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Document Description

Annual Physical Stability Assessment Report – Victoria Gold – Eagle Gold Project

Project Description:

Visual inspection of the following structures; Lower Dublin South Pond, Secondary Crusher – cut slopes, fill slopes and MSE wall, Primary Crusher – cut slopes and fill slopes, 90 Day Stockpile, Stockpile A, Stockpile B, Adsorption, Desorption and Recovery Plant – cut slopes, fill slopes and stockpile, Heap Leach Facility, Event Pond.

REVISION HISTORY

Revision	Status	Date	Revised By	Checked By	Approved By	Description of Revision
0	IFA	20/12/2018	RBK/JRG	RBK/JRG	BWL	Final

Status:

PRE	- Preliminary	IFP	- Issued for Procurement
IFR	- Issued for Review and Comment	IFC	- Issued for Construction
IFA	- Issued for Approval	AB	- As Built
IFQ	- Issued for Quotation		

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1 BACKGROUND

In September, 2018, Allnorth Consultants Limited (Allnorth) was retained by Victoria Gold Corp. (VGC) to conduct a visual physical stability assessment for their Eagle Gold mining operation located in Mayo Mining District, Yukon, Canada in support of Quartz Mining License QML-0011. Rod Keetch P. Eng. and James Garner EIT of Allnorth conducted the inspection on September 25th, 26th, and 27th, 2018. The inspection was limited to visual inspection and did not include any specific geotechnical or structural testing or evaluation. Visual inspection generally consisted of traversing the structures on foot, and viewing the structures in their entirety from accessible vantage points. Any issues that were discovered were investigated and documented with detailed notes and photographs. Allnorth inspectors were given complete freedom in determining what to look at, and were not permanently restricted for access to any locations within the site.

The mining project is currently under construction and is not currently extracting, storing, processing or refining ore at the time of inspection. As the project is in the early stages, there is no stability instrumentation monitoring program in place, nor are there historical records for survey data, or photographs to review and compare. This will likely become part of the physical stability assessment in the future.

2 SCOPE

This report outlines the findings of the physical stability assessment conducted from September 25th-27th of 2018. This report documents the findings of the physical stability assessment and makes recommendations for remediation, additional inspection or monitoring of the issues identified. The following structures were included in the assessment:

- Lower Dublin South Pond and outfall,
- Stockpile B,
- Stockpile A,
- 90 Day Stockpile,
- Heap Leach Facility,
- Cut and fill slopes of the primary and secondary crushers including MSE walls,
- Cut and fill slopes of the Adsorption, Desorption and Recovery Plant.

The purpose of the inspection is to identify any visual indicators associated with instability of mass earth structures, including but not limited to tension cracking, bulging, pooled water above the slope or near the toe of the slope, falling material, indications of creep, slumps, deposits of debris, or cracking in bedrock. Additionally, constructed slopes were reviewed for slope angles and compared against the recommend slope angles for known material types on site.

3 LOWER DUBLIN SOUTH POND (LDSP)

3.1 Spillway

No issues to note.

3.2 1500mm Spillway Outlet Culvert

1. At the inlet of the 1500mm spillway culvert that crosses under the process plant service road there is a depression with exposed soil. Water is pooling in the depression. Additionally, a very small amount of moving water is flowing from ditching adjacent to the camp road to the spillway. The flow is below the riprap, but above the geotextile. This water is not passing through the 1500mm culvert, therefore it is likely that the low volume flow is passing through the granular subgrade of the culvert.

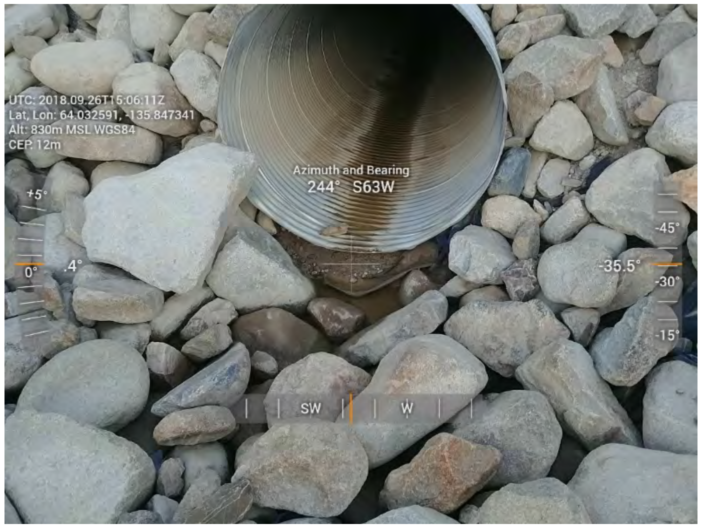

Figure 1: LDSP - 1500mm Culvert with depression and pooling at inlet.

3.3 Lower Dublin South Dam

1. Tension cracking, 0.3m deep by 5.0m long, is present on the Lower Dublin South Dam possibly associated with the settlement of new construction.

Figure 2: LDSP - Tension cracking on south dam.

3.4 Cut slopes

1. A significant amount of water and sediment is entering the collection pond and fore bay from the southern side. Some of the water and sediment is not intercepted by the fore bay prior to entering the collection pond. The water appears to be directed from a berm at a higher elevation. Erosion can be seen at the edge of the collection pond liner, in the cut slopes above the pond and fore bay, and in the bench. Comments on site indicate that a plan is already in place to address drainage in the area.

Figure 3: LDSP - Erosion at the southern side near the fore bay berm.

Figure 4: LDPS - Erosion at liner.

2. On the northeast corner of the pond water is flowing out of a culvert of unknown size. VGC staff have indicated that the culvert was uncovered during construction and is a relic from historic placer mining. The outlet is damaged, and the flow is currently captured by a diversion ditch.

Figure 5: LDSP – Water flow from damaged culvert on northeast corner of pond.

3. Groundwater with unknown origin has previously caused erosion on the West slope of the fore bay. No ground water flows were observed at the time of inspection.

Figure 6: LDSP - Erosion on west slope of fore bay.

4. A small elevated pond above the East slope of the fore bay has trapped some water. A PVC pipe is in place to drain the pond, however, the elevation of the PVC pipe to too high to fully drain the pond. Leaving perched water storage above a soil structure is non-typical. VGC staff have indicated that the pond was created to mitigate erosion of the east fore bay slope and that the pond is periodically pumped to the exfiltration sump when threshold levels in the pond are reached.

Figure 7: LDSP - Elevated Pond above Eastern side of fore bay

3.5 Low Level Outlet Channel

1. In the pond outlet area, surface water from the roadway is flowing down slope causing minor erosion. The exclusion ditching appears inadequate around pond above the v-notch weir to avoid further erosion.

Figure 8: LDSP - Erosion at low level outlet pond.

2. The channel has appropriately sized riprap, but the armour does not meet typical minimum thickness in many locations.

Figure 9: LDSP - Exposed liner in low level outlet channel.

3.6 LDSP Fore bay

1. The fore bay has a reduced capacity due to large quantities of material entering the pond from the South and West slopes. VGC staff have indicated that plans are currently in place to excavate the sedimentation pond and restore additional capacity.

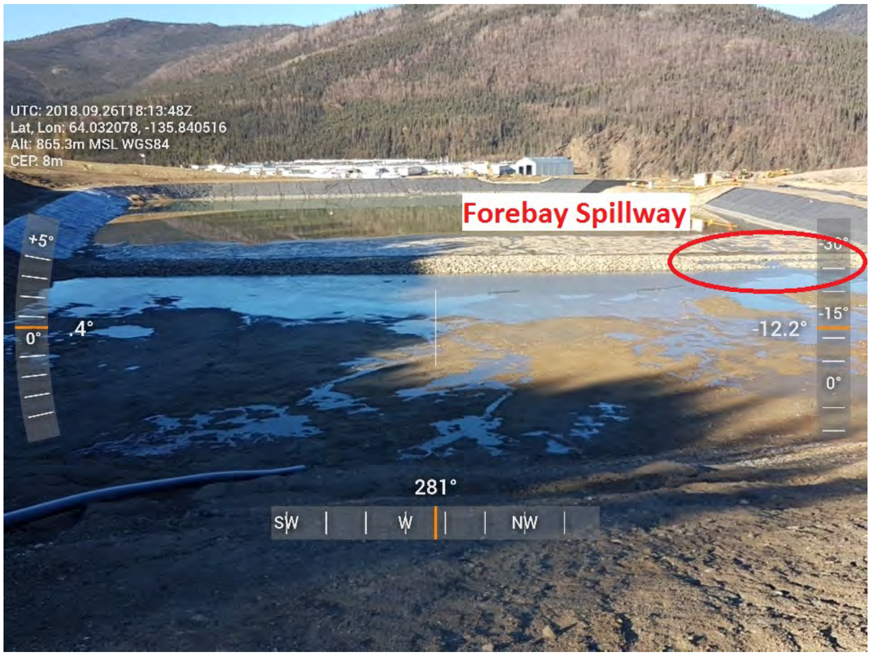

Figure 10: LDSP - Sediment Nearing the top of the fore bay spillway.

3.7 Collection Pond

1. The under drains below the LDSP storage appear to be operating as planned. There is water at the outlet, and outlet flow has stayed fairly constant since their install, according to site staff.

Figure 11: LDSP - Low level outlet pond.

2. Water and sediment has been carried into the pond and onto the liner at the southwest corner of the pond.

Figure 12: Sediment carried onto collection pond liner.

4 PRIMARY CRUSHER

1. The support slope for the Primary Crusher access road is over steepened at 50%, however, this appears to be for a temporary access. (No Photo).

2. The slope immediately behind the primary crusher is rip-able rock with knobs of rock that would require blasting. Measurements taken on site indicates slopes here meet recommendations and range between 50% and 64%.

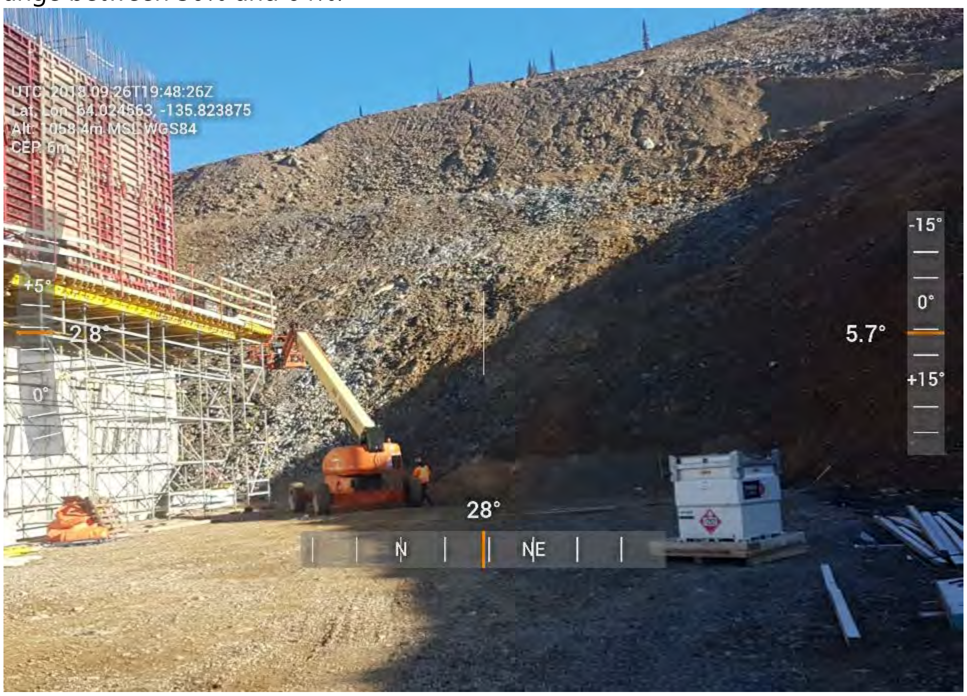

Figure 13: Slope behind primary crusher.

3. Road ditching is in place along the primary crusher access road which restricts over land flow from eroding the slope. (No Photo).

5 SECONDARY CRUSHER + MSE WALL (SC MSE)

1. Very minor ponding is present at the base of the MSE wall due to inadequate grading in some sections.

Figure 14: SC MSE - Minor ponding at base of MSE wall.

2. Drain outlets for the MSE wall are not visible at the face. Site staff have indicated the drain system is in place, installation has been recorded in as-built records and will be day lighted as part of the final site grading. (No Photo).

3. Construction on the MSE wall is ongoing and appears to be well compacted and placed during our inspection.

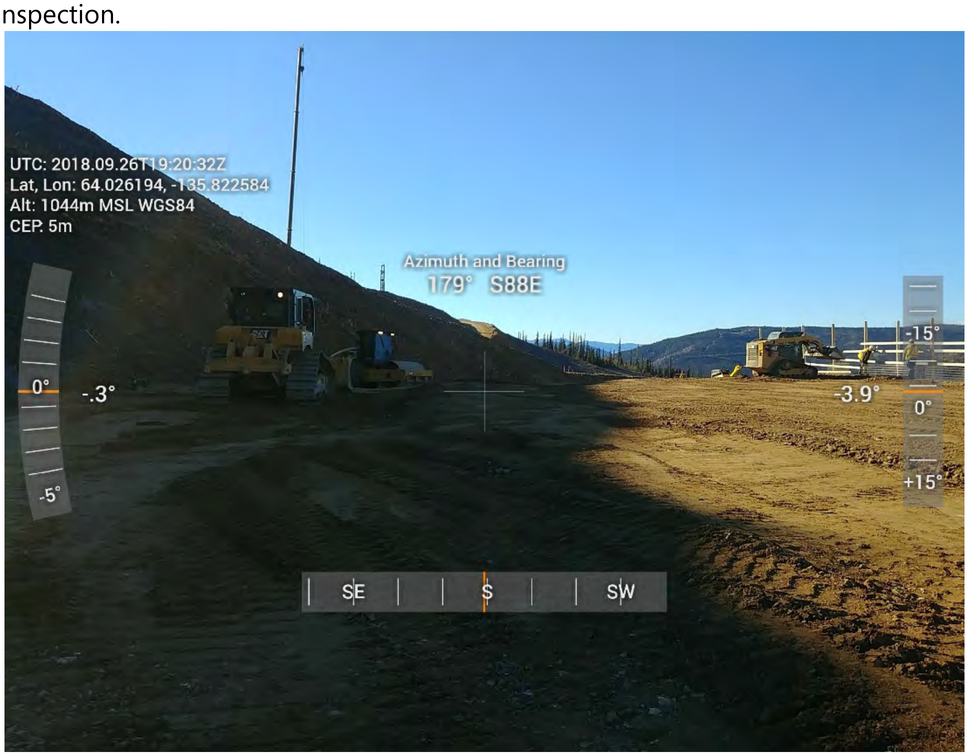

Figure 15: SC MSE - Equipment used for MSE wall construction.

4. Backfill behind the MSE wall varies to a maximum recorded angle of 64% and appears to be type 2 rock and blastable rock.

Figure 16: SC MSE - Slope behind secondary crusher MSE wall.

5. The slope below the MSE wall is well offset from both the wall and the Secondary Crusher foundations. The slope was measured at 22%-25%.

Figure 17: SC MSE - Slope below secondary crusher pad.

6. The MSE wall has inadequate set back and uneven layers at the bottom of the wall. This has been addressed by the owner and the wall manufacturer according to site personnel.

Figure 18: SC MSE - Secondary crusher MSE wall.

6 90 DAY STOCKPILE

1. Portions of the 90 day stockpile has been developed at this time, and the area below the current pad has been stripped of trees in preparation of the second phase. (No Photo)
2. The outside edge of the current pad development appears to have access and some evidence of recent dumping/placement in an attempt to further construct the pad, though no active dumping or earth moving was witnessed during the inspections. The placed material requires dozing and grading to deal with drainage run off in isolated locations, but there were no features identified that would store significant runoff or melt volume.

Figure 19: 90 Day Stockpile - Ungraded material.

3. The current 90 day stockpile fill slopes meet a 50% maximum grade where measured although there is little in the way of benching. (No Photo)

4. There are perched boulders on the fill above an access road on the south east corner of the stockpile, only a relatively narrow band of vegetation and trees separates the toe of the stockpile from the road.

Figure 20: 90 Day Stockpile - perched boulders.

Figure 21: 90 Day Stockpile - perched boulders.

5. Portions of the 90 Day Stockpile footprint have not yet had complete stripping of the organics, and there appears to be limited locations where the new placement is being completed on some built up organics near the west edge. It is unclear if this is an acceptable part of the foundation of the stockpile, or if the stripping program is complete at this time.

Figure 22: 90 Day Stockpile – Organic layer near west edge.

Figure 23: 90 Day Stockpile - Organics in phase 2 foundation (typical).

7 ADSORPTION, DESORPTION AND RECOVERY PLANT(ADR)

1. Vegetation is perched near to the top of the ADR Slope, though an explicit measurement was not possible due to access considerations. There is adequate space at the base of the slope to accommodate any materials that may fall, though during construction some of that space is being used as a laydown.

Figure 24: ADR - Perched vegetation.

2. The established slope behind the ADR building appears stable and well constructed on the face with only minor accumulation at the toe of small rock and gravels.

Figure 25: ADR - Minor accumulation of gravel at base of cut slope.

3. There is additional borrow happening around the corner from the ADR facility. The slope is under construction/excavation, and there does not appear to be any adverse affects to the already constructed slope above the ADR building. The final excavation should be reviewed to ensure that any altered drainage isn't directed onto critical infrastructure, or the slopes above them, or is accounted for.

Figure 26: ADR – Borrow area.

4. There is a temporary stockpile perched on the outside of slope on this area. The stockpile exceeds the recommended slopes for long term stability for a common fill material. The stockpile should be shaped to meet requirements if it is a long term storage solution.

Figure 27: ADR - Common material stockpile with over steepened slopes.

Figure 28: ADR - Common material stockpile with over steepened slopes.

8 HEAP LEACH FACILITY (HLF)

1. Phase 1 of the HLF is under construction. The confining embankment is nearly complete, and the liner is being installed. A drainage collection ditch has been constructed above current liner and is approximately 1m deep by 3m wide at the top. The measured faces of the constructed slopes were measured at an acceptable 38% grade.

Figure 29: HLF – Collection ditch.

Figure 30: HFL - Confining embankment construction.

Figure 31: HLF - Construction (facing south).

Figure 32: HLF - Construction (facing north).

2. Clearing and stripping has begun for the phase 1B areas. Slopes have been graded to approximately 33%.

Figure 33: HLF - Phase 1B northwest slope.

3. A small amount of water has ponded above the collection ditch. VGC staff have indicated that this will be eliminated as construction of the HLF proceeds.

Figure 34: HLF - Ponded water above collection ditch.

Figure 35: HLF - Pooling above collection ditch.

4. The free face of the HLF confining embankment is benched with some heaped material and perched rock. Typically these exposed faces are smoothed and sealed to help prevent erosion of the face once in operation, it is not clear if that is part of the final design. Perched rock does not appear to be located above any construction, infrastructure, or roadways at the time of inspection.

Figure 36: HLF - Free face with heaped material and perched rock.

Figure 37: HLF - Free face with heaped material and perched rock.

5. There is some water directed near, but not onto the HLF construction. This is west of the structure, but there does not appear to be any management plan in place for the concentration of water directed by a terminated haul road.

Figure 38: HLF - Erosion and material flows west of confining embankment.

9 EVENT POND

1. This area is under construction. Temporary excavations in rock meet the suggested slopes as laid out by the specifications provided, and determined by the geotechnical consultants in mine planning.

Figure 39: Event pond (facing east) – rock cuts.

2. There are some small over steepened stockpile material above the rock cuts, but there is no equipment or active work below the face.

Figure 40: Event pond (facing west) – over steepened material.

3. Some tension cracking and sloughing block failures can be seen in material consisting of common fill and mixed stripping organics at the SE corner of the current works. The area does not have any active drainage but is under construction. The short runout for any minor sloughing does not threaten any infrastructure. (No Photo).

10 STOCKPILE A

1. The Stockpile is currently being excavated with the material being used for road fill in a culvert installation on the road adjacent. There is very little stockpiled material present at the time of inspection.

Figure 41: Stockpile A.

2. The rear slopes of the stockpile area are composed of placed rock and engineered fill at 50% below a bench and a rock face above the bench at 65%.

Figure 42: Stockpile A - upper slope.

Figure 43: Stockpile A - upper slope.

3. The temporary faces of the remaining stockpile material are well supported and set at 50% when benching setbacks are included.

Figure 44: Stockpile A - lower slopes.

11 STOCKPILE B

1. Edges of the stockpile are extending past stripping, this could be an issue if there is a required base/foundation preparations for future loading.

Figure 45: Stockpile B - Toe of slope encroaching on organics.

Figure 46: Stockpile B - Toe of slope encroaching on organics.

2. The west portion of the stockpile is primarily organics and topsoil. Tension cracking up to 1m deep and 30m long was found on the west edge behind some slowly failing material caving off in sloughing block sections. There is no infrastructure or active work nearby, therefore, if a small failure were to occur the consequences would be very low.

Figure 47: Stockpile B - West end tension cracking.

Figure 48: Stockpile B - West end tension cracking.

Figure 49: Stockpile B - West end tension cracking.

3. The new material being moved to the stockpile varies significantly in material composition and moisture content. The north edge of the dump has significantly saturated soils at the time of inspection.

Figure 50: Stockpile B - North side saturated soils

4. There is a small failure at the north west edge of the stockpile. While the mechanism is not completely clear, it appears to be linked to a stockpile deposit of mixed ice and earth that was excavated for other works. The material failed in a flow mechanism, and the run out does not extend more than 20m past the toe of the existing stockpile. The toe of the flow is composed of ice chunks and fractured rock mixed with fines. Work is not taking place below the stockpile, but there is an active haul road accessing the stockpile adjacent to the failure path. It is unclear if any ice remains in the stockpile.

Figure 51: Stockpile B - Northwest material flow.

Figure 52: Stockpile B - Northwest material flow.

Figure 53: Stockpile B - Ice found in northwest material flow.

5. Sloping of the outside faces of the stockpile was found to be supported at 90% to 100%.

Figure 54: Stockpile B - Outside slope (Typical).

12 RECOMMENDATIONS

12.1 General

1. VGC should assign a qualified, on site, individual to be responsible for monitoring and documentation of any mass earth structures that have significant risks in the case of a failure. The individual should develop a standard operating procedure for the monitoring and risk management of these structures. This individual should be responsible for coordination with a qualified professional to review monitoring data for concerns and trends, if they are not qualified themselves.

2. All stockpiles, material storage areas, and other mass earth structures should all have formal foundation and construction designs completed by a qualified professional. Design and base preparation have been completed and documented for much of the work in progress. VGC should continue to assign individuals to document and be responsible for the monitoring and construction review to determine if such structures are constructed in accordance with design. Any variations between design documents and final construction should be included in final record drawings.

3. Any finalized construction of mass earth structures should include a final construction report that includes any operational and maintenance requirements (if any) to ensure stability of the structure.

4. VGC should consider a monitoring program to assist in early warning and detection of any movements in mass earth structures. Such a program might use permanent survey points, slope

inclinometers, piezometers, or other tools to measure internal/external movements and pore water pressures. Such a monitoring program should be developed with the assistance of and be implemented with the oversight of a qualified professional.

12.2 LDSP

1. Extend the existing berm along the south side of the pond further to the east to direct water into the fore bay / siltation pond, where there is no liner to disturb and where the facility is designed to capture eroded material.

12.3 Primary Crusher

1. No specific recommendations at this time.

12.4 Secondary Crusher and MSE Wall

1. No specific recommendations at this time.

12.5 90 Day Stockpile

1. Mitigate risks associated with perched rocks throughout the slope. Boulders should be removed in a controlled manner, or have a machine press (or bury) the boulders into the existing fill so they have a more stable base, and are less likely to become dislodged. Care should be taken during this work to ensure that critical infrastructure, workers and equipment are restricted from the fallout path, or other appropriate mitigation measures are put in place.

12.6 ADR

1. Reduce the outside slope of material in the stockpile above the ADR Access Road. The stockpile West Northwest of the ADR Building is composed of a mix of several materials with unknown compaction and possibly over steepened outside slopes. It is recommended that the stockpile be shaped within geotechnical design specifications, or that the location of the pile is adjusted so that there is a bench between the crest of the adjacent slope, and the toe of the stockpile. If the stockpile is to remain long term, the structure should have a design completed by a qualified professional.
2. At the time of inspection, there appeared to be over-steepened temporary cut slopes created adjacent to short term haul roads used for construction access in the area. Cut back slopes adjacent to haul roads that do not meet geotechnical specifications for the site, or have recommendations in place for temporary slopes during construction.

12.7 HLF

1. No specific recommendations at this time.

12.8 Event Pond

1. No specific recommendations at this time.

12.9 Stockpile A

1. No specific recommendations at this time.

12.10 Stockpile B

1. This stockpile should be graded on top to eliminate or seal tension cracking.
2. The extent (volume and location) of ice and other frozen materials in the stockpile should be determined based on site records and information from site staff available. A record of the resulting instability should be noted.
3. Have a qualified professional determine if ice and other frozen materials are an acceptable material for construction of a mass earth structure, and if they are, how they should be placed or incorporated in an overall stockpile design to ensure that there are no localized failures as a result.

13 CONCLUSION

The structures reviewed in this inspection generally show little evidence of movement or risk indicators. Where risk of movement was identified, there risk is typically low and the consequence of a small instability is managed by minimizing exposure to workers, infrastructure or high value natural resources.

Slopes reviewed meet the recommendations for slope angles in most locations except where the slopes are temporary in nature and will later be cut back under final design, this is typical in construction on major projects.

The lack of previous stability review reports due to the age of the project and no requirement for previous completion, the fact that current infrastructure is currently incomplete and in construction, and the lack of any established survey or instrumentation monitoring program leaves little baseline data for comparison, but will improve with subsequent reviews.

There are some minor erosional and stability concerns within the project, that can be addressed with some minor planning and maintenance as construction continues in order to moderate or eliminate the associated risks.

We trust this report satisfies your requirements at this time and thank you for the opportunity to work with you on the project. If you have questions or concerns do not hesitate to contact our office.

Yours truly,

ALLNORTH CONSULTANTS LIMITED

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Dec 20, 2018

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