FINAL REPORT

AMENDMENT#01 TO 6515-E-132-005-132-REP-015

CONSTRUCTION SUMMARY (AS-BUILT) REPORT FOR RANKIN INLET ITIVIA SITE FUEL STORAGE AND CONTAINMENT FACILITY MELIADINE PROJECT, NUNAVUT

PRESENTED TO

Agnico Eagle Mines Ltd.

SEPTEMBER 2019
ISSUED FOR USE
MELIADINE PROJECT, NU | TETRA TECH PROJECT NUMBER: 28920
AGNICO EAGLE DOCUMENT NUMBER: 6515-E-132-005-132-REP-015_AMENDMENT01

Tetra Tech QE inc.
5100, Sherbrooke street east, suite 400
Montreal (QC) H1V 3R9, CANADA
Tel 514.257.1112 Fax 514.257.0717

EXECUTIVE SUMMARY

Tetra Tech was retained by Agnico Eagle Mines Limited (Agnico Eagle) to prepare a construction summary (as-built) report for the Rankin Inlet Itivia Site fuel storage and containment facility at the Meliadine Gold Project, Nunavut. Tetra Tech and WSP Canada Inc. previously prepared the construction drawings and specifications as well as the design report for the fuel storage and containment facilities for the Project (AEM No 6515-E-132-004-132-REP-003). The facilities include two (2) main fuel storage tanks located at Rankin Inlet Itivia site and four (4) fuel storage tanks located at the Meliadine site.

This amendment of the as-built report summarizes the work executed at Rankin Inlet Itivia Site fuel storage and containment facility where two (2) rock check dams were installed in May 2019.

Agnico Eagle requested Tetra Tech to complete on their behalf the following as-built construction summary report. It should be noted that Tetra Tech was not involved, nor was on site, during the construction activities for these water management infrastructures. Accordingly, all the construction, monitoring, quality assurance, and commissioning activities associated with the aforementioned infrastructure was managed by Agnico Eagle and their subcontractors. As such, Tetra Tech has presented the construction data as supplied by Agnico Eagle and therefore Tetra Tech cannot accept any responsibility for the accuracy of any of the data supplied.

TABLE OF CONTENTS

APPENDICES

ACRONYMS & ABBREVIATIONS

ACRONYMS	
ABA	Acid-Base Accounting
AEM	Agnico Eagle Mines
CIRNAC	Crown-Indigenous Relations and Northern Affairs Canada
ENVCan	Environment Canada
KHTO	Kangiqliniq Hunters and Trappers Organization
MDMER	Metal Diamond Mine Effluent Regulations
NP/AP	Neutralizing Potential/Acidizing Potential
TSS	Total Suspended Solids
UTM	Universal Transverse Mercator
V:H	Vertical : Horizontal

UNITS	
km	Kilometer
m	Meter
cm	Centimeter
mm	Millimeter
ft	Feet
in	Inches
ML	Megaliter
kL	Kiloliter
s	Second
V	Volt
mA	Milliamp

1.0 INTRODUCTION

Agnico Eagle Mines Ltd. (Agnico Eagle) retained the services of Tetra Tech and WSP Canada Inc. to carry out the planning and design works associated with the surface infrastructures for the Meliadine project, a gold mine located approximately 25 km north from Rankin Inlet, and 80 km southwest from Chesterfield Inlet in the Kivalliq Region of Nunavut. Situated on the western shore of Hudson Bay, the Project site is located on a peninsula between the east, south, and west basins of Meliadine Lake (63°1'23.8'' N, 92°13'6.42"W) on Inuit Owned Land. The mine site is accessible from an all-weather gravel road linking the existing mine site with Rankin Inlet.

Tetra Tech and WSP Canada Inc. previously prepared the design report, construction summary (as-built) report, and drawings for construction and as-built related to the fuel storage and containment facilities for the Project including one fuel storage facility at the Rankin Inlet Itivia site and two facilities at the Meliadine site (Industrial Site and Mine Site).

Current facilities at the Rankin Inlet Itivia site include a bypass road to divert traffic related to the Project around the community of Rankin Inlet, a fuel storage and containment facility as well as a laydown area which includes a culvert. Future facilities will include a saline water discharge to Melvin Bay.

As required by the Water Licence A (No. 2AM-MEL1631), this report summarizes the construction work of the two (2) rock check dams that were added to the Rankin Inlet Itivia site, upstream of the Rankin Inlet Itivia culvert. Included in this report are:

- A summary of the characteristics of the Rankin Inlet Itivia Site rock check dams;
- Construction documentation on fieldwork;
- As-built drawings;
- Survey drawings conducted during and after the construction of the Rankin Inlet Itivia Site rock check dams;
- Photographs of the Rankin Inlet Itivia Site rock check dams;
- Documentation on material testing.

2.0 SUMMARY OF THE CONSTRUCTION

2.1 Site Location Plan

The figure below presents the site location plan for the two (2) Rankin Inlet Itivia Site rock check dams. The studied area for the rock check dams is located in a small drainage channel to the east of the Rankin Inlet Itivia Laydown area and upstream of Rankin Inlet Itivia culvert as well as the compliance sampling location MEL-SR1. The sample locations are also shown below in Figure 2.1.

Figure 2.1: Rankin Inlet Itivia Site Location Plan

2.2 Construction Schedule

Construction activities at the Rankin Inlet Itivia Site for the two (2) rock check dams were conducted between May 11th and 13th, 2019. Construction was completed according to the milestone dates shown in Table 2.1 on the next page.

Table 2.1: Rankin Inlet Itivia Site Construction Milestone Dates

Item	Date
Site Preparation	May 11th, 2019
Material Placement and Compaction	May 12th. 2019
Finished Construction	May 13th, 2019

2.3 As-Built Drawings and Photographs

A sealed as-built drawing completed by Tetra Tech is presented in Appendix A.

A survey drawing conducted during and after the construction of the two (2) Rankin Inlet Itivia Site rock check dams can be found in Appendix B.

Photographs of the Rankin Inlet Itivia Site rock check dams during and after construction are shown in Appendix C.

3.0 CONSTRUCTION DOCUMENTATION FOR THE RANKIN INLET ITIVIA ROCK CHECK DAMS

3.1 Documentation on Fieldwork

This section documents the site assessment and work done which were approved by the field engineer on site. Table 3.1 on page 5 presents the geometry of both dams as constructed.

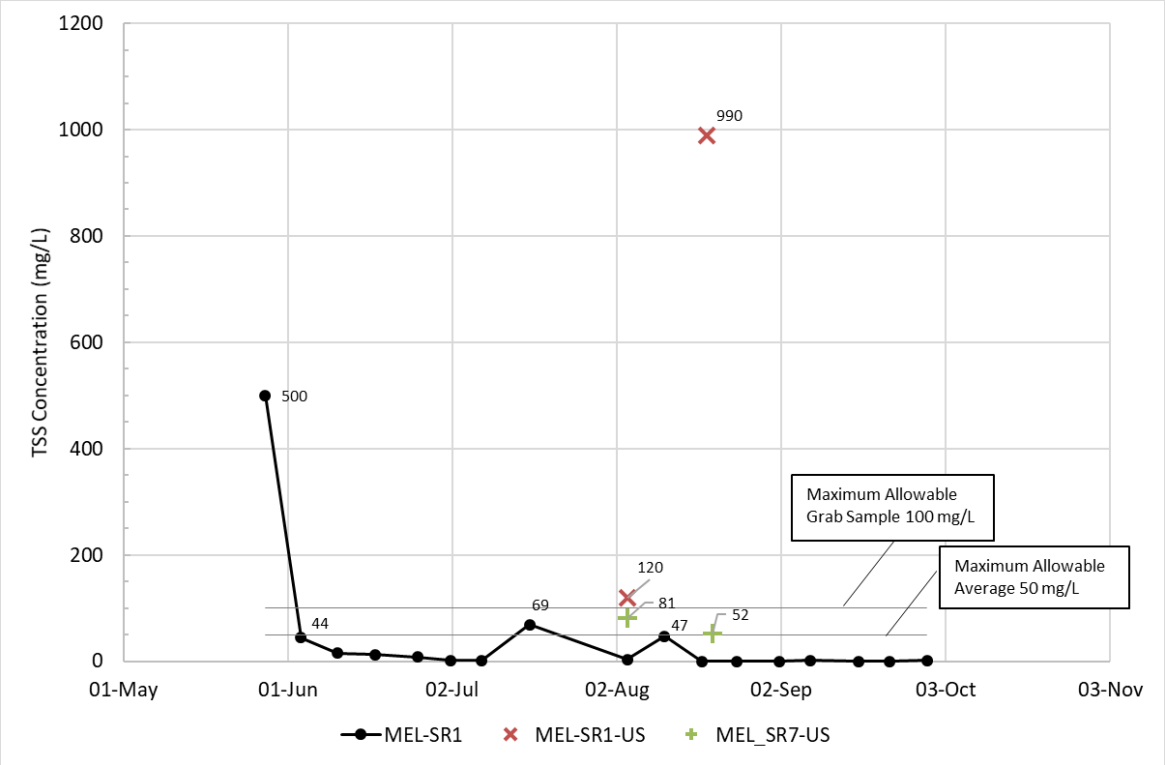
A construction summary was prepared for the Rankin Inlet Itivia Site rock check dams and is located in Appendix D.

3.1.1 Site Data Collection and Assessment

During the Freshet of 2018 elevated Total Suspended Solids (TSS) were reported at the sampling location MEL-SR1. Based on a visual assessment, elevated TSS at the sampling location is believed to be the result of erosion which occurred on Rankin Inlet controlled land which flowed over land and through a drainage ditch on Agnico Eagle Mines (AEM) leased land. This water is believed to have caused an exceedance of the expected parameters at MEL-SR1 sampling location, which contravened AEM's Water License 2, AM-MEL1631.

In August 2018, samples were taken at locations upstream of AEM controlled land to verify that the source of the sediment was not a result of erosion on AEM land. The sampling locations MEL-SR1-US and MEL-SR7-US were positioned upstream of the Itivia Laydown Area. MEL-SR1-US samples were taken at an inflow to the AEM lease area which orginiated from Itivia Street, while MEL-SR7-US samples were taken at an inflow to the AEM lease area which orginiated from a Qupanuaq Street culvert. The abovementioned sampling locations can be seen on previous figure 2.1. Figure 3.1 shows the results of the samples and the compliance limits associated with the permit. It can be noted that the samples taken from both sampling locations upstream of AEM lease are already exceeding the maximum allowable average TSS concentration of 50 mg/L.

Figure 3.1: Sampling Results from Itivia 2018



3.1.2 Commitment and Water Management Objective

AEM committed to Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) and Environment Canada (ENVCan) that permanent features would be installed on AEM controlled land to minimize the chance of a non-compliance occurring at MEL-SR1 sampling location in the future.

The overall objective of the erosion control management strategy of the project was to develop practical and feasible rock check dams that would slow down the flow of water and drop out TSS concentration, potentially originating from the Hamlet of Rankin Inlet and any other water runoff on AEM property prior to reaching the AEM sampling location MEL-SR1. AEM also wanted the solution to be implemented before the next spring freshet in 2019 to benefit from minimizing the TSS concentration during this important water flowing period.

3.1.3 Proposed Solution

AEM completed a field reconnaissance of the area and had initially proposed to build two (2) rock check dams immediately to the east of the Itivia Laydown Area. After discussing this location with AEM employees who have worked at the Rankin Inlet Itivia Site fuel storage and containment facilities it was decided to consider a different position for the dams as this was the same location as a snow machine trail that ran through the drainage ditch and this location would not be accepted by the residents of Rankin Inlet. This was confirmed after having communicated with the Kangiqliniq Hunters and Trappers Organization (KHTO). The KHTO and AEM employees then went out to the Itivia area together and field fitted the location for two (2) rock check dams that would not impede snow machine traffic and would still remain on AEM property. The Rock Check Dams are located upstream of sampling location MEL-SR1 as previously shown on Figure 2.1.

The size, characteristics, and geometry of the check dams were determined and optimized on-site to fit in the slelected location. Table 3.1 below summarizes both Check Dam 1 and Check Dam 2 geometry.

Table 3.1: Rankin Itivia Check Dams Geometry

Description	Check Dam 1	Check Dam 2
Length (m)	15.0	16.6
Width (m)	3.2	2.9
Height (m)	1.1	0.9
Retention Volume (Capacity between the two check dams) (m^3)	92	

3.2 Commissioning, Inspection, and Construction Monitoring

The construction monitoring was managed by Agnico Eagle. Following the construction of the dams, AEM environmental staff have been monitoring the operation of the check dams. Initial observations indicated that the rock check dams have been performing as expected and a review of the performance of the check dams will be scheduled to be done at the same time as inspections occur at the Rankin Inlet Itivia area.

4.0 EARTH WORKS

4.1 Waste Rock – Acid-Base Accounting (ABA) Results

With no active rock quarries in the area available and the short time frame that the work had to be completed prior to the next Spring Freshet, AEM decided to transport waste rock from the SP2 waste rock stockpile at Meliadine to Itivia. This rock had been tested for Acid-Base Accounting (ABA) parameters from December 2018 to April 2019 with sixteen samples taken. The minimum Neutralizing Potential/Acidizing Potential (NP/AP) for these rocks was 5 with an average of 11. A review of the Shake Flask Extraction Tests indicates that all the parameters in the Metal Diamond Mines Effluent Regulations (MDMER) and Permit limits for discharge were met. The complete results for waste rock are located in Appendix E.

4.2 Waste Rock Quantities

Waste rock from Meliadine Mine that was selected had a nominal diameter of 0-300 mm and was installed from the side of the bedrock outcrop to the access road to the Itivia Laydown Area.

Table 4.1: As-Built Material Quantities

Item	Check Dam 1	Check Dam 2	TOTAL
300mm Minus Waste Rock	32 m^3	32 m^3	64 m^3

5.0 LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Agnico Eagle Mines Ltd. and their agents. Tetra Tech does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Agnico Eagle Mines Ltd., or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Tetra Tech accepts no responsibility for losses, claims, expenses or damages, if any, suffered by a third party as a result of any decisions made or actions based on this report. Use of this report is subject to the terms and conditions stated in Tetra Tech's Services Agreement.

While it is believed that the information contained herein is reliable under the conditions and subject to the limitations set forth in the report, this report is based on information not within the control of Tetra Tech, nor has said information been verified by Tetra Tech, and Tetra Tech therefore cannot and does not guarantee its sufficiency and accuracy. The comments in the report reflect Tetra Tech's best judgment in light of the information available to it at the time of preparation.

Use of this Document acknowledges acceptance of the foregoing conditions.

6.0 CLOSURE

We trust this report meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,
Tetra Tech QE inc.

PERMIT TO PRACTICE
TETRA TECH INDUSTRIES, INC.
O/A TETRA TECH
Signature
Date 2019-09-30
PERMIT NUMBER: P 1029
NT/NU Association of Professional Engineers and Geoscientists

REGISTERED PROFESSIONAL ENGINEER
J.M.I.F. ALARIE
LICENSEE
2019-09-30

Prepared by: 2019.09.30
Christopher Morin, Jr. Eng.
Direct Line: 514.257.1112 x3240
Christopher.Morin@tetratech.com

Reviewed by:
Josée Alarie, P.Eng.
Direct Line: 514.257.1112 x3323
Josee.Alarie@tetratech.com

APPENDIX A

As-Built Drawings of Rankin Inlet Itivia Site rock check dams

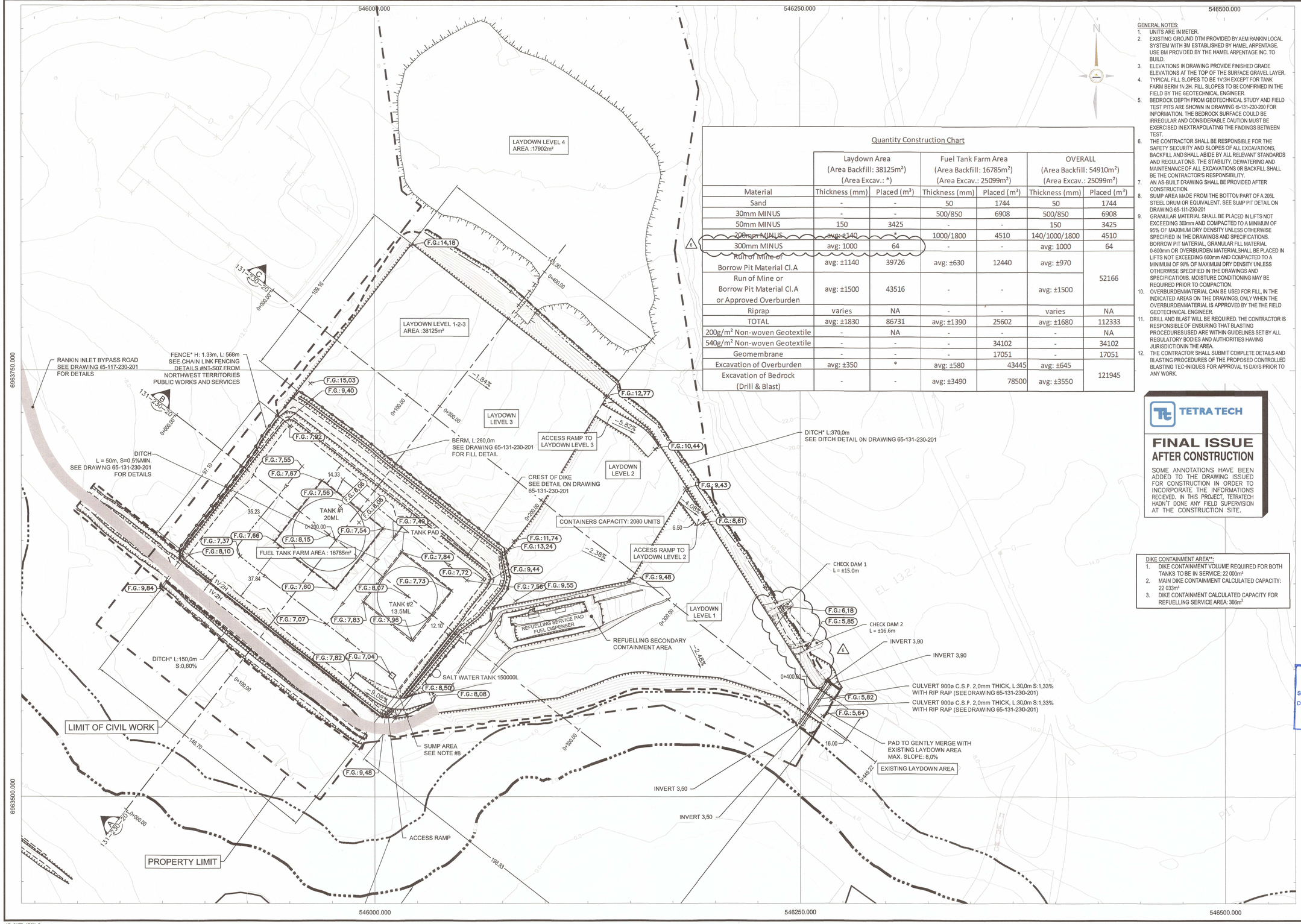
NO. DESSIN DRAWING NO. 65-131-230-200T0202_R6

FORMAT ARCHD

546000.000 546250.000 546500.000

6963750.000

6963500.000



Quantity Construction Chart

	Laydown Area (Area Backfill: 38125m²) (Area Excav.: *)		Fuel Tank Farm Area (Area Backfill: 16785m²) (Area Excav.: 25099m²)		OVERALL (Area Backfill: 54910m²) (Area Excav.: 25099m²)	
Material	Thickness (mm)	Placed (m³)	Thickness (mm)	Placed (m³)	Thickness (mm)	Placed (m³)
Sand	-	-	50	1744	50	1744
30mm MINUS	-	-	500/850	6908	500/850	6908
50mm MINUS	150	3425	-	-	150	3425
200mm MINUS	avg: ±140	*	1000/1800	4510	140/1000/1800	4510
300mm MINUS	avg: 1000	64	-	-	avg: 1000	64
Run of Mine or Borrow Pit Material Cl.A	avg: ±1140	39726	avg: ±630	12440	avg: ±970	52166
Run of Mine or Borrow Pit Material Cl.A or Approved Overburden	avg: ±1500	43516	-	-	avg: ±1500	
Riprap	varies	NA	-	-	varies	NA
TOTAL	avg: ±1830	86731	avg: ±1390	25602	avg: ±1680	112333
200g/m² Non-woven Geotextile	-	NA	-	-	-	NA
540g/m² Non-woven Geotextile	-	-	-	34102	-	34102
Geomembrane	-	-	-	17051	-	17051
Excavation of Overburden	avg: ±350	*	avg: ±580	43445	avg: ±645	121945
Excavation of Bedrock (Drill & Blast)	-	-	avg: ±3490	78500	avg: ±3550	

GENERAL NOTES:
1. UNITS ARE IN METER.
2. EXISTING GRO.IND DTM PROVIDED BY AEM RANKIN LOCAL SYSTEM WITH 3M ESTABLISHED BY HAMEL ARPENTAGE. USE BM PROVIDED BY THE HAMEL ARPENTAGE INC. TO BUILD.
3. ELEVATIONS IN DRAWING PROVIDE FINISHED GRADE ELEVATIONS AT THE TOP OF THE SURFACE GRAVEL LAYER.
4. TYPICAL FILL SLOPES TO BE 1V:3H EXCEPT FOR TANK FARM BERM 1V:2H. FILL SLOPES TO BE CONFIRMED IN THE FIELD BY THE GEOTECHNICAL ENGINEER.
5. BEDROCK DEPTH FROM GEOTECHNICAL STUDY AND FIELD TEST PITS ARE SHOWN IN DRAWING 65-131-230-200 FOR INFORMATION. THE BEDROCK SURFACE COULD BE IRREGULAR AND CONSIDERABLE CAUTION MUST BE EXERCISED IN EXTRAPOLATING THE FINDINGS BETWEEN TEST.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY SECURITY AND SLOPES OF ALL EXCAVATIONS, BACKFILL AND SHALL ABIDE BY ALL RELEVANT STANDARDS AND REGULATONS. THE STABILITY, DEWATERING AND MAINTENANCE OF ALL EXCAVATIONS OR BACKFILL SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
7. AN AS-BUILT DRAWING SHALL BE PROVIDED AFTER CONSTRUCTION.
8. SUMP AREA MADE FROM THE BOTTOM PART OF A 205L STEEL DRUM OR EQUIVALENT. SEE SUMP PIT DETAIL ON DRAWING 65-111-230-201
9. GRANULAR MATERIAL SHALL BE PLACED IN LIFTS NOT EXCEEDING 300mm AND COMPACTED TO A MINIMUM OF 95% OF MAXIMUM DRY DENSITY UNLESS OTHERWISE SPECIFIED IN THE DRAWINGS AND SPECIFICATIONS. BORROW PIT MATERIAL, GRANULAR FILL MATERIAL 0-600mm OR OVERBURDEN MATERIAL SHALL BE PLACED IN LIFTS NOT EXCEEDING 600mm AND COMPACTED TO A MINIMUM OF 90% OF MAXIMUM DRY DENSITY UNLESS OTHERWISE SPECIFIED IN THE DRAWINGS AND SPECIFICATIOIIS. MOISTURE CONDITIONING MAY BE REQUIRED PRIOR TO COMPACTION.
10. OVERBURDEN MATERIAL CAN BE USED FOR FILL, IN THE INDICATED AREAS ON THE DRAWINGS, ONLY WHEN THE OVERBURDEN MATERIAL IS APPROVED BY THE THE FIELD GEOTECHNICAL ENGINEER.
11. DRILL AND BLAST WILL BE REQUIRED. THE CONTRACTOR IS RESPONSIBLE OF ENSURING THAT BLASTING PROCEDURES USED ARE WITHIN GUIDELINES SET BY ALL REGULATORY BODIES AND AUTHORITIES HAVING JURISDICTION IN THE AREA.
12. THE CONTRACTOR SHALL SUBMIT COMPLETE DETAILS AND BLASTING PROCEDURES OF THE PROPOSED CONTROLLED BLASTING TECHNIQUES FOR APPROVAL 15 DAYS PRIOR TO ANY WORK.

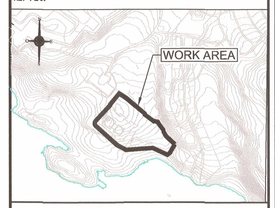
TETRA TECH

FINAL ISSUE AFTER CONSTRUCTION

SOME ANNOTATIONS HAVE BEEN ADDED TO THE DRAWING ISSUED FOR CONSTRUCTION IN ORDER TO INCORPORATE THE INFORMATIONS RECIEVED. IN THIS PROJECT, TETRATECH HADN'T DONE ANY FIELD SUPERVISION AT THE CONSTRUCTION SITE.

DIKE CONTAINMENT AREA**:
1. DIKE CONTAINMENT VOLUME REQUIRED FOR BOTH TANKS TO BE IN SERVICE: 22 000m³
2. MAIN DIKE CONTAINMENT CALCULATED CAPACITY: 22 033m³
3. DIKE CONTAINMENT CALCULATED CAPACITY FOR REFUELLING SERVICE AREA: 366m³

PLAN CLÉ
KEY PLAN



TETRA TECH

NOTES GÉNÉRALES / GENERAL NOTES

* THE FENCE, DITCH, AND THEIR RESPECTIVE MATERIAL QUANTITIES WILL BE INSTALLED AFTER THE AS-BUILT DRAWINGS ARE ISSUED.

TEL QUE CONSTRUIT
AS BUILT
AGNICO EAGLE
DATE : 2019-09-30

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
_	_
_	_
_	_
_	_
_	_
_	_

AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
6	2019-09-30	ISSUED FOR AS-BUILT	C.M.	J.A.	
5	2019-02-13	ISSUED FOR AS-BUILT	M.S.	J.A.	
4	2019-01-24	ISSUED FOR AS-BUILT	M.S.	J.A.	
3	2018-01-25	ISSUED FOR AS-BUILT	C.M.	J.A.	
2	2017-10-13	ISSUED FOR AS-BUILT	C.M.	J.A.	
1	2017-04-12	ISSUED FOR CONSTRUCTION	P.H.	J.A.	

REVISIONS

PERMIT TO PRACTICE
TETRA TECH INDUSTRIES, INC.
O/A TETRA TECH
Signature
Date 25-09-30
PERMIT NUMBER: P 1029
NT/NU Association of Professional Engineers and Geoscientists

REGISTERED PROFESSIONAL ENGINEER
J.M.I.F. ALARIE
LICENSEE
2019-09-30

TITRE / TITLE
AGNICO-EAGLE – MELIADINE DIVISION
000-SITE PREP
230-GENERAL EARTH WORKS
RANKIN FUEL TANK FARM AND LAYDOWN AREA
FINISHED GRADE ELEVATION

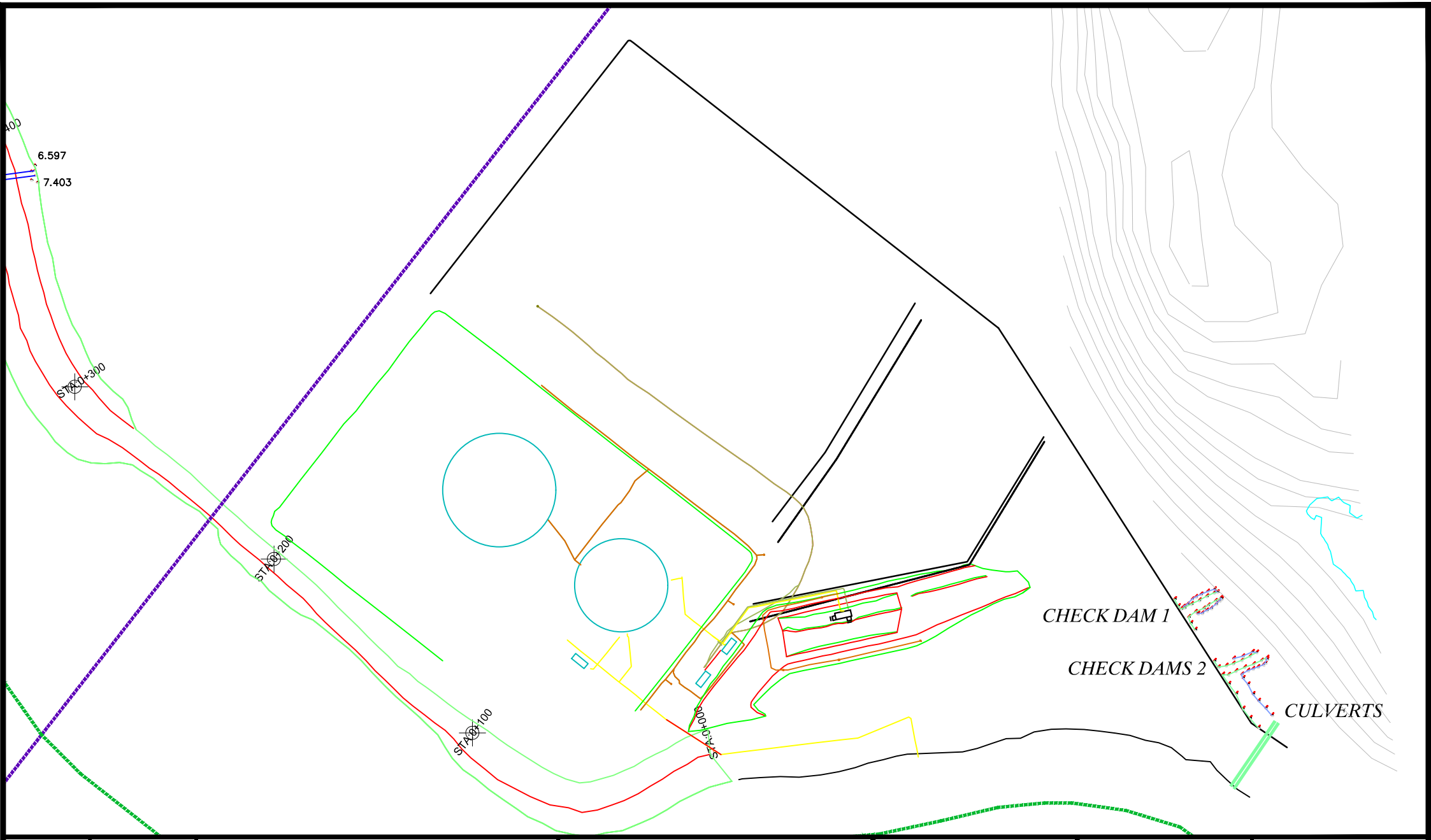
DESSINÉ PAR DRAWN BY	PATRICK HAMEL	DATE 2017-03-03
VERIFIÉ PAR CHECKED BY	MÉLANIE YIP WOON SUN	2017-03-03
APPROUVÉ PAR APPROVED BY	JOSÉE ALARIE	2017-03-03
ÉCHELLE SCALE	1:1000	DATE 2015-07-16
NO. DESSIN DRAWING NO.	65-131-230-200	
NO. PROJET PROJECT NO.	6515/28920	REVISION 6
		FEUILLE / SHT 1 / 1

AE-CART-ARCH D

P:\28920\DESSIN\CIV-INFRA\DESSINS DE TRAVAIL\AUTOCAD\65-131-230-200to202_R6.dwg

APPENDIX B

Survey Drawings of Rankin Inlet Itivia Site rock check dams



HA HAMELARPENTAGE	Système de Coord.: UTM15 NAD83 Echelle: NA	No plan: 65-117-142-200-R0-ABD	CHECK DAMS	AGNICO	Date des travaux : 2019-05-22 Date d'envoi : 2019-05-22	Dessine par: Y. Hamel Approuve par: HAMEL ARP

APPENDIX C

Photographs of Rankin Inlet Itivia Site rock check dams

Photo taken looking upstream from the drainage culvert

Photo taken of the upstream Rock Check Dam Retaining some Water

Photo taken looking downstream from the upstream Waste Rock Check Dam

Photo taken looking upstream at the drainage culvert

APPENDIX D

Construction Summary of Rankin Inlet Itivia Site rock check dams

Construction Summary – Itivia Check Dams

All construction was completed by Inukshuk Contracting Ltd.

The work was carried out between May 11th and May 13th, 2019.

1- Site Preparation
In the area that the check dams were to be constructed a Cat 330 excavator was utilized on May11th to carry out snow removal in the depression/trench down to original ground in order to expose a competent base for the check Dams.

2- Construction of the Check Dams
Backfill material for the check dams was sourced at the SP-2 waste rock stockpile located at the south end of the industrial mine site. Laboratory test results carried out prior to the hauling operations had confirmed that this source of material was acceptable for use at Itivia.
A total of eight (8) tandem truck (10-wheelers) loads was hauled from the mine site to the actual check dams locations in Itivia on May 12th and 13th.
The Cat 330 excavator which had carried out the snow removal was used to place the rockfill and shape the check dams at their respective locations in Itivia as the material was being transported. Each check dam utilized 32 M3 of rockfill for a combined total of 64 M3 for both check dams.
This mandate was completed with an as-built survey within a few days of construction and results are included within this report.

3- Equipment Used for Construction

- CAT 330 excavator
- Komatsu WA 500 Front End Loader
- 2 Tandem dump trucks

APPENDIX E

Waste Rock ABA Results for Rankin Inlet Itivia Site rock check dams

Sample ID				SP2-TH3	SP2-TH4	SP2-TH7	SP2-TH8	SP2-TH9	SP2-TH10	SP2-BH554	SP2-BH339	SP2-BH259	SP2-BH806	SP2-BH711	SP2-BH257	SP2-BH457	SP2-BH326	WR-SP2-Grab 1	WR-SP2-Grab 2
Sample Date/Time				14-Dec-18	14-Dec-18	14-Dec-18	14-Dec-18	14-Dec-18	14-Dec-18	15-Feb-19	09-Mar-19	06-Mar-19	09-Feb-19	09-Feb-19	14-Dec-18	09-Mar-19	06-Mar-19	13-Apr-19	13-Apr-19
Analysis				#VALEUR!	#VALEUR!	#VALEUR!	#VALEUR!	#VALEUR!	#VALEUR!	#VALEUR!	2019.18	2019.17	#VALEUR!	#VALEUR!	#VALEUR!	2019.18	2019.17	#VALEUR!	#VALEUR!
Acid-Base Accounting																			
Paste pH				8.97	9.08	9.00	8.94	8.96	8.85	8.70	8.91	9.32	9.14	9.14	9.40	9.28	9.28	9.32	9.25
NP	t CaCO3/1000 t			44	35	51	43	43	55	51.2	96.4	47.8	53.7	49.2	47.6	43.2	45.7	51.8	64.6
AP	t CaCO3/1000 t			2.81	3.75	2.50	5.94	5.00	8.12	5.31	4.06	3.75	4.06	4.06	3.44	4.38	3.12	5.00	3.44
NP/AP	ratio			15.6	9.23	20.4	7.28	8.64	6.74	9.64	23.7	12.7	13.2	12.1	13.8	9.87	14.6	46.8	61.2
Sulphur (total)	%			0.155	0.241	0.173	0.216	0.218	0.390	0.246	0.232	0.278	0.212	0.216	0.204	0.215	0.209	0.230	0.222
Acid Leachable SO4-S	%			0.06	0.12	0.09	0.03	0.06	0.13	0.08	0.10	0.16	0.08	0.09	0.09	0.08	0.11	0.07	0.11
Sulphide	%			0.09	0.12	0.08	0.19	0.16	0.26	0.17	0.13	0.12	0.13	0.13	0.11	0.14	0.10	0.16	0.11
Sulphide AEM calc				0.10	0.12	0.08	0.19	0.16	0.26	0.17	0.13	0.12	0.13	0.13	0.11	0.14	0.10	0.16	0.11
AP AEM calc				2.97	3.78	2.59	5.81	4.94	8.13	5.19	4.13	3.69	4.13	3.94	3.56	4.22	3.09	5.00	3.50
Carbon (total)	%			0.611	0.450	0.764	0.621	0.623	0.748	0.687	1.25	0.648	0.725	0.681	0.658	0.574	0.637	0.644	0.883
Carbonate (CO3)	%			2.02	1.65	2.82	2.25	2.14	2.52	2.44	5.42	2.36	2.84	2.61	2.86	2.11	2.54	2.27	3.40
NP-carbonate - AEM calc	t CaCO3/1000 t			34	28	47	38	36	42	41	90	39	47	44	48	35	42	38	57
NPR - AEM calc				11	7	18	6	7	5	8	22	11	11	11	13	8	14	8	16
RPD																			
NP				-27%	-24%	-8%	-14%	-19%	-27%	-23%	-6%	-19%	-13%	-12%	0%	-21%	-8%	-31%	-13%
AP				5%	1%	4%	-2%	-1%	0%	-2%	2%	-2%	2%	-3%	3%	-4%	-1%	0%	2%
Multi-elements																			
Silver	µg/g			< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Aluminum	µg/g			80000	78000	76000	84000	77000	72000	67000	62000	68000	70000	71000	66000	73000	74000	76000	69000
Arsenic	µg/g			68	21	140	140	100	62	81	20	40	160	53	54	51	76	40	48
Barium	µg/g			720	710	500	560	480	530	500	250	500	510	490	510	530	540	600	490
Beryllium	µg/g			1.0	1.0	1.0	1.1	1.0	0.92	0.99	0.72	0.89	0.94	0.94	0.93	0.98	0.96	1.1	0.90
Bismuth	µg/g			0.25	0.33	0.34	0.35	0.35	0.39	0.16	0.26	0.20	0.22	0.21	0.20	0.24	0.49	0.21	0.20
Calcium	µg/g			13000	14000	13000	13000	13000	19000	14000	29000	14000	15000	14000	13000	14000	12000	14000	17000
Cadmium	µg/g			0.13	0.13	0.11	0.12	0.15	0.20	0.082	0.22	0.091	0.078	0.073	0.092	0.088	0.062	0.082	0.075
Cobalt	µg/g			20	21	24	26	20	20	22	29	22	22	21	23	21	25	23	19
Chromium	µg/g			76	88	82	85	80	78	80	140	80	79	76	72	63	160	95	76
Copper	µg/g			42	53	49	52	46	49	45	97	61	44	47	40	43	49	53	62
Iron	µg/g			38000	36000	40000	44000	37000	35000	42000	53000	38000	39000	39000	38000	40000	38000	40000	39000
Potassium	µg/g			17000	16000	18000	20000	17000	13000	18000	8000	17000	20000	19000	18000	19000	21000	22000	18000
Lithium	µg/g			34	34	30	37	30	28	27	36	27	27	27	27	31	31	29	25
Magnesium	µg/g			14000	13000	14000	16000	13000	11000	13000	16000	13000	13000	12000	13000	14000	14000	14000	14000
Manganese	µg/g			380	360	370	420	380	400	330	790	390	340	290	410	370	280	400	480
Molybdenum	µg/g			2.4	2.9	2.5	2.9	2.4	1.8	1.2	5.6	1.7	1.3	2.2	1.2	3.1	2.8	1.4	1.2
Sodium	µg/g			22000	25000	23000	21000	24000	26000	20000	20000	23000	20000	19000	20000	21000	15000	20000	20000
Nickel	µg/g			66	64	69	76	65	55	72	62	72	75	73	75	72	84	82	68
Phosphorus	µg/g			440	470	490	500	440	440	510	410	450	450	440	440	450	440	450	380
Lead	µg/g			12	12	11	12	13	14	10	27	8.4	16	7.5	8.4	11	8.6	9.8	7.4
Antimony	µg/g			< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Selenium	µg/g			< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Tin	µg/g			< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Strontium	µg/g			390	370	310	320	340	410	290	360	320	280	280	290	310	270	310	290
Titanium	µg/g			950	1300	2200	1400	1300	850	2100	4400	1500	1700	1900	1700	1100	2600	2000	1900
Thallium	µg/g			0.40	0.34	0.40	0.41	0.36	0.30	0.42	0.18	0.37	0.43	0.41	0.38	0.41	0.45	0.47	0.39
Uranium	µg/g			1.5	1.5	1.5	1.7	1.6	1.9	1.7	1.2	1.8	1.7	1.7	1.6	1.6	1.7	1.7	1.6
Vanadium	µg/g			96	89	100	110	93	78	99	180	92	100	100	98	100	120	120	98
Yttrium	µg/g			7.1	8.9	6.8	8.0	7.1	8.6	6.3	8.2	6.2	6.0	6.1	5.7	6.8	7.2	6.8	6.8
Zinc	µg/g			78	79	76	82	79	77	74	100	81	68	66	75	79	70	80	68
Shake Flask Extraction Tests		MDMER limiits Daily	Permit Limiits Daily																
Sample weight	g			250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250
Volume D.I. Water	mL			750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750
Final pH				8.88	8.90	8.84	8.86	8.76	8.73	8.71	8.84	9.10	9.01	8.92	9.11	9.02	9.02	9.05	9.17
pH	no unit			8.78	8.54	8.84	8.64	8.65	8.61	8.20	8.30	8.71	8.63	8.38	8.63	8.51	8.63	8.53	8.58
Conductivity	uS/cm			218	185	192	186	203	237	363	213	185	290	193	187	219	209	163	161
Alkalinity	mg/L as CaCO3			61	48	68	64	66	55	58	60	66	62	57	69	60	71	59	52
Sulphate	mg/L			12	12	4	5	7	7	68	7	2	8	13	2	10	3	3	3
Mercury	mg/L			< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Silver	mg/L			< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Aluminum	mg/L			0.755	0.823	0.773	0.812	0.720	0.635	0.657	0.378	0.486	0.697	0.627	0.698	0.761	0.802	0.025	0.851
Arsenic	mg/L	1	0.6	0.0375	0.0180	0.0499	0.0376	0.0276	0.0094	0.0494	0.0342	0.0038	0.0411	0.0488	0.0336	0.0384	0.0191	<0.0002	0.0288
Barium	mg/L			0.00315	0.00291	0.00205	0.00197	0.00217	0.00367	0.00127	0.00498	0.00225	0.00177	0.00231	0.00184	0.00185	0.00215	0.0554	0.00144
Boron	mg/L			0.020	0.014	0.012	0.015	0.016	0.021	0.031	0.016	0.020	0.017	0.024	0.019	0.015	0.018	0.105	0.027
Beryllium	mg/L			< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
Bismuth	mg/L			< 0.000007	< 0.000007	< 0.000007	< 0.000007	0.000008	0.000010	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	0.000203	< 0.000007
Calcium	mg/L			8.55	7.39	8.66	8.34	10.0	11.2	7.76	23.3	10.6	6.82	8.49	10.3	7.60	8.25	27.4	6.91
Cadmium	mg/L			0.000007	< 0.000003	0.000031	0.000009	0.000008	0.000007	0.000003	< 0.000003	< 0.000003	0.000003	< 0.000003	< 0.000003	0.000005	0.000018	0.000048	0.000003
Cobalt	mg/L			0.000015	0.000004	0.000012	0.000011	0.000024	0.000012	0.000009	0.000058	0.000012	0.000041	0.000047	0.000080	0.000018	0.000035	0.000061	0.000022
Chromium	mg/L			0.00006	0.00012	0.00004	0.00004	0.00005	0.00007	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008	0.00010	< 0.00008
Copper	mg/L	0.6	0.4	0.00032	0.00039	0.00028	0.00031	0.00029	0.00029	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.0190	0.0003
Iron	mg/L			0.007	0.009	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	0.090	0.007
Potassium	mg/L			18.3	14.1	16.9	17.2	18.0	15.9	9.55	22.7	9.65	18.3	20.4	15.4	19.7	18.1	31.4	13.1

Lithium	mg/L			0.0014	0.0012	0.0023	0.0015	0.0013	0.0017	0.0009	0.0016	0.0049	0.0016	0.0009	0.0020	0.0012	0.0024	0.0018	0.0013
Manganese	mg/L			0.00052	0.00033	0.00067	0.00057	0.00076	0.00110	0.00105	0.00214	0.00149	0.00086	0.00085	0.00099	0.00076	0.00078	0.0135	0.00141
Magnesium	mg/L			2.75	1.30	2.75	2.34	2.94	3.12	2.01	6.42	3.57	2.24	2.80	3.19	2.34	2.34	11.6	1.66
Molybdenum	mg/L			0.00935	0.0110	0.0132	0.0105	0.0103	0.0103	0.00091	0.00334	0.00585	0.00690	0.00318	0.00413	0.00383	0.01136	0.00349	0.00066
Sodium	mg/L			21.1	19.2	17.1	16.6	16.5	21.0	15.9	20.9	18.5	15.7	29.8	12.7	15.4	19.2	62.3	14.6
Nickel	mg/L	1	1	0.0001	< 0.0001	< 0.0001	< 0.0001	0.0002	0.0003	< 0.0001	0.0003	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0011	< 0.0001
Phosphorus	mg/L			0.010	0.021	0.027	0.008	0.005	0.003	< 0.003	< 0.003	0.043	0.009	< 0.003	< 0.003	< 0.003	0.026	5.87	0.015
Lead	mg/L	0.4	0.4	0.00002	0.00003	0.00002	0.00009	0.00001	0.00003	< 0.00001	< 0.00001	< 0.00001	0.00002	0.00004	0.00001	< 0.00001	0.00002	0.00018	< 0.00001
Antimony	mg/L			0.0052	0.0087	0.0072	0.0079	0.0070	0.0067	0.0074	0.0044	0.0064	0.0093	0.0067	0.0077	0.0083	0.0070	< 0.0009	0.0092
Selenium	mg/L			0.00019	0.00027	0.00010	0.00011	0.00020	0.00027	0.00006	0.00009	0.00008	0.00007	0.00012	0.00010	0.00006	0.00008	0.00010	0.00006
Silicon	mg/L			1.83	2.00	1.87	1.77	1.78	1.87	2.76	2.05	1.79	2.17	2.17	1.98	2.10	1.90	8.32	1.95
Tin	mg/L			0.00013	0.00013	0.00036	0.00014	0.00010	0.00047	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	0.00039	< 0.00006
Strontium	mg/L			0.0495	0.0375	0.0358	0.0354	0.0491	0.0672	0.0314	0.0981	0.0710	0.0348	0.0423	0.0400	0.0364	0.0410	0.481	0.0285
Titanium	mg/L			0.00039	0.00058	0.00010	0.00022	0.00018	0.00012	< 0.00005	< 0.00005	0.00005	0.00015	0.00014	0.00017	0.00007	0.00007	0.00072	0.00025
Thallium	mg/L			< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
Uranium	mg/L			0.000262	0.000274	0.000241	0.000131	0.000391	0.000449	0.000134	0.000320	0.000038	0.000299	0.000125	0.000390	0.000140	0.000125	0.000026	0.000110
Vanadium	mg/L			0.00307	0.00419	0.00316	0.00289	0.00228	0.00210	0.00374	0.00096	0.00146	0.00389	0.00236	0.00214	0.00366	0.00237	0.00010	0.00351
Zinc	mg/L	1	0.8	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.070	< 0.002
Zirconium	mg/L			< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002