ATTACHMENT 2

Jay-Cardinal Project Description Addendum (Jay Project Description) EA1314-01

Date June 18, 2014

To Mark Cliffe-Phillips, Executive Director
Mackenzie Valley Review Board

From Richard Bargery, Manager, Permitting Jay Project
Dominion Diamond Ekati Corporation

Addendum to the Jay-Cardinal Project Description: the Jay Project

As discussed on April 29, 2014 with the Review Board staff, Dominion Diamond Ekati Corporation's intent is to mine the Jay pipe only and remove the development of the Cardinal pipe from the Project entirely. This addendum summarizes the revisions to the Jay-Cardinal Project required in order to fully encompass the Project change.

1.0 INTRODUCTION

No substantive changes were identified as being required to encompass the Project change.

2.0 REGULATORY APPROVALS AND AUTHORIZATIONS

No substantive changes were identified as being required to encompass the Project change.

3.0 HUMAN AND BIOPHYSICAL ENVIRONMENT

No substantive changes were identified as being required to encompass the Project change.

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4.0 PROJECT DESCRIPTION

4.1 Approach to the Jay Project

The Jay~~-Cardinal~~ Project is the cornerstone of Dominion's strategy for a long-term sustainable Northern diamonds business that is an on-going source of benefits for the North (Figure 4.1-1 depicts current existing conditions and Figure 4.1-2 illustrates the Project overlaying the existing environment). In itself, the Project will maintain benefits flowing from the Ekati Mine for 10 to 20 additional years. There are also a number of undeveloped kimberlite resources (e.g., Sable pipe, Fox deep) and possible additional undiscovered diamond-bearing kimberlite pipes within Dominion's mineral holdings. These kimberlite pipes represent even longer-term possibilities for Dominion's vision of a prosperous future for the NWT diamonds business. The Project serves this larger vision by providing a stable operating platform from which additional resources can be brought into development in the future. Dominion's strategy is to secure the immediate future of the Ekati Mine through the Project, and to then progress additional opportunities for a long-term sustainable Northern diamonds business that benefits the people of the North.

The Project is an extension of a large, stable and successful mining operation that has been a foundational element of the Northern economy for 15 years. The Project is unique among recently proposed mining projects in the NWT because it is not a 'new project'. New mining projects require extensive construction of basic infrastructure such as site access roads, process plant, camp, and processed kimberlite tailings facilities. As a result, new projects have significantly greater costs to develop, which creates financing risks that can, on occasion, interrupt, delay, or prevent construction. By comparison, expansion projects, such as the Project represent a lower risk means of ensuring the continuation of economic benefits for the North through a long-term sustainable mining project.

Although the Project is an expansion of the Ekati Mine, feedback from Dominion's pre-application engagement indicates that the Project "might cause significant public concern" pursuant to the *Mackenzie Valley Resource Management Act*. This is a regulatory test for referral of a project to the Mackenzie Valley Review Board. Dominion respects this feedback and acknowledges that the Project will be referred for Environmental Assessment by the Mackenzie Valley Environmental Impact Review Board (MVRB).

Dominion has made all parties aware that the financial viability of the Project is linked to the release of diamond-bearing kimberlite for processing prior to the currently scheduled closure of the Ekati mine in 2019. Dominion is committed to working rigorously on the regulatory process to ensure that the process is complete, fair, and comes to a timely conclusion. Dominion has also been clear in requesting all parties to commit to also working rigorously to support a complete, fair, and timely review process. Dominion views it as being in all parties' interests that the Project be given the opportunity to continue operations at the Ekati Mine, with continued economic benefits to Northern people.

Dominion has developed a design of the Project that:

- respects cultural and environmental values;
- ensures uninterrupted operation of the Ekati Diamond Mine;
- maximizes the use of existing infrastructure; and,

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- provides positive project economics, realistic schedule, and mitigation of potential environmental effects.

Examples of how Dominion has achieved these objectives are as follows:

- The Project design avoids any physical disruption at the outlet of Lac du Sauvage into Lac de Gras and surrounding area because of the area's traditional use for camping, fishing, and caribou movement.
- The Project design limits physical disturbance to the esker that is located west of Lac du Sauvage.
- The fundamental approach to the Project delivers acceptable project economics, while addressing community concerns about the Project footprint ~~by including the Cardinal open pit into the Project,~~ and by selecting an approach ~~(diversion and drawdown)~~ that can realistically be constructed in time to avoid mine closure. During only ~~6~~ 14 months of ownership, Dominion has already completed a number of important tasks that facilitate the overall 2019 development schedule, including:
  - submitting the (September 2013) Lynx Project application that was approved in April/May 2014 and that will result in an incremental increase in the operating life of the Ekati Mine;
  - dedicating immediate resources to what was initially referred to as the Jay-Cardinal Project (now referred to as the Jay Project [Project]) such that the~~is~~ Jay-Cardinal Project Description was ~~project~~ submitted~~ssion is provided~~ only six months after taking ownership of the Ekati Mine;
  - conducting open and immediate community engagement on the Jay-Cardinal Project in a manner that shared project concepts even as they were being developed;
  - preparing a Draft Terms of Reference for Environmental Assessment of the Jay-Cardinal Project as a means of facilitating the Review Board's initial stage of work – Scoping;
  - respecting initial feedback received through the engagement process and requesting that the referral procedure be expedited.
  - Responding immediately to community concerns heard through Dominion's engagement process regarding the scope of the Jay-Cardinal Project, specifically the footprint related to inclusion of the development of the Cardinal kimberlite pipe;
  - submitting this addendum to the Project Description describing the selection of a Jay kimberlite pipe mining only approach, which addresses community concerns and results in a reduced environmental footprint by excluding the Cardinal kimberlite pipe; and,
  - preparing a Draft Terms of Reference for Environmental Assessment of the Jay Project that appropriately addresses this amended Project Description.
- The Project design makes full use of existing Ekati Mine facilities to reduce environmental footprint, and to avoid the need for costly and time-consuming construction of major mine components such as process plant, tailings facility, camp, airstrip, and primary access roads, among others.

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- Dominion compared the Project alternatives on the basis of cost, schedule, socio-economics, community feedback, and environmental effects ~~with the result that the selected approach (diversionand drawdown) was significantly superior to the other options~~. The selected alternative will provide ~~This option maximizes potential~~ economic benefits while limiting potential environmental effects by ~~allowing access to both~~ mining only the Jay ~~and Cardinal~~ kimberlite pipe~~s~~. Further, the selected alternative provides a schedule expected to integrate with the current mine plan, and provides reasonable mitigations for potential environmental effects.

The proposed approach to mining the Jay ~~and Cardinal~~ kimberlite pipe~~s~~ is by isolating an area of Lac du Sauvage behind a water retaining dike (similar to that at designed for the Meadowbank Mine in Nunavut), dewatering the diked area,~~s that~~ and diverting a local stream around the diked area~~majority of the inflows to the north and south of the isolated area~~. This approach takes advantage of the natural shape of Lac du Sauvage, which is generally a shallow lake. The shape of Lac du Sauvage is conducive to exposing the ~~areas of the~~ Jay ~~and Cardinal~~ kimberlite pipe~~s~~ for open-pit mining by ~~dawning down~~ dewatering ~~the lake water level~~ within a diked area. The fundamental components and activities of Project are as follows:

At Lac du Sauvage:

- Roads, pipelines, and power line to Lac du Sauvage;
- Quarrying of granite rock ~~borrow areas and quarries~~ for construction material and/or use of granite rock mined from the (planned) Lynx open pit;
- ~~Duchess Lake Diversion (Dike JP2);~~
- ~~Lake E1 Diversion Channel;~~
- ~~North Arm Water Management Area (Dike JP1 and outlet control structure);~~
- ~~Lac du Sauvage Diversion (Dike JP4);~~
- ~~Jay and Cardinal open pit berms;~~
- Exposure of the Jay kimberlite pipe area within Lac du Sauvage by dewatering within a diked area;
- Isolated portion of Lac du Sauvage fish-out;
- Diversion of a small drainage area on the northwest shore of Lac du Sauvage (Christine Lake outflow) around the diked area into the main basin of Lac du Sauvage;
- Lac du Sauvage Pumping Stations~~(s)~~ (~~initial drawdown~~dewatering and on-going operational pumping);
- Jay ~~and Cardinal~~ open pit~~s~~ and underground workings;
- Jay ~~and Cardinal~~ Waste Rock Storage Area (WRSA)~~s~~;
- Continued use of existing Misery site, including the use of the Misery Pit as a water management facility;
- Incorporating reclamation of the (planned) Lynx Pit by filling with water pumped from Lac du Sauvage; and,

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- Reclamation (re-established surface flows, dike breaching, and other activities).

At Ekati Main Camp and Site:

- Processed kimberlite deposition into mined-out Koala and Panda open pits;
- Continued use of Misery access road;
- Continued use of Ekati Mine camp, process plant, airstrip, and all other related facilities; and,
- On-going reclamation of completed areas (certain areas of the Long Lake Containment Facility [LLCF], and others).

The design of these facilities and activities uses standard approaches that have been successfully implemented at the Ekati Mine and other Northern mines. The existing Ekati Mine environmental monitoring, management, and mitigation programs can all be expanded to incorporate the activities proposed for the Project.

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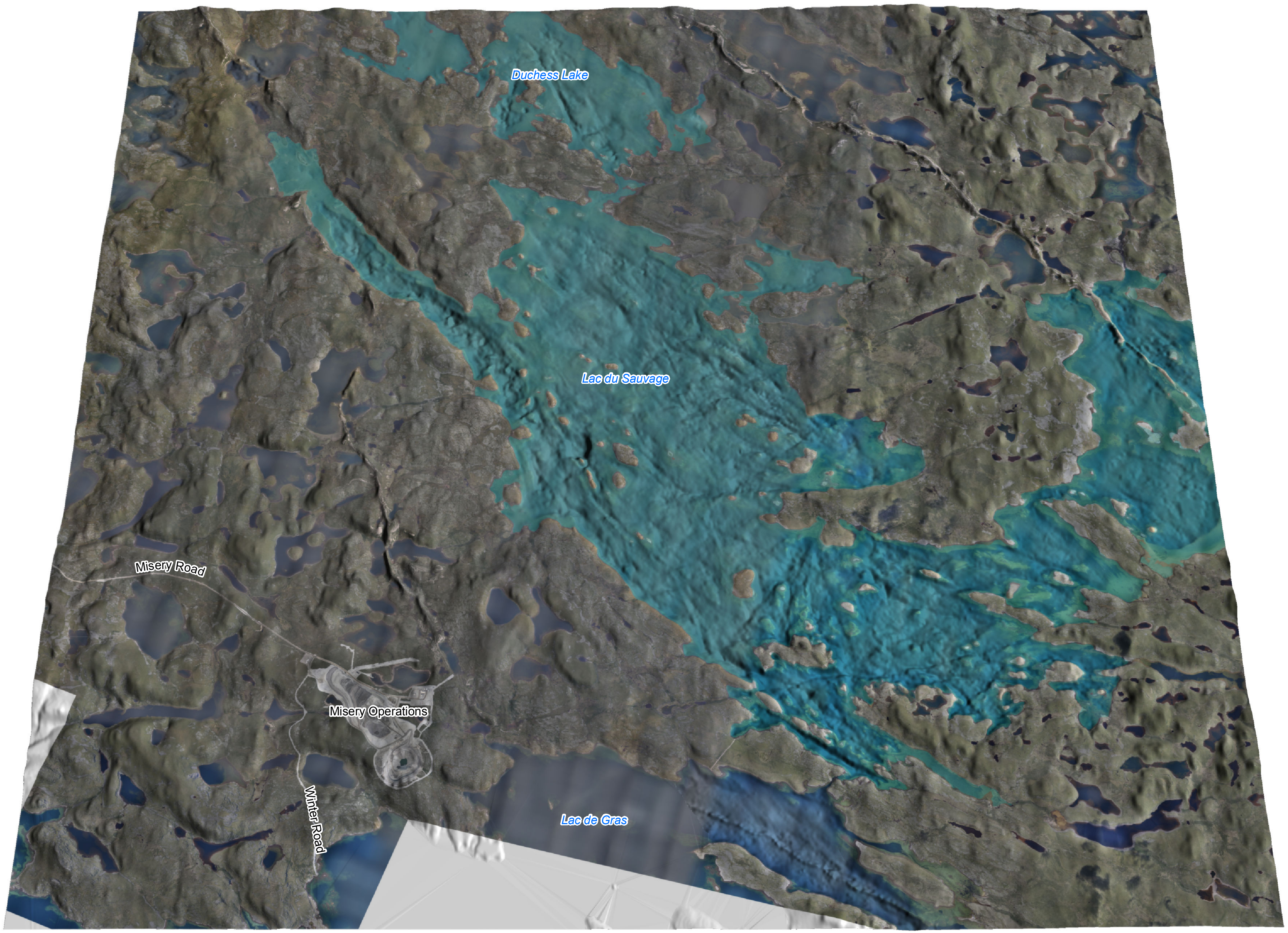


PROJECT

JAY PROJECT
LAC DU SAUVAGE,
NORTHWEST TERRITORIES, CANADA

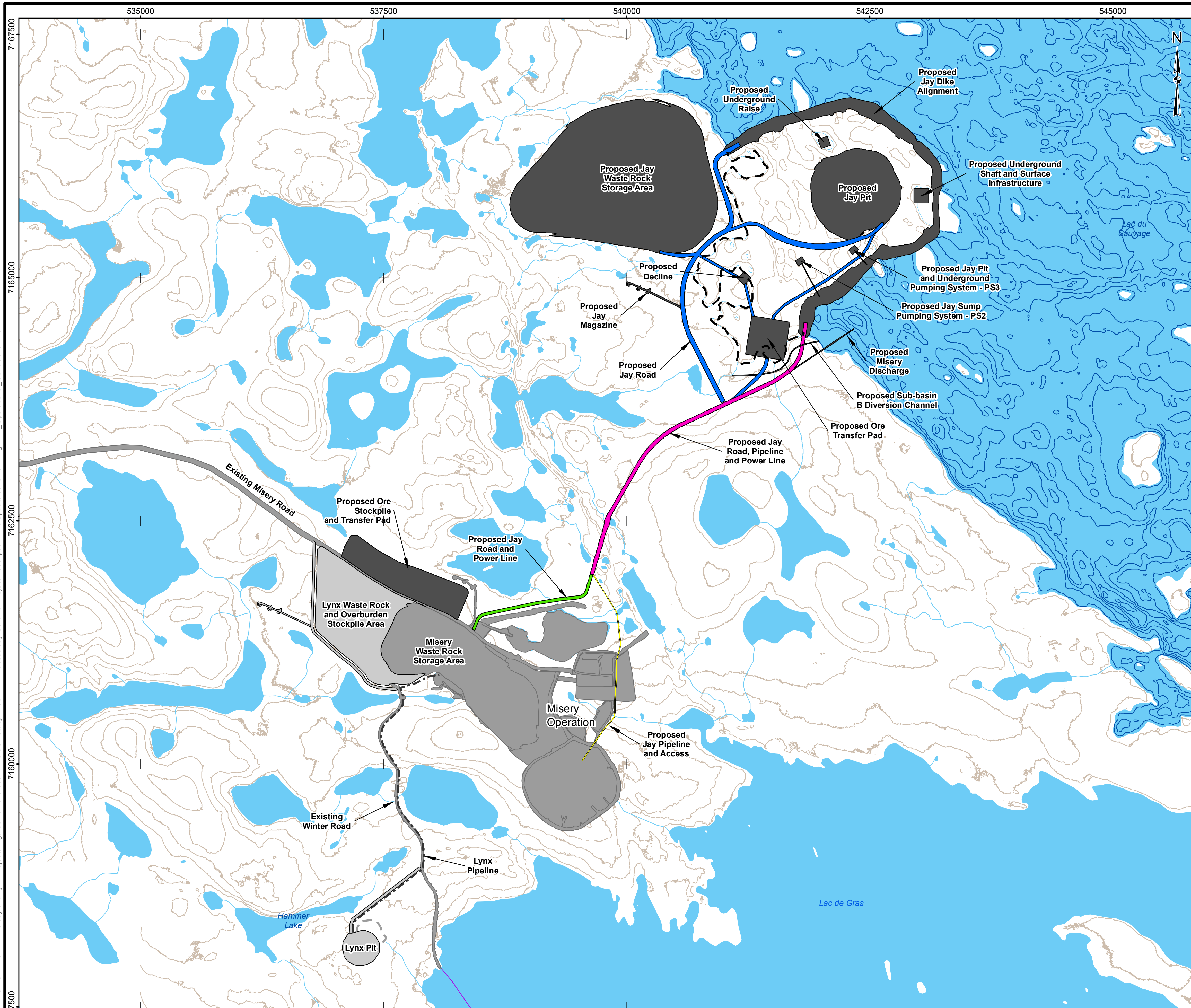
TITLE

EXISTING CONDITIONS

DOMINION DIAMOND

PROJECT		13-1328-0031	FILE No.
DESIGN	NT	16/10/13	SCALE AS SHOWN / REV A
GIS	LMR	17/10/13	
CHECK	ED	17/10/13	**FIGURE: 4.1-1**
REVIEW	ED	17/10/13	

G:\CLIENTS\DOMINION\DDEC Jay and Lynx Projects\Figures\13-1328-0031 Diversion Study\2130 - EIR Process\Jay-Cardinal Project Description\mxd\Fig4.1-1_General_Arrangement.mxd



LEGEND

EKATI MINE FOOTPRINT (MISERY OPERATION)
WINTER ROAD
BATHYMETRY CONTOUR (5 m INTERVAL)
ELEVATION CONTOUR (10 m INTERVAL)
WATERCOURSE
WATERBODY

JAY PROJECT FOOTPRINT

EXISTING SHORELINE OF DEWATERED AREA
PROPOSED JAY PROJECT INFRASTRUCTURE
PROPOSED JAY ROAD
PROPOSED JAY ROAD AND POWER LINE
PROPOSED JAY ROAD, PIPELINE AND POWER LINE
PROPOSED JAY PIPELINE AND ACCESS

LYNX PROJECT FOOTPRINT

EXISTING SHORELINE OF DEWATERED LYNX LAKE
LYNX PIPELINE
LYNX PROJECT INFRASTRUCTURE

DRAFT

REFERENCE

JAY PROJECT CONCEPTUAL ENGINEERING REPORT, EKATI MINE, DOC#: 1313280041-E14037-R-REV0-4060, DATED: MAY 13, 2014
LIDAR AND BATHYMETRIC DATA OBTAINED FROM AURORA, 2013
WATER OBTAINED FROM CANVEC © NATURAL RESOURCES CANADA, 2012
DATUM: NAD83 PROJECTION: UTM ZONE 12N

NOTES

ROAD, PIPELINES, AND POWER LINE ARRANGEMENT TO BE DETAILED AS PART OF PRE-FEASIBILITY DESIGN. APPROXIMATE CORRIDOR WIDTHS ARE SHOWN.

1 0 1
SCALE 1:40,000 KILOMETRES

PROJECT
JAY PROJECT
LAC DU SAUVAGE,
NORTHWEST TERRITORIES, CANADA

TITLE
OPERATIONAL CONDITIONS

DOMINION DIAMOND

PROJECT	13-1328-0031	FILE No.
DESIGN	JC	26/05/14	SCALE AS SHOWN	REV 0
GIS	ANK	05/06/14
CHECK		
REVIEW		

FIGURE: 4.1-2

G:\CLIENTS\DOMINION\DDEC Jay and Lynx Projects\Figures\13-1328-0031 Diversion Study\2130 - EIR Process\Jay-Cardinal Project Description\mxd\Update June 2014\Fig4.1-2_Operational_Conditions.mxd

4.2 Project Schedule

The primary time constraint for the Jay Project is that kimberlite production must be delivered to the process plant by end of 2019. This is needed to avoid a shutdown of the Ekati Mine according to current mine planning schedules. To achieve this requirement, the following general milestones are envisioned for the Project's seven-year start-up schedule:

2013 (completed activities)

- Initial application (~~i.e., this submission~~completed September 2013)
- Referral to the MVRB for Environmental Assessment (completed December 2013)
- ~~MVRB Scoping and Terms of Reference for Environmental Assessment (begins)~~

2014

- MVRB Scoping and Terms of Reference for Environmental Assessment (completed February 2014)
- Project Description addendum and revised Terms of Reference (completed June 2014)
- DDEC Developers Assessment Report
- Environmental Assessment review process (begins)

2015

- Environmental Assessment review process (completed)
- Ministerial approval on Environmental Assessment
- Applications for operational permits and authorizations

2016

- Regulatory review for operational permits and authorizations ~~(completed)~~
- Construction of land-based access (roads and power line) to Lac du Sauvage and other allowable Project activities
- Issuance of Operational Permits and Authorizations
- Construction of dike, pipelines, and pumping facilities (begins)

2017

- ~~Construction of dikes, channels, and pumping facilities~~
- ~~Drawdown pumping and Fish-out (begin)~~
- Construction of dike, pipelines, and pumping facilities (continues)
- Fish-out

2018

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- ~~Drawdown pumping and fish-out (complete)~~
- ~~Construction of Jay and Cardinal berms and access causeways~~
- ~~Pre-stripping for Jay and Cardinal open pits (begins)~~
- Construction of dike, pipelines, and pumping facilities (continues)

2019

- Construction of dike, pipelines, and pumping facilities (completed)
- ~~Pre-stripping for Jay and Cardinal open pits (continue / complete)~~
- Dewatering of the diked area
- ~~Production for kimberlite to process plant from Cardinal open pit (begin)~~
- Pre-stripping for Jay open pit

~~2020~~

- ~~Pre-stripping for Jay open pit (complete)~~
- Production of kimberlite to process plant from Jay ~~and Cardinal~~ open pit~~s~~ (begins~~/continue~~)

After 2020, mining would proceed through Jay ~~and Cardinal~~ open pit and underground workings (projected 10 to 20 year timeframe). Closure and reclamation activities are envisioned to require approximately five years, followed by closure monitoring and progressive relinquishment of liabilities.

DDEC considers this general timeframe to be achievable and has been working diligently over its ~~six~~ 14 months of ownership of the Ekati Mine to create this opportunity (see Section 4.1). The construction timeframe is accelerated to as great a degree as is considered realistic as the means of achieving the 2019 development time constraint while providing a reasonable amount of time for regulatory review and approval. The timely receipt of regulatory approvals is critical to the success of this project opportunity.

DDEC recognizes that amendments to *Mackenzie Valley Resource Management Act* and *Devolution* have occurred during the Project start-up timeframe, which could affect this project opportunity. DDEC will work collaboratively with government and Aboriginal communities to avoid potential project delays and to take advantage of potential project opportunities that may become apparent as these processes are implemented.

4.3 Existing Project Facilities

The principal facilities at the Ekati site include:

- main accommodations complex: dorm-style sleeping rooms; dining, kitchen, and recreation areas; first aid station, emergency response / mine rescue stations; maintenance shops; a sewage treatment plant; water treatment facility; and incinerator room;

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- process plant;
- power plant;
- truck shop / office / warehouse complex that provides for heavy and light vehicle maintenance, heated warehouse storage, change rooms, an environmental laboratory, and an administration offices;
- bulk storage for diesel fuel;
- bulk lubrication facility, that is situated adjacent to the truck shop and holds bulk lubricant and glycol; and,
- all related support facilities and equipment for operation of the above.

Ancillary buildings located at the Ekati main camp area include:

- ammonium nitrate storage facility;
- emulsion plant;
- waste management building, where waste is prepared for transport to off site management facilities;
- site maintenance shed and Sprung facility, which is used for shipping and receiving;
- airport building; and,
- geology and helicopter facility, that consists of a few small structures on the geology laydown pad to support exploration drilling activities and helicopter flight operations.

Surface facilities to support the Koala North and Koala underground operations include: two maintenance shops, a warehouse, an office complex / change house, a compressor building and batch plant (for mixing concrete), a cold storage building, and a one million litre fuel tank located within a bermed area.

Facilities at the Fox Pit include: two 9 million litre (ML) fuel tanks, a truck line-up area, a dispatch trailer, and trailer complex with washrooms and offices. Further, an explosive storage facility exists to serve the Fox pit operations.

The principal facilities at the Misery Pit include:

- an accommodation complex for 115 people, consisting of single occupancy rooms, kitchen complex, recreation room and exercise gym;
- mine office and dry;
- three Type 4 explosive magazines;
- mine maintenance shop and wash bay;
- utility service building;
- communication tower and trailer;

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- diesel power generators with electrical substation
- 9 ML fuel tank farm with off-loading and dispersing; and,
- incinerator with waste handling facility.

A brief description of the existing primary facilities that relate directly to the Project is provided below.

4.3.1 Process Plant

A single, centralized process plant is located within the Ekati main camp, southwest of the Koala Pit. Kimberlite processing through the plant averages 12,500 tonnes per day (tpd) as a continuous operation (i.e., 24 hours a day, 365 days a year). The processing of kimberlite is a physical process rather than a chemical process. Simplified, the general process can be described by size reduction (crushing); washing (also referred to as scrubbing); screening (filtering by size); and, then primary and secondary concentration (separating the material by density).

4.3.2 Haul Roads

Transportation of personnel or equipment from the Misery camp or material from the Misery site to ~~either the waste rock stockpile or~~ the Ekati process plant is completed ~~on~~ using the Misery Haul Road. The road is approximately 29 km in length and connects to the Tibbitt to Contwoyto Winter Road.

4.3.3 Open Pits

The Jay Project proposes to make beneficial use of several existing pits at the Ekati site, as described in the subsections below.

4.3.3.1 Panda and Koala Pits

Open-pit mining at the Panda Pit commenced in August 1998 and continued through to July 2003. Underground production at the Panda Pit began two years later in June 2005 and was completed in 2010, after which the underground workings were decommissioned for closure. Open-pit mining at the Koala Pit commenced in 2003 and was completed in 2007, while underground production at the Koala Pit commenced in 2007 and is anticipated to continue until 2019.

For the Jay Project, the mined-out Panda and Koala pits will be used for fine processed kimberlite (FPK) deposition.

4.3.3.2 Misery Pit

Phase 1 of the Misery open-pit mining was operated from 2002 to 2008, at which time mining was temporarily suspended. Phase 2 of developing the Misery Pit was commenced in 2012 and is anticipated to take six years, with production of kimberlite to the process plant scheduled to proceed until the end of 2018.

For the Jay Project, the mined-out Misery Pit will be used as a water management facility. Some water containing elevated TSS levels will be pumped from the diked area of Lac du Sauvage during the initial dewatering phase of the Project and minewater from the Jay open pit and underground workings during the operational phase of the Project will be pumped to and managed in the Misery Pit.

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4.3.3.3 Lynx Pit

Construction for the Lynx Project is planned to commence in 2015 and is anticipated to take one to two years to complete. Reclamation of the Lynx Pit currently anticipates flooding of the Lynx open pit with water pumped from Lac de Gras.

For the Jay Project, reclamation filling of the Lynx Pit will be accomplished, at least in part, by pumping water from the diked area of Lac du Sauvage during the dewatering. Water quality monitoring as part of the reclamation program will be used to verify that water quality is suitable in terms of reclamation standards.

4.3.4 Fine Processed Kimberlite Storage Facilities

There are two active deposition areas for the fine processed kimberlite (FPK; >0.5 mm in diameter) that remains after processing of the kimberlite through the process plant, LLCF and Beartooth Pit. The FPK is mixed with water and pumped as a slurry into the deposition areas. Deposition is regulated under the Ekati Mine Wastewater and Processed Kimberlite Management Plan.

4.3.4.1 Long Lake Containment Facility

The LLCF is located at the headwater of the western Koala Watershed, which feeds into the Lac de Gras Watershed. The LLCF currently includes the following components:

- five containment cells; cells A, B, and C currently receive and store FPK and waste water; Cell D is currently used as a water management area and may receive FPK in the future; and Cell E which acts as a finishing pond prior to discharge to the receiving environment;
- three filter dikes; Dikes B, C, and D are designed to retain processed kimberlite solids within the upstream cell while allowing water to filter through to the downstream cell;
- the outlet dam; which serves as the downstream water control structure that retains water until sampled, authorized, and then pumped to the receiving environment;
- water pumps; pumps on the upstream side of Dike C are used to pump water from Cell C to the reclaim barge in Cell D to supply recycled water to the process plant, pumps at Dike D are used seasonally to transfer water to Cell E, and pumps in Cell E transfer the water that meets Water Licence discharge criteria to the receiving environment (discharge point is Leslie Lake);
- access roads; roads are located along the north side of Cell A, around the perimeter of Cell B, and the east and south sides of Cell C and D; a road and discharge pipeline on the west side of Cell C and the south side of Cell A are under construction; and,
- associated pipelines.

The current operating plan for the LLCF maximizes the use of the upstream areas (cells A, B, and C) for FPK deposition and, combined with the use of the mined out Beartooth Pit, defers the use of Cell D for FPK deposition until late in the mine life. This approach consolidates the area of disturbance (i.e., FPK beaches) requiring reclamation and is valid for the current operating life of the Ekati mine to 2019. FPK deposition into Cell B is complete except for possible minor or emergency deposition into the lower areas. The upper areas of Cell B are being used as a reclamation pilot study at this time.

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4.3.4.2 Mined-out Beartooth Pit

Since late 2012, the mined out Beartooth Pit has been used for FPK deposition. This approach makes effective use of a completed mining facility and serves to validate the concept of FPK deposition into open pits at the Ekati Mine. FPK deposition is currently planned to proceed to an elevation 30 m below the final pit lake overflow elevation. DDEC may develop technical work to optimize the depth of water required for reclamation, thereby increasing the storage capacity for FPK and reducing deposition into the LLCF surface facility.

4.3.5 Coarse Kimberlite Management Area

The Coarse Kimberlite Reject Storage Area within the Panda/Koala/Beartooth WRSA, was commissioned in 1998. The screened coarse fraction (0.5 to 1.6 mm diameter) of kimberlite feed (de-grit) and HMS light fraction (HMS float; <25 mm) from processing of kimberlite at the process plant is stored at this location. The runoff from this storage area drains to the LLCF.

4.3.6 Ancillary Facilities

4.3.6.1 Sewage / Greywater

Between April 1997 and January 1999, treated sewage was discharged to the Kodiak Lake and in 1999 a pumping station and pipeline was built to redirect the treated sewage to the process plant, where it is now combined with the processed kimberlite prior to discharge to the LLCF.

There are two main sources of sewage, the sanitary sewage system at the main site and the sewage from the remote work sites (e.g., Fox Pit and the Misery Pit facilities). Sewage collected from the underground operations and the remote working sites is trucked to the main camp sewage facility. An enclosed sanitary sewage treatment plant treats all domestic wastewater, and provides both primary and secondary levels of treatment. The final treated effluent is pumped to the process plant and discharged to the LLCF.

4.3.6.2 Landfill

The main camp solid waste landfill was commissioned in 1998 and is located on the western side of the Panda/Koala/Beartooth WRSA. The landfill is used for the disposal of inert non-hazardous wastes (wood, metal, concrete, cardboard, etc.) that is generated as part of operations.

A landfill at Misery site was commissioned in 2001 and is located north of the Misery Pit, within the footprint of the Misery WRSA.

4.3.6.3 Landfarm

The landfarm was constructed in 1998 and is a lined facility designed with a leachate collection system and side berm to control runoff. The landfarm is used for the management of hydrocarbon-impacted soil generated as a result of operational spills of diesel, glycol, gasoline, kerosene, jet fuels, hydraulic oil, transmission fluid, and lube oil. Hydrocarbon impacted soil with an average particle size of less than 4 cm are bio-remediated at the landfarm facility. Hydrocarbon-impacted material that is unsuitable for on-site bioremediation is stored here temporarily until it is shipped offsite for proper disposal.

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4.3.6.4 Contaminated Snow Containment Facility

The contaminated snow/ice facility was constructed in 2004. The bermed and lined facility is designed for the containment of hydrocarbon-impacted snow and ice that are generated as a result of operational spills of diesel, glycol, gasoline, kerosene, jet fuels, hydraulic oil, transmission fluid, and lube oil. Following the spring melt, the hydrocarbon contaminant sheen is removed and properly disposed, and the remaining water is pumped to the LLCF.

4.3.6.5 Water Supply

Freshwater is supplied to the Ekati operations from Grizzly Lake, Little Lake, Thinner Lake (Misery Camp), and Two Rock Lake. A water treatment plant for potable water is located at the Ekati main camp. Potable water for the Misery site is trucked from the Ekati main facility.

Water for the process plant is recycled within the process plant or pumped back from the LLCF.

4.3.6.6 Power and Electrical

Ekati's main power plant consists of seven 4.4 megaWatt (MW) diesel generator sets operating at 4,160 volts (V). The main plant provides power to the process operations, accommodations complex, and truck shop/office complex. Waste heat from the power plant is recovered by means of glycol heat exchangers to heat buildings and process water.

The Misery operation uses three 455 kiloWatt (kW) standalone diesel generators connected to a common synchronized power distribution system. This power distribution system has two distribution centers, the synchronized power distribution center, and a second distribution center located at the accommodation complex. Underground cables provide power to the site and terminate at each respective building.

4.3.6.7 Fuel Storage

Fuel storage on site has a capacity of 98 ML. A central bulk fuel farm that contains 8 tanks and approximately 68 ML is located at the Ekati main camp. Other satellite fuel farms are currently located at the Misery (9 ML fuel tank with dispensing and offloading facilities), Fox, and Koala North sites. To support the logistics of fuel delivery to site, Ekati leases a tank farm in Yellowknife with a capacity of 80 ML.

The fuel tanks are double-lined and housed within bermed areas on an impervious liner.

4.3.6.8 Communications

On-site communications are provided by microwave link from Yellowknife, which is operated by a local telecommunication company, Northwestel. The microwave link has dedicated bandwidth to provide voice, data, and internet services. Also located on-site is a backup satellite connection that has lower capacity than the main microwave link, but can be used as required. Communications at the Misery site are provided by an extension of the microwave link from the Ekati main camp.

Internal site communications are provided by radio, phone, local area network, and wireless internet. A fleet management system, Wenco, is also used to track material movement and equipment status.

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4.3.6.9 Power Line and Substation

Ongoing adjustments or additions to site infrastructure are an essential part of a successful operation such as the Ekati Mine. Several such operational changes are currently pending or are being planned to be in place prior to the Jay Project commencing.

In May 2014, Dominion filed the necessary regulatory applications to construct a power line from the Ekati main camp to the Misery site. Approval is anticipated in July 2014, as such, the Misery power line is anticipated to have undergone all necessary regulatory review and be in place to provide infrastructure support to the Jay Project. The plan is for the power line construction to occur in 2014 and 2015, and be energized in 2015.

The purpose of the power line is to provide the necessary electrical power to the Misery site in a more efficient manner than has been done in the past. The Misery site is approximately 30 km from the Ekati main camp and is currently powered by a remote, standalone diesel generator, with attendant fuel storage tank. Utilizing a power line from the Ekati powerhouse maximizes the operating and environmental benefits of using the larger, centralized, and more efficient generators to achieve cost savings, reduce environmental risks, and maximize environmental recoveries.

The key design elements of the Misery power line are as follows:

- An overhead line will be used to the extent practical to minimize risks to caribou and other wildlife and to facilitate maintenance;
- The line will be laid on the ground where overhead lines are not safe or practical at the northern end of the line (Ekati camp and airstrip area) and at the southern end (Misery camp area);
- High voltage power (3-phase 69 kV) will be transmitted to minimize line losses;
- The line will follow the north side of the Misery Haul Road as closely as practical to meet safety standards, minimize ground disturbance, and facilitate maintenance activities;
- The line will not cross the Misery Haul Road to avoid related safety risks;
- Pole height will be selected to meet safety standards;
- Pole spacing and locations will be selected to meet safety standards and to avoid pole installation in water crossing or at constructed caribou ramps;
- Poles will be installed in-the-ground (drilled) rather than in raised rock-filled boxes to minimize risk to caribou and other wildlife;
- The use of guy wires will be minimized in favour of double poles where practical (i.e., at corners) to reduce risk to wildlife and people;
- Guy wires will be completed with high visibility plastic sleeves to reduce risk to wildlife and people;
- Pole caps and cross bar perch preventers will be used to reduce risk to birds who may otherwise perch or roost on the poles;
- Isolated sections of the Misery Haul Road that are no longer used for haulage traffic will be utilized for pole installation to minimize ground disturbance; and,

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- Pads extended from the north side of the Misery Haul Road for pole access will be constructed of granite rock (i.e., non-acid-generating material).

4.4 Project Alternatives

4.4.1 Alternatives to the Project

A number of alternatives to the Project were considered. The alternatives to the Project, with the exception of “No Project”, were assessed against the following fundamental project requirements:

- respects cultural and environmental values;
- enables uninterrupted operation of the Ekati Diamond Mine;
- maximizes the use of existing infrastructure; and,
- provides positive project economics, realistic schedule, and mitigation of potential environmental effects.

4.4.1.1 No Project

- The reserves of the two largest operating mines in the NWT (the Ekati and Diavik mines) are declining. The Ekati Mine is currently scheduled to close in 2019 and the Diavik Mine in 2023. The continued development of new mineral deposits is a means of allowing Northerners to continue to benefit from a viable mining sector and contribute to a healthy Northern economy.

Mining of the Jay ~~and Cardinal~~ kimberlite pipes represents 10 to 20 years of additional mine life at the current kimberlite processing rates. Development of the Jay kimberlite pipe will extend employment at the Ekati Mine site, increasing long-term employment stability for the current mine employees. Consequently, DDEC has rejected the “No Project” option in favour of gaining the most benefit from the available natural resources at the Ekati Mine for the general benefit of all parties.

4.4.1.2 Underground Mining

It would be possible to mine the Jay kimberlite pipe exclusively by underground methods. The kimberlite would be accessed from an adit located on the shore of Lac du Sauvage. Dominion commissioned Stantec Engineering to develop a conceptual underground mining approach for the Jay kimberlite pipe, which is provided as Appendix 4A.

This approach requires little surface disturbance relative to the other approaches considered; however, this approach has a number of potentially fatal flaws that render it inapplicable as a viable project, specifically:

- the conceptual cash flow projection is clearly and strongly negative, to the point where the approach could not likely be made economically viable in light of current or projected costs and product pricing;
- intensive, up-front capital investment is required to a much greater degree than other approaches, contributing to additional negative economics;

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- the timeframe to construct an underground operation that could consistently produce the necessary 12,500 tpd of process plant feed is in the order of 4 years, which is not a realistic means of production by 2019 given the required permitting timeframe;
- the Cardinal kimberlite pipe would not be mined, leaving potentially valuable resources in the ground;
- large uncertainty in water inflow rates from the overlying Lac du Sauvage would require a large crown pillar of kimberlite resource to remain unmined, and there would be heightened cost and operating risks related to highly uncertain water inflows; and,
- an underground mining workforce at a Northern mine is less conducive for high Northern and Northern-Aboriginal employment than an open pit operation.

4.4.1.3 Open Pit-Mining Within Single Dike – Jay Only

Diavik-Style Ring Dike Alignment

It would be possible to mine the Jay kimberlite pipe by isolating an area for open-pit mining behind a ring dike constructed in Lac du Sauvage. This approach is similar in concept to the approach implemented for the Diavik Mine, although substantively more dike construction would be required to fully encircle the Jay pipe area, including a roadway connecting the ring dike to the shore of Lac du Sauvage. Dominion commissioned EBA Engineering to develop a conceptual ring dike approach for the Jay kimberlite pipe, which is provided as Appendix 4B.

This approach has several positive aspects:

- the open pit mine could be designed to produce the necessary 12,500 tpd feed to the process plant;
- the in-lake environmental effects are largely reversible at the conclusion of mining operations; and,
- an open-pit mining workforce typically offers greater Northern and Northern-Aboriginal employment opportunities as compared to underground mining.

However, this approach also has a number of negative aspects:

- the downstream toe of the ring dike would be located some 100 m from the open pit rim and may limit the options for economic underground mining methods;
- the dike construction method has a high capital cost and the project ~~the conceptual~~ cash flow range ~~is~~ would be marginal to negative;
- the level of design sophistication identified and the attendant design costs may be overly conservative for the conditions present at the Jay pipe area in Lac du Sauvage as compared to the deeper water at the Diavik Mine in Lac de Gras;
- the engineering design and construction requirements are intensive, which requires greater up-front capital investment and a longer construction period;

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- the projected timeframe to construct a ring dike that achieves the necessary sophisticated engineering design is in the order of ~~four~~ five years, which is not a realistic means of production by 2019 given the required permitting timeframe; and,
- there is no option to mine the Cardinal pipe.

Other Dike Alignments

In 2014, Dominion commissioned Golder Associates Ltd. to develop concepts for developing the Jay kimberlite pipe in a water retaining dike with an alignment other than the Diavik-style ring dike alignment. Golder investigated and developed two potential dike alignments (Option 1 “hockey stick” and Option 2 “horseshoe”). The dike construction approach would be similar to that used in the construction of the Bay-Goose Dike at the Meadowbank Mine in Nunavut. These dike alignments are located in shallower water and are a minimum of 200 m from the open pit rim.

This approach has several positive aspects:

- the open pit mine could be designed to produce the necessary 12,500 tpd feed to the process plant;
- the in-lake environmental effects are largely reversible at the conclusion of mining operations;
- an open-pit mining workforce typically offers greater Northern and Northern-Aboriginal employment opportunities as compared to underground mining;
- the projected timeframe to construct a hockey stick or horseshoe dike around the Jay pipe is in the order of 3 to 3½ years, which is a realistic means of achieving production by 2019 given the required permitting timeframe; and,
- the downstream toe of the dike would be located approximately of 200 m from the open pit rim and is not expected to limit options for underground mining methods.

However, with this approach there is no option to mine the Cardinal pipe.

4.4.1.4 Diversion and Drawdown - Jay-Cardinal Project

~~The presence of continuous talik beneath Lac du Sauvage and the identified geologic structures, if permeable, could provide a hydraulic connection between the proposed pits and the deep groundwater system. If a water retention ring dike was built around the Jay kimberlite pipe and the current lake levels were maintained, the water inflow into the pit could be larger than if the lake water level was lowered; therefore increasing the volume of mine water to be managed and the operating risks. As such, a system of strategically placed dikes that would isolate an area of Lac du Sauvage large enough for the Jay and Cardinal pitsis considered a more appropriate approach.~~

It would be possible to mine the Jay and Cardinal kimberlite pipes by isolating an extensive area in Lac du Sauvage behind dikes that divert a majority of the inflows to the north and south of the isolated area. This approach takes advantage of the natural shape of Lac du Sauvage, which is generally a shallow lake. The shape of Lac du Sauvage is conducive to exposing the areas of the Jay and Cardinal kimberlite pipes for open-pit mining by drawing down the lake water level within a diked area. In this approach, the engineering design of the dikes is less sophisticated than the “Diavik-style” ring dike or other dike

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alignments that utilize the Meadowbank construction sequence, because the increase in available surge capacity within the diked off areas reduces operating risks. Dominion commissioned Golder Associates Ltd. to describe several possible variations on carrying out this approach, which is provided as Appendix 4C and described further in the following sections.

This approach satisfies the fundamental requirements and has several positive aspects:

- the conceptual cash flow projection is positive;
- the open pit mines could be designed to produce the necessary 12,500 tpd feed to the process plant;
- mining the Cardinal kimberlite pipe is possible, increasing the benefits of the Project;
- underground mining in either or both kimberlite pipes is possible to further extend mine life;
- the in-lake environmental effects are largely reversible at the conclusion of mining operations;
- the projected timeframe to construct is in the order of 2 ½ to 3 years, which achieves the required timeline for production in 2019;
- a system of strategically placed dikes that would isolate an area of Lac du Sauvage large enough for the Jay and Cardinal pits may reduce incidental inflows into the open pit(s) though the talik zone as compared to the approach of a water retaining dike that maintains the natural lake level adjacent to the open pit(s);
- a large minewater management area is available in the North Arm of Lac du Sauvage; and,
- an open-pit mining workforce typically offers greater Northern and Northern-Aboriginal employment opportunities as compared to underground mining.

This approach also has negative aspects:

- more road construction is required, including multiple crossings of the esker;
- a substantially larger area of Lac du Sauvage is affected during the period of mine operations as compared to the ~~"Diavik-style"~~ single ~~ring~~ dike approaches.
- flooding of Duchess Lake and the construction of the Lake E1 Outlet Diversion Channel is required; and,
- the development of the North Arm Water Management Area (NAWMA) within Lac du Sauvage is also required.

4.4.1.5 Other Approaches

Several other concepts were considered and quickly identified as impractical for the Project for clear reasons, as described below.

Lake Drawdown and Underground Mining

It would be conceptually possible to drain Lac du Sauvage to the point where underground mining could pursue a caving method similar to the methods used in the Panda and Koala underground workings at the Ekati Mine. The lake draining would be accomplished similar to the "Diversion and Drawdown" concept described above or by draining Lac du Sauvage entirely. The advantage of this approach would be that the caving methods are generally less expensive relative to other underground mining extraction techniques. However, the operating risks, costs and other flaws would be substantively the same as described above for "Underground Mining"; as such this approach is not suitable as a project.

Wet Mining

The concept of "wet mining" is based on using a dredge, or otherwise floating platform to raise kimberlite to surface after underwater blasting. Water quality in Lac du Sauvage would be protected by slit curtains; however, it is not envisioned as practical to design this approach using current technology to produce the necessary 12,500 tpd process plant feed. Additionally, the shape and depth of the Jay and Cardinal kimberlite pipes (i.e., vertical 'carrot' shapes) are not ideal for this approach. For these reasons, this approach is not suitable as a project.

Underwater Mining

The underwater mining concept would use a remote-operated underwater crawler, equipped with cutting-head and suction pump, to excavate and pump kimberlite to surface. This approach would be modelled after mining techniques used in South Africa in sand deposits. While conceptually possible, the basic technology for using this concept in kimberlite containing granite inclusions is not developed. This approach is not suitable as a project at this time.

4.4.1.6 Selected Project

~~The diversion and drawdown approach provides the greatest opportunity for success as a project that will substantively extend the operating life of the Ekati Mine, with the attendant continuation of benefits for all parties involved.~~

~~The diversion and drawdown approach will require the construction and operation of a pumping and pipeline diversion system. During the mine operation period, lake drawdown would be maintained with pumping. During operations it is assumed that the lake drawdown elevation will fluctuate to allow for some attenuation of spring freshet inflows and as part of turbidity management.~~

The mining of the Jay pipe within a single water retaining dike provides the greatest opportunity for success as a project that will substantively extend the operating life of the Ekati Mine with the attendant continuation of benefits for all parties involved. This option does not provide for the development of the Cardinal kimberlite pipe, but addresses community concerns of limiting the project footprint in Lac du Sauvage and in the esker area west of Lac du Sauvage.

Alternative means of carrying out this Project are described in the following sections.

4.4.2 Alternative Means of Carrying Out the Project

~~*4.3.2.1 Diversion and Drawdown Approaches*~~

~~A conceptual engineering study was completed to evaluate a range of options for a diversion and drawdown project (Appendix 4C). The general concept of lake drawdown includes pumping to establish an initial drawdown that would provide access to the Jay and Cardinal kimberlite pipe areas, and allow for construction of local water management infrastructure.~~

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~~Lake drawdown to support the development of mining at both the Jay and Cardinal pipes can be achieved with a range of combinations of pumping the Lac du Sauvage base water down and diverting watershed inflows. The alternatives considered range from pumping the lake with limited diversion, to diverting inflows to the lake away to allow for mine development of both Jay and Cardinal pipes. Pumping stations and a sediment pond are proposed for drawdown, and construction of dikes and channels are proposed for diversion of the watershed inflows.~~

- ~~The target lake drawdown elevation was determined using the following criteria:~~
- ~~bathymetry of the Lac du Sauvage lakebed relative to the geometry of the proposed open pits;~~
- ~~limited ring dike requirements around the proposed open pit areas; and,~~
- ~~freeboard between the pit rim and lake drawn-down that accounts for seasonal fluctuations and a design storm inflow event to the drawn-down area of Lac du Sauvage.~~

~~A number of key assumptions were made to calculate the lake drawdown volume by elevation for the alternative options. These include the assumptions that the mean normal lake elevation is 416 m and that all in-lake ponds gradually isolated by the lake drawdown are hydraulically connected so that drawing down the lake in one area results in drawdown of all areas of the lake. Some of the isolated ponds may be hydraulically disconnected from the rest of the lake, which will significantly reduce the water volume for pumping. Further investigation of potential hydraulic connection of sub-basins within the lake will be part of the next stage of the design for this Project.~~

~~Based on the assumptions noted above, the water volume (base volume) of the entire Lac du Sauvage is approximately 500,000,000 m^3 between elevation (EL) 416 m and EL 406 m.~~

~~Five alternatives (ALT1 to ALT5) for drawdown of Lac du Sauvage were evaluated that consider pumping the lake and diverting the inflows. Diversion is based on the construction of dikes at up to four locations (dikes: JP1, JP2, JP3, and JP4) and open channels. Each of the five alternatives includes access roads, pumping stations, a sediment pond, and between one and three dikes. Table 4.4-1 presents a summary of the dikes, pumping, diversion, initial base water withdrawal volume and annual inflow volumes for each of the five alternatives that were considered and are described below. Additional details on each alternative are provided in Appendix 4C.~~

~~Table 4.4-1 Summary of Five Conceptual Lake Drawdown Options~~

~~Alternative Number~~	~~Dike~~				~~Pumping~~				~~Diverting~~				~~Lake E1 Diversion Outlet Channel~~	~~Initial Drawdown Volume to EL. 406 m (1,000,000 m^3)~~	~~Ongoing Mean Annual Inflow (1,000,000 m^3)~~
	~~JP 1~~	~~JP 2~~	~~JP 3~~	~~JP 4~~	~~Duchess Arm~~	~~East Arm~~	~~South Arm~~	~~West Arm~~	~~Duchess Arm~~	~~East Arm~~	~~South Arm~~	~~West Arm~~			
~~ALT1~~	~~yes~~	~~no~~	~~no~~	~~no~~	~~yes~~	~~yes~~	~~yes~~	~~Yes~~	~~no~~	~~no~~	~~no~~	~~no~~	~~yes~~	~~487~~	~~217~~
~~ALT2~~	~~yes~~	~~yes~~	~~no~~	~~no~~	~~no~~	~~yes~~	~~yes~~	~~Yes~~	~~yes~~	~~no~~	~~no~~	~~no~~	~~yes~~	~~457~~	~~150~~
~~ALT3~~	~~yes~~	~~no~~	~~yes~~	~~no~~	~~yes~~	~~no~~	~~yes~~	~~Yes~~	~~no~~	~~yes~~	~~no~~	~~no~~	~~yes~~	~~422~~	~~143~~
~~ALT4~~	~~yes~~	~~yes~~	~~yes~~	~~no~~	~~no~~	~~no~~	~~yes~~	~~Yes~~	~~yes~~	~~yes~~	~~no~~	~~no~~	~~yes~~	~~392~~	~~38~~
~~ALT5~~	~~yes~~	~~yes~~	~~no~~	~~yes~~	~~no~~	~~no~~	~~no~~	~~Yes~~	~~yes~~	~~yes~~	~~yes~~	~~no~~	~~yes~~	~~284~~	~~20~~

~~Note 1: Planned lake drawdown over one year requires pumping to transfer both the initial base volume plus one year ongoing mean inflow.~~

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~~*4.3.2.2 Alternative One*~~

~~The following summarizes the components that are required for drawdown alternative one (ALT1). These components also form the basic components required for the additional four alternatives considered.~~

~~Dikes, Ponds, and Channels~~

- ~~Dike JP1 separates the North Arm of Lac du Sauvage from the rest of Lac du Sauvage and creates the North Arm Water Management Area;~~
- ~~North Arm Water Management Area has two main functions: one is a pond for turbidity control, and the other is a pond to manage the discharge through a channel into Lac de Gras through Paul Lake; and,~~
- ~~The Lake E1 Diversion Outlet Channel diverts inflow from Sub-basin E to Paul Lake and provides an overflow channel from the North Arm Water Management Area allowing discharge into Paul Lake.~~

~~Roads and Causeways~~

- ~~Jay Road is 6.9 km long and connects the existing Misery Road and Jay Causeway;~~
- ~~Jay Causeway, part of Jay Pit development, is 1.2 km long and connects Jay Road and Jay Pit;~~
- ~~JP1 Road is 4.5 km long and connects Jay Road and Dike JP1;~~
- ~~Lake E1 Outlet Road is 7.2 km long and connects JP1 Road and the Lake E1 Diversion Outlet Channel and provides access to the channels for construction and maintenance;~~
- ~~Cardinal Road is 5.4 km long and connects the Misery Road and Cardinal Causeway; and,~~
- ~~Cardinal Causeway, part of Cardinal Pit development, is 4.0 km long and connects Cardinal Road and Cardinal Pit.~~

~~Berms~~

- ~~Jay Berms~~
  - ~~Two berms in the area of the proposed Jay Pit development are required and will be constructed of rockfill and lined with locally borrowed lakebed till from pit pre-stripping if possible. The berms will create sumps to collect local seepage flows, groundwater flow and precipitation, and keep the drawn-down lake from the pit area.~~
- ~~Cardinal Berms~~
  - ~~Two berms in the area of the proposed Cardinal Pit development are required and will be constructed of rockfill and lined with locally borrowed lakebed till from pre-stripping if possible. The berms will create sumps to collect local seepage flows, groundwater flow and precipitation, and keep the drawn-down lake from the pit area.~~

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- ~~An additional pumping station will be required in the isolated pond north of Cardinal Pit and below Dike JP4 North to maintain this area at a drawdown level of El 400 m.~~

~~Pumping Stations and Pipelines~~

- ~~PS1 Pump Station and a 3.5 km long pipeline pumps water from PS1 Pump Station to the North Arm Water Management Area during lake drawdown and maintains lake drawdown during operations;~~
- ~~PS2 Pump Station and a 2.3 km long pipeline pumps water from PS2 Pump Station to Lac de Gras during lake drawdown and maintains the drawdown level during operations; and,~~
- ~~PS3 Pump Station and a 1.5 km long pipeline pumps water from the trench along the southwest shoreline of Lac du Sauvage to PS1 Pump Station.~~

~~*4.3.2.3 Alternative Two*~~

~~The additional components required for alternative two (ALT2), in addition to those listed above for ALT1, include the following:~~

- ~~JP2 Road, which is 6.3 km long and connects Dike JP1 and JP2; and,~~
- ~~Dike JP2, which diverts the inflow from Duchess Arm of Lac du Sauvage to Paul Lake through the Lake E1 Diversion Outlet Channel.~~

~~*4.3.2.4 Alternative Three*~~

~~The additional components required for alternative three (ALT3), in addition to those listed above for ALT1, include the following:~~

- ~~Dike JP3, which retains water in the Sub-basin Aa of Lac du Sauvage. Inflows to the Sub-basin Aa from the Sub-basins H, I, and, J will overflow Dike JP3 and are diverted to the location of the PS2 pump station through the Sub-basin Ab channels;~~
- ~~JP3 Laydown, which provides storage for Dike JP3 construction material and equipment.~~
- ~~The dike will be constructed in winter by using stockpiled construction materials and equipment at a JP3 Laydown. The construction materials and equipment will be hauled and mobilized to the JP3 Laydown a few months to one year earlier through JP3 Winter Road;~~
- ~~JP3 Winter Road, which is 7.3 km long and connects Cardinal Road and JP3 Laydown;~~
- ~~Sub-Basin Ab Channel, which connect the isolated pond at EL 406 m for spilled water discharge to the PS2 pump station; and,~~
- ~~Ab pumping station to maintain drawdown level in the east arm area of the lake.~~

~~*4.3.2.5 Alternative Four*~~

~~The additional components required for alternative four (ALT4), in addition to those listed above for ALT1, include the following~~

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- ~~JP2 Road, which is 6.3 km long and connects Dike JP1 and JP2;~~
- ~~Dike JP2, which diverts the inflow from Duchess Arm to Paul Lake through the Lake E1 Diversion Outlet Channel;~~
- ~~Dike JP3, which holds water in Sub-basin Aa and allows the inflow from the Sub-basins H, I, and J to spill over it. The spilled water will then be diverted to the location of PS2 pump station through the Ab Sub-basin channels;~~
- ~~JP3 Laydown, which provides storage for Dike JP3 construction material and equipment. The dike will be constructed in winter by using stockpiled construction materials and equipment at JP3 Laydown. The construction materials and equipment will be hauled and mobilized to the JP3 Laydown a few months to one year earlier through JP3 winter road;~~
- ~~JP3 Winter Road, which is 7.3 km long and connects Cardinal Road and JP3 Lay-down;~~
- ~~Sub-Basin Ab Channel connecting the isolated pond at EL. 406 m for spilled water discharge to the PS2 Pump Station; and,~~
- ~~Ab Pumping Station, which will maintain the drawdown level in the east arm area of the lake.~~

~~*4.3.2.6 Alternative Five*~~

~~The additional components required for alternative five (ALT5), in addition to those listed above for ALT1, include the following:~~

- ~~JP2 Road, which is 6.3 km long and connects Dike JP1 and JP2;~~
- ~~Dike JP2, which diverts the inflow from Duchess Arm to Paul Lake through the Lake E1 Diversion Outlet Channel;~~
- ~~Dike JP4, which is divided into two sections: JP4 North and JP4 South. This dike diverts the natural flow from the east and south catchment areas to Lac de Gras via the natural Lac du Sauvage outlet channel; and,~~
- ~~JP4 Road, which is 0.8 km long and constructed on the island south of Dike JP4 South, connects the two sections. Road construction material can be supplied locally on the island.~~

~~*4.3.2.7 Pumping and Diverting Volumes*~~

~~Assuming the nominal Lac du Sauvage surface elevation is EL 416 m and the drawdown elevation is EL 406 m, a 10 m drawdown of a portion of Lac du Sauvage results in different pumping volumes for the five alternatives as shown in Table 4.4-2. The five alternatives also divert different portions of the Lac du Sauvage watershed. The diverted volumes of annual inflow are also shown in Table 4.4-2.~~

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~~**Table 4.4-2 Pumping and Diverting of Five Alternatives**~~

~~Alternative Number~~	~~Base Volume for Pumping to EL 406 m (Mm^3)~~	~~Pumping Ratio[a] (%)~~	~~Diverted Annual Inflow (Mm^3)~~	~~Diverting Ratio[b] (%)~~
~~ALT1~~	~~487~~	~~97~~	~~42~~	~~14~~
~~ALT2~~	~~457~~	~~91~~	~~108~~	~~42~~
~~ALT3~~	~~422~~	~~84~~	~~116~~	~~45~~
~~ALT4~~	~~392~~	~~78~~	~~222~~	~~86~~
~~ALT5~~	~~284~~	~~57~~	~~239~~	~~92~~

~~(a) Pumping ratio: base volume for pumping to EL 406 m divided by the Lac du Sauvage total base volume between EL 416 m to EL 406 m (500 Mm^3).~~

~~(b) Diverting ratio: diverted annual inflow divided by total inflow to Lac du Sauvage basin (259 Mm^3).~~

~~Diversions will be created during mine construction, and will remain functional throughout mine operation. The highest pumping requirements and lowest diversion structures are associated with ALT1, where as ALT5 has the lowest pumping requirements and largest diversion structures.~~

~~During initial lake drawdown, it is calculated that the pumping flow rate from Lac du Sauvage to the North Arm Water Management Area will be approximately 63,395 m^3/h for ALT1 and 33,367 m^3/h for ALT5. The pumping flow rates for ALT2 to ALT4 will be between the two rates.~~

~~In all five alternatives, the pumping systems are designed to allow the drawdown of Lac du Sauvage while considering controls to limit the transfer of solids.~~

~~Dike Design~~

~~The construction of low permeability dikes, in particular those constructed in lakes located in the Arctic, can be a high capital cost for projects. Previously at other diamond mine operations in the Canadian Arctic region, dikes with a low permeability barrier cutoff system were constructed directly adjacent to open pits. The construction sequence necessary to create a low permeability dike is time consuming, equipment specific, and expensive (capital expenditure); however, results in lower operational costs (operational expenditure) because of low seepage through dikes.~~

~~Alternatively, DDEC has proposed a permeability dike concept for the Project. The permeability dike can be constructed of crushed rockfill and results in more seepage through the dike. The rockfill is readily available and can be crushed to different sizes to meet design criteria at low cost. Specific construction equipment may not be needed. The large seepage volume can be pumped back to the impoundment area. The higher permeability dike will result in lower capital expenditures and higher operational expenditures compared to the low permeability dike.~~

~~A summary of the average water depth, maximum water depth, and dike length for the proposed dikes is shown in Table 4.4-3.~~

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~~Table 4.4-3 Summary of Water Depths along Proposed Dike Centreline~~

~~Dike~~	~~Crest Elevation (m)~~	~~Approximate Length[a] (m)~~	~~Water Depth (m)~~	
			~~Average[b][c]~~	~~Maximum[c]~~
~~JP1~~	~~420~~	~~800~~	~~6.4~~	~~10~~
~~JP2~~	~~420~~	~~600~~	~~<1~~	~~<1~~
~~JP3~~	~~418~~	~~450~~	~~1.3~~	~~2~~
~~JP4 North~~	~~418~~	~~2200~~	~~5.5~~	~~10~~
~~JP4 South~~	~~418~~	~~600~~	~~6.6~~	~~16~~

~~(a) Measured along the proposed dike crest (i.e., top of densification platform).~~
~~(b) Average water depth calculated using a weighted average according to dike length.~~

~~(c) Calculated assuming a lake surface at EL 416 m.~~

~~The proposed Dike JP4 North and South have been classified as high consequence structures according to the CDA (2007). Dike JP4 North is approximately 2.2 km long and has a maximum water depth of around 10 m according to 2013 bathymetric data. Dike JP4 South is approximately 0.6 km long and has a maximum water depth of 16 m. The water depth at the proposed Dike JP1 also has a maximum depth of 10 m along the proposed dike centreline. Dike JP1 is currently classified as a significant structure according to CDA (2007) due to its distance from the proposed Jay Pit.~~

~~In comparison to proposed Dikes JP1, JP4 North and South, proposed Dikes JP2 and JP3 are much smaller in size and water depth. Dike JP2 and JP3 have a water depth of less than 3 m and are between 450 and 600 m in length. These dikes have been classified as significant structures according to CDA (2007).~~

~~Alternative Selected~~

~~Following preparation of a general arrangement for the five alternatives, a conceptual design was prepared for each required dike, outlet channel, and pumping and pipeline system. Based on quantity estimates for the conceptual designs, a cost estimate for each ALT1 to ALT5 was prepared.~~

~~Table 4.4-4 provides a summary of the alternatives considered in terms of access road requirements, lake drawdown and diversion areas, and construction quantities and costs.~~

~~Table 4.4-4 Comparison of the Five Lake Drawdown Alternatives~~

~~Alternatives~~			~~ALT1~~	~~ALT2~~	~~ALT3~~	~~ALT4~~	~~ALT5~~
~~Dikes~~			~~JP1~~	~~JP1, JP2~~	~~JP1, JP3~~	~~JP1, JP2, JP3~~	~~JP1, JP2, JP4~~
~~Length of Access Roads~~		~~km~~	~~22~~	~~27~~	~~22~~	~~27~~	~~27~~
~~Area~~	~~Lake drawdown~~	~~km~~^{2}	~~94.4~~	~~76.7~~	~~80~~	~~62.3~~	~~46.3~~

~~**Table 4.4-4 Comparison of the Five Lake Drawdown Alternatives**~~

~~**Alternatives**~~			~~**ALT1**~~	~~**ALT2**~~	~~**ALT3**~~	~~**ALT4**~~	~~**ALT5**~~
~~**Dikes**~~			~~**JP1**~~	~~**JP1, JP2**~~	~~**JP1, JP3**~~	~~**JP1, JP2, JP3**~~	~~**JP1, JP2, JP4**~~
	~~Catchment~~	~~km^2~~	~~1,176~~	~~817~~	~~736~~	~~168~~	~~90~~
	~~% Diversion~~		~~14~~	~~42~~	~~45~~	~~86~~	~~92~~
~~Volume~~	~~Dike[(1)]~~	~~Mm^3~~	~~0.57~~	~~0.58~~	~~0.62~~	~~0.63~~	~~2.33~~
	~~Year 1 pumping~~	~~Mm^3~~	~~743.2~~	~~607.6~~	~~565.2~~	~~429.6~~	~~305~~
	~~Operational pumping~~	~~Mm^3~~	~~256~~	~~150.8~~	~~142.7~~	~~37.5~~	~~20.5~~
~~Relative Capital costs (including initial drawdown) [(2)]~~			~~1.0~~	~~1.04~~	~~1.09~~	~~1.12~~	~~1.33~~
~~Relative Annual Operational pumping costs [(2)]~~			~~6.2~~	~~3.8~~	~~5.9~~	~~3.6~~	~~1.0~~
~~Relative Capital with ten years of Operational pumping Costs~~			~~1.1~~	~~1.0~~	~~1.2~~	~~1.0~~	~~1.1~~

~~(1) Includes outlet channels.~~
~~(2) Based on 2013 conceptual level costs estimates assuming the lowest cost is one cost unit.~~
~~M= 1,000,000.~~

~~The relative capital costs, which include the initial drawdown pumping, were found to increase from the lowest costs for ALT 1 up to the highest cost for ALT 5 as the total length and volume of dikes to construct increased. The relative annual operating pumping costs were found to increase from the lowest for ALT 5, to similar costs for ALT 2 and 4, up to the highest costs for ALT 1 and 3. For a ten-year mine life (estimated Jay open pit only mine life) the relative capital costs with ten years of operational pumping costs resulted in similar undiscounted costs for all alternatives when the accuracy was considered. ALT5 presented the lowest lake drawdown area and retained the outflow of about 40% of Lac du Sauvage through the existing outflow channel. Based on these considerations, ALT5 is the preferred option to advance to a pre-feasibility study, including geotechnical investigations that will begin in winter 2014.~~

4.4.2.1 Preliminary Concept, Schedule, and Economics

Various design concepts were considered for the development of an in-lake dike to isolate the portion of Lac du Sauvage overlaying the Jay kimberlite pipe. These designs were all similar to that used at the nearby Diavik Mine and the Meadowbank Mine in Nunavut. Three alternatives were assessed against the following criteria:

- maintaining an alignment that takes advantage of the natural bathymetry of the lake by following areas of shallow water and crossing islands where feasible;
- be stable for the life of the mine development;
- be erosion resistant under seepage flows into the open pit;

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- perform satisfactorily where permafrost advances and after it has frozen;
- be of sufficient elevation that the lake does not overtop the dike in the event of flooding;
- be able to withstand wave and ice forces.
- Minimize the potential influence of pit wall failures on the stability of the dike at the ultimate depth of the pit;
- minimize the potential effect of underground block caving on the stability of the dike;
- provide a buffer to reduce potential effects due to blasting on the low permeability element within the dike;
- provide adequate area for creating stable slopes within the overburden adjacent to the pipe, so that dike stability is not negatively impacted; and,
- provide an area for seepage water collection and management.

Alternative One – Diavik-Style Ring Dike Alignment

Project Concept

Alternative One (ALT 1) considered the construction of a ring dike using crushed and screened rock with an internal vertical plastic concrete seepage cut-off wall. The dike would encompass approximately 1.33 km^2 and the estimated total volume to be dewatered would be 13 M m^3. To manage capital costs, the dike is aligned as close as reasonably possible to the potential open pit limits at a setback distance of 100 m. The following summarizes the key components required for ALT 1:

- Jay WRSA (100.3 M m^3);
- Jay Access Road (7.2 km);
- Jay Causeway (0.4 km);
- Ring Dike (4.1 km);
- pipeline for direct release into main basin of Lac du Sauvage;
- pipeline bench and power line along the Jay Access Road; and,
- pipeline bench to the Misery Pit.

Schedule

The construction of the ring dike is expected to take five years. The following general milestones are envisioned for the ring dike construction schedule:

Year 1

- Access Road to Jay site

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- Jay site laydown areas
- Blasting and crushing for dike construction materials
- Causeway with fish channel and bridge

Year 2

- Lakebed sediment dredging and excavation
- Filter blanket placement (begins)
- Dike fill placement to 417 m (begins)

Year 3

- Filter blanket placement (complete)
- Dike fill placement to 417 m (complete)
- Vibrodensification
- Plastic concrete cut-off wall installed
- Dike fill placement to 418.8 m
- Jet grouting
- Curtain Grouting

Year 4

- Primary dewatering
- Toe berm construction

Year 5

- Secondary dewatering
- Lakebed sediment removed

Currently, it is anticipated that the earliest construction of land-based access (roads and power line) to Lac du Sauvage and other allowable Project activities will be possible is 2016 when appropriate approvals are in place. As such, construction of the ring dike would extend into mid-2020. This timeframe compromises the fundamental project requirements for kimberlite production to the process plant in 2019.

Economics

As a result of the high capital cost and the delay in production of kimberlite to the process plant beyond 2019, the Project cash flow is anticipated to be negative.

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Alternative Two – Hockey Stick Dike Alignment

Project Concept

Alternative Two (ALT 2) considered the construction of a roughly L-shaped dike around the south and east sides of the Jay kimberlite pipe extending northwest to the shore of Lac du Sauvage (Figure 4.4-1). The dike would be constructed with a broad rockfill shell, a central zone of crushed granular fine and coarse filters, and a composite low permeability element, that would vary based on the depth to bedrock. In deeper areas, the composite low permeability element would consist of a combination of a cement soil bentonite cut-off wall, jet grout columns extending from the base of the cut-off wall to the bedrock contact and grouting of the shallow bedrock and bedrock contact. In shallower areas, the composite low permeability element would consist of a cement soil bentonite cut-off wall and grouting of the shallow bedrock and contact. To make use of shallower water depths and islands, the dike alignment is about 200 m from the conceptual open pit limits. The dike would encompass approximately 10.5 km^2 and the estimated total volume to be dewatered would be 64 M m^3. The following summarizes the key components required for Alt 2:

- Jay WRSA (113 M m^3)
- Jay Access Road (11.1 km^2);
- Hockey Stick Dike (5.9 km);
- pipeline for direct release into Lac du Sauvage;
- the North Arm Water Management Area (NAWMA) (approximately 2.9 km^2); and,
- pipeline for release into the NAWMA;

Schedule

The construction of the hockey stick dike is expected to take 3½ years; the following general milestones are envisioned for the ring dike construction schedule:

Year 1

- Access Road to Jay Site
- Jay site laydown areas
- Blasting and crushing for dike construction material
- Rockfill placement

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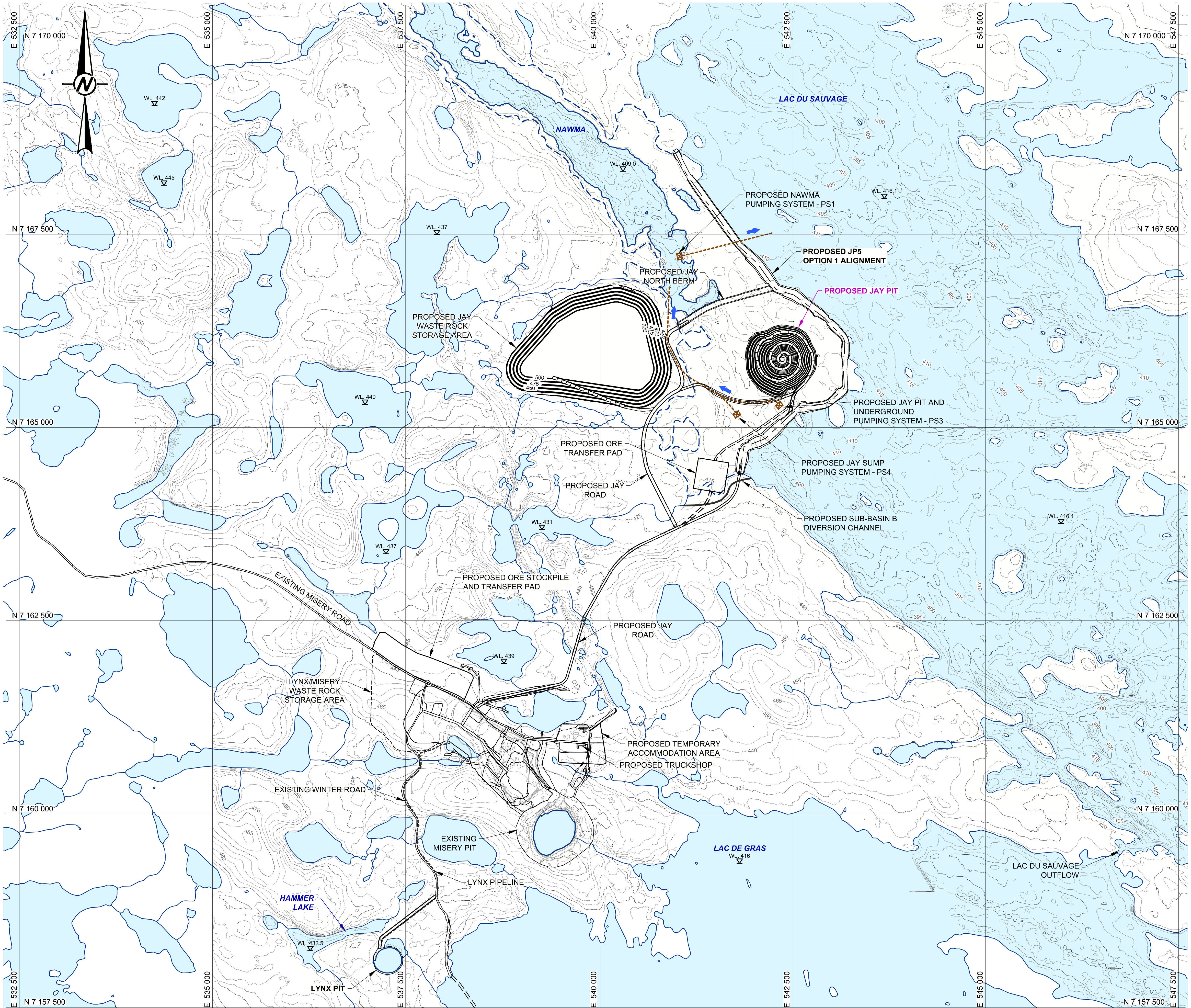

LEGEND

- WATER BODY
- WATER COURSE
- EXISTING SHORELINE OF DRAWDOWN AREA
- ROAD
- WINTER ROAD - YEARLY CONSTRUCTION
- PROPOSED PUMPING SYSTEM
- PROPOSED DIVERSION CHANNEL
- WL WATER LEVEL ELEVATION
- FLOW DIRECTION

NOTES

1. ALL UNITS ARE IN METRES UNLESS OTHERWISE NOTED.
2. ELEVATIONS ARE IN METERS ABOVE SEA LEVEL (masl).
3. GROUND SURFACE AND BATHYMETRY CONTOURS ARE SHOWN AT 5 m INTERVALS.
4. COORDINATES ARE SHOWN IN DATUM: NAD 83, PROJECTION: UTM ZONE 12.

REFERENCE

1. CONTOUR DATA PROVIDED BY AURORA GEOSCIENCES LTD., FILE: Final 1m Contours - Priority Area.dxf, DATE RECEIVED: OCTOBER 29, 2013.

ISSUED FOR REVIEW

DRAFT

0 1,000 2,000 3,000

SCALE METRES

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
A	2014-06-12	DRAFT - ISSUED FOR REVIEW	AK	JD	-	-

PROJECT

JAY PROJECT
LAC DU SAUVAGE
NORTHWEST TERRITORIES, CANADA

TITLE

HOCKEY STICK DIKE ALIGNMENT

DOMINION DIAMOND

PROJECT No.	13-1328-0041.4070.60	
DESIGN	AK	2014-06-12
CADD	JD	2014-06-12
CHECK	-	-
REVIEW	-	-

FILE No. 1313280041-4070-60_4.4-1

SCALE AS SHOWN

FIGURE 4.4-1

Year 2 and 3

- Dike earthworks, including densification of the fine filter (begins)
- Fish-out (begins)
- Jet grouting (begins)
- Curtain grouting (begins)
- Construction of drawdown ramps

Year 4

- Dike earthworks (completed)
- Jet grouting (completed)
- Curtain grouting (completed)

Currently, it is anticipated that the earliest construction of land-based access (roads and power line) to Lac du Sauvage and other allowable Project activities will be possible is 2016 when appropriate approvals are in place. As such, construction of the hockey stick dike would extend into fall of 2019, followed by dewatering and pre-stripping to expose kimberlite in 2020.

Economics

Project cash flow is anticipated to be positive.

Alternative Three – Horseshoe Dike Alignment

Project Concept

Alternative Three (ALT 3) considered the construction of a horseshoe-shaped dike around the Jay kimberlite pipe on the south, east, and north sides connecting at two locations along the west shore of Lac du Sauvage (Figure 4.4-2). The dike would be constructed, in the same manner as ALT 2, with a broad rockfill shell, a central zone of crushed granular fine and coarse filters, and a composite low permeability element which would vary based on the depth to bedrock. In the deeper areas, the composite low permeability element would consist of a combination of a cement soil bentonite cut-off wall, jet grout columns extending from the base of the cut-off wall to the bedrock contact, and grouting of the shallow bedrock and bedrock contact. In shallower areas, the composite low permeability element would consist of a combination of a cement soil bentonite cut-off wall, and grouting of the contact and shallow bedrock. To make use of shallower water depths and small islands, the dike alignment is about 200 m from the conceptual open pit limits. The dike would encompass approximately 4.2 km^2 and the estimated total volume to be dewatered would be 27 M m^3.

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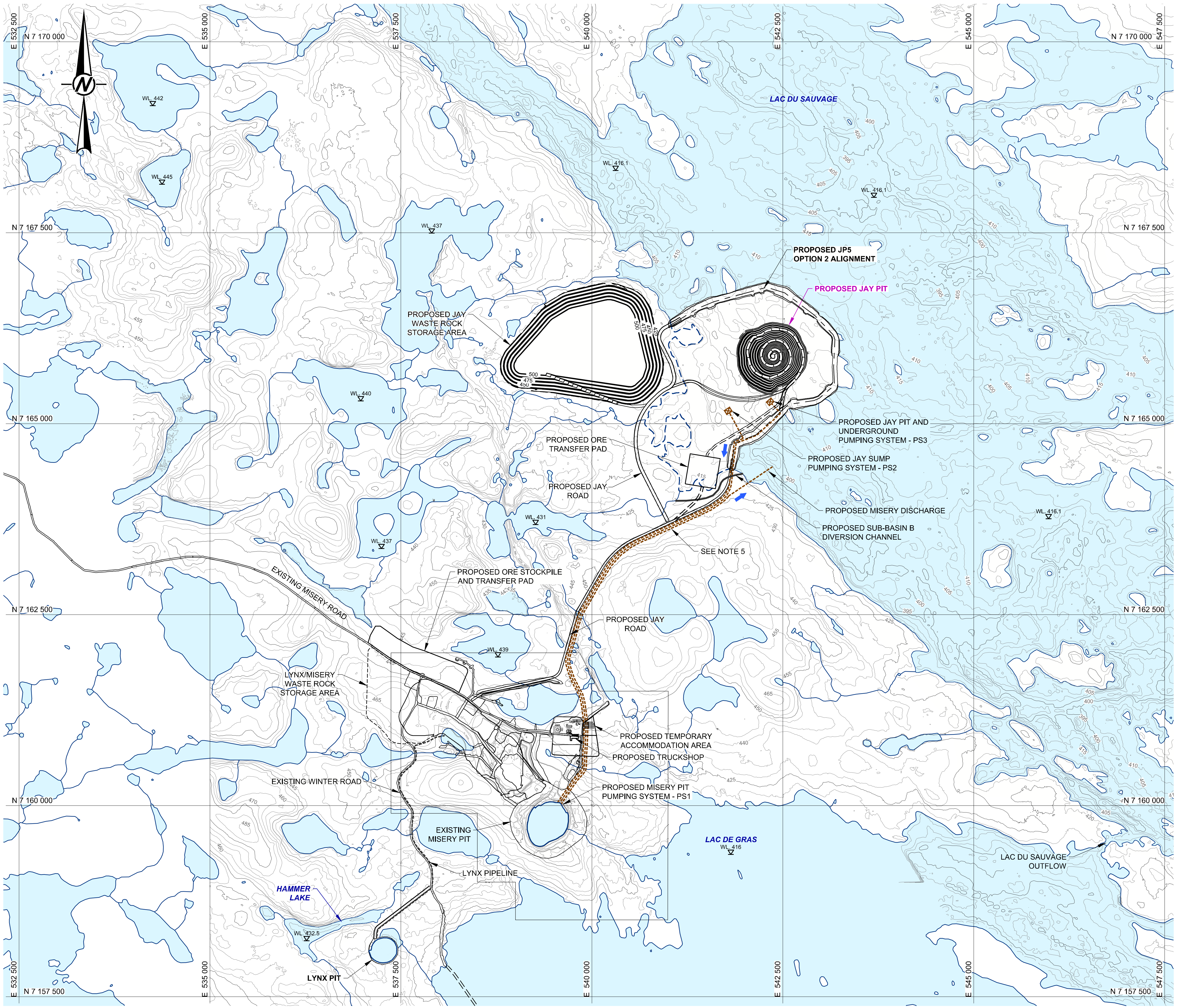

LEGEND

- WATER BODY
- WATER COURSE
- EXISTING SHORELINE OF DRAWDOWN AREA
- ROAD
- WINTER ROAD - YEARLY CONSTRUCTION
- PROPOSED PUMPING SYSTEM
- PROPOSED DIVERSION CHANNEL
- WL WATER LEVEL ELEVATION
- FLOW DIRECTION

NOTES

1. ALL UNITS ARE IN METRES UNLESS OTHERWISE NOTED.
2. ELEVATIONS ARE IN METERS ABOVE SEA LEVEL (masl).
3. GROUND SURFACE AND BATHYMETRY CONTOURS ARE SHOWN AT 5 m INTERVALS.
4. COORDINATES ARE SHOWN IN DATUM: NAD 83, PROJECTION: UTM ZONE 12.
5. ROAD, PIPELINES, AND POWER LINE ARRANGEMENT TO BE DETAILED AS PART OF PRE-FEASIBILITY DESIGN. PIPELINES ARE SCHEMATIC, NOT TO SCALE.

REFERENCE

1. CONTOUR DATA PROVIDED BY AURORA GEOSCIENCES LTD., FILE: Final 1m Contours - Priority Area.dxf, DATE RECEIVED: OCTOBER 29, 2013.

ISSUED FOR REVIEW

DRAFT

0 1,000 2,000 3,000

SCALE METRES

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
A	2014-06-12	DRAFT - ISSUED FOR REVIEW	AK	JD	-	-

PROJECT

JAY PROJECT
LAC DU SAUVAGE
NORTHWEST TERRITORIES, CANADA

TITLE

HORSESHOE DIKE ALIGNMENT

DOMINION DIAMOND

PROJECT No.	13-1328-0041.4070.60	
DESIGN	AK	2014-06-12
CADD	JD	2014-06-12
CHECK	-	-
REVIEW	-	-

FILE No. 1313280041-4070-60_4.4-2

SCALE AS SHOWN

FIGURE 4.4-2

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The following summarizes the key components required for Alt 3:

- Jay WRSA (113 M m^3)
- Jay Access Road (11.1 km^2);
- Horseshoe Dike (5.1 km);
- pipeline for direct release into Lac du Sauvage;
- pipeline between Jay Pit and Misery Pit and Lynx Pit;
- pipeline bench and power line along the Jay Access Road; and,
- pipeline bench to the Misery Pit.

Schedule

The construction of the horseshoe dike is expected to take three year; the following general milestones are envisioned for the horseshoe dike construction schedule:

Year 1

- Access Road to Jay site
- Jay site laydown areas
- Blasting and crushing for dike construction material
- Dike earthworks (begins)
- Curtain grouting (begins)

Year 2

- Dike earthworks (continue)
- Fish-out (begins)
- Jet grouting (begins)
- Curtain grouting (continues)
- Construction of dewatering ramps (begins)

Year 3

- Dike earthworks (completed)
- Jet grouting (completed)
- Curtain grouting (completed)
- Construction of dewatering ramps (completed)

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Currently, it is anticipated that the earliest construction of land-based access (roads and power line) to Lac du Sauvage and other allowable Project activities will be possible is 2016 when appropriate approvals are in place. As such, construction of the horseshoe dike would extend into spring of 2019.

Economics

Project cash flow is anticipated to be positive.

4.4.2.2 Preliminary Conceptual Design

Based on schedule, ALT 1 was not identified as a feasible approach to securing a project that could substantively extend the operating life of the Ekati Mine, as kimberlite production would not likely occur until late-2021. Further, the alignment being closer to the open pit increases the risk to physical stability of an underground mine and could restrict possible expansions of the current conceptual Jay Pit limits. Therefore, only ALT 2 and ALT 3 were carried forward to the next phase of conceptual design.

Alternative 2

Golder investigated and developed the ALT 2 dike alignment and prepared a dewatering dike design similar to that used at the Meadowbank Gold Mine in Nunavut. The downstream toe of the dike is located approximately 200 m from the open pit rim. For ALT 2, the total dike length would be approximately 5.9 km, with approximately 1 km of the dike length crossing existing islands, 3.55 km developed in shallow water, and 1.35 km developed in deeper water.

For ALT 2, the drawdown phase will lower the water level within the isolated area from an initial elevation of 416 masl to an elevation of 381 masl for a total drawdown volume of 77.6 M m^3 (64.1 M m^3 of lake water and 13.5 M m^3 of runoff and direct precipitation; potential groundwater inflows would be in addition to this). The average drawdown rate in the absence of additional groundwater inflows is estimated to be 8,860 cubic metres per hour (m^3/hr). Throughout operations the average annual volume of water requiring management would be 18.1 M m^3.

For ALT 2, the NAWMA would be used as the primary water management facility during drawdown and operations. During drawdown, high TSS water would be pumped from the drawn-down area to the NAWMA for TSS settling prior to discharge to the main basin of Lac du Sauvage. Some treatment of TSS water during this stage may be required. During operations freshwater runoff, drainage from the WRSA and mine inflows (groundwater inflows, direct precipitation, and dike seepage) would be pumped to the NAWMA, which would provide for TSS settlement and TDS attenuation followed by discharge into Lac du Sauvage with treatment if required.

A sump (the Jay Sump) would be located within a natural depression of the drawn-down area to the west of the Jay Pit. Surface runoff reporting to the drawn-down area would be collected in this sump. Another sump (the Mine Inflow Sump) would be located in a natural depression near the crest of the Jay Pit. Mine inflows (groundwater inflows, direct precipitation and dike seepage) would be pumped to this sump. The two sumps would be operated separately and water collected in the sumps would be pumped to NAWMA.

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During drawdown, one pump (PS1) would be required to transport water from the NAWMA to the main basin of Lac du Sauvage, while another (PS2) would be required to transport water from the Jay Pit area to the main basin of Lac du Sauvage. During operations the pumping system required to transport water from the NAWMA to Lac du Sauvage (PS1) would remain in operation. A second pump would be required to transport mine inflows from the mine inflow sump to the NAWMA (PS3) and a third pump to transport water from the Jay sump to the NAWMA (PS4). It is estimated that on average 16 M m^3 of water would be discharged from the NAWMA to the main basin of Lac du Sauvage on an annual basis throughout operations. Water within the NAWMA may require treatment prior to discharge to the environment.

A diversion channel (Sub-basin B Diversion Channel) would need to be constructed to intercept freshwater runoff from Sub-basin B (Christine Lake outflow), upstream from the project site and divert it to Lac du Sauvage south of the hockey stick dike.

At the completion of mining the Jay pipe, it is anticipated that high TDS water will be present in the NAWMA. Closure of the project will include pumping the water from the NAWMA to the Jay underground and to the bottom of the Jay open pit. The high TDS water will be capped with a layer of fresh water (currently assumed to be at least 30 m deep). Once reclamation activities within the drawdown area have been completed, the water from Lac du Sauvage would be pumped over the dike, re-flooding the NAWMA and the Jay Pit area. This process will occur in a controlled manner to minimize TSS generation. Runoff water and precipitation will also contribute to re-flooding. Once water quality within the re-flooded area is shown to be suitable for direct (uncontrolled) release to the environment, the dike will be locally breached to reconnect the isolated portion with the main basin of Lac du Sauvage.

Alternative 3

Golder investigated and developed the ALT 3 dike alignment and prepared a dike design similar to that used at the Meadowbank Gold Mine in Nunavut. The downstream toe of the dike is located approximately 200 m from the open pit rim. For ALT 3, the total dike length (horseshoe dike) would be approximately 5.05 km, with approximately 0.65 km of the dike length crossing existing islands, 3.15 km developed in shallow water, and 1.25 km developed in deeper water.

For ALT 3, the dewatering phase will lower the water level within the isolated area from an initial elevation of 416 masl to a minimum elevation of 318 masl for a total dewatering volume of 29.6 M m^3 (27 M m^3 of lake water and 2.5 M m^3 of runoff, groundwater inflows and direct precipitation). The average dewatering rate, including estimated groundwater inflows, is expected to be approximately 6,500 m^3/hr. Throughout operations the average annual volume of water requiring management would be 9.75 M m^3. During dewatering high TSS water would be pumped from the dewatered area of Lac du Sauvage to the Lynx and Misery pits for TSS settling. During operations, the mine water management facility would be the Misery Pit. Surface runoff and mine inflows (groundwater inflow, direct precipitation, and dike seepage) would be pumped to the Misery Pit for TSS and TDS management prior to discharge to the environment. High TDS water would be pumped to the bottom of the pit through a dedicated pipeline. Surface runoff collected in the dewatered area would be discharged to the top of the Misery Pit through a dedicated pipeline. Once the Misery Pit has reached its maximum operational capacity as a water management

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facility (approximately year 6), water from the top of the pit would be pumped to Lac du Sauvage or to Lac de Gras. Water not meeting discharge quality criteria would be treated prior to release.

A sump (the Jay Sump) would be located within a natural depression within the dewatered area to the west of the Jay Pit. Surface runoff reporting to the dewatered area would be collected in this sump. Another sump (the Mine Inflow Sump) would be located in a natural depression near the crest of the Jay Pit. Mine inflows (groundwater inflows, direct precipitation, and dike seepage) would be pumped to this sump. The two sumps would be operated separately, with water collected in the sumps being pumped to the Misery Pit.

During dewatering the low TSS water would be removed by three pumps, two located in the Jay pipe area (PS1 and PS3) and another in the Jay sump area (PS2). All three pumps will discharge to the main basin of Lac du Sauvage. During the later phase of dewatering, high TSS water would be pumped via these same three pumps to the Lynx Pit. When the Lynx Pit reaches its capacity, the high TSS water would be pumped and discharged into the Misery Pit.

During operations two of the pumps (PS2 and PS3) will be used to pump surface runoff and mine flows to the Misery Pit for management, while the other pump (PS1) will pump water from Misery Pit to Lac du Sauvage or to Lac de Gras, once Misery Pit has reached its maximum operational capacity. The mine inflow water would be pumped to the base of the Misery pit (PS3), while the surface runoff will be pumped to the rim of the pit (PS2). It is estimated that no water would be discharged from the Misery Pit receiving environment until year six of operations and that on average during the final 12 years of operations approximately 9.75 M m^3 of water would be discharged annually from Misery Pit to. Water within Misery Pit may require treatment prior to discharge to the environment.

A diversion channel (Sub-basin B Diversion Channel) would need to be constructed to intercept freshwater runoff from Sub-basin B (Christine Lake outflow), upstream from the project site and divert it to Lac du Sauvage south of the horseshoe dike.

At the completion of mining the Jay pipe, it is anticipated that a portion of the high TDS water contained within the Misery Pit will be pumped to the Jay underground and to the bottom of the Jay open pit. The high TDS water in both the Misery and Jay pits will be capped with a layer of fresh water (currently assumed to be at least 30 m deep). A combination of catchment area runoff, precipitation, and freshwater pumped from Lac du Sauvage will be used to create the freshwater cap. Once reclamation activities within the dewatering area are complete, water will be pumped over the dike to re-flood the Jay Pit area. This process will occur in a controlled manner to minimize TSS generation. Once water quality within the re-flooded area is shown to be suitable for direct release, the dike will be locally breached to reconnect the isolated portion with the main basin of Lac du Sauvage.

4.4.2.3 Alternative Selected

The ALT 3 dike alignment (horseshoe dike) was identified as the preferred approach to securing a project that could substantively extend the operating life of the Ekati Mine. In addition to providing the most favourable construction schedule, ALT 3 also offers the following advantages in comparison to ALT 2:

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- requires a smaller footprint within Lac du Sauvage, including the removal of the NAWMA as a ~~physical~~disturbed area;
- requires a smaller scale fisheries offsetting plan;
- requires a smaller scale fish-out plan;
- requires shorter length of dike development, thus requires less construction material and a shorter construction duration;
- requires less volume of water to be dewatered to provide access for open-pit mining (6 month dewatering period versus 1 year), and therefore has lower power requirement during this stage of the project;
- utilizes the mined-out Misery Pit to delay the need for minewater discharge for at least 6 years;
- provides source of water to complete filling of the Lynx and Misery pits.

4.4.2.4 Road and Pipeline Alignments

The proposed road and pipeline alignments have been selected based on the results of previous decisions made regarding the mining method, water diversion alternatives, the use of existing camp and processing facilities, and from heritage assessments, traditional knowledge studies, and community engagement completed to date. Other criteria included in the selection of road and pipeline alignments included:

- keeping the linear disturbances as short as possible;
- minimize potential impacts on wildlife, including minimizing esker crossings;
- limits creek and other water crossings;
- avoiding conflict with previously identified archaeological sites, ceremonial sites, wildlife crossings, and other areas of interest; and,
- minimizing gradients along the road ~~slope~~.

The final alignment of the roads and pipelines will be determined through engagement with the surrounding communities, specifically in regards to the required esker crossing.

Where possible, water pipelines have been routed to follow proposed road corridors to reduce the amount of linear disturbance to the extent possible.

~~An option for the construction of the new roads required for the Project is to make use of the non-acid generating waste rock from the Lynx Pit. Waste rock from the Lynx Pit will be stored in the expanded Misery WRSA. This reduces the Project footprint by reducing the need for a number of aggregate quarries by taking advantage of a ready stockpile of granite construction material.~~

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~~An aggregate quarry (e.g., borrow source) will be used as a back-up source for granite construction material. The volume of material that may not be able to be supplied by the Lynx Pit waste rock can be supplied by a smaller quarry identified within an area that would be disturbed by Project activity even if the quarry were not required, namely the Jay WRSA.~~

4.4.2.5 Power Supply

Approximately ~~8~~ 3 MW of power will be required at the pump locations for the dewatering~~rawdown~~ stages of the Project and ~~2~~1 MW of power, thereafter, for the life of the mining activities will be required to handle annual runoff collection, pit dewatering, and underground mining. Sources of electrical power normally include connection to a local municipal electrical distribution system or production of dedicated power locally, using fuels such as water (hydroelectric power), natural gas, biomass, or wind.

There is no local municipal electrical distribution system, nor are there any ready sources of water for hydroelectric power, natural gas, and biomass; therefore, these options were eliminated from consideration.

Wind power was eliminated from further consideration for the following reasons:

- the average wind farm will only produce power 30% to 40% of the time due to either to low or too high wind velocity thereby requiring 100% standby capacity from other fuel sources which doubles the capital cost and significantly increases the operating costs; and
- wind turbines do not operate in extremely low temperatures below about minus 35° C, which will occur in this geographical location a significant percentage of the year.

Therefore, the electrical power will be provided by diesel generators. Four options were considered for generation of electricity using diesel fuel and delivery of the electricity to the Project.

Option 1 Expand the diesel generation plant at the Misery Pit

Option 2 Purchase/lease capacity at Diavik Diamond mine and purchase electricity from Diavik

Option 3 Supply capacity from the powerhouse at Ekati Mine

Option 4 Supply capacity from a new powerhouse at the Project site

Use of surface cables placed directly on the ground instead of overhead transmission lines to distribute electricity was eliminated from consideration in all four options for the following reasons.

- surface cables can act as barriers to animal migration;
- surface cables are more readily subject to damage by equipment;
- surface cables are more difficult to repair in the winter months when there is snow coverage; and,

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- surface cables may not meet the code for high voltage when off mine property.

Each option was evaluated on the following metrics using a weighted numerical system:

- reliability;
- fuel storage site requirements;
- system control capability; and,
- total capital and operating cost over 10 years.

Option 3, to provide power from the Ekati powerhouse was determined to be the preferred option based on these metrics, and was selected as the means to provide power to the Project.

4.4.2.6 Waste Rock Storage Areas

Two options were considered for the storage of waste rock and overburden generated by excavation of the Jay open pit. The options are described in Table 4.4-1 and shown in Figure 4.4-3.

Table 4.4-1 Jay Waste Rock Storage Area Options

Option	Height (m)	Available Storage Volume (M m^3)	Distance From Jay Deposit (km)	Footprint Area (ha)
1: West of Jay pit	50	113	2.7	292
2: South of Jay pit	50	113	3.0	263

m = metre; M m^3 = million cubic metres; km = kilometre; ha = hectare

~~Similarly, three options were considered for the storage of waste rock and overburden generated by excavation of the Cardinal open pit. The options are described in Table 4.4-6 and shown in Figure 4.4-1.~~

~~Table 4.4-6 Cardinal Waste Rock Storage Area Options~~

~~Option~~	~~Height (m)~~	~~Available Storage Volume (Mm^3)~~	~~Distance From Cardinal Deposit (km)~~	~~Footprint Area (ha)~~
~~1: Southwest of Cardinal pit~~	~~50~~	~~11~~	~~2.6~~	~~37~~
~~2: Extension of Jay Option 2~~	~~50~~	~~9~~	~~5.0~~	~~40~~
~~3: Between Misery and Cardinal pits~~	~~15~~	~~9~~	~~4.4~~	~~72~~

~~m = metre; Mm^3 = million cubic metres; km = kilometre; ha = hectare~~

In addition to the options shown in Figure 4.4-3, options for in-lake and in-pit waste rock storage were considered but were not selected. Storage of waste rock in the basin of Lac du Sauvage was not selected due to potential regulatory and permitting issues that may not be resolved within the required project

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timeframe, and because other viable waste rock management alternatives exist. Storage of waste rock in mined pits, such as Misery, Lynx, Panda, and Koala was rejected due to uneconomic hauling and placement requirements.

Criteria used to develop the WRSA options are consistent with the Waste Rock and Ore Management Program (WROMP) and include~~d~~:

- storage of granite waste rock, metasediments and overburden from Jay Pit, for a conservative design volume of 113 million M m^3;
- at or below the maximum height allowance ~~of 50 m~~ above the tundra that balances the height of the pile with the surface area in order to fit into the local topography;
- minimum distance of 100 m from natural water bodies and open pits;
- outer slopes benched, with an overall slope angle not greater than 25 degrees; and,
- the waste rock is non-acid generating with the exception of meta sediments from Jay.

All of the options provide for secure, long-term storage. For all options, the existing Ekati Mine WRSA Seepage Monitoring Program would be expanded to incorporate the new WRSA(s).

Jay WRSA Option 1 is located west of the Jay Pit on the shore of Lac Du Sauvage. Waste rock would be hauled from the pit to the WRSA by a short access road. Drainage from the WRSA would be towards Lac du Sauvage. This option sits on granite, and is a potential quarry site for dike construction.

Jay WRSA Option 2 is located south of Jay Pit, on the shore of Lac Du Sauvage. Roads are not shown for Option 2 on Figure 4.4-3; however, it is anticipated that a short road across to the dewatered~~rawdown~~ zone of Lac Du Sauvage and re-orientation of the Jay Pit haul ramp would be required.

Based on a review of the options, Jay WRSA Option 1 has been identified as the preferred alternative. This option has a shorter haul distance, and has the potential for double use as a quarry, which will help minimize the overall project footprint.

~~Cardinal WRSA Option 1 is located on the shore of Lac Du Sauvage, adjacent to the Cardinal access road. This option presents the smallest footprint and shortest haul distance.~~

~~Cardinal WRSA Option 2 is an extension of Jay WRSA Option 2, with waste rock from Cardinal stored in the southeast portion of the footprint. Option 2 would require a longer haul road.~~

~~Cardinal WRSA Option 3 is a standalone option, with waste rock stored along the road between the Cardinal and Misery sites.~~

~~Based on a review of the options, Jay WRSA Option 1 has been identified as the preferred alternative. This option has a shorter haul distance, and has the potential for double use as a quarry, which will help minimize the overall project footprint.~~

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~~Based on a review of options, Cardinal WRSA Option 1 was selected as the preferred alternative. This option has a shorter haul distance, and a reduced footprint area.~~

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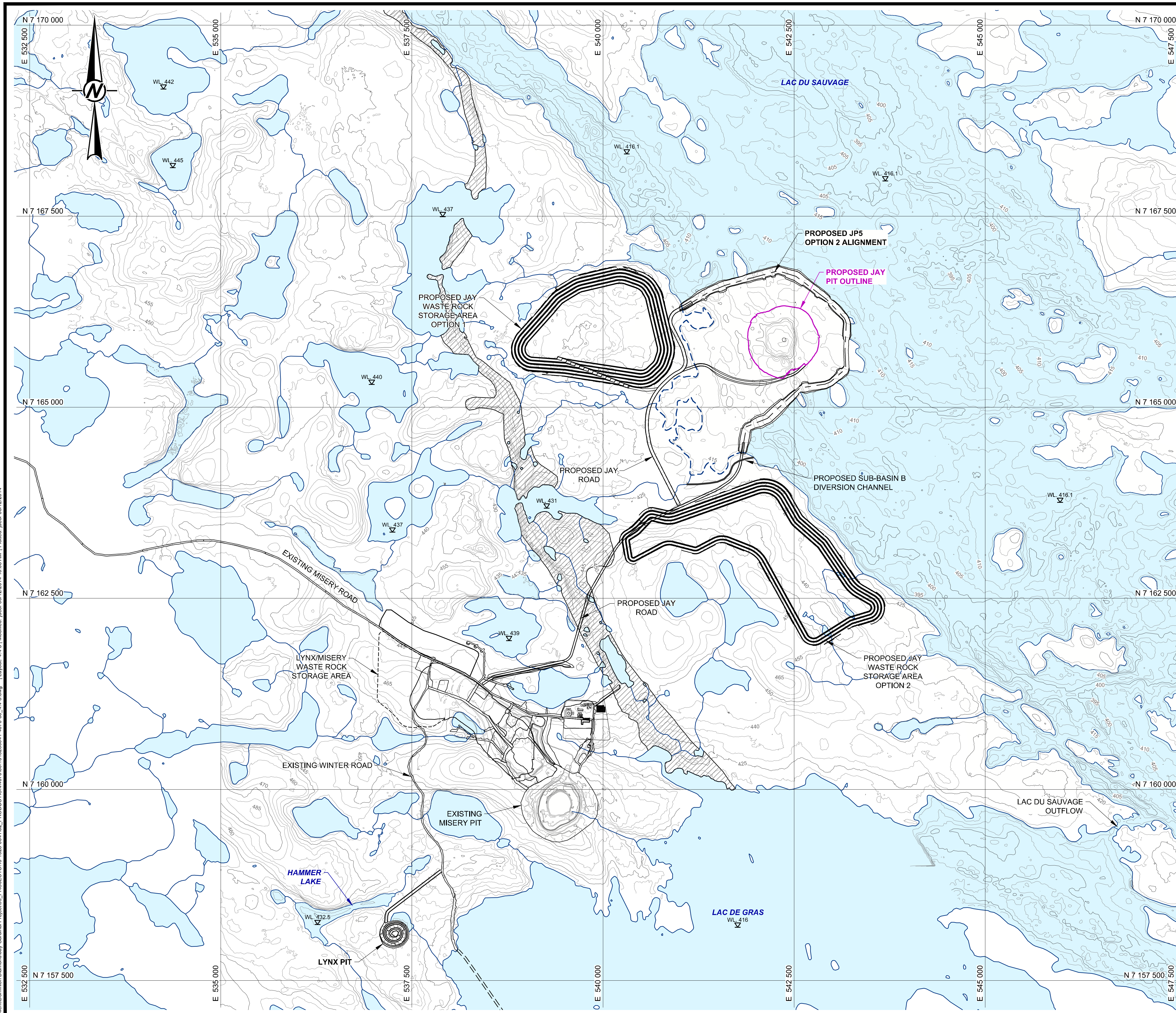

LEGEND

- WATER BODY
- WATER COURSE
- ROAD
- WINTER ROAD - YEARLY CONSTRUCTION
- PROPOSED DIVERSION CHANNEL
- ESKER
- WL WATER LEVEL ELEVATION

NOTES

1. ALL UNITS ARE IN METRES UNLESS OTHERWISE NOTED.
2. ELEVATIONS ARE IN METERS ABOVE SEA LEVEL (masl).
3. GROUND SURFACE AND BATHYMETRY CONTOURS ARE SHOWN AT 5 m INTERVALS.
4. COORDINATES ARE SHOWN IN DATUM: NAD 83, PROJECTION: UTM ZONE 12.

REFERENCE

1. CONTOUR DATA PROVIDED BY AURORA GEOSCIENCES LTD., FILE: Final 1m Contours - Priority Area.dxf, DATE RECEIVED: OCTOBER 29, 2013.

ISSUED FOR REVIEW

DRAFT

SCALE 0 1,000 2,000 3,000 METRES

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
A	2014-06-12	DRAFT - ISSUED FOR REVIEW	AK	JD	-	-

PROJECT

JAY PROJECT
LAC DU SAUVAGE
NORTHWEST TERRITORIES, CANADA

TITLE

WASTE ROCK STORAGE AREA OPTIONS

DOMINION DIAMOND

PROJECT No.	13-1328-0041.4070.60		FILE No. 1313280041-4070-60_4.4-3
DESIGN	AK	2014-05-29	SCALE AS SHOWN
CADD	JD	2014-06-02	FIGURE
CHECK	-	-	4.4-3
REVIEW	-	-	

N:\Client\Dominion Diamond\Jay-Cardinal Project\99_PROJECTS\13-1328-0041\02_PRODUCTION\4070\60\1313280041-4070-60_4.4-3.dwg | Layout: 4.4-3 | Modified: jdeol 06/12/2014 10:08 AM | Plotted: jdeol 06/12/2014

4.5 Geology and Geotechnical Conditions

4.5.1 Geology

4.5.1.1 Ekati Mine

Bedrock at the Ekati Mine is dominated by Archean meta-greywackes of the Yukon Supergroup, intruded by granitoids and transected by Proterozoic mafic dykes. No younger cover sediments are preserved. Bedrock is overlain by Quaternary glacial deposits, which are generally less than 5 m thick.

The kimberlite pipes at the Ekati Mine are part of the Lac de Gras kimberlite field, which is located in the central Slave craton. The kimberlites intrude both granitoids and metasediments.

Fine-grained sediments have been preserved as xenoliths and disaggregated material in kimberlite, which indicates that some sedimentary cover was present at the time of the kimberlite emplacement. The Ekati Mine kimberlites range in age from 45 to 75 Ma; they are mostly small pipe-like bodies (surface areas are for the most part less than 3 ha, but they can extend to as much as 20 ha) that typically extend to project depths of 400 to 600 m below the current land surface. Kimberlite distribution is influenced by fault zones, fault intersections, and dyke swarms.

Pipe infill can be broadly classified into six rock types:

- magmatic kimberlite (MK) – hypabyssal;
- tuffistic kimberlite;
- primary volcaniclastic kimberlite (PVK);
- olivine-rich volcaniclastic kimberlite (VK);
- mud-rich, resedimented volcaniclastic kimberlite (RVK); and,
- kimberlitic sediments.

With few exceptions, the kimberlites are made up almost exclusively of VK, including very fine to medium-grain kimberlitic sediments, RVK, and PVK. The RVK represents pyroclastic material that has been transported (e.g., by gravitational slumping and flow process) from its original location (likely on the crater rim) into the open pipe and has undergone varying degrees of reworking with the incorporation of surficial material (mudstone and plant material). In rare cases (e.g., Grizzly Pipe) pipes are dominated by or include considerable portions of MK.

While occasional peripheral kimberlite dykes are present, geological investigations undertaken to date do not provide any evidence for the presence of complex root zones or markedly flared crater zones.

Economic mineralization is mostly limited to olivine-rich re-sedimented volcaniclastic and primary volcaniclastic types. Approximately 10% of the 150 known kimberlite pipes in the Ekati claim block are of economic interest or have exploration potential.

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4.5.1.2 Jay Pipe

A total of 16 diamond drill holes (3,872 m) and 17 reverse circulation holes (4,979 m) have been completed in the Jay pipe area. Core drilling using synthetic diamond-tipped tools and/or carbide bits was used to define the pipe contacts and internal geology. Geological logging was completed on all 33 drill holes, and core from 15 diamond drill holes was photographed.

The Jay kimberlite pipe is located within Lac du Sauvage, in the southeastern corner of the property, about 25 km southeast of the Ekati main camp and about 7 km north-northeast of the Misery Pit. The pipe is overlain by overburden that is 5 to 10 m thick, which is then covered by approximately 35 m of water.

The Jay pipe has a roughly circular outline in plan view (Figure 4.5-1), with a surface area of approximately 13 ha (375 by 350 m) and a steep-sided vase shape as illustrated in by the isometric view (Figure 4.5-2). The sides of the pipe are interpreted to be roughly planar with minor concavities and bulges. The shape, particularly the north side, is believed to be coincident with geological structures.

The Jay pipe is hosted within granitic rocks, ranging from granite to granodiorite in composition. A regional contact with meta-sedimentary rocks occurs to the west, and a diabase dyke trending approximately east-west occurs to the north of the pipe. Early interpretation of the regional airborne magnetic images suggested the presence of two linear features extending northeast-southwest (E-W lineament) along the northern Jay pipe contact and northwest-southeast (N-S lineament) to the west of the Jay pipe that could be related to geological structures. The east-west structure to the north of the Jay pipe may be associated with the diabase dyke; however, other zones of increased jointing have also been recognized in two core holes. The north-south structure may be associated with the metasediment-granite contact.

The pipe is divided into three domains:

(1) The RVK domain is the uppermost 110 to 170 m in stratigraphic thickness. Small-scale chaotic bedding is present which is defined by waves of silty to sandy laminates, and variations in olivine abundance. Variable amounts and sizes of black, pale grey, blue-grey, blue-green, brown, and tan coloured mudstones and siltstone xenoliths are present. In core intersections, the RVK domain is comprised of repeating, large-scale graded mega-beds defined by mud, breccia, and olivine content. The upper portion of the mega-beds is composed of olivine-poor, mud- and clay-rick unconsolidated mudstone to RVK. Small-scale bedding is present but is very-fine grained. Rare shale breccia is present.

(2) The transitional kimberlite (TransK) domain is a 30 to 70 m thick package of interbedded RVK and VK material of varying degrees of alteration. The transition from the RVK domain to the VK domain is indistinct and is marked by the appearance of small interbeds of fresh to highly altered, dark to pale coloured VK.

(3) The PVK domain which is primarily olivine-rick, competent, grey-blue to green PVK with partially altered olivine set in a serpentinised matrix. The upper contact of the VK domain is marked by the

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absence of RVK and presence of highly-altered, pale-coloured VK material. Small, irregularly shaped, mudstone, and granitic xenoliths are present, but decrease in abundance with depth.

The domains are sub-horizontal and are interpreted to extend the width of the pipe. The boundaries between the domains are transitional in nature.

The geological logging indicates that four geological units exist at the Jay site: granite, metasediment, diabase dike, and kimberlite.

The current resource estimate for the Jay kimberlite pipe includes 36.2 (Mt) of indicated resource at 2.2 carats per tonne (cpt) and 9.5 Mt of inferred resources at 1.4 cpt (Heimersson and Carlson 2013).

~~4.3.3 Cardinal Kimberlite Pipe~~

~~A total of four diamond drill holes (658 m) and five reverse circulation holes (920 m) have been completed in the Cardinal pipe area. Geological logging was completed on nine holes, core from three holes was photographed, and partial geotechnical logging was carried out on one hole.~~

~~The Cardinal kimberlite pipe is located in the southeastern corner of the property, about 30 km southeast of the Ekati main camp, 4.4 km southeast of the Jay pipe, and 14 km northeast of the Misery Pit, within Lac du Sauvage. The pipe is covered by approximately 18 m of water, as well as overburden that is 10 m thick.~~

~~The Cardinal pipe has a roughly circular outline in plan view (Figure 4.6-3) and a steep-sided shape as illustrated in the isometric view (Figure 4.6-4). The kimberlite appears to be approximately one hectare in surface area, but the pipe is constrained by drilling only on the eastern and western margins and by several vertical drill holes within the pipe. It is overlain by approximately 18 m of water and up to 25 m of overburden. The kimberlite has been intersected by four diamond drill (core) holes and three reverse circulation bulk sample holes. The kimberlite is interpreted to have a pipe-like shape and is comprised of a RVK hosted within two-mica granite. Drill hole pierce points indicate that the kimberlite pipe is steep sided.~~

~~The reverse circulation drill holes were completed in 2005 (1) and 2007 (4), using 44.45 cm hole diameters; however, only three of the five holes intersected the kimberlite. In total 114 m^3 (approximately 208 dry metric tonnes [dmt]) of kimberlite material was collected in 48 samples (dominantly 15 m sample intervals). Processing was completed at the Ekati sample plant using a 1 mm slot degrit screen which resulted in the recovery of 216 carats, indicating an average grade of 1.90 carats per cubic meter or 1.04 cpt.~~

~~The tonnage and average grade ranges for the Cardinal kimberlite pipe are estimated at 1.6 million to 3.8 million tonnes and 0.8 to 1.2 cpt, respectively.~~

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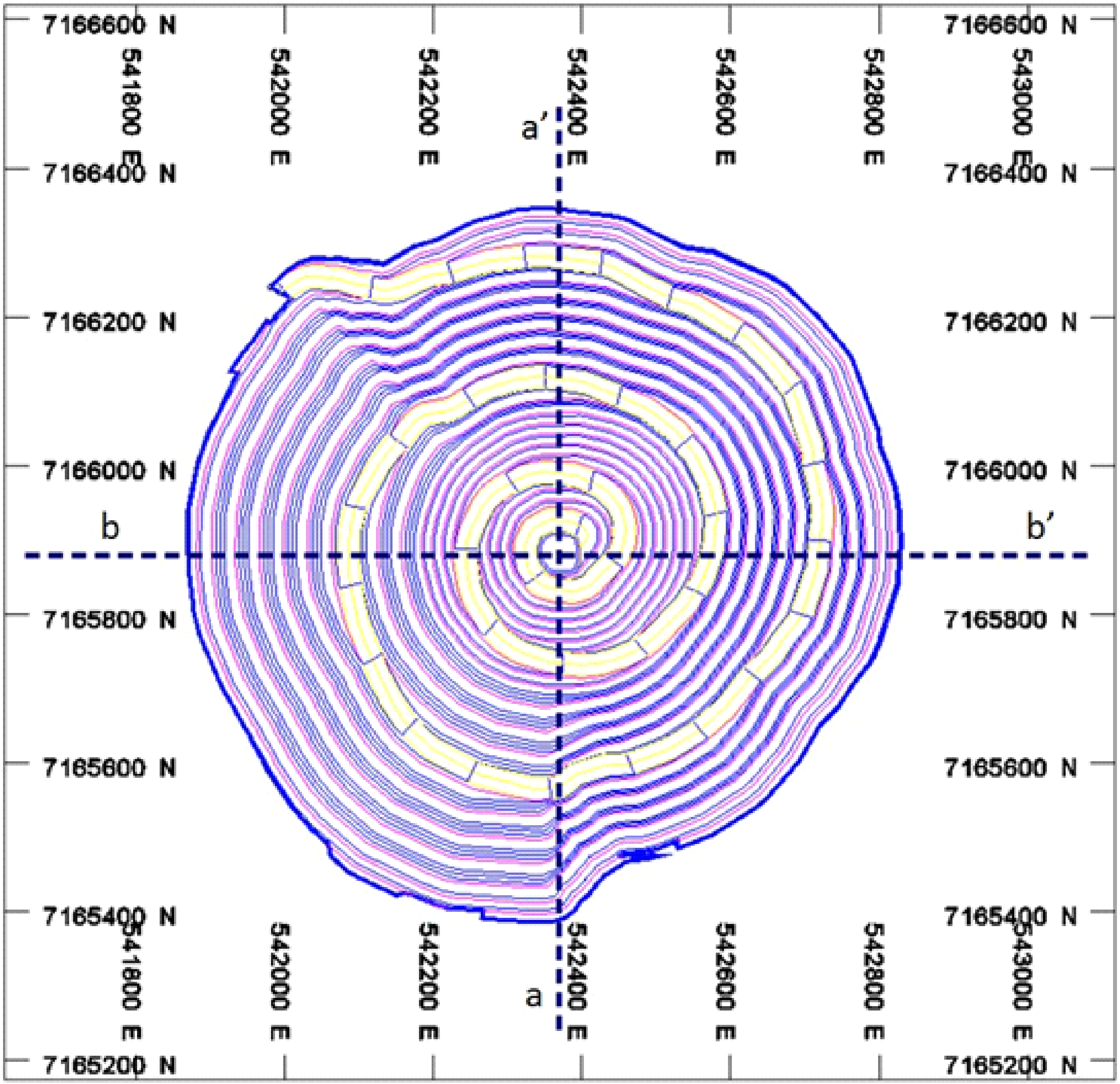

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PROJECT

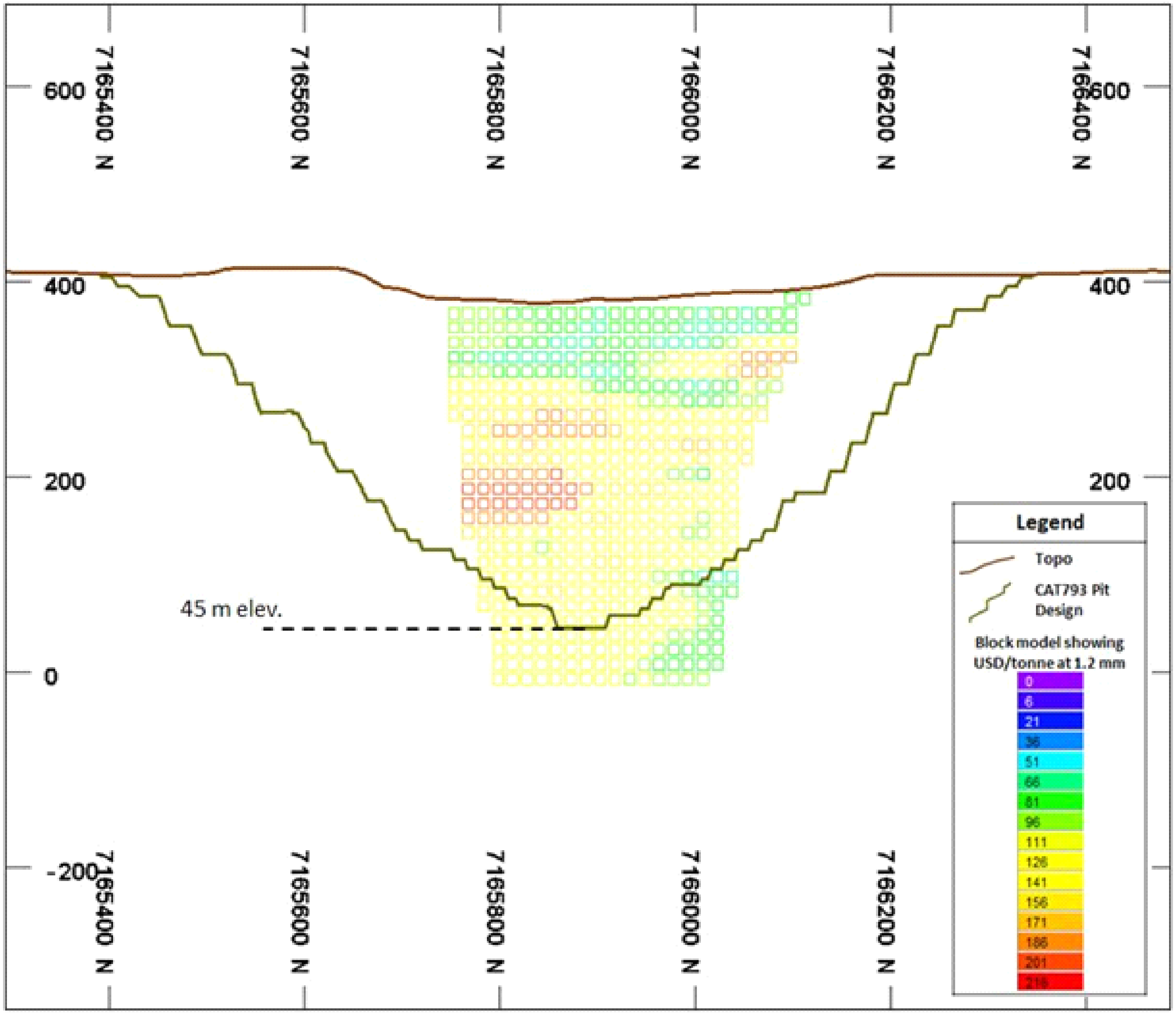
JAY PROJECT
LAC DU SAUVAGE,
NORTHWEST TERRITORIES, CANADA

TITLE

JAY KIMBERLITE
PLAN VIEW

DOMINION DIAMOND

PROJECT		13-1328-0031	FILE No.
DESIGN	WD	08/10/13	SCALE AS SHOWN REV 0
GIS	ANK	12/06/14	
CHECK	AL	12/06/14	**FIGURE: 4.5-1**
REVIEW	ED	12/06/14	



PROJECT
JAY PROJECT
LAC DU SAUVAGE,
NORTHWEST TERRITORIES, CANADA

TITLE
JAY KIMBERLITE
ISOMETRIC VIEW

DOMINION DIAMOND

PROJECT		13-1328-0031	FILE No.	
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GIS	ANK	12/06/14	**FIGURE: 4.5-2**	
CHECK	AL	12/06/14		
REVIEW	ED	12/06/14		

G:\CLIENTS\DOMINION\DDEC Jay and Lynx Projects\Figures\13-1328-0031 Diversion Study\2130 - EIR Process\Jay-Cardinal Project Description\mxd\Update June 2014\Fig4.5-2_Jay_Kimberlite_Isometric_View.mxd

4.5.2 Geochemical Conditions

Acid rock drainage and metal leaching can result from chemical weathering of minerals present in rock that is exposed during construction and mining. Oxidation of sulphide minerals, such as pyrite, can produce acidity, sulphate, and metals. The acidity produced by oxidation of sulphide minerals can be neutralized by the dissolution of carbonate minerals and, to a lesser degree, certain silicate minerals present in the rock.

The primary waste rock expected to be encountered during mining is granite (quartz diorite, granodiorite, two-mica granite, and pegmatite). I~~n the order of two-thirds~~ t is anticipated that 75% of the waste rock mined from the Jay pipe is anticipated to be granite. The remainder of the waste rock mined from the Jay pipe will be metasediment, with minor amounts of diabase and barren/low grade kimberlite.

Geochemical characterization of the main rock types expected to be encountered at the Jay pipe has been undertaken at the Ekati Mine. Granite (including granodiorite and two-mica granite) consists of silicate minerals including quartz, potassium feldspar, plagioclase, biotite, and muscovite. Sulphide minerals are rare in two-mica granite, and fine-grained pyrite has been occasionally observed in granodiorite. The granitic rock at the Ekati Mine has been clearly characterized as non-acid generating. Metasedimentary rock is known to contain trace concentrations of sulphide minerals, with occasional concentrations up to 2 to 5%. Diabase dykes are classified as magnetic or non-magnetic. Diabase dykes contain trace concentrations of sulphide minerals, including pyrite, chalcopyrite and pyrrhotite, and magnetic diabase dykes contain the iron mineral magnetite. The metasedimentary rock and diabase at the Ekati Mine are classified as potentially acid generating.

4.5.3 Geotechnical Conditions

Geotechnical logging of core from core holes is completed to determine rock mass rating (RMR) according to the Laubscher system. For key holes, core is oriented using an ACT (ACE) tool, and detail structural logging completed. In 2009, an acoustic and optical televiewer system was introduced to augment the structural logging program in waste rocks at the Misery pipe.

The following geotechnical parameters were determined for all core drill holes at Misery:

- percentage core recovery;
- rock quality designation;
- fracture frequency;
- point load strength index; and,
- joint condition and water.

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Rock samples are collected following a core drill core sampling procedure and are occasionally shipped for off-site testing at an accredited third-party materials testing facility. Strength index testing included:

- unconfined compressive strength;
- triaxial strength;
- direct strength;
- shear strength;
- Poisson's Ratio; and,
- Young's Modulus Evaluation.

Measurements suitable for the pit wall stability study are obtained with an oriented core device to provide information on the orientation of joints, faults, bedding planes, and other structures.

The RMR system used for logging and mapping at the Ekati Mine is based on the Laubscher RMR system where the following ratings equate to different rock strengths:

- 0-20: Very Poor;
- 21-40: Poor;
- 41-60: Fair;
- 61-80: Good; and,
- 81-100: Excellent.

The major kimberlite lithologies in the Ekati Mine production pipes have a wide range of measured strengths. The kimberlite pipes at the Ekati Mine are mostly situated within granite, a competent host rock.

An extensive geotechnical characterization has been completed within the Project area, as a result of the local regional mining activities, including that for the Misery Pit. The same four geological units encountered at the Jay site exist at the Misery site. Due to the close proximity of the Project to the Misery Pit (approximately 7 km to the southwest), it is reasonable to assume the country rock properties will be similar in the two sites. The rock mass quality of the Misery site is summarized below.

- Observations in the existing Misery Pit suggest good quality conditions for the granite and fair to good quality for the biotite schist and diabase dike. Few very continuous structures are visible.
- The granite at the Misery site is generally good to very good quality. The quality becomes fair to good near the ground surface. The rock quality of the granite near the diabase dike is generally classified as good, with no increase in fracturing or apparent loss of strength due to alteration visible in the core photos. Increased fracturing is observed in the granite immediately around the

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kimberlite satellite pipes. A fracture zone surrounding the kimberlite intrusion is less evident in the data for the Misery Pit as compared to the other pipes at Ekati mine. Observations of core do not indicate the presence of significant weak infilled joints or weak altered zones in the country rock in the immediate vicinity of the main pipe.

- Information on the diabase is provided by core photos from two boreholes drilled at the Misery site and observations of the Mackenzie trend diabase dikes elsewhere. This information indicates that the rock is of good quality with a fracture frequency of approximately two or three factures per metre.
- The majority of the metasediment present at the Misery Pit can be classed from fair to good rock mass quality.
- Metasediment is generally the weakest geological unit of the country rocks. Foliation acts as a plane of weakness and results in continuous join surfaces that are generally smooth and planar. Slope behavior within the metasediments will be governed by the foliation orientation, and failure within the rock mass is not expected.

4.5.4 Hydrogeology

The Jay ~~and Cardinal~~ open pit~~s~~ and underground workings are expected to be excavated in unfrozen ground within the Lac du Sauvage talik. Local areas of Lac du Sauvage that contain water may become a source of shallow groundwater inflow to the open pit. In addition, the excavation of the pit may induce the upward flow (referred to as saline upwelling) of deep-seated saline groundwater. The resulting minewater pumped from the open pit and underground workings will be the result of the mixing of fresh water from Lac du Sauvage and groundwater. Minewater will be expected to contain elevated concentrations of chloride, and other ions characteristic of deep groundwater, in relation to the lake water.

The upper levels of the Jay ~~and Cardinal~~ open pit~~s~~ would not be expected to encounter substantive quantities of deep groundwater. As the pit and underground workings are excavated deeper towards the regional base of permafrost (e.g., in the order of 350 m below ground surface), the quantity of deep groundwater encountered in fault zones, and the concentration of characteristic ions such as chloride, may increase. The minewater management plan is described in Section 4.7.8.

4.5.5 Jay Open Pit Design

Geotechnical parameters used during open pit mine design include inter-ramp and inter-bench angles, structural domains determined from wall mapping, and geotechnical drilling. Pit wall designs are reviewed using commercially available software so that appropriate wall angles and catch bench widths are safe and efficient. The existing geotechnical information for the Project area, data for the Misery Pit, and the above geotechnical and hydrogeological considerations have been used to design the open pits. Refer to Figure 4.5-3 for a schematic representing the pit slope design process.

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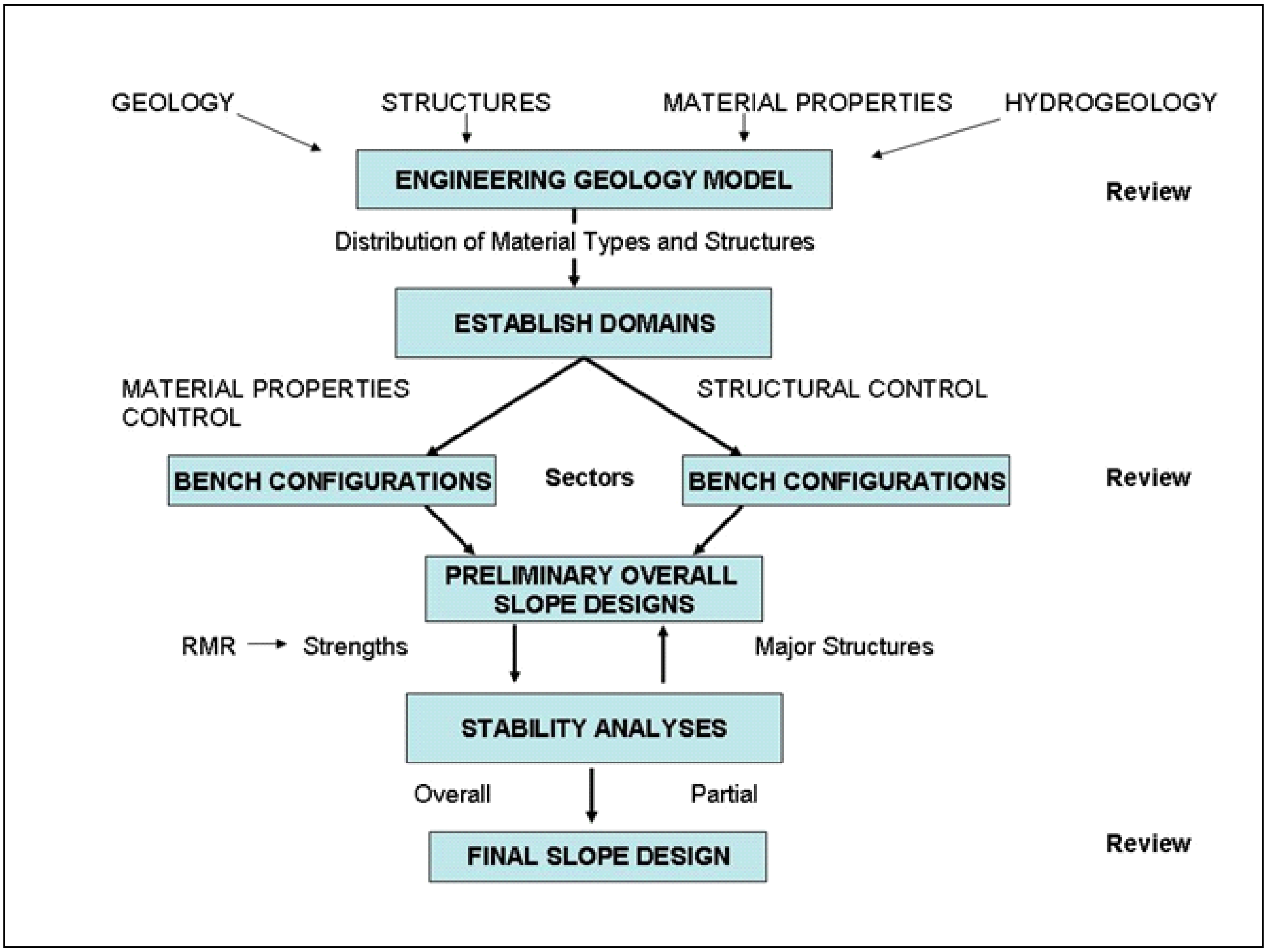

REFERENCE

ADAPTED FROM CSIRO, 2009

PROJECT	JAY PROJECT LAC DU SAUVAGE, NORTHWEST TERRITORIES, CANADA			
TITLE	**PIT SLOPE DESIGN PROCESS SCHEMATIC**			
DOMINION DIAMOND	PROJECT		13-1328-0031	FILE No.
	DESIGN	RK	08/10/13	SCALE AS SHOWN — REV 0
	GIS	TN	12/06/14	**FIGURE: 4.5-3**
	CHECK	AL	12/06/14	
	REVIEW	ED	12/06/14	

G:\CLIENTS\DOMINION\DDEC Jay and Lynx Projects\Figures\13-1328-0031 Diversion Study\2130 - EIR Process\Jay-Cardinal Project Description\mxd\Update June 2014\Fig4.5-3_Pit_Slope_Design_Process.mxd

~~4.3.3.1 Jay Open Pit~~

The conceptual design for the Jay Pit is as follows:

Based on current information, the north, west, and south wall of the planned Jay Pit will be excavated in granite, but the west wall is expected to be mined in metasediments. If the rock masses at the Jay Pit exhibit high strengths and good quality similar to the Misery Pit, failure through the rock masses would be unlikely to occur and the main consideration for rock slope failure mechanisms would be through structurally controlled mechanisms on either a small scale or a larger scale. In this case, the analysis of major joints sets and major structure distribution will be critical for assessing the required slope configuration to control slope kinematics failures.

The Jay Pit will be mined using conventional open pit truck-shovel operations in 10 to 15 m bench heights, with a triple bench configuration. A single circular access ramp that is designed at 29.5 m in width is sufficient for two-way traffic, a safety berm, ditch, and will allow for dewatering pipes to be placed along the edge of the road. The ramp will be designed to accommodate 225 t capacity off-road haul trucks.

The footprint of the designed Jay Pit, at the intersection with the topography, is approximately 960 m x 960 m and has an approximate surface area of 700,000 m^2 (70 ha).

~~4.3.3.2 Cardinal Open Pit~~

~~The conceptual design for the Cardinal Pit is as follows:~~

~~Based on the current information at the Cardinal site, all of the pit walls will be excavated in granite. If the rock masses at the Cardinal Pit exhibit high strengths and good quality similar to the Misery Pit, failure through the rock masses would be unlikely to occur and the main consideration for rock slope failure mechanisms would be through structurally controlled mechanisms on either a small scale or a larger scale. In this case, the analysis of major joint sets and major structure distribution will be critical for assessing the required slope configuration to control slope kinematics failures.~~

~~The Cardinal Pit will be mined using conventional open pit truck-shovel operations in 10 m bench heights, with a triple bench configuration. A single circular access ramp that is designed at 26 m in width is sufficient for two-way traffic, a safety berm, ditch, and will allow for dewatering pipes to be placed along the edge of the road. The ramp will be designed to accommodate 90 tonne capacity off-road haul trucks.~~

~~The footprint of the designed Cardinal Pit, at the intersection with the topography, is approximately 420 m x 420 m and has an approximate surface area of 140,000~~ ~~m^2~~ ~~(14 ha).~~

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4.6 ~~Jay-Cardinal~~ Primary Project Components and Activities

The Project will use the existing mining infrastructure already in place at the Misery site and the Ekati main camp. The conceptual design of the Project components is described below; however, it will be subject to further refinement based on on-going data collection, community engagement, and design iterations.

4.6.1 Buildings and Infrastructure

4.6.1.1 Truck Shop

The existing truck shop at the Misery site will not be adequate for performing maintenance work on large (180 to 225 t) haul trucks; as such, an additional ~~six~~ five bay truck shop (30 m x 70 m) will be required at the Misery site. It is expected that the shop can be constructed within the existing Misery infrastructure footprint (Figure 4.6-1). The conceptual design of the truck shop is as follows:

- ~~one wash bay;~~
- ~~three mobile equipment repair bays;~~
- ~~one tire repair bay; and,~~
- ~~one satellite warehouse bay.~~
- administrative office space;
- warehouse and tool storage; and,
- five haul truck maintenance bays.

The shop will be equipped with overhead cranes and lubricant distribution. ~~A new welding shop will be located in the existing truck shop at the Misery site.~~ The new truck shop will use existing services at the site for power, fresh water, discharge water, and sewage at the Misery camp. A stand by area for vehicles will be developed close to the new truck shop.

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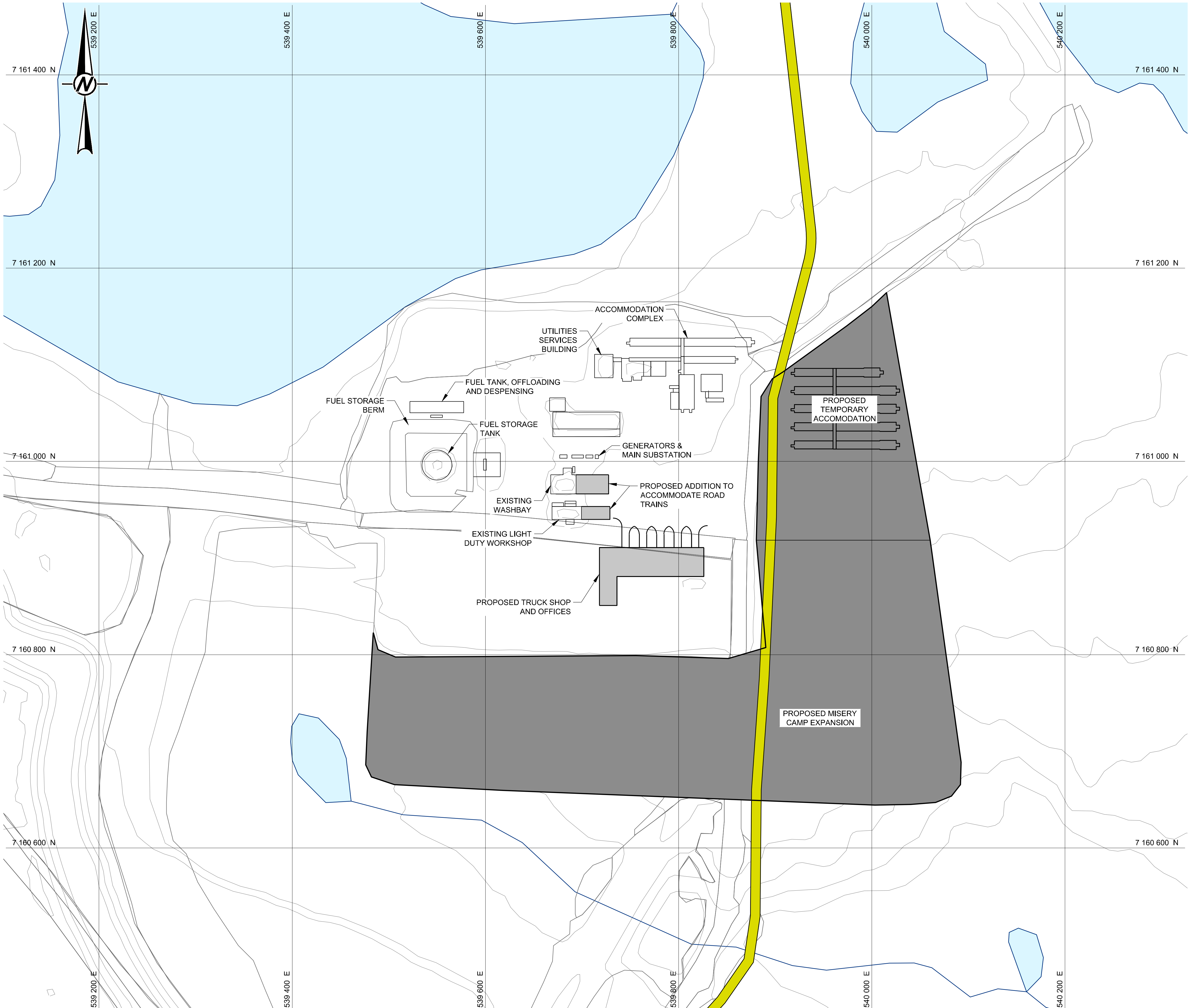

LEGEND

- WATER BODY
- WATER COURSE
- ROAD
- PROPOSED JAY PROJECT INFRASTRUCTURE
- FACILITY EXPANSION FOOTPRINT
- PROPOSED JAY PIPELINE AND ACCESS FOOTPRINT

NOTES

1. ELEVATIONS ARE IN METERS ABOVE SEA LEVEL (masl).
2. GROUND SURFACE AND BATHYMETRY CONTOURS ARE SHOWN AT 5 m INTERVALS.
3. COORDINATES ARE SHOWN IN DATUM: NAD 83, PROJECTION: UTM ZONE 12.
4. ROAD, PIPELINES, AND POWER LINE ARRANGEMENT TO BE DETAILED AS PART OF PRE-FEASIBILITY DESIGN. APPROXIMATE CORRIDOR WIDTHS ARE SHOWN.

REFERENCE

1. CONTOUR DATA PROVIDED BY AURORA GEOSCIENCES LTD., FILE: Final 1m Contours - Priority Area.dxf, DATE RECEIVED: OCTOBER 29, 2013.

ISSUED FOR REVIEW

DRAFT

0 80 160 240

SCALE METRES

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
A	2014-06-12	DRAFT - ISSUED FOR REVIEW	AK	JD	-	-

PROJECT

JAY PROJECT
LAC DU SAUVAGE
NORTHWEST TERRITORIES, CANADA

TITLE

NEW TRUCK SHOP AT MISERY

DOMINION DIAMOND

PROJECT No.	13-1328-0041.4070.60		
DESIGN	AK	2014-05-29	
CADD	JD	2014-06-02	
CHECK	-	-	
REVIEW	-	-	

FILE No. 1313280041-4070-60_4.6-1

SCALE AS SHOWN

FIGURE 4.6-1

N:\Client\Dominion Diamond\Jay-Cardinal Project\99_PROJECTS\13-1328-0041\02_PRODUCTION\4070\60\1313280041-4070-60_4.6-1.dwg | Layout: 4.6-1 | Modified: jdeol 06/12/2014 10:07 AM | Plotted: jdeol 06/12/2014

~~4.3.3.3 Power Line and Substation~~

~~The diesel generators to provide 8 MW of power at the pump locations for the drawdown stages of the Project and 2 MW of power, thereafter, for the life of mining activities to handle runoff collection, pit dewatering, and underground mining are located at the Ekati Mine in the same building as the existing powerhouse.~~

~~Power will be delivered to the Project via overhead 550 MCM ACSR (aluminum) transmission lines at 69 kV to limit line losses. The transmission lines will be supported on 60 to 65 foot wood poles, and will be constructed adjacent to the existing road between the Ekati Mine and Misery Camp, and adjacent to the new access roads to the Project.~~

~~The power generating facilities currently in place at Misery Camp (three – 750 kW generators) will be retained to provide backup power in the event of power interruptions between the Ekati main camp and Misery Camp. The ability to back feed power to the Ekati main camp will be included in the event power is needed due to maintenance or breakdown of the plant.~~

~~Substations will be constructed at the Ekati main camp and Misery Camp to step up power to 69 kV, and at four locations at the Project site on Lac du Sauvage to step down the power to operate the pumps and mining equipment. The substations will be low profile, pad mounted design containing the required components, such as breakers, switches, and controls. The sizes will range from 200 kVA to 3 mVA.~~

~~Figure 4.1-2 shows the general location of the transmission lines and the substations, as well as the sizes of the substations.~~

~~Site lighting around the Jay Pit and Cardinal may initially be provided by mobile powered light towers similar to the units currently in use at the Ekati Mine.~~

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4.6.1.2 Surface Facilities for Open-Pit Mining

A small lunchroom, office, and washroom facility with temporary emergency shelter and supplies will constructed at the Jay ~~and Cardinal~~ site~~s~~. Further, a laydown/truck ready area will also be required.

4.6.1.3 Surface Facilities for Underground Mining

Surface infrastructure near the entrances to the Jay ~~and Cardinal~~ underground workings will include:

- dries;
- substation;
- intake and exhaust fans;
- parking and laydown areas; and,
- ~~for the Jay site~~ a headframe with load-out structure.

This infrastructure is discussed in further detail in Section 4.7.4.

~~4.3.3.4 Misery Temporary Crusher Station~~

~~A temporary crusher station will be set up at the Misery WRSA. This crusher station will be used for crushing granite waste rock required for the roads, dike, and general construction purposes. This temporary crusher station will produce approximately:~~

- ~~one million tonnes of - 200 mm material;~~
- ~~160,000 tonnes of - 56 mm material; and,~~
- ~~420,000 tonnes of -20 mm material.~~

~~The crusher station will be electrically powered; a power line will be constructed from a substation at the Misery site to the crusher station.~~

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4.6.1.4 Pumping Stations and Pipelines

The pumping and pipeline systems identified below are initially described in Section 4.5.2.

~~PS1 Pump Station and a 3.5 km long pipeline pumps water from PS1 Pump Station to the North Arm Water Management Area during lake drawdown and during operations;~~

~~PS2 Pump Station and a 2.3 km long pipeline pumps water from PS2 Pump Station to Lac de Gras during initial lake drawdown and during operations; and,~~

~~PS3 Pump Station and a 1.5 km long pipeline pumps water from the trench along the southwest shoreline of Lac du Sauvage to PS1 Pump Station.~~

The Project will include the establishment of pipelines between the Jay Pit and Misery Pit, and also the Lynx Pit, as part of the water management system. A pipe bench will be constructed to accommodate these pipelines.

Dewatering Initial Phase

- PS1 Pump Station and a 0.86 km long pipeline pumps water, meeting discharge criteria, from PS1 Pump Station (located in the Jay pipe area) to the main basin of Lac du Sauvage during initial dewatering;
- PS2 Pump Station and a 0.54 km long pipeline pumps water, meeting discharge criteria, from PS2 Pump Station (Jay sump area) to the main basin of Lac du Sauvage during initial dewatering; and,
- PS3 Pump Station and a 0.86 km long pipeline pumps water, meeting discharge criteria, from PS3 Pump Station (located in the Jay pipe area) to the main basin of Lac du Sauvage during initial dewatering.

Dewatering Later Phase (Lynx Pit)

- PS1 Pump Station and a 12.23 km long pipeline pumps water, with high TSS levels, from PS1 Pump Station (located in the Jay pipe area) to the Lynx Pit during the later stage of construction dewatering;
- PS2 Pump Station and a 11.18 km long pipeline pumps water, with high TSS levels, from PS2 Pump Station (Jay sump area) to the Lynx Pit during the later stage of construction dewatering; and,
- PS3 Pump Station and a 12.23 km long pipeline pumps water, with high TSS levels, from PS3 Pump Station (located in the Jay pipe area) to the Lynx Pit during the later stage of construction dewatering.

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Dewatering Later Phase and Operations (Misery Pit)

- PS1 Pump Station and a 5.91 km long pipeline (at most) pumps water, meeting discharge criteria, from PS1 Pump Station (located at the Misery Pit) to either the main basin of Lac du Sauvage or Lac de Gras during operations;
- PS2 Pump Station and a 6.43 km long pipeline pumps high TSS water and surface runoff from PS2 Pump Station (Jay sump area) to the top of the Misery Pit during the later stage of construction dewatering and during operations; and,
- PS3 Pump Station and a 6.80 km long pipeline pumps water high TSS water and mine inflow water from PS3 Pump Station (located at the Jay Pit) to the bottom of the Misery pit during the later stage of construction dewatering and during operations.

4.6.1.5 Roads and Pads

A number of roads will be constructed to connect the individual components of the Project to the existing winter road, the existing facilities at the Misery site, and the Ekati main camp (Figure 4.6-2). These connector roads will be approximately 30 m wide and will be constructed using granite to a standard that is safe for use by mine operating equipment. ~~While t~~The final routing of the Jay Access R~~r~~oad (alternative alignments range from 10.6 to 11.7 km) has yet to be ~~not been~~ determined~~, the following site roads and causeways will need to be constructed:~~.

- ~~an approximately 5.4 km road from the Misery Site to the Cardinal causeway (proposed Cardinal Road);~~
- ~~an approximately 6.9 km road from the existing Misery Road to the Jay causeway (proposed Jay Road);~~
- ~~an approximately 4.5 km road from the Jay Road to the Dike JP1 (proposed JP1 Road);~~
- ~~an approximately 7.2 km road from JP1 dike, to Lake E1 and to construct the Lake E1 Diversion Outlet Channel (proposed Lake E1 Diversion Outlet Channel road);~~
- ~~an approximately 6.3 km road from Dike JP1 to Dike JP2 (proposed JP2 Road);~~
- ~~an approximately 0.8 km road between the Dike JP4 North and South (proposed JP4 Road);~~
- ~~an approximately 4.0 km causeway from the proposed Cardinal Road to the Cardinal Pit; and,~~
- ~~an approximately 1.2 km causeway from the proposed Jay Road to the Jay Pit.~~

Small lay-down areas may be constructed at the Jay ~~and Cardinal~~ site~~s~~ using granite rock. Wherever practical, the existing facilities of the Misery workshop facility will be used.

~~A~~ Two temporary kimberlite storage areas ~~(location yet to be determined)~~ will be used to store kimberlite from the Project prior to it being hauled to the process plant at the Ekati main camp. These pads will be constructed of granite and built in accordance with practices already implemented at the Ekati Mine.

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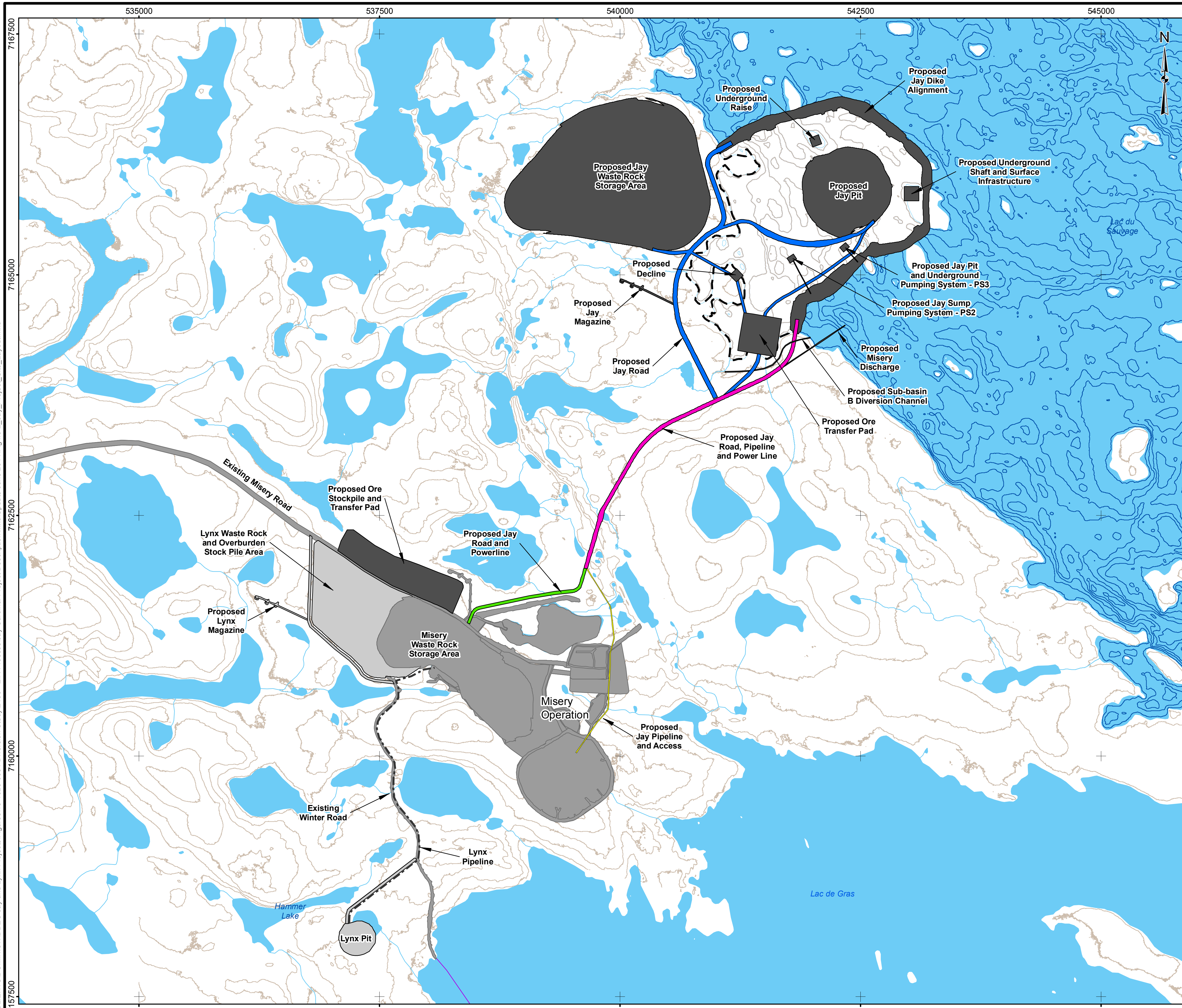

LEGEND

- EKATI MINE FOOTPRINT
- WINTER ROAD
- BATHYMETRY CONTOUR (5 m INTERVAL)
- ELEVATION CONTOUR (10m INTERVAL)
- WATERCOURSE
- WATERBODY

JAY PROJECT FOOTPRINT

- EXISTING SHORELINE OF DEWATERED AREA
- PROPOSED JAY PROJECT INFRASTRUCTURE
- PROPOSED JAY ROAD
- PROPOSED JAY ROAD AND POWERLINE
- PROPOSED JAY ROAD, PIPELINE AND POWER LINE
- PROPOSED JAY PIPELINE AND ACCESS

LYNX PROJECT FOOTPRINT

- LYNX PROJECT INFRASTRUCTURE

REFERENCE

JAY PROJECT CONCEPTUAL ENGINEERING REPORT, EKATI MINE, DOC#: 1313280041-E14037-R-REV0-4060, DATED: MAY 13, 2014
LIDAR AND BATHYMETRIC DATA OBTAINED FROM AURORA, 2013
WATER OBTAINED FROM CANVEC © NATURAL RESOURCES CANADA, 2012
DATUM: NAD83 PROJECTION: UTM ZONE 12N

1 0 1
SCALE 1:40,000 KILOMETRES

PROJECT

JAY PROJECT
LAC DU SAUVAGE,
NORTHWEST TERRITORIES, CANADA

TITLE

JAY PROJECT SITE LAYOUT

DOMINION DIAMOND

PROJECT	13-1328-0031		FILE No.	
DESIGN	ANK	29/05/14	SCALE AS SHOWN	REV A
GIS	ANK	09/06/14		
CHECK				
REVIEW				

FIGURE: 4.6-2

G:\CLIENTS\DOMINION\DDEC Jay and Lynx Projects\Figures\13-1328-0031 Diversion Study\2130 - EIR Process\Jay-Cardinal Project Description\mxd\Update June 2014\Fig4.6-2_Jay_Project_Site_Layout.mxd

4.6.1.6 Fuel Storage

Due to the close proximity of Project to the existing Misery fuel storage infrastructure, no additional mobile equipment fuel storage is planned. Mobile heavy equipment will obtain fuel from the Misery dispensing facility per current operating practices.

4.6.1.7 Quarries

Granite rock in the order of 8 ~~to 10~~ M m^3 (either blasted or crushed and screened to various engineering specifications) is required for construction of roads, pads and the dike~~s~~ at Lac du Sauvage. The granite rock for construction will be obtained from one or more local quarries. Once the excavation of granite waste rock is underway from the Jay ~~and Cardinal~~ open pit~~s~~, the mined rock becomes the source of granite for ongoing maintenance of these facilities.

There are two likely quarry locations for the Project. The primary quarry location would be at the Lynx WRSA~~location of the Jay WRSA (option #1).~~, ~~T~~this location could provide the needed quantity of granite rock, and has the advantage of reducing costs and haulage travel times for construction of roads, pads and the dike located in the Project area. The second option for quarry material, proposed as a contingency source, would be the Jay WRSA, the advantage to this location is then being completely filled and covered by construction of the Jay WRSA. For either option, ~~N~~no reclamation of the quarry would be required. ~~The proposed Lynx WRSA, could be an additional quarry location. The waste rock excavated from the proposed Lynx Pit will be granite, which is proposed to be placed as an extension on the northwest side of the existing Misery WRSA. The Lynx Project still requires regulatory approval; therefore, the use of Lynx waste rock is speculative at this time. However, the use of Lynx waste rock could reduce costs and haulage travel times for construction of roads, pads and dikes located in the area of the Cardinal pipe; therefore, would be considered as an additional quarry if available.~~

4.6.2 Dikes, Sumps~~Ponds~~, and Channels

The dike~~s~~, sumps, ~~berms~~ and channel~~s~~ identified below ~~are~~ were initially described ~~further~~ in Section 4.5.2;

~~4.3.3.5 Dikes~~

- ~~Dike JP1 separates the North Arm from the rest of Lac du Sauvage and creates the North Arm Water Management Area;~~
- ~~Dike JP2 diverts the inflow from Duchess Arm to Paul Lake through the Lake E1 Diversion Outlet Channel; and,~~
- ~~Dike JP4 is divided into two sections: JP4 North and JP4 South and diverts natural flow from the east and south catchment areas to Lac de Gras via the natural Lac du Sauvage outlet channel.~~

~~4.3.3.6 Berms~~

- ~~Jay Berms~~

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- ~~Two berms in the area of the proposed Jay Pit development are required and will be constructed of rockfill and lined with locally borrowed lakebed till from pit pre-stripping if possible. The berms will create sumps to collect local seepage flows, groundwater flow and precipitation and keep the drawn-down lake from the pit area.~~

- ~~Cardinal Berms~~
  - ~~Two berms in the area of the proposed Cardinal Pit development are required and will be constructed of rockfill and lined with locally borrowed lakebed till from pre-stripping if possible. The berms will create sumps to collect local seepage flows, groundwater flow and precipitation, and keep the drawn-down lake from the pit area.~~
  - ~~An additional pumping station will be required in the isolated pond north of Cardinal Pit and below Dike JP4 North to maintain this area at a drawdown level of El. 400m.~~

~~4.3.3.7 Channels~~

- ~~Lake E1 Diversion Outlet Channel diverts inflow from Sub-basin E to Paul Lake and provides an overflow channel from the North Arm Water Management Area allowing discharge into Paul Lake.~~

~~4.3.4 Water Diversion and Drawdown~~

~~Based on the evaluation of the water diversion and drawdown options available for the Project, there will be three dikes built (JP1, JP2, and JP4 North and South), and three pump stations with associated pipelines (PS1, PS2, and PS3). A discharge structure will be built by the small lake (Ad8) between the North Arm and Lake E1. A water channel will be constructed between Sub-basin E and Paul Lake, the Lake E1 Diversion Outlet Channel.~~

~~The general concept of lake drawdown would include pumping to establish an initial drawdown which would provide access to the Jay and Cardinal Pipe areas and allow for construction of local water management infrastructure. During the mine operation period, lake drawdown would be maintained with pumping. During operations is has been assumed that the lake drawdown elevation will fluctuate to allow for some attenuation of spring freshet inflows and as part of turbidity management. During the initial drawdown, all pumped lake water would be discharged into Lac de Gras, either directly if meeting required water quality or through a sediment pond if water quality treatment is required.~~

~~Review of the drawdown criterion, the proposed Jay and Cardinal open pits, and the 2013 bathymetry data indicates that the following stages of lake drawdown are required for the project development.~~

- ~~Initial Lake Drawdown: Pumping to drawdown Lac du Sauvage to EL 406 m (10 m drawdown assuming lake surface at EL 416 m) and expose the lakebed surrounding the Jay and Cardinal Pipes. The initial drawdown is planned to be completed over one year. The total volume includes existing base volume in Lac du Sauvage (between EL 416 m and EL 406 m) plus the volume of annual watershed inflows reporting to the lake during the one-year initial drawdown period. An access road will be advanced towards the proposed pit areas to allow for construction of local water management infrastructure.~~

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- ~~Pit Area Dewatering: Following initial drawdown and development of local water management infrastructure, local pumping at the kimberlite pipes will be required to further drawdown water from EL 406 m down to approximately EL 381 m at the Jay Pipe, and to approximately EL 398 m at Cardinal Pipe. This is required to expose the local areas for open pit development.~~
- ~~Maintain Lake Drawdown: During mining operations, pumping continues to transfer annual inflows reporting to the drawn-down lake to maintain an operating range between about El 406 and 407 m.~~

~~4.3.4.1 Lake Drawdown for Jay Pipe Development~~

~~During initial lake drawdown of Lac du Sauvage, a platform to the east of the Jay Pipe will become exposed at about EL 410 m. Drawdown of the lake to EL 406 m will isolate Jay Pipe area from the surrounding west arm sub-basins. Two rockfill causeways to Jay Pit will be constructed from the west shore. Sections of these causeways will be lined with till on one side to create sumps within the lake drawdown area which will intercept flows towards the pit area.~~

~~4.3.4.2 Lake Drawdown for Cardinal Pipe Development~~

~~Most area around the Cardinal pipe will be exposed during the initial lake drawdown to EL 406 m. A rockfill causeway will be advanced from Dike JP4 towards the Cardinal pipe area. Around the Cardinal pipe, two rockfill berms will be advanced to isolate the pipe from other residual ponds. Both berms will require placing compacted till for seepage reduction. With the lake drawdown maintained between El 406 and 407 m, local pumping will be required from the sumps north of Cardinal Pit and below Dike JP4 North.~~

4.6.2.1 Alternative 3 Dike Alignment

- A horseshoe-shaped dike will be constructed to isolate the portion of Lac du Sauvage overlying the Jay kimberlite pipe, to allow for dewatering and open-pit mining of the kimberlite pipe.

4.6.2.2 Channel

- Sub-basin B Diversion Channel will be constructed to divert inflow from Sub-basin B a small drainage area to the west of Lac du Sauvage. Surface runoff will be intercepted as it drains towards the dewatered area and diverted to the south of the Project site into the main basin of Lac du Sauvage. Fisheries requirements will be evaluated during detailed design. The channel is anticipated to be approximately 1.3 km long with a base width and depth of 1 m.

4.6.2.3 Sumps

- The Jay sump will be located in a natural depression within the dewatered area to the west of the Jay Pit. Surface runoff draining towards the dewatered area will be collected in this sump.
- The mine inflow sump will be located in a natural depression near the crest of the Jay Pit. Mine inflow (groundwater inflows to the pit and direct precipitation) will be pumped to this sump.

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4.6.2.4 Dewatering for Jay Pipe Development

Prior to starting the drawdown of water levels within the isolated portion of Lac du Sauvage, the Sub-basin B Diversion Channel will be constructed to minimize the amount of surface runoff to be managed.

The dewatering will occur in two stages:

- Between water elevation of 416 masl and 411 masl – TSS concentrations are expected to be acceptable for direct discharge to the environment. Water will be pumped from the dewatered area over the dike using the three pumping systems described in Section 4.7.1.3.
- Between water elevation 411 masl and 321 masl TSS management is expected to be required prior to discharge to the environment. Water will be pumped to the Lynx Pit or the Misery Pit for settling of solids using the three pumping systems described in Section 4.6.1.6.

Rockfill ramps will be required in select locations along the dewatering pipeline alignment to provide access to the low spots within the isolated portion of Lac du Sauvage. The ramps will provide access to pump barges and serve as benches for the dewatering pipelines. The pump barges will be required in the deeper portions of the dewatered area. The ramps will extend from the dike to the barge locations. The typical dewatering ramp in cross-section will consist of a crest width of 25 m, which will allow for one-way haul traffic for 777 haul trucks.

4.6.3 Open Pit-Mining

DDEC will work with DFO and Aboriginal communities to develop a fish-out plan for the dewatered~~rawdown~~ area within Lac du Sauvage. Once fish salvage and dewatering~~rawdown~~ has been completed and the pit can be accessed by heavy equipment, the first step in open-pit mining is to remove the overburden material including lake sediments and glacial till that lie within the designed pit perimeter. This will be completed through the use of explosives (if necessary) and standard truck and shovel techniques. As per the established practice at the Ekati Mine, lake bottom sediments will be separated from glacial till and waste rock to the extent practical and stockpiled for possible future use.

Mining of the Jay kimberlite pipe will proceed as an open pit development similar to all of the open pits at the Ekati Mine. The open pits are mined using conventional truck-shovel operations and are developed in benches that are typically 10 to 15 m high. Design pit slopes vary and are established based on detailed geotechnical and hydrogeological studies and operational requirements for each pipe.

Production blast holes are 270 mm diameter and drilled on a 6.5 m by 7.5 m equilateral pattern with 10 to 15 m bench heights. Wall control blasting practices, including pre-shear firing on the perimeter of the pit excavation, are used to enhance final high wall stability. Wall control procedures on the final pit walls includes drilling 165 mm presplit blast holes on a 2.0 m spacing on the pit perimeter followed by a row of

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270 mm wall control blast holes on a 3.0 m burden and 4.0 m spacing. A second row of 270 mm wall control blast holes are placed at a 5.0 m by 5.0 m spacing before switching to the standard production pattern. Further, double or triple benching is used for the final pit walls when in granite. Ongoing high wall stability monitoring is routinely conducted and re-design and/or risk mitigation work is performed as needed.

A single circular access ramp around the perimeter of the pit is developed progressively as the benches are mined. Waste rock is hauled to a WRSA. Kimberlite is either hauled directly from the pit benches to the process plant or, as is done at the Misery Pit and will be the case for the Jay open pit, temporarily stored on a kimberlite storage pad prior to being taken to the process plant in long-haul trucks.

The Jay ~~and Cardinal p~~Pit~~s~~ will follow a similar open-pit mining method as used at the Misery site. Pit development is anticipated to proceed to a depth of approximately 370 m below grade~~ for the Jay Pit and 160 m for the Cardinal Pit~~. The anticipated pit dimensions are shown in Figure 4.5-1 and Figure 4.5-2~~ for the Jay Pit and Figure 4.5-3 and Figure 4.5-4 for the Cardinal Pit~~.

4.6.4 Underground Mining

The Jay~~ and Cardinal~~ pipe~~s~~ has the potential to be mined with underground methods below the proposed open pit. However, there is limited geological information in terms of diamond grade, pipe size and shape, and rock strength below the proposed pit bottom~~s for both pipes~~. For this reason, a number of assumptions are made based on experience from other similar kimberlite pipes at Ekati and Diavik mines. The conceptual design of the Jay~~ and Cardinal~~ underground mine~~s~~ is~~are~~ largely based on these assumptions.

4.6.5 Mining Method

~~Both ~~The Jay pipe~~s~~ appear to be roughly circular in plan. The upper part of the Jay pipe is carrot shaped in cross section with a moderate reduction of the pipe area down to the bottom of the pit. It is assumed that this carrot shape, typical of many kimberlite pipes, continues at depth. It is assumed the pipe has near vertical pipe walls to a considerable depth.~~ The shape and size of the Cardinal pipe is not well defined. It assumed the pipe has a near vertical pipe wall to a considerable depth. The Jay pipe is much larger than the Cardinal pipe.~~ The diameter of the Jay pipe at the proposed open pit bottom is about 200 m and the diameter 200 m below the ultimate pit bottom is estimated at approximately 160 m.~~ The Cardinal pipe diameter at the bottom of the proposed pit is assumed to be approximately 60 m and the diameter 150 m below the proposed pit is assumed to be approximately about 50 m.~~

Indications are that the rock strength is good to very good for waste rock surrounding the pipe and poor to very poor for the kimberlite. The host rocks for the Jay pipe consist predominantly of granites and metasediments, though minor diabase dikes also occur.~~ The Cardinal pipe is entirely enclosed by granite.~~ Based on experience from other pipes in the region, it is reasonable to assume that the kimberlite strength increases with depth. RVK forms the upper parts of the two pipes and typically is less dense and has lower strength than the VK found deeper in the pipes. The underground mine will most likely be entirely located in VK.

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This combination of high wall rock strength, low kimberlite strength and steeply dipping sides makes block caving an attractive mining method. Experience from the Koala underground workings indicates that the freshet period (i.e., increased water movement into the kimberlite due to spring thaw) can cause the extracted ore to be very wet to the point that transportation to surface with a long inclined conveyor belt, as is done at Koala, becomes difficult. For this reason, all conveyor belts are conceptualized as being installed flat in the Jay underground workings, with vertical hoisting of the cave material to surface.

Wet ore in the draw points also has the potential to cause mud rushes and mud pushes. In the Koala workings, mitigating efforts in terms of diverting as much surface run off water from entering the pit and the underground workings below are used. For the Project, these mitigating efforts will be implemented before underground mining begins.

Block caving requires a certain size of the ore body (hydraulic radius) to be successful. The size has to be large enough for the rock to cave. The proposed underground Jay workings most certainly are large enough to cave at the extraction level pipe diameter of 160 m and the slightly larger undercut level.

The schematic Figures 4.6-3, and 4.6-4 illustrate the mining method as applied to the Jay kimberlite pipe.

4.6.6 Construction and Development

~~The Cardinal Pit is significantly smaller than the Jay Pit and consequently will be finished earlier.~~ The block caving method allows development but limited production before the pits have to be abandoned. The pit floor will be used to drill near vertical holes for instrumentation to control the draw. ~~In the case of Cardinal, vertical drill holes will also be required to assist the cave front.~~

Main ramps will be collared and driven down to the extraction level, 200 m below the pit floor at Jay. The slopes of the main ramps will be 1:7. Safety bays to allow safe passage for personnel on foot meeting rolling equipment, muck bays, and temporary sumps will be developed along the ramp. Ventilation raises will be developed in stages as the ramps advance and will be used to supply fresh air during development, and later on during production. A short distance before the ramp reaches the extraction level an uphill ramp will connect to the undercut level.

In the Jay workings, an underground crusher station will be excavated and connected via a flat conveyor drift to a hoisting shaft drilled from surface.

Undercut drifts and haulage drifts will be developed simultaneously. The undercut, draw point, and draw bells will be sequenced so that the undercut is developed slightly ahead of the draw points and draw bells. The Jay development will have approximately 90 draw points.

Underground workshops, refuge stations, explosive magazines, sumps, and pump stations will complete the underground development.

The extraction level will be surfaced with high strength concrete and mucking will be with remote controlled scoop trams.

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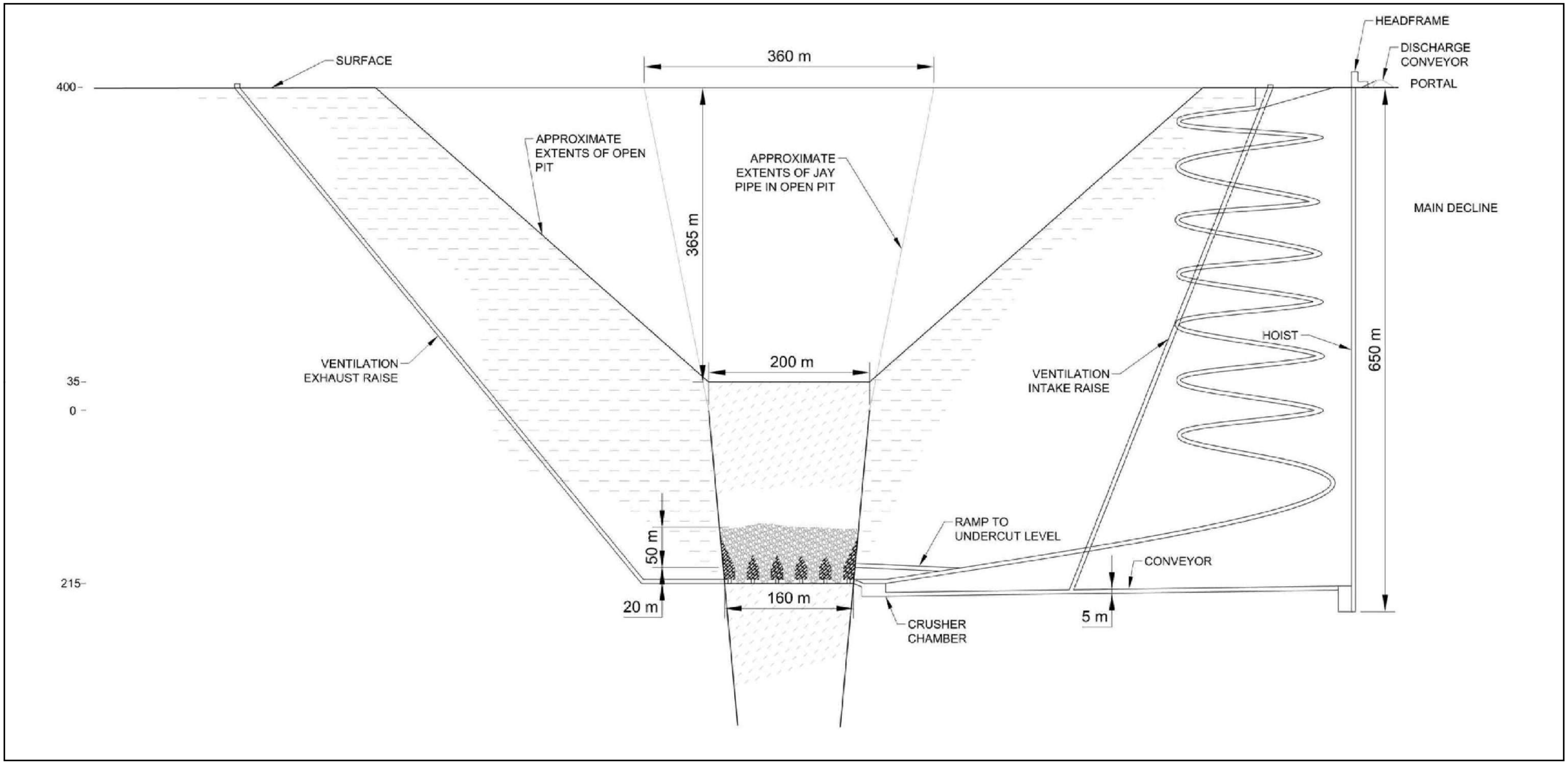
G:\CLIENTS\DOMINION\DDEC Jay and Lynx Projects\Figures\13-1328-0031 Diversion Study\2130 - EIR Process\Jay-Cardinal Project Description\mxd\Update June 2014\Fig4.6-3_Jay_UG_Schematic_Cross-Section.mxd



PROJECT

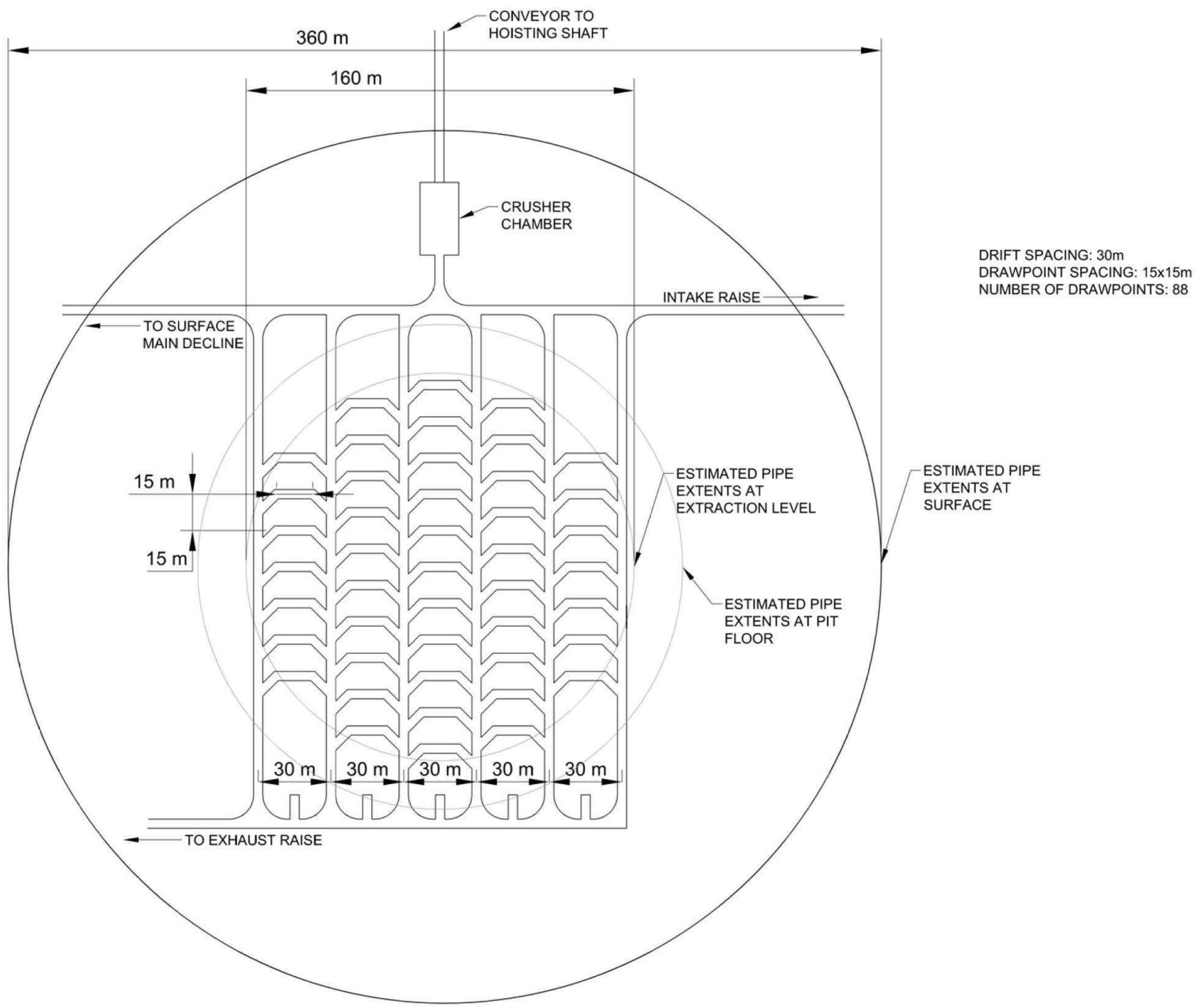
JAY PROJECT
LAC DU SAUVAGE,
NORTHWEST TERRITORIES, CANADA

TITLE

JAY UNDERGROUND SCHEMATIC CROSS-SECTION

DOMINION DIAMOND

PROJECT		13-1328-0031	FILE No.	
DESIGN	WD	08/10/13	SCALE AS SHOWN	REV. 0
GIS	ANK	12/06/14		
CHECK	AL	12/06/14	FIGURE: 4.6-3	
REVIEW	ED	12/06/14		



G:\CLIENTS\DOMINION\DDEC Jay and Lynx Projects\Figures\13-1328-0031 Diversion Study\2130 - EIR Process\Jay-Cardinal Project Description\mxd\Update June 2014\Fig4.6-4_Jay_UG_Schematic_Extraction_Level.mxd

PROJECT

JAY PROJECT
LAC DU SAUVAGE,
NORTHWEST TERRITORIES, CANADA

TITLE

JAY UNDERGROUND
SCHEMATIC EXTRACTION LEVEL

DOMINION DIAMOND

PROJECT		13-1328-0031	FILE No.
DESIGN	WD	08/10/13	SCALE AS SHOWN REV 0
GIS	ANK	12/06/14	**FIGURE: 4.6-4**
CHECK	AL	12/06/14	
REVIEW	ED	12/06/14	

Surface installations at the mine will include a head frame with load out facility, substations, a large dry, exhaust fans, and fresh air fans with oil fired air heating. Parking and laydown areas will be constructed at ~~both locations~~ the Project site.

The total time for construction and development for the Jay underground workings is estimated at 4.5. Most of this development can be done simultaneously with operations in the pits.

All underground development will be with drill and blast methods. Weaker parts of excavations will be reinforced with roof bolts, mesh, shotcrete and possibly spilling. The development waste and ore will initially be transported with underground trucks to surface and deposited on temporary pads. Surface trucks continue the transport of waste to designated waste rock storage areas. Ore will be transported to the Ekati Mine process plant.

Underground drilling will be with electro-hydraulic drill rigs, loading of holes with mechanized loaders, blasting with centralized computerized systems, loading with diesel powered loaders, and hauling to surface with diesel powered trucks. Mechanized roof bolters will be used to install roof bolts and screens, mechanized shotcrete equipment will be used for shotcrete placement. The service vehicles will include scissor lift, fuel and lube trucks, flat beds, surface and underground personnel carriers, and ambulances. This is standard underground mining equipment that has been used at the Ekati Mine and other Northern mines.

At later stages of the development at Jay, once the hoisting shaft is in operation, ore and waste will be hoisted to surface rather than trucked.

The work crews will be housed at Misery camp and a bus service will be established from Misery to the dry~~ies~~ at the Jay site~~and Cardinal~~.

There will be mine rescue teams at ~~both~~the Project site~~ Jay and Cardinal~~ and thi~~es~~e team will train regularly and participate in mine rescue competitions.

During the development phase, underground mining at Jay is anticipated to produce approximately 400,000 tonnes of kimberlite and 280,000 tonnes of waste. ~~Underground mining at Cardinal will produce approximately 40,000 tonnes of kimberlite and 200,000 tonnes of waste.~~

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4.6.7 Production

Production will commence once the underground mines are commissioned. The equipment will be similar to that used for the development. ~~In addition, at the Cardinal site a surface long hole drill will be used to drill the vertical crater retreat holes.~~ Once production starts in a block cave mine very little waste is produced. At the Jay site only secondary blasting will be performed. ~~There will be primary vertical crater retreat blasting along with secondary blasting at the Cardinal site.~~

The production period for the Jay underground workings will be 6 years with a maximum production of 3.3 million tonnes of diamond-bearing kimberlite for processing per year for a total of 14.4 million tonnes. ~~Based on current estimates, the Cardinal underground workings will produce a total of 0.7 million tonnes of diamond-bearing kimberlite for processing over a period of approximately a year and a half.~~

4.6.8 Dewatering and Minewater Management

~~During the initial stages of Lac du Sauvage water level drawdown, clean water will be pumped to Duchess Lake, Lac de Gras, or the south area of Lac du Sauvage. Operating experience at the Ekati Mine suggests that TSS concentrations in the pumped water may increase beyond accepted levels during the final stages of drawdown. This risk may be lower for Lac du Sauvage drawdown than for the previous programs of complete lake dewatering. Nonetheless, sediment levels will be monitored and, if necessary, the late stages of drawdown will be pumped exclusively through the North Arm Water Management Area for settlement of solids.~~

~~The estimated volume of water to be pumped from Lac du Sauvage is 305,000,000 m^3 during the initial drawdown, then 38,000,000 m^3 each year during operations. Respectively, the average daily volume of water to be discharged in relation to the Project is anticipated to be 835,616 m^3 and 54,800 m^3. A drawdown plan will be prepared specifically for Lac du Sauvage and will be submitted to the WLWB. The freshwater intake pumps will operate in accordance with standards developed in consultation with DFO.~~

~~Minewater pipelines will be constructed from the open pits to local sediment ponds contained within the drawn-down lake and then on to the North Arm Water Management Area. The pipeline would be operated year round. The pipelines will also be used in the future for pumping underground minewater.~~

~~A preliminary water balance for the Jay and Cardinal controlled area during operation is shown in Table 4.6-1 for mean annual conditions. The controlled area is defined as the drawn-down area of Lac du Sauvage and surrounding land areas draining to that area, within which runoff is managed.~~

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~~Table 4.6-1 Preliminary Monthly Water Balance for Jay-Cardinal Project Controlled Area (Mean Annual Conditions)~~

Month	Inflows (m^3)							Outflows (m^3)		
	GW Inflow[a]		Dike Seepage		Precipitation		Total Inflows	EVAP	Pumping[b]	Total Outflows
	Jay	Cardinal	JP1	JP4	Direct	Runoff				
January	223,200	120,900	84,932	365,205	140,831	0	935,068	0	935,068	935,068
February	201,600	109,200	76,712	329,863	146,849	0	864,225	0	864,225	864,225
March	223,200	120,900	84,932	365,205	196,200	0	990,437	0	990,437	990,437
April	216,000	117,000	82,192	353,425	230,426	58,295	1,057,337	0	1,057,337	1,057,337
May	223,200	120,900	84,932	365,205	377,116	10,605,402	11,776,755	0	11,776,755	11,776,755
June	216,000	117,000	82,192	353,425	690,619	2,127,213	3,586,448	1,294,527	2,291,921	3,586,448
July	223,200	120,900	84,932	365,205	1,016,522	3,131,044	4,941,803	2,452,788	2,489,015	4,941,803
August	223,200	120,900	84,932	365,205	1,280,401	3,943,833	6,018,471	1,612,481	4,405,990	6,018,471
September	216,000	117,000	82,192	353,425	856,205	2,637,243	4,262,064	794,885	3,467,179	4,262,064
October	223,200	120,900	84,932	365,205	519,264	160,893	1,474,394	0	1,474,394	1,474,394
November	216,000	117,000	82,192	353,425	311,754	0	1,080,370	0	1,080,370	1,080,370
December	223,200	120,900	84,932	365,205	207,033	0	1,001,270	0	1,001,270	1,001,270
Annual							37,988,642			37,988,642

~~Groundwater inflow values are based on preliminary estimates of 7,200 m^3/d for Jay Pit and 3,900 m^3/d for Cardinal Pit. The water balance assumes that the quality of groundwater inflow to the pits will be acceptable for release to local settling ponds or the remnant waters of Lac du Sauvage. If groundwater is not acceptable, it will be managed as a separate stream.~~

~~These values differ from those in the lake drawdown alternatives report because they consider additional contributing areas, including pit inflows and dike seepage.~~

~~GW = Groundwater; EVAP = Evaporation; m^3 = cubic metres~~

~~The North Arm Water Management Area acts as a sedimentation cell; residence time in the facility improves the water quality, which will be released into the receiving environment (Lake E1 into Paul Lake and then into Lac de Gras) once it meets discharge limits specified in the Water Licence.~~

~~In summary, the drawdown and minewater management plan consists of the following:~~

~~Drawdown water clear of sediment will be pumped to the natural environment (Duchess Lake, Lac du Sauvage, and/or Lac de Gras);~~

~~Late stages of drawdown water, if containing elevated sediment, will be pumped to the North Arm Water Management Area for settlement of sediment prior to discharge;~~

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~~Annual pumping from the drawn-down lake area will be pumped to the natural environment (Duchess Lake, Lac du Sauvage) if clear of sediment and compliant with the Water Licence;~~

~~Annual pumping from the drawn-down lake area, if not compliant with the Water Licence, will be pumped to the North Arm Water Management Area for settlement prior to discharge;~~

~~Minewater from the Jay and Cardinal open pits and underground workings will be pumped to local sediment ponds contained within the drawn-down lake and then on to the North Arm Water Management Area for settlement prior to discharge;~~

~~Water Licence Effluent Discharge Criteria would be derived on a site-specific basis using the site-specific water quality objectives, as applicable, that are already available for the Ekati Mine;~~

~~During mine operations, Points of Compliance under the Water Licence would be:~~

~~discharge from the North Arm Water Management Area to Lac de Gras via Paul Lake and Lake E1 and,~~

~~water pumped from pumping station PS1 to Lac du Sauvage at Dike JP4.~~

~~Minewater management during operations will follow an adaptive management approach, as is the established practice at the Ekati Mine. The Ekati Mine Water Licence requires that a documented Aquatic Response Framework be provided to the WLWB in February 2014. The WLWB-approved Response Framework will be expanded in the future to include the Jay-Cardinal Project. The expanded Response Framework will outline possible response actions for water quality upsets related to the Jay-Cardinal Project. One of the possible response options would be a minewater treatment facility located at the North Arm Water Management Area. Such a facility could be designed to remove sediment or metals and ions from minewater, as necessary, to meet discharge criteria. The potential need for a minewater treatment facility will be assessed during future stages of project design and review, in conjunction with the on-going refinement of anticipated minewater volumes and characteristics. Together the Response Framework and the existing Ekati Mine AEMP will be expanded to incorporate the Jay-Cardinal Project.~~

The dewatering and mine water management plan as described in Section 4.5.2 consists of the following:

- Drawdown water, clear of sediment, will be pumped to the natural environment (main basin of Lac du Sauvage);
- During late stages of dewatering, water containing elevated sediment will be pumped to the Lynx Pit to accomplish Lynx Pit reclamation or to Misery Pit where the water will clarify;
- Mine water from the Jay open pit and underground workings will be pumped to the bottom of the Misery Pit for management prior to discharge; and,
- Annual surface runoff reporting to the dewatered area will be pumped to the top of Misery Pit and from there to the receiving environment (i.e., the main basin of Lac du Sauvage) if clear of sediment and compliant with the discharge criteria in the Water Licence.

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During the initial stages of dewatering within the isolated portion of Lac du Sauvage, clean water will be pumped to the main basin of Lac du Sauvage. Operating experience at the Ekati Mine suggests that TSS concentrations in the pumped water may increase beyond accepted levels during the final stages of dewatering. Sediment levels will be monitored and, if necessary, during the late stages of dewatering water will be pumped to the Lynx Pit as part of the reclamation plan. If the required storage requirements exceed the capacity of the Lynx Pit, the remaining high TSS water will be pumped to the Misery Pit for settlement of solids.

The estimated volume of water to be pumped from the dewatered portion of Lac du Sauvage is 29.6 M m^3 during the initial dewatering, then an average annual volume of 9.75 M m^3 during operations. The average daily volume of water to be pumped in relation to the Project is anticipated to be156,000 m^3 during dewatering and 26,703 m^3 during operations. A dewatering plan will be prepared specifically for Lac du Sauvage and will be submitted to the WLWB. The freshwater intake pumps will operate in accordance with standards developed in consultation with DFO.

Minewater pipelines will be constructed from the open pit, underground facility, and local sumps to the Misery Pit. The pipelines would be operated year round and used in dewatering, operations, and closure.

A preliminary summary of the annual discharge volumes during operational phase or the Jay controlled area is shown in Table 4.7-1, the data provided is for mean annual climatic conditions. The controlled area is defined as the dewatered area of Lac du Sauvage and surrounding land areas draining to that area, it is the area within which runoff is managed.

Table 4.7-1 Preliminary Annual Discharge Volumes during Operations for the Jay Project Controlled Area

Year[(a)]	Mine Inflows to Misery Pit and Underground (M m^3)[b]	Jay Sump to Misery Pit (M m^3)	Misery Pit to Receiving Environment (M m^3)
1[(c)]	0.96	3.88	0.00
2	3.13	3.09	0.00
3	3.96	1.73	0.00
4	4.43	1.79	0.00
5	5.09	1.79	0.00
6	5.98	1.79	1.94
7	6.55	1.79	8.43
8	6.77	1.79	8.65
9	7.13	1.79	9.01
10	7.52	1.79	9.40
11	8.82	1.79	10.70
12	10.43	1.79	12.30

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Year(a)	Mine Inflows to Misery Pit and Underground (M m³)b	Jay Sump to Misery Pit (M m³)	Misery Pit to Receiving Environment (M m³)
13	11.48	1.79	13.36
14	12.72	1.79	14.60
15	12.32	1.79	14.19
16	12.43	1.79	14.31
17	12.21	1.79	14.08

Notes:

a) On a calendar year basis

b) Groundwater inflow values are based on preliminary estimates throughout mine life. Mine operations commence in Year 2; underground operations commence in Year 12.

c) Partial Year (October 1, 2019 to Dec 31, 2019)

M m^3 = million cubic metres

Water Licence Effluent Discharge Criteria for the Jay Project would be derived on a site-specific basis using the site-specific water quality objectives, as applicable, that are already available for the Ekati Mine. During mine operations, Points of Compliance under the Water Licence would be:

- water pumped from pumping station PS1, PS2, and PS3 to Lac du Sauvage during the initial phase of dewatering; and,
- discharge from the Misery Pit to Lac du Sauvage or Lac de Gras (PS1) during operations once the storage capacity of the Misery Pit is exceeded (currently estimated to be in year 6 of the mine life).

Minewater management during operations will follow an adaptive management approach, as is the established practice at the Ekati Mine and recently documented in the Ekati Mine Aquatic Response Framework as approved by the WLWB. The Response Framework will be expanded in the future to include the Jay Project. The expanded Response Framework will outline possible response actions for water quality upsets related to the Jay Project. One of the possible response options would be a minewater treatment facility located at the Misery Pit. To meet discharge criteria, such a facility could be designed to remove sediment, nutrients, metals and/or ions from minewater, as necessary. Site-specific information collected during the first 6 years of operations will provide data to evaluate the need for and naturel of a possible water treatment facility.

4.6.9 Waste Rock Storage Area

Waste rock and overburden excavated from the Jay ~~and Cardinal~~ pit~~s~~ will be stored at the Jay WRSA located on the shore of Lac Du Sauvage along with waste generated during dike construction. The existing Ekati Mine Waste Rock and Ore Storage Management Plan, including seepage monitoring, will be expanded in the future to incorporate the Jay ~~and Cardinal~~ WRSA~~s~~. ~~The final heights of the WRSAs is~~

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~~planned to not be greater than 50 m above the underlying ground, which is consistent with established practices at the Ekati Mine.~~

The Jay WRSA will be located west of the Jay Pit on the shore of Lac du Sauvage. The Jay WRSA has been designed to accommodate a volume of 113 M m^3, covering an area of 292 ha. Waste rock from the Jay Pit and underground workings will be mainly granite with some metasediments and overburden. Granite has been demonstrated, and accepted, over the past 15 years of operation at the Ekati Mine, as non-acid generating and non-metal leaching. At this time, the Jay metasediment is assumed to have the same geochemical classification as the metasediments at the Misery site, namely potentially acid generating. Metasediment will be managed at the Jay WRSA with the same objectives as the Misery WRSA, that the metasediment is frozen into permafrost beneath an encapsulating cover of 5 m thick granite. The proportions of granite versus metasediment to be mined from the Jay Pit provide ample granite for this cover layer.

~~The Cardinal WRSA will be built on the shore of Lac du Sauvage adjacent to the Cardinal access road. The Cardinal WRSA has been designed to accommodate a volume of 11 Mm³, covering an area of 37 ha. Waste rock from the Cardinal Pit and underground workings is entirely granite.~~

4.6.10 Processed Kimberlite Tailing Deposition

Processing of the Jay ~~and Cardinal~~ kimberlite is expected to generate approximately 60 Mt of ~~FPK~~processed kimberlite. The Panda and Koala open pits are the primary deposition locations for processed kimberlite resulting from the Project. The use of mined-out open pits for processed kimberlite deposition has been generally acknowledged as a preferred approach dating back to the original Environmental Assessment in 1996. The concept has been demonstrated viable and beneficial through the current use of the mined-out Beartooth Pit for this purpose. Cell D of the LLCF will also be used as a contingency or emergency deposition location for FPK. The Ekati Mine Wastewater and Processed Kimberlite Management Plan, which already anticipates the use of Panda and Koala open pits for FPK deposition, will be updated to incorporate the Project.

4.6.11 Closure and Reclamation

The Ekati Mine is required under its Water Licence and Environmental Agreement to have a closure plan. Version 2.4 of the Ekati Mine Interim Closure and Reclamation Plan (ICRP) was approved by the WLWB in November 2011 (BHP 2011). An annual reclamation update report is provided to the WLWB.

The ICRP describes the Ekati Mine reclamation goal, reclamation objectives, reclamation methods, and required reclamation research that encompass the entire Ekati Mine and all reclamation requirements. The reclamation goal is to return the Ekati Mine site to viable, and wherever practicable, self-sustaining ecosystems that are compatible with a healthy environment, human activities, and the surrounding environment.

Reclamation activities are described in the ICRP according to the following six categories:

- open pits;

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- underground workings;
- waste rock storage areas;
- processed kimberlite containment areas (surface impoundments and mined-out open pits);
- dikes, and channels; and,
- buildings and infrastructure.

The Jay~~-Cardinal~~ Project introduces some necessary changes to the Ekati Mine ICRP, primarily new reclamation activities at Lac du Sauvage and a new pit flooding approach for the Misery, Panda and Koala open pits. The ICRP and the resulting reclamation security will be readily amended to address the Project.

The approach to reclamation of the primary components of the Jay~~-Cardianl~~ Project, and the conceptual changes to the Ekati ICRP resulting from the Project are described below. Dominion views the development of specific closure plans related to the Project as a progressive process that will evolve in detail and specificity throughout the Environmental Assessment and Regulatory Permitting processes.

4.6.11.1 Approach

The approach to reclamation of the Jay~~-Cardinal~~ Project components at Lac du Sauvage that achieves the established Ekati Mine reclamation goal is as follows:

- The affected open pits (Misery, Panda/Koala) are reclaimed as pit lakes with overflow water that is safe for the environment~~natural lake water levels are re-established~~;
- natural flow paths are re-established as practical (i.e., diversions are removed);
- fish can use the affected area of Lac du Sauvage~~local fish are able to naturally re-enter Lac du Sauvage~~; and,
- residual portions of in-lake dike are environmentally neutral or have positive effects.

Other components of the Project such as WRSA~~s~~, roads~~,~~ pads and other infrastructure will be reclaimed according to the methods described in the Ekati Mine ICRP.

4.6.11.2 Open Pit

The Jay open pit will be reclaimed according to the methods described in the Ekati Mine ICRP.
Reclamation of the Jay~~ and Cardinal~~ open pit~~s~~ will involve removal of buoyant or hazardous materials, and submergence beneath Lac du Sauvage. ~~In each case, r~~Removal of equipment from the open pit can begin upon completion of open-pit mining activities, and flooding with water can begin upon completion of underground mining activities. It would not be possible to introduce water into the open pits while underground mining is taking place in the lower areas of that kimberlite pipe.

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At the completion of Jay pipe mining, a portion of the minewater contained within the Misery Pit may be pumped to the bottom of the Jay Pit (and to underground workings) and subsequently covered with freshwater from Lac du Sauvage. The shape and location of the Jay~~ and Cardinal~~ open pit~~s~~ as a very deep hole~~s~~ in the bottom of a much larger and generally shallow lake creates the likelihood of long-term meromixis within the submerged open pit. That is, an area of ionically dense water is likely to form in the deeper parts of the open pit that does not mix with the overlying lake water. The primary cause of this occurrence is likely to be the presence of sub-permafrost connate (ancient) groundwater in the open pit. Connate groundwater contains elevated concentrations of dense ions such as chloride that form a density gradient resulting in meromixis. The absence of other key drivers of seasonal lake mixing such as penetrating wave turbulence and sunlight would also favour the formation of meromixis. Because meromixis would result in this denser water remaining within the submerged open pit, this water would be prevented from having a negative influence on water quality in overlying Lac du Sauvage.

4.6.11.3 Underground Workings

The Jay ~~and Cardinal~~ underground workings will be reclaimed according to the methods described in the Ekati Mine ICRP. Reclamation will focus on removal of buoyant and hazardous materials, and sealing of openings to surface. This work can begin upon the completion of underground mining activities (either wholly or in completed areas of the workings), and will be completed prior to general filling of the workings and open pit~~s~~ with water.

4.6.11.4 Waste Rock Storage Areas

The Jay ~~and Cardinal~~ WRSA~~s~~ will be reclaimed according to the methods described in the Ekati Mine ICRP. Reclamation will focus on providing a thermally protective surface cover over potentially acid generating materials (i.e., metasediment rock), providing a relatively flat upper surface that discourages snow accumulation, and providing for wildlife safety through caribou emergency egress ramps.

~~For the Cardinal WRSA, the placed rock will be entirely granite. For the Jay WRSA, t~~The proportion of granite waste rock (approximately 75%) is more than sufficient to provide for a minimum 5 m thick cover of granite, which will maintain permafrost within the underlying metasediment rock.

4.6.11.5 Processed Kimberlite Containment Areas

The Panda and Koala open pits are the primary deposition locations for processed kimberlite resulting from the Project. As described in Section 4.3.4, the use of mined-out open pits for processed kimberlite deposition has been generally acknowledged as a preferred approach dating back to the original Environmental Assessment in 1996. The concept has been demonstrated viable and beneficial through the current use of the mined-out Beartooth Pit for this purpose. The Panda and Koala open pits will be available for processed kimberlite deposition when Jay kimberlite is processed because mining activities will have been completed in the Panda/Koala underground workings.

The design constraint for in-pit deposition of processed kimberlite will remain at a maximum elevation of 30 m below the final pit lake overflow elevation. This design constraint is taken from the initial discussions of the concept in the 1996 Environmental Assessment. During permitting by the WLWB of processed

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kimberlite deposition into the mined-out Beartooth Pit in 2012, the Ekati Mine's technical consultant (Robertson Geoconsultants) considered 30 m to possibly be unnecessarily overly-conservative. Therefore, DDEC could conduct additional technical studies in future to optimize a site-specific depth of water required over fine processed kimberlite for closure and reclamation.

Reclamation of the Panda and Koala open pits would proceed by pumping freshwater into the pits as a 'cap' overlying the processed kimberlite. This pumping scenario is an improvement over the current Ekati Mine ICRP because substantively less freshwater is required (i.e., approximately 19 M m^3 versus the current approximately 80 M m^3), which reduces requirements from the source lakes. Other aspects of reclamation of the Panda and Koala open pits would proceed as described in the Ekati Mine ICRP.

Cell D of the LLCF will serve as a contingency deposition location for processed kimberlite from the Project. This is an essential back-up measure that prevents mine shutdown in the event of line blockage or breakage between the process plant and the primary deposition locations, Panda and Koala open pits. This approach is consistent with the WLWB-approved Ekati Mine Wastewater and Processed Kimberlite Management Plan in that this approach continues to preferentially defer or, if practical, avoid processed kimberlite deposition into Cell D. Any residual processed kimberlite beaches in Cell D would be relatively small in extent and would be reclaimed according to the methods described in the Ekati Mine ICRP.

4.6.11.6 Dike and Channel

~~The three in-lake dikes at Lac du Sauvage (e.g., JP1/North Arm, JP2/Duchess Lake, and JP4/Lac du Sauvage) will be strategically breached. Considerations for the breaches are as follows:~~

~~The water level on the upstream sides of the dikes cannot effectively be drawn-down to enable the breaching work to be completed 'in-the-dry'. Therefore, water levels will be approximately equalized on both sides by breaching Dike JP2 prior to breaching the remaining dikes after completion of the surface and underground mining of the Jay Pipe. A water flow control structure will be placed in the Dike JP2 breached area to control the flow of water into the main body of Lac du Sauvage where required. By breaching Dike JP2, the source area for freshwater will be the watershed of Duchess Lake. This is a standard engineering approach for this nature of work.~~

~~Dike JP2 will be breached to the original channel elevation. The excavated material (blasted granite rock) from the dikes will be locally placed in a safe manner that is consistent with the current Ekati Mine ICRP.~~

~~Based on current information, it will take about three years for the drawn-down Lac du Sauvage area to flood back to the current lake water levels (416 masl) after completion of mining the Jay and Cardinal kimberlite pipes.~~

~~During excavation of the breaches, silt curtains or other sediment/turbidity mitigation measures will be utilized to reduce risks to water quality where necessary.~~

~~Dikes JP1 (North Arm) and JP4 (Lac du Sauvage) will be breached at one or more locations to approximately 5 m below the minimum water level at Lac du Sauvage. A schematic sketch of the~~

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~~breaching concept is provided in Figure 4.6-6. Excavated materials (crushed granite rock) will be locally placed to extend shallower areas on the residual sides of the dikes and breaches.~~

~~Rip-rap rock or other appropriate erosion mitigation measures will be installed as necessary to provide for long-term physical stability of the dike breach slopes.~~

After the water quality within the dike (i.e., within the re-flooded dewatered area) has been demonstrated to be suitable for direct release without further management, the in-lake dike will be strategically breached in local areas. Considerations for the breaches are as follows:

- The water level on the upstream sides of the dike cannot effectively be dewatered to enable the breaching work to be completed 'in-the-dry'. Therefore, water levels will be approximately equalized on both sides by re-flooding the dewatered area in a controlled manner prior to dike breaching. This is a standard engineering approach for this nature of work.
- During excavation of the breaches, silt curtains or other sediment/turbidity mitigation measures will be utilized to reduce risks to water quality, where necessary.
- The horseshoe dike will be breached at approximately four locations to approximately 5 m below the minimum water level at Lac du Sauvage. A schematic sketch of the breaching concept and the proposed dike breaching locations are provided in Figure 4.6-5. Excavated materials (crushed granite rock) will be locally placed to extend shallower areas on the residual sides of the dikes and breaches.
- Rip-rap rock or other appropriate erosion mitigation measures will be installed as necessary to provide for long-term physical stability of the dike breach slopes.

All equipment and installations within the final area of Lac du Sauvage will be removed. This will include the flow control structures, in-lake pump stations, pipelines, and all related items. Residual portions of dike~~s~~ and access roads will be the only mine components remaining within the lake.

The riparian (shoreline) and littoral (shallow) areas within the diked area ~~around the perimeter of Lac du Sauvage at its re-established water elevation~~ will be reclaimed where necessary to enable natural regrowth of riparian and aquatic vegetation. The reclamation work is envisioned to include localized repair of erosion, and re-vegetation of select areas with aquatic and riparian plants. This work will be based on experience gained through operations and closure of other areas of the Ekati Mine.

The Sub-basin B ~~E1~~ Diversion ~~Outlet~~ Channel will be reclaimed such that water flows through the natural drainage pattern to Lac du Sauvage. The reclaimed diversion will be made safe for movement of wildlife, particularly caribou, and people. ~~This may include filling the channel with crushed rock, till, or other materials. Water will not enter the backfilled channel from the upstream end (i.e., Lake E1) because the channel invert elevation will remain above the re-established elevation of Lake E1. Incidental runoff into the backfilled channel will evaporate, freeze in-place, or slowly filter through the backfill towards Paul~~

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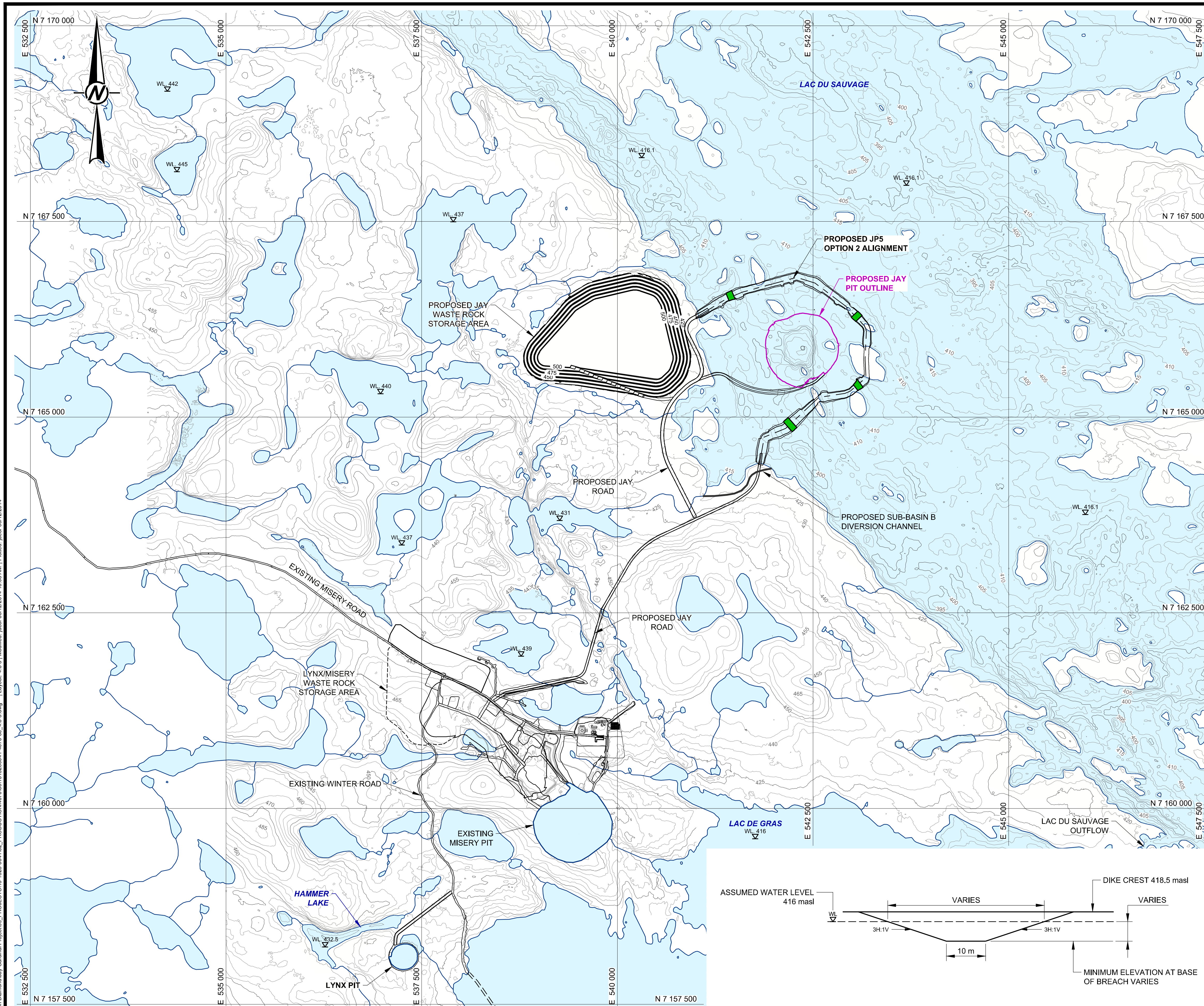

PLAN
SCALE: A

DIKE BREACHING PROFILE
SCALE: B

LEGEND

- WATER BODY
- WATER COURSE
- ROAD
- WINTER ROAD - YEARLY CONSTRUCTION
- PROPOSED DIVERSION CHANNEL
- WL WATER LEVEL ELEVATION
- PROPOSED DIKE JP5 BREACHING LOCATION

NOTES

1. ALL UNITS ARE IN METRES UNLESS OTHERWISE NOTED.
2. ELEVATIONS ARE IN METERS ABOVE SEA LEVEL (masl).
3. GROUND SURFACE AND BATHYMETRY CONTOURS ARE SHOWN AT 5 m INTERVALS.
4. COORDINATES ARE SHOWN IN DATUM: NAD 83, PROJECTION: UTM ZONE 12.
5. FINAL LOCATION OF DIKE BREACHES TO BE DETERMINED IN DETAILED DESIGN.

REFERENCE

1. CONTOUR DATA PROVIDED BY AURORA GEOSCIENCES LTD., FILE: Final 1m Contours - Priority Area.dxf, DATE RECEIVED: OCTOBER 29, 2013.

ISSUED FOR REVIEW

DRAFT

0 20 40 60
SCALE: B METRES

0 1,000 2,000 3,000
SCALE: A METRES

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
A	2014-06-12	DRAFT - ISSUED FOR REVIEW	AK	JD	-	-

PROJECT

JAY PROJECT
LAC DU SAUVAGE
NORTHWEST TERRITORIES, CANADA

TITLE

CONCEPTUAL DIKE BREACHING PLAN

DOMINION DIAMOND

PROJECT No.	13-1328-0041.4070.60		
DESIGN	AK	2014-05-29	
CADD	JD	2014-06-02	
CHECK	-	-	
REVIEW	-	-	

FILE No. 1313280041-4070-60_4.6-5
SCALE AS SHOWN
FIGURE 4.6-5

N:\Client\Dominion Diamond\Jay-Cardinal Project\99_PROJECTS\13-1328-0041\02_PRODUCTION\4070\60\1313280041-4070-60_4.6-5.dwg | Layout: 4.6-5 | Modified: jdeol 06/12/2014 10:08 AM | Plotted: jdeol 06/12/2014

~~Lake. This incidental water will not be a long-term environmental risk because of the small quantity and use of environmentally inert backfill.~~.

4.6.11.7 Buildings and Infrastructure

Buildings and infrastructure, including roads and pads, will be reclaimed according to the methods described in the Ekati Mine ICRP. This will include removal of the overhead power line and power poles. The on-land portions of the dike~~s associated with Dike JP2 (Duchess Lake)~~ will be reclaimed as roads as described in the Ekati Mine ICRP.

4.6.11.8 Monitoring and Maintenance

Monitoring against closure and reclamation objectives and necessary maintenance of the reclaimed facilities will continue for a period of time after completion of the reclamation work. The schedule and program for monitoring an maintenance will be designed to complement the post-reclamation monitoring schedule already developed for the existing Ekati Mine ICRP. Monitoring of the physical stability of dike breaches and water quality monitoring at the outlet of Lac du Sauvage are anticipated.

4.6.11.9 Sequencing

The schedule for reclamation of certain existing facilities at the Ekati Mine will change as a result of the Jay~~-Cardinal~~ Project. The primary changes to the timing of reclamation of existing Ekati Mine facilities will be as follows:

- Reclamation of the Ekati Mine camp, process plant, airstrip, tank farm, Misery road, certain components of the Misery site infrastructure, and other required operating facilities cannot be undertaken until the completion of mining and processing related to the Project. At that time, reclamation would proceed as described in the Ekati Mine ICRP.
- Filling of the Panda and Koala open pits with freshwater cannot be undertaken until in-pit deposition of processed kimberlite is completed. At that time, final filling with freshwater can proceed.
- Reclamation filling of the Lynx Pit with freshwater is linked to dewatering of the diked area of Lac du Sauvage, which does not delay this planned reclamation activity as compared to the current reclamation schedule.
- The final stages of filling the Misery Pit with freshwater cannot be undertaken until the pit is no longer required as a water management facility as part of the Project.
- Reclamation of the upper areas of the LLCF (Cells A, B, and C) can proceed as described in the Ekati Mine ICRP in conjunction with the Project. The continuation of Ekati Mine operations in the absence of processed kimberlite deposition into these areas is a positive factor for reclamation of these areas. The on-going availability of operational resources for a 10-20 year period will improve DDEC's ability to undertake the necessary research, reclamation, and monitoring/adaptive management activities at an appropriately staged pace and with the full support of those operational resources.

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- Reclamation of the lower areas of the LLCF (Cells D and E) cannot be undertaken until the completion of mining and processing related to the Project. Cells D and E are required for contingency processed kimberlite deposition (Cell D only) and for minewater management/discharge. At that time, reclamation can proceed as described in the Ekati Mine ICRP.

The timeframe for completion of reclamation activities related to or dependent on the Project is envisioned to be in the order of five years after completion of mining and processing activities, and after a determination that there is no remaining, economically viable kimberlite resource. This would be followed by a reclamation monitoring period.

The general sequence of events is envisioned as follows:

- Initial Work:
  - ~~Recalmation of Cardinal open pit and underground workings (removal of equipment), followed by flodidng 9planned to be completed during mine operations);~~
  - Reclamation of Jay open pit and underground workings (removal of equipment);
  - Reclamation of pump stations and facilities within the dewatered~~rawn-down~~ area Lac du Sauvage;
  - Installation of Lac du Sauvage water recharge equipment (pipes, siphons, pumps, etc.);
  - Installation of Panda and Koala open pits freshwater pumping equipment; and,
  - Initiation of final reclamation of surface facilities not needed for on-going reclamation.
- Water Recharge and Reclamation Work:
  - Re-flooding of the isolated portion of Lac du Sauvage within the horseshoe dike;
  - ~~Breaching of Dike JP2;~~
  - ~~Recharge of water into the drawn-down area of Lac du Sauvage, including the Jay open pit and underground workings;~~
  - Pumping of freshwater into Panda/~~ and ~~Koala and Misery open pits; and,
  - Reclamation of surface facilities not needed for on-going reclamation.
- Breaching of Lac du Sauvage Dike~~s~~ and Completion of Reclamation Work:
  - Strategic local breaching of Jay ~~Dikes~~ dike~~JP1 and JP4~~; and,
  - Completion of reclamation of surface facilities not needed for on-going monitoring.
- Reclamation Monitoring and Progressive Relinquishment of Liabilities.

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4.7 Employment and Spending

Operating staff at the Ekati Mine will have the opportunity for long-term extended employment through the Jay~~-Cardinal~~ Project. In 2012, the Ekati Mine provided over 1,300 person-hours of direct employment, of which 52% was Northern and 27% was Northern Aboriginal. Over the 13 years from 1999 to 2012, the Ekati Mine has provided over 17,000 person-hours of direct employment, of which 59% has been Northern and 31% Northern Aboriginal. This provides an indication of the tremendous value in direct employment of a substantive extension of the Ekati Mine through the Project.

Similarly, direct business spending will be extended through the Project. In 2012, the Ekati Mine direct business expenditures totaled $400M, of which 67% was Northern and 27% was Aboriginal businesses. Over the 13 years from 1999 to 2012, the Ekati Mine direct business expenditures totaled $5.3B, of which 76% was Northern and 26% was Aboriginal businesses. This provides additional indication of the tremendous value in direct business expenditures of a substantive extension of the Ekati Mine through the Project.

Given that the Project is an open pit, and later underground operation using similar methods to current mining operations, additional personnel may not be needed to support operations. However, additional open-pit mining and construction personnel, and contractors are likely to be needed during construction and open pit mine development activities. For example, the current development of the Misery push-back open pit provided approximately $27M to a Northern Aboriginal business in 2012.

The Ekati Mine SEA sets targets for northern and northern Aboriginal hiring at 33% and 15% (or 44% of the total northern employment target), respectively, during construction, and at 62% and 31% (or 50% of the total northern employment target), respectively, during operations. The Ekati Mine SEA establishes a target of 70% northern purchase of goods and services.

The Ekati Mine has performed well against these, and other, targets and reports on its performance annually.

The 2012 Year in Review Report described the Ekati Mine's prominent role in building NWT communities through financial and in-kind support to numerous community organisations, and discusses how the development of communities and community programs, and the mine itself, considers the culture of the region. Dominion plans to continue support for initiatives that promote the sustainable development of communities and culture around the mine.

The Ekati Mine IBAs establish requirements for funding, training, preferential hiring, business opportunities, and communications.

Dominion works towards focusing employment and economic benefits on Northern and Northern Aboriginal people and businesses. Dominion's location of its head office and senior corporate personnel in Yellowknife, NWT, is a demonstration of this drive. Dominion will continue to work to meet the northern business procurement targets outlined in the Ekati Mine SEA, thereby continuing sustained business opportunities for northern goods and services providers during the life of the Project.

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4.8 References

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Heimersson M, Carlson JA. 2013. Ekati Diamond Mine Northwest Territories, Canada NI43-101 Technical Report. Yellowknife, NWT: Dominion Diamond Corporation.

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5.0 COMMUNITY ENGAGEMENT

No substantive changes were identified as being required to encompass the Project change.

6.0 ENVIRONMENTAL RISKS

No substantive changes were identified as being required to encompass the Project change.

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APPENDIX 4A

JAY PIPE PROJECT
UNDERGROUND MINING CONCEPT STUDY
SEPTEMBER 2013

Project No. 169513545 **10 September 2013**

SUBMITTED TO:

Dominion Diamond Ekati Corporation

Attention: **Mr. Jon Carlson**
Head of Resource Planning and Development

CONCERNING:

Ekati Mine – Jay Pipe Project
Underground Mining Concept Study

~ FINAL ~

PREPARED BY:
Stantec – Mining
200 – 147 McIntyre Street West
North Bay, Ontario P1B 2Y5

Stantec Consulting Ltd.
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North Bay, Ontario P1B 2Y5
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Tel: (705) 494-8255 Fax: (705) 474-2652

10 September 2013

File: 169513545
Email: Jon.Carlson@Ekati.DDCORP.ca

Mr. Jon Carlson
Head of Resource Planning and Development
Dominion Diamond Ekati Corporation
1102 4920 52nd Street
Yellowknife, NT X1A 3T1

Regarding: Ekati Mine – Jay Pipe Project
Underground Mining Concept Study
~ Final ~

Dear Jon,

Please find attached Stantec Consulting Ltd.'s (Stantec's) report concerning the Jay Pipe Project – Underground Mining Concept Study.

Jay Pipe is located below Lac du Sauvage. An earlier study (by others) has assessed the concept of mining by open pit techniques, following construction of a perimeter dyke.

The Underground Mining Concept Study considers the alternative of mining the deposit by underground techniques, leaving a crown pillar intact, such that the lake bottom is relatively undisturbed. The perimeter dyke is not envisaged in this scenario. Cemented backfill would be placed in the opened underground stopes to provide partial support for the crown pillar.

A fundamental risk with this approach relates to the integrity of the crown pillar and the potential for water and/or mud ingress to the mine workings. At this conceptual stage of study it has been assumed that the selected crown pillar size will be adequate. Thorough geomechanical analysis will be required to test this assumption before final mine designs may be prepared.

Primary access to the conceptual underground mine will involve dual ramps from the shore of the lake. One ramp will be equipped with an ore-transport conveyor and the second ramp will provide vehicle / personnel access. This configuration is similar to that of Panda and Koala mines. Infrastructure facilities have been assumed to be similar to those of Panda and Koala where feasible and with appropriate capacity adjustments.

Jay Pipe has been explored to the depth of ±400 metres, but is known to extend below this elevation. For this study, resources have been extrapolated to 600 metres depth.

We would like to express our appreciation to Dominion Diamond Ekati Corporation (DDEC) for the opportunity to be involved in this project. Once you have had an opportunity to review this report, please contact me regarding any questions and/or follow-up requirements.

Sincerely,
Stantec Consulting Ltd.

Jim Paynter, P. Eng.
Senior Consultant and Principal – Mining
Stantec – Mining Practice Area

cc: Mark Hatton, Mickey Murphy, Tom Corkal

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Appendices

1.0 SUMMARY AND COMMENTARY

The Jay kimberlite pipe is located under Lac du Sauvage approximately 30 km southeast from the main Ekati camp and processing complex.

A separate study considering open pit mining options for Jay Pipe was completed (by others) in 2010. This concept involves a perimeter dyke, of sufficient diameter to surround the pit, to be constructed in the lake.

Dominion Diamond Ekati Corporation (DDEC) has requested that Stantec Consulting Ltd. (Stantec) consider the alternative of underground mining and prepare this concept study.

The Base Case concepts selected for study include the following.

- A crown pillar to isolate the underground workings from the lake (no planned impact on Lac du Sauvage).
- Access to the mine via dual ramps from portals located on the southwest shore of the lake. One ramp will be equipped with ore handling conveyors. The second ramp will provide for vehicle and personnel travel.
- The primary mining method will be longhole (blasthole) stoping, similar to the primary underground method at Diavik, but using cemented rock backfill. The backfill is envisioned to provide partial support to the crown pillar.

A fundamental risk with this approach relates to the integrity of the crown pillar and the potential for water and/or mud ingress to the mine workings. At this conceptual stage of study it has been assumed that the selected crown pillar size will be adequate. Thorough geomechanical analysis will be required to confirm this assumption before subsequent mine studies/designs are prepared.

Estimated costs and financial analysis are provided in Section 12.0 of this report. The costs include mining, haulage to the Ekati processing plant and processing costs. Downstream costs for marketing and corporate overheads are not included.

A summary of strategic project metrics is presented in Table 1-1.

Table 1-1: Strategic Project Metrics

Item	Units	Value
NI 43-101 Resource Statement (Indicated and Inferred)	Tonnes (millions)	45.7
	Carats (millions)	91
Mineable Resource (includes Exploration potential)	Tonnes (millions)	65
	Carats (millions	131.7
Mine Production (after crown pillar, recovery and dilution)	Tonnes (millions)	31.9
	Carats (millions	54
Pre-production Project Period	Years	5
Project Period	Years	15
Project Capital (including 20% contingency)	2013 Cdn $M	688.5
Sustaining Capital	2013 Cdn $M	72.9
Operating Costs	2013 Cdn $M	3,633.0
Average Mining Cost per Tonne	2013 Cdn $	114.01
Net Present Value (7% discount rate, no inflation)	2013 Cdn $M	(355.1)
Internal Rate of Return (no inflation)	%	0

2.0 INTRODUCTION

The Ekati Diamond Mine is located north of Lac de Gras, approximately 300 km northeast of Yellowknife and 200 km south of the Arctic Circle in the Northwest Territories, Canada. Access is by air, or by winter road open from late January to early April.

DDEC (as the mine operator) currently mines several kimberlite pipes by both open pit and underground methods.

The Jay kimberlite pipe is located under Lac du Sauvage approximately 30 km southeast from the main Ekati camp and processing complex.

A separate study considering open pit mining options for Jay Pipe was completed (by others) in 2010.

DDEC has requested that Stantec consider the alternative of underground mining and prepare this concept study.

2.1 Geology and Geomechanical

The available geological and geomechanical data and relevant analysis pertaining to Jay Pipe are well presented in the document "Ekati Diamond Mine, Northwest Territories, Canada, NI 43-101 Technical Report", prepared by Heimersson and Carlson, 24 May 2013 (the NI 43-101 report).

Geological Resource
DDEC provided the geological block model and the resource statement described in Section 5.1.

Geomechanical
The following italicized text is copied from the NI 43-101 report.

The major kimberlite lithologies in the production pipes have a wide range of measured strengths that range between very poor to upper fair rock mass (RMR) ratings. The granitic rocks and schist rocks at Ekati range between fair to excellent quality and the majority of the granite is good quality.

For this study, ground support requirements are assumed to be similar to those at Koala, due to the similar size and geometry of the kimberlite pipe.

Hydrogeological

The following italicized text is copied from the NI 43-101 report.

As host rocks have been faulted and overprinted there is potential for hydraulic conductivity or storage. Kimberlite has very low hydraulic conductivity (measured at Koala, Panda, Misery and Fox pits) and the intensity of kimberlite fracturing has little effect; however, kimberlite has a high storage capacity due to its porosity. The chemical properties of groundwater collected and pumped from the underground are monitored.

Studies conducted indicate that groundwater is currently not recharged from surface water bodies at an observable rate.

Since the Jay Pipe is located under Lac du Sauvage, the inflow rate is assumed to be higher and similar to that experienced at the neighboring Diavik Mine.

3.0 ASSIGNMENT APPROACH

DDEC personnel met with senior mining personnel from Stantec on 03 and 04 July 2013 for initial brainstorming meetings related to the Jay Pipe Project. During the brainstorming meetings certain Base Case concepts were identified for further evaluation.

During the brainstorming meetings, potential approaches to mining Jay Pipe were discussed.

- Open pit: this approach involves perimeter dyke construction followed by dewatering the lake inside the dyke.
- Open pit followed by underground mining (similar to Panda, Koala and Koala North).
- Underground mining with a crown pillar (no planned impact on Lac du Sauvage).

The open pit approach was the subject of a separate study (by others) in 2010.

Underground mining with a crown pillar is the Base Case approach assessed in this study report.

Open pit followed by underground mining may be considered at a later stage of study.

3.1 Scope of Work

Working from the Base Case concepts identified during the brainstorming meetings, Stantec has further developed and evaluated the potential project. The work includes the following.

- Preparation of conceptual layouts for mine access and production mining.
- Preparation of a production stope mining cycle (access, drill, blast, muck, backfill) and associated mining plan for the resources identified.
- Preparation of revenue forecasts.
- Preparation of conceptual drawings for associated infrastructure including ventilation, ore handling, backfill, mine services, etc.
- Preparation of a “life of mine” schedule, including access development, construction and production activities.
- Preparation of “Order of Magnitude” capital and operating cost estimates.
- Preparation of preliminary financial analysis (cash flow, IRR, NPV) based on discount rate and parameters as provided by DDEC.
- Preparation of this Concept Study report.

3.2 Battery Limits

The upstream battery limits include receipt of available resource block model and other project data from DDEC (received in preparation for the brainstorming session).

The downstream battery limits are delivery of waste rock to the Misery waste dump and delivery of ore to the Ekati processing plant.

3.3 Exclusions / Work by Others

The following items are excluded from the scope of work.

Legalities:

- Permitting.
- Environmental.
- Mine closure.

Resource:

- Resource modeling.

Processing:

- Metallurgical testing.
- Mill/Processing facilities.
- Tailings facilities.

External Engineering Requirements:

- Geomechanical investigations.
- Hydrogeological studies.
- Exploration and delineation drilling requirements.
- Evaluation of alternatives involving open pit mining or underground options with the orebody opening to surface (lake).

3.4 Assumptions

General

The following assumptions have been made.

- All previous study documents and data have been made available to the Stantec team as backup in preparing the deliverables for this project.
- Designs are based on proven technology and equipment used in the industry.
- All units are in the S.I. (Metric) system of measurement.

Schedules and Costs

- All costs are in Year 2013 Canadian currency (no escalation, HST exclusive).
- Final report deliverables reflect Order of Magnitude accuracy levels (“bottom line” accuracy of ±30 to 35%).
- Major construction, pre-production/ongoing access development and steady state operations will be completed by specialist service providers.
- Cost estimates are based on historical and available data, using prior project estimates, and Stantec’s experience and knowledge based on similar projects and studies.
- Trade-off studies have not been prepared. Some sensitivities have been investigated following completion of the Base Case evaluations, and are presented in Section 12.4.

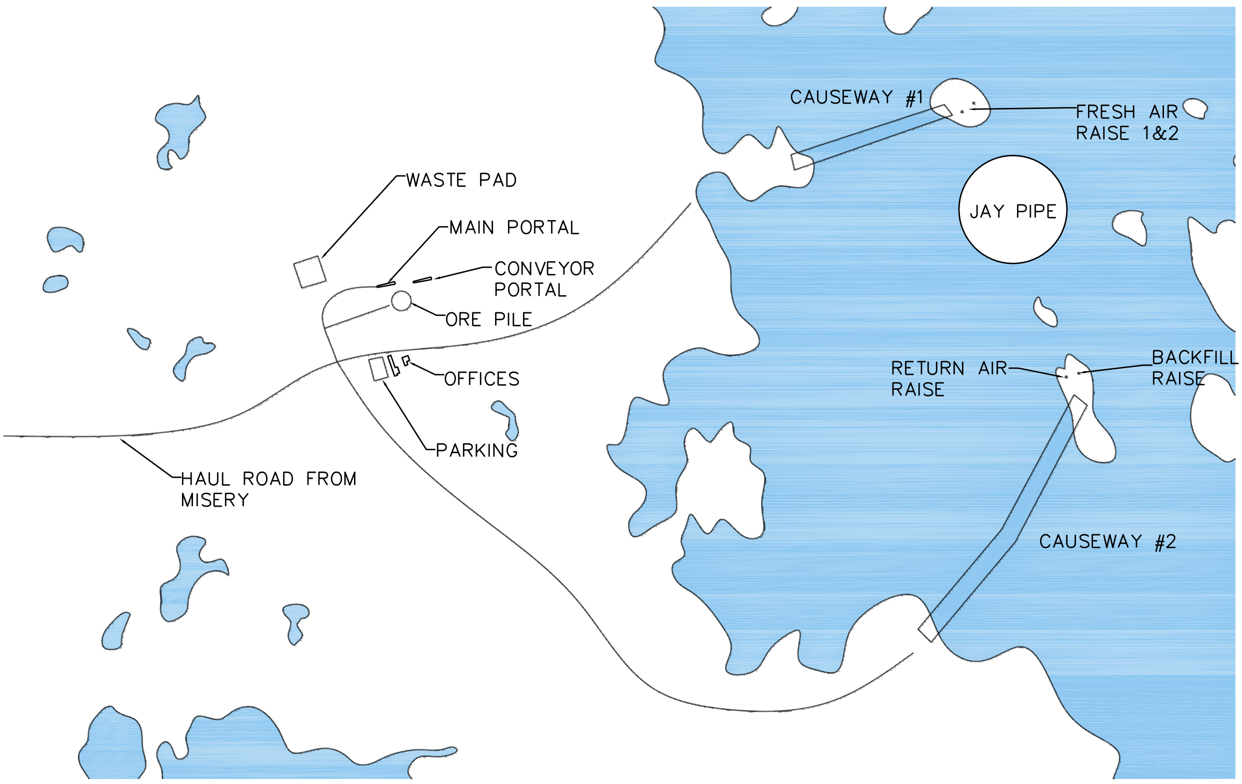
4.0 PRIMARY ACCESS

4.1 Surface Access Routes

The Jay site staging area, portals and general infrastructure will be located on the southwest shore of Lac du Sauvage. An access/haulage road will be constructed from the Misery Haul Road to this site.

Two causeways will be extended into the lake to provide access to two islands located northwest and southeast of the Jay Pipe lake bottom expression. The two fresh air heating plants and raise collars will be located on the northwest island. The return air raise collar and backfill raise collar/truck dump will be located on the southeast island.

Figure 4-1: Surface Plan



4.2 Underground Access

During the brainstorming meetings, three general concepts for providing primary access to the underground mine were discussed.

Shaft
A combination production/service shaft was envisioned with a second vertical opening (ventilation raise equipped as an auxiliary service shaft) for secondary egress.

Ramp and Shaft
The shaft was envisioned for production hoisting. The ramp would provide access for personnel and materials.

Dual Ramp
One ramp was envisioned to be equipped with a conveyor for ore transportation to surface. The second ramp would provide access for vehicles and personnel/materials. This configuration is similar to Panda and Koala.

The Dual Ramp concept was selected as the Base Case for this study, based on "whiteboard" comparisons. Further description of the rationale for this selection is provided in the meeting minutes in Appendix E.

As a preliminary design basis, the dual ramps will extend from portal locations on the shore of Lac du Sauvage southwest of Jay Pipe and will reach proximity with the pipe approximately at 2070 Level. An internal "spiral" ramp will provide access to mining levels above and below this horizon.

5.0 PRODUCTION MINING

5.1 Resource Analysis

Resource Statement

The 2013 NI 43-101 report listed a resource of 45.7 million tonnes with an average grade of 2.0 carats per tonne as shown in Table 5-1. The resource includes indicated and inferred classifications.

Table 5-1: Mineral Resource Statement (NI 43-101)

Resource Class	Mineral Resource Statement[1]		
	Tonnes (millions)	**Grade** (cpt)	**Carats** (millions)
Measured	0.0	0.0	0.0
Indicated	36.2	2.2	78.1
Inferred	9.5	1.4	12.9
Total	45.7	2.0	91.0

Mineable Resource

Stantec queried the block model independently to identify the mineable resource listed in Table 5-2.

In the absence of geomechanical data analysis, the crown pillar thickness was selected at 200 metres. This dimension corresponds to the transition from lower grade, pour quality kimberlite above to better grade, better quality kimberlite below.

The block model includes a resource classified as exploration potential of 7.5 million tonnes that is located outside the NI 43-101 resource above 1990 Level.

Since the resource model only extends to 410 metres depth (1990 Level), Stantec extrapolated a further exploration potential of 12.1 million tonnes, extending the mining limits to 1770 Level (630 metres depth) as shown in Table 5-2. This study is based on the assumption that the indicated, inferred and exploration potential resources (less the crown pillar) are all available.

Table 5-2: Mineral Resource Compared to Mineable Resource

Resource Class	Mineral Resource Statement[1]			Mineable Resource[1]		
	Tonnes (millions)	**Grade** (cpt)	**Carats** (millions)	**Tonnes** (millions)	**Grade** (cpt)	**Carats** (millions)
Measured	0.0	0.0	0.0	0.0	0.0	0.0
Indicated	36.2	2.2	78.1	36.2	2.2	78.1
Inferred	9.5	1.4	12.9	9.3	1.4	12.6
Sub-Total	**45.7**	**2.0**	**91.0**	**45.5**	**2.0**	**90.7**
Exploration Potential[2]				19.6	2.1	41.0
Total				**65.1**	**2.0**	**131.7**
Less Crown Pillar				32.4	1.8	59.5
Available Total				**32.7**	**2.2**	**72.2**

1-Undiluted Values
2-Includes 7.5 m tonnes in block model above 1990 Level plus 12.1 m tonnes extrapolated to 1770 Level

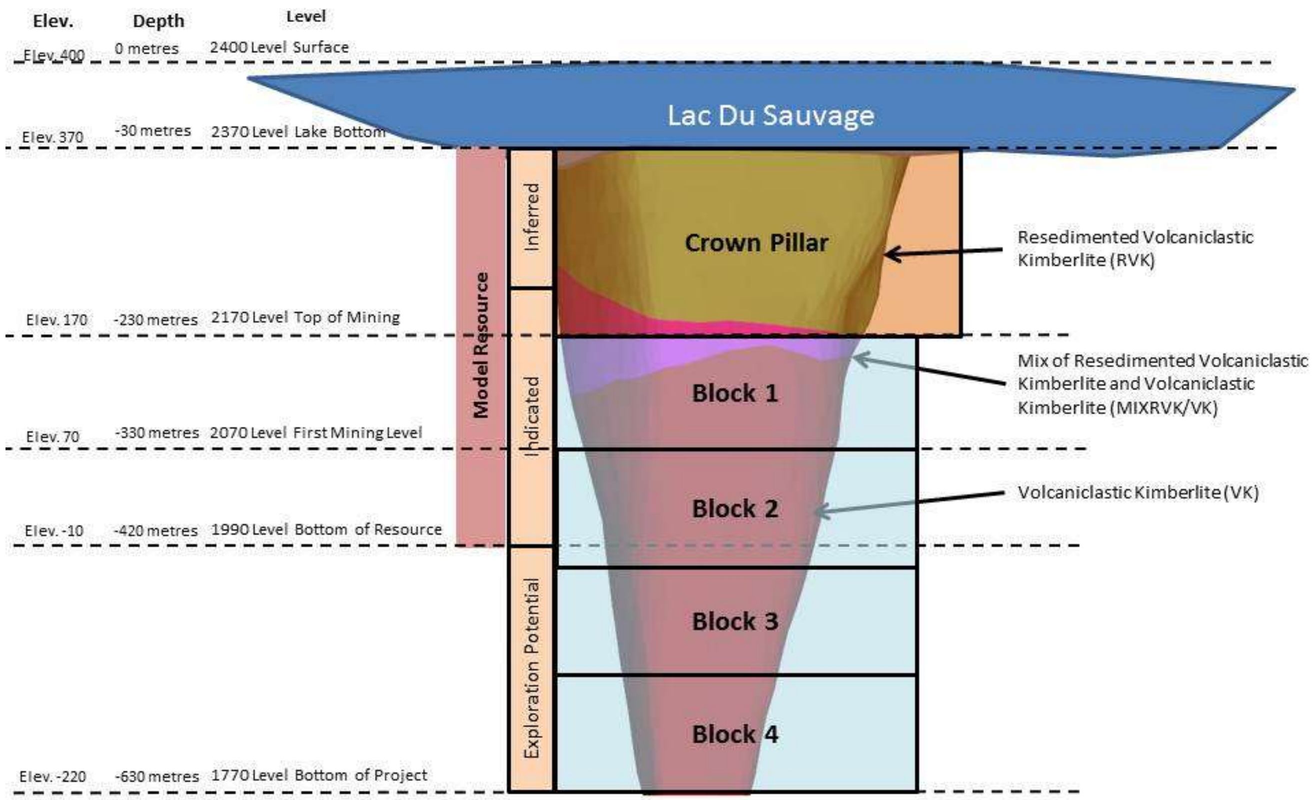
Mining Blocks

It was determined during the brainstorming session, that the mining heights between levels will be 20 metres (based on the dimensions of similar mining methods at Diavik Mine)

For production sequencing purposes, mining blocks of 100 metres (5 levels) in height were defined as shown in Figure 5-1. Stope sequencing begins at the bottom of each block (once the access ramp reaches that depth), and progresses upwards to the (backfilled) block above.

Similar to Koala and Panda, the levels naming convention involves the elevation above sea level plus 2,000 metres.

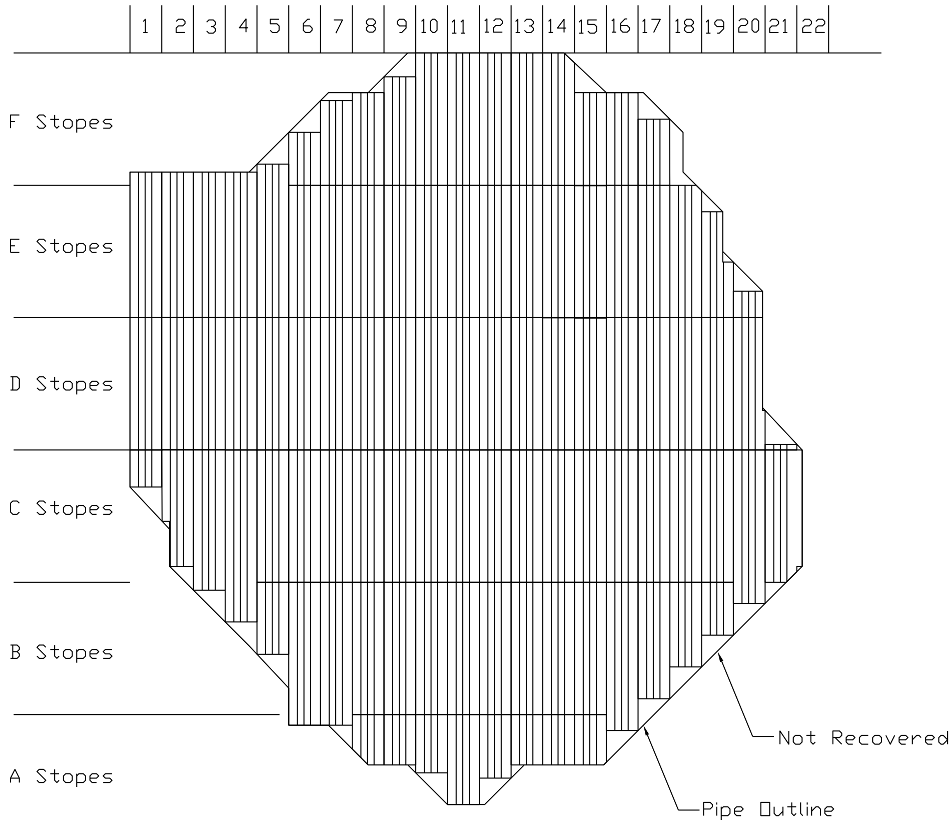
Figure 5-1: Defined Mining Blocks



Recovery

A mining zone between elevations 2100 Level and 2120 Level was evaluated (as a typical level) against detailed stope shapes to determine the “level recovery factor” as illustrated in Figure 5-2.

Figure 5-2: Typical Stope Shapes



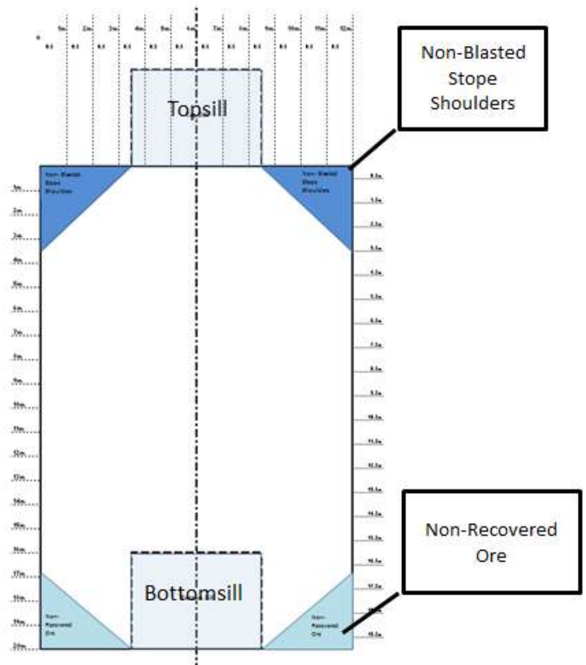
As shown in Table 5-3, it was estimated that 2% of the ore occurred outside the stope limits or involved stope shapes too small/irregular to be considered economic.

Table 5-3: Stope Mining Recovery

Stope Zone	Tonnes
A	105,453
B	401,036
C	592,900
D	569,711
E	502,882
F	289,480
Stope Total	**2,461,461**
Level Total	2,512,405
Variance	50,944
Mining Recovery	**2.0%**

When mining individual stopes, there are specific areas shown in Figure 5-3 that will not be recovered, either due to stope design or equipment capability.

Figure 5-3: Stope Cross-Section



Analysis of these areas (non-blasted stope shoulders and non-recovered ore) against a stope cross-section determined that 90% of a planned stope will be mechanically recoverable (Table 5-4).

Table 5-4: Mechanical Recoverability

	Height	Width	Length	Volume	Tonnes	% Tonnes of Total
Stope Total	20m	12m	50m	12,000	28,200	100.0%
Non-Blasted Stope Shoulders	3.5m	3.5m	50m	613	1,439	5.0%
Non-Recovered Ore	3.5m	3.5m	50m	613	1,439	5.0%
Mining Recovery				**10,775**	**25,321**	**90.0%**

When combined with the level recovery factor of 2%, a maximum recovery of the resource tonnes on a level is estimated at **88%**.

Dilution

For this study, external dilution in a stope is material that contains no diamonds being excavated from the stope during the mucking cycle. The source of this material may be either backfill or barren rock from the stope walls or stope face. Neighboring stope boundaries which are ore do not contribute to external dilution. To calculate the external dilution factor, a typical level was evaluated considering the number of different types of stope boundaries that occur. In each case, an assumed thickness of rock or backfill was assigned to either the stope wall or face, as detailed in Appendix B. The estimated total dilution is 11% (Table 5-5). The total Mining Recovery and Dilution factors used in preparation of the production forecasts are listed in Table 5-6.

Table 5-5: External Dilution Calculation

Dilution Type	Description	Number of Stopes	Location of Dilution	Rock	Backfill	Dilution Tonnes	Stope Tonnes	Percent Dilution
A	Primary/Secondary Corner Stopes	4	Stope Wall	1		11,779	101,408	12%
			Stope Face	1	1			
B	Primary/Secondary Starter Stopes	8	Stope Wall			4,860	184,118	3%
			Stope Face	1				
C	Primary/Secondary Finisher Stopes	8	Stope Wall			12,758	192,016	7%
			Stope Face	1	1			
D	Primary/Secondary Outside Stopes	6	Stope Wall	1		14,023	148,467	9%
			Stope Face		1			
E	Primary/Secondary Inside Stopes	24	Stope Wall			31,590	569,364	6%
			Stope Face		1			
F	Tertiary Starter Stopes	9	Stope Wall		2	29,160	230,825	13%
			Stope Face	1				
G	Tertiary Finisher Stopes	9	Stope Wall		2	41,690	243,355	17%
			Stope Face	1	1			
H	Tertiary Inside Stopes	27	Stope Wall		2	97,732	702,727	14%
			Stope Face		1			
	Total	95				**243,591**	**2,372,279**	**11%**

Table 5-6: Mining Recovery and Dilution

	Stoping	Development
Mining Recovery	88%	100%
Dilution	11%	0%

With mining recovery and dilution applied, and excluding the crown pillar, 31.9 million tonnes containing 63.6 million carats will be produced (Table 5-7). The crown pillar accounts for a reduction of 50% on the tonnes and 49% in carats.

Table 5-7: Recoverable Resource for Scheduling

Zone	Mineable Resource[1]			Recoverable Resource[2]		
	Tonnes[3] (millions)	**Grade[3]** (cpt)	**Carats[3]** (millions)	**Tonnes[3]** (millions)	**Grade[3]** (cpt)	**Carats[3]** (millions)
Crown	32.4	1.8	59.5	0.0	0.0	0.0
Block 1	12.9	2.4	31.3	12.6	2.2	27.5
Block 2	9.2	2.1	19.5	9.0	1.9	17.2
Block 3	6.5	2.0	13.2	6.3	1.8	11.7
Block 4	4.0	2.0	8.1	3.9	1.8	7.2
Total	**65.0**	**2.0**	**131.7**	**31.9**	**2.0**	**63.6**

1-Undiluted Values
2-Dilution (11%) and Mining Recovery (88%) applied to stopes
3-Part of Block 2 and all of Blocks 3 & 4 are exploration potential for projection of pipe down to 1770L

5.2 Mining Method Selection

During the brainstorming meeting three categories of mining methods were discussed.

Mass Mining
Block cave and sub-level cave were considered. Both methods would require a significant crown pillar to prevent subsidence through to the lake bottom. As a result, both methods were eliminated from this stage of study.

Selective Mining
Two methods reviewed were cut and fill and inverse cut and fill. As both methods typically incur higher cost and lower productivities than bulk stoping or mass mining, these were eliminated from further consideration at this stage of study.

Bulk Stoping
All bulk stoping methods would require cemented backfill for support of the crown pillar. The two methods reviewed were blasthole and modified Avoca.

As Diavik Mine is successfully using blasthole mining with cemented fill in similar circumstances, this method was selected for this conceptual evaluation.

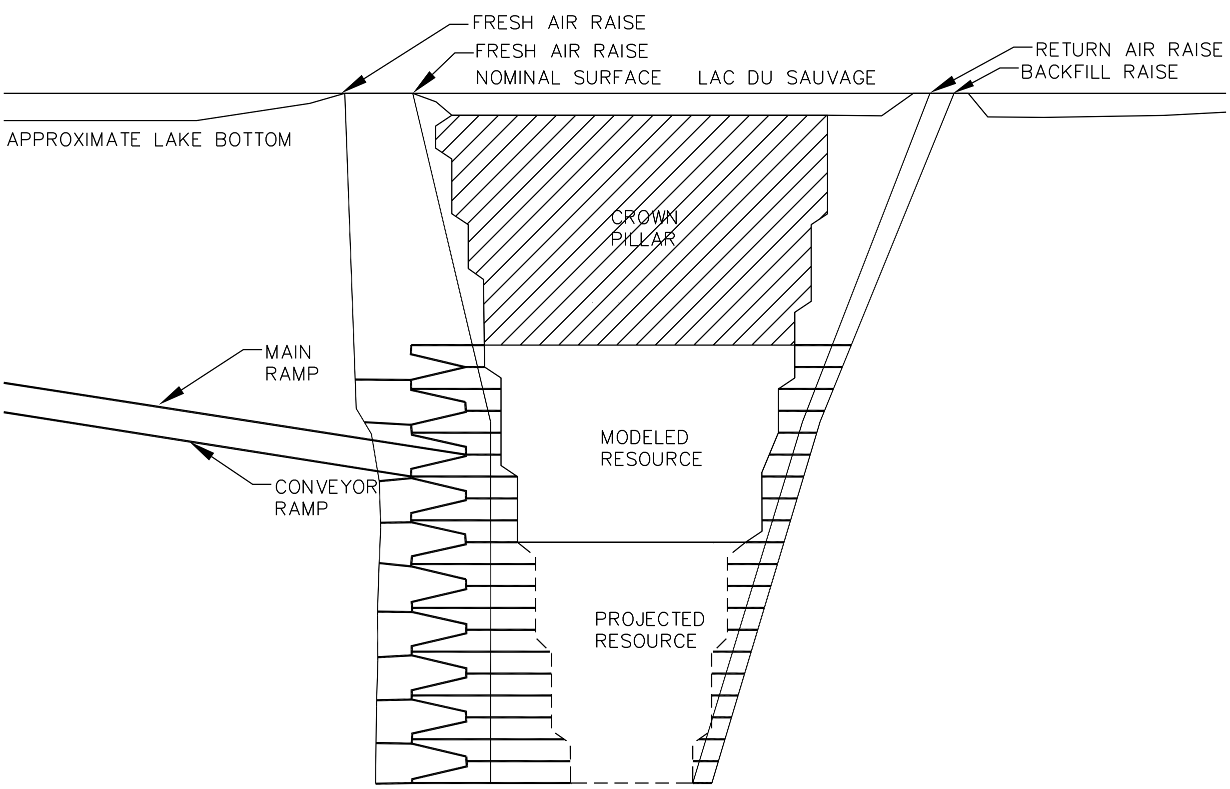
5.3 Mine Design

Mine Access

As described in Section 4.0, access to the pipe will be via a service ramp driven to 2070 Level and a conveyor ramp to 2050 Level. First production will be generated from this level. A general arrangement drawing was prepared to illustrate the design of a typical level, and then extrapolated to other levels for quantity take-offs and scheduling. Internal access ramps to production levels above and below will start from this location as presented in Appendix A, Drawings.

The conveyor ramp (which will act as a second means of egress from the mine) will reach 2050 Level situated 20 metres below the first production horizon. Additional infrastructure will be installed on these two levels to accommodate the sizer and conveying facilities. This study is based on the assumption that all ore below 2070 Level will be trucked up-ramp to a truck dump facility on 2070 Level. Future study work should include a trade-off study to optimize the conveyor system elevation versus trucking cost. A longitudinal section view is provided in Figure 5-4.

Figure 5-4: Long Section



Crown Pillar

Due to the location of Jay Pipe under Lac du Sauvage, a crown pillar is required to prevent fracturing of the ground through to the lake bottom. A thickness of 200 metres was selected for use in this study as this dimension corresponds to a change in geology from lower grade poor quality kimberlite above to better quality, better grade kimberlite below. Before a detailed mining plan can be completed, a thorough geomechanical study of the crown pillar is required. Any holes drilled through this crown pillar must be confirmed to be grouted. Risk assessment and development of mitigating strategies will be a necessary component of future detailed design.

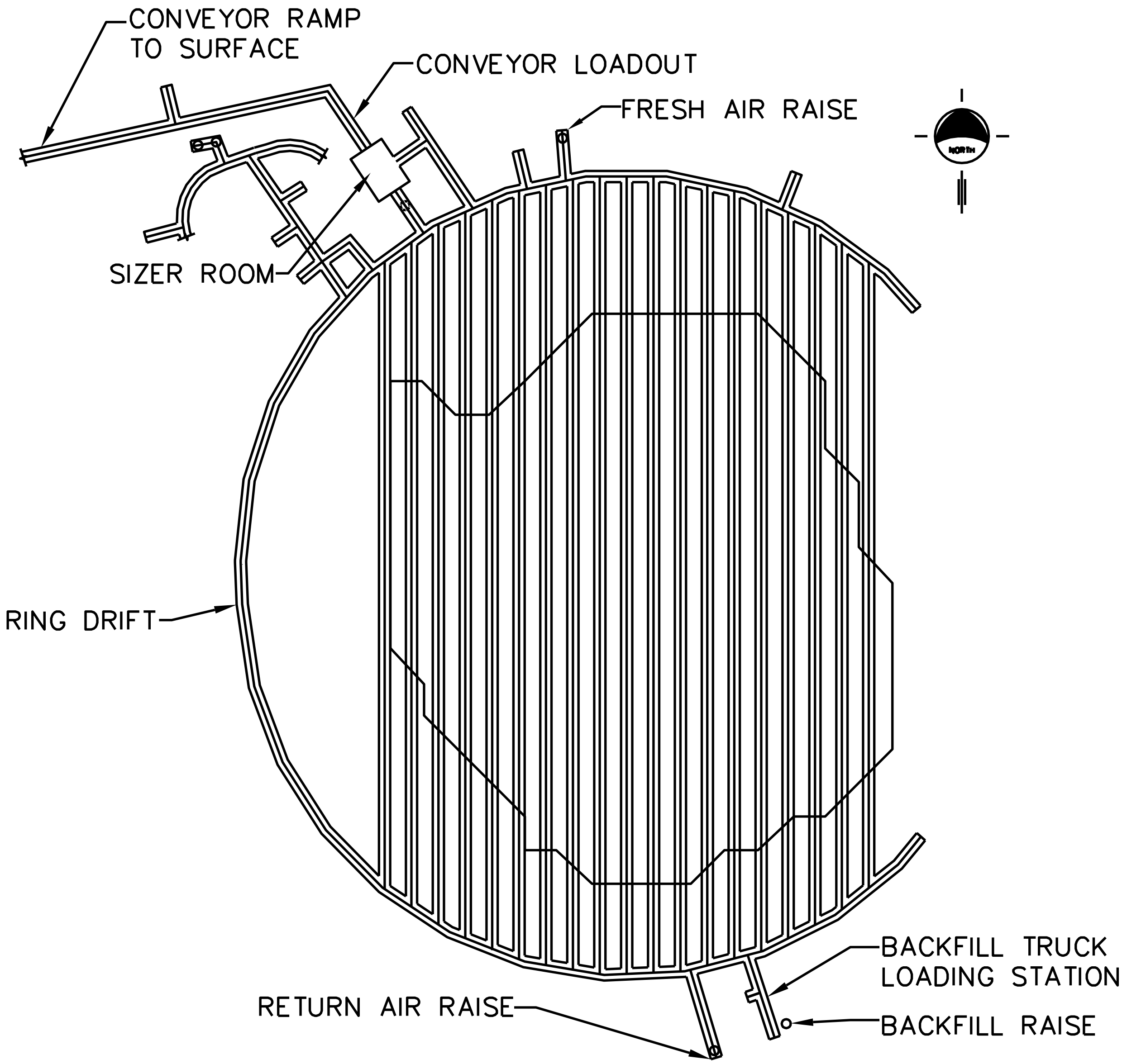
Level Design

To facilitate use of the islands on Lac du Sauvage for ventilation and backfill raises, mining on the level will proceed from the southern pipe contact to the north. As illustrated in Figure 5-5, access to the raises will be via a “ring” drift that is driven approximately ¾ around the pipe (in waste rock). In most instances, sills will be driven from the ring drift through to the opposite side of the pipe. This will allow for filling of stopes from the backside of the stope. There will be some instances (on the east and west sides of the pipe) where the sills will not connect to both sides directly, requiring a cross-cut driven from adjacent sills for filling.

For levels below the 2050 Level sizer, a truck loading area will be required for loading of ore and waste to be trucked up ramp. Levels above the sizer will be provided with an ore pass to transfer ore down to the sizer. Waste will be hauled by truck up the service ramp and recycled as backfill.

Backfill facilities will be located on the south side of the pipe to prevent interference with the ore movement on the north side. The return air raise, also located on the south side, will allow “flow through” ventilation on the production level and prevent exhaust air from entering the main ramp travel ways.

Figure 5-5: 2050 Level Plan

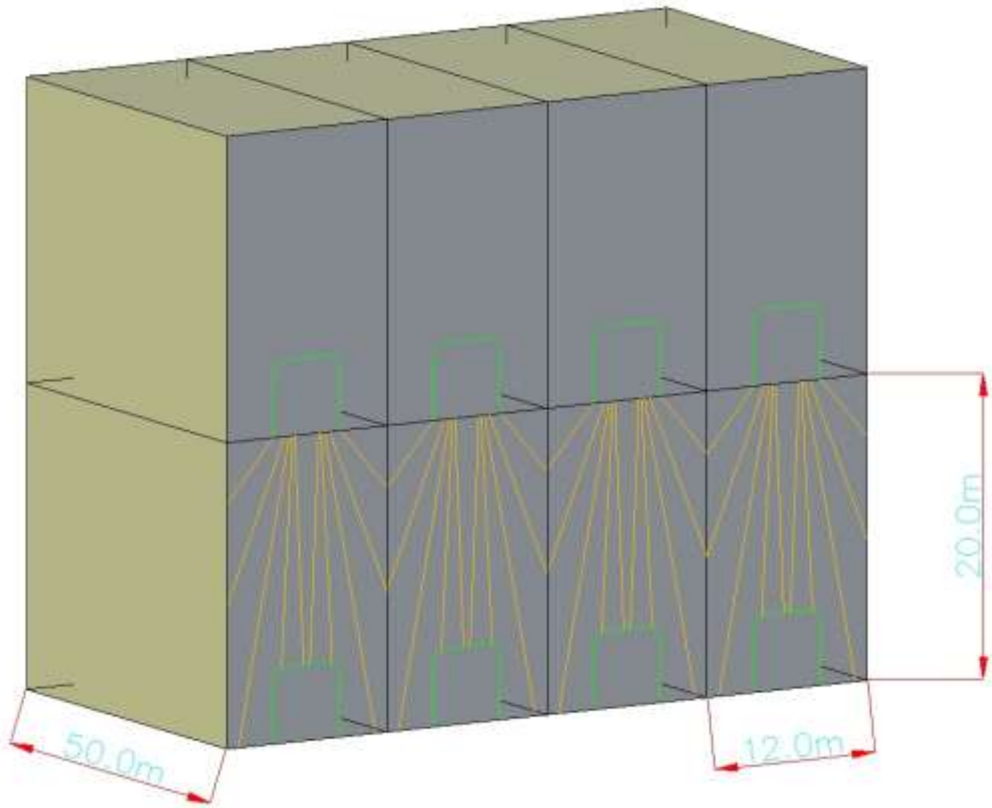


Stope Sequencing

The size of the pipe will enable a primary/secondary stope sequence. Primary mining will begin from the southern-most stope in the centre sill (splitting the pipe into east and west zones) and progress north along this sill and east and west on every second sill. Once primary stopes have been mined to the northern limits of the pipe, secondary stopes between the primary stopes can be extracted.

Mining of the level above can begin when all of the stopes from south to north of the first sill have been completed.

Figure 5-6: Stope 3-D



6.0 VENTILATION

6.1 Airflow Determination

The air volume requirements outlined in the NWT Mine Regulations Section 10.62 (2) state that “The ventilation quantity shall be at least 0.06 cubic metres per second for each kilowatt of diesel powered equipment at the worksite”.

Reasonable judgement has been used in determining what constitutes “equipment operating” and the estimation of equipment utilization. Equipment such as drill jumbos only operate on diesel power while moving from one workplace to the next and are therefore utilized much less than haulage equipment. Utilization factors were applied, including a conservative 80% for ore/waste haulage equipment and 50% or 25% for other pieces of equipment.

Table 6-1 lists the estimated mine ventilation requirements for equipment and allowances for proposed fixed installations.

Table 6-1: Jay Pipe Estimated Airflow Requirement

Equipment Type	No. Units	Engine Hp	Engine kW	Utilization %	CMS Required (0.06 CMS/kW)
Drills					
Development Jumbos	3	148	110	25%	5.0
Production Drills	3	148	110	25%	5.0
Secondary Blasting Jumbo	1	148	110	25%	1.7
Bolting Jumbo	1	148	110	25%	1.7
Ground Support Equipment					
Scissor Lift	2	174	130	25%	3.9
McLean Bolter	3	152	113	25%	5.1
IT-28 Loader c/w Platform	1	148	110	25%	1.7
Shotcrete Jumbo	3	94	70	25%	3.2
Shotcrete Carrier	2	174	130	25%	3.9
Scaler	1	161	120	25%	1.8
LHD's					
8 Cu M LHD	6	414	309	80%	89.0
6 Cu M LHD	3	308	230	80%	33.1
Haulage Trucks					
45 tonne truck	8	589	439	80%	168.6
Services and Supply Fleet					
U/G Personnel Carriers	2	134	100	25%	3.0
ANFO Truck	2	174	130	50%	7.8
Emulsion Truck	1	174	130	50%	3.9
Boom Trucks	2	174	130	50%	7.8
Cassette Truck	1	174	130	25%	2.0
Diesel Fork Lift	1	80	60	25%	0.9
Shifter's Vehicles	2	134	100	50%	6.0
Engineer's Vehicles	2	134	100	50%	6.0
Mechanic's Vehicles	2	134	100	50%	6.0
Electrician's Vehicles	2	134	100	50%	6.0
Lube and Fuel truck	1	174	130	50%	3.9
Fixed Installations					
Fuel Bay Area Allowance	1	589	439	100%	26.3
Conveyor Allowance	1			100%	16.5
Sizer Area Dust Control	1			100%	10.0
	55				**429.5**
		Contingency		15%	64.4
		Total CMS			**493.9**
		Total CFM			**1,046,478**

6.2 Ventilation System Configuration

The primary ventilation system will provide 519 m^3/s (1,100,000 cfm) of fresh air to the mine.

The conceptual system design is patterned after the Koala facilities with allowance for the higher required capacity. Two fresh air raises and a single return air raise will be provided. The service and conveyor ramps will up-cast.

The system will be a push system using two 4.9 metre (16 ft.) diameter fresh air raises. Parallel 447 KW (600 HP) fans on each raise will push 260 m^3/s (550,000 cfm) of air into the mine through each of the two raises. The raises will be larger in cross-section than the 4.0 metre diameter raises at Koala. At this stage of study it is assumed that the geomechanical conditions will be suitable for this diameter. Alternatively, multiple smaller raises, or use of a fully supported sinking method might be required.

A longitudinal section of the mine ventilation design concept is provided in Figure 6-1.

To maintain underground temperatures above freezing, allowing for the external arctic environment, a 6 MW (21 MMBTUH) indirect heating system (diesel fired) will be installed on each fan intake. The air heating systems are similar to those at Koala and designed to heat the intake air to a maximum temperature differential of 47^o C (85^o F). This criterion is derived from the worst-case scenario of – 45^o C (- 49^o F) intake air that must be heated to +2^o C (35.6^o F).

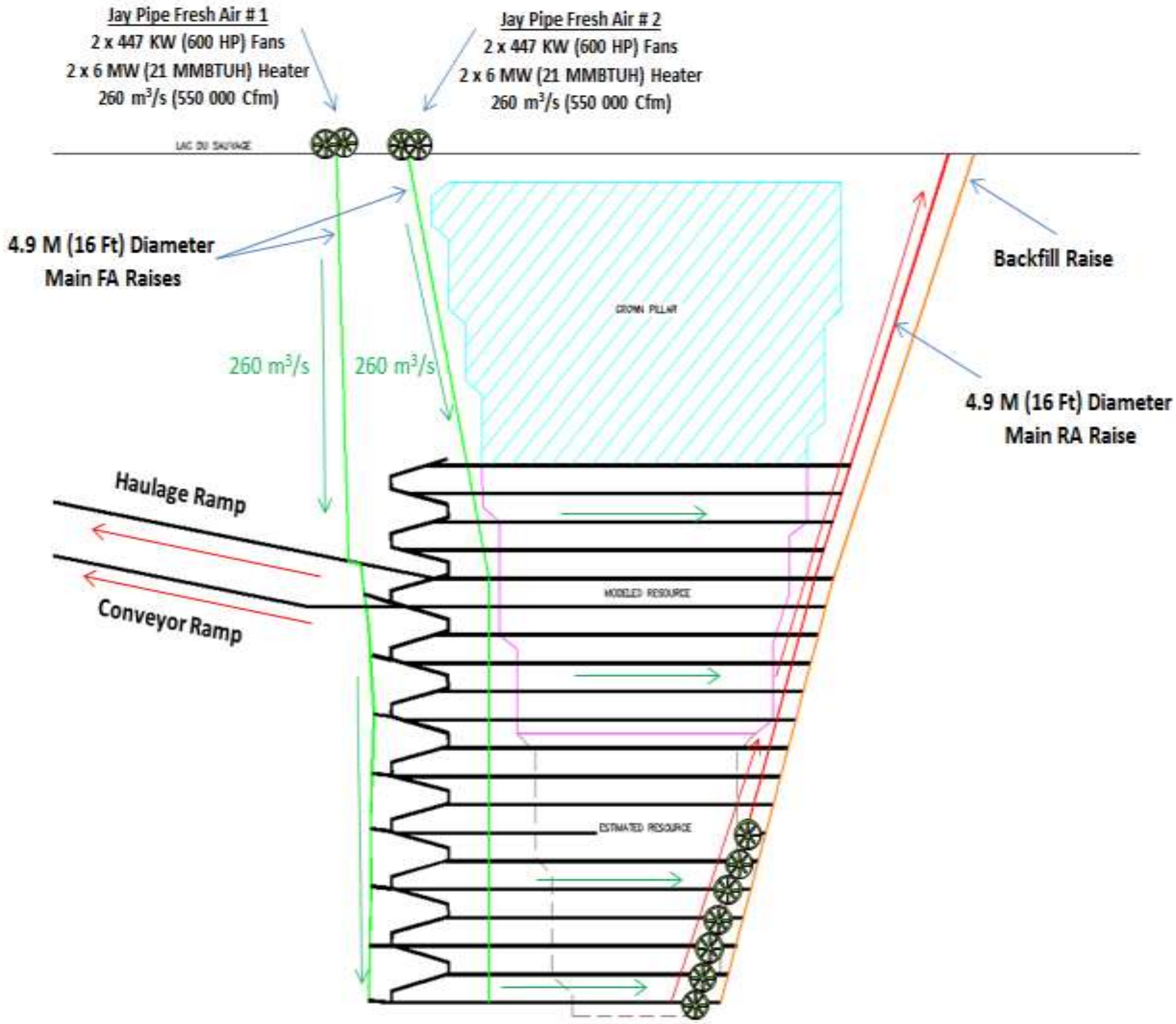
One fresh air raise system will provide fresh air to the mine production levels. The second fresh air raise system will supply air to the haulage ramp and fixed installations.

Exhaust air will be removed from the mining levels via a dedicated 4.9 metre (16 ft.) diameter return air raise to surface. The haulage and conveyor ramps will be up-cast.

The ventilation flow pattern on the production levels will follow standard design practices. Each level will have a controlled connection to the fresh air raise to allow regulation of the airflow in accordance with the local equipment requirements.

Each production level will have a connection to the return air raise providing an exhaust route to surface. Since there will be limited airflow in this raise and a short distance to surface during the early mine production stages, an adjustable regulator at the return air raise will be sufficient to control airflow on the upper levels. When mining activity reaches mid-depth, low-pressure, high volume, adjustable-pitch fans will need to be installed to exhaust the required volume of air from the level. This design will enable regulation of the air such that ventilation doors will not be required in the level access to control air flow between the production level and the ramp.

Figure 6-1: Ventilation Long Section



7.0 ORE AND WASTE ROCK HANDLING

Development in waste rock will primarily be completed prior to commissioning of the ore handling facilities and the associated waste will be hauled to a surface stockpile via truck. Waste generated from sustaining waste development during the production period will be hauled to surface in the same manner.

Ore Handling System

The ore handling system will include an ore pass from 2170 Level to 2070 Level, an ore dump for trucks at 2070 Level with a grizzly and rockbreaker, and a horizontal ore storage located nearby. The ore sizer and conveyor system will be similar to that used at Panda and Koala.

An ore handling system flow diagram is provided in Appendix A.

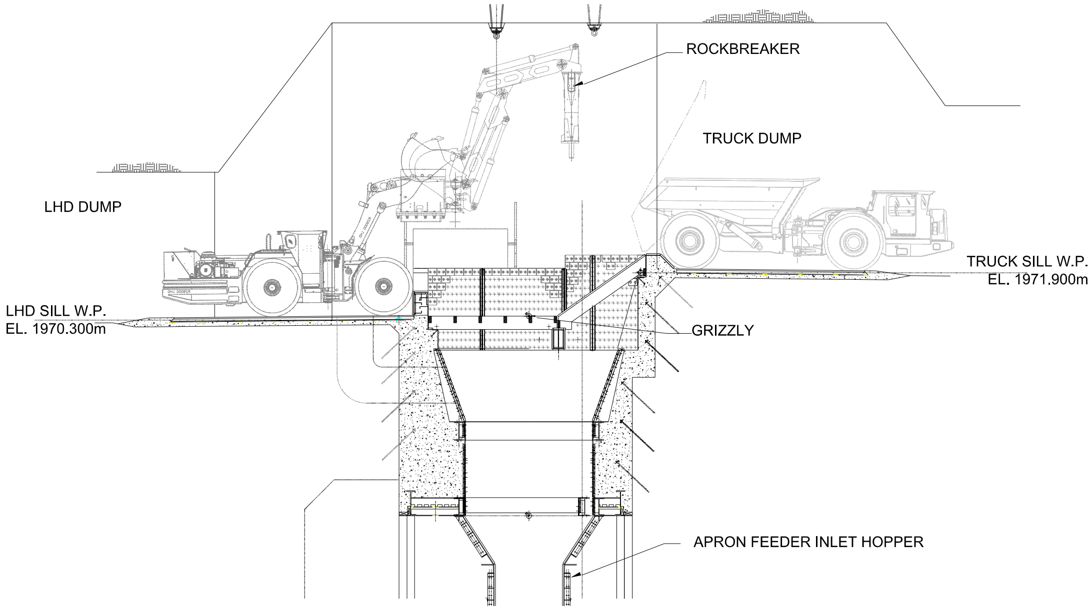
Ore Dump and Horizontal Ore Storage

The ore dump at 2070 Level will consist of an elevated truck dump complete with angled scalper bars to allow the finer material to pass through, thus minimizing the chance of plugging the grizzly. An LHD dump will be located directly across from the truck dump at the elevation of the grizzly. This will allow an LHD to be used to remove any large waste blocks or large pieces of scrap material from the grizzly. On the third side of the grizzly, a chute and control chains will feed ore directly from the ore pass onto the grizzly. The rockbreaker will be located on the fourth side of the grizzly, directly across from the chute.

Ore from levels above 2070 Level will feed directly from the ore pass by means of a chute and control chains to the 2070 Level grizzly. As well, underground haulage trucks and LHD's will transport ore to the ore dump. On the truck dump side, the trucks will dump onto the sloped 'scalper' grizzly.

The main grizzly will allow material smaller than 750 mm to pass through to the sizer, but will hold back larger material which can then be either broken with the rockbreaker (if ore), or moved to the side and collected using an LHD if waste or scrap material. The oversize waste rock that is removed from the grizzly will be picked up with an LHD and moved to a remuck for storage until it is hauled by truck to surface.

Figure 7-1: 2070 Level Ore Dump Arrangement



Ore Sizer

The ore sizer will be the same as the units installed at Panda and Koala (MMD 1000 Twin Roll Primary Ore Sizer). The apron feeder used to feed ore to the sizer, and the conveyor system removing ore from the sizer will be of the same general design, similar equipment, and the same capacity as the Panda and Koala designs. This consistency in equipment selection and installation will simplify design/construction as well as operating and maintenance functions, and will also minimize the site inventory for spare parts.

The sizer station will be located at the 2050 Level to the northwest of the orebody. Kimberlite ore will report to the sizer station after passing through a grizzly at the ore dump. The primary sizer will reduce the ore to a maximum size of 350 mm before it passes through onto the conveyor (‘picking belt’). As with Panda and Koala, this type of size reduction unit was chosen over a gyratory or jaw crusher due to the unique plastic material characteristics in the Ekati kimberlite ore which can prevent consistent and reliable flow through these types of crushers.

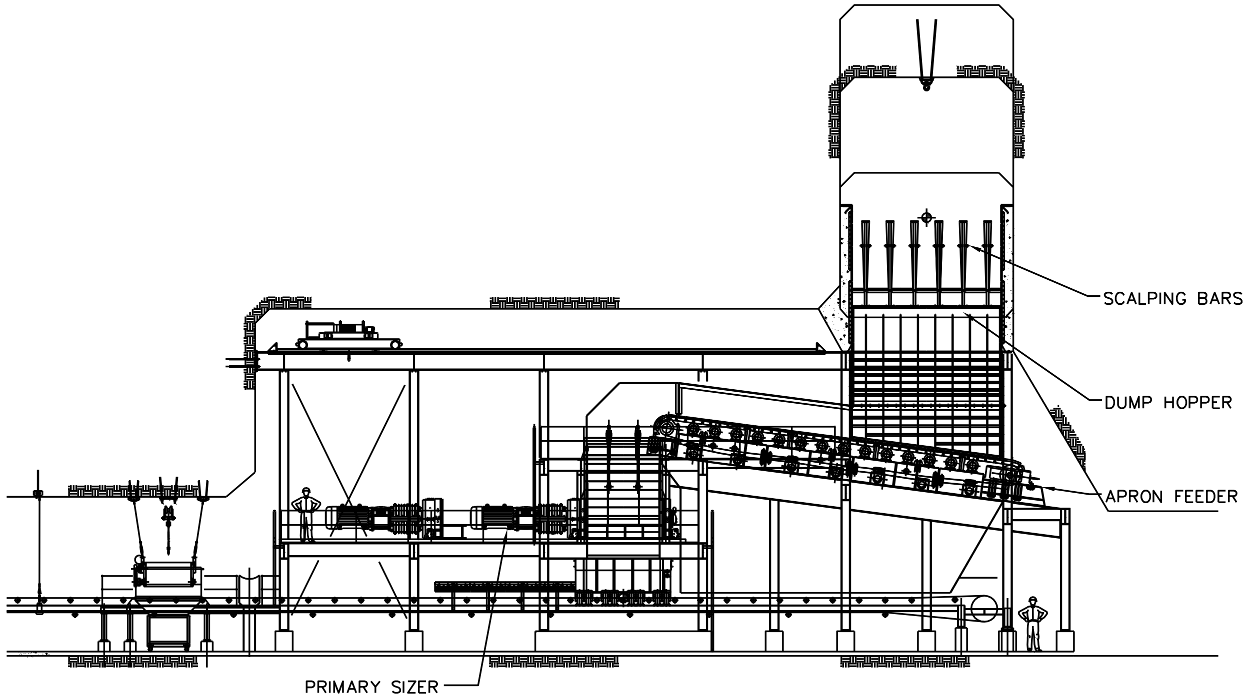
The sizer capacity is 500 tonnes per hour.

The sizer station is a significant excavation approximately 13 metres wide x 25 metres long x 12 metres high with the following major features:

- A truck/LHD ore dump with grizzly and rockbreaker located at 2070 Level.
- An apron feeder which accepts the dumped ore and provides controlled feed to the sizer.

- A primary mineral sizer (crusher).
- A picking conveyor belt.
- A belt magnet and steel detection equipment on the picking belt.

Figure 7-2: Ore Dump, Sizer, & Picking Belt Section View



Conveyor System

The conveyor system will involve the same basic design parameters (belt width and type, idler design, etc.) as Panda and Koala. The system will include:

- A “picking belt” at ±50 metres length equipped with a magnet facility for scrap removal.
- Two main conveyors at ±1,200 metres length. These will be similar in size to Koala conveyor CV-2.
- A surface stacker conveyor which will be the same as the unit at Panda.

Surface Ore Transportation

From a stockpile at the surface stacker conveyor the ore will be loaded using a front-end loader into surface haul trucks and transported to the Ekati processing plant.

8.0 BACKFILL

The Jay Pipe underground mining concepts described in this report will be unique among Ekati operations, in the requirement for backfill to provide partial support to the crown pillar. The longhole mining method will require the majority of the backfill to be cemented.

During the brainstorming meetings a number of potential backfill systems were discussed, including the following.

- Hydraulic (sand) fill
- Paste fill
- Rockfill

Historical testing of kimberlite tailings at Diavik Mine has determined this material to be unsuitable for use in paste fill. Local sources of natural sand in adequate quantities are not known. It is assumed that hydraulic fill or paste fill could only be produced by grinding waste rock, at high cost.

At this level of study, cemented rock fill has been selected as the preferred backfill. Adequate quantities of waste rock are available at the Misery operation. These stockpiles include both potentially acid generating (PAG) and non-acid generating (NAG) rock. Placing the PAG waste underground as backfill may mitigate potential environmental concerns. This potential benefit has not been assessed.

The waste rock will be dumped into a backfill raise from surface, leading down to the active mining levels. The surface backfill truck dump will be located on an island southeast of the pipe and accessed via a causeway from shore. An underground backfill truck loading chute will be provided on each level, with a short “finger raise” connecting the chute to the main backfill raise.

A slurry of normal Portland cement and water will be prepared in the surface batch plant and delivered (in measured batches) to an agitated tank located near the loading chute. As the truck is loaded, a quantity of slurry will be sprayed on the load. Subsequently the truck will deliver the mixture to the stope being filled.

9.0 MINE SERVICES

9.1 Compressed Air and Service Water

Compressed air will be provided by new compressors installed near the portal location, and distributed via pipeline underground.

Service water will be provided by re-cycling a portion of the mine discharge water. Service water will not be potable.

Potable water will be provided as bottled water delivered to underground refuge stations and lunchrooms via service truck.

9.2 Dewatering

The dewatering system will be similar in configuration to the Panda – Koala complex, involving drainage downward from level to level via “borehole sumps” and boreholes to a main pumping facility. Submersible pumps will be provided in lower level “collection sumps” pumping up to the main pumping facility. Relay stations will pump the water to surface where it will be discharged into the Misery settling ponds. An allowance has been included in the estimates for upgrade of these ponds. The system capacity has been estimated to be 0.6 m^3 per second or 36,000 litres per minute (9,500 USGPM) based on Diavik Mine experience.

9.3 Electrical

Primary power will be provided to Jay site from the Ekati generating plant via a new transmission line running parallel to the Misery Haul Road and Jay Access Road. Underground distribution will be similar to Koala, involving common components where feasible. Conceptual electrical system drawings are provided in Appendix A.

10.0 PERSONNEL

At this level of study, forecasts of direct and indirect personnel have not been prepared. The steady state production rate is approximately double that of Koala and direct personnel requirements may vary in proportion.

Indirect personnel requirements will depend on the project and production period timing relative to other mining operations on the Ekati property.

The 100 person camp to be constructed for Jay Pipe is assumed to be of adequate capacity. If overflow is experienced during the project/construction period, some personnel may be accommodated at the main Ekati camp.

11.0 SCHEDULE

The combined pre-production and stope production schedule was prepared in EPS and transferred to Microsoft Project and is included in Appendix C.

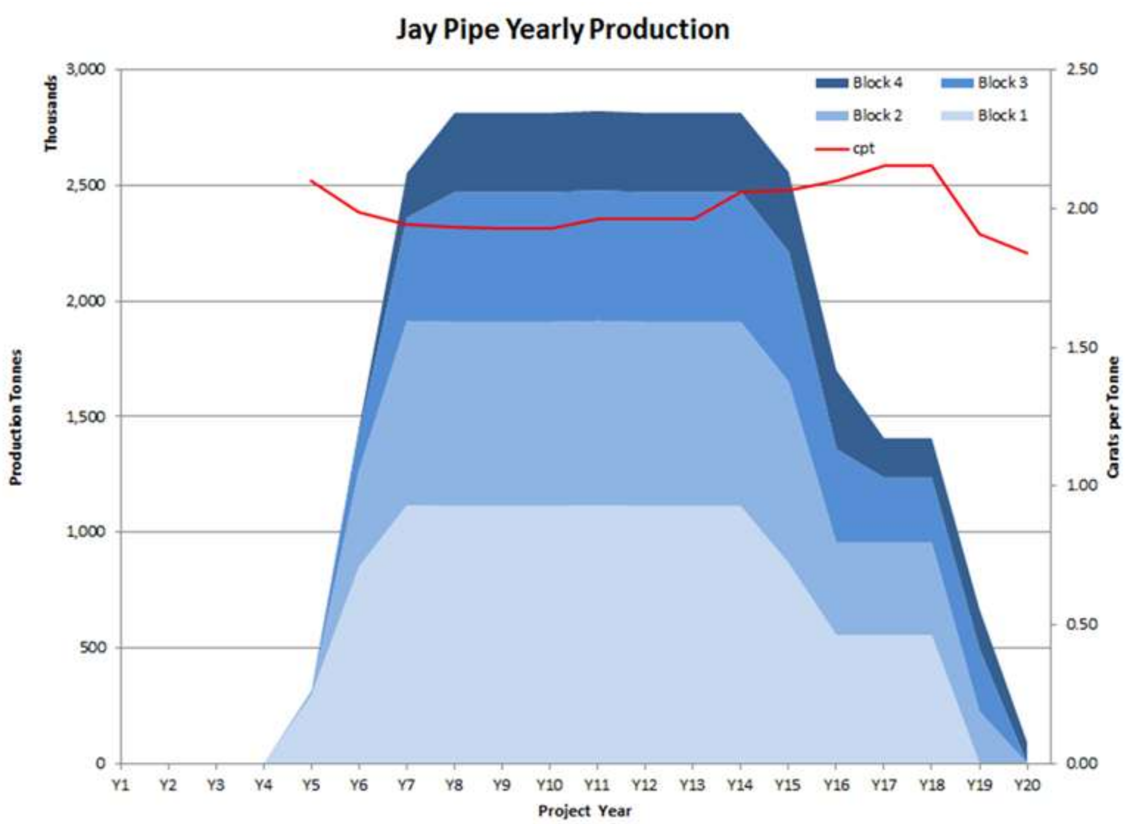
11.1 Pre-Production Period Critical Path

The earliest production will be from 2070 Level at the middle of Project Year Five (Y5). The main pre-production activities include; installation of surface infrastructure, driving the service and conveyor ramps, installation of the conveyor and sizer, pumping facilities on 2050 Level, establishing main fresh and return air systems and establishing the backfill system. Silling development on 2070 and 2090 Levels will also be required.

11.2 Production Profile

The production profile was determined from the EPS schedule and is summarized in Figure 11-1. Block production capacity was derived from detailed scheduling of a 2.5 million tonne level between 2100 Level and 2120 Level.

Figure 11-1: Production Profile



11.2.1 Stope Cycle and Productivity

The duration to mine a stope was estimated based on the key mining activities and is summarized in Table 11-1. The calculations consider a typical stope of 20 metres high x 12 metres wide x 50 metres long and ore density of 2.34.

Table 11-1: Stope Production Cycle

Mining Activity	Duration	Rate
Drilling	29 Days	259 m per day
Blasting1	3 Days	1,872 tonnes per blast
Mucking	13 Days	1,730 tonnes per day
Sub-Total	45 Days	500 tonnes per day
Backfilling	18 Days	800 tonnes backfill per day
Total	63 Days	360 tonnes per day

1 - Days added for blasting. Actual number of productions blasts is 12

Backfill curing time of 7 days was added to the filling duration. Availabilities used for the production schedule generation are:

- Workplace availability: 90%
- Equipment availability: 75%
- Backfill plant availability: 60%

For production scheduling purposes, individual stope sequencing was not prepared. The amalgamated schedule used a consolidated mining rate in tonnes per day for sill development and production. This rate was determined by sequencing a sample level (2000 Level to 2120 Level) of stopes at varying tonnes per day, with associated development, utilizing rates as per Table 11-1 (ramps, level, cross cuts and sills). Table 11-2 lists the consolidated rates for standard stopes. For stopes within mining Block 1 the rate of 1,525 tonnes per day was applied. For all other mining blocks, a consolidated mining rate was developed by factoring the Block 1 rate by the number of calculated full size stopes as per Table 11-3.

Table 11-2: Variance of Consolidated Mining Rates

Density (t per m^3)	Duration (days)	Stope Size (tonnes)	Mining Rate (tonnes per day)	Consolidated Mining Rate (tonnes per day)
2.20	63	21,120	340	1495
2.25	63	21,600	340	1515
2.27	63	21,792	350	1525
2.30	63	22,080	350	1535
2.35	63	22,560	360	1560

Table 11-3: Consolidated Mining Rates Used

Mining Block	Stopes per Level	Change from Block 1	Consolidated Mining Rate (tonnes per day)
1	103	0%	1525
2	73	29%	1080
3	52	49%	770
4	32	69%	470

For scheduling purposes the quantities used for development drifting reflect an additional 10% excavation allowance for miscellaneous slashes/cut-outs that are anticipated, but not designed at this time. In the kimberlite drawpoints, there is no development allowance.

Table 11-4: Development Advance Rates

Drift Size (height x width)	No. of Headings	Advance (m/day)
5.5 m x 5.5 m (Granite) Ramp Access	Single Multiple	5.0 5.6
5.0 m x 5.5 m (Granite) Level Access/ Extraction Drift	Single Multiple	5.0 5.6
5.0 m x 5.0 m (Granite) Level Development	Single Multiple	5.0 5.6
4.6 m x 4.5 m (Granite) Crosscut	Single Multiple	5.0 5.6
4.6 m x 4.5 m (Poor Kimberlite) 4.6 m x 4.5 m (Very Poor Kimberlite)	Multiple Multiple	5.0 4.0

12.0 COST ESTIMATES AND FINANCIAL ANALYSIS

The cost estimates are based on the following.

- Prior studies prepared by Stantec for the Ekati Mine.
- Actual Ekati site cost data where available.
- First principals "built-up" estimates.

Historical estimates were escalated to Year 2013 at 5% per annum. Inflation from Year 2013 forward was not applied.

The cost estimates were prepared in constant dollars (2013 Canadian currency) to an overall "bottom line" accuracy level of ±30 to 35%. It is assumed that contractor crews will complete all pre-production/ongoing development and steady-state operations.

The cost estimates are summarized in Table 12-1 and presented in more detail in Appendix D.

Table 12-1: Cost Estimate Summary

WBS Level 1	Description	Quantity	Unit	Unit Cost	Budgeted Cost
1	Surface Infrastructures	1	ls		$82,716,267
2	Underground Mobile Equipment Purchase	54	each		$59,101,384
3	Mine Development	15,995	metres		$162,102,014
4	Mine Operations	31,866,051	Tonnes	$60.2	$1,917,816,111
5	Mine Ventilation System	1	ls		$34,443,008
6	Material Handling System	1	ls		$79,747,000
7	Underground Infrastructures	1	ls		$49,866,737
8	Owner's Indirects	31,866,051	Tonnes	$32.7	$1,041,508,164
	Total Jay Pipe Concept Study				$3,427,300,685

The estimated costs have been categorized as pre-production capital costs, sustaining capital costs and operating costs

12.1 Capital Costs

The pre-production (project period) capital costs generally include all surface and permanent underground development/infrastructure in waste necessary to support the initial stoping operations. The project period ends when the primary ventilation raises, initial dewatering facilities, and the ore handling system are commissioned. Operating costs incurred prior to the end of the project period are included in the pre-production capital costs.

A contingency of 20% is applied to the pre-production capital costs in the cash flow model.

The sustaining capital costs reflect the post-project period life-of-mine requirements for ramp and primary level access, and for extension of infrastructure systems such as ventilation and dewatering.

Waste development directly associated with the stoping approach (i.e. cross-cuts, drawpoint access, etc.) is included with the operating costs.

12.2 Operating Costs

The operating costs reflect all labour, material, equipment, and consumables required on a daily basis to produce the ore tonnages involved. The costs include surface transportation from Jay Pipe to a stockpile at the processing plant at Ekati. Downstream costs for processing, refining, and marketing are not included in the cost estimates, however, a processing cost of $11.00 per tonne is applied in the cash flow model.

12.3 Cash Flow

Based on the resource grades and diamond value provided by DDEC and the production forecast prepared by Stantec, a forecast of annual revenues was prepared. A process plant recovery factor of 85% was applied.

Based on the life-of-mine schedule and cost estimates, an annual expenditure forecast was prepared. These components were combined to assemble the cash flow model.

The estimated costs have been categorized as pre-production capital costs, sustaining capital costs and operating costs. A contingency of 20% is applied to the pre-production capital costs in the cash flow model.

Inflation from Year 2013 forward has not been applied.

NPV was calculated using 7% discount rate.

Downstream costs for refining and marketing are not included. A processing cost of $11.00 per tonne is applied in the cash flow model.

The estimated cash flow is presented in Appendix D.

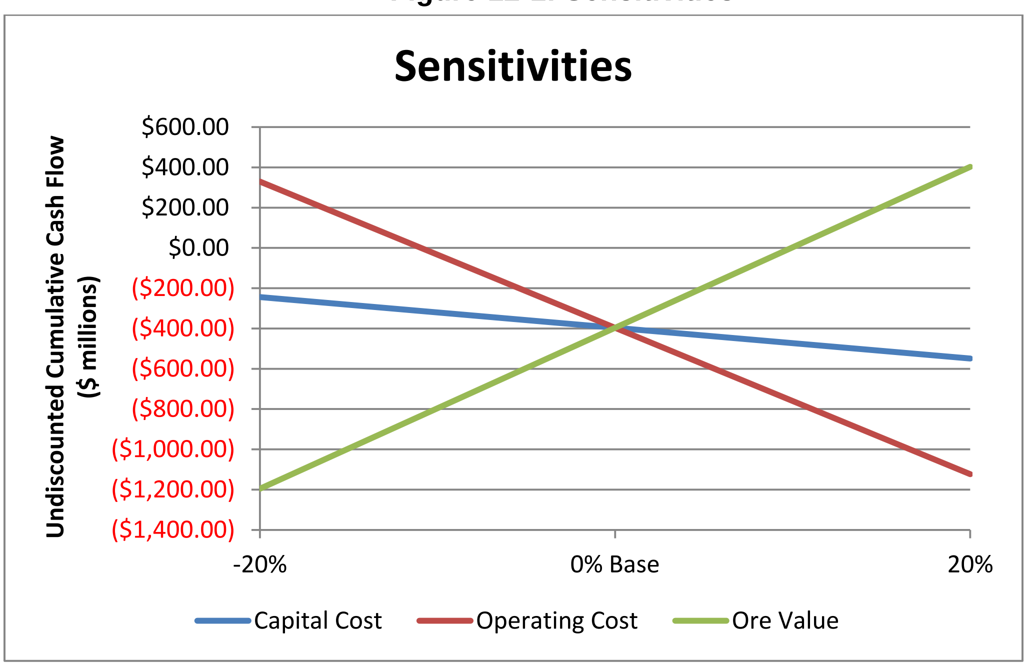
12.4 Sensitivities

Sensitivities (+20% and -20%) to Ore Values, Capital Costs, and Operating Costs have been prepared against undiscounted cash flow and are summarized in Table 12-3 and presented graphically in Figure 12-1. The undiscounted cumulative cash flow is most sensitive to the ore value and least sensitive to capital costs.

Table 12-2 – Sensitivities

Sensitivity Item	Undiscounted Cumulative Cash Flow ($ millions)		
	-20%	0% Base	20%
Capital Cost	($244.23)	($396.50)	($548.78)
Operating Cost	$330.10	($396.50)	($1,123.11)
Ore Value	($1,196.08)	($396.50)	$403.08

Figure 12-1: Sensitivities

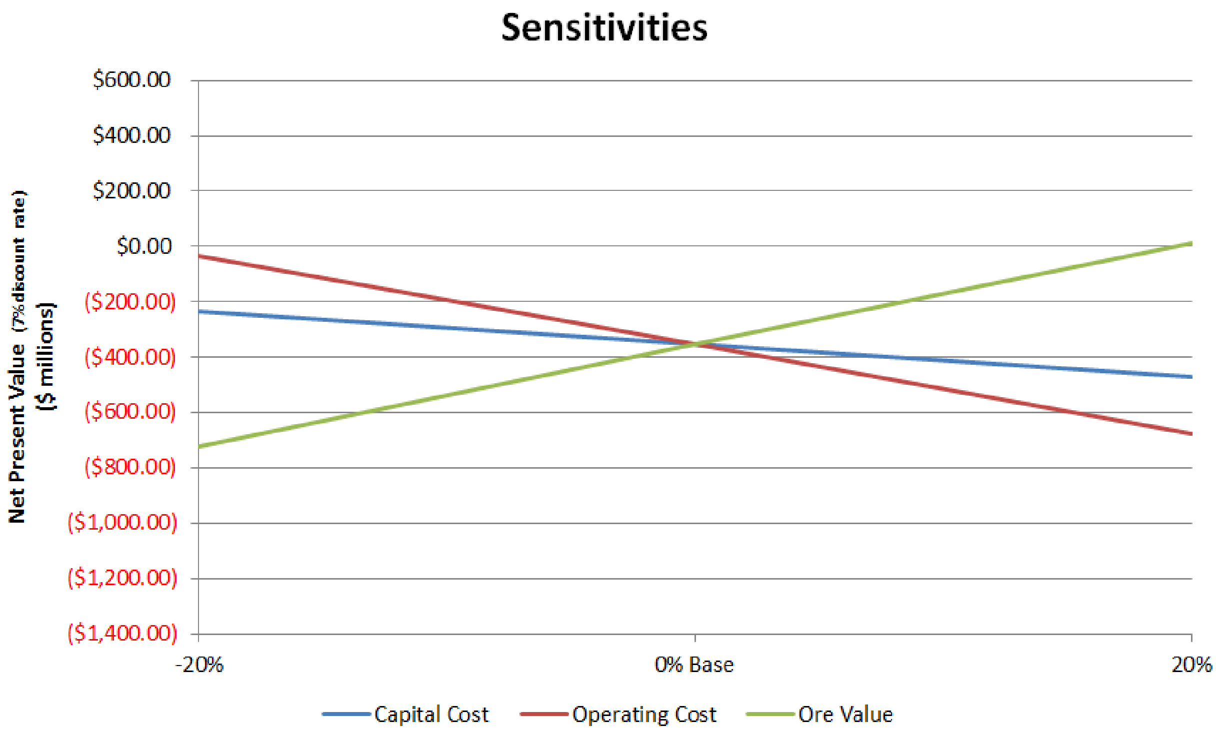


Sensitivities against NPV are summarized in Table 12-3 and presented graphically in Figure 12-2.

Table 12-3 – Sensitivities using Net Present Value

Sensitivity Item	Net Present Value (7% dicount rate) ($ millions)		
	-20%	0% Base	20%
Capital Cost	($236.92)	($355.13)	($473.34)
Operating Cost	($32.82)	($355.13)	($677.44)
Ore Value	($724.62)	($355.13)	$14.37

Figure 12-2 – Sensitivities using Net Present Value



13.0 RISKS AND OPPORTUNITIES

Risks

A fundamental risk with the Base Case underground mining approach described in this report relates to the integrity of the crown pillar and the potential for water and/or mud ingress into the mine workings. At this conceptual stage of study it has been assumed that the selected crown pillar size will be adequate. Thorough geomechanical analysis will be required to test this assumption before subsequent mine studies/designs are prepared.

Exploration holes have been drilled, downward through the resource, including the crown pillar. These holes are reported to have been grouted, however records are incomplete. Confirmation and verification of the condition and location of these holes will be required to mitigate the risk of development or production mining encountering a hydraulic connection to the lake (with subsequent risk of flooding).

Dewatering facilities have been sized in this analysis based on system capacities at the other Ekati and Diavik underground operations. Risk assessment and analysis related to the crown pillar, potential water inflows and dewatering system capacity is recommended at a later stage of study.

Other risks associated with this mining concept include the following.

- Geomechanical conditions at the surface collar locations of the ventilation and backfill raises and the ramp portals may be poor, leading to higher costs and longer construction periods than anticipated.
- Ground conditions in the host rock and in the kimberlite have been assumed to be similar to those at Koala and Panda so that ground support requirements and advance rates will be similar. Poorer conditions would result in slower advance and higher costs.
- The current resource has been estimated to ±400 metres depth. For purposes of this study the resource has been extrapolated to 600 metres depth, assuming a continuous trend of grade and tonnage per level. Further exploration might prove these assumptions to be either optimistic or pessimistic.

Opportunities

The following opportunities are suggested.

- The depth of Lac du Sauvage above Jay Pipe represents a fundamental risk to the underground mining approach described in this report. In the open pit approach (described elsewhere by others), a major cost and similar risk are associated with the perimeter dyke required to surround the pit and control the lake waters from entering the pit. If the level of Lac du Sauvage can be corrected to a lower elevation, then both of these risk areas will be mitigated accordingly.

- Use of a perimeter dyke (with or without lake level correction) in combination with an underground mining approach may provide lower risk and improved economics. The perimeter dyke might be of lesser circumference than in the open pit model. The underground mine could be allowed to cave through to surface (inside the perimeter dyke). The entire pipe would thus be available (no crown pillar). Backfill would not be required, so that operating costs would be reduced accordingly.
- The current resource is defined to ±400 metres depth below lake level. An exploration ramp might be driven from the shore of Lac du Sauvage to encounter the pipe at approximately 350 metres depth and a drift might be driven from this point horizontally through the kimberlite. The kimberlite drift would provide:
  - A bulk sample to test the geological resource estimates.
  - An opportunity to assess geomechanical conditions and ground support requirements.
  - A platform for exploration drilling to greater depth.
  - The exploration ramp might serve as the service ramp in the final mine design.

14.0 CONCLUSIONS

The following advantages and disadvantages are associated with the underground mining approach described in this report.

Advantages

- The approach involves a crown pillar extending some 200 metres from the bottom of Lac du Sauvage to the top mining level. The crown pillar is envisioned to remain in place with partial support provided by backfill. The lake bottom will not be disturbed except for the construction of causeways to provide access to two islands.
- The underground working environment may be more consistent and less susceptible to weather interruptions, compared to open pit alternatives.
- The mine openings provide a platform for further exploration drilling to depth.

Disadvantages

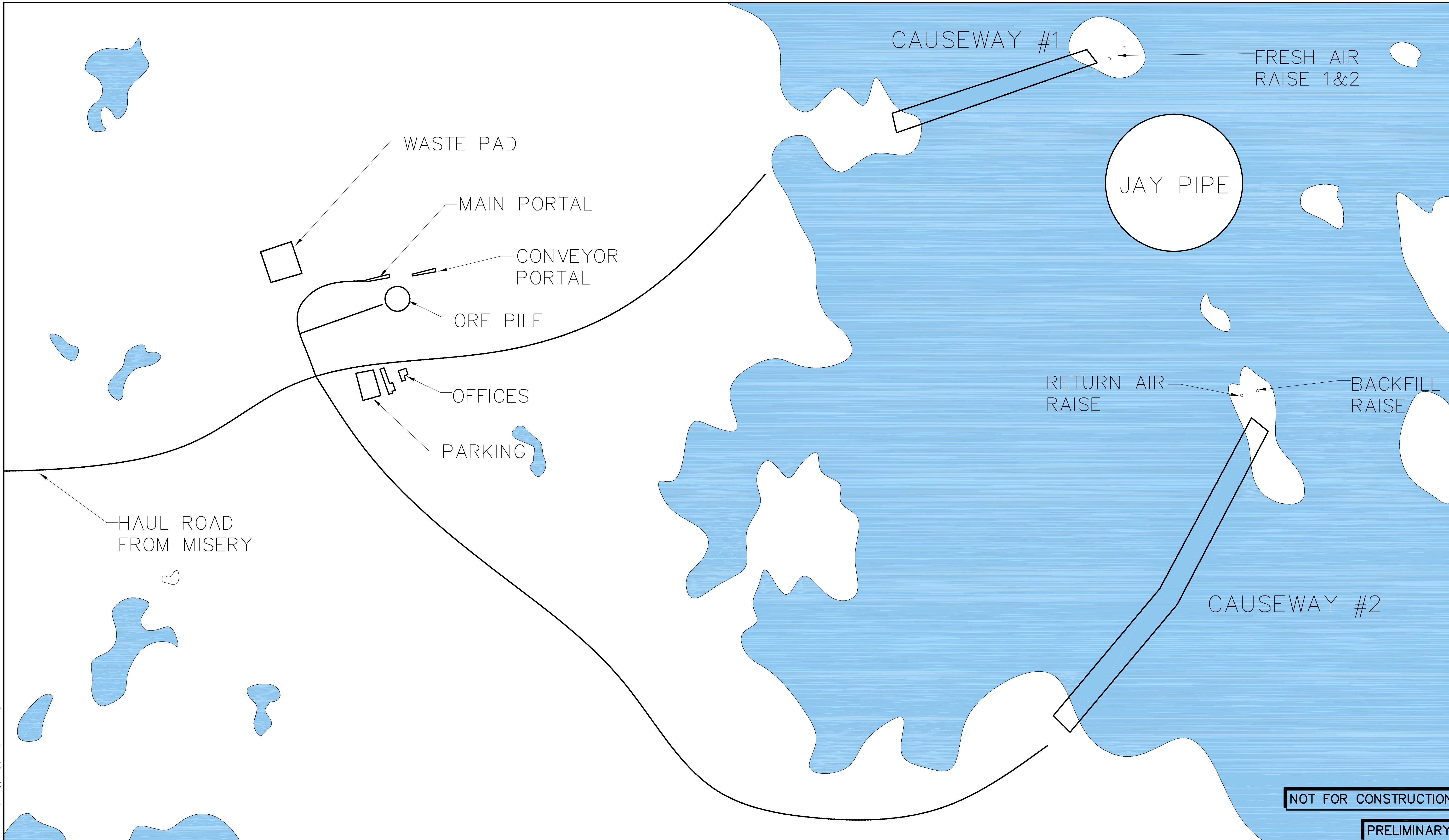
- The approach requires that the upper portion of the resource remain in place as a crown pillar and not be mined.
- The operating costs are comparatively high. The requirement for backfill contributes to these costs.
- To ensure the adequacy of the crown pillar, thorough geomechanical analysis is required. Following this analysis, estimates should be updated regarding:
  - The portion of the resource required to remain in place as the crown pillar.
  - The costs associated with potential crown pillar support.
  - The risk of water inflow in excess of dewatering equipment capacity.
  - The potential for sudden inrush of water or mud.

APPENDIX A

DRAWINGS

JAY PIPE

Drawing No.	SURFACE INFASTRUCTURE	
100-A0001	Site Plan	1
151-A0001	Primary Intake Fans & Heater House - General Arrangement - Plan	1
151-A0002	Primary Intake Fans & Heater House - General Arrangement - Section	1
	UNDERGROUND INFASTRUCTURE	
400-U0001A	Mine Dewatering General Arrangement - Borehole sump - Plan and Sections	1
400-U0002A	Mine Dewatering General Arrangement - Main Sump & Pump station - Plan and Sections	1
400-U0003A	Mine Dewatering General Arrangement - Collection Sump - Plan and Sections	1
400-U0004A	Back Fill Station & Sump - General Arrangement	1
400-U0005A	Sizer Room & Picking belt Arrangement Plan	1
400-U0006A	Sizer Room & Picking belt Arrangement Section	1
420-A0001	Service Area General Arrangement	1
470-A0001	Detonator Magazine General Arrangement - Plan	1
470-A0002	Explosive Magazine General Arrangement - Plan	1
470-A0003	Permanent Refuge Station General Arrangement - Plan and Sections	1
500-U0001A	Typical Ramp Profile 5.5m x 5.5m - Ramp	1
500-U0002A	Typical Drift Profile 5.0m x 5.0m - Drift	1
500-U0003A	Typical Ramp Profile 5.5m x 5.5m - Conveyor	1
510-U0001A	Mine Long Section	1
520-U0001A	Level Plan - 2070L	1
520-U0002A	Level Plan - 2050L	1
520-U0003A	Level Plan - Sub Level	1
520-U0004A	Ramp Plan - Conveyor & Main Ramp Profile	1
530-U001A	Mining Methods	1
	ELECTRICAL	
13545-ESK001A-RA	Riser Diagram - Mine Services	1
13545-ESK002A-RA	Riser Diagram - Block 1	1
13545-ESK003A-RA	Riser Diagram - Block 2	1
13545-ESK004A-RA	Riser Diagram - Block 3	1
13545-ESK005A-RA	Riser Diagram - Block 4	1
13545-ESK006A-RA	Riser Diagram - Mobile Rack	1
	TOTAL DRAWINGS	28



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PROPERTY: JAY PIPE
PROJECT: CONCEPT STUDY
MINE SITE PLAN
GENERAL ARRANGEMENT

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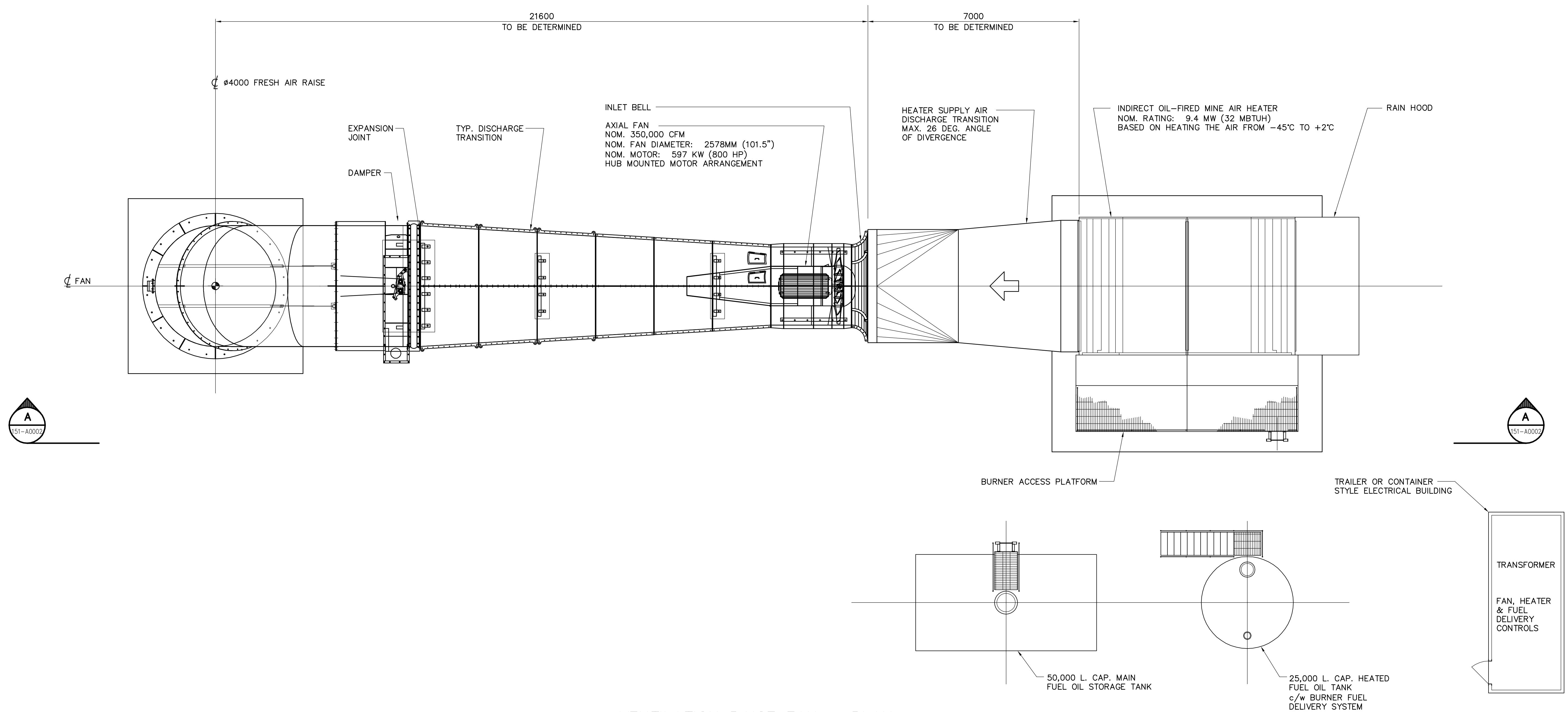

VENTILATION RAISE FAN – PLAN
(2 REQUIRED PER FRESH AIR RAISE)

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DWG. NO. 151-A0001
REV. NO. A

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REV. NO. A

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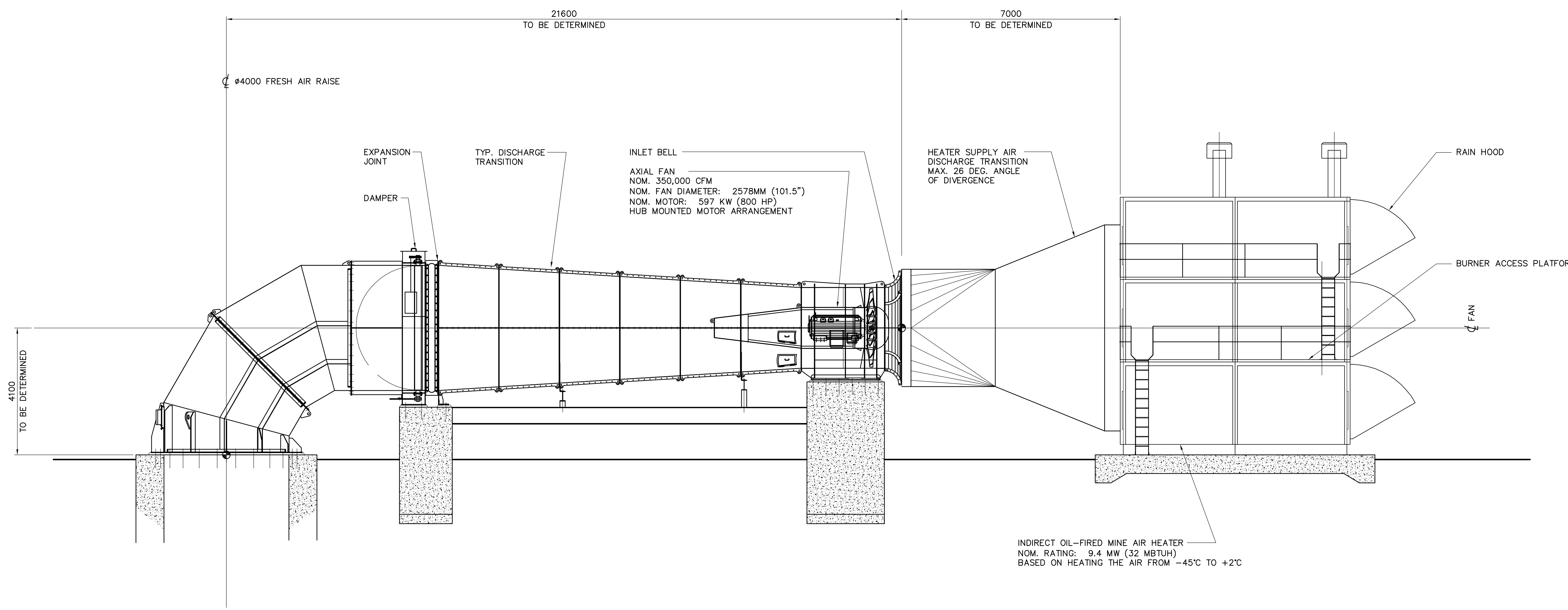

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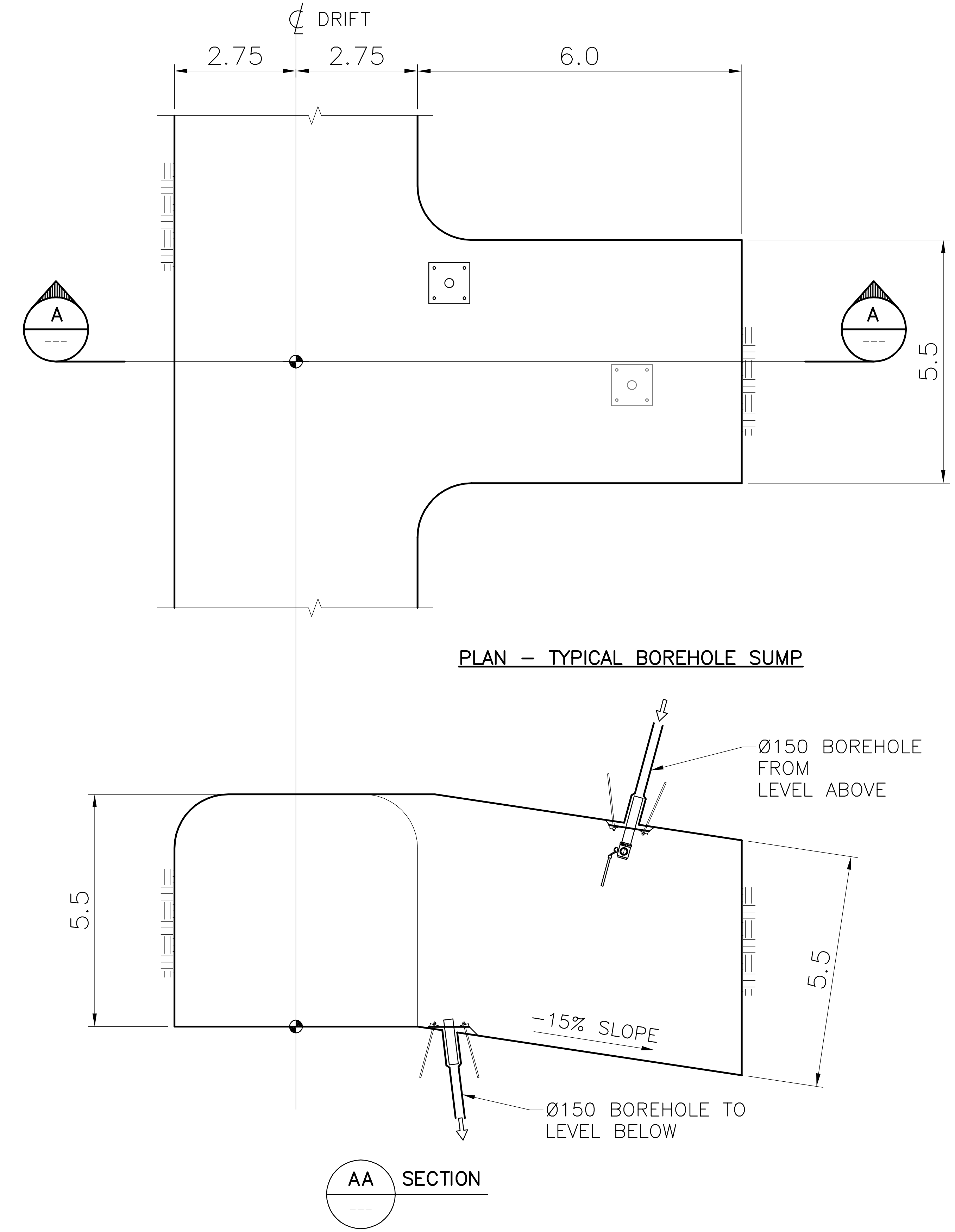

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PROPERTY: JAY PIPE
PROJECT: MINE DEWATERING
TYPICAL BOREHOLE SUMP
GENERAL ARRANGEMENT PLAN & SECTION

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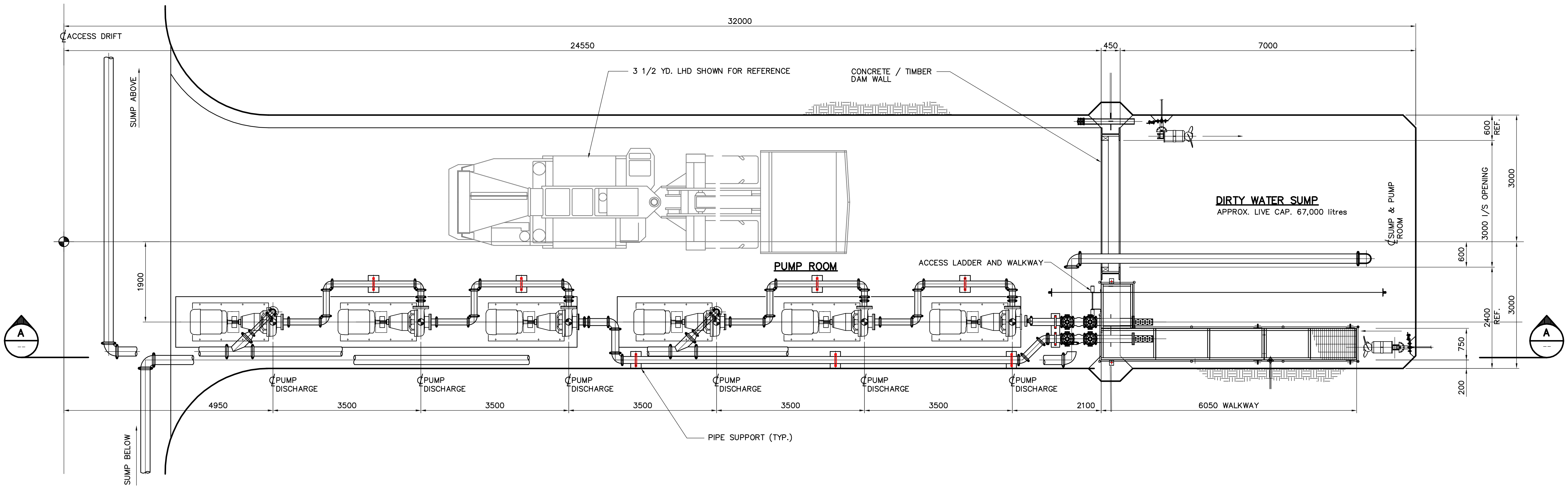
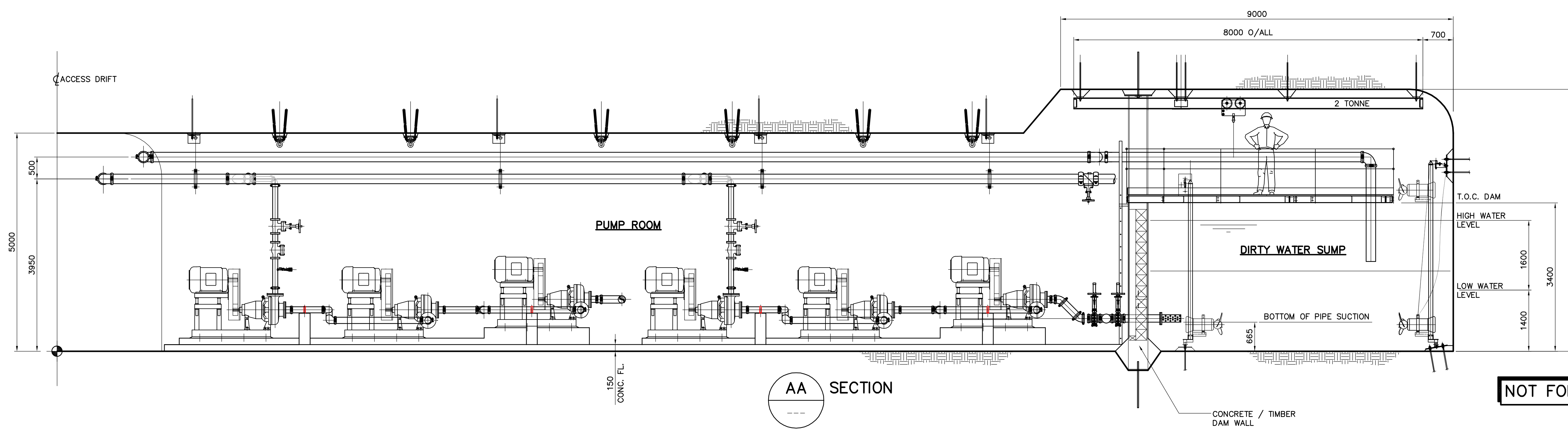


PLAN – MAIN SUMP & PUMP STATION



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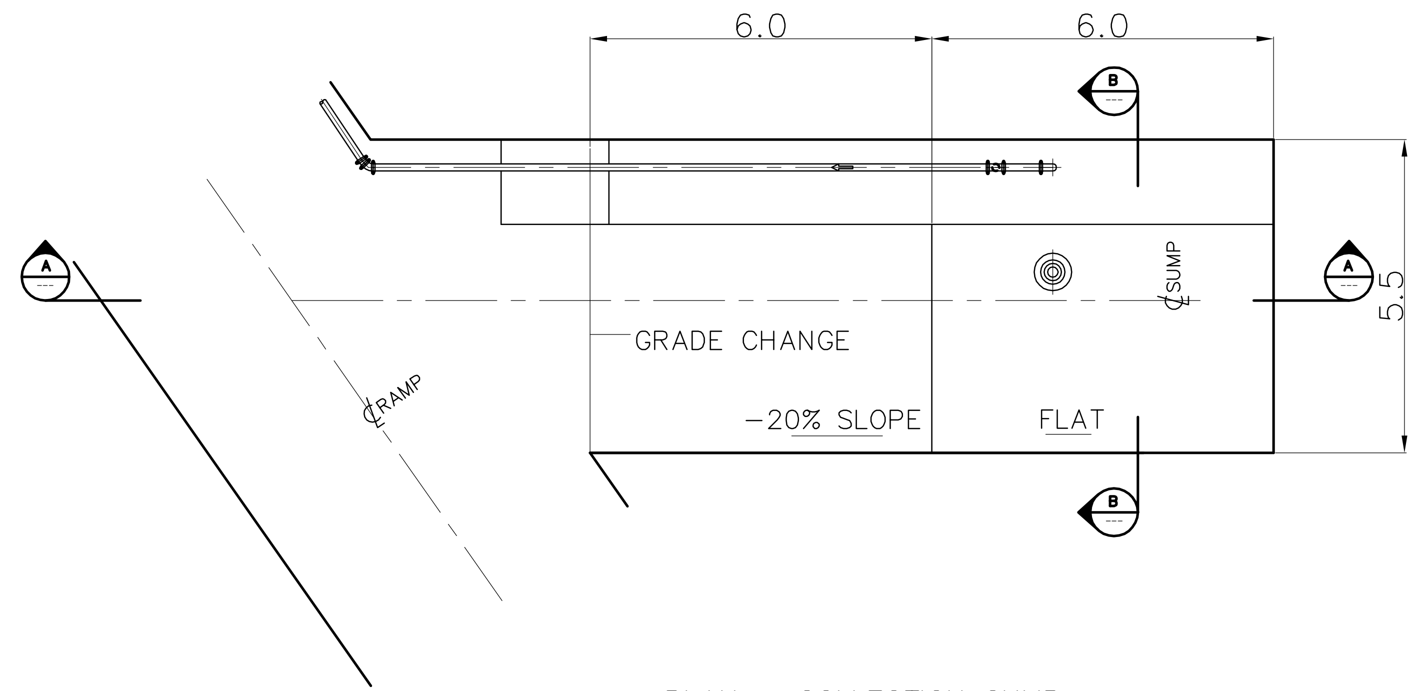
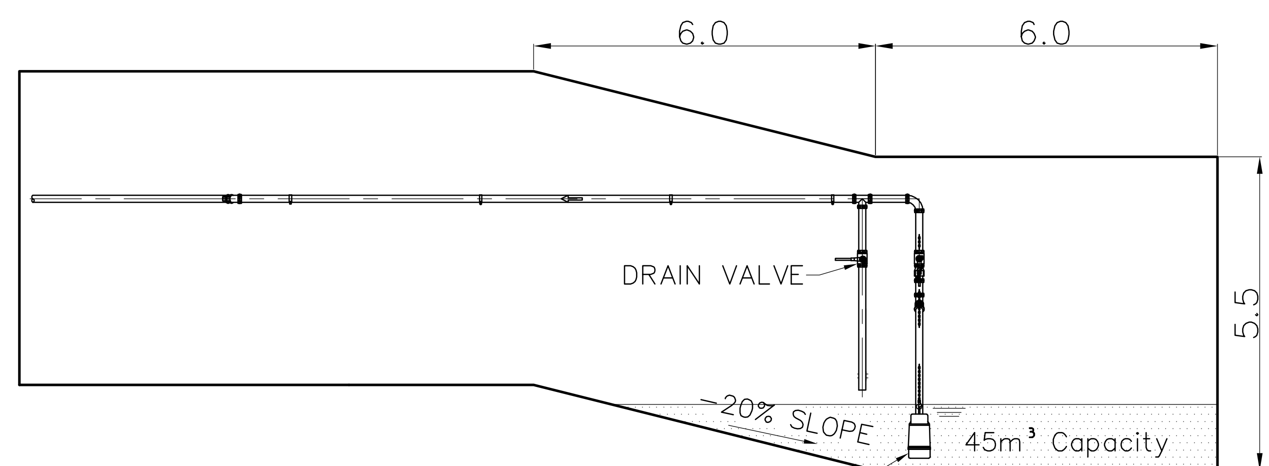


PLAN – COLLECTION SUMP



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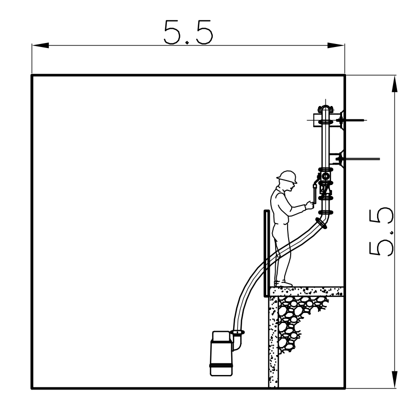

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PLAN & SECTION

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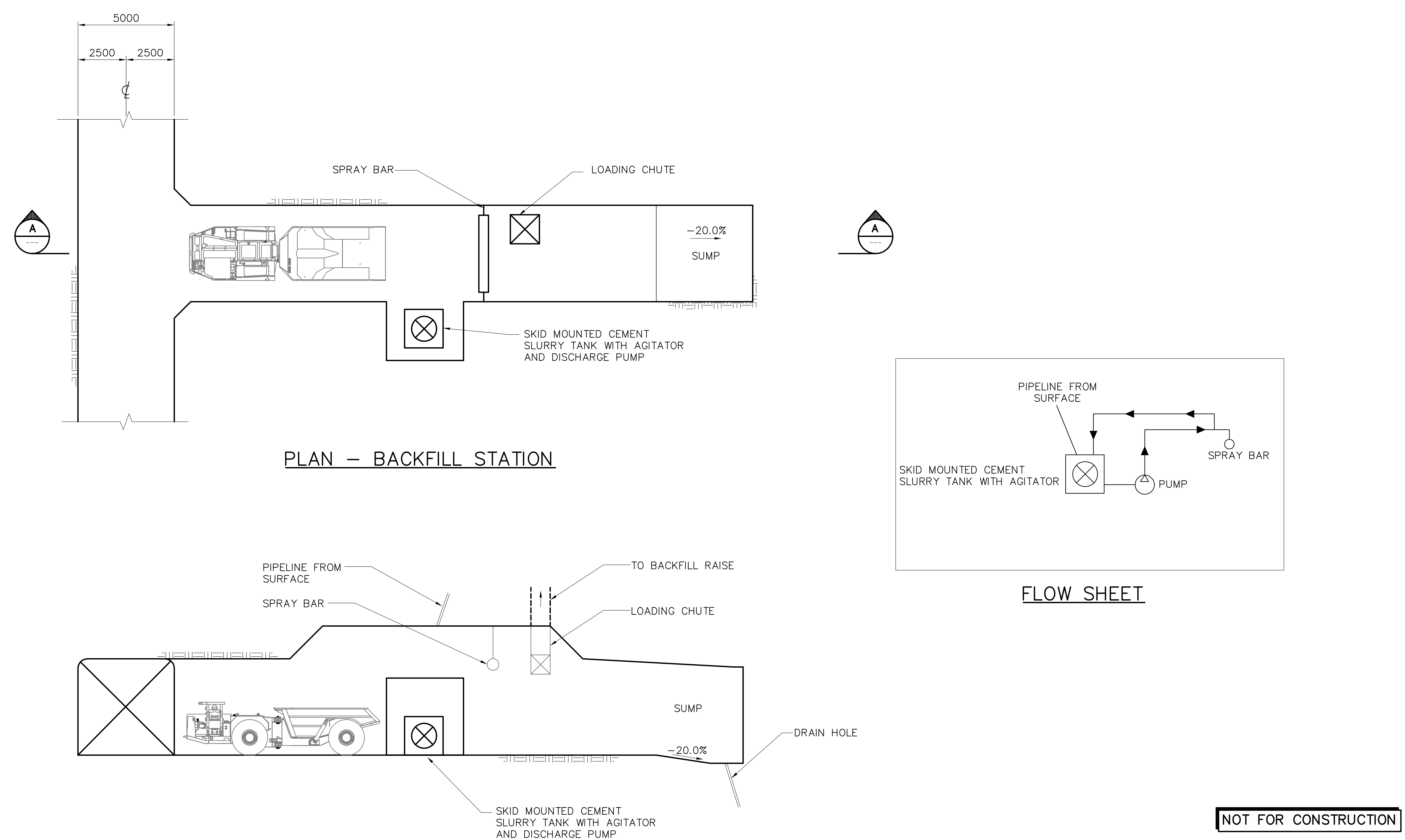

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PROJECT: BACKFILL STATION & SUMP GENERAL ARRANGEMENT PLAN & SECTION

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REV. NO. A

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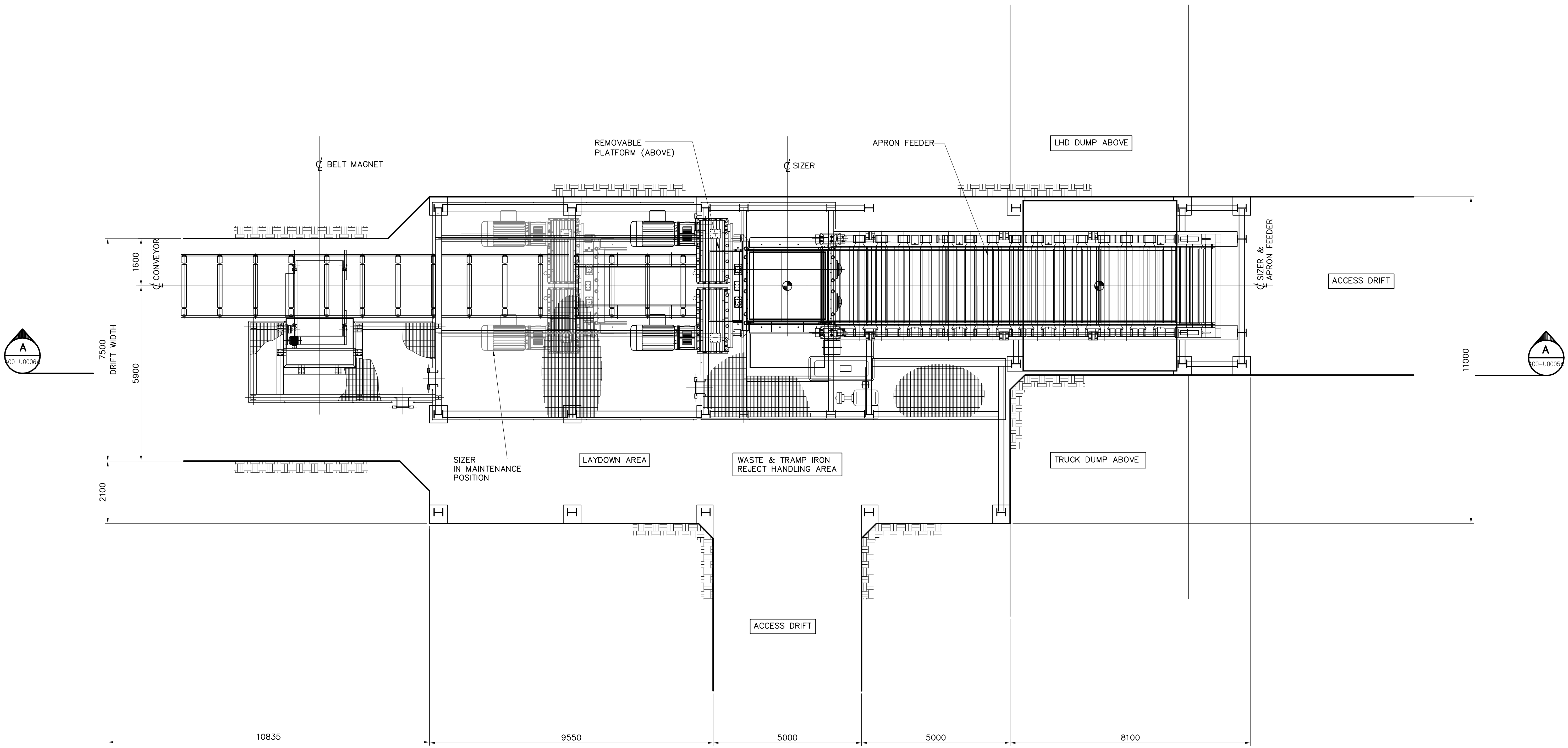

PLAN – 2050L – SIZER ROOM

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PROPERTY: JAY PIPE
PROJECT: SIZER ROOM & PICKING BELT GENERAL ARRANGEMENT 2050L SECTION
SCALE: NTS
PROJ. NO. 169513545
DWG. NO. 400–U0005A
REV. NO. A

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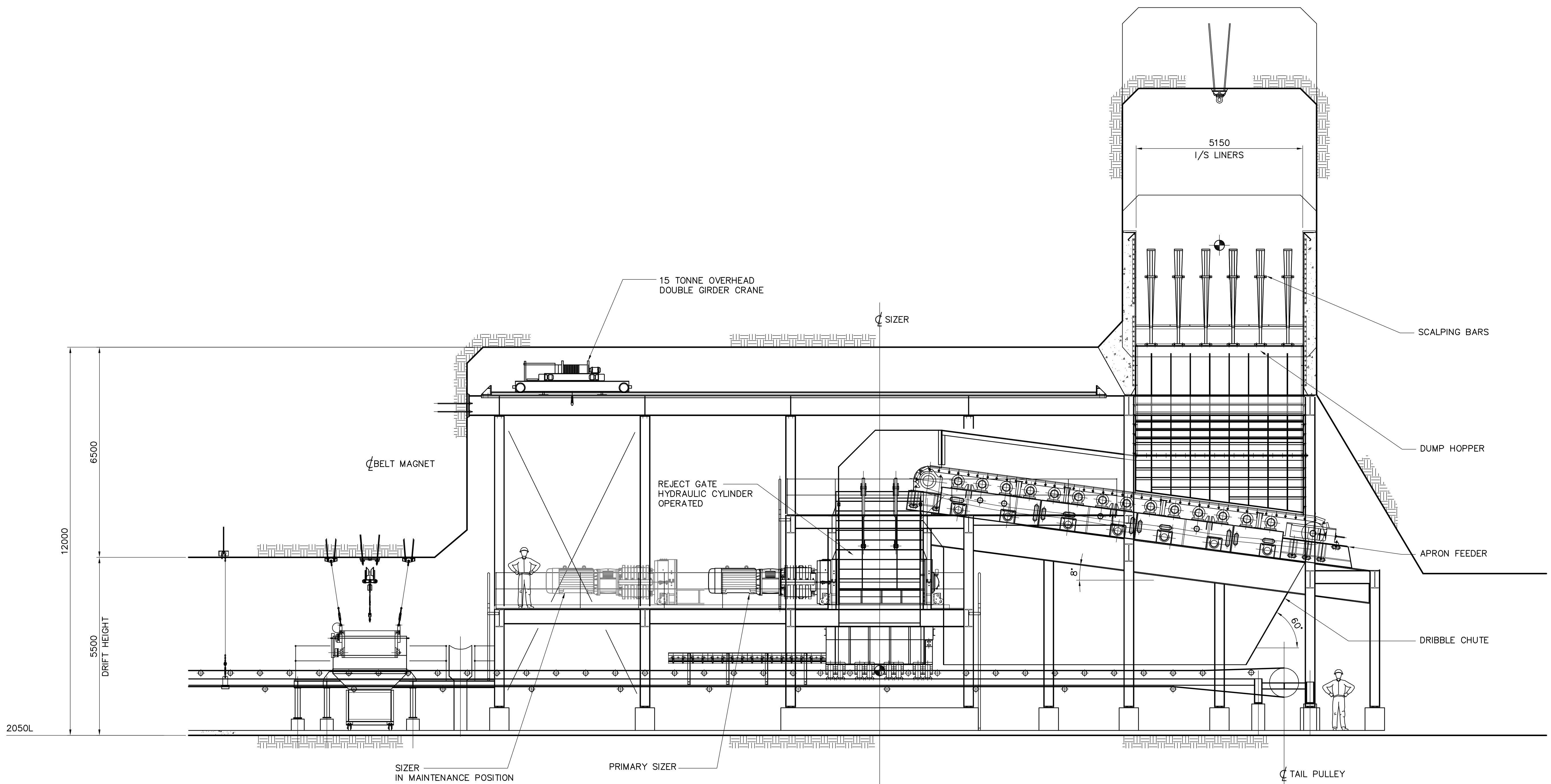

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SECTION

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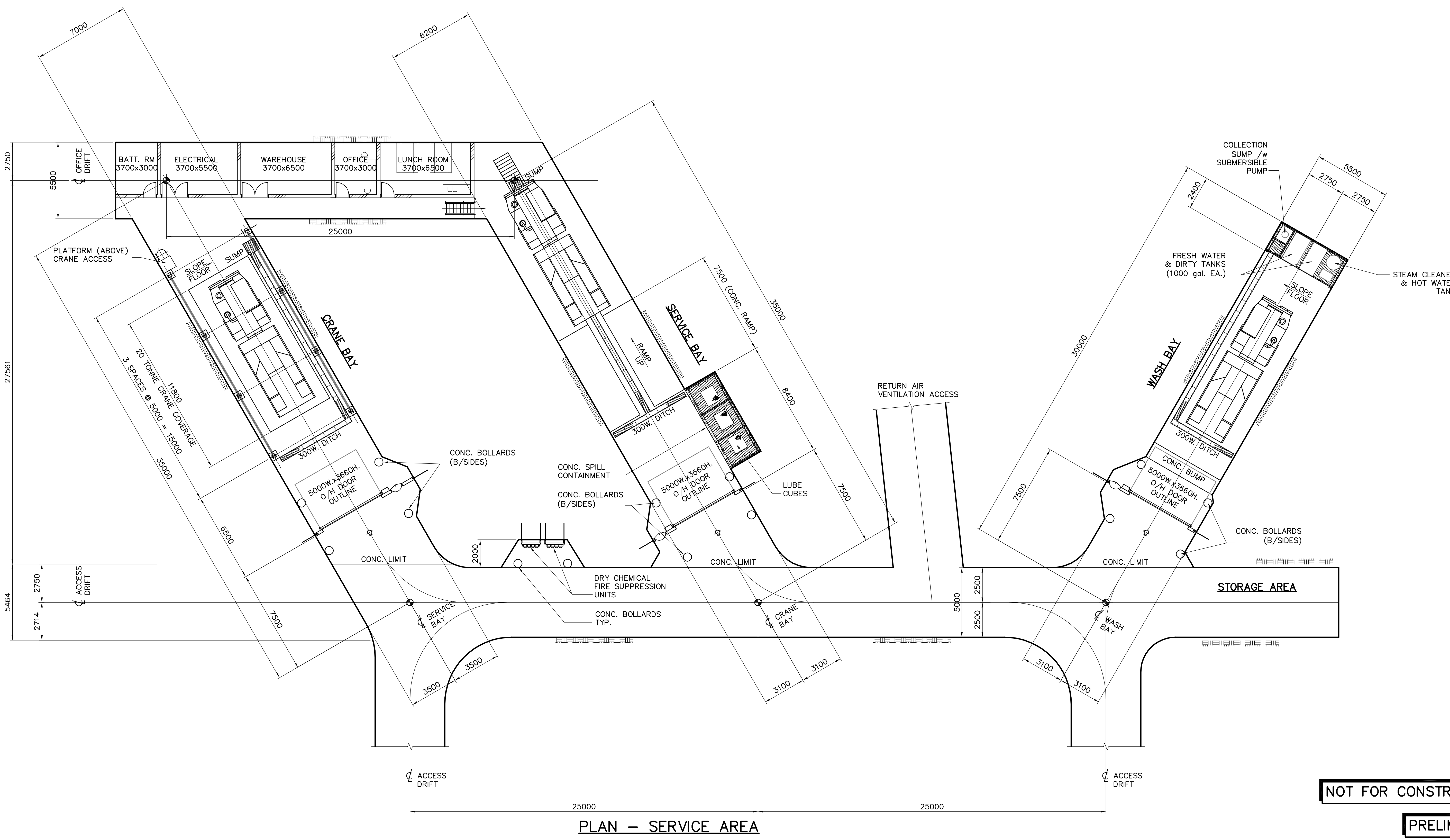
ORIGINAL DRAWN BY: MDL
DATE: 2013.08.01

Stantec

CLIENT: DOMINION DIAMOND
PROPERTY: JAY PIPE
PROJECT: SIZER ROOM & PICKING BELT GENERAL ARRANGEMENT 2050L SECTION
SCALE: NTS
PROJ. NO. 169513545
DWG. NO. 400-U0006A
REV. NO. A

PROJ. NO. 169513545
DWG. NO. 400-U0006A
REV. NO. A

Aug 09, 2013 – 2:58pm \\CD1212-N01U\169513545\drawing\mining_prelim\400-U0006A.dwg



PLAN – SERVICE AREA

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PROJ. NO.	DWG. NO.	REV. NO.
169513545	470-A0001	A

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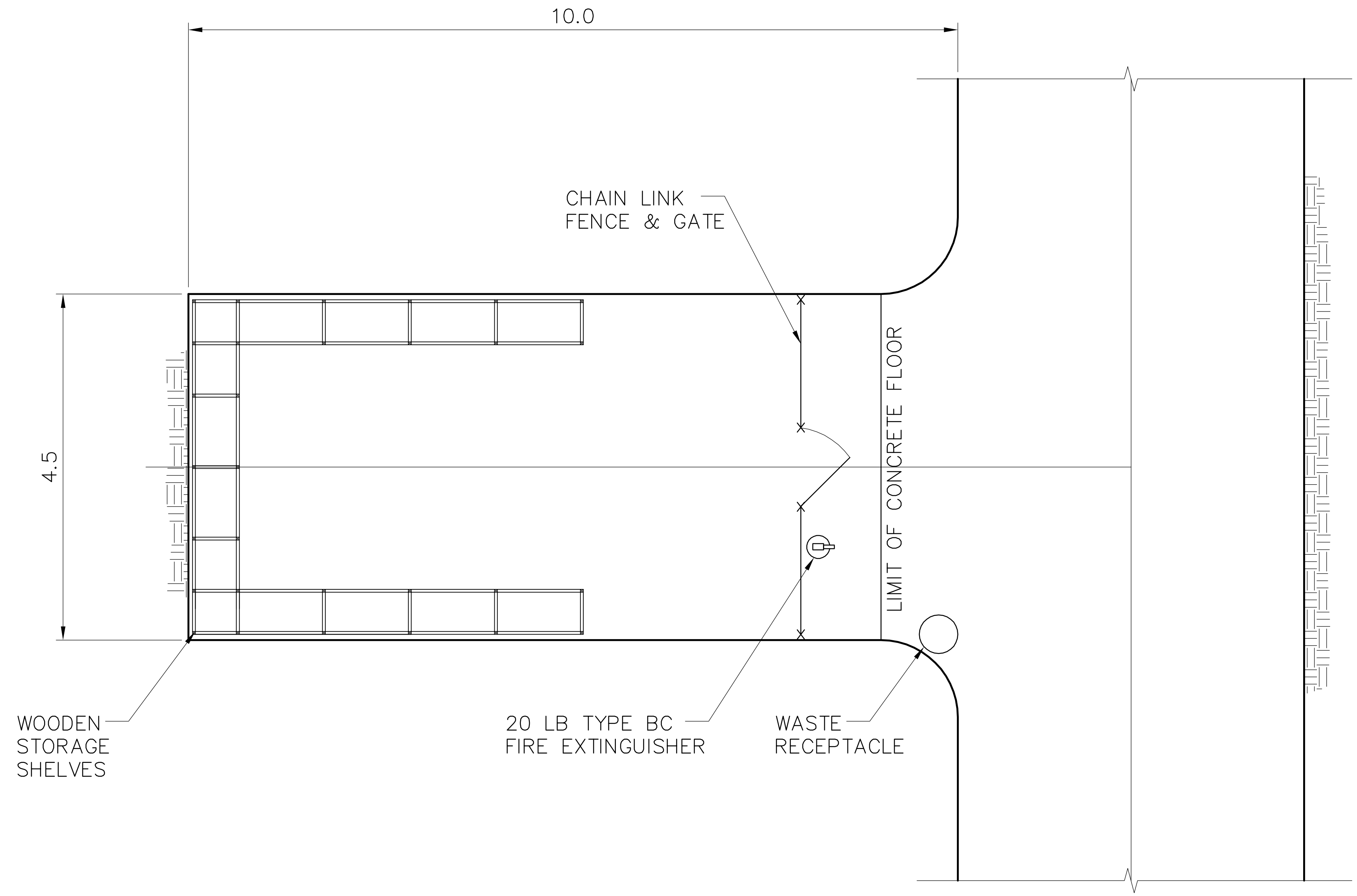
DATE: 2013.08.01

Stantec

CLIENT: DOMINION DIAMOND
PROPERTY: JAY PIPE
PROJECT: U/G INFRASTRUCTURE SERVICE AREA G.A PLAN

SCALE:	PROJ. NO.	DWG. NO.	REV. NO.
NTS	169513545	420-A0001	A

Aug 09, 2013 – 2:58pm \\CD1212-N01U:\169513545\drawing\mining_prelim\420-A0001.dwg



PLAN – DETONATOR MAGAZINE

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ORIGINAL DRAWN BY: MDL
DATE: 2013.08.01

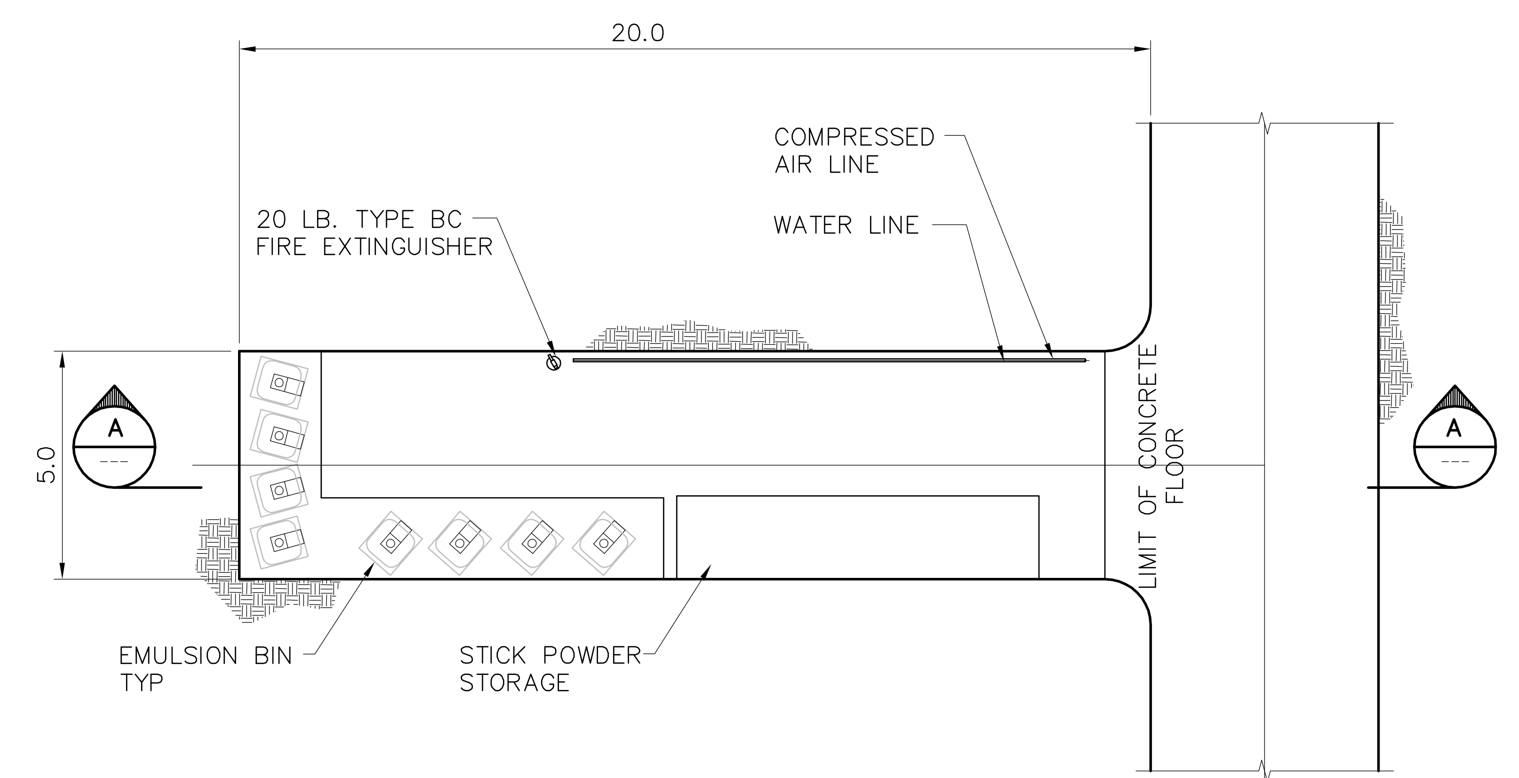
Stantec

CLIENT: DOMINION DIAMOND
PROPERTY: JAY PIPE
PROJECT: DETONATOR MAGAZINE GENERAL ARRANGEMENT PLAN

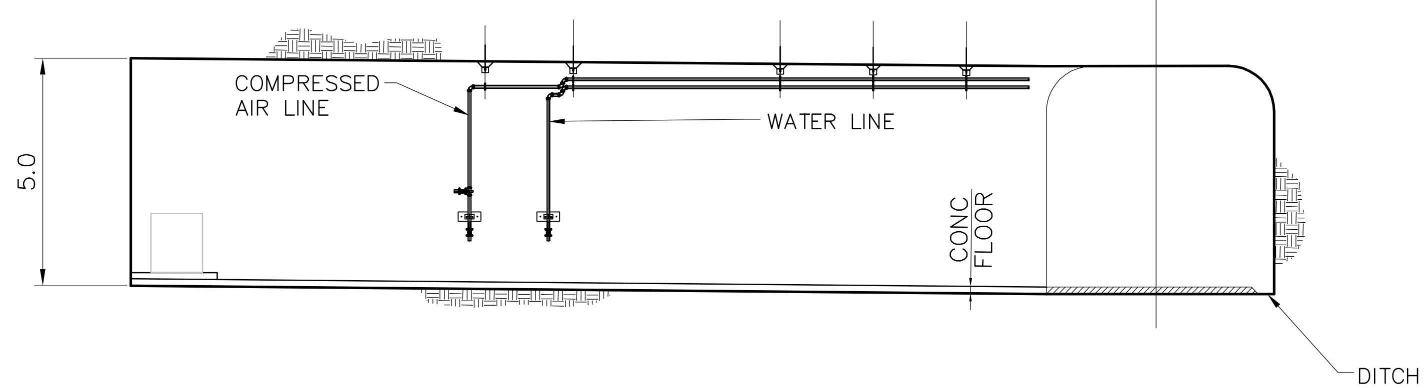
SCALE: NTS | PROJ. NO. 169513545 | DWG. NO. 470–A0001 | REV. NO. A

PROJ. NO. 169513545 DWG. NO. 470–A0001 REV. NO. A

Aug 09, 2013 – 2:59pm \\CD1212–N01U:\169513545\drawing\mining_prelim\470–A0001.dwg



PLAN – EXPLOSIVE MAGAZINE



AA SECTION

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DATE: 2013.08.01

Stantec

CLIENT: DOMINION DIAMOND
PROPERTY: JAY PIPE
PROJECT: EXPLOSIVE MAGAZINE GENERAL ARRANGEMENT PLAN

SCALE: NTS
PROJ. NO. 169513545
DWG. NO. 470–A0002
REV. NO. A

PROJ. NO. 169513545
DWG. NO. 470–A0002
REV. NO. A

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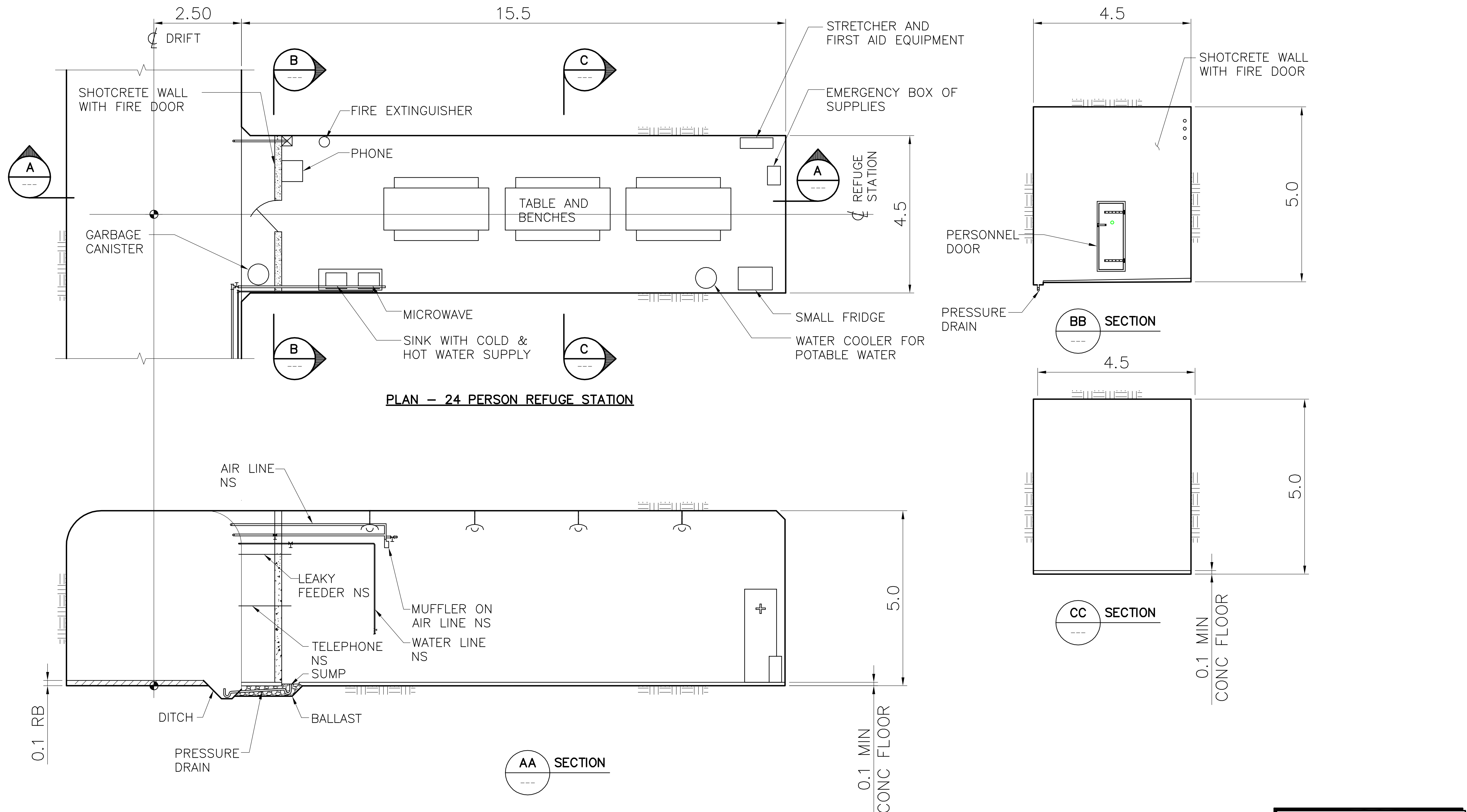

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DATE: 2013.08.01

Stantec

CLIENT: DOMINION DIAMOND
PROPERTY: JAY PIPE
PROJECT: REFUGE STATION GENERAL ARRANGEMENT PLAN

SCALE: NTS
PROJ. NO. 169513545
DWG. NO. 470–A0003
REV. NO. A

PROJ. NO. 169513545
DWG. NO. 470–A0003
REV. NO. A

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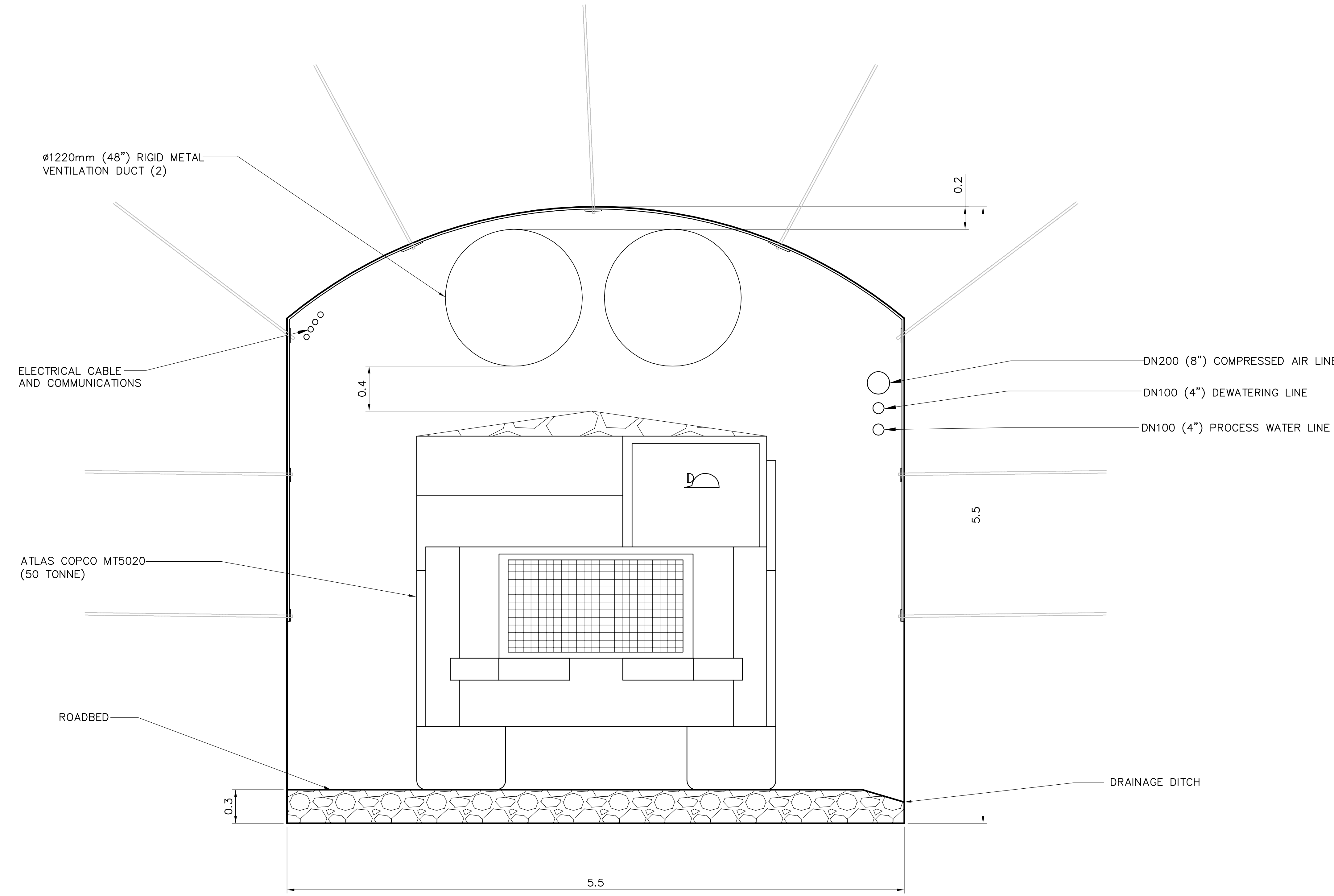

RAMP PROFILE WITH VENTILATION DUCTING & 50 TONNE TRUCK

5.5m WIDE x 5.5m HIGH ARCH BACK DRIFT

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PRELIMINARY

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CLIENT: DOMINION DIAMOND
PROPERTY: JAY PIPE
PROJECT: RAMP PROFILE 5.5m x 5.5m 50 TONNE TRUCK

SCALE:	PROJ. NO.	DWG. NO.	REV. NO.
NTS	169513545	500–U0001A	A

PROJ. NO. 169513545 DWG. NO. 500–U0001A REV. NO. A

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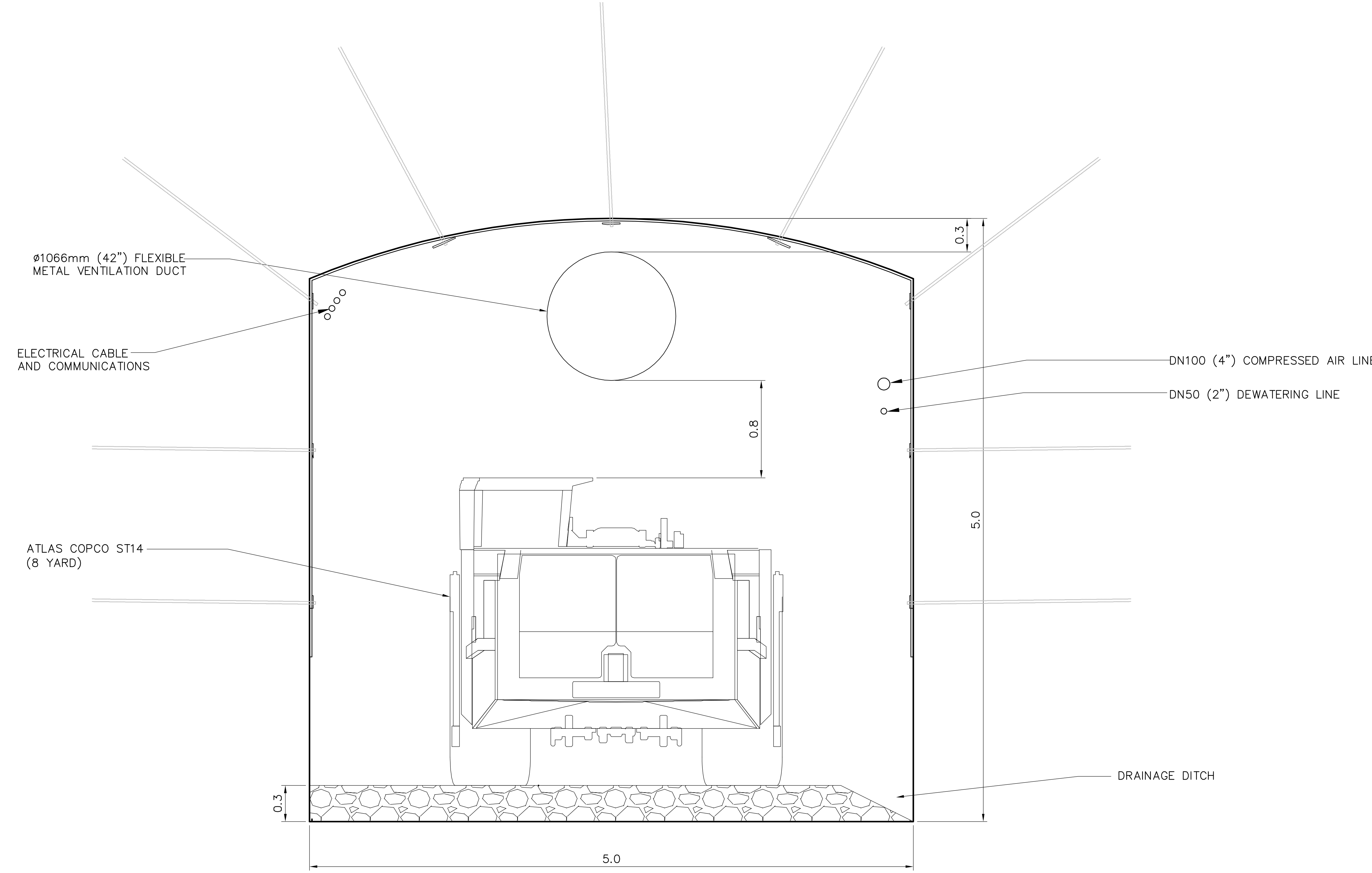

DRIFT PROFILE WITH VENTILATION DUCTING & 8 YARD LHD

5.0m WIDE x 5.0m HIGH ARCH BACK DRIFT (TYPICAL LEVEL)

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DATE: 2013.08.01

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CLIENT: DOMINION DIAMOND
PROPERTY: JAY PIPE
PROJECT: DRIFT PROFILE
5.0m x 5.0m DRIFT
8 YARD LHD

SCALE: NTS
PROJ. NO. 169513545
DWG. NO. 500–U0002A
REV. NO. A

PROJ. NO. 169513545
DWG. NO. 500–U0001
REV. NO. A

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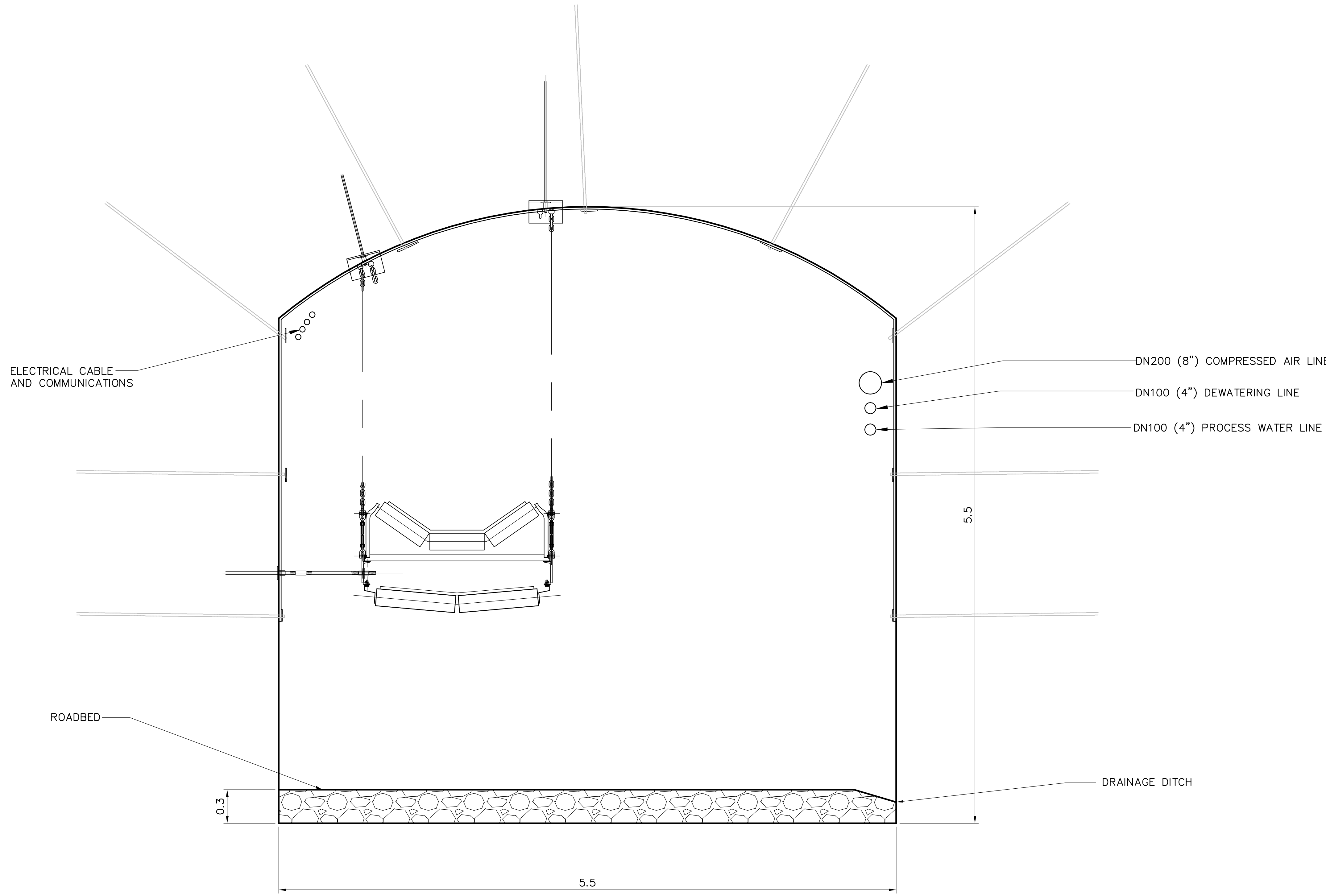

RAMP PROFILE WITH CONVEYOR

5.5m WIDE x 5.5m HIGH ARCH BACK DRIFT

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DATE: 2013.08.01

Stantec

CLIENT: DOMINION DIAMOND
PROPERTY: JAY PIPE
PROJECT: CONVEYOR RAMP PROFILE 5.5m x 5.5m

SCALE: NTS
PROJ. NO. 169513545
DWG. NO. 500–U0003A
REV. NO. A

PROJ. NO. 169513545 DWG. NO. 500–U0003A REV. NO. A

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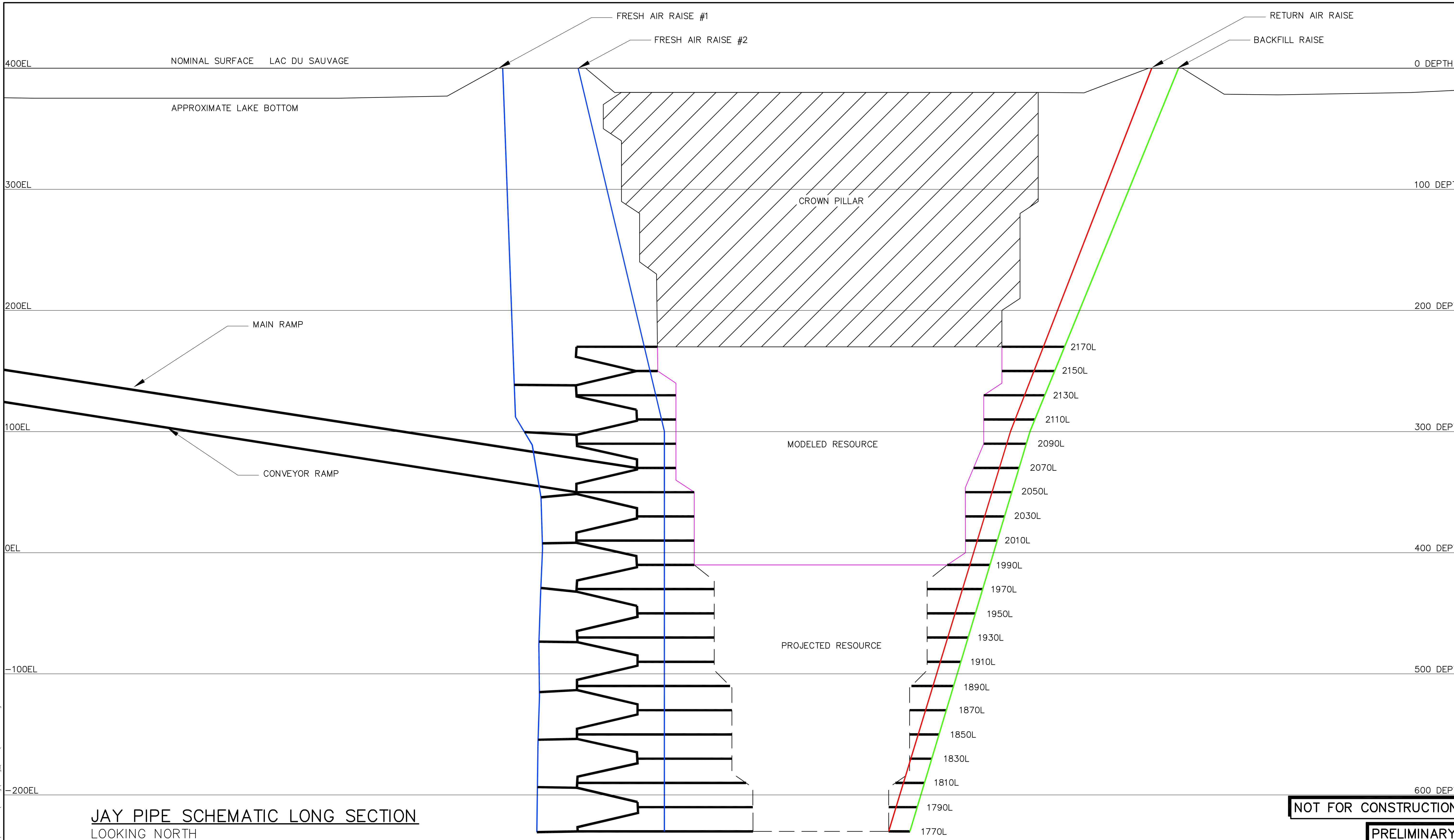

JAY PIPE SCHEMATIC LONG SECTION

LOOKING NORTH

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PROJ. NO.	DWG. NO.	REV. NO.
169513545	510−U0001A	A

REF. DWG. NO.	REFERENCE DRAWING TITLE
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REV.	DESCRIPTION	DATE	BY	CHEF DSGN. CHECK	DSGN ENG. PR.MGR
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DATE: 2013.08.01

Stantec

CLIENT: DOMINION DIAMOND

PROPERTY: JAY PIPE

PROJECT: CONCEPT STUDY LONG SECTION

SCALE:	PROJ. NO.	DWG. NO.	REV. NO.
NTS	169513545	510−U0001A	A

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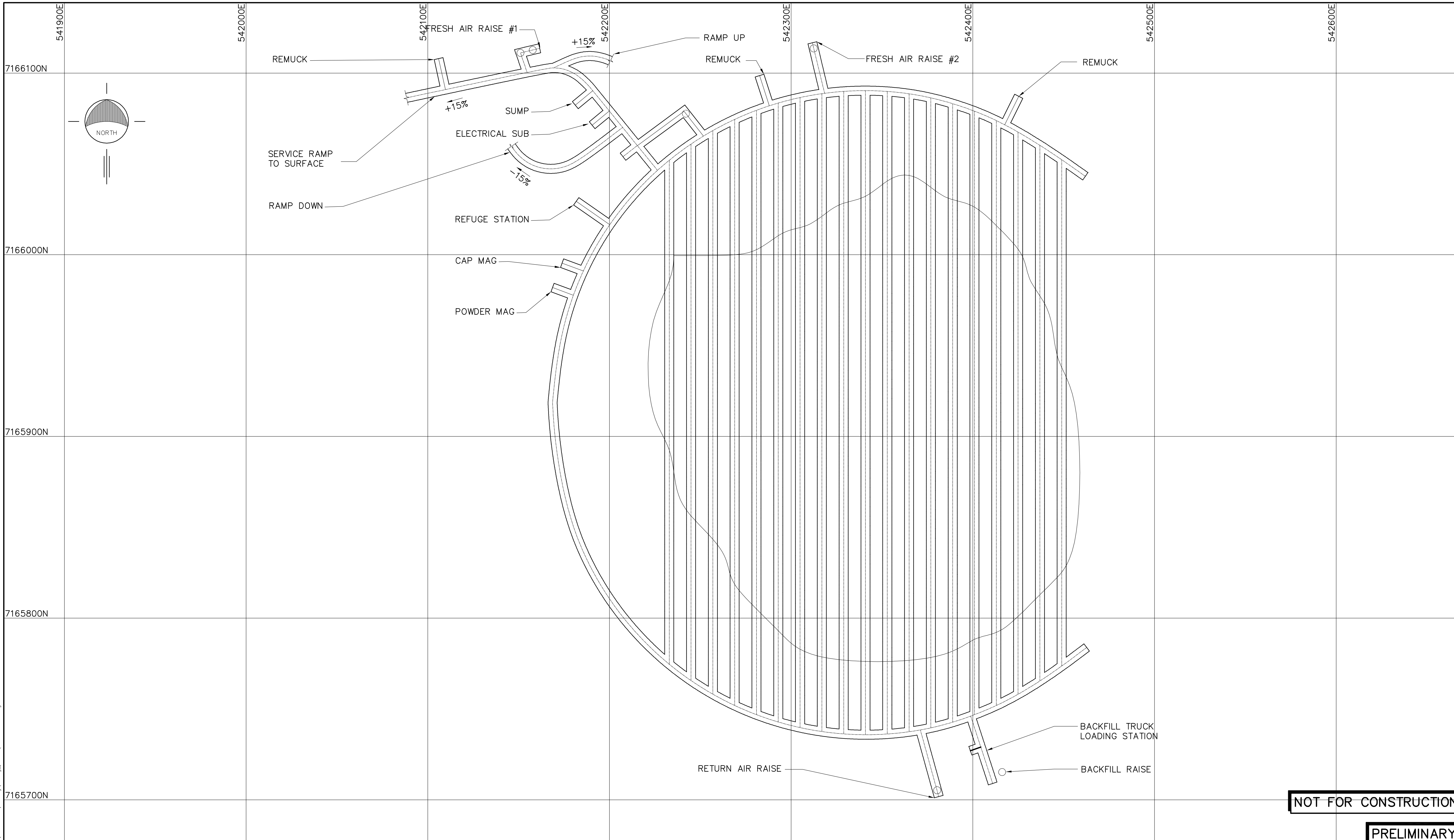

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DWG. NO. 000–U0000
REV. NO. A

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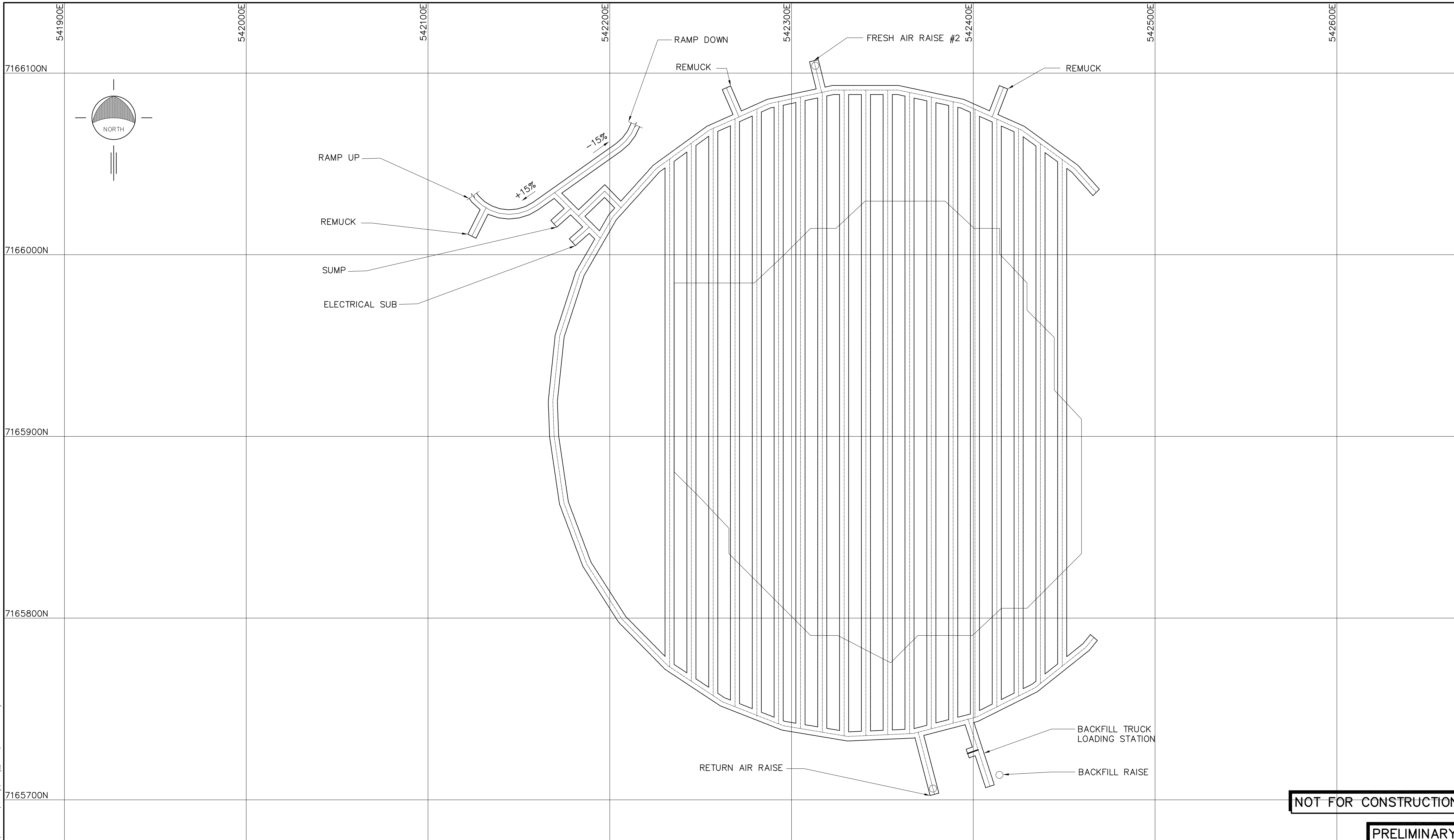
ORIGINAL DRAWN BY: MDL
DATE: 2013.08.01

Stantec

CLIENT: DOMINION DIAMOND
PROPERTY: JAY PIPE
PROJECT: CONCEPT STUDY
2070 L
PLAN

SCALE: 1:1000
PROJ. NO. 169513545
DWG. NO. 520–U0001A
REV. NO. A

Aug 09, 2013 – 3:00pm \\CD1212–N01U\169513545\drawing\mining_prelim\520–U0001A.dwg



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DATE: 2013.08.01

Stantec

CLIENT: DOMINION DIAMOND
PROPERTY: JAY PIPE
PROJECT: CONCEPT STUDY TYPICAL SUBLEVEL PLAN
SCALE: 1:1000
PROJ. NO. 169513545
DWG. NO. 520–U0003A
REV. NO. A

PROJ. NO. 169513845
DWG. NO. 520–U0003A
REV. NO. A

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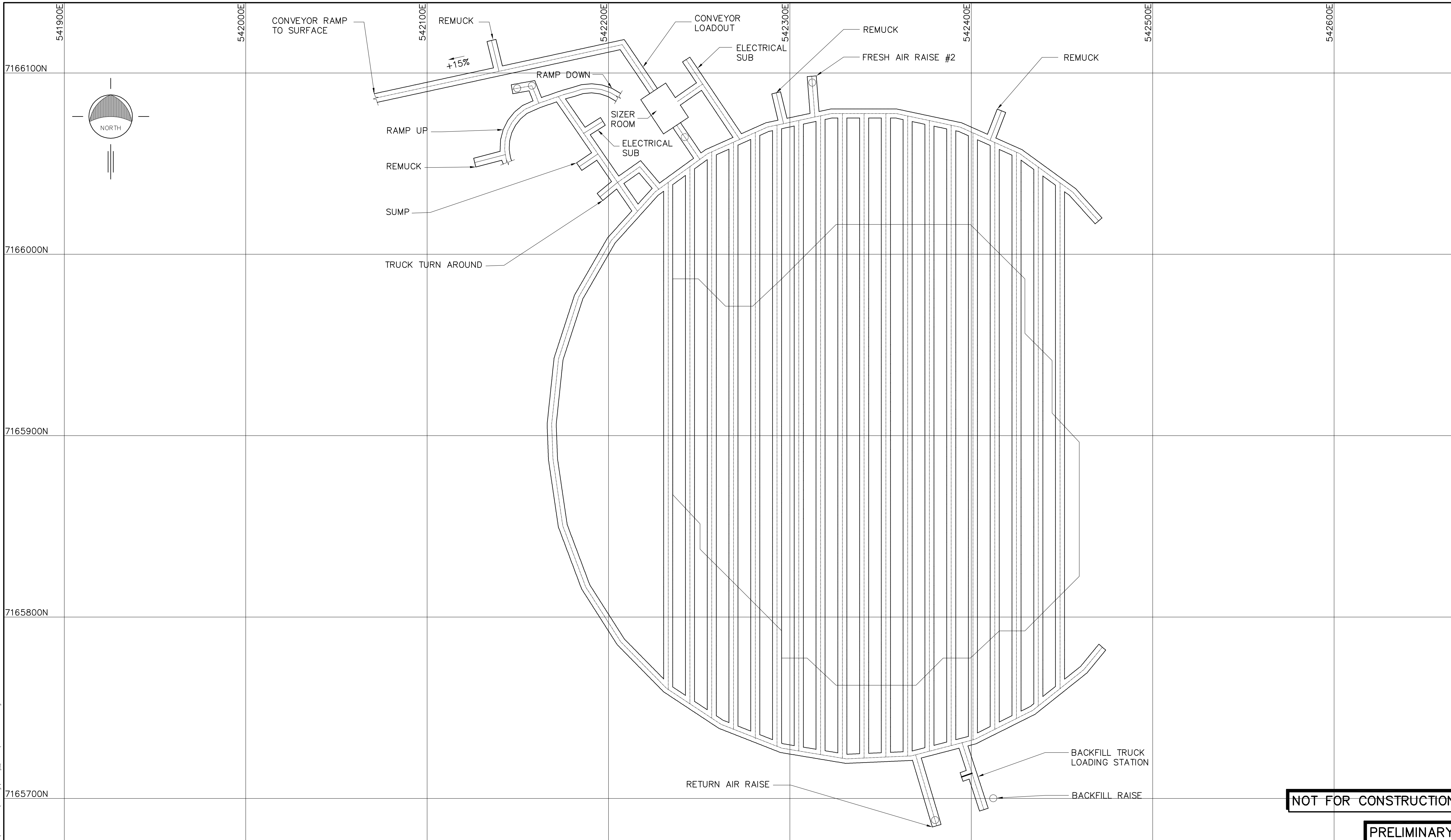

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ORIGINAL DRAWN BY: MDL
DATE: 2013.08.01

Stantec

CLIENT: DOMINION DIAMOND
PROPERTY: JAY PIPE
PROJECT: CONCEPT STUDY
2050 L
PLAN

SCALE: 1:1000
PROJ. NO. 169513545
DWG. NO. 520–U0002A
REV. NO. A

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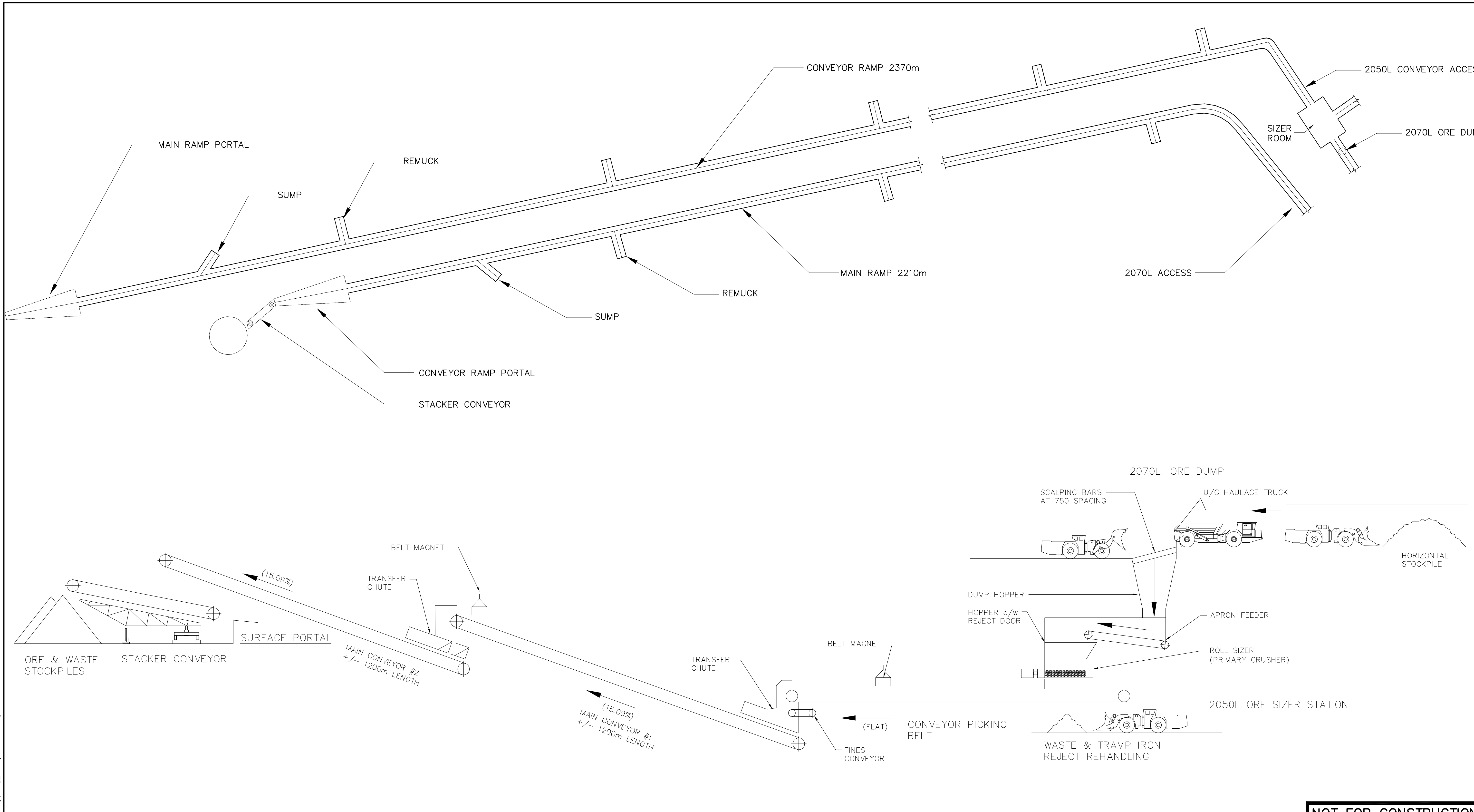

FLOW DIAGRAM

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ORIGINAL DRAWN BY: MDL
DATE: 2013.08.01

Stantec

CLIENT: DOMINION DIAMOND
PROPERTY: JAY PIPE
PROJECT: CONCEPT STUDY
FLOW DIAGRAM
ORE HANDLING SYSTEM

SCALE: NTS | PROJ. NO. 169513845 | DWG. NO. 520–U0004A | REV. NO. A

PROJ. NO. 169513845
DWG. NO. 520–U0004A
REV. NO. A

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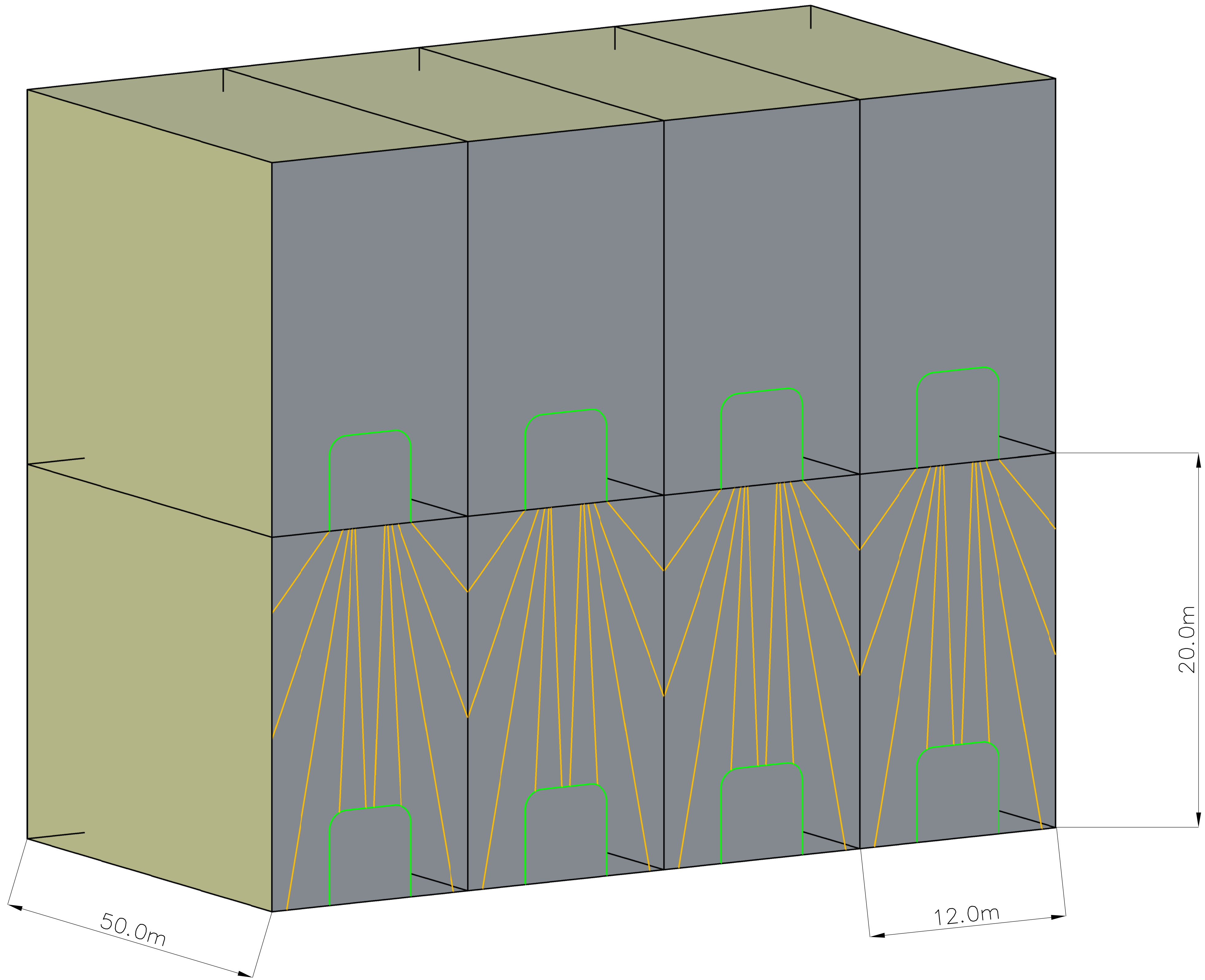

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ORIGINAL DRAWN BY: MDL
DATE: 2013.08.01

Stantec

CLIENT: DOMINION DIAMOND
PROPERTY: JAY PIPE
PROJECT: MINING METHOD
STOPE PROFILE
12m x 20m STOPE

SCALE:	PROJ. NO.	DWG. NO.	REV. NO.
NTS	169513545	530–U0001A	A

PROJ. NO. 169513545 DWG. NO. 530–U0001A REV. NO. A

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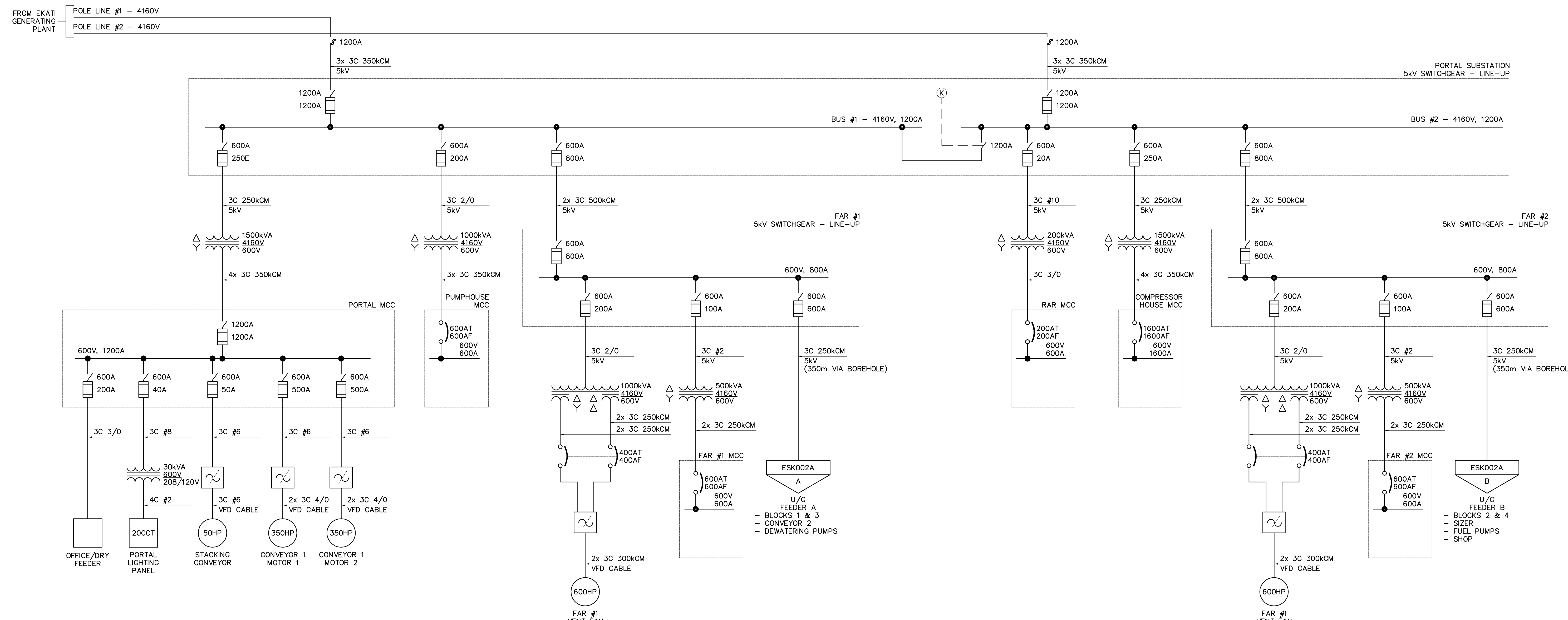

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BY: ADP

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ORIGINAL DRAWN BY: ADP
DATE: 2013.07.31

Stantec

CLIENT: DOMINION DIAMOND
PROPERTY: JAY PIPE
PROJECT: CONCEPT STUDY MINE SERVICES ELECTRICAL RISER DIAGRAM
SCALE: NTS
PROJ. NO. 169513545
DWG. NO. ESK001A
REV. NO. A

PROJ. NO. 169513545 DWG. NO. ESK001A REV. NO. A

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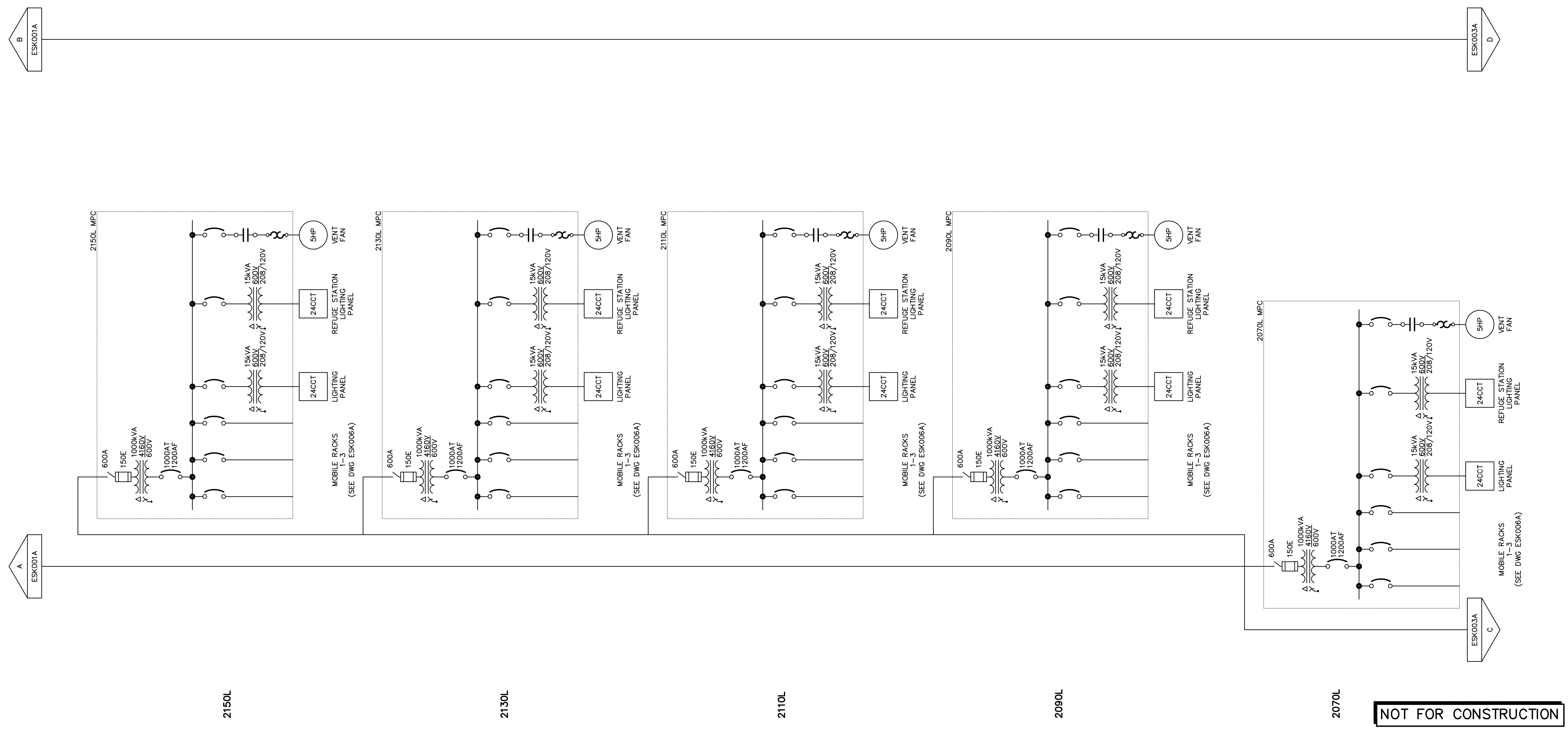

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ORIGINAL DRAWN BY: ADP
DATE: 2013.08.02

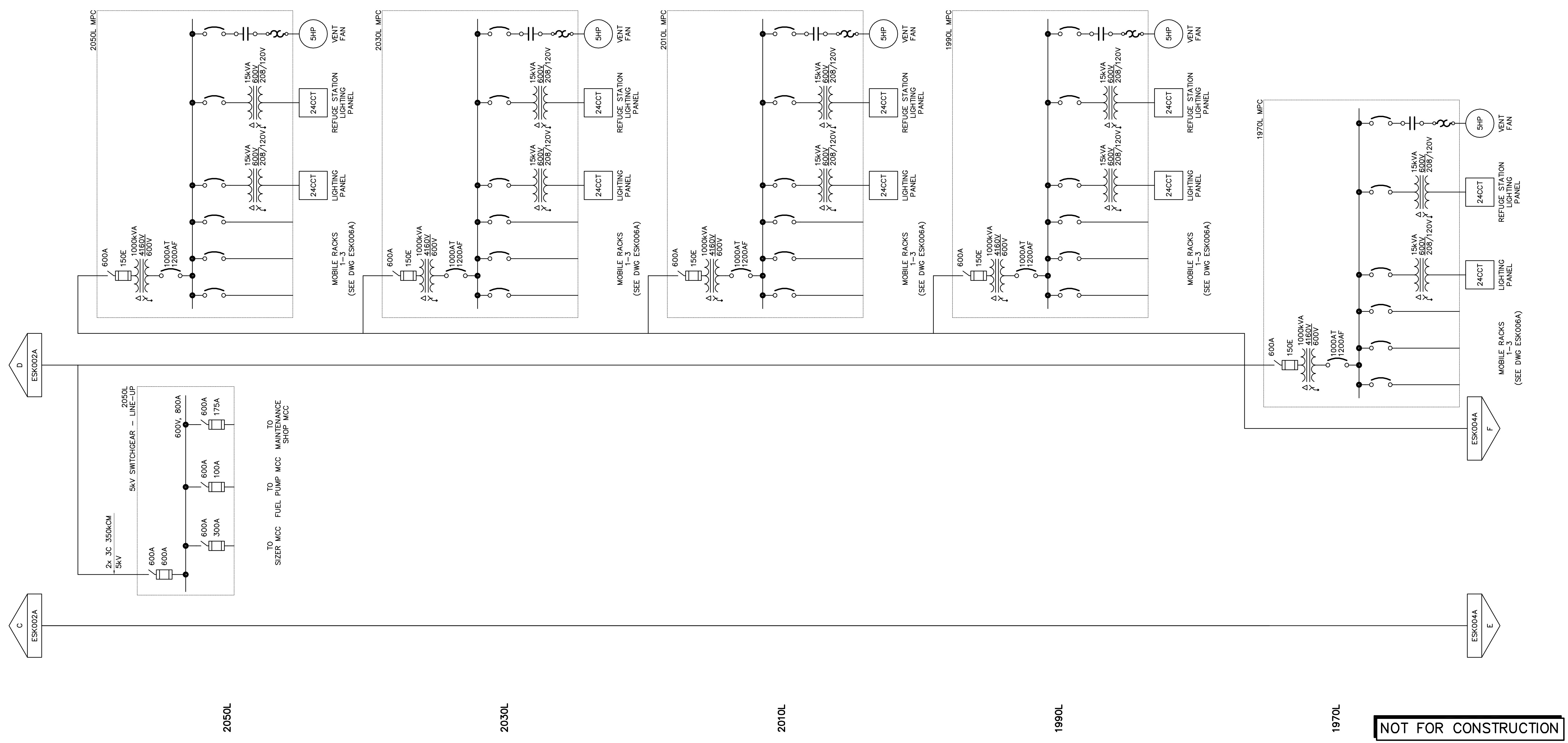
Stantec

CLIENT: DOMINION DIAMOND
PROPERTY: JAY PIPE
PROJECT: CONCEPT STUDY
MINE SERVICES
BLOCK 1 (2070L, 2090L, 2110L, 2130L & 2150L)
RISER DIAGRAM

SCALE: NTS | PROJ. NO. 169513545 | DWG. NO. ESK002A | REV. NO. A

PROJ. NO. 169513545 | DWG. NO. ESK002A | REV. NO. A

Aug 02, 2013 – 5:29pm \\CD1212-N01S\212\169513545\drawing\elec_prelim\13545-ESK002A-RA.dwg



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REF. DWG. NO.	REFERENCE DRAWING TITLE
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REV.	DESCRIPTION	DATE	BY
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DATE: 2013.08.02

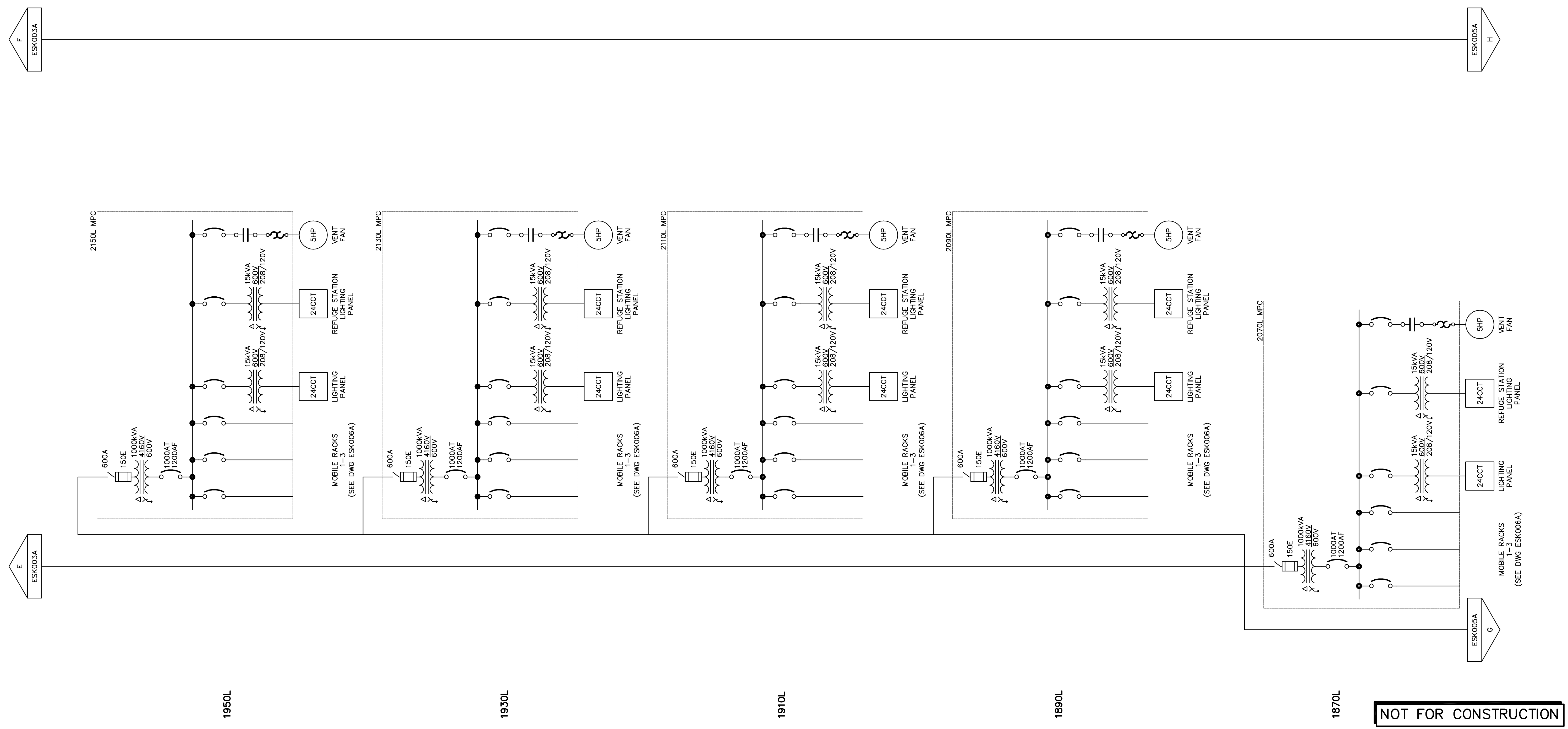
Stantec

CLIENT: DOMINION DIAMOND
PROPERTY: JAY PIPE
PROJECT: CONCEPT STUDY
MINE SERVICES
BLOCK 2 (1970L, 1990L, 2010L, 2030L & 2050L)
RISER DIAGRAM

SCALE: NTS
PROJ. NO. 169513545
DWG. NO. ESK003A
REV. NO. A

PROJ. NO. 169513545
DWG. NO. ESK003A
REV. NO. A

Aug 02, 2013 – 5:29pm \\CD1212-N01S\212\169513545\drawing\elec_prelim\13545-ESK003A-RA.dwg



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PRELIMINARY

REF. DWG. NO.	REFERENCE DRAWING TITLE	REV.	DESCRIPTION	DATE	BY
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ORIGINAL DRAWN BY: ADP
DATE: 2013.08.02

CLIENT: DOMINION DIAMOND
PROPERTY: JAY PIPE
PROJECT: CONCEPT STUDY
MINE SERVICES
BLOCK 3 (1870L, 1890L, 1910L, 1930L & 1950L)
RISER DIAGRAM

SCALE: NTS
PROJ. NO. 169513545
DWG. NO. ESK004A
REV. NO. A

PROJ. NO. 169513545
DWG. NO. ESK004A
REV. NO. A

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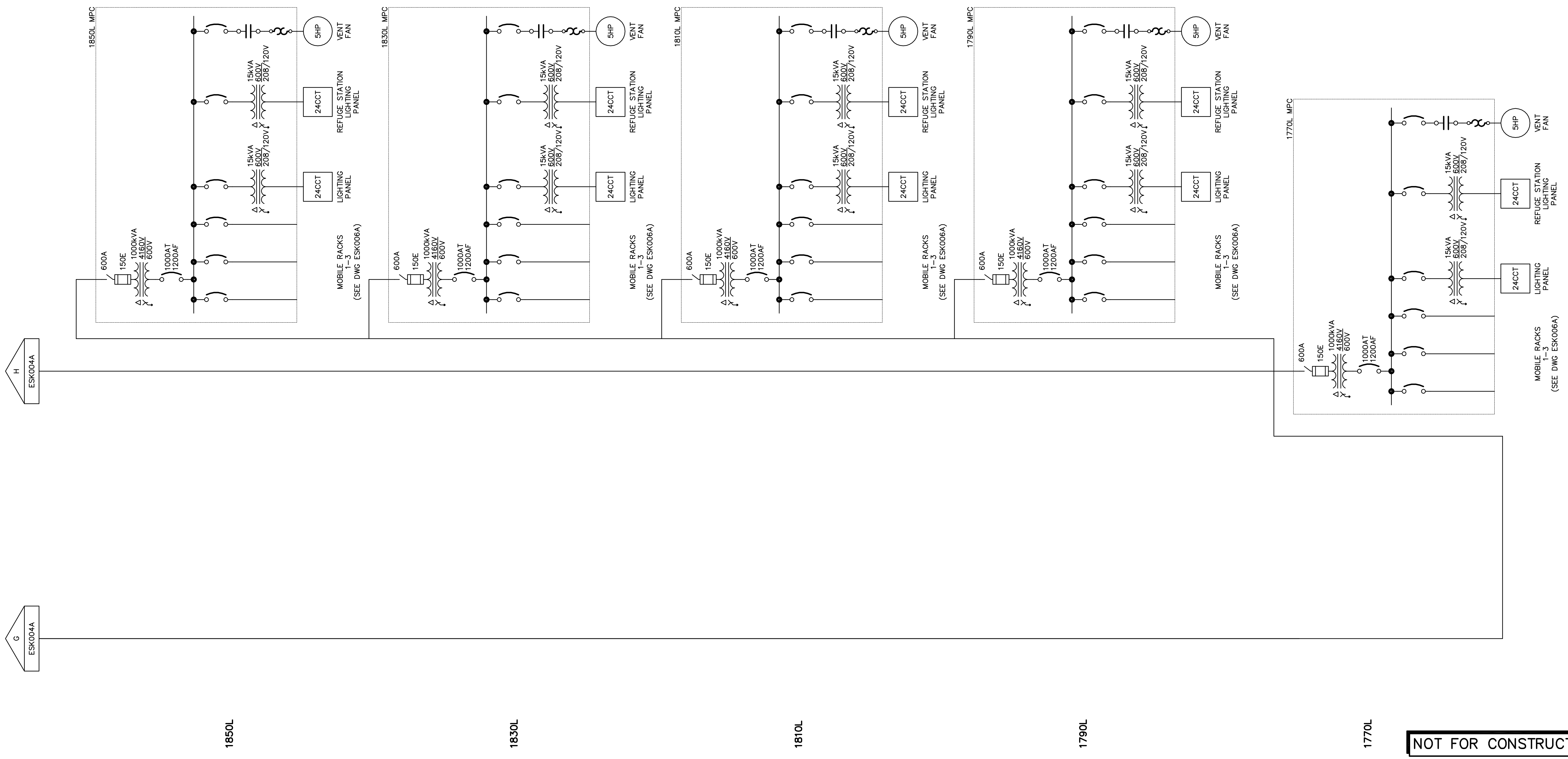

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PROPERTY: JAY PIPE
PROJECT: CONCEPT STUDY
MINE SERVICES
BLOCK 4 (1770L, 1790L, 1810L, 1830L & 1850L)
RISER DIAGRAM

SCALE: NTS
PROJ. NO. 169513545
DWG. NO. ESK005A
REV. NO. A

PROJ. NO. 169513545
DWG. NO. ESK005A
REV. NO. A

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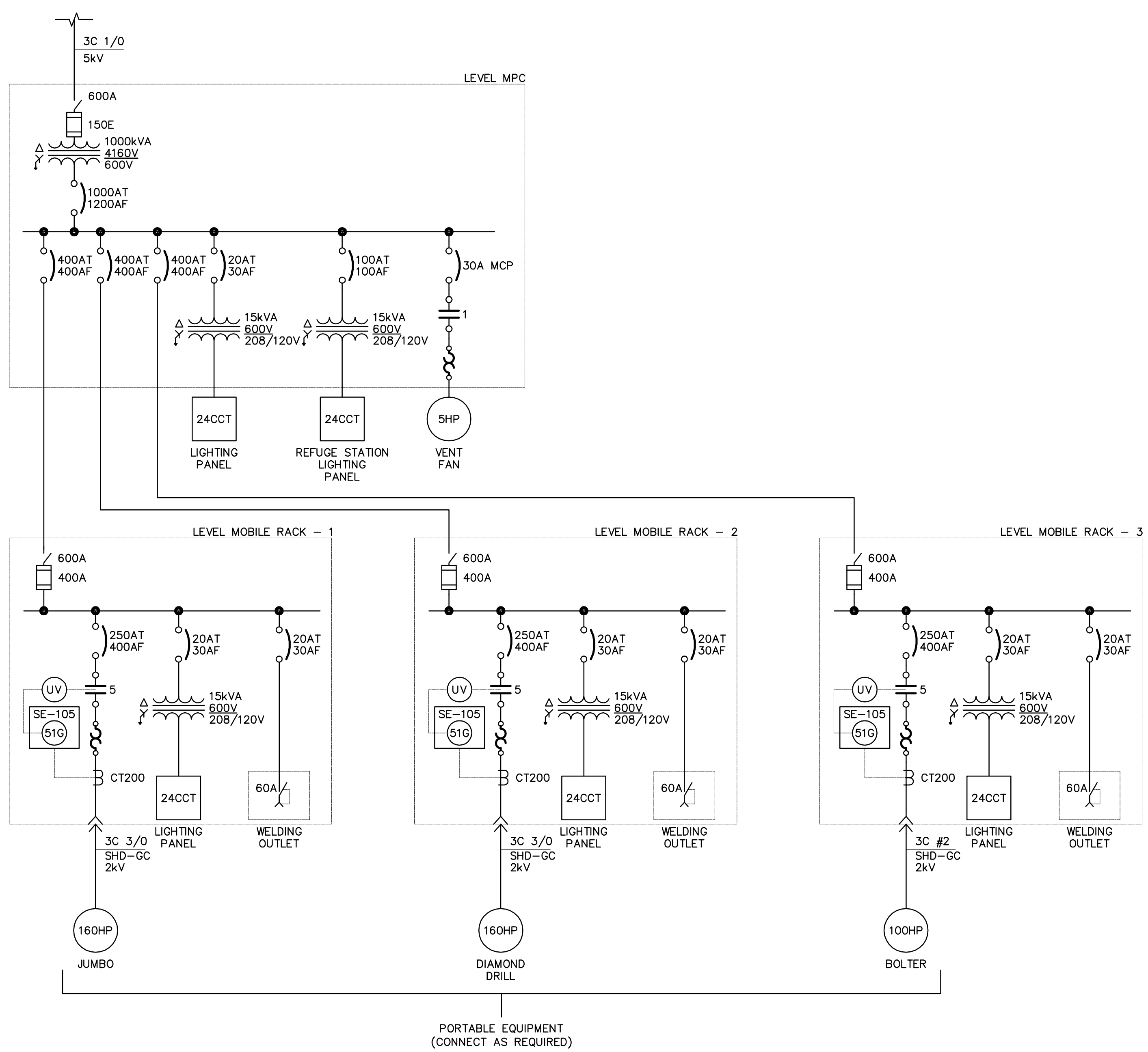

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REF. DWG. NO.	REFERENCE DRAWING TITLE	REV.	DESCRIPTION	DATE	BY
---	---	A	PRELIMINARY –		

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DATE: 2013.08.02

Stantec

CLIENT: DOMINION DIAMOND
PROPERTY: JAY PIPE
PROJECT: CONCEPT STUDY
MINE SERVICES
ELECTRICAL – LEVEL MOBILE RACK
RISER DIAGRAM (TYPICAL)

SCALE:	PROJ. NO.	DWG. NO.	REV. NO.
NTS	169513545	ESK006A	A

PROJ. NO. 169513545
DWG. NO. ESK006A
REV. NO. A

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APPENDIX B

STOPE DILUTION CALCULATIONS

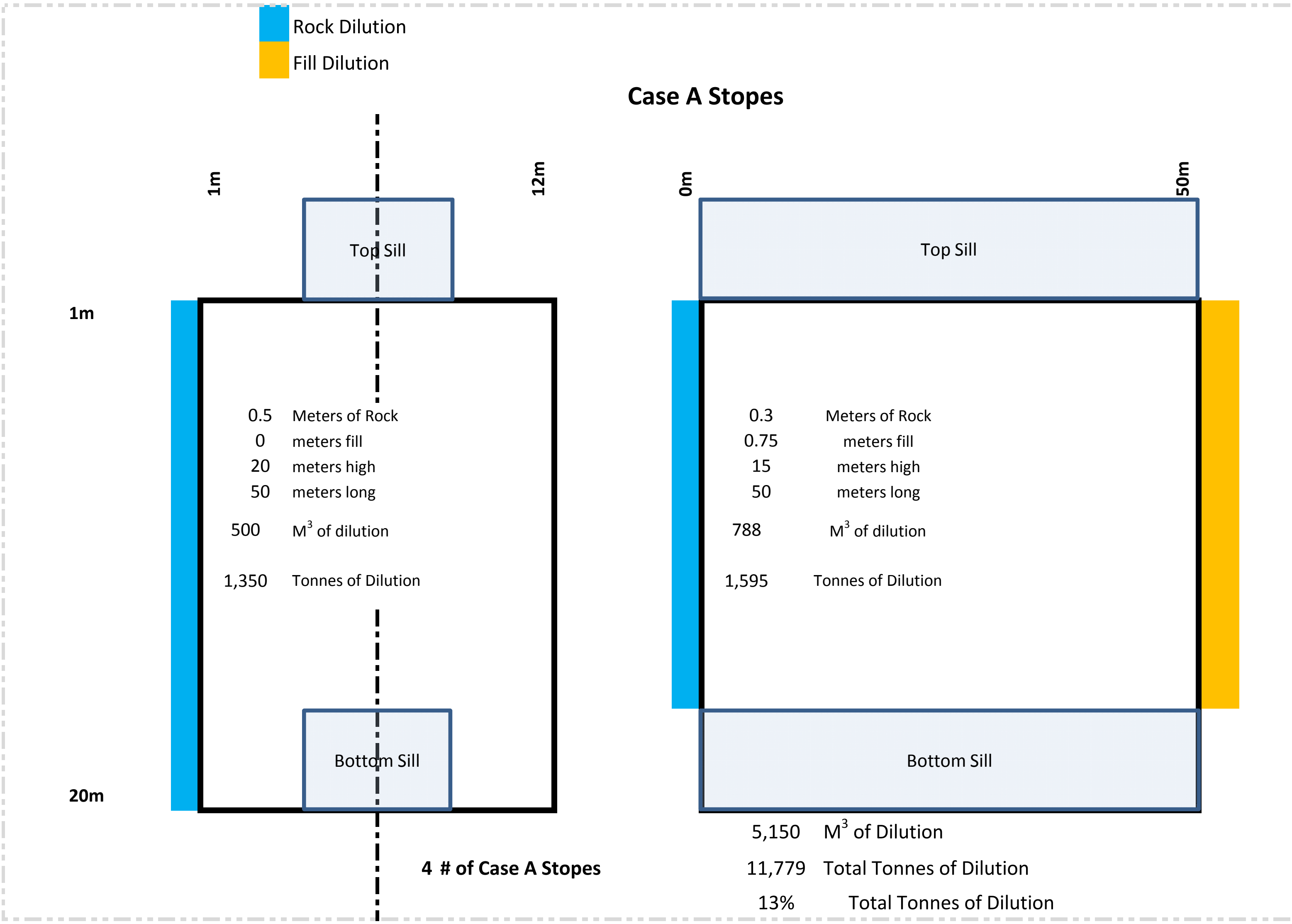
External Dilution Table

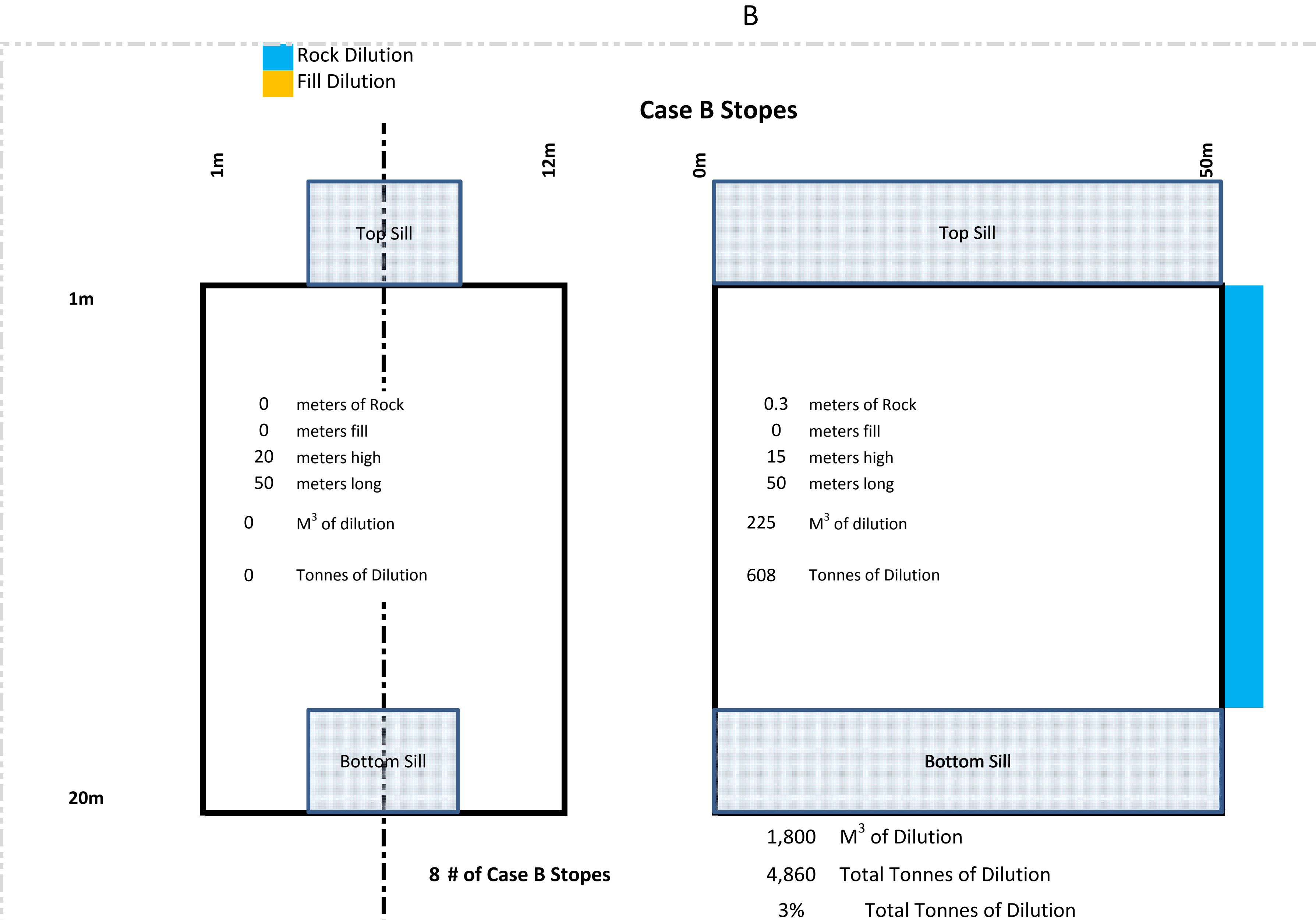
Dilution Type	Description	Number of Stopes	Location of Dilution	Rock	Fill	Dilution Tonnes	Stope Tonnes	Percent Dilution	Volume
A	Primary/Secondary Corner Stopes	4	Stope Wall	1		11,779	101,408	12%	5,150
			Stope Face	1	1				
B	Primary/Secondary Starter Stopes	8	Stope Wall			4,860	184,118	3%	1,800
			Stope Face	1					
C	Primary/Secondary Finisher Stopes	8	Stope Wall			12,758	192,016	7%	6,300
			Stope Face	1	1				
D	Primary/Secondary Outsiders Stopes	6	Stope Wall	1		14,023	148,467	9%	6,375
			Stope Face		1				
E	Primary/Secondary Inside Stopes	24	Stope Wall			31,590	569,364	6%	18,000
			Stope Face		1				
F	Tertiary Starter Stopes	9	Stope Wall		2	29,160	230,825	13%	15,525
			Stope Face	1					
G	Tertiary Finsher Stopes	9	Stope Wall		2	41,690	243,355	17%	21,938
			Stope Face	1	1				
H	Tertiary Inside Stopes	27	Stope Wall		2	97,732	702,727	14%	55,688
			Stope Face		1				
	Total	95				**243,591**	**2,372,279**	**11%**	130,775

Density

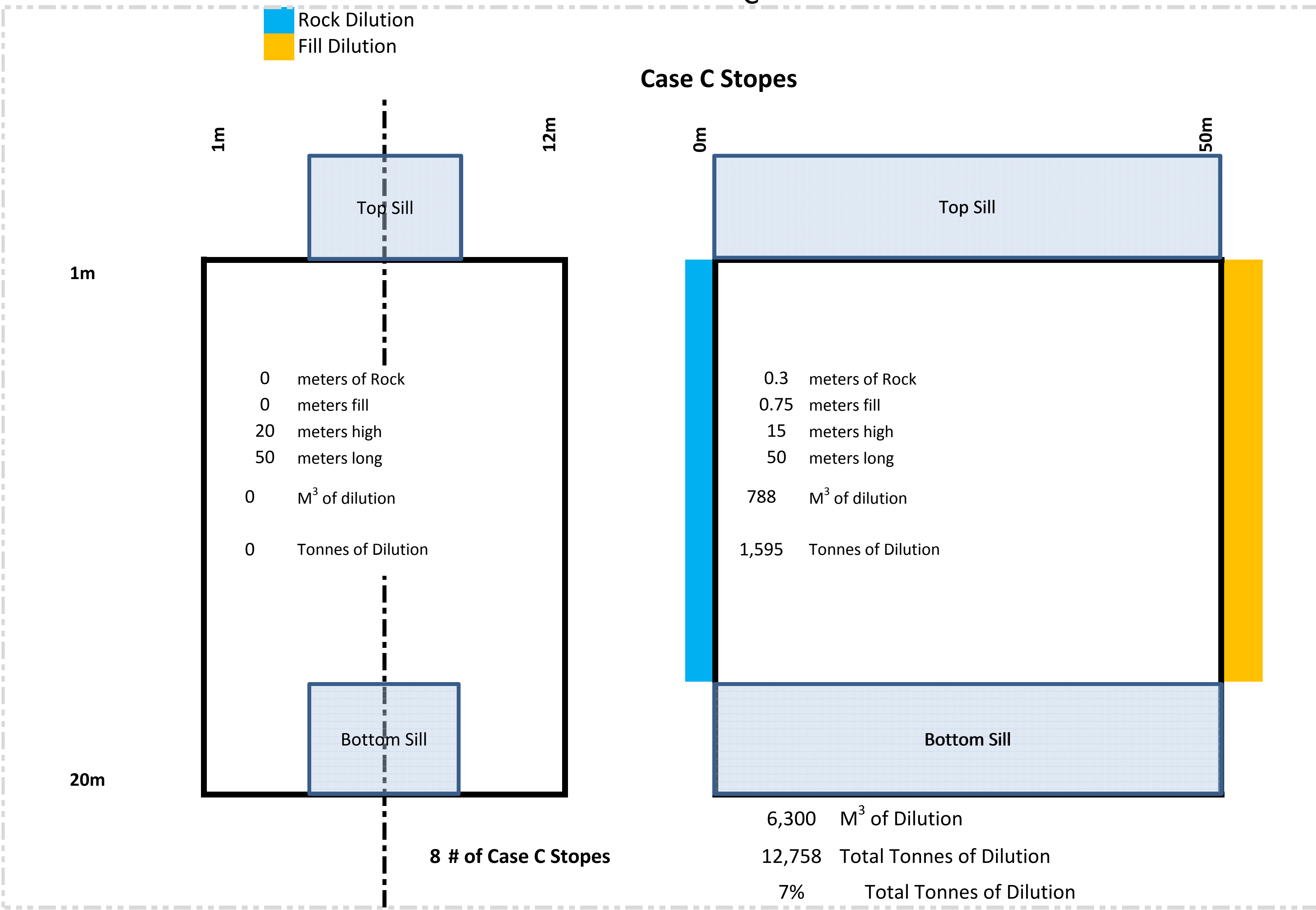
Filling Ratio	65%
Fill	1.76
Rock	2.70
Overall % Dil	**11%**

A

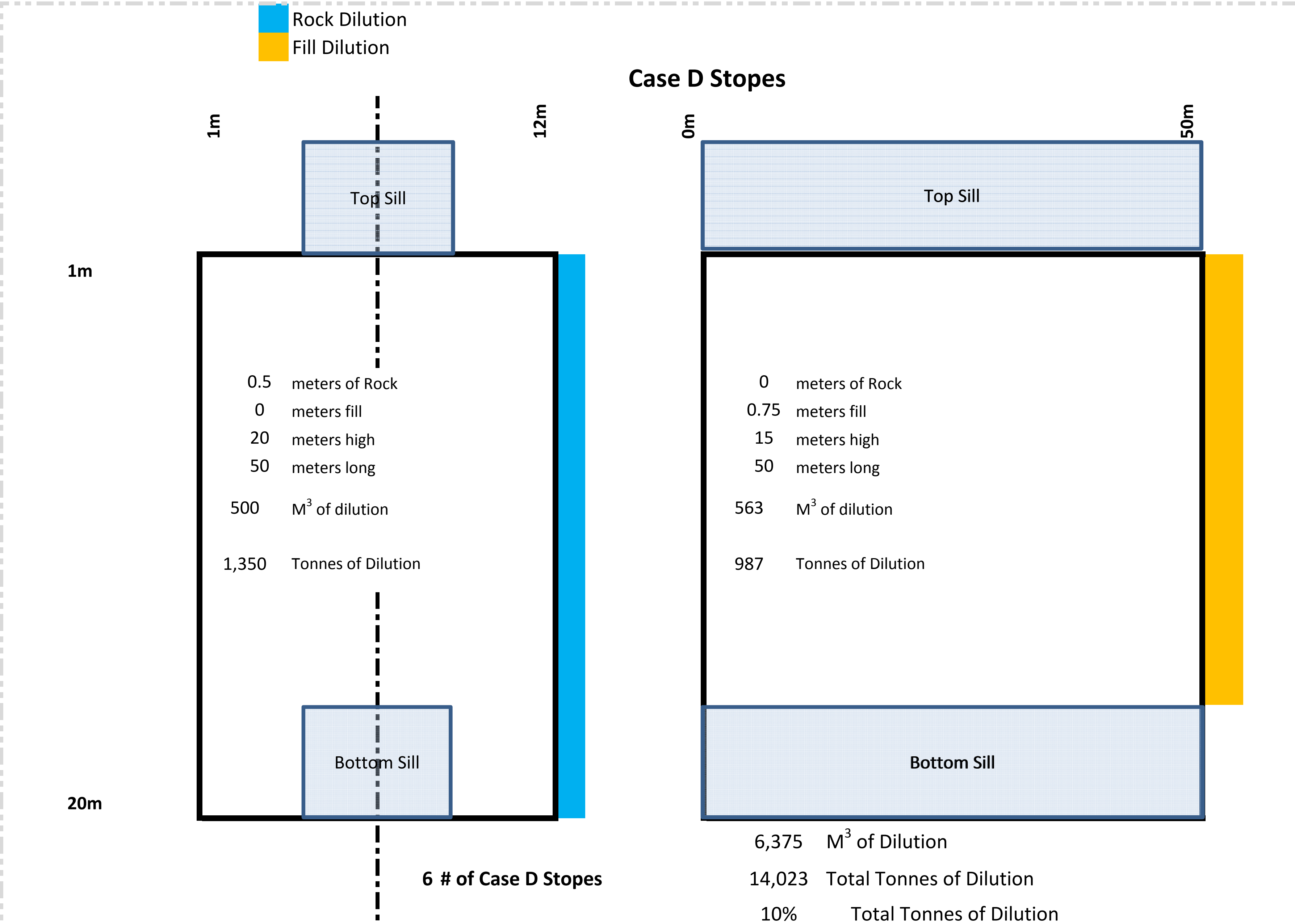



B
Rock Dilution
Fill Dilution
Case B Stopes
1m
12m
0m
50m
Top Sill
Top Sill
1m
0 meters of Rock
0 meters fill
20 meters high
50 meters long
0 M3 of dilution
0 Tonnes of Dilution
0.3 meters of Rock
0 meters fill
15 meters high
50 meters long
225 M3 of dilution
608 Tonnes of Dilution
Bottom Sill
Bottom Sill
20m
1,800 M3 of Dilution
8 # of Case B Stopes
4,860 Total Tonnes of Dilution
3% Total Tonnes of Dilution

C

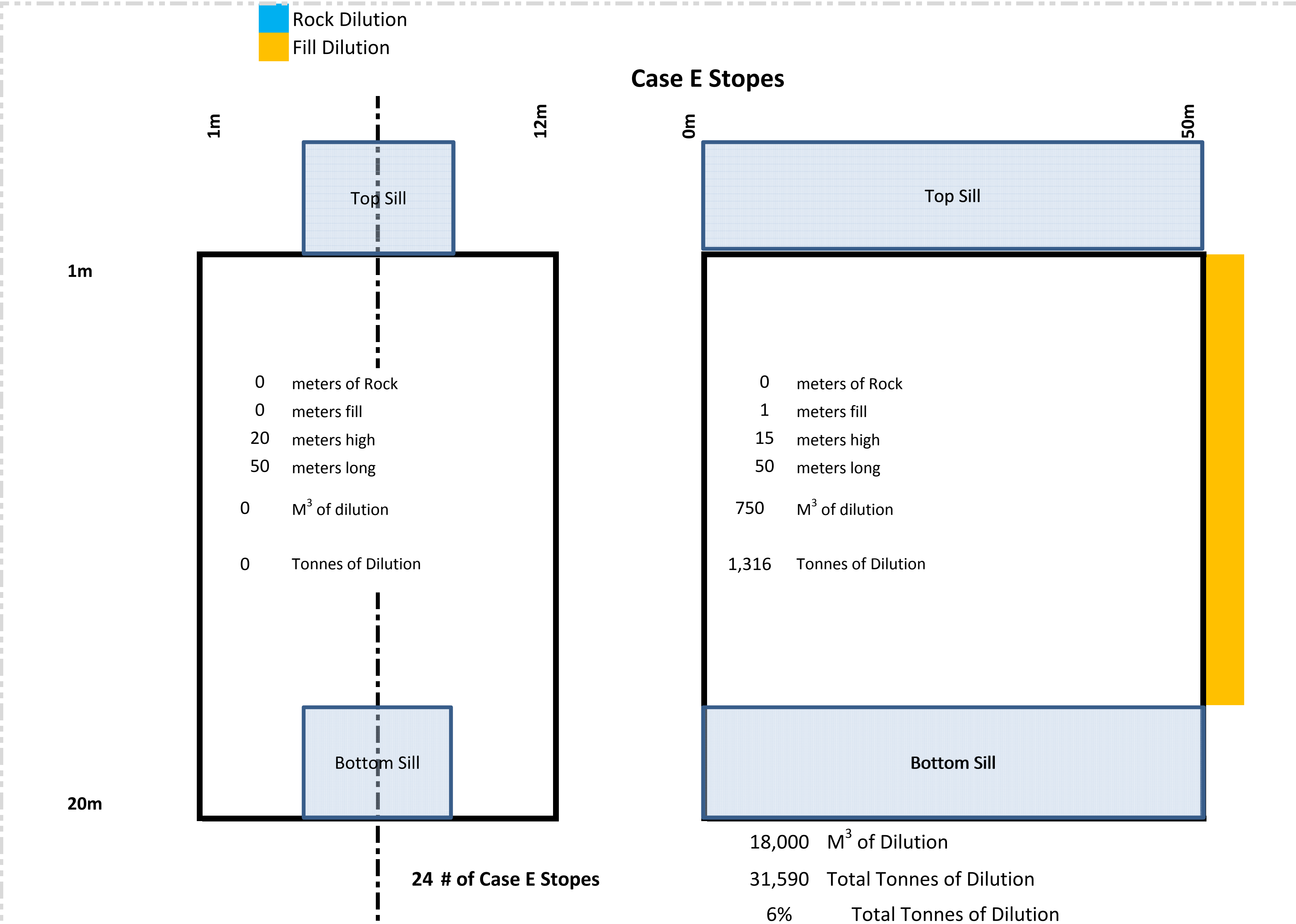

Rock Dilution
Fill Dilution
Case C Stopes
1m
12m
0m
50m
Top Sill
Top Sill
1m
0 meters of Rock
0 meters fill
20 meters high
50 meters long
0 M3 of dilution
0 Tonnes of Dilution
0.3 meters of Rock
0.75 meters fill
15 meters high
50 meters long
788 M3 of dilution
1,595 Tonnes of Dilution
Bottom Sill
Bottom Sill
20m
6,300 M3 of Dilution
8 # of Case C Stopes
12,758 Total Tonnes of Dilution
7% Total Tonnes of Dilution

D

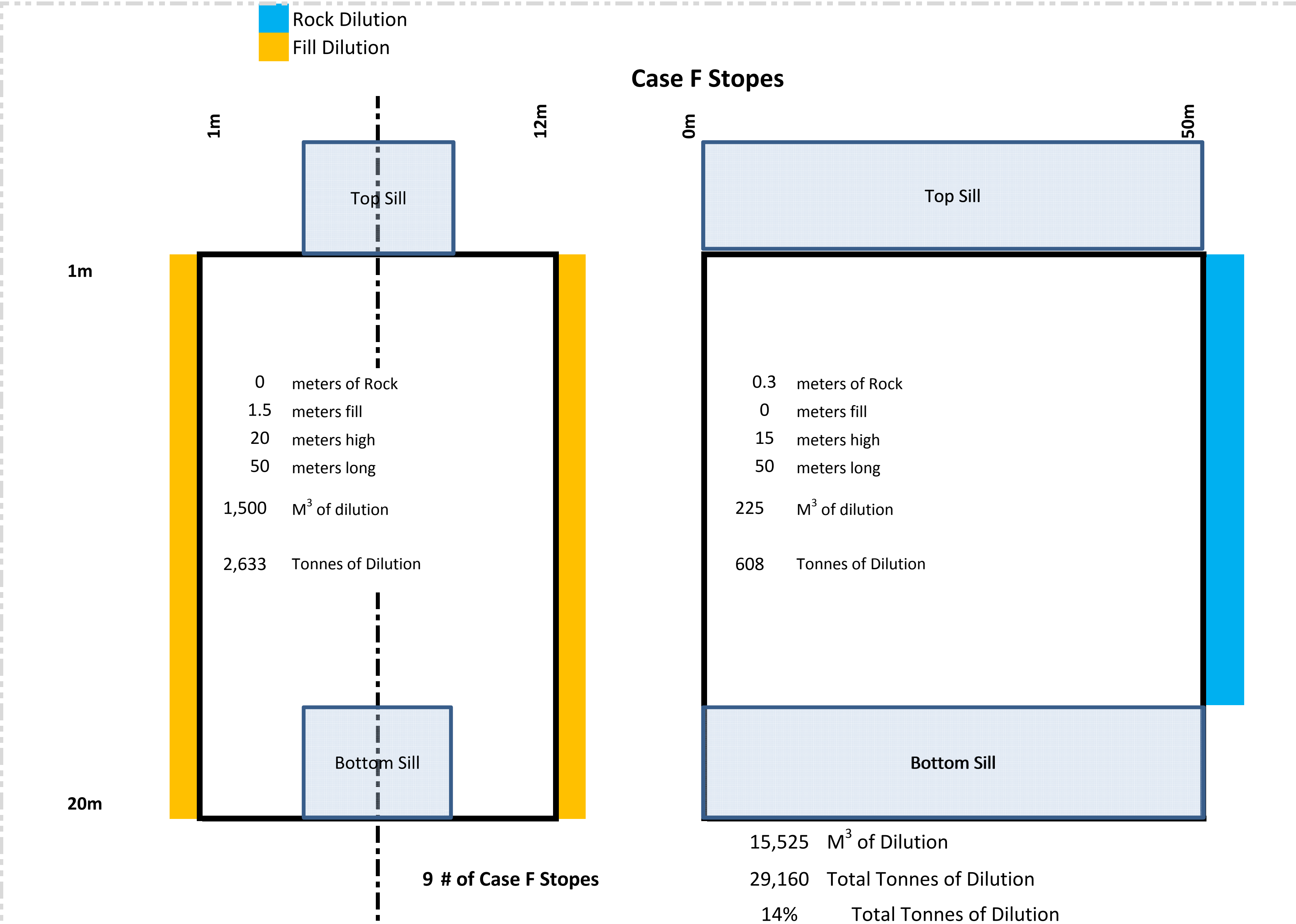


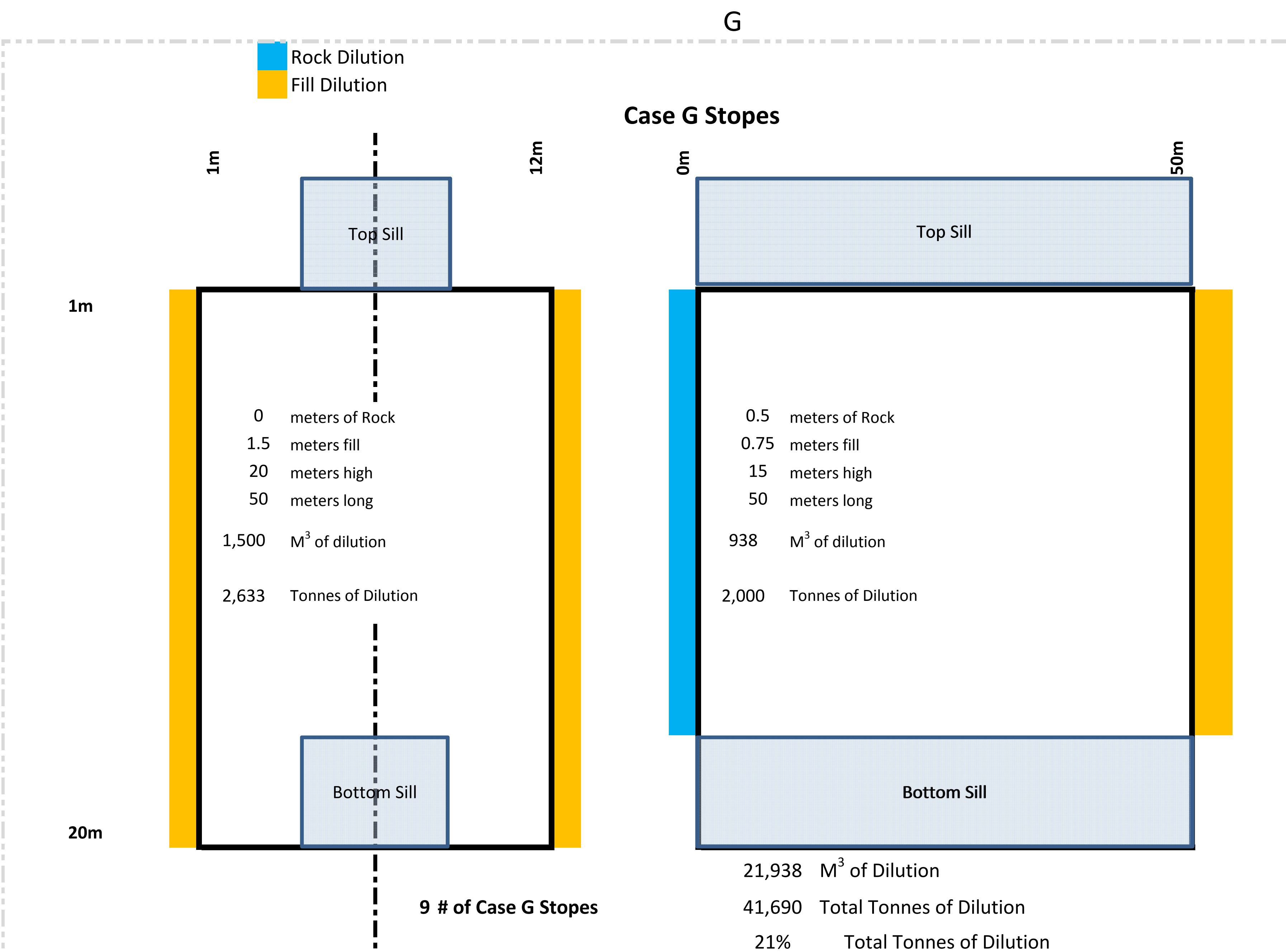
Rock Dilution
Fill Dilution
Case D Stopes
1m
12m
0m
50m
Top Sill
Top Sill
1m
20m
0.5 meters of Rock
0 meters fill
20 meters high
50 meters long
500 M3 of dilution
1,350 Tonnes of Dilution
0 meters of Rock
0.75 meters fill
15 meters high
50 meters long
563 M3 of dilution
987 Tonnes of Dilution
Bottom Sill
Bottom Sill
6 # of Case D Stopes
6,375 M3 of Dilution
14,023 Total Tonnes of Dilution
10% Total Tonnes of Dilution

E

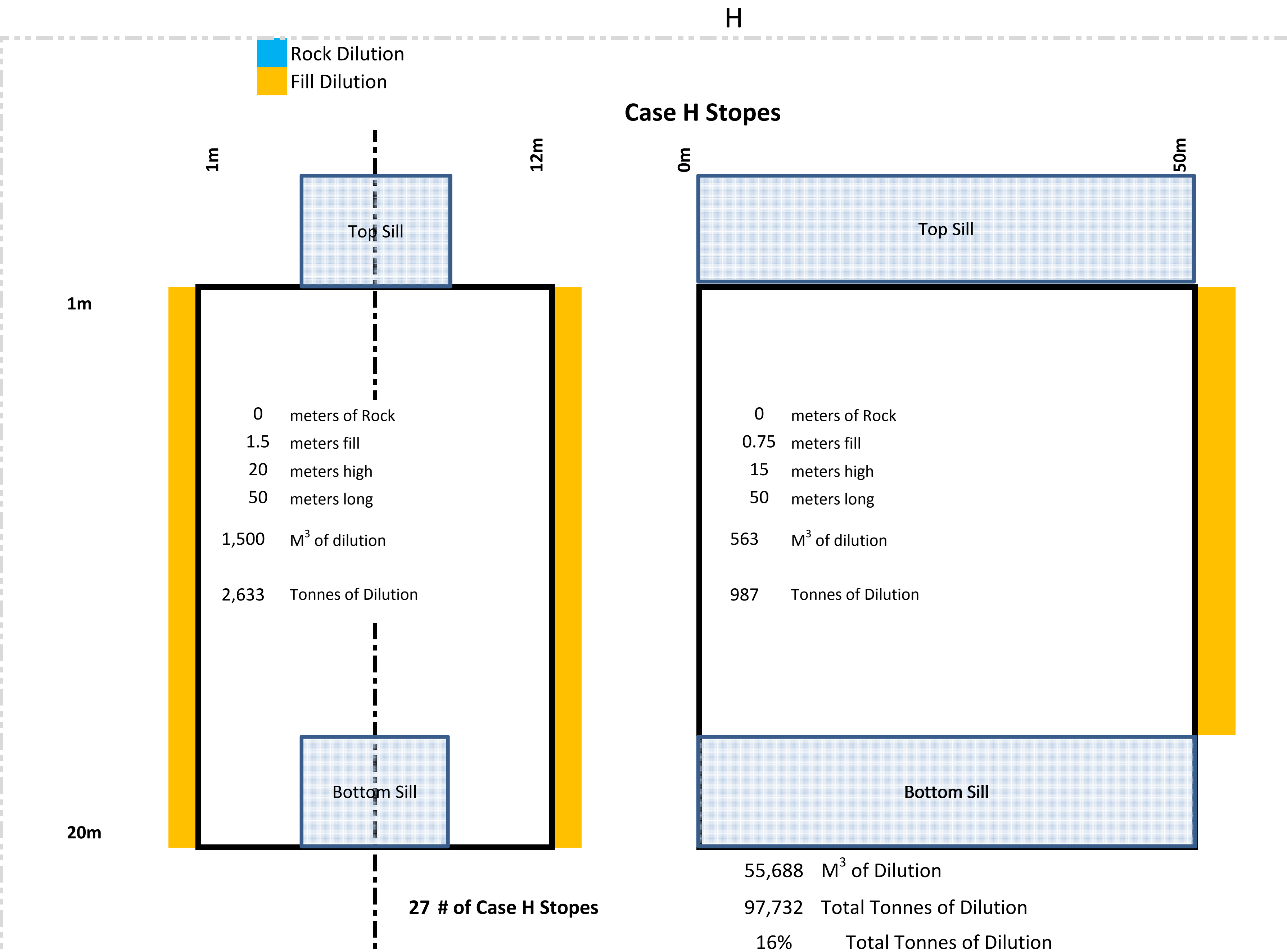

Rock Dilution
Fill Dilution
Case E Stopes
1m
12m
0m
50m
Top Sill
Top Sill
1m
20m
0 meters of Rock
0 meters fill
20 meters high
50 meters long
0 M3 of dilution
0 Tonnes of Dilution
0 meters of Rock
1 meters fill
15 meters high
50 meters long
750 M3 of dilution
1,316 Tonnes of Dilution
Bottom Sill
Bottom Sill
18,000 M3 of Dilution
24 # of Case E Stopes
31,590 Total Tonnes of Dilution
6% Total Tonnes of Dilution

F


Rock Dilution
Fill Dilution
Case F Stopes
1m
12m
0m
50m
Top Sill
Top Sill
1m
0 meters of Rock
1.5 meters fill
20 meters high
50 meters long
1,500 M3 of dilution
2,633 Tonnes of Dilution
0.3 meters of Rock
0 meters fill
15 meters high
50 meters long
225 M3 of dilution
608 Tonnes of Dilution
Bottom Sill
Bottom Sill
20m
15,525 M3 of Dilution
9 # of Case F Stopes
29,160 Total Tonnes of Dilution
14% Total Tonnes of Dilution



G
Rock Dilution
Fill Dilution
Case G Stopes
1m
12m
0m
50m
Top Sill
Top Sill
1m
0 meters of Rock
1.5 meters fill
20 meters high
50 meters long
1,500 M3 of dilution
2,633 Tonnes of Dilution
0.5 meters of Rock
0.75 meters fill
15 meters high
50 meters long
938 M3 of dilution
2,000 Tonnes of Dilution
Bottom Sill
Bottom Sill
20m
21,938 M3 of Dilution
9 # of Case G Stopes
41,690 Total Tonnes of Dilution
21% Total Tonnes of Dilution

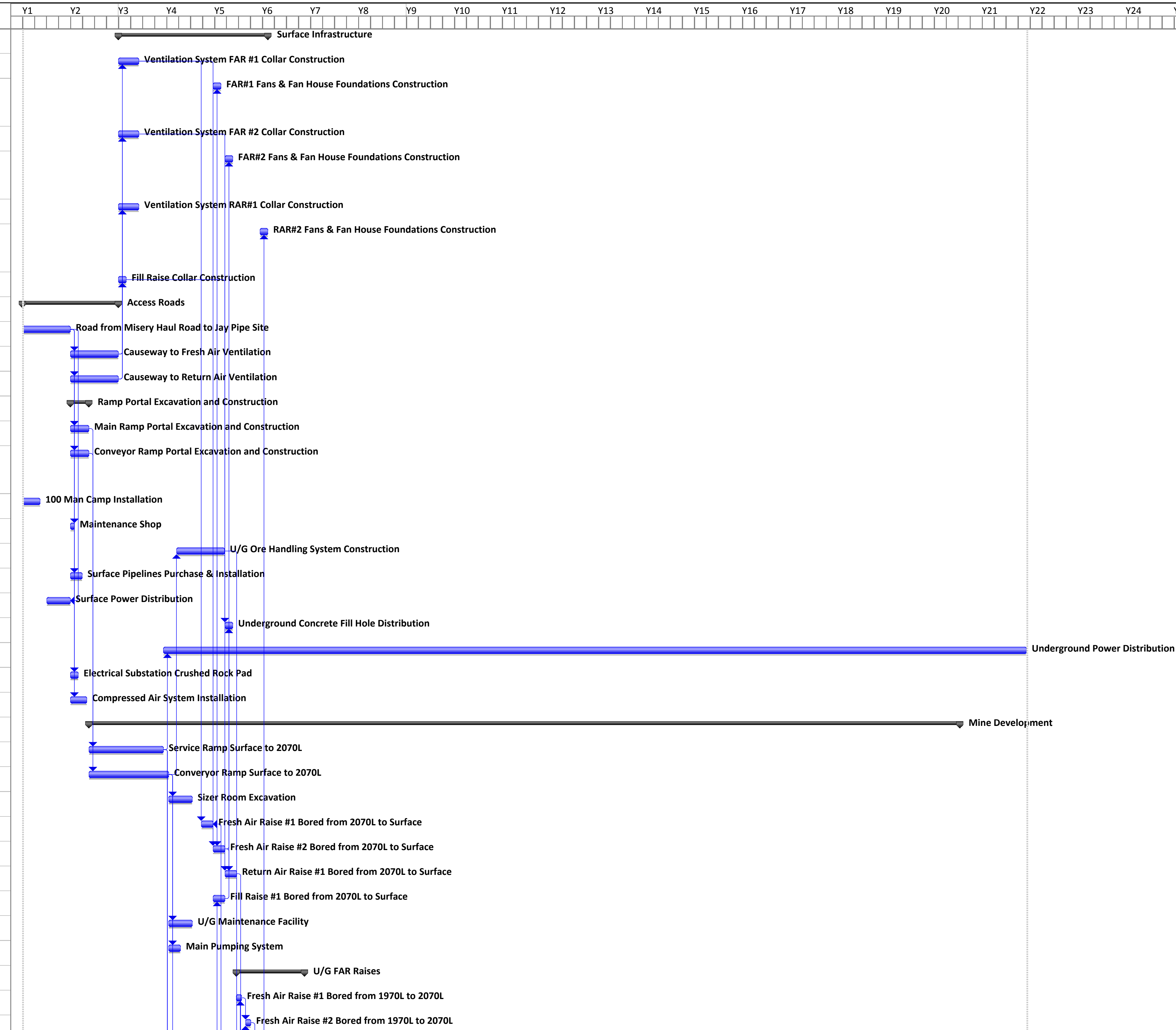


H
Rock Dilution
Fill Dilution
Case H Stopes
1m
12m
0m
50m
Top Sill
Top Sill
1m
20m
0 meters of Rock
1.5 meters fill
20 meters high
50 meters long
1,500 M3 of dilution
2,633 Tonnes of Dilution
0 meters of Rock
0.75 meters fill
15 meters high
50 meters long
563 M3 of dilution
987 Tonnes of Dilution
Bottom Sill
Bottom Sill
55,688 M3 of Dilution
27 # of Case H Stopes
97,732 Total Tonnes of Dilution
16% Total Tonnes of Dilution

APPENDIX C

SCHEDULE

ID		Code	Task Name	Level	Duration	Start	Finish	Mined Tonnes
1			**Surface Infrastructure**		**1138 days**	**Fri 01/01/16**	**ue 02/12/19**	**0**
2		CAPEX-Const	Ventilation System FAR #1 Collar Constructioi		156 days	Fri 01/01/16	un 06/05/16	0
3		CAPEX-Const	FAR#1 Fans & Fan House Foundations Construction		60 days	Fri 12/22/17	Tue 02/20/18	0
4		CAPEX-Const	Ventilation System FAR #2 Collar Constructioi		156 days	Fri 01/01/16	un 06/05/16	0
5		CAPEX-Const	FAR#2 Fans & Fan House Foundations Construction		60 days	Thu 03/22/18	Mon 05/21/18	0
6		CAPEX-Const	Ventilation System RAR#1 Collar Constructior		156 days	Fri 01/01/16	un 06/05/16	0
7		CAPEX-Const	RAR#2 Fans & Fan House Foundations Construction		60 days	Fri 12/14/18	Tue 02/12/19	0
8		CAPEX-Const	Fill Raise Collar Construction		60 days	Fri 01/01/16	ue 03/01/16	0
9			**Access Roads**		**730 days**	**Wed 01/01/**	**Fri 01/01/16**	**0**
10		CAPEX-Const	Road from Misery Haul Road to Jay Pipe Site		365 days	Wed 01/01/1	hu 01/01/15	0
11		CAPEX-Const	Causeway to Fresh Air Ventilation		365 days	Thu 01/01/1	Fri 01/01/16	0
12		CAPEX-Const	Causeway to Return Air Ventilation		365 days	Thu 01/01/1	Fri 01/01/16	0
13			**Ramp Portal Excavation and Construction**		**141 days**	**Thu 01/01/1**	**Fri 05/22/15**	**0**
14		CAPEX-Const	Main Ramp Portal Excavation and Constructi		141 days	Thu 01/01/1	Fri 05/22/15	0
15		CAPEX-Const	Conveyor Ramp Portal Excavation and Construction		141 days	Thu 01/01/15	Fri 05/22/15	0
16		CAPEX-Const	100 Man Camp Installation		134 days	Wed 01/01/1	hu 05/15/14	0
17		CAPEX-Const	Maintenance Shop		30 days	Thu 01/01/1	Sat 01/31/15	0
18		CAPEX-Const	U/G Ore Handling System Construction		365 days	Sun 03/19/1	on 03/19/18	0
19		CAPEX-Const	Surface Pipelines Purchase & Installation		90 days	Thu 01/01/1	ed 04/01/15	0
20		CAPEX-Const	Surface Power Distribution		180 days	Sat 07/05/14	hu 01/01/15	0
21		CAPEX-Const	Underground Concrete Fill Hole Distribution		60 days	Thu 03/22/1	on 05/21/18	0
22		CAPEX-Const	Underground Power Distribution		6570 days	Fri 12/09/16	ue 12/05/34	0
23		CAPEX-Const	Electrical Substation Crushed Rock Pad		60 days	Thu 01/01/1	on 03/02/15	0
24		CAPEX-Const	Compressed Air System Installation		125 days	Thu 01/01/1	ed 05/06/15	0
25			**Mine Development**		**6630 days**	**Fri 05/22/15**	**Sat 07/16/33**	**0**
26		CAPEX-LatDev	Service Ramp Surface to 2070L	2400	567 days	Fri 05/22/15	Fri 12/09/16	0
27		CAPEX-LatDev	Converyor Ramp Surface to 2070L	2400	607 days	Fri 05/22/15	ed 01/18/17	0
28		CAPEX-LatDev	Sizer Room Excavation	2050	180 days	Wed 01/18/1	on 07/17/17	0
29		CAPEX-Rse	Fresh Air Raise #1 Bored from 2070L to Surfa	2400	90 days	Sat 09/23/17	Fri 12/22/17	0
30		CAPEX-Rse	Fresh Air Raise #2 Bored from 2070L to Surfa	2400	90 days	Fri 12/22/17	hu 03/22/18	0
31		CAPEX-Rse	Return Air Raise #1 Bored from 2070L to Surf	2400	90 days	Thu 03/22/1	ed 06/20/18	0
32		CAPEX-Rse	Fill Raise #1 Bored from 2070L to Surface	2400	90 days	Fri 12/22/17	hu 03/22/18	0
33		CAPEX-Const	U/G Maintenance Facility	2070	180 days	Wed 01/18/1	on 07/17/17	0
34		CAPEX-Const	Main Pumping System	2050	90 days	Wed 01/18/1	ue 04/18/17	0
35			**U/G FAR Raises**		**519 days**	**Sun 06/17/1**	**on 11/18/19**	**0**
36		CAPEX-Rse	Fresh Air Raise #1 Bored from 1970L to 2(	2070	40 days	Sun 06/17/1	Fri 07/27/18	0
37		CAPEX-Rse	Fresh Air Raise #2 Bored from 1970L to 2(	2070	40 days	Sun 08/26/1	Fri 10/05/18	0



Project: Jap Pipe Project Schedule
Date: Fri 08/09/13

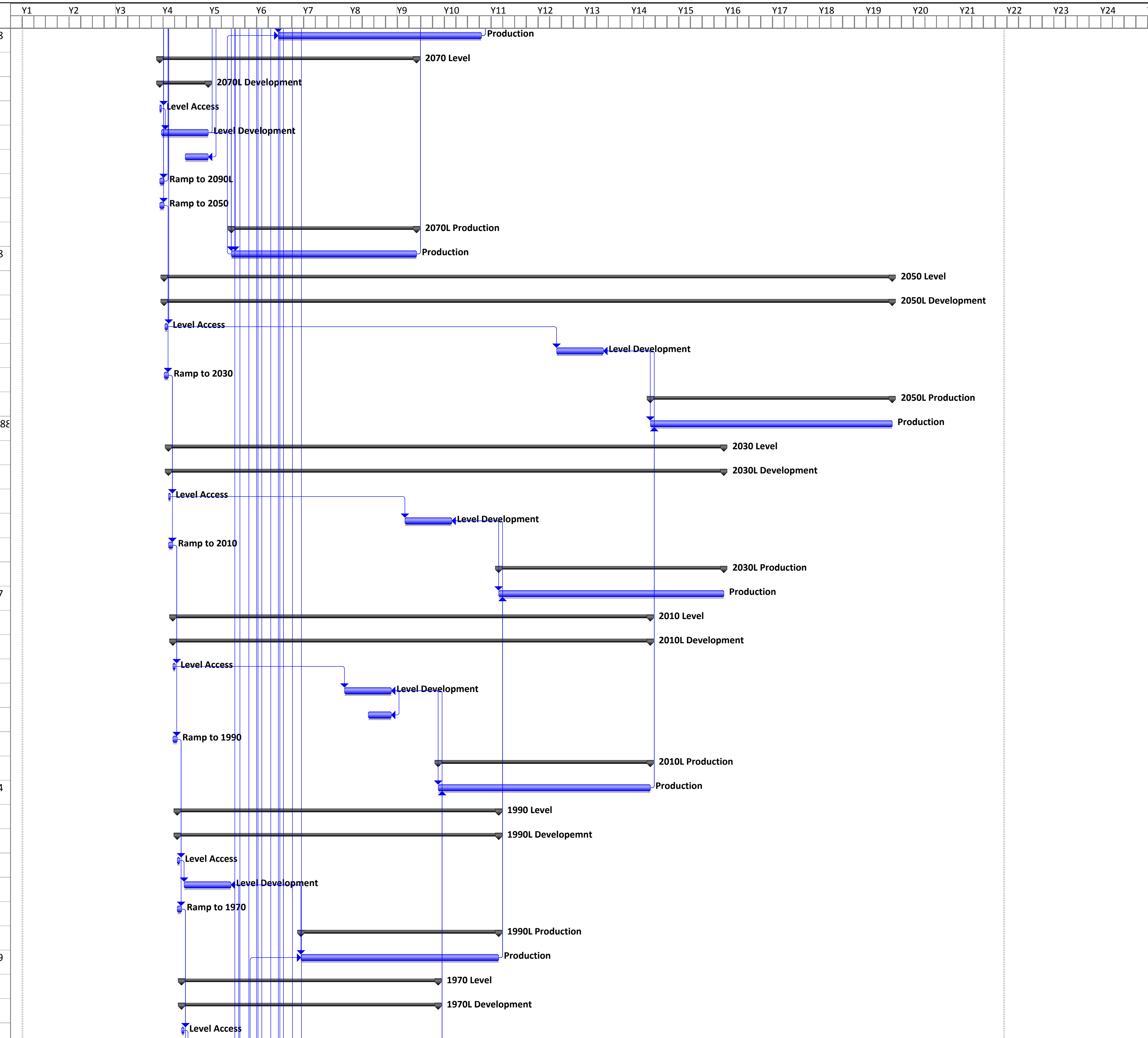
Task | Split | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline | Progress

ID		Code	Task Name	Level	Duration	Start	Finish	Mined Tonnes
38		CAPEX-Rse	Return Air Raise #1 Bored from 1970L to 2070L	2070	40 days	Sun 11/04/18	Fri 12/14/18	0
39		CAPEX-Rse	Fresh Air Raise #1 Bored from 1870L to 1!	1970	40 days	Tue 12/04/1	un 01/13/19	0
40		CAPEX-Rse	Fresh Air Raise #2 Bored from 1870L to 1!	1970	40 days	Tue 02/12/1	un 03/24/19	0
41		CAPEX-Rse	Return Air Raise #1 Bored from 1870L to 1970L	1970	40 days	Tue 04/23/19	Sun 06/02/19	0
42		CAPEX-Rse	Fresh Air Raise #1 Bored from 1770L to 18	1870	40 days	Wed 05/22/:	on 07/01/19	0
43		CAPEX-Rse	Fresh Air Raise #2 Bored from 1770L to 18	1870	40 days	Wed 07/31/:	on 09/09/19	0
44		CAPEX-Rse	Return Air Raise #1 Bored from 1770L to 1870L	1870	40 days	Wed 10/09/19	Mon 11/18/19	0
45			**2170 Level**		**3142 days**	**Thu 05/25/1**	**ed 12/31/25**	**0**
46			**2170L Development**	**2170**	**3142 days**	**Thu 05/25/1**	**ed 12/31/25**	**0**
47		CAPEX-LatDev	Level Access	2170	20 days	Thu 05/25/1	ed 06/14/17	0
48		CAPEX-LatDev	Level Development	2170	365 days	Tue 12/31/2	ed 12/31/25	0
49			**2150 Level**		**5370 days**	**Fri 04/21/17**	**at 01/03/32**	**0**
50			**2150L Development**	**2150**	**5370 days**	**Fri 04/21/17**	**at 01/03/32**	**0**
51		CAPEX-LatDev	Level Access	2150	20 days	Fri 04/21/17	hu 05/11/17	0
52		CAPEX-LatDev	Level Development	2150	365 days	Tue 12/31/2	ed 12/31/25	0
53		CAPEX-LatDev	Ramp to 2170	2150	34 days	Fri 04/21/17	hu 05/25/17	0
54			**2150L Production**	**2150**	**1829 days**	**Thu 12/31/2**	**at 01/03/32**	**0**
55		OPEX-Prod	Production	2150	1829 days	Thu 12/31/2	at 01/03/32	2788448
56			**2130 Level**		**4143 days**	**Sat 03/18/1**	**Fri 07/21/28**	**0**
57			**2130L Development**	**2130**	**4143 days**	**Sat 03/18/1**	**Fri 07/21/28**	**0**
58		CAPEX-LatDev	Level Access	2130	20 days	Sat 03/18/17	Fri 04/07/17	0
59		CAPEX-LatDev	Level Development	2130	365 days	Wed 10/20/:	hu 10/20/22	0
60		CAPEX-LatDev	Ramp to 2150	2130	34 days	Sat 03/18/17	Fri 04/21/17	0
61			**2130L Production**	**2130**	**1736 days**	**Fri 10/20/23**	**Fri 07/21/28**	**0**
62		OPEX-Prod	Production	2130	1736 days	Fri 10/20/23	Fri 07/21/28	2647020
63			**2110 Level**		**3609 days**	**Sun 02/12/1**	**hu 12/31/26**	**0**
64			**2110L Development**	**2110**	**3609 days**	**Sun 02/12/1**	**hu 12/31/26**	**0**
65		CAPEX-LatDev	Level Access	2110	20 days	Sun 02/12/1	at 03/04/17	0
66		CAPEX-LatDev	Level Development	2110	365 days	Tue 06/02/2	ed 06/02/21	0
67		OPEX-DD	Definition Drilling	2110	180 days	Fri 12/04/20	ed 06/02/21	0
68		CAPEX-LatDev	Ramp to 2130	2110	34 days	Sun 02/12/1	at 03/18/17	0
69			**2110L Production**	**2110**	**1673 days**	**Thu 06/02/2**	**hu 12/31/26**	**0**
70		OPEX-Prod	Production	2110	1673 days	Thu 06/02/2	hu 12/31/26	2551426
71			**2090 Level**		**2472 days**	**Thu 01/12/1**	**Fri 10/20/23**	**0**
72			**2090L Development**	**2090**	**2472 days**	**Thu 01/12/1**	**Fri 10/20/23**	**0**
73		CAPEX-LatDev	Level Access	2090	20 days	Thu 01/12/1	ed 02/01/17	0
74		CAPEX-LatDev	Level Development	2090	365 days	Wed 02/01/:	hu 02/01/18	0
75		CAPEX-LatDev	Ramp to 2110L	2090	31 days	Thu 01/12/1	un 02/12/17	0
76			**2090L Production**	**2090**	**1583 days**	**Thu 06/20/1**	**Fri 10/20/23**	**0**

Project: Jap Pipe Project Schedule
Date: Fri 08/09/13

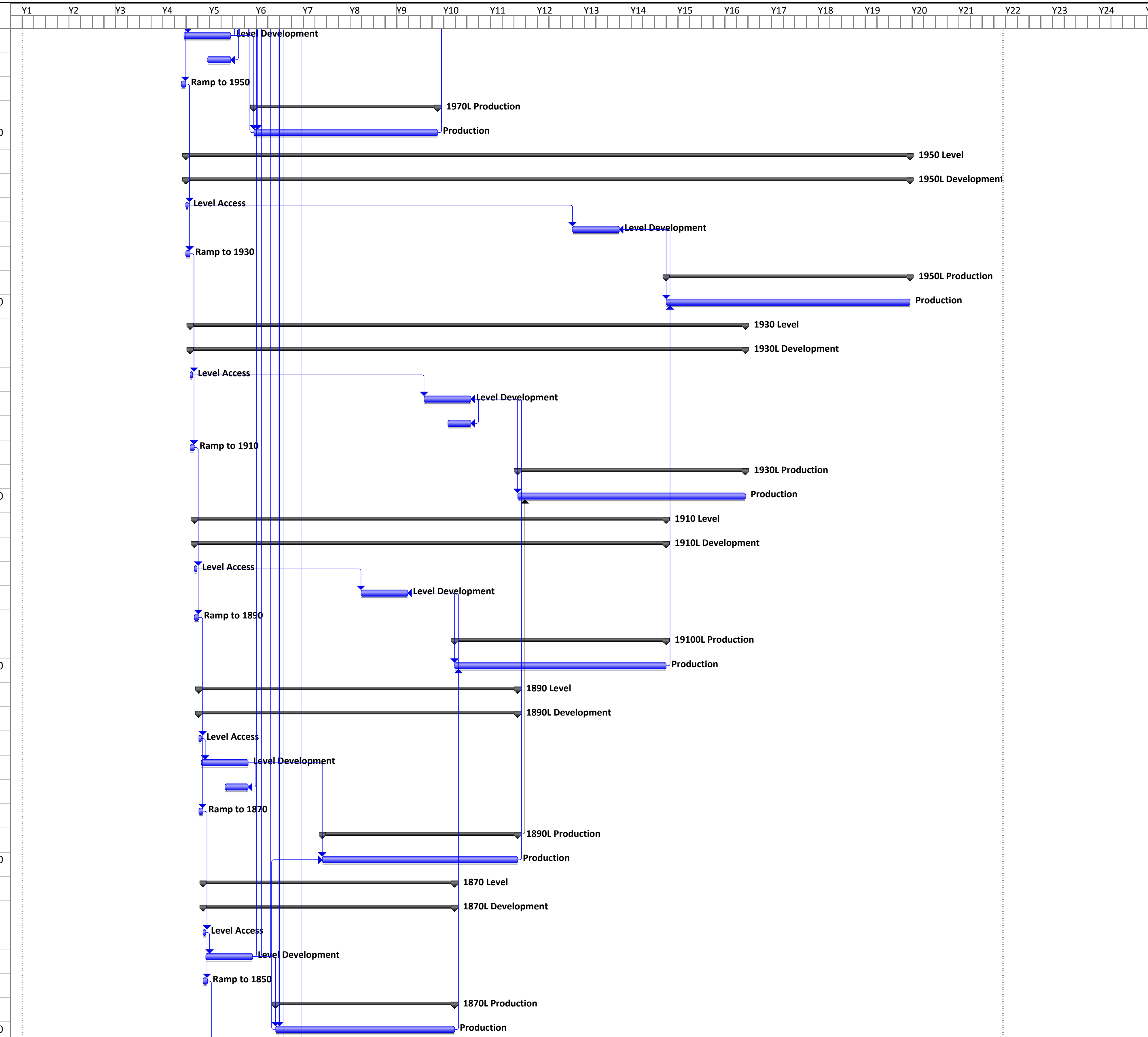
Task | Split | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline | Progress

ID		Code	Task Name	Level	Duration	Start	Finish	Mined Tonnes
77		OPEX-Prod	Production	2090	1583 days	Thu 06/20/1	Fri 10/20/23	2414558
78			**2070 Level**		**2001 days**	**Fri 12/09/16**	**hu 06/02/22**	**0**
79			**2070L Development**		**378 days**	**Fri 12/09/16**	**Fri 12/22/17**	**0**
80		CAPEX-LatDev	Level Access	2070	13 days	Fri 12/09/16	hu 12/22/16	0
81		CAPEX-LatDev	Level Development	2070	365 days	Thu 12/22/1	Fri 12/22/17	0
82		OPEX-DD	Definition Drilling	2070	180 days	Sun 06/25/1	Fri 12/22/17	0
83		CAPEX-LatDev	Ramp to 2090L	2070	34 days	Fri 12/09/16	hu 01/12/17	0
84		CAPEX-LatDev	Ramp to 2050	2070	34 days	Fri 12/09/16	hu 01/12/17	0
85			**2070L Production**	**2070**	**1443 days**	**Wed 06/20/**	**hu 06/02/22**	**0**
86		OPEX-Prod	Production	2070	1443 days	Wed 06/20/	hu 06/02/22	2200218
87			**2050 Level**		**5672 days**	**Thu 01/12/1**	**at 07/24/32**	**0**
88			**2050L Development**	**2050**	**5672 days**	**Thu 01/12/1**	**at 07/24/32**	**0**
89		CAPEX-LatDev	Level Access	2050	20 days	Wed 01/18/	ue 02/07/17	0
90		CAPEX-LatDev	Level Development	2050	365 days	Tue 05/27/2	ed 05/27/26	0
91		CAPEX-LatDev	Ramp to 2030	2050	34 days	Thu 01/12/1	ed 02/15/17	0
92			**2050L Production**	**2050**	**1885 days**	**Thu 05/27/2**	**at 07/24/32**	**0**
93		OPEX-Prod	Production	2050	1885 days	Thu 05/27/2	Sat 07/24/32	2055601.88
94			**2030 Level**		**4326 days**	**Wed 02/15/**	**ed 12/20/28**	**0**
95			**2030L Development**	**2030**	**4326 days**	**Wed 02/15/**	**ed 12/20/28**	**0**
96		CAPEX-LatDev	Level Access	2030	15 days	Wed 02/15/	hu 03/02/17	0
97		CAPEX-LatDev	Level Development	2030	365 days	Thu 03/03/2	Fri 03/03/23	0
98		CAPEX-LatDev	Ramp to 2010	2030	34 days	Wed 02/15/	ue 03/21/17	0
99			**2030L Production**	**2030**	**1754 days**	**Sat 03/02/2**	**ed 12/20/28**	**0**
100		OPEX-Prod	Production	2030	1754 days	Sat 03/02/2	ed 12/20/28	1910987
101			**2010 Level**		**3719 days**	**Tue 03/21/1**	**hu 05/27/27**	**0**
102			**2010L Development**	**2010**	**3719 days**	**Tue 03/21/1**	**hu 05/27/27**	**0**
103		CAPEX-LatDev	Level Access	2010	20 days	Tue 03/21/1	on 04/10/17	0
104		CAPEX-LatDev	Level Development	2010	365 days	Tue 11/17/2	ed 11/17/21	0
105		OPEX-DD	Definition Drilling	2010	180 days	Fri 05/21/21	ed 11/17/21	0
106		CAPEX-LatDev	Ramp to 1990	2010	34 days	Tue 03/21/1	on 04/24/17	0
107			**2010L Production**	**2010**	**1652 days**	**Thu 11/17/2**	**hu 05/27/27**	**0**
108		OPEX-Prod	Production	2010	1652 days	Thu 11/17/2	hu 05/27/27	1799944
109			**1990 Level**		**2504 days**	**Mon 04/24/**	**at 03/02/24**	**0**
110			**1990L Developemnt**	**1990**	**2504 days**	**Mon 04/24/**	**at 03/02/24**	**0**
111		CAPEX-LatDev	Level Access	1990	20 days	Mon 04/24/	un 05/14/17	0
112		CAPEX-LatDev	Level Development	1990	365 days	Sat 06/17/17	un 06/17/18	0
113		CAPEX-LatDev	Ramp to 1970	1990	34 days	Mon 04/24/	un 05/28/17	0
114			**1990L Production**	**1990**	**1540 days**	**Sat 12/14/1**	**at 03/02/24**	**0**
115		OPEX-Prod	Production	1990	1540 days	Sat 12/14/1	Sat 03/02/24	1678569
116			**1970 Level**		**1999 days**	**Sun 05/28/1**	**hu 11/17/22**	**0**
117			**1970L Development**	**1970**	**1999 days**	**Sun 05/28/1**	**hu 11/17/22**	**0**
118		CAPEX-LatDev	Level Access	1970	20 days	Sun 05/28/1	Sat 06/17/17	0



Project: Jap Pipe Project Schedule Date: Fri 08/09/13	Task	Split	Milestone	Summary	Project Summary	External Tasks	External Milestone	Deadline	Progress

ID		Code	Task Name	Level	Duration	Start	Finish	Mined Tonnes
119		CAPEX-LatDev	Level Development	1970	365 days	Sat 06/17/17	un 06/17/18	0
120		OPEX-DD	Definition Drilling	1970	180 days	Tue 12/19/1	un 06/17/18	0
121		CAPEX-LatDev	Ramp to 1950	1970	34 days	Sun 05/28/1	Sat 07/01/17	0
122			1970L Production	1970	1434 days	Fri 12/14/18	hu 11/17/22	0
123		OPEX-Prod	Production	1970	1434 days	Fri 12/14/18	hu 11/17/22	1562880
124			1950 Level		5649 days	Sat 07/01/1	Sat 12/18/32	0
125			1950L Development	1950	5649 days	Sat 07/01/1	Sat 12/18/32	0
126		CAPEX-LatDev	Level Access	1950	20 days	Sat 07/01/17	Fri 07/21/17	0
127		CAPEX-LatDev	Level Development	1950	365 days	Sat 10/04/2	un 10/04/26	0
128		CAPEX-LatDev	Ramp to 1930	1950	34 days	Sat 07/01/17	Fri 08/04/17	0
129			1950L Production	1950	1902 days	Mon 10/04/	Sat 12/18/32	0
130		OPEX-Prod	Production	1950	1902 days	Mon 10/04/	Sat 12/18/32	1465200
131			1930 Level		4331 days	Fri 08/04/17	ed 06/13/29	0
132			1930L Development	1930	4331 days	Fri 08/04/17	ed 06/13/29	0
133		CAPEX-LatDev	Level Access	1930	20 days	Fri 08/04/17	hu 08/24/17	0
134		CAPEX-LatDev	Level Development	1930	365 days	Wed 08/03/	hu 08/03/23	0
135		OPEX-DD	Definition Drilling	1930	180 days	Sat 02/04/2	hu 08/03/23	0
136		CAPEX-LatDev	Ramp to 1910	1930	34 days	Fri 08/04/17	hu 09/07/17	0
137			1930L Production	1930	1776 days	Fri 08/02/24	ed 06/13/29	0
138		OPEX-Prod	Production	1930	1776 days	Fri 08/02/24	ed 06/13/29	1367520
139			1910 Level		3679 days	Thu 09/07/1	on 10/04/27	0
140			1910L Development	1910	3679 days	Thu 09/07/1	on 10/04/27	0
141		CAPEX-LatDev	Level Access	1910	20 days	Thu 09/07/1	ed 09/27/17	0
142		CAPEX-LatDev	Level Development	1910	365 days	Mon 03/29/	ue 03/29/22	0
143		CAPEX-LatDev	Ramp to 1890	1910	34 days	Thu 09/07/1	ed 10/11/17	0
144			19100L Production	1910	1650 days	Wed 03/29/	on 10/04/27	0
145		OPEX-Prod	Production	1910	1650 days	Wed 03/29/	on 10/04/27	1269840
146			1890 Level		2487 days	Wed 10/11/	Fri 08/02/24	0
147			1890L Development	1890	2487 days	Wed 10/11/	Fri 08/02/24	0
148		CAPEX-LatDev	Level Access	1890	20 days	Wed 10/11/	ue 10/31/17	0
149		CAPEX-LatDev	Level Development	1890	365 days	Tue 10/31/1	ed 10/31/18	0
150		OPEX-DD	Definition Drilling	1890	180 days	Fri 05/04/18	ed 10/31/18	0
151		CAPEX-LatDev	Ramp to 1870	1890	34 days	Wed 10/11/	ue 11/14/17	0
152			1890L Production	1890	1523 days	Mon 06/01/	Fri 08/02/24	0
153		OPEX-Prod	Production	1890	1523 days	Mon 06/01/	Fri 08/02/24	1172160
154			1870 Level		1961 days	Tue 11/14/1	ed 03/29/23	0
155			1870L Development	1870	1961 days	Tue 11/14/1	ed 03/29/23	0
156		CAPEX-LatDev	Level Access	1870	20 days	Tue 11/14/1	on 12/04/17	0
157		CAPEX-LatDev	Level Development	1870	365 days	Mon 12/04/	ue 12/04/18	0
158		CAPEX-LatDev	Ramp to 1850	1870	34 days	Tue 11/14/1	on 12/18/17	0
159			1870L Production	1870	1396 days	Sun 06/02/1	ed 03/29/23	0
160		OPEX-Prod	Production	1870	1396 days	Sun 06/02/1	ed 03/29/23	1074480



Project: Jap Pipe Project Schedule
Date: Fri 08/09/13

Task | Split | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline | Progress

ID		Code	Task Name	Level	Duration	Start	Finish	Mined Tonnes
161			**1850 Level**		**5689 days**	**Mon 12/18/**	**at 07/16/33**	**0**
162			**1850L Development**	**1850**	**5689 days**	**Mon 12/18/**	**at 07/16/33**	**0**
163		CAPEX-LatDev	Level Access	1850	20 days	Mon 12/18/	un 01/07/18	0
164		CAPEX-LatDev	Level Development	1850	365 days	Thu 11/06/2	Fri 11/06/26	0
165		OPEX-DD	Definition Drilling	1850	180 days	Sun 05/10/2	Fri 11/06/26	0
166		CAPEX-LatDev	Ramp to 1830	1850	34 days	Mon 12/18/	un 01/21/18	0
167			**1850L Production**	**1850**	**2079 days**	**Sat 11/06/2**	**at 07/16/33**	**0**
168		OPEX-Prod	Production	1850	2079 days	Sat 11/06/2	at 07/16/33	976800
169			**1830 Level**		**4357 days**	**Sun 01/21/1**	**ed 12/26/29**	**0**
170			**1830L Development**	**1830**	**4357 days**	**Sun 01/21/1**	**ed 12/26/29**	**0**
171		CAPEX-LatDev	Level Access	1830	20 days	Sun 01/21/1	at 02/10/18	0
172		CAPEX-LatDev	Level Development	1830	365 days	Sat 11/12/2	un 11/12/23	0
173		CAPEX-LatDev	Ramp to 1810	1830	34 days	Sun 01/21/1	at 02/24/18	0
174			**1830L Production**	**1830**	**1871 days**	**Mon 11/11/**	**ed 12/26/29**	**0**
175		OPEX-Prod	Production	1830	1871 days	Mon 11/11/	ed 12/26/29	879120
176			**1810 Level**		**3542 days**	**Sat 02/24/1**	**at 11/06/27**	**0**
177			**1810L Development**	**1810**	**3542 days**	**Sat 02/24/1**	**at 11/06/27**	**0**
178		CAPEX-LatDev	Level Access	1810	20 days	Sat 02/24/1	Fri 03/16/18	0
179		CAPEX-LatDev	Level Development	1810	365 days	Sun 04/18/2	on 04/18/22	0
180		OPEX-DD	Definition Drilling	1810	120 days	Sun 12/19/2	on 04/18/22	0
181		CAPEX-LatDev	Ramp to 1790	1810	34 days	Sat 02/24/1	Fri 03/30/18	0
182			**1810L Production**	**1810**	**1663 days**	**Tue 04/18/2**	**at 11/06/27**	**0**
183		OPEX-Prod	Production	1810	1663 days	Tue 04/18/2	Sat 11/06/27	781440
184			**1790 Level**		**2418 days**	**Fri 03/30/18**	**on 11/11/24**	**0**
185			**1790L Development**	**1790**	**2418 days**	**Fri 03/30/18**	**on 11/11/24**	**0**
186		CAPEX-LatDev	Level Access	1790	20 days	Fri 03/30/18	hu 04/19/18	0
187		CAPEX-LatDev	Level Development	1790	365 days	Thu 04/19/1	Fri 04/19/19	0
188		CAPEX-LatDev	Ramp to 1770	1790	34 days	Fri 03/30/18	hu 05/03/18	0
189			**1790L Production**	**1790**	**1455 days**	**Tue 11/17/2**	**on 11/11/24**	**0**
190		OPEX-Prod	Production	1790	1455 days	Tue 11/17/2	on 11/11/24	683760
191			**1770 Level**		**1811 days**	**Thu 05/03/1**	**ue 04/18/23**	**0**
192			**1770L Development**	**1770**	**1811 days**	**Thu 05/03/1**	**ue 04/18/23**	**0**
193		CAPEX-LatDev	Level Access	1770	20 days	Thu 05/03/1	ed 05/23/18	0
194		CAPEX-LatDev	Level Development	1770	364 days	Wed 05/23/	ed 05/22/19	0
195		OPEX-LatDev	**1770L Production**	**1770**	**1247 days**	**Mon 11/18/**	**ue 04/18/23**	**0**
196		OPEX-Prod	Production	1770	1247 days	Mon 11/18/	ue 04/18/23	586080

Project: Jap Pipe Project Schedule
Date: Fri 08/09/13

Task | Split | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline | Progress

APPENDIX D

COST ESTIMATE AND CASH FLOW

Dominion Diamonds

Jay Pipe Concept Study

Budgeted Cost

WBS			Description	Quantity	Unit	Unit Cost	Budgeted Cost	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	
Level 1	Level 2	Level 3																										
1			Surface Infrastructures																									
1	100		Acces Roads																									
1	100	001	Road from Misery Site to Jay Pipe Site	7.5	km	$1,000,000	$7,500,000	$7,500,000																				$7,500,000
1	100	002	Road from Jay Site to Fresh Air ventilation Plant	1.5	km	$1,000,000	$1,500,000		$1,500,000																			$1,500,000
1	100	003	Road from Jay Site to Return Air ventilation Plant	1.5	km	$1,000,000	$1,500,000		$1,500,000																			$1,500,000
1	100		Subtotal Access Roads				$10,500,000	$7,500,000	$3,000,000																			$10,500,000
			Ramp Portal Excavation and Construction																									
1	110	001	Main Ramp Portal Excavation and Construction	1	ls	$3,833,153	$3,833,153		$3,833,153																			$3,833,153
1	120	001	Conveyor Ramp Portal Excavation and Construction	1	ls	$3,833,153	$3,833,153		$3,833,153																			$3,833,153
			Subtotal Ramp Portal and Conctruction				$7,666,306		$7,666,306																			$7,666,306
			Raises Collar Construction and Fan House Foundations																									
1	130	001	Ventilation System FAR#1 Collar Construction	1	ls	$3,931,765	$3,931,765		$3,931,765																			$3,931,765
1	140	002	FAR#1 Fans & Fan House Foundations Construction	1	ls	$2,662,764	$2,662,764		$2,662,764																			$2,662,764
1	150	001	Ventilation System FAR#2 Collar Construction	1	ls	$3,931,765	$3,931,765			$3,931,765																		$3,931,765
1	160	002	FAR#2 Fans & Fan House Foundations Construction	1	ls	$2,662,764	$2,662,764			$2,662,764																		$2,662,764
1	170	001	Ventilation System RAR#1 Collar Construction	1	ls	$3,931,765	$3,931,765		$3,931,765																			$3,931,765
1	180	001	Waste Backfill Raise Collar Construction	1	ls	$3,931,765	$3,931,765			$3,931,765																		$3,931,765
1	190	002	Waste Backfill Building Foundations	1	ls	$450,000	$450,000			$450,000																		$450,000
			Subtotal Raises Collar Construction and Fan House Foundations				$21,502,589		10,526,294	10,976,294																		$21,502,589
			Surface Equipment Purchase																									
1	200	001	Underground Power Distribution Purchase	1	ls	$489,600	$489,600		$489,600																			$489,600
1	200	002	Purchase Surface Electrical/Controls	1	ls	$2,187,600	$2,187,600		$2,187,600																			$2,187,600
1	200	003	Purchase & Installation 13.8 KV Ekati Powerline	37	km	$256,800	$9,501,600	$4,750,800	$4,750,800																			$9,501,600
1	200	004	PLC, Communication Interface Ekati	1	ls	$963,000	$963,000		$963,000																			$963,000
1	200	005	Surface Communications Purchase	1	ls	$1,109,700	$1,109,700		$1,109,700																			$1,109,700
1	200	006	Purchase Compressor 1 (1000cfm) & Pipe Fittings	1	ls	$346,300	$346,300		$346,300																			$346,300
1	200	007	Purchase Compressor 2 (1000cfm) & Pipe Fittings	1	ls	$346,300	$346,300		$346,300																			$346,300
1	200	008	Purchase Mine Water Discharge HPDE Pipe 250mm(10")	7,500	m	$360	$2,700,000		$2,700,000																			$2,700,000
1	200	009	Purchase Compressed Air Line 250mm(10")	200	m	$180	$36,000		$36,000																			$36,000
1	200	010	Mine Rescue Team Equipment Purchase	1	ls	$590,945	$590,945		$590,945																			$590,945
1	200	011	Surface ERT Equipment Purchase	1	ls	$549,784	$549,784		$549,784																			$549,784
1	200	012	Purchase Waste Backfill Plant Building	1	ls	$350,000	$350,000				$350,000																	$350,000
1	200	013	Purchase Main Ramp Portal Steel Plates	130	m	$13,964	$1,815,310	$1,815,310																				$1,815,310
1	200	014	Purchase Conveyor Ramp Portal Steel Plates	130	m	$13,964	$1,815,310	$1,815,310																				$1,815,310
1	200	015	Purchase and Install Concrete Backfill Plant	1	ls	$1,500,000	$1,500,000			$750,000	$750,000																	$1,500,000
1	200	016	Purchase and Install Concrete/Shotcrete Plant	1	ls	$1,500,000	$1,500,000		$1,500,000																			$1,500,000
1	200	017	Purchase Connate Water Truck 1	1	ls	$241,392	$241,392		$241,392																			$241,392
1	200	018	Purchase Connate Water Truck 2	1	ls	$241,392	$241,392		$241,392																			$241,392
1	200		Subtotal Surface Equipment Purchase				$26,284,232	$8,381,419	$16,052,812	$750,000	$1,100,000																	$26,284,232
																												$0
			Surface Infrastructures Installation																									$0
1	210	001	100 Man Camp Installation	1	ls	$920,405	$920,405	$920,405																				$920,405
																												$0
1	220	001	Maintenance Shop Purchase & Installation	1	ls	$3,280,008	$3,280,008		$3,280,008																			$3,280,008
																												$0
1	230	001	Quality Assurance/Quality Controls	1	ls	$750,000	$750,000		$250,000	$250,000	$250,000																	$750,000
																												$0
1	240	001	Surface Water Pipeline Purchase & Installation	7,500	m	$960	$7,200,000		$7,200,000																			$7,200,000
																												$0
1	250	001	Surface Power Distribution Installation	1	ls	$1,680,000	$1,680,000		$1,680,000																			$1,680,000
																												$0
1	260	001	Surface Communications Installation	1	ls	$332,100	$332,100		$332,100																			$332,100
																												$0
1	270	001	Underground Concrete Backfill Hole Distribution to 2170 Leve	330	m	$1,803	$594,906				$594,906																	$594,906
1	280	001	Underground Electrical Hole Distribution to 2170 Level	330	m	$1,803	$594,906		$594,906																			
																												$0
1	290	001	Underground Power Distribution Installation	1	ls	$962,316	$962,316		$962,316																			$962,316
																												$0
1	300	001	Surface Electrical Substation Crushed Rock Pad	1	ls	$160,500	$160,500		$160,500																			$160,500
																												$0
1	310	001	Compressed Air System Installation	1	ls	$288,000	$288,000		$288,000																			$288,000
																												$0
			SubtotalSurface Infrastructures Installation				$16,763,141	$920,405	$14,747,830	$250,000	$844,906																	$16,763,141
																												$0
1			Total Surface Infrastructures	1	ls	$82,716,267	$82,716,267	$16,801,824	$51,993,243	$11,976,294	$1,944,906																	$82,716,267
2			U/G Mobile Equipment Purchase																									
			Haulage Truck Purchase																									
2	100	001	AD45 Elphinstone Truck Purchase	4	each	$1,717,600	$6,870,398				$6,870,398																	$6,870,398
2	100	001	AD45 Elphinstone Truck Purchase	4	each	$1,717,600	$6,870,398					$3,435,199	$3,435,199															$6,870,398
2	100		Haulage Truck Purchase	8	each		$13,740,797																					
			LHDs Purchase																									
2	110	001	R1700G Elphinstone LHD Purchase	4	each	$1,544,419	$6,177,677				$6,177,677																	$6,177,677
2	110	001	R1700G Elphinstone LHD & Remote Purchase	4	each	$1,744,419	$6,977,677						$6,977,677															$6,977,677
			LHDs Purchase	8	each		$13,155,354																					
			Drilling Equipment Purchase																									
2	120	001	Jumbo Drilling Equipment Purchase	4	each	$1,725,600	$6,902,400				$6,902,400																	$6,902,400

Dominion Diamonds

Jay Pipe Concept Study

Budgeted Cost

WBS Level 1	WBS Level 2	WBS Level 3	Description	Quantity	Unit	Unit Cost	Budgeted Cost	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	
2	120	001	Longhole Drilling Equipment Purchase	4	each	$1,365,600	$5,462,400						$5,462,400															$5,462,400
			Drilling Equipment Purchase	8	each		$12,364,800																					
2	130	001	Ground Support Equipment Purchase	13	each	$897,579	$11,668,526				$5,834,263	$5,834,263																$11,668,526
2	140	001	Underground Service Vehicles Purchase	17	each	$480,700	$8,171,907				$2,723,969	$2,723,969	$2,723,969															$8,171,907
2			Total U/G Mobile Equipment Purchase	54	each		$59,101,384				$28,508,707	$11,993,431	$18,599,245															$59,101,384
3			Mine Development																									
			Lateral Development																									
3	400	001	Main Access Ramp from Surface to 2070 Level	2,853	metres	$5,837	$16,652,961		$8,326,481	$8,326,481																		$16,652,961
3	410	001	Conveyor Access Ramp from Surface to 2050 Level	3,055	metres	$5,837	$17,832,035		$8,916,018	$8,916,018																		$17,832,035
3	410	002	2050 Level Sizer Area Excavation	150	metres	$5,837	$875,550		$437,775	$437,775																		$875,550
3	410	003	2050 Level Sizer Area Cable bolting	1	ls	$750,000	$750,000		$375,000	$375,000																		$750,000
3	420	001	Level Access Ramps	3,460	metres	$5,837	$20,196,020				$6,732,007	$6,732,007	$6,732,007															$20,196,020
			Subtotal Access Ramp 5.5m X5.5m	9,368	metres	$6,011	$56,306,566																					
			Level Development																									
			Level Access 5.0m x 5.0m and Infrastructures Drift 5.0 x 5.5m																									
3	430	001	Subtotal Level Access and Infrastructures Drift	6,627	metres	$5,286	$35,030,322				$8,757,581	$8,757,581	$8,757,581	$8,757,581														$35,030,322
			Subtotal Lateral Development	15,995	metres	$5,710	$91,336,888																					
			Ventilation Raises																									
			Surface Bored Ventilation Raises																									
3	500	001	Mobilize Raisebore Contractor	1	ls	$126,000	$126,000				$126,000																	$126,000
3	500	001	Fresh Air Raise #1 Bored from 2070L to Surface	370	metres	$5,500	$2,035,000				$1,017,500	$1,017,500																$2,035,000
3	500	002	Fresh Air Raise #2 Bored from 2070L to Surface	390	metres	$5,500	$2,145,000				$1,072,500	$1,072,500																$2,145,000
3	500	003	Return Air Raise #1 Bored from 2070L to Surface	390	metres	$5,500	$2,145,000				$1,072,500	$1,072,500																$2,145,000
3	500	004	Fill Raise #1 Bored from 2070L to Surface	390	metres	$5,500	$2,145,000				$1,072,500	$1,072,500																$2,145,000
3	500	005	Raisebore Standby	60	days	$2,460	$147,600				$73,800	$73,800																$147,600
			Subtotal Surface Bored Ventilation and Fill Raises	1,600	metres	$5,465	$8,743,600																					
3	500	006	Underground FAR Bored Raises 4 metres	630	metres	$7,750	$4,882,500					$2,441,250	$2,441,250															$4,882,500
3	500	007	Underground RAR Bored Raises 4 metres	315	metres	$7,750	$2,441,250					$1,220,625	$1,220,625															$2,441,250
3	500	008	Underground Bored Egress/Manway Raises 3 meters	315	metres	$5,500	$1,732,500					$866,250	$866,250															$1,732,500
3	500	009	Underground Ore Pass Bored Raises 3 metres	315	metres	$5,500	$1,732,500					$866,250	$866,250															$1,732,500
3	500	010	Underground Fill Bored Raises 3 metres	315	metres	$5,500	$1,732,500					$866,250	$866,250															$1,732,500
							$0																					
3	500	011	Demobilize Raisebore Contractor	1	ls	$93,000	$93,000						$93,000															$93,000
			Subtotal Underground Bored Ventilation and Ore Pass Raises	945	metres	$13,348	$12,614,250																					
			Total Bored Ventilation Fill and Ore Pass Raises	2,545	metres	$8,392	$21,357,850																					
3	600	001	Contractor's Indirects Labour- Capital Period	1,460	days	$30,523	$44,562,996		$11,140,749	$11,140,749	$11,140,749	$11,140,749																$44,562,996
3	600	001	Contractor's Indirect Operating & G & A -Capital Period	1,460	days	$3,318	$4,844,280		$1,211,070	$1,211,070	$1,211,070	$1,211,070																$4,844,280
			Subtotal Contractors Indirects				$49,407,276																					$0
3			Total Mine Development	15,995	metres		$162,102,014		$30,407,092	$30,407,092	$32,276,206	$38,410,831	$21,843,212	$8,757,581														$162,102,014
4			Mine Operations																									
4	100	001	Geotechnical, Definition Drilling	14,358	metres	$720	$10,337,760						$689,184	$689,184	$689,184	$689,184	$689,184	$689,184	$689,184	$689,184	$689,184	$689,184	$689,184	$689,184	$689,184	$689,184	$689,184	$10,337,760
4	120	001	Waste Cross Cut 4.5m x 4.6m	47,056	metres	$4,860	$228,668,632				$13,451,096	$13,451,096	$13,451,096	$13,451,096	$13,451,096	$13,451,096	$13,451,096	$13,451,096	$13,451,096	$13,451,096	$13,451,096	$13,451,096	$13,451,096	$13,451,096	$13,451,096	$13,451,096	$13,451,096	$228,668,632
4	130	001	Draw Point Development Kimberlite 4.5m x4.6m	63,567	metres	$8,639	$549,155,313				$32,303,254	$32,303,254	$32,303,254	$32,303,254	$32,303,254	$32,303,254	$32,303,254	$32,303,254	$32,303,254	$32,303,254	$32,303,254	$32,303,254	$32,303,254	$32,303,254	$32,303,254	$32,303,254	$32,303,254	$549,155,313
4	140	001	Slot Raise Preparation (1.1m Bored Raise)	28,064	metres	$600	$16,838,390						$1,122,559	$1,122,559	$1,122,559	$1,122,559	$1,122,559	$1,122,559	$1,122,559	$1,122,559	$1,122,559	$1,122,559	$1,122,559	$1,122,559	$1,122,559	$1,122,559	$1,122,559	$16,838,390
4	150	001	Production Drilling	4,360,483	metres	$21.25	$92,668,986						$6,177,932	$6,177,932	$6,177,932	$6,177,932	$6,177,932	$6,177,932	$6,177,932	$6,177,932	$6,177,932	$6,177,932	$6,177,932	$6,177,932	$6,177,932	$6,177,932	$6,177,932	$92,668,986
4	160	001	Production Blasting	28,343,140	Tonnes	$5.03	$142,509,308						$9,500,621	$9,500,621	$9,500,621	$9,500,621	$9,500,621	$9,500,621	$9,500,621	$9,500,621	$9,500,621	$9,500,621	$9,500,621	$9,500,621	$9,500,621	$9,500,621	$9,500,621	$142,509,308
4	170	001	Production Mucking (R1700G) to Ore Pass	28,343,140	Tonnes	$8.70	$246,585,318						$16,439,021	$16,439,021	$16,439,021	$16,439,021	$16,439,021	$16,439,021	$16,439,021	$16,439,021	$16,439,021	$16,439,021	$16,439,021	$16,439,021	$16,439,021	$16,439,021	$16,439,021	$246,585,318
4	180	001	Production Backfilling	17,005,884	Tonnes	$11.40	$193,867,078						$12,924,472	$12,924,472	$12,924,472	$12,924,472	$12,924,472	$12,924,472	$12,924,472	$12,924,472	$12,924,472	$12,924,472	$12,924,472	$12,924,472	$12,924,472	$12,924,472	$12,924,472	$193,867,078
4	190	001	Production Mucking to Material Handling System	19,244,421	Tonnes	$4.0	$76,977,684						$5,131,846	$5,131,846	$5,131,846	$5,131,846	$5,131,846	$5,131,846	$5,131,846	$5,131,846	$5,131,846	$5,131,846	$5,131,846	$5,131,846	$5,131,846	$5,131,846	$5,131,846	$76,977,684
4	200	001	Production Material Handling System to Surface	30,448,894	Tonnes	$4.00	$121,673,780						$8,111,585	$8,111,585	$8,111,585	$8,111,585	$8,111,585	$8,111,585	$8,111,585	$8,111,585	$8,111,585	$8,111,585	$8,111,585	$8,111,585	$8,111,585	$8,111,585	$8,111,585	$121,673,780
4	210	001	Rocky Ore Haulage to Surface	1,417,157	Tonnes	$21.65	$30,681,449						$2,045,430	$2,045,430	$2,045,430	$2,045,430	$2,045,430	$2,045,430	$2,045,430	$2,045,430	$2,045,430	$2,045,430	$2,045,430	$2,045,430	$2,045,430	$2,045,430	$2,045,430	$30,681,449
4	250	001	Draw Point Rehabilitation	54,361	metres	$500	$27,180,500						$1,812,033	$1,812,033	$1,812,033	$1,812,033	$1,812,033	$1,812,033	$1,812,033	$1,812,033	$1,812,033	$1,812,033	$1,812,033	$1,812,033	$1,812,033	$1,812,033	$1,812,033	$27,180,500
4	300	001	Contractor's Indirects Labour- Operating Period	5,475	days	$29,681	$162,505,862						$10,833,724	$10,833,724	$10,833,724	$10,833,724	$10,833,724	$10,833,724	$10,833,724	$10,833,724	$10,833,724	$10,833,724	$10,833,724	$10,833,724	$10,833,724	$10,833,724	$10,833,724	$162,505,862
4	300	001	Contractor's Indirect Operating & G & A -Operating Period	5,475	days	$3,318	$18,166,050						$1,211,070	$1,211,070	$1,211,070	$1,211,070	$1,211,070	$1,211,070	$1,211,070	$1,211,070	$1,211,070	$1,211,070	$1,211,070	$1,211,070	$1,211,070	$1,211,070	$1,211,070	$18,166,050
4			Total Mine Operations	31,866,051	Tonnes	$60.2	$1,917,816,111				$45,754,350	$45,754,350	$121,753,827	$121,753,827	$121,753,827	$121,753,827	$121,753,827	$121,753,827	$121,753,827	$121,753,827	$121,753,827	$121,753,827	$121,753,827	$121,753,827	$121,753,827	$121,753,827	$121,753,827	$1,917,816,111
5			Mine Ventilation System																									
5	100	001	Ventilation System FAR#1 Equipment Purchase	1	ls	$6,119,730	$6,119,730					$3,059,865	$3,059,865															$6,119,730
5	110	001	Ventilation System FAR#2 Equipment Purchase	1	ls	$6,119,730	$6,119,730					$3,059,865	$3,059,865															$6,119,730

Dominion Diamonds

Jay Pipe Concept Study

Budgeted Cost

WBS			Description	Quantity	Unit	Unit Cost	Budgeted Cost	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	
Level 1	Level 2	Level 3																										
5	120	001	Ventilation System FAR#1 Construction & Installation	1	ls	$5,310,721	$5,310,721					$2,655,361	$2,655,361															$5,310,721
5	130	001	Ventilation System FAR#2 Construction & Installation	1	ls	$5,310,721	$5,310,721					$2,655,361	$2,655,361															$5,310,721
5	140	001	Ventilation System RAR#1 Equipment Purchase	1	ls	$100,000	$100,000					$50,000	$50,000															$100,000
5	150	001	Ventilation System RAR#1 Construction & Installation	1	ls	$250,000	$250,000					$125,000	$125,000															$250,000
5	160	001	Ventilation System Main Ramp Equipment Purchase	1	ls	$1,362,797	$1,362,797		$1,362,797																			$1,362,797
5	170	001	Ventilation System Conveyor Ramp Equipment Purchase	1	ls	$1,362,797	$1,362,797		$1,362,797																			$1,362,797
5	180	001	Ancillary Ventilation Fans	1	ls	$4,330,320	$4,330,320				$1,443,440	$1,443,440	$1,443,440															$4,330,320
5	190	001	Typical level Ventilation Doors/Bulkheads	80	ea	$52,202	$4,176,191				$1,392,064	$1,392,064	$1,392,064															$4,176,191
5			Total Mine Ventilation System				$34,443,008		$2,725,595	$0	$2,835,504	$14,440,955	$14,440,955															$34,443,008
6			Material Handling System																									
6	100	001	JV1 Conveyor Equipment and Material Purchase	100	m	$19,700	$1,970,000				$1,970,000																	$1,970,000
6	110	001	JV3 Conveyor Equipment and Material Purchase	1,400	m	$5,090	$7,126,000				$7,126,000																	$7,126,000
6	120	001	JV4 Conveyor Equipment and Material Purchase	1,400	m	$5,090	$7,126,000				$7,126,000																	$7,126,000
6	130	001	JV5 Stacker Conveyor Equipment and Material Purchase	200	m	$12,500	$2,500,000				$2,500,000																	$2,500,000
6	140	001	Sizer Equipment and Material Purchase	1	ls	$7,775,000	$7,775,000				$3,887,500	$3,887,500																$7,775,000
6	150	001	Ore Pass System Equipment and Material Purchase	1	ls	$7,630,000	$7,630,000				$3,815,000	$3,815,000																$7,630,000
6	160	001	JV1 Conveyor Construction and Installation	80	m	$52,750	$4,220,000				$2,110,000	$2,110,000																$4,220,000
6	200	001	JV3 Conveyor Construction and Installation	1,400	m	$6,800	$9,520,000				$4,760,000	$4,760,000																$9,520,000
6	210	001	JV4 Conveyor Construction and Installation	1,400	m	$6,800	$9,520,000				$4,760,000	$4,760,000																$9,520,000
6	220	001	JV5 Stacker Conveyor Construction and Installation	200	m	$19,700	$3,940,000				$1,970,000	$1,970,000																$3,940,000
6	230	001	Sizer Construction and Installation	1	ls	$5,160,000	$5,160,000				$2,580,000	$2,580,000																$5,160,000
6	240	001	Ore Pass System Construction and Installation	1	ls	$13,260,000	$13,260,000				$4,420,000	$4,420,000	$4,420,000															$13,260,000
6			Total Material Handling System	1	ls		$79,747,000				$47,024,500	$28,302,500	$4,420,000															$79,747,000
7			Underground Infrastructure																									
7	100	001	FAR Steel Manway 2070L to Surface	390	metres	$3,639	$1,419,327				$709,664	$709,664																$1,419,327
7	110	001	Underground FAR Steel Manway from 1770L to 2070L	310	metres	$4,305	$1,334,583					$1,334,583																$1,334,583
7	120	001	2070L Refuge Station	1	ls	$291,206	$291,206			$291,206																		$291,206
7	130	001	2050L Refuge Station	1	ls	$291,206	$291,206			$291,206																		$291,206
7	140	001	Typical Level Refuge Station (6)	1	ls	$1,747,238	$1,747,238				$582,413	$582,413	$582,413															$1,747,238
7	150	001	Portable Refuge Stations (2)	2	ea	$186,000	$372,000		$186,000	$186,000																		$372,000
7	160	001	Typical Level Electrical Substation (19)	19	ea	$588,316	$11,178,000			$2,794,500	$2,794,500	$2,794,500	$2,794,500															$11,178,000
7	170	001	2070 Level Electrical Substation (Material Handling System)	1	ea	$558,000	$558,000				$558,000																	$558,000
7	180	001	Electrical/Controls Mining Equipment	1	ls	$224,064	$224,064		$224,064																			$224,064
7	190	001	U/G Communication & IT Equipment	1	ls	$2,243,700	$2,243,700			$747,900	$747,900	$747,900																$2,243,700
7	200	001	2070L Fuel and Lube Station	1	ls	$621,114	$621,114			$621,114																		$621,114
7	210	001	Explosives Magazines 2070 Level	1	ls	$180,300	$180,300			$180,300																		$180,300
7	220	001	2150 Level Main Dewatering Sump 1	1	ls	$3,594,278	$3,594,278				$3,594,278																	$3,594,278
7	230	001	2150 Level Main Dewatering Sump 2	1	ls	$3,594,278	$3,594,278				$3,594,278																	$3,594,278
7	240	001	2050 Level Main Dewatering Sump 1	1	ls	$3,594,278	$3,594,278			$3,594,278																		$3,594,278
7	250	001	2050 Level Main Dewatering Sump 2	1	ls	$3,594,278	$3,594,278			$3,594,278																		$3,594,278
7	260	001	1930 Level Main Dewatering Sump 1	1	ls	$1,674,250	$1,674,250				$1,674,250																	$1,674,250
7	270	001	1770 Level Main Dewatering Sump 1	1	ls	$1,674,250	$1,674,250				$1,674,250																	$1,674,250
7	280	001	Main Dewatering Pipeline 2070 Level to Surface	3,000	m	$1,008	$3,025,284			$3,025,284																		$3,025,284
7	290	001	Main Dewatering Pipeline 1770 Level to 2070 Level	2,500	m	$1,015	$2,537,220				$2,537,220																	$2,537,220
7	300	001	Underground Concrete Fill Mixing Plant	2	ea	$250,000	$500,000					$250,000	$250,000															$500,000
7	310	001	Underground Boreholes for Concrete Fill	350	m	$1,500	$525,000				$175,000	$175,000	$175,000															$525,000
7	320	001	Main Compressed Air Pipeline	2,500	m	$470	$1,174,560				$391,520	$391,520	$391,520															$1,174,560
7	330	001	Level Dewatering Sumps (19)	19	ea	$86,149	$1,636,826		$327,365	$327,365	$327,365	$327,365	$327,365															$1,636,826
7	340	001	Main Ramp Saline Service Water System Sump	1	ls	$305,618	$305,618		$305,618																			$305,618
7	350	001	Conveyor Ramp Saline Service Water System Sump	1	ls	$305,618	$305,618		$305,618																			$305,618

Dominion Diamonds

Jay Pipe Concept Study

Budgeted Cost

WBS			Description	Quantity	Unit	Unit Cost	Budgeted Cost	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	
Level 1	Level 2	Level 3																										
7	360	001	Levels Dust Collectors	19	ea	$87,908	$1,670,260		$334,052	$334,052	$334,052	$334,052	$334,052															$1,670,260
7			Total Underground Infrastructure	1	ls		$49,866,737	$0	$1,682,716	$15,987,485	$19,694,689	$7,646,996	$4,854,850															$49,866,737
8			Owner's Indirects																									
8	100	001	Owner's Manpower - Capital Period	1,460	days	$11,354	$16,576,898	$3,315,380	$3,315,380	$3,315,380	$3,315,380	$3,315,380																$16,576,898
8	100	001	Owner's Manpower - Operating Period	5,840	days	$11,354	$66,307,594						$4,420,506	$4,420,506	$4,420,506	$4,420,506	$4,420,506	$4,420,506	$4,420,506	$4,420,506	$4,420,506	$4,420,506	$4,420,506	$4,420,506	$4,420,506	$4,420,506	$4,420,506	$66,307,594
			Owner's Manpower	7,300	days		$82,884,492																					
8	110	001	Surface Haulage Sorted Ore/Waste	1,417,157	Tonnes	$6.42	$9,098,148					$568,634	$568,634	$568,634	$568,634	$568,634	$568,634	$568,634	$568,634	$568,634	$568,634	$568,634	$568,634	$568,634	$568,634	$568,634	$568,634	$9,098,148
8	120	001	Surface Ore Haulage from Misery to Ekati	32,183,408	Tonnes	$11.24	$361,722,305					$22,607,644	$22,607,644	$22,607,644	$22,607,644	$22,607,644	$22,607,644	$22,607,644	$22,607,644	$22,607,644	$22,607,644	$22,607,644	$22,607,644	$22,607,644	$22,607,644	$22,607,644	$22,607,644	$361,722,305
8	130	001	Road Maintenance from Misery to Ekati	7,300	days	$7,036	$51,359,981	$2,567,999	$2,567,999	$2,567,999	$2,567,999	$2,567,999	$2,567,999	$2,567,999	$2,567,999	$2,567,999	$2,567,999	$2,567,999	$2,567,999	$2,567,999	$2,567,999	$2,567,999	$2,567,999	$2,567,999	$2,567,999	$2,567,999	$2,567,999	$51,359,981
8	140	001	Surface Connate Water Treatment	7,300	days	$578	$4,217,940	$210,897	$210,897	$210,897	$210,897	$210,897	$210,897	$210,897	$210,897	$210,897	$210,897	$210,897	$210,897	$210,897	$210,897	$210,897	$210,897	$210,897	$210,897	$210,897	$210,897	$4,217,940
8	150	001	Ekati Logistics Crush and Rehandle	7,300	days	$963	$7,029,900	$351,495	$351,495	$351,495	$351,495	$351,495	$351,495	$351,495	$351,495	$351,495	$351,495	$351,495	$351,495	$351,495	$351,495	$351,495	$351,495	$351,495	$351,495	$351,495	$351,495	$7,029,900
8	160	001	Consulting Services	1	ls	$12,680,000	$12,680,000	$5,000,000	$7,680,000																			$12,680,000
			Supply & Services																									
			Accomodations & Flights																									
8	170	001	Accomodations	1,095,000	Man days	$75	$82,125,000	$4,106,250	$4,106,250	$4,106,250	$4,106,250	$4,106,250	$4,106,250	$4,106,250	$4,106,250	$4,106,250	$4,106,250	$4,106,250	$4,106,250	$4,106,250	$4,106,250	$4,106,250	$4,106,250	$4,106,250	$4,106,250	$4,106,250	$4,106,250	$82,125,000
8	180	001	Owner's Flights	15,643	Man Flig	$240	$3,754,320	$187,716	$187,716	$187,716	$187,716	$187,716	$187,716	$187,716	$187,716	$187,716	$187,716	$187,716	$187,716	$187,716	$187,716	$187,716	$187,716	$187,716	$187,716	$187,716	$187,716	$3,754,320
8	190	001	Contractor's Flights	78,214	Man Flig	$540	$42,235,560	$2,111,778	$2,111,778	$2,111,778	$2,111,778	$2,111,778	$2,111,778	$2,111,778	$2,111,778	$2,111,778	$2,111,778	$2,111,778	$2,111,778	$2,111,778	$2,111,778	$2,111,778	$2,111,778	$2,111,778	$2,111,778	$2,111,778	$2,111,778	$42,235,560
			Total Accomodations & Flights	7,300	days	$17,550	$128,114,880	$6,405,744	$6,405,744	$6,405,744	$6,405,744	$6,405,744	$6,405,744	$6,405,744	$6,405,744	$6,405,744	$6,405,744	$6,405,744	$6,405,744	$6,405,744	$6,405,744	$6,405,744	$6,405,744	$6,405,744	$6,405,744	$6,405,744	$6,405,744	$128,114,880
			Fuel Heating Fresh Air Raises and Electricity																									
			Fuel Heating Portal & FAR																									
8	200	001	Fuel Heating Fresh Air Raises	146,306,250	litres	$1.20	$175,567,500		$904,500	$1,809,000	$3,618,000	$7,236,000	$10,800,000	$10,800,000	$10,800,000	$10,800,000	$10,800,000	$10,800,000	$10,800,000	$10,800,000	$10,800,000	$10,800,000	$10,800,000	$10,800,000	$10,800,000	$10,800,000	$10,800,000	$175,567,500
8	210	001	Fuel Electricity	155,247,188	litres	$1.20	$186,296,625		$959,775	$1,919,550	$3,839,100	$7,678,200	$11,460,000	$11,460,000	$11,460,000	$11,460,000	$11,460,000	$11,460,000	$11,460,000	$11,460,000	$11,460,000	$11,460,000	$11,460,000	$11,460,000	$11,460,000	$11,460,000	$11,460,000	$186,296,625
			Total Fuel Heating Fresh Air Raises and Electricity	301,553,438	litres	$1.20	$361,864,125		$1,864,275	$3,728,550	$7,457,100	$14,914,200	$22,260,000	$22,260,000	$22,260,000	$22,260,000	$22,260,000	$22,260,000	$22,260,000	$22,260,000	$22,260,000	$22,260,000	$22,260,000	$22,260,000	$22,260,000	$22,260,000	$22,260,000	$361,864,125
8	220	001	Freight Material and Equipment	12,750,000	kg	$0.60	$7,650,000		$1,500,000	$1,500,000	$1,500,000	$900,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$7,650,000
8	230	001	U/G Light Vehicle Operation and Maintenance	7,300	days	$2,039	$14,886,394		$125,000	$250,000	$853,611	$853,611	$853,611	$853,611	$853,611	$853,611	$853,611	$853,611	$853,611	$853,611	$853,611	$853,611	$853,611	$853,611	$853,611	$853,611	$853,611	$14,886,394
			Supply & Services	7,300	days	$70,208	$512,515,399	$6,405,744	$9,895,019	$11,884,294	$16,216,455	$23,073,555	$29,669,355	$29,669,355	$29,669,355	$29,669,355	$29,669,355	$29,669,355	$29,669,355	$29,669,355	$29,669,355	$29,669,355	$29,669,355	$29,669,355	$29,669,355	$29,669,355	$29,669,355	$512,515,399
8			Total Owner's Indirects	31,866,051	Tonnes	$32.7	$1,041,508,164	$17,851,515	$24,020,790	$18,330,065	$22,662,226	$52,695,604	$60,396,531	$60,396,531	$60,396,531	$60,396,531	$60,396,531	$60,396,531	$60,396,531	$60,396,531	$60,396,531	$60,396,531	$60,396,531	$60,396,531	$60,396,531	$60,396,531	$60,396,531	$1,041,508,164
			Grand Total Jay Pipe Project Concept Study	31,866,051	Tonnes	$107.6	$3,427,300,685	$34,653,339	$110,829,436	$76,700,936	$200,701,088	$199,244,668	$246,308,620	$190,907,939	$182,150,358	$182,150,358	$182,150,358	$182,150,358	$182,150,358	$182,150,358	$182,150,358	$182,150,358	$182,150,358	$182,150,358	$182,150,358	$182,150,358	$182,150,358	$3,427,300,685

Jay Pipe Project Concept Study
Cash Flow and Economic Results

Production

	UoM	Totals	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Total/Average
Mined Tonnes to Mill	tonnes	31,866,051	-	-	-	-	316,995	1,456,160	2,553,950	2,814,150	2,814,150	2,814,150	2,821,860	2,814,150	2,814,150	2,814,150	2,557,879	1,700,425	1,407,075	1,407,075	668,122	91,610	**31,866,051**
Diluted Grade	Carats/tonne	1.99	-	-	-	-	2.1	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.2	1.9	1.8	**2.0**
Production Rate	tonnes/day	5,453	-	-	-	-	868	3,989	6,978	7,710	7,710	7,710	7,710	7,710	7,710	7,710	6,989	4,659	3,855	3,855	1,825	251	**5,453**
Production Operating Days	days/year	5,844	-	-	-	-	365	365	366	365	365	365	366	365	365	365	366	365	365	365	366	365	**5844**
Project Days	days/year	7,305	365	365	366	365	365	365	366	365	365	365	366	365	365	365	366	365	365	365	366	365	

Revenue

	UoM	Totals	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Total/Average
Mined Tonnes to Mill	tonnes	31,866,051	-	-	-	-	316,995	1,456,160	2,553,950	2,814,150	2,814,150	2,814,150	2,821,860	2,814,150	2,814,150	2,814,150	2,557,879	1,700,425	1,407,075	1,407,075	668,122	91,610	**31,866,051**
Diluted Grade	Carats/tonne	1.99	-	-	-	-	2.10	1.99	1.94	1.93	1.93	1.93	1.96	1.96	1.96	2.06	2.07	2.10	2.15	2.15	1.91	1.84	**2.0**
Diamonds in Mill Feed	Carats	63,559,583	-	-	-	-	665,636	2,890,756	4,963,844	5,441,312	5,426,664	5,431,217	5,533,461	5,523,716	5,524,454	5,804,042	5,283,071	3,568,596	3,029,467	3,029,467	1,275,516	168,364	**63,559,583**
Metallurgical Recovery	%	85%	0%	0%	0%	0%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	**85.0%**
Diamonds Recovered	Carats	54,025,645	-	-	-	-	565,791	2,457,142	4,219,267	4,625,115	4,612,664	4,616,535	4,703,442	4,695,159	4,695,786	4,933,435	4,490,611	3,033,307	2,575,047	2,575,047	1,084,188	143,109	**54,025,645**
Diamonds Percent Paid	100%	100%	0%	0%	0%	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	**100.0%**
Diamonds Paid	Carats	54,025,645	-	-	-	-	565,791	2,457,142	4,219,267	4,625,115	4,612,664	4,616,535	4,703,442	4,695,159	4,695,786	4,933,435	4,490,611	3,033,307	2,575,047	2,575,047	1,084,188	143,109	**54,025,645**
Diamond Value Per Carat	$ per Carat	$74.00	$0.00	$0.00	$0.00	$0.00	$74.00	$74.00	$74.00	$74.00	$74.00	$74.00	$74.00	$74.00	$74.00	$74.00	$74.00	$74.00	$74.00	$74.00	$74.00	$74.00	**$74**
Diamond Revenue	$ x 1,000	$ 3,997,898	$ -	$ -	$ -	$ -	$ 41,868.50	$ 181,828.52	$ 312,225.79	$ 342,258.50	$ 341,337.17	$ 341,623.57	$ 348,054.70	$ 347,441.74	$ 347,488.17	$ 365,074.21	$ 332,305.19	$ 224,464.70	$ 190,553.48	$ 190,553.48	$ 80,229.93	$ 10,590.10	**$3,997,898**
Royalty	$ x 1,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-	
Total Revenue	$ x 1,000	$ 3,997,898	**$ -**	**$ -**	**$ -**	**$ -**	**$ 41,868.50**	**$ 181,828.52**	**$ 312,225.79**	**$ 342,258.50**	**$ 341,337.17**	**$ 341,623.57**	**$ 348,054.70**	**$ 347,441.74**	**$ 347,488.17**	**$ 365,074.21**	**$ 332,305.19**	**$ 224,464.70**	**$ 190,553.48**	**$ 190,553.48**	**$ 80,229.93**	**10,590.10**	**$3,997,898**

Capital Cost

	UoM	Totals	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Total/Average
Mine																							
Underground Excavations	$ x 1,000	$ 112,695	$ -	$ 18,055	$ 18,055	$ 19,924	$ 26,059	$ 21,843	$ 8,758	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-	**$112,695**
Underground Construction	$ x 1,000	$ 138,120	$ -	$ 1,683	$ 15,987	$ 69,555	$ 38,785	$ 12,110	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-	**$138,120**
Mobile Equipment and Compressors	$ x 1,000	$ 59,101	$ -	$ -	$ -	$ 28,509	$ 11,993	$ 18,599	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-	**$59,101**
Indirects during Construction Period	$ x 1,000	$ 45,754	$ -	$ -	$ -	$ 45,754	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-	**$45,754**
Mill Refurbishment	$ x 1,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-	**$0**
Tailings Facility	$ x 1,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-	**$0**
Surface Facilities and Services	$ x 1,000	$ 108,653	$ 16,802	$ 54,719	$ 11,976	$ 1,945	$ 11,605	$ 11,605	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-	**$108,653**
Site Indirects Capital Period	$ x 1,000	$ 132,909	$ 17,852	$ 23,896	$ 18,080	$ 21,809	$ 51,273	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-	**$132,909**
EPCM	$ x 1,000	$ 49,407	$ -	$ 12,352	$ 12,352	$ 12,352	$ 12,352	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-	**$49,407**
Subtotal	$ x 1,000	$ 646,640	**$ 34,653**	**$ 110,704**	**$ 76,451**	**$ 199,847**	**$ 152,068**	**$ 64,158**	**$ 8,758**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**-**	**$646,640**
Contingency	20%	$ 114,745	$ 6,931	$ 22,141	$ 15,290	$ 39,969	$ 30,414	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-	**$129,328**
Total Capital Cost	$ x 1,000	$ 761,385	**$ 41,584**	**$ 132,845**	**$ 91,741**	**$ 239,817**	**$ 182,482**	**$ 64,158**	**$ 8,758**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**-**	**$775,968**
Cost per Tonne	$/tonne	$23.89	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$575.66**	**$44.06**	**$3.43**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$24.35**
Cost per Carat (Paid)	$/Carat	$14.09	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$322.53**	**$26.11**	**$2.08**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$14.36**

Operating Cost

	UoM	Totals	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Total/Average
Mining	$ x 1,000	$ 1,872,062	$ -	$ -	$ -	$ -	$ 45,754	$ 121,754	$ 121,754	$ 121,754	$ 121,754	$ 121,754	$ 121,754	$ 121,754	$ 121,754	$ 121,754	$ 121,754	$ 121,754	$ 121,754	$ 121,754	$ 121,754	121,754	**$1,872,062**
Milling	$ x 1,000	$ 347,255	$ -	$ -	$ -	$ -	$ 216	$ 16,018	$ 28,093	$ 30,956	$ 30,956	$ 30,956	$ 31,040	$ 30,956	$ 30,956	$ 30,956	$ 28,137	$ 18,705	$ 15,478	$ 15,478	$ 7,349	1,008	**$347,255**
Site Indirects	$ x 1,000	$ 908,599	$ -	$ 125	$ 250	$ 854	$ 1,422	$ 60,397	$ 60,397	$ 60,397	$ 60,397	$ 60,397	$ 60,397	$ 60,397	$ 60,397	$ 60,397	$ 60,397	$ 60,397	$ 60,397	$ 60,397	$ 60,397	60,397	**$908,599**
Corporate Overhead	$ x 1,000	$ 505,099	$ -	$ -	$ -	$ -	$ 314	$ 23,299	$ 40,863	$ 45,026	$ 45,026	$ 45,026	$ 45,150	$ 45,026	$ 45,026	$ 45,026	$ 40,926	$ 27,207	$ 22,513	$ 22,513	$ 10,690	1,466	**$505,099**
Total Operating Cost	$ x 1,000	$ 3,633,015	**$ -**	**$ 125**	**$ 250**	**$ 854**	**$ 47,706**	**$ 221,467**	**$ 251,107**	**$ 258,132**	**$ 258,132**	**$ 258,132**	**$ 258,341**	**$ 258,132**	**$ 258,132**	**$ 258,132**	**$ 251,213**	**$ 228,062**	**$ 220,141**	**$ 220,141**	**$ 200,190**	**184,624**	**$2,070,511**
Cost per Tonne	$/tonne	$114.01	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$150.50**	**$152.09**	**$98.32**	**$91.73**	**$91.73**	**$91.73**	**$91.55**	**$91.73**	**$91.73**	**$91.73**	**$98.21**	**$134.12**	**$156.45**	**$156.45**	**$299.63**	**$2,015.33**	**$64.98**
Cost per Carat (Paid)	$/Carat	$67.25	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$84.32**	**$90.13**	**$59.51**	**$55.81**	**$55.96**	**$55.91**	**$54.93**	**$54.98**	**$54.97**	**$52.32**	**$55.94**	**$75.19**	**$85.49**	**$85.49**	**$184.64**	**$1,290.09**	**$38.32**

Economic Results

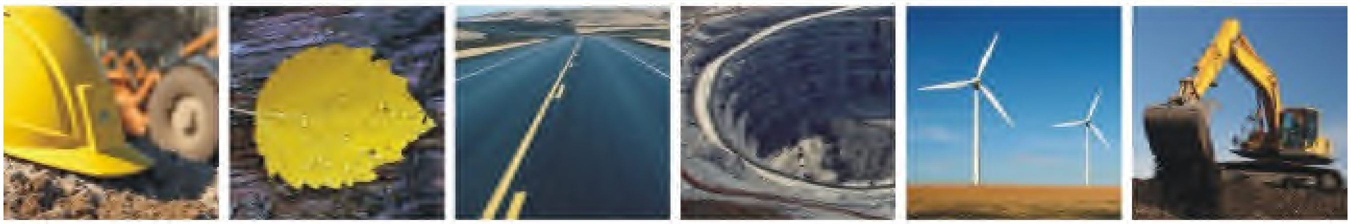
	UoM	Totals	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Total/Average
Revenue	$ x 1,000	$ 3,997,898	$ -	$ -	$ -	$ -	$ 41,869	$ 181,829	$ 312,226	$ 342,258	$ 341,337	$ 341,624	$ 348,055	$ 347,442	$ 347,488	$ 365,074	$ 332,305	$ 224,465	$ 190,553	$ 190,553	$ 80,230	10,590	**$3,997,898**
Capital Cost	$ x 1,000	$ 761,385	$ 41,584	$ 132,845	$ 91,741	$ 239,817	$ 182,482	$ 64,158	$ 8,758	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-	**$761,385**
Operating Cost	$ x 1,000	$ 3,633,015	$ -	$ 125	$ 250	$ 854	$ 47,706	$ 221,467	$ 251,107	$ 258,132	$ 258,132	$ 258,132	$ 258,341	$ 258,132	$ 258,132	$ 258,132	$ 251,213	$ 228,062	$ 220,141	$ 220,141	$ 200,190	184,624	**$3,633,015**
Subtotal	$ x 1,000	$ (396,502)	**$ (41,584)**	**$ (132,970)**	**$ (91,991)**	**$ (240,671)**	**$ (188,320)**	**$ (103,796)**	**$ 52,361**	**$ 84,126**	**$ 83,205**	**$ 83,491**	**$ 89,714**	**$ 89,309**	**$ 89,356**	**$ 106,942**	**$ 81,092**	**$ (3,597)**	**$ (29,588)**	**$ (29,588)**	**$ (119,960)**	**(174,034)**	**($396,502)**
Taxes	$ x 1,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-	$0
Funding	$ x 1,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-	$0
Cash Flow	$ x 1,000	$ (396,502)	**$ (41,584)**	**$ (132,970)**	**$ (91,991)**	**$ (240,671)**	**$ (188,320)**	**$ (103,796)**	**$ 52,361**	**$ 84,126**	**$ 83,205**	**$ 83,491**	**$ 89,714**	**$ 89,309**	**$ 89,356**	**$ 106,942**	**$ 81,092**	**$ (3,597)**	**$ (29,588)**	**$ (29,588)**	**$ (119,960)**	**(174,034)**	**-$396,502**
Cummulative Cash Flow	$ x 1,000		$ (41,584)	$ (174,554)	$ (266,545)	$ (507,216)	$ (695,536)	$ (799,332)	$ (746,971)	$ (662,845)	$ (579,640)	$ (496,149)	$ (406,435)	$ (317,125)	$ (227,770)	$ (120,828)	$ (39,736)	$ (43,333)	$ (72,921)	$ (102,509)	$ (222,468)	(396,502)	
Discounted Cash Flow	7%	$ (355,127)	$ (38,864)	$ (116,141)	$ (75,092)	$ (183,606)	$ (134,269)	$ (69,164)	$ 32,608	$ 48,962	$ 45,258	$ 42,443	$ 42,623	$ 39,654	$ 37,079	$ 41,474	$ 29,392	$ (1,218)	$ (9,367)	$ (8,754)	$ (33,170)	(44,974)	**-$355,127**
Cummulative Discounted Cash Flow	$ x 1,000		$ (38,864)	$ (155,005)	$ (230,097)	$ (413,704)	$ (547,973)	$ (617,137)	$ (584,529)	$ (535,567)	$ (490,309)	$ (447,866)	$ (405,244)	$ (365,589)	$ (328,510)	$ (287,036)	$ (257,644)	$ (258,863)	$ (268,230)	$ (276,984)	$ (310,153)	(355,127)	
NPV at 7%	$ x 1,000	$ (355,127)																					
IRR	%	0%																					
Payback Period (first year of positive cummulative cashflow)		Cannot Calculate																					

APPENDIX 4B

JAY PIPE PROJECT
CIVIL ENGINEERING COMPONENTS
SEPTEMBER 2013

DOMINION DIAMOND EKATI CORPORATION

JAY PIPE DEVELOPMENT: REVISED IDENTIFICATION PHASE STUDY OF CIVIL ENGINEERING COMPONENTS EKATI DIAMOND MINE, NT



REPORT

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EXECUTIVE SUMMARY

This work updates the Jay Pipe identification phase study completed by EBA in June 2010. The primary focus has been to investigate improved mining and construction methodologies with the aim of reducing costs, increasing safe operations, and maintaining operational reliability. A secondary focus was to review and modify the haul road and dyke quarry plans based on more recent information.

The 2010 proposed causeway and dyke quarry location appears suitable based on the existing geological mapping. However, due to acid rock drainage concerns, the haul road quarry source will need to be switched from Misery waste rock pile to a potential location near the existing Misery haul road or the proposed Jay Pipe road. Air photo interpretation indicates a relatively large number of potential locations. The identification of a suitable quarry site is not expected to be a significant challenge.

The most promising development in dyke construction technology is considered to be in-situ concrete mixing for the plastic cut-off wall. EBA feels that using cutter soil mixing (CSM) technology instead of the more conventional Diavik-style approach will result in a significant cost saving.

The 2010 costs for a conventional Diavik-style cut-off wall were updated to a total of $894 million. The comparative estimate for CSM is $783 million (CAD). Cost changes were the result of a change in plastic concrete overconsumption estimates, an increase in the Jay Pipe haul road development costs, changes to contingency and EPCM engineering costs, and an overall reduction due to improved technology. EBA recommends that comparative prices for CSM and jet grouting be obtained on a per unit of surface area basis by soliciting formal bids from several pre-qualified contractors.

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LIMITATIONS OF REPORT

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1.0 INTRODUCTION

EBA Engineering Consultants Ltd. operating as EBA, A Tetra Tech Company (EBA) was retained by Dominion Diamond EKATI Corporation (DDEC) to undertake a revised identification phase study of civil engineering components at the proposed EKATI Jay Pipe Development.

The initial Jay Pipe identification phase study was completed by EBA in June 2010 (EBA 2010). DDEC has requested that EBA revise the work based on potential improved mining and construction methodologies with the aim of safe operations, operational reliability, and reducing costs. In addition, a review of the haul road and dyke quarries was done in light of new information.

All costs are reported using 2013 Canadian dollars and are estimated to have an accuracy ±30%.

1.1 Identification Phase Study Background

The Jay Pipe deposit is located beneath Lac du Sauvage and is approximately 1.2 km from the shoreline. The area and shoreline close to the Jay Pipe deposit is undeveloped, although facilities and infrastructure exist nearby at Misery Camp (approximately 7 km to the southeast) and the main EKATI mine site located approximately 30 km to the northwest.

EBA's 2010 study presented the design basis for the alignment, design, and construction approach for Jay Pipe dyke and infrastructure components to support the development (EBA 2010). The EBA report also provided, at a concept level, the proposed construction methods together with estimated costs and construction schedule. Potential geotechnical and construction risks associated with dyke construction were identified and measures were recommended to mitigate these risks. The identification study was completed by a project team with vast experience with dyke and infrastructure construction in northern environments, including the chief engineer for the Diavik A154 dyke and the consortium of contractors who built both the A154 and A418 dykes.

The 2010 IPS focused on the evaluation of a dyke with plastic cut-off walls in Lac du Savage large enough to permit the development of Jay Pipe by open pit mining methods. Besides the dyke, other civil engineering infrastructure and mining components identified by EBA as necessary for Jay Pipe development included:

- A quarry for dyke and road construction materials;
- An access road to connect the dyke with the existing Misery road;
- A waste rock storage area (WRSA);
- A land-based construction support site, including laydown areas and quarry access roads; and
- A causeway and bridge linking the dyke to the mainland.

1.2 Revised Identification Phase Study

EBA's scope of work for updating the 2010 Jay Pipe identification phase study involved the following tasks:

- Evaluating other potential dyke construction approaches with the intent of reducing costs, maintaining reliability, and contributing to safe operations.

- Re-evaluating the granular material source for the initial Jay Pipe road construction. EBA's assumption in the 2010 identification phase study was to utilize waste rock from the Misery Pit WRSA. However, granite from this source will not be available due to potential acid drainage issues and new sources have been identified. Estimated development costs have been adjusted accordingly.
- Geological review of the proposed dyke quarry location and potential geochemical conditions. The primary purpose of the dyke quarry material is for causeway and dyke construction around the Jay Pipe Development.
- Review and revision of the project costs and schedule. Specifically, costs have been broken out on a component basis.

1.3 Project Team

EBA selected a project team that had first-hand experience with dyke and infrastructure construction in northern environments. In addition to the EBA Arctic Group, which has been involved with development at EKATI since 1993, EBA consulted:

- Mr. John Wonnacott, P.Eng., who was Deputy Project Manager/Chief Engineer for the Diavik A154 dyke from February 1997 to August 2003, and
- BAUER Resources Canada Ltd. (BAUER). BAUER contributed through several meetings and developed recommendations addressing the improved technologies aspects of this document. BAUER supplied the cut-off wall equipment used on the A154 and A418 dykes at Diavik.

EBA would like to acknowledge and express our gratitude to Mr. John Wonnacott and BAUER for significant contributions to this document.

2.0 DYKE QUARRY LOCATION

The 2010 EBA-proposed dyke and causeway quarry is located within the footprint of the proposed waste rock dump approximately 3.5 km to the west of the Jay Pipe deposit. The volume of the proposed quarry is 3.8M m^3 of material (Figure 1).

DDEC recently raised the concern that the originally proposed dyke quarry location was located in metasediment material. Metasediments at EKATI are considered potentially acid generating (PAG) and are avoided as a construction material.

A bedrock geology map provided by DDEC appears to show the 2010 proposed quarry location entirely within the Two Mica Granite (Figure 1). As a result, the quarry location appears to be suitable at this time, although more investigative work will be required. The following section provides comments with respect to experience at other pits at the EKATI mine site and an understanding of the regional and local geology of the EKATI site.

2.1 Site Geology

The Geologic Survey of Canada (GSC) 1:50,000 mapping (Kjarsgaard, 1994) is the most complete geological mapping available for the area of the Jay Pipe Development (Figure 2). There is no known exploration mapping available for this area.

The footprint of the proposed quarry is located within the unit mapped as Two Mica Granite. Approximately 100 m to the west of the proposed quarry location is a unit mapped as Greywacke. There are no additional units mapped in close proximity to the proposed quarry location. The Greywacke unit is interchangeably referred to as Metasediment in various reports and maps prepared for the EKATI mine site.

The proposed Jay Pipe pit is located within an area of three mapped units, including the Two Mica Granite, Greywacke, and a Tonalite unit. The Jay Pipe kimberlite deposit is hosted within the Two Mica Granite (Figure 2).

The Misery Main deposit occupies the contact between Archean metasedimentary rocks (also known in reports as Schist, Biotite Schist and Greywacke) and the Two Mica Granite. It is not clear if the Greywacke observed at the Misery deposit can be considered analogous to that adjacent to the quarry location. Similarly, it is not clear if the Two Mica Granite unit mapped in the area of the proposed quarry would be analogous to the Two Mica Granite unit mapped in the area of the proposed pit for the Jay pipe as they are separated by a swath of Greywacke.

At the Misery Main deposit, the Two Mica Granite is noted to weather to a white to light-grey colour and contain abundant primary muscovite. Textures vary from fine to coarse-grained pegmatic and equigranular to weakly porhyritic (BHP Billiton, 2010). Compositionally, it is composed of fine to coarse-grained quartz, potassium feldspar, and plagioclase, with 3-15% biotite and muscovite. Tourmaline laths up to 0.5 cm to 3.5 cm are observed and pegmatite phases are common. Sulphide minerals are rarely observed, and if present, occur only in trace amounts (BHP Billiton, 2010).

2.2 Geochemistry Assumptions

There has been no analytical test work completed for rock units encountered in either of the proposed quarry or proposed pit locations for the Jay Pipe Development. Assumptions concerning the mineralogy, geochemical composition, and ultimate potential for acid generation or metal leaching of the rock units encountered at the proposed quarry location are based on experience at other pits on the EKATI mine site.

The Misery pipe is the closest operational pipe to Jay Pipe, and has an extensive database of geological information associated with it, including geochemical analyses completed on waste rock units encountered.

Geochemical test work completed for the rock units encountered at Misery indicate the Metasediment material is considered PAG and that the Two Mica Granite is considered non-acid generating (NAG). Metal leaching and whole rock elemental analyses indicate that there is not significant concern for metal leaching from either unit.

Samples of Two Mica Granite material submitted for analysis from the Misery pipe indicate very low sulphide sulphur values and low neutralization potential values. A subset of 10 samples submitted in 1997 (Norecol, Dames & Moore, 1997) all reported total sulphur values at or below the detection limit of 0.01%

sulphur. Neutralization potential values range from <1 to 4 kg $CaCO_3$/tonne. The mean neutralization potential ratio for these samples was 100, indicating strongly NAG material.

2.3 Proposed Quarry Discussion and Recommendations

The 2010 proposed quarry location appears suitable based on the existing geological mapping. The following recommendations should be used to confirm the proposed location.

Recommendations

Detailed geological mapping and geochemical characterization of the rock units should be undertaken to ascertain potential for acid generation and metal leaching. Geological mapping of the proposed quarry location will confirm the units mapped by the GSC and determine the extents of various units in the area. Geological descriptions for each of the rock units should include a detailed focus on identifying sulphide and carbonate minerals present.

The geological descriptions should be compared to core logging or geological mapping information available from the Misery deposit to determine whether the rock units are analogous. If the rock units are the same, then the geochemical characterization for Misery rock units may be proposed as surrogate data for Jay Pipe Development.

In the case that a clear analogue of rock units encountered at Misery and Jay pipes cannot de derived, then it is recommended that confirmatory geochemical test work be completed to determine acid rock drainage (ARD) and metal leaching (ML) potential from quarried rocks. Analytical testing should be conducted according to procedures outlined in the Mine Environment Neutral Drainage (MEND) Guidelines and represent a standard suite of static tests such as:

- Acid base accounting (ABA) including paste pH, total sulphur, total carbon, total inorganic carbon, maximum potential acidity, and neutralization potential.
- Shake flask extraction tests at a 3:1 fluid to solid ratio using distilled water.
- Metal concentration for samples through inductively coupled plasma atomic emission spectroscopy (ICP-AES).
- Mineralogical evaluation in which the minerals present in a material are identified, the amounts of different materials present are quantified, and the chemistry of individual mineral grains are examined.

Based on an estimated quarried rock volume of 3.8M m^3 and an estimated density of 2.8 g/cm^3, the material weight to characterize is 10,640,000 tonnes. The MEND guidelines suggest that the number of samples required to characterize this weight of material, when no previous information is available, is 80 samples. This number may be adjusted based on preliminary results, the homogeneity of material, and availability of information on analogous material.

Drilling investigations prior to construction will be necessary to confirm the extent of geological units at depth. It is recommended that during the excavation there is ongoing testing to confirm geochemical characterization of rock units encountered.

3.0 ROAD CONSTRUCTION QUARRY LOCATION

The Jay Pipe development will require construction of a haul road to the main Misery access road. The road will initially provide construction access and will later be used as a haul road to transport ore from Jay Pipe to the EKATI process plant. The 2010 EBA report assumed the haul road would be built using rock from the existing Misery WRSA. However, this rock is not available due to PAG concerns. EBA has identified sites that can be investigated further as potential quarries for the Jay Pipe haul road.

Figure 3 shows potential quarry sites that are within the vicinity of the proposed Jay Pipe haul road. The sites were chosen based on aerial photo interpretation and accessibility to the existing Misery access road or proposed Jay Pipe haul road. The geology in Figure 2 was not consulted in these selections.

3.1 Potential Locations and Material Quantity

There are a relatively large number of potential locations and the identification of a suitable quarry site is not expected to be a significant challenge. Identification of potential quarries should follow a similar procedure to that laid out in Section 2.3 for the proposed dyke and causeway quarry.

The haul road is estimated to require approximately 1.1M m^3 of material. Assuming the quarry cut is 10 to 15 m deep, an area of 100,000 m^3 is expected to be sufficient for the quarry needs.

Initial development targets are expected to be sites identified near the proposed Jay Pipe haul road intersection.

3.2 Accessibility

The proposed quarries are closer than the Misery WRSA, so there are expected to be some haulage savings. It is assumed that potential quarries along the existing Misery road will be given priority, as otherwise equipment will need to be placed in the winter for the summer construction season.

4.0 IMPROVED DYKE CONSTRUCTION TECHNOLOGIES

The most promising development in dyke construction technology is considered to be in-situ concrete mixing for the plastic cut-off wall. This method has the potential to reduce costs, increase safety, and offer an operationally reliable solution. BAUER refers to this technology as cutter soil mixing, or CSM, although the technology is not limited to them. This report uses the BAUER terminology.

The plastic cut-off wall proposed in the 2010 EBA report followed the procedure used successfully at the Diavik A154 and A418 dykes. The Diavik-style dyke is a proven method, but there appear to be significant cost, schedule, and safety advantages to the CSM construction approach. The CSM method has not been used in the far north, but CSM-style projects number in the hundreds and there appears to be general acceptance within industry. The method is under consideration for Diavik's proposed A21 dyke.

4.1 CSM Overview

The CSM technology aims to create a cut-off wall by using a modified trench cutter to mix cement and bentonite slurry with the in-situ material. This approach combines the excavation and placement phases into a continuous process.

The general CSM procedure is as follows:

1. The cutter head, operating as a mixing tool, is advanced into the ground at a continuous rate. The dyke core and till material is broken up and mixed thoroughly by the cutting wheels on the cutter head. Water is pumped to nozzles located between the cutter wheels, to facilitate the operation of the cutter.
2. After reaching the design depth, the cutter head is slowly extracted while a slurry of water, bentonite and cement is added. The cutting wheel rotation homogenizes the in-situ mixture with the cement slurry.

The process is repeated to create a continuous wall though the placement of overlapping primary and secondary panels, in the same manner used in the Diavik A154 and A418 dyke cut-off wall construction.

Table 1: Comparison of Cut-off Wall Installation Approaches

Diavik-Style Approach	CSM Approach
1. Vibrodensification	1. Vibrodensification
2. Guide Walls	2. Guide Walls
3. Excavate Cut-Off Wall Trench	3. CSM Cut-Off Wall
4. Place Cut-Off Wall	4. Jet Grouting
5. Jet Grouting	

4.2 Potential CSM Advantages

The combination of excavation and placement in the CSM method provides potential advantages in terms of cost, safety, and schedule.

Potential Cost and Schedule Advantages

- Smaller guide wall installation. The Diavik-style method used large concrete guide wall sections to prevent collapse of the top of the trench excavation. The CSM approach will require guide wall sections that are approximately a third the size of previously used guide walls.
- Fewer people and less equipment on site. BAUER estimates 10 to 12 fewer people on site and equipment needs would be cut in half.

- Reduce vibrodensification. Vibrodensification was primarily needed to prevent excavated walls from collapsing before concrete placement. With CSM, the primary purpose will be to prevent settling of the dyke structure. It is estimated that the vibrodensification requirement will be halved.
- Smaller on-site footprint. The reduction in equipment and smaller footprint of the CSM rigs means that less area is needed and a narrower dyke profile can be constructed. This will result in less granular (Zone 2) material being required, which will amount to a significant cost reduction.
- Less cement and bentonite overconsumption. The CSM trench is 0.8 m wide, which is the width of the cutter wheel mixing tool. The Diavik-style excavation can experience significant sloughing, increasing the overall volume of cut-off wall material.
- Cement/bentonite transportation, not concrete. The portable cement and bentonite mix plant will be located on the dyke near the CSM rigs. It requires a supply of cement and bentonite, not concrete, which will reduce the volume of material being transported to the dyke. At Diavik, the plastic concrete mix plant was located off the dyke.
- Energy savings. BAUER expects a reduction in fuel consumption related to the additional efficiency of the CSM process and decrease in equipment.
- Cut-off wall placement is not a separate process. In the Diavik-style method, plastic concrete placement was an additional construction step that required tremie pipes, an installation crane, and a plastic concrete supply pipeline.
- Time savings.
  - Smaller guide wall eliminates the need to construct a dyke platform in two stages. The Diavik approach required placement of embankment material in two steps. The first step was to build the embankment to an initial elevation and place the guide walls. The second step was to add 1.5 m of embankment material to complete the working platform.
  - Eliminate plastic concrete placement as a separate step.
  - Eliminate the construction and operation of bentonite slurry ponds and bentonite delivery and return pipelines.
  - Eliminate the use of grabs and chisels to advance the slurry trench excavation.
  - No more sloughing of the till during excavation, thus saving time otherwise lost correcting overbreak in the till.
  - If predrilling is used (Section 4.4, Option 2), it can be done in the cold months of early spring, before the CSM cut-off wall is started.

Potential Safety and Environment Advantages

- Less equipment and people on site. Traffic and congestion will be significantly reduced.

- Minimal open trench excavation and stability concerns. There will be a small open excavation done for the top of the trench, but the CSM method largely eliminates many of the safety concerns surrounding open excavations and stability from the Diavik-style method.
- With no open slurry trench, there is much less chance of having a leak of bentonite slurry into the surrounding environment.

4.3 CSM Mix Design

A pre-construction mix-design testing program will be established to determine a range for key parameters such as cement and bentonite content.

Mix design will be done using site materials to closely replicate the in-situ conditions. Samples of Lac du Sauvage water will be used as the water source for the testing program. Samples of cement and bentonite will be sourced from the selected suppliers.

The amount of cementitious material pumped into the panels during the CSM process will be based on the results of the pre-construction cut-off wall mix design testing program, which will determine the proportion of binders used to achieve the specified project performance criteria. As the grain-size distribution curve of the fine dyke core material can be adjusted, variations in the grain size distribution could be explored to achieve a technical and economical optimum for the CSM cut-off wall.

The parameters will be monitored and adjustments made during construction.

4.4 CSM Application Options

There are three options currently being considered for CSM:

CSM Option 1

Use the cutter to penetrate the dyke embankment core and into the glacial till, cutting through boulders to the maximum extent possible in the same manner that the cutter was used at Diavik for placement of the plastic concrete cut-off wall. When the excavation has advanced as far as possible, install a cut-off wall by mixing the in-situ material while slowly withdrawing the cutter up to the dyke surface. Then, rely on jet grouting to seal the space from the top of bedrock, up to the bottom of the cutoff wall created by the CSM. This introduces the probability of having long jet grout columns where large till boulders prevent cutter penetration.

BAUER indicates that some predrilling will be used in this method, but only in locations where significant boulders are encountered.

CSM Option 2

Predrill a series of closely-spaced holes along the cut-off wall alignment using an 80 cm casing that is advanced into the till. Run a suite of specialized augers, grabs and cutting tools inside the casing to penetrate or remove boulders. The resulting hole is filled with dike core material and then the CSM technique is followed as per Option 1 above.

BAUER recommends Option 2 as their preferred option because they feel it is the most economical and time efficient way to handle till boulders. However they will not be able to penetrate all the boulders, so jet grouting will still be required to seal the space between bedrock and the bottom of the cutoff wall.

The BAUER predrilling recommendation assumes that jet grouting is more expensive and more time consuming than a cut-off wall created by CSM. They also believe that predrilling and dyke core material placement in the predrilled holes will result in a cost saving compared to using CSM without predrilling.

CSM Option 3

Similar to Option 1, the cutter is advanced through the dyke embankment and into the glacial. Cutting conditions are ceased when a strictly defined set of guidelines are reached. Complete the cut-off wall using CSM and jet grouting to seal the underside of the completed cut-off wall to bedrock.

This option differs from Option 1 in the amount of effort cutting through boulders before jet grouting. During the construction of the Diavik A154 dyke, cutting through boulders resulted in a large direct expense. It took significant time and caused the excavation to slough, resulting in at least a 30% increase in plastic concrete consumption.

4.5 CSM Discussion

EBA feels that using CSM technology instead of the more conventional cutter and plastic concrete wall approach will result in a significant cost saving, and this is reflected in the projected costs presented in Section 6. However, it is not clear that predrilling and attempting to maximize the depth of the cut-off wall into bouldery till will be the most cost effective approach. It may be that planning to use jet grouting to seal almost all the glacial till will turn out to be more cost effective.

EBA recommends that comparative prices for CSM and Jet Grouting be obtained (on a per unit of surface area basis) by soliciting formal bids from several pre-qualified contractors and the final choice of which CSM option to use for construction should be based on the quoted prices.

5.0 COSTS

Cost estimates for the CSM-developed Jay Pipe dyke are presented here, including reasoning, comparison with previous cost projections, and detailed cost breakdowns. The alternative dyke and mining concepts presented in Section 5 are not included.

5.1 Cost Changes from 2010 to 2013

Most of the costs are the same as numbers presented in 2010. The mining construction industry is currently in a downturn and there is more equipment and personnel available than in 2010. The changes to most costs, when accounting for inflation, are expected to be insignificant.

Overconsumption Volume

The 2010 EBA report estimated 20% overconsumption of plastic concrete for the Diavik-style cut-off wall. After review, EBA no longer feels this is representative and the costs presented here assume 40% overconsumption. Forty percent was also originally proposed by the Lac de Gras Construction consortium (EBA 2010).

The overconsumption revision results in an overall increase of $22.9 million to the 2010 costs, assuming use of a Diavik-style cut-off wall.

Haul Road Quarry

The Misery waste rock can no longer be used as a potential source for the Jay Pipe haul road. This will result in additional costs due to the exploitation of a new area. Drilling and blasting costs will be similar, since permafrost aggradation into Misery WRSA would have required drilling and blasting techniques as well. It is also assumed that haul distances to the Misery WRSA would have been slightly longer.

The change in location of the haul road quarry is estimated to increase the costs by $11.1 million.

5.2 Improved Technology Savings

EBA feels that using CSM technology instead of the more conventional cutter and plastic concrete wall approach will result in a significant cost saving. Table 2 presents a comparison of the Diavik-style dyke with a CSM constructed dyke. BAUER estimated costs with CSM Option 2 in mind. The costs here reflect that scenario.

Table 2: Cost Saving Comparison

Component	Estimated Overall Costs with CSM	Estimate Overall Costs with Diavik-Style Dyke
Infrastructure	$ 45,579,656	$ 45,579,656
Dyke Construction	$ 485,928,184	$ 580,427,468
Transportation, Accommodations, and Miscellaneous Costs	$ 169,000,000	$ 175,500,000
Contingency	$ 83,000,000	$ 93,000,000
TOTAL	**$ 783,507,840**	**$ 894,507,124**

The primary savings come from the following areas:

Increased CSM Efficiency

There are numerous potential advantages with the CSM technology documented in detail in Section 4.2. These changes are estimated to reduce the cut-off wall construction costs by $70 million.

Dyke Volume Decrease

The reduced footprint of the CSM equipment means that the dyke width can be reduced by up to 4 metres. This corresponds to a reduction of $15 million in quarried material.

Reduced Vibrodensification Requirement

The need for extensive vibrodensification is reduced because there is no longer an open excavation that can potentially collapse. This corresponds to a reduction of $8 million.

Reduced Contingency and EPCM Engineering

Unidentified risk contingency was kept at the rate used in the 2010 EBA report, which was 10% of site construction costs. With the decrease in construction costs, unidentified risk contingency costs were reduced from $63 million to $53 million.

EPCM engineering is calculated as 7% of the site construction cost. EPCM costs have been reduced from $44 million to $37.5 million.

5.3 Detailed Costs

Detailed costs in the four areas of infrastructure, dyke construction, assorted, and contingency, are broken out below. Infrastructure costs (Table 3) remain the same as in 2010. The dyke construction costs have assumed Option 2 presented in Section 4.4 (Table 4). The transportation, accommodations, and assorted costs are presented in Table 5. Contingency costs are given in Table 6. A more detailed cost summary is presented in Appendix B.

Table 3: Infrastructure

Item	Description	Price
1.1	Jay Pipe Haul Road*	$ 24,017,491
1.2	Causeway*	$ 4,602,602
1.3	Bridge	$ 2,614,547
1.4	Quarry Access Road*	$ 879,753
1.5	Jay Pipe Laydown Areas*	$ 11,419,023
1.6	Quarry Laydown Areas*	$ 449,548
1.7	Quarry Stockpile*	$ 1,596,692
	Subtotal	**$ 45,579,656**
Note: * Indicates a change from the 2010 estimate		

Table 4: Dyke Construction

Item	Description	Price
2.1	Dyke*	$ 119,691,657
2.2	Toe Berm	$ 25,853,369
2.3	Turbidity Barrier	$ 2,343,342
2.4	Dredging Pipeline	$ 5,265,810
2.5	Dredging	$ 11,836,209
2.6	Filter Blanket	$ 30,771,381
2.7	Vibrodensification*	$ 8,841,215
2.8	Concrete Guide Walls*	$ 2,457,000
2.9	CSM Plastic Concrete Wall*	$ 113,929,065
2.10	Pre-Drilled CSM to Bedrock*	$ 23,378,706
2.10	Jet Grout*	$ 43,231,124
2.11	Grout Curtain	$ 47,372,692
2.12	Dewatering	$ 21,454,121
2.13	Instrumentation	$ 12,035,158
2.14	Thermosyphons	$ 17,467,334
	Subtotal	**$ 485,928,184**
Note: * Indicates a change from the 2010 estimate		

Table 5: Transportation, Accommodations, and Miscellaneous Costs

Item	Description	Price
3.1	Mob and demob of materials and equipment (winter road)	$ 64,000,000
3.2	Air Transport of critical materials	$ 2,000,000
3.3	Air Transport of all personnel to/from site	$ 3,300,000
3.4	Accommodations infrastructure at Misery site (construction and operation)	$ 38,500,000
3.5	Site security	$ 5,000,000
3.6	Environmental monitoring during construction	$ 5,000,000
3.7	Geotechnical investigations and testing	$ 8,700,000
3.8	EPCM engineering (7% of site construction cost)*	$ 37,500,000
3.9	Minor support from EKATI mine	$ 5,000,000
	Subtotal	**$ 169,000,000**
Note: * Indicates a change from the 2010 estimate		

Table 6: Contingency Costs

Item	Description	Price
4.1	Identified Risks	$ 30,000,000
4.2	Unidentified Risks: 10% of site construction cost*	$ 53,000,000
	Subtotal	**$ 83,000,000**
Note: * Indicates a change from the 2010 estimate		

6.0 SCHEDULE

There is not expected to be significant variation from the 2010 proposed schedule. The CSM approach is anticipated to be faster than the Diavik-style method, but the logistics and short summer construction season will probably mean that the same approximate schedule will be followed. However, the increased efficiency of the CSM method may mean that there is reduced risk of delays significantly impacting construction. The detailed schedule is attached in Appendix C.

Table 7: Construction Schedule

Year 1	Misery site expansion to accommodate crew
	Access road to Jay Pipe site
	Quarry and Jay Pipe laydown areas
	Blasting and crushing commences for dyke construction materials
	Causeway with fish channel and bridge
	Pressure grouting of bedrock along dyke alignment
Year 2	Lakebed sediment dredging and excavation
	Partial filter blanket placement
	Partial dyke fill placement to 417.0 m
	Pre-drilling (option)
	CSM cut-off wall installation
	Jet grouting
Year 3	Filter blanket placement
	Dyke fill placement
	Vibrodensification
	Pre-drilling (option)
	CSM cut-off wall installation
	Jet grouting
	Curtain grouting
Year 4	Instrumentation installed
	Primary dewatering
	Toe berm construction
Year 5	Secondary dewatering
	Lakebed sediment removed (or optionally removed during dyke dredging)

7.0 CLOSURE

We trust this report meets your present requirements. If you have any questions or comments, please contact the undersigned.

Sincerely,
EBA Engineering Consultants Ltd.

Prepared by:

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12 SEPT 2013

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THE ASSOCIATION OF
PROFESSIONAL ENGINEERS,
GEOLOGISTS and GEOPHYSICISTS
OF THE NORTHWEST TERRITORIES
PERMIT NUMBER
SEPT. 12/13 **P 018**
EBA ENGINEERING
CONSULTANTS LTD.

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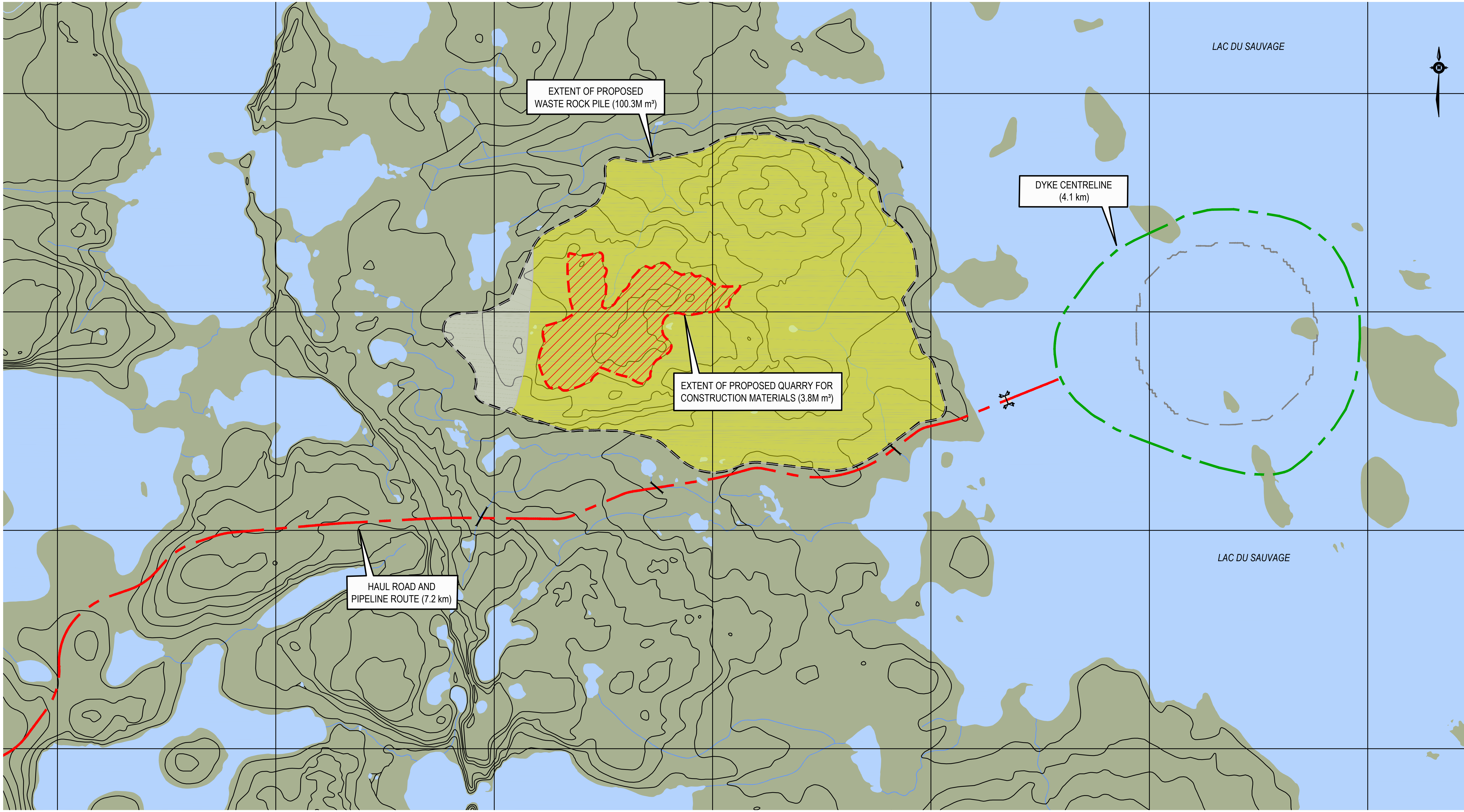
FIGURES



LEGEND:

- TWO MICA GRANITE
- GREYWACKE

0 — 1 000 m

Scale: 1: 20 000 at 22"x34"

NOTES
BASED ON JAY KIMBERLITE BEDROCK GEOLOGY MAP PROVIDED BY MINERAL SERVICES

STATUS
ISSUED FOR USE

CLIENT
DOMINION DIAMOND

eba A TETRA TECH COMPANY

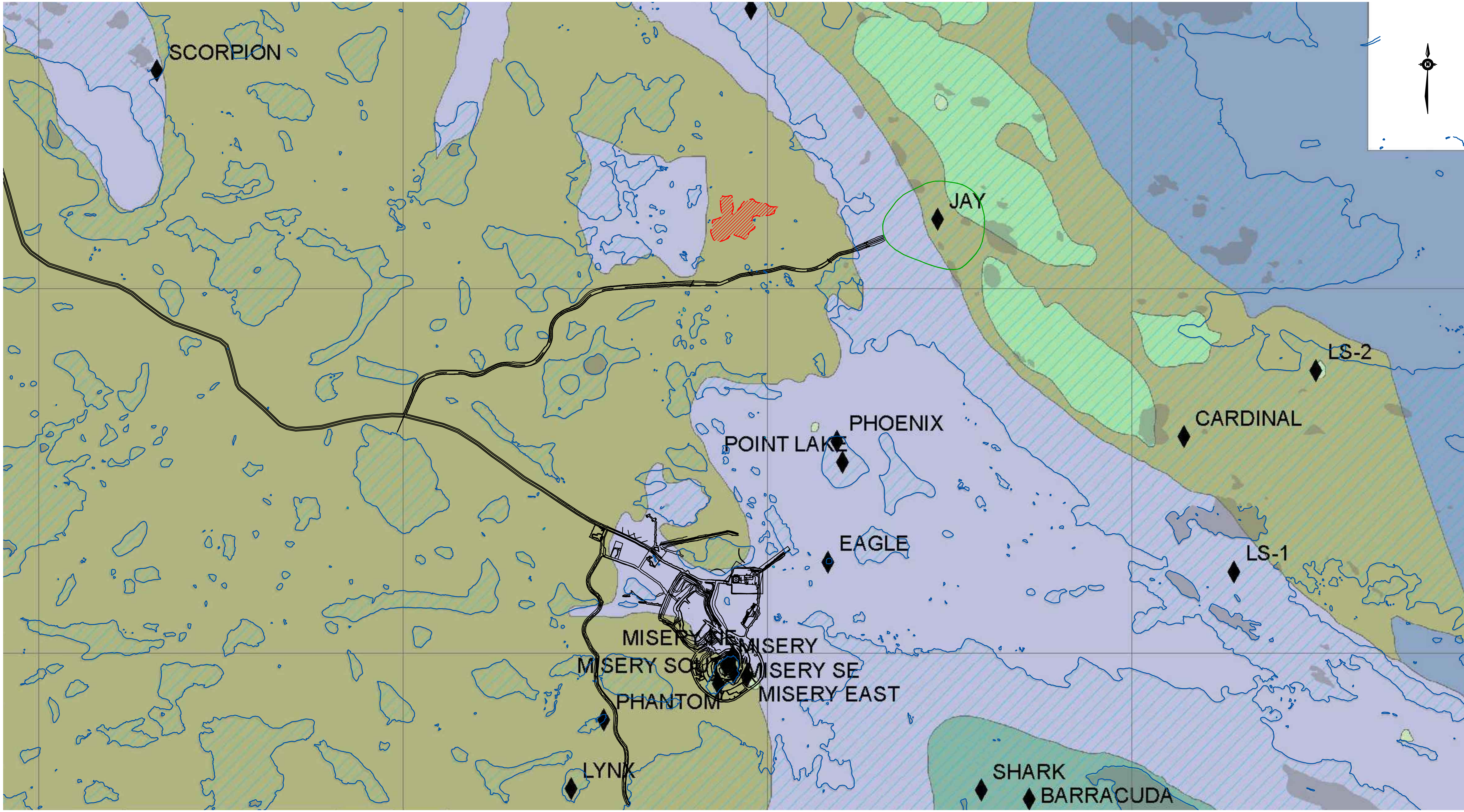
JAY PIPE - REVISED IDENTIFICATION STUDY
EKATI DIAMOND MINE

GEOLOGICAL MAPPING OF THE PROPOSED WASTE ROCK PILE

PROJECT NO.	DWN	CKD	REV
E14103069-01	JMS	RZ	0
OFFICE	DATE		
EDM	July 10, 2013		

Figure 1

Q:\Edmonton\Engineering\E141\Projects_EKATI\E14103069-01 (Jay Pipe)\4.0 Modeling\2.0 Working Drawings\E14101039_Figure 1_R0.dwg [FIGURE 1] August 06, 2013 - 8:52:51 am (BY: STIRLING, JENNIFER)



LITHOLOGY

Biotite Granite	Magnetite Biotite Granodiorite	Two Mica Granite
Biotite Muscovite Monzogranite	Migmatite	Two Mica Leucogranite
Greywacke	Porphyritic Biotite Granite	Two Mica Monzonite
Hornblende Tonalite	Syntectonic Granite	UNDEFINED
Mafic Inclusion	Tonalite	White Biotite Monzogranite

NOTES
Kjarsgaard, B.A., Spark, R.N., and Jacob, Z.J., 1994a

STATUS
ISSUED FOR USE

CLIENT
DOMINION DIAMOND™

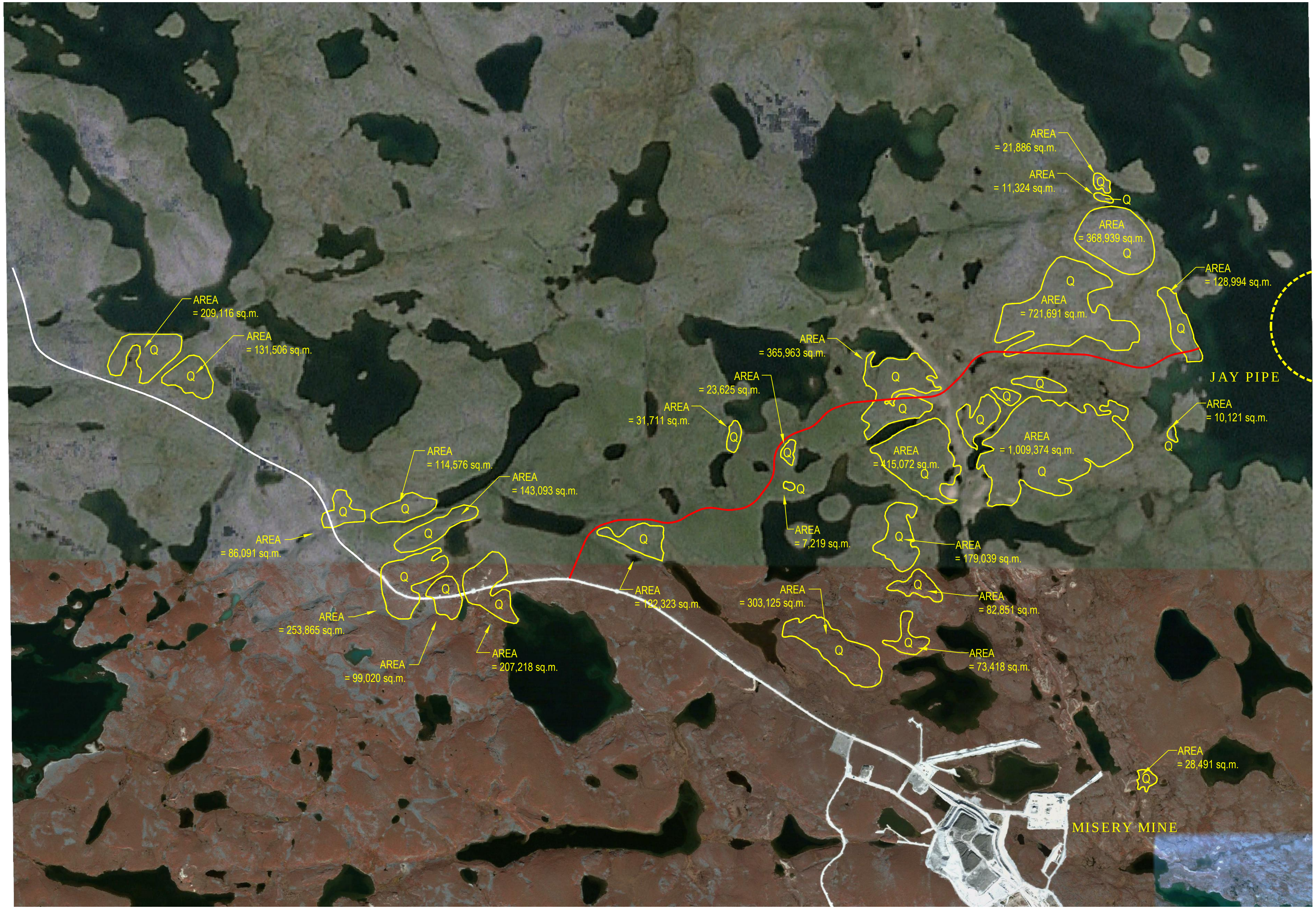
eba
A TETRA TECH COMPANY

JAY PIPE - REVISED IDENTIFICATION STUDY
EKATI DIAMOND MINE

GEOLOGICAL MAPPING OF THE JAY PIPE AND MISERY DEPOSIT AREAS

PROJECT NO.	DWN	CKD	REV	
E14103069-01	JMS	RZ	0	Figure 2
OFFICE	DATE			
EDM	July 10, 2013			

C:\Users\jennifer.stirling\Desktop\E14101039-01_Figure 2.dwg [FIGURE 2] August 06, 2013 - 10:45:59 am (BY: STIRLING, JENNIFER)



LEGEND:

POTENTIAL QUARRY SITE (PARTIALLY EXPOSED BEDROCK WITH PATCHES OF OUTWASH MATERIAL, BOULDERS AND/OR TILL)

PROPOSED JAY PIPE ACCESS ROAD

EXISTING EKATI TO MISERY ACCESS ROAD

0 2 000 m

Scale: 1: 40 000

STATUS
ISSUED FOR USE

CLIENT
DOMINION DIAMOND

A TETRA TECH COMPANY

JAY PIPE - REVISED IPS
EKATI DIAMOND MINE

POTENTIAL ROCK QUARRY SITES ALONG ACCESS ROADS (WITHIN 1 km WIDE CORRIDOR)

PROJECT NO.	DWN	CKD	REV	
E14103069-01	DBD	VER	0	**Figure 3**
OFFICE	DATE			
EDM	July 15, 2013			

Q:\Edmonton\Engineering\E141\Projects_EKATI\E14103069-01 (Jay Pipe)\4.0 Modeling\2.0 Working Drawings\E14103069-01_Figure 3.dwg [FIGURE 3] August 06, 2013 - 9:02:02 am (BY: STIRLING, JENNIFER)

APPENDIX A

EBA'S GENERAL CONDITIONS

GENERAL CONDITIONS

GEOTECHNICAL REPORT

This report incorporates and is subject to these "General Conditions".

1.0 USE OF REPORT AND OWNERSHIP

This geotechnical report pertains to a specific site, a specific development and a specific scope of work. It is not applicable to any other sites nor should it be relied upon for types of development other than that to which it refers. Any variation from the site or development would necessitate a supplementary geotechnical assessment.

This report and the recommendations contained in it are intended for the sole use of EBA's Client. EBA does not accept any responsibility for the accuracy of any of the data, the analyses or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than EBA's Client unless otherwise authorized in writing by EBA. Any unauthorized use of the report is at the sole risk of the user.

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2.0 ALTERNATE REPORT FORMAT

Where EBA submits both electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed EBA's instruments of professional service), only the signed and/or sealed versions shall be considered final and legally binding. The original signed and/or sealed version archived by EBA shall be deemed to be the original for the Project.

Both electronic file and hard copy versions of EBA's instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except EBA. EBA's instruments of professional service will be used only and exactly as submitted by EBA.

Electronic files submitted by EBA have been prepared and submitted using specific software and hardware systems. EBA makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

3.0 ENVIRONMENTAL AND REGULATORY ISSUES

Unless stipulated in the report, EBA has not been retained to investigate, address or consider and has not investigated, addressed or considered any environmental or regulatory issues associated with development on the subject site.

4.0 NATURE AND EXACTNESS OF SOIL AND ROCK DESCRIPTIONS

Classification and identification of soils and rocks are based upon commonly accepted systems and methods employed in professional geotechnical practice. This report contains descriptions of the systems and methods used. Where deviations from the system or method prevail, they are specifically mentioned.

Classification and identification of geological units are judgmental in nature as to both type and condition. EBA does not warrant conditions represented herein as exact, but infers accuracy only to the extent that is common in practice.

Where subsurface conditions encountered during development are different from those described in this report, qualified geotechnical personnel should revisit the site and review recommendations in light of the actual conditions encountered.

5.0 LOGS OF TESTHOLES

The testhole logs are a compilation of conditions and classification of soils and rocks as obtained from field observations and laboratory testing of selected samples. Soil and rock zones have been interpreted. Change from one geological zone to the other, indicated on the logs as a distinct line, can be, in fact, transitional. The extent of transition is interpretive. Any circumstance which requires precise definition of soil or rock zone transition elevations may require further investigation and review.

6.0 STRATIGRAPHIC AND GEOLOGICAL INFORMATION

The stratigraphic and geological information indicated on drawings contained in this report are inferred from logs of test holes and/or soil/rock exposures. Stratigraphy is known only at the locations of the test hole or exposure. Actual geology and stratigraphy between test holes and/or exposures may vary from that shown on these drawings. Natural variations in geological conditions are inherent and are a function of the historic environment. EBA does not represent the conditions illustrated as exact but recognizes that variations will exist. Where knowledge of more precise locations of geological units is necessary, additional investigation and review may be necessary.

7.0 PROTECTION OF EXPOSED GROUND

Excavation and construction operations expose geological materials to climatic elements (freeze/thaw, wet/dry) and/or mechanical disturbance which can cause severe deterioration. Unless otherwise specifically indicated in this report, the walls and floors of excavations must be protected from the elements, particularly moisture, desiccation, frost action and construction traffic.

8.0 SUPPORT OF ADJACENT GROUND AND STRUCTURES

Unless otherwise specifically advised, support of ground and structures adjacent to the anticipated construction and preservation of adjacent ground and structures from the adverse impact of construction activity is required.

9.0 INFLUENCE OF CONSTRUCTION ACTIVITY

There is a direct correlation between construction activity and structural performance of adjacent buildings and other installations. The influence of all anticipated construction activities should be considered by the contractor, owner, architect and prime engineer in consultation with a geotechnical engineer when the final design and construction techniques are known.

10.0 OBSERVATIONS DURING CONSTRUCTION

Because of the nature of geological deposits, the judgmental nature of geotechnical engineering, as well as the potential of adverse circumstances arising from construction activity, observations during site preparation, excavation and construction should be carried out by a geotechnical engineer. These observations may then serve as the basis for confirmation and/or alteration of geotechnical recommendations or design guidelines presented herein.

11.0 DRAINAGE SYSTEMS

Where temporary or permanent drainage systems are installed within or around a structure, the systems which will be installed must protect the structure from loss of ground due to internal erosion and must be designed so as to assure continued performance of the drains. Specific design detail of such systems should be developed or reviewed by the geotechnical engineer. Unless otherwise specified, it is a condition of this report that effective temporary and permanent drainage systems are required and that they must be considered in relation to project purpose and function.

12.0 BEARING CAPACITY

Design bearing capacities, loads and allowable stresses quoted in this report relate to a specific soil or rock type and condition. Construction activity and environmental circumstances can materially change the condition of soil or rock. The elevation at which a soil or rock type occurs is variable. It is a requirement of this report that structural elements be founded in and/or upon geological materials of the type and in the condition assumed. Sufficient observations should be made by qualified geotechnical personnel during construction to assure that the soil and/or rock conditions assumed in this report in fact exist at the site.

13.0 SAMPLES

EBA will retain all soil and rock samples for 30 days after this report is issued. Further storage or transfer of samples can be made at the Client's expense upon written request, otherwise samples will be discarded.

14.0 INFORMATION PROVIDED TO EBA BY OTHERS

During the performance of the work and the preparation of the report, EBA may rely on information provided by persons other than the Client. While EBA endeavours to verify the accuracy of such information when instructed to do so by the Client, EBA accepts no responsibility for the accuracy or the reliability of such information which may affect the report.

APPENDIX B
DETAILED COST SUMMARY

Detailed Cost Summary

Item	Description	Bid Qty	Unit	Total Unit Rate	Price
1	**Infrastructure**				
1.1	***Access/Haul Road***				***$ 24,017,491***
1.1.1	900 mm	1,058,317	m^3	$ 16.37	
1.1.2	200 mm	144,288	m^3	$ 33.63	
1.1.3	56 mm	41,288	m^3	$ 40.21	
1.1.4	Culvert	185	m	$ 974.30	
1.2	***Causeway***				***$ 7,217,149***
1.2.1	900 mm	256,731	m^3	$ 16.37	
1.2.2	200 mm	8,814	m^3	$ 33.63	
1.2.3	56 mm	2,574	m^3	$ 40.21	
1.2.1	40 m Bridge	1		$ 2,614,547.10	
1.3	***Quarry Access Road***				***$ 879,753***
1.3.1	900 mm	29,900	m^3	$ 16.37	
1.3.2	200 mm	7,475	m^3	$ 33.63	
1.3.3	56 mm	2,243	m^3	$ 40.21	
1.3.4	Culvert	50	m	$ 974.30	
1.4	***Jay Pipe Laydown Areas***				***$ 11,419,023***
1.4.1	Admin Laydown 900 mm	72,980	m^3	$ 16.37	
1.4.2	Admin Laydown 200 mm	18,245	m^3	$ 33.63	
1.4.3	Admin Laydown 56 mm	5,474	m^3	$ 40.21	
1.4.4	Dredge/Marine Laydown 900 mm	337,874	m^3	$ 16.37	
1.4.5	Dredge/Marine Laydown 200 mm	84,469	m^3	$ 33.63	
1.4.6	Dredge/Marine Laydown 56 mm	25,341	m^3	$ 40.21	
1.5	***Quarry Laydown Areas***				***$ 449,548***
1.5.1	Quarry Crusher Pad 900 mm	19,762	m^3	$ 16.37	
1.5.2	Quarry Crusher Pad 200 mm	1,976	m^3	$ 33.63	
1.5.3	Quarry Crusher Pad 56 mm	1,482	m^3	$ 40.21	
1.6	***Quarry Stockpile***				***$ 1,596,692***
1.6.1	Quarry Stockpile 900 mm	70,188	m^3	$ 16.37	
1.6.2	Quarry Stockpile 200 mm	7,019	m^3	$ 33.63	
1.6.3	Quarry Stockpile 56 mm	5,264	m^3	$ 40.21	
	Subtotal Infrastructure				**$ 45,579,656**

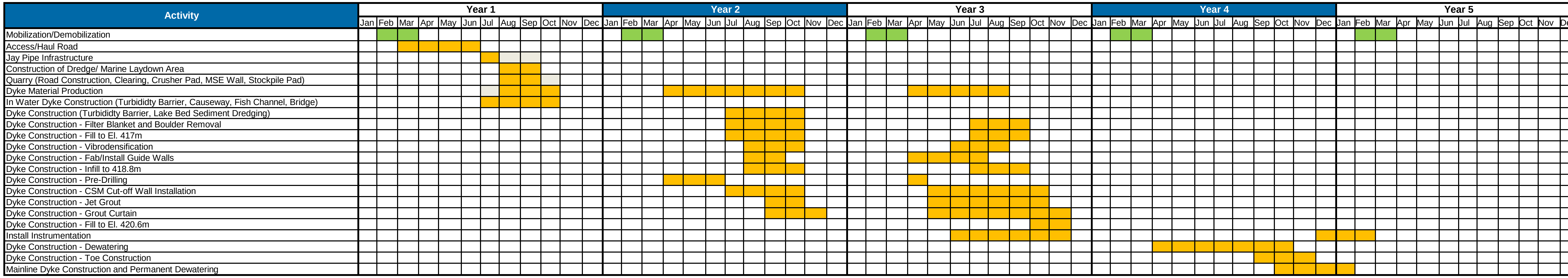
Item	Description	Bid Qty	Unit	Total Unit Rate	Price
2	**Dyke Construction**				
2.1	***Dyke***				***$ 119,691,657***
2.1.1	900 mm	659,396	m^3	$ 16.37	
2.1.2	200 mm	622,843	m^3	$ 35.89	
2.1.3	56 mm	824,016	m^3	$ 62.35	
2.1.4	Course 20 mm	45,000	m^3	$ 48.10	
2.1.5	Washed Sand	40,000	m^3	$ 48.10	
2.1.6	Drill and Blast - dyke Material only	3,381,677	m^3	$ 9.19	
2.2	***Toe Berm***				***$ 25,853,369***
2.2.1	Toe Berm Access Road (Zone 3), perforated pipe	1	LS	$ 4,974,585.68	
2.2.2	900 mm	382,063	m^3	$ 31.76	
2.2.3	200 mm	75,736	m^3	$ 38.06	
2.2.4	56 mm	79,312	m^3	$ 73.91	
2.3	***Turbidity Barrier***				***$ 2,343,342***
2.3.1	Causeway	10,366	m^2	$ 73.17	
2.3.2	Other	21,660	m^2	$ 73.17	
2.4	***Dredging Pipeline***				***$ 5,265,810***
2.4.1	Dredging Pipeline	13,365	m	$ 394.00	
2.5	***Dredging***	***518,839***	**m^3**		***$ 11,836,209***
2.5.1	Deep (>5 m)	403,736	m^3		
2.5.2	Intermediate (4-5 m)	68,239	m^3		
2.5.3	Shallow (<4 m)	46,864	m^3		
2.6	***Filter Blanket***				***$ 30,771,381***
2.6.1	Filter Blanket	240,627	m^3	$ 127.88	
2.7	***Vibrodensification***				***$ 8,841,215***
2.7.1	Vibrodensification	394,345	m^3	$ 44.84	
2.8	***Concrete Guide Walls***				***$ 2,457,000***
2.8.1	Concrete Guide Walls	4,200	m	$ 585.00	
2.9	***CSM Dyke Wall***				***$ 113,929,065***
2.9.1	CSM Dyke Wall	47,769	m^3	$ 2,385.00	
2.10	***Pre-Drilled CSM to bedrock***				**$ 23,378,706**
2.10.1	Pre-Drilled CSM to bedrock	8,815.50	m^3	$ 2,652.00	
2.11	***Jet Grout***				***$ 43,231,124***
2.11.1	Jet Grout	8,815.50	m^2	$ 4,903.99	
2.12	***Grout Curtain***				***$ 47,372,692***
2.12.1	Grout Curtain	62,932	m^2	$ 752.76	
2.13	***Dewatering***				***$ 21,454,121***
2.13.1	Initial Dewatering	1	LS	$ 13,742,743.50	
2.13.2	Permanent dewatering	1	LS	$ 7,711,377.64	
2.14	***Instrumentation***				***$ 12,035,158***
2.14.1	Piezometers	1	LS	$ 1,941,357.24	
2.14.2	Inclinometers	1	LS	$ 1,028,617.01	
2.14.3	Survey Markers/Pins/Monuments	1	LS	$ 265,118.06	
2.14.4	Thermistor Cables	1	LS	$ 3,421,591.12	
2.14.5	Automated Data Acquisition System	1	LS	$ 2,187,677.42	
2.14.6	Relief Wells	1	LS	$ 3,190,797.29	
2.15	***Thermosyphons***	***1***	***LS***	***$ 17,467,334.33***	***$ 17,467,334***
	Subtotal Dyke				**$ 485,928,184**

Item	Description	Bid Qty	Unit	Total Unit Rate	Price
3	**Transportation, Accommodations, and Miscellaneous Costs**				
3.1	**Mob and demob of materials and equipment (winter road)**	**1**		**$ 64,000,000**	**$ 64,000,000**
3.2	**Air Transport of critical materials**	**1**		**$ 2,000,000**	**$ 2,000,000**
3.3	**Air Transport of all personnel to/from site**	**1**		**$ 3,300,000**	**$ 3,300,000**
3.4	**Accommodations infrastructure at Misery site (construction and operation)**	**1**		**$ 38,500,000**	**$ 38,500,000**
3.5	**Site security**	**1**		**$ 5,000,000**	**$ 5,000,000**
3.6	**Environmental monitoring during construction**	**1**		**$ 5,000,000**	**$ 5,000,000**
3.7	**Geotechnical investigations and testing**	**1**		**$ 8,700,000**	**$ 8,700,000**
3.8	**EPCM engineering (7% of site construction cost)**	**1**		**$ 37,500,000**	**$ 37,500,000**
3.9	**Minor support from EKATI mine**	**1**		**$ 5,000,000**	**$ 5,000,000**
	Subtotal				**$ 169,000,000**

Item	Description	Bid Qty	Unit	Total Unit Rate	Price
4	**Contingency:**				
4.1	**Identified Risks**	**1**		**$ 30,000,000**	**$ 30,000,000**
4.2	**Unidentified Risks: 10% of site construction cost**	**1**		**$ 53,000,000**	**$ 53,000,000**
	Subtotal				**$ 83,000,000**

Jay Pipe Project Total	**$ 783,507,839**

APPENDIX C
PROJECT SCHEDULE


Activity
Year 1
Year 2
Year 3
Year 4
Year 5
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Mobilization/Demobilization
Access/Haul Road
Jay Pipe Infrastructure
Construction of Dredge/ Marine Laydown Area
Quarry (Road Construction, Clearing, Crusher Pad, MSE Wall, Stockpile Pad)
Dyke Material Production
In Water Dyke Construction (Turbididty Barrier, Causeway, Fish Channel, Bridge)
Dyke Construction (Turbididty Barrier, Lake Bed Sediment Dredging)
Dyke Construction - Filter Blanket and Boulder Removal
Dyke Construction - Fill to El. 417m
Dyke Construction - Vibrodensification
Dyke Construction - Fab/Install Guide Walls
Dyke Construction - Infill to 418.8m
Dyke Construction - Pre-Drilling
Dyke Construction - CSM Cut-off Wall Installation
Dyke Construction - Jet Grout
Dyke Construction - Grout Curtain
Dyke Construction - Fill to El. 420.6m
Install Instrumentation
Dyke Construction - Dewatering
Dyke Construction - Toe Construction
Mainline Dyke Construction and Permanent Dewatering

APPENDIX 4C

JAY-CARDINAL PROJECT
CONCEPTUAL ENGINEERING REPORT
ON DRAWDOWN ALTERNATIVES
OCTOBER 2013

October 16, 2013

LAC DU SAUVAGE
NORTHWEST TERRITORIES, CANADA

Stage 1 Conceptual Engineering Report on Lake Drawdown Alternatives, Jay-Cardinal Project, Ekati Mine

Submitted to:

Dominion Diamond Resources Corporation
1102 4920-52nd St.
Yellowknife, NT
X1A 3T1

Attention: Mats Heimersson, P.Eng.
Vice President / Consulting Engineer

REPORT

Reference Number: 1313280031-009-R-Rev0-2130

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Golder Associates

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TABLES

FIGURES

1.0 INTRODUCTION

Dominion Diamond Resources Corporation (DDRC) has retained Golder Associates Limited (Golder) to develop a conceptual plan to mine the Jay and Cardinal kimberlite pipe deposits (Jay-Cardinal Project) at its Ekati Diamond Mine in the Northwest Territories (NT). Figure 1 presents a key plan showing the location of the Ekati Diamond Mine. The Jay and Cardinal kimberlite pipes are located under water in Lac du Sauvage (LDS), northeast of the existing Misery Pit Operations. Kimberlite mined from the Jay and Cardinal pipes will be processed at the existing Ekati Mine facilities which are located some 30 kilometres (km) northwest of the Misery Pit Operations.

Golder (2013) presents the results of a drainage basin study for LDS. The study included delineation of sub-basins in the LDS watershed, estimates of lake elevations within the sub-basins, calculation of land and water areas for each sub-basin, estimates of the mean annual water yield and water volume inflows to LDS. This study was used as the basis for the Stage 1 conceptual engineering for the Jay-Cardinal Project.

The Stage 1 project objectives were to understand any constraints or fatal flaws in the proposed LDS lake drawdown concept with respect to cost, engineering, construction, environment, permitting, regulations and safety, and to explore the feasibility of mining the Jay and Cardinal kimberlite pipes with minimal capital costs and sustainable operating costs. For the project to be feasible, mining of the Jay or Cardinal kimberlite pipes should be initiated by 2019 to avoid downtime after existing mining operations at the Ekati Mine are expected to be completed.

This report has been prepared to present a summary of the lake drawdown alternatives used in the conceptual design for the Jay-Cardinal Project.

The reader is referred to the “Study Limitations” which precedes the text and forms an integral part of this document.

2.0 BACKGROUND

2.1 Site Description

The project site is located approximately 300 km northeast of Yellowknife, NT (Figure 1). Figure 2 presents a general location plan including the existing Ekati Mine, existing Misery road, existing Misery Pit Operations area and LDS which is located northeast of the Misery Pit. Figure 2 includes the Jay and Cardinal kimberlite pipe deposit location which are both located under water in LDS.

The shoreline close to the Jay and Cardinal kimberlite pipe deposits is undeveloped. The Jay kimberlite pipe is located approximately 1.2 km from the west shoreline of LDS in a bathymetric low which is covered by about 35 m of water based on 2013 LDS bathymetry data. The Cardinal kimberlite pipe is located approximately 1.5 km from the west shoreline near the centre of this section of LDS, in a bathymetric low which is covered by about 18 m of water and is approximately 4.4 km southeast of the Jay kimberlite pipe.

Ekati's Misery Pit Operations are located approximately 7 km to the southeast of the Jay kimberlite pipe. There is an existing haul road between the Misery Pit Operation and the Ekati processing plant. The processing plant and the main Ekati Mine are located approximately 30 km to the northwest as shown in Figure 2.

2.2 Permafrost

The project site is located within a region of continuous permafrost. Permafrost is expected to a depth of approximately 350 to 400 metres (m) below the land around LDS and below the islands to varying depths depending on the size of the islands and peninsulas. Permafrost usually exists under the lake shoreline where the depth of water is less than about 2 m and winter lake ice freezes to the lake bottom. Permafrost is expected to be absent (talik zone) below the majority of LDS.

2.3 Basin Study

Golder conducted a basin study on LDS and its watershed (Golder 2013). The study identified 11 sub-basins of the LDS watershed, in addition to the local contributing area. Figure 3 presents the subwatershed boundaries and hydrography from that study. The hydrology data, such as the surface elevation and the surface area of lakes, annual water yield of lakes, the 11 sub-basins, and local contributing area, were used as design basis for lake drawdown at this stage.

Golder is in the process of completing more a detailed hydrology study for the Project which will be used in the next stage of design and to support the permitting process. Some key parameters from the basin study (Golder 2013) include:

- The surface area of LDS is 109.1 square kilometres (km^2) at elevation (EL.) 416 m.
- The total area of LDS and its watershed is 1,495.6 km^2.
- The mean annual inflow to LDS is 7.266 cubic metres per second (m^3/s).

For the Jay-Cardinal Project, LDS has been divided into the major areas which include the East Arm, South Arm, West Arm, North Arm and Duchess Arm, as shown by the boundaries on Figure 3.

LDS drains into Lac de Gras (LDG) through the LDS outflow channel at the southwest end of the lake.

2.4 Bathymetric and Topographic Survey

2.4.1 Bathymetric Data

Aurora Geosciences Limited (Aurora) conducted a bathymetric survey of LDS and neighboring lakes, including Lake Ad8, Lake E1, and Paul Lake in June and July 2013. Aurora (2013) noted that the bathymetric survey was completed at 50 m line spacing with a sonar frequency of 200 kHz.

Aurora provided Golder the results of the 2013 bathymetry survey on August 1, 2013. Figure 4 presents the LDS 2013 bathymetry which shows the following key features:

- The deepest area of LDS is located around the Jay kimberlite pipe with base at EL. 381 m, which is 35 m below the lake surface.
- The geographic low at Cardinal kimberlite pipe is EL. 398 m, which is 18 m below the lake surface.
- A trench up to over 20 m deep runs along the southwest shoreline of LDS.
- A similar trench exists along the southwest shoreline of Duchess Lake but with shallower depth (less than 14 m).

2.4.2 Topographic Data

Golder obtained 1:50,000 topographic data from CanVec, Department of Natural Resources Canada, for this study. Portions of this topography data were updated by Aurora with the RTK (real time kinematic) GPS (Global Position System) data of 10 areas, which was made available in August 2013. Real time kinematic GPS is a technique used to enhance the precision of position data derived from GPS, and provides up to centimetre-level accuracy. The 10 areas were of high priority identified at the beginning of the field survey. Figure 4 presents the project area topography used for this study.

During August 2013, Aurora subcontracted LiDAR Services International Inc. to conduct an airborne light detection and ranging (LiDAR) survey for the project site. LiDAR surveys are able to detect subtle topographic features, and measure the land-surface elevation beneath the vegetation canopy and to better resolve spatial derivatives of elevation. LiDAR survey data will be used in subsequent stages of engineering studies for this project.

3.0 LAKE DRAWDOWN ASSESSMENT

A range of lake drawdown options that will allow for the development of mines at both the Jay and Cardinal kimberlite pipes have been developed.

The general concept of lake drawdown will include pumping to establish an initial drawdown which will provide access to the Jay and Cardinal kimberlite pipe areas and allow for construction of local water management infrastructure. During the mine operation period, lake drawdown will be maintained through pumping. During operations it is assumed that the lake drawdown elevation will fluctuate to allow for some attenuation of spring freshet inflows and as part of turbidity management.

All pumped lake water during initial and on-going lake drawdown will be piped to either a sediment control pond constructed within LDS which overflows through a controlled outlet into Lake E1 and then Paul Lake (an arm of LDG) if suitable water quality, or decanted through a pipeline and directly discharged into either LDG or upstream of the Jay-Cardinal Project diversion dikes. The concept includes an allowance for a water treatment plant at the sediment control pond.

3.1 Hydrology Study

Golder (2013) presents preliminary estimates of the mean annual and monthly inflows reporting to the sub-basins of LDS. These were used to support the lake drawdown options and pumping study. The hydrology study applied regional water yields and monthly distributions to basin watershed mapping and derive values for mean conditions. Historical precipitation data were used to provide estimates of factors to be applied to annual values to characterize wet and dry conditions. Runoff in this region is heavily influenced by the depth of winter snowpack, and inter-annual variability in snowpack is typically much less than variability in rainfall.

A detailed hydrology study, which will use historical data and data collected during baseline studies in 2013 to develop, calibrate and validate a water balance model for the entire LDS basin, is currently in progress. This will provide estimates of flows and water levels for mean and extreme conditions based on long-term regional climate data, and will allow short and long duration flood and drought conditions to be characterized with greater confidence.

3.2 Lake Elevation

The surface elevations of key lakes in the project area were provided by Aurora and are summarized in Table 1. Lake surface elevations were surveyed between June and August, 2013 while the lakes were ice-free. Further hydrology studies are underway and include development of a water balance model for the LDS basin which will be used in further stages of the project.

Table 1: Summary of Lake Surface Elevations in Summer 2013

Lake	Lake Surface Elevation (m)	Survey Date
Duchess Lake	416.9	August 19, 2013
LDS	416.5	August 19, 2013
LDG	416.3	August 19, 2013
Lake E1	418.2	August 19, 2013
Paul Lake	417.2	August 19, 2013
Ad8 Lake	418.6	June 23, 2013
Hammer Lake	432.8	August 19, 2013
Lynx Lake	432.0	August 19, 2013

Note: Data provided by Aurora by email on August 19, 2013.

Note that the August 2013 surveyed LDS elevation was reported as 416.5 m, or 0.5 m above that in Golder (2013). As the hydrology study work is ongoing, the conceptual engineering was advanced based on a mean normal lake elevation of 416 m.

3.3 Lake Volume

A three-dimensional model of the LDS lakebed was prepared based on 2013 bathymetry data provided by Aurora and Figure 5 presents the LDS volume by elevation.

A number of key assumptions were made to calculate the lake drawdown volume by elevation for the alternative options. These include the assumptions that the mean normal lake elevation is 416 m and that all in-lake ponds gradually isolated by the lake drawdown are hydraulically connected so that drawing down the lake in one area results in drawdown of all areas of the lake. Some of the isolated ponds may be hydraulically disconnected from the rest of the lake, which will significantly reduce the water volume for pumping. Further investigation of potential hydraulic connection of sub-basins within the lake will be part of the next stage of the design for this project.

Based on the assumptions noted above, the water volume (base volume) of the entire LDS is approximately 500,000,000 m^3 between EL. 416 m and EL. 406 m.

3.4 Drawdown Criteria

The determination of a target lake drawdown elevation considers the following criteria:

- Bathymetry of the LDS lakebed relative to the geometry of the proposed open pits;
- Limited ring dike requirements around the proposed open pit areas; and
- Freeboard between the pit rim and drawn-down lake that accounts for a seasonal fluctuations and a design storm / snowmelt inflow event.

3.5 Staged Drawdown

Review of the drawdown criteria, the proposed Jay and Cardinal open pits, and the 2013 bathymetry data indicates that the following steps of lake drawdown are required for the project development.

- Initial Lake Drawdown: Pumping to draw down LDS to EL. 406 m (10 m drawdown assuming initial lake surface at EL. 416 m) and expose the lakebed surrounding the Jay and Cardinal kimberlite pipes. The initial drawdown is planned to be completed over one year. The total volume includes existing base volume in LDS (between EL. 416 m and EL. 406 m) plus the volume of annual watershed inflows reporting to the lake during the one year initial drawdown period.

  Access roads will be advanced towards the proposed pit areas to allow for construction of local water management infrastructure.

- Pit Area Dewatering: Following initial drawdown, and development of local water management infrastructure, local pumping will be required to dewater from EL. 406 m down to the about EL. 381 m at the Jay kimberlite pipe and down to about EL. 398 m at Cardinal kimberlite pipe to exposed the pipe areas for open pit pre-stripping development.

- Maintaining Lake Drawdown: During mining operations, pumping continues to transfer annual inflows, groundwater inflow and seepage reporting to the drawn-down lake and maintain the target lake elevation between about EL. 406 and 407 m.

3.6 Lake Drawdown for Jay Pipe Development

During initial drawdown of LDS, a platform to the east of the Jay kimberlite pipe will start being exposed at about EL. 410 m. Drawdown of the lake to El. 406 m will isolate the Jay kimberlite pipe area from the surrounding west arm sub-basins. Two rockfill causeways to Jay Pit will be constructed from the west shore. Sections of these causeways will be lined with till on the one side to create local sediment ponds within the lake drawdown area, which will keep pumping water, inflows and seepage from reaching the pit area.

3.7 Lake Drawdown for Cardinal Pipe Development

Most of the area around the Cardinal kimberlite pipe will be exposed during the initial lake drawdown to EL. 406 m. A rockfill causeway will be advanced from Dike JP4 towards the Cardinal kimberlite pipe area. Around the Cardinal kimberlite pipe, two rockfill berms will be advanced to isolate the pipe from other residual ponds. Both berms require placing compacted till for seepage reduction. With the lake drawdown maintained between El. 406 and 407 m, local pumping will be required from the isolated ponds north of Cardinal Pit and below Dike JP4 North.

4.0 LAKE DRAWDOWN ALTERNATIVES

Figure 2 presents a site plan showing the existing conditions at the project site. With the exception of the Misery Pit Operations, located 7 km southeast of the Jay Pipe, the areas around LDS are generally undeveloped.

Lake drawdown to support the development of both the Jay and Cardinal kimberlite pipes can be achieved with a range of combinations of pumping the LDS base water and diverting watershed inflows. The alternatives considered range from mainly pumping the lake with limited diversion of inflows to mainly diverting inflows with limited pumping of the lake to allow for mine development of both Jay and Cardinal kimberlite pipes. Pumping stations and a sediment control pond are proposed for lake drawdown and construction of dikes and channels are proposed for diversion of the watershed inflows.

Golder identified five alternatives (ALT1 to ALT5) for LDS drawdown which consider pumping the lake and diverting the inflows. Diversion is based on the construction of dikes at up to four locations (Dike JP1, JP2, JP3, and JP4) and an open channel.

Table 2 presents a summary of the dikes, pumping, diversion, initial base drawdown volume and annual inflow volumes for each of the five alternatives which are described in the following sections.

Table 2: Summary of Five Conceptual Lake Drawdown Options [1]

Alternative Number	Dike			Pumping				Diverting				Lake E1 Diversion Outlet Channel	Initial Drawdown Volume to EL. 406 m (1,000,000 m^3)	Ongoing Mean Annual Inflow (1,000,000 m^3)
	JP1	JP2	JP3	Duchess Arm	East Arm	South Arm	West Arm	Duchess Arm	East Arm	South Arm	West Arm			
ALT1	yes	no	no	yes	yes	yes	yes	no	no	no	no	yes	487	217
ALT2	yes	yes	no	no	yes	yes	yes	yes	no	no	no	yes	457	150
ALT3	yes	no	yes	yes	no	yes	yes	no	yes	no	no	yes	422	143
ALT4	yes	yes	yes	no	no	yes	yes	yes	yes	no	no	yes	392	38
ALT5	yes	yes	no	no	no	no	yes	yes	yes	yes	no	yes	284	20

Note 1: Planned lake drawdown over one year requires pumping to transfer both the initial base volume plus one year ongoing mean inflow.

4.1 Components Common to All Alternatives

Each of the five alternatives includes access roads, pumping stations, a water management area, and between one and three dikes. The following summarizes the components which are common to all of the five alternatives for lake drawdown.

Dikes, Ponds, and Channels

- Dike JP1:

  The dike separates Sub-basin Ad from the rest of LDS and creates the North Arm Water Management Area (NAWMA).

- North Arm Water Management Area:

  The NAWMA has a number of functions which include: a sediment control pond for turbidity control of pumped water, a pond which manages pumped lake and mine water prior to discharge through the Lake E1 diversion outlet channel and into Paul Lake.

- Lake E1 Diversion Outlet Channel:

  The Lake E1 Diversion Outlet Channel diverts inflow from Sub-basin E to Paul Lake and provides an overflow channel from the NAWMA allowing discharge into Paul Lake.

Roads and Causeways

- Jay Road:

  The road is 6.9 km long and connects the existing Misery Road and Jay Causeway.

- Jay Causeway:

  The Jay Causeway is 1.2 km long and connects Jay Road and Jay Pit. The construction of Jay Causeway is assumed to be part of Jay Pit development.

- JP1 Road:

  The road is 4.5 km long and connects Jay Road and Dike JP1.

- Lake E1 Diversion Outlet Road:

  The road is 7.2 km long and connects JP1 Road and Lake E1 Diversion Outlet Channel and provides access to the channels for construction and maintenance.

- Cardinal Road:

  The road is 5.4 km long and connects the existing Misery Road and Cardinal Causeway.

- Cardinal Causeway:

  The Cardinal Causeway is 4.0 km long and connects Cardinal Road and Cardinal Pit. The construction of Cardinal Causeway is assumed to be part of Cardinal Pit development.

Berms

- Jay Berms:

  Two berms in the area of the proposed Jay Pit development are required and will be constructed of rockfill and lined with locally borrowed lakebed till from pit pre-stripping if possible. The berms will create sumps which collect local seepage flows, groundwater flow, and precipitation and keep the drawn-down lake from the pit area.

- Cardinal Berms:

  Two berms in the area of the proposed Cardinal Pit development are required and will be constructed of rockfill and lined with locally borrowed lakebed till from pit pre-stripping if possible. The berms will create sumps which collect local seepage flows, groundwater flow, and precipitation and keep the drawn-down lake from the pit area.

  An additional pumping station will be required in the isolated pond north of Cardinal Pit and below Dike JP4 North to maintain this area at a drawdown level of EL. 400 m.

Pumping Stations and Pipelines

- PS1 Pump Station and Pipelines:

  The pipeline is 3.5 km long. It pumps water from PS1 Pump Station to the NAWMA during lake drawdown and while maintaining lake drawdown during operations.

- PS2 Pump Station and Pipelines:

  The pipeline is 2.3 km long. It pumps water from PS2 Pump Station to LDG during lake drawdown and maintaining the drawdown level.

- PS3 Pump Station and Pipelines:

  The pipeline is 1.5 km long. It pumps water from the trench along LDS southwest shoreline to PS1 Pump Station.

Power Supply

Power supply for pumping would include a power line from the main Ekati mine site and substations which are located near the proposed pumping stations. Details of power supply and transmission lines are being designed by others.

4.2 Alternative 1 to 5 Components

ALT1 Components Include:

Only the common components are required for ALT1. Figure 6 presents the general arrangement plan for Alternative 1.

ALT2 Components Include:

Figure 7 presents the ALT2 general arrangement plan. In addition to the common components, ALT2 includes the following:

- JP2 Road:

  The road is 6.3 km long and connects Dike JP1 and JP2.

- Dike JP2:

  The dike diverts the inflow from Duchess Arm of LDS to Paul Lake through the Lake E1 Diversion Outlet Channel.

ALT3 Components Include:

Figure 8 presents the ALT3 general arrangement plan. In addition to the common components, ALT3 includes the following:

- Dike JP3:

  Dike JP3 retains water in the Sub-basin Aa. Inflows to the Sub-basin Aa from Sub-basins H, I, and J will overflow Dike JP3 and are diverted to the location of PS2 Pump Station through the Sub-basin Ab channels.

  The dike will be constructed in winter by using stockpiled construction materials and equipment at a JP3 Laydown. The construction materials and equipment will be hauled and mobilized to the Dike JP3 Laydown a few months to one year earlier through Dike JP3 Winter Road.

- JP3 Laydown and JP3 Winter Road:

  The laydown provides storage for Dike JP3 construction material and equipment.

  The winter road is 7.3 km long and connects Cardinal Road and JP3 Laydown.

- Sub-Basin Ab Channel:

  The channels connect the isolated pond at EL. 406 m for the spilled water discharge to the PS2 Pump Station.

- Ab Pumping Station:

  The station is to maintain drawdown level in the east arm area of the lake.

ALT4 Components Include:

Figure 9 presents the ALT4 general arrangement plan. In addition to the common components, ALT 4 includes the following:

- JP2 Road:

  It is 6.3 km long and connects Dike JP1 and JP2.

- Dike JP2:

  The dike diverts the inflow from Duchess Arm to Paul Lake through the Lake E1 Diversion Outlet Channel.

- Dike JP3:

  The dike holds water in Sub-basin Aa and allows the inflow from Sub-basins H, I, and J to spill over it. The spilled water will then be diverted to the location of PS2 Pump Station through the Sub-basin Ab channels.

  The dike will be constructed in winter by using stockpiled construction materials and equipment at the Dike JP3 Laydown. The construction materials and equipment will be hauled and mobilized to the Dike JP3 Laydown a few months to one year earlier through JP3 winter road.

- JP3 Laydown and JP3 Winter Road:

  The lay-down provides storage for Dike JP3 construction material and equipment.

  The winter road is 7.3 km long and connects Cardinal Road and JP3 Laydown.

- Sub-Basin Ab Channel:

  The channels connect the isolated pond at EL. 406 m for spilled water discharge to the PS2 Pump Station.

  The station is to maintain drawdown in the east arm area of the lake.

ALT5 Components Include:

Figure 10 presents the ALT5 general arrangement plan. In addition to the common components, ALT5 includes the following:

- JP2 Road:

  It is 6.3 km long and connects Dike JP1 and JP2.

- Dike JP2:

  The dike diverts the inflow from Duchess Arm to Paul Lake through the Lake E1 Diversion Outlet Channel.

- Dike JP4:

  Dike JP4 is divided into two sections: JP4 North and JP4 South, and includes a 0.8 km JP4 Road which is constructed on an existing island in LDS to connects the two sections of this dike.

  Dike JP4 is a the largest of the proposed dikes for all alternatives considered, however there are a number of major advantages to the construction of a Dike JP4 which include:

  - with the Dike JP4 in place, about 40% of LDS including the south and east arms does not required drawdown to access the Jay and Cardinal Pits.
  - with the Dike JP4 in place, the total annual inflows reporting to all the south and east arms will continue to report to the existing LDS outflow.

4.3 Pumping and Diverting Volumes for Each Alternative

Table 3 presents a summary of the initial base drawdown volume to reach elevation EL. 406 m and the diverted annual inflow by Alternative.

Table 3: Pumping and Diverting Volume of Five Alternatives

Alternative Number	Base Volume for Pumping to EL. 406 m (Mm^3)	Pumping Ratio[a] (%)	Diverted Annual Inflow (Mm^3)	Diverting Ratio[b] (%)
ALT1	487	97	42	14
ALT2	457	91	108	42
ALT3	422	84	116	45
ALT4	392	78	222	86
ALT5	284	57	239	92

[a] Pumping ratio: base volume for pumping to EL. 406 m divided by LDS total base volume between EL. 416 m to EL. 406 m (500 Mm^3).

[b] Diverting ratio: diverted annual inflow divided by total inflow to LDS basin (259 Mm^3).

ALT1 has the highest pumping requirements and lowest diversion structures where ALT5 has the lowest pumping requirements and largest diversion structures.

5.0 ALTERNATIVE SELECTION

Following preparation of a general arrangement for the five alternatives, a conceptual design was prepared for each required dike, outlet channel, pumping and pipeline systems. Based on quantity estimates for the conceptual designs, a cost estimate for each ALT1 to ALT5 was prepared. Relative capital and annual operating costs were used in the Alternatives selection.

Table 4 presents a summary of the Alternative considered in terms construction quantities and relative costs.

Table 4: Comparison of the Five Alternatives for Lake Drawdown

Alternatives			ALT1	ALT2	ALT3	ALT4	ALT5
Dikes			JP1	JP1, JP2	JP1, JP3	JP1, JP2, JP3	JP1, JP2, JP4
Length of Access Roads		km	22	27	22	27	27
Area	Lake drawdown	km^2	94.4	76.7	80	62.3	46.3
	Catchment	km^2	1,176	817	736	168	90
	% Diversion		14	42	45	86	92
Volume	Dike(1)	Mm^3	0.57	0.58	0.62	0.63	2.33
	Year 1 pumping	Mm^3	743.2	607.6	565.2	429.6	305
	Operational pumping	Mm^3	256	150.8	142.7	37.5	20.5
Relative Capital costs (including initial drawdown) (2)			1.0	1.04	1.09	1.12	1.33
Relative Annual Operational pumping costs (2)			6.2	3.8	5.9	3.6	1.0
Relative Capital with ten years of Operational pumping Costs			1.1	1.0	1.2	1.0	1.1

(1) includes outlet channels.
(2) based on 2013 conceptual level costs estimates assuming the lowest cost is one cost unit.
M= 1,000,000.

Cost estimates in Table 4 do not include contingency and mining costs.

The relative capital costs which include the initial drawdown pumping were found to increase from the lowest costs for ALT 1 up to the highest cost for ALT 5 as the total length and volume of dikes to construct increased. The relative annual operating pumping costs were found to increase from the lowest for ALT 5, to similar costs for ALT 2 and 4, up to the highest costs for ALT 1 and 3. For a ten year mine life (estimated Jay open pit only mine life) the relative capital costs with ten years of operational pumping costs, all alternatives resulted in similar undiscounted costs when the accuracy was considered. ALT5 presented the lowest lake drawdown area and retained the outflow of about 40% of LDS through the existing outflow channel. Based on these considerations, ALT5 is the preferred option to advance to pre-feasibility study including geotechnical investigations to be started in winter 2014.

Figure 11 presents the general arrangement plans with lake drawdown to El. 406 m during operations for the ALT5.

6.0 REPORT CLOSURE

We trust that this report meets with your current requirements. Please do not hesitate to contact either of the undersigned if you require any additional information.

GOLDER ASSOCIATES LTD.

REGISTERED PROFESSIONAL ENGINEER
J.C. CUNNING
LICENSEE
NWT/NU

Oct. 16/13

Winston Ding, P.Eng. (BC) Geotechnical Engineer	John Cunning, P.Eng. (BC, NWT/NU) Principal, Senior Geotechnical Engineer

DYH/JCC/kp/jlj

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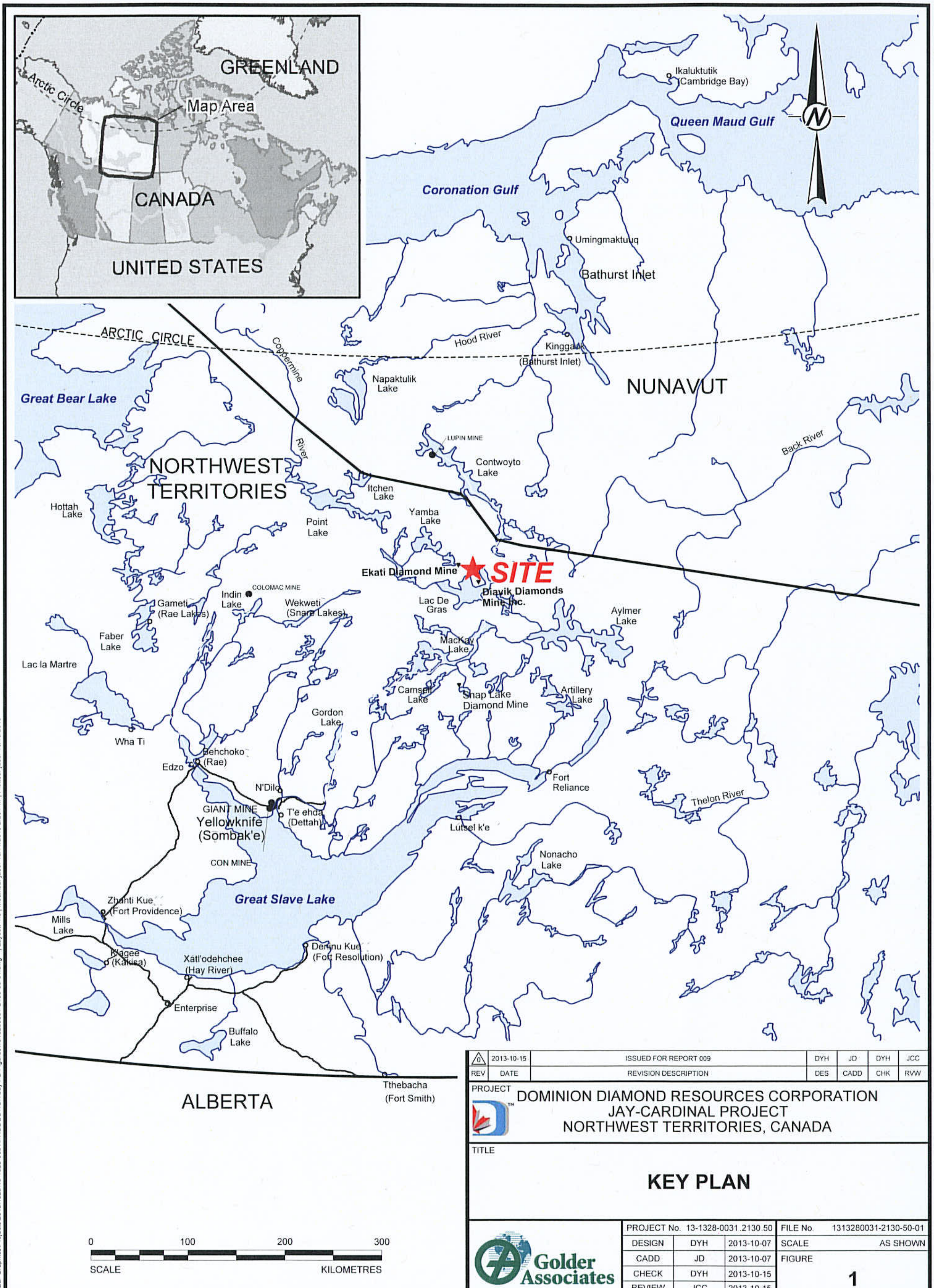
THE ASSOCIATION OF PROFESSIONAL ENGINEERS, GEOLOGISTS and GEOPHYSICISTS OF THE NORTHWEST TERRITORIES
PERMIT NUMBER
P 049
GOLDER ASSOCIATES LTD.

16 Oct 2013

REFERENCE

Aurora Geosciences Ltd. (Aurora), 2013. Re: Lac du Sauvage - Topographic and Bathymetric Surveys, submitted to Dominion Diamond Corporation, dated July 20, 2013.

Golder Associates Ltd. (Golder), 2013. Lac Du Sauvage 2013 Basin Study, submitted to Dominion Diamond Corporation, dated May 23, 2013.



0	2013-10-15	ISSUED FOR REPORT 009	DYH	JD	DYH	JCC
REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW

PROJECT
DOMINION DIAMOND RESOURCES CORPORATION
JAY-CARDINAL PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE

KEY PLAN

Golder Associates

PROJECT No. 13-1328-0031.2130.50			FILE No.	1313280031-2130-50-01
DESIGN	DYH	2013-10-07	SCALE	AS SHOWN
CADD	JD	2013-10-07	FIGURE	
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REVIEW	JCC	2013-10-15		

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LEGEND

- WATER BODY
- WATER COURSE
- EXISTING ROAD
- WINTER ROAD - ON DEMAND CONSTRUCTION
- WINTER ROAD - YEARLY CONSTRUCTION
- PIPE LOCATION
- WATER LEVEL ELEVATION

NOTES

1. ALL UNITS ARE IN METRES UNLESS OTHERWISE NOTED.
2. GROUND SURFACE CONTOURS ARE SHOWN AT 5 m INTERVALS AND BATHYMETRY CONTOURS ARE SHOWN AT 1 m INTERVALS.
3. COORDINATES ARE SHOWN IN DATUM: NAD 83, PROJECTION: UTM ZONE 12

REFERENCES

1. CONTOUR DATA PROVIDED BY AURORA GEOSCIENCES LTD., FILE: compilation_Elev_Gridded.xyz, DATE RECEIVED: JULY 30, 2013, IS BASED ON CANVEC DATA UPDATED WITH 2013 RTK SURVEYS IN SELECTED AREAS.
2. CARDINAL PIPE LOCATION RECEIVED FROM DOMINION DIAMOND CORPORATION, FILE: cardinal_polyline.dxf, DATED: AUGUST 6, 2013.
3. JAY PIPE LOCATION RECEIVED FROM DOMINION DIAMOND CORPORATION, FILE: jay_kimberlite_pipe_OL.dxf, DATED: JULY 19, 2013.

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SCALE METRES

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
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PROJECT
DOMINION DIAMOND RESOURCES CORPORATION
JAY-CARDINAL PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE

GENERAL LOCATION PLAN

PROJECT No.	13-1328-0031.2130.50		FILE No. 1313280031-2130-50-02
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REVIEW	JCC	2013-10-15	

Golder Associates

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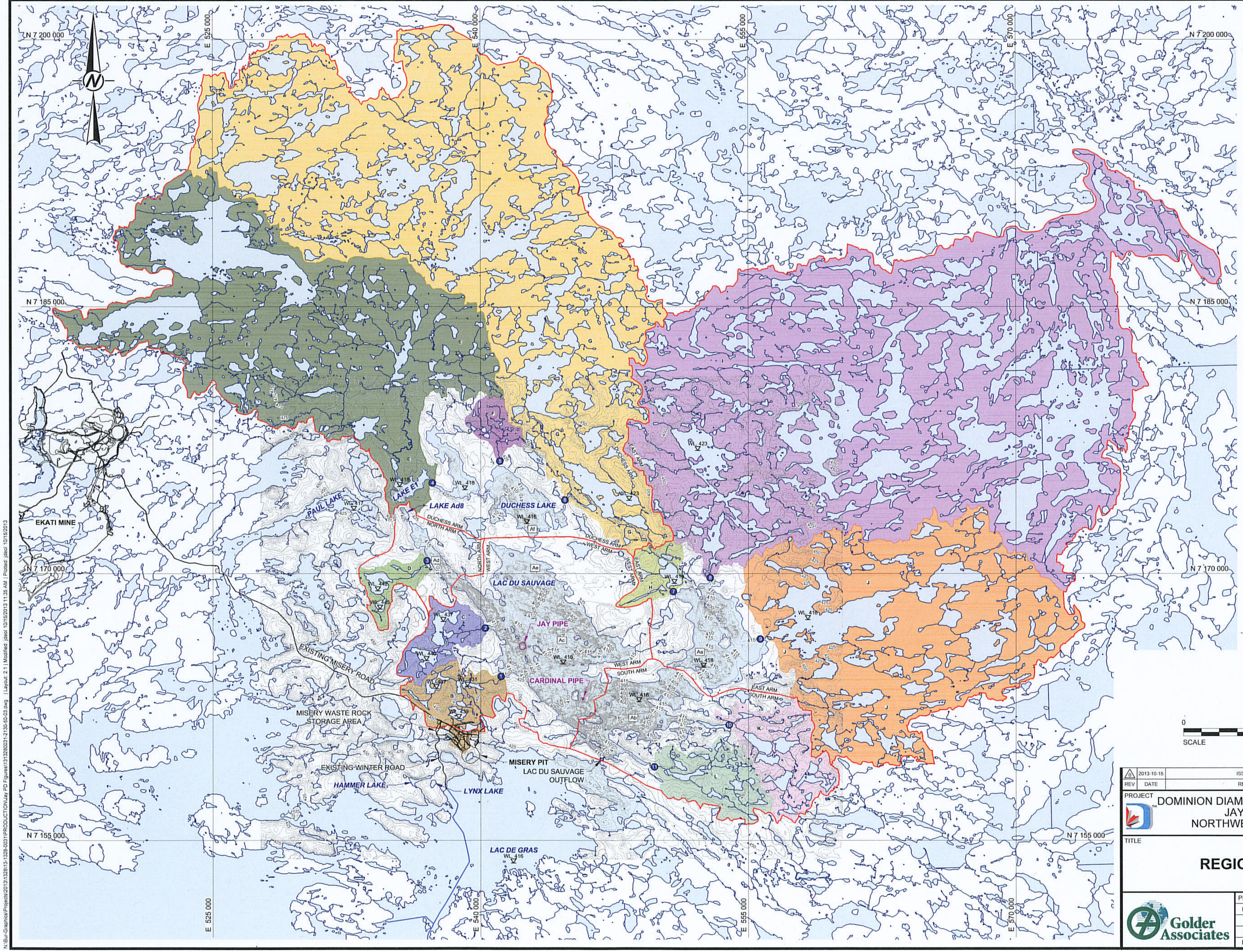

LEGEND

- SUB-BASIN OUTFLOWS
- WATER BODY
- WATER COURSE
- EXISTING ROAD
- WINTER ROAD - YEARLY CONSTRUCTION
- SUB-BASIN BOUNDARY
- PIPE LOCATION
- WATER LEVEL ELEVATION

SUB-BASIN LEGEND

B	Ac	WEST ARM
C	Ae	WEST ARM
D	Ad	NORTH ARM
E	Af	DUCHESS ARM
F	Af	DUCHESS ARM
G	Af	DUCHESS ARM
H	Aa	EAST ARM
I	Aa	EAST ARM
J	Aa	EAST ARM
K	Ab	SOUTH ARM
L	Ab	SOUTH ARM

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REFERENCES

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3. JAY PIPE LOCATION RECEIVED FROM DOMINION DIAMOND CORPORATION, FILE: jay_kimberlite_pipe_OL.dxf, DATED: JULY 19, 2013.

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SCALE METRES

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
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PROJECT

DOMINION DIAMOND RESOURCES CORPORATION
JAY-CARDINAL PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE

REGIONAL HYDROLOGY

Golder Associates

PROJECT No.	13-1328-0031 .2130.50		FILE No.	1313280031-2130-50-03
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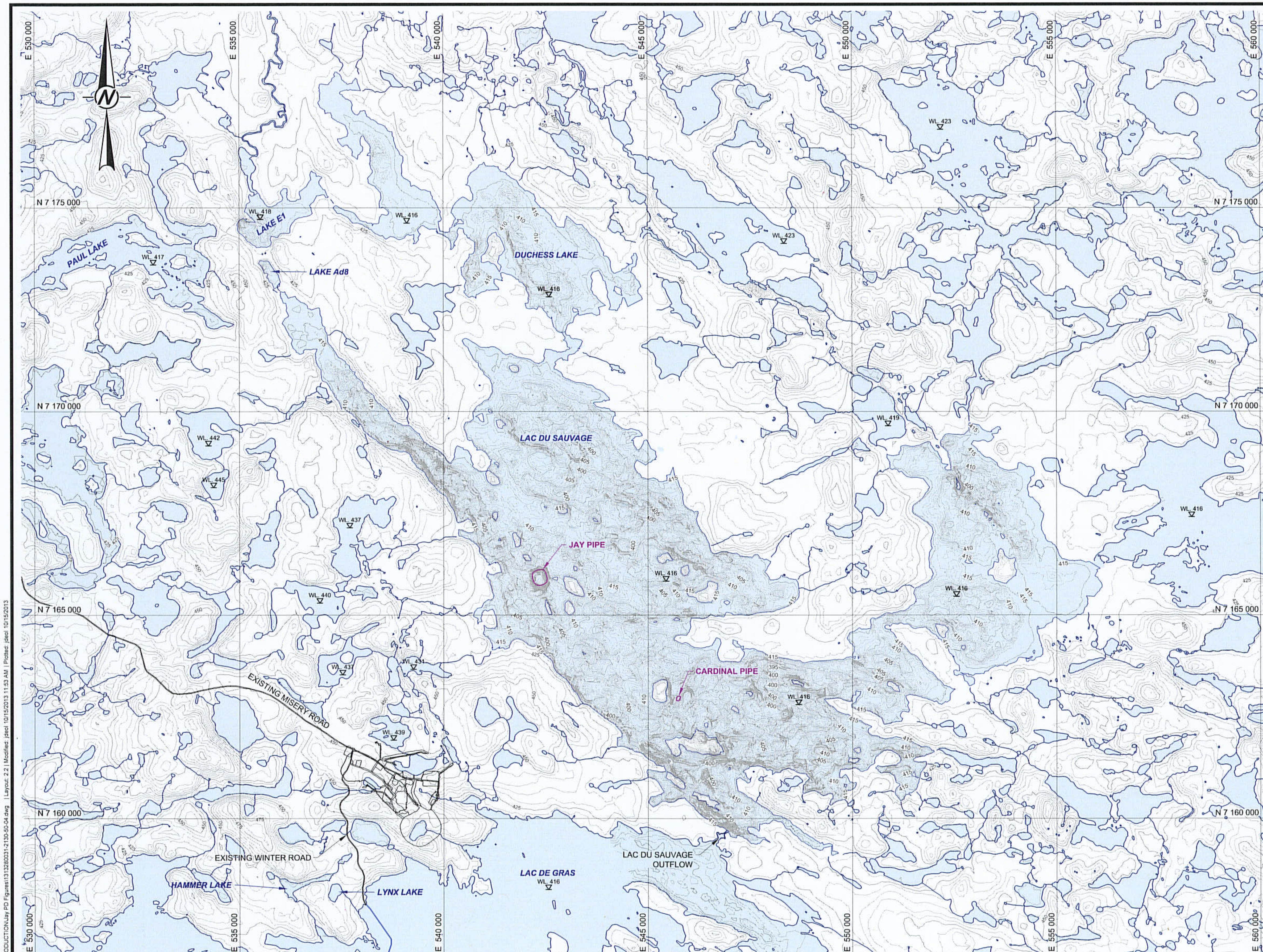
REVIEW	JCC	2013-10-15		



LEGEND

- WATER BODY
- WATER COURSE
- EXISTING ROAD
- WINTER ROAD - YEARLY CONSTRUCTION
- PIPE LOCATION
- WATER LEVEL ELEVATION

NOTES

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1. CONTOUR DATA PROVIDED BY AURORA GEOSCIENCES LTD., FILE: compilation_Elev_Gridded.xyz, DATE RECEIVED: JULY 30, 2013, IS BASED ON CANVEC DATA UPDATED WITH 2013 RTK SURVEYS IN SELECTED AREAS.
2. CARDINAL PIPE LOCATION RECEIVED FROM DOMINION DIAMOND CORPORATION, FILE: cardinal_polyline.dxf, DATED: AUGUST 6, 2013.
3. JAY PIPE LOCATION RECEIVED FROM DOMINION DIAMOND CORPORATION, FILE: jay_kimberlite_pipe_OL.dxf, DATED: JULY 19, 2013.

0 2,000 4,000 6,000
SCALE METRES

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
A	2013-10-15	ISSUED FOR REPORT 009	DYH	JD	DYH	JCC

PROJECT
DOMINION DIAMOND RESOURCES CORPORATION
JAY-CARDINAL PROJECT
NORTHWEST TERRITORIES, CANADA

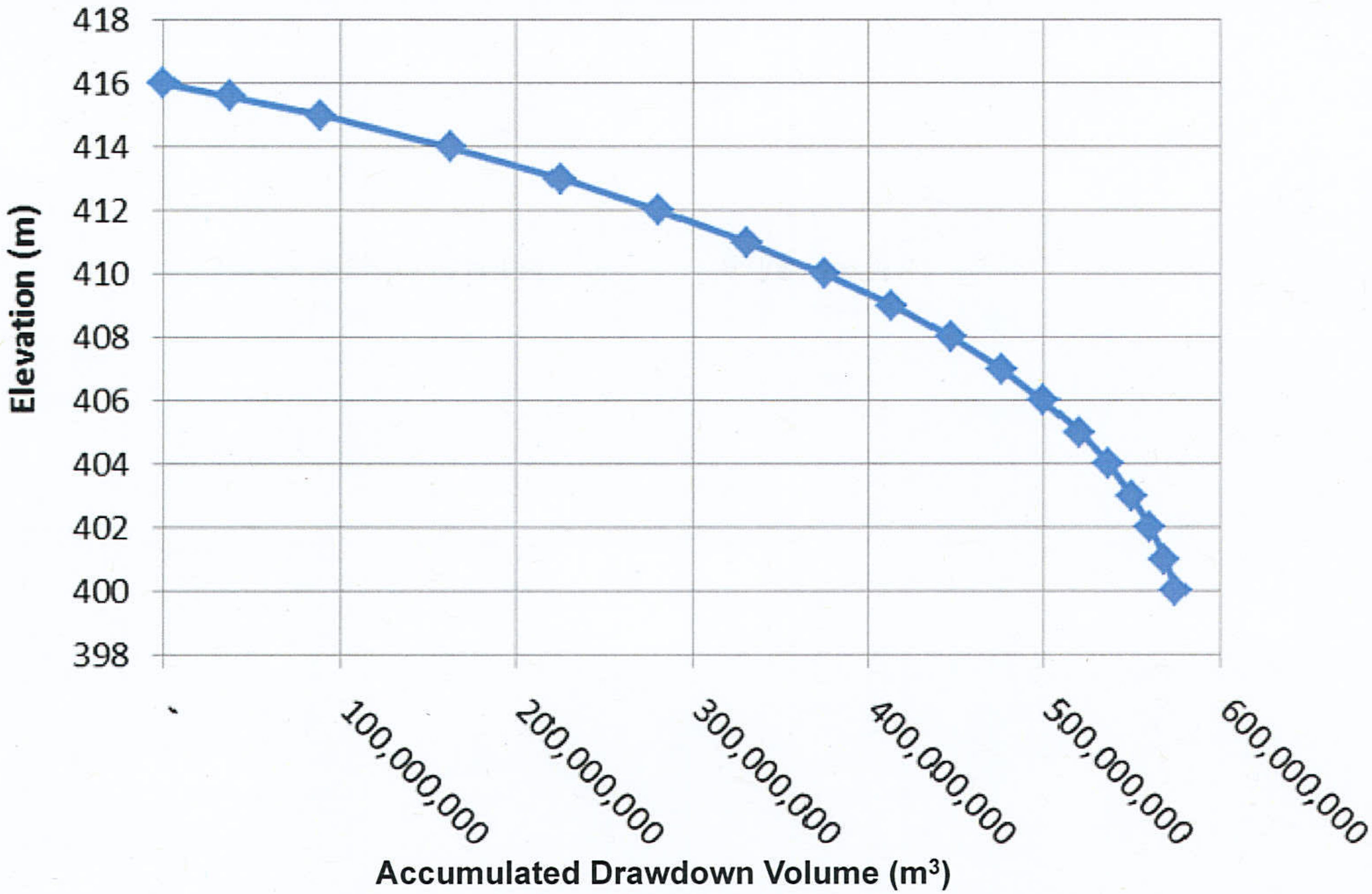
TITLE

2013 LDS BATHYMETRY AND PROJECT AREA TOPOGRAPHY

Golder Associates

PROJECT No. 13-1328-0031 2130.50			FILE No.	1313280031-2130-50-04
DESIGN	DYH	2013-10-07	SCALE	AS SHOWN
CADD	JD	2013-10-07	FIGURE	
CHECK	DYH	2013-10-15		4
REVIEW	JCC	2013-10-15		

FILE: O:\Active_2013\1328\13-1328-0031 Dominion\4090 Draft Deliverables\3-Draft Report\Appendix B - Conceptual Dike Design\Figures – 16 September 2013.pptx



Notes: 1, Assumes normal lake surface at EL. 416 m.
2, Drawdown volume includes East, South, West, North, and Duchess Arms of LDS

PROJECT

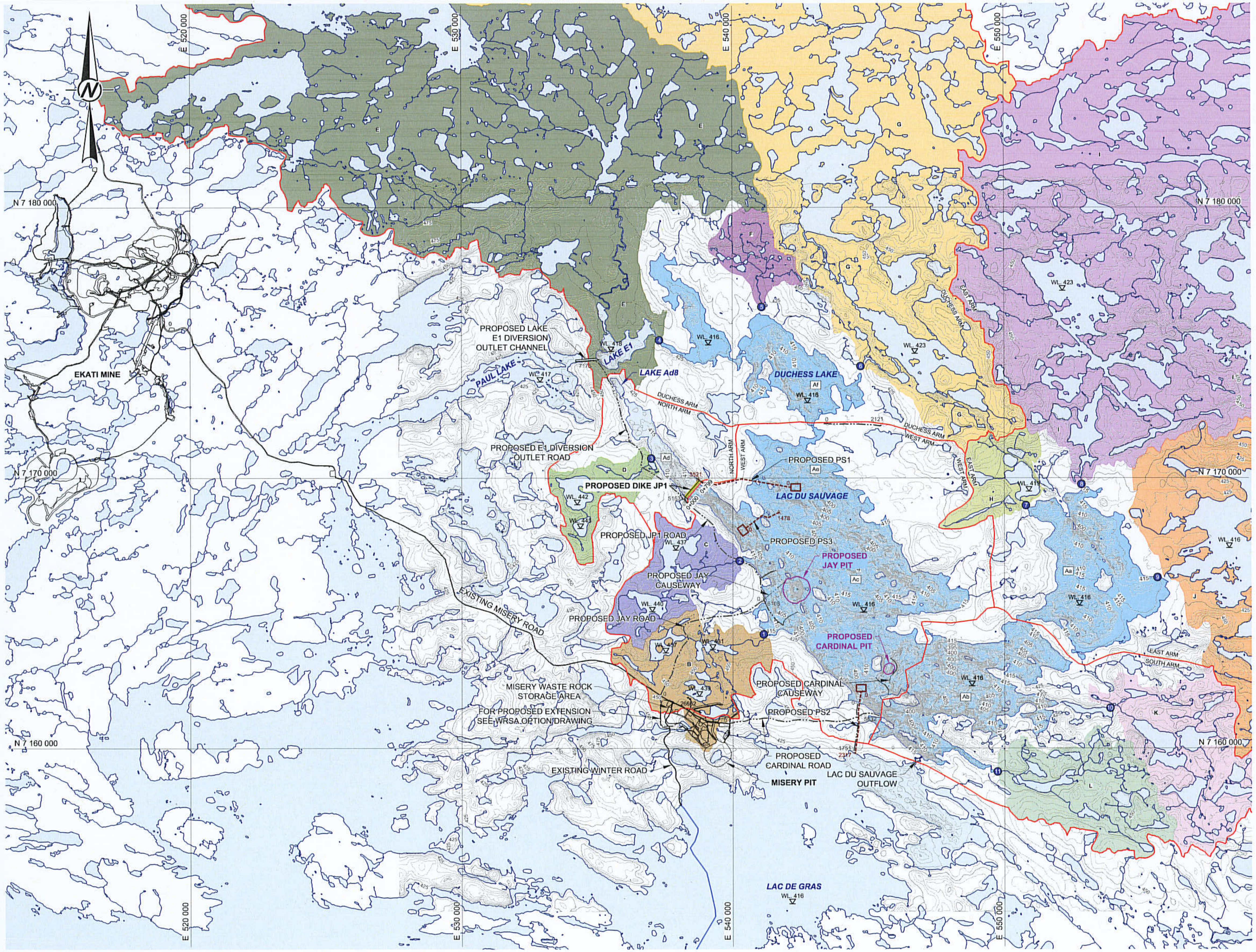
DOMINION DIAMOND RESOURCES CORPORATION
JAY-CARDINAL PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE

LAKE DRAWDOWN VOLUME VS. ELEVATION

Golder Associates

PROJECT No.	13-1328-0031		PHASE No. 2130
DESIGN	CM	2013-10-10	SCALE NTS REV. 0
CADD	LS	2013-10-10	FIGURE 5
CHECK	DYH	2013-10-15	
REVIEW	JCC	2013-10-15	



LEGEND

- SUB-BASIN OUTFLOWS
- WATER BODY
- DRAWDOWN AREA
- PROPOSED DIKE LOCATION
- WATER COURSE
- EXISTING ROAD
- PROPOSED ROAD
- WINTER ROAD - YEARLY CONSTRUCTION
- PROPOSED PUMPING SYSTEM
- PS PUMPING SYSTEM
- SUB-BASIN BOUNDARY
- PROPOSED PIT LOCATION
- WL WATER LEVEL ELEVATION

SUB-BASIN LEGEND

B, C	Ac, Ae	WEST ARM
D	Ad	NORTH ARM
E, F, G	Af	DUCHESS ARM
H, I, J	Aa	EAST ARM
K, L	Ab	SOUTH ARM

NOTES

1. ALL UNITS ARE IN METRES UNLESS OTHERWISE NOTED.
2. GROUND SURFACE CONTOURS ARE SHOWN AT 5 m INTERVALS AND BATHYMETRY CONTOURS ARE SHOWN AT 1 m INTERVALS.
3. COORDINATES ARE SHOWN IN DATUM: NAD 83, PROJECTION: UTM ZONE 12

REFERENCES

1. CONTOUR DATA PROVIDED BY AURORA GEOSCIENCES LTD., FILE: compilation_Elev_Gridded.xyz, DATE RECEIVED: JULY 30, 2013, IS BASED ON CANVEC DATA UPDATED WITH 2013 RTK SURVEYS IN SELECTED AREAS.
2. JAY PIT MODEL: GOLDER ASSOCIATES LTD., 2013. PRELIMINARY MINE DESIGN - JAY PROJECT. SUBMITTED TO DOMINION DIAMOND CORPORATION, DATED OCTOBER 3, 2013. REFERENCE NO: 1313280031-003-R-REV0-4000. (FILE NAME: Jay_CAT793_str.dxf)
3. CARDINAL PIT MODEL: GOLDER ASSOCIATES LTD., 2013. PRELIMINARY MINE DESIGN - CARDINAL PROJECT. SUBMITTED TO DOMINION DIAMOND CORPORATION, DATED OCTOBER 8, 2013. REFERENCE NO: 1313280031-008-R-REVB-4001. (FILE NAME: Cardinal_pitshell_design_str.dxf).

0 3,000 6,000 9,000
SCALE METRES

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
0	2013-10-15	ISSUED FOR REPORT 009	DYH	JD	DYH	JCC

PROJECT

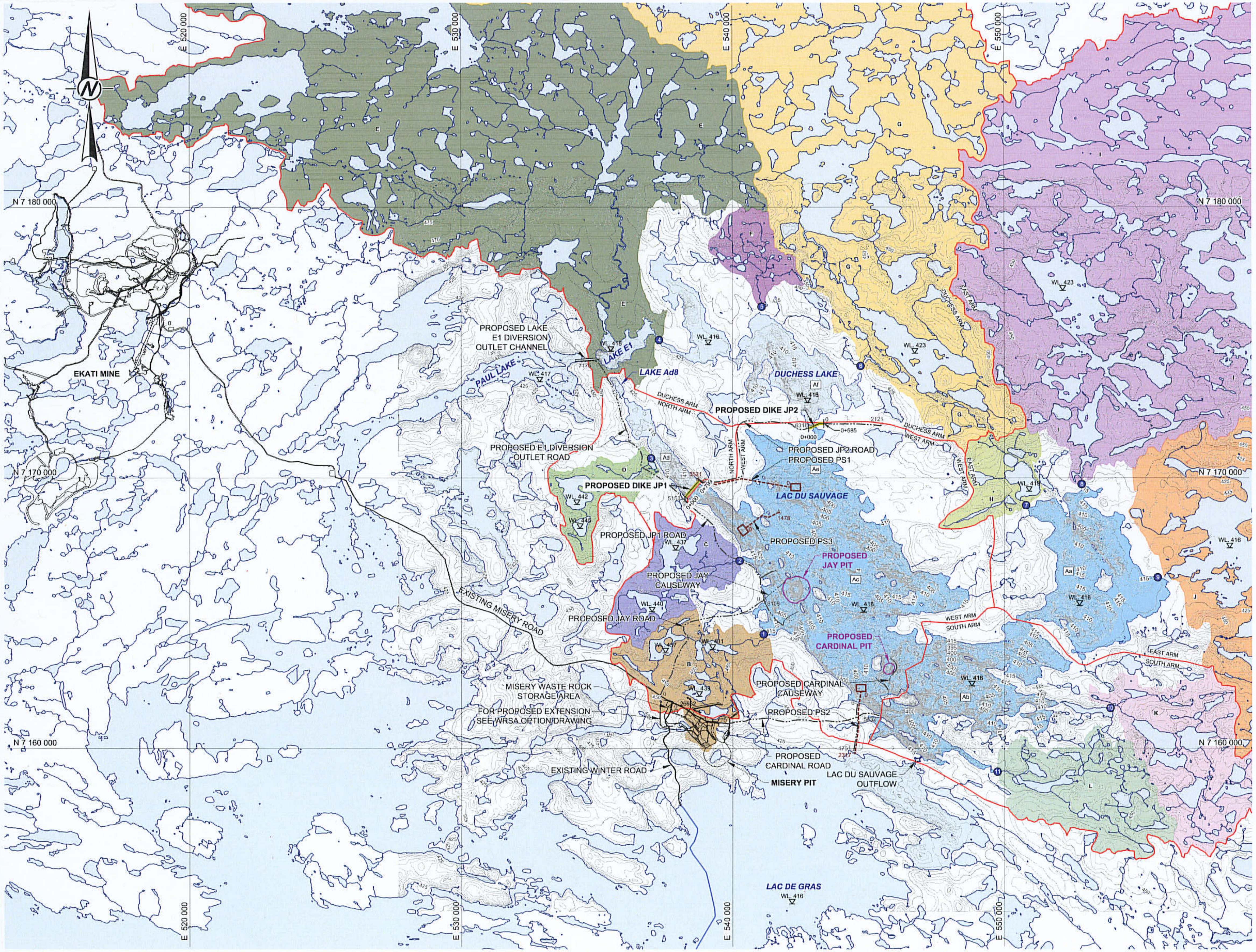
DOMINION DIAMOND RESOURCES CORPORATION
JAY-CARDINAL PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE

GENERAL ARRANGEMENT PLAN - ALT1

PROJECT No.	13-1328-0031 .2130.50		FILE No. 1313280031-2130-50-07
DESIGN	DYH	2013-10-07	SCALE AS SHOWN
CADD	JD	2013-10-07	FIGURE
CHECK	DYH	2013-10-15	6
REVIEW	JCC	2013-10-15	

Golder Associates



LEGEND

- SUB-BASIN OUTFLOWS
- WATER BODY
- DRAWDOWN AREA
- PROPOSED DIKE LOCATION
- WATER COURSE
- EXISTING ROAD
- PROPOSED ROAD
- WINTER ROAD - YEARLY CONSTRUCTION
- PROPOSED PUMPING SYSTEM
- PS PUMPING SYSTEM
- SUB-BASIN BOUNDARY
- PROPOSED PIT LOCATION
- WATER LEVEL ELEVATION

SUB-BASIN LEGEND

B, C	Ac, Ae	WEST ARM
D	Ad	NORTH ARM
E, F, G	Af	DUCHESS ARM
H, I, J	Aa	EAST ARM
K, L	Ab	SOUTH ARM

NOTES

1. ALL UNITS ARE IN METRES UNLESS OTHERWISE NOTED.
2. GROUND SURFACE CONTOURS ARE SHOWN AT 5 m INTERVALS AND BATHYMETRY CONTOURS ARE SHOWN AT 1 m INTERVALS.
3. COORDINATES ARE SHOWN IN DATUM: NAD 83, PROJECTION: UTM ZONE 12

REFERENCES

1. CONTOUR DATA PROVIDED BY AURORA GEOSCIENCES LTD., FILE: compilation_Elev_Gridded.xyz, DATE RECEIVED: JULY 30, 2013, IS BASED ON CANVEC DATA UPDATED WITH 2013 RTK SURVEYS IN SELECTED AREAS.
2. JAY PIT MODEL: GOLDER ASSOCIATES LTD., 2013. PRELIMINARY MINE DESIGN - JAY PROJECT. SUBMITTED TO DOMINION DIAMOND CORPORATION, DATED OCTOBER 3, 2013. REFERENCE NO: 1313280031-003-R-REV0-4000. (FILE NAME: Jay_CAT793_str.dxf)
3. CARDINAL PIT MODEL: GOLDER ASSOCIATES LTD., 2013. PRELIMINARY MINE DESIGN - CARDINAL PROJECT. SUBMITTED TO DOMINION DIAMOND CORPORATION, DATED OCTOBER 8, 2013. REFERENCE NO: 1313280031-008-R-REVB-4001. (FILE NAME: Cardinal_pitshell_design_str.dxf).

SCALE 0 3,000 6,000 9,000 METRES

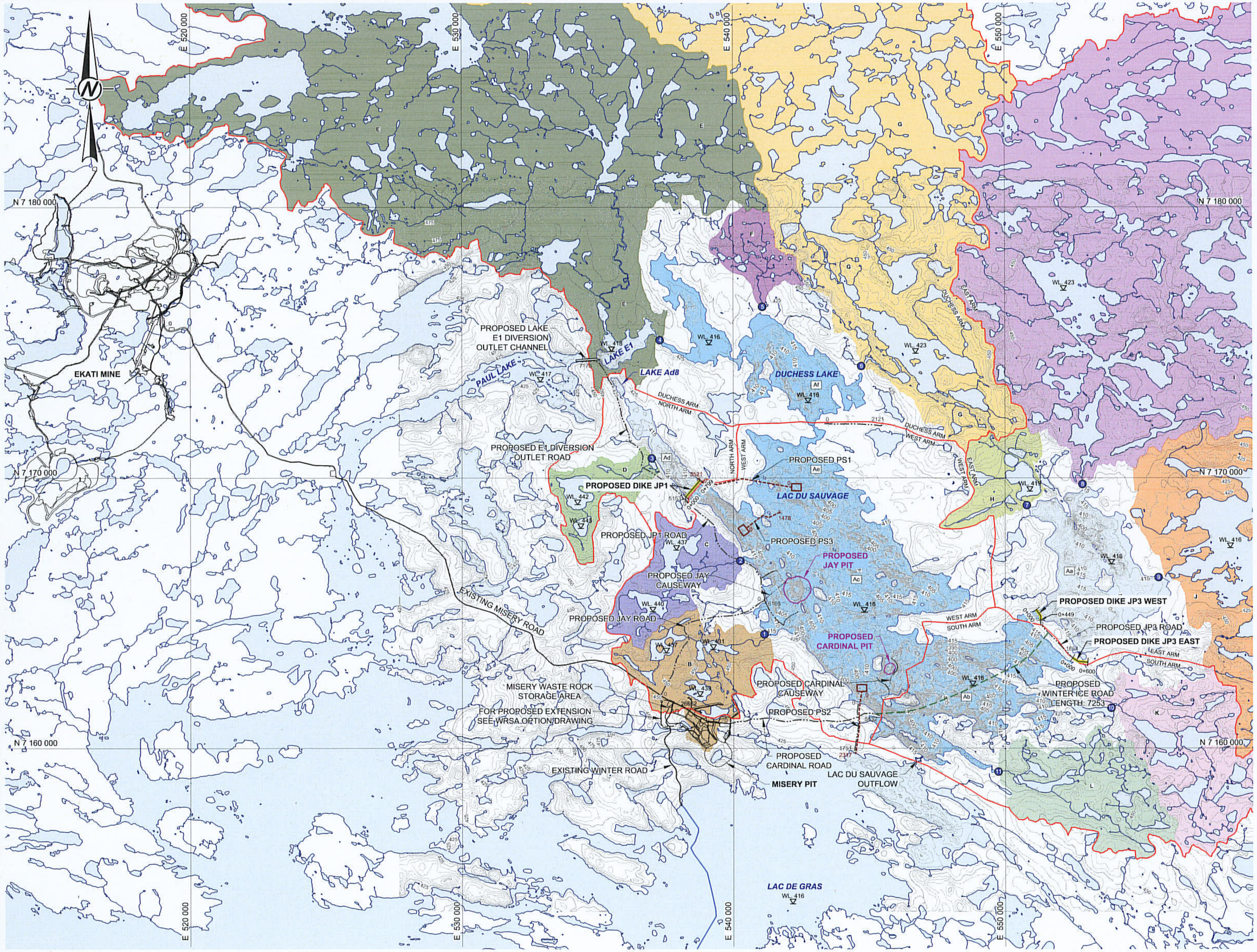
REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
0	2013-10-15	ISSUED FOR REPORT 009	DYH	JD	DYH	JCC

PROJECT
DOMINION DIAMOND RESOURCES CORPORATION
JAY-CARDINAL PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE
GENERAL ARRANGEMENT PLAN - ALT2

Golder Associates

PROJECT No.	13-1328-0031.2130.50		FILE No.	1313280031-2130-50-08
DESIGN	DYH	2013-10-07	SCALE	AS SHOWN
CADD	JD	2013-10-07	FIGURE	7
CHECK	DYH	2013-10-15		
REVIEW	JCC	2013-10-15		



LEGEND

SUB-BASIN OUTFLOWS	PROPOSED PUMPING SYSTEM
WATER BODY	PS PUMPING SYSTEM
DRAWDOWN AREA	SUB-BASIN BOUNDARY
PROPOSED DIKE LOCATION	PROPOSED PIT LOCATION
WATER COURSE	WATER LEVEL ELEVATION
EXISTING ROAD	
PROPOSED ROAD	
PROPOSED ICE ROAD	
WINTER ROAD - YEARLY CONSTRUCTION	

SUB-BASIN LEGEND

B, C	Ac, Ae	WEST ARM
D	Ad	NORTH ARM
E, F, G	Af	DUCHESS ARM
H, I, J	Aa	EAST ARM
K, L	Ab	SOUTH ARM

NOTES

1. ALL UNITS ARE IN METRES UNLESS OTHERWISE NOTED.
2. GROUND SURFACE CONTOURS ARE SHOWN AT 5 m INTERVALS AND BATHYMETRY CONTOURS ARE SHOWN AT 1 m INTERVALS.
3. COORDINATES ARE SHOWN IN DATUM: NAD 83, PROJECTION: UTM ZONE 12

REFERENCES

1. CONTOUR DATA PROVIDED BY AURORA GEOSCIENCES LTD., FILE: compilation_Elev_Gridded.xyz, DATE RECEIVED: JULY 30, 2013, IS BASED ON CANVEC DATA UPDATED WITH 2013 RTK SURVEYS IN SELECTED AREAS.
2. JAY PIT MODEL: GOLDER ASSOCIATES LTD., 2013. PRELIMINARY MINE DESIGN - JAY PROJECT. SUBMITTED TO DOMINION DIAMOND CORPORATION, DATED OCTOBER 3, 2013. REFERENCE NO: 1313280031-003-R-REV0-4000. (FILE NAME: Jay_CAT793_str.dxf)
3. CARDINAL PIT MODEL: GOLDER ASSOCIATES LTD., 2013. PRELIMINARY MINE DESIGN - CARDINAL PROJECT. SUBMITTED TO DOMINION DIAMOND CORPORATION, DATED OCTOBER 8, 2013. REFERENCE NO: 1313280031-008-R-REVB-4001. (FILE NAME: Cardinal_pitshell_design_str.dxf).

0 3,000 6,000 9,000
SCALE METRES

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
0	2013-10-15	ISSUED FOR REPORT 009	DYH	JD	DYH	JCC

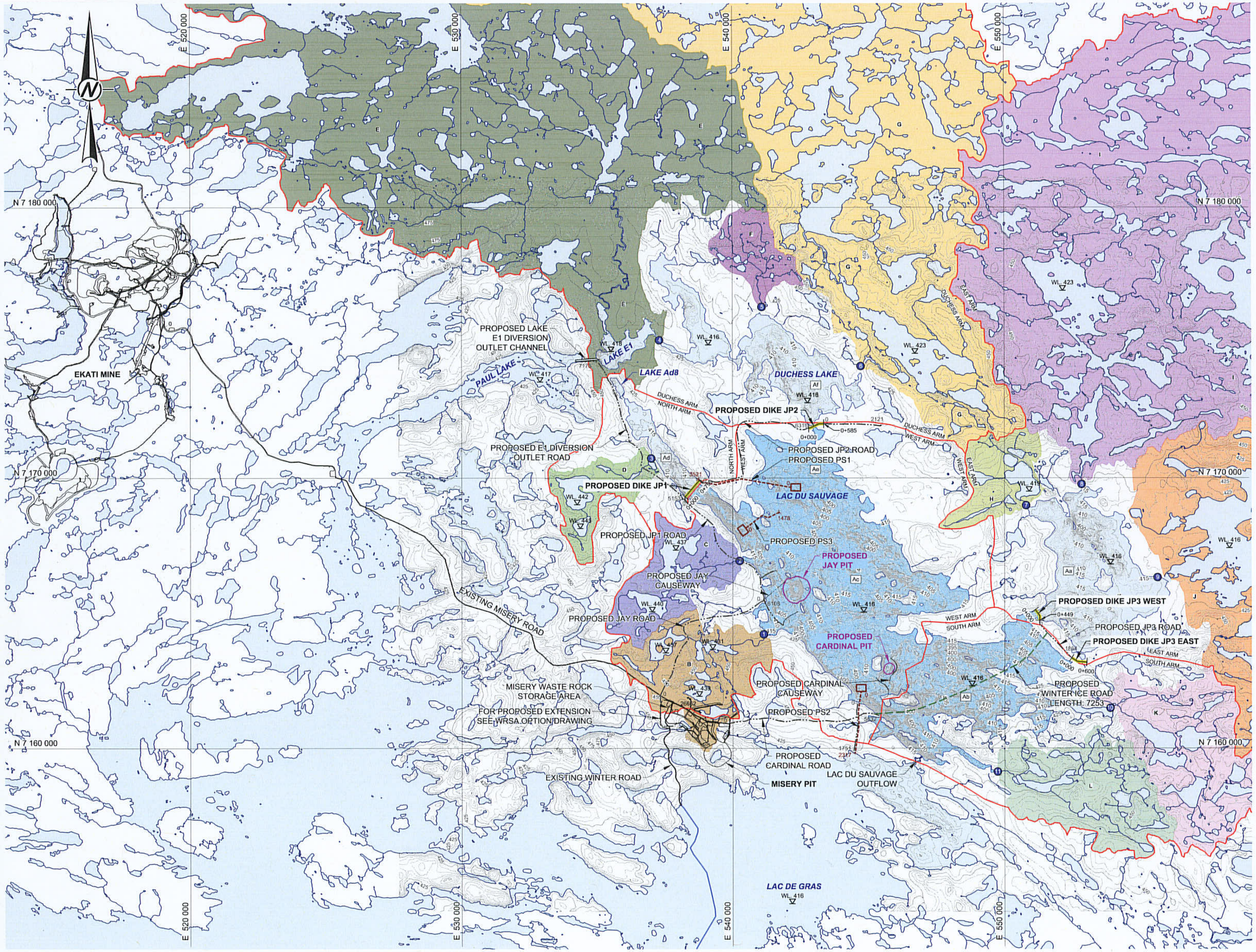
PROJECT
DOMINION DIAMOND RESOURCES CORPORATION
JAY-CARDINAL PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE

GENERAL ARRANGEMENT PLAN - ALT3

Golder Associates

PROJECT No.	13-1328-0031.2130.50		FILE No. 1313280031-2130-50-09
DESIGN	DYH	2013-10-07	SCALE AS SHOWN
CADD	JD	2013-10-07	FIGURE
CHECK	DYH	2013-10-15	8
REVIEW	JCC	2013-10-15	



LEGEND

SUB-BASIN OUTFLOWS	PROPOSED PUMPING SYSTEM
WATER BODY	PS PUMPING SYSTEM
DRAWDOWN AREA	SUB-BASIN BOUNDARY
PROPOSED DIKE LOCATION	PROPOSED PIT LOCATION
WATER COURSE	WL WATER LEVEL ELEVATION
EXISTING ROAD	
PROPOSED ROAD	
PROPOSED ICE ROAD	
WINTER ROAD - YEARLY CONSTRUCTION	

SUB-BASIN LEGEND

Sub-basin		
B, C	Ac, Ae	WEST ARM
D	Ad	NORTH ARM
E, F	Af	DUCHESS ARM
G, H, I, J	Aa	EAST ARM
K, L	Ab	SOUTH ARM

NOTES

1. ALL UNITS ARE IN METRES UNLESS OTHERWISE NOTED.
2. GROUND SURFACE CONTOURS ARE SHOWN AT 5 m INTERVALS AND BATHYMETRY CONTOURS ARE SHOWN AT 1 m INTERVALS.
3. COORDINATES ARE SHOWN IN DATUM: NAD 83, PROJECTION: UTM ZONE 12

REFERENCES

1. CONTOUR DATA PROVIDED BY AURORA GEOSCIENCES LTD., FILE: compilation_Elev_Gridded.xyz, DATE RECEIVED: JULY 30, 2013, IS BASED ON CANVEC DATA UPDATED WITH 2013 RTK SURVEYS IN SELECTED AREAS.
2. JAY PIT MODEL: GOLDER ASSOCIATES LTD., 2013. PRELIMINARY MINE DESIGN - JAY PROJECT. SUBMITTED TO DOMINION DIAMOND CORPORATION, DATED OCTOBER 3, 2013. REFERENCE NO: 1313280031-003-R-REV0-4000. (FILE NAME: Jay_CAT793_str.dxf)
3. CARDINAL PIT MODEL: GOLDER ASSOCIATES LTD., 2013. PRELIMINARY MINE DESIGN - CARDINAL PROJECT. SUBMITTED TO DOMINION DIAMOND CORPORATION, DATED OCTOBER 8, 2013. REFERENCE NO: 1313280031-008-R-REVB-4001. (FILE NAME: Cardinal_pitshell_design_str.dxf).

0 3,000 6,000 9,000
SCALE METRES

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
0	2013-10-15	ISSUED FOR REPORT 009	DYH	JD	DYH	JCC

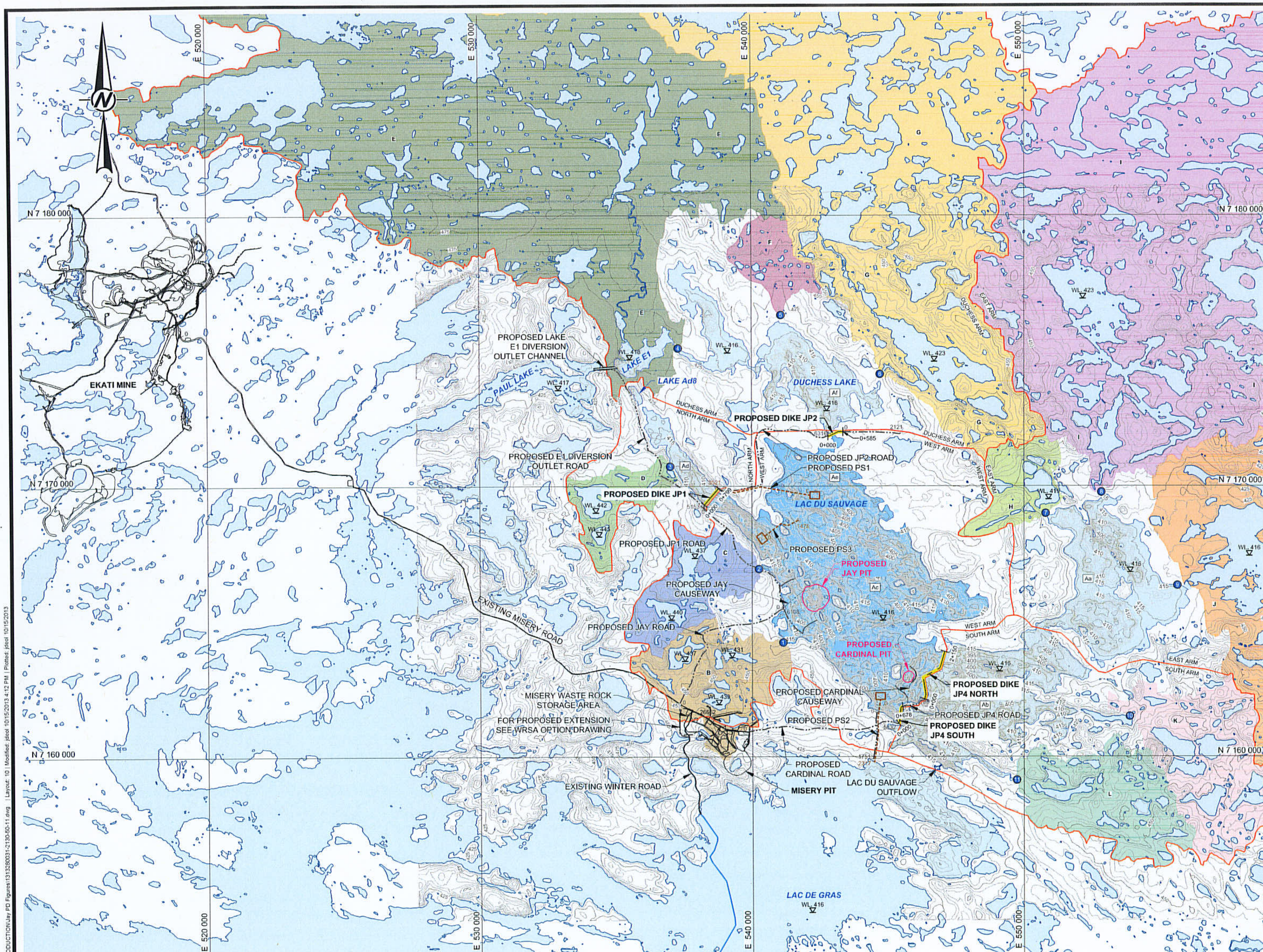
PROJECT
DOMINION DIAMOND RESOURCES CORPORATION
JAY-CARDINAL PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE

GENERAL ARRANGEMENT PLAN - ALT4

Golder Associates

PROJECT No.	13-1328-0031.2130.50		FILE No. 1313280031-2130-50-10
DESIGN	DYH	2013-10-07	SCALE AS SHOWN
CADD	JD	2013-10-07	FIGURE
CHECK	DYH	2013-10-15	9
REVIEW	JCC	2013-10-15	



LEGEND

- SUB-BASIN OUTFLOWS
- WATER BODY
- DRAWDOWN AREA
- PROPOSED DIKE LOCATION
- WATER COURSE
- EXISTING ROAD
- PROPOSED ROAD
- WINTER ROAD - YEARLY CONSTRUCTION
- PROPOSED PUMPING SYSTEM
- PS PUMPING SYSTEM
- SUB-BASIN BOUNDARY
- PROPOSED PIT LOCATION
- WL WATER LEVEL ELEVATION

SUB-BASIN LEGEND

B, C	Ac, Ae	WEST ARM
D	Ad	NORTH ARM
E, F, G	Af	DUCHESS ARM
H, I, J	Aa	EAST ARM
K, L	Ab	SOUTH ARM

NOTES

1. ALL UNITS ARE IN METRES UNLESS OTHERWISE NOTED.
2. GROUND SURFACE CONTOURS ARE SHOWN AT 5 m INTERVALS AND BATHYMETRY CONTOURS ARE SHOWN AT 1 m INTERVALS.
3. COORDINATES ARE SHOWN IN DATUM: NAD 83, PROJECTION: UTM ZONE 12

REFERENCES

1. CONTOUR DATA PROVIDED BY AURORA GEOSCIENCES LTD., FILE: compilation_Elev_Gridded.xyz, DATE RECEIVED: JULY 30, 2013, IS BASED ON CANVEC DATA UPDATED WITH 2013 RTK SURVEYS IN SELECTED AREAS.
2. JAY PIT MODEL: GOLDER ASSOCIATES LTD., 2013. PRELIMINARY MINE DESIGN - JAY PROJECT. SUBMITTED TO DOMINION DIAMOND CORPORATION, DATED OCTOBER 3, 2013. REFERENCE NO: 1313280031-003-R-REV0-4000. (FILE NAME: Jay_CAT793_str.dxf)
3. CARDINAL PIT MODEL: GOLDER ASSOCIATES LTD., 2013. PRELIMINARY MINE DESIGN - CARDINAL PROJECT. SUBMITTED TO DOMINION DIAMOND CORPORATION, DATED OCTOBER 8, 2013. REFERENCE NO: 1313280031-008-R-REVB-4001. (FILE NAME: Cardinal_pitshell_design_str.dxf).

0 3,000 6,000 9,000
SCALE METRES

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
A	2013-10-15	ISSUED FOR REPORT 009	DYH	JD	DYH	JCC

PROJECT
DOMINION DIAMOND RESOURCES CORPORATION
JAY-CARDINAL PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE

GENERAL ARRANGEMENT PLAN - ALT5

Golder Associates

PROJECT No. 13-1328-0031.2130.50			FILE No. 1313280031-2130-50-11
DESIGN	DYH	2013-10-07	SCALE AS SHOWN
CADD	JD	2013-10-07	FIGURE
CHECK	DYH	2013-10-15	
REVIEW	JCC	2013-10-15	10

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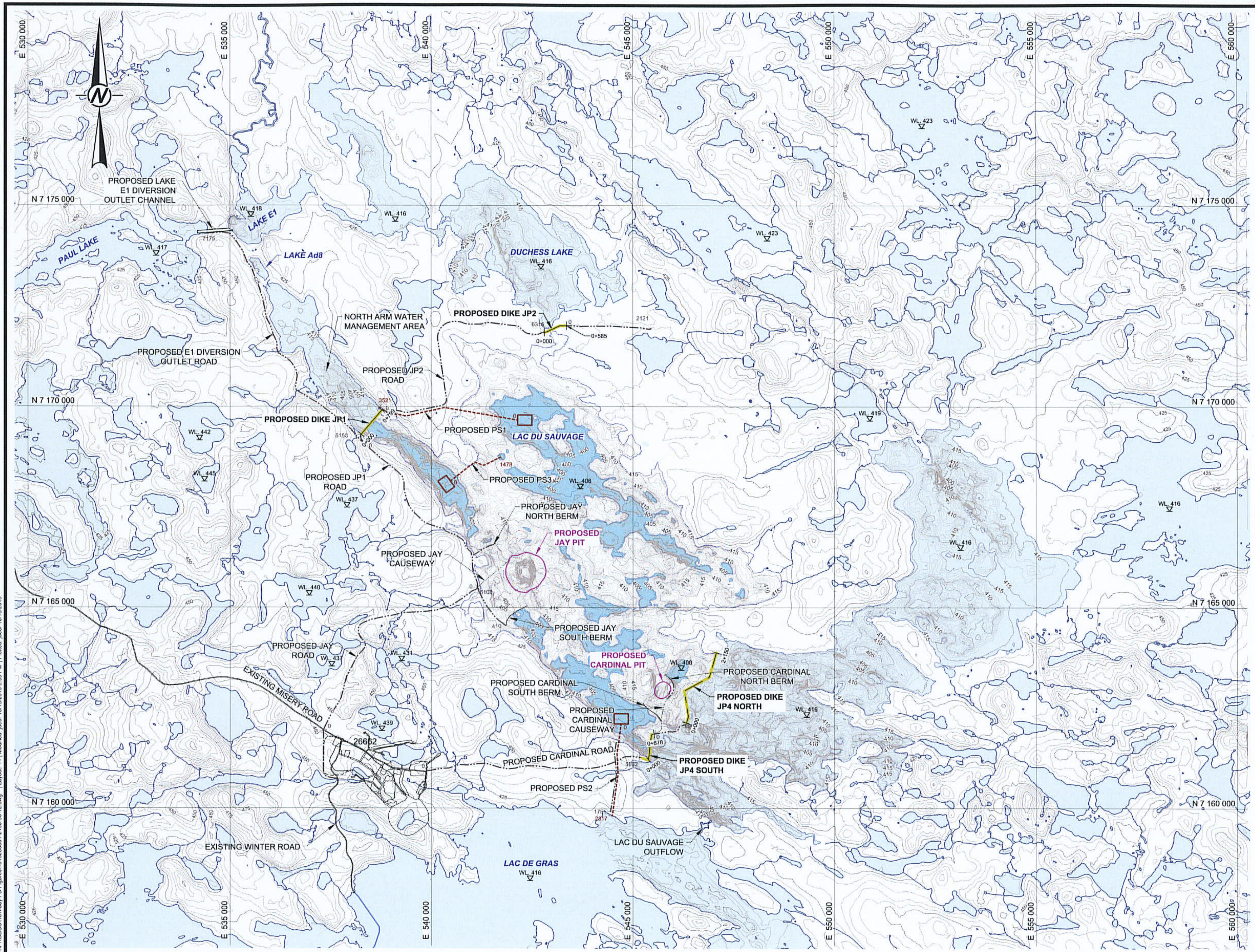

LEGEND

- WATER BODY
- DRAWDOWN AREA
- PROPOSED DIKE LOCATION
- WATER COURSE
- EXISTING ROAD
- PROPOSED ROAD
- WINTER ROAD - YEARLY CONSTRUCTION
- PROPOSED PUMPING SYSTEM
- PS PUMPING SYSTEM
- PROPOSED PIT LOCATION
- WL WATER LEVEL ELEVATION

NOTES

1. ALL UNITS ARE IN METRES UNLESS OTHERWISE NOTED.
2. GROUND SURFACE CONTOURS ARE SHOWN AT 5 m INTERVALS AND BATHYMETRY CONTOURS ARE SHOWN AT 1 m INTERVALS.
3. COORDINATES ARE SHOWN IN DATUM: NAD 83, PROJECTION: UTM ZONE 12.
4. PROPOSED PIPELINES, BARGE LOCATIONS, ACCESS ROADS, DIKES AND OUTLET CHANNELS ARE SHOWN FOR ALTERNATIVE 5.

REFERENCES

1. CONTOUR DATA PROVIDED BY AURORA GEOSCIENCES LTD., FILE: compilation_Elev_Gridded.xyz, DATE RECEIVED: JULY 30, 2013, IS BASED ON CANVEC DATA UPDATED WITH 2013 RTK SURVEYS IN SELECTED AREAS.
2. JAY PIT MODEL: GOLDER ASSOCIATES LTD., 2013. PRELIMINARY MINE DESIGN - JAY PROJECT. SUBMITTED TO DOMINION DIAMOND CORPORATION, DATED OCTOBER 3, 2013. REFERENCE NO: 1313280031-003-R-REV0-4000. (FILE NAME: Jay_CAT793_str.dxf)
3. CARDINAL PIT MODEL: GOLDER ASSOCIATES LTD., 2013. PRELIMINARY MINE DESIGN - CARDINAL PROJECT. SUBMITTED TO DOMINION DIAMOND CORPORATION, DATED OCTOBER 8, 2013. REFERENCE NO: 1313280031-008-R-REVB-4001. (FILE NAME: Cardinal_pitshell_design_str.dxf).

0 2,000 4,000 6,000
SCALE METRES

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
0	2013-10-15	ISSUED FOR REPORT 009	DYH	JD	DYH	JCC

PROJECT
DOMINION DIAMOND RESOURCES CORPORATION
JAY-CARDINAL PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE
OPERATION CONDITIONS AT ELEVATION 406 m - ALT5

PROJECT No.	13-1328-0031.2130.50		FILE No.	1313280031-2130-50-12
DESIGN	DYH	2013-10-07	SCALE	AS SHOWN
CADD	JD	2013-10-07	FIGURE	
CHECK	DYH	2013-10-15		11
REVIEW	JCC	2013-10-15		

As a global, employee-owned organisation with over 50 years of experience, Golder Associates is driven by our purpose to engineer earth's development while preserving earth's integrity. We deliver solutions that help our clients achieve their sustainable development goals by providing a wide range of independent consulting, design and construction services in our specialist areas of earth, environment and energy.

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