

Memo

To:	John Roberts, PEng, Vice President Environment	Client:	TMAC Resources Inc.
From:	Maritz Rykaart, PhD, PEng	Project No:	1CT022.002
Cc:		Date:	December 1, 2015
Subject:	Response to IR: AANDC NIRB #23 – TIA Interim Dike – Underwater Slopes		

1 AANDC-NIRB #23: TIA Interim Dike – Underwater Slopes

1.1 Issue

Constructability of 3H:1V underwater slopes of the Interim Dike within the TIA and potential negative effects on stability and filtering capacity.

1.2 Reference

P6-13, drawing DN-TIA-06, P6-12, Section 4.6.2.

1.3 Concern

The upstream and downstream slopes of the Interim Dike are designed as 3H:1V slopes. Given that the dike will be constructed “in the wet”, it is not clear if it is feasible to construct 3H:1V with the material that will be used to construct it and the depth of water at this location. If due to water depth the dike cannot be constructed with these slopes, potential related effects on stability and more importantly the filtering capacity of the dike have not been described. AANDC requires the rationale for using the slopes as designed, along with how they will be constructed given the Project specific circumstances.

1.4 Information Request

Please provide a description of how the upstream and downstream slopes of the Interim Dike will be constructed to slopes of 3H:1V, and if desired to improve the stability, to the even flatter 5H:1V discussed in P6-12, Section 4.6.2.

1.5 Importance of Issue

This information is needed to confirm the current design parameters or to modify the design of the Interim Dike to ensure constructability and assist AANDC in the subsequent technical review of this component of the Project.

2 TMAC Response

The stability of the Interim Dike, as demonstrated in the stability analysis presented in Appendix E of the Tailings Management System document which is contained in Package 6, Document P6-13 of the Amendment Application Package has been used to establish that the required long term side slope of the dike should be 3H:1V.

The Interim Dike construction will be carried out without draining the TIA, requiring in-water construction through a water depth of 2 - 3 m. Construction will be done in stages, as opposed to the full height from the start, with the first lift construction to an elevation of about 1 m above the TIA water level. Which means the overall dike height during construction would be a maximum height of 3 - 4 m during this first stage, which is the only in-water construction stage. With a target side slope of 3H:1V, it will require a reach of between 9 and 12 m for an excavator when working from the crest of the dike. TMAC has a CAT 330 excavator on site, which has an operating reach of just under 12 m (11.7 m).

The proposed construction plan is as follows:

- The Interim Dike will be constructed from one side only, working from the east abutment towards the west.
- Quarry rock will be end dumped at least 5 m from the working crest of the Interim Dike after which it will be dozed over into the TIA at an angle of repose.
- The target crest width (based on the set elevation) for this first stage of in-water construction will be overbuilt by 2 m (1 m either side) to reduce the required reach distance required to establish the 3H:1V side slope (subsequent reach distance will be 8 – 11 m).
- Working from the crest, the excavator will cast material along the angle of repose side slopes to place material where the flattened side slope are required.
- Once sufficient material has been cast, the excavator will cut back the overall side slope to the required grade of 3H:1V. This includes cutting back the overbuilt crest.

Should it be determined that the overall slope of the Interim Dike should be flattened to say 5H:1V for stability reasons, as described in the P6-13, Appendix E, the same procedure will be followed; however, the crest will initially be overbuilt further to ensure that the excavator reach can be attained.

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