Information Request 13

Response to Information Request 13

IR 13 – Tailings Hydraulic Conductivity – Seepage Estimates

Reference:

EIS Guidelines, Section. 2.7.2.4.2
EIS, Section 2.7.2.4
EIS Appendix 2.6.1.4 D-A (Baseline Groundwater Hydrology Assessment)
EIS Appendix 2.7.2.4 A-B (Water Management Report)
EIS Appendix 2.7.2.4 A-C (Numerical Hydrogeologic Analysis)

Related Comments:

CEAR # 276 (BC Ministry of Mines, Energy and Natural Gas)
CEAR # 292 (Environment Canada)

Rationale:

The modeling described in Appendix B of 2.2.4-D relates to the PAG waste rock that would be disposed of within the TSF. In the EIS (p.1390) the Proponent states that: "The tailings discharged into the impoundment will, once the impoundment is well developed beyond the first few years of operation, serve to limit the rate of seepage through the foundation soils. This will be of particular benefit in any areas where the natural glacial till blanket is discontinuous and there is direct communication between the upper and lower aquifers."

Figure 8.1 of Appendix 2.2.4-D appears to demonstrate that roughly one-third of the footprint of the TSF would be composed of PAG waste rock, and this waste rock would have a much higher hydraulic conductivity than that estimated for tailings. There is no indication that the presence of PAG waste rock in a significant portion of the TSF has been taken into account in the seepage model. This could mean that the model has underestimated the amount of seepage that would be released from the TSF, and therefore underestimated the amount of seepage that could reach surface waters.

According to the BC Ministry of Mines, Energy and Natural Gas, flooded PAG waste rock stored in the tailings management facility presents a greater seepage risk than tailings due to the greater particle size and permeability of the waste rock. In addition, the permeability of the waste rock would not decrease over time due to compaction, as it would for tailings. Hence the presence of a low permeability till cover below the PAG waste rock was noted by the Ministry as being critical for limiting seepage from the TSF.

Information Requested:

In order to better understand seepage estimates and assess the Proponent's predictions of potential impacts on water quality, the Panel requests that Taseko:

a. Predict and describe the results for how seepage rates would change when the seepage model accounts for the significant amount of high permeability PAG waste rock in the TSF.

Information Request #13a

Predict and describe the results for how seepage rates would change when the seepage model accounts for the significant amount of high permeability PAG waste rock in the TSF.

Response Summary

The PAG waste rock within the TSF has been included within the seepage modelling that was conducted for the preliminary design of the TSF as well as the hydrogeological impact assessment. The estimates of seepage included within the EIS document, and that are inputs to the water quality modelling work, already account for the higher permeable nature of the PAG waste rock within the TSF.

Discussion

The presence of the higher permeability Potentially Acid Generating (PAG) waste rock has been considered in each of the seepage analyses presented in the Tailings Storage Facility Seepage Analysis Report (ref: VA101-266/27-3 Appendix B) and in the seepage analyses presented in the response to IR 12c. In each of the analyses, the PAG waste rock is modelled as a block of material with a hydraulic conductivity of 1×10^{-4} m/s located 500 m from the centerline of the TSF dam wall. The offset of 500 m represents the minimum design distance between the dam wall and the PAG waste rock pile.

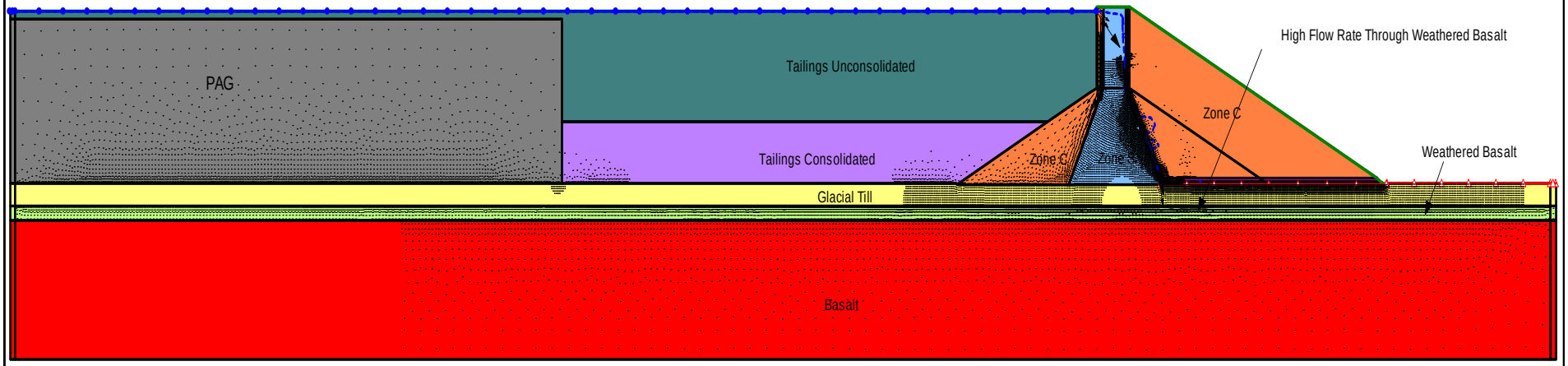
An example of the PAG waste rock in the seepage model is shown on Figure 13A-1(reproduced from EIS Appendix B of Appendix 2.2.4-D Report on the Preliminary Design of the Tailings Storage Facility, Ref: VA101-266/27-3 Appendix B).

It is noted that this methodology may not have been immediately clear in the analyses presented in the Tailings Storage Facility Seepage Analysis Report (ref: VA101-266/27-3 Appendix B) as the screenshots from the finite element seepage software SEEP/W were focused on the TSF embankment for clarity of units and flow paths, with the PAG waste rock unit are not shown in the view. This practice is illustrated on Figure 13A-2 (reproduced from EIS Appendix B of Appendix 2.2.4-D Report on the Preliminary Design of the Tailings Storage Facility, Ref: VA10-266/27-3 Appendix B) and detailed in Figure 13A-3.

In the 3D modelling the conductance of the cells was assigned based on the distribution and thickness of materials in the TSF (either PAG or tails or no conductance where the pond overlies basin materials), with the hydraulic conductivity values of Tails K = 1.0 x 10-8 m/s and PAG K = 1.0 x 10-4 m/s.

References

Taseko Mines Limited (2012). *New Prosperity Gold-Copper Mine Project Environmental Impact Statement*.



NOTES:

1. 15 M OF GLACIAL TILL LAYER UNDERLAYING THE EMBANKMENT AT THE MAXIMUM EMBANKMENT ELEVATION.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	29JUN'12	ISSUED WITH REPORT	DR	GIJ	KJB

TASEKO MINES LIMITED

NEW PROSPERITY GOLD-COPPER PROJECT

TSF EMBANKMENT SEEPAGE ANALYSIS
MAIN EMBANKMENT FINAL (El. 1595 m)

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P/A NO. VA101-266/27

REF. NO. 3

FIGURE 13A-1

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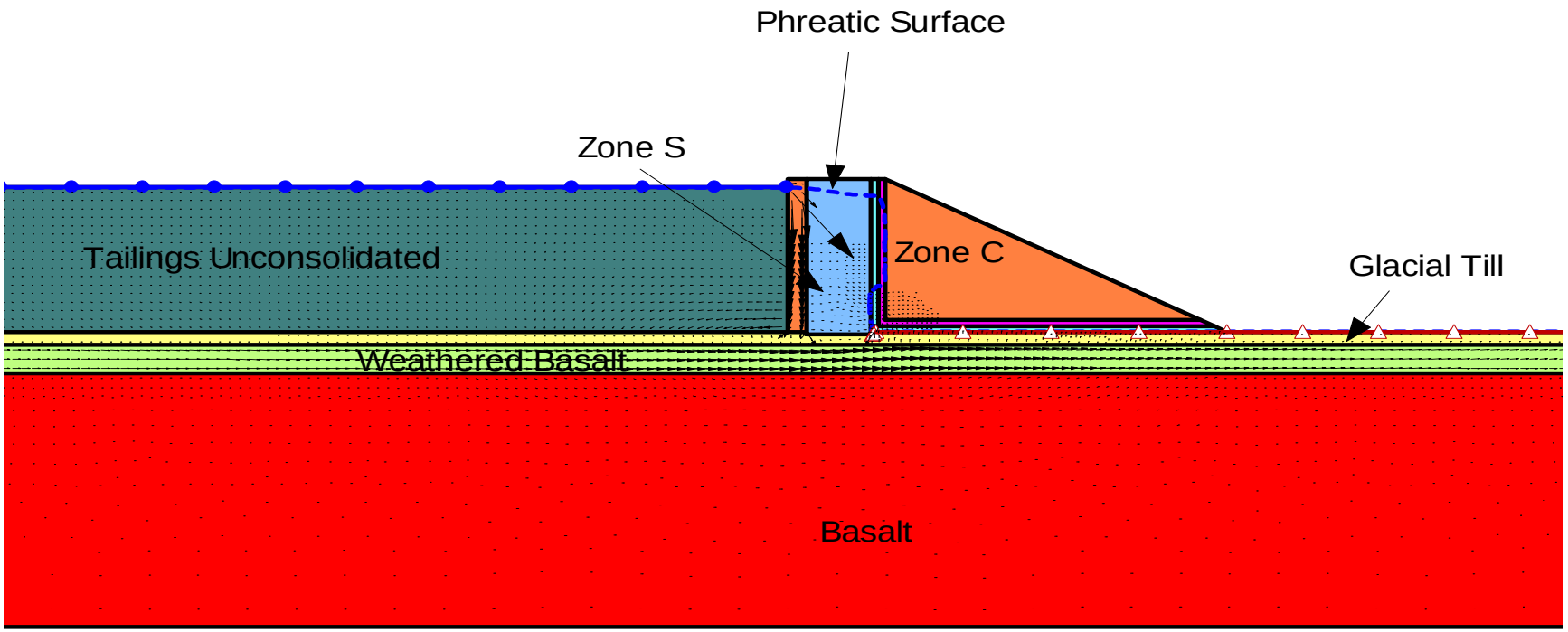

NOTES:
1. 5 M OF GLACIAL TILL LAYER UNDERLAYING THE EMBANKMENT AT THE INTERMEDIATE EMBANKMENT ELEVATION.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	29JUN'12	ISSUED WITH REPORT	DR	GIJ	KJB

TASEKO MINES LIMITED

NEW PROSPERITY GOLD-COPPER PROJECT

**TSF EMBANKMENT SEEPAGE ANALYSIS
MAIN EMBANKMENT INTERMEDIATE
ELEVATION (HEIGHT 55M) (El. 1595 m)**

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P/A NO. VA101-266/27

REF. NO. 3

FIGURE 13A-2

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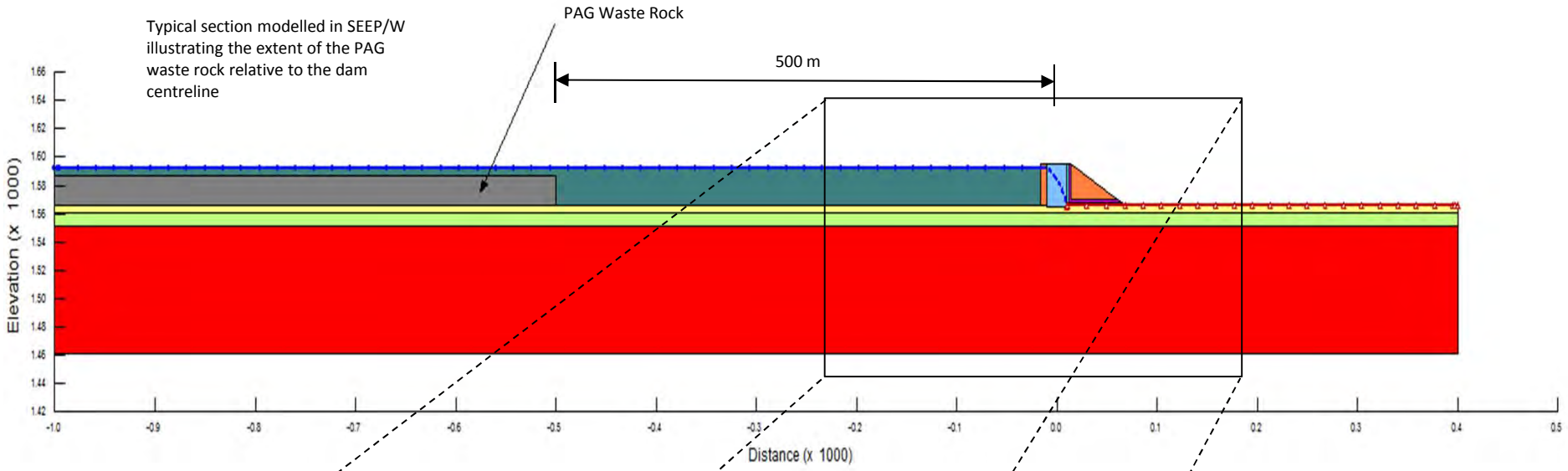
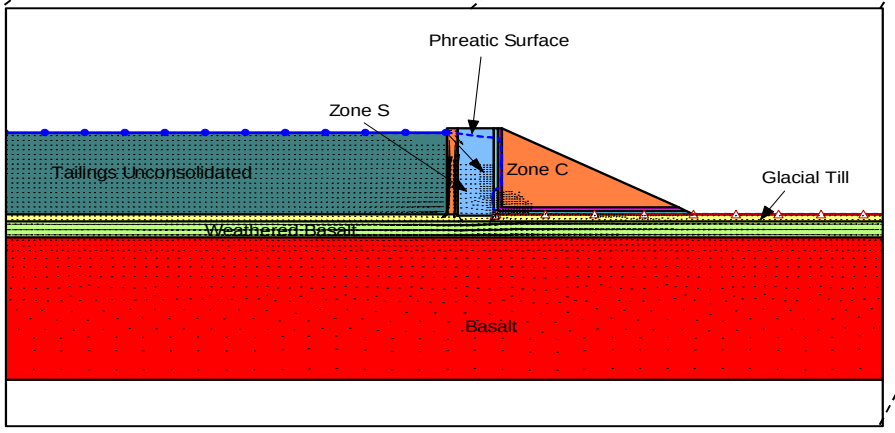
Typical section modelled in SEEP/W illustrating the extent of the PAG waste rock relative to the dam centreline



Typical Figure provided in the Tailings Seepage Analysis Report (ref: VA101-266/27-3 Appendix B).

Note that the presence of the PAG waste rock is not illustrated



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NEW PROSPERITY GOLD-COPPER PROJECT

TSF EMBANKMENT SEEPAGE ANALYSIS
TYPICAL MODEL EXTENTS

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REF. NO. VA13-00360

FIGURE 13A-3

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