Appendix 25

Whale Tail 2020 Thermal Monitoring Report

WHALE TAIL PIT PROJECT

Thermal Monitoring Report 2020

In Accordance with
Project Certificate No. 008, T&C 14

Prepared by:
Agnico Eagle Mines Limited – Meadowbank Division

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1 INTRODUCTION

Agnico Eagle Mines Limited – Meadowbank Division (Agnico Eagle) is developing the Whale Tail Pit Project (Project), a satellite deposit located on the Amaruq property, to continue mine operations and milling at Meadowbank Mine.

This document presents the Thermal Monitoring Report include the following mine facilities and natural locations as described in the Thermal Monitoring Plan:

- Waste rock storage facility (WRSF)
- Water management facilities including Whale Tail Dike, Mammoth Dike, North-East Dike, WRSF Dike, and the Whale Tail Attenuation Pond
- Whale Tail Pit

The Thermal Monitoring Report provides the instrumentation data and their interpretation. Refer to the Thermal Monitoring Plan for a general descriptions of the different facilities, the anticipated impact of operation of the facilities on the permafrost and the general guidelines that are used to define instrumentation needs for each facility.

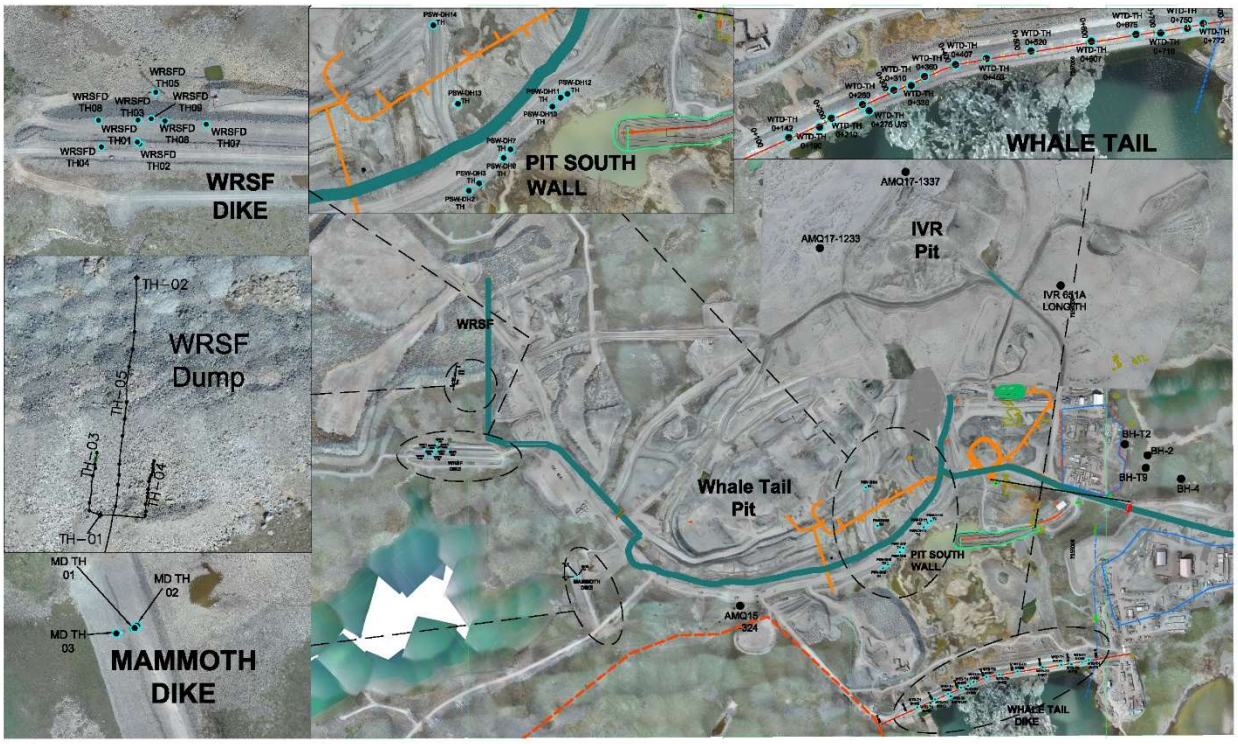
2 AVAILABLE DATA

There are currently 45 active thermistors at the Whale Tail Site project area.

The location and installation summary of the 45 active thermistors within the Project site are presented in the table in Appendix A. Figure 1 shows locations of active and inactive thermistors. Data are collected from the thermistors by data loggers or using manual readout units.

Results of active thermistors are presented in Appendix A.

Figure 1. Location of Thermistors



3 THERMAL MONITORING RESULT

This section presents a summary expected thermal effect as well as interpretation of the instrumentation data gathered for the reporting period.

3.1 WASTE ROCK STORAGE FACILITY

3.1.1 Expected Thermal Effects on Permafrost

Construction of the WRSF on the permafrost is expected to result in aggradation of permafrost into the pile. The permafrost under the pile would remain, but temperatures in the upper permafrost zone are expected to increase gradually until a thermal equilibrium is established with the active zone and zero-amplitude zone moving upward and being located within the waste rock pile. Convective cooling conditions often occur in waste piles and would potentially offset some of the temperature increase in the permafrost.

The waste rock pile itself is expected to freeze back with time and have an active layer formed on the upper portion (Okane 2019b). Climate change in the long-term is expected to extend the depth of the active layer in the pile, but the thick waste rock pile will constitute a protection to the underlying permafrost. If heat generation occurs associated with the oxidation of sulphide-bearing minerals within the pile, the process of freeze-back would be delayed and, depending on the location of the heat generation source, the upper portion of the permafrost foundation could be impacted.

3.1.2 Thermal Monitoring Results

For the thermistor installed in the foundation of the WT WRSF, the instrumentation data is showing thermal behaviour along the expected trend (no permafrost degradation)

The instruments installed at mid-elevation in the PAG of the first bench are now covered in waste rock. 65 % of beads on the horizontal instruments are still operational and due to the redundancy of the installation it is still possible to have a complete horizontal profile for most of the length. The data show that the PAG material is all in permafrost.

3.2 WATER MANAGEMENT FACILITIES

3.2.1 Expected Thermal Effects on Permafrost

The Whale Tail Dike is constructed within the lake where talik is anticipated to exist, therefore there will be no direct negative impact on the permafrost zone underneath the talik. The construction of the Whale Tail Dike is expected to have a cooling effect on the lake ground underneath the dike due to exposure to lower dike temperature than lake water. Minimal effects to the permafrost at the abutment areas are expected.

Following lake dewatering and beginning of operations, areas downstream of the Whale Tail Dike are expected to freeze back progressively, and the upstream area of the dike is expected to remain unfrozen.

After the dike is breached in the final stages of closure, the Whale Tail Lake will be restored, causing frozen zones located downstream of the dike to thaw and progressively restoring the original lake talik.

The other dewatering dike areas are expected to have similar thermal impacts on the permafrost associated with construction, operation and closure of the dikes.

The WRSF Dike will periodically contain a pond formed from water flowing out of the waste rock facility. Depending on pond depth and operational conditions there would be impact with possible thawing of a shallow upper permafrost zone underlying the pond. However, due to the operational pond level that is normally maintained low to reduce the hydraulic gradient, this issue is unlikely.

The talik zone under the Attenuation Pond would remain, but depth of the talik could be reduced as the Attenuation Pond will likely be shallower than the existing lake at that location. The surrounding areas to the pond would freeze back progressively after dewatering but would restore to talik condition after breaching of the dewatering dikes and flooding of the area.

3.2.2 Thermal Monitoring Results

Mammoth Dike

The instrumentation data are showing thermal behaviour along the expected trend at Mammoth Dike with an active layer contained in the rockfill shell and the foundation and key trench are in permafrost condition.

WRSF Dike

A degradation of the thermal condition in the keytrench of WRSF Dike was observed in the summer of 2019 leading to seepage. In 2020 the instruments show that the foundation and keytrench remained frozen all year long (permafrost aggradation of 2 m) which indicate that the mitigation measure implemented in 2020 were successful.

Whale Tail Dike

The trend of permafrost degradation at the abutment continued in 2020 and was observed at the Western abutment (0+142) and at the Eastern abutment up to Sta 0+750. A rapid warmup in the wall and foundation also was noted at 0+675 but is not related to local seepage through the wall. This permafrost degradation at the abutment has not resulted in a seepage increase for the moment.

The thermistors show that limited freezeback is happening in deep bedrock in some areas (0+260, 0+407, 0+520).

IVR Dike D-1 area (not yet constructed)

The thermistors installed in the projected footprint of IVR Dike D-1 (to be constructed in 2021) show that the active layer in this area is about 2 m thick, located within the overburden, while the bedrock is in permafrost.

3.3 OPEN PIT

3.3.1 Expected Effects on Permafrost

Whale Tail pit will be excavated through an upper closed talik zone and underlying permafrost. During operations of the pit the talik zone is expected to freeze back progressively and the lower permafrost zone surrounding the pit walls will, in general, experience reduction in temperature

other than at a shallow active zone adjacent to the pit walls subjected to seasonal thawing during summer.

Upon closure and subsequent flooding of the WT pit, permafrost areas underneath the pit lake are expected to gradually thaw. Thermal assessments have indicated this process would take hundreds of years (Golder 2018a). The pit lake would eventually reduce the permafrost depth in the pit surrounding ground, but this process could take significantly longer time (in the order of 10,000 years) to complete.

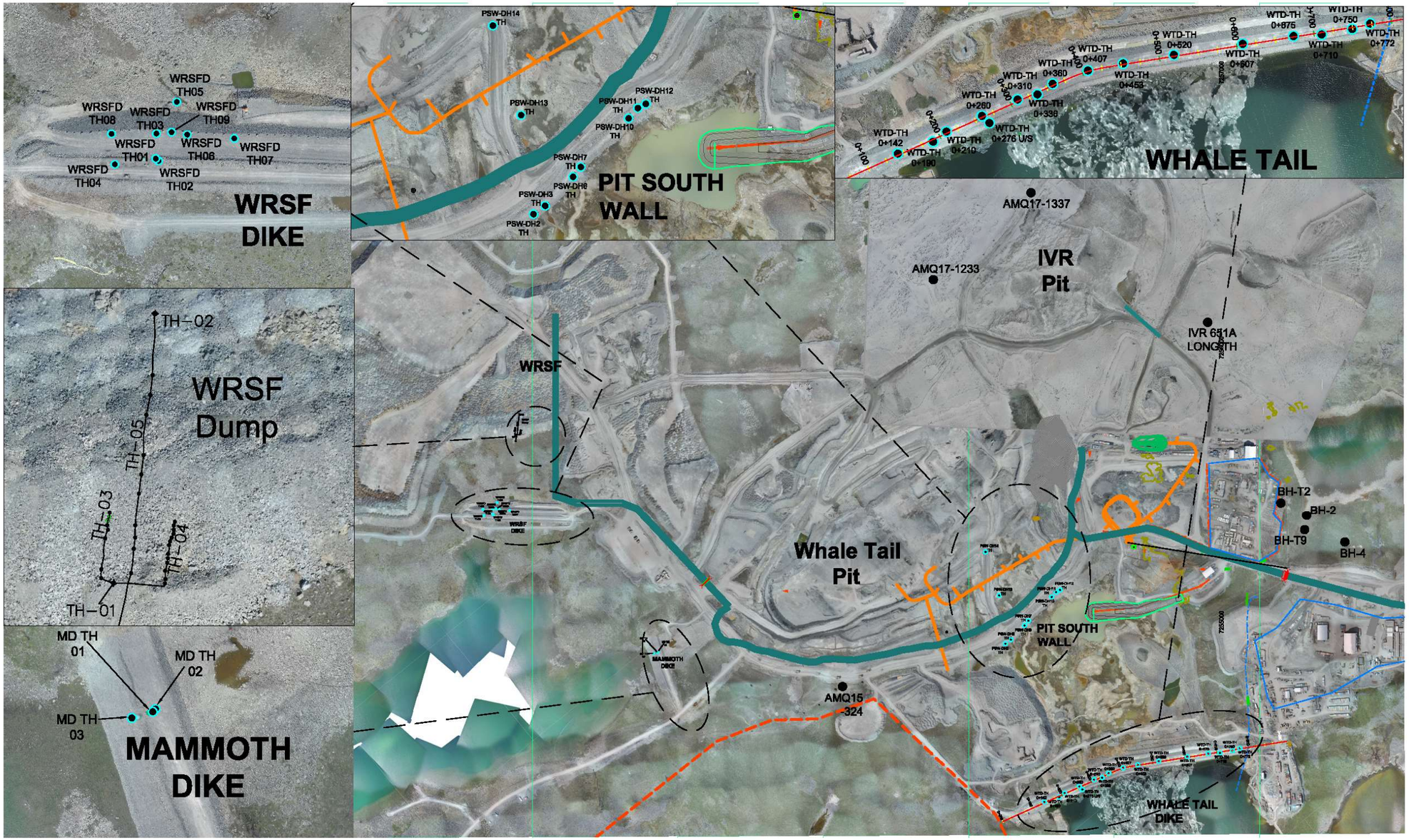
IVR Pit is excavated through permafrost and as a result the mining activity are not expected to impact the thermal regime of that area.

3.3.2 Thermal Monitoring Results

Thermistors have been installed in 2020 in the talik zone near the south wall of the WT Pit. As there is less than a year of data available there is not enough data to draw conclusion for the moment.

The previous thermistors installed in the IVR area are no longer functioning due to mining activity in the sector but were showing permafrost until they stopped working. A deep thermistor has been installed in 2020 in that area (IVR long TH) and shows permafrost conditions down to 500 m below ground surface, to El. 9600 m (mining datum).

APPENDIX A – THERMAL MONITORING DATA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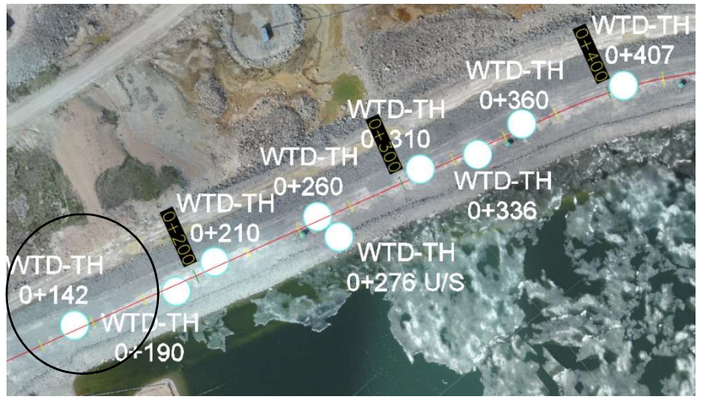
WRSFD TH08
WRSFD TH03
WRSFD TH09
WRSFD TH01
WRSFD TH06
WRSFD TH07
WRSFD TH04
WRSFD TH02
PIT SOUTH WALL
PSW-DH14 TH
PSW-DH13 TH
PSW-DH12 TH
PSW-DH11 TH
PSW-DH10 TH
PSW-DH7 TH
PSW-DH6 TH
PSW-DH3 TH
PSW-DH2 TH
WHALE TAIL
WTD-TH 0+142
WTD-TH 0+190
WTD-TH 0+210
WTD-TH 0+260
WTD-TH 0+276 U/S
WTD-TH 0+310
WTD-TH 0+336
WTD-TH 0+360
WTD-TH 0+407
WTD-TH 0+453
WTD-TH 0+520
WTD-TH 0+607
WTD-TH 0+675
WTD-TH 0+710
WTD-TH 0+750
WTD-TH 0+772
AMQ17-1337
AMQ17-1233
IVR Pit
IVR 651A LONGITH
WRSF
WRSF DIKE
Whale Tail Pit
PIT SOUTH WALL
BH-T2
BH-2
BH-T9
BH-4
MAMMOTH DIKE
AMQ15 -324
WHALE TAIL DIKE
TH-02
WRSF Dump
TH-05
TH-03
TH-04
TH-01
MD TH 01
MD TH 02
MD TH 03
MAMMOTH DIKE

Name	Area	Easting (X)	Northing (Y)	Elevation (Z)	Azimuth	Dip	Installed	Active (Y) or (N)
AMQ15-324	WTP	**606496.80**	**7254995.20**	**161.79**	323.41	-55.46	2015	N
AMQ17-1233	IVR	**606778.00**	**7256254.00**	**162.00**	252.71	-59.06	2017	N
WTD 0+142	WTD	**607119.94**	**7254637.98**	**156.75**		-90	2018	Y
WTD 0+190 U/S	WTD	**607165.34**	**7254653.83**	**157.42**		-90	2018	Y
WTD 0+210	WTD	**607182.85**	**7254666.19**	**157**		-90	2018	Y
WTD 0+260	WTD	**607227.51**	**7254686.28**	**157**		-90	2018	Y
WTD 0+276 U/S	WTD	**607237.2**	**7254677.3**	**157**		-90	2018	Y
WTD 0+310	WTD	**607237.98**	**7254707.09**	**157**		-90	2018	Y
WTD 0+336 U/S	WTD	**607298.44**	**7254713.45**	**157**		-90	2018	Y
WTD 0+360	WTD	**607318.81**	**7254727.15**	**157**		-90	2018	Y
WTD 0+407	WTD	**607363.08**	**7254744.86**	**157**		-90	2018	Y
WTD 0+453	WTD	**607408.60**	**7254753.72**	**157**		-90	2018	Y
WTD 0+520	WTD	**607473.78**	**7254764.22**	**157**		-90	2018	Y
WTD 0+607	WTD	**607561.24**	**7254778.35**	**157**		-90	2018	Y
WTD 0+675	WTD	**607262.31**	**7254788.86**	**157**		-90	2018	Y
WTD 0+710 U/S	WTD	**607662.32**	**7254790.63**	**157**		-90	2018	Y
WTD 0+750	WTD	**607701.81**	**7254797.04**	**157**		-90	2018	Y
WTD 0+772 U/S	WTD	**607724.15**	**7254804.63**	**157**		-90	2018	Y
WRSF TH01	WRSF	**615797.25**	**7238129.77**	**161.546**		-90	2019	Y
WRSF TH02	WRSF	**615861.49**	**7238133.24**	**162.053**		-90	2019	Y
WRSF TH03	WRSF	**615814.31 to 615799.6**	**7238118.6 to 7238117**	**162.744 to 162.042**		0	2019	Y (13/16 beads)
WRSF TH04	WRSF	**615813.38 to 615797.7**	**7238134.1to 7238132.8**	**162.138 to 161.619**		0	2019	Y (8/16 beads)
WRSF TH05	WRSF	**615860.9 to 615800.3**	**71238133.3 to 7238126**	**162.202**		0	2019	Y (10/16 beads)
MD-TH01	MD	**Slope**	**Slope**	**-**		Slope	2019	Y
MD-TH02	MD	**605926.19**	**7255102.52**	**154.9**		-90	2019	Y
MD-TH03	MD	**605926.74**	**7255102.6**	**154.9**		-90	2019	Y
WRSF TH01	WRSF Dike	**Slope**	**Slope**	**-**		Slope	2019	Y
WRSF TH02	WRSF Dike	**605416.44**	**7255526.7**	**159.07**		-90	2019	Y
WRSF TH03	WRSF Dike	**605414.98**	**7255545.01**	**155.29**		-90	2019	Y
WRSF TH04	WRSF Dike	**605387.14**	**7255524.47**	**158.15**		-90	2019	Y
WRSF TH05	WRSF Dike	**605428.59**	**7255566.21**	**153.63**		-90	2019	Y
WRSF TH06	WRSF Dike	**605435.56**	**7255544.29**	**155.35**		-90	2019	Y
WRSF TH07	WRSF Dike	**605466.94**	**7255541.78**	**155.13**		-90	2019	Y
WRSF TH08	WRSF Dike	**605384.991**	**7255544.818**	**159.886**		-90	2019	Y
WRSF TH09	WRSF Dike	**605425.1**	**7255546.038**	**160.037**		-90	2019	Y
PSW DH2 TH	Pit South Wall	**606998.837**	**7255127.783**	**149.02**		-90	2020	Y

PSW DH3 TH	Pit South Wall	**607016.336**	**7255140.383**	**148.041**		-90	2020	Y
PSW DH6 TH	Pit South Wall	**607058.391**	**7255184.293**	**148.181**		-90	2020	Y
PSW DH7 TH	Pit South Wall	**607070.111**	**7255198.772**	**148.734**		-90	2020	Y
PSW DH10 TH	Pit South Wall	**607142.218**	**7255272.101**	**150.109**		-90	2020	Y
PSW DH11 TH	Pit South Wall	**607155.955**	**7255287.46**	**151.241**		-50	2020	Y
PSW DH12 TH	Pit South Wall	**607168.065**	**7255293.87**	**151.934**		-50	2020	Y
PSW DH13 TH	Pit South Wall	**14837.598**	**6846.924**	**145.398**		-90	2020	Y
PSW DH14 Th	Pit South Wall	**14889.046**	**6978.711**	**130.761**		-90	2020	Y
V651A	IVR	**607624.208**	**7256122.348**	**10163.28**		-69	2019	Y
BH-T2	IVR	**607850.8**	**7255563.9**	**164.303**		-90	2019	N
BH-2	IVR	**607930.1**	**7255525.4**	**162.159**		-90	2019	N
BH-T9	IVR	**607923.8**	**72555480.4**	**162.084**		-90	2019	N
BH-4	IVR	**608048**	**7255442**	**163.982**		-90	2019	N

WTD-TH 0+142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WTD-TH 0+360
WTD-TH 0+310
WTD-TH 0+260
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WTD-TH 0+210
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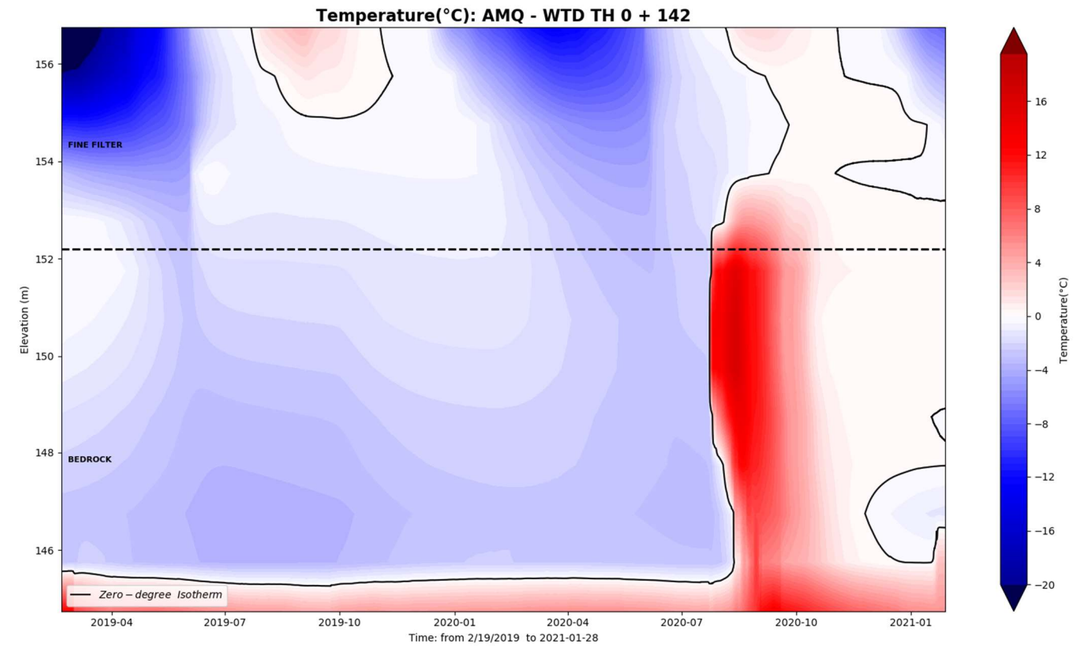
WTD-TH 0+142
WTD-TH 0+190
0+400
0+300
0+200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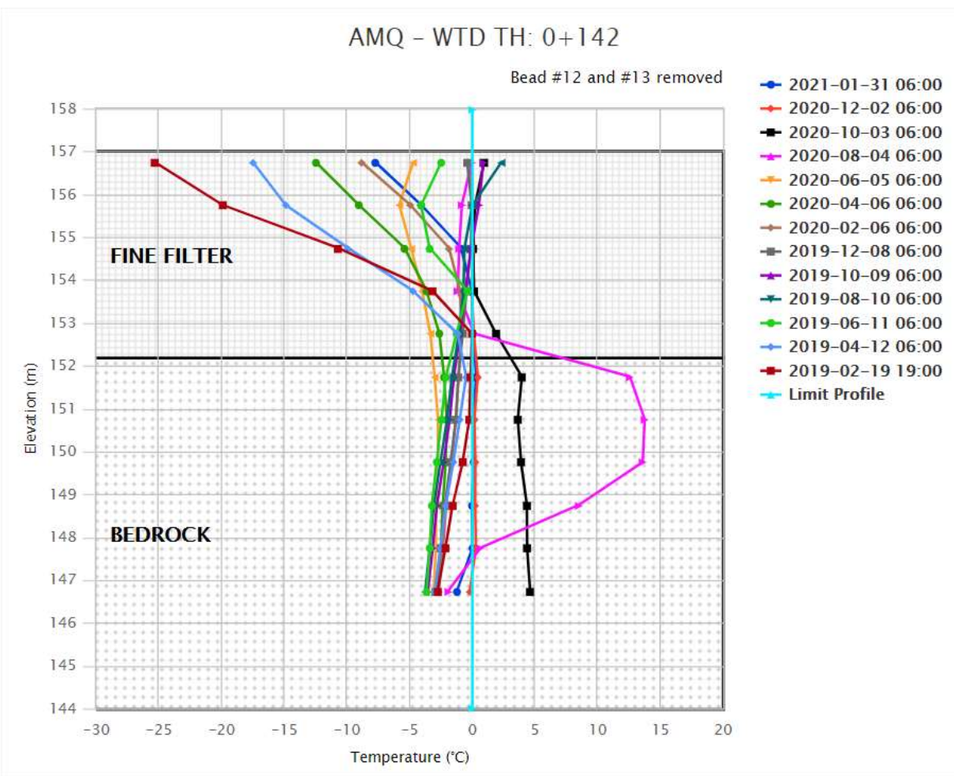
Time: from 2/19/2019 to 2021-01-28
Temperature(°C)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Bead #12 and #13 removed
FINE FILTER
BEDROCK
Elevation (m)
Temperature (°C)
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2020-04-06 06:00
2020-02-06 06:00
2019-12-08 06:00
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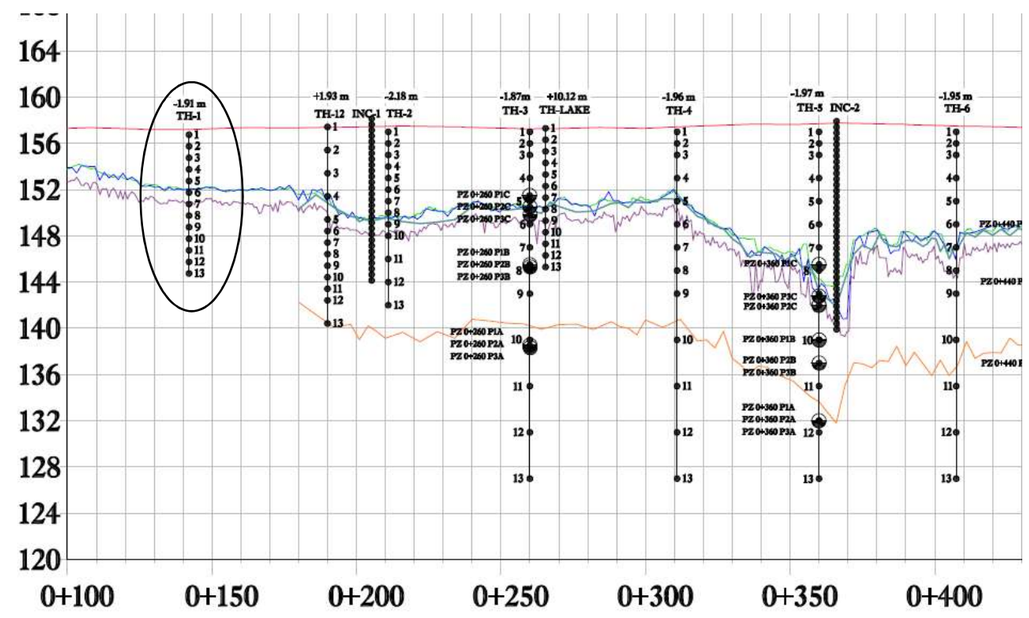
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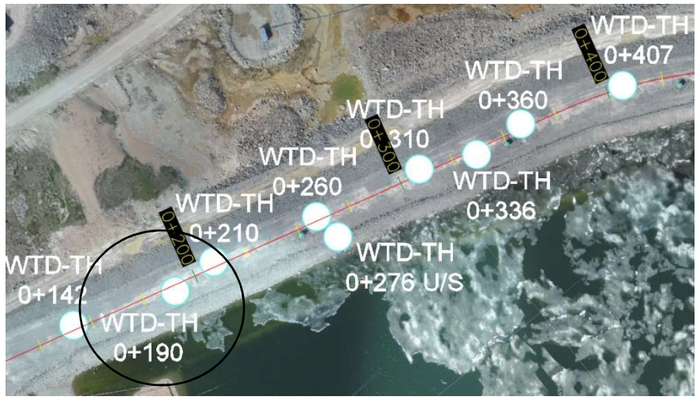
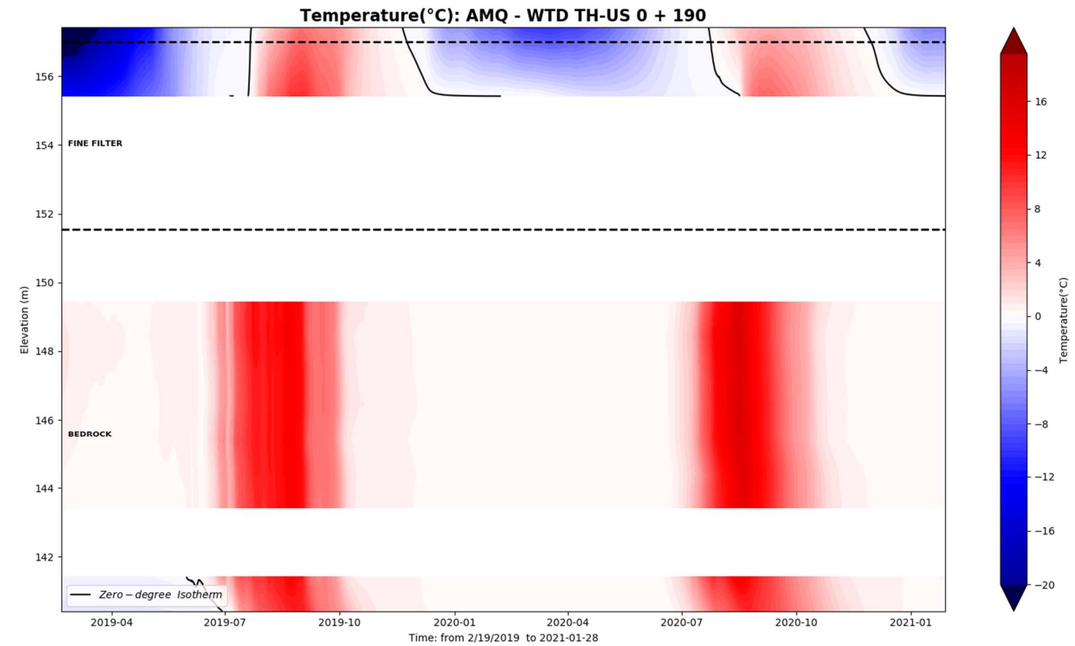
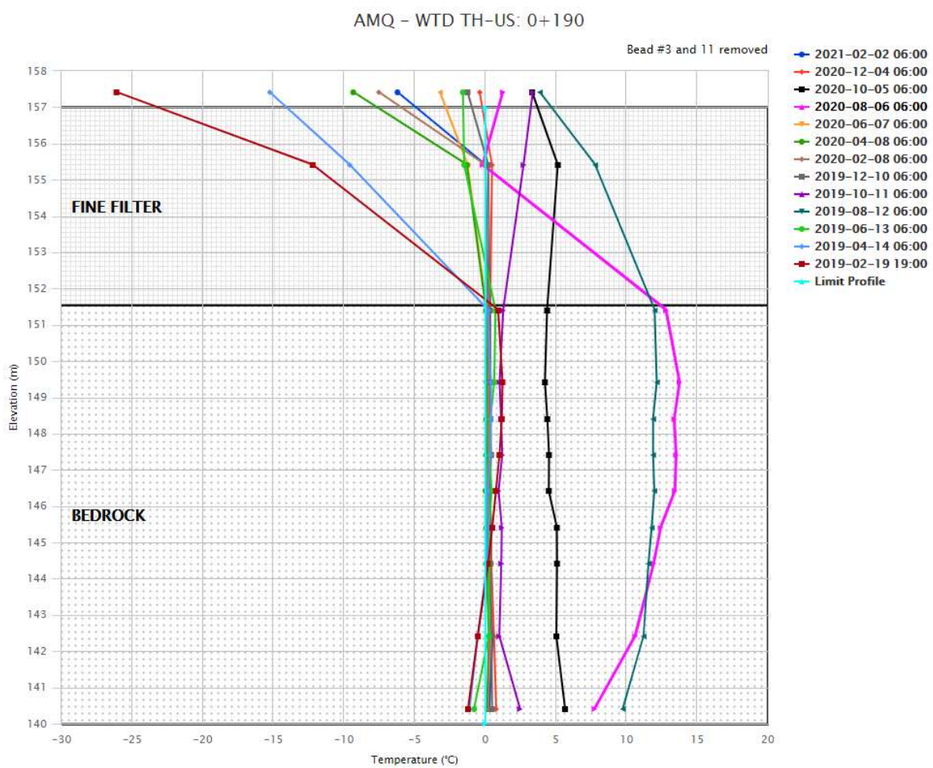
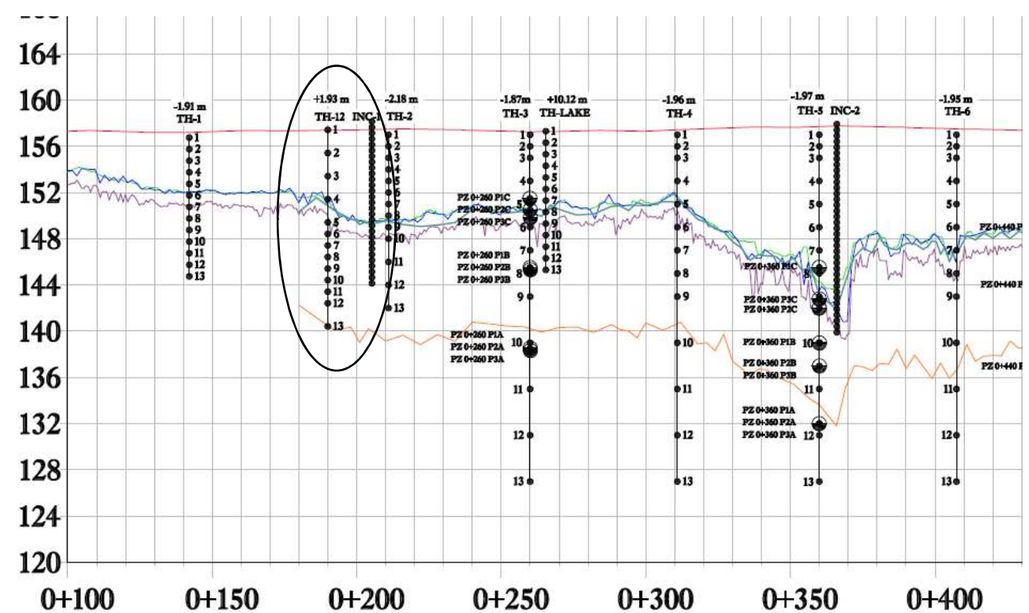
0+400

WTD-TH 0+190 U/S









WTD-TH 0+210


WTD-TH 0+407
WTD-TH 0+360
WTD-TH 0+310
WTD-TH 0+260
WTD-TH 0+336
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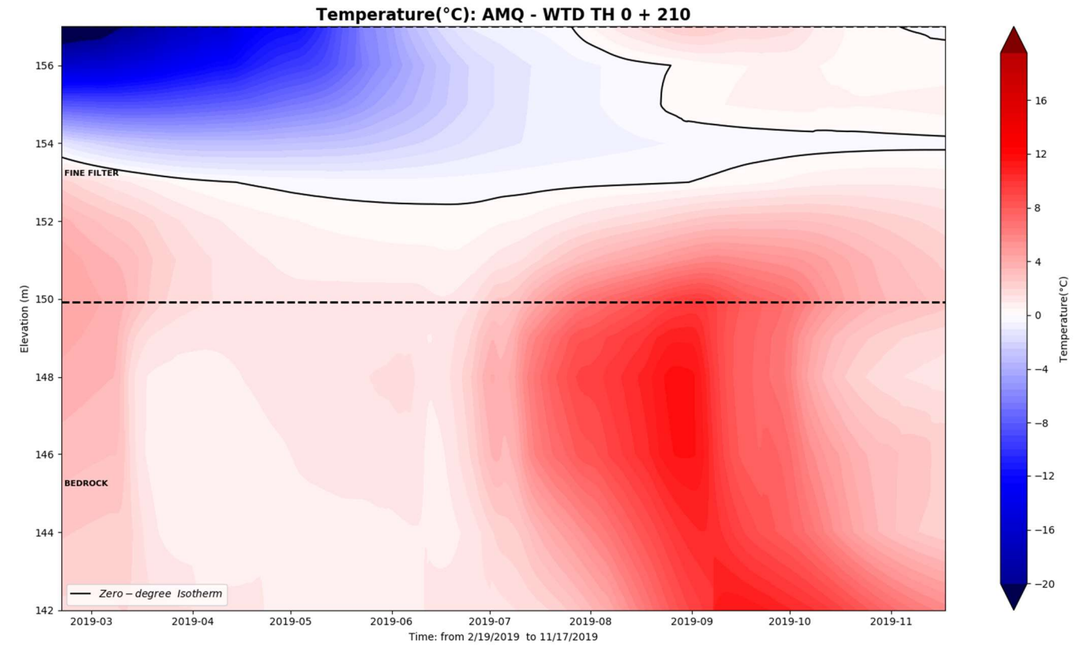
0+200
0+300
0+400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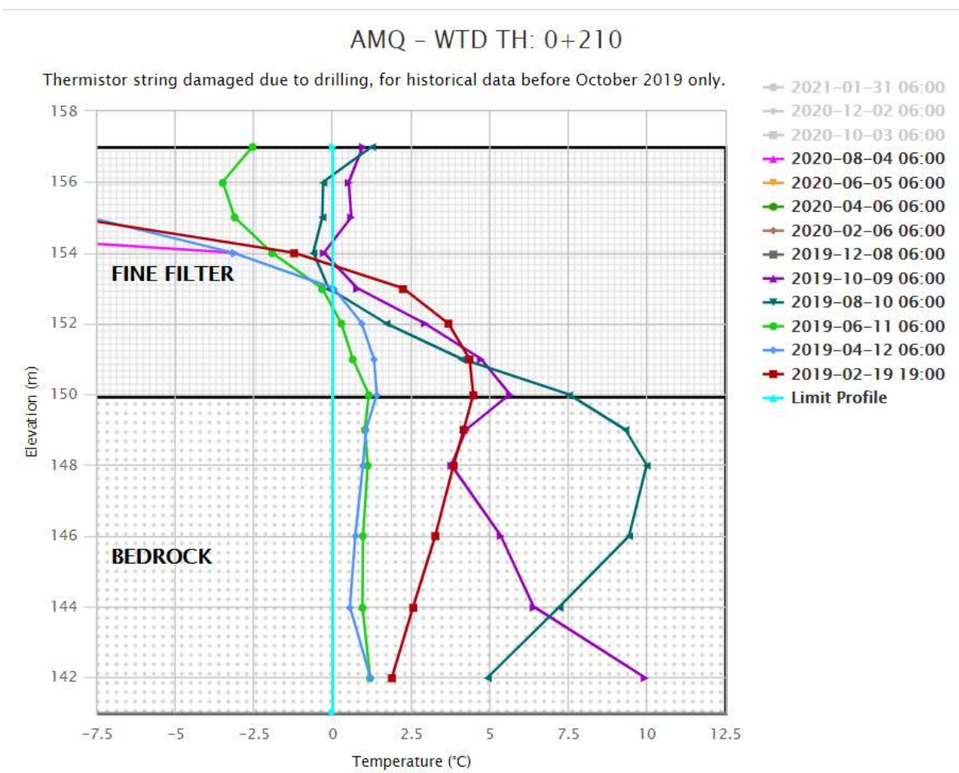
Temperature(°C)


AMQ – WTD TH: 0+210
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FINE FILTER
BEDROCK
Elevation (m)
Temperature (°C)
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2020-12-02 06:00
2020-10-03 06:00
2020-08-04 06:00
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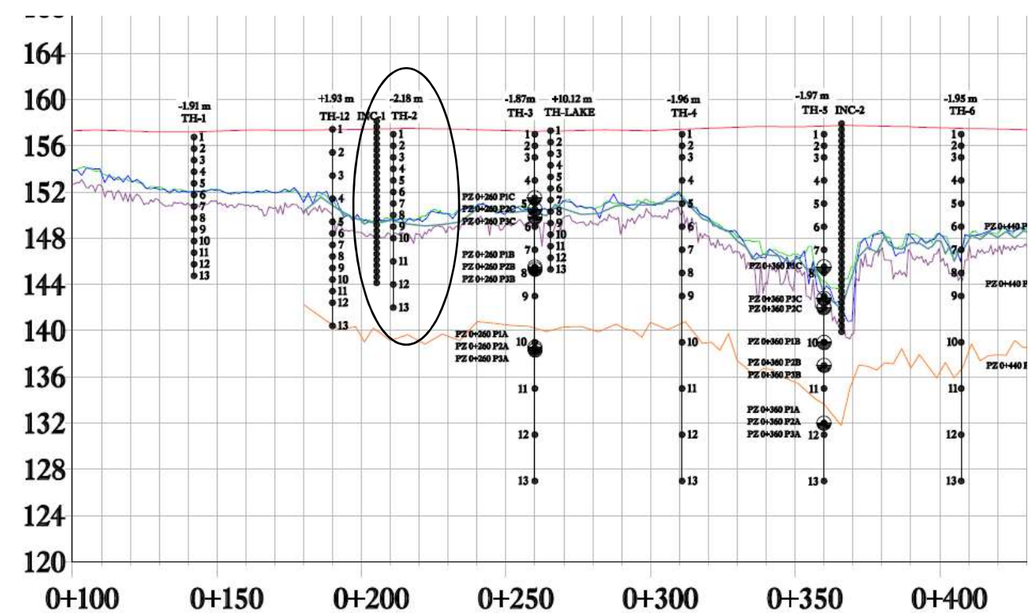
2019-02-19 19:00
Limit Profile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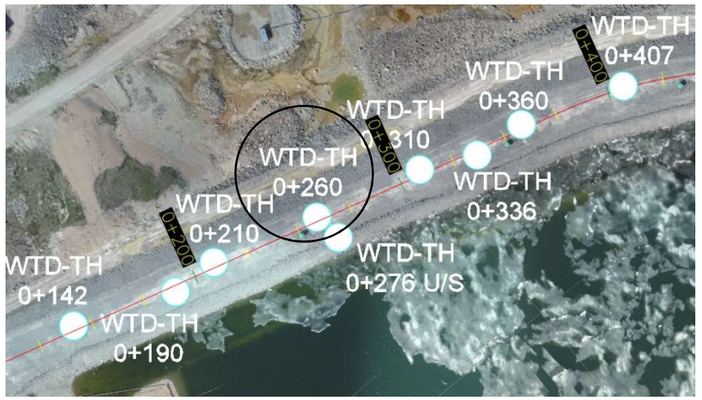
0+150
0+200
0+250
0+300
0+350
0+400

WTD-TH 0+260


WTD-TH 0+407
0+400
WTD-TH 0+360
WTD-TH 0+310
0+300
WTD-TH 0+260
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WTD-TH 0+210
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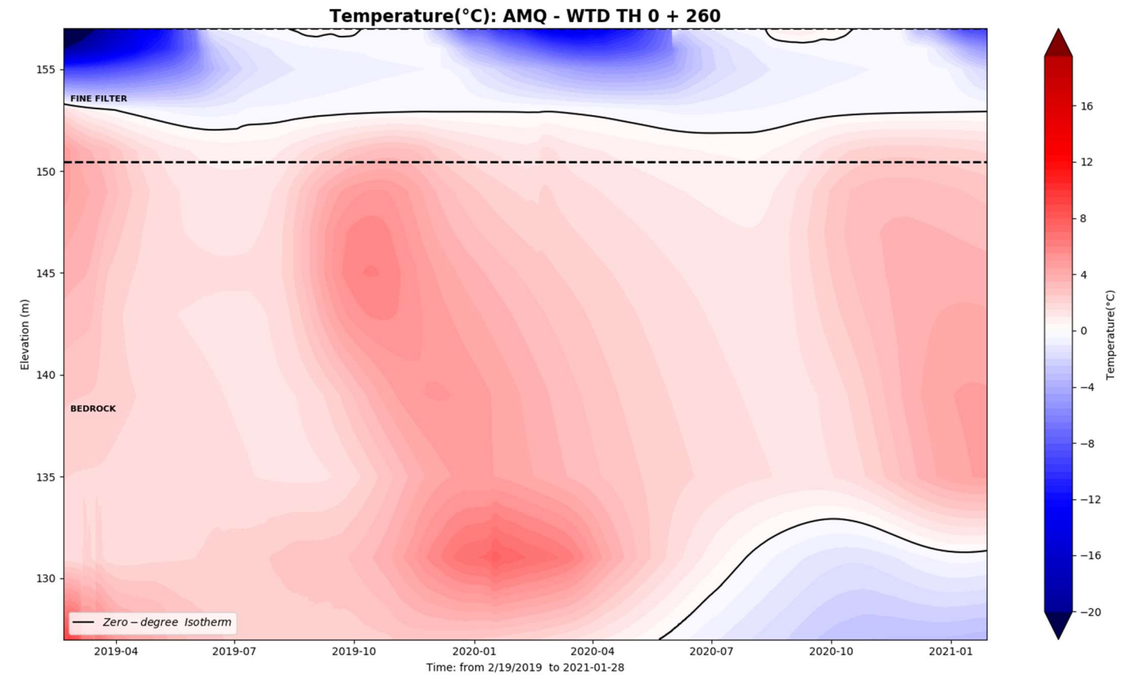
WTD-TH 0+276 U/S
WTD-TH 0+142
WTD-TH 0+190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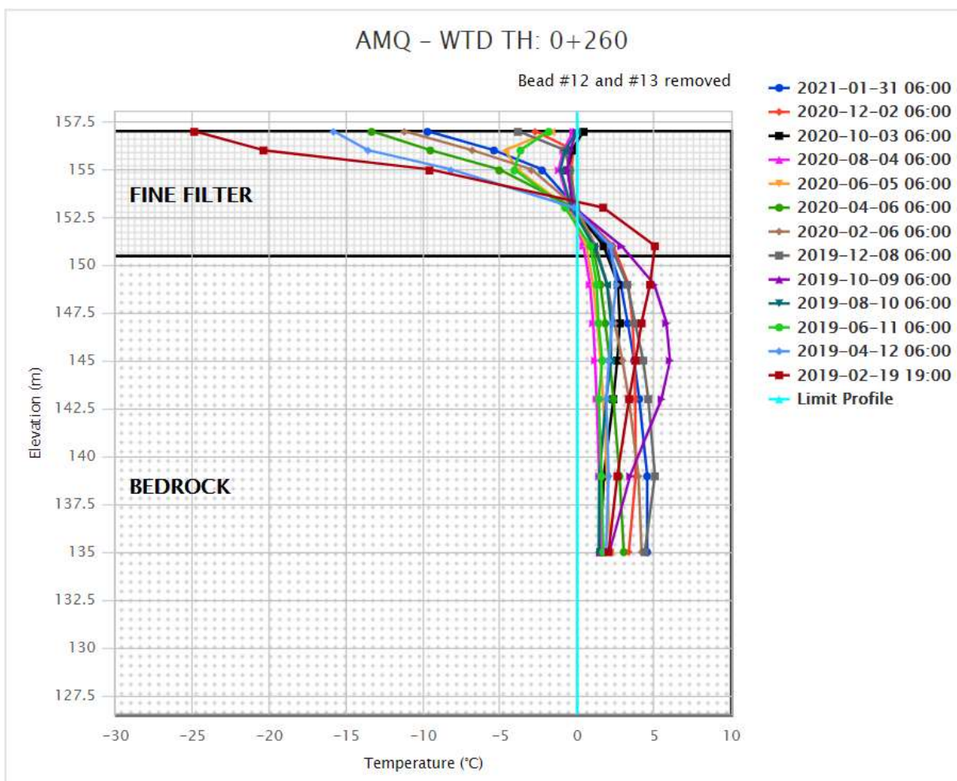
BEDROCK
Zero – degree Isotherm
Elevation (m)
Time: from 2/19/2019 to 2021-01-28
Temperature(°C)


AMQ – WTD TH: 0+260
Bead #12 and #13 removed
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BEDROCK
Elevation (m)
Temperature (°C)
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2020-12-02 06:00
2020-10-03 06:00
2020-08-04 06:00
2020-06-05 06:00
2020-04-06 06:00
2020-02-06 06:00
2019-12-08 06:00
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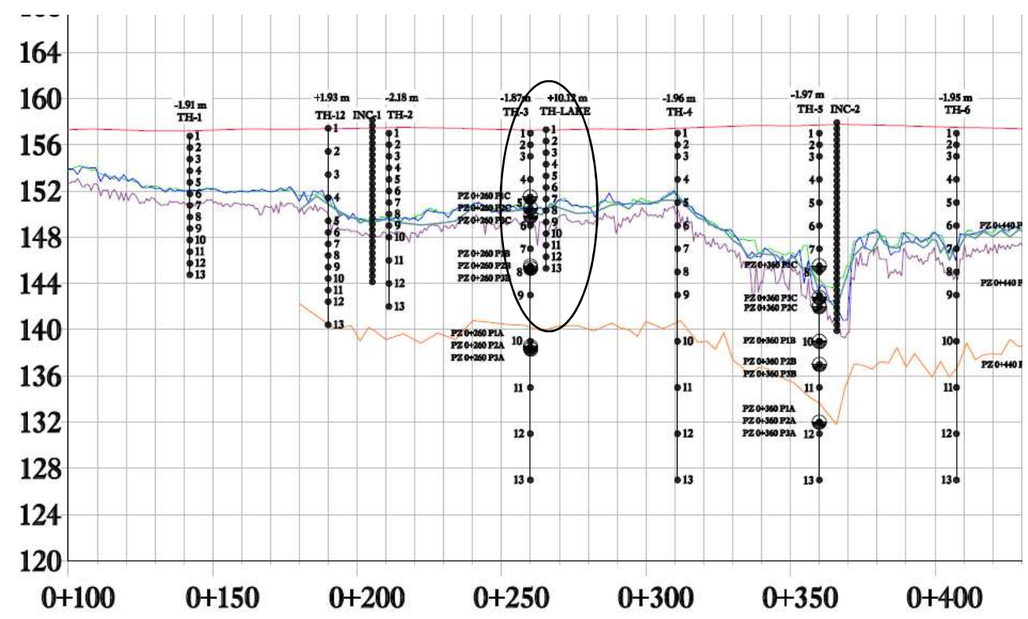
2019-04-12 06:00
2019-02-19 19:00
Limit Profile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INC-1
TH-2
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TH-LAKE
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TH-5
INC-2
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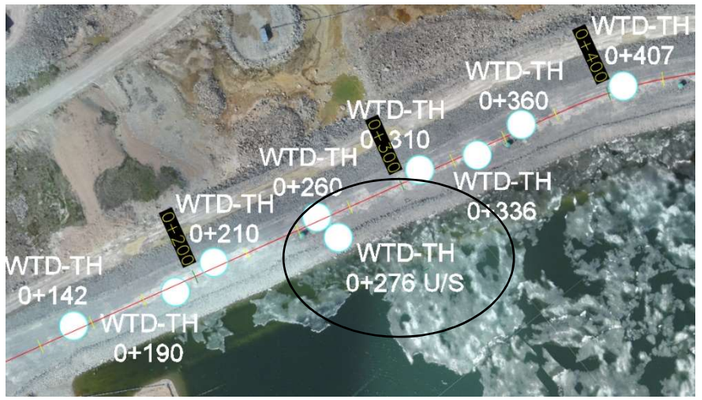
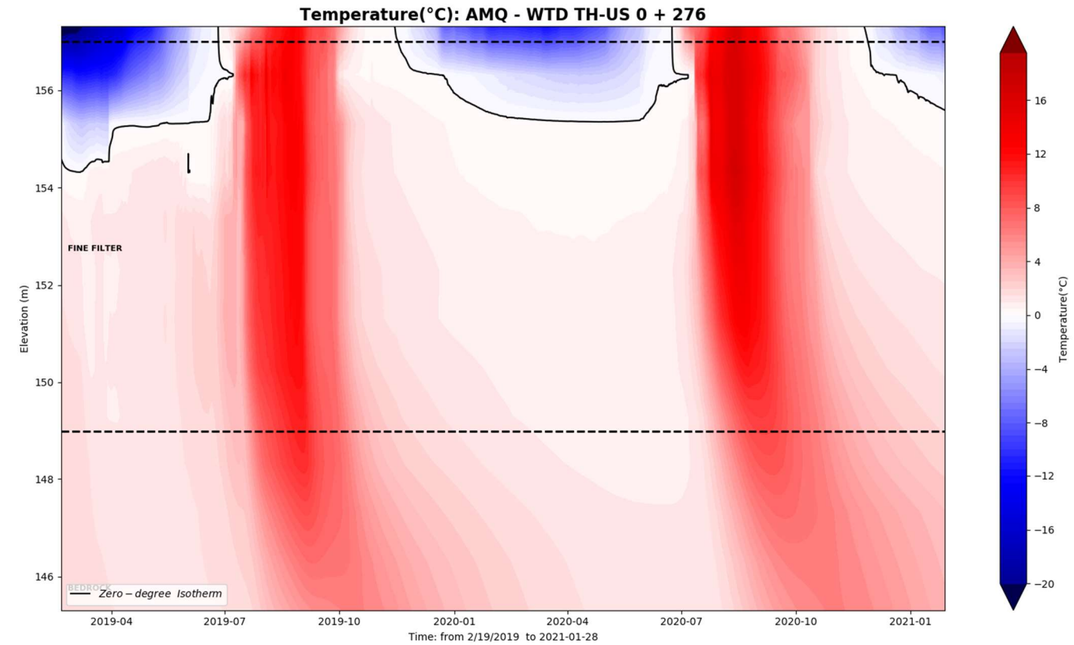
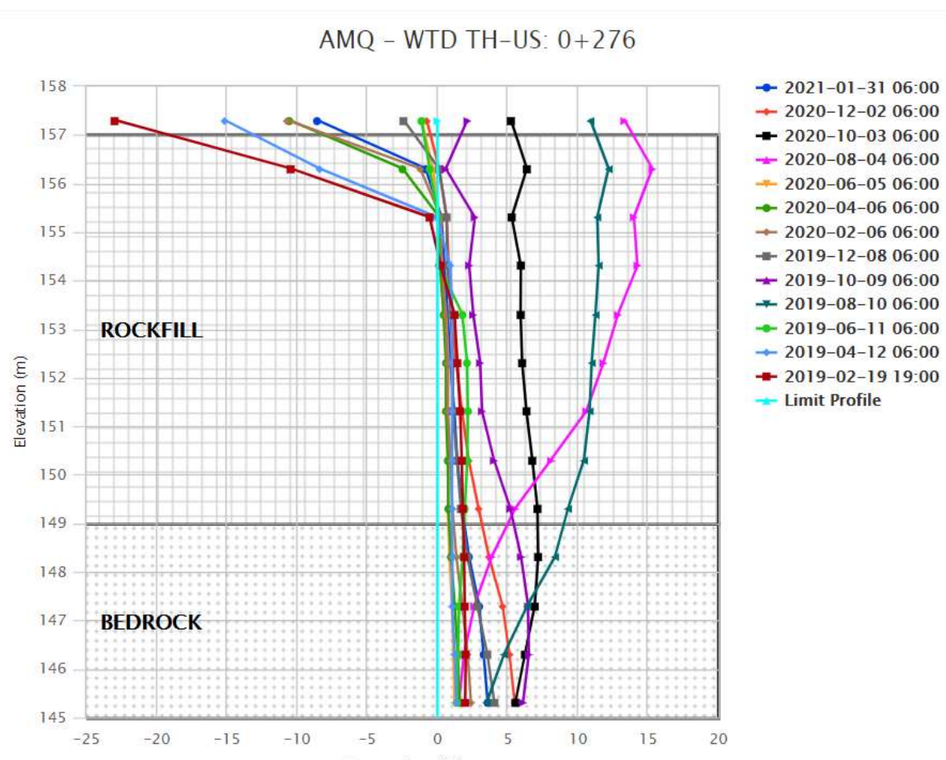
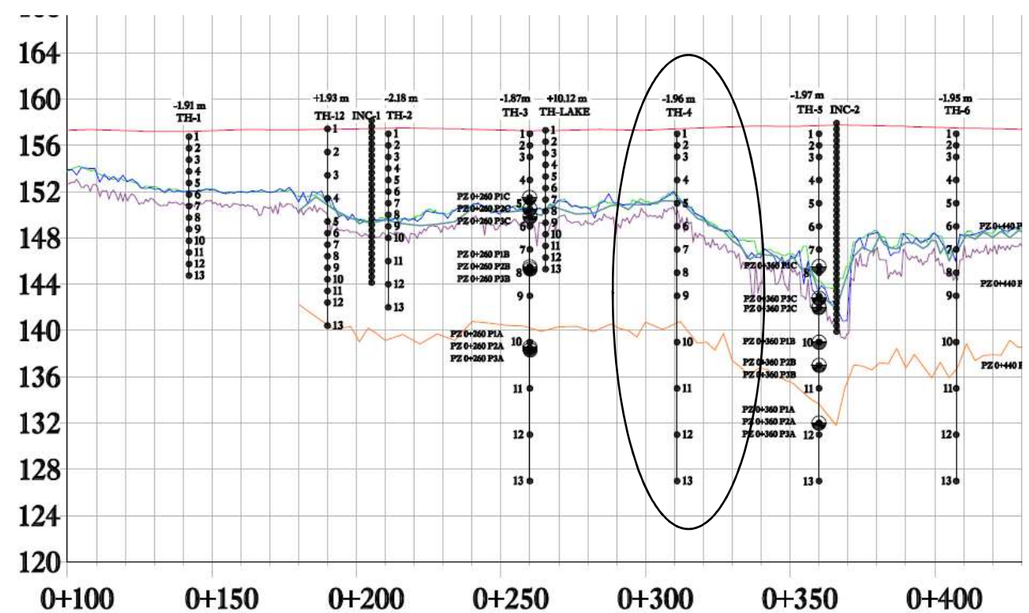
0+400

WTD-TH 0+276 U/S

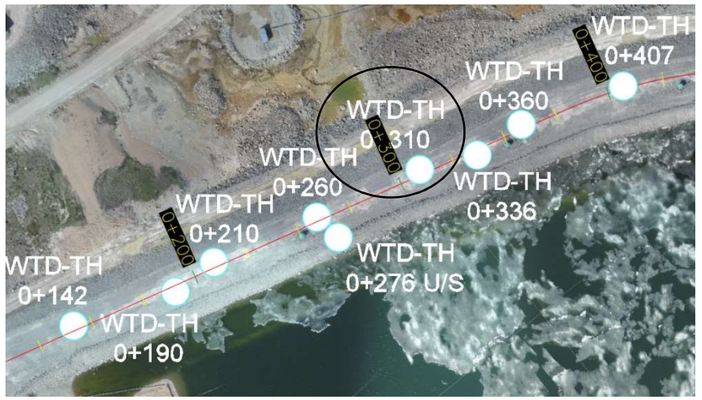


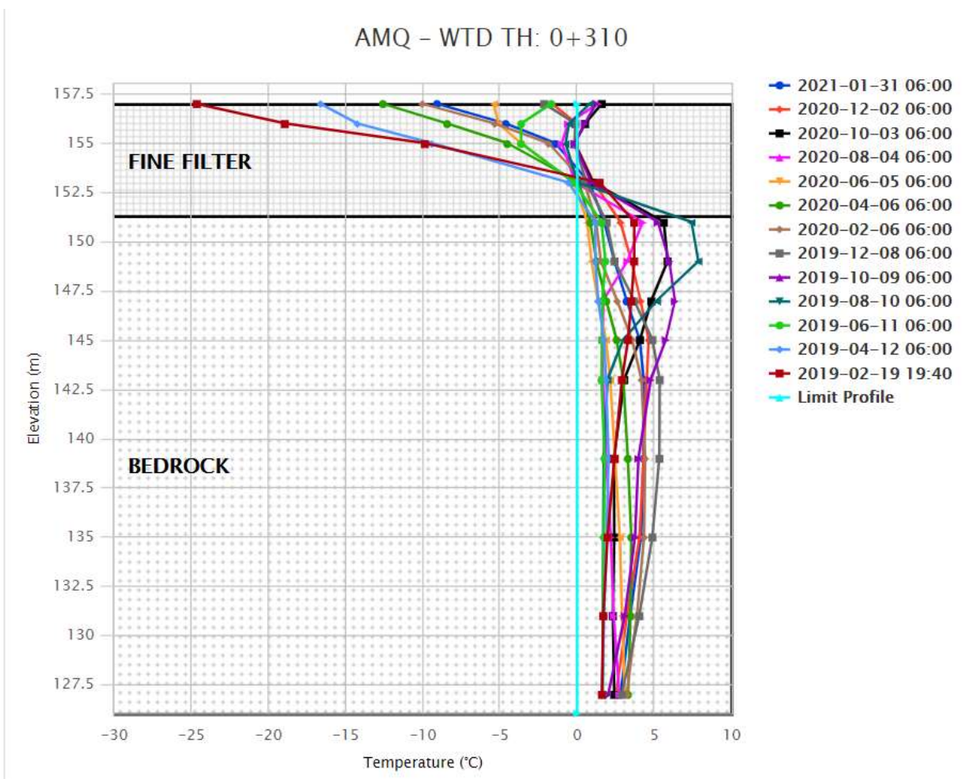


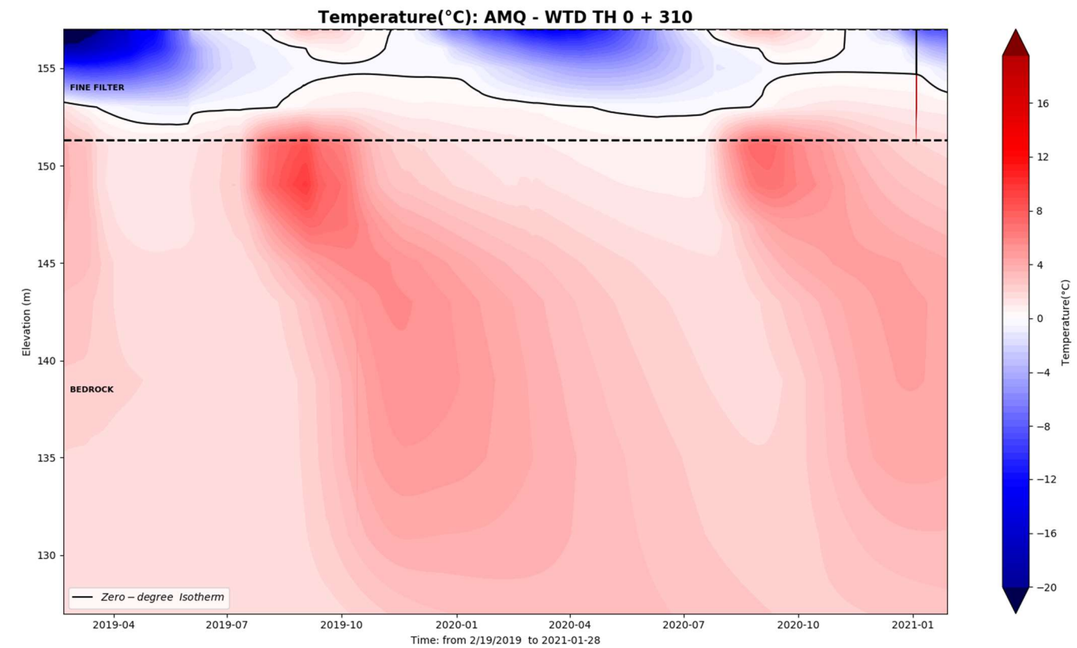


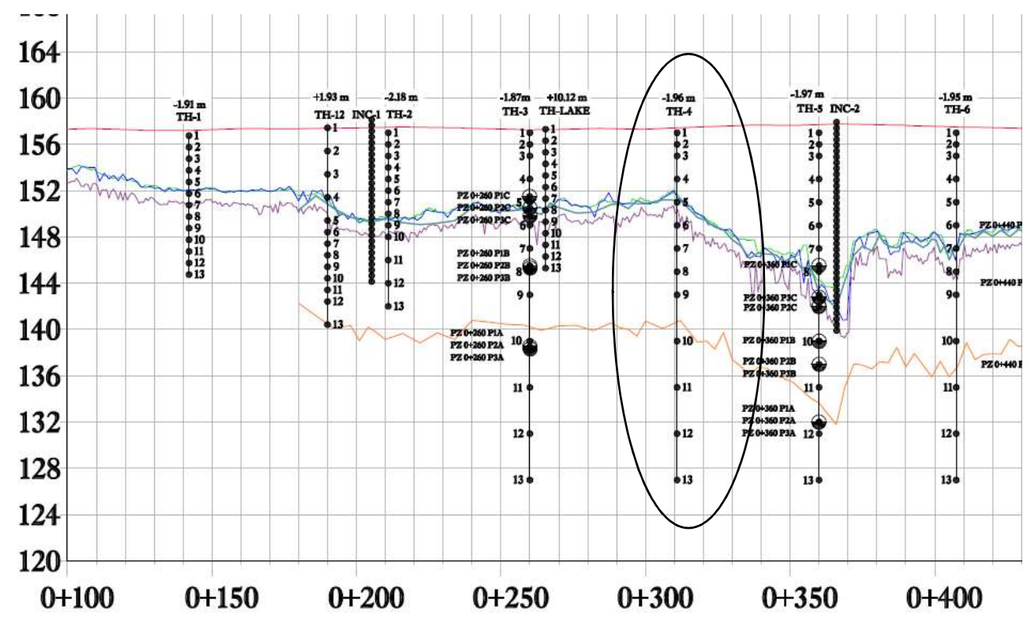


WTD-TH 0+310

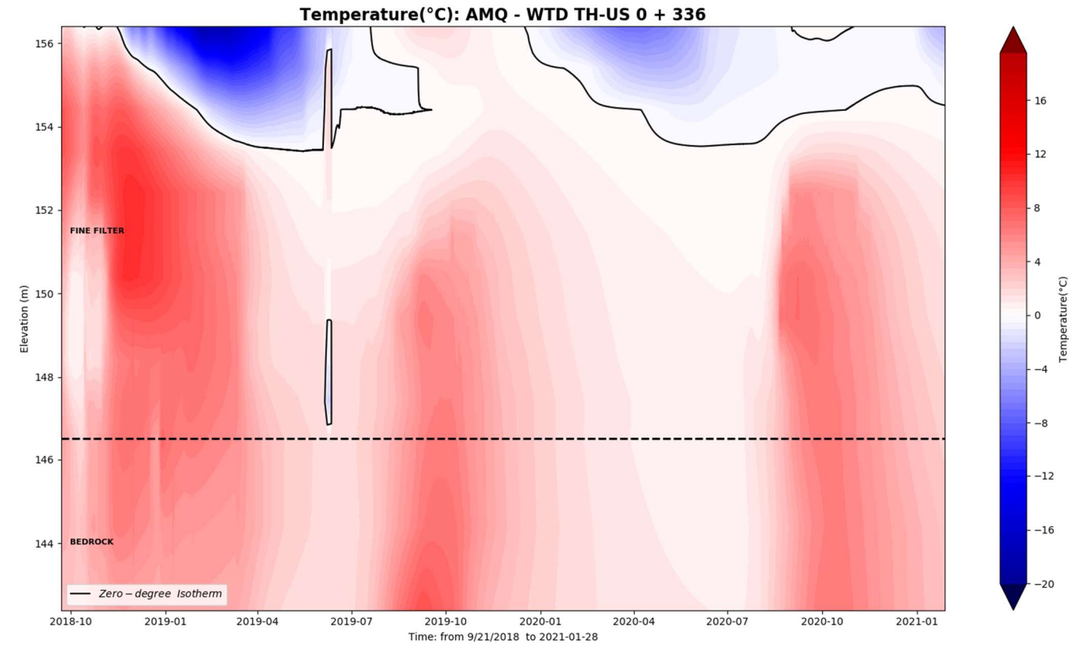

WTD-TH 0+407
0+400
WTD-TH 0+360
WTD-TH 0+310
0+300
WTD-TH 0+260
WTD-TH 0+336
WTD-TH 0+210
0+200
WTD-TH 0+276 U/S
WTD-TH 0+142
WTD-TH 0+190

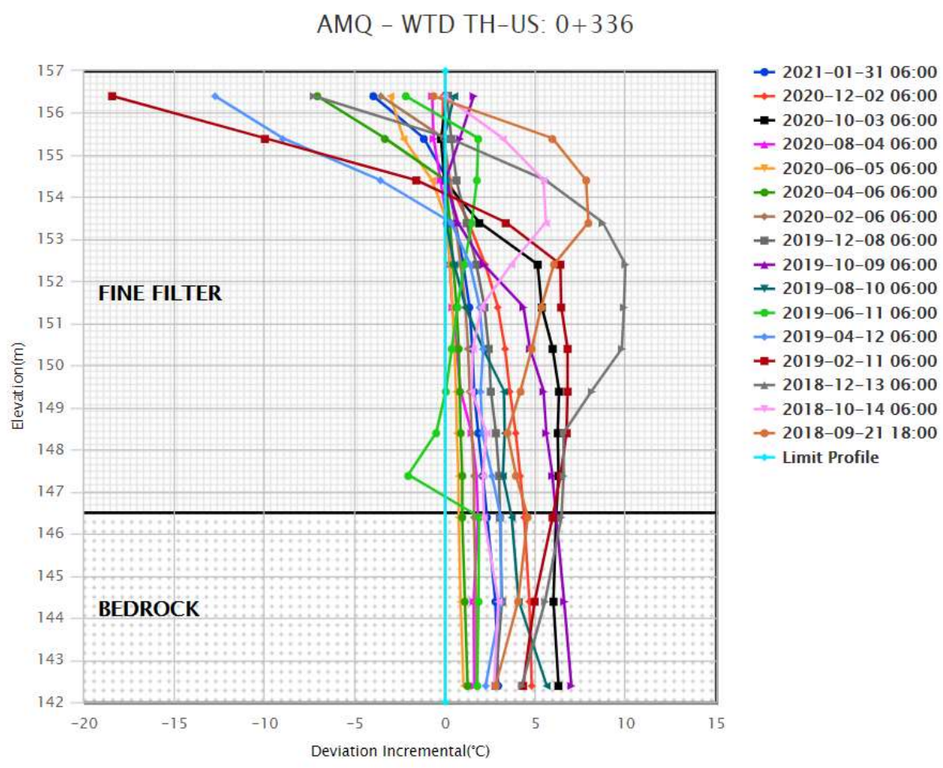

AMQ – WTD TH: 0+310
FINE FILTER
BEDROCK
Elevation (m)
Temperature (°C)
2021-01-31 06:00
2020-12-02 06:00
2020-10-03 06:00
2020-08-04 06:00
2020-06-05 06:00
2020-04-06 06:00
2020-02-06 06:00
2019-12-08 06:00
2019-10-09 06:00
2019-08-10 06:00
2019-06-11 06:00
2019-04-12 06:00
2019-02-19 19:40
Limit Profile

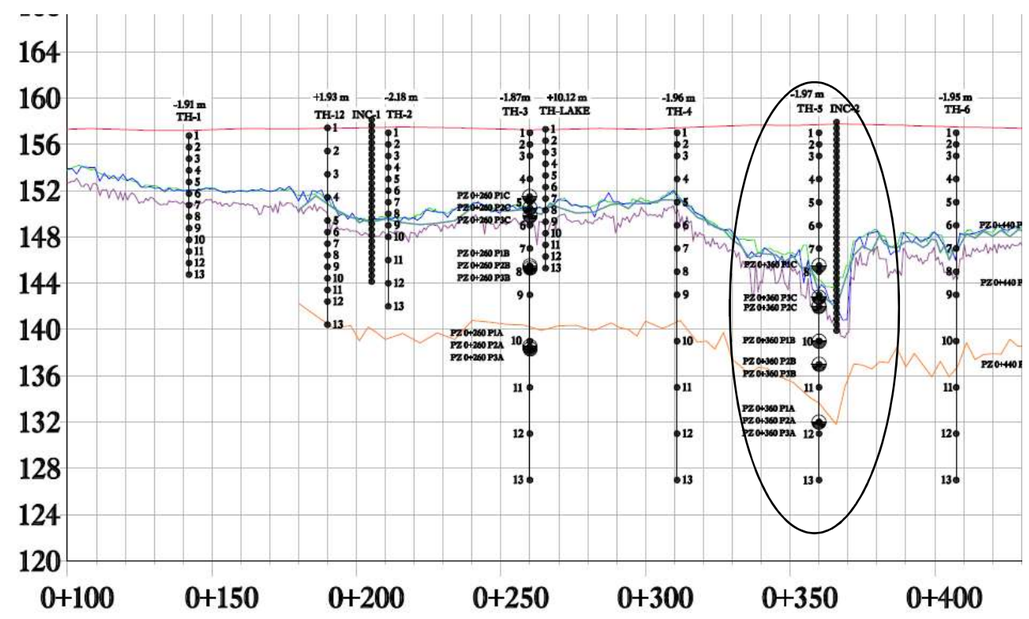

Temperature(°C): AMQ - WTD TH 0 + 310
FINE FILTER
BEDROCK
Elevation (m)
Zero – degree Isotherm
Time: from 2/19/2019 to 2021-01-28
Temperature(°C)


0+100
0+150
0+200
0+250
0+300
0+350
0+400

WTD-TH 0+336 U/S

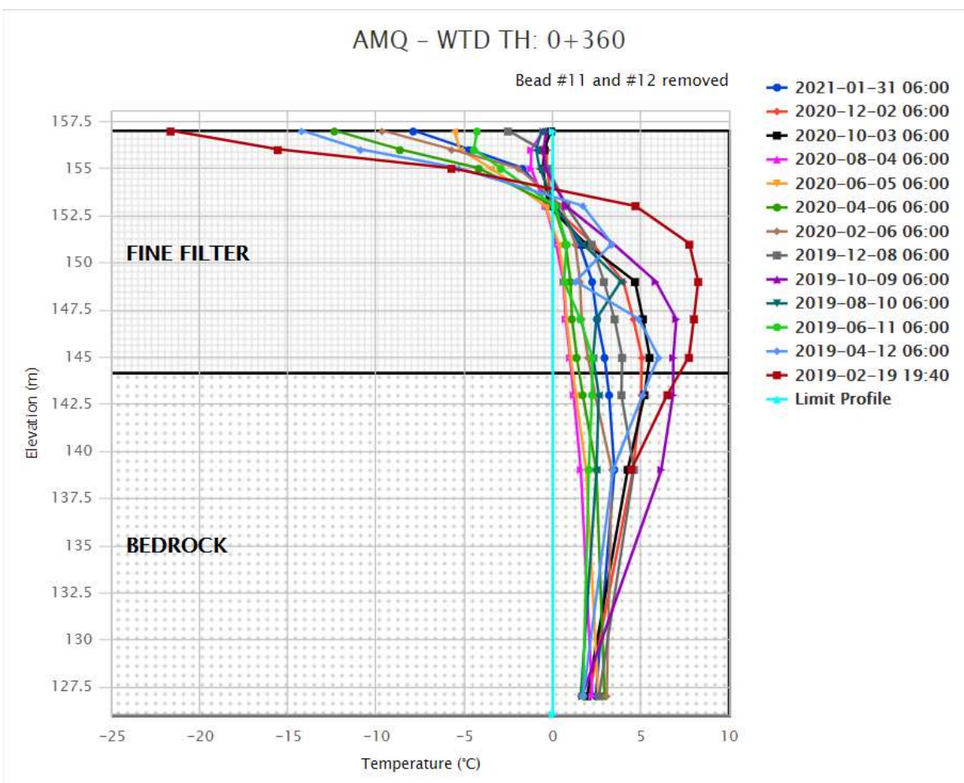


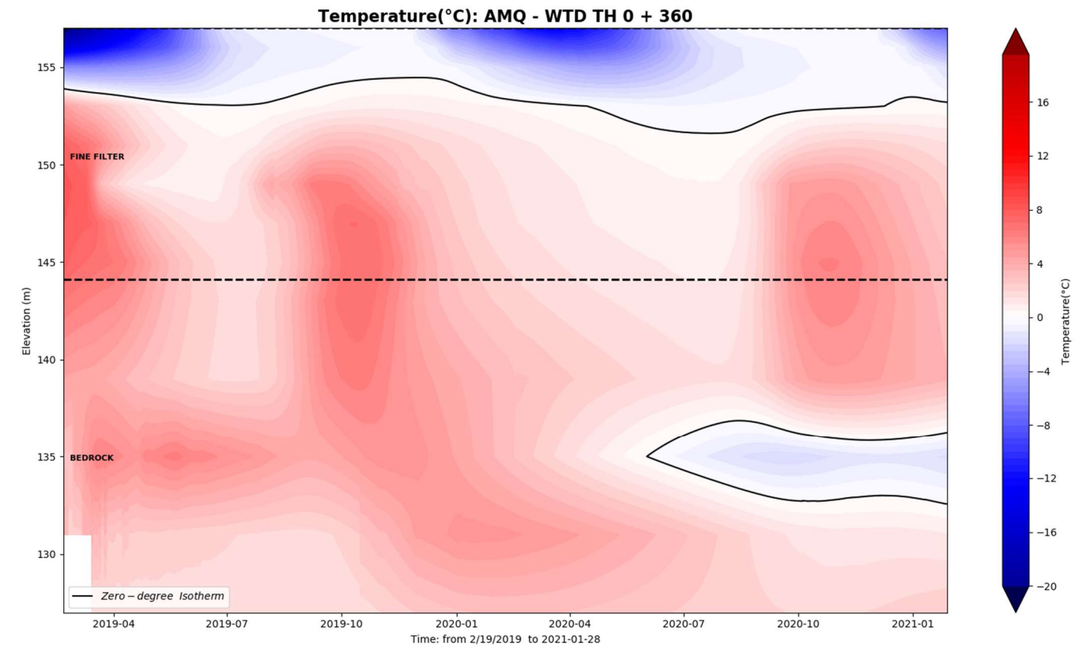


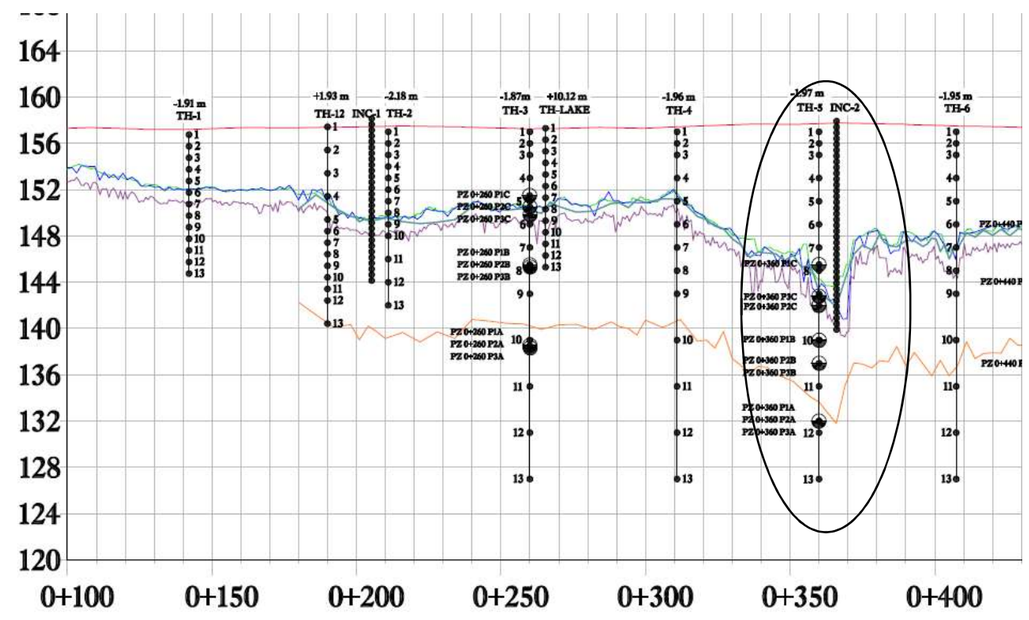


WTD-TH 0+360


WTD-TH 0+407
WTD-TH 0+360
WTD-TH 0+310
WTD-TH 0+260
WTD-TH 0+336
WTD-TH 0+210
WTD-TH 0+276 U/S
WTD-TH 0+142
WTD-TH 0+190
0+200
0+300
0+400

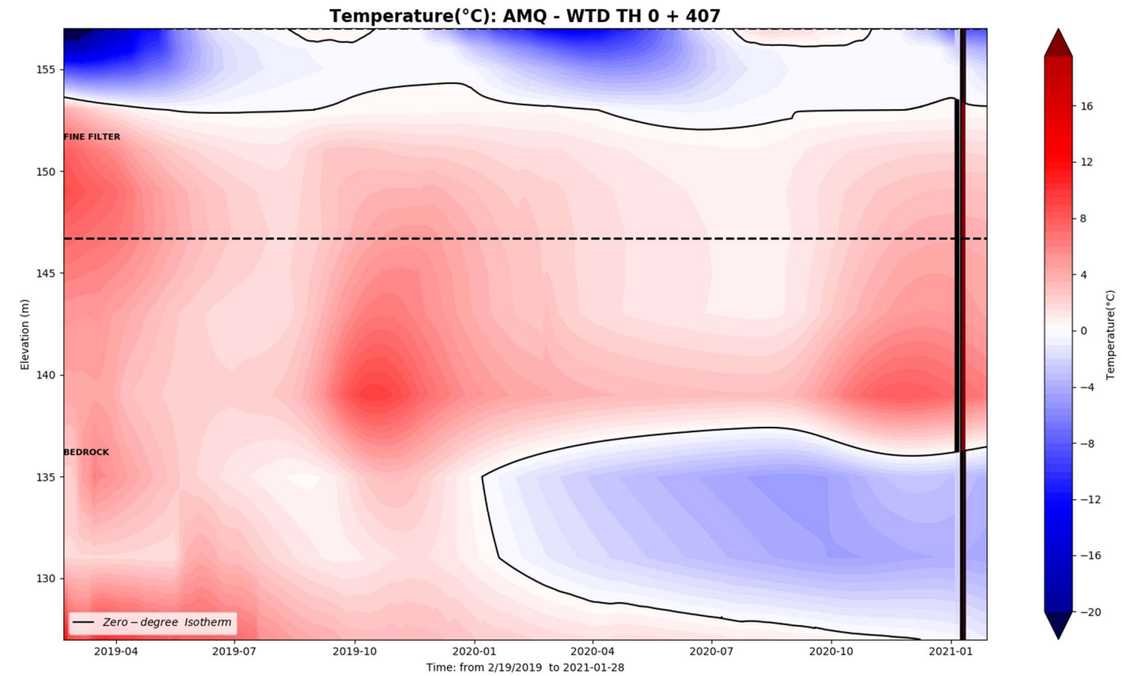

AMQ – WTD TH: 0+360
Bead #11 and #12 removed
FINE FILTER
BEDROCK
Elevation (m)
Temperature (°C)
2021-01-31 06:00
2020-12-02 06:00
2020-10-03 06:00
2020-08-04 06:00
2020-06-05 06:00
2020-04-06 06:00
2020-02-06 06:00
2019-12-08 06:00
2019-10-09 06:00
2019-08-10 06:00
2019-06-11 06:00
2019-04-12 06:00
2019-02-19 19:40
Limit Profile

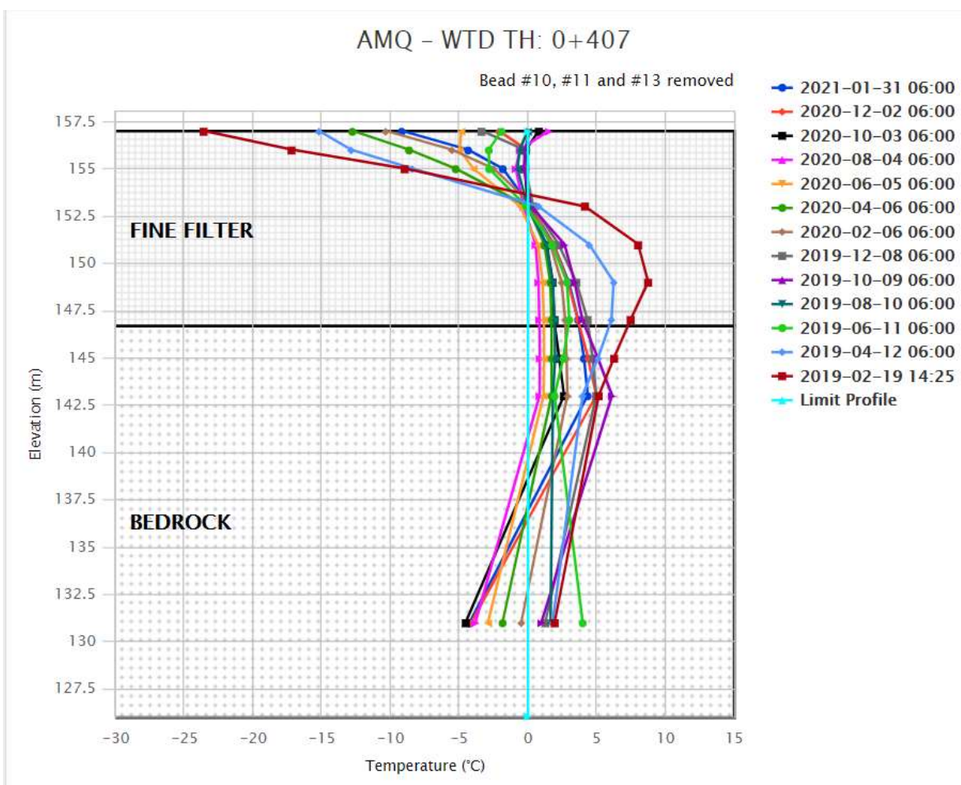

Temperature(°C): AMQ - WTD TH 0 + 360
FINE FILTER
BEDROCK
Elevation (m)
Zero – degree Isotherm
Time: from 2/19/2019 to 2021-01-28
Temperature(°C)

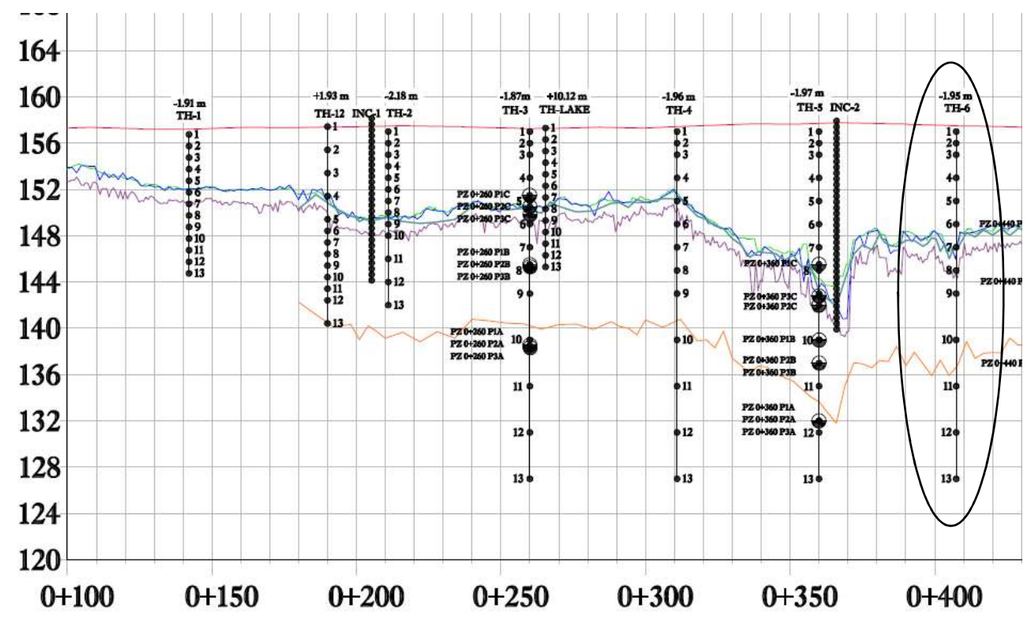

TH-1
TH-12
INC-1
TH-2
TH-3
TH-LAKE
TH-4
TH-5
INC-2
TH-6
0+100
0+150
0+200
0+250
0+300
0+350
0+400

WTD-TH 0+407


WTD-TH 0+407
WTD-TH 0+360
WTD-TH 0+310
WTD-TH 0+260
WTD-TH 0+336
WTD-TH 0+210
WTD-TH 0+276 U/S
WTD-TH 0+142
WTD-TH 0+190
0+400
0+300
0+200

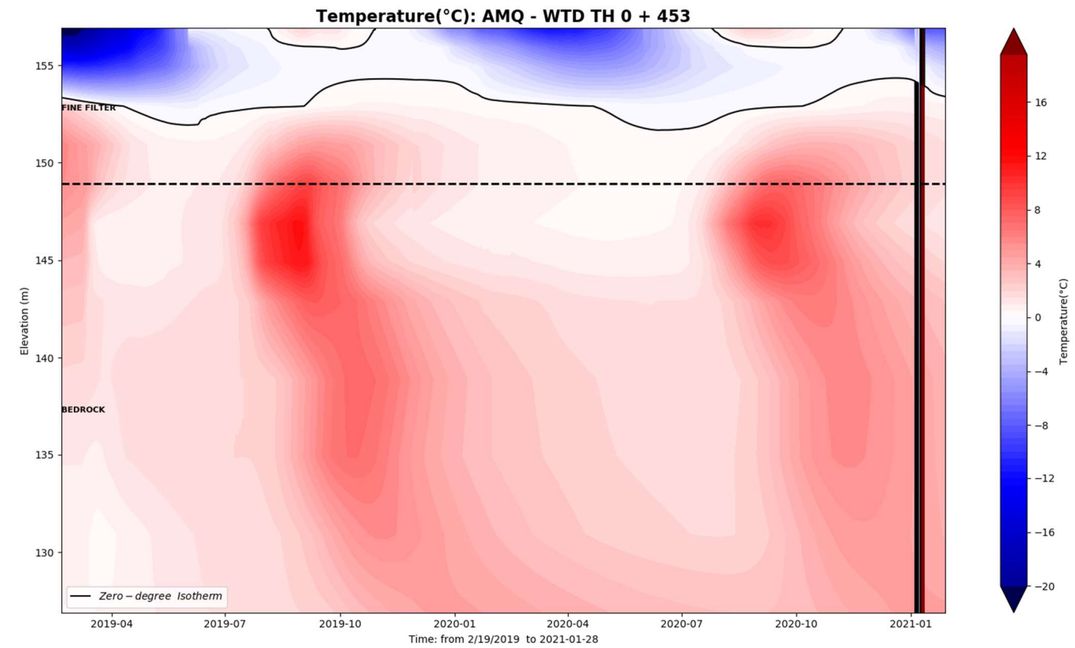

Temperature(°C): AMQ - WTD TH 0 + 407
FINE FILTER
BEDROCK
Zero – degree Isotherm
Elevation (m)
Time: from 2/19/2019 to 2021-01-28
Temperature(°C)

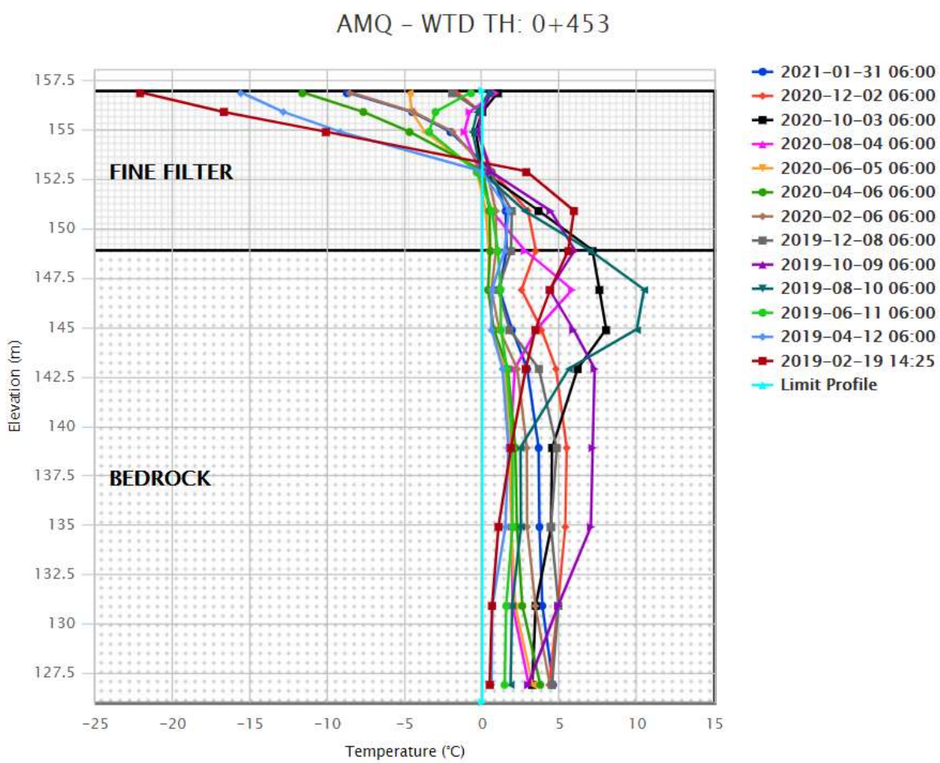

AMQ – WTD TH: 0+407
Bead #10, #11 and #13 removed
FINE FILTER
BEDROCK
Elevation (m)
Temperature (°C)
2021-01-31 06:00
2020-12-02 06:00
2020-10-03 06:00
2020-08-04 06:00
2020-06-05 06:00
2020-04-06 06:00
2020-02-06 06:00
2019-12-08 06:00
2019-10-09 06:00
2019-08-10 06:00
2019-06-11 06:00
2019-04-12 06:00
2019-02-19 14:25
Limit Profile

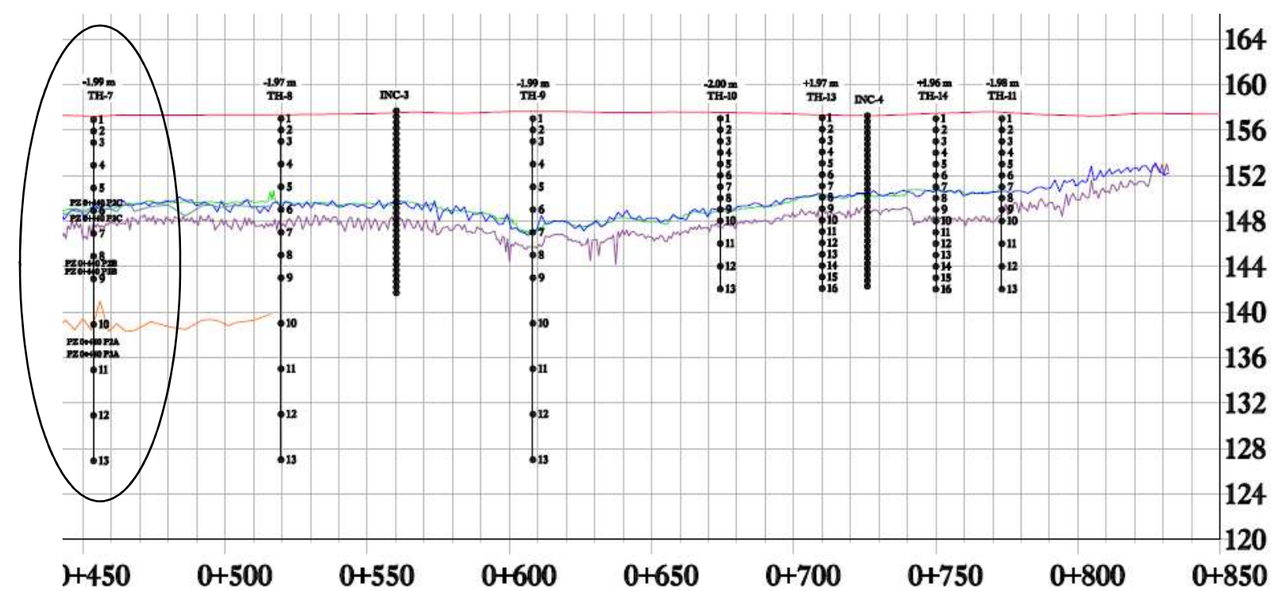

0+100
0+150
0+200
0+250
0+300
0+350
0+400

WTD-TH 0+453


WTD-TH
0+453
WTD-TH
0+520
WTD-TH
0+607
WTD-TH
0+675
WTD-TH
0+710
WTD-TH
0+750
WTD-TH
0+772
0+500
0+600
0+700
0+800

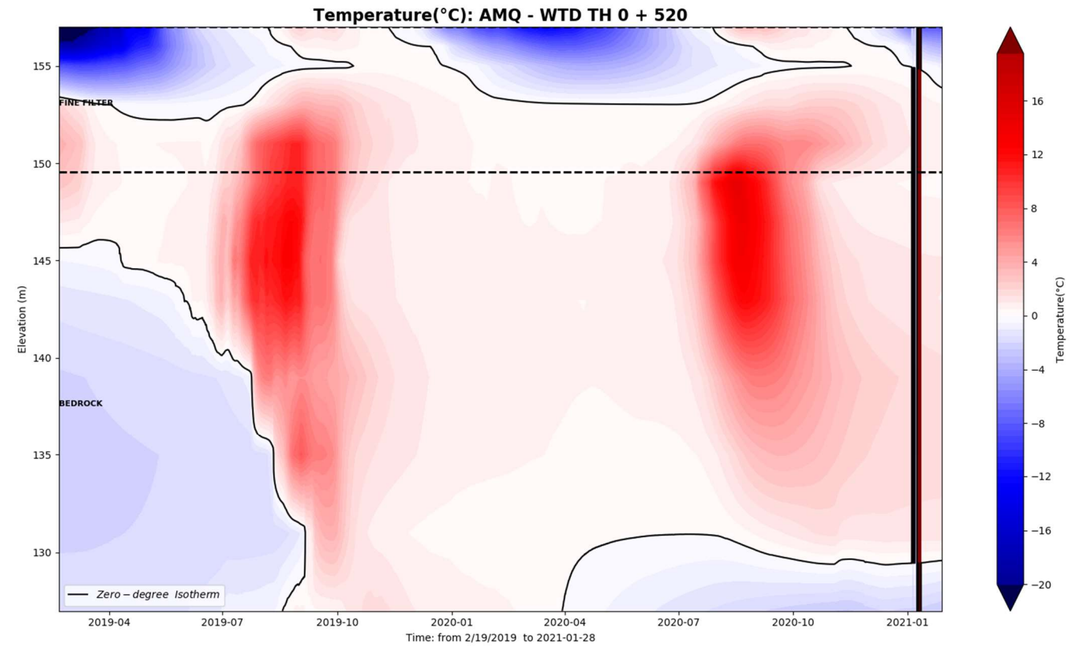

Temperature(°C): AMQ - WTD TH 0 + 453
FINE FILTER
BEDROCK
Elevation (m)
Zero – degree Isotherm
Time: from 2/19/2019 to 2021-01-28
Temperature(°C)

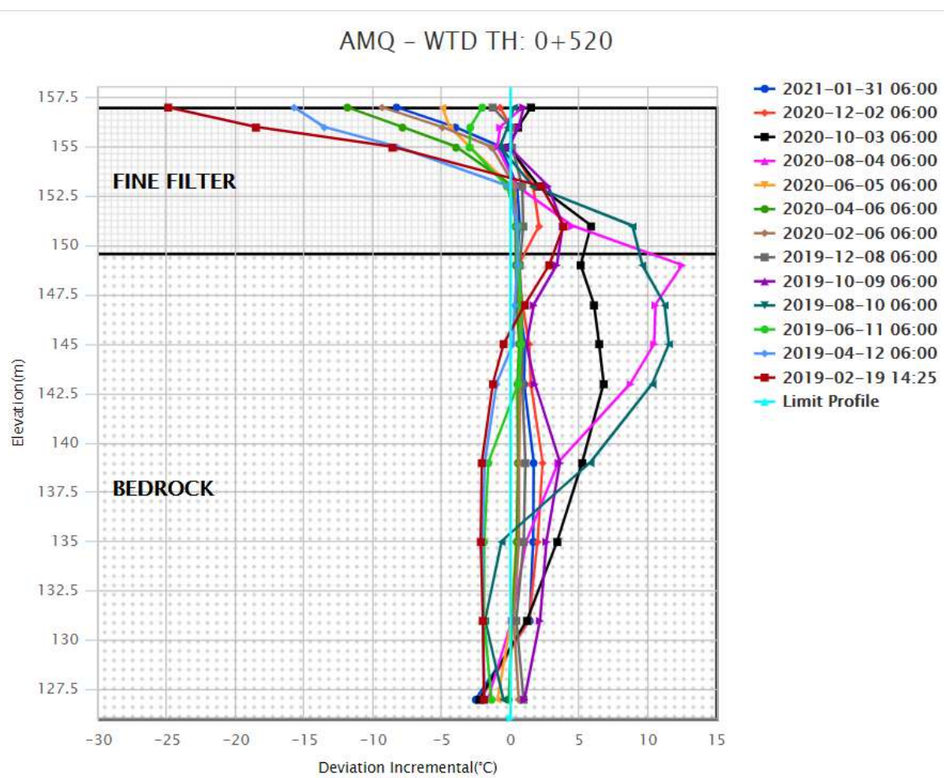

AMQ – WTD TH: 0+453
FINE FILTER
BEDROCK
Elevation (m)
Temperature (°C)
2021-01-31 06:00
2020-12-02 06:00
2020-10-03 06:00
2020-08-04 06:00
2020-06-05 06:00
2020-04-06 06:00
2020-02-06 06:00
2019-12-08 06:00
2019-10-09 06:00
2019-08-10 06:00
2019-06-11 06:00
2019-04-12 06:00
2019-02-19 14:25
Limit Profile

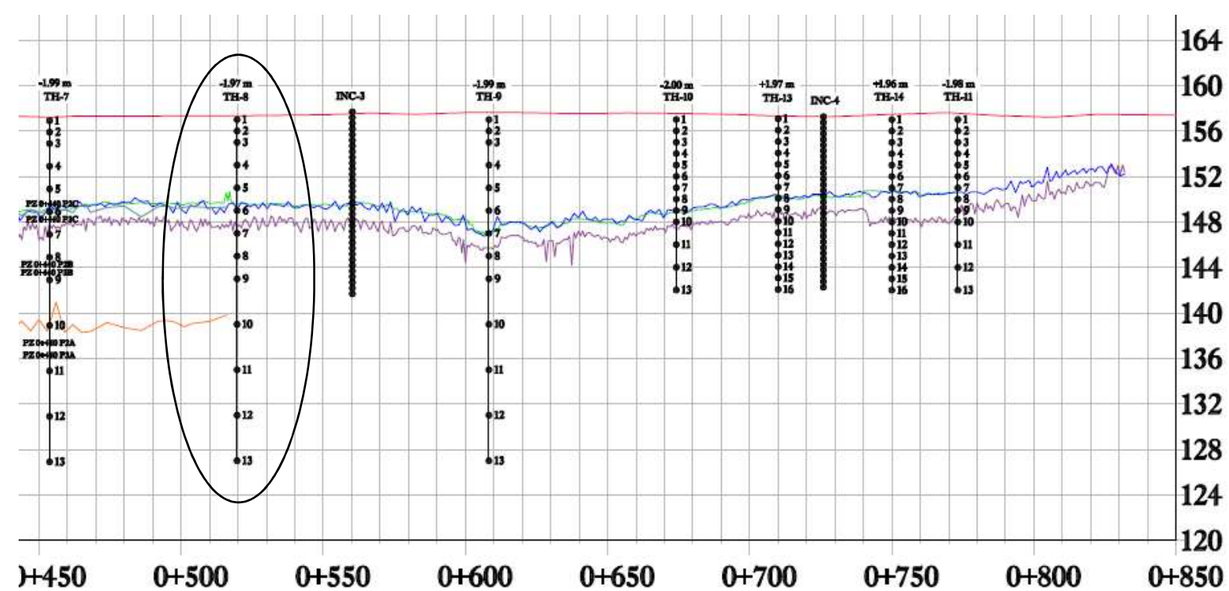

TH-7
TH-8
INC-3
TH-9
TH-10
TH-13
INC-4
TH-14
TH-11
0+450
0+500
0+550
0+600
0+650
0+700
0+750
0+800
0+850

WTD-TH 0+520

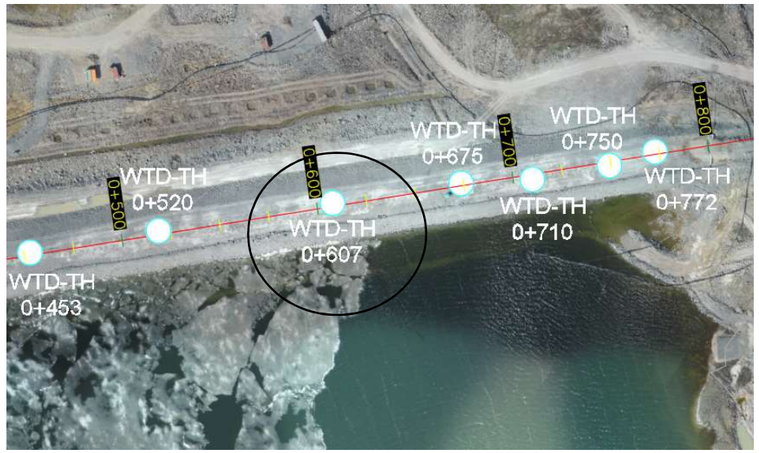

WTD-TH
0+520
WTD-TH
0+453
WTD-TH
0+607
WTD-TH
0+675
WTD-TH
0+710
WTD-TH
0+750
WTD-TH
0+772
0+500
0+600
0+700
0+800

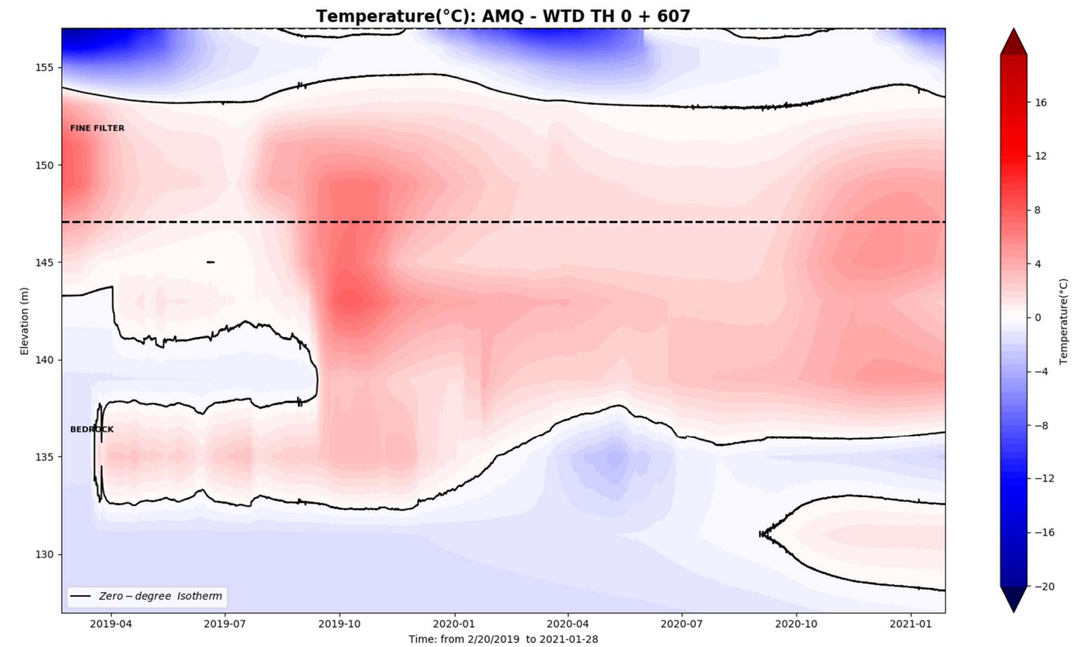

Temperature(°C): AMQ - WTD TH 0 + 520
FINE FILTER
BEDROCK
Zero – degree Isotherm
Elevation (m)
Time: from 2/19/2019 to 2021-01-28
Temperature(°C)

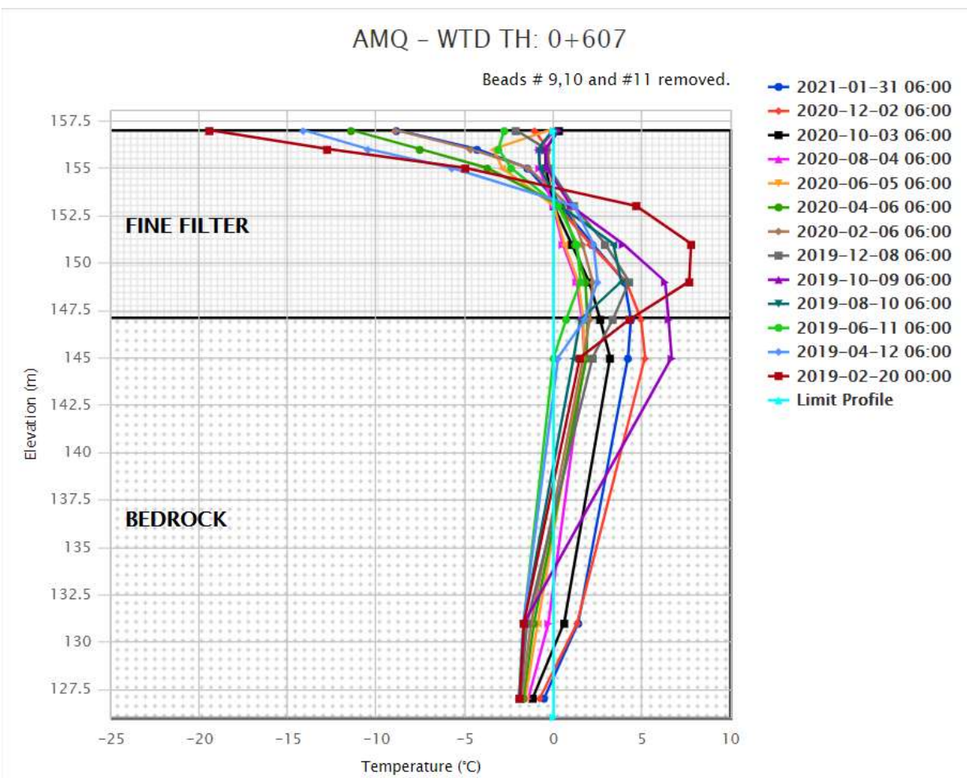

AMQ – WTD TH: 0+520
FINE FILTER
BEDROCK
Elevation(m)
Deviation Incremental(°C)
2021-01-31 06:00
2020-12-02 06:00
2020-10-03 06:00
2020-08-04 06:00
2020-06-05 06:00
2020-04-06 06:00
2020-02-06 06:00
2019-12-08 06:00
2019-10-09 06:00
2019-08-10 06:00
2019-06-11 06:00
2019-04-12 06:00
2019-02-19 14:25
Limit Profile

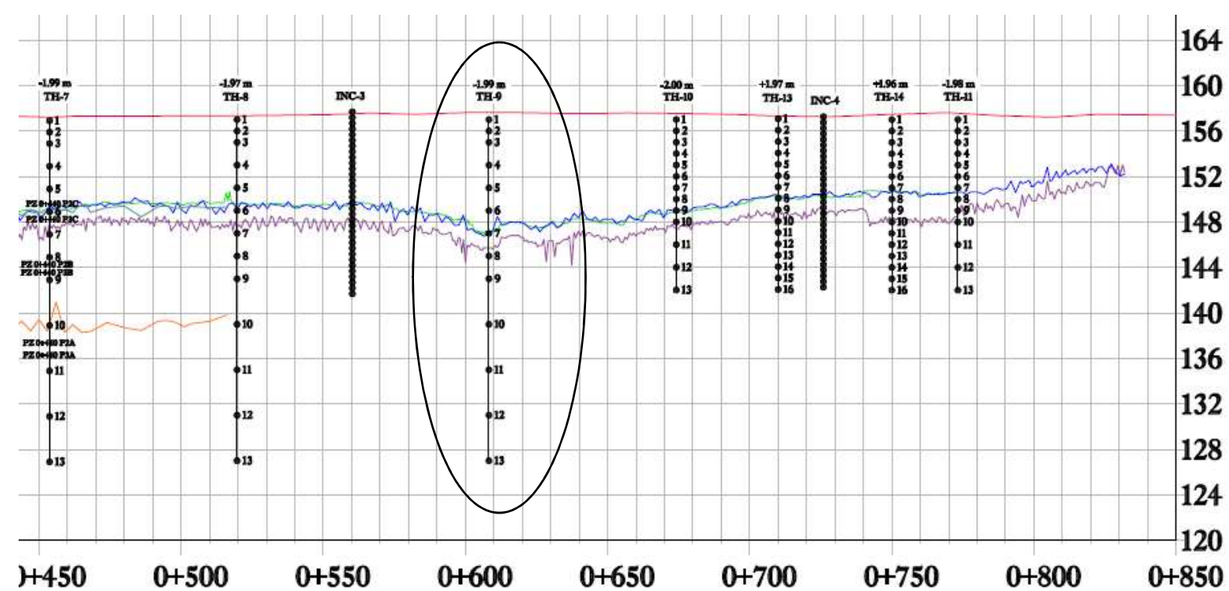

INC-3
INC-4
0+450
0+500
0+550
0+600
0+650
0+700
0+750
0+800
0+850

WTD-TH 0+607

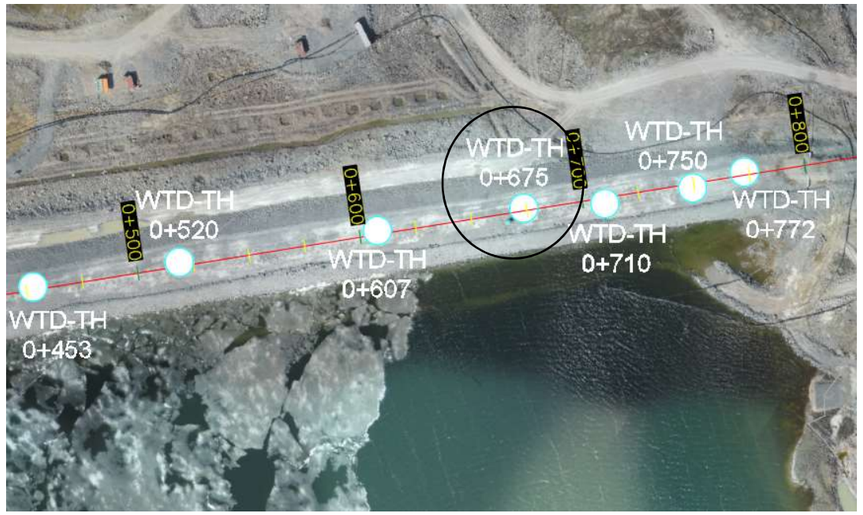

WTD-TH
0+453
0+500
WTD-TH
0+520
0+600
WTD-TH
0+607
WTD-TH
0+675
0+700
WTD-TH
0+710
WTD-TH
0+750
0+800
WTD-TH
0+772

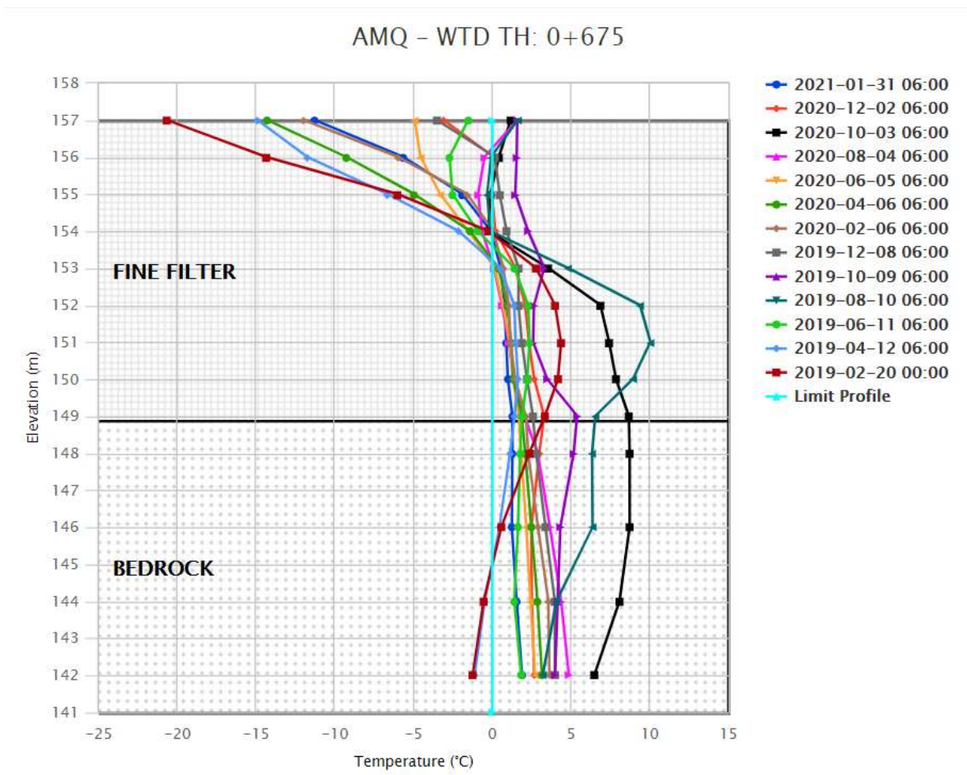

Temperature(°C): AMQ - WTD TH 0 + 607
FINE FILTER
BEDROCK
Zero – degree Isotherm
Elevation (m)
Time: from 2/20/2019 to 2021-01-28
Temperature(°C)

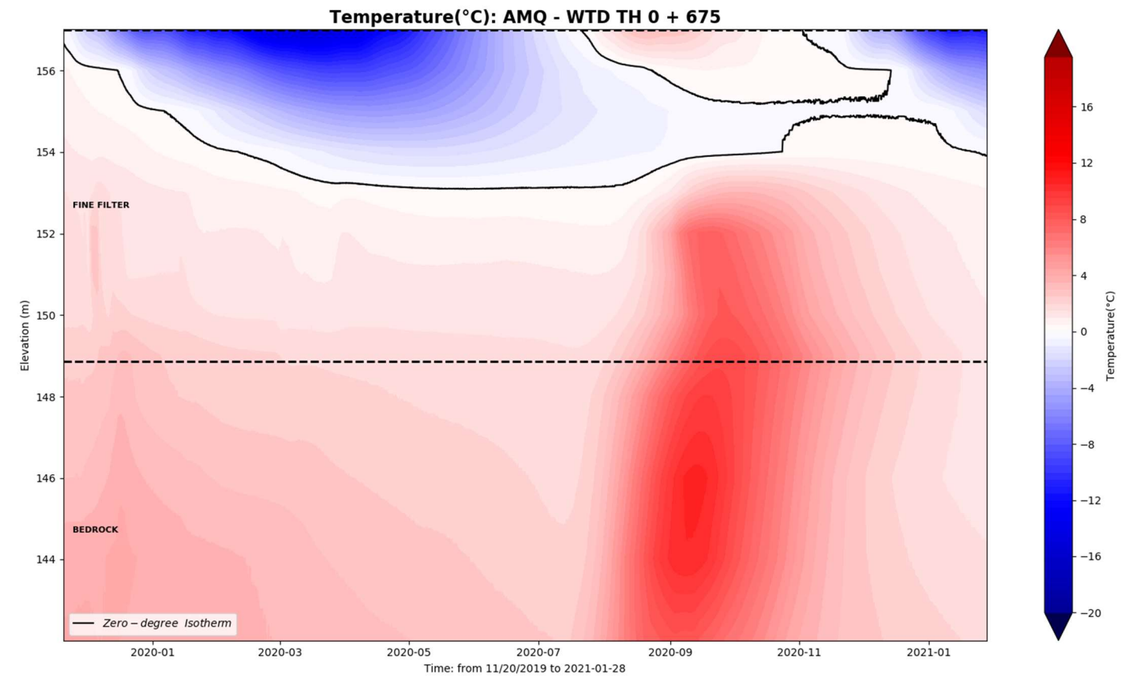

AMQ – WTD TH: 0+607
Beads # 9,10 and #11 removed.
FINE FILTER
BEDROCK
Elevation (m)
Temperature (°C)
2021-01-31 06:00
2020-12-02 06:00
2020-10-03 06:00
2020-08-04 06:00
2020-06-05 06:00
2020-04-06 06:00
2020-02-06 06:00
2019-12-08 06:00
2019-10-09 06:00
2019-08-10 06:00
2019-06-11 06:00
2019-04-12 06:00
2019-02-20 00:00
Limit Profile

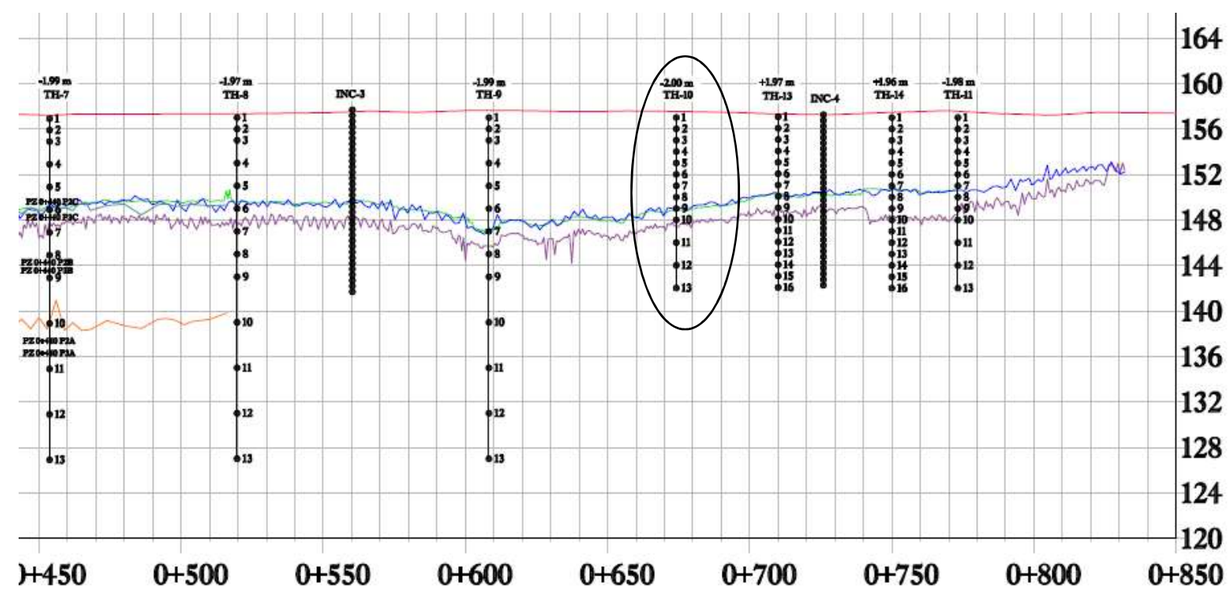

TH-7
TH-8
INC-3
TH-9
TH-10
TH-13
INC-4
TH-14
TH-11
0+450
0+500
0+550
0+600
0+650
0+700
0+750
0+800
0+850

WTD-TH 0+675

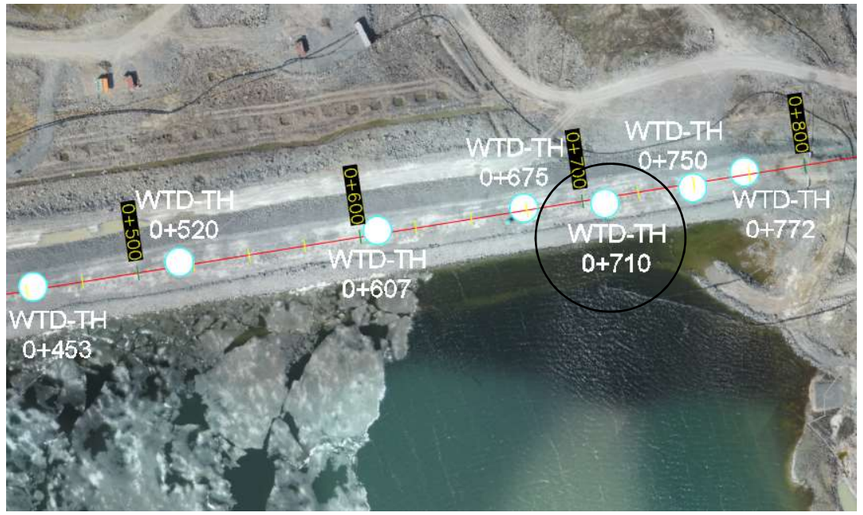

WTD-TH
0+453
WTD-TH
0+520
WTD-TH
0+607
WTD-TH
0+675
WTD-TH
0+710
WTD-TH
0+750
WTD-TH
0+772
0+500
0+600
0+700
0+800

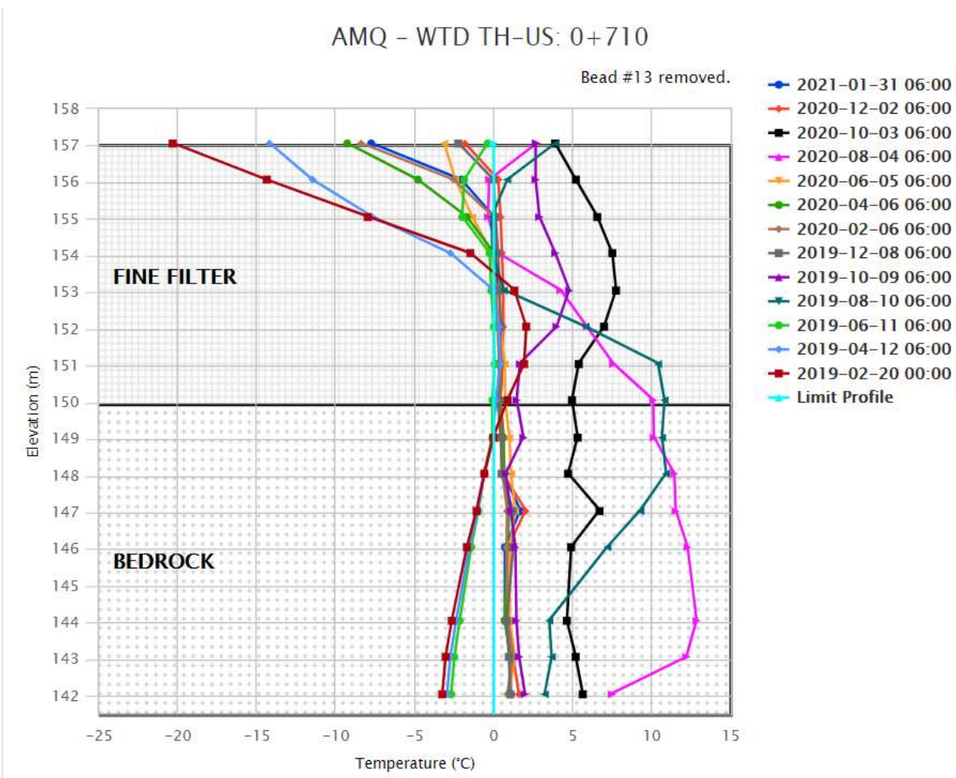

AMQ – WTD TH: 0+675
FINE FILTER
BEDROCK
Elevation (m)
Temperature (°C)
2021-01-31 06:00
2020-12-02 06:00
2020-10-03 06:00
2020-08-04 06:00
2020-06-05 06:00
2020-04-06 06:00
2020-02-06 06:00
2019-12-08 06:00
2019-10-09 06:00
2019-08-10 06:00
2019-06-11 06:00
2019-04-12 06:00
2019-02-20 00:00
Limit Profile

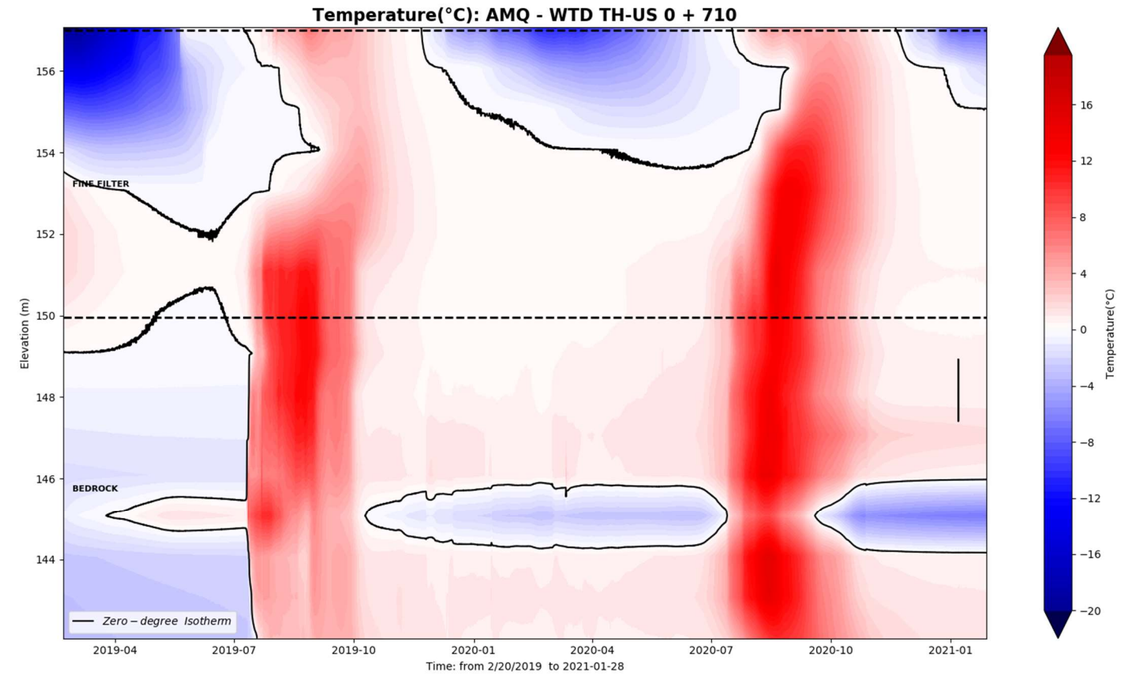

Temperature(°C): AMQ - WTD TH 0 + 675
FINE FILTER
BEDROCK
Zero – degree Isotherm
Elevation (m)
Time: from 11/20/2019 to 2021-01-28
Temperature(°C)

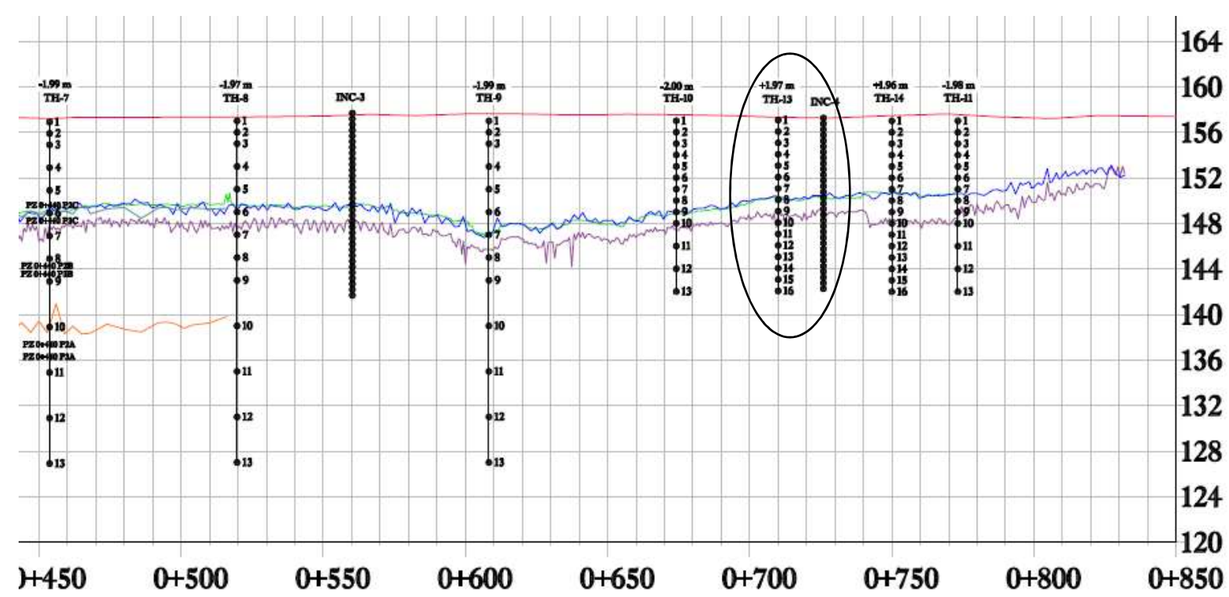

0+450
0+500
0+550
0+600
0+650
0+700
0+750
0+800
0+850

WTD-TH 0+710 U/S



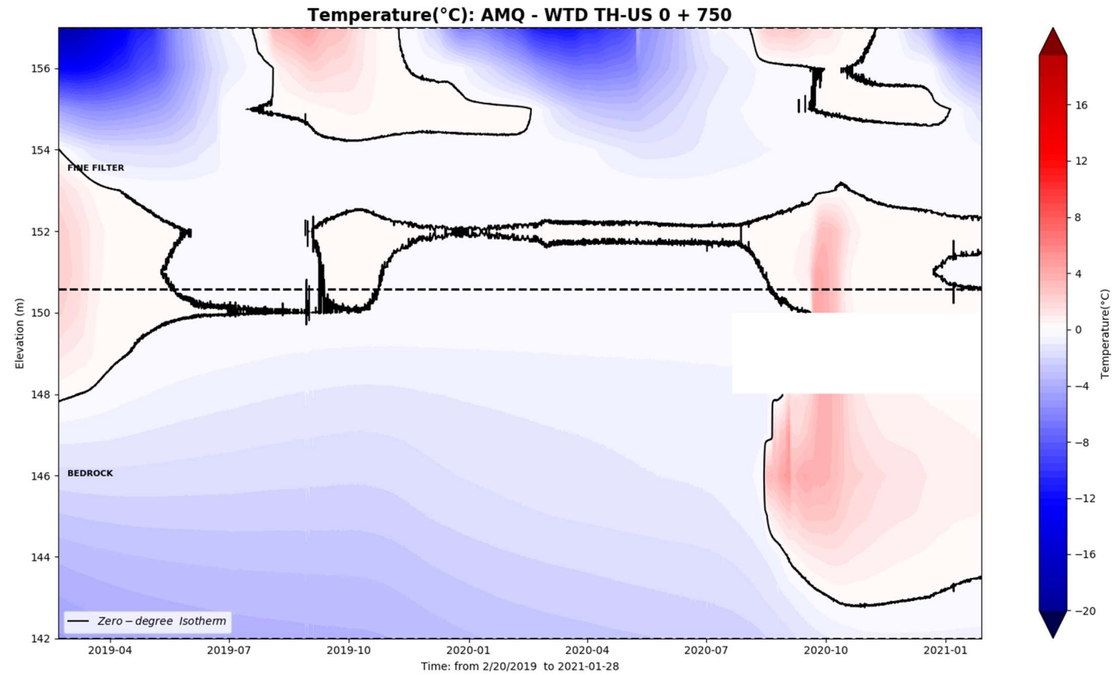


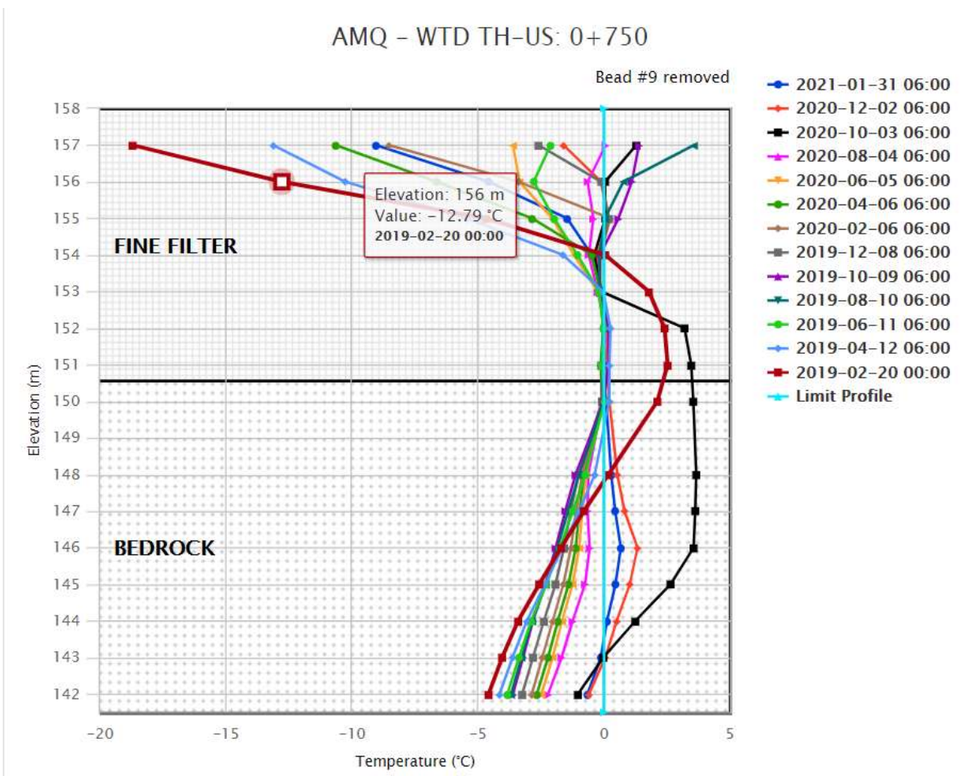


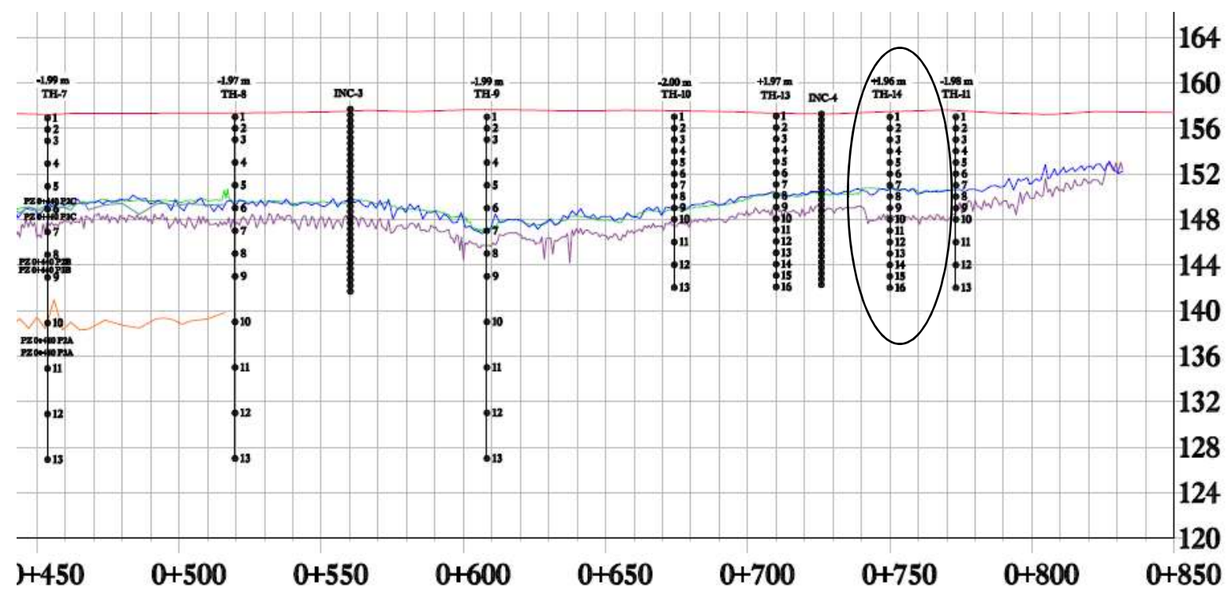


WTD-TH 0+750

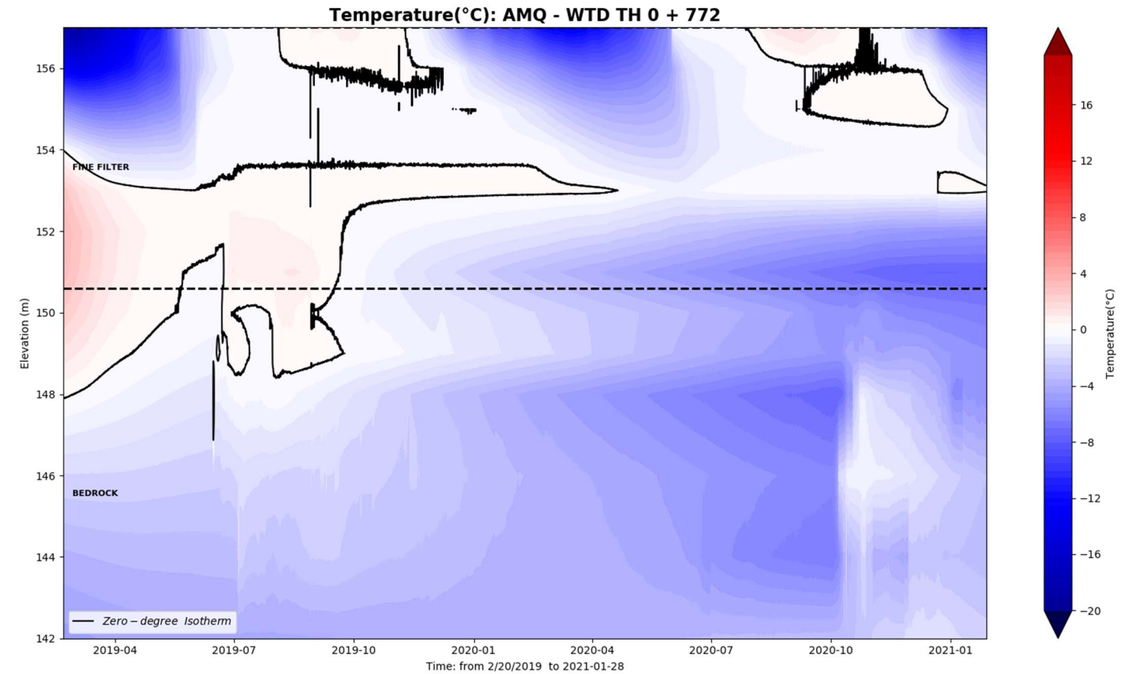

WTD-TH
0+453
0+500
WTD-TH
0+520
0+600
WTD-TH
0+607
WTD-TH
0+675
0+700
WTD-TH
0+710
WTD-TH
0+750
0+800
WTD-TH
0+772

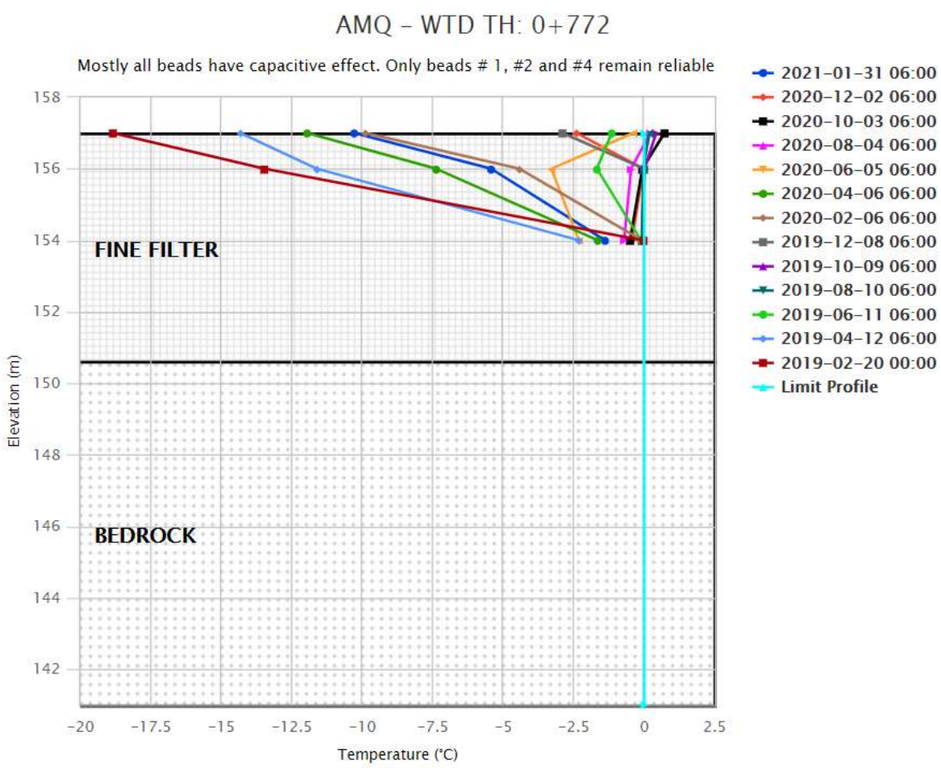

Temperature(°C): AMQ - WTD TH-US 0 + 750
FINE FILTER
BEDROCK
Zero – degree Isotherm
Elevation (m)
Time: from 2/20/2019 to 2021-01-28
Temperature(°C)

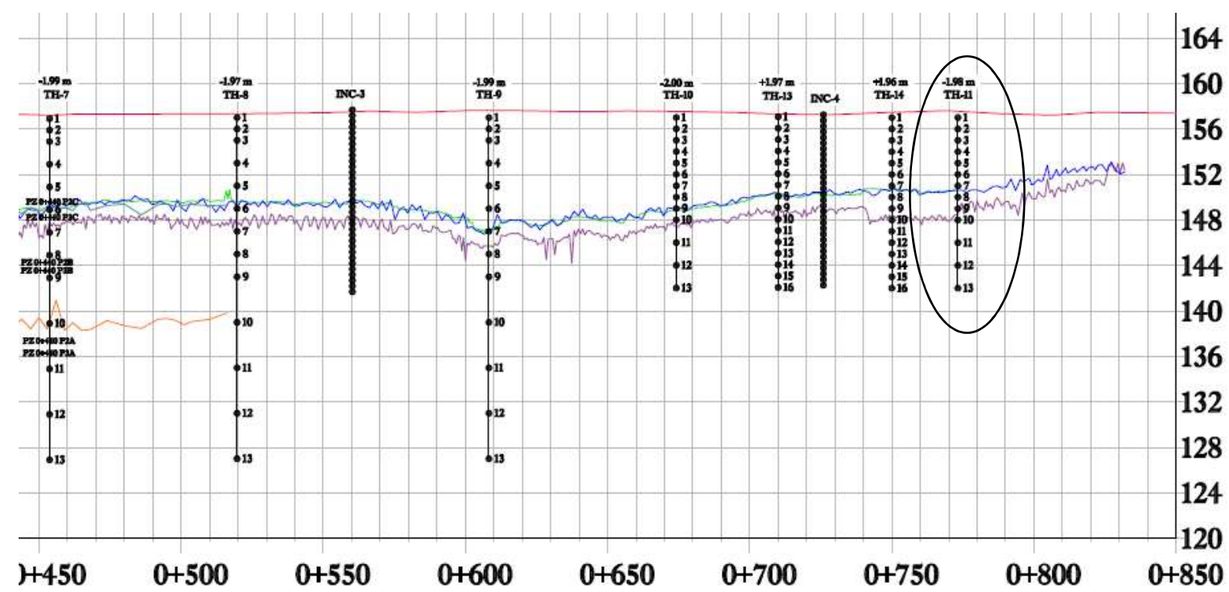

AMQ – WTD TH-US: 0+750
Bead #9 removed
Elevation: 156 m
Value: −12.79 °C
2019-02-20 00:00
FINE FILTER
BEDROCK
Elevation (m)
Temperature (°C)
2021-01-31 06:00
2020-12-02 06:00
2020-10-03 06:00
2020-08-04 06:00
2020-06-05 06:00
2020-04-06 06:00
2020-02-06 06:00
2019-12-08 06:00
2019-10-09 06:00
2019-08-10 06:00
2019-06-11 06:00
2019-04-12 06:00
2019-02-20 00:00
Limit Profile


INC-3
INC-4
0+450
0+500
0+550
0+600
0+650
0+700
0+750
0+800
0+850

WTD-TH 0+772 U/S

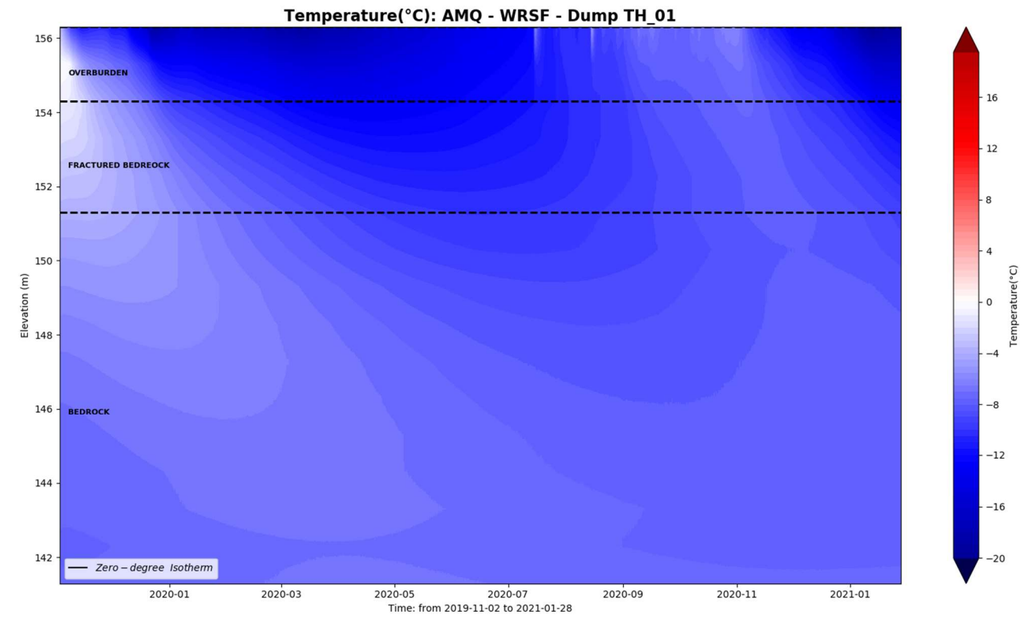


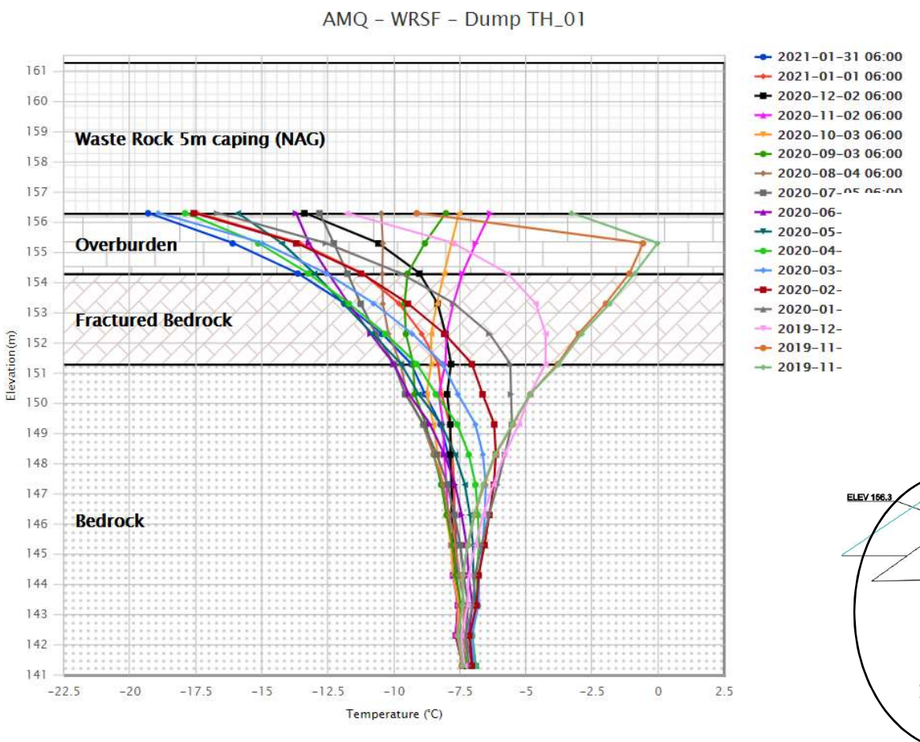


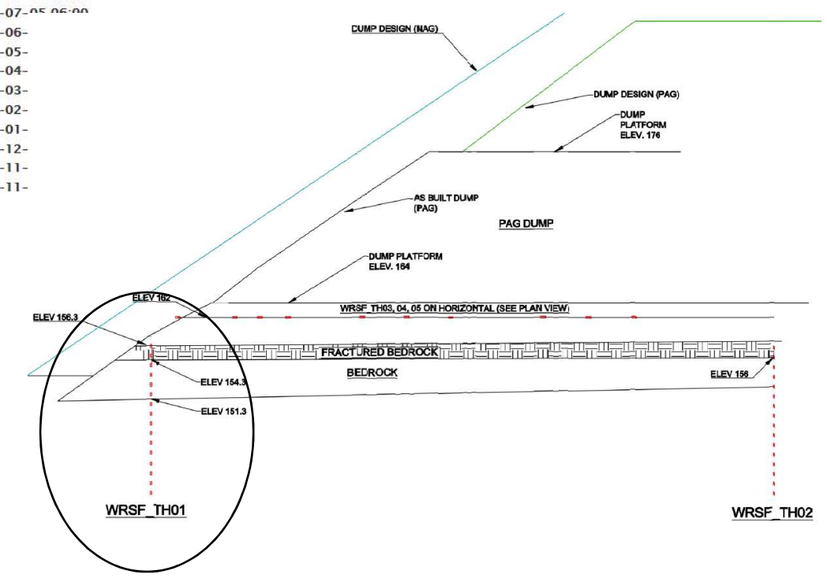


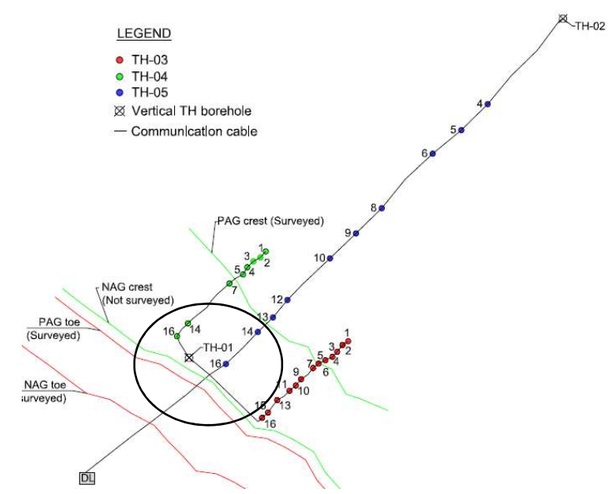
WRSF TH01


Instrument Location
WRSF


Temperature(°C): AMQ - WRSF - Dump TH_01
OVERBURDEN
FRACTURED BEDREOCK
BEDROCK
Zero – degree Isotherm
Elevation (m)
Time: from 2019-11-02 to 2021-01-28
Temperature(°C)

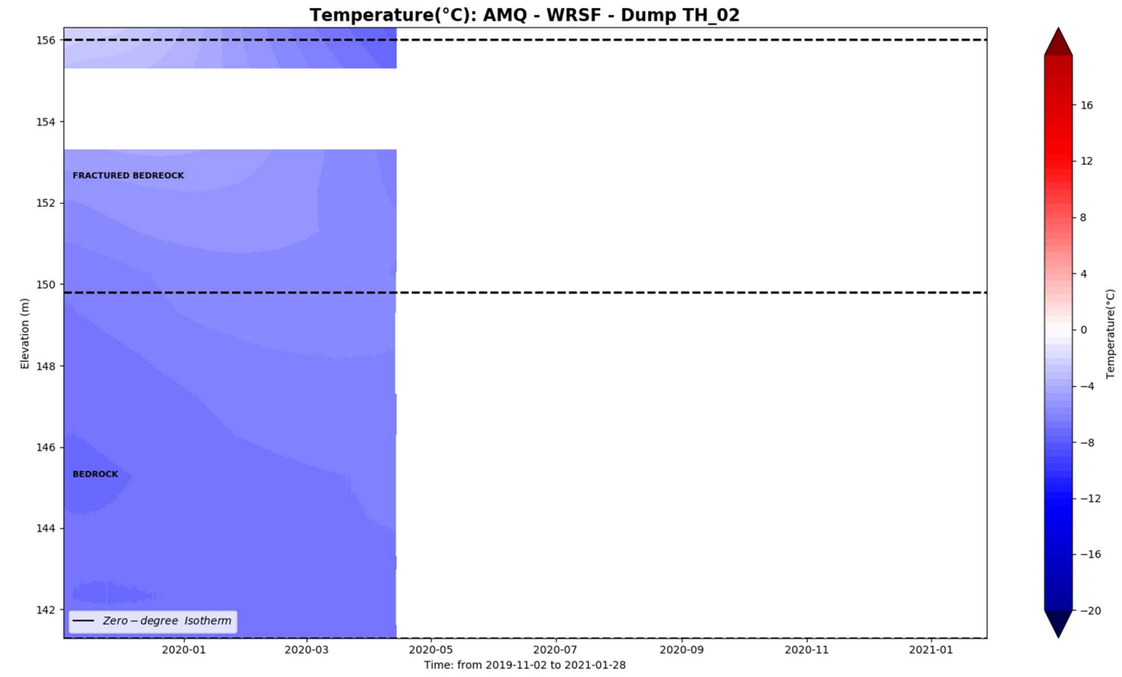

AMQ – WRSF – Dump TH_01
Waste Rock 5m caping (NAG)
Overburden
Fractured Bedrock
Bedrock
Elevation (m)
Temperature (°C)
2021-01-31 06:00
2021-01-01 06:00
2020-12-02 06:00
2020-11-02 06:00
2020-10-03 06:00
2020-09-03 06:00
2020-08-04 06:00
2020-06-
2020-05-
2020-04-
2020-03-
2020-02-
2020-01-
2019-12-
2019-11-
2019-11-

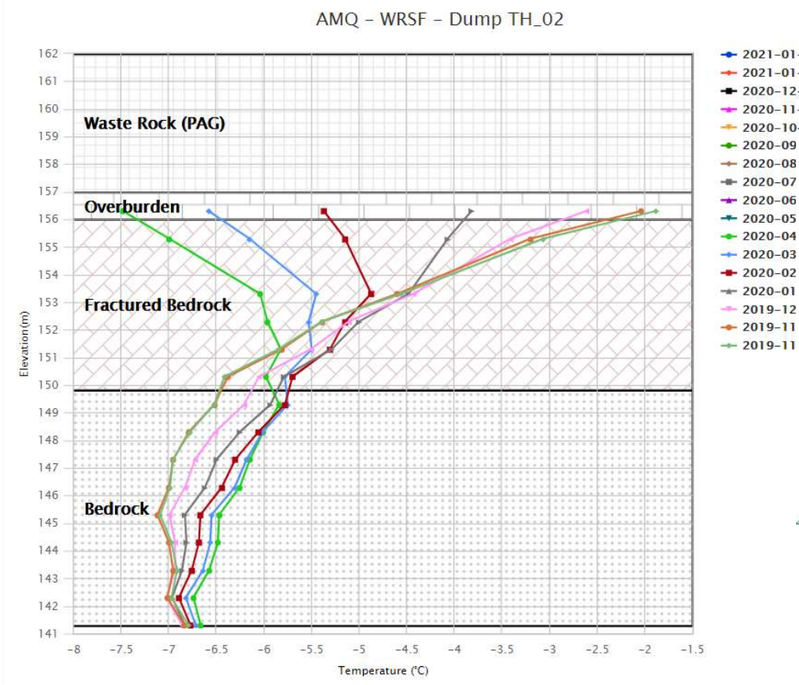

DUMP DESIGN (NAG)
DUMP DESIGN (PAG)
DUMP PLATFORM ELEV. 176
AS BUILT DUMP (PAG)
PAG DUMP
DUMP PLATFORM ELEV. 164
WRSF_TH03, 04, 05 ON HORIZONTAL (SEE PLAN VIEW)
FRACTURED BEDROCK
BEDROCK
ELEV 156.3
ELEV 154.3
ELEV 151.3
WRSF_TH01
WRSF_TH02

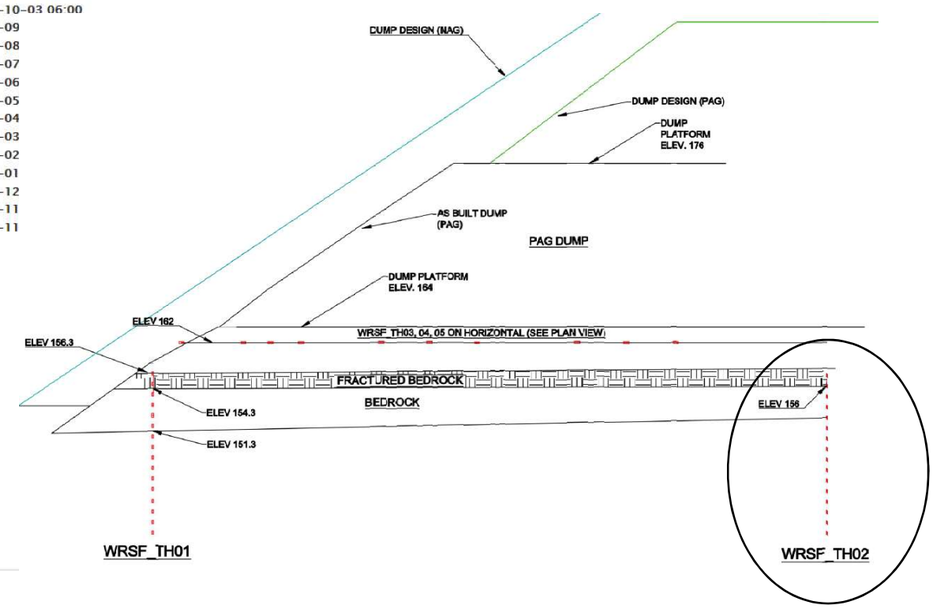

LEGEND
TH-03
TH-04
TH-05
Vertical TH borehole
Communication cable
TH-02
PAG crest (Surveyed)
NAG crest (Not surveyed)
PAG toe (Surveyed)
TH-01
NAG toe
DL

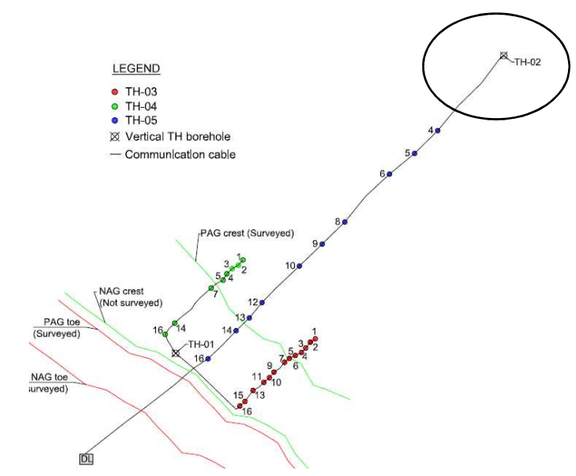
WRSF TH02


Instrument Location
WRSF

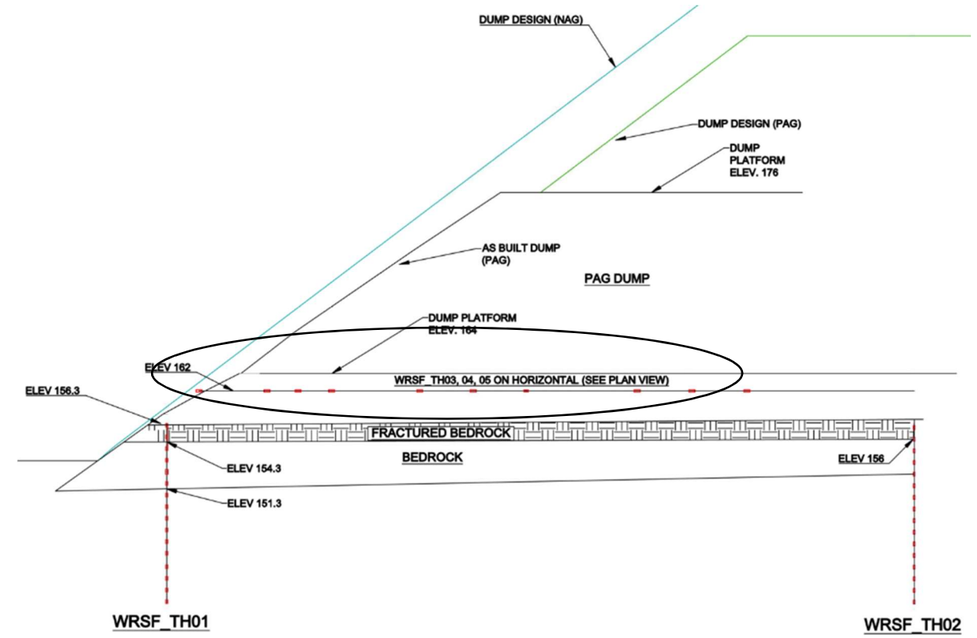

Temperature(°C): AMQ - WRSF - Dump TH_02
FRACTURED BEDREOCK
BEDROCK
Zero – degree Isotherm
Elevation (m)
Time: from 2019-11-02 to 2021-01-28
Temperature(°C)


AMQ – WRSF – Dump TH_02
Waste Rock (PAG)
Overburden
Fractured Bedrock
Bedrock
Elevation (m)
Temperature (°C)
2021-01-31 06:00
2021-01-01 06:00
2020-12-02 06:00
2020-11-02 06:00
2020-10-03 06:00
2020-09
2020-08
2020-07
2020-06
2020-05
2020-04
2020-03
2020-02
2020-01
2019-12
2019-11
2019-11

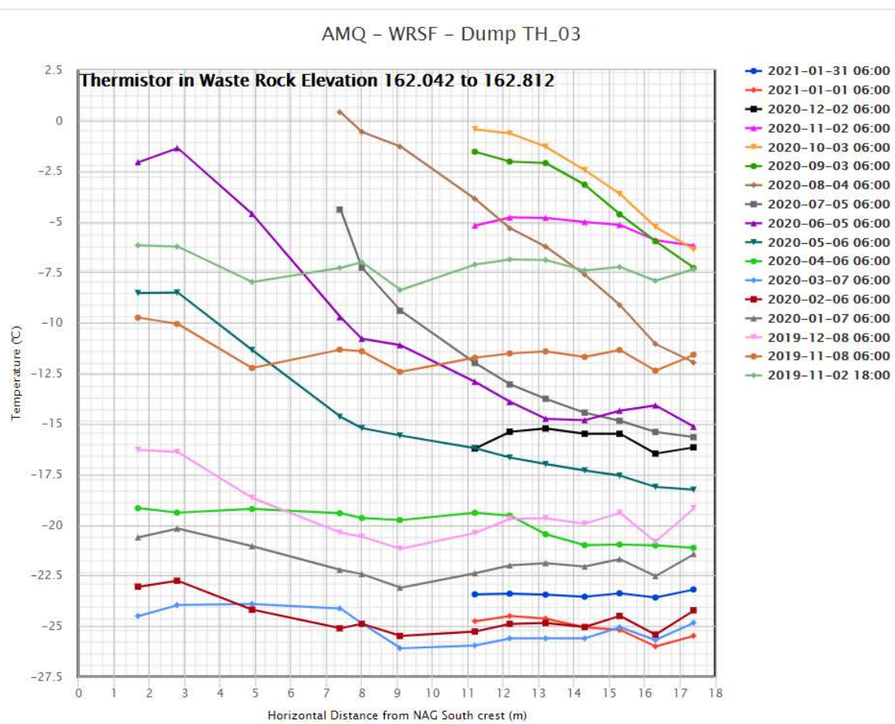

DUMP DESIGN (NAG)
DUMP DESIGN (PAG)
DUMP PLATFORM ELEV. 176
AS BUILT DUMP (PAG)
PAG DUMP
DUMP PLATFORM ELEV. 164
ELEV 162
ELEV 156.3
WRSF_TH03, 04, 05 ON HORIZONTAL (SEE PLAN VIEW)
FRACTURED BEDROCK
BEDROCK
ELEV 154.3
ELEV 151.3
ELEV 156
WRSF_TH01
WRSF_TH02

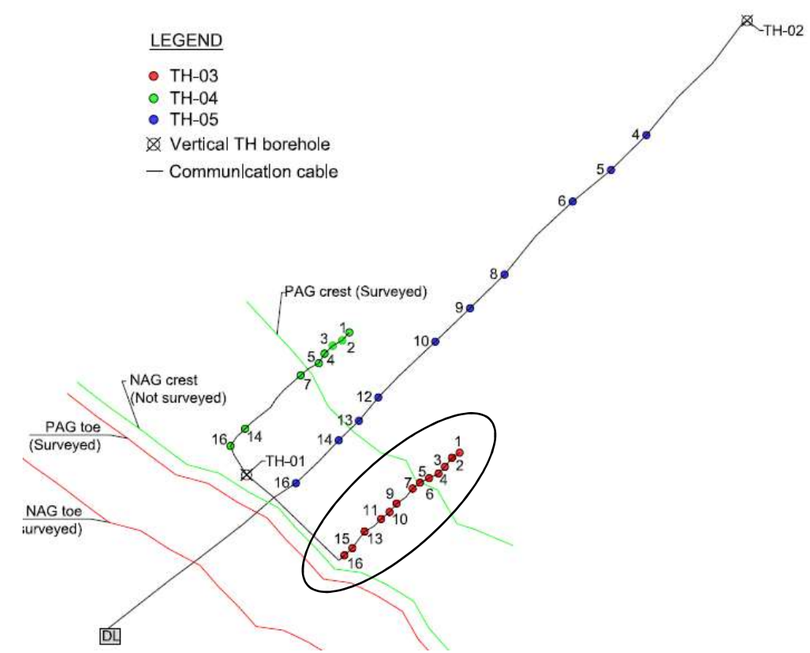

LEGEND
TH-03
TH-04
TH-05
Vertical TH borehole
Communication cable
TH-02
PAG crest (Surveyed)
NAG crest (Not surveyed)
PAG toe (Surveyed)
NAG toe (Surveyed)
TH-01

WRSF TH03



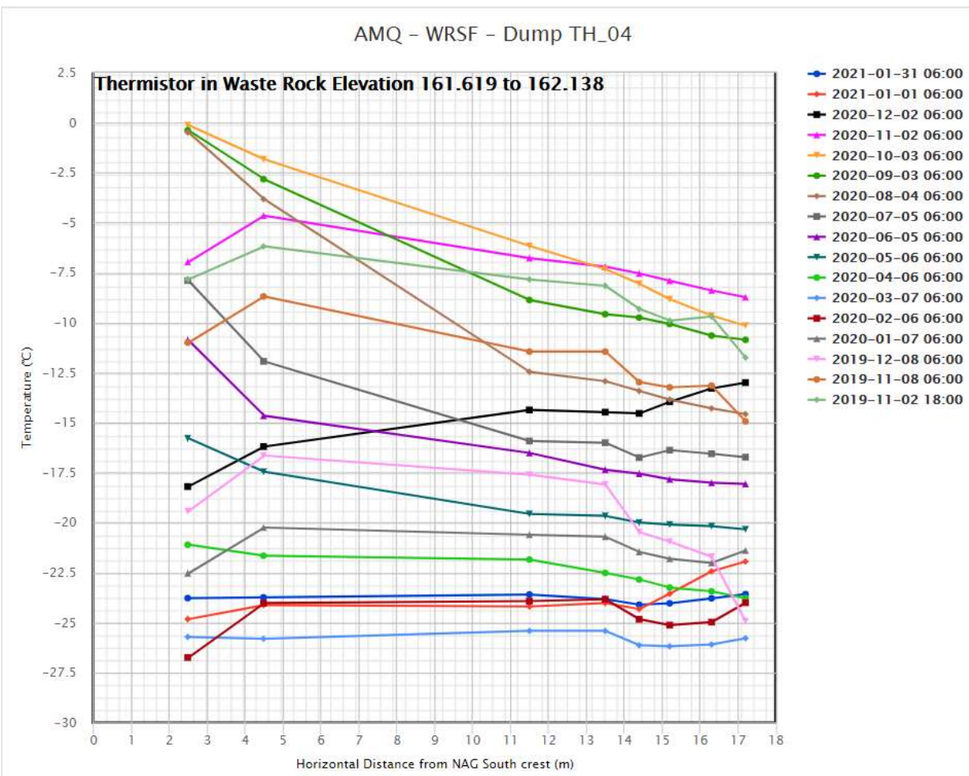
Thermistor in Waste Rock Elevation 162.042 to 162.812.

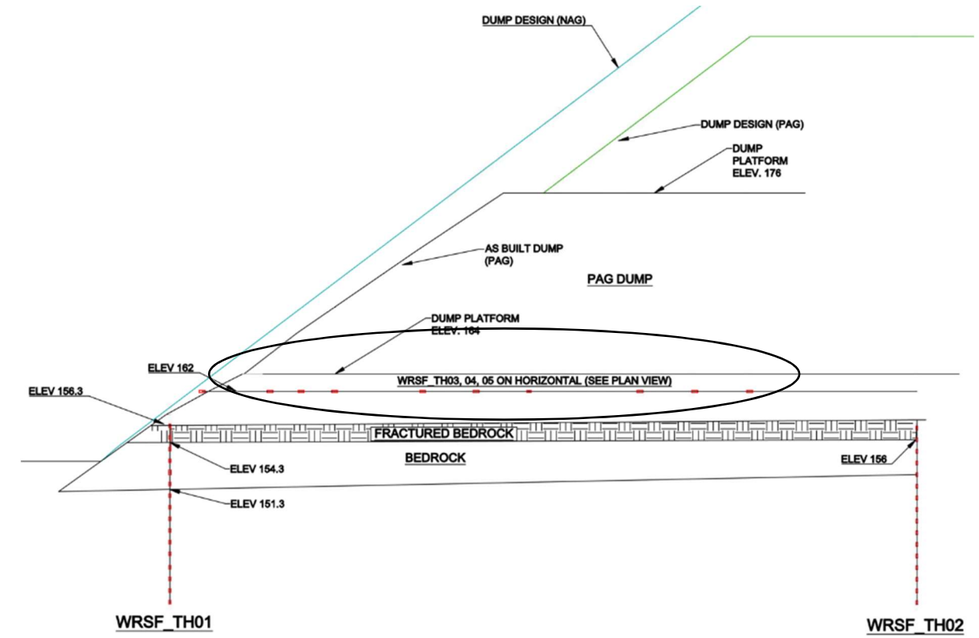


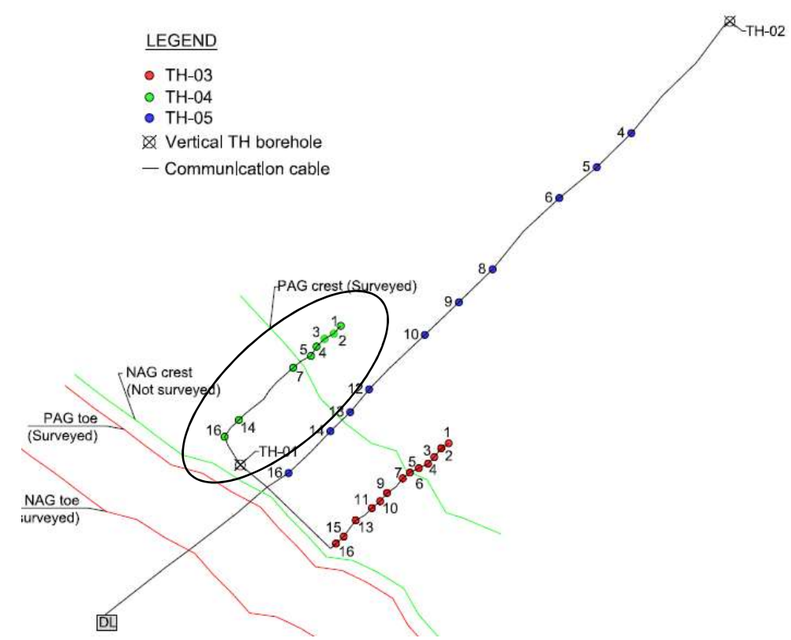


WRSF TH04

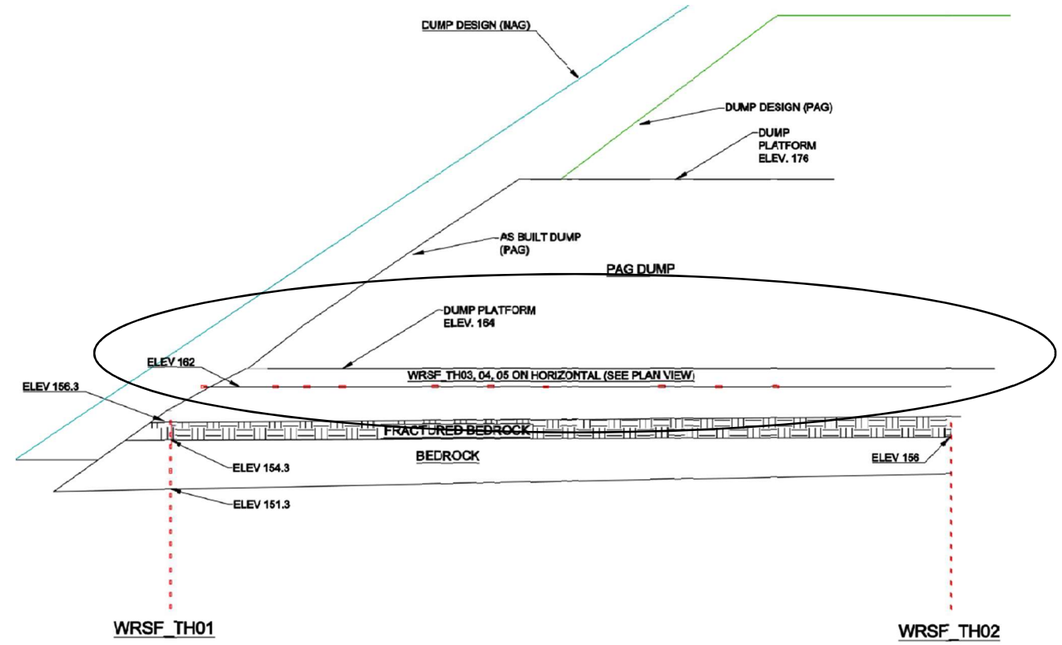
Thermistor in Waste Rock Elevation 161.619 to 162.138.

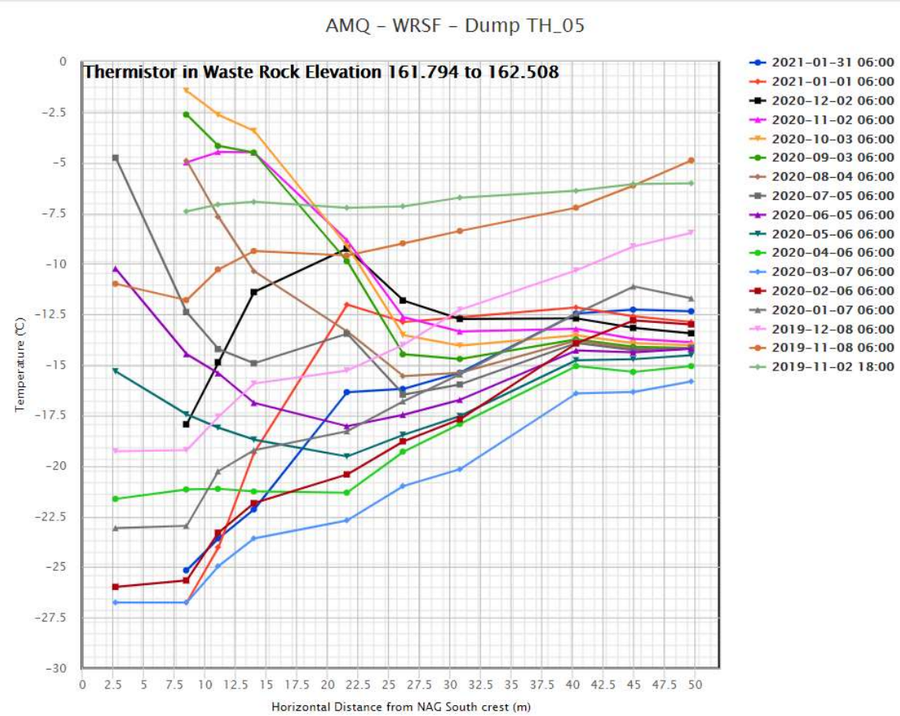






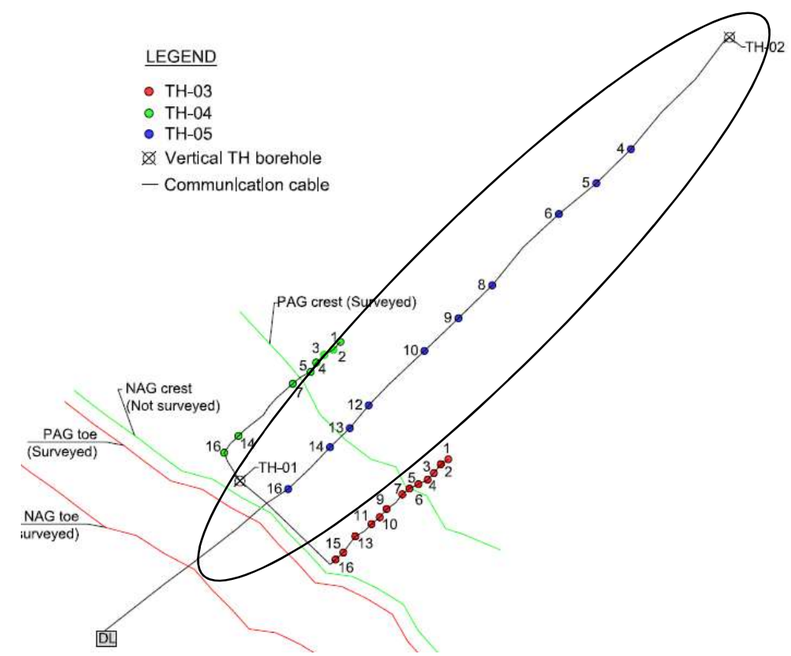
WRSF TH05





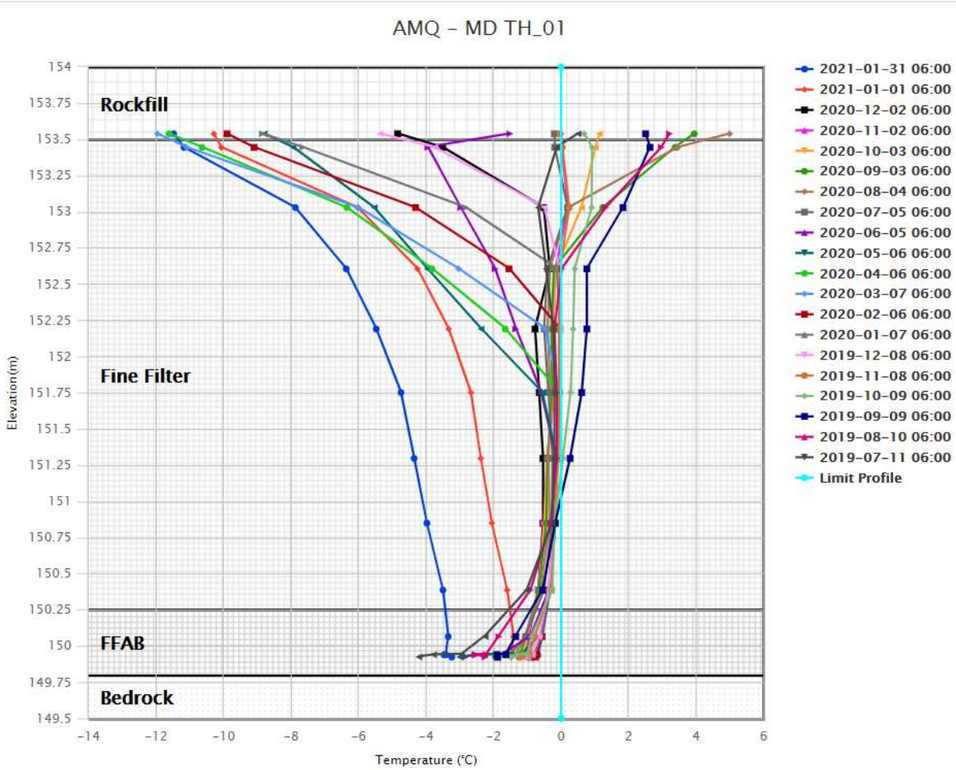
Thermistor in Waste Rock Elevation

161.794 to 162.508



MD TH01


MD TH 01
MD TH 02
MD TH 03
MAMMOTH DIKE


AMQ – MD TH_01
Rockfill
Fine Filter
FFAB
Bedrock
Elevation(m)
Temperature (°C)
2021-01-31 06:00
2021-01-01 06:00
2020-12-02 06:00
2020-11-02 06:00
2020-10-03 06:00
2020-09-03 06:00
2020-08-04 06:00
2020-07-05 06:00
2020-06-05 06:00
2020-05-06 06:00
2020-04-06 06:00
2020-03-07 06:00
2020-02-06 06:00
2020-01-07 06:00
2019-12-08 06:00
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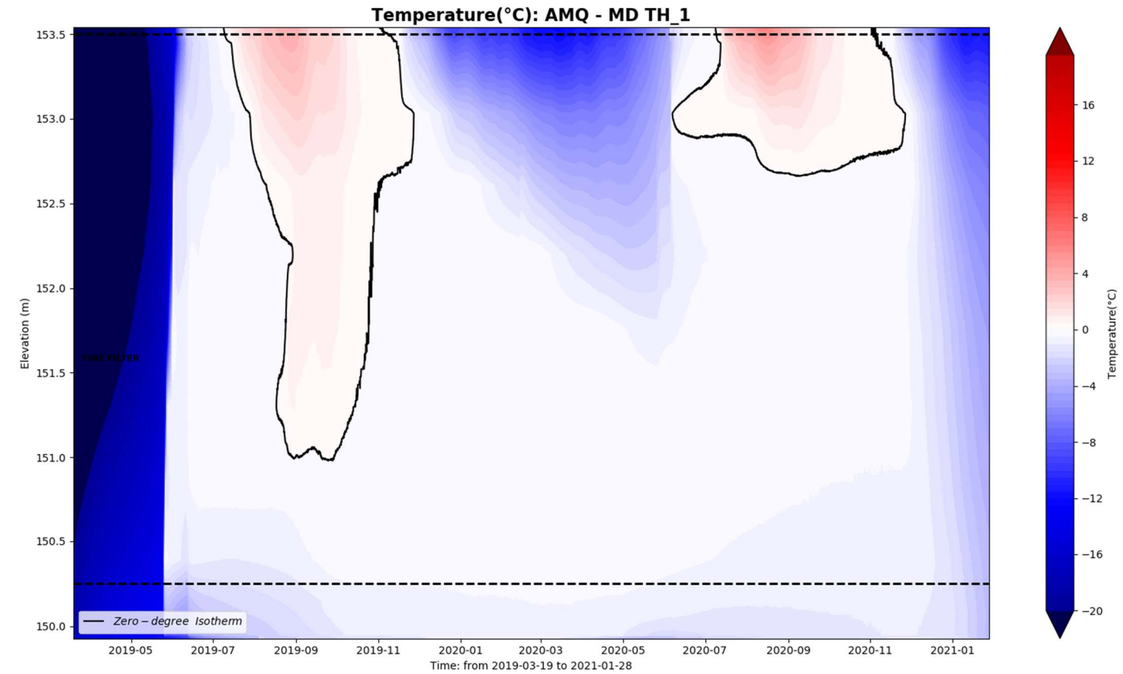
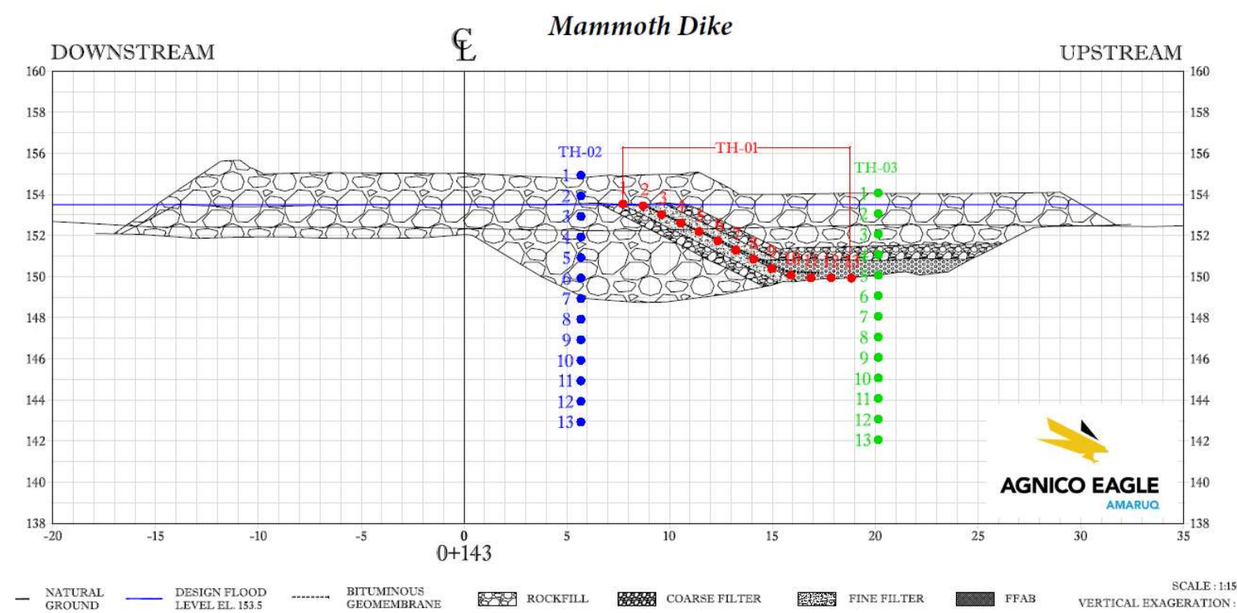
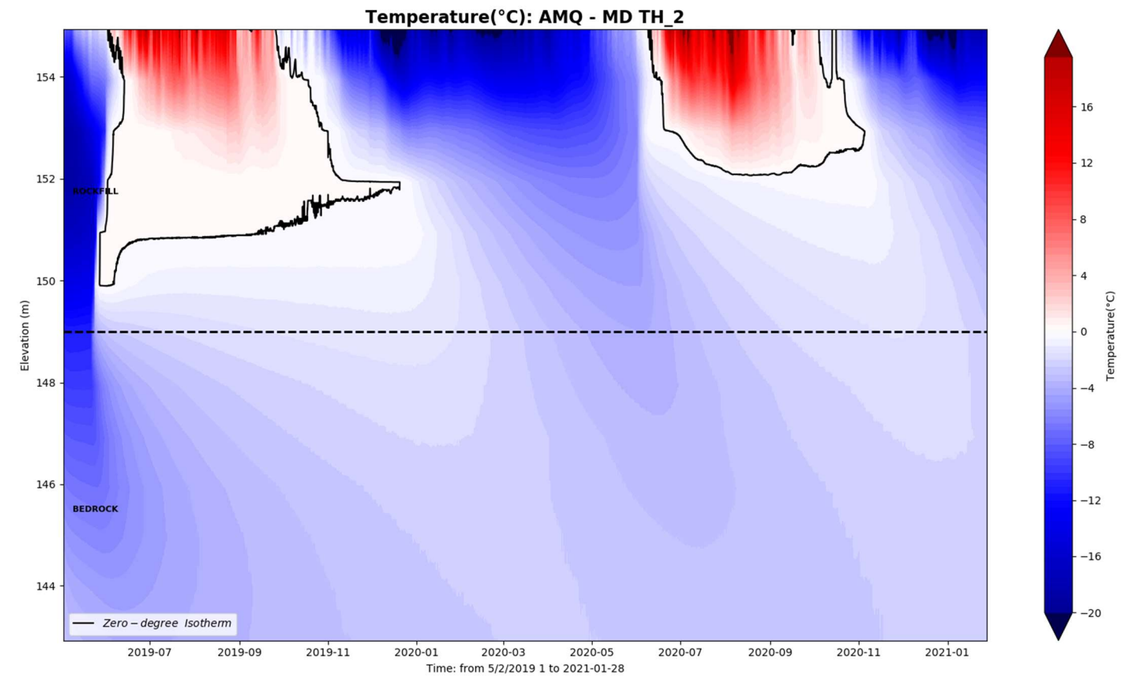
2019-10-09 06:00
2019-09-09 06:00
2019-08-10 06:00
2019-07-11 06:00
Limit Profile

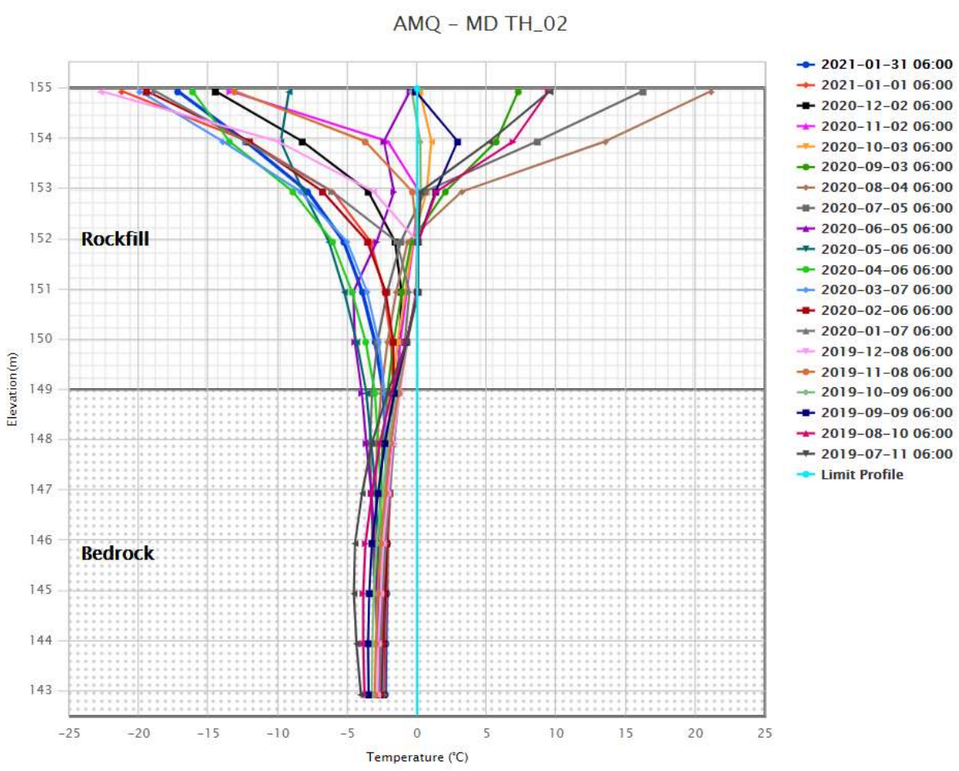

Temperature(°C): AMQ - MD TH_1
Elevation (m)
Zero – degree Isotherm
Time: from 2019-03-19 to 2021-01-28
Temperature(°C)

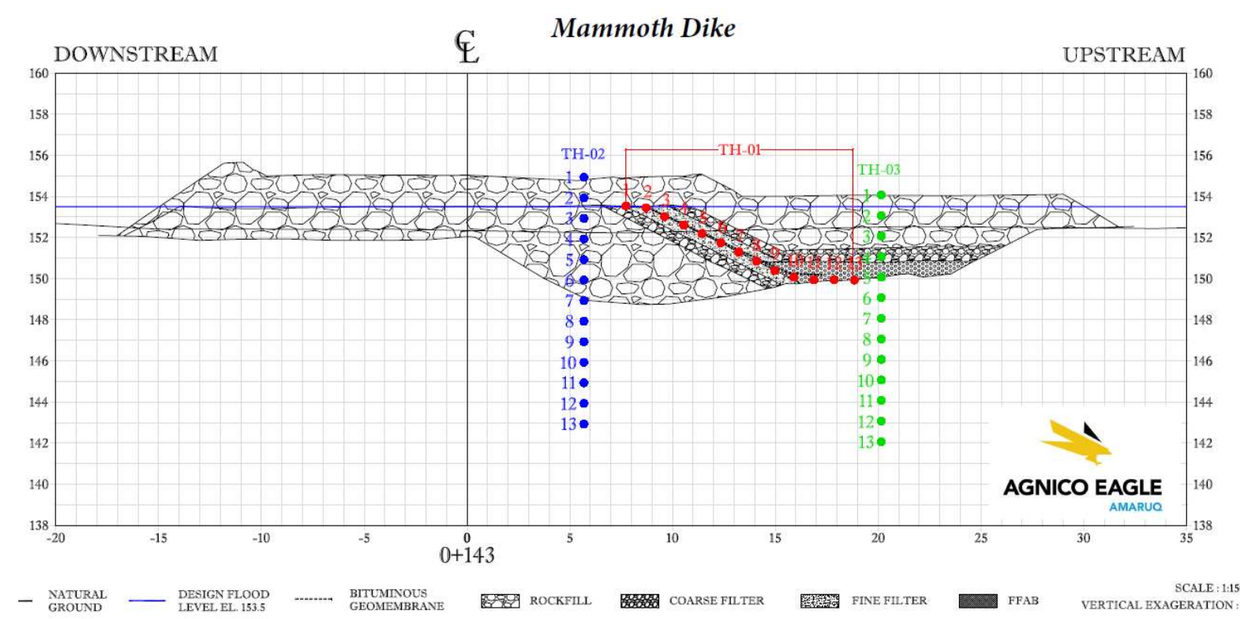

Mammoth Dike
DOWNSTREAM
UPSTREAM
TH-02
TH-01
TH-03
0+143
AGNICO EAGLE
AMARUQ
NATURAL GROUND
DESIGN FLOOD LEVEL EL. 153.5
BITUMINOUS GEOMEMBRANE
ROCKFILL
COARSE FILTER
FINE FILTER
FFAB
SCALE : 1:15
VERTICAL EXAGERATION :

MD TH02


MD TH 01
MD TH 02
MD TH 03
MAMMOTH DIKE

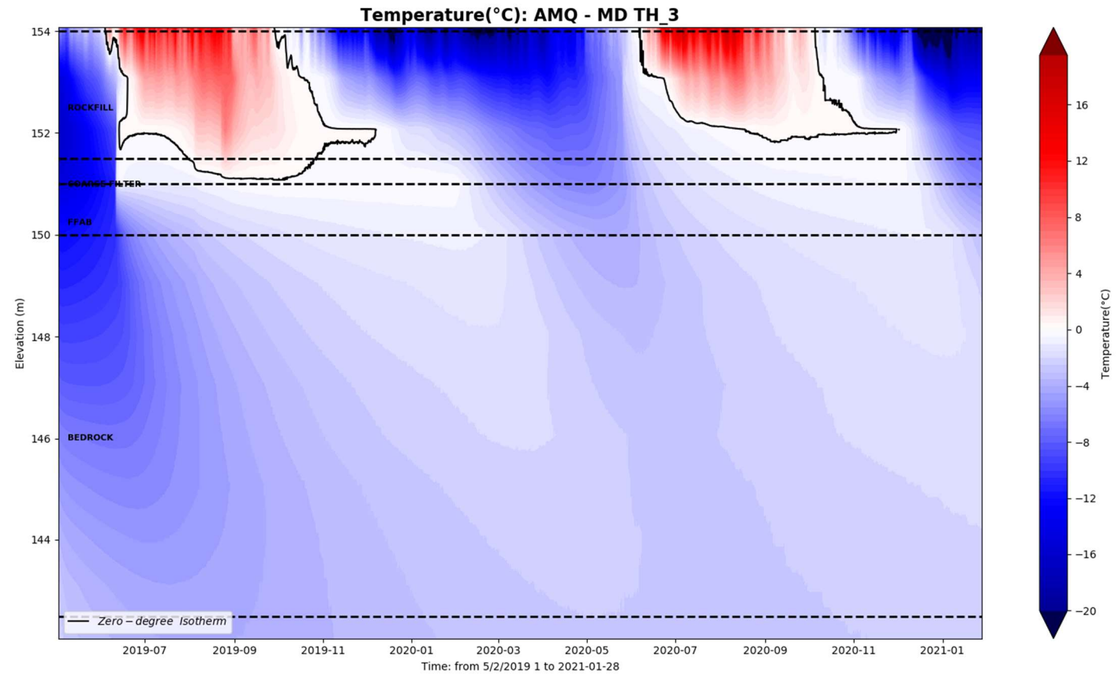

Temperature(°C): AMQ - MD TH_2
Elevation (m)
ROCKFILL
BEDROCK
Zero – degree Isotherm
Time: from 5/2/2019 1 to 2021-01-28
Temperature(°C)

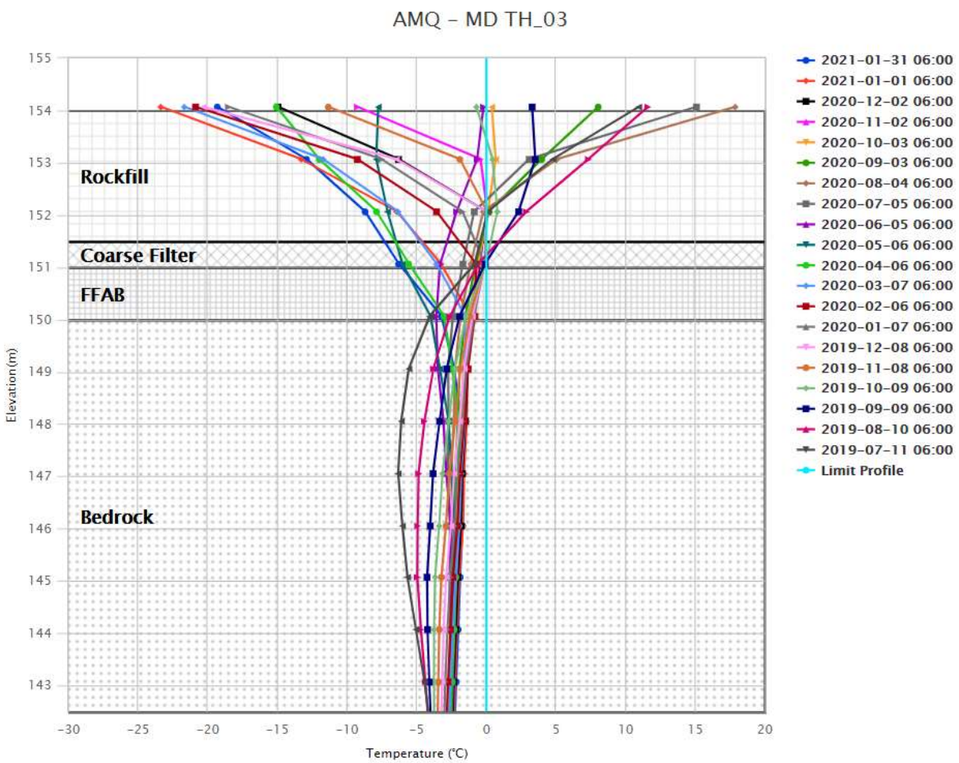

AMQ – MD TH_02
Rockfill
Bedrock
Elevation (m)
Temperature (°C)
2021-01-31 06:00
2021-01-01 06:00
2020-12-02 06:00
2020-11-02 06:00
2020-10-03 06:00
2020-09-03 06:00
2020-08-04 06:00
2020-07-05 06:00
2020-06-05 06:00
2020-05-06 06:00
2020-04-06 06:00
2020-03-07 06:00
2020-02-06 06:00
2020-01-07 06:00
2019-12-08 06:00
2019-11-08 06:00
2019-10-09 06:00
2019-09-09 06:00
2019-08-10 06:00
2019-07-11 06:00
Limit Profile


Mammoth Dike
DOWNSTREAM
UPSTREAM
TH-02
TH-01
TH-03
0+143
AGNICO EAGLE
AMARUQ
NATURAL GROUND
DESIGN FLOOD LEVEL EL. 153.5
BITUMINOUS GEOMEMBRANE
ROCKFILL
COARSE FILTER
FINE FILTER
FFAB
SCALE : 1:15
VERTICAL EXAGERATION :

MD TH03


MD TH 01
MD TH 02
MD TH 03
MAMMOTH DIKE


Temperature(°C): AMQ - MD TH_3
ROCKFILL
COARSE FILTER
FFAB
BEDROCK
Zero – degree Isotherm
Elevation (m)
Time: from 5/2/2019 1 to 2021-01-28
Temperature(°C)


AMQ – MD TH_03
Rockfill
Coarse Filter
FFAB
Bedrock
Elevation(m)
Temperature (°C)
2021-01-31 06:00
2021-01-01 06:00
2020-12-02 06:00
2020-11-02 06:00
2020-10-03 06:00
2020-09-03 06:00
2020-08-04 06:00
2020-07-05 06:00
2020-06-05 06:00
2020-05-06 06:00
2020-04-06 06:00
2020-03-07 06:00
2020-02-06 06:00
2020-01-07 06:00
2019-12-08 06:00
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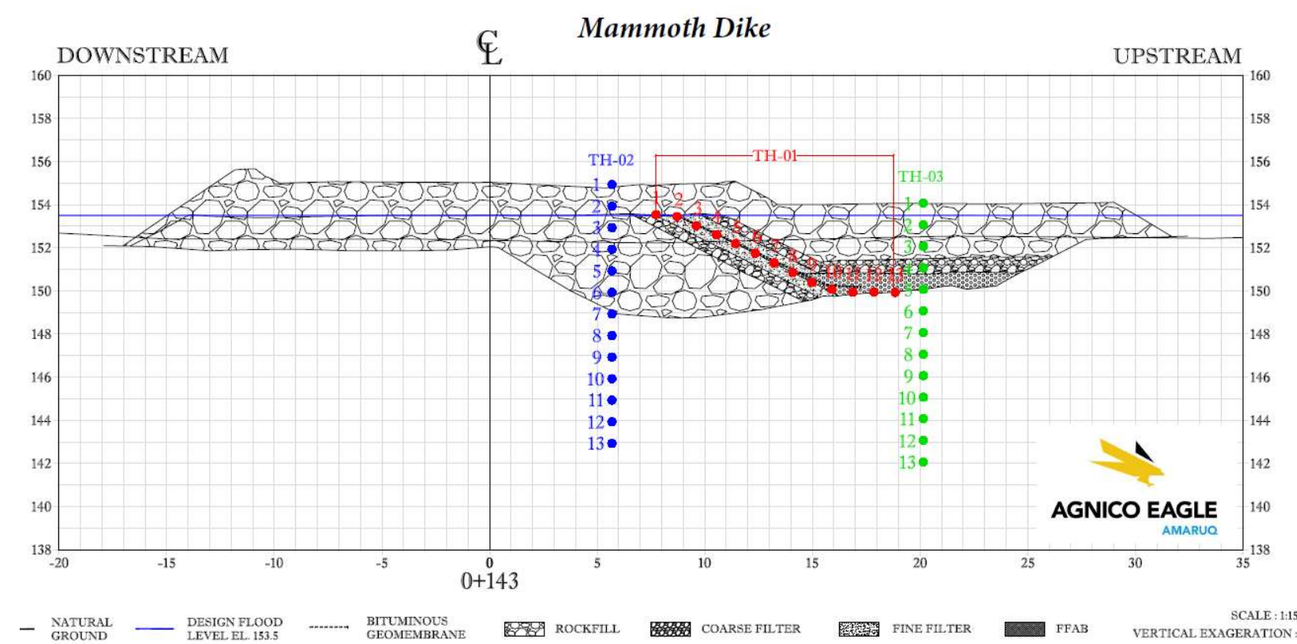
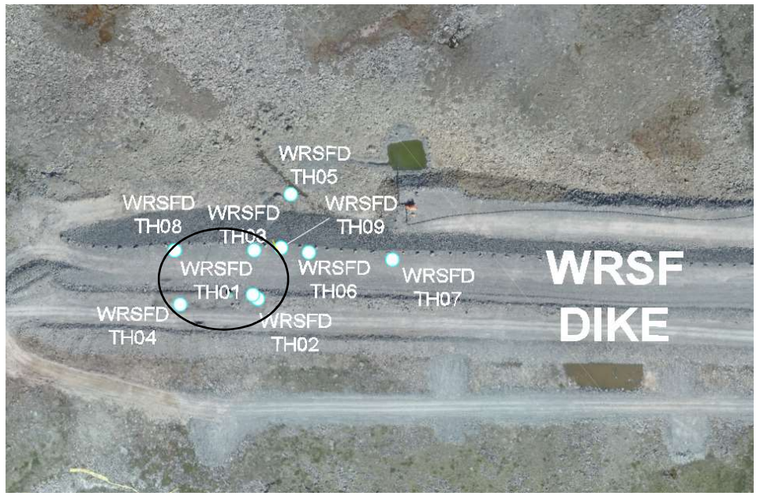
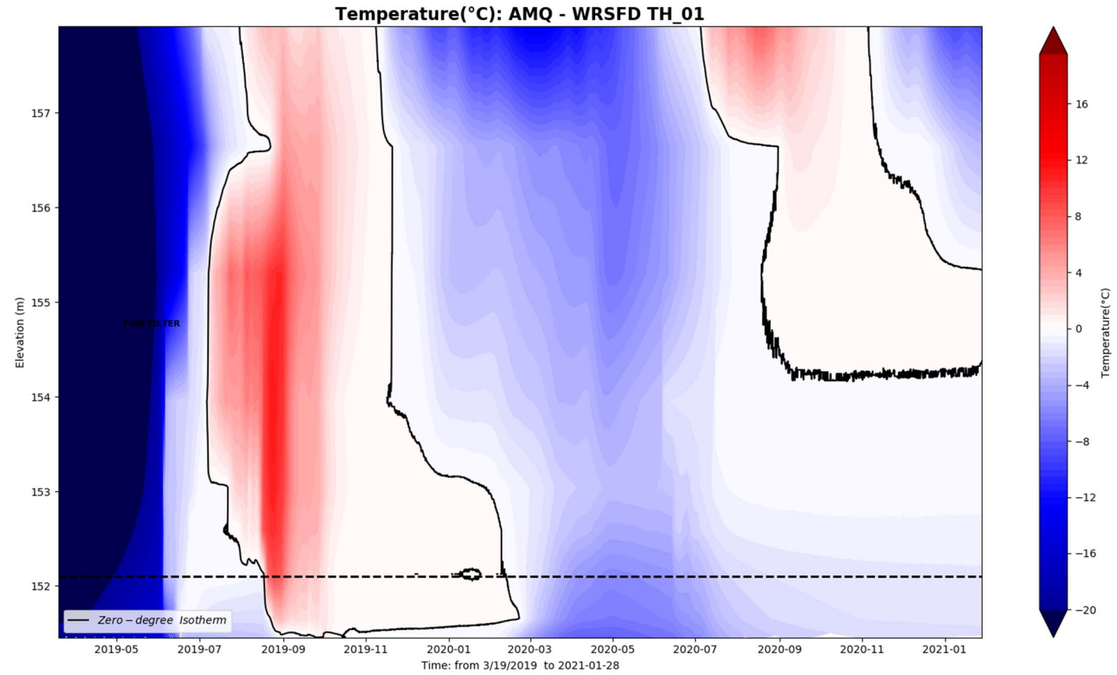
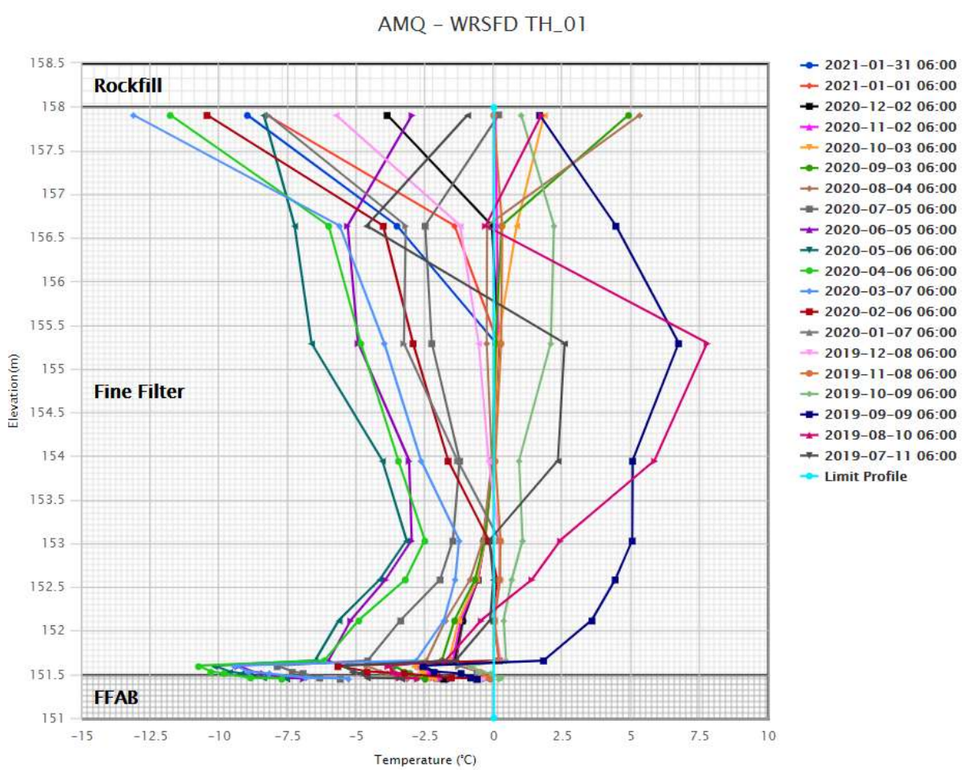
2019-08-10 06:00
2019-07-11 06:00
Limit Profile

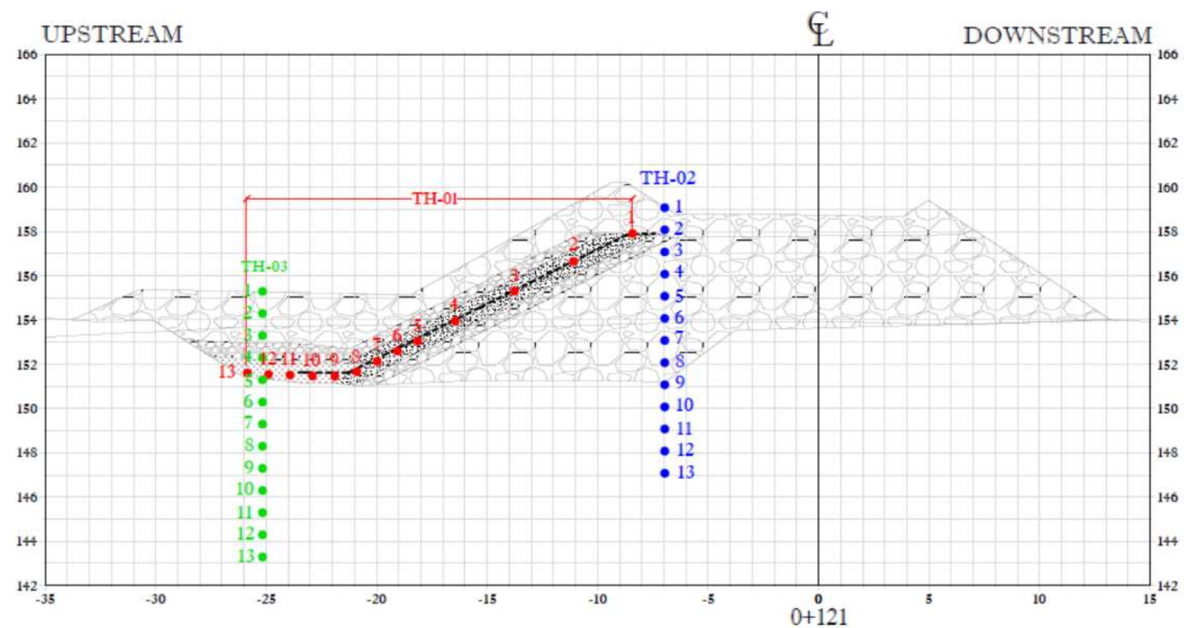

Mammoth Dike
DOWNSTREAM
UPSTREAM
TH-02
TH-01
TH-03
0+143
AGNICO EAGLE
AMARUQ
NATURAL GROUND
DESIGN FLOOD LEVEL EL. 153.5
BITUMINOUS GEOMEMBRANE
ROCKFILL
COARSE FILTER
FINE FILTER
FFAB
SCALE : 1:15
VERTICAL EXAGERATION :

WRSFD TH01

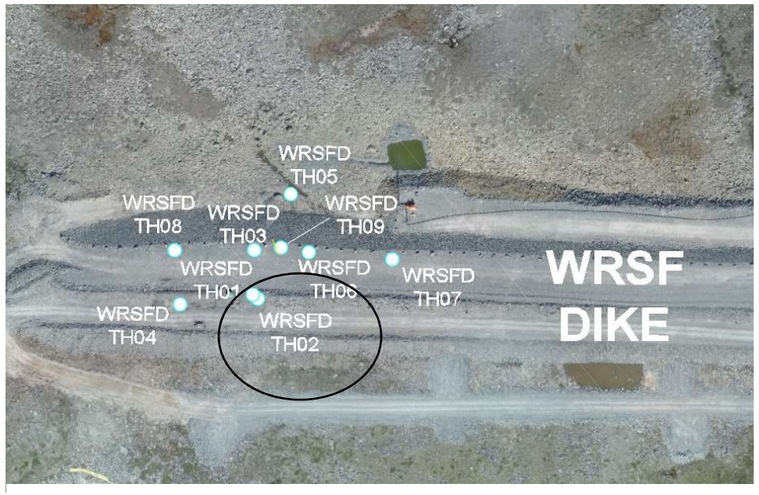

WRSFD TH05
WRSFD TH08
WRSFD TH03
WRSFD TH09
WRSFD TH01
WRSFD TH06
WRSFD TH07
WRSFD TH04
WRSFD TH02
WRSF DIKE

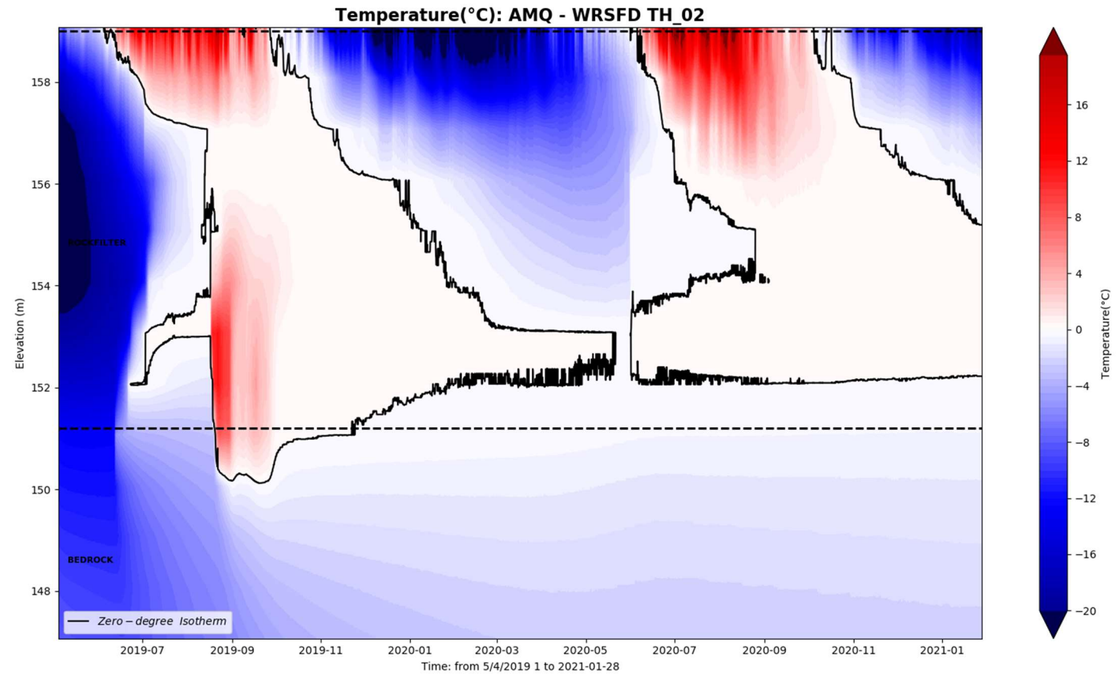

Temperature(°C): AMQ - WRSFD TH_01
Elevation (m)
Time: from 3/19/2019 to 2021-01-28
Zero – degree Isotherm
Temperature(°C)

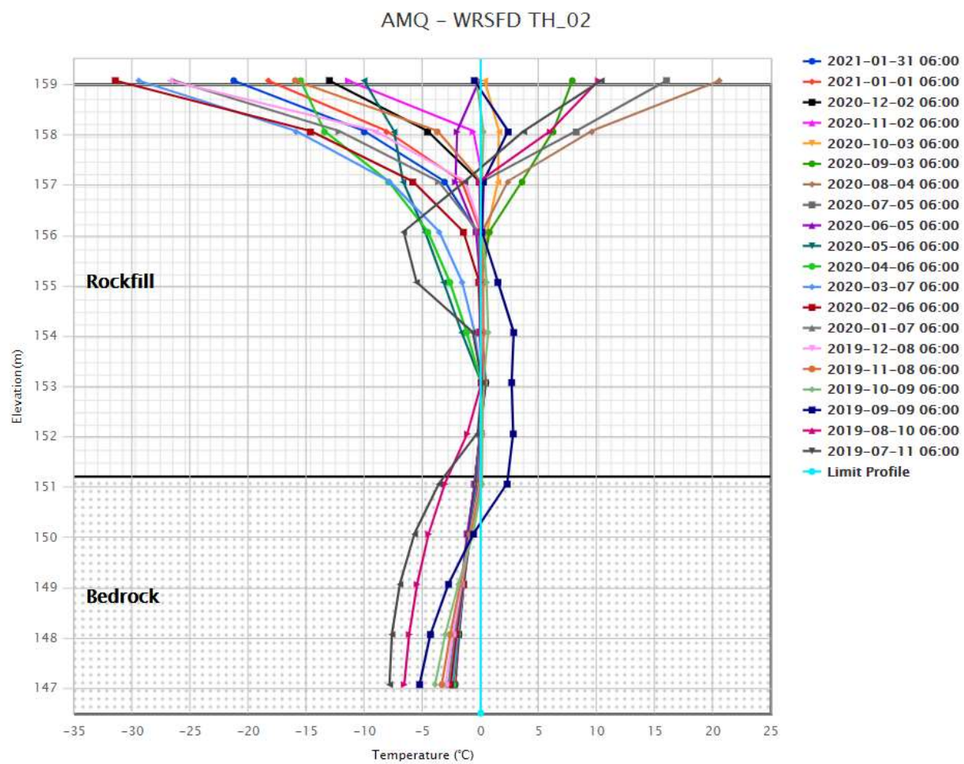

AMQ – WRSFD TH_01
Rockfill
Fine Filter
FFAB
Elevation (m)
Temperature (°C)
2021-01-31 06:00
2021-01-01 06:00
2020-12-02 06:00
2020-11-02 06:00
2020-10-03 06:00
2020-09-03 06:00
2020-08-04 06:00
2020-07-05 06:00
2020-06-05 06:00
2020-05-06 06:00
2020-04-06 06:00
2020-03-07 06:00
2020-02-06 06:00
2020-01-07 06:00
2019-12-08 06:00
2019-11-08 06:00
2019-10-09 06:00
2019-09-09 06:00
2019-08-10 06:00
2019-07-11 06:00
Limit Profile

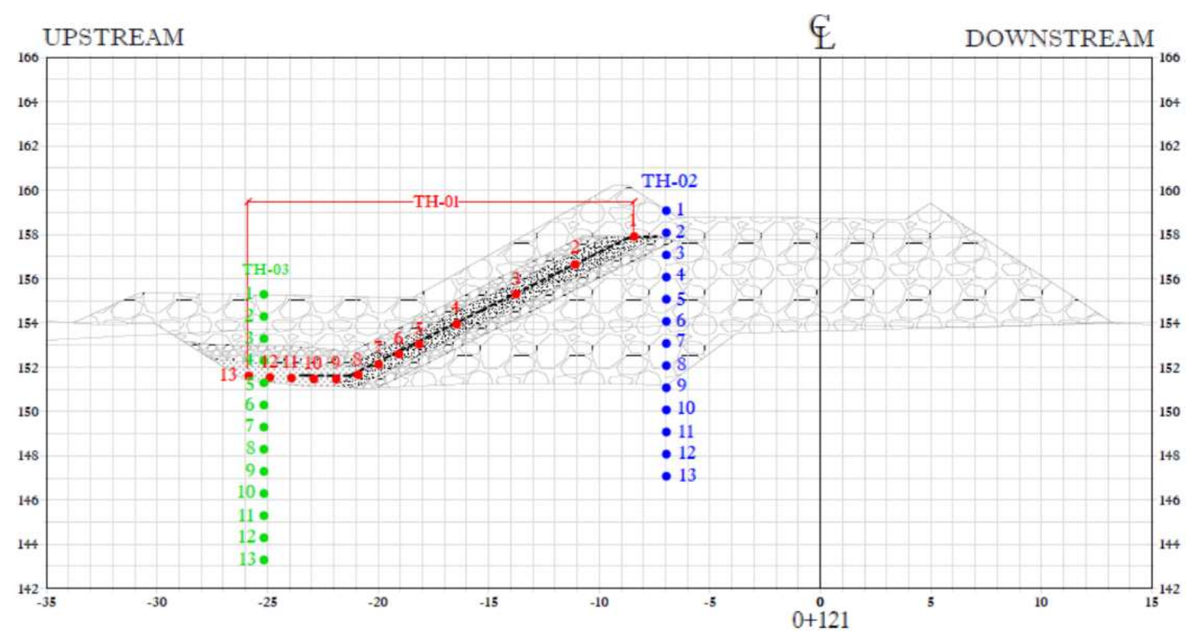

UPSTREAM
DOWNSTREAM
TH-01
TH-02
TH-03
0+121

WRSFD TH02

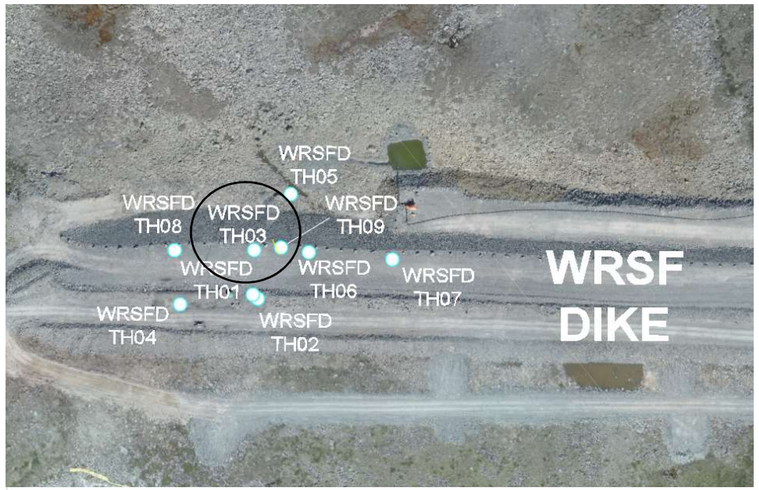

WRSFD TH05
WRSFD TH08
WRSFD TH03
WRSFD TH09
WRSFD TH01
WRSFD TH06
WRSFD TH07
WRSFD TH04
WRSFD TH02
WRSF DIKE

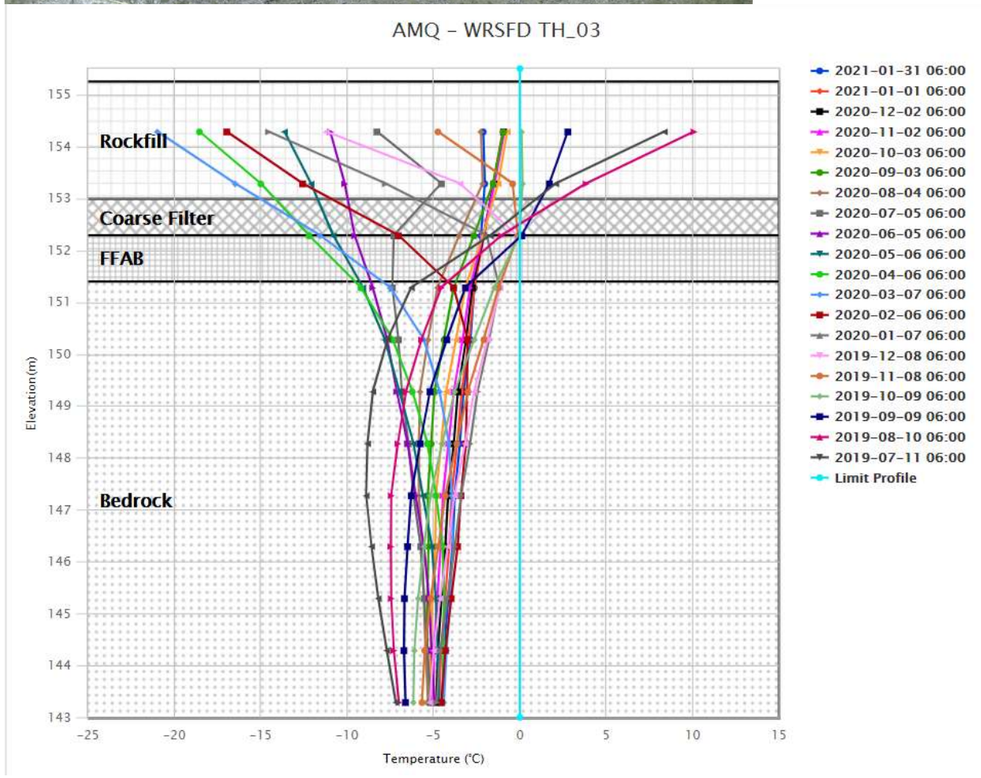

Temperature(°C): AMQ - WRSFD TH_02
Elevation (m)
ROCKFILTER
BEDROCK
Zero – degree Isotherm
Time: from 5/4/2019 1 to 2021-01-28
Temperature(°C)

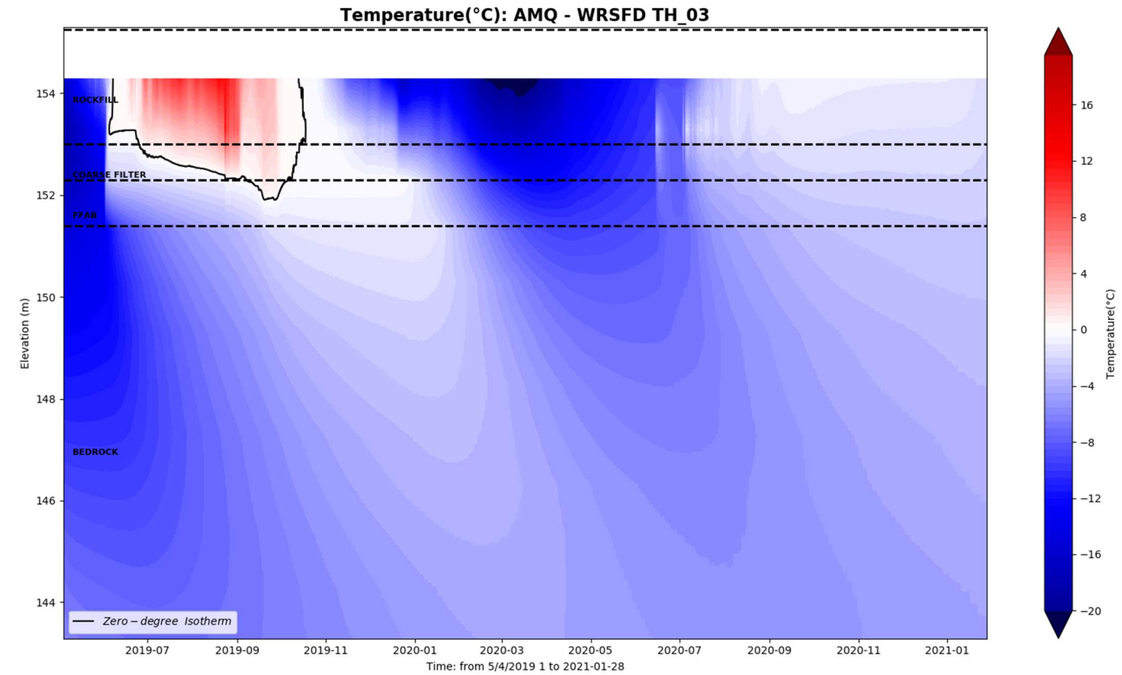

AMQ – WRSFD TH_02
Rockfill
Bedrock
Elevation(m)
Temperature (°C)
2021-01-31 06:00
2021-01-01 06:00
2020-12-02 06:00
2020-11-02 06:00
2020-10-03 06:00
2020-09-03 06:00
2020-08-04 06:00
2020-07-05 06:00
2020-06-05 06:00
2020-05-06 06:00
2020-04-06 06:00
2020-03-07 06:00
2020-02-06 06:00
2020-01-07 06:00
2019-12-08 06:00
2019-11-08 06:00
2019-10-09 06:00
2019-09-09 06:00
2019-08-10 06:00
2019-07-11 06:00
Limit Profile

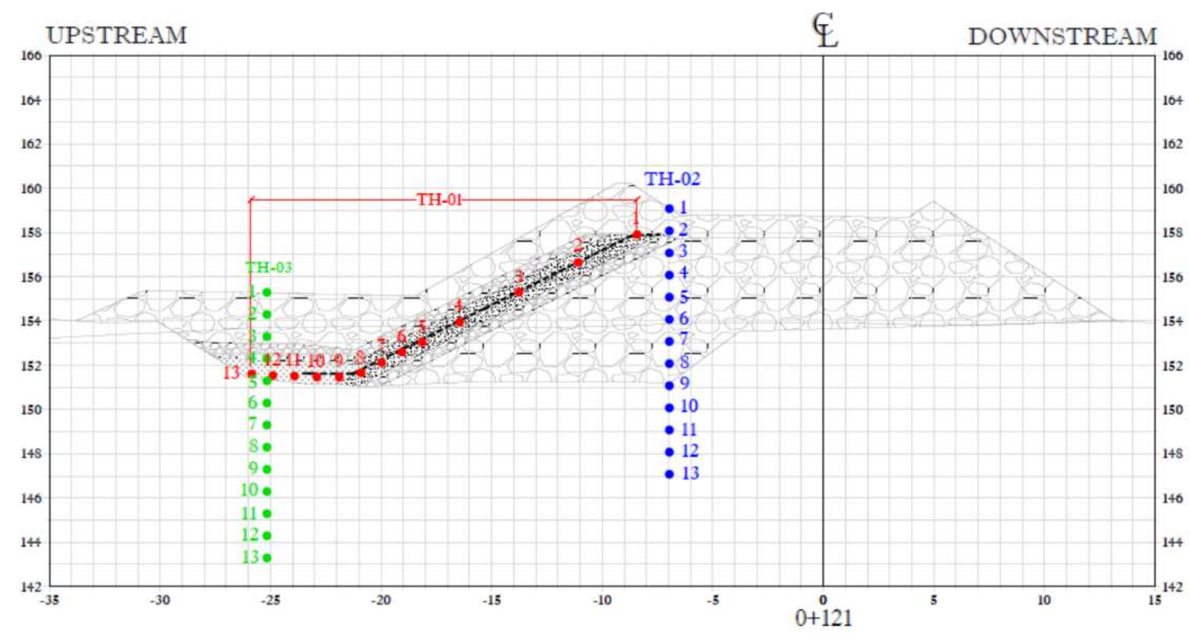

UPSTREAM
DOWNSTREAM
TH-01
TH-02
TH-03
0+121

WRSFD TH03


WRSFD TH05
WRSFD TH08
WRSFD TH03
WRSFD TH09
WRSFD TH01
WRSFD TH06
WRSFD TH07
WRSFD TH04
WRSFD TH02
WRSF DIKE

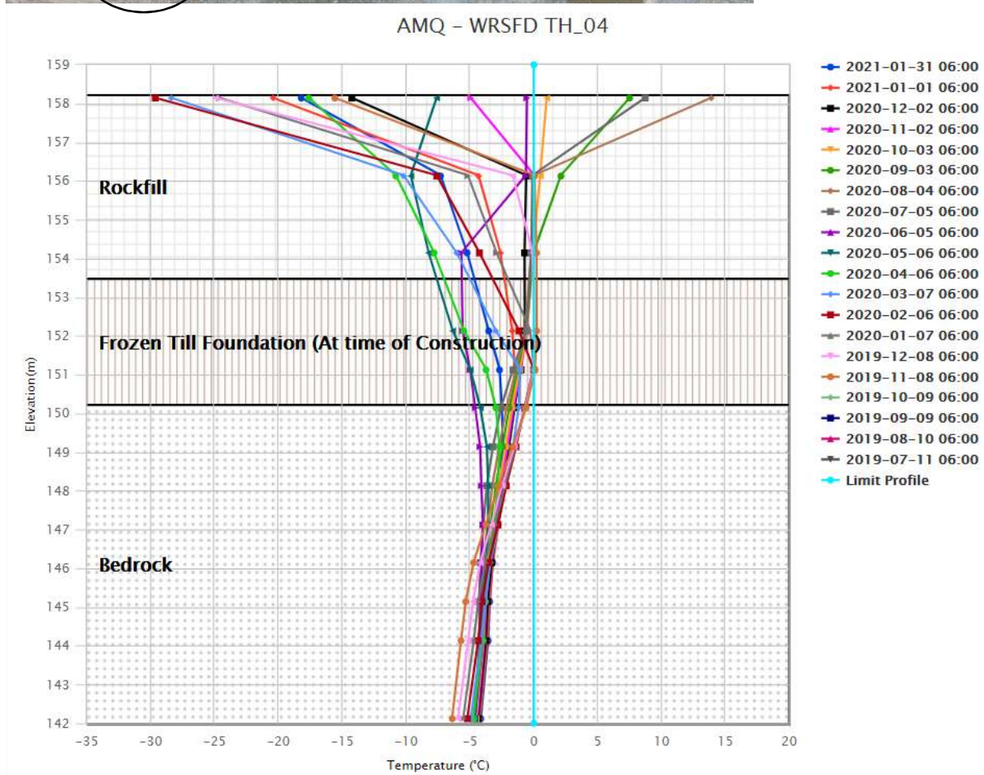

AMQ – WRSFD TH_03
Rockfill
Coarse Filter
FFAB
Bedrock
Elevation (m)
Temperature (°C)
2021-01-31 06:00
2021-01-01 06:00
2020-12-02 06:00
2020-11-02 06:00
2020-10-03 06:00
2020-09-03 06:00
2020-08-04 06:00
2020-07-05 06:00
2020-06-05 06:00
2020-05-06 06:00
2020-04-06 06:00
2020-03-07 06:00
2020-02-06 06:00
2020-01-07 06:00
2019-12-08 06:00
2019-11-08 06:00
2019-10-09 06:00
2019-09-09 06:00
2019-08-10 06:00
2019-07-11 06:00
Limit Profile

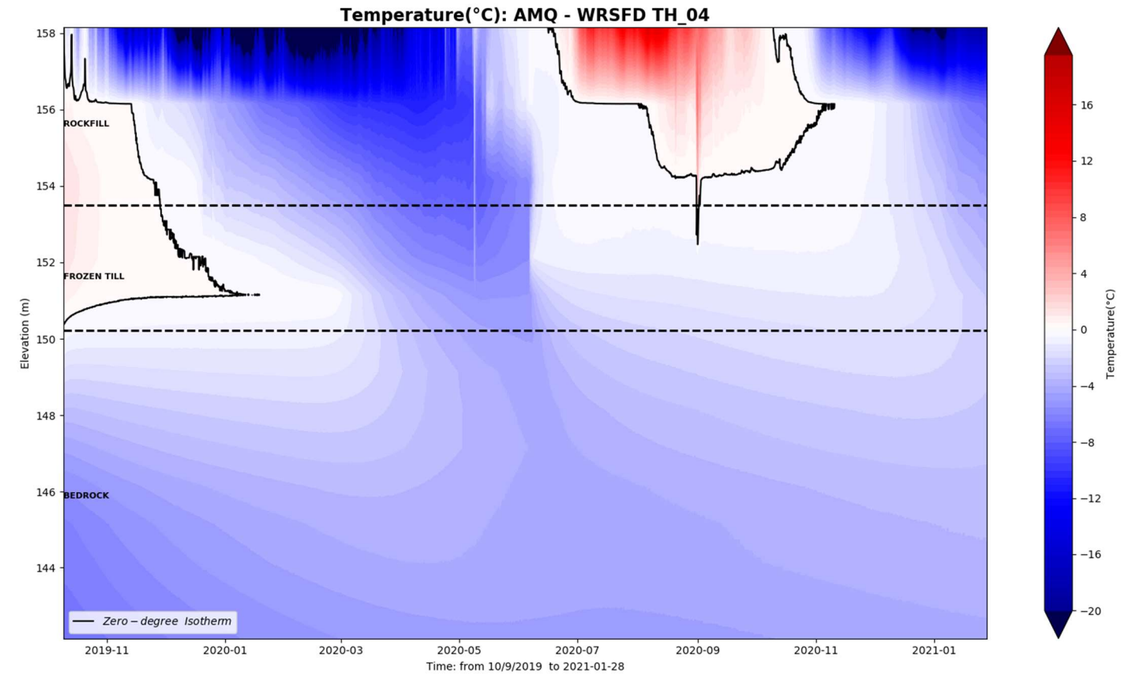

Temperature(°C): AMQ - WRSFD TH_03
ROCKFILL
COARSE FILTER
FFAB
BEDROCK
Elevation (m)
Zero – degree Isotherm
Time: from 5/4/2019 1 to 2021-01-28
Temperature(°C)

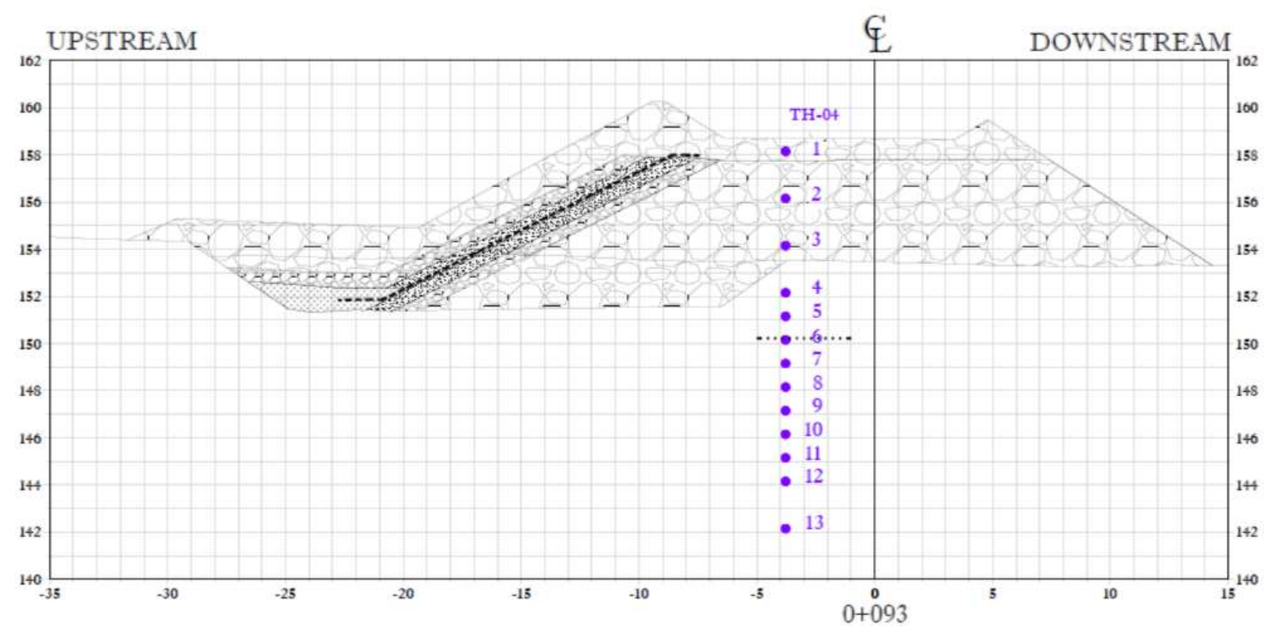

UPSTREAM
DOWNSTREAM
TH-01
TH-02
TH-03
0+121

WRSFD TH04

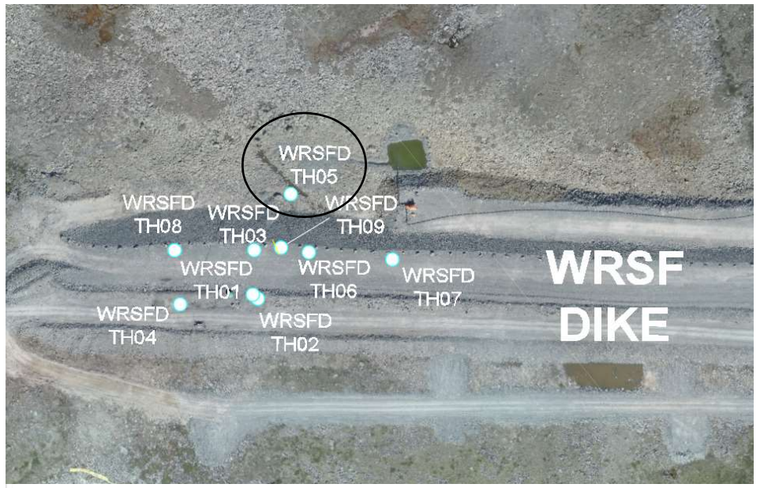

WRSFD TH05
WRSFD TH08
WRSFD TH03
WRSFD TH09
WRSFD TH01
WRSFD TH06
WRSFD TH07
WRSFD TH04
WRSFD TH02
WRSF DIKE

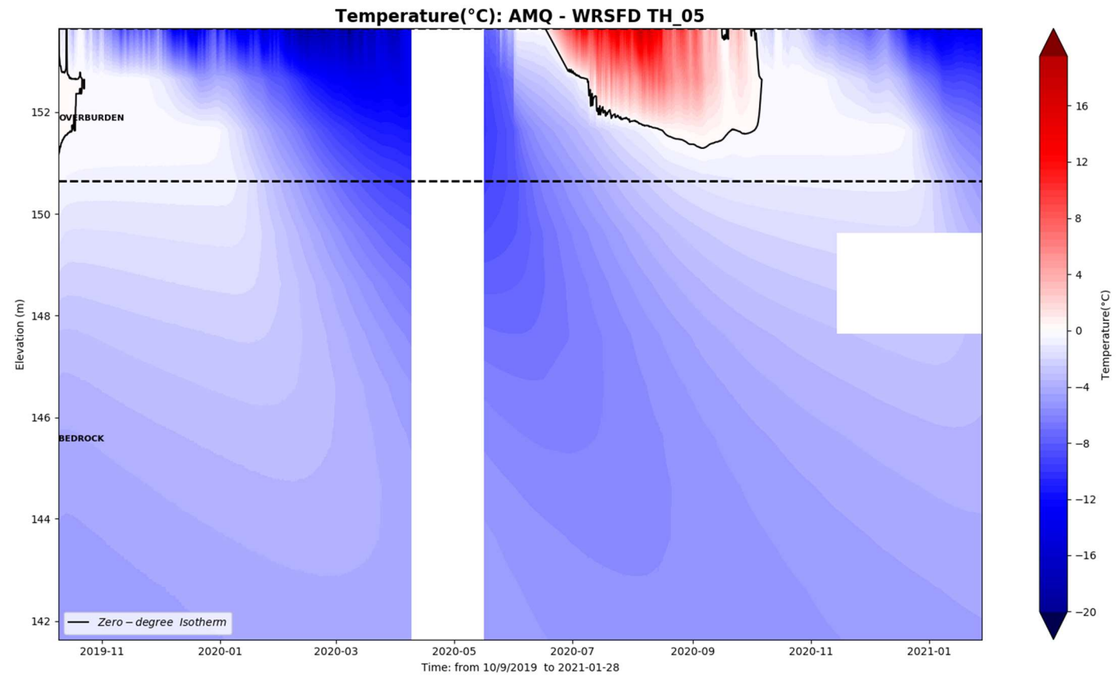

AMQ – WRSFD TH_04
Rockfill
Frozen Till Foundation (At time of Construction)
Bedrock
Elevation (m)
Temperature (°C)
2021-01-31 06:00
2021-01-01 06:00
2020-12-02 06:00
2020-11-02 06:00
2020-10-03 06:00
2020-09-03 06:00
2020-08-04 06:00
2020-07-05 06:00
2020-06-05 06:00
2020-05-06 06:00
2020-04-06 06:00
2020-03-07 06:00
2020-02-06 06:00
2020-01-07 06:00
2019-12-08 06:00
2019-11-08 06:00
2019-10-09 06:00
2019-09-09 06:00
2019-08-10 06:00
2019-07-11 06:00
Limit Profile

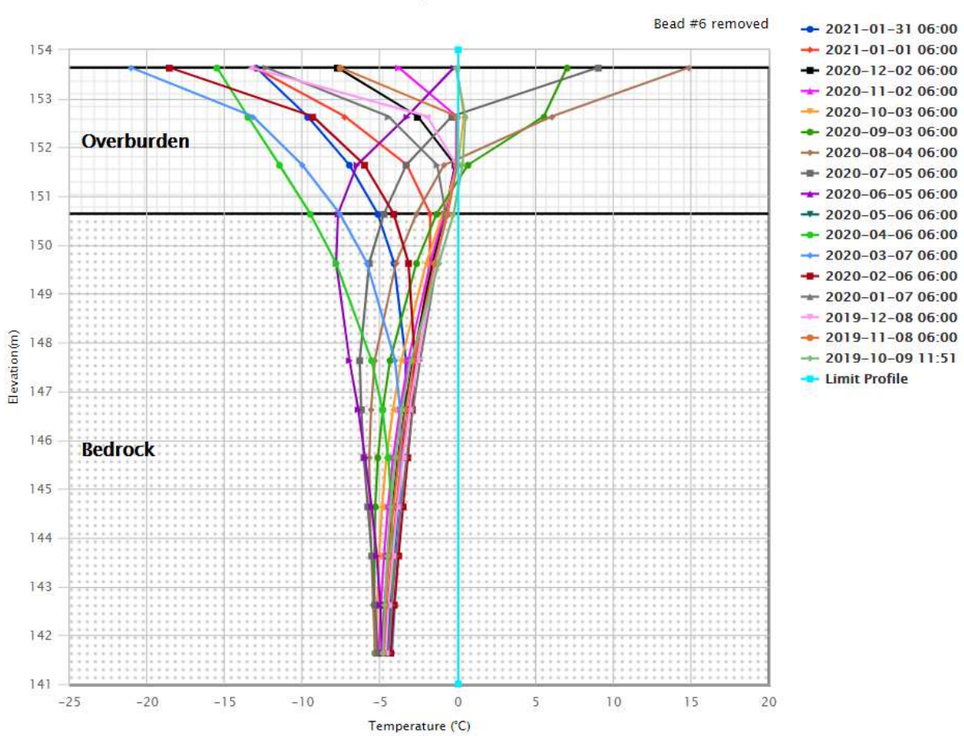

Temperature(°C): AMQ - WRSFD TH_04
ROCKFILL
FROZEN TILL
BEDROCK
Zero – degree Isotherm
Elevation (m)
Time: from 10/9/2019 to 2021-01-28
Temperature(°C)

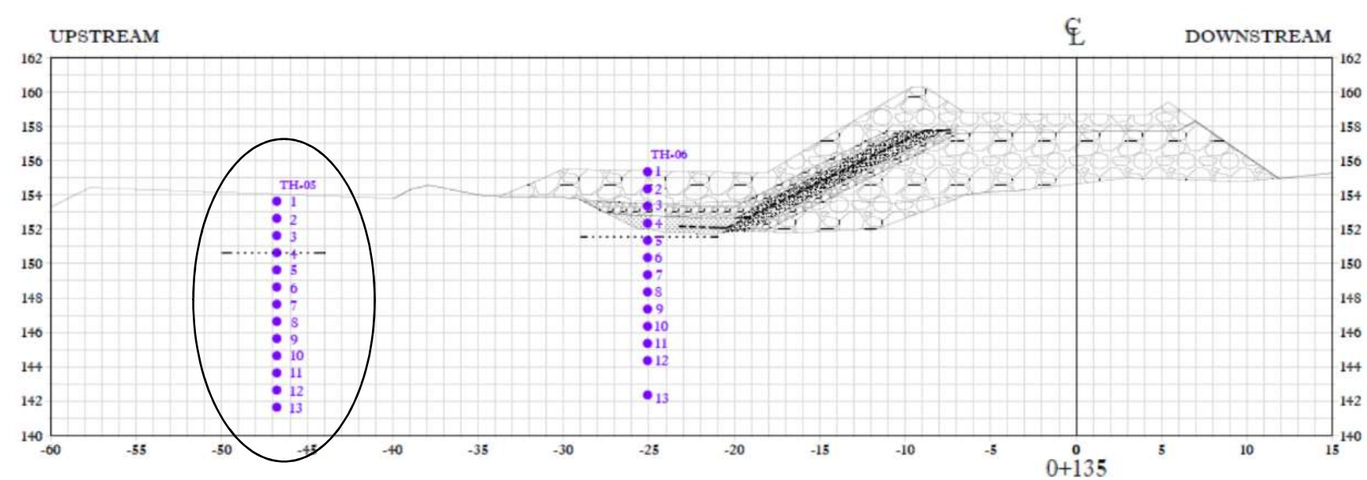

UPSTREAM
DOWNSTREAM
TH-04
0+093

WRSFD TH05

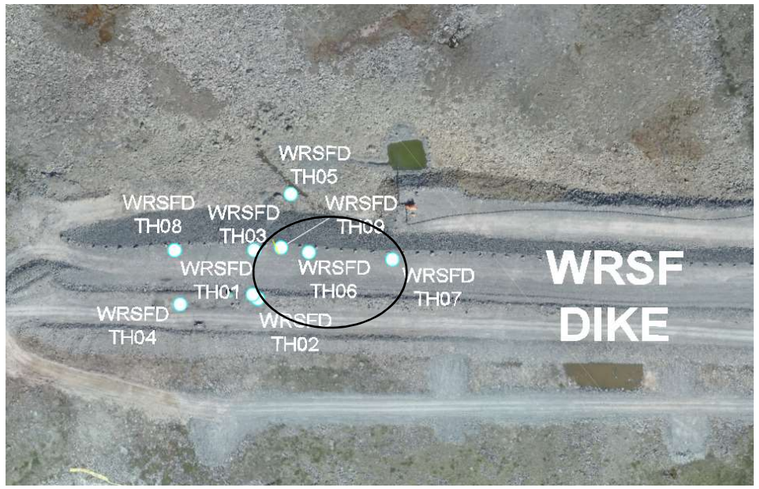

WRSFD TH05
WRSFD TH08
WRSFD TH03
WRSFD TH09
WRSFD TH01
WRSFD TH06
WRSFD TH07
WRSFD TH04
WRSFD TH02
WRSF DIKE

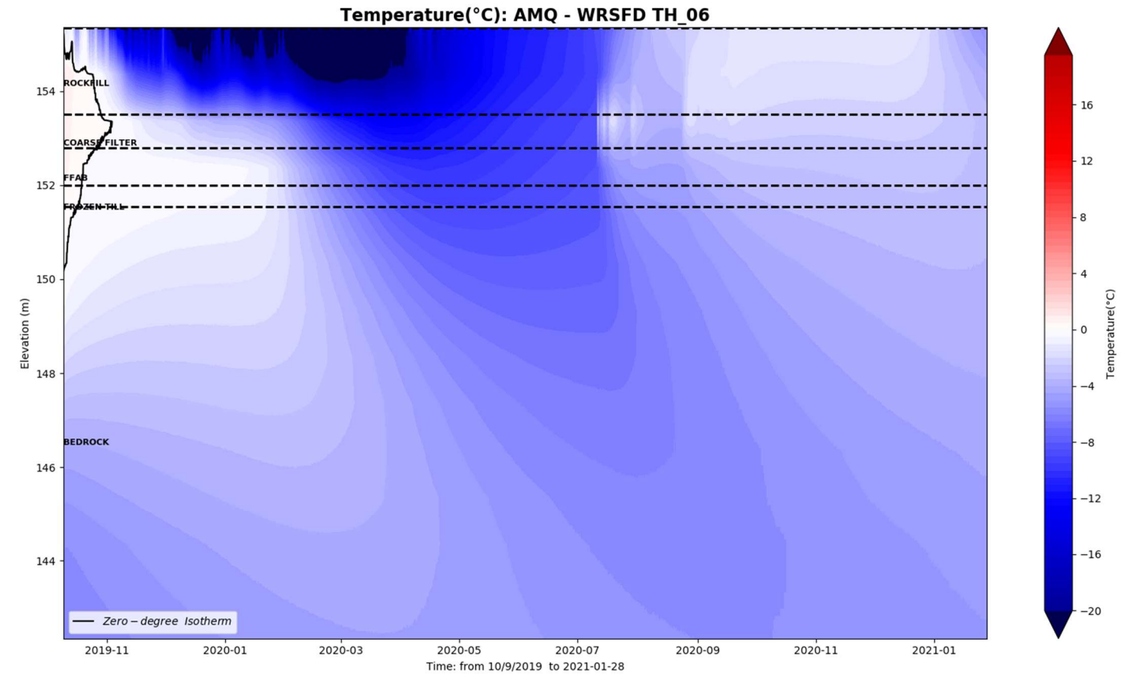

Temperature(°C): AMQ - WRSFD TH_05
OVERBURDEN
BEDROCK
Elevation (m)
Zero – degree Isotherm
Time: from 10/9/2019 to 2021-01-28
Temperature(°C)

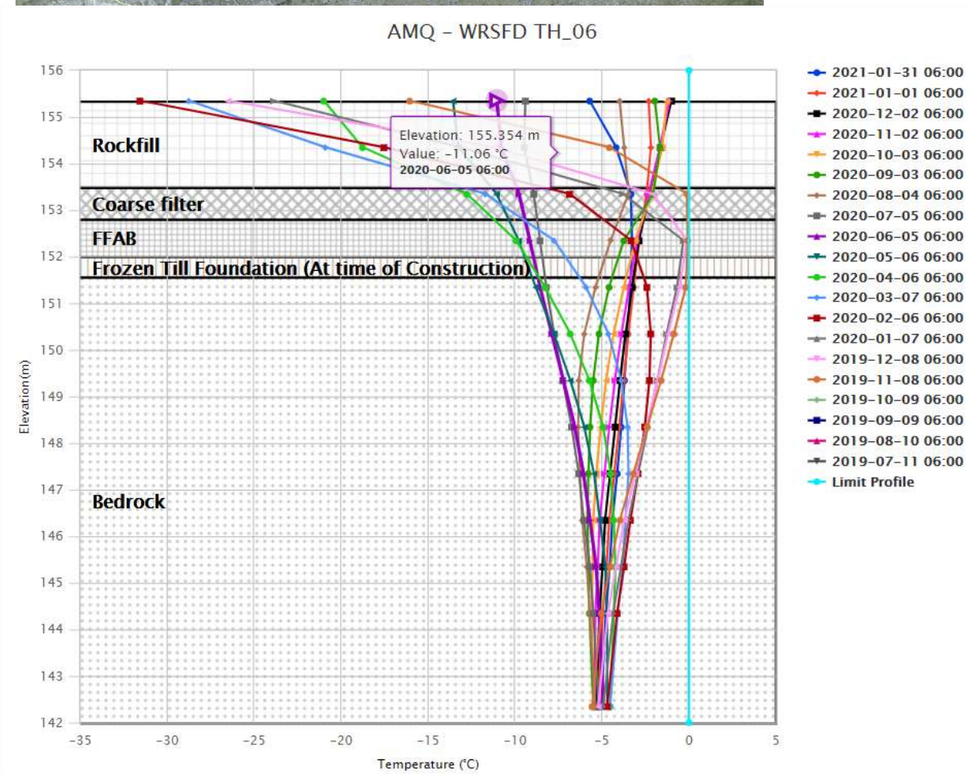

AMQ – WRSFD TH_05
Bead #6 removed
Overburden
Bedrock
Elevation(m)
Temperature (°C)
2021-01-01 06:00
2020-12-02 06:00
2020-11-02 06:00
2020-10-03 06:00
2020-09-03 06:00
2020-08-04 06:00
2020-07-05 06:00
2020-06-05 06:00
2020-05-06 06:00
2020-04-06 06:00
2020-03-07 06:00
2020-02-06 06:00
2020-01-07 06:00
2019-12-08 06:00
2019-11-08 06:00
2019-10-09 11:51
Limit Profile

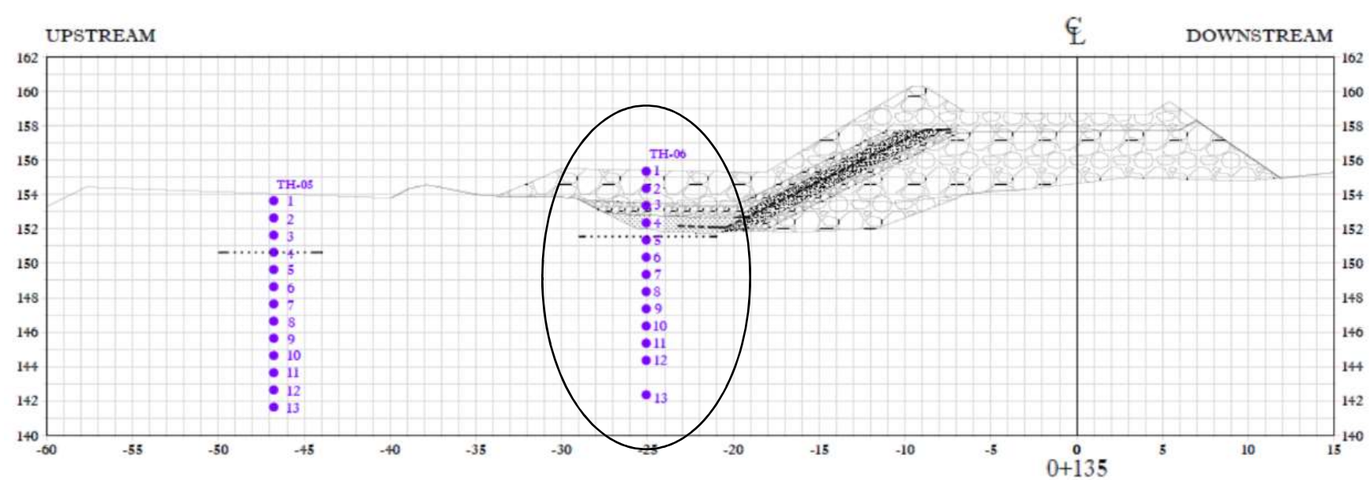

UPSTREAM
DOWNSTREAM
TH-05
TH-06
0+135

WRSFD TH06

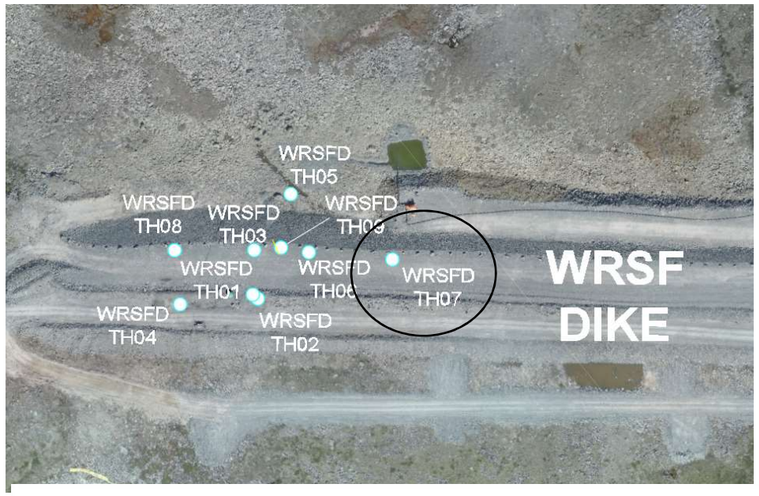

WRSFD TH05
WRSFD TH08
WRSFD TH03
WRSFD TH09
WRSFD TH01
WRSFD TH06
WRSFD TH07
WRSFD TH04
WRSFD TH02
WRSF DIKE

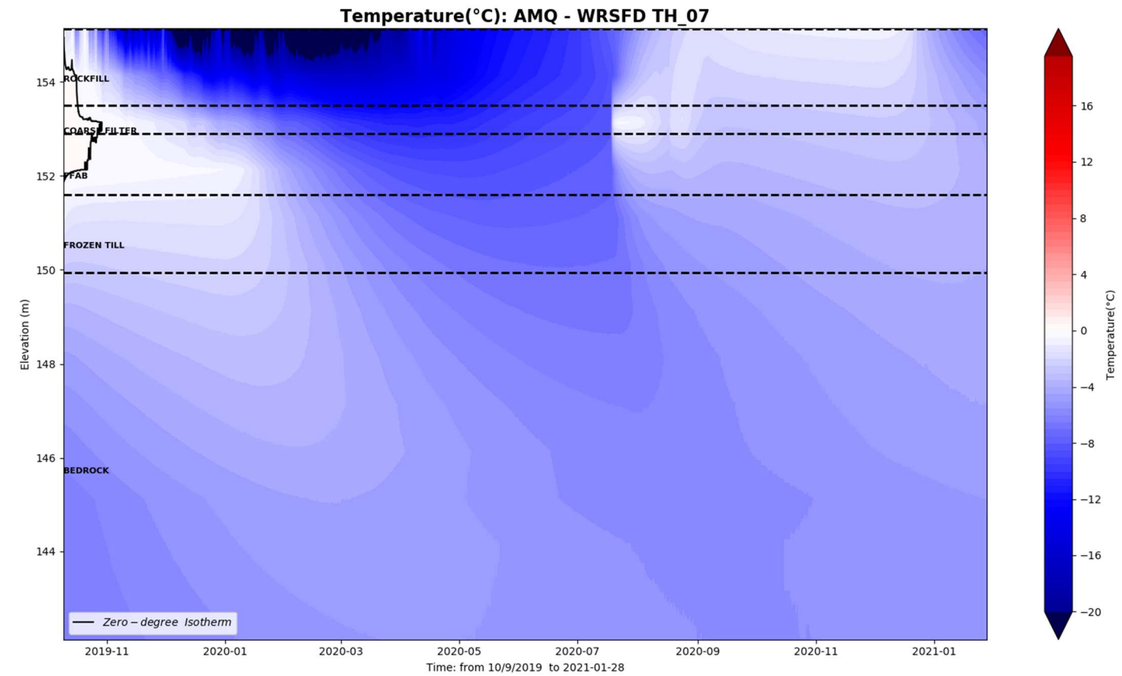

Temperature(°C): AMQ - WRSFD TH_06
ROCKFILL
COARSE FILTER
FFAB
FROZEN TILL
BEDROCK
Elevation (m)
Zero – degree Isotherm
Time: from 10/9/2019 to 2021-01-28
Temperature(°C)

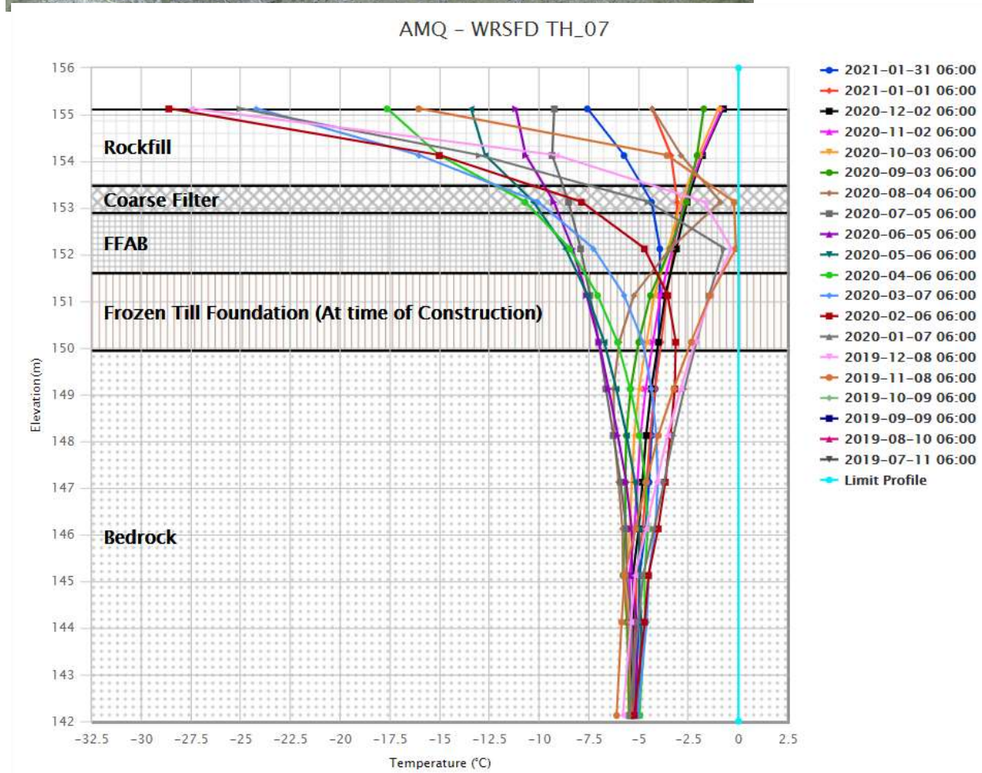

AMQ – WRSFD TH_06
Rockfill
Coarse filter
FFAB
Frozen Till Foundation (At time of Construction)
Bedrock
Elevation: 155.354 m
Value: -11.06 °C
2020-06-05 06:00
Elevation (m)
Temperature (°C)
2021-01-31 06:00
2021-01-01 06:00
2020-12-02 06:00
2020-11-02 06:00
2020-10-03 06:00
2020-09-03 06:00
2020-08-04 06:00
2020-07-05 06:00
2020-06-05 06:00
2020-05-06 06:00
2020-04-06 06:00
2020-03-07 06:00
2020-02-06 06:00
2020-01-07 06:00
2019-12-08 06:00
2019-11-08 06:00
2019-10-09 06:00
2019-09-09 06:00
2019-08-10 06:00
2019-07-11 06:00
Limit Profile

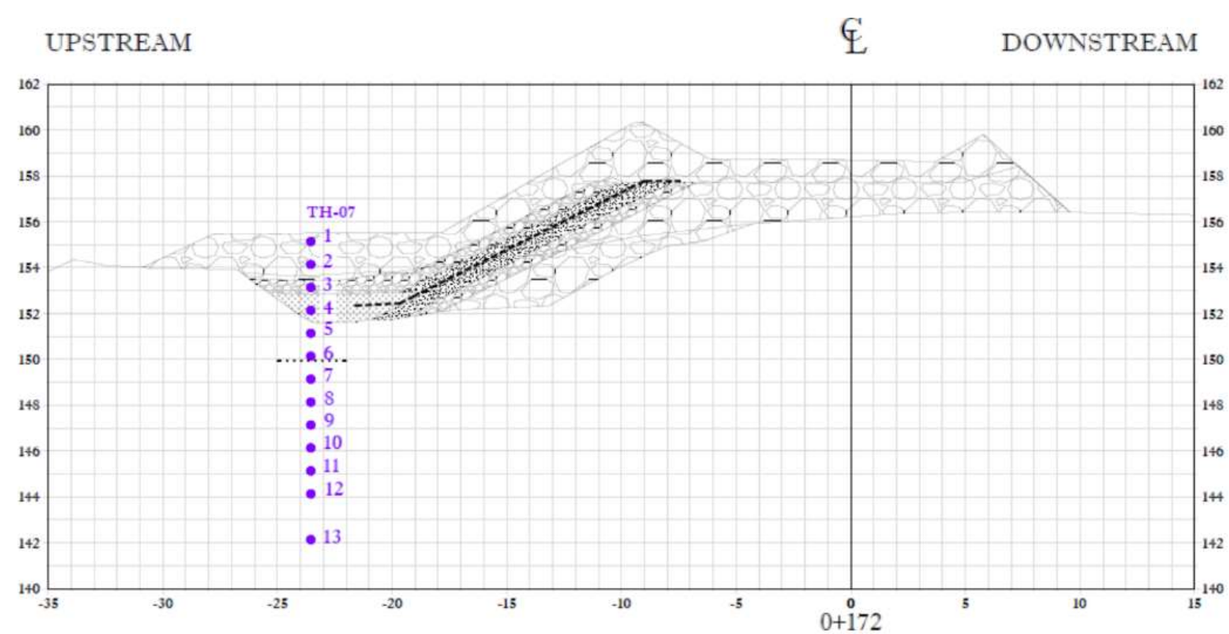

UPSTREAM
DOWNSTREAM
TH-05
TH-06
0+135

WRSFD TH07

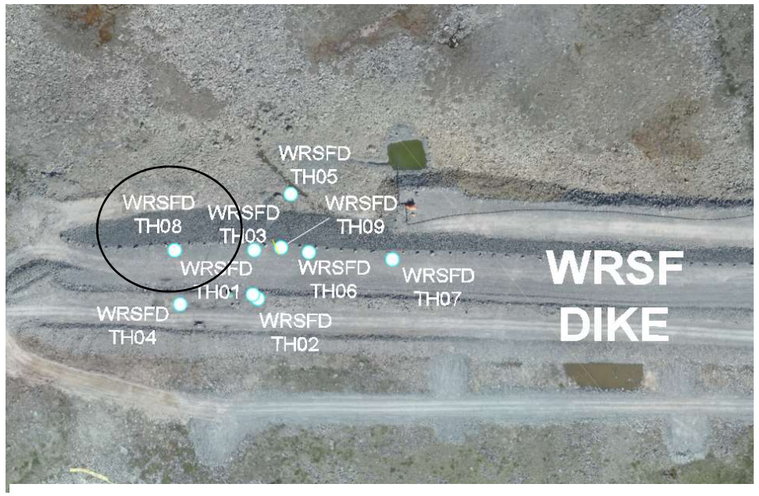

WRSFD TH05
WRSFD TH08
WRSFD TH03
WRSFD TH09
WRSFD TH01
WRSFD TH06
WRSFD TH07
WRSFD TH04
WRSFD TH02
WRSF DIKE

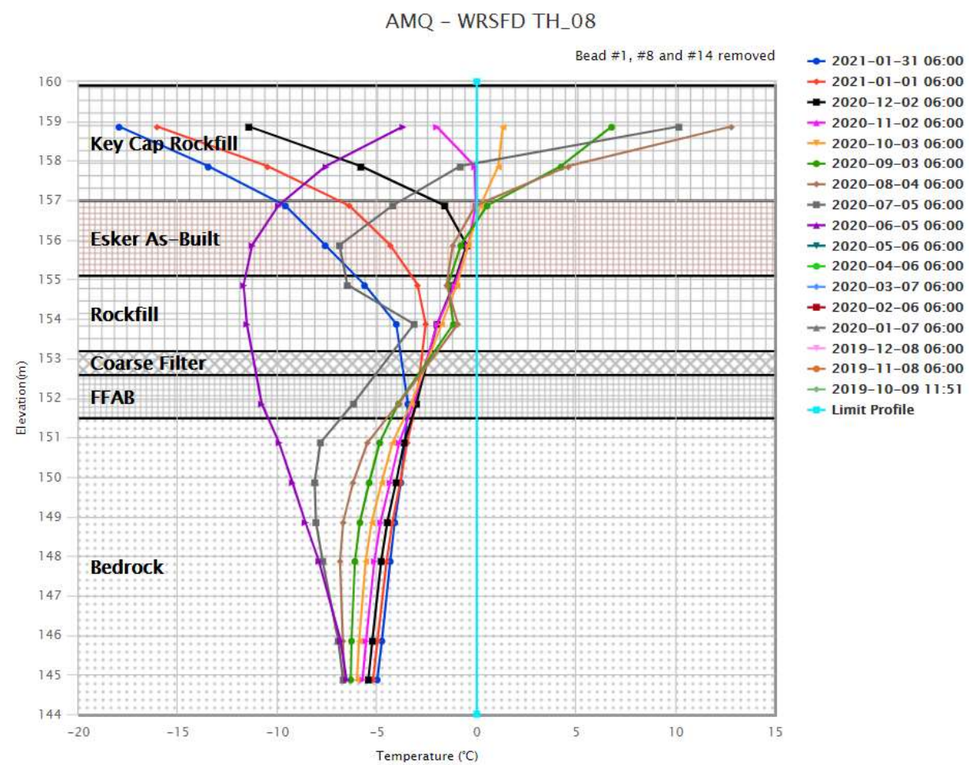

Temperature(°C): AMQ - WRSFD TH_07
ROCKFILL
COARSE FILTER
FFAB
FROZEN TILL
BEDROCK
Elevation (m)
Zero – degree Isotherm
Time: from 10/9/2019 to 2021-01-28
Temperature(°C)

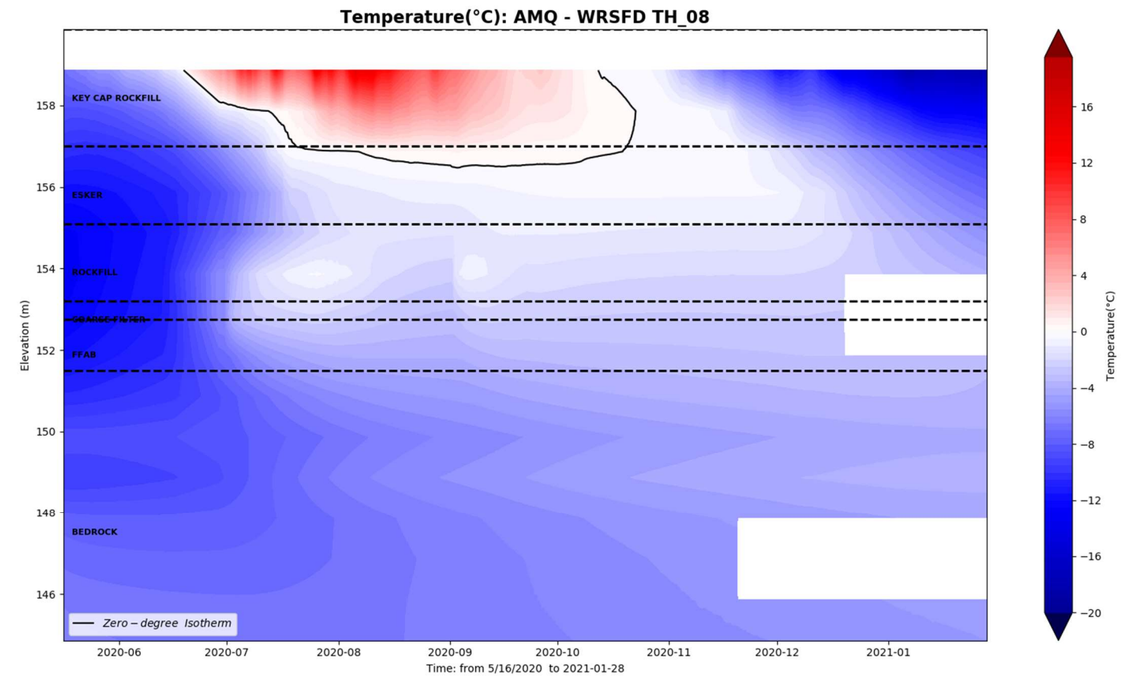

AMQ – WRSFD TH_07
Rockfill
Coarse Filter
FFAB
Frozen Till Foundation (At time of Construction)
Bedrock
Elevation(m)
Temperature (°C)
2021-01-31 06:00
2021-01-01 06:00
2020-12-02 06:00
2020-11-02 06:00
2020-10-03 06:00
2020-09-03 06:00
2020-08-04 06:00
2020-07-05 06:00
2020-06-05 06:00
2020-05-06 06:00
2020-04-06 06:00
2020-03-07 06:00
2020-02-06 06:00
2020-01-07 06:00
2019-12-08 06:00
2019-11-08 06:00
2019-10-09 06:00
2019-09-09 06:00
2019-08-10 06:00
2019-07-11 06:00
Limit Profile

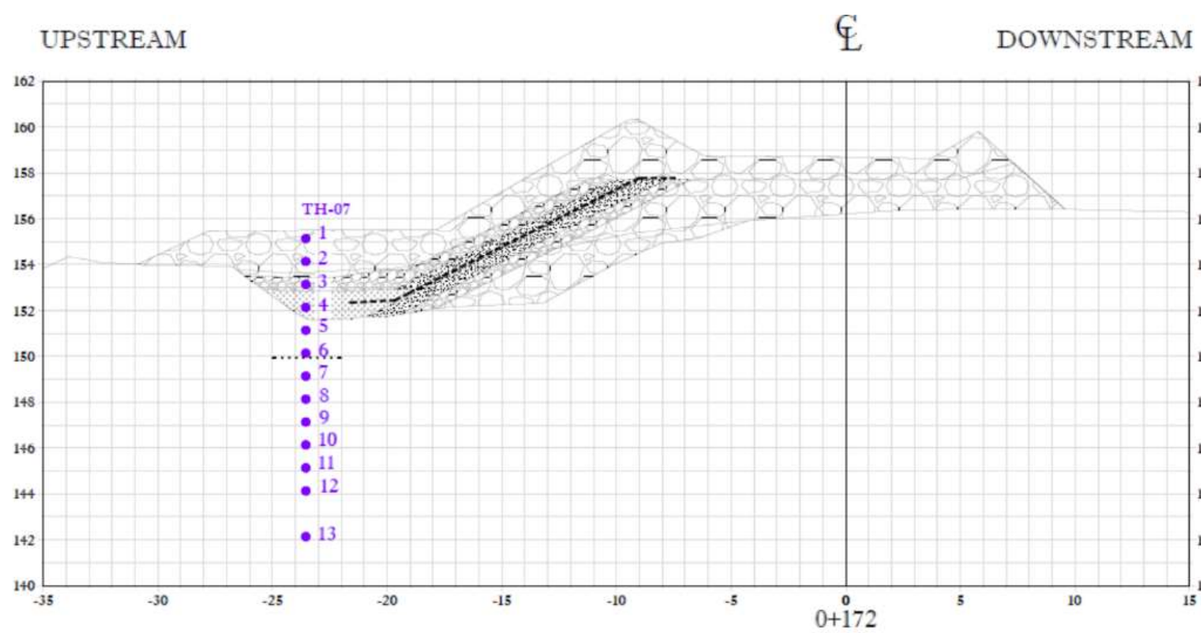

UPSTREAM
DOWNSTREAM
TH-07
0+172

WRSFD TH08

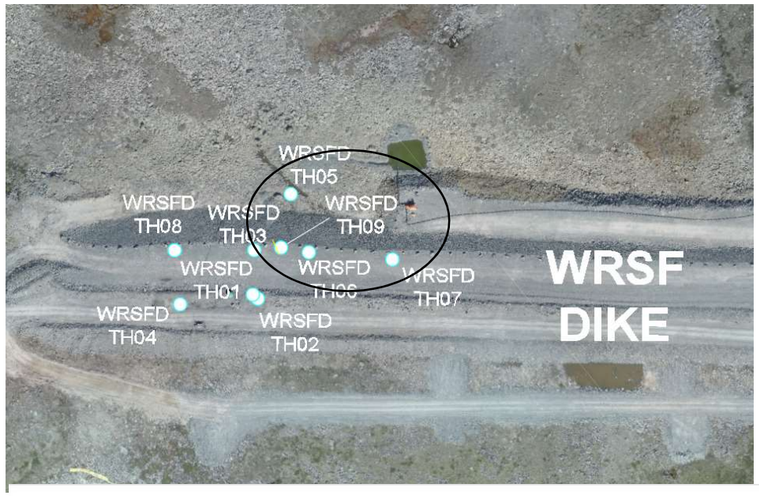

WRSFD TH05
WRSFD TH08
WRSFD TH03
WRSFD TH09
WRSFD TH01
WRSFD TH06
WRSFD TH07
WRSFD TH04
WRSFD TH02
WRSF DIKE

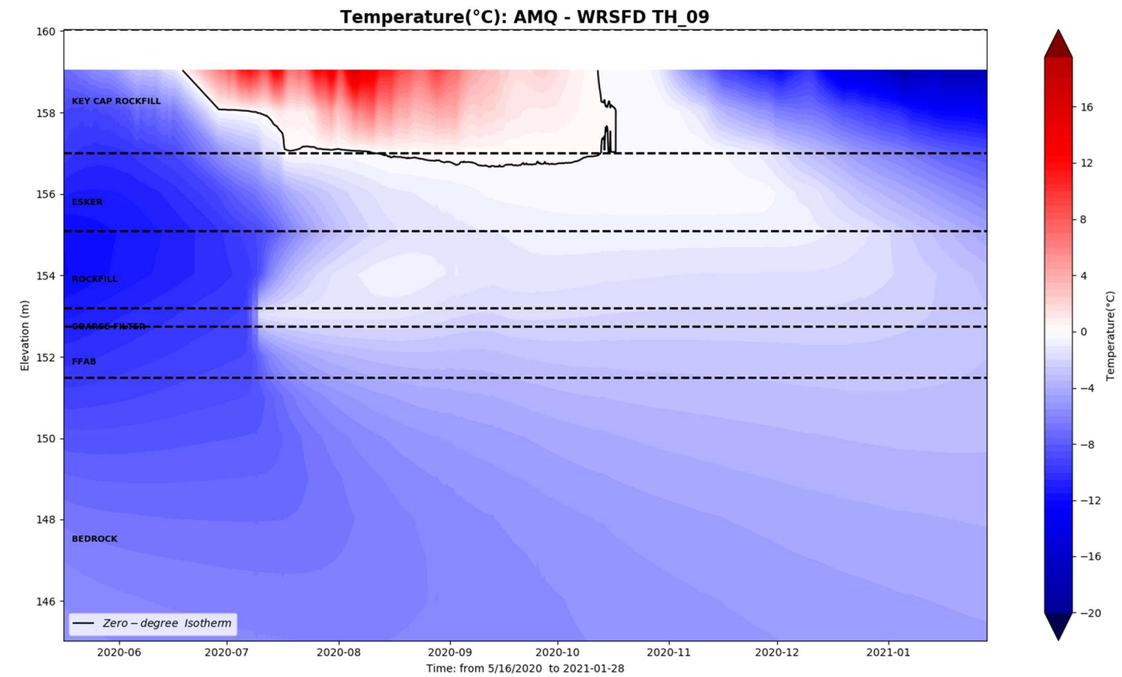

AMQ – WRSFD TH_08
Bead #1, #8 and #14 removed
Key Cap Rockfill
Esker As-Built
Rockfill
Coarse Filter
FFAB
Bedrock
Elevation(m)
Temperature (°C)
2021-01-01 06:00
2020-12-02 06:00
2020-11-02 06:00
2020-10-03 06:00
2020-09-03 06:00
2020-08-04 06:00
2020-07-05 06:00
2020-06-05 06:00
2020-05-06 06:00
2020-04-06 06:00
2020-03-07 06:00
2020-02-06 06:00
2020-01-07 06:00
2019-12-08 06:00
2019-11-08 06:00
2019-10-09 11:51
Limit Profile

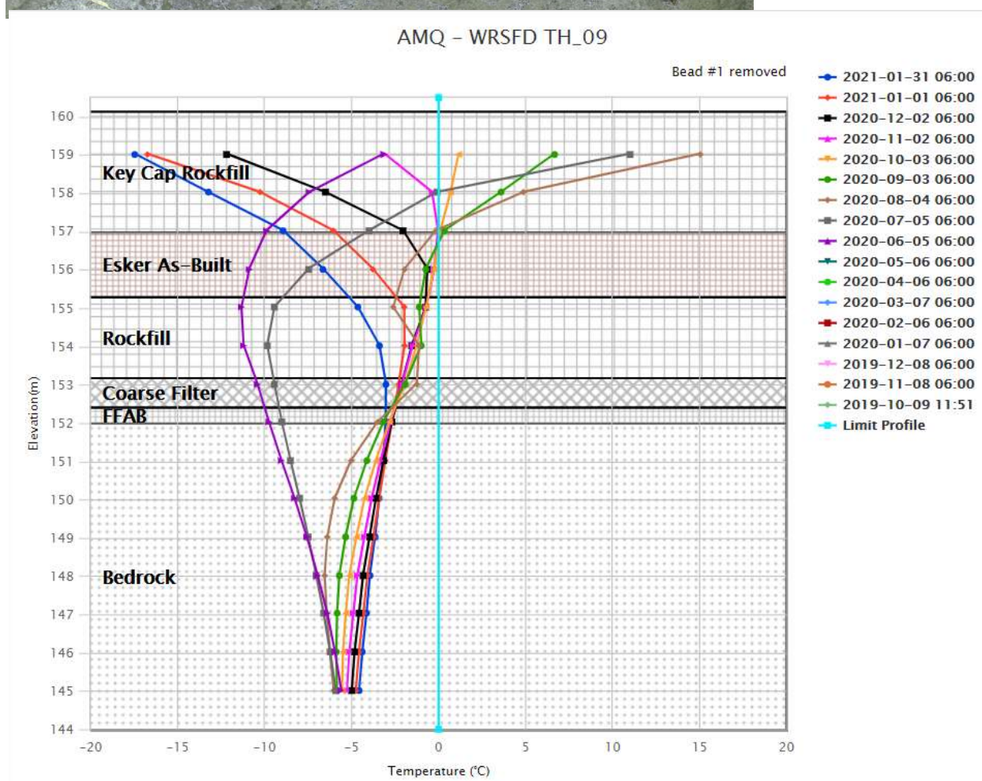

Temperature(°C): AMQ - WRSFD TH_08
KEY CAP ROCKFILL
ESKER
ROCKFILL
COARSE FILTER
FFAB
BEDROCK
Elevation (m)
Zero – degree Isotherm
Temperature(°C)
Time: from 5/16/2020 to 2021-01-28

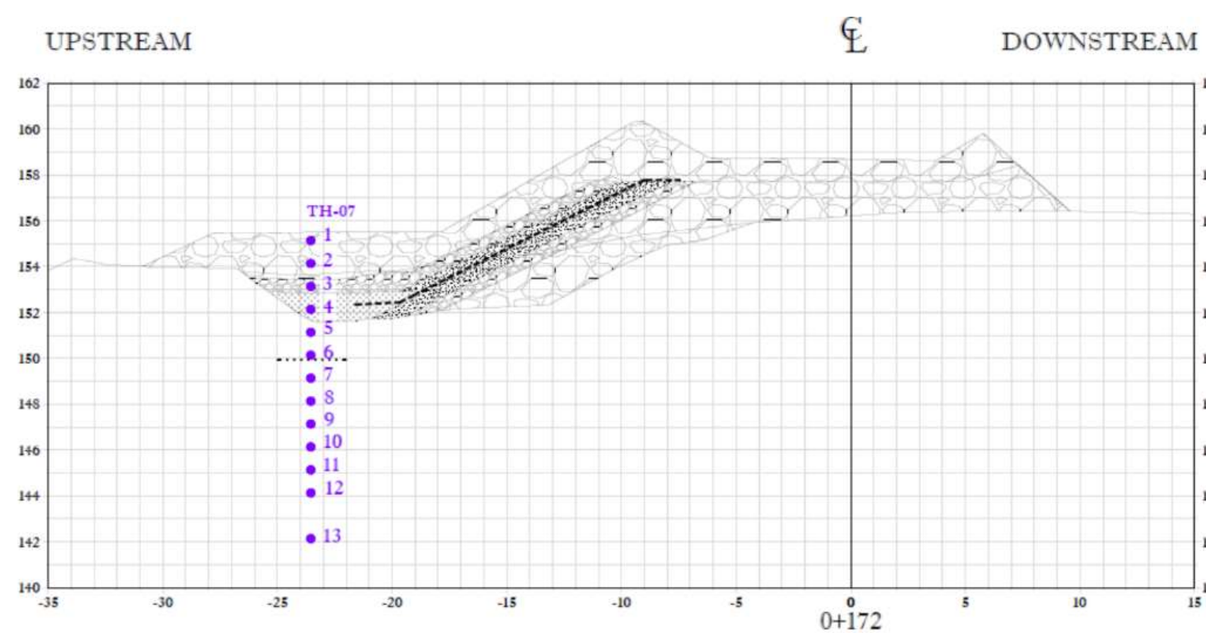

UPSTREAM
DOWNSTREAM
TH-07
1
2
3
4
5
6
7
8
9
10
11
12
13
0+172

WRSFD TH09


WRSFD TH05
WRSFD TH08
WRSFD TH03
WRSFD TH09
WRSFD TH01
WRSFD TH06
WRSFD TH07
WRSFD TH04
WRSFD TH02
WRSF DIKE

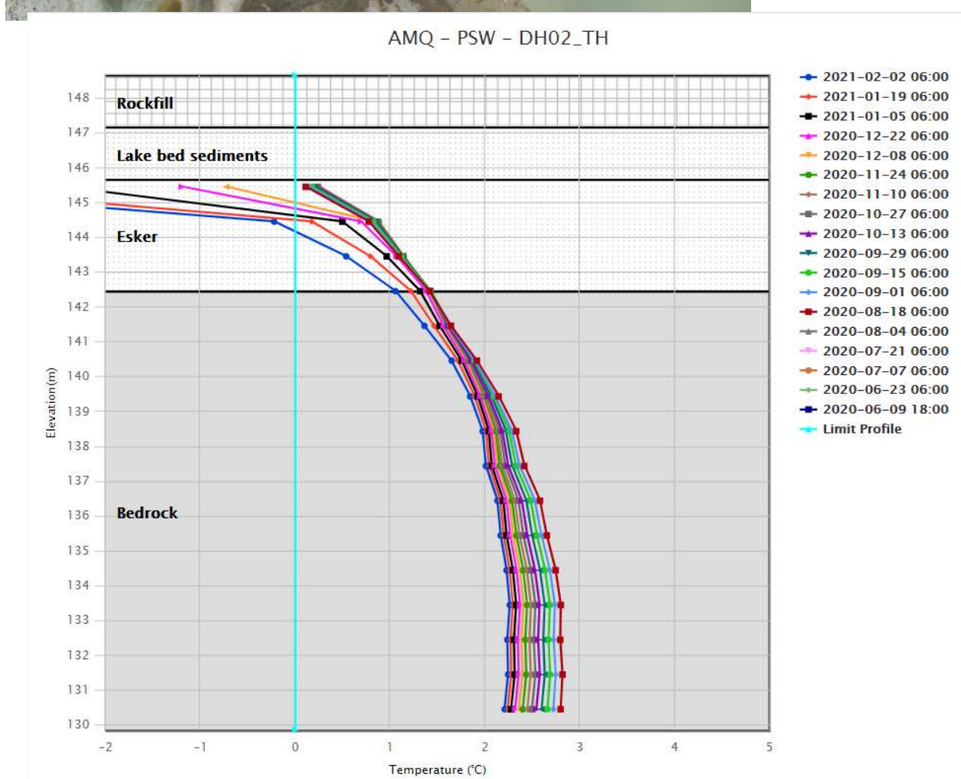

Temperature(°C): AMQ - WRSFD TH_09
KEY CAP ROCKFILL
ESKER
ROCKFILL
COARSE FILTER
FFAB
BEDROCK
Zero – degree Isotherm
Elevation (m)
Temperature(°C)
Time: from 5/16/2020 to 2021-01-28

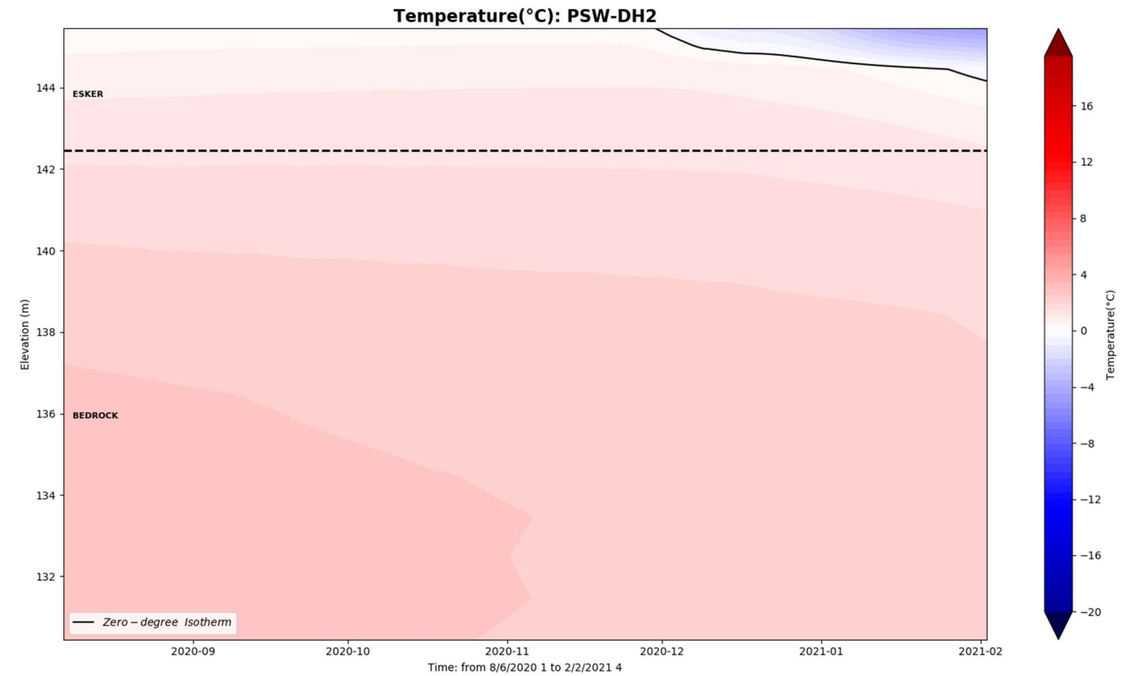

AMQ – WRSFD TH_09
Bead #1 removed
Key Cap Rockfill
Esker As-Built
Rockfill
Coarse Filter
FFAB
Bedrock
Elevation(m)
Temperature (°C)
2021-01-01 06:00
2020-12-02 06:00
2020-11-02 06:00
2020-10-03 06:00
2020-09-03 06:00
2020-08-04 06:00
2020-07-05 06:00
2020-06-05 06:00
2020-05-06 06:00
2020-04-06 06:00
2020-03-07 06:00
2020-02-06 06:00
2020-01-07 06:00
2019-12-08 06:00
2019-11-08 06:00
2019-10-09 11:51
Limit Profile

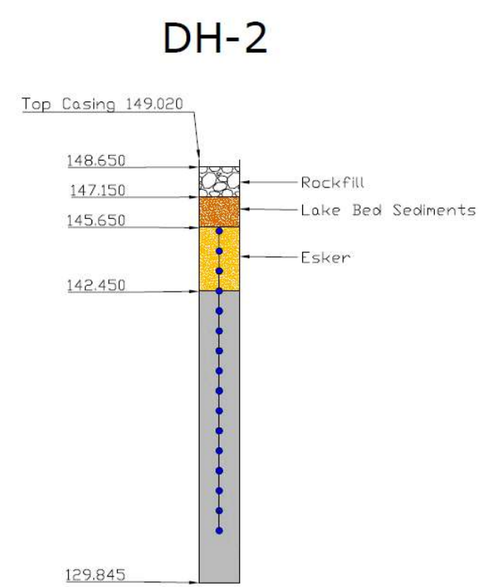

UPSTREAM
DOWNSTREAM
TH-07
0+172

PSW – DH 2 TH


DH1
DH2
DH3
DH4
DH5
DH6
DH7
DH8
DH9
DH10
DH11
DH12

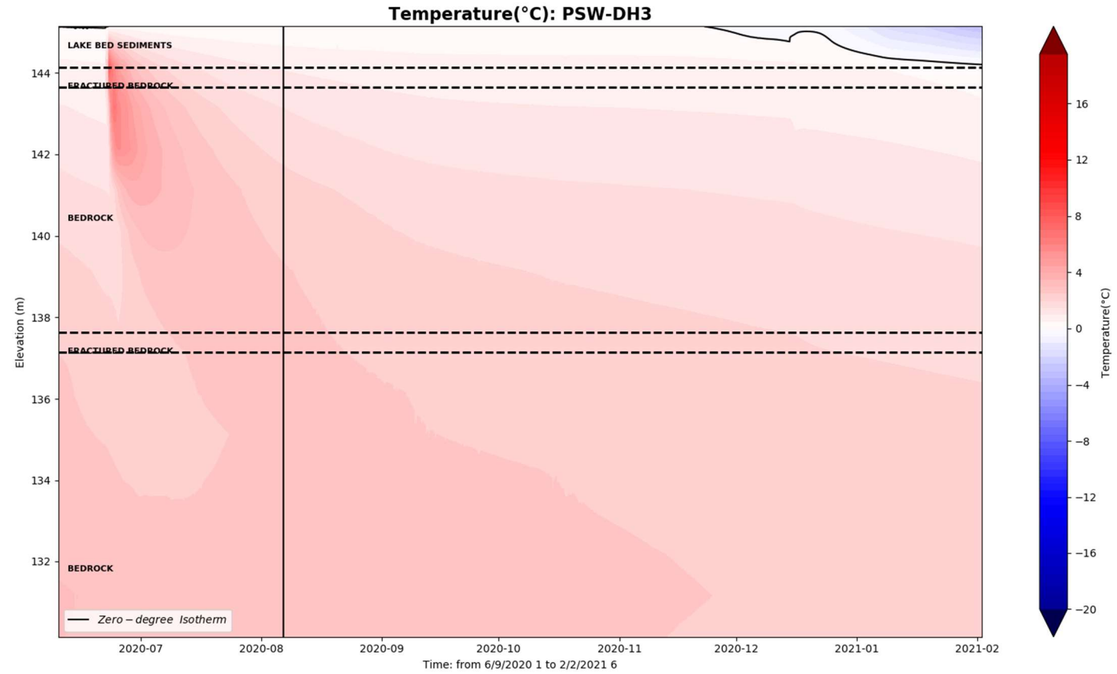

AMQ – PSW – DH02_TH
Rockfill
Lake bed sediments
Esker
Bedrock
Elevation (m)
Temperature (°C)
2021-02-02 06:00
2021-01-19 06:00
2021-01-05 06:00
2020-12-22 06:00
2020-12-08 06:00
2020-11-24 06:00
2020-11-10 06:00
2020-10-27 06:00
2020-10-13 06:00
2020-09-29 06:00
2020-09-15 06:00
2020-09-01 06:00
2020-08-18 06:00
2020-08-04 06:00
2020-07-21 06:00
2020-07-07 06:00
2020-06-23 06:00
2020-06-09 18:00
Limit Profile

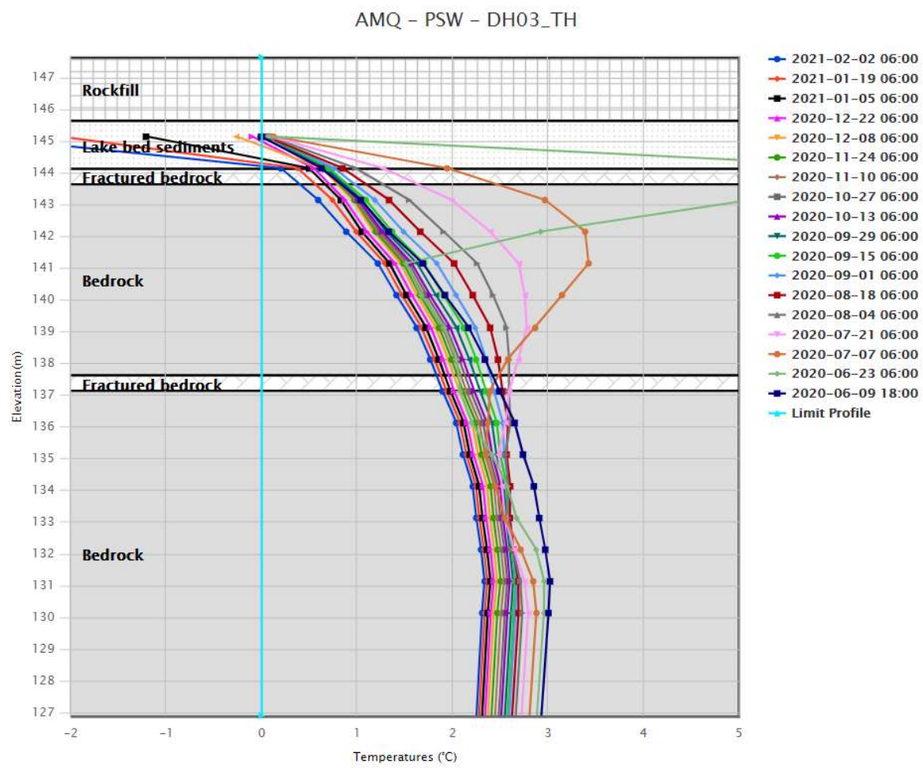

Temperature(°C): PSW-DH2
ESKER
BEDROCK
Zero – degree Isotherm
Elevation (m)
Time: from 8/6/2020 1 to 2/2/2021 4
Temperature(°C)

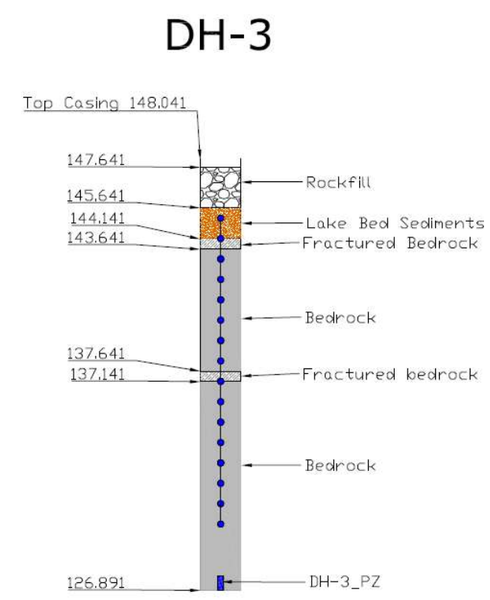

DH-2
Top Casing 149.020
148.650
147.150
145.650
142.450
129.845
Rockfill
Lake Bed Sediments
Esker

PSW – DH 3 TH


DH1
DH2
DH3
DH4
DH5
DH6
DH7
DH8
DH9
DH10
DH11
DH12

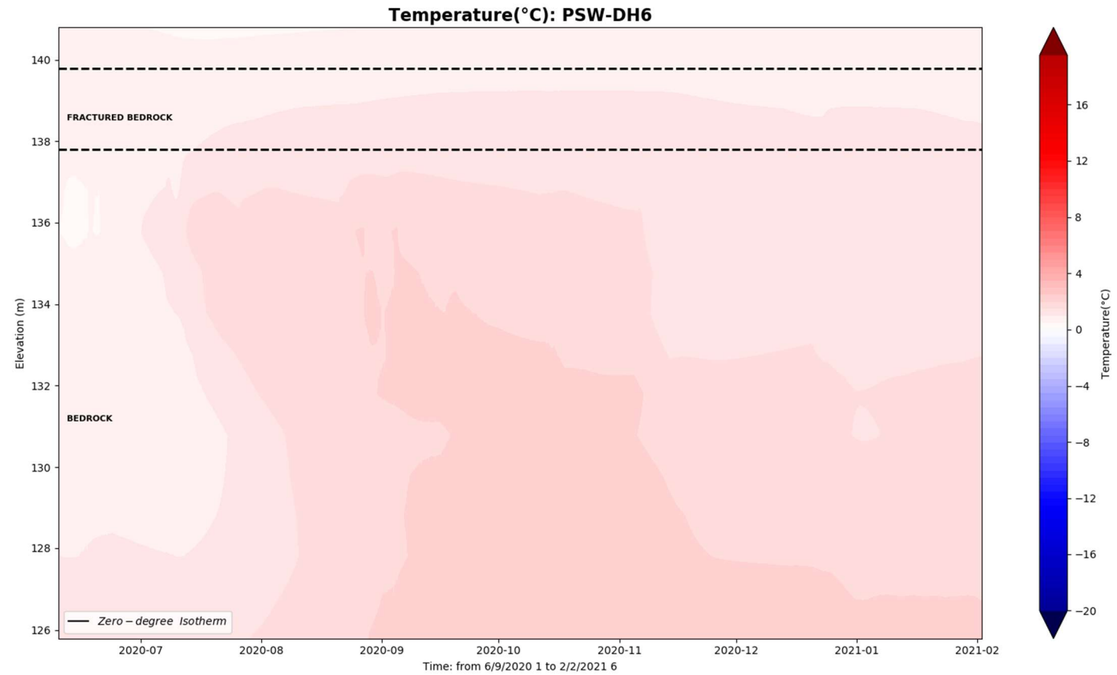

Temperature(°C): PSW-DH3
LAKE BED SEDIMENTS
FRACTURED BEDROCK
BEDROCK
FRACTURED BEDROCK
BEDROCK
Zero – degree Isotherm
Elevation (m)
Time: from 6/9/2020 1 to 2/2/2021 6
Temperature(°C)

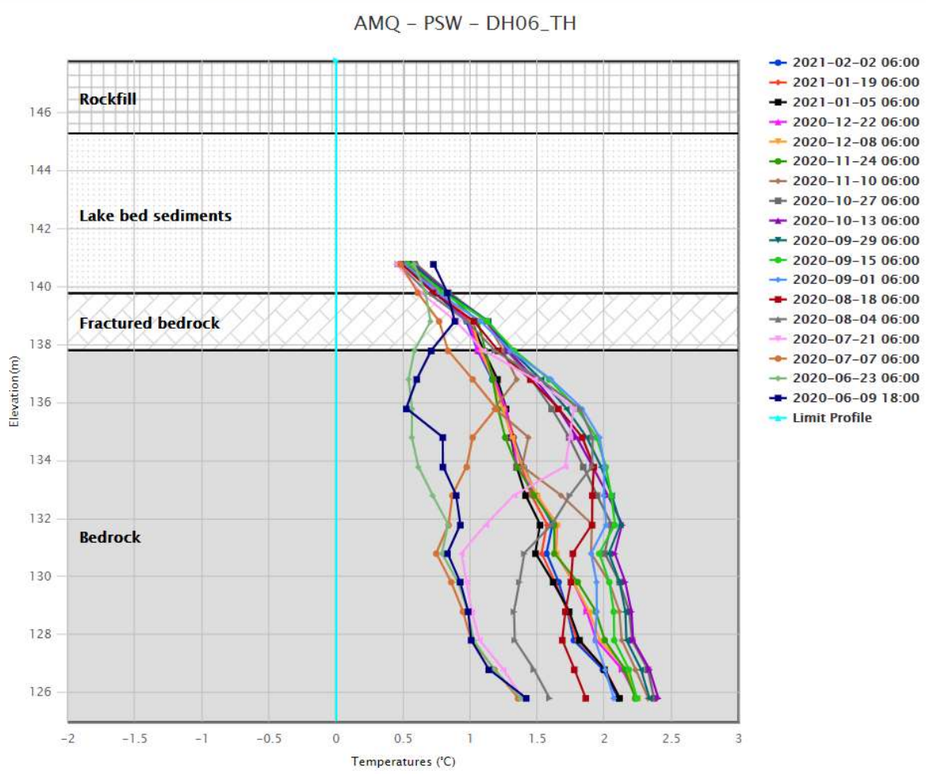

AMQ – PSW – DH03_TH
Rockfill
Lake bed sediments
Fractured bedrock
Bedrock
Fractured bedrock
Bedrock
Elevation(m)
Temperatures (°C)
2021-02-02 06:00
2021-01-19 06:00
2021-01-05 06:00
2020-12-22 06:00
2020-12-08 06:00
2020-11-24 06:00
2020-11-10 06:00
2020-10-27 06:00
2020-10-13 06:00
2020-09-29 06:00
2020-09-15 06:00
2020-09-01 06:00
2020-08-18 06:00
2020-08-04 06:00
2020-07-21 06:00
2020-07-07 06:00
2020-06-23 06:00
2020-06-09 18:00
Limit Profile

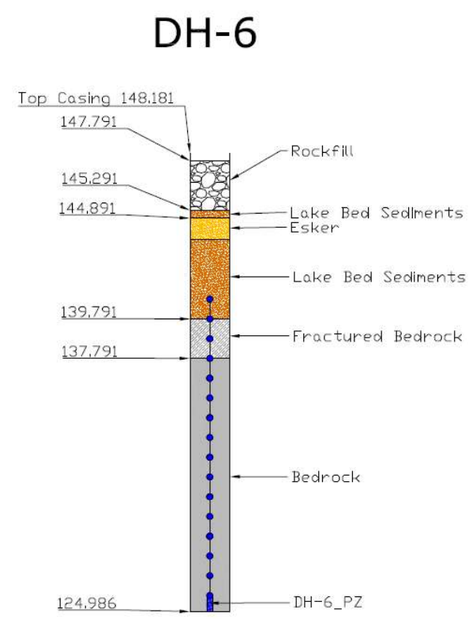

DH-3
Top Casing 148.041
147.641
145.641
144.141
143.641
137.641
137.141
126.891
Rockfill
Lake Bed Sediments
Fractured Bedrock
Bedrock
Fractured bedrock
Bedrock
DH-3_PZ

PSW – DH 6 TH


DH1
DH2
DH3
DH4
DH5
DH6
DH7
DH8
DH9
DH10
DH11
DH12

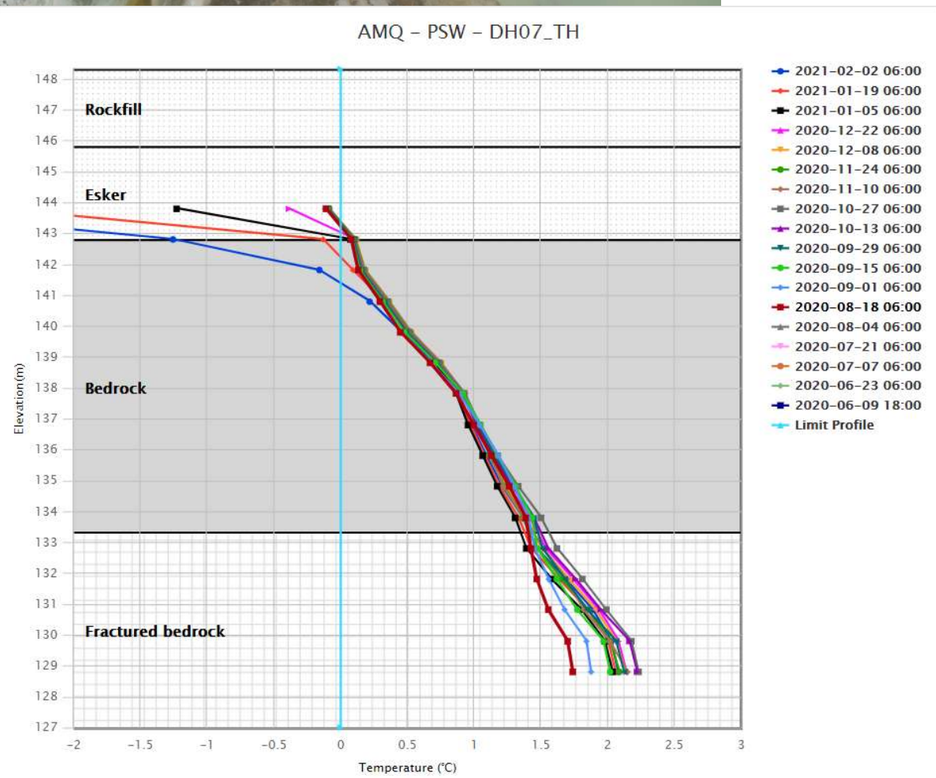

Temperature(°C): PSW-DH6
FRACTURED BEDROCK
BEDROCK
Zero – degree Isotherm
Elevation (m)
Time: from 6/9/2020 1 to 2/2/2021 6
Temperature(°C)

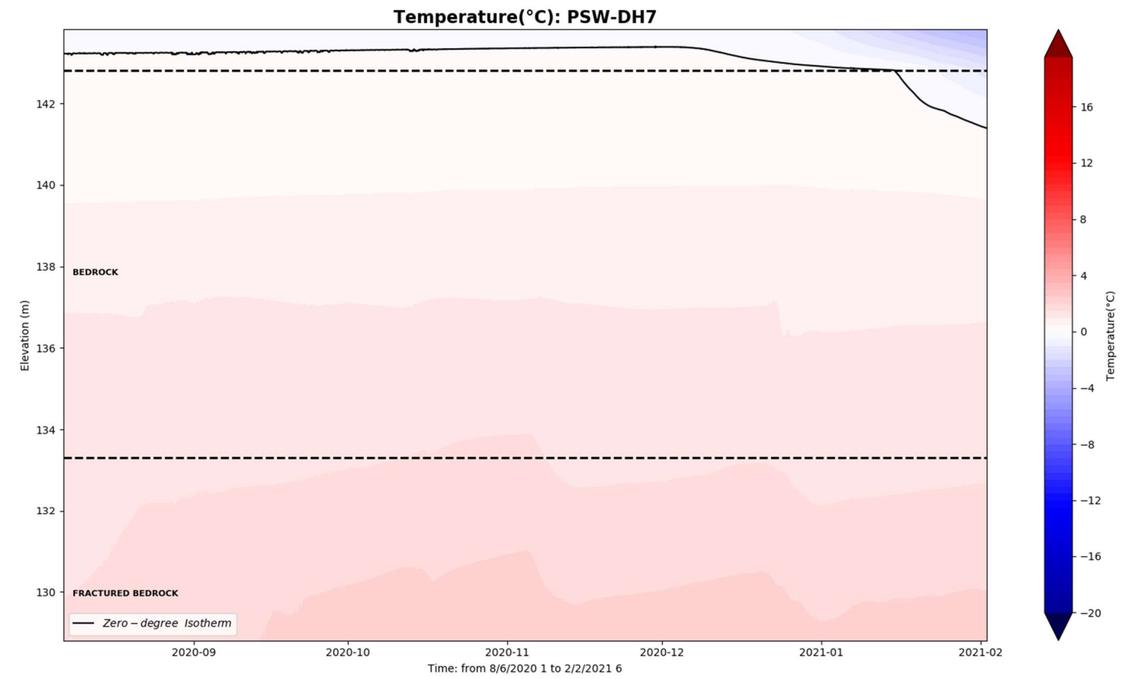

AMQ – PSW – DH06_TH
Rockfill
Lake bed sediments
Fractured bedrock
Bedrock
Elevation(m)
Temperatures (°C)
2021-02-02 06:00
2021-01-19 06:00
2021-01-05 06:00
2020-12-22 06:00
2020-12-08 06:00
2020-11-24 06:00
2020-11-10 06:00
2020-10-27 06:00
2020-10-13 06:00
2020-09-29 06:00
2020-09-15 06:00
2020-09-01 06:00
2020-08-18 06:00
2020-08-04 06:00
2020-07-21 06:00
2020-07-07 06:00
2020-06-23 06:00
2020-06-09 18:00
Limit Profile

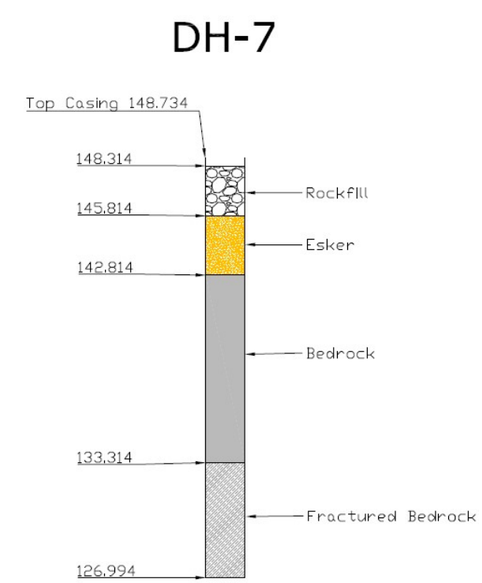

DH-6
Top Casing 148.181
147.791
145.291
144.891
139.791
137.791
124.986
Rockfill
Lake Bed Sediments
Esker
Lake Bed Sediments
Fractured Bedrock
Bedrock
DH-6_PZ

PSW – DH 7 TH


DH1
DH2
DH3
DH4
DH5
DH6
DH7
DH8
DH9
DH10
DH11
DH12

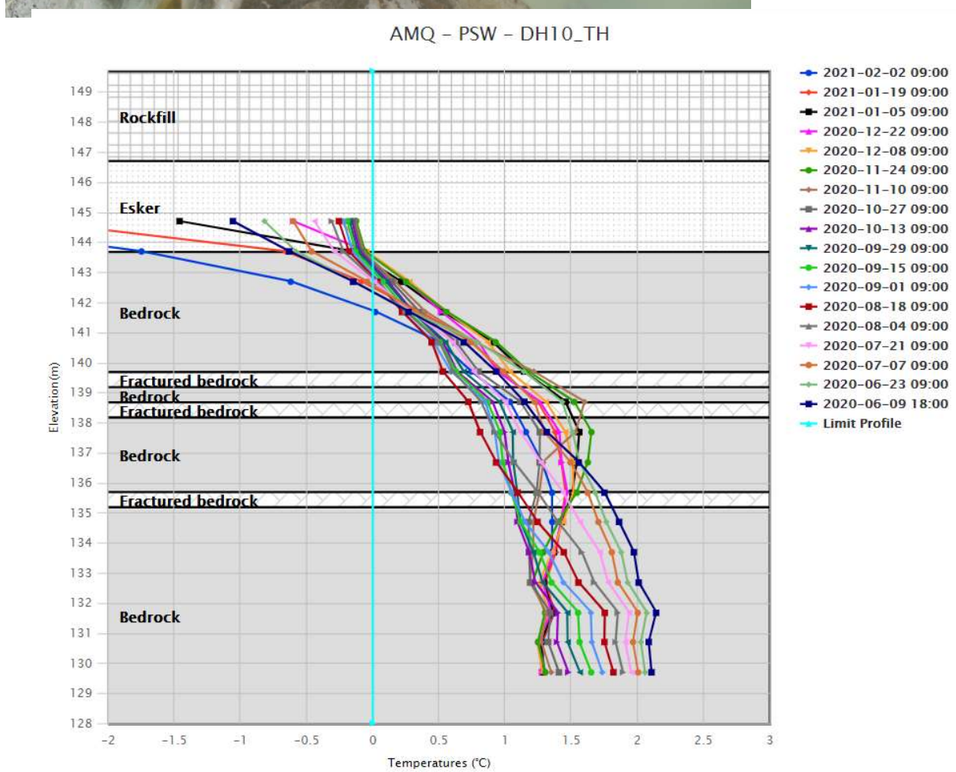

AMQ – PSW – DH07_TH
Rockfill
Esker
Bedrock
Fractured bedrock
Elevation (m)
Temperature (°C)
2021-02-02 06:00
2021-01-19 06:00
2021-01-05 06:00
2020-12-22 06:00
2020-12-08 06:00
2020-11-24 06:00
2020-11-10 06:00
2020-10-27 06:00
2020-10-13 06:00
2020-09-29 06:00
2020-09-15 06:00
2020-09-01 06:00
2020-08-18 06:00
2020-08-04 06:00
2020-07-21 06:00
2020-07-07 06:00
2020-06-23 06:00
2020-06-09 18:00
Limit Profile

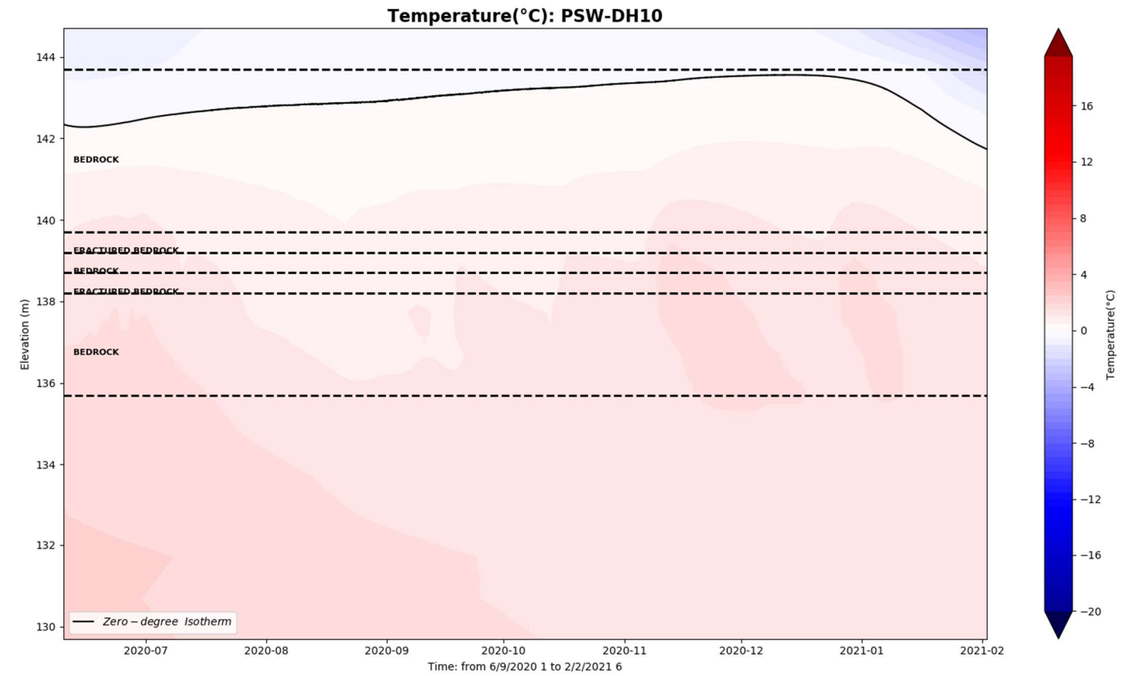

Temperature(°C): PSW-DH7
BEDROCK
FRACTURED BEDROCK
Zero – degree Isotherm
Elevation (m)
Time: from 8/6/2020 1 to 2/2/2021 6
Temperature(°C)

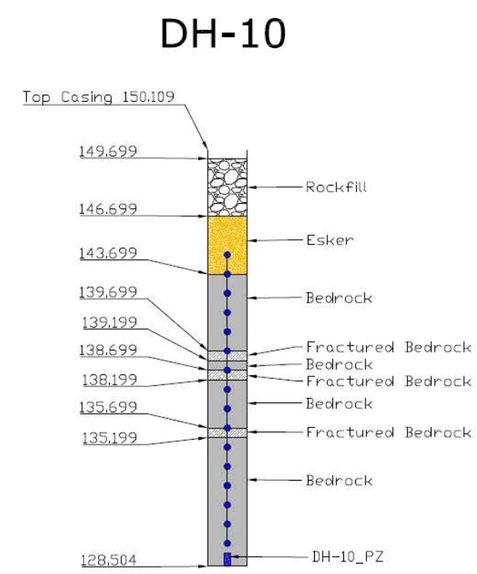

DH-7
Top Casing 148.734
148.314
145.814
142.814
133.314
126.994
Rockfill
Esker
Bedrock
Fractured Bedrock

PSW – DH 10 TH


DH1
DH2
DH3
DH4
DH5
DH6
DH7
DH8
DH9
DH10
DH11
DH12

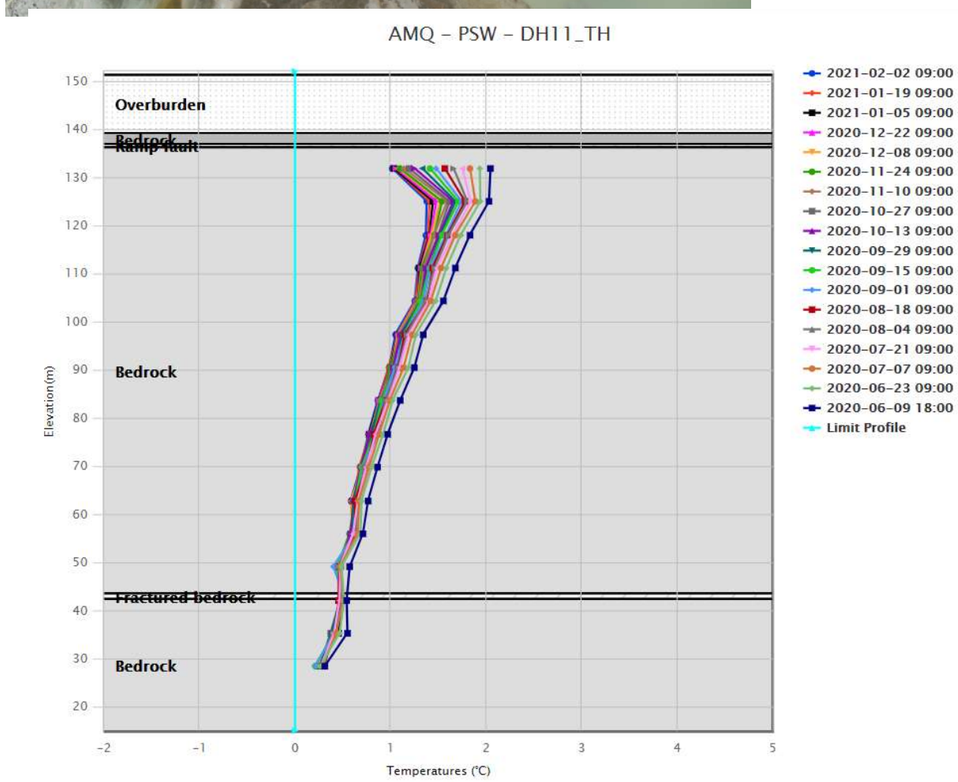

AMQ – PSW – DH10_TH
Rockfill
Esker
Bedrock
Fractured bedrock
Bedrock
Fractured bedrock
Bedrock
Fractured bedrock
Bedrock
Elevation(m)
Temperatures (°C)
2021-02-02 09:00
2021-01-19 09:00
2021-01-05 09:00
2020-12-22 09:00
2020-12-08 09:00
2020-11-24 09:00
2020-11-10 09:00
2020-10-27 09:00
2020-10-13 09:00
2020-09-29 09:00
2020-09-15 09:00
2020-09-01 09:00
2020-08-18 09:00
2020-08-04 09:00
2020-07-21 09:00
2020-07-07 09:00
2020-06-23 09:00
2020-06-09 18:00
Limit Profile

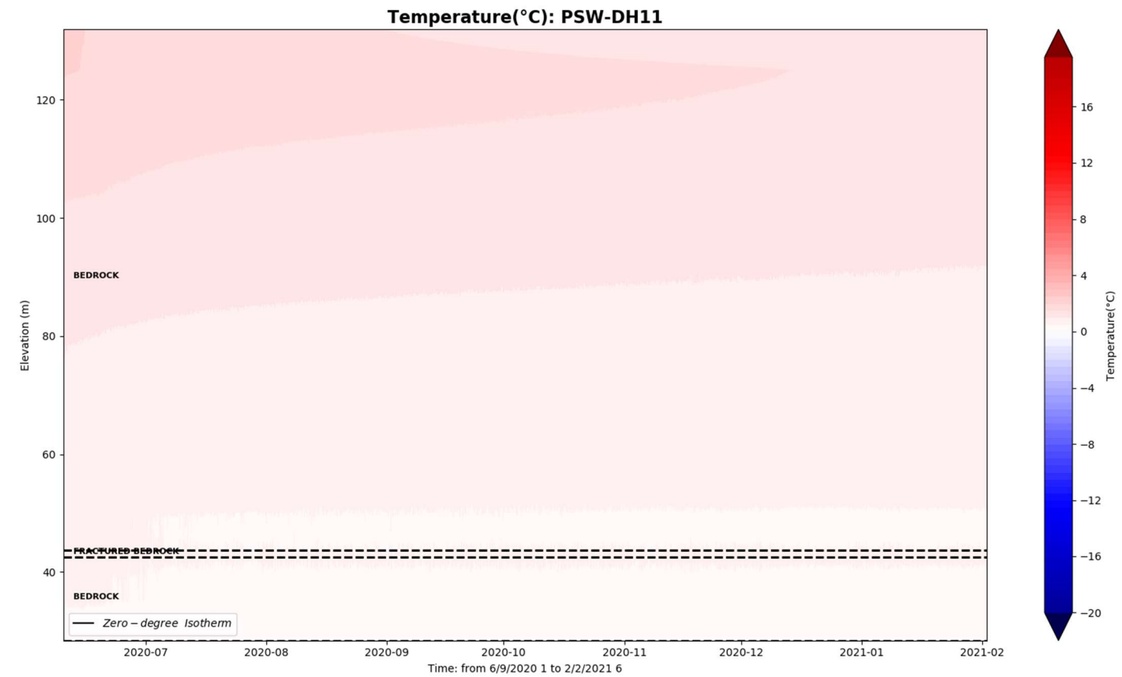

Temperature(°C): PSW-DH10
BEDROCK
FRACTURED BEDROCK
BEDROCK
FRACTURED BEDROCK
BEDROCK
Zero – degree Isotherm
Elevation (m)
Time: from 6/9/2020 1 to 2/2/2021 6
Temperature(°C)

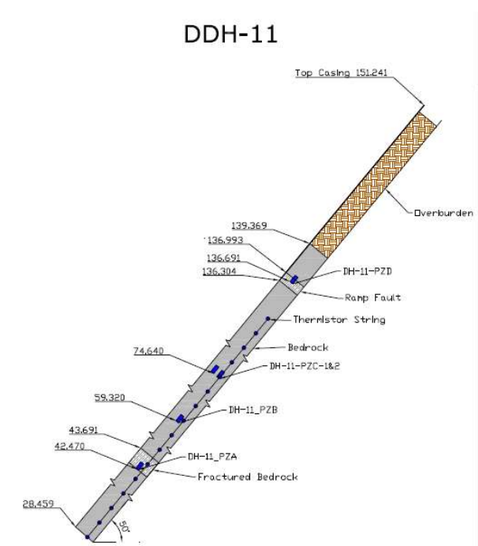

DH-10
Top Casing 150.109
149.699
146.699
143.699
139.699
139.199
138.699
138.199
135.699
135.199
128.504
Rockfill
Esker
Bedrock
Fractured Bedrock
Bedrock
Fractured Bedrock
Bedrock
Fractured Bedrock
Bedrock
DH-10_PZ

PSW – DH 11 TH


DH1
DH2
DH3
DH4
DH5
DH6
DH7
DH8
DH9
DH10
DH11
DH12

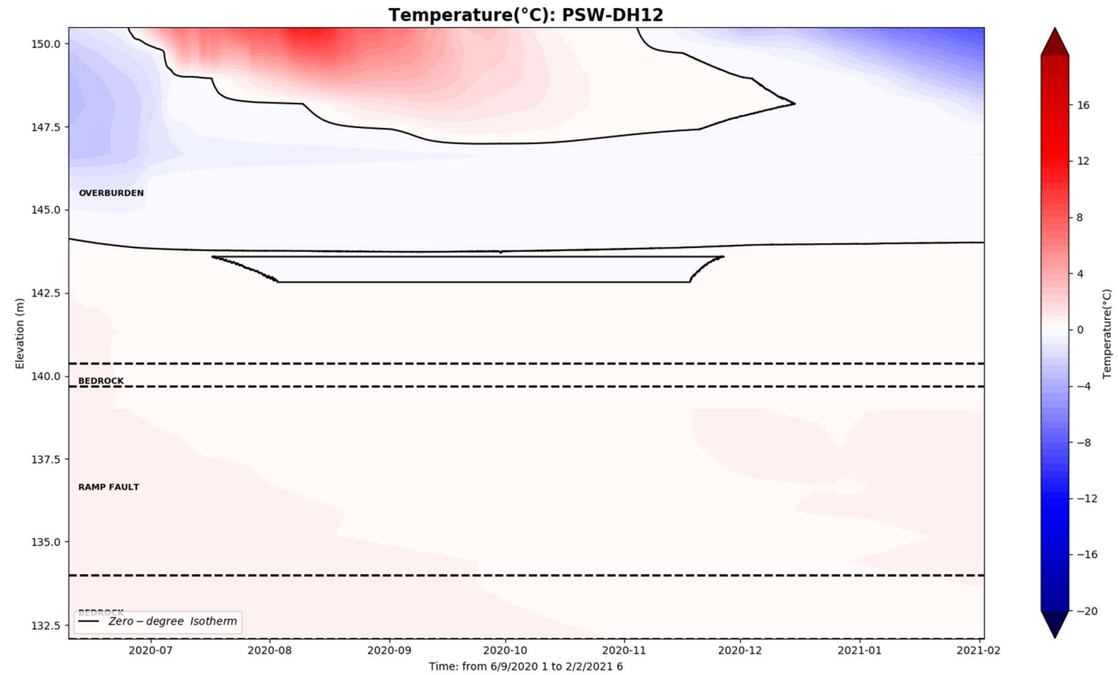

AMQ – PSW – DH11_TH
Overburden
Bedrock
Ramp fault
Bedrock
Fractured bedrock
Bedrock
Elevation (m)
Temperatures (°C)
2021-02-02 09:00
2021-01-19 09:00
2021-01-05 09:00
2020-12-22 09:00
2020-12-08 09:00
2020-11-24 09:00
2020-11-10 09:00
2020-10-27 09:00
2020-10-13 09:00
2020-09-29 09:00
2020-09-15 09:00
2020-09-01 09:00
2020-08-18 09:00
2020-08-04 09:00
2020-07-21 09:00
2020-07-07 09:00
2020-06-23 09:00
2020-06-09 18:00
Limit Profile

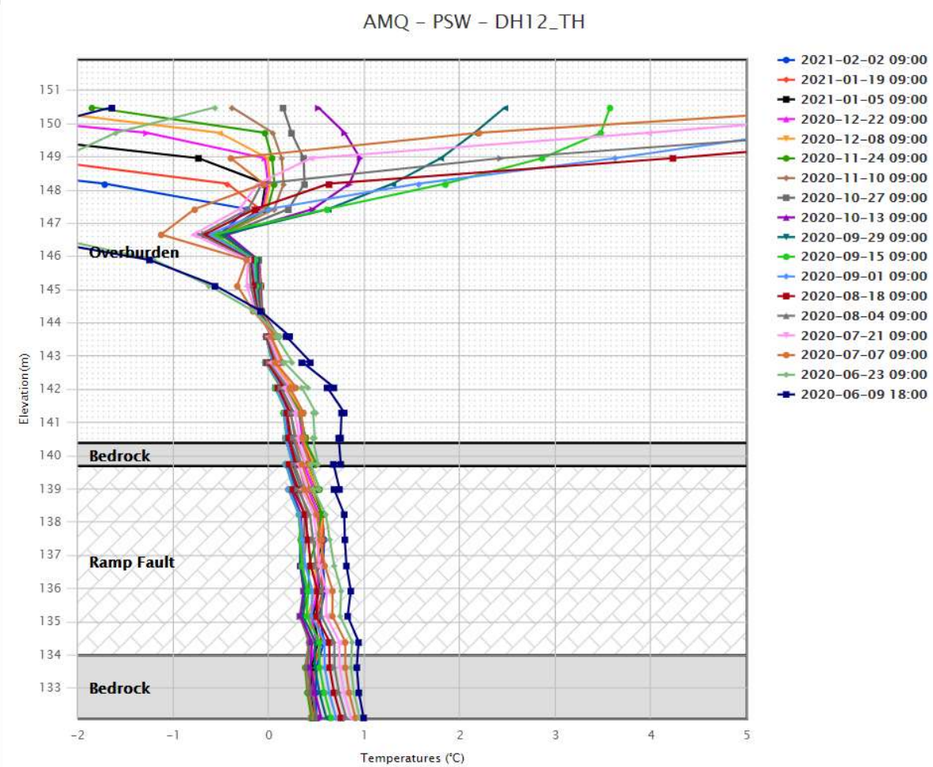

Temperature(°C): PSW-DH11
BEDROCK
FRACTURED BEDROCK
BEDROCK
Zero – degree Isotherm
Elevation (m)
Time: from 6/9/2020 1 to 2/2/2021 6
Temperature(°C)

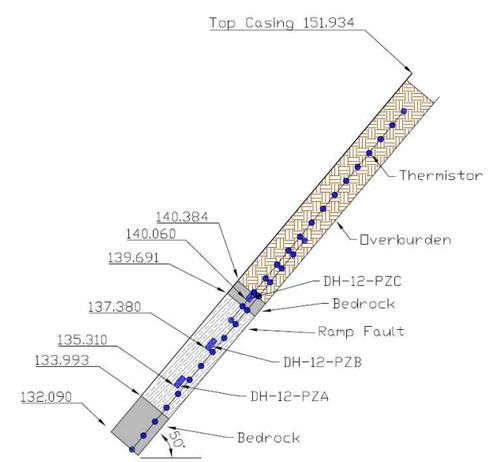

DDH-11
Top Casing 151.241
Overburden
139.369
136.993
136.691
136.304
DH-11-PZD
Ramp Fault
Thermistor String
Bedrock
74.640
DH-11-PZC-1&2
59.320
DH-11_PZB
43.691
42.470
DH-11_PZA
Fractured Bedrock
28.459
55°

PSW – DH 12 TH


DH1
DH2
DH3
DH4
DH5
DH6
DH7
DH8
DH9
DH10
DH11
DH12

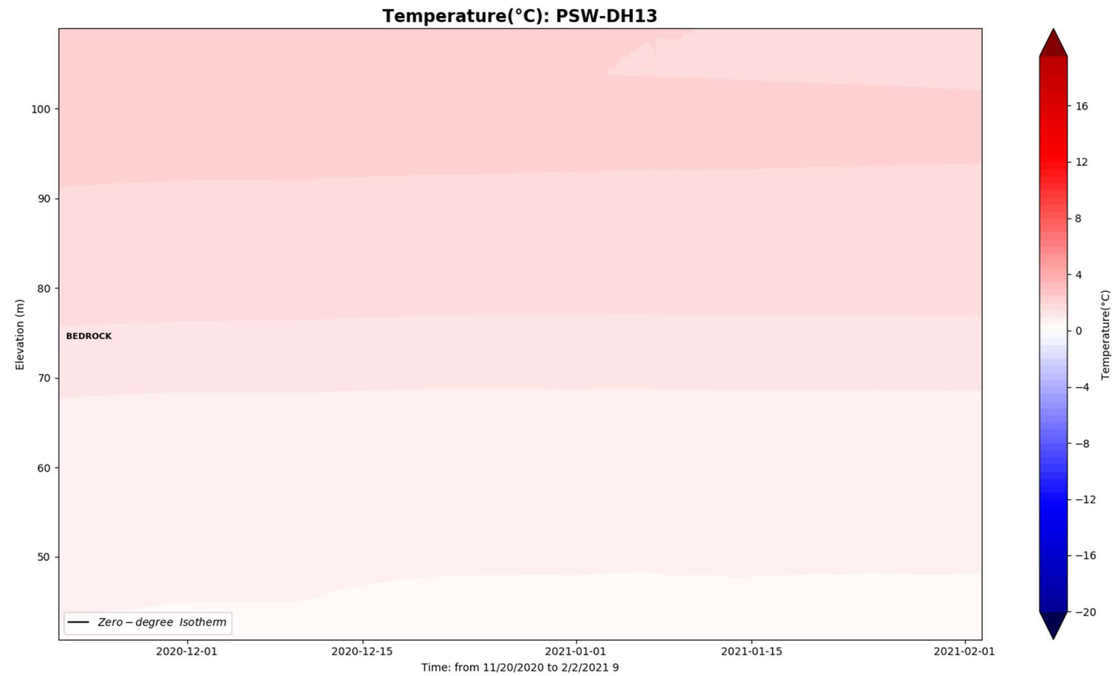

Temperature(°C): PSW-DH12
OVERBURDEN
BEDROCK
RAMP FAULT
Zero – degree Isotherm
Elevation (m)
Time: from 6/9/2020 1 to 2/2/2021 6
Temperature(°C)

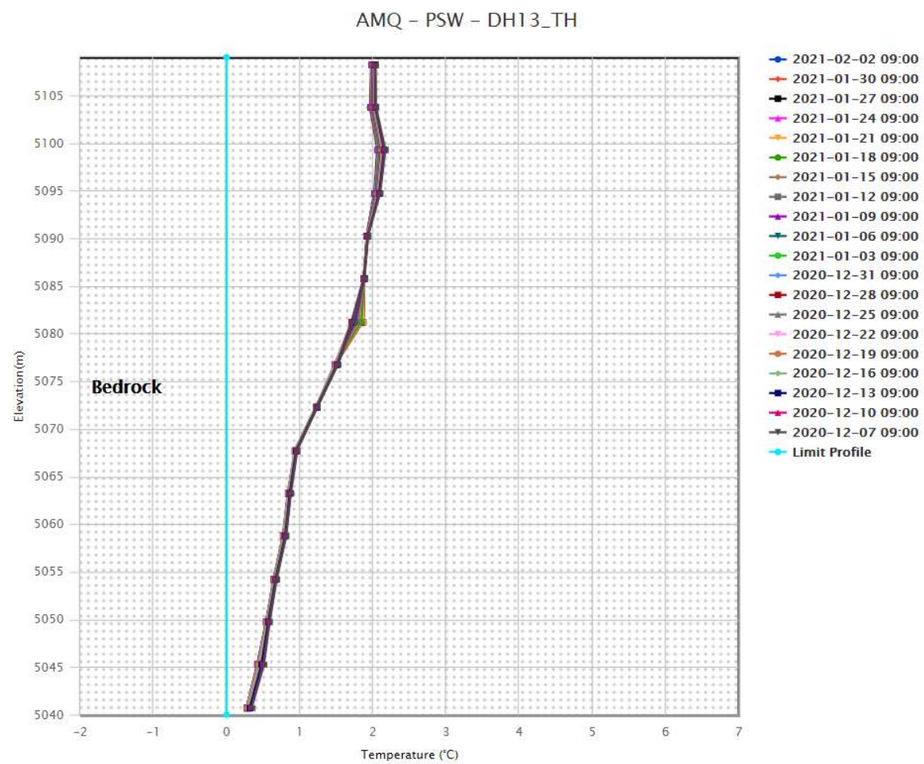

AMQ – PSW – DH12_TH
Overburden
Bedrock
Ramp Fault
Bedrock
Elevation (m)
Temperatures (°C)
2021-02-02 09:00
2021-01-19 09:00
2021-01-05 09:00
2020-12-22 09:00
2020-12-08 09:00
2020-11-24 09:00
2020-11-10 09:00
2020-10-27 09:00
2020-10-13 09:00
2020-09-29 09:00
2020-09-15 09:00
2020-09-01 09:00
2020-08-18 09:00
2020-08-04 09:00
2020-07-21 09:00
2020-07-07 09:00
2020-06-23 09:00
2020-06-09 18:00

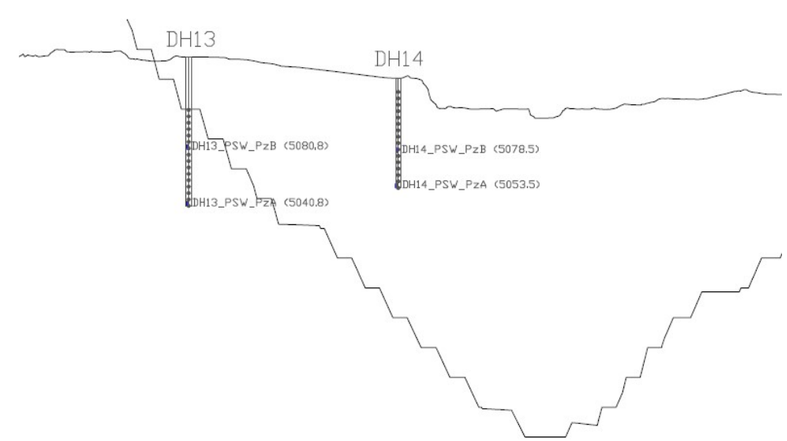

Top Casing 151.934
Thermistor
Overburden
140.384
140.060
139.691
DH-12-PZC
Bedrock
137.380
Ramp Fault
135.310
DH-12-PZB
133.993
DH-12-PZA
132.090
Bedrock
150.

PSW – DH 13 TH


AMQ-PSW-DH14 (Depth = 75m)
Approx. Coordinates
x: 14860
y: 6960
z: 5133
AMQ-PSW-DH13 (Depth 100m)
Approx. Coordinates
x: 14831
y: 6831
z: 5144

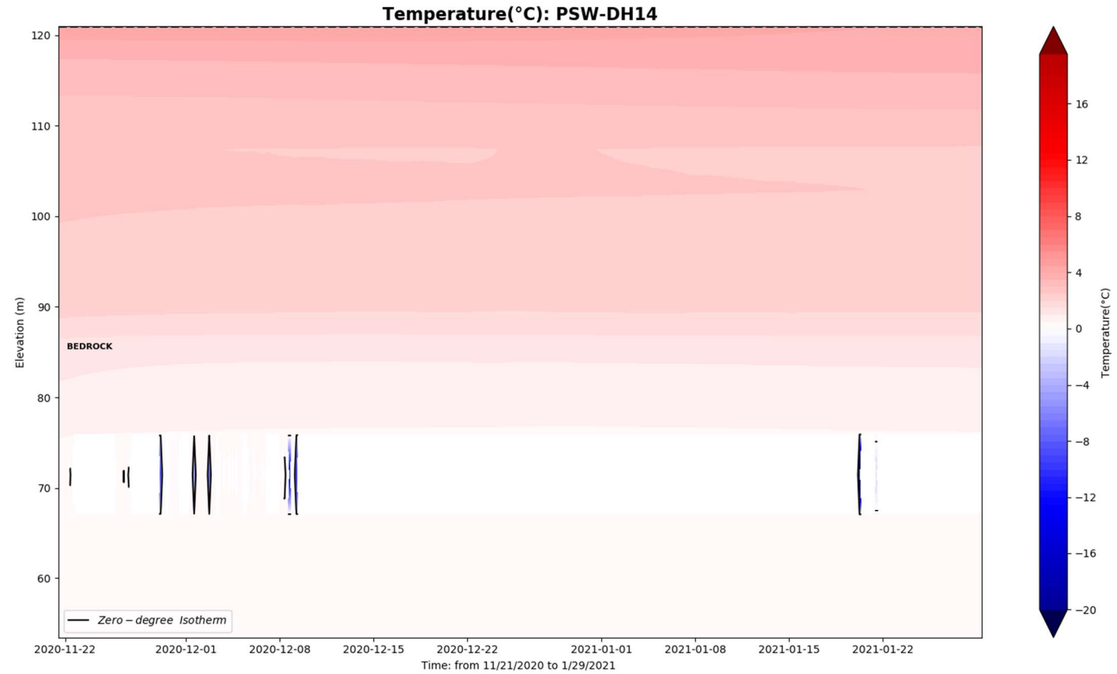

Temperature(°C): PSW-DH13
Elevation (m)
BEDROCK
Zero – degree Isotherm
2020-12-01
2020-12-15
2021-01-01
2021-01-15
2021-02-01
Time: from 11/20/2020 to 2/2/2021 9
Temperature(°C)

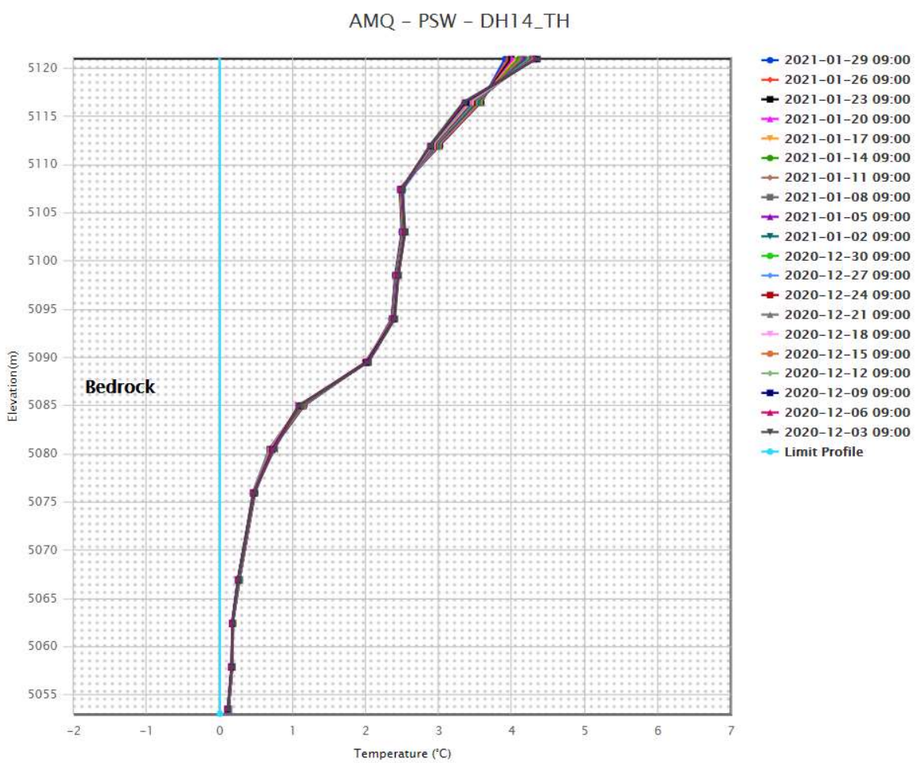

AMQ – PSW – DH13_TH
Elevation(m)
Bedrock
Temperature (°C)
2021-02-02 09:00
2021-01-30 09:00
2021-01-27 09:00
2021-01-24 09:00
2021-01-21 09:00
2021-01-18 09:00
2021-01-15 09:00
2021-01-12 09:00
2021-01-09 09:00
2021-01-06 09:00
2021-01-03 09:00
2020-12-31 09:00
2020-12-28 09:00
2020-12-25 09:00
2020-12-22 09:00
2020-12-19 09:00
2020-12-16 09:00
2020-12-13 09:00
2020-12-10 09:00
2020-12-07 09:00
Limit Profile

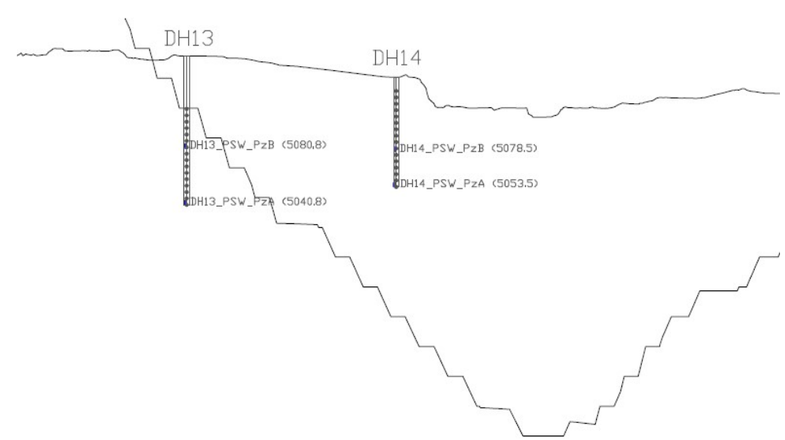

DH13
DH14
DH13_PSW_PzB (5080.8)
DH13_PSW_PzA (5040.8)
DH14_PSW_PzB (5078.5)
DH14_PSW_PzA (5053.5)

PSW – DH 14 TH


AMQ-PSW-DH14 (Depth = 75m)
Approx. Coordinates
x: 14860
y: 6960
z: 5133
AMQ-PSW-DH13 (Depth 100m)
Approx. Coordinates
x: 14831
y: 6831
z: 5144

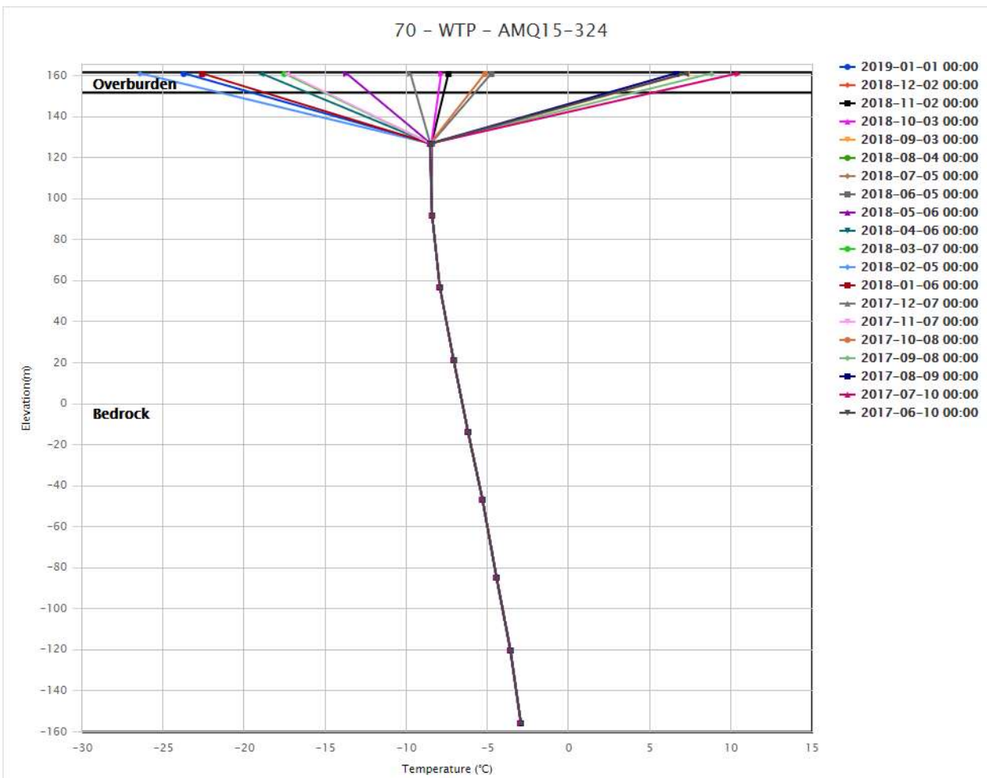

Temperature(°C): PSW-DH14
Elevation (m)
BEDROCK
Zero – degree Isotherm
Time: from 11/21/2020 to 1/29/2021
Temperature(°C)

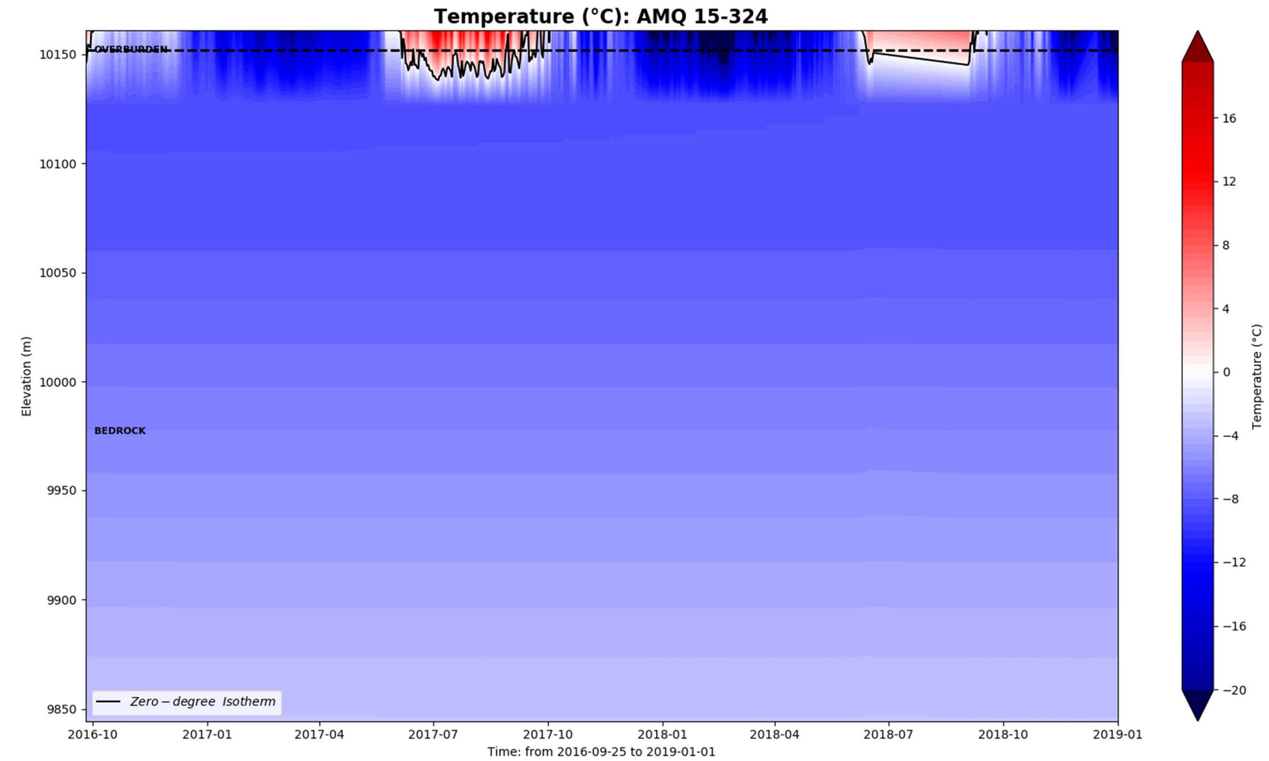

AMQ – PSW – DH14_TH
Elevation(m)
Bedrock
Temperature (°C)
2021-01-29 09:00
2021-01-26 09:00
2021-01-23 09:00
2021-01-20 09:00
2021-01-17 09:00
2021-01-14 09:00
2021-01-11 09:00
2021-01-08 09:00
2021-01-05 09:00
2021-01-02 09:00
2020-12-30 09:00
2020-12-27 09:00
2020-12-24 09:00
2020-12-21 09:00
2020-12-18 09:00
2020-12-15 09:00
2020-12-12 09:00
2020-12-09 09:00
2020-12-06 09:00
2020-12-03 09:00
Limit Profile


DH13
DH14
DH13_PSW_PzB (5080.8)
DH13_PSW_PzA (5040.8)
DH14_PSW_PzB (5078.5)
DH14_PSW_PzA (5053.5)

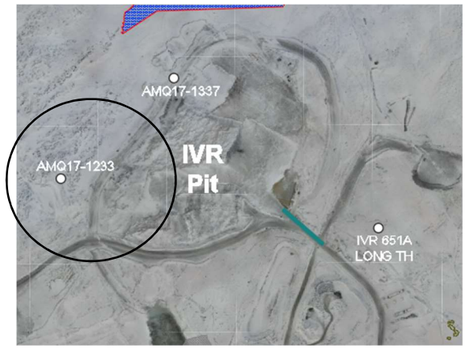
AMQ 15-324

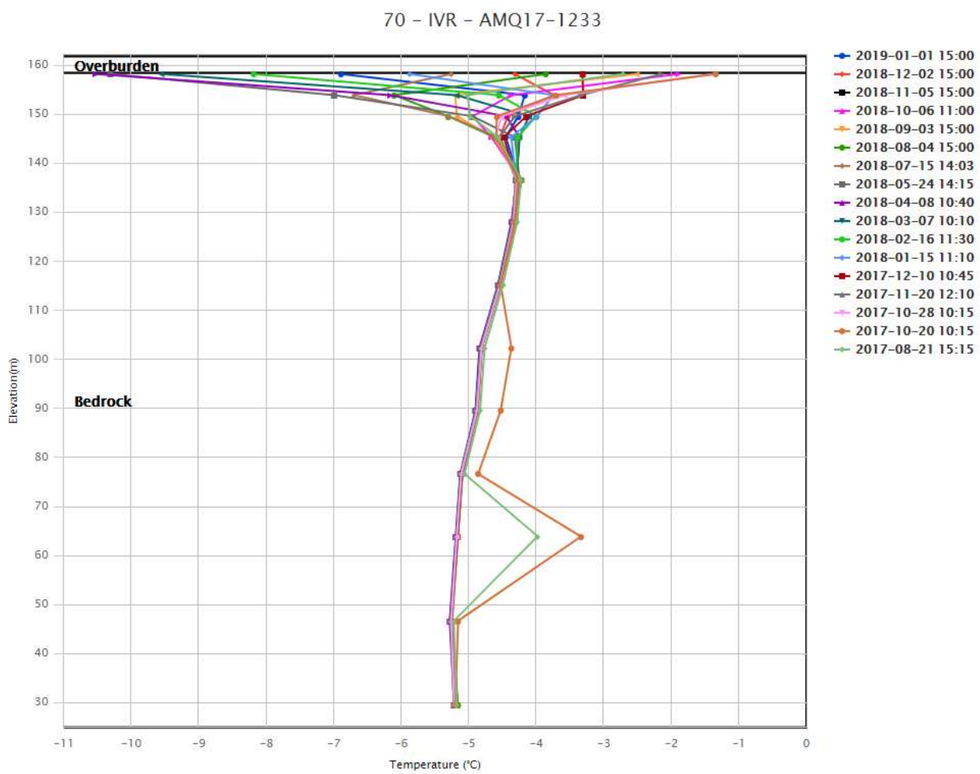

Whale Tail
Pit
AMQ15
-324
WHALE TAIL
DIKE

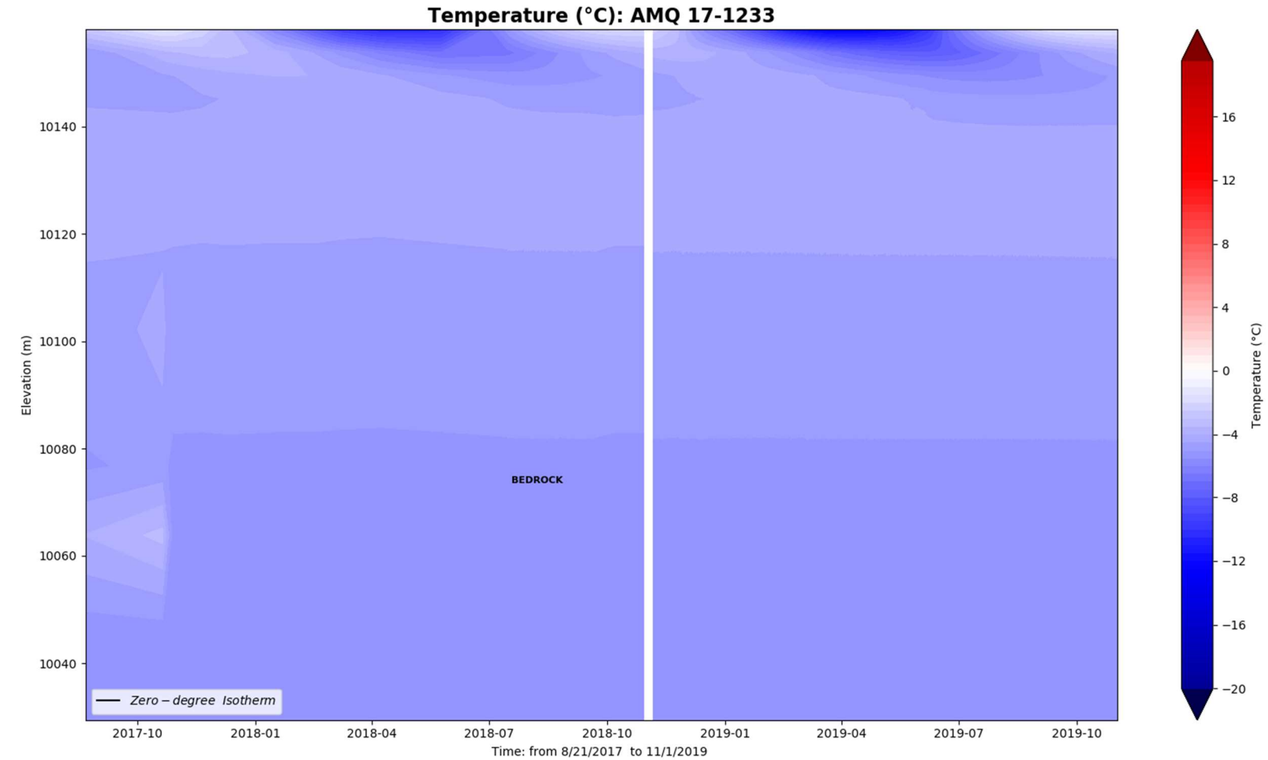

70 – WTP – AMQ15-324
Overburden
Bedrock
Elevation(m)
Temperature (°C)
2019-01-01 00:00
2018-12-02 00:00
2018-11-02 00:00
2018-10-03 00:00
2018-09-03 00:00
2018-08-04 00:00
2018-07-05 00:00
2018-06-05 00:00
2018-05-06 00:00
2018-04-06 00:00
2018-03-07 00:00
2018-02-05 00:00
2018-01-06 00:00
2017-12-07 00:00
2017-11-07 00:00
2017-10-08 00:00
2017-09-08 00:00
2017-08-09 00:00
2017-07-10 00:00
2017-06-10 00:00


Temperature (°C): AMQ 15-324
OVERBURDEN
BEDROCK
Zero – degree Isotherm
Elevation (m)
Time: from 2016-09-25 to 2019-01-01
Temperature (°C)

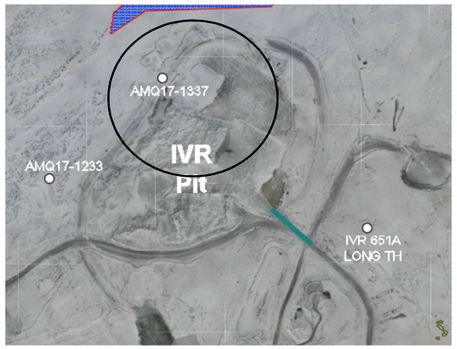
AMQ 17-1233

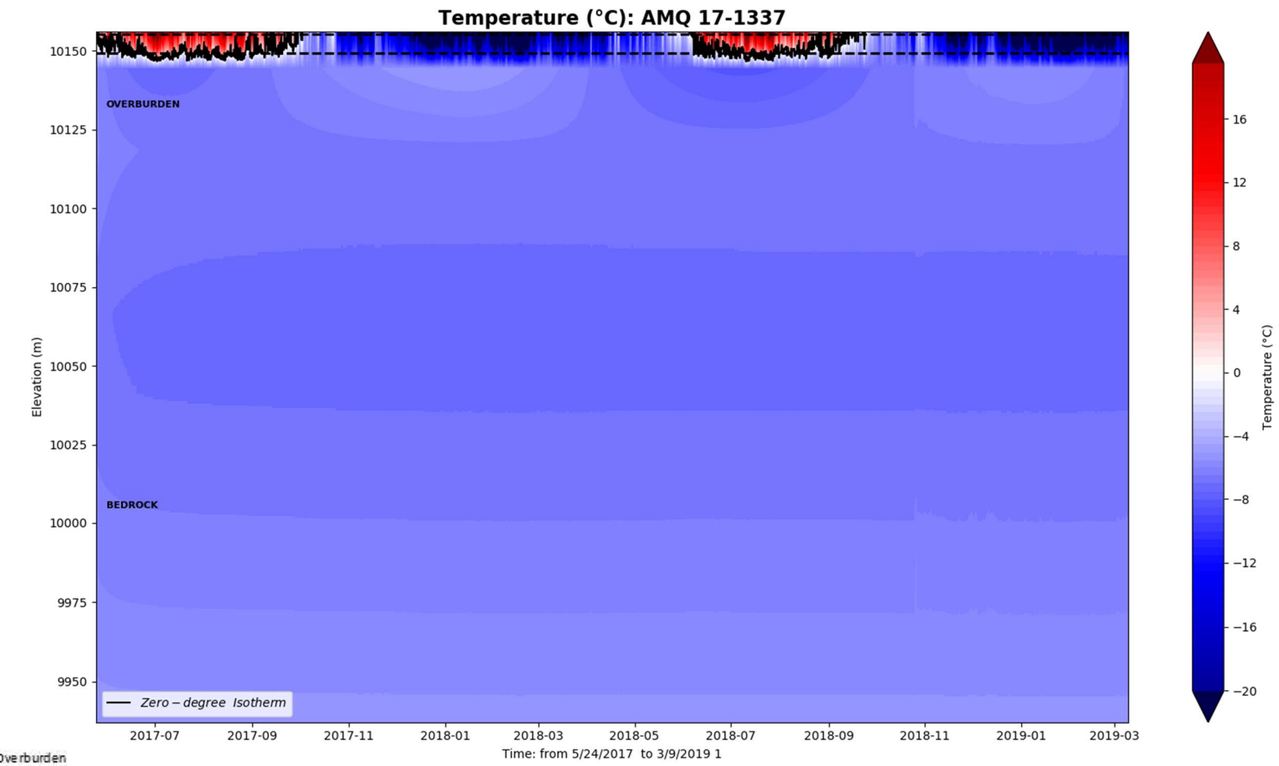

AMQ17-1337
AMQ17-1233
IVR
Pit
IVR 651A
LONG TH

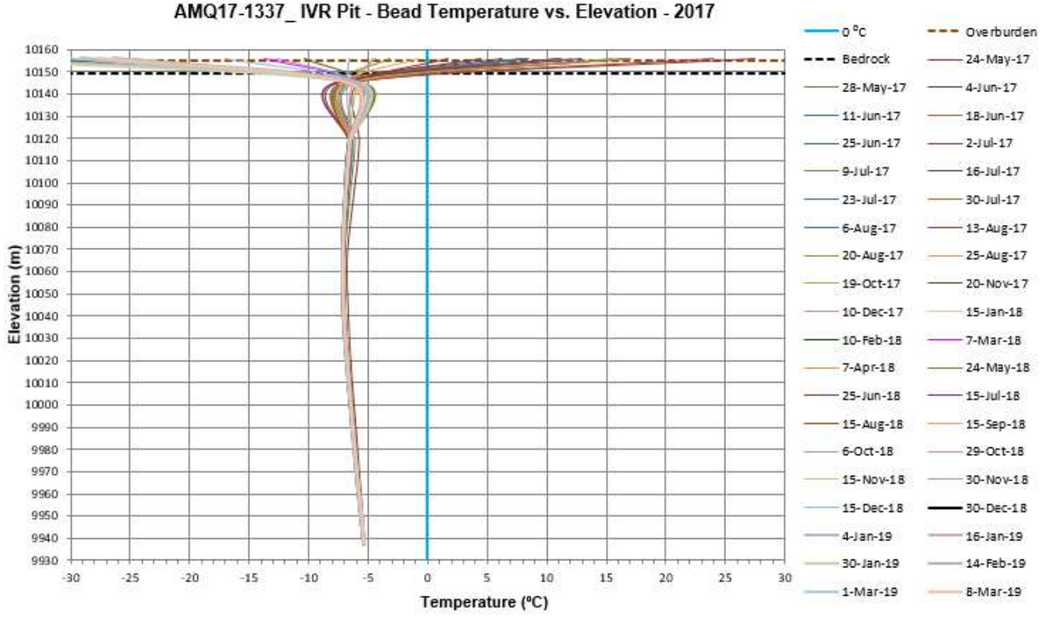

70 – IVR – AMQ17-1233
Overburden
Bedrock
Elevation(m)
Temperature (°C)
2019-01-01 15:00
2018-12-02 15:00
2018-11-05 15:00
2018-10-06 11:00
2018-09-03 15:00
2018-08-04 15:00
2018-07-15 14:03
2018-05-24 14:15
2018-04-08 10:40
2018-03-07 10:10
2018-02-16 11:30
2018-01-15 11:10
2017-12-10 10:45
2017-11-20 12:10
2017-10-28 10:15
2017-10-20 10:15
2017-08-21 15:15


Temperature (°C): AMQ 17-1233
Elevation (m)
BEDROCK
Zero – degree Isotherm
Time: from 8/21/2017 to 11/1/2019
Temperature (°C)

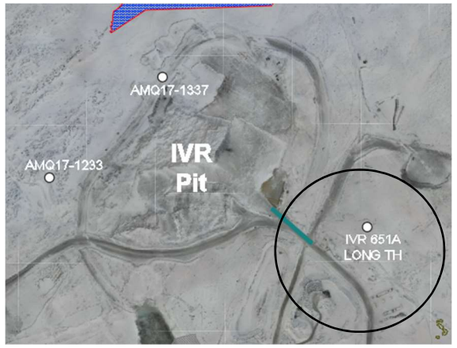
AMQ 17-1337

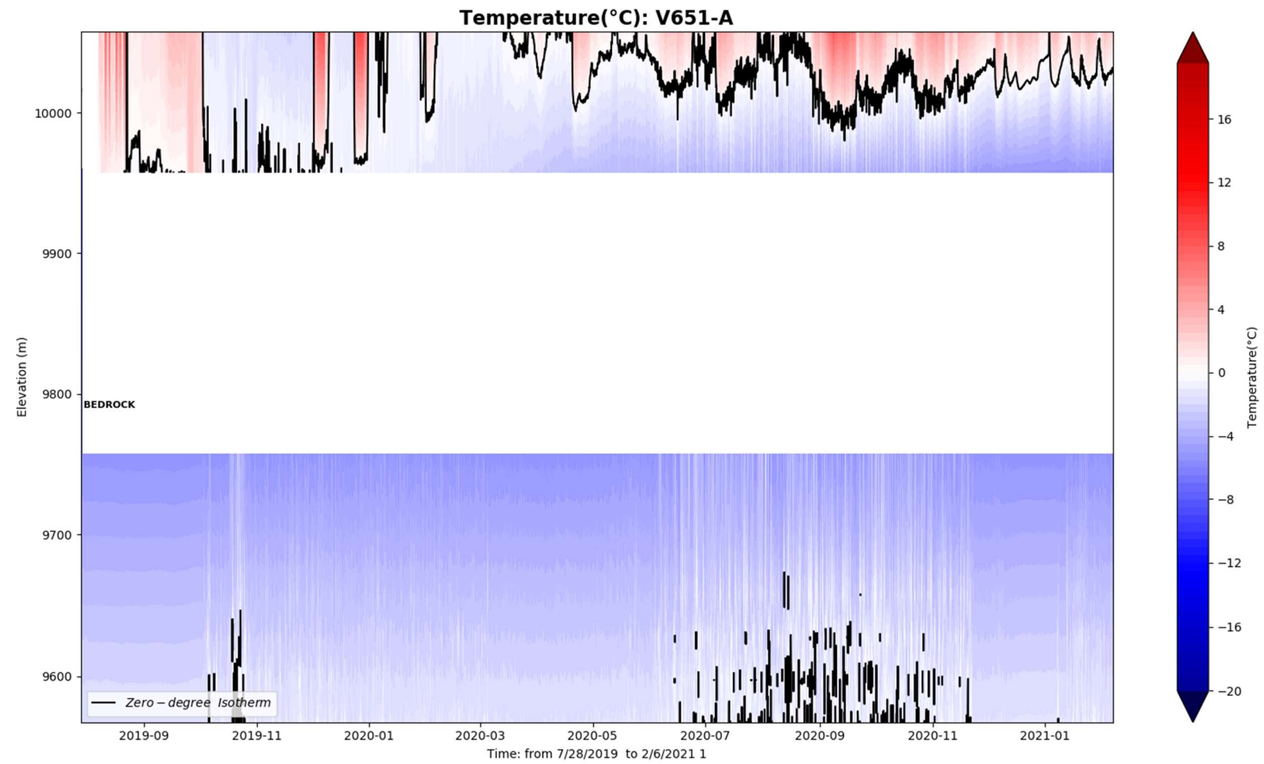

AMQ17-1337
IVR
Pit
AMQ17-1233
IVR 851A
LONG TH

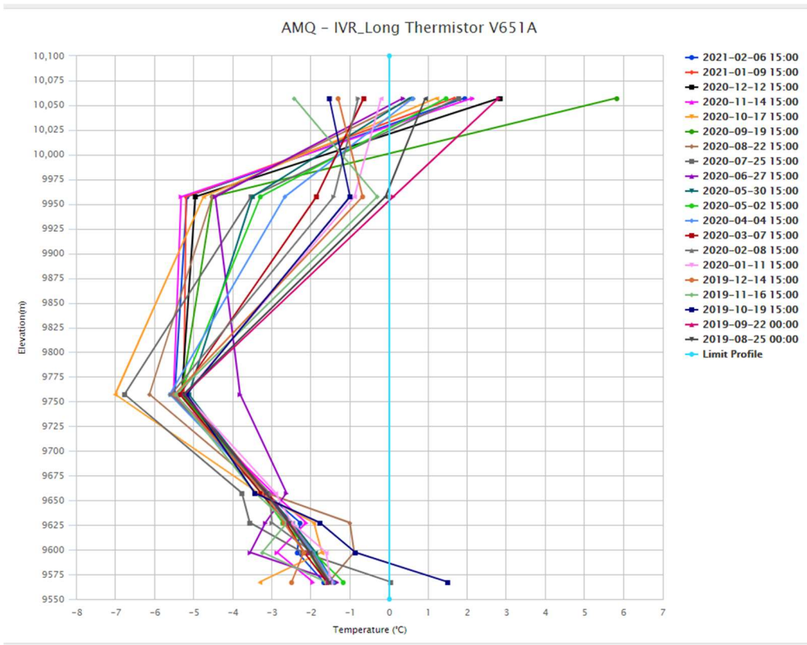

Temperature (°C): AMQ 17-1337
OVERBURDEN
BEDROCK
Zero – degree Isotherm
Elevation (m)
Time: from 5/24/2017 to 3/9/2019 1
Temperature (°C)


AMQ17-1337_ IVR Pit - Bead Temperature vs. Elevation - 2017
Elevation (m)
Temperature (ºC)
0 ºC
Overburden
Bedrock
24-May-17
28-May-17
4-Jun-17
11-Jun-17
18-Jun-17
25-Jun-17
2-Jul-17
9-Jul-17
16-Jul-17
23-Jul-17
30-Jul-17
6-Aug-17
13-Aug-17
20-Aug-17
25-Aug-17
19-Oct-17
20-Nov-17
10-Dec-17
15-Jan-18
10-Feb-18
7-Mar-18
7-Apr-18
24-May-18
25-Jun-18
15-Jul-18
15-Aug-18
15-Sep-18
6-Oct-18
29-Oct-18
15-Nov-18
30-Nov-18
15-Dec-18
30-Dec-18
4-Jan-19
16-Jan-19
30-Jan-19
14-Feb-19
1-Mar-19
8-Mar-19

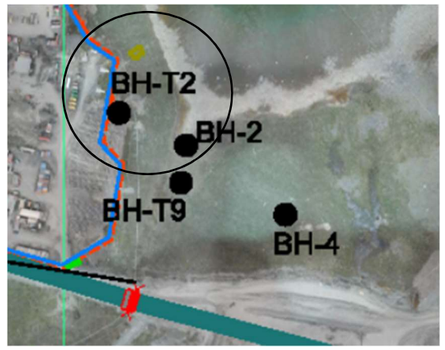
V651A Long TH

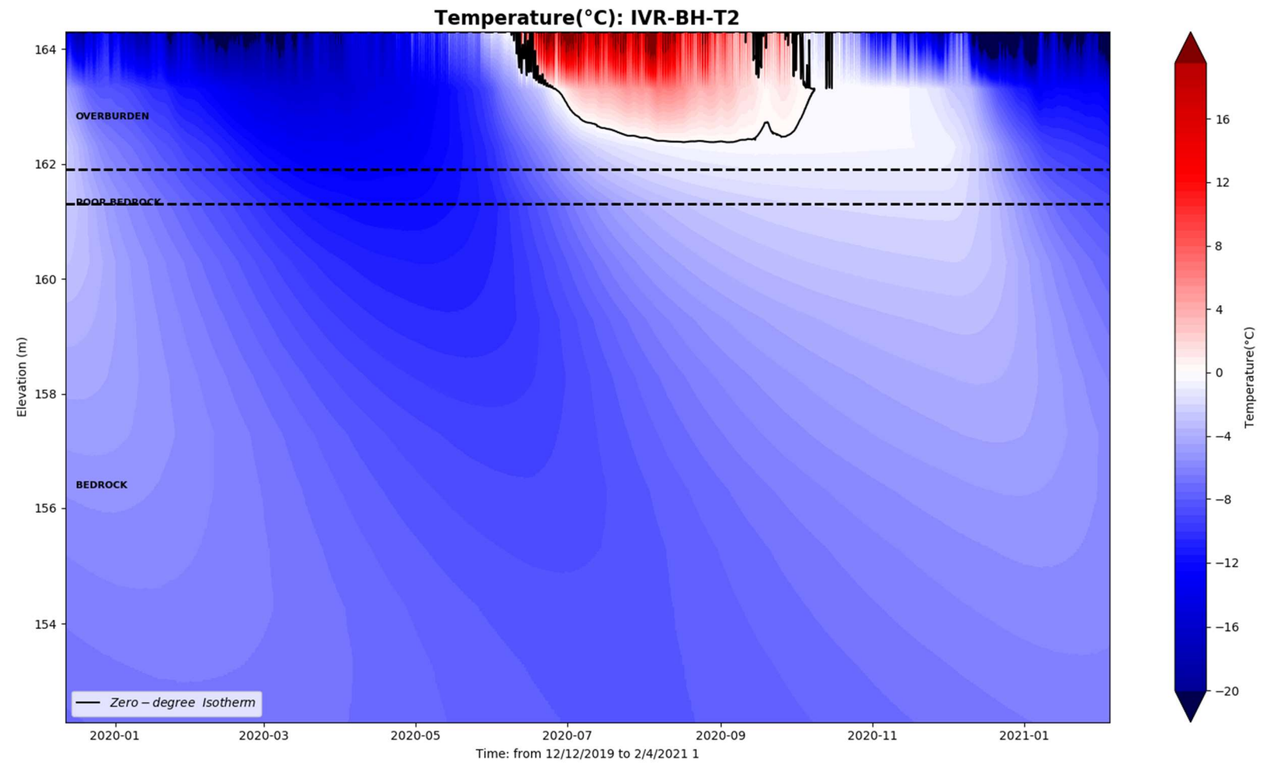


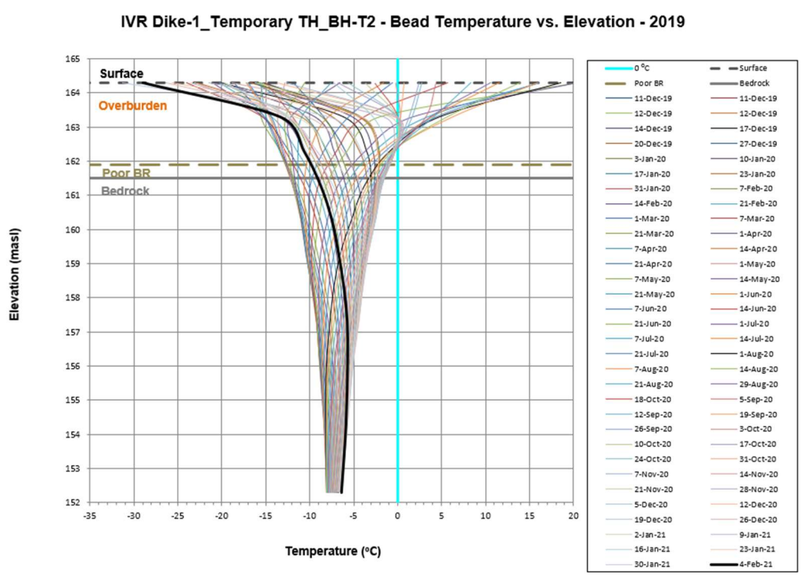




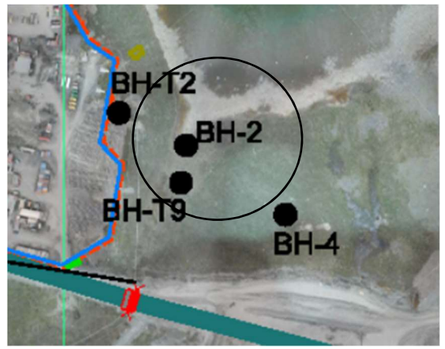
IVR-BH-T2

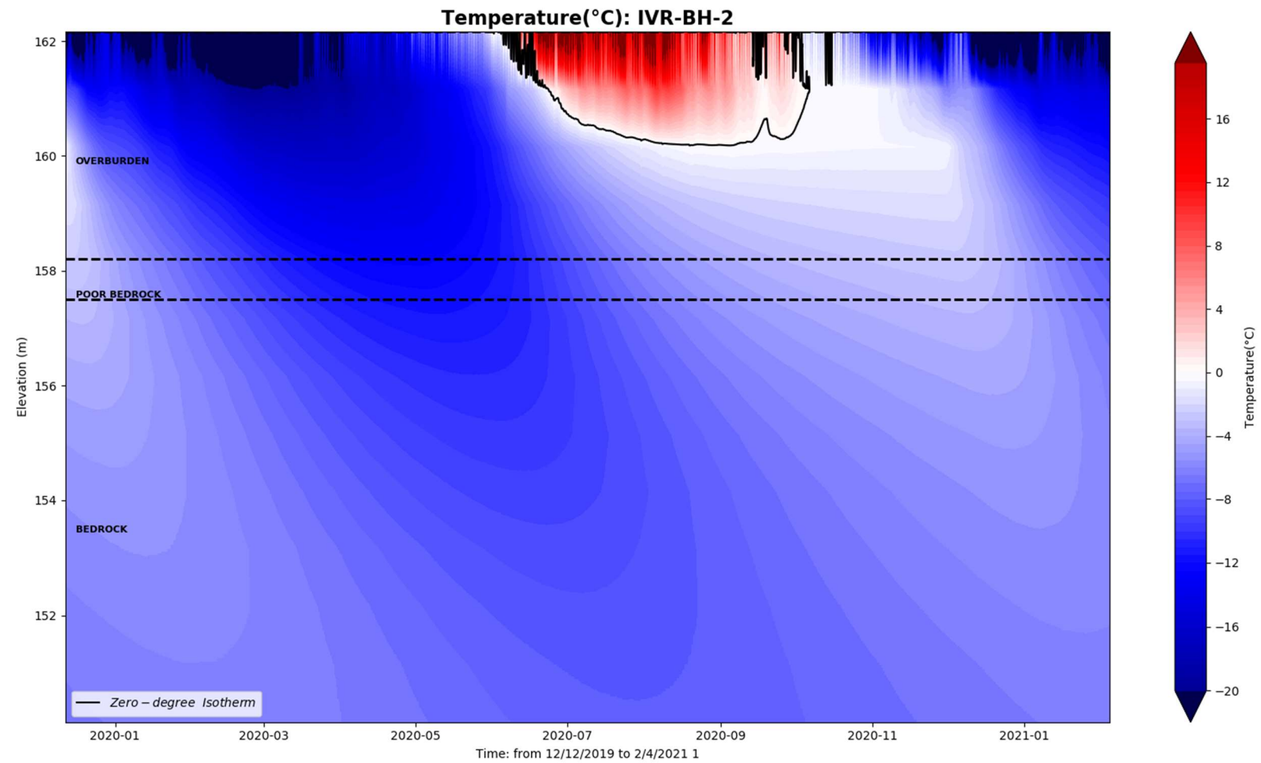

BH-T2
BH-2
BH-T9
BH-4

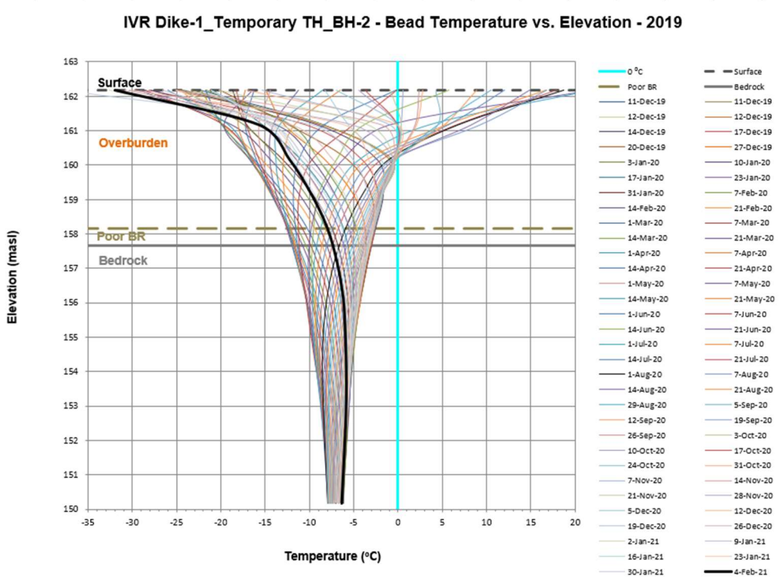

Temperature(°C): IVR-BH-T2
OVERBURDEN
POOR BEDROCK
BEDROCK
Zero – degree Isotherm
Elevation (m)
Temperature(°C)
Time: from 12/12/2019 to 2/4/2021 1


IVR Dike-1_Temporary TH_BH-T2 - Bead Temperature vs. Elevation - 2019
Surface
Overburden
Poor BR
Bedrock
Elevation (masl)
Temperature (°C)

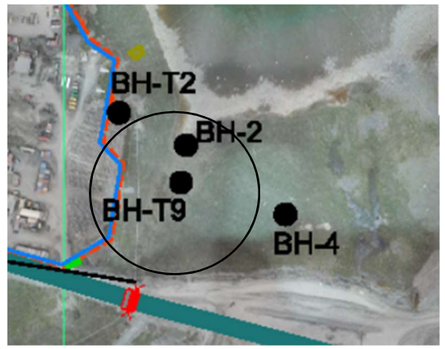
IVR-BH-2

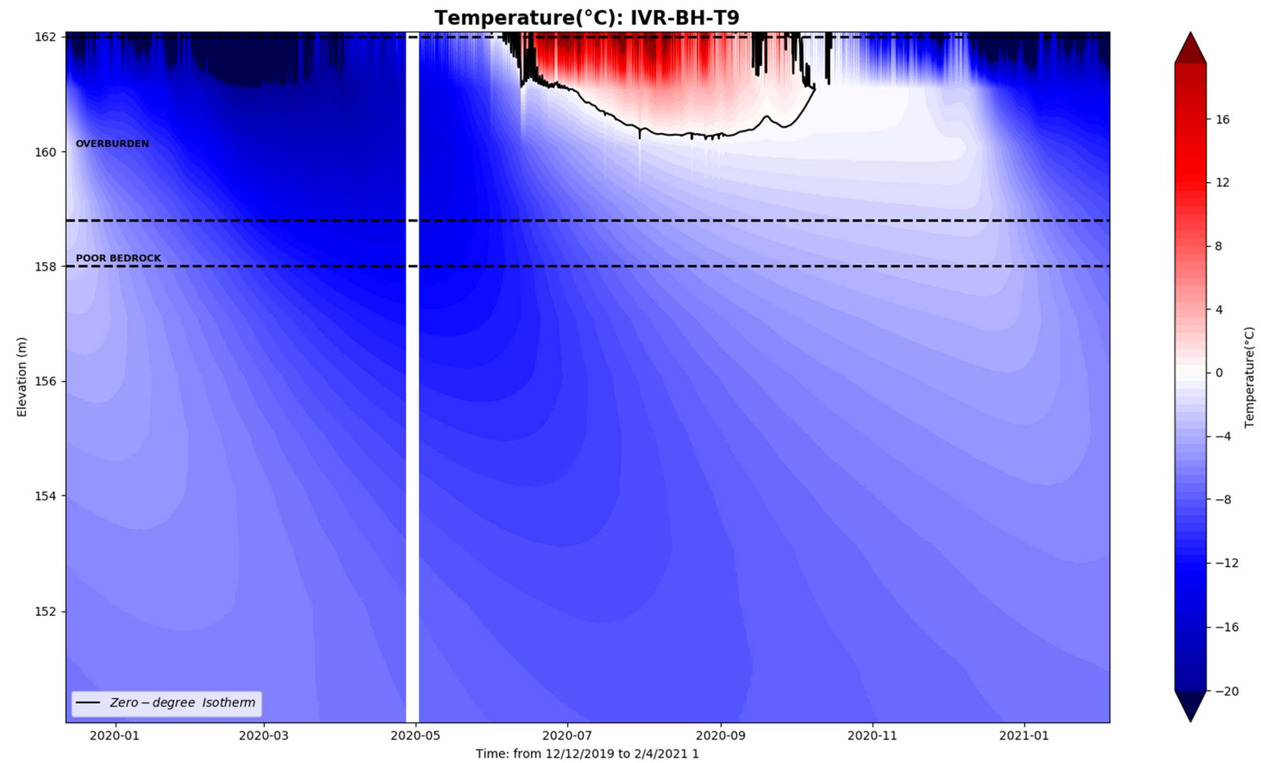

BH-T2
BH-2
BH-T9
BH-4

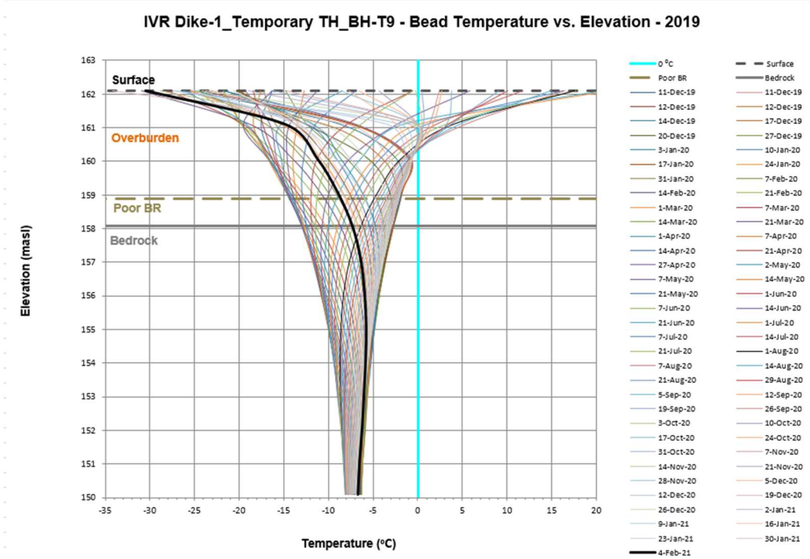

Temperature(°C): IVR-BH-2
OVERBURDEN
POOR BEDROCK
BEDROCK
Zero – degree Isotherm
Elevation (m)
Temperature(°C)
Time: from 12/12/2019 to 2/4/2021 1


IVR Dike-1_Temporary TH_BH-2 - Bead Temperature vs. Elevation - 2019
Surface
Overburden
Poor BR
Bedrock
Elevation (masl)
Temperature (°C)

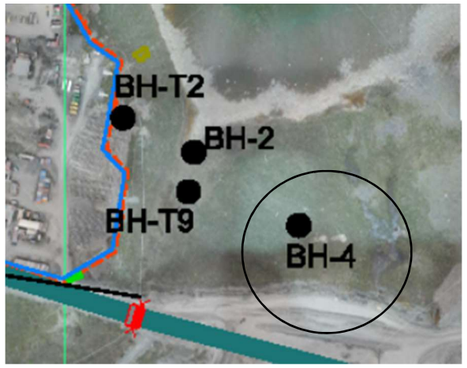
IVR-BH-T9

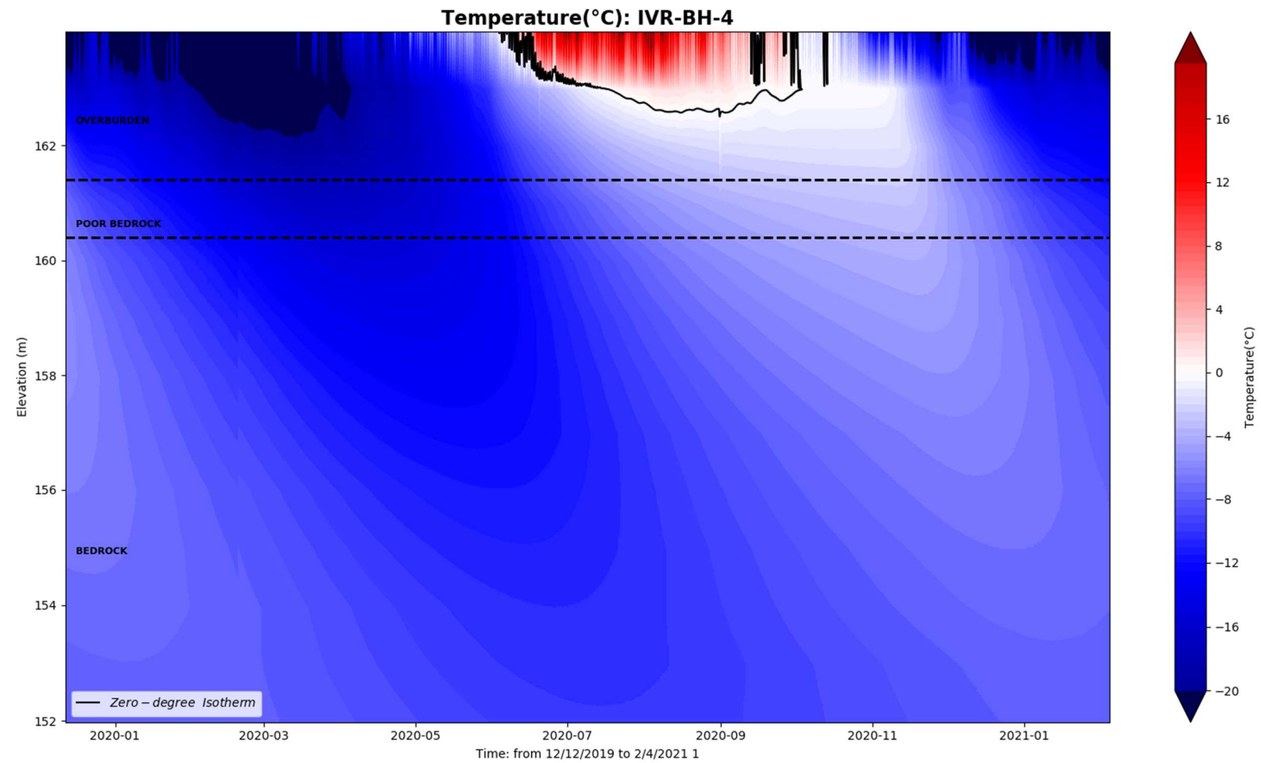

BH-T2
BH-2
BH-T9
BH-4

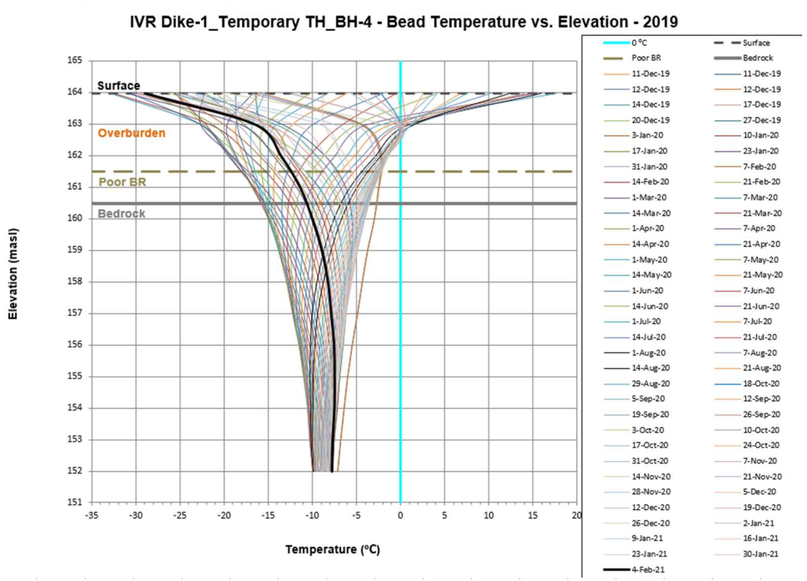

Temperature(°C): IVR-BH-T9
OVERBURDEN
POOR BEDROCK
Zero – degree Isotherm
Elevation (m)
Temperature(°C)
Time: from 12/12/2019 to 2/4/2021 1


IVR Dike-1_Temporary TH_BH-T9 - Bead Temperature vs. Elevation - 2019
Surface
Overburden
Poor BR
Bedrock
Elevation (masl)
Temperature (°C)

IVR-BH-4


BH-T2
BH-2
BH-T9
BH-4


Temperature(°C): IVR-BH-4
OVERBURDEN
POOR BEDROCK
BEDROCK
Zero – degree Isotherm
Elevation (m)
Temperature(°C)
Time: from 12/12/2019 to 2/4/2021 1


IVR Dike-1_Temporary TH_BH-4 - Bead Temperature vs. Elevation - 2019
Surface
Overburden
Poor BR
Bedrock
Elevation (masl)
Temperature (°C)