stockpile has a capacity of 1.5 Mm^3, both of which provide sufficient capacity for the Sherwood North overburden.

Organic rich material in the pit area will be segregated from the underlying till. For the purposes of this Development Plan, the thickness of organic rich material has been assumed to be 20cm. and either placed directly onto rehabilitation areas or stockpiled separately from the till

The locations of the overburden stockpiles relative to the pit are shown in Figure 2. The designs of the stockpiles are shown in Figure 23 and Figure 24.

Sherwood North Phase	Humphrey Main Phase	Pit Overburden		Waste Dump Organics
		Till	Organics	
		kbcm	kbcm	kbcm
1	D	77	51	42
2	G	28	18	132
Total		**105**	**69**	**174**

Table 9: Overburden Movement

Stockpile design criteria for both overburden stockpile are listed in Table 10. The Central stockpile design criteria are more conservative, due to the presence of lake bed sediments in this stockpile (from Hakim Lake).

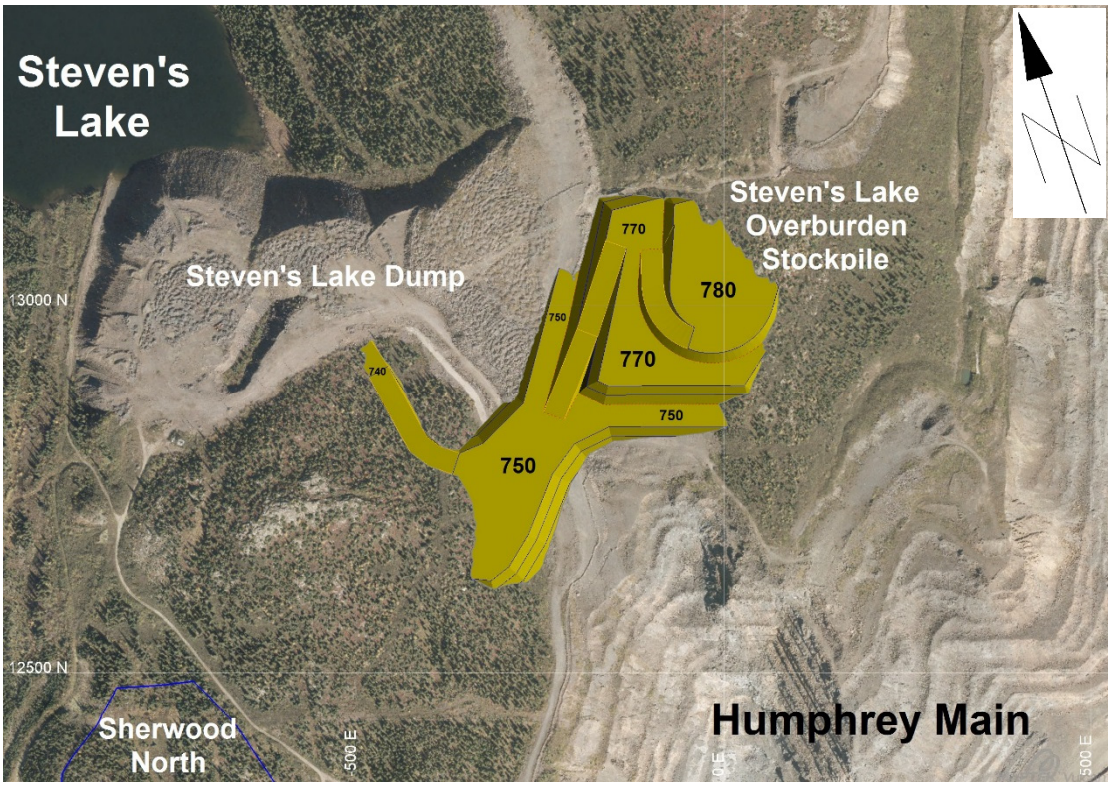


Figure 23: Steven's Lake Overburden Stockpile

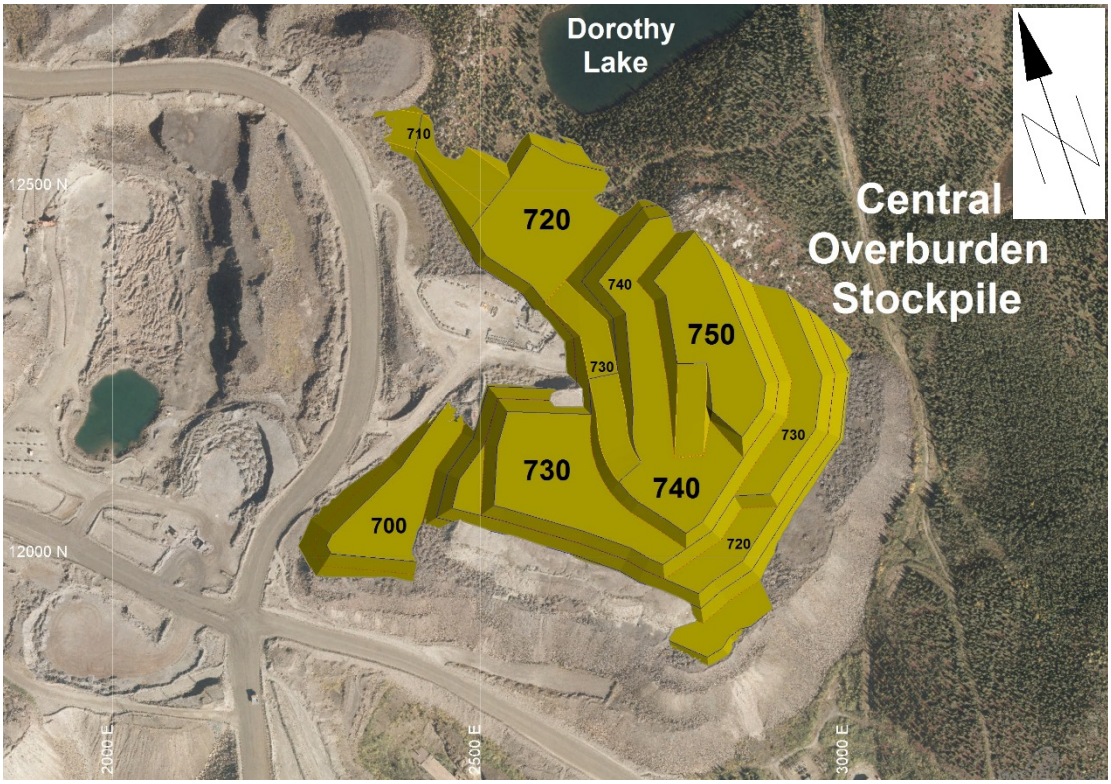


Figure 24: Central Overburden Stockpile

	Central	Steven's Lake
Lift Height	20m	20m
Berm Width	40m	30m
Overall Slope Angle	15°	19°
Face Angle	30°	37°
Road Width	40m	30m
Road Grade	8%	8%

Table 10: Overburden Stockpile Design Criteria

6.6 Pit Dewatering

Groundwater Management

A permeable, limonite altered zone of broken ground follows the eastern (hanging wall) side of the Sherwood North ore zone. An existing pumping well is currently exploiting this zone on the north wall of the Sherwood Pond pit (Humphrey Main Phase B). This well should be sufficient to lower the water table below the first phase of Sherwood North, but a new well will be required to dewater the second phase, partly because it will extend deeper than the first phase, but also because the second phase will mine out the existing well (Figure 25). A possible location for a replacement well has been identified at the bottom of the Phase 1 pit (Figure 25) in the same permeable zone as the existing well.

Piezometers have been installed in the pit area, to allow the aquifer characteristics and future groundwater pumping requirements to be better understood as the water table is drawn down by the current well.

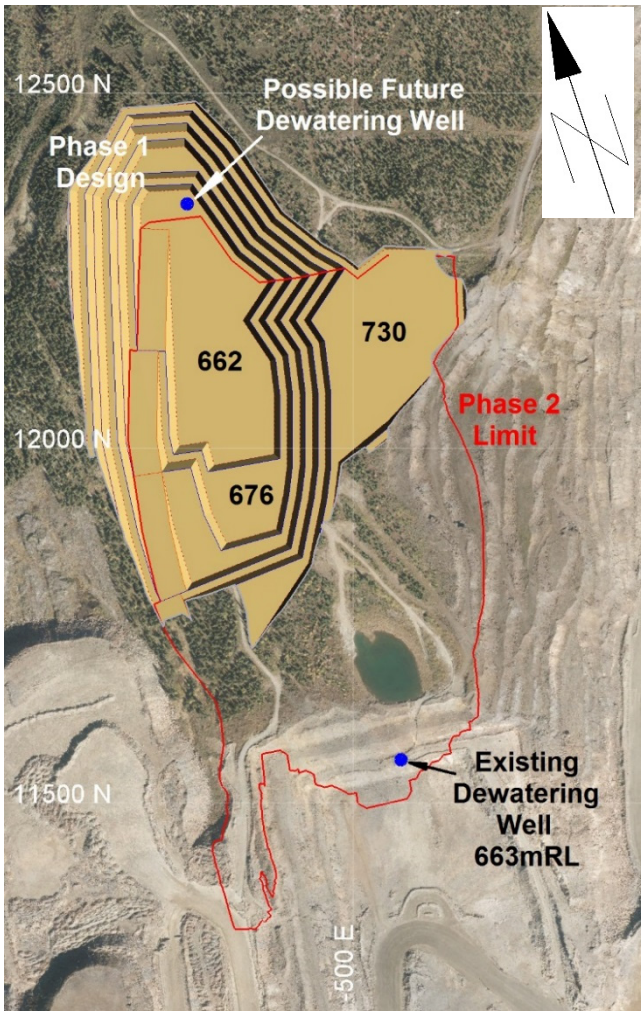


Figure 25: Groundwater Wells

Groundwater from the dewatering well will continue to be pumped to a discharge point in undisturbed forest. Surface run-off from the Sherwood North pit will also be captured and pumped to a discharge point in undisturbed forest. The discharge point will be a vegetated area more than 200m from a waterbody or stream, to allow filtering of suspended solids through a vegetative filter, as has been successfully done in other small mining areas at IOC (eg the Magy Lake development in Humphrey South).

Surface Water Management

Surface run-off from operational areas, as well as any groundwater seepage into the pit, will be captured in sumps within the mining area and pumped to a discharge point adjacent to the groundwater discharge point. This discharge point will also utilise natural vegetation to filter suspended solids from the mine water.

Discharge points will be designed to prevent erosion. It is intended that the two discharge points (ie for ground water and surface water) will be located near each other, to facilitate the on-going monitoring of both discharges.The mine development and the initial (Phase D) waste dump development will stop at the existing power line. Consequently, it is anticipated that the initial discharge point will be located a short distance north of the power line (Figure 26). If the waste dump is extended beyond the power line for the Phase G development, the discharge point be progressively moved ahead of the dump development (Figure 27). The positioning of the discharge points will be selected to ensure that the discharge does not saturate the foundations of the waste dump.

Runoff from the waste dumps will also percolate through undisturbed vegetated areas.

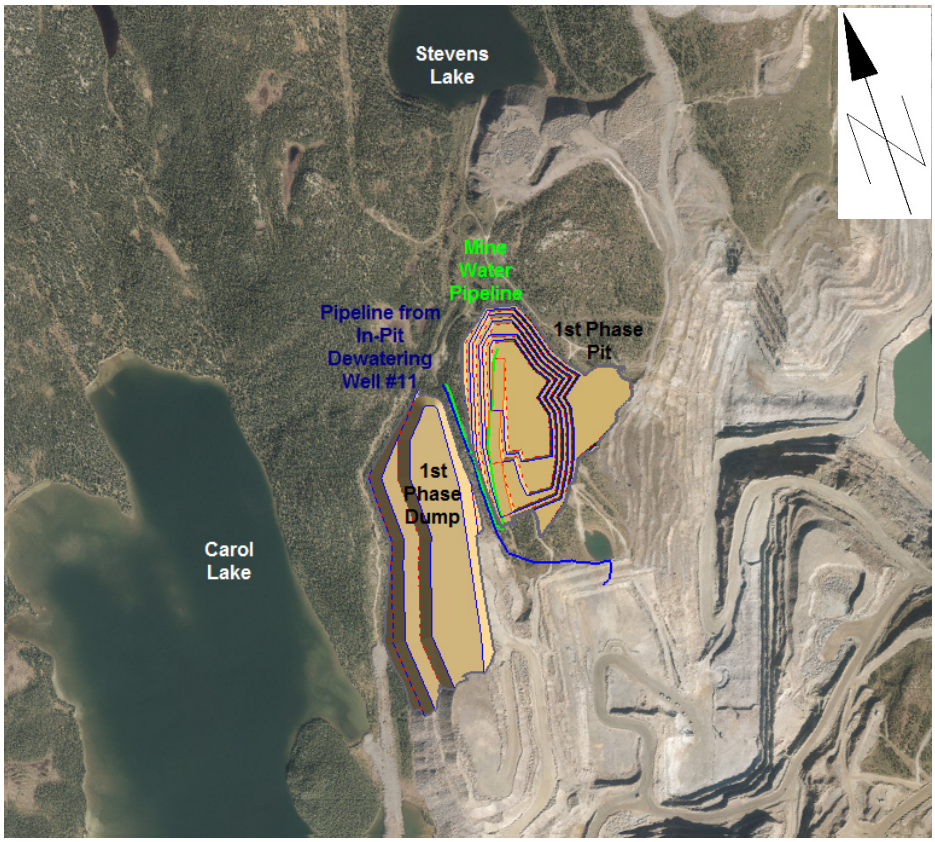


Figure 26: Phase D Pit Dewatering System

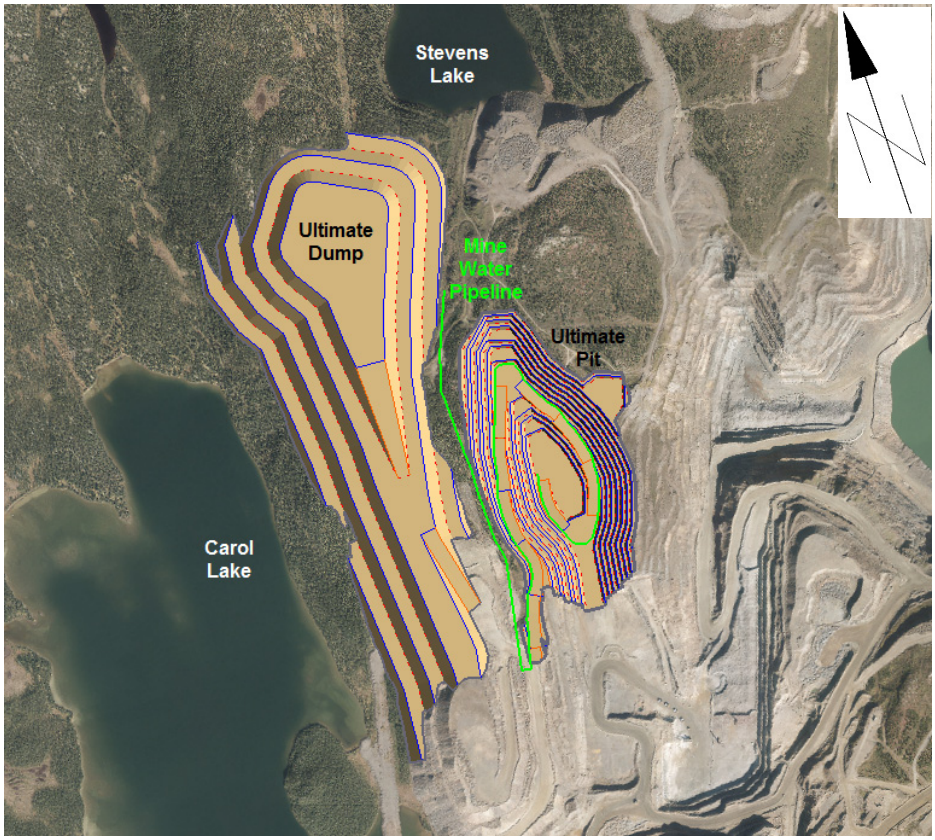


Figure 27: Phase G Pit Dewatering System

6.7 Development

In preparation for overburden stripping, the top of the Steven's Lake dump (Figure 28) will be smoothed with dozers and selected rill slopes will be flattened to 15-20 degrees prior to the start of Sherwood North development works. The existing light vehicle road between the planned stripping area and the Steven's Lake dump will be widened to allow the 85 t haul truck to haul the overburden to Steven's Lake. Trees in the area of the pit and the waste dump will be cut (if > 100 mm diameter) or mulched (if < 100 mm diameter). Overburden (till) from the pit area will be spread on the Steven's Lake dump and organic rich material from both the pit area and the waste dump footprint will be spread on selected areas of the waste dump. Once the overburden and organic material placement for the rehabilitation trial has been completed, the remaining till and organic rich material from the initial pit and waste dump development will be stockpiled on the Steven's Lake overburden stockpile and/or the Central overburden stockpile. Organic rich material will be stockpiled separately from overburden.

Approximately 50 ha will be cleared for the initial pit and waste dump development (Figure 28) and up to 8 ha will be cleared for the Steven's Lake overburden stockpile, as required. A further 85 ha planned to be cleared for the second phase of development; mainly for the waste dump expansion (Figure 29).

Development drilling and blasting will follow overburden stripping in the pit area. The material from the top bench will be removed by the contractor fleet, to allow sufficient broken stocks to be developed to support the continuous operation of a mining shovel.

Initial development volumes (for the development of Phase D) are listed in Table 11. The clearing area listed is the plan area of pit and dump. Some of this area, however, is un-vegetated, due to either rock outcrops or previous clearing (e.g. for roads or drill sites) so the actual clearing area will be somewhat less than listed below. .

	Material	Area (ha)	Volume (kbcm)	Mass (kt)
Clearing (Pit & Dump)		**50**		
Contractor Load & Haul	**Total**		**468**	**1,323**
	Overburden		170	358
	Ore		46	164
	Waste		252	802
Contractor Drill & Blast			**2,137**	**7,274**

Table 11: Development Volumes – Phase D

Prior to the start of mining operations in Sherwood North, a haul road will be developed connecting the existing Sherwood waste dump haul road with the top bench (744m RL) of the planned Sherwood North pit (Figure 30).

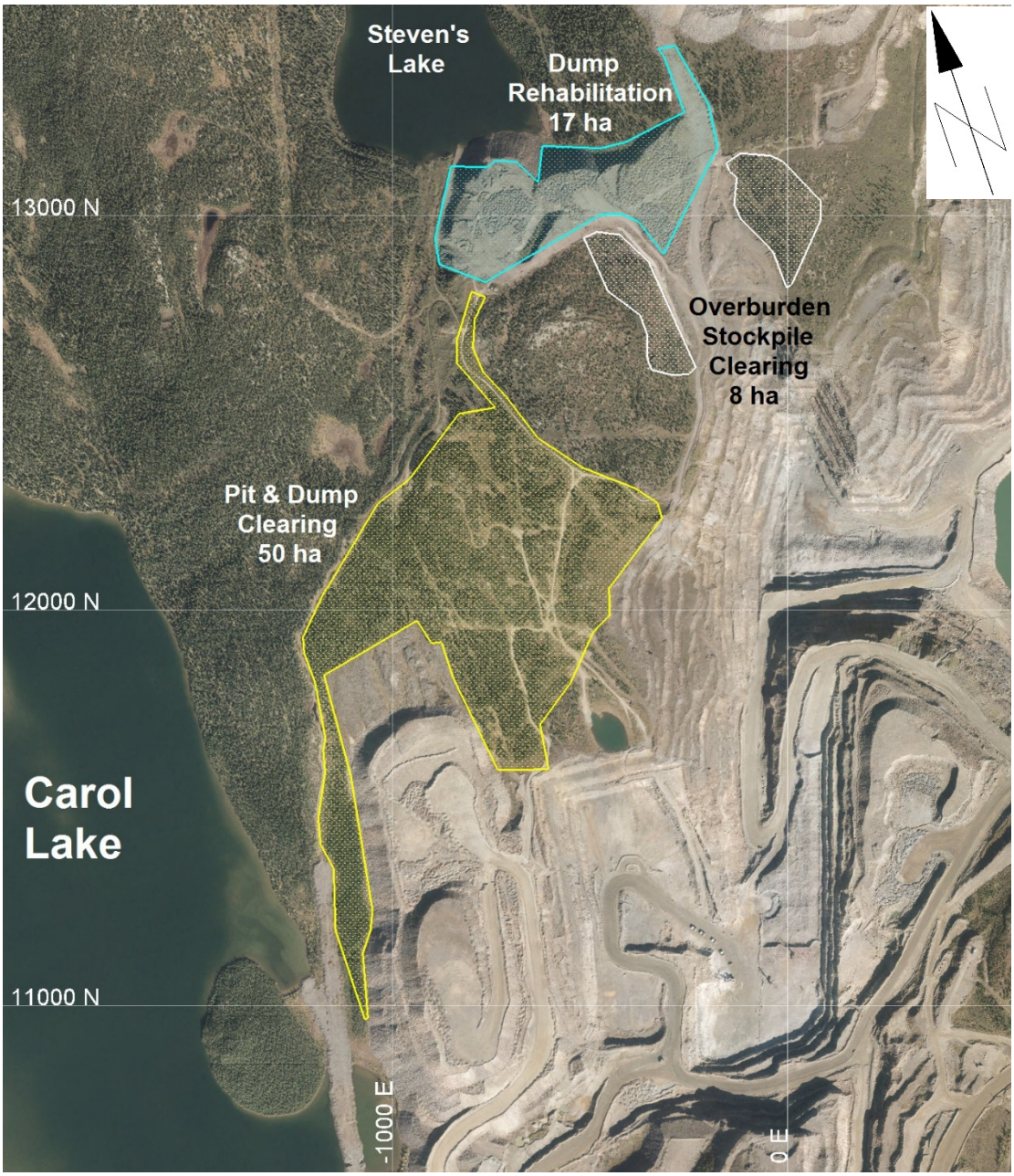


Figure 28: Initial Clearing Areas (Phase D Development)

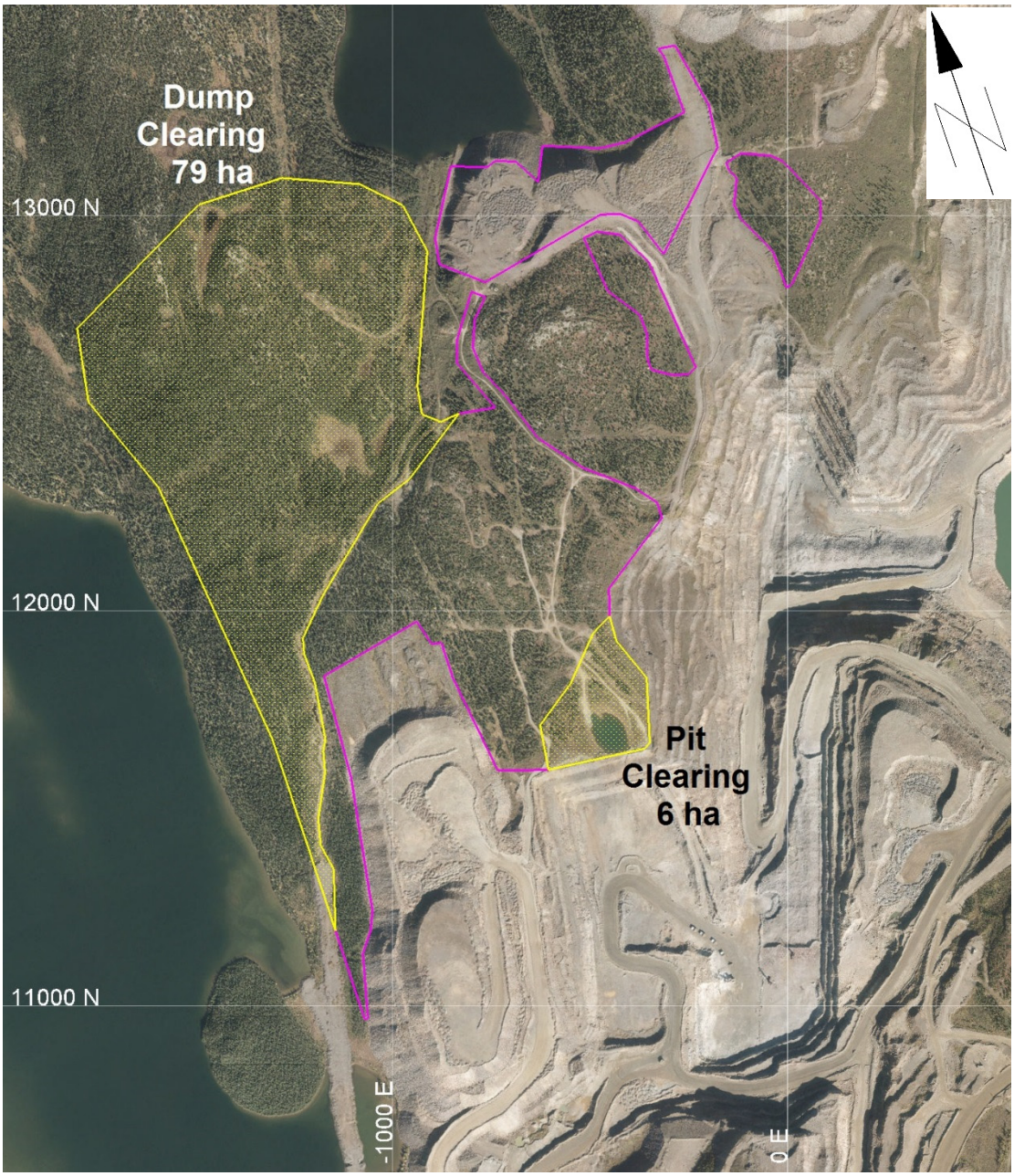


Figure 29: Second Phase Clearing Areas (Phase G Development)

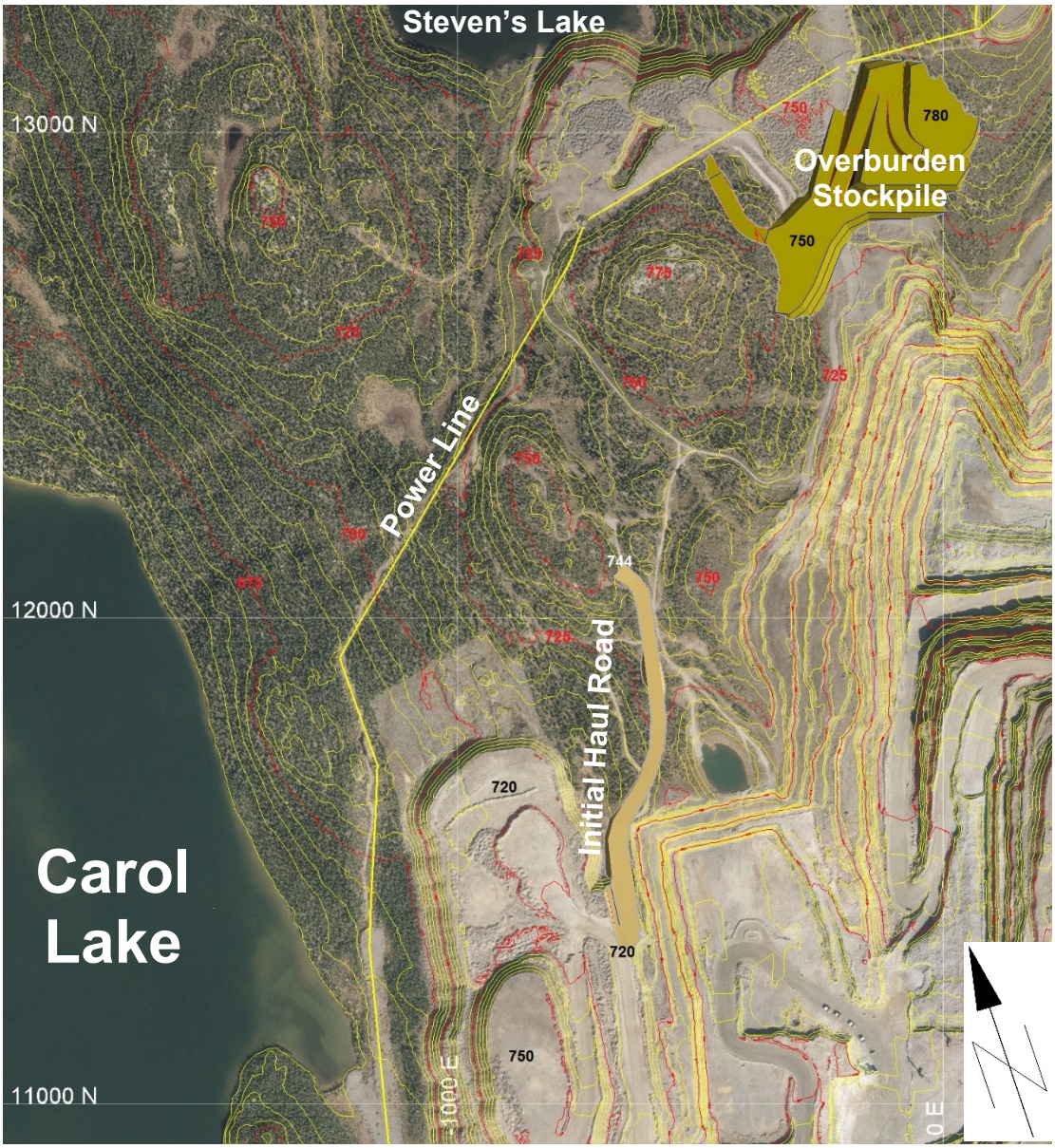


Figure 30: Initial Haul Road

6.8 Acid Rock Drainage Potential

An Acid Rock Drainage (ARD) assessment was completed for the Sherwood Pond pit (i.e. Humphrey Main phase B) in 2010, which indicated that there was no acid generating or potentially acid generating material in the Sherwood Pond mining area (Lorax 2010). Figure 31 shows the collar locations of the two holes (SW-09-31 and SW-09-45) from which these ARD samples were taken (three samples from each hole).

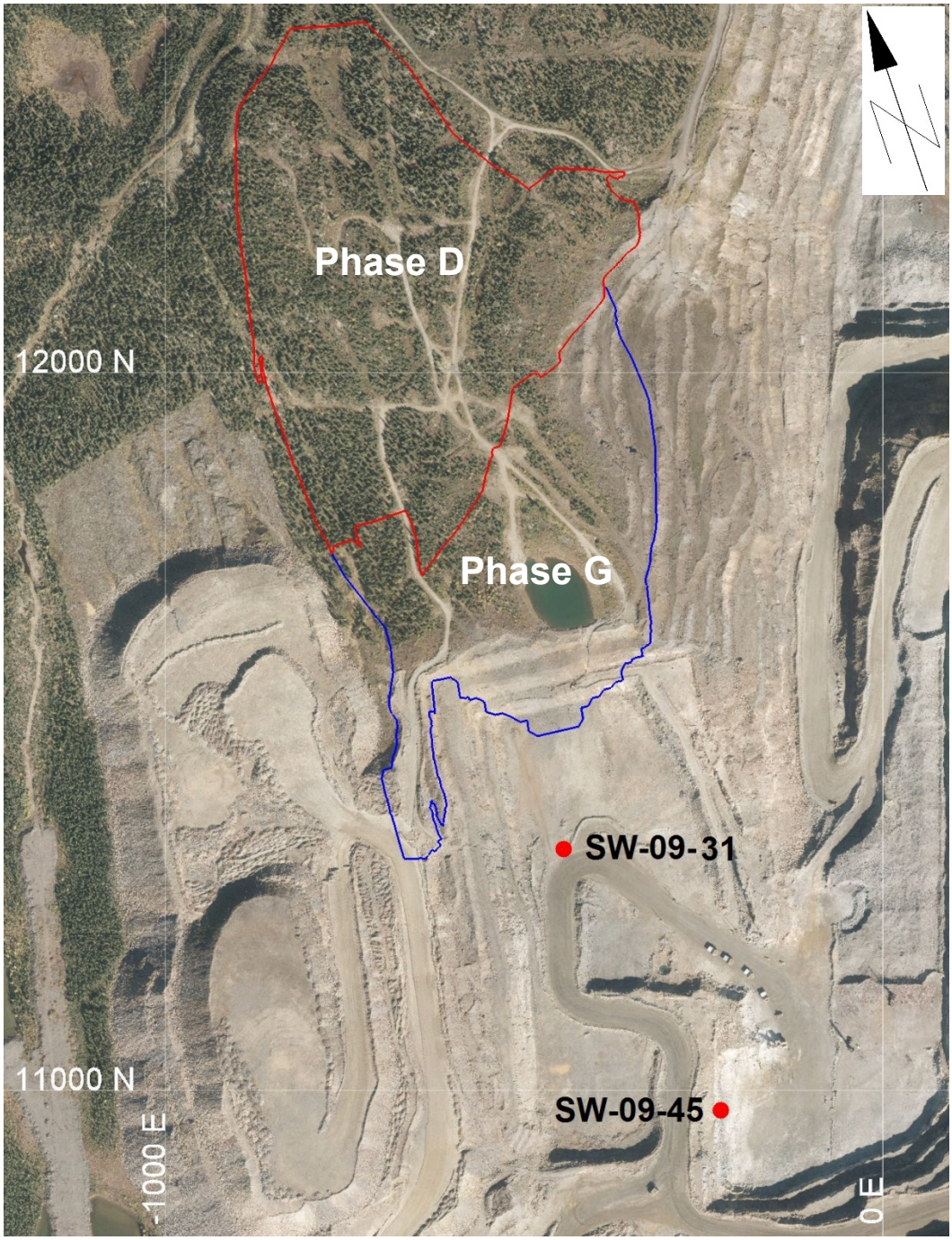


Figure 31: ARD Hole Locations – Sherwood Pond

Figure 32 compares the distribution of sulphur grades for drill samples from the Sherwood North pit with those from the adjacent Sherwood Pond pit and the Luce and Wabush 3 pit. Figure 33 compares the distribution of carbonates grades for drill samples from the same group of pits.

Figure 32 indicates that the sulphur grade distribution in the Sherwood North area is generally comparable to the sulphur grade distributions in the adjacent Sherwood Pond deposit, as well as the Luce and the Wabush 3 deposits, although Sherwood North has lower frequencies of high sulphur grades than the other deposits. Figure 33, however, indicates that Sherwood North has a much higher frequency of low carbonate grades than the other deposits, due to more extensive limonitic alteration. As a consequence of the large volumes of altered, low carbonate material, Sherwood North has a much higher incidence of acid generating or potentially acid generating material (based on an acid-base analysis) than the other deposits (Table 12).

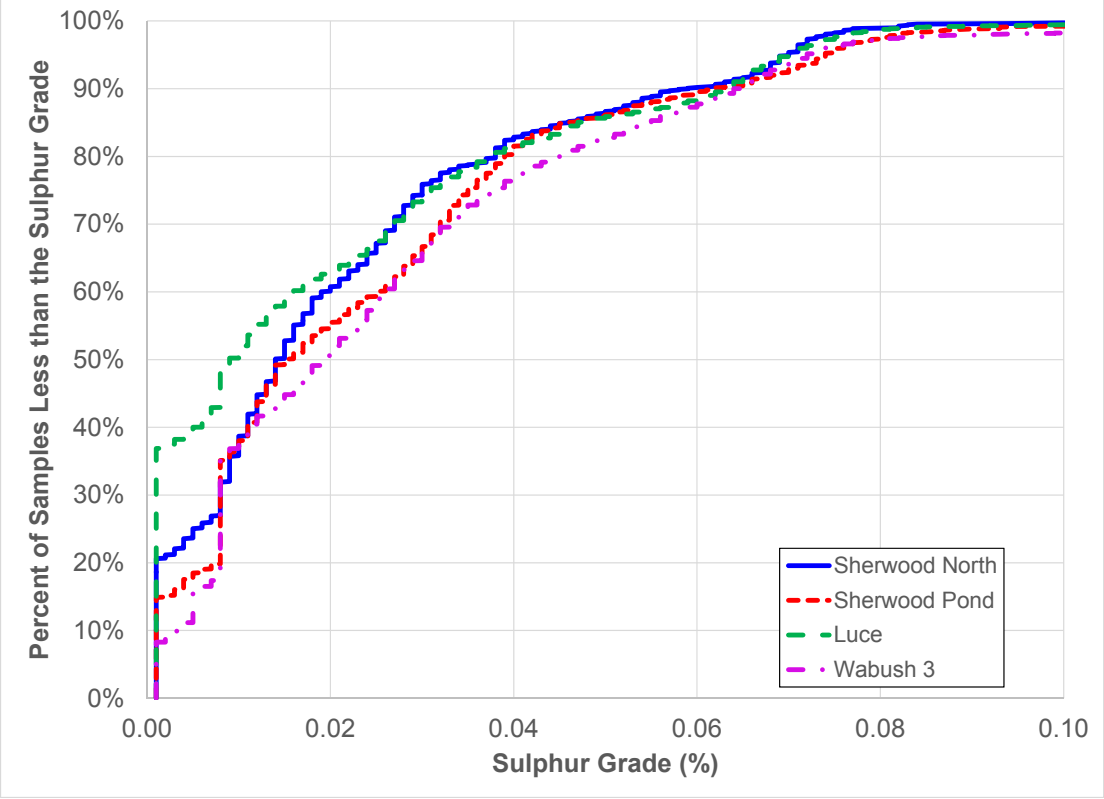


Figure 32: Comparison of Sulphur Grade Distributions

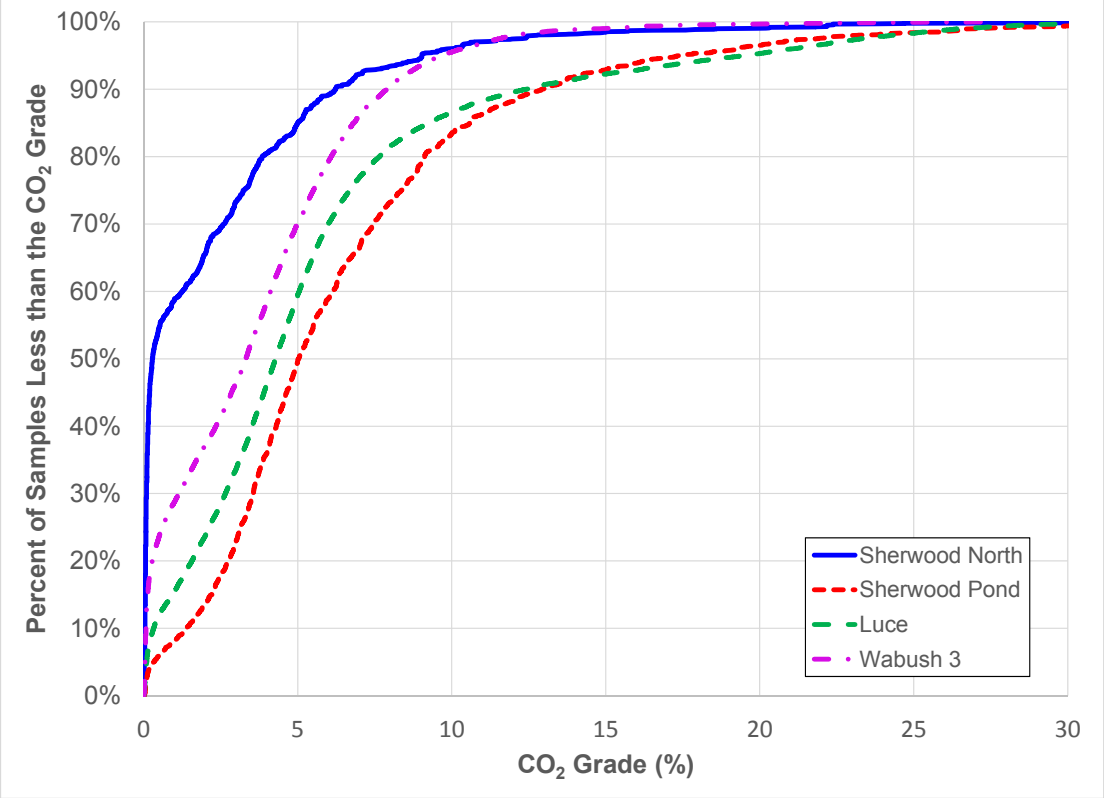


Figure 33: Comparison of Carbonate Grade Distributions

Pit	Samples with ARD Potential (NPR < 2)	
	% of Samples	%S
Sherwood North	27%	0.04
Sherwood Pond	4%	0.04
Luce	2%	0.04
Wabush 3	9%	0.04

Table 12: Comparison of ARD Potential

The 350 Sherwood North drill hole samples with ARD potential (ie NPR <2) listed in Table 12 had an average sulphur grade of 0.038% and a maximum sulphur grade of 0.101%. The average CO_2 grade of the samples with ARD potential was 0.08% with a maximum CO_2 grade of 3.35%. By comparison, the average sulphur grade of all samples was 0.025% and the average CO_2 grade of all samples was 7.0%.

The potentially acid generating material is limonitically altered material with significantly depleted carbonates. There is clearly significant carbonate buffering capacity in the unaltered material in Sherwood North and the acid generation potential (ie sulphur grade) of the potentially acid generating material is low. Consequently, the ARD risk in Sherwood North can be effectively managed by either encapsulating the potentially acid generating

waste with high carbonate waste, or ensuring good mixing of acid generating and acid neutralising wastes. Coincidently, encapsulation of altered waste or mixing of altered are also the two strategies currently being used in IOC's operations to ensure that the low strength limonitic waste does not lead to waste dump instability.

The acid-base analysis protocol being developed to assess ARD potential in the Wabush 3 pit will also be used in Sherwood North to ensure that potential acid generating waste is either encapsulated by or mixed with acid neutralising waste.

No ARD has been observed to date in any of IOC's operating pits, waste dumps or tailings disposal area. Studies carried out for the Wabush 3 deposit indicated that the large gabbro unit in this pit has potential for acid drainage, albeit at very low sulphur grades (approximately 0.15%S) and, hence, low acid generation rates. Although there is a large gabbro unit to the west of the Sherwood North deposit, there is no gabbro modelled in the planned pit. Consequently, the sulphur grades of the potentially acid generating material in Sherwood North are significantly lower than those of the potentially acid generating material in Wabush 3 (0.038% vs 0.15%). The very low acid production from any acid generating waste makes neutralisation of that acid drainage relatively easy with the high carbonate waste from the pit.

To date, IOC has not encountered any metal contents in mine effluent which approach the MMER limits. The similarity of the Sherwood North metal contents to those in the rest of Humphrey Main indicates that there are unlikely to be problematic metal levels in Sherwood North mine water discharges.

6.9 Mining Sequence

Figure 34 to Figure 41 show the planned development of the Sherwood North pit and the Sherwood waste dump, based on Phase G being mined immediately after Phase D. It is likely that there will, in fact, be a pause in development of Sherwood North after the completion of Phase D, while Phases E (Humphrey Main) and F (Sherwood Pond) are mined, but the illustrated sequence shows the fastest feasible mining option for Sherwood North.

Figure 34 shows the configuration of the mine area prior to the commencement of mining. Figure 35 and Figure 36 show the planned development of Phase 1, which is expected to take place over a period of slightly more than two years. Figure 37 to Figure 41 show the mining of Phase G, over a period of approximately four years.

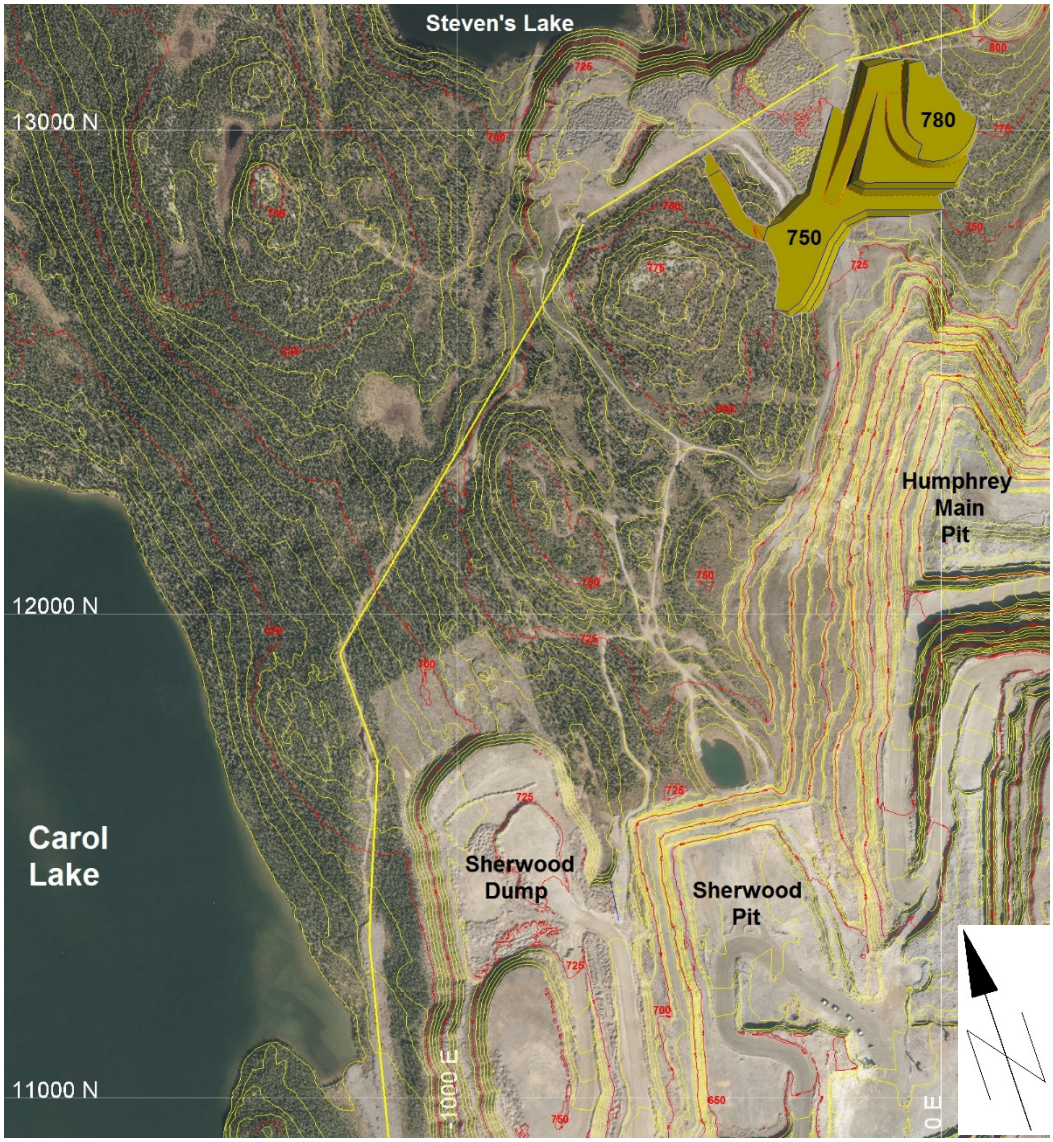


Figure 34: Pre-mine Configuration

Prior to moving a shovel into Sherwood North, the initial haul road will be built (Figure 30), to provide access to the top mining bench (744 mRL). Over the first year, three benches will be mined, with the resulting waste being north and west from the existing 720 mRL tiphead on the Sherwood dump (Figure 35).

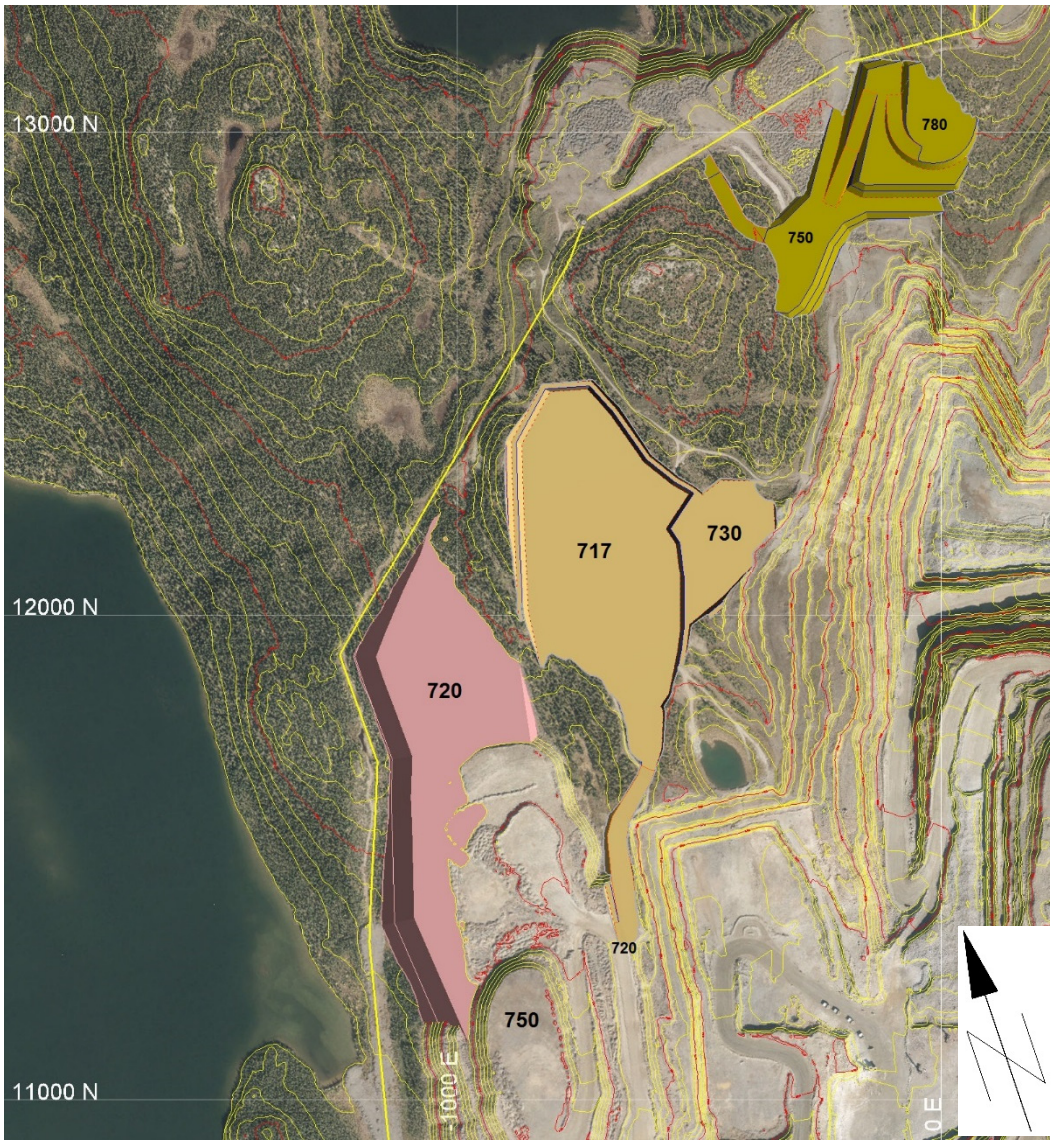


Figure 35: End Year 1

In the second year, a further two and a half benches will be mined from Phase D, with the waste being dumped from the existing upper (750m RL) tiphead on the Sherwood dump (Figure 36). After two years of mining, only 13% of Phase D will remain to be mined.

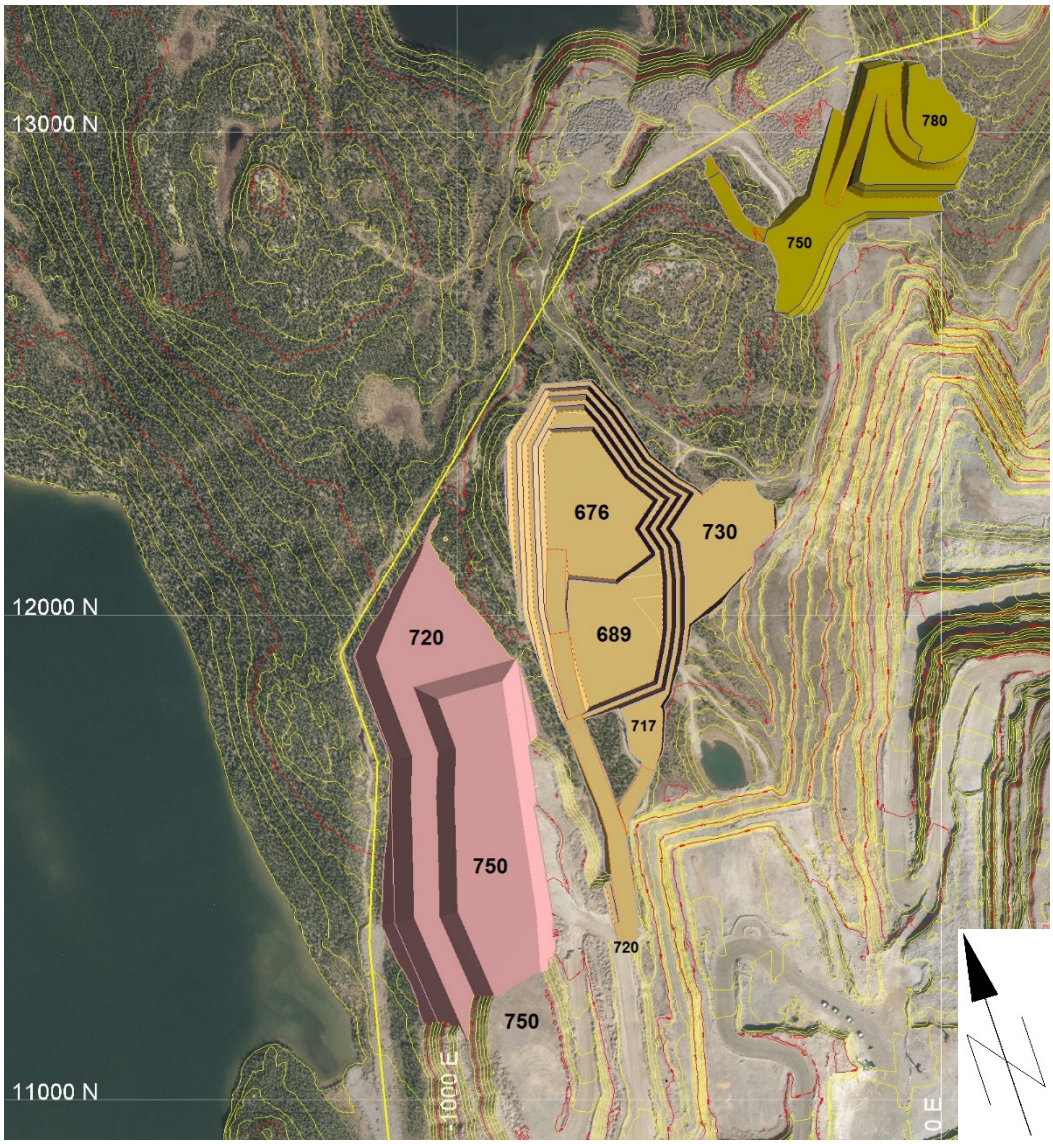


Figure 36: End Year 2

Figure 37 shows the pit and dump configuration after a further year of mining, on the assumption that the Sherwood dump will be extended beyond the existing power line. If the power line needs to be retained or economic mineralisation is found within the planned dump footprint, waste can, instead be hauled to the CWD dump located to the south of the Sherwood dump. The 720 lift of the dump will be extended to the north and west, either by ramping down from the previously dumped 750 lift, or by hauling the waste between the pit and the Phase A dump. In the third year of mining the last bench and a half of material from Phase D will be excavated, along with three benches of material from Phase G.

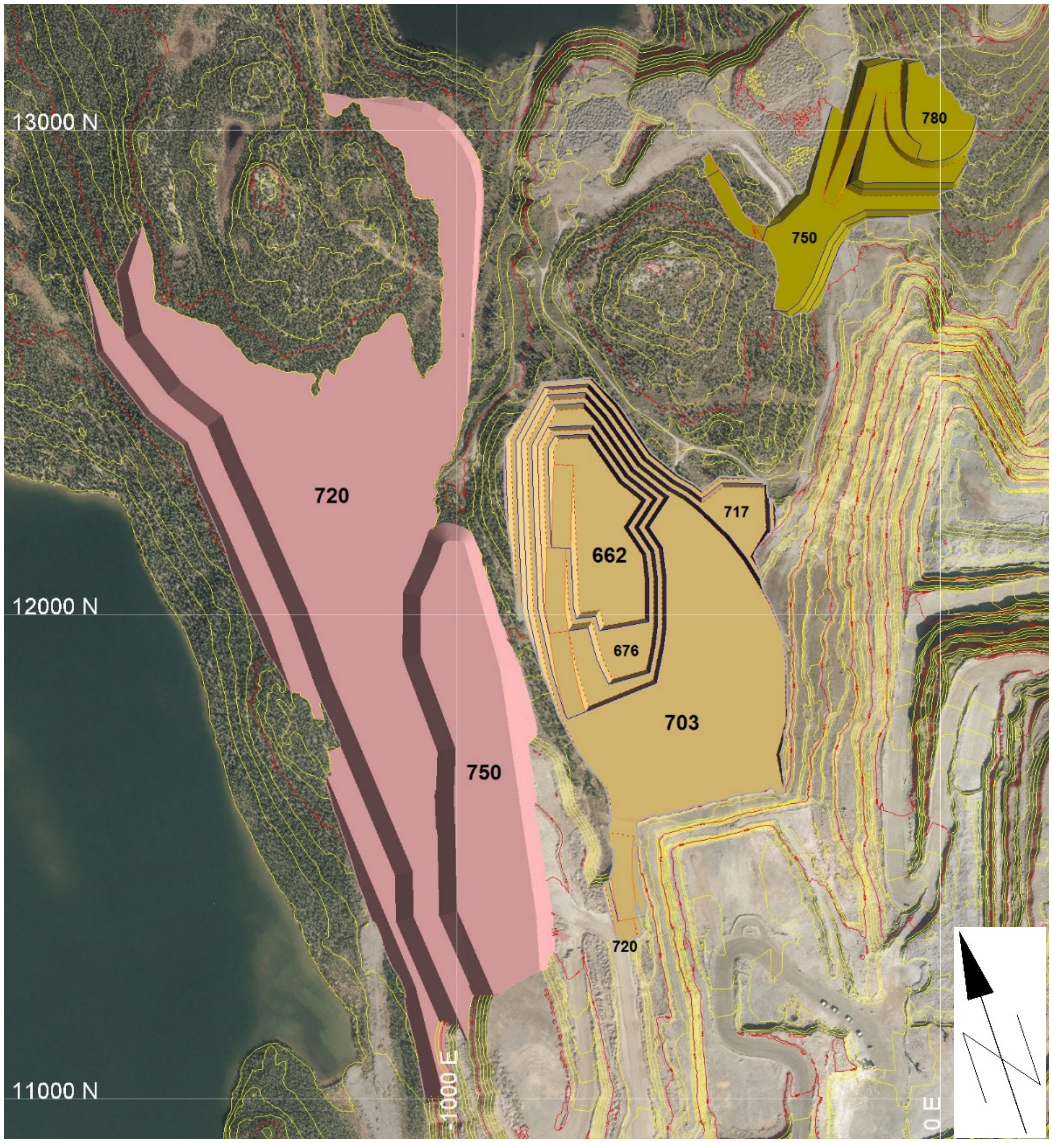


Figure 37: End Year 3

Figure 38 shows the configuration of the pit and dump at the end of the fourth year of production. A further two benches of Phase G will be mined, with waste being dumped on the 750 lift of the dump.

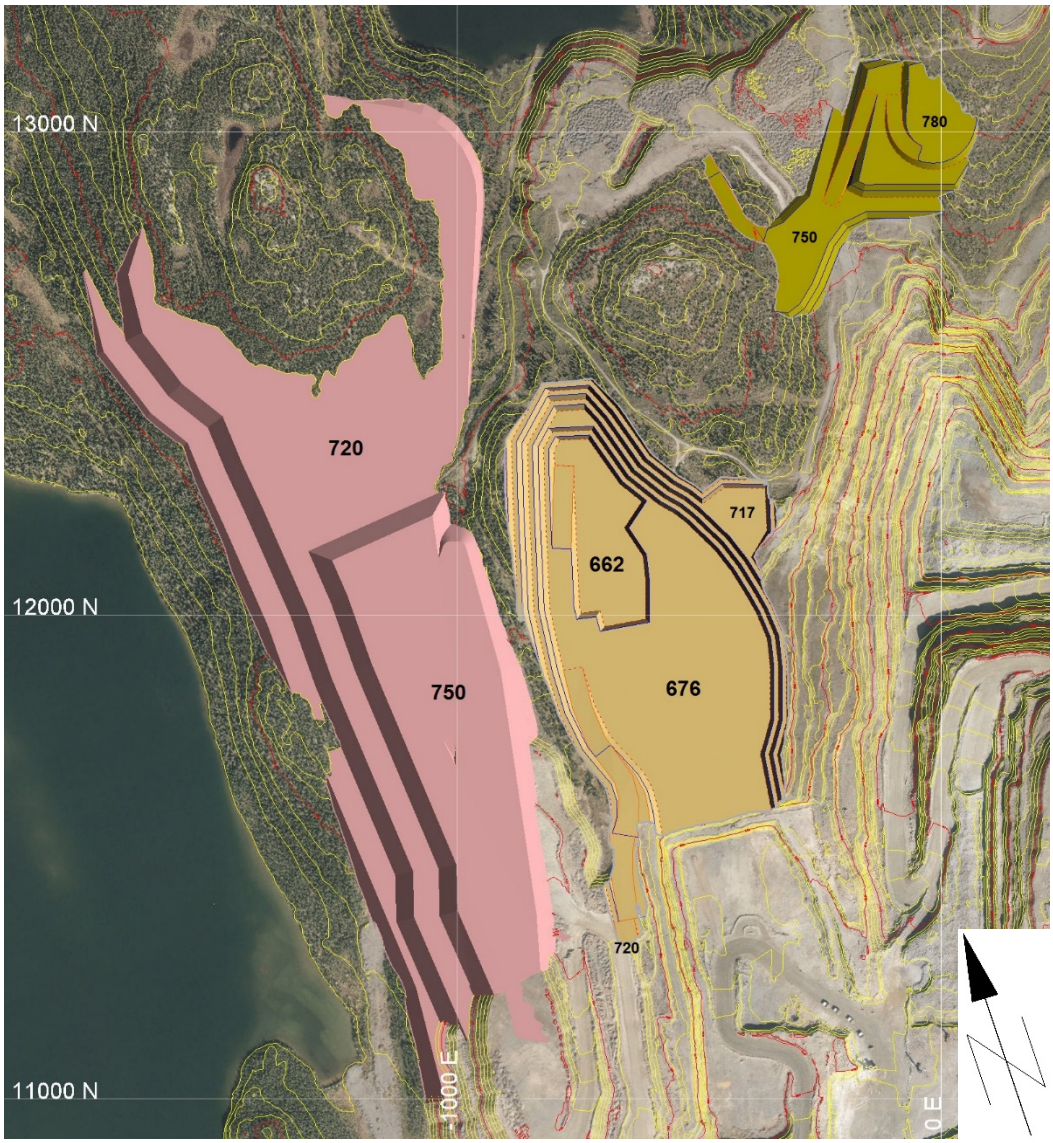


Figure 38: End Year 4

Figure 39 shows the pit and dump configuration after the fifth year of production. Two more benches will be mined with the waste continuing to be dumped on the 750 lift of the Sherwood dump. Phase G develops below the bottom of Phase D in this period.

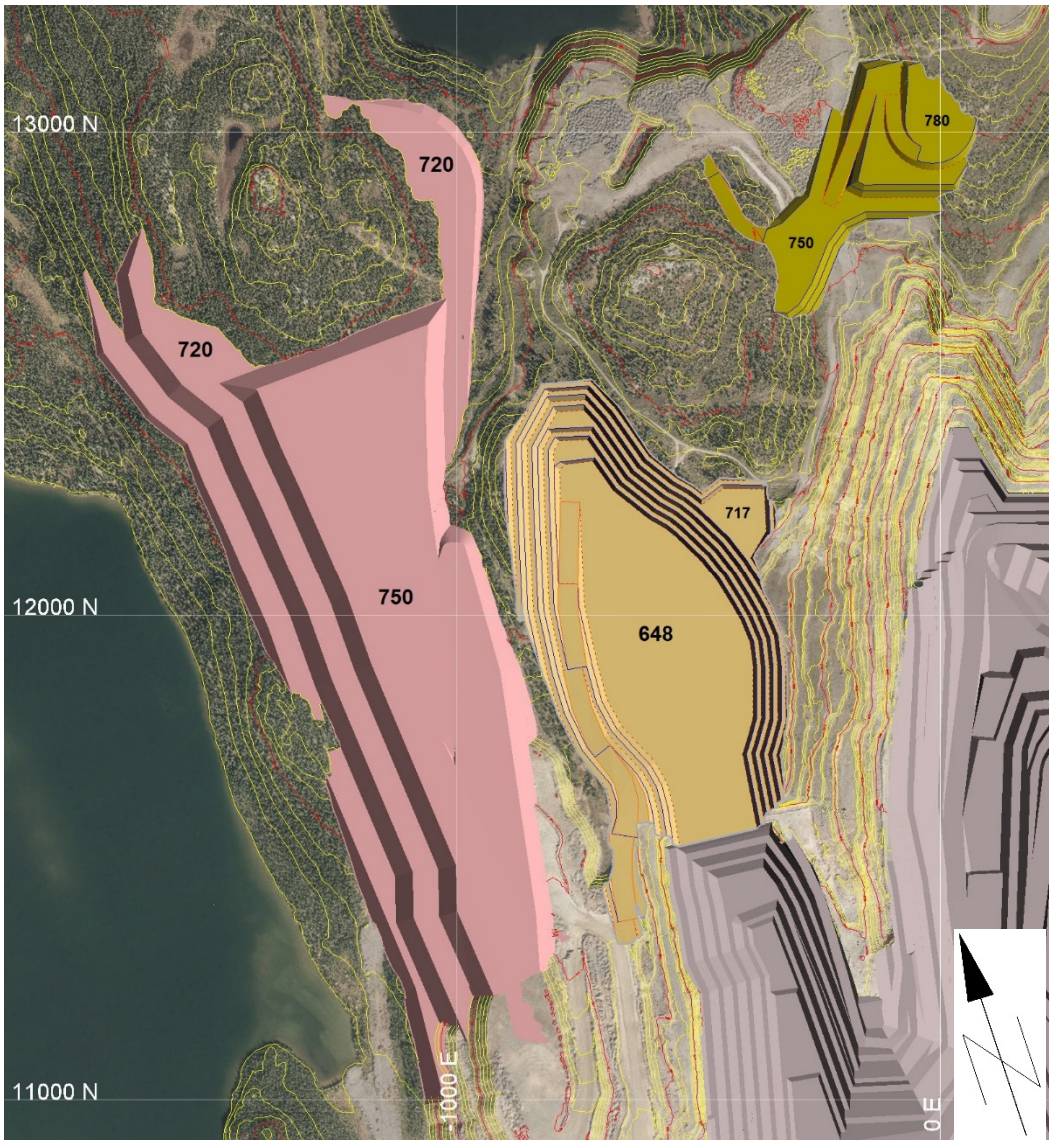


Figure 39: End Year 5

Figure 40 shows the pit and dump after the completion of the sixth year of mining. A further three benches will be mined from Phase G and the 750 lift of the Sherwood dump will be completed.

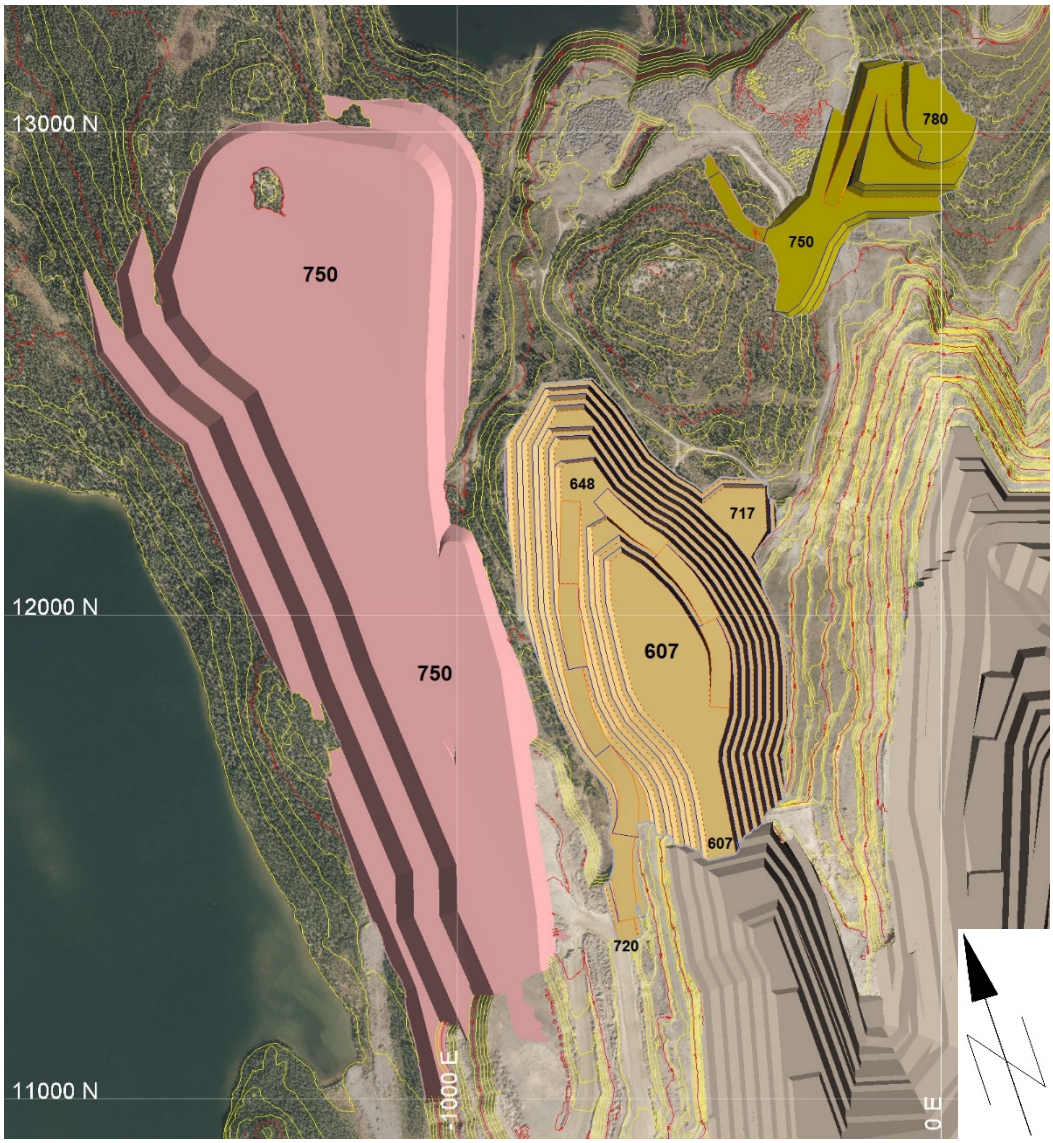


Figure 40: End Year 6

Figure 41 shows the end of the Sherwood North pit. Mining will finish early in the seventh year of production, with the mining of the final bench of Phase G. Very little waste is produced in this period. The 780 Lift of the dump is not required by the current Sherwood North design, unless additional waste is dumped in the Sherwood dump from Phase F (Sherwood Pond).

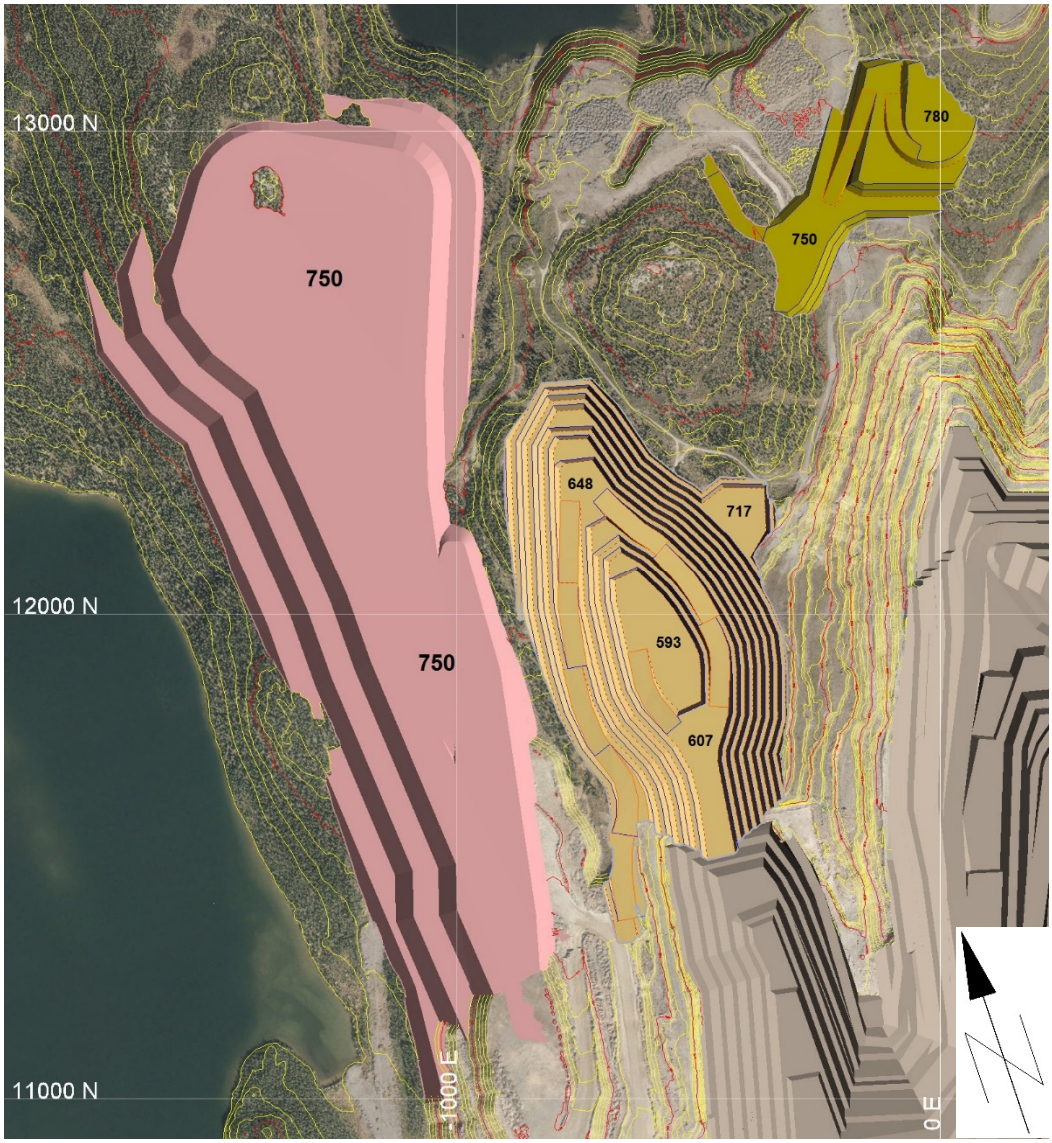


Figure 41: End of Pit

7 Capital Schedule

No development capital expenditure is planned for Sherwood North. All overburden removal, development drilling and blasting, road building and sump excavation will be operating expenses, because Sherwood North is an extension of an operating pit (Humphrey Main). Refurbishment of existing electrical infrastructure (if required) will also be an operating expense, since it does not involve the development of new infrastructure. Future capital expenditure (e.g. drilling of dewatering wells) is included in the site-wide sustaining capital cost previously advised (i.e. these activities will replace similar activities in other operating areas).

8 Rehabilitation

IOC submitted a Rehabilitation and Closure Plan for its existing mining, processing and product delivery infrastructure on 21 July 2010, which was subsequently accepted by the provincial government. Separate closure documents have been submitted for the Wabush 3 development and the Leila Wynne dolomite quarry. An update to the site wide Rehabilitation and Closure Plan was submitted on 21 February 2017, but has not yet been accepted.

Sherwood North involves the extension of the Sherwood pit, extension of the Sherwood waste dump, and the construction of additional infrastructure comprising:

- An extension of existing powerlines;
- Additional pipelines to remove surface water from the new pit areas; and
- Dewatering wells and associated pipelines (as required).

The incremental rehabilitation plan for the Sherwood North development (pit and dump) will comprise:

- Dismantling and removal of all powerlines, pipelines, pumps and associate facilities and removal of all material from site, in a manner consistent with the approved closure plan;
- Flattening of waste dump faces to 20 degrees or less;
- Stabilisation of the abandoned pit slopes;
- Construction of a perimeter bund around the abandoned pit; and
- Revegetation of disturbed areas, in a manner consistent with the approved closure plan. The waste dumps will be progressively reshaped and revegetated where feasible.

The above rehabilitation prescription is consistent with the site-wide Rehabilitation and Closure Plan submitted in February 2017.

Figure 42 shows the conceptual rehabilitated landform of the Sherwood waste dump along with the Sherwood North pit. There is an opportunity to backfill the Sherwood North pit, by extending the Sherwood dump to the west, particularly if the Phase G pit is completed before the Phase F pit is mined.

The above rehabilitation and closure provisions will be incorporated into the site-wide Rehabilitation and Closure Plan submitted in February 2017, which is currently under review.

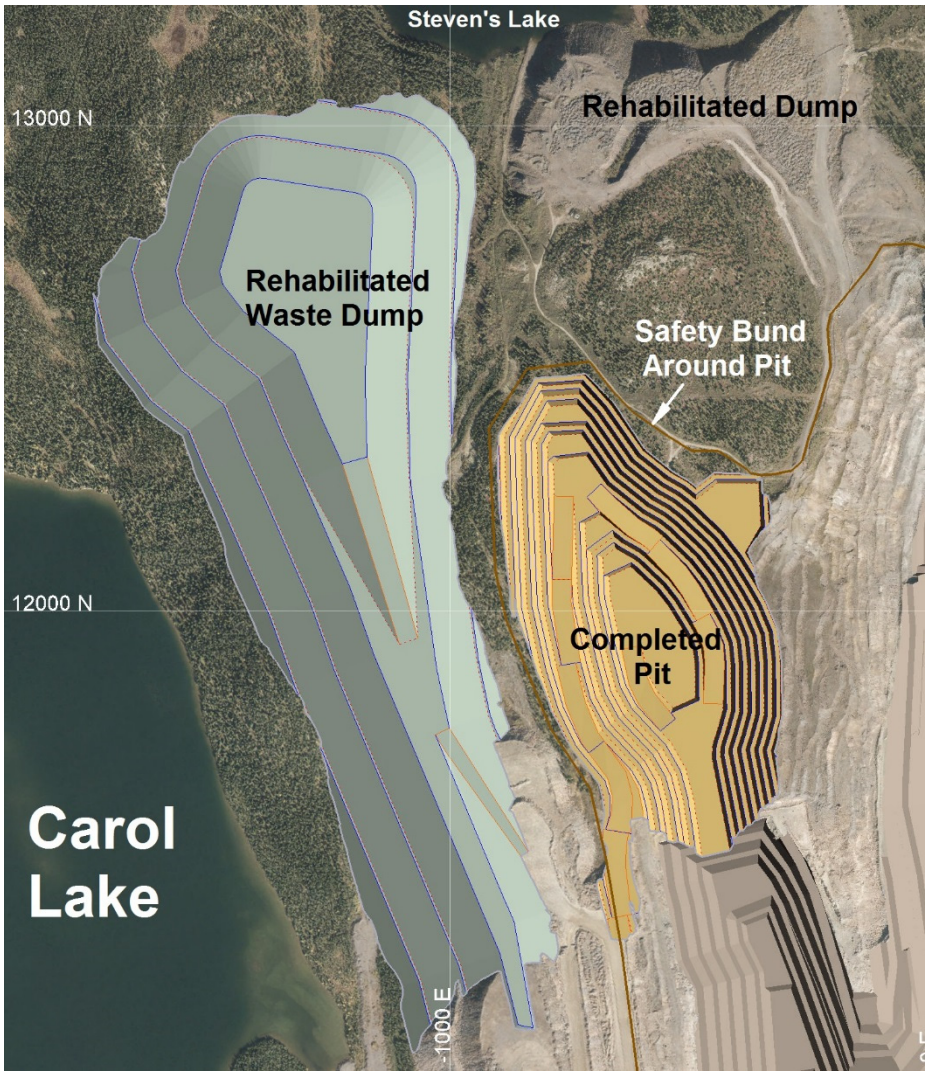


Figure 42: Conceptual Rehabilitated Landform

9 References

IOC (2016) Wabush 3 Development Plan. March.

IOC (2017) Rehabilitation and Closure Plan – Labrador City Operations. February

Lorax (2010) Exploration ML/ARD Study; Samples ARD00023 to ARD00028. November

Appendix A

Drawings

A1: Site Layout Drawings

Site layout drawings enclosed with the development plan are listed below.

Dwg No.	Drawing Description
SN-PLN-2016	Mid 2016 Mine Layout (Mine Grid)
SN-PLN-HM-PHD	Planned Layout End HM Phase D (Mine Grid)
SN-PLN- HM-PHG	Planned Layout End HM Phase G (Mine Grid)

A2: Sections and Plans

A hole trace plan (drawing no. SN-DDH-2016) has been attached to the development plan, to show the collar location and hole orientation of all holes drilled up to the end of 2016. Resource assessment holes have been drilled on east-west section lines.

Cross sections (east-west), long sections (north-south) and bench plans have been plotted as indicated below. Sections and plans show drill hole traces, with iron and magnetite assays, the modelled geology, the current topography and the planned pit designs.

Sections

Section Northing (Mine Grid)	Drawing Number	Section Easting (Mine Grid)	Drawing Number
13109	SN-XS-13109	0	SN-LS-0
13048	SN-XS-13048	-100	SN-LS-minus100
12987	SN-XS-12987	-200	SN-LS-minus200
12926	SN-XS-12926	-300	SN-LS-minus300
12865	SN-XS-12865	-400	SN-LS-minus400
12804	SN-XS-12804	-500	SN-LS-minus500
12743	SN-XS-12743	-600	SN-LS-minus600
12682	SN-XS-12682	-700	SN-LS-minus700
12621	SN-XS-12621	-800	SN-LS-minus800
12560	SN-XS-12560	-900	SN-LS-minus900
12499	SN-XS-12499	-1000	SN-LS-minus1000
12438	SN-XS-12438	-1100	SN-LS-minus1100
12377	SN-XS-12377	-1200	SN-LS-minus1200
12316	SN-XS-12316	-1300	SN-LS-minus1300
12255	SN-XS-12255	-1400	SN-LS-minus1400
12194	SN-XS-12194	-1500	SN-LS-minus1500
12133	SN-XS-12133	-1600	SN-LS-minus1600
12072	SN-XS-12072		
12011	SN-XS-12011		
11950	SN-XS-11950		
11889	SN-XS-11889		
11828	SN-XS-11828		
11767	SN-XS-11767		
11706	SN-XS-11706		
11645	SN-XS-11645		
11584	SN-XS-11584		
11523	SN-XS-11523		
11462	SN-XS-11462		
11401	SN-XS-11401		
11340	SN-XS-11340		

Bench Plans

Bench Number	Bench Elevation (Mine Grid)	Drawing Number
18	771.4	SN-BN-771
19	757.7	SN-BN-758
20	744	SN-BN-744
21	730.3	SN-BN-730
22	716.6	SN-BN-717
23	702.9	SN-BN-703
24	689.2	SN-BN-689
25	675.5	SN-BN-676
26	661.8	SN-BN-662
27	648.1	SN-BN-648
28	634.4	SN-BN-634
29	620.7	SN-BN-621
30	607	SN-BN-607
31	593.3	SN-BN-593

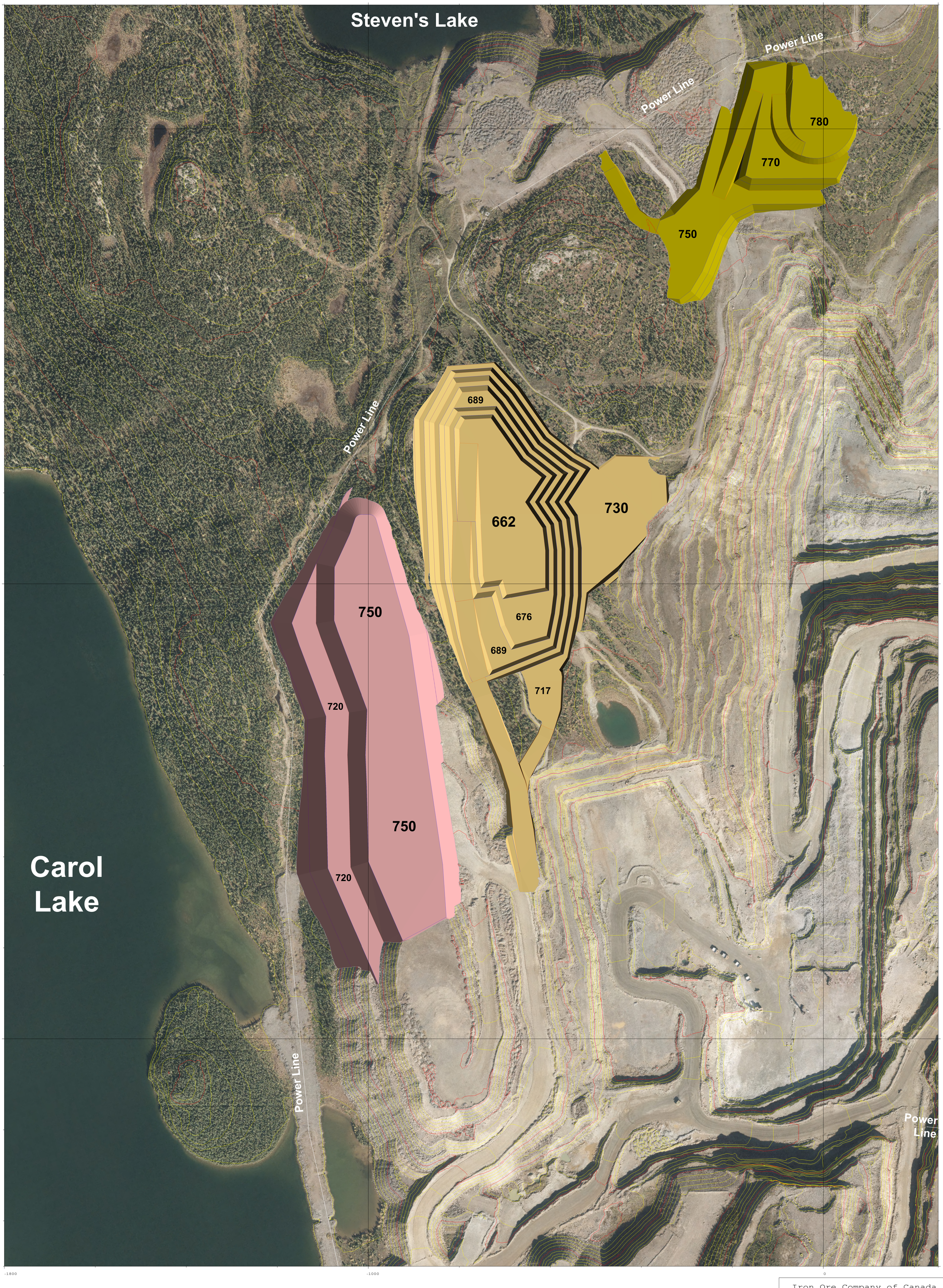
Appendix B
Development Schedule
as of July 2017

Activity Name	2017										2018		
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
RFP for Development													
Tender for Bids													
Bid Evaluation													
PO Issuance													
EA Release													
Kick-off meeting with Contractor, and mobilisation													
Tree Clearing (Mulching)													
Roadway construction for overburden haulage													
Overburden Stripping													
Drill and Blast, bench access development													
Pipeline Installation													
Powerline Refurbishment													
Contractor demobilisation													
Shovel commences production													

5m Minor Contour Interval
25m Major Contour Interval (annotated)

40 0 20 40 60 80 100
Metres

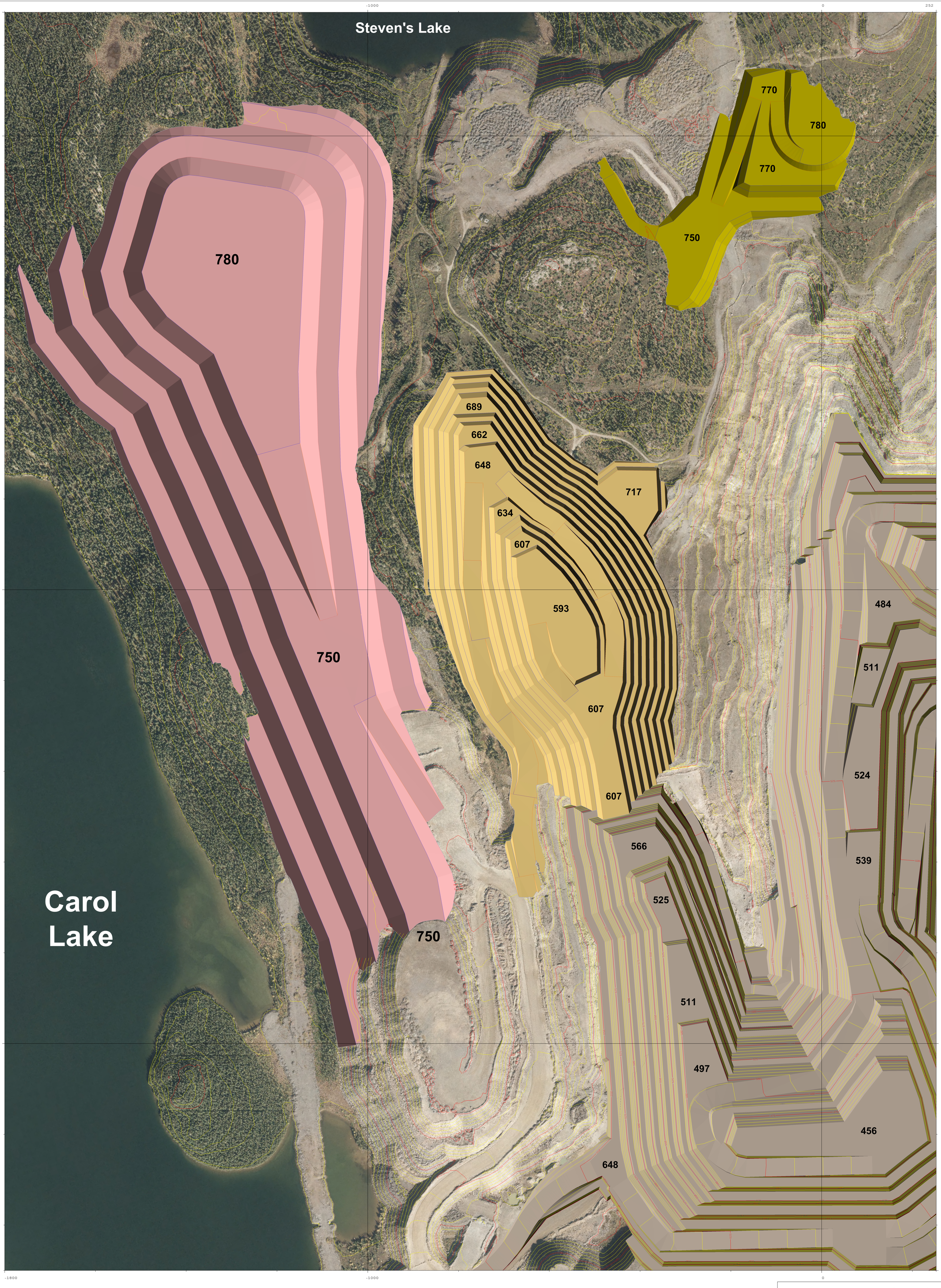
Iron Ore Company of Canada	
Sherwood Nth Development Plan Mid 2016 Topography	Scale:1:2500 Date:22-Apr-2017 Project: Drawn By:RDW Checked: Approved: RDW Drawing No. SN-PLN-2016



5m Minor Contour Interval
25m Major Contour Interval (annotated)

40 0 20 40 60 80 100
Metres

Iron Ore Company of Canada	
Sherwood Nth Development Plan End HM Phase D	Scale:1:2500 Date:22-Apr-2017 Project: Drawn By:RDW Checked: Approved: RDW Drawing No. SN-PLN-HM-PHD



5m Minor Contour Interval
25m Major Contour Interval (annotated)

40 0 20 40 60 80 100
Metres

Iron Ore Company of Canada

Sherwood Nth Development Plan

End HM Phase G

Scale:	1:2500
Date:	22-Apr-2017
Project:	
Drawn By:	RDW
Checked:	
Approved:	RDW
Drawing No.	SN-PLN-HM-PHG