Appendix 9

Meadowbank 2019 Annual Geotechnical Inspection

REPORT

2019 Annual Geotechnical Inspection

Meadowbank Gold Mine, Nunavut

Submitted to:

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Study Limitations

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1.0 INTRODUCTION

Agnico-Eagle Mines Limited’s (AEM) Meadowbank Complex mandated Golder Associés Ltée (Golder) to conduct the 2019 annual geotechnical inspection, pursuant to the requirement of Type A Water Licence Permit No. 2AM-MEA0815 for the Meadowbank Complex, Nunavut.

Under Part I, Item 12 (pages 23 and 24), AEM is required to undertake an annual geotechnical inspection of its facilities between the months of July and September. The following structures were covered by the inspection:

- dewatering dikes (East Dike, South Camp Dike, Bay-Goose Dike and Vault Dike)
- tailings storage facilities (Stormwater Dike, Saddle Dam 1, Saddle Dam 2, Saddle Dam 3, Saddle Dam 4, Saddle Dam 5, Central Dike and the North Cell Internal Structure)
- South Cell pond and North Cell pond (reclaim ponds)
- geotechnical instrumentation
- All-Weather Private Road (AWPR), Amaruq Road and site roads (culverts and bridges at water crossings in particular)
- quarries on site and along the AWPR and Amaruq Road
- landfill and contaminated soil storage and bioremedial landfarm facility
- bulk fuel storage facilities at the mine site, at the Amaruq site and in Baker Lake
- shoreline protection and diffusers
- sediment and erosion control structures
- other structures: sumps, airstrip, Waste Rock Storage Facility (RSF) till plug, Stormwater pond, diversion ditch

The 2019 geotechnical inspection was conducted from July 22 to 26 by Yves Boulianne, a professional geotechnical engineer from Golder. During the inspection, the weather was rainy to sunny with daily temperatures varying between 5°C and 15°C. The inspection was scheduled at the time of year when the seasonal depth of thaw (active layer) is expected at, or near its maximum. Surface water flow is generally low to moderate at this time of year. Peak water flows typically occur during the spring thaw (mid-June through mid-July).

The Operation, Maintenance and Surveillance (OMS) manuals for the dewatering dikes and the tailings storage facility structures were also reviewed in the framework of this mandate.

This report describes the geotechnical aspects of the areas inspected and presents general observations and recommendations.

Figure 1 shows the main mine site area. At the time of the inspection, the South Cell peripheral structures were completed at El. 145 m, the North Cell Internal Structure was completed at El. 152 to 154 m, and tailings deposition was ongoing in Bay-Goose Pit at part of the in-pit deposition plan. No tailings were deposited in the tailings storage facility.

1.1 Scope Limitations

The scope of the inspection is limited to the geotechnical aspects of each of the facilities listed in Section 1.0 above. The inspection did not include other assessments such as structural, mechanical or environmental. For additional information related to the limitations of this scope, reference should be made to the Study Limitations provided at the beginning of this report.

2.0 PRIORITY LEVEL DEFINITIONS FOR RECOMMENDATIONS

In this report, each recommendation is assigned a priority level. The ranking system is used to help AEM determine the priorities of the recommendations. The priority levels and descriptions are based on those in the Health, Safety, and Reclamation Code for Mines in British Columbia (Ministry of Energy and Mines 2017) and the associated Guidance Document.

The priority levels and descriptions presented in Table 1 are used in this document. It is recommended that the status of each recommendation be reported on in the next geotechnical safety system inspection for a follow-up and/or closeout, as appropriate. The recommendations are presented in each section below and summarized in Table 2 in the conclusion section. The term “structure” refers to any kind of geotechnical structure assessed during the geotechnical inspection, including dams, storage facilities, roads, bridges, and others.

Table 1: Priority Levels and Descriptions

Priority Level	Description
P-1	A high priority or actual structure safety issue considered immediately dangerous to life, health, or the environment; or a significant risk of regulatory enforcement.
P-2	If not corrected, could likely result in structure safety issues leading to injury, environmental impact, or significant regulatory enforcement; or a repetitive deficiency that demonstrates a systematic breakdown of procedures.
P-3	Single occurrences of deficiencies or non-conformance that alone would not be expected to result in structure safety issues.
P-4	Best Management Practice – further improvements are necessary to meet industry best practices or reduce potential risks.

3.0 DEWATERING DIKES

The dewatering dikes at Meadowbank include: East Dike, South Camp Dike, Bay-Goose Dike, and Vault Dike. East Dike has been in operation since the dewatering of the northwestern arm of Second Portage Lake was completed in 2009. Bay-Goose Dike and South Camp Dikes became operational in July 2012 when the dewatering of the Bay-Goose Basin was completed. Construction of Vault Dike was completed in March 2013 and phase 2 of the dewatering of Vault Lake was completed in 2014.

The most current version of the OMS manual (AEM 2019a) is dated March 2019 for the dewatering dikes. The most current version of the overall Emergency Response Plan for the mine (AEM 2018) is dated January 2018.. It is good practice to review these documents each year to keep the information up to date, particularly the 24-hour contact name and phone number.

A detailed visual inspection of the dewatering dikes is performed by AEM once a month. The monthly inspection reports were reviewed as part of the annual inspection. Most of the instruments on East Dike, South Camp Dike and Bay-Goose Dike are connected to a system that automatically collects and transmits data every three hours. Data for all instruments can be visualized on the software (VDV) and are checked regularly (every 3 days at a minimum) by the mine engineering team. A review of the instrumentation data for the dewatering dikes is presented in Section 5.0 of this report.

Figure A1 shows a plan view of East Dike, Figure A2 shows a plan view of South Camp Dike and Bay-Goose Dike, and Figure A3 shows a plan view of Vault Dike. These figures indicate the location of the photos taken and observations noted during the inspection.

3.1 East Dike

East Dike is located on the east side of Portage Pit and isolates the northwestern arm of Second Portage Lake. Dewatering of the northwestern arm of Second Portage Lake allowed for the development of Portage Pit and the construction of the Tailings Storage Facility. At the time of the inspection, East Dike served as an access road to the northern portion of Bay-Goose Dike and had not been used as a haul road since 2011.

East Dike is approximately 800 m in length and was constructed within Second Portage Lake prior to dewatering. It consists of a wide rockfill shell, with downstream filters and a soil-bentonite cut-off wall that extends to bedrock up to 8 m below lake level.

Instrumentation has been installed within East Dike and includes piezometers, thermistors, inclinometers, and flow meters, as detailed in Appendix I. The location of the instrumentation is indicated in Appendix C1. The inclinometer at Sta. 60+195 was destroyed in the past and has not been replaced. Replacement of this instrument is not considered necessary; however, monitoring of East Dike should continue and, if anomalous conditions are observed, then replacing this inclinometer should be re-evaluated. Refer to Section 5.1 for the analysis of the available East Dike instrumentation data.

At the time of the 2019 inspection, no signs of sloughing or settlement were observed on the structure (including the vicinity of the 2009 sinkhole near Sta. 60+472). A tension crack, observed in 2018, of approximately 3 m in length, perpendicular to the dike alignment, was still observed around Sta. 60+480 m and seems inactive.

Three seepage zones were identified in the past near the downstream toe of East Dike (at Sta.60+247, 60+498, and 60+575). The zones at about Sta. 60+247 and Sta. 60+498 each have a seepage collection sump with a pump connected to a year-round pumping system. At the time of the inspection, the seepage was being captured within these sumps. According to AEM, the zone at about Sta. 60+575 was practically dry all year, and very little ponding water with no flow was observed during the inspection. No sign of new seepage on the ground surface or downstream was observed.

Seepage flow is measured by the flow meters installed in the two seepage collection sumps downstream of East Dike. The average flow measured during the year was around 17.3 m^3/h with peak activity averaging approximately 30.8 m^3/h in September 2018. The measured flow is slightly decreasing compared to values from the past years. During the year, the water quality in the sump was monitored by the environment department every week during freshet. According to the procedure in place, the water is pumped in Portage Pit instead of being sent to Second Portage Lake when the total suspended solids (TSS) criterion is exceeded. This was the case from January 2019, except for 3 weeks in March 2019. Over the past years, the TSS was usually acceptable during the winter, until the freshet. At the time of the inspection, the water pumped was still pumped into the pit.

From the visual inspection and based on the instrumentation data, the performance of East Dike is satisfactory, as:

- No visual signs of slope instability or erosion were observed on the upstream and downstream rockfill slopes.
- No visual signs of significant cracking or settlement were observed on the dike and along the cut-off wall alignment, besides one tension crack.
- Seepage rates, while higher than anticipated in the design, are stable and are controlled by the pumping system in place. The TSS criterion is low enough for the water to be released in Second Portage Lake, except during the end of winter, freshet and summer of 2019.
- Freeboard is adequate.
- Instrumentation data: piezometric, thermal, seepage, and inclinometer data do not show deteriorating conditions (refer to Section 5.1).

A photographic log and the record of inspection form for East Dike is provided in Appendix A1.

3.2 South Camp Dike

South Camp Dike is located south of the plant site area and is used to connect the mainland to South Camp Island. South Camp Dike, in conjunction with Bay-Goose Dike, isolates a portion of Third Portage Lake (Bay-Goose Basin) that allowed the development of Goose Island Pit and the southern portion of Portage Pit. It covers a narrow channel, approximately 60 m wide, with shallow water depths ranging from 0.5 m to 1.0 m.

South Camp Dike has a broad rockfill shell with a bituminous geomembrane liner installed on the upstream side. Compacted granular material mixed with bentonite was placed above the toe of the liner. The liner was installed on native frozen (permafrost) till material in a trench approximately 3 m to 5 m below the lakebed surface. At the time of the inspection, South Camp Dike was used as an access road to connect the southern part of Bay-Goose Dike, and the contractor’s offices and equipment area with the mine facilities.

An ultramafic waste rock stockpile about 10 m high is located 20 m away from the downstream toe of the dike. The distance between South Camp dike and the waste rock dump is sufficient to allow a complete visual inspection of the downstream area of the dike. It is recommended to continue keeping the downstream toe of the dike clear to facilitate inspection. The downstream toe and slope area was in good condition.

Some water was ponding on the downstream side of South Camp Dike. No flow was observed. This is likely due to run-off water as there were unusually high precipitations in 2019. The water accumulation should still be monitored to confirm this.

Two thermistor strings are installed on the upstream side of the dike. The thermistor data indicate that the foundation of the dike remained frozen throughout the past summers (2009 to 2019). Refer to Section 5.2 for a detailed analysis of South Camp Dike instrumentation data.

No geotechnical issues or seepage were observed during the inspection.

A photographic log and record of inspection form for South Camp Dike is provided in Appendix A2.

3.3 Bay-Goose Dike

Bay-Goose Dike is located within Third Portage Lake on the southern side of Portage Pit and encompasses the Goose Island Pit. Bay-Goose Dike, in conjunction with South Camp Dike, isolates a portion of Third Portage Lake (Bay-Goose Basin).

Bay-Goose Dike is approximately 2,200 m long and consists of a wide rockfill shell, with downstream filters and a cut-off wall. For the majority of the dike, the cut-off wall extends to bedrock and consists of soil-bentonite (SB) and/or cement-soil bentonite (CSB). For portions of the dike where the cut-off wall was not constructed to bedrock, jet grouting of the soil between the base of the cut-off wall and the bedrock was performed, thereby extending the low permeability element of the dike to the bedrock surface. The water depth beneath the dike is up to 9 m, with a maximum depth to bedrock below lake elevation upwards of 20 m.

Instruments to monitor and assess the dike's performance are installed on Bay-Goose Dike. The instrumentation includes piezometers, flow meters (water collection pipe and a plastic bucket), thermistor strings, and inclinometers. Every blast in the vicinity of the dike is monitored for blast vibration. Appendix C1 shows the location of the instrumentation on Bay-Goose Dike.

The tension cracks observed in 2013 and 2014 on the upstream side within the thermal cap (between Sta. 32+100 and 31+750 approximately) were still visible during the 2019 inspection but did not show signs of progression and were not active anymore. Settlement within the thermal cap and on the upstream side of the crest (from Sta. 32+100 to 31+950 approximately), ranging from 0.1 m to >1.0 m, was observed but did not show any significant sign of movement since previous years. These areas should continue to be closely monitored to make sure no aggravating conditions are developing.

Seepage channels and water accumulation were observed at the toe of the dike during the inspection (North Channel, Central Channel, Central Shallows and Channel 3). There is currently no downstream seepage collection system at the downstream toe of the dike as the amount of seepage reporting downstream is currently too small to require such a system. Part of the seepage seems to be reported to the pits. Flow from these channels is monitored by various stations. At the time of the inspections, stations 6, 7, 8 and 9 were active and no turbidity was observed in the water at the downstream toe. Refer to Section 5.3.5 for flowmeter measurements.

Water was observed flowing in the North Channel during the inspection at Sta. 30+420 m. The flow was low and decreased since 2016. According to AEM, water was observed ponding at the toe during the year. Due to the topography, it is possible that water is ponding in this area from a nearby seepage channel (i.e., near the northern abutment). The piezometers of the North Channel have shown response to the unloading conditions that is part of the push back planned for extension of Pit E3 and Pit E4 (see Section 5.3.1 for more details). The North Channel is closely monitored to ensure that blast vibrations from Pit E do not exceed the design limit of 50 mm/s. It is recommended to regularly inspect this area, monitor the flow of water, and be on the lookout for signs of seepage from the toe of the dike and in Pit E4.

Water flow was observed into the Central Shallow seepage channel during the inspection at Sta. 30+625 and 30+655. The flow was low although it increased in 2019 compared to previous years.

A water pond formed by the Central Channel seepage was observed downstream at Sta. 31+125. The mine pumps this pond several times in the summer, and piezometers show a response to the pumping. The inflow has not been monitored in this area since 2015. It is recommended to keep measuring the water inflow when pumping the water pond formed at Central Channel.

Water flow was observed at Channel 3 during the inspection at about Sta. 31+500 m. The flow was low although it increased in 2019 compared to previous years. A drainage channel is dug into the ring road nearby to allow water to flow freely in the pit. According to AEM, water has been reported to the pit from this location during the year through a draining ditch.

A water pond was observed downstream at Sta. 31+750, between Channel 2 and Channel 1. This water pond is not considered seepage as its level never changes except at freshet and after rain events. It is recommended to visually inspect the pond periodically and, if the level changes, to monitor water flow.

Channels 1 and 2 were not active at the time of the inspection. An accumulation of water was observed further downstream against Goose Pit ring road. According to AEM, water is observed downstream in that area during freshet season and naturally drains to Goose Pit without reaching the dike toe. The instrumentation near Sta. 32+000 (Channel 1) indicates a potential seepage zone in that area. It is probable that seepage occurs at this location but reports directly to the pit. The instrumentation at this location needs to be closely monitored for changing trends.

During the inspection, it was observed that an inflow of water was still reported to Goose Pit and that some of the pit walls were wet. These observed water inflows were near Channels 1, 2, and 3 and are not being monitored because the pit is not accessible anymore.

From the visual inspection and based on the instrumentation data, the performance of Bay-Goose Dike is satisfactory, as:

- no visual signs of slope instability or erosion were observed on the upstream and downstream rockfill slopes
- the settlement and sloughing observed in the thermal cap and in the upstream side of the crest are stable and are no longer active
- freeboard is adequate
- instrumentation data: piezometric, thermal, seepage, and inclinometer data do not show concerning deteriorating conditions, although the situation at the North Channel and Channels 1 and 2 must be monitored (refer to Section 5.3)

A photographic log and the record of inspection is provided in Appendix A2.

3.4 Vault Dike

Vault Dike is located across a shallow creek that connects Wally Lake and Vault Lake, at the Vault Pit area. Vault Dike was designed and constructed as a zoned rockfill dam with filter zones and an impervious upstream liner consisting of a bituminous membrane. The dike has an upstream key trench made of aggregate mixed with bentonite.

No geotechnical concerns were identified, and Vault Dike was in good condition.

Five thermistor strings are installed on Vault Dike and four are operational. Data are collected every three days and show that the foundation of the dike is mostly frozen all year long. Given that the remaining instruments indicate a frozen state as expected, it is considered unnecessary to replace the broken instrument. Refer to Section 5.4 for a more detailed analysis of the instrumentation data on Vault Dike.

A photographic log and record of inspection form for Vault Dike is provided in Appendix A3.

4.0 TAILINGS STORAGE FACILITY

The tailings storage facility (TSF) is located within the dewatered portion of the northwestern arm of Second Portage Lake and consists of the North Cell and the South Cell. The South Cell is comprised of Central Dike, Saddle Dam 3, Saddle Dam 4 and Saddle Dam 5, all built to El. 145 m. The North Cell is comprised of peripheral structures Saddle Dam 1, Saddle Dam 2, RF1 and RF2. Stormwater Dike is an internal structure separating the North Cell from the South Cell. The North Cell was internally raised with the construction of the North Cell Internal Structure to a variable elevation ranging from 152 to 154 m. A plan view of the TSF is shown in Figure 1 after the text.

A retention basin and a series of diversion ditches surround the catchment basin of the North Cell. These structures are designed to convey surface water runoff away from the TSF. Since 2014, the Western Diversion Ditch has been collected within a retention basin prior to being pumped within the North Cell. This is due to a turbidity problem from the erosion of the side slope and the crest of the ditches. Three temporary retention basins and one ditch are constructed within the North Cell, at the downstream toe of the North Cell Internal Structure to collect seepage through and runoff from this structure. Refer to Section 10.2 for the inspection of these diversion structures.

The North Cell is being progressively closed in sections except for the North Cell Internal Structure which may still receive tailings in the future. Capping continued in 2019 and tailings deposition resumed in the North Cell from August 2018 to July 2019 from the North Cell Internal Structure. The South Cell has now reached almost full capacity, with only limited residual capacity left. Water is transferred as needed from the North Cell to the South Cell to control the water elevation of the North Cell, and excess water from the South Cell is pumped out to Bay-Goose Pit.

In the summer of 2014, the mine constructed an engineered tailings barrier along RF1 and RF2 to mitigate migration of tailings through RF1 and RF2. Refer to Section 10.3 for the inspection of these structures.

The most current version of the OMS manual (AEM 2019b) is dated March 2019. The most current version of the overall Emergency Response Plan for the mine (AEM 2018) is dated January 2018It is good practice to review these documents each year to keep the information up to date, particularly the 24-hour contact name and phone number.

An inspection of the TSF is performed once a month by AEM. The instruments have been automatically read every three hours since 2017. The monthly inspection reports were reviewed as part of the annual inspection and provided satisfactory information about the evolution of the structures. A summary of the instrumentation data obtained from the TSF is presented in Sections 5.5, 5.6 and 5.6.5 and the data is presented as received from AEM in Appendix C.

Figure B1 shows a plan view that indicates the location of the pictures and general observations related to the North Cell and South Cell, as well as the North Cell Internal Structure. Figure B2 contains a plan view that shows the location of the photos and observations noted on Stormwater Dike. Figure B3 contains a plan view that shows the location of the photos and observations noted on Saddle Dam 1, Saddle Dam 2 and Saddle Dam 3. Figure B4 contains a plan view that shows the location of the photos and observations noted on Central Dike, Saddle Dam 5 and Saddle Dam 4.

4.1 General Observations of the Tailings Facility

Per the TSF design and the standard operating practices, captured in the OMS manual, a tailings beach must be present at all times against all peripheral structures.

At the time of the inspection, the pond of water in the North Cell was located towards the centre of the facility and there was a tailings beach against the peripheral structures to protect them from ice in the winter and to prevent the migration of water out of the TSF (see Figure 1 for an approximate location of the tailings beach). The tailings elevation in the North Cell varied approximately between El. 149.5 m and 152.1 m and the pond elevation was at El. 147.8 m approximately. The tailings beaches against the structures of the North Cell were adequate. The North Cell Internal Structure is built partially on the North Cell tailings and partially on the rockfill cover placed over the last few years for closure operations. At the time of the inspection, tailings deposition had recently stopped in the North Cell and water was still channeling from the deposition points towards the reclaim pond in the south part of the North Cell. It was observed that channelling was occurring against the dike toe and that this caused minor erosion of the filter material.

At the time of the inspection, the tailings elevation varied approximately between El. 132 and 144.6 m in the South Cell and the pond elevation was at El. 143.1 m. Water in the South Cell was ponding against the south part of the downstream toe of Stormwater Dike, while a tailings beach developed against the rest of Stormwater Dike. A tailings beach developed against the majority of Central Dike and Saddle Dams 4 and 5. Water was observed ponding against the liner in the corner of Central Dike and Saddle Dam 5. AEM reported that a large quantity of ice formed in this area during the last winter. At the time of the inspection, no tailings deposition was done in the South Cell, as deposition was now done in the pits.

AEM has been closely monitoring the formation of a tailings beach against the peripheral structures in both cells as well as the compliance of the tailings deposition with the deposition plan during deposition in the tailings storage facility. AEM reported difficulties in managing ice entrapment in the South Cell during the last winter. During 14 days in June 2019, the freeboard was 0.25 m above the required 2 m below dike crest. The situation was discussed with Golder and the Engineer of Record (EoR) and a temporary maximum level of 143.7 m was accepted for a maximum duration of a month based on the fact that this is the reason why a freeboard is set, to be able to contain the project flood, notably at the freshet period or during an extreme precipitation event. The tailings and water levels went back to a compliant level after measures were taken by AEM.

For South Cell closure and environmental aspects, given that it is inferred that the Stormwater Dike foundation presents some open windows of exposed fractured bedrock that may contribute to feeding the seepage at Central Dike, it is recommended that a beach be put in place along Stormwater Dike downstream slope to seal the foundation before the end of the deposition activities. This recommendation has been followed. Water is no longer ponding against Stormwater Dike, as tailings have now formed a beach against the structure and over the downstream buttress.

At the time of the inspection, Saddle Dams 3, 4 and 5 were operational, with water ponding against the erosion protection of Saddle Dam 3 and tailings deposited against Saddle Dams 4 and 5. Permanent sumps have not yet been installed on the downstream side of Saddle Dam 4 and Saddle Dam 5, and water accumulation is pumped as required. A permanent sump is in operation on the downstream side of Saddle Dam 3. It is important that the water level on the downstream side not be allowed to rise higher than the granular layer of the upstream toe liner tie-in to prevent uplifting of the geomembrane.

No depressions in the tailings have been observed this year during the inspection, nor reported by AEM.

Photographs of the TSF's North Cell and South Cell are provided in Appendices B1 to B7.

4.2 Saddle Dam 1 – North Cell

Saddle Dam 1 is located in the northwestern corner of the TSF and forms one of the perimeter structures of the North Cell intended to retain tailings and supernatant fluid during the operation and the closure of the TSF. Saddle Dam 1 crosses a depression between the northwestern arm of Second Portage Lake and Third Portage Lake.

Saddle Dam 1 is a rockfill embankment with an 3H:1V upstream slope and a 1.3H:1V downstream slope. This structure has inverted base filters, upstream graded filters, and a linear low density polyethylene (LLDPE) geomembrane liner on the upstream dike face. The geomembrane liner is placed between an upper and lower non-woven geotextile layer for protection, and is covered by approximately 0.3 m of granular material up to El. 140 m. No granular layer was placed above El. 140 m and the liner is exposed above that elevation. According to the design, a tailings beach has to be maintained on the face of the structure to reduce the potential for ice damage to the liner. The abutments are founded on bedrock, while the central portion of the dike is founded on ice-poor soil. Till and/or crushed aggregate mixed with dry bentonite powder have been placed above the toe of the liner.

Four thermistor strings (T1, T2, T3 and T4) are installed on Saddle Dam 1 and are automatically read every few hours following the installation of dataloggers in 2017. Three thermistors (T1, T2, T3) are installed to monitor the thermal condition within the structure and its foundation. The fourth thermistor string (T4) is installed along the upstream face of the dam to monitor the thermal condition of the tailings. The location of the instrumentation is shown in Appendix C3. Refer to Section 5.6.1 for the analysis of the instrumentation data.

During the inspection, it was observed that Saddle Dam 1 is performing well and does not show any geotechnical concern. An adequate tailings beach was observed along the upstream face of Saddle Dam 1. A stockpile of fine filter material has been present on the north part of the dike since 2011 and poses no geotechnical concern.

A permanent dewatering pump is installed downstream within a sea-can container. Water was observed ponding near the sump. Pumping was done during freshet, and as necessary during summer. The environment department is monitoring the water quality during the year and this information is shared with the engineering department. The water quality results indicate that the water is not seepage from the North Cell. During the Meadowbank Dike Review Board in 2016, the Board members suggested to remove this pumping system and to backfill the toe drain trench to allow natural drainage of the water toward Third Portage Lake. Their opinion is that the foundation of Saddle Dam 1 is now frozen and therefore the weight of tailings will preclude any liner heave. Golder agreed with this and recommended that the monitoring of the instrumentation in this sector continue and that the situation be reassessed if needed. However, as this sump is a permanent feature, it is required that the water quality remains monitored and be reported; the sump therefore cannot be backfilled during operations in order to comply with legal requirements.

A photographic log and the record of inspection form for Saddle Dam 1 is provided in Appendix B2.

4.3 Saddle Dam 2 – North Cell

Saddle Dam 2 is located along the western side of the TSF and connects to the western corner of Stormwater Dike. Along with Saddle Dam 1, it forms one of the perimeter structures of the TSF's North Cell that retain tailings and supernatant fluid during the operation and closure of the TSF. Saddle Dam 2 crosses a depression between the northwestern arm of Second Portage Lake and Third Portage Lake.

The upstream foundation of the dike and abutments are primarily founded on bedrock; however, some portions of the structure, underneath the inverted filter, are founded on ice-poor soil. During construction, a thin layer of low permeability till was placed and compacted along the toe liner tie-in connection with bedrock. A thin layer of crushed aggregate (0 to 22 mm) mixed with dry bentonite powder was also placed under the thin layer of low permeability till in areas where open factures were observed within the bedrock. The toe liner tie-in was then covered with till.

Four thermistor strings (T1, T2, T3, and T4) have been installed at Saddle Dam 2 to monitor the thermal condition within the structure and its foundation. The location of the instrumentation is shown in Appendix C3. Refer to Section 5.6.2 for the analysis of the instrumentation data.

During the inspection, it was observed that Saddle Dam 2 is performing well and does not show any geotechnical concern. An adequate tailings beach was observed against the upstream side of the structure.

During the inspection, water was observed ponding on the downstream side within the rockfill embankment (between Sta. 20+275 and Sta. 20+475 approximately). This water has also been observed since the 2015 annual inspection and the instrumentation indicates that the foundation remains frozen. Per AEM, water has been ponding at that location for a long time. The water is run-off water, and is tested by the environmental team regularly during open water season.

A photographic log and the record of inspection form for Saddle Dam 2 is provided in Appendix B3.

4.4 North Cell Internal Structure – North Cell

The North Cell Internal Structure is located within the North Cell of the TSF, in its northern section. It is built over the existing tailings of the North Cell and the rockfill cover placed over the last years for closure operations.

The North Cell Internal Structure is designed and constructed as a permeable zoned rockfill dam with filter zones, built on the top surface dried tailings of the North Cell and on the existing rockfill cover. The bulk part of the North Cell Internal Structure consists of coarse rockfill material. The upstream face is designed at a 3H:1V slope and the downstream faces are designed at a 1.5H:1V slope. The upstream face of the North Cell Internal Structure comprises two granular filter zones. The filter zones are designed to prevent tailings migration and internal erosion, while allowing water to flow through the embankment. A system of ditches and sumps at the downstream toe of the structure is designed to collect seepage and runoff water.

Four vertical thermistor strings are installed in the North Cell Internal Structure (NCIS-01 to NCIS-04) to monitor the thermal condition within the structure and its foundation constituted of rockfill capping and/or tailings depending on the sections. Refer to Section 5.6.6 for the analysis of the instrumentation data.

This structure was built during the summer of 2018 and had been in operation for about a year at the time of the inspection. The supernatant water is flowing well toward the west side of Stormwater Dike, where water is transferred into the South Cell. Channelling of water has been observed at the upstream toe of the eastern part of the dike. The water flow has started to erode fine filter material at the toe. It is recommended to protect the filters in this area or to start capping this area as part of the closure plan. Tension cracks (2 to 5 m long, a few millimeters wide) have been observed during the inspection in the fine filter surface between Sta. 2+650 and 2+800 m, near the crest. The cracks are minor and appear inactive, therefore they do not suggest an instability. However, they need to be monitored and repaired as they may decrease the efficiency of the filters in case of further tailings deposition.

The pumping stations on the downstream side of the dike are in place and working as needed. AEM indicated that the incoming water is from run-off and not from seepage. The capacity of the North Cell to store the inflow design flood must be ensured continuously during tailings deposition.

A photographic log and the record of inspection form for the North Cell Internal Structure is provided in Appendix B1.

4.5 Stormwater Dike

Stormwater Dike is an internal structure that subdivides the TSF into the North Cell and the South Cell within the dewatered northwestern arm of Second Portage Lake. Stormwater Dike cannot be considered anymore as a temporary structure as it is planned to not fill the South Cell to the same elevation as the North Cell. Therefore, there will remain an elevation difference between tailings elevations on both sides. For this reason, it is recommended to review the design basis criteria and assess whether the actual dike configuration and construction still meets the design criteria and will continue to behave in a satisfactory manner in post-closure conditions. The work could be carried out by the EoR, but should be revised be the original dike designer.

In this document, the North Cell side is taken as upstream and the South Cell side as downstream.

Stormwater Dike is a rockfill embankment structure. The upstream slope is approximately 3H:1V and the downstream slope is about 1.3H:1.0V. A bituminous geomembrane liner has been installed above the graded filters on the upstream face of the dike. Low permeability till was placed and compacted along the upstream toe of the dike as a tie-in of the liner.

The majority of the dike is seated on dense till from the former lakebed within the talik, with lakebed sediments still present in some areas, while the abutments are generally founded on bedrock.

Since 2016, AEM has noticed tension cracks and signs of settlements on the crest of Stormwater Dike in a repeated pattern over the years. After the cracks first appeared in 2016, an evaluation of the settlement mechanism and expected performance of the dike was conducted, based on a drilling and instrumentation campaign. This campaign showed that the most probable mechanism of the movement is settlement due to the thawing of soft sediments caused by the rise of ponding water in the South Cell through Stormwater dike's foundation. As a result, to mitigate against a possible foundation failure, a rockfill buttress support was constructed at the downstream toe of Stormwater Dike in the South Cell (from Sta. 10+300 to Sta. 10+700 approximatively). In 2019, as in the previous years, the observed cracks (around Sta. 10+300 m) appear to be oblique tension fractures. Some cracks were up to 10 mm wide. The evolution of the area affected by these cracks remains consistent with the limits of the South Cell water ponding against Stormwater Dike, which is also consistent with the findings of the 2017 study. After the movement had stopped during each episode, the cracks were filled with bentonite. This is a good practice to limit water infiltration within the cracks.

During the annual inspection, the downstream toe of the dike was not visible as it has been entirely covered by tailings and the South Cell pond. On the upstream side, capping was very close to the dike.

Movement monitoring instruments are installed on the crest of the dike (total of 2 extensometers, 4 crackmeters and 16 prisms). Instrument indicated that movement continued from spring to fall and stabilized over the winter of 2019. No significant movement has been observed since then, despite new cracks being observed.

Thermistors and piezometers are monitoring Stormwater Dike, as detailed in Appendix I. Refer to Section 5.6.5 for the analysis of the instrumentation data at Stormwater Dike including movement monitoring.

A photographic log and the record of inspection form for Stormwater Dike is provided in Appendix B4.

4.6 Saddle Dam 3, Saddle Dam 4 and Saddle Dam 5 – South Cell

The South Cell of the TSF consists of four perimeter structures: Central Dike, Saddle Dam 3, Saddle Dam 4 and Saddle Dam 5. Saddle Dam 3 is located in the northwestern corner of the South Cell and is merged into Saddle Dam 2. Saddle Dam 4 is located in the southwestern corner of the South Cell and is merged into Saddle Dam 5, which merges with the southern end of Central Dike.

Saddle Dams 3, 4, and 5 are designed and constructed as zoned rockfill dams with filter zones, low permeability upstream liners, and upstream toe liner tie-in key trenches. Cross-sections of Saddle Dams 3, 4 and 5 consist of a rockfill embankment, constructed from run-of-mine waste rock, placed in lifts and compacted. The upstream faces are designed at a 3H:1V slope and the downstream faces are designed at a 1.5H:1V slope. The upstream faces of Saddle Dams 3, 4 and 5 are comprised of two granular filter zones and a LLDPE liner extending along the upstream foundation. The filter zones are meant to keep the tailings inside the facility in a case of liner puncture, but mainly act as appropriate bedding for the liner. An upstream liner tie-in key trench excavated to bedrock and filled with compacted till is located along the upstream area of the structures.

At the time of the inspection, all dikes were operational. The water level of the South Cell had reached the upstream toe of Saddle Dam. No geotechnical issues were observed with these structures.

Thermistors are installed at Saddle Dam 3, Saddle Dam 4 and Saddle Dam 5. Refer to Sections 5.5.2 to 5.5.4 for the interpretation of the instrumentation data.

During the inspection, water was observed ponding in some areas of the downstream side of Saddle Dam 3 and Saddle Dam 4. As the downstream toe is higher than the South Cell pond along Saddle Dam 4, this water does not come from the TSF. On the downstream side of Saddle Dam 3, in the sump, water is ponding at a level below the South Cell elevation. It is important to maintain the water level on the downstream side lower than the level of the upstream toe liner tie-in granular material layer to prevent uplift of the geomembrane. As the elevation of the downstream side is lower than the elevation of the granular material, this should not be a problem if the downstream water level is managed.

A photographic log and the record of inspection forms for Saddle Dams 3 and 4 is provided in Appendices B5 and B6. A photographic log and the record of inspection form for Saddle Dam 5 is provided in Appendix B7.

4.7 Central Dike – South Cell

Central Dike is located along the eastern side of the TSF and crosses a depression within Second Portage Lake. Along with Saddle Dam 4 and Saddle Dam 5, Central Dike forms one of the perimeter structures of the South Cell.

Central Dike design includes a compacted rockfill embankment with an upstream seepage barrier, granular filters and a key trench along the centreline of the dike transitioning on the upstream toe near both abutments. The foundation soils include lakebed sediments and till overlying bedrock. Soft and ice-rich soils were removed from the Central Dike footprint during construction.

During the inspection, water was observed ponding at the downstream toe of the dike between approximately Sta. 0+300 and the southern access road at Sta. 0+830. Seepage into the basin at the downstream toe of Central Dike has been observed since 2014 when tailings deposition was transferred from the North Cell of the TSF to the South Cell. The rate of seepage started to increase proportionally to the rise of the pond level of the South Cell. Field investigations and review of coupled seepage-stability analyses indicated that the seepage is mainly controlled by openings in the bedrock, that the dike is physically stable and that the decrease of South Cell water level and use of tailings to seal the bottom of the cell would improve the seepage and piezometric pressure beneath Central Dike. The seepage rate was 308 m^3/h at the time of the inspection and now seems to be stabilized (see Section 5.5.1.3).

During the spring, the water in the downstream pond had reportedly an orange coloration with high turbidity, similarly to the previous years. This event is monitored by AEM and has been attributed to precipitation of iron oxide from bacterial processes.

Central Dike is in good condition. At the time of the inspection, there was a tailings beach against the entire length of the structure except the southern part, from Sta. 0+850 m, where water is ponding on the LLDPE liner. Stormwater Pond was being pumped out into the south Cell at the time of the inspection, and the discharge was located at the corner of Saddle Dam 5 and Central Dike, adding water to the pond. AEM is planning to remove the water ponding in this area as per the design requirements.

There is angular granular material (fine filter) in direct contact with the LLDPE liner at Sta. 0+750 m approximately. A metallic piece around a pipe (discharge from Stormwater Pond) was also observed against the LLDPE liner at Sta. 1+000 m. It is recommended to clean these items in order to avoid risk of perforation. This operation is required regularly and should be detailed in a procedure prepared by AEM. The procedure needs to be communicated to all concerned workers and added to the OMS manual.

The interpretation of the instrumentation data is provided in Section 5.5.1.

A photographic log and the record of inspection form for Central Dike and Saddle Dam 5 is provided in Appendix B7.

5.0 GEOTECHNICAL INSTRUMENTATION

As part of the 2019 geotechnical inspection, the dewatering dikes and TSF instrumentation data were reviewed. During the year, daily review of the instrumentation on the dewatering dikes is done by mine personnel and quarterly reports summarizing their observations are issued internally. Reports for structures with a yellow Trigger Action Response Plan level are issued on a monthly basis. The compilation of the instrumentation data was not part of the scope of this study, and the figures showing the data were provided by AEM. The information provided by AEM is presented as received in Appendix C. The data were sent as figures for the dewatering dikes and as PowerPoint and Excel files for the TSF structures. Continued monitoring and review of instrumentation data is recommended. In the case of a significant variation in the instrumentation data, the designer should be notified according to the OMS manual. A significant variation is defined by a change compared to usual seasonal trends and should be followed-up on to monitor the evolution of the event and identify its causes and consequences, as well as the appropriate actions to take.

5.1 East Dike

Instrumentation was installed within East Dike to monitor the dike's performance following construction and during dewatering, operation, and into closure. All piezometers and thermistors on East Dike are connected to an automatic data collection and transmission system (VDV database). Details of instruments installed on East Dike are provided in Appendix I (Table 1 and Table 2).

The following subsections present a summary of the data collected between September 2018 and September 2019. Previous annual geotechnical inspection reports contain additional information regarding instrumentation data collected prior to September 2018. The 2019 instrumentation data for East Dike are presented in Appendix C.

5.1.1 Piezometers

Three arrays of multilevel vibrating wire piezometers (VWP) are installed within East Dike as follows:

- South Channel (Sta. 60+190)
- North Channel (Sta. 60+490)
- North Shallows (Sta. 60+700)

At each location, multilevel VWPs were installed:

- upstream side of the cut-off wall, approximately 2 m from the centreline
- immediately downstream of the cut-off wall, approximately 2 m from the centreline
- further downstream of the cut-off wall, approximately 10 m from the centreline

Single VWPs were also installed downstream of the cut-off wall near the contact area (base of cut-off wall and top of the bedrock surface). VWP-400-C and VWP-420-C show a seasonal trend that is rising through the years since 2015. For the last two years the rising seasonal trend double each year. Total head is now rising close to 2 m in 2019 from those two VWPs. Of interest, it is to be mentioned that the rise is not associated to a rise of temperature but rather the contrary. It is recommended to closely follow the significant seasonal trend in the future to react quickly if needs be. Also, the rise in pore water pressure cannot be explained by seasonal lake level variations. Based on those aspects, it is considered that those observations should have triggered a yellow threshold criterion per the Dewatering Dykes OMS manual (yellow - personal notification and action required). There was no visual observation of this pressure increase on the field. AEM indicated that this behaviour will be investigated further.

Some of the installed piezometers on East Dike are broken or malfunctioning, most of them due to freezing, as detailed in Appendix I (Table 1). Those instruments give either no data or erratic data. A piezometer that has frozen at some point is unreliable, as freezing generally breaks the piezometer or shifts its calibration curve. It is thus recommended to flag these piezometers and be very careful when interpreting their data.

The piezometers' data show that the pore water pressure is to the value recorded in the past with a long-term trend going towards a slow increase in the pore water pressure, possibly related to freeze-back of the pit walls.

Specific observations have been made for the three piezometric arrays located at Sta. 60+190, Sta. 60+490, and Sta. 60+700, as follows.

Sta. 60+190

At Sta. 60+190, the observed levels are consistent with expectations for a functioning cut-off wall. There is a consistent drop in the hydraulic head across the cut-off wall and within the grouted bedrock in the downstream direction. Further downstream, the hydraulic head continues to decrease. There are spike increases in the hydraulic head in the spring of 2019, similar to the previous years. These spikes are probably due to pumping interruption for maintenance or change of discharge from the lake to the pit. The general trend in the piezometric readings has been steadily increasing since 2014 and the increase seems to accelerate in 2019 and should be monitored.

As observed in past years, no instrument froze in the winter and the temperature data indicate the presence of seepage. For example, the temperature reading at 190-P1-C increased to approximately 2.8°C in September 2018. Then, the temperature decreased between October 2018 and June 2019 to approximately 0.2°C despite extremely cold air temperatures. If the temperature fluctuations at 190-P1-C were caused by changes in air temperature at the ground surface, then thermal responses in both summer and winter would be expected. Since the latter is not the case, it is highly probable that seepage water from the upstream side of the dike is responsible for the thermal behaviour. The recorded piezometric pressure decreases towards the downstream side and with elevation, which seems to indicate that flow is occurring towards the pit. Given the hydraulic head response consistent with the expectations of a functioning cut-off wall, it is reasonable to assume that the seepage water is originating from a different part of the dike.

Sta. 60+490

At Sta. 60+490, flow through the dike is observed as the piezometric pressure is very similar before and after the cut-off wall (490-P3-B vs 490-P2-B in particular). There are spike increases in the hydraulic head in the spring of 2019, similar to the previous years. These spikes are probably due to pumping interruption for maintenance or change of discharge from the lake to the pit. Signs of seepage are also observed in the thermal instrumentation data associated with this piezometric array. The general trend in the piezometric readings has been steadily increasing since 2014 and the increase seems to accelerate in 2019 and should be monitored.

None of the instruments are frozen; there is a correlation between the lake temperature and the temperature recorded by the piezometric array at this location, and the temperature data follow the same trend with very little offset. These piezometric and thermal trends correspond to the seepage zone observed at Sta. 60+498. The recorded piezometric pressure decreases towards the downstream side and with elevation, which seems to indicate that flow is occurring towards the pit.

Sta. 60+700

At Sta. 60+700, the majority of the piezometers are frozen. The remaining instruments (upstream and downstream of the dike, close to the centreline) show that the observed levels are consistent with expectations for a functioning cut-off wall. The general trend in the piezometric readings has been steadily increasing since 2014 and the increase seems to accelerate in 2019 and should be monitored.

The temperature data are consistent with observations noted during the previous years and indicate mostly frozen conditions.

5.1.2 Thermal Regime

Five thermistor strings with 16 nodes at 1 m interval are installed on East Dike, as detailed in Appendix I (Table 1). The instrumentation data for the September 2018 to September 2019 period are consistent with the historical trends, with a slow long-term cooling trend. Specific observations have been made for each instrument for the period analyzed, as follows.

In addition to thermistors, thermal sensors of piezometers installed in the cut-off wall and bedrock along the centreline at 60+550, 60+600 and 60+650 also indicate frozen condition.Sta. 60+092 and Sta. 60+842

The thermistors installed at Sta. 60+092 and Sta. 60+842 are located on the southern and northern abutments. The upper 1 m of the dike of both abutments thawed in 2019 (active layer). From September 2018 to September 2019, there has been little to no change in the ground thermal regime. Below El. 134 m, the cut-off wall remained frozen for these two thermistors. The temperature within the dike varied from 10°C to -20°C within the active layer of the dike, from -3°C to -12.5°C in the till, and from -3°C to -10°C in the bedrock. Fewer temperature variations were generally observed with depth at each location.

Sta. 60+185

The thermistor string installed in the South Channel at Sta. 60+185 (bedrock about 6 m below water surface at El. 127 m) recorded the following temperature variations:

- The upper layer of the cap material (from El. 136 m to El. 131 m) was thawed in September 2019 and was frozen during the winter period (active layer). The active layer shows significant fluctuations in temperature, going from 3°C to -10°C.
- The cut-off wall above the lake level and in the till from El. 131 to 127 m remained frozen, but very slightly below 0°C, with the exception of the bead at El. 128 m which shows that temperature remained slightly over 0°C all year. Very little to no change in the ground thermal regime has been observed from the data. This result may seem surprising, as potential seepage is inferred from the thermal behaviour at 190-P1-C at Sta. 60+190. However, 190-P1-C is further downstream from the dike and the lag between maximum 190-P1-C, and the data seem to suggest that the water is originating from a different part of the dike structure closer to Sta. 60+490.
- The bedrock portion of the dike (below El. 127 m) remained thawed. The bedrock had a temperature variation between -0.5°C and 3°C increasing with depth.

Sta. 60+485

The thermistor string at Sta. 60+485, installed within the North Channel (bedrock at approximately El. 126 m, 7 m below lake level), indicated the following temperature variations:

- From October 2018 to January 2019, the beads seem to have had a glitch and recorded a constant temperature. The normal trend resumed after that period.

- The upper portion of the cut-off wall located in the lake (from El. 136 m to El. 128 m) was in an active zone. Significant temperature fluctuations were recorded (12°C to -20°C).
- The cut-off wall below El. 128 m and the bedrock remained thawed during the year with significant variations in temperature (between 14°C and 0.5°C).

The thermal variation observed within the cut-off wall below El. 128 m and in the bedrock is significant, with fluctuations between 14°C and slightly above 0°C. From September 2018 to September 2019, there is good correlation between recorded temperatures and the upstream lake temperatures, indicating advective flow through the dike (i.e., recorded temperature changes are primarily a result of temperature changes in water flowing through this area). The delay between changes in the recorded temperatures within the lake and within the cut-off wall is minimal. The temperature responses recorded in the piezometers at Sta. 60+490 P2 (A,B,C) and 60+490 P1 (A,B,C) are also significant, as are the responses recorded within the piezometers at Sta. 60+190-P1-C, Sta. 60+450, Sta. 60+460, Sta. 60+472, Sta. 60+480, Sta. 60+490, and Sta. 60+500. Seepage is being observed downstream and is collected in the sump and removed via the pumping system.

Sta. 60+695

The thermistor string installed in the North Shallow at Sta. 60+695 (bedrock at El. 128.5 m approximately, 4.5 m below upstream lake level) recorded the following temperature variations:

- The thermistor beads from El. 136 m to 130 m indicate that the upper portion of the cut-off wall was thawed in September 2019 and frozen during the winter (active layer). The recorded temperature variations are between 9°C and -20°C.
- The thermistor beads from El. 130 m to 128 m indicate that the cut-off wall and the till between these elevations remained frozen throughout the monitoring period, with temperature fluctuations between 0°C and -10°C.
- The temperature recorded in the bedrock varied between -0.7°C and 3°C increasing with depth.

In addition to thermistor data, piezometers' thermal sensors confirm that there is a general cooling trend. At 60+700, piezometers installed at the toe of the dike (P1line) at 60+700 are in permafrost. The two thermistors in upper bedrock at the P2 line (700-P2-B and 700-P2-C) remained frozen while the deeper instrument (700-P2-A) never froze until August 2019.

5.1.3 Inclinometers

Two inclinometers are installed on East Dike at Sta. 60+495 and 60+705, as detailed in Appendix I (Table 2). The inclinometer displacements are referenced along Axis A and Axis B; Axis A is perpendicular to the cut-off wall alignment (positive displacements are towards the Pit side), while Axis B is parallel to the cut-off wall (positive displacements are towards the increasing chainage), perpendicular to Axis A.

Recorded displacements are small. The maximum cumulative displacements at the crest were observed in the inclinometer installed at Sta. 60+705. The cumulative displacement is about 100 mm perpendicular to the cut-off wall (Axis A), and 55 mm aligned to the cut-off wall (Axis B). From 2018 to 2019, no significant movements were observed for all inclinometers; they have all been relatively stable since 2014. The recorded displacements are well within the tolerable displacements for the structure and are not a concern.

5.1.4 Seismograph

No peak particles velocity measurements (measured by the peak vector sum or PVS) were taken in 2019 for East Dike as no blasts occurred in the vicinity of East Dike.

5.1.5 Flow Meters

The flow at the downstream toe between September 2018 and September 2019 was measured by the flow meters installed in the seepage collection sumps downstream of East Dike. The flowmeter was replaced this year for increased accuracy. The average flow measured during the reviewed period was around 17.3 m^3/h with peak activity averaging approximately 30.8 m^3/h in September 2018. The average measured flow appears lower than last year, although the peak was slightly higher than in 2018. Over the 2018-2019 winter, the flow was measured between 12.5 and 16.7 m^3/h and had decreased compared to the 2 previous winters. It is considered that flow during winter is more representative of the seepage, with no incidence of precipitations and snowmelt.

During the past year, the turbidity of the water in the sump met the total suspended solids (TSS) criteria set for direct discharge into the Second Portage Lake from September 2018 until January 2019 as well as during 3 weeks in March 2019. The water was discharged into the pits outside of these periods of time. Based on the data received from AEM, maximum measured TSS value was 8 mg/L after September 2018. No TSS data was available in 2019 for review.

5.2 South Camp Dike

Two thermistor strings are installed on the upstream side of South Camp Dike. SD-10 is located near the liner toe. SD-09-A is located approximately 20 m further upstream within Third Portage Lake. South Camp Dike thermistor data for September 2018 to September 2019 are presented in Appendix C. Based on the thermistors data, no signs of seepage are evident, and the recorded value follows historical trends.

The following summarizes the observations regarding the thermal regime at these locations:

- The temperature profile at SD-09-A on the upstream side of the dike shows that the soils located beneath the dike foundation and liner have remained frozen (permafrost) below El. 128 m. An active layer is present between El. 133 m and 128 m.
- The temperature profile at SD-10 shows that the foundation of the dike below the thermal cap stayed frozen all year long.

5.3 Bay-Goose Dike

Instruments were installed on Bay-Goose Dike to monitor the dike's performance following construction, during dewatering and operation, and into closure. They include piezometers, thermistors and inclinometers (standard type and TDR cable). At the time of the inspection, all the piezometers and thermistors on Bay-Goose Dike had an automatic data collection and transmission system to the VDV database. The following subsections present a summary of the data collected between September 2018 and September 2019. Data plots for the instrumentation sent by AEM are presented in Appendix C.

It must be noted that the current instrumentation of Bay-Goose Dike was designed for performance monitoring from dewatering to closure based on the expected operation duration of about 10 years. The start of the in-pit tailings deposition implies that the dike will be in operation for another decade. As a result, some verifications should be made to ensure that the surveillance and monitoring measures are appropriate. Of particular interest are the sections where soil-bentonite (SB) and cement-soil-bentonite (CSB) portions of the cut-off wall are in contact. Due to the different mechanical properties of these materials, settling of the dike could cause degradation of the CSB wall over time. It is thus recommended to verify whether the current instruments layout and spacing allows for proper monitoring of these contact areas and detection of any degradation that could lead to seepage through the dike. Additional instruments may need to be installed. Golder could perform this analysis on AEM's demand. In the meantime, routine monitoring of the instruments should continue and focus particularly on areas with SB/CSB contact, areas with seepage and areas where instruments exhibit a trend that is different from previous observations or unexpected variations.

5.3.1 Piezometers

Arrays of multilevel VWPs were installed within Bay-Goose Dike as detailed in Appendix I (Table 4).

At each location, multilevel VWPs were installed:

- upstream side of the cut-off wall, approximately 2 m from the centreline
- immediately downstream of the cut-off wall, approximately 2 m from the centreline
- further downstream of the cut-off wall, approximately 10 m from the centreline

In addition, single VWPs were installed immediately downstream of the cut-off wall near the contact area (base of cut-off wall and top of bedrock surface) at several stations.

Some of the installed piezometers on Bay-Goose Dike are broken or malfunctioning, probably from freezing, as detailed in Appendix I. Those instruments give either no data or erratic data. A piezometer that has frozen at some point is unreliable, as freezing generally breaks the piezometer or shifts its calibration curve. It is thus recommended to flag these piezometers and be very careful when interpreting their data. It is recommended to flag these piezometers and to be careful when interpreting their data while staying vigilant about any rapid piezometric variance. The first time a piezometric rapid increase associated to a frozen piezometer is observed, it is important to remain vigilant without overweighting the abnormal trend. For the instruments showing very high piezometric readings, it is recommended to compare the pressure recorded to the instrument limit, in order to identify if the variance could be due to factors other than mechanical problems such as seepage.

A cooling trend starting in July 2012 can be observed in all piezometers installed on Bay-Goose Dike. The instruments located farther on the downstream side generally record lower temperatures than the instrument closer to the dike and the lake. As a result, the instruments on the upstream side of the dike are generally the last ones to freeze and the ones farthest on the downstream side are the first to freeze. In some sectors, most of the piezometers are in frozen condition, while in some sectors almost none of the piezometers are in frozen condition. There seems to be a correlation between the sector in which seepage has been observed historically and the number of frozen instruments.

From 2012 to 2019, a generalized trend can be observed in the pore water pressure measurements of most non-frozen piezometers located along the dike (upstream and downstream side). An increase in pore water pressure is observed during winter (November to May approximately). The pore water pressure tends to stabilize or decrease during freshet (May to September approximately). Historically, the rising trend has been attributed to ice build-up at the downstream toe of the dike and the decrease has been attributed to melting of this ice.

There is generally a drop in the hydraulic head across the cut-off wall and within the grouted bedrock in the downstream direction. In general, the data from the piezometers are similar to the historical trend and a return to normal for piezometers at Sta. 31+885.

In addition to the seasonal trend described above, specific observation trends can be observed for various areas of the dikes. These areas generally coincide with seepage channels as the majority of piezometers are frozen in non-seepage channel areas.

The OMS manual provides procedures in the event of significant or rapid pore-water pressure raises or decreases which need to be followed. The designer needs to be advised in the event of unusual variations.

North Portion (Sta. 30+158 to 30+516.5)

The piezometric level has been stable since 2015 with cyclical variation but has not recovered to the level before 2015. The unfrozen piezometers on the downstream side near the cut-off wall had a 0.3 to 0.5 m cyclical fluctuation from September 2018 to September 2019. Sharp increases and decreases in the recorded pore water pressure for all instruments are linked to drilling and blasting operations in Pit E5. A 0.3 m to 0.5 m increase in pore water pressure is observed for instruments on the downstream side from the beginning of summer 2019 and had not dissipated at the time of the inspection.

Large scale seasonal variations are seen in the pore water pressure recorded in all piezometers, with fluctuation more pronounced on the downstream side. Piezometers located near the North Channel from Sta. 30+378 to Sta. 30+453, that had recorded an increasing trend in pore water pressure in 2018, are now stable with a slight increase (0.5 m) during the summer of 2019. The previous increase was attributed to drilling and blasting operations in Pit E5 and freeze-back of the pit walls.

These variations in pore water pressure are happening in the zone associated with the North Channel seepage and monitored by seepage stations no. 8 and no. 9. In the past, the pressure typically increased in magnitude of the pore water pressure until freshet and then suddenly decreased as a result of mining activity and the depressurisation of the rock walls in Pit E5. However, with the pit walls freezing back, pressure is progressively prevented from dissipating by drainage trough the wall face. The piezometers installed along the Pit E wall (PE5-17-1 to PE5-17-5) exhibit similar trends and their temperature sensors confirm that the area is partially unfrozen, with some instruments cooling down rapidly.

The temperature recorded by the piezometers is stable with a general cooling trend.

Central Shallows (Sta. 30+645.5 to 30+804)

The majority of the piezometers installed in this area are frozen and give erratic data. Seepage station no. 7, which was active during the summer of 2019, is near this area.

The unfrozen piezometers indicate stable pore water pressures in 2019 with a slight increase (0.5 m) during the summer of 2019.

Central Channel (Sta. 31+020 to 31+220)

There is a seepage zone with ponding water observed downstream associated with this channel. The majority of the piezometers in this area are not frozen.

From 2012 to 2019, the maximum and minimum recorded pore water pressures for the piezometers downstream have been constant. There is generally a pressure build-up from January to June followed by several pressure drops and increases from June to September or October. In 2019, a minimum value around 130.4 m was recorded during freshet and a maximum value around 133.5 m was recorded during winter, similarly to the previous years. The pore water pressure data tend to fluctuate more during freshet than during winter. This behaviour seems to be consistent with the explanation that the recorded pore water pressures are influenced by the pumping of the water pond located downstream.

Channel 3 (Sta. 31+565 to 31+700)

There is a seepage zone monitored by station no. 6 associated with this channel. There is a drainage channel dug into the ring road in the area to allow water to flow freely in the pit. The piezometric array in this area are frozen and a cooling trend can be observed in the recorded temperature since 2011.

From 2014 to 2019, the pore water pressure was generally stable in the piezometer located directly downstream (general decrease of 0.2 to 0.6 m while following seasonal trends). The piezometers located farther downstream have recorded a decrease of approximately 1.6 m since 2014 (while following seasonal trends). All piezometers show that pressure minimum has slightly increased over 2018 and 2019 (0.5 m per year). The minimum pressure reached during the period from September 2018 to September 2019 was 131.5 m.

Channels 1 and 2 (Sta. 31+815 to 32+105)

No seepage has been observed at the toe of the dike in 2019, but there is a water pond in this location that naturally drains to Goose Pit. Most of the piezometers are not frozen in this area.

The recorded pore water pressure in the piezometers located in Channels 1 and 2 has generally been stable (0.2 to 0.5 m fluctuation from winter to freshet) since last year for the piezometric arrays of Channels 1 and 2. After the large increase in pore-water pressure observed in the winter of 2018 in the downstream piezometer at Sta. 31+885, the pressure has shown a 1 m spike in January 2019 before decreasing during the summer of 2019 to reach normal levels. The nearby instruments at Sta. 31+815 also shows a stabilization of the pressure, although slightly higher than years before 2018 by about 0.5 m. The trend observed in 2018 has not been observed in 2019 in any instrument of this area. The fact that the pore water pressure in the foundation remains stable indicates that the raise observed in the Sta. 31+885 piezometers within rockfill material of the dike and the instruments nearby was associated with shallow water table fluctuations. Other piezometers are stable with a slight increase (0.5 m) during the summer of 2019.

The thermal data at Sta. 31+815 might indicate some sign of seepage as the thermal cooling is less pronounced and there is a wider fluctuation of temperature recorded at this location than in the other thermistor nearby.

5.3.2 Thermal regime

Thirty-three thermistors (from T1 to T30 and T3’ to T5’) have been installed on Bay-Goose Dike. From September 2018 to September 2019, the following observations have been made. T3, T4, T5 and T6 seems to have a glitch after June 2018 and data from that date is unreliable. AEM is investigating this issue.

In addition to thermistors, thermal sensors of piezometers installed show a general cooling trend and freeze-back of instruments over the years.

Sta. 30+134 (T1), Sta. 30+827 (T14) and 32+140 (T30)

The three thermistors installed at Sta. 30+134 (T1), Sta. 30+827 (T14), and Sta. 32+140 (T30) are located on the northern abutment, Goose Island, and the western abutments. The first node of these thermistors is installed about 1 m below the dike crest. For this period, the dike and its foundation were entirely frozen on the northern abutment (T1), the Goose Island abutment (T14), and the western abutment (T30).

Piezometers at 30+158 confirm this trend with all 3 lines (P1, P2, P3) frozen all year long.

Sta. 30+185 (T2), Sta. 30+489.5 (T9), Sta. 30+553.25 (T10), Sta. 30+621.5 (T11), Sta. 30+650 (T12), Sta. 30+713 (T13), Sta. 31+080 (T15), Sta. 31+134.5 (T16), Sta. 31+170 (T17), Sta. 31+352 (T18), Sta. 31+752.5 (T21), Sta. 31+820 (T22)

Twelve thermistors were installed in the SB portion of the cut-off wall. All the thermistors except for T15 and T18 show a similar trend:

- The rockfill is frozen all year below El. 134 m.
- There is generally an active layer in the till and most of the bedrock is thawed all year with temperatures ranging from -1°C to 3.5°C.

T18 (31+352) indicates that the till and the bedrock remained frozen, while T15 (31+080) indicated that the till and the bedrock remained frozen above El. 123 m.

Piezometers at 30+645.5, located between T11 and T12, show that P1 and P2 lines are entirely frozen, while P3 line is still unfrozen but progressively coming close to 0°C.

Piezometers at 31+165, located between T17 and T18, show that the P1 line is in permafrost and that the P2 line is only frozen in the till while the bedrock remains unfrozen.

Piezometers at 31+815, located between T21 and T22, show that the upper 2 sensors in the P1 line are in permafrost while the deeper bedrock and the P2 and P3 line remain unfrozen.

Sta. 30+260 (T3), Sta. 30+261.5 (T3’), Sta. 30+272 (T4), Sta. 30+273.5 (T4’), Sta. 30+288.5 (T5), Sta. 30+290 (T5’), Sta. 30+330.5 (T6), Sta. 30+261.5 (T3’), Sta. 30+273.5 (T4’)

This portion of the dike contains a cut-off wall where settlement could occur due to CSB, a rigid material, sitting on top of SB, a soft material. The thermistor nodes configuration for T3 (Sta. 30+260), T4 (Sta. 30+272), and T5 (Sta. 30+288.5) has nodes located very close together to monitor the interface between the CSB and SB materials as noted below. Thermistors T3, T4, and T5 were not installed to the designed depths, but instead have been installed below the interface and monitor the bedrock contact. These thermistors are recording temperatures above 0°C. T3’ (30+261.5), T4’ (Sta. 30+273.5), and T5’ (Sta. 30+290) provide readings across the CSB/SB interface.

Thermistor T6 indicates that the ground is completely unfrozen below El. 129 m. Therefore, the till foundation was unfrozen from September 2018 to September 2019. From El. 129 to 133 m, the ground fluctuates above and below 0°C and from El. 133 to 135 m, and the dike remained frozen.

No seepage directly downstream of this portion of the dike was observed; however, based on the topography, it is anticipated that seepage from this area could report to a lower point within the North Channel (i.e., 30+360).

These thermistors show that the till and bedrock were almost completely unfrozen from September 2018 to September 2019.

Piezometers at 30+276.5, located in bedrock between T4' and T5, show that the P1 line is in permafrost and that P2 line is freezing back with the upper 2 sensors frozen all year long, while P3 line remains unfrozen.

Sta. 30+386 (T7), Sta. 30+417.5 (T8), Sta. 31+595 (T19), Sta. 31+605 (T20), Sta. 31+850 (T23), Sta. 31+880 (T24), Sta. 31+960 (T25), Sta. 31+995 (T26), Sta. 32+030 (T27), Sta. 32+060 (T28), Sta. 32+100 (T29)

Eleven thermistors were installed in areas where the bottom of the cut-off wall was jet grouted. These thermistors show that the maximum active layer depth was above 135 m between September 2018 and September 2019. The majority of the rockfill stayed frozen all year and the till and bedrock were unfrozen all year with an exception at T29.

At T29, a part of the till foundation outside of the jet grouted area (between El. 127 m and 133 m) remained frozen for the entire September 2018 to September 2019 period. The jet grouted area, however, did not remain frozen at T29. The temperature of the jet grouted area varied between 0°C and 2.7°C.

Piezometer 31+600, located between T19 and T20, shows that P1 and P2 lines are freezing from the surface. The deeper instruments and the P3 line remain unfrozen. Similarly, piezometers at 32+105, located near T29, show that the P1 line is in permafrost and that P2 line is freezing back with the upper 2 sensors frozen all year long, while P3 line remains unfrozen.

Piezometers at 32+000, located between T26 and T27, show that the upper 2 sensors (in till) in the P1 line are in permafrost while the bedrock and the P2 and P3 line remain unfrozen.

Piezometers thermal sensors in seepage channels

North Channel (Sta. 30+158 to 30+516.5)

Piezometers at 30+453.5 are still unfrozen, with the upper sensor in the P1 line starting to freeze and thaw seasonally over the last year. Piezometers at 30+378.5 are unfrozen all year.

Channel 1 and 2 (Sta. 31+815 to 32+105)

Piezometers at 31+885 are unfrozen all year. Similarly, piezometers at 32+065 remain unfrozen, however the upper sensor in the P2 line (in till) is starting to freeze.

5.3.3 Inclinometers

Eight standard inclinometers and six TDR cable are installed on Bay-Goose Dike, as detailed in Appendix I (Table 5 and Table 6). Only inclinometers data were available for review. The inclinometer displacements are referenced along Axis A and Axis B. Axis A is perpendicular to the cut-off wall alignment (positive displacement towards the Pit side) while Axis B is perpendicular to Axis A, parallel to the cut-off wall (positive displacements towards the increasing stationing). Cumulative displacement in Axis A varied from 0.1 mm to 35 mm. Cumulative displacement values for Axis B varied from 0.1 mm to about 25 mm. The larger settlement happened in the upper portion of the dike and in the thermal cap. Recorded displacements are mainly small and are within the tolerable displacements for the structure.

In the summer of 2019, a slight lateral movement towards the upstream side (about 5 mm) was measured in the cut-off wall (mostly between El. 129 m to 131 m) in inclinometers, 30+282, 30+390, 31+190, 31+815 and 31+885There is no sign of movement visually on the field. No other significant movement was observed for other inclinometers from September 2018 to September 2019, whose measurements have remained relatively stable since 2014. Offsets in the measurement were previously linked to the replacement of the reel.

5.3.4 Seismograph

Seismograph monitoring of blast vibrations on the crest of Bay-Goose Dike has been done for every blast at Goose-Pit and Pit E4/E5. AEM analysed the monitored blast vibrations after each event. The maximum allowable PVS for all dikes is set at 50 mm/s per the designer's recommendations. The highest recorded PVS for Bay-Goose from September 2018 to September 2019 was 44.2 mm/s at station F, near pit E5. No estimated tensile and shear strains were calculated during the annual geotechnical inspection. The recorded PVSs were compared to the peak particle velocity values used in the previous Meadowbank Pit Blasting Effect Study, which considered the tensile and shear strains, indicating that the blast vibrations recorded are not a concern for the integrity of the dike.

5.3.5 Flow Meters

From September 2018 to September 2019, the total average flow of all active monitored seepage station no. 6, 7 8 and 9 due to seepage from the toe of the dike was measured at 38.2 m^3/day compared to 10.7 m^3/day in 2018, 14.7 m^3/day in 2017, 24 m^3/day in 2016, 29 m^3/day in 2015, 132.2 m^3/day (1.5 L/s) in 2013, and 97.2 m^3/day (1.22 L/s) in 2012. The measured flow does not take into account the inflow of water from the pond at Central Channel, as this value has not been measured since 2015 (61 m^3/day in 2013 and 2014). Overall seepage is relatively stable and less than anticipated and is thus currently not a concern.

The North Channel is being monitored by stations 8 (30+420) and 9 (30+380) and has an average flow of 5.8 m^3/day compared to 0.7 m^3/day in 2018, 4.9 m^3/day in 2017, 1.9 m^3/day in 2016, 17 m^3/day in 2015, 58 m^3/day in 2013 and 80.8 m^3/day in 2012.

The Central Shallow seepage channel is being monitored by station 7 and had an average flow of 15 m^3/day compared to 4.5 m^3/day in 2018, 5.6 m^3/day in 2017, 11.5 m^3/day in 2016, 12 m^3/day in 2015, 13.3 m^3/day in 2013 and 18.9 m^3/day in 2012. This is similar to historic trends.

Channel 3 is monitored by station 6, which recorded an average of 17.4 m^3/day compared to 2.6 m^3/day in 2018, 4.2 m^3/day in 2017 and 9.3 m^3/day in 2016.

Flows observed in 2019 appear larger than the last few years. This year flow could have been impacted by the high amount of precipitation received along the summer, especially since the monitoring stations are slightly offset from the toe of the dike, meaning that runoff water can be collected in the weirs as well. It is recommended to continue monitoring the evolution of the seepage at the toe of the dike and to continue measuring the inflow of water from the pond at Central Channel.

5.4 Vault Dike

Four thermistor strings were installed on Vault Dike, as detailed in Appendix I (Table 7). The Vault Dike thermistor data are presented in Appendix C. The instrumentation is indicating that the structure is behaving as expected with data following historical trends.

The following thermal regime observation were made:

- The instrumentation shows that the entire foundation of Vault Dike (till and bedrock) is frozen.
- The upstream toe line tie-in remained entirely frozen all year long.
- The active layer in the rockfill was up to 6 m thick in the summer of 2019.

5.5 TSF South Cell

5.5.1 Central Dike

Instruments were installed on Central Dike to monitor the dike’s performance during its construction, operation, and closure. The instrumentation on Central Dike consists in 2019 in a total of 69 piezometers and 20 thermistor strings installed in 20 boreholes, as detailed in Appendix I (Table 17). Some additional instruments are planned to be installed later in 2020 to replace broken ones.

The following presents a summary of the data collected from September 2018 to September 2019 for the piezometers and the thermistors. Data plots for the instrumentation sent by AEM are presented in Appendix C.

5.5.1.1 Thermistors

The thermistors are showing similar trends as in the past. The following observations of the thermistor data can be made:

- The instruments installed along the central key trench (545-P1, 580-P1, 595-P1, 750-P1, 825-P1) show thawed conditions (between 1.1°C and 3°C) within the rockfill, the till and the bedrock (from El. 110 m to 65 m).
- The instruments installed along the downstream toe of the Central Dike footprint for a final crest elevation of 150 m indicate that the till unit at 545-P2 stayed frozen in 2017-2018 but not at 650-P2, while the majority of the bedrock foundation did not freeze (between -0.2°C and 0.4°C below El. 92 m at 545-P2, and between 0.8°C and 1.2°C below El. 102.5 m at 650-P2).
- Throughout the year, temperature variations up to 1°C can be observed for each bead, except in rockfill near the surface (up to 10 m deep) where the amplitude is larger. The bedrock temperature from El. 105 to 55 m varies from -6.1°C to -4.2°C at 465-P3, from -6.2°C to -0.8°C at 650-P3 and from -0.3°C to 1.1°C at 875-P3. This seems to indicate that a permafrost condition has developed in part of the Portage Pit wall, while the part aligned with the south abutment of Central Dike did not freeze during the year.
- Thermistors 875-P3 and 975-P3 installed near portage Pit show that the bedrock remained unfrozen below El. 105 m approximately, with temperatures ranging from 0°C to 1.3°C.
- The thermistor installed in the West Road (745-P3) indicated that the rockfill stayed in frozen conditions below El. 124 m except for the bead at El. 120 m (-3°C to 4°C) and that the dense till stayed frozen all year,

with the bead at El. 104 m showing maximum temperature around 0°C. It marks the limit of the frozen section observed on the downstream toe of Central Dike.

These observations tend to confirm the visual observation of seepage downstream as the foundation of the dike (till and bedrock) on the downstream side are unfrozen all year. Till and bedrock temperature tend to decrease further from the downstream side and the piezometers near Portage Pit show permafrost condition.

5.5.1.2 Piezometers

The general piezometric trend is stable. Most instruments are correlated with the downstream pond elevation.

It can be observed that the piezometers located in boreholes between Sta. 0+595 and Sta. 0+875 are strongly reacting to the level of the water pond located downstream of Central Dike. In those boreholes, the 23 piezometers that are non-frozen and not in suction are recording piezometric elevation around El. 115 m, the downstream pond level. The piezometers between Sta. 0+595 and Sta. 0+875 located in the rockfill, till and bedrock are reacting similarly, which seems to indicate a hydraulic connection between the downstream pond, the till and the bedrock. The piezometric elevation recorded in the till and the bedrock between Sta. 0+595 and Sta. 0+875 is generally slightly higher than the elevation of the downstream pond, indicating excess pore water pressure or more a higher seepage flow. Piezometers 650-P2 and 875-P3 are the only instruments that seem to react to the South Cell level instead of the downstream pond level. Piezometer 650-P2-A has been on the rise since December 2015, with a deceleration of the increase after 2018, and the measured piezometric elevation exceeds the South Cell pond elevation. This instrument may need to be doubled to confirm this trend. Piezometer 875-P3-A fluctuates with the South Cell head, although piezometer 875-P3-B follows the downstream pond level until June 2018, when pressure started to increase at the same rate at the South Cell level. Pressure in piezometer 875-P3-B caught up with the pressure measured in 875-P3-A during the summer of 2019. Piezometers at 875-P3 are also the only instruments in the P3 zone that are recording an upward trend.

With the exception of 545-P1-D, the piezometers located between Sta. 465 and Sta. 580 are not reacting to the downstream pond water level or the elevation of the South Cell and indicate much lower piezometric elevations. The exception to this observation is piezometer 545-P1-D, located in the till, which recorded a drastic increase in piezometric elevation when deposition started in the South Cell in 2014, then in the summer of 2015, before stabilizing and following the South Cell level trend. Piezometer 545-P1 broke in January 2019, but piezometer D showed pressure coming close to the South Cell level before then. Piezometer 545-P2-A in the bedrock has shown continuous increase of the pressure from January 2014 until it broke in March 2019, with a sharp increase in the months before probably linked to its degradation. Piezometer 700-P1 also exhibits a large increase in piezometric elevation since July 2017, rising from El. 107 m to 125 m after the installation of the instruments. The instrument now seems stabilized and the pressure has been decreasing slowly since December 2018.

Piezometers 595-P1-B and C exhibit a unique trend consisting in 2 subsequent spikes in the fall and in winter (5 and 10 m in 2018-2019), followed by a progressive pressure decrease until the summer, returning to normal levels. This is the same pattern than in 2017, 2018 with a higher amplitude. These instruments are installed in the bedrock, with remaining casing.

Generally, a downward hydraulic gradient in part of the bedrock and of the till can be interpreted in piezometers located in the same boreholes. Small upward gradients in the till or the upper bedrock can also be observed in some boreholes, such as 580-P1-R, 750-P1 and 810 P-1. Significant upward pressure gradients in the bedrock can be observed in holes 545-P1, 545-P2, 700-P1, 825-P1 and 850-P1. It is not possible to observe a generalized upward hydraulic gradient trend that would indicate that pressurised bedrock is transmitting pore water pressure to the till. The piezometric elevation in the bedrock is often similar or smaller than recorded in some parts of the till layer. However, due to the topography, it is possible that water is reporting from bedrock located higher and induces excess pore water pressure on the foundation soil located lower below.

Some instruments were broken or malfunctioning, as detailed in Appendix I (Table 17). Those instruments give either no data or erratic data. A piezometer that has frozen once cannot be relied upon even if it thawed, as freezing generally breaks the piezometer or shifts its calibration curve. It is recommended to flag these piezometers and be careful when interpreting their data even if they seem probable.

Like in previous years, it can be observed that some piezometers are recording negative pressure (suction). Negative pressure for unfrozen conditions was recorded in seven piezometers, as detailed in Appendix I (Table 18). Piezometers in suction are recording very few variations in measured pore water, while the other instruments are reacting to the downstream pond elevation. These instruments are generally located in the bedrock. Based on the available information, it is not possible to determine the exact cause of this suction. This could be due to a problem with the instruments or to a non-continuous geological environment in which the water table is located locally below the installation depth of some of the instruments. The results of these instruments must be interpreted with caution.

5.5.1.3 Flow Meters

At the time of the inspection a seepage flow of approximately 308 m^3/h was pumped back to the South Cell to maintain the downstream pond at El. 115 m, compared to 263 m^3/h in 2018. Water inflow from this location used to be pumped back into the South Cell, but since the South Cell has reached its maximum capacity the water was transferred to Pit A from April 2019. In May 2019, a second pumping system pumped water out of the South Cell into Bay-Goose Pit. Pumping out water from the South Cell combined with an adapted tailings deposition plan effectively reduced the amplitude of the seepage over the last years and the seepage now appears stable. AEM indicated that the flow had decreased to 50 m^3/h in November 2019 following the pumping out of most of the South Cell water pond.

5.5.1.4 Seismograph

Seismograph monitoring of blast vibrations on the crest of Central Dike has occurred at four locations along the dike for every blast at Portage Pit. AEM analysed the monitored blast vibrations after each event. The maximum allowable PVS for all dikes is set at 50 mm/s as per the designer’s recommendations. The highest recorded PVS for Central Dike from September 2018 to September 2019 was 15.3 mm/s. The recorded PVSs were compared to the positive predictive values used in the previous Meadowbank Pit Blasting Effect Study, which considered the tensile and shear strains, indicating that the blast vibrations recorded are not a concern for the integrity of the dike.

5.5.1.5 Turbidity and Water Quality

The turbidity of water in the downstream pond has been monitored from 2015. The turbidity of the downstream pond usually increases with the pump speed. No turbidity data for Central Dike seepage was available for review in the framework of this inspection. The seepage pond water was discharged in the South Cell, then in the pits.

In the freshet of 2019, similarly to the summer of 2017 and 2018, a change in the water coloration was observed in the downstream pond. The water turned orange and back to normal several times in the cycles. An orange sludge was observed on the surfaces below the water level. No change in pH was measured but turbidity increased during the summer. Per AEM, the available results from chemical analyses indicate that no tailings are present in the downstream pond and that the coloration is linked to natural bacterial processes.

5.5.2 Saddle Dam 3

Five thermistors are installed at Saddle Dam 3, as detailed in Appendix I (Table 14). These thermistors are mostly in permafrost condition, with the bedrock frozen all year, including at SD3-T3, where an active layer was previously observed within the upper 3 m of bedrock. It will be important to keep following the performance of the structure as Saddle Dam 3 is operational for containment of supernatant water.

5.5.3 Saddle Dam 4

Four thermistors are installed at Saddle Dam 4, as detailed in Appendix I (Table 15). These thermistors are mostly in permafrost condition. The beads in the bedrock for SD4-T4 (in the upstream toe liner tie-in) stopped transmitting data in January 2018 and should be repaired.

5.5.4 Saddle Dam 5

Three thermistors were installed at Saddle Dam 5, as detailed in Appendix I (Table 16). SD5-T4 shows frozen bedrock and rockfill up to El. 142.5 m, while SD5-T2 further downstream indicates that the bedrock and the rockfill are mostly frozen up to El. 141 m with temperatures between -8°C and 0.2°C. The warmer area identified in 2018 at the surface of the bedrock is no longer observed. SD5-T3 indicates that the bedrock and the compacted till of the tie-in are frozen up to El. 139 m.

5.6 TSF North Cell

5.6.1 Saddle Dam 1

Instrumentation on Saddle Dam 1 comprises thermistors, as detailed in Appendix I (Table 9). Thermistor data from within the structure indicate that the dike foundation remained frozen from September 2018 to September 2019. The foundation soil and bedrock remained in a frozen state with temperatures ranging from about -1.1°C to -5.2°C. At the upstream toe, below El. 132 m, the compacted till base material below the liner remained frozen. The majority of the rockfill shell remained frozen during the reported year as the active layer was 2 m, above El. 146 m. The instrumentation indicates that the structure is behaving as expected with data following historical trends.

No sign of seepage or thawing of the foundation soil can be observed from the instrumentation data. The structure is performing as expected.

Plots of the Saddle Dam 1 thermistor data are presented in Appendix C.

5.6.2 Saddle Dam 2

Instrumentation on Saddle Dam 2 comprises thermistors, as detailed in Appendix I (Table 10).

Thermistor data from within the structure indicates that the dike foundation remained frozen from September 2018 to September 2019 with temperatures ranging from -4°C to -9°C. At the upstream toe of the dike, the semi-pervious backfill remained frozen during the year. The rockfill mostly stayed in frozen condition with an active layer above El. 148 m. The instrumentation indicates that the structure is behaving as expected with data following historical trends.

No signs of seepage or thawing of the foundation soil were observed. The structure is performing as expected.

Plots of the Saddle Dam 2 thermistor data are presented in Appendix C.

5.6.3 RF1-RF2

Four thermistors were installed to monitor the temperature of RF1 and RF2 (which delineates the northeastern side of the TSF North Cell), as detailed in Appendix I (Table 11). Plots of their data are presented in Appendix C.

Three thermistors are installed on RF1 (T121-1, T73-6, and RF1-3). Thermistor T121-1 shows frozen conditions all year long with temperatures varying from -0.4°C to -5.2°C. Thermistor T73-6 shows sub-zero temperatures below El. 149.5 m and the presence of an active layer above that elevation. RF1-3 shows frozen conditions all year long with temperatures varying between 0°C and -9°C.

One thermistor is installed on RF2 (T122-1) and shows temperatures that vary from -1.9°C to -6.4°C, indicating that the RF2 foundation is in a permafrost state.

5.6.4 North Cell Tailings

Nine thermistors are installed in the tailings of the North Cell of the TSF, as detailed in Appendix I (Table 12). Plots of their data are presented in Appendix C. They indicate that the tailings in the North Cell are not entirely frozen, including in the talik area where the reclaim pond was kept during operation.

NC-T1 shows that the tailings and the bedrock did not freeze between September 2018 and September 2019 below El. 140 m, with temperatures ranging between 0°C and 7°C. The unfrozen conditions are attributed to the presence of the supernatant water pond near the Saddle Dams close to the instrument, and the fact that it was always within the supernatant pond during tailings deposition.

NC-17-01 shows that the tailings and bedrock remained frozen between September 2018 and September 2019, with temperatures ranging between 0°C and -6°C.

NC-17-02 shows that the tailings and the bedrock did not freeze in 2019 below El. 139 m, with temperatures ranging between 0°C and 2.3°C. The unfrozen conditions are attributed to the presence of the supernatant water pond near the Saddle Dams close to the instrument.

NC-17-03 shows that the tailings and the bedrock did not freeze in 2019 below El. 140 m, with temperatures ranging between 0°C and 2°C. The unfrozen conditions are attributed to the presence of the supernatant water pond between RF1 and RF2 close to the instrument.

NC-17-04 shows that the tailings and the bedrock remained frozen in 2019 below El. 132 m, with temperatures ranging between 0°C and -3.5°C. Another zone located in the tailings between El. 142 and 148 m did remain frozen, with temperatures ranging between 0°C and -12°C. Between El. 135 and 142 m, the tailings did not freeze and indicate the presence of a talik, consistent with the observations made when the reclaim water pond was present at this location during operations. An active layer is observed in the tailings above El. 148 m.

NC-17-05 shows that the tailings remained frozen in 2019. No active layer was observed in the tailings and the bedrock.

NC-17-06 shows that the tailings and the bedrock remained frozen in 2019 below El. 145 m, with temperatures ranging between -11°C and 0°C. An active layer is observed in the tailings above El. 145 m.

NC-17-07 shows that the tailings and the bedrock remained frozen in 2019 below El. 145 m, with temperatures ranging between -12°C and 0°C. An active layer is observed in the tailings above El. 145 m.

NC-17-08 shows that the tailings and the bedrock did not freeze in 2019 below El. 140 m, with temperatures ranging between 0°C and 3.5°C. The unfrozen conditions are attributed to the location of the instrument directly within the supernatant water pond.

The temperature profile measured in thermistor SWD-01 is discussed in the next section.

5.6.5 Stormwater Dike

Three thermistors, one piezometer, 3 crackmeters, 20 prisms and one extensometer are monitoring Stormwater Dike, as detailed in Appendix I (Table 13).

From September 2018 to September 2019, the prisms measured movement mainly in the vertical direction (up to 30 mm cumulative displacement) from the new baseline installed in October 2018. Limited lateral displacement (millimetres) was measured towards the South Cell (downstream side). The movement appears stabilized. Crackmeters showed displacement up to 10 mm and extensometers registered a maximum displacement of 23 mm near Sta. 10+925.

SWD-01 is installed on the upstream side of Stormwater Dike within the North Cell tailings. This thermistor shows that the tailings and the bedrock did not freeze between September 2018 and September 2019 below El. 132 m with temperatures ranging between 0°C and 1.8°C. The unfrozen conditions are attributed to the presence of the supernatant water pond close to the instrument. The temperature readings indicate that the tailings between El. 132 m and 147 m stay frozen throughout the year, and that an active layer is present above El. 147 m.

SWD-02 is installed on the downstream side of Stormwater Dike (approx. Sta. 10+650 m) within the stabilization buttress and is covered by the South Cell reclaim pond. No data is available below El. 115 m and the rest of the beads stopped working in March 2019. Before breaking, this thermistor showed that the till remained frozen between El. 115 and 123 m, with temperatures ranging between -0.3°C and 0°C. Above El. 123 m, the measurements showed that the overlaying till, lakebed sediments, and rockfill did not freeze.

SWD-03 is installed on the downstream side of Stormwater Dike (approx. Sta. 10+690 m) within the stabilization buttress and is covered by the South Cell reclaim pond. This thermistor shows that the till and the bedrock remained frozen between September 2018 and September 2019 below El. 121.5 m, with temperatures ranging between -0.5°C and 0°C. Above El. 121.5 m, the measurements show that the overlaying till, lakebed sediments, and rockfill did not freeze.

The piezometers show a trend in pore water pressure that follows the evolution of the water level in the South Cell reclaim pond. PZ-SWD-03-B installed in the till shows that the hydraulic head overlaps almost exactly with the measured water level in the South Cell, with a variable offset (up to 4 m below) starting in October 2017. PZ-SWD-02-A installed within the bedrock showed a similar trend with an offset until it broke in March 2019. Likewise, PZ-SWD-03-A is installed within the bedrock and follows a similar trend, with an offset. These 2 instruments are below 0°C but are still providing good quality data.

Plots of Stormwater Dike thermistor and piezometer data are presented in Appendix C. The movement monitoring data can also be found at the end of this appendix.

5.6.6 North Cell Internal Structure

Four vertical thermistor strings were installed on the crest of the North Cell Internal Structure, as detailed in Appendix B-1 (Table 8). NCIS-01, NCIS-02, NCIS-03 and NCIS-04 show frozen tailings and an active layer within the entire layer of rockfill.

Sixteen prisms are installed on the crest of the North Cell Internal Structure. From September 2018 to September 2019, the prisms measured almost no displacement (up to 3 mm cumulative vertical displacement). The structure is stable.

Plots of the North Cell Internal Structure thermistor data are presented in Appendix C.

6.0 ALL-WEATHER PRIVATE ROAD

The All-Weather Private Road (AWPR), formerly referred to as the All-Weather Private Access Road, was built in 2007-2008 to connect the hamlet of Baker Lake to the Meadowbank Mine site. The road is approximately 107 km long with nine bridge crossings and culverts installed at a total of thirty-eight locations. Each structure along the AWPR, their designated name, their approximate location, and the observations noted during the inspection is provided in Appendix D1.

The road design is based on a general rockfill sub-base and crushed granular rockfill surfacing with a combined minimum thickness of 1 m over thawed stable soil and 1.2 m over thawed susceptible soil.

No sign of thermal degradation of the permafrost was observed on the road during the inspection. It should be noted that signs of thermal degradation may not necessarily be observed due to the regular road maintenance performed by AEM. During the inspection, water levels and flow velocities at the crossings were normal for the time of year.

Fill material that comprises the majority of the road provides no significant barrier to low gradient water flow due to its coarse nature. During higher flow and runoff periods, water may flow through portions of the road fill. Water was observed flowing through the rockfill near four culverts during the inspection, and signs that water flowed beneath the road were observed at some other locations during the inspection. This could also be due to the inlet or the outlet of some culverts having been installed too high or too low, which did not promote the flow of water through the culvert until a certain water level had been reached.

During the year, AEM conducts regular and event-based visual inspections of the fish-bearing water crossing locations along the access road. This data should continue to be compiled by AEM to confirm the hydraulic function of the crossings, the adequacy of the crossing locations with respect to the watercourses, and minimal impact to fish habitat.

It is understood that AEM's monitoring program includes an assessment of sedimentation and potential erosion issues at the major bridge crossings. Consideration should be given to expanding AEM's monitoring program to include all culverts and bridges along the road to assess whether they are providing adequate capacity during the freshet and following large precipitation events.

6.1 Culverts

The culverts were generally in good condition at the time of the inspection. No significant degradation of culvert conditions has been observed when compared to the 2018 inspection. Most culverts were unobstructed with no signs of erosion and no signs of damage to the culverts.

Culverts in the following discussion, and in the photographic log, have been identified by name (e.g., R-24) to be consistent with those indicated on the as-built drawings provided by AEM. Each culvert is also identified by its approximate kilometre location (e.g., km 98+250) along the road alignment.

Signs indicating that minor erosion has occurred were observed at the inlet of PC-17A (8+830), and at the outlet of R14 (km 67+840) and R24 (km 98+100). No action is recommended for the culverts showing sign of erosion as the situation seems stable. Culvert erosion progression should be monitored at freshet.

During the inspection, signs of water flowing beneath the road were observed at some locations. This is generally due to the inlet or the outlet of the culvert having been installed too high or too low, which did not promote the flow of water through the culvert until water reached a certain level. This condition can promote erosion and risk of washout beneath the road and should be monitored. This situation has been observed in the past and seems to be stable as no signs of deteriorating conditions were observed. This condition was observed at PC-17A (8+830), PC-11 (39+552), R-18B (82+500), R-20 (85+490), and R-23 (93+600). PC-11, PC-17A, R-20 and R-23 showed a flow of water during the inspection. The progression of the situation should be monitored at freshet.

Obstructed and damaged culverts were observed at some locations during the inspection. In many cases, the obstructions are related to inlets and/or outlets becoming partially or completely obstructed by accumulated rockfill and road material. There was no substantial increase in the number of significantly damaged culverts observed during the 2018 inspection when compared to last year. The following culverts were too damaged and obstructed to function properly: R-00A (2+550), PC-14 (4+260), unnamed culvert at 5+700, and PC-16 (54+950). If insufficient capacity to handle the flow is observed at locations where culverts are obstructed or damaged, it is recommended to clear the obstructions or repair the culvert.

The observations and descriptions for each culvert at the time of the inspection as well as recommendations can be found in Appendix D1. For example, for some culverts, it is recommended to monitor the water level upstream and the flow through the culvert during high flow events (e.g., freshet season). A photographic log of the culverts is included in Appendix D2.

6.2 Bridges

Nine bridges are located along the AWPR: four Acrow Panel bridges and five Rapid Span bridges. A structural and/or mechanical assessment of the bridges was not conducted and is beyond the scope of this geotechnical inspection. A description of the observations of the bridges made during the inspection is presented in Appendix D1. A photographic log of the bridges is included in Appendix D3.

The bridges have been identified in sequence, increasing in number along the road from Baker Lake to Meadowbank (e.g., from Bridge 1 to Bridge 9). The name of each bridge (e.g., R02) is consistent with the as-built drawings of the AWPR provided by AEM. Each bridge is also identified by its approximate kilometre location (e.g., km 8+750).

Due to the low-lying terrain between Baker Lake and Meadowbank, water flow typically occurs in broad areas and not in well-defined channels. The majority of water crossings spanned by bridges have increased channelization of flow due to the embankment fill at the crossing location. No significant signs of embankment erosion were observed at the time of the inspection as they are generally constructed with coarse rockfill.

The bridges and their embankments were in good geotechnical condition at the time of the inspection. Signs of settlement were observed at Bridge R-15 and this condition should continue to be monitored. The following observations were made for each bridge during the inspection and are listed in Appendix D1:

- **Bridge 1, R02 at about km 8+750**: Normal flow was observed at the time of the inspection. No signs of erosion or turbidity were noted. Both abutments show deformation of the corrugated steel bins under the weight of the bridge. In 2011, two additional culverts of 1,800 mm in diameter were installed nearby to increase the drainage capacity during high flow events and prevent the road and the bridge from washing out. It is understood that AEM removes snow and ice at this location and other bridges before the freshet and will continue this practice in the future.
- **Bridge 2, R05 at about km 17+600**: Minor damage to the bin wall of both abutments was observed; it is likely a result of past snow removal activities. No reparation is required yet. No evidence of erosion was observed, and the foundation was in good condition. The streambed consists primarily of cobbles, gravel, and a few boulders towards the perimeter of the channel.
- **Bridge 3, R06 at about km 23+100**: Construction of the bridge has concentrated flow in this area. No signs of erosion or turbidity were observed, and the bridge was in good condition at the time of the inspection.
- **Bridge 4, R09 at approximately km 48+500**: Construction of the bridge has concentrated flow in this area. No signs of turbidity or erosion were observed at the time of the inspection and the bridge was in good condition.
- **Bridge 5, R13 at about km 62+060**: At the time of the inspection, the bridge was in good general condition. No signs of turbidity or erosion were observed. In 2018, the side of the north abutment seemed inclined; In 2019, the bridge appeared horizontal, it is not known if it has been repaired.
- **Bridge 6, R15 at about km 69+200**: Signs of settlement were observed as the bridge was dipping toward the western side on both abutments. The bridge foundation did not show any signs of adverse conditions but is slowly settling. No remediation work is recommended for the moment, but the situation should be monitored. Minor damage to the bin wall of both abutments was also observed and is likely a result of past snow removal activities. No evidence of erosion or turbidity was observed.
- **Bridge 7, R16 at about km 73+800**: No signs of erosion or turbidity noted. Construction of the bridge has concentrated the flow in this area.
- **Bridge 8, R18 at about km 79+500**: The bridge was in good condition. A boulder field is located beneath the bridge and no flow was observed at the time of the inspection.
- **Bridge 9, R19 at about km 83+150**: Steel plates with pipe anchors are installed along both embankments of the bridge. Some damage (bending) to the steel containment plates was observed, which may be associated with snow removal activities. The damage is minor and does not impact the geotechnical integrity of the bridge or of the embankment as the surrounding pipes seem to hold the metal sheet in place (protecting the abutment backfill). No turbidity or erosion was observed at the time of the inspection.

7.0 AMARUQ ROAD

Amaruq Road was built between 2016 and 2019 to connect the Meadowbank Mine site to the Amaruq site under development. The road is 64 km long with eight bridge crossings and culverts installed at a total of 290 locations. Each structure along Amaruq Road, their designated name, their approximate location and the observations noted during the inspection is provided in Appendix E1.

The road design is based on a general rockfill from quarries or sand and gravel from esker burrow pit sub-base and crushed granular rockfill surfacing with a combined minimum thickness of 1.0 m over thawed stable soil and 1.2 m over thawed susceptible soil.

The surface of the road at the time of the inspection was in general good conditions, with some rough portions where construction was going on. No sign of thermal degradation of the permafrost was observed on the road during the inspection. It should be noted that as with the AWPR, signs of thermal degradation may not necessarily be observed in the future due to the regular road maintenance performed by AEM. During the inspection, water levels and flow velocities at the crossings were normal for the time of year.

Fill material that comprises the majority of the road provides no significant barrier to low gradient water flow due to its coarse nature. During higher flow and runoff periods, water may flow through portions of the road fill. Water was observed flowing through the rockfill near some culverts during the inspection, but signs that water flowed beneath the road were observed at some locations during the inspection. This could also be due to the inlet or the outlet of some culverts having been installed too high or too low, which did not promote the flow of water through the culvert until a certain water level had been reached.

At the time of the inspection, Amaruq Road was still under construction. As with the AWPR, AEM is conducting regular and event-based visual inspections during the year of the fish-bearing water crossing locations along the access road. This data is compiled by AEM to confirm the hydraulic function of the crossings, the adequacy of the crossing locations with respect to the watercourses, and minimal impact to fish habitat.

It is understood that AEM's monitoring program includes an assessment of sedimentation and potential erosion issues at the major bridge crossings. Consideration should be given to expanding AEM's monitoring program to include all culverts and bridges along the road to assess if they are providing adequate capacity during the freshet and following large precipitation events.

It is recommended to be on the watch for signs of erosion along the high sandy side slopes along the road and to backfill potential erosion at the toe of bridges as soon as it is noticed.

7.1 Culverts

All culverts with a diameter larger than 900 mm were thoroughly inspected. Smaller diameters culverts were checked from the road surface. Culverts not observed should be considered possibly buried.

The culverts were generally in good condition at the time of the inspection. Most culverts were unobstructed with no signs of erosion and no signs of damage to the culverts. Culverts observed to be buried last year were mostly still buried.

Many culverts seem to have been installed rather high, depending on the permeability of the road to freshet flow, thus possibly posing a risk of road washout. The worst condition would be a continuous boulder field under the sand and gravel road foundation without a rockfill layer at the base of the road.

A photographic log of the inspected culverts is provided in Appendix E2. Given that culverts are almost all in good condition, only locations where important observations were made are documented in the photographic log. Culverts in the following discussion, and in the photographic log, have been identified by their identification number to be consistent with those indicated on the list provided by AEM. Each culvert is also identified by its approximate kilometre location (e.g., km 16+324) along the road alignment, starting at Vault Pit.

No signs of erosion were observed during the inspection. It must be noted that the culverts are newly installed and locations where erosion could occur may not be identified yet.

During the inspection, signs of water flowing beneath the road were observed at some locations. This is generally due to the inlet and the outlet of the culvert having been installed high above original natural ground surface, which does not promote the flow of water through the culvert until a certain water level has been reached. This condition can promote erosion and risk of washout beneath the road and should be monitored. The progression of the situation should be monitored at freshet.

Obstructed and damaged culverts were observed at some locations during the inspection. In many cases, the obstructions are related to inlets and/or outlets becoming partially or completely obstructed by accumulated rockfill and road material or blocks. The following culverts were completely obstructed at a least one of the extremities: #7 (2+013), #7-2 (2+016), #13 (4+615), #27-2 (7+300), #45 (9+710), two outlets of the set of culverts #47 (11+101 to 11+107), #48 (11+203), #54 (12+388), #55 (12+440), #61 (1+050), #64 (13+920), #83 (20+300), #85 (20+671), #86 (20+740), #88 (20+861), #89 (21+180), #93 (22+100), #97 (22+436), #98 (22+482), #101 (23+025), #111 (26+461), #112 (26+630), #117 (27+173), #118 (27+433), #151 (36+562), #163 (40+474), #241 (55+235), #278 (61+870), #283 (62+695), #284-2 (63+072). If insufficient capacity to handle the flow is observed at locations where culverts are obstructed or damaged, it is recommended to clear the obstructions or repair the culvert. None are at a critical location, except for the #47 set.

The observations and descriptions for each culvert at the time of the inspection as well as recommendations are provided in Appendix E1. For example, for some culverts it is recommended to monitor the water level upstream and the flow through the culverts during high flow events (e.g., freshet season).

7.2 Bridges

Eight bridges are located along Amaruq Road. A structural and/or mechanical assessment of the bridges was not conducted and is beyond the scope of this geotechnical inspection. A description of the observations of the bridges made during the inspection is presented in Appendix E1. A photographic log of the bridges is included in Appendix E3.

The bridges have been identified by their approximate kilometre location (e.g., km 16+000) along the road alignment, starting at Vault Pit.

Due to the low-lying terrain between Meadowbank and the Amaruq site, water flow typically occurs in broad areas and not in well-defined channels. The majority of water crossings spanned by bridges have increased channelization of flow due to the embankment fill at the crossing location. No significant signs of embankment erosion were observed at the time of the inspection as they are generally constructed with coarse rockfill.

The bridges and their embankments were in good geotechnical condition at the time of the inspection. No signs of erosion or turbidity were observed. A crack was observed on the north-west concrete abutment of bridge 44.8 (44+800).

8.0 QUARRIES AND ESKERS

8.1 Quarries along the All-Weather Private Road

Twenty-two quarries were developed in the past along the AWPR to provide material for its construction. An additional quarry was developed near the airstrip at Meadowbank to provide further construction materials. All quarries were inspected as part of the geotechnical inspection. A summary of the observations and recommendations made during the 2019 inspection for the structures along the AWPR road including the quarries is provided in Appendix E1. In accordance with the as-built drawings, the quarries have been numbered sequentially from 1 to 22 starting near Baker Lake and increasing towards Meadowbank. The airstrip quarry is referred to as Quarry 23 and is used to store miscellaneous items such as drill core on racks, diamond drill contractor drill rigs, sea-can containers, pipes, and culverts.

The closure and reclamation plan require that all quarries and borrow sources developed during the construction of the AWPR be reclaimed following their use. The closure plan further requires that all quarry slopes be left at an angle of 45 to 50 degrees. During the inspection, it was observed that slope remediation was partly completed but none of them were totally reclaimed. Most quarries are clean although some walls need scaling. Most quarry walls were also free of loose blocks and granular material. Loose blocks and granular material had been placed at the toe of the walls. At the time of the inspection, the majority of the quarries were dry.

During the inspection, it was observed that Quarries 4 and 14 were flooded. These quarries have been flooded for a couple of years and it is understood that AEM is evaluating how to eliminate the ponding of water within these quarries. Quarries 5 and 15 contained minor accumulations of water. Quarries that contain significant amounts of ponded water should be monitored to assess if ponding persists and, if necessary, whether ditches should be developed to facilitate the drainage of water.

Unstable blocks and loose rocks along steep walls remain in Quarries 3, 7, 9, 10, 16 and 23. The west wall of Quarry 3 also contains a falcon nest that prevents its maintenance. It is recommended that workers be cautious in these quarries, be aware of the potential hazard, and stay at a minimum 20 m distance of the walls.

A photographic log of the quarries along the AWPR is included in Appendix F.

8.2 Eskers and quarries along Amaruq Road

Seven eskers and five rock quarries were developed along Amaruq Road to provide material for its construction. All of them except Eskers #2, #3, #4 and #5A are still active. All eskers and quarries were inspected as part of the geotechnical inspection. A summary of the observations and recommendations made during the 2019 inspection for the structures along Amaruq Road, including the eskers and quarries is presented in Appendix E1. In accordance with the as-built drawings, eskers have been numbered sequentially from 1 to 6 starting at Meadowbank and increasing towards the Amaruq site. The quarries are not numbered and were identified for the inspection by their approximate location along Amaruq Road.

The closure and reclamation plan require that all quarries and borrow sources developed during the construction of Amaruq Road be reclaimed following their use. The closure plan further requires that all quarry slopes be left at an angle of 45 to 50 degrees. At the time of the inspection, all of the quarries and eskers were dry, except esker #2, which contained a small accumulation of water.

In Esker #3, the steep north access ramp observed in 2018 has been modified and is now stable.

Unstable loose rocks along steep walls and unstable soil slopes were observed in all eskers and quarries, except Esker #5. It is recommended that workers be cautious in these locations and are aware of the potential rockfall hazard.

9.0 BULK FUEL STORAGE FACILITIES

This section contains the observations made during the 2018 annual inspection of the Baker Lake, Meadowbank and Amaruq tank farm facilities (Main Camp and Vault).

9.1 Baker Lake Tank Farm

The Baker Lake tank farm consists of six large-capacity tanks (10 million litres each) and twenty Jet A fuel tanks (100,000 litres each) that were constructed within four bermed areas (containment cells). Tanks 1 and 2 are located within the first containment area, which is located on the western side of the fuelling area. Tanks 3 and 4 are located within a second containment area adjacent to the first. A central berm is located between the two containment areas. Tanks 5 and 6 are within the third containment area located north and upslope of Tanks 3 and 4. Tanks 5 and 6 are situated within an entirely separate containment cell subexcavated into the hill slope above the initial tank farm area. Twenty Jet A Fuel tanks were installed in 2013 in a containment area located northwest of Tanks 5 and 6 lying over a 0.5 m-thick granular base fill material.

Each containment area has been lined with a 1.5-mm high density polyethylene (HDPE) geomembrane to provide secondary containment.

Visual inspection of the majority of the liner in the containment areas for Tanks 1 to 6 was not possible as it is covered with granular fill material to provide protection. The granular fill material protecting the geomembrane was eroded due to wave actions in some areas, exposing the geomembrane. This condition was observed all along the south side of Tanks 3 and 4 and on the west side of Tank 1. A section of exposed geomembrane with a fold was observed at the northeastern corner of Tank 4. A hole in the exposed geomembrane (300 mm diameter hole) was observed on the south southwestern corner of Tank 3 at the toe of the slope. The hole in the geomembrane should be repaired to ensure a good performance of the retention basin. It is also recommended to cover the exposed area with geotextile and fill material to re-establish the liner protection.

Liner protection was repaired on the northern side of Tank 5.

Animal burrows were observed near the southern corner of Tanks 2 and 4. It is recommended to assess whether the geosynthetics have been damaged.

Ponded water was observed on the southern side of the second and third containment areas. Presence of water on the southern side of the containment areas was reported in the 2011 to 2018 geotechnical inspections. No sump or pump was visible during the site visit. It is recommended to keep the water accumulation at a minimum near the tank foundation. Signs of high water levels being present in this area in the past were noted during the inspection.

The geomembrane of the containment cell of the 20 Jet A fuel tanks remains uncovered around the tanks. A small hole in the liner was observed on the northern side of the containment area. Water was observed ponding within all sides of that containment cell. It is recommended to remove that accumulation of water before it freezes to avoid damaging the geomembrane of the containment cell by ice accumulation. The bituminous geomembrane no longer shows signs of melting. The melting of the bitumen occurred in the past may have damaged it in such a way that contaminated water could seep into the environment.

The embankments around the first and second tank farm containment areas were stable. Tension cracks observed in the past on the upper bench north of Tanks 3 and 4 and south of Tanks 5 and 6 are disappearing. The northern slope of the containment area of Tanks 5 and 6 are steep and the sand and gravel cover may be prone to erosion.

The fuelling station on the western side of the tank farm consists of two containers and a pumping system. The fuelling area is covered by granular road base material. The fuelling station was in good geotechnical condition.

A photographic log of the Baker Lake tank farm and a plan view that shows the location of the photos and observations are included in Appendix G1.

9.2 Meadowbank Tank Farm (Main Camp)

The Meadowbank Main Camp tank farm consists of a single large-capacity tank (5.6 million litres) constructed within an area that has been subexcavated to provide secondary containment. The area has been lined with a 1.5-mm HDPE geomembrane.

At the time of the inspection, the tank backfill foundation pad was in good condition. The liner was well covered with granular fill material for protection, except in the eastern corner of the containment area where a portion of liner is exposed. The granular protection layer over this section should be repaired.

Water (approximately 50 mm) was observed ponding within the eastern corner, as in 2018. Signs of high water levels being present in this area in the past were noted during the inspection. Pumping of ponded water is considered a good practice and should resume.

A fuelling station is located on the northern side of the tank farm. The fuelling area is covered by granular road base material and a geomembrane liner is installed below the refuelling area.

As the tank farm area has been subexcavated, runoff from the tank farm is not anticipated to occur. The side slopes in the tank area are shallow and appear stable.

A photographic log and a plan view that shows the location of the photos and observations noted at the Meadowbank tank farm is provided in Appendix G2.

9.3 Meadowbank Tank Farm (Vault Pit Area)

The Vault tank farm consisted of five tanks and was built in 2014. It was removed after operations terminated at Vault Pit and was no longer existing at the time of the inspection.

9.4 Amaruq Tank Farm

The Amaruq tank farm was still partly under construction at the time of the inspection. At the time of the inspection, the temporary tank farm was in good condition. A tension crack was observed on the side of the excavation of the new tank farm and probably originates from settling of the thawing foundation after the tank farm was built in frozen condition, winter construction and steep side slope. It should be monitored for differential settlement that might affect liner integrity, but it is not considered a concern. Slopes are steep but of a limited height, as a result they are not a significant concern. Consideration to soften the side slope should be made if degradation of the conditions continues. The use of bituminous geomembrane, as with the other tanks farms, can be environmentally problematic in case of jet fuel spill that could melt the material and cause a breach in the containment system.

A photographic log is contained in Appendix G3.

10.0 OTHER MEADOWBANK FACILITIES

This section contains the observations made for the other Meadowbank facilities visited during the 20189 geotechnical inspection such as site roads, the diversion ditch and erosion protection structure, the RSF till plug, the diffusers, the landfill, the contaminated soil storage and bioremedial landfarm facility, the Stormwater Management Pond, the airstrip and the crusher retaining wall. Figure H1 shows the location of the photos taken during the inspection for the other Meadowbank facilities.

10.1 Site Roads

The following roads were inspected:

- East Road – Former haul road between North Portage Pit and East Dike.
- West Road – Haul road between North Portage Pit and the plant.
- Vault Road – Haul road between North Portage Pit and the Vault deposit.
- RF1 – Starts near the northern abutment of Stormwater Dike and follows the eastern perimeter of the TSF's North Cell and the southwestern side of the Portage Rock Storage Facility.
- RF2 – Starts at the end of RF1 and follows the western side of the Portage Rock Storage Facility.

These roads were of adequate width and had appropriate berms at the time of the inspection. The haul road from Goose Pit to the plant was not inspected during this investigation. No geotechnical concerns were identified with East Road, West Road, RF1, and RF2.

Three culverts are installed beneath Vault Road at coordinates 640 964 E / 7 217 466 N. They were slightly collapsed in the middle and showed signs of erosion at the inlet. This condition was observed from 2012 to 2018. No action is required as their condition is stable. These culverts need to be monitored during freshet to ensure that they provide sufficient capacity and that erosion is not occurring. Two other culverts are located at 639 214 E / 7 216 189 N on Vault Road. These culverts are in good condition. It is recommended to observe this area at freshet and to clear the obstructions if insufficient capacity to handle the flow is observed.

Temporary roads developed for construction purposes were not inspected.

Photographs of the Vault Road culverts are provided in Appendix H1.

10.2 Diversion Ditches and Sediment and Erosion Protection Structure

A retention basin and a series of diversion ditches (Western and Eastern) surround the catchment basin of the North Cell. These structures are designed to convey surface water runoff away from the TSF.

Since 2014, the Western Diversion Ditch has been directing the water to a retention basin, which is then pumped to the North Cell due to a turbidity problem caused by the erosion of the ditches. Rehabilitation work was done in 2016 to address the situation. The Eastern Diversion Ditch discharges to lake NP-2, then lake NP-1 and then to Dog Leg Lake. Sediment barriers and erosion protection structures are installed at the outlet of the diversion ditch in Lake NP-1, Lake NP-2 and Third Portage Lake (Dog Leg Lake).

During the inspection, it was observed that the diversion ditches around the TSF western and eastern extensions were in good condition. The erosion protection structure and sediment barriers were also in good condition at the time of the inspection. It is important that they be inspected during to the freshet season as snow melts away and allows visual assessment. The Western Diversion Ditch will need to be amended for closure in order to drain the accumulation of water in its northern part.

Photographs of the diversion ditch and its sediment and erosion protection structure are provided in Appendix H2.

10.3 RSF Till Plug

The RSF till plug (till plug) is located on the upstream side of the Diversion ditches access road between the Waste Rock Storage Facility (RSF) and lake NP2. The till plug is a zoned low permeability earth fill structure intended to prevent seepage from the RSF to reach lake NP2 and to facilitate seepage collection on the upstream side.

The till plug was constructed in the summer of 2013. Its construction consisted in a layer of till with 1 m minimum thickness placed on a foundation excavated to permafrost, which was then covered by 1 m of fine ultramafic rockfill. The materials were compacted with an excavator bucket.

No sign of erosion or geotechnical issues were identified with this structure during the inspection. A pump equipped with an automatic switch was installed within the pond contained by the plug to redirect the water to the North Cell. As the chemical monitoring in NP2 has not shown any signs of contamination for the last two years, the performance of the till plug is considered adequate.

Appendix H3 contains photographs of the till plug.

10.4 Diffusers

The objective of the diffuser is to return the water to the environment without eroding the shoreline.

The diffuser at Vault (within Wally Lake) has been removed after operations were terminated at Vault Pit. There is no longer any diffuser in Wally Lake and in Portage Lake.

A diffuser is in construction at Amaruq and will be inspected next year.

10.5 Landfill

The Meadowbank landfill is located on the northeastern side of the TSF, within the Portage RSF area. It is being progressively constructed and filled. Waste material is being dumped within a bermed area on a pad built using waste rock from the open pit. The waste is then covered with a thin layer of rockfill to reduce windblown debris. No geotechnical concerns were identified with the landfill. Photographs of the landfill are provided in Appendix H4.

10.6 Contaminated Soil Storage and Bioremedial Landfarm Facility

The Meadowbank Contaminated Soil Storage and Bioremedial Landfarm Facility is currently located north of Central Dike, within the South Cell. A 1 m thick till pad has been placed for the landfarm foundation. A berm surrounds the landfarm to contain the fluid/runoff and stops it from moving laterally. Contaminated soils are stored within this cell to promote biodegradation until the soil meets environmental criteria before being disposed within the Portage Rock Storage Facility.

The active area lies over a natural steep slope covered by rockfill as a pad made to operate the landfarm. The west slope of the rockfill pad is at its angle of repose (seemingly 1.1 to 1.3H:1V). This rockfill was probably placed without neither lifts nor compaction and extends into the South Cell pond. The slope is considered at risk for high deformation to slope failure. The signs of superficial slope failure observed in 2018 were still present at the time of the inspection but appeared inactive. The access to the area has been closed by AEM. It is recommended to keep this area on watch for further development. If signs of instability are developing further inside the pile, a thorough assessment and mitigation measures should be put in place.

Photographs of the Contaminated Soil Storage and Bioremedial Landfarm Facility are provided in Appendix H5.

10.7 Stormwater Management Pond

The Stormwater Management Pond is located near the main camp and is being used to store various site waters and sewage. No runoff from the pond was observed at the time of the inspection. No geotechnical concerns were identified with Stormwater Management Pond and the nearby crusher ramp. At the time of the inspection, due to a high water level, Stormwater Management Pond was pumped out into the South Cell. Due to the proximity of the crusher ramp to the pond, it is recommended that regular geotechnical inspections of the crusher ramp be conducted. The surface of the ramp was not inspected on safety grounds.

10.8 Airstrip

There are several small channels dug adjacent to the airstrip to divert water into small excavations or “ponds.” The channels and ponds are unlined, and the ponds have no designed outlet structure. In general, these ponds serve to collect water and allow suspended sediments to settle out before the water overflows into other vegetated areas and/or infiltrates them, depending on the thermal state of the soils.

The runway was built to allow a Boeing 737-200 to land at the Meadowbank site. The northwestern boundary of the airstrip extends approximately 20 m within the lake and was constructed in two phases. Rockfill was placed 1.0 m above water during Phase 1 and the rockfill was constructed to its final elevation during Phase 2. The rockfill slopes for Phase 2 have a side slope of 1.5H:1.0V. The rockfill of Phase 2 is surrounded by a 17.0 m wide bench going from the toe of Phase 2 to the edge of the crest of Phase 1. The Phase 1 rockfill surface and visible side slope were built with coarse boulders to protect the embankment against waves and ice action. The airstrip construction within the lake is considered appropriate.

The slopes were profiled along a portion of the airstrip to a 3H:1V slope to prevent settlement.

No geotechnical concerns were identified with this structure during the inspection.

10.9 Crusher Retaining Wall

No geotechnical concerns were identified with this structure during the inspection. A photographic log of the crusher retaining wall is provided in Appendix H6.

11.0 SUMMARY AND RECOMMENDATIONS

The following table presents a summary of the key findings and recommendations of the 2019 geotechnical inspection, as well as evolution observed compared to the previous inspection.

Table 2: Summary of Recommendations and Priority Levels from the 2019 Geotechnical Inspection

Year of Recommendation	Priority Level(1)	Recommended Action	Follow up the years after
Dewatering dikes			
2018	P-4	■ The condition of the dewatering dikes is regularly inspected by the mine and this practice should continue. No additional action to take.	■ Still the case in 2019.
2018	P-4	■ Regular monitoring and assessment of the monitoring data in the dikes (piezometric, flow, thermal, inclinometer, and seismograph including monitoring to control the reaction to blasting around Pit E5) should continue. It is recommended to flag the piezometers that recorded data below 0°C in the past and be very careful when interpreting their data as they might be broken. Once a piezometer has frozen, it cannot be relied upon even if it thaws.	■ Still the case in 2019.
South Camp Dike			
2019	P-3	■ Some water was ponding on the downstream side of South Camp Dike. No flow was observed. This is likely due to run-off water as there were unusually high precipitations in 2019. The water accumulation should still be monitored to confirm this.	
Bay-Goose Dike			
2018	P-4	■ Water ponds were observed at the downstream toe during the inspection, similar to the previous inspection. It is recommended to pump them periodically to allow for good visual inspection of the downstream toe if visibility is impaired by the presence of the pond. The pond flow formed by seepage should be monitored and recorded.	■ Still the case in 2019. Appropriate monitoring is performed.

Year of Recommendation	Priority Level(1)	Recommended Action	Follow up the years after
2018	P-3	▪ Limited evidence of seepage is observed at the downstream toe of the North Channel, Channel 1 and Channel 3. The instrumentation data and field observations seem to indicate that seepage occurs at these locations but reports directly to the Pits instead of the downstream toe area. To continue monitoring.	▪ Seepage ongoing.
2018	P-2	▪ A 4 m rise in pore water pressure was observed in the vicinity of Channels 1 and 2 and this area need to be closely monitored in the following years. The designer must be advised in the event of significant variations in accordance with the OMS manual.	▪ Resolved: the unusual pressure trend observed in 2018 has not occurred in 2019.
2018	P-2	▪ The piezometers in the North Channel show a pressure build-up with the drilling operations associated with the freezing of the nearby pit wall, which needs to be closely monitored to verify the interpretation of the freeze-back. The designer must be advised in the event of significant variations in accordance with the OMS manual.	▪ Still the case in 2019. ▪ Pressures are on a slow rise, to be monitored.
2019	P-4	▪ Seepage rates observed in the channels have increased compared to the last years and the decreasing trend. The increase may be due to high amount of precipitation the site received this year. To be monitored for evolution.	
2019	P-3	▪ Assess the validity of the current instruments layout for monitoring of the dike’s performance over an extended operation time (10 more years due to in-pit deposition). Install additional instruments it necessary.	
East Dike			

Year of Recommendation	Priority Level(1)	Recommended Action	Follow up the years after
2019	P-3	■ VWP-400-C and VWP-420-C show a seasonal trend that is rising through the years since 2015 and doubled yearly over the last two years. Total head is now rising close to 2 m in 2019 from those two VWPs., while temperature is cooling. It is recommended to further investigate this behaviour (planned by AEM) and closely follow the significant seasonal trends in the future to react quickly if need be. Based on those aspects, it is considered that those observations should have triggered a yellow threshold criterion per the Dewatering Dykes OMS manual (yellow - personal notification and action required).	
2019	P-4	■ The general trend in the piezometric readings has been steadily increasing since 2014 and the increase seems to accelerate in 2019 and should be monitored.	
Tailings storage facilities			
Saddle Dam 2			
2018	P-4	■ Water was observed on the downstream side ponding within the rockfill embankment between Sta. 20+275 and Sta. 20+475 and should be monitored. The water originates from run-off as proved by water sampling and testing.	■ Still the case in 2019. Continue water quality monitoring.

Year of Recommendation	Priority Level(1)	Recommended Action	Follow up the years after
Stormwater Dike			
2018	P-4	■ In April 2018, oblique tension cracks (up to 5 cm wide) were observed similar to the previous years. The cracks have been filled with bentonite after stabilization in the summer of 2018. The evolution of the zone should be monitored. In case of new cracks, measures indicated in the OMS manual should be implemented.	■ 2019: Minor new cracks observed in 2019. Extensometers and crackmeters indicate that movement has stabilized. All stable cracks are filled with bentonite.
2018	P-4	■ An assessment should be conducted as to whether the design criteria will still be met with a different final tailings elevation on both sides of the dike. This can be done by the EoR but needs to be reviewed by the designer engineer. Tailings surface differential elevation could also impact the seepage flow which may impact also the thermal regime and affect the cells freeze back	■ No development on this aspect.
North Cell Internal Structure			
2018	P-4	■ The water is flowing well toward the west side of Stormwater Dike, where water is transferred into the South Cell. The early stages of the deposition seem satisfactory. The pumping stations on the downstream side of the dike are in place and working as needed. The capacity to store the inflow design flood must be verified during tailings deposition when updating the deposition plan.	■ Still the case after one year of deposition. Tailings are no longer being deposited in the North Cell. Inflow design flood capacity should be verified if deposition resumes for closure.
2019	P-2	■ Channelling of water has been observed at the upstream toe of the eastern part of the dike. The water flow has started to erode fine filter material at the toe. It is recommended to protect the filters in this area or to start capping this area as part of the closure plan.	

Year of Recommendation	Priority Level(1)	Recommended Action	Follow up the years after
2019	P-2	■ Tension cracks (2 to 5 m long, a few millimeters wide) have been observed during the inspection in the fine filter surface between Sta. 2+650 and 2+800 m, near the crest. They need to be monitored and repaired as they may decrease the efficiency of the filters in case of further tailings deposition.	
Central Dike			

2018	P-3	■ Seepage from the South Cell is ponding on the downstream side of Central Dike. The water had an orange coloration with high turbidity, and AEM reported that these associated with rapid temperature variations were observed during most of the open water season in the previous years. The water level of the reclaim pond was temporarily lowered in autumn 2017 to reduce the hydraulic pressure on the seepage, and tailings deposition was amended to better cover the area between Saddle Dams 4 and 5. The mitigation measures resulted in a significantly decrease in the average flow. It is recommended to continue: 1. Maintaining a tailings beach against Central Dike; 2. Promote beach deposition to seal assumed fractured bedrock areas expected to control the seepage under Central Dike 3. Controlling the hydraulic gradient by proper management of South Cell water pond and dike downstream toe pond; 4. Closely monitoring the water quality; 5. Inspecting the structure for changing conditions.	■ Orange coloration was observed during the freshet of 2019, as usual. ■ Seepage is stable (308 m^3/h at the time of the inspection). ■ The South Cell has reached its full capacity and AEM is pumping water out of the cell. Seepage should decrease further in the future with this measure. No more tailings deposition is planned in the South Cell at the moment. ■ Monitoring recommendations are still valid in 2019.
2018	P-2	■ It is recommended to clean the angular granular material in direct contact with the LLDPE liner along the deposition points at Sta. 1+050 and 0+280 approximately before resuming the deposition activity within the South Cell, in order to avoid pushing the angular material into the LLDPE which could cause punctures. A procedure should be prepared communicated to all concerned workers and added to the OMS manual.	■ Resolved: according to AEM, these areas were cleaned before tailings reached them.

2019	P-2	■ It is recommended to clean the angular granular material in direct contact with the LLDPE liner at Sta. 0+750 m approximately. A metallic piece around a pipe was also observed against the LLDPE liner at Sta. 1+000 m. This operation is required regularly and should be detailed in a procedure prepared by AEM. The procedure needs to be communicated to all concerned workers and added to the OMS manual.	
2019	P-2	■ Water was observed ponding along the LLDPE liner on the south side of Central Dike and Saddle Dam 5, from Sta. 0+850 m. It is recommended to remove this water before it freezes to protect the LLDPE liner (planned by AEM).	
Saddle Dams 3, 4 and 5			
2018	P-4	■ During the inspection, water was observed ponding on the downstream side of Saddle Dam 3 and Saddle Dam 4. As the downstream toe is higher than the South Cell pond, this water does not come from the TSF. It is important to maintain the water level on the downstream side lower than the granular layer of the upstream toe liner tie-in granular material to prevent uplift of the geomembrane. As the elevation of the downstream side is lower than the elevation of the granular material, this should not be a problem if the downstream water level is managed. The management of this water could be simplified by the construction of a sump, as indicated in the construction drawings, to direct the water in a low point. This is the case for Saddle Dam 3.	

All-Weather Private Road (AWPR)			
2018	P-4	■ The erosion of the culverts is stable. The progression of the erosion of culverts PC-17A (8+830), PC-11 (39+552), R14 (67+840), R18-B (82+500), R-20 (85+490), R-23 (93+600) and R24 (98+100) should be monitored at freshet for any signs of progression or washout, as signs of water flowing beneath the road were observed at these locations.	
2018	P-4	■ For some culvert locations, monitoring is recommended to see if flow occurs through the culvert (i.e., during the freshet). If insufficient capacity to handle the flows is observed, or water circulates under the road, then it is recommended to clear the obstructions or repair the culverts. Particular attention should be paid to R-00A (2+550), PC-14 (4+260), the unnamed culvert at 5+700, and PC-16 (54+950).	
Amaruq Road			
2018	P-3	■ Obstructed and damaged culverts were observed at some locations: two outlets of the set of culverts #7 (2+013), #13 (4+615), two outlets of the set of culverts #47 (11+101 to 11+107), #61 (1+050), #63 (13+390), #83 (20+300), #86 (20+740), #97 (22+436), #98 (22+482), #111 (26+461), #117 (27+173), #278 (61+870). If insufficient capacity to handle the flow is observed at locations where culverts are obstructed or damaged, it is recommended to clear the obstructions or repair the culvert.	■ Road was modified and widened since 2018. Some culverts are now in good condition while some others still show damage or obstruction (see point below).
2019	P-3	■ Obstructed and damaged culverts were observed at some locations:#7 (2+013), #7-2 (2+016), #13 (4+615), #27-2 (7+300), #45 (9+710), two outlets of the set of culverts #47 (11+101 to 11+107), #48 (11+203), #54 (12+388), #55 (12+440), #61 (1+050), #64 (13+920), #83 (20+300), #85 (20+671), #86 (20+740), #88 (20+861), #89 (21+180), #93	

		(22+100), #97 (22+436), #98 (22+482), #101 (23+025), #111 (26+461), #112 (26+630), #117 (27+173), #118 (27+433), #151 (36+562), #163 (40+474), #241 (55+235), #278 (61+870), #283 (62+695), #284-2 (63+072). If insufficient capacity to handle the flow is observed at locations where culverts are obstructed or damaged, it is recommended to clear the obstructions or repair the culvert.	
Quarries and Eskers			
2018	P-4	■ Presence of unstable blocks and loose rocks along steep walls and unstable slopes was observed in Quarries 3, 7, 9, 10, 12, 16, and 23, as well as all eskers and quarries along the Amaruq road except Esker #5. It is recommended that workers be cautious in these quarries and are aware of the potential hazard.	
2018	P-2	■ The north access of Esker #3 is built on a steep slope that seems undercut at its toe. It is recommended to change the access, as this poses an important geotechnical risk.	■ Resolved: the access has been modified and is now stable.
Bulk Fuel Facilities			
Baker Lake Tank Farm			
2018	P-4	■ Ponded water within the secondary containment cell was observed farm. Removal of water should be managed to keep the water accumulation at a minimum near the tank foundation.	■ Still the case in 2019.
2018	P-3	■ The granular fill material protecting the geomembrane was eroded due to wave actions in some areas, exposing the geomembrane. This condition was observed all along the south side of Tanks 3 and 4 and on the west side of Tank 1. A section of exposed geomembrane with a fold was observed at the northwestern corner of Tank 2 and the	■ 2019: partially resolved: ▪ Exposed geomembrane no longer observed at the northwestern corner of Tank 2.

		northeastern corner of Tank 4. It is recommended to cover the exposed area with geotextile and fill material to re-establish the liner protection. Liner is exposed on the northern side of Tank 5. As this condition appears above the elevation of the southern berm, it is considered that the protection of the liner with granular material is not as important as in other areas; however, it remains a good practice and provides protection against animal damage.	▪ Granular protection repaired on the northern side of Tank 5. ▪ Still exposed geomembrane along the south side of Tanks 3 and 4, on the west side of Tank 1 and in the northeastern corner of Tank 4.
2018	P-2	▪ A hole in the exposed geomembrane (300 mm diameter hole) was observed on the south southwestern corner of Tank 3 at the toe of the slope. The hole in the geomembrane should be repaired to ensure a good performance of the retention basin. It is also recommended to cover the exposed area with geotextile and fill material to re-establish the liner protection.	▪ Apparently repaired but damaged again: there is still exposed geomembrane with a hole.
2019	P-2	▪ A small hole in the liner was observed on the northern side of the containment cell of the 20 Jet A fuel tanks. The hole in the geomembrane should be repaired to ensure a good performance of the retention basin.	
2018	P-3	▪ Animal burrows were observed near the southern corner of Tank 2. It is recommended to assess whether the geosynthetics have been damaged under the granular cover.	▪ Still the case in 2019.
2018	P-4	▪ The embankments around the tank farm containment areas were stable. Tension cracks observed in the past on the upper bench north of Tanks 3 and 4 and south of Tanks 5 and 6 are disappearing. There were signs of water flow in this area.	▪ Still the case in 2019.

2018	P-2	■ The bituminous geomembrane around the tanks of the 20 Jet A fuel tanks is damaged by the Jet A fuel (melting). It is recommended to remain vigilant during the freshet and throughout the year to manage water accumulated within the bermed area. It is recommended that AEM sample the liner for performance testing by a geosynthetics laboratory and take appropriates measures to protect the environment.	■ (2019): the bituminous geomembrane no longer shows signs of melting. It is unknown how the melting affected the integrity of the liner. If the liner is damaged, contaminated water could seep into the environment.
Meadowbank Tank Farm			
2018	P-4	■ Ponded water within the secondary containment cell was observed. Removal of water should be managed to keep the water accumulation at a minimum near the tank foundation.	■ Still the case in 2019.
2018	P-3	■ A portion of liner is exposed in the eastern corner of the containment area. The granular protection layer over this section should be repaired.	■ Resolved: exposed geomembrane no longer observed in the eastern corner of the Meadowbank Tank Farm.
Amaruq Tank Farm			
2019	P-3	■ A tension crack was observed on the side of the excavation of the new tank farm and probably originates from settling of the thawing foundation, the winter construction and the steep side slope. It should be monitored for differential settlement that might affect liner integrity. Consideration to soften the side slope should be made if degradation of the conditions continues.	
Meadowbank Site Roads			
2018	P-4	■ Three culverts were installed on Vault Road (coordinates 640 964 E / 7 217 466 N). As previously observed in past annual inspections, these three culverts were partially	

		collapsed in the middle and showed signs of erosion at the inlet. This is currently not a significant issue, but it is recommended to monitor these culverts at freshet to ensure that they provide sufficient capacity and that erosion is not occurring.	
Landfill and Contaminated Soil Storage and Bioremedial Landfarm Facility			
2018	P-2	■ The landfarm lies over a natural steep slope covered by rockfill as a pad made to operate the landfarm. The slope is considered at risk for high deformation to slope failure. The risk will increase as the water level in the South Cell raises. Signs of superficial slope failure were observed during the inspection. It is recommended to watch out for signs of instability and be prepared to close off the area if need be. Workers who access the area should be informed of the potential risk and be trained to recognize signs of instability.	■ The tension cracks appear inactive. The access to the area has been closed by AEM. It is recommended to keep this area on watch for further development. If signs of instability are developing further inside the pile, a thorough assessment and mitigation measures should be put in place.
Additional recommendations			
2019	P-4	■ Since AEM is a member of the Mining Association of Canada, it is recommended that a tailings management audit be held in the framework of the Towards Sustainable Mining initiative.	

Note: (1) Priority Level Descriptions

P-1: A high priority or actual structure safety issues considered immediately dangerous to life, health, or the environment, or a significant risk of regulatory enforcement.

P-2: If not corrected could likely result in structure safety issues leading to injury, environmental impact, or significant regulatory enforcement; or, a repetitive deficiency that demonstrates a systematic breakdown of procedures.

P-3: Single occurrences of deficiencies or non-conformance that alone would not be expected to result in structure safety issues.

P-4: Best Management Practice – further improvements are necessary to meet industry best practices or reduce potential risks.

12.0 REFERENCES

AEM (Agnico-Eagle Mines Ltd., Meadowbank Complex). 2018. *Emergency Response Plan, Meadowbank Complex*. Version 12. January 2018.

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AEM 2019b. *Tailings Storage Facilities Operation, Maintenance and Surveillance Manual*. Version 9. March 2019.

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Signature Page

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MH/YB/

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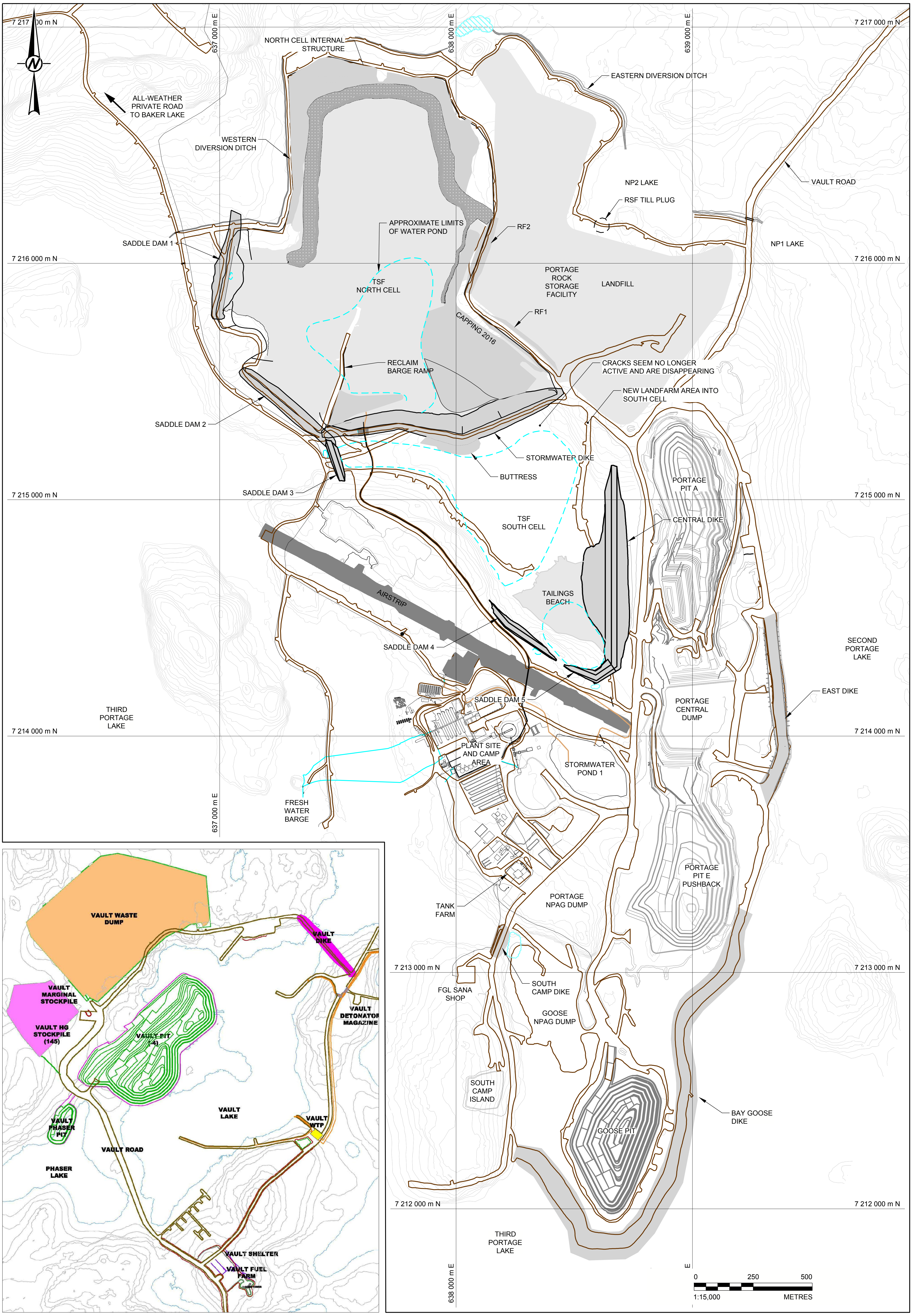

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REFERENCE

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CLIENT

AGNICO EAGLE

CONSULTANT

GOLDER

YYYY-MM-DD	2019-08-28
PREPARED	M. Habersetzer
DESIGN	A. Annoual
REVIEW	M. Habersetzer
APPROVED	Y. Boulianne

PROJECT

2019 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE

MEADOWNBANK MINE SITE DURING THE ANNUAL INSPECTION OF 2019

PROJECT No.	PHASE	Rev.	FIGURE
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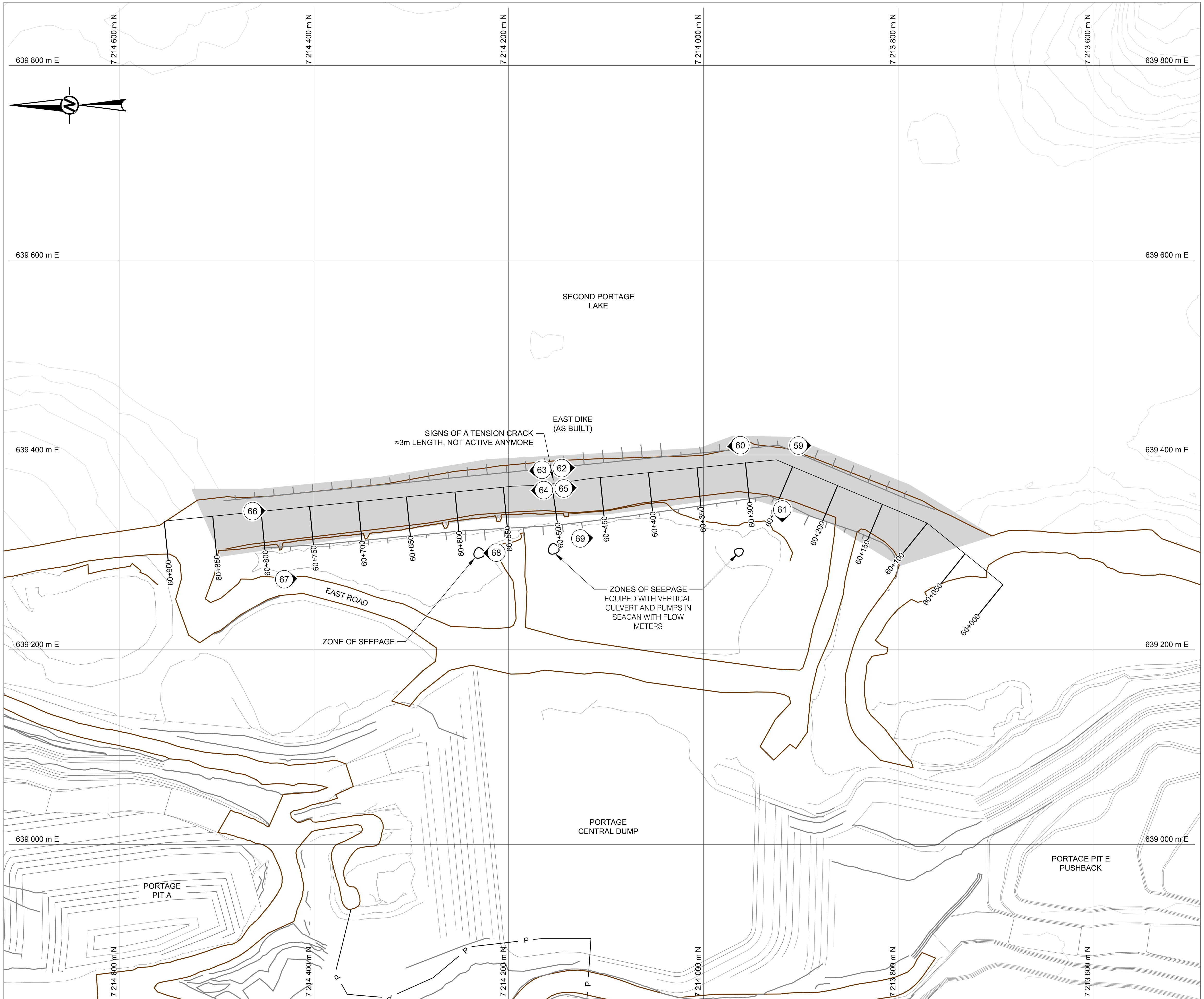

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1 IDENTIFICATION AND DIRECTION OF PHOTOGRAPHY TAKEN DURING THE ANNUAL INSPECTION OF 2019

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PROJECT

2019 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE

EAST DIKE DURING THE ANNUAL INSPECTION OF 2019

CONSULTANT

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YYYY-MM-DD	2019-08-28
PREPARED	M. Habersetzer
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REVIEW	M. Habersetzer
APPROVED	Y. Boulianne

PROJECT No.	PHASE	Rev.	FIGURE
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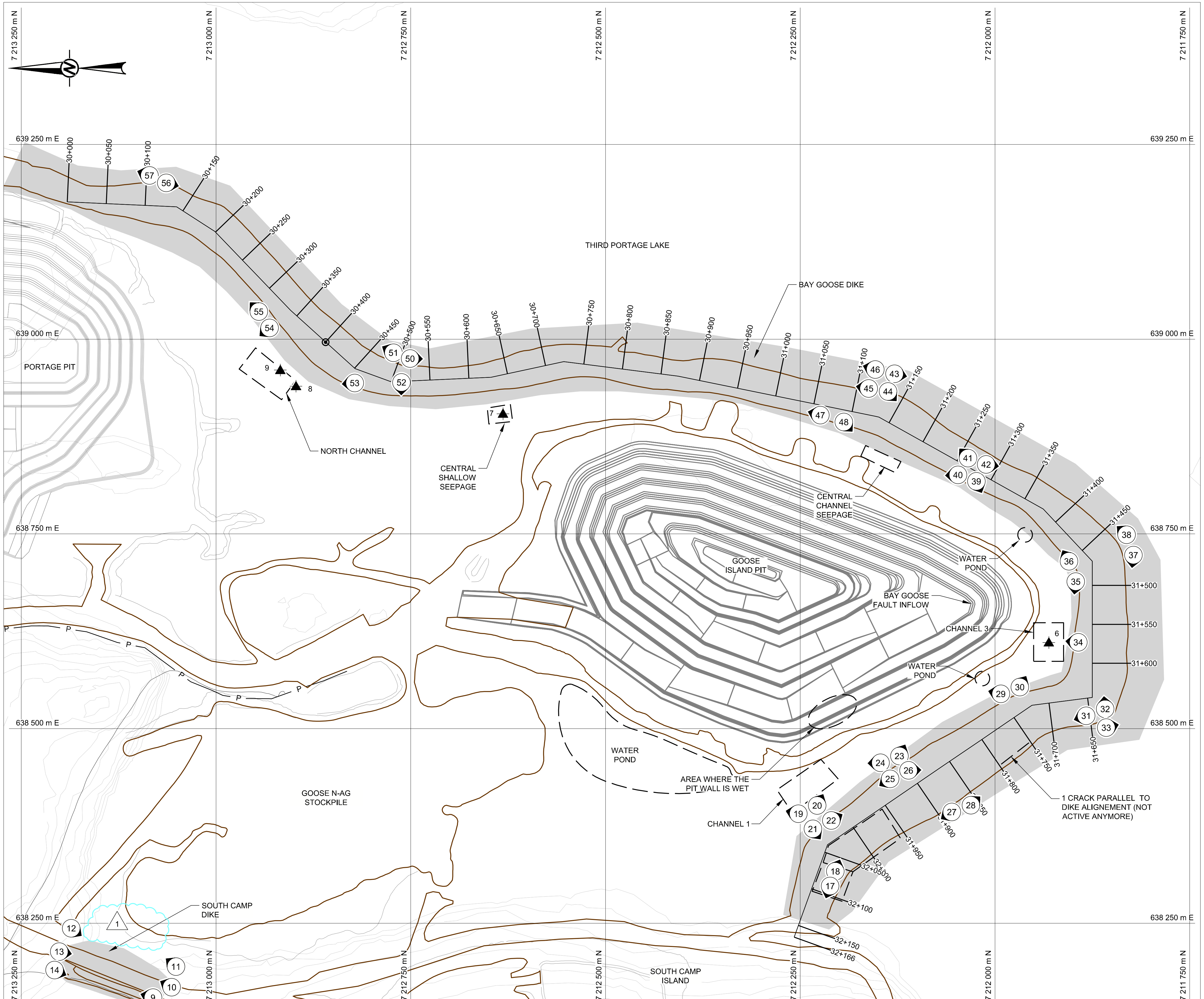

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IDENTIFICATION AND DIRECTION OF PHOTOGRAPHY TAKEN DURING THE ANNUAL INSPECTION OF 2019

MANUAL MONITORING FLOW STATION

WATER ACCUMULATION. NO SIGN OF FLOW.

NOTE

GRID REFERENCE: NAD 83, UTM ZONE 14.

REFERENCE

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PROJECT

2019 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE

BAY-GOOSE AND SOUTH CAMP DIKES DURING THE ANNUAL INSPECTION OF 2019

CONSULTANT

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YYYY-MM-DD	2019-08-28
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PROJECT No.	PHASE	Rev.	FIGURE
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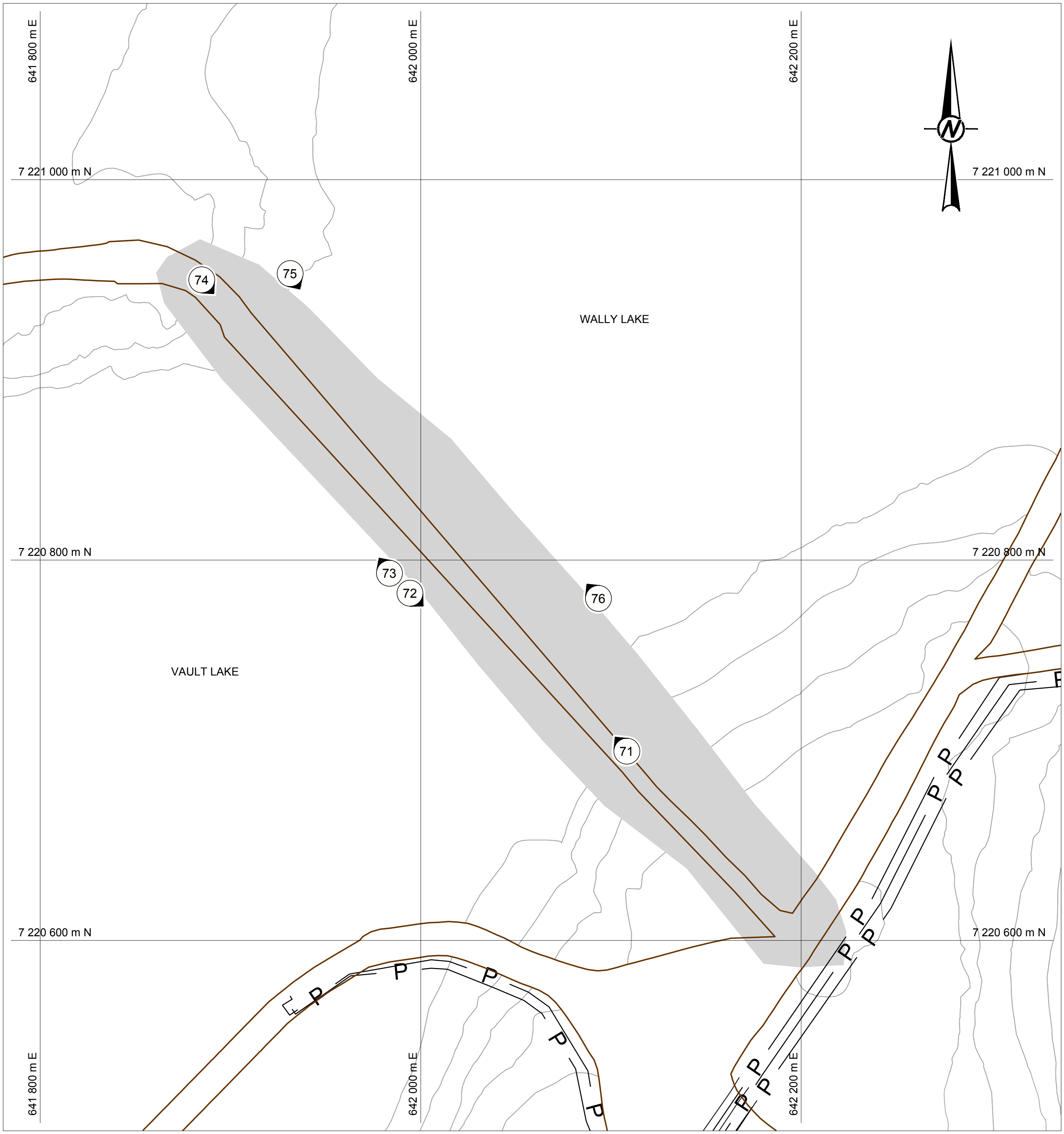

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IDENTIFICATION AND DIRECTION OF PHOTOGRAPHY TAKEN DURING THE ANNUAL INSPECTION OF 2019

NOTE

GRID REFERENCE: NAD 83, UTM ZONE 14.

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CLIENT
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PROJECT
2019 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE
VAULT DIKE DURING THE ANNUAL INSPECTION OF 2019

PROJECT No.	PHASE	Rev.	FIGURE
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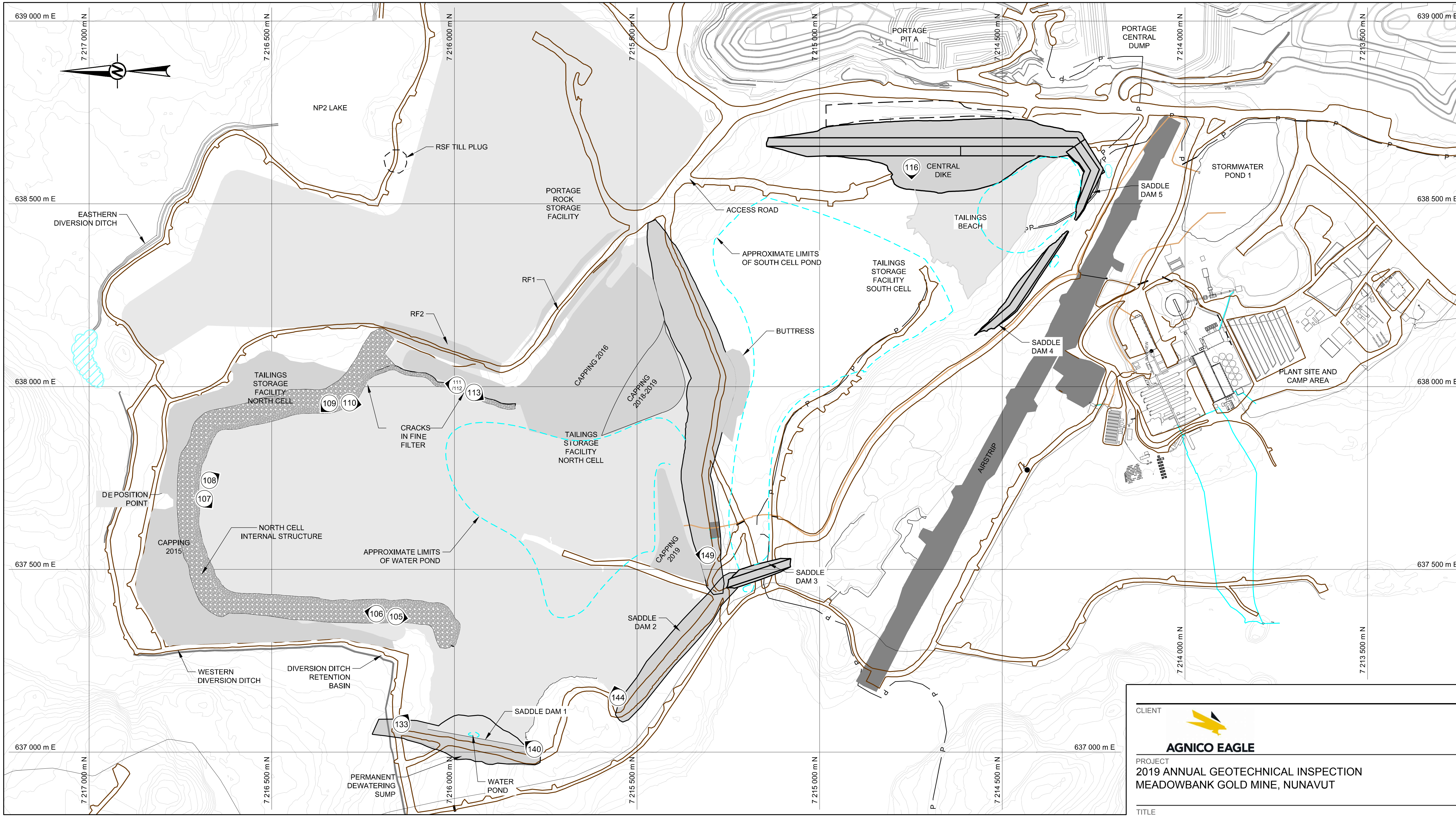

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1 IDENTIFICATION AND DIRECTION OF PHOTOGRAPHY TAKEN DURING THE ANNUAL INSPECTION OF 2019

NOTE

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CLIENT

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PROJECT

2019 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE

GENERAL VIEW OF TAILINGS STORAGE FACILITY DURING THE ANNUAL INSPECTION OF 2019

CONSULTANT

GOLDER

YYYY-MM-DD	2019-08-28
PREPARED	M. Habersetzer
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PROJECT No.	PHASE	Rev.	FIGURE
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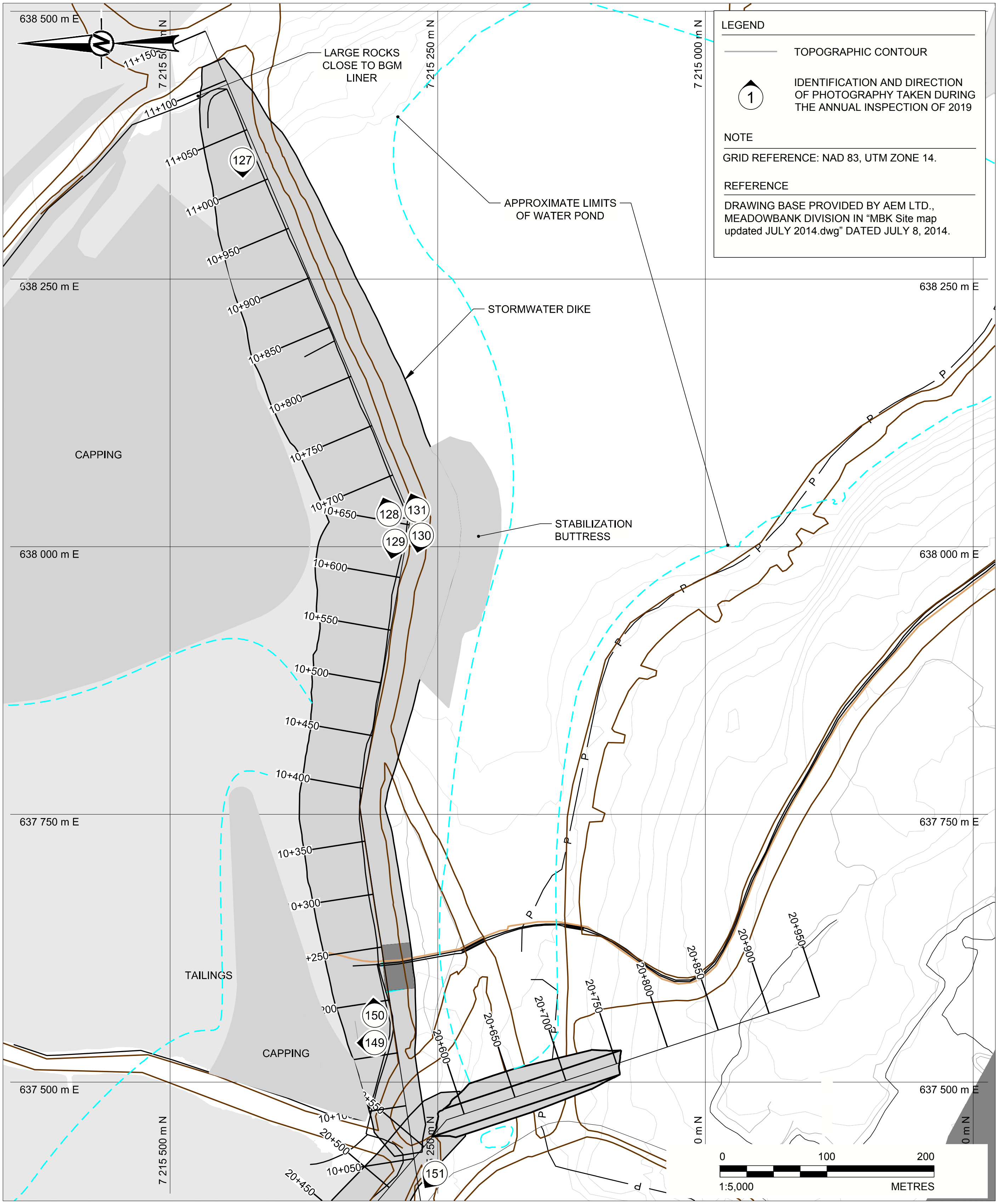

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YYYY-MM-DD	2019-08-28
PREPARED	M. Habersetzer
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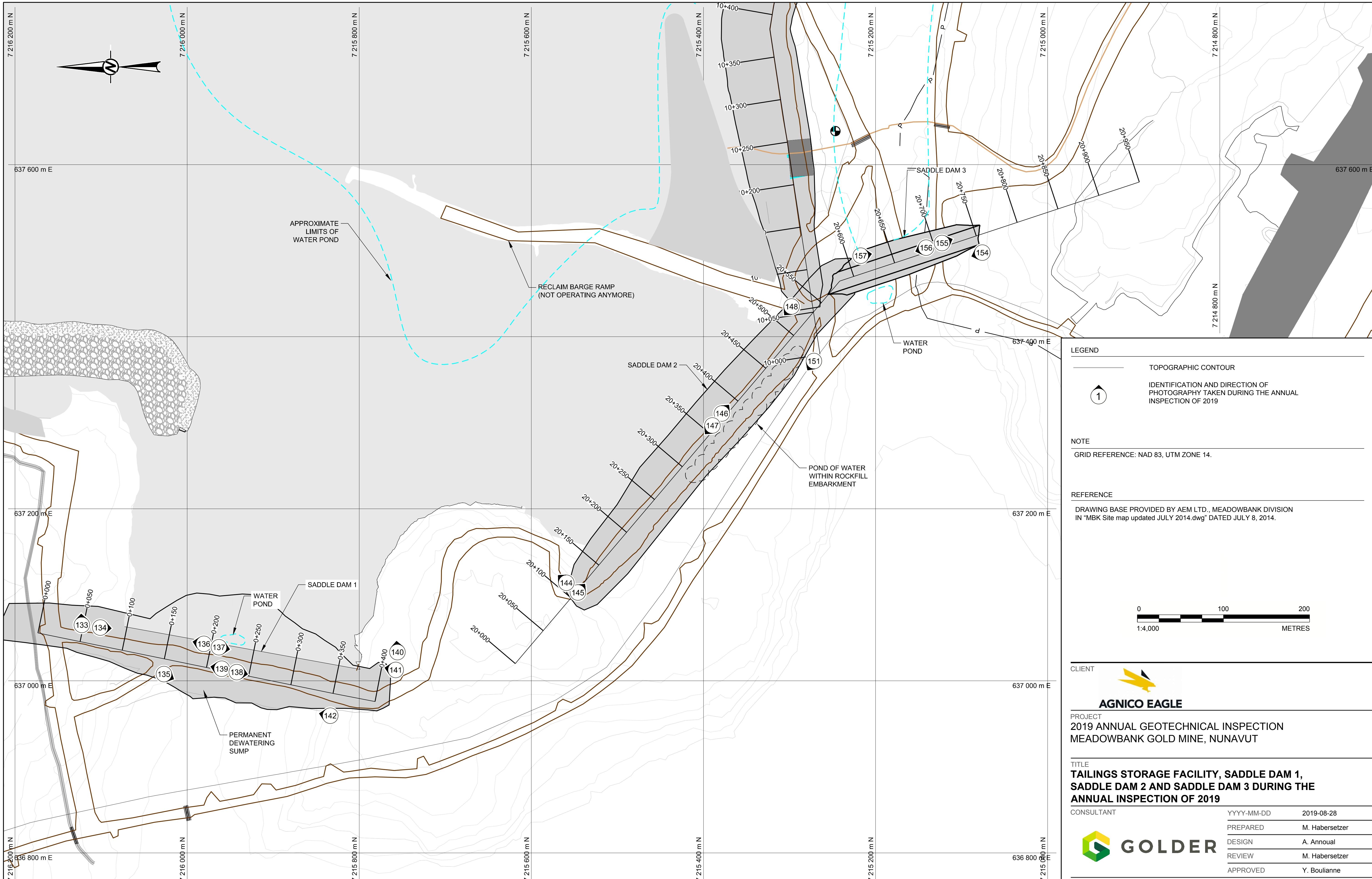
PROJECT

2019 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE

STORMWATER DIKE DURING THE ANNUAL INSPECTION OF 2019

PROJECT No.	PHASE	Rev.	FIGURE
19123067	6000	0	B2



LEGEND

TOPOGRAPHIC CONTOUR

1 IDENTIFICATION AND DIRECTION OF PHOTOGRAPHY TAKEN DURING THE ANNUAL INSPECTION OF 2019

NOTE

GRID REFERENCE: NAD 83, UTM ZONE 14.

REFERENCE

DRAWING BASE PROVIDED BY AEM LTD., MEADOWBANK DIVISION IN "MBK Site map updated JULY 2014.dwg" DATED JULY 8, 2014.

0 100 200
1:4,000 METRES

CLIENT
AGNICO EAGLE

PROJECT
2019 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE
TAILINGS STORAGE FACILITY, SADDLE DAM 1, SADDLE DAM 2 AND SADDLE DAM 3 DURING THE ANNUAL INSPECTION OF 2019

CONSULTANT
GOLDER

YYYY-MM-DD	2019-08-28
PREPARED	M. Habersetzer
DESIGN	A. Annoual
REVIEW	M. Habersetzer
APPROVED	Y. Boulianne

PROJECT No.	PHASE	Rev.	FIGURE
19123067	6000	0	B3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

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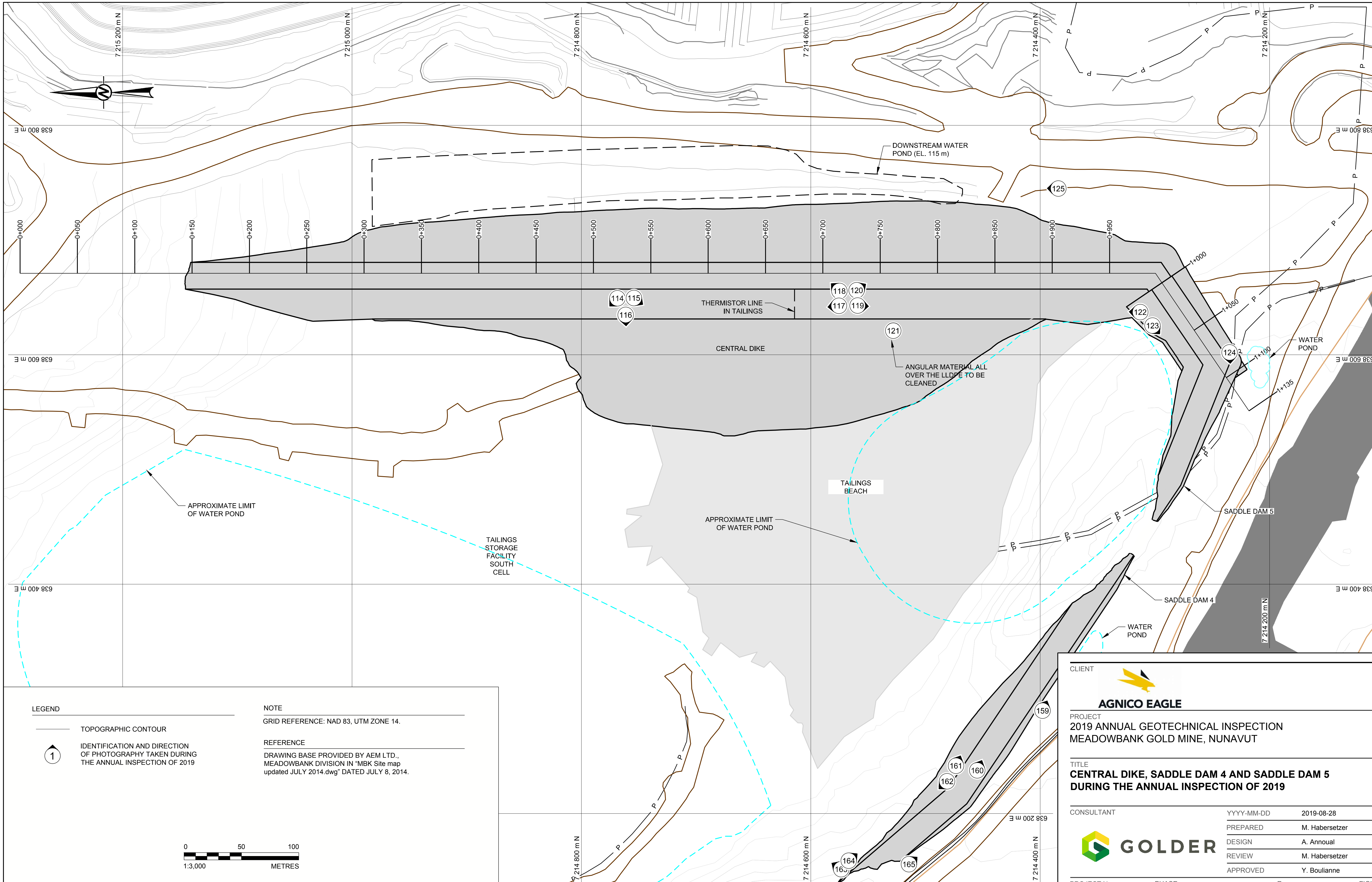

LEGEND

TOPOGRAPHIC CONTOUR

1 IDENTIFICATION AND DIRECTION OF PHOTOGRAPHY TAKEN DURING THE ANNUAL INSPECTION OF 2019

NOTE

GRID REFERENCE: NAD 83, UTM ZONE 14.

REFERENCE

DRAWING BASE PROVIDED BY AEM LTD., MEADOWBANK DIVISION IN "MBK Site map updated JULY 2014.dwg" DATED JULY 8, 2014.

0 50 100
1:3,000 METRES

CLIENT

AGNICO EAGLE

PROJECT

2019 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE

CENTRAL DIKE, SADDLE DAM 4 AND SADDLE DAM 5 DURING THE ANNUAL INSPECTION OF 2019

CONSULTANT

GOLDER

YYYY-MM-DD	2019-08-28
PREPARED	M. Habersetzer
DESIGN	A. Annoual
REVIEW	M. Habersetzer
APPROVED	Y. Boulianne

PROJECT No.	PHASE	Rev.	FIGURE
19123067	6000	0	B4

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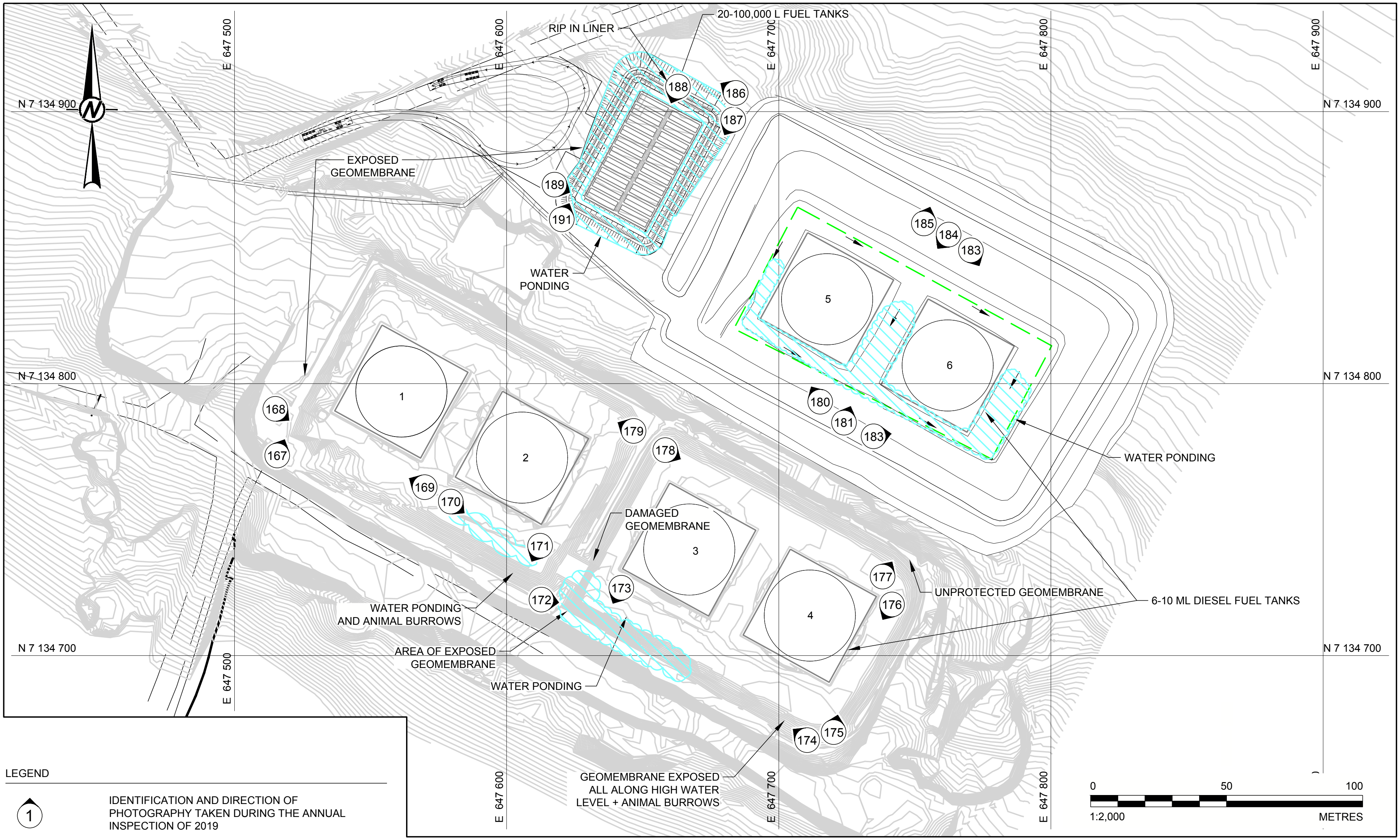


LEGEND

IDENTIFICATION AND DIRECTION OF PHOTOGRAPHY TAKEN DURING THE ANNUAL INSPECTION OF 2019

NOTE

GRID REFERENCE: NAD 83, UTM ZONE 14.

REFERENCE

BASE PLAN PROVIDED BY AEM LTD. IN "PORTAGE_GOOSE_VAULT_END2019_LOM2013_V4D-WITH LABEL.dwg, RECEIVED OCTOBER 7, 2013

CLIENT

AGNICO EAGLE

CONSULTANT

GOLDER

YYYY-MM-DD	2019-08-28
PREPARED	M. Habersetzer
DESIGN	A. Annoual
REVIEW	M. Habersetzer
APPROVED	Y. Boulianne

PROJECT

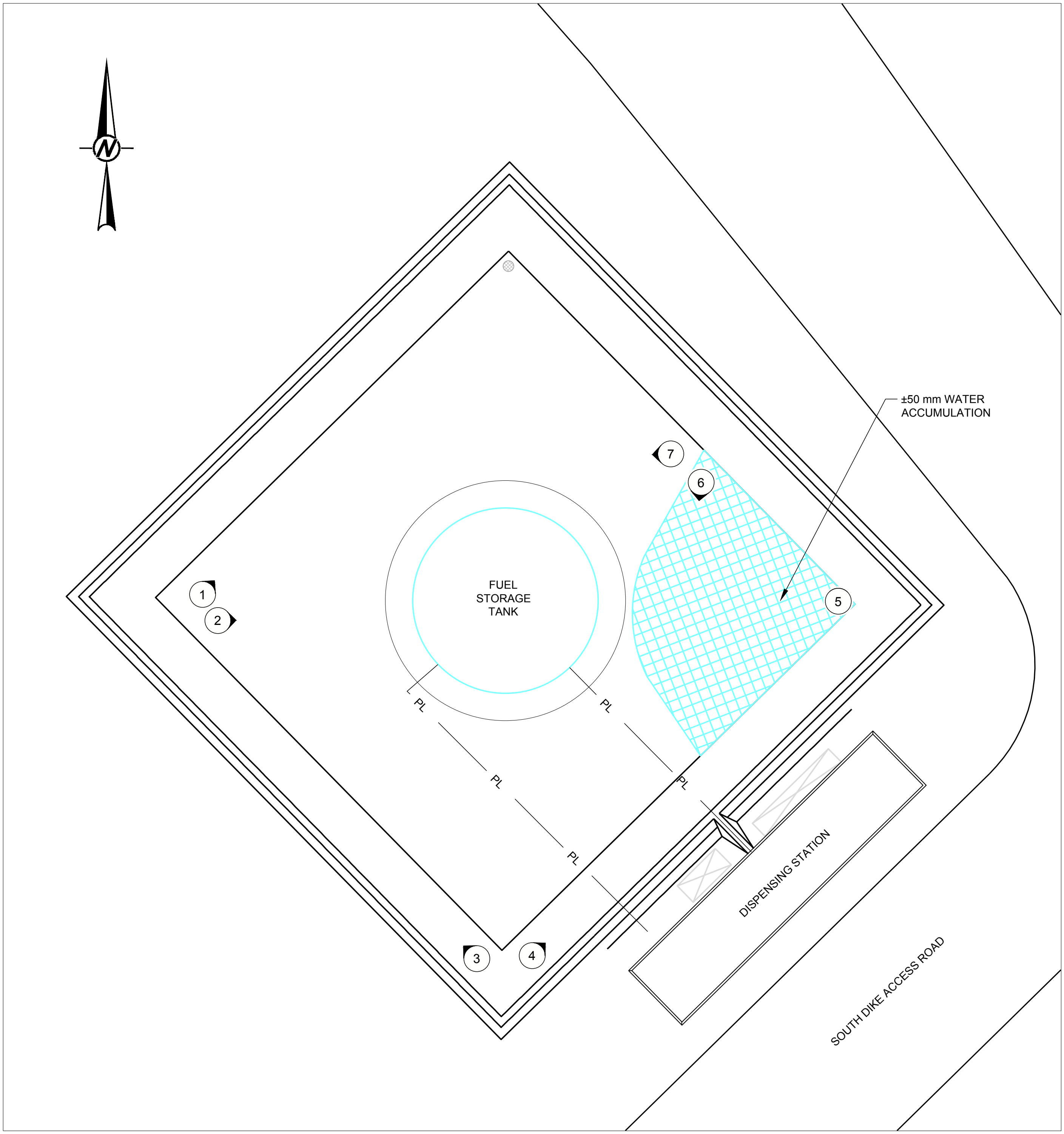
2019 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE

BAKER LAKE TANK FARM DURING THE ANNUAL INSPECTION OF 2019

PROJECT No.	PHASE	Rev.	FIGURE
19123067	6000	0	G1

25 mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A



LEGEND

1 IDENTIFICATION AND DIRECTION OF PHOTOGRAPHY TAKEN DURING THE ANNUAL INSPECTION OF 2019

REFERENCE

BASE PLAN INFORMATIONS IS PROVIDED BY CUMBERLAND DATED FEBRUARY 03, 2008

0 12.5 25
1:750 METRES

CLIENT
AGNICO EAGLE

CONSULTANT
GOLDER

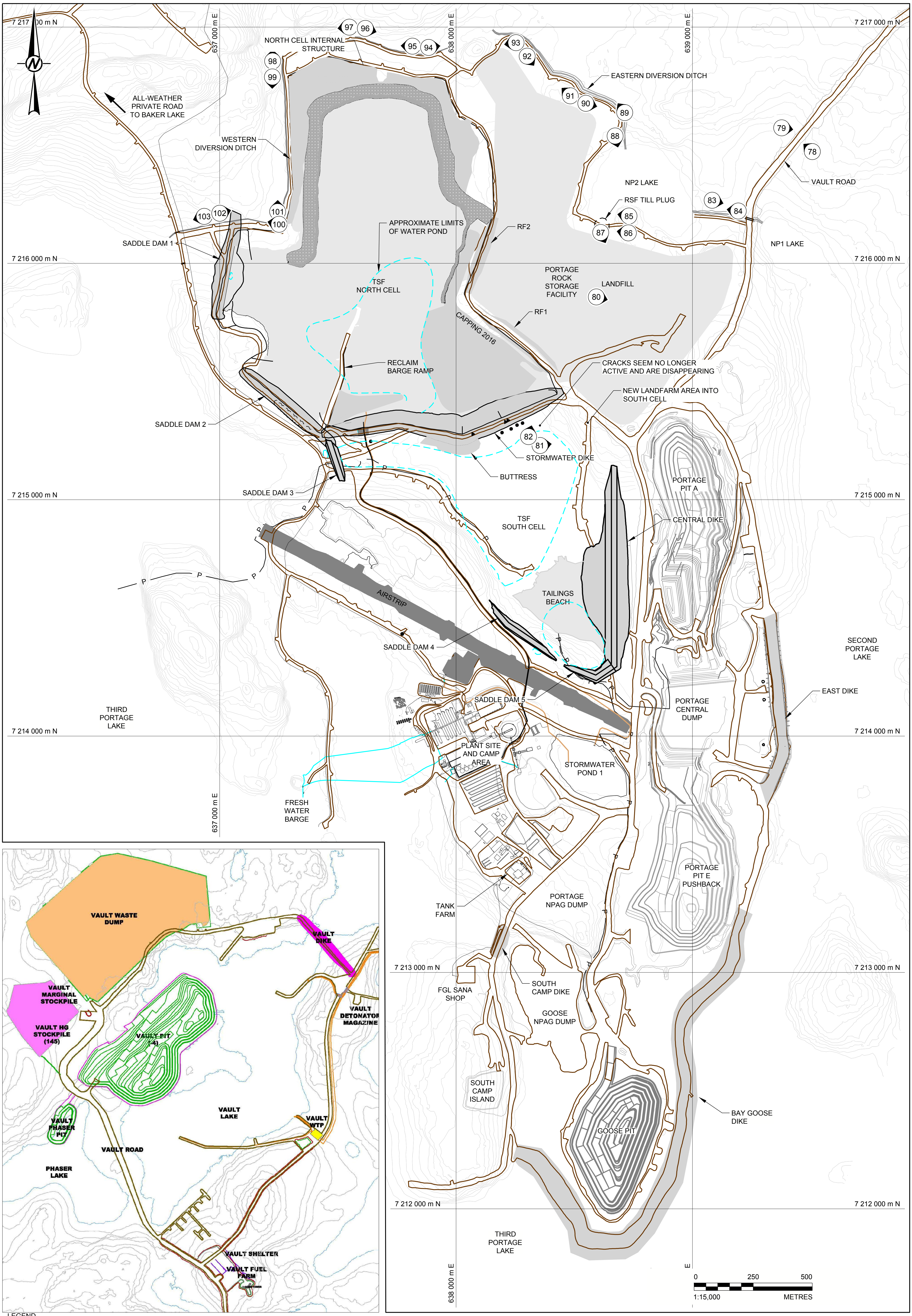
YYYY-MM-DD	2019-08-28
PREPARED	M. Habersetzer
DESIGN	A. Annoual
REVIEW	M. Habersetzer
APPROVED	Y. Boulianne

PROJECT
2019 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE
MEADOWBANK TANK FARM DURING THE ANNUAL INSPECTION OF 2019

PROJECT No.	PHASE	Rev.	FIGURE
19123067	6000	0	G2

Path: \\golder.gds\gal\Montreal\SIG\CAD\PROJETS\AGNICO-EAGLE\MEADOWBANK\PRODUCTION\19123067\5000\ | File Name: 19123067-5000-01.DWG



LEGEND

TOPOGRAPHIC CONTOUR

IDENTIFICATION AND DIRECTION OF PHOTOGRAPHY TAKEN DURING THE ANNUAL INSPECTION OF 2019

NOTE

GRID REFERENCE: NAD 83, UTM ZONE 14.

REFERENCE

DRAWING BASE PROVIDED BY AEM LTD., MEADOWBANK DIVISION IN "MBK Site map updated JULY 2014.dwg" DATED JULY 8, 2014.

CLIENT

AGNICO EAGLE

CONSULTANT

GOLDER

YYYY-MM-DD	2019-08-28
PREPARED	M. Habersetzer
DESIGN	A. Annoual
REVIEW	M. Habersetzer
APPROVED	Y. Boulianne

PROJECT

2019 ANNUAL GEOTECHNICAL INSPECTION
MEADOWBANK GOLD MINE, NUNAVUT

TITLE

MEADOWBANK MINE SITE DURING THE ANNUAL INSPECTION OF 2019

PROJECT No.	PHASE	Rev.	FIGURE
19123067	6000	0	H1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

APPENDIX A

Dewatering Dikes

APPENDIX A1

East Dike

Client:	AEM	**By:**	Yves Boulianne
Project:	Meadowbank	**Date:**	July 23, 2019
Location:	East Dike	**Reviewed:**	Yves Boulianne

GENERAL INFORMATION			
Dam Type:	Rockfill embankment with a soil bentonite cut-off wall and downstream filters		
Weather Conditions:	Overcast	**Temperature:**	10°C

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST		59, 60, 62, 63, 64, 65, 66	
1.1 Crest elevation	136.5 m Cut-off 136.1m		Design thermal cap crest revised in 2011 to El. 136.5 m (Golder 2011a)
1.2 Reservoir level	133.86 m U/S		
Current freeboard	2.6 m		Design 2 m.
1.3 Distance to tailings pond (if applicable)	Not applicable		
1.4 Surface cracking	Tension crack (approx. 3 m in length) around Sta. 60+480 m, no longer active		
1.5 Unexpected settlement	None		
1.6 Lateral movement	Not apparent		
1.7 Other unusual conditions	None		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
2. UPSTREAM SLOPE		59, 60	
2.1 Slope angle	Approx. 1.6H:1V		
2.2 Signs of erosion	Stable		
2.3 Signs of movement (deformation)	None observed		
2.4 Cracks	None observed		
2.5 Face liner condition (if applicable)	Not applicable		
2.6 Other unusual conditions	None		
3. DOWNSTREAM SLOPE		67, 68, 69	
3.1 Slope angle	Approx.1.6H:1V		
3.2 Signs of erosion	None observed		
3.3 Signs of movement (deformation)	None observed		
3.4 Cracks	None observed		
3.5 Seepage or wet areas	Not apparent		
3.6 Vegetation growth	None observed		
3.7 Other unusual conditions	None		
4. DOWNSTREAM TOE AREA		67, 68, 69	
4.1 Seepage from dam	Yes, presence of 3 zones		Zone of seepage downstream near Sta. 60+247. A sump is installed (pumping system located in container on the photo). No additional seepage observed at the surface of the ground. Pumping collection system started on April 4, 2012. Flow is being monitored since July 2013.

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
			Zone of seepage downstream near Sta. 60+498. A sump is installed (pumping system located in container on the photo). Ponded water nearby. No additional seepage observed at the surface of the ground during the inspection. Pumping collection system started on April 4, 2012. Flow is being monitored since July 2013.
			Seepage zone near Sta. 60+575. According to AEM, this zone was practically dry all year. Water ponding was observed during inspection but no flow was noticed.
4.2 Signs of erosion	Not observed		
4.3 Signs of turbidity in seepage water	Not observed		Based on AEM's monthly report: TSS criteria were not exceeded in 2019.
4.4 Discoloration/staining	No		
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other unusual conditions	None		
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of erosion	None observed		
5.3 Excessive vegetation	No		
5.4 Presence of rodent burrows	None observed		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
5.5 Other unusual conditions	None		
6. RESERVOIR			
6.1 Stability of slopes	Stable		Low relief region, stable upstream and downstream of dike. Portage Pit is on the downstream side of the dike.
6.2 Distance to nearest slide (if applicable)	None observed		
6.3 Estimate of slide volume (if applicable)	Not applicable		
6.4 Floating debris	None observed		
6.5 Other unusual conditions	None		
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE			
7.1 Surface condition	No spillway or outlet structure exists, only dewatering pump		
7.2 Signs of erosion			
7.3 Signs of movement (deformation)			
7.4 Cracks			
7.5 Settlement			
7.6 Presence of debris or blockage			
7.7 Closure mechanism operational			
7.8 Slope protection			

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
7.9 Instability of side slopes			
7.10 Other unusual conditions	No		
8. Instrumentation			
8.1 Piezometers	Yes		See Section 5.0 of the report.
8.2 Settlement cells	No		
8.3 Thermistors	Yes		No data after June 2016. See Section 5.0 of the report.
8.4 Settlement monuments	Not anymore		They have been removed in the past.
8.5 Seismograph	Periodic		See Section 5.0 of the report.
8.6 Inclinometer	Yes		See Section 5.0 of the report
8.7 Weirs and flow monitors	Yes		Flow meters are installed for the two pumping systems downstream. The flow of the seepage zone at Sta. 60+575 is measured using a pipe.
8.8 Data logger(s)	Yes		The piezometers and thermistors on East Dike have automatic data collection since June 2012 (data transmitted every 3 hours).
8.9 Other			
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	March 2019		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	January 2018		
10. NOTES			

Inspector's Signature	Yves Boulianne	**Date:**	July 23, 2019

Photograph A1-1 East Dike

Date: July 23, 2019 **Photo Number**: 64

Description: From approximately Sta. 60+560, looking north at the crest.

Photograph A1-2 East Dike

Date: July 23, 2019 **Photo Number**: 65

Description: From approximately Sta. 60+540, looking south at the crest.

Photograph A1-3 East Dike

Date: July 23, 2019 **Photo Number**: 62

Description: From approximately Sta. 60+540 upstream, looking south at the crest.

Photograph A1-4 East Dike

Date: July 23, 2019 **Photo Number**: 63

Description: From approximately Sta. 60+560 upstream, looking north at the crest.

Photograph A1-5 East Dike

Date: July 23, 2019 **Photo Number**: 66

Description: From approximately Sta. 60+810, looking south at the crest.

Photograph A1-6 East Dike

Date: July 23, 2019 **Photo Number**: 60

Description: From Sta. 60+300 upstream, looking north along the upstream slope.

Photograph A1-7 East Dike

Date: July 23, 2019 **Photo Number**: 59

Description: From approximately Sta. 60+250 upstream, looking south at the crest and the upstream slope.

Photograph A1-8 East Dike

Date: July 23, 2019 **Photo Number**: 61

Description: From approximately Sta. 60+250, looking west at the downstream side and toe.

Photograph A1-9 East Dike

Date: July 23, 2019 **Photo Number**: 67

Description: From approximately Sta. 60+770, looking south at the downstream toe.

Photograph A1-10 East Dike

Date: July 23, 2019 **Photo Number**: 69

Description: From approximately Sta. 60+475, looking south at the downstream toe.

Photograph A1-11 East Dike

Date: July 23, 2019 **Photo Number**: 68

Description: From approximately Sta. 60+560, looking north at the downstream toe.

APPENDIX A2

South Camp Dike

Client:	AEM	**By:**	Yves Boulianne
Project:	Meadowbank	**Date:**	July 22, 2019
Location:	South Camp Dike	**Reviewed:**	Yves Boulianne

GENERAL INFORMATION			
Dam Type:	Rockfill shell with upstream filter, a bituminous geomembrane liner and protective cover.		
Weather Conditions:	Rainy	**Temperature:**	10°C

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST		9, 10, 12, 13, 14	
1.1 Crest elevation	El. 136.6 m (rockfill) El. 134.7 m (liner)		
1.2 Reservoir level	U/S El.132.93 m D/S		No water observed at downstream toe since 2011, except periodic run-off.
Current freeboard	3,67 m (rockfill crest) 1.77 m (liner crest)		
1.3 Distance to tailings pond (if applicable)	Not applicable		
1.4 Surface cracking	None at the time of inspection		
1.5 Unexpected settlement	None at the time of inspection		
1.6 Lateral movement	Not apparent		
1.7 Other unusual conditions	None		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
2. UPSTREAM SLOPE		9, 14	
2.1 Slope angle	Approx. 1.3V: 1H		Adequate
2.2 Signs of erosion	None observed		
2.3 Signs of movement (deformation)	None observed		
2.4 Cracks	None observed		
2.5 Face liner condition (if applicable)	Liner not visible at the time of the inspection		Bituminous geomembrane liner. Compacted granular material mixed with bentonite was placed above the liner, followed by a thermal cap layer covering the entire liner face.
2.6 Other unusual conditions	None		
3. DOWNSTREAM SLOPE		11, 12	
3.1 Slope angle	Approx. 1.4V:1H		Adequate
3.2 Signs of erosion	None observed		
3.3 Signs of movement (deformation)	None observed		
3.4 Cracks	None observed		
3.5 Seepage or wet areas	None observed.		
3.6 Vegetation growth	No		
3.7 Other unusual conditions	None		
4. DOWNSTREAM TOE AREA		11, 12	
4.1 Seepage from dam	Accumulation of run-off water.		No sign of flow, probably due to high precipitations this season. To be monitored.
4.2 Signs of erosion	None observed		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
4.3 Signs of turbidity in seepage water	None		
4.4 Discoloration/staining	No		
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other unusual conditions	None		
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of erosion	None observed		
5.3 Excessive vegetation	No		
5.4 Presence of rodent burrows	None observed		
5.5 Other unusual conditions	None		
6. RESERVOIR			
6.1 Stability of slopes	Stable		
6.2 Distance to nearest slide (if applicable)	Not applicable		
6.3 Estimate of slide volume (if applicable)	None observed		
6.4 Floating debris	None		
6.5 Other unusual conditions	None		
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE			

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
7.1 Surface condition	No spillway or outlet structure exists		
7.2 Signs of erosion			
7.3 Signs of movement (deformation)			
7.4 Cracks			
7.5 Settlement			
7.6 Presence of debris or blockage			
7.7 Closure mechanism operational			
7.8 Slope protection			
7.9 Instability of side slopes			
7.10 Other unusual conditions			
8. INSTRUMENTATION			
8.1 Piezometers	No		
8.2 Settlement cells	No		
8.3 Thermistors	Yes		Section 5.0 of the report describes the thermal condition.
8.4 Settlement monuments	No		
8.5 Seismograph	No		
8.6 Inclinometer	No		
8.7 Weirs and flow monitors	No		
8.8 Data logger(s)	Yes		
8.9 Other	No		
9. DOCUMENTATION			

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	March 2019		
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	January 2018		
10. NOTES			
Inspector's Signature	Yves Boulianne	**Date:**	July 22, 2019

Photograph A2-1 South Camp Dike

Date: July 22, 2019 **Photo Number**: 9

Description: From the south abutment, looking north at the upstream slope and the thermistors instrumentation set-up.

Photograph A2-2 South Camp Dike

Date: July 22, 2019 **Photo Number**: 14

Description: From the north abutment, looking south at the upstream slope and thermistors instrumentation set-up.

Photograph A2-3 South Camp Dike

Date: July 22, 2019 **Photo Number**: 10

Description: From the south abutment, looking north at the crest.

Photograph A2-4 South Camp Dike

Date: July 22, 2019 **Photo Number**: 13

Description: From the north abutment, looking south at the crest.

Photograph A2-5 South Camp Dike

Date: July 22, 2019 **Photo Number**: 12

Description: From the north abutment, looking south at the downstream slope. There is an accumulation of water, probably from run-off.

Photograph A2-6 South Camp Dike

Date: July 22, 2019 **Photo Number**: 11

Description: From the south abutment, looking north at the downstream slope. There is an accumulation of water, probably from run-off.

APPENDIX A3

Bay-Goose Dike

Client:	AEM	**By:**	Yves Boulianne
Project:	Meadowbank	**Date:**	July 22-23, 2019
Location:	Bay-Goose Dike	**Reviewed:**	Yves Boulianne

GENERAL INFORMATION			
Dam Type:	Rockfill embankment with a cut-off wall (soil-bentonite, cement-soil-bentonite and jet grouting columns) and downstream filters		
Weather Conditions:	Cloudy	**Temperature:**	10°C

INSPECTION ITEM	**OBSERVATIONS DATA**	**PHOTO**	**COMMENTS & OTHER DATA**
1. DAM CREST		17, 18, 21, 22, 25, 26, 27, 28, 31, 32, 33, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 50, 51, 52, 56, 57	
1.1 Crest elevation	+/-138 cut-off 136.1m		Thermal cap completed in May 2013.
1.2 Reservoir level	132.93 m upstream		Downstream side dewatered since mid-November 2011.
Current freeboard	5 m		Design 2.0 m.
1.3 Distance to tailings pond (if applicable)	Not applicable		
1.4 Surface cracking	Yes		The tension cracks observed in 2013 on the upstream side within the thermal cap placed during winter 2013 are still visible but are no longer active.

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1.5 Unexpected settlement	Yes		The rockfill cap added over the cut-off in the winter of 2013 is showing settlement all along the upstream side of the dike and over the cut-off. Settlement varies from 0.1 m to > 1 m. No longer active.
1.6 Lateral movement	Not apparent		
1.7 Other unusual conditions	Yes		
2. UPSTREAM SLOPE	27, 28, 33, 37, 38, 43, 44, 45, 46, 50, 51, 56, 57		
2.1 Slope angle	Approx. 1.6H:1.0V		Rockfill
2.2 Signs of erosion	Stable		
2.3 Signs of movement (deformation)	None observed		
2.4 Cracks	None observed		
2.5 Face liner condition (if applicable)	Not applicable		
2.6 Other unusual conditions	None		
3. DOWNSTREAM SLOPE	19, 20, 23, 24, 25, 26, 29, 30, 34, 35, 36, 39, 40, 41, 42, 47, 48, 54, 55		
3.1 Slope angle	Approx.1.6H:1V		
3.2 Signs of erosion	None observed		
3.3 Signs of movement (deformation)	None observed		
3.4 Cracks	None observed		
3.5 Seepage or wet areas	Not apparent		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
3.6 Vegetation growth	None observed		
3.7 Other unusual conditions	None		
4. DOWNSTREAM TOE AREA	19, 20, 23, 24, 25, 26, 29, 30, 34, 35, 36, 39, 40, 47, 48, 53, 54, 55		
4.1 Seepage from dike	Yes		Seepage zone observed as well as water pond. The seepage is being monitored by the mine and does not show signs of aggravation.
	North Channel	225, 219	Monitored by stations 8 (30+420) and 9 (30+380). Water flowing was observed during the inspection.
	Central Shallow	230	Presence of 2 seepage channels at 30+650 and 30+625. Flow was observed during inspection at 30+650. Monitored by station 7.
	Central Channel	265	Presence of a seepage channel at Sta. 31+165. Water ponding was observed at the time of the inspection. It was pumped once after freshet only.
	Channel 3	246, 251, 255	Light flow observed during inspection. Monitored by station 6.
	Channel 1	237, 236	This seepage channel was not flowing at the time of the inspection.
	Water Ponds	247	Presence of water pond with no sign of seepage. Located at 31+750. Water was observed downstream of Channel 1 ponding against the ring road of Goose Pit.
4.2 Signs of erosion	None observed		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
4.3 Signs of turbidity in seepage water	No.		
4.4 Discoloration/staining	No		
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other unusual conditions	Yes		Inflow of water on pit wall. Probably due to the Bay-Goose fault and rock quality. In the vicinity of Channels 1, 2 and 3. Not monitored anymore.
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of erosion	None observed		
5.3 Excessive vegetation	No		
5.4 Presence of rodent burrows	None observed		
5.5 Other unusual conditions	None		
6. RESERVOIR			
6.1 Stability of slopes	Stable		
6.2 Distance to nearest slide (if applicable)	None observed		
6.3 Estimate of slide volume (if applicable)	Not applicable		
6.4 Floating debris	None observed		
6.5 Other unusual conditions	None		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE			
7.1 Surface condition	No spillway or outlet structure exists, only dewatering pump.		
7.2 Signs of erosion			
7.3 Signs of movement (deformation)			
7.4 Cracks			
7.5 Settlement			
7.6 Presence of debris or blockage			
7.7 Closure mechanism operational			
7.8 Slope protection			
7.9 Instability of side slopes			
7.10 Other unusual conditions			
8. INSTRUMENTATION			
8.1 Piezometers	Yes		See Section 5.0 of the report.
8.2 Settlement cells	No		
8.3 Thermistors	Yes		See Section 5.0 of the report.
8.4 Settlement monuments	No		Survey monuments removed in the past.
8.5 Seismograph	Periodic		See Section 5.0 of the report.
8.6 Inclinometer	Yes		See Section 5.0 of the report.
8.7 Weirs and flow monitors	Yes		Seepage monitoring system installed at seepage channel to monitor flow.

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
8.8 Data logger(s)	Yes		The piezometers and the thermistors have automatic data transmission (every 3 hours).
8.9 Other			
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	March 2019		
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	January 2018		
10. NOTES			

Inspector's Signature	Yves Boulianne	**Date:**	July 23, 2019

Photograph A3-1 Bay Goose Dike

Date: July 23, 2019 **Photo Number**: 56

Description: From approximately Sta. 30+142 (north abutment) looking southwest at the crest.

Photograph A3-2 Bay Goose Dike

Date: July 23, 2019 **Photo Number**: 57

Description: From approximately Sta. 30+130 (north abutment), looking north at the crest.

Photograph A3-3 Bay Goose Dike

Date: July 23, 2019 **Photo Number**: 55

Description: From approximately Sta. 30+340 on the crest, looking northeast at the dam crest and downstream slope

Photograph A3-4 Bay Goose Dike

Date: July 23, 2019 **Photo Number**: 54

Description: From approximately Sta. 30+340, looking northwest at the north seepage channel.

Photograph A3-5 Bay Goose Dike

Date: July 23, 2019 **Photo Number**: 53

Description: From approximately Sta. 30+450, looking north at the crest and the downstream slope.

Photograph A3-6 Bay Goose Dike

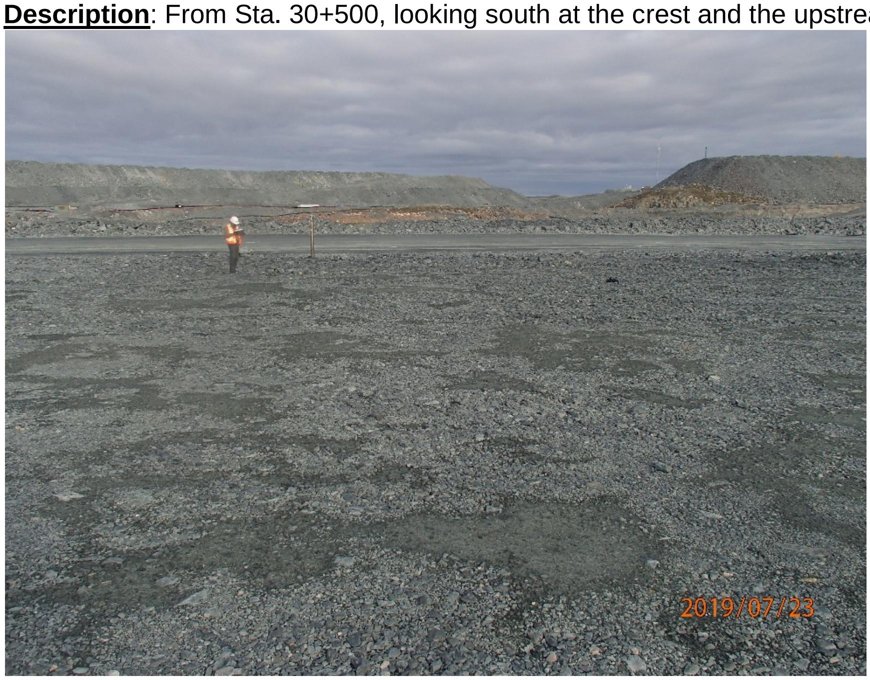
Date: July 23, 2019 **Photo Number**: 51

Description: From Sta. 30+500, looking northeast at the crest and the upstream slope.

Photograph A3-7 Bay Goose Dike

Date: July 23, 2019 **Photo Number**: 50

Description: From Sta. 30+500, looking south at the crest and the upstream slope.



Photograph A3-8 Bay Goose Dike

Date: July 23, 2019 **Photo Number**: 52

Description: From Sta. 30+500, looking west at the crest.

Photograph A3-9 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 43

Description: From approximately Sta. 31+130, looking south at the crest and upstream slope.

Photograph A3-10 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 16

Description: From approximately Sta. 31+130, looking north at the crest and upstream slope.

Photograph A3-11 Bay Goose Dike

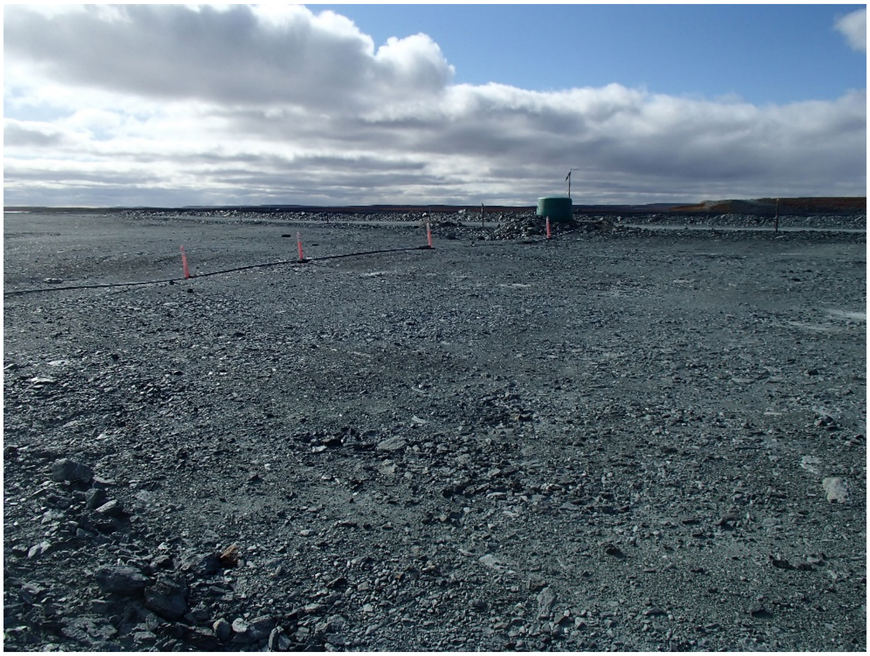
Date: July 22, 2019 **Photo Number**: 47

Description: From approximately Sta. 31+080 on the crest, looking north at the downstream slope and toe.

Photograph A3-12 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 48

Description: From approximately Sta. 31+080 on the crest, looking southwest at the pond of water at Central Channel seepage at Sta. 31+165.



Photograph A3-13 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 44

Description: From approximately Sta. 31+130, looking southwest at the crest.

Photograph A3-14 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 45

Description: From approximately Sta. 31+130, looking north at the crest.

Photograph A3-15 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 40

Description: From approximately Sta. 31+280 on the crest, looking north at the downstream slope and toe area.

Photograph A3-16 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 39

Description: From approximately Sta. 31+280 on the crest, looking southwest at the downstream slope and the water pond at the downstream toe at Sta. 31+350.

Photograph A3-17 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 42

Description: From approximately Sta. 31+280, looking south at the crest.

Photograph A3-18 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 41

Description: From approximately Sta. 31+280, looking northeast at the crest.

Photograph A3-19 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 36

Description: From approximately Sta. 31+490, looking northeast at the downstream toe and slope.

Photograph A3-20 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 35

Description: From approximately Sta. 31+490, looking west toward Channel 3.

Photograph A3-21 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 37

Description: From approximately Sta. 31+475, looking west at the crest and the upstream slope.

Photograph A3-22 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 38

Description: From approximately Sta. 31+475, looking northeast at the crest and the upstream slope.

Photograph A3-23 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 36

Description: From approximately Sta. 31+475, looking east at the crest and the downstream slope.

Photograph A3-24 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 35

Description: From approximately Sta. 31+475, looking west at the crest and the downstream slope.

Photograph A3-25 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 34

Description: From approximately Sta. 31+570, looking north toward Channel 3.

Photograph A3-26 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 32

Description: From approximately Sta. 31+645, looking east at the crest centreline.

Photograph A3-27 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 31

Description: From approximately Sta. 31+645, looking northwest at the crest and the upstream slope.

Photograph A3-28 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 33

Description: From approximately Sta. 31+640, looking southeast at the upstream slope.

Photograph A3-29 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 30

Description: From the crest at approximately Sta. 31+740. Looking southeast downstream toward Channel 3.

Photograph A3-30 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 29

Description: From the crest at approximately Sta. 31+740, looking north downstream at the water pond at Sta. 31+750.

Photograph A3-31 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 27

Description: From approximately Sta. 31+870, looking northwest at the crest and upstream slope.

Photograph A3-32 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 28

Description: From approximately Sta. 31+870, looking southeast at the crest and upstream slope.

Photograph A3-33 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 26

Description: From approximately Sta. 31+920, looking south at the crest.

Photograph A3-34 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 25

Description: From approximately Sta. 31+920, looking northwest at the crest.

Photograph A3-35 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 23

Description: From approximately Sta. 31+920 on the crest, looking southeast at the downstream slope.

Photograph A3-36 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 24

Description: From about Sta. 31+920 on the crest, looking northwest toward Channel 1 monitoring station.

Photograph A3-37 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 22

Description: From approximately Sta. 32+030 looking southeast at the crest.

Photograph A3-38 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 21

Description: From approximately Sta. 32+030 looking southwest at the crest.

Photograph A3-39 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 19

Description: From approximately Sta. 32+030 downstream, looking north at the downstream slope.

Photograph A3-40 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 20

Description: From approximately Sta. 32+030 downstream, looking southeast at the downstream slope.

Photograph A3-41 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 18

Description: From approximately Sta. 32+025 (south abutment) looking east at the crest. Zone of high magnitude settlement in the ultramafic cap. The tension cracks seem no longer active.

Photograph A3-42 Bay Goose Dike

Date: July 22, 2019 **Photo Number**: 17

Description: From approximately Sta. 32+025 (south abutment) looking west at the crest. Zone of high magnitude settlement in the ultramafic cap. The tension cracks seem no longer active.

APPENDIX A4

Vault Dike

Client:	AEM	**By:**	Yves Boulianne
Project:	Meadowbank	**Date:**	July 23, 2019
Location:	Vault Dike	**Reviewed:**	Yves Boulianne

GENERAL INFORMATION			
Dam Type:	Rockfill embankment with filter zones, impervious upstream liner (bituminous membrane) and an upstream key trench (aggregate mixed with bentonite)		
Weather Conditions:	Overcast	**Temperature:**	10°C

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST		71, 72, 73, 74, 75, 76	
1.1 Crest elevation	142.4 m		
1.2 Reservoir level	139.55 m U/S		
Current freeboard	2.85 m		
1.3 Distance to tailings pond (if applicable)	Not applicable		
1.4 Surface cracking	No		
1.5 Unexpected settlement	No		
1.6 Lateral movement	Not apparent		
1.7 Other unusual conditions	No		
2. UPSTREAM SLOPE		75, 76	
2.1 Slope angle	Approx. 1.5H:1V		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
2.2 Signs of erosion	Stable		
2.3 Signs of movement (deformation)	None observed		
2.4 Cracks	No		
2.5 Face liner condition (if applicable)	Not applicable		
2.6 Other unusual conditions	None		
3. DOWNSTREAM SLOPE	72, 73		
3.1 Slope angle	Approx.1.5H:1V		
3.2 Signs of erosion	None observed		
3.3 Signs of movement (deformation)	No		
3.4 Cracks	None observed		
3.5 Seepage or wet areas	Not apparent		
3.6 Vegetation growth	None observed		
3.7 Other unusual conditions	None		
4. DOWNSTREAM TOE AREA			
4.1 Seepage from dam	None		
4.2 Signs of erosion	Not observed		
4.3 Signs of turbidity in seepage water	No		
4.4 Discoloration/staining	No		
4.5 Outlet operating problem (if applicable)	Not applicable		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
4.6 Other unusual conditions	None		
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of erosion	None observed		
5.3 Excessive vegetation	No		
5.4 Presence of rodent burrows	None observed		
5.5 Other unusual conditions	None		
6. RESERVOIR			
6.1 Stability of slopes	Good conditions		
6.2 Distance to nearest slide (if applicable)	None observed		
6.3 Estimate of slide volume (if applicable)	Not applicable		
6.4 Floating debris	None observed		
6.5 Other unusual conditions	None		
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE	No spillway or outlet structure exists, only dewatering pump.		
7.1 Surface condition			
7.2 Signs of erosion			
7.3 Signs of movement (deformation)			

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
7.4 Cracks			
7.5 Settlement			
7.6 Presence of debris or blockage			
7.7 Closure mechanism operational			
7.8 Slope protection			
7.9 Instability of side slopes			
7.10 Other unusual conditions	No		
8. Instrumentation			
8.1 Piezometers	No		
8.2 Settlement cells	No		
8.3 Thermistors	Yes		See Section 5.0 of the report.
8.4 Settlement monuments	No		
8.5 Seismograph	No		
8.6 Inclinometer	No		
8.7 Weirs and flow monitors	No		
8.8 Data logger(s)	No		
8.9 Other			
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
9.1.3 Date of last revision	March 2019		
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	January 2018		
10. NOTES			

Inspector's Signature	Yves Boulianne	**Date:**	July 23, 2019

Photograph A4-1 Vault Dike

Date: July 23, 2019 **Photo Number**: 71

Description: From the east abutment, looking northwest at the crest.

Photograph A4-2 Vault Dike

Date: July 23, 2019 **Photo Number**: 72

Description: From downstream, looking southeast at the downstream toe.

Photograph A4-3 Vault Dike

Date: July 23, 2019 **Photo Number**: 73

Description: From downstream, looking northwest at the downstream toe.

Photograph A4-4 Vault Dike

Date: July 23, 2019 **Photo Number:** 74

Description: From the west abutment, looking southeast at the crest.

Photograph A4-5 Vault Dike

Date: July 23, 2019 **Photo Number**: 75

Description: From the upstream side, looking southeast at the upstream slope.

Photograph A4-6 Vault Dike

Date: July 23, 2019 **Photo Number**: 76

Description: From the upstream side, looking northwest at the upstream slope.

APPENDIX B

Tailings Storage Facility

APPENDIX B1

North Cell Internal Structure

Client:	AEM	**By:**	Yves Boulianne
Project:	Meadowbank	**Date:**	July 23, 2019
Location:	North Cell Internal Structure	**Reviewed:**	Yves Boulianne

GENERAL INFORMATION			
Dam Type:	Rockfill embankment with upstream filters built inside the existing North Cell		
Weather Conditions:	Overcast	**Temperature:**	10°C

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST		105, 106, 108	
1.1 Crest elevation	152 to 154 m		Design 154 m
1.2 Reservoir level	149.5 m to 152.1 m – tailings 147.8 m - water		
Current freeboard	1.9 m to 2.5 -tailings 4.2 m to 6.2 m - water		Design 2 m water, 0.5 m tailings
1.3 Distance to tailings pond (if applicable)	>100 m		Tailings beach all along the NCIS
1.4 Surface cracking	None observed		
1.5 Unexpected settlement	None observed		
1.6 Lateral movement	Not apparent		
1.7 Other unusual conditions	None		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
2. UPSTREAM SLOPE		105, 106, 107, 108, 109, 110, 111, 112, 113	
2.1 Slope angle	Approx. 3H:1V		Rockfill
2.2 Signs of erosion	Slight erosion of the toe of the fine filter slope	111	Due to channelling of water at the toe of the slope
2.3 Signs of movement (deformation)	None observed		
2.4 Cracks	Some minor tension cracks between Sta. 2+650 and 2+800 m	109, 112	Tension cracks (2 to 5 m long, a few millimeters wide) in the fine filter surface, near the crest.
2.5 Face liner condition (if applicable)	In good condition		
2.6 Other unusual conditions	None		
3. DOWNSTREAM SLOPE			
3.1 Slope angle	Approx.1.2H or 1.3 H:1V variable		Rockfill
3.2 Signs of erosion	None observed		
3.3 Signs of movement (deformation)	None observed		
3.4 Cracks	None observed		
3.5 Seepage or wet areas	None observed		
3.6 Vegetation growth	None observed		
3.7 Other unusual conditions	None		
4. DOWNSTREAM TOE AREA			

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
4.1 Seepage from dam	Yes		Pumping stations are in place downstream of the structure and in operation as needed.
4.2 Signs of erosion	None observed		
4.3 Signs of turbidity in seepage water	Not applicable		
4.4 Discoloration/staining	No		
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other unusual conditions			
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of erosion	None observed		
5.3 Excessive vegetation	No		
5.4 Presence of rodent burrows	None observed		
5.5 Other unusual conditions	None		
6. RESERVOIR		106, 107, 108, 109, 113	
6.1 Stability of slopes	Stable		
6.2 Distance to nearest slide	None observed		
6.3 Estimate of slide volume (if applicable)	Not applicable		
6.4 Floating debris	None observed		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
6.5 Other unusual conditions	No		
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE			
7.1 Surface condition	No spillway or outlet structure exists, only dewatering pump.		
7.2 Signs of erosion			
7.3 Signs of movement (deformation)			
7.4 Cracks			
7.5 Settlement			
7.6 Presence of debris or blockage			
7.7 Closure mechanism operational			
7.8 Slope protection			
7.9 Instability of side slopes			
7.10 Other unusual conditions			
8. INSTRUMENTATION			
8.1 Piezometers	No		
8.2 Settlement cells	No		
8.3 Thermistors	Yes		See Section 5.0 of the report.
8.4 Settlement monuments	Yes		16 prisms installed. See Section 5.0 of the report.
8.5 Seismograph	No		
8.6 Inclinometer	No		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
8.7 Weirs and flow monitors	No		A temporary seepage collection and pump back system is built and will be completed at a later time according to the design.
8.8 Data logger(s)	Yes		
8.9 Other			
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	March 2019		
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	Janvier 2018		
10. NOTES :			

Inspector's Signature	Yves Boulianne	**Date:**	July 23, 2019

Photograph B1-1 Tailings Storage Facility

Date: July 23, 2019 **Photo Number**: 106

Description: From the North Cell Internal Structure, looking northeast toward the upstream slope and the North Cell.

Photograph B1-2 Tailings Storage Facility

Date: July 23, 2019 **Photo Number**: 105

Description: From the North Cell Internal Structure, looking northeast toward the upstream slope and the North Cell.

Photograph B1-3 Tailings Storage Facility

Date: July 23, 2019 **Photo Number**: 109

Description: From the North Cell Internal Structure, looking northwest toward the upstream slope.

Photograph B1-4 Tailings Storage Facility

Date: July 23, 2019 **Photo Number**: 110

Description: From the North Cell Internal Structure, looking south toward the upstream slope.

Photograph B1-5 Tailings Storage Facility

Date: July 23, 2019 **Photo Number**: 108

Description: From the North Cell Internal Structure on a deposition point, looking southeast at the North Cell.

Photograph B1-6 Tailings Storage Facility

Date: July 23, 2019 **Photo Number**: 107

Description: From the North Cell Internal Structure on a deposition point, looking southwest at the North Cell.

Photograph B1-7 Tailings Storage Facility

Date: July 23, 2019 **Photo Number**: 111

Description: From the North Cell Internal Structure at approx. Sta. 2+800. The toe of the slope is eroded by water.

Photograph B1-8 Tailings Storage Facility

Date: July 23, 2019 **Photo Number**: 112

Description: From the North Cell Internal Structure at approx. Sta. 2+800, looking north toward the upstream slope.

Photograph B1-9 Tailings Storage Facility

Date: July 23, 2019 **Photo Number**: 113

Description: From the North Cell Internal Structure at approx. Sta. 2+800, looking south toward the upstream slope.

APPENDIX B2

Saddle Dam 1

Client:	AEM	**By:**	Yves Boulianne
Project:	Meadowbank	**Date:**	July 23, 2019
Location:	Saddle Dam 1	**Reviewed:**	Yves Boulianne

GENERAL INFORMATION			
Dam Type:	Rockfill embankment with inverted filter on base, upstream filters, a geomembrane liner tied in a toe till plug and protective cover.		
Weather Conditions:	Rainy	**Temperature:**	10°C

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST		134, 138, 139, 141	
1.1 Crest elevation	150 m		Design 150 m
1.2 Reservoir level	149.5 m - tailings		
Current freeboard	0.5 m -tailings		Design 2 m water, 0.5 m tailings
1.3 Distance to tailings pond (if applicable)	>300 m		Tailings beach all along SD1
1.4 Surface cracking	None at time of inspection		
1.5 Unexpected settlement	None observed		
1.6 Lateral movement	Not apparent		
1.7 Other unusual conditions	None		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
2. UPSTREAM SLOPE		133, 134, 136, 137, 141	
2.1 Slope angle	Approx. 3H:1V		Rockfill
2.2 Signs of erosion	None observed		
2.3 Signs of movement (deformation)	None observed		
2.4 Cracks	None observed		
2.5 Face liner condition (if applicable)	In good condition		
2.6 Other unusual conditions	None		
3. DOWNSTREAM SLOPE		135, 142	
3.1 Slope angle	Approx.1.2H or 1.3 H:1V variable		Rockfill
3.2 Signs of erosion	None observed		
3.3 Signs of movement (deformation)	None observed		
3.4 Cracks	None observed		
3.5 Seepage or wet areas	None observed		
3.6 Vegetation growth	None observed		
3.7 Other unusual conditions	None		
4. DOWNSTREAM TOE AREA		135, 142	
4.1 Seepage from dam	Uncertain		A dewatering sump is installed downstream. Water was observed ponding in that area.
4.2 Signs of erosion	None observed		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
4.3 Signs of turbidity in seepage water	Not applicable		
4.4 Discoloration/staining	No		
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other unusual conditions			
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of erosion	None observed		
5.3 Excessive vegetation	No		
5.4 Presence of rodent burrows	None observed		
5.5 Other unusual conditions	None		
6. RESERVOIR		133, 134, 136, 137, 140, 141	
6.1 Stability of slopes	Stable		
6.2 Distance to nearest slide	None observed		
6.3 Estimate of slide volume (if applicable)	Not applicable		
6.4 Floating debris	None observed		
6.5 Other unusual conditions	No		A small pond of water was observed in the tailings and is not a concern.

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE			
7.1 Surface condition	No spillway or outlet structure exists, only dewatering pump.		
7.2 Signs of erosion			
7.3 Signs of movement (deformation)			
7.4 Cracks			
7.5 Settlement			
7.6 Presence of debris or blockage			
7.7 Closure mechanism operational			
7.8 Slope protection			
7.9 Instability of side slopes			
7.10 Other unusual conditions			
8. INSTRUMENTATION			
8.1 Piezometers	No		
8.2 Settlement cells	No		
8.3 Thermistors	Yes		See Section 5.0 of the report.
8.4 Settlement monuments	No		Construction drawings show settlement monuments to be installed on Stage 2 crest.
8.5 Seismograph	No		
8.6 Inclinometer	No		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
8.7 Weirs and flow monitors	No		Per the design, a seepage collection and pump back system is built.
8.8 Data logger(s)	Yes		
8.9 Other			
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	March 2019		
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	January 2018		
10. NOTES :			
Inspector's Signature	Yves Boulianne	**Date:**	July 23, 2019

Photograph B2-1 Saddle Dam 1

Date: July 23, 2019 **Photo Number**: 142

Description: From the south abutment (Sta. 0+350) looking north at the downstream face. Notice the sea-can container where a sump is installed.

Photograph B2-2 Saddle Dam 1

Date: July 23, 2019 **Photo Number**: 135

Description: From Sta. 0+150 looking south at the downstream face. Notice the sea-can container where a sump is installed.

Photograph B2-3 Saddle Dam 1

Date: July 23, 2019 **Photo Number**: 139

Description: From approximately Sta. 0+225, looking north at the crest.

Photograph B2-4 Saddle Dam 1

Date: July 23, 2019 **Photo Number**: 138

Description: From approximately Sta. 0+225, looking south at the crest.

Photograph B2-5 Saddle Dam 1

Date: July 23, 2019 **Photo Number**: 134

Description: From approximately Sta. 0+055, looking south at the crest and upstream slope.

Photograph B2-6 Saddle Dam 1

Date: July 23, 2019 **Photo Number**: 137

Description: From approximately Sta. 0+195 upstream, looking south at the upstream slope. Adequate tailings beach against SD1. A small pond of water is present at the surface of the tailings and is not a concern.

Photograph B2-7 Saddle Dam 1

Date: July 23, 2019 **Photo Number**: 136

Description: From approximately Sta. 0+195 upstream, looking north at the upstream slope. Adequate tailings beach against SD1.

Photograph B2-8 Saddle Dam 1

Date: July 23, 2019 **Photo Number**: 141

Description: From the south abutment looking north at the upstream slope. Adequate tailings beach against SD1.

Photograph B2-9 Saddle Dam 1

Date: July 23, 2019 **Photo Number**: 140

Description: From the south abutment looking east at the North Cell.

Photograph B2-10 Saddle Dam 1

Date: July 23, 2019 **Photo Number**: 133

Description: From approximately Sta. 0+050 upstream, looking east at the North Cell.

APPENDIX B3

Saddle Dam 2

Client:	AEM	**By:**	Yves Boulianne
Project:	Meadowbank	**Date:**	July 23, 2019
Location:	Saddle Dam 2	**Reviewed:**	Yves Boulianne

GENERAL INFORMATION			
Dam Type:	Rockfill embankment with inverted filter on base, upstream filters, a geomembrane liner tied in a toe till plug and upstream till blanket.		
Weather Conditions:	Rainy	**Temperature:**	10°C

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST		145, 146, 147	
1.1 Crest elevation	150 m		Design 150 m
1.2 Reservoir level	149.5 m - tailings		
Current freeboard	0.5 m - tailings		Design 2 m water, 0.5 m tailings
1.3 Distance to tailings pond (if applicable)	>200 m		Adequate tailings beach
1.4 Surface cracking	None at time of inspection		
1.5 Unexpected settlement	None observed		
1.6 Lateral movement	Not apparent		
1.7 Other unusual conditions	None		
2. UPSTREAM SLOPE		144, 145, 146, 147, 148	
2.1 Slope angle	Approx. 3H:1V		Rockfill
2.2 Signs of erosion	None observed		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
2.3 Signs of movement (deformation)	None observed		
2.4 Cracks	None observed		
2.5 Face liner condition (if applicable)	Good		
2.6 Other unusual conditions	None		
3. DOWNSTREAM SLOPE		151	
3.1 Slope angle	Approx.1.2H or 1.3H:1V variable		Rockfill
3.2 Signs of erosion	None observed		
3.3 Signs of movement (deformation)	None observed		
3.4 Cracks	None observed		
3.5 Seepage or wet areas	None observed on slope		
3.6 Vegetation growth	None observed		
3.7 Other unusual conditions	None		
4. DOWNSTREAM TOE AREA		151	
4.1 Seepage from dam	No		
4.2 Signs of erosion	None observed		
4.3 Signs of turbidity in seepage water	Not applicable		
4.4 Discoloration/staining	No		
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other unusual conditions	Yes		Water is still ponding within the rockfill embankment between 20+275 to 20+475 approximately.

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of erosion	None observed		
5.3 Excessive vegetation	No		
5.4 Presence of rodent burrows	None observed		
5.5 Other unusual conditions	None		
6. RESERVOIR		144, 145, 146, 147, 148	
6.1 Stability of slopes	Stable		
6.2 Distance to nearest slide (if applicable)	None observed		
6.3 Estimate of slide volume (if applicable)	Not applicable		
6.4 Floating debris	None observed		
6.5 Other unusual conditions	No		
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE			
7.1 Surface condition	No spillway or outlet structure exists, only dewatering pump.		
7.2 Signs of erosion			
7.3 Signs of movement (deformation)			
7.4 Cracks			
7.5 Settlement			
7.6 Presence of debris or blockage			

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
7.7 Closure mechanism operational			
7.8 Slope protection			
7.9 Instability of side slopes			
7.10 Other unusual conditions			
8. INSTRUMENTATION			
8.1 Piezometers	No		
8.2 Settlement cells	No		
8.3 Thermistors	Yes		See Section 5.0 of the report.
8.4 Settlement monuments	No		Construction drawings show displacement monitoring on Stage 2 crest.
8.5 Seismograph	No		
8.6 Inclinometer	No		
8.7 Weirs and flow monitors	No		
8.8 Data logger(s)	Yes		
8.9 Other			
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	March 2019		
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	January 2018		
10. NOTES :			
Inspector's Signature	Yves Boulianne	**Date:**	July 23, 2019

Photograph B3-1 Saddle Dam 2

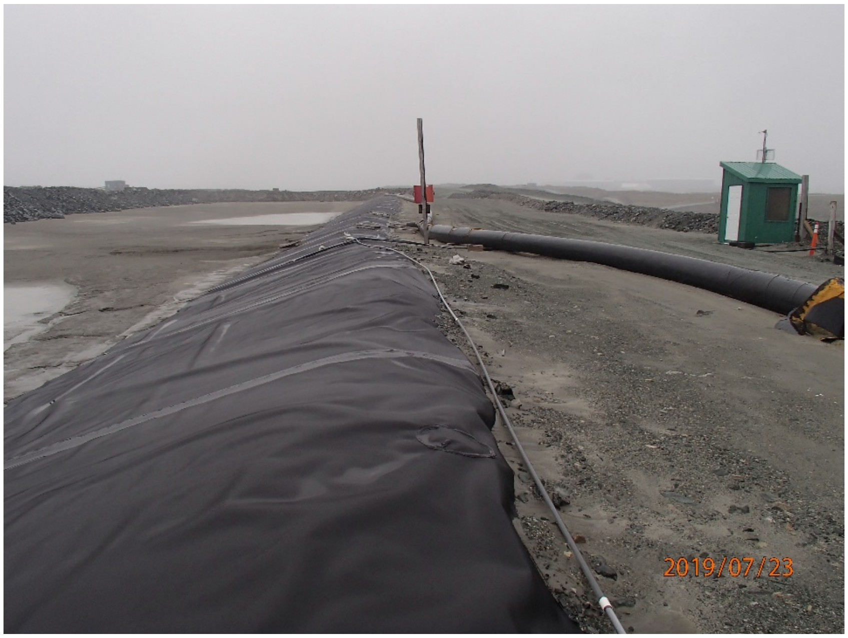
Date: July 23, 2019 **Photo Number**: 145

Description: From Saddle Dam 2 (approximately Sta. 20+110) looking southeast at the crest and upstream slope of Saddle Dam 2. The tailings beach against SD2 is adequate.

Photograph B3-2 Saddle Dam 2

Date: July 23, 2019 **Photo Number**: 144

Description: From Saddle Dam 2 (approximately Sta. 20+110) upstream, looking southeast at the crest and upstream slope of Saddle Dam 2. The tailings beach against SD2 is adequate.



Photograph B3-3 Saddle Dam 2

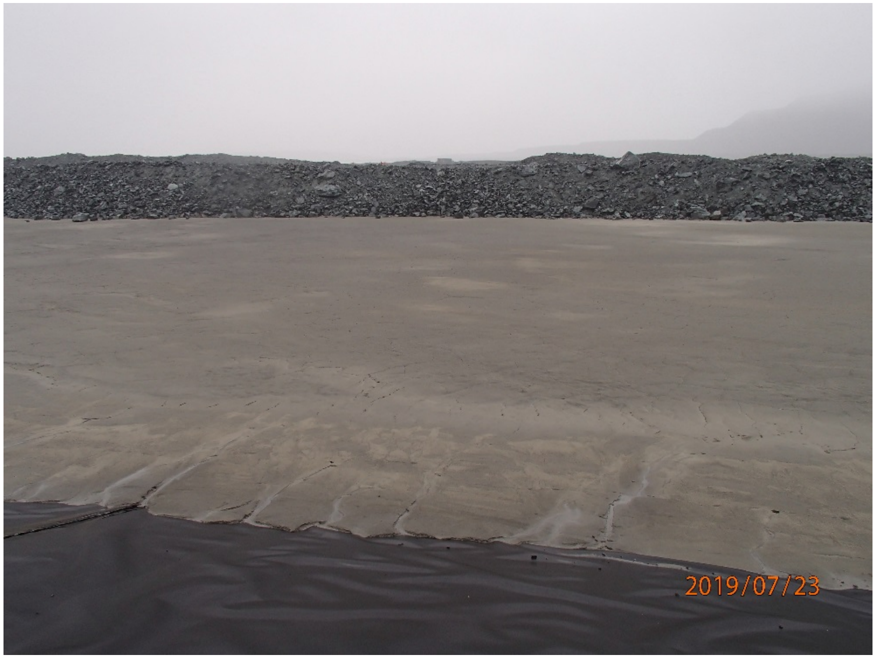
Date: July 23, 2019 **Photo Number**: 146

Description: From approximately Sta. 20+370 looking southeast at the crest and upstream slope.

Photograph B3-4 Saddle Dam 2

Date: July 23, 2019 **Photo Number**: 147

Description: From approximately Sta. 20+370 looking northwest at the crest and upstream slope.



Photograph B3-5 Saddle Dam 2

Date: July 23, 2019 **Photo Number**: 148

Description: From approximately Sta. 20+525, looking northwest at the crest.

Photograph B3-6 Saddle Dam 2

Date: July 23, 2019 **Photo Number**: 151

Description: From Saddle Dam 2 (approximately Sta. 20+500) downstream, looking northwest at the downstream toe and slope of Saddle Dam 2. Some water is ponding at the toe.

APPENDIX B4

Stormwater Dike

Client:	AEM	**By:**	Yves Boulianne
Project:	Meadowbank	**Date:**	July 23, 2019
Location:	Stormwater Dike	**Reviewed:**	Yves Boulianne

GENERAL INFORMATION			
Dam Type:	Rockfill embankment, upstream filters and a bituminous geomembrane liner. Compacted till placed above liner at toe, prior to tailings deposition.		
Weather Conditions:	Rainy	**Temperature:**	10°C

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST		127, 128, 129, 130, 131	
1.1 Crest elevation	150 m		Design 150 m
1.2 Reservoir level	143.1 – water 144.6 m (max) – tailings (South Cell) 149.5 m - tailings (North Cell)		
Current freeboard	6.9 m – water 5.4 m - tailings (South Cell) 0.5 m – tailings (North Cell)		Design 2 m in operation and 1 m at closure for water and 0.5 m for tailings.
1.3 Distance to tailings pond (if applicable)	Adequate (North Cell)		Adequate beach in place all along the dike on North Cell. Some shallow water ponding against dike in some places (from 10+550 to 10+950 approximately). Water and tailings have reached the toe of the structure in the South Cell.

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1.4 Surface cracking	Yes		Tension cracks and unexpected movement were observed (oblique tension cracks extending side to side). They are concentrated around 10+300 and appeared during the freshet. They have since been filled with bentonite. No movement has been observed in the zone where a buttress was constructed at the toe in the South Cell. The buttress is covered by the pond.
1.5 Unexpected settlement	No		
1.6 Lateral movement	Yes		
1.7 Other unusual conditions			
2. UPSTREAM SLOPE		127, 128, 129, 130, 131, 149, 150	
2.1 Slope angle	Approx. 3H:1V		Rockfill
2.2 Signs of erosion	None observed		
2.3 Signs of movement (deformation)	None observed		
2.4 Cracks	None observed		
2.5 Face liner condition (if applicable)	Good conditions.		
2.6 Other unusual conditions	None		
3. DOWNSTREAM SLOPE			
3.1 Slope angle	Approx.1.2H or 1.5 H:1V variable		Rockfill
3.2 Signs of erosion	None observed		
3.3 Signs of movement (deformation)	None observed		
3.4 Cracks	None observed		
3.5 Seepage or wet areas	None observed on slope		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
3.6 Vegetation growth	None observed		
3.7 Other unusual conditions	None		
4. DOWNSTREAM TOE AREA	Not visible		Downstream toe and berm is submerged by the South Cell pond. The berm was constructed at the downstream toe to stabilize the movement and cracks observed in 2016.
4.1 Seepage from dam	Not visible		
4.2 Signs of erosion	Not visible		
4.3 Signs of turbidity in seepage water	Not visible		
4.4 Discoloration/staining	Not visible		
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other unusual conditions	Not visible		
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of erosion	None observed		
5.3 Excessive vegetation	No		
5.4 Presence of rodent burrows	None observed		
5.5 Other unusual conditions	None		
6. RESERVOIR		149, 150	
6.1 Stability of slopes	Stable		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
6.2 Distance to nearest slide (if applicable)	None observed		
6.3 Estimate of slide volume (if applicable)	Not applicable		
6.4 Floating debris	None observed		
6.5 Other unusual conditions	No		
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE	No spillway or outlet structure exists, only dewatering pump		
7.1 Surface condition			
7.2 Signs of erosion			
7.3 Signs of movement (deformation)			
7.4 Cracks			
7.5 Settlement			
7.6 Presence of debris or blockage			
7.7 Closure mechanism operational			
7.8 Slope protection			
7.9 Instability of side slopes			
7.10 Other unusual conditions			
8. INSTRUMENTATION			
8.1 Piezometers	Yes		See Section 5.0
8.2 Settlement cells	No		
8.3 Thermistors	Yes		See Section 5.0
8.4 Settlement monuments	Yes		See Section 5.0
8.5 Seismograph	No		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
8.6 Inclinometer	No		
8.7 Weirs and flow monitors	No		
8.8 Data logger(s)	No		
8.9 Other	None		
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	March 2019		
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	January 2018		
10. NOTES :			

Inspector's Signature	Yves Boulianne	**Date:**	July 23, 2019

Photograph B4-1 Stormwater Dike

Date: July 23, 2019 **Photo Number**: 127

Description: From the east abutment (11+100 approximately), looking west at the upstream face and the rockfill cover of the North Cell. Shallow water ponding against portion of the dike (less than 30 cm deep). Large rocks are present near the liner.

Photograph B4-2 Stormwater Dike

Date: July 23, 2019 **Photo Number**: 128

Description: From Sta. 10+650 looking east at the crest.

Photograph B4-3 Stormwater Dike

Date: July 23, 2019 **Photo Number**: 129

Description: From Sta. 10+650 looking west at the crest. Shallow water against portion of Stormwater Dike.

Photograph B4-4 Stormwater Dike

Date: July 23, 2019 **Photo Number**: 130

Description: From approximately Sta. 10+650 looking west at the downstream slope.

Photograph B4-5 Stormwater Dike

Date: July 23, 2019 **Photo Number**: 131

Description: From approximately Sta. 10+650 looking east at the downstream slope.

Photograph B4-6 Stormwater Dike

Date: July 23, 2019 **Photo Number**: 150

Description: From Sta.10+175, looking east at the upstream slope. The tailings beach is adequate.

Photograph B4-7 Stormwater Dike

Date: July 23, 2019 **Photo Number**: 149

Description: From Sta.10+175, looking north at the upstream slope and the North Cell. The tailings beach is adequate.

APPENDIX B5

Saddle Dam 3

Client:	AEM	**By:**	Yves Boulianne
Project:	Meadowbank	**Date:**	July 23, 2019
Location:	Saddle Dam 3	**Reviewed:**	Yves Boulianne

GENERAL INFORMATION			
Dam Type:	Rockfill embankment with inverted filter on base, upstream filters, a geomembrane liner tied in a toe till plug and upstream till blanket.		
Weather Conditions:	Rainy	**Temperature:**	10°C

INSPECTION ITEM	**OBSERVATIONS DATA**	**PHOTO**	**COMMENTS & OTHER DATA**
1. DAM CREST		154, 155, 156, 157	
1.1 Crest elevation	145 m		Designed to be able to be raised up to El. 150 m
1.2 Reservoir Level	143.1 m - water 132 m – tailings (West extremity of the South Cell)		
Current Freeboard	1.9 (water)		Water is in contact with the structure (against erosion protection cover).
1.3 Distance To Tailings Pond (if applicable)	NA		Water now reaches the structure but no tailings are planned to be in contact with the structure.
1.4 Surface Cracking	None at time of inspection		
1.5 Unexpected Settlement	None observed		
1.6 Lateral Movement	Not apparent		
1.7 Other Unusual Conditions	None		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
2. UPSTREAM SLOPE	154, 157		
2.1 Slope angle	3H:1V		
2.2 Signs of Erosion	None observed		
2.3 Signs of Movement (Deformation)	None observed		
2.4 Cracks	None observed		
2.5 Face liner condition (if applicable)	Good		
2.6 Other Unusual Conditions	None		
3. DOWNSTREAM SLOPE			
3.1 Slope angle	1.5H:1V		
3.2 Signs of Erosion	None observed		
3.3 Signs of Movement (Deformation)	None observed		
3.4 Cracks	None observed		
3.5 Seepage or Wet Areas	None observed on slope		
3.6 Vegetation Growth	None observed		
3.7 Other Unusual Conditions	None		
4. DOWNSTREAM TOE AREA			
4.1 Seepage from Dam	No		
4.2 Signs of Erosion	None observed		
4.3 Signs of Turbidity in Seepage Water	Not applicable		
4.4 Discoloration/staining	No		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other Conditions	Yes		A sump was constructed on the downstream side to collect the ponding water, so its level does not exceed the elevation of the granular layer of the upstream toe liner tie-in.
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of Erosion	None observed		
5.3 Excessive Vegetation	No		
5.4 Presence of Rodent Burrows	None observed		
5.5 Other Unusual Conditions	None		
6. RESERVOIR			
6.1 Stability of Slopes	Stable		
6.2 Distance to Nearest Slide (if applicable)	None observed		
6.3 Estimate of Slide Volume (if applicable)	Not applicable		
6.4 Floating debris	None observed		
6.5 Other Unusual Conditions	No		
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE	No spillway or outlet structure exists, only dewatering pump.		
7.1 Surface Condition	.		
7.2 Signs of Erosion			

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
7.3 Signs of Movement (Deformation)			
7.4 Cracks			
7.5 Settlement			
7.6 Presence of Debris or Blockage			
7.7 Closure mechanism operational			
7.8 Slope Protection			
7.9 Instability of Side Slopes			
7.10 Other Unusual Conditions			
8. INSTRUMENTATION			
8.1 Piezometers	No		
8.2 Settlement Cells	No		
8.3 Thermistors	Yes		See Section 5.0 of the report.
8.4 Settlement Monuments	No		
8.5 Seismograph	No		
8.6 Inclinometer	No		
8.7 Weirs and Flow Monitors	No		
8.8 Data logger(s)	Yes		
8.9 Other			
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
9.1.3 Date of last revision	March 2019		
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	January 2018		
10. NOTES :			
Inspector's Signature	Yves Boulianne	**Date:**	July 23, 2019

Photograph B5-1 Saddle Dam 3

Date: July 23, 2019 **Photo Number**: 154

Description: From Sta. 20+750, looking northwest at the downstream slope and toe.

Photograph B5-2 Saddle Dam 3

Date: July 23, 2019 **Photo Number**: 155

Description: From Sta. 20+700, looking southeast at the crest.

Photograph B5-3 Saddle Dam 3

Date: July 23, 2019 **Photo Number**: 156

Description: From Sta. 20+700, looking northwest at the crest.

Photograph B5-4 Saddle Dam 3

Date: July 23, 2019 **Photo Number**: 157

Description: From Sta. 20+610, looking south at the upstream slope.

APPENDIX B6

Saddle Dam 4

Client:	AEM	**By:**	Yves Boulianne
Project:	Meadowbank	**Date:**	July 23, 2019
Location:	Saddle Dam 4	**Reviewed:**	Yves Boulianne

GENERAL INFORMATION			
Dam Type:	Rockfill embankment with inverted filter on base, upstream filters, a geomembrane liner tied in a toe till plug and upstream till blanket.		
Weather Conditions:	Overcast	**Temperature:**	13°C

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST		160, 161, 162, 164, 165	
1.1 Crest elevation	145 m		Designed to be able to be raised to El. 150 m
1.2 Reservoir Level	143.1 m - water 144.5 m - tailings		
Current Freeboard	1.9 m - water 0.5 m - tailings		
1.3 Distance To Tailings Pond (if applicable)	Approx. 50 m		
1.4 Surface Cracking	None at time of inspection		
1.5 Unexpected Settlement	None observed		
1.6 Lateral Movement	Not apparent		
1.7 Other Unusual Conditions	None		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
2. UPSTREAM SLOPE		161, 162, 163, 164	
2.1 Slope angle	3H:1V		
2.2 Signs of Erosion	None observed		
2.3 Signs of Movement (Deformation)	None observed		
2.4 Cracks	None observed		
2.5 Face liner condition (if applicable)	Good		
2.6 Other Unusual Conditions	None		
3. DOWNSTREAM SLOPE		159, 165	
3.1 Slope angle	1.5H:1V		
3.2 Signs of Erosion	None observed		
3.3 Signs of Movement (Deformation)	None observed		
3.4 Cracks	None observed		
3.5 Seepage or Wet Areas	None observed on slope		
3.6 Vegetation Growth	None observed		
3.7 Other Unusual Conditions	None		
4. DOWNSTREAM TOE AREA		159, 165	
4.1 Seepage from Dam	No		
4.2 Signs of Erosion	None observed		
4.3 Signs of Turbidity in Seepage Water	Not applicable		
4.4 Discoloration/staining	No		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other Conditions	Yes		Runoff water accumulate at the downstream side of the structure. It is pumped out so that the water level does not exceed the elevation of the granular layer of the upstream toe liner tie-in.
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		Highly fractured bedrock observed at the western abutment.
5.2 Signs of Erosion	None observed		
5.3 Excessive Vegetation	No		
5.4 Presence of Rodent Burrows	None observed		
5.5 Other Unusual Conditions	None		
6. RESERVOIR		161, 162, 163, 164	
6.1 Stability of Slopes	Stable		
6.2 Distance to Nearest Slide (if applicable)	None observed		
6.3 Estimate of Slide Volume (if applicable)	Not applicable		
6.4 Floating debris	None observed		
6.5 Other Unusual Conditions	None		
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE	No spillway or outlet structure exists, only dewatering pump.		
7.1 Surface Condition			
7.2 Signs of Erosion			

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
7.3 Signs of Movement (Deformation)			
7.4 Cracks			
7.5 Settlement			
7.6 Presence of Debris or Blockage			
7.7 Closure mechanism operational			
7.8 Slope Protection			
7.9 Instability of Side Slopes			
7.10 Other Unusual Conditions			
8. INSTRUMENTATION			
8.1 Piezometers	No		
8.2 Settlement Cells	No		
8.3 Thermistors	Yes		See Section 5.0 of the report
8.4 Settlement Monuments	No		
8.5 Seismograph	No		
8.6 Inclinometer	No		
8.7 Weirs and Flow Monitors	No		Construction drawings indicate a seepage collection system is to be constructed.
8.8 Data logger(s)	Yes		
8.9 Other			
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	March 2019		
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	January 2018		
10. NOTES :			
Inspector's Signature	Yves Boulianne	**Date:**	July 23, 2019

Photograph B6-1 Saddle Dam 4

Date: July 23, 2019 **Photo Number**: 165

Description: From 40+150 approximately, looking southeast at the crest and the downstream slope.

Photograph B6-2 Saddle Dam 4

Date: July 23, 2019 **Photo Number**: 163

Description: From 40+150 approximately, looking northwest at the crest and the upstream slope.

Photograph B6-3 Saddle Dam 4

Date: July 23, 2019 **Photo Number**: 164

Description: From 40+150 approximately, looking southeast at the crest and the upstream slope.

Photograph B6-4 Saddle Dam 4

Date: July 23, 2019 **Photo Number**: 162

Description: From 40+250 approximately, looking northwest at the crest and the upstream slope.

Photograph B6-5 Saddle Dam 4

Date: July 23, 2019 **Photo Number**: 161

Description: From 40+250 approximately, looking southeast at the crest and the upstream slope.

Photograph B6-6 Saddle Dam 4

Date: July 23, 2019 **Photo Number**: 160

Description: From 40+250 approximately, looking southeast at the crest.

Photograph B6-7 Saddle Dam 4

Date: July 23, 2019 **Photo Number**: 159

Description: From 40+400 approximately, looking southeast at the crest and the downstream slope.

APPENDIX B7

Central Dike - Saddle Dam 5

Client:	AEM	**By:**	Yves Boulianne
Project:	Meadowbank	**Date:**	July 23, 2019
Location:	Central Dike and Saddle Dam 5	**Reviewed:**	Yves Boulianne

GENERAL INFORMATION			
Dam Type:	Rockfill embankment with inverted filter on base, key trench, upstream filters, a geomembrane liner tied in a toe till plug and protective cover.		
Weather Conditions:	Overcast	**Temperature:**	10°C

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST		114, 115, 119, 120, 123	
1.1 Crest Elevation	Cofferdam Crest = 110 m Rockfill crest = 145 m		
1.2 Reservoir Level	143.1 m - water 144.56 m - tailings		
Current Freeboard	1.9 m - water 0.44 m - tailings		
1.3 Distance To Tailings Pond (if applicable)	Variable	123	Adequate tailings beach against Central Dike, except south of Sta. 0+850, where water is ponding against the Central Dike and Saddle Dam 5.
1.4 Surface Cracking	None at time of inspection		
1.5 Unexpected Settlement	None observed		
1.6 Lateral Movement	Not apparent		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
1.7 Other Unusual Conditions			
2. UPSTREAM SLOPE		114, 115, 117, 118, 119, 120, 121, 122, 123	
2.1 Slope angle	3:1V up to El. 130 m and 2H:1V above		
2.2 Signs of Erosion	None observed		
2.3 Signs of Movement (Deformation)	None observed		
2.4 Cracks	None observed		
2.5 Face liner condition (if applicable)		121, 122	Liner covered by a granular protection layer up to El. 128 m and well protected underneath deposition fingers. Presence of gravel on the liner at Sta. 0+750 m and of a metallic pipe at Sta. 1+000 m.
2.6 Other Unusual Conditions	None		
3. DOWNSTREAM SLOPE		124, 125	
3.1 Slope angle	1.5H		
3.2 Signs of Erosion	None observed		
3.3 Signs of Movement (Deformation)	None observed		
3.4 Cracks	None observed		
3.5 Seepage or Wet Areas			
3.6 Vegetation Growth	None observed		
3.7 Other Unusual Conditions	None		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
4. DOWNSTREAM TOE AREA		124, 125	
4.1 Seepage from Dam	Yes	125	Presence of a water pond formed by seepage on the downstream side between the downstream toe and West Road (0+300 to 0+830 approximately). The pond is pumped back to the South Cell and maintained at El. 115 m. The pumping rate was 308 m^3/hr at the time of the inspection.
4.2 Signs of Erosion	None observed		
4.3 Signs of Turbidity in Seepage Water	Yes		High turbidity events observed in the pond and an orange coloration was observed periodically.
4.4 Discoloration/staining	No		
4.5 Outlet operating problem (if applicable)	Not applicable		
4.6 Other Unusual Conditions			
5. ABUTMENTS			
5.1 Seepage at contact zone (abutment/embankment)	None observed		
5.2 Signs of Erosion	None observed		
5.3 Excessive Vegetation	No		
5.4 Presence of Rodent Burrows	None observed		
5.5 Other Unusual Conditions	None		

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
6. RESERVOIR		114, 115, 116, 117, 118, 119, 122, 123	
6.1 Stability of Slopes	Stable		
6.2 Distance to Nearest Slide	None observed		
6.3 Estimate of Slide Volume (if applicable)	Not applicable		
6.4 Floating debris	None observed		
6.5 Other Unusual Conditions	None		
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE	No spillway or outlet structure exists, only dewatering pump.		
7.1 Surface Condition			
7.2 Signs of Erosion			
7.3 Signs of Movement (Deformation)			
7.4 Cracks			
7.5 Settlement			
7.6 Presence of Debris or Blockage			
7.7 Closure mechanism operational			
7.8 Slope Protection			
7.9 Instability of Side Slopes			
7.10 Other Unusual Conditions			

INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
8. INSTRUMENTATION			
8.1 Piezometers	Yes		See Section 5.0 of the report.
8.2 Settlement Cells	No		
8.3 Thermistors	Yes		See Section 5.0 of the report.
8.4 Settlement Monuments	No		
8.5 Seismograph	No		
8.6 Inclinometer	No		
8.7 Weirs and Flow Monitors	No		
8.8 Data logger(s)	Yes		
8.9 Other			
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Plan			
9.1.1 OMS Plan exists	Yes		
9.1.2 OMS Plan reflects current dam conditions	Yes		
9.1.3 Date of last revision	March 2019		
9.2 Emergency Preparedness Plan (EPP)			
9.2.1 EPP exists	Yes		
9.2.2 EPP reflects current conditions	Yes		
9.2.3 Date of last revision	January 2018		

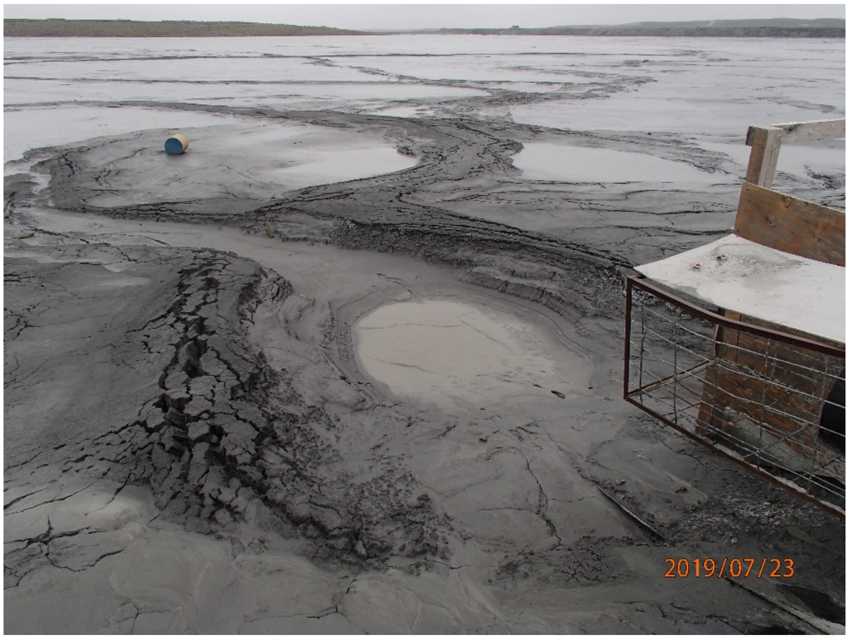
INSPECTION ITEM	OBSERVATIONS DATA	PHOTO	COMMENTS & OTHER DATA
10. NOTES :			
Inspector's Signature	Yves Boulianne	**Date:**	July 23, 2019

Photograph B7-1 Central Dike and Saddle Dam 5

Date: July 23, 2019 **Photo Number**: 114
Description: From approximately Sta. 0+525 looking northwest at the upstream slope. Adequate tailings beach against the south section of the structure.

Photograph B7-2 Central Dike and Saddle Dam 5

Date: July 23, 2019 **Photo Number**: 115
Description: From approximately Sta. 0+525 looking southwest at the upstream slope. Adequate tailings beach against the south section of the structure.



Photograph B7-3 Central Dike and Saddle Dam 5

Date: July 23, 2019 **Photo Number**: 116

Description: From approximately Sta. 0+525 looking at the deposition finger. The LLDPE liner is well protected and the tailing beach against the structure is adequate.

Photograph B7-4 Central Dike and Saddle Dam 5

Date: July 23, 2019 **Photo Number**: 120

Description: From approximately Sta. 0+720 looking southeast at the crest and upstream slope.

Photograph B7-5 Central Dike and Saddle Dam 5

Date: July 23, 2019 **Photo Number**: 118

Description: From approximately Sta. 0+720 looking northeast at the crest and upstream slope.

Photograph B7-6 Central Dike and Saddle Dam 5

Date: July 23, 2019 **Photo Number**: 119

Description: From approximately Sta. 0+720 looking south at the upstream slope.

Photograph B7-7 Central Dike and Saddle Dam 5

Date: July 23, 2019 **Photo Number**: 117

Description: From approximately Sta. 0+720 looking north at the upstream slope.

Photograph B7-8 Central Dike and Saddle Dam 5

Date: July 23, 2019 **Photo Number**: 121

Description: From approximately Sta. 0+800 on the crest, looking at the upstream slope. Granular material is present on the LLDPE liner.

Photograph B7-9 Central Dike and Saddle Dam 5

Date: July 23, 2019 **Photo Number**: 125

Description: From approximately Sta. 0+900 downstream, looking north at the downstream pond.

Photograph B7-10 Central Dike and Saddle Dam 5

Date: July 23, 2019 **Photo Number**: 122

Description: From approximately Sta. 1+000 looking north at the upstream slope of Central Dike and SD5. A metallic pipe is present on the LLDPE liner.

Photograph B7-11 Central Dike and Saddle Dam 5

Date: July 23, 2019 **Photo Number**: 123

Description: From approximately Sta. 1+000 looking southwest at the upstream slope of SD5.

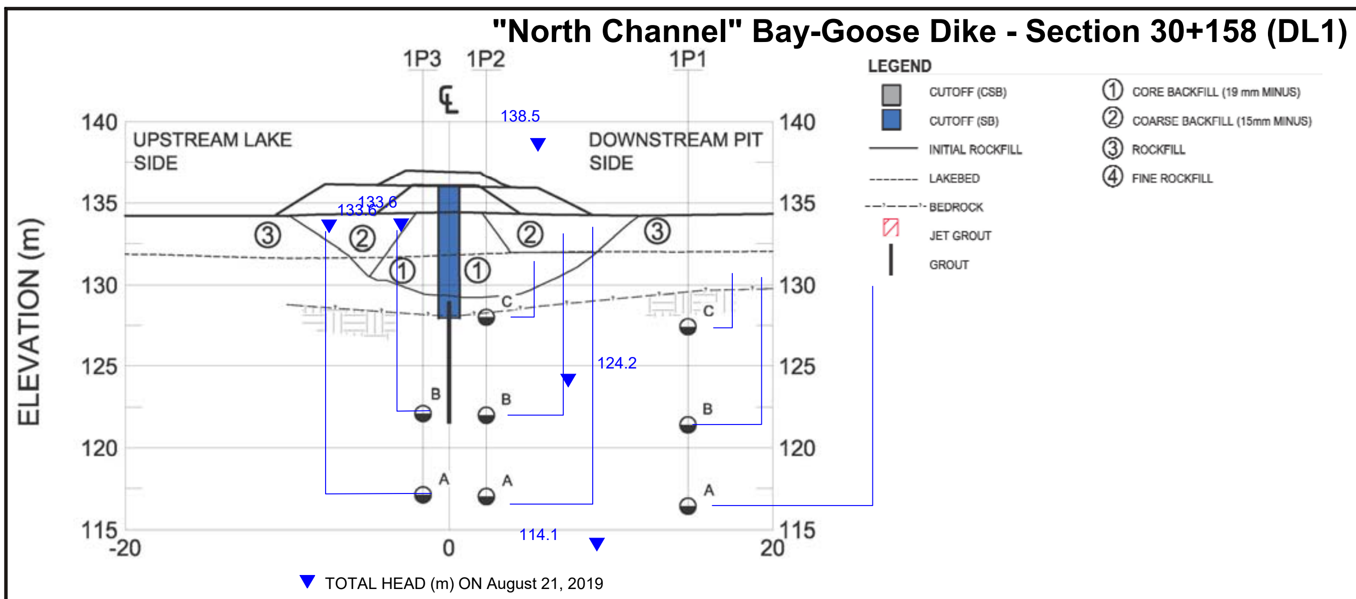
Photograph B7-12 Central Dike and Saddle Dam 5

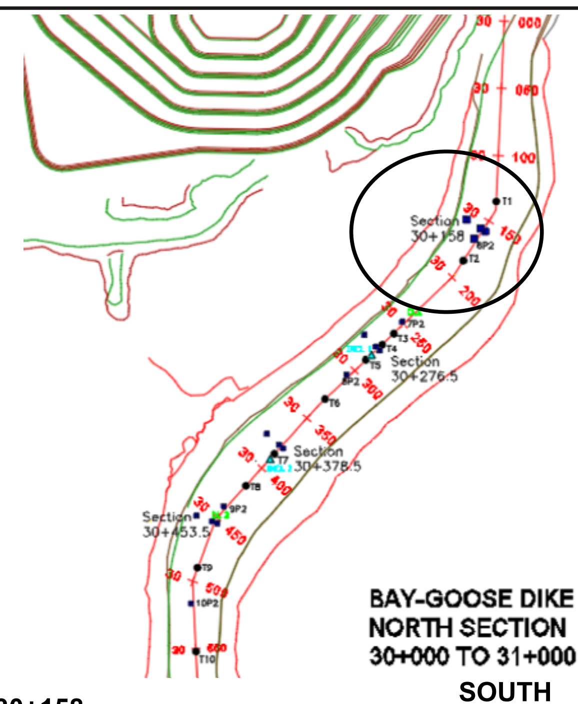
Date: July 23, 2019 **Photo Number**: 124

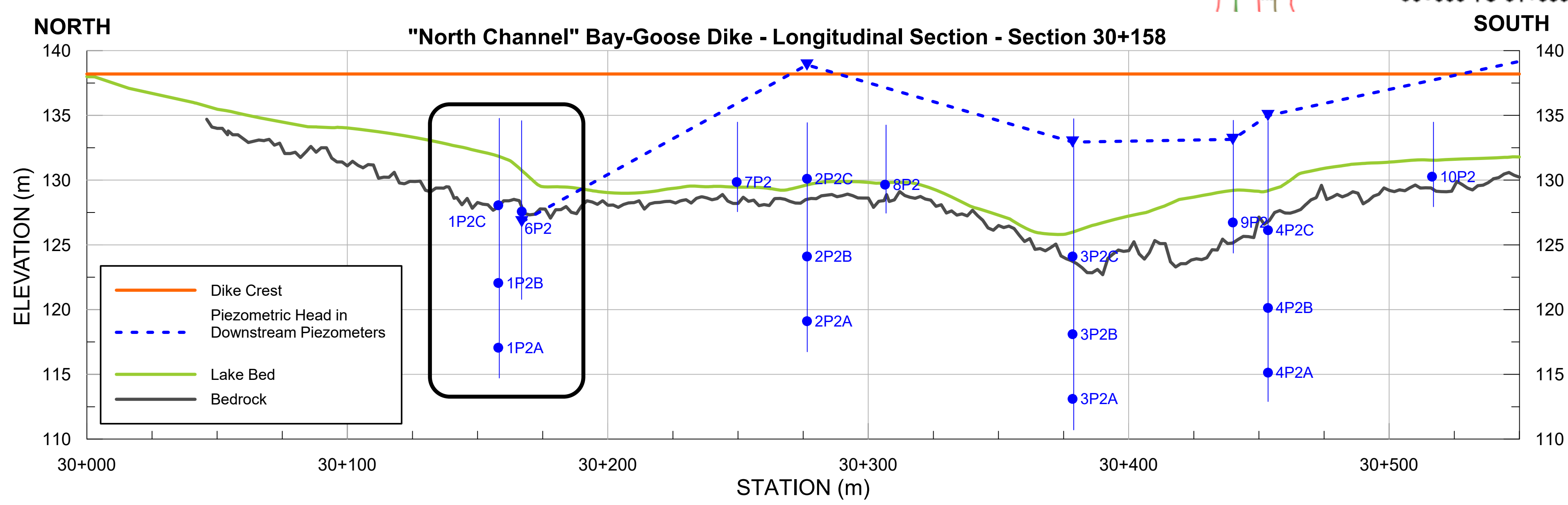
Description: From approximately Sta. 1+075 looking west at the upstream slope of SD5.

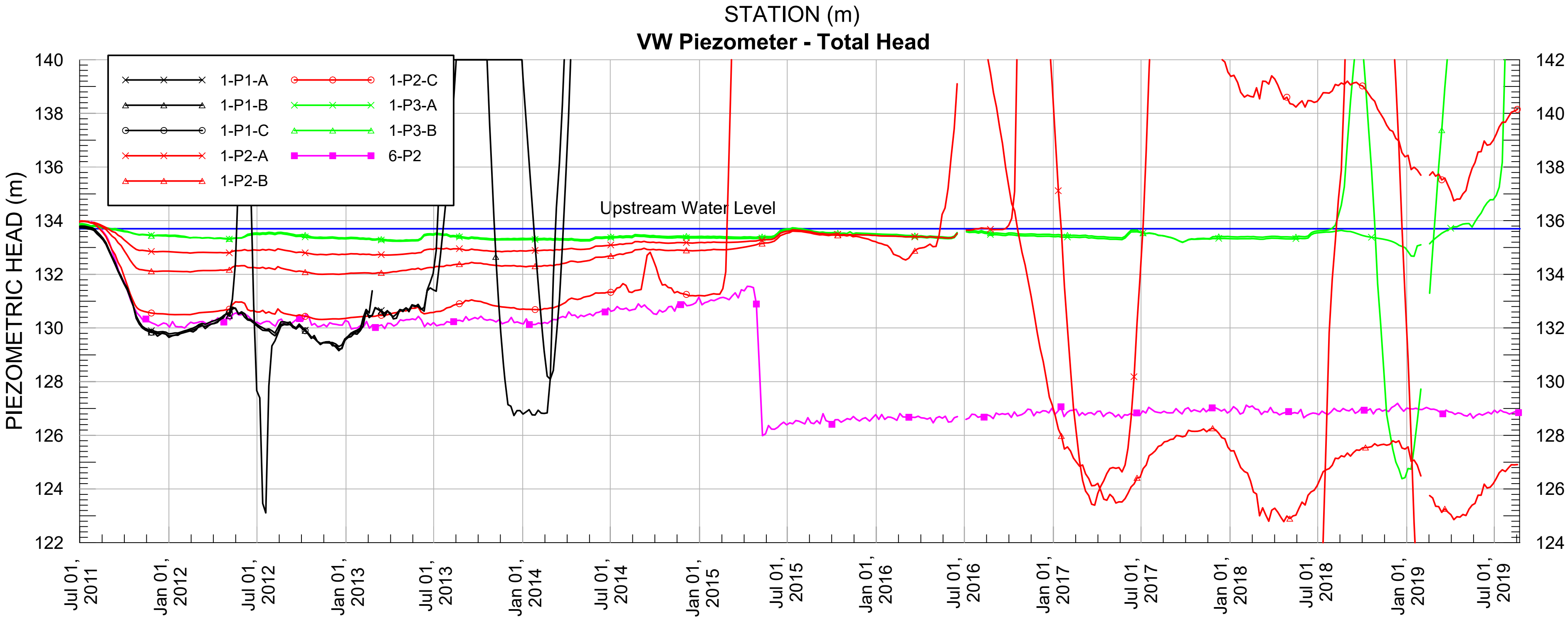
APPENDIX C

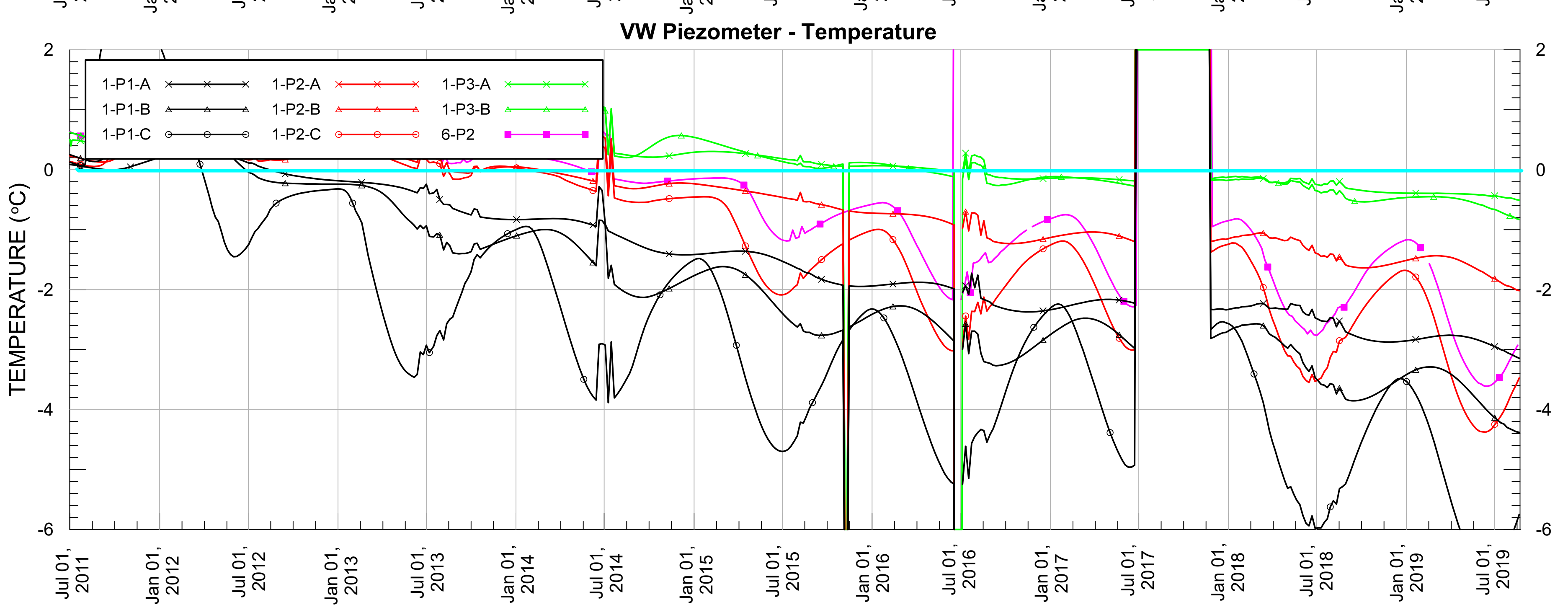
Instrumentation Data











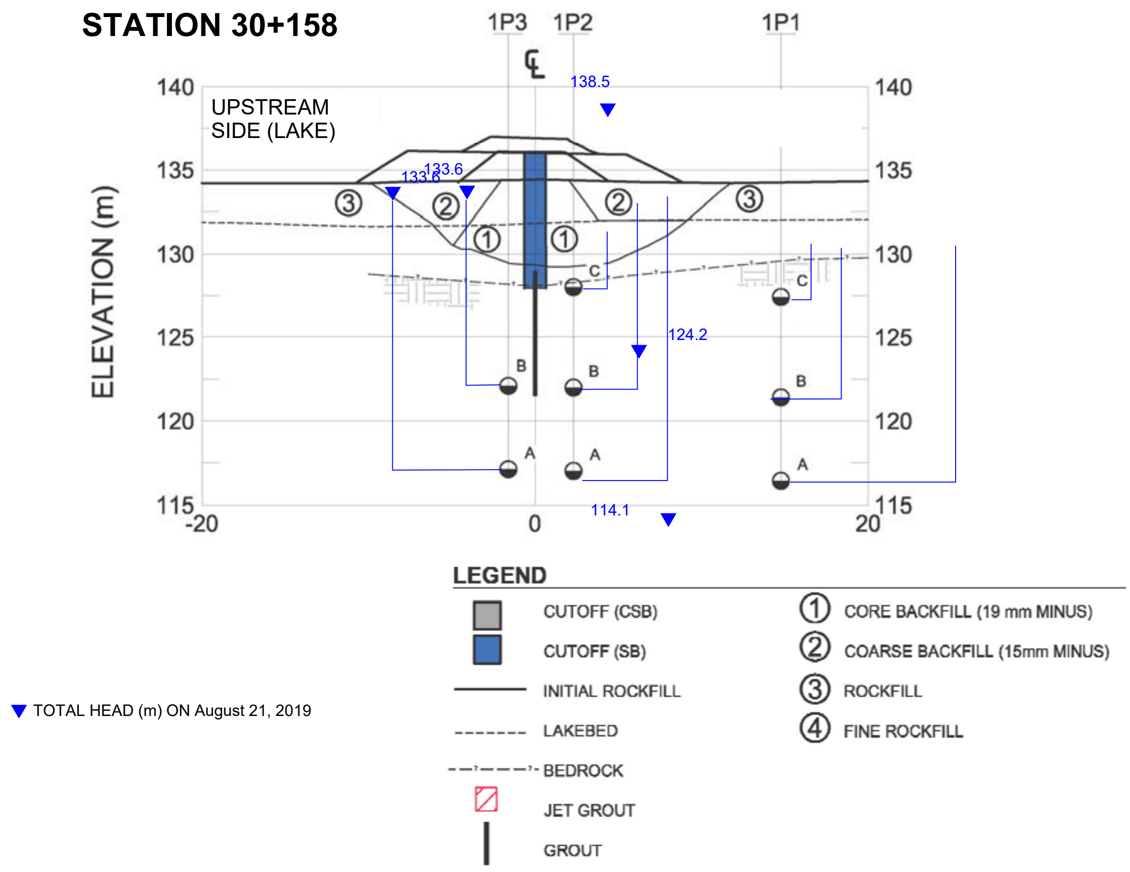
NOTES:

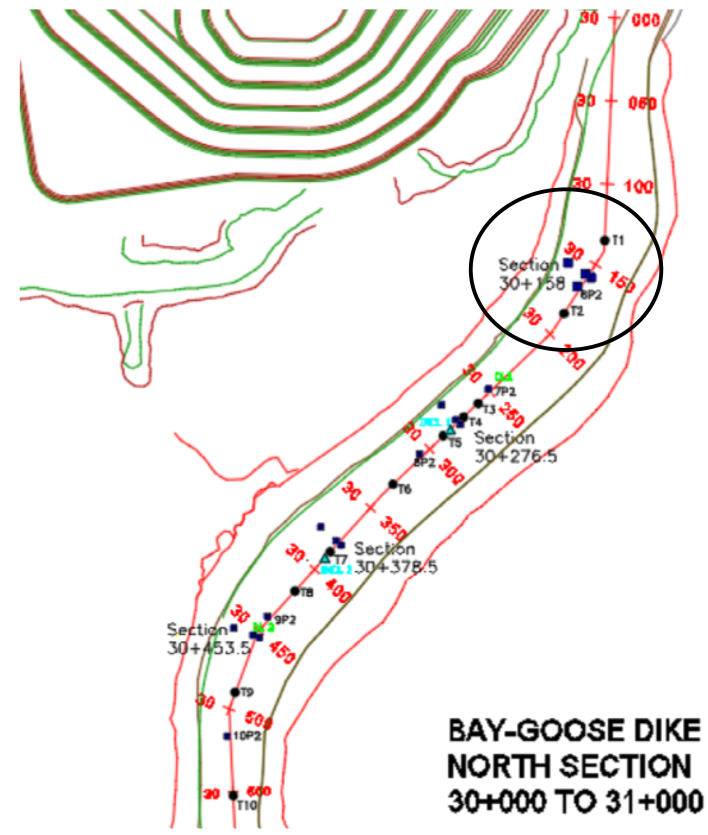
1. 1-P1-A, 1-P2-B,1-P1-C, 1-P2-C and 6P2 are assumed to been frozen and not giving good data. The PWP not considered reliable.

PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE Section 30+158 - PIEZOMETRIC DATA (July 1/11 to Aug 21/19)

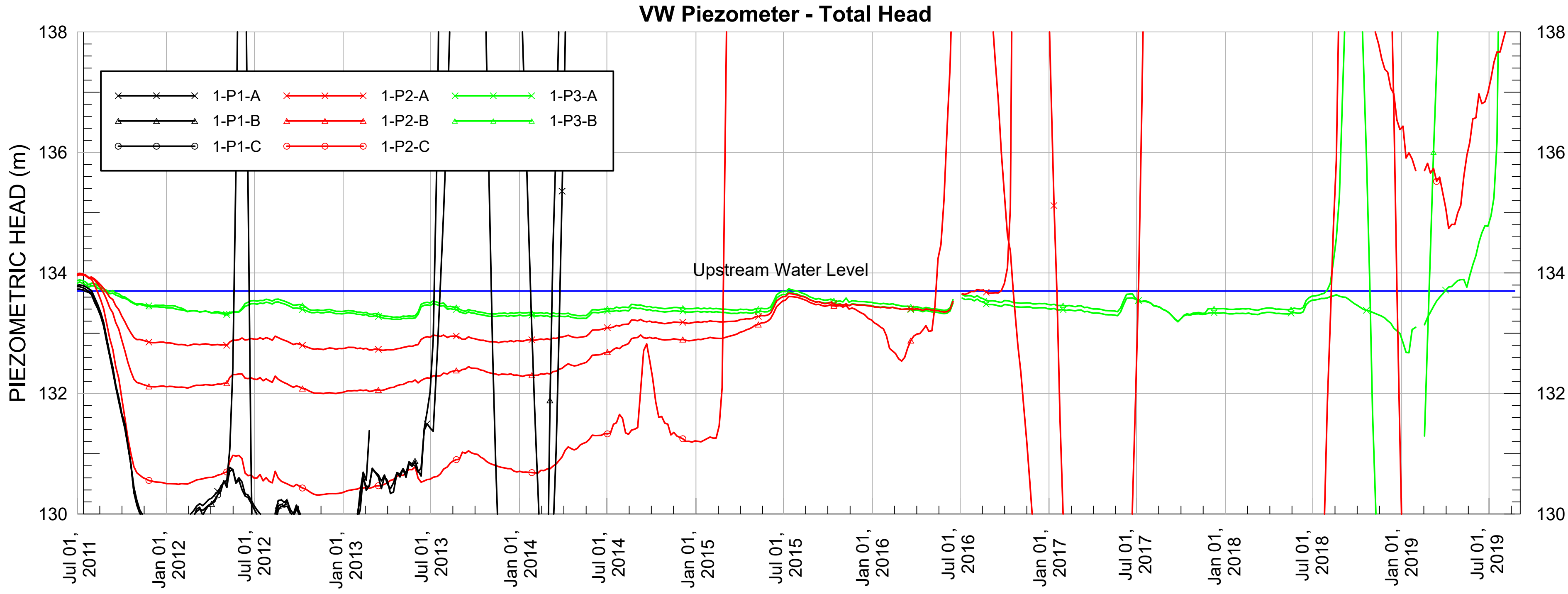
AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	30/8/14	SCALE AS SHOWN	REV.
CADD	TD	30/8/14	FIGURE 1	
CHECK	PG	31/8/14		
REVIEW				

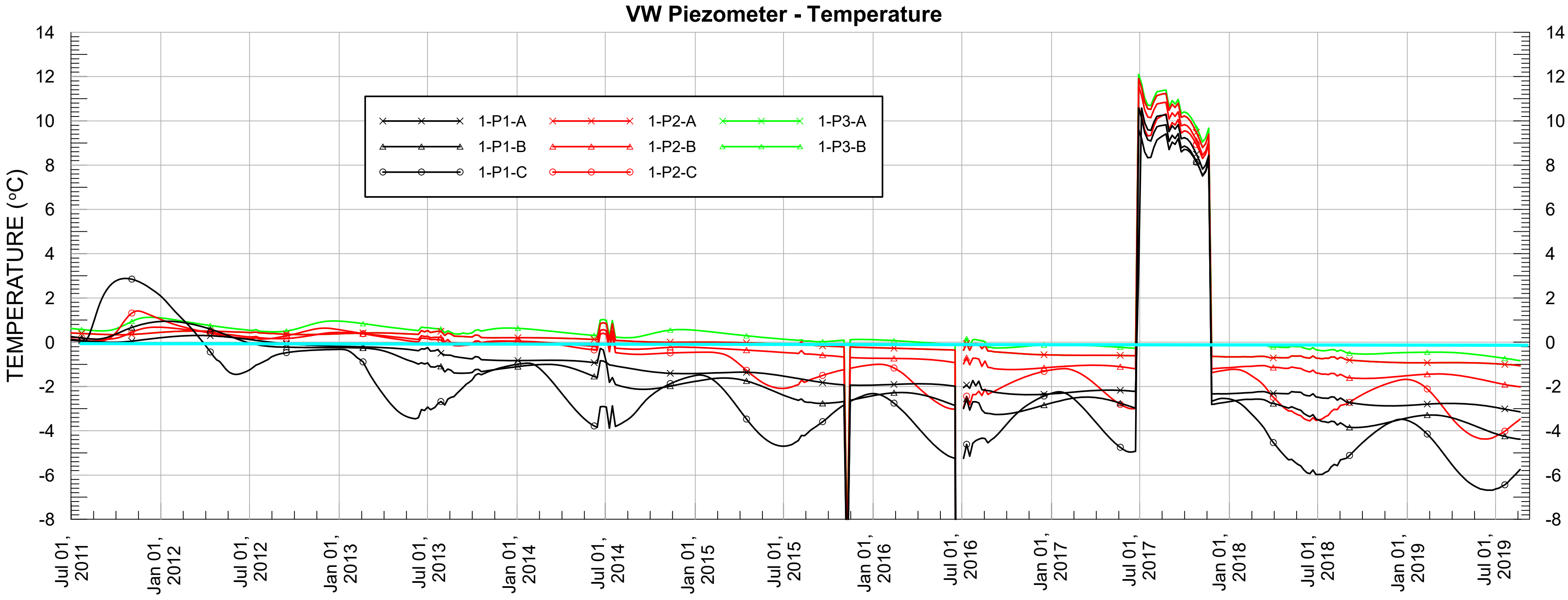




VW Piezometer - Total Head



VW Piezometer - Temperature



NOTES:

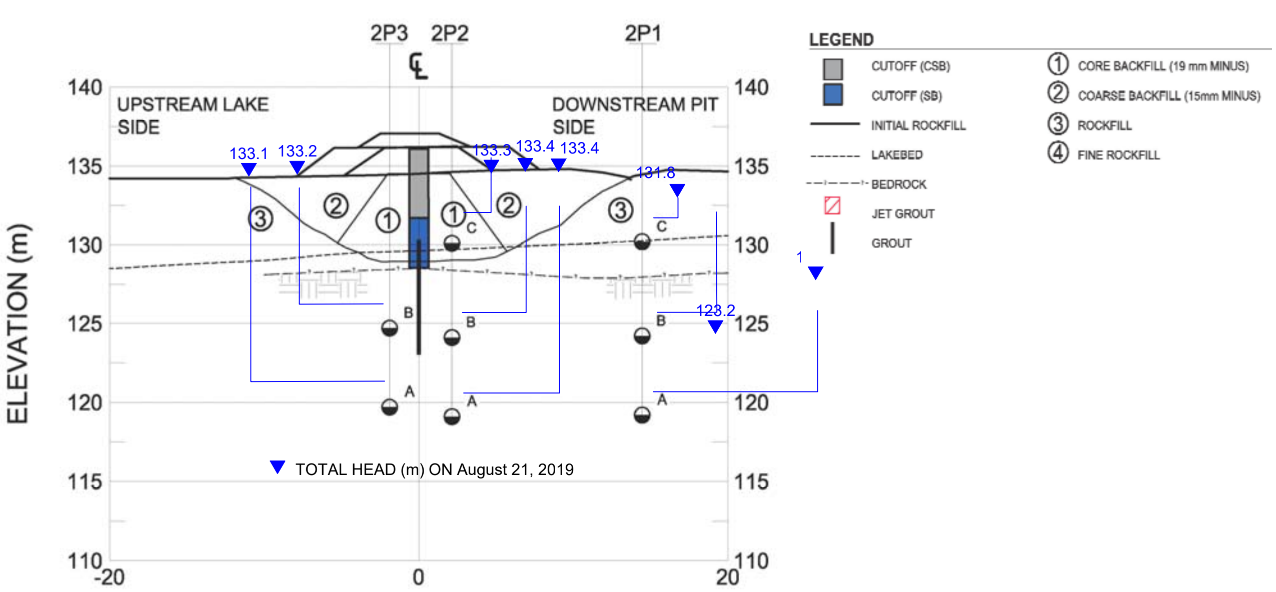
1. 1-P1-A, 1-P2-B,1-P1-C, 1-P2-A and 6P2 are assumed to been frozen and not giving good data. The PWP not considered to be reliable data.

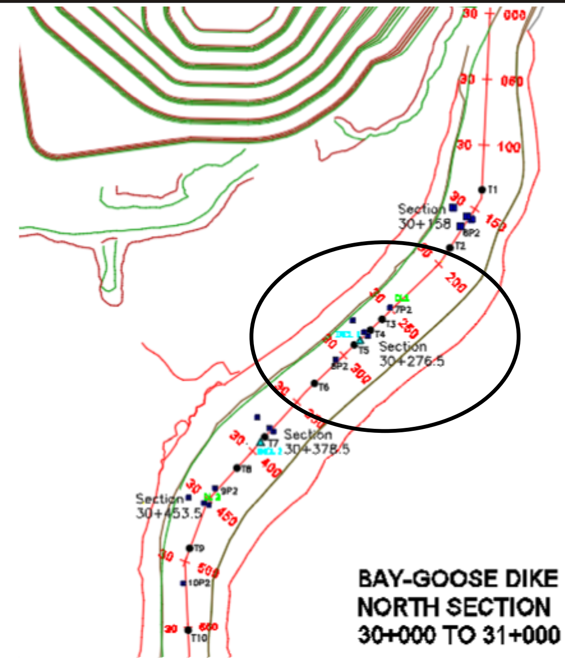
PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE - SECTION 30+158 PIEZOMETRIC DATA (July 1/11 to Aug 21/19)

AGNICO EAGLE MEADOWBANK

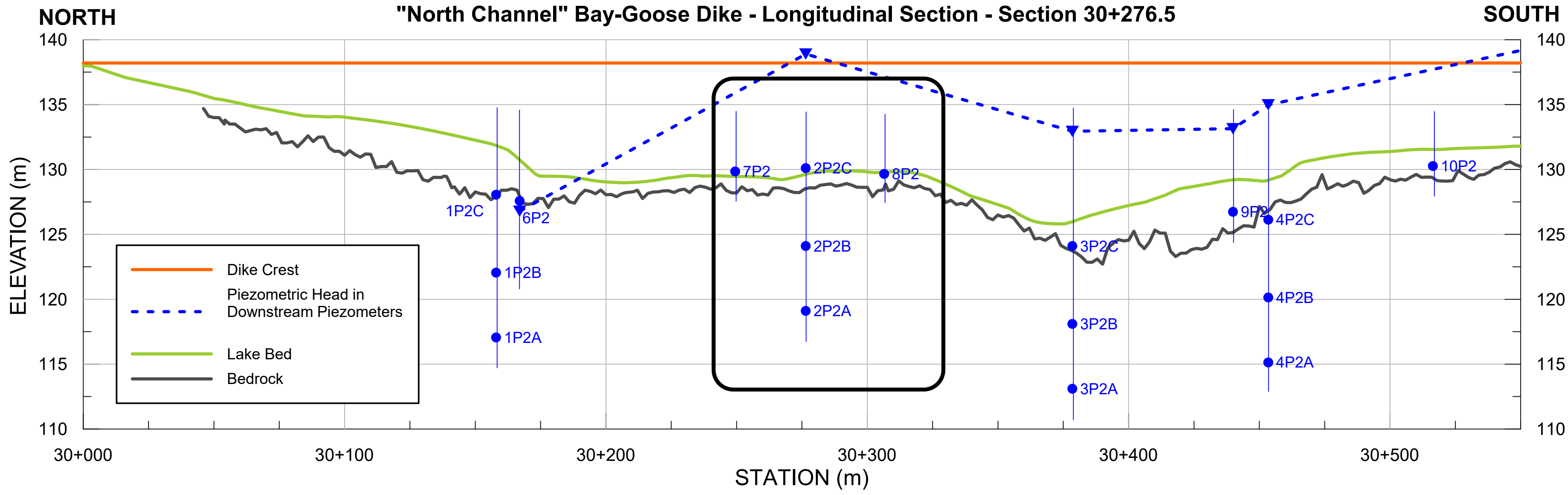
PROJECT No.			PHASE No.
DESIGN	TD	31AUG14	SCALE AS SHOWN REV.
CADD	TD	31AUG14	FIGURE 2
CHECK	PG	28AUG14	
REVIEW			

"North Channel" Bay-Goose Dike - Section 30+276.5 (DL1)

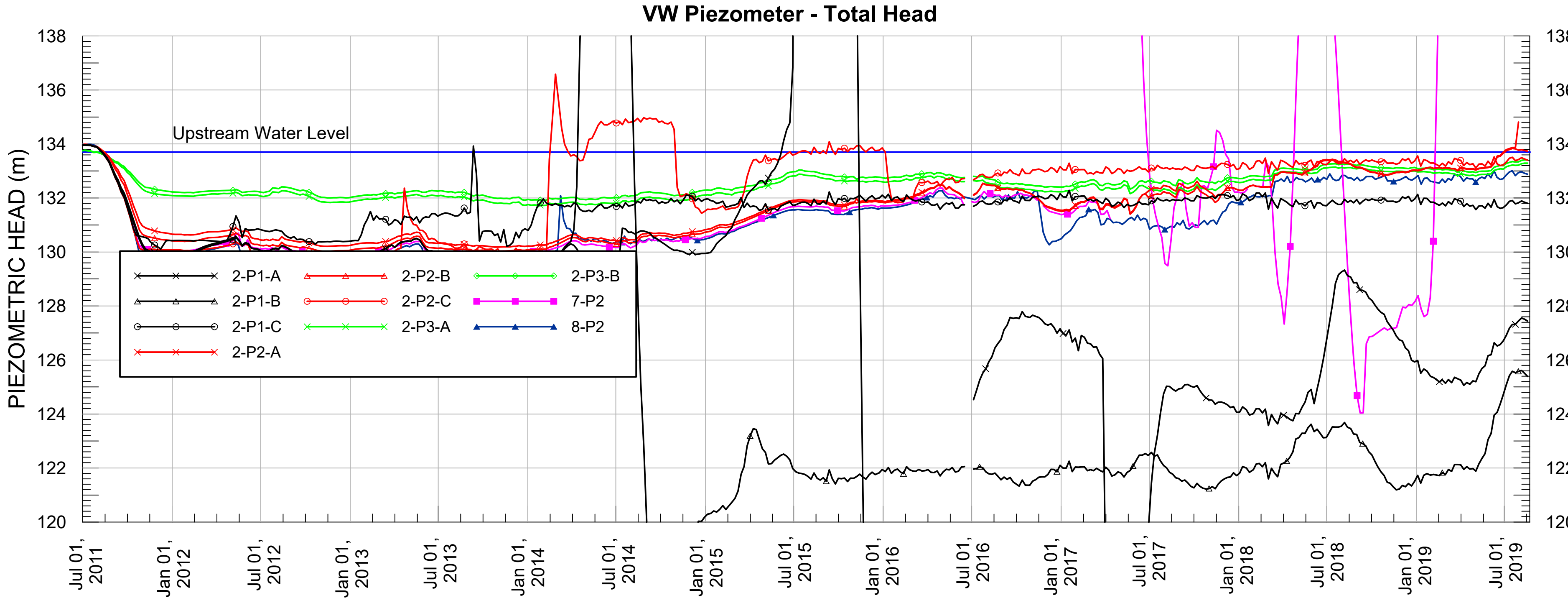




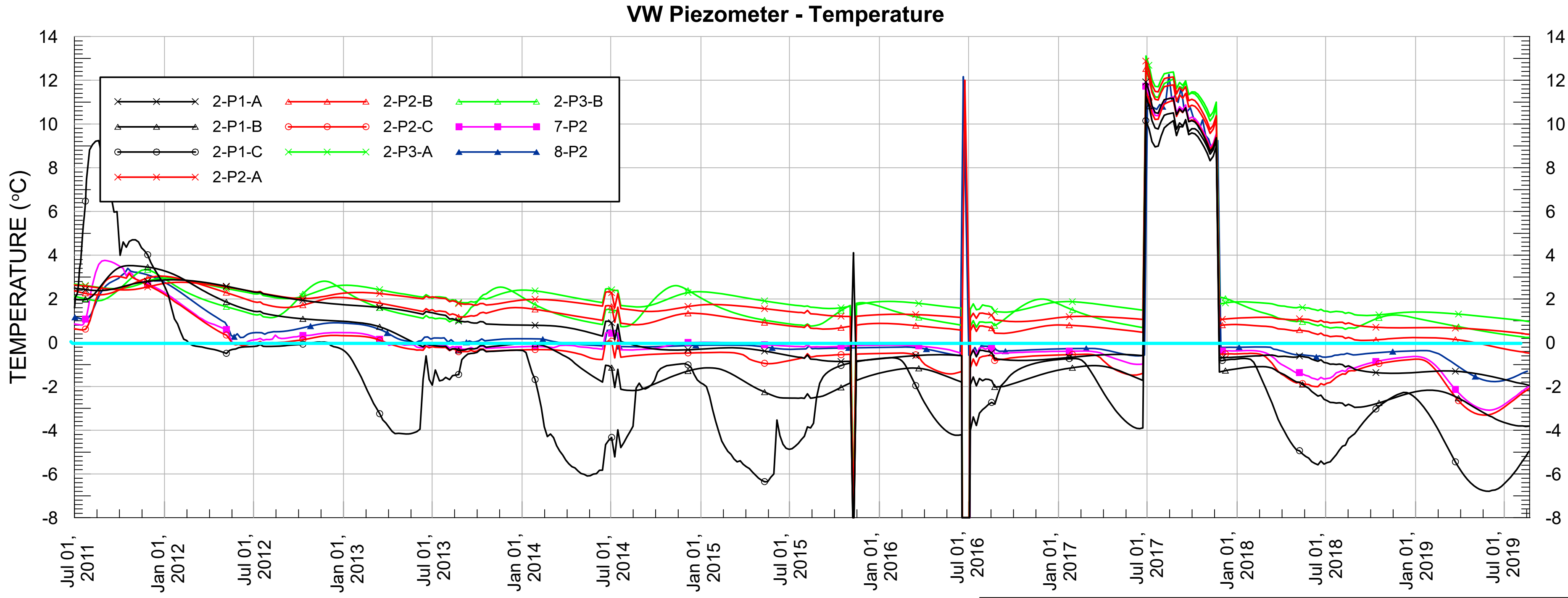
"North Channel" Bay-Goose Dike - Longitudinal Section - Section 30+276.5



VW Piezometer - Total Head



VW Piezometer - Temperature



NOTES:

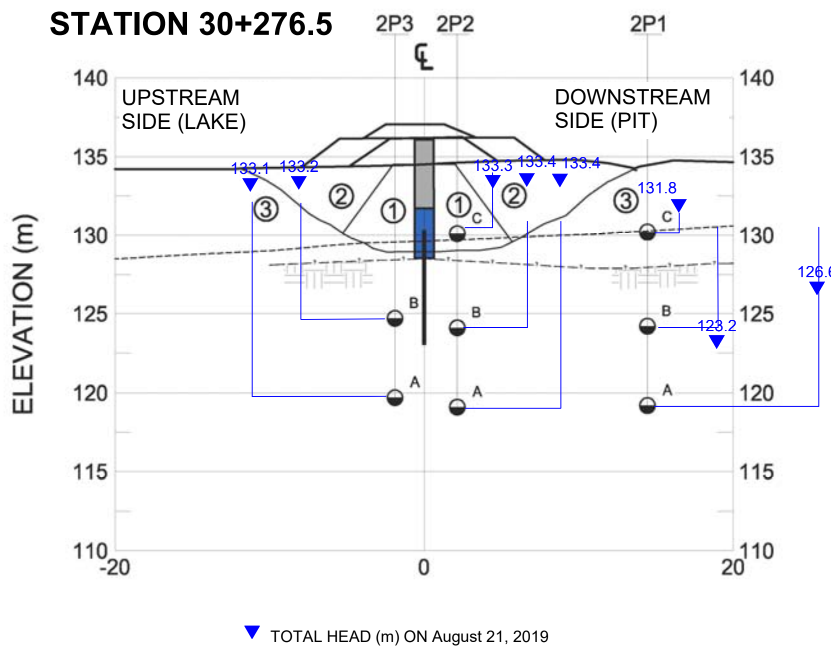
1: 2P1A, 2P1B and 2P2C are assumed to be frozen. 7P2 and 8P2 are also considered frozen therefore the data is considered not reliable as the previous trend shows.

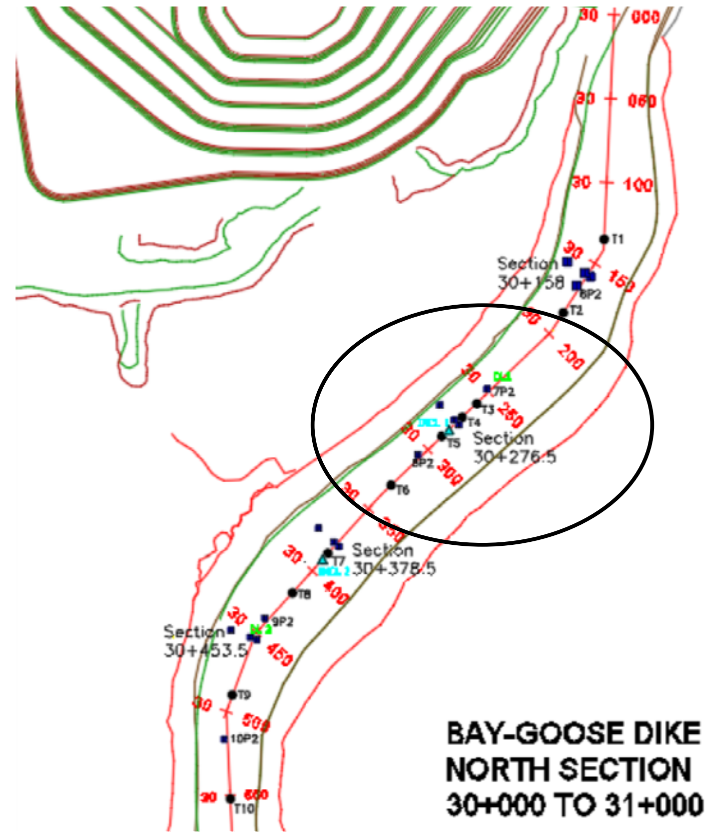
PROJECT: AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

TITLE: **BAYGOOSE DIKE**
Section 30+276.5 - PIEZOMETRIC DATA
(July 1/11 to Aug 21/19)

AGNICO EAGLE
MEADOWBANK

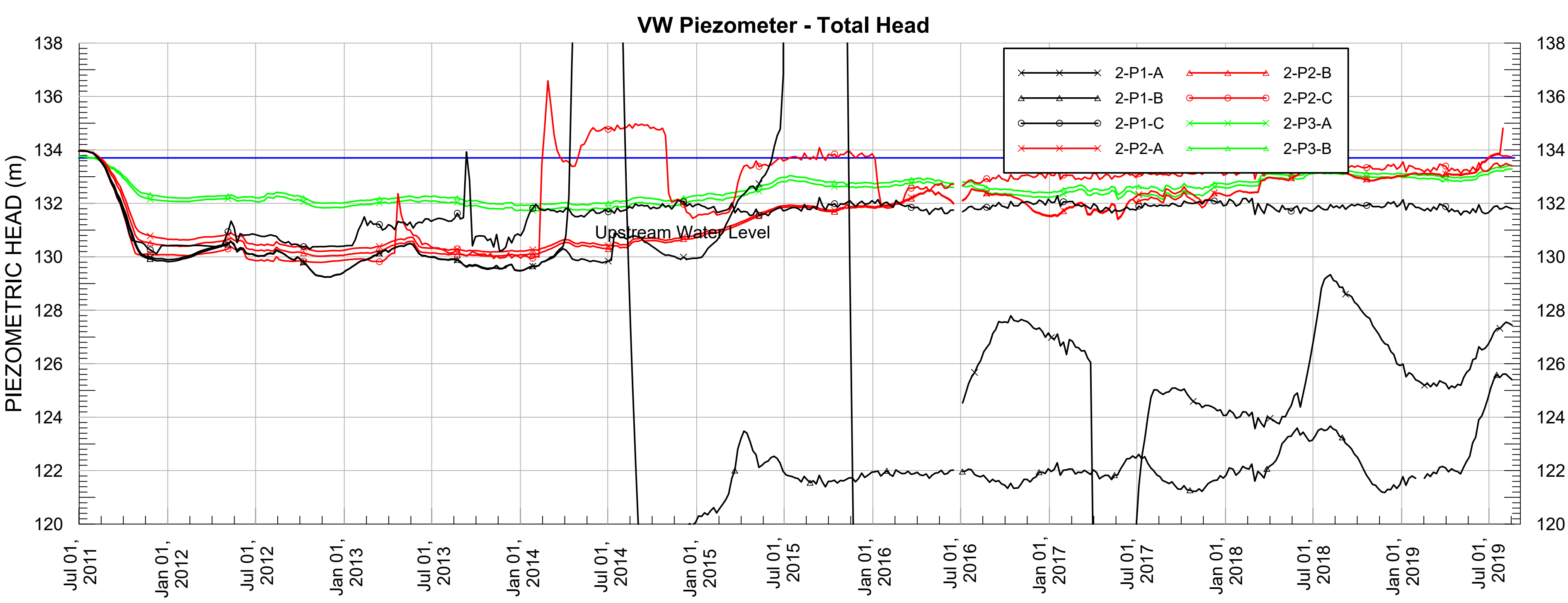
PROJECT No.			PHASE No.	
DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
CADD	TD	28AUG14	**FIGURE 3**	
CHECK	PG	28AUG14		
REVIEW				

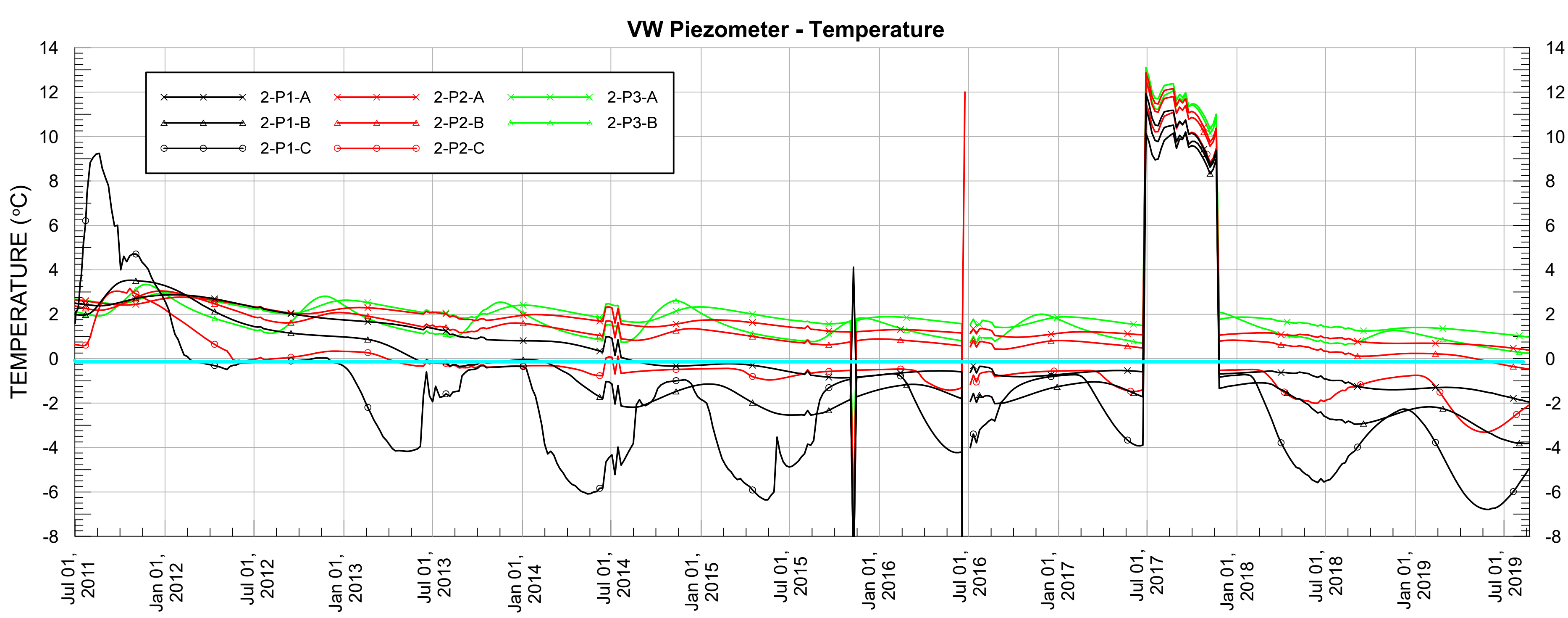




LEGEND

CUTOFF (CSB)	① CORE BACKFILL (19 mm MINUS)
CUTOFF (SB)	② COARSE BACKFILL (15mm MINUS)
INITIAL ROCKFILL	③ ROCKFILL
LAKEBED	④ FINE ROCKFILL
BEDROCK	
JET GROUT	
GROUT	





NOTES:

1. 2P1A, 2P1B and 2P2C are assumed to be frozen. 7P2 is also frozen therefore the instrument is not giving reliable data.

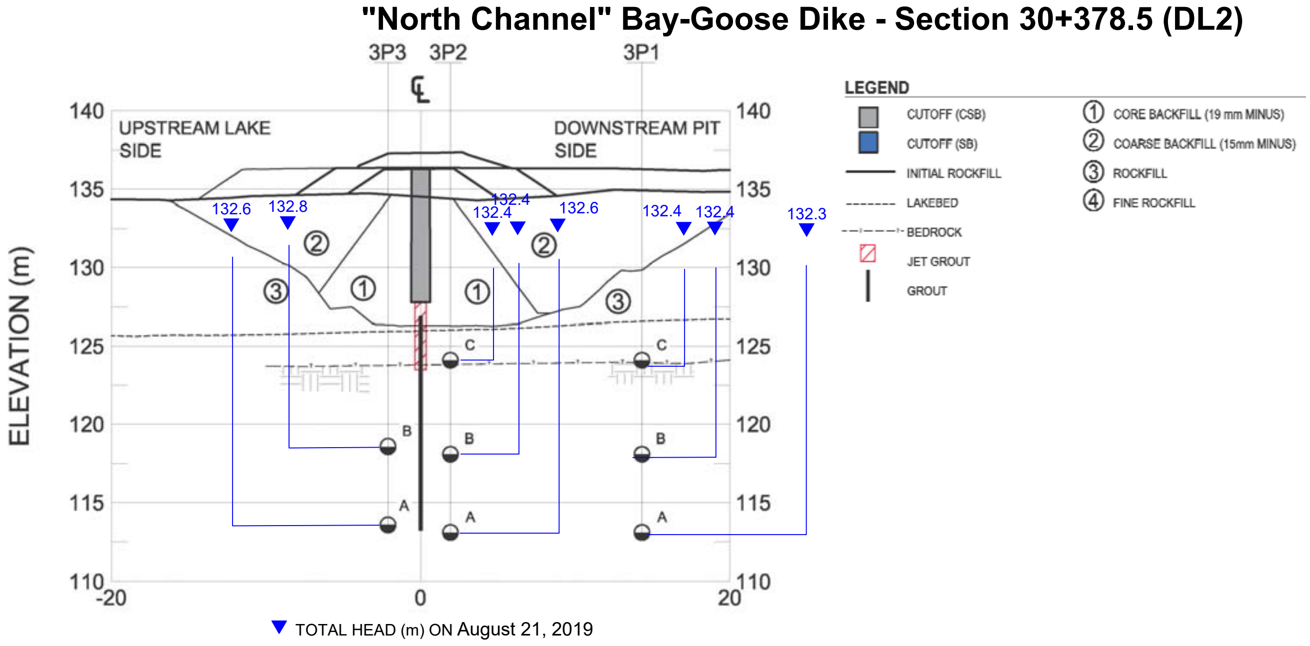
PROJECT: AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

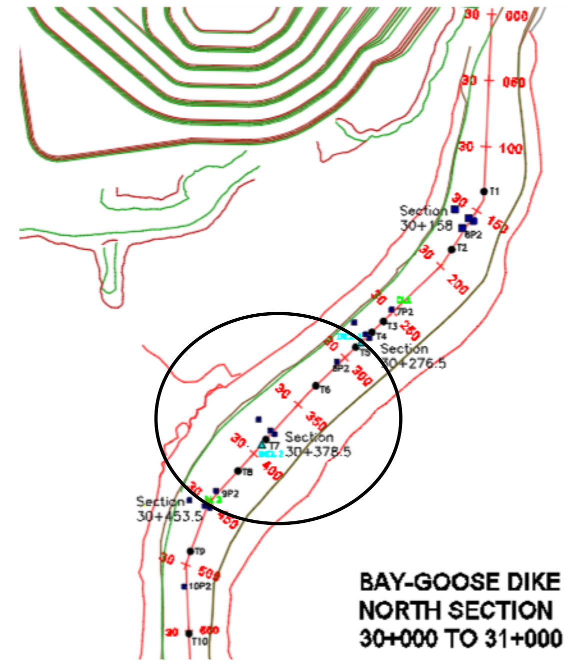
TITLE: **BAY GOOSE DIKE - SECTION 30+276.5**
PIEZOMETRIC DATA
(July 1/11 to Aug 21/19)

AGNICO EAGLE
MEADOWBANK

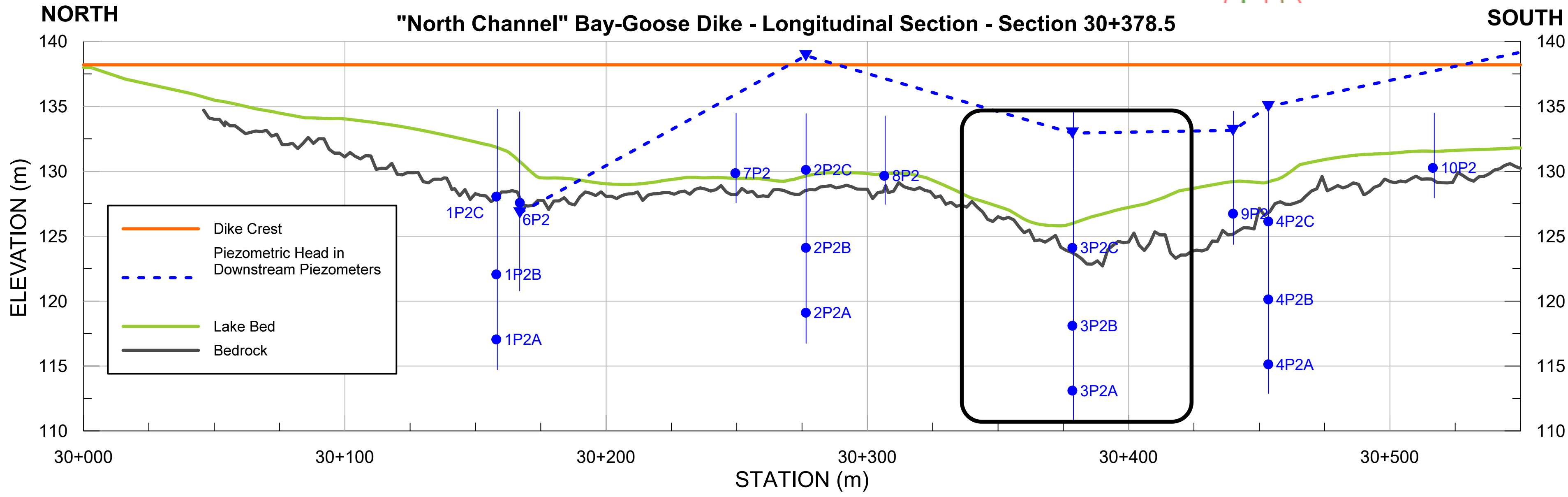
PROJECT No.			PHASE No.
DESIGN	TD	28AUG14	SCALE AS SHOWN REV.
CADD	TD	28AUG14	
CHECK	PG	28AUG14	**Figure 4**
REVIEW			

"North Channel" Bay-Goose Dike - Section 30+378.5 (DL2)

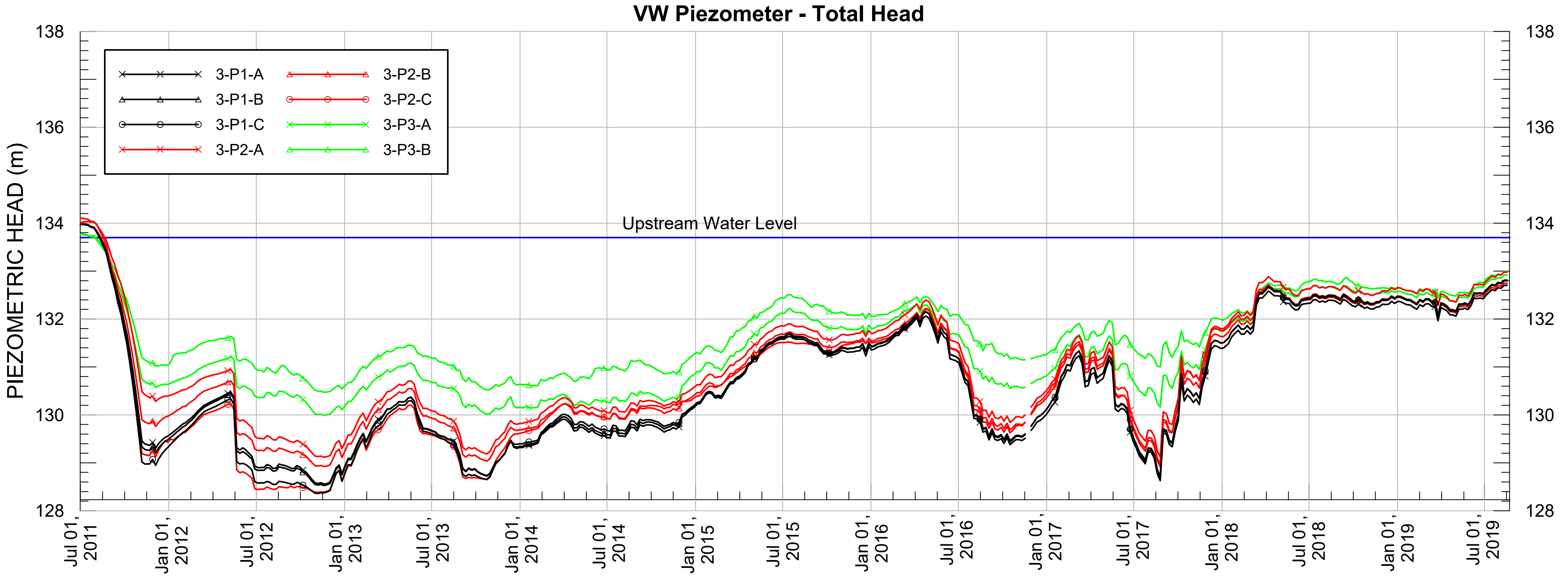




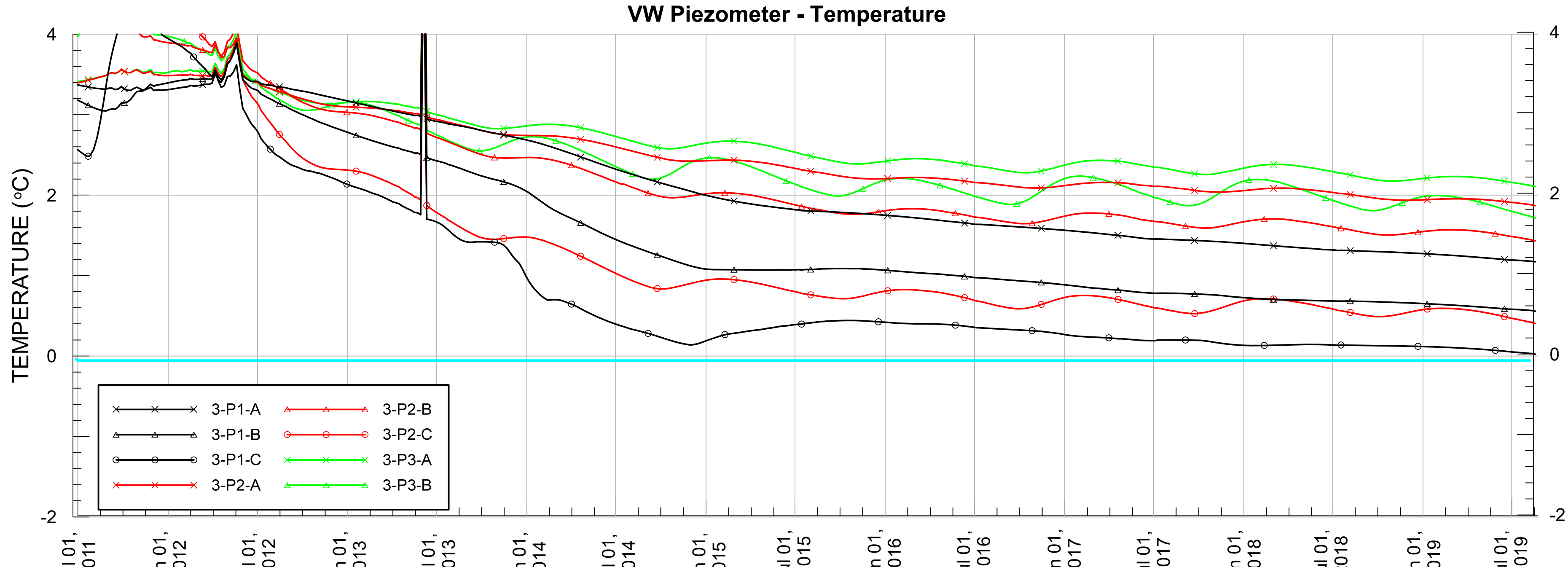
"North Channel" Bay-Goose Dike - Longitudinal Section - Section 30+378.5



VW Piezometer - Total Head



VW Piezometer - Temperature



NOTES:

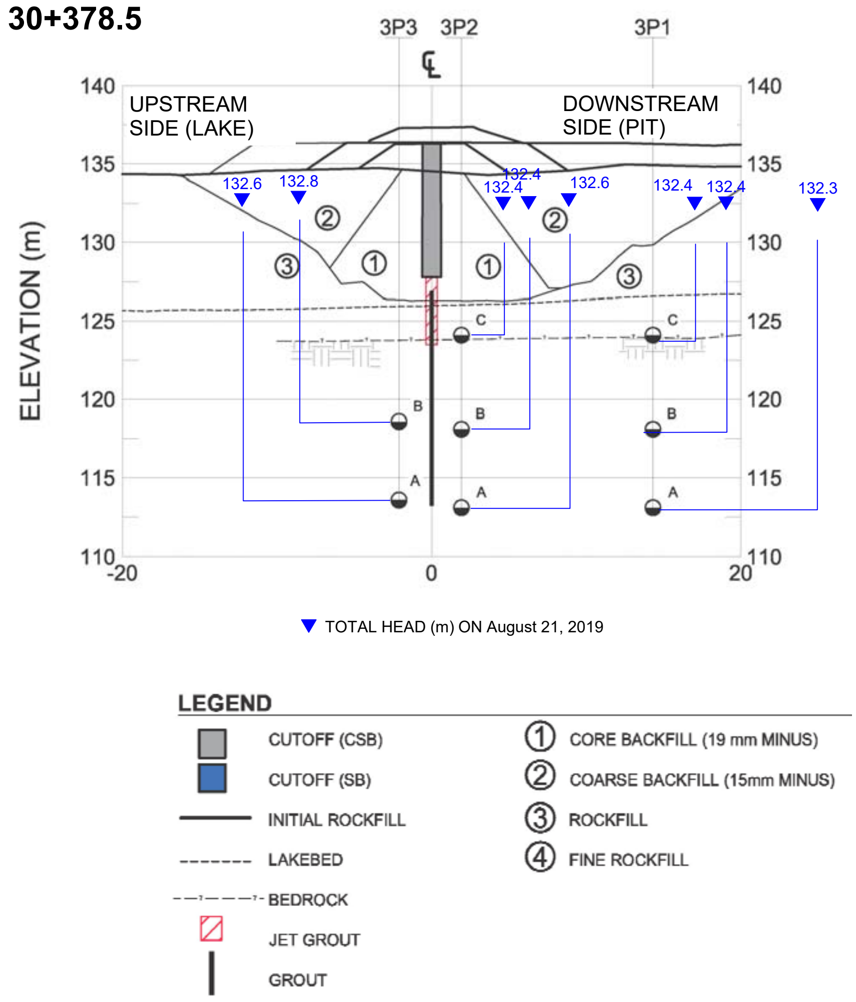
1. Changes in PWP pressure are directly related to the drill and blasting that is currently ongoing in Portage Pit E5. Ice buildup is also a factor.

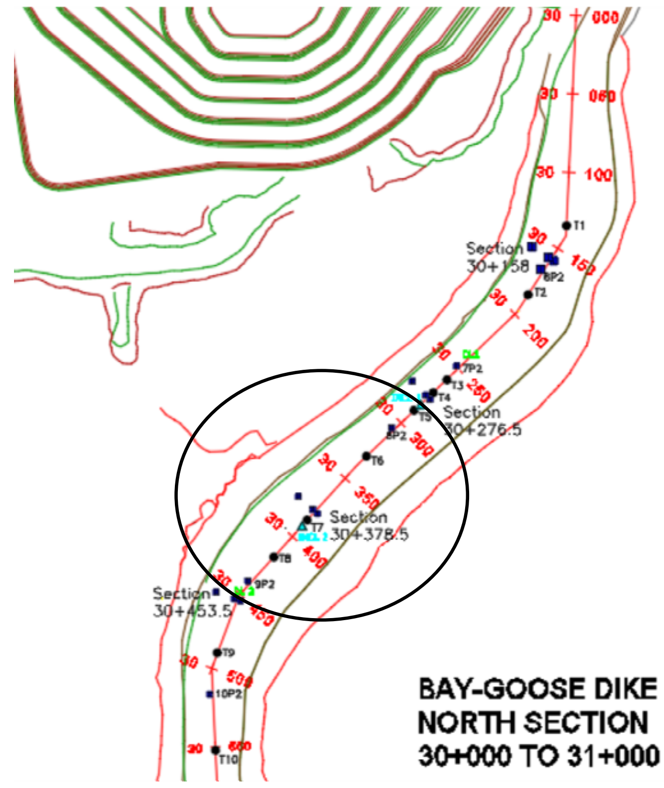
PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE Section 30+378.5 - PIEZOMETRIC DATA (July 1/11 to Aug 21/19)

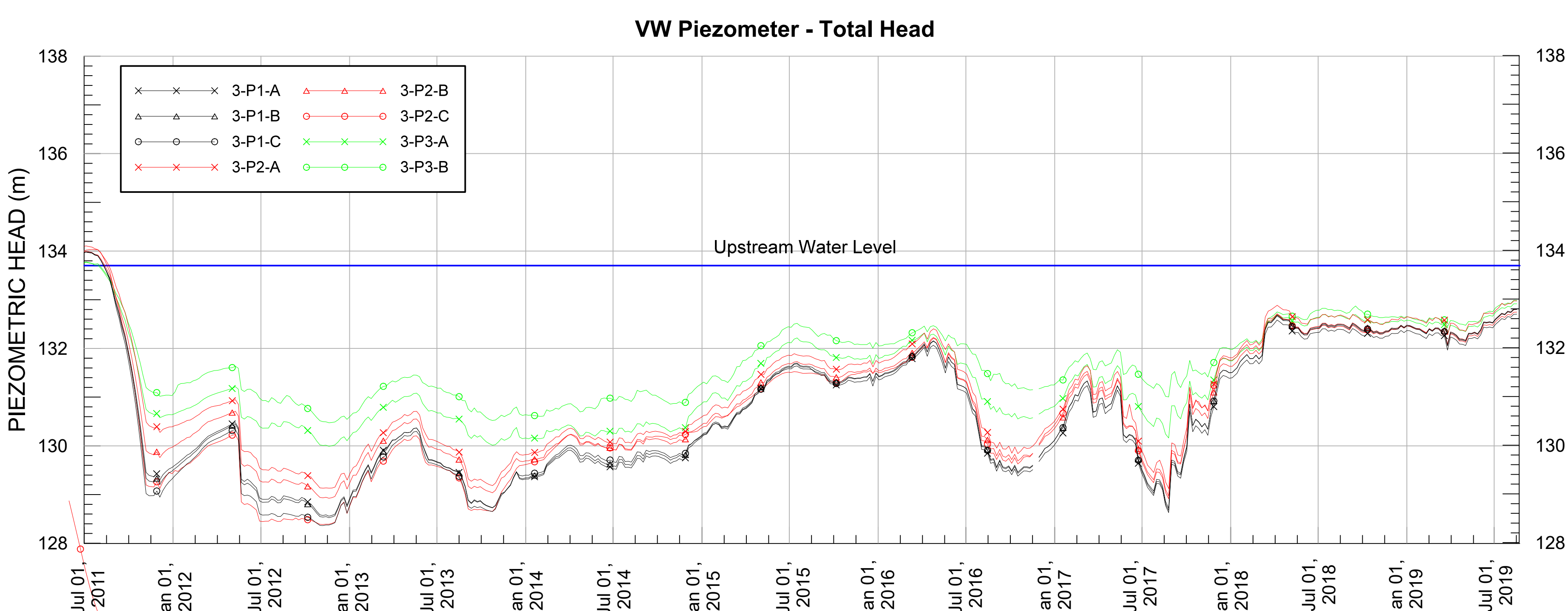
AGNICO EAGLE MEADOWBANK

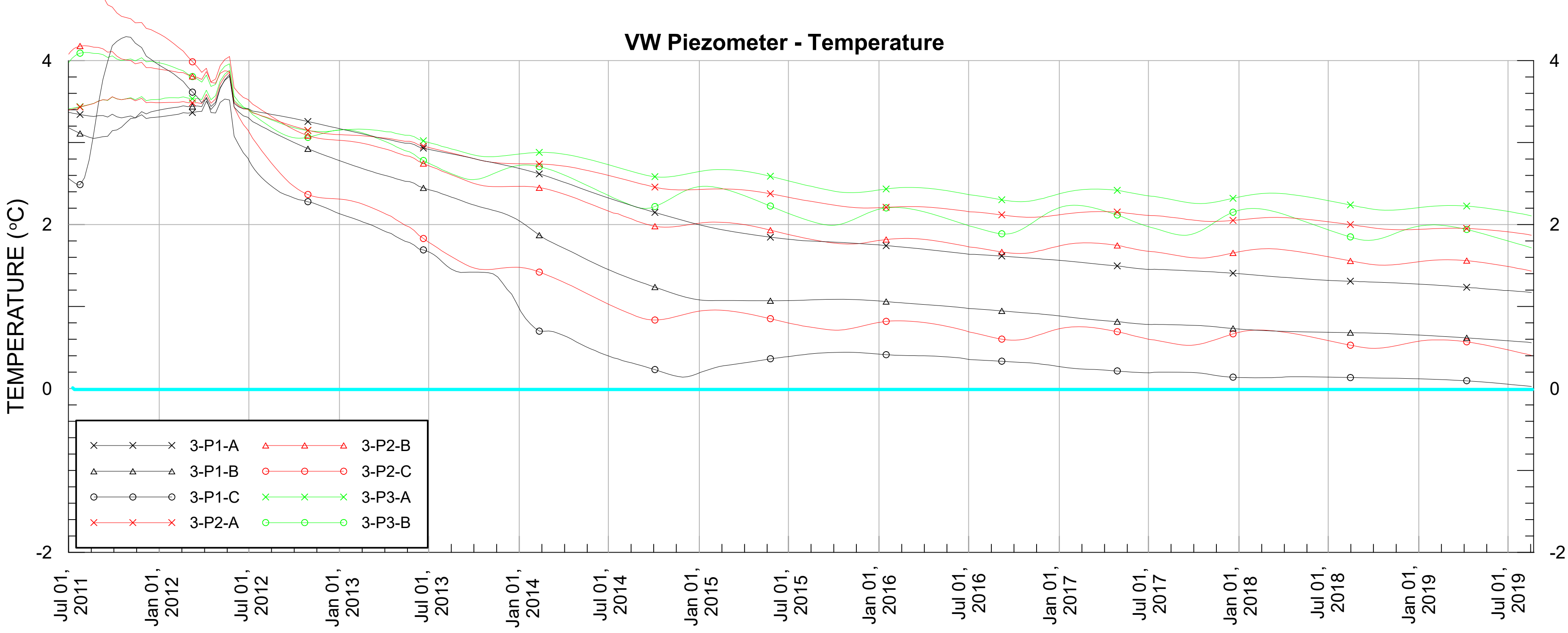
PROJECT No.			PHASE No.
DESIGN	TD	28AUG14	SCALE AS SHOWN REV.
CADD	TD	28AUG14	FIGURE 5
CHECK	PG	28AUG14	
REVIEW			

STATION 30+378.5









NOTES:

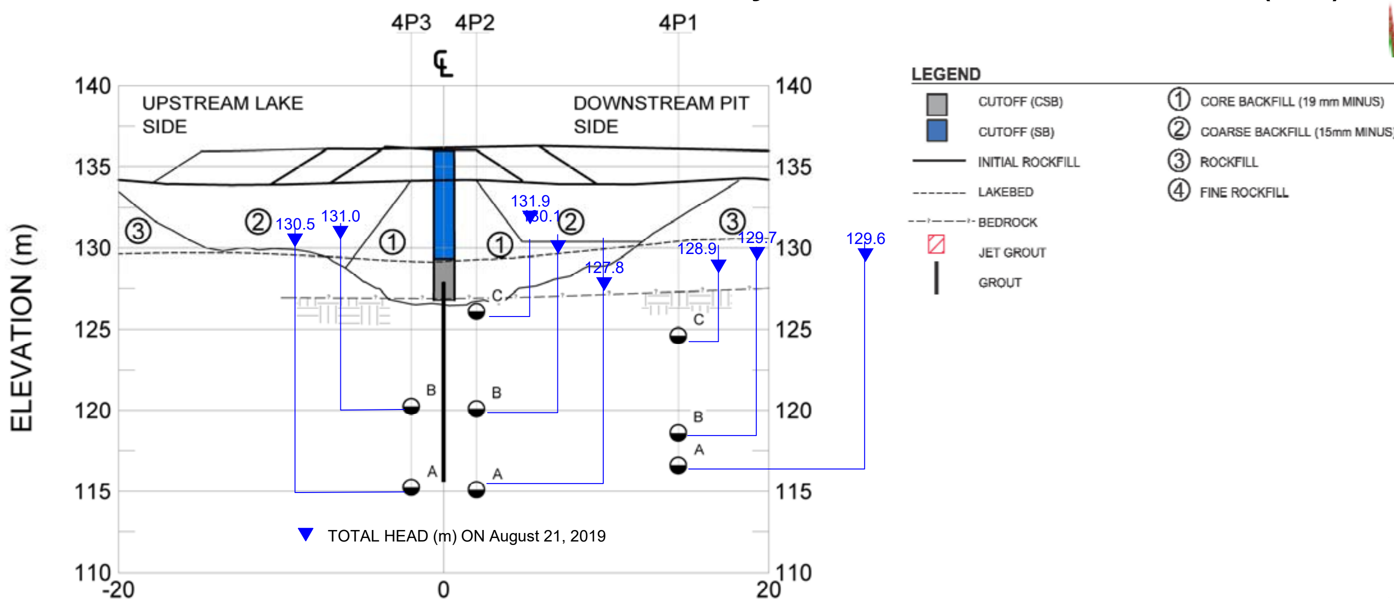
1. Changes in PWP pressure are directly related to the drill and blasting that is currently ongoing in Portage Pit E5. Ice buildup is also a factor.

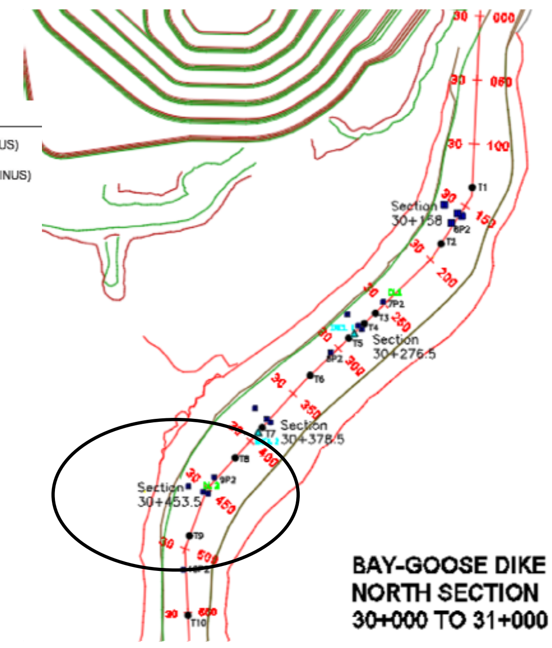
PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE - SECTION 30+378.5 PIEZOMETRIC DATA (July 1/11 to Aug 21/19)

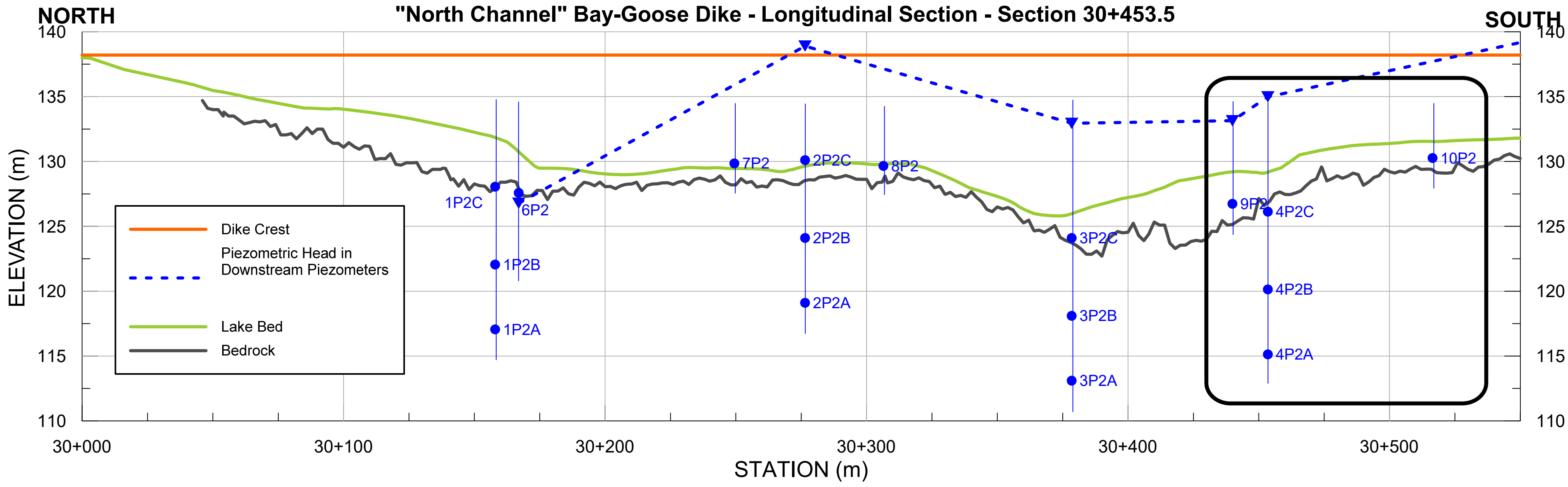
AGNICO EAGLE MEADOWBANK

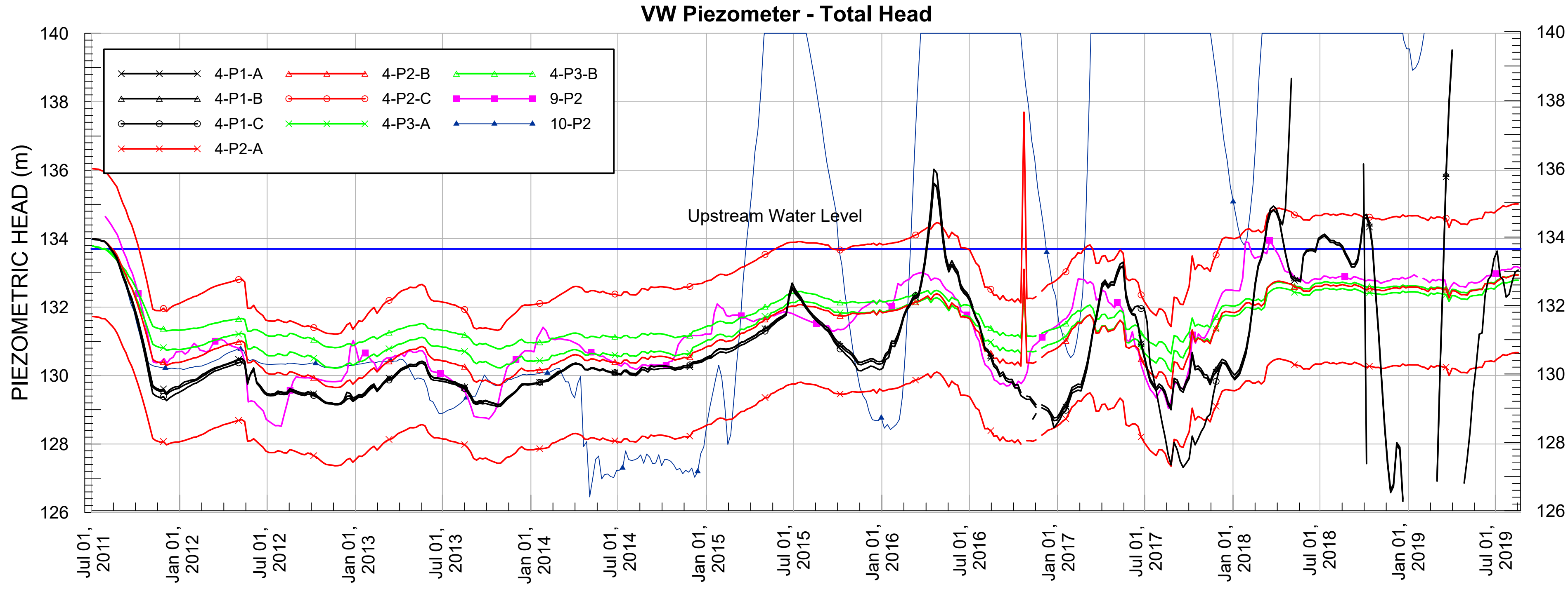
PROJECT No.			PHASE No.		
DESIGN			SCALE		REV.
CADD	TD	28AUG14	AS SHOWN		
CHECK	TD	28AUG14			
REVIEW	PG	28AUG14	FIGURE 6		

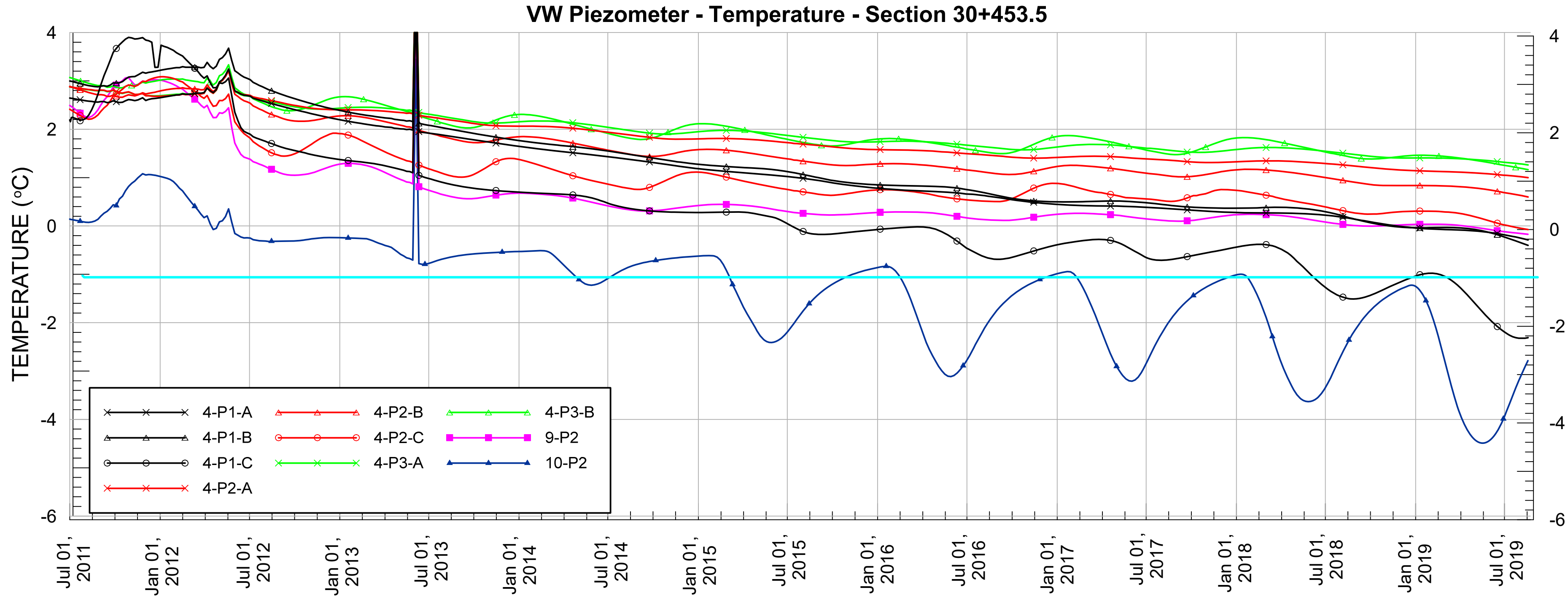
"North Channel" Bay-Goose Dike - Section 30+453.5 (DL2)









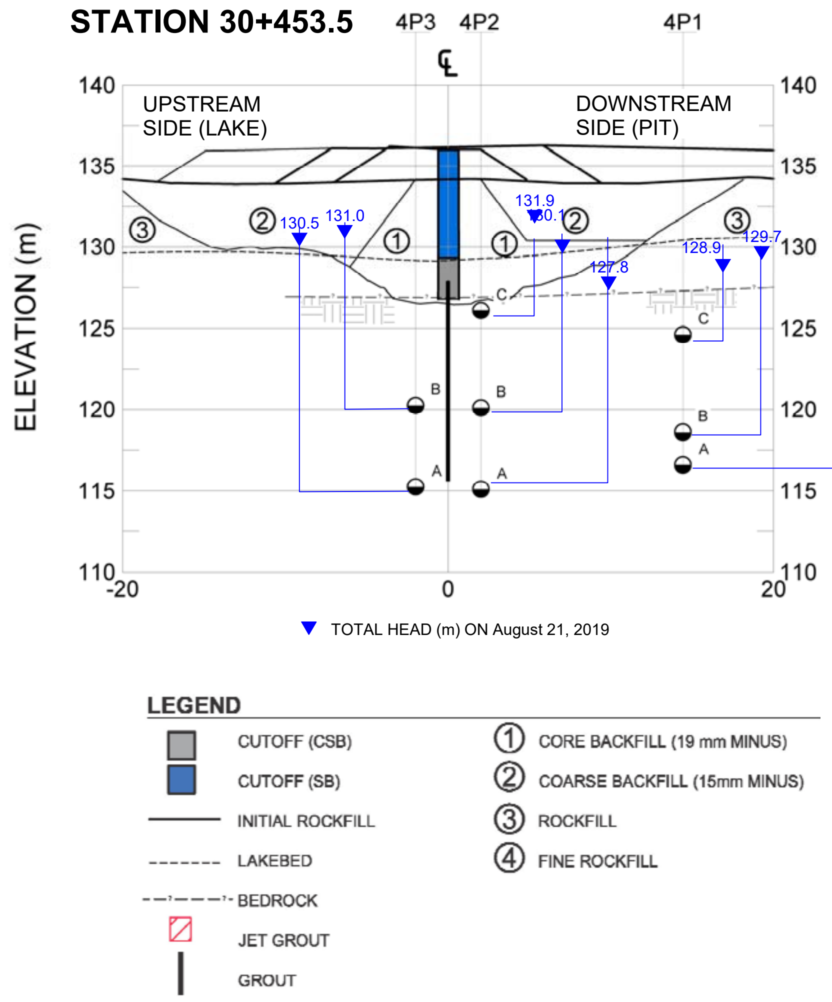


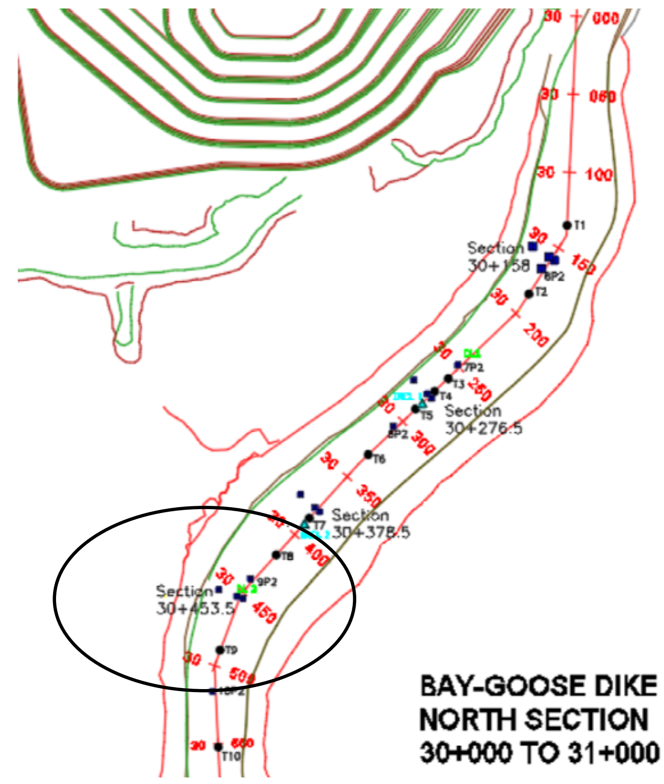
NOTES:

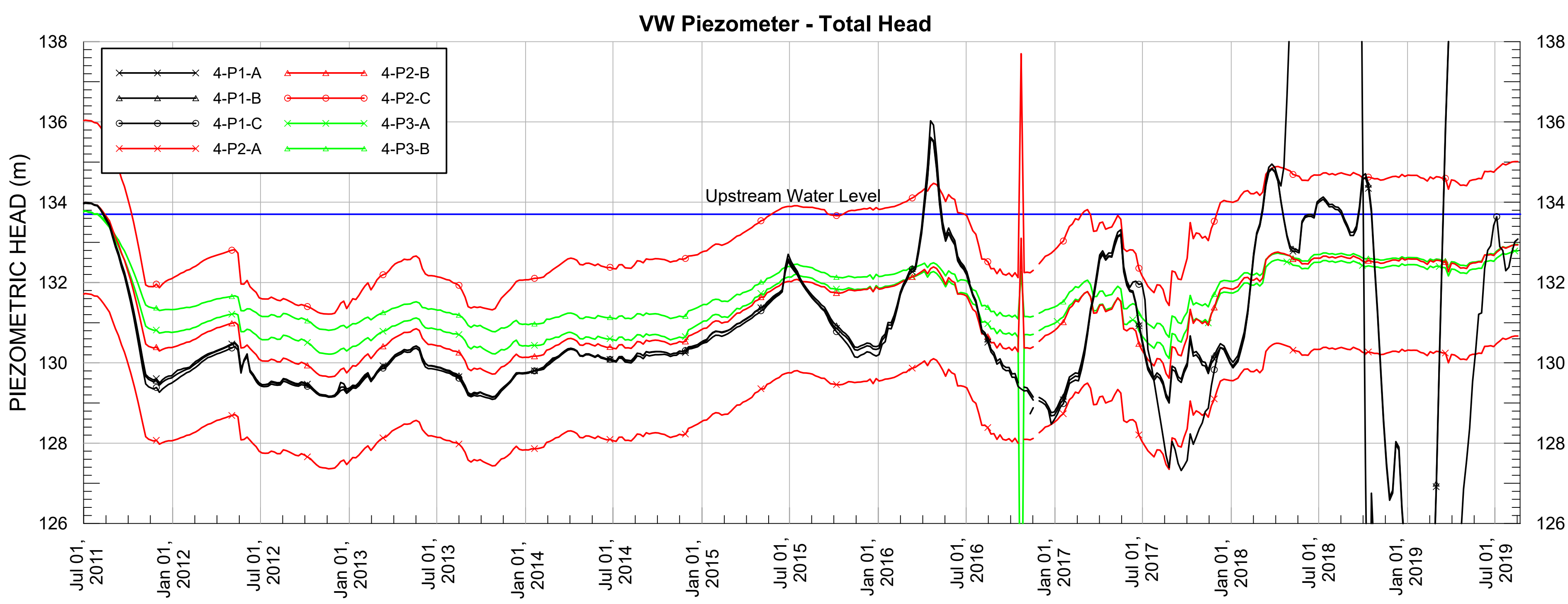
1. All 4P1, 4P2C and 10P2 is given unstable readings and since the temperature either shows a negative reading or is close to a negative reading it is assumed to be frozen.
2. Pressure changes are attributed to the drill and blast in Portage Pit E5 along with ice buildup that occurs.
3. Some of the PWP that are over the Upstream Water Level can be attributed to having a negative temperature and assumed frozen.

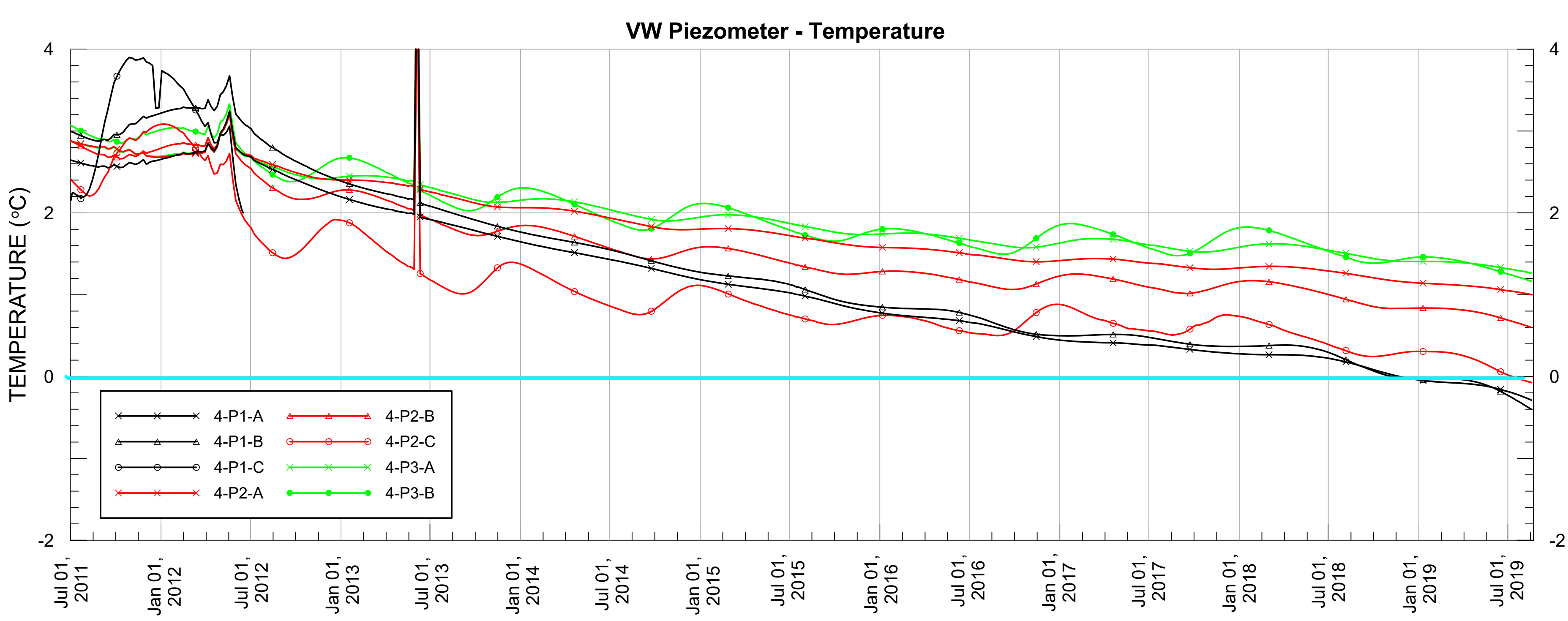
PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE Section 30+453.5 - PIEZOMETRIC DATA (July 1/11 to Aug 21/19)

AGNICO EAGLE MEADOWBANK	PROJECT No.			PHASE No.
	DESIGN	TD	28AUG14	SCALE AS SHOWN REV.
	CADD	TD	28AUG14	FIGURE 7
	CHECK	PG	28AUG14	
	REVIEW			









NOTES:

1. 4P1 and 4P2CPWP is given unstable readings and since the temperature is close to a freezing temperature it is assumed to be frozen.
2. Pressure changes are attributed to the drill and blast in Portage Pit E5 along with ice buildup that occurs.
3. Some of the PWP that are over the Upstream Water Level can be attributed to having a negative temperature and assumed frozen and data considered to not be reliable.

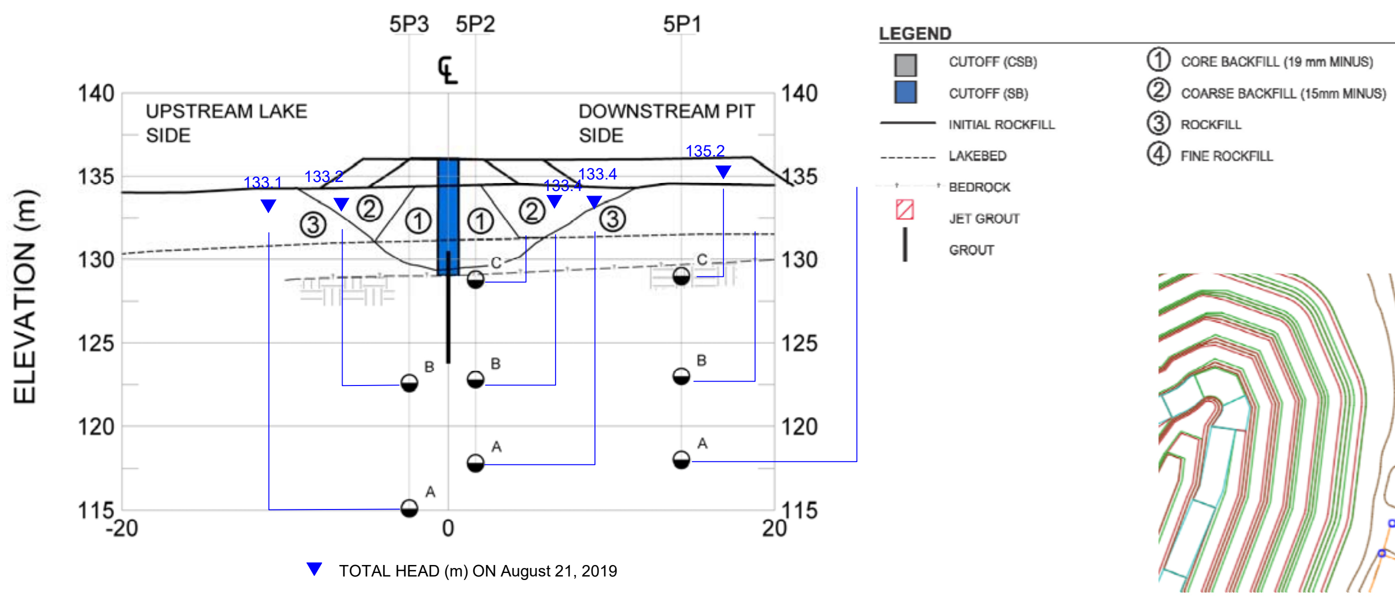
PROJECT
AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

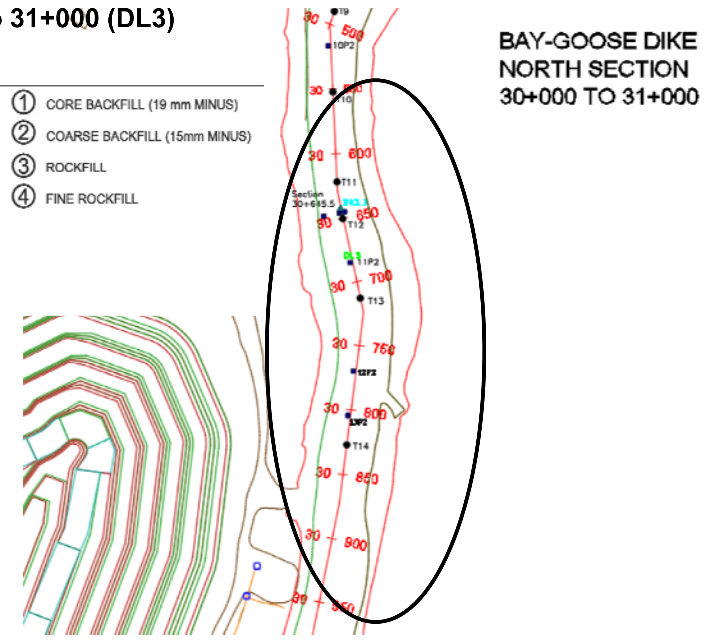
TITLE
BAYGOOSE DIKE - SECTION 30+453.5
PIEZOMETRIC DATA
(July 1/11 to Aug 21/19)

AGNICO EAGLE MEADOWBANK

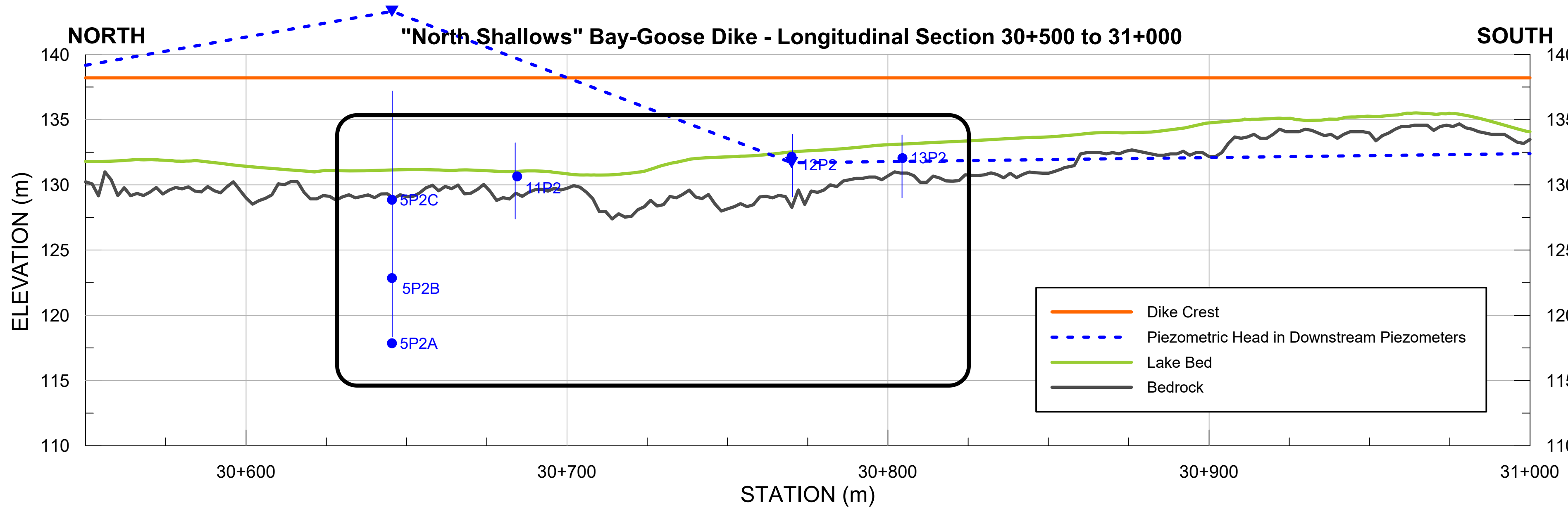
PROJECT No.			PHASE No.
DESIGN	TD	28AUG14	SCALE AS SHOWN REV.
CADD	TD	28AUG14	
CHECK	PG	28AUG14	FIGURE 8
REVIEW			

"North Shallows" Bay-Goose Dike - 30+500 to 31+000 (DL3)

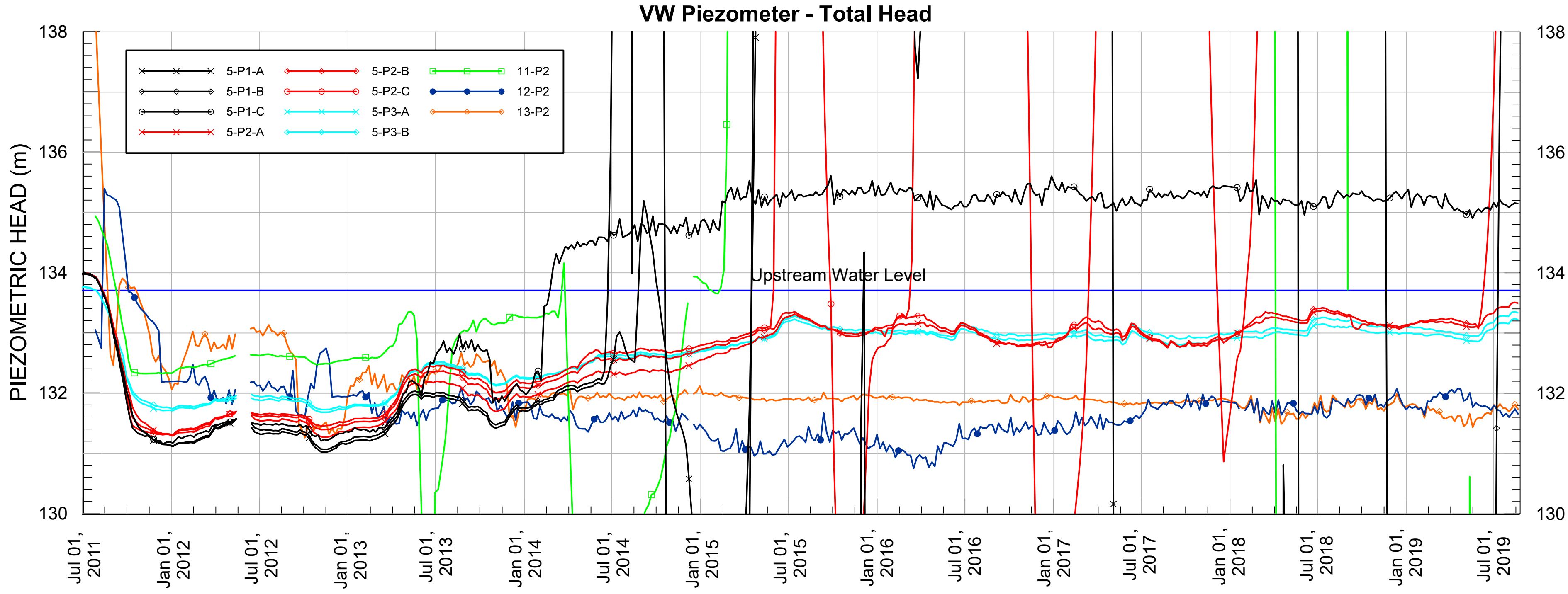




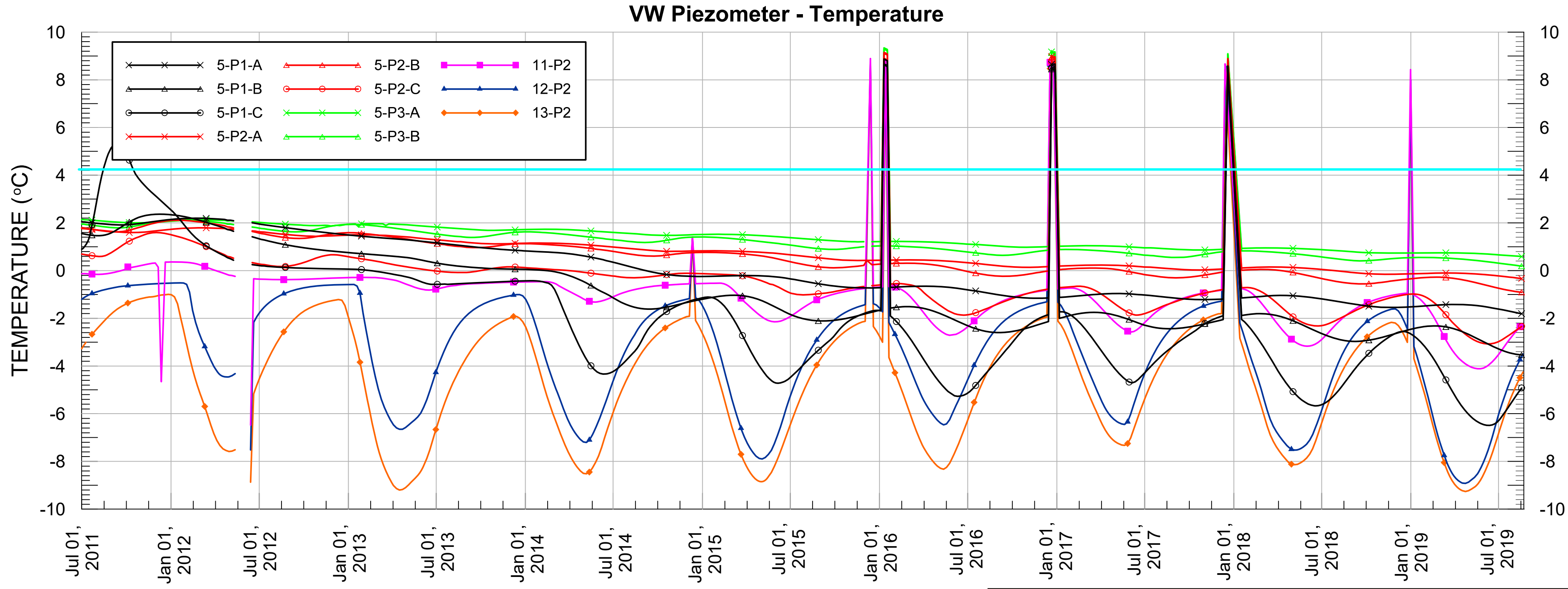
"North Shallows" Bay-Goose Dike - Longitudinal Section 30+500 to 31+000



VW Piezometer - Total Head



VW Piezometer - Temperature



NOTES:

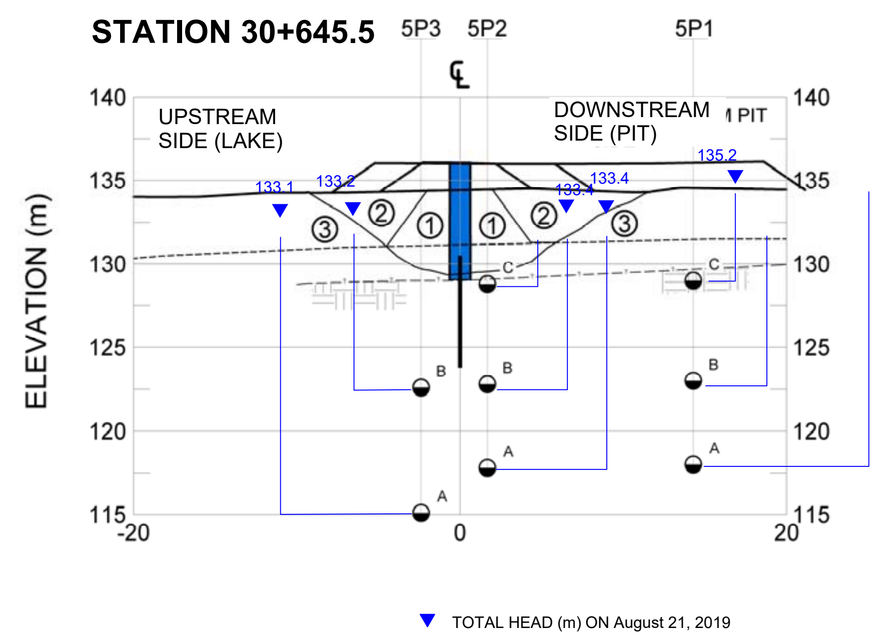
1. 5P1A, 5P1B, 5P1C, 5P2C and 11P2 are giving unstable readings and since the temperature shows a negative reading it is assumed to be frozen.

PROJECT **AGNICO EAGLE MINES LIMITED**
MEADOWBANK GOLD PROJECT
NUNAVUT

TITLE **BAYGOOSE DIKE**
30+550 to 31+000 - PIEZOMETRIC DATA
(July 1/11 to Aug 21/19)

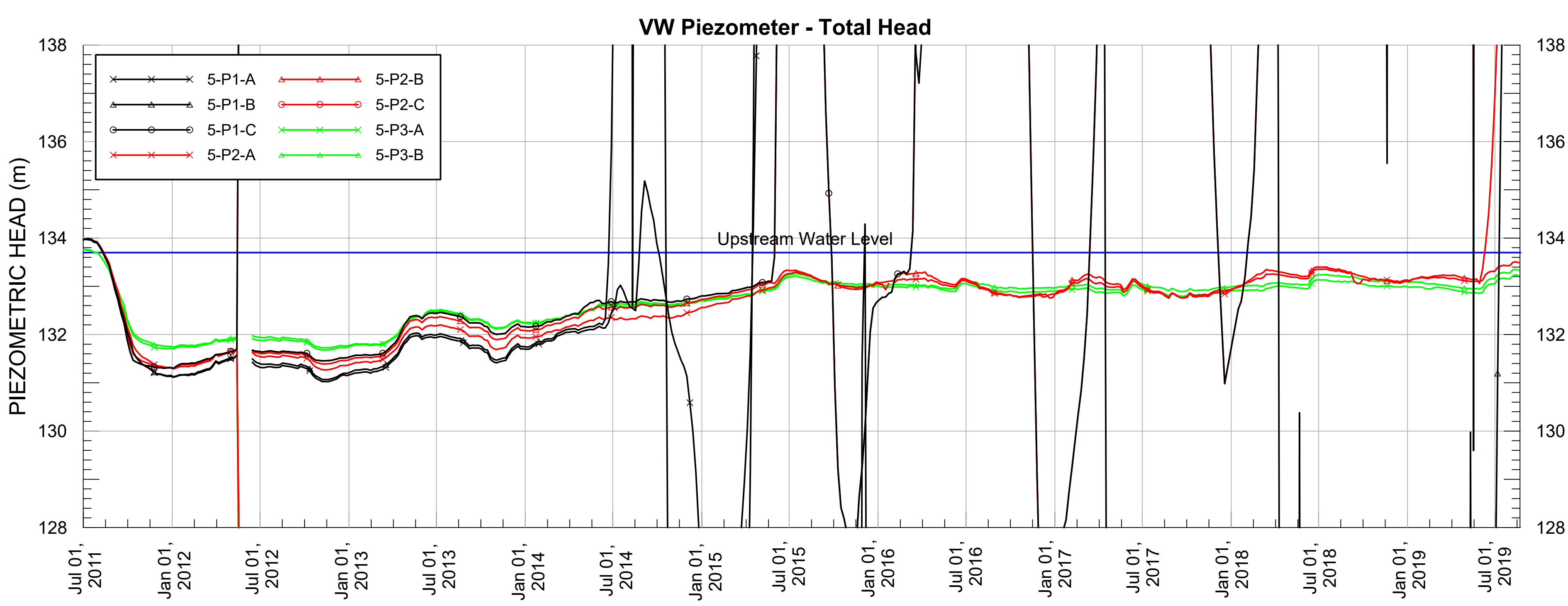
AGNICO EAGLE MEADOWBANK

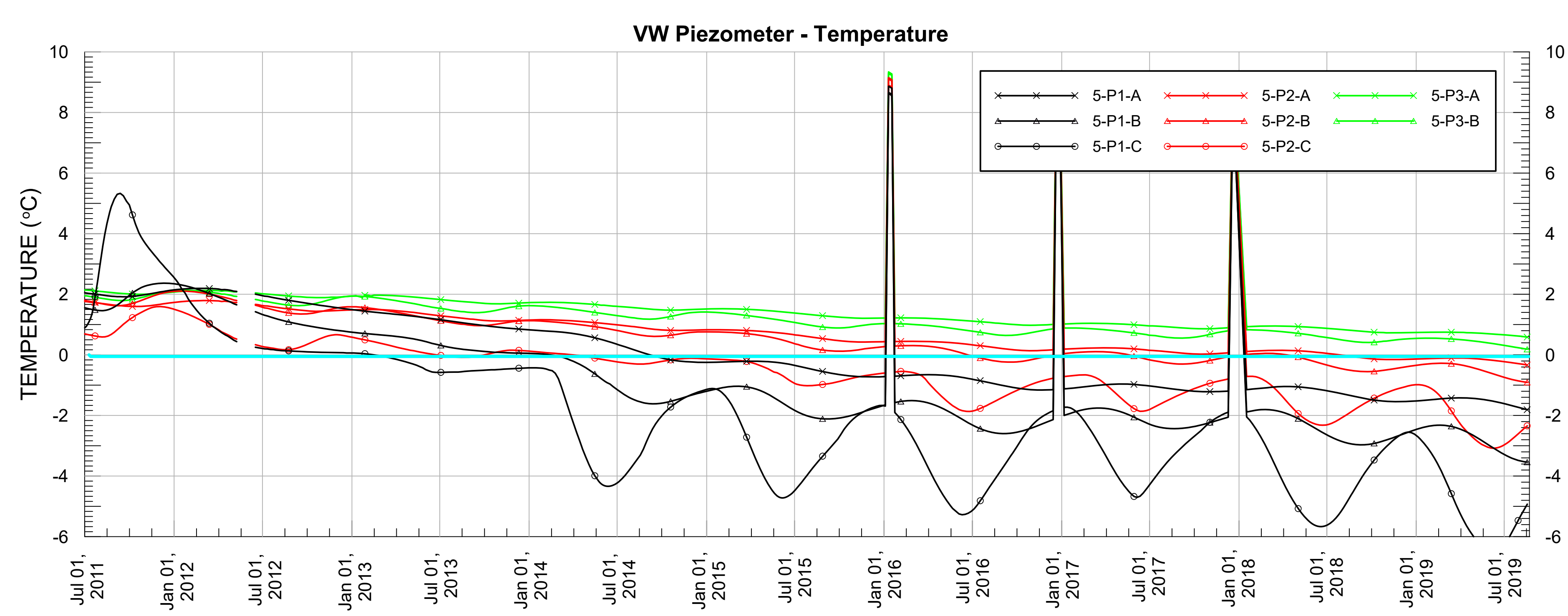
PROJECT No. 09-1428-5007			PHASE No. 4000	
DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
CADD	TD	28AUG14	**FIGURE 9**	
CHECK	PG	28AUG14		
REVIEW				



LEGEND

	CUTOFF (CSB)	①	CORE BACKFILL (19 mm MINUS)
	CUTOFF (SB)	②	COARSE BACKFILL (15mm MINUS)
	INITIAL ROCKFILL	③	ROCKFILL
	LAKEBED	④	FINE ROCKFILL
	BEDROCK		
	JET GROUT		
	GROUT		





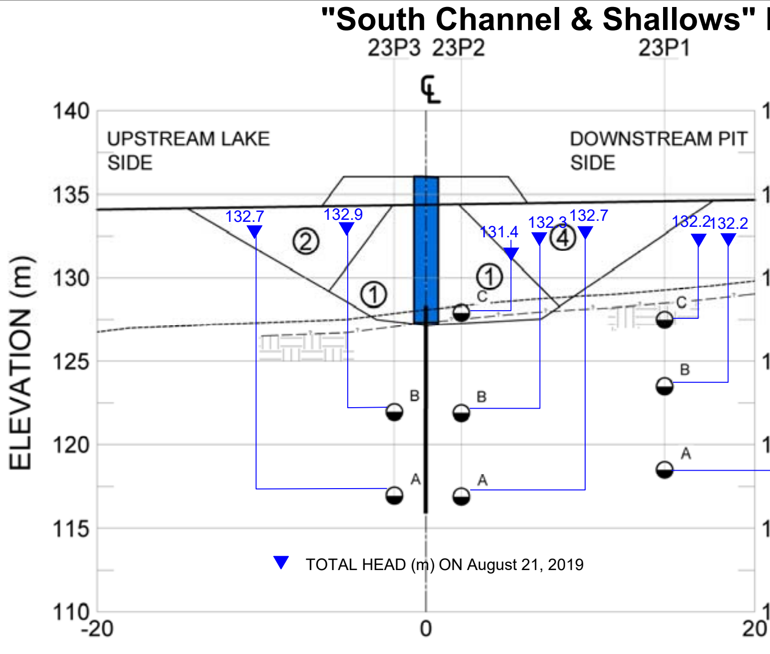
NOTES:
1. 5P1A, 5P1B, 5P1C, 5P2C are giving unstable readings and since the temperature shows a negative reading it is assumed to be frozen and PWP data is not considered reliable.

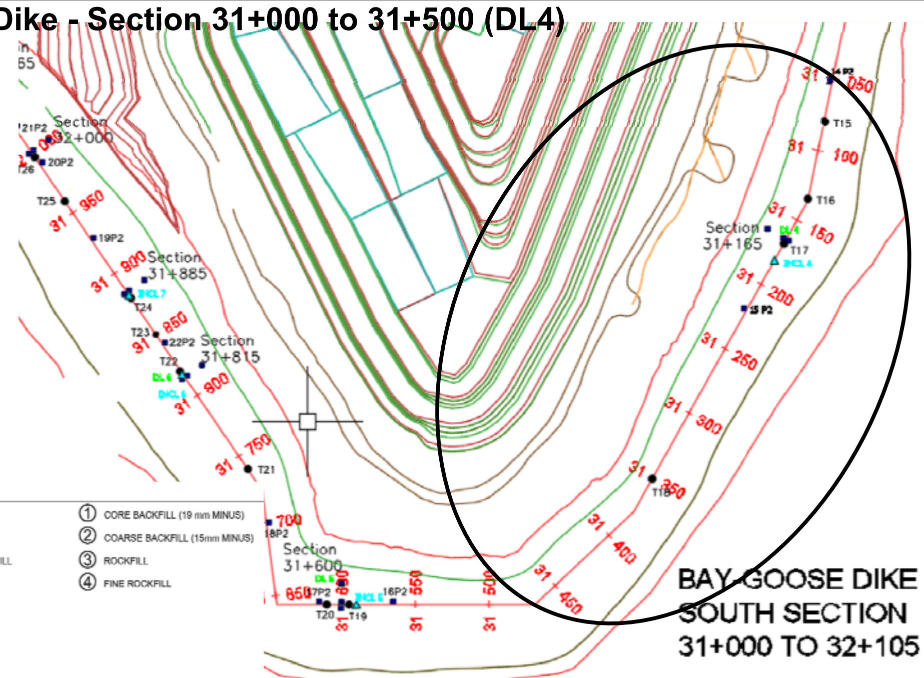
PROJECT: AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

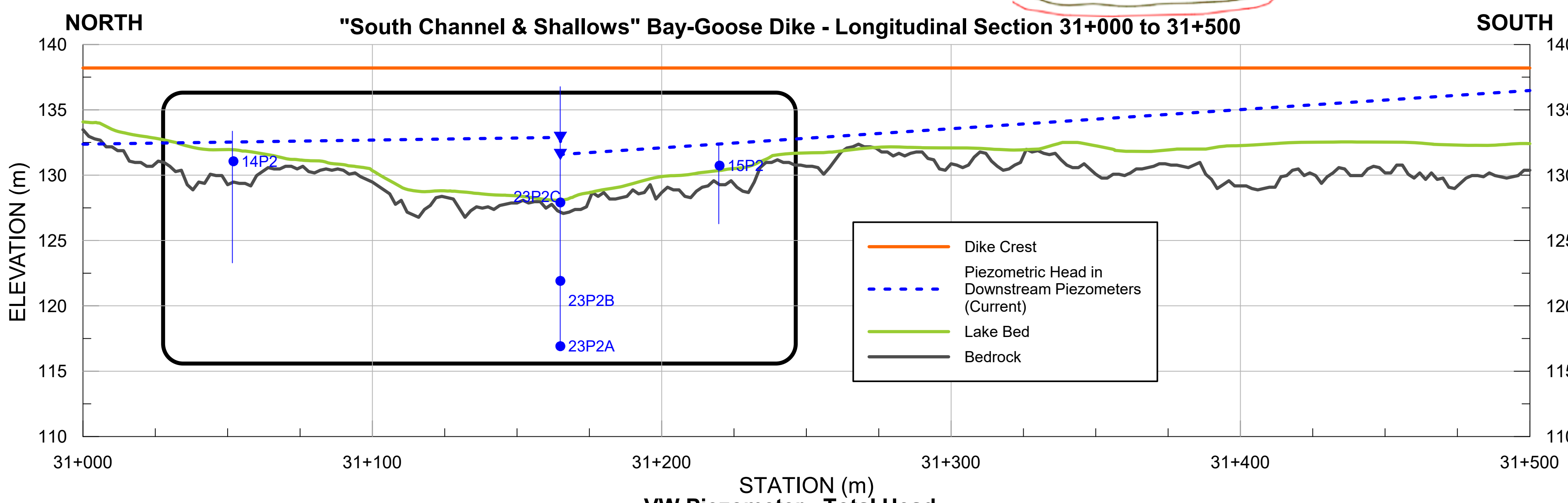
TITLE: **BAYGOOSE DIKE - SECTION 30+645.5 PIEZOMETRIC DATA (July 1/11 to Aug 21/19)**

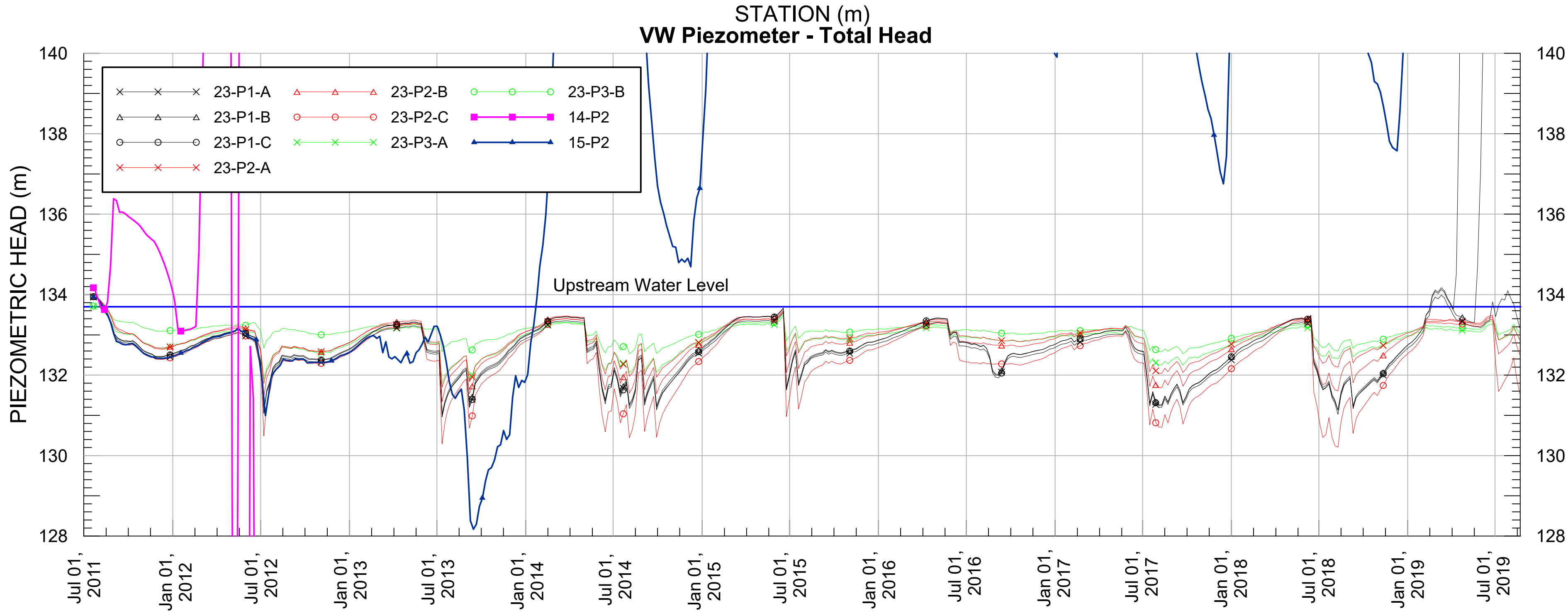
AGNICO EAGLE
MEADOWBANK

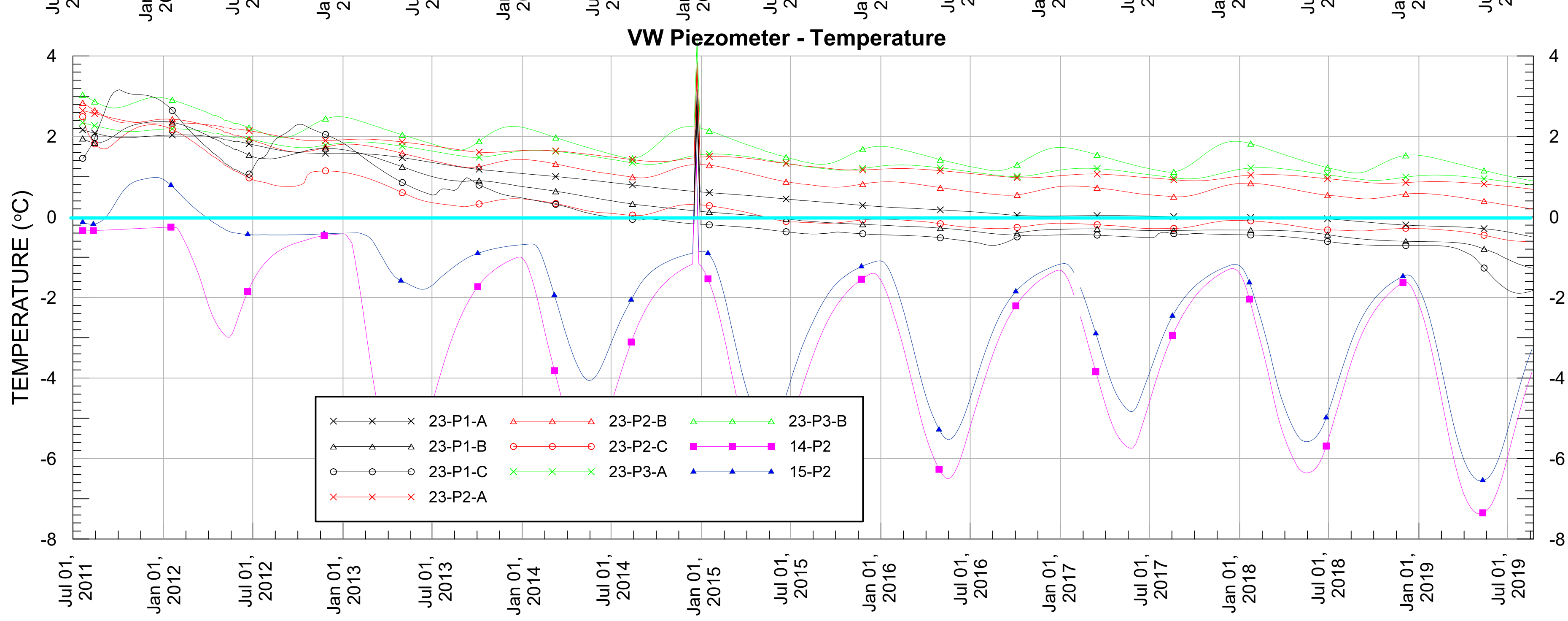
PROJECT No.			PHASE No.	
DESIGN	TD	17JAN14	SCALE AS SHOWN	REV.
CADD	TD	17JAN14		
CHECK			**FIGURE 10**	
REVIEW				











NOTES:

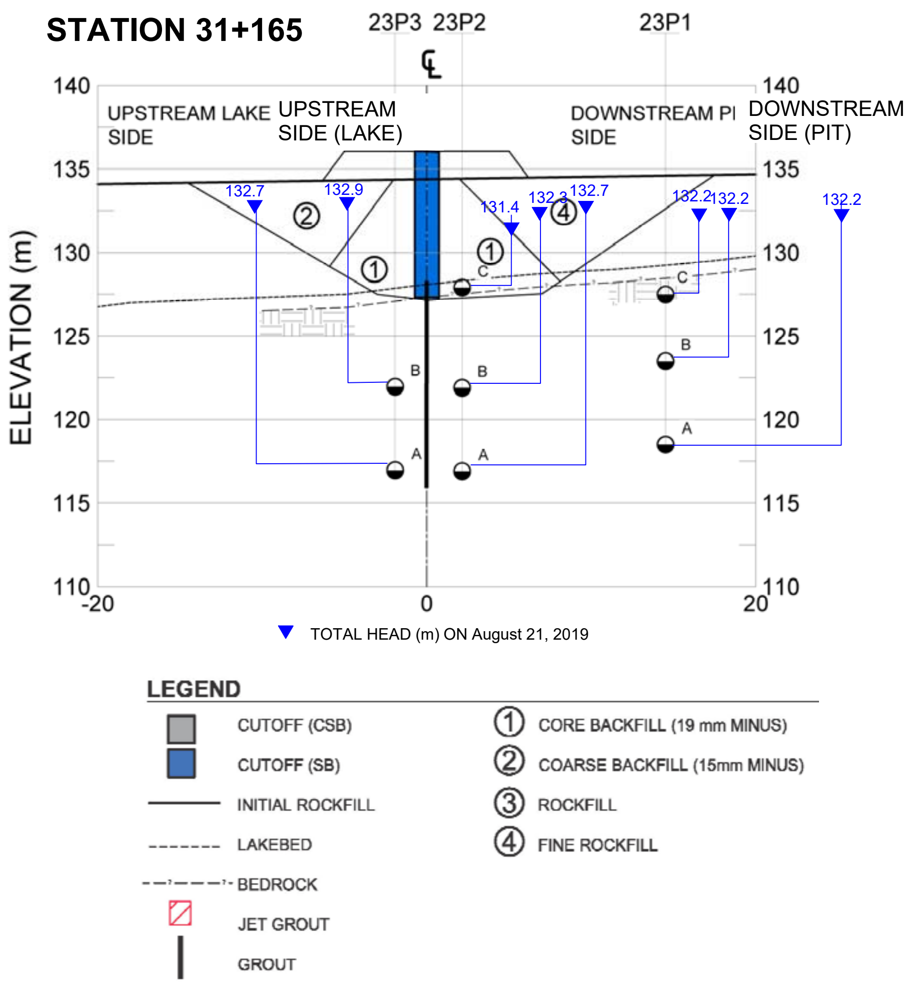
1. Pz23P1B, Pz23P1C, 14P2 and 15P2are given unstable readings and since the temperature shows a negative reading it is assumed to be frozen.
2. PWP rises and falls due to ponding in the area and continous pumping, and allowing the ponding to raise. The steady increase is when the ponding area freezes, and no pumping is done till the thawing of the area.

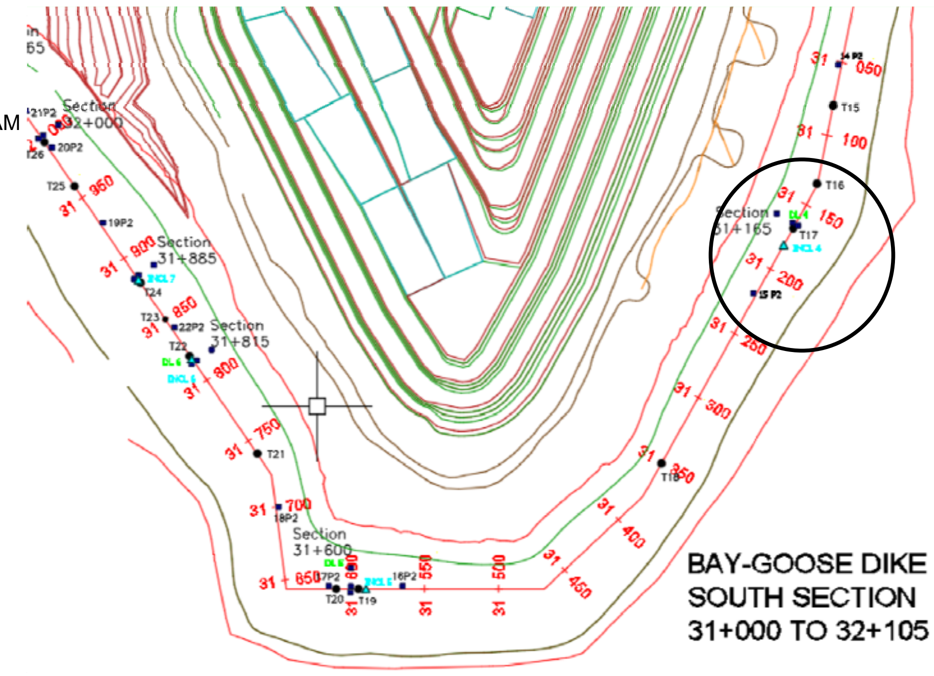
PROJECT: AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

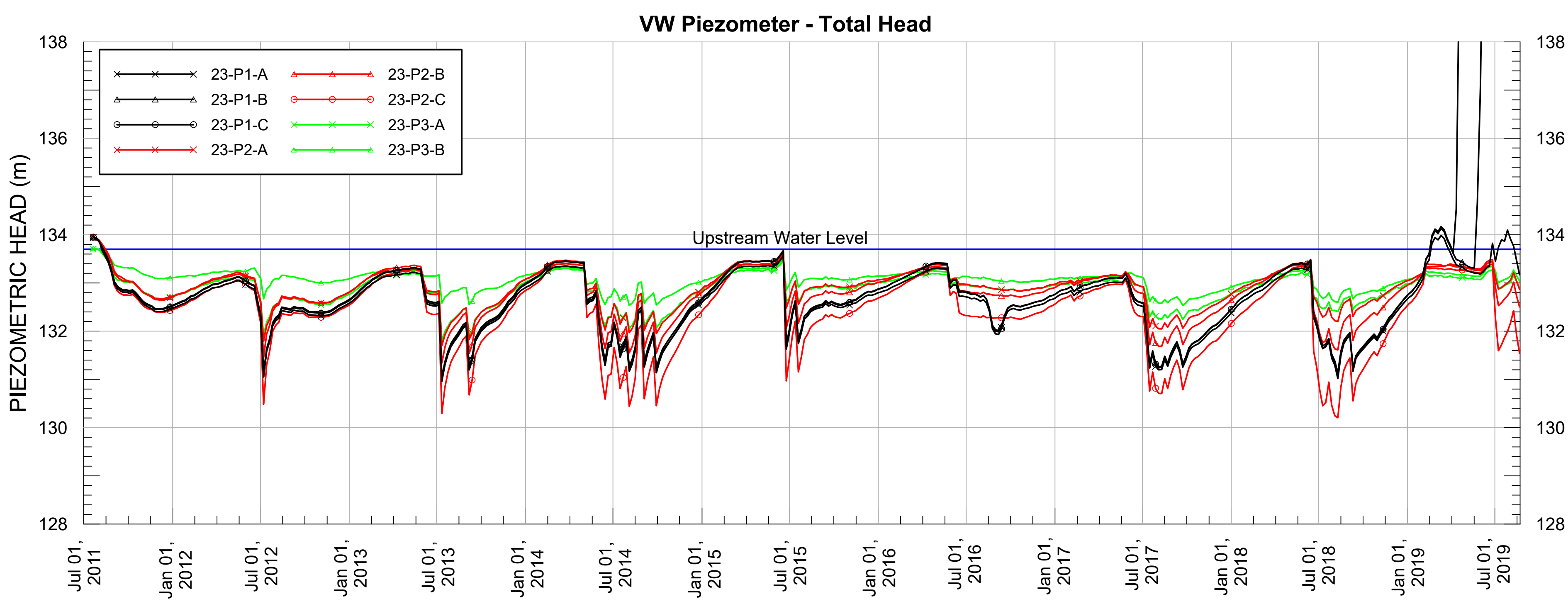
TITLE: BAYGOOSE DIKE
31+000 to 31+500 - PIEZOMETRIC DATA
(July 1/11 to Aug 21/19)

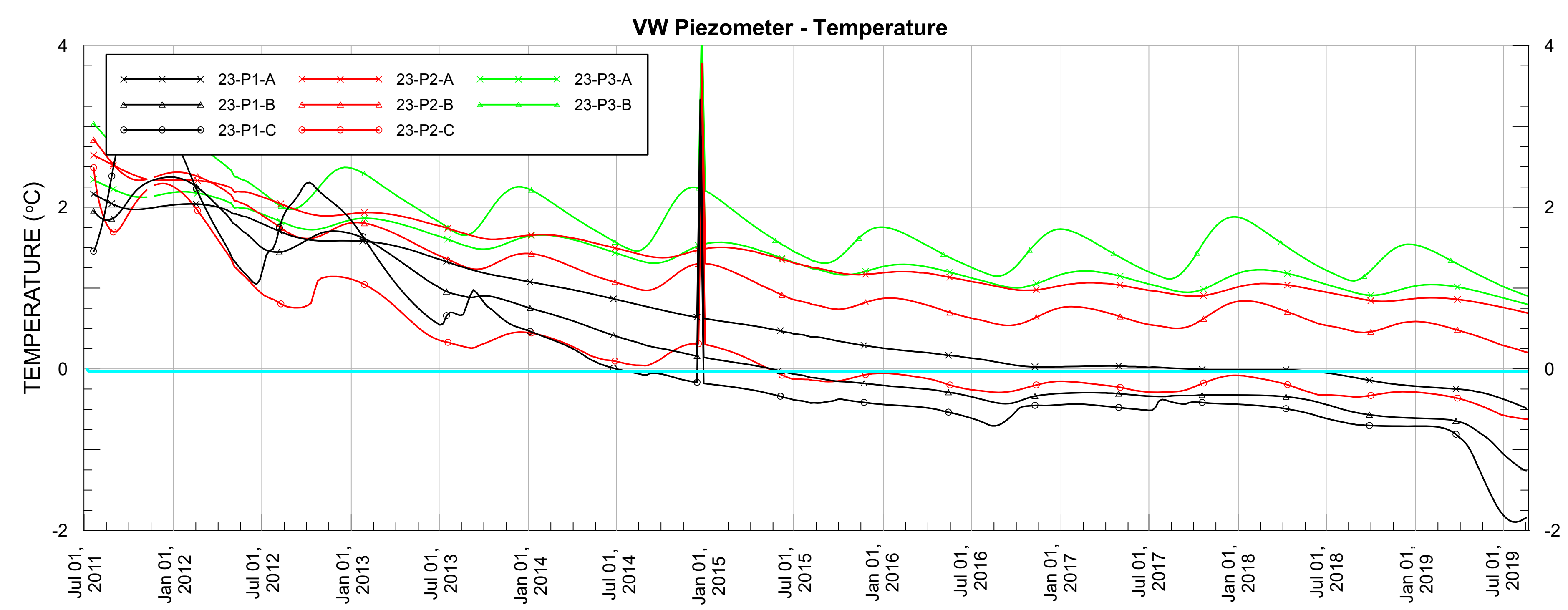
AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.
DESIGN	TD	28AUG14	SCALE AS SHOWN REV.
CADD	TD	28AUG14	FIGURE 11
CHECK	PG	28AUG14	
REVIEW			









NOTES:

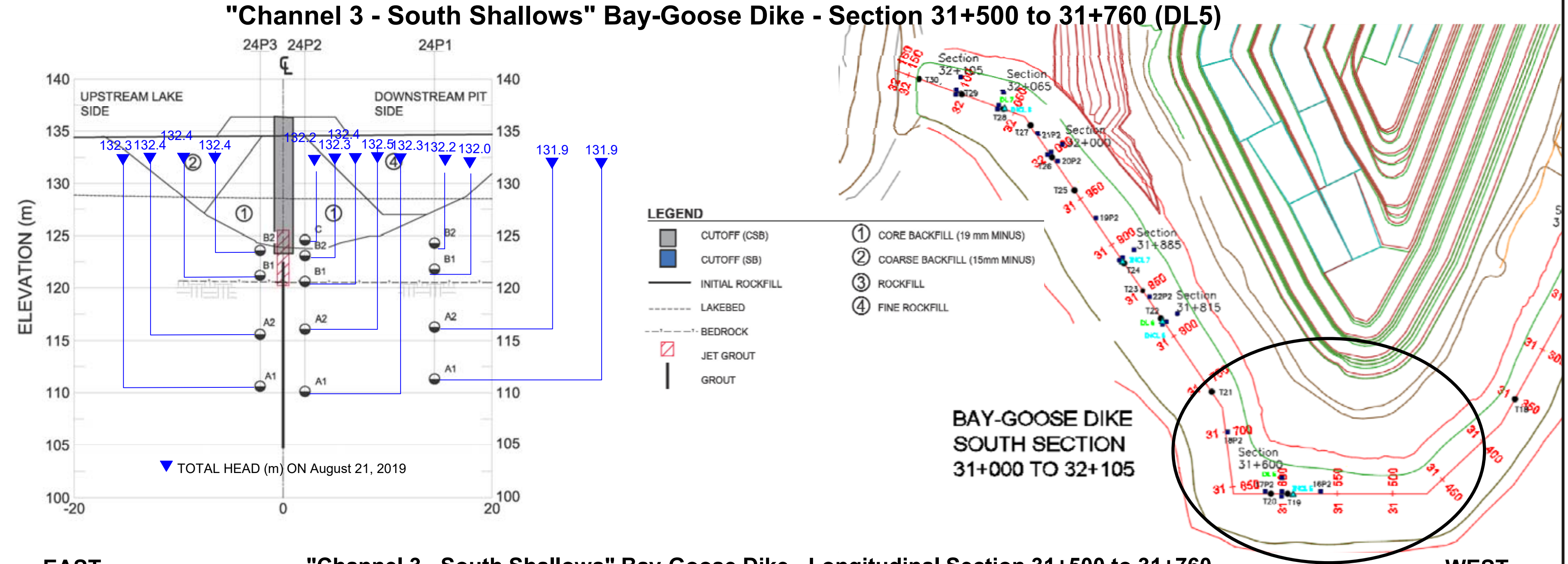
1. PWP rises and falls due to ponding in the area and continous pumping, and allowing the ponding to raise. The steady increase is when the ponding area freezes, and no pumping is done till the thawing of the area.
2. 23-P1-B and 23-P1-C have a negative temperature and appear to be frozen and not giving good data.

PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE - SECTION 31+165 PIEZOMETRIC DATA (July 1/11 to Aug 21/19)

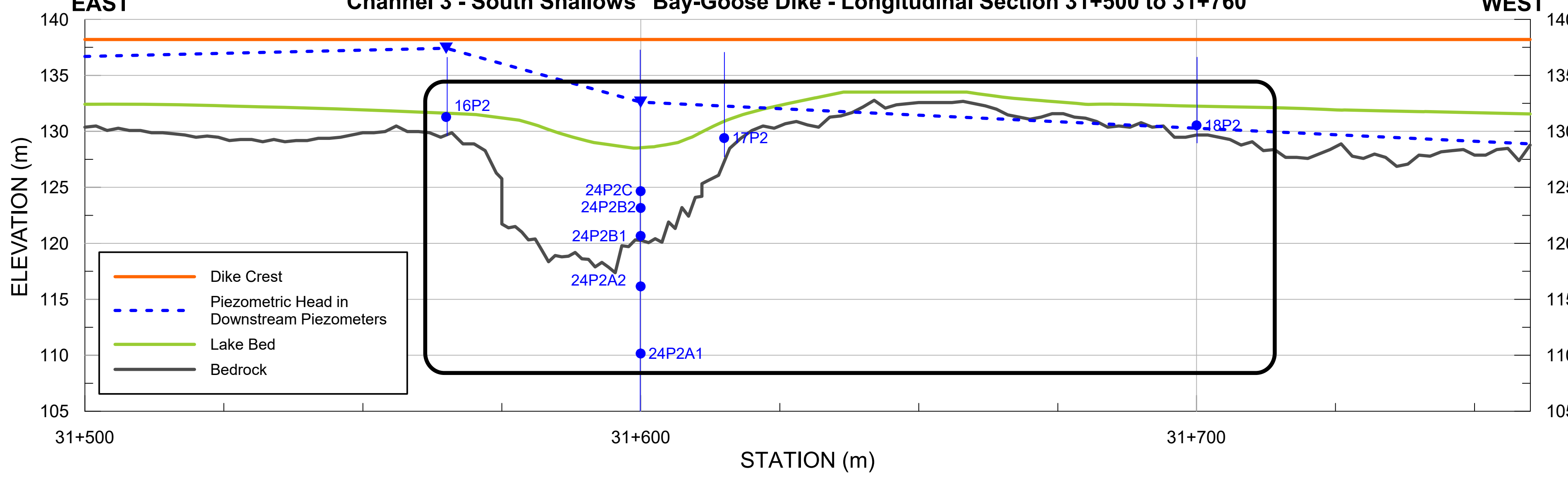
AGNICO EAGLE
MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
CADD	TD	28AUG14	FIGURE 12	
CHECK	PG	28AUG14		
REVIEW				

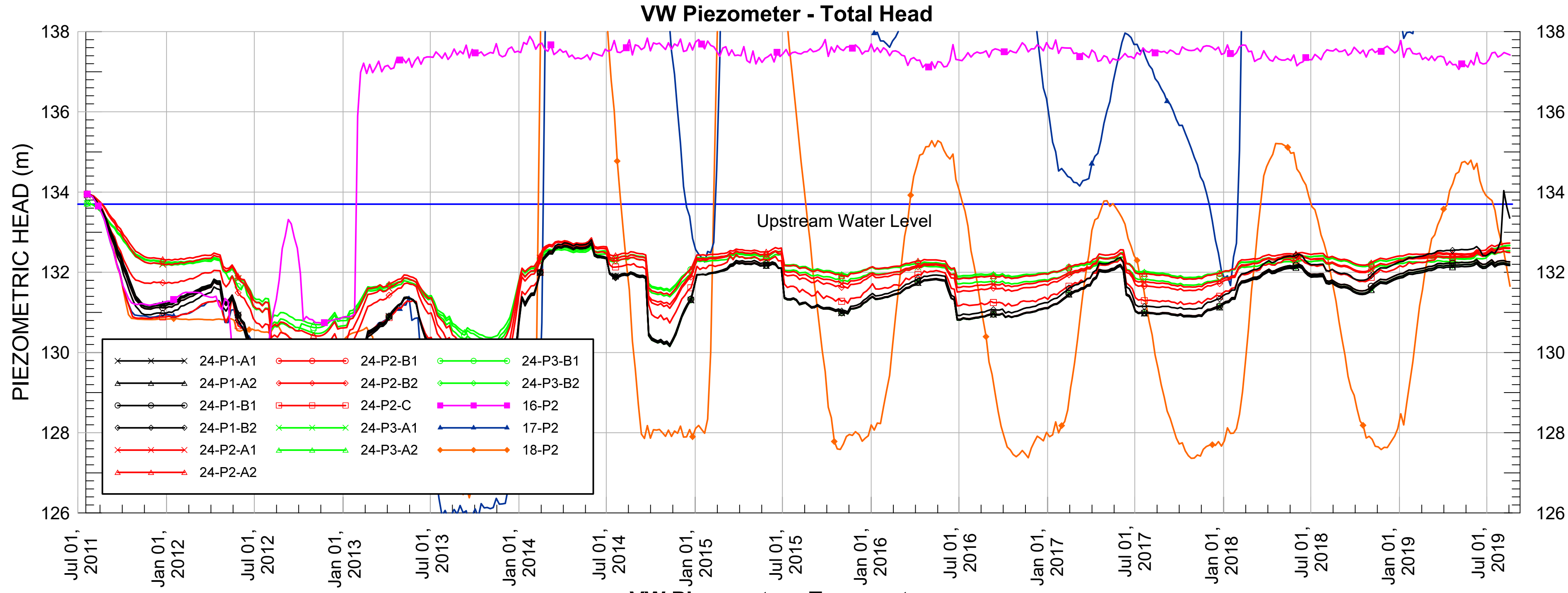
"Channel 3 - South Shallows" Bay-Goose Dike - Section 31+500 to 31+760 (DL5)



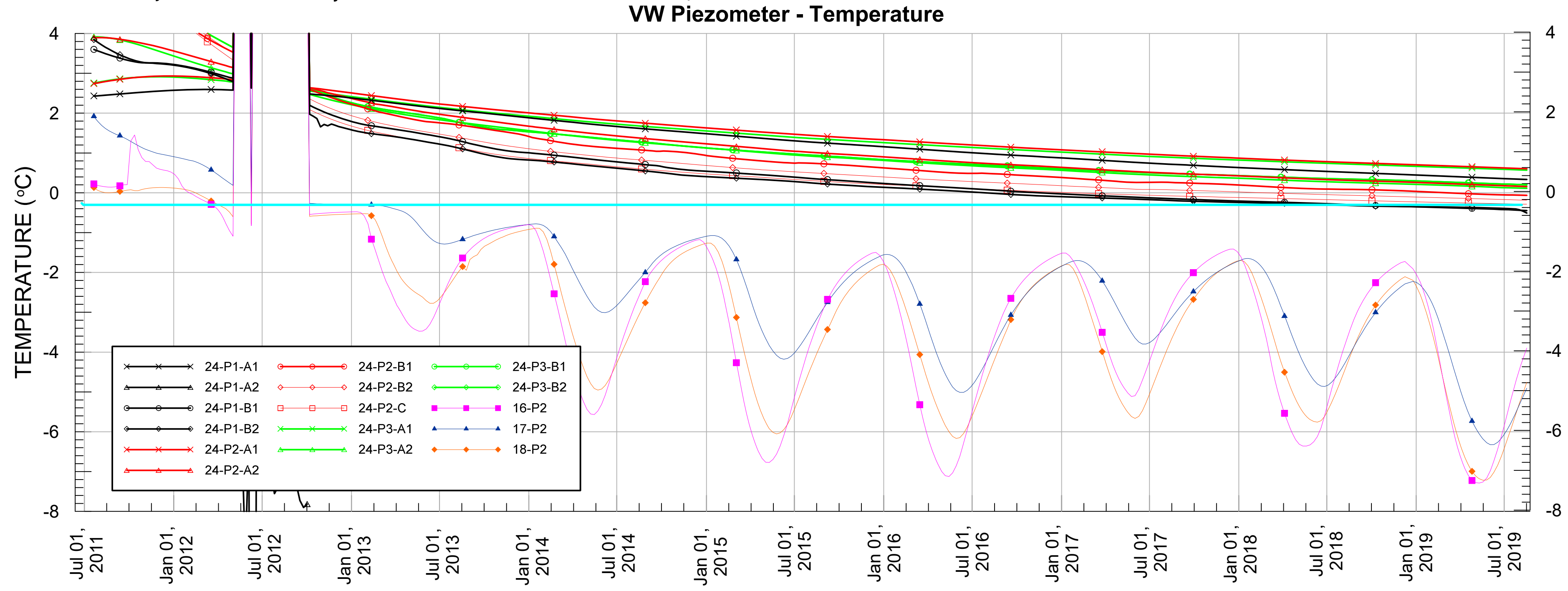
"Channel 3 - South Shallows" Bay-Goose Dike - Longitudinal Section 31+500 to 31+760



VW Piezometer - Total Head



VW Piezometer - Temperature



NOTES:

1. 16P2, 17P2 and 18P2 are given unstable readings and since the temperature shows a negative reading it is assumed to be frozen.
2. PWP is following same trend as previous years. When ice builds the pressure increases and when it melts in summer the pressure decreases

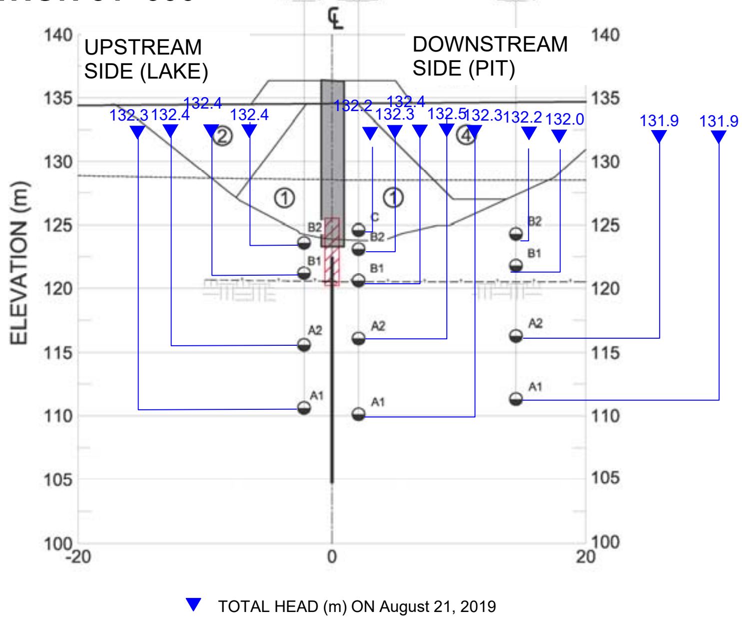
PROJECT
AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

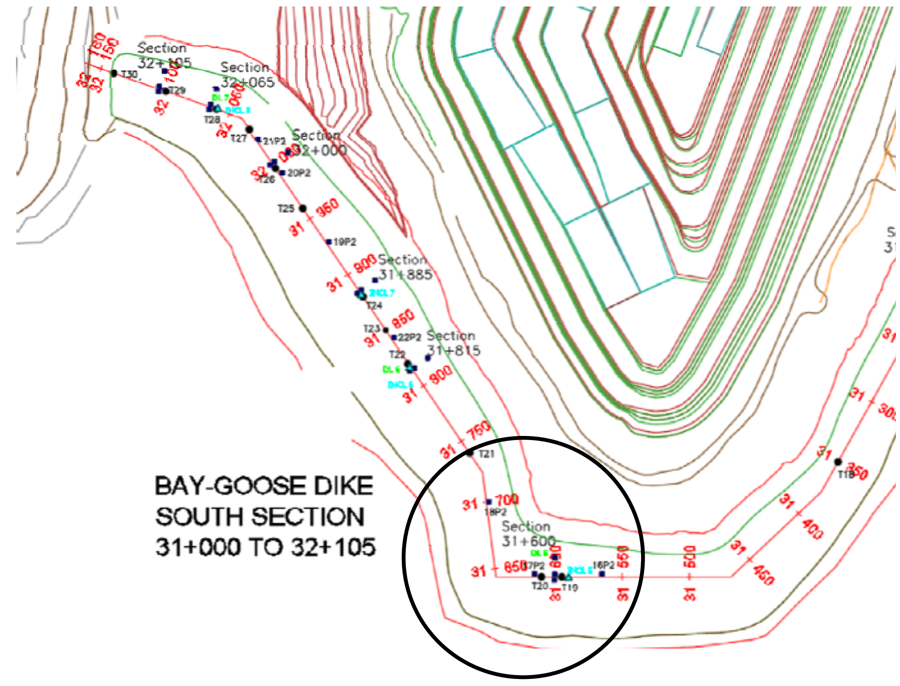
TITLE
BAYGOOSE DIKE
31+500 to 31+760 - PIEZOMETRIC DATA
(July 1/11 to Aug 21/19)

AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.
DESIGN	TD	28AUG14	SCALE AS SHOWN REV.
CADD	TD	28AUG14	
CHECK	PG	28AUG14	**FIGURE 13**
REVIEW			

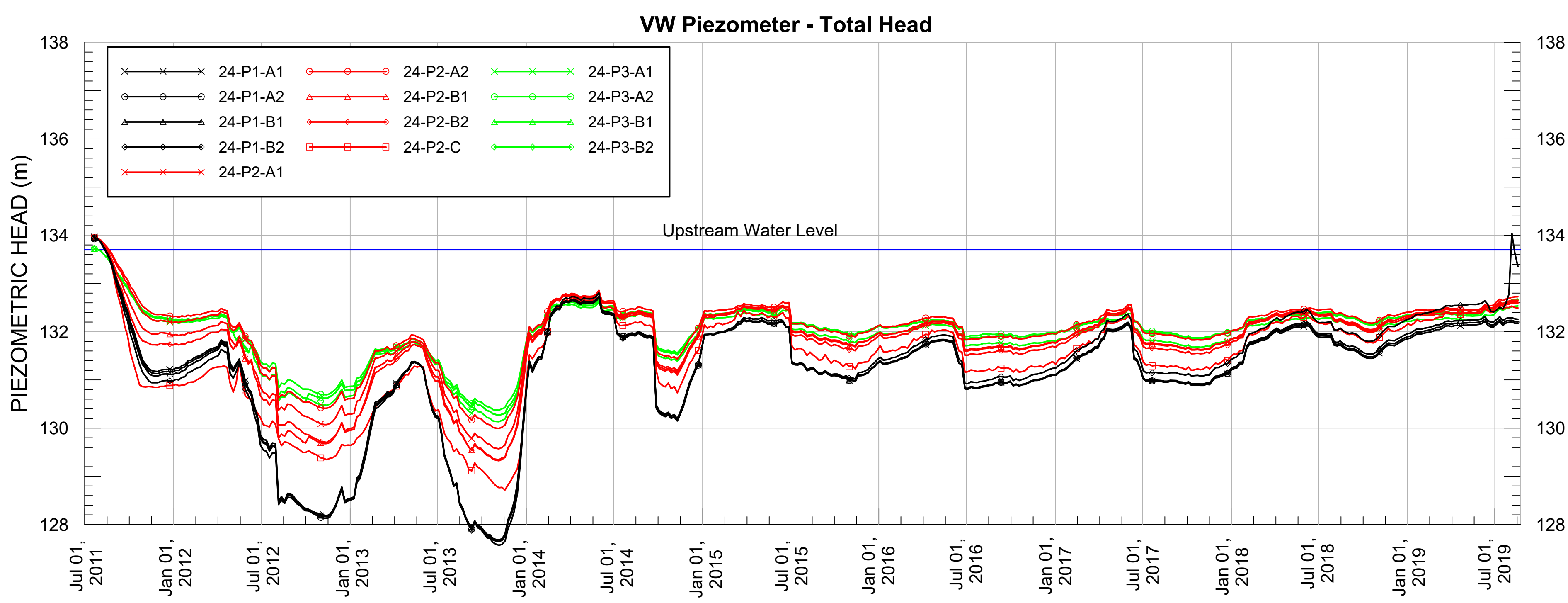
STATION 31+600

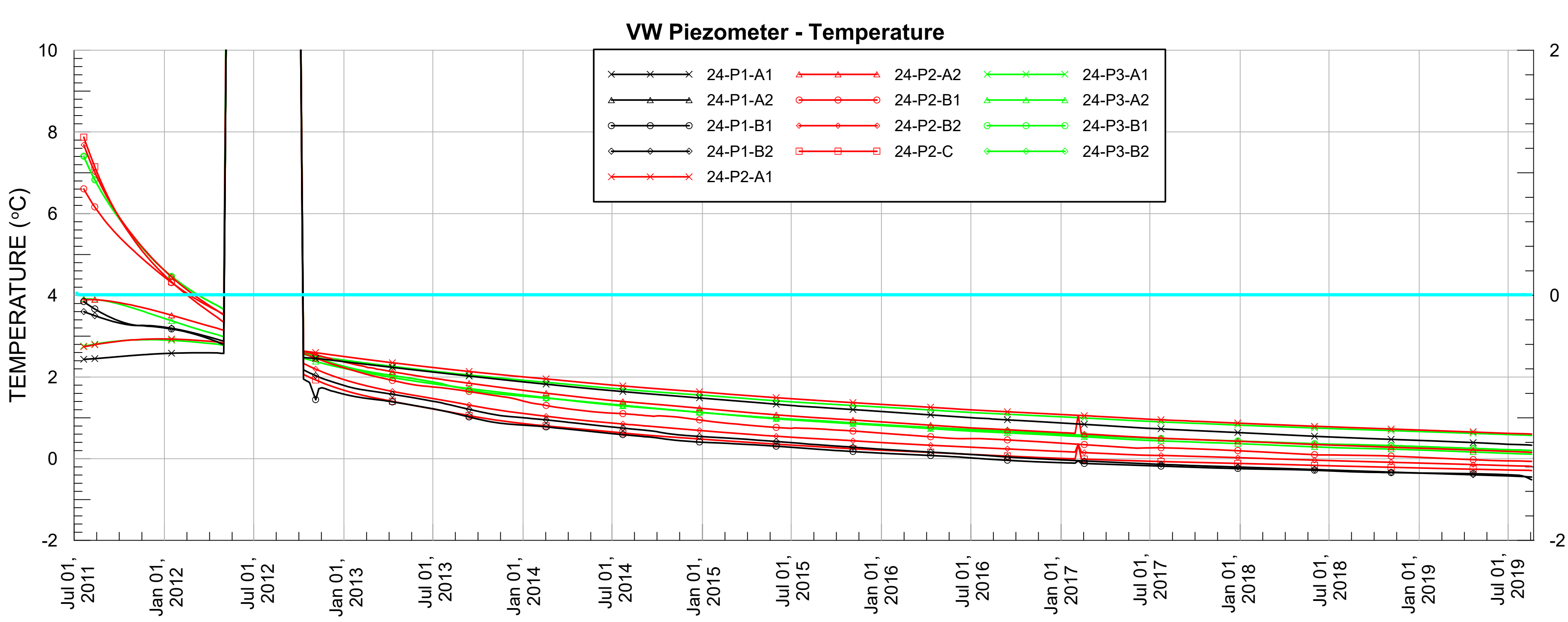




LEGEND

- CUTOFF (CSB)
- CUTOFF (SB)
- INITIAL ROCKFILL
- LAKEBED
- BEDROCK
- JET GROUT
- GROUT
- ① CORE BACKFILL (19 mm MINUS)
- ② COARSE BACKFILL (15mm MINUS)
- ③ ROCKFILL
- ④ FINE ROCKFILL





NOTES:

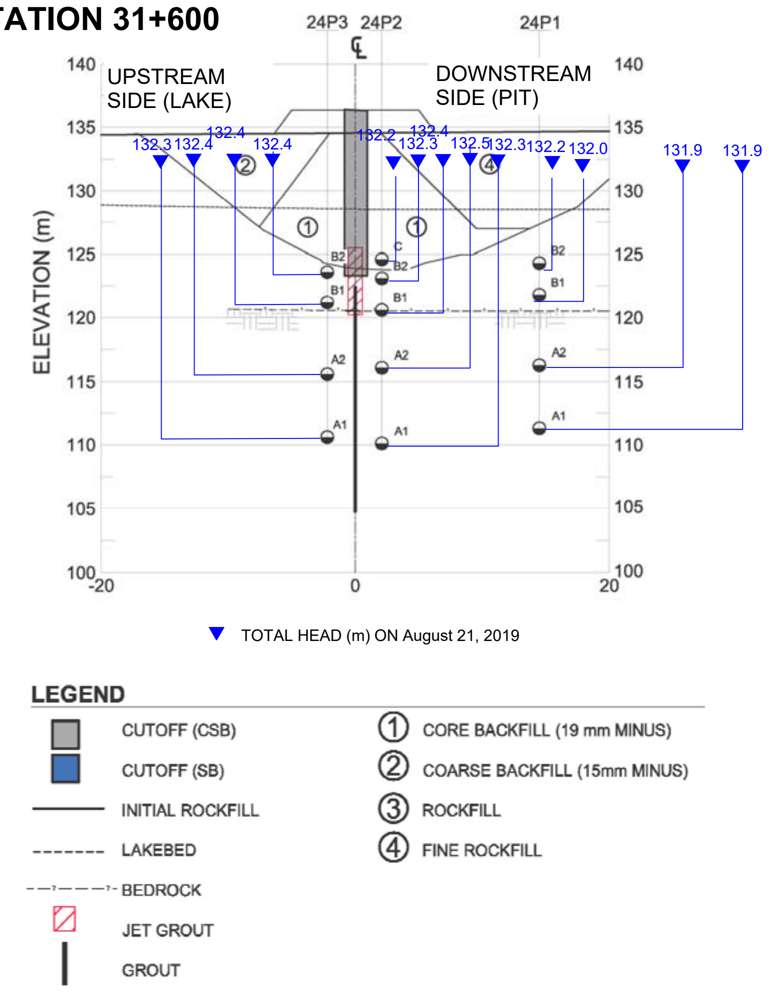
1. PWP is following same trend as previous years. When ice builds the pressure increases and when it melts in summer the pressure decreases
2.

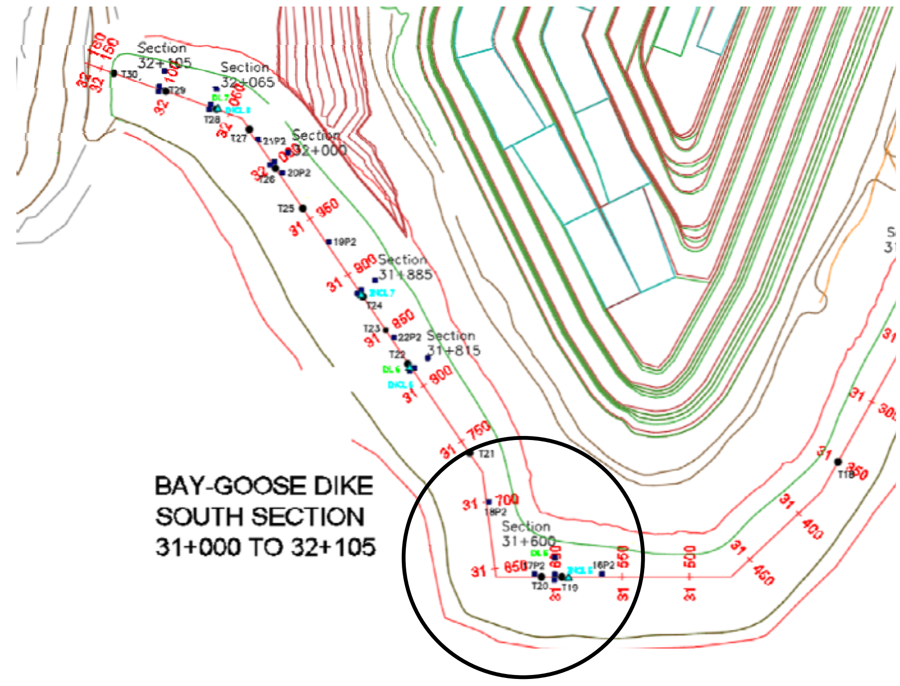
PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE - SECTION 31+600 PIEZOMETRIC DATA (July 1/11 to Aug 21/19)

AGNICO EAGLE
MEADOWBANK

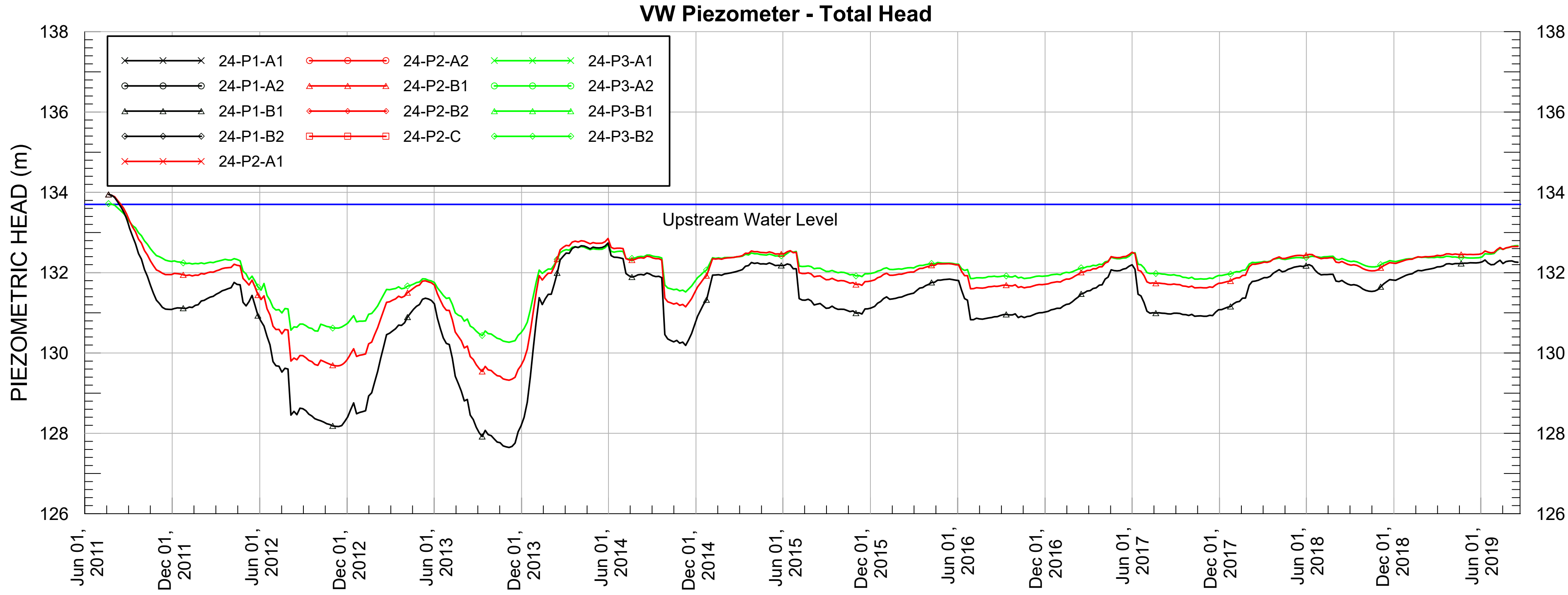
PROJECT No.			PHASE No.	
DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
CADD	TD	28AUG14	FIGURE 14	
CHECK	PG	28AUG14		
REVIEW				

STATION 31+600

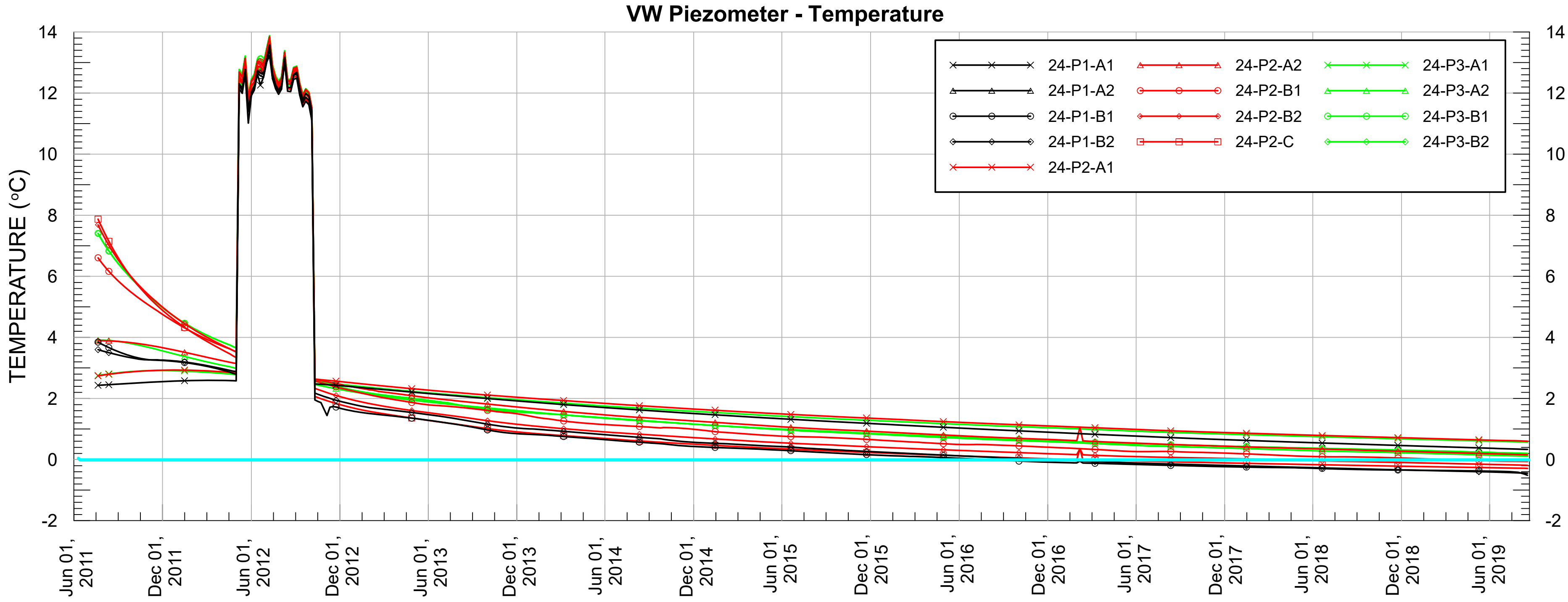




VW Piezometer - Total Head



VW Piezometer - Temperature



NOTES:
1. PWP is following same trend as previous years. When ice builds the pressure increases and when it melts in summer the pressure decreases
2. Small gaps in data are due to a low battery. Battery was changed the following day.
3. The large temperature flucuation was due to a faulty MUX board which was changed when the new one arrived on site.

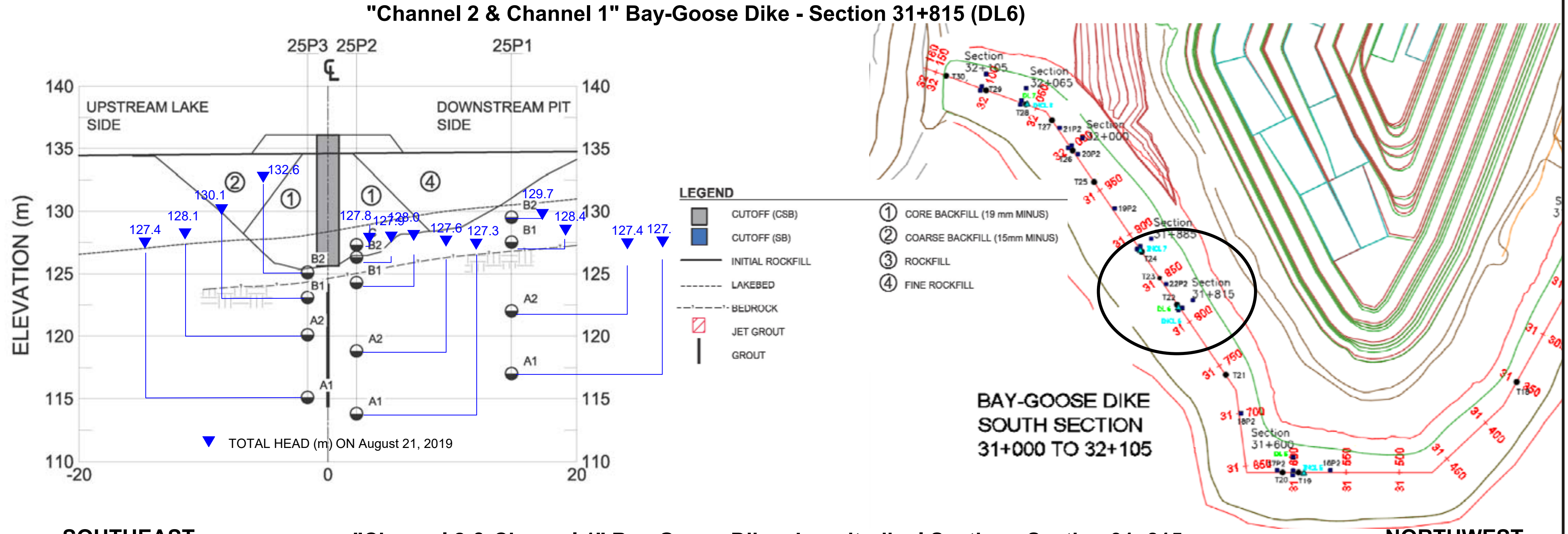
PROJECT: **AGNICO EAGLE MINES LIMITED**
MEADOWBANK GOLD PROJECT
NUNAVUT

TITLE: **BAYGOOSE DIKE - SECTION 31+600**
PIEZOMETRIC DATA
(July 1/11 to Aug 21/19)

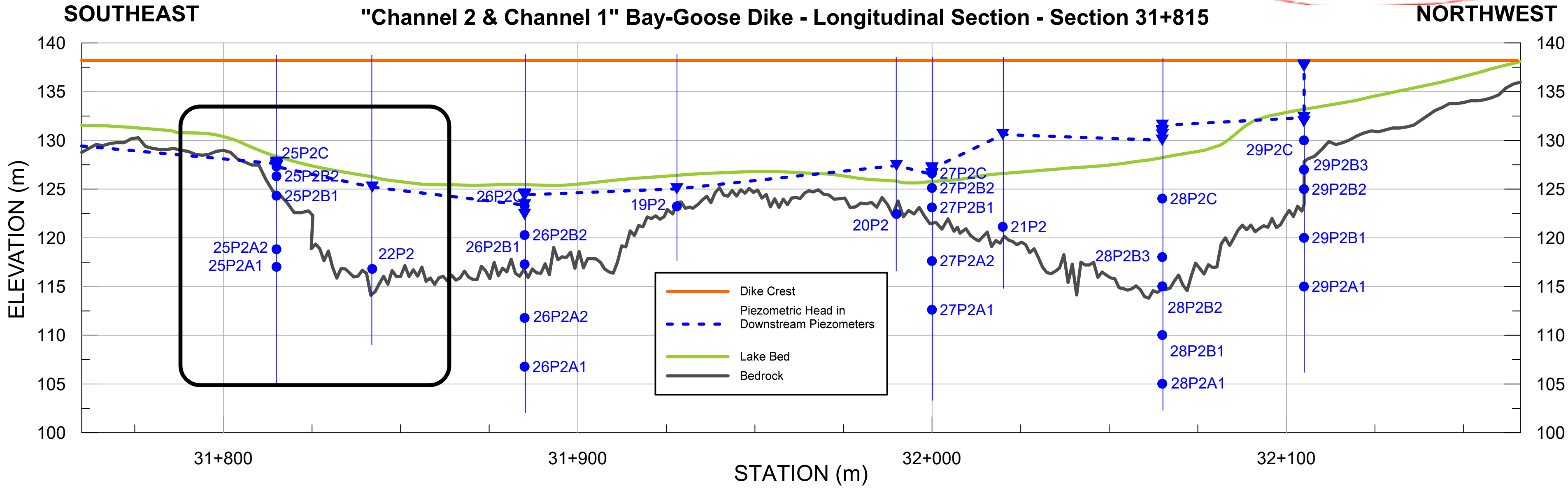
AGNICO EAGLE
MEADOWBANK

PROJECT No.			PHASE No.
DESIGN	TD	28AUG14	SCALE AS SHOWN REV.
CADD	TD	28AUG14	
CHECK	PG	28AUG14	**FIGURE 14**
REVIEW			

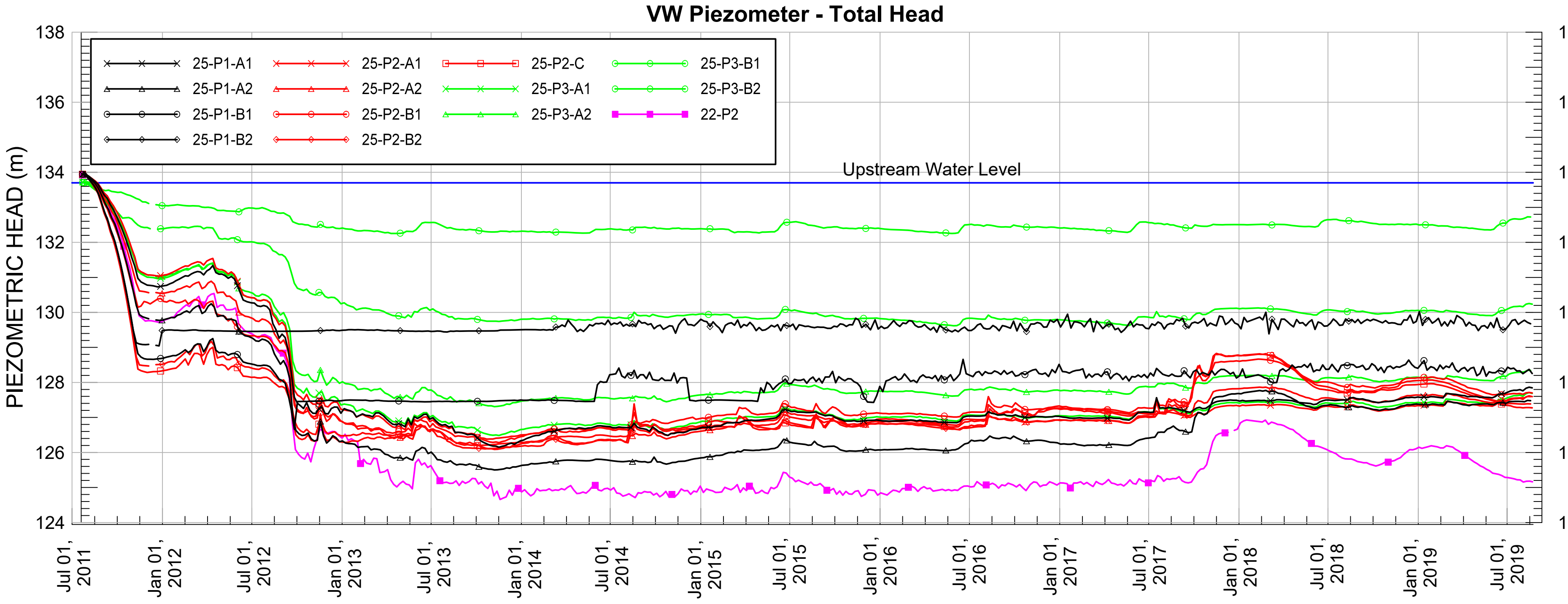
"Channel 2 & Channel 1" Bay-Goose Dike - Section 31+815 (DL6)



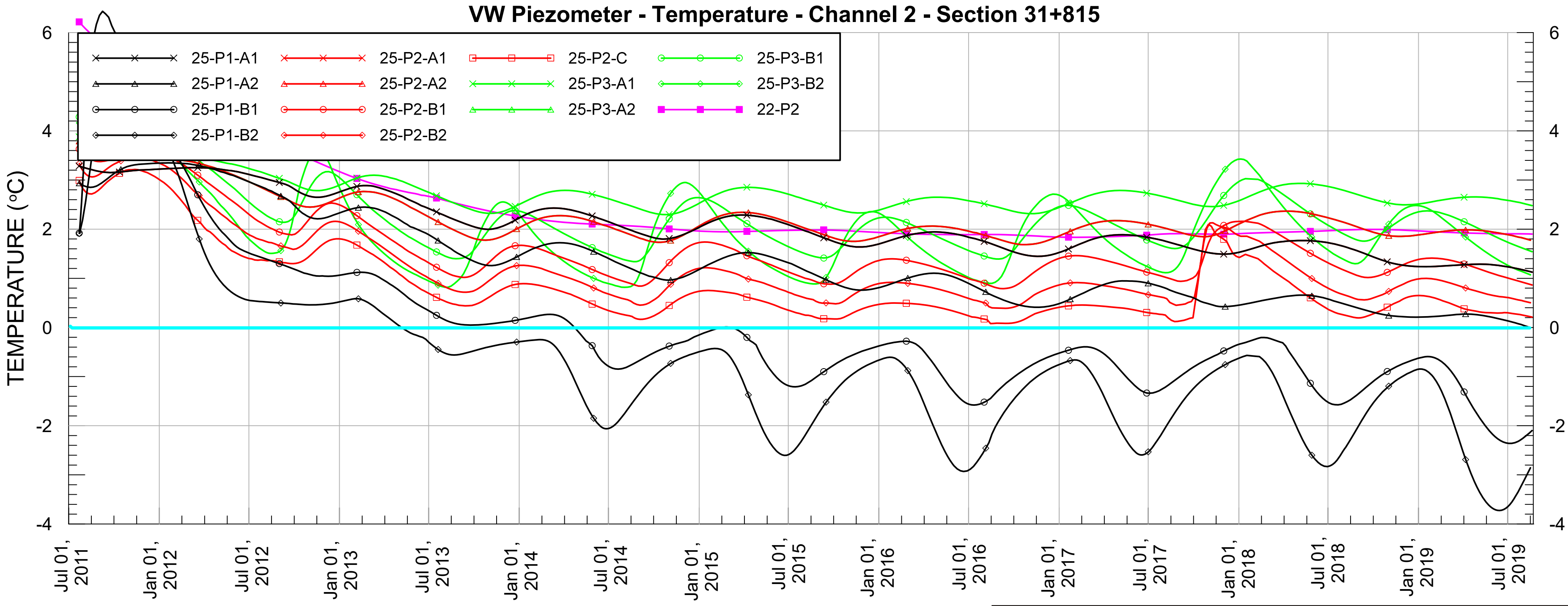
SOUTHEAST "Channel 2 & Channel 1" Bay-Goose Dike - Longitudinal Section - Section 31+815 NORTHWEST



VW Piezometer - Total Head



VW Piezometer - Temperature - Channel 2 - Section 31+815



NOTES:

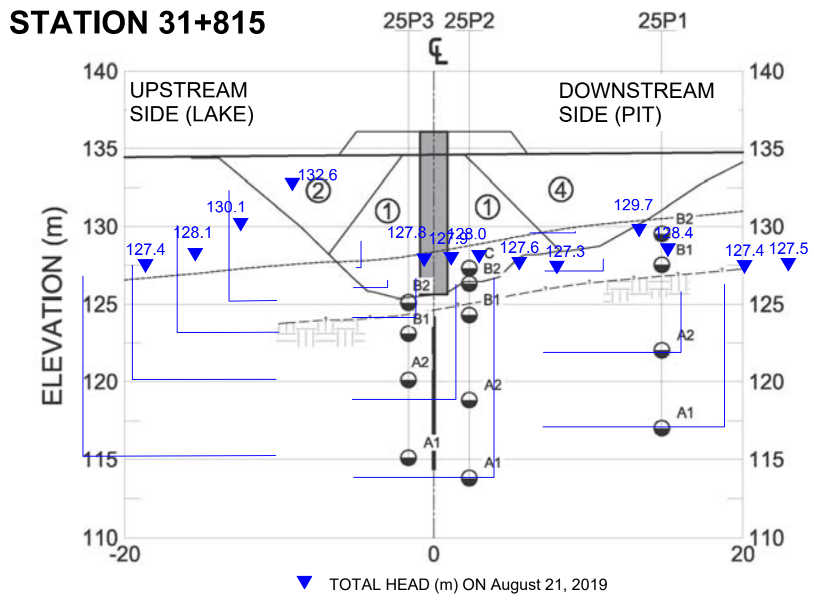
1. The rise in temperature and PWP was interpreted as the permafrost at the toe of the dike blocking the seepage path which led to this events. Will continue to monitor in the field and the instruments. Since the snow melt the blockage is not longer there and the PWP is on a downtrend.
2. 25P1B1 and 25P1B2 are showing a negative temperature reading and are assumed to be frozen.

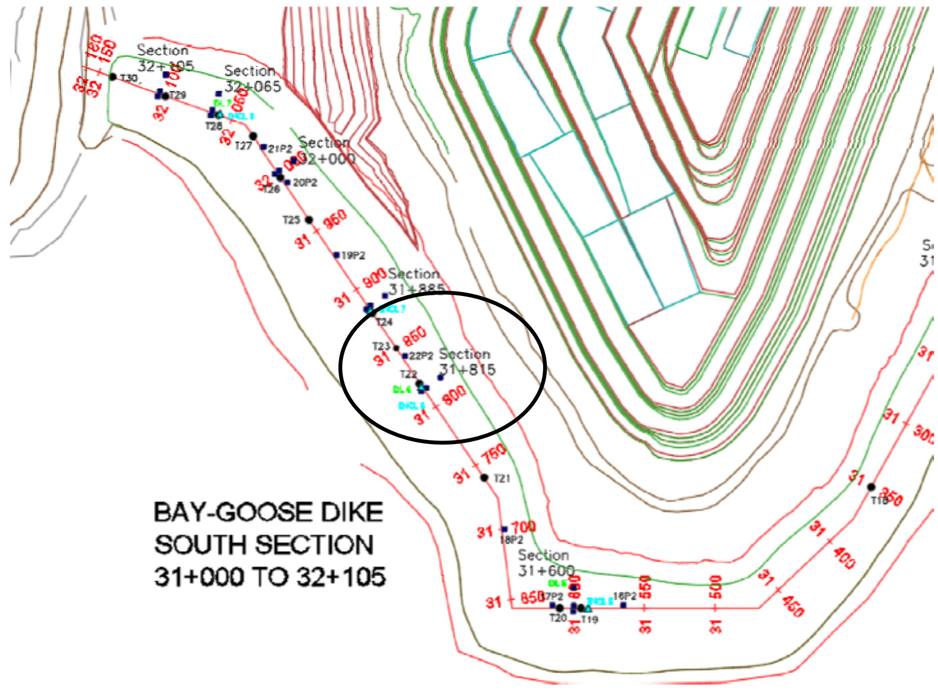
PROJECT AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

TITLE **BAYGOOSE DIKE**
Section 31+815 - CHANNEL 2, PIEZOMETRIC DATA (July 1/11 to Aug 21/19)

AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
CADD	TD	28AUG14	**FIGURE 15**	
CHECK	PG	28AUG14		
REVIEW				

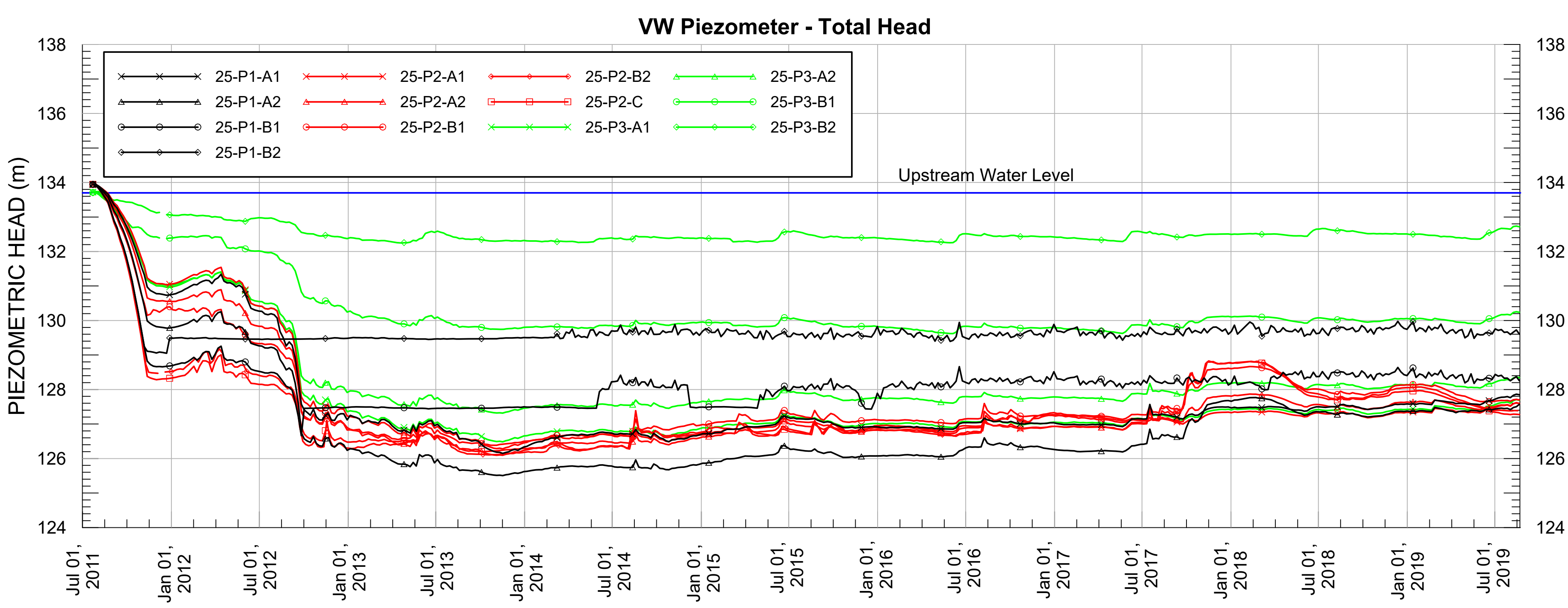


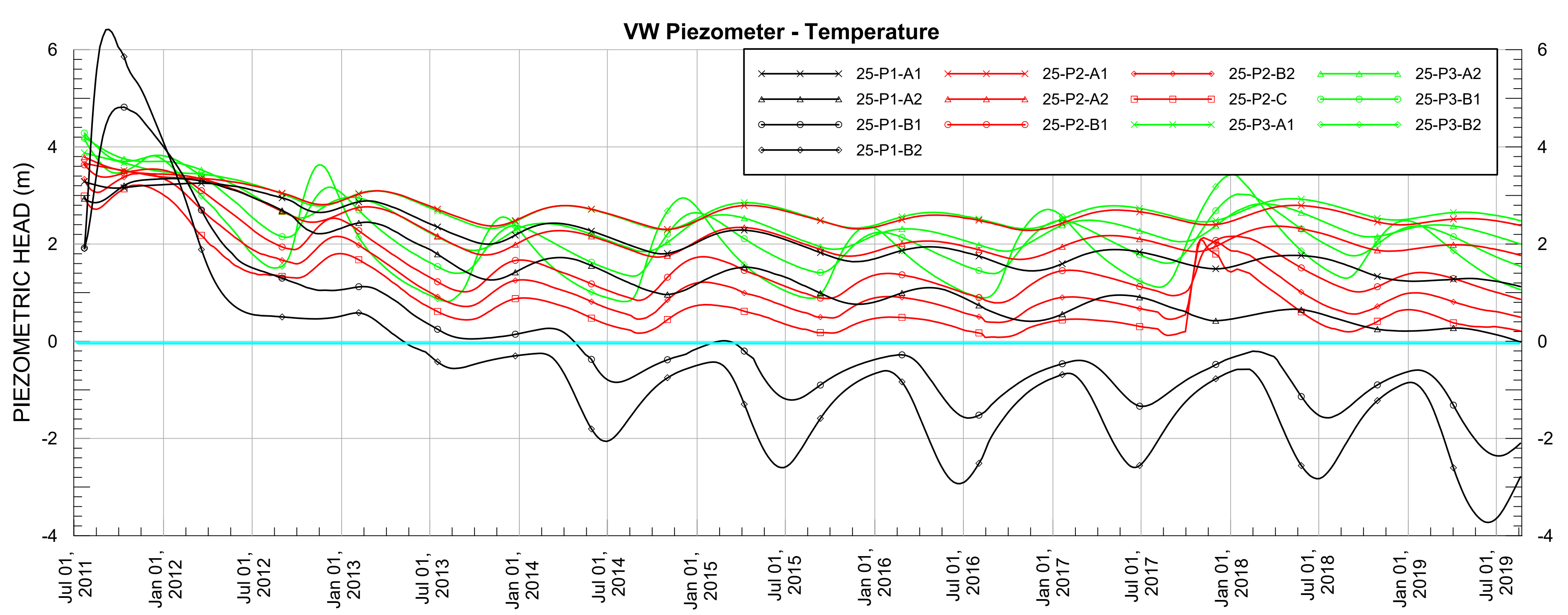


LEGEND

- CUTOFF (CSB)
- CUTOFF (SB)
- INITIAL ROCKFILL
- LAKEBED
- BEDROCK
- JET GROUT
- GROUT

1. CORE BACKFILL (19 mm MINUS)
2. COARSE BACKFILL (15mm MINUS)
3. ROCKFILL
4. FINE ROCKFILL





NOTES:

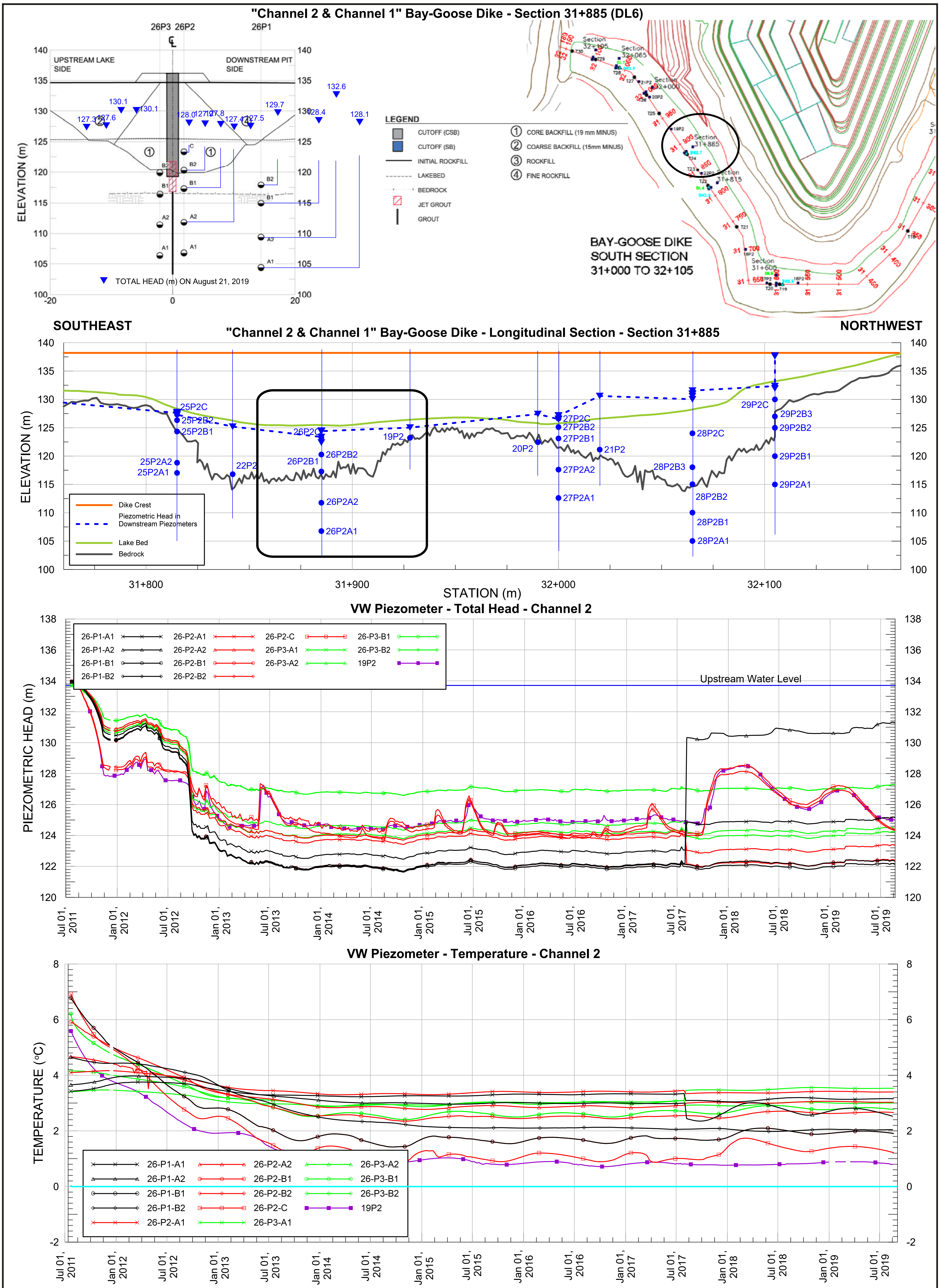
1. The rise in temperature and PWP was interpreted as the permafrost at the toe of the dike blocking the seepage path which led to this events. Will continue to monitor in the field and the instruments. Since the snow melt the blockage is no longer there and the PWP is on a downtrend.

PROJECT
AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

TITLE
BAY-GOOSE DIKE - SECTION 31+815
PIEZOMETRIC DATA
(July 1/11 to Aug 21/19)

AGNICO EAGLE MEADOWBANK

PROJECT No.	09-1428-5007		PHASE No.	4000
DESIGN	TD	28AUG14	SCALE	AS SHOWN
CADD	TD	28AUG14	REV.	
CHECK	PG	28AUG14	**FIGURE 16**	
REVIEW				



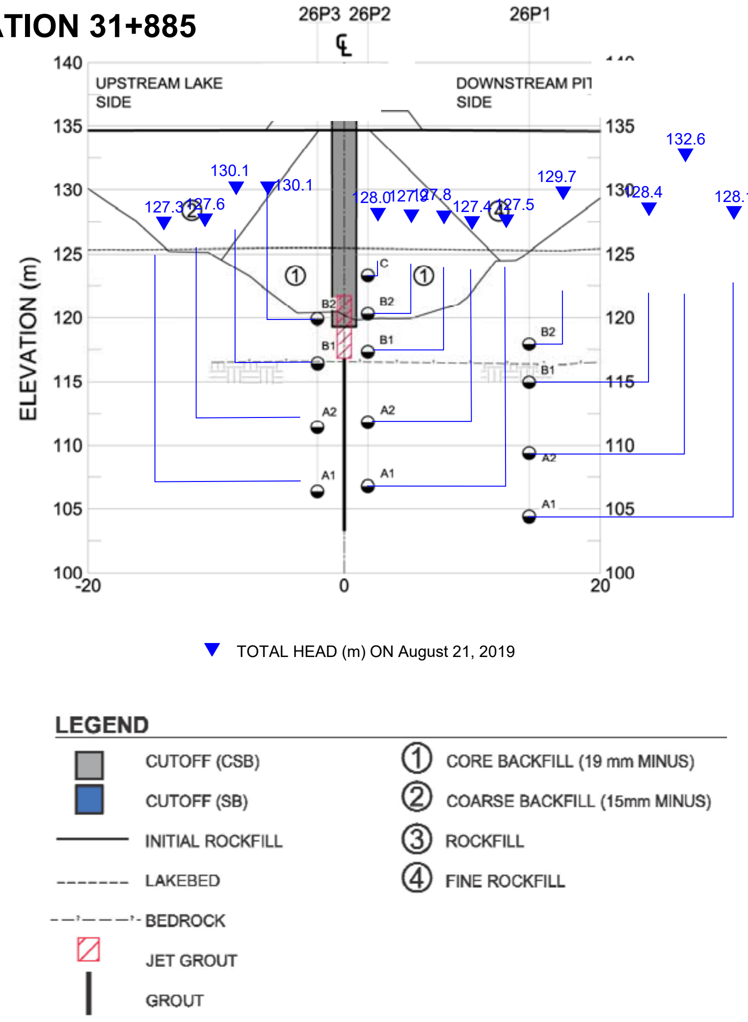
NOTES:

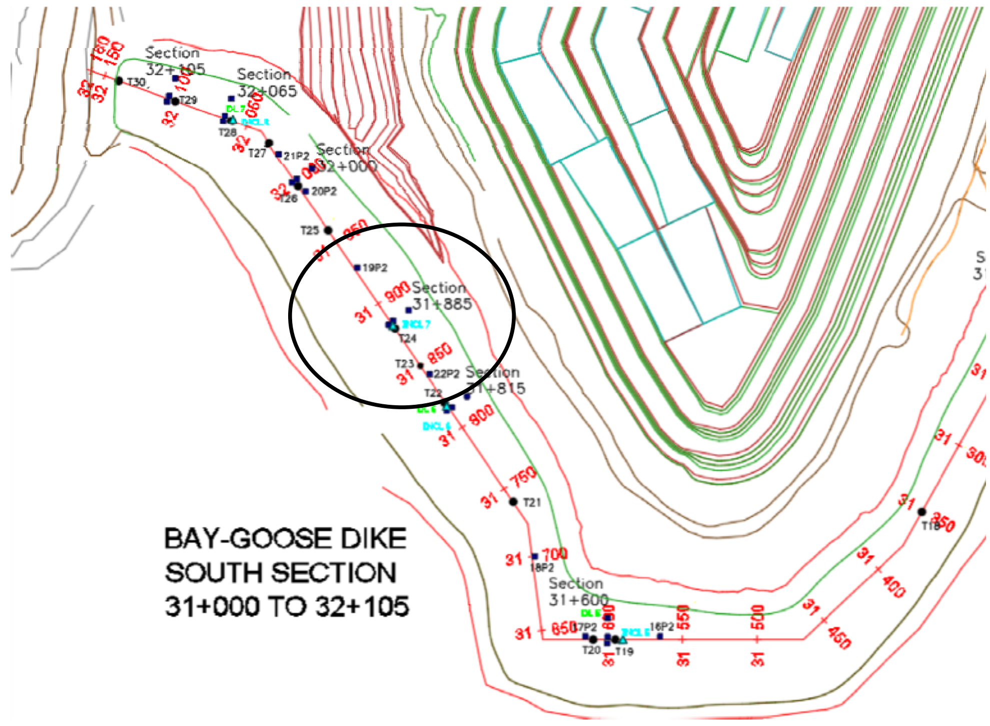
1. The rise in temperature and PWP was interpreted as the permafrost at the toe of the dike blocking the seepage path which led to this events. Will continue to monitor in the field and the instruments. Now that ice has melted the PWP has decreased as the seepage path is no longer blocked.

PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE Section 31+885 - CHANNEL 2, PIEZOMETRIC DATA (July 1/11 to Aug 21/19)

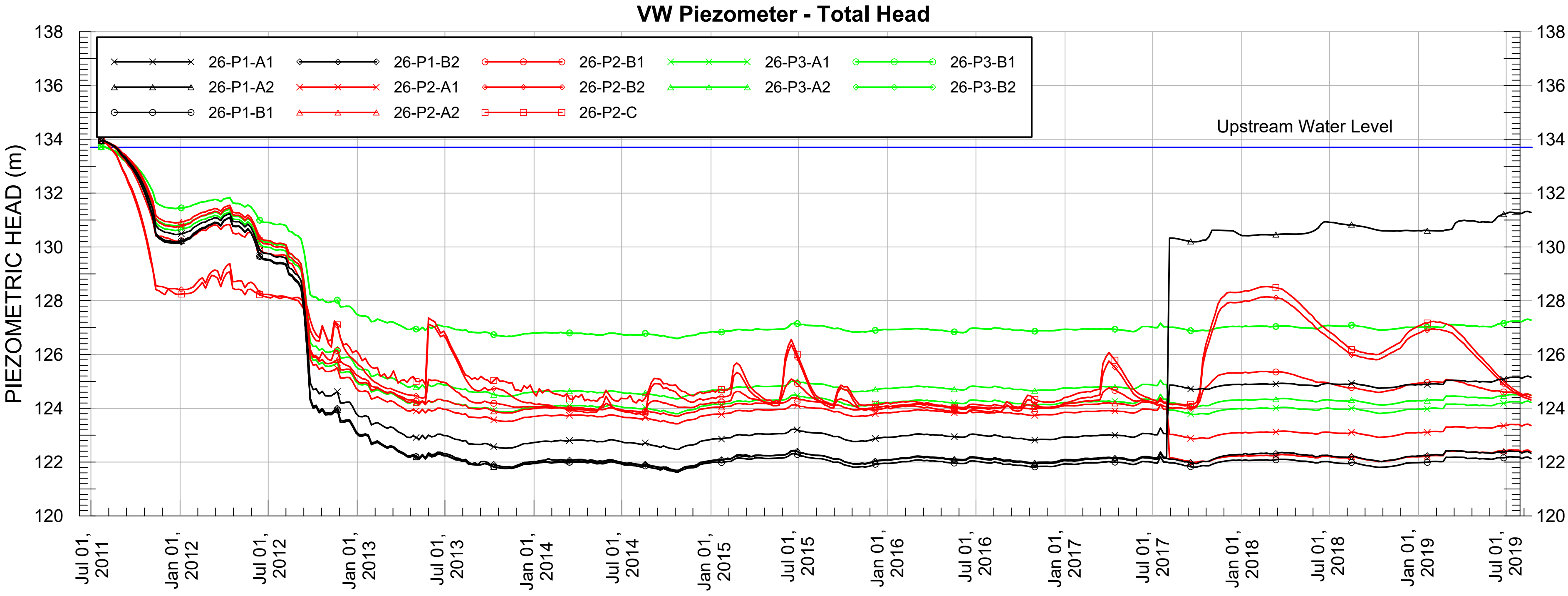
AGNICO EAGLE MEADOWBANK	PROJECT No.			PHASE No.	
	DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
	CADD	TD	28AUG14	FIGURE 17	
	CHECK	PG	28AUG14		
	REVIEW				

STATION 31+885

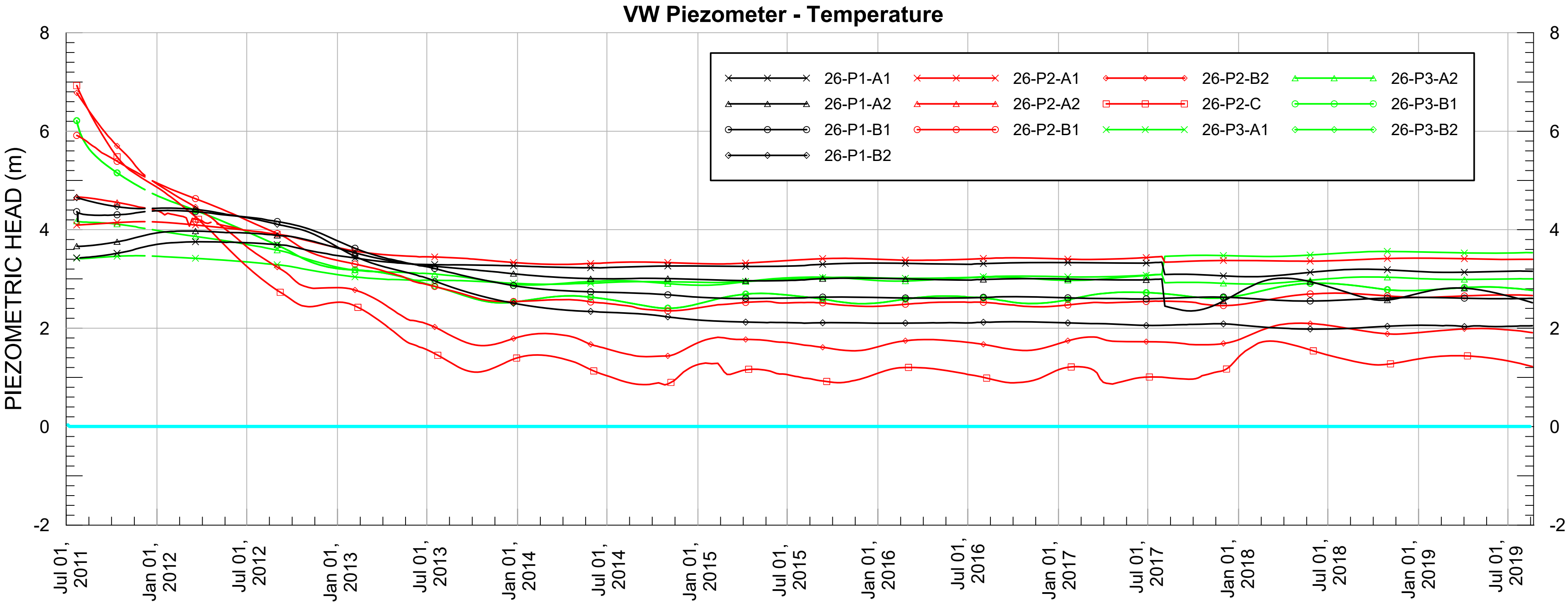




VW Piezometer - Total Head



VW Piezometer - Temperature



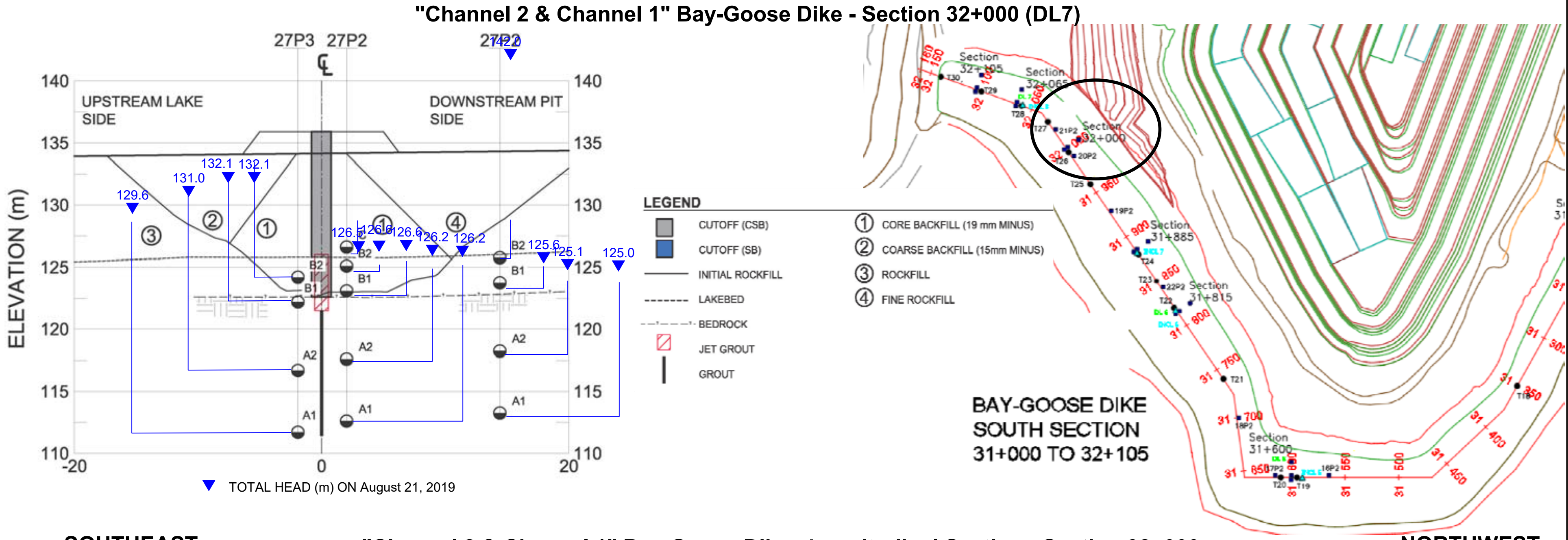
NOTES:

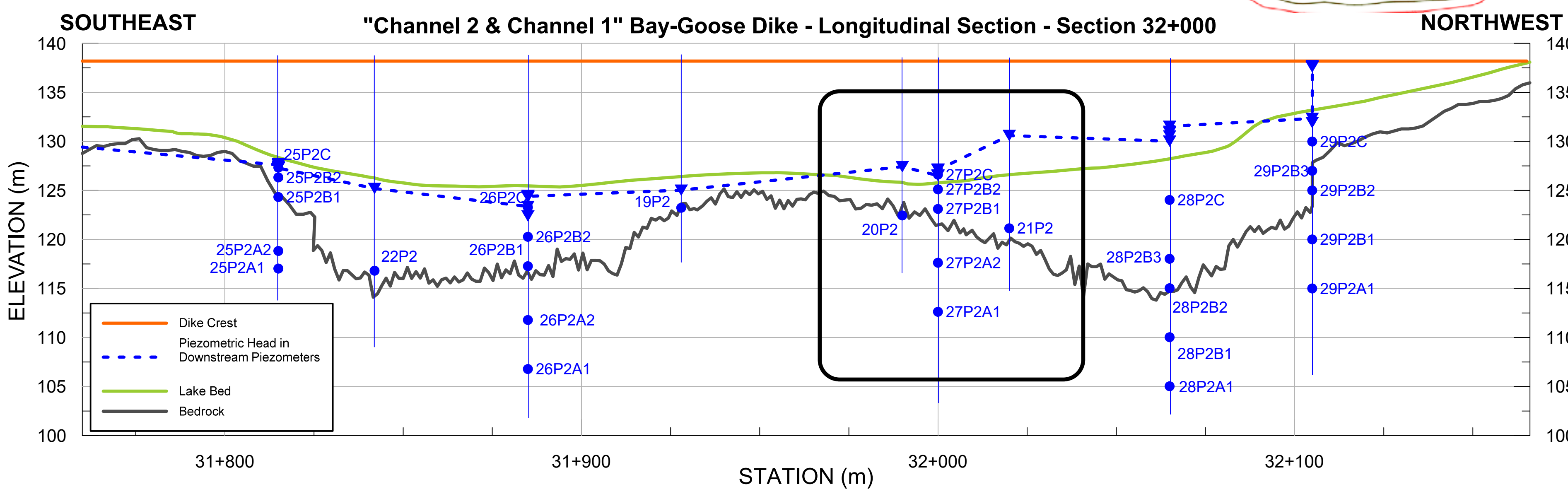
1. The rise in temperature and PWP was interpreted as the permafrost at the toe of the dike blocking the seepage path which led to this events. Will continue to monitor in the field and the instruments. Now that ice has melted the PWP has decreased as the seepage path is no longer blocked.

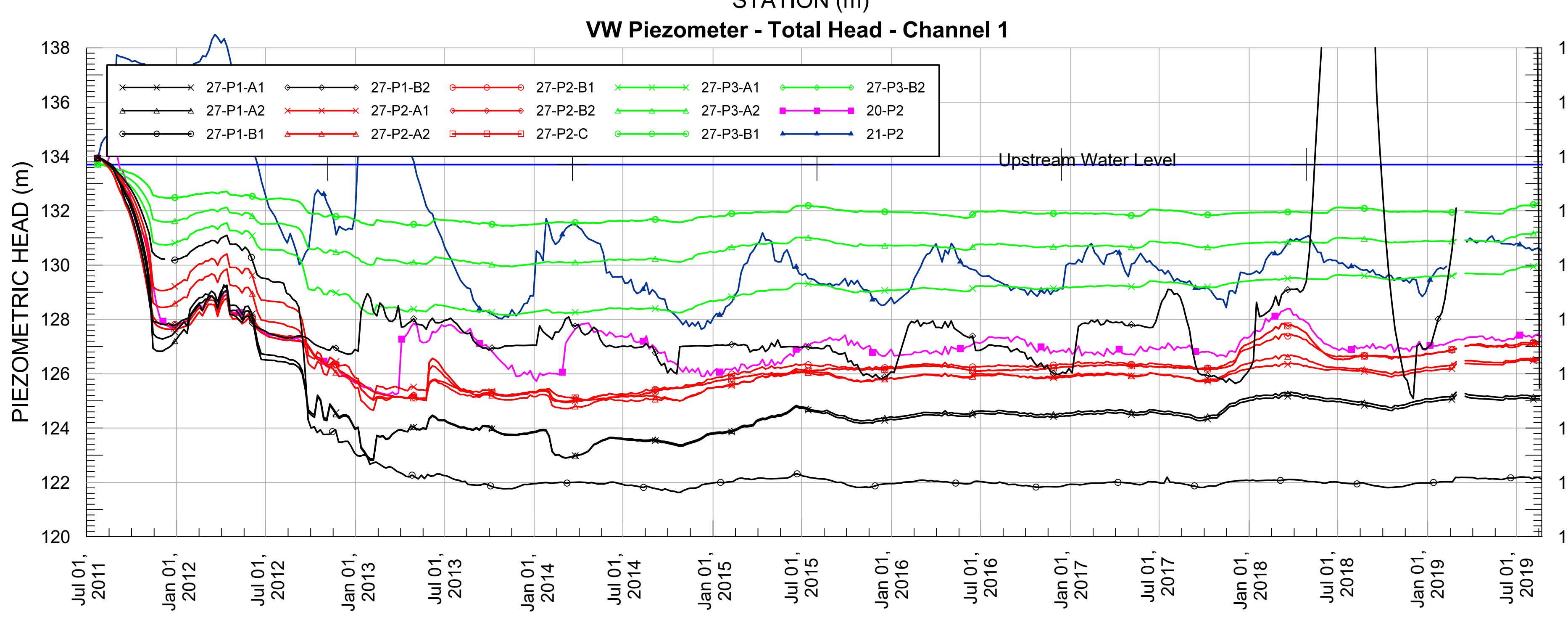
PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE - SECTION 31+885 PIEZOMETRIC DATA (July 1/11 to Aug 21/19)

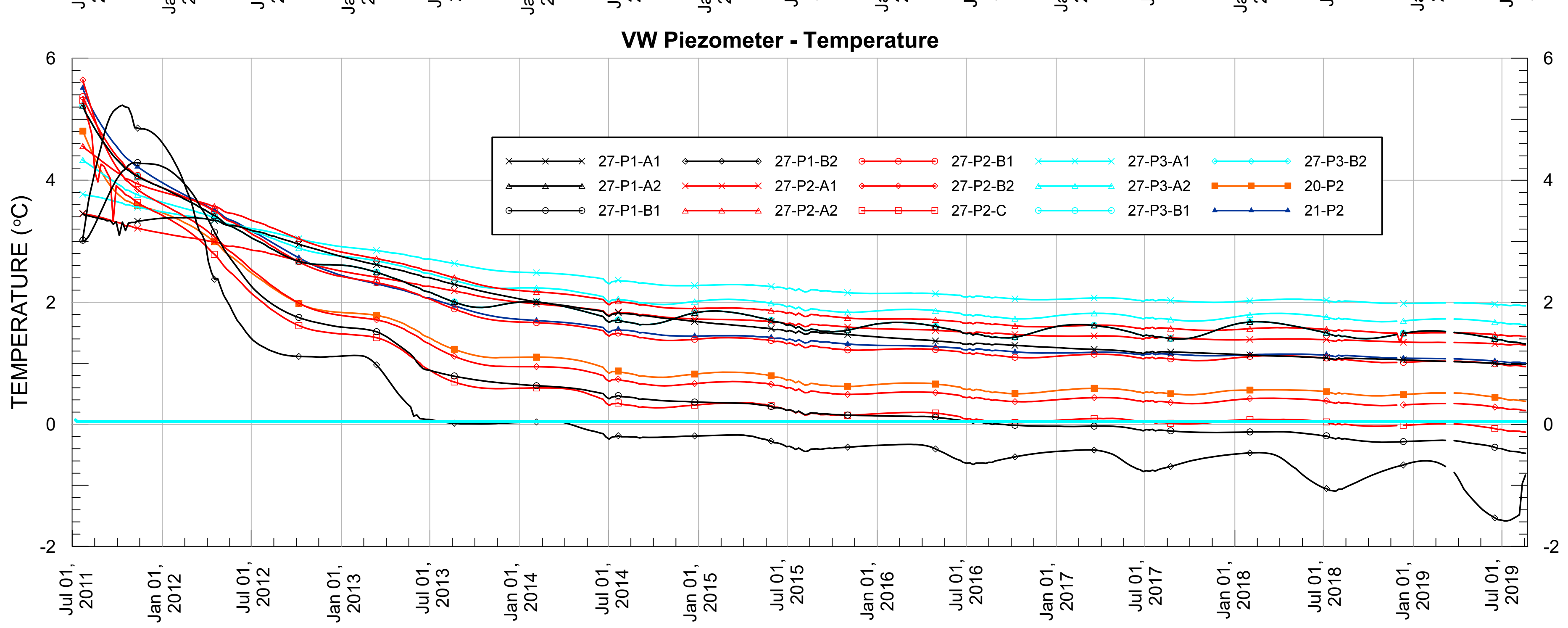
AGNICO EAGLE
MEADOWBANK

PROJECT No.			PHASE No.
DESIGN	TD	28AUG14	SCALE AS SHOWN REV.
CADD	TD	28AUG14	FIGURE 18
CHECK	PG	28AUG14	
REVIEW			









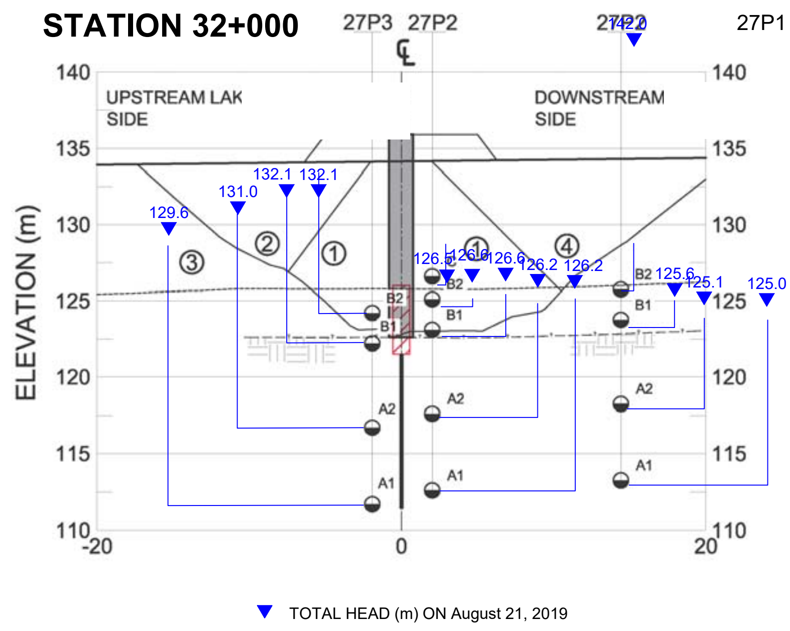
NOTES:

1. With the spike PWP pressure in 27-P1-B2 it is assumed that this instrument is not functioning anymore as the PWP pressure is higher than the lake elevation.

PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE CHANNEL 1, PIEZOMETRIC DATA SECTION 32+000 (July 1/11 to Aug 21/19)

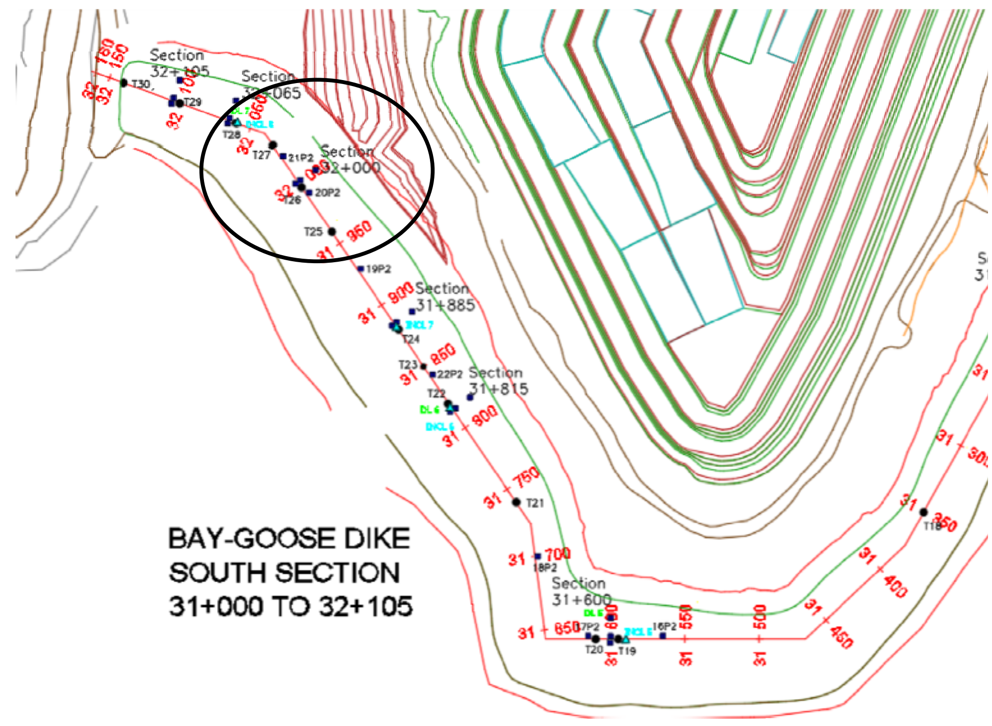
AGNICO EAGLE
MEADOWBANK

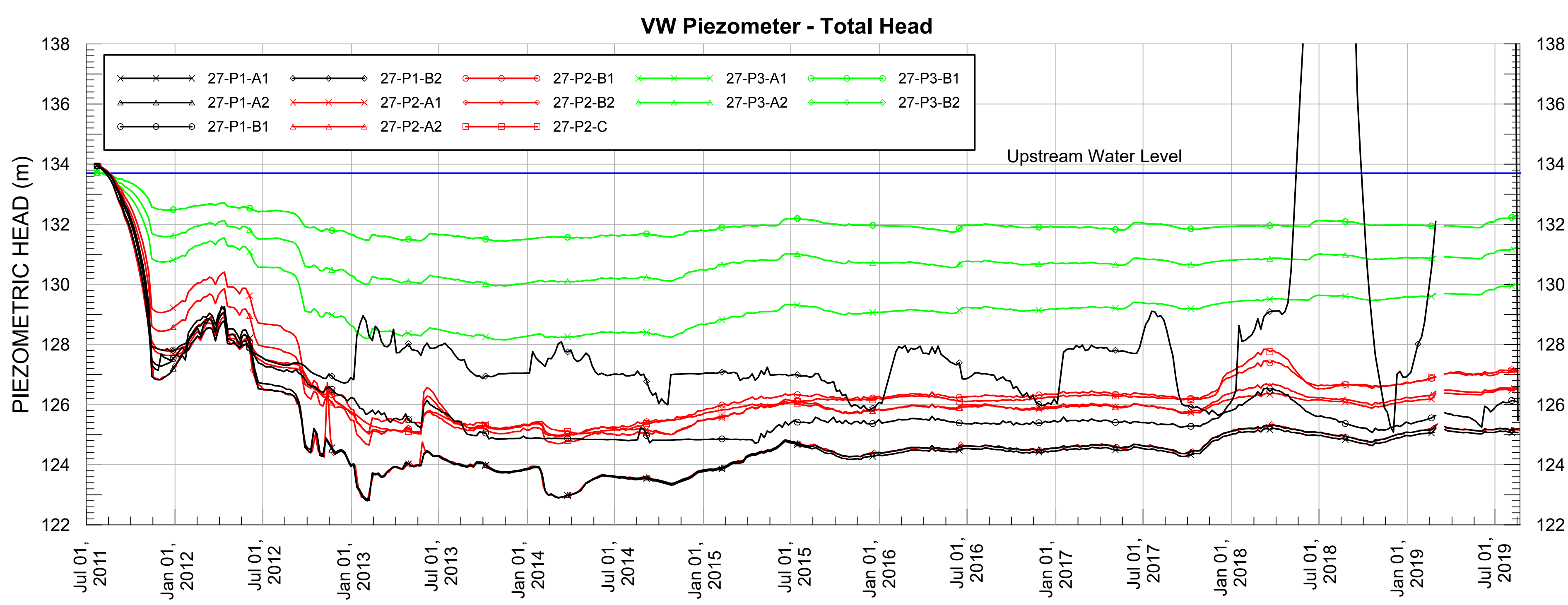
PROJECT No.			PHASE No.	
DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
CADD	TD	28AUG14	FIGURE 19	
CHECK	PG	28AUG14		
REVIEW				

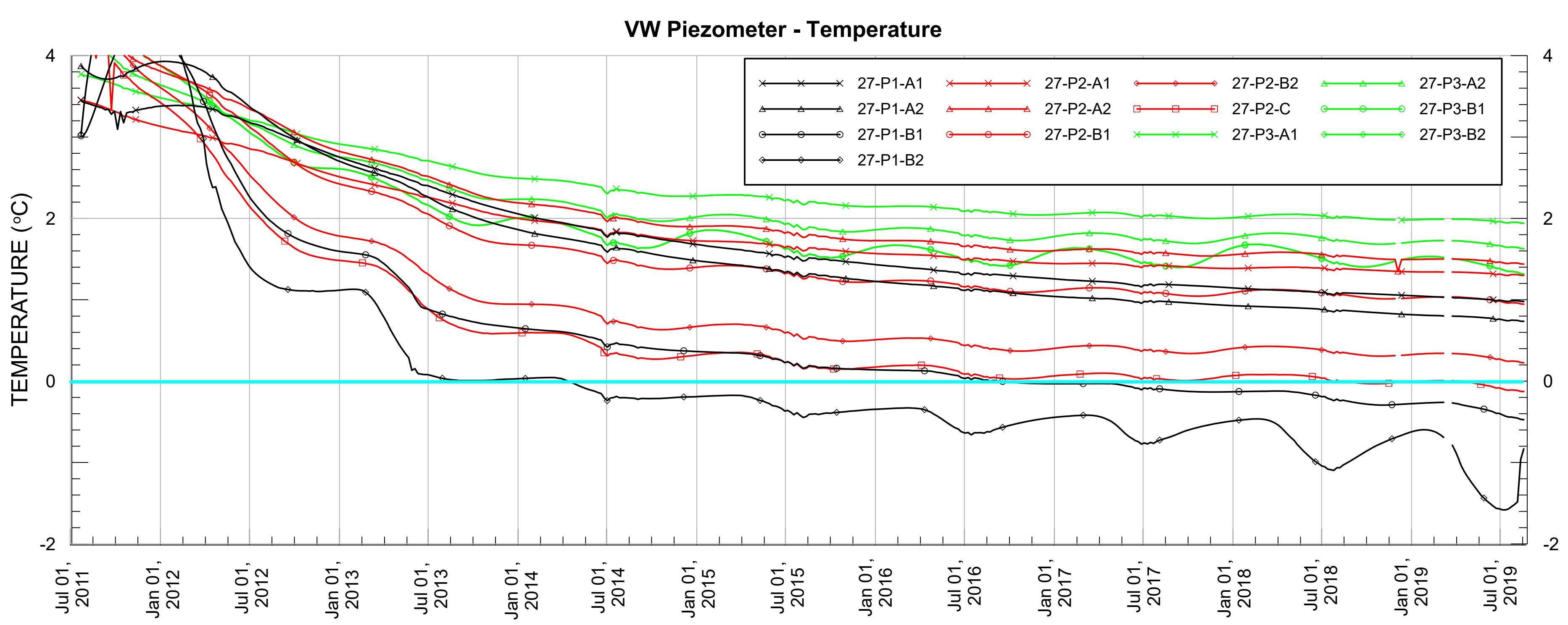


LEGEND

CUTOFF (CSB)	① CORE BACKFILL (19 mm MINUS)
CUTOFF (SB)	② COARSE BACKFILL (15mm MINUS)
INITIAL ROCKFILL	③ ROCKFILL
LAKEBED	④ FINE ROCKFILL
BEDROCK	
JET GROUT	
GROUT	







NOTES:

1. With the spike PWP pressure in 27-P1-B2 it is assumed that this instrument is not functioning anymore as the PWP pressure is higher than the lake elevation.

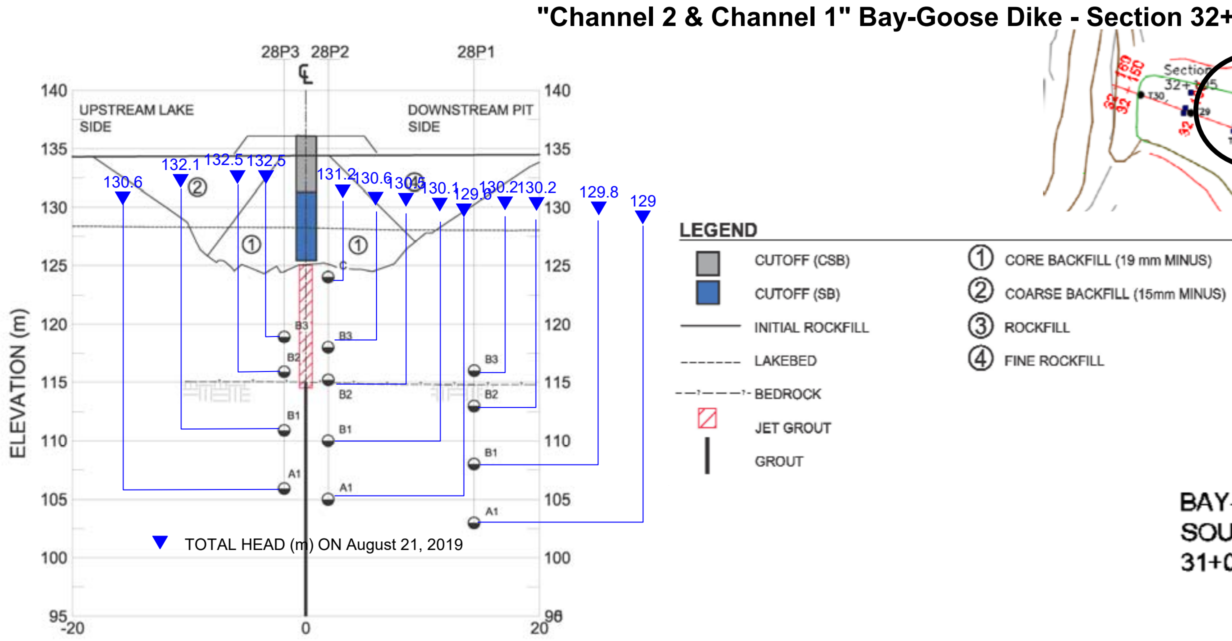
PROJECT: AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

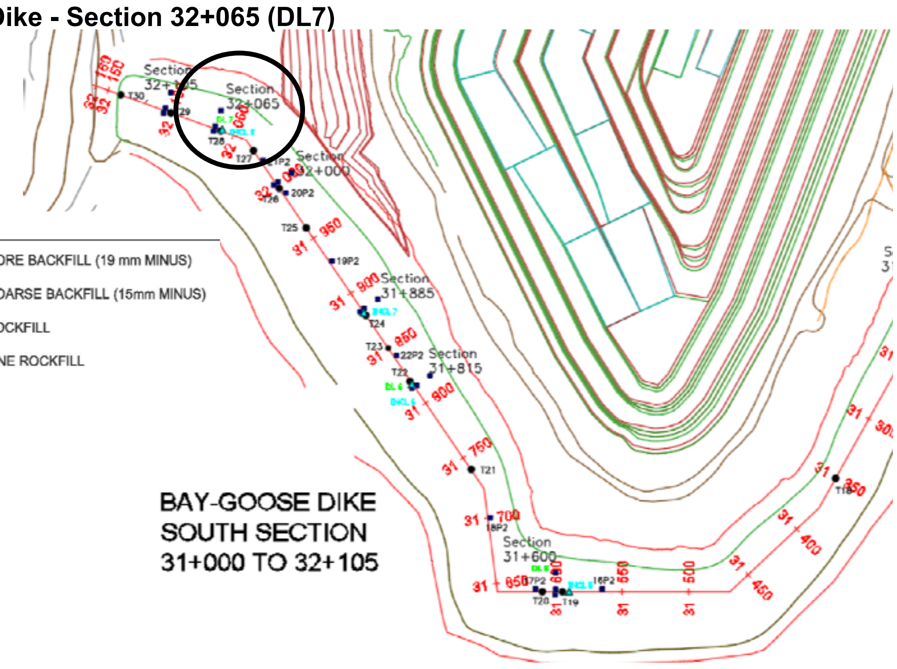
TITLE: BAY OOSE DIKE - SECTION 32+000
PIEZOMETRIC DATA
(July 1/11 to Aug 21/19)

AGNICO EAGLE

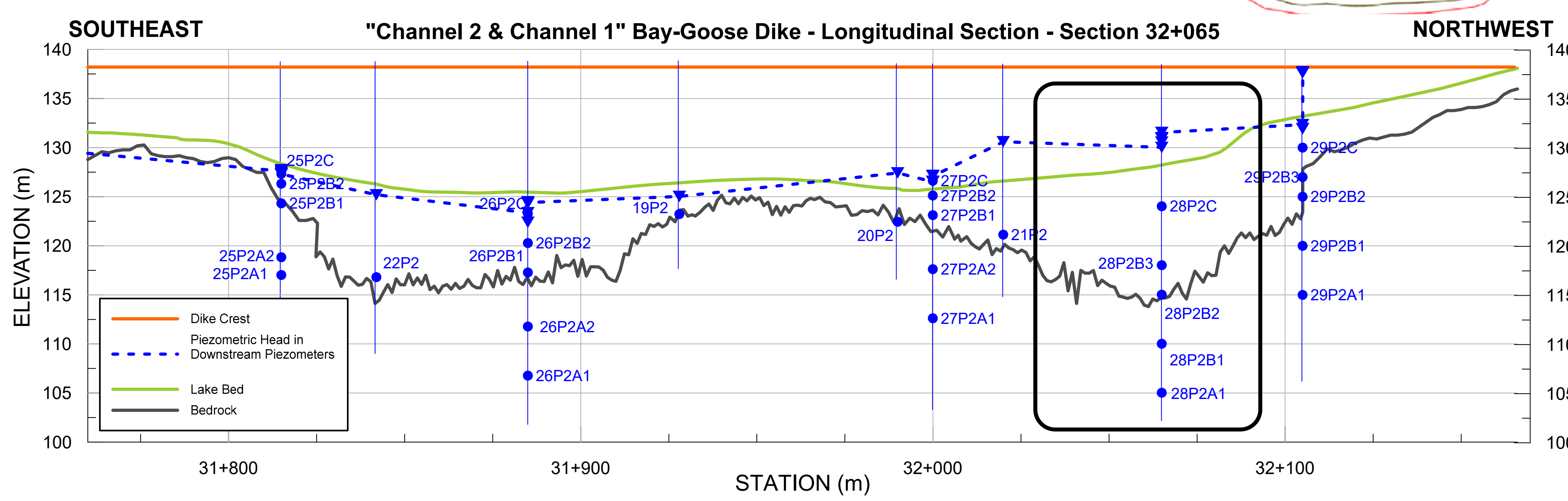
PROJECT No.			PHASE No.
DESIGN	TD	28AUG14	SCALE AS SHOWN REV.
CADD	TD	28AUG14	
CHECK	PG	28AUG14	FIGURE 20
REVIEW			

"Channel 2 & Channel 1" Bay-Goose Dike - Section 32+065 (DL7)

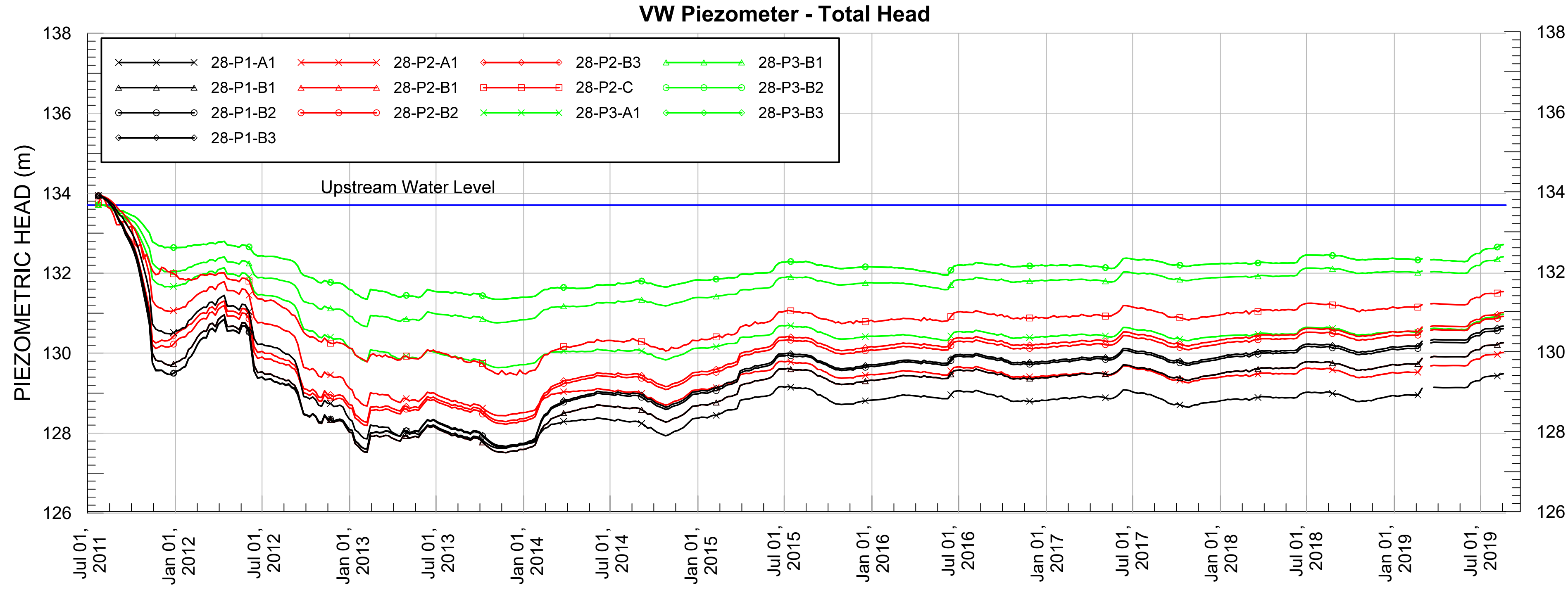




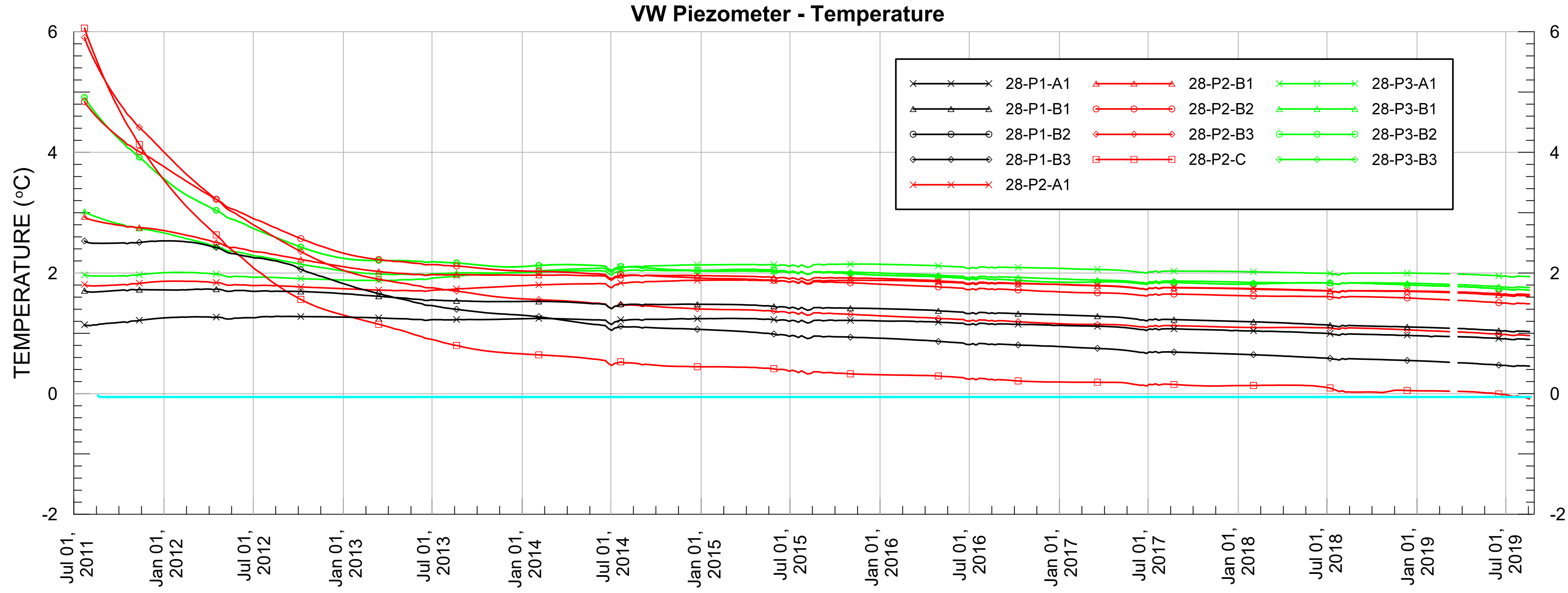
"Channel 2 & Channel 1" Bay-Goose Dike - Longitudinal Section - Section 32+065



VW Piezometer - Total Head



VW Piezometer - Temperature



NOTES:
1.

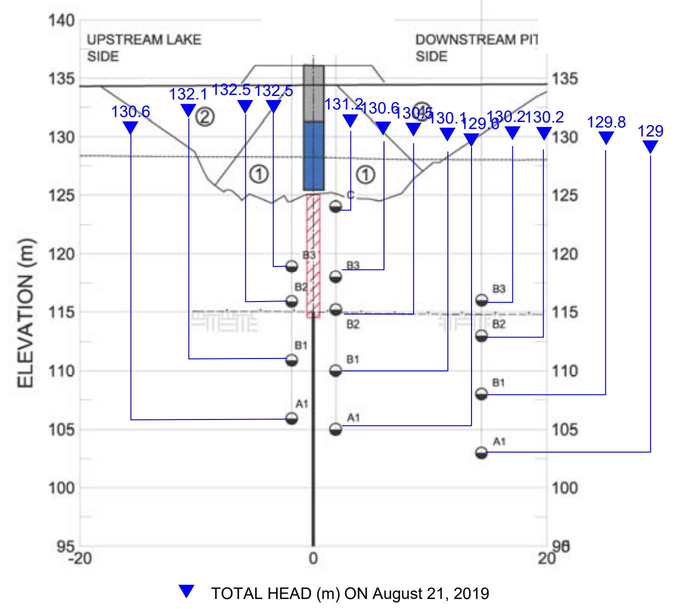
PROJECT
AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

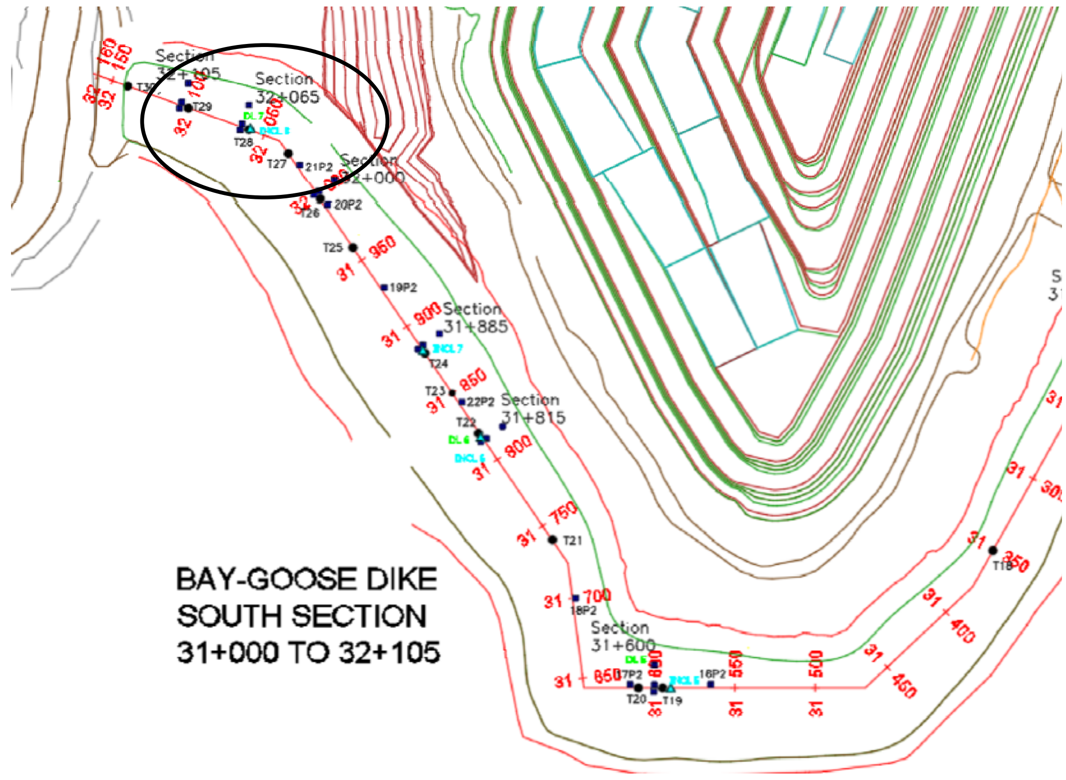
TITLE
BAYGOOSE DIKE
Section 32+065 - CHANNEL 1, PIEZOMETRIC DATA (July 1/11 to Aug 21/19)

AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
CADD	TD	28AUG14	**FIGURE 21**	
CHECK	PG	28AUG14		
REVIEW				

STATION 32+065

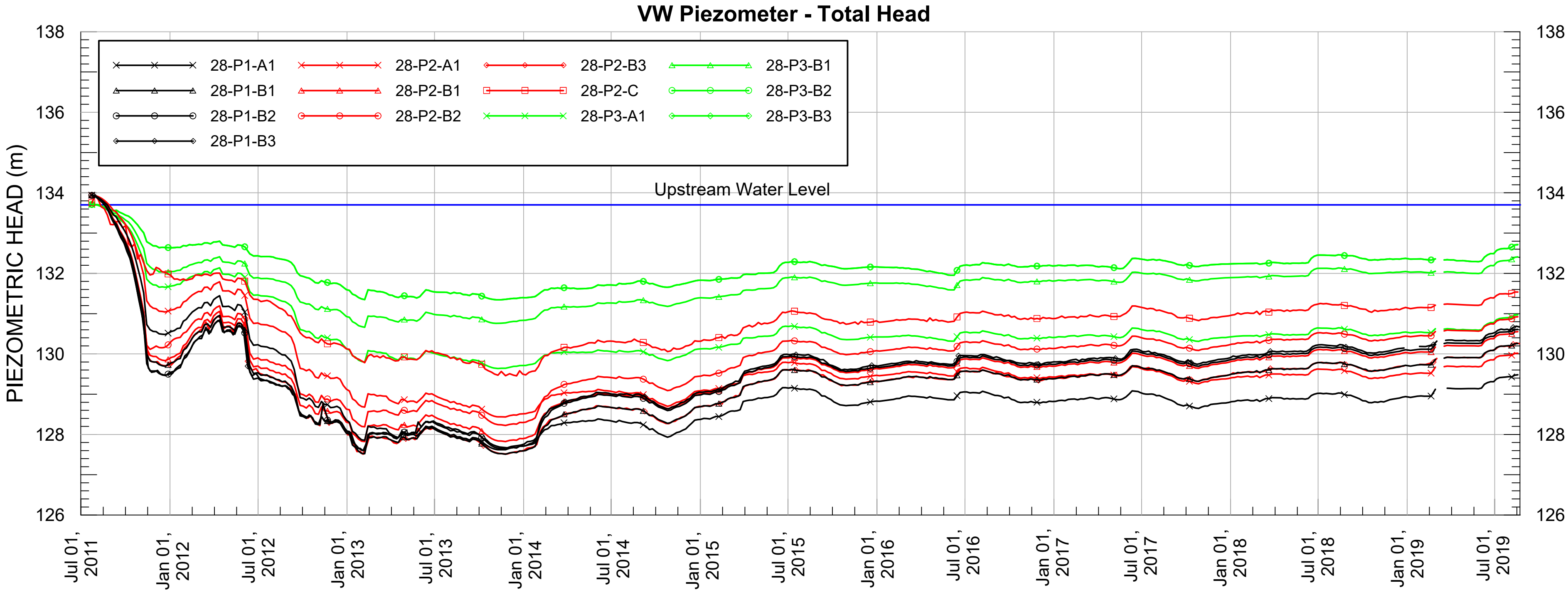




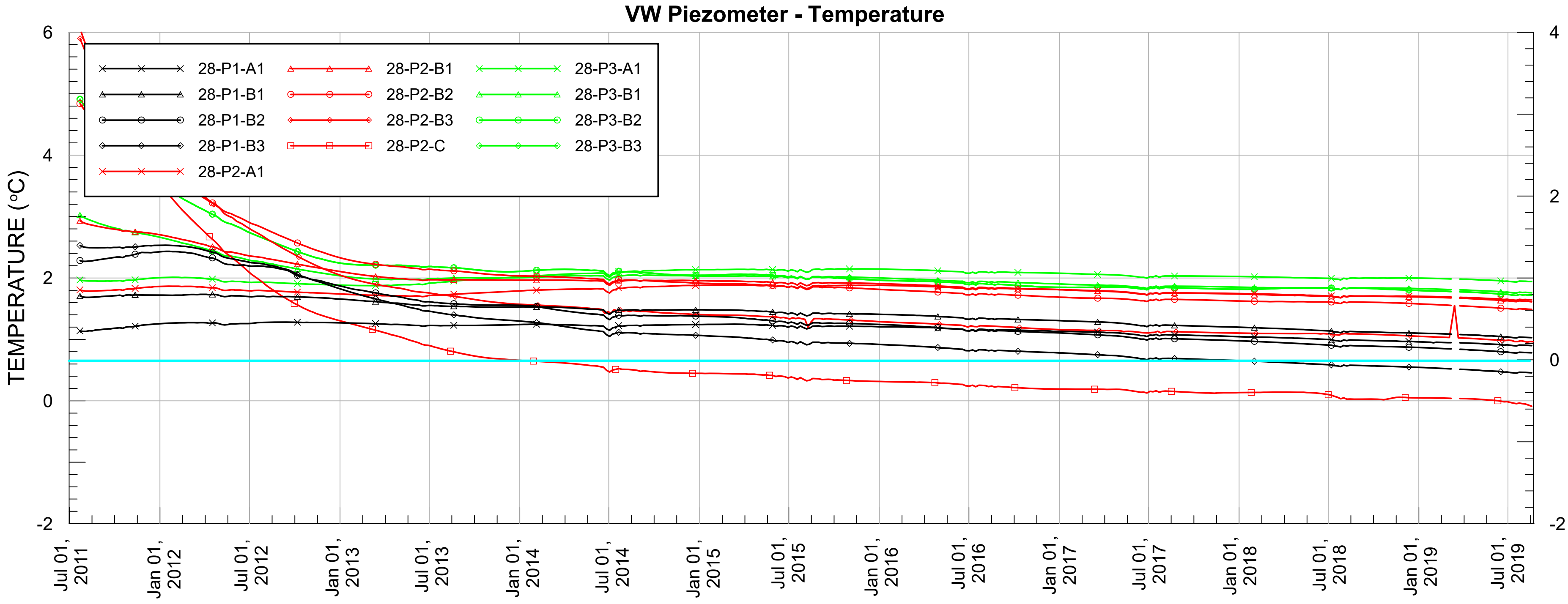
LEGEND

- CUTOFF (CSB)
- CUTOFF (SB)
- INITIAL ROCKFILL
- LAKEBED
- BEDROCK
- JET GROUT
- GROUT
- ① CORE BACKFILL (19 mm MINUS)
- ② COARSE BACKFILL (15mm MINUS)
- ③ ROCKFILL
- ④ FINE ROCKFILL

VW Piezometer - Total Head



VW Piezometer - Temperature



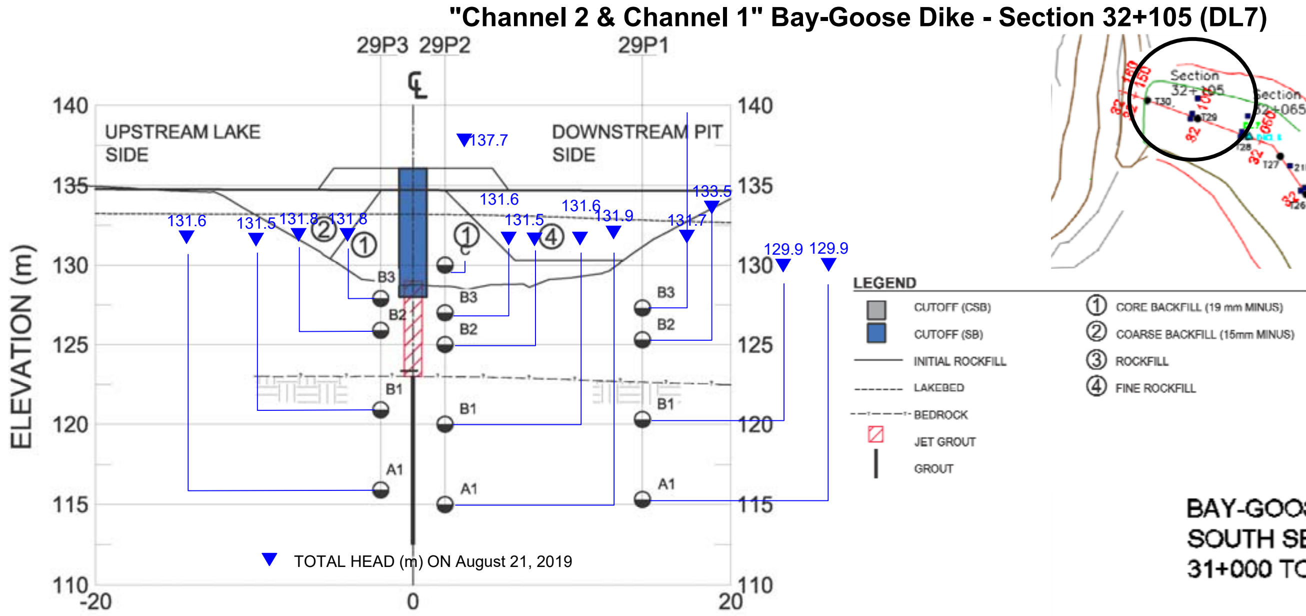
NOTES:
1

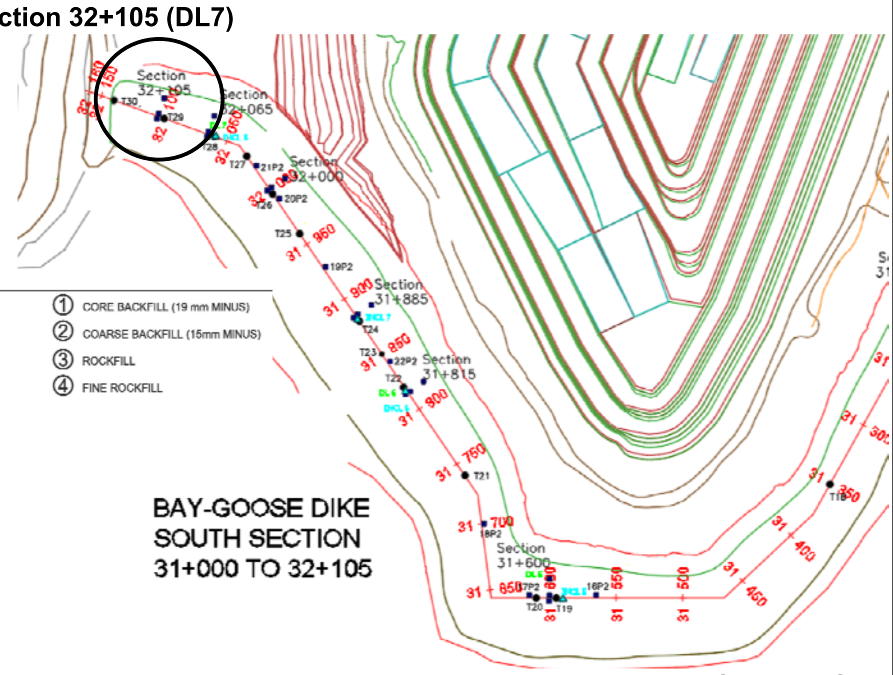
PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	**BAYGOOSE DIKE - SECTION 32+065 PIEZOMETRIC DATA (July 1/11 to Aug 21/19)**

AGNICO EAGLE
MEADOWBANK

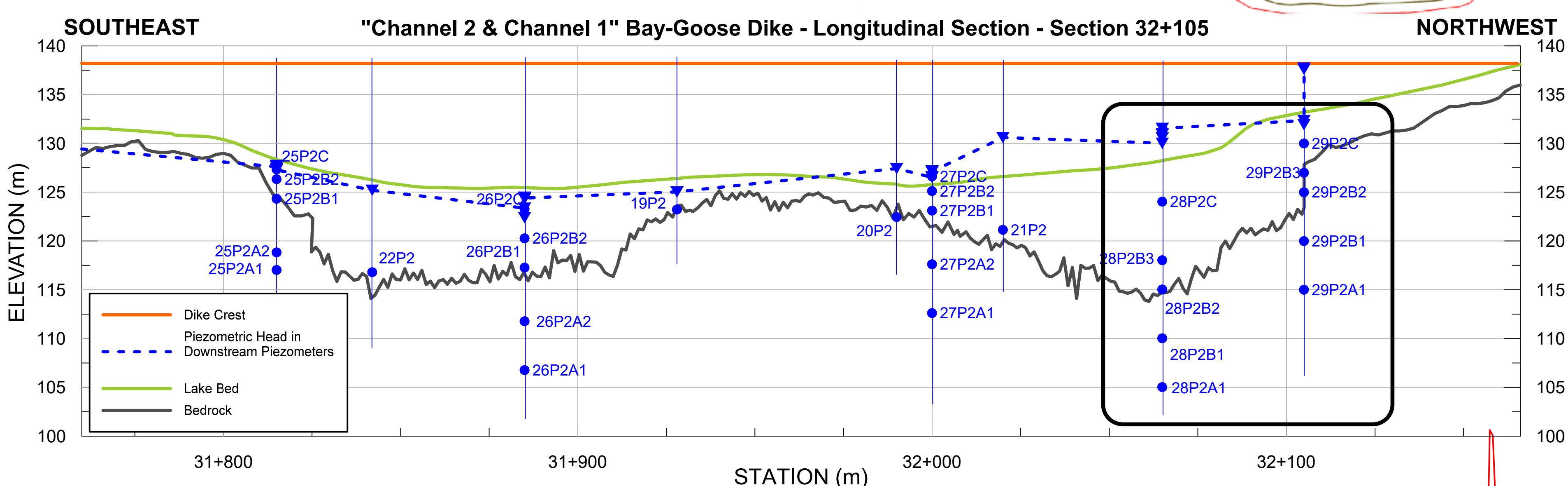
PROJECT No.			PHASE No.	
DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
CADD	TD	28AUG14	**FIGURE 22**	
CHECK	PG	28AUG14		
REVIEW				

"Channel 2 & Channel 1" Bay-Goose Dike - Section 32+105 (DL7)

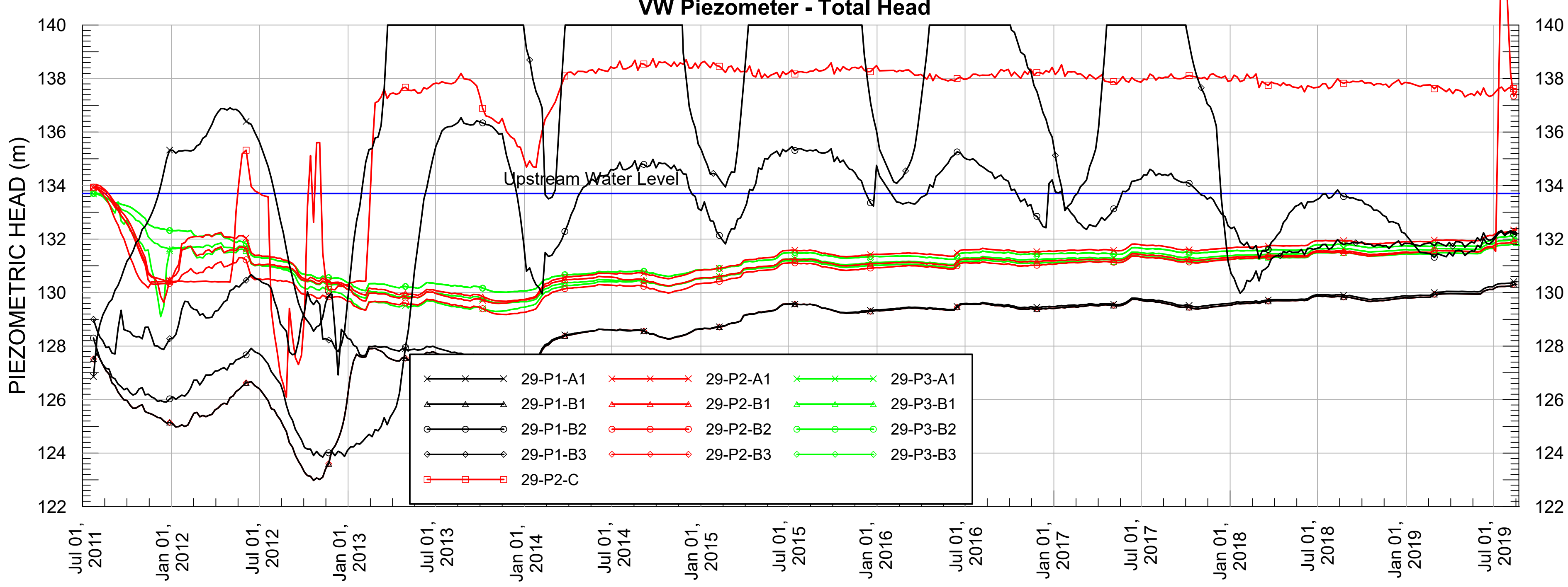




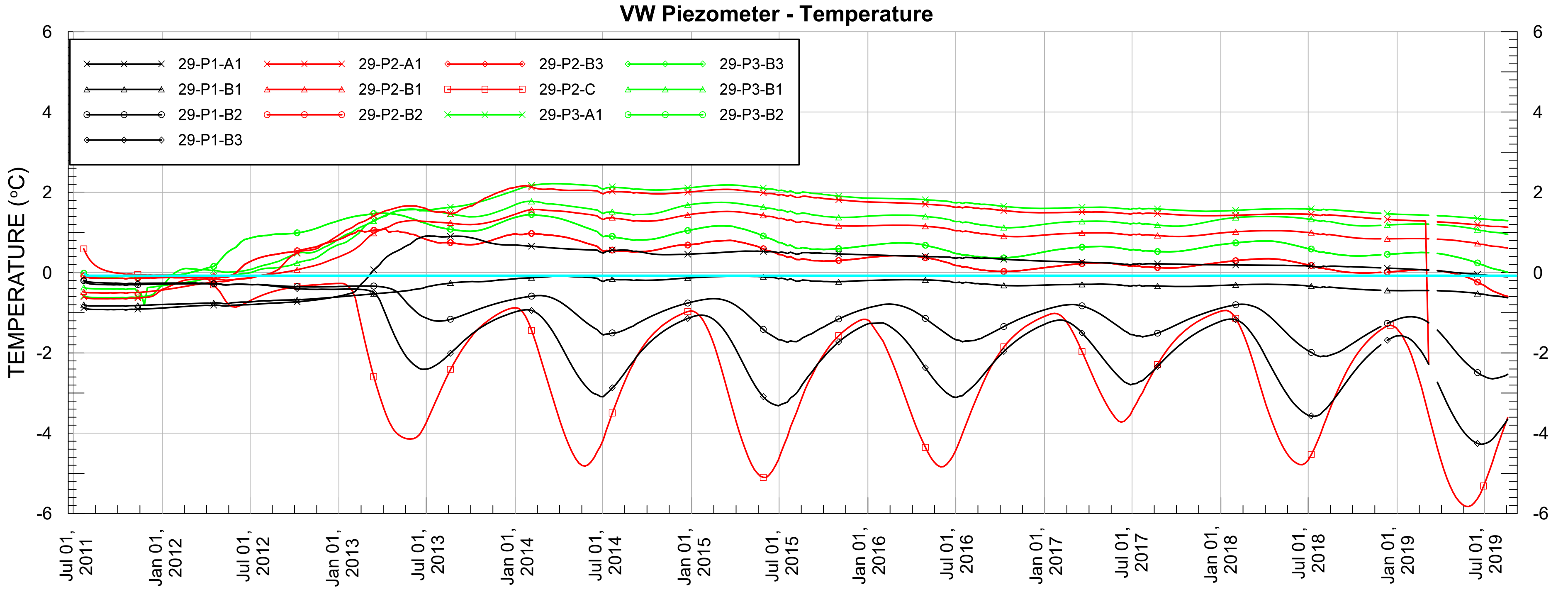
"Channel 2 & Channel 1" Bay-Goose Dike - Longitudinal Section - Section 32+105



VW Piezometer - Total Head



VW Piezometer - Temperature



NOTES:

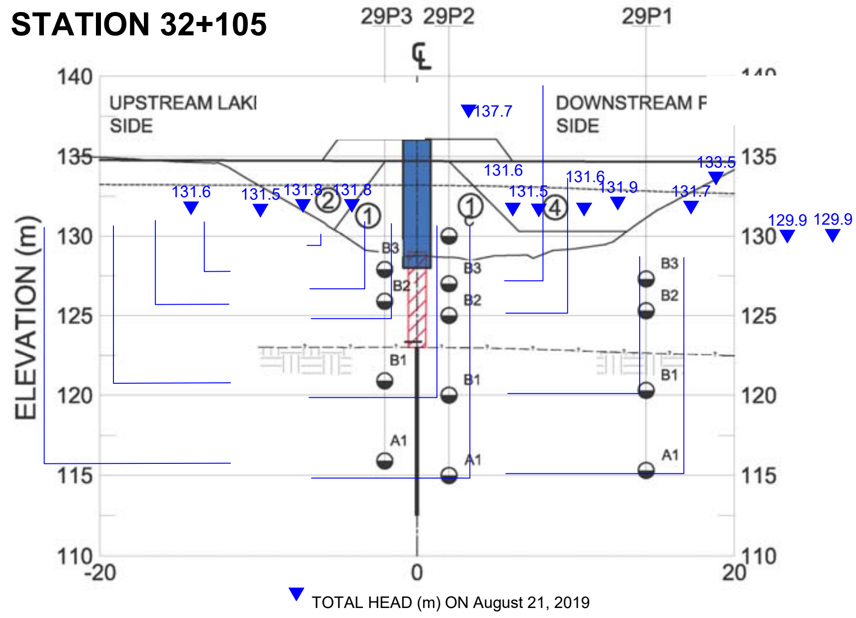
1. 29P1B2, 29P1B3, 29P2B3, 29P3B3 and 29P2C are given unstable readings and since the temperature shows a negative reading it is assumed to be frozen.

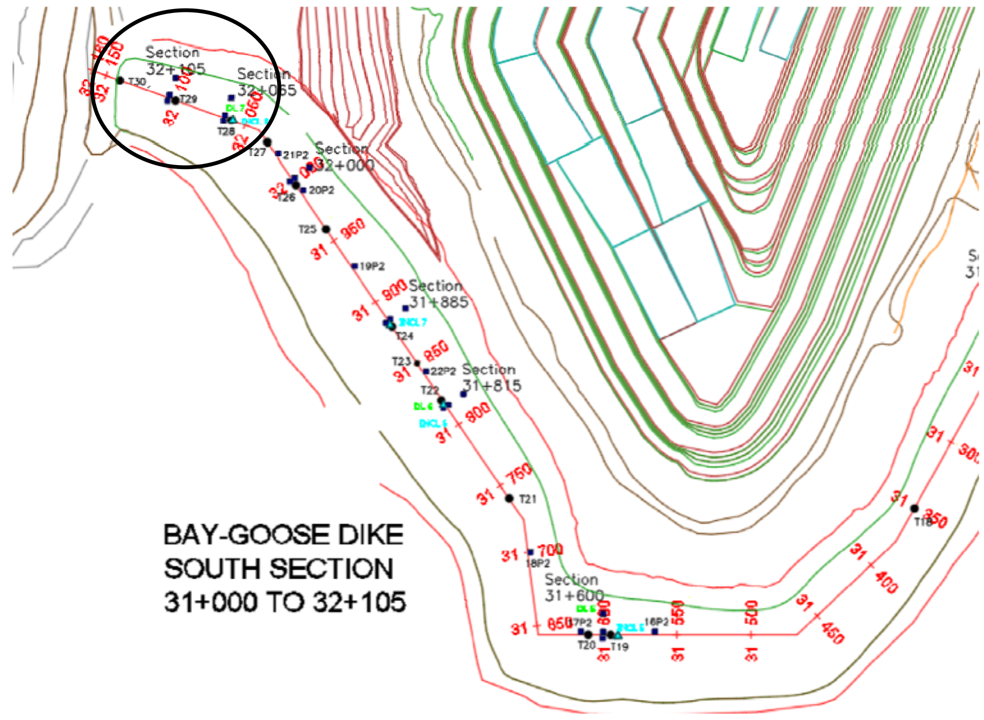
PROJECT
AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

TITLE
BAYGOOSE DIKE
Station 32+105 - CHANNEL 1, PIEZOMETRIC DATA (July 1/11 to Aug 21/19)

AGNICO EAGLE
MEADOWBANK

PROJECT No.			PHASE No.
DESIGN	TD	28AUG14	SCALE AS SHOWN REV.
CADD	TD	28AUG14	
CHECK	PG	28AUG14	FIGURE 23
REVIEW			

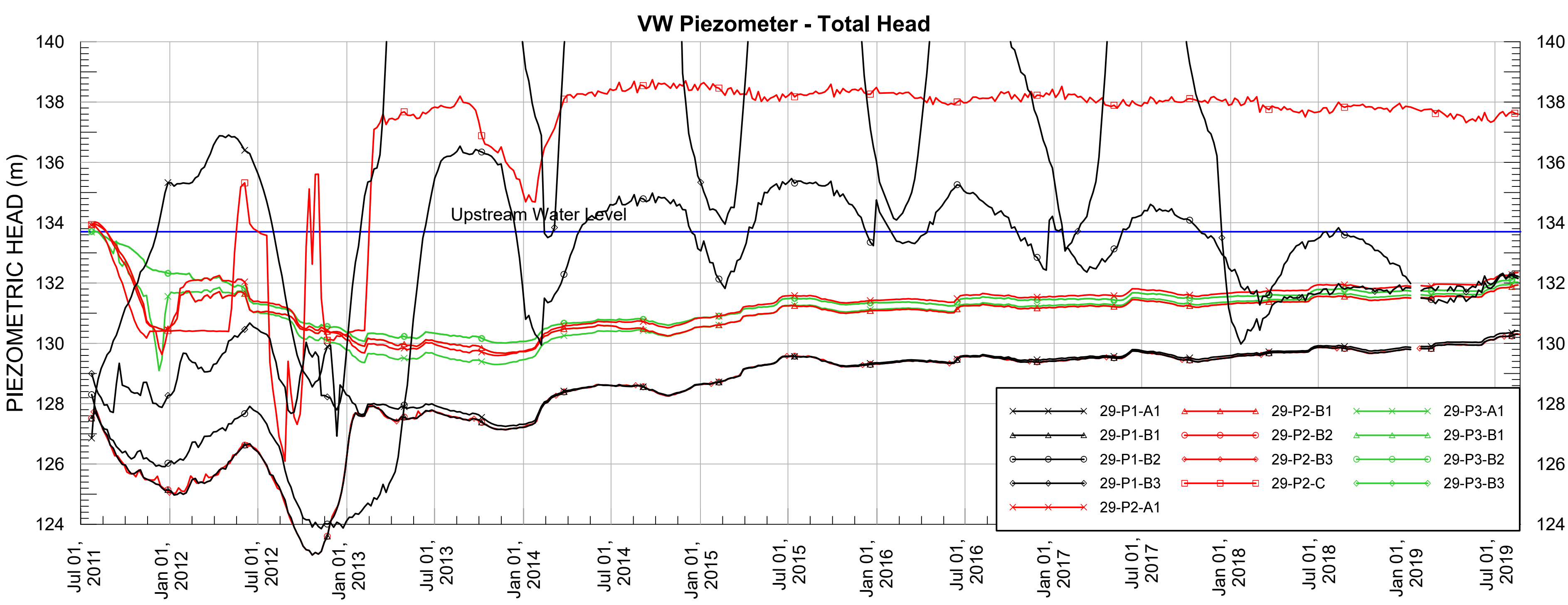


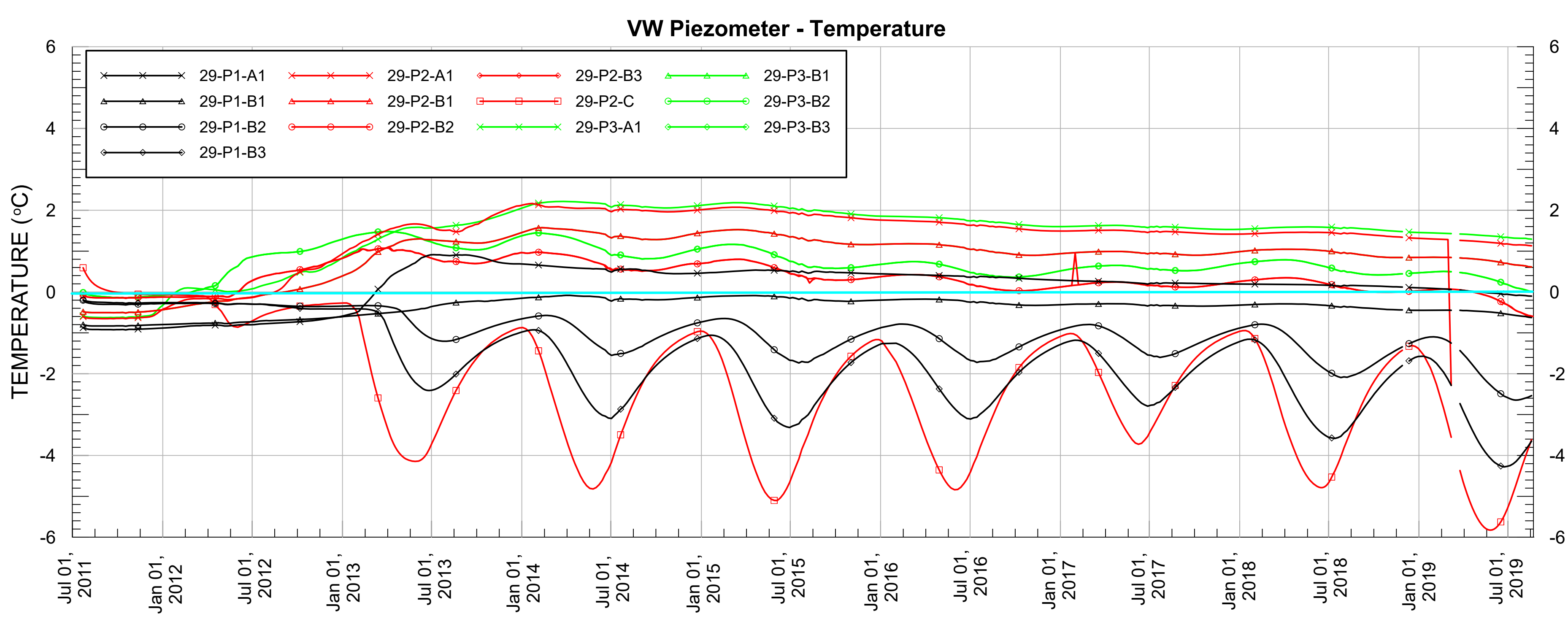


LEGEND

CUTOFF (CSB)
CUTOFF (SB)
INITIAL ROCKFILL
LAKEBED
BEDROCK
JET GROUT
GROUT

1. CORE BACKFILL (19 mm MINUS)
2. COARSE BACKFILL (15mm MINUS)
3. ROCKFILL
4. FINE ROCKFILL





NOTES:

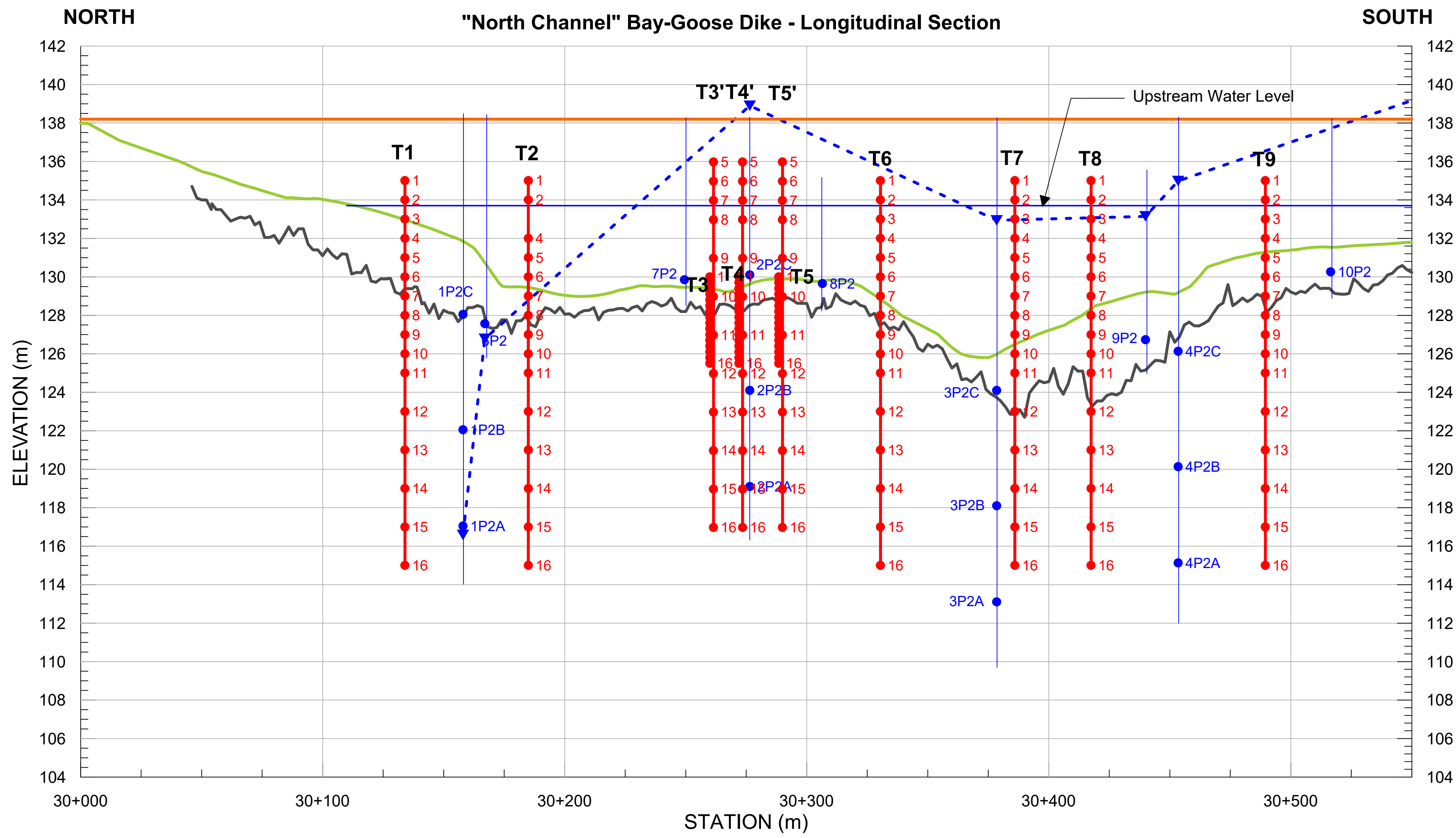
1. 29P1B2, 29P1B3, 29P2B3, 29P3B3 and 29P2C are given unstable readings and since the temperature shows a negative reading it is assumed to be frozen.

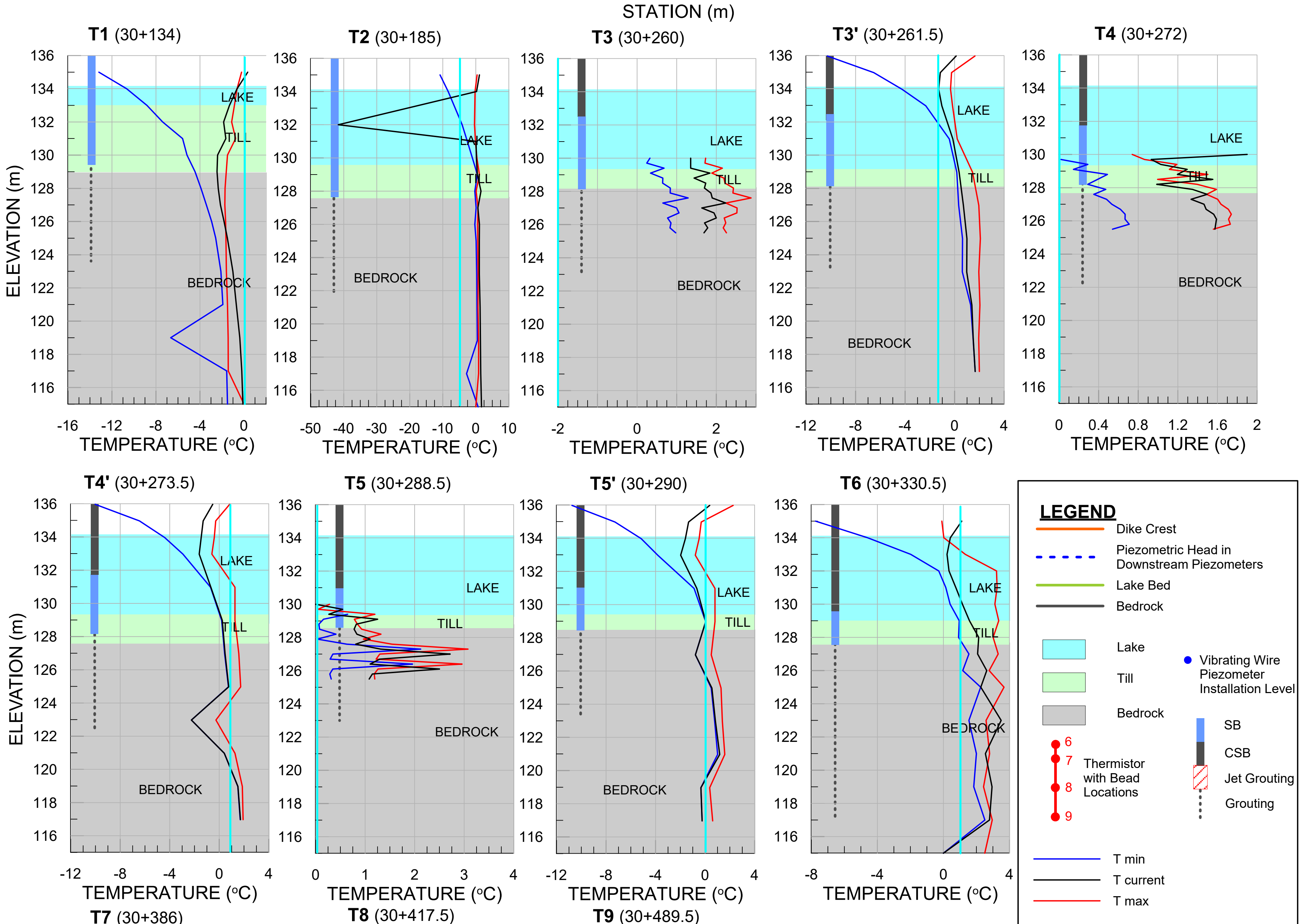
PROJECT: AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

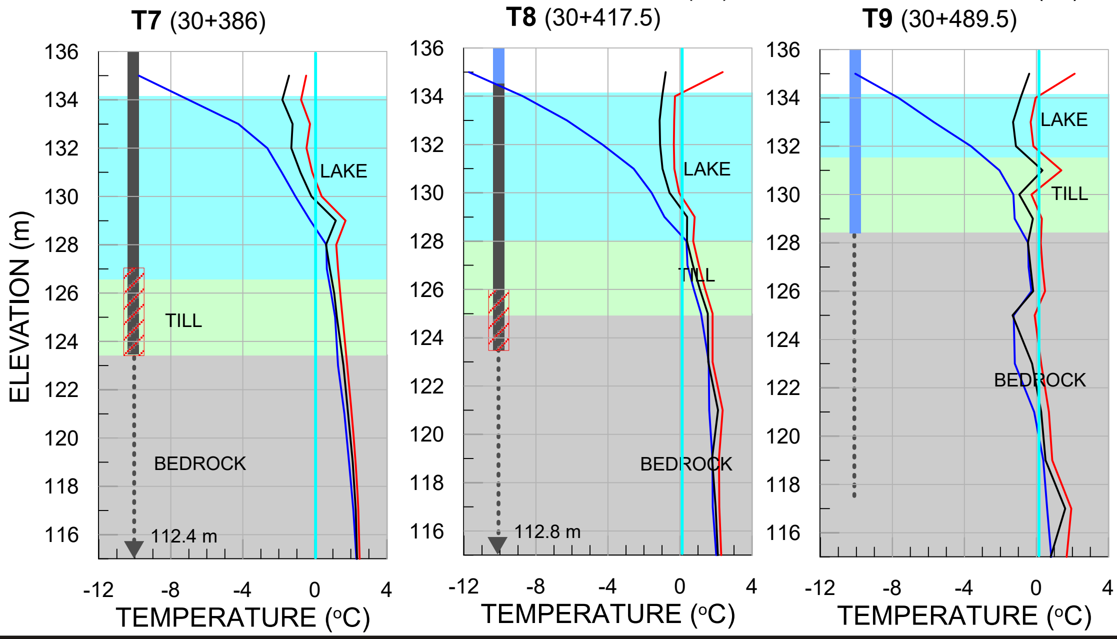
TITLE: BAYGOOSE DIKE - SECTION 32+105
PIEZOMETRIC DATA
(July 1/11 to Aug 21/19)

AGNICO EAGLE
MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
CADD	TD	28AUG14	FIGURE 24	
CHECK	PG	28AUG14		
REVIEW				







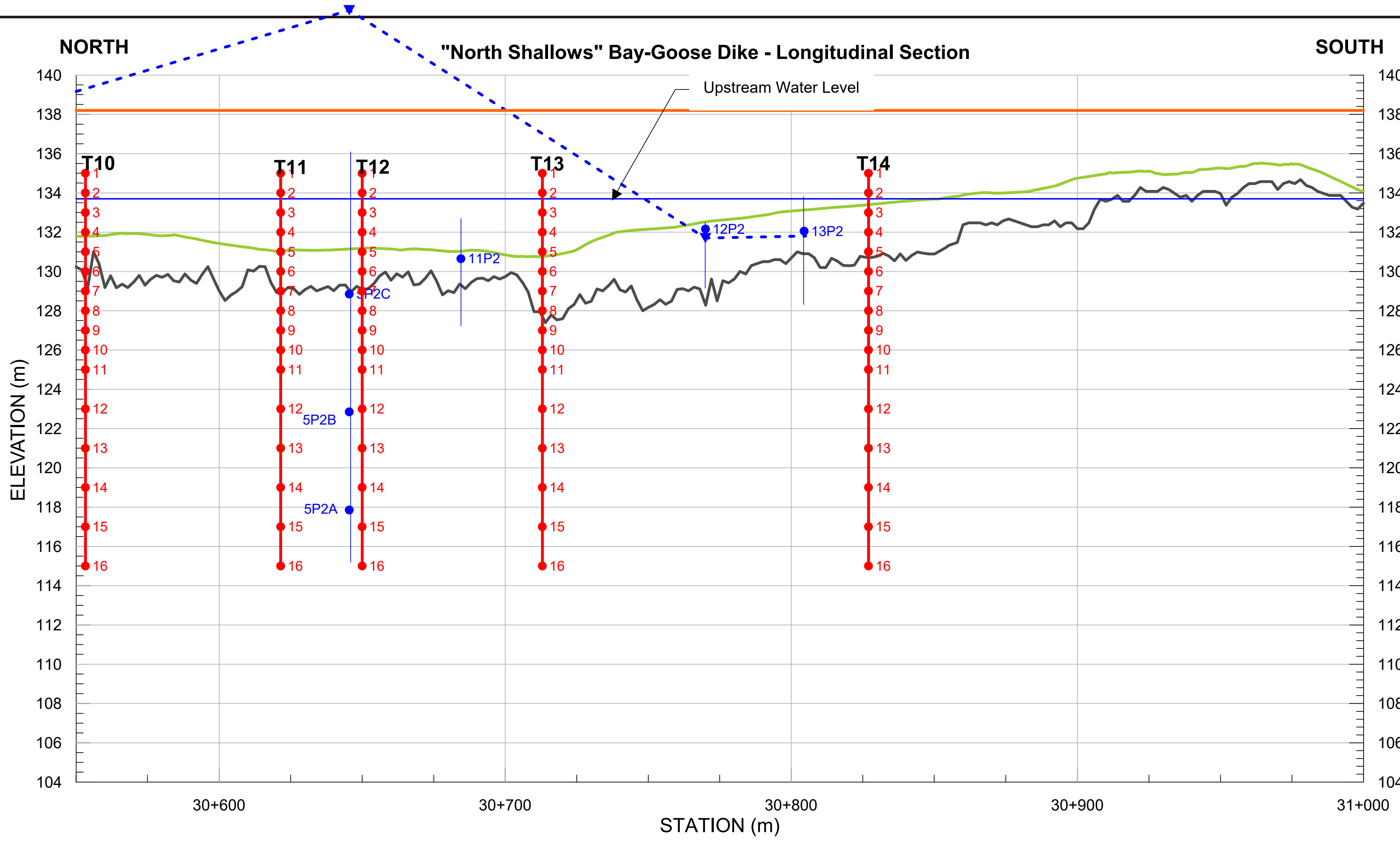
Current Temperature On August 21st,2019

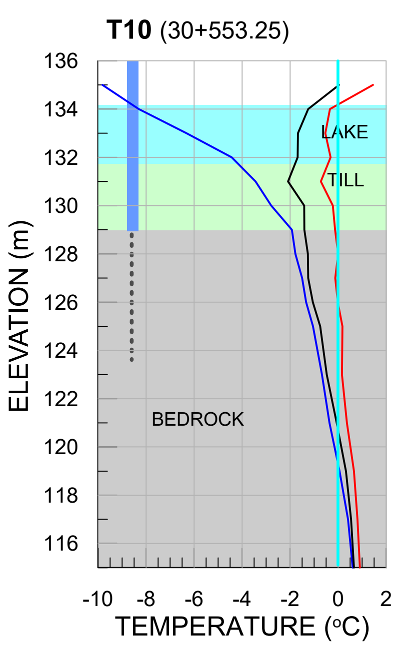
NOTES:
1. Third node of thermistor T2 (elevation 135 m) is not functional.
2. On July 11th, 2019 there appears to be an issue with the receiving reliable data. This is under investigation.

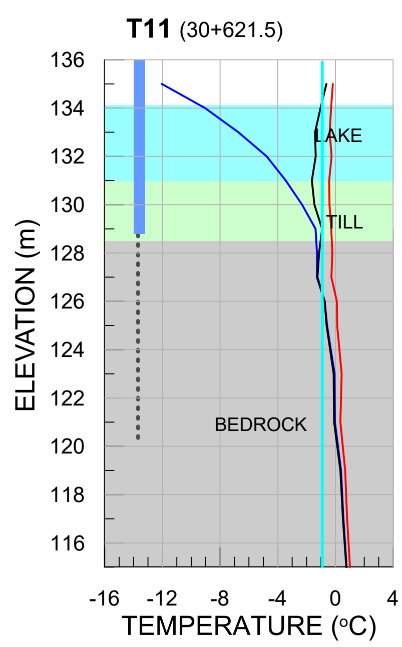
PROJECT	**AGNICO EAGLE MINES LIMITED** **MEADOWBANK GOLD PROJECT** **NUNAVUT**
TITLE	**BAYGOOSE DIKE** **30+000 to 30+550 - TEMPERATURE DATA** **(Aug 1/18 to Aug 21/19)**

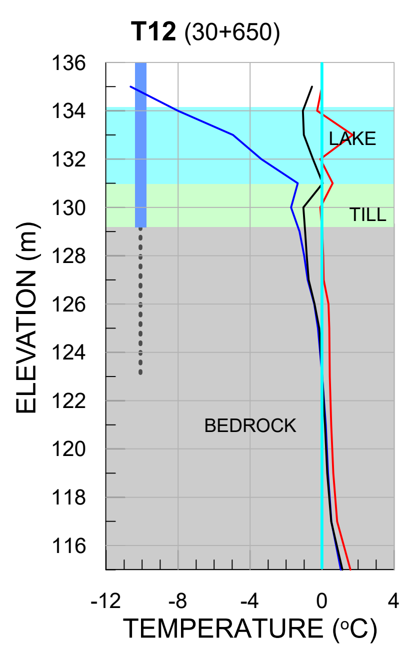
AGNICO EAGLE
MEADOWBANK

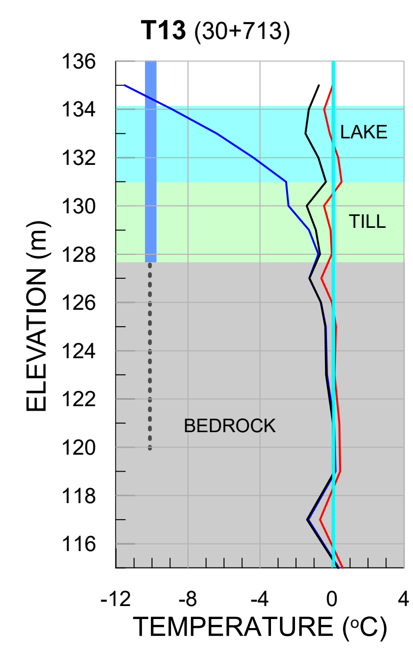
PROJECT No.			PHASE No.
DESIGN	TD	20JAN14	SCALE AS SHOWN REV.
CADD	TD	20JAN14	**FIGURE 25**
CHECK			
REVIEW			

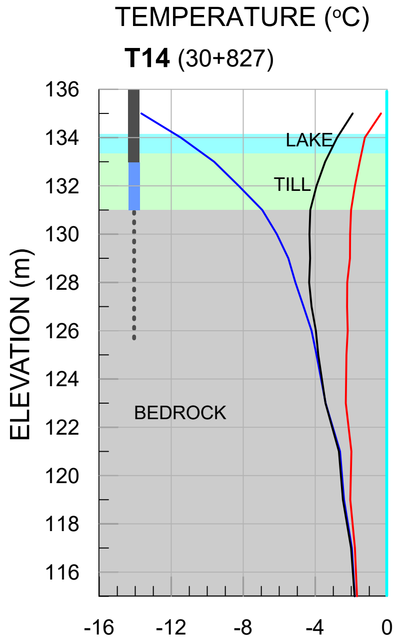












Current Temperature On August 21st,2019

LEGEND

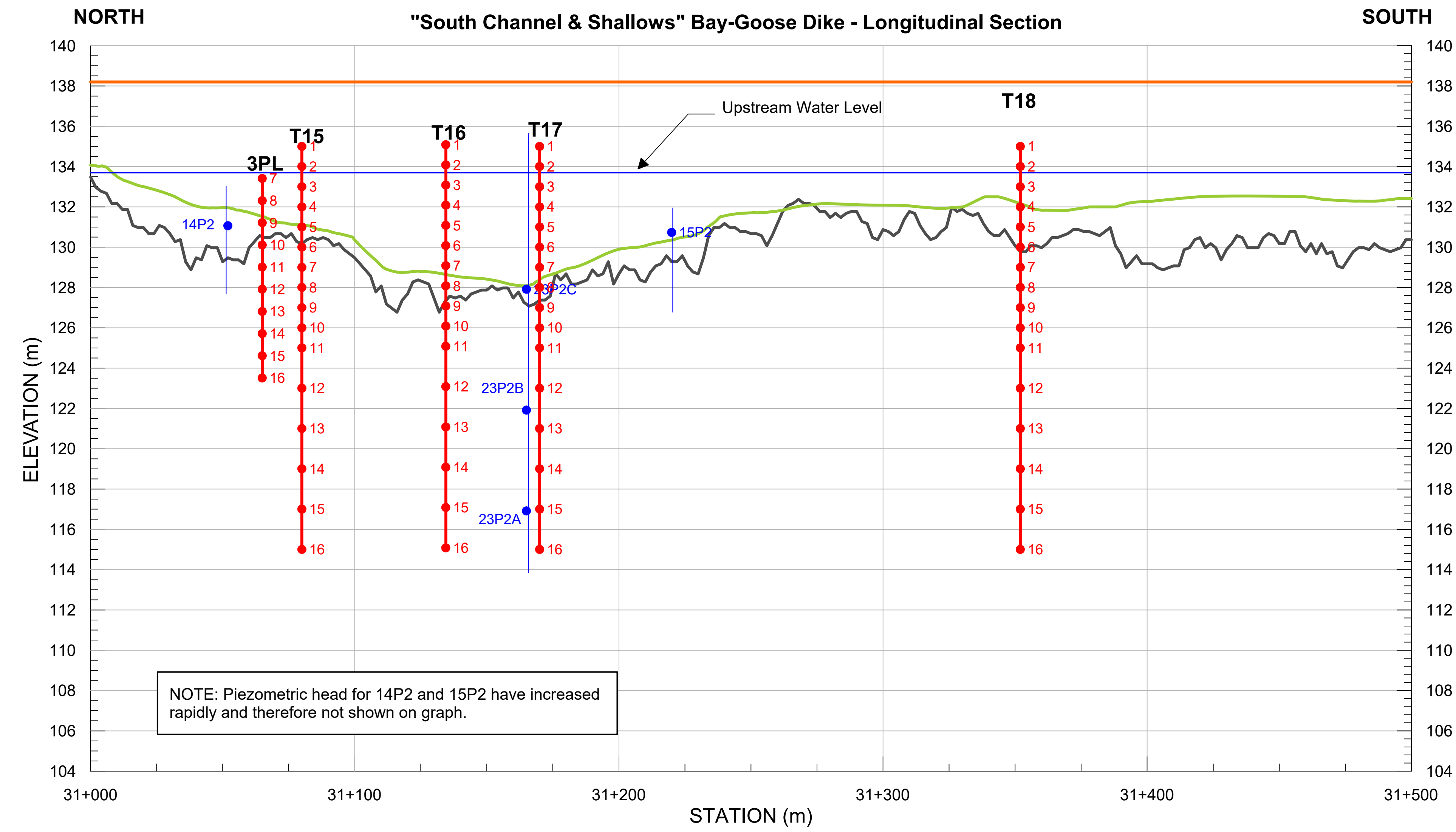
- Dike Crest
- Piezometric Head in Downstream Piezometers
- Lake Bed
- Bedrock
- T min
- T current
- T max
- Lake
- Till
- Bedrock
- Thermistor with Bead Locations
- Vibrating Wire Piezometer Installation Level
- SB
- CSB
- Jet Grouting
- Grouting

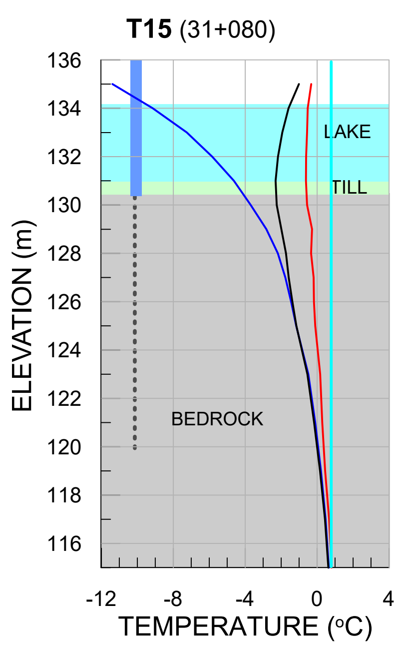
PROJECT
AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

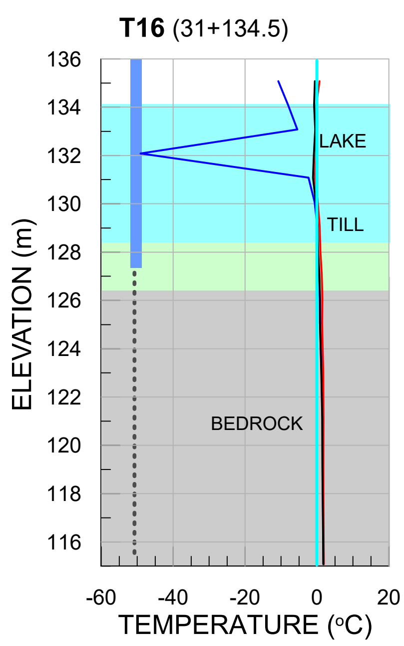
TITLE
BAYGOOSE DIKE
30+550 to 31+000 - TEMPERATURE DATA
(Aug 1/18 to Aug 21/19)

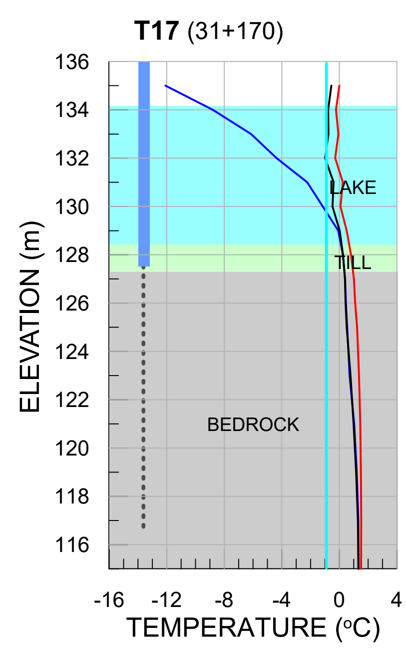
AGNICO EAGLE MEADOWBANK

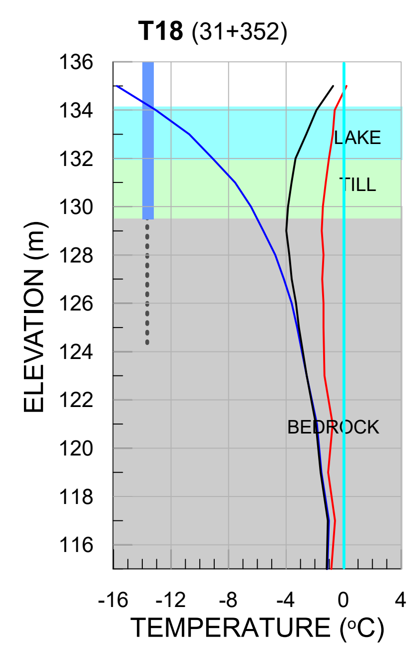
PROJECT No.			PHASE No.
DESIGN	TD	20JAN14	SCALE AS SHOWN REV.
CADD	TD	20JAN14	
CHECK			**FIGURE 26**
REVIEW			

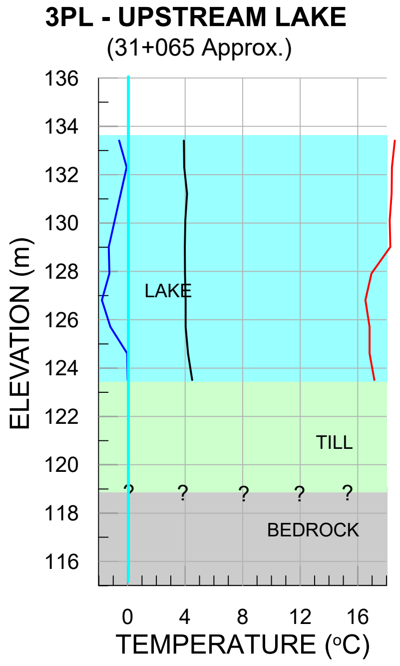












Current Temperature On August 21st,2019

LEGEND

- Dike Crest
- Piezometric Head in Downstream Piezometers
- Lake Bed
- Bedrock
- T min
- T current
- T max
- Lake
- Till
- Bedrock
- Thermistor with Bead Locations
- Vibrating Wire Piezometer Installation Level
- SB
- CSB
- Jet Grouting
- Grouting

NOTES:

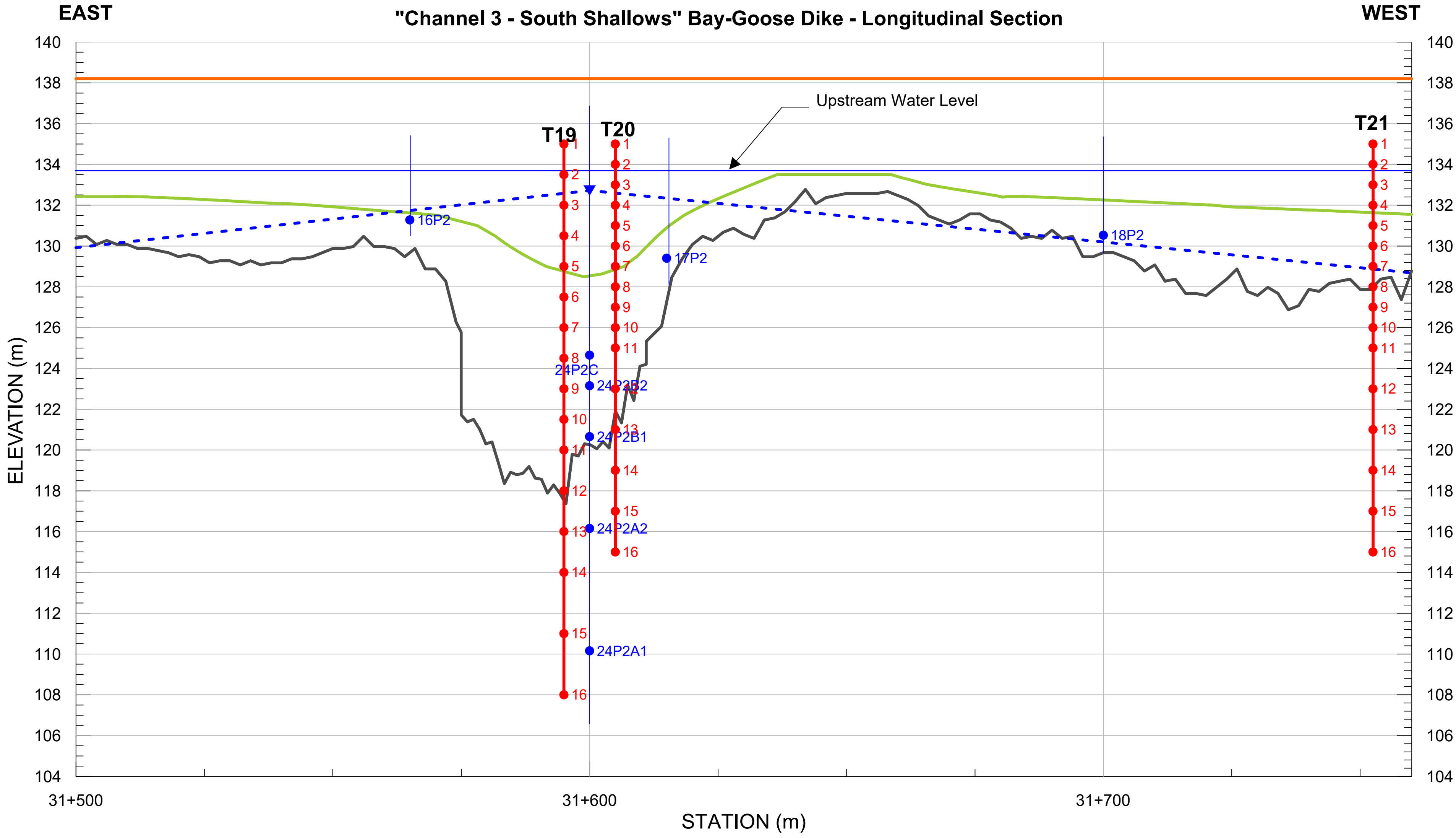
1. Thermistor 3PL is installed upstream of the dike within Third Portage Lake.

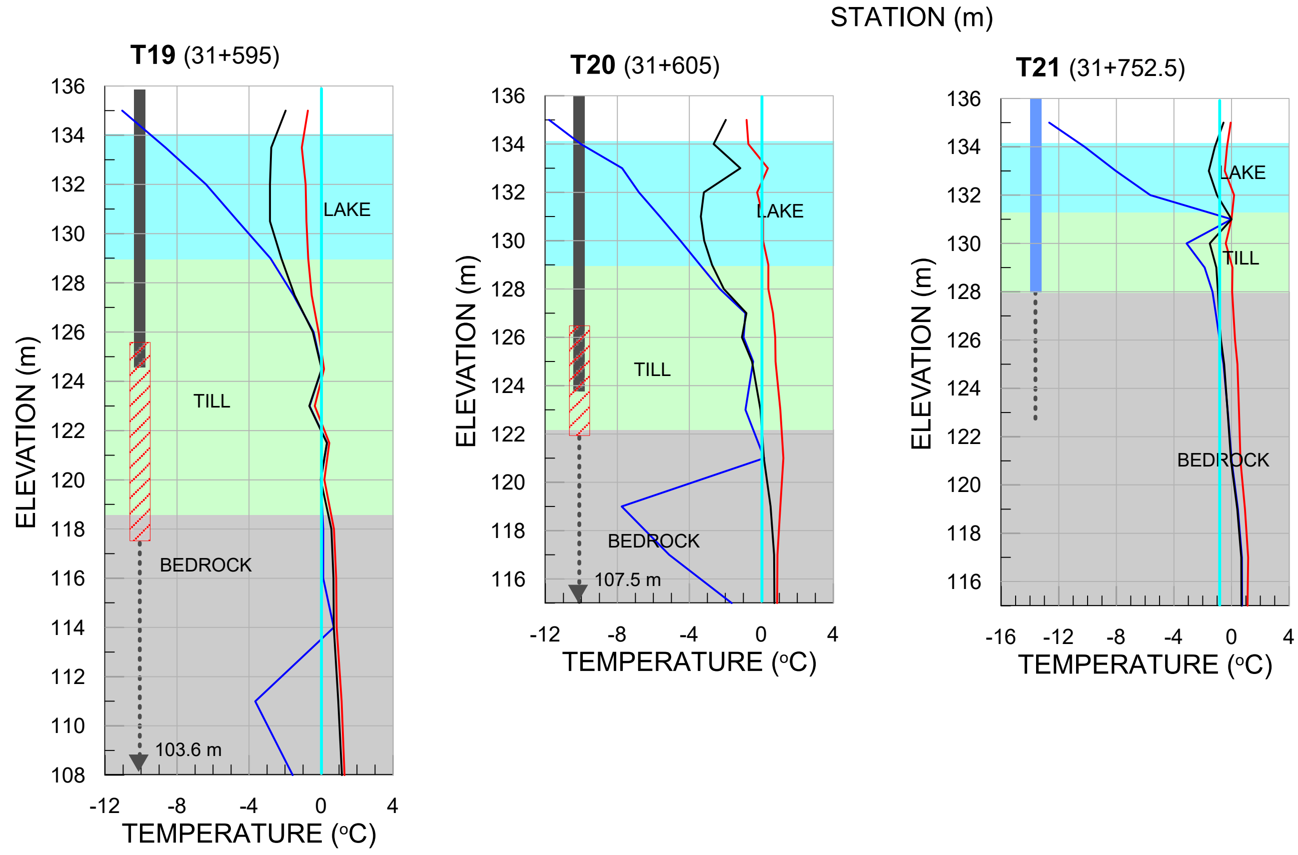
PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE 31+000 to 31+500 - TEMPERATURE DATA (Aug 1/18 to Aug 21/19)

AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.
DESIGN	TD	20JAN14	SCALE AS SHOWN REV.
CADD	TD	20JAN14	
CHECK			FIGURE 27
REVIEW			

"Channel 3 - South Shallows" Bay-Goose Dike - Longitudinal Section





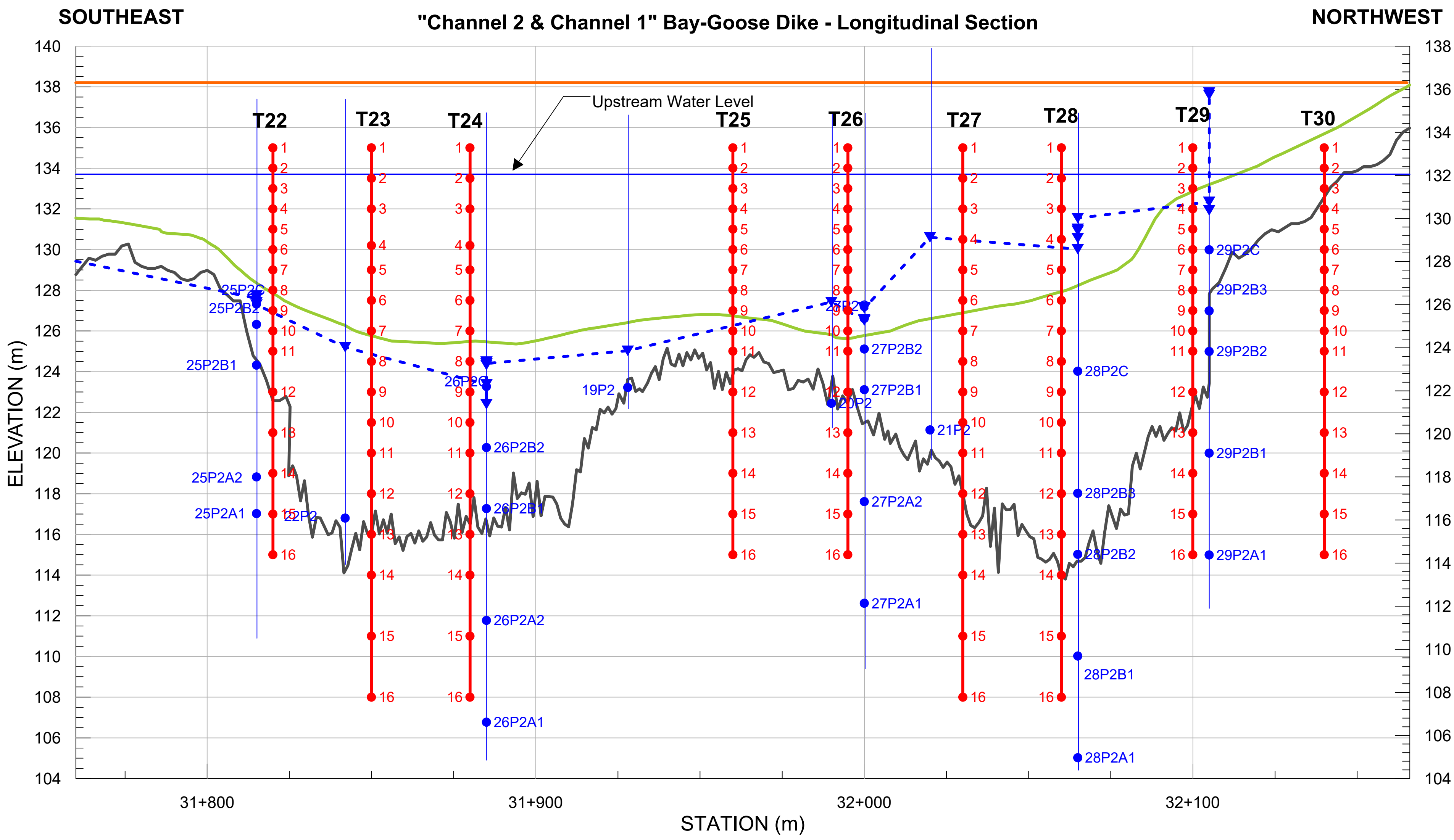
Current Temperature On August 21st,2019

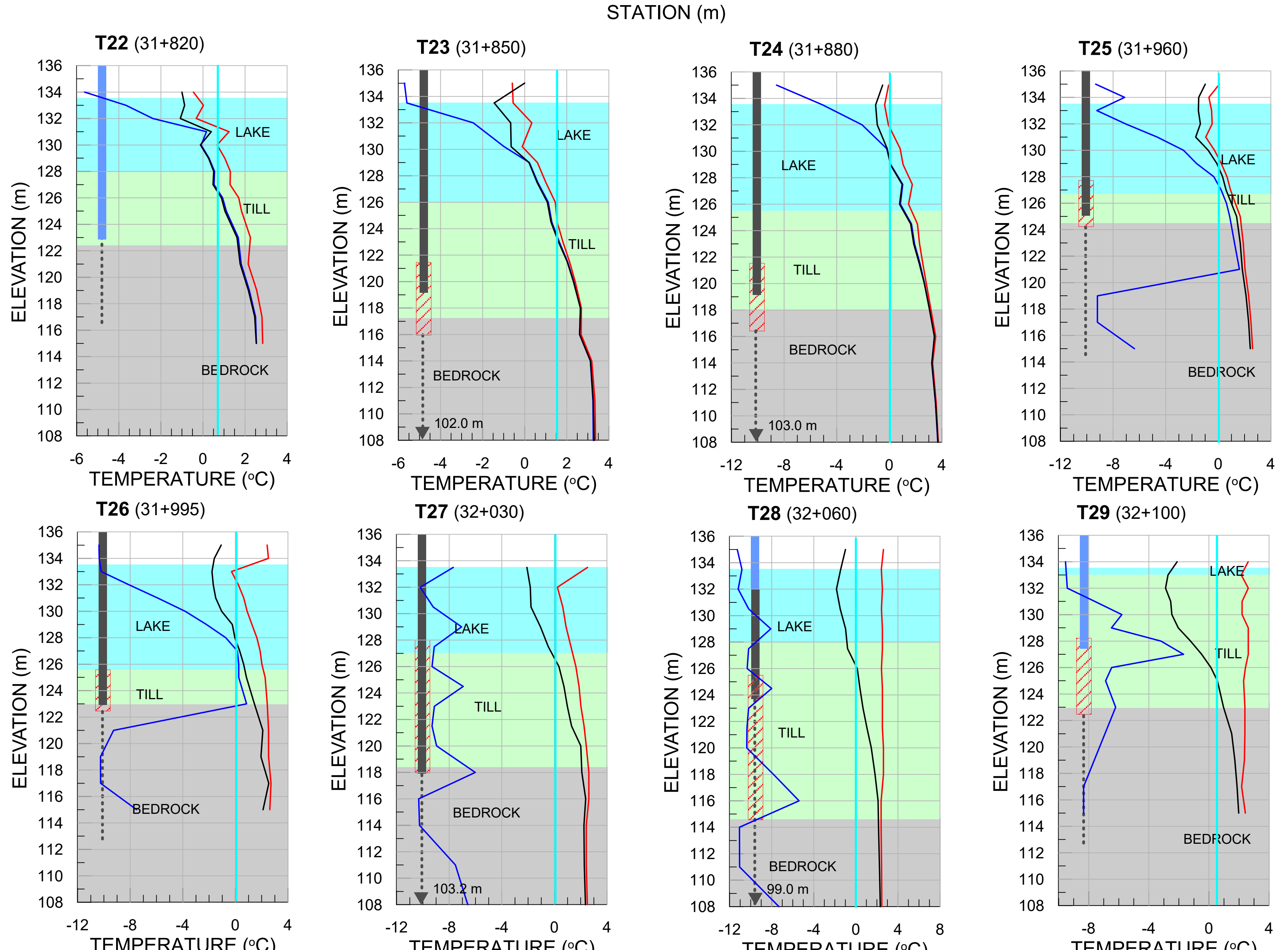
LEGEND

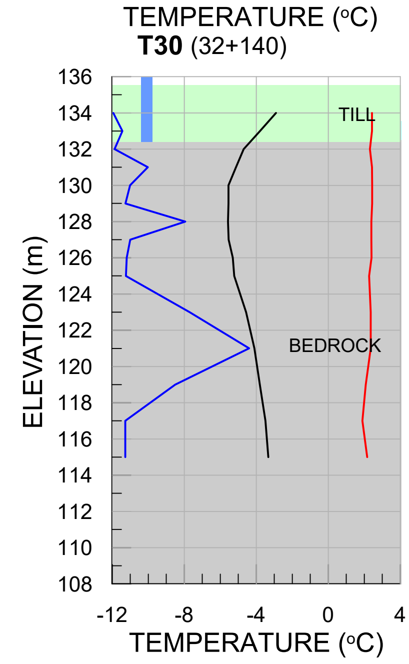
- Dike Crest
- Piezometric Head in Downstream Piezometers
- Lake Bed
- Bedrock
- T min
- T current
- T max
- Lake
- Till
- Bedrock
- Thermistor with Bead Locations (6, 7, 8, 9)
- Vibrating Wire Piezometer Installation Level
- SB
- CSB
- Jet Grouting
- Grouting

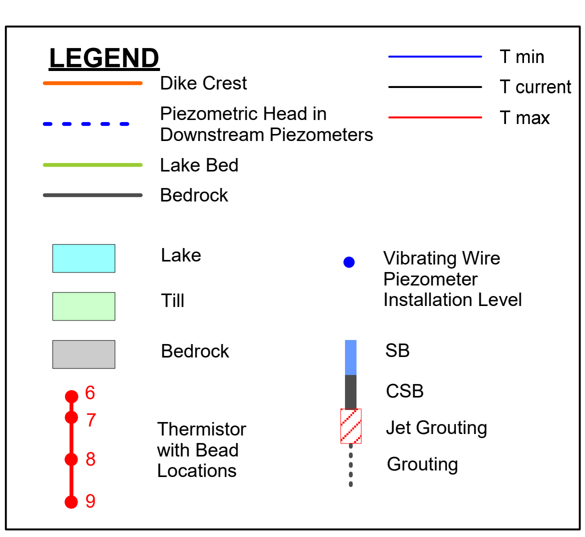
PROJECT	AGNICOEAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE 31+500 to 31+760 - TEMPERATURE DATA (Aug 1/18 to Aug 21/19)

AGNICO EAGLE MEADOWBANK	PROJECT No.			PHASE No.
	DESIGN	TD	20JAN14	SCALE AS SHOWN REV.
	CADD	TD	20JAN14	FIGURE 28
	CHECK			
	REVIEW			





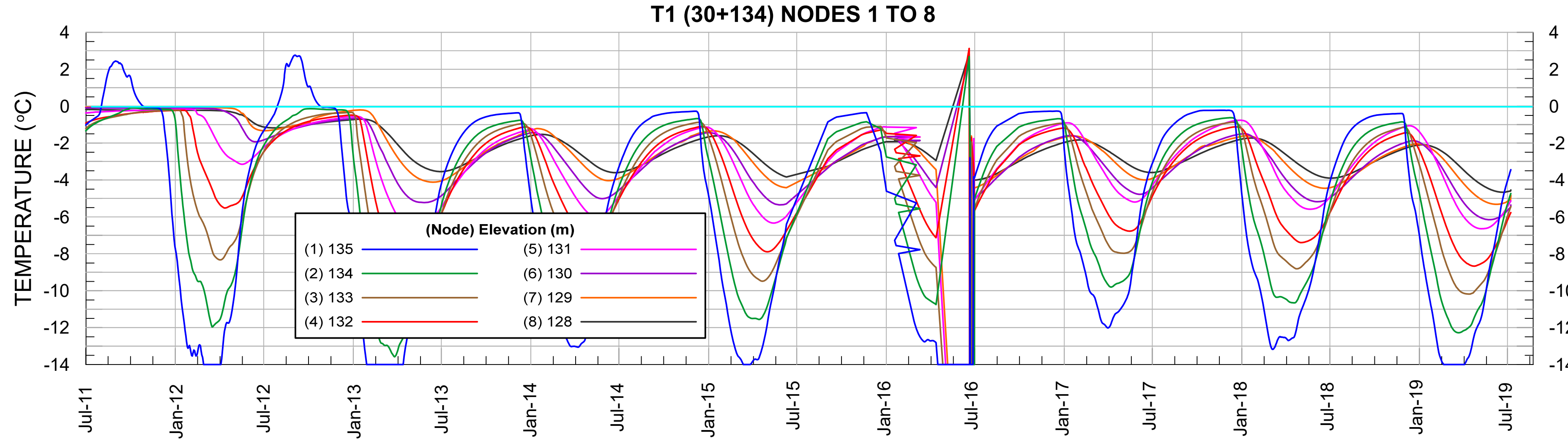




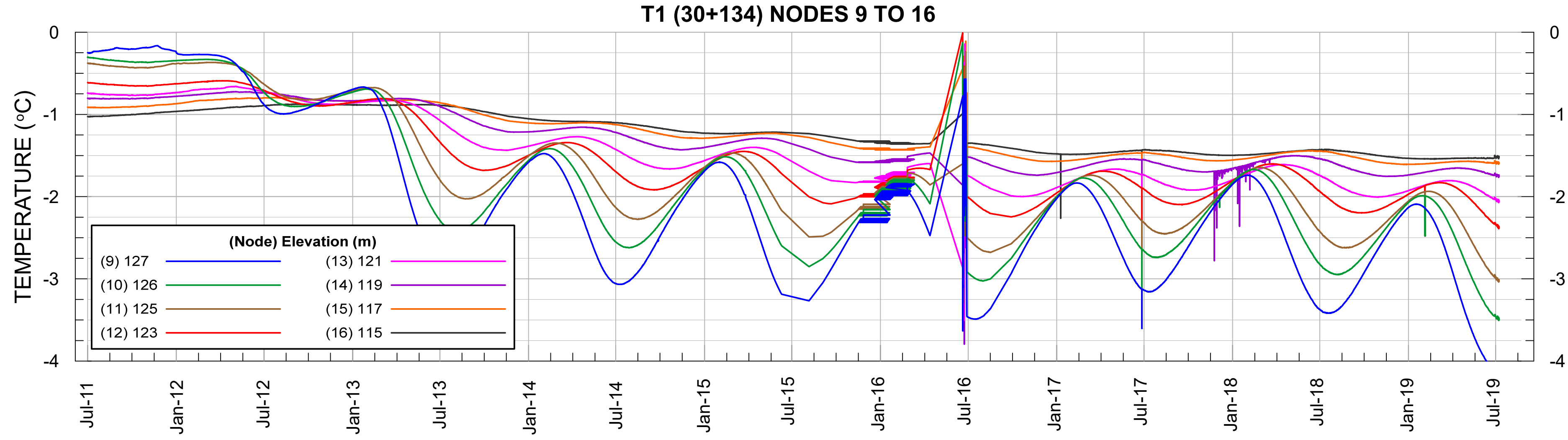
Current Temperature On August 21st,2019

PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT				
TITLE	BAYGOOSE DIKE 31+760 to 32+166 - TEMPERATURE DATA (Aug 1/18 to Aug 21/19)				
AGNICO EAGLE MEADOWBANK	PROJECT No.			PHASE No.	
	DESIGN	TD	20JAN14	SCALE AS SHOWN	REV.
	CADD	TD	20JAN14	FIGURE 29	
	CHECK				
	REVIEW				

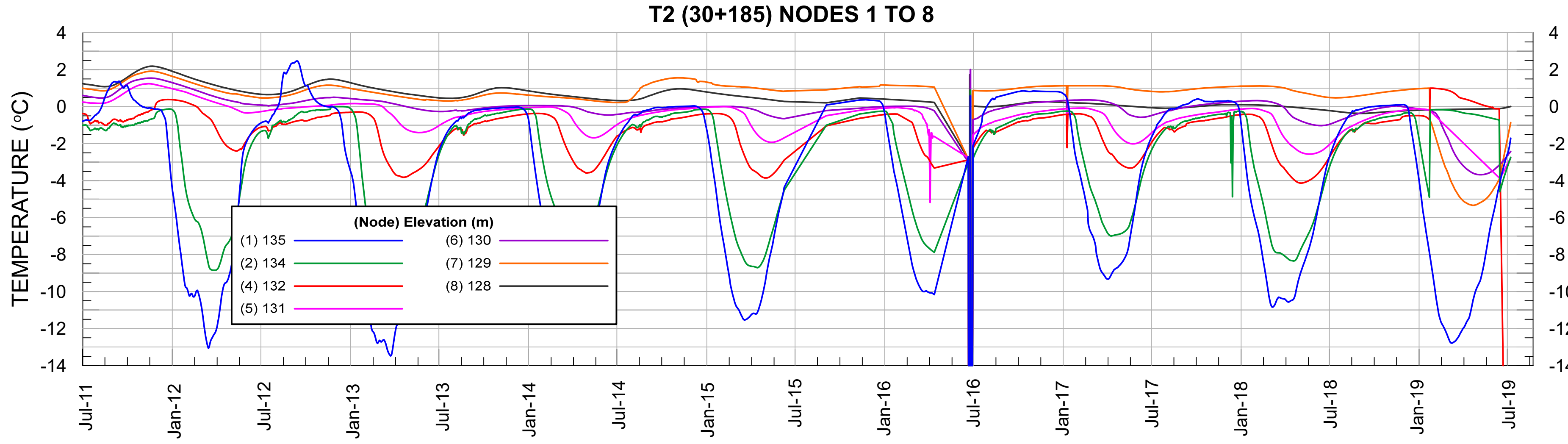
T1 (30+134) NODES 1 TO 8



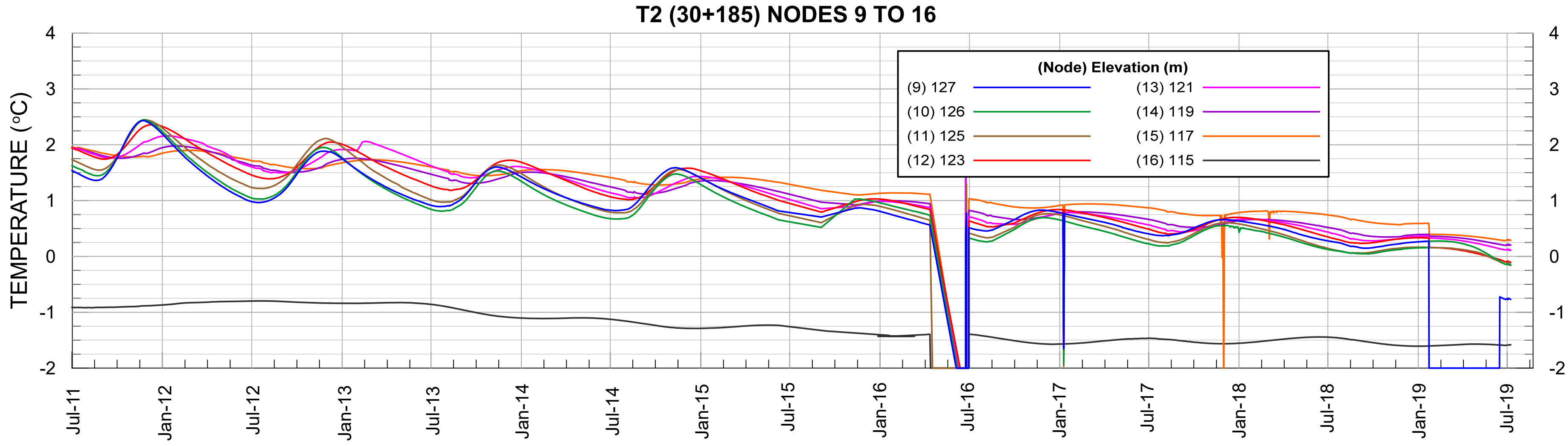
T1 (30+134) NODES 9 TO 16



T2 (30+185) NODES 1 TO 8



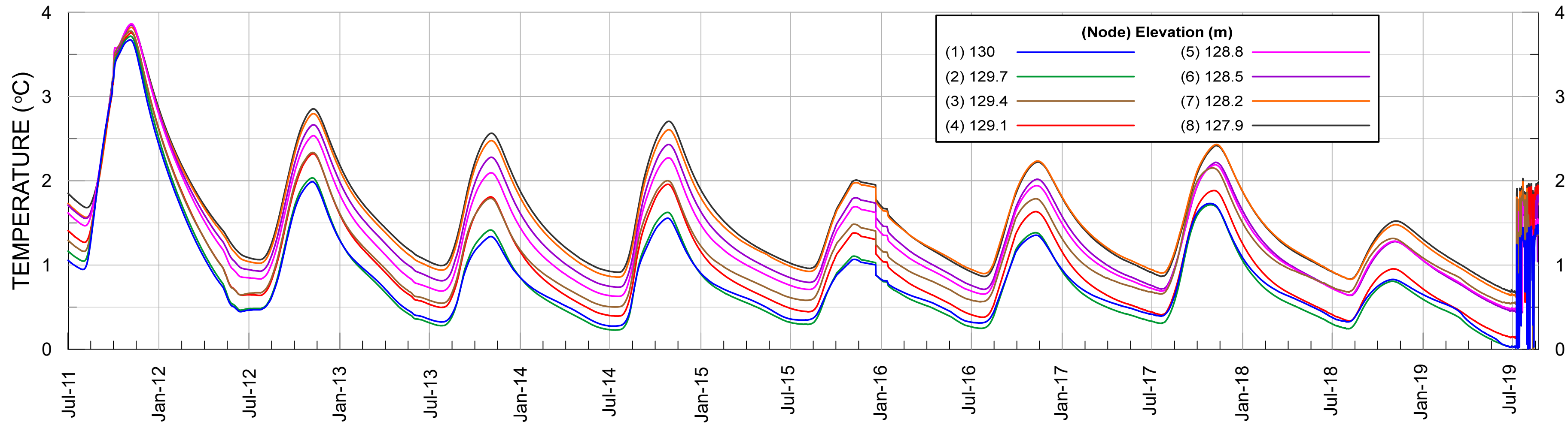
T2 (30+185) NODES 9 TO 16



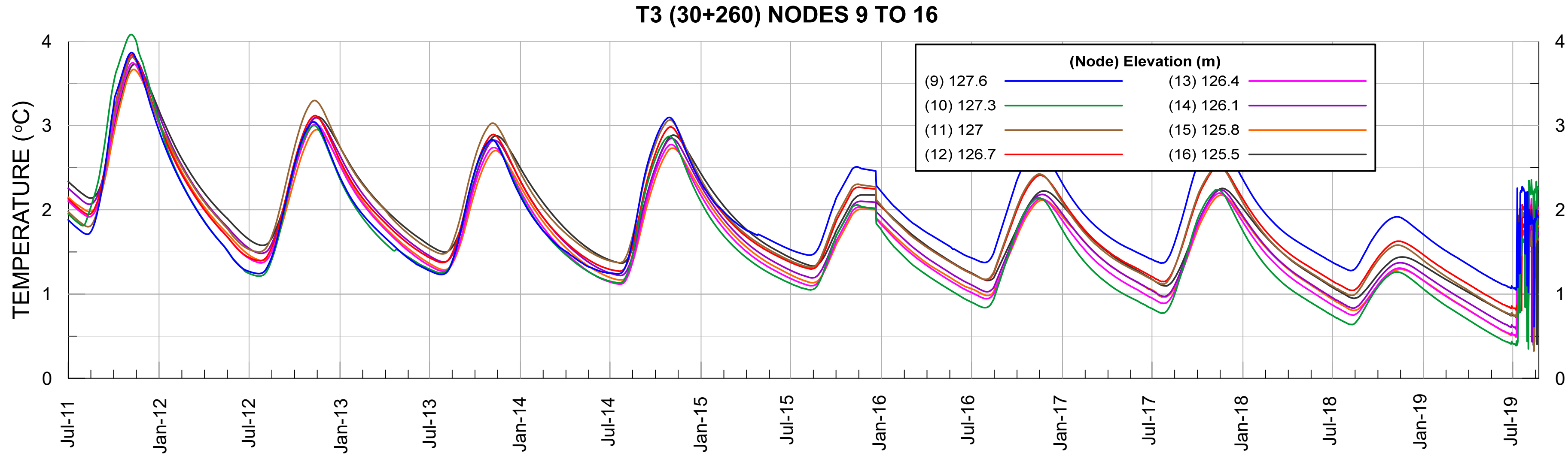
NOTE: On July 11th, 2019 there appears to be an issue with the receiving reliable data.
This is under investigation.

PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT				
TITLE	BAYGOOSE DIKE NODAL THERMAL TIMELINES (July 1/11 to Aug 21/19)				
AGNICO EAGLE MEADOWBANK	PROJECT No.			PHASE No.	
	DESIGN	TD	20JAN14	SCALE AS SHOWN	REV.
	CADD	TD	20JAN14	FIGURE 30	
	CHECK				
	REVIEW				

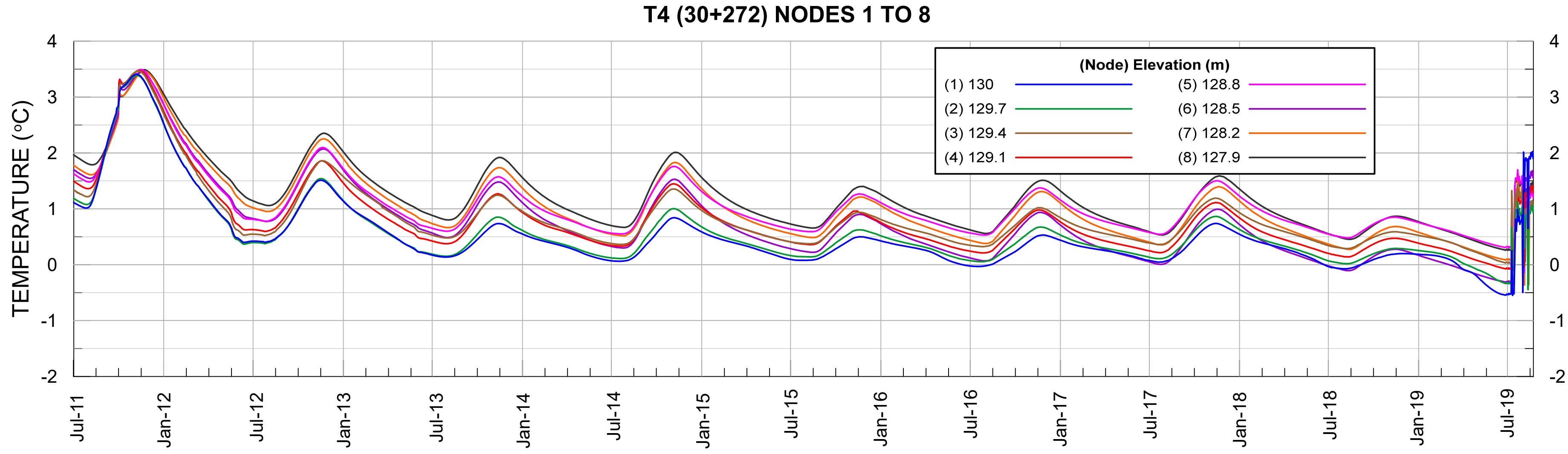
T3 (30+260) NODES 1 TO 8



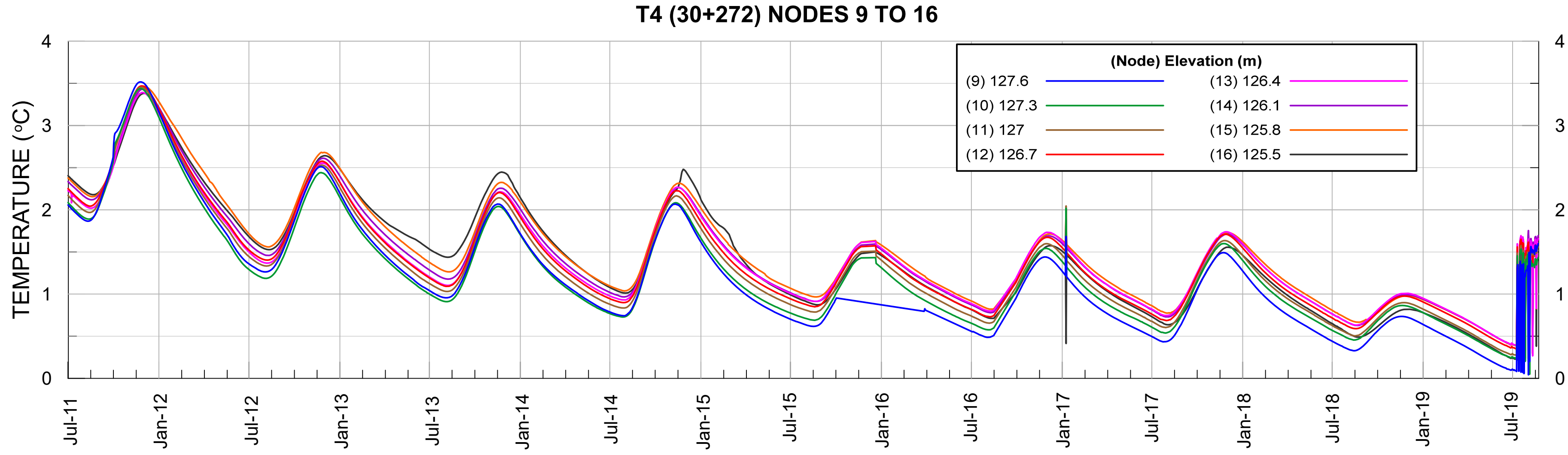
T3 (30+260) NODES 9 TO 16



T4 (30+272) NODES 1 TO 8



T4 (30+272) NODES 9 TO 16



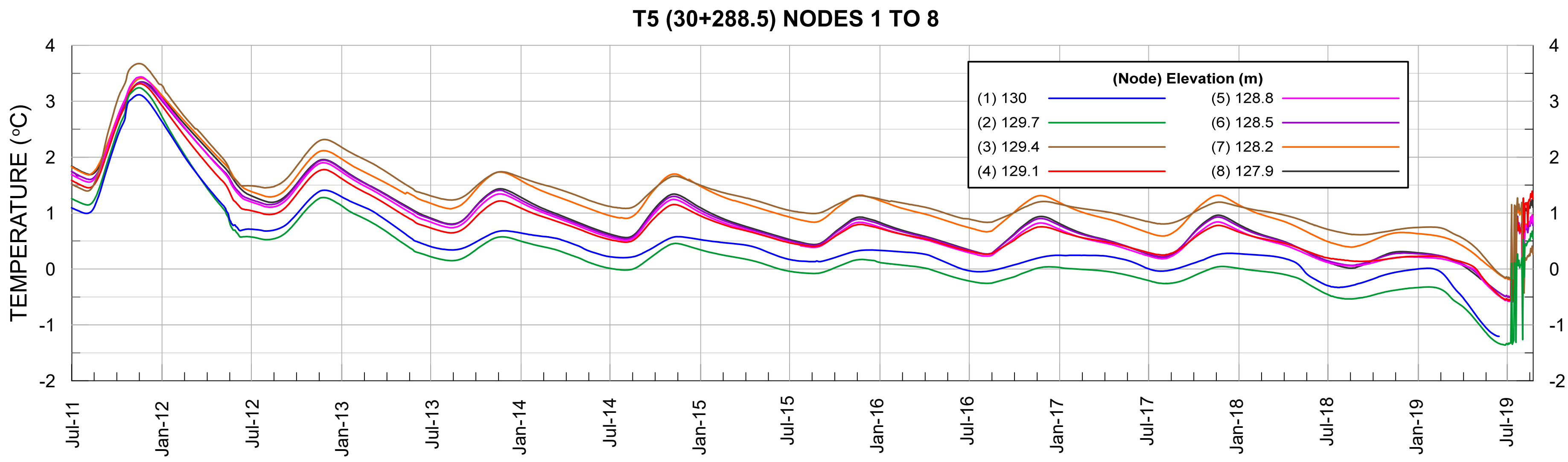
NOTE: On July 11th, 2019 there appears to be an issue with the receiving reliable data.
This is under investigation.

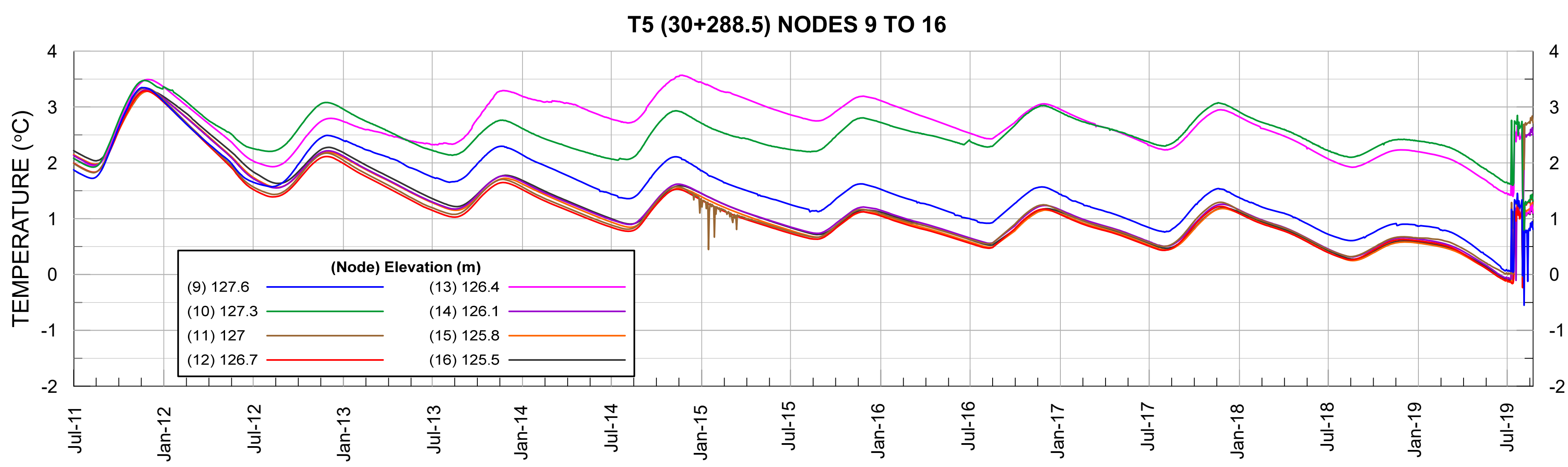
PROJECT: AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

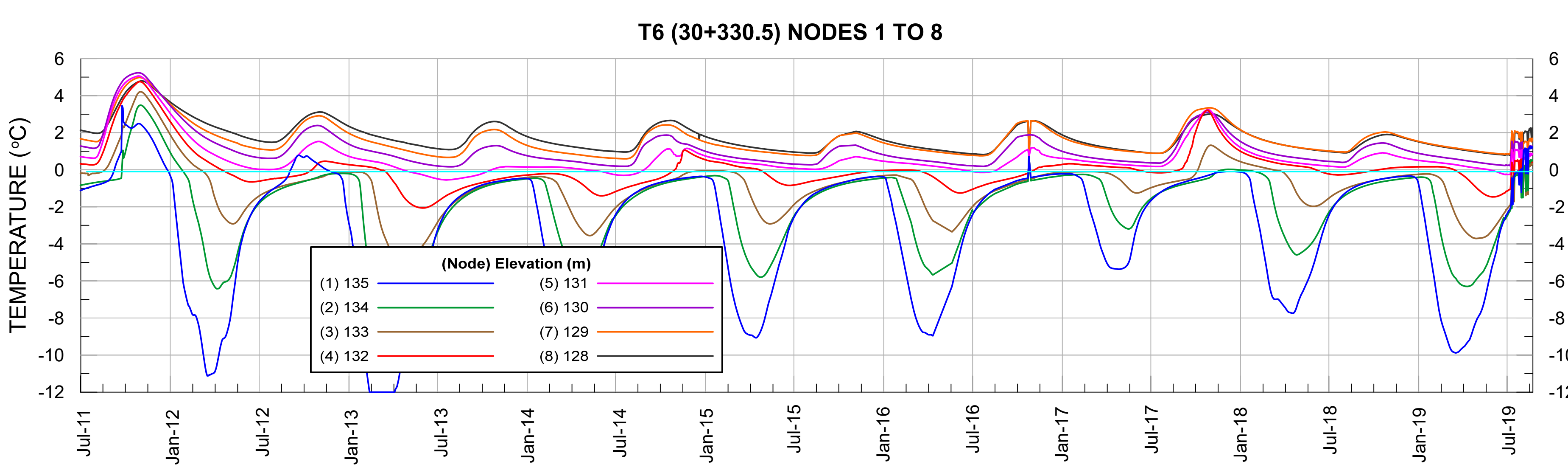
TITLE: BAYGOOSE DIKE
NODAL THERMAL TIMELINES
(July 1/11 to Aug 21/19)

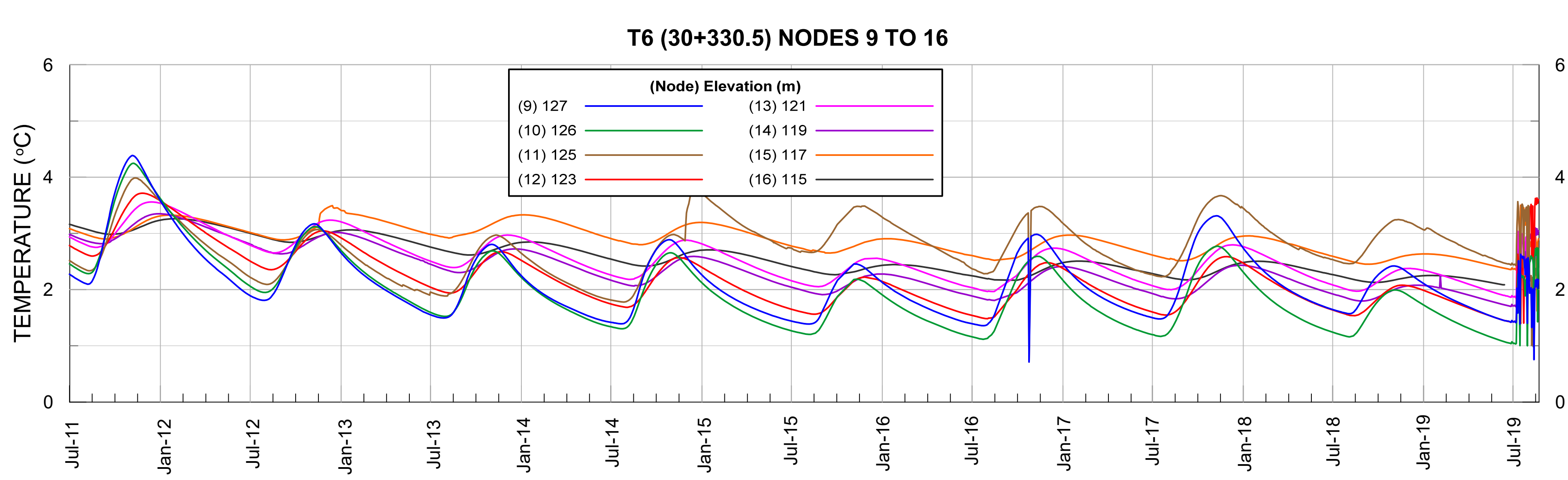
AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	20JAN14	SCALE AS SHOWN	REV.
CADD	TD	20JAN14	FIGURE 31	
CHECK				
REVIEW				









NOTE: On July 11th, 2019 there appears to be an issue with the receiving reliable data.
This is under investigation.

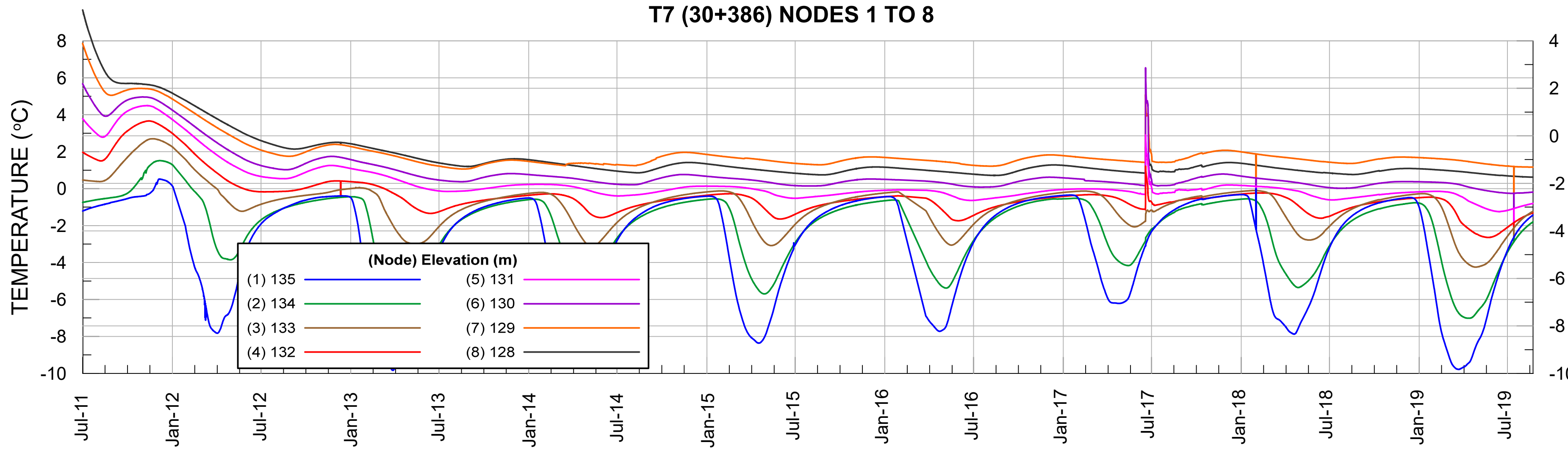
PROJECT
AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

TITLE
BAYGOOSE DIKE
NODAL THERMAL TIMELINES
(July 1/11 to Aug 21/19)

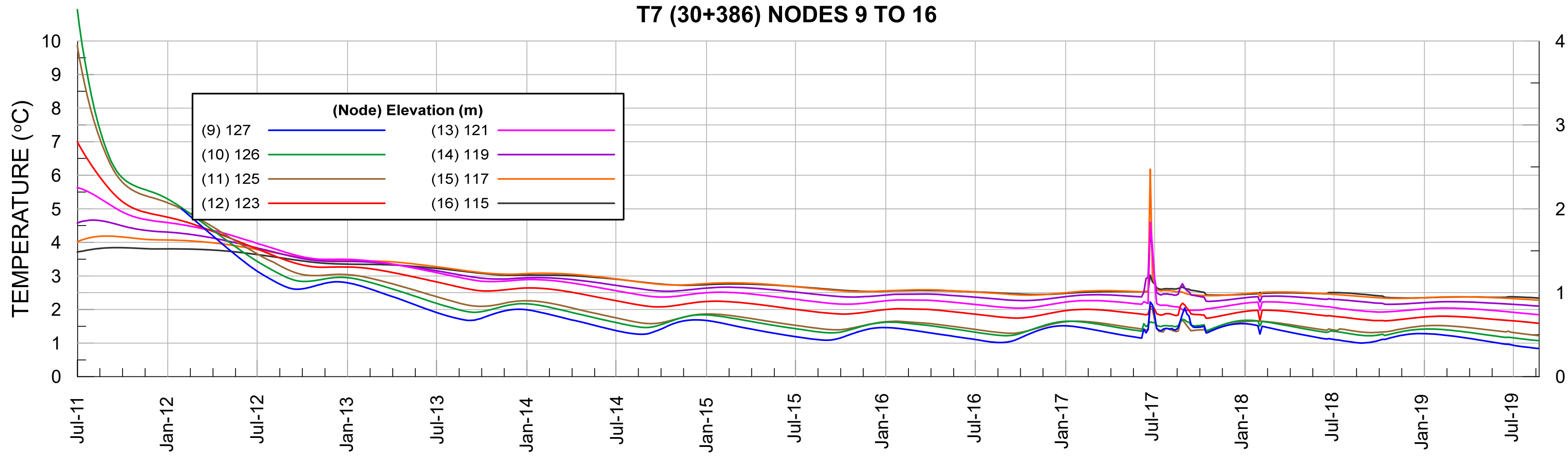
AGNICO EAGLE

PROJECT No.			PHASE No.	
DESIGN	TD	20JAN14	SCALE AS SHOWN	REV.
CADD	TD	20JAN14	**FIGURE 32**	
CHECK				
REVIEW				

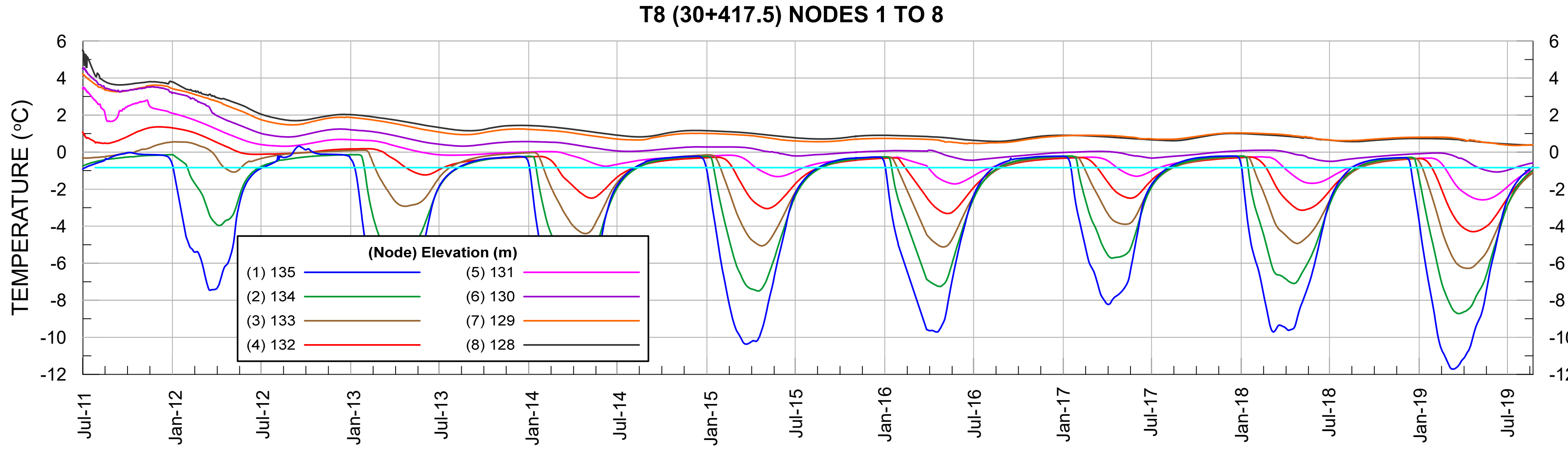
T7 (30+386) NODES 1 TO 8



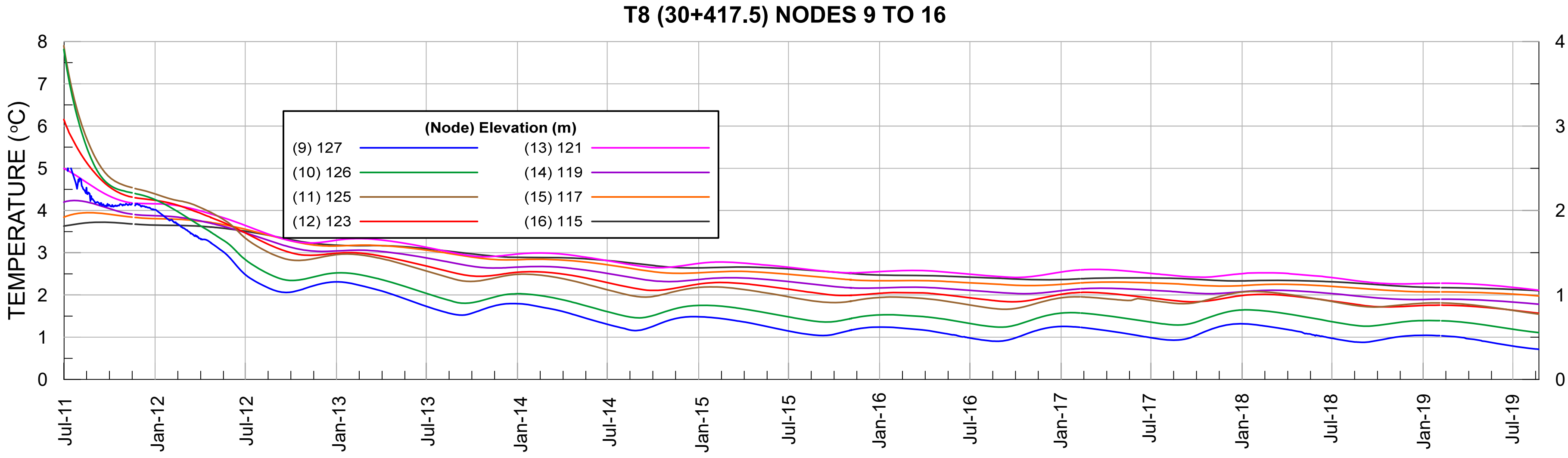
T7 (30+386) NODES 9 TO 16



T8 (30+417.5) NODES 1 TO 8



T8 (30+417.5) NODES 9 TO 16



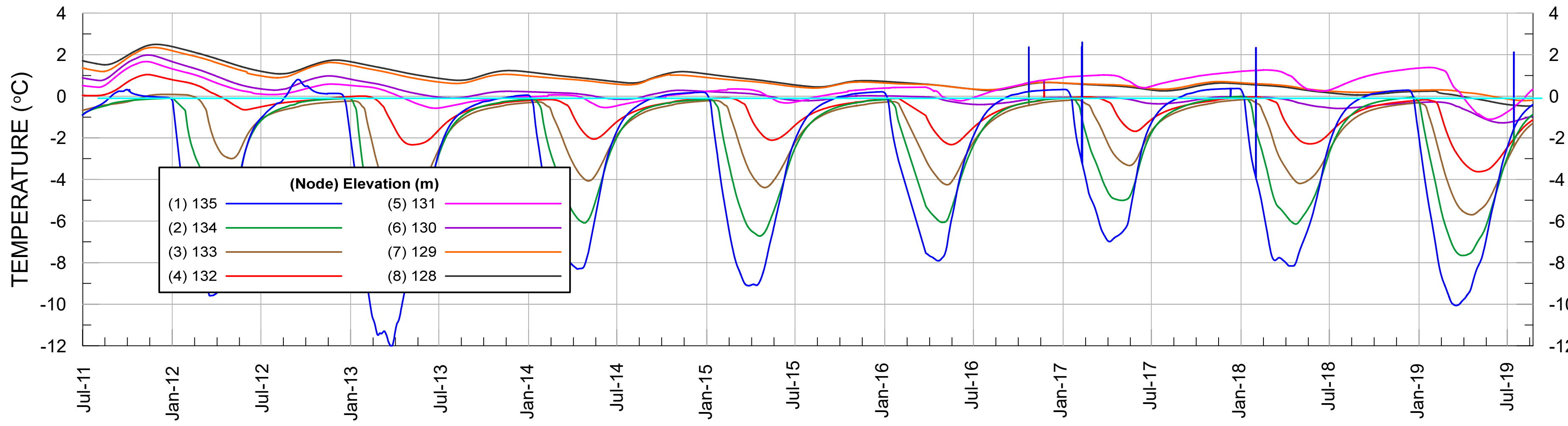
NOTE:

PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE NODAL THERMAL TIMELINES (July 1/11 to Aug 21/19)

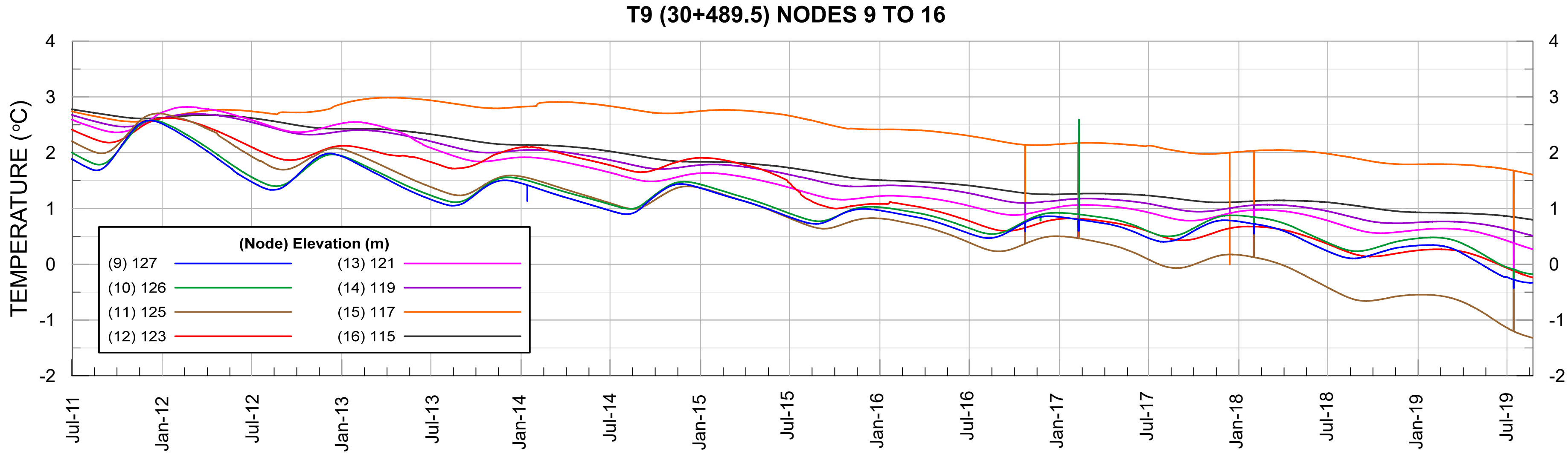
AGNICO EAGLE

PROJECT No.			PHASE No.
DESIGN	TD	20JAN14	SCALE AS SHOWN REV.
CADD	TD	20JAN14	FIGURE 33
CHECK			
REVIEW			

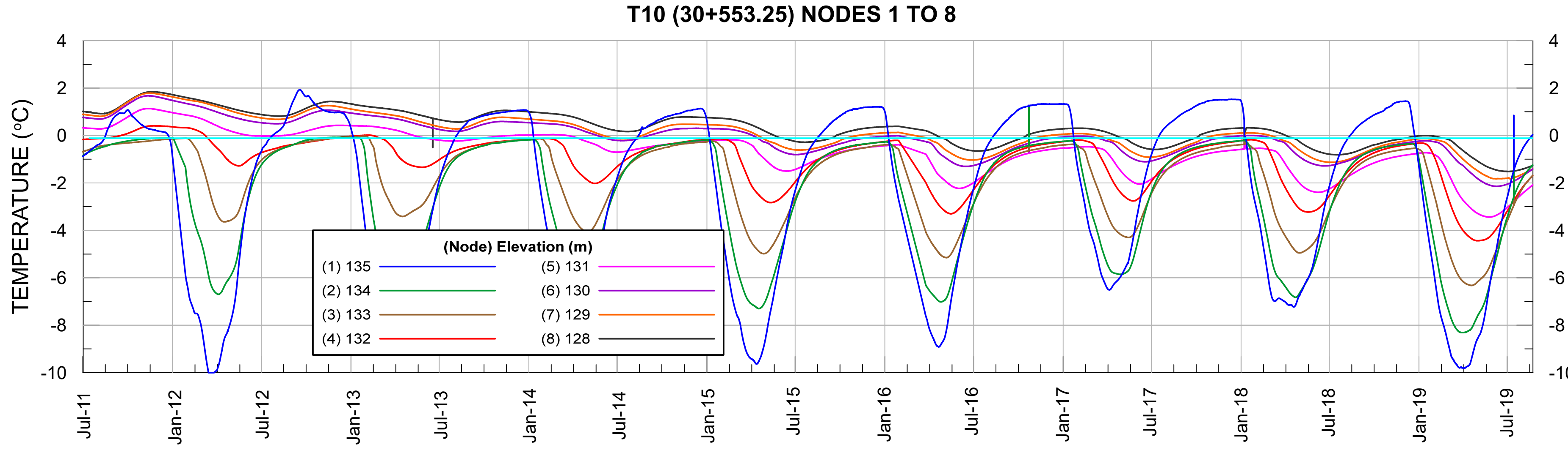
T9 (30+489.5) NODES 1 TO 8



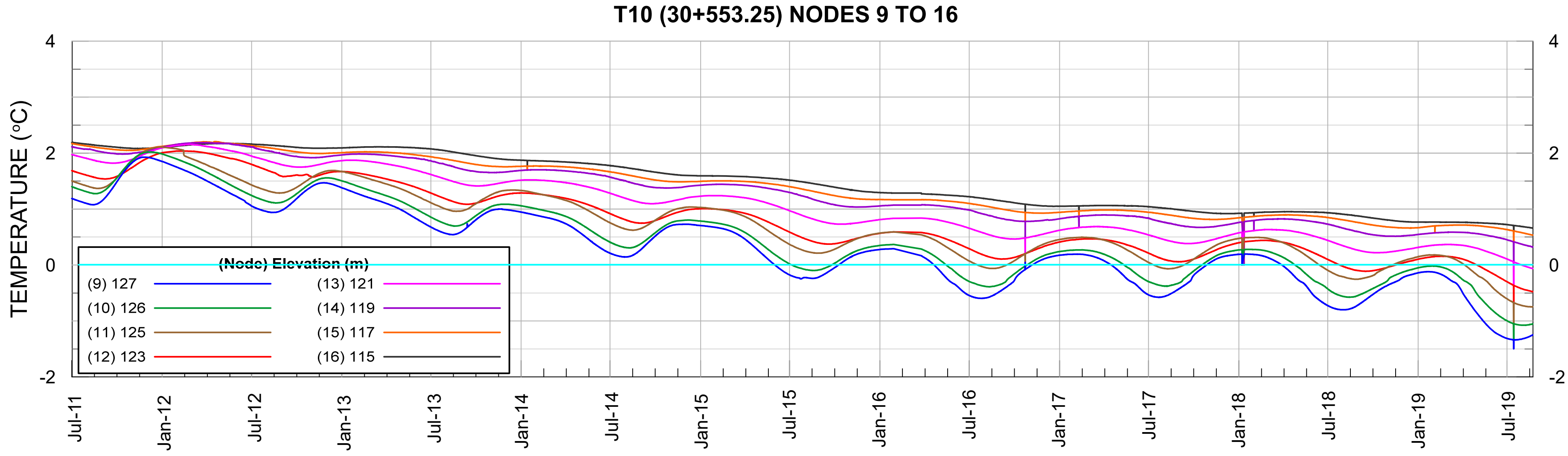
T9 (30+489.5) NODES 9 TO 16



T10 (30+553.25) NODES 1 TO 8



T10 (30+553.25) NODES 9 TO 16

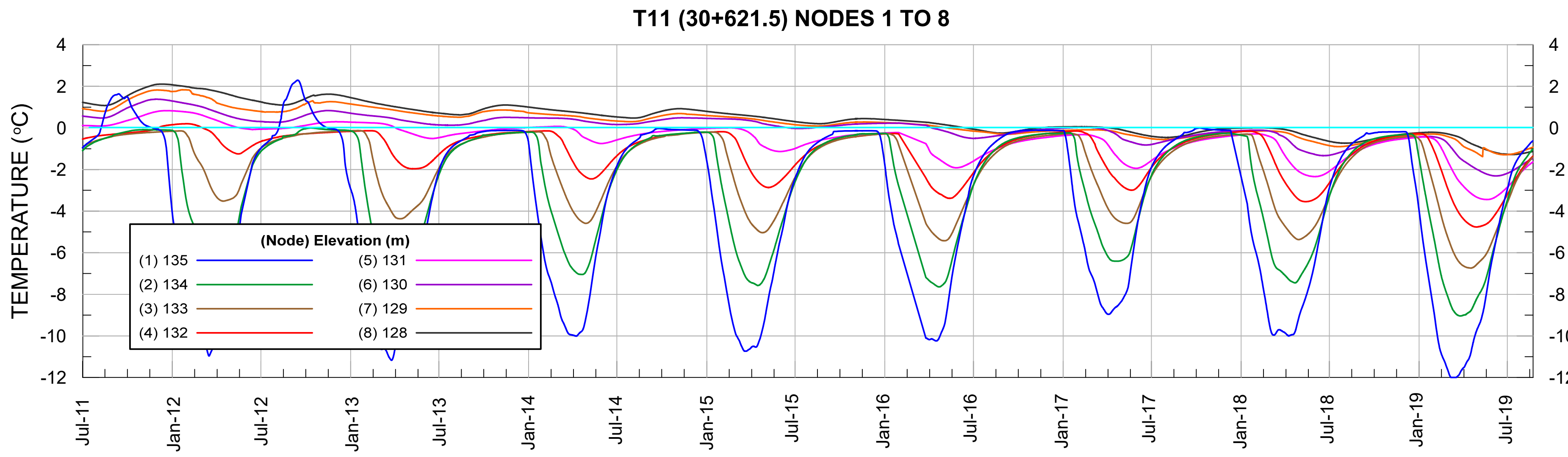


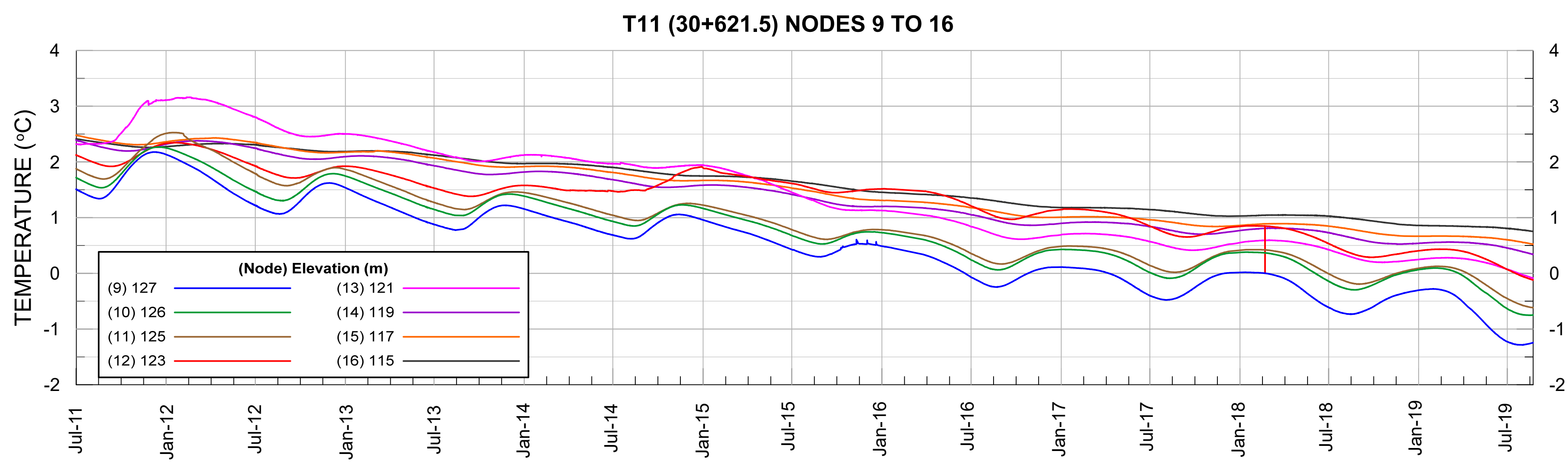
PROJECT
AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

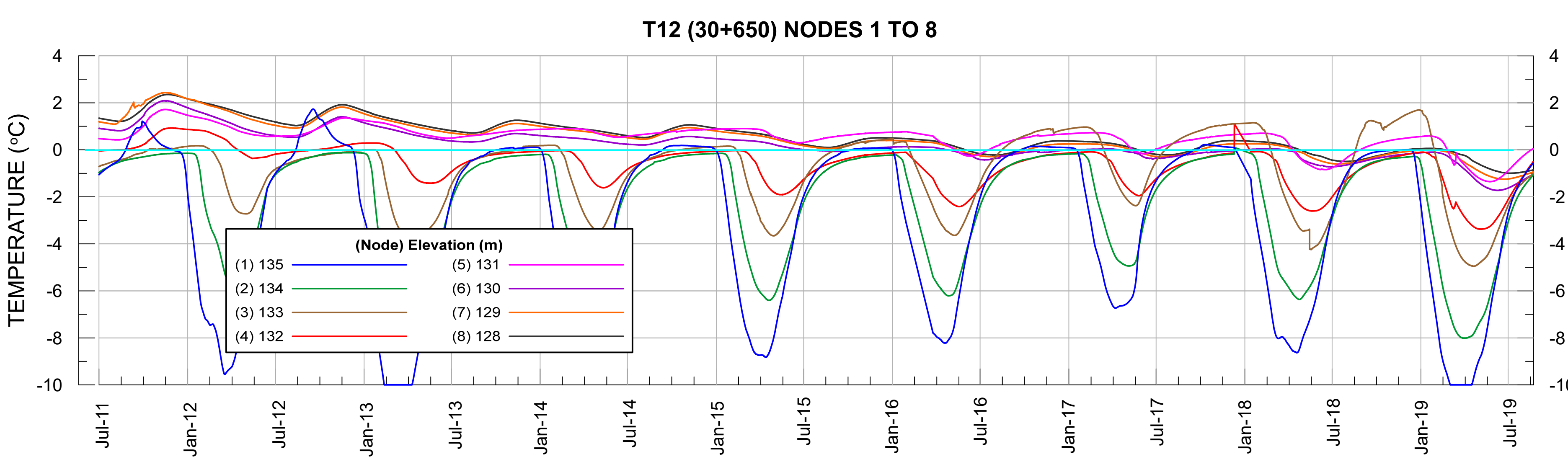
TITLE
BAYGOOSE DIKE
NODAL THERMAL TIMELINES
(July 1/11 to Aug 21/19)

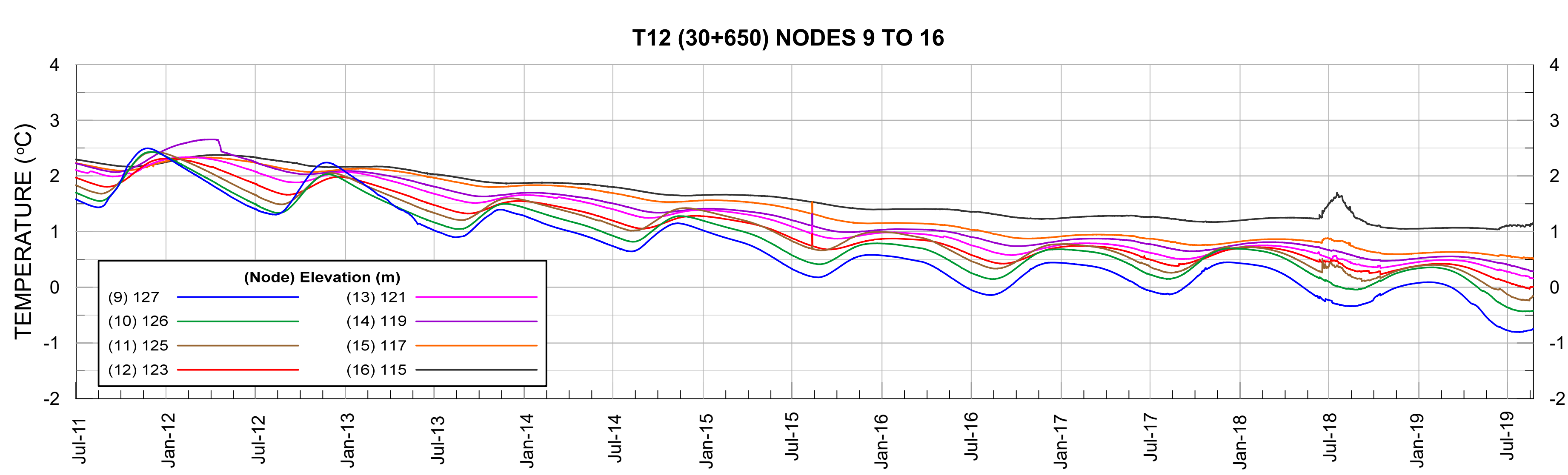
AGNICO EAGLE
MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	20JAN14	SCALE AS SHOWN	REV.
CADD	TD	20JAN14	**FIGURE 34**	
CHECK				
REVIEW				









PROJECT
AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
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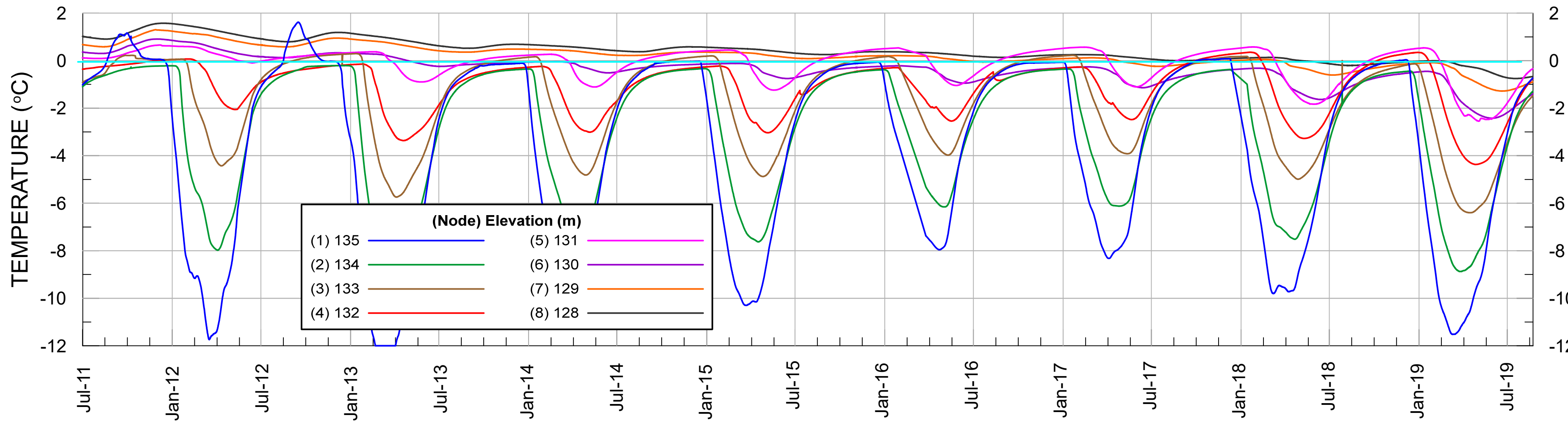
BAYGOOSE DIKE
NODAL THERMAL TIMELINES
(July 1/11 to Aug 21/19)

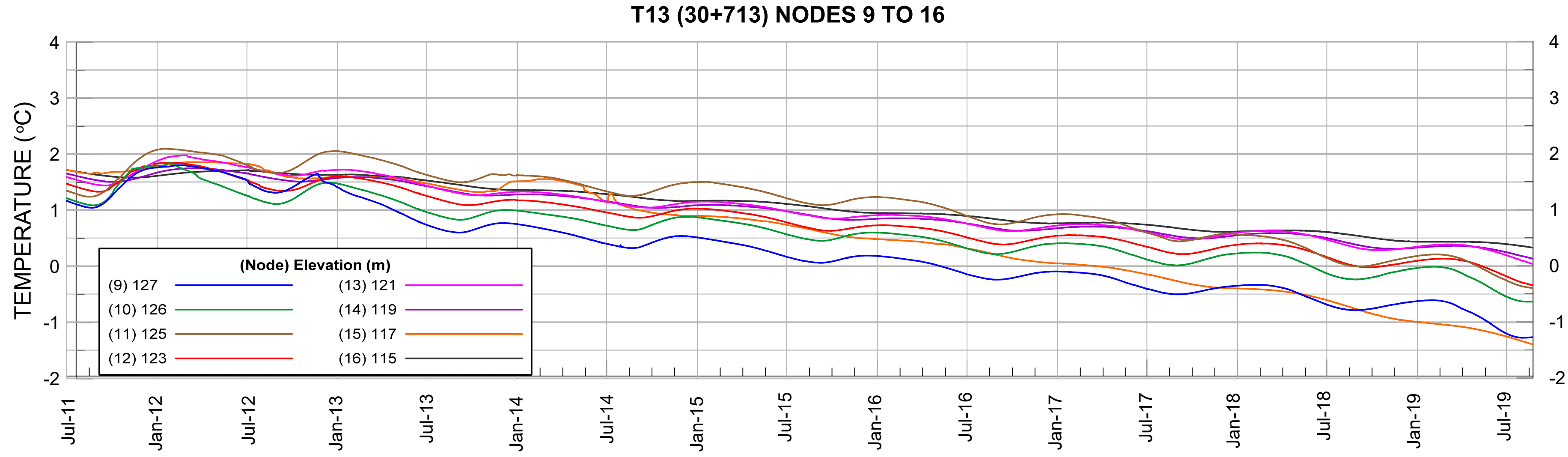
AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	20JAN14	SCALE AS SHOWN	REV.
CADD	TD	20JAN14	**FIGURE 35**	
CHECK				
REVIEW				

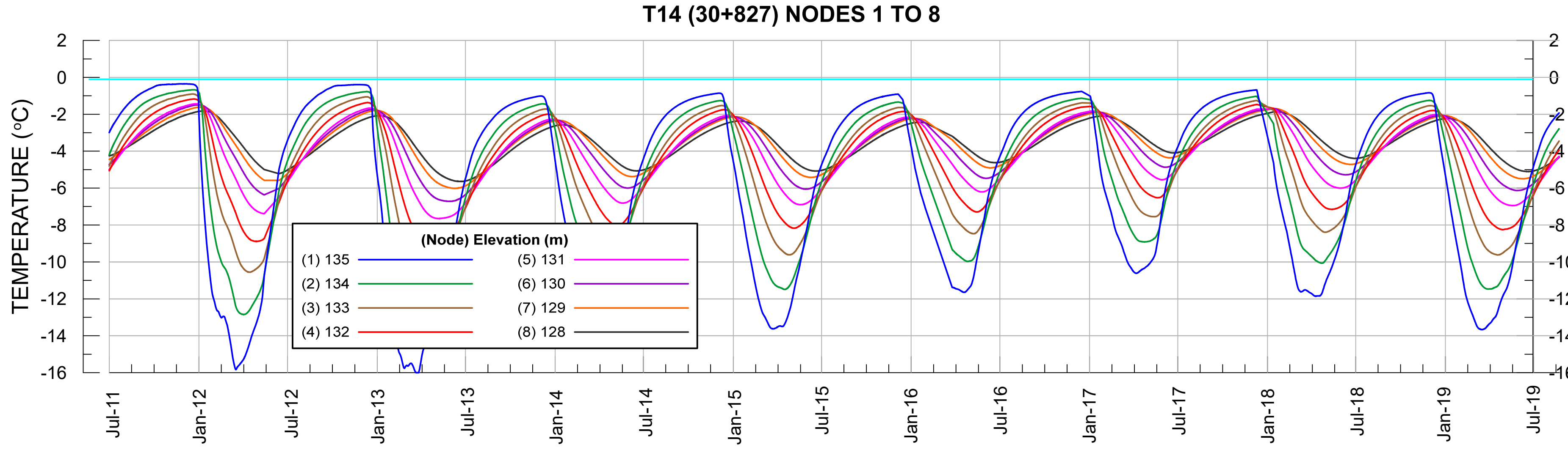
T13 (30+713) NODES 1 TO 8



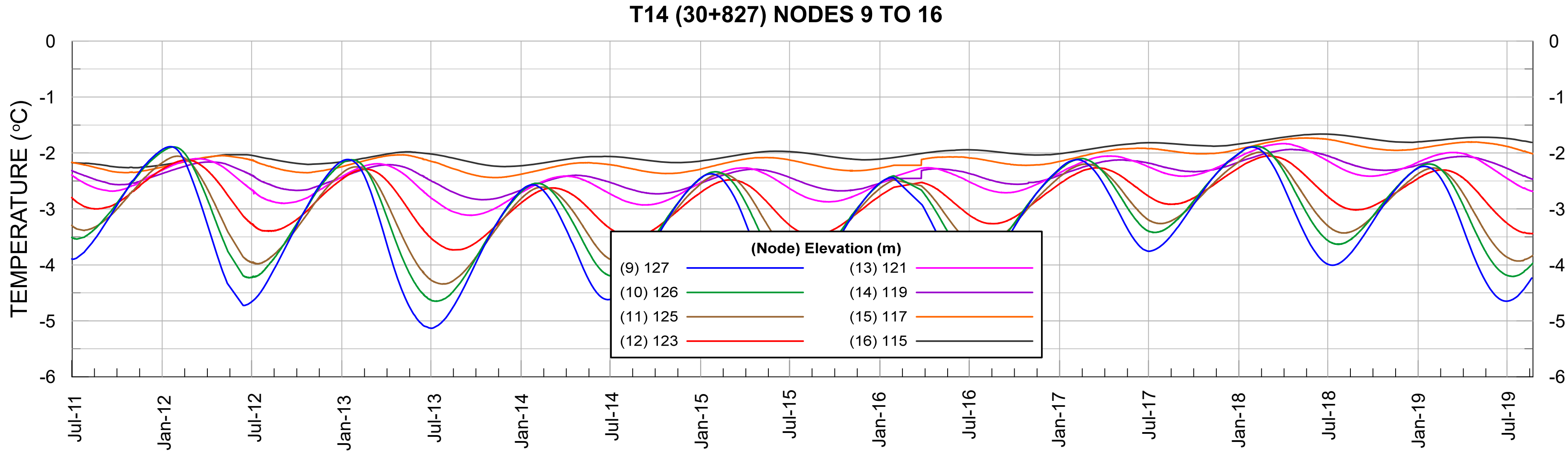
T13 (30+713) NODES 9 TO 16



T14 (30+827) NODES 1 TO 8



T14 (30+827) NODES 9 TO 16

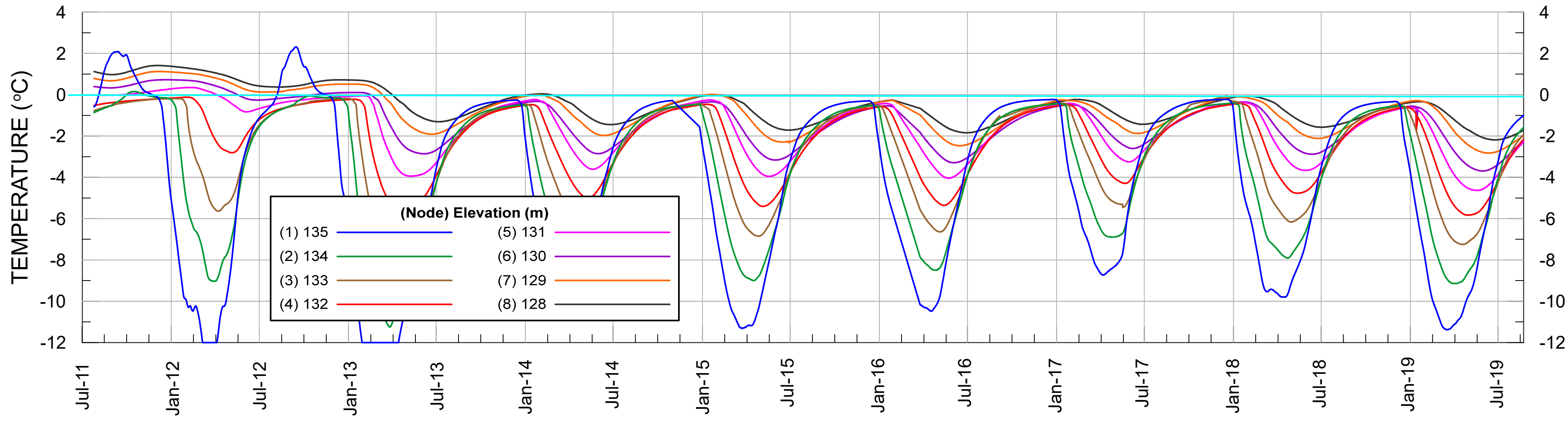


PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE NODAL THERMAL TIMELINES (July 1/11 to Aug 21/19)

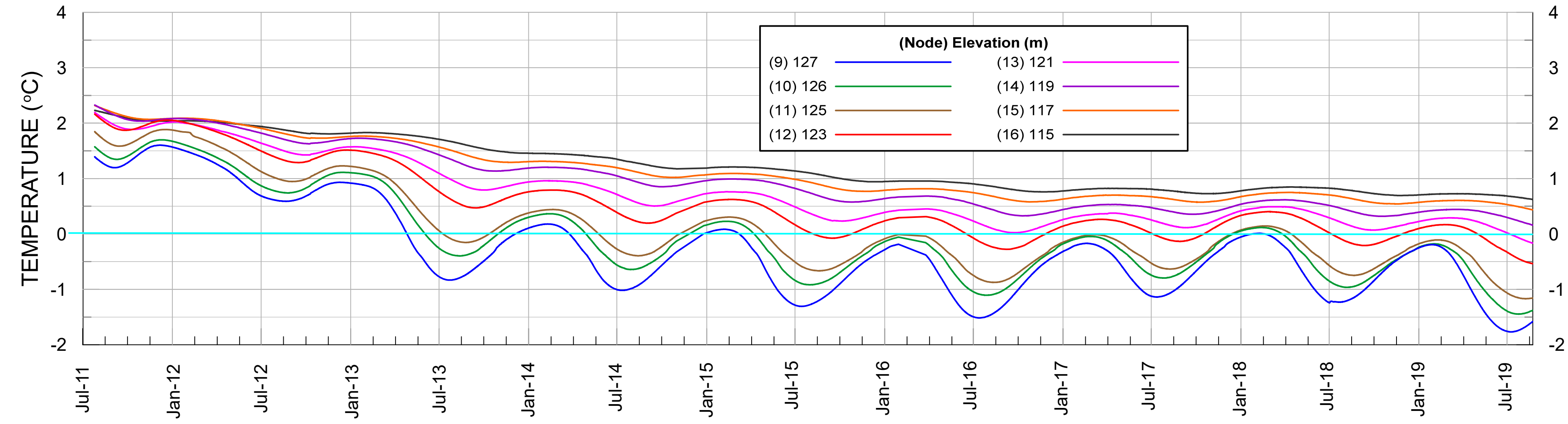
AGNICO EAGLE
MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	20JAN14	SCALE AS SHOWN	REV.
CADD	TD	20JAN14	FIGURE 36	
CHECK				
REVIEW				

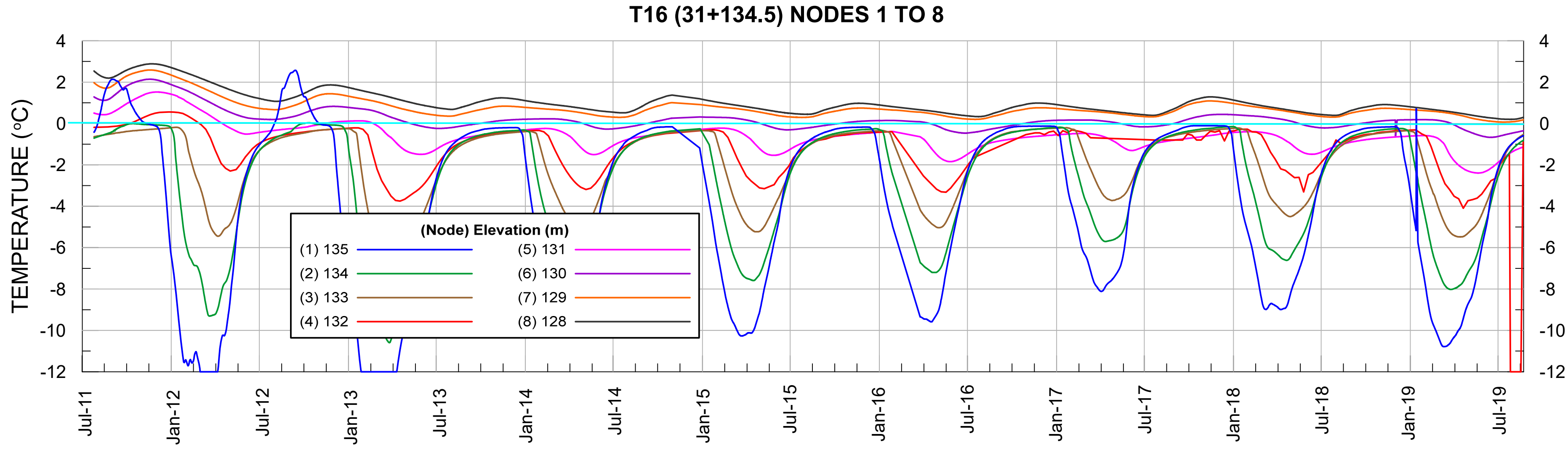
T15 (31+080) NODES 1 TO 8



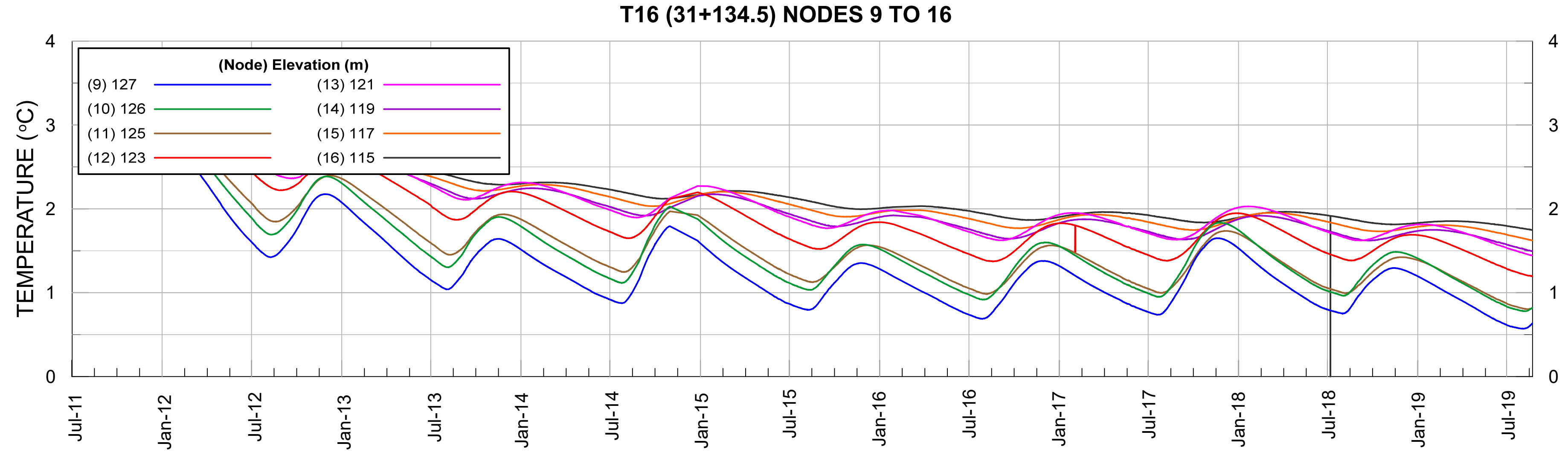
T15 (31+080) NODES 9 TO 16



T16 (31+134.5) NODES 1 TO 8



T16 (31+134.5) NODES 9 TO 16

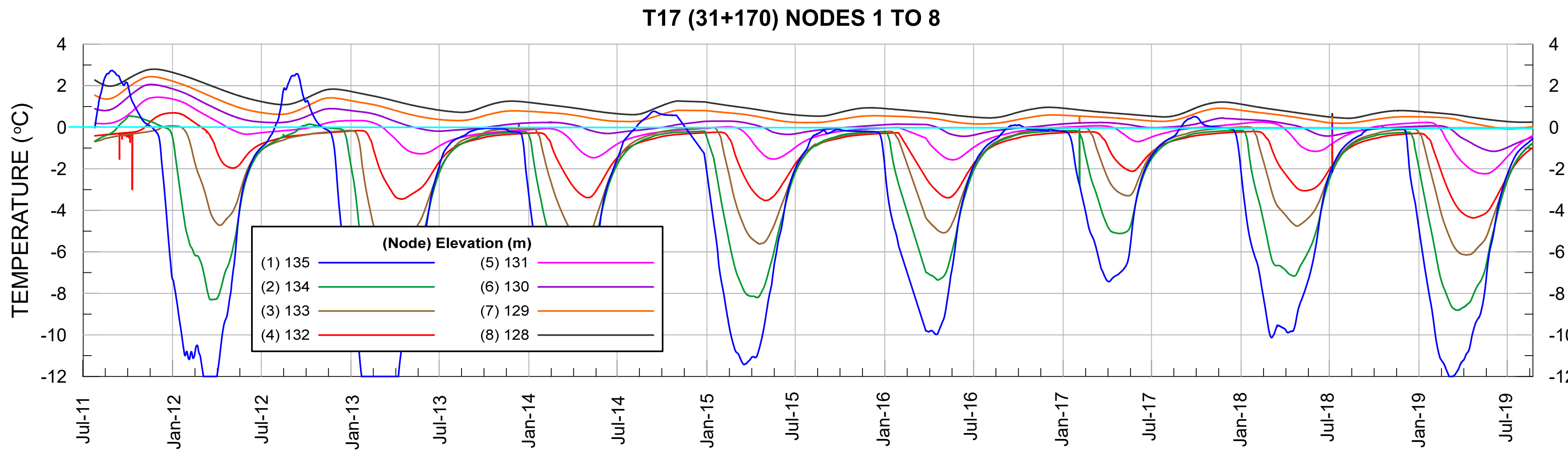


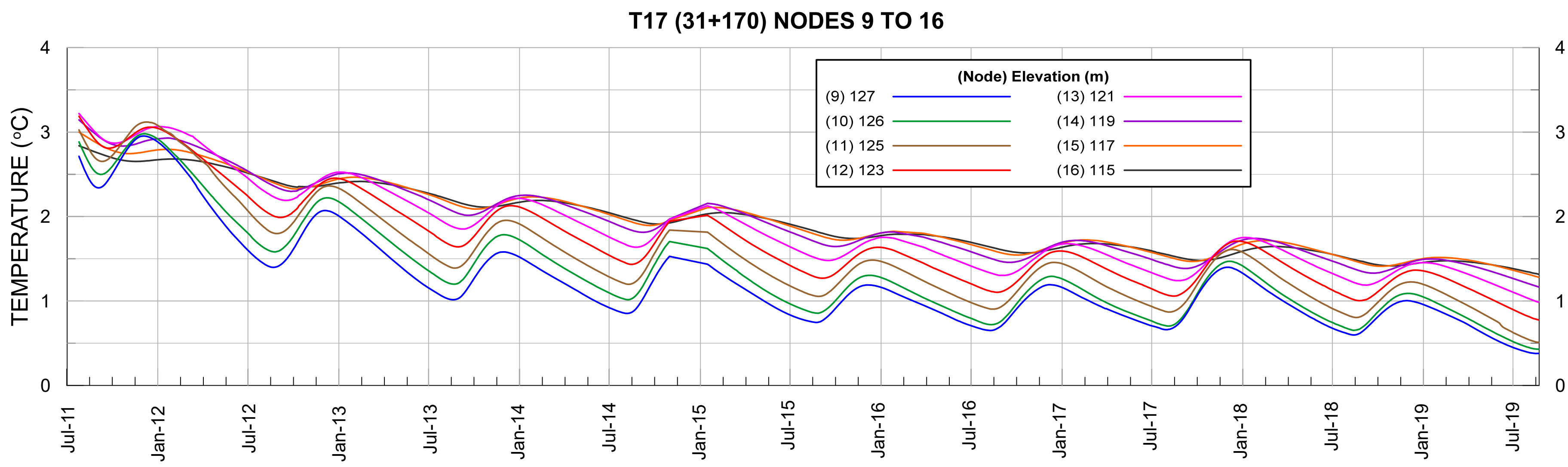
PROJECT
AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

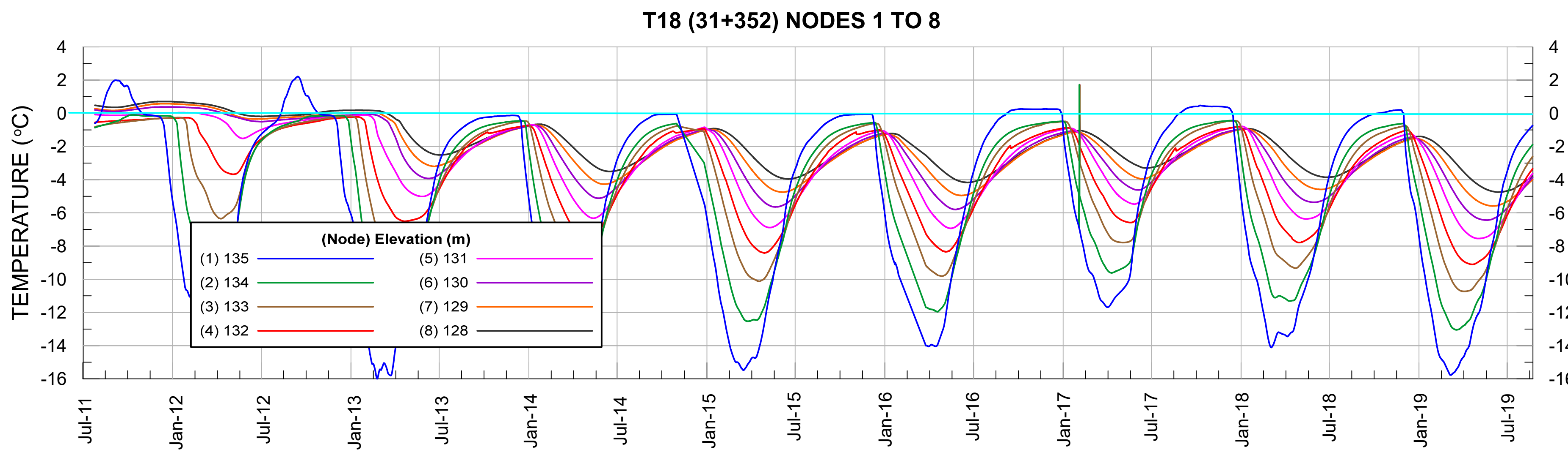
TITLE
BAYGOOSE DIKE
NODAL THERMAL TIMELINES T15-T16
(July 1/11 to Aug 21/19)

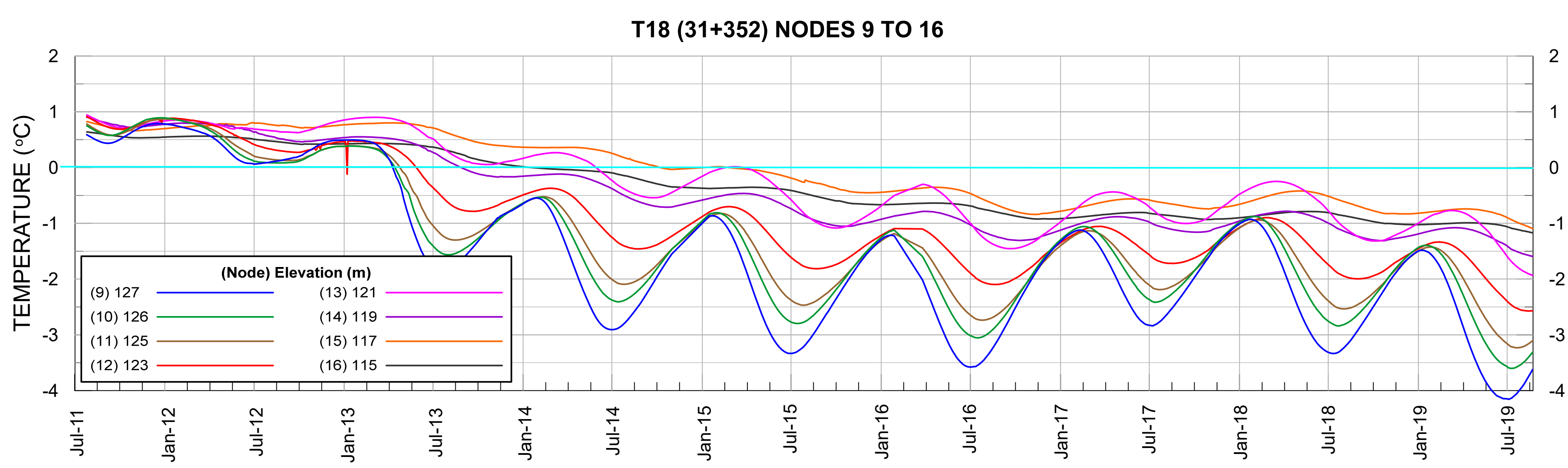
AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	20JAN14	SCALE AS SHOWN	REV.
CADD	TD	20JAN14	FIGURE 37	
CHECK				
REVIEW				







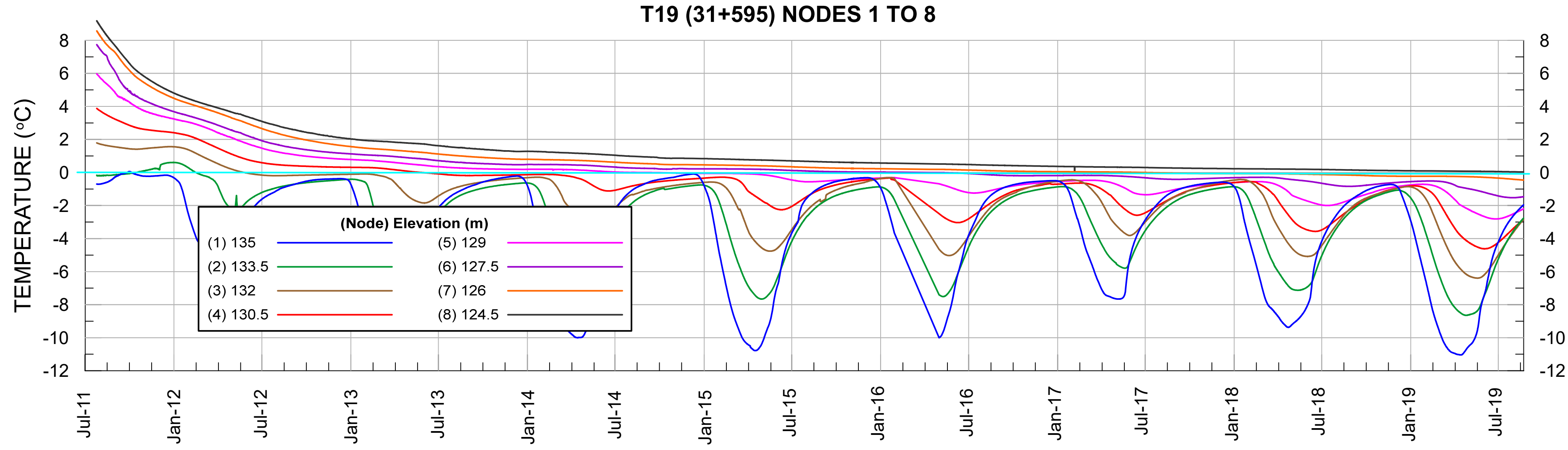


PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE NODAL THERMAL TIMELINES (July 1/11 to Aug 21/19)

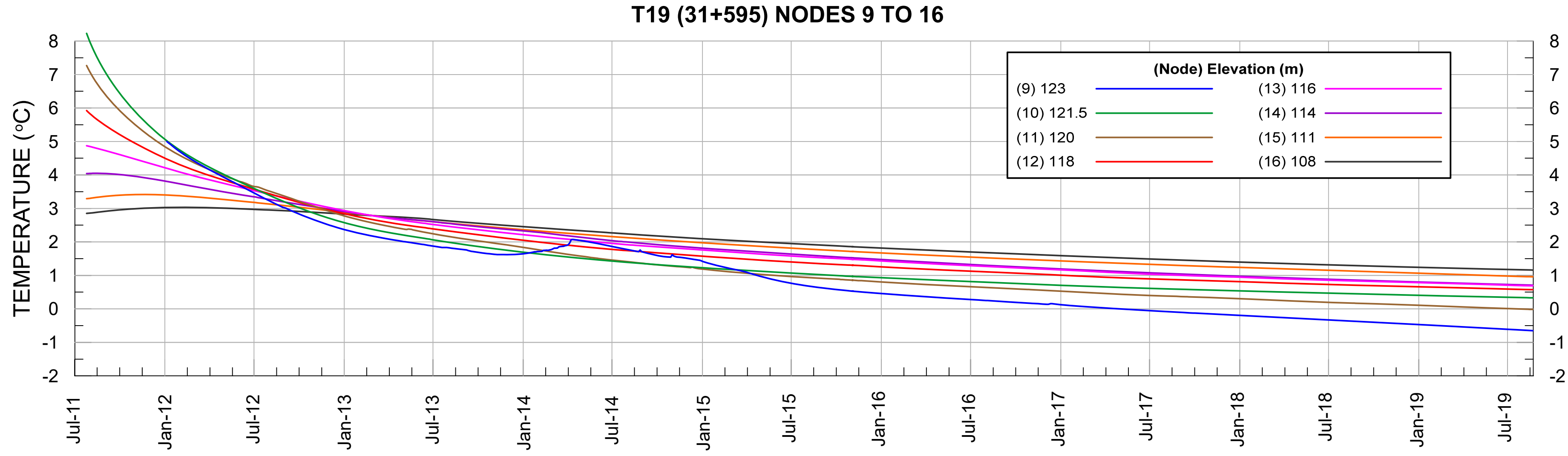
AGNICO EAGLE
MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	20JAN14	SCALE AS SHOWN	REV.
CADD	TD	20JAN14	FIGURE 38	
CHECK				
REVIEW				

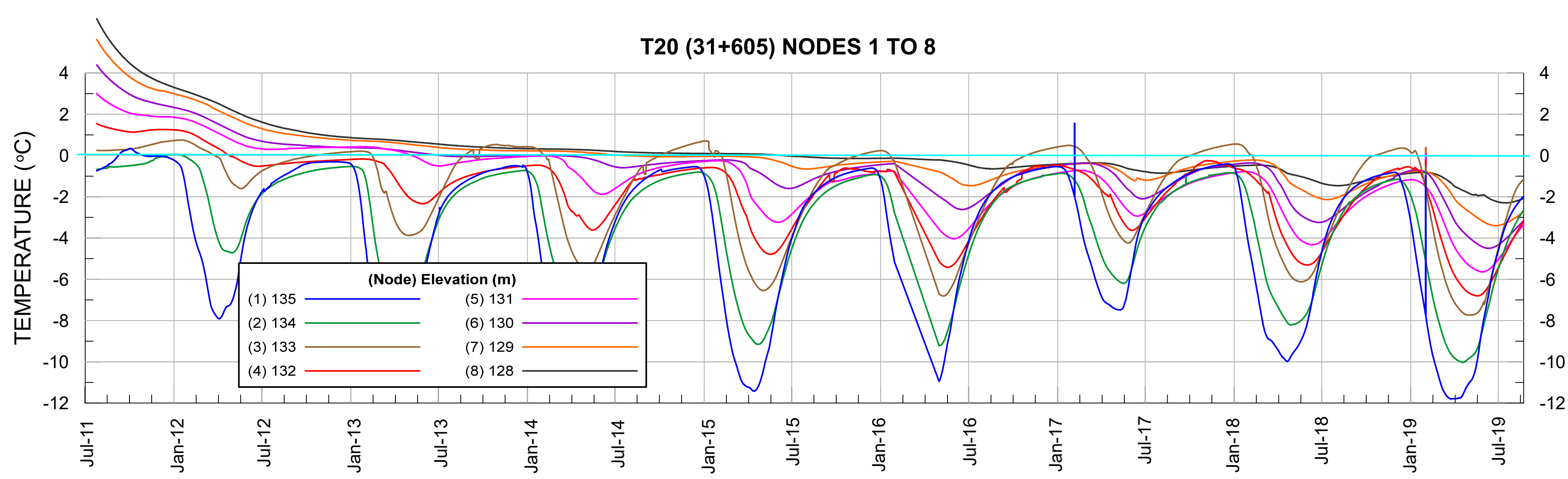
T19 (31+595) NODES 1 TO 8



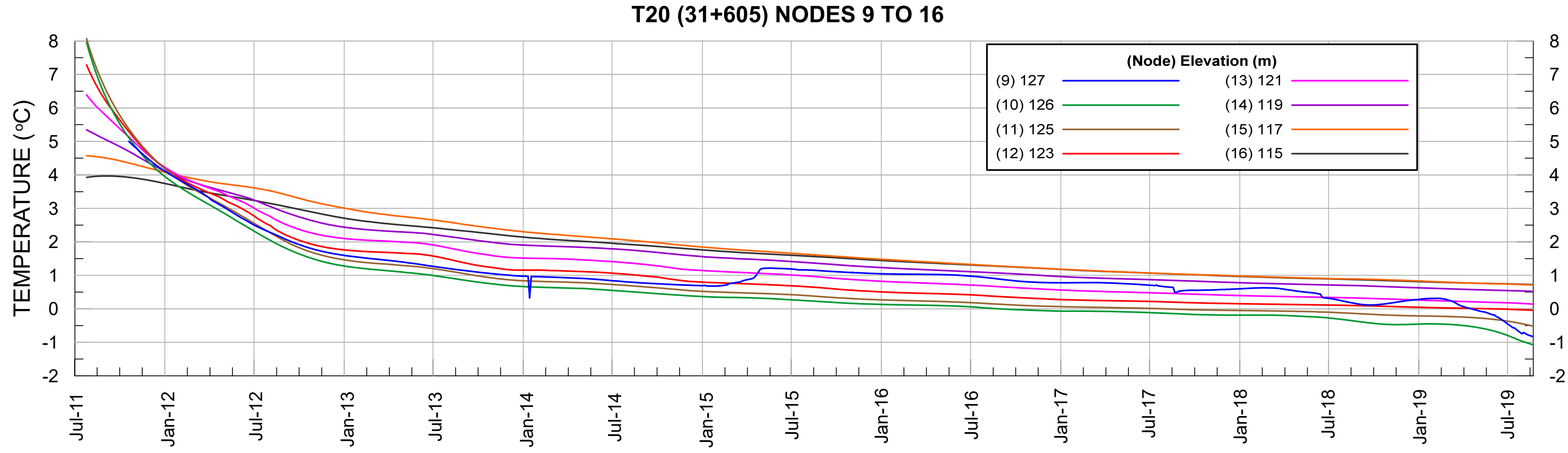
T19 (31+595) NODES 9 TO 16



T20 (31+605) NODES 1 TO 8



T20 (31+605) NODES 9 TO 16



PROJECT
AGNICO EAGLE MINES LIMITED
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BAYGOOSE DIKE
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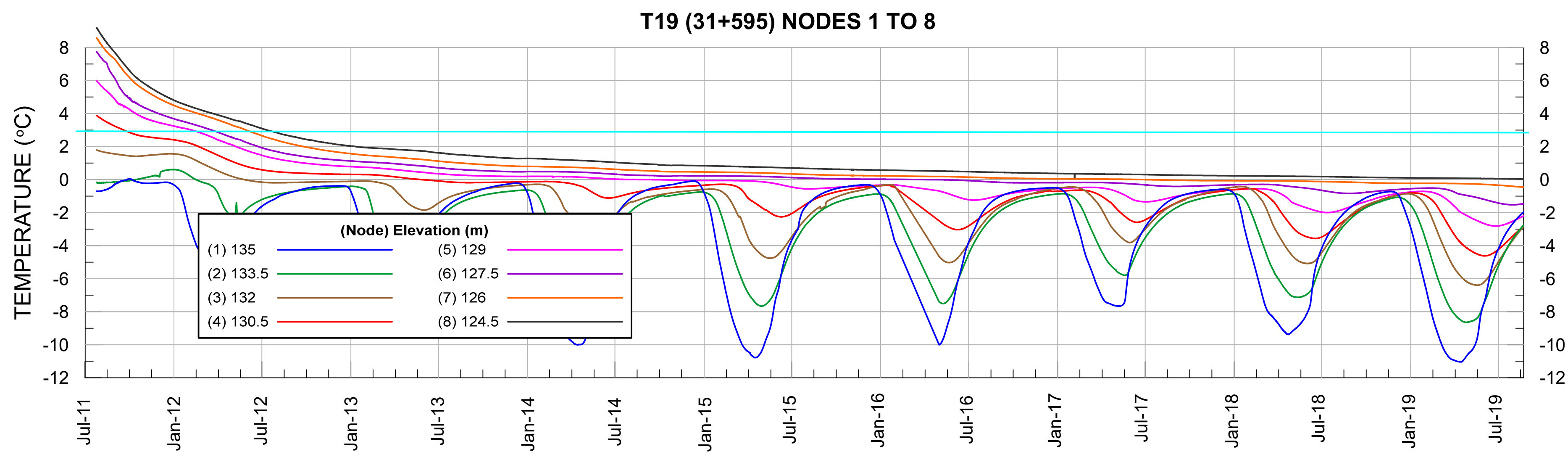
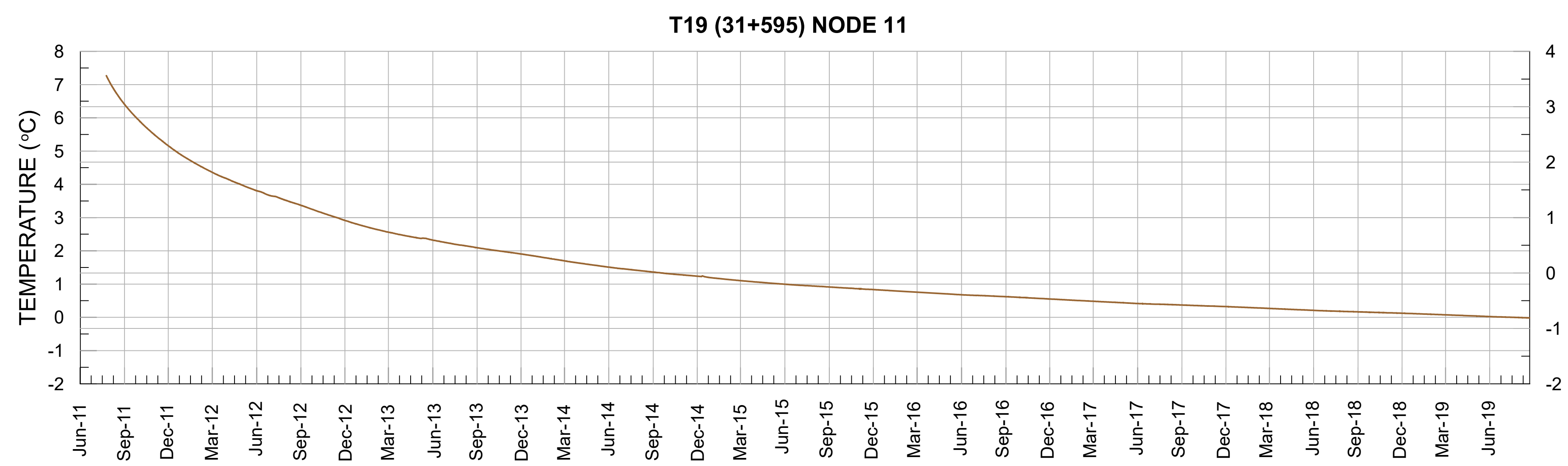
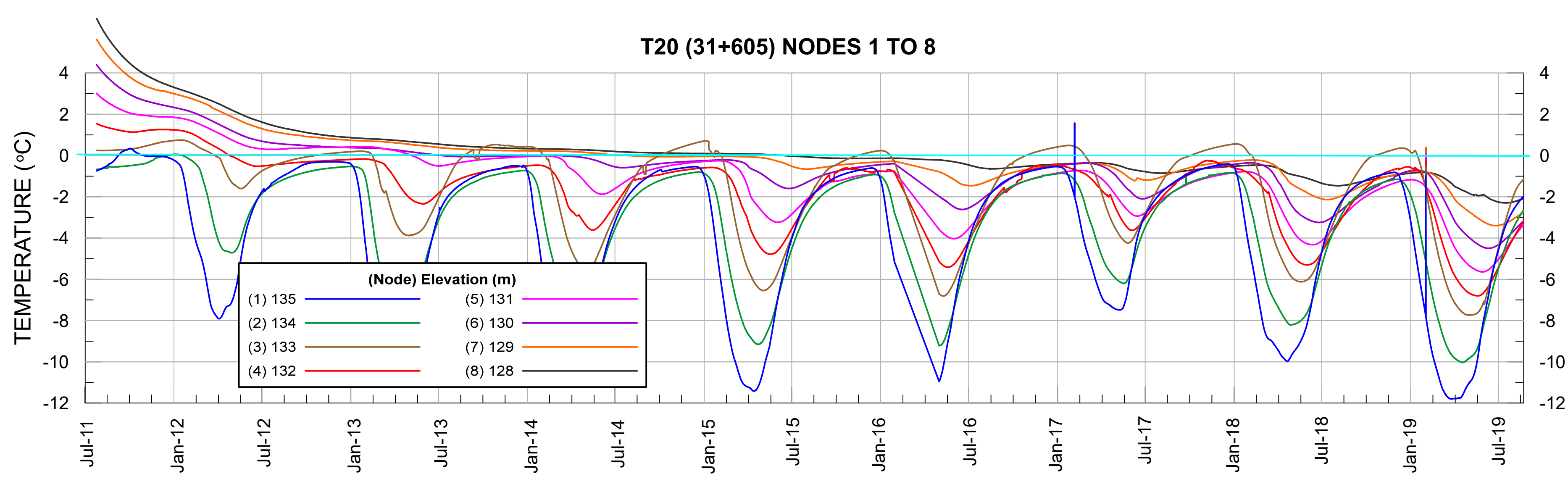
(July 1/11 to Aug 21/19)

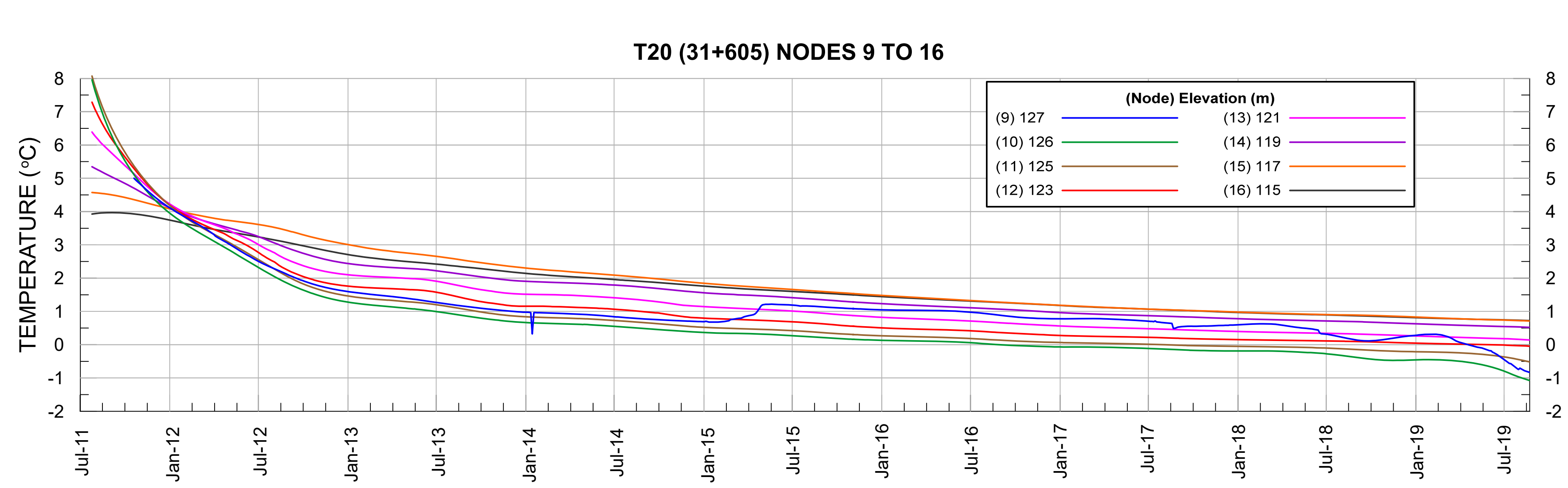
AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	20JAN14	SCALE AS SHOWN	REV.
CADD	TD	20JAN14		
CHECK			**FIGURE 39**	
REVIEW				

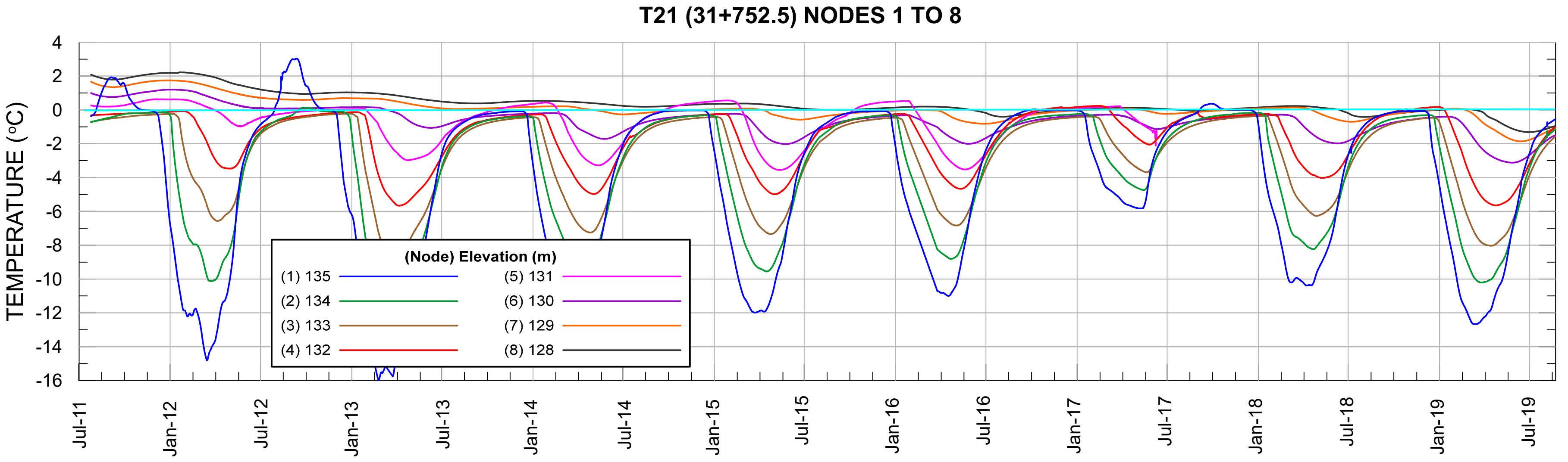


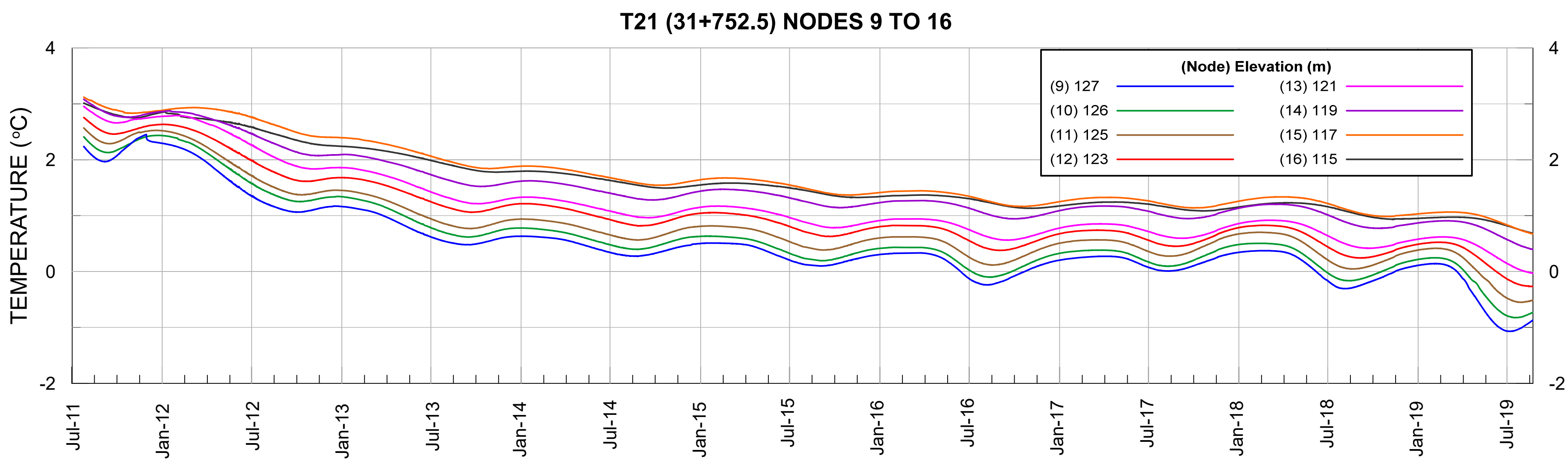


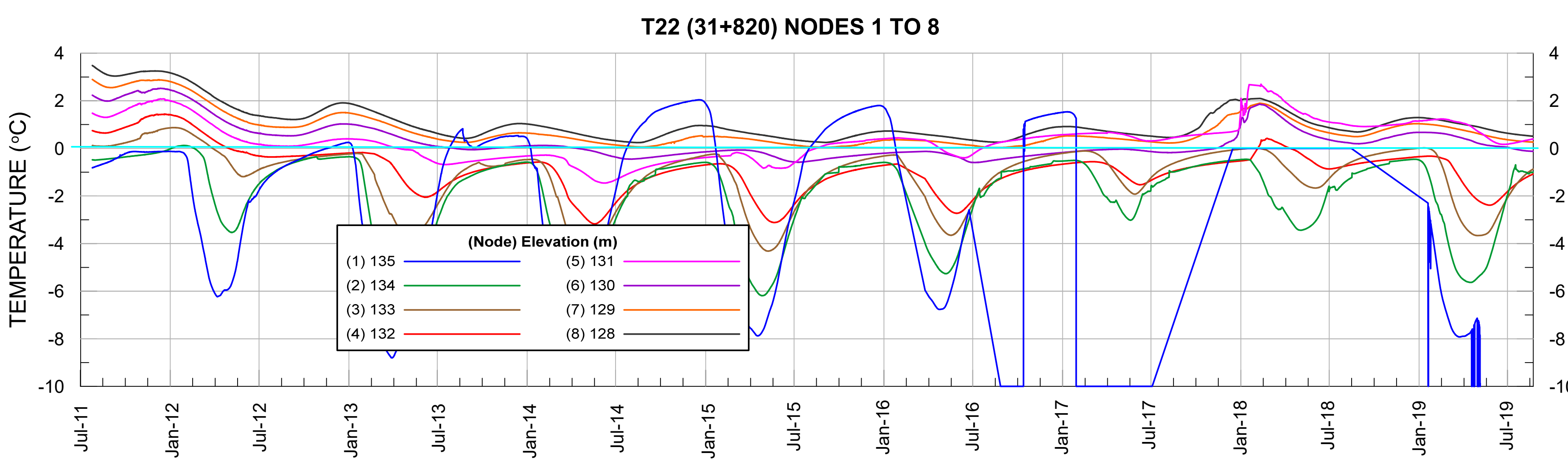


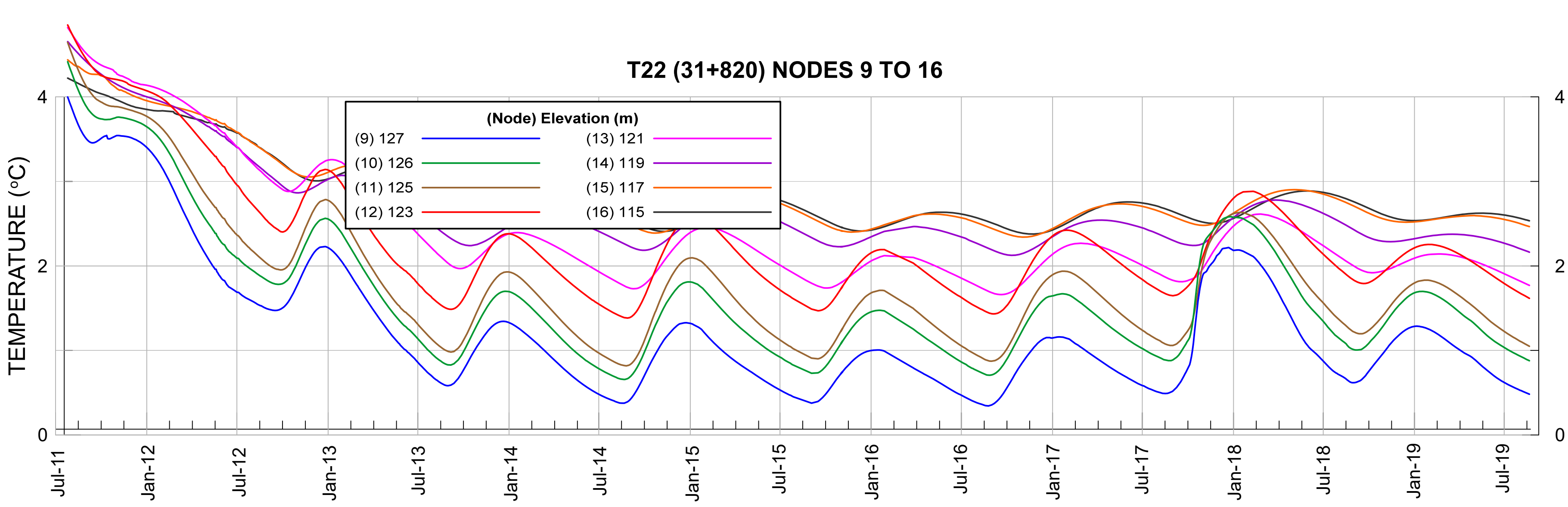


PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT			
TITLE	BAYGOOSE DIKE NODAL THERMAL TIMELINES (June 1/11 to Aug 21/19)			
AGNICO EAGLE MEADOWBANK	PROJECT No.			PHASE No.
	DESIGN	TD	20JAN14	SCALE AS SHOWN REV.
	CADD	TD	20JAN14	FIGURE 39
	CHECK			
	REVIEW			





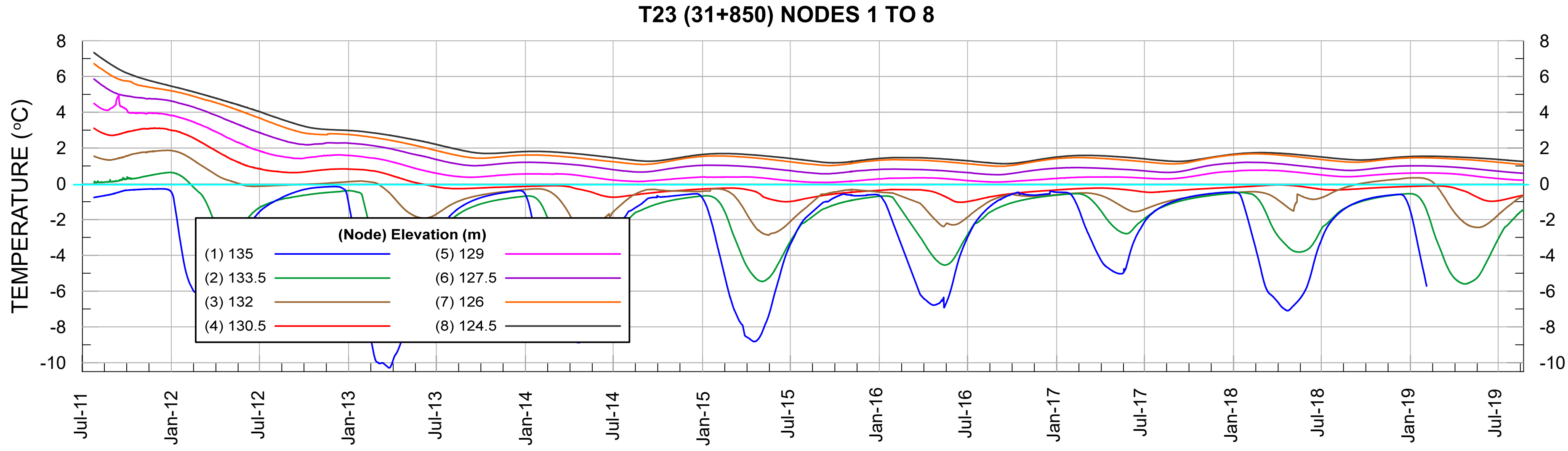




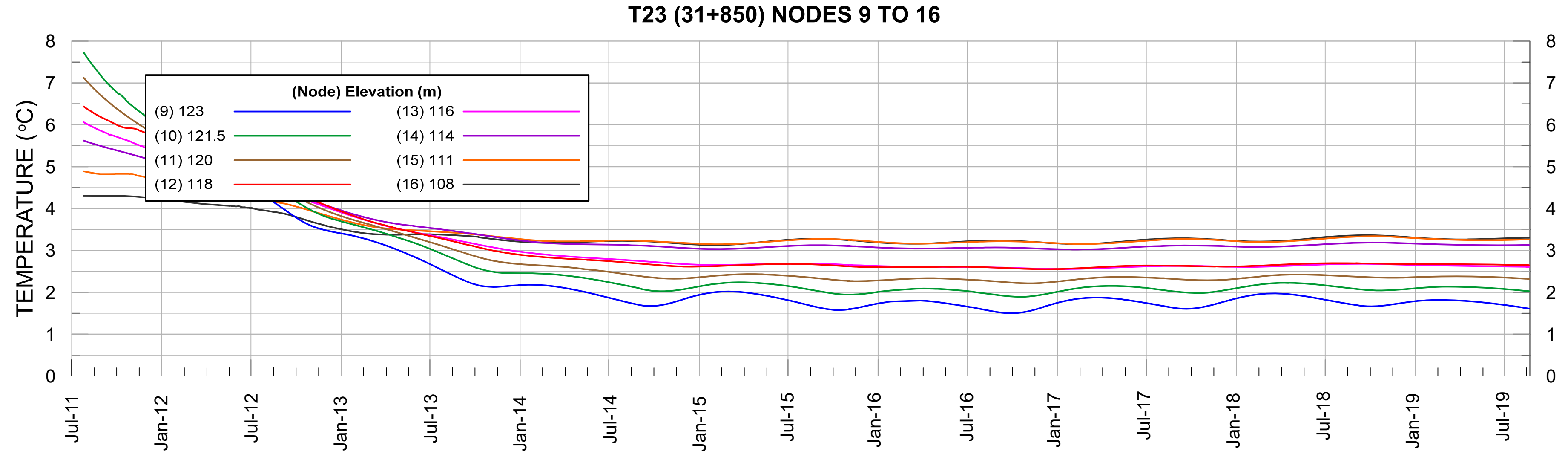
PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE NODAL THERMAL TIMELINES (July 1/11 to Aug 21/19)

AGNICO EAGLE MEADOWBANK	PROJECT No.			PHASE No.	
	DESIGN	TD	20JAN14	SCALE AS SHOWN	REV.
	CADD	TD	20JAN14	FIGURE 40	
	CHECK				
	REVIEW				

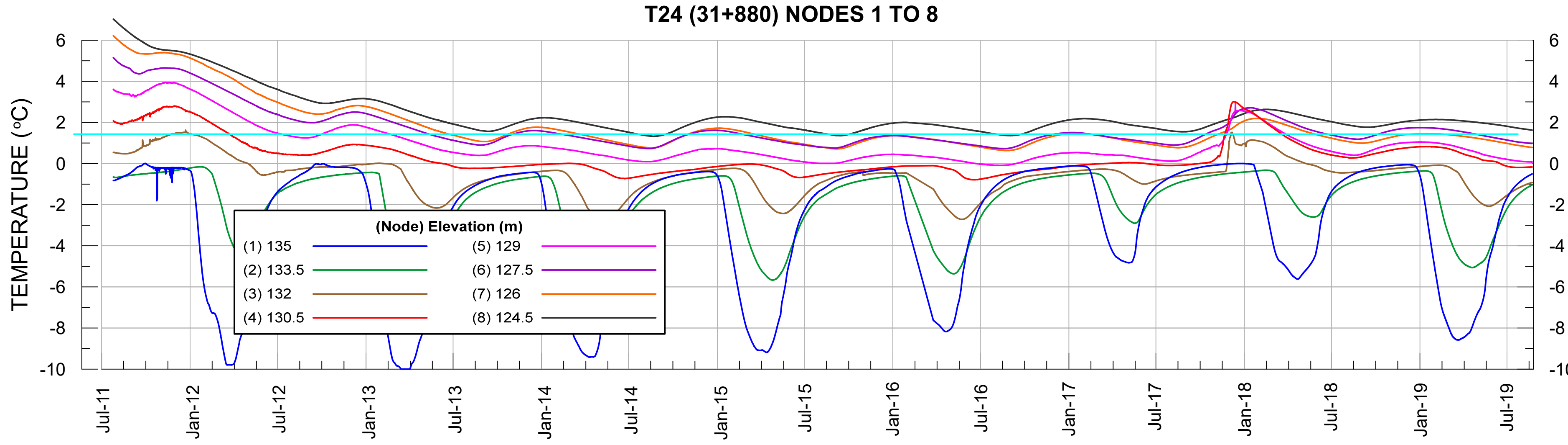
T23 (31+850) NODES 1 TO 8



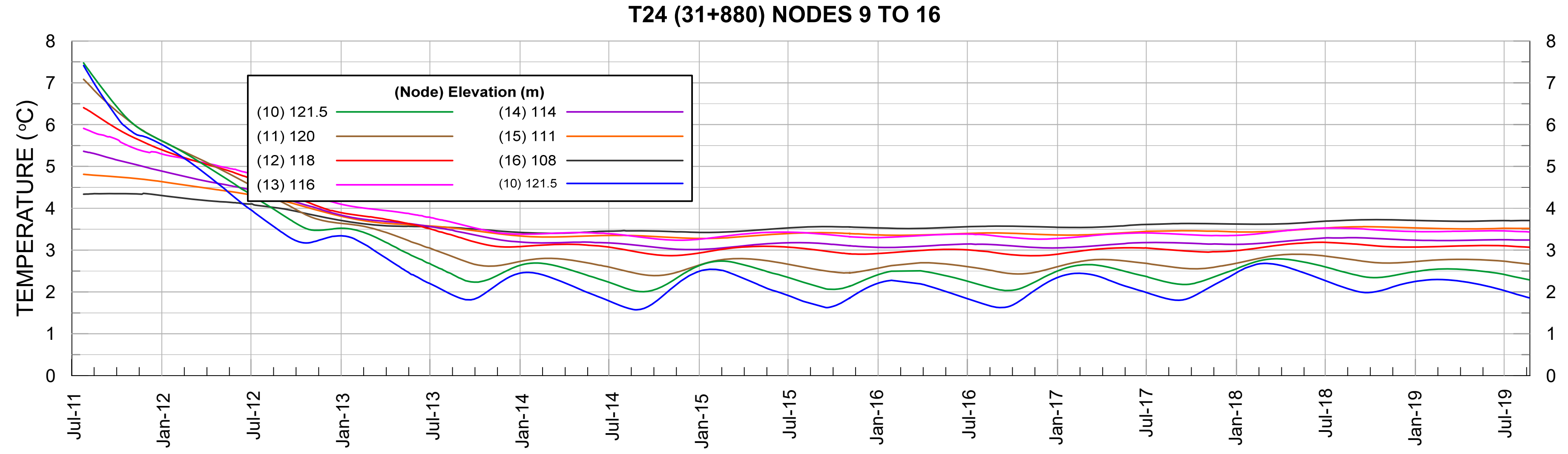
T23 (31+850) NODES 9 TO 16



T24 (31+880) NODES 1 TO 8



T24 (31+880) NODES 9 TO 16

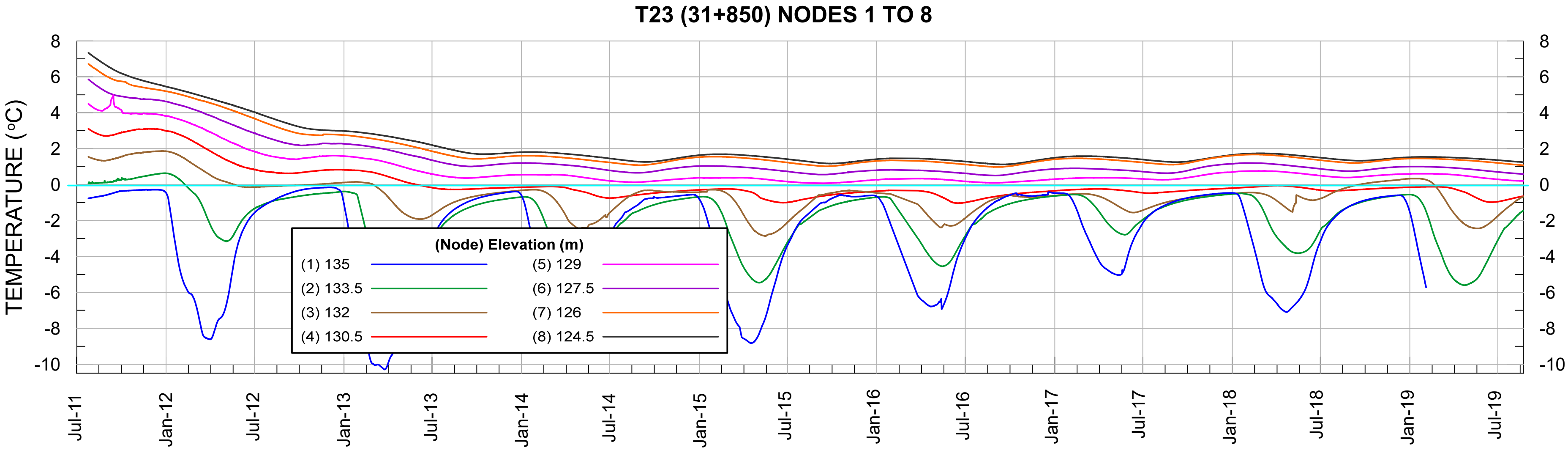


PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	**BAYGOOSE DIKE** **NODAL THERMAL TIMELINES** **(July 1/11 to Aug 21/19)**

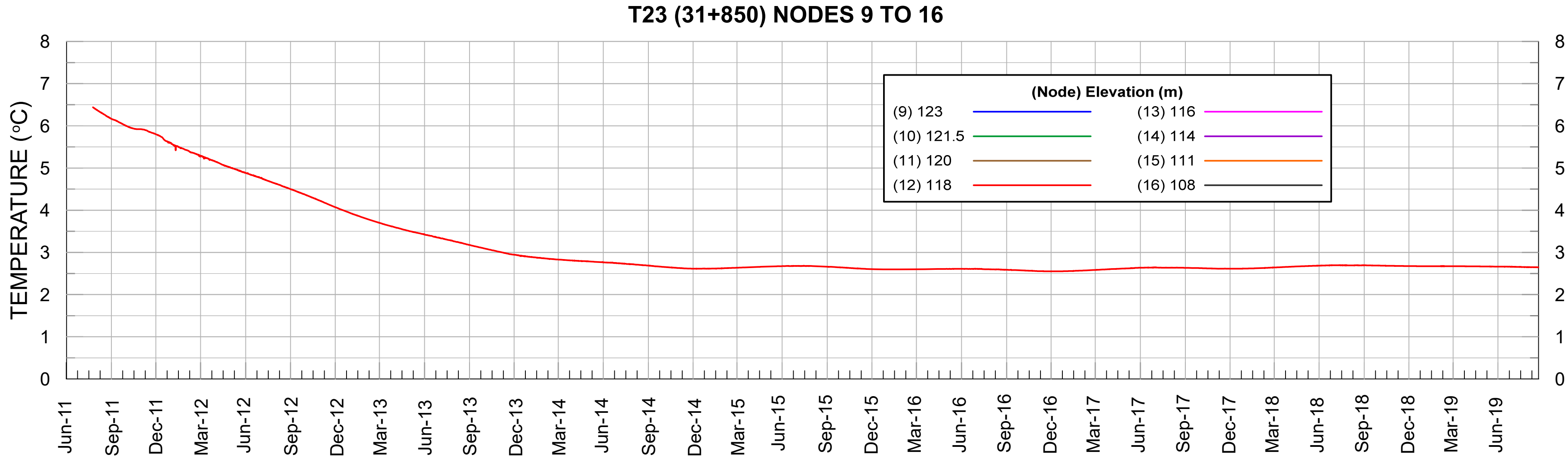
AGNICO EAGLE
MEADOWBANK

PROJECT No.			PHASE No.
DESIGN	TD	20JAN14	SCALE AS SHOWN REV.
CADD	TD	20JAN14	**FIGURE 41**
CHECK			
REVIEW			

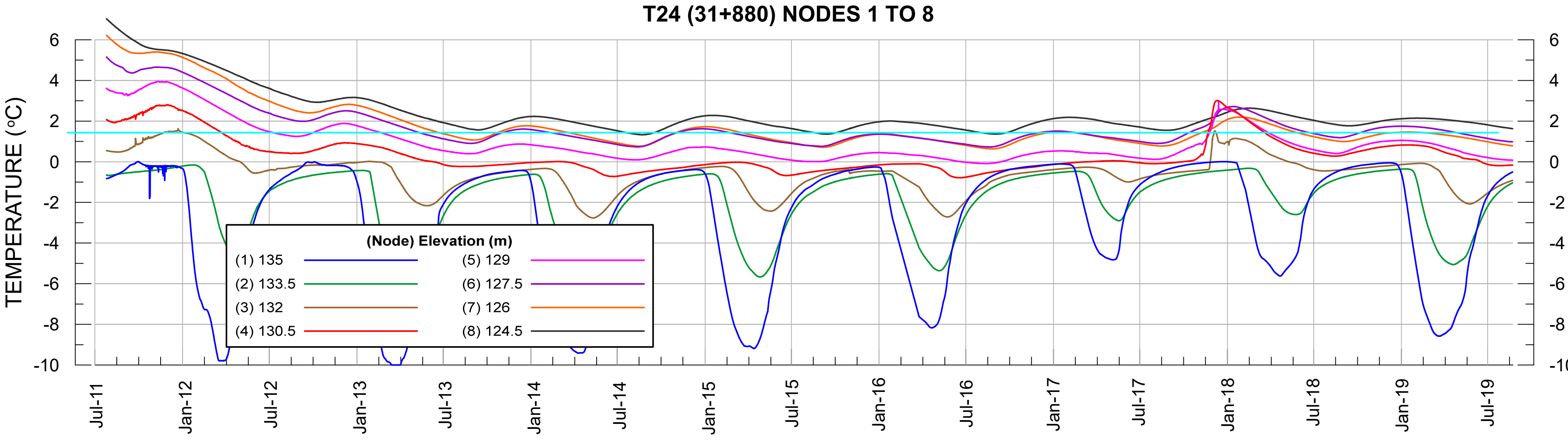
T23 (31+850) NODES 1 TO 8



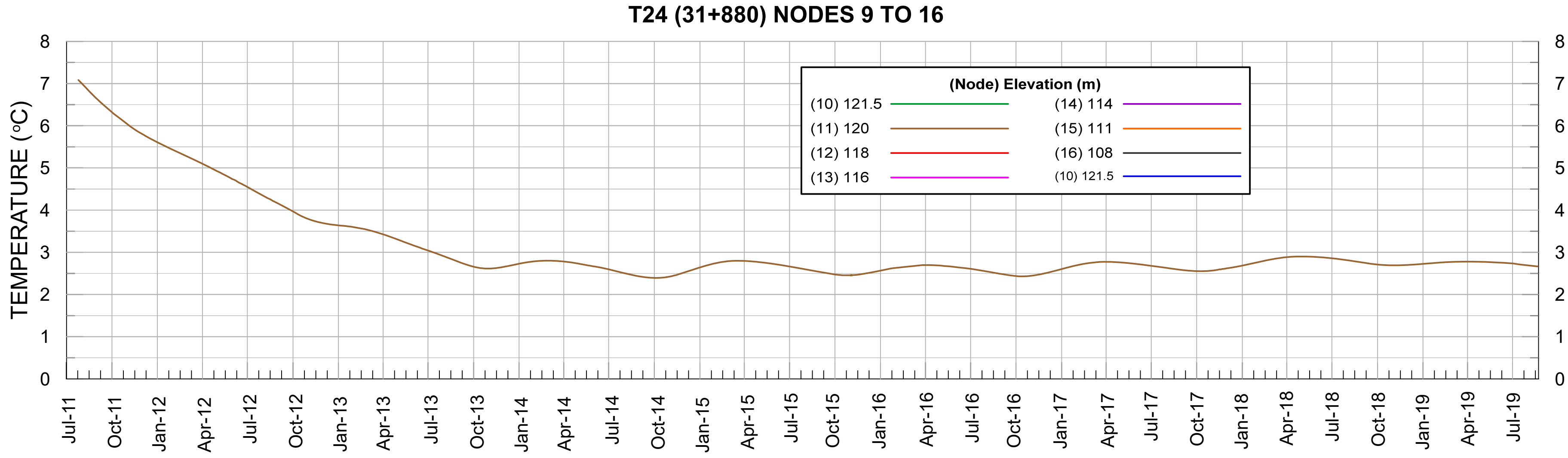
T23 (31+850) NODES 9 TO 16



T24 (31+880) NODES 1 TO 8



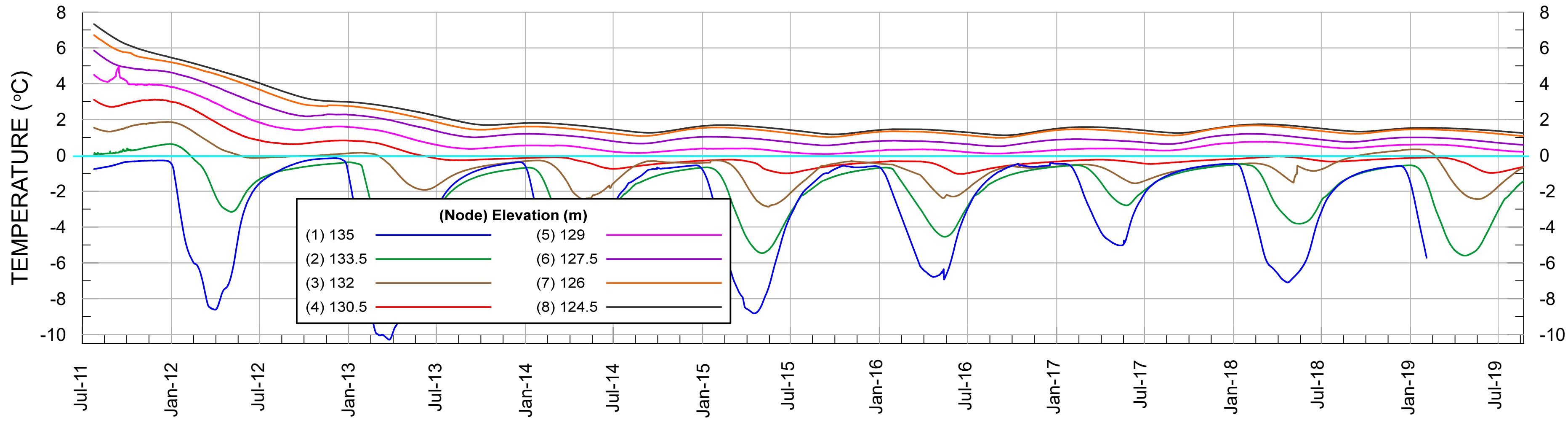
T24 (31+880) NODES 9 TO 16



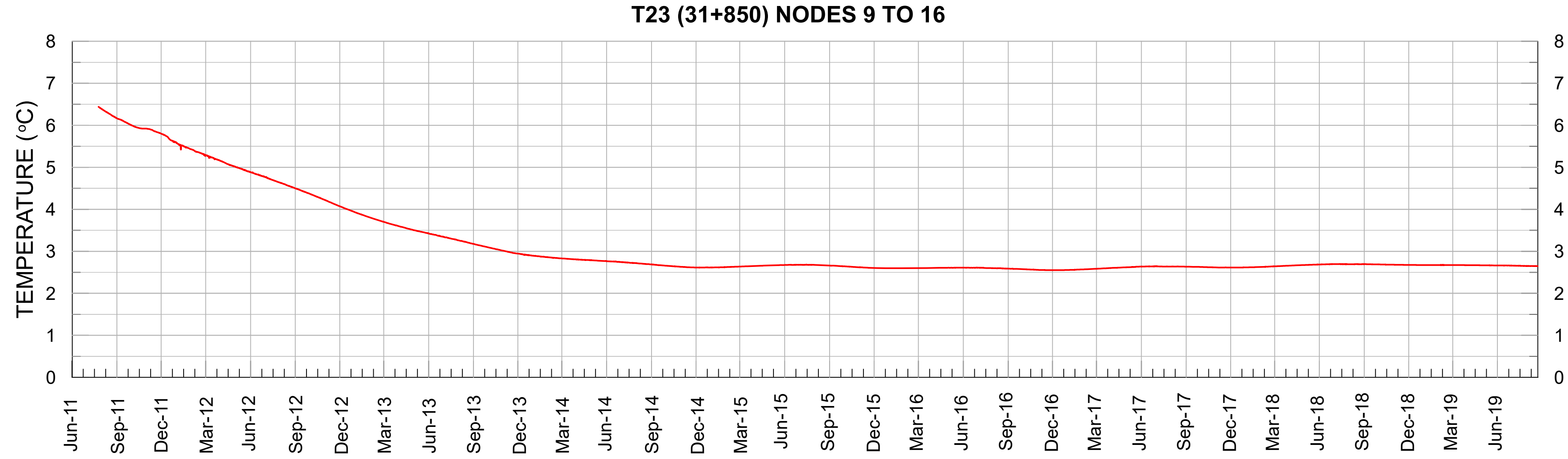
PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE (July 1/11 to Aug 21/19)

AGNICO EAGLE MEADOWBANK	PROJECT No.			PHASE No.
	DESIGN	TD	20JAN14	SCALE AS SHOWN REV.
	CADD	TD	20JAN14	FIGURE 41
	CHECK			
	REVIEW			

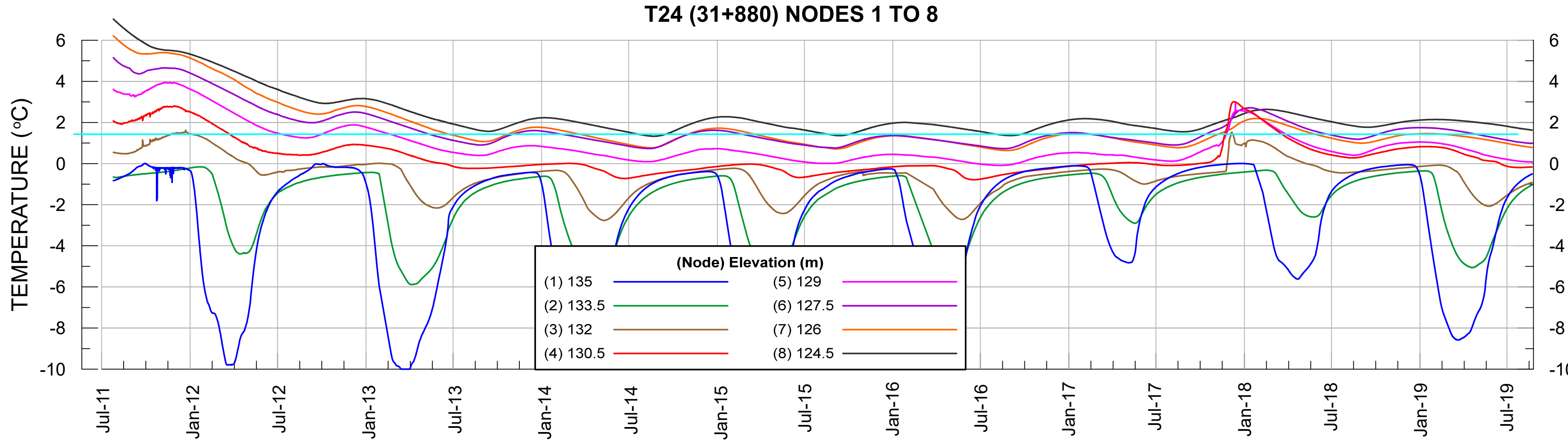
T23 (31+850) NODES 1 TO 8



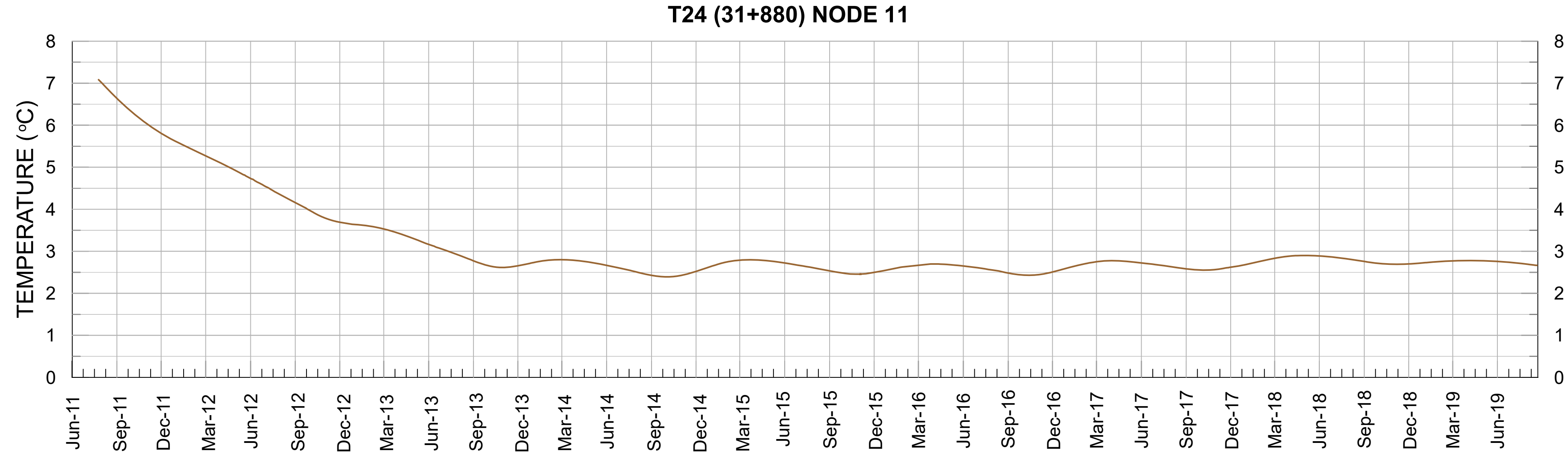
T23 (31+850) NODES 9 TO 16



T24 (31+880) NODES 1 TO 8



T24 (31+880) NODE 11

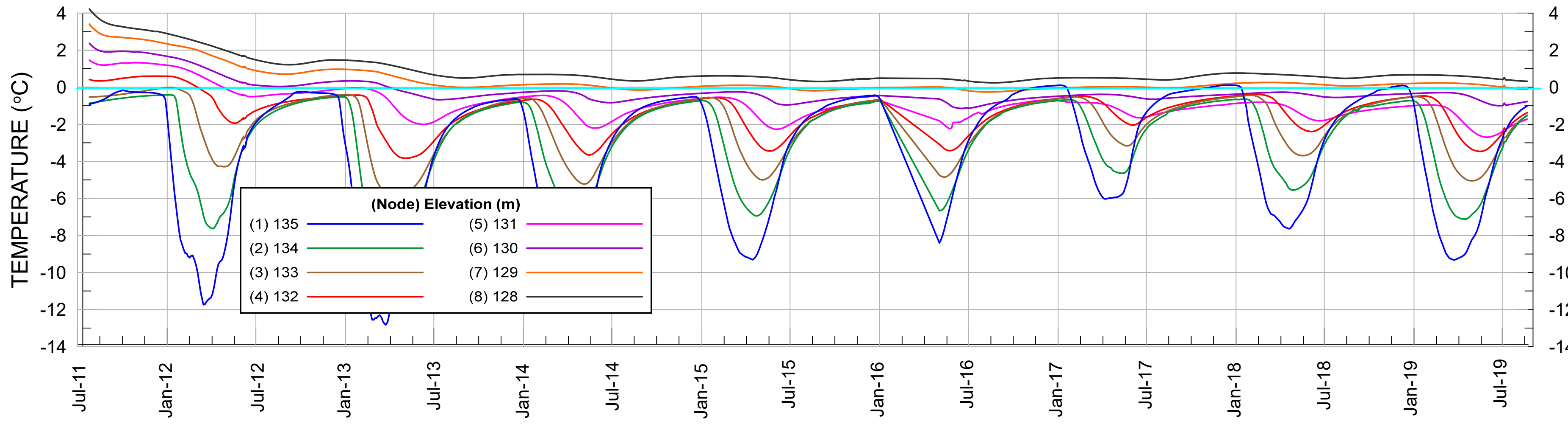


PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE (June 1/11 to Aug 21/19)

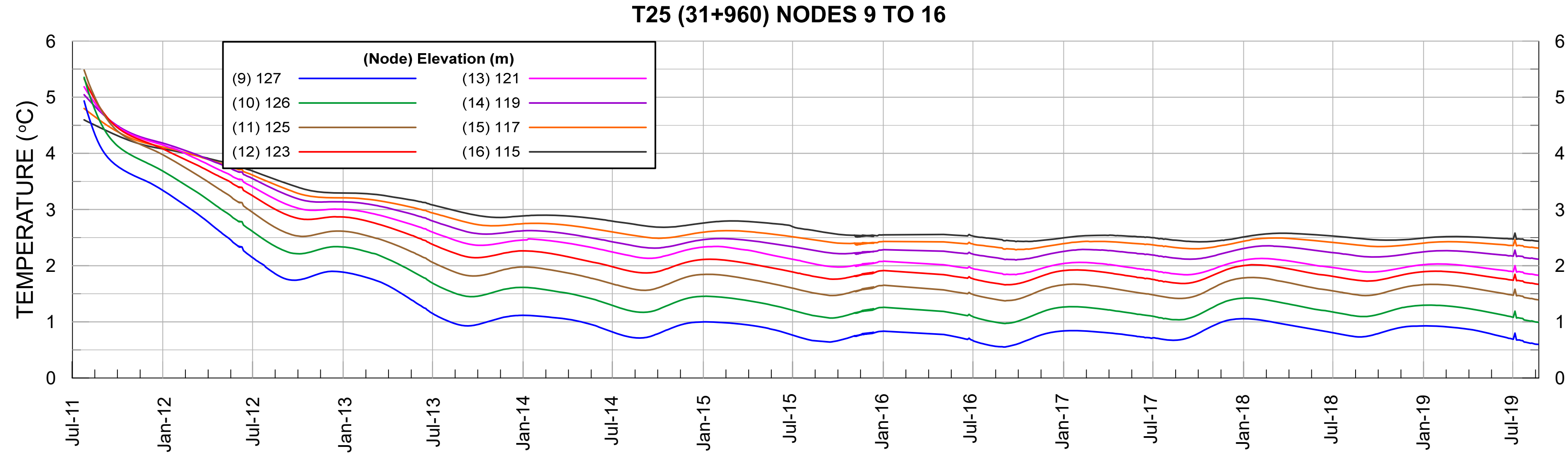
AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.
DESIGN	TD	20JAN14	SCALE AS SHOWN REV.
CADD	TD	20JAN14	FIGURE 41
CHECK			
REVIEW			

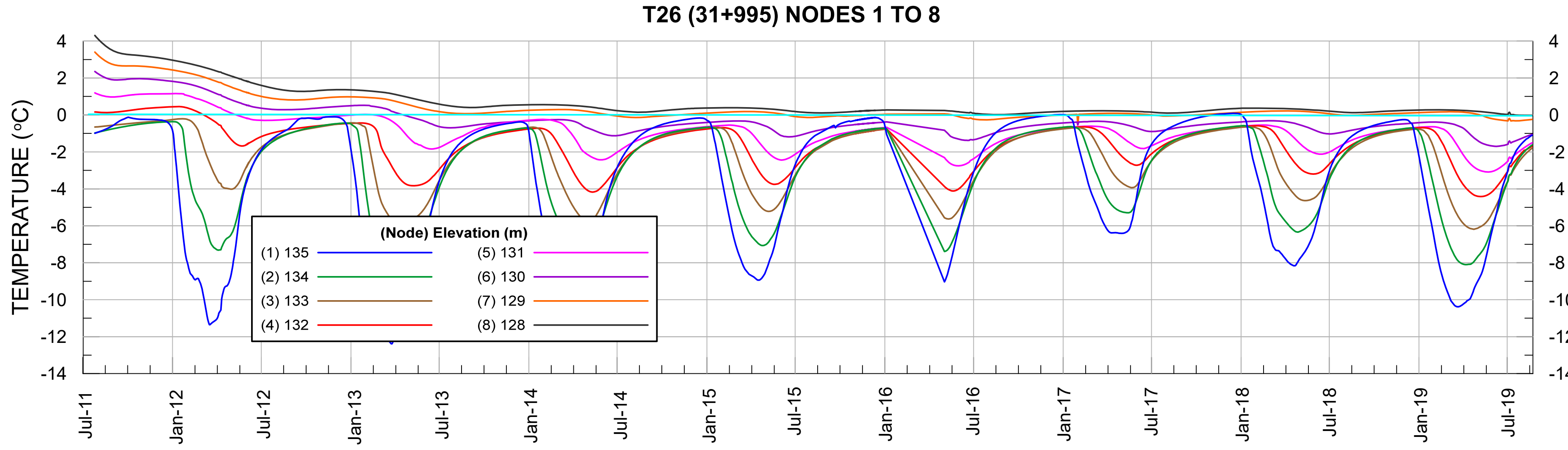
T25 (31+960) NODES 1 TO 8



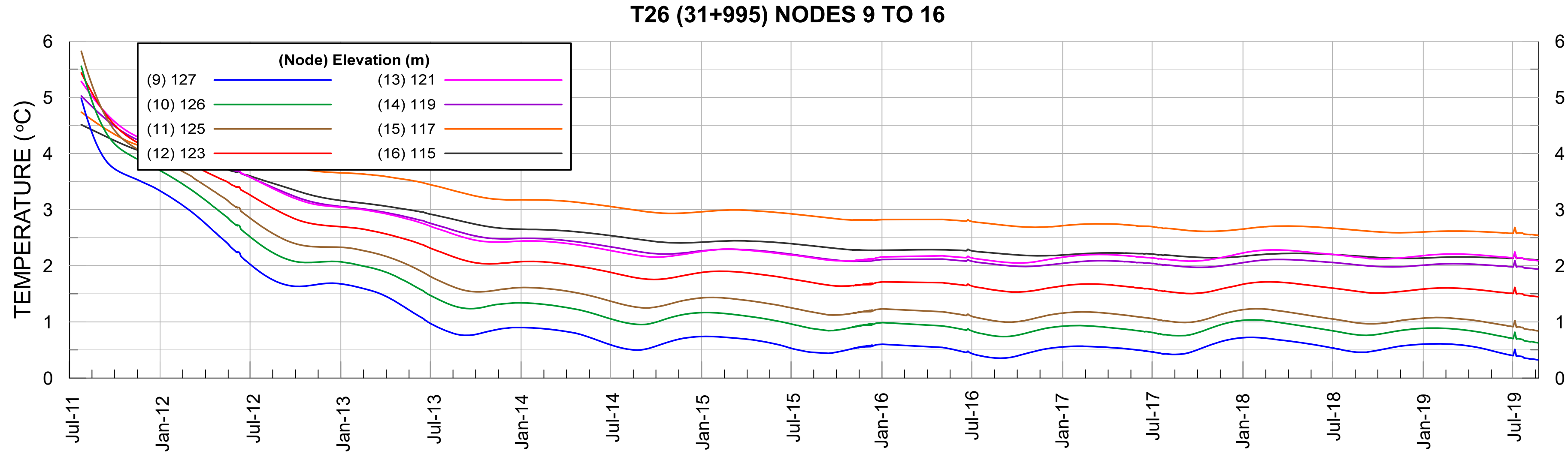
T25 (31+960) NODES 9 TO 16



T26 (31+995) NODES 1 TO 8



T26 (31+995) NODES 9 TO 16



PROJECT: AGNICO EAGLE MINES LIMITED
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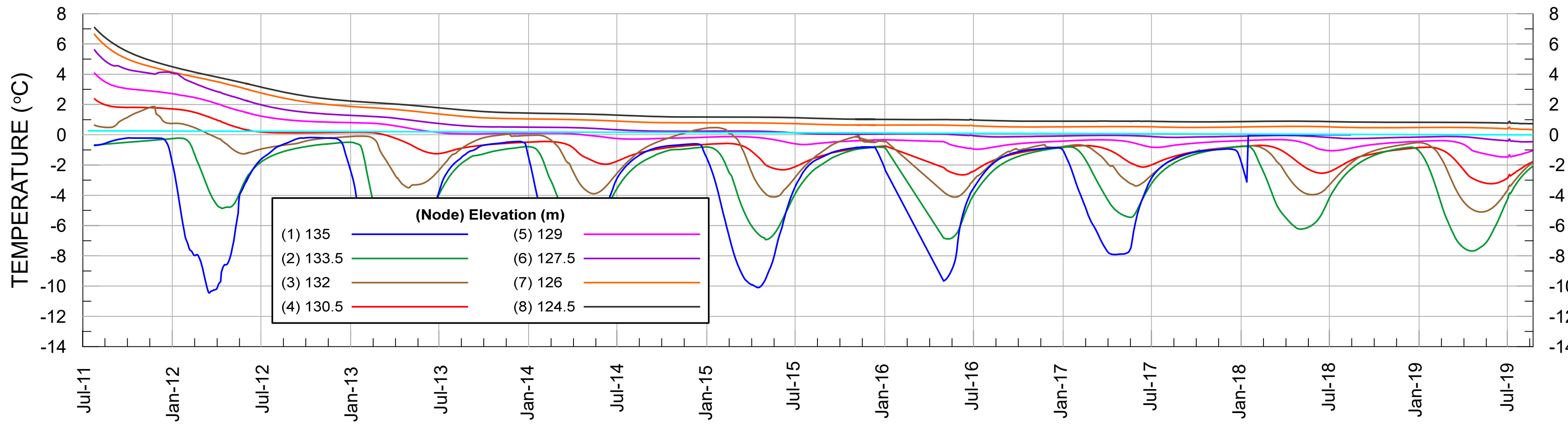
NUNAVUT

TITLE: BAYGOOSE DIKE
NODAL THERMAL TIMELINES
(July 1/11 to Aug 21/19)

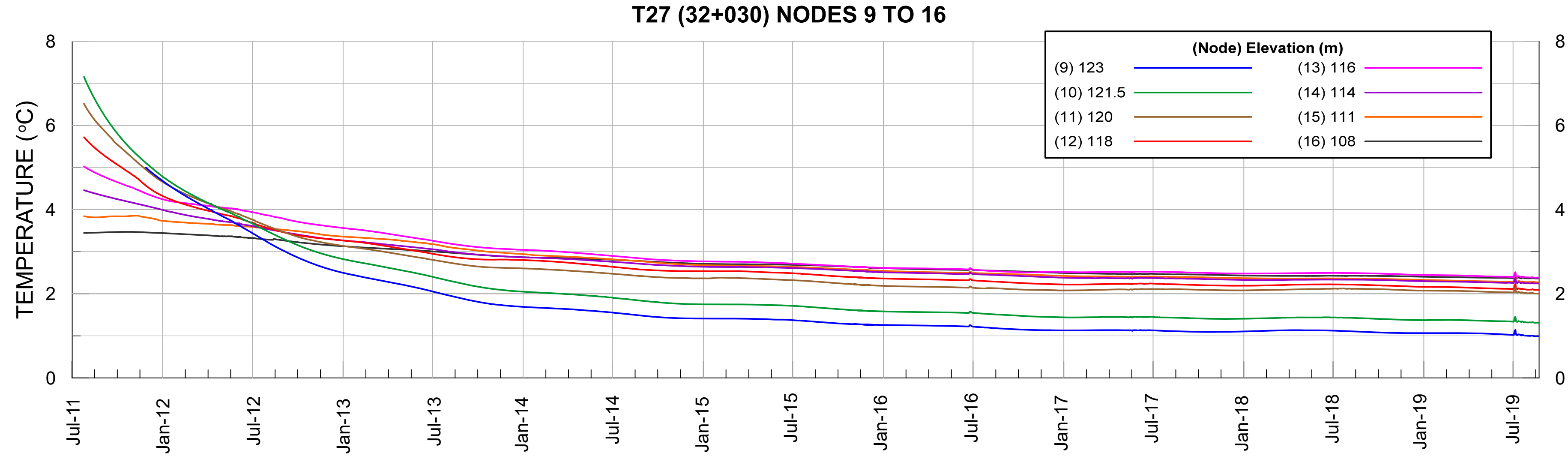
AGNICO EAGLE
MEADOWBANK

PROJECT No.			PHASE No.
DESIGN	TD	20JAN14	SCALE AS SHOWN REV.
CADD	TD	20JAN14	
CHECK			FIGURE 42
REVIEW			

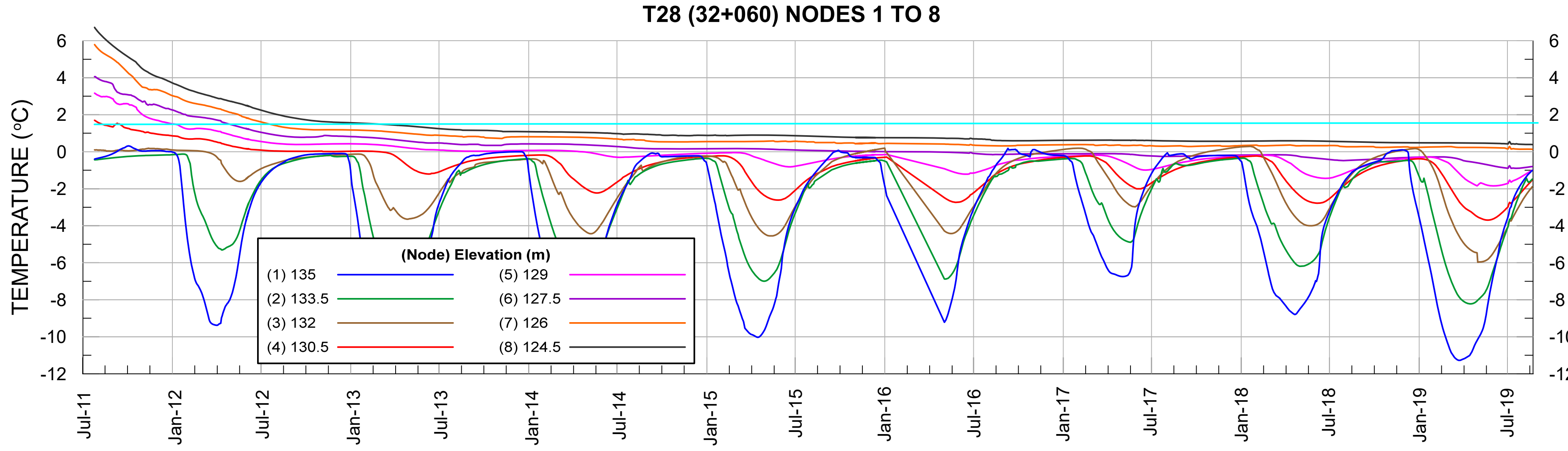
T27 (32+030) NODES 1 TO 8



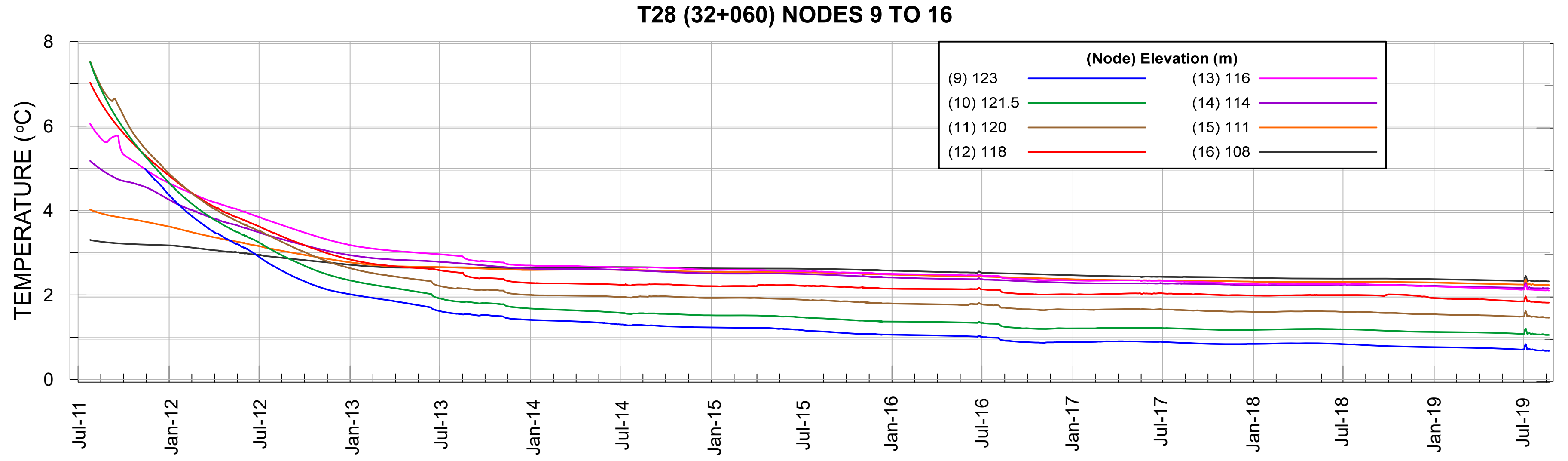
T27 (32+030) NODES 9 TO 16



T28 (32+060) NODES 1 TO 8



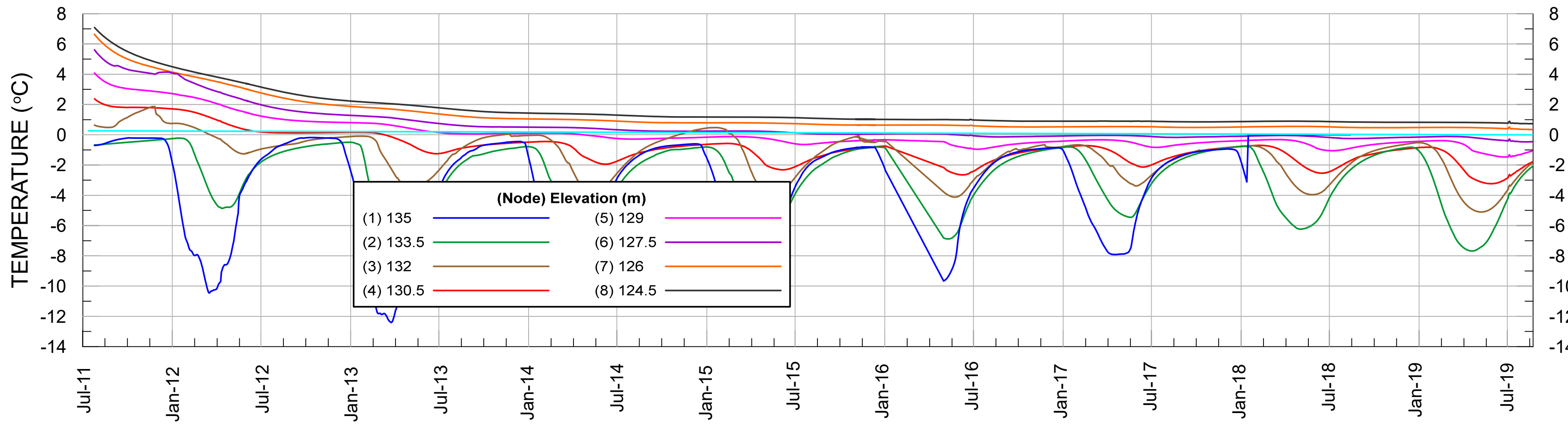
T28 (32+060) NODES 9 TO 16



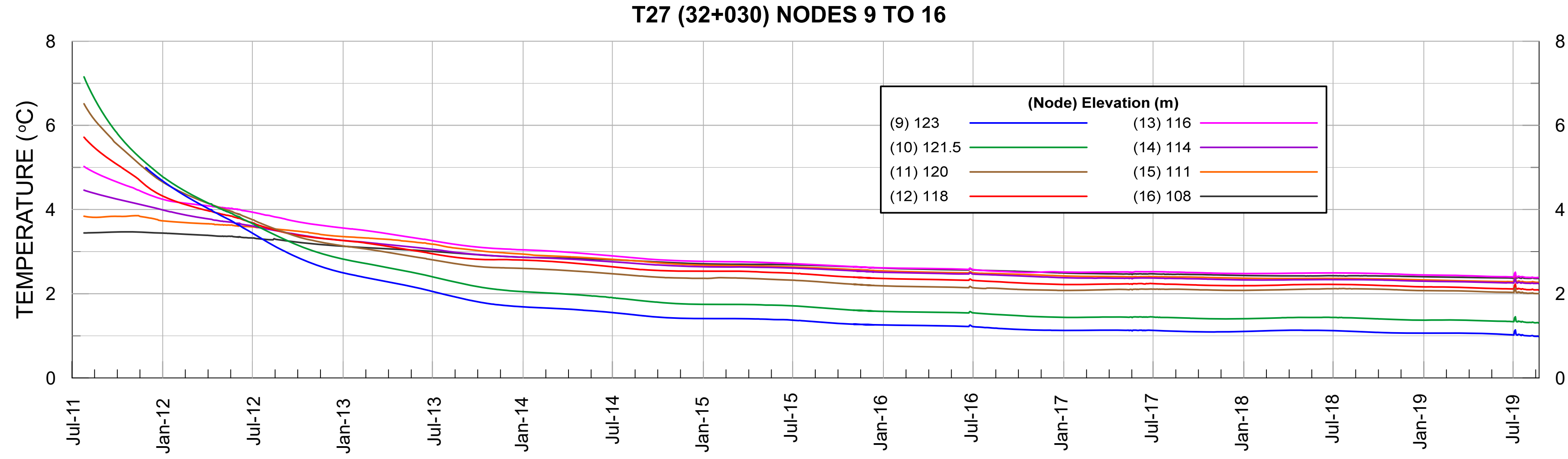
Note:

PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT				
TITLE	BAYGOOSE DIKE NODAL THERMAL TIMELINES (July 1/11 to Aug 21/19)				
AGNICO EAGLE MEADOWBANK	PROJECT No.			PHASE No.	
	DESIGN	TD	17JAN14	SCALE AS SHOWN	REV.
	CADD	TD	17JAN14	FIGURE 43	
	CHECK				
	REVIEW				

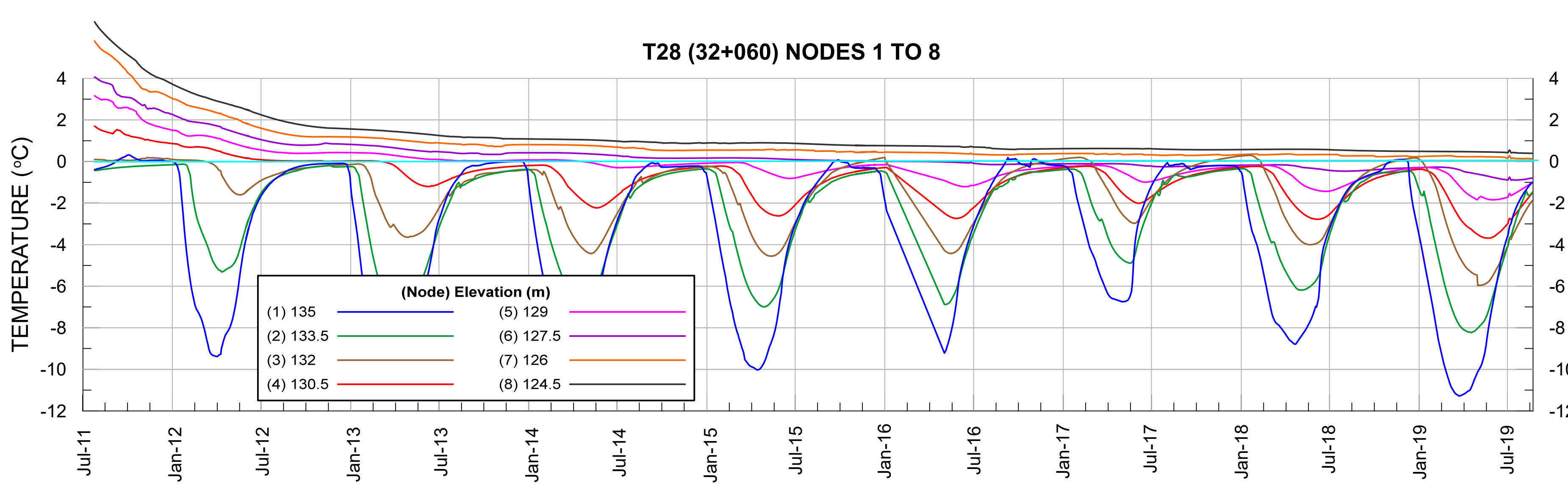
T27 (32+030) NODES 1 TO 8



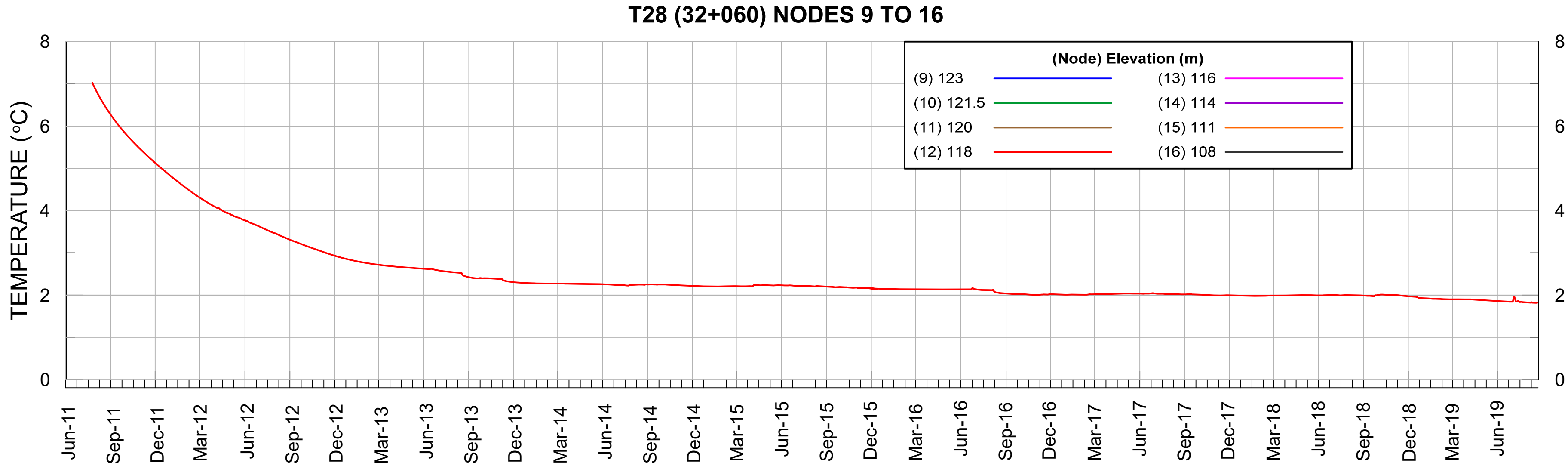
T27 (32+030) NODES 9 TO 16



T28 (32+060) NODES 1 TO 8



T28 (32+060) NODES 9 TO 16

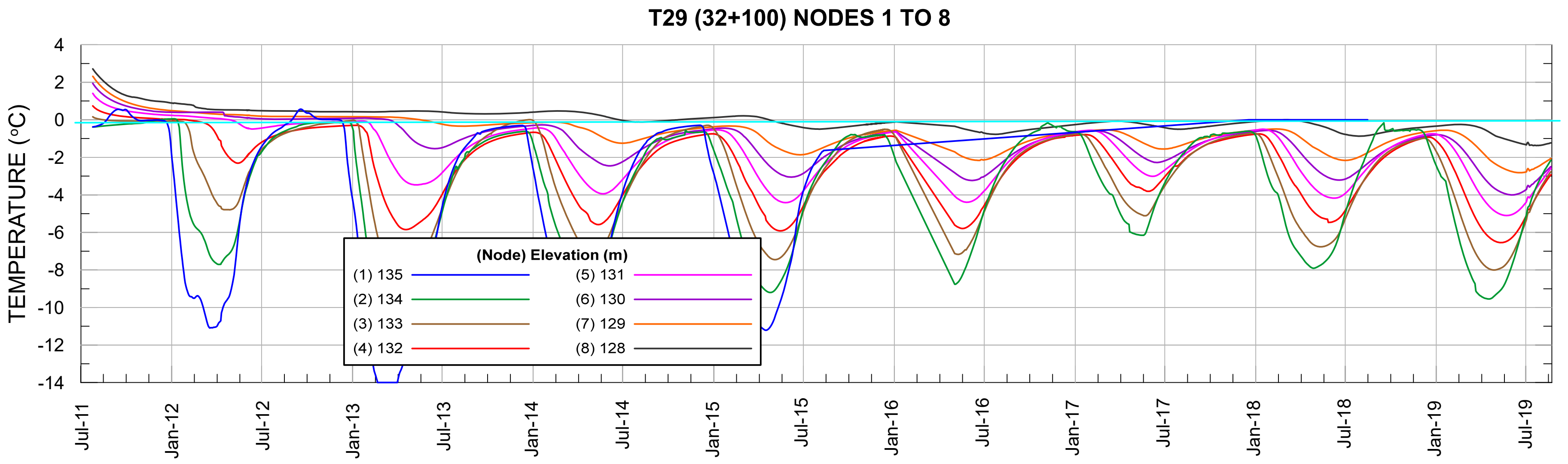


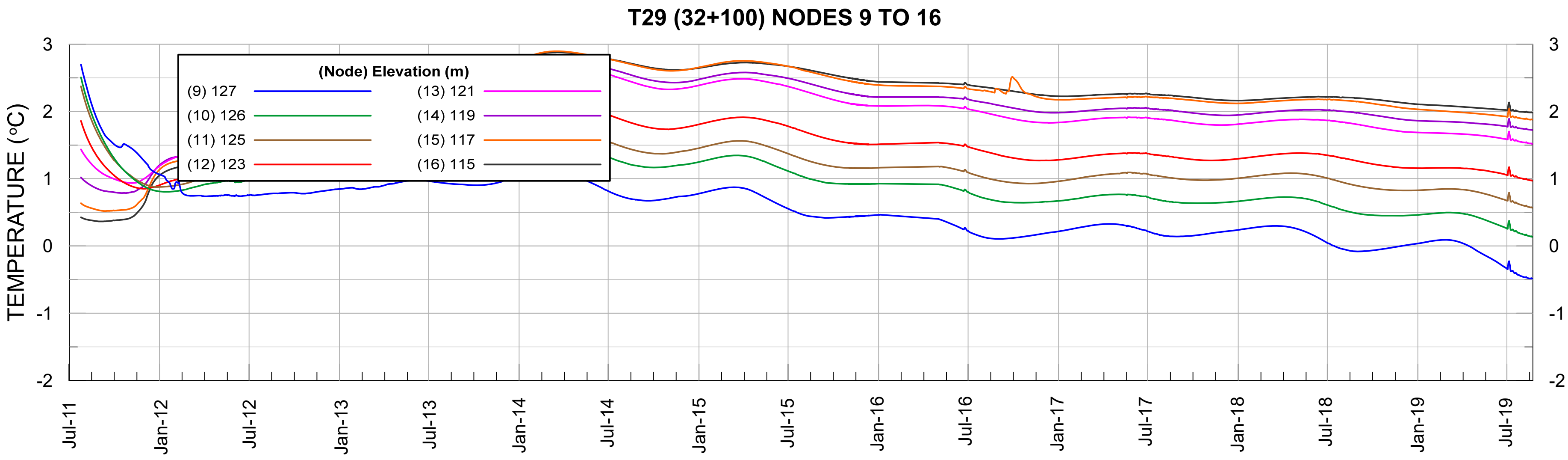
Note:

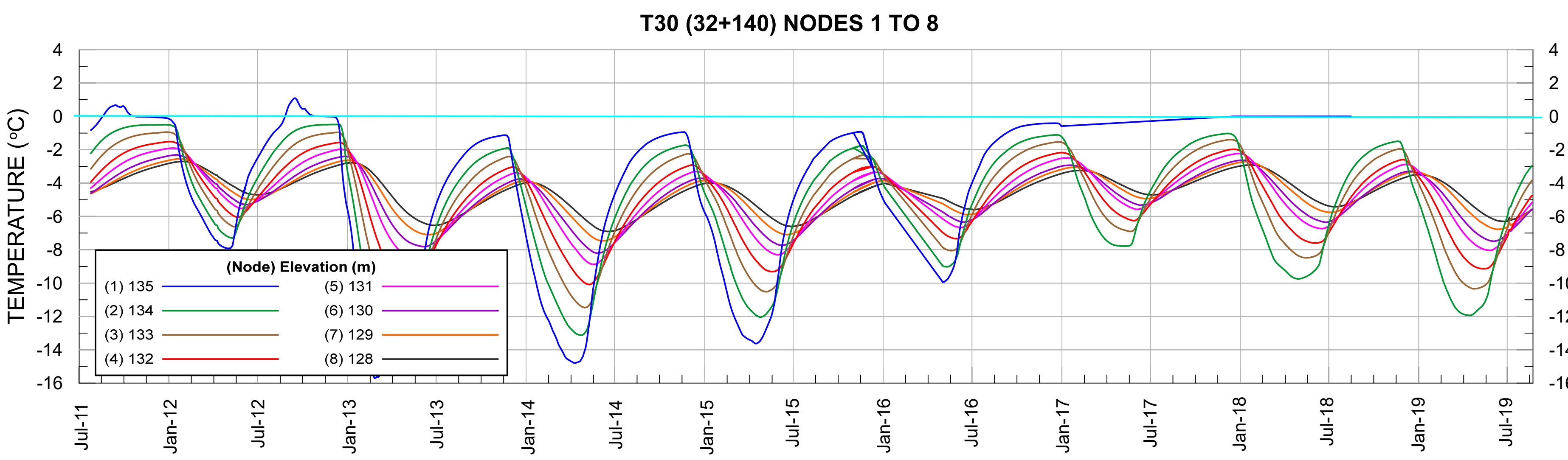
PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE NODAL THERMAL TIMELINES (July 1/11 to Aug 21/19)

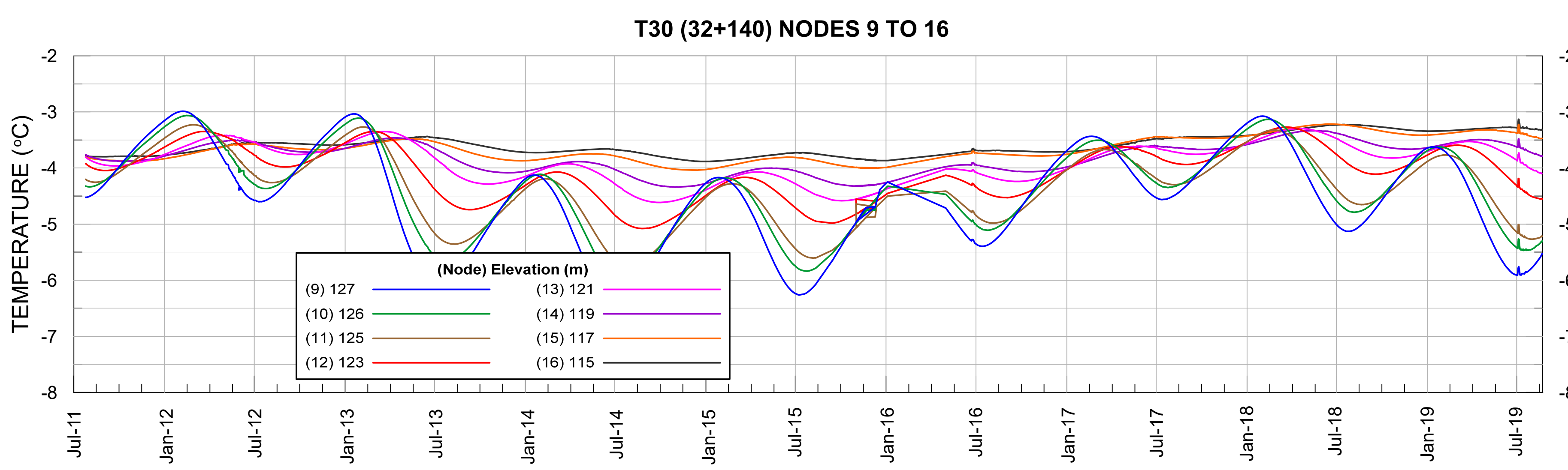
AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.
DESIGN	TD	17JAN14	SCALE AS SHOWN REV.
CADD	TD	17JAN14	FIGURE 43
CHECK			
REVIEW			





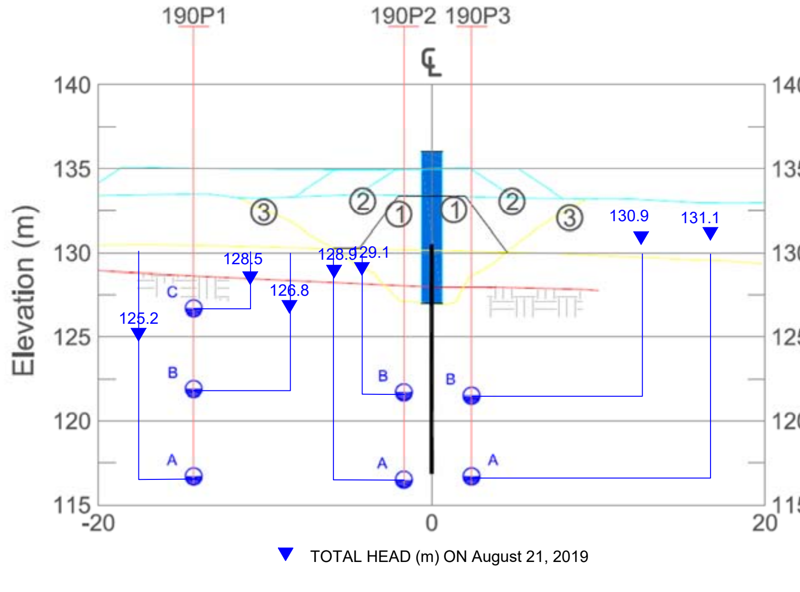


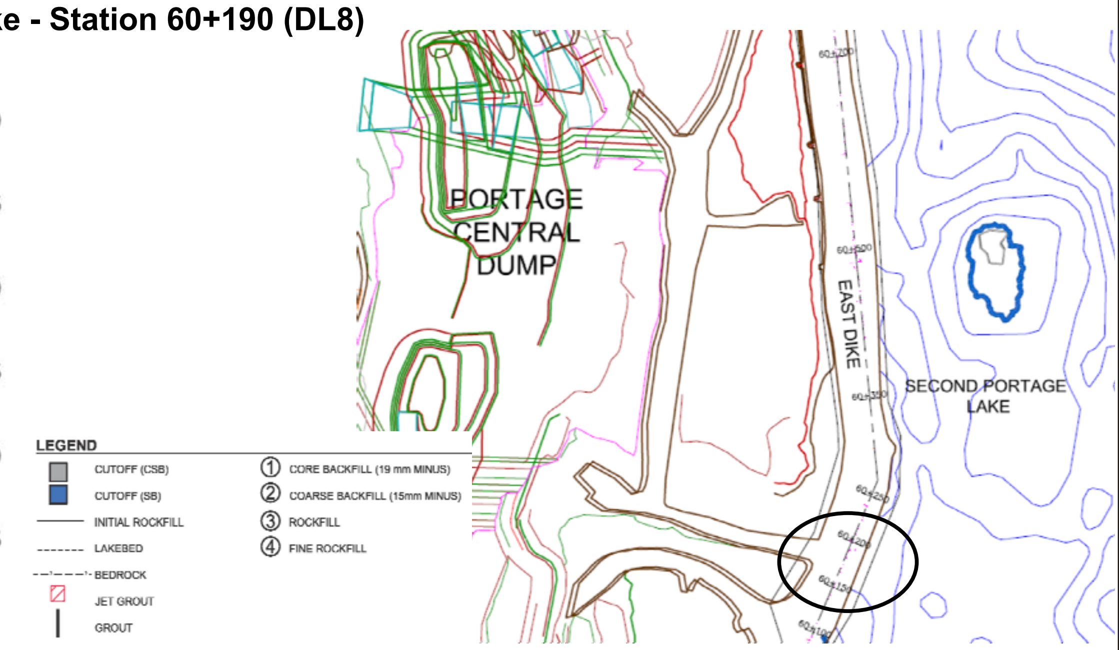


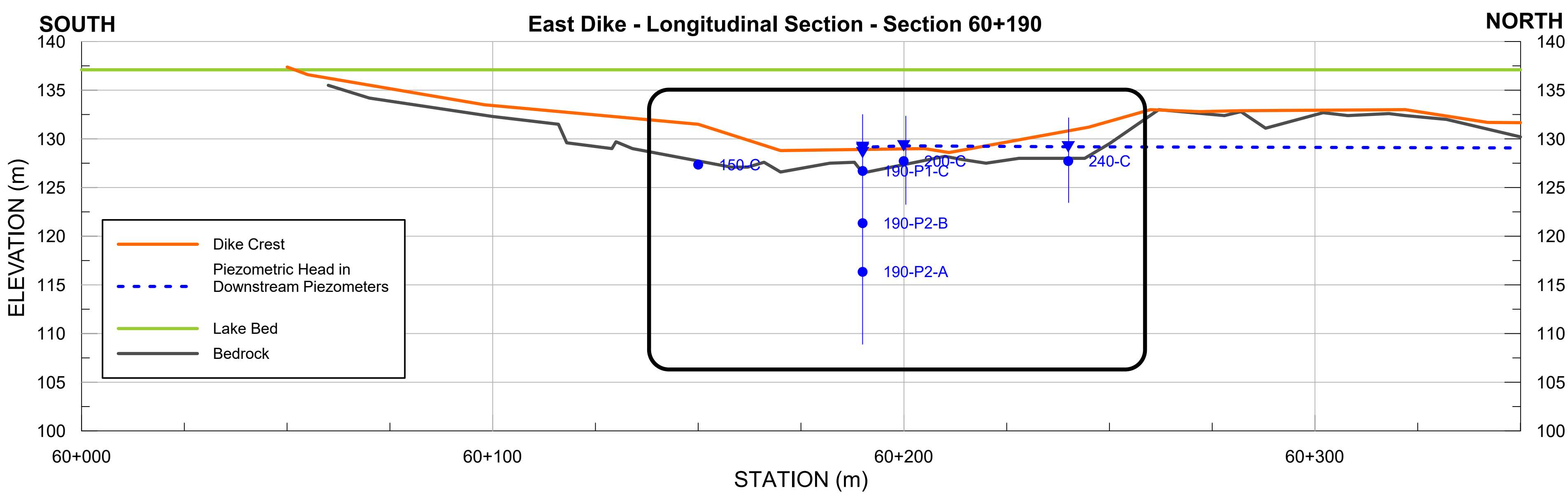
Note:

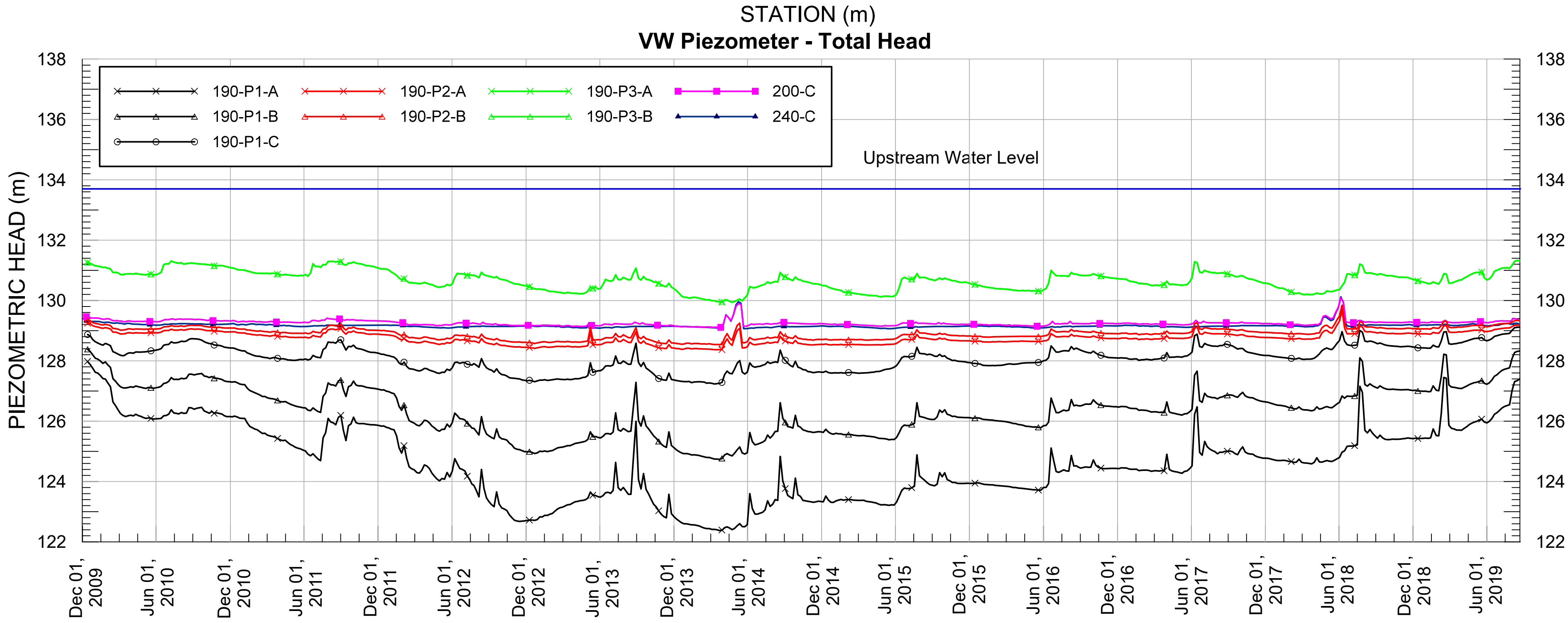
PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT				
TITLE	BAYGOOSE DIKE NODAL THERMAL TIMELINES (July 1/11 to Aug 21/19)				
AGNICO EAGLE MEADOWBANK	PROJECT No.			PHASE No.	
	DESIGN	TD	17JAN14	SCALE AS SHOWN	REV.
	CADD	TD	17JAN14	FIGURE 44	
	CHECK				
	REVIEW				

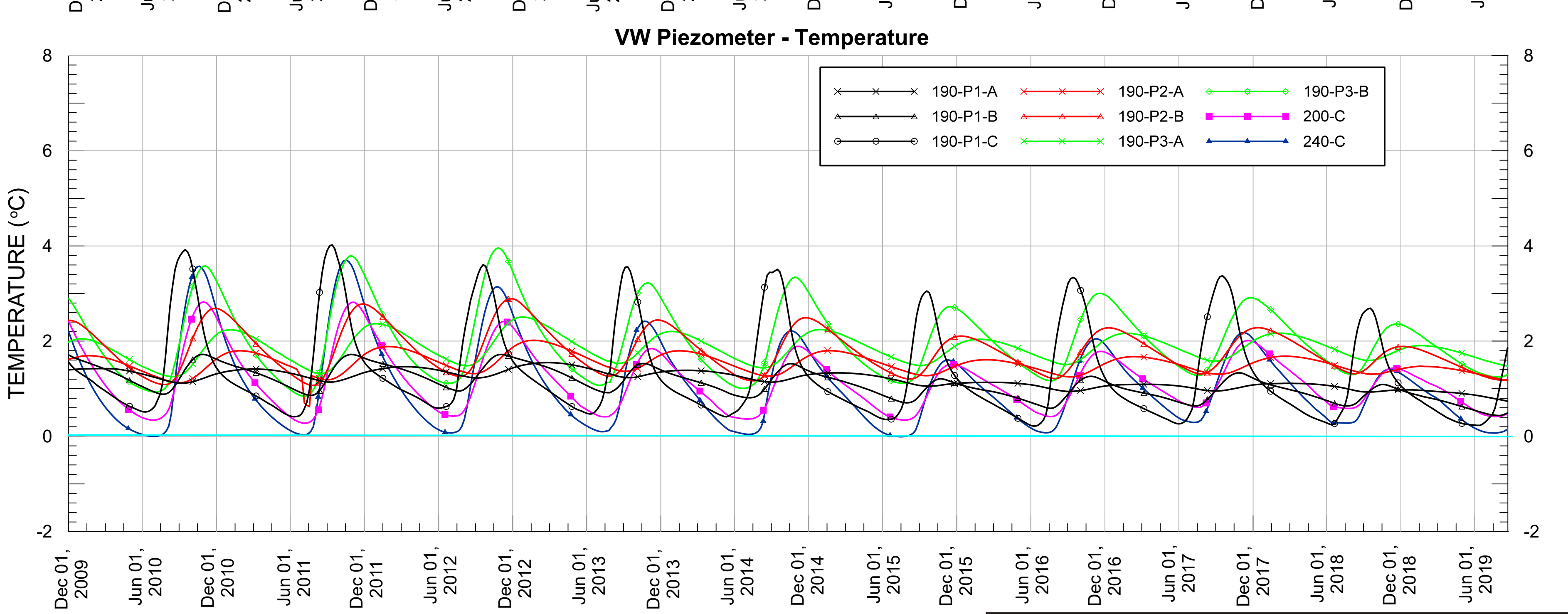
East Dike - Station 60+190 (DL8)











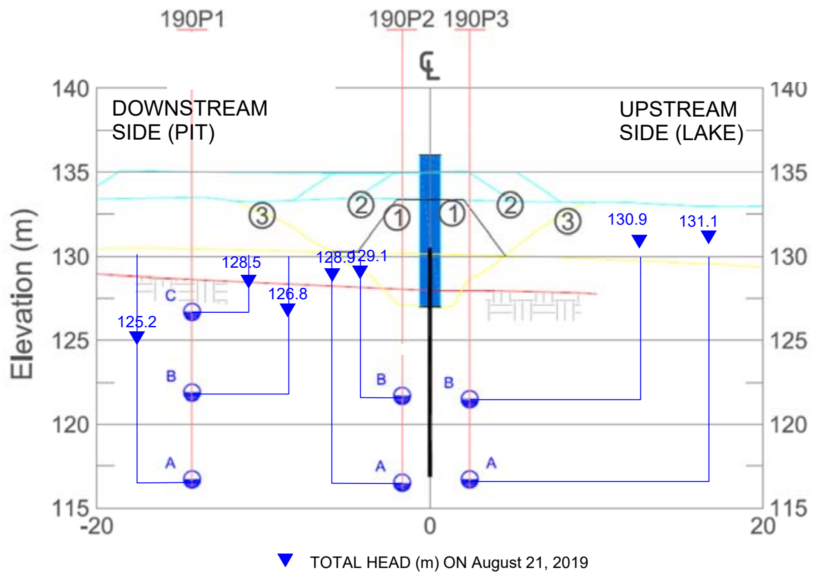
NOTES:
1: 150-C stopped working in Nov 2012
2. Change in PWP and temperature are related to the discharge pipe changed from pit to lake.
3. Bumps in data are from discharge pipes freezing and water bing discharged close to the area.

PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	EAST DIKE Section 60+190 - PIEZOMETRIC DATA (Dec 1/09 to Aug 21/19)

AGNICO EAGLE MEADOWBANK

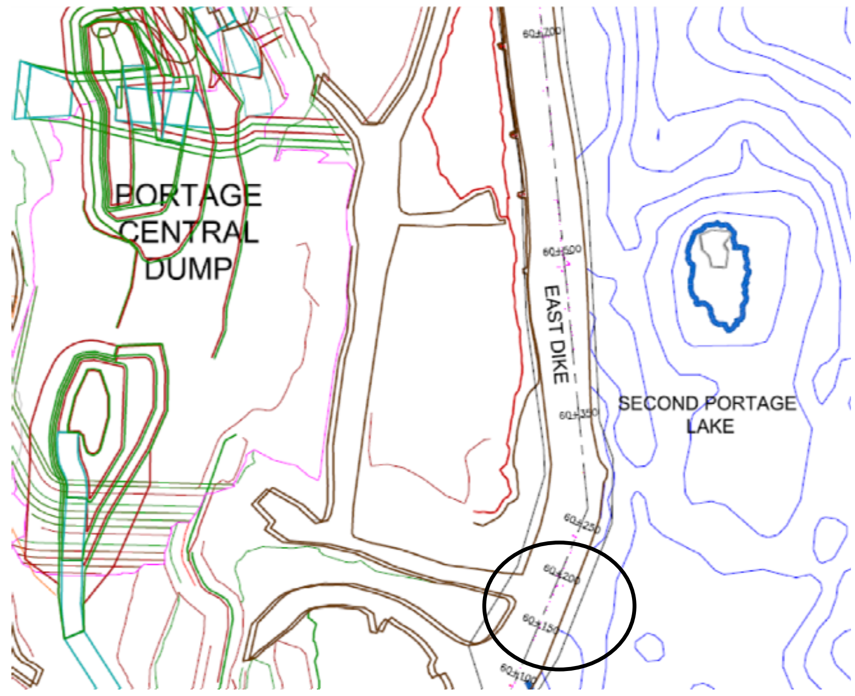
PROJECT No.			PHASE No.	
DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
CADD	TD	28AUG14		
CHECK	PG	28AUG14	FIGURE 45	
REVIEW				

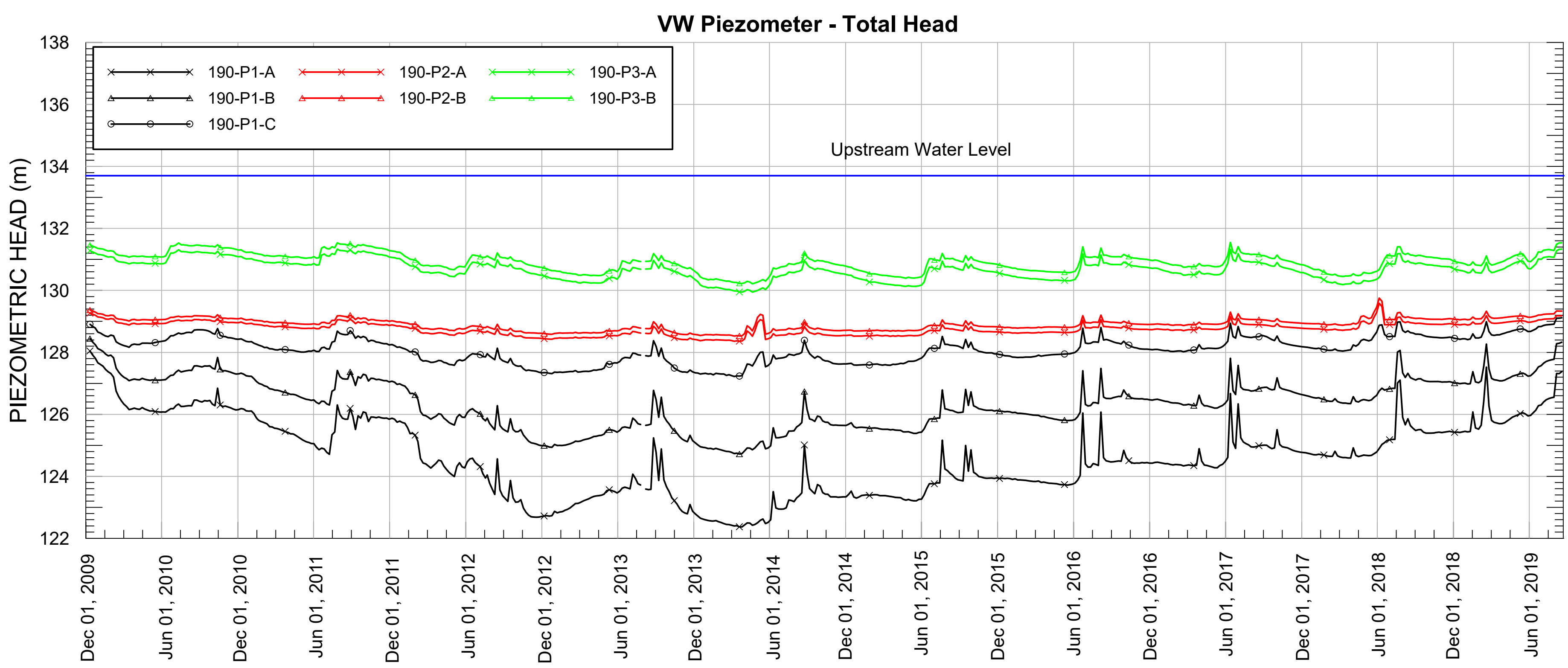
STATION 60+190

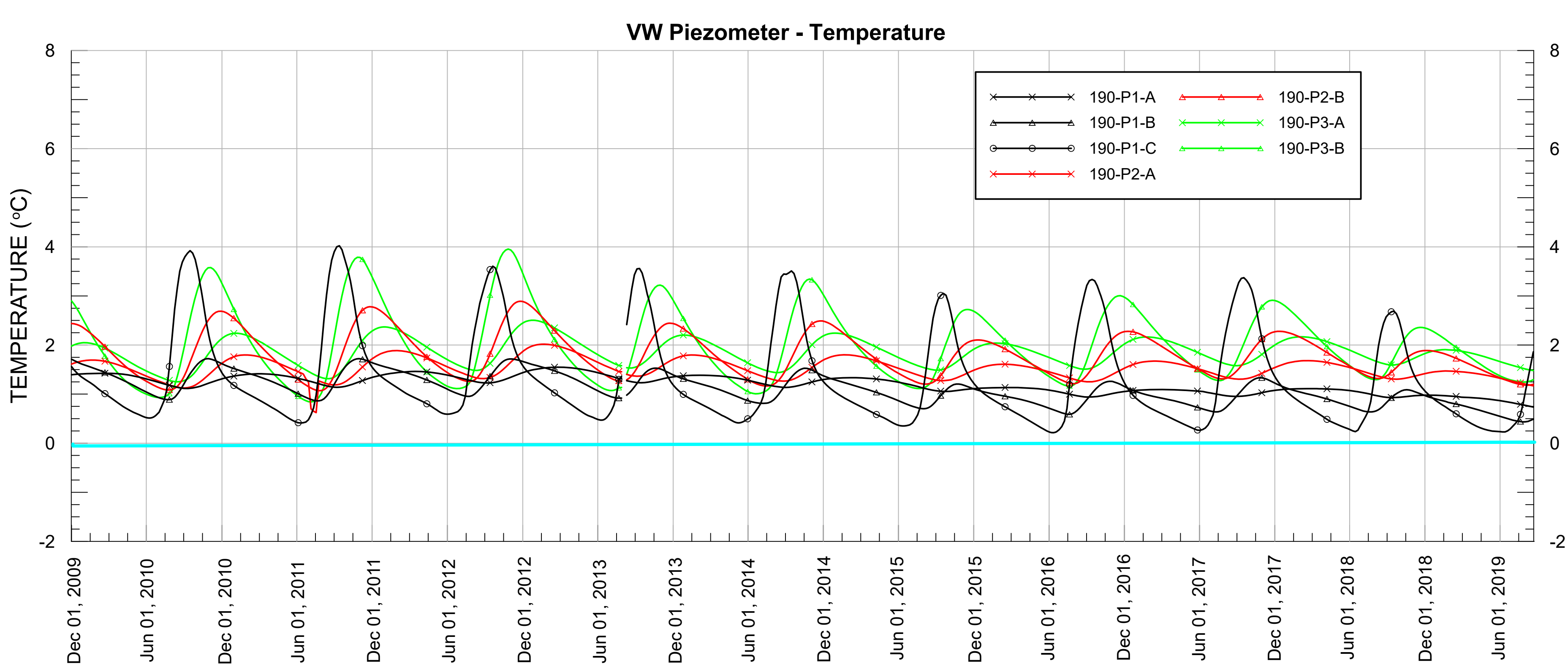


LEGEND

- CUTOFF (CSB)
- CUTOFF (SB)
- INITIAL ROCKFILL
- LAKEBED
- BEDROCK
- JET GROUT
- GROUT
- ① CORE BACKFILL (19 mm MINUS)
- ② COARSE BACKFILL (15mm MINUS)
- ③ ROCKFILL
- ④ FINE ROCKFILL







NOTES:
1. Change in PWP and temperature are related to the discharge pipe changed from pit to lake and lake to pit.
2. Bumps in data were caused when the pipes froze and water was dishcarge close by until the pipes were fixed.

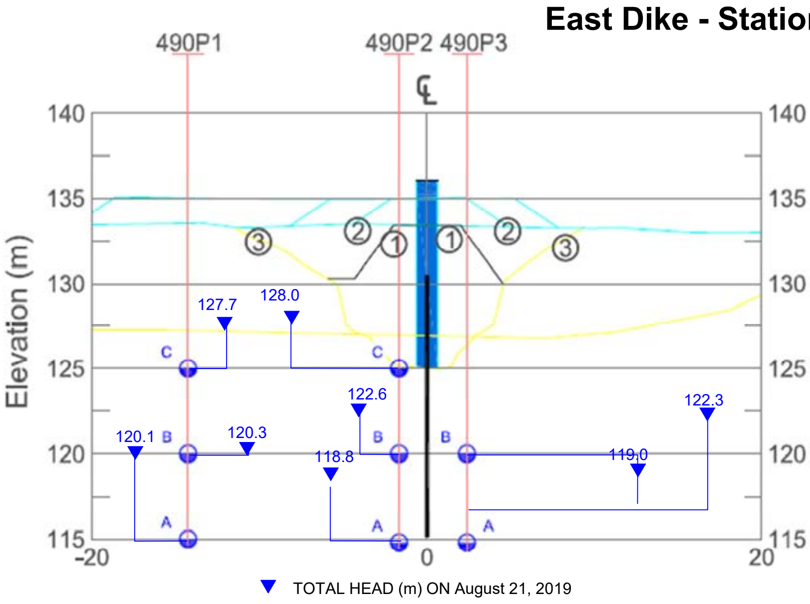
PROJECT: **AGNICO EAGLE MINES LIMITED**
MEADOWBANK GOLD PROJECT
NUNAVUT

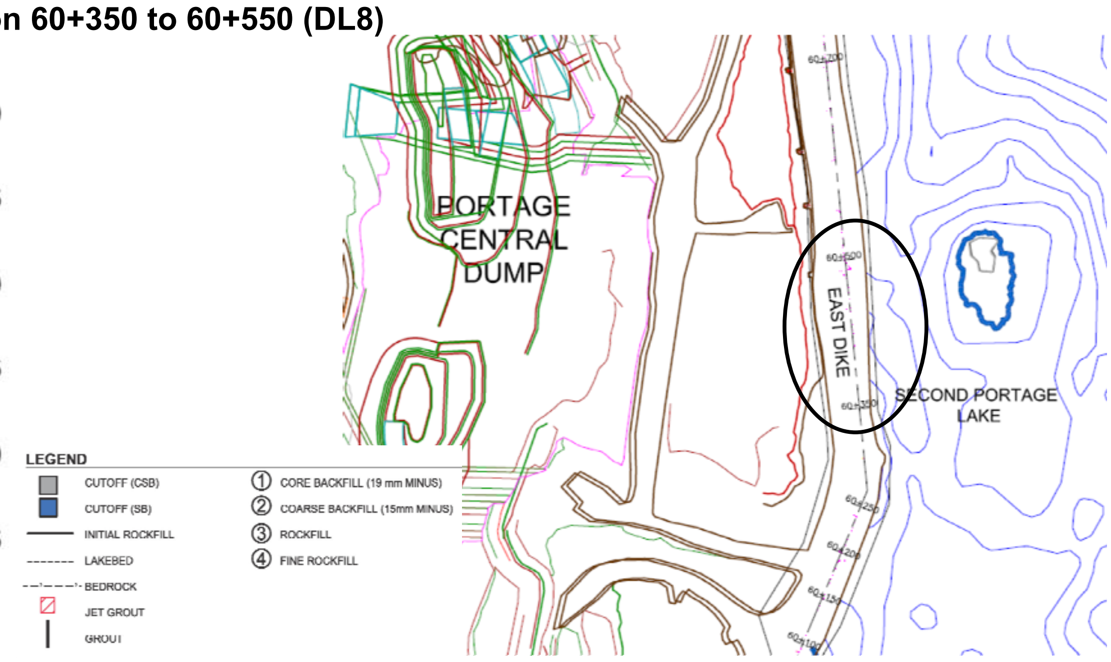
TITLE: **EAST DIKE - SECTION 60+190**
PIEZOMETRIC DATA
(Dec 1/09 to Aug 21/19)

AGNICO EAGLE
MEADOWBANK

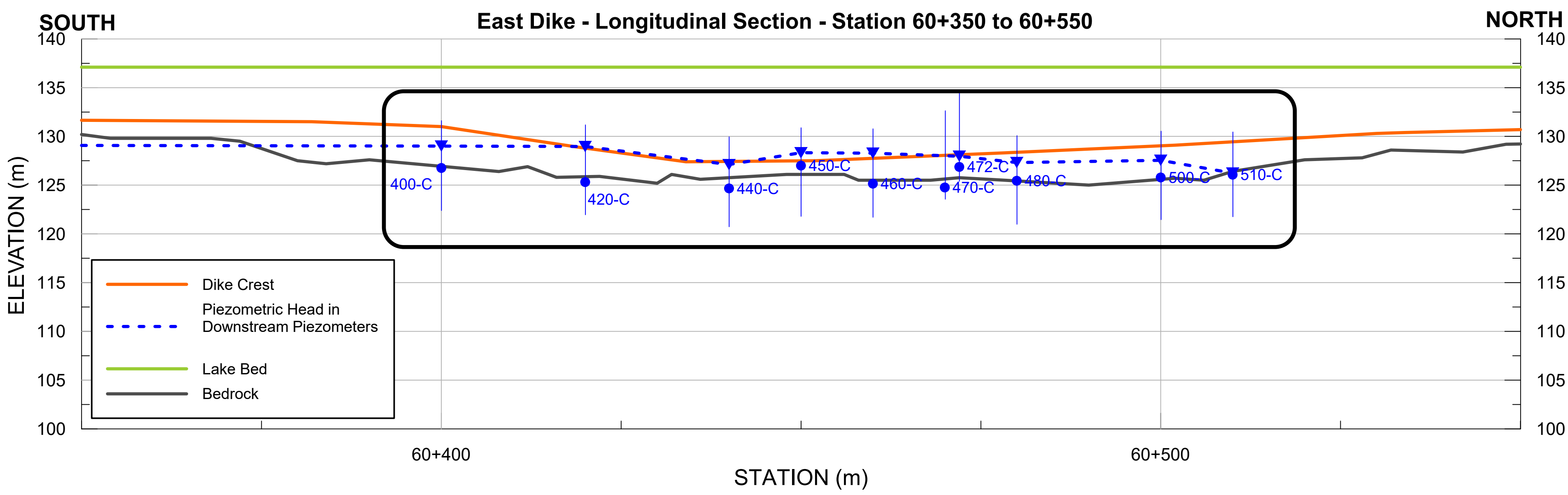
PROJECT No.			PHASE No.	
DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
CADD	TD	28AUG14	**FIGURE 46**	
CHECK	PG	28AUG14		
REVIEW				

East Dike - Station 60+350 to 60+550 (DL8)

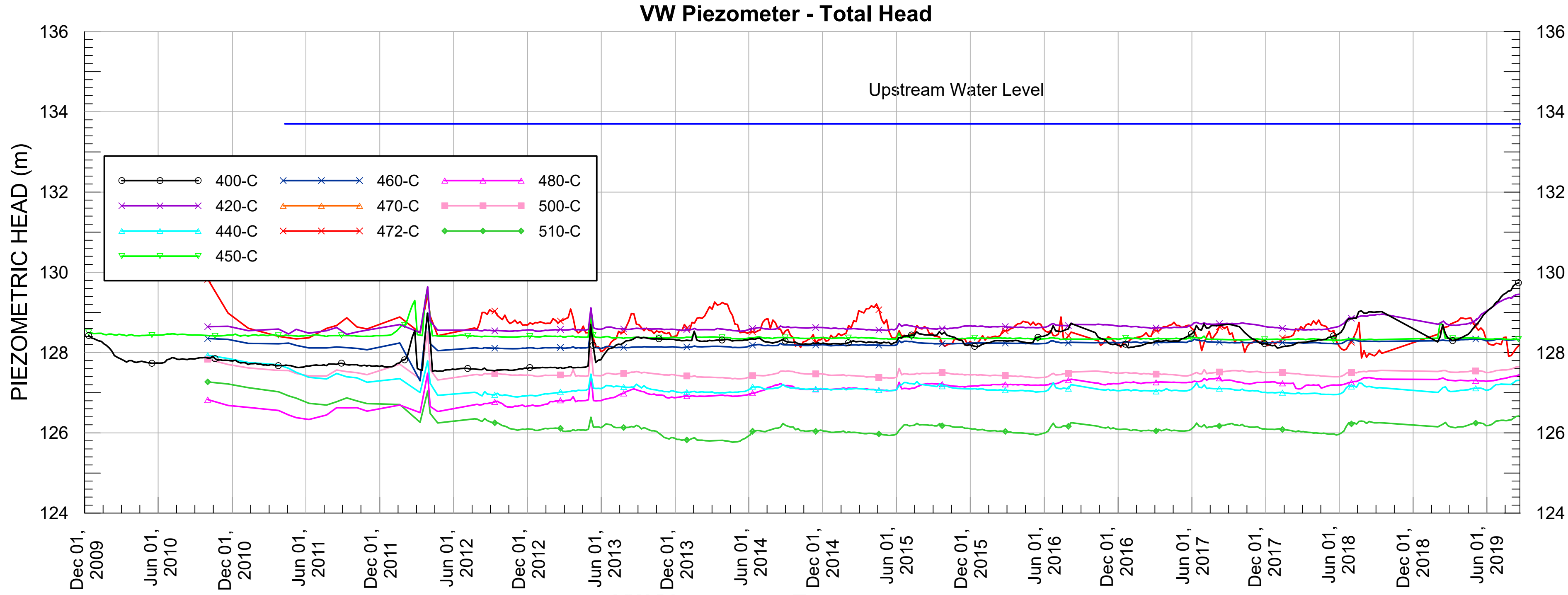




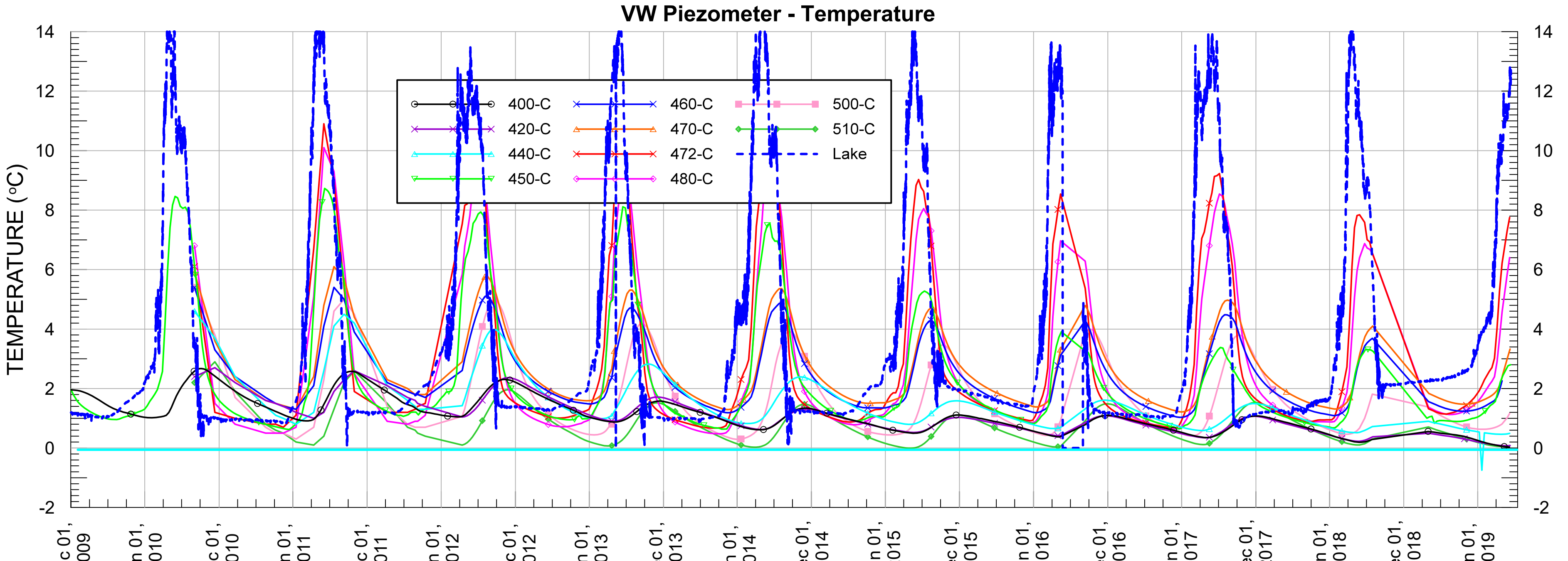
East Dike - Longitudinal Section - Station 60+350 to 60+550



VW Piezometer - Total Head



VW Piezometer - Temperature



NOTES:

1. As seen in the graph on the side, the progression of the temperature in the Pz follows the lake temperature closely. Usually it takes approximately one to two weeks to see the trend following the lake temperature.
2. Bumps in data are from discharge pipes freezing and water bing discharged close to the area.

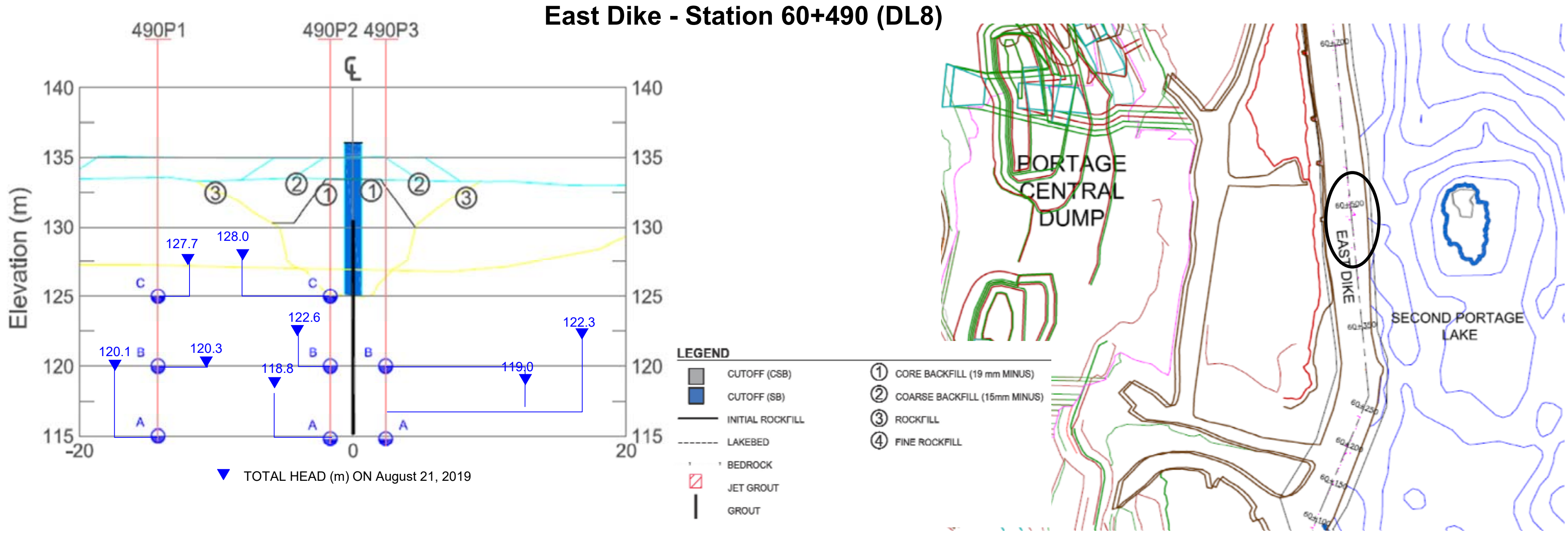
PROJECT **AGNICO EAGLE MINES LIMITED**
MEADOWBANK GOLD PROJECT
NUNAVUT

TITLE **EAST DIKE**
Section 60+350 to 60+550 - PIEZOMETRIC DATA (Dec 1/09 to Aug 21/19)

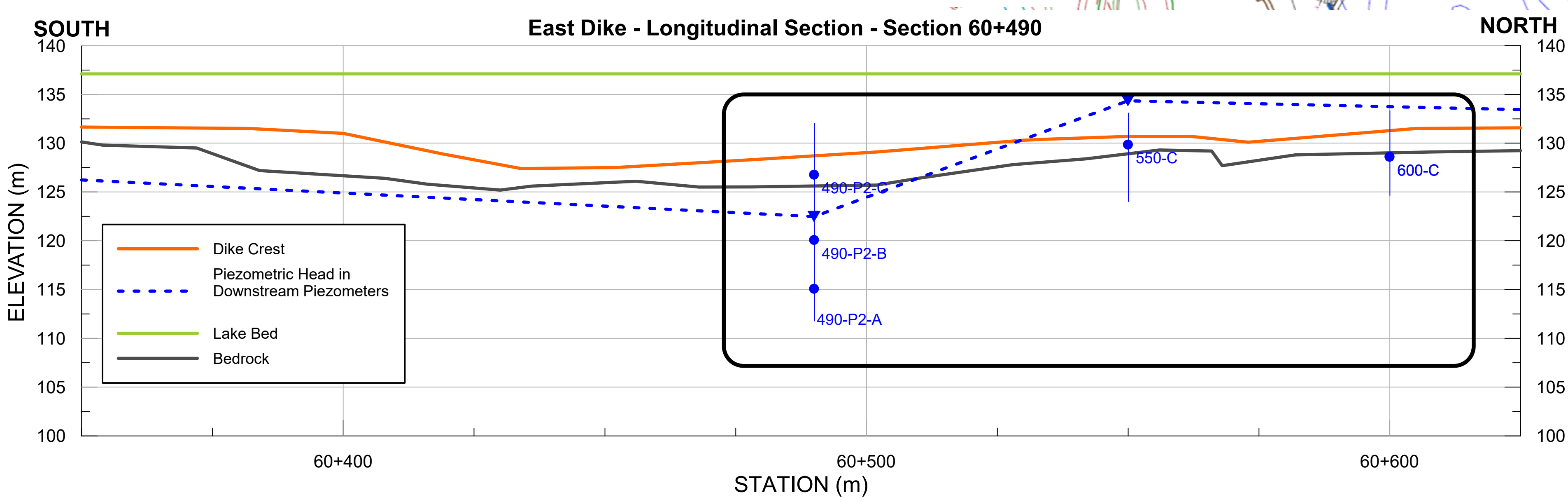
AGNICO EAGLE
MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
CADD	TD	28AUG14	**FIGURE 47**	
CHECK	PG	28AUG14		
REVIEW				

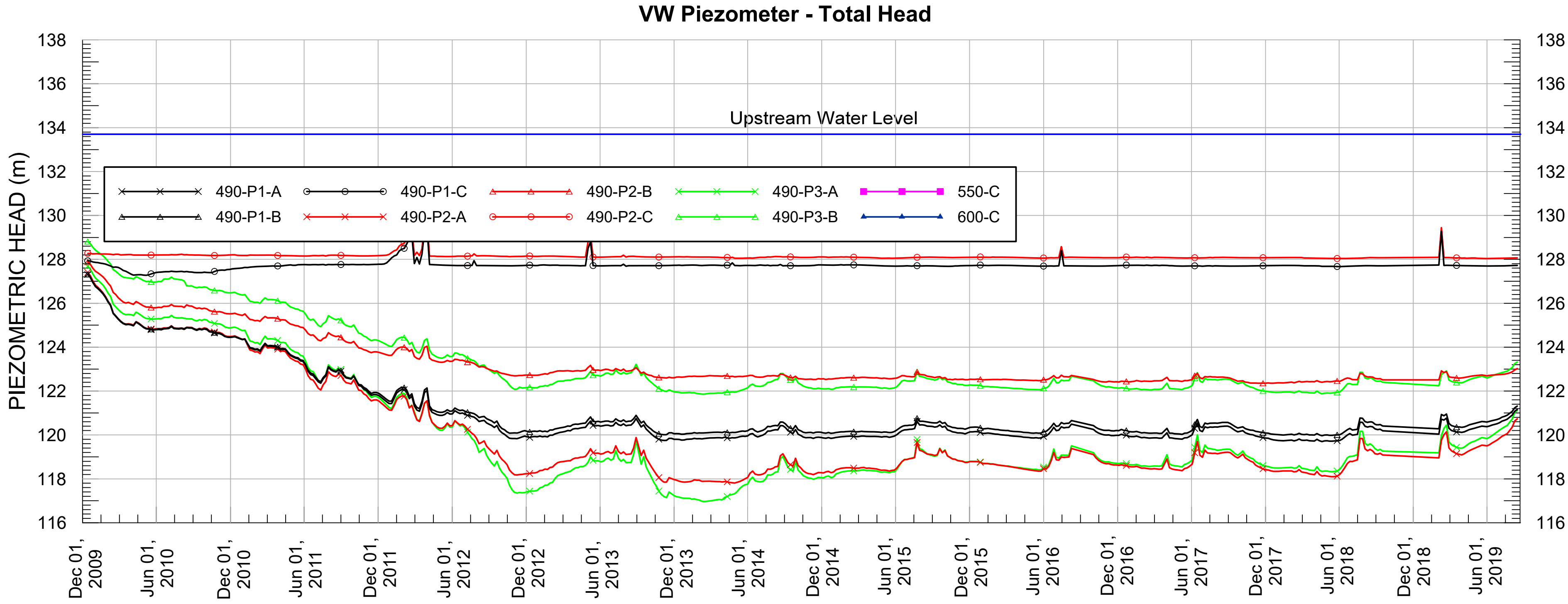
East Dike - Station 60+490 (DL8)



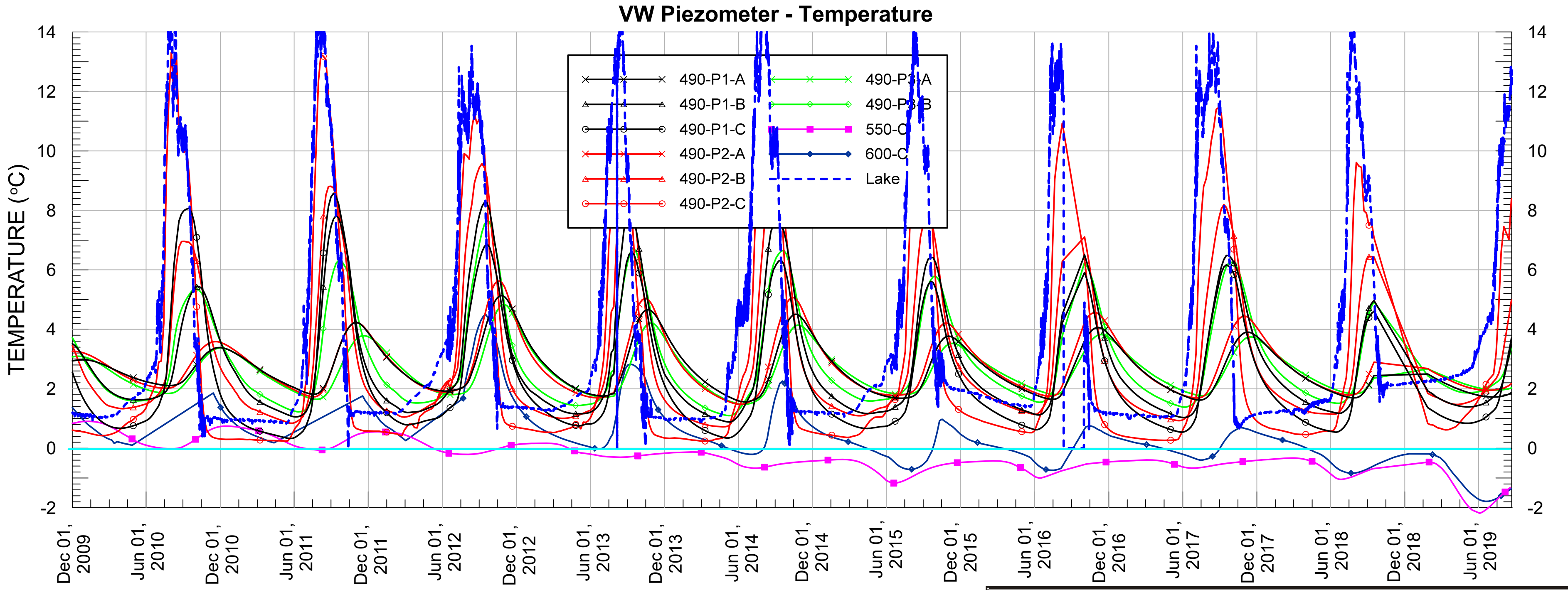
East Dike - Longitudinal Section - Section 60+490



VW Piezometer - Total Head



VW Piezometer - Temperature



NOTES:

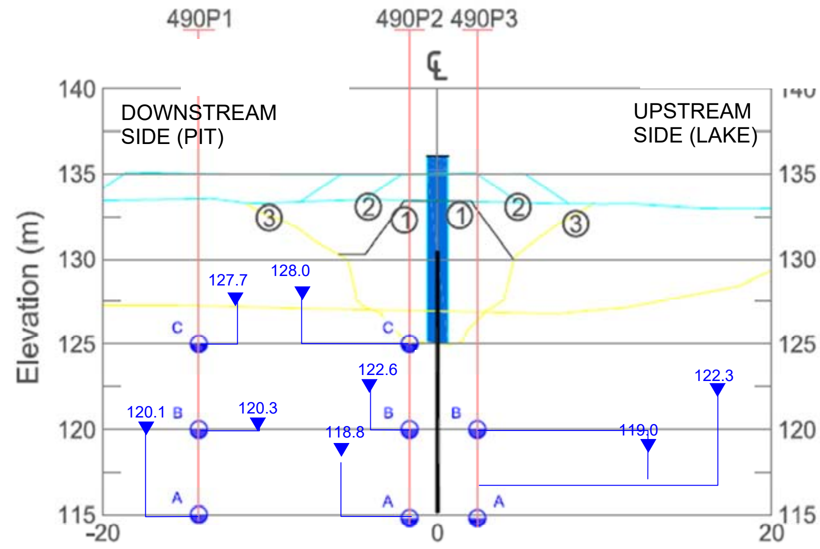
1: 550-C and 600-C are giving unreliable readings and with a negative temperature are assumed to be frozen.

2. As seen in the graph on the side, the progression of the temperature in the Pz follows the lake temperature closely. Usually it takes approximately one to two weeks to see the trend following the lake temperature.

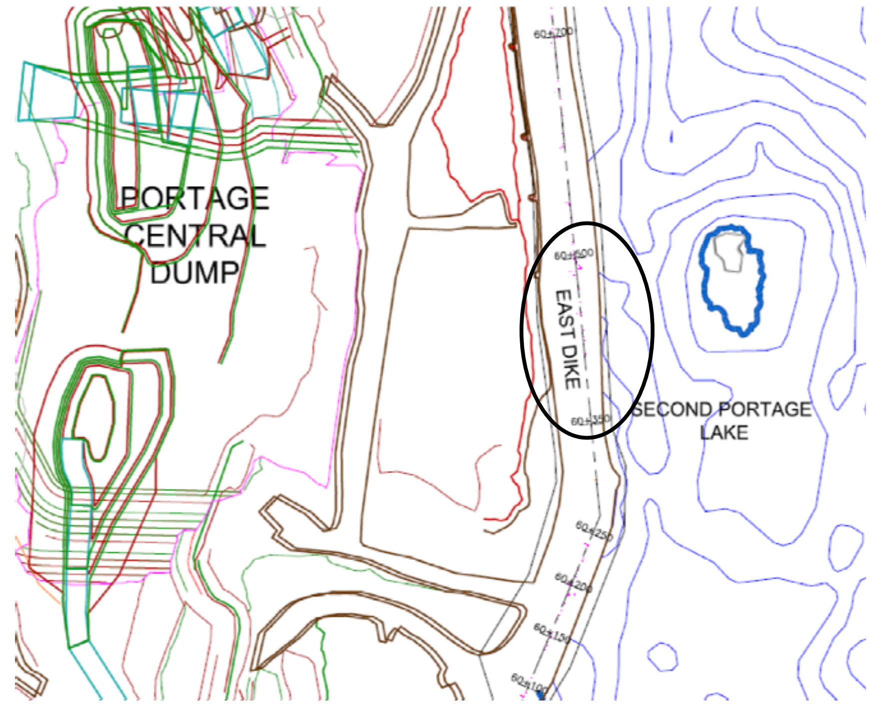
3. Bumps in data are from discharge pipes being frozen and water being discharged in the area.

PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT				
TITLE	EAST DIKE Section 60+490 - PIEZOMETRIC DATA (Dec 1/09 to Aug 21/19)				
AGNICO EAGLE MEADOWBANK	PROJECT No.			PHASE No.	
	DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
	CADD	TD	28AUG14	FIGURE 48	
	CHECK	PG	28AUG14		
	REVIEW				

STATION 60+490

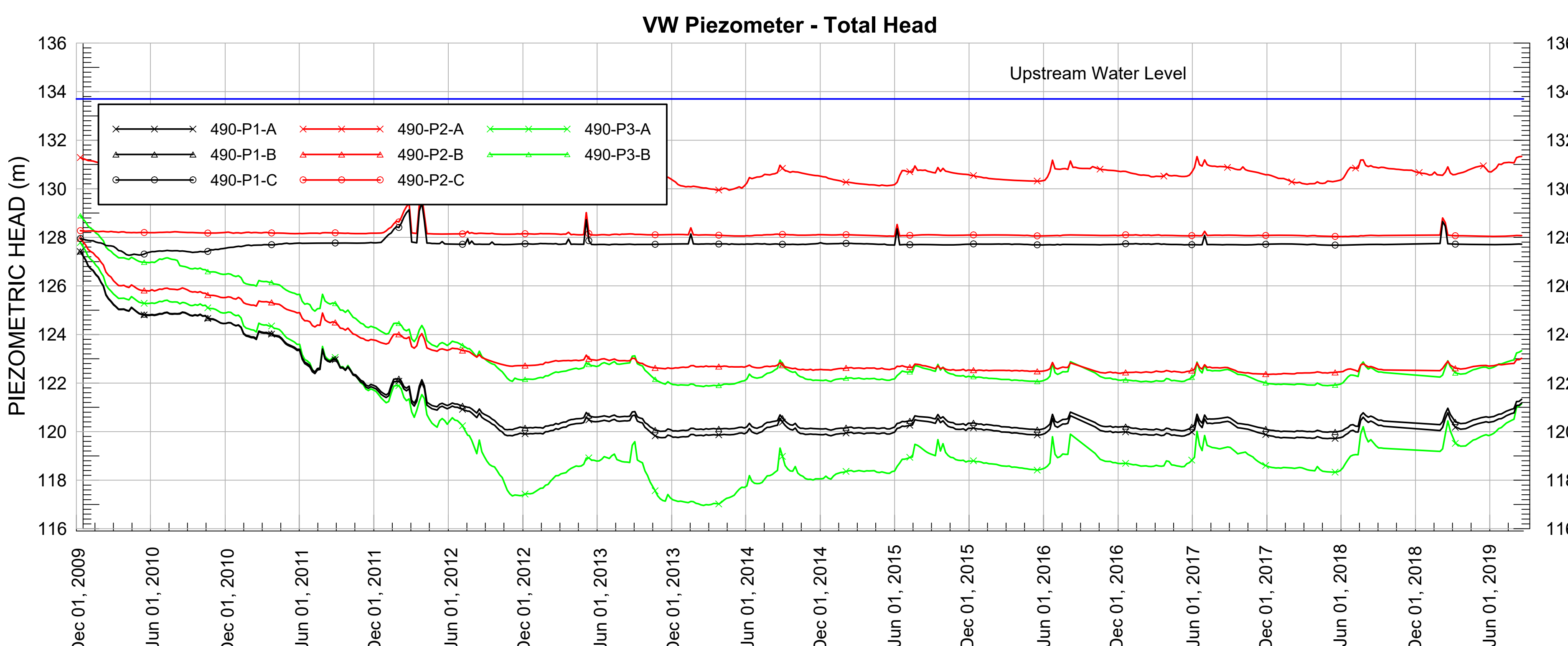


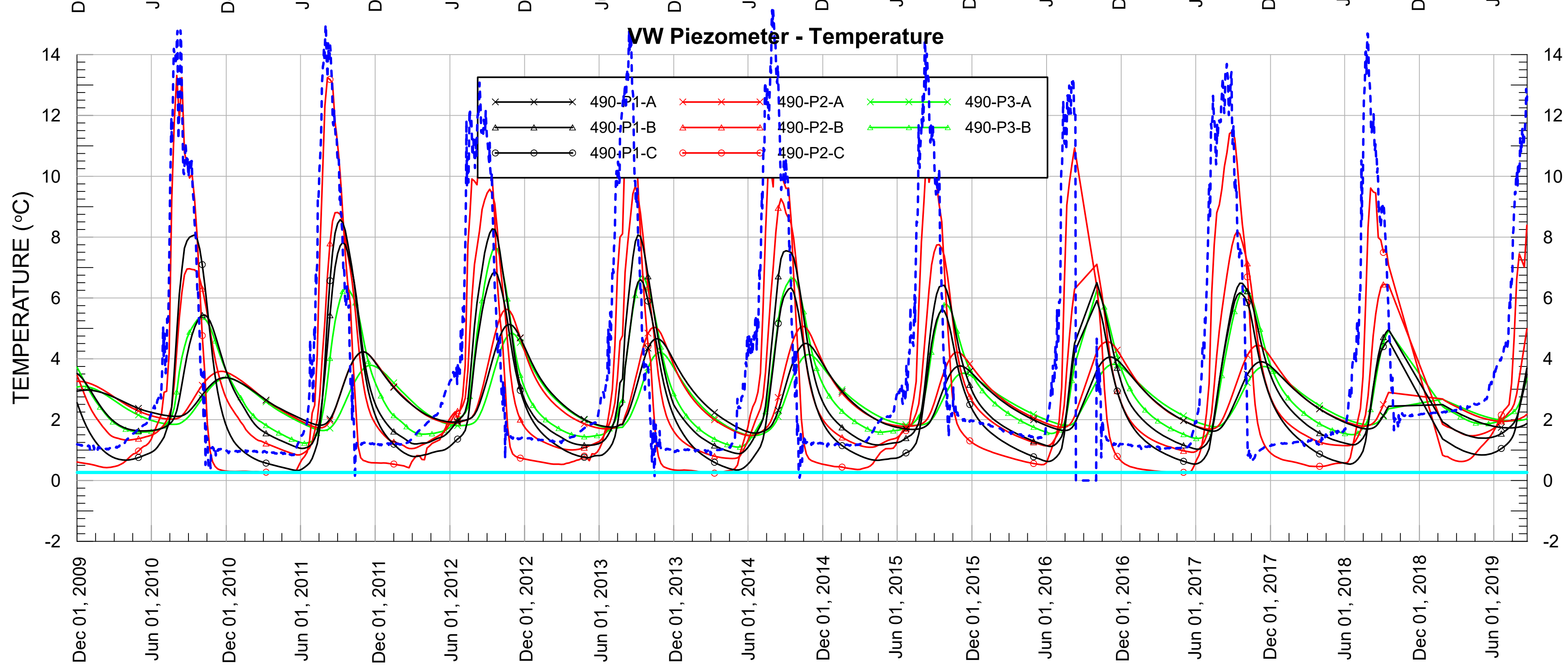
▼ TOTAL HEAD (m) ON August 21, 2019



LEGEND

CUTOFF (CSB)	① CORE BACKFILL (19 mm MINUS)
CUTOFF (SB)	② COARSE BACKFILL (15mm MINUS)
INITIAL ROCKFILL	③ ROCKFILL
LAKEBED	④ FINE ROCKFILL
BEDROCK	
JET GROUT	
GROUT	

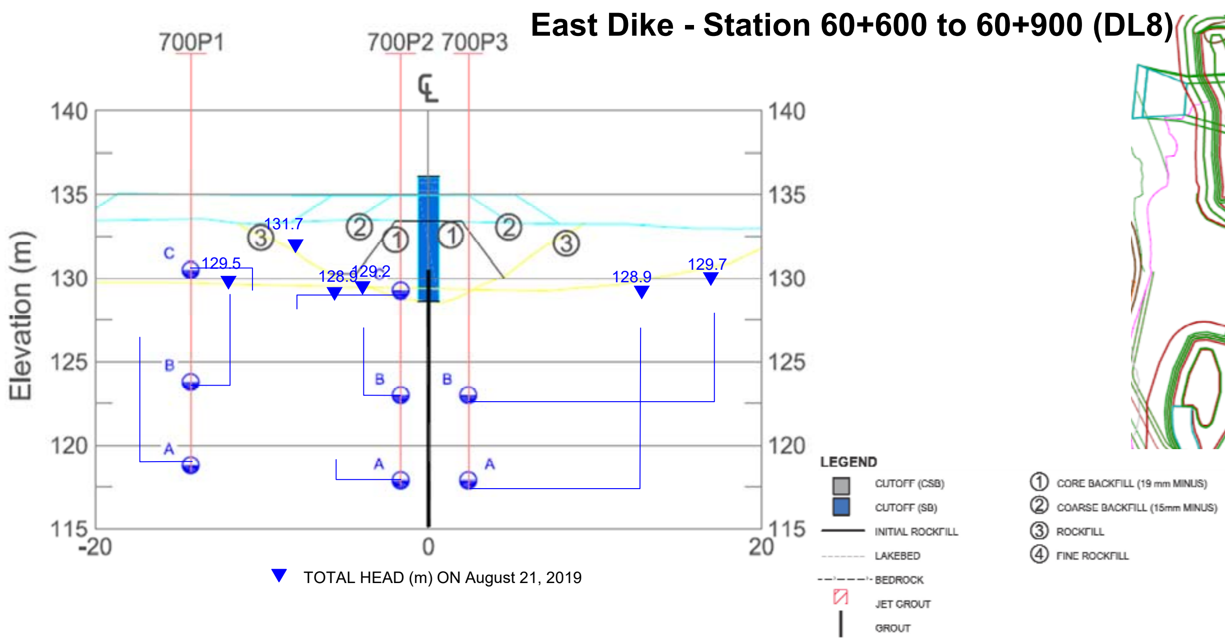


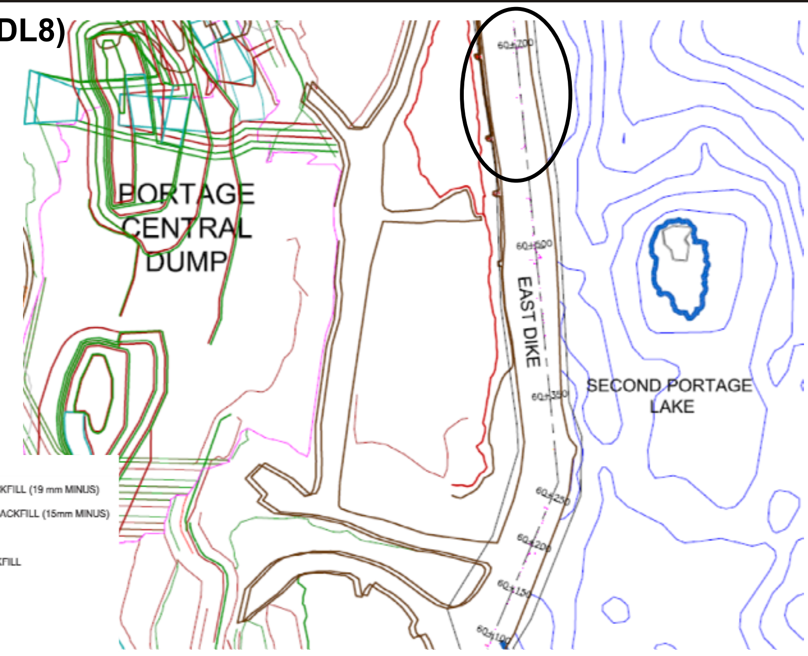


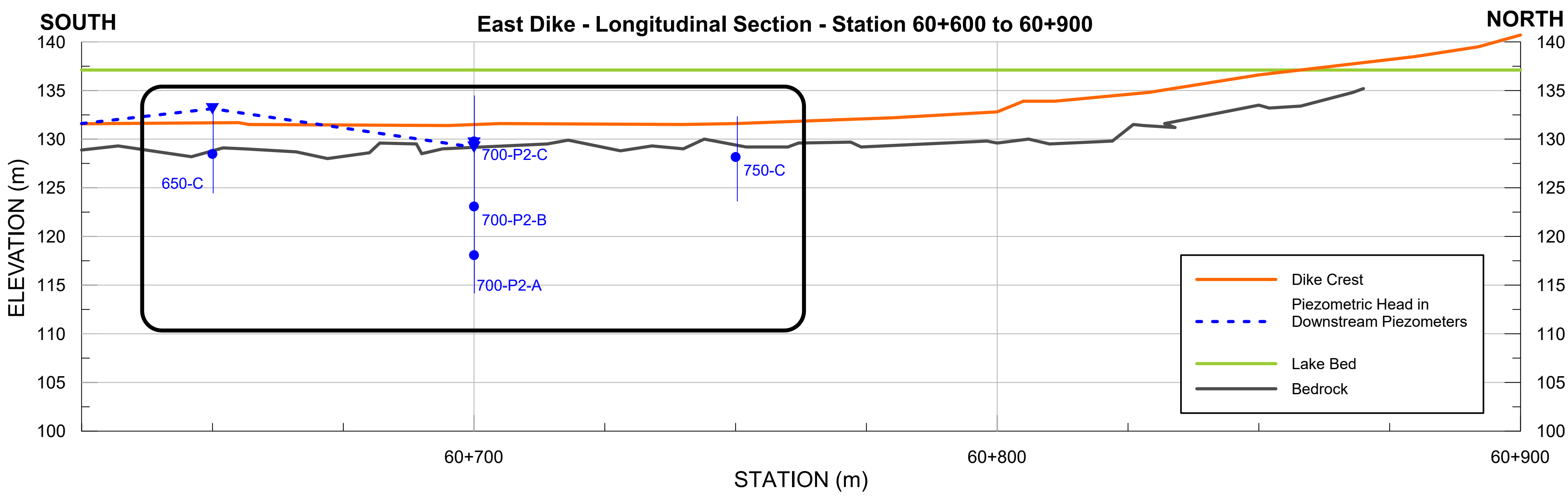
NOTES:
1. As seen in the graph on the side, the progression of the temperature in the Pz follows the lake temperature closely. Usually it takes approximately one to two weeks to see the trend following the lake temperature.
2. Bumps in data were caused when the pipes froze and water was dishcarge close by until the pipes were fixed.

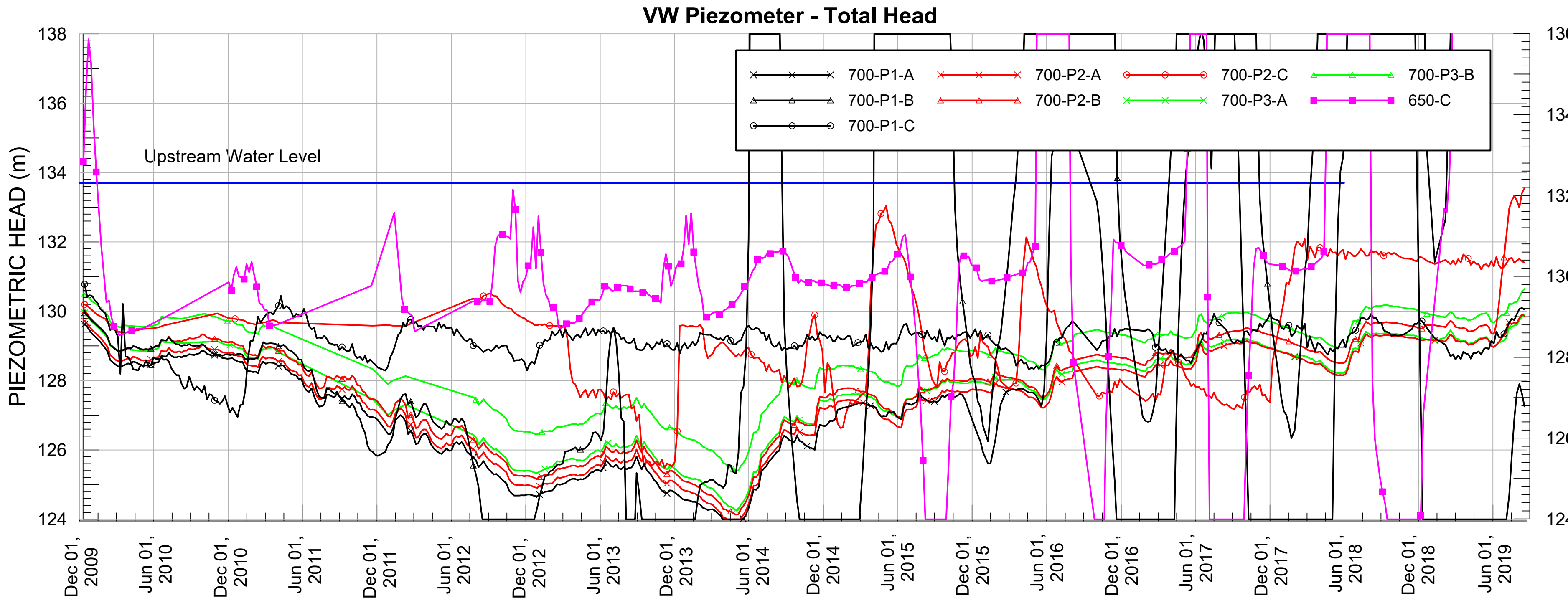
PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT			
TITLE	EAST DIKE - SECTION 60+490 PIEZOMETRIC DATA (Dec 1/09 to Aug 21/19)			
AGNICO EAGLE MEADOWBANK	PROJECT No.			PHASE No.
	DESIGN	TD	28AUG14	SCALE AS SHOWN REV.
	CADD	TD	28AUG14	FIGURE 49
	CHECK	PG	28AUG14	
	REVIEW			

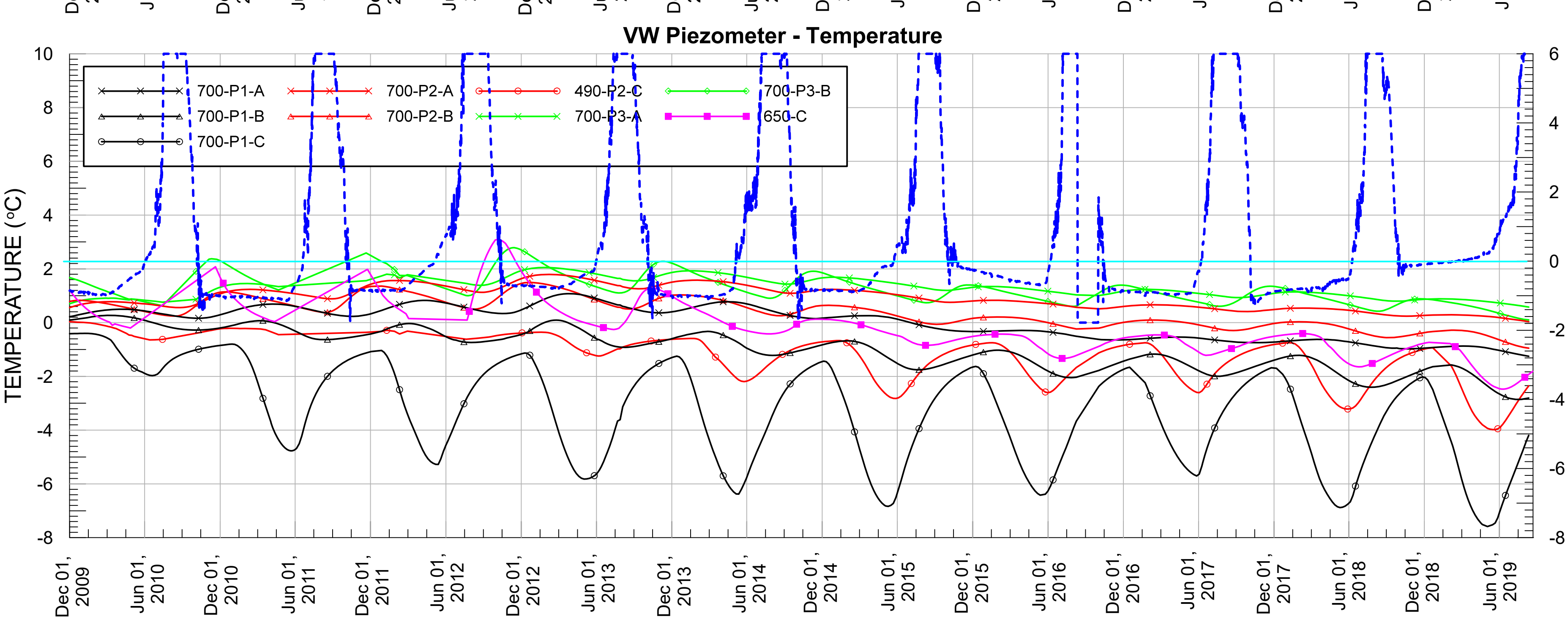
East Dike - Station 60+600 to 60+900 (DL8)











NOTES:

1: 700-P1-B and 750-C are giving unreliable readings and with a negative temperature are assumed to be frozen.

2. PWP follows same trends as previous years.

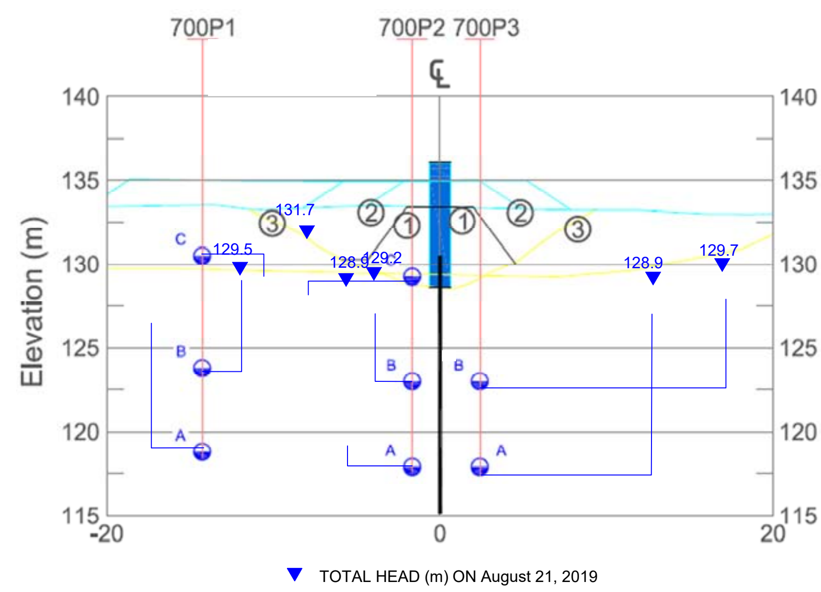
PROJECT: **AGNICO EAGLE MINES LIMITED**
MEADOWBANK GOLD PROJECT
NUNAVUT

TITLE: **EAST DIKE**
Section 60+600 to 60+900 - PIEZOMETRIC DATA
(Dec 1/09 to Aug 21/19)

AGNICO EAGLE MEADOWBANK

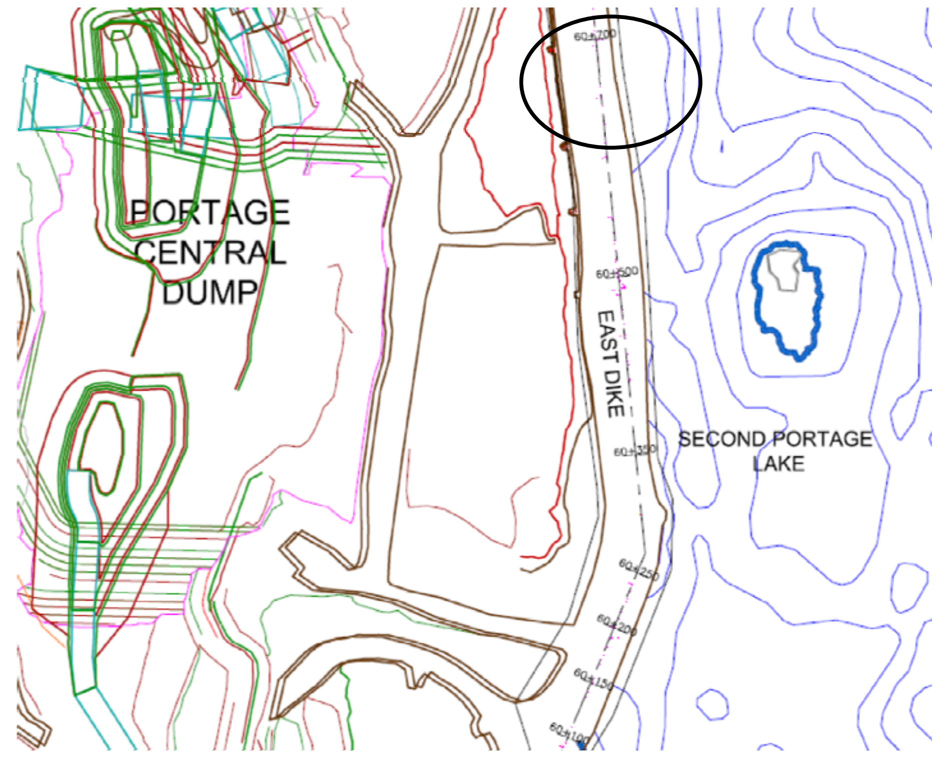
PROJECT No.			PHASE No.
DESIGN	TD	28AUG14	SCALE AS SHOWN REV.
CADD	TD	28AUG14	**FIGURE 50**
CHECK	PG	28AUG14	
REVIEW			

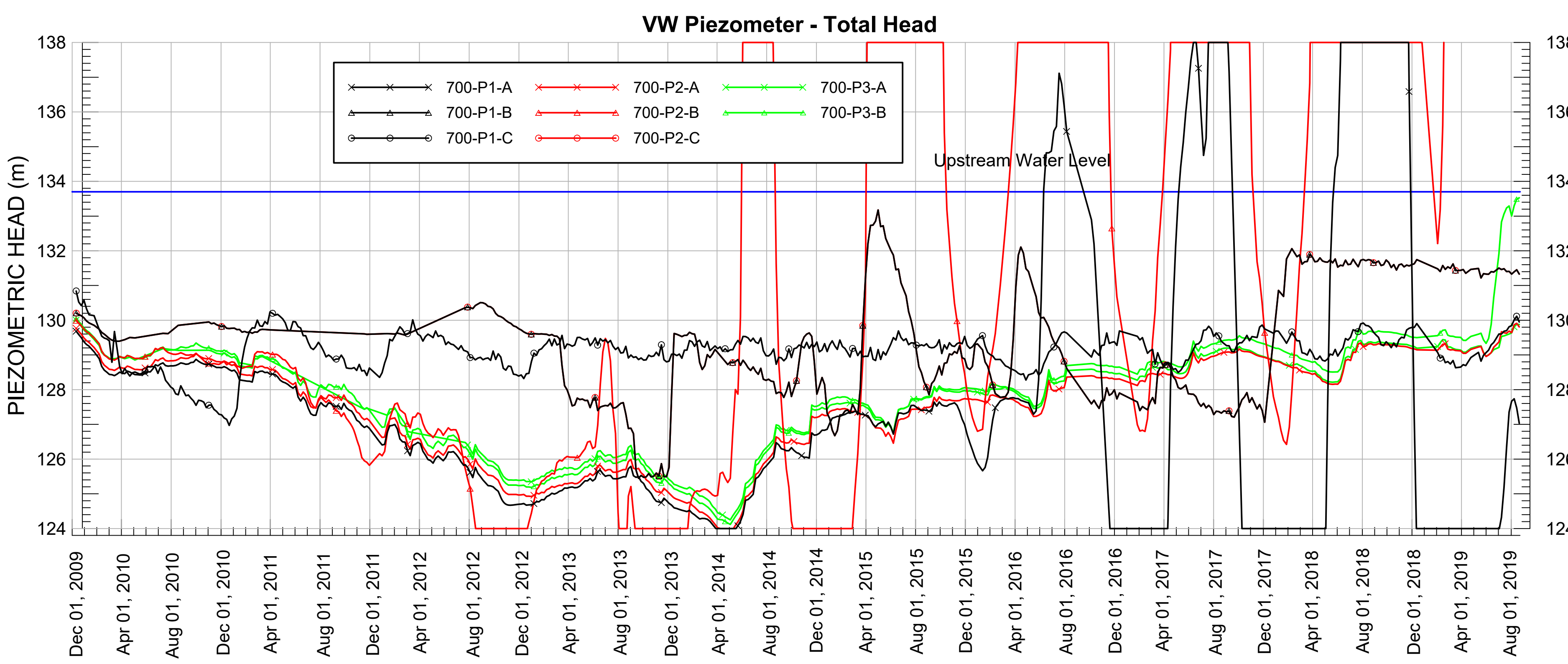
STATION 60+700

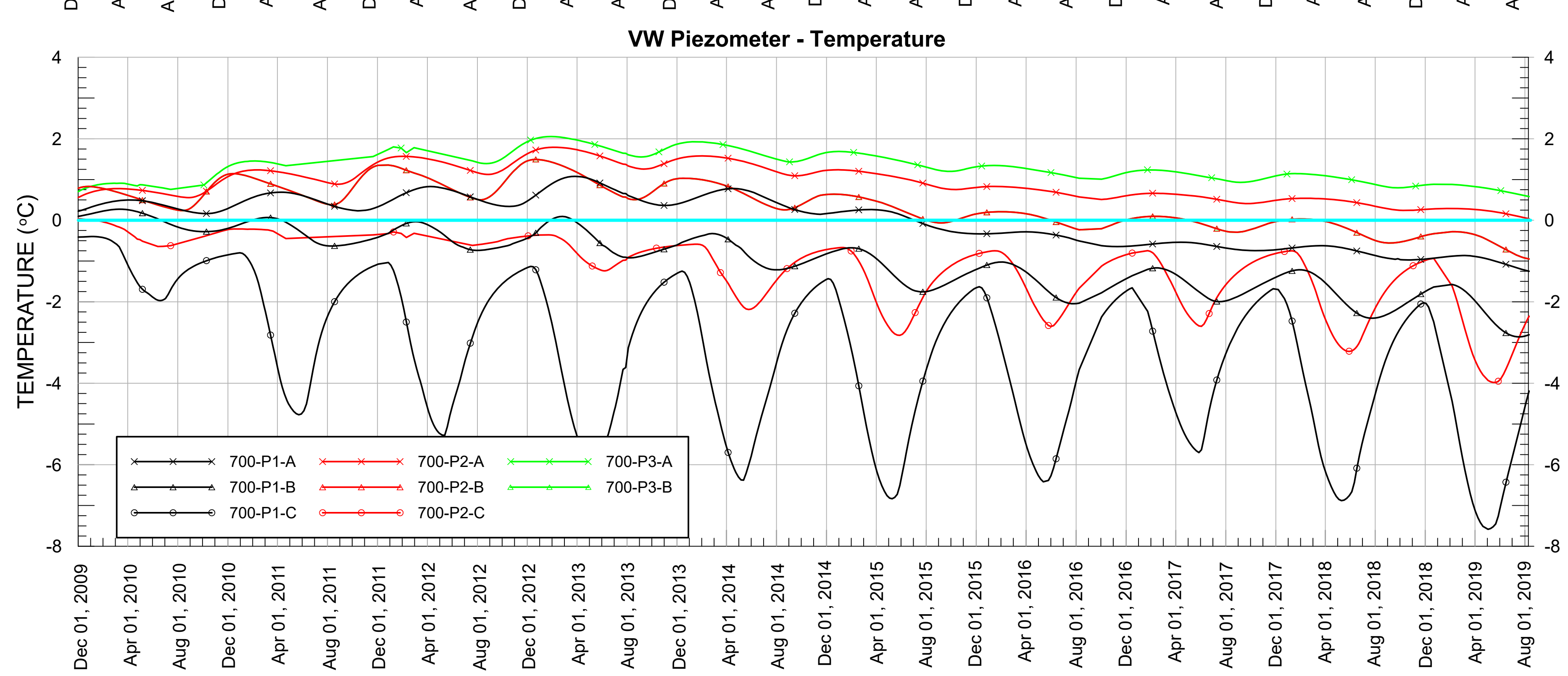


LEGEND

	CUTOFF (CSB)	1	CORE BACKFILL (19 mm MINUS)
	CUTOFF (SB)	2	COARSE BACKFILL (15mm MINUS)
	INITIAL ROCKFILL	3	ROCKFILL
	LAKEBED	4	FINE ROCKFILL
	BEDROCK		
	JET GROUT		
	GROUT		







NOTES:

1: 700-P1-B and 750-C are giving anomoly readings and with a negative temperature are assumed to be frozen and data is not considered reliable.

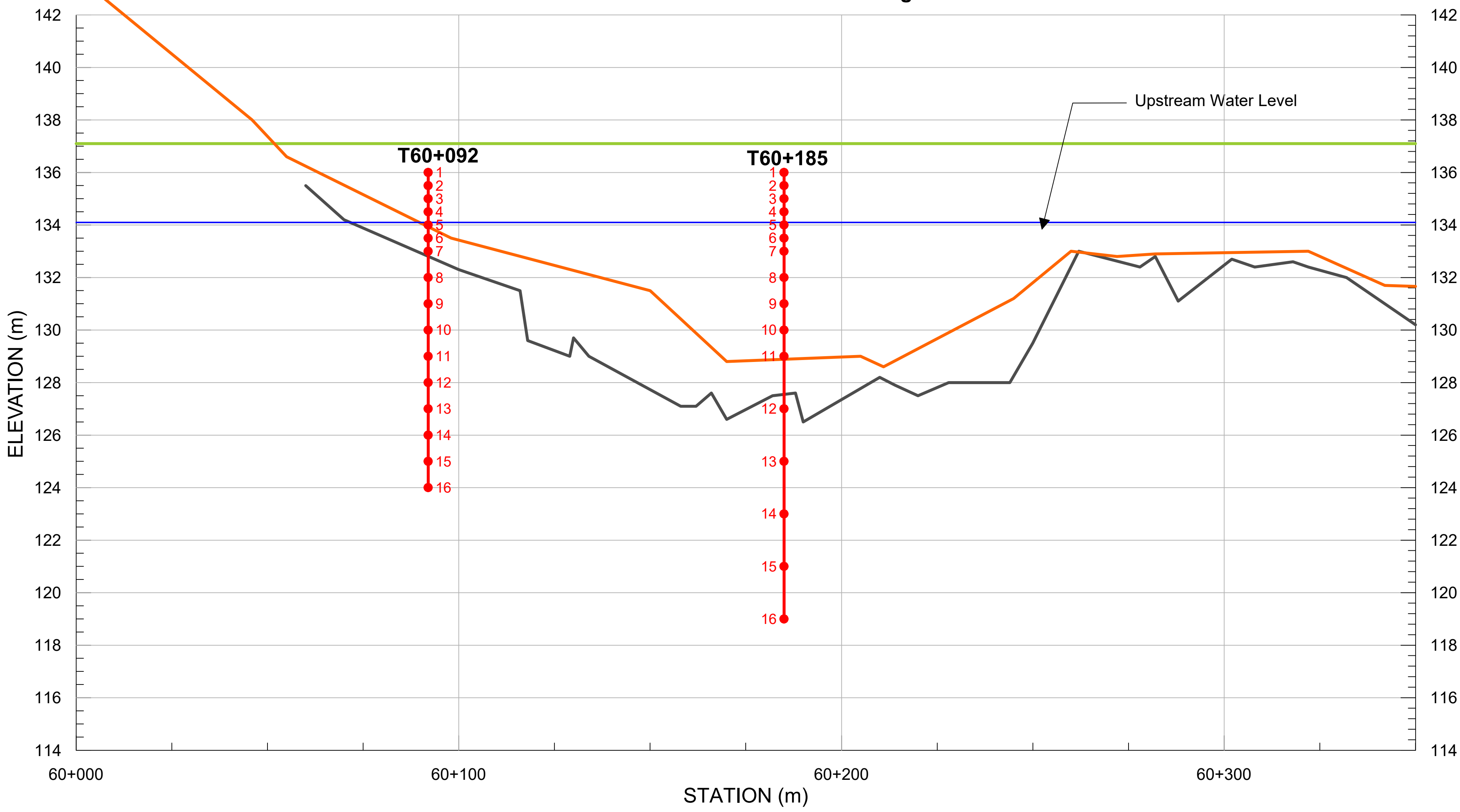
PROJECT **AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT**

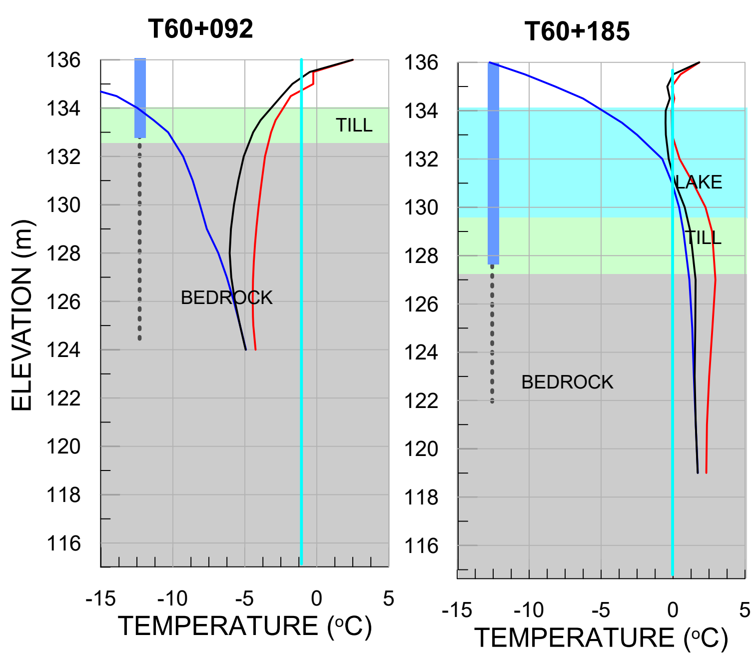
TITLE **EAST DIKE - SECTION 60+700 PIEZOMETRIC DATA (Dec 1/09 to Aug 21/19)**

AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
CADD	TD	28AUG14	**FIGURE 51**	
CHECK	PG	28AUG14		
REVIEW				

"South Abutment to North Channel" East Dike - Longitudinal Section





Current Temperature On August 21st, 2019

LEGEND

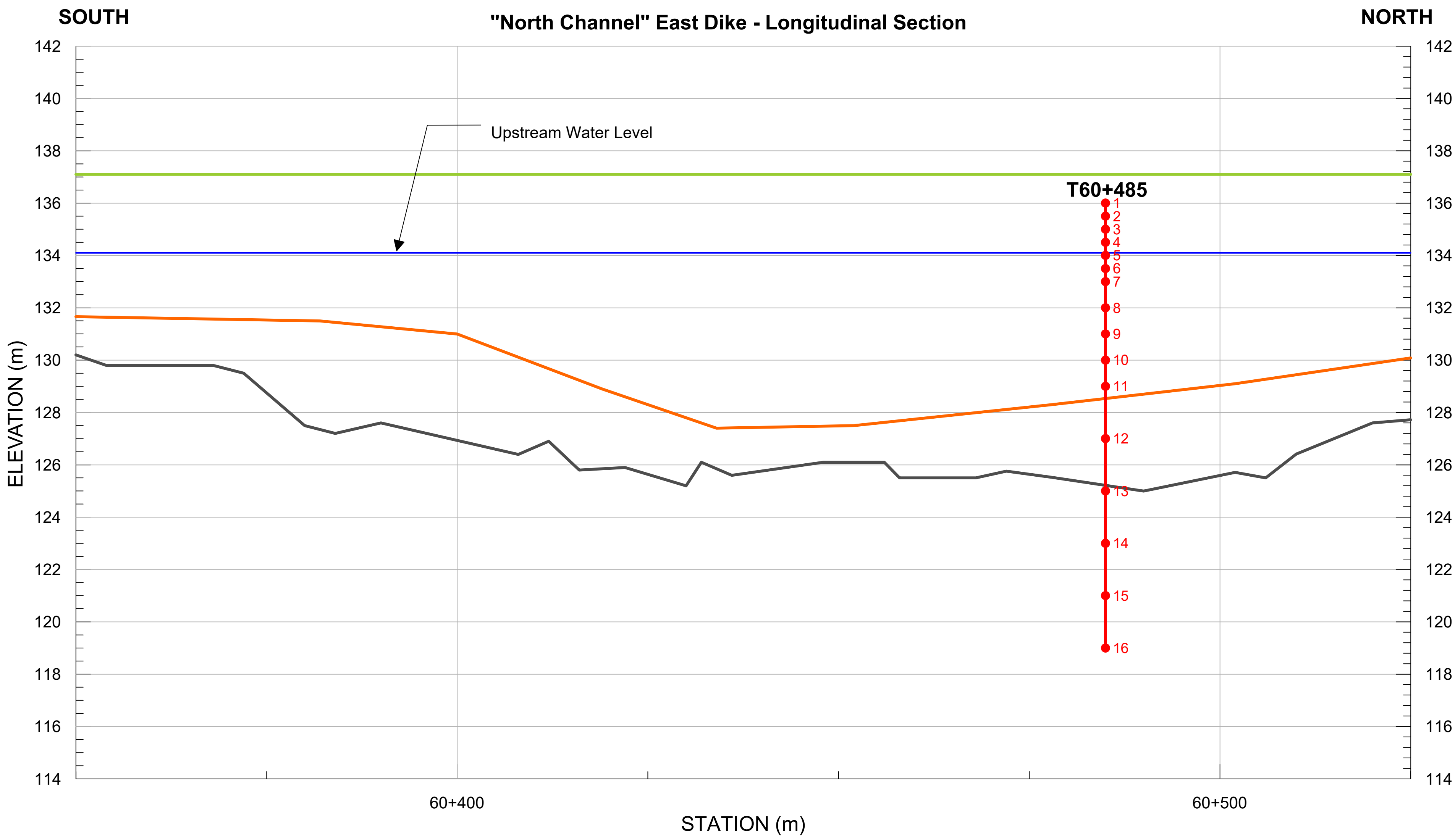
- Dike Crest
- Piezometric Head in Downstream Piezometers
- Lake Bed
- Bedrock
- Lake
- Till
- Bedrock
- Thermistor with Bead Locations
- Vibrating Wire Piezometer Installation Level
- SB
- CSB
- Jet Grouting
- Grouting
- T min
- T current
- T max

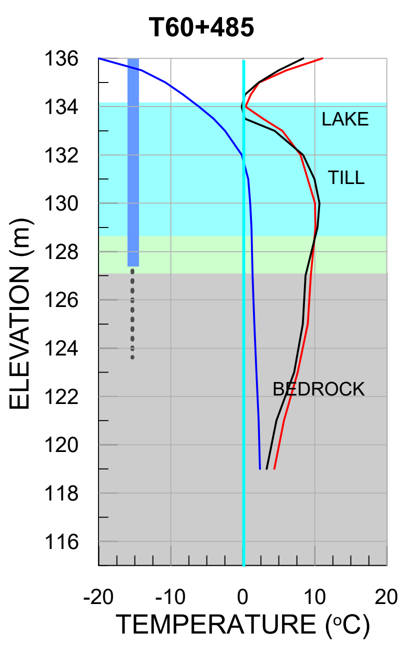
NOTES:
1.

PROJECT	**AGNICO EAGLE MINES LIMITED** **MEADOWBANK GOLD PROJECT** **NUNAVUT**
TITLE	**EAST DIKE** **60+000 to 60+350 - TEMPERATURE DATA** **(Aug 1/18 to Aug 21/19)**

AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.
DESIGN	TD	20JAN14	SCALE AS SHOWN REV.
CADD	TD	20JAN14	
CHECK			**FIGURE 57**
REVIEW			





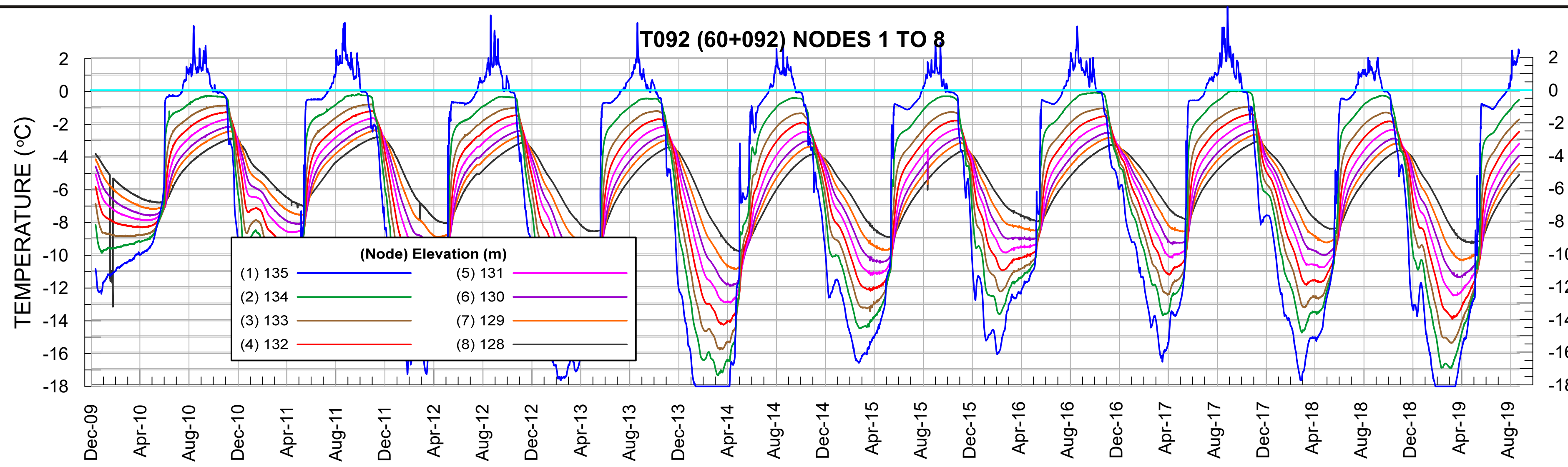
Current Temperature On August 21st,2019

LEGEND

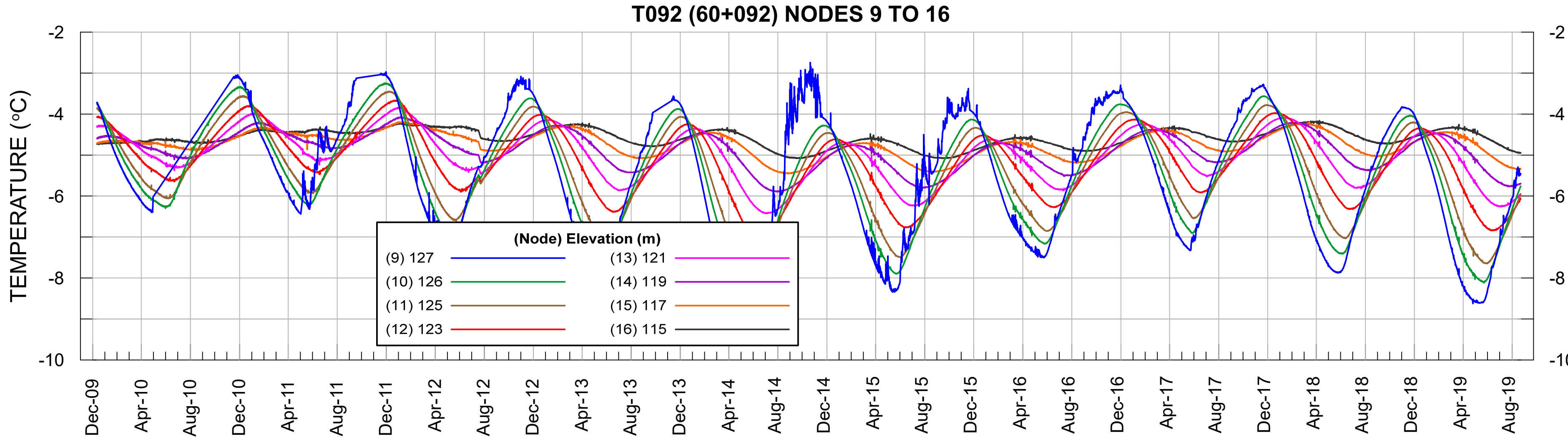
- Dike Crest
- Piezometric Head in Downstream Piezometers
- Lake Bed
- Bedrock
- Lake
- Till
- Bedrock
- Thermistor with Bead Locations
- Vibrating Wire Piezometer Installation Level
- SB
- CSB
- Jet Grouting
- Grouting
- T min
- T current
- T max

NOTES:
1.

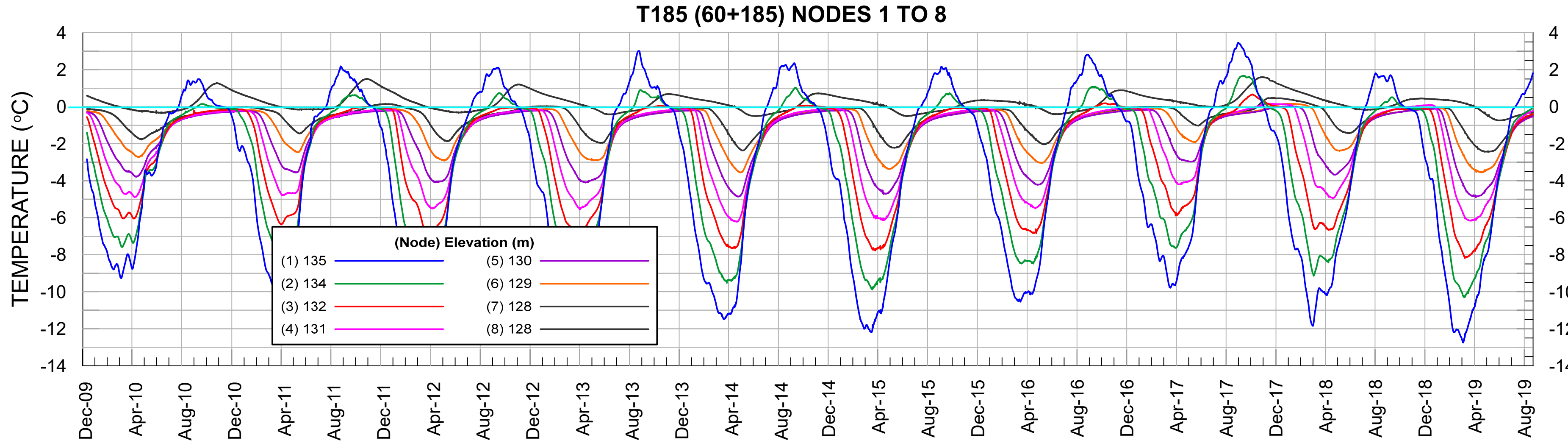
PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT		
TITLE	BAYGOOSE DIKE 60+350 to 60+525 - TEMPERATURE DATA (Aug 1/18 to Aug 21/19)		
AGNICO EAGLE MEADOWBANK	PROJECT No.		PHASE No.
	DESIGN TD 20JAN14		SCALE AS SHOWN REV.
	CADD TD 20JAN14		FIGURE 58
	CHECK		
	REVIEW		



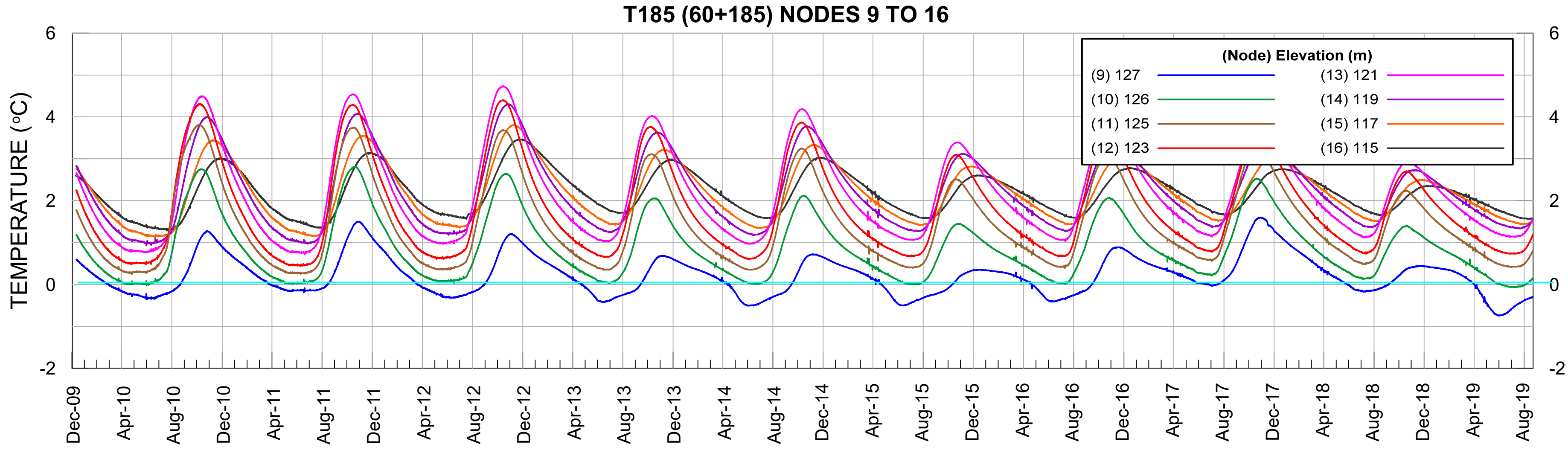
T092 (60+092) NODES 9 TO 16



T185 (60+185) NODES 1 TO 8



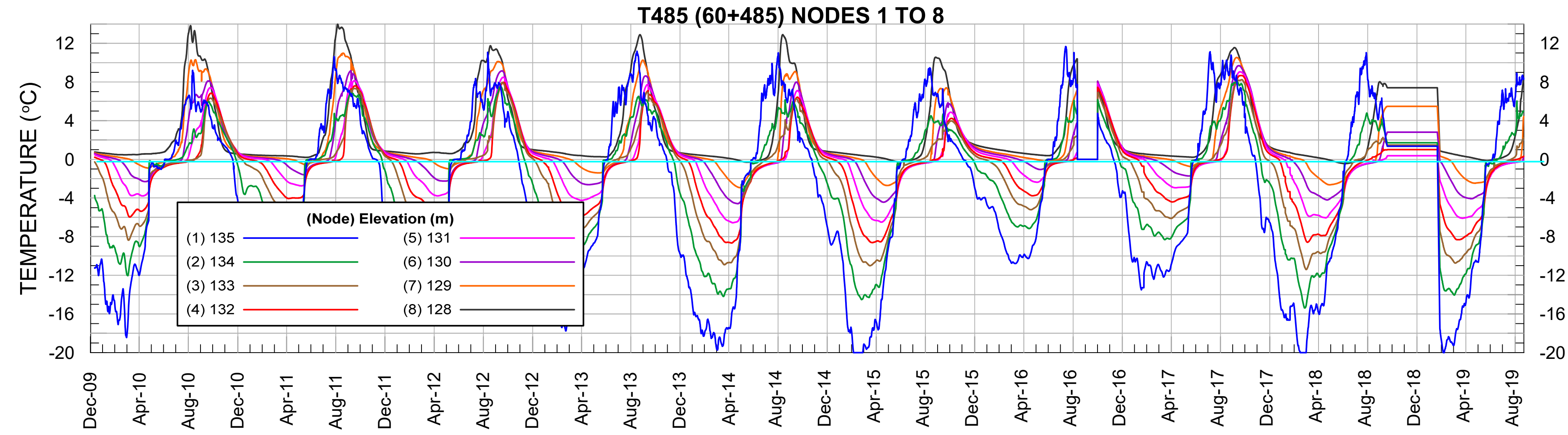
T185 (60+185) NODES 9 TO 16

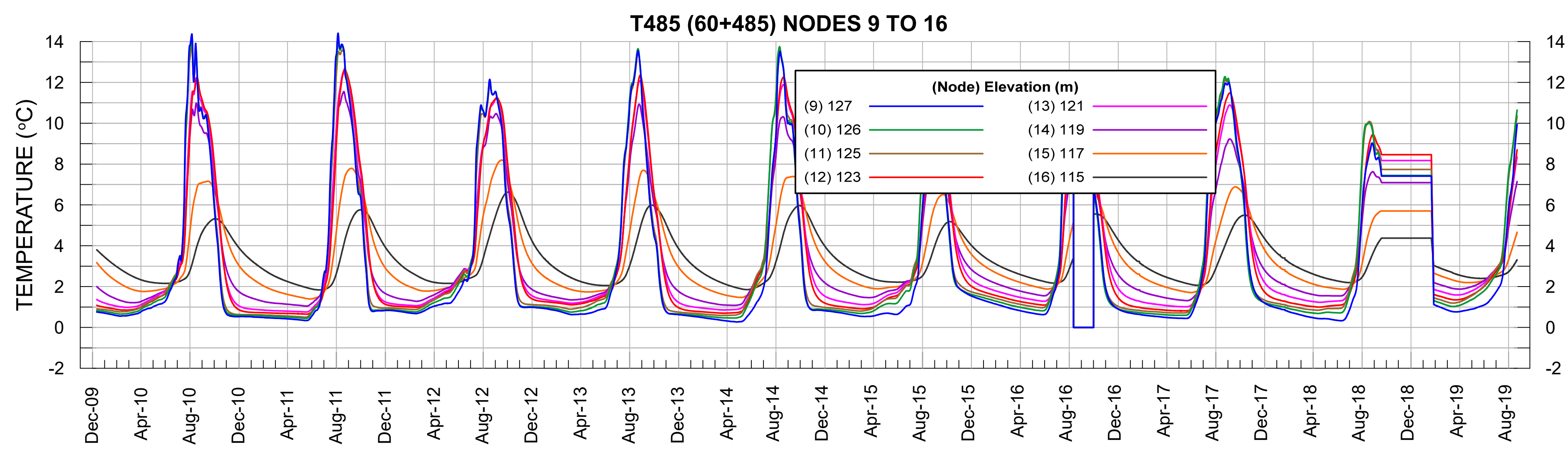


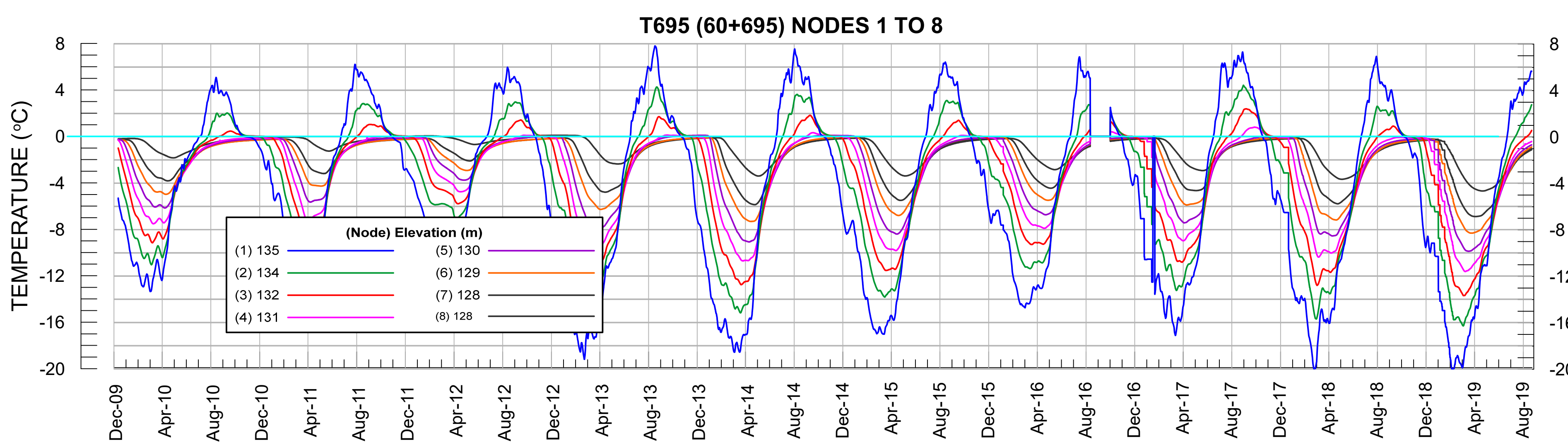
PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	EAST DIKE NODAL THERMAL TIMELINES (Dec 1/09 to Aug 21/19)

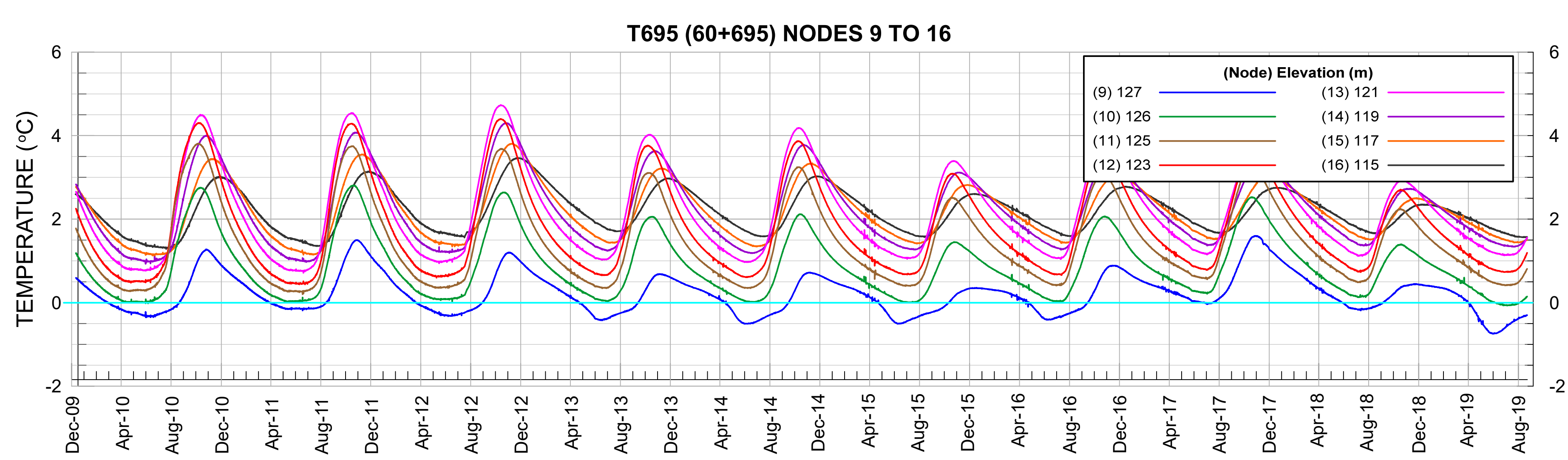
AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	20JAN14	SCALE AS SHOWN	REV.
CADD	TD	20JAN14	FIGURE 59	
CHECK				
REVIEW				





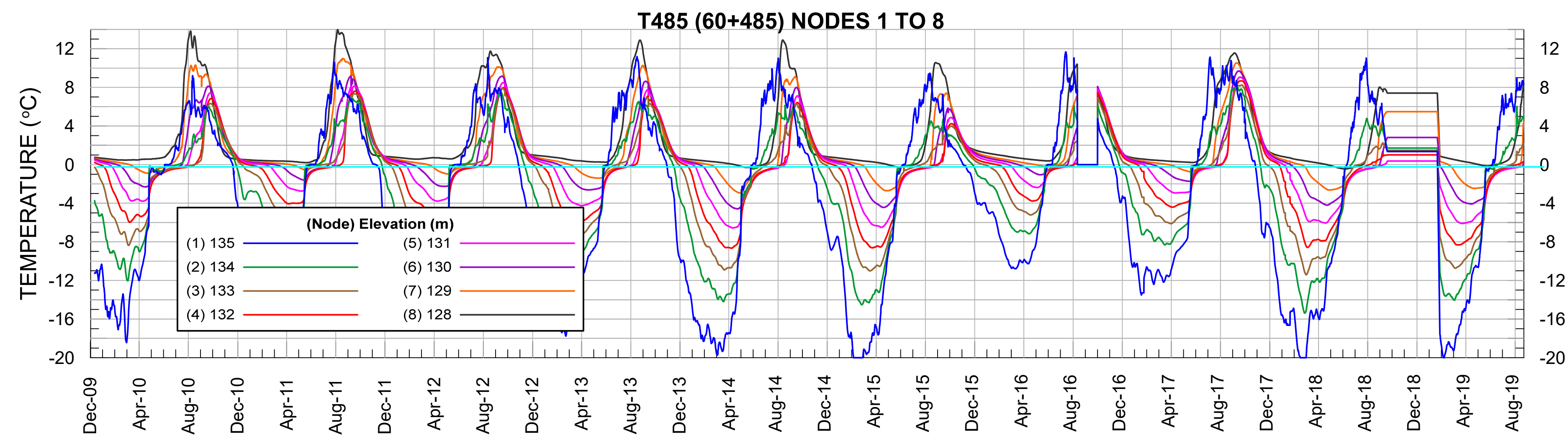


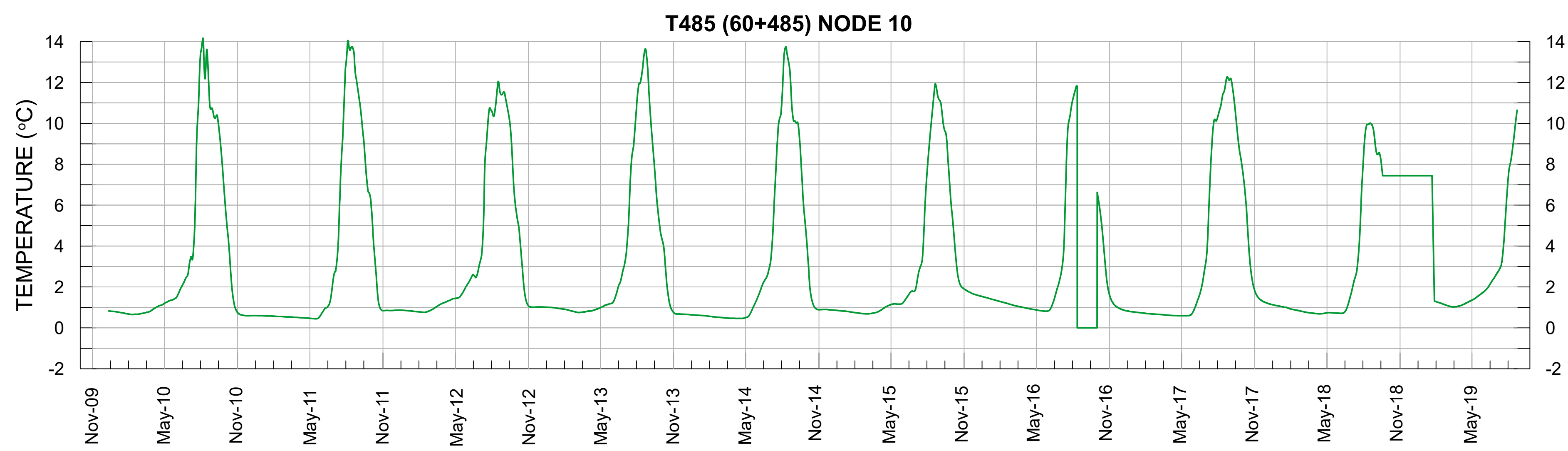


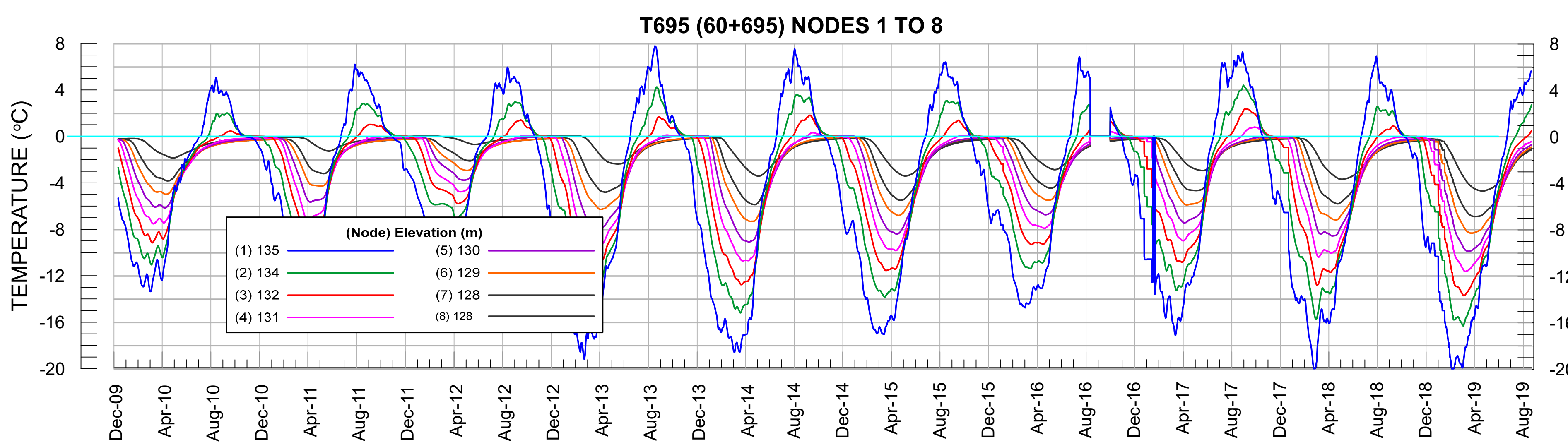
PROJECT
AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

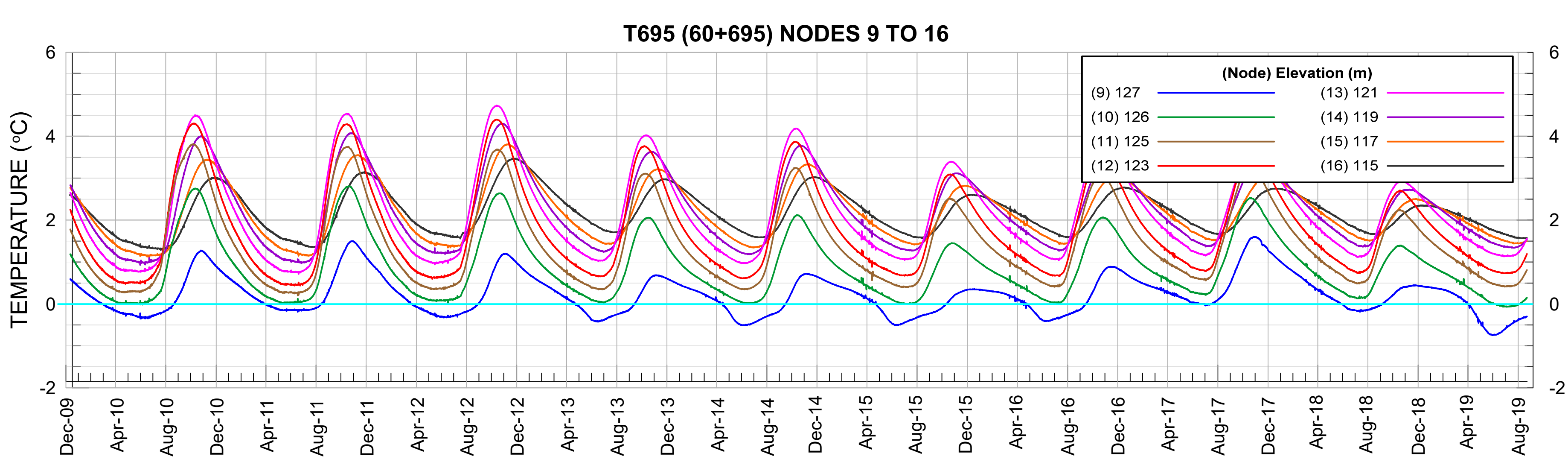
TITLE
EAST DIKE
NODAL THERMAL TIMELINES
(Dec 1/09 to Aug 21/19)

PROJECT No.			PHASE No.
DESIGN	TD	20JAN14	SCALE AS SHOWN REV.
CADD	TD	20JAN14	
CHECK			**FIGURE 60**
REVIEW			









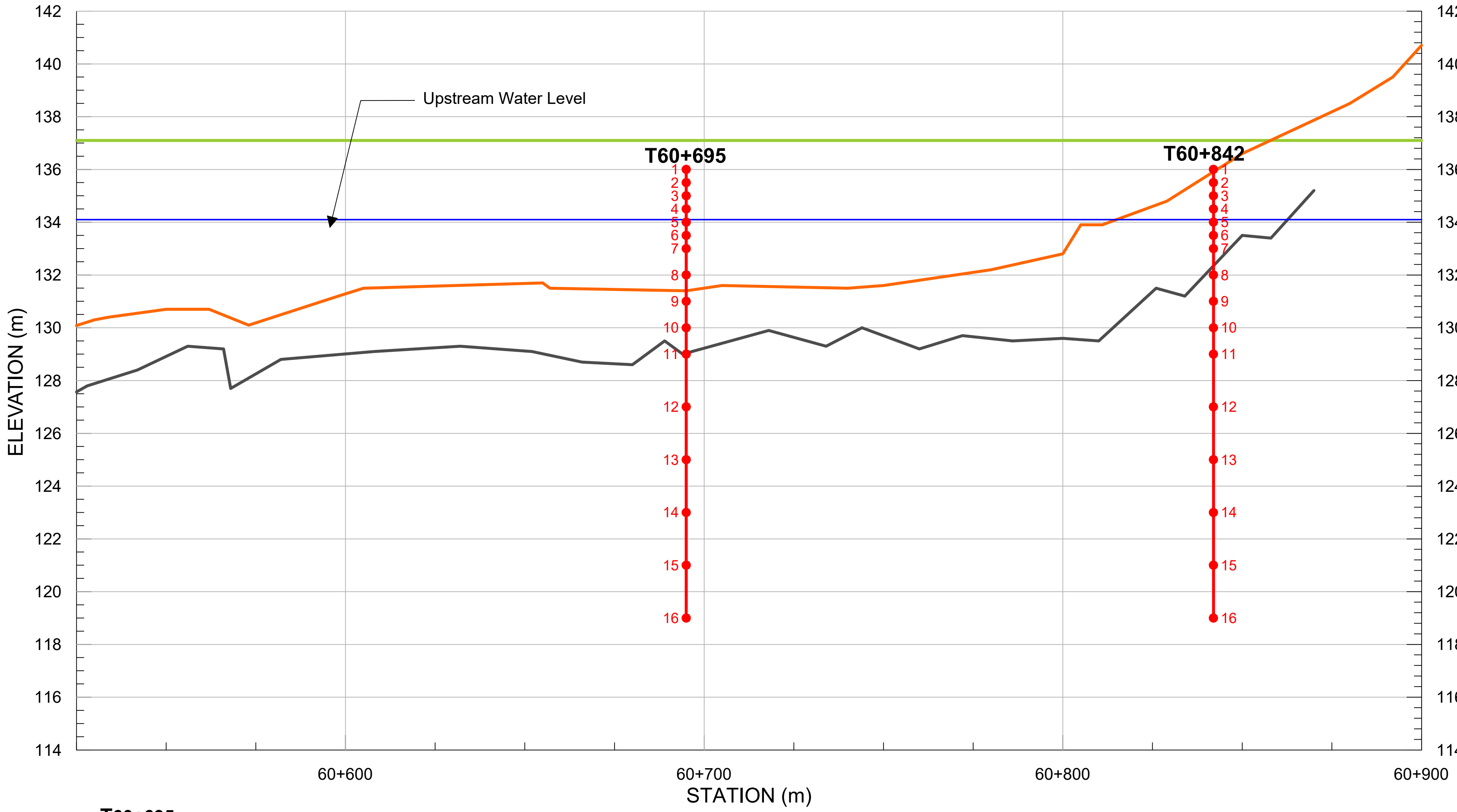
PROJECT
AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

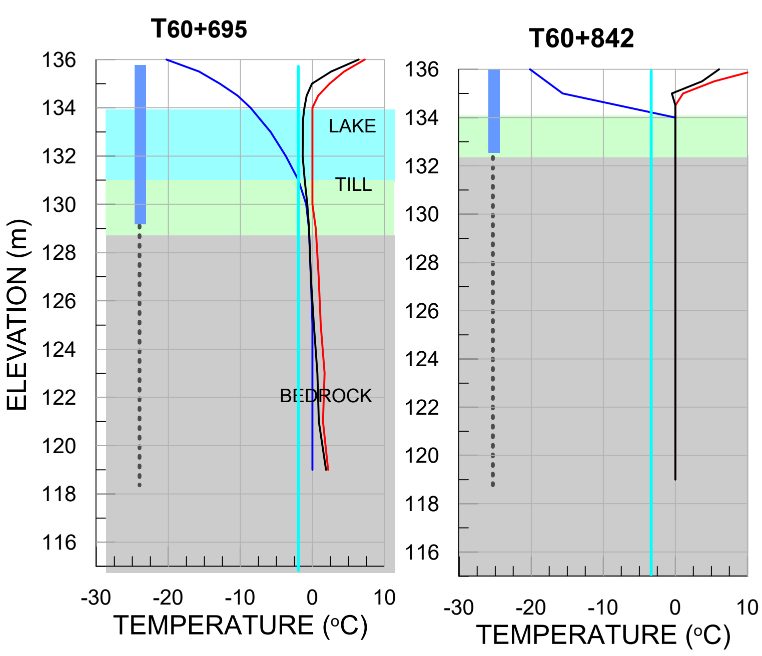
TITLE
EAST DIKE
NODAL THERMAL TIMELINES
(Dec 1/09 to Aug 21/19)

AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.
DESIGN	TD	20JAN14	SCALE AS SHOWN REV.
CADD	TD	20JAN14	**FIGURE 60**
CHECK			
REVIEW			

"North Channel to North Abutment" East Dike - Longitudinal Section





Current Temperature On August 21st, 2019

LEGEND

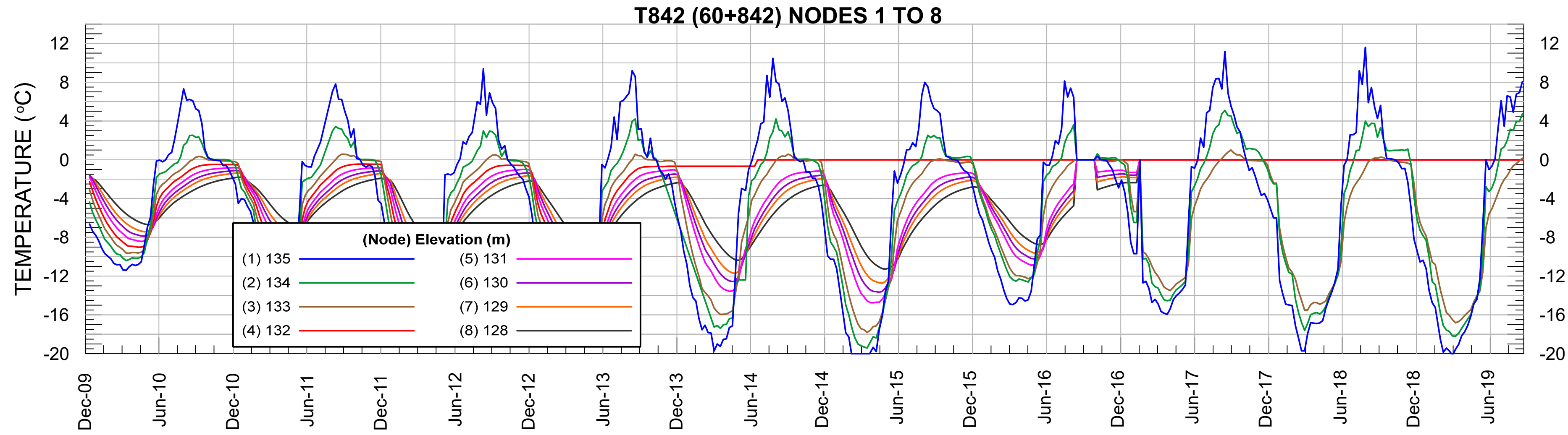
- Dike Crest
- Piezometric Head in Downstream Piezometers
- Lake Bed
- Bedrock
- Lake
- Till
- Bedrock
- Vibrating Wire Piezometer Installation Level
- Thermistor with Bead Locations
- SB
- CSB
- Jet Grouting
- Grouting
- T min
- T current
- T max

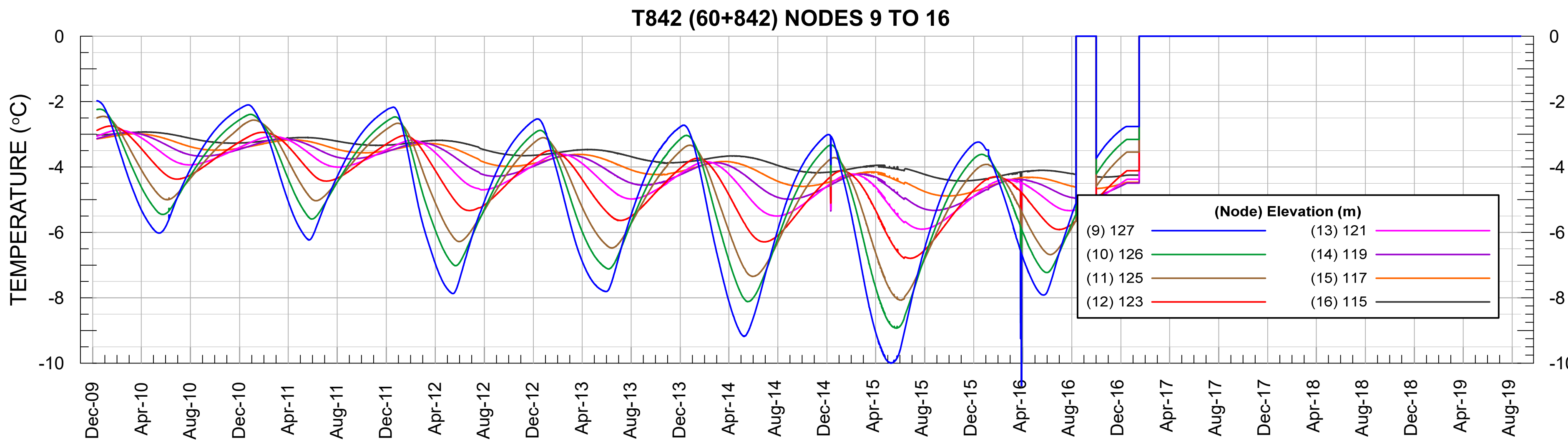
NOTES:
1. Beads on T60+842 do not seem to be working properly.

PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	BAYGOOSE DIKE 30+000 to 30+550 - TEMPERATURE DATA (Aug 1/18 to Aug 21/19)

AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.
DESIGN	TD	20JAN14	SCALE AS SHOWN REV.
CADD	TD	20JAN14	FIGURE 61
CHECK			
REVIEW			

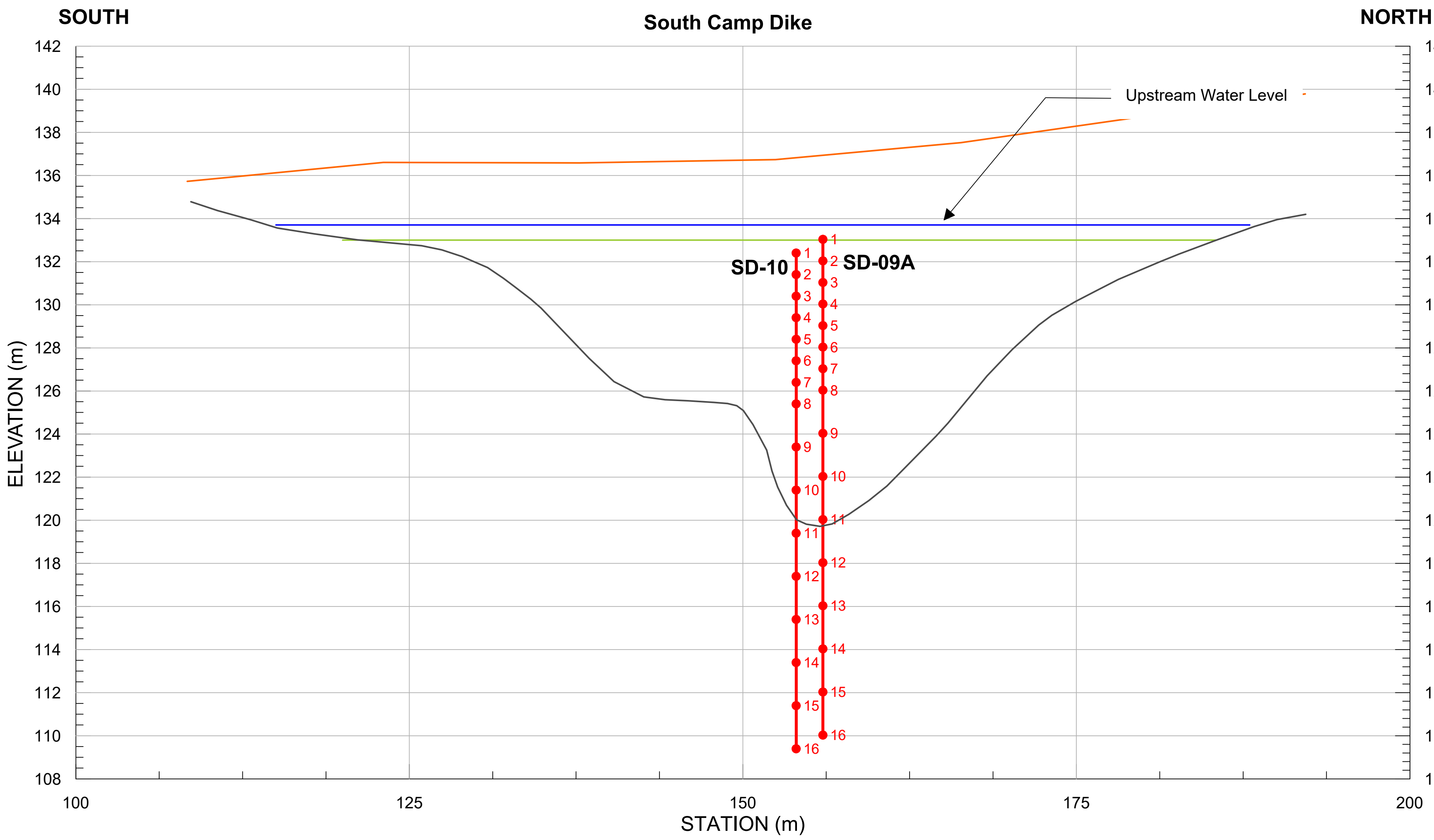


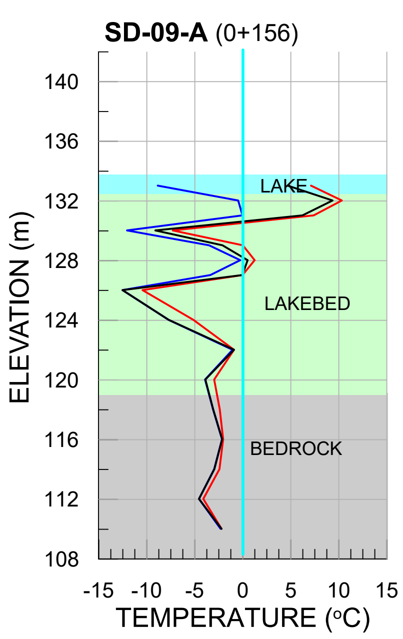


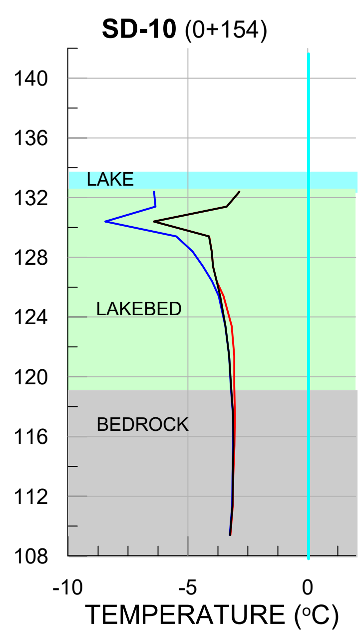
PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	EAST DIKE NODAL THERMAL TIMELINES (Dec 1/09 to Aug 21/19)

AGNICO EAGLE
MEADOWBANK

PROJECT No.			PHASE No.
DESIGN	TD	20JAN14	SCALE AS SHOWN REV.
CADD	TD	20JAN14	FIGURE 62
CHECK			
REVIEW			





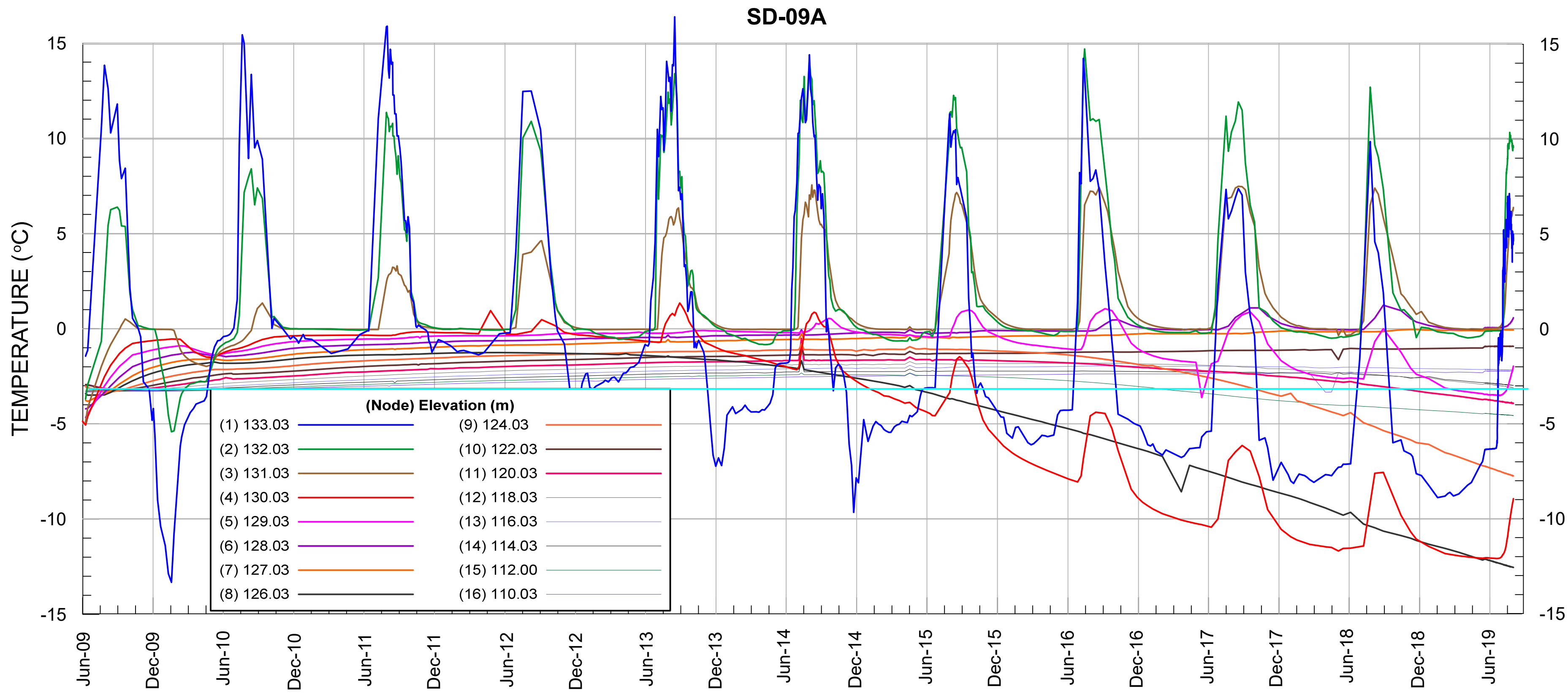


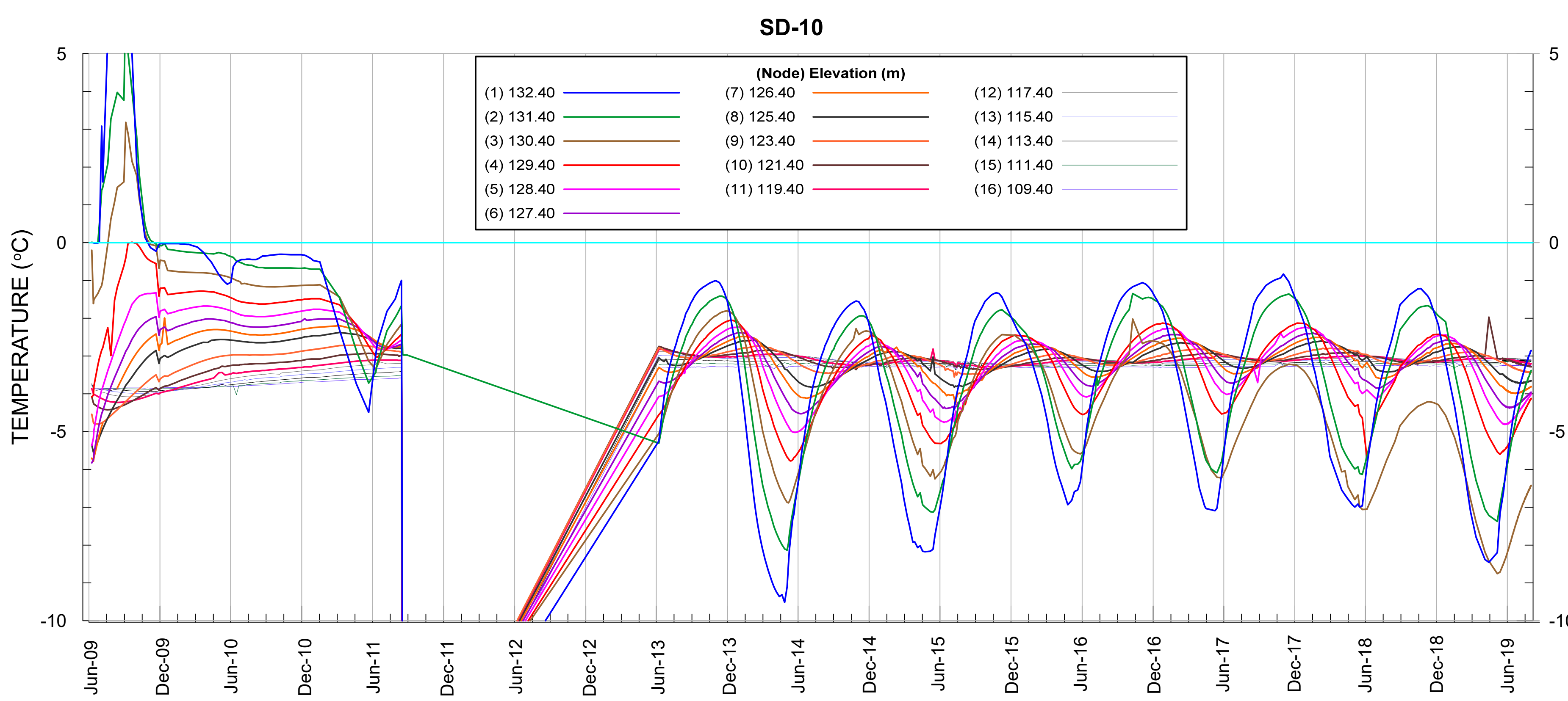
Current Temperature on August 21st, 2019

LEGEND

- Dike Crest
- Lake Bed
- Bedrock
- Lake
- Till
- Bedrock
- Thermistor with Bead Locations
- T min
- T current
- T max

PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT			
TITLE	SOUTH CAMP DIKE TEMPERATURE DATA (Aug 1/18 to Aug 21/19)			
AGNICO EAGLE MEADOWBANK	PROJECT No.			PHASE No.
	DESIGN	TD	28AUG14	SCALE AS SHOWN REV.
	CADD	TD	28AUG14	FIGURE 52
	CHECK	PG	28AUG14	
	REVIEW			



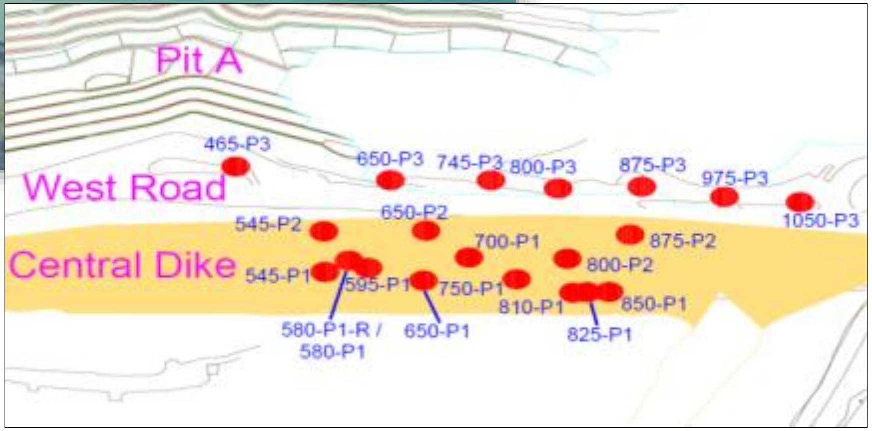


PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	SOUTH CAMP DIKE NODAL THERMAL TIMELINES (June 1/09 to Aug 1/19)

AGNICO EAGLE MEADOWBANK

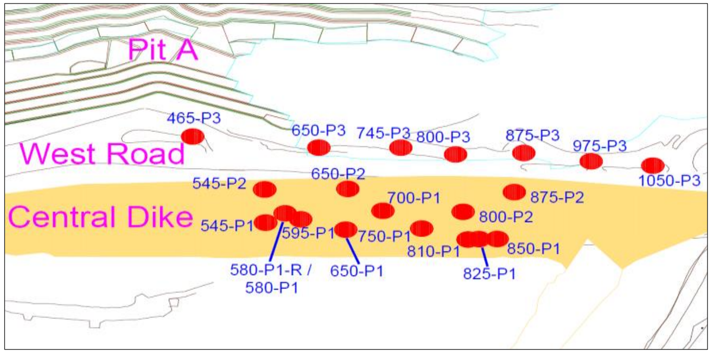
PROJECT No.			PHASE No.
DESIGN	TD	28AUG14	SCALE AS SHOWN REV.
CADD	TD	28AUG14	FIGURE 53
CHECK	PG	28AUG14	
REVIEW			

APPENDIX I
CENTRAL DIKE



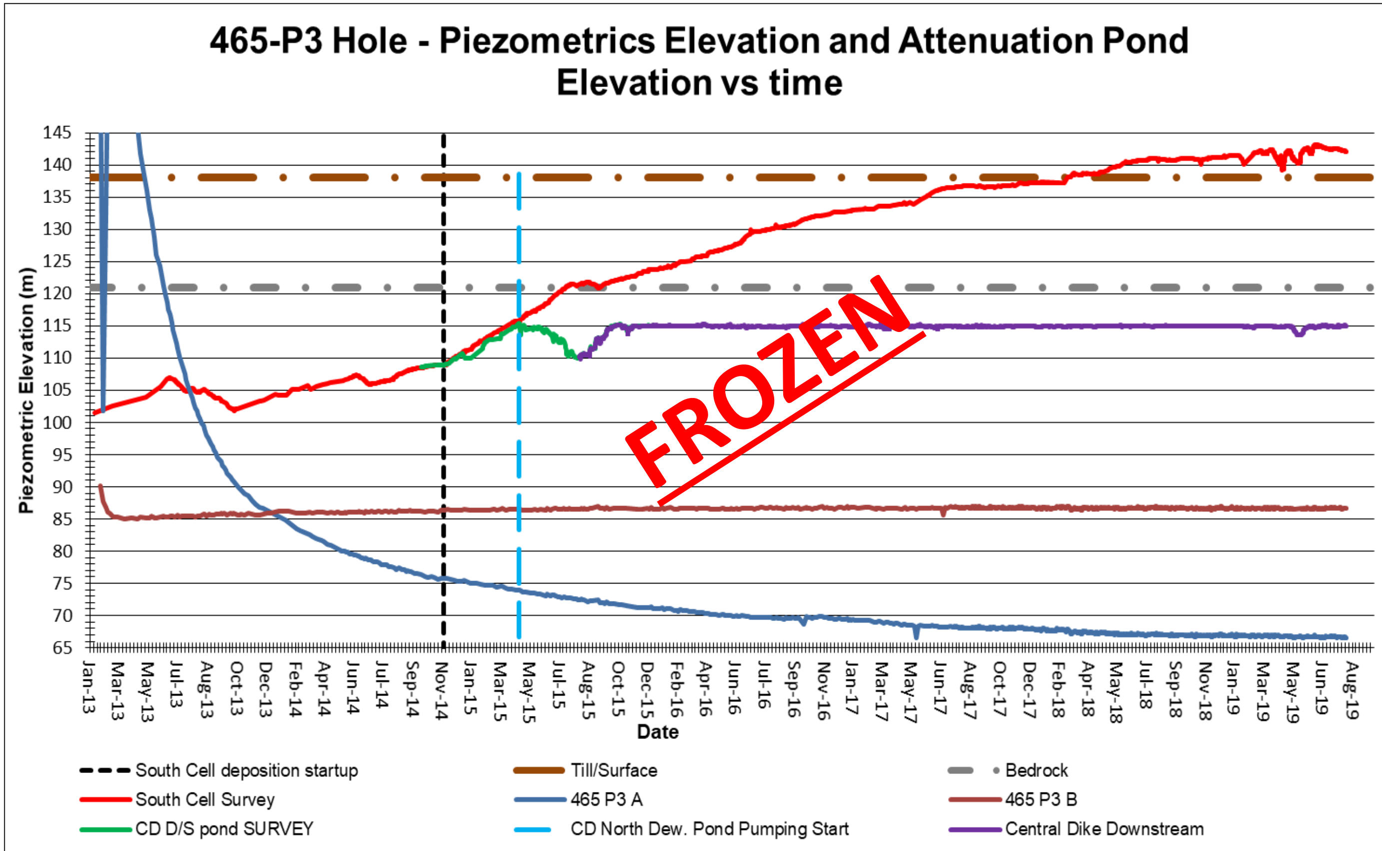
Central Dike Pond Elevation

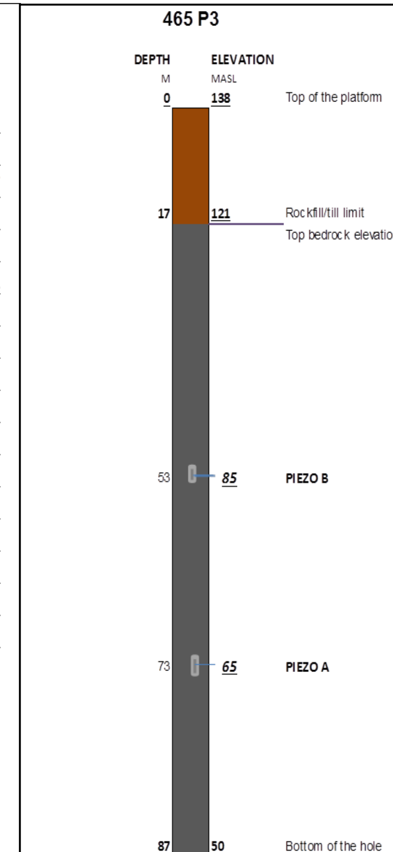
Central Dike Downstream Pond Elevation

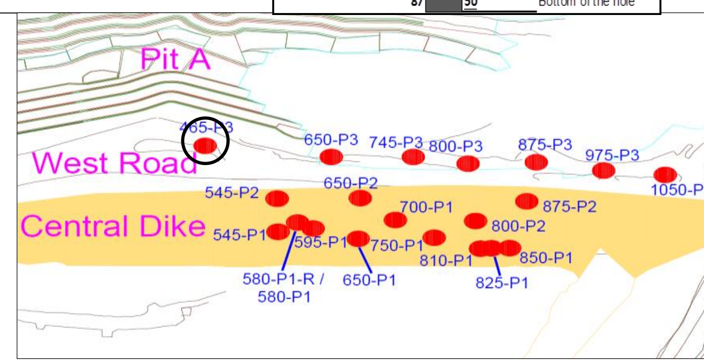


Central Dike

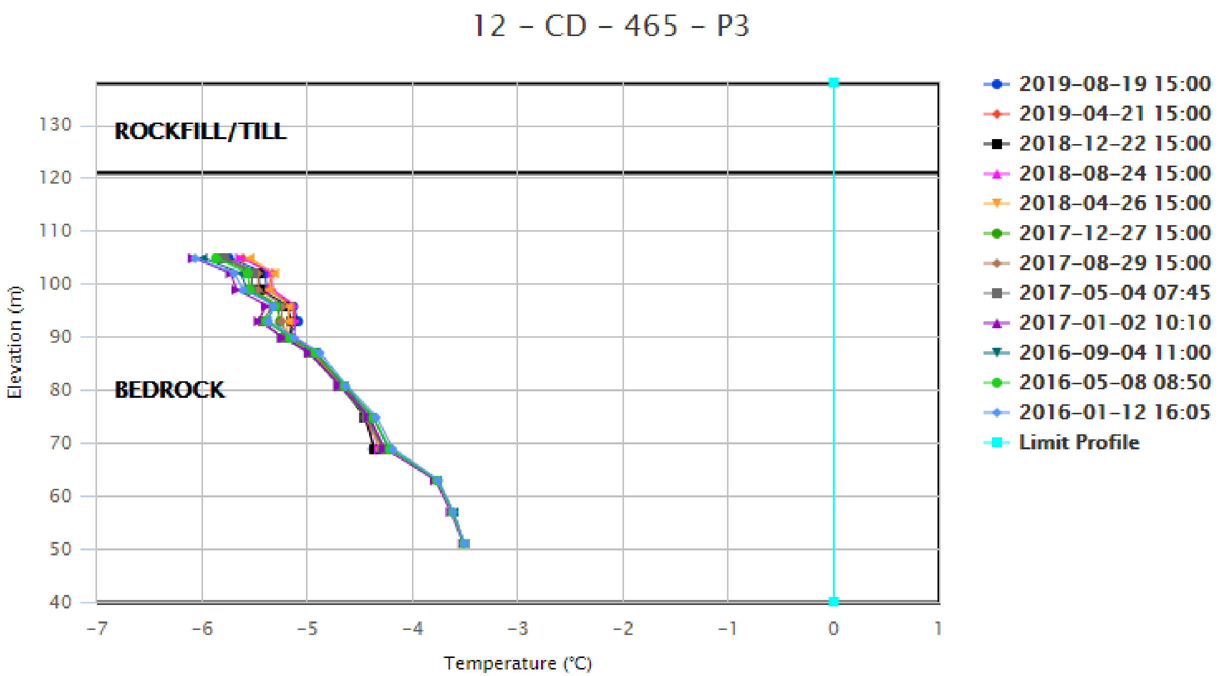
Piezometer 465-P3

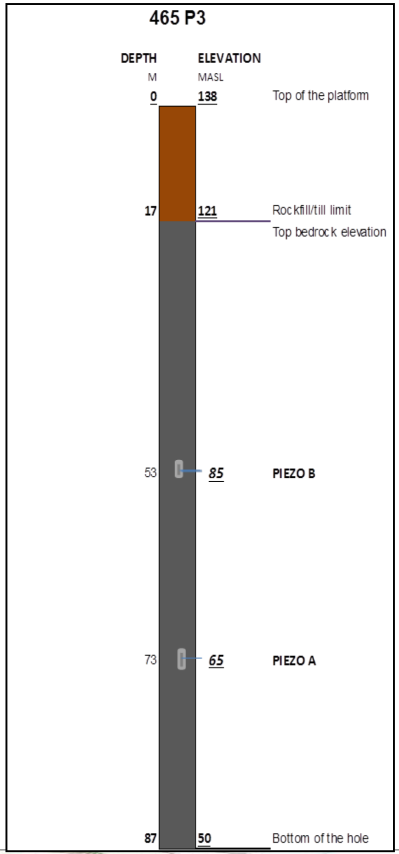


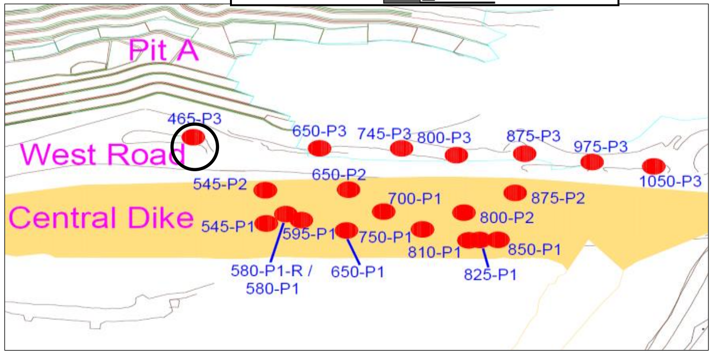




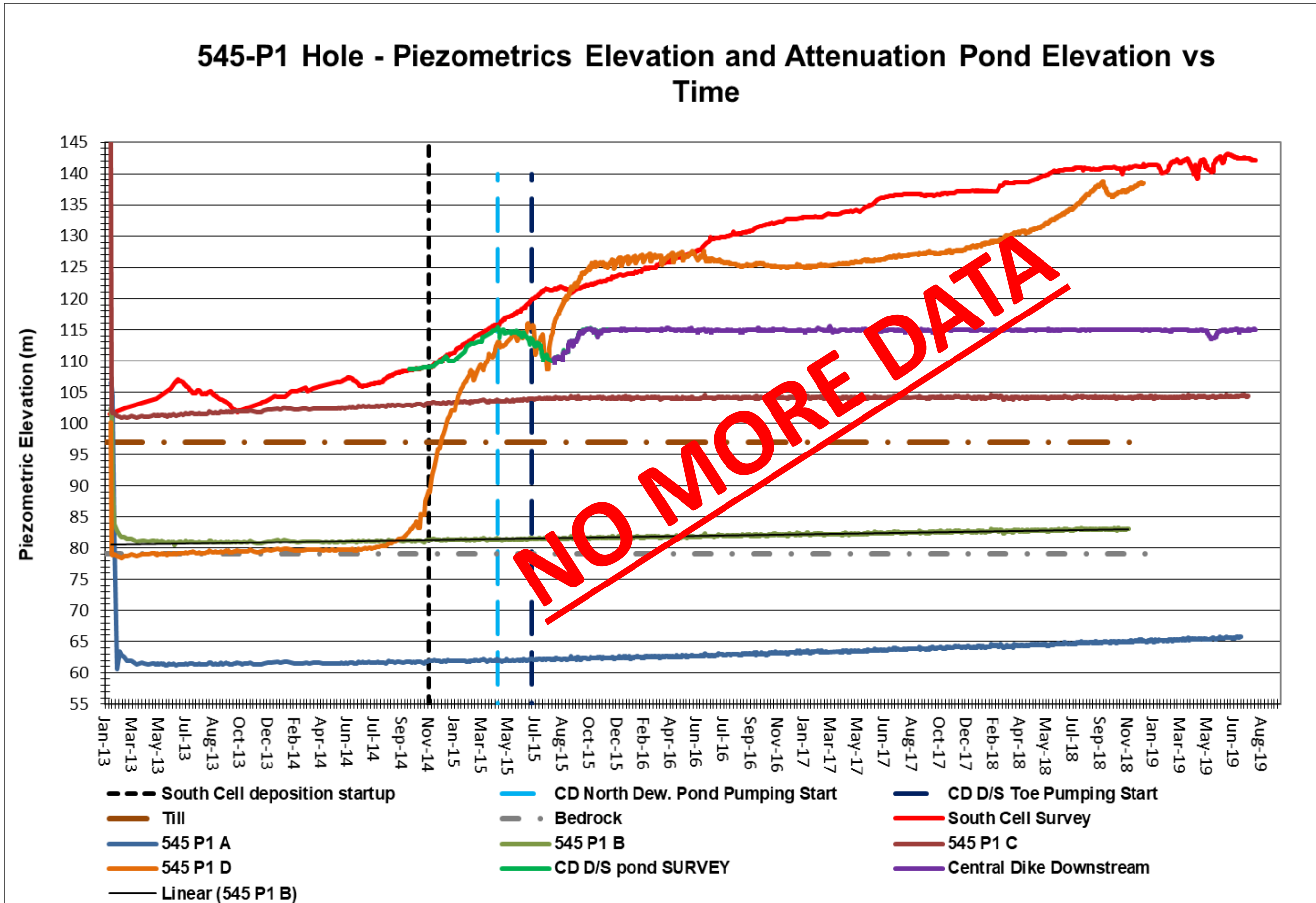
Thermistor 465-P3

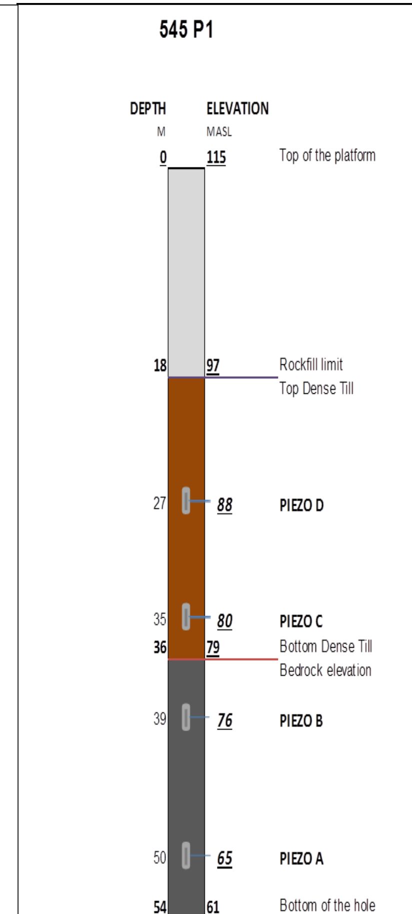


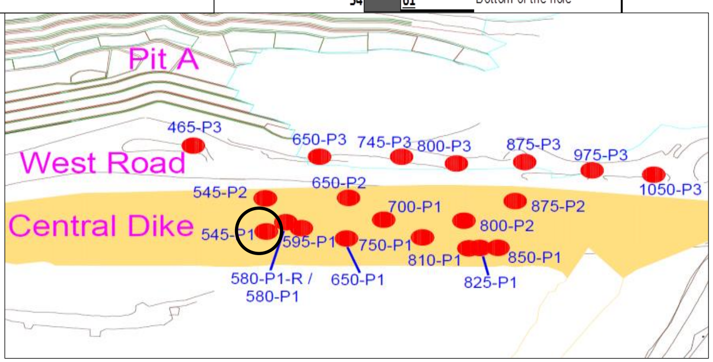




Piezometer 545-P1

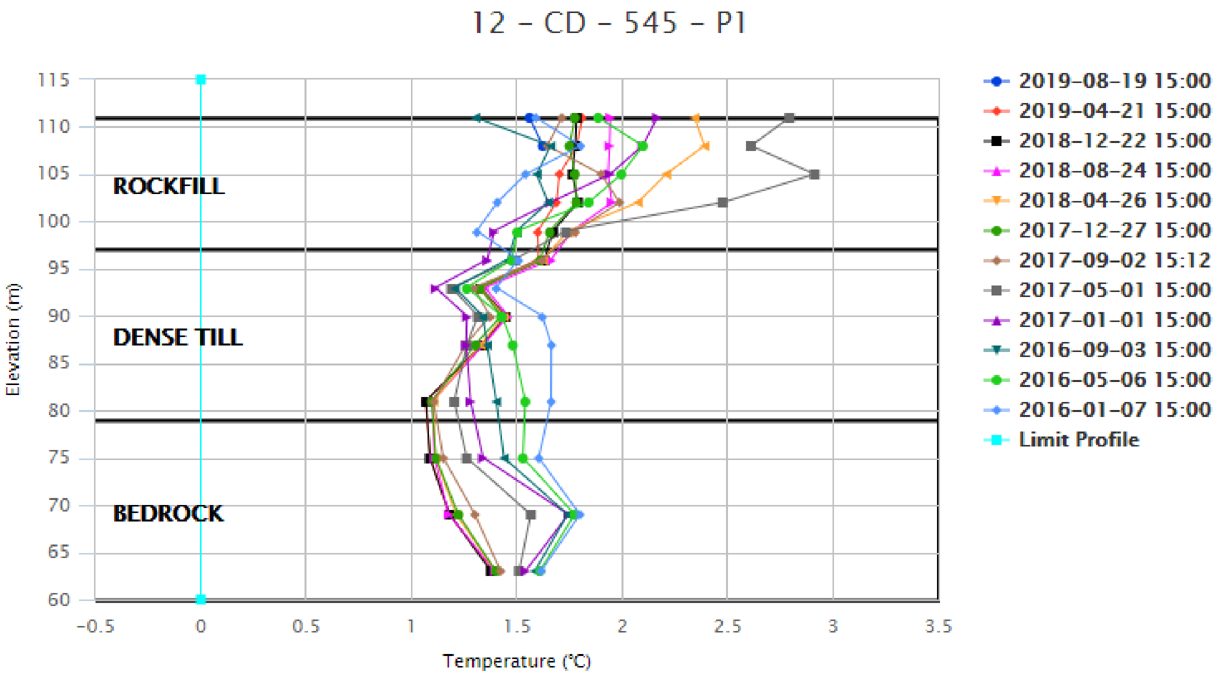


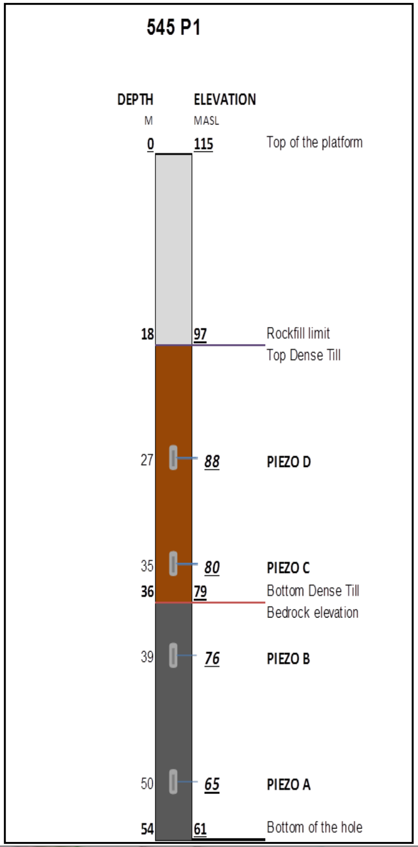


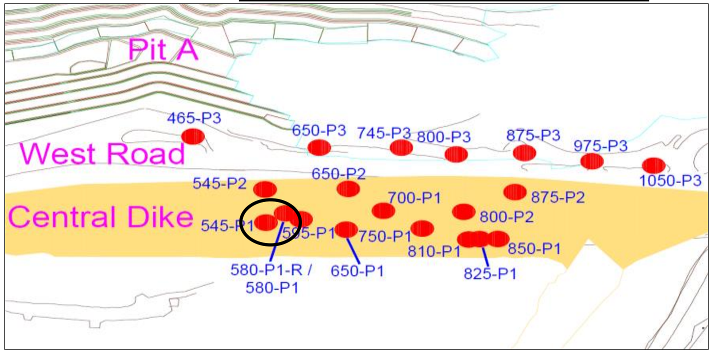


Central Dike

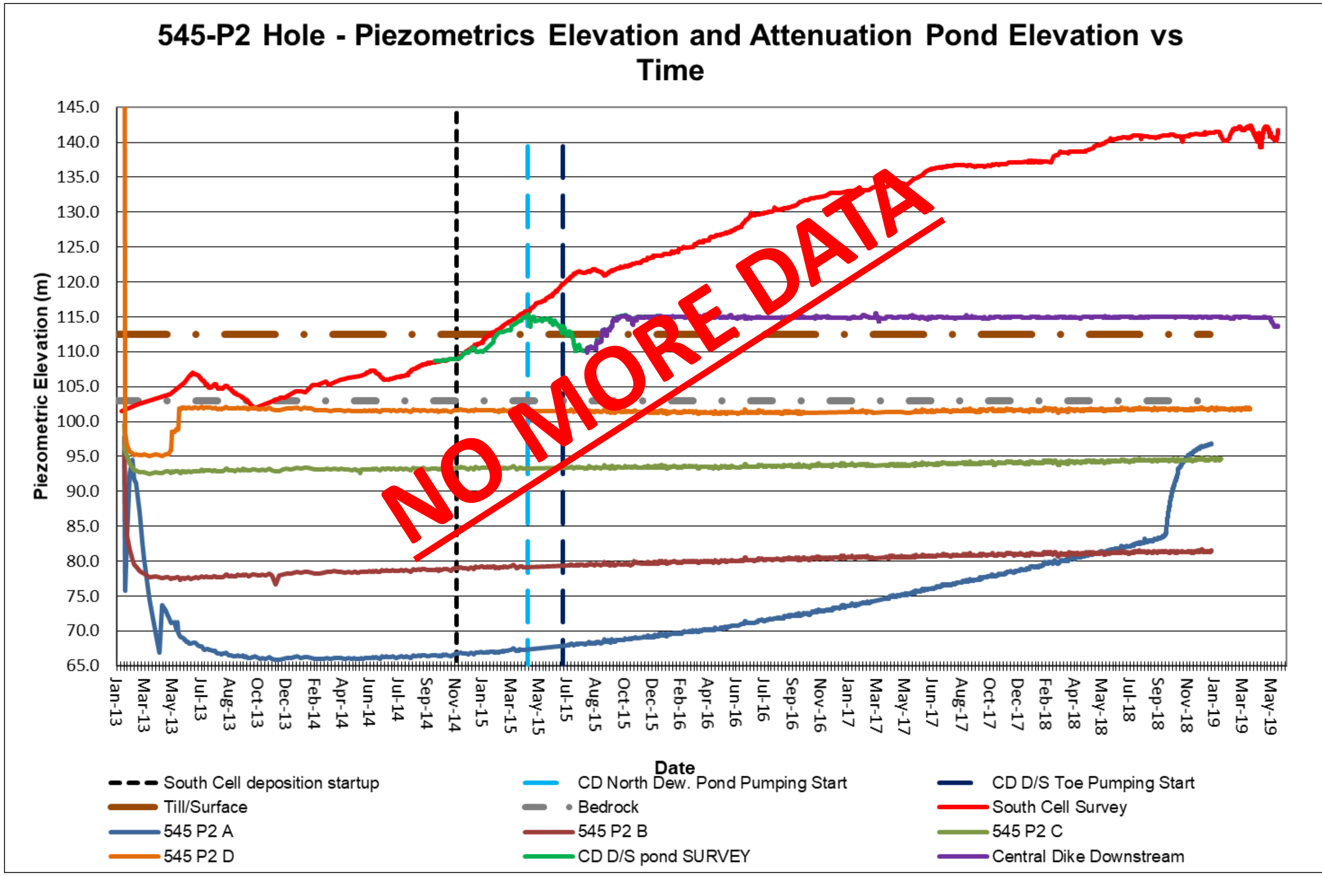
Thermistor 545-P1

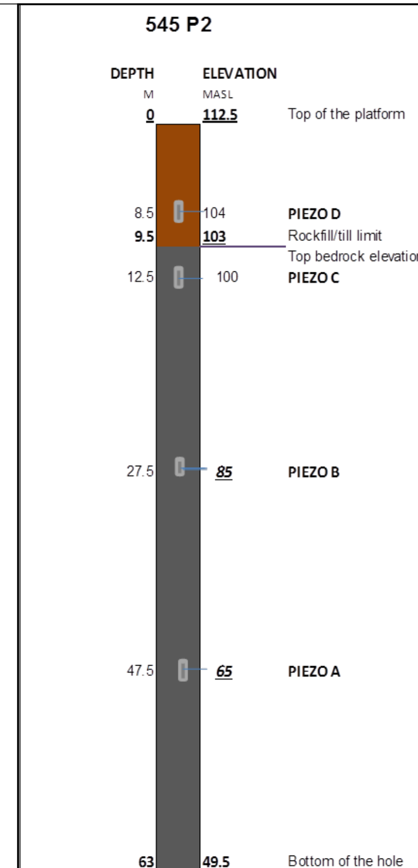


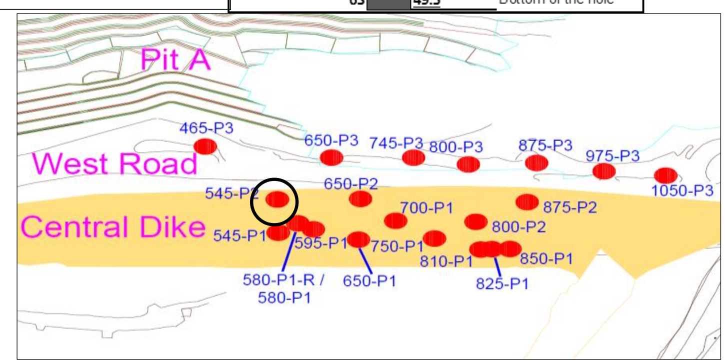




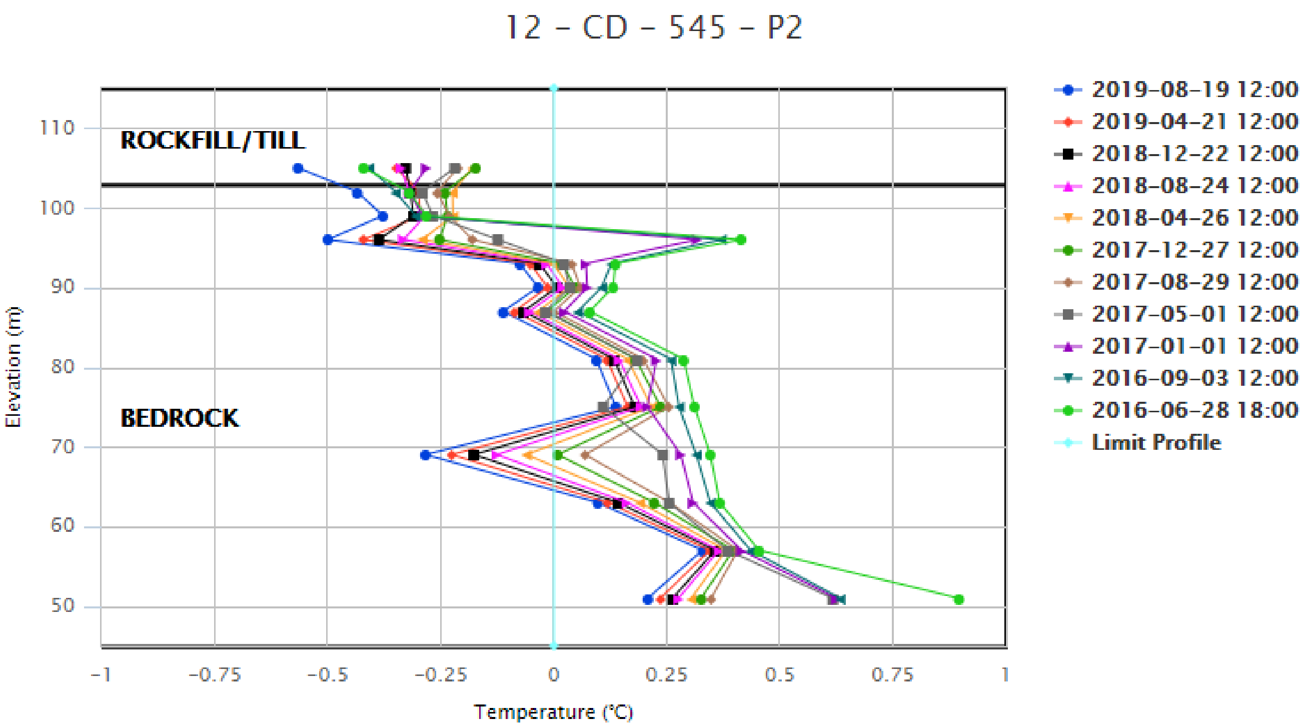
Piezometer 545-P2

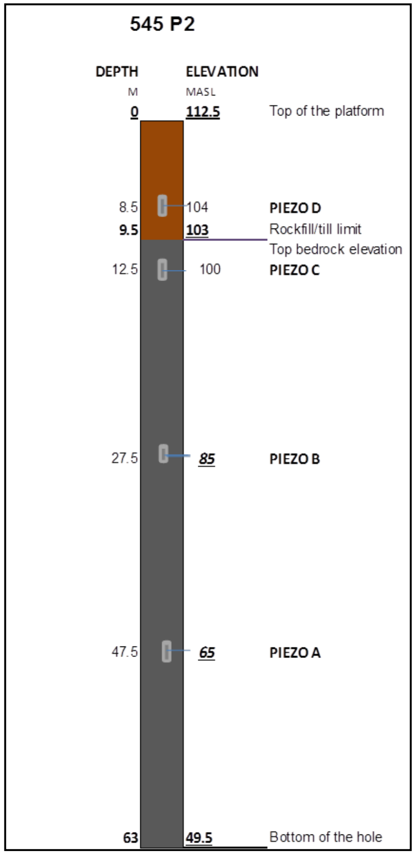


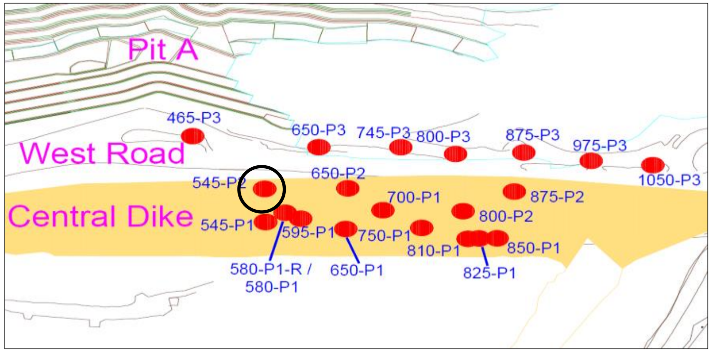




Thermistor 545-P2

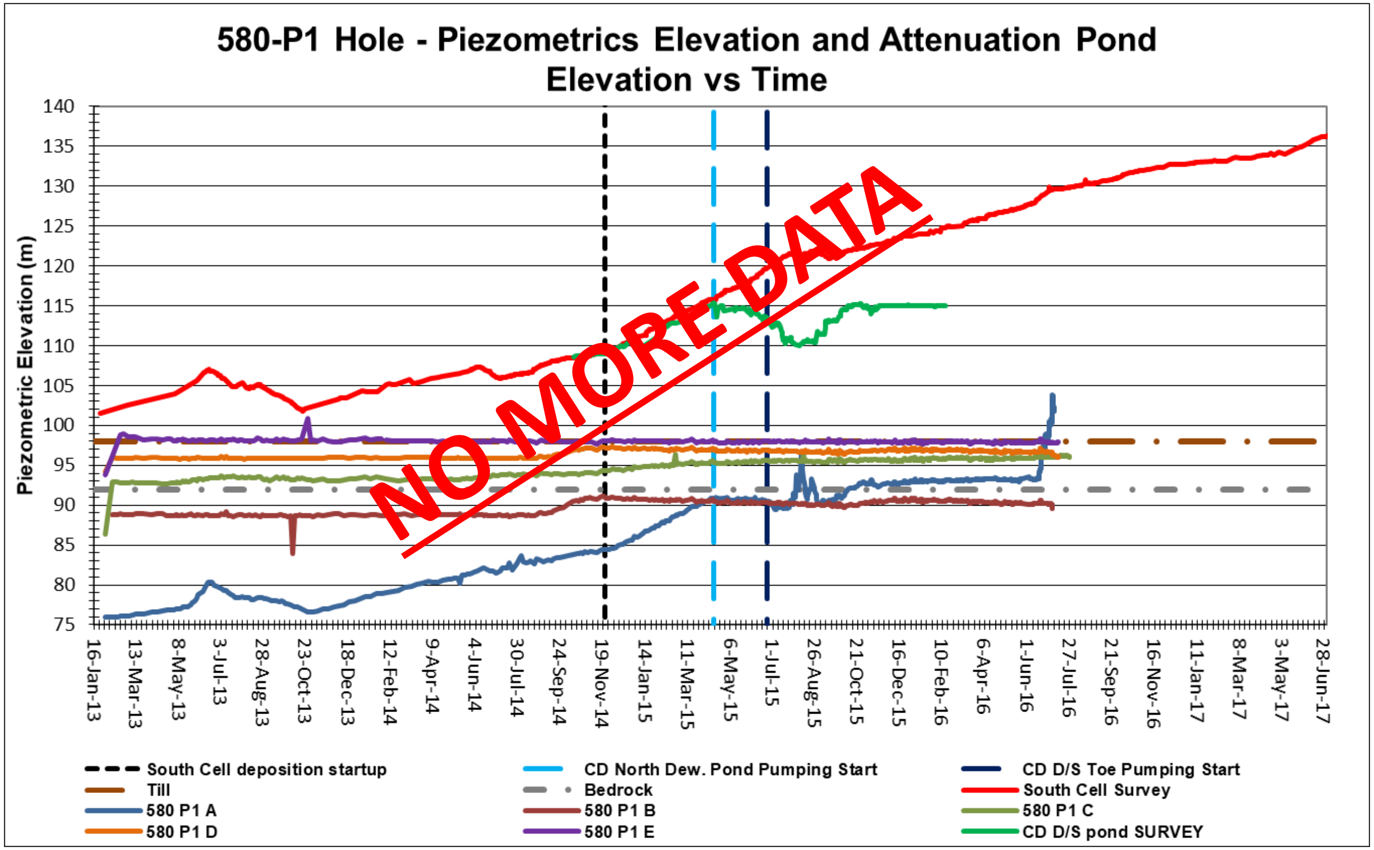


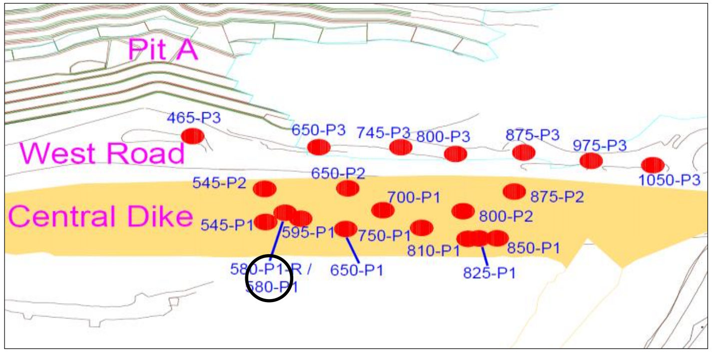




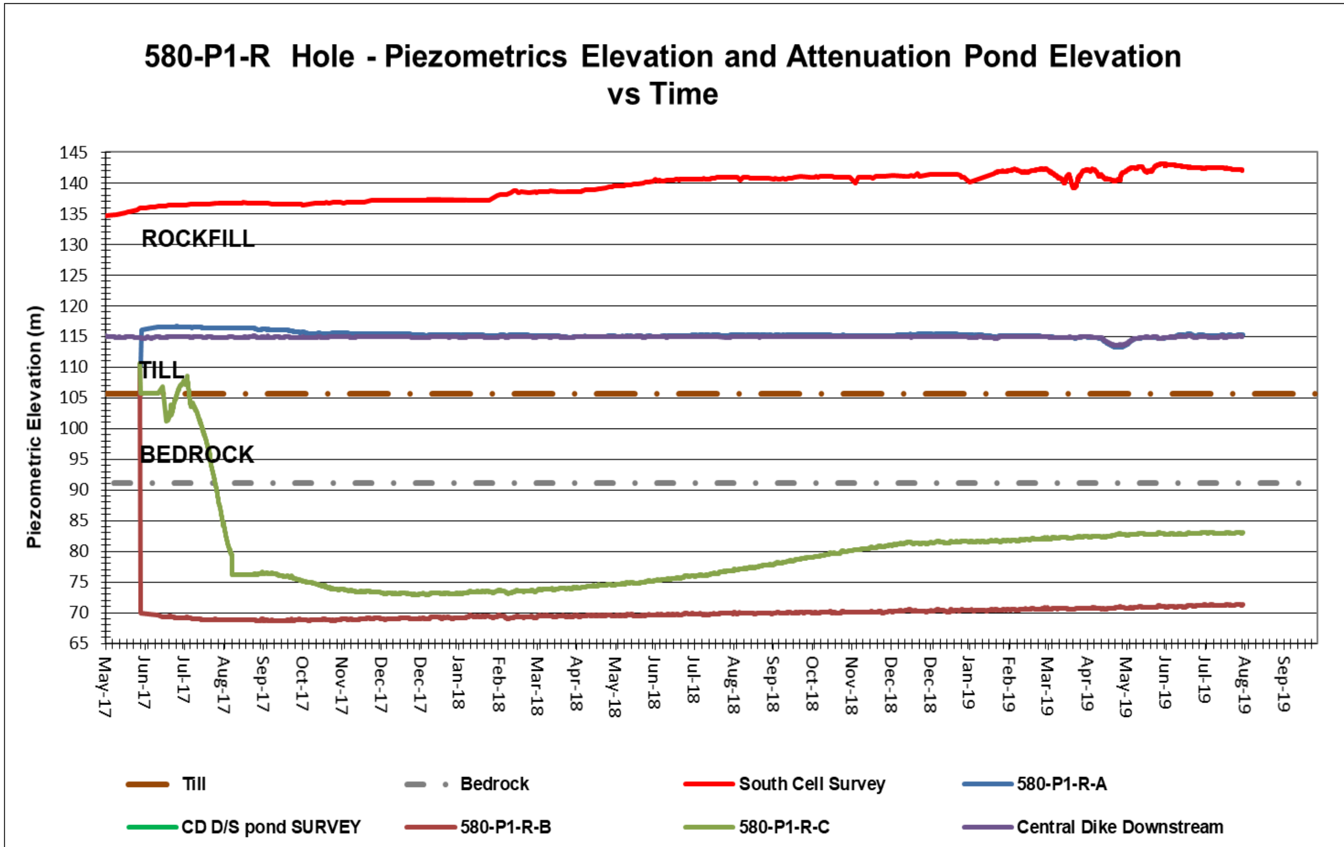
Central Dike

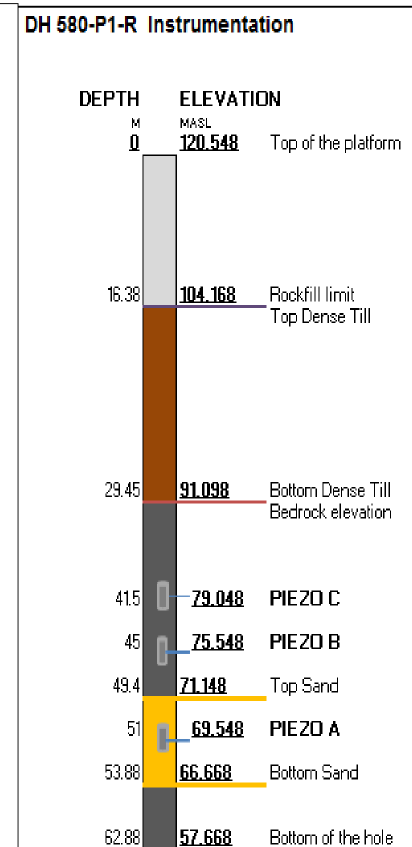
Thermistor 580-P1

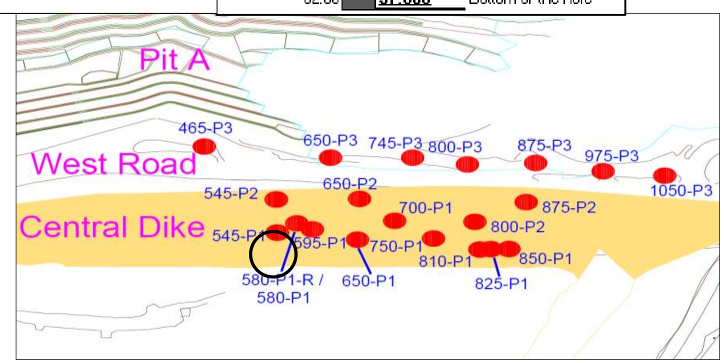




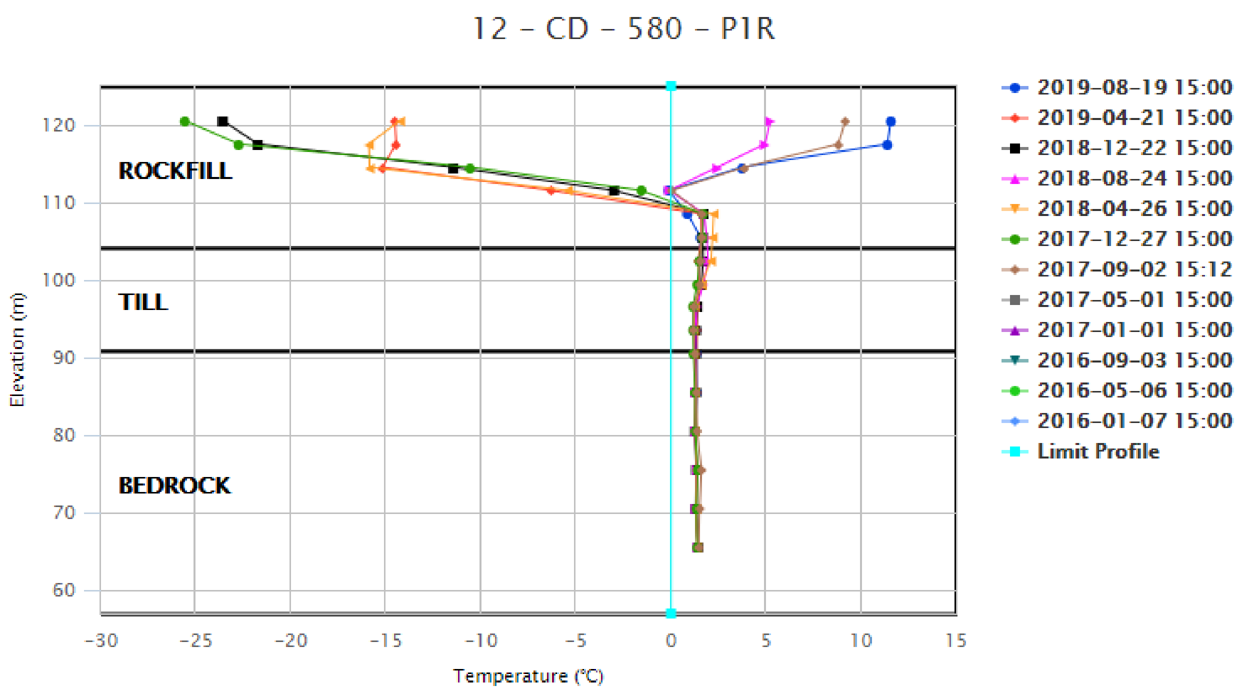
Piezometer 580-P1-R

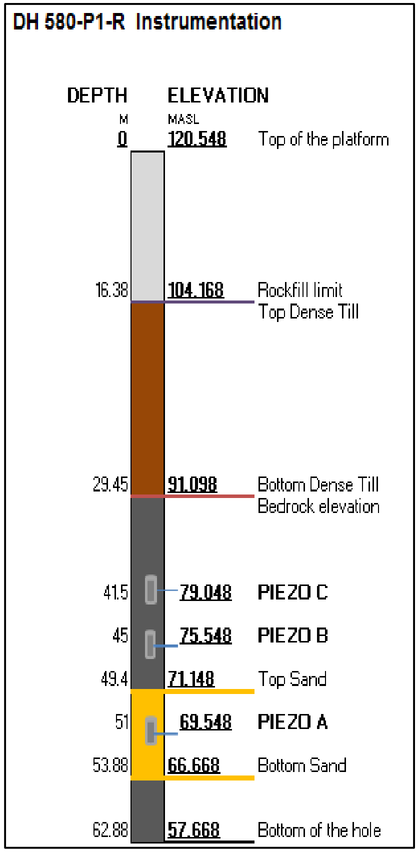


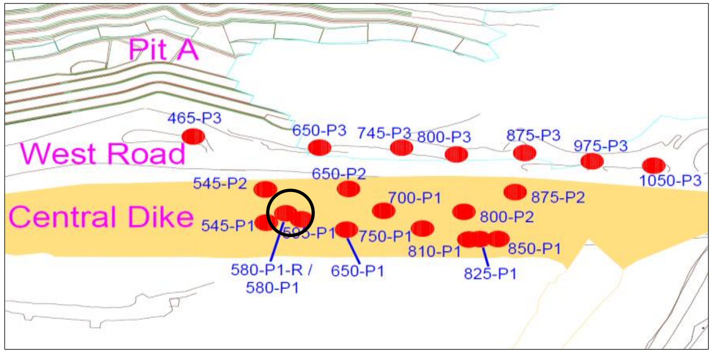




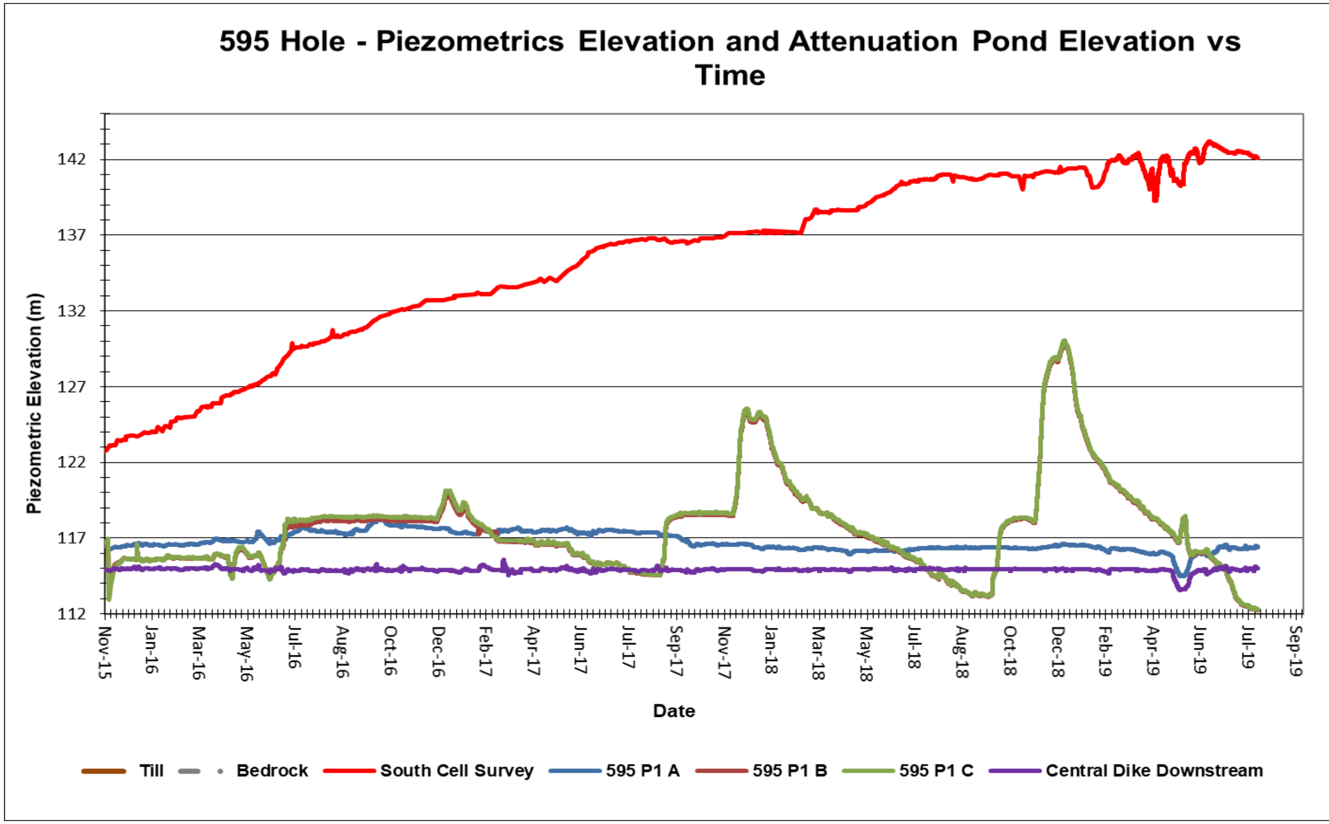
Thermistor 580-P1-R

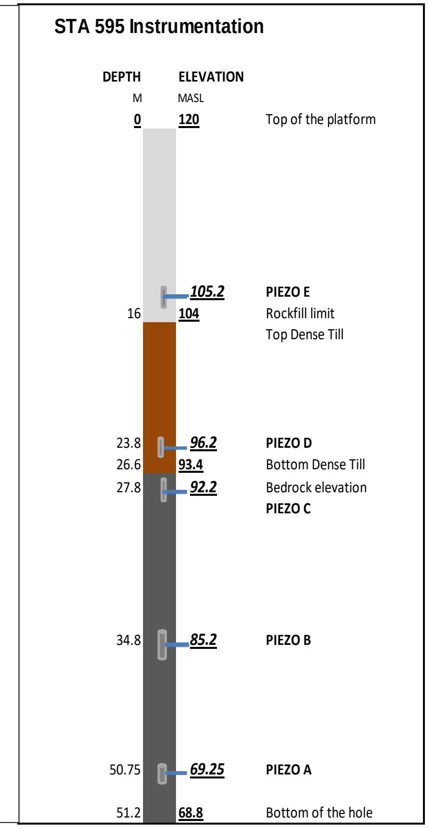


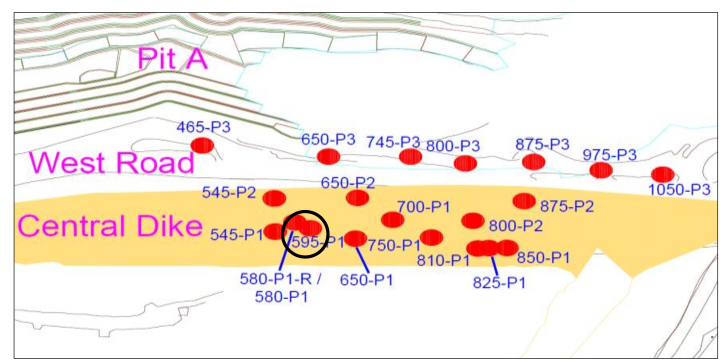




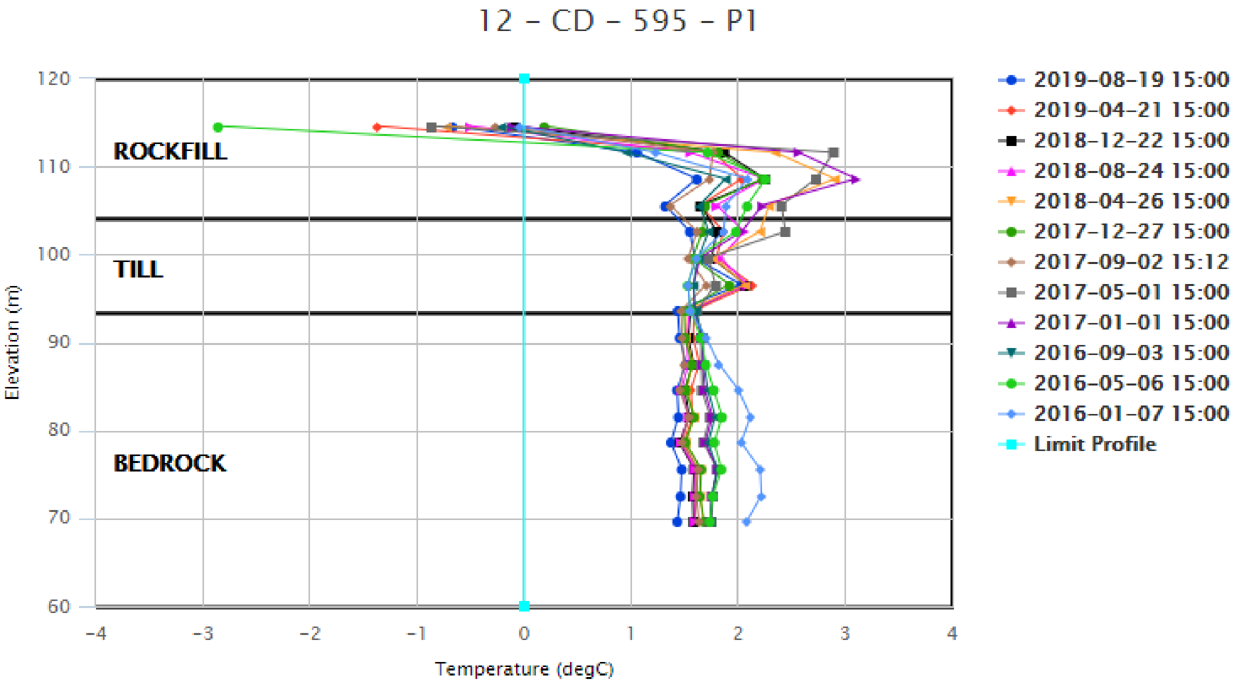
Piezometer 595-P1

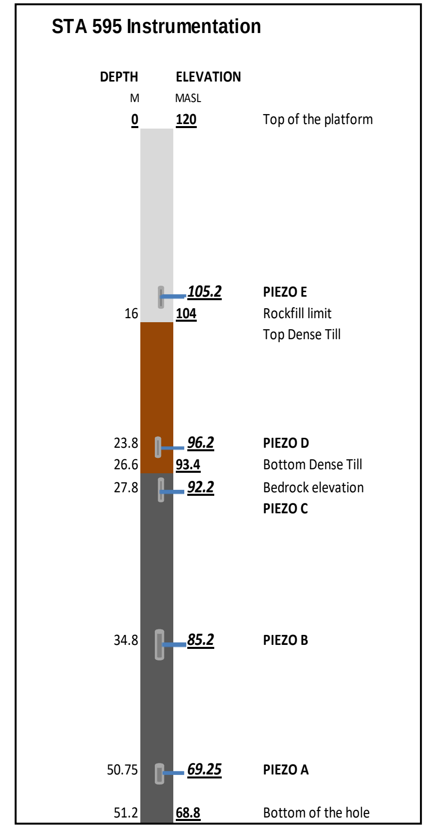


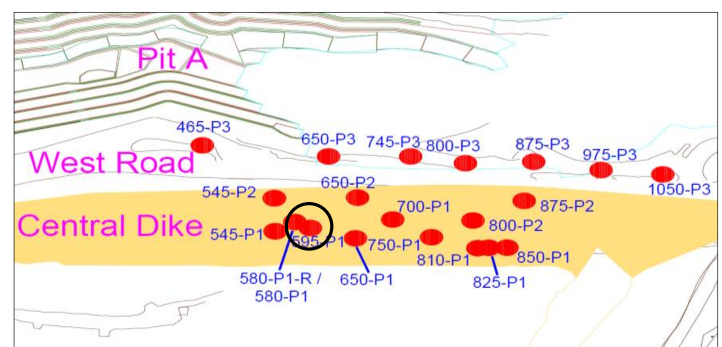




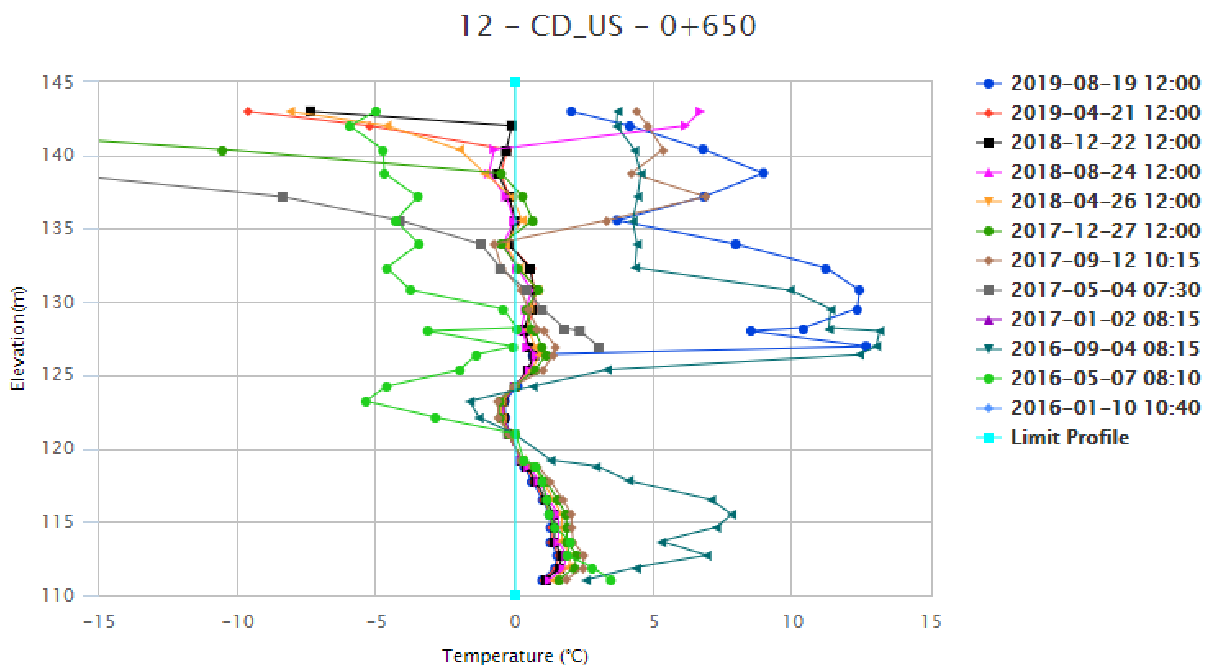
Thermistor 595-P1

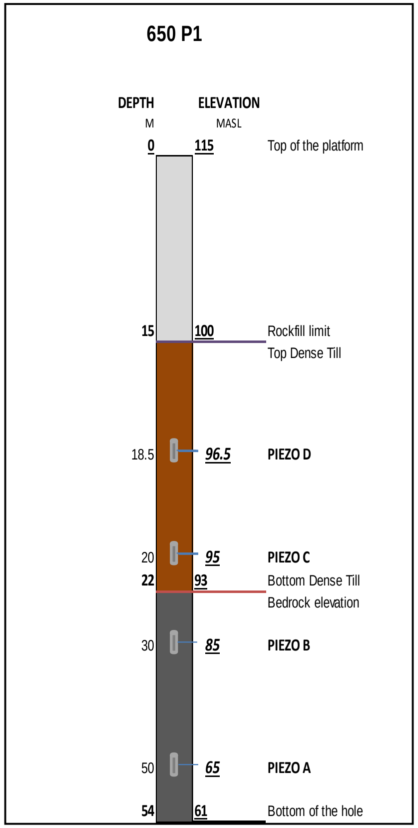


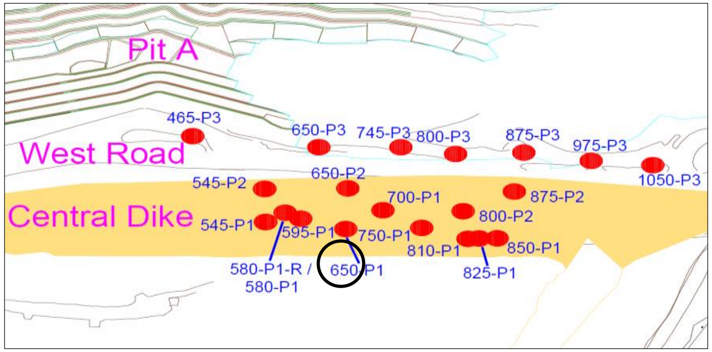




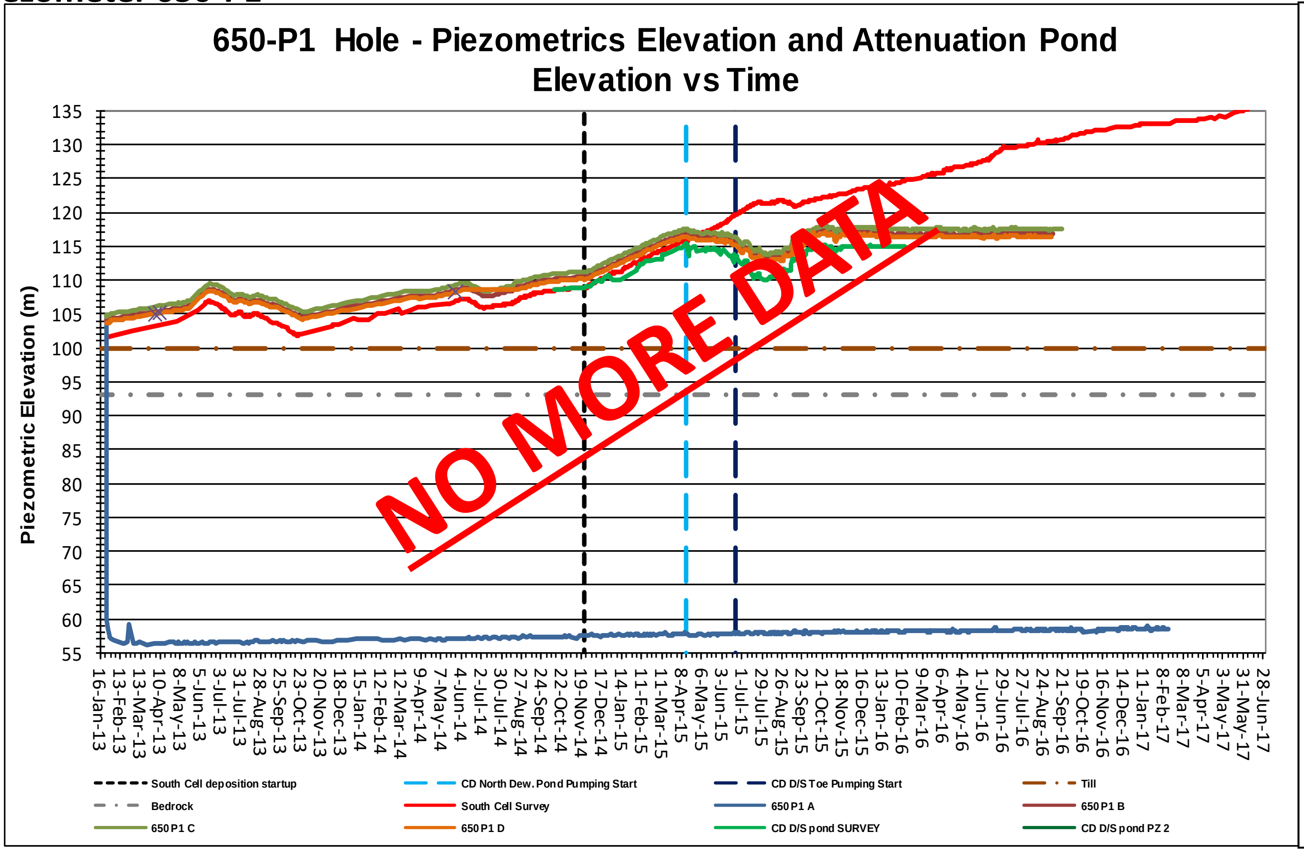
Thermistor CD_US-0+650

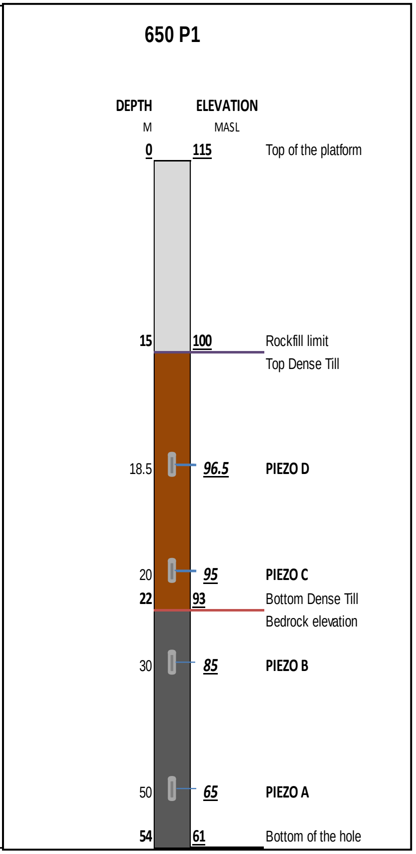


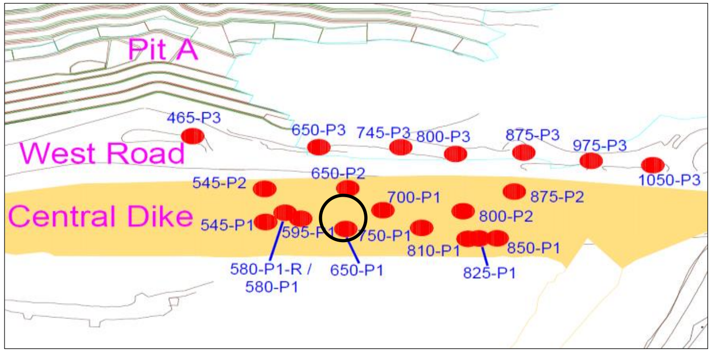




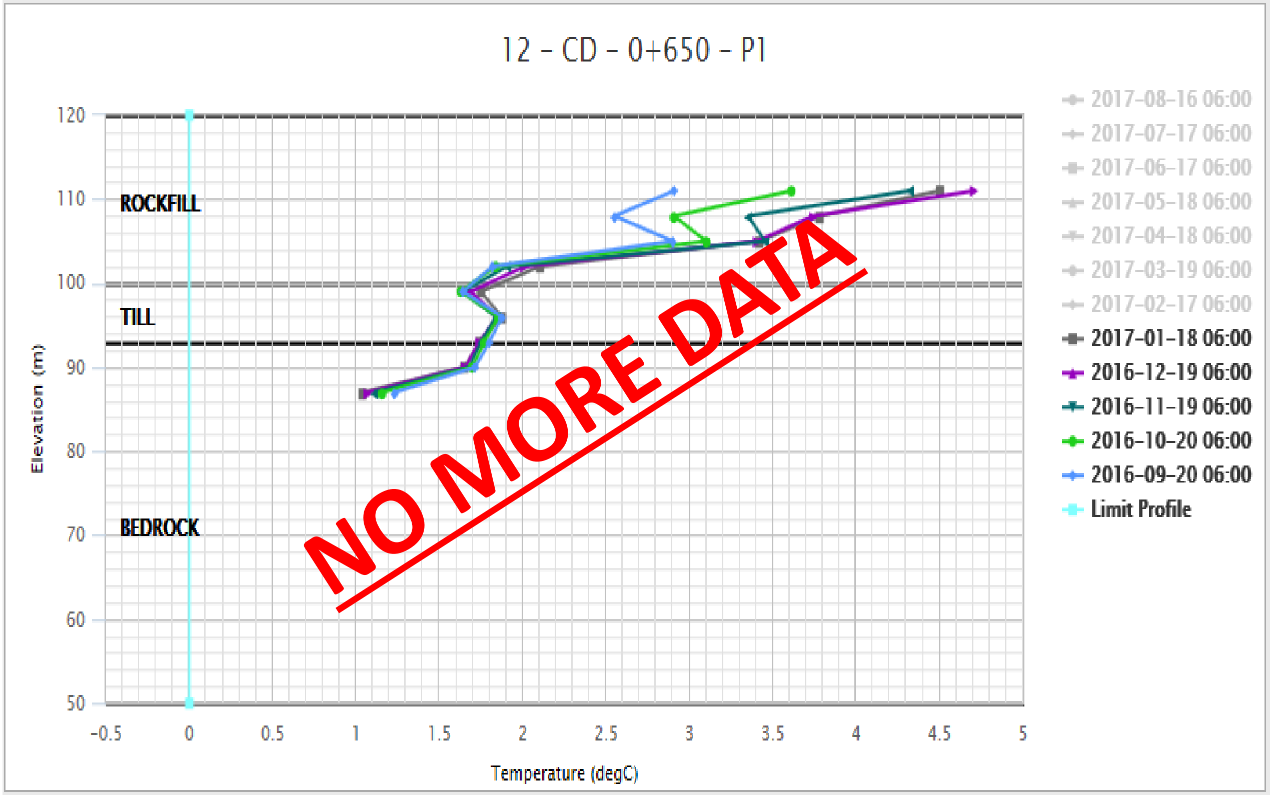
Piezometer 650-P1

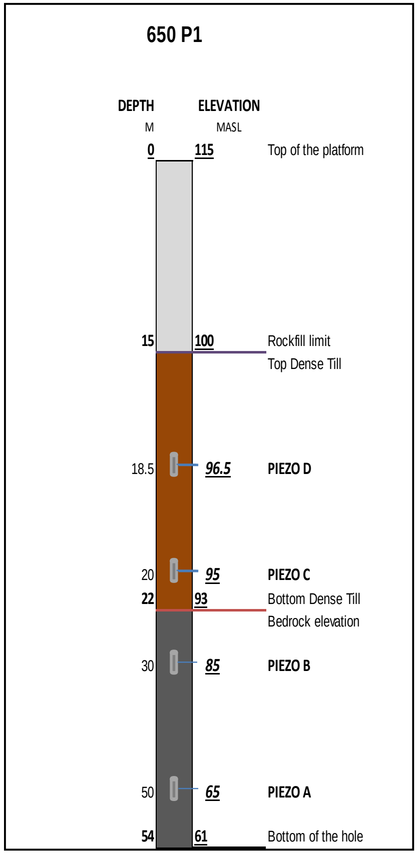


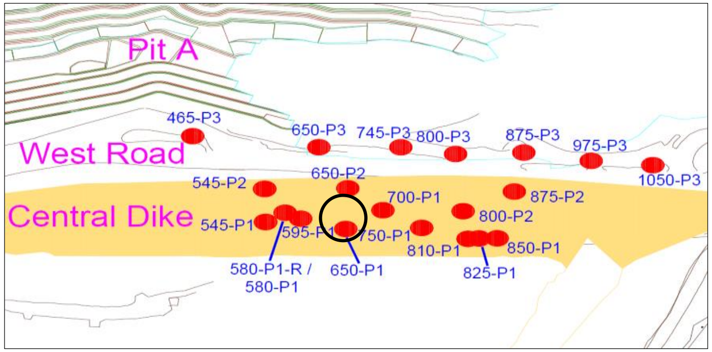




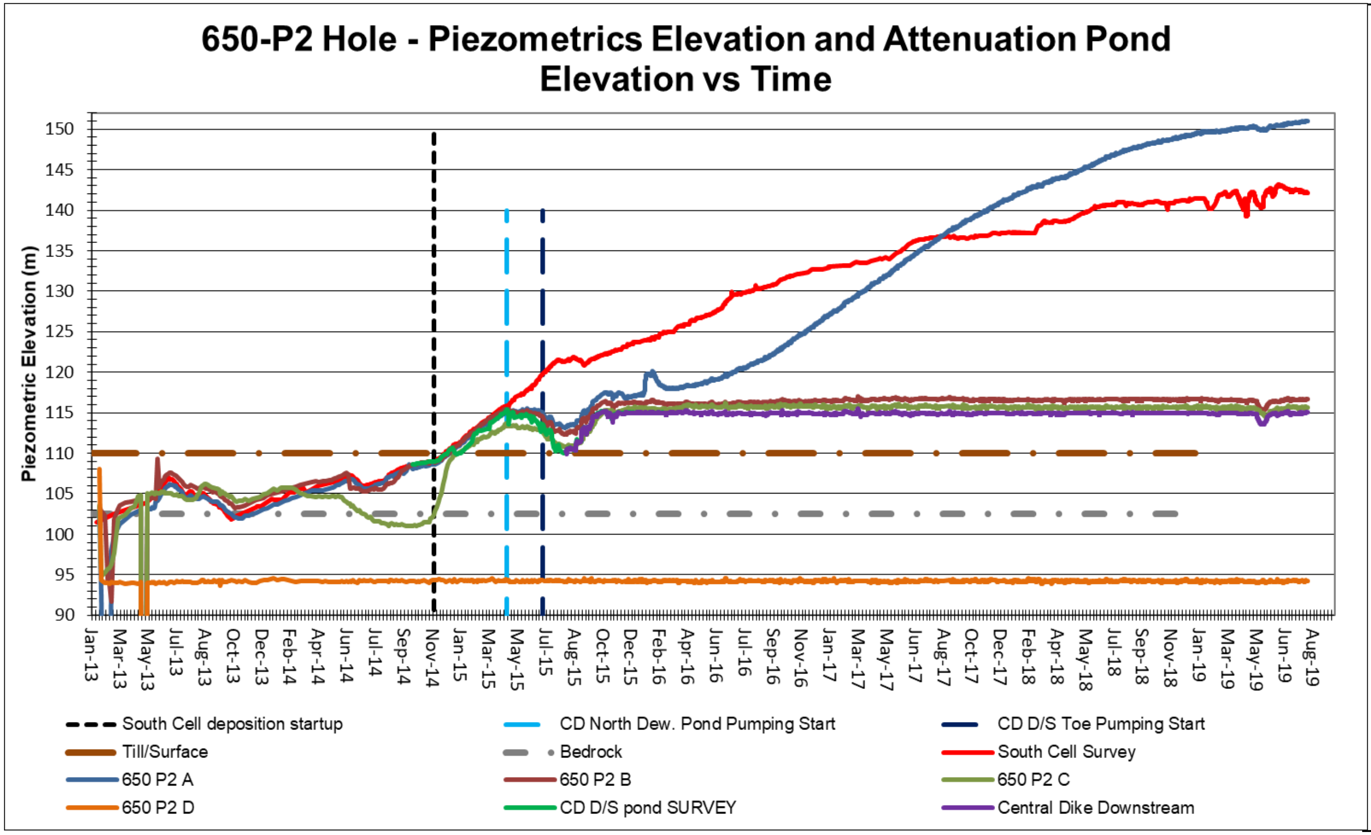
Thermistor 650-P1

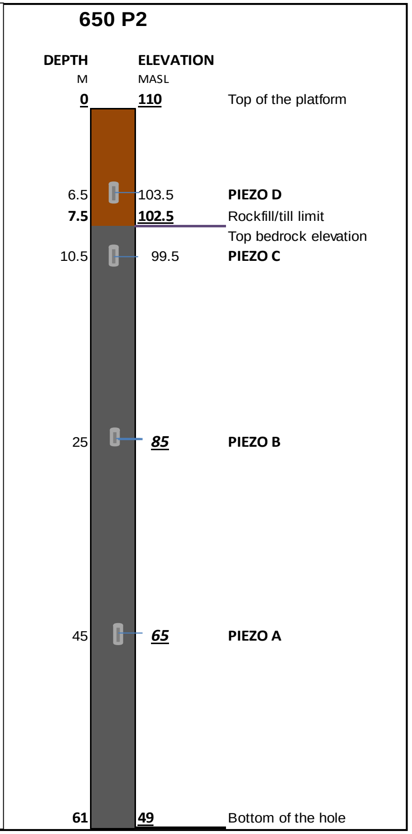


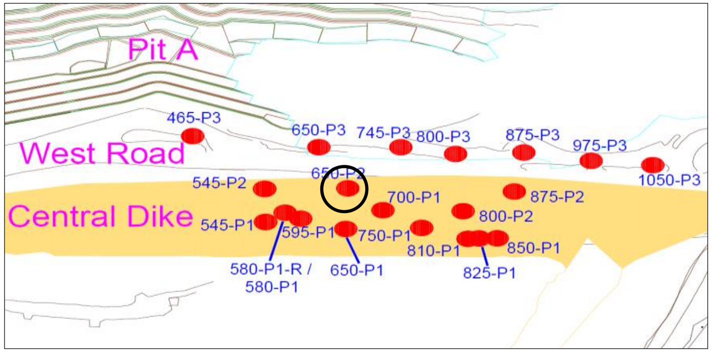




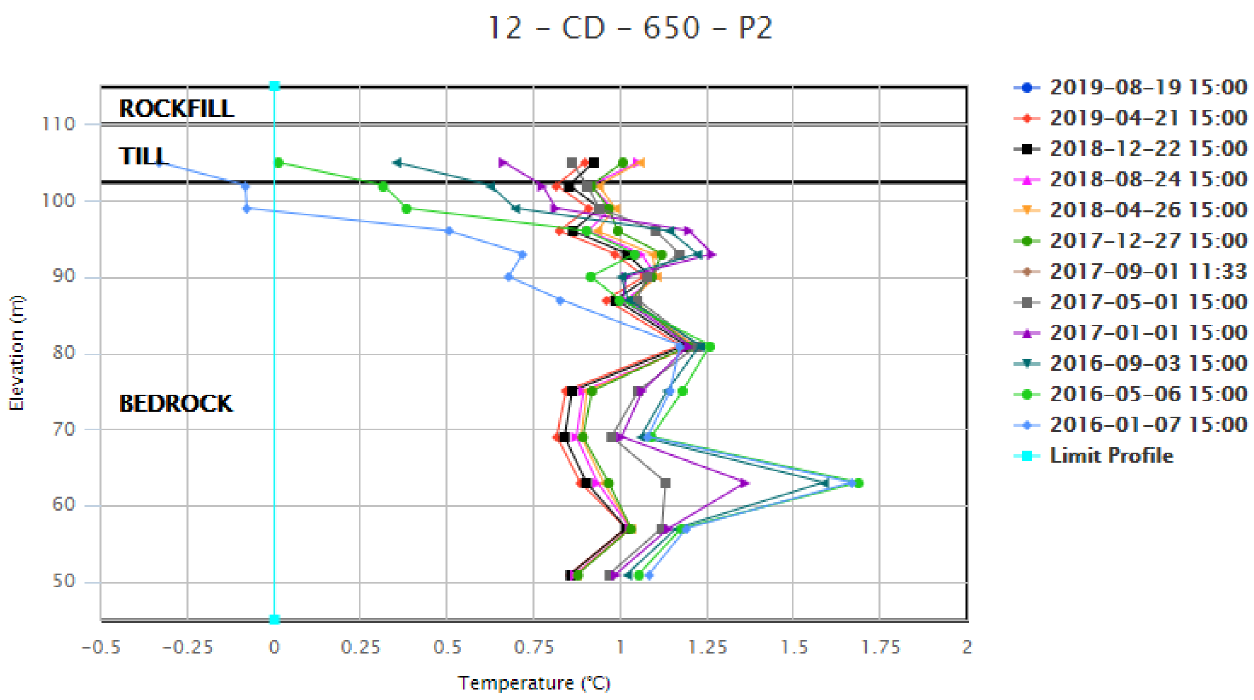
Piezometer 650-P2

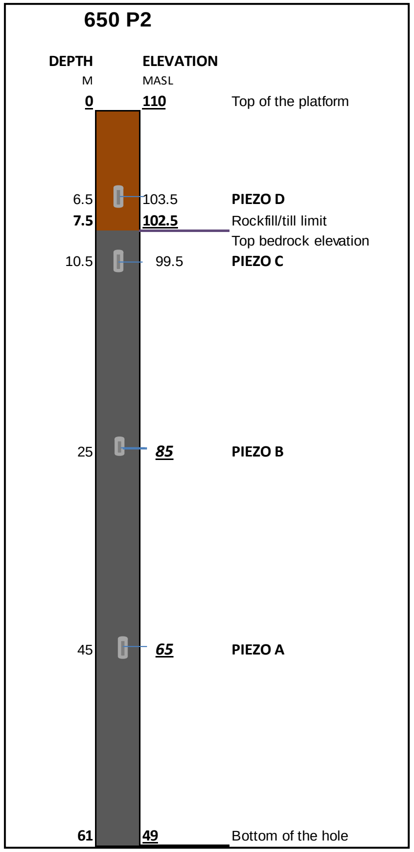


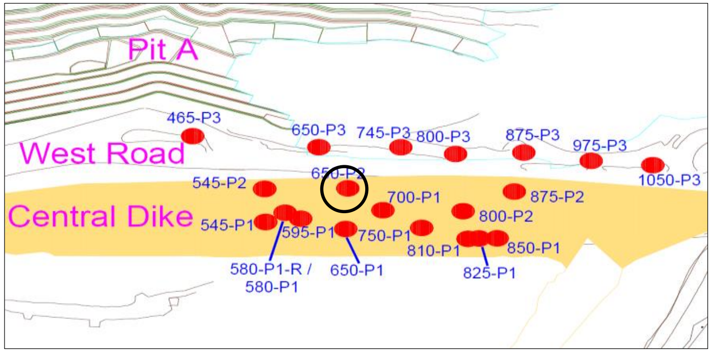




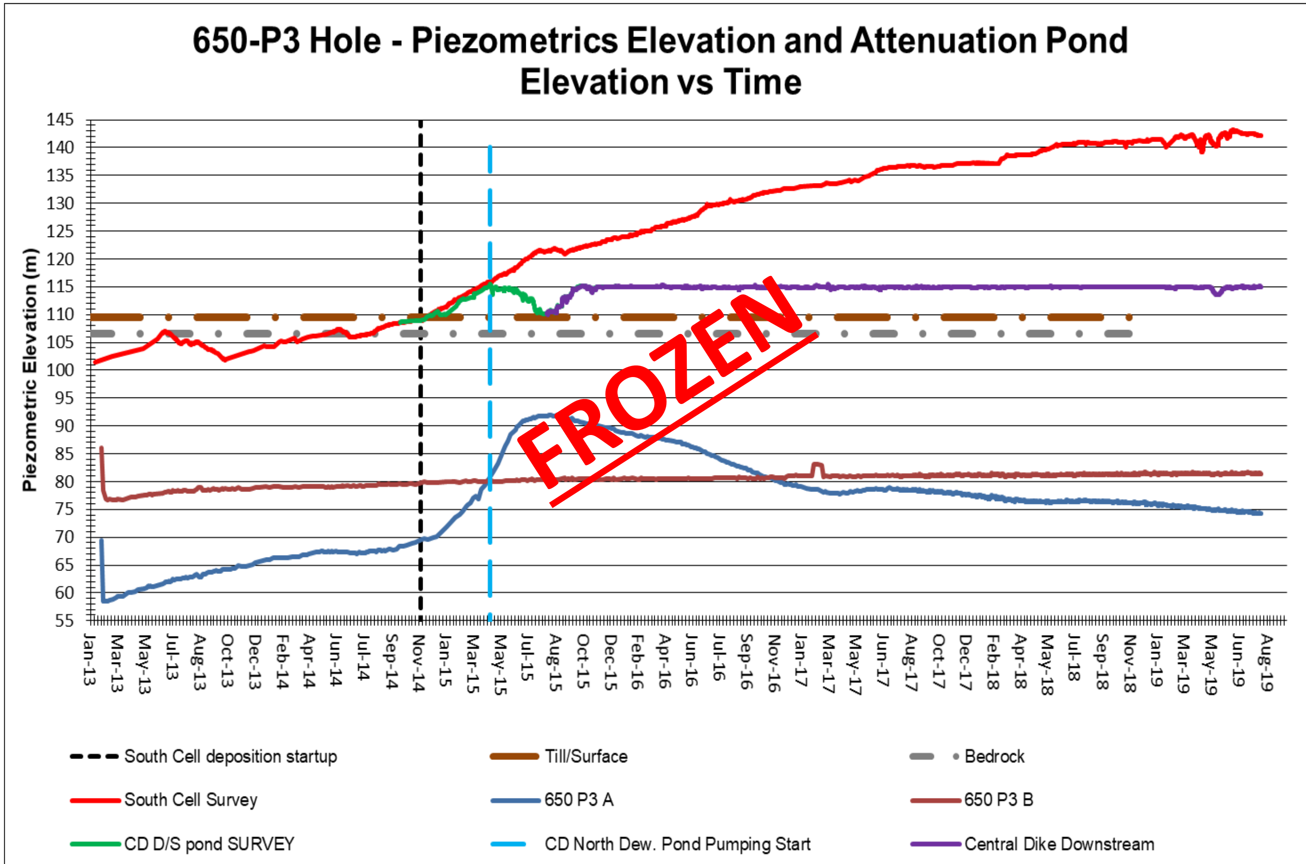
Thermistor 650-P2

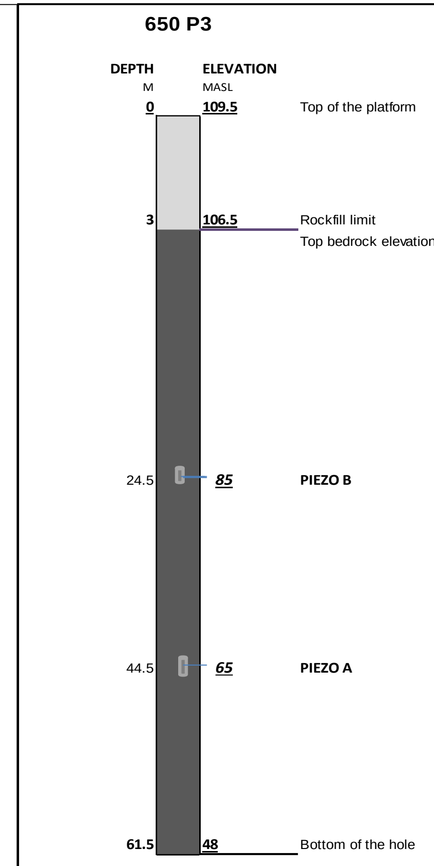


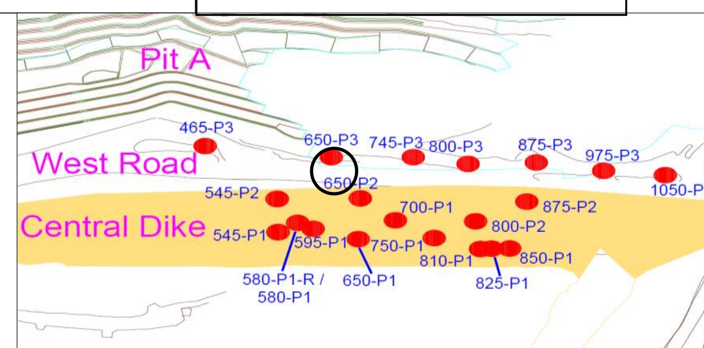




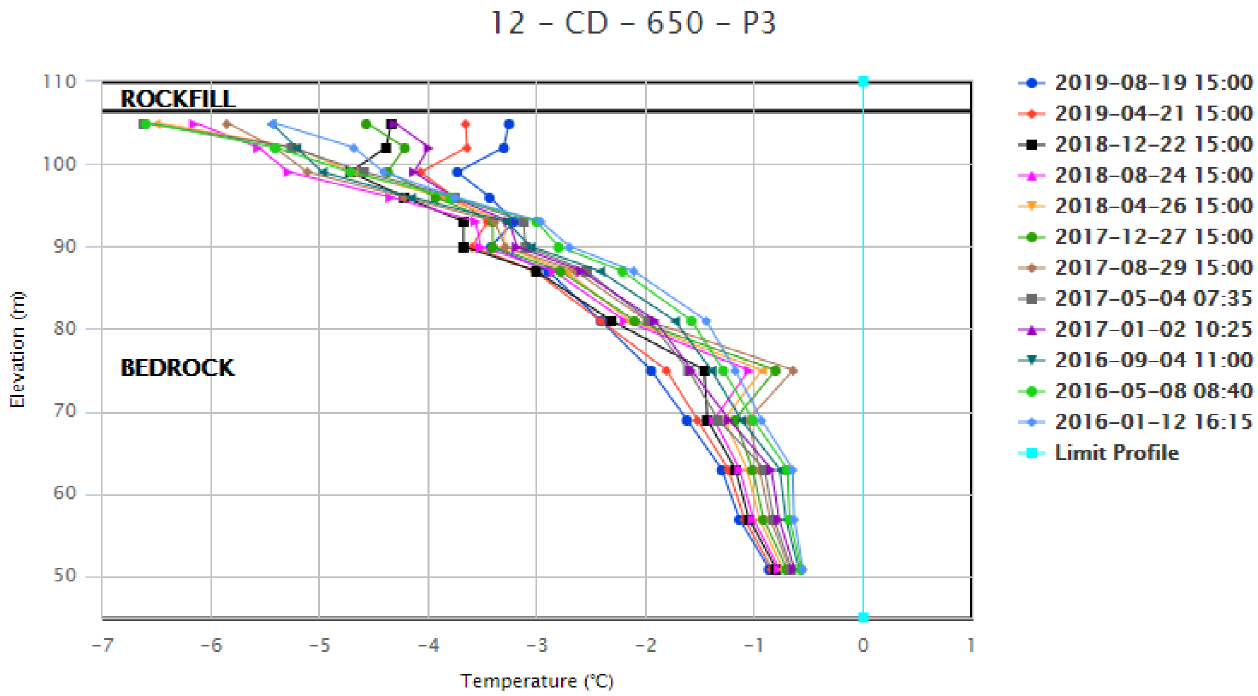
Piezometer 650-P3

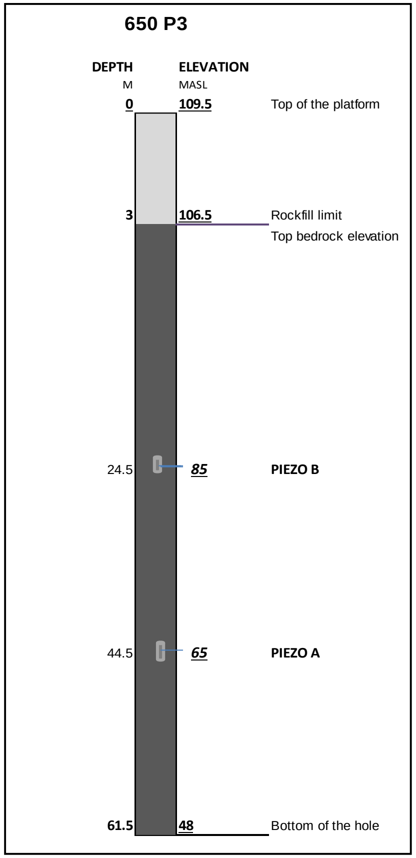


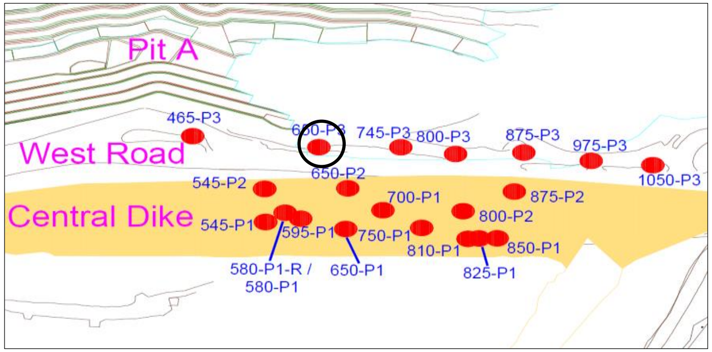




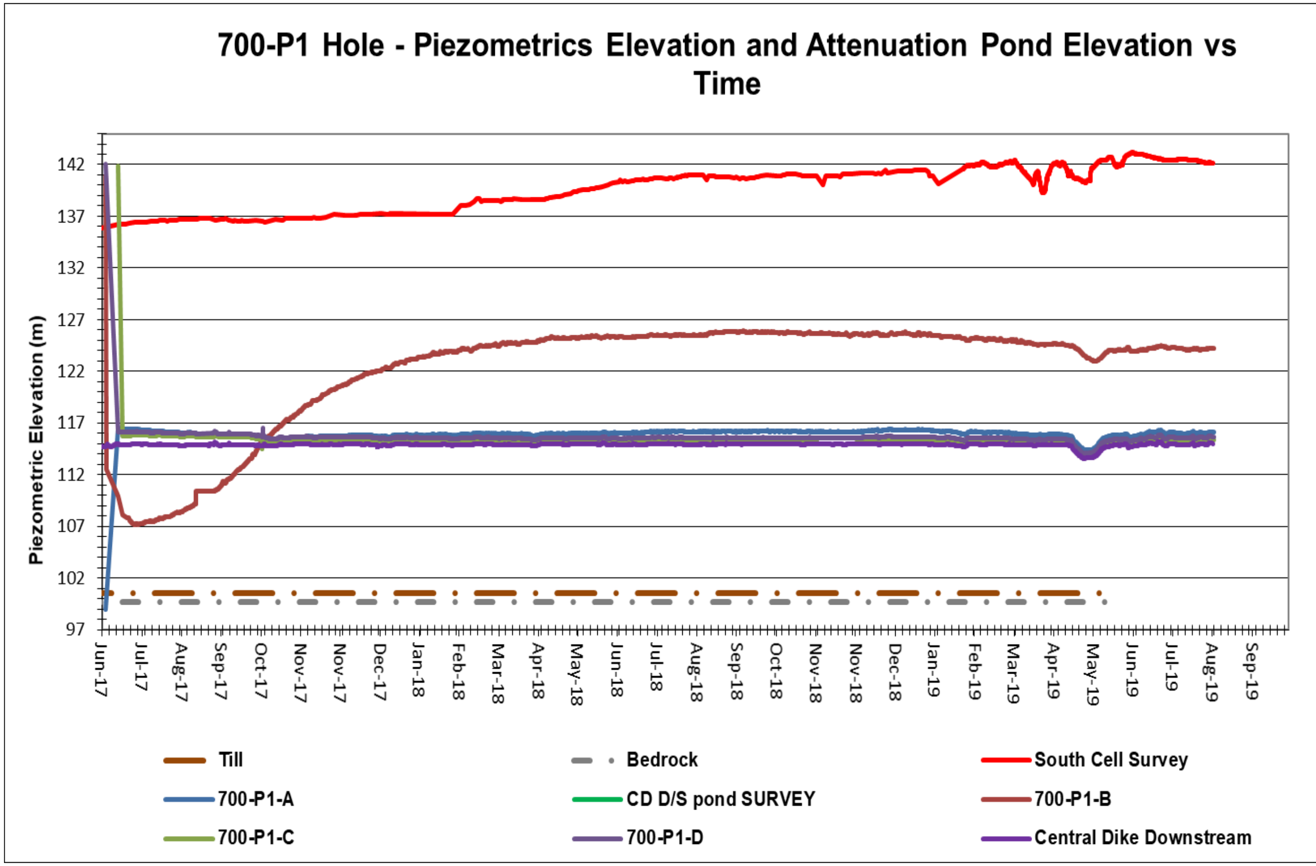
Thermistor 650-P3

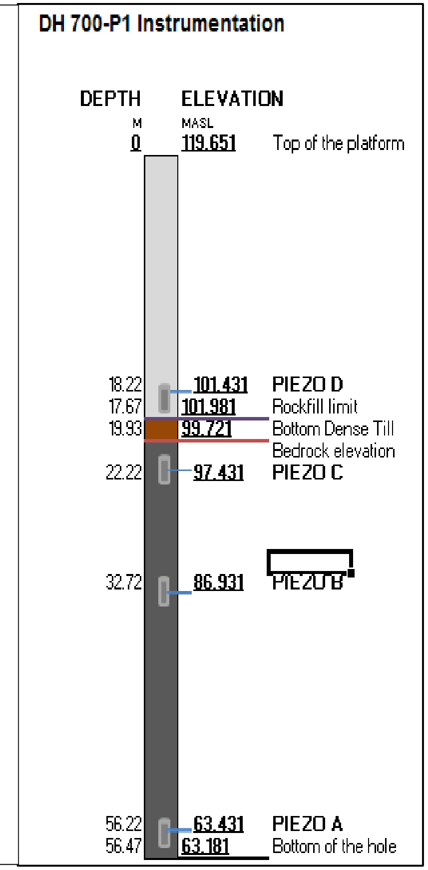


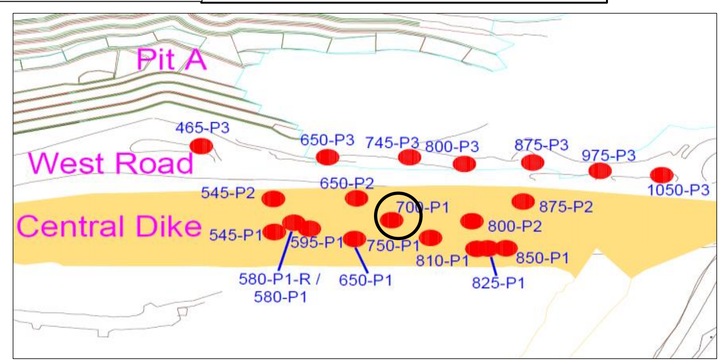




Piezometer 700-P1







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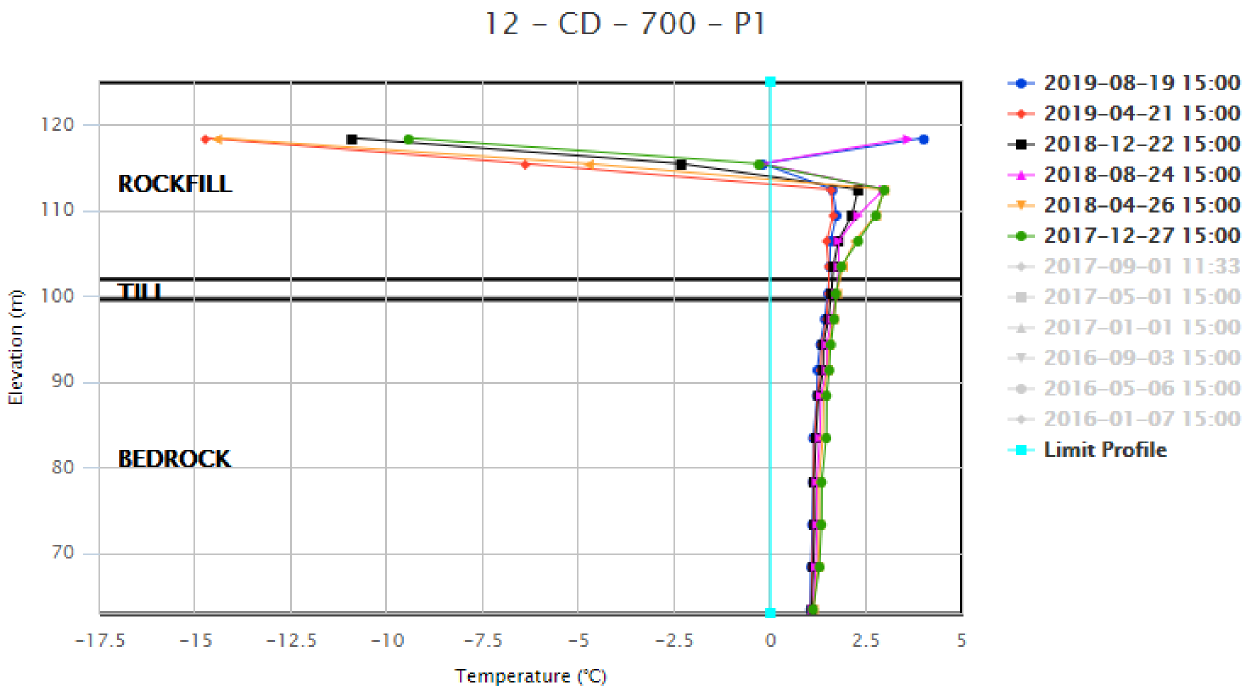
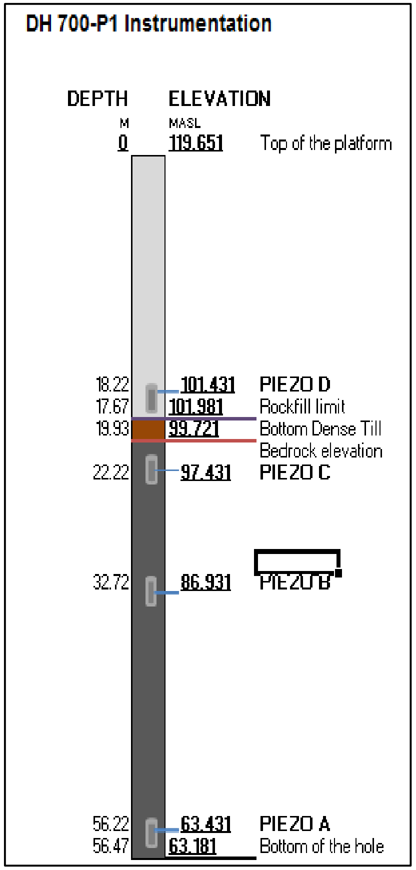
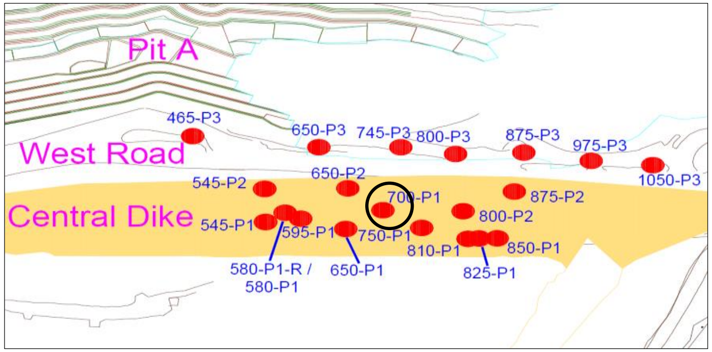
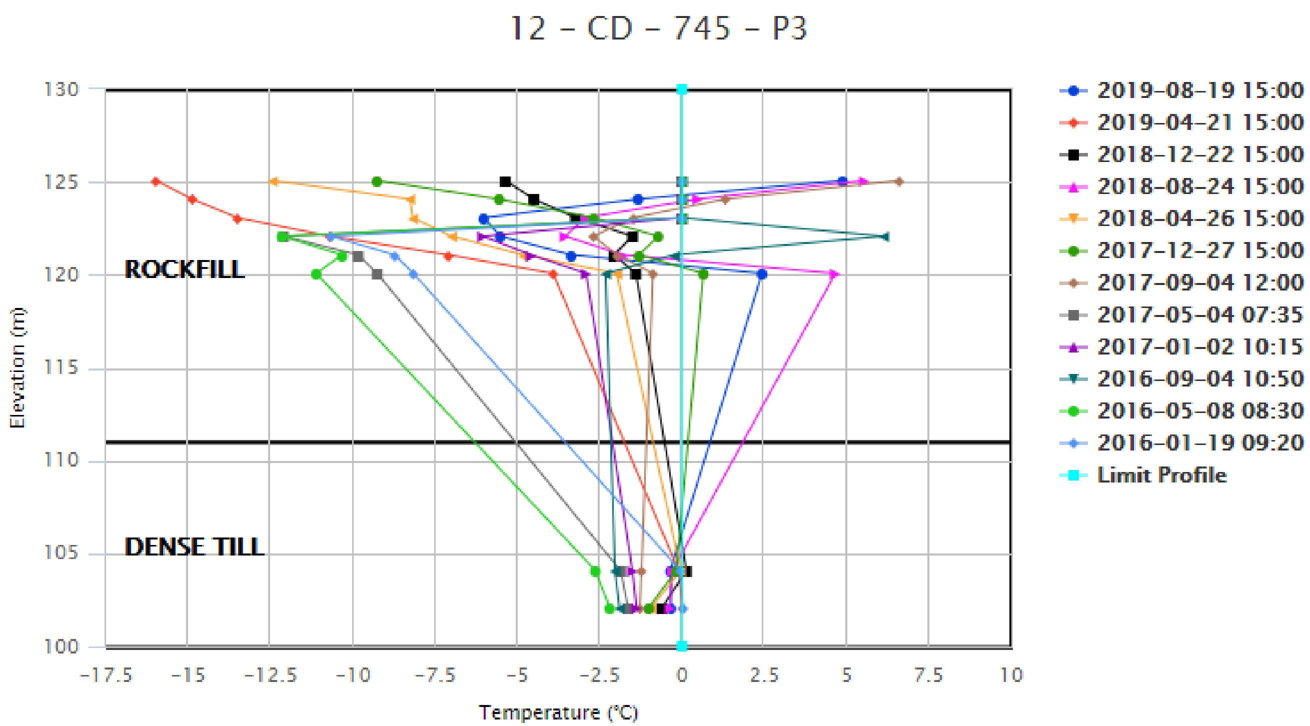
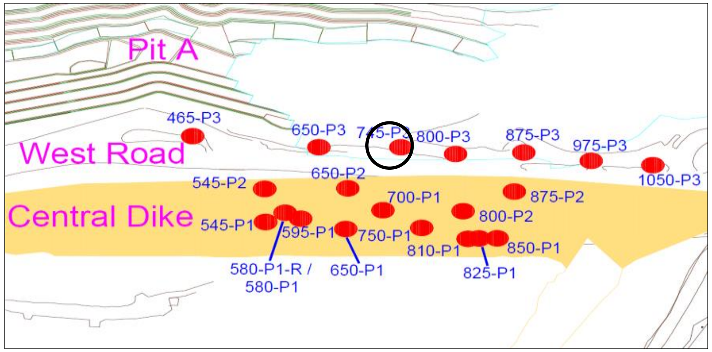






Thermistor 745-P3 (WR-P3)





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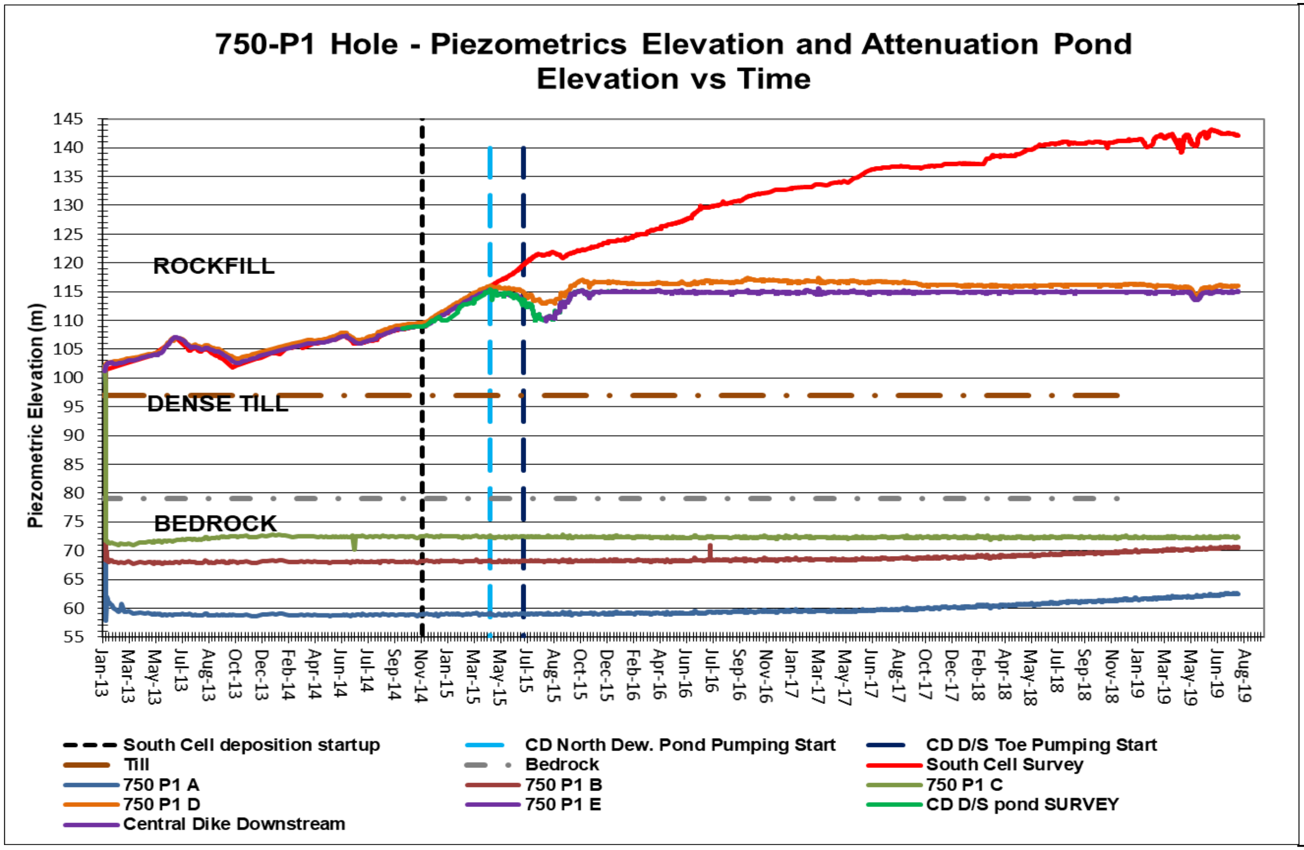

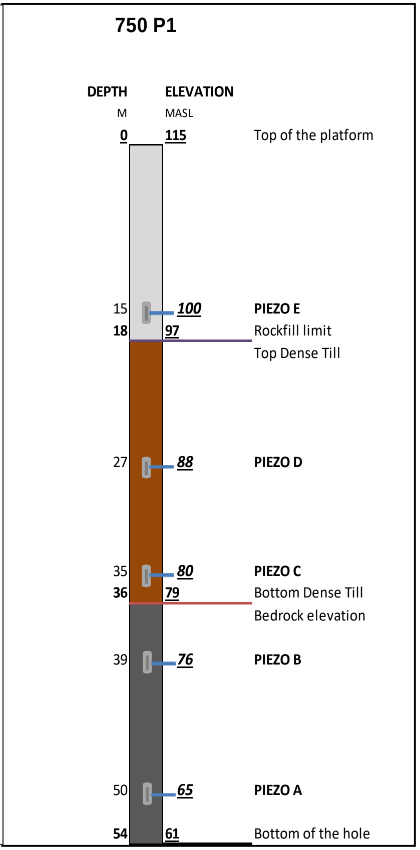

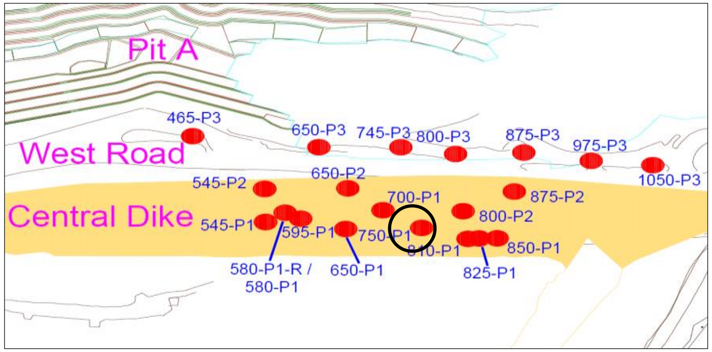

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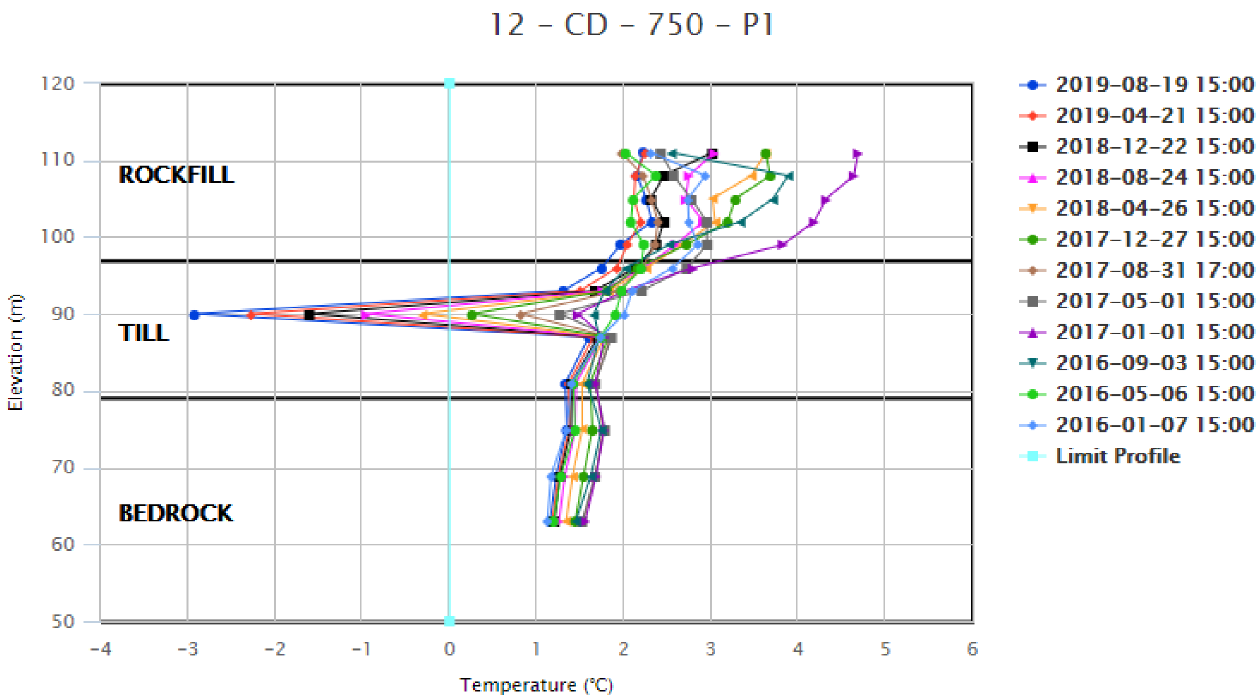
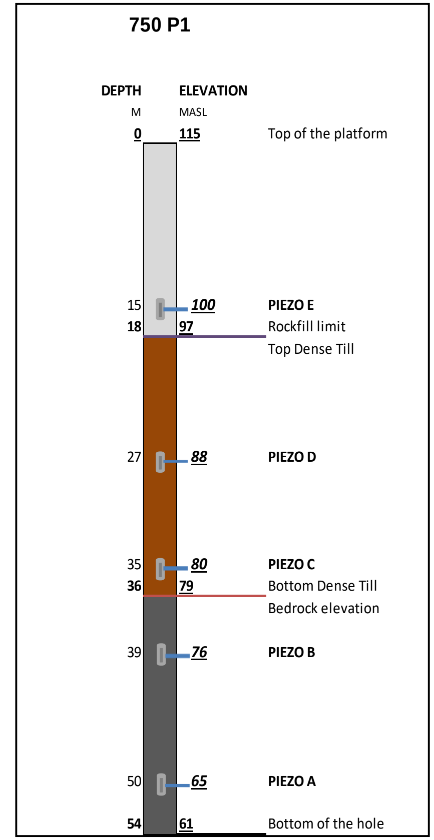
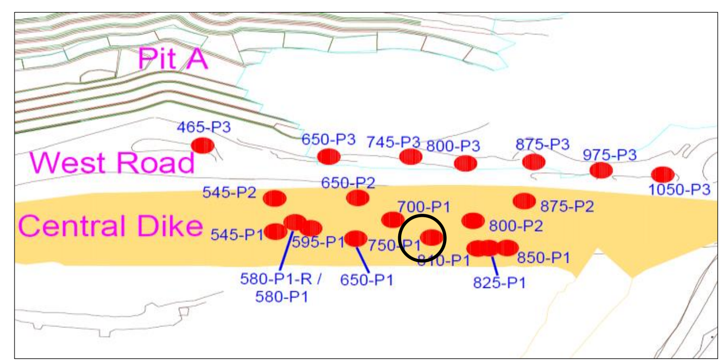
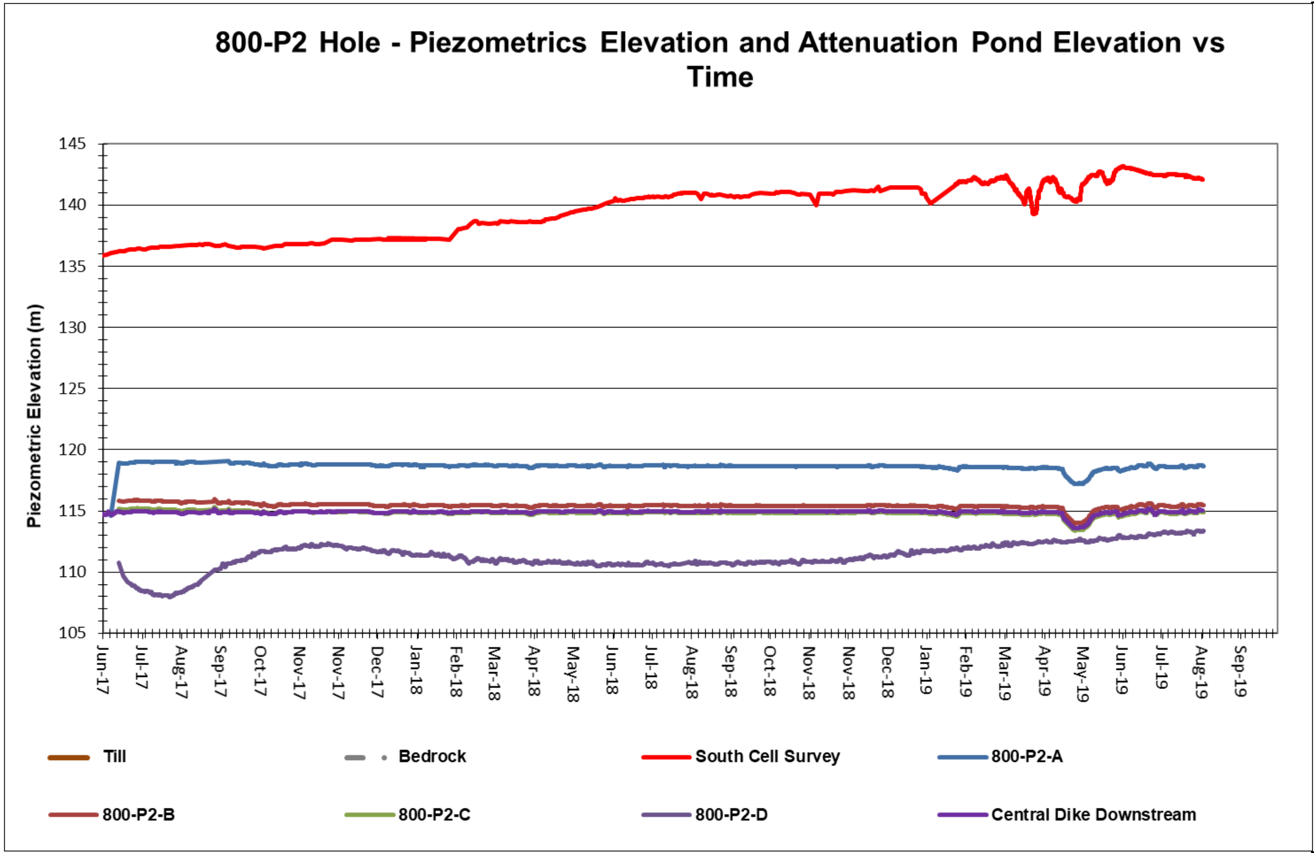


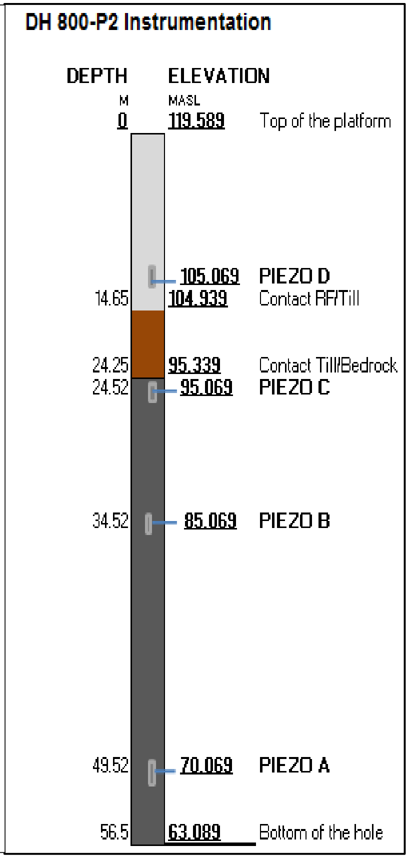


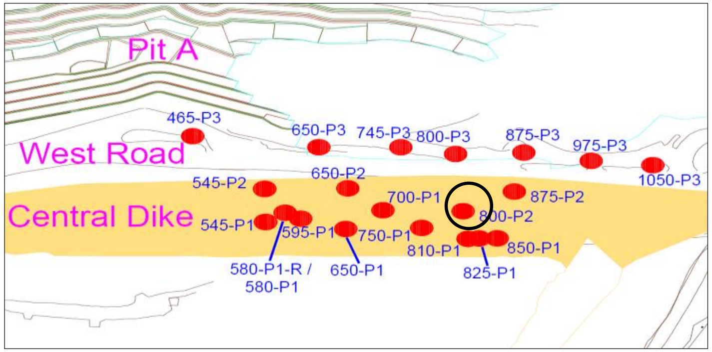
Comments: Bead #8 at elevation 90MASL is below the freezing point. Temperature tends to decrease from top to bottom at elevation 63 MASL. The data taken on the field indicates that the reading on that bead is stable despite the apparent capacitance effect.



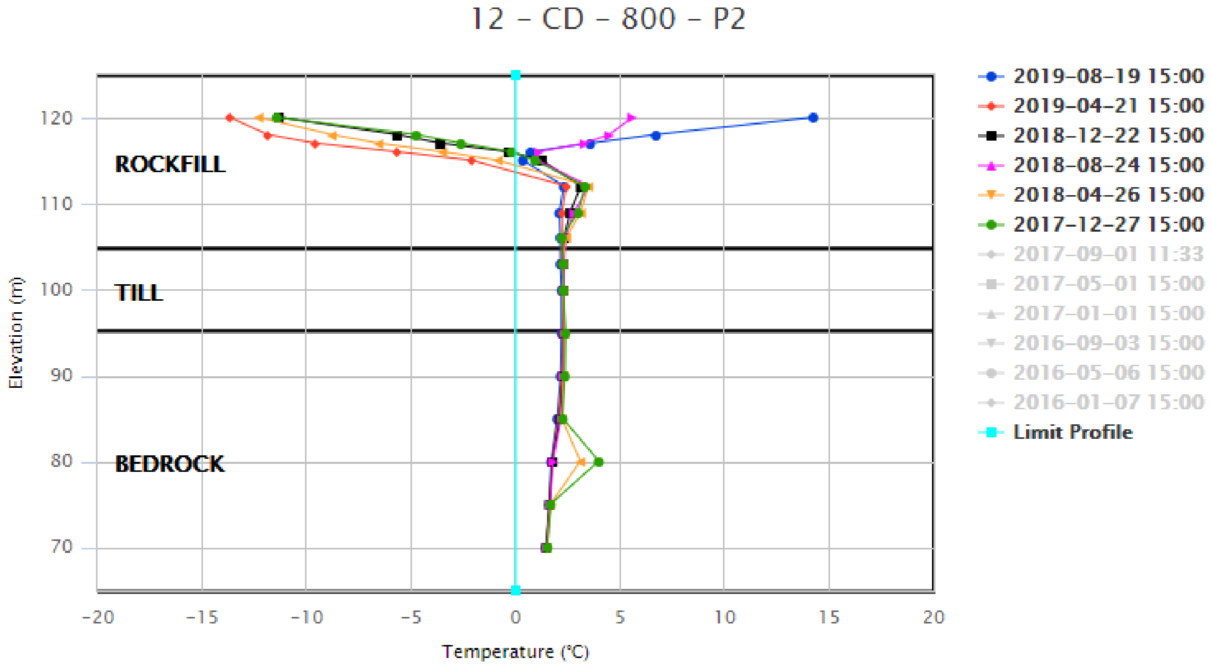
Piezometer 800-P2

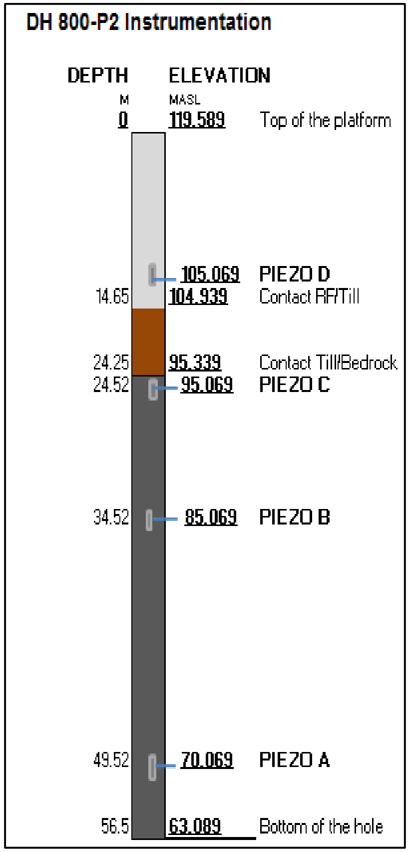


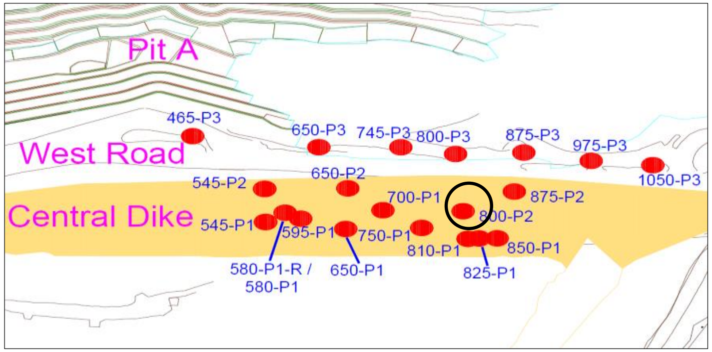




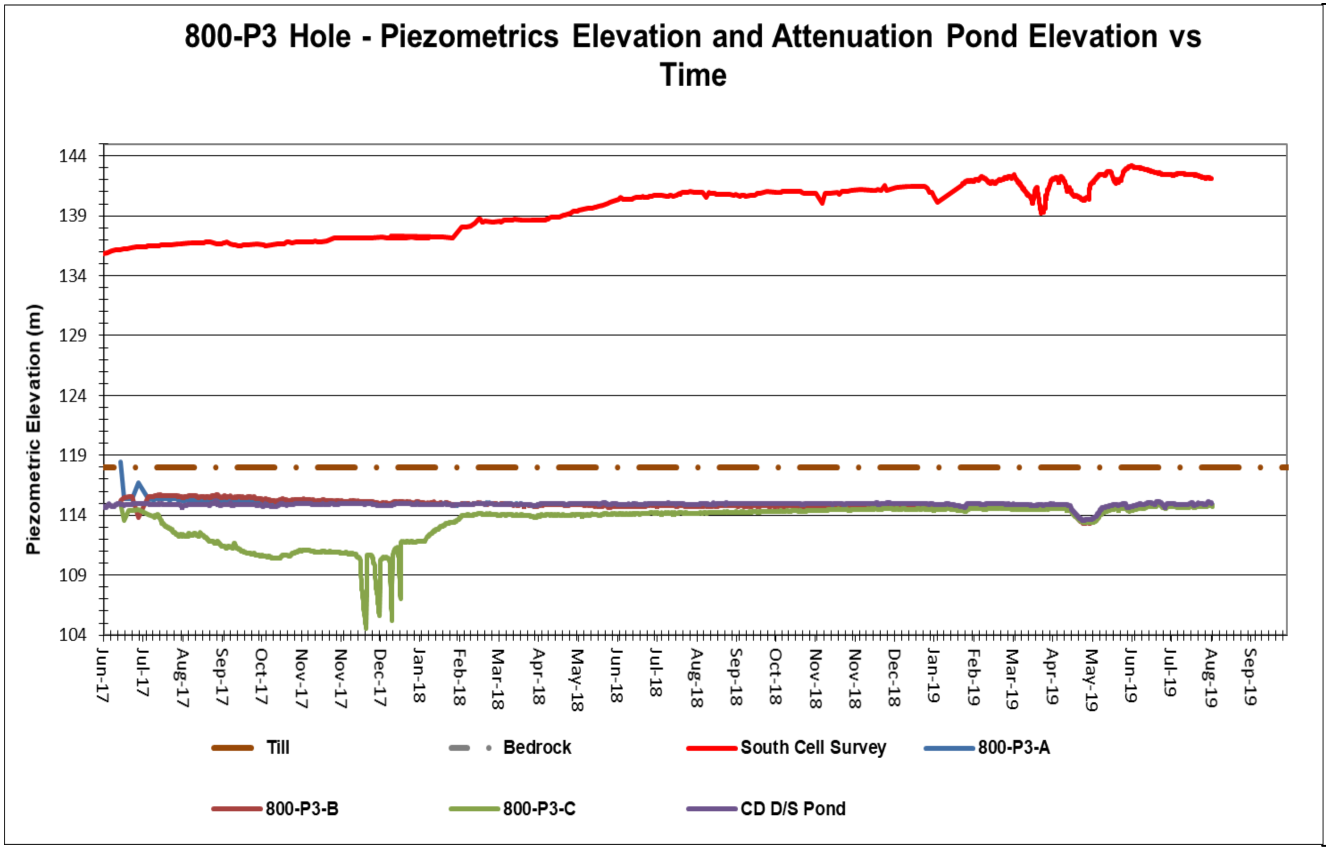
Thermistor 800-P2

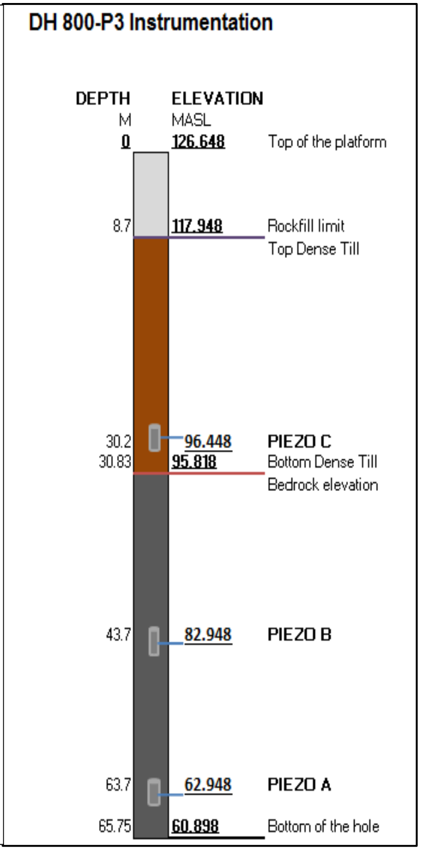


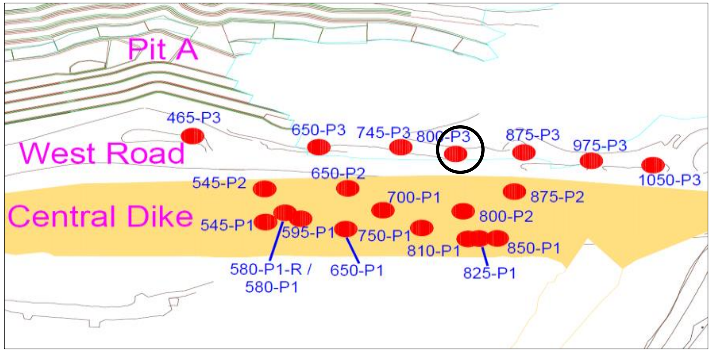




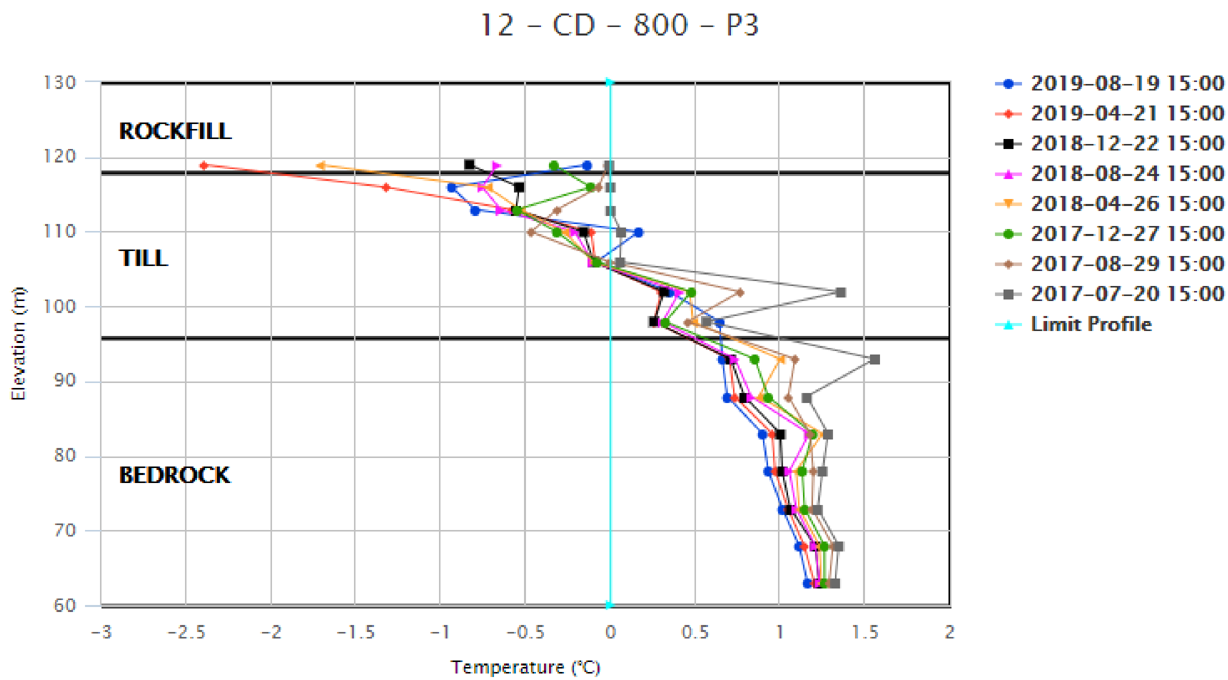
Piezometer 800-P3

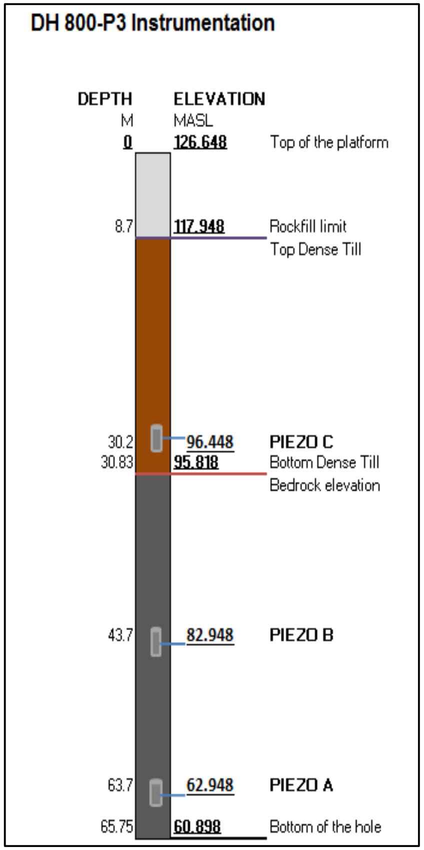


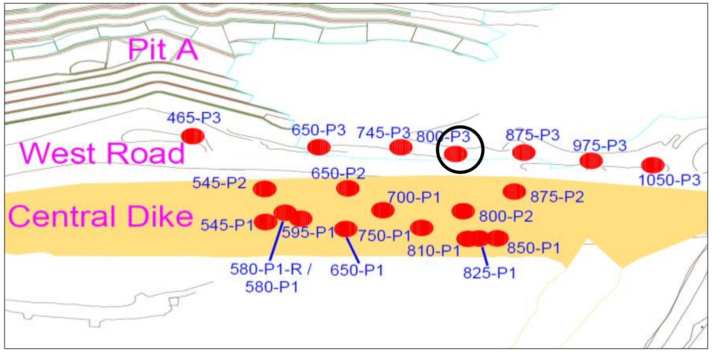




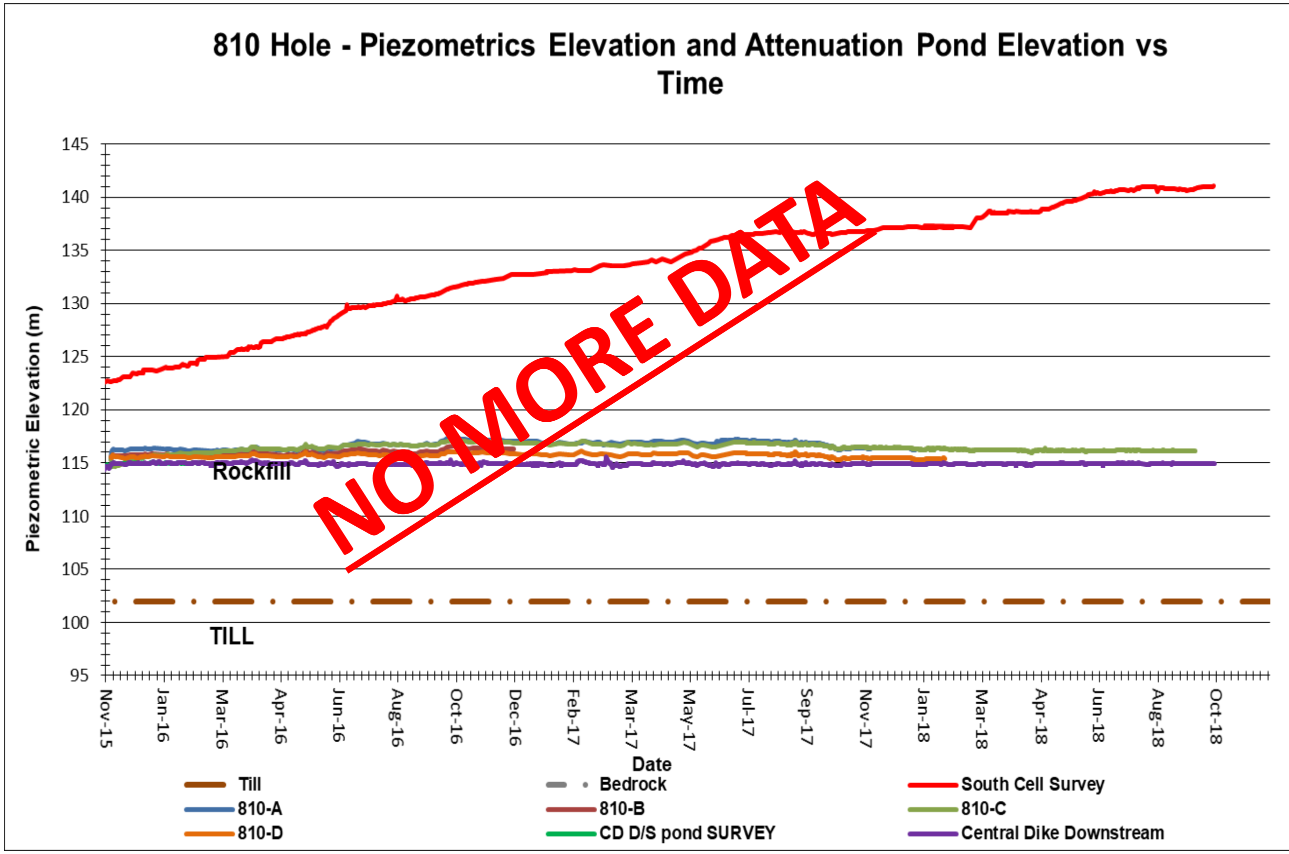
Thermistor 800-P3

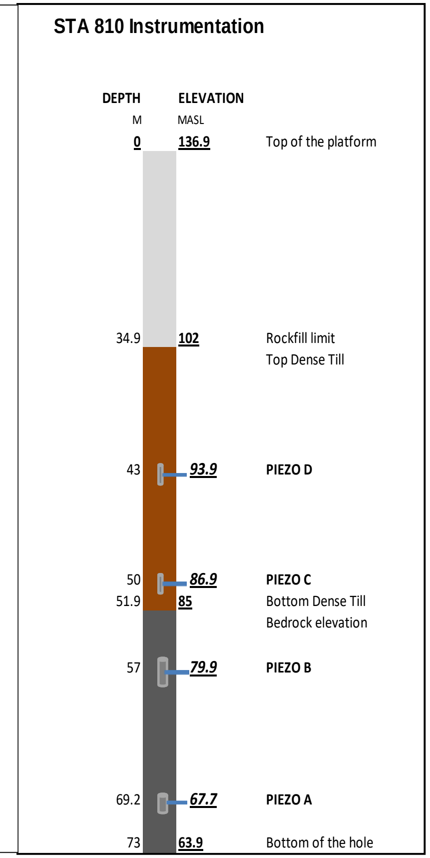


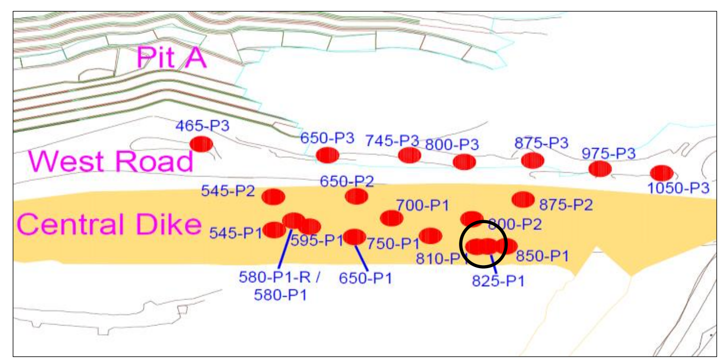




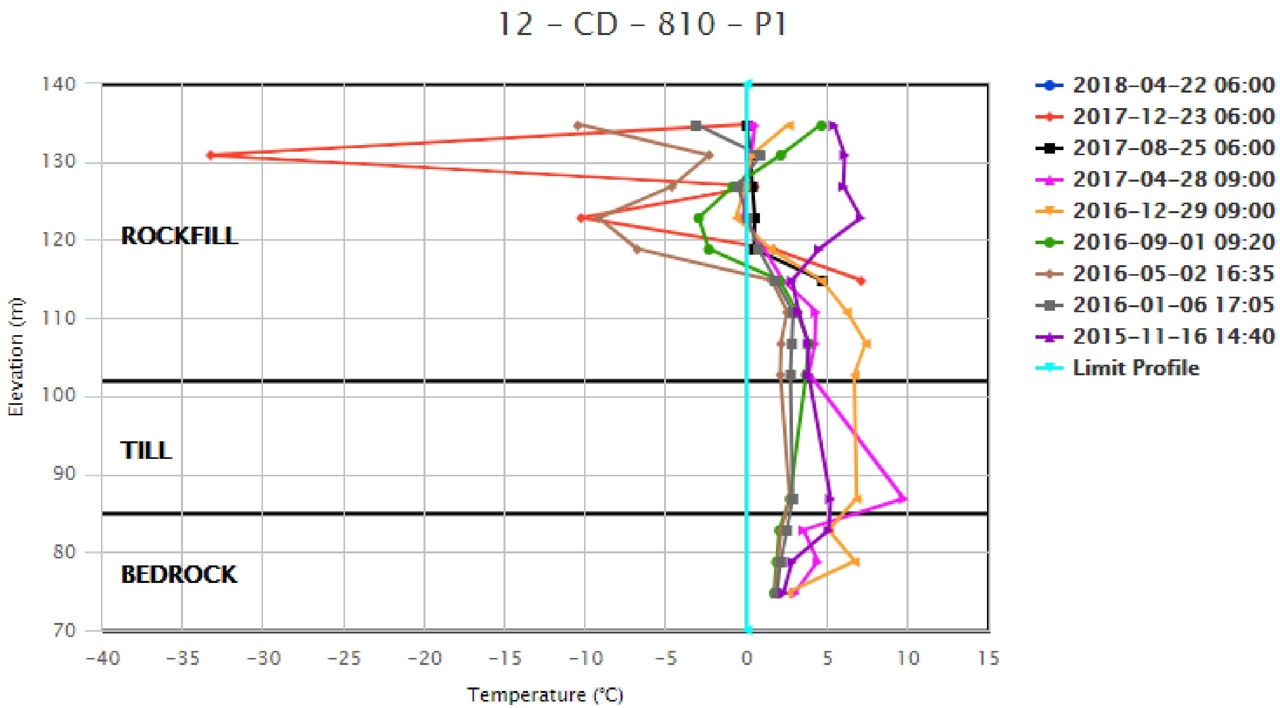
Piezometer 810-P1

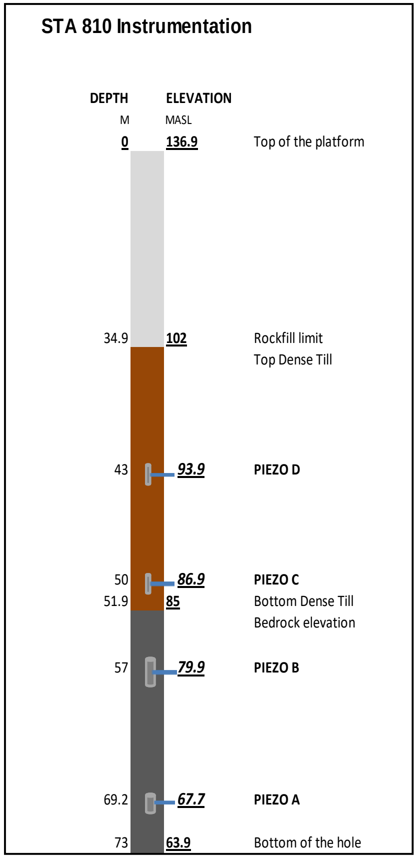


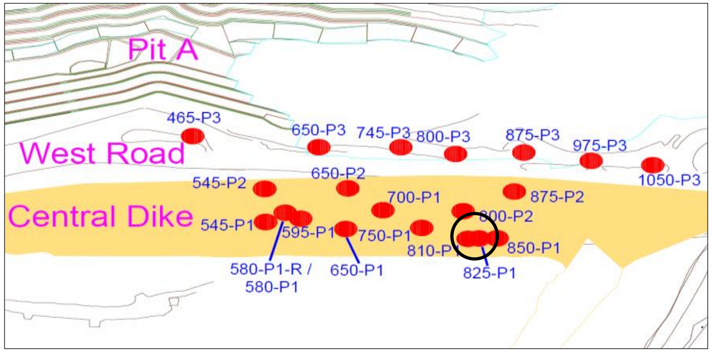




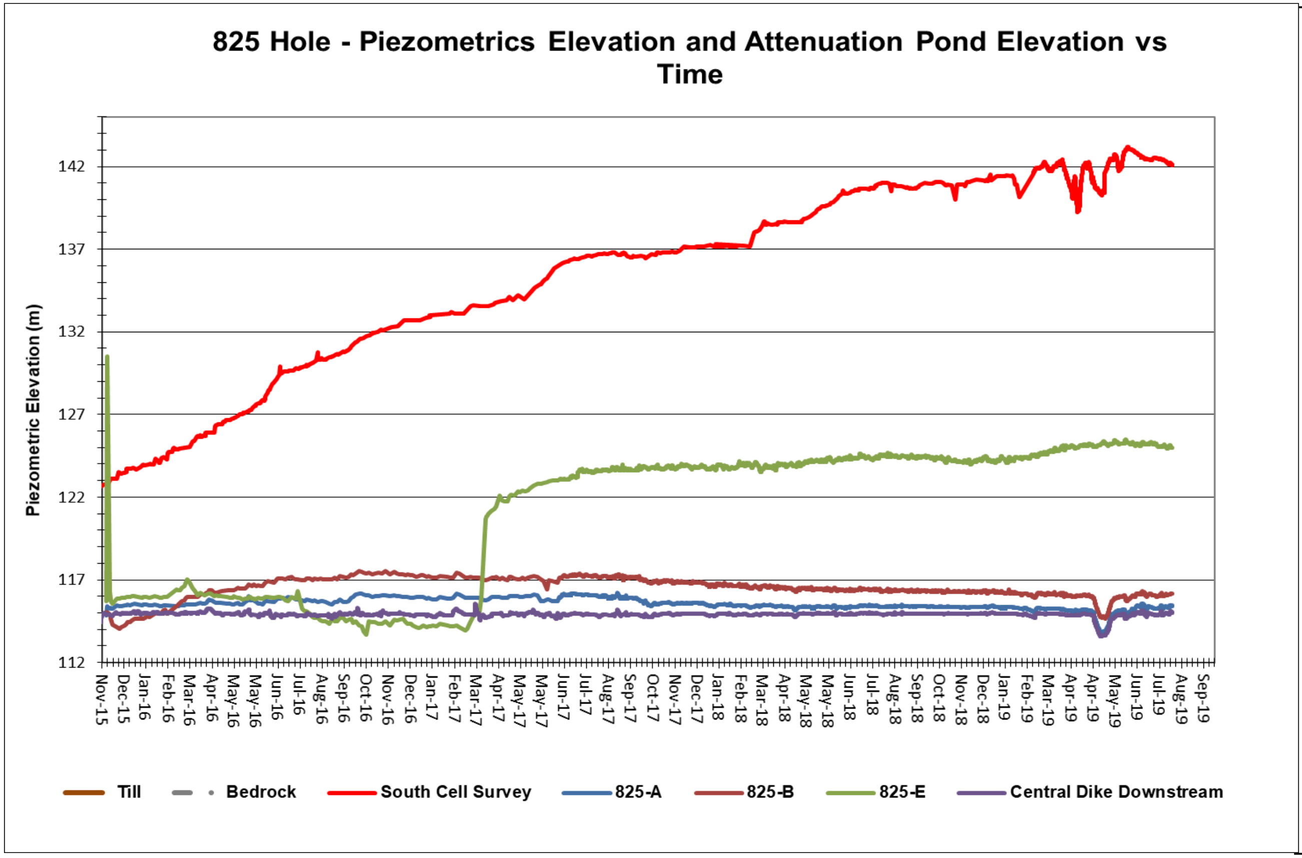
Thermistor 810-P1

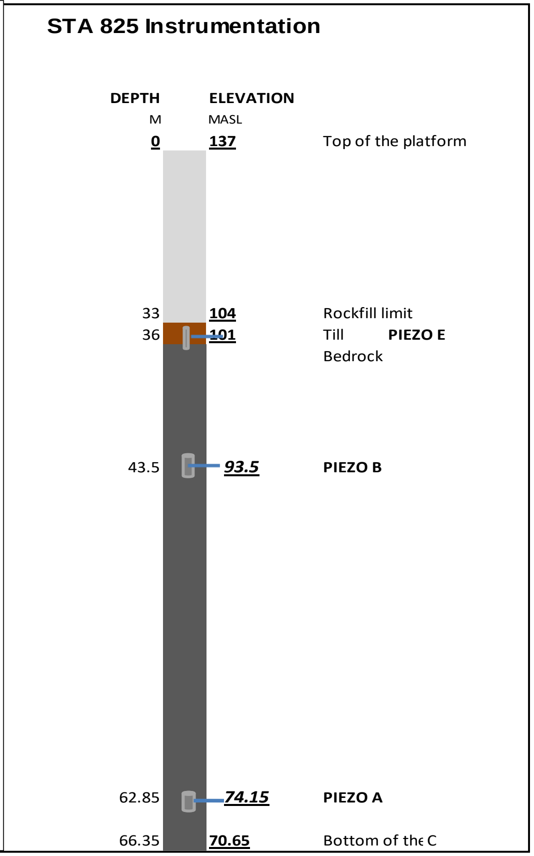


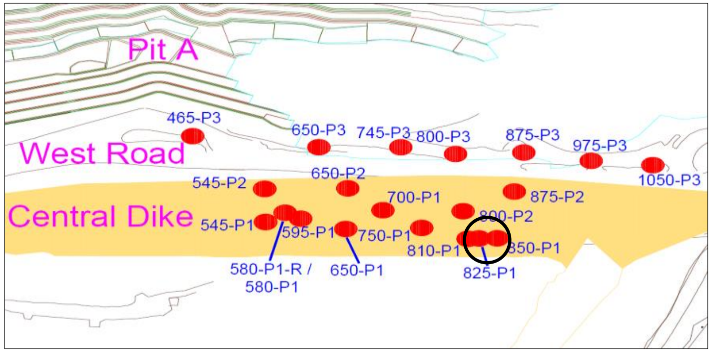




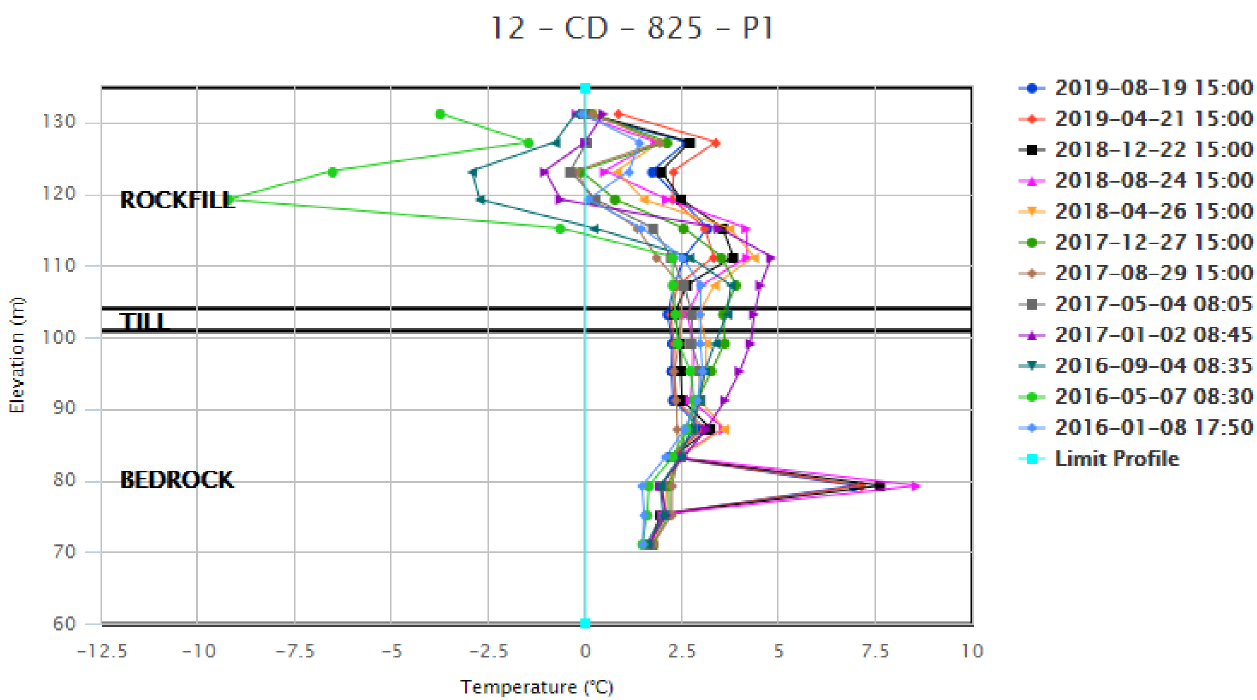
Piezometer 825-P1

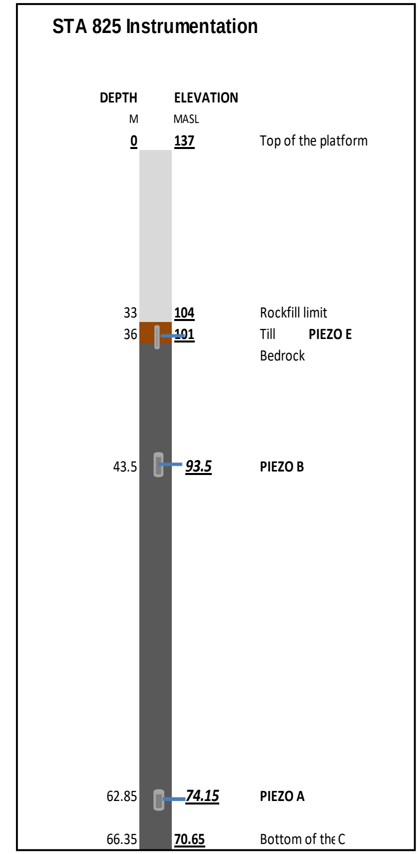


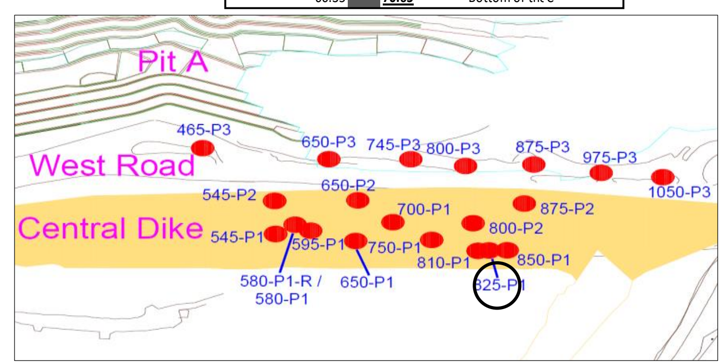




Thermistor 825-P1







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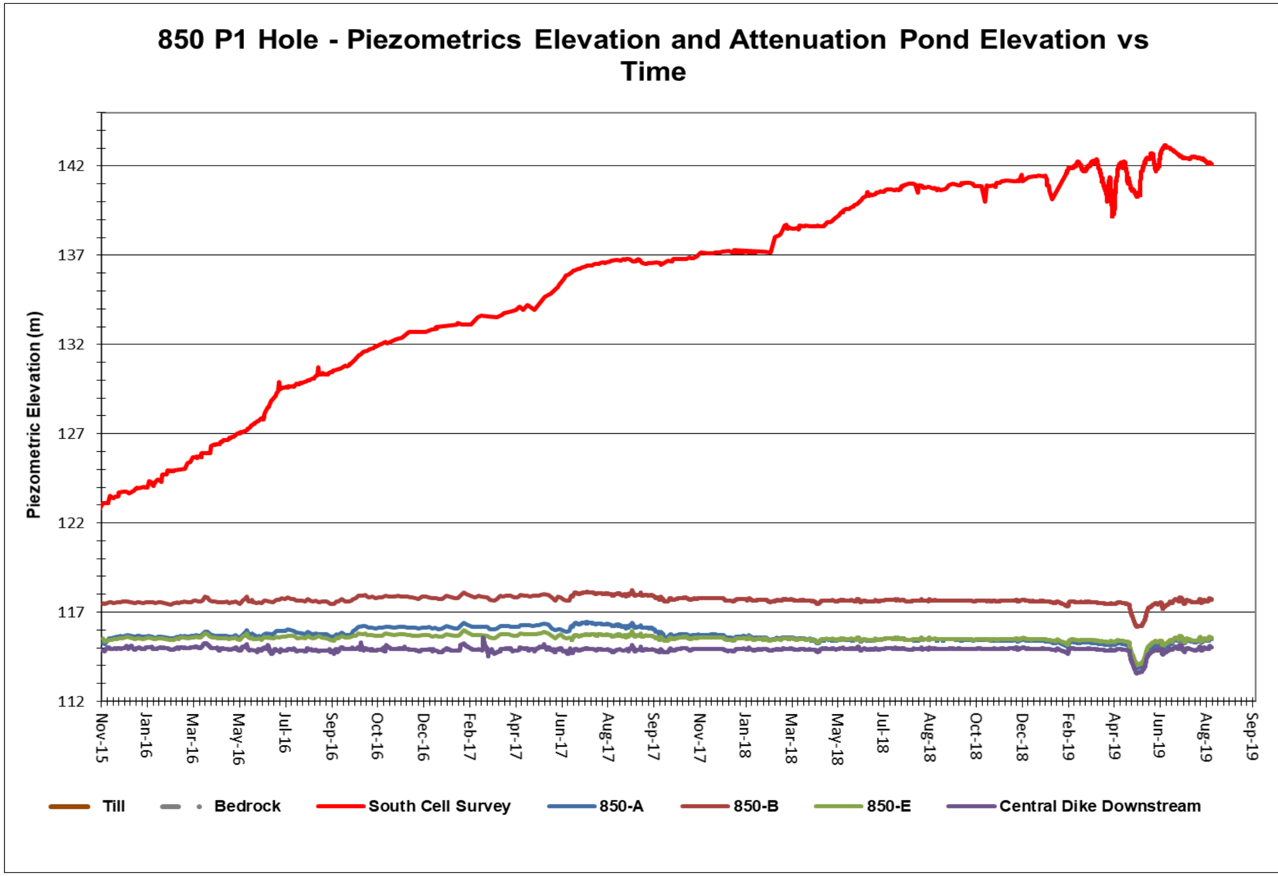
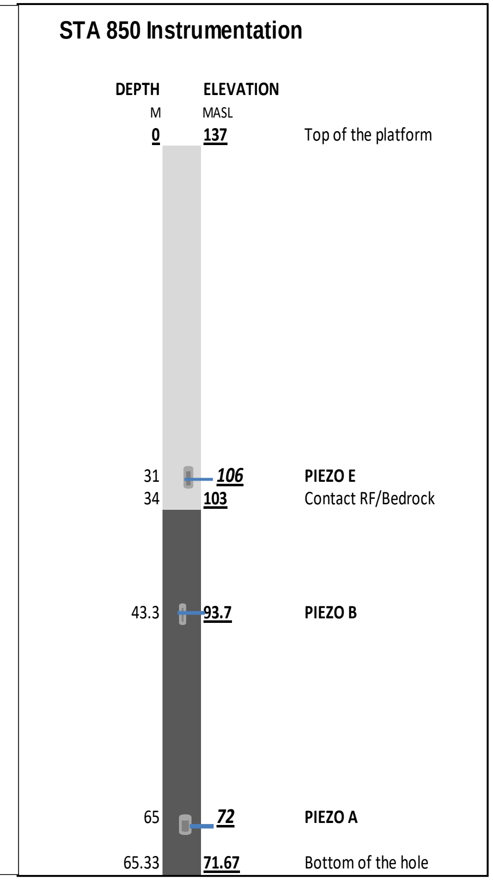
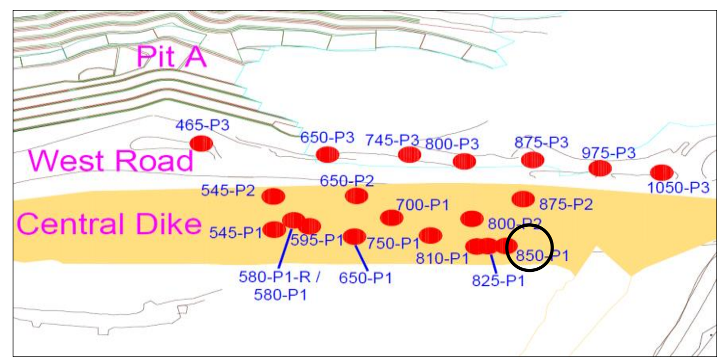
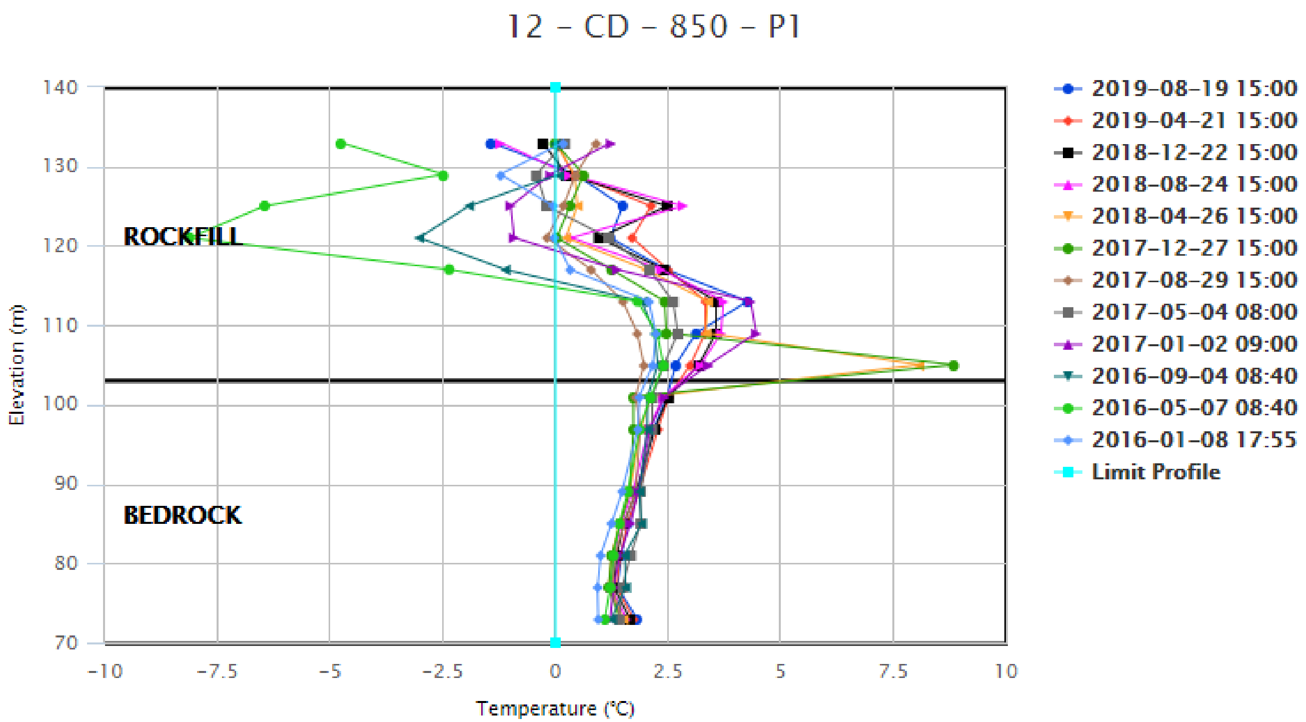
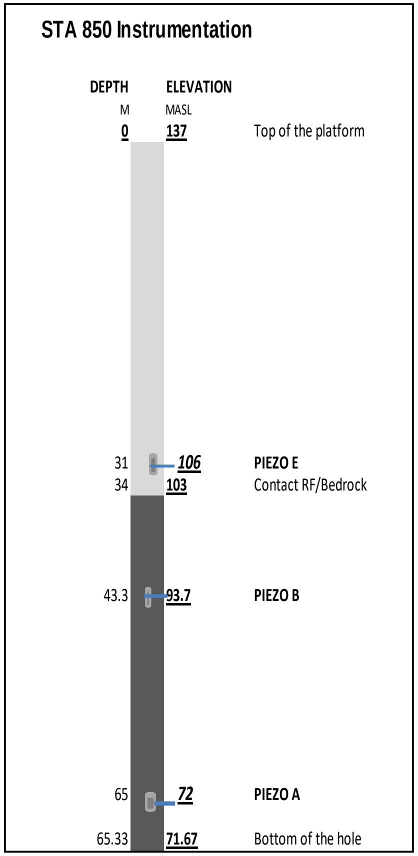


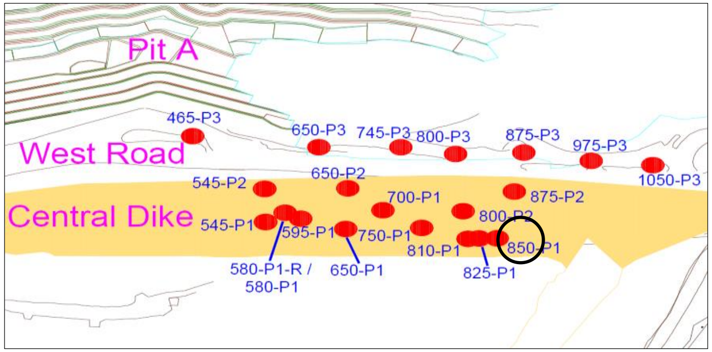




Thermistor 850-P1







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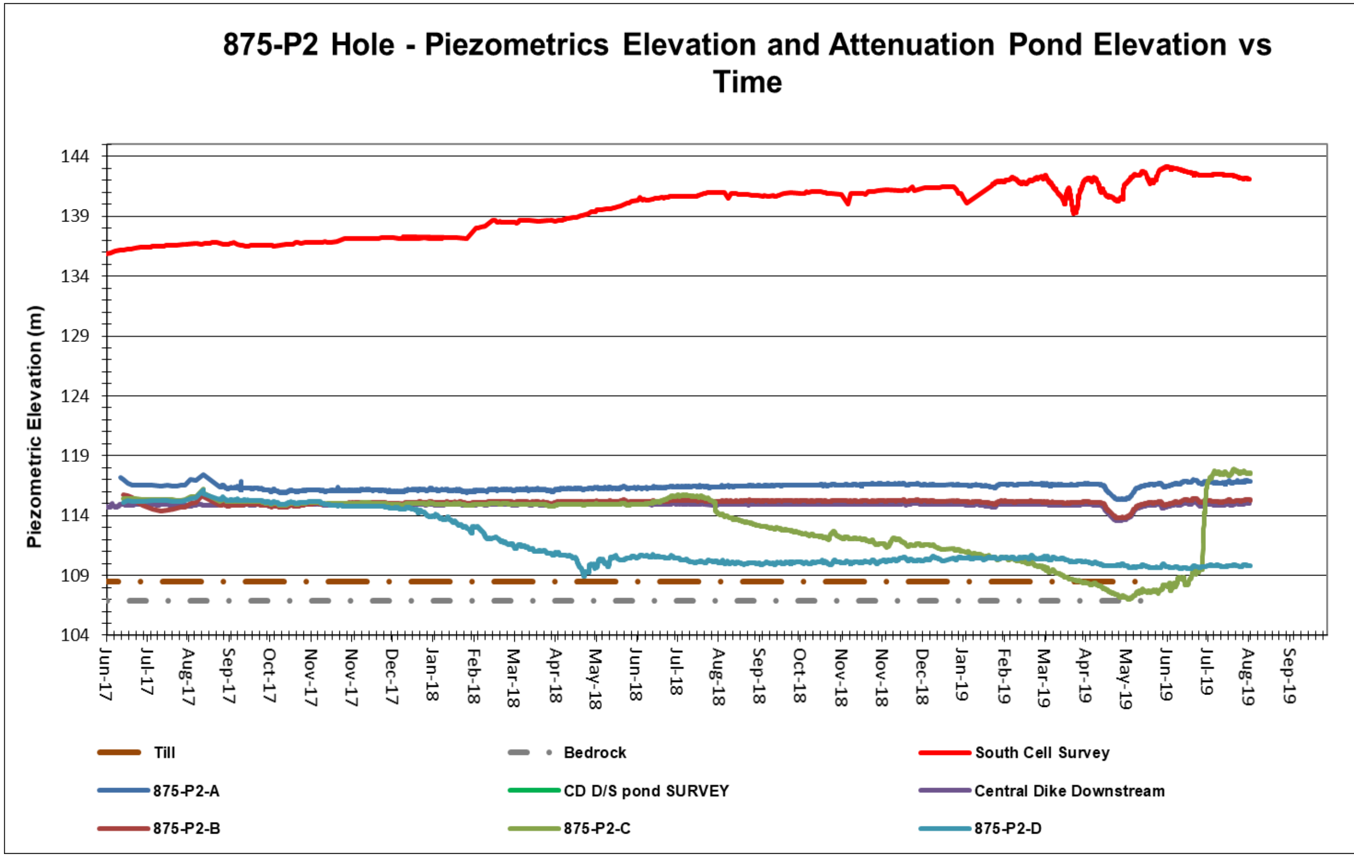

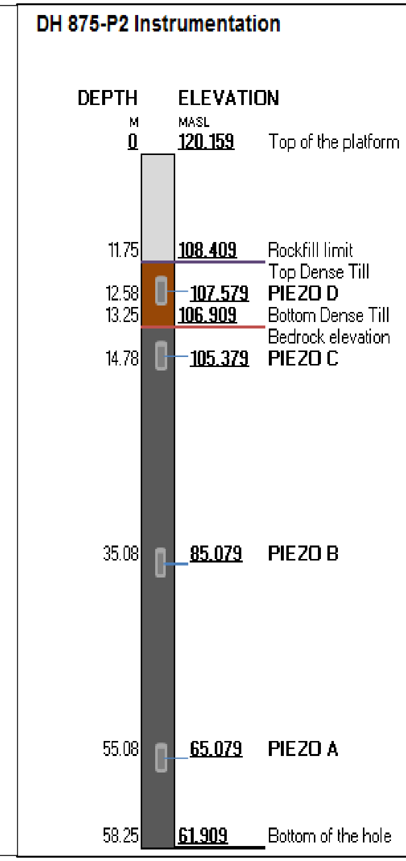

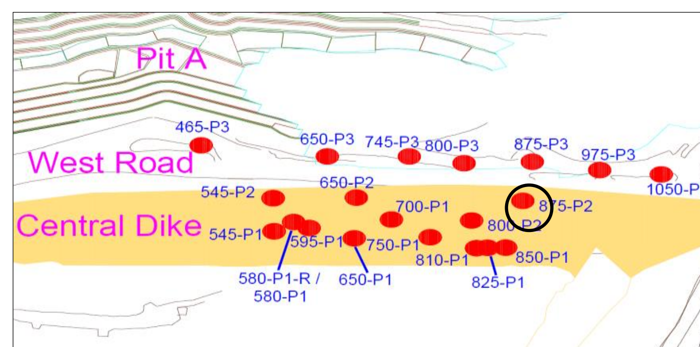

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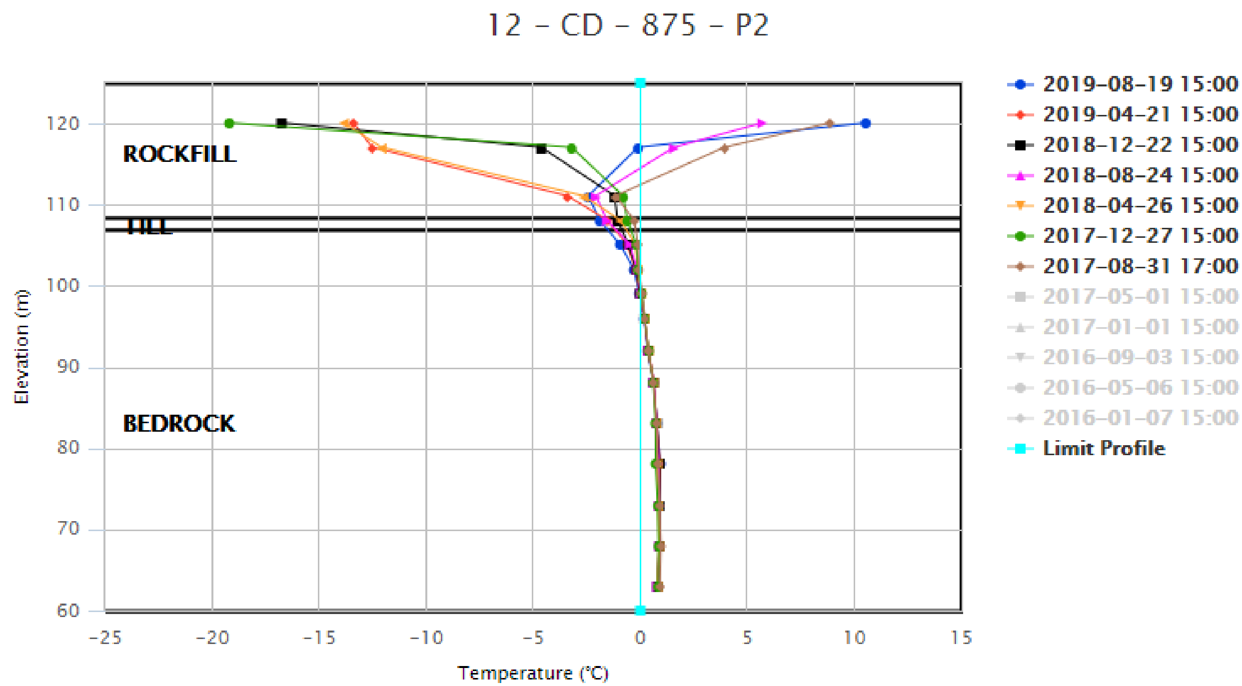

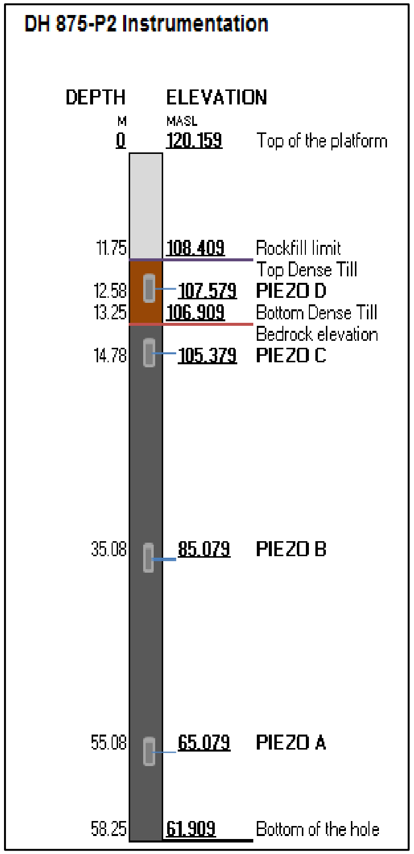

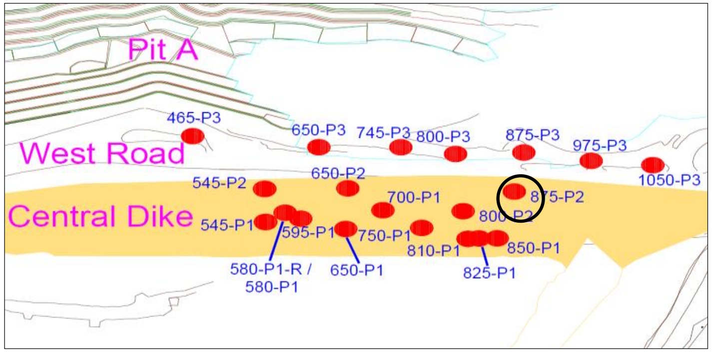

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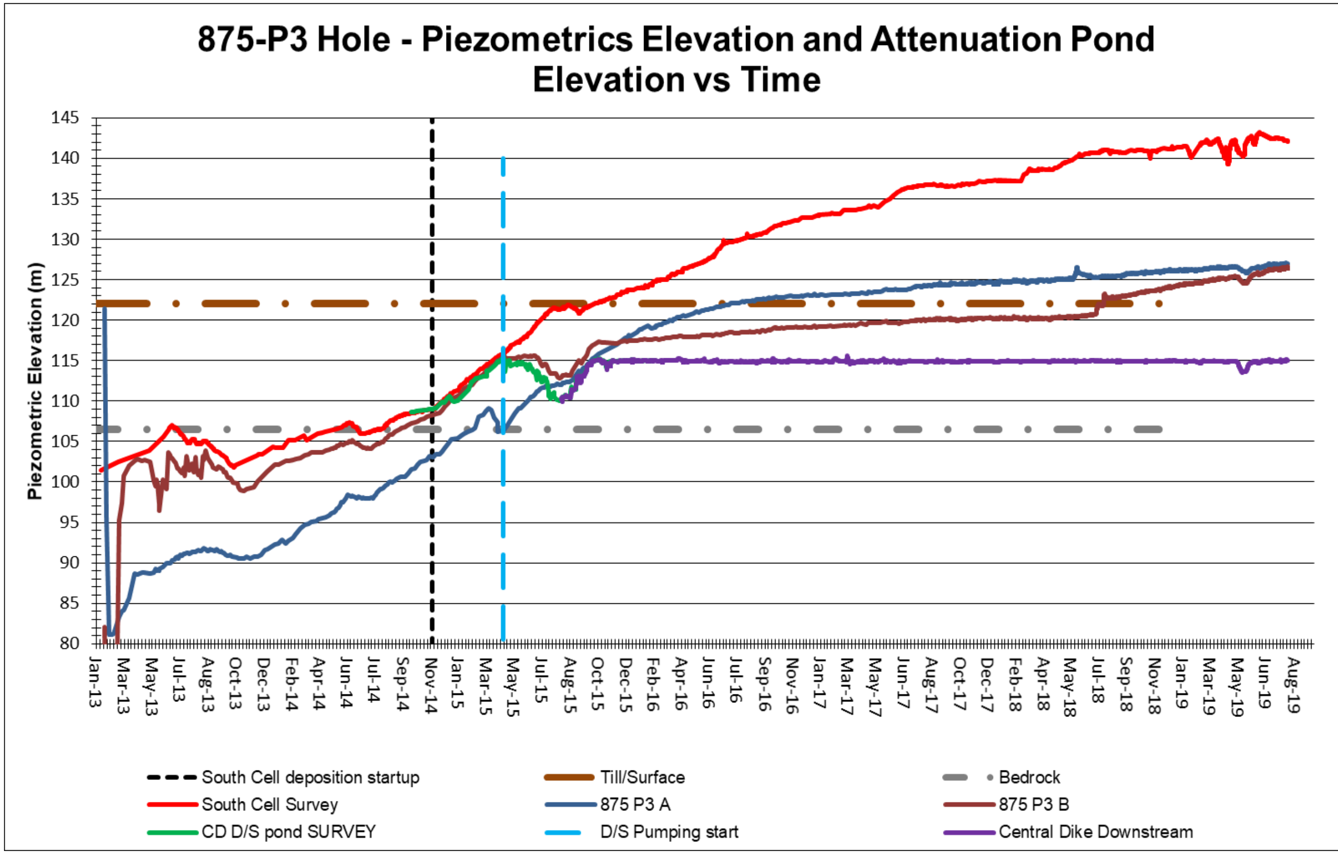

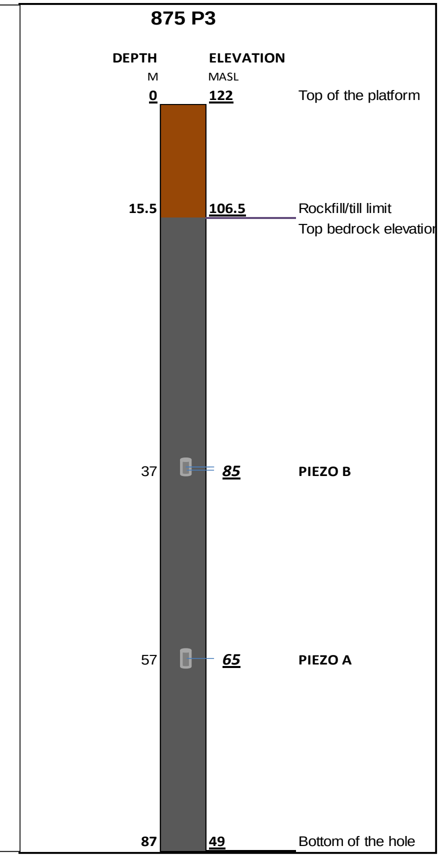

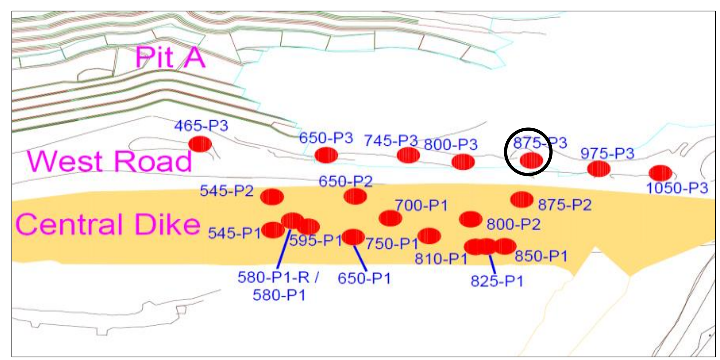

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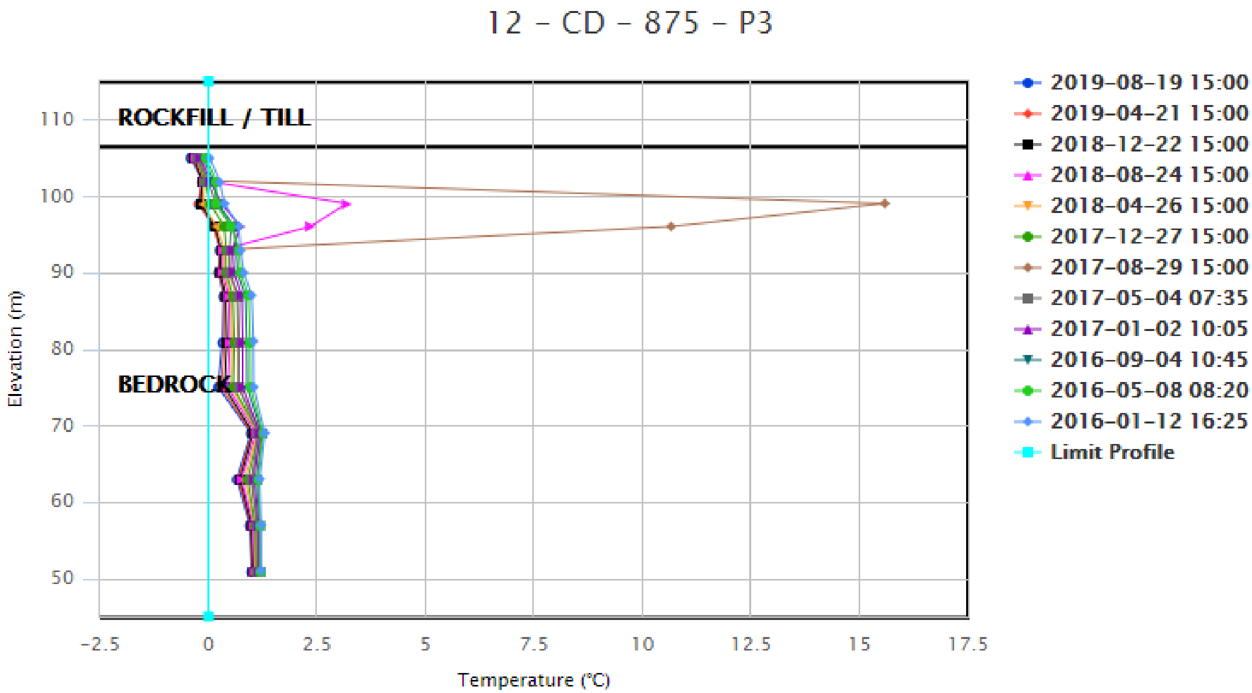
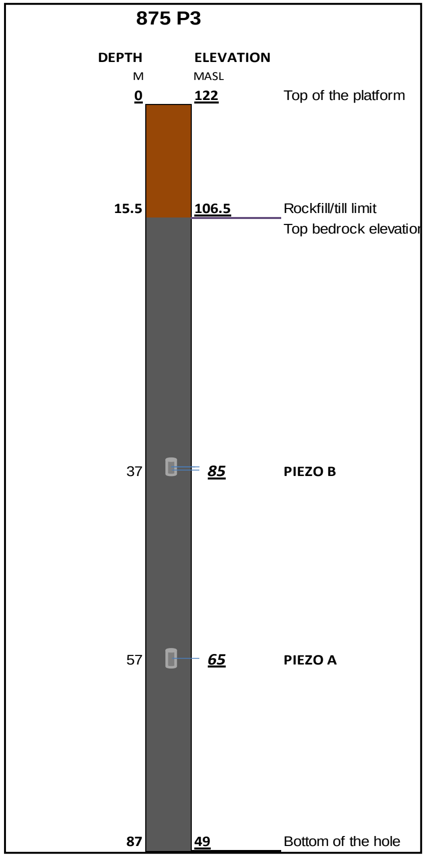
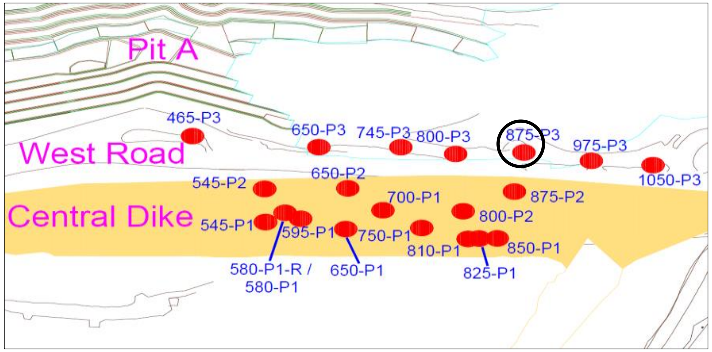
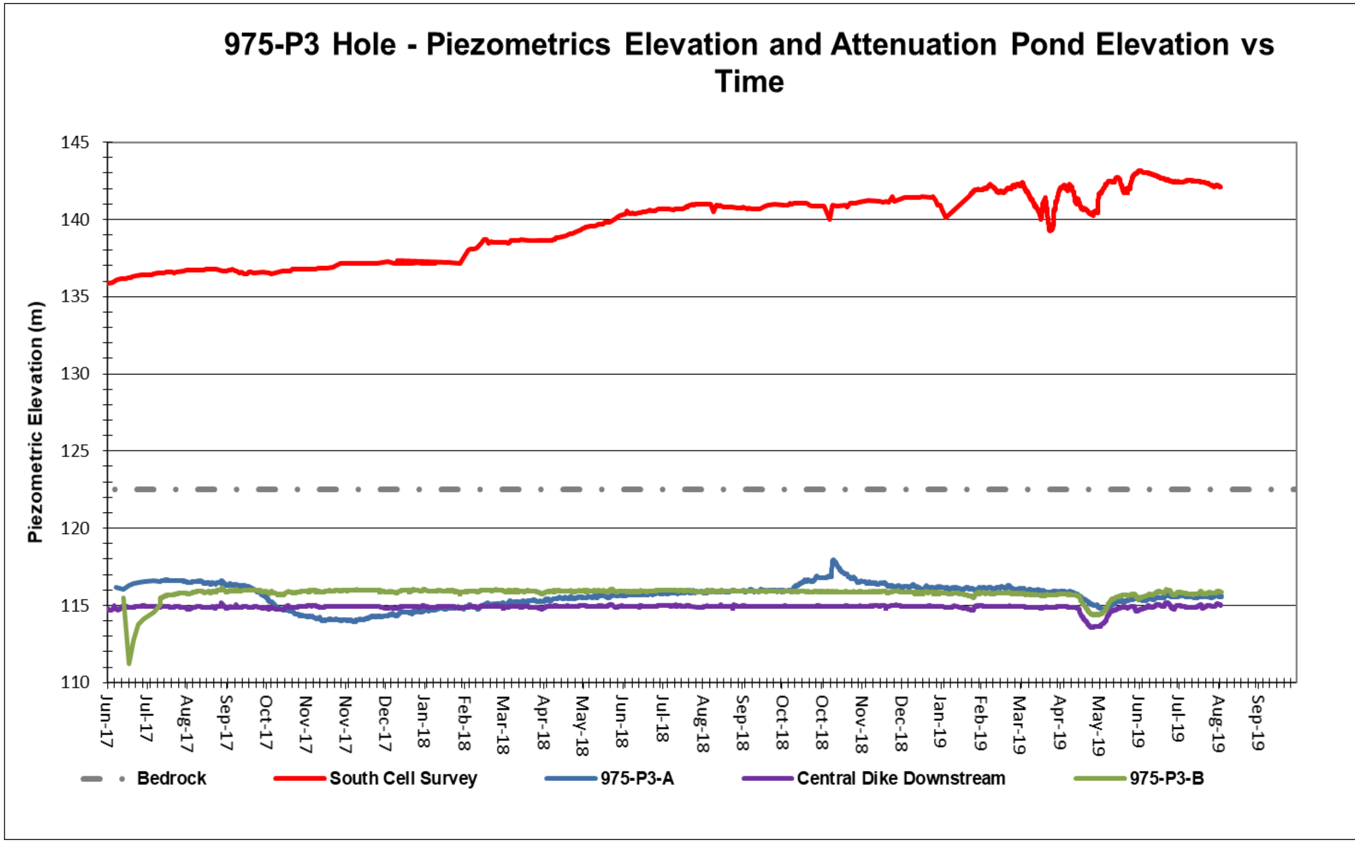
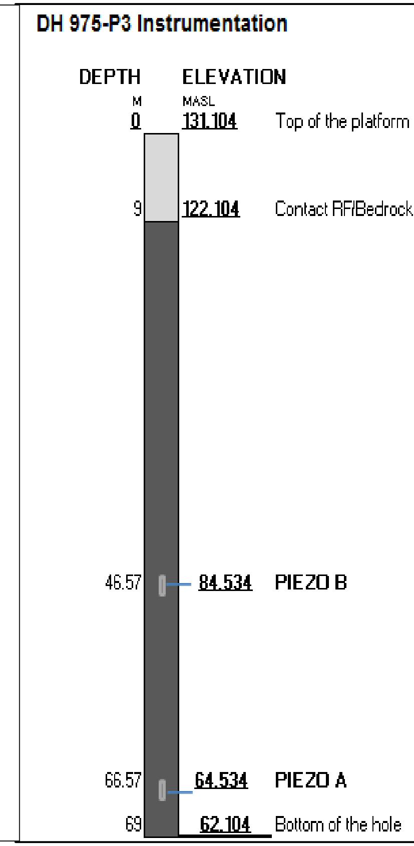


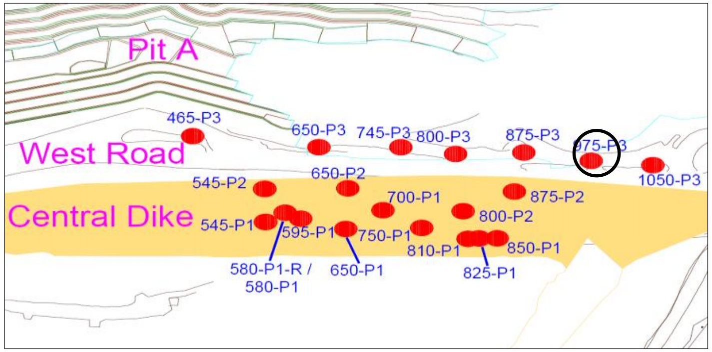




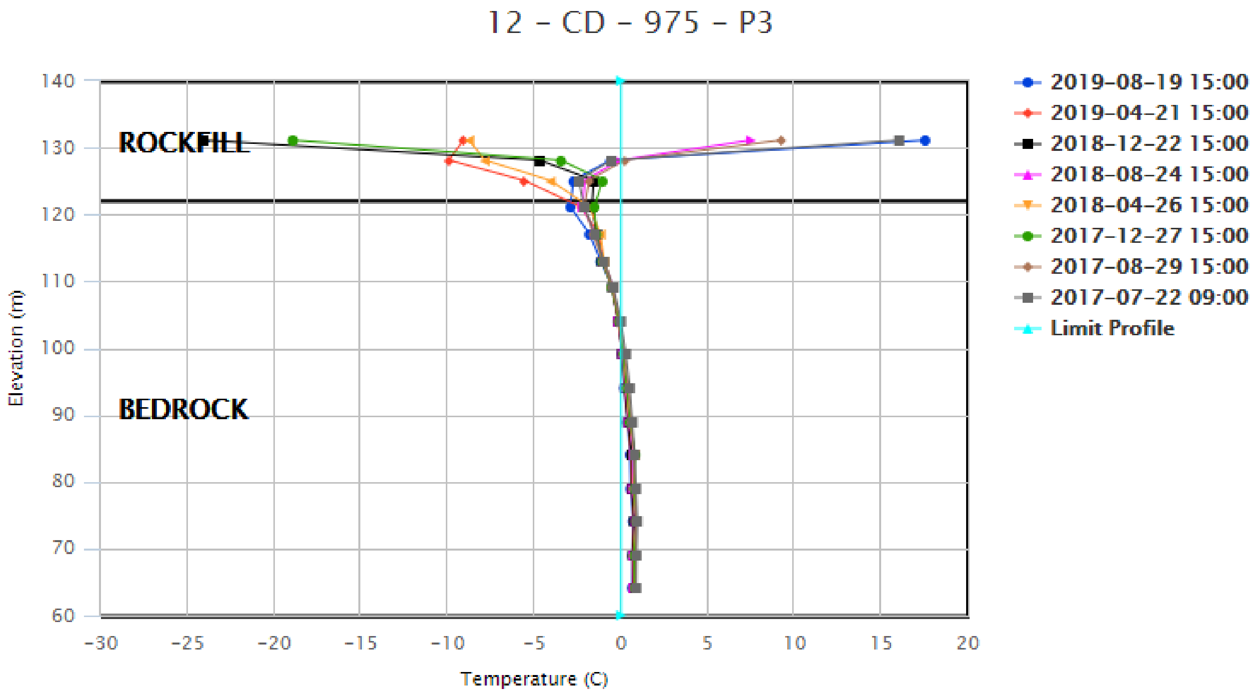
Piezometer 975-P3

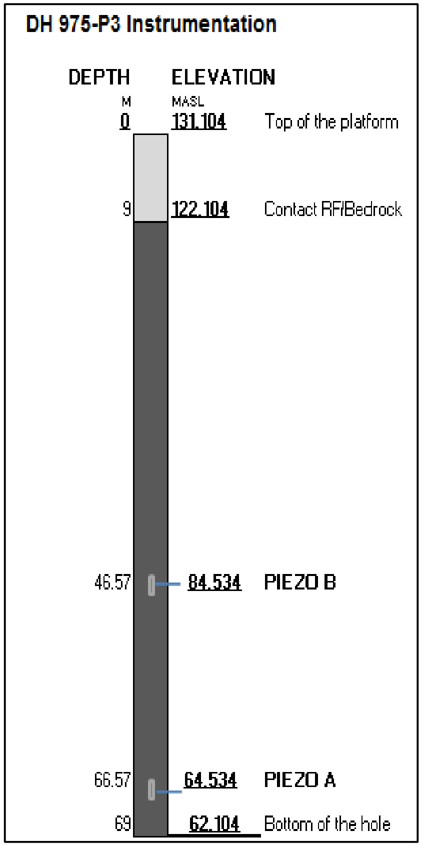


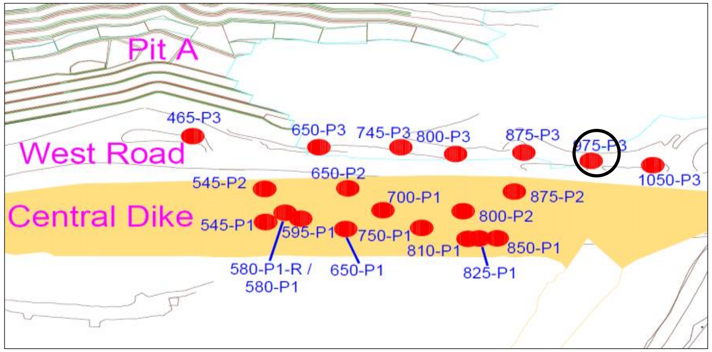




Thermistor 975-P3







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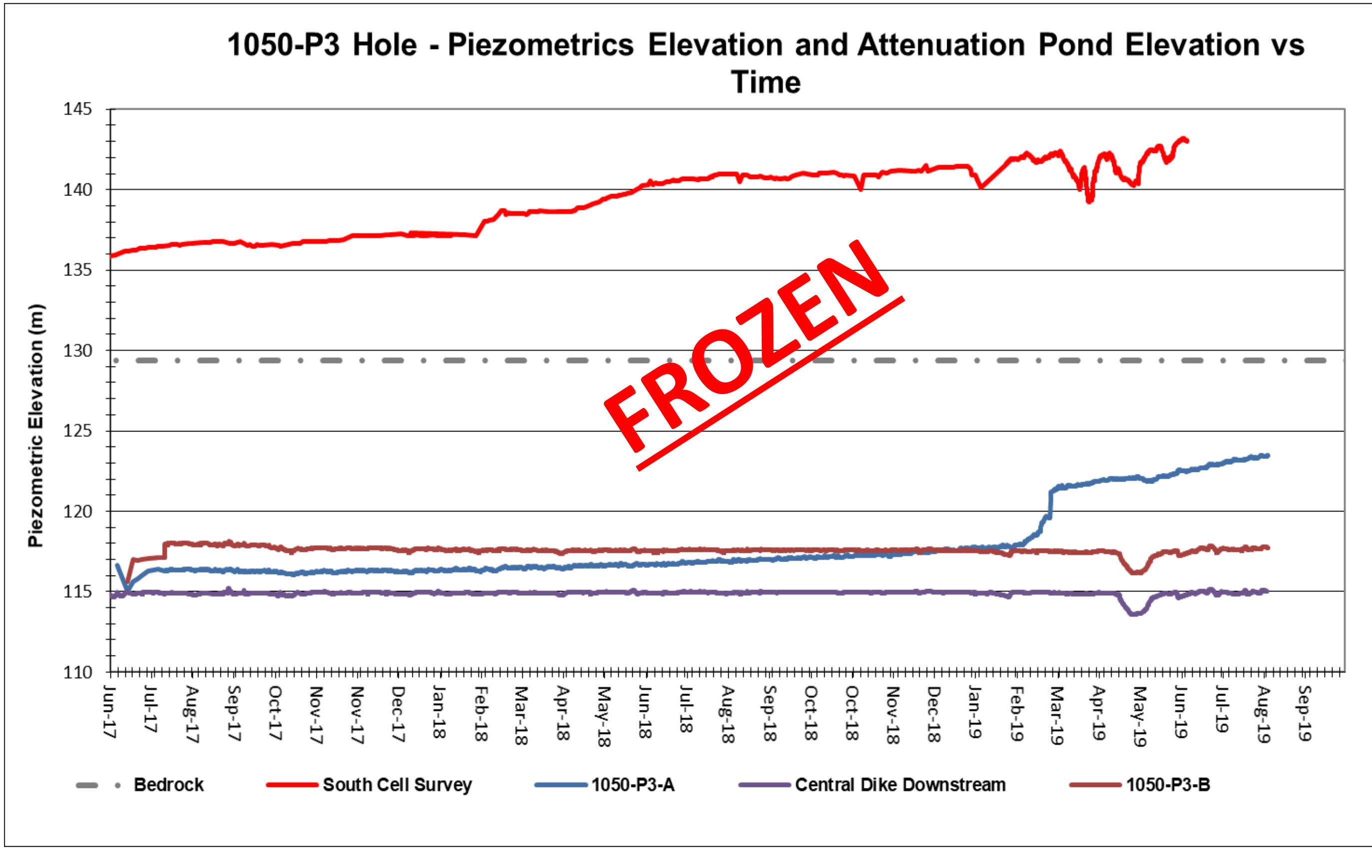
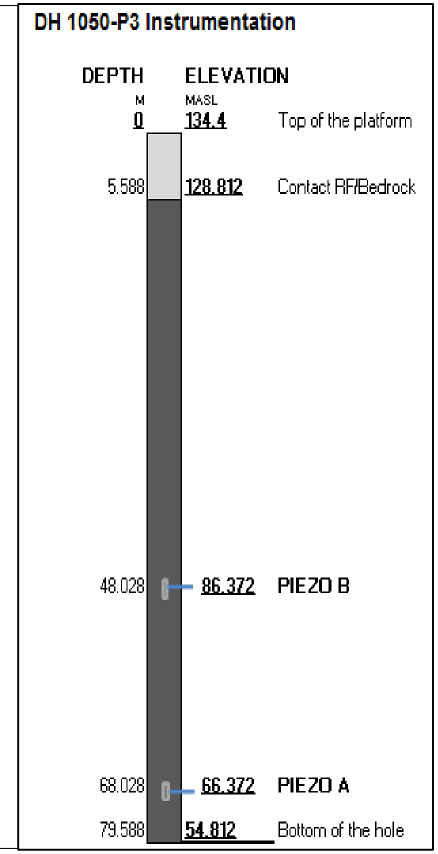
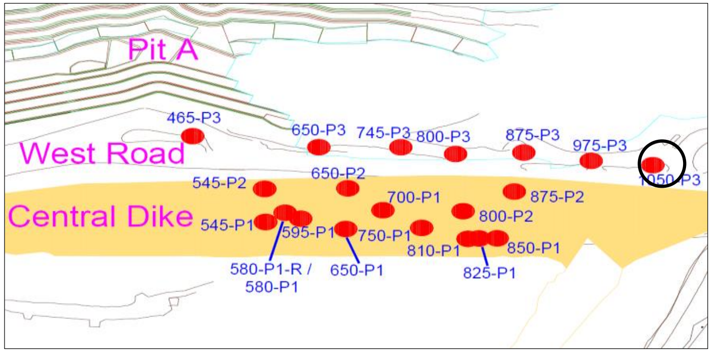
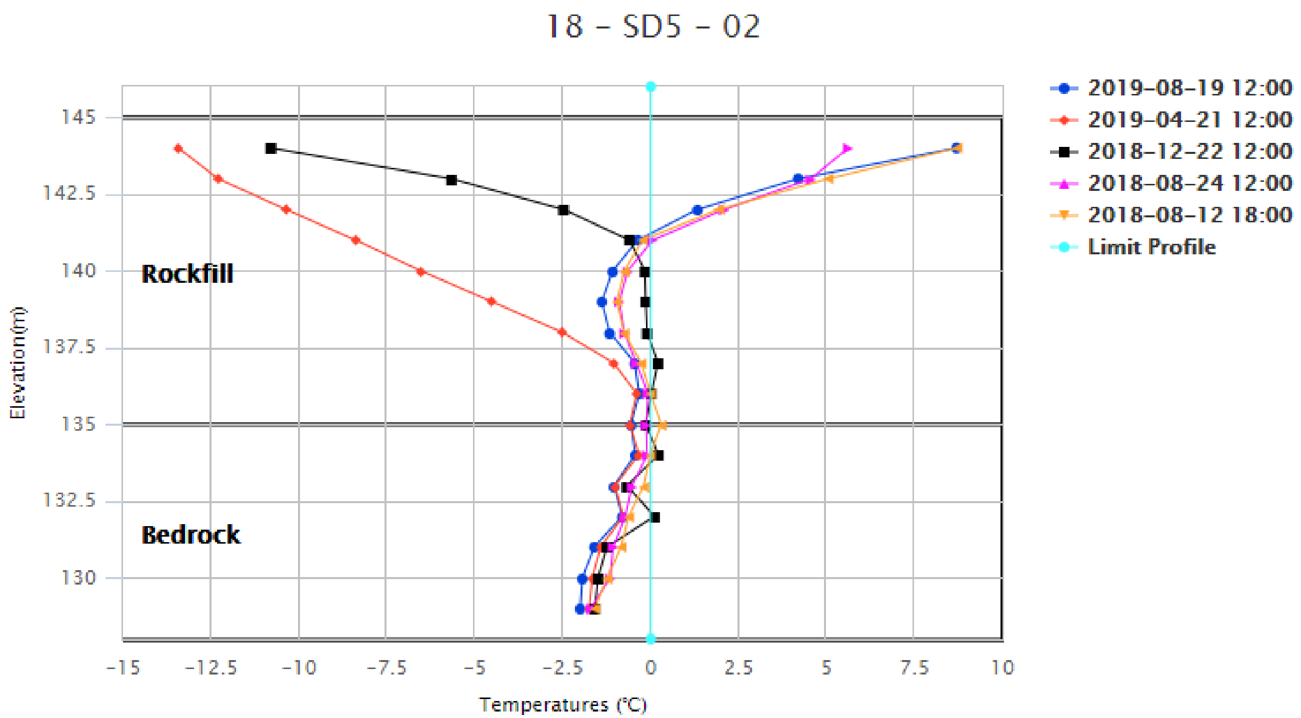
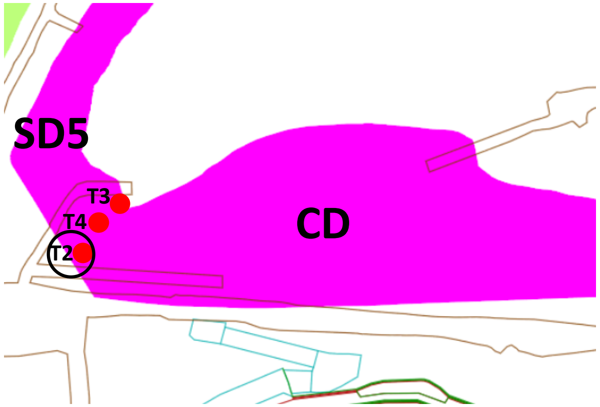






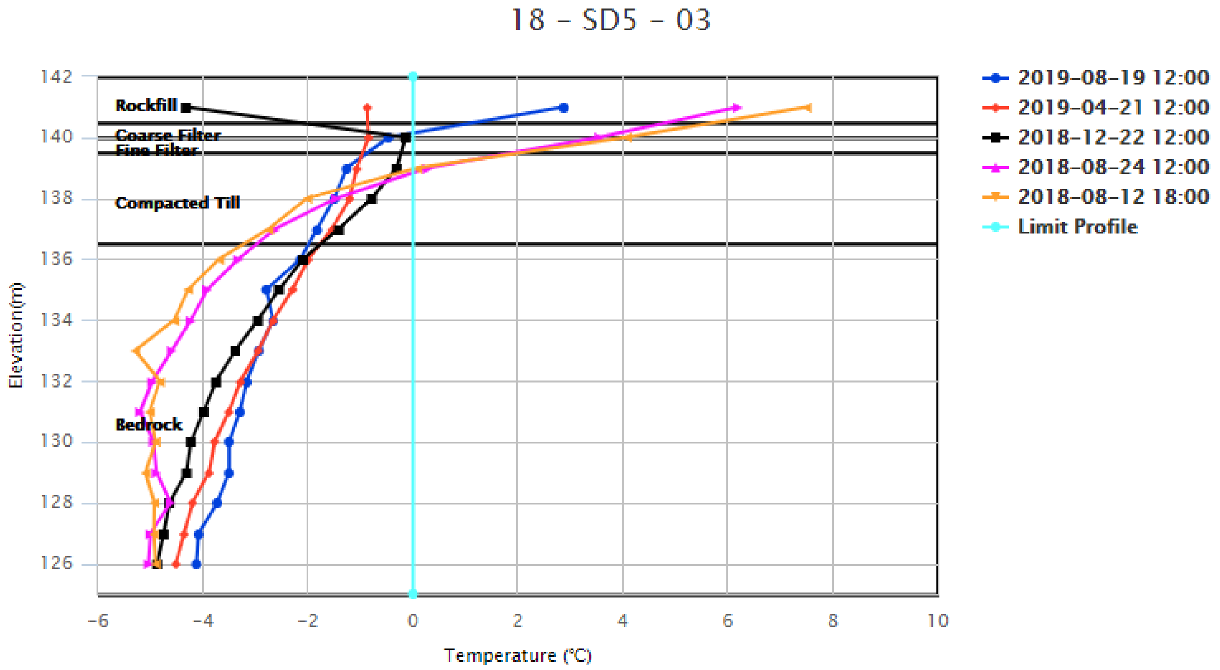
Thermistor 18-SD5-02

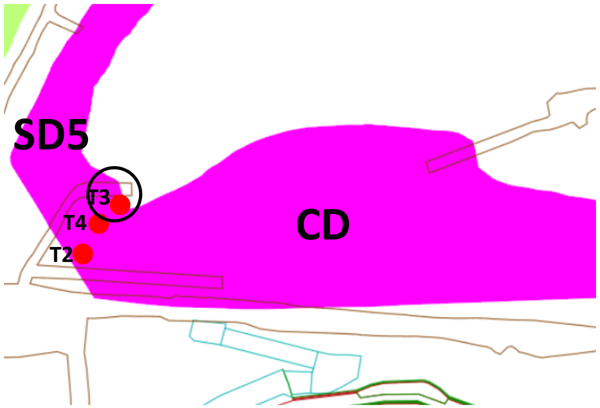




Central Dike (SD5)

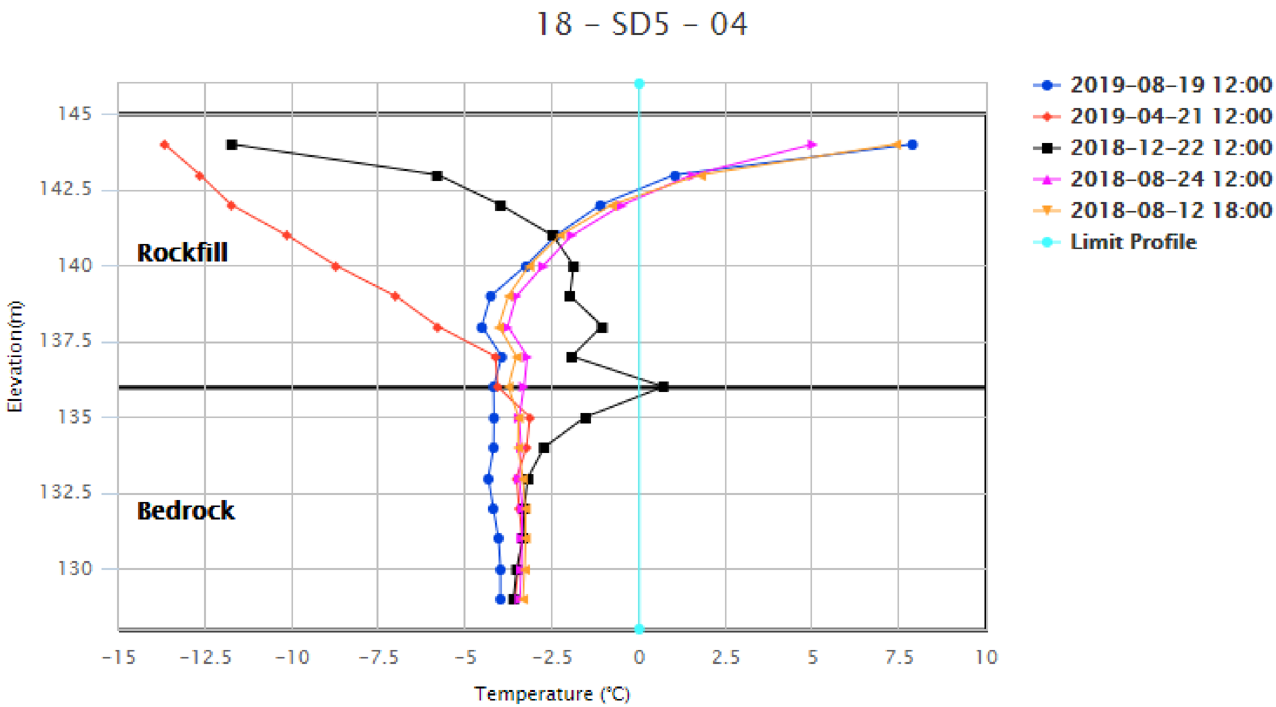
Thermistor 18-SD5-03

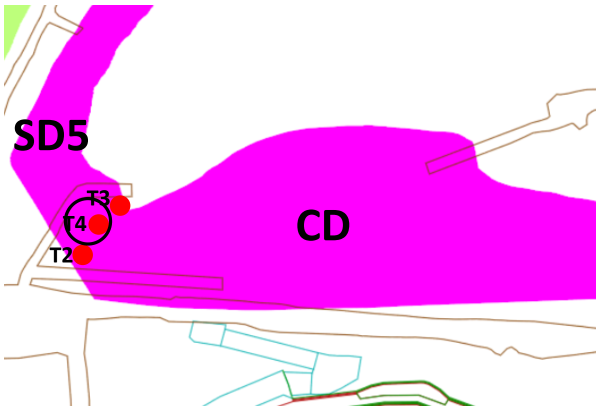




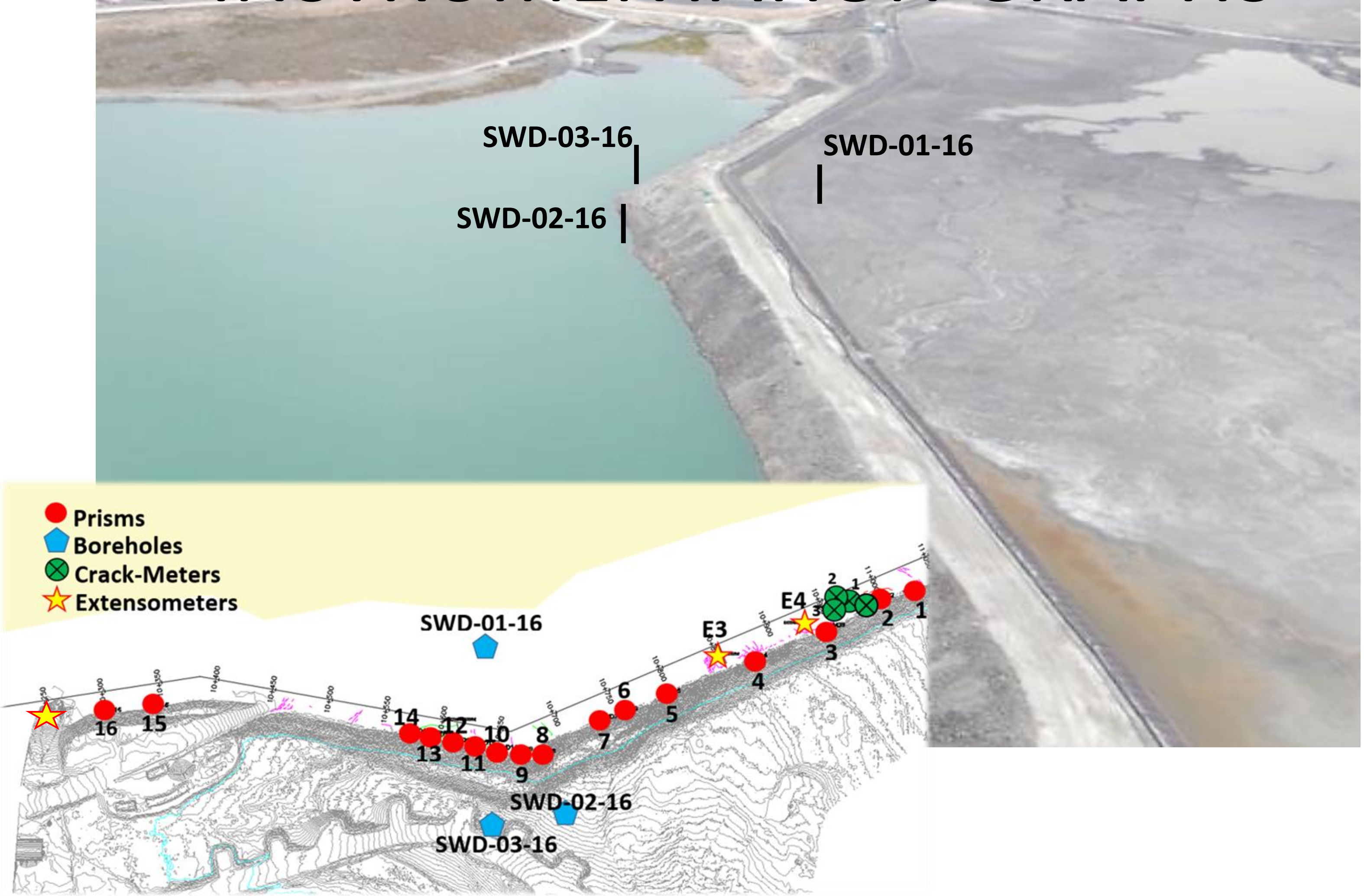
Central Dike (SD5)

Thermistor 18-SD5-04

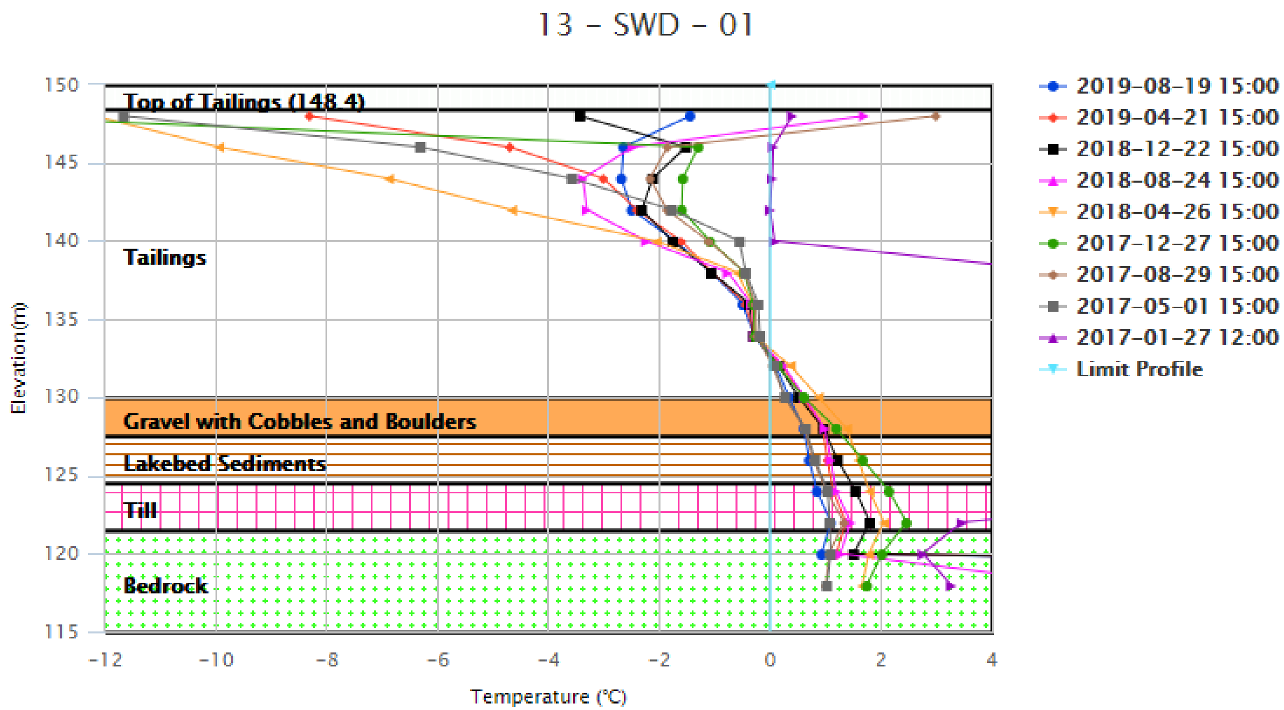


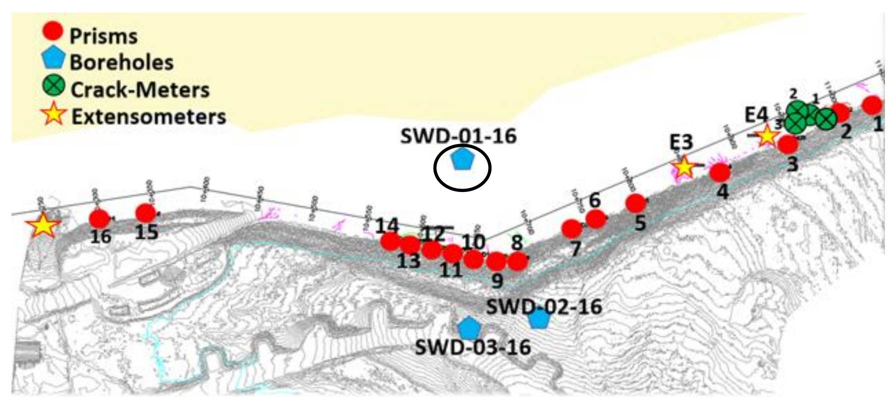


APPENDIX III
INSTRUMENTATION GRAPHS

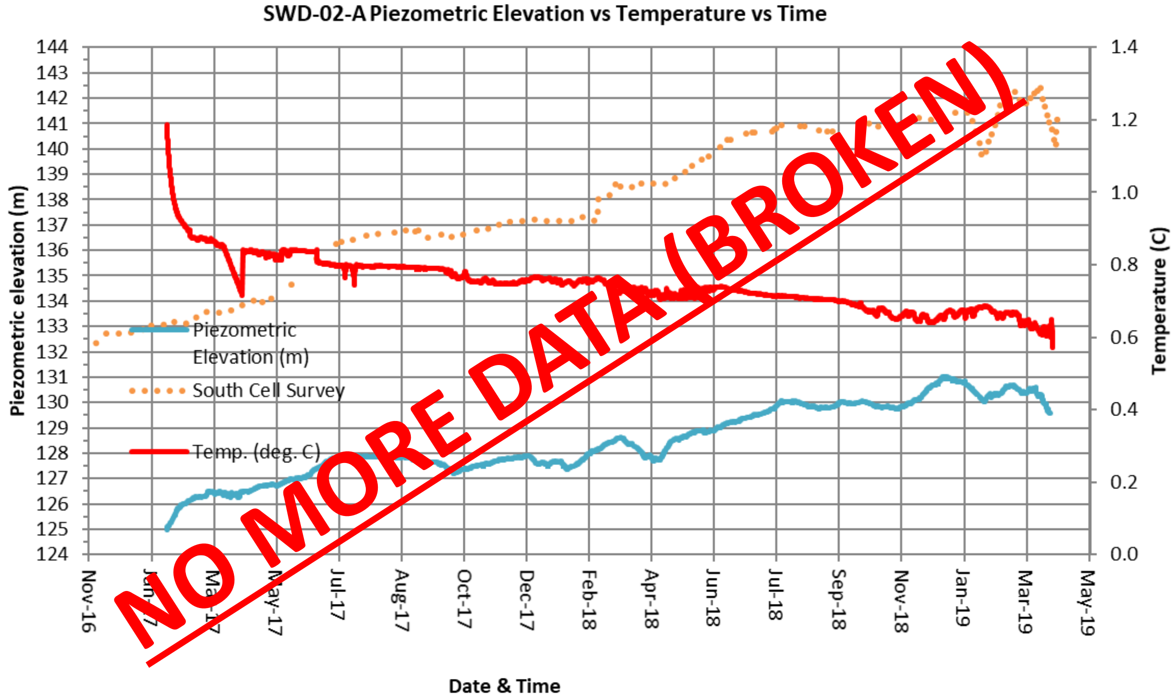


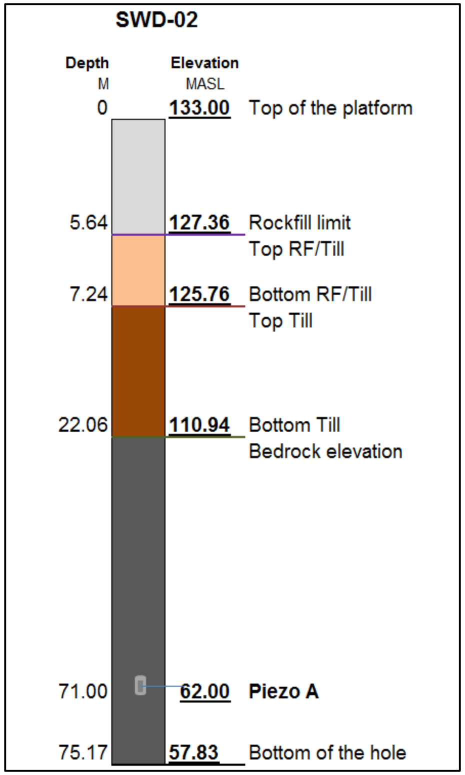
Thermistor SWD-01-16



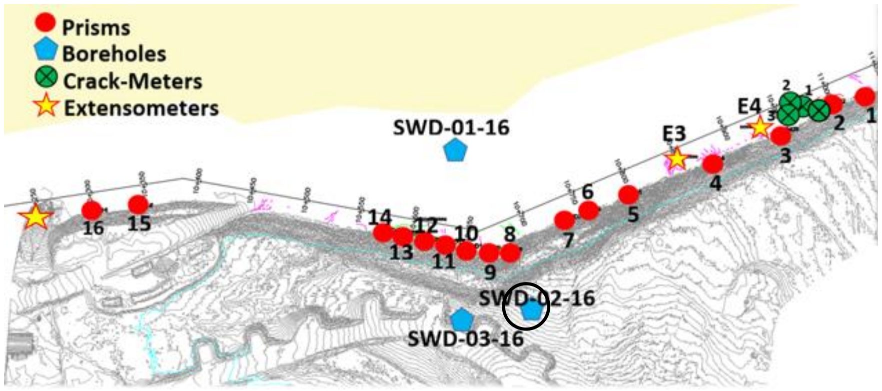


Piezometer SWD-02-16

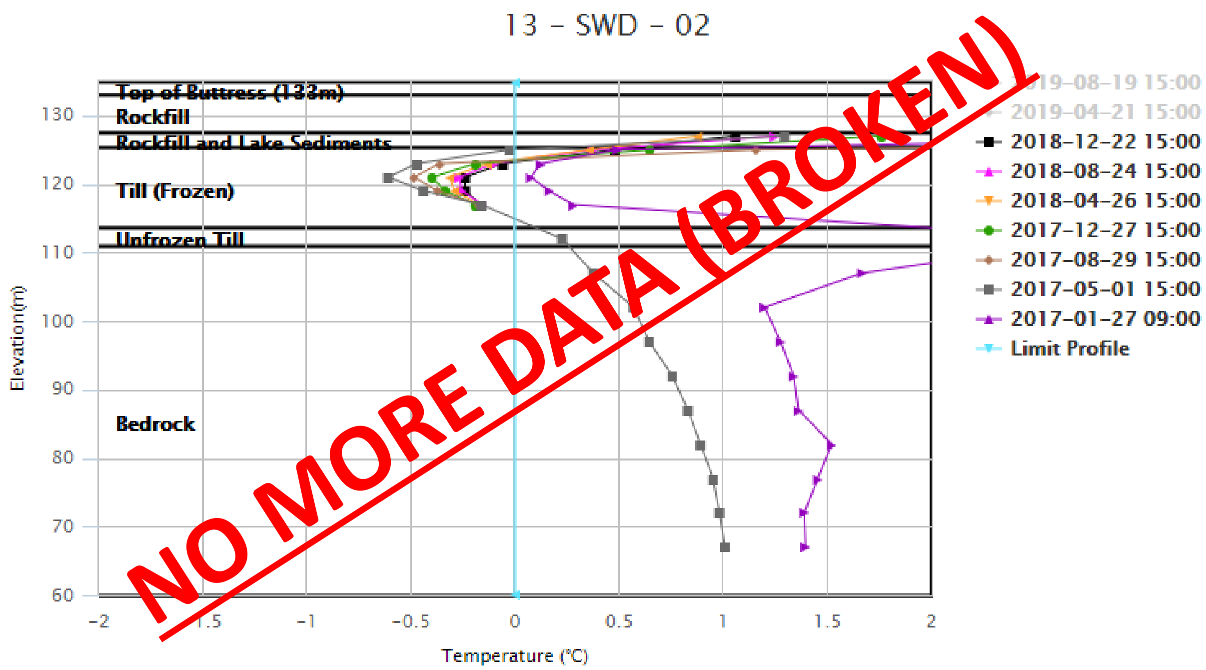


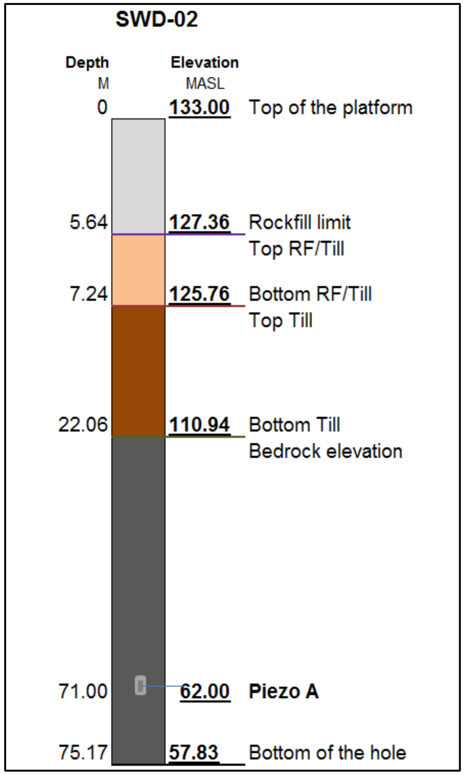


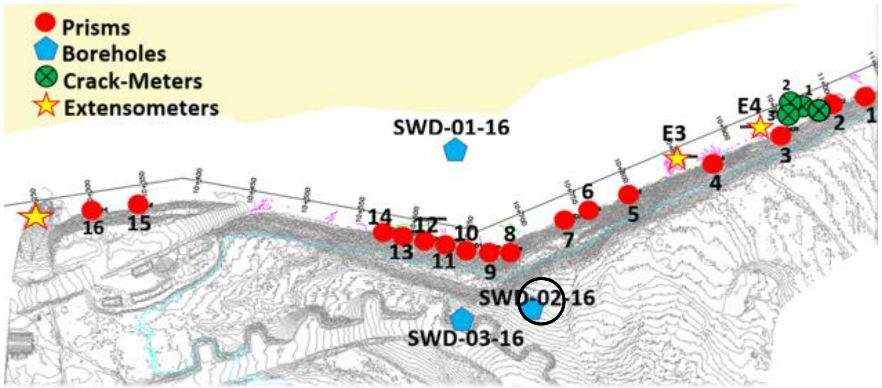
The piezometer stopped sending data on March 30, 2019.



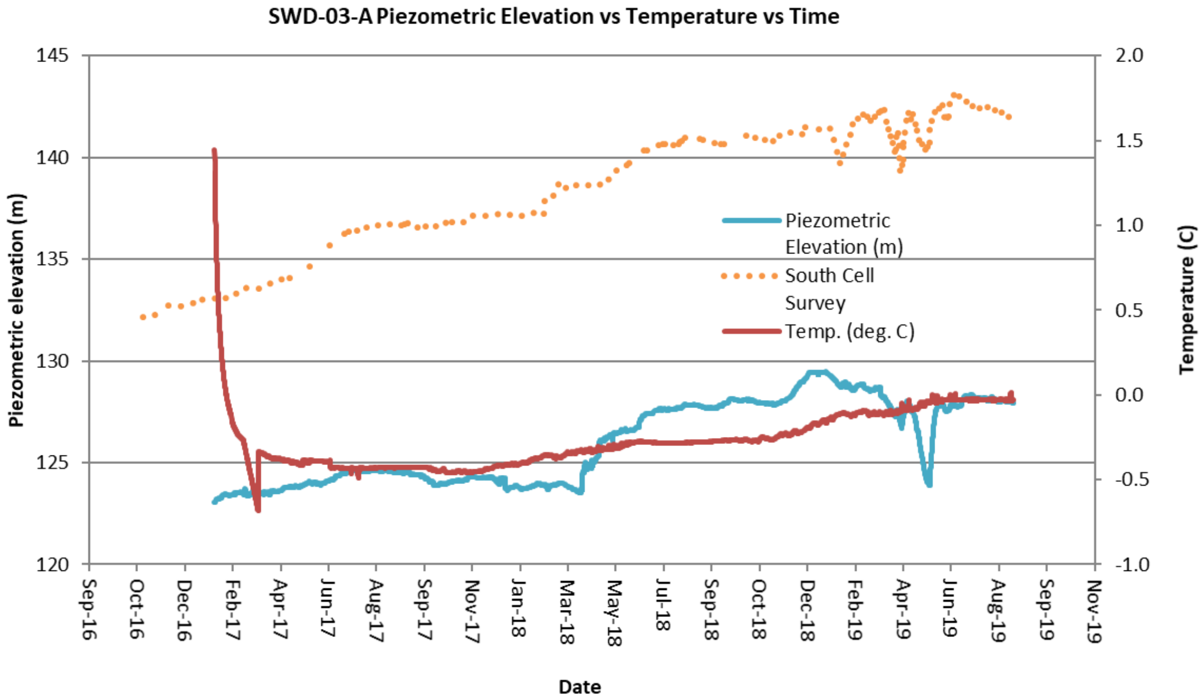
Thermistor SWD-02-16

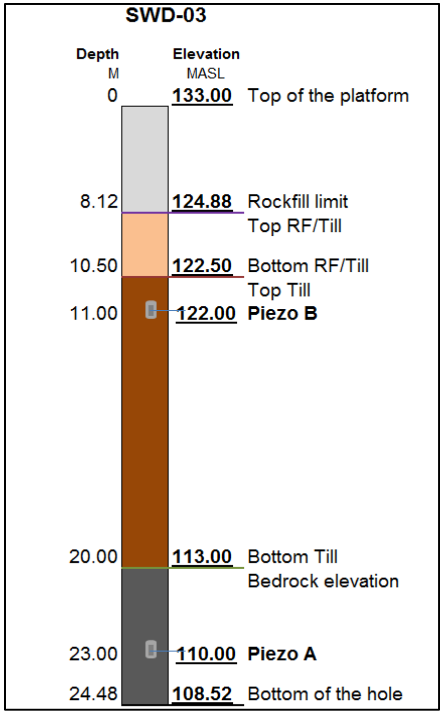




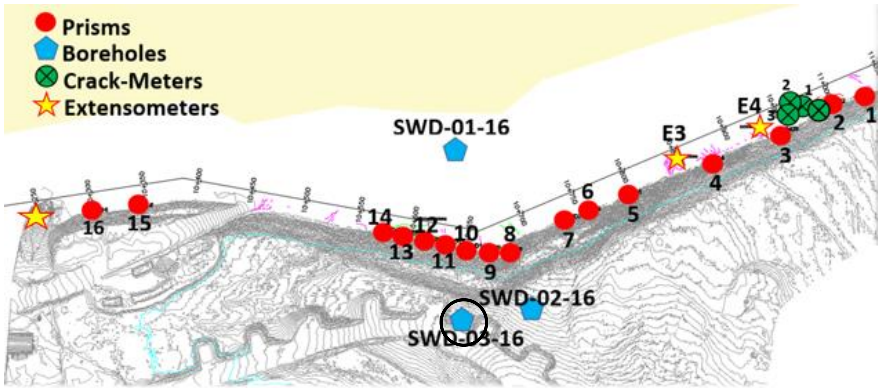


Piezometer SWD-03-16-A

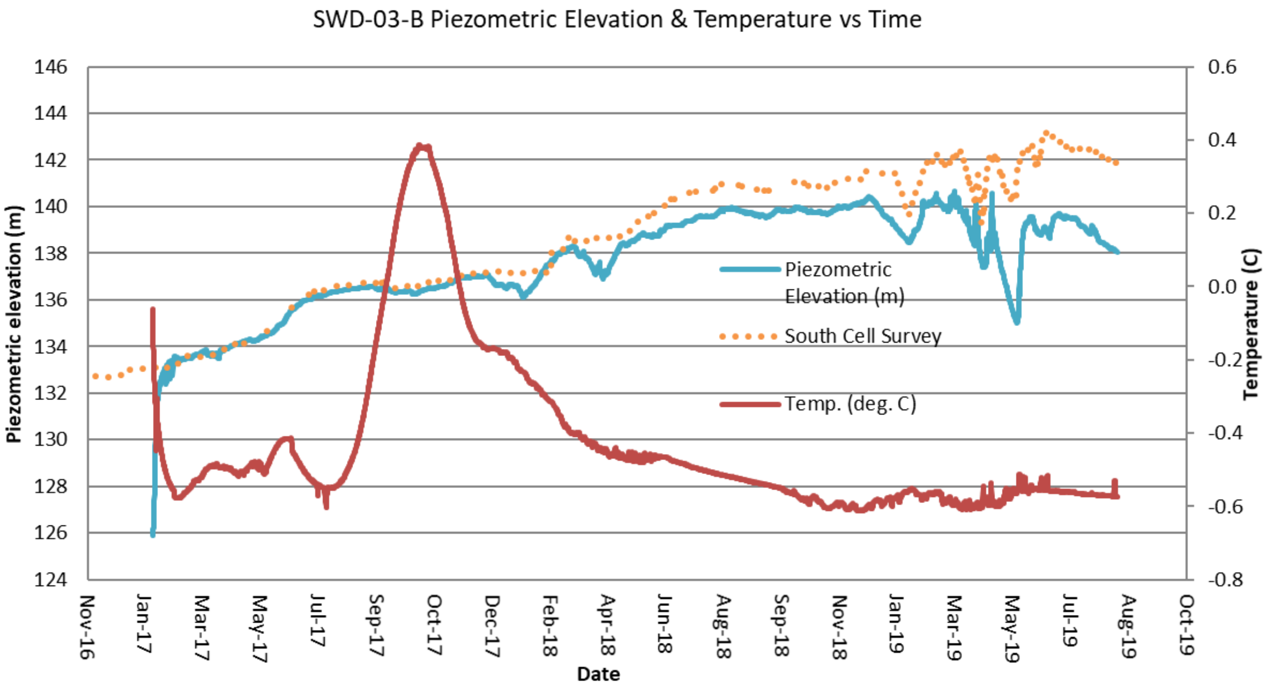


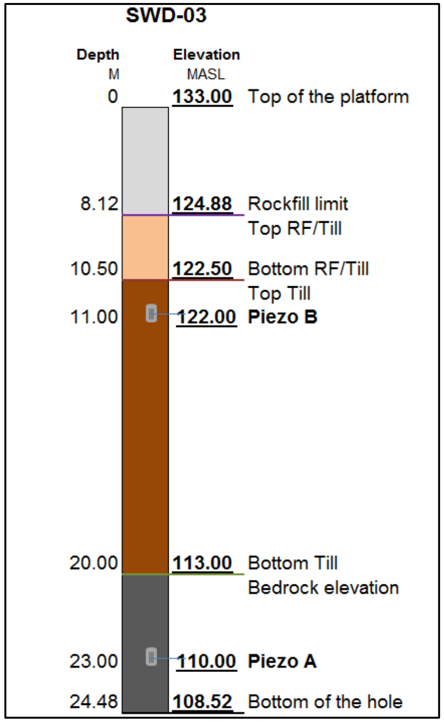


The instrument temperature is below the freezing point and therefore won't be interpreted.

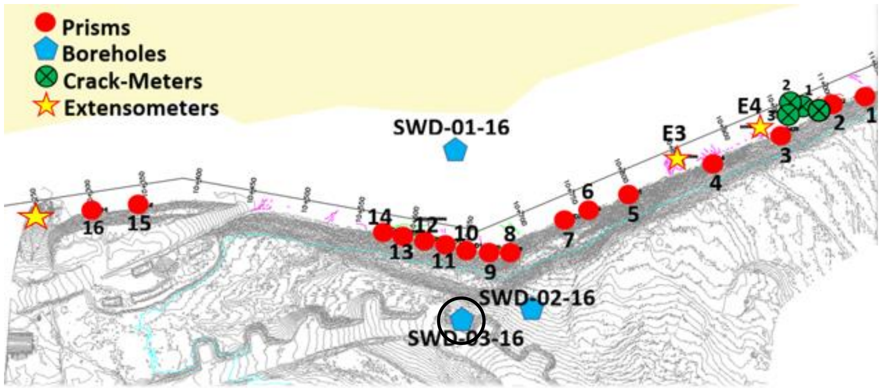


Piezometer SWD-03-16-B

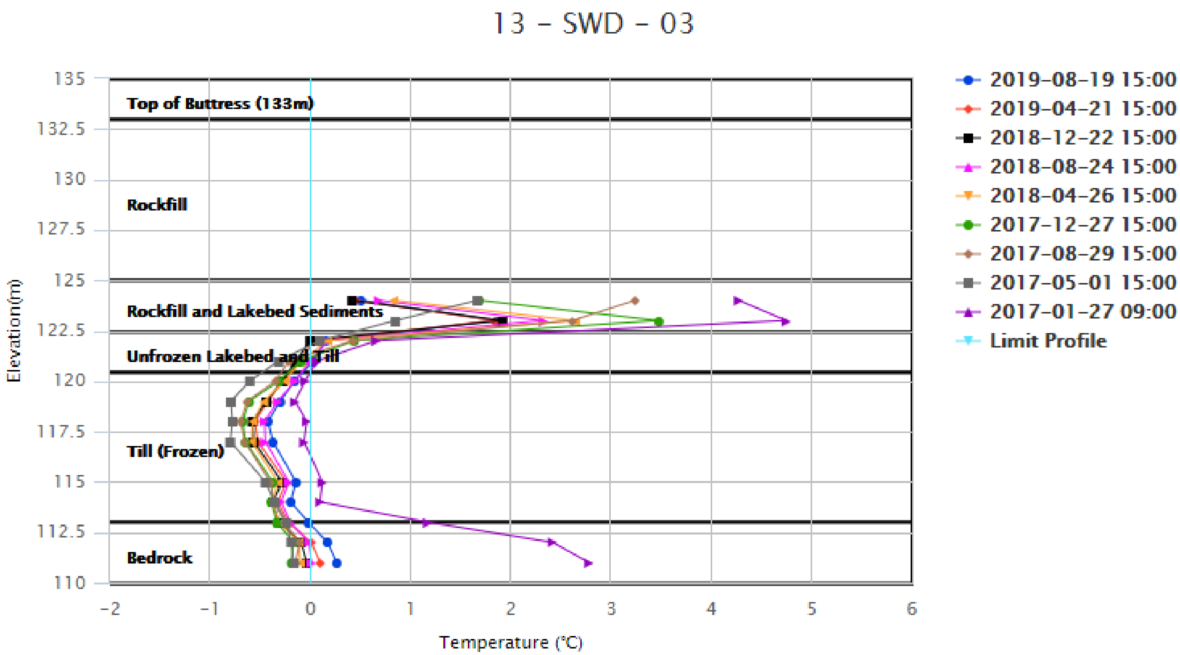


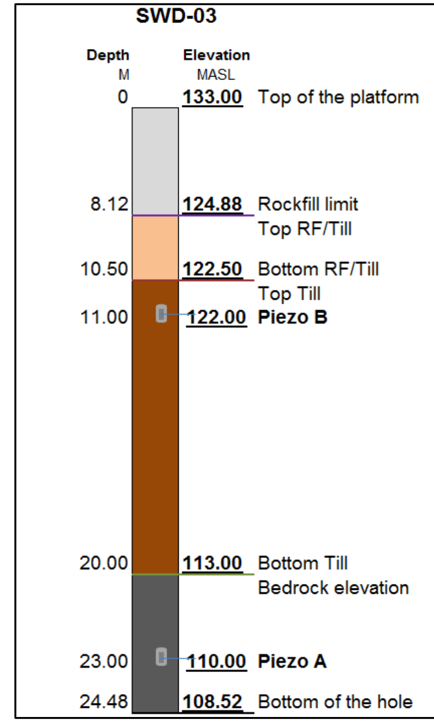


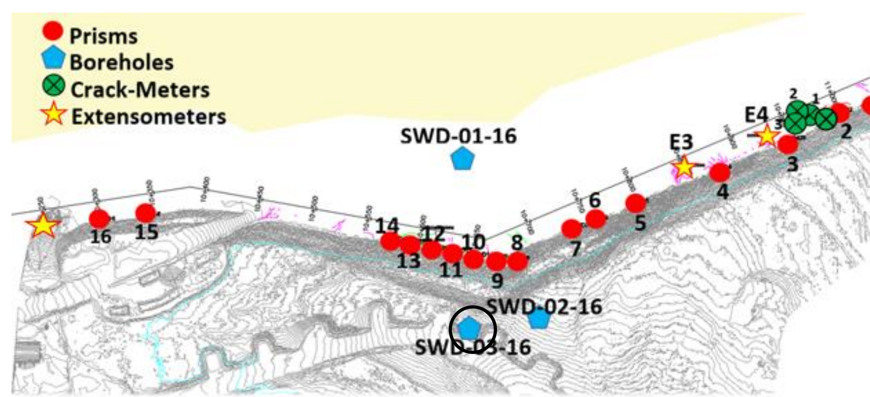
The instrument is below the freezing point. Therefore, it won't be interpreted.



Thermistor SWD-03-16

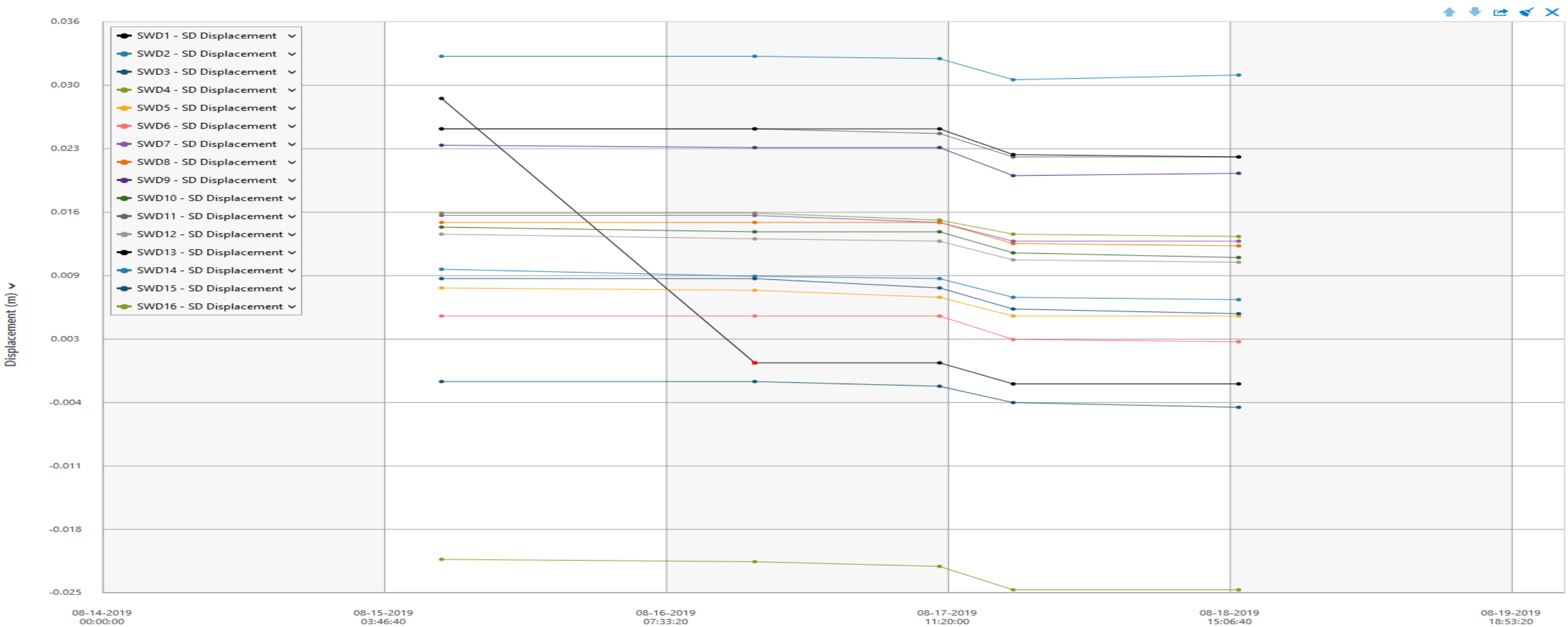




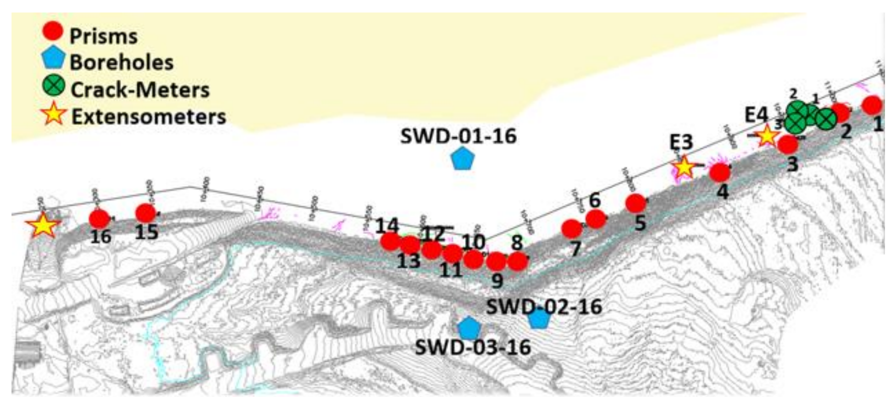


Prisms Monitoring

Prisms slope distance displacement (base line October 2018)



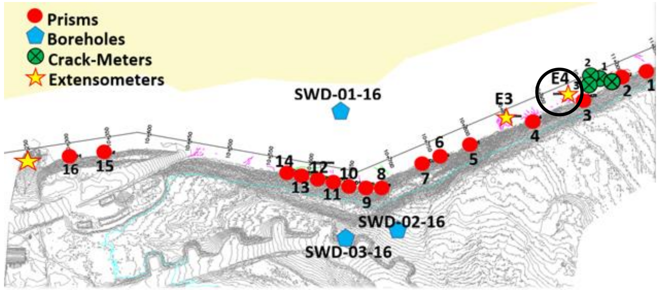
The Total Station is back from repair and a new base line was created last year to be able to monitored the internal structure as well. Adjustments needs to be implement into the GeoExplorer software. However, from last year base line there is very few displacement associated with the structure, ranging from +3cm to -2 cm. That confirm our visual inspections and other instrumentation.



Extensometers

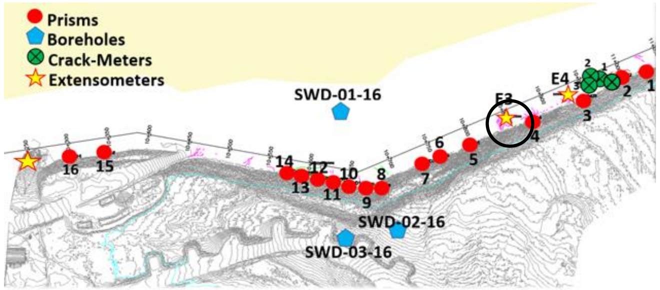
Extensometer 3 (10+ 850)

Date (dd/mm/yyyy)	Time(hh:mm)	Reading (m)	Cumulative Difference (m)	Wireline was relocated/moved (YES/NO)	Daily rate (mm/day)	Status	Action required
01-02-19	11:00	5.629	0.5	NO	-0.2	1	Normal
24-02-19	17:00	5.634	0.5	NO	0.2	1	Normal
24-04-19	11:00	5.629	0.5	NO	-0.1	1	Normal
26-05-19	15:00	5.620	0.5	NO	-0.3	1	Normal
23-06-19	16:00	5.625	0.5	NO	0.2	1	Normal
01-07-19	9:45	5.630	0.5	NO	0.6	1	Normal
19-07-19	15:45	5.630	0.5	NO	0.0	1	Normal
17-08-19	10:45	5.633	0.5	NO	0.1	1	Normal



Extensometer 4 (10+ 925)

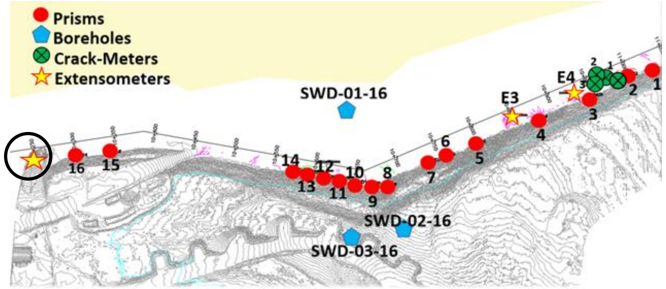
Date (dd/mm/yyyy)	Time(hh:mm)	Reading (m)	Cumulative Difference (m)	Wireline was relocated/moved (YES/NO)	Daily rate (mm/day)	Status	Action required
07-01-19	14:00	6.812	0.023	NO	0.000	1	Normal
01-02-19	11:00	6.810	0.021	NO	0.000	1	Normal
24-04-19	17:00	6.810	0.0	NO	0.000	1	Normal
26-05-19	15:00	6.80	0.0	NO	0.000	1	Normal
23-06-19	16:00	6.80	0.0	NO	0.000	1	Normal
03-07-19	10:00	6.80	0.0	NO	0.000	1	Normal
19-07-19	11:50	6.80	0.0	NO	0.000	1	Normal
17-08-19	16:50	6.80	0.0	NO	0.000	1	Normal



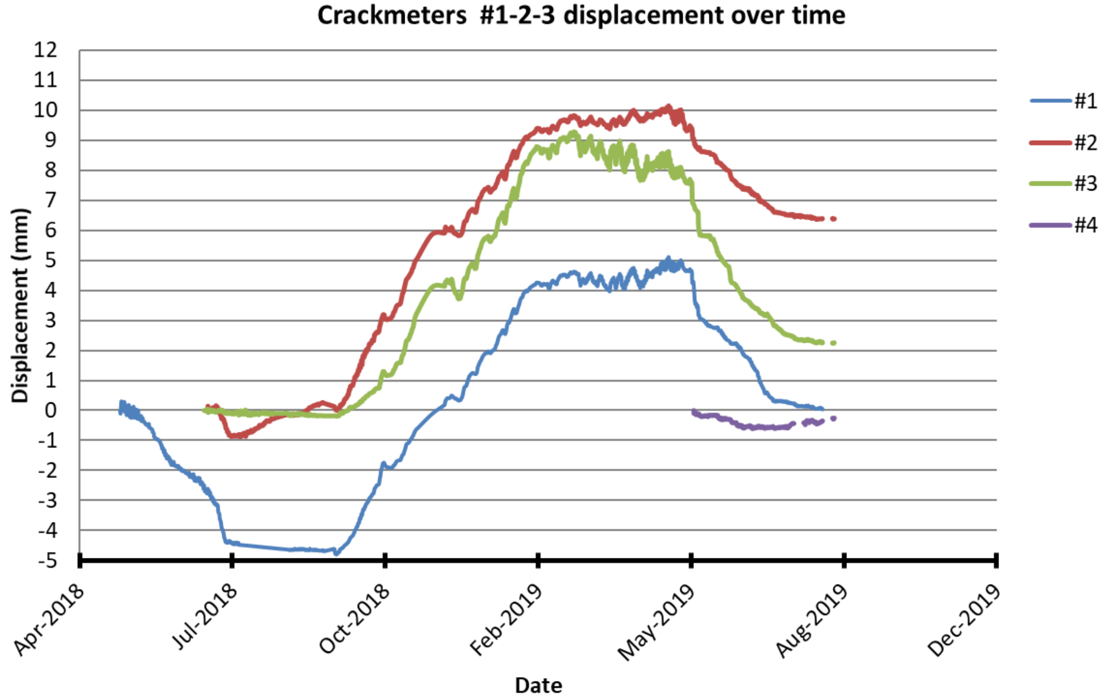
Extensometer 6 (Booster Pump)

Date (dd/mm/yyyy)	Time(hh:mm)	Reading (m)	Cumulative Difference (m)	Wireline was relocated/moved (YES/NO)	Daily rate (mm/day)	Status	Action required
24-06-19	10:15	0.300		YES	Not Applicable	Not Applicable	Not Applicable
19-07-19	16:00	0.289	-0.011	NO	0.000	1	Normal
17-08-19	11:00	0.293	-0.007	NO	0.000	1	Normal

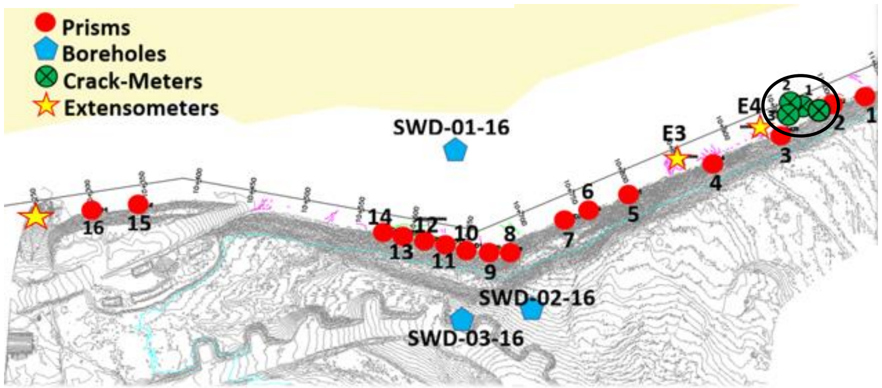
An additional extensometer was installed close to the booster pump after the apparition of small tension cracks. Original cracks are not showing any progression and the extensometer is confirming the visual observations.



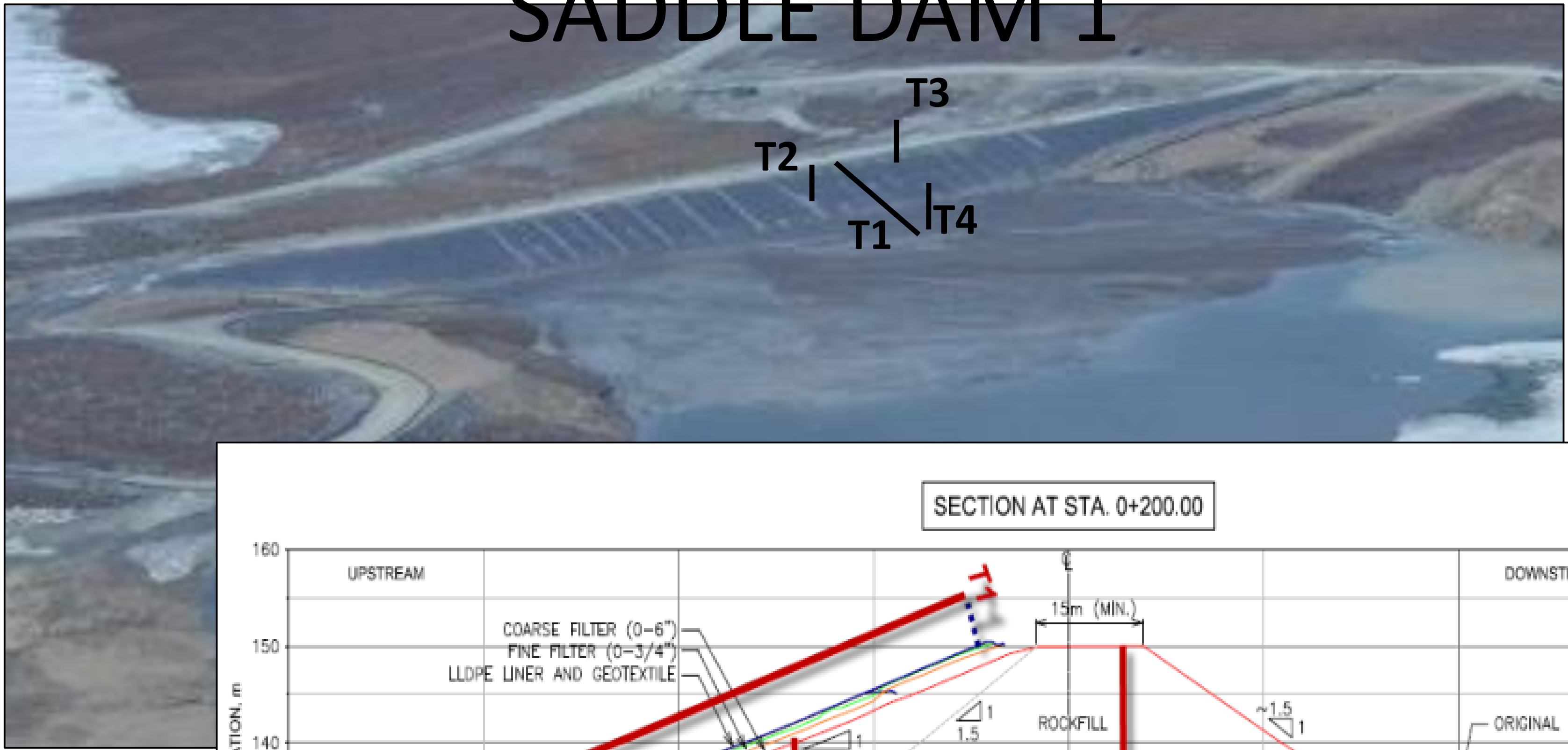
Crackmeter 1-2-3 (10+ 975)

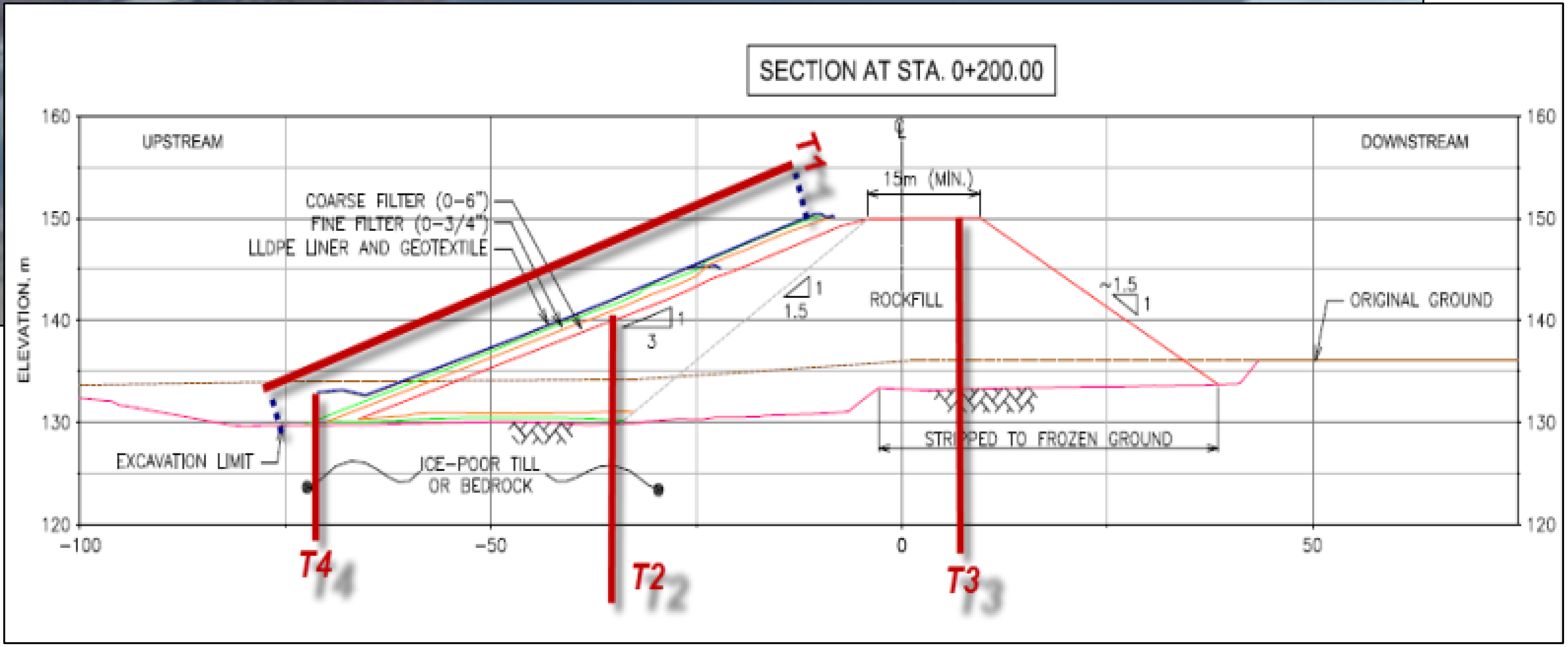


All of the crackmeter are showing stable result without significant trend during the past month. All of them have been disable by wildlife during the period and were repaired. However, crackmeter # 1 is still not functioning. We will repair it again.

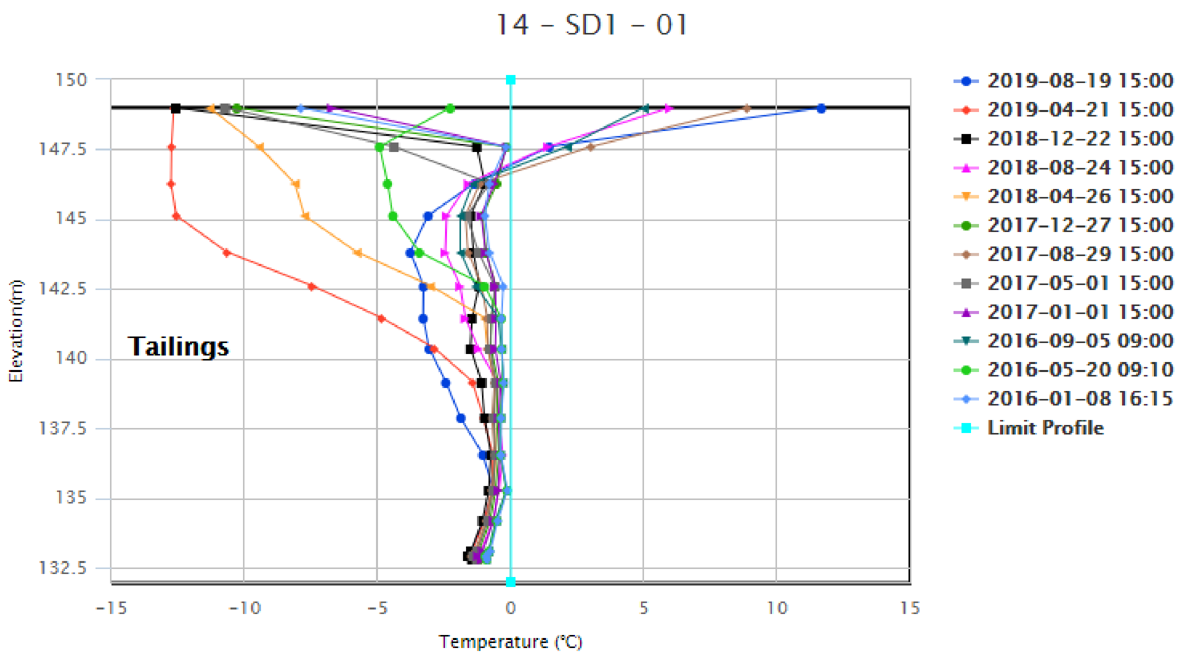


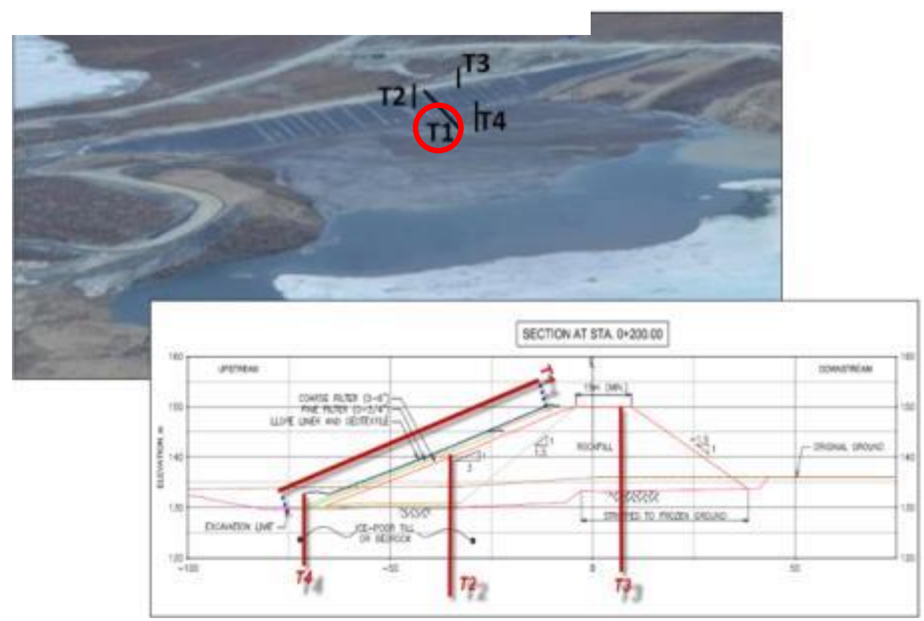
APPENDIX III
SADDLE DAM 1



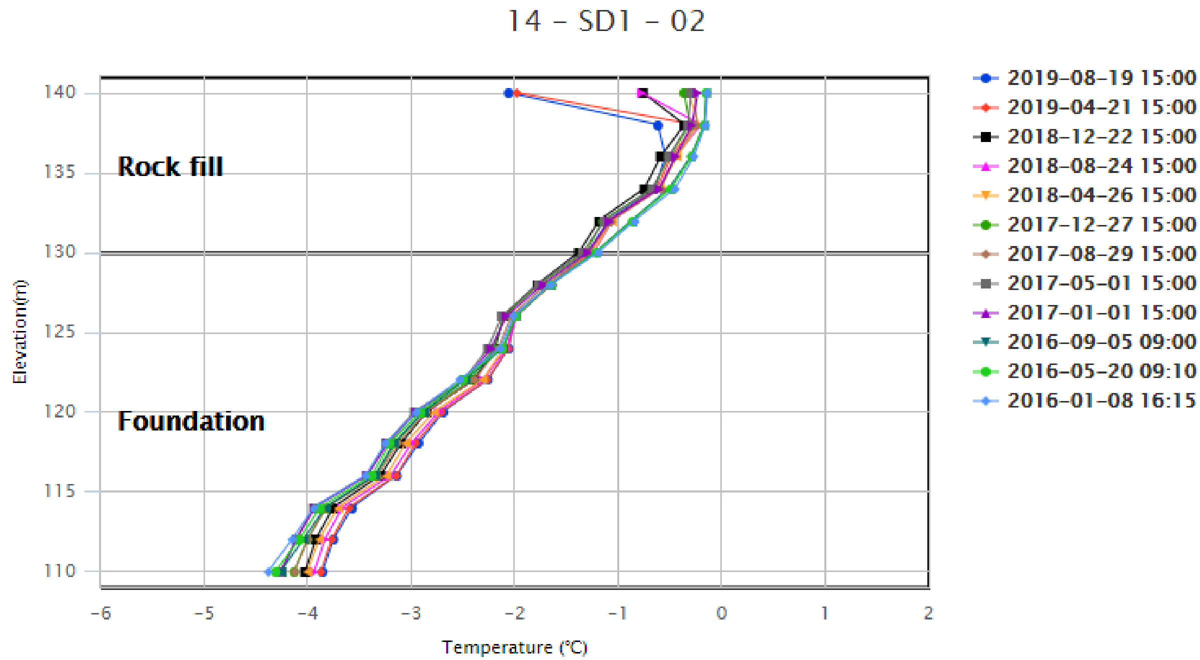


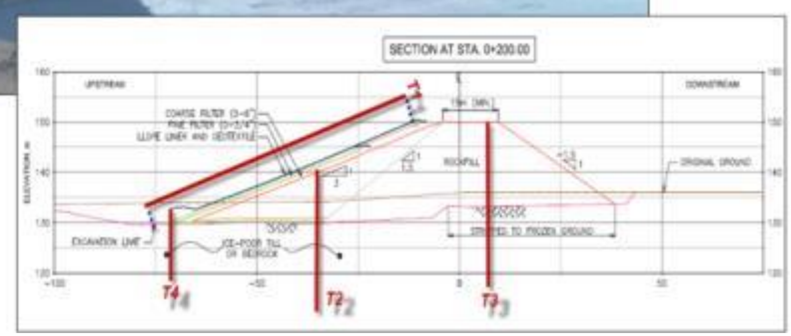
Thermistor SD1-01



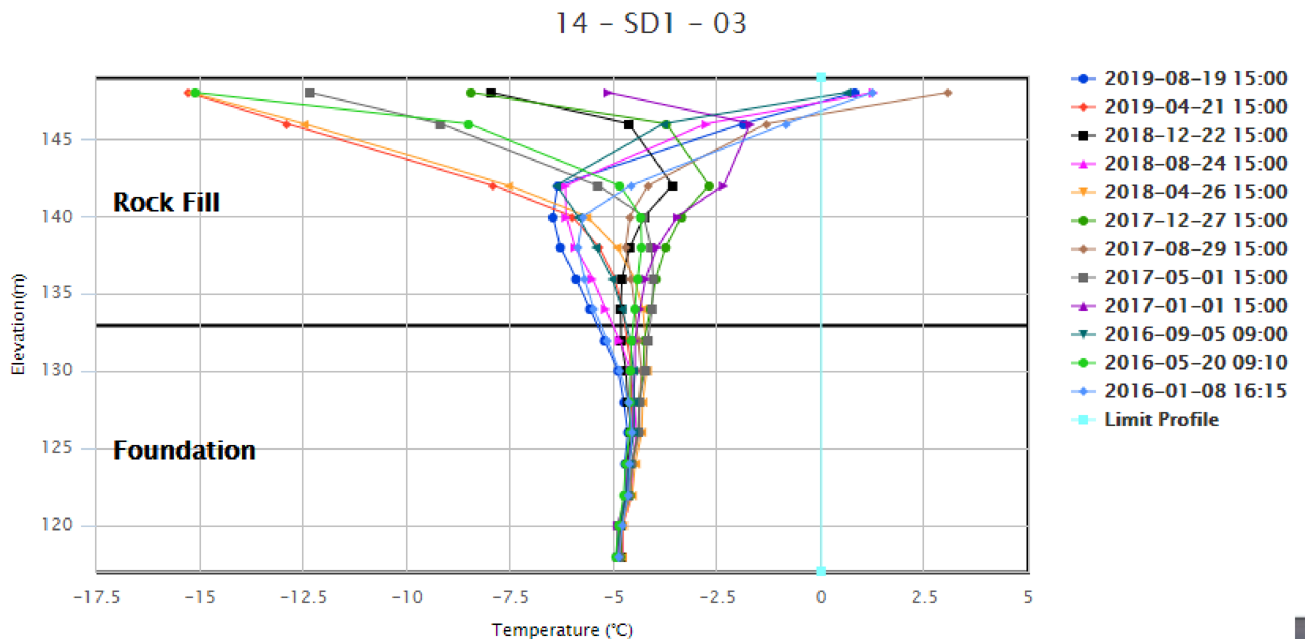


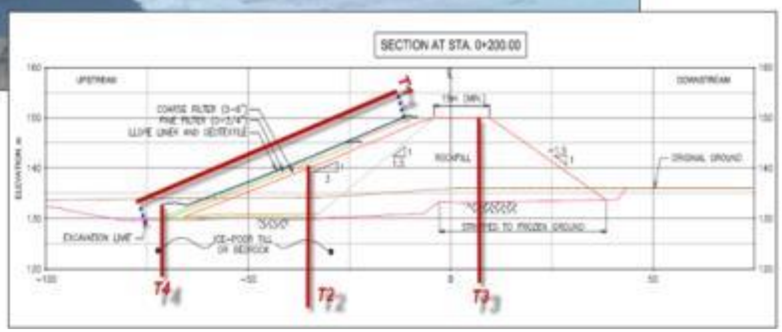
Thermistor SD1-02



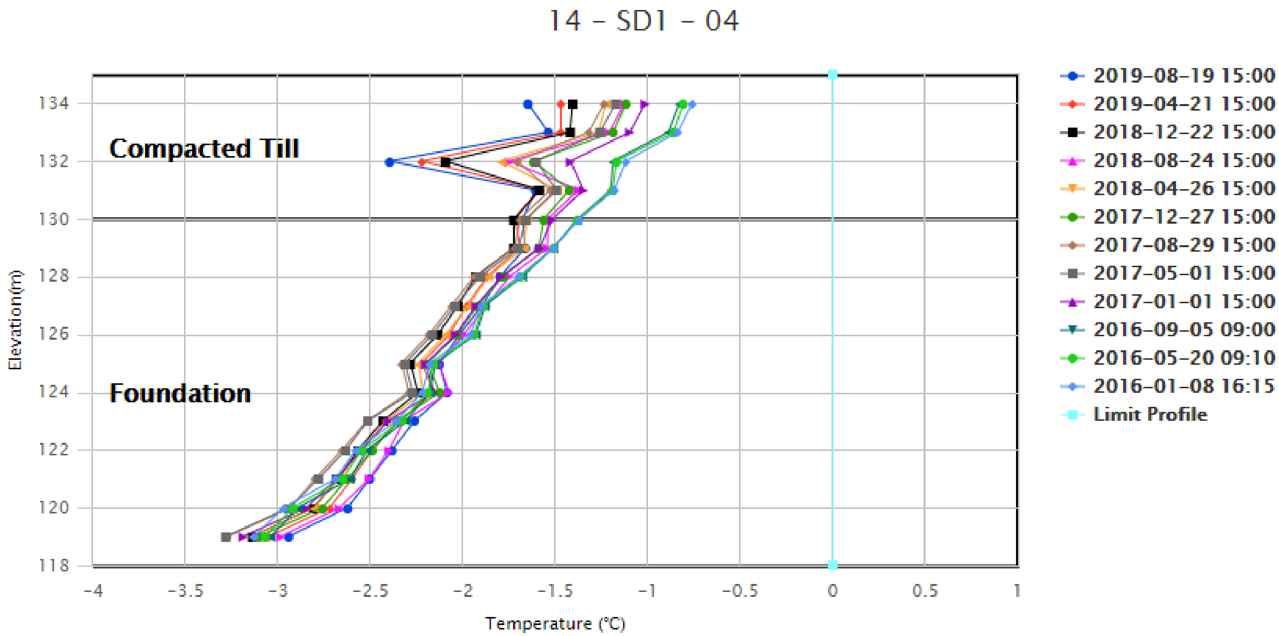


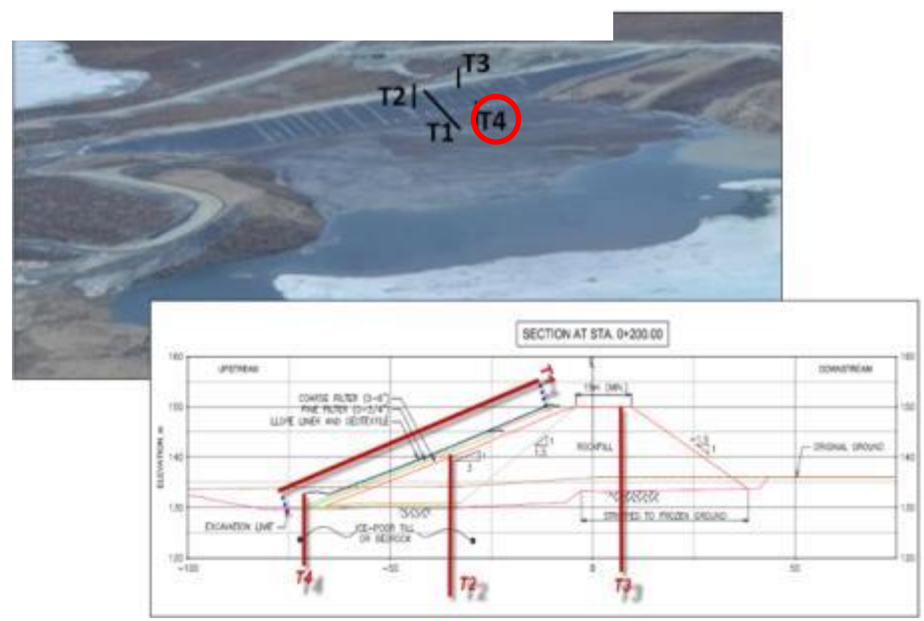
Thermistor SD1-03



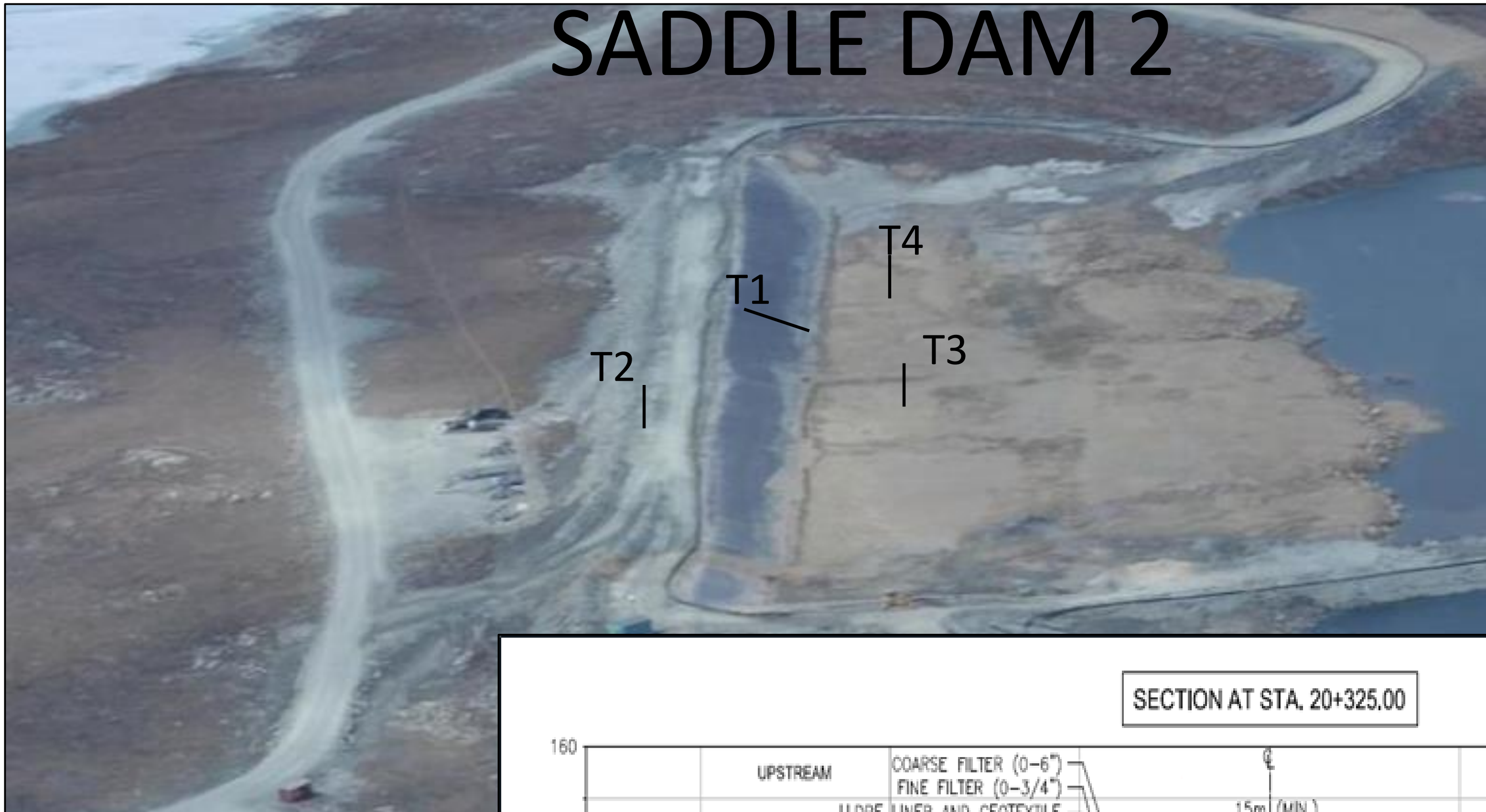


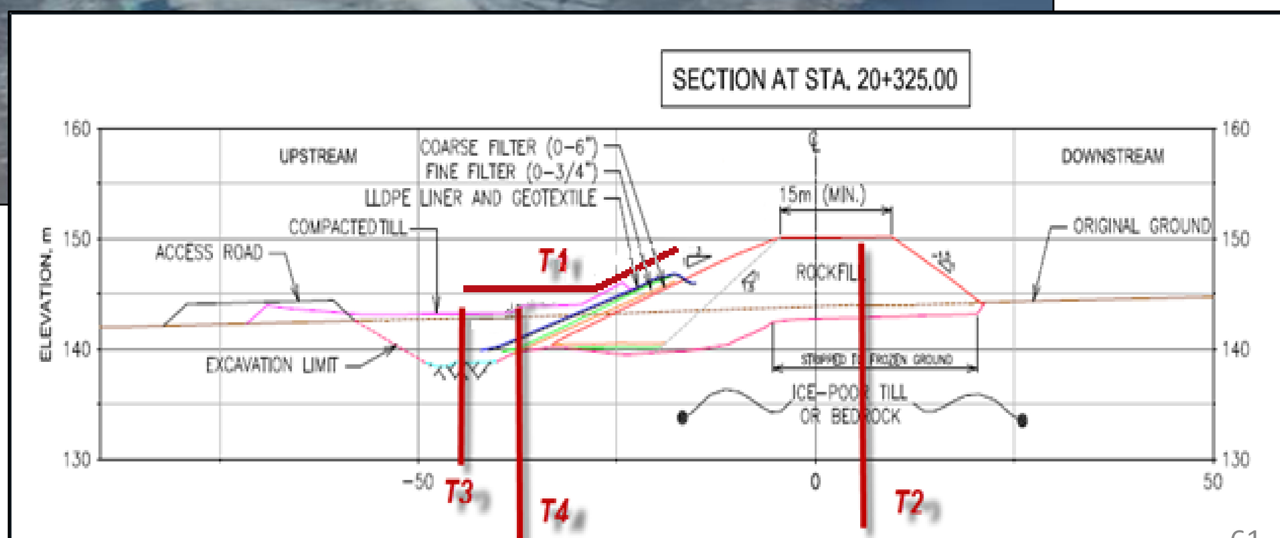
Thermistor SD1-04



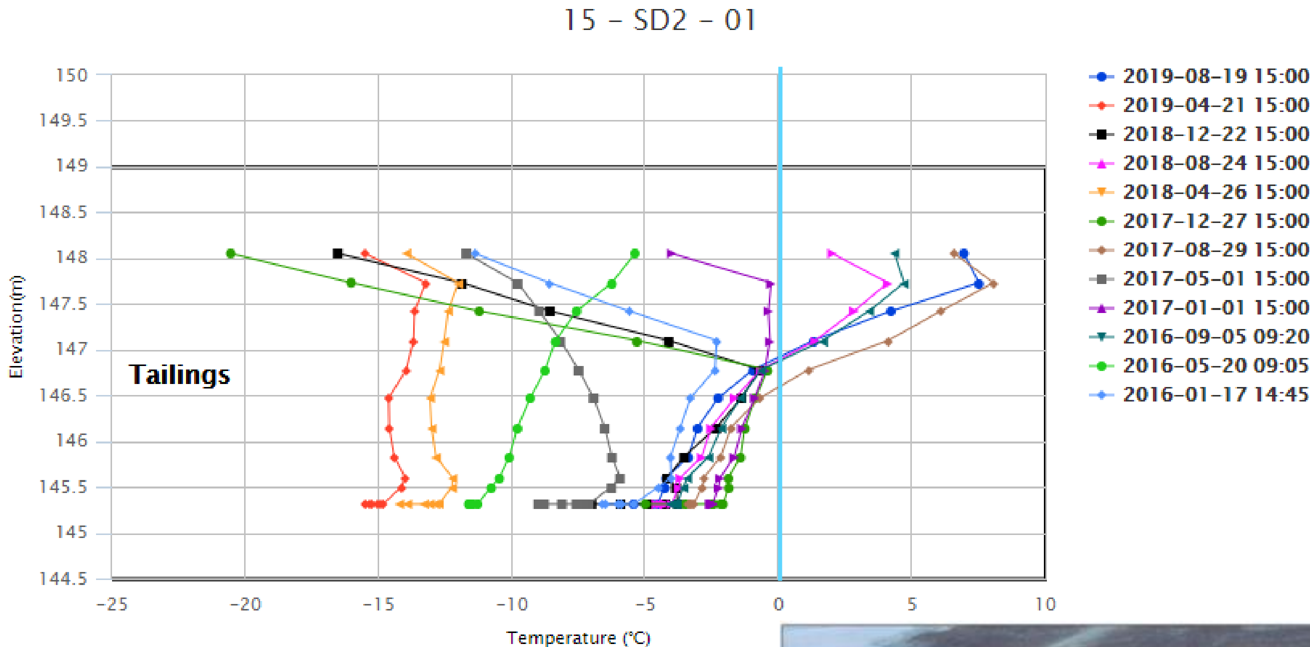


APPENDIX IV
SADDLE DAM 2

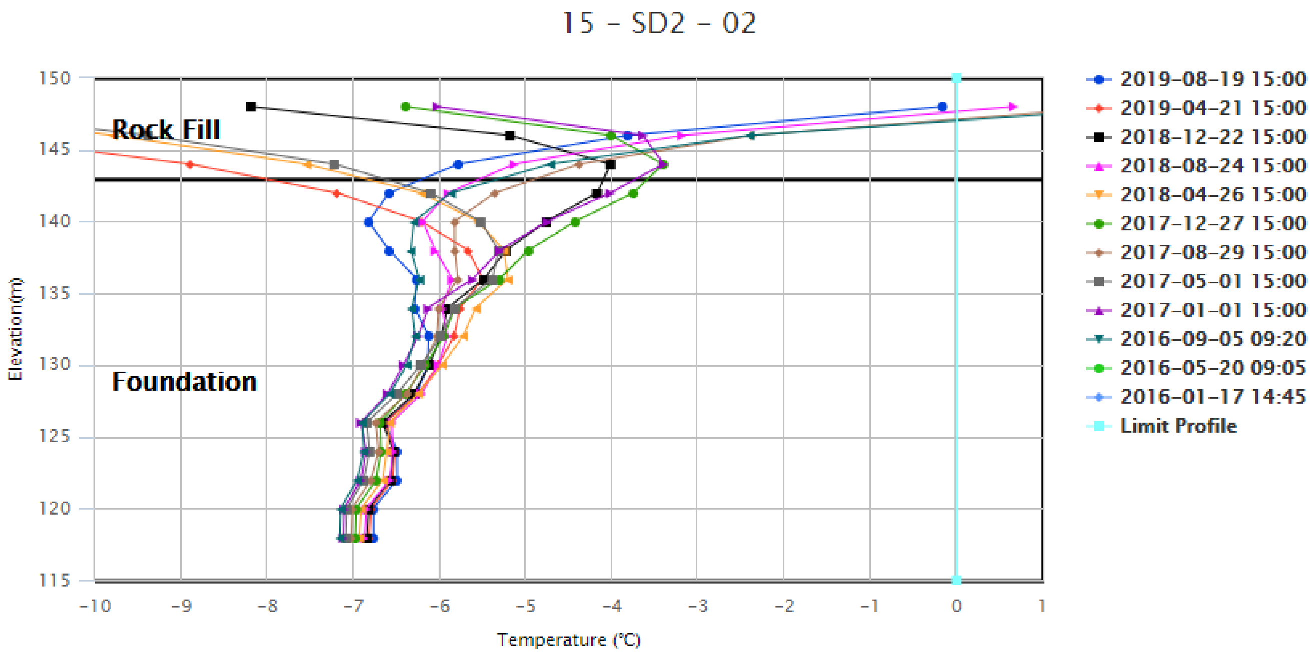




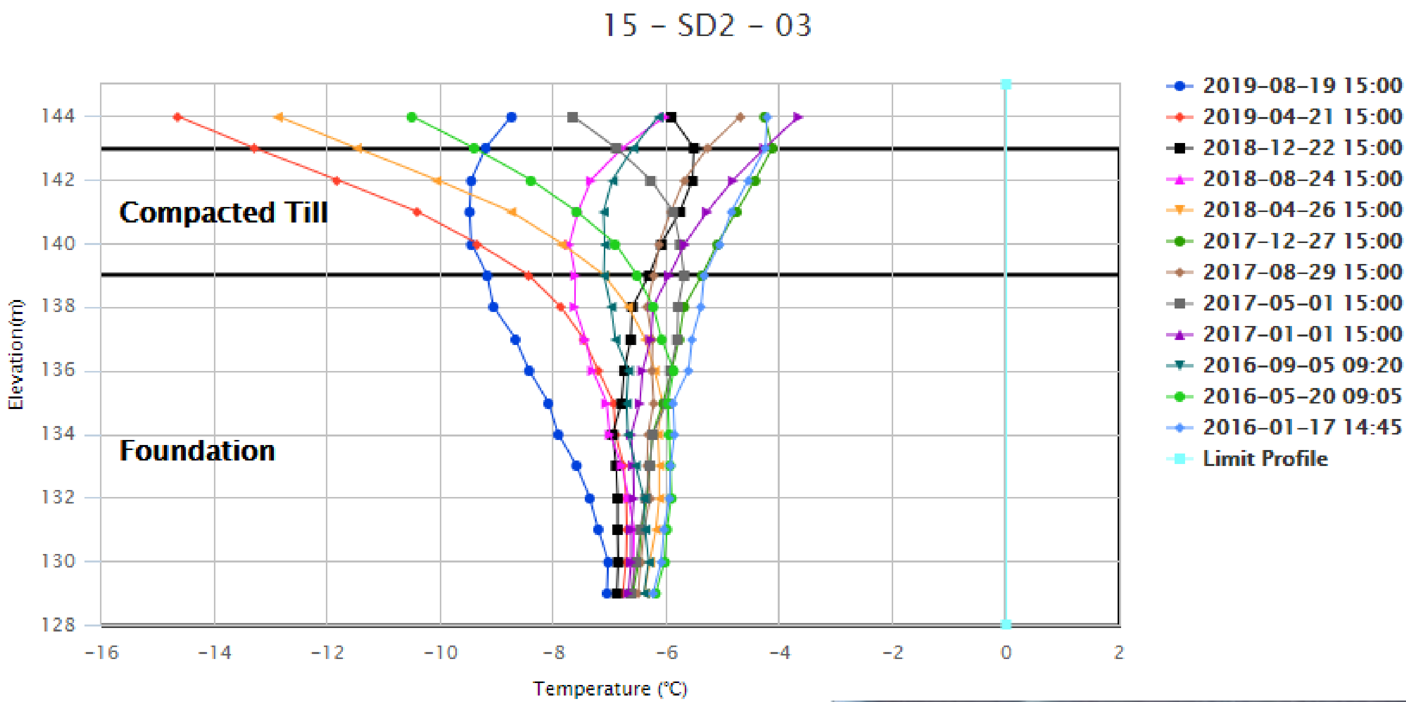
Thermistor SD2-01



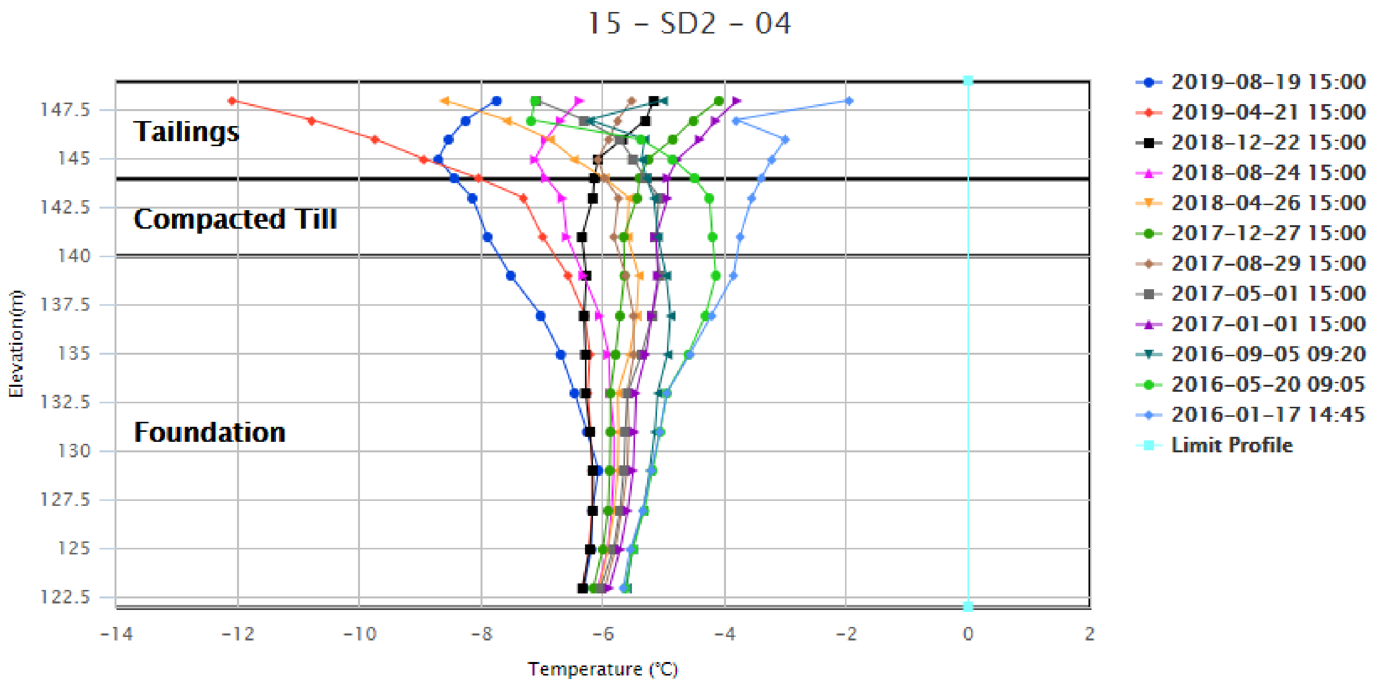
Thermistor SD2-02

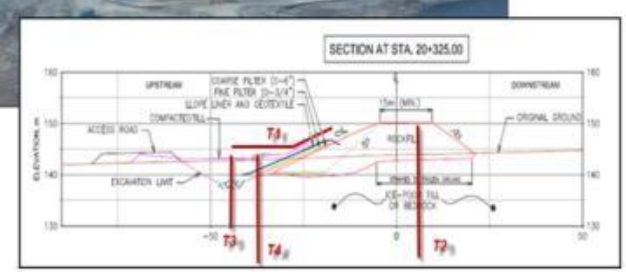


Thermistor SD2-03

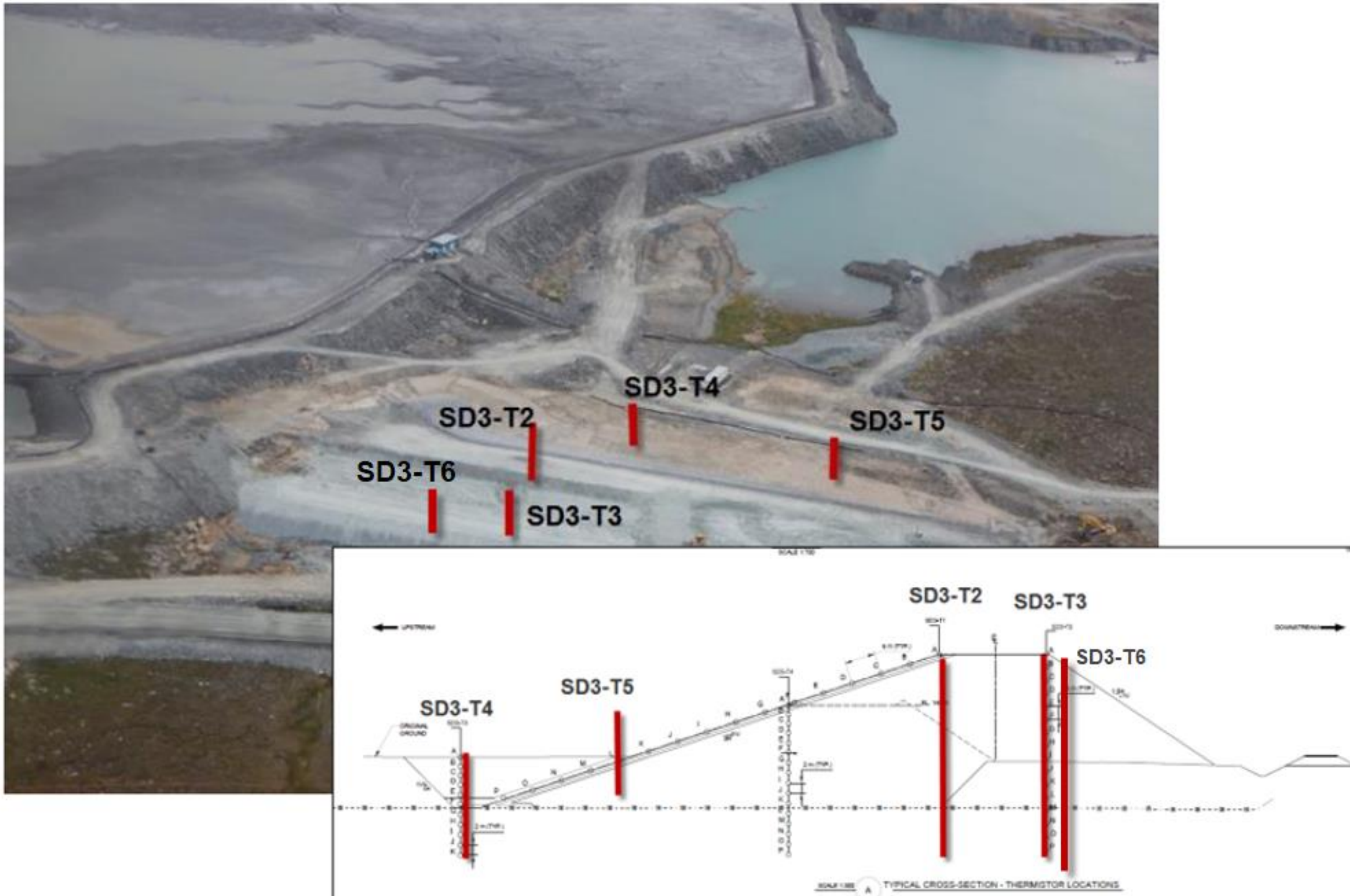


Thermistor SD2-04

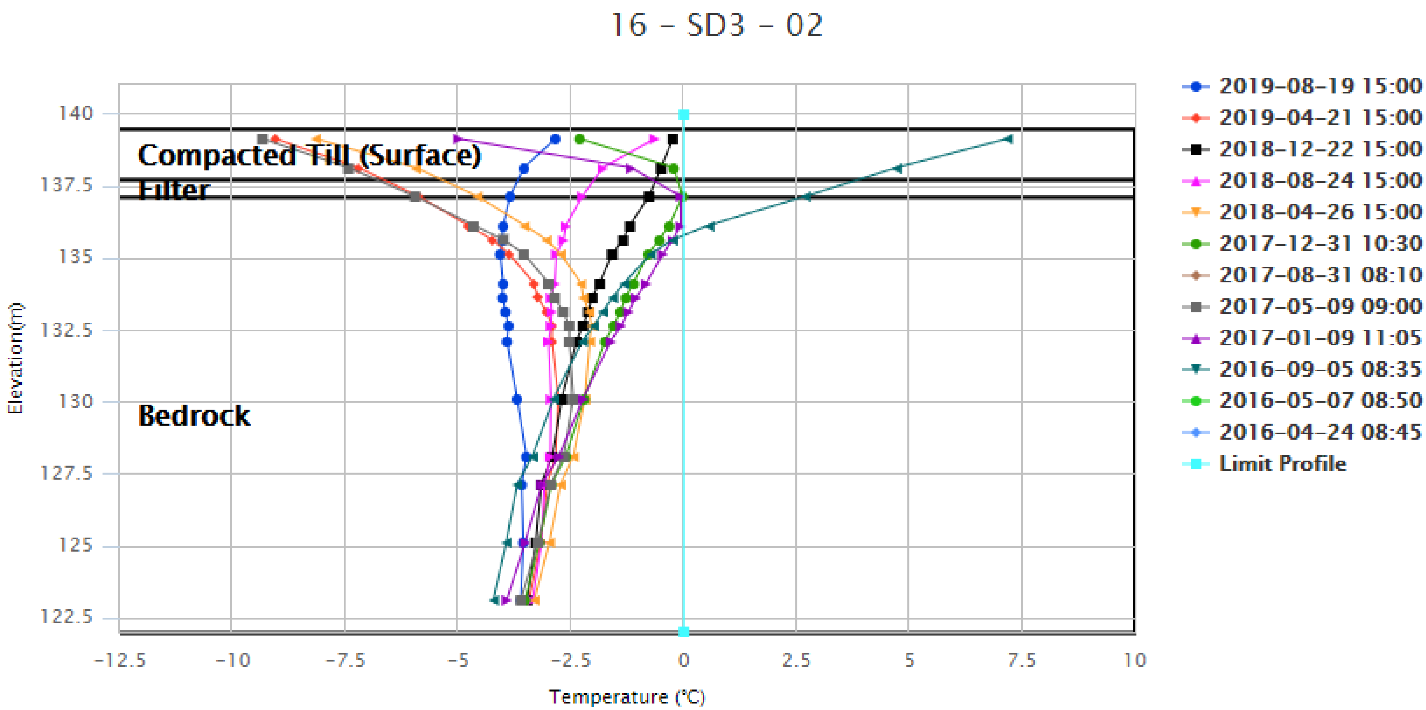




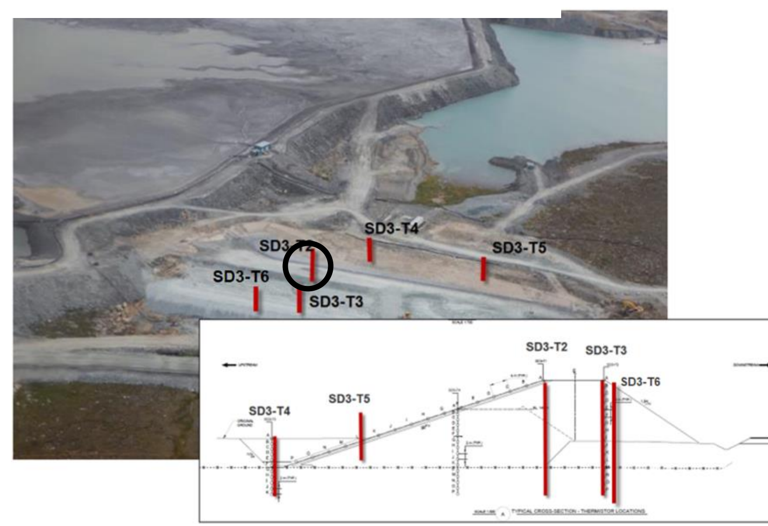
APPENDIX V
SADDLE DAM 3



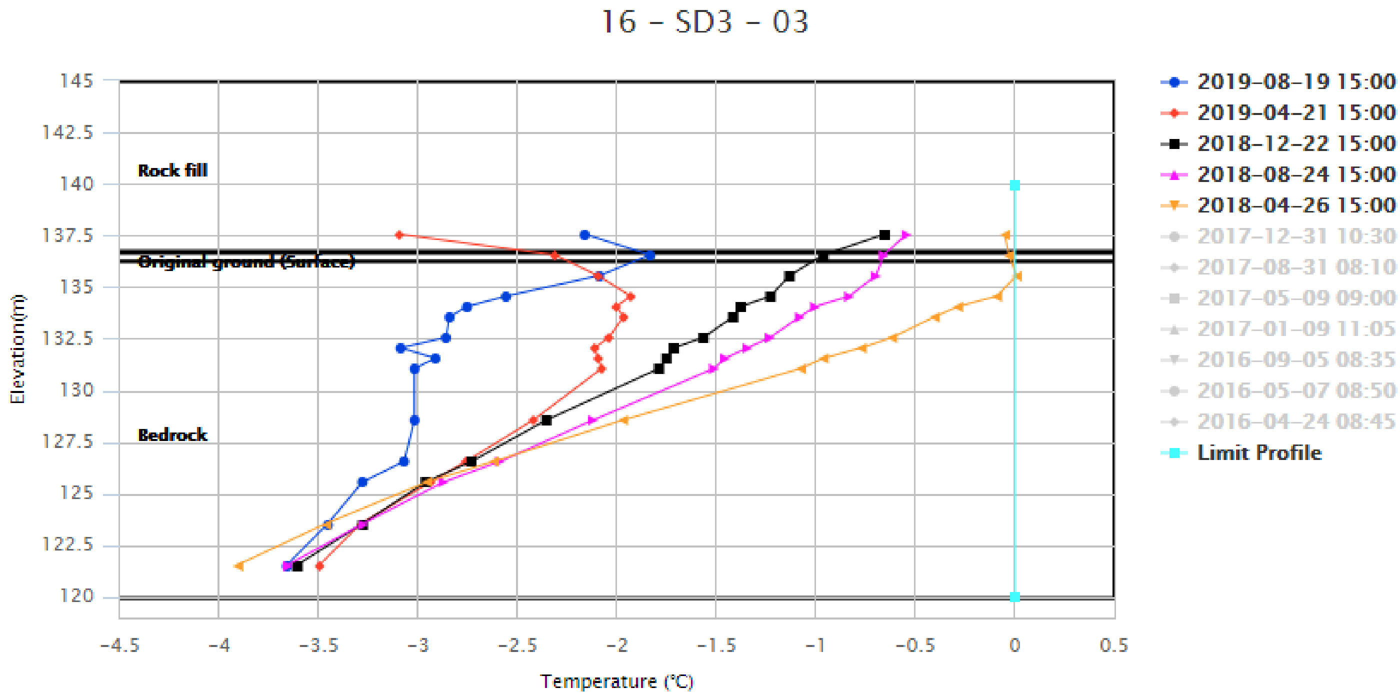
Thermistor SD3-T2

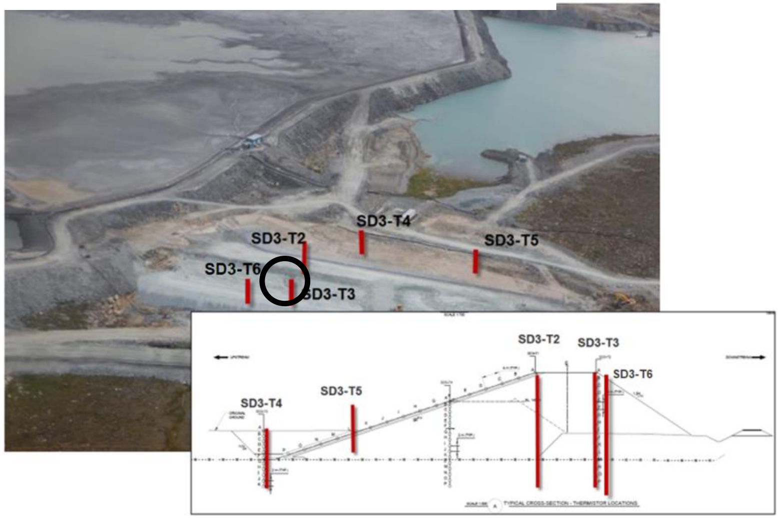


All temperatures were below the freezing point during Q2, 2019. From the bedrock layer to the bottom of the hole, temperature dropped significantly.

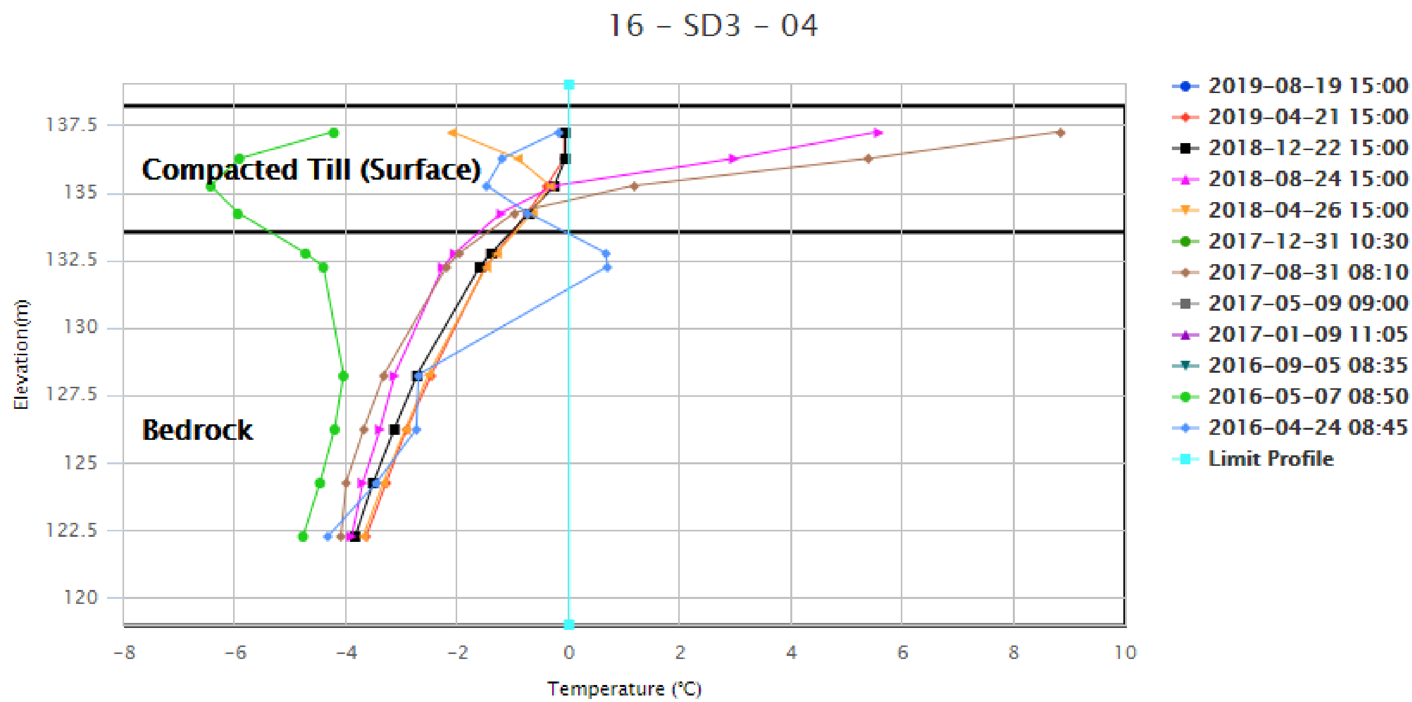


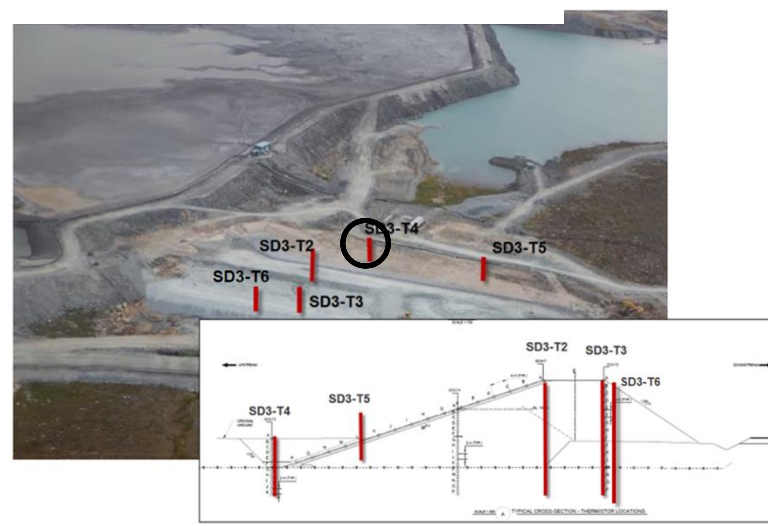
Thermistor SD3-T3



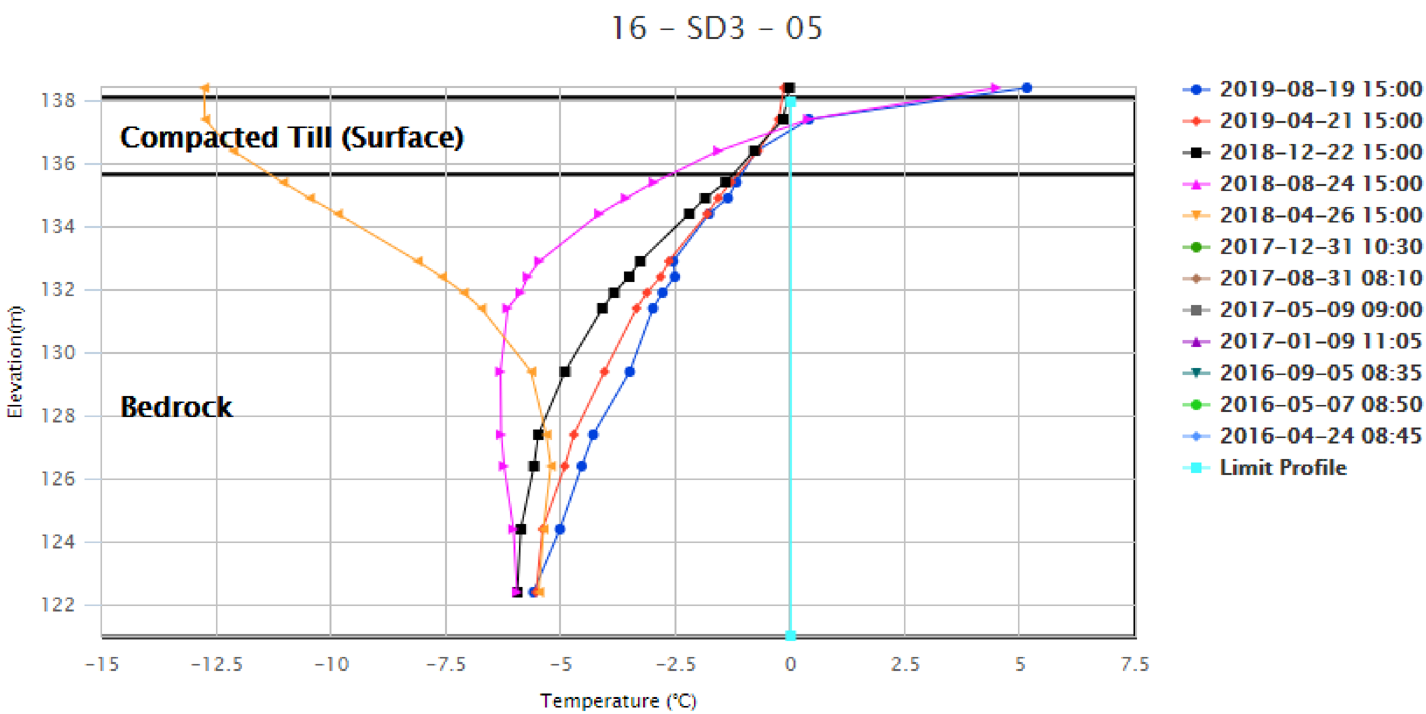


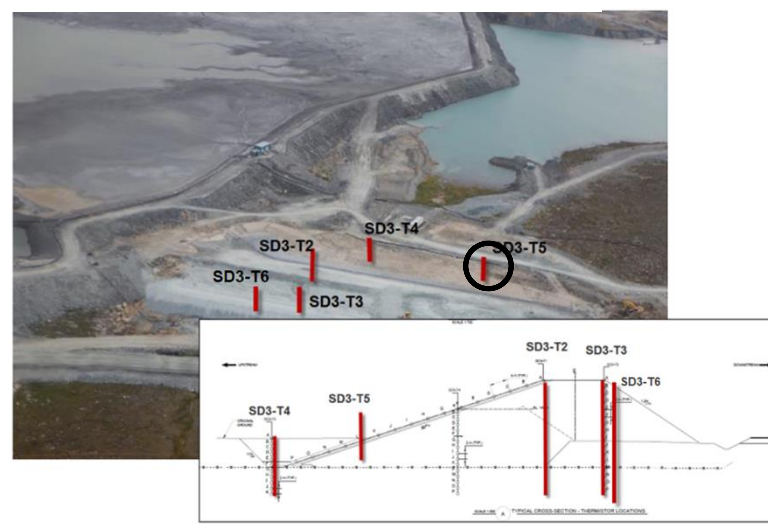
Thermistor SD3-T4



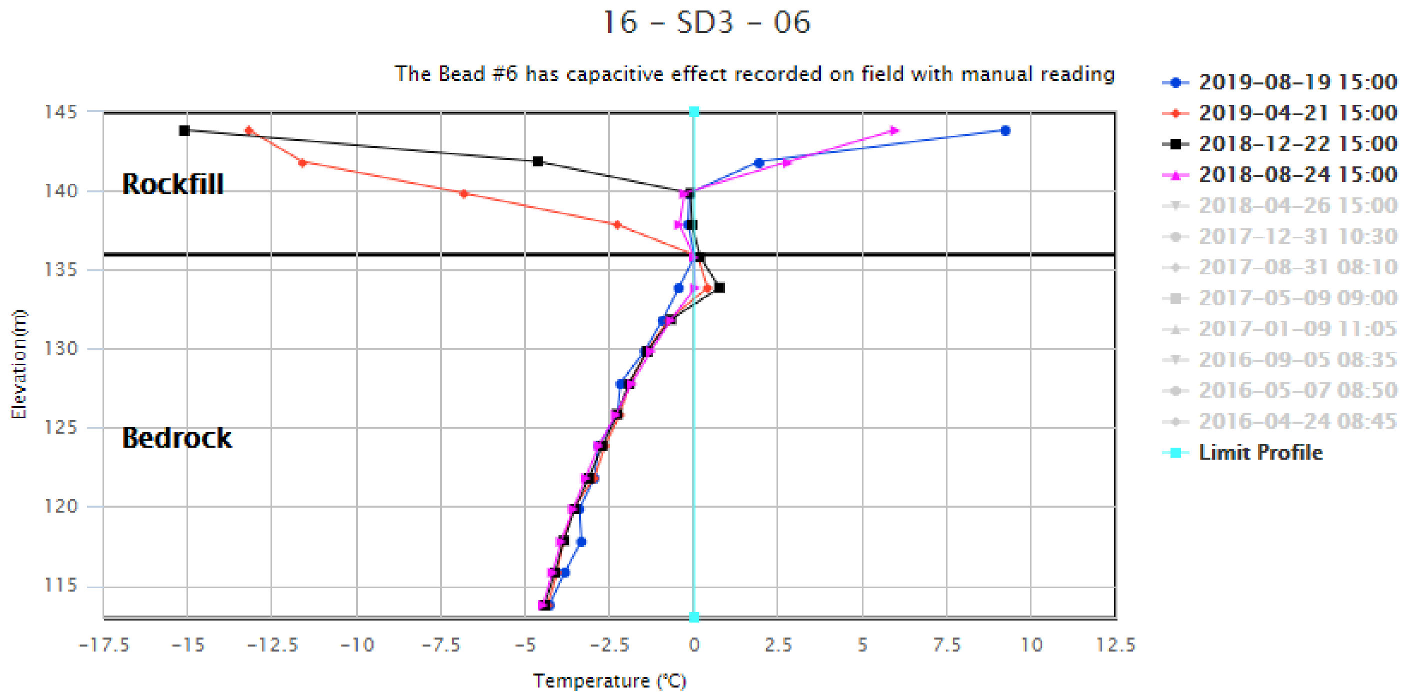


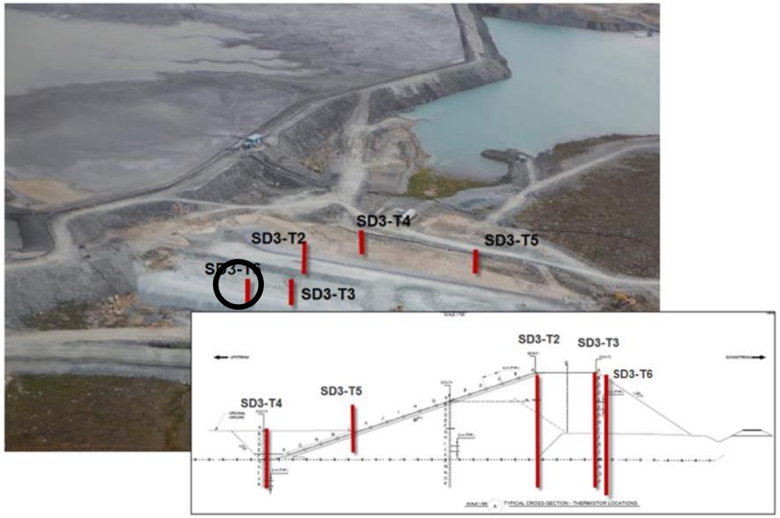
Thermistor SD3-T5



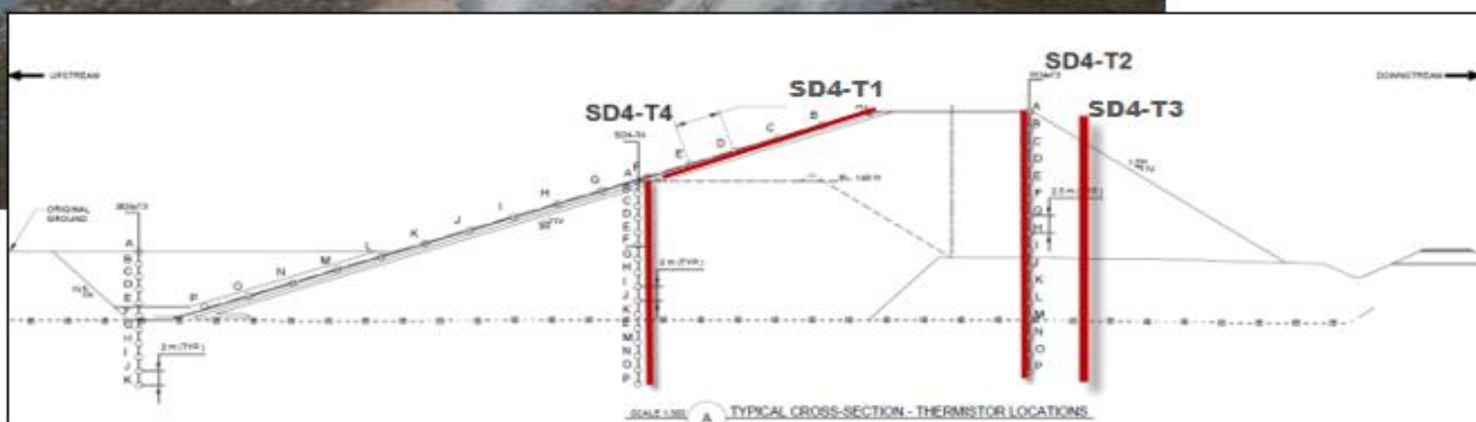


Thermistor SD3-T6

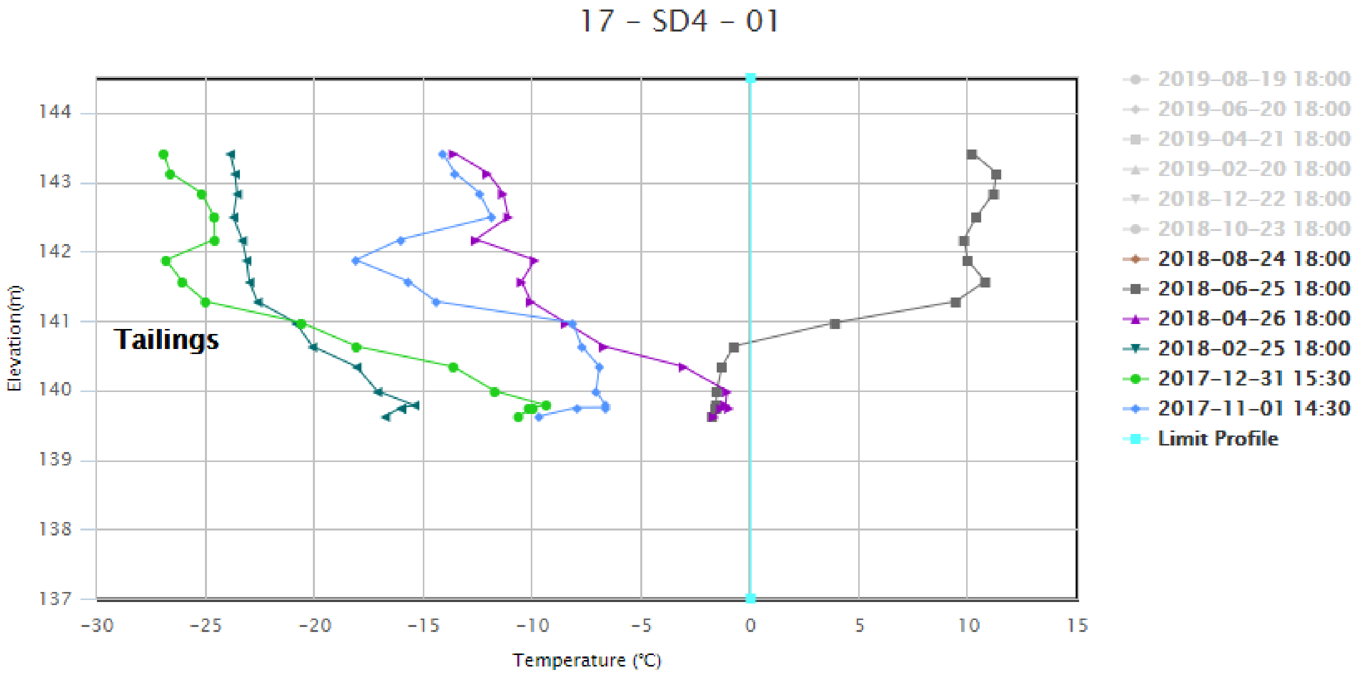




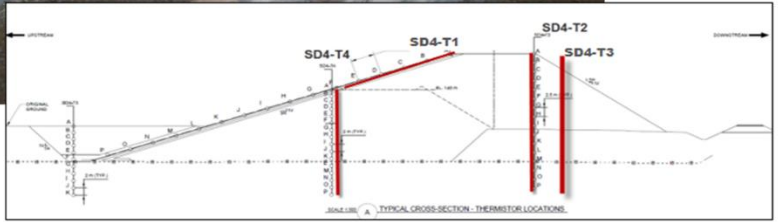
APPENDIX VI
SADDLE DAM 4



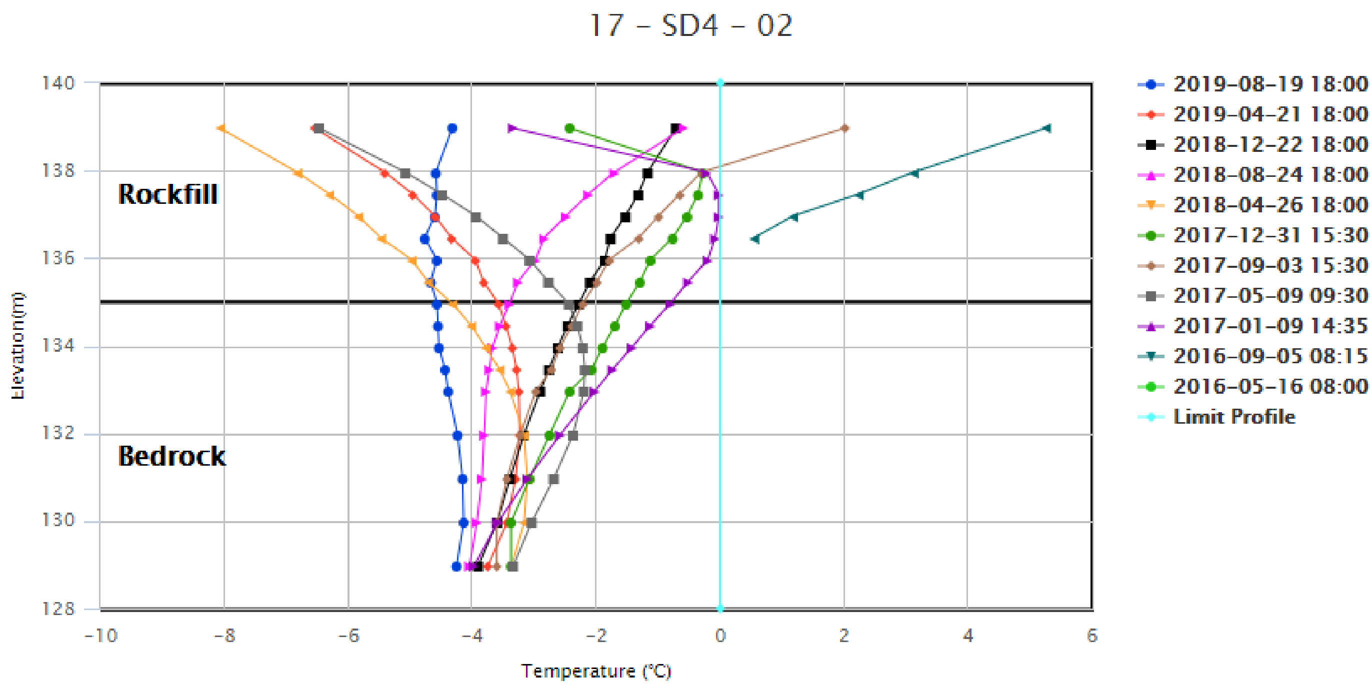
Thermistor SD4-T1

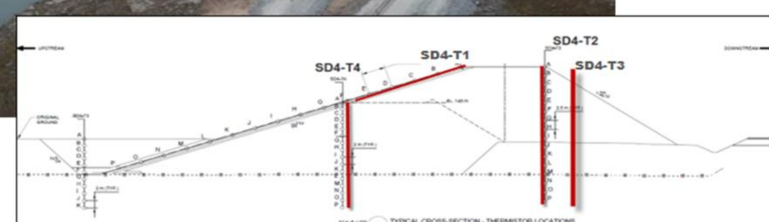


The thermistor has not given data since August 2018.

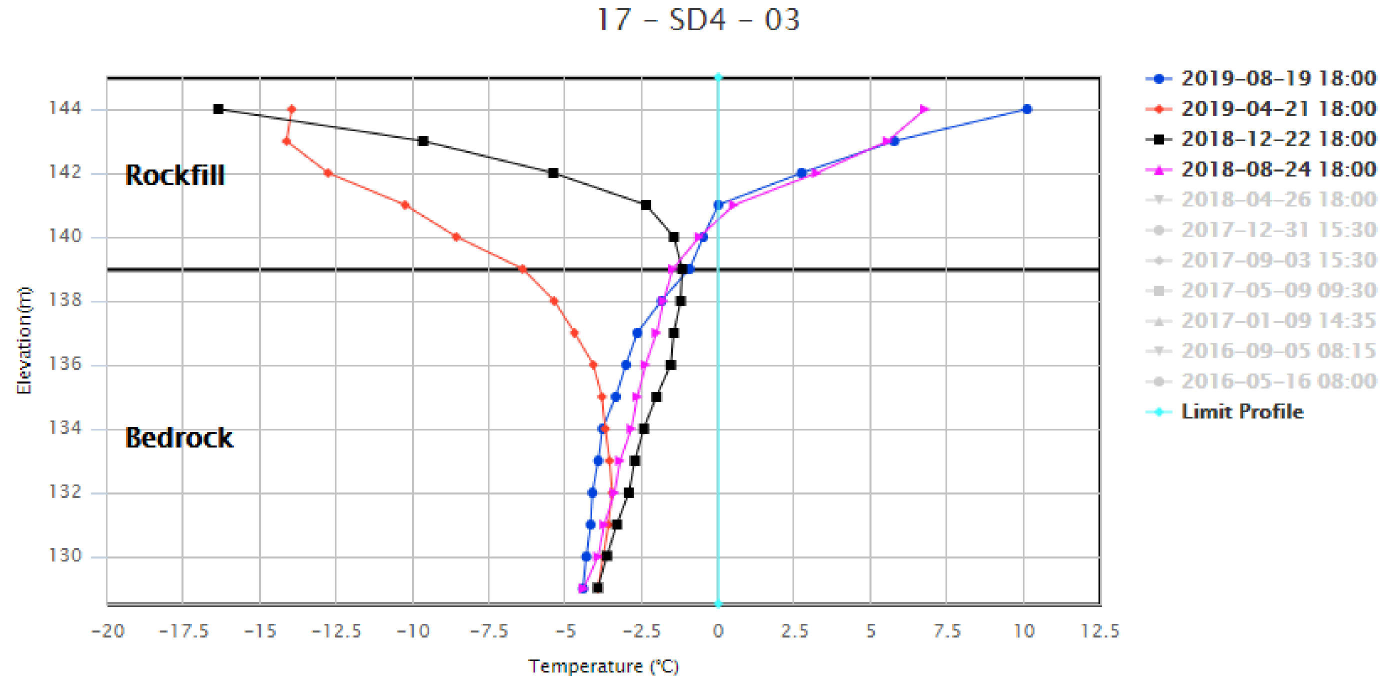


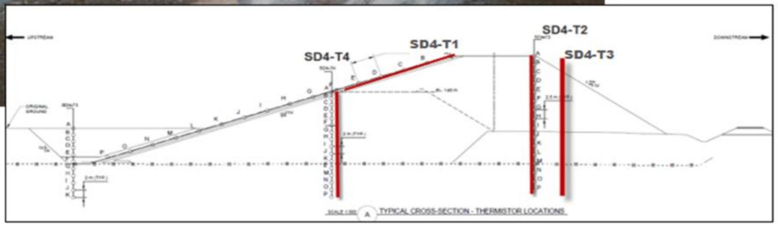
Thermistor SD4-T2



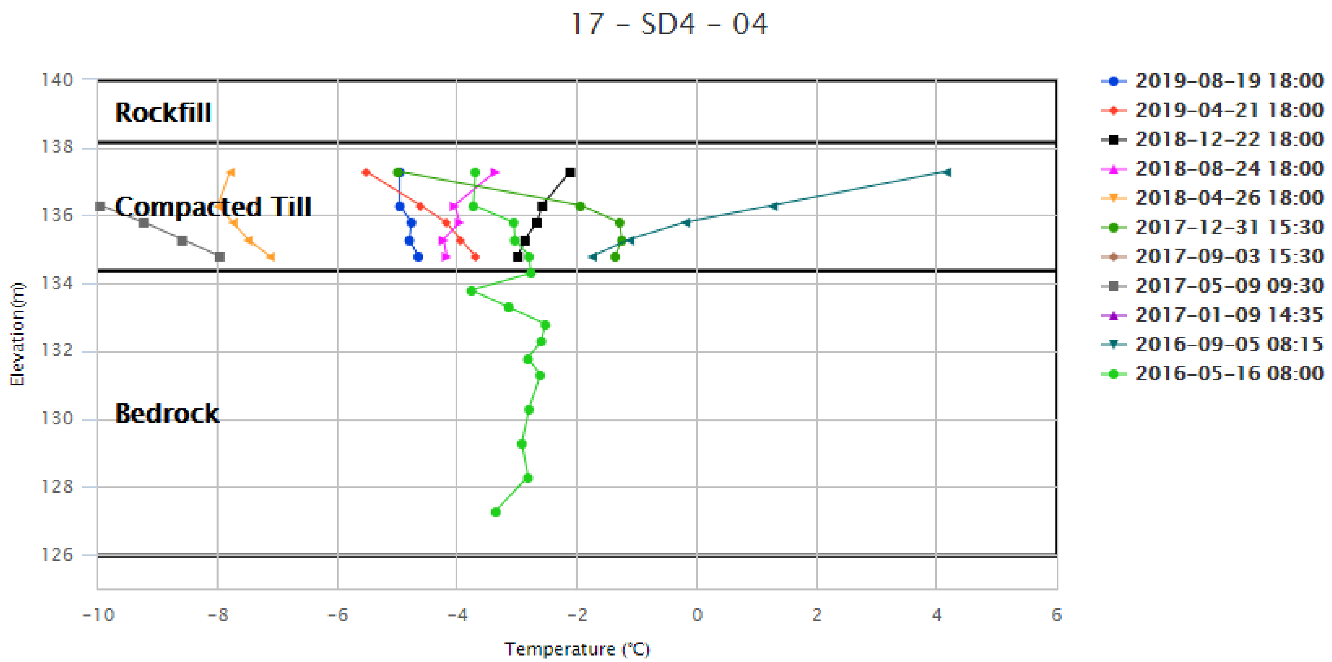


Thermistor SD4-T3



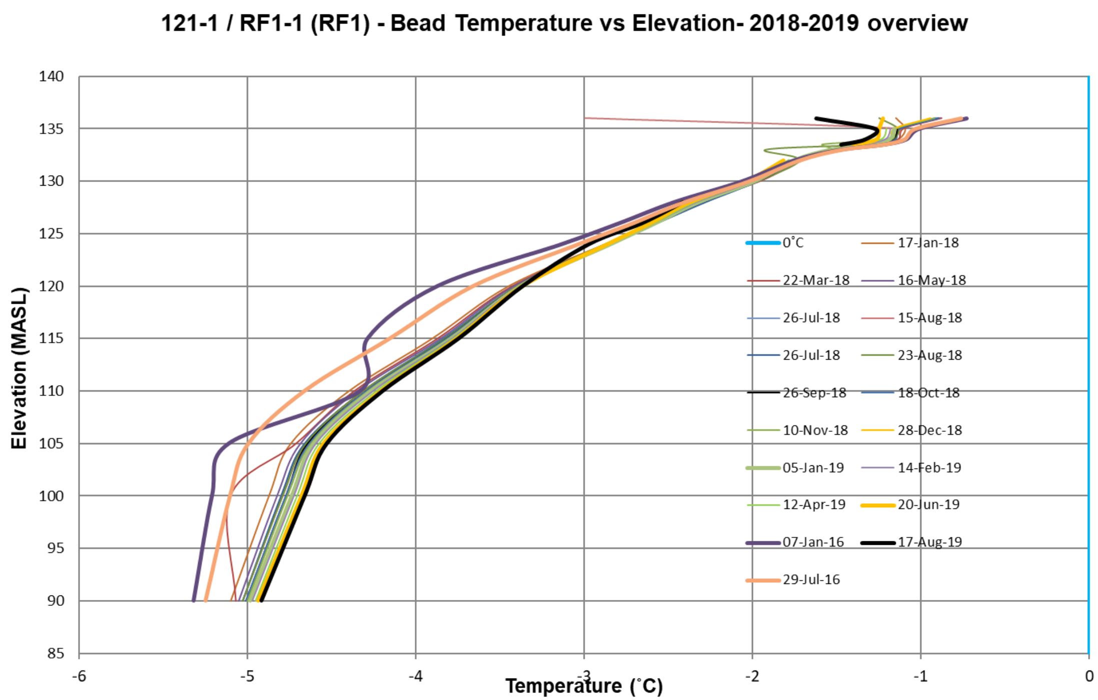


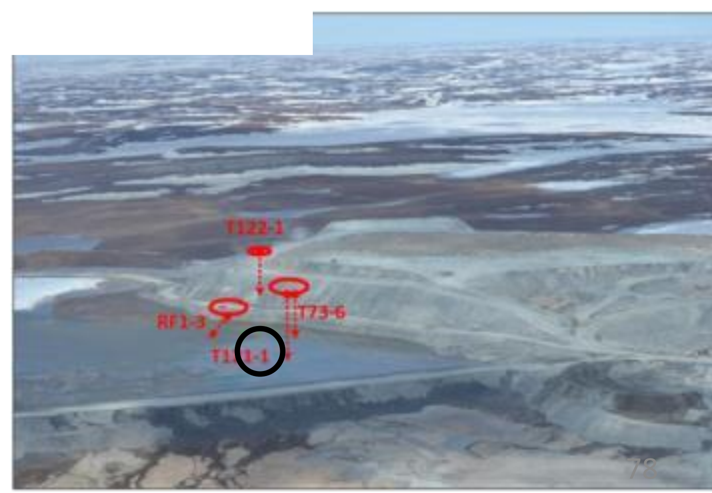
Thermistor SD4-T4



APPENDIX VII
RF1-RF2

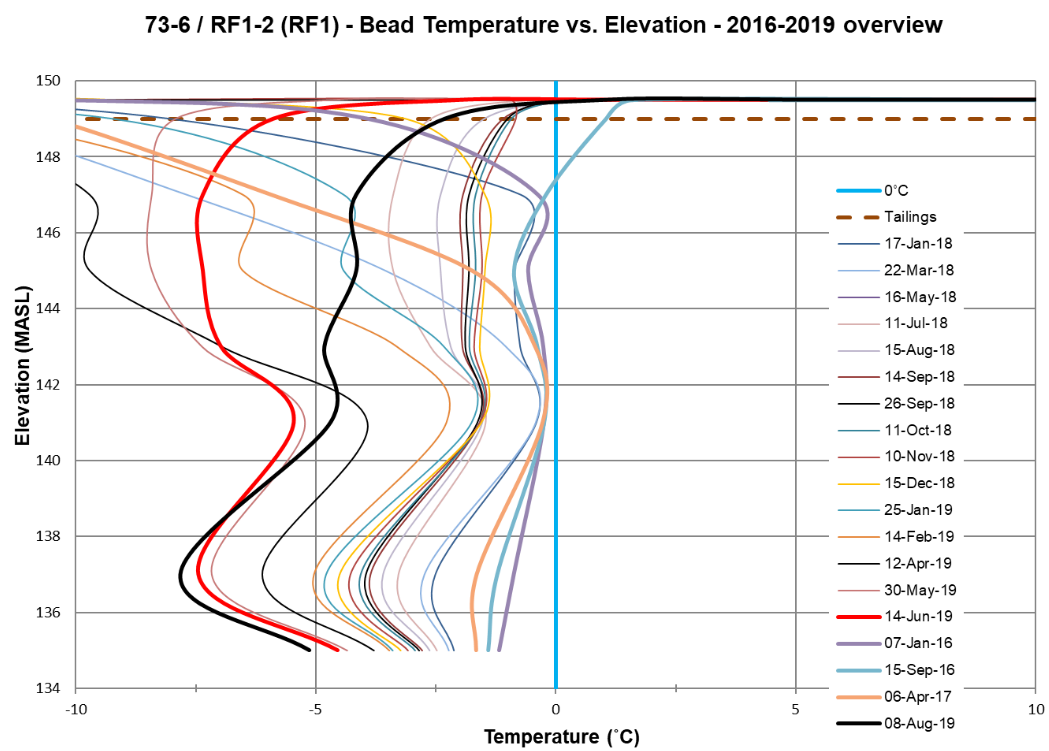
Thermistor 121-1 RF1 (RF1)

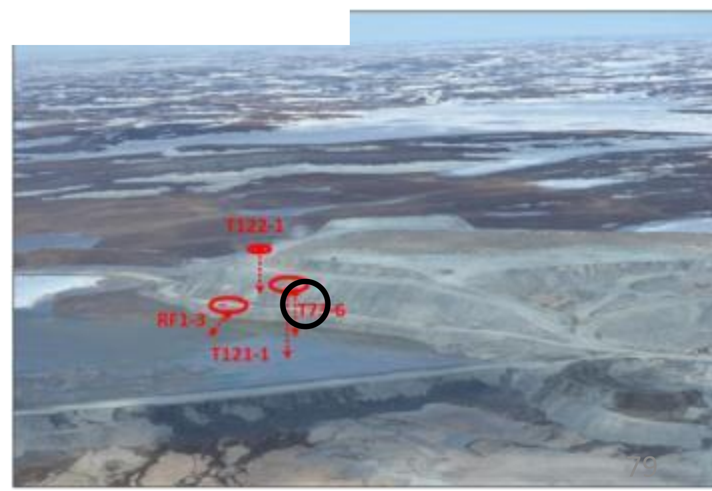




RF1-RF2

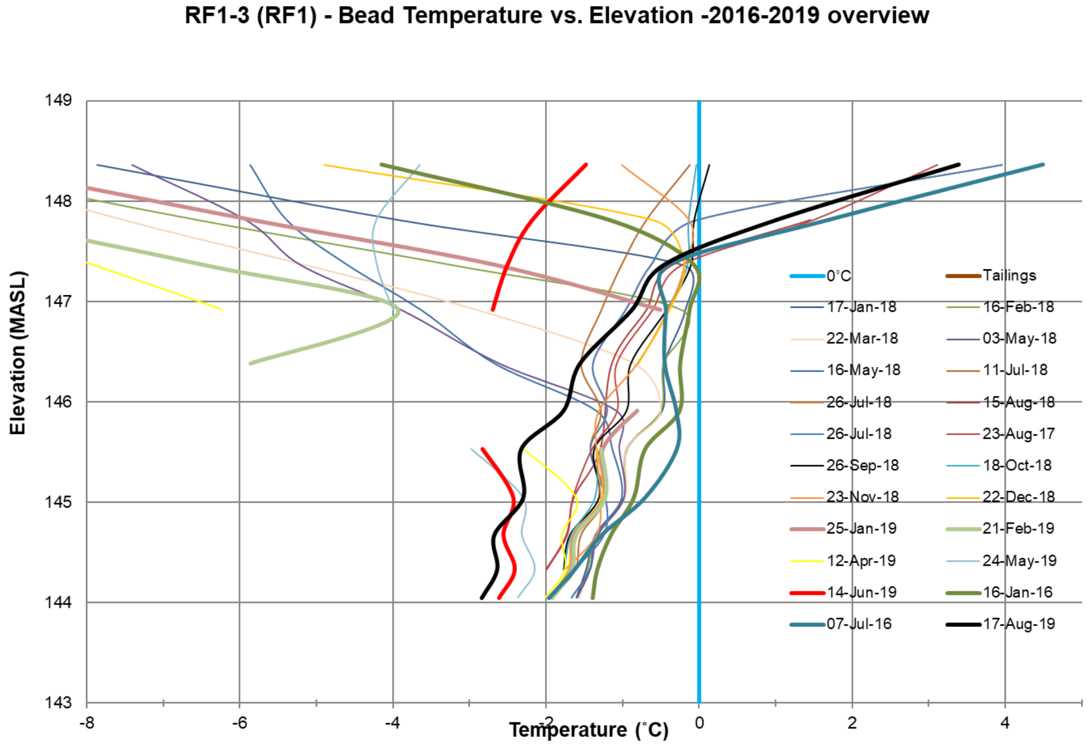
Thermistor RF1 (73-6)

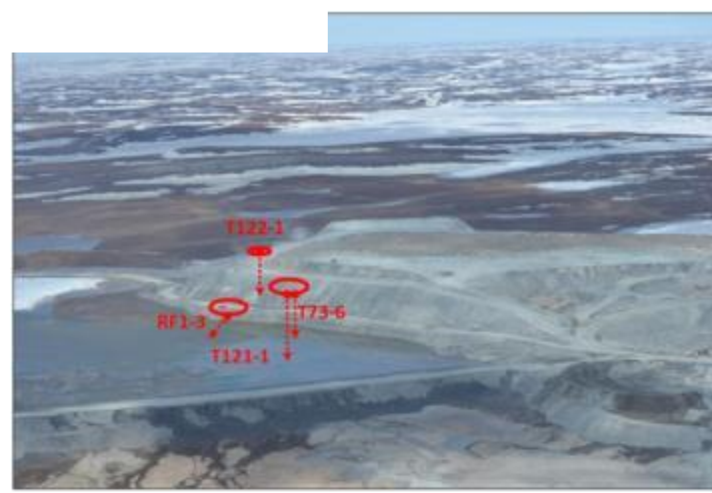




RF1-RF2

Thermistor RF1-3

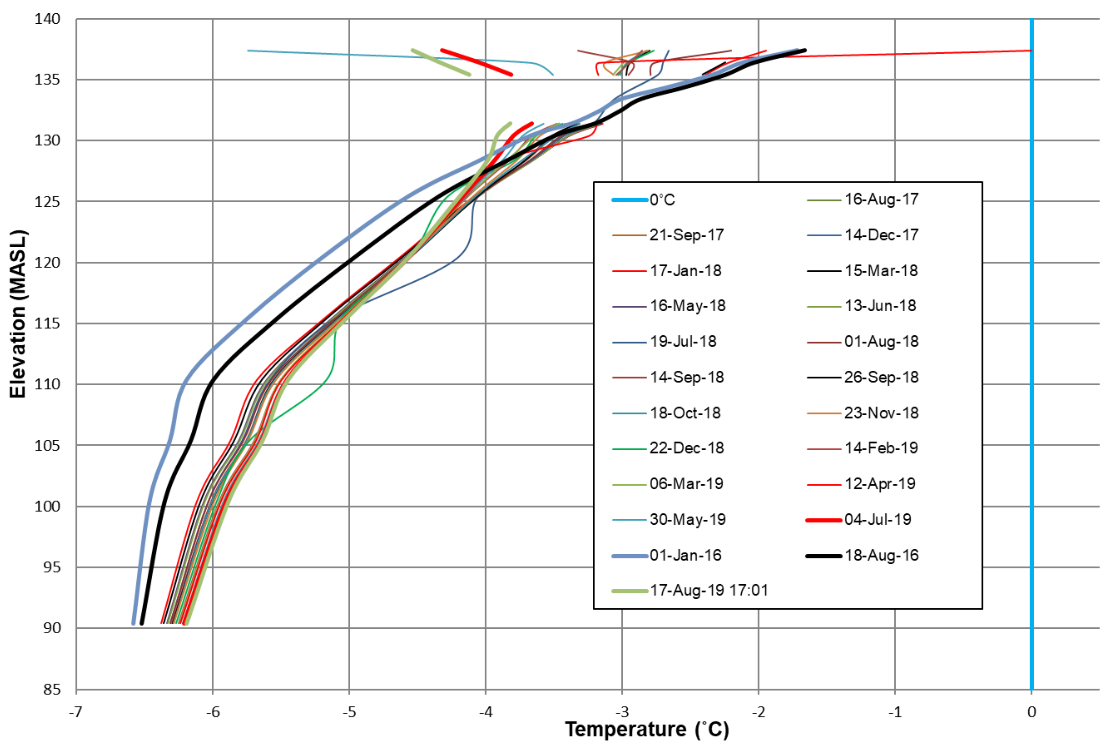


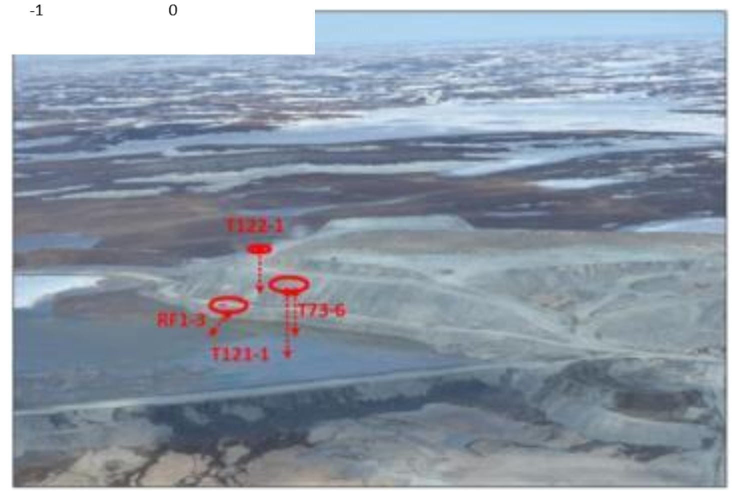


RF1-RF2

Thermistor 122-1

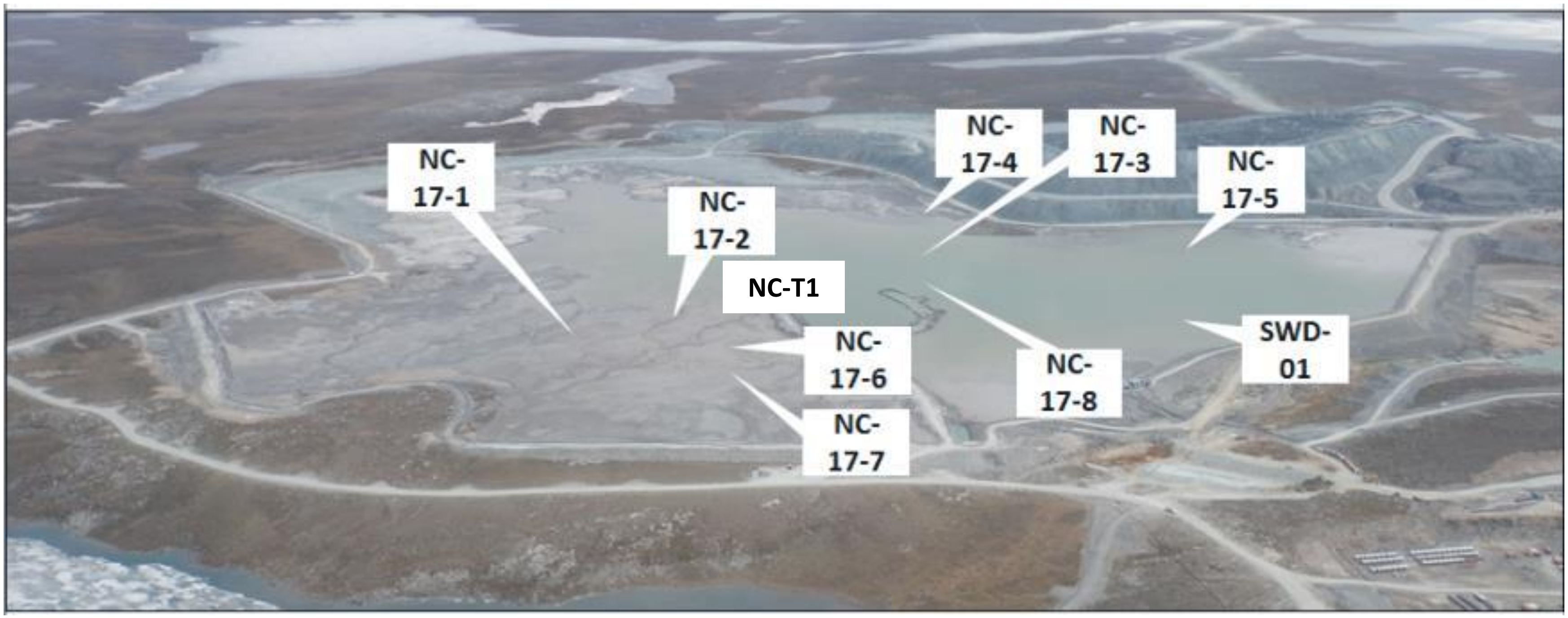
122-1 / RF2 (RF2) - Bead Temperature vs. Elevation - 2016-2019 overview



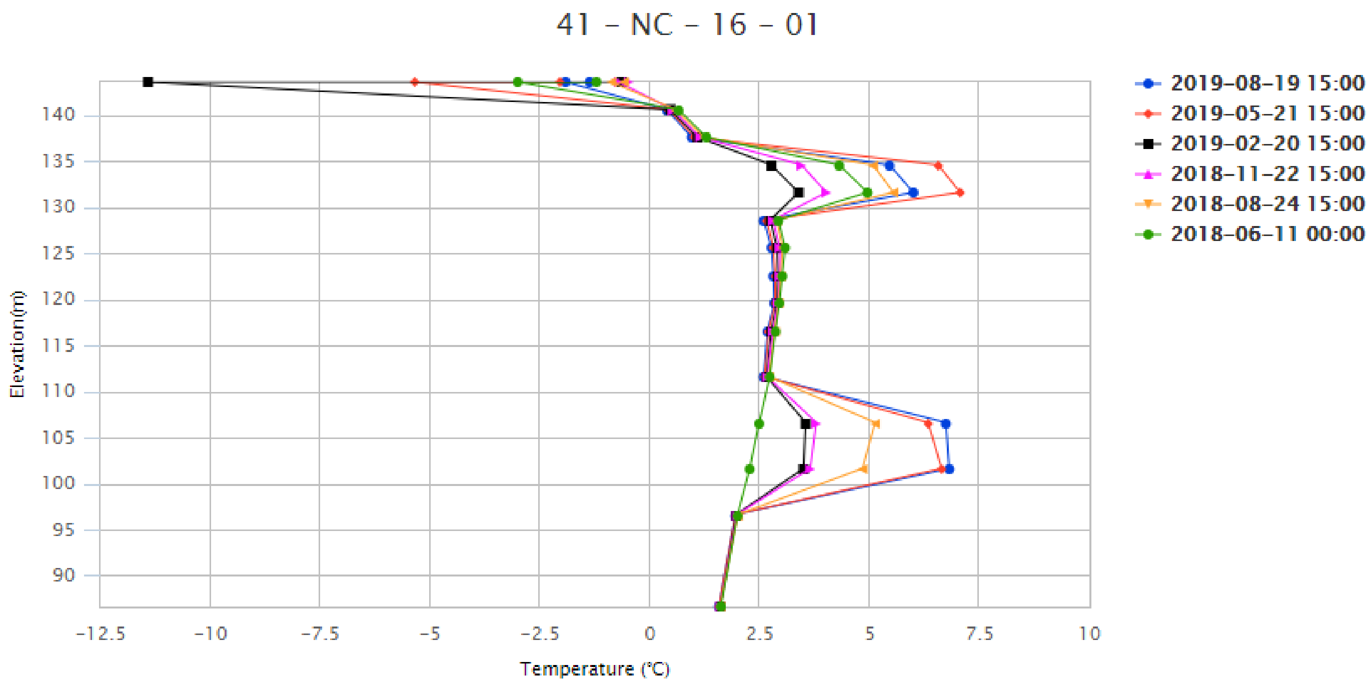


RF1-RF2

APPENDIX VIII
NORTH CELL TAILING

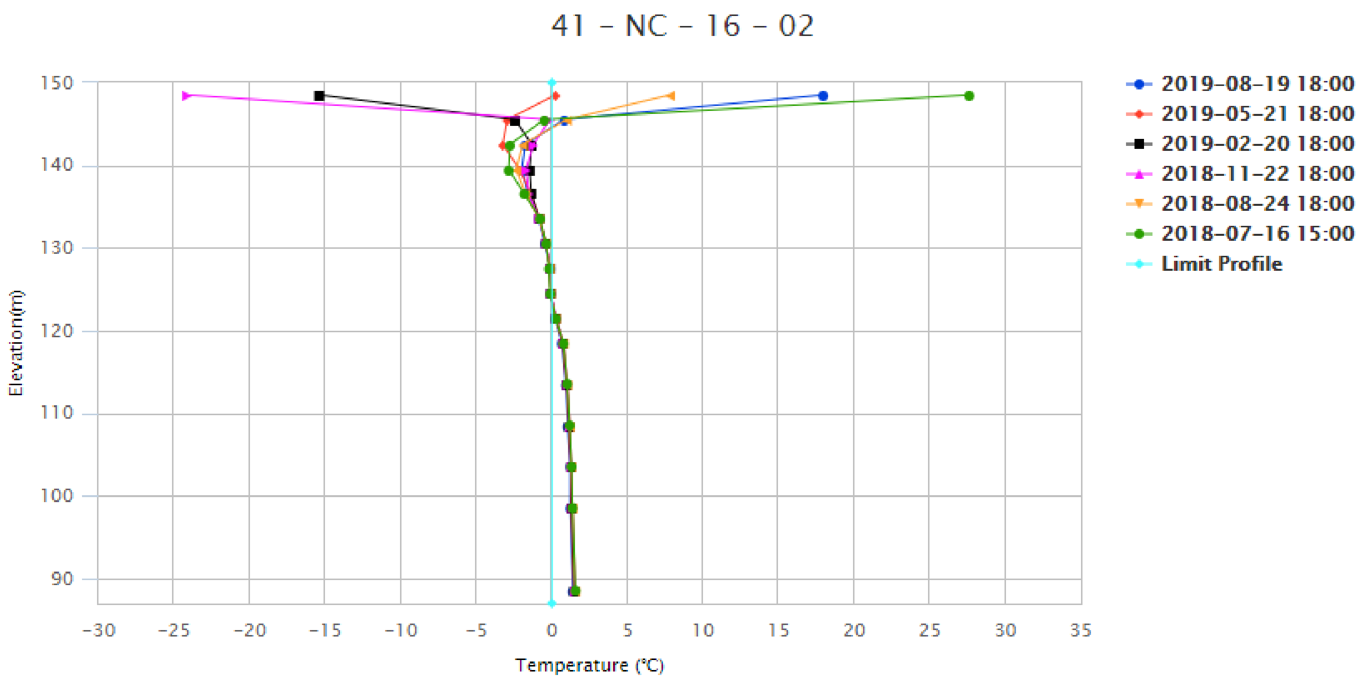


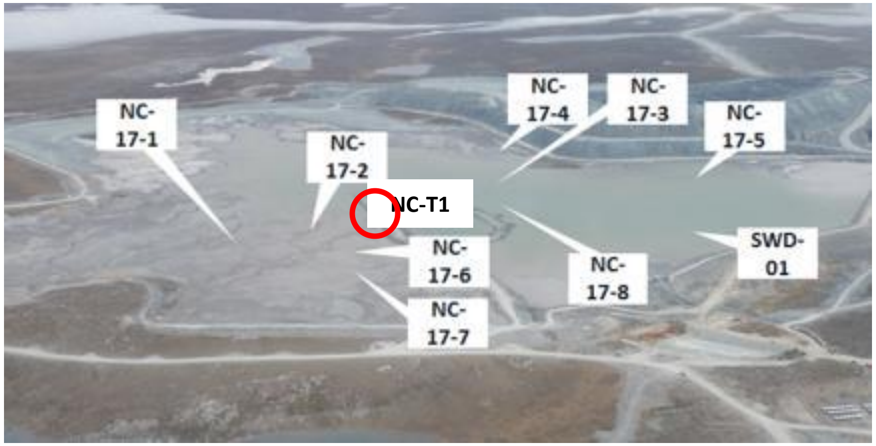
Thermistor NC-T1 (NC-16-01)



North Cell Tailing

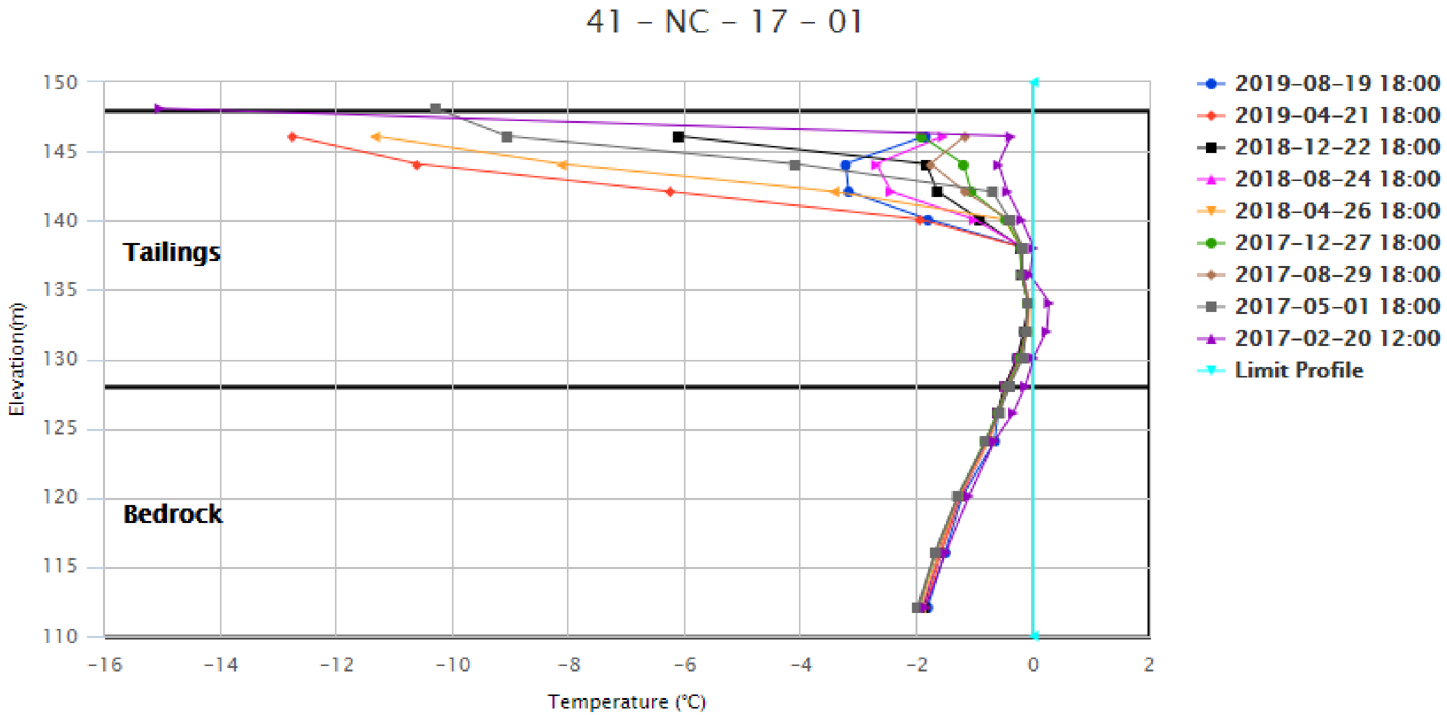
Thermistor NC-T1 (NC-16-02)

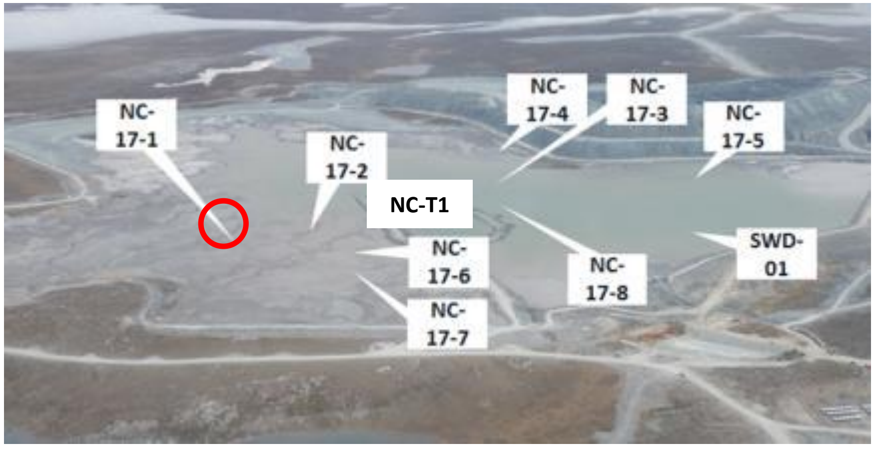




North Cell Tailing

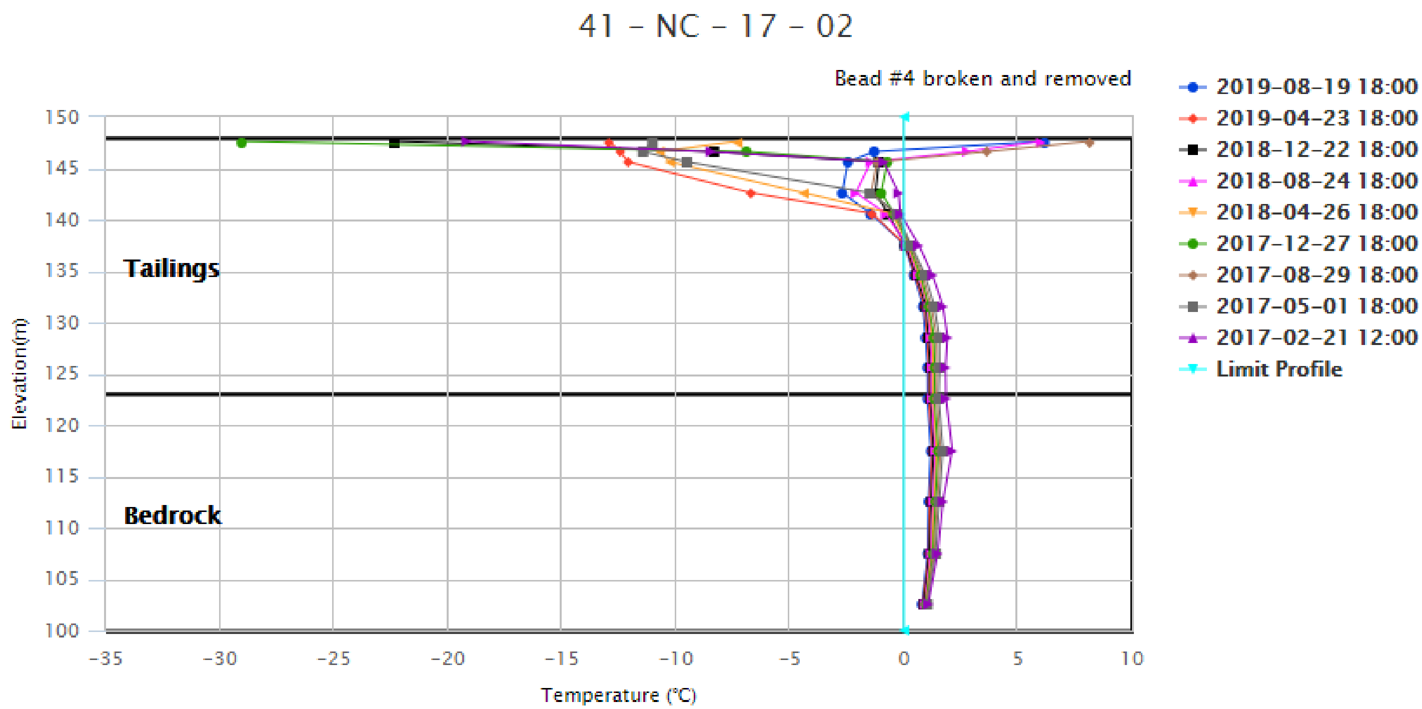
Thermistor NC-17-01

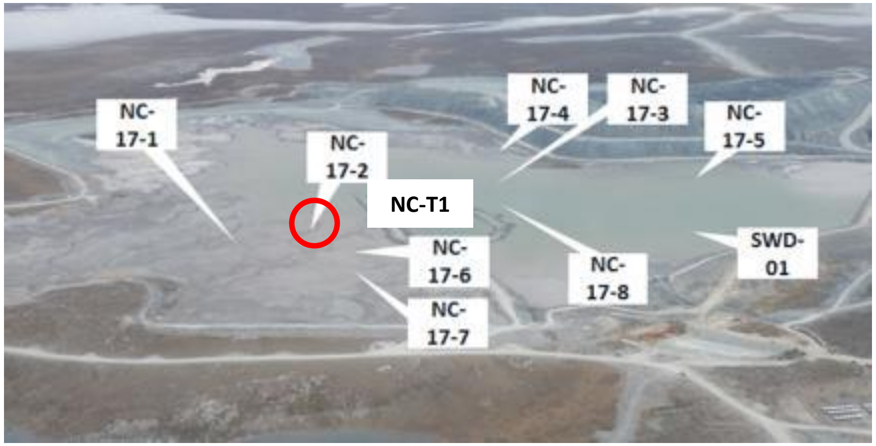




North Cell Tailing

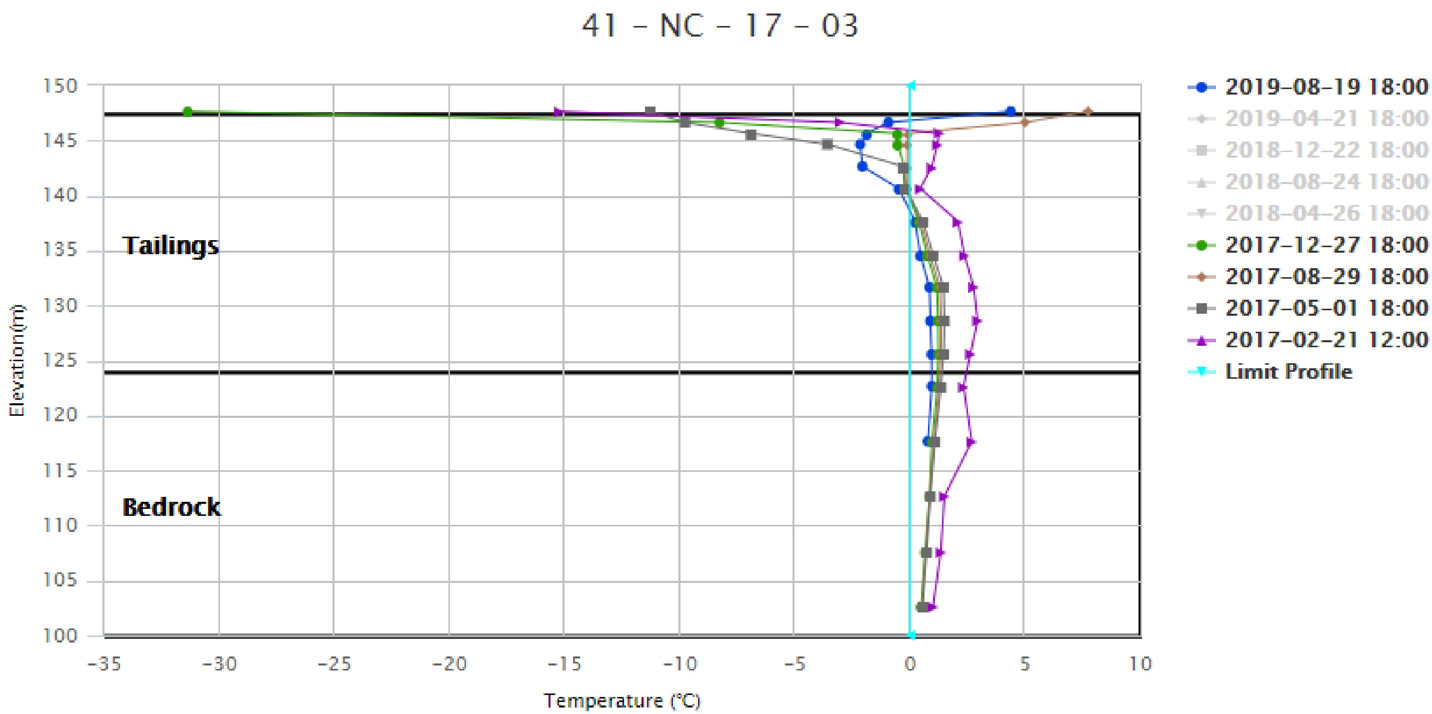
Thermistor NC-17-02

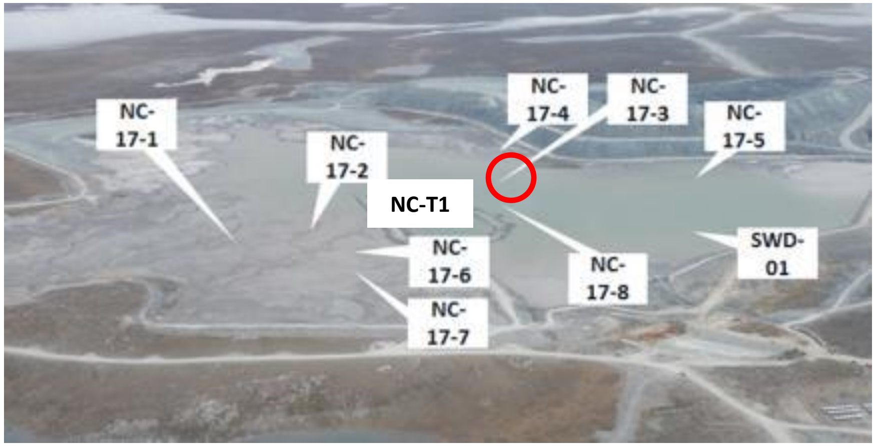




North Cell Tailing

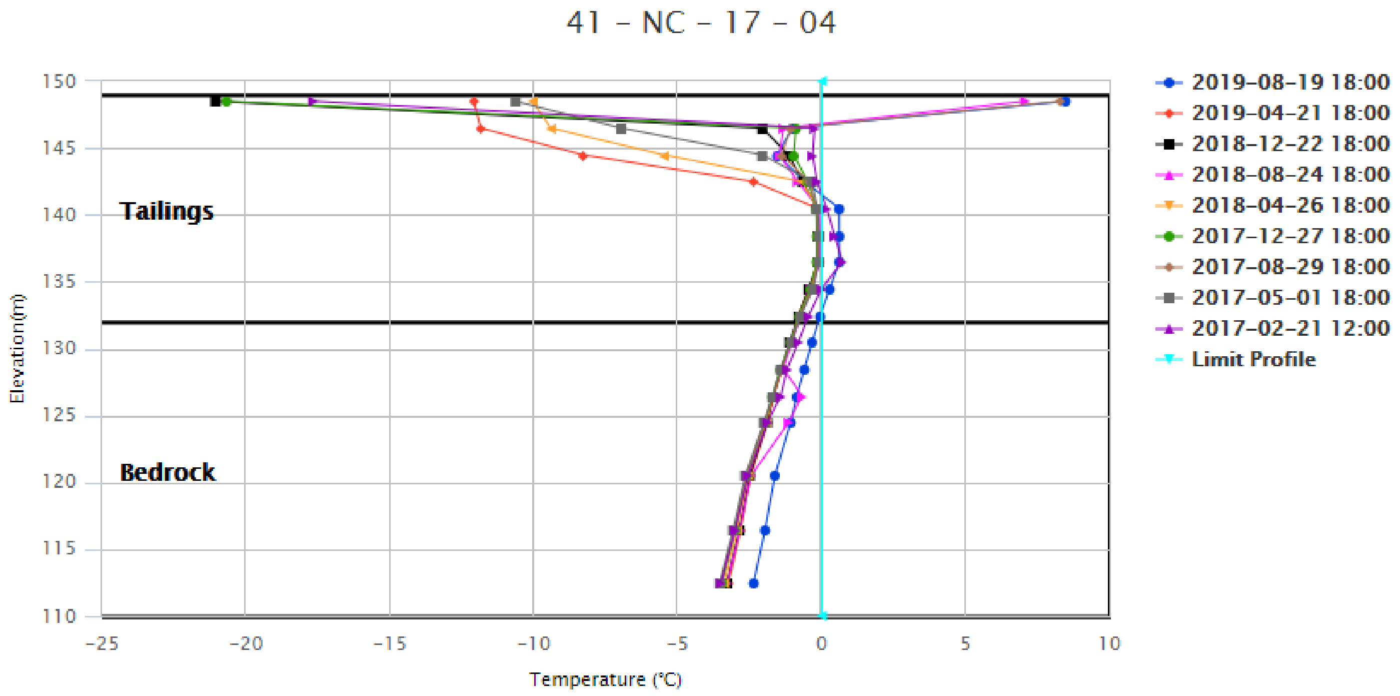
Thermistor NC-17-03





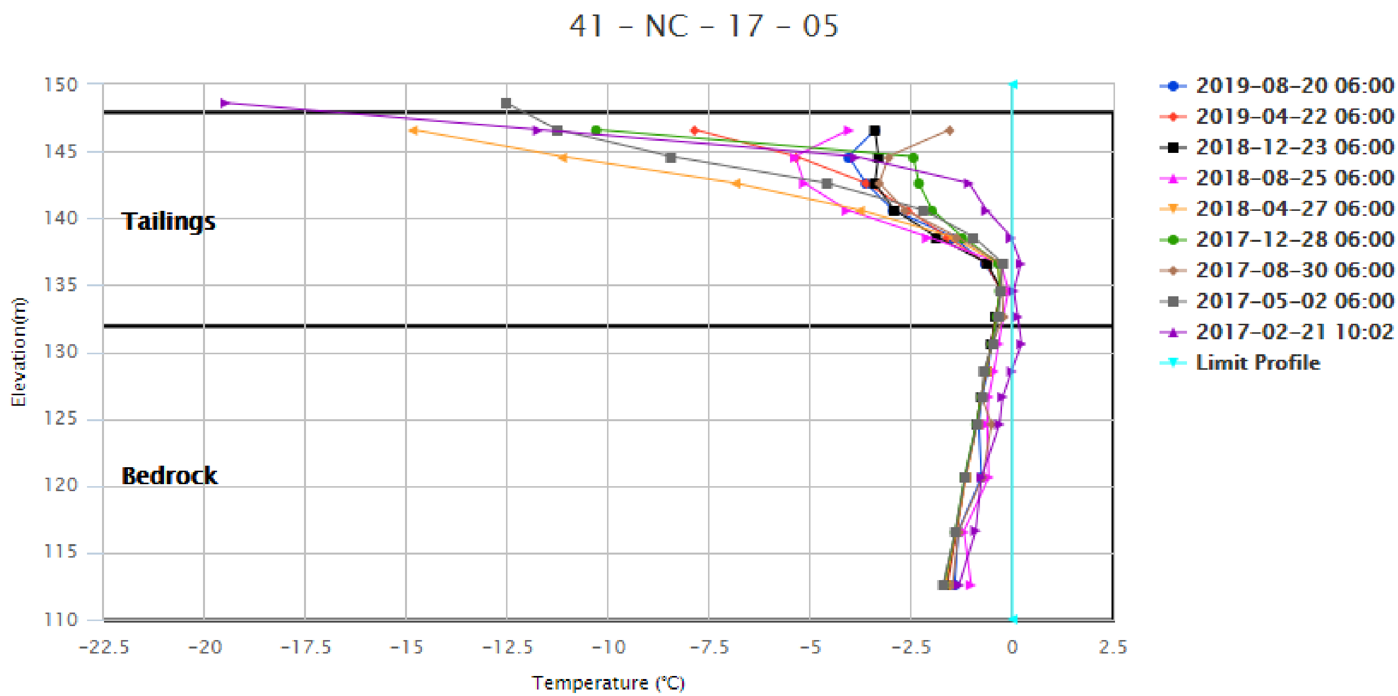
North Cell Tailing

Thermistor NC-17-04



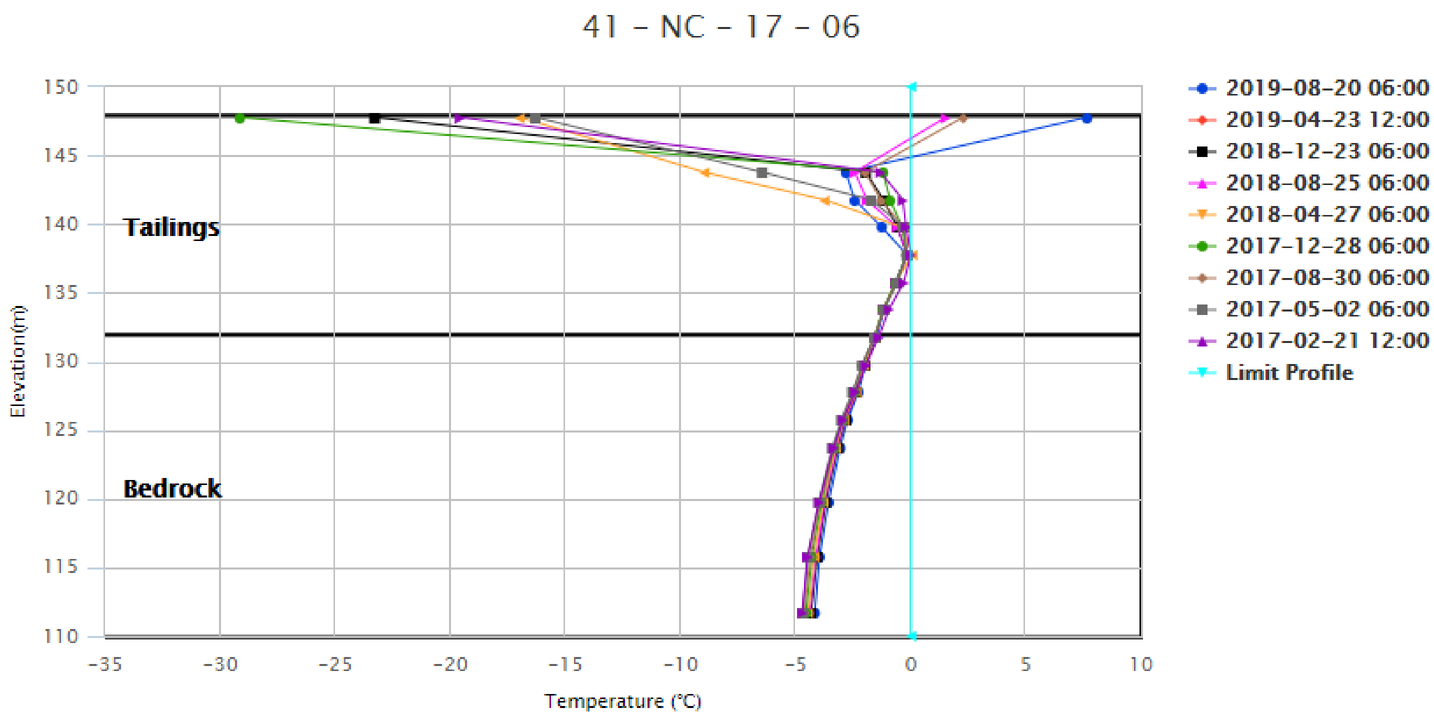
North Cell Tailing

Thermistor NC-17-05

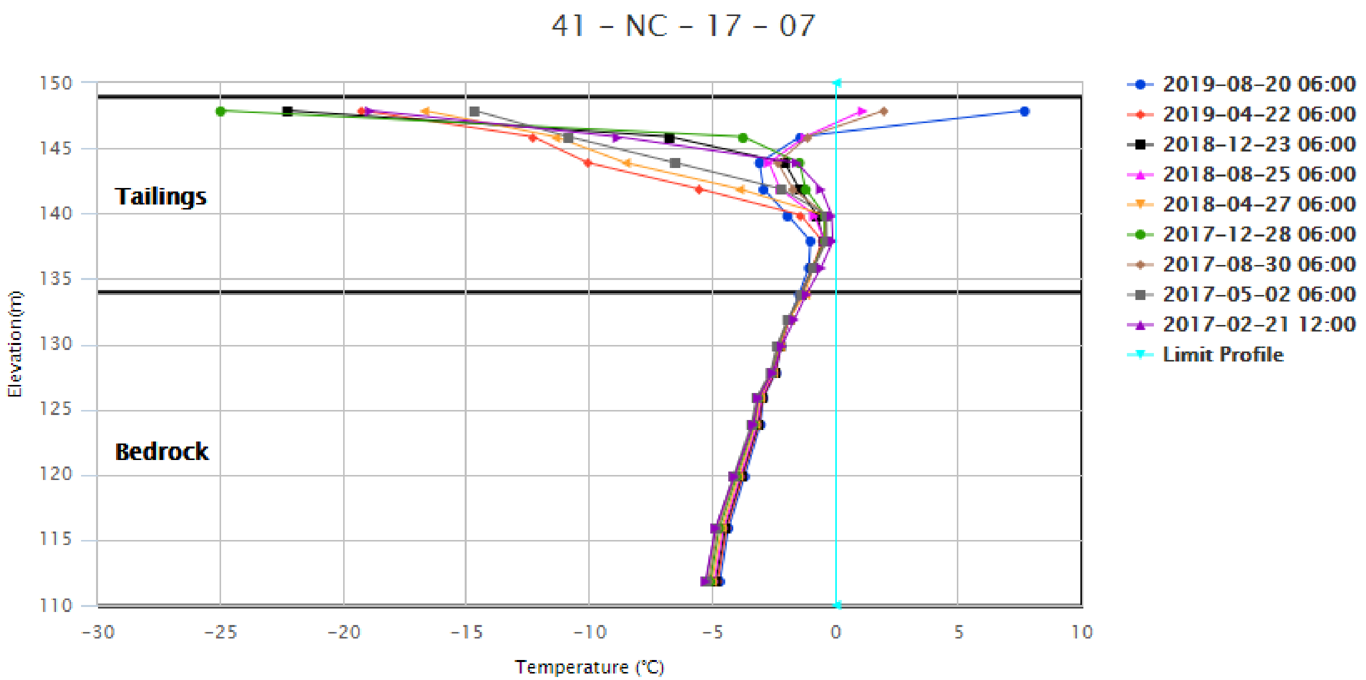


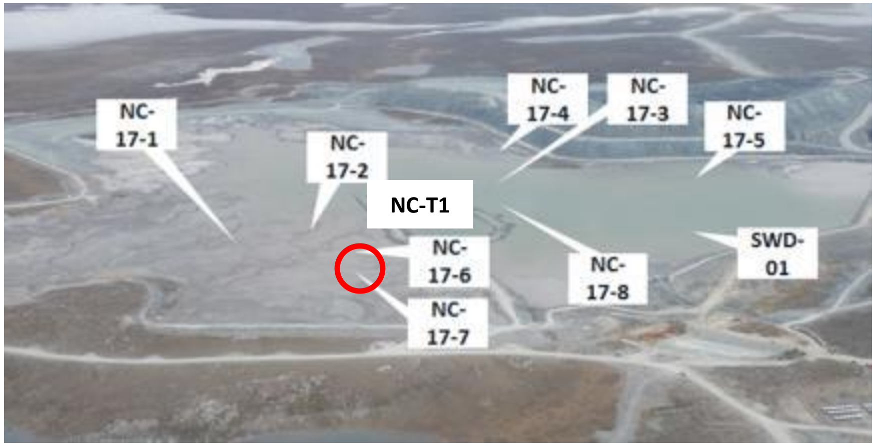
North Cell Tailing

Thermistor NC-17-06



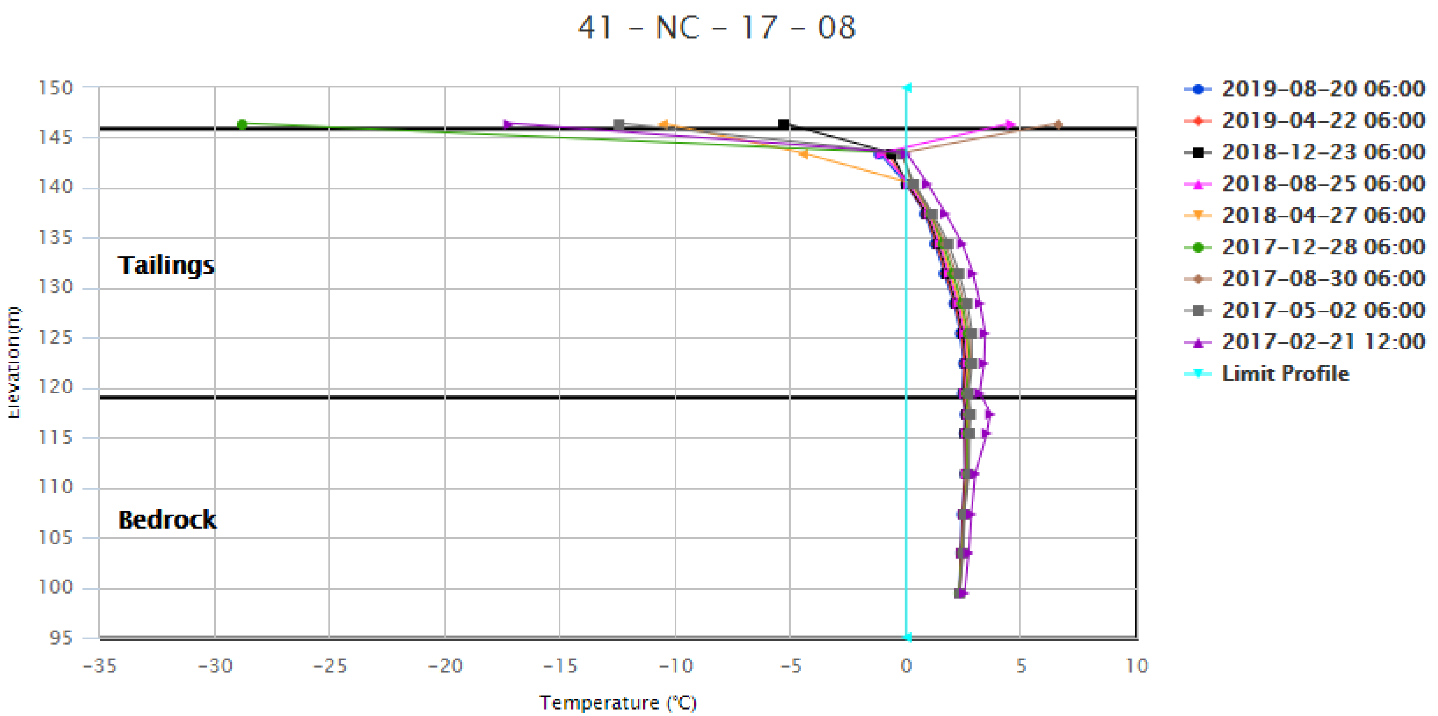
Thermistor NC-17-07

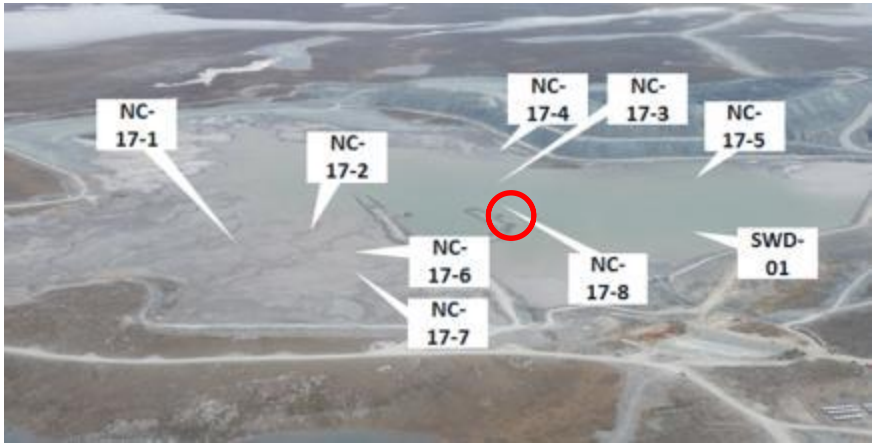




North Cell Tailing

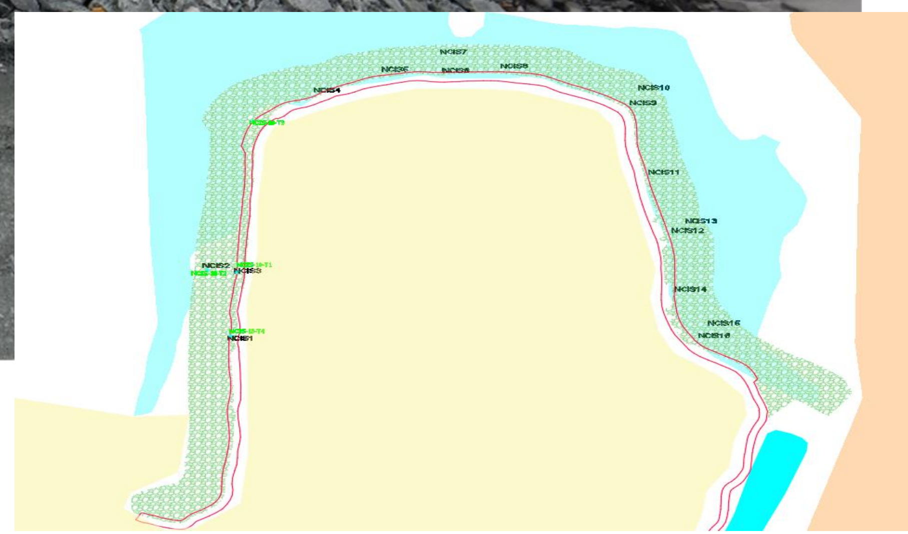
Thermistor NC-17-08



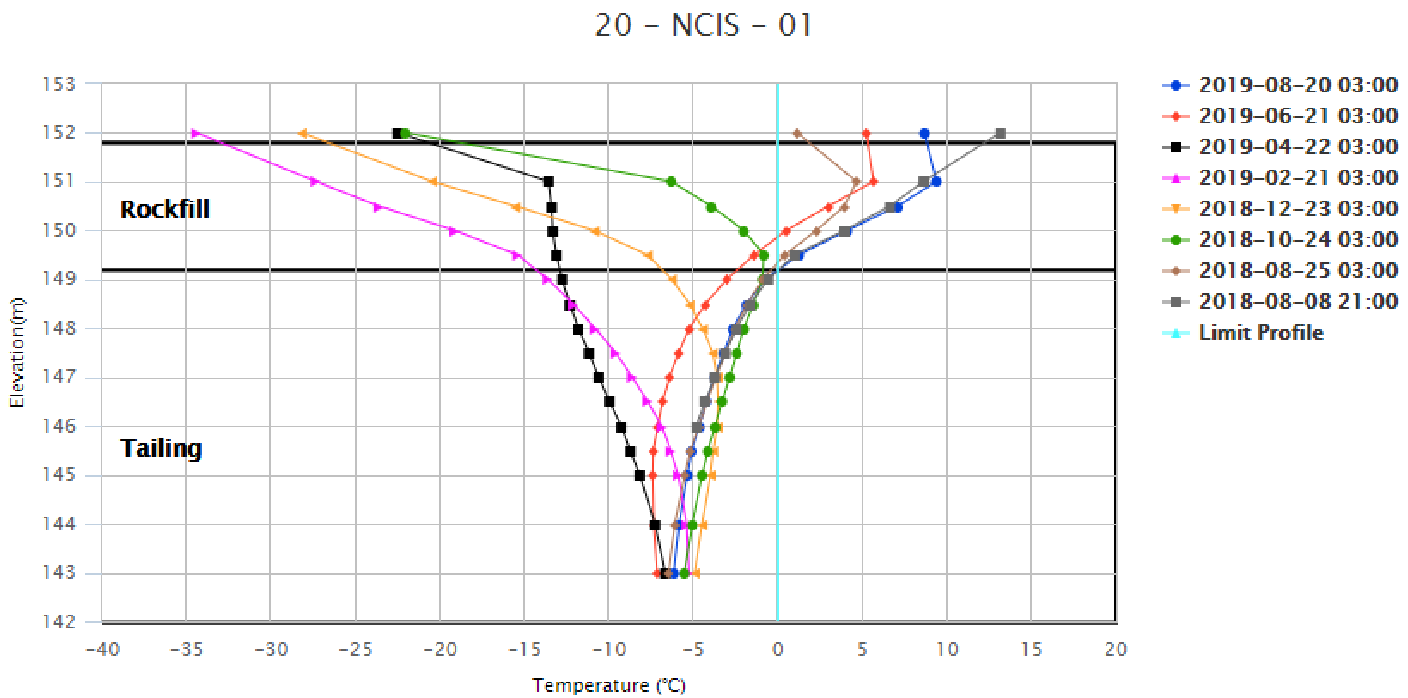


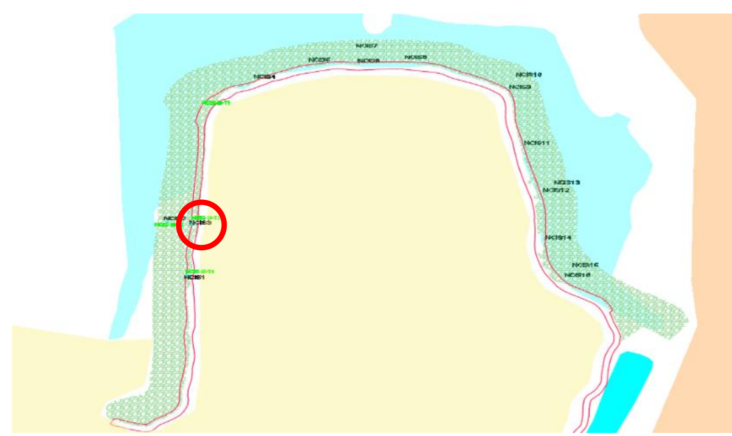
North Cell Tailing

APPENDIX IX
NORTH CELL INTERNAL STRUCTURE

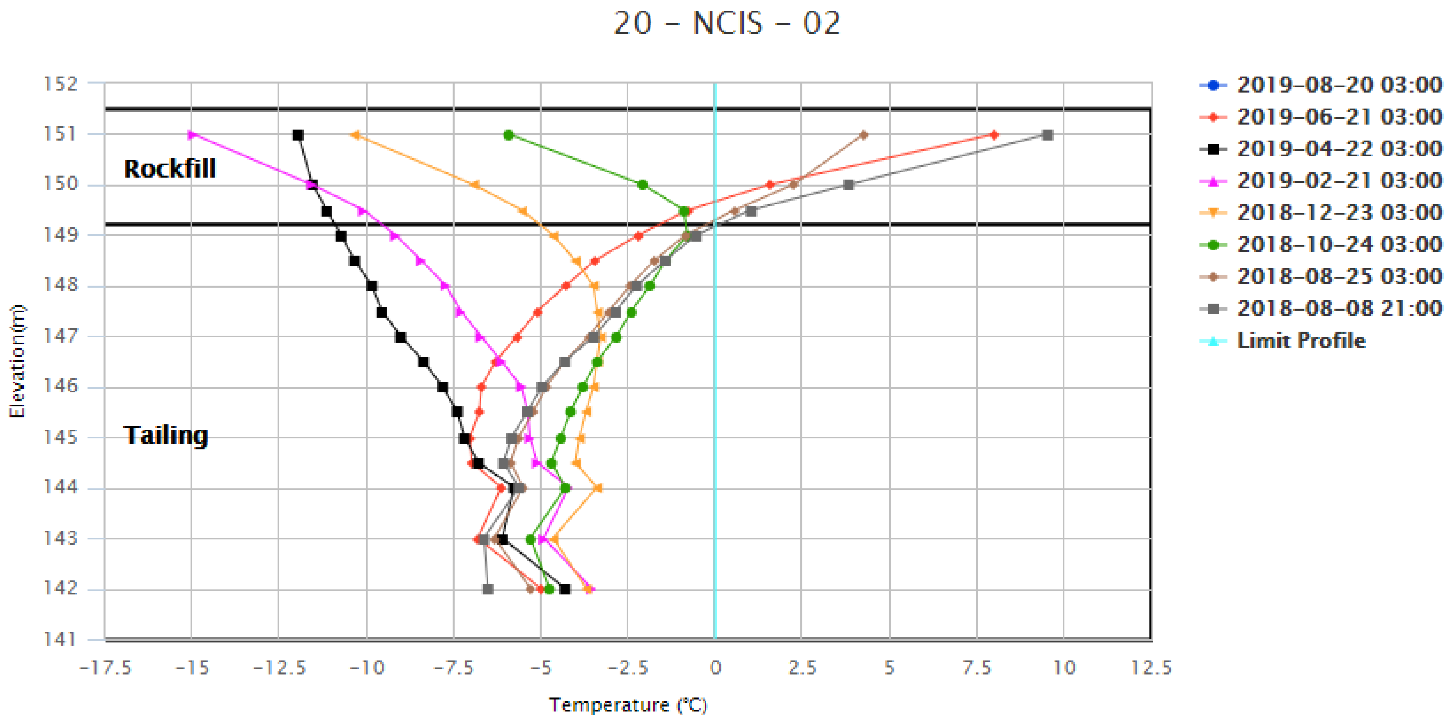


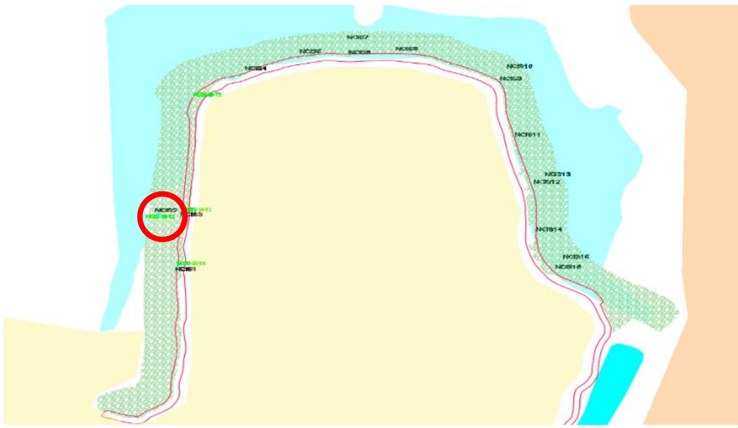
Thermistor NCIS-18-T1



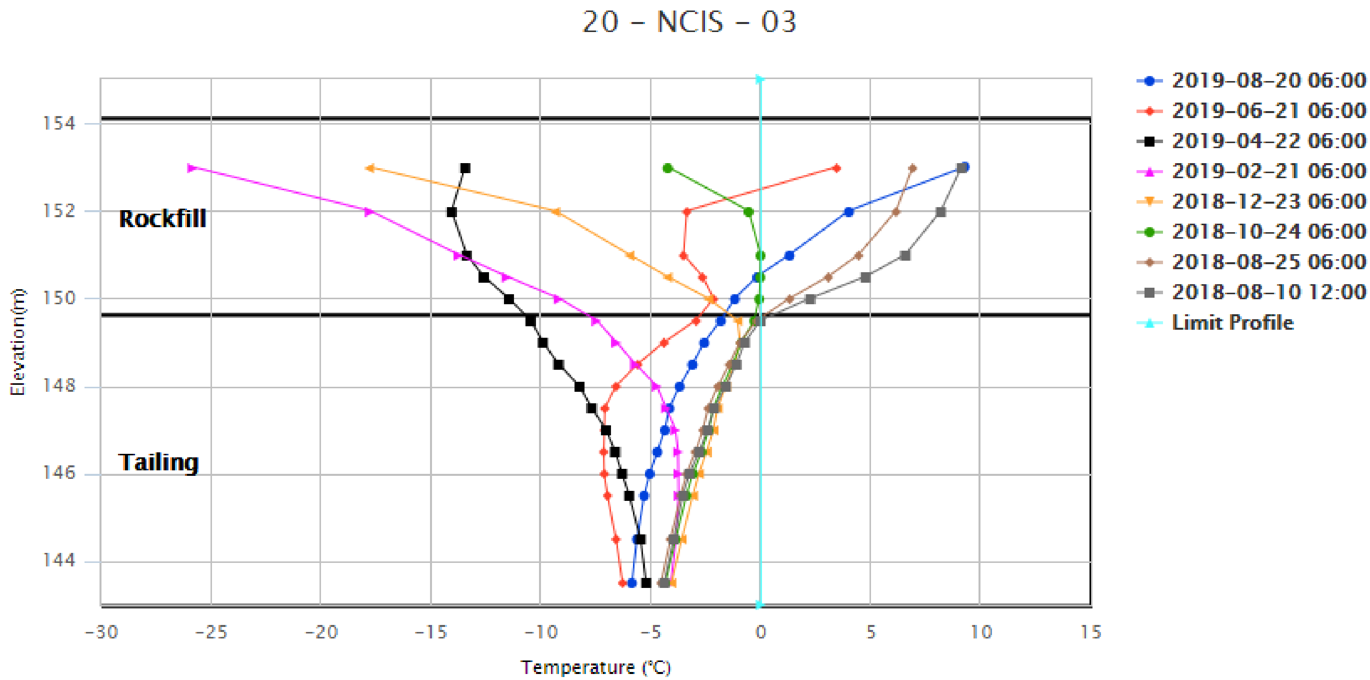


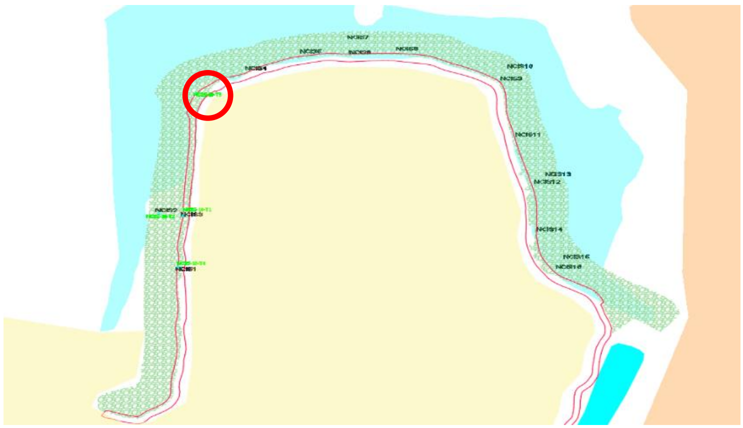
Thermistor NCIS-18-T2



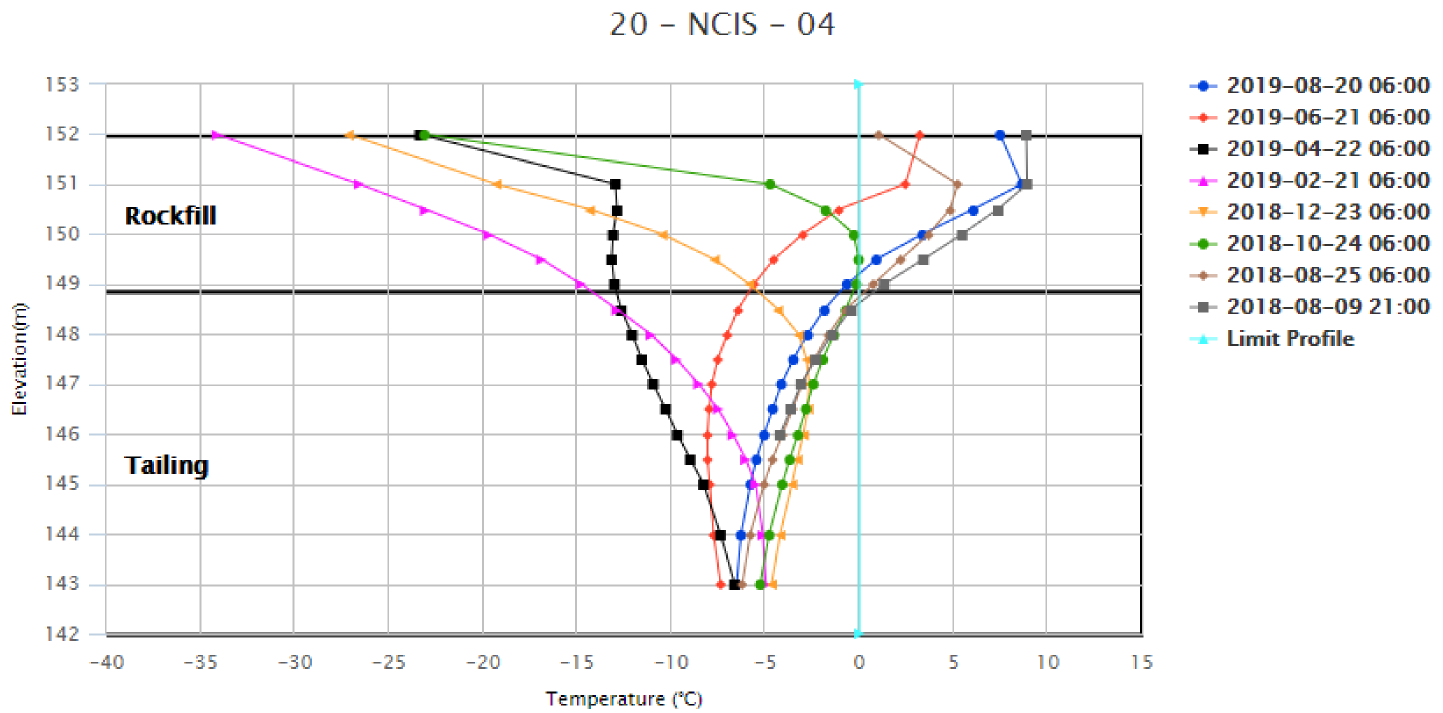


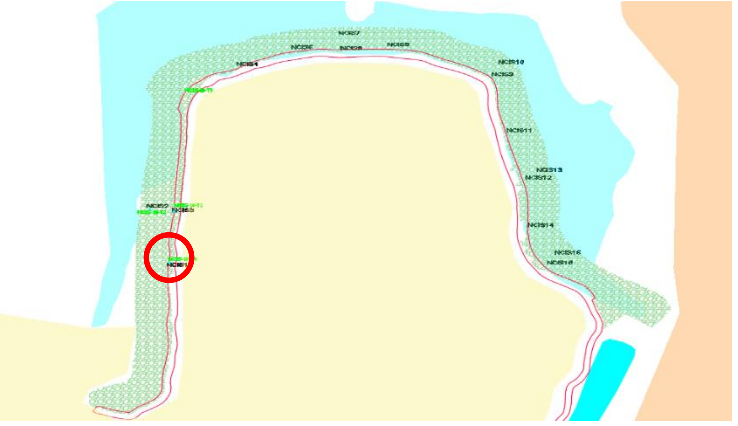
Thermistor NCIS-18-T3



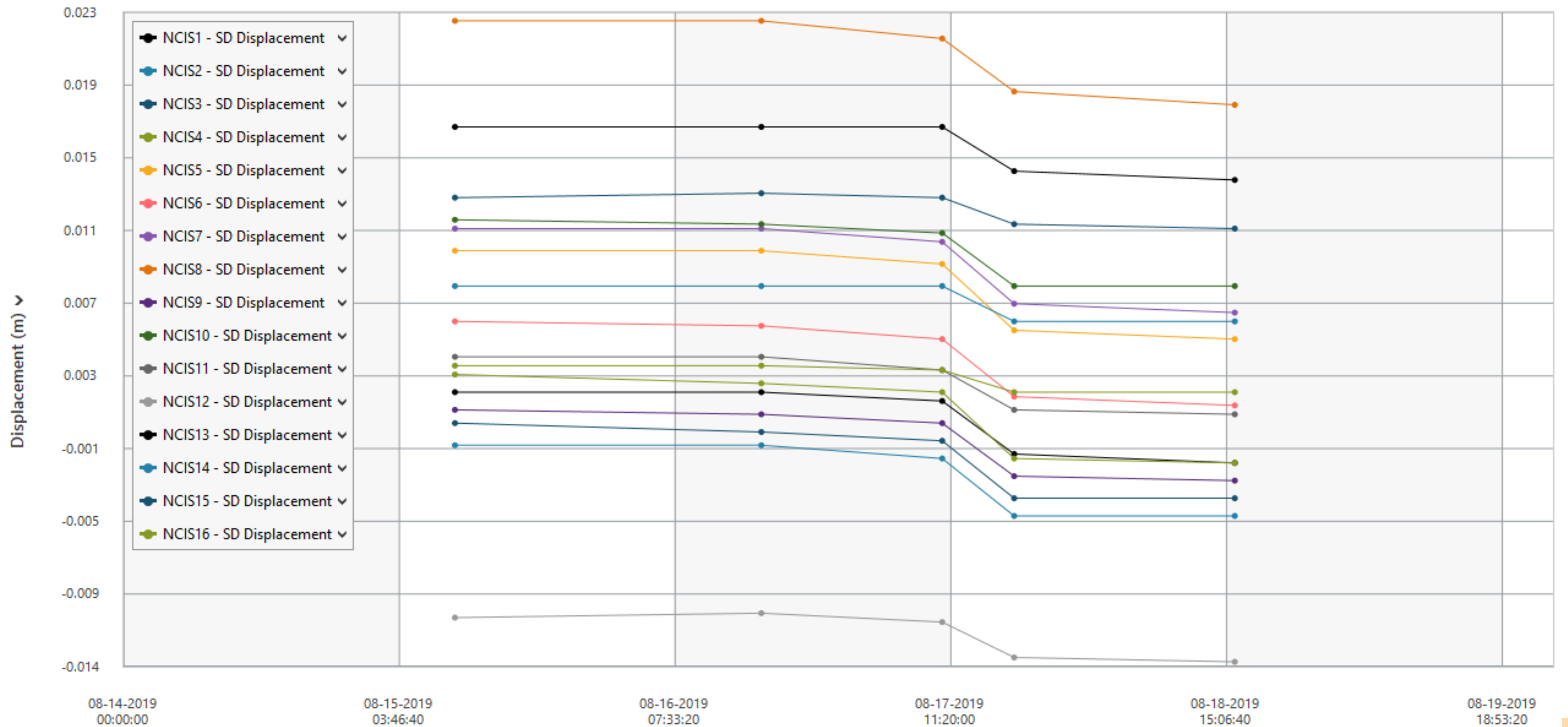


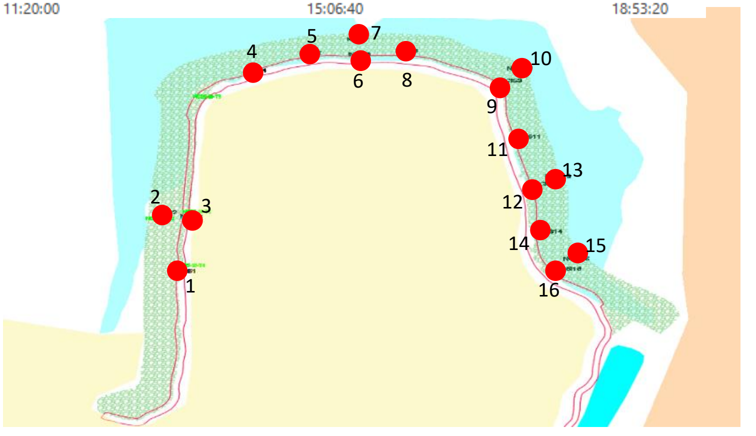
Thermistor NCIS-18-T4

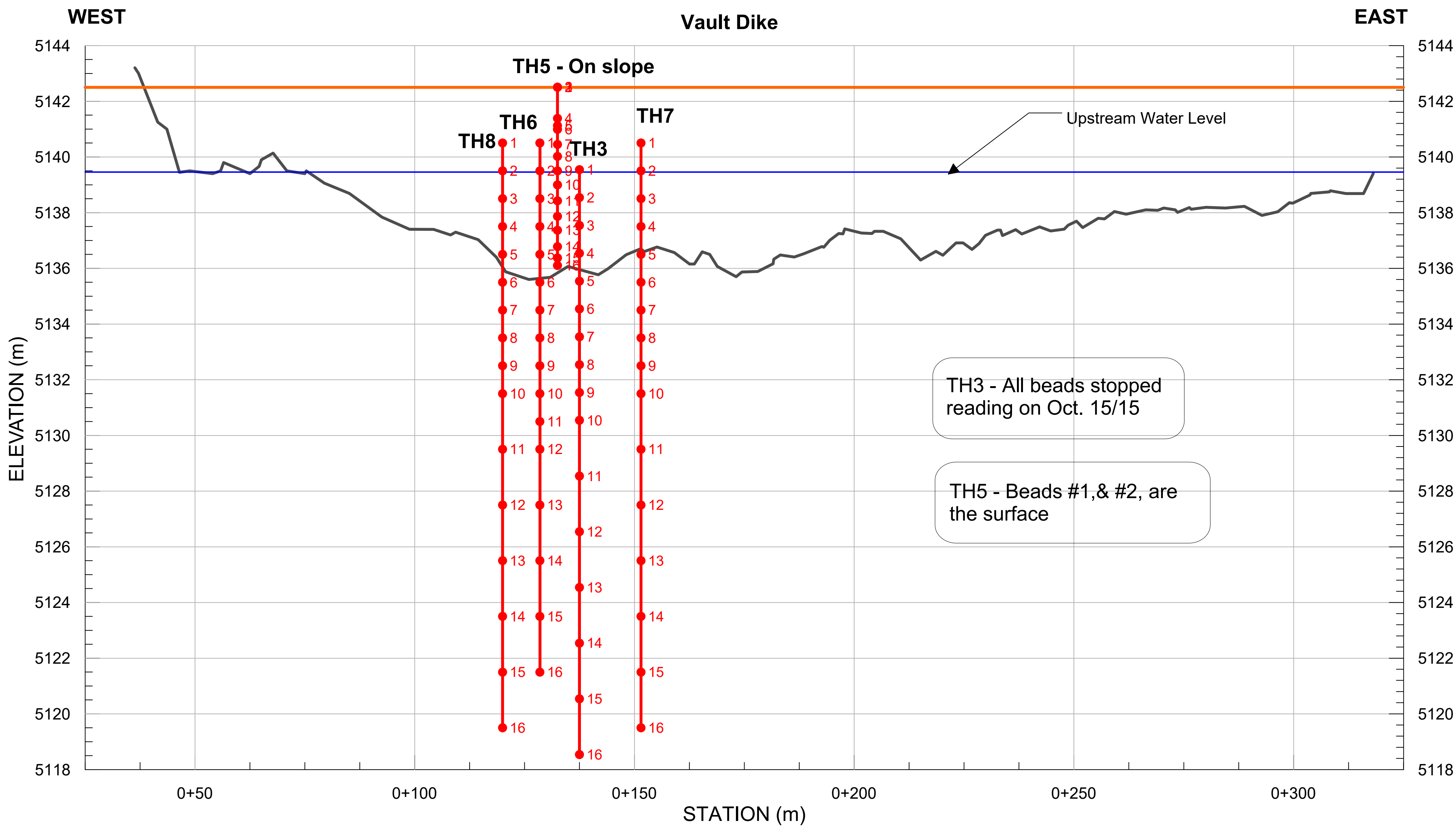


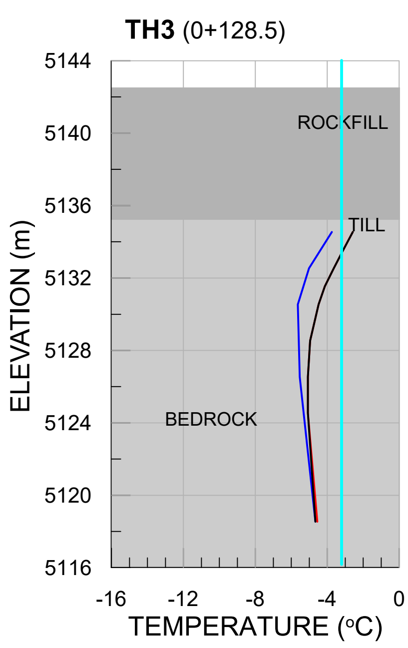


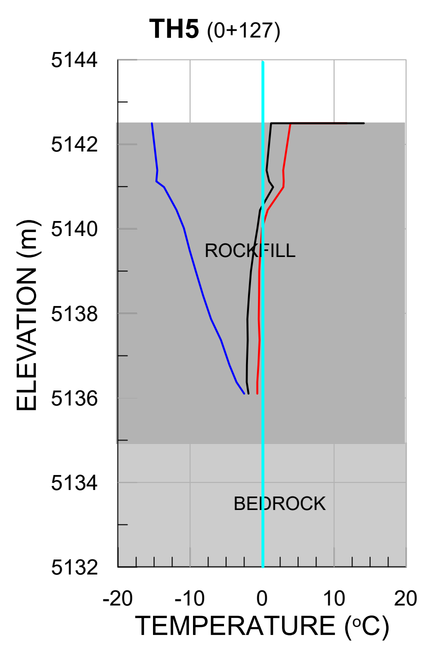
Prisms NCIS-1 to 16

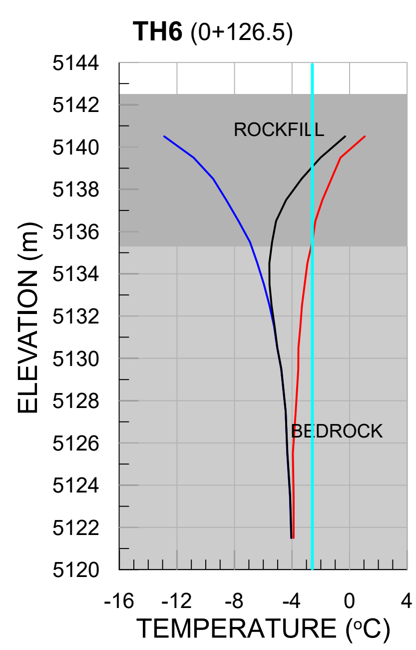


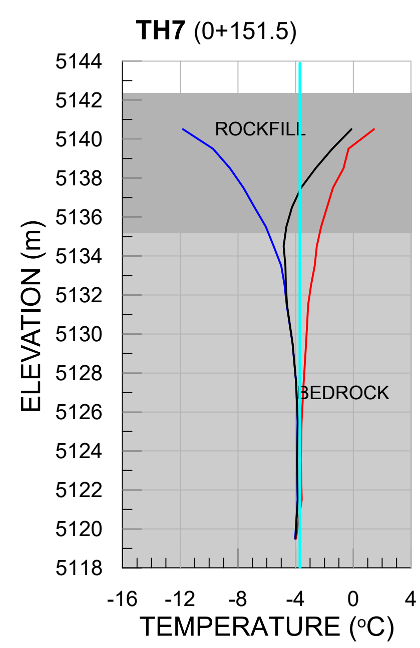


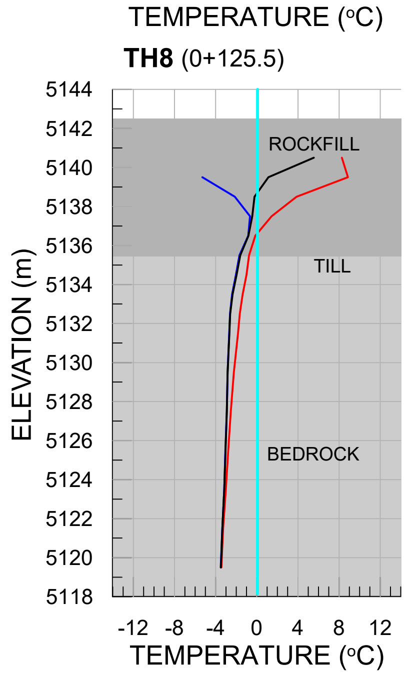












LEGEND

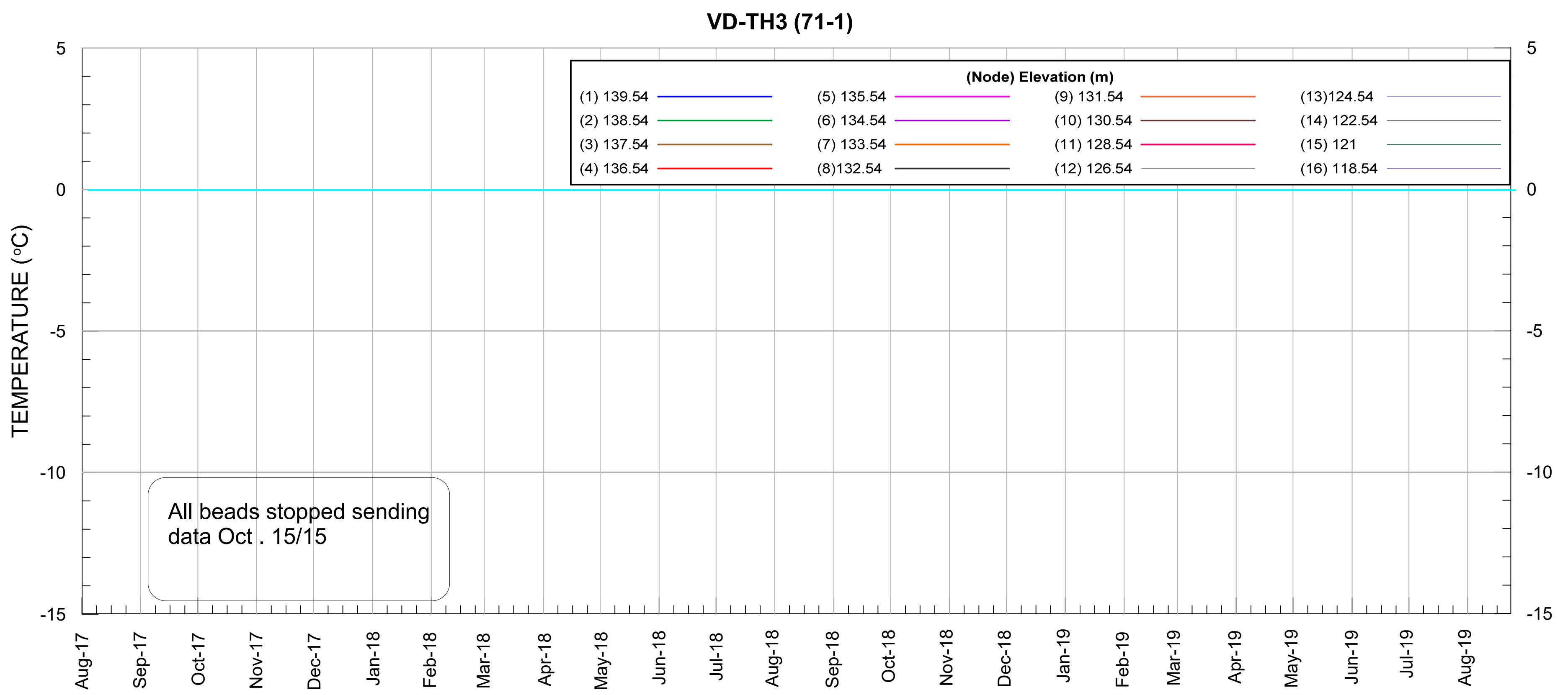
- Dike Crest
- Lake Bed
- Bedrock
- T min
- T current
- T max
- Lake
- Till
- Bedrock
- Thermistor with Bead Locations (6, 7, 8, 9)

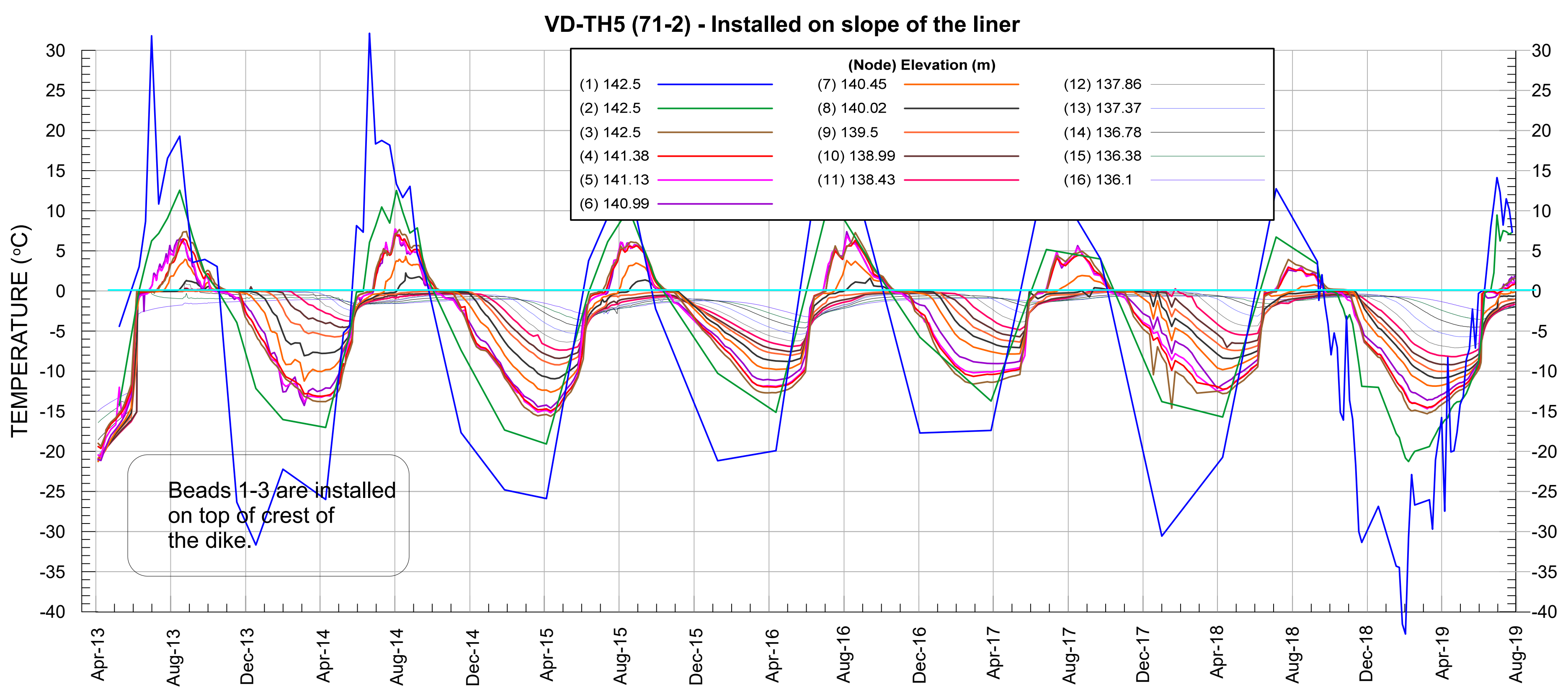
Current Temperature on August 21st, 2019

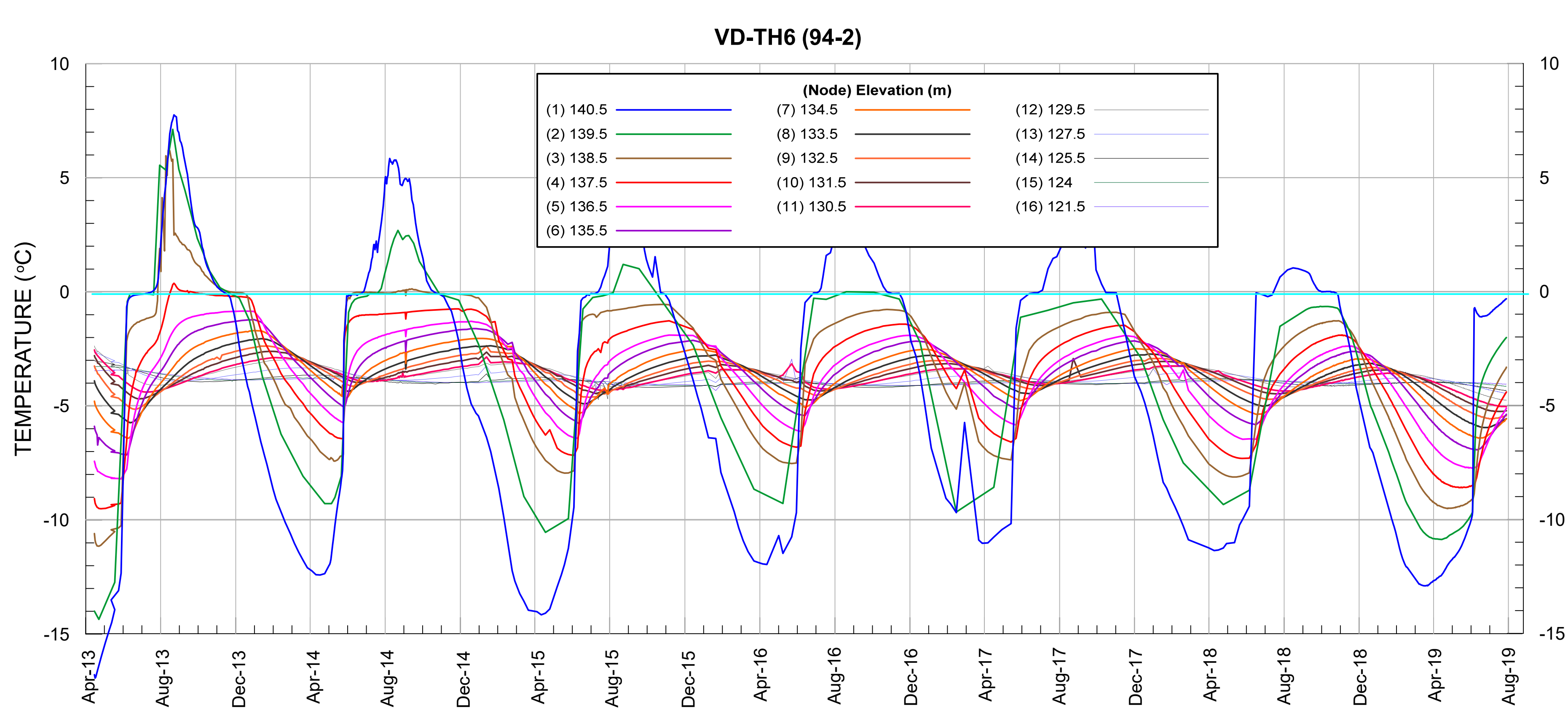
PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	VAULT DIKE TEMPERATURE DATA (Aug 1/18 to Aug 21/19)

AGNICO EAGLE
MEADOWBANK

PROJECT No.			PHASE No.
DESIGN	TD	28AUG14	SCALE AS SHOWN REV.
CADD	TD	28AUG14	
CHECK	PG	28AUG14	FIGURE 54
REVIEW			







PROJECT	AGNICO EAGLE MINES LIMITED MEADOWBANK GOLD PROJECT NUNAVUT
TITLE	VAULT DIKE NODAL THERMAL TIMELINES (Apr 1/13 to Aug 21/19)

AGNICO EAGLE MEADOWBANK

PROJECT No.			PHASE No.
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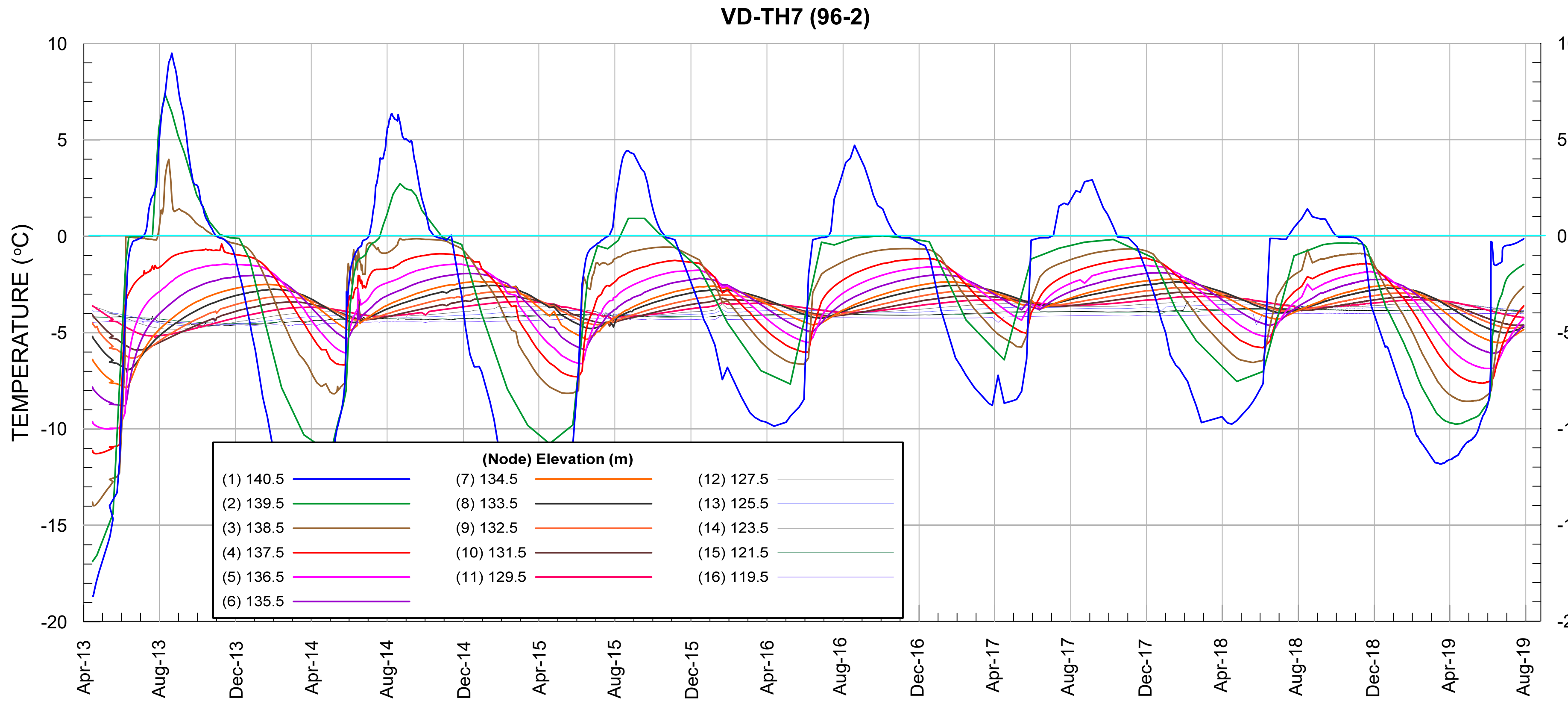
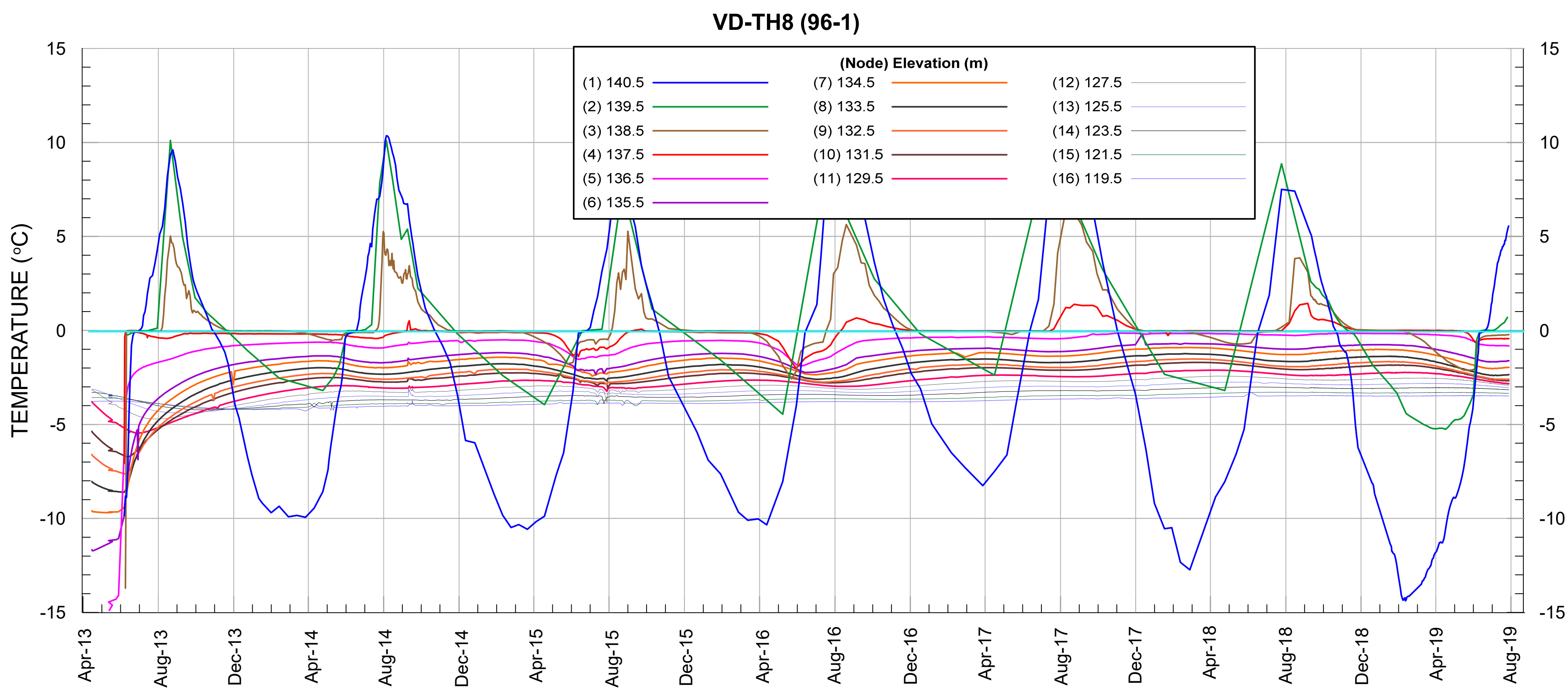
CADD	TD	28AUG14	FIGURE 55
CHECK	PG	28AUG14	
REVIEW			





PROJECT
AGNICO EAGLE MINES LIMITED
MEADOWBANK GOLD PROJECT
NUNAVUT

TITLE
VAULT DIKE
NODAL THERMAL TIMELINES
(Apr 1/13 to Aug 21/19)

AGNICO EAGLE
MEADOWBANK

PROJECT No.			PHASE No.	
DESIGN	TD	28AUG14	SCALE AS SHOWN	REV.
CADD	TD	28AUG14	**FIGURE 56**	
CHECK	PG	28AUG14		
REVIEW				

APPENDIX D

All Weather Private Road

APPENDIX D1

AWPR Observations

STATIO N	NAME	STRUCTURE DESCRIPTION	COMMENTS	GPS COORDINATES	PHOTO
0+430	PRC1	1x600 mm CSP	Culvert owned by the town and not AEM. Minor damage to outlet. Minor obstruction of the outlet. Still in good condition. No action required	15W356163 /7136092	
0+470	PRC2	2x600 mm CSP	Culvert owned by the town and not AEM. Good condition	15w 356196 /7136129	Outlet: 192
1+380	PRC3	1x600 mm CSP	Culvert owned by the town and not AEM. Good condition	15w 356448 /7136952	
2+550	R-00A	1x600 mm CSP	No sign of any flow. Inlet partially collapsed, outlet entirely collapsed with signs of obstruction from road material, one hole in the culvert was visible from the crest of the road in the past, but is now well recovered.	15w 355926 /7137789	
4+260	PC-14	2x600 mm CSP	These 2 culverts are too damaged to function any longer. If needed, new culvert should be installed further north.	15w 355150 /7139212	-
5+200	Quarry 1		Rocks walls are generally clean and stable.		193
~5+700	unname d	1x600 mm CSP	The inlet is buried in gravel. The outlet is in good condition.	14w 644762 /7140728	
8+750	R02 Centre Bridge	30m Acrow Panel Bridge	In general good condition. The two corrugated steel bins at both abutments show deformation under the weight of the bridge.		194: north 195: south

STATION	NAME	STRUCTURE DESCRIPTION	COMMENTS	GPS COORDINATES	PHOTO
8+830	PC-17A	2X1800 mm CSP	Sign of erosion beneath the inlet and flow of water occuring beneath the culvert. The 1800 CSP were installed too high. While conditions are not perfect, they have proven stable over the past years. No sign of degradation from last year on both the inlet and outlet sides. Flow was observed beneath the culvert in the past, but in 2019 the flow moved further south (5-10 m from culvert). To be on watch during next spring for evolution.	14w 643845 /7143422	Outlet : 196
8+850	PC-17	2x1200 mm CSP	In good condition	14w 643845 /7143422	-
9+952	PC-1	1x600 mm CSP	In good condition	14w 643800 /7144488	
10+580	R-03	1x600 mm CSP	In good condition	14w 643583 /7145080	
12+050	R-04	1x1200 mm CSP	In good condition	14w 643082 /7146461	Inlet (west) : 197 Outlet (east) : 198
12+745	PC-13	1x600 mm CSP	In good condition but inlet slightly bent.	14w 642850 /7147107	

STATION	NAME	STRUCTURE DESCRIPTION	COMMENTS	GPS COORDINATES	PHOTO
13+250	Quarry 2		The wall is mostly clean. One steep area is unstable and would require cleaning if operations resume.		199
13+405	PC-2	1x600 mm CSP	In good condition	14w 642617 /7147733	
13+685	PC-3	1x600 mm CSP	In good condition	14w 642524 /7147992	
13+950	unnamed	1x600 mm CSP	In good condition	14w 642362 /7148374	
14+910	PC-4	1x600 mm CSP	In good condition	14w 642007 /7149100	
15+745	R-05A	1x1200 mm CSP	In good condition	14w 641539 /7149630	
17+600	R05 Center Bridge	30m Acrow Panel Bridge	In good condition. Minor damage to the bin wall of both abutments as a result of past snow removal activites. No reparation required yet.	14w 640343 /7151125	201: north 202: south
18+280	PC-5	1x600 mm CSP	In good condition	14w 640268 /7151768	
18+900	PC-6	1x600 mm CSP	In good condition	14w 640089 /7152535	

STATION	NAME	STRUCTURE DESCRIPTION	COMMENTS	GPS COORDINATES	PHOTO
20+240	PC-7A	2x600 mm CSP	In general good condition. The outlet of the northern culvert is damaged.	14w 639438 /7153812	
20+250	PC-7	1x600 mm CSP	The outlet of the culvert is damaged and to be cleaned.	14w 639443 /7153804	
23+100	R06 Center Bridge	30 m Acrow Panel Bridge	In good condition		203: north 204: south
23+700	Quarry 3		A crusher is installed in this quarry. The west wall is in good and stable condition but would need additional cleaning locally.		205, 206
25+900	R-07	1x1200 mm CSP	In good condition	14w 636368 /7157921	
29+420	PC-8	1x600 mm CSP	In good condition	14w 634850 /7161315	
31+300	Quarry 4		Quarry flooded. In good condition.		207, 208
34+650	Quarry 5		Rock walls are in good and stable condition, except for a small portion on the east side.		209, 210
35+690	PC-9	1x600 mm CSP	In good condition.	14w 631460 /7164196	
36+470	Quarry 6		The remaining rock walls are clean and stable.		211, 212

STATION	NAME	STRUCTURE DESCRIPTION	COMMENTS	GPS COORDINATES	PHOTO
36+865	PC-10	1x600 mm CSP	In good condition.	14w 630696 /7164989	
39+552	PC-11	1x600 mm CSP	In good condition. The inlet is too high and water is flowing underneath it.	14w 629977 /7167512	
39+800	Quarry 7		The quarry walls are in unstable condition. Scaling is recommended before resuming activities.		215
41+300	PC-12	1x600 mm CSP	In good condition, almost submerged.	14w 629714 /7169091	
42+950	Quarry 8		Walls are generally stabilized with rockfill berm but some others are in loose unstable condition.		216, 217
44+600	Quarry 9		Presence of unstable loose rocks and boulders along the steepest and highest wall section. Some walls are in unstable condition with loose rocks.		218, 219
48+500	R09 Center Bridge	12m Rapid Span Bridge	In good condition	14w 625545 /7173765	220, 221
48+900	Quarry 10		The steep west rock wall is unstable.		

STATION	NAME	STRUCTURE DESCRIPTION	COMMENTS	GPS COORDINATES	PHOTO
53+500	Quarry 11		Rock walls are clean and stable.		222, 223
54+950	PC-16	1x600 mm CSP	Not observed in 2019	14w 626436 /7179742	
58+300	Quarry 12		In general good, stable condition.		224
62+060	R13 Center Bridge	12 m Rapid Span Bridge	In general good condition. The east side of the north abutment seemed inclined in the past but not anymore.	14w 626197 /7185563	225: north 226 : south
62+350	Quarry 13		Loose blocks were observed in some portions of the rock wall, but the quarry is in general good condition.		227, 228
65+700	Quarry 14		Quarry flooded. Loose blocks were observed in some portions of the rock wall, but in general good condition.		229, 230
67+600	Quarry 15		Steep rock wall in relatively stable condition		231
67+840	R-14	3x1200 mm CSP	Middle and northern culverts show small sign of erosion at the outlet and have been damaged (collapsed) inside, below the road, but it is anticipated that they will continue to perform well. All of them were installed too high but function well. No action required.	14w 626859 /7190950	

STATION	NAME	STRUCTURE DESCRIPTION	COMMENTS	GPS COORDINATES	PHOTO
69+200	R15 Centre Bridge	30 m Acrow Panel Bridge	Bin wall of both abutments were observed to be damaged but they are still holding well. The bridge is dipping toward the west side on both north and south abutments. The foundation does not show signs of failure but is slowly settling. Its condition should be monitored.	14w 627469 /7192035	232 : north 233 : south
70+400	Quarry 16		Presence of unstable loose rocks and boulders but in general good condition.	14w 627216 /7193129	234
72+800	Quarry 17		Steep rock wall in stable conditions.	14w 626884 /7195600	
73+800	R16 Centre Bridge	12m Rapid Span Bridge	In good condition	14w 626701 /7196535	235 : north 236 : south
77+440	R-17	1x1200 mm CSP	In good condition	14w 626127 /7199708	
79+500	R18 Centre Bridge	12 m Rapid Span Bridge	In good condition	14w 627270 /7201462	237 : north 238 : south
80+200	Quarry 18		In general good condition, south wall is high (about 8 m) with some loose blocks.	14w 627370 /7202154	239
80+950	R-18A	3x1200 mm CSP	In good condition.	14w 627556 /7202800	240
82+500	R-18B	1X600 mm CSP	In good condition, installed above ground surface (water can flow below culvert).	14w 627034 /7203901	

STATION	NAME	STRUCTURE DESCRIPTION	COMMENTS	GPS COORDINATES	PHOTO
83+150	R19 Centre	12m Rapid Span Bridge	Some damage to the steel containment plates and to one pile was observed, which may be associated with snow removal activity. The damage is minor and does not affect the geotechnical integrity of the bridge.	14w 627680 /7203918	241 : north 242 : south
84+300	Quarry 19		Rock walls are in good condition.		
85+490	R-20	1x1200 mm CSP	Outlet of the culvert is slighly twisted. The middle of the culvert is slightly collapsed. The inlet is installed above the ground surface and water is able to flow beneath the culvert. No follow-up required, in stable conditions.	14w 629596 /7204573	
87+300	R-21	2x1200 mm CSP	Both culverts are slightly collapsed in the middle. Should have been installed lower to avoid erosion issue. In stable condition.	14w 630593 /7206335	
89+550	Quarry 20		Quarry walls are in good condition	14w 631254 /7208023	243, 244
93+400	Quarry 21		Quarry walls are in good condition.	14w 630863 /7211784	
93+600	R-23	1x1200 mm CSP	Minor damage near the top, but still in good condition. The culvert is installed too high and as a result there is a low flow of water through the road rockfill. The situation has been under control over the past years.	14w 630975 /7211918	
98+100	R-24	2x1200 mm CSP	Both outlet are installed too high. The outlet of the southern culvert still shows small signs of erosion, but this has been under control over the past years. Both culvert show deformation in the upper part.	14w 633902 /7215232	

STATIO N	NAME	STRUCTURE DESCRIPTION	COMMENTS	GPS COORDINATES	PHOTO
99+200	Quarry 22		In relative stable condition.	14w 633894 /7216183	
101+950	R-25	2x600 mm CSP	One culvert is angling up toward the downstream end and natural drainage by gravity does not occur. A second culvert alongside is well installed and should drain water for the remainder of the season. No sign of erosion observed during the inspection.	14w 635112 /7217370	
104+400	R-26	3x1200 mm CSP	In good condition	14w 636844 /7216000	
	Quarry 23		This is an active quarry used to store rock cores and other things. Because of the presence of loose rocks on top of steep wall, the workers who need access to the quarry should be aware of rockfall potential and stay at a minimum of 20 m away from the wall.		245, 246
	Culvert along Western Diversio n Ditch	2x1200 mm CSP	Outlet in good condition and inlet slightly bent but still in good condition.		

APPENDIX D2

Culverts Photographic Log

Photograph D2-1: PRC2 km 0+470

Date: July 24, 2019 **Photo Number**: 192

Description: View of the culvert outlet. Good condition.

Photograph D2-2: PC-17A km 8+830

Date: August July 24, 2019 **Photo Number**: 196

Description: View of the culverts outlet. No sign of degradation since last year but the flow moved further south (5-10 m from culvert).

Photograph D2-3 R-04 km 12+050

Date: July 24, 2019 **Photo Number**: 197

Description: View of the culvert inlet. In good condition.

Photograph D2-4: R-04 km 12+050

Date: July 24, 2019 **Photo Number**: 198

Description: View of the culvert outlet. In good condition.

Photograph D2-5: R-18A km 80+950

Date: July 24, 2019 **Photo Number**: 240

Description: View of the culverts outlet. In good condition.

APPENDIX D3

Bridges Photographic Log

Photograph D3-1 Bridges 1 – R02 km 8+750

Date: July 24, 2019 **Photo Number**: 194

Description: Looking at the north abutment. The corrugated steel bin shows deformation under the weight of the bridge.

Photograph D3-2 Bridges 1 – R02 km 8+750

Date: July 24, 2019 **Photo Number**:195

Description: Looking at the south abutment. The corrugated steel bin shows deformation under the weight of the bridge.

Photograph D3-3 Bridges 2 – R05 km 17+600

Date: July 24, 2019 **Photo Number**: 201

Description: Looking at the north abutment.

Photograph D3-4 Bridges 2 – R05 km 17+600

Date: July 24, 2019 **Photo Number**: 202

Description: Looking at the south abutment. Minor damage to the bin wall.

Photograph D3-5 Bridges 3 – R06 km 23+100

Date: July 24, 2019 **Photo Number**: 203

Description: Looking at the north abutment.

Photograph D3-6 Bridges 3 – R06 km 23+100

Date: July 24, 2019 **Photo Number**: 204

Description: Looking at the south abutment.

Photograph D3-7 Bridges 4 – R13 km 62+060

Date: July 24, 2019 **Photo Number**: 225

Description: Looking at the north abutment.

Photograph D3-8 Bridges 4 – R13 km 62+060

Date: July 24, 2019 **Photo Number**: 226

Description: Looking at the south abutment.

Photograph D3-9 Bridges 5 – R15 km 69+200

Date: July 24, 2019 **Photo Number**: 232

Description: Looking at the north abutment. Damage to the bin wall likely caused during snow removal activities. Bridge is tipping toward the west side on the abutment.

Photograph D3-10 Bridges 5 – R15 km 69+200

Date: July 24, 2019 **Photo Number**: 233

Description: Looking at the south abutment. Damage to the bin wall likely caused during snow removal activities. Bridge is tipping toward the west side on the abutment.

Photograph D3-11 Bridges 6 – R16 km 73+800

Date: July 24, 2019 **Photo Number**: 235

Description: Looking at the north abutment. In good condition.

Photograph D3-12 Bridges 6 – R16 km 73+800

Date: July 24, 2019 **Photo Number**: 236

Description: Looking at the south abutment. In good condition.

Photograph D3-13 Bridges 7 – R18 km 79+500

Date: July 24, 2019 **Photo Number**: 237

Description: Looking at the north abutment. In good condition.

Photograph D3-14 Bridges 7 – R18 km 79+500

Date: July 24, 2019 **Photo Number**: 238

Description: Looking at the south abutment. In good condition.

Photograph D3-15 Bridges 8 – R19 km 83+150

Date: July 24, 2019 **Photo Number**: 241

Description: Looking at the north abutment. Minor damage to steel plate due to snow removal activity.

Photograph D3-16 Bridges 8 – R19 km 83+150

Date: July 24, 2019 **Photo Number**: 242

Description: Looking at the south abutment. Minor damage to steel plate due to snow removal activity.

APPENDIX E

Amaruq Road

APPENDIX E1

Amaruq Road Observations

STATION	NAME	STRUCTURE DESCRIPTION	COMMENTS	Photo
0+449	#1	450 mm	Not observed, seems to be under Vault Pad.	-
0+675	#2	300 mm		-
1+133	#3	900 mm	In good condition.	-
1+137	#3-2	900 mm		
1+325	#4	800 mm	Not observed.	-
1+525	#5	600 mm	In good condition.	-
1+799	#6	600 mm	Not observed.	-
2+013	#7	900 mm	Inlet in good condition, outlet totally buried.	-
2+016	#7-2	900 mm		
2+125	#8	900 mm	In good condition.	-
2+127	#8-2	900 mm		
2+659	#9	600 mm	Inlet in good condition, outlet damaged and pinched.	-
3+400	Bridge 3.4		In good condition.	279: north 280: south
3+264	#10	600 mm	Inlet in good condition, outlet damaged and pinched.	-
3+850	#11	300 mm	In good condition.	-
4+183	#12	900 mm	In good condition.	-
4+181	#12-2	900 mm		
4+179	#12-3	900 mm		
4+184	#12-4	900 mm		
4+186	#12-5	900 mm		
4+615	#13	300 mm	Inlet in good condition, outlet not observed as it is buried.	-

STATION	NAME	STRUCTURE DESCRIPTION	COMMENTS	Photo
4+756	#14	600 mm	In good condition.	-
4+850	#15	900 mm	In good condition.	-
5+050	#16	300 mm	Not observed.	-
5+161	#17	800 mm	In good condition, outlet damaged.	-
5+330	#18	700 mm	In good condition.	-
5+574	#19	900 mm	In good condition.	-
5+931	#20	900 mm	In good condition.	-
5+929	#20-2	900 mm		
6+310	#21	300 mm	Not observed.	-
6+423	#22	600 mm	In good condition.	-
6+442	#23	600 mm	In good condition.	-
6+493	#24	600 mm	Not observed.	-
6+530	#25	600 mm	In good condition.	-
7+216	#26	800 mm	In good condition.	-
7+218	#26-2	800 mm		
7+275	#27	600 mm	In good condition.	-
7+300	#27-2	600 mm	Outlet is buried.	
7+325	#27-3	600 mm	In good condition.	-
7+349	#28	600 mm	In good condition.	-
7+375	#28-2	600 mm	In good condition.	-
7+779	#29	900 mm	Not observed.	-
7+781	#29-2	900 mm	Not observed.	-

STATIO N	NAME	STRUCTURE DESCRIPTION	COMMENTS	Photo
7+968	#30	900 mm	In good condition.	-
7+970	#30-2	900 mm		
8+005	#31	900 mm	In good condition.	-
8+383	#32	900 mm	In good condition.	-
8+405	#33	900 mm	In good condition.	-
8+426	#34	900 mm	In good condition.	-
8+428	#34-2	900 mm		
8+581	#35	700 mm	In good condition.	-
9+000	#36	700 mm	In good condition.	-
9+035	#37	900 mm	In good condition.	-
9+049	#38	900 mm	In good condition.	-
9+193	#39	900 mm	In good condition.	-
9+195	#39-2	900 mm		
9+291	#40	900 mm	In good condition.	-
9+388	#41	600 mm	In good condition.	-
9+416	#42	600 mm	In good condition.	-
9+460	#43	600 mm	In good condition.	-
9+490	#44	300 mm	Not observed.	-
9+710	#45	600 mm	Inlet is buried.	-
10+500	Quarry 10.5		Unstable wall, loose rocks. Workers should stay away from the wall.	-
10+700	Bridge 10.7	600 mm	In good condition.	277: north 278: south

STATION	NAME	STRUCTURE DESCRIPTION	COMMENTS	Photo
11+020	#46	900 mm	In good condition.	-
11+101	#47	900 mm	2 of the 5 outlets are completely buried.	-
11+103	#47-2	900 mm		
11+105	#47-3	900 mm		
11+107	#47-4	900 mm		
11+203	#48	900 mm	The inlet is 3/4 buried.	-
11+411	#49	450 mm	Not observed.	-
11+748	#50	600 mm	In good condition.	-
11+905	#51	300 mm	Not observed.	-
12+195	#52	700 mm	In good condition.	-
12+240	#53	700 mm	In good condition, the outlet is half buried.	-
12+388	#54	600 mm	Inlet is buried.	-
12+440	#55	600 mm	Inlet is buried.	-
12+485	#56	600 mm	In good condition.	-
12+635	#57	450 mm	In good condition, the outlet is buried.	-
12+740	#58	900 mm	In good condition.	-
12+760	#59	900 mm	In good condition.	-
12+775	#60	900 mm	In good condition.	-
13+050	#61	600 mm	Inlet in good condition but outlet completely buried.	-
13+265	#62	600 mm	In good condition.	-
13+390	#63	300 mm	In good condition.	-
13+920	#64	600 mm	Inlet is buried.	-

STATIO N	NAME	STRUCTURE DESCRIPTION	COMMENTS	Photo
14+924	#65	800 mm	In good condition.	-
16+000	Bridge 16		In good condition.	275: north 276: south
16+324	#66	600 mm	The inlet is half buried.	-
16+689	#67	600 mm	Not observed.	-
16+750	#68	600 mm	In good condition.	-
17+000	Esker #1		Active (gravel and rock). Presence of loose rock on the steep wall, risk of sloughing.	-
17+250	#68-A	600 mm	In good condition.	-
17+500	#68-B	600 mm	Not observed.	-
17+784	#69	600 mm	Not observed.	-
17+837	#70	600 mm	In good condition.	-
18+580	#73	1200 mm	In good condition.	-
18+559	#74	900 mm	In good condition.	-
18+610	#74-2	900 mm		
18+861	#75	600 mm	In good condition.	-
18+916	#76	450 mm	In good condition.	-
18+998	#77	450 mm	In good condition.	-
19+092	#78	300 mm	In good condition.	-
19+092	#78-2	300 mm		
19+495	#79	700 mm	In good condition.	-
19+659	#80	450 mm	In good condition.	-
19+841	#81	600 mm	In good condition.	-

STATION	NAME	STRUCTURE DESCRIPTION	COMMENTS	Photo
20+000	Bridge 20		In good condition.	273: north 274: south
20+143	#82	300 mm	In good condition.	-
20+300	#83	600 mm	Inlet is bent, still working.	-
20+527	#84	700 mm	In good condition.	-
20+671	#85	600 mm	Inlet in good condition, outlet is buried.	-
20+740	#86	600 mm	In good condition but outlet buried.	-
20+810	#87	600 mm	In good condition.	-
20+881	#88	300 mm	In good condition, the outlet is almost completely blocked.	-
	Quarry 21 (Q141)		Not accessible by pick-up.	-
21+180	#89	450 mm	In good condition, the outlet is high above ground.	-
21+295	#90	800 mm	In good condition.	-
21+297	#90-2	800 mm		
21+770	#91	600 mm	In good condition.	-
22+040	#92	600 mm	In good condition.	-
22+100	#93	450 mm	Inlet in good condition, outlet totally buried.	-
22+147	#94	900 mm	In good condition.	-
22+149	#94-2	900 mm	In good condition.	-
22+150	#94-3	900 mm	In good condition.	-
22+161	#95	900 mm	In good condition.	-
22+162	#95-2	900 mm	In good condition.	-
22+353	#96	600 mm	In good condition.	-

STATION	NAME	STRUCTURE DESCRIPTION	COMMENTS	Photo
22+436	#97	600 mm	In good condition, the inlet is buried by rockfill.	-
22+482	#98	600 mm	In good condition.	-
22+830	#99	600 mm	In good condition.	-
22+936	#100	600 mm	In good condition.	-
23+025	#101	600 mm	Outlet in good condition, inlet totally buried.	-
23+265	#102	600 mm	In good condition.	-
23+562	#103	600 mm	In good condition.	-
23+595	#104	600 mm	In good condition.	-
23+900	Bridge 23.9		In good condition.	271: north 272: south
24+555	#105	600 mm	In good condition.	-
24+700	#106	600 mm	In good condition.	-
24+961	#107	900 mm	In good condition.	-
24+982	#107-2	900 mm		
24+984	#107-3	900 mm		
25+000	Esker #2		In general good condition, but the small walls are steep and in loose conditions. Risk of rockfalls near the walls.	-
25+551	#108	600 mm	In good condition.	-
25+905	#109	800 mm	In good condition.	-
26+100	Bridge 26.1		In good condition.	269: north 270: south
26+350	#110	450 mm	In good condition.	-
26+461	#111	300 mm	Outlet in good condition, the inlet is buried.	-

STATION	NAME	STRUCTURE DESCRIPTION	COMMENTS	Photo
26+630	#112	300 mm	In good condition but outlet totally buried.	-
26+736	#113	450 mm	In good condition.	-
26+810	#114	450 mm	In good condition.	-
26+865	#115	300 mm	In good condition.	-
26+940	#116	450 mm	In good condition.	-
27+173	#117	700 mm	In good condition.	-
27+433	#118	450 mm	In good condition but inlet is half blocked.	-
27+777	#119	300 mm	In good condition.	-
28+125	#120	300 mm	In good condition.	-
28+300	#121	900 mm	In good condition.	-
28+302	#121-2	900 mm		
28+304	#121-3	900 mm		
28+414	#122	900 mm	In good condition.	-
28+416	#122-2	900 mm		
28+418	#122-3	900 mm		
28+575	#123	800 mm	In good condition.	-
28+710	#124	300 mm	In good condition.	-
29+040	#125	800 mm	In good condition.	-
29+240	#126	800 mm	Installed oblique to the road, but in good condition.	-
30+409	#129	1200 mm	In good condition.	-
30+180	Quarry 30.5		The quarry was cleaned and is in good condition. Some walls still show some loose blocks.	
	30+540	600 mm	In good condition.	-

STATION	NAME	STRUCTURE DESCRIPTION	COMMENTS	Photo
30+812	#130	600 mm	In good condition.	-
31+041	#131	600 mm	In good condition.	-
31+540	#132	600 mm	In good condition.	-
32+141	#133	300 mm	Not observed.	-
32+300	Bridge 32.3		In good condition.	267: north 268: south
32+389	#134	300 mm	In good condition but inlet is totally buried.	-
32+567	#135	300 mm	In good condition.	-
32+905	#136	300 mm	Not observed.	-
32+940	#137	300 mm	Not observed.	-
33+000	#138	300 mm	In good condition but inlet is buried.	-
33+214	#139	900 mm	In good condition.	-
33+216	#139-2	900 mm		
33+218	#139-3	900 mm		
33+256	#140	900 mm	In good condition.	-
33+258	#140-2	900 mm		
33+260	#140-3	900 mm		
33+727	#141	900 mm	In good condition.	-
33+728	#141-2	900 mm		
33+730	#141-3	900 mm		
33+732	#141-4	900 mm		
33+734	#141-5	900 mm		
34+160	#142	450 mm	In good condition.	-

STATION	NAME	STRUCTURE DESCRIPTION	COMMENTS	Photo
34+291	#143	600 mm	In good condition.	-
34+319	#144	1000 mm	In good condition.	-
34+395	#145	300 mm	In good condition but inlet is buried by a large rock.	-
34+660	#146	1200 mm	In good condition.	-
34+855	#147	600 mm	In good condition but outlet is half buried.	-
35+173	#148	600 mm	In good condition.	-
35+000	Rock quarry 35 (Q150)		Active quarry. In general good condition but the western wall (4-5 m high) is in unstable condition.	-
35+670	#149	900 mm	In good condition.	-
36+171	#150	900 mm	In good condition.	-
36+173	#150-2	900 mm		
36+175	#150-3	900 mm		
36+177	#150-4	900 mm		
36+179	#150-5	900 mm		
36+562	#151	600 mm	In good condition but outlet is half buried.	-
36+933	#152	900 mm	In good condition.	-
37+027	#153	600 mm	In good condition.	-
37+028	#153-2	600 mm		-
37+030	#153-3	600 mm		-
37+032	#153-4	600 mm		-
37+033	#153-5	600 mm		-
37+261	#154	450 mm	In good condition.	-
37+470	#155	600 mm	In good condition.	-

STATION	NAME	STRUCTURE DESCRIPTION	COMMENTS	Photo
37+506	#156	450 mm	In good condition.	-
38+028	#157	600 mm	In good condition.	-
38+490	#158	900 mm	In good condition.	-
38+491	#158-2	900 mm		
38+493	#158-3	900 mm		
39+768	#159	700 mm	Not observed.	-
39+966	#160	600 mm	In good condition.	-
40+051	#161	600 mm	In good condition.	-
40+238	#162	600 mm	In good condition.	-
40+474	#163	300 mm	Outlet in good condition but inlet totally buried.	-
40+790	#164	300 mm	In good condition.	-
40+964	#165	600 mm	In good condition.	-
41+610	#166	900 mm	In good condition.	-
41+843	#167	900 mm	In good condition.	-
42+342	#168	600 mm	In good condition.	-
42+765	#169	300 mm	In good condition.	-
43+340	#170	800 mm	In good condition.	-
43+500	Bridge 43.5		In good condition.	265: north 266: south
43+568	#170-A	900 mm	In good condition.	-
43+577	#170-B	900 mm		
43+587	#170-C	900 mm		

STATION	NAME	STRUCTURE DESCRIPTION	COMMENTS	Photo
43+815	#171	600 mm	In good condition.	-
44+431	#173	1000 mm	In good condition. The 2 southern culverts are installed below ground surface and water is flowing.	-
44+433	#173-2	1000 mm		
44+435	#173-3	1000 mm		
44+470	#174	600 mm	In good condition.	-
44+640	#175	450 mm	In good condition.	-
44+800	Bridge 44.8		A crack is present on the north-west concrete abutment.	263: north 264: south
45+055	#176	600 mm	Not observed.	-
45+065	#177	600 mm	In good condition.	-
45+170	#178	600 mm	In good condition.	-
45+485	#179	700 mm	In good condition.	-
45+803	#180	600 mm	In good condition.	-
45+935	#181	600 mm	In good condition.	-
46+000	Esker #3		Not active. Only the entrance was seen, as there is no further access. The steep slope observed in 2018 was modified and now meets a stable configuration.	-
46+126	#182	800 mm	In good condition.	-
46+185	#183	800 mm	In good condition.	-
46+187	#183-2	800 mm	In good condition.	-
46+230	#184	600 mm	In good condition.	-
46+404	#185	300 mm	In good condition.	-
46+541	#186	450 mm	In good condition.	-

STATIO N	NAME	STRUCTURE DESCRIPTION	COMMENTS	Photo
46+570	#187	600 mm	In good condition.	-
46+595	#188	600 mm	In good condition.	-
46+870	#189	700 mm	In good condition.	-
46+985	#190	900 mm	In good condition.	-
47+046	#191	300 mm	Not observed.	-
47+190	#192	600 mm	In good condition.	-
47+360	#193	600 mm	In good condition.	-
47+660	#194	600 mm	In good condition.	-
47+808	#195	700 mm	In good condition.	-
47+961	#196	300 mm	In good condition.	-
48+120	#197	600 mm	In good condition.	-
48+222	#198	450 mm	In good condition.	-
48+383	#199	900 mm	In good condition.	-
48+385	#199-2	900 mm		
48+387	#199-3	900 mm		
48+389	#199-4	900 mm		
48+457	#201	900 mm	Installed below the ground level.	-
48+800	#203	600 mm	In good condition.	-
48+840	#204	600 mm	In good condition.	-
49+108	#206	450 mm	In good condition.	-
49+310	#207	600 mm	In good condition.	-

STATION	NAME	STRUCTURE DESCRIPTION	COMMENTS	Photo
49+431	#208	900 mm	In good condition.	-
49+433	#209	900 mm	In good condition.	
49+435	#210	900 mm	In good condition.	
49+550	#211	450 mm	In good condition.	-
49+640	#212	600 mm	In good condition.	-
49+795	#213	300 mm	In good condition but outlet is half blocked.	-
49+915	#214	800 mm	In good condition.	-
50+135	#215	300 mm	In good condition.	-
50+510	#216	600 mm	Not observed.	-
50+600	Quarry Q165		In good condition.	-
50+790	#217	450 mm	In good condition.	-
51+233	#218	900 mm	In good condition.	-
51+235	#218-2	900 mm		
51+237	#218-3	900 mm		
51+239	#218-4	900 mm		
51+460	#219	300 mm	In good condition.	-
51+883	#221	900 mm	In good condition.	-
51+885	#221-2	900 mm		
51+887	#221-3	900 mm		
52+000	Rock quarry 52		Active. In good and clean condition. The northern wall may pose a rockfall hazard (loose blocks and cobbles) which workers need to be aware of.	-
52+315	#222	600 mm	In good condition.	-

STATION	NAME	STRUCTURE DESCRIPTION	COMMENTS	Photo
52+650	#223	600 mm	In good condition.	-
52+705	#224	600 mm	In good condition.	-
52+715	#225	450 mm	In good condition.	-
52+935	#226	700 mm	Not observed.	-
52+937	#226-2	450 mm		
52+970	#227	600 mm	In good condition.	-
52+995	#228	700 mm	In good condition.	-
53+245	#229	300 mm	In good condition.	-
53+363	#230	700 mm	In good condition.	-
53+659	#231	300 mm	Not observed.	-
53+928	#232	300 mm	In good condition.	-
54+240	#233	450 mm	In good condition.	-
54+385	#234	450 mm	Not observed.	-
54+500	#235	600 mm	In good condition.	-
54+625	#236	450 mm	In good condition.	-
54+655	#237	600 mm	In good condition.	-
54+850	#238	600 mm	In good condition.	-
55+060	#239	600 mm	In good condition.	-
55+164	#240	600 mm	In good condition.	-
55+235	#241	600 mm	Outlet in good condition but inlet buried.	-
55+329	#242	600 mm	In good condition.	-
55+593	#243	600 mm	In good condition but inlet is buried.	-

STATIO N	NAME	STRUCTURE DESCRIPTION	COMMENTS	Photo
55+625	#244	450 mm	In good condition.	-
55+735	#245	600 mm	Not observed.	-
56+005	#246	600 mm	In good condition.	-
56+065	#247	700 mm	In good condition.	-
65+220	#248	700 mm	In good condition.	-
56+435	#249	600 mm	In good condition.	-
56+610	#250	800 mm	In good condition.	-
56+745	#251	300 mm	In good condition.	-
56+900	#252	900 mm	In good condition.	-
56+965	#253	900 mm	In good condition.	-
56+967	#253-2	900 mm	In good condition.	-
56+969	#253-3	900 mm	In good condition.	-
57+125	#254	600 mm	In good condition.	-
57+195	#255	600 mm	In good condition.	-
57+350	#256	600 mm	In good condition.	-
57+525	#257	600 mm	Not observed.	-
57+875	#258	600 mm	Not observed.	-
57+985	#259	900 mm	In good condition.	-
58+185	#260	300 mm	In good condition.	-
58+350	#261	450 mm	In good condition.	-
58+410	#262	450 mm	In good condition.	-
58+885	#263	450 mm	Not observed.	-

STATION	NAME	STRUCTURE DESCRIPTION	COMMENTS	Photo
58+922	#264	600 mm	In good condition.	-
58+967	#265	450 mm	In good condition.	-
59+024	#266	300 mm	In good condition.	-
59+720	Esker #5		Active (gravel). In good condition.	-
59+720	#267	900 mm	In good condition.	-
59+774	#268	600 mm	In good condition.	-
59+860	#269	600 mm	In good condition.	-
60+000	#270	600 mm	In good condition.	-
60+050	#271	600 mm	In good condition.	
60+087	#272	600 mm	In good condition.	
60+649	#273	300 mm	In good condition.	-
60+815	#274	600 mm	In good condition.	-
61+022	#275	600 mm	In good condition.	-
61+170			Added pipe to drain area of accumulated water. This is a good practice.	262
61+282	#276	600 mm	In good condition.	-
61+622	#277	450 mm	In good condition.	-
61+870	#278	1200 mm	In good condition.	-
62+307	#279	300 mm	Not observed.	-
62+416	#280	900 mm	Not observed.	-

STATION	NAME	STRUCTURE DESCRIPTION	COMMENTS	Photo
62+350	#281	600 mm	Not observed.	-
62+500	Esker #6		In good condition.	-
	Esker #7		Not observed. Possible not yet developed.	-
62+965	#283	450 mm	Outlet in good condition but inlet is buried.	-
63+070	#284	900 mm	In good condition. To be extended.	-
63+072	#284-2	900 mm		
63+074	#284-3	900 mm		
63+429	#287	600 mm	Not observed.	-
63+530	#288	600 mm	In good condition.	-
63+733	#289	600 mm	In good condition.	-
63+900	Unnamed culverts		Set of 4 culverts, 2 are heated by hot water. All are installed below ground level for fish. Water is flowing in the 2 middle culverts.	-
63+975	#290	600 mm	Not observed.	-

APPENDIX E2

Culverts Photographic Log

Photograph E2-1: Unnamed pipe, km 61+170

Date: July 25, 2019 **Photo Number**: 262

Description: View of a pipe installed to drain the area of water accumulation. Considered a good practice.

APPENDIX E3

Bridges Photographic Log

Photograph E3-1 Bridges 1 – km 3+400

Date: July 25, 2019 **Photo Number**: 280

Description: Looking at the north abutment.

Photograph E3-2 Bridges 1 – km 3+400

Date: July 25, 2019 **Photo Number**: 279

Description: Looking at the south abutment.

Photograph E3-3 Bridges 2 – km 10+700

Date: July 25, 2019 **Photo Number**: 278

Description: Looking at the north abutment.

Photograph E3-4 Bridges 2 – km 10+700

Date: July 25, 2019 **Photo Number**: 277

Description: Looking at the south abutment.

Photograph E3-5 Bridges 3 – km 16+000

Date: July 25, 2019 **Photo Number**: 276

Description: Looking at the north abutment.

Photograph E3-6 Bridges 3 – km 16+000

Date: July 25, 2019 **Photo Number**: 275

Description: Looking at the south abutment.

Photograph E3-7 Bridges 4 – km 20+000

Date: July 25, 2019 **Photo Number**: 274

Description: Looking at the north abutment.

Photograph E3-8 Bridges 4 – km 20+000

Date: July 25, 2019 **Photo Number**: 273

Description: Looking at the south abutment.

Photograph E3-9 Bridges 5 – km 23+900

Date: July 25, 2019 **Photo Number**: 272

Description: Looking at the north abutment.

Photograph E3-10 Bridges 5 – km 23+900

Date: July 25, 2019 **Photo Number**: 271

Description: Looking at the south abutment.

Photograph E3-11 Bridges 6 – km 26+100

Date: July 25, 2019 **Photo Number**: 270

Description: Looking at the north.

Photograph E3-12 Bridges 6 – km 26+100

Date: July 25, 2019 **Photo Number**: 269

Description: Looking at the south abutment.

Photograph E3-13 Bridges 7 – km 32+300

<u>Date</u>: July 25, 2019 **<u>Photo Number</u>**: 268

<u>Description</u>: Looking at the north abutment.

Photograph E3-14 Bridges 7 – km 32+300

<u>Date</u>: July 25, 2019 **<u>Photo Number</u>**: 267

<u>Description</u>: Looking at the south abutment.

Photograph E3-15 Bridges 8 – km 43+500

Date: July 25, 2019 **Photo Number**: 266

Description: Looking at the north abutment.

Photograph E3-16 Bridges 8 – km 43+500

Date: July 25, 2019 **Photo Number**: 265

Description: Looking at the south abutment.

Photograph E3-17 Bridges 9 – km 44+800

Date: July 25, 2019 **Photo Number**: 264

Description: Looking at the north abutment. A crack is present in the concrete on the western side.

Photograph E3-18 Bridges 9 – km 44+800

Date: July 25, 2019 **Photo Number**: 263

Description: Looking at the south abutment.

APPENDIX F

Quarries

Photograph F-1: Quarry 1 – km 5+200

Date: July 24, 2019 **Photo Number**: 193

Description: Rocks walls are generally clean and stable.

Photograph F-2: Quarry 2 – km 13+250

Date: July 24, 2019 **Photo Number**: 199

Description: The wall is mostly clean. One steep area is unstable and would require cleaning if operations resume.

Photograph F-3: Quarry 3 – km 23+700

Date: July 24, 2019 **Photo Number**: 205

Description: View of west wall. In good and stable condition but would need additional cleaning locally.

Photograph F-4: Quarry 3 – km 23+700

Date: July 24, 2019 **Photo Number**: 206

Description: View of east wall. In good condition.

Photograph F-5: Quarry 4 – km 31+300

Date: July 24, 2019 **Photo Number**: 207

Description: Quarry flooded. In good condition.

Photograph F-6: Quarry 4 – km 31+300

Date: July 24, 2019 **Photo Number**: 208

Description: Quarry flooded. In good condition.

Photograph F-7: Quarry 5 – km 34+650

Date: July 24, 2019 **Photo Number**: 209

Description: View of north and east walls. Rock walls are in good and stable condition, except for a small portion on the east side.

Photograph F-8: Quarry 5 – km 34+650

Date: July 24, 2019 **Photo Number**: 210

Description: View of north and west walls. In good condition.

Photograph F-9: Quarry 6 – km 36+470

Date: July 24, 2019 **Photo Number**: 211

Description: View of south and west walls. In good condition.

Photograph F-10: Quarry 6 – km 36+470

Date: July 24, 2019 **Photo Number**: 212

Description: View of south and east walls. In good condition.

Photograph F-11: Quarry 7 – km 39+800

Date: July 24, 2019 **Photo Number**: 215

Description: The quarry walls are in unstable condition. Scaling is recommended before resuming activities..

Photograph F-12: Quarry 8 – km 42+950

Date: July 24, 2019 **Photo Number**: 216

Description: View of west wall.

Photograph F-13: Quarry 8 – km 42+950

Date: July 24, 2019 **Photo Number**: 217

Description: View of south wall. Presence of loose blocks.

Photograph F-14: Quarry 9 – km 44+600

Date: July 24, 2019 **Photo Number**: 218

Description: View of west and south walls. Presence of loose blocks at the base of the wall.

Photograph F-15: Quarry 9 – km 44+600

Date: July 24, 2019 **Photo Number**: 219

Description: View of north and east walls. View of a pile of loose material.

Photograph F-16: Quarry 11 – km 53+500

Date: July 24, 2019 **Photo Number**: 222

Description: View of north and east walls. In good condition.

Photograph F-17: Quarry 11 – km 53+500

Date: July 24, 2019 **Photo Number**: 223

Description: View of west and north walls. In good condition.

Photograph F-18: Quarry 12 – km 58+300

Date: July 24, 2019 **Photo Number**: 224

Description: In good condition.

Photograph F-19: Quarry 13 – km 62+350

Date: July 24, 2019 **Photo Number**: 227

Description: View of the south and east walls. In general good condition.

Photograph F-20: Quarry 13 – km 62+350

Date: July 24, 2019 **Photo Number**: 228

Description: View of the west and north walls. In general good condition.

Photograph F-21: Quarry 14 – km 65+700

Date: July 24, 2019 **Photo Number**: 229

Description: View of north and west walls. Quarry flooded.

Photograph F-22: Quarry 14 – km 65+700

Date: July 24, 2019 **Photo Number**: 230

Description: View of west and south walls. Quarry flooded.

Photograph F-23: Quarry 15 – km 67+600

Date: July 24, 2019 **Photo Number**: 231

Description: Steep rock wall in generally stable condition.

Photograph F-24: Quarry 16 – km 70+400

Date: July 24, 2019 **Photo Number**: 234

Description: View of the south and west walls. Presence of loose rocks on steep wall but in general good condition.

Photograph F-25: Quarry 18 – km 80+200

Date: July 24, 2019 **Photo Number**: 239

Description: View of the south wall. In general good condition, south wall is high (about 8 m) with some loose blocks

Photograph F-26: Quarry 20 – km 89+550

Date: July 24, 2019 **Photo Number**: 243

Description: In good condition.

Photograph F-27: Quarry 20 – km 89+550

Date: July 24, 2019 **Photo Number**: 244

Description: In good condition.

Photograph F-28: Quarry 23 (Airstrip Quarry)

Date: July 24, 2019 **Photo Number**: 245

Description: Loose rocks on top of steep wall (bermed). The quarry is used to store equipment.

Photograph F-29: Quarry 23 (Airstrip Quarry)

Date: July 24, 2019 **Photo Number**: 246

Description: Loose rocks on top of steep wall (bermed). The quarry is used to store equipment.

APPENDIX G

Bulk Fuel Facilities

APPENDIX G1

Baker Lake Tank Farm Photographic Log

Photograph G1-1 Baker Lake Tank Farm

Date: July 24, 2019 **Photo Number**: 167

Description: From the south side of Tank 1, looking southeast at Tanks 1, 2, 3, and 4. Presence of water ponding.

Photograph G1-2 Baker Lake Tank Farm

Date: July 24, 2019 **Photo Number**: 168

Description: Looking at the southwestern corner of Tank 1.

Photograph G1-3 Baker Lake Tank Farm

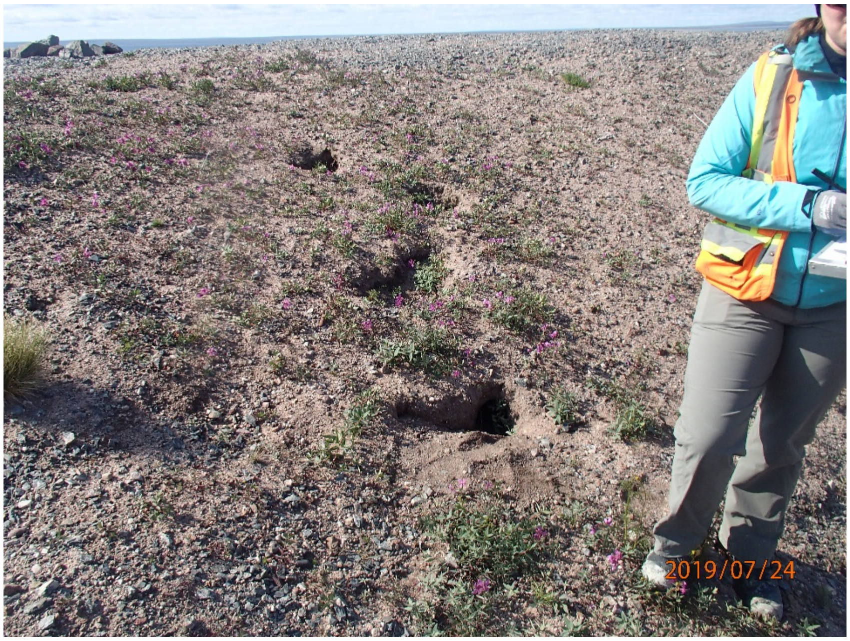
Date: July 24, 2019 **Photo Number**: 169

Description: Looking northwest toward the south side of Tank 1.

Photograph G1-4 Baker Lake Tank Farm

Date: July 24, 2019 **Photo Number**: 170

Description: Looking northeast toward the south side of Tanks 2 and 3.



Photograph G15 Baker Lake Tank Farm

Date: July 24, 2019 **Photo Number**: 171

Description: Looking southwest toward the south wall of the tank farm. Presence of animal burrows.

Photograph G1-6 Baker Lake Tank Farm

Date: July 24, 2019 **Photo Number**: 173

Description: Looking southwest. The geomembrane between the south side of tank 2 and 3 is damaged.

Photograph G1-7 Baker Lake Tank Farm

Date: July 24, 2019 **Photo Number**: 172

Description: From the southwestern corner of Tank 3 looking southeast. View of exposed LLDPE and water ponding.

Photograph G1-8 Baker Lake Tank Farm

Date: July 24, 2019 **Photo Number**: 174

Description: From the south portion of the site looking northwest at the south side of Tank 3 and 4.

Photograph G1-9 Baker Lake Tank Farm

Date: July 24, 2019 **Photo Number**: 175

Description: From the south portion of the site looking northeast.

Photograph G1-10 Baker Lake Tank Farm

Date: July 24, 2019 **Photo Number**: 176

Description: From the northeastern corner of Tank 4 looking southwest toward Tank 4.

Photograph G1-11 Baker Lake Tank Farm

Date: July 24, 2019 **Photo Number**: 177

Description: From the northern side of Tank 4, looking northwest toward Tanks 4, 3, 2, and 1. Presence of exposed liner.

Photograph G1-12 Baker Lake Tank Farm

Date: July 24, 2019 **Photo Number**: 179

Description: From the northeastern corner of Tank 2 looking northwest towards the northeastern side of Tanks 1 and 2.

Photograph G1-13 Baker Lake Tank Farm

Date: July 24, 2019 **Photo Number**: 178

Description: From the northwestern corner of Tank 3 looking southeast towards the northeastern side of Tanks 3 and 4.

Photograph G1-14 Baker Lake Tank Farm

Date: July 24, 2019 **Photo Number**: 180

Description: Looking northwest at the southern and western sides of Tank 5.

Photograph G1-15 Baker Lake Tank Farm

Date: July 24, 2019 **Photo Number**: 181

Description: Looking north between Tanks 5 and 6. Presence of water ponding.

Photograph G1-16 Baker Lake Tank Farm

Date: July 24, 2019 **Photo Number**: 182

Description: Looking northeast at the southern side of Tank 6. Presence of water ponding.

Photograph G1-17 Baker Lake Tank Farm

Date: July 24, 2019 **Photo Number**: 183

Description: Looking southeast at the northeastern side of Tank 6. Presence of water ponding.

Photograph G1-18 Baker Lake Tank Farm

Date: July 24, 2019 **Photo Number**: 184

Description: Looking south between Tanks 5 and 6.

Photograph G1-19 Baker Lake Tank Farm

Date: July 24, 2019 **Photo Number**: 185

Description: Looking west at the northeastern side of Tank 5.

Photograph G1-20 Baker Lake Tank Farm

Date: July 24, 2019 **Photo Number**: 187

Description: From the northeastern corner of the Jet A fuel tanks looking south. Presence of exposed geomembrane.

Photograph G1-21 Baker Lake Tank Farm

Date: July 24, 2019 **Photo Number**: 186

Description: From the northeastern corner of the Jet A fuel tanks looking west. Presence of exposed geomembrane.

Photograph G1-22 Baker Lake Tank Farm

Date: July 24, 2019 **Photo Number**: 188

Description: From the northern side the Jet A fuel tanks looking southwest. Presence of a hole in the geomembrane.

Photograph G1-23 Baker Lake Tank Farm

Date: July 24, 2019 **Photo Number**: 189

Description: From the southwestern corner of the Jet A fuel tanks looking east. Presence of exposed geomembrane and water ponding.

Photograph G1-24 Baker Lake Tank Farm

Date: July 24, 2019 **Photo Number**: 190

Description: From the southwestern corner of the Jet A fuel tanks looking north. Presence of exposed geomembrane and water ponding.

APPENDIX G2

Meadowbank Tank Farm Photographic Log

Photograph G2-1 Meadowbank Tank Farm

Date: July 22, 2019 **Photo Number**: 2

Description: From the western corner, looking east at the tank.

Photograph G2-2 Meadowbank Tank Farm

Date: July 22, 2019 **Photo Number**: 1

Description: From the western corner, looking northeast at the tank.

Photograph G2-3 Meadowbank Tank Farm

Date: July 22, 2019 **Photo Number**: 7

Description: From the eastern side, looking northwest.

Photograph G2-4 Meadowbank Tank Farm

Date: July 22, 2019 **Photo Number**: 6

Description: From the eastern side looking southwest. Presence of water ponding. A pump is installed.

Photograph G2-5 Meadowbank Tank Farm

Date: July 22, 2019 **Photo Number**: 4

Description: Looking northeast from the southern corner. Accumulation of water in the eastern corner.

Photograph G2-6 Meadowbank Tank Farm

Date: July 22, 2019 **Photo Number**: 3

Description: Looking northwest from the southern corner.

Photograph G2-7 Meadowbank Tank Farm

Date: July 22, 2019 **Photo Number**: 5

Description: Looking northwest from the southern corner.

APPENDIX G3

Amaruq Tank Farm Photographic Log

Photograph G3-1 Amaruq Tank Farm

Date: July 25, 2019 **Photo Number**: 255

Description: From the northeast side of the Tanks looking west toward the Amaruq Tank Farm.

Photograph G3-2 Amaruq Tank Farm

Date: July 25, 2019 **Photo Number**: 254

Description: From the southeast side of the Tanks looking west toward the Amaruq Tank Farm.

Photograph G3-3 Amaruq Tank Farm

Date: July 25, 2019 **Photo Number**: 256

Description: From the northwest side of the Tanks looking southeast toward the Amaruq Tank Farm.

Photograph G3-4 Amaruq Tank Farm

Date: July 25, 2019 **Photo Number**: 257

Description: From the fuelling pad, looking West at the new Tank Farm.

Photograph G3-5 Amaruq Tank Farm

Date: July 25, 2019 **Photo Number**: 258

Description: From the fuelling pad, looking North at the new Tank Farm.

Photograph G3-6 Amaruq Tank Farm

Date: July 25, 2019 **Photo Number**: 259

Description: From the northeast corner of the Tank, looking South at the new Tank Farm and the fuelling pad.

Photograph G3-7 Amaruq Tank Farm

Date: July 25, 2019 **Photo Number**: 260

Description: From the northeast corner of the Tank, looking West.

Photograph G3-8 Amaruq Tank Farm

Date: July 25, 2019 **Photo Number**: 261

Description: From the northwest corner of the Tank, looking South.

APPENDIX H

Other Facilities

APPENDIX H1

Vault Culverts Photographic Log

Photograph H1-1 Vault Road Culverts

Date: July 23, 2019 **Photo Number**: 78

Description: Looking at the outlet of the three culverts located on Vault Road at 640964E/7217466N. All of them are deformed in the middle.

Photograph H1-2 Vault Road Culverts

Date: July 23, 2019 **Photo Number**: 79

Description: From the inlet side of the three culverts located on Vault Road at 640964E/7217466N. The culverts are slightly deformed on top in the middle.

APPENDIX H2

Diversion Ditch Photographic Log

Photograph H2-1 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2019 **Photo Number**: 83

Description: Looking east toward the culverts beneath the road.

Photograph H2-2 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2019 **Photo Number**: 84

Description: Looking west toward the western diversion ditch.

Photograph H2-3 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2019 **Photo Number**: 88

Description: From the eastern diversion ditch looking south toward Lake NP2.

Photograph H2-4 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2019 **Photo Number**: 89

Description: From the eastern diversion ditch looking northwest.

Photograph H2-5 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2019 **Photo Number**: 90

Description: From the eastern diversion ditch, looking east.

Photograph H2-6 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2019 **Photo Number**: 91

Description: From the eastern diversion ditch, looking northwest.

Photograph H2-7 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2019 **Photo Number**: 92

Description: From the northern diversion ditch looking southeast.

Photograph H2-8 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2019 **Photo Number**: 93

Description: From the northern diversion ditch looking west.

Photograph H2-9 Diversion Ditch and its Sediment and Erosion Protection Structure

<u>Date</u>: July 23, 2019 **<u>Photo Number</u>**: 94

From the northern diversion ditch looking east.

Photograph H2-10 Diversion Ditch and its Sediment and Erosion Protection Structure

<u>Date</u>: July 23, 2019 **<u>Photo Number</u>**: 95

From the northern diversion ditch looking west.

Photograph H2-11 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2019 **Photo Number**: 96

Description: From the northern diversion ditch looking east.

Photograph H2-12 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2019 **Photo Number**: 97

Description: From the northern diversion ditch looking west.

Photograph H2-13 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2019 **Photo Number**: 98

Description: From 637281E/7216790N, looking north. View of the western diversion ditch.

Photograph H2-14 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2019 **Photo Number**: 99

Description: From 637281E/7216790N, looking south at the western diversion ditch.

Photograph H2-15 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2019 **Photo Number**: 101

Description: From 637251E/7216171N, looking north at the western diversion ditch.

Photograph H2-16 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2019 **Photo Number**: 100

Description: From 637251E/7216171N, looking west at the western diversion ditch and its retention basin.

Photograph H2-17 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2019 **Photo Number**: 102

Description: From 637074E/7216157N, looking east at the western diversion ditch.

Photograph H2-18 Diversion Ditch and its Sediment and Erosion Protection Structure

Date: July 23, 2019 **Photo Number**: 103

Description: From 637074E/7216157N, looking west at the western diversion ditch.

APPENDIX H3

RSF Till Plug Photographic Log

Photograph H3-1 RSF Till Plug

Date: July 23, 2019 **Photo Number**: 85

Description: From the south side of NP2 Lake (north of the diversion ditch) looking west at the RSF till plug.

Photograph H3-2 RSF Till Plug

Date: July 23, 2019 **Photo Number**: 86

Description: From the south side of NP2 Lake (south of the diversion ditch) looking west at the RSF till plug.

Photograph H3-3 RSF Till Plug

Date: July 23, 2019 **Photo Number**: 87

Description: From the south side of NP2 Lake (south of the diversion ditch) looking southeast at the RSF till plug.

APPENDIX H4

Landfill Photographic Log

Photograph H4-1 Landfill

Date: July 23, 2019 **Photo Number**: 80

Description: From the new landfill location within the Rock Storage Facility, looking southeast.

APPENDIX H5

Landfarm Photographic Log

Photograph H5-1 Contaminated Soil Storage and Bioremedial Landfarm Facility

Date: July 23, 2019 **Photo Number**: 81

Description: From the northeast extremity of the South Cell, looking southeast at the Contaminated Soil Storage and Bioremedial Landfarm Facility. Signs of superficial slope failure are disappearing.

Photograph H5-2 Contaminated Soil Storage and Bioremedial Landfarm Facility

Date: July 23, 2019 **Photo Number**: 82

Description: From the northeast extremity of the South Cell, looking northeast at the Contaminated Soil Storage and Bioremedial Landfarm Facility. Signs of superficial slope failure are disappearing.

APPENDIX H6

Crusher Retaining Wall Photographic Log

Photograph H6-1 Crusher Retaining Wall

Date: July 25, 2019 **Photo Number**: 281

Description: From the access road, looking southeast at the retaining wall.

Photograph H6-2 Crusher Retaining Wall

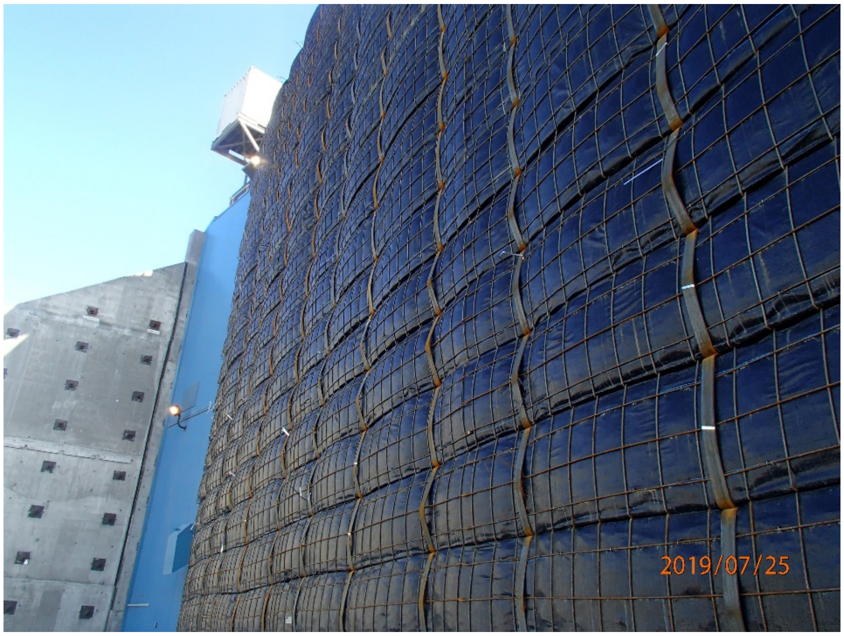
Date: July 25, 2019 **Photo Number**: 282

Description: From the base of the retaining wall, looking south.

Photograph H6-3 Crusher Retaining Wall

Date: July 25, 2019 **Photo Number**: 283

Description: From the base of the retaining wall, looking southwest.



Photograph H6-4 Crusher Retaining Wall

Date: July 25, 2019 **Photo Number**: 284

Description: From the base of the retaining wall, looking southeast.

Photograph H6-5 Crusher Retaining Wall

Date: July 25, 2019 **Photo Number**: 285

Description: From the base of the retaining wall, looking west.

APPENDIX I

Dikes Details and Instrumentation

1.0 DEWATERING DIKES

1.1 East Dike

East Dike was constructed in the summer of 2008; grouting of the foundation and bedrock occurred in 2008 and during the first quarter of 2009.

Instrumentation has been installed within East Dike and includes piezometers, thermistors, inclinometers, and flow meters. Survey monuments were removed from East Dike in the past as they have never been used. The inclinometer at Sta. 60+195 was destroyed in the past and has not been replaced. Replacement of this instrument is not considered necessary; however, monitoring of East Dike should continue and, if anomalous conditions are observed, then replacing this inclinometer should be re-evaluated.

Instrumentation within East Dike was installed in the spring of 2009 to monitor the dike's performance following construction and during dewatering, operation, and into closure. Additional instrumentation was added in 2009 and 2010 to increase coverage across the dike. Since June 2012, all piezometers and thermistors on East Dike have been connected to an automatic data collection and transmission system (VDV database). The following subsections present a summary of the data collected between September 2017 and August 2018.

Instrumentation within East Dike was installed in the spring of 2009 to monitor the dike's performance following construction and during dewatering, operation, and into closure. Additional instrumentation was added in 2009 and 2010 to increase coverage across the dike. Since June 2012, all piezometers and thermistors on East Dike have been connected to an automatic data collection and transmission system (VDV database). Two inclinometers are installed on East Dike at Sta. 60+495 and 60+705. An inclinometer was installed at Sta. 60+195, but was destroyed in July 2010 and has not been replaced.

Table 1 and Table 2 below detail instrumentation on East Dike.

Table 1: List of Piezometers and Thermistors on East Dike (source: AEM)

Station	Instrument ID	Type	Status	Readings	For PZ		For TH	
#	ID	PZ/TH	Operational (✓)/Not operational (×) /Frozen (F)	Manual/ Automatic	Elevation (m)	Stratigraphic unit	Number of operational beads	Elevation interval in meters (top/bottom)
60+092	TH92	TH	✓	Automatic (DL8-SH1)	-	-	16	136/119
60+150	Pz150C	PZ	×(F)	Automatic (DL8-SH1)	127.35	Interface	-	-
60+185	TH185	TH	✓	Automatic (DL8-SH1)	-	-	16	136/119
60+190	Pz190P1A	PZ	✓	Automatic (DL8-SH1)	116.7	Bedrock	-	-
60+190	Pz190P1B	PZ	✓	Automatic (DL8-SH1)	121.7	Bedrock	-	-
60+190	Pz190P1C	PZ	✓	Automatic (DL8-SH1)	126.7	Interface	-	-
60+190	Pz190P2A	PZ	✓	Automatic (DL8-SH1)	116.34	Bedrock	-	-
60+190	Pz190P2B	PZ	✓	Automatic (DL8-SH1)	121.34	Bedrock	-	-
60+190	Pz190P2C	PZ	×(F)	Automatic (DL8-SH1)	126.34	Bedrock		
60+190	Pz190P3A	PZ	✓	Automatic (DL8-SH1)	116.63	Bedrock	-	-
60+190	Pz190P3B	PZ	✓	Automatic (DL8-SH1)	121.63	Bedrock	-	-
60+200	Pz200C	PZ	✓	Automatic (DL8-SH1)	127.71	Interface	-	-
60+240	Pz240C	PZ	✓	Automatic (DL8-SH1)	128.71	Interface	-	-
60+400	Pz400C	PZ	✓	Automatic (DL8-SH2)	126.76	Interface	-	-
60+420	Pz420C	PZ	✓	Automatic (DL8-SH2)	125.32	Interface	-	-
60+440	Pz440C	PZ	✓	Automatic (DL8-SH2)	124.66	Interface	-	-
60+450	Pz450C	PZ	✓	Automatic (DL8-SH2)	127	Interface	-	-
60+460	Pz460C	PZ	✓	Automatic (DL8-SH2)	125.15	Interface	-	-
60+470	Pz470C	PZ	×(F)	Automatic (DL8-SH2)	124.76	Interface	-	-

Station	Instrument ID	Type	Status	Readings	For PZ		For TH	
#	ID	PZ/TH	Operational (✓)/Not operational (×)	Manual/ Automatic	Elevation (m)	Stratigraphic unit	Number of operational beads	Elevation interval in meters (top/bottom)
60+472	Pz472C	PZ	✓	Automatic (DL8-SH2)	126.87	Interface+1M	-	-
60+480	Pz480C	PZ	✓	Automatic (DL8-SH2)	125.44	Interface	-	-
60+485	TH485	TH	✓	Automatic (DL8-SH2)	-	-	16	136/119
60+490	Pz490P1A	PZ	✓	Automatic (DL8-SH2)	114.12	Bedrock	-	-
60+490	Pz490P1B	PZ	✓	Automatic (DL8-SH2)	119.12	Bedrock	-	-
60+490	Pz490P1C	PZ	✓	Automatic (DL8-SH2)	125.81	Interface	-	-
60+490	Pz490P2A	PZ	✓	Automatic (DL8-SH2)	115.07	Bedrock	-	-
60+490	Pz490P2B	PZ	✓	Automatic (DL8-SH2)	120.07	Bedrock	-	-
60+490	Pz490P2C	PZ	✓	Automatic (DL8-SH2)	126.76	Interface	-	-
60+490	Pz490P3A	PZ	✓	Automatic (DL8-SH2)	114.62	Bedrock	-	-
60+490	Pz490P3B	PZ	✓	Automatic (DL8-SH2)	119.62	Bedrock	-	-
60+500	Pz500C	PZ	✓	Automatic (DL8-SH2)	125.78	Interface	-	-
60+510	Pz510C	PZ	✓	Automatic (DL8-SH2)	126.06	Interface	-	-
60+550	Pz550C	PZ	×(F)	Automatic (DL8-SH2)	129.85	Interface	-	-
60+600	Pz600C	PZ	×(F)	Automatic (DL8-SH3)	128.6	Interface	-	-
60+650	Pz650C	PZ	×(F)	Automatic (DL8-SH3)	128.48	Interface	-	-
60+695	TH695	TH	✓	Automatic (DL8-SH3)	-	-	16	136/119

Station	Instrument ID	Type	Status	Readings	For PZ		For TH	
#	ID	PZ/TH	Operational (✓)/Not operational (×)	Manual/ Automatic	Elevation (m)	Stratigraphic unit	Number of operational beads	Elevation interval in meters (top/bottom)
60+700	Pz700P2A	PZ	✓	Automatic (DL8-SH3)	118.08	Bedrock	-	-
60+700	Pz700P2B	PZ	✓	Automatic (DL8-SH3)	123.08	Bedrock	-	-
60+700	Pz700P2C	PZ	×(F)	Automatic (DL8-SH3)	129.77	Interface	-	-
60+700	Pz700P3A	PZ	✓	Automatic (DL8-SH3)	117.93	Bedrock	-	-
60+700	Pz700P3B	PZ	✓	Automatic (DL8-SH3)	122.93	Bedrock	-	-
60+750	Pz750C	PZ	×(F)	Automatic (DL8-SH3)	128.16	Interface	-	-
60+842	TH842	TH	✓	Automatic (DL8-SH3)	-	-	16	136/119

Table 2: Inclinometers on East Dike (source: AEM)

Location	Instrument ID	Operational (✓)/Not operational (×)	Manual/Automatic	Elevation interval in meters (top/bottom)
60+195	ED-IN-195	×(Damaged)	-	-
60+495	ED-IN-495	✓	Manual	136.6/124.1
60+705	ED-IN-705	✓	Manual	137.1/126.1

1.2 South Camp Dike

South Camp Dike was constructed between April and June of 2009. Additional thermal capping material and rockfill for the haul road was added to the dike in the winter of 2009-2010.

Table 3 below details instrumentation on South Camp Dike.

Table 3: List of Thermistors on South Camp Dike (source: AEM)

Hole	ID	Type	Status	Readings	For PZ		For TH	
#	ID	PZ/TH	Operational (✓)/Not operational (×)	Manual/ Automatic	Elevation (m)	Stratigraphic unit	Number of operational beads	Elevation interval in meters (top/bottom)
38-3	SC-09-A	TH	✓	Manual	-	-	16	133.03/110.03
38-5	SC-10	TH	✓	Manual	-	-	16	132.40/109.40

1.3 Bay-Goose Dike

Construction of Bay-Goose Dike started in the summer of 2009. The earthworks component for the northern portion of the dike was mostly completed by early October 2009 and by October 2010 for the southern portion.

Grouting of the foundation and bedrock occurred between March 2010 and July 2011. Jet grouting occurred in selected portions of the dike between October 2010 and May 2011. The first phase of dewatering Bay-Goose Basin was completed by mid-November 2011 and the second phase was completed in August 2012.

Instruments were installed on Bay-Goose Dike in the summer of 2011 to monitor the dike's performance following construction, during dewatering and operation, and into closure. Survey monuments were removed from Bay-Goose Dike as they have never been used. Additional boreholes have been drilled in the North Channel sector in 2017 to install TDR reflectometers and inclinometers in order to monitor the dike's reaction to nearby blasting in Pit E5.

Table 4, Table 5 and Table 6 below detail instrumentation on Bay-Goose Dike.

Table 4: List of Piezometers and Thermistors on Bay-Goose Dike (source: AEM)

Station	Instrument ID	Type	Status	Readings	For PZ		For TH	
#	ID	PZ/TH	Operational (✓)/Not operational (×)/Frozen (F)	Manual/ Automatic	Elevation (m)	Stratigraphic unit	Number of operational beads	Elevation interval in m (top/bottom)
30+134	T1	TH	✓	Automatic (DL1)	-	-	16	135/115
30+158	Pz01P1A	PZ	×(F)	-	-	-	-	-
30+158	Pz01P1B	PZ	×(F)	-	-	-	-	-
30+158	Pz01P1C	PZ	×(F)	-	-	-	-	-
30+158	Pz01P2A	PZ	✓	Automatic (DL1)	117.05	10m below bedrock	-	-
30+158	Pz01P2B	PZ	✓	Automatic (DL1)	122.05	5m below bedrock	-	-
30+158	Pz01P2C	PZ	×(F)	Automatic (DL1)	128.05	1m above bedrock	-	-
30+158	Pz01P3A	PZ	×	Automatic (DL1)	117.13	10m below bedrock	-	-
30+158	Pz01P3B	PZ	×	Automatic (DL1)	122.13	5m below bedrock	-	-
30+167	Pz06P2	PZ	×(F)	Automatic (DL1)	127.57	1m above bedrock	-	-
30+185	T2	TH	✓	Automatic (DL1)	-	-	16	135/115
30+249.5	Pz07P2	PZ	×(F)	Automatic (DL1)	129.85	1m above bedrock	-	-
30+260	T3	TH	✓	Automatic (DL1)	-	-	16	130/125.5
30+272	T4	TH	✓	Automatic (DL1)	-	-	16	130/125.5
30+276.5	Pz02P1A	PZ	×(F)	Automatic (DL1)	119.25	10m below bedrock	-	-
30+276.5	Pz02P1B	PZ	×(F)	Automatic (DL1)	124.25	5m below bedrock	-	-
30+276.5	Pz02P1C	PZ	×(F)	Automatic (DL1)	130.25	1m above bedrock	-	-
30+276.5	Pz02P2A	PZ	✓	Automatic (DL1)	119.1	10m below bedrock	-	-
30+276.5	Pz02P2B	PZ	✓	Automatic (DL1)	124.1	5m below bedrock	-	-
30+276.5	Pz02P2C	PZ	×	Automatic (DL1)	130.1	1m above bedrock	-	-
30+276.5	Pz02P3A	PZ	✓	Automatic (DL1)	119.7	10m below bedrock	-	-

Station	Instrument ID	Type	Status	Readings	For PZ		For TH	
#	ID	PZ/TH	Operational (✓)/Not operational (×)/ Frozen (F)	Manual/ Automatic	Elevation (m)	Stratigraphic unit	Number of operational beads	Elevation interval in meters (top/bottom)
30+276.5	Pz02P3-B	PZ	✓	Automatic (DL1)	124.7	5m below bedrock	-	-
30+288.5	T5	TH	✓	Automatic (DL1)	-	-	16	130/125.5
30+306.5	Pz08P2	PZ	×(F)	Automatic (DL1)	129.65	1m above bedrock	-	-
30+330.5	T6	TH	✓	Automatic (DL1)	-	-	16	135/115
30+378.5	Pz03P1A	PZ	✓	Automatic (DL2)	113.12	10m below bedrock	-	-
30+378.5	Pz03P1B	PZ	✓	Automatic (DL2)	118.12	5m below bedrock	-	-
30+378.5	Pz03P1C	PZ	✓	Automatic (DL2)	124.12	1m above bedrock	-	-
30+378.5	Pz03P2A	PZ	✓	Automatic (DL2)	113.1	10m below bedrock	-	-
30+378.5	Pz03P2B	PZ	✓	Automatic (DL2)	118.1	5m below bedrock	-	-
30+378.5	Pz03P2C	PZ	✓	Automatic (DL2)	124.1	1m above bedrock	-	-
30+378.5	Pz03P3A	PZ	✓	Automatic (DL2)	113.58	10m below bedrock	-	-
30+378.5	Pz03P3B	PZ	✓	Automatic (DL2)	118.58	5m below bedrock	-	-
30+386	T7	TH	✓	Automatic (DL2)	-	-	16	135/115
30+417.5	T8	TH	✓	Automatic (DL2)	-	-	16	135/115
30+440	Pz09P2	PZ	✓	Automatic (DL2)	126.73	1m above bedrock	-	-
30+453.5	Pz04P1A	PZ	×(F)	Automatic (DL2)	116.61	10m below bedrock	-	-
30+453.5	Pz04P1B	PZ	×(F)	Automatic (DL2)	118.61	5m below bedrock	-	-
30+453.5	Pz04P1C	PZ	×(F)	Automatic (DL2)	124.61	1m above bedrock	-	-
30+453.5	Pz04P2A	PZ	✓	Automatic (DL2)	115.13	10m below bedrock	-	-
30+453.5	Pz04P2B	PZ	✓	Automatic (DL2)	120.13	5m below bedrock	-	-
30+453.5	Pz04P2C	PZ	✓	Automatic (DL2)	126.13	1m above bedrock	-	-
30+453.5	Pz04P3A	PZ	✓	Automatic (DL2)	115.25	10m below bedrock	-	-
30+453.5	Pz04P3B	PZ	✓	Automatic (DL2)	120.25	5m below bedrock	-	-

Station	Instrument ID	Type	Status	Readings	For PZ		For TH	
#	ID	PZ/TH	Operational (✓)/Not operational (×)/ Frozen (F)	Manual/ Automatic	Elevation (m)	Stratigraphic unit	Number of operational beads	Elevation interval in meters (top/bottom)
30+489.5	T9	TH	✓	Automatic (DL2)	-	-	16	135/115
30+516.5	Pz010P2	PZ	×(F)	Automatic (DL2)	130.26	1m above bedrock	-	-
30+553.25	T10	TH	✓	Automatic (DL2)	-	-	16	135/115
30+621.5	T11	TH	✓	Automatic (DL3)	-	-	16	135/115
30+645.5	Pz05P1A	PZ	×(F)	Automatic (DL3)	118	10m below bedrock	-	-
30+645.5	Pz05P1B	PZ	×(F)	Automatic (DL3)	123	5m below bedrock	-	-
30+645.5	Pz05P1C	PZ	×(F)	Automatic (DL3)	129	1m above bedrock	-	-
30+645.5	Pz05P2A	PZ	✓	Automatic (DL3)	117.85	10m below bedrock	-	-
30+645.5	Pz05P2B	PZ	✓	Automatic (DL3)	122.85	5m below bedrock	-	-
30+645.5	Pz05P2C	PZ	×(F)	Automatic (DL3)	128.85	1m above bedrock	-	-
30+645.5	Pz05P3A	PZ	✓	Automatic (DL3)	115.15	10m below bedrock	-	-
30+645.5	Pz05P3B	PZ	✓	Automatic (DL3)	122.6	5m below bedrock	-	-
30+650	TH12	TH	✓	Automatic (DL3)	-	-	16	135/115
30+684.5	Pz11P2	PZ	×(F)	Automatic (DL3)	130.65	1m above bedrock	-	-
30+713	TH13	TH	✓	Automatic (DL3)	-	-	16	135/115
30+770	Pz12P2	PZ	×(F)	Automatic (DL3)	132.16	1m above bedrock	-	-
30+804.5	Pz13P2	PZ	×(F)	Automatic (DL3)	132.05	1m above bedrock	-	-
30+827	TH14	TH	✓	Automatic (DL3)	-	-	16	135/115
31+052	Pz14P2	PZ	×(F)	Automatic (DL4)	131.06	1m above bedrock	-	-
31+080	TH15	TH	✓	Automatic (DL4)	-	-	16	135/115
31+134.5	TH16	TH	✓	Automatic (DL4)	-	-	16	135.08/115.08

Station	Instrument ID	Type	Status	Readings	For PZ		For TH	
#	ID	PZ/TH	Operational (✓)/Not operational (×)/ Frozen (F)	Manual/ Automatic	Elevation (m)	Stratigraphic unit	Number of operational beads	Elevation interval in meters (top/bottom)
31+165	Pz23P1A	PZ	✓	Automatic (DL4)	118.49	10m below bedrock	-	-
31+165	Pz23P1B	PZ	×(F)	Automatic (DL4)	123.49	5m below bedrock	-	-
31+165	Pz23P1C	PZ	×(F)	Automatic (DL4)	127.49	1m above bedrock	-	-
31+165	Pz23P2A	PZ	✓	Automatic (DL4)	116.91	10m below bedrock	-	-
31+165	Pz23P2B	PZ	✓	Automatic (DL4)	121.91	5m below bedrock	-	-
31+165	Pz23P2C	PZ	✓	Automatic (DL4)	127.91	1m above bedrock	-	-
31+165	Pz23P3A	PZ	✓	Automatic (DL4)	116.96	10m below bedrock	-	-
31+165	Pz23P3B	PZ	✓	Automatic (DL4)	121.96	5m below bedrock	-	-
31+170	TH17	TH	✓	Automatic (DL4)	-	-	16	135/115
31+220	Pz15P2	PZ	×(F)	Automatic (DL4)	130.73	1m above bedrock	-	-
31+352	TH18	TH	✓	Automatic (DL4)	-	-	16	135/115
31+565	Pz16P2	PZ	×(F)	Automatic (DL5)	131.28	1m above bedrock	-	-
31+595	TH19	TH	✓	Automatic (DL5)	-	-	16	135/108
31+600	Pz24P1A1	PZ	✓	Automatic (DL5)	111.3	11m below bedrock	-	-
31+600	Pz24P1A2	PZ	✓	Automatic (DL5)	116.3	4m below bedrock	-	-
31+600	Pz24P1B1	PZ	✓	Automatic (DL5)	121.8	1m above bedrock	-	-
31+600	Pz24P1B2	PZ	✓	Automatic (DL5)	124.3	4m above bedrock	-	-
31+600	Pz24P2A1	PZ	✓	Automatic (DL5)	110.15	10m below bedrock	-	-
31+600	Pz24P2A2	PZ	✓	Automatic (DL5)	116.15	4m below bedrock	-	-
31+600	Pz24P2B1	PZ	✓	Automatic (DL5)	120.65	10m above bedrock	-	-
31+600	Pz24P2B2	PZ	✓	Automatic (DL5)	123.15	3m above bedrock	-	-

Station	Instrument ID	Type	Status	Readings	For PZ		For TH	
#	ID	PZ/TH	Operational (✓)/Not operational (×)/ Frozen (F)	Manual/ Automatic	Elevation (m)	Stratigraphic unit	Number of operational beads	Elevation interval in meters (top/bottom)
31+600	Pz24P2C	PZ	✓	Automatic (DL5)	124.65	4m above bedrock	-	-
31+600	Pz24P3A1	PZ	✓	Automatic (DL5)	110.64	10m below bedrock	-	-
31+600	Pz24P3A2	PZ	✓	Automatic (DL5)	115.64	5m below bedrock	-	-
31+600	Pz24P3B1	PZ	✓	Automatic (DL5)	121.16	11m above bedrock	-	-
31+600	Pz24P3B2	PZ	✓	Automatic (DL5)	123.00	13m above bedrock	-	-
31+605	TH20	TH	✓	Automatic (DL5)	-	-	16	135/115
31+615	Pz17P2	PZ	×(F)	Automatic (DL5)	129.4	1m above bedrock	-	-
31+700	Pz18P2	PZ	×(F)	Automatic (DL5)	130.53	1m above bedrock	-	-
31+752.5	TH21	TH	✓	Automatic (DL6)	-	-	16	135/115
31+815	Pz25P1A1	PZ	✓	Automatic (DL6)	117.02	7m below bedrock	-	-
31+815	Pz25P1A2	PZ	✓	Automatic (DL6)	122.02	2m below bedrock	-	-
31+815	Pz25P1B1	PZ	×(F)	Automatic (DL6)	127.52	3m above bedrock	-	-
31+815	Pz25P1B2	PZ	×(F)	Automatic (DL6)	129.52	5m above bedrock	-	-
31+815	Pz25P2A1	PZ	✓	Automatic (DL6)	113.82	11m below bedrock	-	-
31+815	Pz25P2A2	PZ	✓	Automatic (DL6)	118.82	6m below bedrock	-	-
31+815	Pz25P2B1	PZ	✓	Automatic (DL6)	124.32	bedrock	-	-
31+815	Pz25P2B2	PZ	✓	Automatic (DL6)	126.32	2m above bedrock	-	-
31+815	Pz25P2C	PZ	✓	Automatic (DL6)	127.32	3m above bedrock	-	-
31+815	Pz25P3A1	PZ	✓	Automatic (DL6)	115.1	9m below bedrock	-	-
31+815	Pz25P3A2	PZ	✓	Automatic (DL6)	120.1	4m below bedrock	-	-
31+815	Pz25P3B1	PZ	✓	Automatic (DL6)	123.1	12m below bedrock	-	-
31+815	Pz25P3B2	PZ	✓	Automatic (DL6)	125.1	1m above bedrock	-	-

Station	Instrument ID	Type	Status	Readings	For PZ		For TH	
#	ID	PZ/TH	Operational (✓)/Not operational (×)/ Frozen (F)	Manual/ Automatic	Elevation (m)	Stratigraphic unit	Number of operational beads	Elevation interval in meters (top/bottom)
31+820	TH22	TH	✓	Automatic (DL6)	-	-	16	135/115
31+842	Pz22P2	PZ	✓	Automatic (DL6)	116.8	2m above bedrock	-	-
31+850	TH23	TH	✓	Automatic (DL6)	-	-	16	135/108
31+880	TH24	TH	✓	Automatic (DL6)	-	-	16	135/108
31+885	Pz26P1A1	PZ	✓	Automatic (DL6)	104.44	10m below bedrock	-	-
31+885	Pz26P1A2	PZ	✓	Automatic (DL6)	109.44	5m below bedrock	-	-
31+885	Pz26P1B1	PZ	✓	Automatic (DL6)	114.94	bedrock	-	-
31+885	Pz26P1B2	PZ	✓	Automatic (DL6)	117.94	3m above bedrock	-	-
31+885	Pz26P2A1	PZ	✓	Automatic (DL6)	106.77	8m below bedrock	-	-
31+885	Pz26P2A2	PZ	✓	Automatic (DL6)	111.77	3m below bedrock	-	-
31+885	Pz26P2B1	PZ	✓	Automatic (DL6)	117.27	2m above bedrock	-	-
31+885	Pz26P2B2	PZ	✓	Automatic (DL6)	120.27	5m above bedrock	-	-
31+885	Pz26P2C	PZ	✓	Automatic (DL6)	123.27	8m above bedrock	-	-
31+885	Pz26P3A1	PZ	✓	Automatic (DL6)	104.74	10m below bedrock	-	-
31+885	Pz26P3A2	PZ	✓	Automatic (DL6)	109.69	5m below bedrock	-	-
31+885	Pz26P3B1	PZ	✓	Automatic (DL6)	117.46	2m above bedrock	-	-
31+885	Pz26P3B2	PZ	✓	Automatic (DL6)	120.46	5m above bedrock	-	-
31+928	Pz19P2	PZ	✓	Automatic (DL7)	123.22	1m above bedrock	-	-
31+960	TH25	TH	✓	Automatic (DL7)	-	-	16	135/115
31+990	Pz20P2	PZ	✓	Automatic (DL7)	122.44	1m above bedrock	-	-
31+995	TH26	TH	✓	Automatic (DL7)	-	-	16	135/115

Station	Instrument ID	Type	Status	Readings	For PZ		For TH	
#	ID	PZ/TH	Operational (✓)/Not operational (×)/ Frozen (F)	Manual/ Automatic	Elevation (m)	Stratigraphic unit	Number of operational beads	Elevation interval in meters (top/bottom)
32+000	Pz27P1A1	PZ	✓	Automatic (DL7)	113.25	8m below bedrock	-	-
32+000	Pz27P1A2	PZ	✓	Automatic (DL7)	118.25	3m below bedrock	-	-
32+000	Pz27P1B1	PZ	✓	Automatic (DL7)	123.75	2m above bedrock	-	-
32+000	Pz27P1B2	PZ	✓	Automatic (DL7)	125.75	4m above bedrock	-	-
32+000	Pz27P2A1	PZ	✓	Automatic (DL7)	112.61	9m below bedrock	-	-
32+002	Pz27P2A2	PZ	✓	Automatic (DL7)	117.61	4m below bedrock	-	-
32+000	Pz27P2B1	PZ	✓	Automatic (DL7)	123.11	2m above bedrock	-	-
32+000	Pz27P2B2	PZ	✓	Automatic (DL7)	125.11	4m above bedrock	-	-
32+000	Pz27P2C	PZ	✓	Automatic (DL7)	126.61	5m above bedrock	-	-
32+000	Pz27P3A1	PZ	✓	Automatic (DL7)	111.72	10m below bedrock	-	-
32+000	Pz27P3A2	PZ	✓	Automatic (DL7)	116.72	5m below bedrock	-	-
32+000	Pz27P3B1	PZ	✓	Automatic (DL7)	122.22	1m above bedrock	-	-
32+000	Pz27P3B2	PZ	×(F)	Automatic (DL7)	123.22	2m above bedrock	-	-
32+020	Pz21P2	PZ	✓	Automatic (DL7)	121.13	1m above bedrock	-	-
32+030	TH27	TH	✓	Automatic (DL7)	-	-	16	135/108
32+060	TH28	TH	✓	Automatic (DL7)	-	-	16	135/108
32+065	Pz28P1A1	PZ	✓	Automatic (DL7)	102.99	12m below bedrock	-	-
32+065	Pz28P1B1	PZ	✓	Automatic (DL7)	107.99	7m below bedrock	-	-
32+065	Pz28P1B2	PZ	✓	Automatic (DL7)	112.99	2m below bedrock	-	-
32+065	Pz28P1B3	PZ	✓	Automatic (DL7)	115.99	1m above bedrock	-	-
32+065	Pz28P2A1	PZ	✓	Automatic (DL7)	105.02	10m below bedrock	-	-

Station	Instrument ID	Type	Status	Readings	For PZ		For TH	
#	ID	PZ/TH	Operational (✓)/Not operational (×)/ Frozen (F)	Manual/ Automatic	Elevation (m)	Stratigraphic unit	Number of operational beads	Elevation interval in meters (top/bottom)
32+065	Pz28P2B1	PZ	✓	Automatic (DL7)	110.02	5m below bedrock	-	-
32+065	Pz28P2B2	PZ	✓	Automatic (DL7)	115.02	bedrock	-	-
32+065	Pz28P2B3	PZ	✓	Automatic (DL7)	118.02	3m above bedrock	-	-
32+065	Pz28P2C	PZ	✓	Automatic (DL7)	124.02	9m above bedrock	-	-
32+065	Pz28P3A1	PZ	✓	Automatic (DL7)	105.91	10m below bedrock	-	-
32+065	Pz28P3B1	PZ	✓	Automatic (DL7)	110.91	5m below bedrock	-	-
32+065	Pz28P3B2	PZ	✓	Automatic (DL7)	115.91	1m above bedrock	-	-
32+065	Pz28P3B3	PZ	✓	Automatic (DL7)	118.91	4m above bedrock	-	-
32+100	TH29	TH	✓	Automatic (DL7)	-	-	16	135/115
32+105	Pz29P1A1	PZ	✓	Automatic (DL7)	115.32	10m below bedrock	-	-
32+105	Pz29P1B1	PZ	✓	Automatic (DL7)	120.32	5m below bedrock	-	-
32+105	Pz29P1B2	PZ	×(F)	Automatic (DL7)	125.32	bedrock	-	-
32+105	Pz29P1B3	PZ	×(F)	Automatic (DL7)	127.32	2m above bedrock	-	-
32+105	Pz29P2A1	PZ	✓	Automatic (DL7)	114.99	10m below bedrock	-	-
32+105	Pz29P2B1	PZ	✓	Automatic (DL7)	119.99	5m below bedrock	-	-
32+105	Pz29P2B2	PZ	✓	Automatic (DL7)	124.99	bedrock	-	-
32+105	Pz29P2B3	PZ	×(F)	Automatic (DL7)	126.99	2m above bedrock	-	-
32+105	Pz29P2C	PZ	×(F)	Automatic (DL7)	129.99	5m above bedrock	-	-
32+105	Pz29P3A1	PZ	✓	Automatic (DL7)	115.91	9m below bedrock	-	-
32+105	Pz29P3B1	PZ	✓	Automatic (DL7)	120.91	4m below bedrock	-	-
32+105	Pz29P3B2	PZ	✓	Automatic (DL7)	125.91	1m above bedrock	-	-
32+105	Pz29P3B3	PZ	×(F)	Automatic (DL7)	127.91	3m above bedrock	-	-
32+140	TH30	TH	✓	Automatic (DL7)	-	-	16	135/115

Table 5: List of Inclinometers on Bay-Goose Dike (source: AEM)

Location	Instrument ID	Operational (✓)/Not operational (×)	Manual/Automatic	Elevation interval in meters (top/bottom)
30+282	BG-IN-30+282	✓	Manual	139.3/124.8
30+390	BG-IN-30+390	✓	Manual	140.0/119.0
30+640	BG-IN-30+640	✓	Manual	138.8/124.3
31+180	BG-IN-31+180	✓	Manual	139.0/124.5
31+590	BG-IN-31+590	✓	Manual	139.5/115.0
31+815	BG-IN-31+815	✓	Manual	139.2/119.7
31+885	BG-IN-31+885	✓	Manual	138.8/113.3
32+065	BG-IN-32+065	✓	Manual	139.1/116.6

Table 6: List of TDR Reflectometers on Bay-Goose Dike (source: AEM)

Location of hole	DL #	Instrument ID	Inclination (°)	Length (m)	Casing elevation (m)	Crimps
31+255	9	TDR-11	60	70	134.4	Every 25 m
31+153	9	TDR-12	60	180	133.5	Every 25 m
31+058	9	TDR-15	60	180	134.3	Every 25 m
31+035	9	TDR-17	60	206.35	134.9	Every 25 m
30+937	9	TDR-18	60	180	135.6	Every 25 m
30+960	9	TDR-20	60	200	136.5	Every 25 m

1.4 Vault Dike

The construction of Vault Dike was done in the winter of 2013 to keep its foundation frozen.

Five thermistor strings were originally installed on Vault Dike following its construction in the winter of 2013 and four are still operational. TH3 is installed in the deepest channel downstream, TH5 is installed under the liner, TH6 is installed upstream of the liner, TH7 is installed east of the deepest channel, and TH8 is installed upstream in the deepest channel outside of the key trench. One thermistor (TH-3, on the side of Vault Lake) had been damaged by sloughing in previous year and stopped working in October 2015.

Table 7 below details instrumentation on Vault Dike.

Table 7: List of Thermistors on Vault Dike (source: AEM)

Hole	ID	Type	Status	Readings	For PZ		For TH	
#	ID	PZ/TH	Operational (✓)/Not operational (×)	Manual/ Automatic	Elevation (m)	Stratigraphic unit	Number of operational beads	Elevation interval in meters (top/bottom)
71-2	VD-TH5	TH	✓	Manual	-	-	16	142.50/136.10
94-2	VD-TH6	TH	✓	Manual	-	-	16	140.50/121.50
96-1	VD-TH8	TH	✓	Manual	-	-	16	140.50/119.50
96-2	VD-TH7	TH	✓	Manual	-	-	16	140.50/119.50

2.0 TAILINGS STORAGE FACILITY

The TSF was commissioned in conjunction with the mill start-up in February 2010, with tailings being deposited within the North Cell of the facility. The North Cell and structures Saddle Dam 1, Saddle Dam 2 and Stormwater Dike were constructed to El. 150 m in two stages from 2009 to 2011.

The construction of the South Cell started in 2012 with Central Dike, thereby closing the eastern portion of the South Cell. The beginning of the tailings deposition in the South Cell started at the end of 2014. From 2012 to 2018, Central Dike was raised to El. 145 m in six stages. To increase the capacity of the South Cell, additional peripheral structures (Saddle Dam 3, Saddle Dam 4 and Saddle Dam 5) were constructed to El. 145 m in three stages from 2015 to 2018. The South Cell is designed to be able to be raised to El. 150 m. The construction of subsequent portions of the South Cell could occur in the future in the unlikely case of additional capacity being required.

2.1 North Cell Internal Structure – North Cell

The North Cell Internal Structure was built in 2018 to El. 152 m from Sta. 1+100 m to 1+660 m and from 2+750 m to 3+200 m, and to El. 154 m from Sta. 1+660 m to 2+750. This stage is an intermediate phase and the structure could be raised and lengthened to provide additional capacity if required. The tailings deposition from the North Cell Internal Structure started in August 2018.

Tailings deposition was transferred from the North Cell to the South Cell at the end of 2014. Tailings deposition occurred during the summer of 2015 within the North Cell and resumed in the South Cell in October 2015. Progressive closure of the North Cell started in the winter of 2015 with the construction of a non-acid generating rockfill capping over the tailings and continued in the winter of 2016.

A rockfill berm was constructed in 2016 at the toe of Stormwater Dike in the South Cell (from Sta. 10+300 to Sta. 10+750) to mitigate the crest and downstream slope movement observed in this sector at the end of August 2016. Following an investigation and instrumentation program, the movements observed are inferred to be caused by the soft sediment foundation thawing and settling due to the South Cell water pond reaching the dike foundation during the summer. Water ponding against Stormwater Dike is part of the tailings deposition plan and is acceptable, as Stormwater Dike is not a peripheral structure. Having direct ponding water within Stormwater Dike foundation is geotechnically acceptable. For South Cell closure and environmental aspects, given that it is inferred that the Stormwater Dike foundation presents some open windows of exposed fractured bedrock that may contribute to feeding the seepage at Central Dike, it is recommended that a beach be put in place along Stormwater Dike downstream slope to seal the foundation before the end of the deposition activities.

Four vertical thermistor strings were installed on the crest of the North Cell Internal Structure in August 2018 (NCIS-01, NCIS-02, NCIS-03 and NCIS-04). NCIS-01, NCIS-02 and NCIS-04 are installed on the upstream side of the dike whereas NCIS-02 is installed on the downstream side.

Table 8 below details instrumentation on the North Cell Internal Structure.

Table 8: List of Instruments on the North Cell Internal Structure (source: AEM)

Hole	Instrument ID	Type	Status	Readings	For PZ		For TH	
#	ID	PZ/TH	Operational (✓)/Not operational (×)	Manual/ Automatic	Elevation (m)	Stratigraphic unit	Number of operational beads	Elevation interval in meters (top/bottom)
NCIS-T1	NCIS-18-01	Thermistor	✓	Automatic (DL55)	-	-	16	140/110
NCIS-T2	NCIS-18-02	Thermistor	✓	Automatic (DL55)	-	-	16	134/119
NCIS-T3	NCIS-18-03	Thermistor	✓	Automatic (DL56)	-	-	16	149/132.84
NCIS-T4	NCIS-18-04	Thermistor	✓	Automatic (DL57)	-	-	15/16	148/118
NCIS-T4	NCIS-18-04	Thermistor	✓	Automatic (DL55)	-	-	15/16	148/118
PSM	NCIS1 TO NCIS16	PRSME	✓	Manual	-	-	-	-

2.2 Saddle Dam 1 – North Cell

Stage 1 of Saddle Dam 1 was constructed in the fall of 2009 to a height of 10 m (crest elevation of 141 m) and a length of 250 m. Stage 2 was constructed in 2010 to an overall height of 20 m (final crest elevation of 150 m) and length of about 400 m.

Three thermistors (T1, T2, T3) are installed to monitor the thermal condition within the structure and its foundation; they were installed in 2009 and early 2010 as part of Stage 1. The fourth thermistor string (T4) was installed in 2009 and extended in 2010 along the upstream face of the dam to monitor the thermal condition of the tailings. The SD1-T1 thermistor string is installed in the centre of the upstream face of the dike immediately beneath the geomembrane liner to monitor temperatures within the deposited tailings. A thin layer of protective granular material exists above the geomembrane liner at this location. The SD1-T2 thermistor string is installed vertically through the upstream Stage 1 crest in the centre of the dike at El. 140 m. The SD1-T3 thermistor string is installed vertically through the upstream Stage 2 crest in the centre of the dike at El. 150 m. The SD1-T4 thermistor string is installed vertically through the upstream toe of the dike near the centre of the dike.

Table 9 below details instrumentation on Saddle Dam 1.

Table 9: List of Thermistors on Saddle Dam 1 (source: AEM)

Hole	Instrument ID	Type	Status	Readings	For PZ		For TH	
#	ID	PZ/TH	Operational (✓)/Not operational (×)	Manual/ Automatic	Elevation (m)	Stratigraphic unit	Number of operational beads	Elevation interval in meters (top/bottom)
SD1-T2	SD1-02	Thermistor	✓	Automatic (DL14)	-	-	16	140/110
SD1-T4	SD1-04	Thermistor	✓	Automatic (DL14)	-	-	16	134/119
SD1-T1	SD1-01	Thermistor	✓	Automatic (DL14)	-	-	16	149/132.84
SD1-T3	SD1-03	Thermistor	✓	Automatic (DL14)	-	-	15/16	148/118

2.3 Saddle Dam 2 – North Cell

Saddle Dam 2 was constructed in one stage in 2011 to a crest elevation of 150 m. Saddle Dam 2 has a maximum height of about 10 m and a crest length of 460 m.

Table 10 below details instrumentation on Saddle Dam 2.

Table 10: List of Thermistors on Saddle Dam 2 (source: AEM)

Hole	Instrument ID	Type	Status	Readings	For PZ		For TH	
#	ID	PZ/TH	Operational (✓)/Not operational (×)	Manual/ Automatic	Elevation (m)	Stratigraphic unit	Number of operational beads	Elevation interval in meters (top/bottom)
SD2-T1	SD2-01	Thermistor	✓	Automatic (DL15)	-	-	16	148.05/145.31
SD2-T2	SD2-02	Thermistor	✓	Automatic (DL15)	-	-	16	148/118
SD2-T3	SD2-03	Thermistor	✓	Automatic (DL15)	-	-	16	144/129
SD2-T4	SD2-04	Thermistor	✓	Automatic (DL15)	-	-	16	148/123

2.4 RF1/RF2 – North Cell

Four thermistors were installed in 2012 to monitor the temperature of RF1 and RF2 (which delineates the northeastern side of the TSF North Cell).

Table 11 below details instrumentation on RF1 and RF2.

Table 11: List of Thermistors on RF1 and RF2 (source: AEM)

Hole	Instrument ID	Type	Status	Readings	For PZ		For TH	
#	ID	PZ/TH	Operational (✓)/Not operational (×)	Manual/ Automatic	Elevation (m)	Stratigraphic unit	Number of operational beads	Elevation interval in meters (top/bottom)
121-1	121-RF1-1	Thermistor	✓	Manual	-	-	16/16	136/90
73-6	73-6-RF1-2	Thermistor	✓	Manual	-	-	14/16	149.5/133
RF1-3	RF1-3	Thermistor	✓	Manual	-	-	11/11	148/144
122-1	122-1RF2	Thermistor	✓	Manual	-	-	14/16	137/90

2.5 North Cell Tailings

Five thermistors are installed in the tailings of the North Cell of the TSF (SWD-1, SD2-1, 90-1, NC-TH-1 and NC-TH-2). These thermistors were installed from 2012 to 2016. Thermistor 90-1 was installed in 2012 in the tailings of the North Cell near Saddle Dam 1. Thermistor NC-T1 and NC-T2 were installed in April 2016 in the tailings of the North Cell in the location of the former reclaim pond. Nine additional thermistors were installed in February 2017 in the tailings of the North Cell (SWD-01, NC17-01, NC-17-02, NC-17-03, NC-17-04, NC-17-05, NC-17-06, NC-17-07, NC-17-08).

Table 12 below details instrumentation in the North Cell tailings.

Table 12: List of Thermistors in the North Cell tailings (source: AEM)

Hole	Instrument ID	Type	Status	Readings	For PZ		For TH	
#	ID	PZ/TH	Operational (✓)/Not operational (×)	Manual/ Automatic	Elevation (m)	Stratigraphic unit	Number of operational beads	Elevation interval in meters (top/bottom)
NC-T1	NC-T1	Thermistor	✓	Manual	-	-	16	146.6/86.6
NC-17-01	NC-17-01	Thermistor	✓	Automatic (DL20)	-	-	16	148/112
NC-17-02	NC-17-02	Thermistor	✓	Automatic (DL21)	-	-	16	147.6/102
NC-17-03	NC-17-03	Thermistor	✓	Automatic (DL22)	-	-	16	147.6/102.6
NC-17-04	NC-17-04	Thermistor	✓	Automatic (DL23)	-	-	16	148.5/122
NC-17-05	NC-17-05	Thermistor	✓	Automatic (DL24)	-	-	16	146.6/112.6
NC-17-06	NC-17-06	Thermistor	✓	Automatic (DL25)	-	-	16	148/112
NC-17-07	NC-17-07	Thermistor	✓	Automatic (DL26)	-	-	16	148/112
NC-17-08	NC-17-08	Thermistor	✓	Automatic (DL27)	-	-	16	146/99

2.6 Stormwater Dike – Divider Dike

Stormwater Dike was progressively constructed. Stage 1 was constructed in 2009 to a height of 10 m (crest elevation of 140 m) and a length of 860 m. Stage 2 was primarily constructed in 2010 to an overall height of 18 m (crest elevation of 148 m) and length of about 1,060 m. A horizontal bench is present along the upstream face of the structure due to the connection of the 2009 and 2010 portions of the structure. The junction between the bituminous liner of Stormwater Dike and the LLDPE liner of Saddle Dam 2 was completed in 2011. The crest of Stormwater Dike was raised to 150 m in 2013.

The majority of the dike is seated on dense till from the former lakebed within the talik while the abutments are generally founded on bedrock. The foundation preparation of Stage 2 was completed in winter conditions. It was generally done above water except in an area where water ponding was present (between Sta.10+500 and 10+750 approximately). This pond was located where the topography suggests that the soft lakebed sediment thickness may be greater than at other locations along the dike. Due to the presence of water, the ice crust was cracked with the excavator and only minimal foundation preparation was possible. As a result, most of the lakebed sediment probably remained in place in this area.

A single deep thermistor (T147-1) and a piezometer string (VWP 13265) were installed at the downstream toe of Stormwater Dike (within the South Cell). These instruments were broken in September 2016 during the construction of the buttress at the toe of Stormwater Dike within the South Cell. Three new thermistors (TH-SWD-01, TH-SWD-02, TH-SWD-03) and piezometers (PZ-SWD-02-A, PZ-SWD-03-A, PZ-SWD-03-B) were installed since then. SWD-01 is installed on the upstream side of Stormwater Dike within the North Cell tailings. SWD-02 is installed on the downstream side of Stormwater Dike (approx. Sta. 10+650 m) within the stabilization buttress. SWD-03 is installed on the downstream side of Stormwater Dike (approx. Sta. 10+690 m) within the stabilization buttress.

PZ-SWD-02-A and TH-SWD-02 are now broken, while the other piezometers are frozen but still transmit data.

In 25 August 2016 two wireline extensometers, four crack monitoring stations and three prisms were installed on the crest of Stormwater Dike in the area showing movements (between Sta. 10+500 and 10+750 approximately). Following the MDRB recommendations, AEM installed additional instruments in 2017 to monitor the response of Stormwater Dike during tailings deposition in the South Cell. In 2018, an additional prism and 3 crackmeters were added, leading to a total of 3 piezometers, 3 thermistors, 4 extensometers, 3 crackmeters and 20 prisms installed on Stormwater Dike.

Table 13 below details instrumentation on Stormwater Dike.

Table 13: List of Instruments on Stormwater Dike (source: AEM)

Hole	Instrument ID	Type	Status	Readings	For PZ		For TH	
#	ID	PZ/TH	Operational (✓)/Not operational (×)	Manual/ Automatic	Elevation (m)	Stratigraphic unit	Number of operational beads	Elevation interval in meters (top/bottom)
SWD-01	SWD-01	Thermistor	✓	Automatic (DL19)			16	148/118
SWD-02	PZ-SWD-02-A	Piezo	✓	Automatic (DL19)	62	Bedrock		
	TH-SWD-02	Thermistor	✓	Automatic (DL19)			6	127/117
SWD-03	PZ-SWD-03A	Piezo	×	Automatic (DL19)	110	Bedrock		
	PZ-SWD-03B	Piezo	×	Automatic (DL19)	122			
	TH-SWD-03	Thermistor	✓	Automatic (DL19)			14	125/111
CRK	#1	Crakcmeter	✓	Automatic				
	#2	Crackmeter	✓	Automatic				
	#3	Crackmeter	✓	Automatic				
EXT	#2	Extensometer	Removed	Manual				
	#3	Extensometer	Removed	Manual				
	#4	Extensometer	✓	Manual				
	#5	Extensometer	Removed	Manual				
PSM	000 to 119	Prisms	✓	Manual				

2.7 Saddle Dam 3, Saddle Dam 4 and Saddle Dam 5 – South Cell

Stage 1 of Saddle Dam 3 and 4 was constructed in 2015. Stage 1 of Saddle Dam 5 was constructed in 2016. During Stage 1, Saddle Dam 3 and 4 were constructed to El. 140 m and Saddle Dam 5 to El. 137 m. Stage 2 of Saddle Dam 3, 4 and 5 was constructed to El. 143 m in 2016. Stage 3 of Saddle Dam 4 and 5 was constructed to El. 145 m in 2017. Stage 3 of Saddle Dam 3 was constructed partially to El. 145 m in 2017, with the installation the geomembrane and the construction of the liner erosion protection cover completed in 2018. These structures are designed to be able to be raised to El. 150 m and the final crest elevation of these structures is subject to review by AEM. At the end of Stage 3, the decision was made by AEM to close the abutments of these structures, as no further raise was planned at the moment. If these structures are to be raised higher, it will be necessary to re-open the abutments. The completed crest length is approximately 245 m for Saddle Dam 3, 365 m for Saddle Dam 4, and 255 m for Saddle Dam 5.

Five thermistors are installed at Saddle Dam 3. Three of these thermistors are located along the axis of the faulted zone that was encountered during the construction of Saddle Dam 3 (around Sta. 20+650). Along this axis, two thermistors are installed on the crest (SD3-T3 around the centerline and SD3-T2 on the upstream edge), and the other (SD3-T4) is installed on the upstream toe liner tie-in. Another thermistor is installed at Sta. 20+720 within the upstream toe liner tie-in (SD3-T5). One thermistor (SD3-T6) was installed in 2018 on the crest towards the junction with Saddle Dam 2.

Table 14 below details instrumentation on Saddle Dam 3.

Table 14: List of Thermistors on Saddle Dam 3 (source: AEM)

Hole	Instrument ID	Type	Status	Readings	For PZ		For TH	
#	ID	PZ/TH	Operational (✓)/Not operational (×)	Manual/ Automatic	Elevation (m)	Stratigraphic unit	Number of operational beads	Elevation interval in meters (top/bottom)
SD3-T2	SD3-02	Thermistor	✓	Automatic (DL16)	-	-	16	139.1/123.1
SD3-T3	SD3-03	Thermistor	✓	Automatic (DL16)	-	-	15	138.6/121.6
SD3-T4	SD3-04	Thermistor	× (since June 2019)	Automatic (DL16)	-	-	0/15	137.3/122.3
SD3-T5	SD3-05	Thermistor	✓	Automatic (DL16)	-	-	16	138.4/122.4
SD3-T6	SD3-06	Thermistor	✓	Automatic (DL16)	-	-	16	143.9/113.9

Four thermistors are installed at Saddle Dam 4 near Sta. 40+300. One thermistor (SD4-T2) is installed on the upstream edge crest while another (SD4-T4) is installed in the upstream toe line tie-in, and another one (SD4-T1) is in the centre of the upstream face of the dike immediately on top of the geomembrane liner to monitor the thermal regime of the tailings in contact with the structure. One thermistor (SD4-T3) was installed on the middle of the crest in January 2018.

Table 15 below details instrumentation on Saddle Dam 4.

Table 15: List of Thermistors on Saddle Dam 4 (source: AEM)

Hole	Instrument ID	Type	Status	Readings	For PZ		For TH	
#	ID	PZ/TH	Operational (✓)/Not operational (×)	Manual/ Automatic	Elevation (m)	Stratigraphic unit	Number of operational beads	Elevation interval in meters (top/bottom)
SD4-T2	SD4-02	Thermistor	✓	Automatic (DL17)	-	-	16	139/129
SD3-T3	SD3-03	Thermistor	✓	Automatic (DL17)	-	-	16	144/129
SD4-T4	SD4-04	Thermistor	✓	Automatic (DL17)	-	-	5/14	137.3/127.8
SD4-T1	SD4-01	Thermistor	× (since August 2018)	Automatic (DL17)	-	-	16	143.4/139.6

Three thermistors were installed at Saddle Dam 5 in 2018 near Sta. 40+680. One thermistor (SD5-T2) is installed on the downstream edge crest, one (SD5-T4) around the middle of the crest, and another (SD5-T3) is installed in the toe liner tie-in.

Table 16 below details instrumentation on Saddle Dam 5.

Table 16: List of Thermistors on Saddle Dam 5 (source: AEM)

Hole	Instrument ID	Type	Status	Readings	For PZ		For TH	
#	ID	PZ/TH	Operational (✓)/Not operational (×)	Manual/ Automatic	Elevation (m)	Stratigraphic unit	Number of operational beads	Elevation interval in meters (top/bottom)
SD5-02	SD4-02	Thermistor	✓	Automatic (DL58)	-	-	16(cap)	144/129
SD5-03	SD3-03	Thermistor	✓	Automatic (DL58)	-	-	16	141/126
SD5-04	SD4-04	Thermistor	✓	Automatic (DL58)	-	-	16(cap)	144/129

2.8 Central Dike – South Cell

Construction of Central Dike started in 2012 (stage 1) at the El. 110 m with a key trench located underneath the centreline. In 2013 (Stage 2), the footprint of Central Dike was widened for a crest elevation of 150 m, the structure was raised to El. 115 m and the key trench was relocated at the upstream toe. In 2014 (Stage 3), the key trench was relocated at the upstream toe and constructed to El. 132 m. Central Dike was raised to El. 137 in 2015 (Stage 4), to El. 143 m in 2016 (Stage 5), and to El. 145 m in two steps in 2017 and 2018 (Stage 6). Central

Dike is designed to be able to be raised to El. 150 m and the final crest elevation is subject to review by AEM. The completed crest length is approximately 900 m at El. 145 m.

Desktop studies were undertaken by Golder in 2015 to estimate the seepage flows and pore water pressures, verify the dike stability, and attempt to predict the eventual flow volume that would report to the downstream toe for higher pond elevation. The seepage pathway used in the Golder 2015 model was through a layer of fine material in the till layer of the foundation as it was deemed the most critical scenario for the structure stability. The main recommendation from this desktop study was to maintain beaches adjacent to Central Dike and to maintain a ‘back pressure’ on the downstream side of Central Dike in order to reduce the hydraulic gradient by holding the downstream pond at El. 115 m. Willowstick was also hired to carry out electromagnetic surveys to detect seepage paths. The geophysical campaign led to additional recommendations and identified possible seepage path locations. Following the geophysical campaign, an investigation was conducted by SNC-Lavalin (SNC) and AEM in December 2015 at station CD-595, and between CD-810 and CD-850. Highly altered and fractured bedrock was encountered, and high hydraulic conductivity was measured from Packer testing. Instrumentation of the four boreholes with piezometers and thermistors was done at the same time. A study has been completed in 2017 by Golder to update the seepage modelling with a seepage flow through the bedrock, and allowed for updating of the Emergency Preparedness Plan as well as the Operation, Maintenance, and Surveillance Manual. The summer 2017 investigation and instrumentation campaign shows that the seepage pathway was most probably mainly controlled by the bedrock.

Instruments were installed on Central Dike to monitor the dike’s performance during its construction, operation, and closure. Nine boreholes were drilled on three rows corresponding to the central key trench (545-P1, 580-P1, 650-P1 and 750-P1), the final downstream toe (545-P2 and 650-P2) and the Portage Pit limit (465-P3, 650-P3, 875-P3 and WR-P3). Four additional boreholes were drilled and instrumented in 2016 during the seepage field investigation in the key trench alignment (595-P1, 810-P1, 825-P1 and 850-P1). Two thermistor strings were also installed on the upstream face to monitor the temperature within the tailings of the South Cell.

Seven additional boreholes were drilled and instrumented in 2017 (700-P1, 745-P3, 800-P2, 800-P3, 875-P2, 975-P3 and 1050-P3). The instrumentation on Central Dike consists in 2018 in a total of 69 piezometers and 20 thermistor strings installed in 20 boreholes.

Table 15 below details instrumentation on Central Dike.

Table 17: List of Piezometers and Thermistors on Central Dike (source: AEM)

Hole	Instrument ID	Type	Status	Readings	For PZ		For TH	
#	ID	PZ/TH	Operational (✓)/Not operational (×)	Manual/ Automatic	Elevation (m)	Stratigraphic unit	Number of operational beads	Elevation interval in meters (top/bottom)
465-P3	465-P3-A	Piezo	Frozen	Automatic	65	Bedrock	-	-
	465-P3-B	Piezo	Frozen	Automatic	85	Bedrock	-	-
	465-TH-P3	Thermistor	✓	Automatic	-	-	10/13	105/69
545-P1	545-P1-A	Piezo	✓	Automatic	65	Bedrock	-	-
	545-P1-B	Piezo	× (since Nov. 2018)	Automatic	76	Bedrock	-	-
	545-P1-C	Piezo	✓	Automatic	80	Dense Till	-	-
	545-P1-D	Piezo	× (since Dec. 2018)	Automatic	88	Dense Till	-	-
	545-TH-P1	Thermistor	✓	Automatic	-	-	13	111/63
545-P2	545-P2-A	Piezo	× (since Jan 2, 2019)	Automatic	65	Bedrock	-	-
	545-P2-B	Piezo	× (since Jan 2, 2019)	Automatic	85	Bedrock	-	-
	545-P2-C	Piezo	× (since Jan 21, 2019)	Automatic	100	Bedrock	-	-
	545-P2-D	Piezo	× (since Mar 28, 2019)	Automatic	104	Rock fill/Till	-	-
	545-TH-P2	Thermistor	✓	Automatic	-	-	13	105/51
580-P1	580-P1-A	Piezo	× (since July 2016)	-	-	-	-	-
	580-P1-B	Piezo	× (since July 2016)	-	-	-	-	-
	580-P1-C	Piezo	× (since July 2016)	-	-	-	-	-
	580-P1-D	Piezo	× (since July 2016)	-	-	-	-	-
	580-P1-E	Piezo	× (since July 2016)	-	-	-	-	-
	580-TH-P1	Thermistor	× (since July 2016)	-	-	-	-	-
595-P1	595-P1-A	Piezo	✓	Automatic	69.25	Bedrock	-	-
	595-P1-B	Piezo	✓	Automatic	85.2	Bedrock (Casing)	-	-
	595-P1-C	Piezo	✓	Automatic	92.2	Bedrock (Casing)	-	-
	595-P1-D	Piezo	× (June 2017)	Automatic	96.2	Dense Till (Casing)	-	-
	595-P1-E	Piezo	× (June 2017)	Automatic	105.2	Rock fill (Casing)	-	-
	595-TH	Thermistor	✓	Automatic	-	-	16	114.60/69.60
650-P1	650-P1-A	Piezo	× (since February 2016)	-	-	-	-	-
	650-P1-B	Piezo	× (since September 2016)	-	-	-	-	-
	650-P1-C	Piezo	× (since September 2016)	-	-	-	-	-
	650-P1-D	Piezo	× (since September 2016)	-	-	-	-	-
	650-TH-P1	Thermistor	× (since August 2016)	-	-	-	-	-

Hole	Instrument ID	Type	Status	Readings	For PZ		For TH	
#	ID	PZ/TH	Operational (✓)/Not operational (×)	Manual/ Automatic	Elevation (m)	Stratigraphic unit	Number of operational beads	Elevation interval in meters (top/bottom)
650-P2	650-P2-A	Piezo	✓	Automatic	65	Bedrock	-	-
	650-P2-B	Piezo	✓	Automatic	85	Bedrock	-	-
	650-P2-C	Piezo	✓	Automatic	99.5	Bedrock	-	-
	650-P2-D	Piezo	✓	Automatic	103.5	Rock fill/Till	-	-
	650-TH-P2	Thermistor	✓	Automatic	-	-	13	105/51
650-P3	650-P3-A	Piezo	Frozen	Automatic	65	Bedrock	-	-
	650-P3-B	Piezo	Frozen	Automatic	85	Bedrock	-	-
	650-TH-P3	Thermistor	✓	Automatic	-	-	13	105/51
750-P1	750-P1-A	Piezo	✓	Automatic	65	Bedrock	-	-
	750-P1-B	Piezo	✓	Automatic	76	Bedrock	-	-
	750-P1-C	Piezo	✓	Automatic	80	Dense Till	-	-
	750-P1-D	Piezo	✓	Automatic	88	Dense Till	-	-
	750-P1-E	Piezo	✓	Automatic	100	Rock fill	-	-
	750-TH-P1	Thermistor	✓	Automatic	-	-	13	111/63
810-P1	810-P1-A	Piezo	× (since Dec. 2017)	Automatic	67.7	Bedrock	-	-
	810-P1-B	Piezo	× (since January 2017)	-	-	-	-	-
	810-P1-C	Piezo	× (since Sept 2018)	Automatic	86.9	Dense Till	-	-
	810-P1-D	Piezo	× Elev. Working only	Automatic	93.9	Dense Till	-	-
	810-TH	Thermistor	× (since February 2018)	Automatic	-	-	0/16	134.84/114.84
825-P1	825-P1-A	Piezo	✓	Automatic	74.15	Bedrock	-	-
	825-P1-B	Piezo	✓	Automatic	93.5	Bedrock	-	-
	825-P1-E	Piezo	✓	Automatic	101	Till (Casing)	-	-
	825-TH	Thermistor	✓	Automatic	-	-	14/16	131.25/71.25
850-P1	850-P1-A	Piezo	✓	Automatic	72	Bedrock	-	-
	850-P1-B	Piezo	✓	Automatic	93.7	Bedrock	-	-
	850-P1-E	Piezo	✓	Automatic	106	Rock fill	-	-
	850-TH	Thermistor	✓	Automatic	-	-	13/16	133.02/73.02
875-P3	875-P3-A	Piezo	✓	Automatic	65	Bedrock	-	-
	875-P3-B	Piezo	✓	Automatic	85	Bedrock	-	-
	875-TH-P3	Thermistor	✓	Automatic	-	-	11/13	105/51
875-P2	875-P2-A	Piezo	✓	Automatic	65.08	Bedrock	-	-
	875-P2-B	Piezo	✓	Automatic	85.08	Bedrock	-	-
	875-P2-C	Piezo	Frozen	Automatic	105.38	Bedrock	-	-
	875-P2-D	Piezo	Frozen	Automatic	107.58	Till	-	-
	TH-875-P2	Thermistor	✓	Automatic	-	-	15/16	120.08/63.08
800-P2	800-P2-A	Piezo	✓	Automatic	70.07	Bedrock	-	-
	800-P2-B	Piezo	✓	Automatic	85.07	Bedrock	-	-
	800-P2-C	Piezo	✓	Automatic	95.07	Bedrock	-	-
	800-P2-D	Piezo	✓	Automatic	105.07	Rock fill/Till	-	-
	TH-800-P2	Thermistor	✓	Automatic	-	-	16	120.07/70.07

Hole	Instrument ID	Type	Status	Readings	For PZ		For TH	
#	ID	PZ/TH	Operational (✓)/Not operational (×)	Manual/ Automatic	Elevation (m)	Stratigraphic unit	Number of operational beads	Elevation interval in meters (top/bottom)
700-P1	700-P1-A	Piezo	✓	Automatic	63.43	Bedrock	-	-
	700-P1-B	Piezo	✓	Automatic	86.93	Bedrock	-	-
	700-P1-C	Piezo	✓	Automatic	97.43	Bedrock	-	-
	700-P1-D	Piezo	✓	Automatic	101.43	Void before bedrock	-	-
	TH-700-P1	Thermistor	✓	Automatic	-	-	16	118.43/63.43
580-P1 (R)	580-P1-R-A (R)	Piezo	✓	Automatic	69.55	Sand	-	-
	580-P1-R-B (R)	Piezo	✓	Automatic	75.55	Bedrock	-	-
	580-P1-R-C (R)	Piezo	✓	Automatic	79.05	Bedrock	-	-
	TH-580-P1 (R)	Thermistor	✓	Automatic	-	-	16	120.55/65.55
1050-P3	1050-P3-A	Piezo	Frozen	Automatic	66.37	Bedrock	-	-
	1050-P3-B	Piezo	Frozen	Automatic	86.37	Bedrock	-	-
	TH-1050-P3	Thermistor	✓	Automatic	-	-	16	134.77/65.77
975-P3	975-P3-A	Piezo	✓	Automatic	64.53	Bedrock	-	-
	975-P3-B	Piezo	✓	Automatic	84.53	Bedrock	-	-
	TH-975-P3	Thermistor	✓	Automatic	-	-	16	131.12/64.12
800-P3	800-P3-A	Piezo	✓	Automatic	62.95	Bedrock	-	-
	800-P3-B	Piezo	✓	Automatic	82.95	Bedrock	-	-
	800-P3-C	Piezo	✓	Automatic	96.45	Till	-	-
	TH-800-P3	Thermistor	✓	Automatic	-	-	16	118.95/62.95
745-P3 (WR-P3)	TH-745-P3	Thermistor	✓	Automatic	-	-	8/16	125.08/102.08
CD_US-0+650	CD-US-1	Thermistor	✓	Automatic	-	-	16	126.40/111.056
	CD-US-2	Thermistor	✓	Automatic	-	-	16	143/127
SD5	TH-02	Thermistor	✓	Automatic	-	-	12/16	144/129
	TH-03	Thermistor	✓	Automatic	-	-	16	141/126
	TH-04	Thermistor	✓	Automatic	-	-	9/16	144/129

Table 18: List of Piezometers Recording Suction on Central Dike

Name of Piezometer	Installation Unit	Observation
545-P1-A	Bedrock	Suction.
580-P1R-B	Bedrock	Suction.
750-P1-(A,B,C)	Bedrock, till	Suction.
545-P2 B	Bedrock	Suction.
545-P2-C	Bedrock	Suction.
545-P2-D	Till	Suction.
650-P2-D	Till	Suction. Frozen.
650-P3-B	Bedrock	Suction. Frozen.

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