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September 15, 2020

Derek Donald
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Nunavut Water Board
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Sent via Email: licensing@nwb-oen.ca; derek.donald@nwb-oen.ca

Re: KIA Comments on 2019 Annual Geotechnical Inspection Report for the Tailings Impoundment Area Hope Bay Project, Nunavut

Dear Mr. Donald,

On September 15, 2020, TMAC Resources Inc. (TMAC) received from the Nunavut Water Boar (NWB) comments on behalf of the Kitikmeot Inuit Association (KIA) regarding the results of the Hope Bay Project 2019 Annual Geotechnical Inspection of the Doris Tailings Impoundment Area conducted by SRK Consulting (Canada) Inc.

Please be advised on September 4, 2020 TMAC formally responded to the KIA, regarding comments KIA-NIRB-37 through KIA NIRB-42, via the Nunavut Impact Review Board 2019 Hope Bay Annual Report review process.

As noted by the KIA in their submission, as these are excerpts of the same comments, TMAC has reproduced the September 4, 2020 responses to KIA-NIRB-37 through KIA NIRB-42 in Attachment 1 of this the letter for the NWB's information.

Should you have any further questions please feel free to contact me at oliver.curran@tmacresources.com.

Sincerely,

Oliver Curran
Vice President, Environmental Affairs, TMAC

Cc:

Licencing (NWB)
John Roesch (KIA)
Kyle Conway (TMAC)
Sarah Warnock (TMAC)
Adam Grzegorczyk (TMAC)

Attachments:

Attachment 1 – Reproduction of TMAC Responses to KIA-NIRB-37 through KIA NIRB-42 (TMAC, submitted September 4, 2020)

Attachment 1

Reproduction of TMAC Responses to KIA-NIRB-37 through KIA NIRB-42 (TMAC, submitted September 4, 2020)

- ## KIA-NIRB-37

  - ### SUBJECT

Ice entrainment in tailings.

  - ### REFERENCES

2019 Annual Geotechnical Inspection TIA – Section 2.4.6.

  - ### SUMMARY

Further information regarding monitoring for ice entrainment.

  - ### DETAILED REVIEW COMMENT

The report notes storage capacity assessments for the TIA include an allowance for 25% ice entrainment. The report also notes that there is no evidence to suggest that there is any significant entrained ice within the deposited tailings. No information is provided on methods used to assess ice entrainment.

  - ### RECOMMENDATION/REQUEST

Provide information on how ice entrainment within the TIA will be monitored going forward.

  - ### TMAC RESPONSE TO KIA-NIRB-37

The tailings deposition plan includes a conservative estimate for 25% for ice entrainment. Evidence for ice entrainment may include a hummocky tailings surface resulting from differential thaw-settlement or a notable loss in containment volume, as would be apparent in the bathymetric surveys of the TIA. These conditions have not been observed to date, at the TIA. The tailings deposition plans for the TIA are also reviewed annually, and ongoing modification made to the tailings spigot locations are made to: best optimize tailings deposition, to allow for the tailings beach to freeze back in the winter, and to limiting ice entrainment (done in part through limiting or employing strategic spigot moves in the winter months) . Annual estimates of tailings volume in the TIA are also compared with mill output and storage capacity curves as secondary checks. Satellite imagery / remote sensing (with Sentinel-2 data) is also checked monthly to help track tailings deposition development and ice formation and melt on the TIA. The current checks on ice entrainment are therefore primarily indirect. As the tailings facility capacity decreases, in later years, methods to directly evaluate ice entrainment within the tailings (such as drilling or CPTs) will be further examined.

- ## KIA-NIRB-38

  - ### SUBJECT

North Dam Thermosyphon - North 2.

  - ### REFERENCES

2019 Annual Geotechnical Inspection TIA – Section 4.2.2.

  - ### SUMMARY

Further information regarding modelling impacts of non-functioning thermosyphon.

  - ### DETAILED REVIEW COMMENT

The report notes thermosyphon North 2 has not functioned appropriately since 2012. The report further notes that, following an inspection and potential mitigation actions undertaken by Arctic Foundations of Canada Inc. in 2019, TMAC has exhausted the practical repair options for the thermosyphon. It is also stated that additional thermal modelling of the North Dam was previously undertaken considering the non-functioning North 2 thermosyphon which shows the North Dam performance will not be adversely impacted, but that design redundancy is slightly reduced. This modelling is not included in the report nor is a reference provided.

  - ### RECOMMENDATION/REQUEST

Provide the results of the additional thermal modelling or if it was included in previous project documentation, provide the reference in which the results were included.

  - ### TMAC RESPONSE TO KIA-NIRB-38

SRK modeled the North Dam with *five* working thermosyphons to meet conservative conditions along the north panel of thermosyphons. The analysis was done with the most thermally critical / sensitive sections and applies the five thermosyphons (i.e., with one of the thermosyphons removed) to be thermally conservative. Based on this modelling, TMAC's Engineer of Record (EOR) remains confident that the North Dam is performing within its design criteria.

- ## KIA-NIRB-39

  - ### SUBJECT

South Dam Ground Temperature Monitoring.

  - ### REFERENCES

2019 Annual Geotechnical Inspection TIA – Section 4.3, Appendix L – South Dam Thermal Performance Review.

  - ### SUMMARY

Plan for replacement of inactive ground temperature monitoring cables.

  - ### DETAILED REVIEW COMMENT

The report notes several ground temperature monitoring cables installed within and beneath the South Dam to monitor thermal performance of the structure are inactive and some are considered irreparable. Given the performance of the structure relies on maintaining a frozen foundation, thermal monitoring of the structure is essential. The report recommends replacement of some temperature cables, but not all due to the practical limitations of placement within the dam post-construction.

  - ### RECOMMENDATION/REQUEST

Provide a plan and schedule for which cables will be replaced and any other measures (monitoring, modelling or otherwise) being undertaken in consideration of the fact that some cables will not be able to be replaced.

  - ### TMAC RESPONSE TO KIA-NIRB-39

The South Dam ground temperatures were initially installed during construction of the South dam. This monitoring was installed with redundancy to ensure adequate monitoring of the thermal behaviour of the dam and foundation. Initial redundancy was built into this monitoring system as it is common during construction and ongoing operation to loose some of the ground temperate cable monitoring points (from wildlife, equipment or operational induced damage etc.). The need for replacement of non-functioning cables, completion of additional thermal modeling, or additional forms of geotechnical investigation would be completed for any conditions that are outside of the expected thermal or physical performance of the dam. The dam and foundation are currently observed to meet the expected thermal conditions and performance and therefore were not required in 2019. Ground temperature monitoring with telemetry data loggers (readings transmitted daily) and evaluation of the measurements is routinely

completed to identify changing conditions. The need for the installation of replacement or new ground temperate cables will be further evaluated as part of the 2020 Annual Geotechnical Inspection. The TIA engineer of record (SRK) will assist in proving a plan and rational for the installation of any replacement cables if / as required. If replacement cable installations are required, then this additional monitoring would be installed in 2021, or as directed by the engineer of record.

- ## KIA-NIRB-40

  - ### SUBJECT

South Dam Tailings Beach Monitoring.

  - ### REFERENCES

2019 Annual Geotechnical Inspection TIA, Appendix I – TIA Water Levels, Section 3.

  - ### SUMMARY

Monitoring of length of beach at South Dam in TIA.

  - ### DETAILED REVIEW COMMENT

The report notes the South Dam is designed to have a tailings beach with a minimum length of 100 m. While information is provided in the tailings deposition plan, monitoring data demonstrating the beach length with time showing compliance with the design criteria is not explicitly provided.

  - ### RECOMMENDATION/REQUEST

Provide a summary of beach length with time for 2019 demonstrating compliance with the minimum beach length criteria.

  - ### TMAC RESPONSE TO KIA-NIRB-40

A snapshot of the tailings deposition history is illustrated in Figure 10 of the 2019 TIA AGI Report. This includes a satellite photo of the tailings beach in August 2019 and the tailings survey completed in December 2019. Photos of the tailings deposition are also shown in Photologs 6 and 7. At the time of the 2019 AGI, tailings discharge from the South Dam was underway and beach development had pushed supernatant water greater than the specified 100m offset from the upstream dam crest. The tailings survey demonstrates compliance with the minimum beach length criteria.

- ## KIA-NIRB-41

  - ### SUBJECT

Tailings Deposition Planning – Tailings density assessment.

  - ### REFERENCES

2019 Annual Geotechnical Inspection TIA, Appendix N – Tailings Deposition Update, Section 5.

  - ### SUMMARY

Assessment of placed tailings density.

  - ### DETAILED REVIEW COMMENT

The report notes tailings deposition modelling was completed for an overall density of 1.3 t/m3. The report goes on to note that the capacity of the TIA could be significantly impacted by tailings density and recommends that as-placed density be checked throughout to ensure the density assumption remains valid.

  - ### RECOMMENDATION/REQUEST

Provide methods that will be used to assess the as-placed density of the tailings and an assessment of what this value currently is, including calibration method for the results. If the in-situ density appears significantly different from the assumed value of 1.3 t/m3, then the deposition modelling should be updated.

  - ### TMAC RESPONSE TO KIA-NIRB-41

The 2020 deposition modelling update was completed for an overall density of 1.3t/m^3, based on testing completed by SRK (SRK, 2016). As per the 2019 TIA AGI, the capacity of the TIA could be impacted by tailings density and as-placed density will be checked throughout to ensure this assumption remains valid. As-placed density will be checked by comparing ground surveys and bathymetry to the mill throughput. See TMAC response to KIA-NIRB-37 for further discussion on confirming TIA volumes.

- ## KIA-NIRB-42

  - ### SUBJECT

Waste Rock Pile Pad T – Oversteepening of Slopes.

  - ### REFERENCES

2019 Annual Geotechnical Inspection for the Doris and Madrid Sites, Attachment 2.

  - ### SUMMARY

Over-steepened slopes of waste rock pile on Pad T.

  - ### DETAILED REVIEW COMMENT

Based on SRK's inspection of the waste rock pipe on Pad T, the pile was noted to be both over-steepened and to exceed its maximum design height. TMAC's response was that the waste rock pile has been re-worked to reduce the height and slope angles and will continue to work with SRK to achieve the design parameters and safety factors. No details on the observed height or slope angles were provided.

  - ### RECOMMENDATION/REQUEST

Provide the current (regraded) geometry of the waste rock pile and if not within the design criteria, an assessment of current safety factors and a plan to comply with the design criteria.

  - ### TMAC RESPONSE TO KIA-NIRB-42

The figures below provide the current (regraded) geometry of the waste rock pile (based on an August 2020 physical survey). As demonstrated in the figures, TMAC has conducted re-sloping of the waste rock pile since SRK's observations were noted in 2019. Checks completed have confirmed a Factor of Safety (FoS) above 1 and TMAC continues to work with SRK to ensure the long stability of the waste rock pile with a FoS in the1.4+m range. Its noted, for a short term safety measure additional catch / safety berms have been placed around the area (upstream of the portal face) where risks from rolling rocks or shallow slope sloughing exist.

Figure 4: Pad-T As-Built Waste Rock Pile

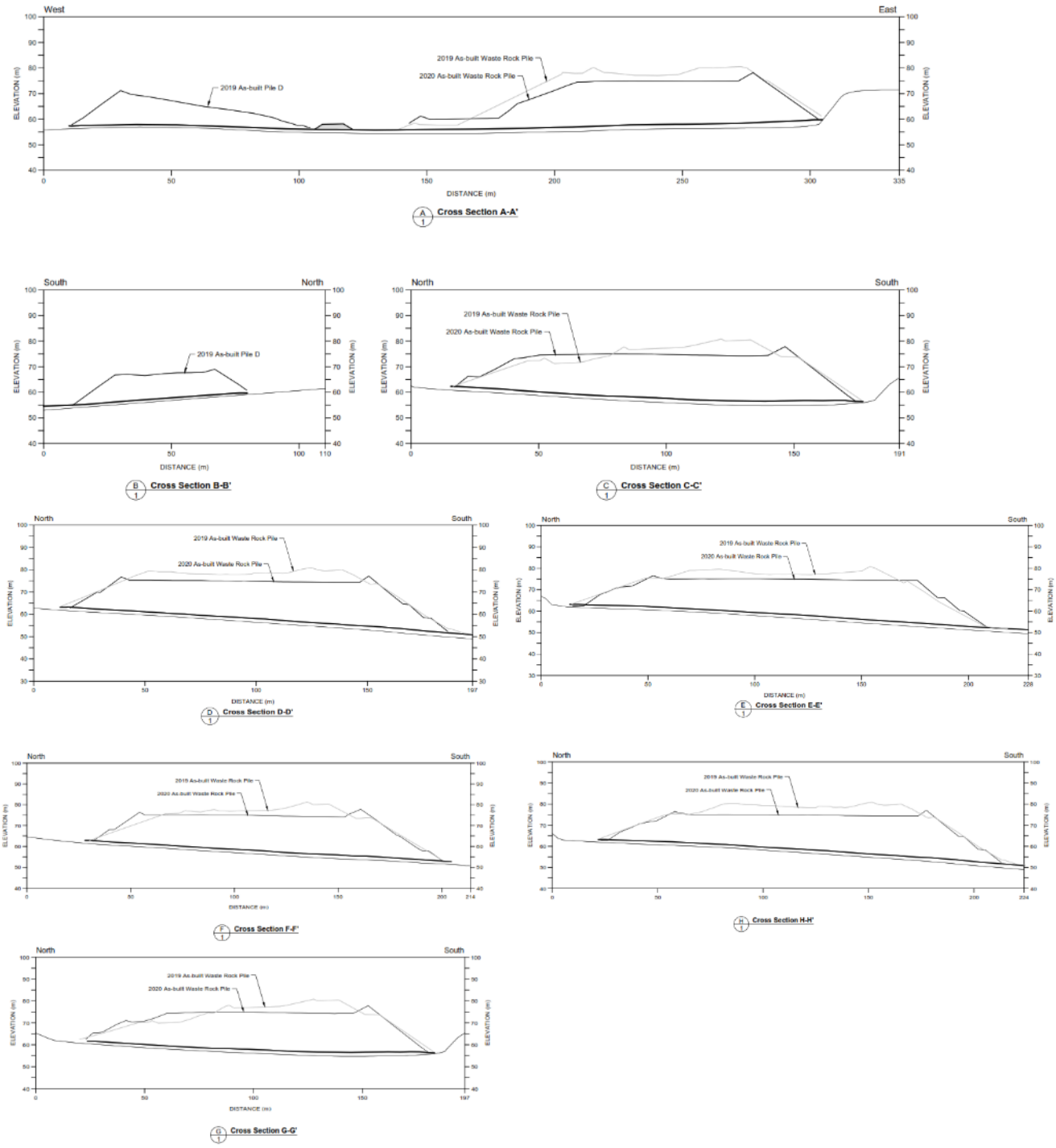

Figure 5: Pad-T As-Built Waste Rock Pile Cross Sections