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December 9, 2015

Mr. Wentzel Coetzer
Facility General Manager
Tantalum Mining Corporation of Canada, Limited
Box 2000
Lac du Bonnet, Manitoba
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Dear Mr. Coetzer,

AECOM Project No: 60342266
Environmental Review of the Cable Bolting Project

Cabot Corporation (Cabot) wishes to undertake a Cable Bolting Project, the purpose of which is to secure the mine from a potential Fall of Ground (FOG) under Bernic Lake. The purpose of this undertaking is to secure potential future extraction of the remaining Pollucite ore from the mining zone identified as the East Zone (Project East) in the long term, at the Tantalum Mining Corporation of Canada, Limited (TANCO) Mine near Lac du Bonnet, Manitoba.

To mitigate unacceptable risk to workers, the environment, and assets while under care and maintenance, the mine will need to be stabilized from a potential FOG to allow safe conditions for personnel and to ensure the long-term operation of the TANCO Mine. With the support of SRK Consulting (SRK), Cabot is developing a Cable Bolting Project as a technical solution to ensure the long term stabilization of the FOG area and ensure that Project East will be possible once conditions are suitable for development.

In order to determine any potential environmental impacts that may result from the proposed development associated with the Cable Bolting Project, and to assist in identifying any required mitigation measures in the final design and construction, AECOM Canada Ltd. (AECOM) conducted an environmental assessment of the project components and existing environment at the TANCO Mine site.

A summary of the existing environment is provided in **Section 3** of this document, and a discussion on the potential environmental impacts and any proposed mitigation is provided in **Section 4**.

Thank you for providing AECOM with the opportunity to work with you on this project. Please feel free to contact Mark Hadfield directly at (204) 928-9241 if you have any questions or require any additional information.

Sincerely,

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Environment
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mh:MH

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AECOM: 2012-01-06

1. Summary of Project Components

There are two (2) primary components associated with the implementation of the Cable Bolting Project:

1. Installation of 96 cable bolts.
2. Installation of two (2) Time Domain Reflectometry (TDR) cables.

The cable bolts and TDR cables will be installed within drill holes advanced from surface into the crown pillar. These holes will be drilled above the East Main Zone in the FOG area from two (2) drilling barges located on Bernic Lake.

All drill holes are located within TANCO's Mineral Leases ML4, ML5 and ML6 and Surface Leases M127-SL, M128-SL, M130-SL, and SL1.

Once the holes are drilled, the cable bolts and TDR cables will be cemented into the drill holes, which will seal the hole from the lake and prevent infiltration of water into the mine. The cable bolts will be contained completely within the drill holes. The TDR cables will exit their drill holes and be laid along the lake bottom to connect to existing geotechnical monitoring systems via connections in the West Pump House (connected to the mine power supply). The TDR instrumentation work is identical to the work described in the approved Notice of Alteration (Manitoba Conservation File 1906.20) dated September 29, 2014.

The TDRs are to be installed by SRK personnel, who will be assisted by an approved drilling contractor, selected by TANCO to conduct this work.

The development of the Cable Bolting Project is subject to section 14 of The *Environment Act.* *S*ection 14 of the *Act* requires notification and approval for alterations in a development as licensed, or in a proposal submitted for licensing. Alterations are assessed by the Director as either minor, having insignificant environmental effects, or major, having significant environmental effects. Major alterations must be addressed through the filing of a new *Environment Act* Proposal for the altered project. Minor alterations may be approved through a revised *Environment Act* Licence or by a letter from the Director for Class 1 and 2 projects or the Minister for Class 3 projects.

Following AECOM review of the project description as provided by Cabot, AECOM is of the opinion that the Cable Bolting Project would be classified as a minor alteration to TANCO's existing license. With respect to these components that are regulated under The *Environment Act*, the following sections provide additional details on the Cable Bolts and TDR instrumentation, including location and preliminary design details, environmental setting, potential environmental impact and decommissioning.

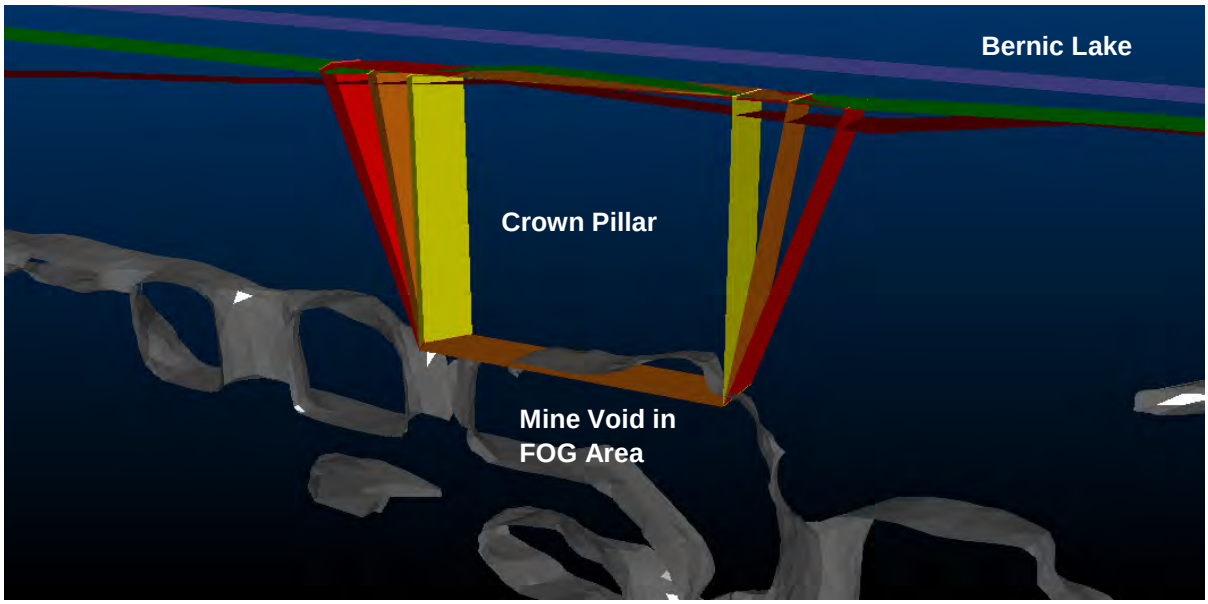
1.1 Cable Bolt Installation

With the support of SRK, TANCO has come up with a technical solution for the continued safe mining of ore from the existing underground operations at the TANCO Mine. Cabot is currently designing the Cable Bolting Project to install 96 cable bolts above the FOG area, drilling these from the lake surface. The installation of these cables will provide long term stability of the crown pillar while minimising the potential for disturbance during installation.

The function of the cable bolts is to support the open span underground and the major block components of the crown pillar. Cable bolt support is intended as a primary support for the major blocks in the crown pillar and will reduce the breakthrough risk to the lake bottom. Primary surface support and mesh of the FOG area from within the mine is not a viable option due to the nature of the FOG area in the mine. While the crown pillar itself is supported, the cable bolts will not provide support for the immediate back (roof of the mine in the FOG area) and any smaller blocks not intersected by a bolt. Neither of these items is considered a concern to the long term stability to the crown pillar in the FOG area.

The cable bolts will be installed from the lake by two (2) barge mounted and survey controlled drill rigs. Bernic Lake is approximately 4 m to 6 m deep in the FOG area, with approximately 2.5 m of sediment over the crown pillar. The crown pillar is approximately 45 m thick in this area and the FOG area is approximately 30 m in width. **Figure 1** shows the general arrangement of the FOG area.

Figure 1: Cross Section of FOG Area in relation to Bernic Lake and Mine Workings



Cable bolts will be approximately 35 m long based on the crown pillar thickness and installed on a grid of 3 m to 4 m based on the span and crown pillar materials encountered. Cables bolts are targeting areas of exposed amphibolite, critical faults, and large spans of ~20 m. The pattern is grid based as this allows for simply drill moves and survey. To reduce setup time, two holes will be drilled from each drill setup. Holes will be drilled at the same azimuth (E-W direction) but with varied inclinations (angle of hole) targeting the planned support locations.

1.1.1 Methodology

Cable bolts consist of a cable that is chemically grouted into a drill hole to provide support to rock masses by securing rock with the potential to move to stable areas of the surrounding rock mass. The sequence of installation of the cable bolts is described as follows and shown on **Figures 2 to 8.**

1. Install a casing consisting of a steel tube socketed into the competent rock of the lake bottom **(Figure 2)**. This casing will allow for all cable bolting activities to be performed without risking further disturbance of the lake bottom and will isolate the drill hole from the surrounding lake (see **Section 4.6**).
2. Within the casing a HQ (96 mm diameter) drill hole will be drilled to the target depth into the crown pillar **(Figure 3)**. This hole will be terminated within ~5 m of the back.
3. Faults and open voids intersected by the drill hole will be grouted to stabilize and seal the drill hole and the surrounding voids and faults within the crown pillar **(Figure 4)**.
    a. A specific grout suitable for underwater applications is required.
    b. The grout pressure is critical to prevent "jacking" of the back.
    c. The grout will be allowed to cure and the hole will be re-drilled to the required diameter.
4. Two cables will be placed into the hole and the grouted into place **(Figure 5)**.
    a. Cables are 15 mm in diameter with 28 mm bulbs spaced along the length.
    b. Bulbed cables allow grout to enter the bulbs increasing the strength between the cable and grout.
    c. Twin strand cables double the support capacity and the grout-cable bond.
    d. After the grout has cured, the casing will be removed from the lake bottom. As the hole will be grouted along its entire length, there is no risk of flooding the mine.
    e. Divers might be required to retrieve stuck casings but this is a low risk with vertical and close to vertical holes.
5. A second hole is then drilled from the same setup to reduce drill moves and setup time with minimal impact on support **(Figure 6)**.
6. Cable bolts will be installed on the prescribed pattern **(Figure 7 and 8)** maintaining the 5 m separation from the back and grouting additional faults as they are encountered.

Figure 2: Casing is drilled from the lake surface

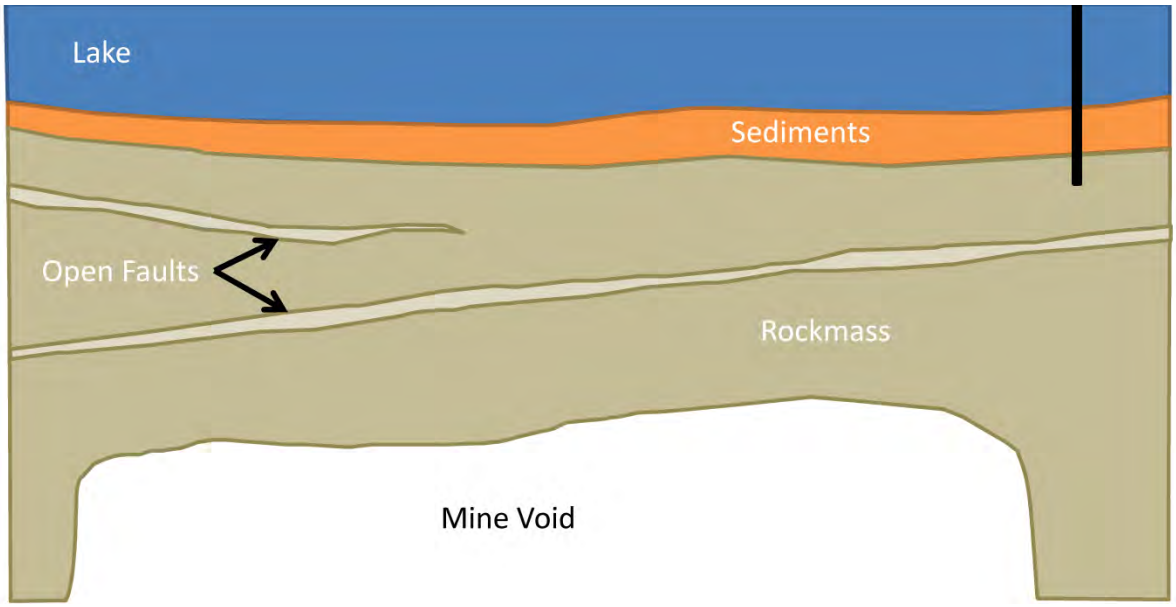


Figure 3: Hole is drilled through the casing to within 5 m of the back

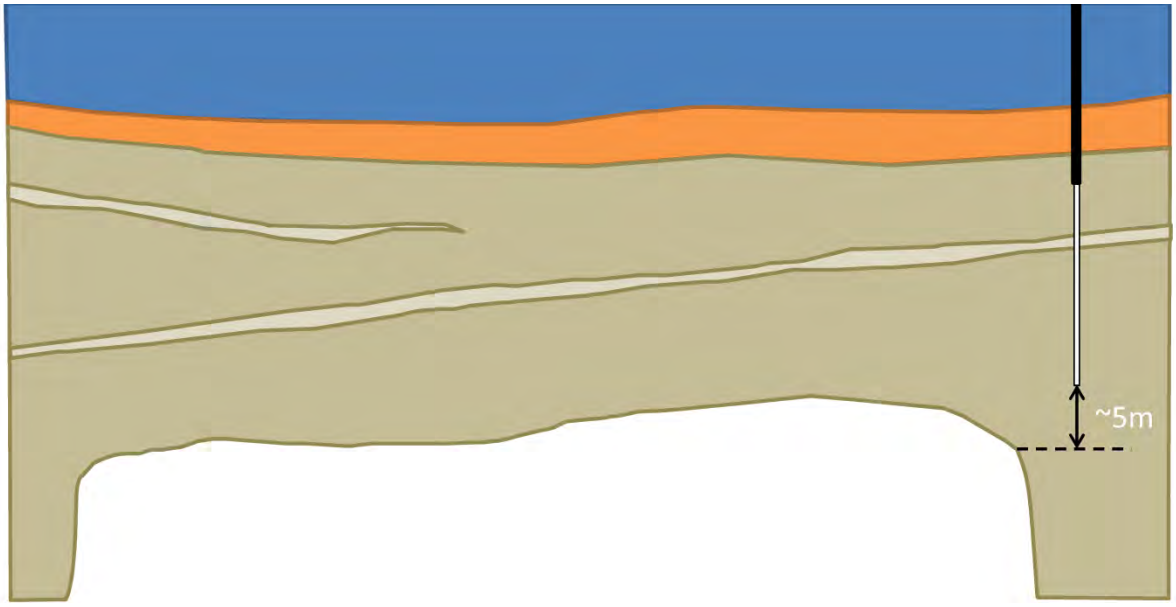


Figure 4: The drilled hole and any open faults and voids are grouted

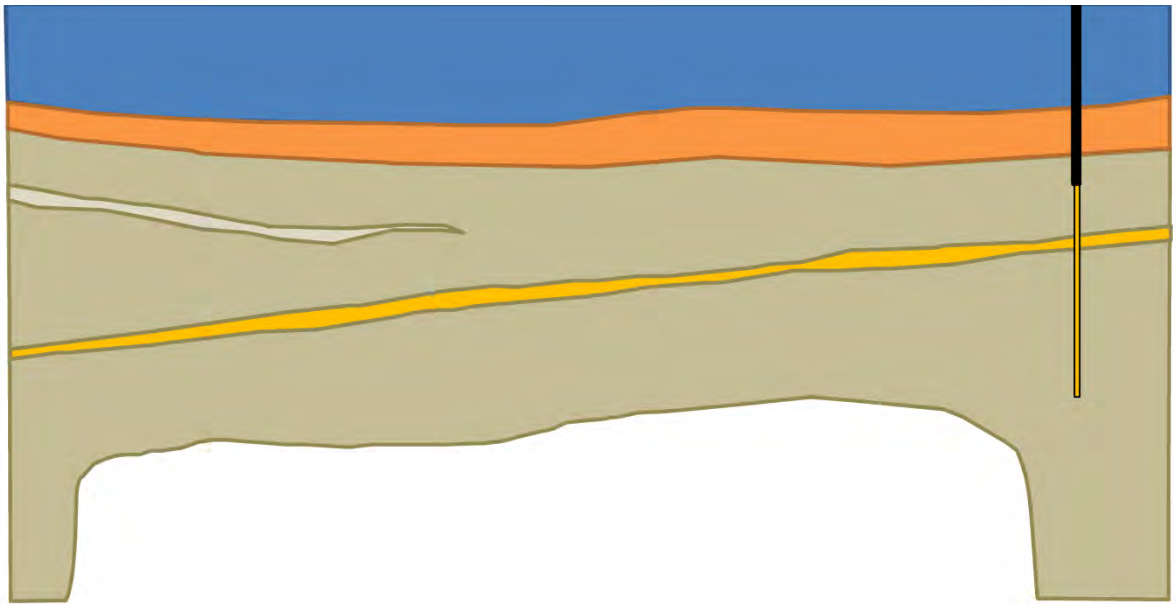


Figure 5: Hole is re-drilled, cables installed, and grouted

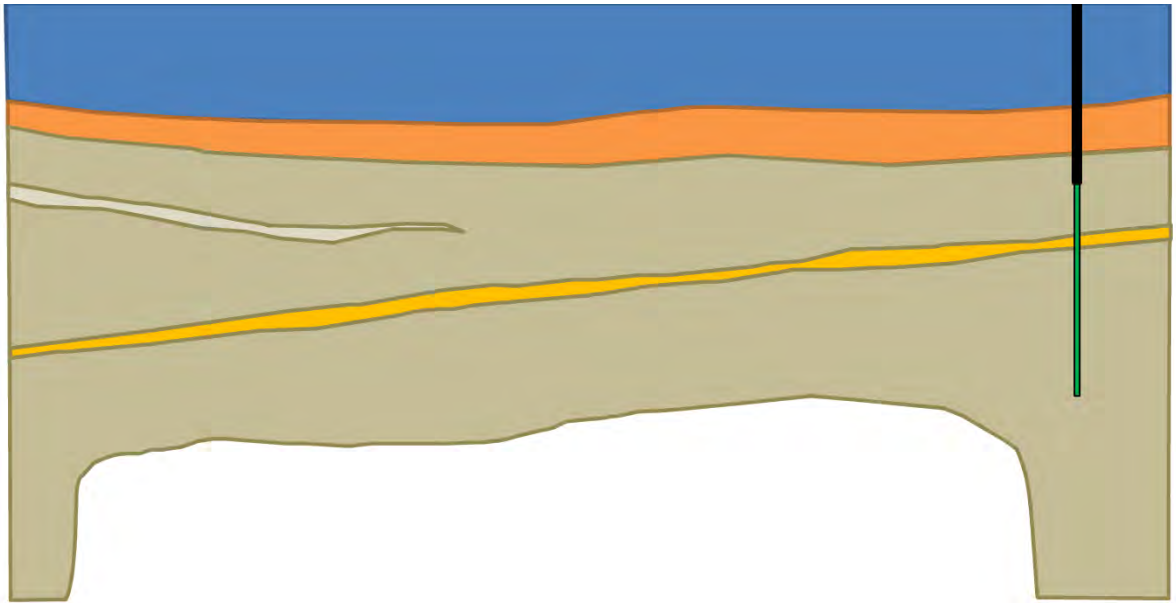


Figure 6: Second hole is drilled from the same setup.

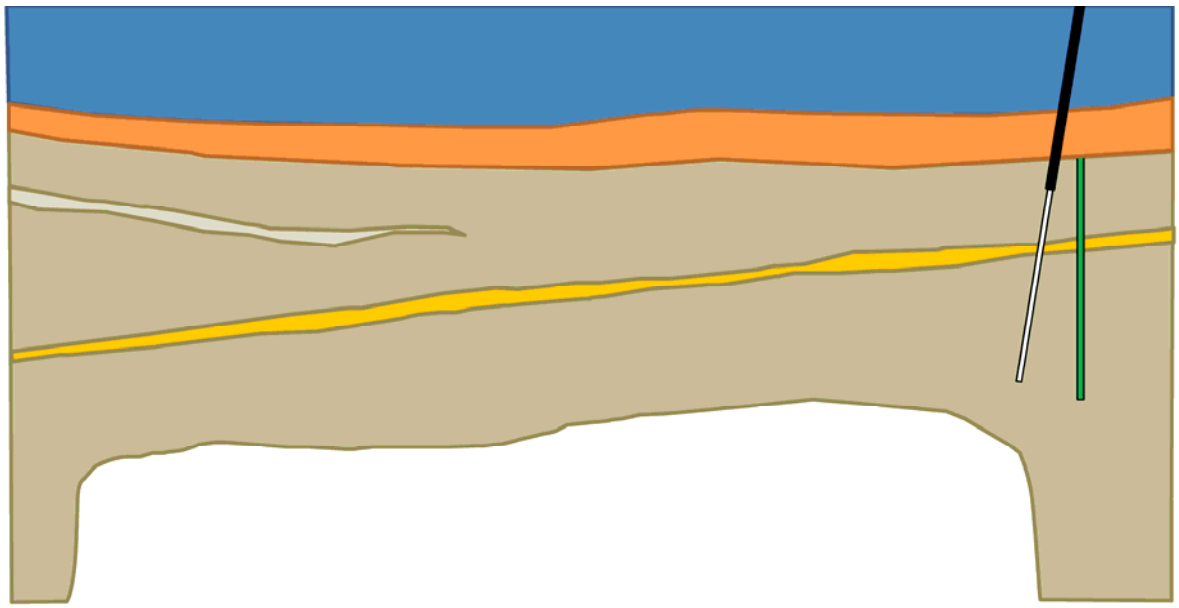


Figure 7: Cables are installed on the prescribed pattern

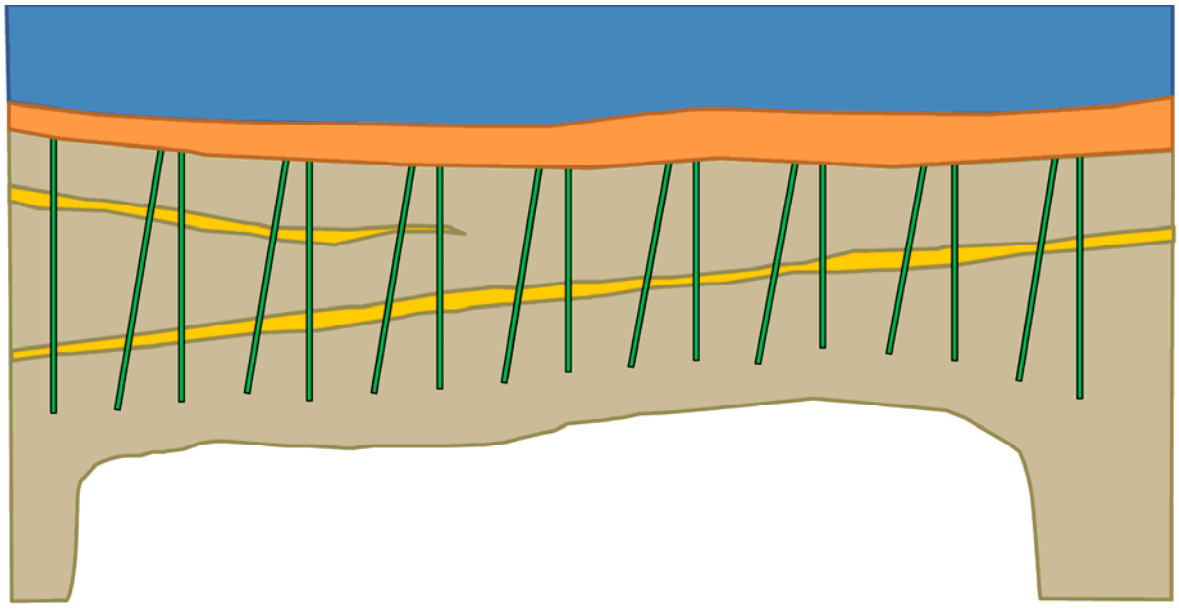
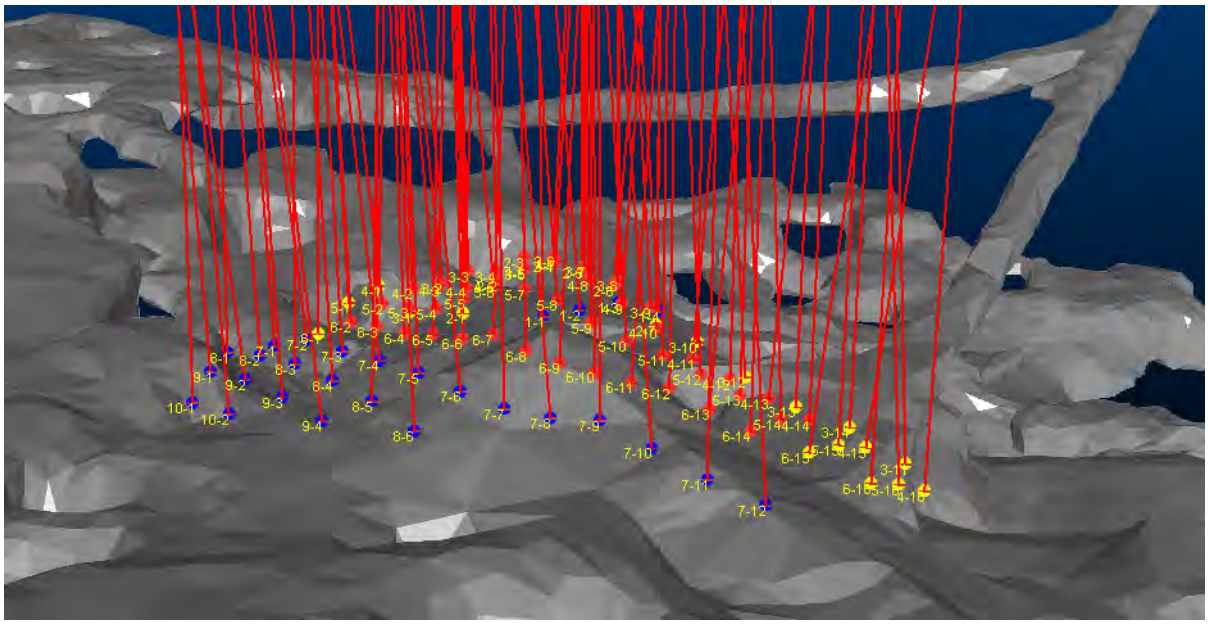


Figure 8: Isometric view of completed Cable Bolt Project above mine workings



1.1.2 Grouting Considerations

As the drill holes will be partially or completely water filled due to groundwater infiltration, a grout suitable for pouring in standing water will be used. Grout can degrade when poured through free standing water so a *Tremie* pour is required for optimal grouting. The *Tremie* placement method uses a pipe, through which grout is placed below water level. The lower end of the pipe is raised during grouting while it is kept immersed in fresh grout so that the rising grout from the bottom displaces the water without washing out the cement content. Non-shrink grout types are recommended to maintain adhesion to the cables and a nominal expansion is required to minimize jacking of faults.

1.1.3 Timing

The cable bolting program is scheduled to begin in the spring and summer of 2016. While winter drilling is less challenging (greater stability, less time required for setup, and moving drills between holes) it also has an impact on the grouting quality and there are additional costs required to heat the grout, the water, and the cables during installation. Spring and summer drilling is less affected by weather and has a longer drilling season with water temperatures more suitable for grouting. With the installation and less complex grouting procedures that are more likely to be effective, the additional costs of drilling from barges and the increased complexity of setup on target is justified as the long term performance of the cable bolts are the priority.

1.2 TDR Instrumentation Installation

Cabot's external advisory board, the Geotechnical Mining Review Board (GMRB), recommended that Time Domain Reflectometry (TDR) cables be installed from the surface at the mine site into the crown pillar above the current FOG area to aid in monitoring the occurrence of failure (dilation on joints/faults). These TDR cables were installed in 2015 under the Notice of Alteration File No. 1906.20. In support of the Cable Bolting Project, two additional TDRs will be installed to further enhance the crown rock mass monitoring system. This will help monitor the long term performance of the Cable Bolting Project, manage the risk to personnel by increasing the monitoring capability in the FOG area, and by providing a better understanding of rock mass changes (exhibited as seismicity) that may occur in the East Main Zone.

2. Project Setting

2.1 Certificate of Title/Project Location

The TANCO Mine is located approximately 160 km northeast of Winnipeg, Manitoba and 70 km northeast of Lac du Bonnet, Manitoba. The components of the Cable Bolting Project described in this document will be located on or in close proximity to existing mine infrastructure.

2.2 Mineral Rights and Mining Permits

The area in and around the TANCO Mine is comprised of the surface leases and mineral leases that permit use and occupation of the land surface for the purpose of prospecting, exploring for, developing, mining or production of minerals on, in, or under the land. These claims and leases have been held by the company from as early as 1968.

Thirteen (13) surface leases held by TANCO encompass the mine site, including the FOG area and associated surface infrastructure. The 13 leases, which cover a total area of 1,337 hectares (ha) and are in good standing, are as follows:

Table 1: TANCO Surface Leases

Holder	Disposition No	Hectares	Issue Date	Year of Expiry
TANCO	M-126	10.1	APR-2-1968	-
TANCO	M-127	10.4	APR-2-1968	-
TANCO	M-128	16.2	APR-2-1968	-
TANCO	M-129	15.7	APR-2-1968	-
TANCO	M-130	13.1	APR-2-1968	-
TANCO	M-145	14.0	APR-7-1971	-
TANCO	M-146	15.6	APR-7-1971	-
TANCO	M-147	15.0	APR-7-1971	-
TANCO	M-148	12.9	APR-7-1971	-
TANCO	M-149	18.3	APR-7-1971	-
TANCO	SL-1	578.8	SEP-8-1992	-
TANCO	SL-3	592.7	OCT-16-1995	-
COLTAN	SL-11	24.0	JUL-23-2008	-
Total		**1,336.8**		

Three (3) mineral leases encompass the mine site and area surrounding the mine site (primarily to the east, west and south. The leases, totalling 1,645 ha, are as follows:

Table 2: TANCO Mineral Leases

Holder	Disposition No	Hectares	Issue Date	Anniversary Date
TANCO	ML-004	592.7	APR-1-2013	APR-1-2034
TANCO	ML-005	565.7	APR-1-1992	JAN-4-2013
TANCO	ML-006	486.7	APR-1-1992	JAN-4-2013
Total		**1,645.1**		

2.3 Description of Existing Land Use

The site of the Cable Bolting Project is currently an active mine site. All supporting surface infrastructure associated with this project (described in **Section 1**) is located on land that has been previously cleared and is within the active mining operation.

2.4 Land Use Designation

The land use is designated for mining at the location of the proposed site upgrades.

2.5 Previous Studies and Activities

The following environmental reports and memorandums were used by AECOM in the completion of this document;

1. TANCO Mine, Cable Bolting from Lake, PFS Level of Study. Presentation by SRK, August 2015.

2. TDR and Triaxial Geophone Installation Project - Safety Aspects, SRK, June 25, 2014

3. Environmental Opinion on Potential Impacts of Tanco Mine Geotechnical Instrumentation Installation, AECOM, September 8, 2014.

4. Letter of Withdrawal of NOA #20. August 27, 2014.

The above reports and memorandums document the engineering and environmental considerations identified during design and setting of the Cable Bolting Project and provide the rationale on which the design is based.

3. Environmental Setting

3.1.1 Physiology and Regional Geology

The TANCO Mine is located on the eastern half and north shore of Bernic Lake, a small, second-order lake located approximately 160 km northeast of Winnipeg, Manitoba and 70 km northeast of Lac du Bonnet, Manitoba. The area is located within the Lac Seul Upland Ecoregion, which is part of the greater Boreal Shield Ecozone. The area is situated in the Mid Boreal Ecoclimatic Region and climate is characterized by short, warm summers with very cold winters with a mean temperature range of 0.3 ^{o}C to 1.1 ^{o}C. The average annual precipitation in the Ecoregion ranges from approximately 540 mm in the northwest to over 580 mm in the southeast, of which approximately one-third falls as snow.

The Ecoregion is part of the Nelson River watershed and locally, Bernic Lake drains into Bird River via Bernic Creek. Drainage is westward into Lake Winnipeg through a number of bedrock controlled streams in the eastern portion of the ecoregion and through peatland-dominated terrain along Lake Winnipeg.

The regional topography consists of Archaean massive rocks that form broad sloping uplands and lowlands, which are part of the Severn Plains. Ridged to hummocky bedrock outcrops covered with acidic, sandy to coarse loamy granitic till is present in the eastern region and local bedrock ridges and knolls are more prominent nearing Lake Winnipeg. Elevations in the Ecoregion range from 330 metres above sea level (masl) near the Manitoba-Ontario border to 218 masl along the shores of Lake Winnipeg. Where bedrock is dominant in the east, there are many small, medium and large lakes, where in the west where peatland dominates; there are fewer larger lakes, however small lakes and pools cover a significant portion of the area.

Towards the western portion of the Ecoregion, gray luvisols and well to imperfectly drained calcareous loamy to clayey textured glaciolacustrine soils are co-dominant with shallow and deep organic Mesisols and Fibrisols. Surface deposits consist of glacial drift predominated by granitic materials. Organic soils prevail in bogs and acid soils are dominant on uplands and include podzol, brown podzolic and andgrey-wooded types.

3.1.2 Vegetation and Wildlife Resources

Vegetation in the area of the mine site is typical for the region. Jack Pine (*Pinus banksiana*) is common on the rock outcrops and the dominant species in the area is Balsalm Fir (*Abies balsalmea*). Poplar (*Populus balsamifera)* and Birch (*Betula paperifera)* occur throughout, especially in the shoreline areas. Black Spruce *(Picea mariana*) is common in the upland areas and forms a bog environment over the approaches to the site from the east.

The understorey plants observed are typical for the area. Rocky areas are covered in lichen, with a carpet of mosses over the remainder of the site. Signature boreal species such as Labrador Tea (*Ledum groenlandicum*) and Bunchberry were commonly observed. Some blow down is evident at the site, creating a tangle of trunks and branches. Most blow down is Balsam Fir which have shallow root systems. The few deep, wet areas encountered in the area were covered with Green Alder (*Alnus crispa*).

A winter tracking survey conducted in March 2014 identified the presence of wolves in areas surrounding the TANCO Mine site. Social sites with many tracks in a small area indicated a gathering of individuals in several areas, most likely for howling sessions. The other significant form of wildlife identified as frequenting the area was white-tailed deer, and this may be the cause of wolf presence in the area. Deer were observed from the air during the winter tracking study, and deer tracks were numerous throughout the area. Deer and wolves are surprisingly plentiful in this area.

Although the area represents a good habitat for moose, there very few indicators of moose presence observed during the winter tracking study. It is known that white-tailed deer and moose do not co-exist due to parasite intolerance in moose, and it would appear that the deer have become the major prey species for wolves in this area.

Tracks of smaller canids, most likely fox, were observed, and tracks of fishers were observed in the ice and snow cover on Bernic Lake. Wing marks and bird tracks were also observed in the snow and were likely left by ravens.

During the spring terrestrial survey wildlife species were determined from droppings observed during the site survey. Moose *(Alces alces*) droppings and fresh black bear (*Ursus americanus*) scat was observed in the area. Bear scat was especially common, indicating frequent use of this area by an individual bear. No birds were recorded during the survey and no nests were found. However, a winter accumulation of droppings from Ruffed grouse (*Bonasa umbellus*) was observed in several locations. These grouse shelter under the snow in severe weather, often for extended periods of time. They produce droppings in this snow shelter that remain into the spring and melt out of the snow.

In general, based on findings from the various terrestrial studies conducted at the site, the TANCO Mine site does not contain any species of special concern. It is a very typical boreal stand, with a wide diversity of tree, shrub and understory species, common for the area.

3.1.3 Aquatic Resources

Bernic Lake is the only major waterbody located within close proximity to the TANCO Mine. Bernic Lake is a small (360 ha) upper watershed Precambrian Shield lake. There is one main outlet, Bernic Creek, which is located on the western end of Bernic Lake. A series of rapids and cascades are located within Bernic Creek, which provide a barrier to fish passage from Bird River located downstream. Several small first order streams drain into Bernic Lake.

Bernic Lake is not accessible to the general public and the local area surrounding the TANCO Mine, including Bernic Lake, has not been a site of traditional resource harvest during the period of mine operation.

Fish community surveys were conducted in Bernic Lake and Bernic Creek in 1975, 1997, and 2013. During these studies a total of fifteen (15) species of fish were collected, including:

- Cisco (Coregonus artedi),
- Northern Pike (Esox lucius),
- Central Mudminnow (Umbra limi),
- White Sucker (Catastomus commersoni),
- Golden Shiner (Notemigonus crysoleucus),
- Emerald Shiner (Notemigonus crysoleucas),
- Blacknose Shiner (Notropis heterolepis),
- Spottail Shiner (Notropis hudsonius),
- Northern Redbelly Dace (Phoxinus eos),
- Fathead Minnow (Pimephales promelas),
- Slimy Sculpin (Cottus cognatus),
- Pumpkinseed (Lepomis gibbosus),
- Iowa Darter (Ethiostoma exile),
- Johnny Darter (Ethiostoma nigrum), and
- Yellow Perch (Perca flavescens).

None of the collected species of fish is listed under the Species at Risk Act, and no species at risk are known to be found within Bernic Lake.

3.1.4 Socio-Economic Environment

The municipalities, communities and First Nations that are closest to the TANCO Mine site are of key interest with respect to socio-economic impacts associated with Project West. These municipalities and communities include the RM of Lac du Bonnet, the Town of Lac du Bonnet, the LGD of Pinawa, the RM of Alexander, the Town of Powerview-Pine Falls, and Sagkeeng First Nation (Fort Alexander). The majority of the mine workers currently employed at the TANCO Mine live in nearby Lac du Bonnet or Pinawa.

PR 313 east of the Winnipeg River and PR 315 are the main roads that connect Lac du Bonnet to the TANCO Mine. Local residents, cottagers, park users, and employees of the TANCO Mine and a few other rural businesses are the primary travelers on these roads.

Recreation use in the area is limited to the Bird River, where a number of cottages are located downstream of the confluence with Bernic Creek. As mentioned previously Bernic Lake is not accessible to the general public. The local area surrounding the TANCO Mine, including Bernic Lake, has not been a site of traditional resource harvest during the period of mine operation.

4. Potential Environmental Impacts

4.1 Type, Quantity and Concentration of Pollutants to be Released into the Air

The primary concerns regarding air quality comprise the potential for impacts resulting from:

Gaseous and Particulates Emissions from Construction Equipment: Drilling equipment used during installation of the cable bolts and TDRs could potentially result in gaseous and particulate emissions in the area. The drilling contractor will be required to keep vehicles and machinery in good working condition to avoid localized objectionable gaseous and particulate emissions.

Noise Caused by Construction Activities: Drilling activities including the operation of pumps have the potential to generate noise in excess of background levels. Aside from workers and visitors at the mine site, there are no human receptors (residence or cottages) and no sensitive wildlife receptors located in the project area.

Equipment will be regularly serviced and maintained in order to help reduce noise, and vehicle idling will be kept to a minimum in order to reduce noise from the site.

4.2 Type, Quantity and Concentration of Pollutants to be Released to the Water

During installation, there is a risk that spills of diesel fuel, gasoline, grouts, and hydraulic oil can occur. To ensure the risk of spills and emergencies are mitigated for, the following procedures will be implemented to mitigate any losses of deleterious substances:

- The entire barge platform will be lined with synthetic liner to prevent any deleterious substances from passing from the barge into open water.
- Secondary containment will be placed around the entire barge at water level to absorb and contain any suspended lubricants.
- Fuel for the project will be loaded on site at start up to prevent the need for fuel transfer over water.
- Daily services to machines and equipment will be conducted over contained areas with sorbent matting on site.

- Fuel will be stored in tanks equipped with secondary containment and all fueling will be conducted in accordance with the *Storage and Handling of Petroleum Products and Allied Products Regulations* (MR 188/2001).
- The drill will have a collection system installed to prevent release of drill cuttings into open water.
- Settling tanks will be monitored and maintained, ensuring no leakage or harm to environment.
- Cuttings will be removed from settling tanks and disposed of in a pre-determined approved area.
- Emergency spill kits (drip trays, absorbent pads, etc.) will be kept on drill at all times in case of emergency release.
- The grout pump and grout hose will be maintained in good condition.
- Grouting will be conducted through drill casing to minimize sediment from entering the water column.
- Regular equipment inspection and maintenance will be conducted to minimize the risk of fuel spills.
- A spill response procedure will be in place and will be initiated in the event of a major spill (i.e. >100 L).

The management of other potential sources of pollution will be the responsibility of the drilling contractor, and will be managed in accordance with TANCO's Contractor Safety and Health Manual which requires the contractor to remove all hazardous wastes from the property for disposal at an off-site licensed hazardous waste, dangerous goods storage facility.

4.3 Type, Quantity and Concentration of Pollutants to be Released to the Land

Pollutants released to the land during the installation are not expected to be a major concern. During installation there is a risk that fuel spills from support equipment operation and refuelling or accidental spills of construction materials may occur.

During installation, to avoid contamination of the environment, the drilling contractor shall not be permitted to allow liquid or solid wastes, or fuel to be deposited upon the ground. When servicing requires the drainage or pumping of lubricating oils, or other fluids from the equipment, a groundsheet of suitable material and size shall be spread on the ground to catch all fluid in the event of a leak or spill. An adequate supply of suitable absorbent material and any other supplies and equipment necessary to immediately clean up spills must be available. Storage and disposal of liquid wastes and filters from equipment maintenance, and any residual material from spill clean-up must be contained in an environmentally safe manner and in accordance with any existing regulations.

All waste disposals will be undertaken in accordance with existing regulations. The drilling contractor will conduct all day-to-day operations in such a manner as to avoid creating any unpleasant appearances or any conditions that will be detrimental to the surrounding area. Waste materials and refuse shall be promptly disposed of in a manner that will not contaminate or impair the surrounding area, and every effort will be made to prevent debris from being deposited on land or entering a watercourse.

4.4 Impact on Wildlife

The impact on wildlife during installation will be negligible. The project is situated on Bernic Lake and the launching site for the barge and support boats, etc. will be situated in an area that has already been subject to development.

4.5 Impact on Fisheries

It is expected that there will be no impact on aquatic resources in the area. There are no fish breeding habitats or stream crossings designed to accommodate free fish passage within the vicinity of the proposed development which may be disturbed during installation.

The Department of Fisheries and Oceans Canada (DFO) includes mineral exploration in the list of project activities and criteria where DFO review is not required. As the proposed work is identical in nature and impact to the type of low density drilling from water used in the mineral exploration activity that is described in DFO's list, it is AECOM's opinion that this work will not require a DFO review.

However, even in the absence of a review, DFO requires that the activities "*avoid causing serious harm to fish by following best practices such as those described in the measures to avoid harm."*

DFO interprets serious harm to fish as:

- *the death of fish;*
- *a permanent alteration to fish habitat of a spatial scale, duration or intensity that limits or diminishes the ability of fish to use such habitats as spawning grounds, or as nursery, rearing, or food supply areas, or as a migration corridor, or any other area in order to carry out one or more of their life processes;*
- *the destruction of fish habitat of a spatial scale, duration, or intensity that fish can no longer rely upon such habitats for use as spawning grounds, or as nursery, rearing, or food supply areas, or as a migration corridor, or any other area in order to carry out one or more of their life processes.*

AECOM fisheries biologists have reviewed the proposed activities and have determined that, if standard procedures for the protection of aquatic resources are followed, the project will have negligible risk to fish and fish habitat for the following reasons:

- The disturbance of the lake bottom at the cable bolt and TDR installation sites will be localized and of short duration.
- The area of disturbance to the lake bottom from the TDR cables will be small as the cables are less than 10 cm in diameter and 150 m in length. This habitat disruption will not prevent fish from relying on the habitat in that area as they will be covered in new sediments over time and removed when the mine is decommissioned.

4.6 Impact on Surface Water and Groundwater

The drill holes have been designed to stop within 5 m of the current mine workings, just as was undertaken in the recent TDR instrumentation installation. The same practices will be followed to prevent a major occurrence of water to enter the mine. SRK has developed a Water to Rock Seal Procedure (WRSP) that serves to reduce the likelihood, to acceptable levels, of the lake water entering into the drill hole. If a hole-through to the underground does occur, the fact that the drill hole system has been isolated from the lake by casing, that a plug can be installed into the hole, and the hole can then be grouted, will reduce the risk of mine flooding to reasonably acceptable levels. The drill hole stoping distance of 5 m from the excavation should reduce the risk related to breakthrough as a result of a scan and hole-surveying inaccuracy.

Set-up on the drill for collaring of the drill hole and the checking of the orientation during drilling will help manage the risk related to the accuracy of the hole placement and drilling accuracy. The chosen drilling contractor will be required to develop procedures that comply with the WRSP for the breakthrough hazard. The risk of breakthrough is real and it is mitigated with procedures and policies in place which aim to mitigate the risk of lake water and underground interaction.

The contractor will use the TANCO on-site washroom and dry facilities which follow all applicable Provincial and Federal guideline and standards. This includes collection and disposal of all sewage and associated grey water at approved off-site disposal facility.

4.7 Impact on Forestry and Vegetation

The impact on wildlife during installation will be negligible. The project is situated on Bernic Lake and the launching site for the barge and support boats, etc. will be situated in an area that has already been subject to development

4.8 Impact on Heritage Resources

There will be no impact on heritage resources resulting from this project. The project is situated on Bernic Lake and the launching site for the barge and support boats, etc. will be situated in an area that has already been subject to development.

4.9 Impact on Traffic

Transportation of the supplementary contracted workforce to and from the mine site will be the responsibility of the drilling contractor. This will include private transport operated by the contractor from their place of accommodation. The overall increase in traffic on the public highways and roads is expected to be about 2 additional vehicles daily to and from the TANCO Mine.

5. Decommissioning

The existing Closure Plan for the TANCO Mine site includes provisions to restore the area to pre-development conditions, to the maximum extent possible. The decommissioning of the TDR cables will take place either before or during the final decommissioning of the TANCO Mine and the cable bolts will not have a surface feature. Decommissioning and closure activities will be carried out in accordance with the Manitoba *Mining and Minerals Act* and the approved Closure Plan that has been developed for the TANCO Mine.

6. Schedule

In order to complete this work, Cabot needs to initiate drilling of the drill holes after the water temperature in Bernic Lake exceeds 4 °C, in approximately April 2016.

7. Conclusions

AECOM is of the opinion that of the activities described will have a negligible impact on the environment if the practices defined are incorporated and followed.