

# Appendix L

## RFIs List

As-Built Report of Whale Tail Dike		Original -V.PB
2019-03-20	658309-0000-56ER-0001	Technical Report

RFI #	Date Received	Date Responded	Status	Subject	Location/Address	Notes
RFI-001	2018-06-15	2018-07-27	No Objection	Interlocking in the Secant string by Primary, Secondary and Tertiary Piles	Cut-Off Wall	Per Section 4.4.3.9 of Specification, no tertiary piles were defined and secondary piles were to be bored into primary piles. The contractor work plan indicated the use of tertiary piles. A deviation from Specification standard method was allowed.
RFI-002	2018-08-17	2018-08-17	Approved	Placement of Coarse Filter (CF) Between Frozen Soil and Fine Filter	0+740 to 0+774	Coarse filter materials already placed between fine filter and frozen soil (Section HH of Drawing). The min 2.5 m fine filter material width from centerline of secant pile is still maintained and approval was made since no compromise was expected from this deviation.
RFI-003	2018-08-16	2018-08-17	Approved Conditionally	Change in Sequence and Thickness of Fill Placement	~ 0+350	AEM/KCG intention to perform the fill placement in certain sequence and a 2m thickness instead of 1.5 m for efficiency in the fieldwork considering the narrowness of the area near Section FF. Approved with the condition to supervise the fill placement thoroughly.
RFI-004	2018-08-18	2018-08-19	Approved with Correction	Adding CF in U/S and Extending CF in D/S	0+120 to 0+135	AEM suggested to raise the Coarse Filter 1.2 m (above the natural ground) to 157masl instead of rockfill placement. This change in Section DD had no design impact and accepted after modifying the suggested CF slopes near Section DD.
RFI-005	2018-08-24	2018-08-25	Agreed "As Is"	Thickness of CF Materials Less than Specification Requirement	~0+753 to ~0+767	Per surveyor's as-built results, the thickness of upstream coarse filter layer did not meet the requirements. To facilitate construction progress, this non-conformance was accepted "as is" because the variation in the CF materials thickness is not expected to jeopardize the stability of the dike in this area and its effect in the overall seepage would be minimal.
RFI-006	2018-08-24	2018-09-05	As-Built Approved	Modification of Dike Cross-Section in Segment with Deeper Bedrock	0+355 to 0+385	Deeper bedrock in Section HH required alterations in the dike cross-section profile, which was applied by surveyor after QA feedback on-site.
RFI-007	na	2018-08-16	AEM-KCG Decision	Excavation Instead of Blasting	0+700 to 0+830	The area was stripped as the soil was easy to excavate compared to earlier expectation of hard frozen ground near Sections GG and II
RFI-008	2018-08-27	2018-08-27	Approved	Secant Pile Start from 0+088.75 based on Surveyed Bedrock Elevation	0+088.75 to East	Edge of first casing was at 88.25 and pile numbering started from this location. Details 3, Drawing 651298-2500-4G-DD-0007-01
RFI-009	na	2018-08-31	Approved	Excavation Ended at 0+830	0+772 to 0+843	Excavation halted at 0+830 due to bedrock above El. 157 m. Menard adjusted accordingly - no Dynamic Compaction beyond 0+830
RFI-010	2018-08-27	2018-08-27	Approved	Start Secant Pile Installation with 0.8 m Spacing instead of 0.75 m	0+90 to 0+190	With 50 mm and 0.75% tolerances, in the extreme allowable cases, the 0.8 m spacing could not create a gap between adjacent piles in the FF zone and is acceptable - Start with 0.8 m at West Abutment and spacing to be reduced for deeper sections
RFI-011	na	2018-09-05	Approved	Slurry Trench Sides Sloped Instead of Vertical Sides	0+065 to 0+089.7	A slope of ~ 1H:1V implemented for the slurry trench in the west abutment, instead of vertical sides shown in Section CC of the design drawing. QA not present but assessed the density of side slopes through spot checks after the slope profiling.
RFI-012	2018-09-10	2018-09-12	Approved	~ 1m Deeper Secant Piles in Uncertain Permafrost Zone	0+500 to 0+600	The proposal by QA for deeper piles, based on comparisons between as-built and predicted bedrock El, was approved by AEM as it had minimal impact on the contingency margin at the time.
RFI-013	2018-09-10	2018-09-12	Approved	~ 0.8m Deeper Secant Piles Due to Uncertainties in Bedrock El.	0+710 to 0+727	The proposal by Designer for deeper piles (~0.8 m) in this area, because the as-built bedrock provided by the surveyor during excavations is above the predicted bedrock El and not convinced that bedrock was reached, was approved by AEM as it had minimal impact on the contingency margin at the time.
RFI-014	2018-09-11	2018-09-16	Conditional Approval	Temporarily No Admixture in CB Slurry Mixes	Piles Backfilled Prior to Sep 25, 2018	Slurry mixes prepared without lignosulfonate admixture until batch plant system is fixed. Advice was made that if the time for placement of slurry into piles took longer than gelation time, a thinner slurry would be required to assure piles are backfilled before slurry starts to jellify.
RFI-015	2018-09-16	2018-09-25	-	AEM Waived Requirement for Viscosity Measurement On-site.	Piles Backfilled Prior to Sep 25, 2018	Marsh readings are essential to monitor viscosity of the mix including the gel time. Slurry placement should be completed before gelation occurs. Slurries poured in piles since September 16, 2018 show a noticeably higher viscosity. Marsh readings were resumed from Sep 25, 2018.
RFI-016	2018-09-04	2018-10-09	Approved	Modified Test Frequency Program for Controls on CB Mix.	Production Work - Secant Piles	KCG/AEM proposed modifications on Appendix 2 of Specification, dated July 4, 2018 was revised and approved by Designer based on actual site conditions/logistics. Agreed modifications were sent to AEM (Memo 002) and then applied in the revised technical specifications, dated Jan 23,

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						2019.
RFI-017	2018-08-07	2018-10-14	Approved	Pile Spacing and Its Rationalization for Secant Piles	Cut-Off Wall	Pursuant to Section 4.4.3 of Specification, Henry Drilling proposed a pile spacing of 0.75 m in the submittal/work plan. A memo issued by Designer on implications of the pile spacing on the continuity of wall ( to be included in the as-built).
RFI-018	2018-09-28	2018-09-28	Approved	Use of ASTM C940 for Bleeding Test instead of API 13B	Cut-Off Wall and Curtain Grouting	The API 13B, recommended in design report, is withdrawn or may not be accessible. ASTM C940 can be used as an alternative.
RFI-019	2018-09-30	2018-10-01	Not Approved	Suggestion for Drilling Tertiaries After 4 days, Instead of Testing for 50 kPa	Piles Installed after Sep 30	Considering variations that could occur in the field during mix preparation, inaccuracies in the weighing system and amount of admixture at this stage - there is no guarantee that the backfill strength would gain a strength of > 50 kPa after a certain time. Following Specification Section 4.4.3.9 by conducting a UCS test is still a good practice.
RFI-020	2018-10-01	2018-10-01	Approved	Clarification/Change on Section 4.4.3.9 of Specifications.	All Secant Piles	It was "The secondary piles shall not be bored into the primary piles unless the CB reaches the specified minimum early strength of 50 kPa UCS". It is now changed to "The tertiary piles shall not be bored into the primary and secondary piles unless the CB backfill reaches the specified minimum early strength (UCS) of 50 kPa"
RFI-021	2018-10-11	na	Contractor's Submittal	Cement Reduction in CB Slurry Mix Proportions	All Piles Since Oct 9, 2018	Per Specification Section 4.3.6, Contractor shall submit its CB mix design to QA for approval prior to beginning of the Work. No submittal was provided for the slurry with reduced cement (317 kg/m3 Cement instead of ~ 350 kg/m3) but the QC tests during production was used to verify the new slurry mix properties.
RFI-022	2018-10-15	2018-10-15	Approved	Depth Tertiary Piles Determined Equal to the Deepest of 2 Adjacent Piles	All Tertiaries since Oct 15	Due to difficulties in realizing actual bedrock elevation during drilling tertiary piles, this deviation was accepted instead of drilling > 1 m below the actual bedrock (Section 4.4.3.5 of Specification).
RFI-023	2018-11-01	2018-11-01	Accepted "As Is"	Minimal Number of Sockets Slightly Less than $1.0 \pm 0.1$ m	Small Number of Piles, e.g. #599	After seating of casing in bedrock and cleaning of the socket, a one meter long socket shall be formed. The tolerance on lines and grades is 0.1 m. (Sections 4.4.3.5 and 2.8 of Specification). A slightly more tolerance was agreed to save time and cost for DTH rig re-mobilization.
RFI-024	2018-11-05	2018-11-05	Approved	No Need for ~ 1m Deeper Secant Piles in Uncertain Permafrost Zone	0+500 to 0+600	The earlier arrangement for 2 m rock sockets instead of 1 m (see RFI-012) was not found applicable after few piles were drilled with 2 m sockets. AEM decided to maintain the original socket depth of 1 m.
RFI-025	2018-11-01	2018-11-16	Design Modification	Last Pile in East Abutment at Station 0+832	0+810 to 0+832	At 0+825 the cut-off is at Operational Water Level ( El. 156.0 m). Designer recommended to add short piles anchored in till up to Station 0+832 m to finalize the Eastern section at elevation 157.0 m.
RFI-026	2018-10-24	2018-11-25	Agreed	2 m Rock Sockets instead of 1 m per MDRB Recommendation	0+710 to 0+772	Further to a recommendation by MDRB to increase the rock socket depth in the east abutment. Originally it was intended to apply this from 0+710 to 0+772, however, the primaries and secondaries had already been installed in part of this area and the 2 m sockets were implemented effective from 0+740 to 0+772
RFI-027	2018-11-24	2018-11-27	Agreed	Grout Curtain Offset of 0.7 m (U/S) from Center of Cut-off Wall	0+180 to 0+730	AEM proposal is understood to be based on the AEM-MDRB discussions that coring through cut-off wall could damage the wall. SNC agreed to proceed with 0.7 m offset with a notation on potential risk of seepage bypass through the offset zone. The change will also take away the chance of having confirmatory coring in the cut-off wall.
RFI-028	2018-11-29	2018-11-29	Agreed	Grout Holes (U/S) Drilled Vertical	0+180 to 0+730	Following the RFI-027, the modified design/drawings specified grout holes with inclination 3%-4% to intersect the base of cut-off wall and maintain continuity between the cut-off wall and grout curtain. AEM believed inclined holes could still damage the wall and advised to have grout holes drilled vertically.
RFI-029	2018-12-07	2018-12-10	Agreed	Grout Curtain Extends 10 m below Bedrock Surface	0+180 to 0+730	In original design, the grout curtain extended 10 m below the bottom of the cut-off wall. Per AEM request, the grout curtain was extended 10 m below the bedrock surface instead of below the rock socket bottom, i.e. the curtain is shortened 1 m to ~ 3.5 m

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RFI-030	2018-11-27	2018-12-01	-	Longitudinal Extension of Grout Curtain from 0+180 to 0+516	0+180 to 0+516	AEM wanted to stop grouting at Station 0+516 instead 0+ 730 that was suggested by SNC on Nov 27, 2018. The strategy was to step a bit in the permafrost zone and during the injection assess the need for more casing drilling towards the east based on grout takes. No evidence available, if such an assessment was done.
RFI-031	2019-18-01	2019-01-28	Agreed	Eight Quaternaries only	0+180 to 0+516	Per Section 5.5.5.11 - Quaternary holes would be on an if required basis. Initially AEM did not approve proceeding with quaternary holes, regardless of grout takes in tertiaries. However, after a SNC-AEM meeting (Jan 18) considering the time constrains, grouting of Q397.5, Q400.5, Q403.5, Q406.5, Q463.5, Q466.56 quaternaries met AEM approval. Q199.5, Q202.5 were added later by AEM, making a total of 8 quaternaries .
RFI-032	2018-12-28	2019-01-03	-	No Downstage Grouting for Curtain Grouting Except for Two Holes	0+180 to 0+516	QA required downstage grouting of holes when the holes caved-in during drilling in the fractures zones, which did not meet AEM approval. Nevertheless, downstage grouting was partially implemented in S-402 and S378 .
RFI-033	2019-01-06	2019-01-07	Specification Modification	Refusal Criterion		Section 5.5.5.16 was modified from "less than 5 litres per minute per 5 m of stage length, measured over a 10 minute period" to "1 to 3 litres per minute over a 5 minute period at target pressure", regardless of stage length.
RFI-034	na	2018-08-08	Agreed	Using Coarse Filter Materials instead of Rockfill	West Abutment	According to specifications, the esker had to be excavated up to El. 153.0 m and the initial rockfill platforms made to El. 154.0 m. Since the platform elevation was modified from 154.0 m to 153.5 m, the rockfill with particles between 0.5 m and 1 m, was no longer suitable for a 0.5 m thick fill. AEM decided to place coarse filter instead of rockfill.
RFI-035	na	2018-08-08	Agreed	Excavation of 2.5 m Ice - More than Expected in Design	0+750 to 0+820	The ice was about 2.5 m thicker in the east abutment than initially proposed. AEM decided to remove ice. Coarse filter was placed on the downstream natural ground slope as a protective layer against thawing of ice-rich till. A narrower trench of 10 m (5 m from each side of the centerline) compared to 15 m was executed.
RFI-036	na	2018-08-15	Agreed	Coarse and Fine Filter Zones in Dike Cross-Section	0+355 to 0+370	Coarse filter placement from Stations 0+355 to 0+370 or (355 to 385) was modified due to deeper than expected excavation in poor bedrock (to El. 144). To maintain the same slope angles, dike dimensions had to be changed at this location.
RFI-037	na	2018-10-10	Agreed	Core Barrel used to Drill Rock Socket	Some Piles Since Oct 3, 2018	Henry Drilling employed core barrel as an alternative method for socket drilling to avoid significant slurry loss near casing shoe elevation and also as a backup when DTH did not work. Core barrel was used to drill approximately 1 m into bedrock and DTH hammer was then used to clean the socket. QA/AEM agreed with the change provided that the socket is cleaned satisfactorily.
RFI-38	na	2018-11-28	Agreed	Piles with No Rock Sockets	0+826 to 0+832	No rock sockets were required due to presence of frozen till, encountered during stripping of the foundation. Hence Piles 967-975 are without rock sockets.
RFI-039	na	2019-01-31	Agreed	No WPT/Check Holes and No more Quaternary Holes	0+180 to 0+516	AEM decided not to add any further hole for WPT and/or grouting and cancelled previously planned WPT in Q-406.5 and Q-466.5 due to time constrains.
RFI-040	2019-02-10	2019-02-22	-	Placement of Final Lift from El. 157 to El. 159	Entire Dike	Design recommendation was to place the final lift before the freshet (March-April) to reduce the potential freeze-thaw cycles and prevent local disturbance of the CB backfilled piles. AEM placed ~ 1 m of aggregate in the end of Jan 2019 and final lift to be executed during May-June, 2019.
RFI-041	2018-07-04	2018-12-23	Specification Modification	Circulation of Grout Mixes for Over 2 Hrs	Grout Curtain	Per Section 5.5.5.13 a grout batch, which has been in circulation for over 2 hours is not suitable for injection and shall be disposed of. This requirement was waived. QC/QA controlled other properties of grouts, i.e. set time (~ 5 hrs), continuous agitation, temperature, viscosity and density.
RFI-042	2018-07-04		-	No Grouting If Temperature of Rock Below 0 °C.	0+180 to 0+730	Per Section 5.5.5.5, no grouting shall take place if the temperature of the rock to be grouted is below 0°C. No confirmation of temperature of the foundation was carried out to assess the groutability of the foundation rock and the limit of the grout curtain.