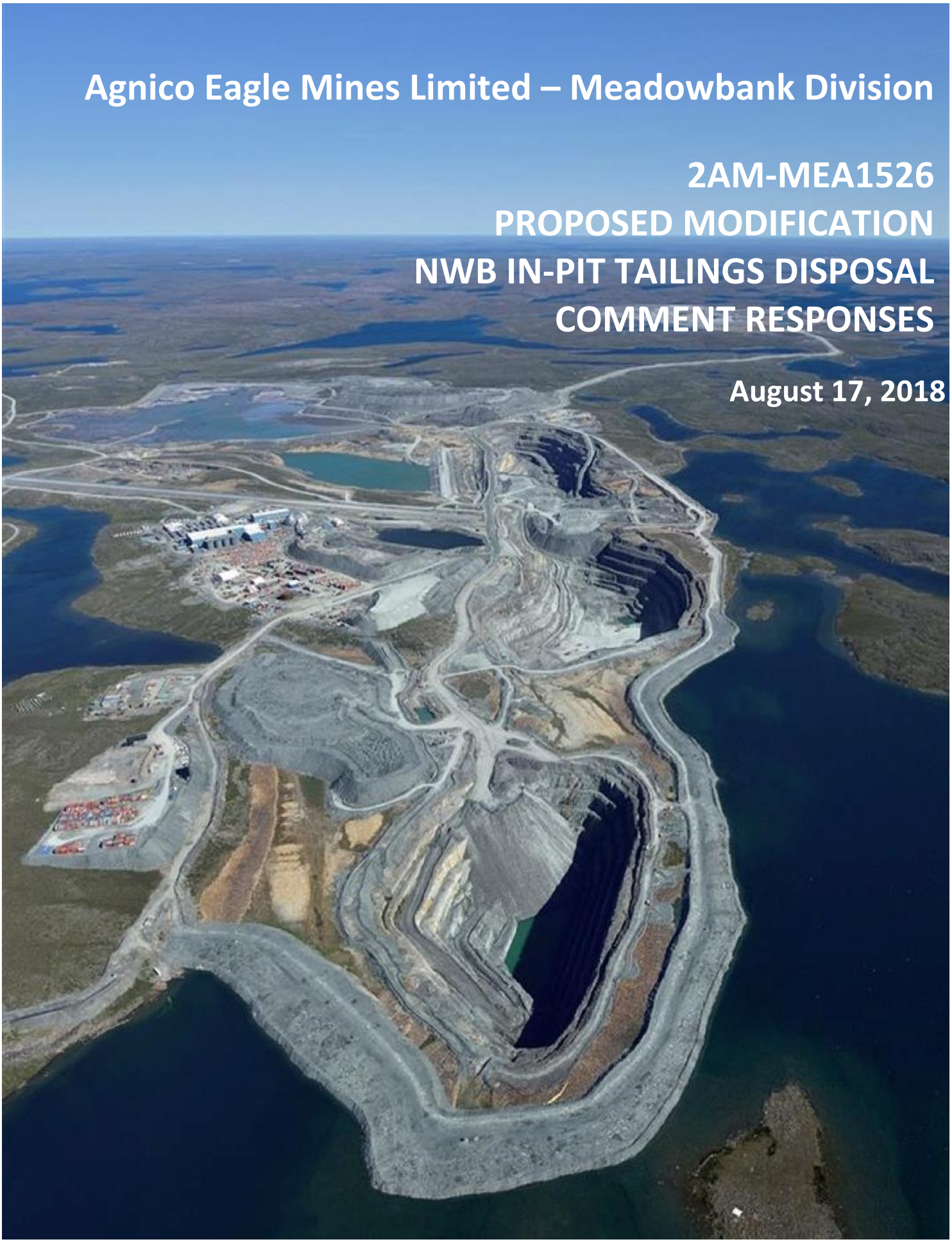
Agnico Eagle Mines Limited – Meadowbank Division

2AM-MEA1526
PROPOSED MODIFICATION
NWB IN-PIT TAILINGS DISPOSAL
COMMENT RESPONSES

August 17, 2018



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ENVIRONMENT AND CLIMATE CHANGE CANADA

Interested Party:	**Environment and Climate Change Canada (ECCC)**	**Rec No.:**	**ECCC#1**
Re:	**Treatment of Reclaim Water**		

Reference:

SNC Lavalin Technical Note "In-Pit Tailings Deposition Water Balance and Water Quality Forecast" dated Sept. 12, 2017

SNC Lavalin Memo "Technical Assessment of Potential Water Treatment Requirements following In-Pit Deposition" dated July 4, 2018

AEM "In-Pit Disposition Information Request Responses" dated July 11, 2018

AEM presentation to ECCC July 12, 2018

Final Written Submission / Recommendation Made By Interested Party

a) ECCC recommends that the external treatment processes be optimized and used to the maximum extent, such that treatment sludges can be disposed of outside the pits. If it is necessary to use in-pit treatment, the selected treatment process should be evaluated in the context of conditions in the pit, for long-term stability of the treatment residuals.

b) ECCC recommends that the commitments by AEM to conduct annual updates of predictive modeling, conduct pore water quality monitoring, and identify treatment plans prior to re-flooding be incorporated by the NWB as conditions for the water licence modification.

Agnico Eagle's Response to Final Submission / Recommendation

ECCC#1a Response

Agnico Eagle agrees to address the ECCC recommendation as follows. In the design of the water treatment system, the treatment system will consider the management of any residuals produced by the treatment outside of the pit. The detailed engineering design will evaluate the best approach to manage the residuals on site, considering its long-term stability.

ECCC#1b Response

Agnico Eagle agrees to address the ECCC recommendation as follow. In accordance with the 2AM-MEA1526 Meadowbank Gold Mine Project Type 'A' Water Licence, Agnico Eagle is committed to conduct annual updates of the water balance / water quality forecasting model based on the expected Life of Mine and actual operating site conditions. Agnico Eagle is also committed to continue its regular surface and groundwater monitoring at the site, as well as develop, design and implement a program to monitor the pore water quality in the tailings in consultation with ECCC, KIA and other relevant stakeholders. The water treatment system required at the

end of deposition will be developed prior to pit flooding. Water quality forecast will be updated during the operational window on an annual basis to continue updating the water quality forecast with monitoring data. Model result will be used to assess treatment options and duration of treatment. Final treatment plant design will be communicated in the final closure plan. Also, Agnico Eagle will use results of bench and pilot scale tests to develop water treatment plant design.

Interested Party:	**Environment and Climate Change Canada (ECCC)**	**Rec No.:**	**ECCC#2**
Re:	**Sulphate and Major Ions**		

Reference:

SNC Lavalin Technical Note "In-Pit Tailings Deposition Water Balance and Water Quality Forecast" dated Sept. 12, 2017

AEM "In-Pit Disposition Information Request Responses" dated July 11, 2018

AEM presentation to ECCC July 12, 2018

Final Written Submission / Recommendation Made By Interested Party

ECCC recommends that plans for management and treatment of high-sulphate and TDS water be developed, and include:

a) Feasibility of treatment from a technical and efficacy standpoint;
b) Information on management of treatment brines and residual waste;
c) The list of parameters with their associated treatment targets, including a treatment target for TDS; and
d) Updated predictions of water quality with the chosen treatment process.

Plans should be developed sufficiently in advance of the end of deposition to be implemented prior to re-flooding.

Agnico Eagle's Response to Final Submission / Recommendation

ECCC#2a to #2d Response

Agnico Eagle agrees to address the ECCC recommendation and specific items listed in the ECCC#2 recommendation as follow. In accordance with the 2AM-MEA1526 Meadowbank Gold Mine Project Type 'A' Water Licence, Agnico Eagle is committed to continue regular monitoring of the surface water quality at site and update on an annual basis the water management plan, which includes an update of the water balance, the water quality forecast and the water treatment requirements at closure (refer to NIRB final submission CIRNAC-01). Furthermore, Agnico Eagle will develop the Final Closure Plan which will include details on the final design of the water treatment plant and the detailed management strategy for pit lake treatment and brine and/or residual waste management of the treatment plant.

Interested Party:	Environment and Climate Change Canada (ECCC)	Rec No.:	ECCC#3
Re:	Mitigation: Capping of Tailings		

Reference:

AEM "In-Pit Disposition Information Request Responses" dated July 11, 2018

AEM presentation to ECCC July 12, 2018

Final Written Submission / Recommendation Made By Interested Party

a) ECCC recommends that tailings closure plans include an evaluation of the feasibility of introducing a rock cover above the tailings, and identify conditions where this may be warranted.
b) ECCC recommends that closure monitoring plans include pore water quality monitoring and contingencies for mitigation if exposure to pore water constituents would be undesirable for aquatic life.

Agnico Eagle's Response to Final Submission / Recommendation

IR ECCC#3a Response

Agnico Eagle agrees with the ECCC recommendation and will evaluate the feasibility for capping the tailings and identify conditions where this may be warranted in the final closure plan. As noted by ECCC in the ECCC#3 Final Written Submission: ''*AEM noted that placement of any materials would be done subaqueously via pipeline. For practical reasons placement of rock materials would be logistically very challenging. Rock materials would need to be coarse-ground and pumped/piped underwater. AEM is evaluating options for capping the tailings.*''

IR ECCC#3b Response

Agnico Eagle agrees with ECCC recommendation and will integrate these recommendations in the closure water quality and flow monitoring plan as part of the final closure plan.

FISHERIES AND OCEANS CANADA

Interested Party:	**Fisheries and Oceans Canada (DFO)**	**Rec No.:**	**DFO-1**
Re:	**Fish Habitat and Fisheries Offsetting**		

Reference:

Agnico Eagle Mines Limited – Meadowbank Division In-Pit Deposition Information Responses, p. 7-8 (ECCC#3a), p. 9-10 (ECCC #4), p. 13-16 (IR DFO 3.1, 3.2); PRI: 318722

Azimuth. 2010. Appendix F5 - Aquatic Effects Monitoring Program- Habitat Compensation Monitoring -2009, March 2010. Section 3.2.2 (p. 16-17) and Section 4 (p.31-32); PRI: 289333, Note: found under Meadowbank Gold Project (application no: 124588)

Appendix C- Meadowbank No Net Loss Plan (AEM 2012), Section 6, p. 61-69; PRI: 288916, Note: found under Meadowbank Gold Project (application no: 124588)

No Net Loss Habitat Report: Section 2.1 Species Habitat preferences (p. 2-1 to 2-11) Table 2.1 (p. 2-6); Section 2.2 Overview of Habitat Requirements of Lacustrine Fish in Project Lakes (p. 2-11 to 2-14); PRI: 281600, Note: found under Meadowbank Gold Project (application no: 124588)

Technical Memorandum Re: Updated NNL Calculations for Habitat Gains in Second and Third Portage Lakes Section 1.4, p.3; PRI: 315726

Technical Note: Environmental Impact Study Review – Meadowbank In Pit Tailings Deposition, Section 5.4, p.13-14; Table 7 Appendix 1; PRI: 315712

Final Environmental Impact Statement, Section 4.13.4.2, p. 70-71; PRI: 281512; Note: found under Meadowbank Gold Project (application no: 124588)

ECCC final written submission to NIRB, ECCC#3 Mitigation: Capping of Tailings Technical Memorandum Re: Updated NNL Calculations for Habitat Gains in Second and Third Portage Lakes.

Final Written Submission / Recommendation Made By Interested Party

Given the uncertainty related to fish use of flooded in-pit tailings areas with regards to suitability of the substrate, and potential delays in use of the tailings substrate:

1) DFO-FPP recommends the Proponent :
   a) Provide additional information to support the prediction that ‘Habitat 7’ will provide viable / suitable habitat once fish are reintroduced, similar to ‘Habitat 9, in the absence of a granular cap.

b) Provide details respecting how differences in physical features of the substrate (i.e. tailings vs. coarse granular cover / capping materials) impact habitat use; this is including but not limited to the interaction(s) fish and aquatic life may have with different substrates.

2) DFO-FPP recommends that the Proponent:

a) Continue to work with DFO-FPP to update the accounting of habitat gains and losses, and associated offsetting resulting from any additional serious harm from the proposed In-pit Tailings Disposal Modification proposal, or from modifications to the accounting in the existing No Net Loss Plans. Updated accounting should account for the uncertainty that remains regarding the functionality of new habitat structure (i.e. Habitat Type 7) and the time lags associated with use of the new habitat structure. DFO-FPP also notes that any modifications to the accounting within the existing NNLP requires additional consideration by DFO.

b) Provide updated rationale for how predicted impacts of in-pit storage deposition will "diminish over time" as per Table 7: Predicted Impacts to Fish and Fish Habitat (Closure and Post-Closure) in the Technical Note: Environmental Impact Study Review – Meadowbank In Pit Tailings Deposition. The rationale should include, but not be limited to, an assessment of the magnitude of impacts as they relate to life stages of fish and benthic organisms.

3) DFO-FPP recommends that the Proponent:

Provide updated contingency offsetting options to address the potential risk that water quality may not be suitable for the reintroduction or establishment of fish at closure.

Agnico Eagle's Response to Final Submission / Recommendation

DFO 1.1.a Response

As per DFO recommendations, Agnico Eagle will continue to work with DFO-FPP. For further clarification, following tailings deposition in Portage Pit and Goose Pit, Agnico Eagle categorized this habitat as Type 7 (fine substrate; > 4 m in depth) and will be suitable for supporting aquatic life. To expend on this, habitat in the Portage pit lake (which is a combination of pit area and former lake area) is predicted to provide viable habitat once fish are introduced into the area. More specifically in a case study on a historical subaqueous tailings disposal site in Mandy Lake Flin Flon, Manitoba (MEND Report 9.2b, 2006, sponsored by Environment Canada, SNC 2006) it was found that "Mandy Lake has diverse and abundant biota & metals do not appear to bio-accumulate in fish (page 15)" and that "water quality in the lake is good and there is diverse and abundant aquatic life. The lake has rehabilitated naturally and will probably continue to do so" (page i). Similarly, in Babine Lake (BC), Buttle Lake (BC), Summit Lake (BC), Fox Lake (Manitoba) and Garrow Lake (NWT), environmental monitoring of lakes found insignificant impacts on lake water and aquatic populations due to historical subaqueous tailings deposition in these lakes. Based on current water quality predictions, Agnico Eagle expects these areas will perform in a manner consistent with these studies and slightly improve fish occupancy as compared to deeper pits areas (as originally modelled in the Agnico Eagle (2012) offsetting plan).

DFO 1.1.b Response

Agnico Eagle refers DFO to Section 2.2.2 Habitat Suitability rankings which are based on general life history characteristics published for Arctic fishes (eg Evans et al. 2002, Richardson et al 2001, Stewart et al. 2007). Based on our current evaluation a granular cap upon the tailings is not required to prevent tailings re-

suspension (as wind wave induced shear at the tailings interface will be well below critical shear) and literature review suggests the following will occur as the tailings becomes incorporated into the benthic sediments without a cap (refer to Table 1.2.b in DFO 1.2.b Response for more details):

- The short, medium and longer term flux of metals and sulphate salinity from the tailings to the overlying water column will be negligible (as suggested by all studies presented that did not require a cap);
- The water quality above the tailings will eventually have low sulphate and metals concentrations (as suggested by studies at Mandy Lake, Benson Lake, Buttle Lake, Anderson Lake, Shallow Water Cover - Sherritt-Gordon Zn-Cu Mine and Mattabi mine, no cap was present in any of these studies);
- An organic layer will eventually be established over the tailings and induce a reductive environment that will aid to reduce metals flux from the tailings (as suggested by studies at Mandy Lake, Benson Lake, Buttle Lake, Anderson Lake, Shallow Water Cover - Sherritt-Gordon Zn-Cu Mine and Mattabi mine, no cap was present in any of these studies).

Under these assumptions, “the interaction(s) fish and aquatic life may have with different substrates” will depend on the types of substrates, the variation of natural and unnatural habitat in the lakes which are adequately captured in the HEP model presented in Agnico Eagle (2017) Appendix A by species. Additional details respecting how differences in physical features of substrate impact habitat use are captured in Agnico Eagle (2012) habitat mapping and Habitat Suitability Indices presented on page 14 -19 and Table 2-3 and Table 2-4 which provides a “summary of habitat preferences for the Meadowbank region species”; these HSI values were extensively reviewed by DFO in 2012 and later in 2017/2018 by DFO and Dr. Ken Minns.

DFO 1.2.a Response

Agnico Eagle will continue to work with DFO. For clarification, as an addendum to the original No Net Loss Plan (Agnico Eagle, 2012), Agnico Eagle believes the model and accounting used for the proposed In-pit Tailings Disposal Modification is appropriate for the purposes of calculating offsetting for this project. As stated in Agnico Eagle (2017) “no reduction in habitat gains will occur under the new proposed mine plan as compared to the NNLP (Agnico Eagle 2012) as authorized under NU – 030191.3.” This plan provides a 1.68:1 ratio to account for uncertainty, the functionality of Habitat Type 7 and associated time lags. In addition to contingency offsetting options listed in Section 6.0 of Agnico Eagle (2012), the project has a sufficient letter of credit as per authorization NU-030191.3.

DFO 1.2.b Response

Agnico Eagle refers DFO to Table 1.2.b which provides a summary of case studies to illustrate specific lines of evidence for diminishing contaminant levels / improving water quality and improvement to Benthic Environment and Fish Habitat.

TABLE 1.2.b – Case Studies to illustrate Specific Lines of Evidence for Diminishing Contaminant Levels / Improving Water Quality and Improvement to Benthic Environment and Fish Habitat

Site	Background Overview	Specific Lines of Evidence for Diminishing Contaminant Levels / Improving Water Quality	Specific Lines of Evidence for Improvement to Benthic Environment and Fish Habitat	Reference
Mandy Lake, near Flin Flon, Manitoba, Canada	From 1943-1944, 73,000 metric tonnes of high-sulphur base metal tailings discharged into lake. The lake is mesotrophic. Subject to two monitoring campaigns: 1975-1976 focused on characterization of tailings, water and vegetation; 1989-1990 focused on water quality, sediments composition and biota.	1975-1976 findings: despite tailings with an acid potential of 475 kg H_2SO_4 per 1000 tonne and limited neutralization potential (52 H_2SO_4 per 1000 tonne) water quality above tailings had relatively low metals and sulphate salinity concentrations (iron at 0.05 mg/L and highest metal was zinc at 0.20 mg/L). 1989-1990 findings: water quality has low metals levels and negligible flux from tailings	1975-1976 findings: with no rehabilitation work, aquatic animal and insect life had moved into the tailings area, vegetation had established a mat of organic matter that covered the entire surface of the tailings. 1989-1990 findings: diverse and abundant biota, metals found not to bioaccumulate in fish, although sediment metal levels elevated organic layer appears to reduce oxygen levels, pond weed shows uptake of metals.	Case Study Assessment – Subaqueous Tailings Disposal. MEND Report 9.2b. November 2006

TABLE 1.2.b – Case Studies to illustrate Specific Lines of Evidence for Diminishing Contaminant Levels / Improving Water Quality and Improvement to Benthic Environment and Fish Habitat

Site	Background Overview	Specific Lines of Evidence for Diminishing Contaminant Levels / Improving Water Quality	Specific Lines of Evidence for Improvement to Benthic Environment and Fish Habitat	Reference
Benson Lake, near Port Alice, British Columbia, Canada	Benson Lake is a small, deep, oligotrophic coastal mountain lake at the northern end of Vancouver Island. From 1962 to 1973 the Benson Lake Coast Copper Mine deposited tailings into the deep basin of the lake.	1990 findings: physical and chemical water quality sampling suggested that water was similar in most aspects to the waters of a nearby control lake, Keogh Lake. The only exception was Benson Lake's higher TDS, alkalinity and major cations and anions that were thought to be attributable to drainage basin flow (i.e. input creek water sources) and Keogh Lake's higher nutrient levels that were thought to be associated with a fish farm. An organic layer covering the tailings was thought to reduce metals flux from tailings.	1990 findings: Benthic invertebrate community in the lake had re-established to reflect typical oligotrophic lakes throughout Canada and the world. Net phytoplankton densities and community structure similar to control lake and other coastal mountain lakes in British Columbia, with the exception of lower zooplankton species. Vegetation demonstrated uptake of arsenic and copper. Concentrations of metals in the flesh of fish from Benson Lake was lower than the control lake, but the metals concentrations in the livers were higher. Overall metals concentrations within both fish tissue and livers was within the range expected for fish from unpolluted Canadian waters. The stomach contents were consistent with the re-established benthic invertebrate community in their diet.	A Preliminary Biological and Geological Assessment of Subaqueous Tailings Disposal in Benson Lake, British Columbia. MEND Report 2.11.1c-a. March 1991

TABLE 1.2.b – Case Studies to illustrate Specific Lines of Evidence for Diminishing Contaminant Levels / Improving Water Quality and Improvement to Benthic Environment and Fish Habitat

Site	Background Overview	Specific Lines of Evidence for Diminishing Contaminant Levels / Improving Water Quality	Specific Lines of Evidence for Improvement to Benthic Environment and Fish Habitat	Reference
Buttle Lake, Vancouver Island, British Columbia, Canada	Buttle Lake is a deep and long lake where approximately 5.5 million tonnes were deposited between 1966 and 1984	1989 findings: The low flux of Zn, Cu, Cd or Pb to the overlying water column is similar to natural geochemical processes in lake and coastal sediments. An organic rich layer above the tailings appears to be maintaining an anoxic environment.	1989 findings: well established benthic organic layer and redox cycling of iron and manganese, low turbidity of overlying water column, no habitat survey work or fish tissue sampling.	Geochemical Assessment of Subaqueous Tailings Disposal in Buttle Lake in British Columbia. MEND Project 2.11.1b March 1990.
Anderson Lake, Manitoba, Canada	Anderson Lake is mesotrophic and relatively shallow three to six metres, 8 million tonnes of tailings deposited from 1979 right up until the study in 1990.	1990 findings: Elevated metals in overlying water column, but tailings still being deposited at that time and negligible flux of metals from tailings to overlying water body and it was thought that organic rich sediments would eventually be established and maintained.	1990 findings: vegetation along shoreline adversely affected, at the time of the study benthic invertebrate densities were low and zooplankton densities highly variable and fish are rare, however zooplankton diversity is similar to other Manitoba Lakes and the lake was known to have few fish prior to tailings deposition (this was supported by a lack of fish caught in pre tailings deposition limnology survey work).	Geochemical Assessment of Subaqueous Tailings Disposal in Anderson Lake, Snow Lake Area, Manitoba. MEND Project 2.11.1b-b

TABLE 1.2.b – Case Studies to illustrate Specific Lines of Evidence for Diminishing Contaminant Levels / Improving Water Quality and Improvement to Benthic Environment and Fish Habitat

Site	Background Overview	Specific Lines of Evidence for Diminishing Contaminant Levels / Improving Water Quality	Specific Lines of Evidence for Improvement to Benthic Environment and Fish Habitat	Reference
Shallow Water Cover - Sherritt-Gordon Zn-Cu Mine, Manitoba, Canada	Tailings that were deposited into a shallow lake up until 1951 at the former Sherritt-Gordon Zn–Cu mine.	2001 and 2009 findings: the water cover thickness was only 1 metre and sulfide-mineral alteration within the submerged tailings was confined to a <6 cm thick zone located immediately below the water-tailings interface which suggests extremely limited sulphide oxidation over almost six decades. Pore-water in the sub-aqueous tailings was characterized by near-neutral pH, moderate alkalinity, and relatively low concentrations of dissolved sulfate and metals.	No ecological survey work was undertaken.	Long-term mineralogical and geochemical evolution of sulfide mine tailings under a shallow water cover. Moncur et al. 2015. Applied Geochemistry 57 (2015) 178–193.
Old Tailings Dam located at the Savage River mine, western Tasmania, Australia	38 million tonnes of pyritic tailings deposited from 1967 to 1982	In the sub-aqueous zone, the degree of pyrite oxidation demonstrates a direct relationship with cover depth, with unoxidized, potentially reactive tailings identified from 2.5 m, directly beneath an organic-rich sediment layer. These findings are broadly similar to other tailings storage facilities e.g., Fox Lake, Sherritt-Gordon Zn-Cu mine, Canada and Stekenjokk mine, Sweden where water covers up to 2 m have successfully reduced ARD-ML.	No ecological survey work was undertaken.	Mineralogical and geochemical characterization of the Old Tailings Dam, Australia: Evaluating the effectiveness of a water cover for longterm AMD control. Jackson and Parbhakar-Fox. Applied Geochemistry 68 (2016) 64-78

TABLE 1.2.b – Case Studies to illustrate Specific Lines of Evidence for Diminishing Contaminant Levels / Improving Water Quality and Improvement to Benthic Environment and Fish Habitat

Site	Background Overview	Specific Lines of Evidence for Diminishing Contaminant Levels / Improving Water Quality	Specific Lines of Evidence for Improvement to Benthic Environment and Fish Habitat	Reference
Mattabi mine tailings site near Ignace, Ontario, Canada.	The tailings had oxidized for approximately 10 years prior to flooding. The experiment involved the construction of a 70 m2 test cell and a monitoring program that extended over more than 2 years. The water cover varied from sub 0.3 m to 2 m.	Results indicate that directly flooding pre-oxidized tailings can initially lead to the release of metals and sulfate to the water cover. However, dilution of the water cover by rain and snowmelt, flushing of the oxidation products by infiltration into the tailings, and removal of some metals by precipitation and sorption progressively reduced concentrations in the water cover below regulatory discharge limits.	No ecological survey work was undertaken.	Field assessment of metal and sulfate fluxes during flooding of pre-oxidized mine tailings. Catalan et al. Advances in Environmental Research 4 (2000) 295-306

DFO 1.3 Response

Agnico Eagle disagrees with DFO and believes the existing contingency options presented in Agnico Eagle (2012) remain viable. Agnico Eagle refers DFO to Section 6.0 – No Net Loss Contingency Options in Agnico Eagle (2012) which lists compensation contingency options currently under consideration for Meadowbank are:

1. Improvement of Airplane Lake culverts
2. Improvement of access between Wally Lake and Wally 4
3. Construction of arctic grayling spawning pads
4. Remediation of Airplane Lake water quality
5. Provisions for funding for research opportunities aimed at validating HSIs
6. Creation of larger finger dikes and sea mounts

Estimated habitat gains and details of each option are presented on pages 61 – 69 of Agnico Eagle (2012).

References:

Agnico Eagle. 2012. Meadowbank Gold Project No Net Loss Plan (NNLP), Agnico-Eagle Mines Ltd, October 15, 2012.

Agnico Eagle .2017. Updated NNL Calculations for Habitat Gains in Second and Third Portage Lakes, November 17, 2017

Evans, C.L., J.D. Reist, and C.K. Minns. 2002. Life History Characteristics of Freshwater Fishes Occurring in the Northwest Territories and Nunavut, with Major Emphasis on Riverine Habitat Requirements. Canadian Manuscript Report of Fisheries and Aquatic Sciences 2614: xiii + 169 p.

Richardson, E. S., J. D. Reist, et al. 2001. Life history characteristics of freshwater fishes occurring in the Northwest Territories and Nunavut, with major emphasis on lake habitat requirements. Canadian Manuscript Report of Fisheries and Aquatic Sciences 2569: 146.

SNC. 2006. Case study assessment – subaqueous tailings disposal in Mandy Lake Flin Flon, Manitoba. November 2006. MEND Report 9.2b.

Stewart, D.B., N.J. Mochnacz, J.D. Reist, T.J. Carmichael, and C.D. Sawatzky. 2007. Fish Life History and Habitat Use in the Northwest Territories: Arctic Grayling (Thymallus arcticus). Canadian Manuscript Report of Fisheries and Aquatic Sciences 2797: vi + 55 p.

CROWN-INDIGENOUS RELATIONS AND NORTHERN AFFAIRS CANADA

Interested Party:	**Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC)**	**Rec No.:**	**CIRNAC-01**
Re:	**Current tailings disposal**		

Reference:

Letter: RE: Agnico Eagle Mines Meadowbank Mine Type A Water License – 2AM-MEA1525 Modification Request, Agnico Eagle, February 23, 2018.

Water Licence Inspection Form, INAC, October 25-27, 2017.

2016 Mine Waste Rock and Tailings Management Report & Plan Update, Meadowbank Gold Mine, Agnico Eagle, November 2016.

Final Written Submission / Recommendation Made By Interested Party:
CIRNAC requests clarification on where the tailings from both the Meadowbank Gold Mine Project and the Whale Tail Pit Project are currently being deposited pending approval of the proposed modification to allow for in-pit tailings deposition.

Agnico Eagle's Response to Final Submission / Recommendation
CIRNAC #1 Response

Currently, Agnico Eagle is continuing to deposit tailings generated by the mining of the Meadowbank and Whale Tail Projects in the existing North and South Cell Tailings Storage Facility (TSF) as approved under 2AM MEA1526. Pending approval of the proposed modification to allow for in-pit tailings deposition, Agnico Eagle will deposit Meadowbank Golder Mine and the Whale Tail Pit Project Tailings in the expanded Tailings Storage Facility which will include the pits and continue to adhere to Licence 2AM-MEA 1526 Part F Item 19: '' *The Licensee shall dispose of tailings and operate the Tailings Storage Facility in accordance with the approved Mine Waste Rock and Tailings Management Plan (March 2017), Meadowbank Tailings Storage Facility Management Plan for Whale Tail Pit (January 2017) submitted as part of water licence application for the Whale Tail Pit Project submitted by AEM to the NWB on July 8, 2016, and Guide to the Management of Tailings Facilities (Mining Association of Canada September 1998). The tailings solids fraction shall be permanently contained within the Tailings Storage Facility*.''

Interested Party:	Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC)	Rec No.:	CIRNAC-02
Re:	Updated Goose and Portage pit design		

Reference:

Letter: RE: Agnico Eagle Mines Meadowbank Mine Type A Water License – 2AM-MEA1525 Modification Request, Agnico Eagle, February 23, 2018.

2AM-MEA1525 Meadowbank Gold Mine Project Type 'A' Water Licence: Part I, Item 11 & 12.

Information Request /

Final Written Submission / Recommendation Made By Interested Party:

CIRNAC recommends the NWB and CIRNAC be provided with the 2016 MDRB in-pit tailings disposal report and the updated Goose and Portage pit engineering drawings to review, along with the comments from the Independent Geotechnical Expert Review Panel.

Agnico Eagle's Response to Final Submission / Recommendation:

CIRNAC #2 Response

Agnico Eagle agrees with CIRNAC recommendation and will provide to CIRNAC and NWB the following additional documentation on August 17, 2018:

- MDRB Meeting No 19 Report (MDRB, 2016) is referring to the review of the Multiple Account Analysis that was performed to select in-pit disposal as the preferred option for the way forward.
- MDRB Meeting No 22 Report (MDRB, 2017) is referring to the review of the in-pit disposal prefeasibility study.

For clarification, the Independent Geotechnical Expert Review Panel is the same organization as the Meadowbank Dike Review Board (MDRB). Also, the reports listed above were submitted to the NWB on May 16, 2017 (MDRB, 2016) and June 1, 2018 (MDRB, 2018) as part of the annual report.

Agnico Eagle refers CIRNAC to Prefeasibility Study Report in which the Updated Goose and Portage pit engineering drawings were used. These drawings can be found in the documentation submitted by Agnico Eagle on February 15, 2018.

Interested Party:	Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC)	Rec No.:	CIRNAC-03
Re:	Thermal monitoring and hydrogeological connectivity		

Reference:

2016 Mine Waste Rock and Tailings Management Report & Plan Update, Meadowbank Gold Mine, Agnico Eagle, November 2016.

2AM-MEA1525 Meadowbank Gold Mine Project Type 'A' Water Licence: Part I, Item 9.

Final Written Submission / Recommendation Made By Interested Party:
CIRNAC recommends the hydrogeological flow models be updated to reflect the changing extent of permafrost, and to examine potential changes in groundwater contaminant transport from the Meadowbank Gold Mine Property – in particular out of the Goose and Portage pits.

Agnico Eagle's Response to Final Submission / Recommendation:

CIRNAC #3 Response
Agnico Eagle agrees to provide the requested information to CIRNAC and refers CIRNAC to the Agnico Eagle response to NRCAN recommendation NRCAN-03 and NRCAN-11.

Interested Party:	**Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC)**	**Rec No.:**	**CIRNAC-04**
Re:	**Seeps**		

Reference:

SNC-Lavalin. 2017. Tailings Storage Facility Extension -In-Pit Tailings Disposal - Prefeasibility Study Final Report. Report 653541-7000-40ER-0001. December 5, 2017. Revision B00. (including supporting reports, technical memos, and meeting records)

AEM. 2018. In-Pit Deposition Information Request Responses. July 11, 2018.

Final Written Submission / Recommendation Made By Interested Party:
CIRNAC recommends the seep locations most likely to leak first be identified, and a plan for early detection and implementation be provided for detecting potential leaks from Goose and Portage pits.

Agnico Eagle's Response to Final Submission / Recommendation:

CIRNAC #4 Response
Agnico Eagle agrees to provide further information to respond to the CIRNAC recommendation and is fully aware of the importance to properly monitor the groundwater (GW) around the pits and the importance of having a robust and reliable GW monitoring well installation that can provide relevant data for monitoring

purposes. For this reason, in 2017, Agnico Eagle has updated and improved its groundwater monitoring program (AEM, 2018a), which was deployed in the following phases:

- Phase 1: Perform field investigation in 2017 to define thickness of the permafrost and performed packer tests in the water bearing structures located in the area of concerns defined following the completion of the prefeasibility study hydrogeological contaminant transport analysis (SNC, 2017)
- Phase 2: Design of more robust and reliable GW monitoring well installation. Selection of the sampling location and interval based on the results from the prefeasibility study hydrological modelling (SNC, 2017) and field investigation (SNC, 2018).
- Phase 3: Installation of new groundwater monitoring wells prior to initiate in-pit tailings deposition in June 2018 (AEM, 2018b).

If any new seepage paths are identified following an update of the hydrological contaminant transport models, Agnico Eagle will proceed to the installation of new groundwater monitoring wells in these locations using the same installation procedures.

The Groundwater Monitoring Plan will be updated and provided to NWB with the final infrastructure designs required pursuant to Type A Water Licence 2AM MEA1526 Part B Item 14, 60 days following approval of the modification. Any future modelling will be reported in Agnico Eagle's NWB annual report.

Interested Party:	**Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC)**	**Rec No.:**	**CIRNAC-05**
Re:	**Flooding strategy**		

Reference:

2016 Water Management Report and Plan Update, Meadowbank Gold Mine, Agnico Eagle, November 2017 Version 02.

Final Written Submission / Recommendation Made By Interested Party:

CIRNAC recommends more detail be included in the flooding strategy, such as the predicted rate of flooding.

Agnico Eagle's Response to Final Submission / Recommendation:

CIRNAC #5 Response

Agnico Eagle agrees to provide further information to respond to the CIRNAC recommendation and refers CIRNAC to the Agnico Eagle's response to the NRCAN-05 recommendation, which sets out Agnico Eagle's commitment to provide the requested additional detail.

Interested Party:	**Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC)**	**Rec No.:**	**CIRNAC-06**
Re:	**Water management report and plan update**		

Reference:

2016 Water Management Report and Plan Update, Meadowbank Gold Mine, Agnico Eagle, November 2017 Version 02.

Final Written Submission / Recommendation Made By Interested Party:
CIRNAC requests clarification on the referencing within the 2016 water management report and plan update.

Agnico Eagle's Response to Final Submission / Recommendation:

CIRNAC #6 Response
In the 2016 Water Management Report and Plan Update (Nov. 2017), details of the flooding activities can be found in section 2.3. The findings of the water quality forecast are summarized in section 3.0 and the full report can be found in Appendix B.

Interested Party:	**Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC)**	**Rec No.:**	**CIRNAC-07**
Re:	**Interim Closure and Reclamation Plan and Security**		

Reference:

2AM-MEA1525 Meadowbank Gold Mine Project Type 'A' Water Licence: Part C, Item 1.

Final Written Submission / Recommendation Made By Interested Party:
CIRNAC recommends that the ICRP be updated accordingly, and that security be revisited to ensure Agnico Eagle Mines Limited is sufficiently bonded for additional tailings disposal in the mined out Goose and Portage pits at the Meadowbank Gold Mine Project.

Agnico Eagle's Response to Final Submission / Recommendation:

CIRNAC #7 Response
Agnico Eagle agrees to continue to work with CIRNAC and KIA to ensure sufficient bonding is in place for the Meadowbank Mine. Agnico Eagle will evaluate the changes in Reclaim, as a result of in-pit tailings disposal, compared to the current closure estimate.

Reference:
Agnico Eagle, 2017 (AEM, 2017a). Meadowbank Tailings Storage Facility Management Report & Plan – 2016, Version 6, March 2017.

Agnico Eagle, 2017 (AEM, 2017a). Meadowbank Tailings Storage Facility Management Plan for Whale Tail Pit, Version 1, January 2017.

Agnico Eagle, 2017 (AEM, 2018a). Groundwater Monitoring Plan, Version 8, January 2018.

Agnico Eagle, 2017 (AEM, 2018b). Groundwater Well Campaign for the In-Pit Deposition - May 26th to June 4th, 2018, July 17, 2018.

Meadowbank Dike Review Board, 2016 (MDRB, 2016). MDRB Meeting No 19 Report, October 7th, 2016.

Meadowbank Dike Review Board, 2017 (MDRB, 2017). MDRB Meeting No 22 Report, October 10th, 2017.

SNC-Lavalin, 2017 (SNC, 2017). Hydrogeological Modelling for In-Pit Deposition of Tailings. Technical Note. 643541-3000-4WER-0001 Rev A00, November 30, 2017.

SCN-Lavalin, 2018 (SNC, 2018). Hydrogeological Field Investigation, East Road & Goose In-Pit Tailings Deposition. Technical Note. 648081-3000-4WER-0001-00, November 16, 2017.

NATURAL RESOURCES CANADA

Reference:

AEM, 2018a. In-Pit Disposition. NR-CAN information request responses. 16 July 2018.

AEM, 2018b. In-Pit Disposition. Information request responses. 11 July 2018.

AEM, 2018c. Meadowbank Gold Project, Groundwater Monitoring Plan. Version 8, January 2018.

AEM, 2017a. Meadowbank Gold Mine, 2016 Mine Waste Rock and Tailings Management Report & Plan Update. November 2017 (Note: cover page indicates a date of November 2016 but subsequent footers and references in the document indicate 2017 dates).

AEM, 2017b. Updated NNL Calculations for Habitat Gains in Second and Third Portage Lakes. Technical memorandum from AEM to DFO. 17 November 2017.

Cumberland Resources Ltd., 2005. Meadowbank Gold Project, Mine Waste & Water Management, Final Report, October 2005.

Golder Associates Ltd., 2005. Technical Memorandum, Items #24A and 37 - Predictions of Regional Groundwater Flow Directions after mine Closure, Meadowbank. 05-1413-036A, October 5, 2005.

Golder Associates Ltd., 2004. Report on Hydrogeology Baseline Studies, Meadowbank Gold Project. 03-1413-078, February 3, 2004.

NRCan, 2018. Information Requests for Agnico Eagle Mine's In-Pit Tailings Disposal Modification (NIRB File No. 03MN107), Natural Resources Canada, Submission to the Nunavut Impact Review Board, July 9, 2018.

SNC-Lavalin, 2018a. Environmental Impact Study Review – Meadowbank In-Pit Tailings Deposition. Technical Note. 651196-0000-4EER-0001-B01 Rev 01, February 15, 2018.

SNC-Lavalin, 2018b. Groundwater Monitoring for In-Pit Tailings Deposition project – Meadowbank. Memorandum. 651196-3000-4WER-0002. July 3, 2018.

SNC-Lavalin, 2018c. In Pit Water Quality Assessment at Closure Technical Note. SNC No. 651196-2100-4EER-001 Rev. 00, 10 July 2018.

SNC-Lavalin, 2018d. Meadowbank-In-Pit Tailings Deposition Pit Lake Stratification Part B - Tailings Fine Resuspension Modelling. Memorandum. Ref. No. 651196-2100-4GCC-0002. 9 March 2018.
SNC-Lavalin, 2017a. Hydrogeological Modelling for In-Pit Deposition of Tailings. Technical Note. 643541-3000-4WER-0001 Rev A00, November 30, 2017.

SNC-Lavalin, 2017b. In-Pit Tailings Deposition Water Balance and Water Quality Forecast. Technical Note. 643541-5000-40ER-0002, Rev. B00. September 12, 2017.

SNC-Lavalin, 2017c. 2D ground thermal modeling – Portage In-Pit Deposition Prefeasibility Study. Memorandum. 643541-5000-4GCA-0002 Rev 01, September 20, 2017.

SNC-Lavalin, 2016a. In-Pit Tailings Deposition Concept. Tailings Storage Facility Extension Project – Phase 2, 637215-1000-4GER-0001. Version A00. November 4, 2016.

SNC-Lavalin, 2016b. Multiple Accounts Analysis for the Tailings Facility Extension Project. Technical Note. 637215-5000-4GER-0001. Version A00. October 24, 2016.

Interested Party:	**Natural Resources Canada (NRCan)**	**Rec No.:**	**NRCAN-01**
Re:	**Model extent**		

Final Written Submission / Recommendation Made By Interested Party:

NRCan recommends that the model be extended to adjacent lakes using large elements, since it allows the hydraulic heads in the sub-permafrost groundwater to be solved numerically, thereby taking into consideration the hydrogeological influence of varied lake sizes, elevations and distances.

If the model is not extended, NRCan recommends that specified heads be assigned in the sub-permafrost groundwater according to the Golder (2004, 2005) results (i.e. around the domain, rather than just for two segments with specified heads and the remaining segments specified as no-flow boundaries).

Furthermore, a sensitivity analysis on the specified heads in the sub-permafrost groundwater would be needed to assess their influence on groundwater flowpaths in the open talik and, in particular, on the vertical gradients and related vertical groundwater flow.

Agnico Eagle's Response to Final Submission / Recommendation:

NRCAN #1 Response

Agnico Eagle agrees to provide NRCan with further information as per its recommendation and will adjust the boundary conditions. However, the current hydrogeological modelling provided to NWB is sufficient to support the modification process.

For clarification, Agnico Eagle has produced two hydrogeological models (Version 1 (SNC, 2017) and Version 2 (SNC, 2018a)) in support of this application. Version 1 is related to the Pre-Feasibility Engineering Phase and Version 2 is related to the Detail Engineering Phase of the In-Pit Disposal project. Version 2 already addressed NRCan recommendations NRCAN-03, NRCAN-06 and NRCAN-10. Version 2 results are consistent with Version 1 and are also consistent with what was predicted in the original FEIS; ''In conclusion, the comparison to what was originally predicted, the proposed in-pit tailings disposal modification is predicted to have the same or less impact to the groundwater in operation, closure/post closure (SNC 2018, page 13).'' (SNC, 2018b).

To satisfy NRCan, in Version 3 hydrogeological model (sensitivity analysis of Version 2), Agnico Eagle will adjust the boundary conditions on the current extent of the model assigning hydraulic heads in the sub-permafrost groundwater based on Golder (2004, 2005) regional modeling results. Additional revised boundary conditions

are presented in response to NRCan-02 recommendation. Also, Version 3 will include a sensitivity analysis on sub-permafrost hydraulic head at the northern boundaries of the model, by increasing hydraulic heads by 1 m.

The recommendation NRCAN-01 is an input to the model which is related to NRCAN-7 and NRCAN-11 recommendations. Based on review by SNC-Lavalin and Golder of recommendation NRCAN-01, although the discharge rate from Version 3 of the hydrogeological model may change from that Version 1 and 2, these changes will not alter the predicted impact to the receiving environment as per Versions 1 and 2 of the hydrogeological model.

The results of Version 3 hydrogeological model (sensitivity analysis of Version 2), will be submitted to the NWB as part of the modification review during the week of September 17, 2018.

Interested Party:	**Natural Resources Canada (NRCan)**	**Rec No.:**	**NRCAN-02**
Re:	**Justification of flow boundary descriptions**		

Final Written Submission / Recommendation Made By Interested Party:
NRCan finds that the proponent has not adequately justified the exterior boundary conditions for their models. The differences between the proponent's specified boundary conditions and the hydraulic heads modelled by Golder (2004, 2005) have the potential to influence some of the proponent's model results.

NRCan's recommendations to the NIRB for this issue are as stated in relation to IR#1:

i) a preference to extend the model to adjacent lakes, or
ii) if the model is not to be extended, to vary the sub-permafrost boundary conditions to reflect the entire range of boundary conditions implied by Golder (2004, 2005) model results and use a sensitivity analysis to assess their impact on vertical groundwater flow in the open talik.

Agnico Eagle's Response to Final Submission / Recommendation:

NRCAN #2 Response

Agnico Eagle agrees to provide further information to respond to NRCAN2ii) recommendation. For clarification, Agnico Eagle believes the recommendation NRCAN-02ii) is the same as NRCAN-01. As per Agnico Eagle response to NRCAN-01, the Version 1 (SNC, 2017) and 2 (SNC, 2018a) hydrogeological modelling provided to NWB is sufficient to support the modification process. Agnico Eagle disagrees with NRCAN2i) recommendation as for contaminant transport simulation, using a larger model and elements could lead to numerical dispersion and to numerical errors. These results and any future annual monitoring and modelling updates will be provided to NWB in annual reporting and updated management plans according to the 2AM MEA1526.

The Version 3 hydrogeological model (sensitivity analysis of Version 2) will assign the sub-permafrost boundary conditions of the Golder model. The following map provides NIRB the overlay of the Golder (2004, 2005) regional model and the SNC Version 1 and 2 hydrogeological models.

Figure 2.1 – Golder and SNC models overlay

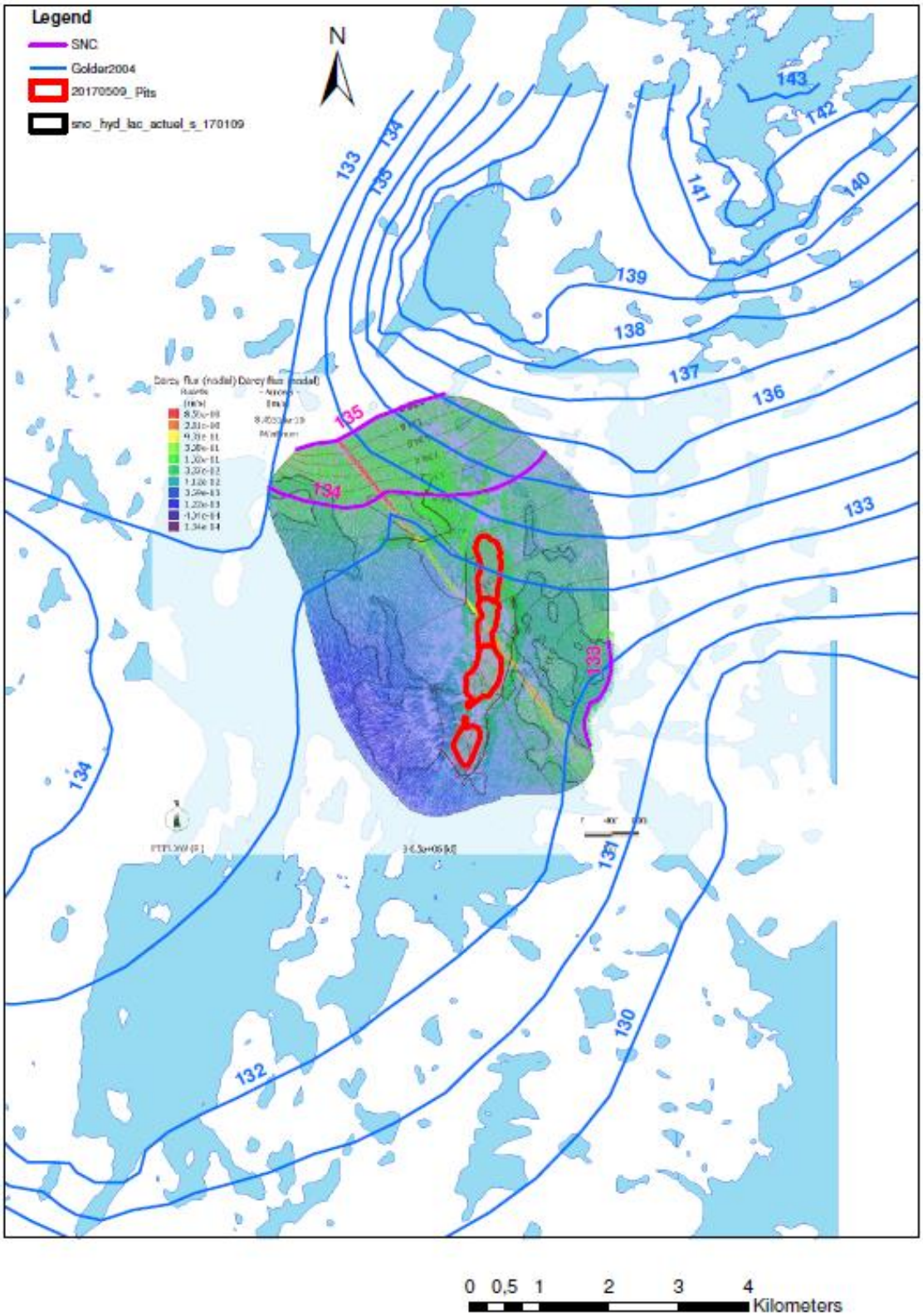


Figure 2.2: Boundary conditions at the bottom of the model (sub-permafrost)

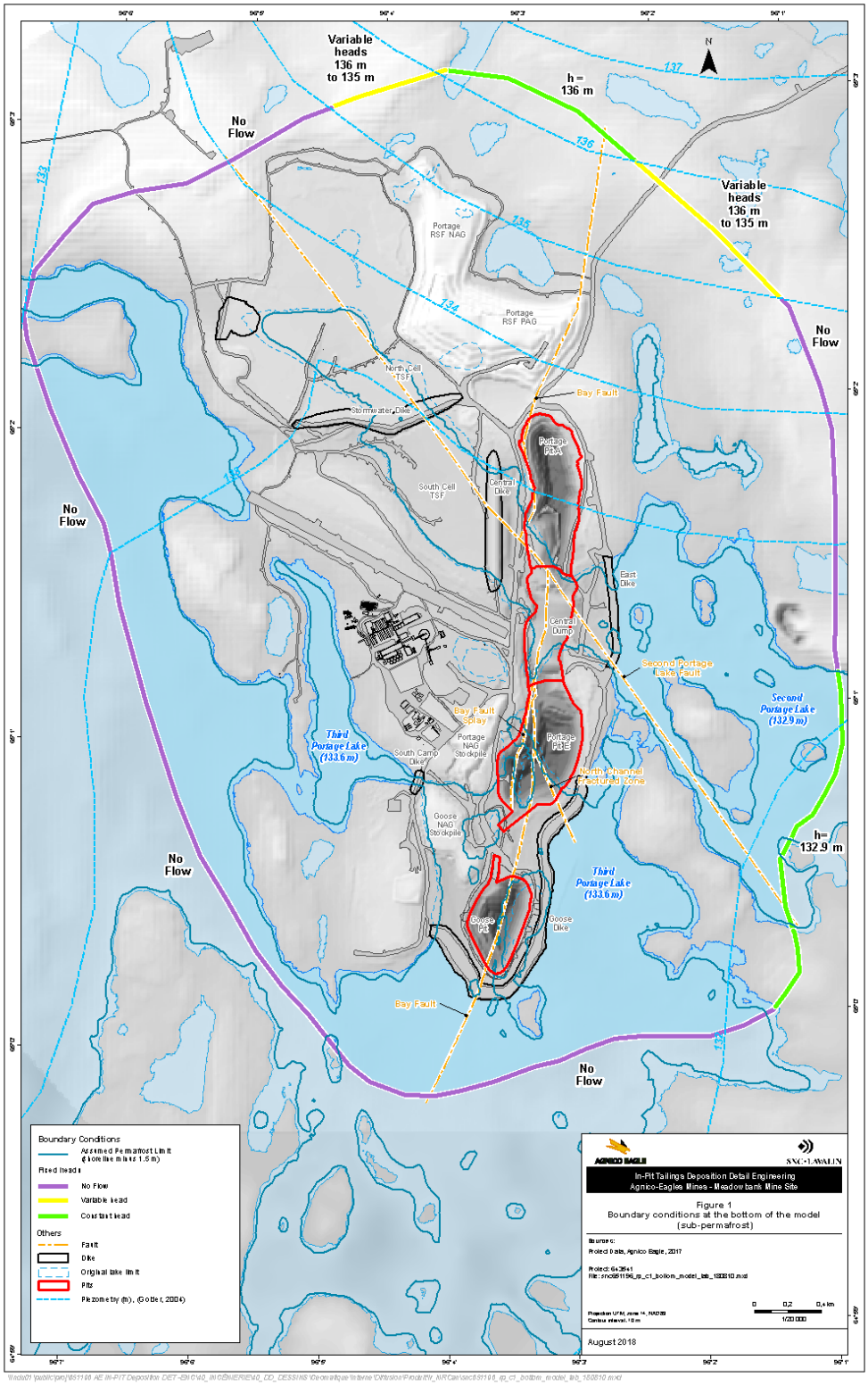
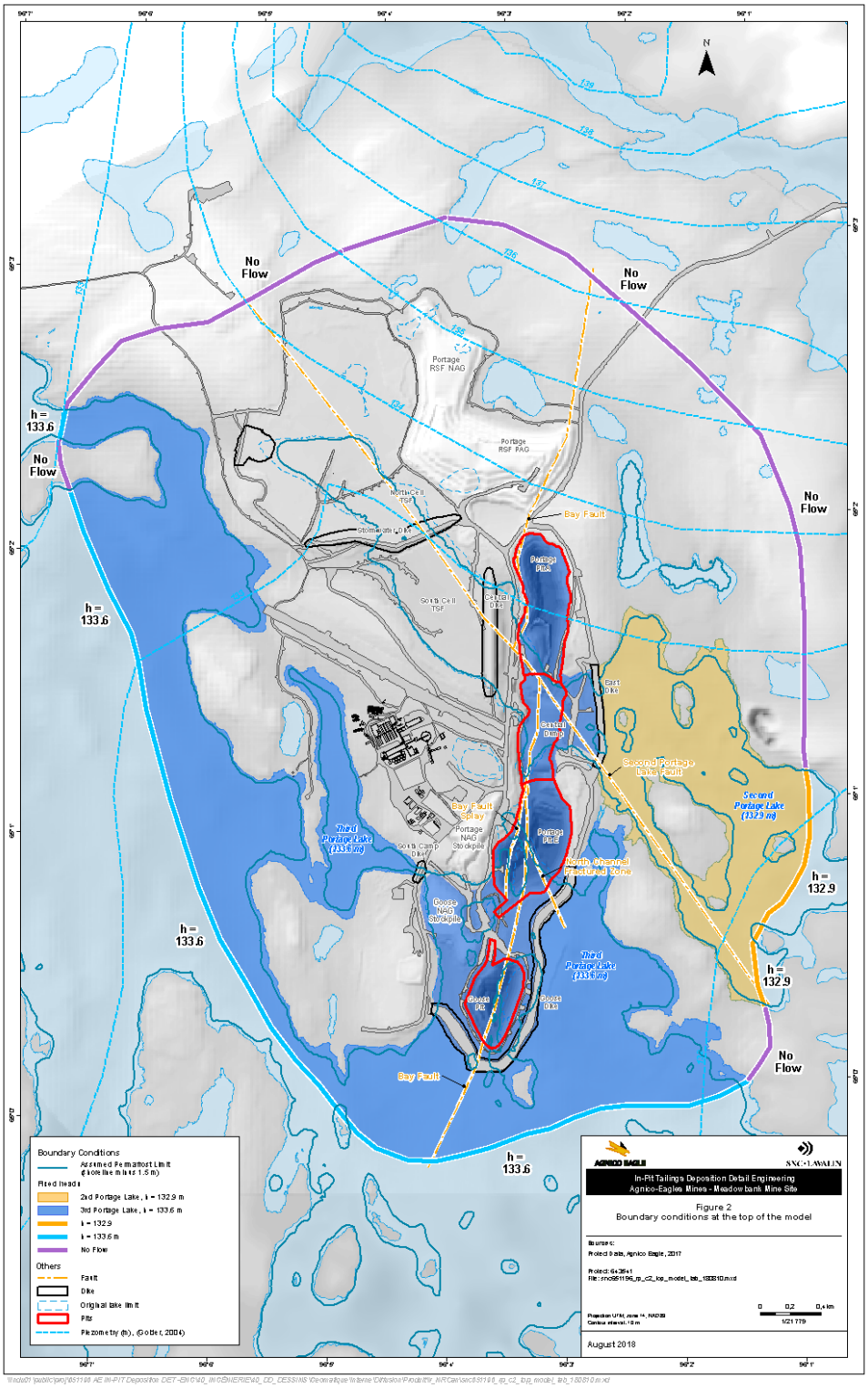

Variable heads 136 m to 135 m
h = 136 m
No Flow
Variable heads 136 m to 135 m
No Flow
No Flow
No Flow
No Flow
h= 132.9 m
N
137
136
135
134
133
Portage RSF NAG
Portage RSF PAG
North Cell TSF
Stormwater Dike
South Cell TSF
Central Dike
Bay Fault
Portage Pit A
East Dike
Central Dump
Second Portage Lake Fault
Second Portage Lake (132.9 m)
Third Portage Lake (133.6 m)
Bay Fault Splay
Portage NAG Stockpile
Portage Pit E
South Camp Dike
North Channel Fractured Zone
Goose NAG Stockpile
Third Portage Lake (133.6 m)
Goose Pit
Goose Dike
Bay Fault
Boundary Conditions
Assumed Permafrost Limit (Isotherm value 1.5 m)
Fixed heads
No Flow
Variable head
Constant head
Others
Fault
Dike
Original lake limit
Pits
Piezometry (ft), (Golder, 2004)
AGNICO EAGLE
SNC-LAVALIN
In-Pit Tailings Deposition Detail Engineering
Agnico-Eagles Mines - Meadowbank Mine Site
Figure 1
Boundary conditions at the bottom of the model (sub-permafrost)
Source:
Project Data, Agnico Eagle, 2017
0 0,2 0,4 km
1/20 000
August 2018

Figure 2.3: Boundary conditions at the top of the model



As presented on Figure 2.1, Versions 1 and 2 of the hydrogeological models and the Golder (2004,2005) regional model are showing similar hydraulic heads at the boundary conditions used for Versions 1 and 2 hydrogeological models.

For clarification, SNC and Golder developed Figures 2.2 and 2.3 from the overlay of the model extent and the sub-permafrost hydraulic heads as simulated by Golder (2004). These boundary conditions will be used for developing the Version 3 hydrogeological model (sensitivity analysis of Version 2).

Based on the difference in between the hydraulic gradients, SNC and Golder predict with high confidence Version 3 hydrogeological model (sensitivity analysis of Version 2) will have result as follows:

- Groundwater flow and travel time will be increased by approximately a factor of 3 to 4 times for Portage Pit E, 5 times for Portage Pit A and no change predicted for Goose Pit;
- Groundwater flow through the tailings is expected to be dominated by downward flow;
- Contaminant plumes concentration will remain the same;
- Contaminant plumes location will remain the same;
- The predicted impact in the receiving environment will not change.

The recommendation NRCAN-02 is an input to the model which is related to NRCAN-7 and NRCAN-11 recommendations. Based on review by SNC-Lavalin and Golder of recommendation NRCAN-02, the Version 3 hydrogeological model (sensitivity analysis of Version 2) will not change the predicted impact in the receiving environment as per Versions 1 and 2 of the hydrogeological model.

The results of Version 3 hydrogeological model (sensitivity analysis of Version 2) will be submitted to the NWB as part of the modification review during the week of September 17, 2018. These results and any future annual monitoring and modelling updates will be provided to NWB in annual reporting and updated management plans according to the 2AM MEA1526.

Interested Party:	**Natural Resources Canada (NRCan)**	**Rec No.:**	**NRCAN-03**
Re:	**Extent of the permafrost in the groundwater model**		

Final Written Submission / Recommendation Made By Interested Party:

NRCan recommends that the NIRB not accept the SNC-Lavalin (2017a) contaminant transport modelling results for post closure scenarios because the assessment of permafrost conditions for the post-closure conditions remains incomplete and because of the substantial effect of permafrost extent on the modelling results.

NRCan recommends that the permafrost extent be delineated for post-closure conditions. The permafrost extent should be mapped for several model layers to indicate the distribution of thawed permafrost with depth. The delineation of permafrost should be justified either by thermal modelling or by making assumptions to delineate a "worst case" scenario of permafrost thawing.

NRCan recommends that the post-closure permafrost extent be used for updated groundwater modelling of post-closure conditions (as described in NRCan-IR#12).

Agnico Eagle's Response to Final Submission / Recommendation:

NRCAN #3 Response

Agnico Eagle disagrees with NRCan recommendation as permafrost assumptions made for the contaminant transport modelling (SNC, 2017) for the post-closure conditions was confirmed during the thermal model update (SNC, 2018c). This thermal model was used as an input of the Version 2 hydrogeological modeling (SNC, 2018a). The thermal modelling assumptions were representative of a worst case scenario of permafrost thawing. Figure 3.1 shows the location of the 2D cross-section at Goose Pit and Portage Pits. Thawing effects from the tailings as well as climate change were considered in the latest thermal models and results are found below for the four cross-sections (Figure 3.2 to 3.5).

As recommended by NRCan, permafrost extent that was integrated in the Version 2 hydrogeological model are presented on the Figure 3.6 at four depths of the model (2, 50, 120 and 160m deep. The predicted permafrost thawing at the south east corner of Pit A and the north side of Pit E, as mentioned by NRCan, has been addressed with the updated thermal modeling and has been included in the Version 2 hydrogeological model (Figure 3.6a). According to the 2D thermal cross-section at Pit A, limited permafrost thawing was predicted on the eastern wall of the pit.

Based on review by SNC-Lavalin and Golder of recommendation NRCAN-03, the Version 2 hydrogeological model results are similar to Version 1 hydrogeological model result (SNC, 2017).

Version 2 already addressed NRCan recommendations NRCAN-03. Version 2 results are consistent with Version 1 and are also consistent with what was predicted in the original FEIS; ''In conclusion, the comparison to what was originally predicted, the proposed in-pit tailings disposal modification is predicted to have the same or less impact to the groundwater in operation, closure/post closure (SNC 2018, page 13).'' (SNC, 2018b).

Agnico Eagle consider that the Version 1 and 2 contaminant transport modelling results for post closure scenarios provided to NWB is sufficient to support the modification process.

Figure 3.1 Site plan view showing thermistor location and sections analyzed

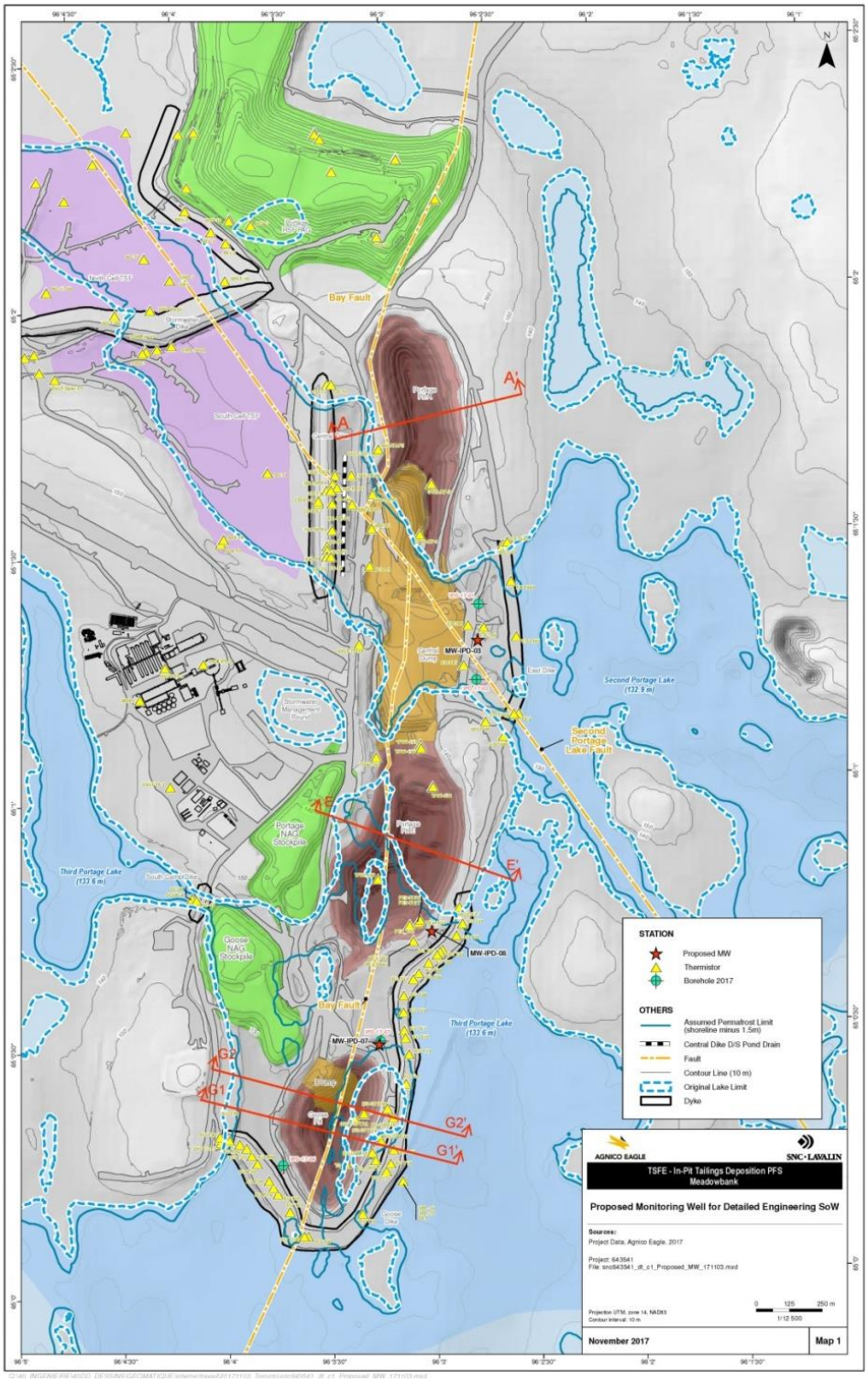


Figure 3.2: Thermal Condition at Goose Pit, Cross section GG'1, Long term, at the end of a 100-year period – Climate Warming

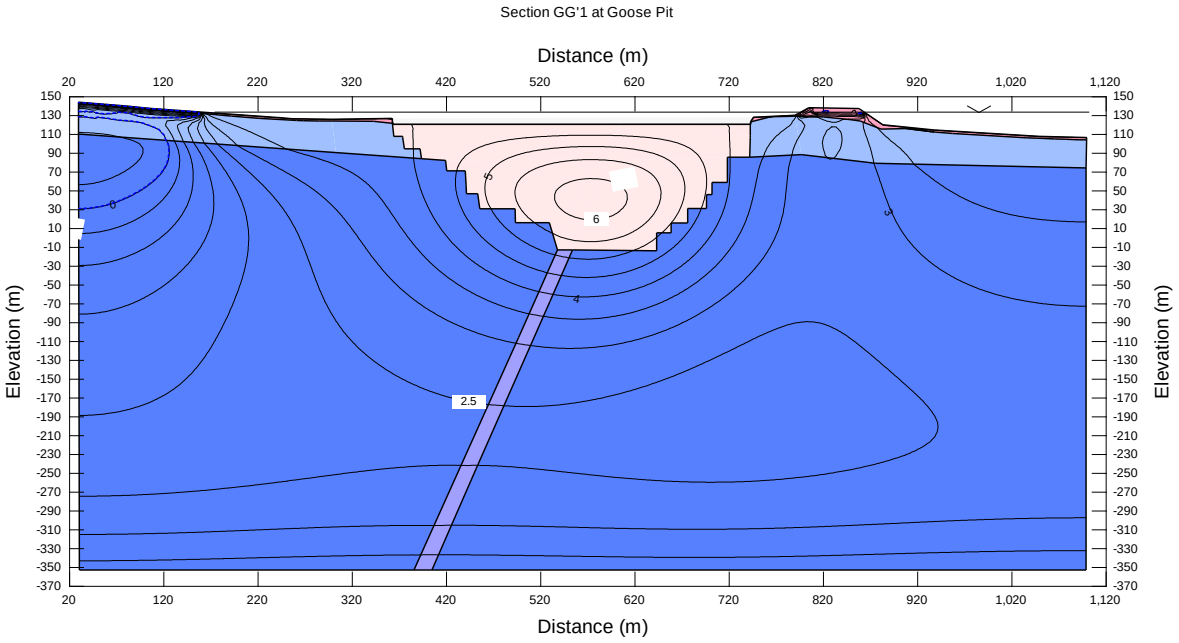


Figure 3.3: Thermal Condition at Goose Pit, Cross section GG'2, Long term, at the end of a 100-year period – Climate Warming

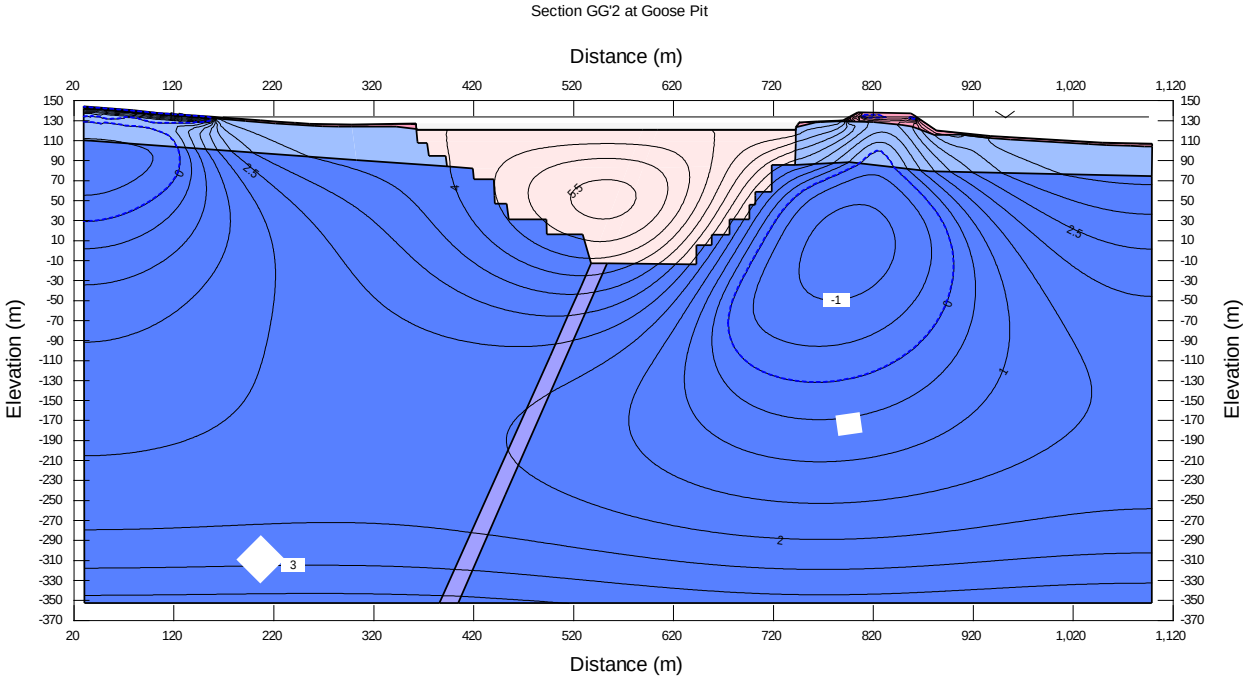


Figure 3.4: Thermal Condition at Portage Pit E, Cross section EE', at the end of a 100-year period – Climate Warming

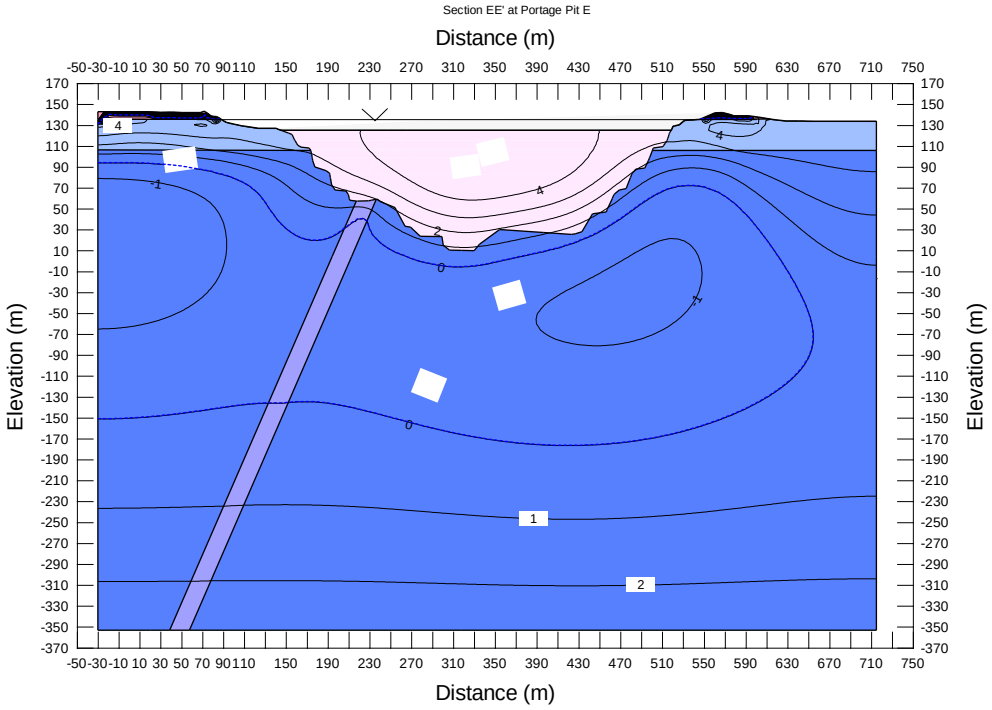


Figure 3.5: Thermal Condition at Portage Pit A, Cross section AA', at the end of a 100-year period – Climate Warming

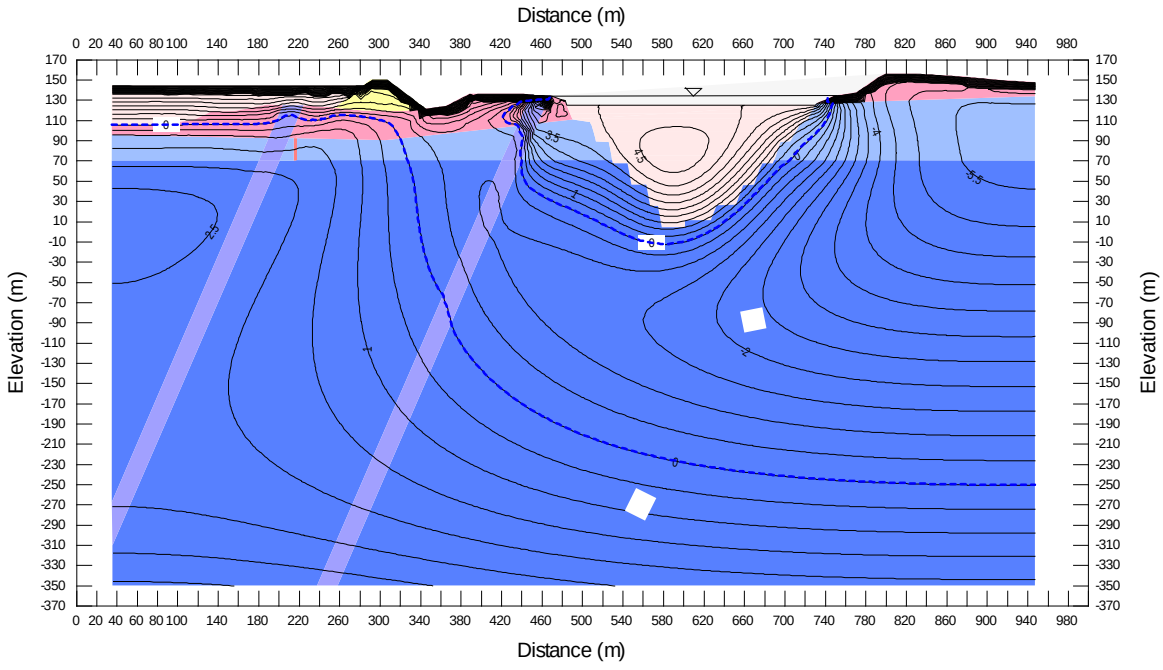
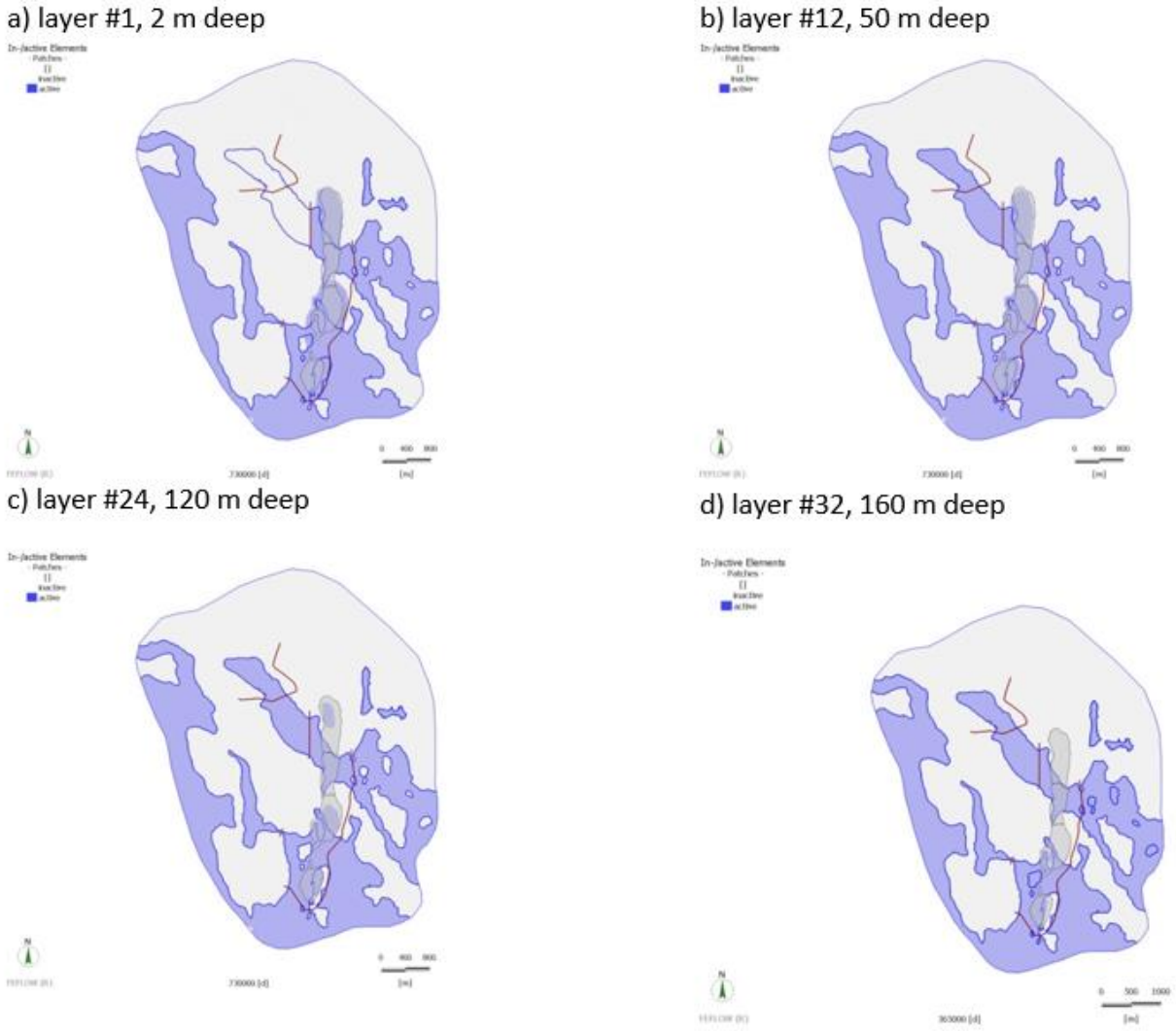


Figure 3.6: Permafrost extension at post-closure period



Interested Party:	**Natural Resources Canada (NRCan)**	**Rec No.:**	**NRCAN-04**
Re:	**Waste rock and tailings within pits**		

Final Written Submission / Recommendation Made By Interested Party:

Although this issue is not a critical issue with respect to the assessment of contaminant transport, NRCan nonetheless recommends that the higher hydraulic conductivity values of the Goose Dump be included in any subsequent groundwater simulations of the Meadowbank site (for times after the waste rock was deposited).

Agnico Eagle's Response to Final Submission / Recommendation:

NRCAN #4 Response

Agnico Eagle agrees to provide further information to respond to NRCan's recommendation and will assume higher hydraulic conductivity values to the Goose Dump in the Version 3 hydrogeological model (sensitivity analysis of Version 2 (SNC, 2018a)). The hydraulic conductivity that was used for Portage Central Dump will be used for the Goose Dump.

For clarification, Agnico Eagle considers that the current hydrogeological modelling provided to NWB is sufficient for the assessment of potential effects of the project.

The recommendation NRCAN-04 is an input to the model which is related to NRCAN-7 and NRCAN-11 recommendations.

The results of Version 3 hydrogeological model (sensitivity analysis of Version 2) will be submitted to the NWB as part of the modification review during the week of September 17, 2018. These results and any future annual monitoring and modelling updates will be provided to NWB in annual reporting and updated management plans according to the 2AM MEA1526.

Interested Party:	**Natural Resources Canada (NRCan)**	**Rec No.:**	**NRCAN-05**
Re:	**Water level controls during in-pit deposition periods**		

Final Written Submission / Recommendation Made By Interested Party:

NRCan recommends that the proponent should clearly state the anticipated pit water levels during Periods 4 and 5 and resolve the apparent contradictions between pit water levels and flooding of the areas surrounding the pits. The proponent should state when the area surrounding the pits will be flooded and whether this will result from natural drainage or pumping, or breaching of the dikes.

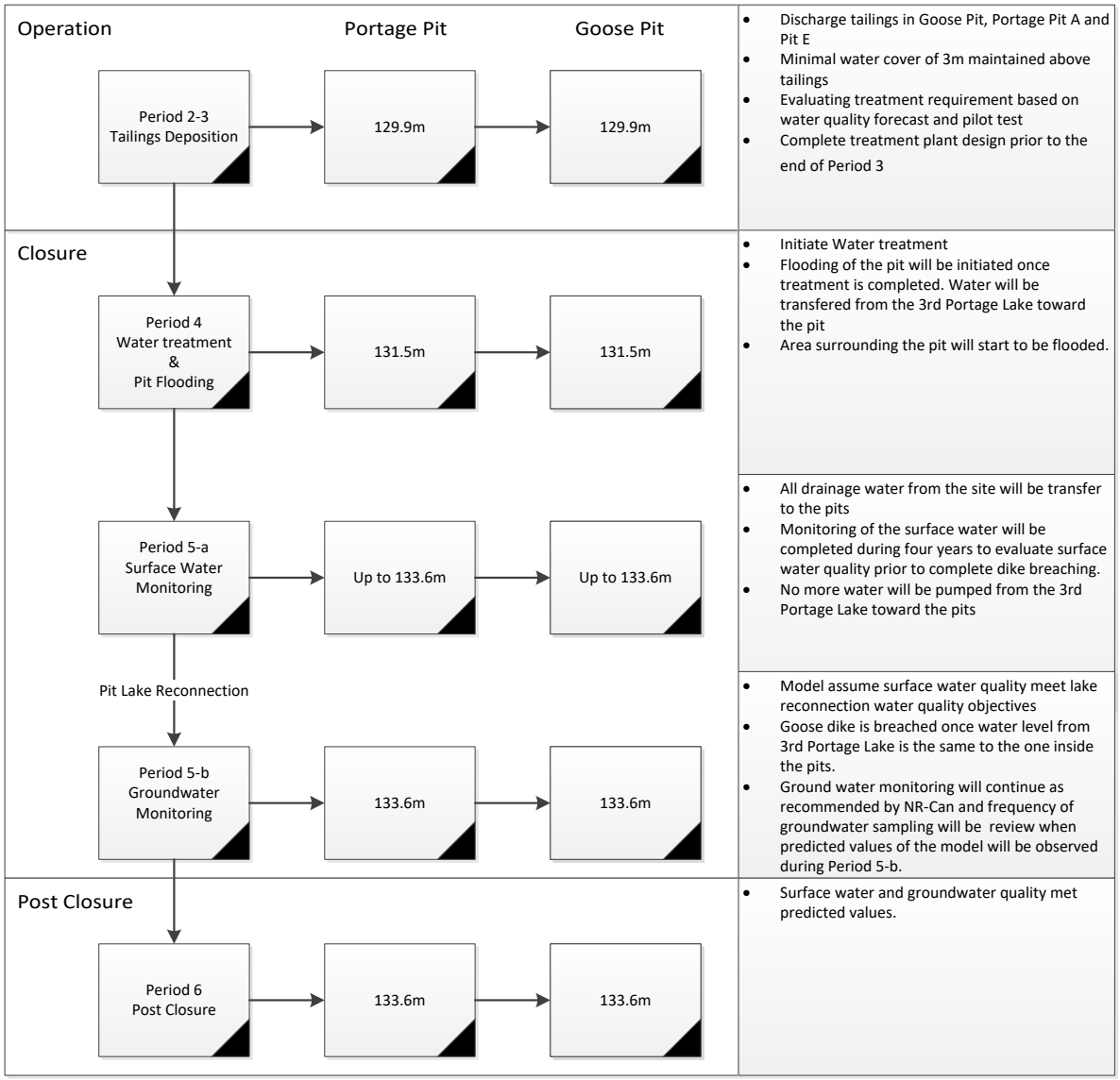
NRCan recommends that "post-closure" groundwater contaminant simulations towards Second Portage Lake should begin when pit water levels exceed those of the Second Portage Lake.

Agnico Eagle's Response to Final Submission / Recommendation:

NRCAN #5 Response

Agnico Eagle agrees to provide further information to address the NRCan recommendation and has developed the flowchart presented on the Figure 5.1 to summarize the closure sequence (Period 4 and 5) with the water elevation at the end of each phases within the pits. Water elevation presented in this flowchart are different than the tailings beach elevation which will reach maximum elevation 125m. Also, Agnico Eagle would like to clarify that the average pit crest elevation is 130m. The closure monitoring period (Period 5) was be split in two segments to comply with Information Request NRCan-10 made in July 2018.

Figure 5.1: Closure sequence flowchart



Agnico Eagle agrees with NRCan recommendation that “post-closure” groundwater contaminant migration towards Second Portage Lake should begin when pit water levels exceed those of the Second Portage Lake and will integrate this recommendation in the Version 3 hydrogeological model (sensitivity analysis of Version 2 (SNC, 2018a)). For clarification, the assumption made in the Versions 1 (SNC, 2017) and 2 hydrogeological models was that “post-closure” groundwater contaminant migration towards Second Portage Lake starts once water level within the pits reach 3rd Portage Lake elevation (end of Period 5a).

Based on review by SNC-Lavalin and Golder of recommendation NRCAN-05, the Version 3 hydrogeological model (sensitivity analysis of Version 2) result to the environment will be similar to Versions 1 and 2 hydrogeological model results. As it will take about 1.5 to 2 years to raise the water level from 132.9 to 133.6m, this modification to the model will lead to a minor change in the model output, but not change to the impacts to the environment. Agnico Eagle consider that the Version 1 and 2 contaminant transport modelling results for post closure scenarios provided NWB is sufficient to support the modification process.

The recommendation NRCAN-05 is an input to the model which is related to NRCAN-7 and NRCAN-11 recommendations.

The results of Version 3 hydrogeological model (sensitivity analysis of Version 2) will be submitted to the NWB as part of the modification review during the week of September 17, 2018. These results and any future annual monitoring and modelling updates will be provided to NWB in annual reporting and updated management plans according to the 2AM MEA1526.

Interested Party:	**Natural Resources Canada (NRCan)**	**Rec No.:**	**NRCAN-06**
Re:	**Tailings as a contaminant source**		

Final Written Submission / Recommendation Made By Interested Party:
NRCan recommends that the entire extent of tailings should be included in any subsequent groundwater simulations of the Meadowbank site.

Agnico Eagle's Response to Final Submission / Recommendation:

NRCAN #6 Response
Agnico Eagle agrees with NRCan recommendation and has already included the entire extent of tailings as a source of contaminant in the Version 2 hydrogeological modeling (SNC, 2018a).

Based on review by SNC-Lavalin and Golder of recommendation NRCAN-06, the Version 2 hydrogeological model results are similar to Version 1 hydrogeological model result.

Version 2, therefore, already addressed NRCan recommendations NRCAN-06. Version 2 results are consistent with Version 1 and are also consistent with what was predicted in the original FEIS; ''In conclusion, the comparison to what was originally predicted, the proposed in-pit tailings disposal modification is predicted to have the same or less impact to the groundwater in operation, closure/post closure (SNC 2018, page 13).'' (SNC, 2018b).

Agnico Eagle believe that the Version 1 (SNC, 2017) and 2 contaminant transport modelling results for post closure scenarios provided to NWB is sufficient to support the modification process.

Interested Party:	Natural Resources Canada (NRCan)	Rec No.:	NRCAN-07
Re:	In-pit deposition periods and contaminant transport scenarios		

Final Written Submission / Recommendation Made By Interested Party:

NRCan's opinion is that the contaminant transport simulations presented by the proponent cannot be relied upon to assess potential contaminant transport during the post-closure period. NRCan recommends that current hydrogeological modelling be considered insufficient for the assessment of potential effects.

NRCan recommends that the groundwater model be updated using revised scenarios, permafrost extent and boundary conditions that appropriately represent expected conditions at the site (see NRCan-#11).

Agnico Eagle's Response to Final Submission / Recommendation:

NRCAN #7 Response

Agnico Eagle disagrees with NRCan opinion that the contaminant transport simulations presented by the proponent cannot be relied upon to assess potential contaminant transport during the post-closure period. The current hydrogeological modelling provided to NWB is sufficient to support the modification process as it was developed according to the industry standard and based on conservative assumptions that were confirmed during the field investigation completed in 2017 (SNC, 2018d).

This model was reviewed many parties: Don Chorley from Golder Associates and the Meadowbank Dike Review Board, Independent Geotechnical Expert Review Panel, who stated in their report No. 22: '' This study also constitutes a good approach that is adequate for the current level of study. The Board concurs with the recommendations for future work (parameter and geometry refinement for the model) and note that the provision of sampling wells for calibration has been included. This is obviously a long-term exercise with progressive up-date of parameters being required. This will continue into the period of monitoring post mine closure. Similar comments can be made related to the thermal modelling of conditions post-closure.'' (MDRB, 2017).

As previously stated in Agnico Eagle response to NRCAN-01 recommendation, Agnico Eagle has produced two hydrogeological models (Version 1 (SNC, 2017) and Version 2 (SNC, 2018a)) in support of this application. Version 1 is related to the Pre-Feasibility Engineering Phase and Version 2 is related to the Detail Engineering Phase of the In-Pit Disposal project. Version 2 results are consistent with Version 1 and are also consistent with what was predicted in the original FEIS; ''In conclusion, the comparison to what was originally predicted, the proposed in-pit tailings disposal modification is predicted to have the same or less impact to the groundwater in operation, closure/post closure (SNC 2018, page 13).'' (SNC, 2018b). Note that the version 2 hydrogeological model includes the recommendations made by Don Chorley and the Meadowbank Dike Review Board following their reviews of the Version 1 model.

As previously stated in Agnico Eagle response to NRCAN-03 recommendation, the permafrost extent (SNC, 2017c) was integrated in the Version 2 hydrogeological model. Agnico Eagle is confident these appropriately represent expected conditions at the site because thawing effects from the tailings as well as climate change were considered in the latest thermal models.

Additionally, Agnico Eagle is confident that the boundaries are appropriate for the assessment stage because Versions 1 and 2 of the hydrogeological models and the Golder (2004,2005) regional model are showing similar hydraulic heads at the boundary conditions used for Versions 1 and 2 hydrogeological models.

As previously stated in Agnico Eagle response to NRCAN-02 recommendation, the boundary conditions will be used for developing the Version 3 hydrogeological model (sensitivity analysis of Version 2). As concluded in Agnico Eagle response to NRCAN-02, based on the difference in between the hydraulic gradients, SNC and Golder predict with high confidence that Version 3 hydrogeological model (sensitivity analysis of Version 2) will have result as follows:

- Groundwater flow and travel time will be increased by approximately a factor of 3 to 4 times for Portage Pit E, 5 times for Portage Pit A and no change predicted for Goose Pit;
- Groundwater flow through the tailings is expected to be dominated by downward flow;
- Contaminant plumes concentration will remain the same;
- Contaminant plumes location will remain the same;
- The predicted impact in the receiving environment will not change.

The recommendation NRCAN-01 and NRCAN-02 related to the hydrogeological model boundary conditions are inputs to the model which are related to NRCAN-11 recommendation. Based on review by SNC-Lavalin and Golder of recommendation NRCAN-01 and NRCAN-02, the Version 3 hydrogeological model (sensitivity analysis of Version 2) will not change the predicted impact in the receiving environment as per Versions 1 and 2 of the hydrogeological model.

The results of Version 3 hydrogeological model (sensitivity analysis of Version 2) will be submitted to the NWB as part of the NWB's consideration of Agnico Eagle's modification request during the week of September 17, 2018. These results and any future annual monitoring and modelling updates will be provided to NWB in annual reporting and updated management plans according to the 2AM MEA1526.

Interested Party:	**Natural Resources Canada (NRCan)**	**Rec No.:**	**NRCAN-08**
Re:	**Assessment of contaminant migration to Third Portage Lake**		

Final Written Submission / Recommendation Made By Interested Party:
NRCan recommends that the proponent use updated groundwater modelling to assess the potential for groundwater flow through the tailings to transport contaminants to surface water overlying the tailings. If significant, groundwater contaminant fluxes could be integrated into surface water quality modelling.

Agnico Eagle's Response to Final Submission / Recommendation:

NRCAN #8 Response

Agnico Eagle agrees to provide further information to address the NRCan recommendation and will proceed to update groundwater modeling to assess the potential for groundwater flow through the tailings. Version 3 hydrogeological model (sensitivity analysis of Version 2) will address the recommendations NRCAN-01, NRCAN-02 and NRCAN-08.

However as previously stated by Agnico Eagle in response to NRCAN-02 recommendation, based on the difference in between the hydraulic gradients, SNC and Golder predict Version 3 hydrogeological model (sensitivity analysis of Version 2) will have result as follows:

- Groundwater flow and travel time will be increased by approximately a factor of 3 to 4 times for Portage Pit E, 5 times for Portage Pit A and no change predicted for Goose Pit;
- Groundwater flow through the tailings is expected to be dominated by downward flow;
- Contaminant plumes concentration will remain the same;
- Contaminant plumes location will remain the same;
- The predicted impact in the receiving environment will not change.

The recommendation NRCAN-08 is an input to the model which is related to NRCAN-7 and NRCAN-11 recommendations. Based on review by SNC-Lavalin and Golder of recommendation NRCAN-08, the Version 3 hydrogeological model (sensitivity analysis of Version 2) will not change the predicted impact in the receiving environment as per Versions 1 and 2 of the hydrogeological model.

The results of Version 3 hydrogeological model (sensitivity analysis of Version 2) will be submitted to the NWB as part of the modification review. These results and any future annual monitoring and modelling updates will be provided to NWB in annual reporting and updated management plans according to the 2AM MEA1526.

Interested Party:	**Natural Resources Canada (NRCan)**	**Rec No.:**	**NRCAN-09**
Re:	**Groundwater monitoring following dike breaching**		

Final Written Submission / Recommendation Made By Interested Party:

NRCan recommends that the NIRB seek commitments from the proponent to ensure sufficient, relevant groundwater monitoring into the post-closure period to observe potential groundwater contaminant migration caused by flooding of the pits and surrounding areas.

NRCan recommends that updated groundwater modelling (NRCan-IR#12) be used to assess the predicted breakthrough curves of groundwater contaminants at existing monitoring wells and assess the suitability of these wells which may be too deep to serve as sentinels of groundwater contamination.

Agnico Eagle's Response to Final Submission / Recommendation:

NRCAN #9 Response

Agnico Eagle agrees to provide further information in response to NRCan recommendation. Agnico Eagle is committed to ensure sufficient, relevant groundwater monitoring into the post-closure period to observe potential groundwater contaminant migration caused by flooding of the pits and surrounding areas. The monitoring wells installed during the summer 2018 by Agnico Eagle were installed according to Version 1

hydrogeological modelling results and installation depths have been selected with a detailed drilling log and thermal investigation completed in 2017 to target the most permeable zone at the selected locations. Agnico Eagle considers this as the best approach to intercept potential contaminant migration in predicted plume pathways and will be used following future hydrogeological model updates.

If deemed appropriate by NIRB and NWB, Agnico Eagle submits NRCan recommendation could be reflected in the NWB modification process. This can be managed by updating the annual report and associated management plans.

Agnico Eagle commits to continue to consider and address the NRCan recommendation in its annual reports as well as updates the Groundwater Monitoring Plan.

Interested Party:	**Natural Resources Canada (NRCan)**	**Rec No.:**	**NRCAN-10**
Re:	**High permeability near the Central Dike**		

Final Written Submission / Recommendation Made By Interested Party:
Unexpectedly high seepage rates beneath the Central Dike should be regarded as a warning that hydrogeological predictions at the Meadowbank site are subject to the uncertainty in upper bedrock hydraulic conductivity. NRCan recommends to the NIRB that updated hydrogeological modelling (NRCan-IR#12) should include a sensitivity analysis of contaminant transport modelling results to a tenfold variation in upper bedrock hydraulic conductivity.

Agnico Eagle's Response to Final Submission / Recommendation:

NRCAN #10 Response
Agnico Eagle disagrees with NRCan recommendation and does not agree that it is necessary or appropriate to carry out a sensitivity analysis of post-closure contaminant transport modelling results to a tenfold variation of the hydraulic conductivity, applied to the upper weathered bedrock (5 to 30 m deep) in other sectors. The following provides clarity and rationale for this opinion.

Pit wall monitoring and physical observations completed by Agnico Eagle during the mining of Goose and Portage Pits provided actual field information to define the extent of potential seepage pathways. In the case of the Central Dike seepage, Agnico Eagle did not have the bedrock exposed beneath the Central Dike to physical observed seepage areas; only field investigation performed by drilling and geophysical surveys were used to define the potential seepage pathways following the seepage occurrence.

Agnico Eagle used the pit wall monitoring results and observation data during the mining of the Goose and Portage Pits in the development of the different hydrogeological models and the 2017 field investigation completed for the in-pit disposal project. The most critical zone identified during the pit wall monitoring was

limited to the Second Portage Lake area located between East Dike and Central Dike, a very localized area that does not extend to the other sections of the pits. The field investigation, performed by SNC in 2017 (SNC, 2017d), was targeting this zone and the objective was to define properly the upper bedrock unit characteristics.

Based on the 2017 field investigation results, the Version 2 hydrogeological (SNC, 2018a) modeling include a conservative and high permeability zone of 2x10-3 m/s having a thickness of 2 m to the upper bedrock unit located in the Second Portage Lake area. Agnico Eagle considered this a conservative approach compared to the pit wall monitoring, observation data and 2017 field investigation results as a 2m high permeability structure has not been observed on the full extent of the Second Portage Lake area.

Interested Party:	**Natural Resources Canada (NRCan)**	**Rec No.:**	**NRCAN-11**
Re:	**Updated hydrogeological modelling**		

Final Written Submission / Recommendation Made By Interested Party:
NRCan recommends to the NIRB that the current hydrogeological modelling be considered insufficient for the assessment of potential effects.

NRCan recommends that the Proponent update the hydrogeological modelling.

NRCan recommends that the following elements be included in the updated hydrogeological modelling:

a) *Use an updated post-closure extent of permafrost and talik for simulations of post-closure scenarios (NRCan-IR#4).*
b) *Update the boundary conditions on the Second and Third Portage Lakes and pits to represent the actual post-closure hydraulic heads in the model (NRCan-IR#8). Specifically,*
    i. *the entire surface and water body of the Second Portage Lake should be a specified head equal to lake level;*
    ii. *the entire surface and water body of the Third Portage Lake, including the entire water body of the flooded area inside the dikes following their flooding, should be a specified head equal to lake level.*
c) *Update the boundary conditions on the sub-permafrost groundwater (NRCan-IR#1 and NRCan-IR#3). As noted in NRCan-IR#1, this could be accomplished using two approaches:*
    i. *the model can be extended to adjacent lakes using large elements since it allows the hydraulic heads in the sub-permafrost groundwater to be solved numerically, thereby taking into consideration the hydrogeological influence of varied lake sizes, elevations and distances. This is NRCan's preference as it removes more uncertainty in sub-permafrost boundary conditions than does approach ii)*
    ii. *If the model area is not extended, NRCan recommends that specified heads be assigned in the sub-permafrost groundwater according to the Golder (2004, 2005)*

results (i.e. around the domain, rather than just for two segments with specified heads and the remaining segments specified as no-flow boundaries). Furthermore, a sensitivity analysis on the specified heads in the sub-permafrost groundwater is recommended to assess their influence on groundwater flowpaths in the talik and, in particular, on the vertical gradients and related vertical groundwater flow.

d) *Conduct a sensitivity analysis of contaminant transport scenarios by varying the hydraulic conductivity of the upper bedrock hydraulic conductivity (NRCan-IR#11). A tenfold variation in hydraulic conductivity is recommended in NRCan-IR#11.*
e) *Assess the potential for groundwater contaminant transport from the tailings into the overlying Third Portage Lake during the post-closure period as a result of groundwater flow (NRCan-IR#9). This requires careful consideration of the vertical hydraulic gradients in the sub-permafrost groundwater beneath each of the pits (NRCan-IR#1 and #3).*
f) *Include the entire extents of tailing deposition in the Goose and Portage Pits as sources of contamination (NRCan-IR#7). This modification was easily accomplished in the proponent response to IR#7. The inclusion of the entire extent of tailings deposition may be more relevant for the assessment of groundwater contaminant transport from the tailings into the overlying Third Portage Lake during the post-closure period (e).*
g) *Include the waste rock deposited in the Goose Pit as a hydrostratigraphic unit in the model (NRCan-IR#5). This could be easily accomplished in the model and may be relevant for the assessment of groundwater contaminant transport from the tailings into the overlying Third Portage Lake during the post-closure period (e).*
h) *Update the modelling scenarios to represent planned conditions (and BCs) during and following in-pit deposition with a greater emphasis on predicting contaminant migration to natural receptors.*

Scenario 1) Goose Pit filled with tailings for the entire duration of Portage Pit filling (Period 3).
Although this scenario represents flow and transport towards an artificial receptor (Portage Pit E), the hydraulic gradients are high during this period and could produce a plume that may subsequently migrate towards natural receptors during subsequent periods when gradients and flowpaths change. The source concentration should apply to the entire depth of the tailings (f). The Goose dump should be included, since it may provide a more permeable flowpath (g). The duration of the simulation should be the entire duration of the Portage Pit deposition (Period 3) and, therefore, may require variable head BCs on the Portage pits. As the water level in Goose Pit is to be managed (i.e. pumped at times), a specified BC may be more appropriate.

Scenario 2) Post-closure, all pits filled with tailings and flooded (Period 6).
This scenario needs to assess the transport from each pit to possible natural receptors, including the surface water above the pits (which will become part of Third Portage Lake) (e), Second Portage Lake and, if appropriate, Lake Tehek. The source concentration should apply to the entire depth of the tailings in each pit (f). To make use of the Scenario 1 results, the initial concentrations for the Goose Pit should be based on results from the Scenario 1 simulations with the contamination extending beyond Goose Pit (h, i). The extent of permafrost in the model (a) and the hydraulic head BCs (b, c) should be representative of post-closure conditions with dikes breached (i.e. flooded).

Other scenarios, such as variable source BCs over time, could be considered. However, evidence that the tailings act as a variable source should be provided.

NRCan recommends to the NIRB that the updated modelling be fully documented and present all the pertinent results to allow for the assessment and review of the proposed project modification. A sensitivity analysis of the contaminant transport scenarios by varying the hydraulic conductivity of the upper bedrock hydraulic conductivity should be included (d). An assessment and discussion specific to the potential for the migration of contaminants from the tailings into the overlying Third Portage Lake during the post-closure period is also required (e). In general, the approach used in the SNC-Lavalin (2017a) report is satisfactory; plan and cross-sectional views show the dominant contaminant migration pathways and concentrations. Such figures should be provided along the flowpaths to each of the main receptors from each of the pits. Since the BCs used to simulate the groundwater flow in Figures 18 and 19 do not apply to the transport scenarios, hydraulic head maps for both shallow and deep (sub-permafrost) model layers should be provided for each contaminant transport scenario.

Agnico Eagle's Response to Final Submission / Recommendation:

NRCAN #11 Response

Agnico Eagle agrees to provide further information within the NWB modification process to address the NRCan recommendations. However, Agnico Eagle is of the view that the current hydrogeological modelling should be considered sufficient by NIRB for the assessment of the potential effects.

For clarification, Agnico Eagle developed the following table to summarize the recommendations of NRCan included in its Final Submission and to clarify which version of the hydrogeological model addresses or will address these specific recommendations. Our detailed rationale is included in our responses to each recommendation, but this summary is provided for the Board's convenience.

NRCAN Recommendation #		Subject	Agnico Eagle Responses	Supporting Documentation
1	Same as NRCAN11-c)	Model extent	Agree – Boundary conditions will be adjusted and included in Version 3 hydrogeological model (sensitivity analysis of Version 2 (SNC, 2017a))	Agnico Eagle response to NRCAN-02 recommendation
2	Same as NRCAN11-c)	Justification of flow boundary descriptions	Agree - Boundary conditions will be adjusted and included in Version 3 hydrogeological model (sensitivity analysis of Version 2)	Agnico Eagle response to NRCAN-02 recommendation
3	Same as NRCAN11-a) and NRCAN11-c)	Extent of the permafrost in the groundwater model	Disagree - Extent of the permafrost in the Version 2 hydrogeological model. See Agnico Eagle response to NRCan-3 for further rationale.	Updated thermal model and Version 2 hydrogeological model
4	Same as NRCAN11-g)	Waste rock and tailings within pits	Agree - Will be included in Version 3 hydrogeological model (sensitivity analysis of Version 2) as part of NWB modification process.	
5	Same as NRCAN11-h)	Water level controls during in-pit deposition periods	Agree - Will be included in Version 3 hydrogeological model (sensitivity analysis of Version 2) as part of NWB modification process.	

6	Same as NRCAN11-f)	Tailings as a contaminant source	Agree - Version 2 hydrogeological modeling considers entire extent of tailings as a source	Version 2 hydrogeological model
7	Same as NRCAN11-b)	In-pit deposition periods and contaminant transport scenarios	Disagree - Current hydrogeological modelling provided to NIRB is sufficient for the assessment of potential effects of the project. See Agnico Eagle response to NRCan-7 for further rationale.	Version 2 hydrogeological model
8	Same as NRCAN11-e)	Assessment of contaminant migration to Third Portage Lake	Agree - Will be included in Version 3 hydrogeological model (sensitivity analysis of Version 2) as part of NWB modification process.	
9		Groundwater monitoring following dike breaching	Agree - Should be reflected in the NWB modification process	
10	Same as NRCAN11-d)	High permeability near the Central Dike	Disagree - High permeability zone characteristic supported by field investigation, pit wall monitoring and physical observations. See Agnico Eagle response to NRCan-10 for further rationale.	Version 2 hydrogeological model
11		Updated hydrogeological modelling	Agree - Version 3 hydrogeological model (sensitivity analysis of Version 2) will be completed by Agnico Eagle as part of NWB modification process.	
12		Updated groundwater monitoring plan	Agree - Should be reflected in the NWB modification process	

The Version 3 hydrogeological model (sensitivity analysis of Version 2) will include the two scenarios recommended by NRCan; Scenario 1 and Scenario 2. Based on review by SNC-Lavalin and Golder, the Version 3 hydrogeological model (sensitivity analysis of Version 2) will not change the predicted impact in the receiving environment as per Versions 1 (SNC, 2017) and 2 of the hydrogeological model.

The results of Version 3 hydrogeological model (sensitivity analysis of Version 2) will be submitted to the NWB as part of the modification review during the week of September 17, 2018. These results and any future annual monitoring and modelling updates will be provided to NWB in annual reporting and updated management plans according to the 2AM MEA1526.

Interested Party:	**Natural Resources Canada (NRCan)**	**Rec No.:**	**NRCAN-12**
Re:	**Updated groundwater monitoring plan**		

Final Written Submission / Recommendation Made By Interested Party:

NRCan recommends that NIRB or NWB (Nunavut Water Board) should establish a timetable for the update of the groundwater monitoring plan.

NRCan recommends that the groundwater monitoring plan should be re-assessed prior to in-pit deposition.

NRCan recommends that the groundwater monitoring plan should explicitly state which monitoring wells will be maintained in the post-closure period (and groundwater monitoring period) and their monitoring and sampling frequencies.

NRCan recommends that the groundwater monitoring plan should discuss contingency measures to deal with potential contaminant migration issues.

NRCan recommends to the NIRB that the proponent develop a monitoring approach to assess groundwater contaminant migration from the in-pit tailings to the overlying surface water following flooding of the pits.

NRCan recommends that the updated groundwater modelling (NRCan-#IR12) be used to assess the groundwater monitoring well locations; they appear to be too deep and may not be ideal sentinels of contaminant migration. The modelling of breakthrough curves at observation points in FEFLOW is simple and would require little additional effort. NRCan recommends that these curves be used to evaluate the effectiveness of the monitoring locations in comparison to the predicted plumes.

Agnico Eagle's Response to Final Submission / Recommendation:

NRCAN #12 Response

As described above, Agnico Eagle proposes to provide the Version 3 hydrogeological model (sensitivity analysis of Version 2 (SNC, 2018a)) results prior to NWB approval of in-pit tailings modification and discuss the results with NRCan at a mutually agreeable during the week of September 17, 2018. Based on the results of the sensitivity analysis and workshop with NRCan, if deemed appropriate by NIRB and NWB, Agnico Eagle will update the groundwater monitoring plan which will include:

- Which monitoring wells will be maintained in the post closure period, their monitoring and sampling frequencies;
- Contingency measures to address any potential contaminant migration issues (which Agnico Eagle notes are not expected based on our detailed analysis to date).;
- Prior to Period 4 (Water treatment and pit flooding), Agnico Eagle commits to develop a monitoring approach to further evaluate the potential for groundwater contaminant migration from the in-pit tailings to the overlying surface water following flooding of the pits.

The updated groundwater monitoring plan will be shared with NWB and NIRB along with applicable final infrastructure designs required 60 days following Board approval as per 2AM MEA1526 Part B Item 14. As per the existing Project Certificate and 2AM-MEA1526 terms and conditions, ground water monitoring results will be summarized and provided to NWB and NIRB on an annual basis and updated based on intervener recommendations.

References

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Meadowbank Dike Review Board, 2017 (MDRB, 2017). MDRB Meeting No 22 Report, October 10th, 2017.

SNC-Lavalin, 2017. Hydrogeological Modelling for In-Pit Deposition of Tailings. Technical Note. 643541-3000-4WER-0001 Rev A00, November 30, 2017.

SCN-Lavalin, 2018a - Hydrogeological Modelling for In-Pit Tailings Deposition. Technical Note. 51196-3000-4WER-0001 Rev A00, August 16, 2018.

SCN-Lavalin, 2018b - Environmental Impact Study Review – Meadowbank In-Pit Tailings Deposition. Technical Note. 651196-0000-4EER-0001-B01 Rev 01, February 15, 2018.

SCN-Lavalin, 2018c - In-Pit Tailings Deposition Thermal Modelling. Technical Note. 651196-3100-4GER-0001 Rev 00, April 16, 2018.

SCN-Lavalin, 2018d – Hydrogeological Field Investigation, East Road & Goose In-Pit Tailings Deposition. Technical Note. 648081-3000-4WER-0001-00, November 16, 2017.