2021 Annual Geotechnical Inspection – Doris Tailings Impoundment Area

Hope Bay Mine, Nunavut, Canada
Agnico Eagle Mines Limited

SRK Consulting (Canada) Inc. ▪ 1CT022.077 ▪ March 2022

srk consulting

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Hope Bay Mine, Nunavut, Canada

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Photo of the Doris TIA taken during the annual inspection.

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Executive Summary

Hope Bay is a gold mining and milling operation of Agnico Eagle Mines (Agnico Eagle). Hope Bay comprises three distinct areas of known mineralization, Doris, Madrid (North and South), and Boston. Doris Mine (Phase 1) is currently being operated (as of December 2018) under Nunavut Water Board (NWB) Type A Water License 2AM-DOH1335 - Amendment No.2. This license covers the current Phase 1 and well as the Phase 2 mining developments. Agnico Eagle contracted SRK Consulting (Canada) Inc. to conduct an annual geotechnical inspection (AGI) for the Tailings Impoundment Area (TIA) in accordance with all stipulated license conditions.

On February 2, 2021 TMAC Resources Inc. (TMAC) was purchased by Agnico Eagle and became a wholly owned subsidiary of Agnico Eagle. Effective as of January 1st, 2022, Agnico Eagle and TMAC amalgamated and continued under the Agnico Eagle name. Accordingly, by operation of law and without any further acts or steps necessary, TMAC ceased to exist and continued as Agnico Eagle, and Agnico Eagle possessed all of the property, rights, privileges and franchises and is subject to all liabilities, including civil, criminal and quasi-criminal, and all contracts, disabilities and debts of TMAC.

The TIA currently consists of a water retaining dam, the North Dam, and a tailings retaining dam, the South Dam. A second tailings retaining dam or saddle dam, the West Dam, will be built adjacent to the South Dam when the South Dam is raised. Subaerial tailings are currently retained by the South Dam, and the Reclaim Pond is impounded by the North Dam. The North Dam was constructed during the winters of 2011 and 2012, and Phase 1 of the South Dam was constructed in one season during the winter of the 2017 to 2018 season. In Phase 2, the South Dam will be raised to approximately 46 masl and the West Dam will be constructed. Construction of the Phase 2 South Dam raise is expected to commence, and be completed, by the time the tailings beach against the South Dam reaches the full supply level of the existing dam (36.5 masl or approximately 2.64Mt of total tailings tonnage). Following construction of the Phase 2 South Dam, construction of the West Dam is expected to start. The exact timing of the South Dam Phase 2 raise construction and West Dam construction will be depending on the restart of production activity and tailings discharge on site (currently suspended for 2022).

Table A provides a summary of the 2021 AGI inspection components for the TIA, and the primary recommendations stemming from the site inspection and subsequent review of monitoring data. The recommendations from the previous 2020 AGI are included for reference. Based on the results of the 2021 AGI, the North Dam and South Dam are functioning as designed, and no concerns were identified regarding the ongoing performance of these structures. There are maintenance items that require attention, and suggestions for improvement of the performance monitoring system. The items in Table A are considered important to the ongoing performance and safety of the TIA and require attention by Hope Bay staff prior to the 2022 annual geotechnical inspection. In addition to formal recommendations (black text), suggestions are captured in blue text, and where appropriate, an update status of certain recommendations or important context is provided in *red* text.

Table 1.A: Summary of 2021 AGI Recommendations

Inspection Item	2020 Recommendations (for reference)	2021 Recommendations
General TIA Management Recommendations		
Third Party Dam Safety Review	▪ Conduct an independent third-party Dam Safety Review (DSR) for both the North and South Dams in the summer of 2021. ▪ *Planning for this is in progress. An independent third-party Dam Safety Review is scheduled to be conducted for both the North and South Dams in summer of 2021 pending COVID-19 restrictions.*	▪ No recommendations. ▪ *A DSR was completed by a third party (Tetra Tech) in 2021. Agnico is actively working on review and implementation of the DSR comments where appropriate.*
Tailings Operating, Maintenance and Surveillance (OMS) Manual and Emergency Response Plan (ERP)	▪ A draft version of the 'Hope Bay Project Dam Emergency Plan' was completed by Hope Bay staff in 2021. This Dam Emergency Plan should be finalized by site and integrated with the into the OMS and TARP framework ▪ Once integrated, the suite of OMS, TARPs, ERP and Dam Emergency Plan should reviewed with all site operations annually and updated as necessary. ▪ All of these components should be reviewed against Agnico Eagle's corporate tailings management system and updated tailings standards through a gap analysis to identify required updates. ▪ The roles and responsibilities for the TIA are defined in the OMS update and must be updated with any changes in Agnico Eagle's corporate structure. ▪ *A revised OMS was issued in 2020* ▪ *TARPs were developed for the TIA in Q4 2020. Further refinement based on site input to the TARPs and integration with OMS manual should be completed in 2021*	▪ Overall, the OMS manual, TARPS and Dam Emergency plan must be reviewed by Agnico Eagle and updated to reflect the many recent changes, including, but not limited to the Dam Emergency Plan, the updated TARPs and change in key personnel listed in the OMS manual. Minor updates to the North and South dam monitoring SOPs are also recommended. ▪ All components should be reviewed against Agnico Eagle's corporate tailings management system and updated tailings standards through a gap analysis to identify required updates. ▪ *SRK and Agnico Eagle are currently collaborating on updates to these plans.* ▪ The suite of OMS, TARPs, ERP and Dam Emergency Plan must be reviewed with all site operations annually and updated as necessary. ▪ *Agnico Eagle are currently in the process of updated the Dam Emergency Plan.* ▪ Agnico Eagle should ensure all staff are properly informed and trained on the contents of the OMS Manual.
Compliance with Monitoring Frequency Requirements	▪ Conduct monitoring in accordance with the specified frequency in the Monitoring SOP and OMS. If changes in the monitoring frequency are required due to new operating schedules these must be proposed to and approved by the EOR. ▪ The North and South Dam Monitoring SOPs were updated in 2020. An additional update should be completed following any notable updates to the Tailings Management System.	▪ Recommended monitoring frequencies have been met in all categories except for visual inspections and survey monitoring. Agnico Eagle should aim to improve the frequency of these monitoring events in 2022. ▪ *It is understood that COVID-19 and site staffing limitations during this monitoring year impacted the ability to collect this data. Plans in place now from Agnico to further increase visual inspections in 2022.*
North Dam Inspection and Review of Monitoring Data		
Ground Temperature Cables (GTCs)	▪ No recommendations. ▪ Consider implementing satellite telemetry for the North Dam data loggers to allow daily transmission of the measurements rather than manual downloads. This would be a more proactive approach rather than a requirement at this time.	▪ No new recommendations.
Thermosyphons	▪ No recommendations.	▪ The joints on the thermosyphons are showing signs of weathering and rusting. The thermosyphon weld joints should be cleaned (wire-wheel) and repainted to slow additional corrosion.

Inspection Item	2020 Recommendations (for reference)	2021 Recommendations
CR1000 Datalogger Battery Voltage	■ The external CR1000 datalogger batteries should continue to be monitored and recharged annually or replaced as needed. ■ *The batteries have been recharged in March 2021*	■ The external CR1000 datalogger batteries should continue to be monitored and recharged annually or replaced as needed.
Inclinometers	■ The inclinometer probe and read-out were sent for recalibration and maintenance, but due to Covid-19 it was not possible to complete in 2020. The probe has and readout should be re-sent to the manufacturer for recalibration and maintenance in 2021. ■ *Note that TMAC has informed SRK that the inclinometer probe has now been sent off site (sent off site Q1 2021) for recalibration and maintenance.*	■ No recommendations. ■ *Site staff should maintain a record of probe and read-out service and recalibration dates. The next service and recalibration should be planned for 2024.*
Survey Monitoring Points	■ Backfill the erosion around survey monitoring point ND−DSP−100 at the North Dam. ■ Continue to carefully observe the North Dam downstream shell settlement points ND-SSP-080-3 and ND-SSP-110-3 to monitor for increased thaw settlement of the toe and undue deformation. ■ Installation of additional surficial survey points (SSP) on the upstream face of the North Dam to track deformation of the upstream face. These additional SSPs are recommended to better track the deformation of the upstream shell as foundation at the toe thaws due to elevated Reclaim Pond water levels. Note that this upstream foundation thaw is expected as per the original designs and there are no concerns with current thaw rate, however improved tracking of the displacement going forward will provide an early warning should adverse thaw conditions occur, and help ensure the dam design life is not being impacted.	■ No recommendations. ■ *Install a few key surficial survey points (SSP) on the upstream face of the North Dam. These additional SSPs will track the potential deformation of the upstream shell as the upstream foundation thaws due to thermal loading of an elevated Reclaim Pond water level. Note that upstream foundation thaw is expected as per the original designs and there have been no visual observation of settlement and there are no concerns with current thaw rate.* – *SRK and Agnico Eagle are currently collaborating on this item to further assess the need, as well as to determine a suitable time for potential additional survey monitoring point collection. This is not a critical path item and this additional survey point collection may not be done in 2022, as there is currently no mill operation resulting on site.*
Creep Displacement	■ No recommendations.	■ No recommendations.
Visual Inspection (Walk Over)	■ Complete weekly walkover surveys at the North Dam in accordance with the Monitoring SOPs. This is an important surveillance activity as defined in the OMS Manual and needs to be complied with. *Since 2018 there has been an improvement in the frequency of the walk over surveys but additional surveys were still required to be in accordance with the SOPs.*	■ Increase the completion of weekly visual inspections at the North Dam in accordance with the specified frequency. ■ *The number of visual inspections (formerly walk overs surveys) has improved in 2021, however additional inspections are required to be in compliance with the specified frequency.*
Monitoring of Flowing Water at the Toe of the North Dam	■ No recommendations. ■ Frost probe surveys are not required as part of the 2021 monitoring. If conditions change and a frost probe survey is required, the EOR will inform Hope Bay staff.	■ Modify the water quality monitoring SOP based on the absence of data to suggest the presence of TIA Reclaim Pond water in the flowing water at the toe of the North Dam. Recommended changes to the monitoring SOP are below, final changes to the frequency will be documented in an updated SOP. ■ Reduce the water quality and flow monitoring frequency for field measurements, from once per week to once per

Inspection Item	2020 Recommendations (for reference)	2021 Recommendations
		month in the periods while flowing water is observed (if observed). ■ Reduce the laboratory water quality monitoring frequency to once per year, during August, when flowing water is observed at the downstream toe, ensuring that this sample is collected and analyzed per the SOP, including all field parameters. This change in frequency also applies to the other LAS samples described in the monitoring SOP.
AGI Physical Inspection	■ No recommendations.	■ No recommendations. ■ *The v-notch weir at the toe of the dam is not performing correctly. To minimize future thermal impacts, the v-notch weir should be decommissioned and the velocity-area method used in its place when flow estimation is required.* ■ *If site elects to do some clean-up of the upstream pumping pad (when the Reclaim Pond water level is decreased, the crush material, currently located over the top of the dam shell, should be removed (to help improve visual monitoring in this area).*
South Dam Inspection and Review of Monitoring Data		
Ground Temperature Cables (GTCs) and D405 Dataloggers	■ GTCs provide thermal monitoring of the dam to ensure conditions remain within the intended design for safe operation and tailings containment. GTC replacement is recommended in some areas of the South Dam where recent instrument failure has occurred. Four replacement GTCs are suggested to be installed at this time (two upstream and two downstream). TMAC should work with the EOR to install these replacement GTCs as soon as practical. Priority should be given to the two upstream GTC replacements. ■ *Four replacement GTC strings are now on site (at the Doris North Camp). The exact timing of the installation of these cables has not yet been established due to current site limitations with available surface drill rigs.* ■ Beadedstream telemetry subscription requires annual renewal. TMAC should work with the EOR to ensure that the telemetry system operations are maintained. ■ Complete a walk over survey of the South Dam after spring melt and look for any exposed or damaged ground temperature cables. This will allow for preventative maintenance and placement of protective material to be done if exposed cables are observed, which will help to limit the potential for damage from wildlife. ■ Manually download data from each datalogger once annually in accordance with the monitoring SOP.	■ GTCs provide thermal monitoring of the dam to ensure conditions remain within the intended design for safe operation and tailings containment. GTC replacement is recommended in some areas of the South Dam where recent instrument failure has occurred. Four replacement GTCs are suggested to be installed at this time (two upstream and two downstream). The Agnico Eagle should work forward to install these replacement GTCs as soon as practical. Priority should be given to the two upstream GTC replacements. Four replacement GTC strings are on site (at the Doris North Camp) ■ Complete a detailed visual inspection of the South Dam after spring melt, especially looking for any exposed or damaged ground temperature cables. This will allow for preventative maintenance and placement of protective material to be done if exposed cables are observed, which will help to limit the potential for damage from wildlife. ■ Complete a manual download of data from each datalogger once in 2022, following the instructions in the monitoring SOP. ■ *Beadedstream telemetry subscription requires annual renewal. Agnico Eagle has taken over the subscription with Beadedstream and will be responsible for maintenance of the GTC telemetry system operations are maintained.*
Survey Monitoring Points	■ A monthly survey of the downstream toe is required as part of the Monitoring SOP. This monitoring requirement should be conducted at	■ A survey of the downstream toe is required as part of the Monitoring SOP with the intent of being completed at the same time as the monthly monitoring surveys (May to November), however the frequency requirement in the

Inspection Item	2020 Recommendations (for reference)	2021 Recommendations
	least once during August each year to track the lateral extent of ponding downstream of the dam.	SOP requires modification. The toe survey should be conducted at least once annually during snow-free conditions (typically August) each year to track the lateral displacement and the extent of ponding downstream of the dam. Additional dam toe surveys may be collected during monthly GPS survey events when the toe is mostly snow free. ■ Update the SOP and monitoring schedule to reflect the modified frequency. ■ *In 2021, a drone LiDAR survey was completed over the North Dam, South Dam and tailings beach. The LiDAR survey is valuable data for tracking the evolution of the TIA and provides an acceptable method for satisfying the downstream toe survey requirement.*
Visual Inspection (Walkover)	■ Complete weekly walkover surveys at the South Dam in accordance with the Monitoring SOPs. This is an important surveillance activity as defined in the OMS Manual and needs to be complied with.	■ Increase the completion of weekly visual inspections at the South Dam in accordance with the required weekly frequency.
Monitoring of Flowing and Ponded Water at the Toe of the South Dam	■ No recommendations.	■ No recommendations ■ *Signs of increased ponding water were observed in 2020 at the downstream toe of the South Dam. The ponded volume was notably less during the 2021 AGI inspection. Downstream of the Phase 1 South Dam, permafrost, including frost wedge polygons existed prior to construction which is indicative of the area being historically wet or ponded.* ■ *Drone images taken just after freshet and just before winter freeze up should be collected to assist with ongoing monitoring of the ponded water at the downstream portion of the South Dam toe.*
Annual Physical Inspection of the South Dam	■ Methods to limit tailings dispersion downstream of the dam should be considered in 2021. As the sub-aerial tailings beach grows, this is expected to become a more critical item. ■ The initial phases of some permafrost degradation and increased ponding water have been observed at the downstream toe of the South Dam. This downstream area is near the area where snow access roads were constructed as part of the Phase 1 South Dam construction (and is within the ultimate Phase 2 dam footprint). Remediation of this area should be considered prior to construction of the Phase 2 raise (Phase 2 raise not expected to be completed in 2021 at this time). This remediation would be expected to consist of the placement of 1.5m thickness of ROQ material directly over these areas (and against the current downstream dam fill / shell).	■ There are two zones on the 2H:1V downstream slope of the South Dam, specifically where the downstream GTCs were brought up the downstream slope, that some minor sloughing and tension cracking of the dam shell ROQ has occurred. These areas should be closely monitored and additional fill (toe berm) along these portions of the slope could provide some mitigation in these areas (See later bullet). ■ Phase 1 South Dam construction disturbance, where snow access roads were constructed appears to have initiated some permafrost degradation (thaw depressions and ponding) and should continue to be closely monitored. ■ *All ponding, tension cracking, sloughing and permafrost disturbance is within the Phase 2 South Dam footprint. Delayed construction of the Phase 2 raise may lead to further degradation of the permafrost in these areas. To proactively mitigate the risk of foundation thaw prior to construction of the South Dam Phase 2 raise, a thermal toe berm should be implemented. The toe berm would include at least 1.5 m of ROQ fill placed over this area (about 5 m in width). The toe berm fill would be integrated into the Phase 2 dam shell volume. Initial volumetric modeling of a 2 m thick, top crest width 5m with 2H:1V*

Inspection Item	2020 Recommendations (for reference)	2021 Recommendations
		side slopes indicates that neat-line volumes for this additional fill material would be in the range of 4,000 m^3. ▪ *Agnico Eagle has already sourced dust suppression agents for the TIA and should determine when the dust suppression measures should be implemented based on monitoring observations and the planned restart of production and tailings deposition.*
▪ TIA-Wide Monitoring		
Tailings Deposition System	▪ Saline mine water may only be discharged through the tailings pipeline from, or within, 300 m of the South Dam provided the freezing point depression is less than 0.5°C (less than 4,500 mg/L Cl maximum equivalent). While not current practice, this operational recommendation remains in place. ▪ The tailings discharge system must be operated in accordance with the designated tailings discharge plan. Primary spigot moves should be expected during, or shortly after, spring melt and again prior to winter freeze up. In the summer of 2021, it is expected that at least one additional spigot location will be required to be installed (north of the current spigot H location). ▪ No TIA bathymetric survey was conducted in 2020, as approved by the EOR. For 2020 deposition planning, conservative volume assumptions were used as part of the 2020 AGI tailings deposition plan (i.e. assuming larger deposited volumes or less available space). A bathymetry survey of the TIA reclaim pond should be completed in 2021 to allow for better determination of the tailings volume and available storage volume in the TIA. ▪ Plans should start to be made in 2021 for the Phase 2 raise of the South Dam; The raise is expected to be required once the tailings beach reaches against the existing dam reaches the full supply level for tailings (36.5 masl or approximately 2.64Mt of total tailings tonnage). The required timing is dependent on milling rates, but construction is expected in winter 2022 or 2023.	▪ The tailings discharge system must be operated in accordance with the tailings deposition plan (SRK 2021). Primary spigot moves should be expected during, or shortly after, spring melt and again prior to winter freeze up. The next winter discharge should be located at the northeastern extent of the subaerial beach (north of the current spigot H location) to limit ice entrainment due to winter sub-aerial deposition. Following spring melt, deposition from the South Dam (Spigot A, B and C) should resume. In the subsequent fall/winter, a move to the new northeastern extent of the subaerial beach should be anticipated. ▪ A bathymetric survey was conducted in 2021. With this newly available data, Agnico Eagle should work with SRK to complete tailings volume reconciliation and updated deposition planning prior to resuming production. ▪ Plans for the Phase 2 raise of the South Dam should be made in parallel with updates to the mine plan to ensure construction can occur in the appropriate season (winter); The raise is required to be in place once the tailings beach against the existing dam reaches the full supply level for tailings (36.5 masl or approximately 2.64Mt of total tailings tonnage). The required timing is dependent on the resumption of production and future milling rates. ▪ *Production activities and tailings discharge have been suspended in 2022. No immediate recommendations during periods when tailings discharge is not active.*
Emergency Dump Catch Basins	▪ The Western Emergency Dump Catch Basin still requires repairs. These repairs should still be planned to be carried out.	▪ The Western Emergency Dump Catch Basin still requires repairs and should be closely monitored. Additional liner slippage since 2020 was noted at the top of the liner crest. This pond still maintains the minimum required capacity but further liner slippage may result in a reduction of the capacity of this emergency catch basin.
Pipelines (Reclaim, Tailings Deposition and TIA Discharge)	▪ TMAC must carefully inspect all pipelines placed directly on the tundra for signs of vegetation dieback and associated flow path channeling. Where this is occurring, the pipeline must be relocated to follow existing all-weather road shoulders, and appropriate remediation needs to be put in place where damage has occurred.	▪ Agnico Eagle should carefully inspect all pipelines placed directly on the tundra for signs of vegetation dieback and associated flow path channeling. Where this is occurring, the pipeline must be relocated to follow existing all-weather road shoulders, and appropriate remediation needs to be put in place where damage has occurred.

Inspection Item	2020 Recommendations (for reference)	2021 Recommendations
	■ The permafrost thermal erosion feature that has developed along the northern shore of the TIA was backfilled by TMAC in 2019. This area should continue to be monitored to ensure that additional thermal erosion does not result in this area. ■ Monitoring should continue at the repaired TIA Reclaim Jetty Pad (710 Pumphouse pad) following the recommended survey frequency of twice monthly from May to November.	■ The smaller diameter TIA pipelines going from the North Dam to Doris Creek, that were used during the care and maintenance period and before tailings were placed in the TIA around 2017, are no longer connected or functional. Agnico Eagle should consider removing these nonfunctional pipelines from the tundra.
TIA Reclaim Pond Jetty (710 Pumphouse) Pad	■ Settlement monitoring at the Reclaim Jetty should continue in 2021 (twice monthly, May to November). ■ Major Jetty repairs were completed in 2020. There is still one area off the most WSW end of the reclaim jetty fill (i.e. by the area where the pipelines extend from the seacans into the TIA) that are still over steepened and should be carefully monitored. ■ Additional (relatively minor) fills are recommended on the west side of the pad where the full fill extents, of the proposed reclaim jetty repairs, were not fully met. ■ Once all repairs are complete, ensure the recommended survey monitoring points are reestablished.	■ Continue settlement monitoring at the TIA Reclaim Jetty (710 Pumphouse) following the recommended survey frequency of twice monthly, May through November. ■ Once the survey monitoring of the Reclaim Jetty resumes, and the surface is snow-free, conduct an audit of the existing survey monitoring points and establish survey monitoring points where proposed locations are missing or damaged. ■ Agnico Eagle should develop a plan to raise the Reclaim Jetty pad from its current minimum elevation of roughly 32.1 masl to above the Full Supply Level of the TIA (33.7 masl would raise the pad 0.2 meters above the TIA FSL), or some interim raise which the water level can be maintained with adequate freeboard below the pad. ■ Once any significant construction or remediation is complete, ensure the recommended TIA Reclaim Jetty survey monitoring points are reestablished. ■ *Agnico Eagle is in the process of reviewing options for modification of the TIA Reclaim Jetty to improve long term operation at this area.*
TIA Operational Water Balance and Level Targets	■ It is of paramount importance that the RBDS be re-commissioned by May 2021 to manage water levels in the Reclaim Pond. Further delay of this may result in reduced operations. ■ *During maintenance of the Roberts Bay Discharge Line in the fall of 2020, portions of the submersed line became buoyant requiring the submersed line to be shortened. The end of the Roberts Bay Discharge line is now at around 20m depth in Roberts Bay compared to the previous 40 meters depth. In Q1 2021, TMAC made a submission to the Nunavut Impact Review Board indicating why the revised discharge location does not pose a significant modification to the Hope Bay Mine or the previously assessed environmental effects. It is expected that this discharge line will be able to be used again before freshet 2021.* ■ If delays in approvals to use the Roberts Bay Discharge system are expected past the end of May 2021 then the EOR should be informed so additional plans can be made with site staff. Water levels in the TIA will continue to be carefully monitored (specifically during the periods where there is no discharge from the TIA to Roberts Bay).	■ Water level targets must be adhered to whenever practical. Short-term or risk-based exceedances may be acceptable. ■ Currently the main area of immediate impact from raised water levels is the TIA Reclaim Jetty. See recommendations in the section above. ■ The RBDS resumed in June 2021 and has since been stopped as of December 1, 2021 due to changes in the discharge water quality requirements (specifically changes in the toxicity testing requirements). From a TIA water management perspective, it is important that the RBDS be re-commissioned or alternative water management strategies be developed as the water level approaches the FSL of the TIA (33.5 masl). ■ Agnico Eagle and SRK are actively in the process of reviewing options for future water management in the TIA. Changes to the water balance and level targets will be reported on in future reports.

Inspection Item	2020 Recommendations (for reference)	2021 Recommendations
	■ Continue discharge 2021 to reduce the water levels in the pond to within the target elevation range. ■ Continue to monitor the South Dam beach length to maintain at least 100 meters separation between the Dam and the Reclaim Pond or any large pond.	
TIA Water Quality	■ No recommendations. ■ If water quality or water treatment capacity is expected to impact the ability to maintain the Reclaim Pond within the operational range, the EOR must be notified.	■ No recommendations. ■ *Agnico Eagle and SRK are in the process of reviewing options for future water management in the TIA. Changes to the water quality requirements will be reported on in future reporting.*
Climate Data	■ No recommendations.	■ No recommendations.

1 Introduction

1.1 General

Hope Bay is a gold mining and milling operation of Agnico Eagle Mines (Agnico Eagle). The Operation is located 705 km northeast of Yellowknife and 153 km southwest of Cambridge Bay in Nunavut Territory, and is situated east of Bathurst Inlet (Figure 1). The Operation comprises three distinct areas of known mineralization, Doris, Madrid (North and South), and Boston.

On February 2, 2021 TMAC Resources Inc. was purchased by Agnico Eagle; TMAC continues to exist as a legal entity and is now a wholly owned subsidiary of Agnico Eagle. All rights, obligations, liabilities of TMAC continue to reside with TMAC until or if an amalgamation with Agnico occurs. For the purposes of this report, all past, current and forward-looking recommendations regarding the two entities will refer to Agnico Eagle or Hope Bay, unless explicitly requiring reference to TMAC. All recommendations are intended for both TMAC and Agnico Eagle and should be interpreted based on the specific context.

Phase 1 and 2 of the TIA are now approved and the TIA is operated under the Amended Water Licences (2AM DOH1335). Phase 1 included mining and infrastructure at Doris (Figure 2), while Phase 2 includes mining and infrastructure at Madrid and Boston located approximately 10 and 60 km south from Doris, respectively. The Doris Tailings Impoundment Area (TIA) (Figure 3) will ultimately contain both Phase 1 and 2 tailings.

Construction of Phase 1 infrastructure started in 2007, and underground development commenced in 2010. The North Dam, which provides containment for the TIA at its northern perimeter, was constructed over two winter seasons, 2011 and 2012 (Figure 3). In the fall of 2012, the Project was placed into Care and Maintenance prior to completing infrastructure development required to allow commercial production. Following an ownership change of the Project, Phase 1 was taken out of Care and Maintenance in 2015 and transitioned into commercial production in 2017. Construction of the South Dam, providing southern TIA containment, was carried out between January and June of 2018 (Figure 3).

To fulfill regulatory compliance requirements for an annual geotechnical inspection (AGI) for the TIA containment dams as well as any supplementary infrastructure pertaining to the TIA operations such as pipelines and emergency catch basins, Agnico Eagle contracted SRK Consulting (Canada) Inc., the Design Engineer, to conduct the 2021 inspection. This report provides a summary of the conditions observed, a review of monitoring data, and recommendations to ensure ongoing successful performance of the tailings management system. SRK has conducted each formal AGI of the TIA since 2012.

John Kurylo, MSc, PEng, Principal Consultant with SRK and the Engineer of Record, conducted the on-site annual geotechnical inspection between August 4 and 6, 2021. Weather conditions during the inspection were overcast or partly cloudy. The detailed inspection of the dams and supporting infrastructure was carried out on foot, followed by an aerial survey of the TIA using a low altitude helicopter flyover. Nancy Duquet-Harvey, On-Site Environmental Superintendent with Agnico Eagle,

accompanied John during the walk over inspections. Photos detailing the inspection conditions are included as photologs, and comprehensive review and analysis of the monitoring data are provided in the appendices. A post inspection meeting was held on site with key personnel from relevant departments, where SRK presented the preliminary inspection findings.

Monitoring and surveillance activities occur throughout the year on a regular basis (Section 4.1), with Agnico Eagle and SRK working in close collaboration. The AGI includes a review and summary of TIA operations and monitoring data and follows a monitoring year period from October 1, 2020 to September 30, 2021 to end shortly after the on-site inspection is completed. This monitoring year is adjusted from past reports, previously January 1 to December 31 was used.

Sections 4 and 5 contain recommendations below each component to easily identify the important recommendations. In addition to these formal recommendations (black text), suggestions are captured in blue text, and where appropriate, an update status of certain recommendations or important context is provided in *red* text.

1.2 Inspection Requirements

Under Type A Water License 2AM-DOH1335 – Amendment No. 2, dated December 7, 2018, the specific TIA inspection requirements are stated in Part I, items 9 and 10 of the license:

9. The Licensee shall undertake a geotechnical inspection of all surface infrastructure and earthworks, annually between July and September, by a Geotechnical Engineer. The inspection shall be conducted in accordance with applicable best practices including the Canadian Dam Association Guidelines for water and waste containment facilities.

10. The Licensee shall submit to the Board for review, within ninety (90) days of completion of the geotechnical inspection, a report in accordance with Part I Item 9 and/or the Annual Report. The report shall include a cover letter from the Licensee outlining an implementation plan addressing each of the Geotechnical Engineer's recommendations and shall include the following:

a. *All quantities in cubic meters of dike seepage from the North, West, and South Dams pumped back into the Tailings Impoundment Area;*
b. *As-built drawings and a summary of the mitigation works undertaken along the shoreline of the Tailings Impoundment Area in response to erosion; and*
c. *All data and information generated from the monitoring of all project geotechnical instrumentation.*

2 Site Conditions

2.1 Tailings Impoundment Area History

A summary of the TIA permitting, construction, and operations history is provided in Table 1.

Table 1: Summary of TIA Development History

Period	Comments
2003	Doris North Project preliminary economic assessment is completed with Tail Lake designated as the TIA, assuming subaqueous deposition and a maximum tailings quantity of about 0.4 Mt (SRK 2002a).
2002 – 2005	Geotechnical, geophysical, geohydrological and permafrost investigations of dam foundations (North, South and alternate internal locations), TIA shoreline perimeter, and TIA talik (SRK 2002b, 2003 and 2005a, 2005b and 2005c).
2005	Environmental Assessment for the Doris North Project is completed which includes rigorous alternatives assessment confirming Tail Lake as the preferred TIA.
2006	Project Certificate is issued for the Doris North Project.
2006	Application for Schedule 2 listing of Tail Lake as TIA in accordance with the Metal Mining Effluent Regulations (MMER).
2008	Tail Lake MDMER Schedule 2 listing obtained.
Winter 2011 and Winter 2012	North Dam constructed (SRK 2012b).
Fall 2012	Project placed into Care and Maintenance before any tailings was ever produced.
2012 – 2015	Project in Care and Maintenance. Water within the TIA is managed in accordance with the Interim Water Management Plan (SRK 2012c) which includes pumping water from the Pollution Control Pond (PCP) to the TIA and discharging TIA water to Doris Creek.
2015 – 2016	TMAC submits application to amend the Water License and Project Certificate which amongst other things will result in a change from subaqueous tailings deposition to sub-aerial tailings deposition, increase the TIA capacity to 2.5 Mt, change the South Dam design to a frozen foundation dam, and construction of an Interim Dike. This amendment was approved November 4, 2016.
2017 – 2019	TMAC submits application to amend the Doris Water License and Project Certificate, and to obtain a new Water License in support of Phase 2 of the Hope Bay Mine. Amongst other things, this will result in increasing the TIA capacity to 18 Mt, constructing a South Dam raise, and the Interim Dike would no longer be required. The updated Project Certificate was issued in October 2018, and the amended and new Water License issued December 2018.
January 2017	Start of tailings deposition in TIA.
January – June 2018	Completion of Phase 1 South Dam construction.
August 2018	Additional installation of South Dam instrumentation, and cable extensions for the ground temperature cables.
May 2019	Instrumentation upgrades and additional data logger installations at the South Dam.
February – August 2020	Doris TIA discharge via the Roberts Bay Discharge (temporarily offline as of August 2020)
February 2021	Agnico Eagle Mines (Agnico Eagle) purchased the project and became responsible for the operation of the TIA
June 2021	Doris TIA discharge resumes via the Roberts Bay Discharge System (RBDS)

2.2 Tailings Management Strategy

2.2.1 Phase 1

Phase 1 tailings were subaerially deposited in the TIA (formerly Tail Lake), which was listed on Schedule 2 of the Metal and Diamond Mining Effluent Regulations (MDMER) specifically for use as a tailings facility. The TIA is located south-east of the Doris mill and mine (Figure 2). Containment for the TIA is provided through a water retaining frozen core dam (North Dam), and a geosynthetic clay liner (GCL) lined frozen foundation tailings dam (South Dam). Phase 1 tailings solids containment capacity is limited to 2.5 Mt.

2.2.2 Phase 2

Phase 2 tailings management increases the overall tailings solids containment capacity to approximately 18 Mt. The North Dam remains unchanged and is not planned to be raised; however, as part of Phase 2, the South Dam is raised and a new West Dam (also a frozen foundation GCL lined dam) is constructed (Figure 3).

2.3 Tailings Storage Requirements

The planned tailings production rates and associated tailings storage requirements for the Doris TIA are summarized in Table 2.

Table 2: TIA Containment Volume Design Criteria

Description	Value
Nominal Tailings Production Rate	2020 to 2023 → 2,000 tonnes per day (tpd)[1] 2024 → up to 3,500 tpd 2025 to End of Mine Life → up to 4,000 tpd
Tailings Specific Gravity	2.85
Deposited Tailings Dry Density	1.3 t/m^3
Tailings Solids Content	35% solids (by weight) initially, increasing to 65% (somewhat dependent on if mine water inputs continue to TIA or if this water is treated and discharged directly to Roberts Bay before going to the TIA)
Total Tailings Storage Requirement:	
By Mass	20.0 Mt
By Volume	15.4 Mm^3
Remaining Tailings Storage Requirement:	
By Mass	18.8 Mt
By Volume	14.5 Mm^3
Ice Entrainment Allowance:	
Percentage of Tailings Capacity	20%
By Volume	2.4 Mm^3

Description	Value
Tailings Beach Slope:	Between 0.5% and 1.0% (expected variability based on monitoring data and survey data)

Notes:

[1] 2021 to 2023 anticipated tailings production rates are 1,500 tpd

2.4 Tailings Impoundment Area Infrastructure

2.4.1 North Dam

The North Dam forms the northern boundary of the Doris TIA within a narrow natural valley, blocking the original Tail Lake outlet to Doris Lake (Figure 3). Complete North Dam geometric design parameters and design criteria are summarized in Table 3 and Table 4 respectively. Figure 4 through Figure 6 depict pertinent details of the North Dam and its instrumentation. Photolog 1 through Photolog 3 shows inspection photos of the upstream and downstream slopes, and the installed instrumentation.

The North Dam impounds the Reclaim Pond and was designed as a water retaining structure. The dam has a central frozen core with a secondary upstream GCL. The dam is constructed from local quarry rock and consists of processed fines for the core, 150 mm nominal sized transition material, and a run of quarry (ROQ) outer shell. To ensure maintenance of frozen foundation and frozen core conditions, the key trench of the dam is equipped with 12 horizontal thermosyphon evaporators (SRK 2007, 2012a, 2013a, 2015a).

Construction of the North Dam started in February 2011 and was completed in April 2012, over two distinct winter seasons. Complete as-built details are provided in SRK (2012b).

2.4.2 South Dam

The South Dam is located at the southern end of the former Tail Lake, on the watershed divide to Ogama Lake (Figure 3). The South Dam is designed as a frozen foundation dam consisting of a compacted rock fill dam (sourced from a local quarry) with a GCL keyed into the permafrost overburden and bedrock foundation for seepage control. Complete geometric design parameters and design criteria are summarized in Table 3 and Table 4 respectively, with Figure 7 through Figure 9 presenting pertinent details of the South Dam design. The dam is designed to retain beached tailings as opposed to water. The dam is to be constructed in two phases, incorporating a single downstream raise between Phase 1 and Phase 2.

South Dam construction began in January 2018 and Phase 1 construction was completed in June 2018. The South Dam instrumentation was mostly completed in August 2018. Photolog 4 and 5 shows the South Dam Inspection photos.

2.4.3 West Dam

The West Dam has been designed as a frozen foundation dam with a key trench and a GCL liner keyed into permafrost, similar in design to the South Dam. It is intended to retain beached tailings along low-lying ground on the western perimeter of the TIA (Figure 3). Complete geometric design parameters and design criteria are provided in Table 3 and Table 4. This dam will be constructed in a single stage using local quarry rock. This dam has not yet been constructed.

Table 3: TIA Containment Dams Geometric Design Parameters

Description	North Dam	South Dam	West Dam
Structure Type	Frozen core rock fill dam with geomembrane	Frozen foundation rock fill dam with geomembrane	Frozen foundation rock fill dam with geomembrane
Secondary Seepage Barrier	GCL		
GCL Deployment Slope	2.5H:1V	Phase 1 – 3H:1V Phase 2 – 4H:1V	3H:1V
Thermosyphons	12 sloped	None	None
Crest Centerline Length	220 m	515 m	470 m
Maximum Height	11.0 m	Phase 1 – 6.0 m Phase 2 – 14.0 m	5.0 m
Crest Elevation	37.5 masl	Phase 1 – 38.0 masl Phase 2 – 46.0 masl	46.0 masl
Core/GCL Elevation	35.0 masl	Phase 1 – 37.0 masl Phase 2 – 45.0 masl	45.0 masl
Full Supply Level (FSL)	33.5 masl	Phase 1: Water – 33.5 masl Tailings – 36.5 masl Phase 2: Water – 33.5 masl Tailings – 44.5 masl	Water – 33.5 masl Tailings – 44.5 masl
Original Tail Lake Water Level	28.3 masl		
Total Actual Freeboard (Crest to FSL)	4.0 m	Phase 1: Water – 4.5 m Tailings – 1.5 m Phase 2: Water – 12.5 m Tailings – 1.5 m	Water – 12.5 m Tailings – 1.5 m
Total Actual Minimum Freeboard (Core/GCL to FSL)	1.5 m	Phase 1: Water – 3.5 m Tailings – 0.5 m Phase 2: Water – 11.5 m Tailings – 0.5 m	Water – 11.5 m Tailings – 0.5 m
Required Normal Freeboard (CDA 2013)	Wind setup (0.07 m) + Wave runup (1.06 m) = 1.13 m		

Description	North Dam	South Dam	West Dam
Required Minimum Freeboard (CDA 2013)	Wind setup (0.06 m) + Wave runup (1.16 m) = 1.22 m Inflow Design Flood (IDF) Freeboard = 2.1 m (at end of mine life when Reclaim Pond is at its minimum size)		
Thermal Protection above Frozen Core	2.5 m	n/a	n/a
Crest Width	13 m	10 m	10 m
Upstream Structure Slope	6H:1V	4H:1V	4H:1V
Downstream Structure Slope	4H:1V	2H:1V	2H:1V
Key Trench Depth	Varies (2.0 – 5.0 m)	Varies (2.0 – 4.0 m)	4.0 m
Key Trench Upstream Slope	0.5H:1V	2H:1V	2H:1V
Key Trench Downstream Slope	0.5H:1V	1H:1V	1H:1V

Table 4: TIA Containment Dams Design Criteria

Description	North Dam	South Dam	West Dam
Settlement Allowance	1.00 m		
Foundation thaw of 1 m (partial thaw)		0.47 – 0.67 m	0.40 – 0.60 m
Foundation thaw of 7 m (full thaw)		2.45 – 3.85 m	2.03 – 3.43 m
Deformation Allowance (Total Strain due to Creep)	<2%	n/a	n/a
Original Design Life:			
Active use as water retaining structure	17 years		
Design base as water retaining structure	22 years		
Design base until breach	30 years		
Active use as solids retaining structure		17 years	17 years
Design base as solids retaining structure		25 years	25 years
Annual Exceedance Probability (AEP) for Inflow Design Flood (IDF)			
Risk Based	1/2,475 (0.0004)		
Standards Based	1/3 between 1/1,000 and the PMF[(1)]		
Static Stability Factor of Safety: Long-term (Drained Conditions)	1.3 during construction 1.5 during operation and closure 1.2 to 1.3 partial or rapid drawdown		
Pseudo-Static Stability Factors of Safety	1.0 during earthquake 1.2 post earthquake		
AEP for Earthquake Design Ground Motion	1/2,500 (0.0004)		
Peak Ground Acceleration (PGA)	0.060g[(2)]	0.036g	0.043g
Mean Annual Air Temperature Climate Change	+6.8°C up to year 2100		
Thermal Design Freezing Point Depression (Normal Conditions)			
Tailings	n/a	0 to -1°C	0 to -1°C
Overburden	-8°C	-2°C	-2°C
Frozen core	-2°C	n/a	n/a

Description	North Dam	South Dam	West Dam
Thermal Design Freezing Point Depression (Upset Conditions) Tailings Overburden Frozen core	 n/a -7°C -1°C	 0 to -1°C -2°C n/a	 0 to -1°C -2°C n/a
Seepage Allowance	78 m^3/day	50 m^3/day	<1 m^3/day

Notes:

[1] Value based on experiential engineered judgement.

[2] A peak ground acceleration for a 1/2475 return period was not available at the time of design of the North Dam, and therefore the PGA of 0.06 g was selected based on published data for Kugluktuk. This is further described in SRK (2007).

2.4.4 Spillway

As part of the Phase 2 TIA design (SRK 2017e) the water level was expected to be managed through annual discharges to Roberts Bay due to the substantive freeboard and design capacity to contain the PMF. This removed the previous spillway requirement.

Review of the operational beach slopes and tailings deposition plan (Appendix L of SRK 2021a) indicates current deposition plan will eventually decrease the Reclaim Pond to a capacity of between 133,000 m^3 and 209,000 m^3. Until the North Dam is breached, the IDF storage volume is greater than 640,000 m^3 and requires adequate control in accordance with (CDA 2019).

Based on the mine and operation plans, and corresponding dam design life, presented in the FEIS reports, a spillway was not originally planned for the Doris TIA. A reassessment of the need for a spillway, and the timing for construction, is planned to be completed by SRK and Agnico Eagle as part of the ongoing TIA water management reviews. Based on current plans, and assuming the Roberts Bay Discharge system continues to be operational, it is not until the last two to four years of the tailings deposition (depending on operational pond volumes) when the available pond storage in the TIA starts to approach the IDF storage volume requirement. At that point in time, it is expected that lowering the elevation of the TIA's normal operating water level (NOWL) will be required to help free up as much storage space as possible for the IDF storm event. To mitigate against the risk of an overtopping failure at the North Dam and to remove the dependency on an active management system (i.e. to have a passive outflow in the event pumps break down) an emergency spillway may be required prior to the end of mine life. A discharge from the spillway would only occur during a very low probability emergency event and is not planned for routine use.

The potential spillway construction timeline is linked to the later stages of the mine life, as indicated by the deposition planning models. However, these timelines could easily be impacted by production rates, unexpected conditions or poor management practices i.e. storing additional water in the TIA or in particular if the Roberts Bay Discharge system was to fail or be offline for more than one normal discharge period.

2.4.5 Tailing Deposition System

The tailings discharge system is designed as a single heat-traced and insulated pipeline with end point (i.e. single spigot) discharge at predetermined locations. The tailings deposition pipeline consists of a combination of 6-inch internal diameter steel and High-Density Polyethylene (HDPE) pipelines with no redundancy. There are no double lined pipeline sections for environmental containment. The pipeline is placed directly on the ground, which consists of either engineered rockfill pads, the all-weather road shoulders, or in some areas directly on the tundra.

Actual tailings deposition started in February 2017 and there are currently eight tailings discharge locations. A plan overview of the tailings deposition history is illustrated in Figure 10. Photos of the tailings deposition are shown in Photologs 7 and 8 attached.

Table 5 summarizes the deposition status as of September 2021. Actual tailings deposition rates are less than what was previously planned (Table 2). Deposition rates were increased in 2019 but have been reduced since December 2019, primarily due to COVID-19 related reductions (Figure 11 and Figure 12). The current deposition modelling and storage capacity assessment (Appendix L of SRK 2021a) includes a 20% allowance for ice entrainment.

Table 5: Actual Tailings Deposition Between September 2020 and September 2021

Period	Percent Solids (by Weight)	Tailings Solids (tpd)	Cumulative Tailings Solids (tonnes)	Cumulative Tailings Solids (m^3)
September 2020	20.0	383	1,513,105	540,395
October 2020	31.0	1,037	1,545,250	551,875
November 2020	26.0	878	1,571,582	561,279
December 2020	45.0	1,018	1,603,133	572,548
January 2021	42.3	1,090	1,636,926	584,616
February 2021	42.0	754	1,658,038	592,156
March 2021	44.5	526	1,674,344	597,980
April 2021	44.0	1,243	1,711,634	611,298
May 2021	42.0	1,291	1,751,654	625,591
June 2021	42.0	484	1,766,174	630,777
July 2021	32.0	756	1,789,610	639,147
August 2021	44.0	1,028	1,821,478	650,528
September 2021	47.0	961	1,850,308	660,824

2.4.6 Emergency Dump Catch Basins

Two Emergency Dump Catch Basins (EDCBs) have been constructed on either side of Doris Creek (Photolog 9). The EDCBs are lined cells constructed at a topographic low-point along the tailings and reclaim pipeline routes that allow for the pipelines to be drained during prolonged mill shutdowns or power failures to prevent pipeline freeze-up. They were designed to accommodate at least two consecutive shutdowns plus direct precipitation over the basin areas. The EDCBs were constructed in 2017. Table 6 summarizes their design and as-built containment capacities.

Table 6. EDCB Design and As-built Capacities

Component	Western EDCB	Eastern EDCB
Permitted Design Capacity	120 m^3	120 m^3
Required Design Capacity	97 m^3	85 m^3
As-Built Design Capacity	124 m^3	85 m^3

2.4.7 Reclaim Water System

Reclaim water is drawn from the TIA Reclaim Pond for re-use in the Process Plant. Reclaim water is drawn from a submerged suction line feeding a low suction head pump installed in an on-shore enclosure located at the Reclaim Pond (Figure 3). This heat-traced and insulated pipeline follows the TIA Access Road (aka Secondary Road) from the Reclaim Pond to the Doris mill and is placed directly on the ground (either tundra, all-weather road shoulder, or the engineered rockfill pads). There are no double-lined sections of this pipeline and there is no redundant pipeline.

Table 7 provides a summary of reclaim water volumes drawn from the TIA since tailings production started.

Table 7: Reclaim Water Volumes Between September 2020 and September 2021

Date	Reclaim Volume (m^3/month)	Cumulative Reclaim Volume (m^3)
September 2020	45,973	3,330,749
October 2020	71,946	3,402,695
November 2020	80,145	3,482,840
December 2020	86,495	3,569,335
January 2021	85,079	3,654,414
February 2021	77,385	3,731,799
March 2021	76,663	3,808,462
April 2021	78,336	3,886,798
May 2021	74,222	3,961,020
June 2021	57,629	4,018,649
July 2021	56,777	4,075,426
August 2021	66,438	4,141,864
September 2021	69,343	4,211,207

2.4.8 TIA Water Discharge System

The Roberts Bay Discharge System (RBDS) was commissioned in February 2020 and was run until August 2020, discharge resumed in June 2021. At the time of writing this report, discharge has been stopped as of December 1, 2021. Under normal operation, the discharge pump is located adjacent to the reclaim pump on the reclaim jetty which pumps water in a pipeline following the same route as the reclaim water pipeline until it branches off to the Doris Contact Water Treatment Plant (Figure 13). The

discharge to the Roberts Bay Discharge System is provided in Table 8. Historically, prior to tailings deposition, TIA water was discharged to Doris Creek (compliance monitoring station TL-2) during the open water seasons of 2014 and 2015 (SRK 2021a).

Table 8: Discharge from Doris TIA to Roberts Bay Discharge System

Date	Discharge to RBDS (m^3/month)	Cumulative Discharge to RBDS (m^3)
January 2020	-	-
February 2020	154,211	154,211
March 2020	168,053	322,264
April 2020	165,578	487,842
May 2020	167,282	655,124
June 2020	147,624	802,748
July 2020	163,955	966,703
August 2020	67,957	1,034,660
September 2020	-	1,034,660
October 2020	-	1,034,660
November 2020	-	1,034,660
December 2020	-	1,034,660
January 2021	-	1,034,660
February 2021	-	1,034,660
March 2021	-	1,034,660
April 2021	-	1,034,660
May 2021	-	1,034,660
June 2021	185,609	1,220,269
July 2021	152,586	1,372,855
August 2021	167,027	1,539,882
September 2021	137,679	1,677,561

2.5 Tailings Impoundment Area Instrumentation

The Dam instrumentation is monitored and maintained in accordance with the North and South Dam Monitoring Standard Operating Procedure (SOP) (SRK 2020b and 2020c)

2.5.1 North Dam

Permanent performance monitoring instrumentation for the North Dam consists of:

- 11 vertical ground temperature cables (GTCs);
- 13 horizontal GTCs;

- 18 surficial survey monitoring points located throughout the downstream face of the dam;
- 14 crest survey monitoring points located along the upstream and downstream crest of the dam;
- 3 deep settlement points;
- 6 inclinometers located within the downstream face; and
- 12 single bead thermistors, measuring thermosyphon contact temperatures.

Figure 4 through Figure 6 illustrates the location of North Dam instrumentation. All GTCs are connected to dataloggers allowing continuous data collection. Slope inclinometers are recorded manually using a slope inclinometer instrument owned by Agnico Eagle. Settlement monitoring is completed by total station ground survey. The Dam instrumentation is monitored and maintained in accordance with the North Dam Monitoring Standard Operating Procedure (SOP) (SRK 2020b)

2.5.2 South Dam

The active South Dam permanent performance monitoring instrumentation consists of:

- 9 horizontal GTCs;
- 12 vertical GTCs;
- 1 long GTC parallel to the top crest of the key trench;
- 19 surficial survey monitoring points (crest and downstream slope);
- 12 crest survey monitoring points; and
- 3 deep settlement points.

The monitoring instrument locations are shown on Figure 7 and Figure 9. All GTCs are connected to dataloggers allowing continuous data collection and transmitted and accessed from an online portal. Settlement monitoring is completed by total station and RTK GPS ground survey. The Dam instrumentation is monitored and maintained in accordance with the South Dam Monitoring Standard Operating Procedure (SOP) (SRK 2020c).

2.5.3 West Dam

The West Dam is not yet constructed.

2.5.4 Other TIA Instrumentation and Monitoring

Additional monitoring data collected for the TIA are summarized below:

- The water level in the TIA Reclaim Pond is monitored by an automated pressure transducer-datalogger installed at monitoring point TIA-2. The data is transmitted by a solar-powered iridium satellite transceiver to an online portal where it can be accessed remotely by Agnico Eagle and SRK. There is also a back-up datalogger installed to record pond levels should a problem occur

with the primary data collection system. The secondary datalogger also records water temperature which is beneficial from a thermal review perspective.

- The primary datalogger is configured to collect a reading every 15 minutes in the summer and every 60 minutes during the winter. The data is transmitted to the online portal daily.
- On at least an annual basis, Environmental Resources Management (ERM) conducts a water level reference survey and bathymetry survey of the TIA basin. Based on communications from ERM and Agnico Eagle, the water level constant elevation was adjusted from 27.761 masl (ERM 2017) to 27.71 m on August 15, 2019 at 00:00, this constant remained unchanged for 2021.

Additional detail of the installed tailings monitoring system is described by ERM (2017) and SRK (2020b):

- Tailings deposition is a continuous operation and the volumes are monitored with a flowmeter and an automated data collection system;
- Reclaim water is measured using a flowmeter with an automated data collection system;
- Mine water is measured by means of a totalizer instrument, recorded manually twice daily; and
- Comprehensive climate data from the Doris meteorological station is maintained in a database for review in conjunction with any TIA monitoring.

2.6 Water Management

2.6.1 Water Management Plan and Water and Load Balance

The TIA is used as the overall collector for all site contact water, which is either pumped or trucked to the TIA. Saline underground water (i.e., mine water) may also be pumped to the TIA if it is not discharged directly to Roberts Bay. Water stored in the Reclaim Pond is recycled for processing make-up to the extent possible. Excess water in the TIA is discharged to Roberts Bay by the RBDS. Prior to discharge to Roberts Bay, all water must meet MDMER limits.

There are no non-contact surface water diversions upstream of the TIA. The TIA is in an isolated catchment measuring 461 ha, the benefits of diversions are generally outweighed by the relative cost and complexity of constructing them on the tundra. A schematic of the TIA water management plan is presented in Figure 13.

The 2020 detailed review of the operational water and load balance is provided in a separate report (SRK 2021a).

2.7 Dam Hazard Classification

Dam hazard classifications for the TIA containment dams were made in accordance with the Canadian Dam Safety Guidelines (CDA 2013), as well as the CDA Technical Bulletin on Application of Dam Safety Guidelines to Mining Dams (CDA 2014, CDA 2019), as summarized in Table 9. The designated dam hazard classifications assigned to each structure is listed in Table 10 (SRK 2015, 2016b, 2017e).

Table 9: Dam Hazard Classification (as defined in CDA 2013)

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 affection 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).

Notes:

[1] Definitions 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 temporarily 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 residents); three consequence classes (high, very high, extreme) are proposed to allow for more detailed estimates of potential loss of life (to assist in decision-making if the appropriate analysis is carried out).

[2] Implications 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 10: Dam Hazard Classification of TIA Containment Structures

Structure	Population at Risk (PAR)	Loss of Life	Environmental and Cultural Values	Infrastructure and Economics	Overall Hazard Classification
North Dam	SIGNIFICANT	SIGNIFICANT	HIGH	LOW	HIGH
South Dam	SIGNIFICANT	SIGNIFICANT	HIGH	LOW	HIGH
West Dam (Not constructed)	SIGNIFICANT	SIGNIFICANT	HIGH	LOW	HIGH

3 TIA Management System Review Findings

3.1 Third Party Dam Safety Review

In accordance with CDA Dam Safety Guidelines (CDA 2013, 2014, 2019), including the CDA Technical Bulletin on Dam Safety Reviews (CDA 2016), independent third-party dam safety reviews (DSRs) should be conducted in accordance with a frequency informed by the hazard classification of the structures. This frequency typically ranges between 5 and 10 years. It is recommended a dam with a HIGH hazard classification, such as the North Dam and South Dam, undergo a dam safety review every seven years.

The Dam Safety Review was completed in 2021 by Tetra Tech Inc. Findings from this DSR were not yet available at the time of writing and will be discussed in later reports.

The hazard rating was reviewed as part of the 2019 inspection. In 2021, no changes in the TIA operations or context warrant modification to the hazard rating of HIGH the constructed North and South Dams. The hazard rating shall be reviewed periodically to ensure that the rating remains valid.

Given both dams underwent a DSR in 2021, in accordance with CDA guidelines, the next DSR would be planned for 2028.

Recommendations:

- No recommendations.
- Review and implement recommendations from the DSR where appropriate

3.2 Tailings Operating, Maintenance and Surveillance Manual

Phase 1 tailings management is carried out under a Tailings Operation, Maintenance and Surveillance (OMS) Manual prepared in 2016 (TMAC 2016). Because tailings deposition in 2017 was inconsistent and less than the planned deposition rates due to mill commissioning challenges, a thorough review of OMS Manual procedures was not undertaken in 2017, although a minor update was completed (TMAC 2017). There were however significant operational changes in 2018, including significant personnel changes, and as a result the OMS Manual became outdated. Although the OMS Manual was updated in 2017 (TMAC 2017), that update was centered around changes associated with Phase 2, and the necessary operational and personnel changes were not adequately captured. In 2019 and 2020, an updated OMS capturing input from site personnel, changes from the Phase 2 project, as well as the updated North and South Dam monitoring SOPs (SRK 2020b, 2020c) was submitted to TMAC. The full document has been rewritten to further improve the usability of the document. An updated set of Trigger Action Response Plans (TARPs) was submitted to TMAC in Q4 2020 and have been redistributed to Agnico Eagle following ownership transition. It is expected that the next revision of the OMS will integrate the dam monitoring SOPs, TARPs, Dam Emergency Plan as well as any changes to the tailings management system under Agnico Eagle's corporate tailings management system.

The roles and responsibilities for those involved in managing the TIA are defined in the current OMS Manual but are out of date (Due to the ownership transition from TMAC to Agnico Eagle). An update to the *Organization and Individual Responsibilities* section in the TIA OMS are recommended. This will be documented in the next revision of the TIA OMS Manual. SRK understands the primary responsible party for the TIA remains with the Environment team, with the Process (Mill) team and on-site water management teams playing a supporting role. An abbreviated list of key responsible parties is provided below (Agnico Eagle personnel unless otherwise stated):

- Michel Julien – Accountable Executive Officer, Vice-president Environment and Critical Infrastructure
- Thomas Lepine – Engineer of Record & Technical Specialist, Environmental Management
- Eric Steinmetzer– Mine General Manager
- Nancy Duquet Harvey – Environmental Superintendent & Responsible Person
- Paul Simms – Process Operations (Mill) Superintendent
- Doug Brown – Health and Safety Manager
- John Kurylo – SRK Design Engineer and Engineer of Record (EOR) of the Doris TIA throughout 2021. EOR to be transferred over to Thomas Lepine in 2022.
- Peter Luedke – SRK engineering support and current Deputy Engineer of Record

John Kurylo, MSc, PEng, a licenced professional engineer in Nunavut Territory, and a Senior Consultant was the EOR throughout 2021 and at the time of inspection. All monitoring data for the TIA is submitted to the EOR monthly for review, and the EOR remains in constant communication with site staff regarding the overall operation of the TIA. Agnico Eagle has allowed free access to information and resources to allow the EOR to fulfill his duties.

Recommendation:

- Overall, the OMS manual, TARPS and Dam Emergency plan must be reviewed by Agnico Eagle and updated to reflect the many recent changes, including, but not limited to the Dam Emergency Plan, the updated TARPs and change in key personnel listed in the OMS manual. Minor updates to the North and South dam monitoring SOPs are also recommended.
- All components should be reviewed against Agnico Eagle's corporate tailings management system and updated tailings standards through a gap analysis to identify required updates.
- *SRK and Agnico Eagle are currently collaborating on updates to these plans.*
- The suite of OMS, TARPs, ERP and Dam Emergency Plan must be reviewed with all site operations annually and updated as necessary.
- Agnico Eagle should ensure all staff are properly informed and trained on the contents of the OMS Manual.

4 TIA Inspection and Monitoring Instrumentation Findings

4.1 Compliance with Monitoring Frequency Requirements

The North Dam monitoring frequency requirements were first outlined in the North Dam As-built Report (SRK 2012b) and subsequently finalized in the North Dam Monitoring Standard Operating Procedures (Monitoring SOP) which was updated in 2020 (SRK 2020b). The South Dam monitoring requirements are outlined in the South Dam Monitoring SOP (SRK 2020c).

Since transitioning to active tailings deposition in 2017, and commissioning of the South Dam in 2018, routine monitoring and inspections of the North and South Dam have been completed by site personnel. The monitoring frequency requirements and actual monitoring frequency for the 2021 monitoring year (October 1, 2020 to September 30, 2021) are summarized for North and South Dams in Table 11 and Table 12, respectively.

Table 11: North Dam Monitoring Frequency Requirements for the 2021 Monitoring Year[1]

Element	Item	Method	Responsibility	Required Frequency	Conformance with Frequency Requirements (SRK 2020b)[1][2]	Comments
Thermal	Ground Temperature Cables	Datalogger	Agnico Eagle	Daily (automated)	Yes	Recorded four times daily
	Thermo-syphons				Yes	Record four times daily
	Datalogger downloads	Manual		Monthly	Yes	Data collected monthly
Deformation	Downstream Surface Settlement	Manual	Agnico Eagle	Monthly (May to Nov.)	No (Acceptable)	Surveys received monthly, except for November 2020
	Downstream Deep Settlement				No (Acceptable)	
	Crest Settlement				No (Acceptable)	
	Depressions				Yes	No changes observed
	Inclinometers			Monthly	No (Acceptable)	Data collected monthly, except when inclinometer was off site for servicing
Water Balance	Water Level	Datalogger / Pressure Transducer	Agnico Eagle	Daily (automated)	Yes	Readings every 15 min and uploaded daily during open water season, every 60 min and uploaded ever 5 days during winter.
	Water Level	Manual		Monthly	Yes	Manual water level surveys only required if a data logger is not in place, however monthly elevation checks are suggested in conjunction with the North Dam surveys. Water level constant for pressure transducer is checked annually during open water season.

Element	Item	Method	Responsibility	Required Frequency	Conformance with Frequency Requirements (SRK 2020b)[1][2]	Comments
	Seepage Monitoring[5]			Weekly when flowing water is observed	No (acceptable)	Water quality sampling occurred, however not always weekly. Water flow estimates were not provided. Frequency modified for 2022 (Section 4.2.8)
Visual	Visual Walkover Inspection and Reporting	Manual	Agnico Eagle	Weekly (below FSL[3]) Daily (at or above FSL)	No	34 inspections conducted during this monitoring year. The inspection rate is below the target (52 inspections)[4]
	Annual Geotechnical Inspection		Independent Qualified Licensed Geotechnical Engineer	Annually	Yes	August 2021 (This report)
Maintenance						
North Dam Thermal Datalogger	Datalogger Primary Batteries	Manually recharge	Agnico Eagle	Annually	Yes	Recharged March 2021
	Datalogger Backup Batteries	Manually replace		5-year cycle	Yes	Replaced during datalogger recalibration
	Datalogger Recalibration	Manual			Yes	Completed Jan. 2018
	Desiccant Packs	Manually replace		As required	Not required	No action required
Water Level Datalogger Station (TIA-2)	Datalogger Transmission Subscription	Online		Annually	Yes	33% of the data subscription remains
	Physical Datalogger Station	Manually recalibrate or replace		As required	Not required	No action required

Note(s):

1 The monitoring year (or data reporting period) included in this report was October 1, 2020 to September 30, 2021.

2 This column lists if the monitoring frequency is compliant with the monitoring frequency requirements during this monitoring year.

3 FSL: Full Supply Level

4 Due to COVID-19 and reduced personnel at site

5 The Seepage Monitoring standard operating procedure (SRK 2020b) monitors the flowing water at the toe of the North Dam for chemical signature of seepage originating in the TIA Reclaim Pond, no chemical signature has been observed to date. The Seepage Monitoring SOP also includes TL-5 geochemical sampling and Geochemical QA/QA monthly while water flow is observed at the North Dam toe.

Table 12: South Dam Monitoring Frequency Requirements for the 2021 Monitoring Year [1]

Element	Item	Method	Resp.	Required Frequency	Conformance with Frequency Requirements (SRK 2020c)[1][2]	Comments
Thermal	Ground Temperature Cables	Datalogger	Agnico Eagle	Daily (automated)	Yes	Data is transmitted every 12 hours.
Deformation	Deep Settlement	Manual	Agnico Eagle	Monthly (May – Nov.)	No (acceptable)	Surveys collected monthly, except for November 2020
	Crest Settlement				No (acceptable)	Surveys collected monthly, except for November 2020

Element	Item	Method	Resp.	Required Frequency	Conformance with Frequency Requirements (SRK 2020c)[1][2]	Comments
	Surficial Settlement				No (acceptable)	Surveys collected monthly, except for November 2020
	Depressions				Yes	No issues observed
Water Balance	Water Level	Datalogger	Agnico Eagle	Daily	Yes	Refer to Table 11
	Seepage Monitoring	Manual	Agnico Eagle	Weekly when observed (flowing water)	Yes	No flowing water observed.
	Downstream Ponded Water	Manual	Agnico Eagle	Monthly when observed	Yes	Samples collected once in July 2021.
Visual	Visual Walkover Inspection	Manual	Agnico Eagle	Weekly (below FSL[3]) Daily (at or above FSL)	No	29 inspections conducted during this monitoring year. The inspection rate is below the target (52 inspections)[4]
	Annual Geotechnical Inspection		Independent Qualified Licensed Geotechnical Engineer	Annually	Yes	August 2021 (This report)
Maintenance						
South Dam Thermal Datalogger	Datalogger Batteries	Solar recharge	Agnico Eagle	As needed	Yes	No maintenance required
	Datalogger Recalibration	Manual				
	Desiccant Packs	Manual				
	Data logger transmission subscription	Online	SRK/Agnico Eagle	Annually	Yes	Beaded stream subscription renewal required

Note(s):

[1] The monitoring year (or data reporting period) included in this report was October 1, 2020 to September 30, 2021.

[2] This column lists if the monitoring frequency is compliant with the monitoring frequency requirements during this monitoring year.

[3] FSL: Full Supply Level

[4] Due to COVID-19 and reduced personnel at site

Recommendations:

- Recommended monitoring frequencies have been met in all categories except for visual inspections and one survey monitoring event. Agnico Eagle should aim to improve the frequency of these monitoring events in 2022.
- *It is understood that COVID-19 and site staffing limitations during this monitoring year impacted the ability to collect some data.*

4.2 North Dam Inspection and Monitoring

4.2.1 Ground Temperature Cables

To monitor long-term temperature of the frozen core and the dam foundation, a total of twenty-four GTCs were installed during the North Dam construction (SRK 2012b). Of the twenty-four installed GTCs, twenty-two are still functional. Since September 2012, GTC data for the North Dam is recorded every six hours by two Campbell Scientific CR1000 dataloggers (Photolog 3). Data is downloaded directly from the dataloggers by Agnico Eagle personnel.

The recorded temperature data is presented in Appendix A, and the detailed dam thermal review is presented in Appendix K. In general, the data logger and GTC system is performing well. The complete status of all North Dam GTCs is summarized in Table 13.

Table 13: North Dam Ground Temperature Cable Status

GTC ID	Status	Comments
ND-VTS-040-KT	Active	Disconnected for recalibration between January 1 to March 3, 2018
ND-HTS-040-31.5	Active	Disconnected for recalibration between January 1 to March 3, 2018
ND-HTS-040-33.5	Active	Cable disconnected from datalogger October 10, 2013 to May 13, 2014
		Connection to datalogger more permanently repaired July 2014
		Disconnected for recalibration between January 1 to March 3, 2018
ND-VTS-060-US	Inactive	Irreparably damaged between April 27 and August 8, 2012
ND-VTS-060-DS	Active	Disconnected for recalibration between January 1 to March 3, 2018
ND-VTS-060-KT	Active	Spliced during construction. Fully operational, except for recalibration January 1 to March 3, 2018
ND-HTS-060-28.8	Active	Bead 7 – No readings February 11, 2012 to December 8, 2013
		Bead 7 – No readings since April 21, 2014
		Bead 7 – Readings between November 1, 2014 and April 19, 2015
		Bead 7 – Readings between October 2015 and April 2016
		Bead 7 – Readings between October 2016 and June 2017
		Bead 7 – Readings between September 2017 and May 2018 (excluding recalibration period), resuming at the end of October 2018. Occasional erratic readings continue (since fall 2016) and are attributed to instrument errors.
		Bead 9 – No readings October 10, 2013 to May 20, 2014 and July 2014 onward
		Disconnected for recalibration between January 1 to March 3, 2018
ND-HTS-060-31.0	Active	Disconnected for recalibration between January 1 to March 3, 2018
ND-HTS-060-33.5	Active	Disconnected for recalibration between January 1 to March 3, 2018
ND-VTS-085-US	Active	Erratic data at most beads (excluding Beads 3, 6 and 9) between June 2016 and May 2017 with lower amplitude spikes between December 2016 and May 2017
		Erratic data subsided since May 2017

GTC ID	Status	Comments
		Disconnected for recalibration between January 1 to March 3, 2018
ND-VTS-085-DS	Active	Erratic data at most beads (excluding Beads 3, 6 and 9) between June 2016 and May 2017 with lower amplitude spikes between December 2016 and May 2017
		Erratic data subsided since May 2017
		Disconnected for recalibration between January 1 to March 3, 2018
ND-VTS-085-KT	Active	Erratic data at most beads (excluding Beads 3, 6 and 9) between June 2016 and May 2017 with lower amplitude spikes between December 2016 and May 2017
		Erratic data subsided since May 2017
		Disconnected for recalibration between January 1 to March 3, 2018
ND-HTS-085-25.3	Active	Disconnected for recalibration between January 1 to March 3, 2018
ND-HTS-085-29.4	Active	Disconnected for recalibration between January 1 to March 3, 2018
ND-HTS-085-33.5	Inactive	Irreparably damaged during construction
ND-VTS-130-US	Active	Bead 9 – Readings erratic for periods since June 2016 (temperature dropping randomly to less than -15°C)
		Disconnected for recalibration between January 1 to March 3, 2018
		Bead 1 offline since August 13, 2020
		Bead 8 offline from Feb 25 to September 21, 2021
ND-VTS-130-DS	Active	Small magnitude temperature spikes during summer months between 2013 and 2017 (Bead 3, 7, 8, 9, 11), no spikes observed in 2018
		Beads 3 – 8 were offline after the connector at the datalogger housing was damaged on September 24, 2017. Repaired and reconnected on March 11, 2018 following datalogger recalibration
		Disconnected for recalibration between January 1 to March 3, 2018. Beads 3 to 8 were disconnected and repaired between September 24, 2017 and March 3, 2018 (due to damaged cable connection)
ND-VTS-130-KT	Active	Disconnected for recalibration between January 1 to March 3, 2018
ND-HTS-130-28.8	Active	All beads were offline after the connector at the datalogger housing was damaged on September 24, 2017. Repaired and reconnected on March 4, 2018 following datalogger recalibration
		Disconnected for recalibration between January 1 to March 3, 2018
		Low temperature spikes and intermittent logging from Bead 2 in Summer 2018 to 2020
ND-HTS-130-31.0	Active	Disconnected for recalibration between January 1 to March 3, 2018
ND-HTS-130-33.5	Active	Fully operational, except for cable repair and recalibration between September 24, 2017 to March 3, 2018
ND-VTS-175-KT	Active	Spliced during construction
		Incorrectly connected to datalogger as ND-HTS-175-33.5 from August 9, 2012 to June 16, 2014
		Beads 9, 10 and 11 – No readings August 9, 2012 to June 16, 2014
		Disconnected for recalibration between January 1 to March 3, 2018

GTC ID	Status	Comments
ND-HTS-175-32.5	Active	Disconnected for recalibration between January 1 to March 3, 2018
ND-HTS-175-33.5	Active	Spliced during construction
		Incorrectly connected to datalogger as ND-HTS-175-KT, from August 9, 2012 to June 16, 2014
		Disconnected for recalibration between January 1 to March 3, 2018

Source: J:\01_SITES\Hope.Bay\!Project_Data (Not Job Specific)\06_NorthDamMonitoringData\[SiteMonitoringSummary.xlsx]ThermisorStatus

The North Dam GTCs were installed to ensure the dam core and key trench foundation section remain below the thermal design freezing point depression criteria of −2˚C and −8˚C, respectively under normal operating conditions. Under upset conditions these temperatures increase to −1˚C and −7˚C. In addition, ground temperature data along with thermosyphon monitoring data can be used to determine if the thermosyphons are functioning correctly (Section 4.2.2). Observations related to a review of the data presented in Appendix A and Appendix K are summarized in Table 14.

Table 14: Summary of Core and Key Trench Ground Temperature Cable Observations

Zone	Horizontal GTCs	Vertical GTCs	Observation
Design Temperature	−2˚C	−8˚C	The minimum criteria required to ensure Dam is performing in accordance with design specifications
Station 0+040	Meets	Meets	Performing as expected with substantive safety buffer and slight trend suggesting ongoing cooling
Station 0+060	Meets	Meets	Performing as expected with substantive safety buffer and slight trend suggesting ongoing cooling In conjunction with Appendix G, no evidence of seepage was noted at this station
Station 0+085	Meets	Meets	Generally performing as expected with substantive safety buffer within the core and slight trend suggesting ongoing cooling in the foundation. A rise in the temperature of the upstream-most beads of ND-HTS-085-29.4 and ND-HTS-085-25.3 was observed and has since returned to a lower seasonal maximum. In conjunction with Appendix G, no evidence of seepage was noted at the North Dam.
Station 0+130	Meets	Meets	Generally performing as expected with substantive safety buffer in the core and stable or a slight cooling trend within the core and the key trench foundation Erratic reading attributed to instrumentation error are noted in both ND-HTS-130-28.8 (Bead 2) and ND-VTS-130-US (Bead 9) in 2021. In conjunction with Appendix G, no evidence of seepage was noted at the North Dam.
Station 0+175	Meets	Meets	Generally performing as expected with substantive safety buffer and stable trend in the core, and slight cooling trend in the foundation

Recommendations:

- No recommendations.

- *Consider implementing satellite telemetry for the North Dam data loggers to allow regular transmission of the measurements rather than monthly manual downloads. This approach would be more proactive and has the potential to improve the efficiency of the download and processing procedures.*

4.2.2 Thermosyphons

Passive thermosyphons assist in cooling the North Dam key trench foundation. They function when the ambient air temperature is colder than the ground temperature where the thermosyphon is located. This happens because of phase change of the carbon dioxide gas with which the thermosyphon is filled. Therefore, during the winter months the cold ambient air temperature is used to draw heat from the foundation, but during the summer period the thermosyphons remain dormant.

Thermosyphon temperature monitoring for the North Dam has been automated. Single bead thermistors connected to the datalogger system are attached to each thermosyphon evaporator pipe below the ground surface, and insulation has been placed around the thermistor beads to ensure the evaporator pipe temperature, and not the ambient air temperature, is measured (SRK 2012b). Additionally, air temperatures are recorded at the dataloggers every six hours. This data is downloaded as part of the monthly ground temperature cable datalogger downloads.

To monitor the performance of the thermosyphons, thermosyphon evaporator pipe contact temperatures and air temperatures are plotted against time. During the winter months, when the thermosyphons are working, the thermosyphon pipe temperature should be roughly 5˚C warmer than the air temperature. If the thermosyphon pipe temperature during the winter months is approximately the same as the air temperature, it indicates that the thermosyphon is not working correctly.

Thermistor data indicates all the south and north thermosyphons are functioning except for North 2 (Appendix B). Since 2012, the measured pipe temperature of North 2 was only slightly higher than the measured air temperature, which indicates a malfunction. Ground temperature readings near the North 2 thermosyphon pipe support the conclusion that the North 2 thermosyphon is not working correctly.

As documented in past AGI's (SRK 2021b and 2020a) past efforts to investigate and remediate the non-functional thermosyphon through practical measures have been exhausted. Thermal modelling of the frozen core has considered loss of the North 2 thermosyphon. There are no significant concerns arising from the loss of the North 2 thermosyphon. Any additional measures will be taken as necessary based on the observed performance of the overall dam.

The thermosyphon radiator steel foundations are in good condition. The thermosyphons themselves do not show any physical damage; however, there is rust and peeling paint at the weld between the evaporator pipe and the twin radiators on most of the thermosyphons. AFC was not concerned about this surface rust during their inspection, however some preventative maintenance may be undertaken by cleaning and repainting around the weld.

Recommendations:

- The joints on the thermosyphons are showing signs of weathering and rusting. The thermosyphon weld joints should be cleaned (wire-wheel) and repainted to slow additional corrosion.

4.2.3 CR1000 External Datalogger Battery Voltage

Each CR1000 data logger is powered by an external lead acid battery. Battery voltage is an important indicator of datalogger performance. If the battery voltage drops below 12 V, it is operating outside of the optimal range. At or below 9.6 V, voltage is outside of the operating range and the recorded readings could be incorrect, or the datalogger will shut down and readings would not be recorded at all. The dataloggers record the minimum battery voltage four times daily. A graph of battery voltage versus time is provided in Appendix C.

The batteries have been recharged on multiple occasions since the North Dam was commissioned. At no time has the voltage dropped low enough to cause any concerns with data integrity. The batteries should continue to be monitored to ensure they maintain their charge through the winter months.

Recommendations:

- The external CR1000 datalogger batteries should continue to be monitored and recharged annually or replaced as needed.

4.2.4 Inclinometers

Six inclinometers were installed within the downstream face of the North Dam. These inclinometers are used along with the survey monitoring points to monitor deformation within the dam and dam foundation. Inclinometer readings are taken by Agnico Eagle site personnel.

Inclinometer measurements are provided in Appendix D. Data quality for the surveys has generally been good. The inclinometer profiles show only negligible displacements in the dam foundation, and small displacements over the portion of the inclinometer above the natural ground surface as summarized in Table 15. Inclinometer ND-IN-120-3 is the only inclinometer that suggests a trend of downslope movement, though the total magnitude is 3 cm. All other inclinometers are showing virtually no movement, or the movement is oscillating seasonally which likely indicates there is some movement of the inclinometer tube itself, as opposed to actual deformation of the dam or foundation.

Table 15: Summary of Inclinometer Measurement Observations (Sep. 2012 through September 2021)

Inclinometer	Maximum Overall Deformation			Maximum Foundation Deformation (m)	Observations
	Magnitude (m)	Location – Depth Below Dam Shell (m)	Location – Height Above Foundation (m)		
ND-IN-070-1	0.026	0	9.5	Less than 0.01	Displacement essentially constant since 2015
ND-IN-070-2	0.033	2.0	7.0	0.016	Seasonal oscillation.
ND-IN-070-3	0.013	2.0	5.5	Less than 0.01	Displacement essentially constant since 2015
ND-IN-120-1	0.012	0	7.0	Less than 0.01	Deformation essentially constant since May 2016
ND-IN-120-2	0.022	0	6.0	Less than 0.01	Displacement trend constant since November 2017.
ND-IN-120-3	0.030	0	3.7	Less than 0.01	General trend of movement in dam shell, towards the south and downstream of the dam

The inclinometer was sent to Durham-Geo Slope Indicator (DGSI) for service and recalibration between February and May 2021. No readings were collected during this period. The next service and recalibration should be planned for 2024.

Recommendations:

- No recommendations.
- *Site staff should maintain a record of probe and read-out service and recalibration dates. The next service and recalibration should be planned for 2024.*

4.2.5 Survey Monitoring Points

A series of 14 crest survey monitoring points, 3 deep survey monitoring points, and 18 surficial survey points were installed in the North Dam upon completion. These survey monitoring points were installed to monitor for any surface movement of the crest and downstream face, and deep settlement of the downstream foundation of the dam.

Survey monitoring of the North Dam occurred for six of seven occurrences during the monitoring year. The survey data should be collected monthly between May and November. Complete survey data is presented in Appendix E.

The overall vertical and horizontal displacement since completion of construction based on these readings are summarized in Table 16. Deep settlement and crest displacement have been very small and of similar magnitude, and has essentially been unchanged since September 2013, confirming that much of the measured displacement to date is all directly related to the period immediately following construction.

Downstream dam shell settlement follows the same general trends as the deep and crest settlement points; however, the total displacement magnitude is larger. There is also an increasing trend in displacement in two points (ND-SSP-155-2 and ND-SSP-110-3) since June 2016. The measured vertical displacement of these points is limited, but the horizontal displacement is increasing, which results in the overall increased displacement trend. Both these points are located near the downstream toe of the dam, and this increased displacement is likely a result of increased active layer thaw beneath the shallow rockfill toe of the dam. The survey data does not indicate any immediate concerns, but will continue to be closely monitored for acceleration in this trend going forward.

Table 16. Summary of Survey Monitoring Observations (2021 surveys relative to May 2012)

Location	No. of Stations	Vertical Displacement (m)		Horizontal Displacement (m)	
		Max.	Typical	Max.	Typical
Deep settlement points (DSP)	3	0.04	0.01	0.10	0.05
Crest settlement points (SMP)	14	-0.09	-0.02	0.11	0.05
Surficial settlement points – Downstream dam shell (SSP)	18	-0.22	0.11	0.36	0.08

Notes:

Negative vertical displacements are in the downward direction

Displacement values shown exclude surveys expected to have significant survey errors, indicated by a spike in the data.

Recommendations:

- No recommendations.
- *Install a few key surficial survey points (SSP) on the upstream face of the North Dam. These additional SSPs will track the deformation of the upstream shell as the upstream foundation thaws due to thermal loading of an elevated Reclaim Pond water level. Note that upstream foundation thaw is expected as per the original designs and there are no concerns with current thaw rate; however, improved tracking of the displacement going forward will provide an additional line of evidence (in addition to monitoring ground temperatures) should adverse thaw conditions occur.*

4.2.6 Creep Displacement

North Dam displacements as recorded by the inclinometers and survey points are expected to be caused primarily because of creep of the saline ice-rich permafrost foundation soils. Table 17 summarizes the predicted deformation as determined through rigorous numerical creep deformation modeling (SRK 2017c), as well as the allowable design values. Figure 15 presents a plot comparing predicted vertical displacement against measured vertical displacement along the crest of the dam near Station 1+20. This graph clearly demonstrates that the current displacement is less than predicted.

Table 17: Predicted North Dam Deformation Displacement

Period	Location	Max. Shear Strain Rate (year-1)	Max. Shear Strain (m/m)	Displacement (m)	
				Max. Horizontal	Max. Vertical
Overall allowable design values	Core	3.2E+02	2%	-	1.0
10 years post construction	Core crest	-	-	-	0.2
	Core	5.0E-08	5.0E-02	0.4	0.6
	Foundation	1.0E-07	~1.0E-01	0.4	0.6
30 years post construction	Core crest	-	-	-	1.0
	Core	2.0E-08	1.0E-01	0.8	1.0
	Foundation	4.0E-08	~2.0E-02	0.6	1.0

Recommendations:

- No recommendations.

4.2.7 Visual Inspection (Walk Over)

Visual inspections of the North Dam are required weekly when tailings deposition is occurring, and when the TIA water level is below the FSL. During the 2021 monitoring period, 34 weekly visual inspections were completed, and the associated reports and photos are included in Appendix F.

The visual inspection reports and tracks all changes to the dam surface, visible damage to instrumentation, signs of erosion or seepage, or any other surface anomalies. To date, the primary observations of note from the inspections include:

- Surface depressions in the upstream and downstream slopes of the dam;
- Minor cracking on the turn-around pad on the upstream side;
- Rust on the thermosyphons (Section 4.2.2);
- Erosion near the thermosyphons (Section 4.2.2); and
- Ponded or flowing water at the downstream toe of the dam (Section 4.2.8).

The surface depressions are located on the upstream and downstream faces of the dam. Six depressions on the North Dam fill have historically been classified as significant depressions requiring monitoring (D1, D2, D3, U1, U2 and U3), as illustrated in SRK 2021. Based on the AGI physical inspection (Photolog 1 and 2), SRK is satisfied that there were no substantial changes to the surface depressions since the 2017 AGI, and this observation is confirmed by the settlement data.

Some surficial cracking has been noted in past walk over inspections near the upstream face of the North Dam near the historic pumping access pad constructed while the mine was in care and maintenance. During the 2021 inspection, the pad was flooded so no visual inspection could be made, however the thermal monitoring data does not indicate concerning levels of thaw in the upstream foundation.

Recommendations:

- Increase the completion of weekly visual inspections at the North Dam in accordance with the specified frequency.
- *The number of visual inspections (formerly walk overs surveys) has improved in 2021, however additional inspections are required to be in compliance with the specified frequency.*

4.2.8 Monitoring of Flowing Water at the Toe of the North Dam

The monitoring of the flowing water at the North Dam toe is described in the Monitoring SOP (SRK 2020b) and monitors the flowing water for evidence that the source may be from the TIA Reclaim Pond chemical signature indicating seepage through the dam. The program includes routine water quality sampling and flow measurements if flow is observed. SRK's review of the 2021 water quality data (Appendix G) confirms that there is no data to suggest the presence of TIA Reclaim Pond water in the flowing water at the toe of the North Dam. Flow measurements were not collected in this monitoring period, however, flow observed was within the typical range (0 to 2.5l/s) during the visual inspections June through September 2021.

Recommendations:

- Modify the water quality monitoring SOP based on the absence of data to suggest the presence of TIA Reclaim Pond water in the flowing water at the toe of the North Dam. Recommended changes to the monitoring SOP are below, final changes to the frequency will be documented in an updated SOP.
  - Reduce the water quality and flow monitoring frequency for field measurements, from once per week to once per month while flowing water is observed, provided the laboratory water quality sample is being collected and analyzed as per the SOP.
  - Reduce the laboratory water quality monitoring frequency to once per year, during August, when flowing water is observed at the downstream toe, ensuring that this sample is collected and analyzed per the SOP, including all field parameters. This change in frequency also applies to the other LAS samples described in the monitoring SOP.

4.2.9 Physical Inspection of the North Dam

As part of the 2021 AGI an inspection of the North Dam was completed. No additional issues of concern were observed. The North Dam appears to be in good condition.

Recommendations in the 2020 AGI suggested spreading of the crush material on the pumping pad on the upstream side of the North Dam to avoid concerns about observed cracking. The recommendation to spread this material is changed to either leave the material in place (with the understanding that the cracking is not a concern), or removal of the crushed rock pad as a house-keeping item. Site staff are familiar with the cracking mechanism on this pad, and it is recognized not to be a concern, and spreading the material will likely result in additional visual changes in subsequent years as the material settles.

The attached Photolog (Photolog 1 to 3) provides a general overview of conditions on the North Dam.

Recommendations:

- No recommendations.
- *The v-notch weir at the toe of the dam is not performing correctly. To minimize future thermal impacts, the v-notch weir should be decommissioned and the velocity-area method used in its place when flow estimation is required.*
- *If site elects to do some clean-up of the upstream pumping pad (when the Reclaim Pond water level is decreased, the crush material should be removed as spreading the material may increase the incidence of visible cracking.*

4.3 South Dam Inspection and Monitoring

4.3.1 Ground Temperature Cables

To monitor long-term temperature of the frozen foundation dam, a total of twenty-seven GTCs were installed during South Dam construction (SRK 2018c). The GTCs are connected to Beaded Stream Dataloggers (D405) to allow continuous data capture. Summarized thermal data is shown in Appendix A. Table 18 provides a summary of the GTC status during the 2021 AGI inspection.

The thermal design freezing point depression criteria requires a ground temperature of less than -2°C at the upstream base of the key trench (Figure 9). The ground temperatures generally meet the thermal design criteria, and the dam is performing as expected.

Table 18: South Dam Ground Temperature Cable Status Summary

GTC ID	Station ID	Status	# of Sensors (Functional / As-built)	Comment
SD-VTS-065-KT	0+65	Active	11 / 11	▪ Damaged following construction (repaired)
SD-HTS-065-US	0+65	Active	5 / 5	▪ Damaged following construction (repaired)
SD-VTS-155-KT	1+55	Active	11 / 11	
SD-HTS-155-US	1+55	Active	5 / 5	
SD-VTS-155-US	1+55	Inactive	0 / 11	▪ Single sensor functioning until 11/8/2019
SD-VTS-155-DS	1+55	Active	11 / 11	
SD-HTS-155-KT	1+55	Inactive	0 / 11	▪ Damaged during construction (irreparable)
SD-HTS-240-KT	2+40	Active	11 / 11	
SD-VTS-240-KT	2+40	Active	11 / 11	
SD-HTS-240-US	2+40	Active	7 / 7	
SD-VTS-240-US	2+40	Inactive	0 / 11	▪ Measurements ended on 10/10/2019
SD-VTS-240-DS	2+40	Inactive	0 / 11	▪ Measurements ended on 10/22/2019
SD-VTS-365-KT	3+65	Inactive	0 / 11	▪ Damaged following construction (irreparable)
SD-HTS-365-KT	3+65	Active	11 / 11	▪ Damaged following construction (repaired)
SD-HTS-365-US	3+65	Active	11 / 11	

GTC ID	Station ID	Status	# of Sensors (Functional / As-built)	Comment
SD-VTS-365-US	3+65	Active	11 / 11	
SD-VTS-365-DS	3+65	Inactive	0 / 11	▪ Measurements ended on 8/3/2020
SD-VTS-US1	3+65	Active	2 / 13	▪ Installed in suspected ground ice wedge near upstream toe ▪ Bead 1 and 2 active
SD-VTS-US2	3+65	Active	1 / 15	▪ Installed in suspected ground ice wedge near upstream toe ▪ Bead 1 active
SD-VTS-460-KT	4+60	Active	11 / 11	
SD-HTS-460-KT	4+60	Active	11 / 11	
SD-VTS-460-US	4+60	Active	11 / 11	▪ Damaged following construction (repaired)
SD-VTS-460-DS	4+60	Active	11 / 11	
SD-HTS-460-US	4+60	Inactive	0 / 5	▪ Damaged following construction (irreparable)
SD-VTS-510-KT	5+10	Active	11 / 11	
SD-HTS-510-US	5+10	Active	5 / 5	▪ Damaged following construction (repaired)
SD-HTS-B1-KT	NA	Active	20 / 20	

Table 19: Summary of Key Trench foundation Ground Temperature Cable Observations

Zone	Horizontal GTC	Vertical GTC	Observation
Design Freezing Point Depression	−2˚C	−2˚C	The minimum criteria required to ensure Dam is performing in accordance with design specifications
Station 0+65	No GTC	Meets	Performing as expected with substantive safety buffer and slight trend suggesting ongoing cooling
Station 1+55	Offline	Meets	Performing as expected with substantive safety buffer. SD-HTS-155-KT has been offline since construction
Station 2+40	Meets	Meets	Performing as expected with substantive safety buffer
Station 3+65	Meets	Offline	Performing as expected with substantive safety buffer in the base of the key trench. SD-VTS-365-KT has been offline since construction.
Station 4+60	Meets	Meets	Performing as expected with substantive safety buffer and slight trend suggesting ongoing cooling
Station 5+10	No GTC	Meets	Performing as expected with substantive safety buffer and slight trend suggesting ongoing cooling
SD-HTS-B1-KT	Meets	N/A	Performing as expected with substantive safety buffer. Bead 1 and 2 (near station 2+40) exceed the foundation freezing point depression seasonally, however no adverse performance is observed at Station 2+40 in the other GTCs

Based on the operational GTCs, the thermal design criteria along the base of and in the foundation of the key trench is being met in all locations where data is available. A thorough review of the South Dam GTCs is provided in Appendix K.

Recommendations:

- GTCs provide thermal monitoring of the dam to ensure conditions remain within the intended design for safe operation and tailings containment. GTC replacement is recommended in some areas of the South Dam where recent instrument failure has occurred. Four replacement GTCs are suggested to be installed at this time (two upstream and two downstream). Agnico Eagle should work with the EOR to install these replacement GTCs as soon as practical. Priority should be given to the two upstream GTC replacements. Four replacement GTC strings are on site (at the Doris North Camp).
- Complete a detailed visual inspection of the South Dam after spring melt, especially looking for any exposed or damaged ground temperature cables. This will allow for preventative maintenance and placement of protective material to be done if exposed cables are observed, which will help to limit the potential for damage from wildlife.
- Complete a manual download of data from each datalogger once in 2022, following the instructions in the monitoring SOP.
- *Beadedstream telemetry subscription requires annual renewal. Agnico Eagle has taken over the subscription with Beadedstream and will be responsible for maintenance of the GTC telemetry system operations are maintained.*

4.3.2 Survey Monitoring Points

A series of 12 crest survey monitoring points, 3 deep settlement points, and 26 surficial survey monitoring points are proposed for the South Dam. Survey monitoring points were installed in August 2019. Surveys were collected monthly between May through November. For this monitoring period, six of the potential 7 surveys were collected. The November survey was missed due to workforce limitations on site. Complete survey data is presented in Appendix E.

Table 20: Summary of Survey Monitoring Observations (2021 surveys relative to August 2019)

Location	No. of Stations	Vertical Displacement (m)		Horizontal Displacement (m)	
		Max.	Typical	Max.	Typical
Deep settlement points (DSP)	3	-0.05	-0.02	0.05	0.03
Crest survey monitoring points (SMP)	14	-0.06	-0.04	0.04	0.02
Surficial survey settlement points - Downstream dam shell (SSP)	18	-0.05	-0.03	0.04	0.02

Notes:

SSP locations are surveyed by RTK GPS due to line-of-sight challenges, as such the accuracy of the measurements may be lower.

The overall vertical and horizontal displacement since August 2019 is limited in all survey locations. The relative increase in displacement in Fall 2020 appears to be a systematic error between the total station and RTK GPS survey methods for each survey location type. Following the apparent spikes in

Fall 2020, displacements have returned to a more typical magnitude. In 2021, the SMP and DSP points have indicated a downward displacement of 5-10 mm, however these displacements were not confirmed by the SSP points. The SSP points are surveyed by RTK GPS and the SMP and DSP points are surveyed by total station, so the discrepancy is attributed to survey error. At this point the limited displacements observed are not of concern, but detailed review of monitoring data will continue

Recommendation:

- A survey of the downstream toe is required as part of the Monitoring SOP with the intent of being completed at the same time as the monthly monitoring surveys (May to November), however the frequency requirement in the SOP requires modification. The toe survey should be conducted at least once annually during snow-free conditions (typically August) each year to track the lateral displacement and the extent of ponding downstream of the dam. Additional dam toe surveys may be collected during monthly GPS survey events when the toe is mostly snow free.
- Update the SOP and monitoring schedule to reflect the modified frequency.
- *In 2021, a drone LiDAR survey was completed over the North Dam, South Dam and tailings beach. The LiDAR survey is valuable data for tracking the evolution of the TIA and provides an acceptable method for satisfying the downstream toe survey requirement.*

4.3.3 Visual Inspection (Walk Over)

Visual inspections of the South Dam are required weekly when tailings deposition is occurring, and when the TIA water level is below the FSL. During this monitoring period, 29 of the possible 52 visual inspections were completed and the associated reports and photos are included in Appendix F.

The visual inspection reports and tracks all changes to the dam surface, visible damage to instrumentation, signs of erosion or seepage, or any other surface anomalies. At the South Dam it also provides record of the active spigot locations. To date, the primary observations of note from the visual inspections include:

- Changes in spigot locations.
- Instrumentation hardware issues or ice buildup on solar panels.
- Ponding or beach length encroachment on the dam.
- Changes in the size of ponded water on the downstream side of the dam.

Updated Visual Inspection forms were issued in 2021. The name of this monitoring component was modified from Walkover Survey to avoid confusion with naming of ground survey monitoring methods.

Recommendation:

- Increase the completion of weekly visual inspections at the South Dam in accordance with the required weekly frequency.

4.3.4 Monitoring of Flowing and Ponded Water at the Toe of the South Dam

The South Dam seepage and ponded water monitoring program is described in the Monitoring SOP (SRK 2020c). The program includes routine water quality sampling and flow measurements if flowing water is observed. Since dam construction in 2019, there has been no flowing water observed at the toe of the South dam. The purpose of the ponded water monitoring program is to establish a geochemical baseline and monitor for potential seepage or changes in thermal regime of the ice-rich tundra in the area. SRK's review of the 2021 geochemical monitoring data (Appendix G) confirms that the chemistry of the ponded water downstream of the South Dam is within baseline conditions suggesting no seepage or significant changes in the permafrost conditions at this location.

Recommendations:

- No recommendations
- *Signs of increased ponding water were observed in 2020 at the downstream toe of the South Dam. The ponded volume was notably less during the 2021 AGI inspection. Downstream of the Phase 1 South Dam, permafrost, including frost wedge polygons existed prior to construction which is indicative of the area being historically wet or ponded.*
- *Drone images taken just after freshet and just before winter freeze up should be collected to assist with ongoing monitoring of the ponded water at the downstream portion of the South Dam toe.*

4.3.5 Physical Inspection of the South Dam

As part of the AGI, a visual inspection of the South Dam was completed. Overall the dam is performing as expected and there were no significant issues of concern.

Ponded water has been observed at the downstream toe of the dam. This area contained frost wedge polygons and standing water prior to construction. Between 2018 and 2020, more water has been observed ponding in this area, however in 2021, the pond size was notably reduced.

A zone of tundra was also disturbed during construction of snow access roads. Signs of tension cracking and minor sloughing was observed on the downstream face of the dam (2H:1V) near this disturbance. The two zones where this is observed are near where the downstream GTCs were brought up the downstream slope. This area should be regularly inspected as part of the visual inspections and integrated with the ROQ toe berm if implemented

Both the ponding and tundra disturbance are within the footprint and will be covered by the ultimate Phase 2 South Dam raise, however additional degradation of the permafrost will require additional mitigation at the time of construction. To proactively mitigate the risk of foundation thaw prior to construction of the South Dam Phase 2 raise, SRK and Agnico Eagle have discussed the placement of an ROQ thermal toe berm. The toe berm would include at least 1.5 m of ROQ fill placed over this area (about 5 m in width). The toe berm fill would be integrated into the Phase 2 dam shell volume.

Along the downstream toe, limited amounts of tailings were visible on vegetation (i.e. a dust coating) and has been observed on the melting snow drifts early in the summer. It is hypothesized that this has

been transported during periods of strong winds from the north. Monitoring such as water quality sampling as well as visual monitoring is ongoing and will inform the need for dust mitigation. As the subaerial tailings beach grows, the potential for dust generation at the South Dam also increases. At this time the wind transported tailings visible on the ground is in very small quantities and only observed on or immediately downstream South Dam toe and is not a significant concern and currently no action is suggested beyond ongoing monitoring. Photolog 4 and 5 provides a general overview of the South Dam conditions at the time of the AGI.

Recommendations:

- There are two zones on the 2H:1V downstream slope of the South Dam, specifically where the downstream GTCs were brought up the downstream slope, that some minor sloughing and tension cracking of the dam shell ROQ has occurred. These areas should be closely monitored and additional fill (toe berm) along these portions of the slope could provide some mitigation in these areas (see later bullet).
- Phase 1 South Dam construction disturbance, where snow access roads were constructed appears to have initiated some permafrost degradation (thaw depressions and ponding) and should continue to be closely monitored.
- *All ponding, tension cracking, sloughing and permafrost disturbance is within the Phase 2 South Dam footprint. Delayed construction of the Phase 2 raise may lead to further degradation of the permafrost in these areas. To proactively mitigate the risk of foundation thaw prior to construction of the South Dam Phase 2 raise, a thermal toe berm should be implemented. The toe berm would include at least 1.5 m of ROQ fill placed over this area (about 5 m in width). The toe berm fill would be integrated into the Phase 2 dam shell volume. Initial volumetric modeling of a 2m thick, top crest width 5m with 2H:1V side slopes indicates that neat-line volumes for this additional fill material would be in the range of 4,000m3.*
- *Agnico Eagle has already sourced dust suppression agents for the TIA and should determine when the dust suppression measures should be implemented based on monitoring observations and the planned restart of production and tailings deposition. Inactive deposition and the resultant decreasing moisture in the tailings beach surface is likely to result in increased tailings dust dispersion.*

4.4 Tailings Deposition System

Table 5, Figure 10, and Figure 11 provide a summary of tailings deposition in the TIA to date. Generally, the tailings deposition rates to date have been lower than the planned rates. In 2021, the tailings solids contents were highly variable as the mill was operated intermittently. Monthly averages ranged from 26% to 47% with an average around the target 35%.

Tailings deposition has occurred as single point discharge from 3 separate locations in 2020-21 monitoring period; two locations along the eastern shoreline of the TIA, including one winter location near the northern limit of the subaerial tailings beach (Spigot H) and one near “Varley’s Corner” (Spigot F) during variable milling conditions or when milling was stopped; and, one location from the South

Dam for summer deposition (Spigot A). The well-established beach will now maintain a beach length over 200 m at the FSL of the North Dam (upper limit of the reclaim pond water levels). Though good progress has been made on beach establishment, there is currently a large pond on the tailings beach which is hydraulically isolated from the reclaim pond and could present ice entrainment of beach length issues. Tailings deposition will need to continue from the South Dam in accordance with the update of the tailings deposition plan (Figure 12) as provided in the 2020 AGI (SRK 2021b).

Saline mine water is typically discharged to the TIA via a separate mine water discharge line to the reclaim pond. If saline water (greater than 4,500 mg/l Cl equivalent) must be directed to the TIA through the tailings pipeline, then it should be discharged from a spigot location that is at least 300 m away from the South Dam crest so that the freeze back of the tailings beach against the South Dam is not impacted.

Recommendations:

- The tailings discharge system must be operated in accordance with the tailings deposition plan (SRK 2021). Primary spigot moves should be expected during, or shortly after, spring melt and again prior to winter freeze up. The next winter discharge should be located at the northeastern extent of the subaerial beach (north of the current spigot H location) to limit ice entrainment due to winter sub-aerial deposition. Following spring melt, deposition from the South Dam (Spigot A, B and C) should resume. In the subsequent fall/winter, a move to the new northeastern extent of the subaerial beach should be anticipated.
- A bathymetric survey was conducted in 2021. With this newly available data, Agnico Eagle should work with SRK to complete tailings volume reconciliation and updated deposition planning prior to resuming production.
- Plans for the Phase 2 raise of the South Dam should be made in parallel with updates to the mine plan to ensure construction can occur in the appropriate season (winter). The raise is required to be in place once the tailings beach against the existing dam reaches the full supply level for tailings (36.5 masl or approximately 2.64Mt of total tailings tonnage). The required timing is dependent on the resumption of production and future milling rates.
- *Production activities and tailings discharge have been suspended in 2022.*

4.5 Emergency Dump Catch Basins

The Eastern Dump Catch Basin is in good condition as shown in Photolog 9. The Western Dump Catch Basin however has wrinkled liner that does not appear to be adequately anchored and may not perform as intended. Currently it appears this structure has the required containment volume, but some liner slippage has been noted and repairs at the earliest opportunity are suggested by SRK. Agnico Eagle has agreed to do this reconstruction at the earliest opportunity on site / when practical.

Recommendations:

- The Western Emergency Dump Catch Basin still requires repairs. These repairs should still be planned to be carried out as soon as practical. Additional liner slippage since 2020 was noted at

the top of the liner crest. Further liner slippage may result in a reduction of the capacity of this emergency catch basin.

4.6 Pipelines (Reclaim, Tailings Deposition and TIA Discharge)

Pipelines are placed directly on the ground, which could be either rockfill pads, road shoulders or directly on the tundra. There are signs of vegetation dieback because of pipelines placed directly on the tundra along the northern shore of the TIA upstream of the Reclaim Pump Station. This is becoming a preferred flow path for surface runoff which could ultimately lead to rapid surface erosion and subsequent thermal erosion of permafrost.

Recommendations:

- Agnico Eagle should carefully inspect all pipelines placed directly on the tundra for signs of vegetation dieback and associated flow path channeling. Where this is occurring, the pipeline must be relocated to follow existing all-weather road shoulders, and appropriate remediation needs to be put in place where damage has occurred.
- The smaller diameter TIA pipelines going from the North Dam to Doris Creek, that were used during the care and maintenance period and before tailings were placed in the TIA around 2017, are no longer connected or functional. Agnico Eagle should consider removing these nonfunctional pipelines from the tundra.
- *Going forward, Agnico Eagle should consider abandoning the practice of placing pipelines directly onto the tundra. Additional pipelines (specifically any pipelines that are no longer in use) should be removed from the tundra where practical. Any pipeline removal should consider approaches to ensure that additional permafrost damage does not result from the removal activities.*

4.7 TIA Reclaim Pond Jetty (710 Pumphouse) Pad

Settlement and tension cracking have been observed since construction at the TIA Reclaim Jetty Pad (also referred to as the 710 Pumphouse pad). In 2020, the major repairs were made to the Reclaim Jetty pad provide shallower side slopes to reduce the risk of a failure which would impact the operation of the 710 pumphouse. There is still one area of the jetty (WSW end where the pipelines extend from the seacans into the reclaim pond) that is oversteepened. Survey monitoring was completed on a regular basis and did not indicate any concerning levels of displacement once the repairs were complete. An as-built of the repaired TIA reclaim jetty / pumphouse pad is presented in the 2020 AGI (SRK 2021), and the most recent Reclaim Jetty monitoring summary is provided in Appendix H.

In 2021, the Reclaim Jetty access road and part of the pad was flooded due to high water levels in the TIA. The road and pad begin to flood at approximately 32.1 masl. The water level should be maintained below this level whenever possible, and if the operational water balance requires the water level to exceed this elevation, then raising or modifying the Reclaim Jetty location will need to be executed along a similar timeline.

Recommendations:

- Continue settlement monitoring at the TIA Reclaim Jetty (710 Pumphouse) following the recommended survey frequency of twice monthly, May through November.
- Once the survey monitoring of the Reclaim Jetty resumes, and the surface is snow-free, conduct an audit of the existing survey monitoring points and establish survey monitoring points where proposed locations are missing or damaged.
- Agnico Eagle should develop a plan to raise the Reclaim Jetty pad from its current minimum elevation of roughly 32.1 masl to above the Full Supply Level of the TIA (33.7 masl would raise the pad 0.2 meters above the TIA FSL), or some interim raise which the water level can be maintained with adequate freeboard below the pad.
- Once any significant construction or remediation is complete, ensure the recommended TIA Reclaim Jetty survey monitoring points are reestablished.

4.8 TIA Operational Water Balance and Level Targets

The TIA operational water and load balance tool is used to predict water levels in the TIA and communicate water balance updates and projections monthly. The operational water level range target for 2022 is 31.5 masl or less and therefore the Reclaim Pond should be maintained within this range to limit thermal loading on the North Dam. It is expected that during freshet the water levels may temporarily rise above 31.5 masl, however, the Reclaim Pond must be lowered into the range as soon as is practical. Above 32.1 masl, the Reclaim Jetty begins to flood, which has access implications, and significantly higher water levels may lead to adverse impacts to operational capacity to pump water from the Reclaim Pond.

The targets above are based on treated water discharge via the RBDS. Due to recent changes in the MDMER discharge water quality requirements, and the need to stop Roberts Bay discharge on December 1, 2021, Agnico Eagle and SRK are in the process of reviewing options for future water management in the TIA. Changes to the operational water and load balance and level targets will be reported on in future reports.

In addition to the Reclaim Pond water level targets, the South Dam beach length must be maintained and no large ponding should occur within 100 m of the dam (SRK 2020c).

Recommendations:

- Water level targets must be adhered to whenever practical. Short-term or risk-based exceedances may be acceptable.
- Currently the main area of immediate impact from raised water levels is the TIA Reclaim Jetty. See recommendations in the section above.
- The RBDS resumed in June 2021 and has since been stopped as of December 1, 2021 due to changes in the discharge water quality requirements. From a TIA water management perspective, it is of paramount importance that the RBDS be re-commissioned or alternative water management

strategies be arranged to limit thermal loading on the North Dam, and/or a reduction in operations as the water level approaches the FSL of the TIA (33.5 masl). Agnico Eagle and SRK are in the process of reviewing options for future water management in the TIA. Changes to the water balance and level targets will be reported on in the future.

4.9 TIA Water Quality

The TIA water quality is monitored at compliance station TL-1 at the Reclaim Water pump station and will continue to be monitored were compliant with MDMER prior to September 30, 2021 (this monitoring period). After the MDMER water quality requirement changes on December 1, 2021, site has stopped all treated TIA water discharge to the RBDS. Details of the TIA water quality are provided in the annual water and load balance reviews (typically March of the following year). Agnico Eagle and SRK are in the process of reviewing options for future water management in the TIA. Beyond this discharge restriction, there have been no significant changes in the TIA water quality in the past year.

Recommendations:

- No recommendations.
- *Agnico Eagle and SRK are in the process of reviewing options for future water management in the TIA. Changes to the water quality requirements will be reported on in the future.*

4.10 Climate Data

For reference, the updated climate data received from the Doris meteorological station is provided in Appendix I. The data presented summarizes the historical climate record, the 2021 climate record and a comparison of 2021 air temperatures to all air temperature data since 2004. The climate data shown is sourced from monthly data submissions from Stantec, uploaded to the SRK Environmental Data Management System database.

Recommendations:

- No recommendations.

5 Recommendations and Conclusions

Based on the results of the 2021 AGI, the Doris TIA and associated structures (primarily the North Dam and South Dam) are functioning as designed. Some items were observed during the physical inspection and some anomalies were identified during the monitoring data review; however, these are either within expected performance or determined to be of no significant concern to dam performance. Improvements to the overall tailings management system were also identified (e.g. Integration of the OMS Manual with the TARPS, ERP and Dam Emergency Plan, as well as Agnico Eagle corporate and new site structure). Table 21 presents a summary of the recommendations listed throughout this report.

Table 21: Summary of Recommendations

Inspection Item	2020 Recommendations (for reference)	2021 Recommendations
	General TIA Management Recommendations	
Third Party Dam Safety Review	▪ Conduct an independent third-party Dam Safety Review (DSR) for both the North and South Dams in the summer of 2021. ▪ *Planning for this is in progress. An independent third-party Dam Safety Review is scheduled to be conducted for both the North and South Dams in summer of 2021 pending COVID-19 restrictions.*	▪ No recommendations. ▪ *A DSR was completed by a third party (Tetra Tech) in 2021. Agnico is actively working on review and implementation of the DSR comments where appropriate.*
Tailings Operating, Maintenance and Surveillance (OMS) Manual and Emergency Response Plan (ERP)	▪ A draft version of the 'Hope Bay Project Dam Emergency Plan' was completed by Hope Bay staff in 2021. This Dam Emergency Plan should be finalized by site and integrated with the into the OMS and TARP framework ▪ Once integrated, the suite of OMS, TARPs, ERP and Dam Emergency Plan should reviewed with all site operations annually and updated as necessary. ▪ All of these components should be reviewed against Agnico Eagle's corporate tailings management system and updated tailings standards through a gap analysis to identify required updates. ▪ The roles and responsibilities for the TIA are defined in the OMS update and must be updated with any changes in Agnico Eagle's corporate structure. ▪ *A revised OMS was issued in 2020* ▪ *TARPs were developed for the TIA in Q4 2020. Further refinement based on site input to the TARPs and integration with OMS manual should be completed in 2021*	▪ Overall, the OMS manual, TARPS and Dam Emergency plan must be reviewed by Agnico Eagle and updated to reflect the many recent changes, including, but not limited to the Dam Emergency Plan, the updated TARPs and change in key personnel listed in the OMS manual. Minor updates to the North and South dam monitoring SOPs are also recommended. ▪ All components should be reviewed against Agnico Eagle's corporate tailings management system and updated tailings standards through a gap analysis to identify required updates. ▪ *SRK and Agnico Eagle are currently collaborating on updates to these plans.* ▪ The suite of OMS, TARPs, ERP and Dam Emergency Plan must be reviewed with all site operations annually and updated as necessary. ▪ *Agnico Eagle are currently in the process of updated the Dam Emergency Plan.* ▪ Agnico Eagle should ensure all staff are properly informed and trained on the contents of the OMS Manual.
Compliance with Monitoring Frequency Requirements	▪ Conduct monitoring in accordance with the specified frequency in the Monitoring SOP and OMS. If changes in the monitoring frequency are required due to new operating schedules these must be proposed to and approved by the EOR. ▪ The North and South Dam Monitoring SOPs were updated in 2020. An additional update should be	▪ Recommended monitoring frequencies have been met in all categories except for visual inspections and survey monitoring. Agnico Eagle should aim to improve the frequency of these monitoring events in 2022. ▪ *It is understood that COVID-19 and site staffing limitations during this monitoring year impacted the ability to collect*

Inspection Item	2020 Recommendations (for reference)	2021 Recommendations
	completed following any notable updates to the Tailings Management System.	*this data. Plans in place now from Agnico to further increase visual inspections in 2022.*
	North Dam Inspection and Review of Monitoring Data	
Ground Temperature Cables (GTCs)	■ No recommendations. ■ Consider implementing satellite telemetry for the North Dam data loggers to allow daily transmission of the measurements rather than manual downloads. This would be a more proactive approach rather than a requirement at this time.	■ No new recommendations.
Thermosyphons	■ No recommendations.	■ The joints on the thermosyphons are showing signs of weathering and rusting. The thermosyphon weld joints should be cleaned (wire-wheel) and repainted to slow additional corrosion.
CR1000 Datalogger Battery Voltage	■ The external CR1000 datalogger batteries should continue to be monitored and recharged annually or replaced as needed. ■ *The batteries have been recharged in March 2021*	■ The external CR1000 datalogger batteries should continue to be monitored and recharged annually or replaced as needed.
Inclinometers	■ The inclinometer probe and read-out were sent for recalibration and maintenance, but due to Covid-19 it was not possible to complete in 2020. The probe has and readout should be re-sent to the manufacturer for recalibration and maintenance in 2021. ■ *Note that TMAC has informed SRK that the inclinometer probe has now been sent off site (sent off site Q1 2021) for recalibration and maintenance.*	■ No recommendations. ■ *Site staff should maintain a record of probe and read-out service and recalibration dates. The next service and recalibration should be planned for 2024.*
Survey Monitoring Points	■ Backfill the erosion around survey monitoring point ND−DSP−100 at the North Dam. ■ Continue to carefully observe the North Dam downstream shell settlement points ND-SSP-080-3 and ND-SSP-110-3 to monitor for increased thaw settlement of the toe and undue deformation. ■ Installation of additional surficial survey points (SSP) on the upstream face of the North Dam to track deformation of the upstream face. These additional SSPs are recommended to better track the deformation of the upstream shell as foundation at the toe thaws due to elevated Reclaim Pond water levels. Note that this upstream foundation thaw is expected as per the original designs and there are no concerns with current thaw rate, however improved tracking of the displacement going forward will provide an early warning should adverse thaw conditions occur, and help ensure the dam design life is not being impacted.	■ No recommendations. ■ *Install a few key surficial survey points (SSP) on the upstream face of the North Dam. These additional SSPs will track the potential deformation of the upstream shell as the upstream foundation thaws due to thermal loading of an elevated Reclaim Pond water level. Note that upstream foundation thaw is expected as per the original designs and there have been no visual observation of settlement and there are no concerns with current thaw rate.* – *SRK and Agnico Eagle are currently collaborating on this item to further assess the need, as well as to determine a suitable time for potential additional survey monitoring point collection. This is not a critical path item and this additional survey point collection may not be done in 2022, as there is currently no mill operation resulting on site.*
Creep Displacement	■ No recommendations.	■ No recommendations.
Visual Inspection (Walk Over)	■ Complete weekly walkover surveys at the North Dam in accordance with the Monitoring SOPs. This	■ Increase the completion of weekly visual inspections at the North Dam in accordance with the specified frequency.

Inspection Item	2020 Recommendations (for reference)	2021 Recommendations
	is an important surveillance activity as defined in the OMS Manual and needs to be complied with. *Since 2018 there has been an improvement in the frequency of the walk over surveys but additional surveys were still required to be in accordance with the SOPs.*	■ *The number of visual inspections (formerly walk overs surveys) has improved in 2021, however additional inspections are required to be in compliance with the specified frequency.*
Monitoring of Flowing Water at the Toe of the North Dam	■ No recommendations. ■ Frost probe surveys are not required as part of the 2021 monitoring. If conditions change and a frost probe survey is required, the EOR will inform Hope Bay staff.	■ Modify the water quality monitoring SOP based on the absence of data to suggest the presence of TIA Reclaim Pond water in the flowing water at the toe of the North Dam. Recommended changes to the monitoring SOP are below, final changes to the frequency will be documented in an updated SOP. ■ Reduce the water quality and flow monitoring frequency for field measurements, from once per week to once per month in the periods while flowing water is observed (if observed). ■ Reduce the laboratory water quality monitoring frequency to once per year, during August, when flowing water is observed at the downstream toe, ensuring that this sample is collected and analyzed per the SOP, including all field parameters. This change in frequency also applies to the other LAS samples described in the monitoring SOP.
AGI Physical Inspection	■ No recommendations.	■ No recommendations. ■ *The v-notch weir at the toe of the dam is not performing correctly. To minimize future thermal impacts, the v-notch weir should be decommissioned and the velocity-area method used in its place when flow estimation is required.* ■ *If site elects to do some clean-up of the upstream pumping pad (when the Reclaim Pond water level is decreased, the crush material, currently located over the top of the dam shell, should be removed (to help improve visual monitoring in this area).*
South Dam Inspection and Review of Monitoring Data		
Ground Temperature Cables (GTCs) and D405 Dataloggers	■ GTCs provide thermal monitoring of the dam to ensure conditions remain within the intended design for safe operation and tailings containment. GTC replacement is recommended in some areas of the South Dam where recent instrument failure has occurred. Four replacement GTCs are suggested to be installed at this time (two upstream and two downstream). TMAC should work with the EOR to install these replacement GTCs as soon as practical. Priority should be given to the two upstream GTC replacements. ■ *Four replacement GTC strings are now on site (at the Doris North Camp). The exact timing of the installation of these cables has not yet been established due to current site limitations with available surface drill rigs.* ■ Beadedstream telemetry subscription requires annual renewal. TMAC should work with the EOR to ensure that the telemetry system operations are maintained.	■ GTCs provide thermal monitoring of the dam to ensure conditions remain within the intended design for safe operation and tailings containment. GTC replacement is recommended in some areas of the South Dam where recent instrument failure has occurred. Four replacement GTCs are suggested to be installed at this time (two upstream and two downstream). The Agnico Eagle should work forward to install these replacement GTCs as soon as practical. Priority should be given to the two upstream GTC replacements. Four replacement GTC strings are on site (at the Doris North Camp) ■ Complete a detailed visual inspection of the South Dam after spring melt, especially looking for any exposed or damaged ground temperature cables. This will allow for preventative maintenance and placement of protective material to be done if exposed cables are observed, which will help to limit the potential for damage from wildlife. ■ Complete a manual download of data from each datalogger once in 2022, following the instructions in the monitoring SOP.

Inspection Item	2020 Recommendations (for reference)	2021 Recommendations
	■ Complete a walk over survey of the South Dam after spring melt and look for any exposed or damaged ground temperature cables. This will allow for preventative maintenance and placement of protective material to be done if exposed cables are observed, which will help to limit the potential for damage from wildlife. ■ Manually download data from each datalogger once annually in accordance with the monitoring SOP.	■ *Beadedstream telemetry subscription requires annual renewal. Agnico Eagle has taken over the subscription with Beadedstream and will be responsible for maintenance of the GTC telemetry system operations are maintained.*
Survey Monitoring Points	■ A monthly survey of the downstream toe is required as part of the Monitoring SOP. This monitoring requirement should be conducted at least once during August each year to track the lateral extent of ponding downstream of the dam.	■ A survey of the downstream toe is required as part of the Monitoring SOP with the intent of being completed at the same time as the monthly monitoring surveys (May to November), however the frequency requirement in the SOP requires modification. The toe survey should be conducted at least once annually during snow-free conditions (typically August) each year to track the lateral displacement and the extent of ponding downstream of the dam. Additional dam toe surveys may be collected during monthly GPS survey events when the toe is mostly snow free. ■ Update the SOP and monitoring schedule to reflect the modified frequency. ■ *In 2021, a drone LiDAR survey was completed over the North Dam, South Dam and tailings beach. The LiDAR survey is valuable data for tracking the evolution of the TIA and provides an acceptable method for satisfying the downstream toe survey requirement.*
Visual Inspection (Walkover)	■ Complete weekly walkover surveys at the South Dam in accordance with the Monitoring SOPs. This is an important surveillance activity as defined in the OMS Manual and needs to be complied with.	■ Increase the completion of weekly visual inspections at the South Dam in accordance with the required weekly frequency.
Monitoring of Flowing and Ponded Water at the Toe of the South Dam	■ No recommendations.	■ No recommendations ■ *Signs of increased ponding water were observed in 2020 at the downstream toe of the South Dam. The ponded volume was notably less during the 2021 AGI inspection. Downstream of the Phase 1 South Dam, permafrost, including frost wedge polygons existed prior to construction which is indicative of the area being historically wet or ponded.* ■ *Drone images taken just after freshet and just before winter freeze up should be collected to assist with ongoing monitoring of the ponded water at the downstream portion of the South Dam toe.*
Annual Physical Inspection of the South Dam	■ Methods to limit tailings dispersion downstream of the dam should be considered in 2021. As the sub-aerial tailings beach grows, this is expected to become a more critical item. ■ The initial phases of some permafrost degradation and increased ponding water have been observed at the downstream toe of the South Dam. This downstream area is near the area where snow access roads were constructed as part of the	■ There are two zones on the 2H:1V downstream slope of the South Dam, specifically where the downstream GTCs were brought up the downstream slope, that some minor sloughing and tension cracking of the dam shell ROQ has occurred. These areas should be closely monitored and additional fill (toe berm) along these portions of the slope could provide some mitigation in these areas (See later bullet).

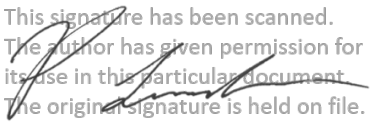
Inspection Item	2020 Recommendations (for reference)	2021 Recommendations
	Phase 1 South Dam construction (and is within the ultimate Phase 2 dam footprint). Remediation of this area should be considered prior to construction of the Phase 2 raise (Phase 2 raise not expected to be completed in 2021 at this time). This remediation would be expected to consist of the placement of 1.5m thickness of ROQ material directly over these areas (and against the current downstream dam fill / shell).	▪ Phase 1 South Dam construction disturbance, where snow access roads were constructed appears to have initiated some permafrost degradation (thaw depressions and ponding) and should continue to be closely monitored. ▪ *All ponding, tension cracking, sloughing and permafrost disturbance is within the Phase 2 South Dam footprint. Delayed construction of the Phase 2 raise may lead to further degradation of the permafrost in these areas. To proactively mitigate the risk of foundation thaw prior to construction of the South Dam Phase 2 raise, a thermal toe berm should be implemented. The toe berm would include at least 1.5 m of ROQ fill placed over this area (about 5 m in width). The toe berm fill would be integrated into the Phase 2 dam shell volume. Initial volumetric modeling of a 2 m thick, top crest width 5m with 2H:1V side slopes indicates that neat-line volumes for this additional fill material would be in the range of 4,000 m^3.* ▪ *Agnico Eagle has already sourced dust suppression agents for the TIA and should determine when the dust suppression measures should be implemented based on monitoring observations and the planned restart of production and tailings deposition.*
▪ TIA-Wide Monitoring		
Tailings Deposition System	▪ Saline mine water may only be discharged through the tailings pipeline from, or within, 300 m of the South Dam provided the freezing point depression is less than 0.5°C (less than 4,500 mg/L Cl maximum equivalent). While not current practice, this operational recommendation remains in place. ▪ The tailings discharge system must be operated in accordance with the designated tailings discharge plan. Primary spigot moves should be expected during, or shortly after, spring melt and again prior to winter freeze up. In the summer of 2021, it is expected that at least one additional spigot location will be required to be installed (north of the current spigot H location). ▪ No TIA bathymetric survey was conducted in 2020, as approved by the EOR. For 2020 deposition planning, conservative volume assumptions were used as part of the 2020 AGI tailings deposition plan (i.e. assuming larger deposited volumes or less available space). A bathymetry survey of the TIA reclaim pond should be completed in 2021 to allow for better determination of the tailings volume and available storage volume in the TIA. ▪ Plans should start to be made in 2021 for the Phase 2 raise of the South Dam; The raise is expected to be required once the tailings beach reaches against the existing dam reaches the full supply level for tailings (36.5 masl or approximately 2.64Mt of total tailings tonnage). The required timing is dependent on milling rates,	▪ The tailings discharge system must be operated in accordance with the tailings deposition plan (SRK 2021). Primary spigot moves should be expected during, or shortly after, spring melt and again prior to winter freeze up. The next winter discharge should be located at the northeastern extent of the subaerial beach (north of the current spigot H location) to limit ice entrainment due to winter sub-aerial deposition. Following spring melt, deposition from the South Dam (Spigot A, B and C) should resume. In the subsequent fall/winter, a move to the new northeastern extent of the subaerial beach should be anticipated. ▪ A bathymetric survey was conducted in 2021. With this newly available data, Agnico Eagle should work with SRK to complete tailings volume reconciliation and updated deposition planning prior to resuming production. ▪ Plans for the Phase 2 raise of the South Dam should be made in parallel with updates to the mine plan to ensure construction can occur in the appropriate season (winter); The raise is required to be in place once the tailings beach against the existing dam reaches the full supply level for tailings (36.5 masl or approximately 2.64Mt of total tailings tonnage). The required timing is dependent on the resumption of production and future milling rates. ▪ *Production activities and tailings discharge have been suspended in 2022. No immediate recommendations during periods when tailings discharge is not active.*

Inspection Item	2020 Recommendations (for reference)	2021 Recommendations
	but construction is expected in winter 2022 or 2023.	
Emergency Dump Catch Basins	▪ The Western Emergency Dump Catch Basin still requires repairs. These repairs should still be planned to be carried out.	▪ The Western Emergency Dump Catch Basin still requires repairs and should be closely monitored. Additional liner slippage since 2020 was noted at the top of the liner crest. This pond still maintains the minimum required capacity but further liner slippage may result in a reduction of the capacity of this emergency catch basin.
Pipelines (Reclaim, Tailings Deposition and TIA Discharge)	▪ TMAC must carefully inspect all pipelines placed directly on the tundra for signs of vegetation dieback and associated flow path channeling. Where this is occurring, the pipeline must be relocated to follow existing all-weather road shoulders, and appropriate remediation needs to be put in place where damage has occurred. ▪ The permafrost thermal erosion feature that has developed along the northern shore of the TIA was backfilled by TMAC in 2019. This area should continue to be monitored to ensure that additional thermal erosion does not result in this area. ▪ Monitoring should continue at the repaired TIA Reclaim Jetty Pad (710 Pumphouse pad) following the recommended survey frequency of twice monthly from May to November.	▪ Agnico Eagle should carefully inspect all pipelines placed directly on the tundra for signs of vegetation dieback and associated flow path channeling. Where this is occurring, the pipeline must be relocated to follow existing all-weather road shoulders, and appropriate remediation needs to be put in place where damage has occurred. ▪ The smaller diameter TIA pipelines going from the North Dam to Doris Creek, that were used during the care and maintenance period and before tailings were placed in the TIA around 2017, are no longer connected or functional. Agnico Eagle should consider removing these nonfunctional pipelines from the tundra.
TIA Reclaim Pond Jetty (710 Pumphouse) Pad	▪ Settlement monitoring at the Reclaim Jetty should continue in 2021 (twice monthly, May to November). ▪ Major Jetty repairs were completed in 2020. There is still one area off the most WSW end of the reclaim jetty fill (i.e. by the area where the pipelines extend from the seacans into the TIA) that are still over steepened and should be carefully monitored. ▪ Additional (relatively minor) fills are recommended on the west side of the pad where the full fill extents, of the proposed reclaim jetty repairs, were not fully met. ▪ Once all repairs are complete, ensure the recommended survey monitoring points are reestablished.	▪ Continue settlement monitoring at the TIA Reclaim Jetty (710 Pumphouse) following the recommended survey frequency of twice monthly, May through November. ▪ Once the survey monitoring of the Reclaim Jetty resumes, and the surface is snow-free, conduct an audit of the existing survey monitoring points and establish survey monitoring points where proposed locations are missing or damaged. ▪ Agnico Eagle should develop a plan to raise the Reclaim Jetty pad from its current minimum elevation of roughly 32.1 masl to above the Full Supply Level of the TIA (33.7 masl would raise the pad 0.2 meters above the TIA FSL), or some interim raise which the water level can be maintained with adequate freeboard below the pad. ▪ Once any significant construction or remediation is complete, ensure the recommended TIA Reclaim Jetty survey monitoring points are reestablished. ▪ *Agnico Eagle is in the process of reviewing options for modification of the TIA Reclaim Jetty to improve long term operation at this area.*
TIA Operational Water Balance and Level Targets	▪ It is of paramount importance that the RBDS be re-commissioned by May 2021 to manage water levels in the Reclaim Pond. Further delay of this may result in reduced operations. ▪ *During maintenance of the Roberts Bay Discharge Line in the fall of 2020, portions of the submersed line became buoyant requiring the submersed line to be shortened. The end of the Roberts Bay*	▪ Water level targets must be adhered to whenever practical. Short-term or risk-based exceedances may be acceptable. ▪ Currently the main area of immediate impact from raised water levels is the TIA Reclaim Jetty. See recommendations in the section above. ▪ The RBDS resumed in June 2021 and has since been stopped as of December 1, 2021 due to changes in the

Inspection Item	2020 Recommendations (for reference)	2021 Recommendations
	Discharge line is now at around 20m depth in Roberts Bay compared to the previous 40 meters depth. In Q1 2021, TMAC made a submission to the Nunavut Impact Review Board indicating why the revised discharge location does not pose a significant modification to the Hope Bay Mine or the previously assessed environmental effects. It is expected that this discharge line will be able to be used again before freshet 2021. ■ If delays in approvals to use the Roberts Bay Discharge system are expected past the end of May 2021 then the EOR should be informed so additional plans can be made with site staff. Water levels in the TIA will continue to be carefully monitored (specifically during the periods where there is no discharge from the TIA to Roberts Bay). ■ Continue discharge 2021 to reduce the water levels in the pond to within the target elevation range. ■ Continue to monitor the South Dam beach length to maintain at least 100 meters separation between the Dam and the Reclaim Pond or any large pond.	discharge water quality requirements (specifically changes in the toxicity testing requirements). From a TIA water management perspective, it is important that the RBDS be re-commissioned or alternative water management strategies be developed as the water level approaches the FSL of the TIA (33.5 masl). ■ Agnico Eagle and SRK are actively in the process of reviewing options for future water management in the TIA. Changes to the water balance and level targets will be reported on in future reports.
TIA Water Quality	■ No recommendations. ■ If water quality or water treatment capacity is expected to impact the ability to maintain the Reclaim Pond within the operational range, the EOR must be notified.	■ No recommendations. ■ *Agnico Eagle and SRK are in the process of reviewing options for future water management in the TIA. Changes to the water quality requirements will be reported on in future reporting.*
Climate Data	■ No recommendations.	■ No recommendations.

Closure

This report, 2021 Annual Geotechnical Inspection – Doris Tailings Impoundment Area, was prepared by



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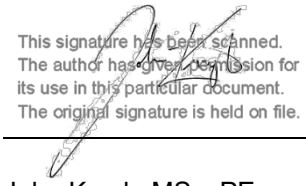

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All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

References

Canadian Dam Association (CDA), 1999. Dam Safety Guidelines. Canadian Dam Association. www.cda.ca.

Canadian Dam Association, 2013. Dam Safety Guidelines 2007 (Revised 2013). Canadian Dam Association. Revised October 2013. www.cda.ca.

Canadian Dam Association, 2014. Technical Bulletin: Application of Dam Safety Guidelines to Mining Dams. 2014 www.cda.ca.

Canadian Dam Association, 2016. Technical Bulletin: Dam Safety Reviews. 2016. www.cda.ca.

Canadian Dam Association, 2019. Technical Bulletin: Application of Dam Safety Guidelines to Mining Dams. Updated 2019. www.cda.ca.

ERM Group Inc. 2017. Hope Bay Project: TIA-2 Station Description. Memorandum prepared for TMAC Resources Inc. October 2017.

SRK Consulting (Canada) Inc. 2002a. Hope Bay Project Preliminary Assessment Doris North Trial Operation, Nunavut, Canada. Report Prepared for Hope Bay Joint Venture. Project No. 2CH005.02. February 2002.

SRK Consulting (Canada) Inc. 2002b. Hope Bay Doris North Project, Tail Lake Dam Site Geotechnical Investigation and Conceptual Design Report, Nunavut, Canada. Report Prepared for Miramar Hope Bay Limited. Project No.: 2CH005.03. December 2002.

SRK Consulting (Canada) Inc. 2003. Hope Bay Doris North Project – Tailings Impoundment Preliminary Design, Nunavut, Canada. Report Submitted to Hope Bay Limited. Project No. 1CM014.01. October 2003.

SRK Consulting (Canada) Inc. 2005a. Preliminary Surface Infrastructure Design, Doris North Project, Hope Bay, Nunavut, Canada. Report Submitted to Miramar Hope Bay Limited. Project No. 1CM014.06. October 2005.

SRK Consulting (Canada) Inc. 2005b. Hope Bay Doris North Project – Summer 2004 Geotechnical Field Investigation at Tail Lake, Nunavut, Canada. Report Submitted to Miramar Hope Bay Limited. Project No. 1CM014.04. 2005.

SRK Consulting (Canada) Inc. 2005c. Hope Bay Doris North Project – Winter 2005 Geotechnical Field Investigation at Tail Lake, Nunavut, Canada. Report Submitted to Miramar Hope Bay Limited. Project No. 1CM014.04. 2005.

SRK Consulting (Canada) Inc. 2007. Design of Tailings Containment Area, Doris North Project, Hope Bay, Nunavut, Canada. Report Prepared for Miramar Hope Bay Ltd. Project No. 1CM014.008. March 2007.

SRK Consulting (Canada) Inc. 2012a. 2011 Annual Geotechnical Inspection, Doris North Project, Hope Bay, Nunavut. Report Prepared for Hope Bay Mining Limited. Project No. 1CH004.046. March 2012.

SRK Consulting (Canada) Inc. 2012b. Hope Bay Project, North Dam As-Built Report. Report Prepared for Hope Bay Mining Ltd. Project No. 1CH008.058. October 2012.

SRK Consulting (Canada) Inc. 2012c. Doris North Project Interim Water Management Plan, Revision 5. Report Prepared for Hope Bay Mining Ltd. HBML Document Number: HB-WM-OPS-MP-001. Project No. 1CH008.069. December 2012.

SRK Consulting (Canada) Inc. 2013a. 2012 Annual Geotechnical Inspection, Doris North Project, Hope Bay, Nunavut. Report Prepared for Hope Bay Mining Limited. Project No. 1CH004.066. March 2013.

SRK Consulting (Canada) Inc. 2013b. Hope Bay Project, North Dam Monitoring: Standard Operating Procedures – Revision 1. Report Prepared for TMAC Resources Inc. Project No. 1CT022.000. September 2013.

SRK Consulting (Canada) Inc., 2014a. 2013 Annual Geotechnical Inspection, Doris North Project, Hope Bay, Nunavut. Report Prepared for TMAC Resources Inc. Project No. 1CT022.000. March 2014.

SRK Consulting (Canada) Inc., 2014b. 2014 Annual Geotechnical Inspection, Tailings Impoundment Area, Doris North Area, Doris North Project, Hope Bay, Nunavut. Report Prepared for TMAC Resources Inc. Project No. 1CT022.001. December 2014.

SRK Consulting (Canada) Inc., 2015. Doris North Project Tailings Management System Design. Report Prepared for TMAC Resources Inc. Project No. 1CT022.002.200.560. May 2015.

SRK Consulting (Canada) Inc., 2016a. 2015 Annual Geotechnical Inspection Tailings Impoundment Area Doris North Project, Hope Bay, Nunavut Final Report. Report Prepared for TMAC Resources Inc. Project No. 1CT022.006. April 2016.

SRK Consulting (Canada) Inc., 2016b. Doris Tailings Management System Phase 2 Design, Hope Bay Project. Report Prepared for TMAC Resources Inc. Project No. 1CT022.004. December 2016.

SRK Consulting (Canada) Inc., 2017a. 2016 Annual Geotechnical Inspection Tailings Impoundment Area Doris Project, Hope Bay, Nunavut Final Report. Report Prepared for TMAC Resources Inc. Project No. 1CT022.009. March 2017.

SRK Consulting (Canada) Inc., 2017b. Madrid-Boston Project Water and Load Balance, Hope Bay Project. Report Prepared for TMAC Resources Inc. Project No. 1CT022.013. November 2017

SRK Consulting (Canada) Inc., 2017c. Hope Bay Project: Doris Tailings Impoundment Area North Dam Creep Deformation Analysis. Memorandum Prepared for TMAC Resources Inc. Project No. 1CT022.013. November 2017

SRK Consulting (Canada) Inc., 2017d. Hope Bay Project: Phase 2 Doris Tailings Impoundment Area Tailings Deposition Plan. Memorandum Prepared for TMAC Resources Inc. Project No. 1CT022.013. November 2017

SRK Consulting (Canada) Inc., 2017e. Doris Tailings Management System Phase 2 Design, Hope Bay Project. Report Prepared for TMAC Resources Inc. Project No. 1CT022.013. November 2017.

SRK Consulting (Canada) Inc., 2018a. 2017 Annual Geotechnical Inspection Tailings Impoundment Area Doris Project, Hope Bay, Nunavut Final Report. Report Prepared for TMAC Resources Inc. Project No. 1CT022.016. March 2018.

SRK Consulting (Canada) Inc., 2018b. Hope Bay Project, North Dam Monitoring: Standard Operating Procedures – Revision 2. Report Prepared for TMAC Resources Inc. Project No. 1CT022.016. May 2018.

SRK Consulting (Canada) Inc., 2018c. Hope Bay Project, Phase 1 South Dam As-Built Report DRAFT. Report Prepared for TMAC Resources Inc. Project No. 1CT022.031. December 2018.

SRK Consulting (Canada) Inc., 2019a. 2018 Annual Geotechnical Inspection Tailings Impoundment Area Doris Project, Hope Bay, Nunavut. Report Prepared for TMAC Resources Inc. Project No. 1CT022.028. March 2019.

SRK Consulting (Canada) Inc., 2019b. Source of Elevated Total Suspended Solids in the Doris Tailings Impoundment Area – Rev 1. Memorandum Prepared for TMAC Resources Inc. Project No. 1CT022.026. January 2019.

SRK Consulting (Canada) Inc., 2019c. Hope Bay – Doris TIA 2020 Water Level Targets. Memorandum Prepared for TMAC Resources Inc. Project No. 1CT022.045. August 2019.

SRK Consulting (Canada) Inc., 2020a. 2019 Annual Geotechnical Inspection, Tailings Impoundment Area, Hope Bay Project, Hope Bay, Nunavut. Report Prepared for TMAC Resources Inc. Project No. 1CT022.038. July 2020.

SRK Consulting (Canada) Inc., 2020b. Hope Bay Project, North Dam Monitoring: Standard Operating Procedures – Revision 3. SOP prepared for TMAC Resources Inc. Project No. 1CT022.064. August 2020.

SRK Consulting (Canada) Inc., 2020c. Hope Bay Project, South Dam Monitoring: Standard Operating Procedures – Revision 1. SOP prepared for TMAC Resources Inc. Project No. 1CT022.064. August 2020.

SRK Consulting (Canada) Inc., 2021a. Doris Mine – Annual Water and Load Balance Assessment – 2020 Calendar Year. Memorandum Prepared for Agnico Eagle Mines Ltd. Project No. 1CT022.066. March 2021.

SRK Consulting (Canada) Inc., 2021b. 2020 Annual Geotechnical Inspection, Doris Tailings Impoundment Area, Hope Bay Mine. Nunavut, Canada. Report prepared for Agnico Eagle Mines Ltd. Project No. 1CT022.057. April 2021.

TMAC Resources Inc., 2016. Hope Bay Project Doris Tailings Impoundment Area Operations, Maintenance, and Surveillance Manual Hope Bay, Nunavut. June 2016.

TMAC Resources Inc., 2017. Hope Bay Project Doris and Madrid Water Management Plan, Hope Bay, Nunavut. December 2017.