2016 Lupin Mine Tailings Containment Area Geotechnical Inspection

Submitted to:

Lupin Mines Incorporated

Project Number: 924-1

Date:

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CORPORATION

OQM | Organizational Quality Management Program

Table of Contents

List of Table

List of Figures

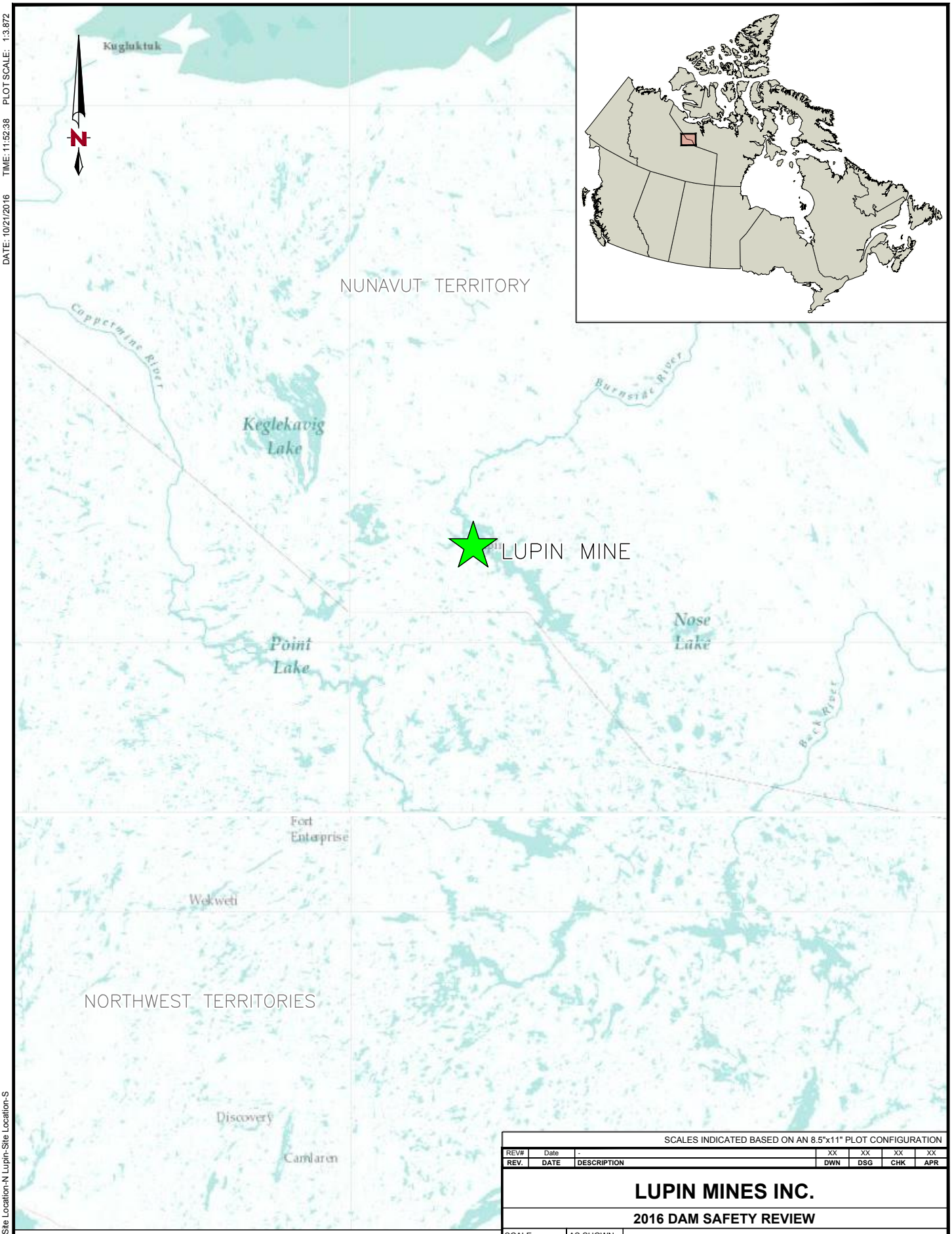
1 INTRODUCTION

Lupin Mines Incorporated (LMI) retained Norwest Corporation (Norwest) to complete the annual geotechnical dam inspection at the Lupin Mine tailings containment area (TCA). The Lupin Mine site is currently under care and maintenance status and operates under the Nunavut Water License 2AM-LUP1520 (NWB 2015) for LMI. LMI is a wholly-owned indirect subsidiary of Mandalay Resources.

The Lupin Mine is located on the northwest shore of Contwoyto Lake, approximately 400km northeast of Yellowknife, Northwest Territories (Figure 1). The site consists of a mill, camp and support facilities, fuel storage, airstrip, and the TCA (Figure 2). Detailed view of the mill site is provided in Figure 3 and the TCA in Figure 4.

The water license explicitly requires an annual geotechnical inspection to be completed for the TCA perimeter dams, TCA reclamation covers, including a quantitative assessment of any seepage from the TCA (NWB 2015). Norwest has provided a qualified person to conduct the geotechnical inspection to fulfill the requirements listed in Part E, Item 6 of the water license, which stipulates the following:

> "*The tailings containment area shall be constructed, operated and maintained to engineering standards such that:*
>
> a. *A minimum freeboard of 1.0 metre shall be maintained at all times or as recommended by a geotechnical engineer and as approved by the Board in writing;*
> b. *Seepage from the Tailings Containment Area is minimized;*
> c. *Any seepage that occurs is collected and returned immediately to the Tailings Containment Area;*
> d. *Erosion of constructed facilities is addressed immediately;*
> e. *The solids fraction of the mill tailings shall be permanently contained within the Tailings Containment Area or underground as backfill.*
> f. *Implement measures to ensure that the Tailings Containment Area is adequately covered or managed, including the use of approved binding agents, so as to prevent windblown tailings from impacting other areas of the project site;*
> g. *During care and maintenance, inspection shall be carried out on a bi-weekly basis during the freshet (approx. May and June), and monthly during the reminder of the open water period (approx. July – October) of the following:*
>
> i. *Collection and return of seepage in Dam 2;*
> ii. *Water levels in ponds 1 and 2, and cells 3 and 5;*
> iii. *General surface erosion and anomalies on dams; and,*



SCALES INDICATED BASED ON AN 8.5"x11" PLOT CONFIGURATION

REV#	Date	-	XX	XX	XX	XX
REV.	DATE	DESCRIPTION	DWN	DSG	CHK	APR

LUPIN MINES INC.

2016 DAM SAFETY REVIEW

SCALE:	AS SHOWN
DATE:	2016-10-20
CO-ORD. SYS.:	UTM-NAD83-12
DRW'N BY:	KM
DSG'N BY:	--
REV'D BY:	AT
APP'D BY:	SE

SITE LOCATION

NORWEST

PROJECT NO.:	FIG. NO.:	REV.:
-	1	A

DATE: 10/21/2016 TIME: 11:52:38 PLOT SCALE: 1:3,872

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XREF FILE(S):
IMAGE FILE(S): Lupin-Site Location-N Lupin-Site Location-S

DATE: 10/21/2016 TIME: 11:53:39 PLOT SCALE: 1:3,872

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XREF FILE(S):
IMAGE FILE(S): Lupin-NE Lupin-NW Lupin-SW lupin_mine_wv2_2012aug21_north lupin_mine_wv2_2012aug21_south

SCALES INDICATED BASED ON AN 8.5"x11" PLOT CONFIGURATION

REV#	Date	-	XX	XX	XX	XX
REV.	DATE	DESCRIPTION	DWN	DSG	CHK	APR

1000m 500 0 1000 2000 3000m

SCALE 1:50,000

LUPIN MINES INC.

2016 DAM SAFETY REVIEW

SCALE:	AS SHOWN
DATE:	2016-10-20
CO-ORD. SYS.:	UTM-NAD83-12
DRW'N BY:	KM
DSG'N BY:	--
REV'D BY:	AT
APP'D BY:	SE

SITE OVERVIEW

NORWEST

PROJECT NO.:	FIG. NO.:	REV.:
924-2	2	A

100m 0 100 200 400m

SCALE 1:6000

SCALES INDICATED BASED ON AN 8.5"x11" PLOT CONFIGURATION

REV#	Date	-	XX	XX	XX	XX
REV.	DATE	DESCRIPTION	DWN	DSG	CHK	APR

LUPIN MINES INC.

2016 DAM SAFETY REVIEW

SCALE:	AS SHOWN
DATE:	2016-10-20
CO-ORD. SYS.:	UTM-NAD83-12
DRW'N BY:	KM
DSG'N BY:	--
REV'D BY:	AT
APP'D BY:	SE

MILL SITE AND SUPPORT FACILITY PLAN

NORWEST

PROJECT NO.:	FIG. NO.:	REV.:
924-2	3	A

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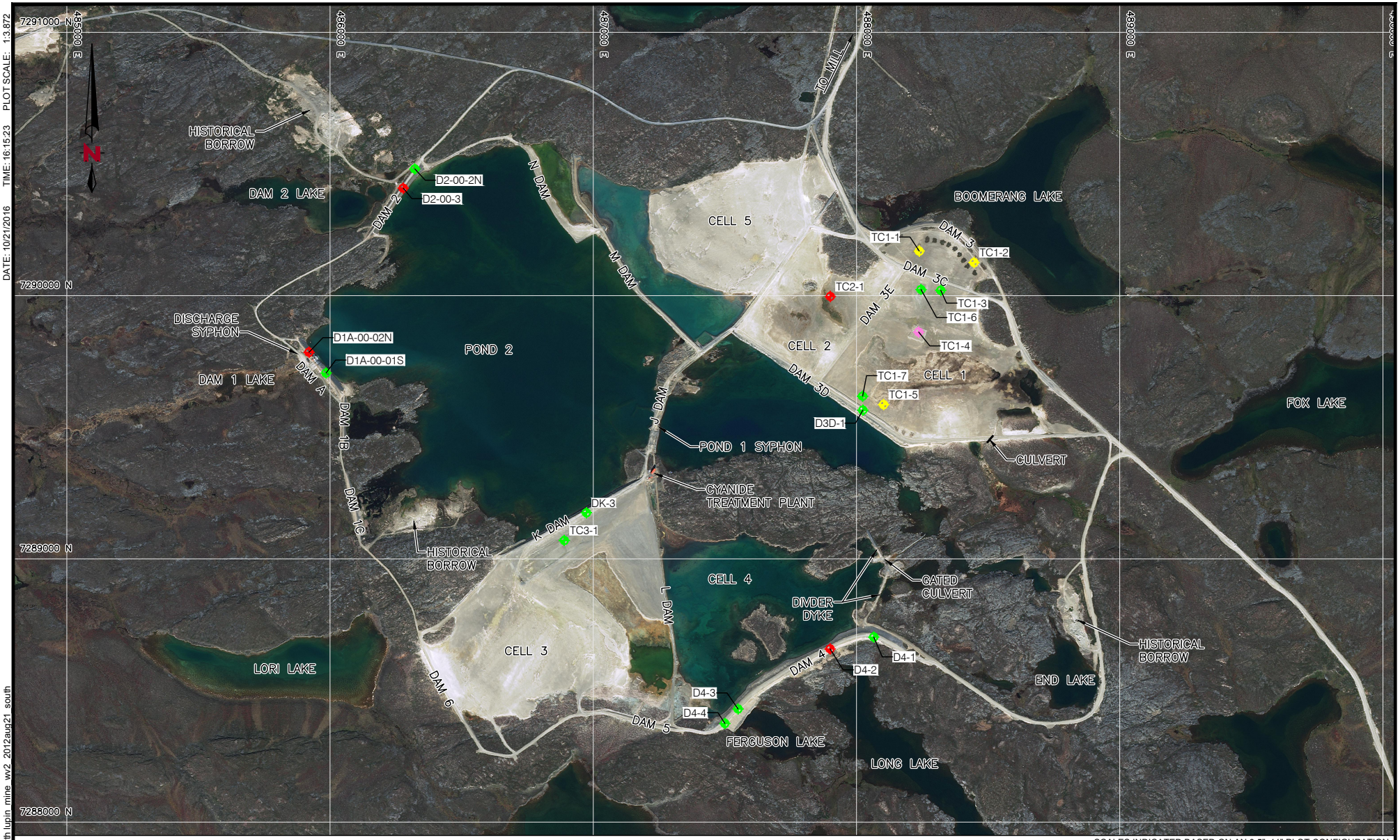

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XREF FILE(S):
IMAGE FILE(S): lupin_mine_wv2_2012aug21_north lupin_mine_wv2_2012aug21_south

LEGEND

THERMISTORS STATUS

- ACTIVELY MONITORED
- DAMAGED
- MONITORED DURING DSR-NO CALIBRATION DATA
- UNLOCATED-LOCATION ESTIMATED FROM HISTORICAL MAP

500m 0 500 1000m

SCALE 1:20,000

SCALES INDICATED BASED ON AN 8.5"x11" PLOT CONFIGURATION

REV#	Date	-	XX	XX	XX	XX
REV.	DATE	DESCRIPTION	DWN	DSG	CHK	APR

LUPIN MINES INC.

2016 DAM SAFETY REVIEW

SCALE:	AS SHOWN
DATE:	2016-10-20
CO-ORD. SYS.:	UTM-NAD83-12
DRW'N BY:	KM
DSG'N BY:	--
REV'D BY:	AT
APP'D BY:	SE

TAILINGS CONTAINMENT AREA

NORWEST

PROJECT NO.:	FIG. NO.:	REV.:
924-2	4	A

iv. *Tension crack in Dam M. If water level in the ponds rise, then inspection shall be carried out bi-weekly during the open water season (approx. May – October);*

v. *Records of these inspection shall be kept for review upon the request of an Inspector, or as otherwise approved by the Board. More frequent inspections shall be performed at the requested of an Inspector.*

vi. *More frequent inspections shall be performed at the requests of an Inspector;*

vii. *An inspection of the Tailings Containment Area shall be carried out annually during ice free, open water condition by a geotechnical Engineer. The Engineer's report shall be submitted to the Board within sixty (60) days following the inspection, and shall include a cover letter from the Licensee outlining an implementation plan to respond to the Engineer's recommendations."*

This report summarizes Norwest's observation of the TCA's condition in 2016 and presents our recommendations. Previous annual inspections, safety reviews, and risk assessments with respect to the TCA made available to Norwest include:

- Inspection Report from 2012-2015 by SRK Consulting;
- 2015 Dam Safety Review Report by SRK Consulting; and,
- 2012 TCA Risk Assessment and Water Quality Review by SRK Consulting.

While the annual inspection is carried out to satisfy the license requirements, the format and methodology used are in accordance to the best engineering practice using the Inspection and Maintenance of Dams Safety Guidelines issued by the Province of British Columbia, Water Management Branch (BCWMB 2011).

1.1 Project Description

1.1.1 Location and Access

The Lupin Mine is only assessable by air or winter road. The air access is serviced by a gravel runway, capable of handling large aircraft such as Hercules C-130 and Boeing 737 jets. Charter flights are typically deployed from Yellowknife for worker rotation and re-supply during the open water seasons. When the mine was in operation, it used the Tibbitt to Contwoyto Winter Road to resupply the mine. This winter road currently ends at the Ekati Diamond Mine and has not been extended to the Lupin Mine since 2005, when the mine went into care and maintenance status.

1.1.2 History and Current Status

Currently the Lupin Mine is in care and maintenance status and licensed accordingly. Mining operation ceased in 2005. Current care and maintenance operations include, but are not limited to, earthwork maintenance, water treatment and discharge as needed, water quality monitoring, waste management as needed.

1.1.3 Site Infrastructure

The mine site consists of the following main structures: mill site, camp and support facilities, fuel storage, airstrip, and tailings containment area (TCA).

- The mill site included an underground hoist and wheelhouse, ball mill, concentrator, and a paste backfill plant (now decommissioned).
- The camp and support facilities included multiple wings of accommodations for workers, an office building, recreation facilities, cool and warm storage, generators, sewage lagoons and dams, and waste management facilities. Gravel roads are in place to connect the facilities.
- Fuel storage includes the main tank farm that contains diesel fuel for annual operation, along with fuel for aircraft. Fuel is pumped to a satellite tank farm as needed for equipment fueling and power generation to minimize the risk of spillage and accidents from using the large fuel tanks at the main farm.
- The airstrip is a gravel runway that can accommodate aircraft up to the size of a Boeing 737 jet.
- The TCA consists of a number of frozen core dams that provide a closed system for tailings and water treatment. Tailings are contained in a number of cells and progressive reclamation is ongoing and has now been completed at several cells. Water treatment is carried out using Pond 1 as a holding pond for effluent, treating the water in a plant, and then using Pond 2 as a polishing pond to allow the solids to precipitate prior to discharge to the environment. Details of the TCA configuration are described in the following sections.

1.2 Climate

Norwest evaluated the climate data from an automated weather station known as Lupin (CWIJ) available in the Weather Underground database (WU 2016). Intermittent climate data is also available from the Environment Canada database under station Lupin CS Climate ID 230N002. The evaluation was done from May 2005 to April 2016. The evaluation results indicate the station reported an annual mean temperature of -11°C. The average winter temperature, from October

to April, was around -17°C. The average summer temperature, from May to September, was around 8°C. Annual total precipitation was averaged to be around 512mm, where the data does not differentiate between snow and rain. The mean wind direct was south-southeast, with average wind speed of 18km/h and high of 90km/h.

1.3 Site Geological Conditions

The Lupin Mine is located in the Archean metaturbidite sequence of the Contwoyto Formation. The rocks have been subjected to both regional and contact metamorphism, including deformations and intrusions.

The area was glaciated and experienced isostatic rebound after the melt. The glaciers and runoff from the melt washed out the erodible soils and formed lakes in low laying areas. The easily erodible glaciolacustrine and glacio-fluvial sands were reworked and displaced by the meltwater and resulted in the present day outcrops with thin soils veneers, abandoned beaches and esker formation (Kinross 2005). Where bedrock is not present at the surface, the overburden typically consists of coarse grained glacial till which is intermittently covered by glaciolacustrine and glacial-fluvial deposits. The till is a silty sand with gravel and boulders, with low plasticity and ice depending on the depth.

1.4 Permafrost and Dam Geotechnical Conditions

The site is within a continuous permafrost region. The active layer is observed to be somewhat variable between the depth of 1.3m to 3.1m based on available data. During operation, scheduled monitoring was completed on all instrumentation, recording water levels, water quality and production volumes. This monitoring program was reduced accordingly during the care and maintenance period and is carried out when work is being done on site. Thermistors are installed in several dams and in the reclamation cover to monitor their performance. Some of the thermistors are no longer functional or damaged beyond repair. The remaining thermistors are read at least once annually during the geotechnical inspection and more often when site access allows. The thermistor readings indicate that permafrost remains within the dams and reclaimed tailings, and these are consistent with historical variation and limits.

2 TAILINGS CONTAINMENT AREA DAMS

The tailings produced are primarily comprised of amphibole and quartz, which accounts for 80% of the volume. Pyrrhotite and arsenopyrite make up an additional 17%. The tailings have been shown through various studies to have potential for acid generation (Kinross 2005). All of the tailings are contained within the TCA.

The Lupin Mine TCA consists of eight perimeter dams and nine (9) internal dams. The perimeter dams are Dam 1A, 1B, 1C, and Dam 2 through Dam 6. The internal dams are Dam 3a through 3e, Dams J through N, and the Divider Dykes. Combinations of the perimeter dams and internal dams form Tailings Cell 1 through 5 for containment. As the progressive reclamation is being completed, some of the internal dams (3a, 3b, 3c, 3e) are incorporated into the cover and are no longer considered as individual dams. Currently, Cells 1 and 2 are completely reclaimed, while Cell 3 is approximately 80% covered and Cell 5 is approximately 70% covered. About 84% of the entire tailings area is reclaimed with at least 1m of sand/gravel cover. No new tailings have been produced since 2005 when the site went into care and maintenance status.

All dams are constructed from esker sand and gravels, with the perimeter dams incorporating a geosynthetics liner for seepage control. All the perimeter dams are designed as frozen core dams founded on permafrost. Generally, the perimeter dams range in height from 1 to 8 metres. The internal dam heights range from 6 to 12 metres.

The care and maintenance procedures for water management direct runoff and seepage from Cell 3 into Cell 4. The water in Cell 4 then flows through the Divider Dykes either though the control structure or seepage into Pond 1. Cell 5 runoff is pumped directly into Pond 1. Pond 1 water level is managed by siphoning water into Pond 2. Water treatment is carried out by treating the water in-situ in Pond 2, by adding in lime to raise the pH. Precipitates from this treatment are deposited in Pond 2. The treated water in Pond 2 is siphoned into the environment in accordance with the Water License requirements (NWB 2015). Pond 2 does not have any flood overflow structures, such as a spillway or a control gate, to manage the water level. All discharge is retained and restricted until water quality meets the discharge requirement outlined in the Water License (NWB 2015).

2.1 Dam Consequence Classifications

Norwest utilized the Canadian Dam Associate Guidelines (CDA 2014) to classify the consequence classification of each dam. The CDA consequence classification is shown in Table 1.

The dam consequence classification of the dams based on Norwest's 2016 inspection is outlined in Table 2. Norwest's consequence classifications are in line with the classifications outlined in the 2015 Dam Safety Review (SRK 2015).

An emergency preparedness plan (EPP) is noted by the DSR (SRK 2015) to be in place and deemed appropriate for care and maintenance status. Norwest did not review the EPP. Due to the lack of transportable tailings, permanent population or infrastructure downstream of the perimeter dams, a detailed inundation study is deemed non-applicable.

Table 1.
CDA Dam Consequence Classification (CDA 2014)

Dam Class	Population at Risk[1]	Incremental Losses		
		Loss of Life[2]	Environmental and Cultural Values	Infrastructure and Economics
Low	None	0	Minimal short-term loss; No long-term loss	Low economic losses Area contains limited infrastructure or services
Significant	Temporary only	Unspecified	No significant loss or deterioration of fish or wildlife habitat Loss of marginal habitat only Restoration or compensation in kind highly possible	Losses to recreational facilities, seasonal workplaces, and infrequently used transportation routes
High	Permanent	10 or fewer	Significant loss or deterioration of important fish or wildlife habitat Restoration or compensation in kind highly possible	High economic losses affecting infrastructure, public transportation, and commercial facilities
Very High	Permanent	100 or fewer	Significant loss or deterioration of critical fish or wildlife habitat Restoration or compensation in kind possible but impractical	Very high economic losses affecting important infrastructure or services (e.g. highway, industrial facility, storage facilities for dangerous substances)
Extreme	Permanent	More than 100	Major loss of critical fish or wildlife habitat Restoration or compensation in kind impossible	Extreme losses affecting critical infrastructure or services (e.g. hospital, major industrial complex, major storage facilities for dangerous substances)

Note 1. Definition for population at risk:
None - There is no identifiable population at risk, so there is no possibility of loss of life other than through unforeseeable misadventure.
Temporary - People are only temporary in the dam-breach inundation zone (e.g. seasonal cottage use, passing through on transportation routes, participating in recreational activities). **Permanent** - The population at risk is ordinarily located in the dam-breach inundation zone (e.g. as permanent resident); three consequence classes (high, very high, extreme) are proposed to allow for more detailed estimate of potential loss life (to assist in decision-making if the appropriate analysis is carried out).
Note 2. Implication for loss of life:
Unspecified - The appropriate level of safety required at a dam where people are temporarily at risk depends on the number of people, the exposure time, the nature of their activity, and other conditions. A higher class could be appropriate, depending on the requirements. However, the design flood requirement, for example, might not be higher if the temporary population is not likely to be present during the flood season.

Table 2.

Lupin TCA Dam Consequence Classification

Dam		Consequence Classification	Rationale
Perimeter Dams	1A	Significant	Release of water that might not meet discharge criteria into the environment
	1B	Significant	Release of water that might not meet discharge criteria into the environment
	1C	Significant	Release of water that might not meet discharge criteria into the environment
	2	Significant	Release of water that might not meet discharge criteria into the environment
	3	Low	No free-standing water; Stable reclaimed tailings with very limited impact consequence upon failure
	4	Significant	Release of water that might not meet discharge criteria into the environment
	5	Low	No free-standing water; Stable reclaimed tailings with very limited impact consequence upon failure
	6	Low	No free-standing water; Stable reclaimed tailings with very limited impact consequence upon failure
Internal Dams	3D	Low	Any release of effluent or tailings are contained within the TCA
	J	Low	Any release of effluent or tailings are contained within the TCA
	K	Low	Any release of effluent or tailings are contained within the TCA
	L	Low	Any release of effluent or tailings are contained within the TCA
	M	Low	Any release of effluent or tailings are contained within the TCA
	N	Low	Any release of effluent or tailings are contained within the TCA
	Divider Dykes	Low	Any release of effluent or tailings are contained within the TCA

3 2016 TCA INSPECTION

3.1 General

Mr. Alvin Tong, PEng., a Senior Geotechnical Engineer with Norwest, conducted the geotechnical inspection on the 24th to 25th of August, 2016. An aerial survey of the overall site was also completed. Detailed visual inspection was completed on all TCA components, along with reading of instrumentation. Mr. David Vokey, representative of LMI, was on site for communication and organization, but did not accompany Norwest on the inspection.

The weather during inspection was cool and overcast with periods of sunshine. Detailed inspection and photograph logs are provided in Appendix A. The inspection logs are provided in Appendix B.

The general observations indicated that the perimeter dams are in stable condition. The divider dykes and Dam K should be considered for maintenance and repairs and Norwest communicated this to Mr. Vokey on site. Dam M was undergoing maintenance and repair at the time of the inspection. Pond 2 water level was significantly lower than last year's level with a freeboard upwards of 4m at the perimeter dams. The water level in Cell 5 continues to be lowered by pumping to Pond 1 to reduce any impact from potential failure of Dam M, to facilitate repair and allow placement of cover over the tailings.

Since the inspection in August, LMI has finished the maintenance and repair of Dam M, and continues to cover the tailings in Cell 5. Monitoring is being carried out on the water level in Cell 4 and the condition of the divider dykes.

3.2 Thermistors

Thermistors were installed in the TCA between 1995 and 2004 to monitor the performance of the dams and tailings covers. From the existing records, there were thirteen thermistors installed in the dams, but only seven of them are currently functional. Of the seven functioning thermistors, five are in the perimeter dams and two are in the internal dams. There are an additional seven thermistors installed in the reclaimed tailings cover, but three of them do not have calibration data on record to evaluate the results. This report focuses on the thermistor readings from dams, and using the thermistor readings from the cover for reference and comparison.

The thermistors were read monthly during operation up until 2006, and then read semi-annually during care and maintenance. Not all of the functioning thermistors were read consistently throughout the care and maintenance period. To provide a point of reference in this report, selected data series between August and September, from year 2010 to 2016, are shown for

comparison, while maximum values are calculated from the entire series from the first available records to 2016.

For the perimeter dams, the five functional thermistors are less than 20m deep. The five thermistor readings are shown in Figures 5 to 9. The data suggests the 2016 readings are within the historical variations, taking into account annual climatic variations and time of reading. Generally, the active layer (thaw zone) ranges from 2m to 3m depth, as interpolated by the 0°C gradient line. The largest historical variation in the given data set is approximately 2.2°C (between -2.5°C and -4.7°C) in Dam 2 (D2-00-02n) at the depth of 6m.

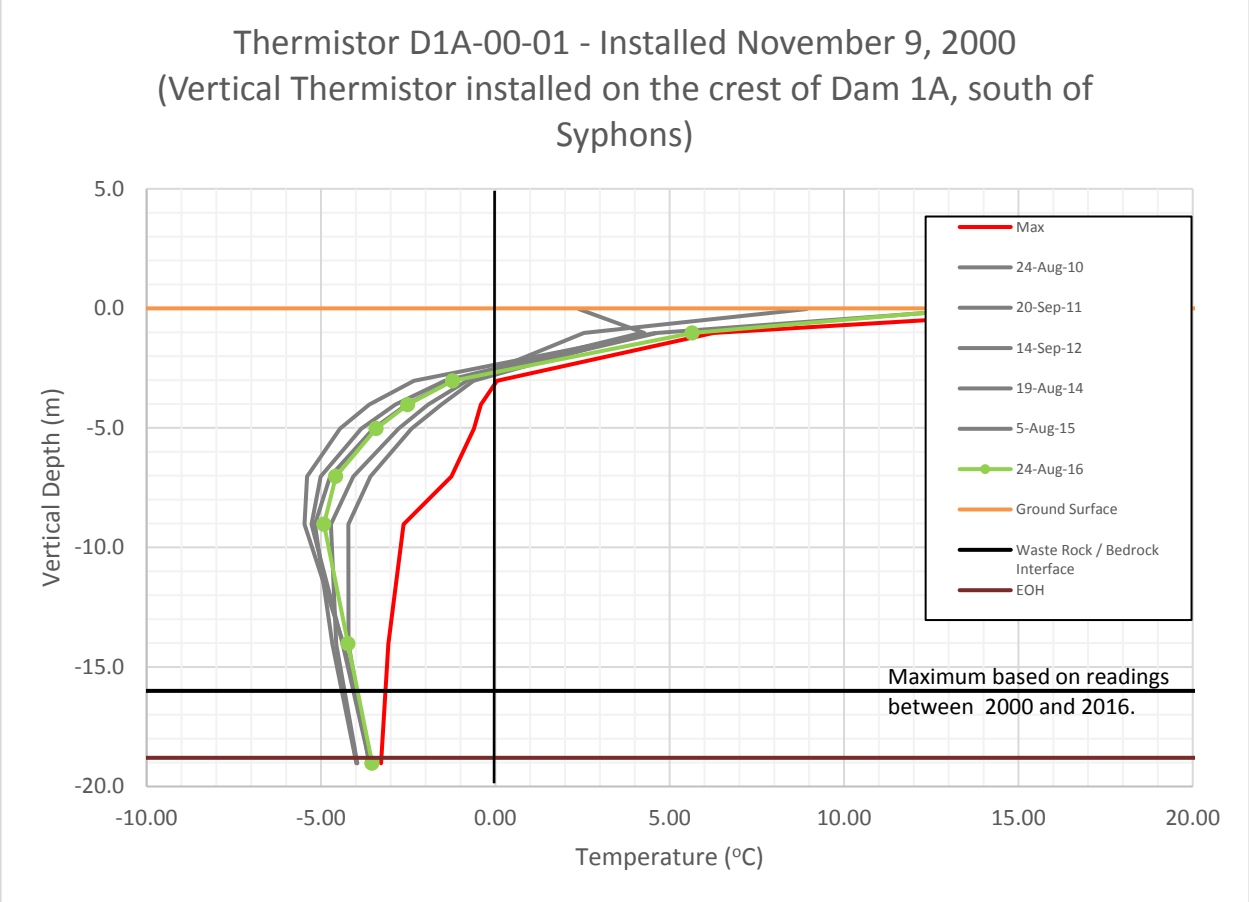

Figure 5: Thermistor Reading for D1A-00-01

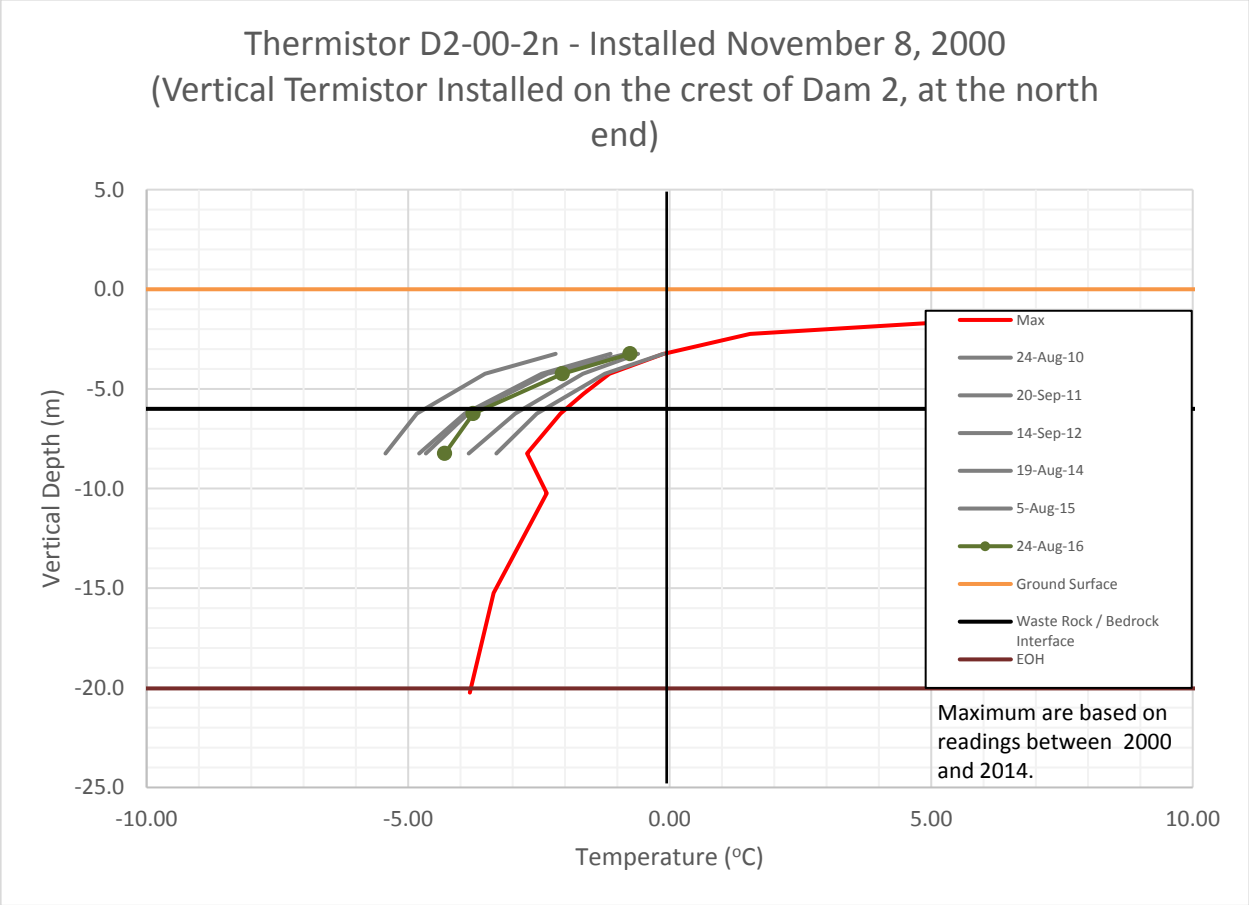

Figure 6 Thermistor Reading for D2-00-2n

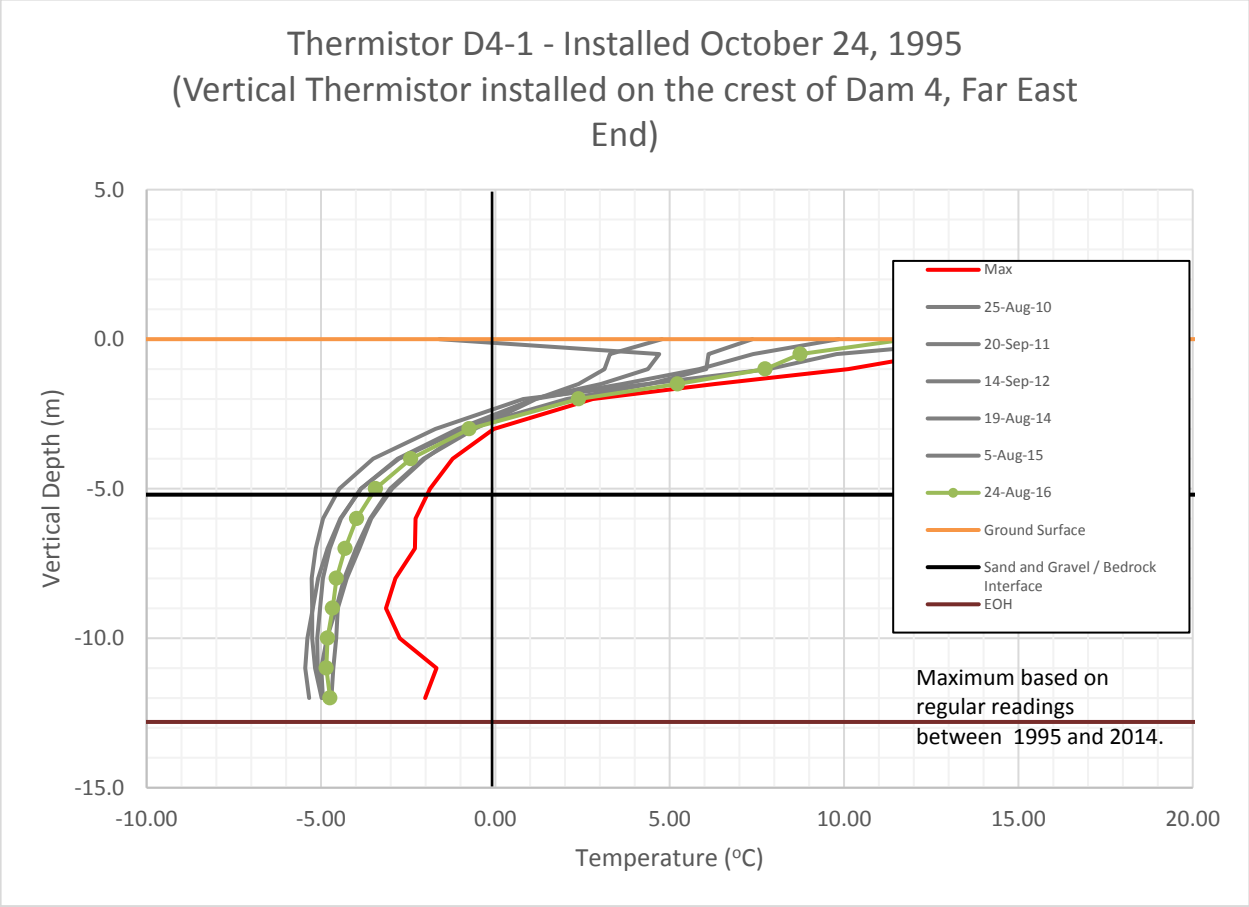

Figure 7 Thermistor Reading for D4-1

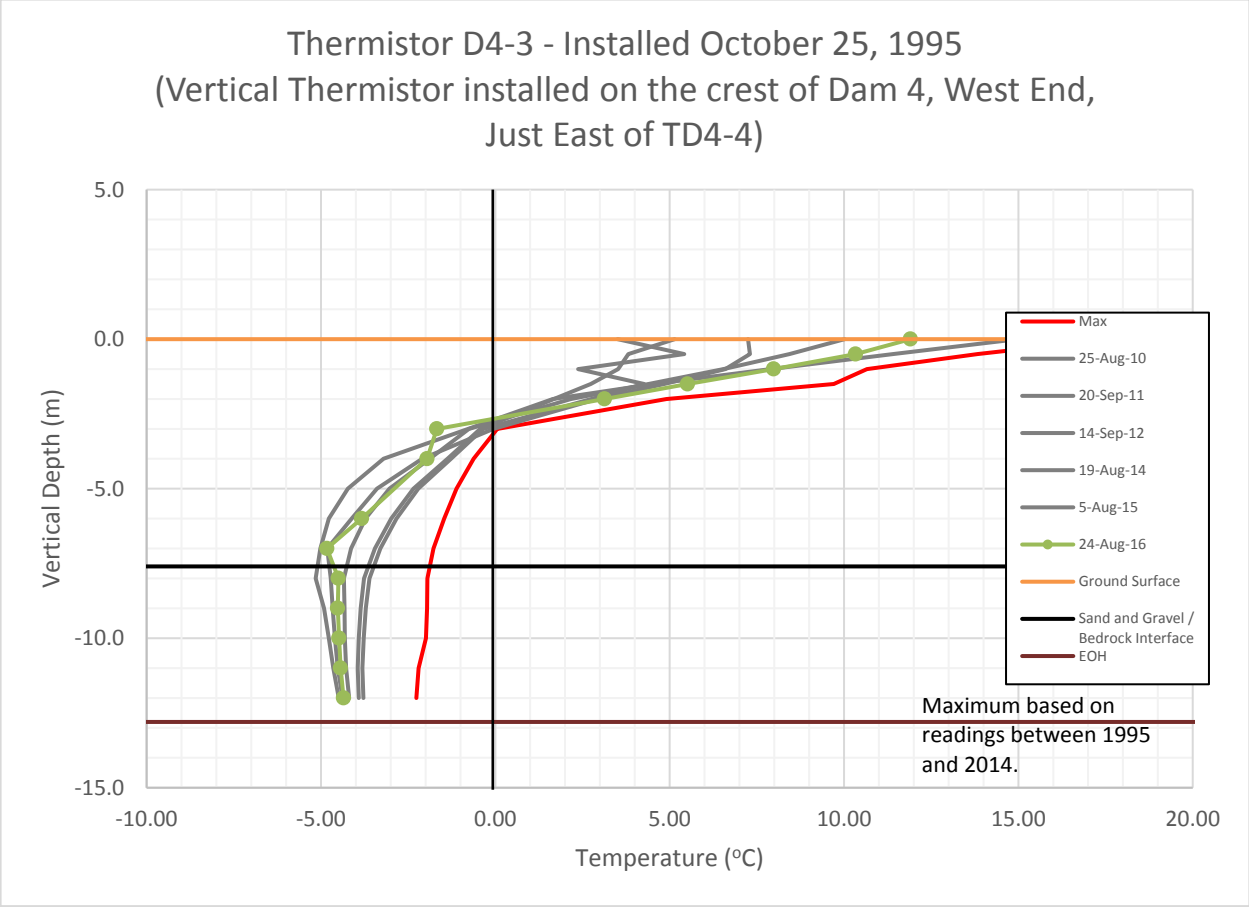

Figure 8 Thermistor Reading for D4-3

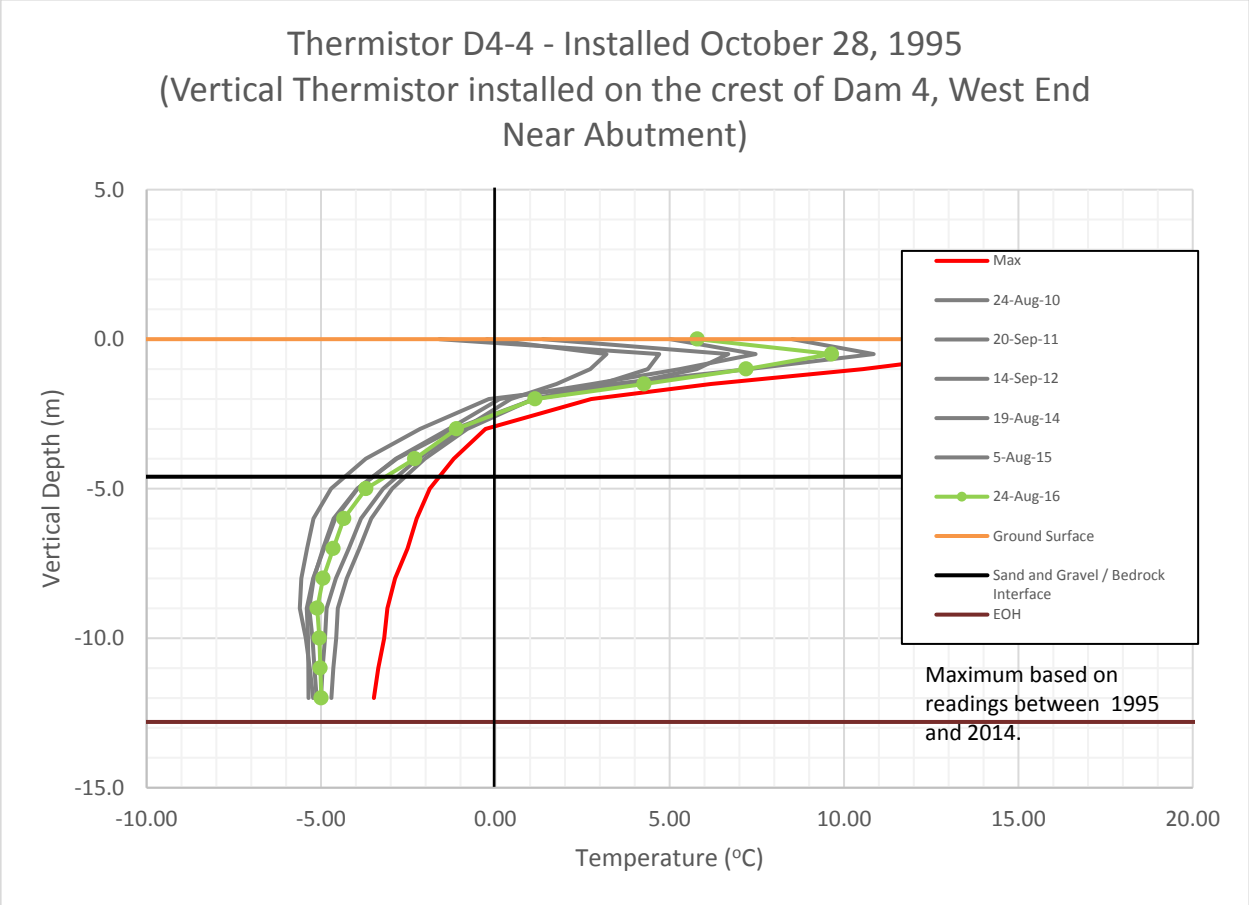

Figure 9 Thermistor Reading for D4-4

For the internal dams, the two functional thermistors are also less than 20m deep. These were not monitored as rigorously as the ones installed in the perimeter dams, and only have recent data between 2014 and 2016. The two thermistors readings are shown in Figure 10 and Figure 11. The active layer is observed to be between 2m to 3m, as interpolated by the 0°C gradient line. The variations between the data set are less than 2°C and generally occur below the historical maximum.

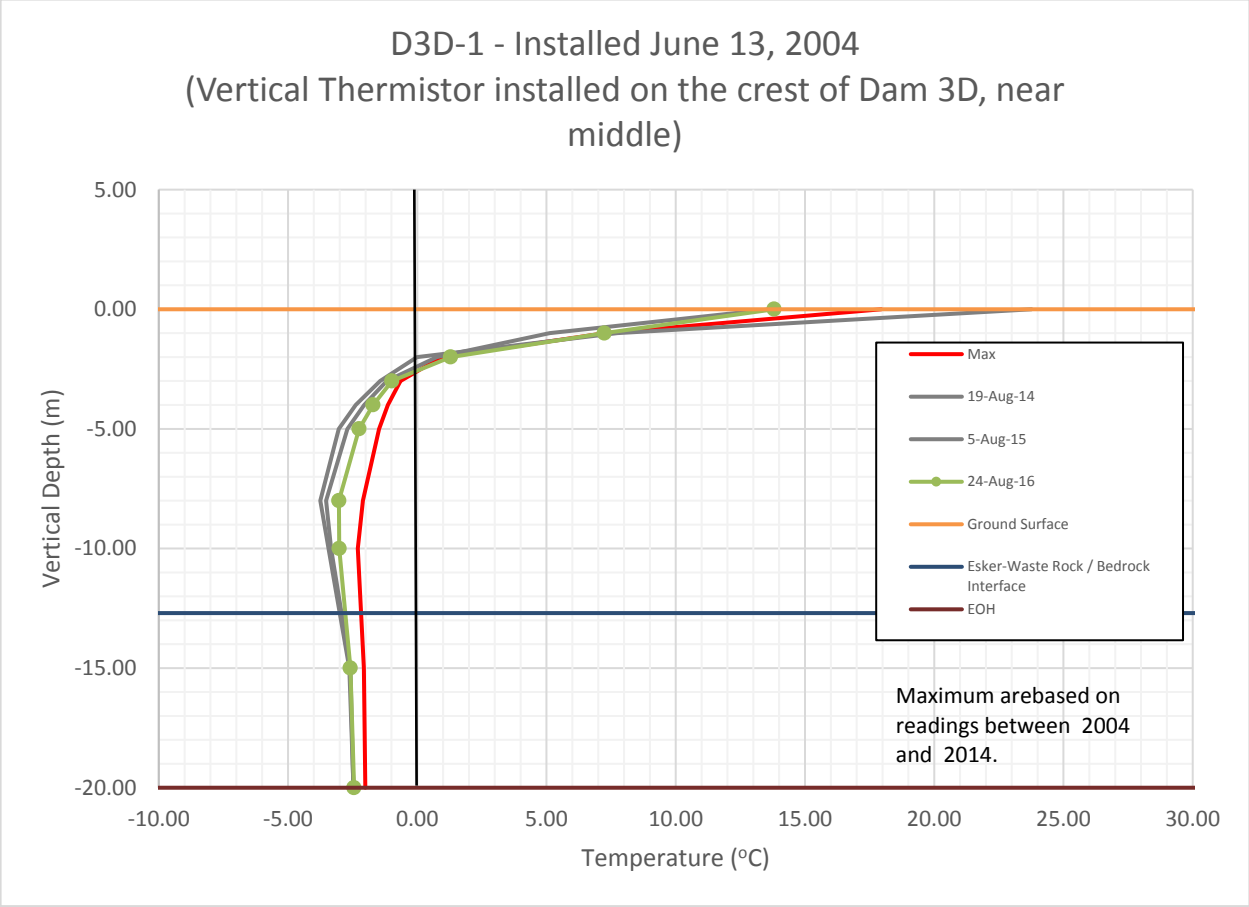

Figure 10: Thermistor Reading for D3D-1

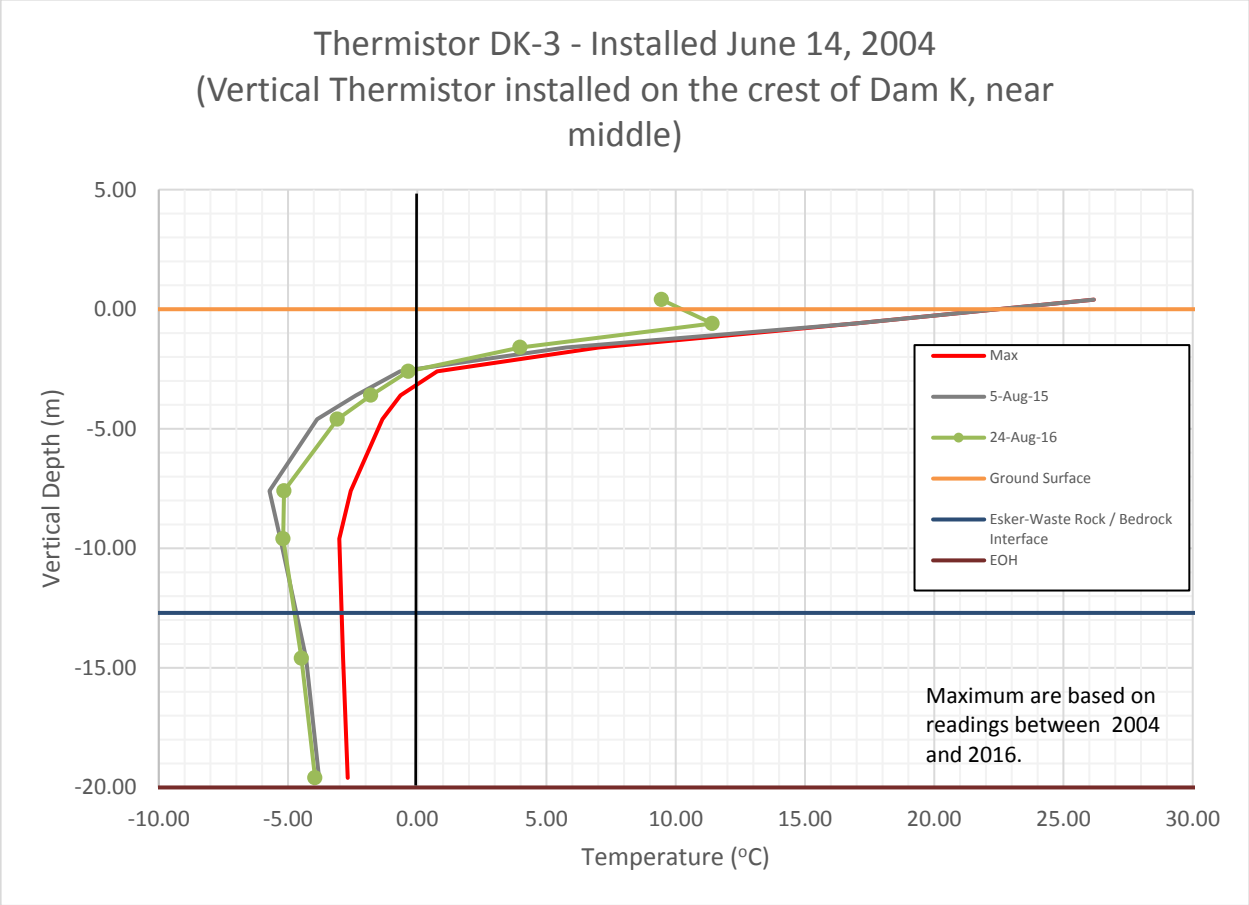

Figure 11 Thermistor Reading for DK-3

Readings from the four thermistors in the tailings cover are not presented in this report. The results are comparable to the readings from the dams. All the observed temperature deviations remained to be below 0°C and well below the active layer. The observed active layer depths remain within the site recorded data and information provided by national research (Penner 1983). The thermistor readings indicated that the frozen cores within the monitored dams are frozen below the active layer and are performing well within the regional climate disparities.

3.3 TCA Perimeter Dams

The perimeter dams (Dam 1A through Dam 6) were observed to be in stable condition, although some erosion was observed on dam slopes from either surface runoff or wave action at the high water mark (HMM). While most of the surface erosion was observed to be minor, repair work should be considered on the downstream face of Dam 1A (Photo 1 to 5). The rest of the dams should be monitored and repaired as needed, to prevent the erosion from becoming worse and creating preferential surface flow paths.

Previous annual inspections found seepage from the northern toe buttress of Dam 2 into the seepage collection pond adjacent to Dam 2 Lake. This seepage was observed in 2016 at less than 0.5L/min, similar to the flowrates observed since 2012 (Photo 16). The seepage was collected and periodically pumped back into Pond 2. Historically, seepage was observed in the western buttress of Dam 4 into Ferguson Lake back dating back to 2011. This seepage was not observed in 2016 and was not found in the previous four years.

The 2015 annual inspection noted work was done to repair an erosion gully over the crest of Dam 3 (Photo 20 to 23). The repair work was done by converting the erosion gully into an armored channel to facilitate the drainage in that area. Previously this area was vulnerable to erosion due to the poor grading in the storm drain along the upstream crest of Dam 3. The 2015 repair allows the flow to bypass the problematic section of the storm drain and prevent erosion damage to Dam 3. No new erosion damage was observed in the 2016 inspection along Dam 3.

The observed freeboard at the perimeter dams was around 4m, which represents a significant increase over past years. This exceeds the minimum requirement of 1m freeboard as stated in the water license. Dam 1B, 1C, Dam 5 and Dam 6 do not have water on the upstream face of the dams. There are areas of these dams that were previously submerged and now exposed for inspection. Overall, the reduction in water level has decreased the impact of the wave action and erosion at the high water mark (HWM) and has allowed access for maintenance and repair.

3.4 Internal Dams

All of the internal dams have some erosion on their slopes, associated with the sand and gravel construction material from either surface runoff or wave action at the HWM. Dam 3D also has some crest erosions from the surface runoff. Dam J (Photo 46 and 47) and Dam L (Photo 54) both have wave action erosion at the HWM that has reduced their crest widths. Maintenance should be considered to repair the erosion on the slope of Dam 3D, Dam J and Dam L.

Dam K has experienced considerable undercutting at the toe from Pond 2 wave action (Photo 48 to 52). The toe was previously submerged due to high water in Pond 2, and it is now exposed allowing inspection. The erosion has not yet migrated upwards to develop sloughing and cracks. The eroded toe section is currently less susceptible to erosion due to lowered water level. This area should be closely monitored for physical change and rising water level, and repair is recommended (see Table 3).

Previous inspections identified significant tension cracks in Dam M along the eastern (abutment to Dam J) and western (abutment to Dam N) sections of the downstream crest facing Pond 2. The cracks have been monitored since they were first observed back in 2012 (Photo 58). Recommendations were provided to mitigate the compromised sections in previous reports (SRK 2016 and SRK 2015). The lowered water level in Pond 2 allowed inspection of the downstream

toe undercuts and the sloughed material. The inspection revealed that an approximately 20m section of dam, near the mid-point, was constructed over loose poorly graded fine sand (Photo 63 and 64). This sand can be highly susceptible to erosion and would further compromises to the integrity of the dam if eroded. Significant undercuts and near vertical slopes were also found along the toe. This observation was communicated to Mr. Vokey on site.

The maintenance and repair of the tension cracks were near completion in Dam M at the time of the inspection (Photo 60 and 65). With the water level in Pond 2 lowered, LMI had started the repairs to the compromised sections of the dam. The repair was completed by constructing buttresses in front of the compromised areas, and sealing the cracks to limit infiltration into the core of the dam. The buttress was to be built up to 2/3 height of the dam in lifts of 1m with compacted esker sand and gravel at a slope of approximately 2H:1V. Compaction of the buttress was done with vehicle traffic. The toe of the buttress was armored with large boulders as riprap protection. The tension cracks on the crest were removed by excavation to 1m and replaced with compacted sand and gravel to limit infiltration. The western abutment is approximately 100m long, measured from Dam N abutment, and the eastern abutment is approximately 150m long, measured from Dam J abutment. The repairs are considered completed to mitigate the risks identified in 2015. Due to the observation of the poorly graded fine sand in 2016, Norwest recommended the western and eastern buttress to be connected to form a continuous buttress to protect the exposed sand in the toe before the end of the construction season. This was communicated to and agreed by Mr. Vokey.

The lowered Pond 2 water level allowed inspection of Dam N, which was inaccessible in 2015. The dam was observed to be in stable condition, but with only 0.5m freeboard between it and Pond 2 (Photo 73). This was communicated with LMI site personnel, and the need to increase the freeboard to 1m to meet water license requirement. Dam N and its contents were submerged in previous years, which did not appear to have had any adverse impact on water quality or geotechnical stability. The reduced freeboard does not create any geotechnical and environmental concerns as Dam N and its contents are contained within Pond 2.

The divider dykes at the east end of Cell 4 are in poor geotechnical condition. Signs of erosion, cracks, and sloughing were noted on the upstream and downstream sides of both dykes (Photo 75 to 80). Deformations have created an uneven crest and reduced its width to around 2m in some areas. The south divider dyke has experienced sufficient sloughing to create a low spot with a freeboard of 0.4m. The slopes of the dykes vary between 2H:1V to 1H:1V in some areas.

4 RECOMMENDATIONS

Table 3 summarizes the observations and recommendations from the 2016 inspection, together with the findings from the 2015 inspection for comparison. The highlighted recommendations are deemed to be high priority.

Table 3.
Inspection Observation and Recommendations

Inspection Item	2016 Inspection			2015 Inspection	
	Estimated Freeboard (m)	Observation	Recommendations	Observations	Recommendations
Perimeter Dams					
Dam 1A	3.7	Historical minor erosion on slopes with some deep erosion gullies	Repair deep erosion gullies.	Minor erosion on slopes with some deep erosion gullies	Repair deep erosion gullies.
Dam 1B	N/A(1)	Historical minor erosions in the slopes. One animal burrow at noted.	Surface maintenance, e.g. grading and backfilling. Monitor burrow activities.	Minor surface erosions	Surface maintenance, e.g. grading and backfilling
Dam 1C	N/A(1)	Historical minor erosions in the slopes.	Surface maintenance e.g. grading and backfilling.	Minor surface erosions. No cracks observed.	Surface maintenance e.g. grading and backfilling.
Dam 2	3.8	Historical minor erosions in the slopes. Seepage at northern abutment estimated at 0.5L/min. Seepage was collected and pumped back into Pond 2.	Surface maintenance e.g. grading and backfilling. Monitor the seepage and pump back into Pond 2 as necessary.	Minor surface erosion. Estimated seepage at the northern buttress is less than 0.1 L/min. Collection pond was emptied in 2015.	Monitor the seepage and water level in collection pond to pump the collected seepage back into Pond 2 as necessary.
Dam 3	No water is impounded by this dam	Repair done in 2015 on the eroded section of the dam crest by converting the gully into an armored channel. No new erosion was found in 2016. Historical erosion in the downstream slope.	Monitor the performance of the new armored channel for erosion and flow arounds.	Erosion has once again damaged the dam crest due to the poor storm ditch grading. Mitigation Included converting the erosion gully into an armored storm ditch to provide proper drainage.	Repairs were completed on the eroded section by LMI after the inspection. Monitoring should be carried out to check that the new ditch is performing as intended.
Dam 4	3.6	Historical minor erosions in the	Surface maintenance e.g.	Surface erosion with a number of erosion	Repair the deep erosion gullies,

Inspection Item	2016 Inspection			2015 Inspection	
	Estimated Freeboard (m)	Observation	Recommendations	Observations	Recommendations
		slopes. Historical exposed geogrid at the east abutment.	grading and backfilling. Monitor the exposed geogrid for changes and deformations.	gullies. Exposed geogrid observed near the eastern downstream toe of the dam.	regrade surface and backfill and depressions. Monitor the exposed geogrid for further erosion and potential water seepage.
Dam 5	N/A[1]	Historical minor erosions in the slopes.	Surface maintenance e.g. grading and backfilling.	Minor surface erosions.	Surface maintenance e.g. grading and backfilling.
Dam 6	N/A[1]	Ponding in a natural low at the south abutment. Historical erosion gullies in the downstream slope.	Surface maintenance e.g. grading and backfilling. Monitor the ponded water level in the south abutment.	Minor surface erosions.	Surface maintenance e.g. grading and backfilling.
Internal Dams					
Dam 3D	No water is impounded by this dam	Historical minor erosions in the slopes.	Surface and slope maintenance e.g. grading and backfilling.	Minor surface erosions.	Surface maintenance e.g. grading and backfilling.
Dam J	1.1[2]	Historical erosion gullies on slopes. Over steepened slope due to erosion and reduced crest width.	Repair the eroded slope and crest with compacted sand and gravel.	Reduced crest width due to erosion and placement of siphon pipes. Toe erosion likely due to wave action from Pond 1 and 2. Free board is around 0.2 m.	Repair eroded section and siphon pipes base. Rebuild crest width where possible. Place riprap along the dam face on both sides to protect against further erosion.
Dam K	N/A[1]	Erosion at HWM and historical erosion gullies in the downstream crest. Near vertical slope at the eroded toe. No animal burrows were observed.	Repair the eroded gullied at the crest and toe, and armor the slope up to the HWM with boulders to limit further erosion. Monitor the crest for cracks and sloughing until repairs are completed.	Downstream crest erosion and undercutting at toe from Pond 2 wave action. Animal burrows are noted.	Surface maintenance. e.g. backfilling and regrading Recommend placing riprap near the toe for erosion protection. Monitor the animal burrows activity in the dam and consult an animal specialist for mitigative measures

Inspection Item	2016 Inspection			2015 Inspection	
	Estimated Freeboard (m)	Observation	Recommendations	Observations	Recommendations
					if burrow activities increase.
Dam L	1.5[(2)]	Erosion in the crests and slopes.	Repair the eroded slope and armor the toe for protection. Monitor the water level in Cell 3 and manage as necessary.	Erosion of the dam face in Cell 3 and reduced crest width. Repair was done on the erosion damage from 2012.	Recommend placing riprap at the eroded areas for protection.
Dam M	2.5[(2)]	Cell 5 is mostly dewatered for risk mitigation and cover construction. Repairs are completed on the tension cracks and sloughing noted in previous inspection. Compacted sand and gravel buttresses, armored with boulders are built below the cracks. The cracks are excavated down to 1m and replaced with compacted sand and gravel to limit seepage into the core.	Join the repairs to form a continuous buttress by connecting the western and eastern buttresses. Monitor the repair for settlement, erosion, deformations.	Slope surface erosion. Tension cracks observed to be widening and lengthening prepared to previous year. Cracks are up to 30 m long and deeper than 30 cm.	Set up barricades on dam to prevent non-authorized personnel traffic. LMI should contact the engineer-of-record to identify proper mitigation repairs. Reference section 4.1 for detailed mitigation measures.
Dam N	0.5[(2)]	Minor wave action erosion at HWM.	Monitor the water level behind Dam N and manage it as necessary to yield minimum 1m freeboard.	Nearly submerged at the time of visit. Water is noted to pond in the western abutment.	Monitoring of the dam is recommended once the Pond 2 water level is lowered to allow observations.
Divider Dykes	0.4[(2)]	Erosion, sloughing and cracks along upstream and downstream of the dykes. Uneven crest level and reduced crest width.	Repair the dyke to original design with compacted sand and gravel. Monitor the water level in Cell 4 and manage as necessary to yield minimum 1m freeboard.	No observations were made in 2015.	No recommendations were provided in 2015.

Notes: 1. Water is not adjacent to the dam to determine available freeboard.

2. Freeboard at the lowest point of the dam and below the minimum requirement stated in the Water License (NWB 2015).

4.1 Mitigation for Dam K Wave Action Toe Erosion

The Dam K toe has significant erosion below the HWM from the wave action in Pond 2. The erosion has undercut the toe of the dam and created near vertical slopes in several areas. The undercutting makes the dam susceptible to instability such as sloughing and cracks. To mitigate these risks, Norwest recommends that LMI maintain the water level in Pond 2 as low as practicable to limit further erosion. The crest and slopes of the dam should be inspected for any deformation such as cracks, sloughs, scars, or settlement. Maintenance and repair should be completed to replace the eroded material with compacted sand and gravel armored with boulders/riprap for wave protection. All the work should be endorsed by the Engineer-of-Record prior to commencement.

4.2 Maintenance and Repairs

Of the repairs and maintenance recommended in Table 3**Error! Reference source not found.**, the following repairs should be prioritized:

1. Monitor the condition of the Divider Dykes. Repair the Divider Dykes with compacted sand and gravel to restore the original design configuration, including side slopes, a leveled crest and armoring up to the high water mark (HWM), as directed by the Engineer-of-Record.
2. Monitor the condition of Dam K. Repair the eroded toe at Dam K with compacted sand and gravel to restore the original design configuration and armor the repaired toe with boulders/riprap for wave protection.
3. Connect the eastern and western buttresses to form a continuous structure to protect Dam M's eroded downstream toe.
4. Monitor the water level behind Dam N and lower the water level to maintain a minimum 1m freeboard and prevent localized erosion of dam crest.
5. Monitor the water level in Cell 4 and lower the water level to maintain a minimum 1m freeboard and prevent overtopping of the Divider Dykes.

After the completion of the priority repairs, LMI should consider carrying out the following repairs after the prioritized repairs are completed:

- Monitor the seepage at Dam 2 and manage it as necessary by pumping the seepage back into Pond 2.
- Monitor the water level in Cell 5 and manage it as necessary by pumping the water to Pond 1.
- General repairs on surface and slope erosion at high water mark.

- Monitor animal burrow activities.
- Monitor the performance of the completed repair at Dam N for cracks, settlement, sloughs, sinkholes, erosion and other deformation.

All observations and records from monitoring should be included in the annual inspection report, and sent to a qualified person and the Engineer-of-Record for review.

4.3 Update of the Dam Safety Inspection Guideline

Prior to 2014, Dam 3D, Dam L and Dam N were not included in the annual inspections. Due the to change in 2014 Canadian Dam Association Guidelines (CDA 2014) that state any structure impounding liquefiable contents, such as unfrozen tailings, should be considered a dam, these dams have now been included in the annual dam safety inspection until the tailings behind these dams are confirmed to be non-liquefiable. The functioning thermistors within the tailings cover suggest the active layer is between 2m to 3m, and material beneath 3m is below 0°C. There is currently insufficient data and evidence to determine if the tailings beneath the cover, and above the permafrost, are non-liquefiable. Until such information is available, these dams need to be incorporated in to the annual inspection.

Should LMI wish to declassify Dam 3D, Dam L and Dam N as regulated dams according to the CDA guidelines, additional test work should be considered to confirm the tailings beneath the cover are non-liquefiable.

5 CLOSURE

This report has been prepared by Norwest for Lupin Mines Incorporated (LMI). The text contained herein presents documentation of the inspection carried out by Norwest with respect to the safe operation of the Lupin Mine, located in Nunavut, Canada. This report represents the opinion of Norwest based on information provided by LMI and observations made during limited site visits.

All the information contained herein has been interpreted by Alvin Tong, PEng., and has been reviewed by Tim Peterson, P.Eng.

Author

Alvin Tong, P.Eng.
Senior Geotechnical Engineer

Reviewed by:

Tim Peterson, P.Eng.
Senior Vice President

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Appendix A
Photograph and Inspection Logs

Photo 1: Looking east along the upstream slope. Note the erosion at the HWM.

Photo 2: Looking east along the crest. Note the water treatment equipment and work pad extending over the upstream slope

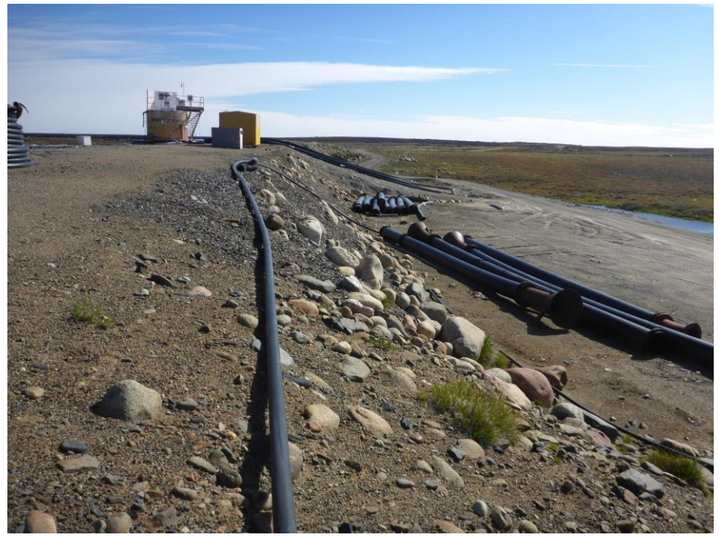

Photo 3: Looking east along the downstream slope. Note discharge siphons.

Photo 4: Looking east at the upstream slope at the over steepened work pad extension.

Photo 5: Panoramic view of the downstream slope at the siphon. Note the erosion gullies.

LMI	**Lupin Mine Incorporated**		
	2016 Dam Safety Inspection		
Site Inspection Photograph Log for Dam 1A			
NORWEST	PN: 924-2	**FIGURE 1**	REV. A

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Photo 6: Looking south along the upstream slope. Note there is no adjacent water.

Photo 7: Looking south along the crest.

Photo 8: Looking south along the downstream slope.

Photo 9: Looking south at the mid-point of the dam at the downstream crest. Note the animal burrow.

LMI	Lupin Mine Incorporated		
	2016 Dam Safety Inspection		
Site Inspection Photograph Log for Dam 1B			
NORWEST	PN: 924-2	FIGURE 2	REV. A

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Photo 10: Looking south along the upstream slope. Note there is no adjacent water.

Photo 11: Looking south along the crest.

Photo 12: Looking south along the downstream slope.

Photo 13: Looking at the erosion gully about 1/3 way past the north abutment.

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LMI	Lupin Mine Incorporated		
	2016 Dam Safety Inspection		
Site Inspection Photograph Log for Dam 1C			
NORWEST	PN: 924-2	FIGURE 3	REV. A

Photo 14: Looking south along the upstream slope. Note the erosion at the HWM.

Photo 15: Looking south along the downstream slope at the thermistor D2-00-2n.

Photo 16: Looking south at the seepage collection pond at northern buttress.

Photo 17: Looking south at the crest.

Photo 18: Panoramic view of the downstream slope at the seepage collection pond. Note the erosion gullies.

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LMI	Lupin Mine Incorporated			
	2016 Dam Safety Inspection			
Site Inspection Photograph Log for Dam 2				
NORWEST	PN: 924-2	FIGURE 4	REV. A	

Photo 19: Looking east along the upstream slope.

Photo 20: Looking west along crest and storm drain.

Photo 21: Looking north at the repair erosion gully with boulder armoring. Boomerang Lake is in the background.

Photo 22: Looking north at the original storm drain discharge.

Photo 23: Looking east at the crest and storm drain, with the repaired erosion gully to the left.

LMI	Lupin Mine Incorporated		
	2016 Dam Safety Inspection		
Site Inspection Photograph Log for Dam 3			
NORWEST	PN: 924-2	FIGURE 5	REV. A

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Photo 24: Looking east from the west abutment along the upstream slope.

Photo 25: Looking west along crest and upstream slope at the upstream crest 1/3 distance away from west abutment.

Photo 26: Looking west at the downstream slope from the east abutment

Photo 27: Looking at the erosion gully over the downstream crest at the east abutment

Photo 28: Looking east at the downstream slope at the east abutment. Note the erosion gullies and exposed geogrid.

LMI	**Lupin Mine Incorporated**		
	2016 Dam Safety Inspection		
Site Inspection Photograph Log for Dam 4			
NORWEST	PN: 924-2	**FIGURE 6**	REV. A

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Photo 29: Looking east from the west abutment along the upstream slope.

Photo 30: Looking west along crest from the west abutment.

Photo 31: Looking west at the downstream slope from the west abutment

Photo 32: Panoramic view of the downstream slope.

LMI	Lupin Mine Incorporated		
	2016 Dam Safety Inspection		
Site Inspection Photograph Log for Dam 5			
NORWEST	PN: 924-2	FIGURE 7	REV. A

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Photo 33: Looking south from the north abutment at the crest and downstream toe.

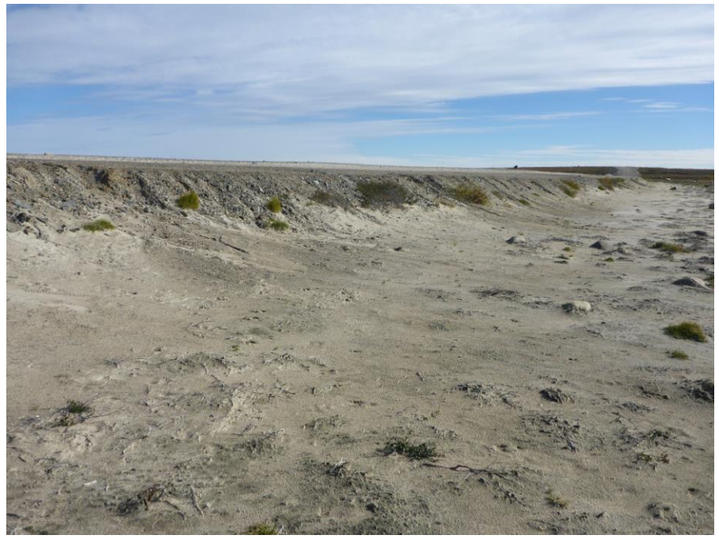

Photo 34: Looking at the downstream slope from the north abutment. Note the erosion gullies.

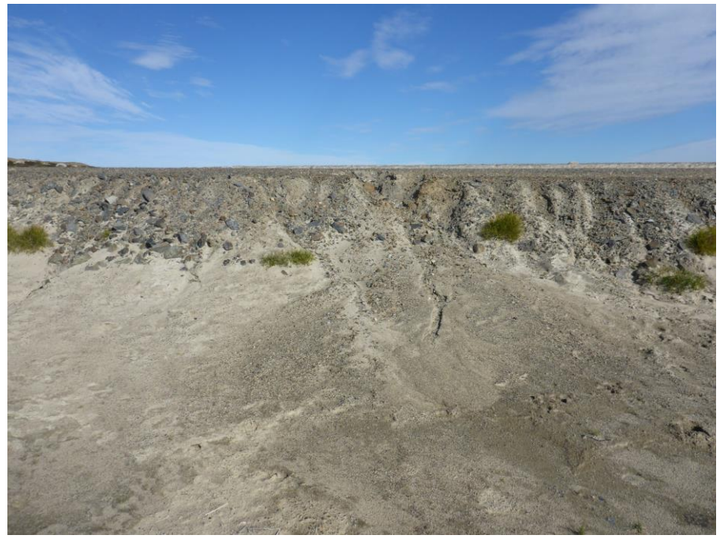

Photo 35: Close up view of the erosion gullies in the downstream slope at the mid-point of the dam.

Photo 36: Looking south at the erosion gully over the downstream crest at the mid-point of the dam.

Photo 37: Looking north from the south abutment at the crest with the Cell 3 cover in the background. Note the ponding water near the south abutment.

LMI	Lupin Mine Incorporated		
	2016 Dam Safety Inspection		
Site Inspection Photograph Log for Dam 6			
NORWEST	PN: 924-2	FIGURE 8	REV. A

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Photo 38: Looking east at the downstream slope from the west abutment.

Photo 39: Looking west at the downstream slope at the mid-point of the dam.

Photo 40: Looking east at the crest from thermistor D3D-1, with the Cell 1 cover to the right and mine rock buttress to the left.

Photo 41: Looking east at the crest from the thermistor D3D-1, with the Cell 1 cover to the left and mine rock buttress to the right.

Photo 42: Looking west at the mine rock buttress crest.

LMI	Lupin Mine Incorporated			
	2016 Dam Safety Inspection			
Site Inspection Photograph Log for Dam 3D				
NORWEST	PN: 924-2	FIGURE 9	REV. A	

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Photo 43: Looking south at the upstream slope (facing Pond 1). Note the erosion at the HWM.

Photo 44: Looking north at the upstream slope (facing Pond 1). Note the erosion at the HWM.

Photo 45: Looking south at the crest.

Photo 46: Looking south at the downstream slope (facing Pond 2). Note the undercut and erosion at the HWM.

Photo 47: Close up looking north at the downstream slope (facing Pond 2). Note the undercut has caused sloughing and reduce crest width.

LMI	Lupin Mine Incorporated		
	2016 Dam Safety Inspection		
Site Inspection Photograph Log for Dam J			
NORWEST	PN: 924-2	FIGURE 10	REV. A

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Photo 48: Looking south at the downstream slope (facing Pond 2) from north abutment of Dam J. Note the undercut erosion at the HWM.

Photo 49: Looking west at the downstream slope from the toe of the dam. Note the near vertical eroded slope.

Photo 50: Close up look at the undercut erosion and the near vertical slope.

Photo 51: Close up look at an erosion gully over the downstream crest at mid-point of the dam. Note the sloughing at the toe.

Photo 52: Close up look at the sloughing near the mid-point of the dam from the toe.

LMI	**Lupin Mine Incorporated**	
	2016 Dam Safety Inspection	
Site Inspection Photograph Log for Dam K		
NORWEST	PN: 924-2	**FIGURE 11** REV. A

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Photo 53: Looking north at the upstream slope (facing Cell 3) and the crest from the south abutment. Note the Cell 3 cover in the left horizon.

Photo 54: Looking north at the upstream slope (facing Cell 3). Note the erosion at the HWM.

Photo 55: Looking north at the downstream slope (facing Cell 4).

Photo 56: Looking south at the south abutment, with Cell 3 to the right and Cell 4 to the left.

Photo 57: Close up look at an erosion gully over the downstream crest south of the Cell 3 cover boundary.

LMI	Lupin Mine Incorporated			
	2016 Dam Safety Inspection			
Site Inspection Photograph Log for Dam L				
NORWEST	PN: 924-2	FIGURE 12	REV. A	

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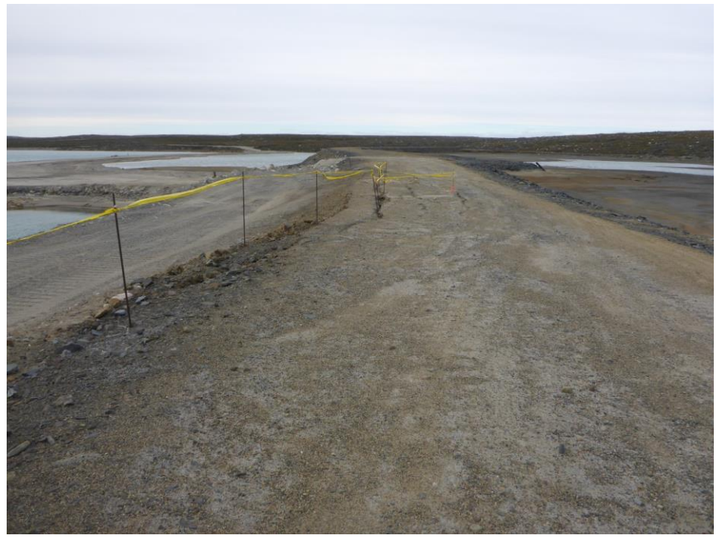

Photo 58: Looking northwest at the start of the western buttress in front of the downstream cracks at the Dam N abutment.

Photo 59: Looking northwest at the upstream slope (facing Cell 5). Note the lowered water level and exposed tailings beach.

Photo 60: Looking southeast at the start of the western buttress from the Dam N abutment.

Photo 61: Looking southeast at the downstream slope from the western buttress.

Photo 62: Looking northwest at the western buttress from the toe near the mid-point of the dam.

Photo 63: Looking at the undercut and sloughed downstream toe near the mid-point of the dam. Note the exposed loose poorly graded fine sand foundation.

LMI	Lupin Mine Incorporated		
	2016 Dam Safety Inspection		
Site Inspection Photograph Log for Dam M			
NORWEST	PN: 924-2	FIGURE 13	REV. A

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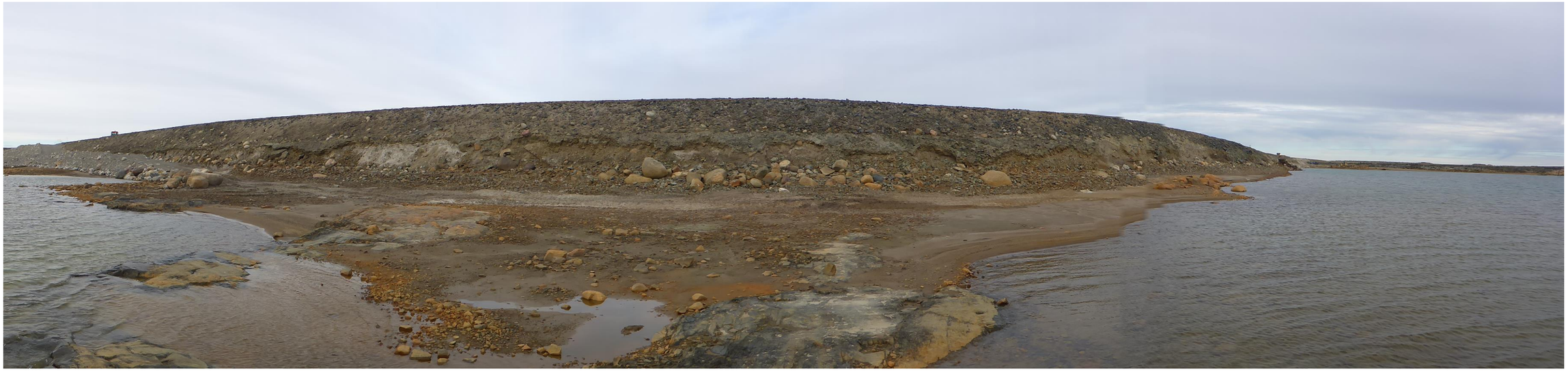

Photo 64: Panoramic view of the downstream slope from the mid-point of the dam. Note the undercut erosion and sloughing material. The loose fine sand foundation can be seen beyond the western buttress at the left.

Photo 65: Panoramic view of the eastern buttress construction near the Dam J abutment.

LMI	Lupin Mine Incorporated			
	2016 Dam Safety Inspection			
Site Inspection Photograph Log for Dam M				
NORWEST	PN: 924-2	FIGURE 14	REV. A	

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Photo 66: Looking northwest from the start of the eastern buttress on its first lift.

Photo 67: Looking northwest at the undercut erosion at the HWM beyond the eastern buttress.

Photo 68: The significant undercut in the downstream slope at 1/3 way down from the Dam J abutment.

Photo 69: Close up look at the significant undercut.

Photo 70: Looking southeast at cracks along the downstream crest near Dam J abutment, above the eastern buttress.

LMI	Lupin Mine Incorporated			
	2016 Dam Safety Inspection			
Site Inspection Photograph Log for Dam M				
NORWEST	PN: 924-2	FIGURE 15	REV. A	

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Photo 71 Looking northwest at the downstream slope (facing Pond 2).

Photo 72: Looking northwest at the crest toward the north abutment. Note the water behind the dam (right) is approximately 0.5m below the crest.

Photo 73: Looking northwest at the upstream slope.

Photo 74: Looking north at the Dam M abutment. Note the Dam M western buttress right of the abutment.

LMI	Lupin Mine Incorporated		
	2016 Dam Safety Inspection		
Site Inspection Photograph Log for Dam N			
NORWEST	PN: 924-2	FIGURE 16	REV. A

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Photo 75: Looking north at the upstream slope of the South Divider Dyke. Note the erosion at the HWM.

Photo 76: Looking north at the downstream slope of the South Divider Dyke. Note the sloughing and cracks.

Photo 77: Looking south at the upstream slope and value control at the North Divider Dyke.

Photo 78: Looking south at the downstream slope of the North Divider Dyke. Note the flow control culvert at the toe of the dyke.

Photo 79: Looking north from value control at the crest of the North Divider Dyke. Note the sloughing, cracks and reduced width of the crest.

Photo 80: Looking west at the downstream slope of South Divider Dyke. Note the low spot in the middle of the dyke.

LMI	**Lupin Mine Incorporated**
	2016 Dam Safety Inspection
Site Inspection Photograph Log for Divider Dyke	
NORWEST	PN: 924-2 **FIGURE 17** REV. A

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Appendix B
Inspection Logs

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM SUMMARY INFORMATION

SITE: Lupin Mine

OWNER: Lupin Mine Incorporated

STRUCTURE: Tailings Containment Area

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
PURPOSE OF DAM	Tailings and water containment
DAM CLASSIFICATION	Low to Significant
DATE OF LAST DSR	2015
DATE OF NEXT DSR	2020
ORIGINAL DESIGN ENGINEER	Geocon
CURRENT DESIGN ENGINEER	Golder Associates
LENGTH AND MAX. HEIGHT	Max Individual Dam Length = 930m, Max Individual Height = 6.2m
CREST WIDTH	Variable between 2m to 10m
STORAGE VOLUME	Information not available
CONSTRUCTION METHOD	Sand and gravel frozen core dam with geosynthetics liner cutoff
POND ADJACENT TO DAM	Pond is adjacent to most perimeter dams and some internal dams
DESIGN BEACH WIDTH	Information not available
CURRENT BEACH WIDTH	between 0 and 200m
DISCHARGE STRUCTURES	Siphons over Dam 1A during water treatment
EMERGENCY DISCHARGE STRUCTURES	None. Fully enclosed facility
CURRENT DAM ELEVATION	Approximately 486.2m
CURRENT POND ELEVATION	Approximately 482.2m
DATE OF LAST DAM RAISE	2005
FINAL DAM ELEVATION	Approximately 486.2m
MINE PRODUCTION RATE	None. Currently at care and maintenance status
TAILINGS DEPOSITION METHOD	None. Currently at care and maintenance status
DAM INSTRUMENTATION	Thermistors in some dams
DESIGN/AS-BUILT INFO. AVAILABLE	Last design by BGC Engineering in 2003
SURVEILLANCE PROGRAM AVAILABLE	Annual geotechnical inspection
WATERSHED AREA	Combined totall approximately 1,188 ha.

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

Site consist of eight preimeter dams and seven internal dams.

PREPARED BY: REVIEWED BY: PROJECT #:

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Dam 1A

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	None

UPSTREAM DAM SLOPE / BEACH

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Concern with water level / freeboard		x			
Beach development		x			
Wave or other erosion	x		Upstream Slope	1	
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern	x		Water treatment Pad	4	Over steepened slope
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

DAM CREST

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Crest width / access		x			
Evidence of erosion	x		Downstream crest	3	
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Settlement		x			
Low areas (sinkholes) or ponded water		x			
Instrumentation	x			2	Thermistor D1A-00-01s
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Dam 1A

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	

DOWNSTREAM DAM SLOPE

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Erosion	x		downstream slope	5	
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Non-uniform slope		x			
Other noteworthy conditions		x			

DAM ABUTMENTS

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Erosion		x			
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine

OWNER: Lupin Mine Incorporated

STRUCTURE Dam 1A

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	

DOWNSTREAM TOE

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Soft toe conditions		x			
Evidence of boils		x			
Evidence of contamination		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

SPILLWAY OR DISCHARGE STRUCTURES

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Control structures	x		Mid-point	3, 5	
Blockages or debris		x			
Erosion		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE: Dam 1A

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
CHANGES SINCE LAST INSPECTION	

OPERATIONS, MAINTENANCE AND SURVEILLANCE SYSTEMS

FEATURES	YES	NO	DOCUMENTS / COMMENTS / NOTES
Regular inspections	x		Annual geotechnical inspection with weekly inspection in s
Qualified personnel completing surveillance	x		PEng for annual and technical for weekly
Processes & procedures established & documented	x		As per CDA and BCWMB guidelines
Critical failure modes understood	x		Overtopping and thaw of frozen core
Monitoring addresses critical failure modes	x		water level and core temperature are monitored
Monitoring frequency adequate	x		Annual reading of instruments and periodically monitoring
Timely review of monitoring results	x		All results are reviewed within 60 days
Alarm thresholds in place and relevant	x		1m freeboard specified by Water License. Water balance su
Deficiencies tracked and corrected	x		All geotech deformations recorded. Repairs are completed
Maintenance procedures documented	x		Maintenance is documented in the Annual Report
Foundation adequately characterized		x	Unknown. Limited design is available
Foundation responds to loading conditions	x		No minor deformation recorded to date.
Contingency plans available	x		EPP is sufficient for care and maintenance status
Tailings management plans followed		x	No tailings deposition since 2005
Water balance is adequate	x		Water balance is completed in 2015
Backup power available for critical systems		x	No tailings deposition since 2005

ADDITONAL NOTES / REFERENCES / INTERVIEWS

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE: Dam 1A

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
CHANGES SINCE LAST INSPECTION	

DAM SAFETY MANAGEMENT SYSTEMS

FEATURES	YES	NO	DOCUMENTS / COMMENTS / NOTES
Corporate tailings management policy statement		x	See note 1 below.
Tailings management accountability assigned		x	See note 1 below.
Objectives and targets established		x	See note 1 below.
Roles and responsibilities assigned and understood		x	See note 1 below.
Succession planning		x	See note 1 below.
Adequate resources assigned		x	See note 1 below.
Training systems in place		x	See note 1 below.
Periodic reporting to management and regulator		x	See note 1 below.
Regulations, permits and commitments understood		x	See note 1 below.
Regulatory compliance measured	x		As per annual inspection
Formal risk management plan in place		x	See note 1 below.
Potential failure mode analysis completed		x	See note 1 below.
Communication systems in place		x	See note 1 below.
ERP/EPP developed and tested	x		EPP is in place but not tested
Decommissioning and closure accounted for	x		Active reclamation is compliance to the Closure Plan
Document management system in place	x		Documented in Annual Report.
Corporate review of tailings management		x	See note 1 below.
Adequate financial resources assigned		x	See note 1 below.

This Dam Facility Inspection Form follows the philosophy and intent of the following guidelines:

- Canadian Dam Association (CDA) Technical Bulletin: Dam Safety Reviews (DRAFT, 2015)
- Mining Association of Canada (MAC): A Guide to Audit and Assessment of Tailings Facility Management (2011)
- Association of Professional Engineers and Geoscientists of BC (APEGBC): Professional Practice Guidelines - Legislated Dam Safety Reviews in BC

ADDITONAL NOTES / REFERENCES / INTERVIEWS

1. No tailings has been deposit since 2005. The site is currently on care and maintenance. Tailings deposition procedures, documentations, and regulation requirements will be updated once the site go into production.

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM SUMMARY INFORMATION

SITE: Lupin Mine

OWNER: Lupin Mine Incorporated

STRUCTURE: Tailings Containment Area

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
PURPOSE OF DAM	Tailings and water containment
DAM CLASSIFICATION	Low to Significant
DATE OF LAST DSR	2015
DATE OF NEXT DSR	2020
ORIGINAL DESIGN ENGINEER	Geocon
CURRENT DESIGN ENGINEER	Golder Associates
LENGTH AND MAX. HEIGHT	Max Individual Dam Length = 930m, Max Individual Height = 6.2m
CREST WIDTH	Variable between 2m to 10m
STORAGE VOLUME	Information not available
CONSTRUCTION METHOD	Sand and gravel frozen core dam with geosynthetics liner cutoff
POND ADJACENT TO DAM	Pond is adjacent to most perimeter dams and some internal dams
DESIGN BEACH WIDTH	Information not available
CURRENT BEACH WIDTH	between 0 and 200m
DISCHARGE STRUCTURES	Siphons over Dam 1A during water treatment
EMERGENCY DISCHARGE STRUCTURES	None. Fully enclosed facility
CURRENT DAM ELEVATION	Approximately 486.2m
CURRENT POND ELEVATION	Approximately 482.2m
DATE OF LAST DAM RAISE	2005
FINAL DAM ELEVATION	Approximately 486.2m
MINE PRODUCTION RATE	None. Currently at care and maintenance status
TAILINGS DEPOSITION METHOD	None. Currently at care and maintenance status
DAM INSTRUMENTATION	Thermistors in some dams
DESIGN/AS-BUILT INFO. AVAILABLE	Last design by BGC Engineering in 2003
SURVEILLANCE PROGRAM AVAILABLE	Annual geotechnical inspection
WATERSHED AREA	Combined totall approximately 1,188 ha.

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

Site consist of eight preimeter dams and seven internal dams.

PREPARED BY: REVIEWED BY: PROJECT #:

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Dam 1B

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	None

UPSTREAM DAM SLOPE / BEACH

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Concern with water level / freeboard		x			
Beach development		x			
Wave or other erosion		x			
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

DAM CREST

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Crest width / access		x			
Evidence of erosion		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Settlement		x			
Low areas (sinkholes) or ponded water		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions	x		mid-point of dam	9	animal burrow.

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Dam 1B

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	

DOWNSTREAM DAM SLOPE

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Erosion	x		downstream slope	8	
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Non-uniform slope		x			
Other noteworthy conditions		x			

DAM ABUTMENTS

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Erosion		x			
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine

OWNER: Lupin Mine Incorporated

STRUCTURE Dam 1B

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	

DOWNSTREAM TOE

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Soft toe conditions		x			
Evidence of boils		x			
Evidence of contamination		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

SPILLWAY OR DISCHARGE STRUCTURES

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Control structures		x			
Blockages or debris		x			
Erosion		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE: Dam 1B

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
CHANGES SINCE LAST INSPECTION	

OPERATIONS, MAINTENANCE AND SURVEILLANCE SYSTEMS

FEATURES	YES	NO	DOCUMENTS / COMMENTS / NOTES
Regular inspections	x		Annual geotechnical inspection with weekly inspection in s
Qualified personnel completing surveillance	x		PEng for annual and technical for weekly
Processes & procedures established & documented	x		As per CDA and BCWMB guidelines
Critical failure modes understood	x		Overtopping and thaw of frozen core
Monitoring addresses critical failure modes	x		water level and core temperature are monitored
Monitoring frequency adequate	x		Annual reading of instruments and periodically monitoring
Timely review of monitoring results	x		All results are reviewed within 60 days
Alarm thresholds in place and relevant	x		1m freeboard specified by Water License. Water balance su
Deficiencies tracked and corrected	x		All geotech deformations recorded. Repairs are completed
Maintenance procedures documented	x		Maintenance is documented in the Annual Report
Foundation adequately characterized		x	Unknown. Limited design is available
Foundation responds to loading conditions	x		No minor deformation recorded to date.
Contingency plans available	x		EPP is sufficient for care and maintenance status
Tailings management plans followed		x	No tailings deposition since 2005
Water balance is adequate	x		Water balance is completed in 2015
Backup power available for critical systems		x	No tailings deposition since 2005

ADDITONAL NOTES / REFERENCES / INTERVIEWS

PREPARED BY: REVIEWED BY: PROJECT #:

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE: Dam 1B

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
CHANGES SINCE LAST INSPECTION	

DAM SAFETY MANAGEMENT SYSTEMS

FEATURES	YES	NO	DOCUMENTS / COMMENTS / NOTES
Corporate tailings management policy statement		x	See note 1 below.
Tailings management accountability assigned		x	See note 1 below.
Objectives and targets established		x	See note 1 below.
Roles and responsibilities assigned and understood		x	See note 1 below.
Succession planning		x	See note 1 below.
Adequate resources assigned		x	See note 1 below.
Training systems in place		x	See note 1 below.
Periodic reporting to management and regulator		x	See note 1 below.
Regulations, permits and commitments understood		x	See note 1 below.
Regulatory compliance measured	x		As per annual inspection
Formal risk management plan in place		x	See note 1 below.
Potential failure mode analysis completed		x	See note 1 below.
Communication systems in place		x	See note 1 below.
ERP/EPP developed and tested	x		EPP is in place but not tested
Decommissioning and closure accounted for	x		Active reclamation is compliance to the Closure Plan
Document management system in place	x		Documented in Annual Report.
Corporate review of tailings management		x	See note 1 below.
Adequate financial resources assigned		x	See note 1 below.

This Dam Facility Inspection Form follows the philosophy and intent of the following guidelines:

- Canadian Dam Association (CDA) Technical Bulletin: Dam Safety Reviews (DRAFT, 2015)
- Mining Association of Canada (MAC): A Guide to Audit and Assessment of Tailings Facility Management (2011)
- Association of Professional Engineers and Geoscientists of BC (APEGBC): Professional Practice Guidelines - Legislated Dam Safety Reviews in BC

ADDITONAL NOTES / REFERENCES / INTERVIEWS

1. No tailings has been deposit since 2005. The site is currently on care and maintenance. Tailings deposition procedures, documentations, and regulation requirements will be updated once the site go into production.

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM SUMMARY INFORMATION

SITE: Lupin Mine

OWNER: Lupin Mine Incorporated

STRUCTURE: Tailings Containment Area

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
PURPOSE OF DAM	Tailings and water containment
DAM CLASSIFICATION	Low to Significant
DATE OF LAST DSR	2015
DATE OF NEXT DSR	2020
ORIGINAL DESIGN ENGINEER	Geocon
CURRENT DESIGN ENGINEER	Golder Associates
LENGTH AND MAX. HEIGHT	Max Individual Dam Length = 930m, Max Individual Height = 6.2m
CREST WIDTH	Variable between 2m to 10m
STORAGE VOLUME	Information not available
CONSTRUCTION METHOD	Sand and gravel frozen core dam with geosynthetics liner cutoff
POND ADJACENT TO DAM	Pond is adjacent to most perimeter dams and some internal dams
DESIGN BEACH WIDTH	Information not available
CURRENT BEACH WIDTH	between 0 and 200m
DISCHARGE STRUCTURES	Siphons over Dam 1A during water treatment
EMERGENCY DISCHARGE STRUCTURES	None. Fully enclosed facility
CURRENT DAM ELEVATION	Approximately 486.2m
CURRENT POND ELEVATION	Approximately 482.2m
DATE OF LAST DAM RAISE	2005
FINAL DAM ELEVATION	Approximately 486.2m
MINE PRODUCTION RATE	None. Currently at care and maintenance status
TAILINGS DEPOSITION METHOD	None. Currently at care and maintenance status
DAM INSTRUMENTATION	Thermistors in some dams
DESIGN/AS-BUILT INFO. AVAILABLE	Last design by BGC Engineering in 2003
SURVEILLANCE PROGRAM AVAILABLE	Annual geotechnical inspection
WATERSHED AREA	Combined totall approximately 1,188 ha.

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

Site consist of eight preimeter dams and seven internal dams.

PREPARED BY: REVIEWED BY: PROJECT #:

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Dam 1C

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	None

UPSTREAM DAM SLOPE / BEACH

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Concern with water level / freeboard		x			
Beach development		x			
Wave or other erosion		x			
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

DAM CREST

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Crest width / access		x			
Evidence of erosion		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Settlement		x			
Low areas (sinkholes) or ponded water		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Dam 1C

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	

DOWNSTREAM DAM SLOPE

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Erosion	x		downstream slope	13	erosion gully
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Non-uniform slope		x			
Other noteworthy conditions		x			

DAM ABUTMENTS

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Erosion		x			
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Dam 1C

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	

DOWNSTREAM TOE

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Soft toe conditions		x			
Evidence of boils		x			
Evidence of contamination		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

SPILLWAY OR DISCHARGE STRUCTURES

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Control structures		x			
Blockages or debris		x			
Erosion		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE: Dam 1C

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
CHANGES SINCE LAST INSPECTION	

OPERATIONS, MAINTENANCE AND SURVEILLANCE SYSTEMS

FEATURES	YES	NO	DOCUMENTS / COMMENTS / NOTES
Regular inspections	x		Annual geotechnical inspection with weekly inspection in s
Qualified personnel completing surveillance	x		PEng for annual and technical for weekly
Processes & procedures established & documented	x		As per CDA and BCWMB guidelines
Critical failure modes understood	x		Overtopping and thaw of frozen core
Monitoring addresses critical failure modes	x		water level and core temperature are monitored
Monitoring frequency adequate	x		Annual reading of instruments and periodically monitoring
Timely review of monitoring results	x		All results are reviewed within 60 days
Alarm thresholds in place and relevant	x		1m freeboard specified by Water License. Water balance su
Deficiencies tracked and corrected	x		All geotech deformations recorded. Repairs are completed
Maintenance procedures documented	x		Maintenance is documented in the Annual Report
Foundation adequately characterized		x	Unknown. Limited design is available
Foundation responds to loading conditions	x		No minor deformation recorded to date.
Contingency plans available	x		EPP is sufficient for care and maintenance status
Tailings management plans followed		x	No tailings deposition since 2005
Water balance is adequate	x		Water balance is completed in 2015
Backup power available for critical systems		x	No tailings deposition since 2005

ADDITONAL NOTES / REFERENCES / INTERVIEWS

PREPARED BY: REVIEWED BY: PROJECT #:

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE: Dam 1C

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
CHANGES SINCE LAST INSPECTION	

DAM SAFETY MANAGEMENT SYSTEMS

FEATURES	YES	NO	DOCUMENTS / COMMENTS / NOTES
Corporate tailings management policy statement		x	See note 1 below.
Tailings management accountability assigned		x	See note 1 below.
Objectives and targets established		x	See note 1 below.
Roles and responsibilities assigned and understood		x	See note 1 below.
Succession planning		x	See note 1 below.
Adequate resources assigned		x	See note 1 below.
Training systems in place		x	See note 1 below.
Periodic reporting to management and regulator		x	See note 1 below.
Regulations, permits and commitments understood		x	See note 1 below.
Regulatory compliance measured	x		As per annual inspection
Formal risk management plan in place		x	See note 1 below.
Potential failure mode analysis completed		x	See note 1 below.
Communication systems in place		x	See note 1 below.
ERP/EPP developed and tested	x		EPP is in place but not tested
Decommissioning and closure accounted for	x		Active reclamation is compliance to the Closure Plan
Document management system in place	x		Documented in Annual Report.
Corporate review of tailings management		x	See note 1 below.
Adequate financial resources assigned		x	See note 1 below.

This Dam Facility Inspection Form follows the philosophy and intent of the following guidelines:

- Canadian Dam Association (CDA) Technical Bulletin: Dam Safety Reviews (DRAFT, 2015)
- Mining Association of Canada (MAC): A Guide to Audit and Assessment of Tailings Facility Management (2011)
- Association of Professional Engineers and Geoscientists of BC (APEGBC): Professional Practice Guidelines - Legislated Dam Safety Reviews in BC

ADDITONAL NOTES / REFERENCES / INTERVIEWS

1. No tailings has been deposit since 2005. The site is currently on care and maintenance. Tailings deposition procedures, documentations, and regulation requirements will be updated once the site go into production.

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM SUMMARY INFORMATION

SITE: Lupin Mine

OWNER: Lupin Mine Incorporated

STRUCTURE: Tailings Containment Area

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
PURPOSE OF DAM	Tailings and water containment
DAM CLASSIFICATION	Low to Significant
DATE OF LAST DSR	2015
DATE OF NEXT DSR	2020
ORIGINAL DESIGN ENGINEER	Geocon
CURRENT DESIGN ENGINEER	Golder Associates
LENGTH AND MAX. HEIGHT	Max Individual Dam Length = 930m, Max Individual Height = 6.2m
CREST WIDTH	Variable between 2m to 10m
STORAGE VOLUME	Information not available
CONSTRUCTION METHOD	Sand and gravel frozen core dam with geosynthetics liner cutoff
POND ADJACENT TO DAM	Pond is adjacent to most perimeter dams and some internal dams
DESIGN BEACH WIDTH	Information not available
CURRENT BEACH WIDTH	between 0 and 200m
DISCHARGE STRUCTURES	Siphons over Dam 1A during water treatment
EMERGENCY DISCHARGE STRUCTURES	None. Fully enclosed facility
CURRENT DAM ELEVATION	Approximately 486.2m
CURRENT POND ELEVATION	Approximately 482.2m
DATE OF LAST DAM RAISE	2005
FINAL DAM ELEVATION	Approximately 486.2m
MINE PRODUCTION RATE	None. Currently at care and maintenance status
TAILINGS DEPOSITION METHOD	None. Currently at care and maintenance status
DAM INSTRUMENTATION	Thermistors in some dams
DESIGN/AS-BUILT INFO. AVAILABLE	Last design by BGC Engineering in 2003
SURVEILLANCE PROGRAM AVAILABLE	Annual geotechnical inspection
WATERSHED AREA	Combined totall approximately 1,188 ha.

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

Site consist of eight preimeter dams and seven internal dams.

PREPARED BY: REVIEWED BY: PROJECT #:

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine

OWNER: Lupin Mine Incorporated

STRUCTURE Dam 1A

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	None

UPSTREAM DAM SLOPE / BEACH

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Concern with water level / freeboard		x			
Beach development		x			
Wave or other erosion	x		upstream slope	14	wave erosion
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

DAM CREST

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Crest width / access		x			
Evidence of erosion		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Settlement		x			
Low areas (sinkholes) or ponded water		x			
Instrumentation	x		North abutment	15	Thermistor D2-00-2n
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Dam 1A

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	

DOWNSTREAM DAM SLOPE

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Erosion	x		downstream slope	16, 18	erosion gullies
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Non-uniform slope		x			
Other noteworthy conditions		x			

DAM ABUTMENTS

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Erosion		x			
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine

OWNER: Lupin Mine Incorporated

STRUCTURE Dam 2

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	

DOWNSTREAM TOE

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage	x		north abutment	16, 18	historical seepage at 0.5L/min
Areas of seepage turbid		x			
Soft toe conditions		x			
Evidence of boils		x			
Evidence of contamination		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

SPILLWAY OR DISCHARGE STRUCTURES

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Control structures		x			
Blockages or debris		x			
Erosion		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE: Dam 1A

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
CHANGES SINCE LAST INSPECTION	

OPERATIONS, MAINTENANCE AND SURVEILLANCE SYSTEMS

FEATURES	YES	NO	DOCUMENTS / COMMENTS / NOTES
Regular inspections	x		Annual geotechnical inspection with weekly inspection in s
Qualified personnel completing surveillance	x		PEng for annual and technical for weekly
Processes & procedures established & documented	x		As per CDA and BCWMB guidelines
Critical failure modes understood	x		Overtopping and thaw of frozen core
Monitoring addresses critical failure modes	x		water level and core temperature are monitored
Monitoring frequency adequate	x		Annual reading of instruments and periodically monitoring
Timely review of monitoring results	x		All results are reviewed within 60 days
Alarm thresholds in place and relevant	x		1m freeboard specified by Water License. Water balance su
Deficiencies tracked and corrected	x		All geotech deformations recorded. Repairs are completed
Maintenance procedures documented	x		Maintenance is documented in the Annual Report
Foundation adequately characterized		x	Unknown. Limited design is available
Foundation responds to loading conditions	x		No minor deformation recorded to date.
Contingency plans available	x		EPP is sufficient for care and maintenance status
Tailings management plans followed		x	No tailings deposition since 2005
Water balance is adequate	x		Water balance is completed in 2015
Backup power available for critical systems		x	No tailings deposition since 2005

ADDITONAL NOTES / REFERENCES / INTERVIEWS

PREPARED BY: REVIEWED BY: PROJECT #:

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE: Dam 1A

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
CHANGES SINCE LAST INSPECTION	

DAM SAFETY MANAGEMENT SYSTEMS

FEATURES	YES	NO	DOCUMENTS / COMMENTS / NOTES
Corporate tailings management policy statement		x	See note 1 below.
Tailings management accountability assigned		x	See note 1 below.
Objectives and targets established		x	See note 1 below.
Roles and responsibilities assigned and understood		x	See note 1 below.
Succession planning		x	See note 1 below.
Adequate resources assigned		x	See note 1 below.
Training systems in place		x	See note 1 below.
Periodic reporting to management and regulator		x	See note 1 below.
Regulations, permits and commitments understood		x	See note 1 below.
Regulatory compliance measured	x		As per annual inspection
Formal risk management plan in place		x	See note 1 below.
Potential failure mode analysis completed		x	See note 1 below.
Communication systems in place		x	See note 1 below.
ERP/EPP developed and tested	x		EPP is in place but not tested
Decommissioning and closure accounted for	x		Active reclamation is compliance to the Closure Plan
Document management system in place	x		Documented in Annual Report.
Corporate review of tailings management		x	See note 1 below.
Adequate financial resources assigned		x	See note 1 below.

This Dam Facility Inspection Form follows the philosophy and intent of the following guidelines:

- Canadian Dam Association (CDA) Technical Bulletin: Dam Safety Reviews (DRAFT, 2015)
- Mining Association of Canada (MAC): A Guide to Audit and Assessment of Tailings Facility Management (2011)
- Association of Professional Engineers and Geoscientists of BC (APEGBC): Professional Practice Guidelines - Legislated Dam Safety Reviews in BC

ADDITONAL NOTES / REFERENCES / INTERVIEWS

1. No tailings has been deposit since 2005. The site is currently on care and maintenance. Tailings deposition procedures, documentations, and regulation requirements will be updated once the site go into production.

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM SUMMARY INFORMATION

SITE: Lupin Mine

OWNER: Lupin Mine Incorporated

STRUCTURE: Tailings Containment Area

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
PURPOSE OF DAM	Tailings and water containment
DAM CLASSIFICATION	Low to Significant
DATE OF LAST DSR	2015
DATE OF NEXT DSR	2020
ORIGINAL DESIGN ENGINEER	Geocon
CURRENT DESIGN ENGINEER	Golder Associates
LENGTH AND MAX. HEIGHT	Max Individual Dam Length = 930m, Max Individual Height = 6.2m
CREST WIDTH	Variable between 2m to 10m
STORAGE VOLUME	Information not available
CONSTRUCTION METHOD	Sand and gravel frozen core dam with geosynthetics liner cutoff
POND ADJACENT TO DAM	Pond is adjacent to most perimeter dams and some internal dams
DESIGN BEACH WIDTH	Information not available
CURRENT BEACH WIDTH	between 0 and 200m
DISCHARGE STRUCTURES	Siphons over Dam 1A during water treatment
EMERGENCY DISCHARGE STRUCTURES	None. Fully enclosed facility
CURRENT DAM ELEVATION	Approximately 486.2m
CURRENT POND ELEVATION	Approximately 482.2m
DATE OF LAST DAM RAISE	2005
FINAL DAM ELEVATION	Approximately 486.2m
MINE PRODUCTION RATE	None. Currently at care and maintenance status
TAILINGS DEPOSITION METHOD	None. Currently at care and maintenance status
DAM INSTRUMENTATION	Thermistors in some dams
DESIGN/AS-BUILT INFO. AVAILABLE	Last design by BGC Engineering in 2003
SURVEILLANCE PROGRAM AVAILABLE	Annual geotechnical inspection
WATERSHED AREA	Combined totall approximately 1,188 ha.

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

Site consist of eight preimeter dams and seven internal dams.

PREPARED BY: REVIEWED BY: PROJECT #:

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Dam 3

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	None

UPSTREAM DAM SLOPE / BEACH

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Concern with water level / freeboard		x			
Beach development		x			
Wave or other erosion		x			
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

DAM CREST

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Crest width / access		x			
Evidence of erosion		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Settlement		x			
Low areas (sinkholes) or ponded water		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions	x		near mid-point	20, 21, 23	repaired erosion gully

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Dam 3

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	

DOWNSTREAM DAM SLOPE

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Erosion		x			
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Non-uniform slope		x			
Other noteworthy conditions		x			

DAM ABUTMENTS

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Erosion		x			
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine

OWNER: Lupin Mine Incorporated

STRUCTURE Dam 3

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	

DOWNSTREAM TOE

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Soft toe conditions		x			
Evidence of boils		x			
Evidence of contamination		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

SPILLWAY OR DISCHARGE STRUCTURES

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Control structures		x			
Blockages or debris		x	west abutment	22	
Erosion		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x	near mid-point	23	see note 1 below

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

1. There is a high point in the storm drain built into the crest. Repeated erosion occurred in this area and repair was done to add armor and geotextile to the erosion gully to change it into a discharge channel.

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE: Dam 3

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
CHANGES SINCE LAST INSPECTION	

OPERATIONS, MAINTENANCE AND SURVEILLANCE SYSTEMS

FEATURES	YES	NO	DOCUMENTS / COMMENTS / NOTES
Regular inspections	x		Annual geotechnical inspection with weekly inspection in s
Qualified personnel completing surveillance	x		PEng for annual and technical for weekly
Processes & procedures established & documented	x		As per CDA and BCWMB guidelines
Critical failure modes understood	x		Overtopping and thaw of frozen core
Monitoring addresses critical failure modes	x		water level and core temperature are monitored
Monitoring frequency adequate	x		Annual reading of instruments and periodically monitoring
Timely review of monitoring results	x		All results are reviewed within 60 days
Alarm thresholds in place and relevant	x		1m freeboard specified by Water License. Water balance su
Deficiencies tracked and corrected	x		All geotech deformations recorded. Repairs are completed
Maintenance procedures documented	x		Maintenance is documented in the Annual Report
Foundation adequately characterized		x	Unknown. Limited design is available
Foundation responds to loading conditions	x		No minor deformation recorded to date.
Contingency plans available	x		EPP is sufficient for care and maintenance status
Tailings management plans followed		x	No tailings deposition since 2005
Water balance is adequate	x		Water balance is completed in 2015
Backup power available for critical systems		x	No tailings deposition since 2005

ADDITONAL NOTES / REFERENCES / INTERVIEWS

PREPARED BY: REVIEWED BY: PROJECT #:

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE: Dam 3

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
CHANGES SINCE LAST INSPECTION	

DAM SAFETY MANAGEMENT SYSTEMS

FEATURES	YES	NO	DOCUMENTS / COMMENTS / NOTES
Corporate tailings management policy statement		x	See note 1 below.
Tailings management accountability assigned		x	See note 1 below.
Objectives and targets established		x	See note 1 below.
Roles and responsibilities assigned and understood		x	See note 1 below.
Succession planning		x	See note 1 below.
Adequate resources assigned		x	See note 1 below.
Training systems in place		x	See note 1 below.
Periodic reporting to management and regulator		x	See note 1 below.
Regulations, permits and commitments understood		x	See note 1 below.
Regulatory compliance measured	x		As per annual inspection
Formal risk management plan in place		x	See note 1 below.
Potential failure mode analysis completed		x	See note 1 below.
Communication systems in place		x	See note 1 below.
ERP/EPP developed and tested	x		EPP is in place but not tested
Decommissioning and closure accounted for	x		Active reclamation is compliance to the Closure Plan
Document management system in place	x		Documented in Annual Report.
Corporate review of tailings management		x	See note 1 below.
Adequate financial resources assigned		x	See note 1 below.

This Dam Facility Inspection Form follows the philosophy and intent of the following guidelines:

- Canadian Dam Association (CDA) Technical Bulletin: Dam Safety Reviews (DRAFT, 2015)
- Mining Association of Canada (MAC): A Guide to Audit and Assessment of Tailings Facility Management (2011)
- Association of Professional Engineers and Geoscientists of BC (APEGBC): Professional Practice Guidelines - Legislated Dam Safety Reviews in BC

ADDITONAL NOTES / REFERENCES / INTERVIEWS

1. No tailings has been deposit since 2005. The site is currently on care and maintenance. Tailings deposition procedures, documentations, and regulation requirements will be updated once the site go into production.

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM SUMMARY INFORMATION

SITE: Lupin Mine

OWNER: Lupin Mine Incorporated

STRUCTURE: Tailings Containment Area

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
PURPOSE OF DAM	Tailings and water containment
DAM CLASSIFICATION	Low to Significant
DATE OF LAST DSR	2015
DATE OF NEXT DSR	2020
ORIGINAL DESIGN ENGINEER	Geocon
CURRENT DESIGN ENGINEER	Golder Associates
LENGTH AND MAX. HEIGHT	Max Individual Dam Length = 930m, Max Individual Height = 6.2m
CREST WIDTH	Variable between 2m to 10m
STORAGE VOLUME	Information not available
CONSTRUCTION METHOD	Sand and gravel frozen core dam with geosynthetics liner cutoff
POND ADJACENT TO DAM	Pond is adjacent to most perimeter dams and some internal dams
DESIGN BEACH WIDTH	Information not available
CURRENT BEACH WIDTH	between 0 and 200m
DISCHARGE STRUCTURES	Siphons over Dam 1A during water treatment
EMERGENCY DISCHARGE STRUCTURES	None. Fully enclosed facility
CURRENT DAM ELEVATION	Approximately 486.2m
CURRENT POND ELEVATION	Approximately 482.2m
DATE OF LAST DAM RAISE	2005
FINAL DAM ELEVATION	Approximately 486.2m
MINE PRODUCTION RATE	None. Currently at care and maintenance status
TAILINGS DEPOSITION METHOD	None. Currently at care and maintenance status
DAM INSTRUMENTATION	Thermistors in some dams
DESIGN/AS-BUILT INFO. AVAILABLE	Last design by BGC Engineering in 2003
SURVEILLANCE PROGRAM AVAILABLE	Annual geotechnical inspection
WATERSHED AREA	Combined totall approximately 1,188 ha.

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

Site consist of eight preimeter dams and seven internal dams.

PREPARED BY: REVIEWED BY: PROJECT #:

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Dam 4

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	None

UPSTREAM DAM SLOPE / BEACH

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Concern with water level / freeboard		x		24	
Beach development		x			
Wave or other erosion		x		24, 25	
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

DAM CREST

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Crest width / access		x			
Evidence of erosion		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Settlement		x			
Low areas (sinkholes) or ponded water		x			
Instrumentation	x				Thermistor D4-1, D4-3, D4-4
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Dam 4

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	

DOWNSTREAM DAM SLOPE

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Erosion	x		downstream slope	27, 28	erosion gullies
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Non-uniform slope		x			
Other noteworthy conditions		x			

DAM ABUTMENTS

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Erosion		x			
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions	x		east abutment	28	historical exposed geogrid

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine

OWNER: Lupin Mine Incorporated

STRUCTURE Dam 4

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	

DOWNSTREAM TOE

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Soft toe conditions		x			
Evidence of boils		x			
Evidence of contamination		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

SPILLWAY OR DISCHARGE STRUCTURES

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Control structures		x			
Blockages or debris		x			
Erosion		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE: Dam 4

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
CHANGES SINCE LAST INSPECTION	

OPERATIONS, MAINTENANCE AND SURVEILLANCE SYSTEMS

FEATURES	YES	NO	DOCUMENTS / COMMENTS / NOTES
Regular inspections	x		Annual geotechnical inspection with weekly inspection in s
Qualified personnel completing surveillance	x		PEng for annual and technical for weekly
Processes & procedures established & documented	x		As per CDA and BCWMB guidelines
Critical failure modes understood	x		Overtopping and thaw of frozen core
Monitoring addresses critical failure modes	x		water level and core temperature are monitored
Monitoring frequency adequate	x		Annual reading of instruments and periodically monitoring
Timely review of monitoring results	x		All results are reviewed within 60 days
Alarm thresholds in place and relevant	x		1m freeboard specified by Water License. Water balance su
Deficiencies tracked and corrected	x		All geotech deformations recorded. Repairs are completed
Maintenance procedures documented	x		Maintenance is documented in the Annual Report
Foundation adequately characterized		x	Unknown. Limited design is available
Foundation responds to loading conditions	x		No minor deformation recorded to date.
Contingency plans available	x		EPP is sufficient for care and maintenance status
Tailings management plans followed		x	No tailings deposition since 2005
Water balance is adequate	x		Water balance is completed in 2015
Backup power available for critical systems		x	No tailings deposition since 2005

ADDITONAL NOTES / REFERENCES / INTERVIEWS

PREPARED BY: REVIEWED BY: PROJECT #:

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE: Dam 4

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
CHANGES SINCE LAST INSPECTION	

DAM SAFETY MANAGEMENT SYSTEMS

FEATURES	YES	NO	DOCUMENTS / COMMENTS / NOTES
Corporate tailings management policy statement		x	See note 1 below.
Tailings management accountability assigned		x	See note 1 below.
Objectives and targets established		x	See note 1 below.
Roles and responsibilities assigned and understood		x	See note 1 below.
Succession planning		x	See note 1 below.
Adequate resources assigned		x	See note 1 below.
Training systems in place		x	See note 1 below.
Periodic reporting to management and regulator		x	See note 1 below.
Regulations, permits and commitments understood		x	See note 1 below.
Regulatory compliance measured	x		As per annual inspection
Formal risk management plan in place		x	See note 1 below.
Potential failure mode analysis completed		x	See note 1 below.
Communication systems in place		x	See note 1 below.
ERP/EPP developed and tested	x		EPP is in place but not tested
Decommissioning and closure accounted for	x		Active reclamation is compliance to the Closure Plan
Document management system in place	x		Documented in Annual Report.
Corporate review of tailings management		x	See note 1 below.
Adequate financial resources assigned		x	See note 1 below.

This Dam Facility Inspection Form follows the philosophy and intent of the following guidelines:

- Canadian Dam Association (CDA) Technical Bulletin: Dam Safety Reviews (DRAFT, 2015)
- Mining Association of Canada (MAC): A Guide to Audit and Assessment of Tailings Facility Management (2011)
- Association of Professional Engineers and Geoscientists of BC (APEGBC): Professional Practice Guidelines - Legislated Dam Safety Reviews in BC

ADDITONAL NOTES / REFERENCES / INTERVIEWS

1. No tailings has been deposit since 2005. The site is currently on care and maintenance. Tailings deposition procedures, documentations, and regulation requirements will be updated once the site go into production.

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM SUMMARY INFORMATION

SITE: Lupin Mine

OWNER: Lupin Mine Incorporated

STRUCTURE: Tailings Containment Area

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
PURPOSE OF DAM	Tailings and water containment
DAM CLASSIFICATION	Low to Significant
DATE OF LAST DSR	2015
DATE OF NEXT DSR	2020
ORIGINAL DESIGN ENGINEER	Geocon
CURRENT DESIGN ENGINEER	Golder Associates
LENGTH AND MAX. HEIGHT	Max Individual Dam Length = 930m, Max Individual Height = 6.2m
CREST WIDTH	Variable between 2m to 10m
STORAGE VOLUME	Information not available
CONSTRUCTION METHOD	Sand and gravel frozen core dam with geosynthetics liner cutoff
POND ADJACENT TO DAM	Pond is adjacent to most perimeter dams and some internal dams
DESIGN BEACH WIDTH	Information not available
CURRENT BEACH WIDTH	between 0 and 200m
DISCHARGE STRUCTURES	Siphons over Dam 1A during water treatment
EMERGENCY DISCHARGE STRUCTURES	None. Fully enclosed facility
CURRENT DAM ELEVATION	Approximately 486.2m
CURRENT POND ELEVATION	Approximately 482.2m
DATE OF LAST DAM RAISE	2005
FINAL DAM ELEVATION	Approximately 486.2m
MINE PRODUCTION RATE	None. Currently at care and maintenance status
TAILINGS DEPOSITION METHOD	None. Currently at care and maintenance status
DAM INSTRUMENTATION	Thermistors in some dams
DESIGN/AS-BUILT INFO. AVAILABLE	Last design by BGC Engineering in 2003
SURVEILLANCE PROGRAM AVAILABLE	Annual geotechnical inspection
WATERSHED AREA	Combined totall approximately 1,188 ha.

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

Site consist of eight preimeter dams and seven internal dams.

PREPARED BY: REVIEWED BY: PROJECT #:

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Dam 5

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	None

UPSTREAM DAM SLOPE / BEACH

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Concern with water level / freeboard		x			
Beach development		x			
Wave or other erosion		x			
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

DAM CREST

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Crest width / access		x			
Evidence of erosion		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Settlement		x			
Low areas (sinkholes) or ponded water		x			
Instrumentation	x				Thermistor D4-1, D4-3, D4-4
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Dam 5

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	

DOWNSTREAM DAM SLOPE

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Erosion	x		downstream slope	31, 32	erosion gullies
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Non-uniform slope		x			
Other noteworthy conditions		x			

DAM ABUTMENTS

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Erosion		x			
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine

OWNER: Lupin Mine Incorporated

STRUCTURE Dam 5

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	

DOWNSTREAM TOE

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Soft toe conditions		x			
Evidence of boils		x			
Evidence of contamination		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

SPILLWAY OR DISCHARGE STRUCTURES

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Control structures		x			
Blockages or debris		x			
Erosion		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE: Dam 5

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
CHANGES SINCE LAST INSPECTION	

OPERATIONS, MAINTENANCE AND SURVEILLANCE SYSTEMS

FEATURES	YES	NO	DOCUMENTS / COMMENTS / NOTES
Regular inspections	x		Annual geotechnical inspection with weekly inspection in s
Qualified personnel completing surveillance	x		PEng for annual and technical for weekly
Processes & procedures established & documented	x		As per CDA and BCWMB guidelines
Critical failure modes understood	x		Overtopping and thaw of frozen core
Monitoring addresses critical failure modes	x		water level and core temperature are monitored
Monitoring frequency adequate	x		Annual reading of instruments and periodically monitoring
Timely review of monitoring results	x		All results are reviewed within 60 days
Alarm thresholds in place and relevant	x		1m freeboard specified by Water License. Water balance su
Deficiencies tracked and corrected	x		All geotech deformations recorded. Repairs are completed
Maintenance procedures documented	x		Maintenance is documented in the Annual Report
Foundation adequately characterized		x	Unknown. Limited design is available
Foundation responds to loading conditions	x		No minor deformation recorded to date.
Contingency plans available	x		EPP is sufficient for care and maintenance status
Tailings management plans followed		x	No tailings deposition since 2005
Water balance is adequate	x		Water balance is completed in 2015
Backup power available for critical systems		x	No tailings deposition since 2005

ADDITONAL NOTES / REFERENCES / INTERVIEWS

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE: Dam 5

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
CHANGES SINCE LAST INSPECTION	

DAM SAFETY MANAGEMENT SYSTEMS

FEATURES	YES	NO	DOCUMENTS / COMMENTS / NOTES
Corporate tailings management policy statement		x	See note 1 below.
Tailings management accountability assigned		x	See note 1 below.
Objectives and targets established		x	See note 1 below.
Roles and responsibilities assigned and understood		x	See note 1 below.
Succession planning		x	See note 1 below.
Adequate resources assigned		x	See note 1 below.
Training systems in place		x	See note 1 below.
Periodic reporting to management and regulator		x	See note 1 below.
Regulations, permits and commitments understood		x	See note 1 below.
Regulatory compliance measured	x		As per annual inspection
Formal risk management plan in place		x	See note 1 below.
Potential failure mode analysis completed		x	See note 1 below.
Communication systems in place		x	See note 1 below.
ERP/EPP developed and tested	x		EPP is in place but not tested
Decommissioning and closure accounted for	x		Active reclamation is compliance to the Closure Plan
Document management system in place	x		Documented in Annual Report.
Corporate review of tailings management		x	See note 1 below.
Adequate financial resources assigned		x	See note 1 below.

This Dam Facility Inspection Form follows the philosophy and intent of the following guidelines:

- Canadian Dam Association (CDA) Technical Bulletin: Dam Safety Reviews (DRAFT, 2015)
- Mining Association of Canada (MAC): A Guide to Audit and Assessment of Tailings Facility Management (2011)
- Association of Professional Engineers and Geoscientists of BC (APEGBC): Professional Practice Guidelines - Legislated Dam Safety Reviews in BC

ADDITONAL NOTES / REFERENCES / INTERVIEWS

1. No tailings has been deposit since 2005. The site is currently on care and maintenance. Tailings deposition procedures, documentations, and regulation requirements will be updated once the site go into production.

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM SUMMARY INFORMATION

SITE: Lupin Mine

OWNER: Lupin Mine Incorporated

STRUCTURE: Tailings Containment Area

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
PURPOSE OF DAM	Tailings and water containment
DAM CLASSIFICATION	Low to Significant
DATE OF LAST DSR	2015
DATE OF NEXT DSR	2020
ORIGINAL DESIGN ENGINEER	Geocon
CURRENT DESIGN ENGINEER	Golder Associates
LENGTH AND MAX. HEIGHT	Max Individual Dam Length = 930m, Max Individual Height = 6.2m
CREST WIDTH	Variable between 2m to 10m
STORAGE VOLUME	Information not available
CONSTRUCTION METHOD	Sand and gravel frozen core dam with geosynthetics liner cutoff
POND ADJACENT TO DAM	Pond is adjacent to most perimeter dams and some internal dams
DESIGN BEACH WIDTH	Information not available
CURRENT BEACH WIDTH	between 0 and 200m
DISCHARGE STRUCTURES	Siphons over Dam 1A during water treatment
EMERGENCY DISCHARGE STRUCTURES	None. Fully enclosed facility
CURRENT DAM ELEVATION	Approximately 486.2m
CURRENT POND ELEVATION	Approximately 482.2m
DATE OF LAST DAM RAISE	2005
FINAL DAM ELEVATION	Approximately 486.2m
MINE PRODUCTION RATE	None. Currently at care and maintenance status
TAILINGS DEPOSITION METHOD	None. Currently at care and maintenance status
DAM INSTRUMENTATION	Thermistors in some dams
DESIGN/AS-BUILT INFO. AVAILABLE	Last design by BGC Engineering in 2003
SURVEILLANCE PROGRAM AVAILABLE	Annual geotechnical inspection
WATERSHED AREA	Combined totall approximately 1,188 ha.

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

Site consist of eight preimeter dams and seven internal dams.

PREPARED BY: REVIEWED BY: PROJECT #:

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Dam 3D

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	None

UPSTREAM DAM SLOPE / BEACH

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Concern with water level / freeboard		x		38	
Beach development		x			
Wave or other erosion		x		39	
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

DAM CREST

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Crest width / access		x			
Evidence of erosion		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Settlement		x			
Low areas (sinkholes) or ponded water		x			
Instrumentation	x		1/3 way from east abutmte	40	Thermistor D3D-1
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

PREPARED BY: REVIEWED BY: PROJECT #:

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Dam 3D

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	

DOWNSTREAM DAM SLOPE

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Erosion		x			
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Non-uniform slope		x			
Other noteworthy conditions		x			

DAM ABUTMENTS

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Erosion		x			
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine

OWNER: Lupin Mine Incorporated

STRUCTURE Dam 3D

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	

DOWNSTREAM TOE

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Soft toe conditions		x			
Evidence of boils		x			
Evidence of contamination		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

SPILLWAY OR DISCHARGE STRUCTURES

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Control structures		x			
Blockages or debris		x			
Erosion		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE: Dam 3D

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
CHANGES SINCE LAST INSPECTION	

OPERATIONS, MAINTENANCE AND SURVEILLANCE SYSTEMS

FEATURES	YES	NO	DOCUMENTS / COMMENTS / NOTES
Regular inspections	x		Annual geotechnical inspection with weekly inspection in s
Qualified personnel completing surveillance	x		PEng for annual and technical for weekly
Processes & procedures established & documented	x		As per CDA and BCWMB guidelines
Critical failure modes understood	x		Overtopping and thaw of frozen core
Monitoring addresses critical failure modes	x		water level and core temperature are monitored
Monitoring frequency adequate	x		Annual reading of instruments and periodically monitoring
Timely review of monitoring results	x		All results are reviewed within 60 days
Alarm thresholds in place and relevant	x		1m freeboard specified by Water License. Water balance su
Deficiencies tracked and corrected	x		All geotech deformations recorded. Repairs are completed
Maintenance procedures documented	x		Maintenance is documented in the Annual Report
Foundation adequately characterized		x	Unknown. Limited design is available
Foundation responds to loading conditions	x		No minor deformation recorded to date.
Contingency plans available	x		EPP is sufficient for care and maintenance status
Tailings management plans followed		x	No tailings deposition since 2005
Water balance is adequate	x		Water balance is completed in 2015
Backup power available for critical systems		x	No tailings deposition since 2005

ADDITONAL NOTES / REFERENCES / INTERVIEWS

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE: Dam 3D

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
CHANGES SINCE LAST INSPECTION	

DAM SAFETY MANAGEMENT SYSTEMS

FEATURES	YES	NO	DOCUMENTS / COMMENTS / NOTES
Corporate tailings management policy statement		x	See note 1 below.
Tailings management accountability assigned		x	See note 1 below.
Objectives and targets established		x	See note 1 below.
Roles and responsibilities assigned and understood		x	See note 1 below.
Succession planning		x	See note 1 below.
Adequate resources assigned		x	See note 1 below.
Training systems in place		x	See note 1 below.
Periodic reporting to management and regulator		x	See note 1 below.
Regulations, permits and commitments understood		x	See note 1 below.
Regulatory compliance measured	x		As per annual inspection
Formal risk management plan in place		x	See note 1 below.
Potential failure mode analysis completed		x	See note 1 below.
Communication systems in place		x	See note 1 below.
ERP/EPP developed and tested	x		EPP is in place but not tested
Decommissioning and closure accounted for	x		Active reclamation is compliance to the Closure Plan
Document management system in place	x		Documented in Annual Report.
Corporate review of tailings management		x	See note 1 below.
Adequate financial resources assigned		x	See note 1 below.

This Dam Facility Inspection Form follows the philosophy and intent of the following guidelines:

- Canadian Dam Association (CDA) Technical Bulletin: Dam Safety Reviews (DRAFT, 2015)
- Mining Association of Canada (MAC): A Guide to Audit and Assessment of Tailings Facility Management (2011)
- Association of Professional Engineers and Geoscientists of BC (APEGBC): Professional Practice Guidelines - Legislated Dam Safety Reviews in BC

ADDITONAL NOTES / REFERENCES / INTERVIEWS

1. No tailings has been deposit since 2005. The site is currently on care and maintenance. Tailings deposition procedures, documentations, and regulation requirements will be updated once the site go into production.

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM SUMMARY INFORMATION

SITE: Lupin Mine

OWNER: Lupin Mine Incorporated

STRUCTURE: Tailings Containment Area

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
PURPOSE OF DAM	Tailings and water containment
DAM CLASSIFICATION	Low to Significant
DATE OF LAST DSR	2015
DATE OF NEXT DSR	2020
ORIGINAL DESIGN ENGINEER	Geocon
CURRENT DESIGN ENGINEER	Golder Associates
LENGTH AND MAX. HEIGHT	Max Individual Dam Length = 930m, Max Individual Height = 6.2m
CREST WIDTH	Variable between 2m to 10m
STORAGE VOLUME	Information not available
CONSTRUCTION METHOD	Sand and gravel frozen core dam with geosynthetics liner cutoff
POND ADJACENT TO DAM	Pond is adjacent to most perimeter dams and some internal dams
DESIGN BEACH WIDTH	Information not available
CURRENT BEACH WIDTH	between 0 and 200m
DISCHARGE STRUCTURES	Siphons over Dam 1A during water treatment
EMERGENCY DISCHARGE STRUCTURES	None. Fully enclosed facility
CURRENT DAM ELEVATION	Approximately 486.2m
CURRENT POND ELEVATION	Approximately 482.2m
DATE OF LAST DAM RAISE	2005
FINAL DAM ELEVATION	Approximately 486.2m
MINE PRODUCTION RATE	None. Currently at care and maintenance status
TAILINGS DEPOSITION METHOD	None. Currently at care and maintenance status
DAM INSTRUMENTATION	Thermistors in some dams
DESIGN/AS-BUILT INFO. AVAILABLE	Last design by BGC Engineering in 2003
SURVEILLANCE PROGRAM AVAILABLE	Annual geotechnical inspection
WATERSHED AREA	Combined totall approximately 1,188 ha.

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

Site consist of eight preimeter dams and seven internal dams.

PREPARED BY: REVIEWED BY: PROJECT #:

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Dam 6

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	None

UPSTREAM DAM SLOPE / BEACH

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Concern with water level / freeboard		x			
Beach development		x			
Wave or other erosion		x			
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

DAM CREST

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Crest width / access		x			
Evidence of erosion		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Settlement		x			
Low areas (sinkholes) or ponded water		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Dam 6

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	

DOWNSTREAM DAM SLOPE

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Erosion	x		downstream slope	33-36	erosion gullies
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Non-uniform slope		x			
Other noteworthy conditions		x			

DAM ABUTMENTS

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Erosion		x			
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions	x		east abutment	37	ponding water in natural low.

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

PREPARED BY: REVIEWED BY: PROJECT #:

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine

OWNER: Lupin Mine Incorporated

STRUCTURE Dam 6

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	

DOWNSTREAM TOE

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Soft toe conditions		x			
Evidence of boils		x			
Evidence of contamination		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation	x			34, 36	Minor vegetations are noted
Other noteworthy conditions		x			

SPILLWAY OR DISCHARGE STRUCTURES

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Control structures		x			
Blockages or debris		x			
Erosion		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE: Dam 6

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
CHANGES SINCE LAST INSPECTION	

OPERATIONS, MAINTENANCE AND SURVEILLANCE SYSTEMS

FEATURES	YES	NO	DOCUMENTS / COMMENTS / NOTES
Regular inspections	x		Annual geotechnical inspection with weekly inspection in s
Qualified personnel completing surveillance	x		PEng for annual and technical for weekly
Processes & procedures established & documented	x		As per CDA and BCWMB guidelines
Critical failure modes understood	x		Overtopping and thaw of frozen core
Monitoring addresses critical failure modes	x		water level and core temperature are monitored
Monitoring frequency adequate	x		Annual reading of instruments and periodically monitoring
Timely review of monitoring results	x		All results are reviewed within 60 days
Alarm thresholds in place and relevant	x		1m freeboard specified by Water License. Water balance su
Deficiencies tracked and corrected	x		All geotech deformations recorded. Repairs are completed
Maintenance procedures documented	x		Maintenance is documented in the Annual Report
Foundation adequately characterized		x	Unknown. Limited design is available
Foundation responds to loading conditions	x		No minor deformation recorded to date.
Contingency plans available	x		EPP is sufficient for care and maintenance status
Tailings management plans followed		x	No tailings deposition since 2005
Water balance is adequate	x		Water balance is completed in 2015
Backup power available for critical systems		x	No tailings deposition since 2005

ADDITONAL NOTES / REFERENCES / INTERVIEWS

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE: Dam 6

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
CHANGES SINCE LAST INSPECTION	

DAM SAFETY MANAGEMENT SYSTEMS

FEATURES	YES	NO	DOCUMENTS / COMMENTS / NOTES
Corporate tailings management policy statement		x	See note 1 below.
Tailings management accountability assigned		x	See note 1 below.
Objectives and targets established		x	See note 1 below.
Roles and responsibilities assigned and understood		x	See note 1 below.
Succession planning		x	See note 1 below.
Adequate resources assigned		x	See note 1 below.
Training systems in place		x	See note 1 below.
Periodic reporting to management and regulator		x	See note 1 below.
Regulations, permits and commitments understood		x	See note 1 below.
Regulatory compliance measured	x		As per annual inspection
Formal risk management plan in place		x	See note 1 below.
Potential failure mode analysis completed		x	See note 1 below.
Communication systems in place		x	See note 1 below.
ERP/EPP developed and tested	x		EPP is in place but not tested
Decommissioning and closure accounted for	x		Active reclamation is compliance to the Closure Plan
Document management system in place	x		Documented in Annual Report.
Corporate review of tailings management		x	See note 1 below.
Adequate financial resources assigned		x	See note 1 below.

This Dam Facility Inspection Form follows the philosophy and intent of the following guidelines:

- Canadian Dam Association (CDA) Technical Bulletin: Dam Safety Reviews (DRAFT, 2015)
- Mining Association of Canada (MAC): A Guide to Audit and Assessment of Tailings Facility Management (2011)
- Association of Professional Engineers and Geoscientists of BC (APEGBC): Professional Practice Guidelines - Legislated Dam Safety Reviews in BC

ADDITONAL NOTES / REFERENCES / INTERVIEWS

1. No tailings has been deposit since 2005. The site is currently on care and maintenance. Tailings deposition procedures, documentations, and regulation requirements will be updated once the site go into production.

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM SUMMARY INFORMATION

SITE: Lupin Mine

OWNER: Lupin Mine Incorporated

STRUCTURE: Tailings Containment Area

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
PURPOSE OF DAM	Tailings and water containment
DAM CLASSIFICATION	Low to Significant
DATE OF LAST DSR	2015
DATE OF NEXT DSR	2020
ORIGINAL DESIGN ENGINEER	Geocon
CURRENT DESIGN ENGINEER	Golder Associates
LENGTH AND MAX. HEIGHT	Max Individual Dam Length = 930m, Max Individual Height = 6.2m
CREST WIDTH	Variable between 2m to 10m
STORAGE VOLUME	Information not available
CONSTRUCTION METHOD	Sand and gravel frozen core dam with geosynthetics liner cutoff
POND ADJACENT TO DAM	Pond is adjacent to most perimeter dams and some internal dams
DESIGN BEACH WIDTH	Information not available
CURRENT BEACH WIDTH	between 0 and 200m
DISCHARGE STRUCTURES	Siphons over Dam 1A during water treatment
EMERGENCY DISCHARGE STRUCTURES	None. Fully enclosed facility
CURRENT DAM ELEVATION	Approximately 486.2m
CURRENT POND ELEVATION	Approximately 482.2m
DATE OF LAST DAM RAISE	2005
FINAL DAM ELEVATION	Approximately 486.2m
MINE PRODUCTION RATE	None. Currently at care and maintenance status
TAILINGS DEPOSITION METHOD	None. Currently at care and maintenance status
DAM INSTRUMENTATION	Thermistors in some dams
DESIGN/AS-BUILT INFO. AVAILABLE	Last design by BGC Engineering in 2003
SURVEILLANCE PROGRAM AVAILABLE	Annual geotechnical inspection
WATERSHED AREA	Combined totall approximately 1,188 ha.

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

Site consist of eight preimeter dams and seven internal dams.

PREPARED BY: REVIEWED BY: PROJECT #:

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Dam J

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	None

UPSTREAM DAM SLOPE / BEACH

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Concern with water level / freeboard		x		43	
Beach development		x			
Wave or other erosion	x			43	
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

DAM CREST

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Crest width / access		x			
Evidence of erosion	x		mid-point	45, 47	erosion reduced crest width
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Settlement		x			
Low areas (sinkholes) or ponded water		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Dam J

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	

DOWNSTREAM DAM SLOPE

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Erosion	x		downstream slope	44, 46, 47	erosion at HWM
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Non-uniform slope		x			
Other noteworthy conditions		x			

DAM ABUTMENTS

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Erosion		x			
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Dam J

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	

DOWNSTREAM TOE

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Soft toe conditions		x			
Evidence of boils		x			
Evidence of contamination		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

SPILLWAY OR DISCHARGE STRUCTURES

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Control structures	x		mid-point of dam	44	siphons.
Blockages or debris		x			
Erosion		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE: Dam J

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
CHANGES SINCE LAST INSPECTION	

OPERATIONS, MAINTENANCE AND SURVEILLANCE SYSTEMS

FEATURES	YES	NO	DOCUMENTS / COMMENTS / NOTES
Regular inspections	x		Annual geotechnical inspection with weekly inspection in s
Qualified personnel completing surveillance	x		PEng for annual and technical for weekly
Processes & procedures established & documented	x		As per CDA and BCWMB guidelines
Critical failure modes understood	x		Overtopping and thaw of frozen core
Monitoring addresses critical failure modes	x		water level and core temperature are monitored
Monitoring frequency adequate	x		Annual reading of instruments and periodically monitoring
Timely review of monitoring results	x		All results are reviewed within 60 days
Alarm thresholds in place and relevant	x		1m freeboard specified by Water License. Water balance su
Deficiencies tracked and corrected	x		All geotech deformations recorded. Repairs are completed
Maintenance procedures documented	x		Maintenance is documented in the Annual Report
Foundation adequately characterized		x	Unknown. Limited design is available
Foundation responds to loading conditions	x		No minor deformation recorded to date.
Contingency plans available	x		EPP is sufficient for care and maintenance status
Tailings management plans followed		x	No tailings deposition since 2005
Water balance is adequate	x		Water balance is completed in 2015
Backup power available for critical systems		x	No tailings deposition since 2005

ADDITONAL NOTES / REFERENCES / INTERVIEWS

PREPARED BY: REVIEWED BY: PROJECT #:

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE: Dam J

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
CHANGES SINCE LAST INSPECTION	

DAM SAFETY MANAGEMENT SYSTEMS

FEATURES	YES	NO	DOCUMENTS / COMMENTS / NOTES
Corporate tailings management policy statement		x	See note 1 below.
Tailings management accountability assigned		x	See note 1 below.
Objectives and targets established		x	See note 1 below.
Roles and responsibilities assigned and understood		x	See note 1 below.
Succession planning		x	See note 1 below.
Adequate resources assigned		x	See note 1 below.
Training systems in place		x	See note 1 below.
Periodic reporting to management and regulator		x	See note 1 below.
Regulations, permits and commitments understood		x	See note 1 below.
Regulatory compliance measured	x		As per annual inspection
Formal risk management plan in place		x	See note 1 below.
Potential failure mode analysis completed		x	See note 1 below.
Communication systems in place		x	See note 1 below.
ERP/EPP developed and tested	x		EPP is in place but not tested
Decommissioning and closure accounted for	x		Active reclamation is compliance to the Closure Plan
Document management system in place	x		Documented in Annual Report.
Corporate review of tailings management		x	See note 1 below.
Adequate financial resources assigned		x	See note 1 below.

This Dam Facility Inspection Form follows the philosophy and intent of the following guidelines:

- Canadian Dam Association (CDA) Technical Bulletin: Dam Safety Reviews (DRAFT, 2015)
- Mining Association of Canada (MAC): A Guide to Audit and Assessment of Tailings Facility Management (2011)
- Association of Professional Engineers and Geoscientists of BC (APEGBC): Professional Practice Guidelines - Legislated Dam Safety Reviews in BC

ADDITONAL NOTES / REFERENCES / INTERVIEWS

1. No tailings has been deposit since 2005. The site is currently on care and maintenance. Tailings deposition procedures, documentations, and regulation requirements will be updated once the site go into production.

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM SUMMARY INFORMATION

SITE: Lupin Mine

OWNER: Lupin Mine Incorporated

STRUCTURE: Tailings Containment Area

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
PURPOSE OF DAM	Tailings and water containment
DAM CLASSIFICATION	Low to Significant
DATE OF LAST DSR	2015
DATE OF NEXT DSR	2020
ORIGINAL DESIGN ENGINEER	Geocon
CURRENT DESIGN ENGINEER	Golder Associates
LENGTH AND MAX. HEIGHT	Max Individual Dam Length = 930m, Max Individual Height = 6.2m
CREST WIDTH	Variable between 2m to 10m
STORAGE VOLUME	Information not available
CONSTRUCTION METHOD	Sand and gravel frozen core dam with geosynthetics liner cutoff
POND ADJACENT TO DAM	Pond is adjacent to most perimeter dams and some internal dams
DESIGN BEACH WIDTH	Information not available
CURRENT BEACH WIDTH	between 0 and 200m
DISCHARGE STRUCTURES	Siphons over Dam 1A during water treatment
EMERGENCY DISCHARGE STRUCTURES	None. Fully enclosed facility
CURRENT DAM ELEVATION	Approximately 486.2m
CURRENT POND ELEVATION	Approximately 482.2m
DATE OF LAST DAM RAISE	2005
FINAL DAM ELEVATION	Approximately 486.2m
MINE PRODUCTION RATE	None. Currently at care and maintenance status
TAILINGS DEPOSITION METHOD	None. Currently at care and maintenance status
DAM INSTRUMENTATION	Thermistors in some dams
DESIGN/AS-BUILT INFO. AVAILABLE	Last design by BGC Engineering in 2003
SURVEILLANCE PROGRAM AVAILABLE	Annual geotechnical inspection
WATERSHED AREA	Combined totall approximately 1,188 ha.

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

Site consist of eight preimeter dams and seven internal dams.

PREPARED BY: REVIEWED BY: PROJECT #:

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Dam K

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	None

UPSTREAM DAM SLOPE / BEACH

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Concern with water level / freeboard		x			
Beach development		x			
Wave or other erosion		x			
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

DAM CREST

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Crest width / access		x			
Evidence of erosion	x		downstream crest	51	erosion gullies
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Settlement		x			
Low areas (sinkholes) or ponded water		x			
Instrumentation	x		near mid-point		Thermistor DK-3
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Dam K

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	

DOWNSTREAM DAM SLOPE

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Erosion		x			
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Non-uniform slope		x			
Other noteworthy conditions		x			

DAM ABUTMENTS

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Erosion		x			
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Dam K

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	

DOWNSTREAM TOE

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Soft toe conditions		x			
Evidence of boils		x			
Evidence of contamination		x			
Deformation or geotechnical concern	x		downstream toe	48-52	significant wave undercut.
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

SPILLWAY OR DISCHARGE STRUCTURES

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Control structures	x		mid-point of dam	44	siphons.
Blockages or debris		x			
Erosion		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE: Dam K

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
CHANGES SINCE LAST INSPECTION	

OPERATIONS, MAINTENANCE AND SURVEILLANCE SYSTEMS

FEATURES	YES	NO	DOCUMENTS / COMMENTS / NOTES
Regular inspections	x		Annual geotechnical inspection with weekly inspection in s
Qualified personnel completing surveillance	x		PEng for annual and technical for weekly
Processes & procedures established & documented	x		As per CDA and BCWMB guidelines
Critical failure modes understood	x		Overtopping and thaw of frozen core
Monitoring addresses critical failure modes	x		water level and core temperature are monitored
Monitoring frequency adequate	x		Annual reading of instruments and periodically monitoring
Timely review of monitoring results	x		All results are reviewed within 60 days
Alarm thresholds in place and relevant	x		1m freeboard specified by Water License. Water balance su
Deficiencies tracked and corrected	x		All geotech deformations recorded. Repairs are completed
Maintenance procedures documented	x		Maintenance is documented in the Annual Report
Foundation adequately characterized		x	Unknown. Limited design is available
Foundation responds to loading conditions	x		No minor deformation recorded to date.
Contingency plans available	x		EPP is sufficient for care and maintenance status
Tailings management plans followed		x	No tailings deposition since 2005
Water balance is adequate	x		Water balance is completed in 2015
Backup power available for critical systems		x	No tailings deposition since 2005

ADDITONAL NOTES / REFERENCES / INTERVIEWS

PREPARED BY: REVIEWED BY: PROJECT #:

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE: Dam K

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
CHANGES SINCE LAST INSPECTION	

DAM SAFETY MANAGEMENT SYSTEMS

FEATURES	YES	NO	DOCUMENTS / COMMENTS / NOTES
Corporate tailings management policy statement		x	See note 1 below.
Tailings management accountability assigned		x	See note 1 below.
Objectives and targets established		x	See note 1 below.
Roles and responsibilities assigned and understood		x	See note 1 below.
Succession planning		x	See note 1 below.
Adequate resources assigned		x	See note 1 below.
Training systems in place		x	See note 1 below.
Periodic reporting to management and regulator		x	See note 1 below.
Regulations, permits and commitments understood		x	See note 1 below.
Regulatory compliance measured	x		As per annual inspection
Formal risk management plan in place		x	See note 1 below.
Potential failure mode analysis completed		x	See note 1 below.
Communication systems in place		x	See note 1 below.
ERP/EPP developed and tested	x		EPP is in place but not tested
Decommissioning and closure accounted for	x		Active reclamation is compliance to the Closure Plan
Document management system in place	x		Documented in Annual Report.
Corporate review of tailings management		x	See note 1 below.
Adequate financial resources assigned		x	See note 1 below.

This Dam Facility Inspection Form follows the philosophy and intent of the following guidelines:

- Canadian Dam Association (CDA) Technical Bulletin: Dam Safety Reviews (DRAFT, 2015)
- Mining Association of Canada (MAC): A Guide to Audit and Assessment of Tailings Facility Management (2011)
- Association of Professional Engineers and Geoscientists of BC (APEGBC): Professional Practice Guidelines - Legislated Dam Safety Reviews in BC

ADDITONAL NOTES / REFERENCES / INTERVIEWS

1. No tailings has been deposit since 2005. The site is currently on care and maintenance. Tailings deposition procedures, documentations, and regulation requirements will be updated once the site go into production.

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM SUMMARY INFORMATION

SITE: Lupin Mine

OWNER: Lupin Mine Incorporated

STRUCTURE: Tailings Containment Area

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
PURPOSE OF DAM	Tailings and water containment
DAM CLASSIFICATION	Low to Significant
DATE OF LAST DSR	2015
DATE OF NEXT DSR	2020
ORIGINAL DESIGN ENGINEER	Geocon
CURRENT DESIGN ENGINEER	Golder Associates
LENGTH AND MAX. HEIGHT	Max Individual Dam Length = 930m, Max Individual Height = 6.2m
CREST WIDTH	Variable between 2m to 10m
STORAGE VOLUME	Information not available
CONSTRUCTION METHOD	Sand and gravel frozen core dam with geosynthetics liner cutoff
POND ADJACENT TO DAM	Pond is adjacent to most perimeter dams and some internal dams
DESIGN BEACH WIDTH	Information not available
CURRENT BEACH WIDTH	between 0 and 200m
DISCHARGE STRUCTURES	Siphons over Dam 1A during water treatment
EMERGENCY DISCHARGE STRUCTURES	None. Fully enclosed facility
CURRENT DAM ELEVATION	Approximately 486.2m
CURRENT POND ELEVATION	Approximately 482.2m
DATE OF LAST DAM RAISE	2005
FINAL DAM ELEVATION	Approximately 486.2m
MINE PRODUCTION RATE	None. Currently at care and maintenance status
TAILINGS DEPOSITION METHOD	None. Currently at care and maintenance status
DAM INSTRUMENTATION	Thermistors in some dams
DESIGN/AS-BUILT INFO. AVAILABLE	Last design by BGC Engineering in 2003
SURVEILLANCE PROGRAM AVAILABLE	Annual geotechnical inspection
WATERSHED AREA	Combined totall approximately 1,188 ha.

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

Site consist of eight preimeter dams and seven internal dams.

PREPARED BY: REVIEWED BY: PROJECT #:

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Dam L

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	None

UPSTREAM DAM SLOPE / BEACH

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Concern with water level / freeboard		x		53-54	
Beach development		x			
Wave or other erosion	x			53-54	
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

DAM CREST

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Crest width / access	x		south section of dam	53-54, 56	erosion reduced crest width
Evidence of erosion	x		upstream crest	53-54	wave action erosion
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Settlement		x			
Low areas (sinkholes) or ponded water		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Dam L

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	

DOWNSTREAM DAM SLOPE

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Erosion	x		mid-point, past cover	57	erosion gully
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Non-uniform slope		x			
Other noteworthy conditions		x			

DAM ABUTMENTS

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Erosion		x			
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine

OWNER: Lupin Mine Incorporated

STRUCTURE Dam L

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	

DOWNSTREAM TOE

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Soft toe conditions		x			
Evidence of boils		x			
Evidence of contamination		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions	x		downstream slope	55	minor wave erosion

SPILLWAY OR DISCHARGE STRUCTURES

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Control structures		x			
Blockages or debris		x			
Erosion		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE: Dam L

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
CHANGES SINCE LAST INSPECTION	

OPERATIONS, MAINTENANCE AND SURVEILLANCE SYSTEMS

FEATURES	YES	NO	DOCUMENTS / COMMENTS / NOTES
Regular inspections	x		Annual geotechnical inspection with weekly inspection in s
Qualified personnel completing surveillance	x		PEng for annual and technical for weekly
Processes & procedures established & documented	x		As per CDA and BCWMB guidelines
Critical failure modes understood	x		Overtopping and thaw of frozen core
Monitoring addresses critical failure modes	x		water level and core temperature are monitored
Monitoring frequency adequate	x		Annual reading of instruments and periodically monitoring
Timely review of monitoring results	x		All results are reviewed within 60 days
Alarm thresholds in place and relevant	x		1m freeboard specified by Water License. Water balance su
Deficiencies tracked and corrected	x		All geotech deformations recorded. Repairs are completed
Maintenance procedures documented	x		Maintenance is documented in the Annual Report
Foundation adequately characterized		x	Unknown. Limited design is available
Foundation responds to loading conditions	x		No minor deformation recorded to date.
Contingency plans available	x		EPP is sufficient for care and maintenance status
Tailings management plans followed		x	No tailings deposition since 2005
Water balance is adequate	x		Water balance is completed in 2015
Backup power available for critical systems		x	No tailings deposition since 2005

ADDITONAL NOTES / REFERENCES / INTERVIEWS

PREPARED BY: REVIEWED BY: PROJECT #:

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE: Dam L

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
CHANGES SINCE LAST INSPECTION	

DAM SAFETY MANAGEMENT SYSTEMS

FEATURES	YES	NO	DOCUMENTS / COMMENTS / NOTES
Corporate tailings management policy statement		x	See note 1 below.
Tailings management accountability assigned		x	See note 1 below.
Objectives and targets established		x	See note 1 below.
Roles and responsibilities assigned and understood		x	See note 1 below.
Succession planning		x	See note 1 below.
Adequate resources assigned		x	See note 1 below.
Training systems in place		x	See note 1 below.
Periodic reporting to management and regulator		x	See note 1 below.
Regulations, permits and commitments understood		x	See note 1 below.
Regulatory compliance measured	x		As per annual inspection
Formal risk management plan in place		x	See note 1 below.
Potential failure mode analysis completed		x	See note 1 below.
Communication systems in place		x	See note 1 below.
ERP/EPP developed and tested	x		EPP is in place but not tested
Decommissioning and closure accounted for	x		Active reclamation is compliance to the Closure Plan
Document management system in place	x		Documented in Annual Report.
Corporate review of tailings management		x	See note 1 below.
Adequate financial resources assigned		x	See note 1 below.

This Dam Facility Inspection Form follows the philosophy and intent of the following guidelines:

- Canadian Dam Association (CDA) Technical Bulletin: Dam Safety Reviews (DRAFT, 2015)
- Mining Association of Canada (MAC): A Guide to Audit and Assessment of Tailings Facility Management (2011)
- Association of Professional Engineers and Geoscientists of BC (APEGBC): Professional Practice Guidelines - Legislated Dam Safety Reviews in BC

ADDITONAL NOTES / REFERENCES / INTERVIEWS

1. No tailings has been deposit since 2005. The site is currently on care and maintenance. Tailings deposition procedures, documentations, and regulation requirements will be updated once the site go into production.

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM SUMMARY INFORMATION

SITE: Lupin Mine

OWNER: Lupin Mine Incorporated

STRUCTURE: Tailings Containment Area

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
PURPOSE OF DAM	Tailings and water containment
DAM CLASSIFICATION	Low to Significant
DATE OF LAST DSR	2015
DATE OF NEXT DSR	2020
ORIGINAL DESIGN ENGINEER	Geocon
CURRENT DESIGN ENGINEER	Golder Associates
LENGTH AND MAX. HEIGHT	Max Individual Dam Length = 930m, Max Individual Height = 6.2m
CREST WIDTH	Variable between 2m to 10m
STORAGE VOLUME	Information not available
CONSTRUCTION METHOD	Sand and gravel frozen core dam with geosynthetics liner cutoff
POND ADJACENT TO DAM	Pond is adjacent to most perimeter dams and some internal dams
DESIGN BEACH WIDTH	Information not available
CURRENT BEACH WIDTH	between 0 and 200m
DISCHARGE STRUCTURES	Siphons over Dam 1A during water treatment
EMERGENCY DISCHARGE STRUCTURES	None. Fully enclosed facility
CURRENT DAM ELEVATION	Approximately 486.2m
CURRENT POND ELEVATION	Approximately 482.2m
DATE OF LAST DAM RAISE	2005
FINAL DAM ELEVATION	Approximately 486.2m
MINE PRODUCTION RATE	None. Currently at care and maintenance status
TAILINGS DEPOSITION METHOD	None. Currently at care and maintenance status
DAM INSTRUMENTATION	Thermistors in some dams
DESIGN/AS-BUILT INFO. AVAILABLE	Last design by BGC Engineering in 2003
SURVEILLANCE PROGRAM AVAILABLE	Annual geotechnical inspection
WATERSHED AREA	Combined totall approximately 1,188 ha.

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

Site consist of eight preimeter dams and seven internal dams.

PREPARED BY: REVIEWED BY: PROJECT #:

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Dam M

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	Buttress construction

UPSTREAM DAM SLOPE / BEACH

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Concern with water level / freeboard		x		59	
Beach development		x		59	
Wave or other erosion		x			
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

DAM CREST

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Crest width / access		x			
Evidence of erosion		x			
Evidence of cracking	x		downstream crest	70	see note 1.
Deformation or geotechnical concern		x			
Settlement		x			
Low areas (sinkholes) or ponded water		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

1. Documented cracks along the downstream crest. Approximatey 50m long from Dam N abutment and 200m from Dam J abutment. Buttresses are being built to shore up the slope and offer protection from waves.

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Dam M

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	

DOWNSTREAM DAM SLOPE

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Erosion	x		downstream slope	61-69	erosion gully
Evidence of sloughing / sliding	x		downstream slope	61-69	sloughing
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Non-uniform slope		x			
Other noteworthy conditions		x			

DAM ABUTMENTS

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Erosion		x			
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Dam M

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	

DOWNSTREAM TOE

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Soft toe conditions		x			
Evidence of boils		x			
Evidence of contamination		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions	x		downstream slope	61-69	see note 1.

SPILLWAY OR DISCHARGE STRUCTURES

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Control structures		x			
Blockages or debris		x			
Erosion		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

1. Significant undercut from wave action erosion. Two (western and eastern) buttresses are being construction to shore up and protect the compromised areas. Recommended the buttresses to be connected to form a continuous structure to protect the entire eroded toe.

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE: Dam M

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
CHANGES SINCE LAST INSPECTION	

OPERATIONS, MAINTENANCE AND SURVEILLANCE SYSTEMS

FEATURES	YES	NO	DOCUMENTS / COMMENTS / NOTES
Regular inspections	x		Annual geotechnical inspection with weekly inspection in s
Qualified personnel completing surveillance	x		PEng for annual and technical for weekly
Processes & procedures established & documented	x		As per CDA and BCWMB guidelines
Critical failure modes understood	x		Overtopping and thaw of frozen core
Monitoring addresses critical failure modes	x		water level and core temperature are monitored
Monitoring frequency adequate	x		Annual reading of instruments and periodically monitoring
Timely review of monitoring results	x		All results are reviewed within 60 days
Alarm thresholds in place and relevant	x		1m freeboard specified by Water License. Water balance su
Deficiencies tracked and corrected	x		All geotech deformations recorded. Repairs are completed
Maintenance procedures documented	x		Maintenance is documented in the Annual Report
Foundation adequately characterized		x	Unknown. Limited design is available
Foundation responds to loading conditions	x		No minor deformation recorded to date.
Contingency plans available	x		EPP is sufficient for care and maintenance status
Tailings management plans followed		x	No tailings deposition since 2005
Water balance is adequate	x		Water balance is completed in 2015
Backup power available for critical systems		x	No tailings deposition since 2005

ADDITONAL NOTES / REFERENCES / INTERVIEWS

PREPARED BY: REVIEWED BY: PROJECT #:

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE: Dam M

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
CHANGES SINCE LAST INSPECTION	

DAM SAFETY MANAGEMENT SYSTEMS

FEATURES	YES	NO	DOCUMENTS / COMMENTS / NOTES
Corporate tailings management policy statement		x	See note 1 below.
Tailings management accountability assigned		x	See note 1 below.
Objectives and targets established		x	See note 1 below.
Roles and responsibilities assigned and understood		x	See note 1 below.
Succession planning		x	See note 1 below.
Adequate resources assigned		x	See note 1 below.
Training systems in place		x	See note 1 below.
Periodic reporting to management and regulator		x	See note 1 below.
Regulations, permits and commitments understood		x	See note 1 below.
Regulatory compliance measured	x		As per annual inspection
Formal risk management plan in place		x	See note 1 below.
Potential failure mode analysis completed		x	See note 1 below.
Communication systems in place		x	See note 1 below.
ERP/EPP developed and tested	x		EPP is in place but not tested
Decommissioning and closure accounted for	x		Active reclamation is compliance to the Closure Plan
Document management system in place	x		Documented in Annual Report.
Corporate review of tailings management		x	See note 1 below.
Adequate financial resources assigned		x	See note 1 below.

This Dam Facility Inspection Form follows the philosophy and intent of the following guidelines:

- Canadian Dam Association (CDA) Technical Bulletin: Dam Safety Reviews (DRAFT, 2015)
- Mining Association of Canada (MAC): A Guide to Audit and Assessment of Tailings Facility Management (2011)
- Association of Professional Engineers and Geoscientists of BC (APEGBC): Professional Practice Guidelines - Legislated Dam Safety Reviews in BC

ADDITONAL NOTES / REFERENCES / INTERVIEWS

1. No tailings has been deposit since 2005. The site is currently on care and maintenance. Tailings deposition procedures, documentations, and regulation requirements will be updated once the site go into production.

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM SUMMARY INFORMATION

SITE: Lupin Mine

OWNER: Lupin Mine Incorporated

STRUCTURE: Tailings Containment Area

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
PURPOSE OF DAM	Tailings and water containment
DAM CLASSIFICATION	Low to Significant
DATE OF LAST DSR	2015
DATE OF NEXT DSR	2020
ORIGINAL DESIGN ENGINEER	Geocon
CURRENT DESIGN ENGINEER	Golder Associates
LENGTH AND MAX. HEIGHT	Max Individual Dam Length = 930m, Max Individual Height = 6.2m
CREST WIDTH	Variable between 2m to 10m
STORAGE VOLUME	Information not available
CONSTRUCTION METHOD	Sand and gravel frozen core dam with geosynthetics liner cutoff
POND ADJACENT TO DAM	Pond is adjacent to most perimeter dams and some internal dams
DESIGN BEACH WIDTH	Information not available
CURRENT BEACH WIDTH	between 0 and 200m
DISCHARGE STRUCTURES	Siphons over Dam 1A during water treatment
EMERGENCY DISCHARGE STRUCTURES	None. Fully enclosed facility
CURRENT DAM ELEVATION	Approximately 486.2m
CURRENT POND ELEVATION	Approximately 482.2m
DATE OF LAST DAM RAISE	2005
FINAL DAM ELEVATION	Approximately 486.2m
MINE PRODUCTION RATE	None. Currently at care and maintenance status
TAILINGS DEPOSITION METHOD	None. Currently at care and maintenance status
DAM INSTRUMENTATION	Thermistors in some dams
DESIGN/AS-BUILT INFO. AVAILABLE	Last design by BGC Engineering in 2003
SURVEILLANCE PROGRAM AVAILABLE	Annual geotechnical inspection
WATERSHED AREA	Combined totall approximately 1,188 ha.

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

Site consist of eight preimeter dams and seven internal dams.

PREPARED BY: REVIEWED BY: PROJECT #:

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Dam N

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	Buttress construction

UPSTREAM DAM SLOPE / BEACH

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Concern with water level / freeboard	x			72-73	0.5m freeboard only (min. 1m)
Beach development		x			
Wave or other erosion		x			
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

DAM CREST

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Crest width / access		x			
Evidence of erosion		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Settlement		x			
Low areas (sinkholes) or ponded water		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Dam N

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	

DOWNSTREAM DAM SLOPE

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Erosion	x		downstream slope	71	wave action erosion
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Non-uniform slope		x			
Other noteworthy conditions		x			

DAM ABUTMENTS

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Erosion		x			
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Dam N

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	

DOWNSTREAM TOE

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Soft toe conditions		x			
Evidence of boils		x			
Evidence of contamination		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions	x		downstream toe	71	wave action erosion

SPILLWAY OR DISCHARGE STRUCTURES

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Control structures		x			
Blockages or debris		x			
Erosion		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE: Dam N

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
CHANGES SINCE LAST INSPECTION	

OPERATIONS, MAINTENANCE AND SURVEILLANCE SYSTEMS

FEATURES	YES	NO	DOCUMENTS / COMMENTS / NOTES
Regular inspections	x		Annual geotechnical inspection with weekly inspection in s
Qualified personnel completing surveillance	x		PEng for annual and technical for weekly
Processes & procedures established & documented	x		As per CDA and BCWMB guidelines
Critical failure modes understood	x		Overtopping and thaw of frozen core
Monitoring addresses critical failure modes	x		water level and core temperature are monitored
Monitoring frequency adequate	x		Annual reading of instruments and periodically monitoring
Timely review of monitoring results	x		All results are reviewed within 60 days
Alarm thresholds in place and relevant	x		1m freeboard specified by Water License. Water balance su
Deficiencies tracked and corrected	x		All geotech deformations recorded. Repairs are completed
Maintenance procedures documented	x		Maintenance is documented in the Annual Report
Foundation adequately characterized		x	Unknown. Limited design is available
Foundation responds to loading conditions	x		No minor deformation recorded to date.
Contingency plans available	x		EPP is sufficient for care and maintenance status
Tailings management plans followed		x	No tailings deposition since 2005
Water balance is adequate	x		Water balance is completed in 2015
Backup power available for critical systems		x	No tailings deposition since 2005

ADDITONAL NOTES / REFERENCES / INTERVIEWS

PREPARED BY: REVIEWED BY: PROJECT #:

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE: Dam N

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
CHANGES SINCE LAST INSPECTION	

DAM SAFETY MANAGEMENT SYSTEMS

FEATURES	YES	NO	DOCUMENTS / COMMENTS / NOTES
Corporate tailings management policy statement		x	See note 1 below.
Tailings management accountability assigned		x	See note 1 below.
Objectives and targets established		x	See note 1 below.
Roles and responsibilities assigned and understood		x	See note 1 below.
Succession planning		x	See note 1 below.
Adequate resources assigned		x	See note 1 below.
Training systems in place		x	See note 1 below.
Periodic reporting to management and regulator		x	See note 1 below.
Regulations, permits and commitments understood		x	See note 1 below.
Regulatory compliance measured	x		As per annual inspection
Formal risk management plan in place		x	See note 1 below.
Potential failure mode analysis completed		x	See note 1 below.
Communication systems in place		x	See note 1 below.
ERP/EPP developed and tested	x		EPP is in place but not tested
Decommissioning and closure accounted for	x		Active reclamation is compliance to the Closure Plan
Document management system in place	x		Documented in Annual Report.
Corporate review of tailings management		x	See note 1 below.
Adequate financial resources assigned		x	See note 1 below.

This Dam Facility Inspection Form follows the philosophy and intent of the following guidelines:

- Canadian Dam Association (CDA) Technical Bulletin: Dam Safety Reviews (DRAFT, 2015)
- Mining Association of Canada (MAC): A Guide to Audit and Assessment of Tailings Facility Management (2011)
- Association of Professional Engineers and Geoscientists of BC (APEGBC): Professional Practice Guidelines - Legislated Dam Safety Reviews in BC

ADDITONAL NOTES / REFERENCES / INTERVIEWS

1. No tailings has been deposit since 2005. The site is currently on care and maintenance. Tailings deposition procedures, documentations, and regulation requirements will be updated once the site go into production.

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM SUMMARY INFORMATION

SITE: Lupin Mine

OWNER: Lupin Mine Incorporated

STRUCTURE: Tailings Containment Area

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
PURPOSE OF DAM	Tailings and water containment
DAM CLASSIFICATION	Low to Significant
DATE OF LAST DSR	2015
DATE OF NEXT DSR	2020
ORIGINAL DESIGN ENGINEER	Geocon
CURRENT DESIGN ENGINEER	Golder Associates
LENGTH AND MAX. HEIGHT	Max Individual Dam Length = 930m, Max Individual Height = 6.2m
CREST WIDTH	Variable between 2m to 10m
STORAGE VOLUME	Information not available
CONSTRUCTION METHOD	Sand and gravel frozen core dam with geosynthetics liner cutoff
POND ADJACENT TO DAM	Pond is adjacent to most perimeter dams and some internal dams
DESIGN BEACH WIDTH	Information not available
CURRENT BEACH WIDTH	between 0 and 200m
DISCHARGE STRUCTURES	Siphons over Dam 1A during water treatment
EMERGENCY DISCHARGE STRUCTURES	None. Fully enclosed facility
CURRENT DAM ELEVATION	Approximately 486.2m
CURRENT POND ELEVATION	Approximately 482.2m
DATE OF LAST DAM RAISE	2005
FINAL DAM ELEVATION	Approximately 486.2m
MINE PRODUCTION RATE	None. Currently at care and maintenance status
TAILINGS DEPOSITION METHOD	None. Currently at care and maintenance status
DAM INSTRUMENTATION	Thermistors in some dams
DESIGN/AS-BUILT INFO. AVAILABLE	Last design by BGC Engineering in 2003
SURVEILLANCE PROGRAM AVAILABLE	Annual geotechnical inspection
WATERSHED AREA	Combined totall approximately 1,188 ha.

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

Site consist of eight preimeter dams and seven internal dams.

PREPARED BY: REVIEWED BY: PROJECT #:

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Divider Dykes

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	

UPSTREAM DAM SLOPE / BEACH

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Concern with water level / freeboard	x		south dyke	80	0.4m freeboard only (min. 1m)
Beach development		x			
Wave or other erosion	x		both dykes	75, 77, 79	wave action erosion
Evidence of sloughing / sliding	x		both dykes	75-77, 79	sloughs
Evidence of cracking	x		both dykes	75-77, 79	cracks
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

DAM CREST

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Crest width / access	x		both dykes	75-79	reduced crest width
Evidence of erosion		x			
Evidence of cracking	x		both dykes	76, 79	cracks
Deformation or geotechnical concern		x			
Settlement	x		both dykes	79-80	low spot in the south dyke
Low areas (sinkholes) or ponded water		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
OWNER: Lupin Mine Incorporated
STRUCTURE Divider Dykes

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	

DOWNSTREAM DAM SLOPE

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Erosion	x		downstream slope	76,79-80	wave action erosion
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Non-uniform slope		x			
Other noteworthy conditions		x			

DAM ABUTMENTS

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Erosion		x			
Evidence of sloughing / sliding		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions		x			

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine

OWNER: Lupin Mine Incorporated

STRUCTURE Divider Dykes

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
WORK SINCE LAST INSPECTION	

DOWNSTREAM TOE

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Signs of phreatic surface / seepage		x			
Areas of seepage turbid		x			
Soft toe conditions		x			
Evidence of boils		x			
Evidence of contamination		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions	x		downstream toe	76,79-80	sloughing

SPILLWAY OR DISCHARGE STRUCTURES

OBSERVED FEATURES	YES	NO	LOCATION	PHOTO #	COMMENTS / NOTES
Control structures	x		south dyke	77-78	valve control
Blockages or debris		x			
Erosion		x			
Evidence of cracking		x			
Deformation or geotechnical concern		x			
Instrumentation		x			
Vegetation		x			
Other noteworthy conditions	x		south dyke		Don't know if the valve is functional

ADDITONAL NOTES / REFERENCES / PLAN VIEW / CROSS SECTION / SKETCHES

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
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STRUCTURE: Divider Dykes

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
WEATHER CONDITIONS	Overcast with Sunny periods
CHANGES SINCE LAST INSPECTION	

OPERATIONS, MAINTENANCE AND SURVEILLANCE SYSTEMS

FEATURES	YES	NO	DOCUMENTS / COMMENTS / NOTES
Regular inspections	x		Annual geotechnical inspection with weekly inspection in s
Qualified personnel completing surveillance	x		PEng for annual and technical for weekly
Processes & procedures established & documented	x		As per CDA and BCWMB guidelines
Critical failure modes understood	x		Overtopping and thaw of frozen core
Monitoring addresses critical failure modes	x		water level and core temperature are monitored
Monitoring frequency adequate	x		Annual reading of instruments and periodically monitoring
Timely review of monitoring results	x		All results are reviewed within 60 days
Alarm thresholds in place and relevant	x		1m freeboard specified by Water License. Water balance su
Deficiencies tracked and corrected	x		All geotech deformations recorded. Repairs are completed
Maintenance procedures documented	x		Maintenance is documented in the Annual Report
Foundation adequately characterized		x	Unknown. Limited design is available
Foundation responds to loading conditions	x		No minor deformation recorded to date.
Contingency plans available	x		EPP is sufficient for care and maintenance status
Tailings management plans followed		x	No tailings deposition since 2005
Water balance is adequate	x		Water balance is completed in 2015
Backup power available for critical systems		x	No tailings deposition since 2005

ADDITONAL NOTES / REFERENCES / INTERVIEWS

PREPARED BY: REVIEWED BY: PROJECT #:

DAM FACILITY INSPECTION FORM

NORWEST CORPORATION

DAM INSPECTION CHECKLIST

SITE: Lupin Mine
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STRUCTURE: Divider Dykes

INSPECTED BY	Alvin Tong
DATE	August 24, 2016
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CHANGES SINCE LAST INSPECTION	

DAM SAFETY MANAGEMENT SYSTEMS

FEATURES	YES	NO	DOCUMENTS / COMMENTS / NOTES
Corporate tailings management policy statement		x	See note 1 below.
Tailings management accountability assigned		x	See note 1 below.
Objectives and targets established		x	See note 1 below.
Roles and responsibilities assigned and understood		x	See note 1 below.
Succession planning		x	See note 1 below.
Adequate resources assigned		x	See note 1 below.
Training systems in place		x	See note 1 below.
Periodic reporting to management and regulator		x	See note 1 below.
Regulations, permits and commitments understood		x	See note 1 below.
Regulatory compliance measured	x		As per annual inspection
Formal risk management plan in place		x	See note 1 below.
Potential failure mode analysis completed		x	See note 1 below.
Communication systems in place		x	See note 1 below.
ERP/EPP developed and tested	x		EPP is in place but not tested
Decommissioning and closure accounted for	x		Active reclamation is compliance to the Closure Plan
Document management system in place	x		Documented in Annual Report.
Corporate review of tailings management		x	See note 1 below.
Adequate financial resources assigned		x	See note 1 below.

This Dam Facility Inspection Form follows the philosophy and intent of the following guidelines:

- Canadian Dam Association (CDA) Technical Bulletin: Dam Safety Reviews (DRAFT, 2015)
- Mining Association of Canada (MAC): A Guide to Audit and Assessment of Tailings Facility Management (2011)
- Association of Professional Engineers and Geoscientists of BC (APEGBC): Professional Practice Guidelines - Legislated Dam Safety Reviews in BC

ADDITONAL NOTES / REFERENCES / INTERVIEWS

1. No tailings has been deposit since 2005. The site is currently on care and maintenance. Tailings deposition procedures, documentations, and regulation requirements will be updated once the site go into production.