Appendix 13

Meadowbank 2018 TSF As-built report

REPORT

2018 CONSTRUCTION SEASON AS-BUILT REPORT TAILINGS STORAGE FACILITY MEADOWBANK GOLD PROJECT, NUNAVUT

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Distribution List

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EXECUTIVE SUMMARY

The 2018 construction season at Meadowbank was conducted from April 23, 2018 to August 3, 2018. It consisted in the construction of Stage 6 for Central Dike, the finalization of Stage 3 for Saddle Dam 3, and the construction of the North Cell Internal Structure. Construction was completed in accordance with the requirements of the Design and Technical Specifications developed by Golder for each structure.

The data collected from the quality assurance (QA) and quality control (QC) program during the construction of Stage 6 Central Dike, the finalization of Stage 3 of Saddle Dam 3 and the construction of the North Cell Internal Structure were used to confirm that the construction of each structure was completed in compliance with the Drawings and Technical Specifications. This includes earthwork construction such as foundation preparation and fill placement as well as the installation of the geosynthetics.

During the course of the work, four design changes and thirteen field adjustments were applied to take into account the existing site conditions and to optimize construction activities.

DOCUMENT CONTROL

Document Version	Date	Revised Section	Revision
Working Copy	October 15, 2018	All	Golder Associés
Final Copy	November 30, 2018	All	Golder Associés

1.0 INTRODUCTION

The 2018 construction season of the Tailings Storage Facility (TSF) at Meadowbank was conducted from April 23 to August 8, 2018 and consisted of the construction of Stage 6 of Central Dike, the finalization of Stage 3 of Saddle Dam 3 and the construction of the North Cell Internal Structure (NCIS).

This as-built report for the 2018 construction season presents a summary of the Technical Specifications, the construction activities, the QA/QC activities, as well as the overall information used to produce the as-built drawings. This report was prepared with input from a number of contributors in a collaborative effort between Agnico Eagle Mines Limited (AEM) and Golder Associés Ltée (Golder).

The work done in the previous stages of Central Dike and Saddle Dams 3 is described in the respective construction summary as-built reports.

1.1 Roles and Responsibilities

The Drawings and Technical Specifications for Central Dike, Saddle Dams 3, 4, and 5, and the North Cell Internal Structure were developed by Golder and reviewed by the AEM Meadowbank Engineering Team (MET) and by the Meadowbank Dike Review Board (MDRB). Kivalliq Contractor Group (KCG), formerly SANA, was contracted by AEM for the work of the 2018 construction season of the South Cell and the North Cell. The Owner Representative from AEM was responsible for managing and planning the construction. Golder was responsible for the quality assurance (QA) program and provided technical review of the work to ensure that the structures were constructed according to the Technical Specifications (Technical Specifications) and Construction Drawings (Drawings). The quality control (QC) program (with the exception of aspects related to geosynthetics) was carried out by GHD consultant (GHD), under the direction of AEM. GHD monitored the construction to ensure that the work and materials met the Technical Specifications. The geosynthetics were installed by subcontractor ZTG Geosynthetics (ZTG) under the direction of KCG. The geomembrane QC was also done by ZTG.

Table 1 presents a summary of the general roles and responsibilities for each of the parties involved during the 2018 construction season. This table also includes the key companies and the key personnel that contributed to the various construction activities.

Table 1: Roles, Responsibilities and Key Personnel for the South Cell 2018 Construction Season

Company	Role	Responsibility	Key Personnel	Position
Agnico Eagle Mines Meadowbank Division	Owner	Manage and plan the construction Act as Owner's Representative	Frédérick L. Bolduc Alexandre Lavallée	Geotechnical Coordinator
			Patrice Gagnon Pier-Éric McDonald	Geotechnical Specialist
			Pierre McMullen Miles Legault (Assistant)	Engineering Superintendent
			Olivier Jacques Rock Chabot Denis Gosselin	Dike Supervisor

Company	Role	Responsibility	Key Personnel	Position
Kivalliq Contractor Group (KCG)	Contractor	Carry out 2018 TSF construction activities Provide survey and as-built drawings	Dany Pageau	Superintendant
			Christopher Gilbert Jeannot Gagnon	Project Manager
			Sabin Larouche Patrice Ouellet Michaël Gagnon	KCG Foreman
			Mikaël Lévesque Marc-André Blackburn François Gravel-Grenier Alain Girard	Surveyor
Golder Associés Ltée	Structure designer	QA program during construction Technical review of construction work	Yves Boulianne	Project Director and Dike Designer
			Marion Habersetzer	Project Manager and QA Engineer
			Samuel Barbeau	QA Engineer
GHD	Sub-contractor of the Owner	Carry out QC program and construction monitoring	Daniel Pedneault	Project Manager
			Sébastien Blackburn Cédrick Fillon-Tremblay Daniel Roy Hugues Potvin Mathieu Côté	QC Representative
ZTG Geosynthetics	Sub-contractor of the Contractor (KCG	Geosynthetics installation and QC testing	Jean-Marc Brunet	Project Director
			Stéphane Côté	Field Supervisor and QC Representative (geosynthetics)

1.2 Definitions of Terms Used in this Document

The following table presents the definition of the terms used in this report.

Table 2: Definition of Terms

Term	Definition
AEM	Agnico Eagle Mines, Owner.
As-built drawing	Document showing no new concept. It is the graphical representation of a built structure showing the real measurements, installed instruments and objects. It is not a final plan and can be seen as an inventory of what was built for reference.
Approval	A written engineering or geotechnical opinion, related to the progress and completion of the Work.
Coarse Filter –	Material produced from processing of NON-AG and PAG rockfill and meeting the Technical Specifications.
Compacted Till –	Reworked till satisfying the Technical Specifications. The Technical Specifications refer to compacted till (0-150 mm) and compacted sieved till (0-50 mm).
Contractor	Kivalliq Contractor group (KCG). On-site representative of the construction company contracted by the Owner to successfully carry out the scope of work as defined in the Technical Specifications.
Designer	Golder Associés Ltée.
Dike	Earthwork made of rockfill and natural soil to retain water and tailings.
Downstream and Upstream	The downstream direction represents the downward direction of water flow in a valley or in the direction of a slope. Upstream is defined as the opposite of downstream. For a dike, downstream is the direction of flow from the dike and upstream represents what is retained by the structure.
Field Laboratory	Area and facilities provided for QC and QA testing at Meadowbank.
Fine Filter	Material produced from processing of NON-AG and PAG rockfill and satisfying Technical Specifications.
Fine Rockfill	Processed rockfill satisfying Technical Specifications.
Geotextile	Non-woven geotextile, minimum 500 g/m^2, GSE NW16 or equivalent.
Ice-Poor Soils	Frozen soils that contain less than 10% visible ice and having a water content of less than 20%. No visible ice lenses.

Term	Definition
Ice-Rich Soils	Frozen soils that contain more than 10% visible ice and/or having a water content greater than 20%. Ice lenses may be present.
Liner Installer	ZTG Geosynthetics. Subcontractor under the responsibility of the Contractor and responsible for the installation of geotextile and LLDPE geomembrane.
LLDPE Geomembrane	Linear low-density polyethylene geomembrane satisfying Technical Specifications.
Low Quality Till	Till-like material having relative low permeability.
Owner	Agnico-Eagle Mines Limited, Meadowbank Division (AEM)
Owner’s Representative	Person(s) employed by the Owner in order to oversee the project works and the Owner’s interests. The primary point of contact for the Designer and the Contractor.
PAG / NON-AG	PAG: A material that has been geochemically classified as being potentially acid generating. NON-AG: A material that has been geochemically classified as not being acid generating.
QA Engineer	Responsible for QA activities.
Quality Assurance (QA)	A planned system of inspection and testing of documents, to the satisfaction of the Owner, the Engineer, other stakeholders and regulators, that the Work complies with the design, Drawings and Technical Specifications. Quality Assurance comprises inspections carried out during Quality Control that include verifying and assessing materials and workmanship necessary to determine and document the quality of the constructed facility. Quality Assurance refers to the measures taken by the Quality Assurance organization and the Engineer to assess whether the Contractor is in compliance with the design, Drawings and Technical Specifications.
Quality Control (QC)	A planned system of inspection, testing and documentation carried out by the Contractor during construction to ensure that the Work is being performed and completed in a manner that complies with the Drawings and Technical Specifications. The Contractor is responsible for the Quality Control of all Work performed by him and all Work performed by any Subcontractor under contract with him.
QC Representative	Person or company hired by the Owner and under the supervision of the Owner’s Representative to collaborate with the Contractor to ensure QC testing and inspection of all work done by the Contractor.

Term	Definition
Rockfill – Zone 4	NON-AG rockfill, expected to be run-of-mine material requiring little to no processing and satisfying the Technical Specifications.
Tailings Deposition Fingers	Engineered elements designed by the Owner to facilitate the deposition of tailings from the crest of Central Dike while protecting the structure.
Till	Naturally-occurring well-graded soils consisting of sizes ranging from clay to boulders.
TSF	Tailings Storage Facility
Work	All activities associated with the construction of Central Dike, and Saddle Dams 3, 4, and 5.
Working Platform	Surface of fill and/or excavated surface from which the work is conducted.

1.3 Description of the Built Structures

The South Cell of the Meadowbank TSF consists of five permanent perimeter structures: Central Dike, Stormwater Dike, Saddle Dam 3, Saddle Dam 4, and Saddle Dam 5. Central Dike is located in the southeastern end of the South Cell and adjacent to the western limits of the North Portage Pit. Saddle Dam 3 is located in the northwestern corner of the South Cell and is designed to merge with Saddle Dam 2. Saddle Dam 4 is located in the southwestern corner of the South Cell and is merged with Saddle Dam 5, which merges with the southern end of Central Dike. Figure 1 shows a plan view of the South Cell.

Figure 1: Layout of the South Cell of the Meadowbank Tailings Storage Facility

The North Cell of the Meadowbank TSF consists of five permanent perimeter structures: Saddle Dam 1, Saddle Dam 2, Stormwater Dike, RF1 and RF2. Saddle Dam 1 is located in the western end of the North Cell. Saddle Dam 2 is located in the southwestern corner of the North Cell and merges with Saddle Dam 3 and Stormwater Dike. Stormwater Dike is located at the south of the North Cell and is the boundary between the North Cell and the South Cell. RF1 is located in the southeastern corner of the North Cell and is merged with RF2, which is located in the eastern end of the North Cell. The North Cell Internal Structure is built over the dried top surface tailings and existing rockfill cover in the northern part of the North Cell. Figure 2 shows a plan view of the North Cell.

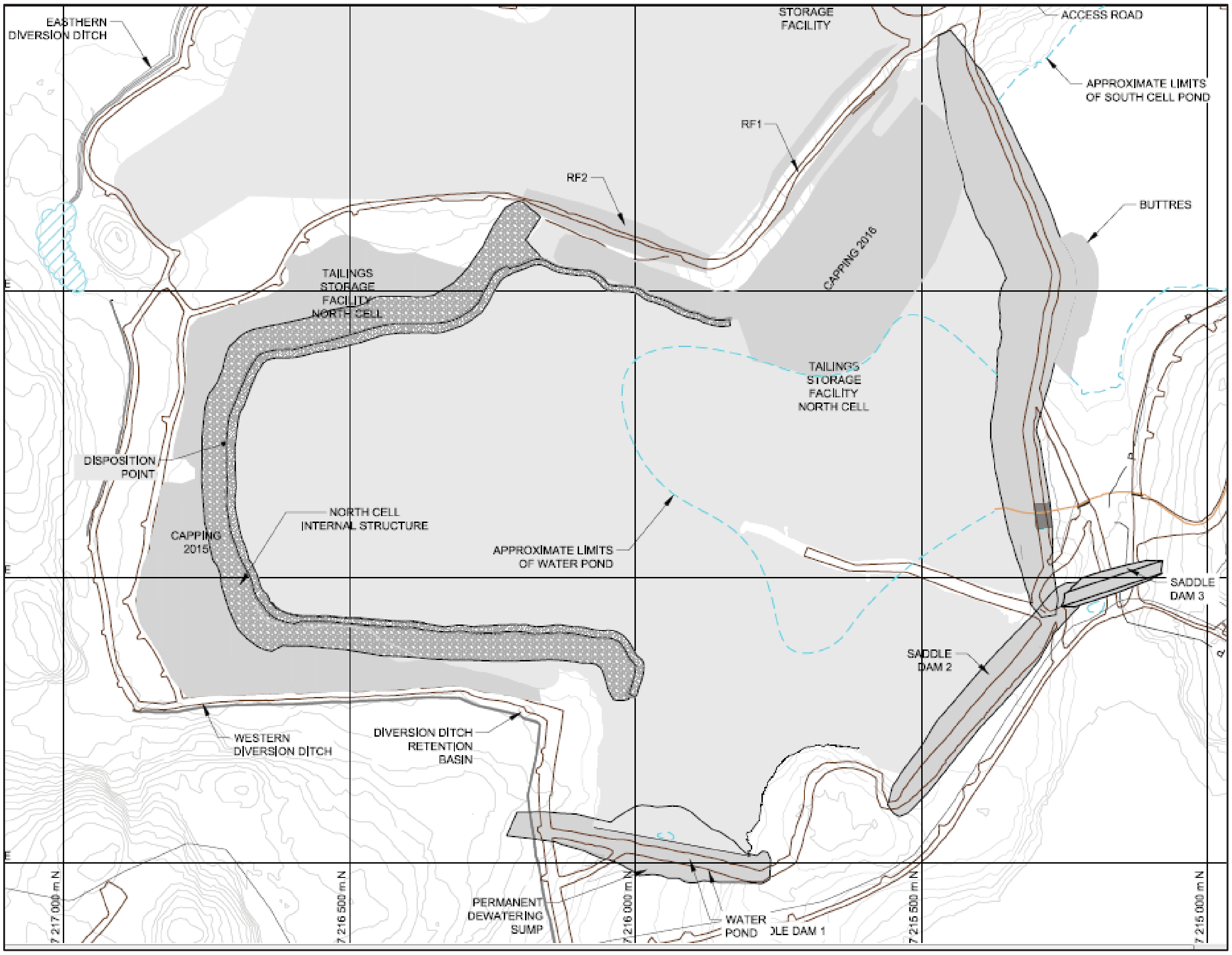

Figure 2: Layout of the North Cell of the Meadowbank Tailings Storage Facility

1.3.1 Stage 6 of Central Dike

Central Dike is designed and constructed as a zoned rockfill dam with filter zones, an impervious upstream liner, and a liner tie-in key trench. The central part of the dike was constructed in 2012 and 2013 with a centreline liner tie-in key trench. In 2013, the design was modified for the south and north abutment to have an upstream toe liner tie-in key trench. The Central Dike cross-section consists of a rockfill embankment constructed from run-of-mine waste rock, placed in lifts and compacted, with the upstream face at a 3H:1V slope from elevation (El.) 110 m to El. 130 m and 2H:1V above El. 130 m. The downstream face is at a 1.5H:1V slope. The upstream face of Central Dike comprises two granular filter zones (Zone 2 and 3) and a linear low-density polyethylene (LLDPE) liner extending along the upstream foundation. The filter zones act as the bedding to prevent damage to the liner and as a filter designed to prevent tailings migration and internal erosion. An upstream till liner tie-in key trench excavated to bedrock and filled with compacted till (Zone 1) is located along the upstream area of the structure. The bulk part of Central Dike consists of coarse rockfill (Zone 4). A cofferdam is included with Central Dike as part of the upstream face.

The north abutment of Central Dike was raised to El. 145 m in 2017. During construction in 2018, the remaining part of Central Dike was raised from a crest El. of 143 m to a crest El. of 145 m (downstream toe ranging from El. 142 m to El. 145 m approximately). The length of the dike remained at about 900 m (from Sta. 0+090 to 0+990 m).

1.3.2 Finalization of Stage 3 of Saddle Dam 3

Saddle Dam 3 is designed and constructed as a zoned rockfill dam with filter zones, a low permeability upstream liner, and an upstream toe liner tie-in key trench. The Saddle Dam 3 cross-section consists of a rockfill embankment, constructed from run-of-mine waste rock, placed in lifts and compacted. The upstream face is designed at a 3H:1V slope and the downstream faces are designed at a 1.5H:1V slope. The upstream face of Saddle Dam 3 comprises two granular filter zones (Zone 2 and 3) and an LLDPE liner extending along the upstream foundation. The filter zones act as the bedding to prevent damage to the liner and as a filter designed to prevent tailings migration and internal erosion. A liner tie-in key trench excavated to bedrock and filled with compacted till (Zone 1) is located along the upstream area of the structure. The bulk part of Saddle Dam 3 consists of coarse rockfill material (Zone 4).

During the finalization of Stage 3 construction in 2018, geosynthetics were installed on the upstream face of Saddle Dam 3 from El. 143 m to the crest at El. 145 m (downstream toe ranging from El. 134 m to El. 145 m approximately). The length of the dike remained at about 245 m (from Sta. 20+569 to 20+814 m). The upstream erosion protection cover was raised to El. 144 m during this stage.

1.3.3 Construction of the North Cell Internal Structure

The North Cell Internal Structure is designed and constructed as a permeable zoned rockfill dam with filter zones, built on the top surface dried tailings of the North Cell and on the existing rockfill cover. The North Cell Internal Structure cross-section consists of a rockfill embankment, constructed from run-of-mine waste rock, placed in lifts and compacted. The upstream face is designed at a 3H:1V slope and the downstream faces are designed at a 1.5H:1V slope. The upstream face of the North Cell Internal Structure comprises two granular filter zones (Zone 2 and 3). The filter zones are designed to prevent tailings migration and internal erosion, while allowing water to flow through the embankment. The bulk part of the North Cell Internal Structure consists of coarse rockfill material (Zone 1). A system of ditches and sumps at the downstream toe of the structure is designed to collect seepage and runoff water.

The North Cell Internal Structure was built in 2018 to El. 152 m from Sta. 1+100 m to 1+660 m and from 2+750 m to 3+200 m, and to El. 154 m from Sta. 1+660 m to 2+750 m. The length of the dike is about 2,160 m (from Sta. 1+100 to 3+260 m), and the downstream toe is at El. 148 m to 150 m approximately.

1.4 Construction Drawings and Technical Specifications

The Construction Drawings and Technical Specifications of Central Dike were developed by Golder in 2012 prior to the beginning of construction. In 2013, a change in design was made to modify the original central liner tie-in key trench under the dike to an upstream liner tie-in key trench.

The Construction Drawings and Technical Specifications for Saddle Dam 3 were developed by Golder prior to the start of the 2015 construction season.

The Construction Drawings and Technical Specifications for the North Cell Internal Structure were developed by Golder prior to the start of the 2018 construction season.

Table 3, Table 4, Table 5 and Table 6 below present the available versions of the Design Reports, Technical Specifications, and Drawings in chronological order.

Table 3: List of Design Reports for Central Dike, Saddle Dam 3 and the North Cell Internal Structure

Document Number	Date	Rev	Title
Doc 1349 11-1221-0035	06/11/2012	1	Detailed design report for Central Dike
Doc 1504 1416081	05/12/2015	0	Detailed design report for Saddle Dams 3, 4, and 5
1784383-Rev0	19/04/2018	0	Detailed engineering design of North Cell internal structure

Table 4: List of Technical Specifications for Central Dike, Saddle Dams 3 and the North Cell Internal Structure

Document Number	Date	Rev	Title
Doc. 1327 11-1221-0035	07/03/2012	0	Meadowbank Gold Project Central Dike Construction Technical Specifications
Doc. 1498 14-16081	04/30/2015	0	Meadowbank Gold Project Saddle Dams 3, 4 and 5 Construction Technical Specifications
1784383-Rev0	05/02/2018	0	Meadowbank Mine North Cell Internal Structure Construction Technical Specifications

Table 5: List of Construction Drawings for Central Dike

Drawing Number	Date	Rev	Title
CD-01	03/07/2012	0	CENTRAL DIKE LOCATION MAP AND DRAWING INDEX
CD-02	03/07/2012	0	CENTRAL DIKE PROJECT SITE PLAN
CD-03	03/07/2012	0	CENTRAL DIKE GENERAL LAYOUT PLAN OF THE TSF
CD-04	03/07/2012	0	CENTRAL DIKE GENERAL ARRANGEMENT PLAN
CD-05	03/07/2012	0	CENTRAL DIKE PLAN, PROFILE AND QUANTITIES STA 0+000 TO 0+400
CD-06	03/07/2012	0	CENTRAL DIKE PLAN, PROFILE AND QUANTITIES STA 0+400 TO 0+800

Drawing Number	Date	Rev	Title
CD-07	03/07/2012	0	CENTRAL DIKE PLAN, PROFILE AND QUANTITIES STA 0+800 TO 1+135
CD-08	03/07/2012	0	CENTRAL DIKE TYPICAL SECTION – WITH COFFERDAM
CD-09	03/07/2012	0	CENTRAL DIKE TYPICAL SECTION – ABUTMENT PORTIONS
CD-10	03/07/2012	0	CENTRAL DIKE TYPICAL DETAILS – SHEET 1 OF 2
CD-11	03/07/2012	0	CENTRAL DIKE TYPICAL DETAILS – SHEET 2 OF 2
CD-12	03/07/2012	0	CENTRAL DIKE AND SADDLE DAM 5 CONNECTION DETAILS
CD-13	03/07/2012	0	CENTRAL DIKE TAILINGS MIGRATION CONTINGENCY PLAN
CD-14	03/07/2012	0	CENTRAL DIKE CONSTRUCTION SEQUENCE
CD-15	03/07/2012	0	CENTRAL DIKE CROSS-SECTIONS
CD-16	03/07/2012	0	CENTRAL DIKE INSTRUMENTATION PLAN AND SECTION
CD-01	07/12/2013	1	CENTRAL DIKE LOCATION MAP AND DRAWING INDEX
CD-04	07/12/2013	1	CENTRAL DIKE GENERAL ARRANGEMENT PLAN
CD-08	07/12/2013	1	CENTRAL DIKE TYPICAL SECTION – WITH COFFERDAM
CD-09	07/12/2013	1	CENTRAL DIKE TYPICAL SECTION – NORTH ABUTMENT PORTIONS
CD-09A	07/12/2013	1	CENTRAL DIKE TYPICAL SECTION – SOUTH ABUTMENT PORTIONS
CD-12	07/12/2013	1	CENTRAL DIKE KEY TRENCH TO UPSTREAM LINER TIE-IN TRANSITION DETAILS – SHEET 1 OF 2
CD-12A	07/12/2013	1	CENTRAL DIKE KEY TRENCH TO UPSTREAM LINER TIE-IN TRANSITION DETAILS – SHEET 2 OF 2

Table 6: List of Construction Drawings for Saddle Dams 3, 4, and 5

Drawing Number	Date	Rev	Title
SD 3,4&5-01	04/30/2015	0	LOCATION MAP AND DRAWING INDEX
SD 3,4&5-02	04/30/2015	0	PROJECT SITE PLAN
SD 3,4&5-03	04/30/2015	0	GENERAL ARRANGEMENT PLAN
SD 3,4&5-04	04/30/2015	0	SADDLE DAM 3 PLAN, PROFILE AND QUANTITIES
SD 3,4&5-05	04/30/2015	0	SADDLE DAM 4 PLAN, PROFILE AND QUANTITIES
SD 3,4&5-06	04/30/2015	0	SADDLE DAM 5 PLAN, PROFILE AND QUANTITIES
SD 3,4&5-07	04/30/2015	0	TYPICAL CROSS-SECTION AND DETAILS
SD 3,4&5-08	04/30/2015	0	STAGED CONSTRUCTION SEQUENCE
SD 3,4&5-09	04/30/2015	0	SADDLE DAM 3 CROSS-SECTIONS
SD 3,4&5-10	04/30/2015	0	SADDLE DAM 4 CROSS-SECTIONS
SD 3,4&5-11	04/30/2015	0	SADDLE DAM 5 CROSS-SECTIONS
SD 3,4&5-12	04/30/2015	0	INSTRUMENTATION PLAN AND SECTION – SADDLE DAM 3
SD 3,4&5-13	04/30/2015	0	INSTRUMENTATION PLAN AND SECTION – SADDLE DAM 4
SD 3,4&5-14	04/30/2015	0	INSTRUMENTATION PLAN AND SECTION – SADDLE DAM 5
SD 3,4&5-15	04/30/2015	0	SUMP LOCATIONS AND DETAILS

Table 7: List of Construction Drawings for the North Cell Internal Structure

Drawing Number	Date	Rev	Title
001	07/02/2018	0	COVER PAGE
002	07/02/2018	0	GENERAL ARRANGEMENT PLAN
003	07/02/2018	0	GEOTECHNICAL INVESTIGATION PLAN

Drawing Number	Date	Rev	Title
004	07/02/2018	0	INTERNAL STRUCTURE AND DITCH PLAN AND PROFILE 1 OF 8
005	07/02/2018	0	INTERNAL STRUCTURE AND DITCH PLAN AND PROFILE 2 OF 8
006	07/02/2018	0	INTERNAL STRUCTURE AND DITCH PLAN AND PROFILE 3 OF 8
007	07/02/2018	0	INTERNAL STRUCTURE AND DITCH PLAN AND PROFILE 4 OF 8
008	07/02/2018	0	INTERNAL STRUCTURE AND DITCH PLAN AND PROFILE 5 OF 8
009	07/02/2018	0	INTERNAL STRUCTURE AND DITCH PLAN AND PROFILE 6 OF 8
010	07/02/2018	0	INTERNAL STRUCTURE AND DITCH PLAN AND PROFILE 7 OF 8
011	07/02/2018	0	INTERNAL STRUCTURE AND DITCH PLAN AND PROFILE 8 OF 8
012	07/02/2018	0	SECTIONS AND DETAILS OF INTERNAL STRUCTURE AND DITCHES
013	07/02/2018	0	DETAILS OF INTERNAL STRUCTURE AND DITCHES

1.5 As-Built Drawings

Table 8 presents the as-built drawings for the 2018 construction season of the TSF South Cell and North Cell. The surveying and the as-built drawings were done by KCG and verified by Golder. The as-built drawings for the 2018 construction of the South Cell and North Cell are included in Appendix A.

Table 8: List of As-Built Drawings for the Stage 6 of the Central Dike, the Finalization of Stage 3 of Saddle Dam 3 and the Construction of the North Cell Internal Structure

Drawing Title	Date	Rev	Structure
CENTRAL DIKE AS BUILT 2018 PLAN VIEW	11/08/2018	0	CENTRAL DIKE (1/2)
CENTRAL DIKE AS BUILT 2018 SECTION VIEW (0+160 TO 1+000)	11/08/2018	0	CENTRAL DIKE (2/2)
SD 3 AS BUILT 2018 PLAN VIEW	30/08/2018	0	SADDLE DAM 3 (1/2)
SD 3 AS BUILT 2018 SECTION VIEW (20+600 TO 20+800)	30/08/2018	0	SADDLE DAM 3 (2/2)
NORTH CELL INTERNAL STRUCTURE AS BUILT 2018 PLAN VIEW	10/09/2018	0	NORTH CELL INTERNAL STRUCTURE (1/2)
NORTH CELL INTERNAL STRUCTURE AS BUILT 2018 SECTION VIEW (1+300 TO 2+700)	10/09/2018	0	NORTH CELL INTERNAL STRUCTURE (2/2)

1.6 Technical Memoranda – Design Changes

Design changes and field adjustments occurred during the 2018 construction season to adapt the initial design to the field conditions encountered during construction. These design changes and adjustments were implemented by the Designer (Golder) in partnership with AEM and were documented in the present report, or in technical memoranda. Per AEM's request, one design change memorandum was issued this year, while the other changes and adjustments are documented in Section 5.0 of this report. Relevant design changes memoranda from past construction years were applied to the 2018 construction season. Table 9, Table 10 and Table 11 list the technical memoranda that discuss field adaptation or modification from the initial Technical Specifications and Drawings relevant to the 2018 Construction Season listed in chronological order. The technical memoranda issued during the 2018 construction season can be found in Appendix B. For the other design change technical memoranda, refer to past as-built reports.

Table 9: List of Design Change Memoranda Relevant to the 2018 Construction Season of Central Dike

Doc Number	Date	Rev	Title
Doc 1102 120528	05/16/2012	0	Material placement over LLDPE geomembrane, Central Dike.
Doc 1103 120528	05/28/2012	0	Placement of fill material over LLDPE geomembrane and underlying geotextile, Central Dike.
Doc 1363 11-1221-0035	06/18/2012	0	Response to the contractor proposed work for placement of fill material over LLDPE geomembrane, Central Dike.
Doc 1385	09/18/2012	0	Central Dike – non-acid generating cover for dike closure.
Doc 1453 1312210034	04/24/2014	0	2013 Central Dike design changes.
Doc 1466 1403762	06/01/2014	0	Central Dike inverse filter details for an upstream toe liner tie-in.
Doc 1469 1403762	06/06/2014	0	Central Dike design changes in the fine filter sample frequency.
Doc 1143 1403762	06/08/2014	0	Site instruction for the use of a CAT 307 excavator for placement of material over LLDPE geomembrane, Central Dike.
Doc 1470 1403762	06/09/2014	0	Central Dike design changes, geomembrane protection cover.
Doc 1471 1403762	06/17/2014	0	Central Dike south abutment key trench and transition to the upstream toe liner tie-in details between Sta. 0+800 and 0+850.
Doc 1472 1403762	06/19/2014	0	Summary of placement of fill material.
Doc 1479 1403762	08/11/2014	0	Central Dike rockfill quality recommendations.
Doc1518 1528661	07/24/2015	0	Recommendations on the use of ultramafic rockfill on Central Dike above El. 133 m.
Doc 1544 1656047	08/01/2016	0	Presentation of a new particle size envelope for the sieved compacted till.
Doc 1545 1606047	10/17/2016	0	Technical update about the placement of good quality NON-AG rockfill on Central Dike.

Table 10: List of Design Change Memoranda Relevant to the 2018 Construction Season of Saddle Dam 3

Doc Number	Date	Rev	Title
Doc 1514 1528661	09/09/2015	0	Saddle Dam 3, 4, 5 Design changes for upstream toe liner tie-in in backfill.
Doc 1515 1528661	09/10/2015	0	Saddle Dam 3 construction over faulted zone.
Doc 1564 1777687	11/30/2017	1	Design change for the LLDPE geomembrane protection on the upstream slope of Saddle Dam 3.
1897439-1577-TM Rev0 (weekly report for time period from 7/07 to 15/07)	16/07/2018	0	Change in the LLDPE geomembrane protection on the upstream slope of Saddle Dam 3

Table 11: List of Design Change Memoranda Relevant to the 2018 Construction Season of the North Cell Internal Structure

Doc Number	Date	Rev	Title
1897439-1582-TM-Rev0	29/11/2018	0	Phased construction of the ditches, sumps and instrumentation of the north cell internal structure
1897439-1577-TM Rev0 (weekly report for time period from 21/05 to 27/05)	28/05/2018	0	Change in the downstream slope of the structure built on tailings
1897439-1577-TM Rev0 (weekly report for time period from 21/05 to 27/05)	28/05/2018	0	Change in the alignment of the structure

2.0 SUMMARY OF TECHNICAL SPECIFICATIONS REQUIREMENTS

The Technical Specifications and Requirements for the main work activities for Central Dike, Saddle Dam 3 and the North Cell Internal Structure are summarized below.

2.1 Excavation and Foundation Preparation

The technical requirements for the foundation preparation of Central Dike and the Saddle Dams include:

- Stripping of the footprints to provide suitable surface for rockfill and granular fill placement, such as removal of boulders, organic soils, soft soils and ice-rich soils, including blasting.
- Preparation of foundation surfaces for LLDPE geomembrane installation, where applicable.
- Excavation of upstream toe liner tie-in.

Stripping and excavation must be carried out in accordance with their respective Drawings and Technical Specifications, using the necessary water control measures required for safe and effective operation.

Temporary drainage and pumping systems must be provided, operated, and maintained as required to direct water away from the surface excavation areas and the toe of the dikes during construction.

Foundation approval must be completed and documented before placing granular material above the foundation.

The technical requirements for the foundation preparation of the North Cell Internal Structure include snow removal, and do not require foundation approval forms as the structure is laying over the dried top surface tailings.

2.2 Fills Materials and Placement

Central Dike and the Saddle Dams are made of six different zones of fill materials. The North Cell Internal Structure is made of three different zones of fill material. The general Technical Specifications for each fill material zone are described below. The material gradation limits are summarized in Table 12 and Table 13.

Table 12: Material Gradation Limits for Central Dike and the Saddle Dams

Grain Size (mm)	Percent Passing by Mass (%)			
	Compacted Till (Zone 1)	Compacted Sieved Till (Zone 1)	Fine Filter (Zone 2)	Coarse Filter (Zone 3)
200	-	-	-	100
152.4	100	-	-	86-100
76.2	90-100	-	-	35-100
50	-	100	-	-
25.4	75-91	85-100	-	5-40
20	-	-	100	-

Grain Size (mm)	Percent Passing by Mass (%)			
	Compacted Till (Zone 1)	Compacted Sieved Till (Zone 1)	Fine Filter (Zone 2)	Coarse Filter (Zone 3)
12.7	65-84	75-94	50-100	0-18
4.76	53-73	63-83	23-68	0-9
2	-	-	-	0-5
0.425	33-48	43-58	0-20	-
0.075	20-35	30-45	0-15	-

Table 13: Material Gradation Limits for the North Cell Internal Structure

Grain Size (mm)	Percent Passing by Mass (%)	
	Coarse Filter (Zone 2)	Fine Filter (Zone 3)
200	100	-
152	100-86	-
76	100-42	-
38.1	-	100
25	52-14	-
19.05	-	100-65
12.7	35-10	100-50
4.76	23-5	60-28
2	15-3	40-16
0.425	10-1	23-6
0.075	7-0	10-0

2.2.1 Zone 1 – Compacted Till and Compacted Sieved Till (Central Dike and Saddle Dams)

Compacted till must be an unfrozen mix of silty sand and gravel with a maximum particle size of 150 mm. Compacted sieved till is a material specified to be placed within 0.5 m of the LLDPE geomembrane for its protection. This material has a maximum particle size of 50 mm. Compacted till and compacted sieved till must be well-graded, plastic and have a certain fine content (percent of material by mass passing No. 200 sieve). This material must be free of organic material, debris, cinders, ash, refuse, snow, ice, and other deleterious materials subject to approval by the Owner's Representative.

The maximum loose horizontal lift thickness of compacted till is 0.5 m. The placement water content of the compacted till must be at 0% to 3% above the optimum water content (ASTM D698). Compaction must be carried out using a 10-T smooth drum compactor. The use, or non-use, of vibration during compaction will be based on the results of field trials. Placement and compaction of the compacted till must result in a homogeneous low hydraulic conductivity zone. The density of the compacted till material is expected to be about 95% of standard Proctor maximum density (ASTM D698).

Compacted sieved till placed over and within 0.5 m of the LLDPE geomembrane shall:

- Be placed in loose lifts having a thickness of 0.5 m using an excavator with a maximum mass of 20 T. Direct dumping of compacted till onto the LLDPE geomembrane is not allowed.
- Be compacted with a single pass of the track of an excavator having a maximum mass of 20 T and not using a roller compactor.
- Not be trafficked by any light, heavy, or haulage equipment other than that above.
- Be to the satisfaction of the Owner's Representative.

2.2.2 Zone 1A – Low Quality Till (Central Dike and Saddle Dams)

Low quality till is constituted of unfrozen silty sand and gravel. The material must be well-graded and have a gradation ranging between 0 and 500 mm. Low quality till must be free of boulders, organic material, debris, cinders, ash, refuse, snow, ice, and other deleterious materials. This material is part of the Saddle Dams design, but not of the Central Dike design.

The maximum loose lift thickness for the low-quality till shall be 1.0 m. Placement equipment shall traffic the material uniformly parallel and perpendicular to the lift front advancement to aid with compaction. Compaction of low quality till shall be carried out using a 10-T smooth drum roller vibratory compactor with a minimum of 4 passes parallel to the axis of Saddle Dam 3 and to the satisfaction of the Owner's Representative.

2.2.3 Zone 2 (Central Dike and Saddle Dams) or Zone 3 (North Cell Internal Structure) – Fine Filter

Fine filter is made of crushed NON-AG or PAG rockfill processed to satisfy the gradation limits. Fine filter shall be free of organic material, debris, cinders, ash, refuse, snow, ice, and other deleterious material subject to the satisfaction of the Owner's Representative.

The maximum loose lift thickness of fine filter is 0.5 m. Compaction of fine filter must be carried out using a 10-T smooth drum vibratory roller compactor with a minimum of 4 passes parallel to the axis of the structure.

2.2.4 Zone 3 (Central Dike and Saddle Dams) or Zone 2 (North Cell Internal Structure) – Coarse Filter

Coarse filter is made of crushed NON-AG or PAG rockfill processed to satisfy the gradation limits. Coarse filters shall be free of organic material, debris, cinders, ash, refuse, snow, ice, and other deleterious material.

The maximum loose lift thickness of the coarse filter is 0.5 m. Coarse filter shall be placed and compacted to avoid disturbing the underlying materials. Compaction of the coarse filter shall be carried out using a 10-T smooth drum vibratory roller compactor with a minimum of 4 passes parallel to the axis of the structure and to the satisfaction of the Owner's Representative.

2.2.5 Zone 4A/4B (Central Dike and Saddle Dams) or Zone 1 (North Cell Internal Structure) – Coarse Rockfill

On Central Dike and the Saddle Dams, coarse rockfill must be made of sound, hard, durable, well-graded rock fragments free from ice, frozen chunks, organic matter, debris and other deleterious materials. On the North Cell Internal Structure, the material used must be well-graded NON-AG ultramafic volcanic rock fragments free from ice, frozen chunks, organic matter, debris and other deleterious materials. Coarse rockfill must have a maximum particle size of 1.3 m. All rockfill shall be geochemically classified by the Owner prior to placement.

Coarse rockfill classified Zone 4A must comprise NON-AG or PAG rockfill material. Coarse rockfill classified Zone 4B must comprise NON-AG rockfill material only and be placed in the zones shown on the drawings and areas prioritized by the Owner's Representative. NON-AG rockfill may be used instead of PAG rockfill but only at the direction of the Owner's Representative.

The maximum loose lift thickness for coarse rockfill is 2 m. Placement equipment shall traffic the material uniformly parallel and perpendicular to the lift front advancement to aid with compaction. Coarse rockfill shall be placed and compacted to avoid disturbance of the underlying materials. Compaction of coarse rockfill shall be carried out using a fully-loaded haul truck with a minimum of 4 passes parallel to the axis of the structure. Alternatively, a 10-T smooth drum roller vibratory compactor with a minimum of 6 passes (Central Dike and the Saddle Dams) or 4 passes (North Cell Internal Structure) parallel to the axis of the structure can be used. Compaction shall be to the satisfaction of the Owner's Representative.

2.2.6 Zone 5 – Fine Rockfill (Central Dike and Saddle Dams)

Fine rockfill is made of sound, hard, durable, well-graded rock fragments free from ice, frozen chunks, organic matter, debris, and other deleterious materials. Fine rockfill must be well graded and have a gradation ranging between 0 and 300 mm. NON-AG and PAG rockfill may be used for the fine rockfill at the direction of the Owner's Representative.

The maximum loose lift thickness for fine rockfill is 0.5 m. Placement equipment shall traffic the material uniformly parallel and perpendicular to the lift front advancement to aid with compaction. Compaction of fine rockfill shall be carried out using a 10-T smooth drum roller vibratory compactor with a minimum of 4 passes parallel to the axis of the structure and to the satisfaction of the Owner's Representative.

2.3 Liner Tie-In Key Trench

The Technical Specifications for the construction of the liner tie-in key trench of Central Dike and the Saddle Dams include the following activities:

- Excavation of the liner tie-in key trench that may involve blasting and the use of a hydraulic hammer.

- Preparation of the bedrock surface at the base of the liner tie-in key trench. This includes removal of soft material and ponding water, bedrock mapping and the filling of exposed bedrock discontinuities. The filling of bedrock discontinuities for piping and erosion protection is done by the application of slush grout for Central Dike or a fine filter and bentonite mix for Saddle Dams 3, 4, and 5.
- Preparation of liner tie-in key trench surfaces for LLDPE geomembrane placement.
- Backfilling of the liner tie-in key trench with compacted till and erosion protection cover.

2.4 Geosynthetics

The Central Dike and Saddle Dams Technical Specifications define the technical requirements for installation of the non-woven geotextile (minimum mass per unit area of 500 g/m^2). The work covered by the Technical Specifications includes the purchase, fabrication (if needed), supply, transport, storage, testing, and installation of the geotextile.

The LLDPE geomembrane placed on the upstream face and within the tie-in key trench must be a micro spike geomembrane (1.5-mm thick, textured on both sides) or an approved equivalent. The work covered by the Technical Specifications includes the purchase, supply, transport, storage, installation, and testing of the LLDPE geomembrane.

The bituminous geomembrane placed in the shallow lined ditches in waste rock must be Coletanche ES2 elastomeric geomembrane (4-mm thick) or an approved equivalent. The work covered by the Technical Specifications includes the purchase, supply, transport, storage, installation, and testing of the bituminous geomembrane.

3.0 SUMMARY OF CONSTRUCTION ACTIVITIES AND SCHEDULE

This section describes the construction steps performed during the 2018 construction season to build the Central Dike, the Saddle Dam 3 and the North Cell Internal Structure. This section also includes the schedule for the work done on each structure.

3.1 Stage 6 of Central Dike– Schedule and Construction Steps

The construction of Stage 6 of Central Dike was done from April 21 to July 22, 2018, and comprised the following major work items:

- Site preparation (access ramp construction, removal of snow on the dike and scarification of the rockfill lift at El. 143 m);
- Foundation preparation and approval (excavation of snow and rock fragments);
- Fill placement, compaction, and slope profiling (rockfill and upstream filter placement);
- Geotextile and LLDPE geomembrane installation;
- Placement and compaction of compacted till layers and erosion protection material over the geosynthetics in the upstream toe liner tie-in;
- Construction of four tailings deposition points (designed by AEM).

The work procedures followed during the construction of these work items are discussed in the following subsections.

Selected photographs of the work progress taken throughout the construction season are shown in Appendix C1.

Table 14 presents the construction schedule for the main work items regarding the preparation of the north abutment of Central Dike.

Table 14: Schedule for the Construction Activity for Stage 6 of Central Dike

Activity	Beginning	End
Site preparation (access ramp, snow removal and scarification of the crest at El. 143 m)	April 23, 2018	April 27, 2018
Foundation preparation and approval	April 27, 2018	April 28, 2018
Placement, compaction and profiling of rockfill on the crest from El. 143 m to El. 145 m and on the footprint (1.5:H d/s, 2H:1V u/s)	April 21, 2018	May 16, 2018
Placement, compaction and profiling of filter material on the upstream 2H:1V slope from El. 143 m to El. 145 m	May 6, 2018	May 12, 2018
Final profiling of the 2H:1V upstream slope before geosynthetics installation	May 11, 2018	May 12, 2018
Geosynthetics installation on the upstream 2H:1V slope	May 22, 2018	June 9, 2018
Placement and compaction of compacted till layers and erosion protection material over the geosynthetics in the upstream toe liner tie-in of the north abutment to complete it (compacted till, fine filter, coarse filter, fine rockfill)	July 22, 2018	July 22, 2018

The delay between the installation of geosynthetics and the placement of the compacted till layers and erosion protection material is due to the fact that the till stockpiles were frozen, and operations could only resume once they were sufficiently thawed in July 2018.

3.1.1 Drilling and Blasting

No drilling and blasting was required during Stage 6 of Central Dike.

3.1.2 Site Preparation

The access ramp at the south extremity of Central Dike was reprofiled in order to allow access to haul trucks. This ramp is located within the footprint of Saddle Dam 5 and built with ultramafic volcanic (UM) rockfill. The access at the north extremity was adapted to ensure visibility in the curve. The West Road was used for hauling material to the south access ramp. Snow was removed from the crest and the upstream slope of Central Dike. The crest of the dike at El. 143 m was scarified to promote a good contact with the subsequent lift placed in 2018.

Instruments installed on the crest of Central Dike were preventively raised and protected by fine filter.

3.1.3 Foundation Preparation

Foundation preparation was completed on the south extremity of Central Dike on a limited surface for the extension of the structure for a dike footprint going from El. 143 m to El 145 m on the downstream side.

The foundation preparation consisted of the removal of the foundation soil to the bedrock surface within the planned footprint. As the foundation was already prepared during the 2016 construction season, most of the material to be excavated had already been removed. However, the foundation was cleared of snow accumulation, and remaining loose material was removed by excavator (CAT 345D).

Before the placement of fill materials over the dike foundation, the foundation surface was inspected and then accepted by the Owner’s Representative, the QC Representative and the QA Engineer. The parties verified that the foundation to be approved was competent, dry and free of contamination or ice. The approved foundation area was then surveyed by KCG surveyors. The foundation preparation approval process before the placement of fill materials was performed once during the construction of Stage 6 of Central Dike. A foundation approval form was filled out. Refer to Appendix G for the completed foundation approval forms.

The volume material excavated during the construction of Stage 6 of Central Dike was not surveyed and represents a minor volume.

3.1.4 Placement of Rockfill for Embankment Raise to El. 145 m

The lift of rockfill between El. 143 m and 145 m had a thickness of 2 m and was placed by a dozer (D8). The rockfill was composed of good quality, NON-AG, intermediate volcanic (IV) rock. To avoid segregation, the rockfill was dumped on a flat surface and then pushed on the slope. The lift was compacted with 6 passes of a 10-T smooth-drum vibratory roller compactor on the entire surface of the lift, but not below the safety berms placed on the downstream edge of the crest due to the risk of fall down from the downstream slope. This surface will be compacted if Central Dike is raised above El. 145 m, when the crest is widened to a footprint corresponding to El. 150 m. After compaction, the slope of the lift was profiled with an excavator. The downstream slope was profiled with a 1.5H:1V slope, while the upstream rockfill slope was profiled with a 2H:1V slope.

Intermediate volcanic (IV) rockfill was placed on the footprint enlargement at the south extremity of Central Dike with an excavator instead of a dozer because of the access constraints. The lifts had a thickness of 1 m. The first lift was compacted with 8 passes of a 10-T smooth-drum vibratory roller compactor, and the subsequent lifts were compacted by passes of the excavator. The downstream slope was profiled with a 1.5H:1V slope. It was noticed at the end of the construction that the footprint was too narrow by 0.6 m and left as is, since this did not cause any stability issues and did not impact traffic on the crest significantly. The correction will be done if Central Dike is raised to an elevation higher than 145 m.

A total of 41,641 m^3 of intermediate volcanic (IV) rockfill was placed on Central Dike during the construction of Stage 6 of Central Dike.

3.1.5 Filter Placement on Foundation and on the Upstream Slope

During material placement on the 2H:1V upstream slope, fine and coarse filters were placed with the bucket of the excavator in 0.5-m thick horizontal lifts compacted against the rockfill. Coarse material was placed first and raised against the rockfill and followed by the fine filter material. The width of each lift was such that the thickness of the material perpendicular to the slope was 0.5 m. Well-graded aggregates made of sound good quality material were used on Central Dike. The material was placed by an excavator so as to prevent segregation.

After the placement of each 0.5-m lift of fine and coarse filter, the compaction of both materials was completed with 4 passes of a smooth-drum compactor in vibratory mode. Watering of the filters to promote compaction was impossible, as freezing temperatures would have caused the water to freeze within the lifts, which would have prevented compaction. Additional passes of the compactor were conducted when the material seemed visually excessively loose. When the elevation of the upstream filter reached the rockfill elevation, the slope of the fine filter was profiled with the bucket of an excavator to obtain a continuous 2H:1V upstream slope.

There were 3,825 m^3 of coarse filter and 3,469 m^3 of fine filter placed on Central Dike during the construction of Stage 6 of Central Dike.

3.1.6 Upstream Toe Liner Tie-In Key Preparation

No upstream toe liner key-in preparation was required, as the north abutment was done in 2017.

3.1.7 Geosynthetics Installation

Geosynthetics installation included the placement of a geotextile above El. 143 m on the fine filter surface and the installation of a LLDPE geomembrane above the geotextile. The missing panel between El. 143 m and 145 m on the north abutment after its preparation in 2017 was completed after the QA Engineer verified that the bedding surface was still in good condition and acceptable for geosynthetics installation. The geotextile and the LLDPE geomembrane were installed by the subcontractor, ZTG. No geosynthetics were allowed to be installed when it was raining or snowing. When not in use, the geomembrane rolls were stored on a smooth surface covered with geotextile. Stoppers generally made of sandbags were placed to secure the rolls in place.

Before the installation of the geosynthetics on the upstream slope and the upstream toe liner tie-in, the geosynthetics bedding was prepared. The upstream fine filter face was smoothed out by an excavator with a roller attachment without using vibration. Surface made of fine filters on the upstream slope was then approved by the Owner’s Representative, the QC Representative, and the QA Engineer. The four existing tailings deposition points made of fine filter material and bituminous geomembrane panels placed over the LLDPE liner were also removed to allow welding of the new LLDPE panels. This activity caused damages to the existing LLDPE liner between El. 142 m and 143 m, however since the rips were located within the 1 m overlap of the new LLDPE liner panels, they did not need to be repaired. It was verified that the surface was smooth, dry and would not damage the geosynthetics. The surface was surveyed by KCG, and a geosynthetics bedding surface approval form was filled out. Refer to Appendix G for the completed approval forms.

The geotextile and the LLDPE geomembrane were buried in a 0.5-m deep anchor trench excavated into the upstream side of the rockfill crest within the coarse filter. The anchor trench was backfilled after the installation of the geosynthetics, once all QC tests passed, and compacted with 4 passes of a smooth-drum compactor in vibratory mode. The geomembrane was welded on the existing geomembrane in place at El. 143 m with a 1 m overlap.

The geotextile panels were mostly seamed with the dual hot wedge welding equipment using a minimum overlap of 0.15 m. When wedge seams were not possible (before the arrival of the dual hot wedge equipment) the geotextiles were bonded with a heat gun with a minimum overlap of 0.45 m. The geotextiles were visually inspected during installation to make sure that the overlap was sufficient and that the panels were not damaged.

The LLDPE geomembrane panels were mostly seamed with the dual hot wedge welding equipment using a minimum overlap of 0.15 m. When wedge seams were not practical (such as for seaming the new liner with the existing liner or for patches), the LLDPE geomembranes were bonded with extrusion fillet seams. The LLDPE geomembranes were visually inspected during installation to ensure that the overlap was sufficient and that the panels were not damaged.

The LLDPE geomembrane installation included air channel testing and vacuum box testing as part of the continuous QC program. In conformity with the technical specifications, an air channel test was conducted on each fusion seam, and vacuum testing was conducted on each extrusion weld, patch and repair. No air channel test failed during this construction season. When a vacuum box test indicated a leak, the extrusion material was grinded off and the weld was remade until vacuum test results were compliant with the specifications. The QA team was present for all air channel tests and half the vacuum box tests, in compliance with the design requirements. Test details and results are presented in the Liner Installers' QC report in Appendix H.

As part of the QA supervision of the LLDPE liner installation, the following destructive samples were taken, tested, and kept by the Owner's Representative:

Table 15: Details of the Destructive Testing on Central Dike

Name	Date sampled and tested	Structure	Station	Seam	Comment
D-1	Sampled and tested on May 25th	Central Dike	0+960 m, El. 145 m	Between panels 814 and 815	Compliant
D-2	Sampled on May 28th and tested on May 29th	Central Dike	0+855 m	Between panels 830 and 831	Compliant
D-3	Sampled and tested on June 1st	Central Dike	0+760 m	Between panels 845 and 846	Compliant
D-4	Sampled and tested on June 1st	Central Dike	0+655 m	Between panels 860 and 861	Compliant
D-5	Sampled and tested on June 2nd	Central Dike	0+555 m	Between panels 875 and 876	Compliant
D-6	Sampled and tested on June 3rd	Central Dike	0+450 m	Between panels 890 and 891	Compliant
D-7	Sampled and tested on June 3rd	Central Dike	0+350 m	Between panels 905 and 906	Compliant
D-8	Sampled on June 4th and tested on June 5th	Central Dike	0+240 m	Between panels 920 and 921	Compliant

After its installation, the LLDPE geomembrane surface was visually inspected and approved by the Owner's Representative and the QA Engineer. A geosynthetics approval form was completed after the installation of the LLDPE geomembrane. Refer to Appendix G for the completed approval forms.

A total of 9,239 m^2 of geotextile and 9,239 m^2 of LLDPE geomembrane were installed during the construction of Stage 6 of Central Dike.

3.1.8 Protection Cover of the Upstream Toe Liner Tie-In

The upstream toe liner tie-in was done in 2017 and only a minor section was missing and was completed during the 2018 construction season.

The 2-m erosion protection cover placed over the compacted sieved till of the upstream toe liner tie-in was completed at approximately Sta. 0+150 m. The erosion protection cover consists of 0.5 m of fine filter, 0.5 m of coarse filter and 1 m of fine rockfill (2 0.5-m thick lifts) placed with the CAT 345 excavator. The fine filter and coarse filter lift were made of intermediate volcanic (IV) rockfill and were placed with an excavator and compacted with 4 passes of a 10-T smooth-drum compactor in vibratory mode. The fine rockfill consisted of ultramafic volcanic (UM) rockfill (see Section 5.2) that was mechanically sorted to remove boulders of more than 0.5 m in diameter. The fine rockfill lifts were compacted with 4 passes of the 10-T smooth-drum compactor in vibratory mode. During the compaction of the erosion protection cover, the compactor stayed at a safe distance from the upstream slope LLDPE to avoid damaging it.

There were 30 m^3 of compacted sieved till, 66 m^3 of fine filter, 40 m^3 of coarse filter, and 104 m^3 of fine UM rockfill placed on Central Dike during the construction of Stage 6 of Central Dike.

3.2 Saddle Dam 3 – Schedule and Construction Steps

The finalization of Stage 3 of Saddle Dam 3 was done from May 14 to July 19, 2018, and comprised the following main work items:

- Site preparation (including snow removal, slope corrections and water management);
- Geotextile and LLDPE geomembrane installation;
- Placement and compaction of compacted till layers and erosion protection material over the geosynthetics in the upstream toe liner tie-in.
- Placement and compaction of the protection cover over the geosynthetics in the upstream slope.

The work procedures followed during the construction of these work items are discussed in the following subsections.

Selected photographs of the work progress taken throughout the construction season are shown in Appendix C2.

Table 16 presents the construction schedule for the main work items for the finalization of Stage 3 of Saddle Dam 3.

Table 16: Schedule for the Construction Activity for the finalization of Stage 3 of Saddle Dam 3

Activity	Beginning	End
Site preparation	May 14, 2018 (snow removal) June 5, 2018 (dewatering)	May 16, 2018 (snow removal) June 7, 2018 (dewatering)
Geosynthetics installation on the upstream 2H:1V slope	June 6, 2018	June 8, 2018
Placement and compaction of compacted till layers and erosion protection material over the geosynthetics in the upstream toe liner tie-in of the north abutment (compacted till, fine filter, coarse filter, fine rockfill)	July 11, 2018	July 19, 2018
Placement and compaction of protection cover materials over the geosynthetics in the upstream slope	July 7th, 2017	July 18th, 2018

The delay between the installation of geosynthetics and the placement of the compacted till layers and erosion protection material is due to the fact that the till stockpiles were frozen, and operations could only resume once they were sufficiently thawed in July 2018.

3.2.1 Drilling and Blasting

No drilling and blasting was required during the finalization of Stage 3 of Saddle Dam 3.

3.2.2 Site Preparation

The main access road used to get to the Saddle Dam 3 area was the Saddle Road access starting at the portion of West Road in front of the Portage Pit Central Dump and leading to Saddle Dam 3 and Saddle Dam 4 along the airstrip. Snow removal operations were conducted on the Saddle Road before the beginning of construction.

Snow was removed on the crest and the upstream slope of Saddle Dam 3 in preparation for the construction works. The fine filter slope was compacted again with a roller attachment to ensure a smooth slope for geosynthetics installation. Excess fine filter and till placed on the existing liner was also removed at Sta. 20+595 m.

Ponding water on the first compacted sieved till layer of the upstream toe liner tie-in was also pumped out before the beginning of the geosynthetics installation.

3.2.3 Geosynthetics Installation

Geosynthetics installation included the placement of a geotextile above El. 143 m on the fine filter surface and the installation of a LLDPE geomembrane above the geotextile. The geotextile and the LLDPE geomembrane were installed by the subcontractor, ZTG. No geosynthetics were allowed to be installed when it was raining or snowing. When not in use, the geomembrane rolls were stored on a smooth surface covered with geotextile. Stoppers generally made of sandbags were placed to secure the rolls in place.

Before the installation of the geosynthetics on the upstream slope and the upstream toe liner tie-in, the geosynthetics bedding was prepared. The upstream fine filter face was smoothed out by an excavator with a roller attachment without using vibration. Surface made of fine filters on the upstream slope was then approved by the Owner's Representative, the QC Representative, and the QA Engineer. It was verified that the surface was smooth, dry and would not damage the geosynthetics. The surface was surveyed by KCG and a geosynthetics bedding surface approval form was filled out. Refer to Appendix G for the completed approval forms.

The geotextile and the LLDPE geomembrane were buried in a 0.5-m-deep anchor trench excavated into the upstream side of the rockfill crest within the coarse filter. The anchor trench was backfilled after the installation of the geosynthetics, once all QC tests passed, and compacted with 4 passes of a smooth-drum compactor in vibratory mode. The geomembrane was welded on the existing geomembrane in place at El. 143 m with a 1 m overlap.

The geotextile panels were mostly seamed with the dual hot wedge welding equipment using a minimum overlap of 0.15 m. The geotextiles were visually inspected during installation to ensure sufficient overlap and ensure that the panels were undamaged.

The LLDPE geomembrane panels were mostly seamed with the dual hot wedge welding equipment using a minimum overlap of 0.15 m. When wedge seams were not practical (such as for seaming the new liner with the existing liner or for patches), the LLDPE geomembranes were bonded with extrusion fillet seams. The LLDPE geomembranes were visually inspected during installation to ensure sufficient overlap and ensure that the panels were undamaged.

The LLDPE geomembrane installation included air channel testing and vacuum box testing as part of the continuous QC program. In conformity with the technical specifications, an air channel test was conducted on each fusion seam, and vacuum testing was conducted on each extrusion weld, patch and repair. No air channel test failed during this construction season. When a vacuum box test indicated a leak, the extrusion material was grinded off and the weld was remade until vacuum test results were compliant with the specifications. The QA team was present for all air channel tests and half the vacuum box tests, in compliance with the design requirements. Test details and results are presented in the Liner Installers' QC report in Appendix H.

As part of the QA supervision of the LLDPE liner installation, the following destructive samples were taken, tested, and kept by the Owner's Representative:

Table 17: Details of the Destructive Testing on Saddle Dam 3

Name	Date sampled and tested	Structure	Station	Seam	Comment
D-9	Sampled on June 7th and tested on June 8th	Saddle Dam 3	20+615 m	Between panels 935 and 936	Compliant
D-10	Sampled and tested on June 8th	Saddle Dam 3	20+695 m	Between panels 948 and 949	Compliant
D-11	Sampled and tested on June 8th	Saddle Dam 3	20+795 m	Between panels 959 and 960	Compliant
D-12	Sampled and tested on June 8th	Saddle Dam 3	20+700 m	Bottom extrusion seam of panel 949	Non-compliant. The seam was repaired and successfully vacuum tested.

After its installation, the LLDPE geomembrane surface was visually inspected and approved by the Owner's Representative and the QA Engineer. A geosynthetics approval form was completed after the installation of the LLDPE geomembrane. Refer to Appendix G for the completed approval forms.

A total of 2,552 m^2 of geotextile and 2,552 m^2 of LLDPE geomembrane were installed during the finalization of Stage 3 of Saddle Dam 3.

3.2.4 Protection Cover of the Upstream Toe Liner Tie-In

Once the geosynthetics installation was completed in the upstream toe liner tie-in, three 0.5-m thick lifts of compacted sieved till were placed over the LLDPE geomembrane on the south abutment, two 0.5-m thick lifts of compacted sieved till and one 0.5-m-thick of compacted till (0-150 mm) on the north abutment, for a total of 2 m of compacted till including the 0.5-m bedding under the LLDPE. The compacted sieved till was well graded and taken directly from the haul truck with the excavator to avoid contamination. Compacted till (0-150 mm) was placed as the last layer on the upstream slope of the toe-liner tie-in on the north abutment, as no more thawed sieved till (0-50 mm) was available at the time. Only the compactor was allowed to traffic over the geomembrane where there was at least 1 m of material over it. The compaction of the first lift over the geomembrane was done with the excavator bucket. The remainder of the till lift was compacted with the 10-T smooth drum compactor. The compaction of each lift was controlled with a portable nuclear gauge by the QC Representative to ensure it met the Technical Specifications. The placement and compaction of till was only allowed when there was no rain. Haul trucks were not allowed to pass over the compacted till material.

The erosion protection cover design consists of 0.5 m of fine filter, 0.5 m of coarse filter and 1 m of fine rockfill placed with the CAT 345 excavator. The fine filter and coarse filter lift were made of ultramafic volcanic (UM) rockfill and were placed with an excavator and compacted with 4 passes of a 10-T smooth-drum compactor in vibratory mode. The fine rockfill consisted of ultramafic volcanic (UM) rockfill that was mechanically sorted to remove boulders of more than 0.5 m in diameter. The fine rockfill lift was compacted with 4 passes of the 10-T smooth-drum compactor in vibratory mode. During the compaction of the erosion protection cover, the compactor stayed at safe distance from the upstream slope LLDPE to avoid damaging it.

Due to the relatively high elevation of the abutments (close to El. 145 m), coarse filter and fine rockfill were only placed on the south abutment, and the fine rockfill layer was only about 0.5 m thick.

There were 497 m^3 of compacted sieved till, 450 m^3 of compacted till (0-150 mm), 266 m^3 of fine filter, 2016 m^3 of coarse filter, and 293 m^3 of fine UM rockfill placed on Saddle Dam 3 during the finalization of Stage 3 of Saddle Dam 3.

3.2.5 Protection Cover of the Upstream Liner

The protection cover for LLDPE geomembrane and the current erosion protection were raised from El. 142 m to 143.5 m.

Regarding the protection cover for the LLDPE geomembrane, the deposition plan issued by AEM showed that free water will be in direct contact with the geomembrane liner. In order to protect the LLDPE geomembrane from the water ponding, protection cover was placed directly over the liner.

The proposed configuration included the placement of a 2.0-m thick layer of till, including a 0.5-m thick layer of sieved till (0-50 mm) directly against the LLDPE liner followed by a 1.5-m thick layer of low quality till (0-300 mm). Due to a shortage in sieved till, the compacted sieved till in the protection cover was replaced with compacted till sieved with an excavator, with an objective of 150 mm maximum particle size. The LLDPE geomembrane was covered with 2 layers of TenCate Mirafi S1600 geotextile to protect it against possible oversize particles.

A 1.0-m thick layer of fine rockfill (0-500 mm) was placed directly against the 2.0-m thick layer of till. The lifts of compacted till (0-150 mm) were placed in lifts with a vertical thickness of 0.5 m and compacted with 4 passes of a 10-T smooth-drum compactor in vibratory mode. The fine rockfill consisted of IV and UM rockfill that was mechanically sorted to remove boulders of more than 0.5 m in diameter. The fine rockfill lift was placed in lifts with a vertical thickness of 2 m. The lifts were compacted 6 passes of a 10-T smooth-drum compactor in vibratory mode.

A section of sieved till was missing at the end of the 2017 construction season around Sta. 20+620 m, because of a water pond which froze and could not be removed without risking damaging the LLDPE liner. This part was completed at the beginning of the protection cover raise.

There were 1,358 m^3 of compacted (0-150 mm) till, and 2,798 m^3 of fine IV and UM rockfill placed on Saddle Dam 3 during the raise of the erosion protection cover to El. 143.5 m.

3.3 North Cell Internal Structure Construction – Schedule and Construction Steps

The construction of the North Cell Internal Structure was done from May 19 to August 8, 2018, and comprised the following major work items:

- Foundation preparation (removal snow and excavation of till and rock fragments in one area);
- Fill placement, compaction, and slope profiling (rockfill and upstream filter placement) under QA/QC, some material was already in place;

- Excavation of one ditch and two sumps, placement of an erosion protection layer in the excavations in tailings.

The work procedures followed during the construction of these work items are discussed in the following subsections.

Selected photographs of the work progress taken throughout the construction season are shown in Appendix C1.

Table 18 presents the construction schedule for the main work items for the construction of the North Cell Internal Structure.

Table 18: Schedule for the Construction Activity for the North Cell Internal Structure

Activity	Beginning	End
Foundation preparation	May 19, 2018 (snow removal) June 20, 2018 (bedrock preparation)	May 19, 2018 (snow removal) June 20, 2018 (bedrock preparation)
Placement, compaction and profiling of rockfill on the crest from the base of the tailings or existing capping to variable elevations 152 m to 154 m (1.5:H d/s, 3H:1V u/s)	May 19, 2018 (beginning of QA/QC supervision)	July 30, 2018
Placement, compaction and profiling of filter material on the upstream 3H:1V slope from the base of the tailings or existing capping to variable elevations 152 m to El. 154 m	June 18, 2018	July 31, 2018
Excavation of ditch and sumps, placement of an erosion protection layer	July 24, 2018	August 8, 2018

3.3.1 Drilling and Blasting

No drilling and blasting was required during the construction of the North Cell Internal Structure.

3.3.2 Site Preparation

The North Cell Internal Structure is partially built over the North Cell capping, constituted of ultramafic volcanic (UM) rockfill (see Figure 2). The capping construction started in 2015 by the horseshoe-shaped section at the north end and continued in 2016 with the strip along RF1 and RF2. Some of the UM rockfill constituting the North Cell Internal Structure was placed before the beginning of the QA/QC supervision, as part of the North Cell capping, under AEM's supervision only.

One instrument installed on the North Cell capping was raised during the placement of UM rockfill.

3.3.3 Foundation Preparation

Foundation preparation included snow removal on the surfaces of the capping and the tailings, and the excavation of a snow bank underlying the UM rockfill from approx. Sta 2+600 m to 2+700 m to the toe of the structure. It was verified with test pits that the snow bank was only localised underneath the excess UM rockfill placed in this area and did not extend into the North Cell Internal Structure limits.

Foundation preparation was also done on the section of foundation between Sta. 1+750 m and 1+850 m, where the North Cell Internal Structure was partially founded on a layer of till and organic soil.

The foundation preparation consisted of the removal of the foundation soil to the bedrock surface within the planned footprint, outside of the existing capping. The loose material was removed by excavator (CAT 345D) to ensure this portion of the structure was founded on sound bedrock.

Before the placement of fill materials over the dike foundation, the foundation surface was inspected by the Owner's Representative, the QC Representative and the QA Engineer. The parties verified that the foundation to be approved was competent, dry and free of contamination or ice. Approval was communicated to the concerned parties, and no foundation approval form was required by the specifications of the North Cell Internal Structure.

The volume material excavated during the construction of the North Cell Internal Structure was not surveyed and represents a minor volume.

3.3.4 Placement of Rockfill for Embankment Construction to El. 152 m to 154 m

The rockfill was placed in lifts of a maximum thickness of 2.5 m (see Section 5.4). Various numbers of lifts were required along the North Cell Internal Structure depending on the elevation of the North Cell capping (rockfill) or tailings on which the structure was founded upon. Foundation elevation ranged from approx. 148 m to 151.5 m. The limits of the lift at El. 154 m were defined based on AEM's tailings deposition plan and a ramp with a 10H:1V slope was built at the extremities of this lift to make a transition with the rest of the structure at El. 152 m. The lifts of rockfill had an average thickness of 2 m and were placed by a dozer (D8). The rockfill was composed of well graded NON-AG, ultramafic volcanic (UM) rock. To avoid segregation, the rockfill was dumped on a flat surface and then pushed on the slope. The lift was compacted with 6 passes of a 10-T smooth-drum vibratory roller compactor on the surface of the lift not trafficked by haul trucks, in accordance with the Technical Specifications. After compaction, the upstream slope of the lift was profiled with an excavator with a 3H:1V slope. The 1.5H:1V downstream slope was not profiled (see Section 5.4).

The initial UM rockfill lift built on the rockfill cover to El. 152 m exceeded the design width, however corrective measures were implemented during the QA/QC supervision of the works, which included more frequent surveying checks for width and elevation of the lift, as well as dike footprint marking on the field for operators.

The North Cell Internal Structure was built in 2018 to El. 152 m from Sta. 1+100 m to 1+660 m and from 2+750 m to 3+200 m, and to El. 154 m from Sta. 1+660 m to 2+750 m.

A total of 219,821 m^3 of ultramafic volcanic (UM) rockfill were placed on the North Cell Internal Structure during its construction.

3.3.5 Filter Placement on the Upstream Slope

During material placement on the 3H:1V upstream slope, fine and coarse filters were placed with the bucket of the excavator, each in one lift compacted against the rockfill with a thickness of 0.5 m perpendicular to the slope.

Coarse material was placed first and raised against the rockfill, compacted, followed by the fine filter material. Well-graded aggregates made of sound good quality material (both intermediate volcanic (IV) and ultramafic volcanic (UM) rockfill) were used on the North Cell Internal Structure. The material was placed by an excavator so as to prevent segregation.

After the placement of each lift of fine and coarse filter, the compaction was done with 4 passes of a smooth-drum compactor in vibratory mode in the slope (see Section 5.4). In order to stabilize material in the slope, the first pass down the slope was done without vibration in certain areas. The bottom of the slope where the compactor could not reach was reprofiled and compacted with the bucket of the excavator. No watering of the filters to promote compaction was required.

There were 13,339 m^3 of coarse filter and 13,204 m^3 of fine filter placed on the North Cell Internal Structure during its construction.

3.3.6 Excavation of Ditch and Sumps

One shallow unlined ditch was excavated at the downstream toe of the North Cell Internal Structure, on the west side, from Sta. 1+720 m to 1+140 m. The ditch alignment followed the toe of the rockfill structure, and the excavation was approximately 0.8 m deep and 1 m wide. The ditch was mostly excavated in the UM rockfill cover in place, with a section excavated in the tailings at its south extremity. Where the ditch was excavated in the tailings, a 0.3-m thick layer of till sieving reject material was placed against the surfaces to prevent erosion of the tailings. The ditch was terminated in the North Cell after by-passing the southwestern extremity of the dike with the excavation of a temporary sump at Sta. 1+140 m, as gravitational drainage alone was not effective. The excavation of this sump was done under AEM's supervision only, after the QA and QC representatives had left the site.

Two shallow unlined sumps were identified at the location of natural low point areas and excavated at the downstream toe of the North Cell Internal Structure, on the east side, directly along the RF1 and RF2 structures. The sumps were excavated in the tailings between Sta. 3+010 m and 3+030 m, and between Sta. 3+345 m and 3+365 m, with a depth of 1.5 m for both sumps. The excavation depth was limited by the presence of the upstream slope of RF1 and RF2 at a shallow depth underneath the tailings. The north sump is approximately 3 m wide and 20 m long, and the south sump is approximately 8 m wide and 15 m long. The dimensions were optimized in the field to ensure sufficient capacity despite the limited depth. A 0.3-m thick layer of till sieving reject material was placed against the surfaces to prevent erosion of the tailings.

The changes made to the original design of the sump and ditches around the North Cell Internal structure are temporary only. The changes are considered acceptable as the site is in operation and the site engineering team is inspecting daily the performance of the surface water management system. Review of the water management system for closure and post-closure phases is mandatory so that it meets the original design intent. This is discussed in further details in the design change technical memorandum (1897439-1582-TM-Rev0) presented in Appendix B.

4.0 QA/QC PROGRAM AND RESULTS

4.1 General

During the 2018 construction season of the South Cell and the North Cell, a daily construction meeting was held each morning on the construction site with all parties present on site (AEM, KCG, Golder, GHD). This meeting was used to review the progress of the last 24 hours, plan for the next 24 hours and to discuss and resolve problems encountered during the construction. Minutes from these meeting were taken by AEM and Golder and AEM's minutes are presented in Appendix D.

The QA program was carried out by Golder during the preparation of Stage 6 of the Central Dike, the finalization of Stage 3 of Saddle Dam 3, and the construction of the North Cell Internal Structure. The content of the QA program is defined in the Technical Specifications and includes foundation preparation, fill placement, and geosynthetics installation. The QA team consisted of QA Engineers working on approximately two-week rotations. A QA Engineer was present full time on site from April 23 to August 2, 2018. No QA activities were performed during night shifts. Construction of the North Cell Internal Structure (placement of UM rockfill) began before the start of the QA supervision, as part of the North Cell Capping operations. Daily and weekly reports were prepared by the QA personnel to document the QA activities performed during the construction of Stage 6 of the Central Dike, the finalization of Stage 3 of Saddle Dam 3, and the construction of the North Cell Internal Structure. These QA daily and weekly reports are presented in Appendix E.

GHD carried out the QC program defined in the Technical Specifications for all construction activities except for the geosynthetics installation. The GHD QC team worked under the supervision of AEM and consisted of a QC representative on day shift from April 23 to August 2, 2018. The daily reports prepared by the on-site QC Representatives to document the QC activities are presented in Appendix F.

The geosynthetics installation QC activities were carried out by the geosynthetics installation crew (ZTG) under the supervision of KCG.

The Owner's representative and the QA Engineer routinely conducted visual inspection of the work done during the construction of Stage 6 of Central Dike, the finalization of Stage 3 of Saddle Dam 3, and the construction of the North Cell Internal Structure. Review of the work procedures was done on a daily basis and corrections were made as necessary. Photographs of the work progress and activities were taken every day. A selection of photographs taken throughout the construction season are presented in Appendix C.

Daily surveys were conducted by KCG to ensure that limits and grades were followed correctly during construction of the South Cell. Periodic surveys were conducted by KCG during construction of the North Cell. These surveys were reviewed by the QA Engineer.

4.2 Foundation Approval

As part of the QA/QC program, the foundations were approved before placing any material over natural soil and before the installation of geosynthetics on a bedding surface. The objective of the foundation approval process was to ensure that the foundation was prepared as per the Technical Specifications. The approval was done by the Owner's Representative, the QA Engineer and the QC Representative. It was verified that the foundation to be approved was competent, dry, free of contamination or ice, and also that:

- The clearing and stripping were adequate.
- The foundation excavation and the removal of unsuitable foundation materials were adequate.

- The preparation of the bedrock surface within the upstream toe liner tie-in was adequate.
- The bedding surface conditions for geomembrane placement were smooth and flat.

For each foundation approval, the limit of the approved area was surveyed, and a foundation approval form was signed by the surveyor, the Owner's Representative, the QA Engineer, and the QC Representative. Each foundation approval form included a sketch and picture of the approved foundation area as well as the filled inspection item checklist. Table 19 presents a summary of the foundation approvals done during the 2018 construction season of the South Cell. No foundation approval form was completed for the construction of the North Cell, as it was not required by the specifications. These foundation approvals forms are presented in Appendix G. Geosynthetics were installed at the Central Dike and Saddle Dam 3 in 2018.

Table 19: Summary of Foundation Approval for the 2018 Construction Season of the South Cell

Structure	# of Foundation Approval for Fill Placement	# of Foundation Approval for Geosynthetics Bedding
Central Dike	1 (FND-CD-139)	1 (FND-CD-140)
Saddle Dam 3	-	2 (FND-SD3-37 and FND-SD3-38)

4.3 Geosynthetics Installation

QC testing of the geosynthetics installation was done by ZTG under the supervision of the QA Engineer. QC testing was done during the assembly and the installation. QC testing during installation included welding calibration (AM and PM), air pressure tests on every seam, vacuum box testing of each extrusion weld, and destructive weld integrity tests every 150 m of welding. The QA Engineer assisted at a minimum of 20% of the vacuum box testing and 100% of the other QC tests to ensure that they were done according to Technical Specifications.

The QC report from the geomembrane installer (ZTG) is presented in Appendix H. This document presents the layout of the geosynthetics installation, the results of the geosynthetics QC testing, and the manufacturer data sheet of the LLDPE geomembrane All of the installed geomembrane passed the QC testing.

The manufacturer data sheet for the geotextile, as well as the factory QC testing program details, were not available to the QA Engineer.

After the completion of the geomembrane installation, the Owner's Representative, the QA Engineer, and the ZTG QC Representative completed an inspection of the installation to approve the installation. The inspection was done to ensure that:

- The geomembrane was not damaged (cracks or rips) and was smooth and flat.
- The welding and patches were done properly.
- The QC testing was completed and passed all tests.

After each geosynthetic approval, the limit of the approved area was surveyed and a geosynthetic approval form was signed by the surveyor, the Owner's Representative, the QA Engineer, and the QC Representative. Each geosynthetic approval form included a sketch and picture of the approved area and the filled-out inspection item checklist. Table 20 presents a summary of the geosynthetic approval completed during the 2018 construction season of the South Cell and the North Cell. The completed geosynthetic installation approval forms for the construction of Stage 6 of Central Dike and the finalization of Stage 3 of Saddle Dam 3 are included in Appendix G.

Table 20: Summary of Geosynthetic Approval for the 2018 Construction Season of the South Cell and the North Cell

Structure	# of Geomembrane Approval
Central Dike	1 (LLDPE-CD-31)
Saddle Dam 3	1 (LLDPE-SD3-003)

4.4 Material Placement

During material placement, the quality of the material and the placement technique were routinely reviewed. It was ensured that the placement technique limited segregation, that the material quality was visually acceptable, and that the maximum allowable lift thickness was not exceeded.

During placement of fine filter and coarse filter on the upstream slope, it was visually verified that the coarse filter completely wrapped the fine filter so that the fine filter did not come in direct contact with the coarse rockfill.

During rockfill placement, it was verified by the QC Representative and QA Engineer that the rockfill was well graded, did not contain oversized particles and was placed in the correct area of the dike. For the placement of UM rockfill, special attention was taken to observe whether the material was competent and was not predominantly formed of fine particles and rock powder.

4.4.1 Laboratory Testing

Samples of compacted sieved till, fine filter, and coarse filter were taken by the QC Representative and the QA Engineer during construction per the sampling intervals defined in the Technical Specifications. The QA Engineer reviewed the QC Representative sampling technique and laboratory procedures to ensure that proper techniques were being used. The QA Engineer took and tested one sample for every five samples taken by the QC Representative.

The volumes of material (coarse filter, fine filter, compacted till and compacted sieved till) placed daily were communicated by KCG to the QA and QC personnel, and samples were taken accordingly to ensure that the sampling frequency was compliant. The specifications require the following sampling frequencies:

Table 21: QC sampling frequencies for the construction of the South Cell and the North Cell

Material	Sampling frequency in stockpile	Sampling frequency in place
Coarse filter	1 sample in 5,000 m^3	1 sample in 5,000 m^3
Fine filter	1 sample in 1,000 m^3	1 sample in 1,000 m^3
Compacted sieved till	1 sample in 1,000 m^3	1 sample in 1,000 m^3

The fine filter and coarse filter samples were tested for particle size distribution (ASTM C136) to ensure that the gradation limits of the Technical Specifications were met. The samples of compacted sieved till were tested for particle size distribution (ASTM C136) and water content (ASTM D2216). The particle size distribution tests were conducted to ensure that the gradation limits of the Technical Specifications were met.

A standard Proctor test was performed in 2017 on the compacted sieved till and corrected to define the optimal dry density and water content. In order to take into account possible variability within the material from one construction season to the next (variability of the material within the stockpiles, different moisture contents), it was supplemented by reference board testing in the field. Reference boards were done for both the compacted sieved till and the low quality till placed on the upstream toe liner tie-ins. Stockpiles were tested with the portable nuclear gauge before transportation of the material to ensure that its moisture was acceptable (measured values not recorded).

The results of gradation testing on compacted sieved till (Zone 1) indicate that the material was well graded and met the Technical Specifications in the stockpile and in situ. The placed material was also visually acceptable.

The results of gradation testing on fine filter (Zone 2) indicate that the material was well graded and mostly met the Technical Specifications in the stockpile and in situ, with some samples exhibiting a slight excess of large particles. The placed material was visually acceptable. The material was still accepted by the QA Engineer and QC Representative as it was visually adequate, and it was judged that this difference would not negatively impact the performance of the filter.

The results of gradation testing on coarse filter (Zone 3) indicate that the material was well graded. Some samples were 5 to 10% finer than allowed by the Technical Specifications below the 12.5 mm fractions. The material was still accepted by the QA Engineer and QC Representative as it was visually adequate, and it was judged that this difference would not negatively impact the performance of the filter.

The results of the QC and QA laboratory testing of the material used during the construction of Stage 6 of the Central Dike, the finalization of Stage 3 of Saddle Dam 3, and the construction of the North Cell Internal Structure are presented in Appendices I and J. Table 22 indicates the number of samples tested during the 2018 construction season of the South Cell and the North Cell. Given the small volumes of filters placed on SD3 in 2018, the sampling and testing program of SD3 and the North Cell Internal Structure were combined in terms of total fine and coarse filter volumes. The sampling requirements of the Technical Specifications were met during the 2018 construction season.

Table 22: Summary of Field Laboratory Testing During South Cell and North Cell 2018 Construction Season

Sample Location	Material	# Samples QC	# Samples QA
Stockpile	Compacted Sieved Till Stockpiles 0-50 mm	1 PSD 1 WC	1 PSD 1 WC
	Fine Filter (Zone 2)	20 PSD 20 WC	5 PSD 5 WC

Sample Location	Material	# Samples QC	# Samples QA
	Coarse Filter (Zone 3)	5 PSD 5 WC	3 PSD 3 WC
Saddle Dam 3	Low-Quality Till (used for erosion protection of the liner)	-	-
	Compacted Sieved Till (Zone 1)	1 PSD 1 WC	1 PSD 1 WC
	Fine Filter (Zone 2)	1 PSD 1 WC	- -
	Coarse Filter (Zone 3)	-	-
Central Dike	Compacted Sieved Till (Zone 1)	-	-
	Fine Filter (Zone 2)	4 PSD 4 WC	1 PSD 1 WC
	Coarse Filter (Zone 3)	1 PSD 1 WC	1 PSD 1 WC
North Cell Internal Structure	Fine Filter (Zone 3)	14 PSD 14 WC	3 PSD 3 WC
	Coarse Filter (Zone 2)	3 PSD 3 WC	1 PSD 1 WC

Note: Particle size distribution (PSD) per ASTM C136-06, Water Content (WC) testing per ASTM D2216 and Standard Proctor (Proctor) testing per ASTM D698

4.4.2 Control of Compaction

The QC Representative was present at all times during material compaction to supervise the process. The compaction of the fine filter, coarse filter and rockfill was verified visually, and it was checked that a sufficient number of compactor passes was done. The overlap of the passes and the compactor speed was continuously verified by the QC Representative.

The compaction of each lift of compacted sieved till material (0-50 mm), as well as the lift of low-quality till (0-150 mm) placed on the upstream toe liner tie-ins was controlled by the QC Representative in the field with a portable nuclear gauge. The number of compactor passes was adjusted in the field until 98% of the optimal dry density of the reference board was reached. The overlap of the passes and the compactor speed were verified by the QC Representative.

The optimal dry density of the compacted sieved till material was obtained as the maximum value obtained from the Standard Proctor laboratory test in 2017, and two compaction reference boards in 2018. The maximum optimal dry density obtained with the proctor test was 2,050 kg/m^3 for a water content of 9%. However, 9% moisture was difficult to achieve in the field, as sieved till would become excessively soft to compact. Instead, the values of optimal water content and dry density provided by the reference boards were used.

During the compaction reference board testing, a test pad made of compacted sieved till was constructed in the field and compacted by the 10-T smooth-drum compactor in vibratory mode. After each pass of the compactor, the dry density and water content was measured with the portable nuclear gauge. This method was used to determine the optimal dry density and the number of compactor passes required to achieve it.

Results from the field measurement of the dry density and water content are summarized in Table 23 and are presented in Appendix I. A degree of compaction higher than 98% of the optimal was achieved for all compacted sieved till and compacted till material (Zone 1) placed during the 2018 construction season of the South Cell. It should be noted that some of the water content tests taken on Saddle Dam 3 were done several days after placement of the sieved till and thus yielded results lower than the probable realistic water content at the time of placement.

Table 23: Summary of Portable Nuclear Gauge Field Testing during South Cell 2018 Construction Season

Sample Location	Material	Water Content %	Water content % Mean	Dry Volumetric Density Kg/m^3	Dry volumetric density Kg/m^3 Mean	Compaction Rate %	Compaction Rate % Mean
Saddle Dam 3	Compacted Sieved Till (reference board)	8.2	-	2,144	-	-	-
	Compacted Sieved Till (in place)	5.9 to 9.4	7.6	2,113 to 2,228	2,159.8	97.9 to 100.6	99.5

Sample Location	Material	Water Content %	Water content % Mean	Dry Volumetric Density Kg/m^3	Dry volumetric density Kg/m^3 Mean	Compaction Rate %	Compaction Rate % Mean
	Low quality Till (reference board)	6.6	-	2,125	-	-	-
	Low quality Till (in place)	5.9 to 7.6	7.0	2,092 to 2,116	2,103.7	98.4 to 99.5	99.0

5.0 DESIGN CHANGES AND FIELD ADJUSTMENTS

Design changes and field adjustments were implemented during the preparation of Stage 6 of Central Dike, the finalization of Stage 3 of Saddle Dam 3, and the construction of the North Cell Internal Structure.

Some elements of the design were changed during construction to adapt the design to the encountered field conditions. These changes were implemented by the Designer in collaboration with AEM and were documented in daily and weekly field reports. Per AEM's request, one design change memorandum was issued for the 2018 construction season while the other changes were documented in the QA weekly and daily reports and are summarized in this section. This document is listed in Section 1.6 and can be found in Appendix B.

The design changes of Central Dike and Saddle Dam 3 that were implemented in previous construction seasons and still relevant to the 2018 construction season were carried out. Eighteen design changes documented in technical memoranda were carried out from previous construction seasons to the 2018 construction season. These documents are listed in Section 1.6 and can be found in their respective construction season reports.

Thirteen local field adjustments were made during construction when the encountered conditions were different than the expected conditions. These local adjustments were discussed with the Designer and implemented by the Owner's Representative without requiring a change to the design. Field adjustments were documented in the QA weekly and daily reports and are summarized in this section.

5.1 General

Field Adjustment – Modification to Sampling Quantity of Till and Coarse Filter

According to ASTM Standard C136, 60 kg of till and 300 kg of coarse filter should be taken for each particle size distribution test. These quantities were high to efficiently be manually sampled with a bucket and a shovel and tested with the available field laboratory testing equipment. As in the previous construction season, smaller quantities of materials were sampled (10-20 kg of material). Care was taken to obtain representative samples while minimizing segregation and a duplicate was taken when it was believed that segregation during sampling could have impacted the results.

Field Adjustment – Modification of Compaction Method for the Filter Materials

According to the technical specifications, filter materials should be wetted to achieve optimal compaction. Due to the subzero temperatures at the time of placement of the coarse and fine filters on Central Dike, no watering of the materials was done in order to avoid freezing of the water inside the lifts. The presence of ice within the lifts would prevent compaction and it was deemed preferable to perform additional passes of the smooth-drum compactor in order to achieve the best compaction possible. As a result, the coarse and fine filters lifts were compacted with 4 to 6 passes of the smooth-drum compactor until satisfactory compaction was obtained (visual control only).

Field Adjustment – Modification of Seaming Method for Geotextile Panels

According to the technical specifications regarding geosynthetics installation, geotextile panels should be spot-welded together with a heat gun and a minimum overlap of 450 mm. While this was done in the curve between Saddle Dam 5 and the Central Dike from Sta. 40+640 m 0+750 m due to the delay in the shipping of the Liner Installers' welding equipment, the remainder of the geotextile panels installed on the Central Dike and Saddle Dam 3 were seamed using a dual hot wedge with an overlap of 150 mm. This type of seaming produces stronger and more regular seams than spot-welding.

5.2 Central Dike North Stage 6

Field Adjustment – Compaction under the Downstream Berms at El. 145 m

Compaction of the entire width of the non-AG intermediate volcanic (IV) rockfill lift at El. 145 m required removing the downstream berms (about 2 m wide) and compacting the rockfill beneath with the 10-T smooth-drum compactor. However, given the considerable height of the downstream slope, driving the compactor so close to the edge could not be done safely. It was thus decided with AEM that no compaction under the berms would be performed this year. No significant structural issue is expected due to this change if El. 145 m is the final dike elevation. Should the Central Dike be raised to El. 150 m, this surface would need to be compacted once the dike is built at the El. 145 m to its final width.

Field Adjustment – Placement of Intermediate Volcanic (IV) Rockfill with an Excavator

Because of a restrained access, completion of the 145 m footprint at the south end of the Central Dike near SD5 was done by placing the intermediate volcanic (IV) rockfill with an excavator instead of a dozer. Care was taken to limit segregation during placement, and lift thickness was limited to 0.5 m (1 m for the first lift). The first 1-m thick lift was compacted with 8 passes of a 10-T smooth-drum compactor. Due to the restrained access, the following 0.5-m lifts were compacted with the tracks of the excavator only. The slope was then profiled and compacted with the bucket of the excavator.

Field Adjustment – Placement of Ultramafic Volcanic (UM) Rockfill on the Upstream Toe Liner Tie-in

As per the design, good quality non-AG intermediate volcanic (IV) rockfill should be used on the Central Dike. At the end of the construction season, when the upstream toe liner tie-in of the north abutment of the Central Dike was built, the IV rockfill stockpile was entirely used up. Since the purpose of the fine rockfill on the upstream toe liner tie-in is erosion protection of the till layers and it has no structural function, it was acceptable to use fine UM rockfill instead with a similar gradation.

Field Adjustment – Modification of the Thicknesses of the Fine Filter and Coarse Filter Layers Placed against the Upstream Slope of Central Dike in the Toe Liner Tie-in

Due to a field adjustment in the layers of materials placed against the upstream slope of the north upstream toe liner tie-in of the Central Dike at El. 143 m during the previous raise (compacted sieved till replaced by fine filter with a layer of geotextile and narrower total width of the fine filter layer towards the south), the footprint of the layers of compacted sieved till, fine filter and coarse filters were modified. In order to guarantee the thickness of the compacted sieved till layer (0.5 m) which is the first protection placed against the LLDPE liner, fine and coarse filter layers were thinned (about 0.3-m thick). The fine UM rockfill in place on the rest of the upstream toe liner tie-in did not allow for offsetting of the filters layers to maintain the original thickness of 0.5 m.

5.3 Saddle Dam 3 Finalization of Stage 3

Design Change – Change in the LLDPE Geomembrane Protection on the Upstream Slope of Saddle Dam 3

A design change was done in 2017 to the LLDPE geomembrane protection on the upstream slope of Saddle Dam 3. The configuration was commonly agreed upon by Golder and the Meadowbank Engineering Team (Doc 1777687-1564-TM-Rev1). The original configuration consists in a 2.0-m thick layer of till, including a 0.5-m thick layer of sieved till (0-50 mm) directly against the LLDPE liner followed by a 1.5-m thick layer of low quality till (0-300 mm). A 1.0-m thick layer of fine rockfill (Type-5 0-500 mm) was placed directly against the 2.0-m thick layer of till.

Due to a shortage in sieved till (0-50 mm) and the unavailability of a crusher to sieve new material, it was agreed upon between Golder and AEM to replace the sieved till by compacted till sieved with an excavator in order to remove as many particles larger than 150 mm as possible, and aiming for 0-150-mm till. Due to the presence of relatively large rocks that could damage the LLDPE, an additional protection against perforation was required for the LLDPE liner. As the geotextile available on site was TenCate Mirafi S1600, which did not meet thickness and density requirements, 2 layers of geotextile were placed against the LLDPE liner. Close supervision by the QA and QC personnel was done to ensure that material placement against the geotextile layers were conducted so as to prevent the second layer from slipping against the first layer and to ensure that no oversize particles or any particularly sharp rock was laid against the slope.

The modified design consisted in a 2.0-m thick layer of 0-150-mm compacted till placed against the LLDPE liner, protected by 2 layers of geotextile, followed by 1.0-m thick layer of fine rockfill (Type-5 0-500 mm). The decision to use only 0-150 mm compacted till instead of one 0.5-m thick layer of 0-150-mm compacted till followed by one 1.5-m thick layer of 0-300-mm low quality till was taken to simplify the till placement, as the excavator loading the haul trucks at the Pit E5 stockpile had enough time between loadings to sieve large volumes of till.

Field Adjustment – Use of Sieved Till in Place of Compacted Till for Upstream Toe Liner Tie-In Construction

It was originally planned to build the upstream toe line tie-in with one first 500 mm thick lift of compacted sieved till (0-50 mm) as liner bedding, followed by another 500 mm thick lift of compacted sieved till above the liner and 2 other lifts of compacted till (0-150 mm). As was done in 2017, it was decided to use only sieved till (0-50 mm) for the 4 lifts of till on Saddle Dam 3, as there was enough sieved till to do so and because this yields a more robust design than required by the Technical Specifications. However, all the thawed sieved till had been used when the last till layer of the north abutment upstream toe liner tie-in was placed, and the rest of the stockpile was still frozen. As a result, the last 0.5-m thick layer of till was made with compacted till (0-150 mm).

Field Adjustment – Merging of the Upstream Erosion Protection Cover and the Upstream Toe Liner Tie-in on the South Abutment

The upstream erosion protection cover was merged with the upstream toe liner tie-in of the south abutment of Saddle Dam 3 by extending the low quality (0-150 mm) till of the erosion protection until it reached the south abutment upstream toe liner tie-in till layers. The granular protection layers of the toe liner tie-in were then placed and completed over the low-quality till (0-150 mm) with a 3H:1V slope. The fine UM rockfill of the erosion protection merged with the fine UM rockfill layer of the toe liner tie-in in the upstream slope.

On the north abutment, no merging was necessary since the hump in the dike separated the upstream toe-liner tie-in from the erosion protection.

5.4 North Cell Internal Structure

Design Change – Change in the Downstream Slope of the Structure Built on Tailings

Following discussions with AEM and the Designer, it was agreed that the downstream slopes of the internal structure which were originally designed with a 2.5H:1V on a tailings foundation, expected to thaw in summer, could be built with a 1.5H:1V provided AEM was aware of the probability of shallow failures. Analyses showed that the potential failure paths associated with FoS values of 1.2 and 1.5 were limited to the area of the 2.3 m high safety berm and did not penetrate into the vehicle path itself on the crest. The risk of these potential shallow failures is tolerable as long as there is a regime in place to monitor localized failures and repair them if they occur. AEM decided not to profile the downstream slope with an excavator and leave the material at the angle of repose, as it was already placed at a 1.5H:1V angle. Minor rockfalls may result from slope adjustment over time.

Design Change – Change in the Alignment of the Structure

Following AEM's decision with the agreement of the Designer, the North Cell Internal structure was built on the upstream end of the North Cell capping and on the existing tailings. As a result, the Internal Structure is offset towards the centre of the North Cell as opposed to the initial plans. The upstream toe of the rockfill capping was mapped to perform a field fitting of the design and a new centerline was drawn. In this updated configuration, the filters extend down to the tailings at their base. The southwestern portion of the structure, built on tailings, was realigned in order to avoid the cyanide burning area. The structure was also shortened compared to the initial plans, as deposition plans indicated that a shorter length was required (see as-built drawings in Appendix A).

Design Change – Phased Construction of the Ditches and Sumps

Discussions between AEM and Golder concluded that it would be possible to phase the construction of the drainage system, constituted of peripheral ditches and sumps, through time and to manage water in the low points with pumping equipment. This is acceptable as the North Cell Internal Structure is still in operation and not yet in closure, provided AEM is ready to increase the pumping capacities and/or to dig additional ditches if excessive seepage or runoff is observed. The construction done during the 2018 season included:

- Clearing a channel through the area near the cyanide burning pad to allow water to flow gravitationally inside the North Cell Internal Structure;
- Digging a ditch west of the NCIS, flowing southbound towards the interior of the NCIS, without installing a liner;
- Improving the water management capacities by deepening the low points in the tailings east of the NCIS, installing a granular cover to prevent erosion of the tailings and creating an access for the pumping crew.

The QA/QC personnel conducted close supervision of the excavation in the tailings to ensure that the underlying RF2 till layers were not excavated.

This design change is documented in technical memorandum 1897439-1582-TM-Rev0, presented in Appendix B.

Field adjustment – Change in the Maximum Allowable UM Rockfill Lift Thickness

According to the survey done on the existing UM rockfill lift at El. 152 m (approximately) at the beginning of the construction season, it appeared that the actual capping thickness varied from 0.9 m to 3.5 m, with elevations ranging from 151.9 m to 153.9 m. It was agreed with the Designer that a lift thickness maximum of 2.5 m could be left as is, as it was not expected to affect the maximum achievable compaction significantly with special attention paid to compaction (6 passes of the compactor). One section of the UM rockfill lift constituting the North Cell Internal Structure was thicker than 2.5 m; this section was corrected with the dozer to maximum El. 153 m.

Field adjustment – Foundation of the Structure on Natural Ground

The North Cell Internal Structure alignment included a portion where the 2015 North Cell rockfill capping was built on the natural soil (thin layer of organic soil overlying till), between Sta. 1+800 m and 1+900 m approximately. The toe of the structure, including UM rockfill and filter materials, extended the natural ground. The foundation in this area was prepared by removing soft materials (organic soil and till) with an excavator until good quality bedrock was reached, in order to provide a sound foundation for the filter materials and limit risks of settlement which could impact filter performance.

Field adjustment – Change in the Coarse and Fine Filters Material Placement and Compaction

Due to the impossibility of trafficking over the soft, thawed tailings and the limited reach of the excavator from the crest of the structure, placement of filter materials in horizontal lifts to their full width was difficult. As a result, the coarse and fine filters were placed on the upstream slope of the North Cell Internal Structure each in a single lift, ranging from the upstream toe to the crest, with a thickness of 0.5 m perpendicular to the slope. Given the gentle 3H:1V slope, compaction was done on each lift with 4 passes of a 10-T smooth-drum compactor directly on the slope. Compaction of the coarse filter lift was done before the excavator trafficked over the coarse filter to place the fine filter lift.

Compaction of the filters was done with a 10-T smooth-drum compactor in the upstream slope, attached to an excavator to assist it when going uphill. Due to the soft tailings foundation in certain areas, the compactor was unable to reach the bottom of the slope (about 1 m from the toe), as it pushed material downwards into the tailings. This portion of the slope was flattened and compacted with the bucket of the excavator at the end of the compaction operation. In soft foundation areas, the first pass of the compactor down the slope was conducted without vibration to stabilize the material in place.

Field adjustment – Compaction under the Downstream Berms at El. 154 m

Haul trucks trafficked the entire width of the UM rockfill platform at El. 154 m except for the downstream berms and represent an acceptable compaction of the material. Since the downstream berms represent a smaller width than trafficable safely by the compactor, and since no further raise is planned above El. 154 m, it is acceptable not to compact the portion of the UM rockfill platform underneath the downstream berms.

Signature Page

Golder Associés Ltée

Marion Habersetzer, M.Sc.
Mine Waste Group

Marion Habersetzer
for: Samuel Barbeau
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PERMIT TO PRACTICE
GOLDER ASSOCIATES LTD.
Signature
Date 2018-11-30
PERMIT NUMBER: P 049
NT/NU Association of Professional Engineers and Geoscientists

https://golderassociates.sharepoint.com/sites/1897439/preparation of deliverables/as-built/1897439-1578-r-rev0 as-built report 2018.docx

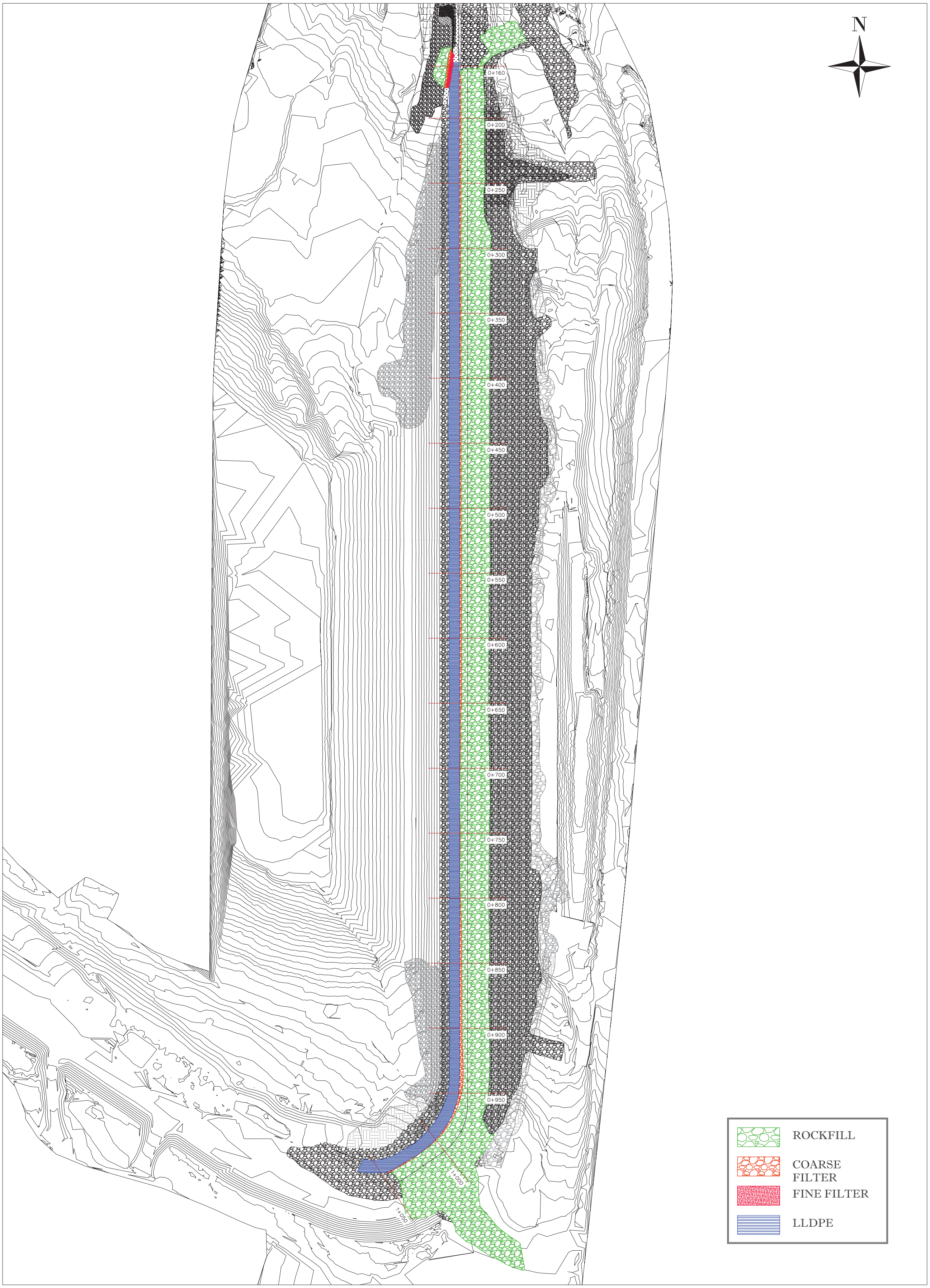
APPENDIX A

As-built drawings

APPENDIX A-1

Central Dike Stage 6

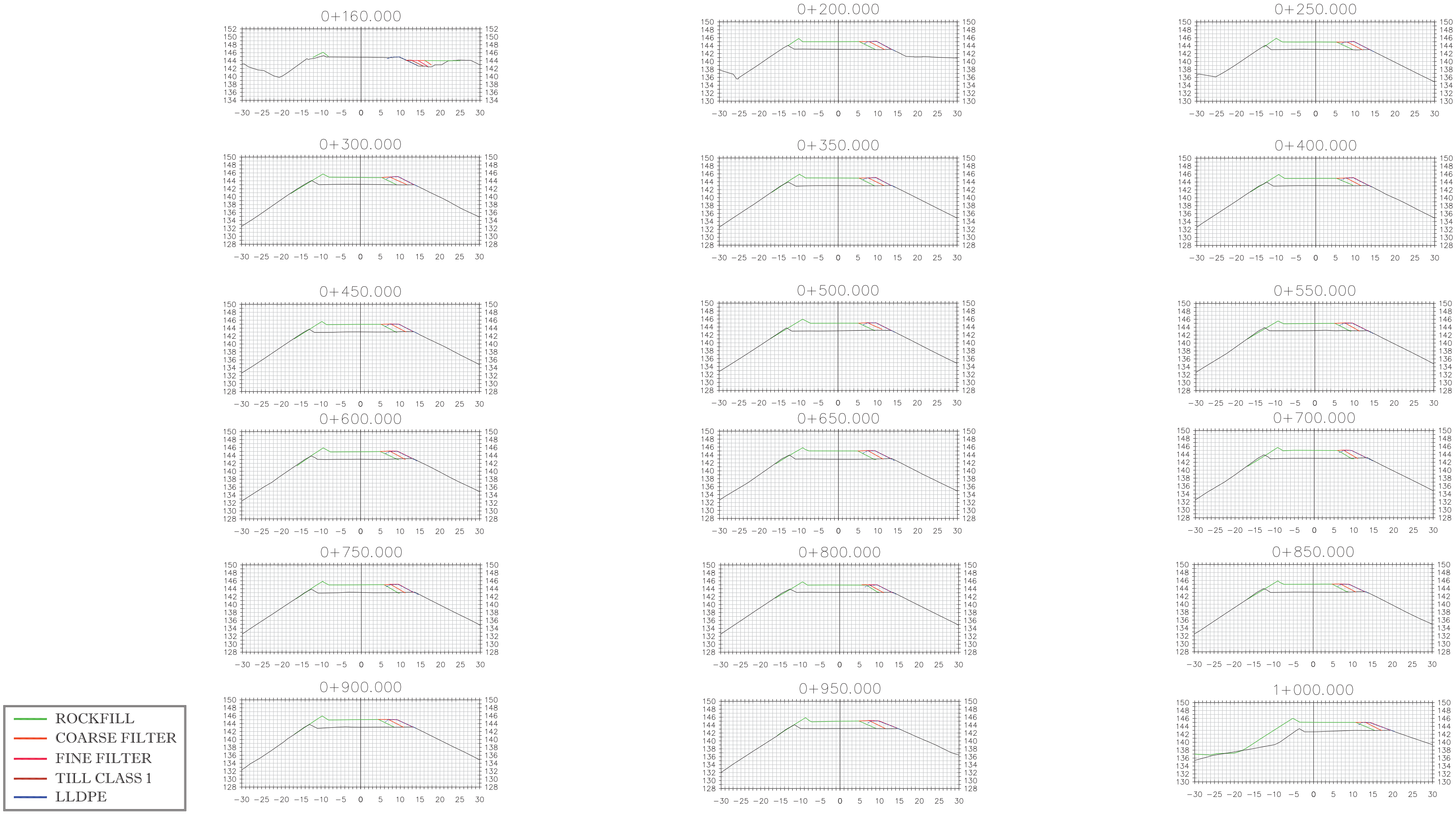
AS BUILT CENTRAL DIKE
DIKES CONSTRUCTION
CONTRACT # 11-505



KIVALLIQ CONTRACTORS GROUP LTD

PREPARED BY : MIKAËL LÉVESQUE
DATE : 11-08-2018
CON-FD-027_CD

AS BUILT CENTRAL DIKE
DIKES CONSTRUCTION
CONTRACT # 11-505



KIVALLIQ CONTRACTORS
GROUP LTD

PREPARED BY : MIKAËL LÉVESQUE
DATE : 11-08-2018
CON-FD-027_CD

APPENDIX A-2

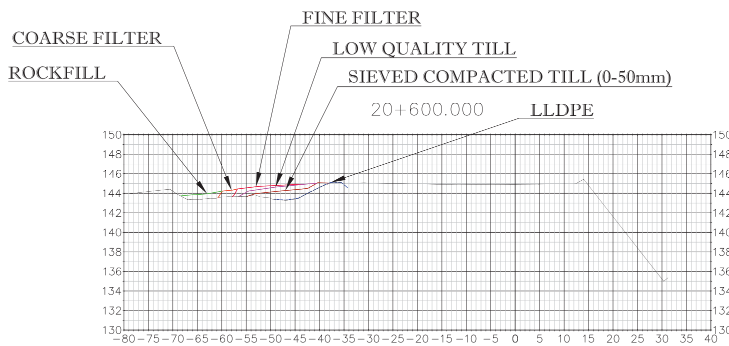
Saddle Dam 3 finalization of Stage 3

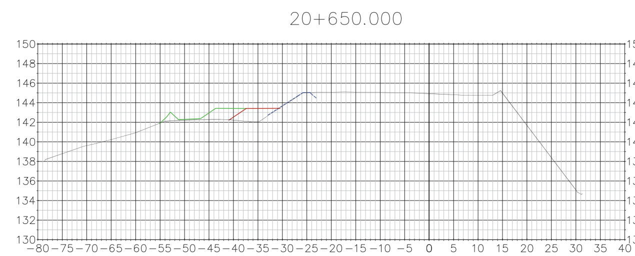
SADDLE DAM 3 AS BUILT
DIKE CONSTRUCTION
CONTRACT # 11-505

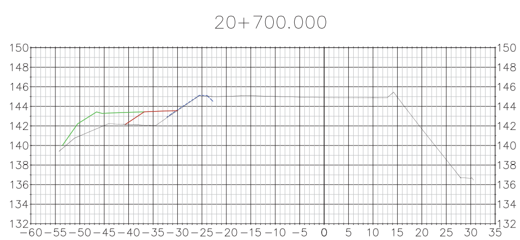
KIVALLIQ CONTRACTORS GROUP LTD

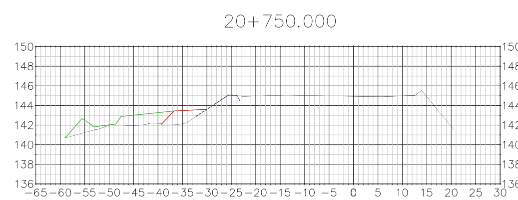
PREPARED BY : MIKAËL LÉVESQUE
DATE : 30-08-2018
CON-FD-010-SD3

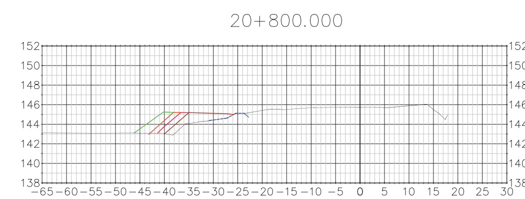
SADDLE DAM 3 AS-BUILT
DIKE CONSTRUCTION
CONTRACT # 11-505











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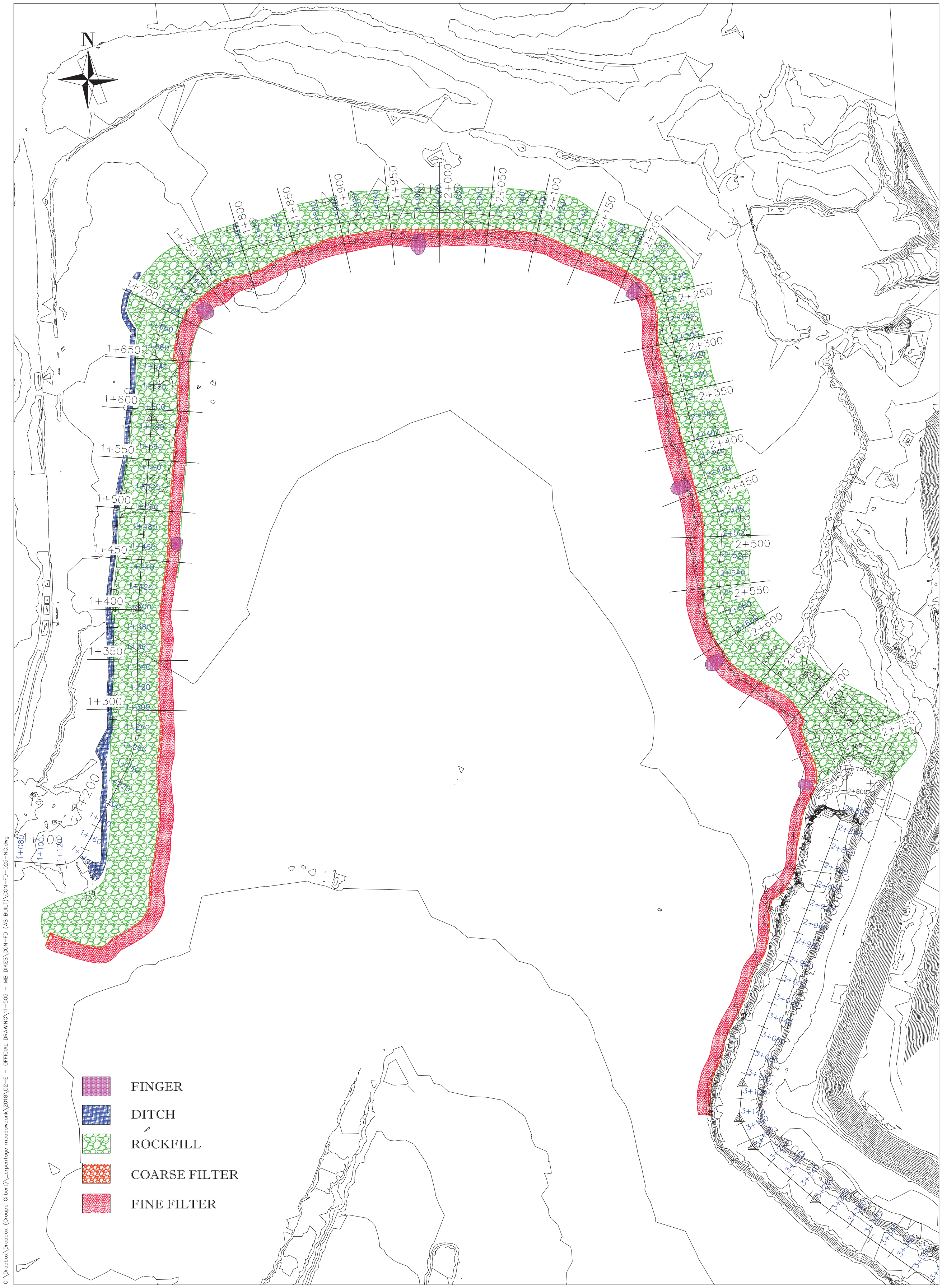
PREPARED BY : MIKAËL LÉVESQUE
DATE : 30-08-2018
CON-FD-010-SD3

APPENDIX A-3

North Cell Internal Structure Construction

NORTH CELL AS BUILT
DIKE CONSTRUCTION
CONTRACT # 11-505



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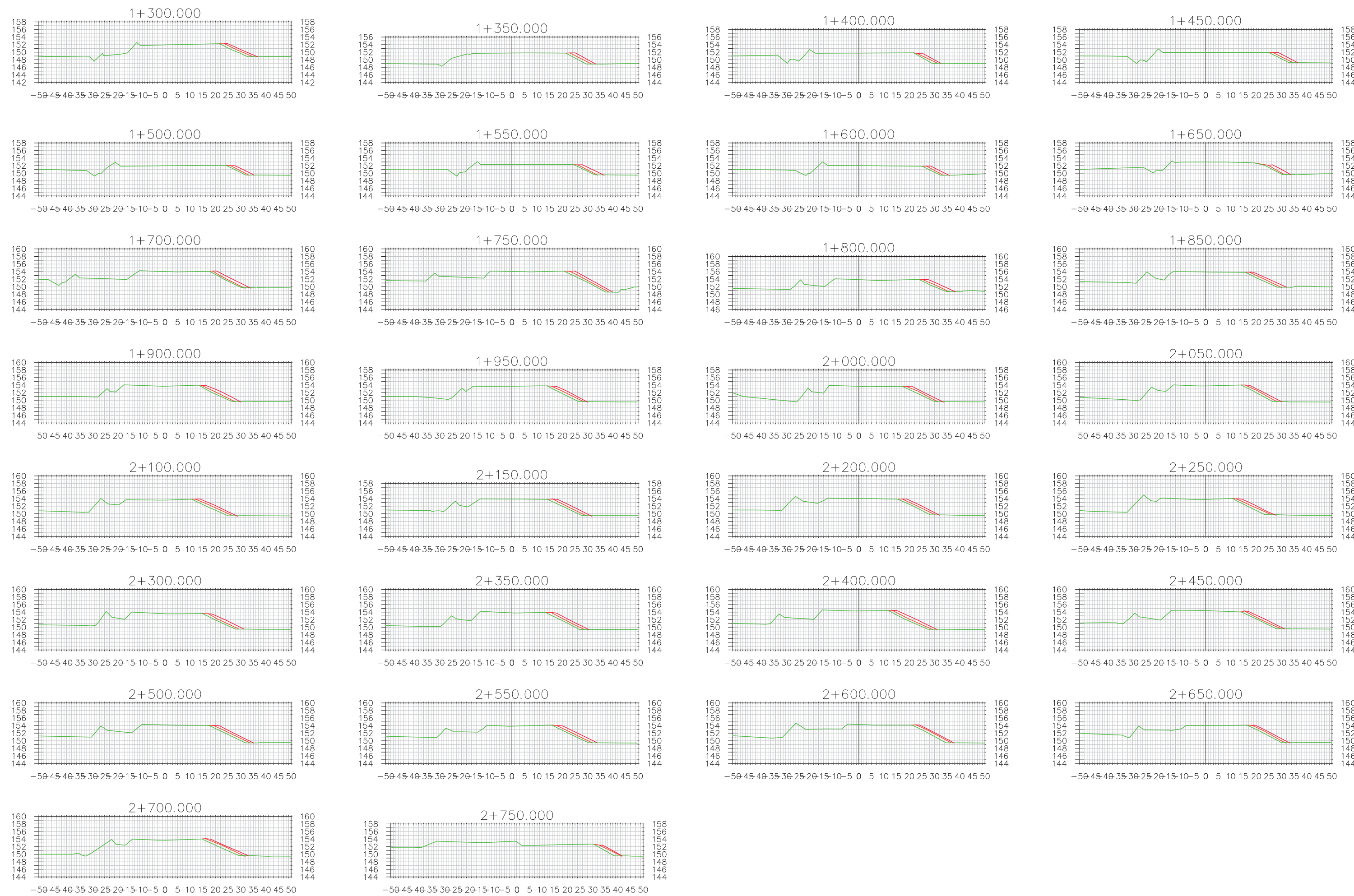
PREPARED BY : MIKAËL LÉVESQUE
DATE : 10-09-2018
CON-FD-025_NC_REV2

NORTH CELL AS BUILT
DIKE CONSTRUCTION
CONTRACT # 11-505



KIVALLIQ CONTRACTORS
GROUP LTD

PREPARED BY : MIKAËL LÉVESQUE
DATE : 10-09-2018
CON-FD-025_NC_REV2

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APPENDIX B

Design Modification Documents

GOLDER

TECHNICAL MEMORANDUM

DATE November 29, 2018 **Reference No.** 1897439-1582-TM-Rev0

TO Patrice Gagnon, Pier-Éric McDonald
Agnico Eagle Mines Ltd, Meadowbank Division

CC Frédérick Bolduc, Alexandre Lavallée

FROM Marion Habersetzer, Yves Boulianne **EMAIL mhabersetzer@golder.com**

RE: PHASED CONSTRUCTION OF THE DITCHES, SUMPS AND INSTRUMENTATION OF THE NORTH CELL INTERNAL STRUCTURE – MEADOWBANK MINE, NUNAVUT

1.0 INTRODUCTION

The North Cell of the tailings storage facility is planned for use in 2018 and 2019 to store tailings from the Meadowbank process plant. To this end, the North Cell is being raised in 2018 through the construction of the North Cell Internal Structure. The purpose of the North Cell Internal Structure is to allow for tailings deposition without water retention; together with the rock cover, it will establish the defined final landform for the closure of the North Cell. Figure 3 after the text presents the initial design of the North Cell Internal Structure as stated in the design report (reference 1784383-Rev0, Golder, 2018). The as-built footprint of the structure, as constructed during the 2018 construction season, is also indicated on the figure.

Since the structure is designed as a filtering dike to let water within the tailings slurry seep through, a drainage system was included in the design (Golder, 2018). The original design included a total of seven perimeter ditches around the Internal Structure and four sumps to be excavated below ground surface. The purpose of the perimeter ditches and sumps is to collect runoff from the downstream face of the Internal Structure and surrounding areas, while collecting toe seepage (contaminated water) for pumping into the internal pond as required.

The North Cell Internal Structure is being built in 2018 at the elevation 152 m, and 154 m in its northeastern portion, as required by the deposition plan developed by AEM for the North Cell raise. The rest of the structure may be raised to El. 154 m during a subsequent phase if needed. The dike alignment has also been shifted toward the centre of the North Cell, so that the dike lies on the inner edge of the existing rock cover (capping) built on the North Cell existing tailings, following discussions between Agnico-Eagle Mines (AEM) and Golder Associates (Golder). The stations featured on Figure 3 after the text correspond to the revised alignment (modified alignment provided by AEM). It is estimated that offsetting the dike alignment towards the centre of the cell facilitates water management towards the centre of the cell. Therefore, given the change in the location of the structure, as well as the fact that the structure will not be built in its final configuration in 2018, a phasing of the ditches and sumps has been agreed upon by AEM and Golder. This technical memorandum describes the recommendations for each drainage element for the 2018 construction season and provides recommendations on the phasing of the construction of the drainage system over the lifetime of the dike. Structures built during the operation of the dike are temporary structures, and the phasing of the construction does not alter the need for the construction of all the required drainage elements at the time of the North Cell closure as per the design report and construction drawings.

The recommended preliminary instrumentation of the North Cell Internal Structure is also described below.

2.0 DITCH 1 AND SUMP 1

As per the design, Ditch 1 is a shallow unlined ditch which collects runoff at the southwest corner of the North Cell Internal Structure and drains southwest into Sump 1.

This section of the North Cell Internal Structure (between Sta. 0+000 m and 0+400 m of the original alignment, see Figure 3 at the end of the text) will not be built in 2018. Thus, Ditch 1 and Sump 1 are not necessary at this point. These elements will need to be built when this section is built at a later time.

3.0 DITCH 2 AND SUMP 2

As per the design, Ditch 2 is a two-section shallow lined ditch which collects runoff on the west side of the North Cell Internal Structure and drains northwest (southern portion) and south (northern portion) into Sump 2. This ditch was designed to be lined with geomembrane due to its proximity to the environment.

The North Cell Internal Structure in this area is further from the environment than on the original alignment. The downstream side of the dike is mostly constituted of rockfill cover (from approx. Sta. 1+300 m to 1+900 m of the original alignment). From approx. Sta. 1+100 m to 1+300 m of the original alignment, in the vicinity of the Cyanide Burning Pad, the downstream side of the dike is constituted of North Cell tailings. The extent of structure built in 2018 being shorter than the original alignment, the downstream side of the structure still connects to the southern part of North Cell. No accumulation of water on either the rockfill cover or the tailings on the downstream side of the dike was observed before the operation of the North Cell Internal Structure, and based on the assumed tailings slope during deposition, it is expected that water from the tailings will not predominantly flow towards this portion of the dike; hence no significant seepage is expected in the short term. The presence of the Cyanide Burning Pad, however, represents a blockage for the drainage of water toward the North Cell, should seepage occur in this area.

The decision was made to excavate a shallow unlined ditch (at least 1 m wide and 0.5 m deep) in the rockfill cover and tailings on the downstream side of the dike, in order to collect and redirect possible seepage which could occur through the dike toward the North Cell (see Figure 3). The ditch will start from the northwestern extremity of the North Cell Internal Structure, cross the Cyanide Burning Pad area (the pad will ultimately be relocated) and extend beyond the southwestern extremity of the dike to ensure that water is redirected toward the North Cell pond. A layer of rockfill was placed on the surfaces of the ditch excavated within the tailings to prevent erosion of the tailings. A temporary sump was excavated at the south extremity of the ditch.

AEM should monitor the downstream area for signs of seepage and be ready to take measures if it is higher than expected (e.g. if the tailings deposition differs from the plan or if changing tailings slopes causes water to redirect toward this area). Should such a situation arise, the deposition point should be switched and Ditch 2 and Sump 2 should be built in a timely manner to control the seepage. In all cases, Ditch 2 and Sump 2 will be built in accordance with the design for the North Cell closure phase. The necessity of lining the ditch and sump can be reevaluated at that moment based on observations made during operations.

4.0 DITCH 3 AND SUMP 3

As per the design, Ditch 3 is a two-section shallow unlined ditch which collects runoff on the north side of the North Cell Internal Structure and drains west (eastern portion) and east (western portion) into Sump 3, see Figure 3 at the end of the text.

The North Cell Internal Structure in this area is built further south than on the original alignment. The downstream side of the dike is mostly constituted of rockfill cover (from approx. Sta. 1+900 m to 2+500 m of the original alignment), with till-like material and North Cell tailings being present downstream of the eastern end of the structure (from approx. Sta. 2+500 m to 2+750 m of the original alignment). On the northwestern extremity of the dike, water is accumulating in a topographic low point (clean water from runoff of the watershed north of the North Cell). On the northeastern extremity of the dike, another low point accumulating runoff water exists (in contact with tailings, thus contaminated), kept open after the area was capped with a rockfill cover, allowing it to freeze and thus providing a low-permeability medium. Deposition from the northern portion of the dike is expected to provide a slope promoting gravitational flow of the water away from this section of the structure.

It is expected that the wide rockfill cover on the downstream side of this portion of the North Cell Internal Structure will promote infiltration and natural drainage of runoff and seepage towards the North Cell. During operations, water is expected to be manageable in this area without a ditch. Low points will be monitored and pumped out at freshet or any time when water accumulation becomes significant, as it has been the case since the beginning of operations. The water of both low points will need to be pumped into the North Cell, as water could be contaminated by seepage of tailings water through the dike once it is in operation. The northeastern low point should be monitored for resurgences after capping with rockfill cover to evaluate whether it provides a satisfactory low-permeability medium. If water accumulation is noticed, the immediate construction of Ditch 3 will be required. Ditch 3 will in any case be built before closure of the North Cell. For closure, clean water runoff from the watershed outside the North Cell footprint will need to be efficiently drained by redirecting water toward the environment, while only North Cell seepage water will be collected in water sumps. Ditch 3 and Sump 3 will be built according to the design. Until the final construction to its full extent, the length of Ditch 3 toward the east could be subject to possible changes if no water is observed during operations in the northeast sector.

5.0 DITCH 4 AND SUMP 4

As per the design, Ditch 4 is a two-section deep unlined ditch which collects runoff at the southeast corner of the North Cell Internal Structure, along structures RF1 and RF2, and drains south (northern portion) and north (southern portion) into Sump 4, see Figure 3 at the end of the text.

A topographic high point is located within the proposed extent of Ditch 4 (approx. Sta. 3+400 m of the original alignment), and water is observed ponding on the tailings on both sides of this apparent rock outcrop, between the North Cell Internal Structure and the RF1 and RF2 structures. This water accumulation has been observed regularly and is currently monitored by AEM and pumped out as needed (during freshet).

During operations, water can be managed in this area by excavating two sumps of smaller size than the design but will retain the same geometry, one on each side of the high point, while being pumped out as needed. AEM could decide to install smaller capacity pumps that are sized to meet observed flows, with the prospect that it may become necessary to increase the pump sizes later if and when the seepage flows increase. It is estimated that dividing the watershed in two will effectively reduce the required magnitude of the sumps and pumping systems. The capacity of this relatively contained area in terms of water retention will also provide enough reaction time to increase the pumping capacity in case of rising water levels. The drainage system in this area was designed with one deep ditch and one deep sump. During operations, the temporary setup will be constituted of two shallow sumps only. For closure, given that the watershed will then be managed in two parts instead of centralizing all the runoff water in one sump, the sizing of the final drainage elements (ditches and sumps) will need to be confirmed to comply with the design. During excavation near RF1 and RF2, great care was taken to excavate only tailings and to avoid interfering with the RSF till plug underneath. A close follow-up by the QA and QC team will be required during these operations to ensure that the integrity of the RSF till plug is not compromised.

6.0 INSTRUMENTATION OF THE NORTH CELL INTERNAL STRUCTURE

The purpose of the instrumentation is to monitor changes in the thermal regime of the tailings and associated settlements, should they occur. To this end, thermistors and displacement monitoring points should be installed on the structure. This section describes the recommended instrumentation regarding the current configuration of the structure. Additional instruments will be required at a later date.

6.1 Thermistors

The thermistors should be installed at and around a deposition point, in order to monitor the behaviour of the foundation and structure with regards to the deposition.

- One instrument should be installed as close to the deposition point as safely manageable, on the upstream crest (number 1 on Figure 1 below);
- A second instrument should be installed on the downstream crest, across from the deposition point (number 2 on Figure 1 below);
- A third instrument should be installed on the upstream crest 25-30 m away from the first one (number 3 on Figure 1 below).

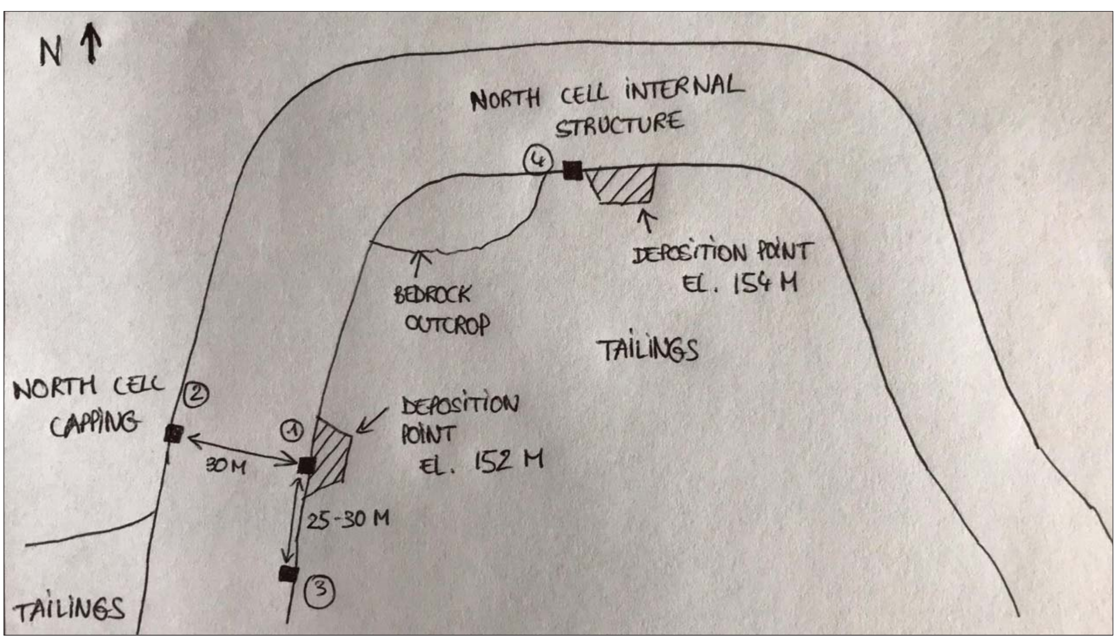

Figure 1: Proposed layout of the thermistors (symbolized by numbered blacks squares) around deposition points

The thermistors should have at least one node at the base of the rockfill, one at the top of the foundation, and extending at least 5 m through the foundation but preferably reaching the bedrock.

The thermistor node locations must be adjusted along the PVC to focus on the area from the base of the rockfill layer to a few metres under the tailings surface. Nodes are to be located within the rockfill layer and one of them 500 mm from the base of the layer. Within the tailings, a few nodes are to be placed every 500 mm from the top of the tailings surface. At least one bead should be installed within the bedrock. Figure 2 below provides an illustration of the required spacing around the rockfill-tailings interface.

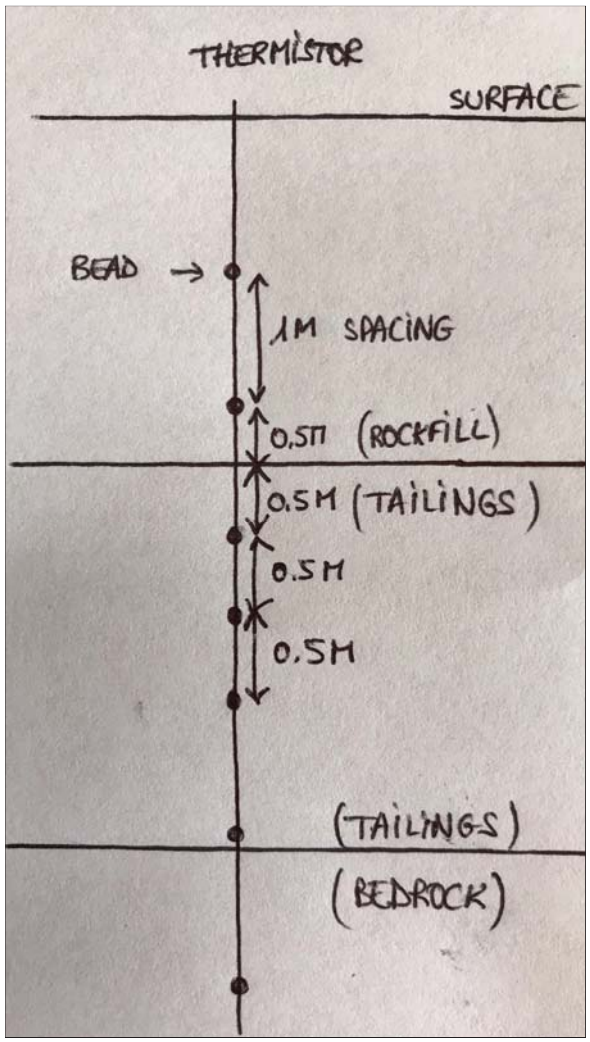

Figure 2: Schematic cross-section of a thermistor showing the required spacing around the rockfill-tailings interface

The southwestern part of the structure is built entirely on exposed tailings, whereas the rest of the structure is at least half built on the North Cell Capping (downstream side) overlying the tailings. The portion built on exposed tailings had a design change to deviate the downstream slope from 2.5:1 to 1.5:1, provided AEM was aware of the risk of skin failures, and as such, and the risk that settlements could occur in this area. Therefore, it was decided by AEM and agreed upon by Golder to install 3 instruments on the deposition point located in this section, with the above-mentioned configuration to monitor the tailings response. A fourth thermistor was installed near the deposition point located in the northern part of the structure (number 4 on Figure 1).

6.2 Settlement Monitoring points

It is recommended to install prisms along the structure to monitor tridimensional displacement. Prisms should be installed on the upstream and downstream edge of the crest at each of the deposition points, as well as at half the distance between two adjacent deposition points.

Should movement be observed within the structure (e.g. settlement, cracks, sloughing), additional monitoring points will be installed immediately to monitor the section of concern.

7.0 CONCLUSION AND GENERAL RECOMMENDATIONS

The design of the North Cell Internal Structure includes a drainage system composed of seven ditches and four sumps and was developed in view of the role of the dike in the North Cell closure. During the operation of the dike, the construction of these elements can be phased according to the needs in terms of seepage control and water management, while always respecting the design basis criteria. During the 2018 construction season in view of the operation of the dike, it is acceptable to build only a preliminary ditch downstream of the western part of the dike, which at closure will be finalized as Ditch 2, as well as two sumps downstream of the southeastern part of the dike instead of one single Sump 4. These two sumps will be built in existing topographic low points where water is ponding, and thus pumped out as needed to control seepages in this area. The works were completed during the summer of 2018, at a time of year when water accumulation and seepages are low. It should be kept in mind that additional works during the 2018-2019 winter may be required to prepare for the 2019 freshet. The changes made to the original design of the sump and ditches around the North Cell Internal structure are temporary only. The changes are considered acceptable as the site is in operation and the site engineering team is inspecting daily the performance of the surface water management system. Review of the water management system for closure and post-closure phases is mandatory so that it meets the original design intent. The required drainages elements will need to be built at a later date, according to the closure design and drawings issued for construction

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Attachement : Figure 3: Initial Design of the North Cell Internal Structure and As-built Footprint

References

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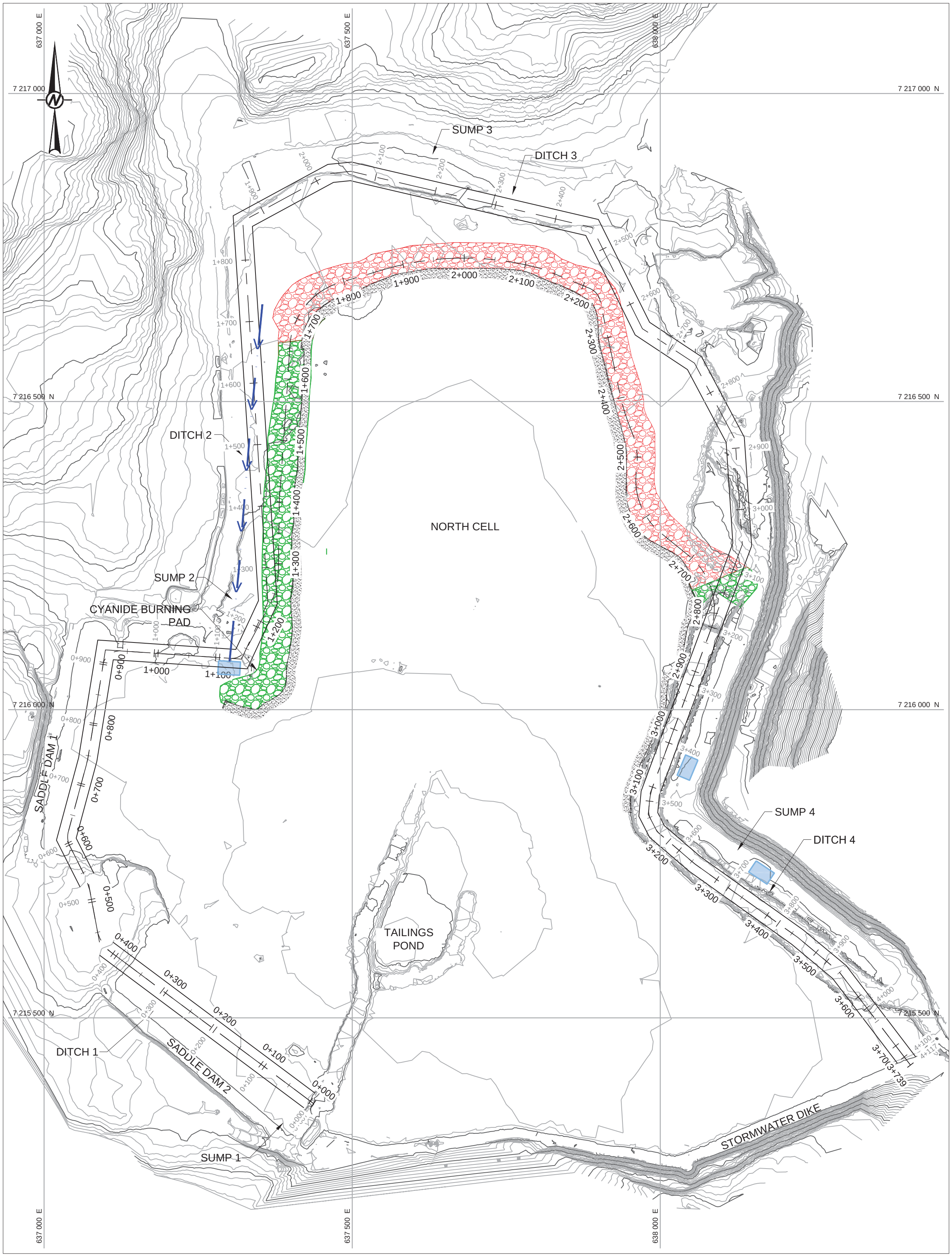
https://golderassociates.sharepoint.com/sites/1897439/preparation of deliverables/1897436-1582-tm-rev0 memo ditches and sumps nc/rev0/1897439-1582-tm-rev0 memo ditches and sumps nc.docx

PERMIT TO PRACTICE
GOLDER ASSOCIATES LTD.
Signature
Date 2018-11-29
PERMIT NUMBER: P 049
NT/NU Association of Professional Engineers and Geoscientists



LEGEND

SUMPS APPROXIMATIVE LOCATION	NORTH CELL INTERNAL STRUCTURE, AS BUILT (El.152 m)
DITCH APPROXIMATIVE LOCATION	NORTH CELL INTERNAL STRUCTURE, AS BUILT (El.154 m)
1+000 INITIAL ALIGNMENT	FILTER SYSTEM
1+000 REVISED ALIGNMENT	

0 100 200
1:5 000 MÈTRES

CLIENT
AGNICO EAGLE MINES LIMITED

PROJECT
MEADOWBANK MINE, NUNAVUT
NORTH CELL INTERNAL STRUCTURE

CONSULTANT
GOLDER

YYYY-MM-DD	2018-08-16
DESIGNED	S. Barbeau
PREPARED	A. Touchette
REVIEWED	Y. Boulianne
APPROVED	Y. Boulianne

TITLE
INITIAL DESIGN OF THE NORTH CELL INTERNAL STRUCTURE AND AS-BUILT FOOTPRINT

PROJECT NO.	PHASE	REV.	FIGURE
1897439	5000	0	3

APPENDIX C

Construction Photographs

APPENDIX C-1

Central Dike Stage 6 Photographs

SD3-297 (2018-05-14), looking SE from Sta. 20+730/-10 m. Removal of snow on the upstream slope of SD3-with an excavator, from Sta. 20+640 to 20+760 m.

SD3-298 (2018-05-16), looking S from Sta. 20+680/-88 m. Removal of snow on the upstream slope of SD3-above El. 142 m, from Sta. 20+620 m to 20+780 m.

SD3-299 (2018-05-16), looking NW from Sta. 20+620/-26 m. Scarification of the frozen ultramafic volcanic (UM) rockfill on the crest with a dozer for the anchoring trench excavation between Sta. 20+605 m and 20+780 m.

SD3-300 (2018-05-16), looking NW from Sta. 20+790/-33 m. Excavation of the LLDPE geomembrane crest anchoring trench with an excavator from Sta. 20+675 m to 20+780 m.

SD3-301 (2018-05-17), looking SE from Sta. 20+660/-22 m. Excavation of the LLDPE geomembrane crest anchoring trench with an excavator from Sta. 20+655 m to 20+675 m.

SD3-302 (2018-05-18), looking NE from Sta. 20+595/-42 m. View of water ponding on the first compacted sieved till layer of upstream toe liner tie-in. A portion of exposed damaged LLDPE liner is visible.

SD3-303 (2018-05-21), looking N from Sta. 20+780/-15 m. View of a LLDPE liner roll stored on geotextile.

SD3-304 (2018-05-21), looking SE from Sta. 20+620/-36 m. Smoothing of the surface of the fine filter with an excavator on top of the upstream slope from Sta. 20+600 m to 20+780 m.

SD3-305 (2018-06-05), looking NE from Sta. 20+590/-48 m. Dewatering of the water ponding on the first compacted sieved till layer of upstream toe liner tie-in. A Genset Frost-fighter is heating the sieved till layer and a pump is evacuating the water.

SD3-306 (2018-06-06), looking S from Sta. 20+780/-25 m. Correction of the surface of the fine filter in the upstream slope and the top of the first class compacted sieved till layer with an excavator from Sta. 20+803 m to 20+793 m.

SD3-307 (2018-06-06), looking N from Sta. 20+800/-25 m. View of the liner bedding ready for geosynthetics installation.

SD3-308 (2018-06-06), looking SW from Sta. 20+620/-48 m. Installation of the geotextile on the upstream slope 3H:1V between El. 143 m and 145 m from Sta. 20+620 m to 20+630 m.

SD3-309 (2018-06-06), looking N from Sta. 20+640/-26 m. Installation of the LLDPE liner on the upstream slope 3H:1V between El. 143 m and 145 m from Sta. 20+620 m to 20+630 m (panel numbers 934 to 939).

SD3-310 (2018-06-07), looking S from Sta. 20+635/-24 m. Installation of the geotextile on the upstream slope 3H:1V between El. 143 m and 145 m from Sta. 20+630 m to 20+800 m.

SD3-311 (2018-06-07), looking N from Sta. 20+810/-26 m. Installation of the LLDPE liner on the upstream slope 3H:1V between El. 143 m and 145 m from Sta. 20+630 m to 20+800 m (panel numbers 939 to 964).

SD3-312 (2018-06-08), looking W from Sta. 20+610/-48 m. Placement of a 0.15 m thick lift of compacted sieved till from Sta. 20+596.4 m to 20+601.6 m (o.s. -42.6 to -46.3 m) to fill the depression in the compacted sieved till layer.

SD3-313 (2018-06-08), looking S from Sta. 20+600/-52 m. Compaction of the 0.15 m-thick lift of compacted sieved till with a 10-tonne smooth-drum compactor without vibration (4 passes) from Sta. 20+596 m to 20+601 m.

SD3-314 (2018-06-08), looking E from Sta. 20+590/-32 m. View of the liner bedding ready for geosynthetics installation.

SD3-315 (2018-06-08), looking W from Sta. 20+615/-46 m. Installation of the geotextile on the upstream slope 3H:1V between El. 143 m and 145 m from Sta. 20+593 m to 20+610 m and installation of the LLDPE liner on the upstream slope 3H:1V between El. 143 m and 145 m from Sta. 20+593 m to 20+610 m (panel numbers 965 to 967).

SD3-316 (2018-06-09), looking NW from Sta. 20+610/-45 m. Repairs on the extrusion fillet seam between LLDPE panel 965 and the existing LLDPE panel at Sta. 20+600 m (approx.).

SD3-317 (2018-07-07), looking E from Sta. 20+800/-22 m. Reworking of the access to SD3.

SD3-318 (2018-07-07), looking SE from Sta. 20+710/-24 m. Placement of IV rockfill in the water up to El. 142m with an excavator from Sta. 20+785 m to 20+730 m, at the bottom of the upstream slope of SD3 to widen the rockfill layer and allow access to the erosion protection.

SD3-319 (2018-07-08), looking NE from Sta. 20+740/-31 m. Placement of IV rockfill in the water up to El. 142m with an excavator from Sta. 20+730 m to 20+610 m, at the bottom of the upstream slope of SD3 to widen the rockfill layer and allow access to the erosion protection.

SD3-320 (2018-07-08), looking E from Sta. 20+620/-67 m. Placement of a 1 m thick (approx.) lift of fine IV rockfill over the compacted till in the upstream slope from El. 142 m to 144 m with an excavator from Sta. 20+600 m to 20+610 m.

SD3-321 (2018-07-09), looking SW from Sta. 20+610/-56 m. Water ponding at El. 142m on the compacted sieved till layer of the upstream toe liner tie-in at approx. Sta. 20+620 m to 20+630 m was pumped.

SD3-322 (2018-07-09), looking W from Sta. 20+625/-63 m. Installation of two layers of geotextile on the upstream slope 3H:1V between El. 142 m and 143 m (approx.) from Sta. 20+610 m to 20+800 m.

SD3-323 (2018-07-09), looking S from Sta. 20+610/-43 m. Placement of the first 0.5 m thick lift of low quality till (0-150 mm) from El. 142 m to 142.5 m from Sta. 20+610 m to 20+715 m.

SD3-324 (2018-07-10), looking S from Sta. 20+680/-39 m. Placement of a 0.5 m thick lift of low quality till (0-150 mm) from El. 142 m to 142.5 m from Sta. 20+715 m to 20+760 m.

SD3-325 (2018-07-10), looking S from Sta. 20+610/-43 m. Placement of a first 0.5 m thick lift of fine rockfill (0-500 mm) upstream of the low quality till from El. 142 m to 142.5 m from Sta. 20+610 m to 20+760 m.

SD3-326 (2018-07-11), looking N from Sta. 20+820/-34 m. Placement of the 0.5 m thick lift of low class till, fine filter, coarse filter and fine rockfill on the upstream slope of the upstream toe liner tie-in with an excavator from Sta. 20+780 to 20+810 m.

SD3-327 (2018-07-11), looking S from Sta. 20+610/-43 m. Compaction of the 0.5 m lift of low quality till (0-150 mm) at El. 142.5 m with a 10-tonne smooth-drum compactor with vibration (4 passes) from Sta. 20+610 m to 20+615 m and from Sta. 20+635 m to 20+760 m.

SD3-328 (2018-07-11), looking N from Sta. 20+820/-34 m. Compaction perpendicularly to the longitudinal axe of Saddle Dam 3 of the 0.5 m lift of low quality till (0-150 mm) at El. 142.5 m with a 10-tonne smooth-drum compactor without vibration (4 passes) from Sta. 20+615m to 20+635 m.

SD3-329 (2018-07-11), looking N from Sta. 20+820/-34 m. Placement of a 0.5 m thick lift of low quality till (0-150 mm) from El. 142.5 m to 143 m from Sta. 20+610 m to 20+760 m.

SD3-329 (2018-07-11), looking N from Sta. 20+820/-34 m. Placement of a 0.5 m thick lift of low quality till (0-150 mm) from El. 142.5 m to 143 m from Sta. 20+610 m to 20+760 m.

SD3-330 (2018-07-12), looking S from Sta. 20+610/-43 m. Placement of a second 0.5 m thick lift of fine rockfill (0-500 mm) upstream of the low quality till (0-150mm) from El. 142.5 m to 143 m from Sta. 20+610 m to 20+760 m.

SD3-331 (2018-07-12), looking S from Sta. 20+610/-43 m. Compaction of the 0.5 m lift of low quality till (0-150 mm) at El. 143 m with a 10-tonne smooth-drum compactor with vibration (4 passes) from Sta. 20+610 m to 20+760 m.

SD3-332 (2018-07-12), looking SE from Sta. 20+775/-23 m. Placement of a first 0.5 m thick lift of compacted sieved till over the LLDPE geomembrane on the upstream toe liner tie-in with an excavator from Sta. 20+775 m to 20+800 m.

SD3-333 (2018-07-13), looking N from Sta. 20+817/-29 m. Placement of a second 0.5 m thick lift of fine rockfill on the upstream slope of the upstream toe liner tie-in with an excavator from Sta. 20+775 m to 20+800 m.

SD3-334 (2018-07-13), looking SE from Sta. 20+780/-26 m. Compaction of the second 0.5 m thick lift of compacted sieved till and third lift of fine filter, coarse filter and fine rockfill of the upstream toe liner tie-in with a 10 tonne smooth-drum compactor with vibrations from Sta. 20+770 m to 20+800 m.

SD3-335 (2018-07-14), looking N from Sta. 20+815/-27 m. Placement of a third 0.5 m thick lift of compacted sieved till on the upstream toe liner tie-in with an excavator from Sta. 20+760 m to 20+810 m.

SD3-336 (2018-07-14), looking S from Sta. 20+755/-48 m. Placement of a fourth 0.5 m thick lifts of fine filter, coarse filter and fine rockfill on the upstream slope of the upstream toe liner tie-in with an excavator from Sta. 20+770 to 20+800 m.

SD3-337 (2018-07-14), looking S from Sta. 20+760/-37 m. Compaction of the fourth 0.5 m thick lifts of fine filter, coarse filter and fine rockfill on the upstream slope of the upstream toe liner tie-in with a 10 tonne smooth-drum compactor with vibrations (4 passes) from Sta. 20+770 to 20+800 m.

SD3-338 (2018-07-14), looking NW from Sta. 20+610/-43 m. Placement of a first 0.5 m thick lift of compacted sieved till over the LLDPE geomembrane on the upstream toe liner tie-in with an excavator from Sta. 20+588 m to 20+599 m.

SD3-339 (2018-07-15), looking E from Sta. 20+600/-29 m. Compaction of a first 0.5 m thick lift of compacted sieved till on the upstream toe liner tie-in with an excavator from Sta. 20+588 m to 20+599 m.

SD3-340 (2018-07-15), looking S from Sta. 20+750/-40 m. Compaction of the third 0.5 m thick lift of compacted sieved till on the upstream toe liner tie-in with an excavator from Sta. 20+760 m to 20+820 m.

SD3-341 (2018-07-15), looking W from Sta. 20+600/-59 m. Placement of a first 0.5 m thick lift of fine rockfill on the upstream slope of the upstream toe liner tie-in with an excavator from Sta. 20+588 m to 20+599 m.

SD3-342 (2018-07-15), looking W from Sta. 20+600/-58 m. View of the compaction test and view of the filling of the depression between SD2 and SD3 with low quality till up to El. 145 m.

SD3-343 (2018-07-16), looking W from Sta. 20+590/-40 m. View of the depression between SD2 and SD3 backfilled with low quality till up to El. 145 m.

SD3-344 (2018-07-16), looking S from Sta. 20+610/-43 m. Placement of a third 0.5 m thick lift of low quality till (0-150 mm) from El. 142.5 m to 143 m from Sta. 20+570 m to 20+590 m.

SD3-345 (2018-07-17), looking NW from Sta. 20+760/-42 m. Placement of a fourth 0.5 m thick lift of low quality till (0-150 mm) from El. 143 m to 143.5 m from Sta. 20+619 m to 20+777 m.

SD3-346 (2018-07-17), looking E from Sta. 20+760/-21 m. Placement of a third 0.5 m thick lift of fine UM rockfill (0-500 mm) upstream of the low quality till (0-150mm) from El. 143 m to 143.5 m from Sta. 20+668 m to 20+777 m.

SD3-347 (2018-07-18), looking W from Sta. 20+640/-41 m. Placement of a third 0.5 m thick lift of fine UM rockfill (0-500 mm) upstream of the low quality till (0-150mm) from El. 143 m to 143.5 m from Sta. 20+688 m to 20+619 m.

SD3-348 (2018-07-18), looking E from Sta. 20+760/-25 m. Placement of a 0.5 m thick layer of compacted sieved till on the upstream slope of SD3 with an excavator from Sta. 20+777 m to 20+807 m. No large rock was allowed to be placed against the LLDPE liner.

SD3-349 (2018-07-18), looking SE from Sta. 20+765/-29 m. Compaction of the 0.5 m thick lift of fine filter on the top of the upstream toe liner tie-in with a 10 tonne smooth-drum compactor with vibration (4 passes) from Sta. 20+777 m to 20+807 m.

SD3-350 (2018-07-18), looking SE from Sta. 20+740/-24 m. Placement of a 0.5 m thick lift of coarse filter on the top of the fine filter on the upstream toe liner tie-in with an excavator from Sta. 20+777 m to 20+807 m.

SD3-351 (2018-07-18), looking SE from Sta. 20+740/-24 m. Compaction of the 0.5 m lift of low quality till (0-150 mm) at El. 143.5 m with a 10-tonne smooth-drum compactor with vibration (4 passes) from Sta. 20+619 m to 20+777 m.

SD3-352 (2018-07-19), looking SW from Sta. 20+600/-59 m. Corrections to the layer of compacted sieved till placed against the upstream slope from Sta. 20+599 m to 20+613 m.

SD3-353 (2018-07-22), looking SW from Sta. 20+580/-49 m. View of SD3 at the end of the 2018 construction phase.

APPENDIX C-2

Saddle Dam 3 finalization of Stage 3 Photographs

NCIS-001 (2018-05-19). View of a test pit in the UM rockfill lift at El. 152 m: a thick layer of snow (2 m) underlies the rockfill.

NCIS-002 (2018-05-19). View of the scraped upstream side of the UM rockfill lift at El. 152 m: n thick layer of snow (1.5 m) underlies the rockfill.

NCIS-003 (2018-05-19). Excavation of the snow-rich upstream toe material on an average width of 2 to 3 m with an excavator.

NCIS-004 (2018-05-19). View of the scraped upstream side of the UM rockfill lift at El. 152 m further to the north: the snow layer is only observed at the toe and is approximately 0.5 m thick.

NCIS-005 (2018-05-19). Removal of the excavated material, pushed with a dozer towards the center of the North Cell to clear the upstream toe.

NCIS-006 (2018-05-19). View of oversize boulders on the UM rockfill lift at El. 152 m.

NCIS-007 (2018-05-20). Profiling of the upstream slope (3H:1V) from El. 150 to 152 m with an excavator.

NCIS-008 (2018-05-20). Placement a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer. The material is of good quality and is well graded.

NCIS-009 (2018-05-21). Placement a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+880 m to 1+825 m (o.s. unavailable).

NCIS-010 (2018-05-21). Profiling of the upstream slope (3H:1V) from El. 150 to 152 m with an excavator from Sta. 2+777 m to 2+400 m.

NCIS-011 (2018-05-22), looking SW from Sta. 2+000 m. Placement a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+880 m to 1+767 m (o.s. unavailable).

NCIS-012 (2018-05-22), looking NW from Sta. 2+000 m. Profiling of the upstream slope (3H:1V) from El. 150 to 152 m with an excavator from Sta. 2+325 m to 2+275 m (approx.).

NCIS-013 (2018-05-22), looking NE from Sta. 2+600 m. Correction of the crest elevation with an excavator to achieve a closer elevation to 152 m around Sta. 2+650 m.

NCIS-014 (2018-05-22), looking SE from Sta. 1+900 m. View of the natural soil on which the 2015 capping is built.

NCIS-015 (2018-05-22), looking S from Sta. 1+850 m. View of the 200 mm deep test pit excavated into the natural soil. A thin layer or organic soil overlies frozen till.

NCIS-016 (2018-05-23), looking SE from Sta. 1+750 m. View of the Iron Formation rockfill (PAG material) piles on the North Cell Internal Structure.

NCIS-017 (2018-05-24), looking SW from Sta. 2+290 m. Profiling of the upstream slope (3H:1V) from El. 150 to 152 m with an excavator from Sta. 2+138 m to 1+989 m.

NCIS-018 (2018-05-25), looking NW from Sta. 2+310 m. Profiling of the upstream slope (3H:1V) from El. 150 to 152 m with an excavator from Sta. 1+989 m to 1+860 m.

NCIS-019 (2018-05-26), looking SW from Sta. 2+100 m. Profiling of the upstream slope (3H:1V) from El. 150 to 152 m with an excavator from Sta. 1+860 m to 1+678 m. The portion between Sta. 1+900 m and 1+800 m, where the structure is built on the natural ground, was not profiled.

NCIS-020 (2018-05-27), looking S from Sta. 1+570 m. Placement a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+564 m to 1+535 m (o.s. unavailable).

NCIS-021 (2018-05-28), looking S from Sta. 1+550 m. Placement a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+535 m to 1+500 m (o.s. unavailable).

NCIS-022 (2018-05-30), looking SE from Sta. 2+245 m. Compaction of the 2 m lift (approx.) of ultramafic (UM) rockfill at El. 152 m with a 10-tonne smooth-drum compactor with vibration (6 passes) between the haul truck traffic lane and the upstream slope from Sta. 2+625 to 1+625 m (o.s. unavailable).

NCIS-023 (2018-05-31), looking W from Sta. 2+570 m. Placement of a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+500 m to 1+450 m (o.s. unavailable). The material is of good quality and is well graded.

NCIS-024 (2018-05-31), looking SW from Sta. 2+570 m. Removal of the snow bank in the footprint with an excavator from Sta. 1+160 m to 1+120 m (approx.).

NCIS-025 (2018-06-01), looking SE from Sta. 1+475 m. Placement of a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+450 m to 1+390 m (o.s. unavailable). The material is of good quality and is well graded.

NCIS-026 (2018-06-06), looking S from Sta. 1+440/+2 m. Placement of a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+390 m to 1+365 m (+10 m to -29 m).

NCIS-027 (2018-06-07), looking E from Sta. 1+360/+67 m. Placement of a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+365 m to 1+360 m (+9 m to -28 m).

NCIS-028 (2018-06-09), looking E from Sta. 1+340/+3 m. View of the UM rockfill lift approximately 3.2 m thick.

NCIS-029 (2018-06-19), looking SE from Sta. 2+120/-27 m. Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 2+280 m to 2+105 m.

NCIS-030 (2018-06-20), looking W from Sta. 2+140/-29 m. Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 2+105 m to 1+930 m. Notice the presence of water ponding at the bottom of the slope.

NCIS-031 (2018-06-20), looking SW from Sta. 1+880/-21 m. Final clean-up of the dike footprint with an excavator to reach a good quality bedrock from Sta. 1+800 to 1+850 m (o.s. -42 to -33 m).

NCIS-032 (2018-06-20), looking N from Sta. 1+400/-24 m. Compaction of the 2 m lift (approx.) of ultramafic (UM) rockfill at El. 152 m with a 10-tonne smooth-drum compactor with vibration (6 passes) between the haul truck traffic lane and the upstream slope from Sta. 1+660 to 1+380 m (o.s. -45 to -24 m).

NCIS-033 (2018-06-21), looking E from Sta. 1+900/-21 m. Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 1+930 m to 1+715 m.

NCIS-034 (2018-06-21), looking W from Sta. 1+900/-21 m. Profiling of the upstream slope (3H:1V) from El. 150 to 152 m with an excavator from Sta. 1+860 m to 1+750 m.

NCIS-035 (2018-06-21), looking N from Sta. 2+550/-25 m. Compaction of the 0.5 m lift (approx.) of coarse filter between El. 150 and 152 m with a 10-tonne smooth-drum compactor (4 passes) in the upstream slope from Sta. 2+524 m to 2+450 m.

NCIS-036 (2018-06-22), looking SE from Sta. 1+900/-21 m. Placement of a 0.5 m thick lift of fine filter over the coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 2+542 m to 2+475 m.

NCIS-037 (2018-06-22), looking NW from Sta. 1+550/-25 m. Compaction of the 0.5 m lift (approx.) of coarse filter between El. 150 and 152 m with a 10-tonne smooth-drum compactor (4 passes) in the upstream slope from Sta. 2+450 to 1+805 m.

NCIS-038 (2018-06-22), looking SE from Sta. 2+510/-28 m. Compaction of the 0.5 m lift (approx.) of fine filter between El. 150 and 152 m with a 10-tonne smooth-drum compactor (4 passes) in the upstream slope from Sta. 2+542 m to 2+475 m.

NCIS-039 (2018-06-23), looking W from Sta. 2+200/-24 m. Placement of a 0.5 m thick lift of fine filter over the coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 2+460 m to 2+475 m and from Sta. 2+065 m to 1+980 m.

NCIS-040 (2018-06-24), looking W from Sta. 2+185/-25 m. Placement of a 0.5 m thick lift of fine filter over the coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 2+305 m to 2+460 m and from Sta. 1+980 m to 1+835 m.

NCIS-041 (2018-06-24), looking S from Sta. 1+220/-7 m. Placement of a 1.5 to 2 m thick (approx.) lift of UM rockfill from El. 148 m to El. 150 m (approx.) with a dozer from Sta. 1+197 m to 1+150 m (-7 m to -41 m).

NCIS-042 (2018-06-25), looking SE from Sta. 2+210/-27 m. Placement of a 0.5 m thick lift of fine filter over the coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 2+305 m to 2+040 m.

NCIS-043 (2018-06-25), looking N from Sta. 1+250/-38 m. Compaction of the 1.5 to 2 m lift (approx.) of ultramafic (UM) rockfill at El. 150 m with a 10-tonne smooth-drum compactor with vibration (6 passes) between the haul truck traffic lane and the upstream slope from Sta. 1+330 to 1+200 m (o.s. -53 to -24 m).

NCIS-044 (2018-06-25), looking S from Sta. 1+200/-19 m. Placement of a 1.5 to 2 m thick (approx.) lift of UM rockfill from El. 148 m to El. 150 m (approx.) with a dozer from Sta. 1+150 m to 1+120 m (-92 m to +10 m). The material is of good quality and is well graded.

NCIS-045 (2018-06-25), looking S from Sta. 2+760/-40 m. Profiling of the upstream slope (3H:1V) from El. 150 to 152 m with an excavator from Sta. 2+715 m to 2+825 m.

NCIS-046 (2018-06-26), looking SE from Sta. 2+680/-18 m. Removal of till material mixed with the UM rockfill of the capping (about 1 to 2 m thick along the slope) with an excavator from Sta. 2+760 m to 2+850 m (o.s. -35 to -17 m).

NCIS-047 (2018-06-26), looking N from Sta. 2+580/-35 m. Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 2+560 m to 2+640 m.

NCIS-048 (2018-06-26), looking SW from Sta. 1+120/-92 m. Placement of a 1.5 to 2 m thick (approx.) lift of UM rockfill from El. 148 m to El. 150 m (approx.) with a dozer from Sta. 1+125 m to 1+115 m (-92 m to -47 m).

NCIS-049 (2018-06-26), looking N from Sta. 2+870/-28 m. Removing of UM rockfill material from the capping with a dozer to level the surface to El. 150 m from Sta. 2+760 m to 2+850 m (o.s. -29 to -17 m).

NCIS-050 (2018-06-26), looking S from Sta. 1+230/-55 m. Compaction of the 1.5 to 2 m lift (approx.) of ultramafic (UM) rockfill at El. 150 m with a 10-tonne smooth-drum compactor with vibration (6 passes) between the haul truck traffic lane and the upstream slope from Sta. 1+220 to 1+130 m (o.s. -91 to -44 m).

NCIS-051 (2018-06-27), looking SE from Sta. 2+630/-34 m. Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 2+640 m to 2+815 m.

NCIS-052 (2018-06-27), looking SW from Sta. 1+120/-87 m. Placement of a 1.5 to 2 m thick (approx.) lift of UM rockfill from El. 148 m to El. 150 m (approx.) with a dozer from Sta. 1+115 m to 1+100 m (-107 m to -45 m).

NCIS-053 (2018-06-27), looking S from Sta. 2+840/-37 m. Removing of UM rockfill material from the capping with a dozer to level the surface to El. 152 m from Sta. 2+850 m to 2+980 m (o.s. -38 to -24 m).

NCIS-054 (2018-06-28), looking SE from Sta. 2+580/-31 m. Compaction of the 0.5 m lift (approx.) of coarse filter between El. 150 and 152 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 2+560 m to 2+815 m.

NCIS-055 (2018-06-28), looking NE from Sta. 1+730/-42 m. Placement of a 0.5 m thick lift of fine filter over the coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 1+820 m to 1+595 m.

NCIS-056 (2018-06-28), looking S from Sta. 1+290/-39 m. Profiling of the upstream slope (3H:1V) from El. 148 to 150 m with an excavator from Sta. 1+340 m to 1+130 m.

NCIS-057 (2018-06-28), looking SW from Sta. 3+010/-15 m. Removing of UM rockfill material from the capping with a dozer to level the surface to El. 152 m from Sta. 2+980 m to 3+050 m (o.s. -30 to -20 m).

NCIS-058 (2018-06-29), looking S from Sta. 1+340/-34 m. Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 148 m to 152 m with an excavator from Sta. 1+340 m to 1+270 m.

NCIS-059 (2018-06-29), looking S from Sta. 1+330/-34 m. Placement of a 1.5 to 2 m thick (approx.) lift of UM rockfill from El. 148 m to El. 150 m (approx.) with a dozer from Sta. 1+120 m to 1+100 m (-96 m to -60 m). The material is of good quality and is well graded.

NCIS-060 (2018-06-29), looking SW from Sta. 1+365/-35 m. Placement of a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+340 m to 1+320 m (-19 m to +16 m). The material is of good quality and is well graded.

NCIS-061 (2018-06-29), looking S from Sta. 1+365/-35 m. Compaction of the 0.5 m lift of coarse filter between El. 148 and 152 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 1+340 m to 1+270 m.

NCIS-062 (2018-06-29), looking N from Sta. 1+525/-33 m. Placement of a 0.5 m thick lift of fine filter over the coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 1+330 m to 1+260 m and from Sta. 1+595 m to 1+550 m.

NCIS-063 (2018-06-30), looking SW from Sta. 1+200/-65 m. Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 148 m to 150 m with an excavator from Sta. 1+270 m to 1+100 m.

NCIS-064 (2018-06-30), looking W from Sta. 1+200/-65 m. Placement of a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+320 m to 1+235 m (-65 m to -45 m). The material is of good quality and is well graded.

NCIS-065 (2018-06-30), looking NE from Sta. 1+140/-96 m. Compaction of the 0.5 m lift of coarse filter between El. 148 and 150 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 1+270 m to 1+100 m.

NCIS-066 (2018-06-30), looking N from Sta. 1+400/-34 m. Placement of a 0.5 m thick lift of fine filter over the coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 1+595 m to 1+550 m.

NCIS-067 (2018-07-01), looking N from Sta. 2+880/-26 m. Profiling of the upstream slope (3H:1V) from El. 150 to 152 m with an excavator from Sta. 2+860 m to 2+975 m.

NCIS-068 (2018-07-01), looking S from Sta. 1+150/-62 m. Placement of a 0.5 m thick lift of fine filter over the coarse filter in the upstream slope from El. 148 m to 150 m with an excavator from Sta. 1+180 m to 1+100 m.

NCIS-069 (2018-07-01), looking NW from Sta. 1+180/-56 m. Placement of a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+235 m to 1+160 m (-60 m to -44 m). The material is of good quality and is well graded.

NCIS-070 (2018-07-01), looking S from Sta. 1+160/-89 m. Compaction of the 0.5 m lift of fine filter between El. 150 and 152 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 1+335 m to 1+100 m.

NCIS-071 (2018-07-02), looking SE from Sta. 2+670/-28 m. Placement of a 0.5 m thick lift of fine filter over the coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 1+550 m to 1+320 m and 1+630 m to 1+610 m.

NCIS-072 (2018-07-02), looking W from Sta. 2+790/-38 m. Profiling of the upstream slope (3H:1V) from El. 150 to 152 m with an excavator from Sta. 2+975 m to 3+070 m.

NCIS-073 (2018-07-03), looking N from Sta. 1+300/-33 m. Placement of a 0.5 m thick lift of fine filter over the coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 1+320 m to 1+300 m.

NCIS-074 (2018-07-03), looking SE from Sta. 2+750/-37 m. Compaction of the 0.5 m lift (approx.) of fine filter between El. 150 and 152 m with a 10-tonne smooth-drum compactor (4 passes) in the upstream slope from Sta. 2+810 m to 2+095 m.

NCIS-075 (2018-07-03), looking S from Sta. 2+860/-36 m. Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 2+815 m to 2+980 m.

NCIS-076 (2018-07-04), looking SW from Sta. 2+940/-15 m. Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 2+980 m to 3+160 m.

NCIS-077 (2018-07-04), looking S from Sta. 1+310/-32 m. Profiling of the upstream slope (3H:1V) from El. 150 m to 152 m with an excavator from Sta. 1+300 m to 1+175 m and from 3+070 m to 3+160 m.

NCIS-078 (2018-07-05), looking S from Sta. 2+760/-39 m. Placement of a 0.5 m thick lift of fine filter over the coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 2+800 m to 2+980 m.

NCIS-079 (2018-07-05), looking SW from Sta. 1+280/-39 m. Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 1+300 m to 1+200 m.

NCIS-080 (2018-07-05), looking S from Sta. 2+800/-38 m. Compaction of the 0.5 m lift (approx.) of coarse filter between El. 150 and 152 m with a 10-tonne smooth-drum compactor (4 passes) in the upstream slope from Sta. 2+925 m to 3+160 m and from Sta. 1+300 m to 1+200 m.

NCIS-081 (2018-07-06), looking SE from Sta. 2+975/-37 m (approx.). Placement of a 0.5 m thick lift of fine filter over the coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 1+300 m to 1+210 m and from Sta. 2+940 m to 3+120 m.

NCIS-082 (2018-07-07), looking S from Sta. 3+060/-33 m. Placement of a 0.5 m thick lift of fine filter over the coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 3+120 m to 3+160 m.

NCIS-083 (2018-07-07), looking SW from Sta. 1+140/52 m. Placement of a 2 m thick (approx.) lift of IV rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+160 m to 1+170 m (-64 m to -111 m).

NCIS-084 (2018-07-08), looking E from Sta. 1+080/+47 m (approx.). Placement of a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+160 m to 1+130 m (-55 m to -102 m).

NCIS-085 (2018-07-09), looking SW from Sta. 1+150/-67 m (approx.). Placement of a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+130 m to 1+100 m (-55 m to -78 m).

NCIS-086 (2018-07-10), looking E from Sta. 2+750/+14 m (approx.). Placement of a 2 m thick (approx.) lift of UM rockfill from El. 152 m to El. 154 m (approx.) with a dozer from Sta. 2+780 m to 2+760 m (-60 m to -44 m).

NCIS-087 (2018-07-11), looking W from Sta. 1+950/-34 m (approx.). Compaction of the 0.5 m lift (approx.) of fine filter between El. 150 and 152 m with a 10-tonne smooth-drum compactor (4 passes) in the upstream slope from Sta. 2+000 m to 1+930 m.

NCIS-088 (2018-07-12), looking W from Sta. 2+000/-35 m (approx.). Compaction of the 0.5 m lift (approx.) of fine filter between El. 150 m and 152 m with a 10-tonne smooth-drum compactor (4 passes) in the upstream slope from Sta. 2+028 m to 1+650 m.

NCIS-089 (2018-07-12), looking S from Sta. 2+525/+4 m (approx.). Placement of a 2 m thick (approx.) lift of UM rockfill from El. 152 m to El. 154 m (approx.) with a dozer from Sta. 2+605 m to 2+455 m (+3 m to -23 m).

NCIS-090 (2018-07-13), looking SE from Sta. 2+440/-1 m (approx.). Placement of a 2 m thick (approx.) lift of UM rockfill from El. 152 m to El. 154 m (approx.) with a dozer from Sta. 2+455 m to 2+370 m (+4 m to -24 m).

NCIS-091 (2018-07-14), looking S from Sta. 2+330/+13 m (approx.). Placement of a 2 m thick (approx.) lift of UM rockfill from El. 152 m to El. 154 m (approx.) with a dozer from Sta. 2+370 m to 2+290 m (+9 m to -22 m).

NCIS-092 (2018-07-14), looking S from Sta. 1+160/-77 m (approx.). Profiling of the upstream slope (3H:1V) from El. 150 to 152 m with an excavator from Sta. 1+185 m to 1+135 m.

NCIS-093 (2018-07-15), looking S from Sta. 2+260/+12 m (approx.). Placement of a 2 m thick (approx.) lift of UM rockfill from El. 152 m to El. 154 m (approx.) with a dozer from Sta. 2+290 m to 2+280 m (+9 m to -22 m).

NCIS-094 (2018-07-15), looking SW from Sta. 1+125/-109 m (approx.). Profiling of the upstream slope (3H:1V) from El. 150 to 152 m with an excavator from Sta. 1+135 m to 1+115 m.

NCIS-095 (2018-07-16), looking S from Sta. 2+375/-18 m (approx.). Profiling of the upstream slope (3H:1V) from El. 152 to 154 m with an excavator from Sta. 2+545 m to 2+410 m.

NCIS-096 (2018-07-18), looking N from Sta. 2+355/+9 m (approx.). Placement of a 2 m thick (approx.) lift of UM rockfill from El. 152 m to El. 154 m (approx.) with a dozer from Sta. 2+190 m to 2+103 m (+7 m to -22 m).

NCIS-097 (2018-07-19), looking SW from Sta. 1+180/-75 m (approx.). Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 1+200 m to 1+113 m.

NCIS-098 (2018-07-19), looking E from Sta. 2+040/-9 m (approx.). Placement of a 2 m thick (approx.) lift of UM rockfill from El. 152 m to El. 154 m (approx.) with a dozer from Sta. 2+103 m to 1+984 m (+7 m to -22 m). The material is of good quality and is well graded.

NCIS-099 (2018-07-19), looking SE from Sta. 1+180/-76 m (approx.). Compaction of the 0.5 m lift (approx.) of coarse filter between El. 150 m and 152 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 1+200 m to 1+170 m.

NCIS-100 (2018-07-20), looking E from Sta. 1+960/+10 m (approx.). Placement of a 2 m thick (approx.) lift of UM rockfill from El. 152 m to El. 154 m (approx.) with a dozer from Sta. 1+984 m to 1+947 m (+14 m to -26 m). The material is of good quality and is well graded.

NCIS-101 (2018-07-20), looking N from Sta. 1+120/-89 m (approx.). Placement of a 0.5 m thick lift of fine filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 1+113 m to 1+205 m.

NCIS-102 (2018-07-20), looking W from Sta. 2+680/-21 m (approx.). Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 152 m to 154 m with an excavator from Sta. 2+575 m to 2+710 m and from Sta. 2+411 m to 2+460 m.

NCIS-103 (2018-07-20), looking NE from Sta. 2+420/-27 m (approx.). Profiling of the upstream slope (3H:1V) from El. 152 to 154 m with an excavator from Sta. 2+400 m to 2+410 m. Oversize boulders were removed.

NCIS-104 (2018-07-21), looking SE from Sta. 2+650/-23 m (approx.). Placement of a 0.5 m thick lift of fine filter in the upstream slope from El. 152 m to 154 m with an excavator from Sta. 2+710 m to 2+445 m.

NCIS-105 (2018-07-21), looking NW from Sta. 2+630/-34 m (approx.). Compaction of the 0.5 m lift (approx.) of coarse filter between El. 152 m and 154 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 2+710 m to 2+411 m.

NCIS-106 (2018-07-21), looking NW from Sta. 2+620/-35 m (approx.). Placement of a 2 m thick (approx.) lift of UM rockfill from El. 152 m to El. 154 m (approx.) with a dozer from Sta. 1+947 m to 1+863 m (+14 m to -26 m).

NCIS-107 (2018-07-21), looking S from Sta. 1+380/-38 m (approx.). Compaction of the 0.5 m lift (approx.) of fine filter between El. 150 m and 152 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 1+251 m to 1+660 m.

NCIS-108 (2018-07-22), looking N from Sta. 2+490/-32 m (approx.). Profiling of the upstream slope (3H:1V) from El. 152 to 154 m with an excavator from Sta. 2+159 m to 2+409 m.

NCIS-109 (2018-07-22), looking N from Sta. 2+450/-21 m (approx.). Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 152 m to 154 m with an excavator from Sta. 2+293 m to 2+411 m.

NCIS-110 (2018-07-23), looking N from Sta. 2+320/-22 m (approx.). Compaction of the 0.5 m lift (approx.) of coarse filter between El. 152 m and 154 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 2+293 m to 2+080 m.

NCIS-111 (2018-07-23), looking NW from Sta. 2+320/-22 m (approx.). Profiling of the upstream slope (3H:1V) from El. 152 to 154 m with an excavator from Sta. 2+159 m to 2+000 m and placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 152 m to 154 m with an excavator from Sta. 2+293 m to 2+080 m.

NCIS-112 (2018-07-24), looking N from Sta. 2+610/-29 m (approx.). Compaction of the 0.5 m lift (approx.) of coarse filter between El. 152 m and 154 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 2+080 m to 2+000 m.

NCIS-113 (2018-07-24), looking SW from Sta. 2+220/-26 m (approx.). Profiling of the upstream slope (3H:1V) from El. 152 to 154 m with an excavator from Sta. 2+000 m to 1+185 m and placement of a 0.5 m thick lift of fine filter in the upstream slope from El. 152 m to 154 m with an excavator from Sta. 2+300 m to 2+090 m.

NCIS-114 (2018-07-24), looking N from Sta. 1+700/-34 m (approx.). Excavation of a 0.8 m (approx.) deep, 1 m wide shallow ditch in the rockfill capping with an excavator from Sta. 1+500 m to 1+650 m.

NCIS-115 (2018-07-24), looking NE from Sta. 3+040/-33 m (approx.). Excavation of a 1 m (approx.) sump in the tailings with an excavator from Sta. 3+010 m to 3+030 m (o.s. +27 to +30 m).

NCIS-116 (2018-07-25), looking SE from Sta. 1+700/+37 m (approx.). Excavation of a 0.8 m (approx.) deep, 1 m wide shallow ditch in the rockfill capping with an excavator from Sta. 1+500 m to 1+455 m.

NCIS-117 (2018-07-25), looking SW from Sta. 2+050/-25 m (approx.). Placement of a 0.5 m thick lift of fine filter in the upstream slope from El. 152 m to 154 m with an excavator from Sta. 2+090 m to 1+890 m.

NCIS-118 (2018-07-25), looking S from Sta. 1+500/-37 m (approx.). View of a deposition point.

NCIS-119 (2018-07-26), looking N from Sta. 1+430/-22 m (approx.). Excavation of a 0.8 m (approx.) deep, 1 m wide shallow ditch in the rockfill capping with an excavator from Sta. 1+455 m to 1+400 m.

NCIS-120 (2018-07-26), looking NE from Sta. 1+830/-27 m (approx.). View of an accumulation of boulders on the upstream slope of the NCIS.

NCIS-121 (2018-07-26), looking NE from Sta. 3+050/+26 m (approx.). Placement of a 0.3 m thick (approx.) layer of till sieving reject material on the bottom and on the slopes of the sump.

NCIS-122 (2018-07-27), looking W from Sta. 1+960/-6 m (approx.). Placement of a 2 m thick (approx.) lift of UM rockfill from El. 152 m to El. 154 m (approx.) with a dozer from Sta. 1+830 m to 1+860 m (+8 m to -23 m).

NCIS-123 (2018-07-27), looking S from Sta. 3+340/+33 m (approx.). Excavation of a 1 m (approx.) deep sump (south sump) in the tailings with an excavator from Sta. 3+345 m to 3+365 m (o.s. +24 to +32 m).

NCIS-124 (2018-07-27), looking S from Sta. 3+340/+33 m (approx.). Placement of a 0.3 m thick (approx.) layer of till sieving reject material on the bottom and on the slopes of the south sump.

NCIS-125 (2018-07-27), looking NE from Sta. 3+050/+26 m (approx.). Corrections to the north sump: removal of approx. 0.5 m of tailing and till sieving reject material on the bottom of the excavation. The erosion protection material was replaced.

NCIS-126 (2018-07-27), looking W from Sta. 1+140/-98 m (approx.). Compaction of the 0.5 m lift (approx.) of fine filter between El. 150 m and 152 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 1+240 m to 1+100 m.

NCIS-127 (2018-07-28), looking SW from Sta. 1+470/+20 m (approx.). View of the culvert installed in the ditch at Sta. 1+460 m.

NCIS-128 (2018-07-28), looking NE from Sta. 1+680/-42 m (approx.). Placement of a 2 m thick (approx.) lift of UM rockfill from El. 152 m to El. 154 m (approx.) with a dozer from Sta. 1+830 m to 1+660 m (+8 m to -31 m) and profiling of the upstream slope (3H:1V) from El. 152 to 154 m with an excavator from Sta. 1+880 m to 1+780 m.

NCIS-129 (2018-07-28), looking S from Sta. 2+450/-21 m (approx.). Compaction of the 0.5 m lift (approx.) of fine filter between El. 152 m and 154 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 2+220 m to 1+940 m.

NCIS-130 (2018-07-28), looking S from Sta. 1+445/+16 m (approx.). Excavation of a 0.8 m (approx.) deep, 1 m wide shallow ditch in the rockfill capping with an excavator from Sta. 1+380 m to 1+300 m.

NCIS-131 (2018-07-29), looking W from Sta. 1+940/-20 m (approx.). Compaction of the 0.5 m lift (approx.) of coarse filter between El. 152 m and 154 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 1+890 m to 1+826 m.

NCIS-132 (2018-07-29), looking W from Sta. 1+940/-20 m (approx.). Profiling of the upstream slope (3H:1V) from El. 152 to 154 m with an excavator from Sta. 1+780 m to 1+660 m.

NCIS-133 (2018-07-29), looking W from Sta. 1+820/-28 m (approx.). Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 152 m to 154 m with an excavator from Sta. 1+890 m to 1+826 m.

NCIS-134 (2018-07-30), looking NE from Sta. 1+630/-32 m (approx.). Completion of the profiling of the upstream slope (3H:1V) from El. 152 to 154 m with an excavator from Sta. 1+700 m to 1+660 m.

NCIS-135 (2018-07-30), looking SW from Sta. 1+860/-12 m (approx.). Placement of a 0.5 m thick lift of fine filter in the upstream slope from El. 152 m to 154 m with an excavator from Sta. 1+830 m to 1+700 m.

NCIS-136 (2018-07-31), looking SW from Sta. 1+800/-33 m (approx.). Placement of a 0.5 m thick lift of fine filter in the upstream slope from El. 152 m to 154 m with an excavator from Sta. 1+700 m to 1+660 m.

NCIS-137 (2018-07-31), looking SW from Sta. 1+380/+14 m (approx.). Excavation of a 0.8 m (approx.) deep, 1 m wide shallow ditch in the tailings with an excavator from Sta. 1+300 m to 1+200 m.

NCIS-138 (2018-08-01), looking SW from Sta. 1+365/+15 m (approx.). Excavation of a 0.8 m (approx.) deep, 1 m wide shallow ditch in the tailings and placement of a 0.3 m thick (approx.) layer of till sieving reject material on the bottom and on the slopes of the ditch from Sta. 1+200 m to 1+100 m.

APPENDIX C-3

North Cell Internal Structure Construction Photographs

CD-1796 (2018-04-23), looking N from Sta. 0+650/-28 m. Damaged geomembrane near a deposition finger on Central Dike.

CD-1797 (2018-04-23), looking N from Sta. 0+380/-20 m. Placement a 2 m thick (approx.) lift of intermediate volcanic rockfill from El. 143 m to El. 145 m from 0+250 to 0+400 m (o.s. -28 to -18 m).

CD-1798 (2018-04-24), looking N from Sta. 0+500/-15 m. Placement a 2 m thick (approx.) lift of intermediate volcanic rockfill from El. 143 m to El. 145 m from 0+340 to 0+435 m (o.s. -28 to -18 m).

CD-1799 (2018-04-24), looking S from Sta. 0+080/-25 m. Placement a 2 m thick (approx.) lift of intermediate volcanic rockfill from El. 143 m to El. 145 m from 0+340 to 0+435 m (o.s. -28 to -18 m).

CD-1800 (2018-04-25), looking N from Sta. 0+500/-14 m. Placement a 2 m thick (approx.) lift of intermediate volcanic (IV) rockfill from El. 143 m to El. 145 m from 0+435 to 0+535m (o.s. -28 to -18 m).

CD-1801 (2018-04-26), looking N from Sta. 0+650/-10 m. Placement a 2 m thick (approx.) lift of intermediate volcanic (IV) rockfill from El. 143 m to El. 145 m from 0+535 to 0+625m (o.s. -28 to -18 m).

CD-1802 (2018-04-27), looking N from Sta. 0+770/-16 m. Placement a 2 m thick (approx.) lift of intermediate volcanic (IV) rockfill from El. 143 m to El. 145 m from approx. Sta. 0+625 to 0+710 m (o.s. -28 to -18 m).

CD-1803 (2018-04-27), looking NE from Sta. 40+750/+27 m. Removal of snow to expose the foundation bedrock with an excavator between approx. Sta. 40+780 and 40+800 m (o.s. 7 to 10 m).

CD-1804 (2018-04-28), looking S from Sta. 40+790/-2 m. Presence of oversize boulders on the existing slope at the junction between SD5 and Central Dike.

CD-1805 (2018-04-28), looking NE from Sta. 40+780/+2 m. Placement a 1.5 m thick (approx.) lift of intermediate volcanic (IV) rockfill from approx. Sta. 40+780 to 40+805 m (o.s. -6 to 9 m).

CD-1806 (2018-04-28), looking N from Sta. 0+800/-27 m. Placement a 2 m thick (approx.) lift of intermediate volcanic (IV) rockfill from El. 143 m to El. 145 m from approx. Sta. 0+710 to 0+760m (o.s. -28 to 3 m).

CD-1807 (2018-04-28), looking S from Sta. 0+200/-15 m. Compaction of the 2 m lift (approx.) of IV rockfill with a 10-tonne smooth-drum compactor with vibration (6 passes) from Sta. 0+150 to 0+280 m (o.s. -21 to 11 m).

CD-1808 (2018-04-28), looking E from Sta. 40+790/-14 m. Placement a 2 m thick (approx.) lift of intermediate volcanic (IV) rockfill from approx. Sta. 40+780 to 40+805 m (o.s. -6 to 9 m).

CD-1809 (2018-04-29), looking N from Sta. 0+870/-16 m. Placement a 2 m thick (approx.) lift of intermediate volcanic (IV) rockfill from El. 143 m to El. 145 m from approx. Sta. 0+760 to 0+835 m (o.s. -28 to 3 m).

CD-1810 (2018-04-30), looking S from Sta. 0+335/-15 m. Compaction of the 2 m lift (approx.) of IV rockfill at El. 145 m with a 10-tonne smooth-drum compactor with vibration (6 passes) from Sta. 0+350 to 0+540 m (o.s. -19 to -7 m).

CD-1811 (2018-04-30), looking SE from Sta. 0+985/-11 m. Placement the second, third, fourth and fifth 1 m thick (approx.) lifts of intermediate volcanic (IV) rockfill from approx. Sta. 0+985 to 40+780 m (o.s. -8 to 8 m) with the excavator.

CD-1812 (2018-04-30), looking SE from Sta. 0+985/-11 m. Placement of intermediate volcanic (IV) rockfill on the existing downstream slope up to approx. El. 140 m, from approx. Sta. 0+985 to 40+780 m.

CD-1813 (2018-05-01), looking S from Sta. 0+980/-2 m. Placement of intermediate volcanic (IV) rockfill on the existing downstream slope up to approx. El. 143 m, from approx. Sta. 0+980 to 40+780 m.

CD-1814 (2018-05-01), looking NE from Sta. 0+970/-10 m. Placement of intermediate volcanic (IV) rockfill around the instruments at approx. Sta. 0+830 m with the excavator.

CD-1815 (2018-05-02), looking S from Sta. 0+920/-25 m. Placement of a 2 m thick (approx.) lift of intermediate volcanic (IV) rockfill from El. 143 m to El. 145 m from approx. Sta. 40+740 to 0+980 m (o.s. -28 to -11 m).

CD-1816 (2018-05-02), looking S from Sta. 0+175/-27 m. Profiling of the upstream slope (2H:1V) from El. 143 to 145 m with an excavator between Sta. 0+175 and 0+560 m.

CD-1817 (2018-05-02), looking NE from Sta. 40+700/-10 m. View of the rockfill lift thickness at the junction of Saddle Dam 5 and Central Dike, approx. 2.5 m thick..

CD-1818 (2018-05-03), looking NE from Sta. 40+770/-25 m. Placement of a 2 m thick (approx.) lift of intermediate volcanic (IV) rockfill from El. 143 m to El. 145 m from approx. Sta. 0+980 m to 0+880 m (o.s. -28 to -11 m).

CD-1819 (2018-05-03), looking S from Sta. 0+560/-21 m. Profiling of the upstream slope (2H:1V) from El. 143 to 145 m with an excavator between Sta. 0+560 m and 0+830 m.

CD-1820 (2018-05-04), looking S from Sta. 0+790/-7 m. Placement of a 2 m thick (approx.) lift of intermediate volcanic (IV) rockfill from El. 143 m to El. 145 m from approx. Sta. 0+880 m to 0+830 m (o.s. -28 to -11 m).

CD-1821 (2018-05-04), looking S from Sta. 0+175/+3 m. Profiling of the downstream slope (1.5H:1V) from El. 143 to 145 m with an excavator between Sta. 0+250 m and 0+330 m.

CD-1822 (2018-05-04), looking N from Sta. 40+725/+7 m. Placement of two 2 m thick lifts of IV rockfill from El. 141 m to El. 145 m from approx. Sta. 40+720 m to 40+750 m (o.s. -10 to +10 m) and profiling of the upstream slope (2H:1V) from El. 143 to 145 m with an excavator between Sta. 0+830 m and 0+980 m.

CD-1823 (2018-05-04), looking NE from Sta. 40+725/+8 m. Compaction of the two 2 m lifts (approx.) of intermediate volcanic (IV) rockfill at El. 143 and at El. 145 m with a 10-tonne smooth-drum compactor with vibration (6 passes) from Sta. 40+720 m to 40+750 m (o.s. -10 to +10 m).

CD-1824 (2018-05-05), looking NE from Sta. 40+760/-25 m. Profiling of the upstream slope (2H:1V) from El. 143 to 145 m with an excavator between Sta. 0+830 m and 40+730 m.

CD-1825 (2018-05-05), looking S from Sta. 0+430/+9 m. Profiling of the downstream slope (1.5H:1V) from El. 143 to 145 m with an excavator between Sta. 0+330 m and 0+440 m and between Sta. 0+530 m and 0+745 m.

CD-1826 (2018-05-06), looking NE from Sta. 40+770/-27 m. Placement of a 0.5 m thick lift of coarse filter from El. 143 m to 143.5 m with an excavator from Sta. 40+730 m to 0+ 775 m.

CD-1827 (2018-05-06), looking SW from Sta. 0+940/-16 m. Placement of a 0.5 m thick lift of fine filter from El. 143 m to 143.5 m with an excavator from Sta. 40+730 m to 0+ 835 m.

CD-1828 (2018-05-06), looking N from Sta. 0+410/-22 m. Defrosting of the deposition point finger materials with two Frost Fighters at Sta. 0+390 m.

CD-1829 (2018-05-06), looking N from Sta. 0+340/-24 m. Placement of a 0.5 m thick lift of coarse filter from El. 143 m to 143.5 m with an excavator from Sta. 0+170 m to 0+460 m and placement of a 0.5 m thick lift of fine filter from Sta. 0+170 m to 0+380 m.

CD-1830 (2018-05-07), looking N from Sta. 0+420/-26 m. Removal of the deposition finger materials with an excavator at Sta. 0+390 m.

CD-1831 (2018-05-07), looking NE from Sta. 40+730/-24 m. Compaction of the 0.5 m lift (approx.) of fine and coarse filters material at El. 143.5 m with a 10-tonne smooth-drum compactor with vibration (6 passes) from Sta. 40+730 to 0+830 m.

CD-1832 (2018-05-07), looking N from Sta. 0+280/-25 m. Placement of a second 0.5 m thick lift of coarse filter from El. 143.5 m to 144 m with an excavator from Sta. 0+175 m to 0+280 m.

CD-1833 (2018-05-07), looking S from Sta. 0+390/-25 m. Damaged geomembrane near a deposition finger on Central Dike at Sta. 0+390 m.

CD-1834 (2018-05-08), looking NE from Sta. 40+760/-23 m. Placement of a first 0.5 m thick lift of coarse filter from El. 143 m to 143.5 m on length of approx. 5 m with an excavator at the location of the deposition finger at Sta 0+520 m and 0+660 m.

CD-1835 (2018-05-08), looking N from Sta. 0+830/-20 m. Compaction of the first 0.5 m lift (approx.) of fine and coarse filters material at El. 143.5 m with a 10-tonne smooth-drum compactor with vibration (6 passes) from Sta 0+490 m to 0+835 m.

CD-1836 (2018-05-08), looking N from Sta. 0+580/-18 m. Placement of a first 0.5 m thick lift of fine filter from El. 143 m to 143.5 m upstream of the coarse filter with an excavator from Sta. 0+490 m to 0+835 m.

CD-1837 (2018-05-08), looking N from Sta. 0+940/-25 m. Placement of a second 0.5 m thick lift of coarse filter from El. 143.5 m to 144 m with an excavator from Sta. 0+290 m to 0+500 and from Sta. 0+835 m to 0+930 m.

CD-1838 (2018-05-09), looking NE from Sta. 40+750/-31 m. Placement of a second 0.5 m thick lift of fine filter from El. 143.5 m to 144 m upstream of the coarse filter with an excavator from Sta. 0+500 m to 0+835 m and from 0+930 to 40+730 m.

CD-1839 (2018-05-09), looking N from Sta. 0+835/-20 m. Placement of a second 0.5 m thick lift of coarse filter from El. 143.5 m to 144 m with an excavator from Sta. 0+500 m to 0+835 m and from 0+930 to 40+730 m.

CD-1840 (2018-05-09), looking NW from Sta. 0+575/-15 m. Compaction of the second 0.5 m lift (approx.) of fine and coarse filters material at El. 144 m with a 10-tonne smooth-drum compactor with vibration (4 passes) from Sta 0+500 m to 40+730 m.

CD-1841 (2018-05-10), looking N from Sta. 0+475/-14 m. Placement of a third 0.5 m thick lift of coarse filter from El. 144 m to 144.5 m with an excavator from Sta. 0+335 m to 40+730 m.

CD-1842 (2018-05-10), looking S from Sta. 0+380/-16 m. Placement of a third 0.5 m thick lift of fine filter from El. 143.5 m to 144 m upstream of the coarse filter with an excavator from Sta. 0+335 m to 0+940 m.

CD-1843 (2018-05-10), looking S from Sta. 0+460/-23 m. Compaction of the third 0.5 m lift (approx.) of fine and coarse filters material at El. 144.5 m with a 10-tonne smooth-drum compactor with vibration (4 passes) from Sta 0+335m to 0+900 m.

CD-1844 (2018-05-11), looking SE from Sta. 0+080/-49 m. Placement of a fourth 0.5 m thick lift of coarse filter from El. 144.5 m to 145 m with an excavator from Sta. 0+170 m to 40+730 m.

CD-1845 (2018-05-11), looking N from Sta. 0+660/-20 m. Profiling of the upstream slope (2H:1V) from El. 143 to 145 m with an excavator between Sta. 0+175 and 0+330 m and between Sta. 0+600 m and 0+715 m.

CD-1846 (2018-05-12), looking N from Sta. 0+835/-25 m. Profiling of the upstream slope (2H:1V) from El. 143 to 145 m with an excavator between Sta. 0+330 and 0+600 m and between Sta. 0+715 m and 40+730 m.

CD-1847 (2018-05-12), looking SE from Sta. 0+085/-48 m. Compaction of the fourth 0.5 m lift (approx.) of fine and coarse filters material at El. 145 m with a 10-tonne smooth-drum compactor with vibration (4 passes) from Sta 0+170 m to 0+930 m.

CD-1848 (2018-05-13), looking N from Sta. 40+780/-15 m. Compaction of the fourth 0.5 m lift (approx.) of fine and coarse filters material at El. 145 m with a 10-tonne smooth-drum compactor with vibration (4 passes) from Sta 0+930 m to 40+730 m.

CD-1849 (2018-05-13), looking NE from Sta. 40+750/-17 m. Final rolling of the upstream slope in view of the LLDPE geomembrane installation from Sta. 0+170 m to 40+730 m.

CD-1850 (2018-05-13), looking SW from Sta. 0+160/+20 m. Profiling of the downstream slope (1.5H:1V) from El. 143 to 145 m with an excavator between Sta. 0+440 m and 0+530 m and between Sta. 0+745 m and 0+835 m.

CD-1851 (2018-05-13), looking S from Sta. 0+910/-18 m. Excavation of the LLDPE geomembrane crest anchoring trench from Sta. 40+730 m to 0+830 m.

CD-1852 (2018-05-14), looking N from Sta. 0+500/-25 m. Excavation of the LLDPE geomembrane crest anchoring trench from Sta. 0+830 m to 0+170 m.

CD-1853 (2018-05-14), looking S from Sta. 0+850/+3 m. Profiling of the downstream slope (1.5H:1V) from El. 143 to 145 m with an excavator between Sta. 0+835 m and 0+940.

CD-1854 (2018-05-15), looking N from Sta. 0+860/-13 m. Profiling of the downstream slope (1.5H:1V) from El. 143 to 145 m with an excavator between Sta. 0+940 m and 0+990 m.

CD-1855 (2018-05-16), looking S from Sta. 0+230/-22 m. Clean-up of the existing LLDPE with pressurized air stream in preparation for liner installation between Sta. 0+170 m and 40+780 m3.

CD-1856 (2018-05-18), looking N from Sta. 0+670/-24 m. Clean-up of the fine filter placed against the slope at the deposition finger at approx. Sta. 0+670 m with pressurized air stream to expose 1 m of LLDPE liner, in preparation for the new liner installation.

CD-1857 (2018-05-21), looking N from Sta. 0+700/-20 m. Snow removal in the anchoring trench with an excavator between Sta. 0+170 m and 40+780 m.

CD-1858 (2018-05-21), looking S from Sta. 0+970/-45 m. View of the bottom of the fine filter upstream slope. Some material is missing to achieve a smooth slope.

CD-1859 (2018-05-22), looking SW from Sta. 40+780/-38 m. Installation of the geotextile on the upstream slope 3H:1V (SD5 side) to 2H:1V (Central Dike side) between El. 143 m and 145 m from Sta. 40+640 m to 0+830 m.

CD-1860 (2018-05-23), looking N from Sta. 0+790/-26 m. Installation of the geotextile on the upstream slope 2H:1V between El. 143 m and 145 m from Sta. 0+830 m to 0+750 m.

CD-1861 (2018-05-24), looking NE from Sta. 40+680/-8 m. Installation of the LLDPE liner on the upstream slope 3H:1V (SD5 side) to 2H:1V (Central Dike side) between El. 143 m and 145 m from Sta. 40+680 m to 0+950 m (panel numbers 802 to 817).

CD-1862 (2018-05-24), looking from Sta. 40+960/-24 m. View of an air channel test.

CD-1863 (2018-05-24), looking SW from Sta. 40+750/-18 m. Backfilling of the geosynthetics tie-in from Sta. 40+680 m to 0+950 m.

CD-1864 (2018-05-25), looking from Sta. 40+700/-38 m. View of bubbles formed in the extrusion weld because of humidity.

CD-1865 (2018-05-25), looking NW from Sta. 40+740/-35 m. Repairs on the extrusion fillet seam at the bottom of the LLDPE liner panels between Sta. 40+680 m and 0+950 m, on panels 802 to 807, and 811 to 813.

CD-1866 (2018-05-25), looking NW from Sta. 0+940/-25 m. Installation of the LLDPE liner on the upstream slope 2H:1V between El. 143 m and 145 m from Sta. 0+950 m to 0+935 m (panel numbers 818 and 819).

CD-1867 (2018-05-25), looking E from Sta. 40+680/-37 m. View of repair patches on the extrusion weld at the bottom of the panels.

CD-1868 (2018-05-27), looking S from Sta. 0+915/-24 m. Removal of the wet geotextile in place from Sta. 0+935 m to 0+900 m.

CD-1869 (2018-05-27), looking W from Sta. 0+915/-30 m. Installation of the geotextile on the upstream slope 2H:1V between El. 143 m and 145 m from Sta. 0+935 m to 0+900 m.

CD-1870 (2018-05-27), looking S from Sta. 0+900/-26 m. Installation of the LLDPE liner on the upstream slope 2H:1V between El. 143 m and 145 m from Sta. 0+935 m to 0+900 m (panel numbers 820 to 823).

CD-1871 (2018-05-28), looking N from Sta. 0+910/-25 m. Installation of the geotextile on the upstream slope 2H:1V between El. 143 m and 145 m from Sta. 0+900 m to 0+870 m.

CD-1872 (2018-05-28), looking N from Sta. 0+900/-24 m. Installation of the LLDPE liner on the upstream slope 2H:1V between El. 143 m and 145 m from Sta. 0+900 m to 0+760 m (panel numbers 824 to 844).

CD-1873 (2018-05-29), looking N from Sta. 0+760/-26 m. Installation of the geotextile on the upstream slope 2H:1V between El. 143 m and 145 m from Sta. 0+760 m to 0+740 m.

CD-1874 (2018-05-29), looking N from Sta. 0+760/-26 m. Installation of the LLDPE liner on the upstream slope 2H:1V between El. 143 m and 145 m from Sta. 0+760 m to 0+740 m (panel numbers 845 to 848).

CD-1875 (2018-05-30), looking N from Sta. 0+835/-26 m. View of a vacuum box testing.

CD-1876 (2018-05-30), looking N from Sta. 0+820/-26 m. View of repair patches on the extrusion weld at the bottom of the panel 838.

CD-1877 (2018-06-01), looking N from Sta. 0+745/-22 m. Installation of the geotextile on the upstream slope 2H:1V between El. 143 m and 145 m from Sta. 0+740 m to 0+610 m.

CD-1878 (2018-06-01), looking N from Sta. 0+720/-22 m. Installation of the LLDPE liner on the upstream slope 2H:1V between El. 143 m and 145 m from Sta. 0+740 m to 0+610 m (panel numbers 849 to 867).

CD-1879 (2018-06-01), looking N from Sta. 0+735/-28 m. View of the repaired holes on panel 850.

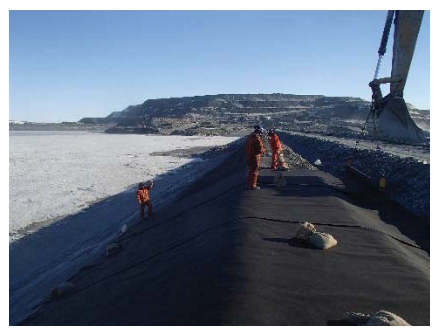
CD-1880 (2018-06-02), looking N from Sta. 0+600/-25 m. Installation of the geotextile on the upstream slope 2H:1V between El. 143 m and 145 m from Sta. 0+610 m to 0+480 m.

CD-1881 (2018-06-02), looking N from Sta. 0+530/-27 m. View of a geotextile panel with a horizontal weld in the slope at Sta. 0+520 m before its removal.

CD-1882 (2018-06-02), looking S from Sta. 0+510/-25 m. View of the emplacement of the geotextile panel with a horizontal weld in the slope at Sta. 0+520 following its removal.

CD-1883 (2018-06-02), looking N from Sta. 0+525/-26 m. Installation of the LLDPE liner on the upstream slope 2H:1V between El. 143 m and 145 m from Sta. 0+610 m to 0+480 m (panel numbers 868 to 886).

CD-1884 (2018-06-02), looking S from Sta. 0+530/-25 m. Backfilling of the geosynthetics tie-in from Sta. 0+610 m to 0+480 m and compaction of the tie-in material with a 10-tonne smooth-drum compactor with vibration (4 passes) from Sta.0+610 to 0+480 m.



CD-1885 (2018-06-03), looking N from Sta. 0+460/-26 m. Installation of the geotextile on the upstream slope 2H:1V between El. 143 m and 145 m from Sta. 0+480m to 0+320 m. compactor with vibration (4 passes) from Sta.0+610 to 0+480 m.

CD-1886 (2018-06-03), looking N from Sta. 0+485/-26 m. Installation of the LLDPE liner on the upstream slope 2H:1V between El. 143 m and 145 m from Sta. 0+480 m to 0+320 m (panel numbers 887 to 910).

CD-1887 (2018-06-04), looking N from Sta. 0+310/-26 m. Installation of the geotextile on the upstream slope 2H:1V between El. 143 m and 145 m from Sta. 0+320m to 0+160 m.

CD-1888 (2018-06-04), looking N from Sta. 0+325/-26 m. Installation of the LLDPE liner on the upstream slope 2H:1V between El. 143 m and 145 m from Sta. 0+320 m to 0+160 m (panel numbers 911 to 910).

CD-1889 (2018-06-04), looking N from Sta. 0+150/-28 m. View of the underlying liner that has been cut at around Sta. 0+160 m to drain the water.

CD-1890 (2018-06-05), looking N from Sta. 0+310/-26 m. View of the extrusion welding.

CD-1891 (2018-06-05), looking NE from Sta. 0+960/-28 m. View of leaking extrusion fillet seams before their repair on panel 816 and 818.

CD-1892 (2018-06-06), looking S from Sta. 0+155/-32 m. View of the liner panel 933 overlapping the underlying liner that has been cut at around Sta. 0+160 m to drain the water.

CD-1893 (2018-06-06), looking SW from Sta. 0+950/-27 m. View of repair patches on the extrusion weld at the bottom of the panels 803, 807, 808, 810, 814, 815, 816 and 818.

CD-1894 (2018-06-10), looking W from Sta. 0+800/-28 m. View of a block in direct contact with the LLDPE liner following the construction of the deposition fingers on Central Dike.

CD-1895 (2018-06-11), looking E from Sta. 40+670/-15 m. Compaction of the geosynthetics tie-in material at El. 145 m with a 10-tonne smooth-drum compactor with vibration (4 passes) from Sta. 40+670 m to 0+950 m.

CD-1896 (2018-07-22), looking S from Sta. 0+140/-30 m. Placement of 0.5 m thick layers of compacted sieved till and fine filter on the upstream slope of Central Dike with an excavator from Sta. 0+147 m to 0+177 m.

CD-1897 (2018-07-22), looking NW from Sta. 0+145/-30 m. Placement of a 0.5 m thick lift of coarse filter on the top of the fine filter on the top of the upstream toe liner tie-in and on the upstream slope with an excavator from Sta. 0+147 m to 0+177 m.

CD-1898 (2018-07-22), looking W from Sta. 0+145/-30 m. Compaction of the 0.5 m thick lift of coarse filter on the top of the fine filter on the top of the upstream toe liner tie-in and on the upstream slope with a 10 tonne smooth-drum compactor with vibration (4 passes) from Sta. 0+147 m to 0+177 m.

CD-1899 (2018-07-22), looking S from Sta. 0+140/-33 m. View of Central Dike at the end of the 2018 construction phase.

APPENDIX D

Construction Meeting Minutes

DAILY CONSTRUCTION MEETING

CENTRAL DIKE

AGNICO EAGLE
MEADOWBANK

Date: 4/23/2018

Time: 8:00

Presents:

AEM: Pier-Éric McDonal, Olivier Jacques

SANA: Luc Blanchette, Sabin Larouche, Jeannot Gagnon, Dany Pageau

QA:

QC:

Health & Safety:

A Switch Channel Sign from PORT OP to MBDYKES on one side and MBDYKES to PORT OP on the other side was installed at the entrance of central dike south access.

AEM advise Sana that the heavy equipments need to have their windows and doors close at all time. Dust Prevention

Daily Advance:

SANA:

Sana started the rockfill yesterday from the North. One Haul Truck 777 (HTR6) at the start of the shift and we put another Haul Truck 777 (HTR14) at 14h00 PM.

Loading Unit SANA WA-600. Placement Unit = Sana D8T

No survey this morning, he went on Amaruq Road. Wenco Quantities = 67 Loads for 5 829 T.

AEM ask Sana if it's possible to have chainage progression at the morning meeting with the Dozer GPS.

QA:

OWNER:

General Planning/Comments:

SANA:

QA:

QA will arrive on-site today.

OWNER:

Report By: Olivier Jacques, Dike Supervisor

DAILY CONSTRUCTION MEETING

CENTRAL DIKE

Date: **4/24/2018**

Time: **8:00**

Presents:

AEM: Pier-Éric McDonal, Olivier Jacques

SANA: Pierre Gauthier, Sabin Larouche, Dany Pageau

QA: Marion Habersetzer

QC: Cédrick Fillion-Tremblay

Health & Safety:

Reminder to all personnel working on central dike to give blast clearance to the Drill & Blast Supervisor

AEM ask Sana to lower the snowbank at the central dike north entrance to increase light vehicule visibility for Haul truck

Reminder it is strickly forbidden to pass on the LLDPE liner with pick-up trucks

Daily Advance:

SANA:

Rockfill : 2 Haul truck HTR6 and HTR14, Wenco - 73 Loads = 6351 T. = +/- 3 300 m3

Rockfill Progression : Station - 0+255 @ 0+342 = 87m

QA:

OWNER:

General Planning/Comments***:***

SANA:

QA:

Granulometry test on Fine and Coarse Filter

Coarse Filter : Stockpile = 1 / 5000 m3, Placement 1 / 5000 m3 = 2 tests for central dike construction

Fine Filter : Stockpile = 1 / 5000 m3, Placement 1 / 2000 m3 = 3 tests for central dike construction

OWNER:

Report By: **Olivier Jacques, Dike Supervisor**

DAILY CONSTRUCTION MEETING

CENTRAL DIKE

Date: 4/25/2018

Time: 8:00

Presents:

AEM: Pier-Éric McDonal, Olivier Jacques

SANA: Pierre Gauthier, Sabin Larouche, Dany Pageau, Christopher Gilbert

QA: Marion Habersetzer

QC: Cédrick Fillion-Tremblay

Health & Safety:

AEM do a reminder that when working on central dike to use MBDYKES channel and when working on foot around heavy equipment to have a portable radio at all time.

Make sure this information is transmited to new workers arriving on-site

Daily Advance:

SANA:

Rockfill : 2 Haul truck HTR8 and HTR14, Wenco - 79 Loads = 6873 T. = +/- 3 700 m3

Rockfill Progression : Station - 0+342 @ 0+436 = 94m

QA:

OWNER:

General Planning/Comments:

SANA:

QA:

Granulometry Sample on Fine and Coarse Filter stockpile scheduled at 9h00 AM this morning.

OWNER:

Site Service compactor scheduled to be used for rockfill compaction next Friday

AEM confirms Sana to planned the footprint correction on downstream between station 0+965 @ 1+060. A specific backfill method to be planned by AEM and QA/QC.

Report By: Olivier Jacques, Dike Supervisor

DAILY CONSTRUCTION MEETING

CENTRAL DIKE

Date: 4/26/2018

Time: 8:00

Presents:

AEM: Pier-Éric McDonal, Olivier Jacques

SANA: Pierre Gauthier, Sabin Larouche, Christopher Gilbert

QA: Marion Habersetzer

QC: Cédrick Fillion-Tremblay

Health & Safety:

A lot of dust coming up from the north cell tailing yesterday was noticed and affected the visibility on the dike. To be monitored by the supervisors and the haul truck drivers.

Daily Advance:

SANA:

Rockfill : 2 Haul truck HTR8 and HTR14, Wenco - 82 Loads = 7134 T. = +/- 3 850 m3

Rockfill Progression : Station - 0+436 @ 0+534 = 98m

QA:

Samples on the coarse and fine filter stockpile done yesterday with the Sana loader.

OWNER:

General Planning/Comments*:*

SANA:

QA:

Stockpile granulometry results will be finished today.

OWNER:

Compaction planned for tomorrow.

An excavator is planned tomorrow to remove snow to expose the foundation between 0+965 @ 1+060. The dike footprint was done for elevation 143 instead of 145m.

Report By: Olivier Jacques, Dike Supervisor

DAILY CONSTRUCTION MEETING

CENTRAL DIKE

Date: 4/27/2018

Time: 8:00

Presents:

AEM: Pier-Éric McDonal, Olivier Jacques

SANA: Pierre Gauthier, Sabin Larouche, Serge Lalancette, Christopher Gilbert

QA: Marion Habersetzer

QC: Cédrick Fillion-Tremblay

Health & Safety:

AEM do a reminder **AGAIN** that when working on central dike to use MBDYKES channel and when working on foot around heavy equipment to have a portable radio at all time.

Make sure this information is transmited to new workers arriving on-site

A wolf was observed yesterday at the west road and vault intersection. Make sure to advise Environment department of any wildlife observed on the mining site.

Daily Advance:

SANA:

Rockfill : 2 Haul truck HTR8 and HTR14, Wenco - 82 Loads = 7134 T. = +/- 3 850 m3

Rockfill Progression : Station - 0+534 @ 0+624 = 90m

QA:

QA/QC will send the results of the granulometries on coarse and fine filter stockpiles tomorrow or after tomorrow.

OWNER:

General Planning/Comments:

SANA:

Sana is planning to start the downstream and upstream sloping next Monday. A backhoe operator is scheduled to arrived on-site Monday for this activity.

QA:

OWNER:

CPT01 is ready to use and it is parked at the north central dike end. The compaction is postponed to Sunday. We will continue backfilling from the north until we arrived at the first instrumental posts. The width between the upper slope and the instrumental post is around 8 meters. This will not impact significantly the production and it is safer to proceed like this.

The snow removal and foundation cleaning for the footprint correction on downstream between station 0+965 @ 1+060 will be done today.

Report By: Olivier Jacques, Dike Supervisor

DAILY CONSTRUCTION MEETING

CENTRAL DIKE

Date: 4/28/2018

Time: 8:00

Presents:

AEM: Pier-Éric McDonal, Olivier Jacques, Alexandre Lavallée

SANA: Pierre Gautier, Sabin Larouche

QA: Marion Habersetzer

QC: Cédrick Fillion-Tremblay

Health & Safety:

Radio call when entering by the north entrance for haul truck drivers.

Wildlife activity (wolf, caribous and wolverine) was reported yesterday on Vault Road. Advise Mine Dispatch or Environment Dept.

Daily Advance:

SANA:

Rockfill : 2 Haul truck HTR8 and HTR14, Wenco - 70 Loads = 6061 T. = +/- 3 150 m3

Rockfill Progression : Station - 0+624 @ 0+710 = 86m

QA:

QA/QC will send the results of the granulometries on coarse and fine filter stockpiles today.

Foundation approval footprint elv. 145 between 0+965 @ 1+060 downstream to be done today.

OWNER:

General Planning/Comments*:*

SANA:

Rockfill footprint elv. 145 between 0+965 @ 1+060 is planned for tomorrow. Only one haul truck will be required.

QA:

OWNER:

Report By: Olivier Jacques, Dike Supervisor

DAILY CONSTRUCTION MEETING

CENTRAL DIKE

Date: **4/29/2018**

Time: **8:00**

Presents:

AEM: Pier-Éric McDonal, Olivier Jacques, Alexandre Lavallée

SANA: Pierre Gautier, Sabin Larouche, Serge Lalancette

QA: Marion Habersetzer

QC: Cédrick Fillion-Tremblay

Health & Safety:

Nothing to report

Wildlife activity (wolverine) around Vault Road and West Road.

Daily Advance:

SANA:

Rockfill : 2 Haul truck HTR6 and HTR14, Wenco - 61 Loads = 5307 T. = +/- 2745 m3

Rockfill Progression : Station - 0+710 @ 0+761 = 51m

14 loads for the footprint 143-145m between 0+965@1+060 and the access ramp. - 47 loads rockfill between 0+710 @ 0+761

QA:

Granulometries on coarse and fine filter stockpiles by QC are compliant. Analysis reports were sent yesterday.

Foundation approval footprint elv. 145 between 0+965 @ 1+060 downstream done yesterday. QA asked to revised the survey drawing from Sana, to be done shortly.

OWNER:

General Planning/Comments*:*

SANA:

The rockfill crest should reach the first instrumental post by the end of the day. Tomorrow, the rockfill will be done by the south entrance. Another backhoe operator is scheduled to arrive on-site tomorrow to start the downstream sloping. Once Sana have two backhoe operator, they will start the rockfill in the slope between 0+965 @ 1+060.

QA:

OWNER:

Due to snow falls yesterday morning, it was decided to backfill the foundation right after the approval. Only one layer was done and we switched on the crest rockfill after.

While doing the footprint rockfill, we started compacting the crest from the north.

Report By: **Olivier Jacques, Dike Supervisor**

DAILY CONSTRUCTION MEETING

CENTRAL DIKE

AGNICO EAGLE
MEADOWBANK

Date: **4/30/2018**

Time: **8:00**

Presents:

AEM: Pier-Éric McDonal, Olivier Jacques

SANA: Pierre Gautier, Sabin Larouche

QA: Marion Habersetzer

QC: Cédrick Fillion-Tremblay

Health & Safety:

Nothing to report

Daily Advance:

SANA:

Rockfill : 2 Haul truck HTR6 and HTR14, Wenco - 59 Loads = 5133 T. = +/- 2655 m3, 1.5 hrs (lost time for 0-3/4" Site service, 17h30 WA-600 at the crusher)

Rockfill Progression : Station - 0+761 @ 0+834 = 73m

Rockfill passed first instrumental post from the north. Backfill underneath the pumping pipe is done.

QA:

OWNER:

General Planning/Comments*:*

SANA:

Start the rockfill in the slope between 0+965 @ 1+060 today. Sana says it will take around 2 days to do it.

Currently doing the compaction on crest should be completed today or tomorrow morning.

QA:

QC/QA is concern about the till preparation. The stockpile at Sana crusher is frozen and don't have the required quantities

QA/QC will look for an alternative solution.

OWNER:

Report By: **Olivier Jacques, Dike Supervisor**

DAILY CONSTRUCTION MEETING

CENTRAL DIKE

AGNICO EAGLE
MEADOWBANK

Date: **5/2/2018**

Time: **8:00**

Presents:

AEM: Patrice Gagnon, Olivier Jacques, Alexandre Lavallée, Roch Chabot

SANA: Pierre Gautier, Christopher Gilbert

QA: Marion Habersetzer, Samuel Barbeau

QC: Cédrick Fillion-Tremblay

Health & Safety:

Nothing to report

Daily Advance:

SANA:

Rockfill : 2 Haul truck HTR6 and HTR14, Wenco - 67 Loads = T. = +/- 3015 m3

Rockfill Progression : Station - 0+996 @ 1+011 = 15m

Footprint Correction completed, Raising South Access Ramp 1m to fit with crest at elv.145 completed

QA:

OWNER:

General Planning/Comments*:*

SANA:

Sana will start the sloping on downstream today with one backhoe.

QA:

Foundation approval will be sent shortly. Sana sent the drawing yesterday.

Alternative solution for till will be to use 0-3/4" with bentonite since the till stockpile doesn't have the required quantities. Good till will be kept for the "plug" at Saddle Dam 3

OWNER:

AEM have dozer availability for the rockfill. DOZ06 will do the rockfill instead of the Sana D8T with GPS. Close survey follow-up for crest elevation by surveyor.

Report By: **Olivier Jacques, Dike Supervisor**

DAILY CONSTRUCTION MEETING

Central Dike

Date: 05/03/2018

Time: 8h00am

Presents:

AEM: RC, PG, AL

SANA: CG, PG, PO,

QA: MH

QC: CFT

Health & Safety:

Slips, trips and falls; use 3 poits contact and watch your footing.

Daily Advance:

SANA: Central Dike rockfill to 145.0: From 0+966 to 0+850 and from 1+011to 1+031 towards SD5

Sloping: Upstream from 0+170 to 0+650

QA:

OWNER:

General Planning/Comments:

SANA: Continue rockfill and sloping.

QA:

OWNER:

Report By: Roch Chabot

DAILY CONSTRUCTION MEETING

Central Dike

Date: 05/04/2018

Time: 8h00am

Presents:

AEM: RC, PG, AL

SANA: PG, PO,

QA: MH

QC: CFT

Health & Safety:

Reviewed 992 loader and Sana pick-up near miss.

Reviewed radio procedure when approaching heavy equipment.

Daily Advance:

SANA: Central Dike rockfill to 145.0: From 0+950 to 0+871

Sloping: Upstream from 0+650 to 0+839

Downstream from 0+170 to 0+250

QA:

OWNER:

General Planning/Comments:

SANA: Finish 145.0 elevation rockfill, compaction, instrumentation.

Sloping: Continue downstream sloping

QA:

OWNER:

Report By: Roch Chabot

DAILY CONSTRUCTION MEETING

Central Dike

AGNICO EAGLE
MEADOWBANK

Date: 05/05/2018

Time: 8h00am

Presents:

AEM: RC, PG,

SANA: PG, PO,

QA:

QC:

Health & Safety:

Nothing to report, radio communication is much better.

Daily Advance:

SANA: Central Dike rockfill to 145.0: From 0+871 to 0+835, from 1+018 to 1+034 and all the instrumentation

Sloping: Upstream from 0+839 to 0+950

Downstream from 0+250 to 0+350

Compaction from 0+825 to 1+034 and around the instrumentation

QA:

OWNER:

General Planning/Comments:

SANA: Complete upstream sloping from 0+950 to 1+034

Continue downstream sloping from 0+350 moving south.

QA:

OWNER:

Report By: Roch Chabot

DAILY CONSTRUCTION MEETING

Central Dike

Date: 05/06/2018

Time: 8h00am

Presents:

AEM: PG

SANA: PO, CG, PG

QA: MH, SB

QC: CF

Health & Safety:

Nothing to report

Foggy in the morning, make sure to be well seen by the operators, communication

Daily Advance:

SANA: Sloping: Upstream from 0+940 to 1+038

Sloping: Downstream from 0+350 to 0+440 & 0+530 to 0+745

Transition CD to SD5 slopes completed.

QA:

OWNER:

General Planning/Comments:

SANA: Start coarse filters on both abutments (AMQ road closed)

Prepare setup to thaw the deposition fingers with frost fighters

QA:

OWNER: Weekly meeting at 2pm, 2nd floor coffee room

Report By: Patrice Gagnon

DAILY CONSTRUCTION MEETING

SADDLE DAMS 3-4-5

AGNICO EAGLE
MEADOWBANK

Date: May 7th 2015

Time: 8h00

Presents:

AEM: DG - RC

SANA: PO -

QA: MH - SB

QC: CF

Health & Safety:

- No concern
- Coactivity lots of traffic on dike

Daily Advance:

SANA: Coarse & fine filter 0+170 - 460 1+130 + 775 + Compaction
0+170 - 360 1+138 + 835

~~downstream~~ slope

Start finger thawing with frost fighter

QA:

OWNER:

General Planning/Comments:

SANA: - Continue coarse & fine filters + compaction
- move frost fighters to next finger

QA: - Check compaction of filters

OWNER:

Report By: [signature]

DAILY CONSTRUCTION MEETING

SADDLE DAMS 3 - CENTRAL DIKE 2018

AGNICO EAGLE
MEADOWBANK

Date: May 8th 2018

Time: 8h00

Presents:

AEM: PG - RC

SANA: LB - PO

QA: SB

QC: SB

Health & Safety:

- No concerns
- Check snowblows and assess works

Daily Advance:

SANA: Remove 4 fingers

Continue 0-3/4" 0+380 @ 0+490 0-600 @ 0+550

0-6" 0+644 @ 0+460 0+170 @ 0+290 2nd lift

Compaction 1st lift

QA:

OWNER: Compaction of fine on an angle

General Planning/Comments:

SANA:
- Continue fine & coarse filter
- Compaction 1st lift

QA:

OWNER: All good!

Report By: [signature]

DAILY CONSTRUCTION MEETING

SADDLE DAMS 3 - CENTRAL DIKE 2018

AGNICO EAGLE
MEADOWBANK

Date: May 9th 2018

Time: 7h00

Presents:

AEM: DG- AL- MA

SANA: LB- PO

QA: SB

QC: SB

Health & Safety:

- Nothing to report
- Fox spotted on the dike

Daily Advance:

SANA: Fine filter → 0+490 @ 0+550 0+600 @ 0+715 0+830 @ 0+715 0+935 - 0+9

Coarse filter → 0+850 - 0+775 1st 2nd/ 0+875 0+930 0+890 - 0+500

Compaction 1st lift completed

QA:

OWNER:

General Planning/Comments:

SANA: Continue fine filter

Continue coarse filters

Continue compaction

QA:

OWNER: Need plans daily by mail

Report By: [signature]

DAILY CONSTRUCTION MEETING

SADDLE DAMS 3 - CENTRAL DIKE 2018

AGNICO EAGLE
MEADOWBANK

Date: May 10th 2018

Time: 8h00

Presents:

AEM: PG - MA

SANA: LB - PO

QA: SB

QC: SB

Health & Safety:

- Nothing to report
- Access to Saddle Road tricky, to be reviewed by Mine Ops

Daily Advance:

SANA: - Coarse filters: 0+320 @ 0+660 0+660 - 1+038 0+070 @ 0+335

- Fine filters: 0+500 @ 0+660 0+660 - 1+038 0+170 @ 0+335

QA: - Compaction to be done ideally on the same day

OWNER:

General Planning/Comments:

SANA: - Fine & Coarse filter 3rd lift and start 4th lift

- Compaction

QA: - Sampling of materials ongoing

OWNER: - Nucleo densometer shipment

Report By: [signature]

DAILY CONSTRUCTION MEETING

SADDLE DAMS 3 - CENTRAL DIKE 2018

AGNICO EAGLE
MEADOWBANK

Date: May 11th 2018

Time: 8h00

Presents:

AEM: DG - MA - FB - intern NB

SANA: DP - LB - RO

QA: SB

QC: SB

Health & Safety:

- Nothing to report
- Wheel chock on compactor

Daily Advance:

SANA: - Fine filters: 3rd lift 0+660 @ 1+038

- Coarse filters: 0+660 @ 0+940

Compaction 0+900

QA: - Corrected compaction number of passes

OWNER:

General Planning/Comments:

SANA: - Continue & complete 3rd filters lift

- Start final 0+3/4 lift

QA: - Continue Granub

OWNER: Will evaluate 0-3/4 in pblg at 503

Report By:

DAILY CONSTRUCTION MEETING

SADDLE DAMS 3 - CENTRAL DIKE 2018

AGNICO EAGLE
MEADOWBANK

Date: May 12th 2018

Time: 8h00

Presents:

AEM: PG - MA - FB - MB

SANA: LB - PO - DP

QA: SB

QC: — (SOP Mine)

Health & Safety:

- No Concerns

- Snow bank to be removed this morning at SD road entrance

Daily Advance:

SANA: Fine : complete 3rd lift 0+940 @ 1+038 4th lift 0+170 @ 0+330 0+600 @ 0+715
Coarse 0+170 @ 1+038

~~Compaction~~ 0+900 @ 0+138

QA: Till plug required for SD3 → wait for August *
Yves B & Marion

OWNER:

General Planning/Comments:

SANA: Compaction of fine & coarse filter
Fine filter & sloping 4th lift

QA:

OWNER:

Report By:

DAILY CONSTRUCTION MEETING

SADDLE DAMS 3 - CENTRAL DIKE 2018

AGNICO EAGLE
MEADOWBANK

Date: May 13 2018

Time: 8h00

Presents:

AEM: PG-FB -NB

SANA: LB-PO-

QA: SB

QC: SB

Health & Safety: - Spill 740 CAT 806 at SANA crusher

- No other concerns

Daily Advance:

SANA: Fine filter : 0+330 @ 1+038

Course filter : finished

Compaction finished

QA:

OWNER: Welder to fix the wheel shock stands on compactor 01

General Planning/Comments:

SANA: Sloping D/S

Compaction

Snow removal on Saddle Road to widen it

QA:

OWNER: Check for 304 availability

Report By: [signature]

DAILY CONSTRUCTION MEETING

SADDLE DAMS 3 - CENTRAL DIKE 2018

AGNICO EAGLE
MEADOWBANK

Date: May 14th 2018

Time: 8h00

Presents:

AEM: PG - MA -

SANA: DP - LB - PO

QA: SB

QC: SB

Health & Safety:

- No concerns

-

Daily Advance:

SANA: - Completed 0-3/4 sloping U/S 0+670 @ 1+038

- Started sloping D/S 0+430 @ 0+530 & 0+745 @ 0+835

- Started anchor trench 1+038 @ 0+825

QA:

- Completed remaining compaction

OWNER: - Snow removal at Saddle Road

General Planning/Comments:

SANA: - Complete D/S slope

- Finish ditch anchor

- Crew change

QA:

- Crew change

OWNER:

Report By:

DAILY CONSTRUCTION MEETING

SADDLE DAMS 3 - CENTRAL DIKE 2018

AGNICO EAGLE
MEADOWBANK

Date: May 15th 2019

Time: 9h00

Presents:

AEM: PG - O - MA

SANA: DP - LB - SL

QA: MH

QC: SB

Health & Safety:

- Spill 10 L hydraulic oil at CD
- Blast at Pit E5

Daily Advance:

SANA:
- Finish anchor for liner
- Sloping D/S
- SD3 snow removal

QA:

OWNER:

General Planning/Comments:

SANA:
- Finish sloping d/s
- Remove muck from CD
- Finish preparation snow removal

QA:

OWNER:

Report By: [signature]

DAILY CONSTRUCTION MEETING

Central Dike

AGNICO EAGLE
MEADOWBANK

Date: 5/16/2018

Time: 8h00am

Presents:

AEM: Olivier Jacques

SANA: Sabin Larouche, Luc Blanchette

QA: Marion Habersetzer

QC: Sébastien Blackburn

Health & Safety:

Nothing to report

A lot of dust coming from the tailing make sure to be well seen by the operators, communication, Wear protection masks if working outside (labor)

Daily Advance:

SANA: Sloping Downstream on Central Dike Completed

Snow Removal at Saddle Dam 3 to expose the LLDPE (40 % completed)

QA:

OWNER:

General Planning/Comments:

SANA: A dozer is required to rip the rockfill for the LLDPE Key trench at Saddle Dam 3. Dozer DO-1 is avalaible and will be move at SD3 after the meeting.

No activity planned on dike tomorrow. Access road for dewatering between SD3 and SD4 to be built if the Culvert crew of Amaruq Road are still on-standby

because of the caribous on the road.

QA:

OWNER:

Report By: Olivier Jacques

DAILY CONSTRUCTION MEETING

Central Dike

AGNICO EAGLE
MEADOWBANK

Date: 5/17/2018

Time: 8h00am

Presents:

AEM: Olivier Jacques, Frédéric Bolduc

SANA: Sabin Larouche, Luc Blanchette, Jeannot Gagnon

QA: Marion Habersetzer

QC: Sébastien Blackburn

Health & Safety:

Nothing to report

A lot of dust coming from the tailing make sure to be well seen by the operators, communication, Wear protection masks if working outside (labor)

Daily Advance:

SANA: Snow Removal at Saddle Dam 3 to expose the LLDPE completed

Used a dozer DOZ01 to rip the LLDPE anchor trench at Saddle Dam 3 (frozen materials)

Excavation of the LLDPE anchor trench at Saddle Dam 3

Clean-up of the LLDPE with blow pipes at Central Dike

QA:

OWNER:

General Planning/Comments:

SANA: No activity planned on dike tomorrow. Access road for dewatering Deposition S9 access road to be built.

because of the caribous on the road.

QA:

OWNER: AEM gives to SANA the go-ahead to start sloping the upstream and downstream at North Cell caping

AEM to provide all information required (drawings, DWG files, etc)

AEM confirms to Sana the 0-3/4" mixed with bentonite is cancelled and we will wait later in the summer to proceed with till.

Report By: Olivier Jacques

DAILY CONSTRUCTION MEETING

Central Dike

AGNICO EAGLE
MEADOWBANK

Date: 5/18/2018

Time: 8h00am

Presents:

AEM: Olivier Jacques, Frédéric Bolduc, Pier-Eric McDonald, Justine Petrucci

SANA: Sabin Larouche, Luc Blanchette, Jeannot Gagnon, Dany Pageau, Mikael Levesque

QA: Marion Habersetzer

QC: Sébastien Blackburn

Health & Safety:

Nothing to report

Schedule a fit test for the ZTG (LLDPE subcontractor) personnel Monday afternoon.

Daily Advance:

SANA: Excavation of the LLDPE anchor trench at Saddle Dam 3 (3hrs Backhoe Cat 345DL)

QA:

OWNER:

General Planning/Comments:

SANA: Construction of the Deposition S9 access road today.

Complete the excavation of the LLDPE anchor trench at Saddle dam 3 tomorrow.

Finalize the LLDPE clean-up on central dike if necessary by QA.

Prepare all the materials (geotextile, LLDPE rolls) for the LLDPE subcontractor for Monday. Sana asks for a hyster to move a geotextil seacan from East Dike.

Sloping at North Cell caping plan to start tomorrow. Sana to check if they will start with a day and night shift. To be confirmed

Sana presented a modified central line axel for the north caping with the survey done yesterday to optizime the sloping efficiency. To be approved.

QA: Golder asks SANA for a surveyor for the upstream slope approval on Central Dike this afternoon.

OWNER: AEM asks SANA to do a follow-up for the rockfill elevation at north cell caping (Elv. 152.0) with their surveyor. (Assist the dozer operator)

The rockfill is 800mm to high at the moment where the dozer is. (Elv. 152.8m)

AEM asks SANA to provide with the modified central line stations for the daily follow-up.

Report By: Olivier Jacques

DAILY CONSTRUCTION MEETING

Central Dike

Date: 5/20/2018

Time: 8h00am

AGNICO EAGLE
MEADOWBANK

Presents:

AEM: Olivier Jacques, Frédéric Bolduc, Pier-Eric McDonald, Justine Petrucci

SANA: Sabin Larouche, Luc Blanchette

QA: Marion Habersetzer

QC: Sébastien Blackburn

Health & Safety:

Nothing to report

A fit test for the ZTG (LLDPE subcontractor) personnel is scheduled Monday afternoon at 13h30 followed by SOP mine from 16h00 to 18h00.

Daily Advance:

SANA: Excavation of the LLDPE anchor trench at Saddle Dam 3 completed

Instrumental cable (thermistance) at Saddle Dam 3 downstream side was burried with reject before the water raise.

Snow removal at the upstream toe with excavators and a dozer at North Cell Internal Structure. Upstream Berms were pushed in the slope with a dozer.

Preparation of sand bags for the geotextile and LLDPE installation Central Dike

QA: QA/QC representatives noticed oversize boulders in the rockfill at the North Cell Internal Structure.

Rockfill was placed on an important layer of snow ealier at the beginning of the construction over a distance of 70m. To be removed.

Central Dike fine filter slope approval to be signed by AEM representative and SANA surveyor today.

OWNER: AEM sent an email to all the mine operation supervision to remind them about the oversize boulders and how to manage them (downstream slope).

AEM moved two geotextile seacans at the wide with the site service Hyster.

General Planning/Comments***:***

SANA: Sloping at North Cell caping plan on-going

Snow removal in the LLDPE anchor trench at Central dike tomorrow and snow removal on the actual LLDPE with labors.

Prepare all the materials (geotextile, LLDPE rolls) for the LLDPE subcontractor tomorrow.

QA: Golder asks SANA to do one or two pass of compactor roll on the Saddle Dam 3 fine filter slope and clean a 0-3/4" spill on the LLDPE.

OWNER:

Report By: Olivier Jacques

DAILY CONSTRUCTION MEETING

Central Dike

AGNICO EAGLE
MEADOWBANK

Date: 5/21/2018

Time: 8h00am

Presents:

AEM: Olivier Jacques, Pier-Eric McDonald

SANA: Sabin Larouche, Luc Blanchette, Jeannot Gagnon

QA: Marion Habersetzer

QC: Sébastien Blackburn

Health & Safety:

Nothing to report

A fit test for the ZTG (LLDPE subcontractor) personnel is scheduled Monday afternoon at 13h30 followed by SOP mine from 16h00 to 18h00.

AEM asks to Sana to include in the Geotextile & LLDPE installation JHA a part for the handling of rolls from the site to the dike.

Daily Advance:

SANA: Preparation of sand bags for the geotextile and LLDPE installation Central Dike completed (250 bags)

LLDPE clean-up with an air compressor and snow removal on the liner at Central Dike

3:1 Sloping at North Cell - Internal Structures (2 backhoe) approximatly 200m completed.

QA:

OWNER:

General Planning/Comments:

SANA: No work at North Cell - Internal Structure. Tomorrow to be confirmed with the manpower of the road.

Snow removal in the LLDPE anchor trench at Central dike and snow removal on the actual LLDPE with labors on-going.

Prepare all the materials (geotextile, LLDPE rolls) for the LLDPE subcontractor on-going. Sana is moving geotextile rolls on central dike crest.

ZTG personnels are arriving on-site today. SOP and Fit test all afternoon. Geotextile installation to start tomorrow.

QA: QA/QC representatives noticed Haul truck driver dumping their loads into the slope at the north cell caping not on top of the crest.

OWNER: AEM spoke with the dozer operator to advise him the proper way to do the rockfill. The message was also pass to all the supervisor on-site so they can advise haul truck drivers.

Report By: Olivier Jacques

DAILY CONSTRUCTION MEETING

Central Dike

AGNICO EAGLE
MEADOWBANK

Date: 5/22/2018

Time: 8h00am

Presents:

AEM: Olivier Jacques, Pier-Eric McDonald, Frédérick Bolduc

SANA: Sabin Larouche, Luc Blanchette, Dany Pageau

QA: Marion Habersetzer

QC: Cédrick Tremblay

Health & Safety:

Hydraulic Oil Spill Sana Shop 20 liters - Towerlight truck hydraulic pump failure. SANA reported it to ENV Depart.

The LLDPE & Geotextile Installation JHA was presented to the workers this morning. A copy with the signed page to be sent to AEM,

A ZTG worker is going back home today because he is not compliant to mine regulations. (E-Learning not completed and doesn't speak in English)

AEM notice this morning a surveyor in the downstream slope at central dike doing survey. AEM advise Sana it is not permitted and if survey needs to be done we will do it with the SANA GPS backhoe.

Daily Advance:

SANA: Move LLDPE and Geotextile rolls on top of Central Dike with a Zoom Boom.

LLDPE clean-up on the liner at Central Dike

3:1 Sloping at North Cell - Internal Structures (1 backhoe) started at 16h00.

Snow removal in the LLDPE anchor trench at Central Dike and Saddle dam 3

QA:

OWNER:

General Planning/Comments:

SANA: North Cell - Internal Structure 3:1 sloping on-going this morning with one backhoe. AEM dozer when it have down-time to push upstream berms into the slope.

Installation of the Geotextile at Central Dike by Sana subcontractor - ZTG today and tomorrow

Prepare all the materials (geotextile, LLDPE rolls) for the LLDPE subcontractor on-going.

QA:

OWNER: AEM to make sure subcontractor tools crate to arrive on-site tomorrow. Contact Denis Caron CTMN Val d'Or

Report By: Olivier Jacques

DAILY CONSTRUCTION MEETING

Central Dike

AGNICO EAGLE
MEADOWBANK

Date: 5/22/2018

Time: 8h00am

Presents:

AEM: Olivier Jacques, Pier-Eric McDonald, Frédérick Bolduc

SANA: Sabin Larouche, Pierre Gauthier, Dany Pageau

QA: Marion Habersetzer

QC: Cédrick Tremblay

Health & Safety:

Nothing to report

Daily Advance:

SANA: Central Dike - Move LLDPE and Geotextile rolls on crest with a Zoom Boom.

Central Dike - LLDPE clean-up on the liner

North Cell - Rockfill 1+767 this morning, 3:1 Sloping at approx. 2+200

Central Dike - Geotextile Installation 0+810 @ 1+060 (Stop at 14h30 due to snow forecast in the night)

QA:

OWNER:

General Planning/Comments:

SANA: North Cell -3:1 sloping. 3 Loads of NAG and 2 Loads of Ore-To-Waste were dumped in the rockfill. Removal is on-going with 1x100T and Sana 345

Installation of the Geotextile at Central Dike by Sana subcontractor

QA:

OWNER: AEM asks what is the slop % of the ramp between elv. 152 to 154 at North Cell. It is decided to go with a 8 to 10% transition ramp.

Report By: Olivier Jacques

DAILY CONSTRUCTION MEETING

Central Dike

AGNICO EAGLE
MEADOWBANK

Date: 5/22/2018

Time: 8h00am

Presents:

AEM: Olivier Jacques, Pier-Eric McDonald, Frédérick Bolduc

SANA: Pierre Gauthier

QA: Marion Habersetzer

QC: Cédrick Tremblay

Health & Safety:

Blast at Vault 18h30

Daily Advance:

SANA: Central Dike - Geotextile installation 0+810 @ 0+765

Central Dike - LLDPE clean-up on the liner

North Cell - Rockfill 1+715 this morning, 3:1 Sloping at 2+138

Central Dike - LLDPE installation starting around 1+040, ZTG received their tools crate yesterday afternoon. LLDPE fusion test completed.

QA: Central Dike - LLDPE fusing test approved

OWNER:

General Planning/Comments:

SANA: North Cell - 3:1 sloping all day

Central Dike - LLDPE installation

QA: QA/QC representatives ask to have the calibration certificat of the instrument used for LLDPE fusion test. AEM will ask SANA.

OWNER: AEM to send the as-built for the correction of the footprint elv. 145 at Central Dike to QA/QC representatives. There is a 0.6m width of rockfill missing

at the beginning of the correction at the north. No corrective measure anticipated but it needs to be documented.

Report By: Olivier Jacques

DAILY CONSTRUCTION MEETING

Central Dike

AGNICO EAGLE
MEADOWBANK

Date: 5/25/2018

Time: 8h00am

Presents:

AEM: Olivier Jacques, Pier-Eric McDonald, Alexandre Lavallée

SANA: Pierre Gauthier

QA: Marion Habersetzer

QC: Cédrick Tremblay

Health & Safety:

Blast at BB phaser 12h45PM

AEM ask to SANA to block the access road at Saddle dam 3 on the upstream at the bottom. Water is raising and the road is no more used.

QC representative asks what is the good channel when at North Cell. PortOp is the channel to use.

Daily Advance:

SANA: Central Dike - LLDPE installation from 1+060 to 0+947 (113meters)

North Cell - Rockfill 1+640 this morning, 3:1 Sloping at 1+989

QA:

OWNER:

General Planning/Comments:

SANA: North Cell - 3:1 sloping all day

Central Dike - LLDPE installation, LLDPE horizontal welds 9 reworks to do this morning. A little layer of ice is on the geotextile this morning.

QA: QA confirmed yesterday that it is not necessary to correct the missing quantities at Central Dike between 0+950 @ 0+975. The 1.5H : 1V is respected (no stability issue). It will be corrected during the next raise. To be documented in the as-built drawing.

QA representative asks to compact the LLDPE anchor trench once it is backfill over the LLDPE. (4 passes)

OWNER:

Report By: Olivier Jacques

DAILY CONSTRUCTION MEETING

Central Dike

Date: 5/26/2018

Time: 8h00am

Presents:

AEM: Olivier Jacques, Pier-Eric McDonald, Justine Petrucci

SANA: Pierre Gauthier, Sabin Larouche

QA: Marion Habersetzer

QC: Cédrick Tremblay

Health & Safety:

Blast at Vault phaser 12h45PM

Nothing to Report

Daily Advance:

SANA: Central Dike - LLDPE installation from 0+947 to 0+936 (11meters, started at 15h00), 9 horizontal welds repaired and approved.

North Cell - Rockfill 1+605 this morning, 3:1 Sloping 1+989 to 1+860

QA:

OWNER:

General Planning/Comments:

SANA: North Cell - 3:1 sloping all day, Sloping at North Cell will stop shortly because of the rockfill advance. SANA go faster sloping than the rockfill.

to be re-evaluated when to restart the sloping.

Central Dike - No work anticipated today due to weather, ZTG and SANA on stand-by.

QA:

OWNER:

Report By: Olivier Jacques

DAILY CONSTRUCTION MEETING

Central Dike

Date: 5/27/2018

Time: 8h00am

Presents:

AEM: Olivier Jacques, Pier-Eric McDonald, Alexandre Lavallee

SANA: Pierre Gauthier, Sabin Larouche

QA: Marion Habersetzer

QC: Cédrick Tremblay

Health & Safety:

No Blast

Nothing to Report

Daily Advance:

SANA: Central Dike - No activity due to the weather (strong wind, icy rain)

North Cell - Rockfill 1+564 this morning, 3:1 Sloping 1+860 to 1+678 (we skipped the tundra island area, 96m). Sloping stopped at 15h30 yesterday.

Sloping was too close to the rockfill advance. (>100m)

QA:

OWNER:

General Planning/Comments:

SANA: North Cell - No activity, Sloping is stopped for minimum 1 week until the rockfill advance.

Central Dike - Ice layer on the geotextile this morning. In order to progress, remove the problematic geotextile and put new layer so we can install the LLDPE.

QA:

OWNER: AEM ask to SANA to stake out all the north cell rockfill aligmnent limit on the tailing before it starts to melt.

AEM to confirm to SANA if we proceed with the compaction of the rockfill platform at North Cell while sloping activity are stopped. At least the section,

where the rockfill will be raise from 152m to 154. (+/- 1000m).

Report By: Olivier Jacques

DAILY CONSTRUCTION MEETING

Central Dike

Date: 5/28/2018

Time: 8h00am

Presents:

AEM: Olivier Jacques, Pier-Eric McDonald, Alexandre Lavallee, Justine Petrucci

SANA: Pierre Gauthier, Sabin Larouche

QA: Marion Habersetzer

QC: Cédrick Tremblay

Health & Safety:

Blast at BB Phaser 18:30

Incent : Yesterday we had an incident on central dike. A labor was sweeping the snow on the geotextile. He slipped and slightly twisted his ankle. Light Duty work

Report is in the Intelex. No investigation needed. Remind workers about the risks when going in the slope.

Daily Advance:

SANA: Central Dike - geotextile and LLDP installation AM, No activity in PM due to strong wind. LLDPE at 0+909

North Cell - Rockfill 1+535 this morning, 3:1 Sloping in PM 1+678 to 1+638

QA:

OWNER:

General Planning/Comments:

SANA: North Cell - No activity, Sloping is stopped for minimum 1 week until the rockfill advance.

Central Dike - Geotextile and LLDPE installation

QA:

OWNER: AEM needs to check with QA representatives what action to take for the tundra island rockfill portion before next rockfill lift.

AEM ask SANA to evaluate the coarse and fine filter quantities with the current as-built and modified alignment.

AEM ask SANA to paint mark the top slope on the DS where the rockfill will be raise from 152 to 154 to see if the berm needs to be remove for compaction

AEM ask SANA to mark the top slope on the US at the East entrance of the north cell to evaluate the corrective measure for the snow underneath the rockfill.

Report By: Olivier Jacques

DAILY CONSTRUCTION MEETING

Central Dike

AGNICO EAGLE
MEADOWBANK

Date: 5/28/2018

Time: 8h00am

Presents:

AEM: Olivier Jacques, Pier-Eric McDonald

SANA: Pierre Gauthier, Patrice Ouellet

QA: Marion Habersetzer

QC: Cédrick Tremblay

Health & Safety:

No blast

Nothing to report

Daily Advance:

SANA: Central Dike - LLDP installation 0+909 @ 0+760, Geotextile installation 0+790 @ 0+760

North Cell - Rockfill 1+500

QA:

OWNER:

General Planning/Comments:

SANA: North Cell - No activity

Central Dike - Geotextile and LLDPE installation, Compaction of the LLDPE anchor trench

Snow started to fall at the moment. The work may be stopped depending on the weather.

QA:

OWNER: AEM gives to SANA the go-ahead to proceed with the compaction of the 152.0m platform. QA representatives agreed to not compact the haul truck traffic lane since it is already compacted by the loaded haul truck and the dozer.

AEM talked with the Env Department this morning for the cyanide burn area. It is decided to do an extension with the rockfill to relocated the burn area onto the rockfill. SANA will redo the drawing to include that aspect and will send it to AEM. QA representatives don't see any issue to proceed like this.

Report By: Olivier Jacques

DAILY CONSTRUCTION MEETING

Central Dike

Date: 5/30/2018

Time: 8h00am

Presents:

AEM: Olivier Jacques, Alexandre Lavallee, Patrice Gagnon, Nicholas Blackburn, Roch Chabot

SANA: Pierre Gauthier, Patrice Ouellet

QA: Samuel Barbeau

QC: Cédrick Tremblay

Health & Safety:

Blast Pit E5 12h45PM. Make sure to give your blast clearance to the Drill&Blast supervisor

Nothing to report

Daily Advance:

SANA: North Cell - No rockfill, 3:1 Sloping 1+625 @ 1+580, Platform correction for compaction between 2+700 @ 2+290

Central Dike - Geotextile and LLDPE installation 0+769 @ 0+741, 0+825 @ 0+741 Horizontal welding and test

QA:

OWNER:

General Planning/Comments:

SANA: Central Dike - No activity this morning due to the strong wind. No LLDPE or Geotextile installation.

North Cell - Compaction starting at 2+700. On-going. No rockfill

QA:

OWNER: AEM reiterate to SANA to send them the calibration certificate of the tensiometer used by ZTG for their tests.

Report By: Olivier Jacques

DAILY CONSTRUCTION MEETING

Central Dike

Date: 2018-05-31

Time: 8h00am

Presents:

AEM: Olivier Jacques, Alexandre Lavallee, Patrice Gagnon, Nicholas Blackburn, Roch Chabot

SANA: Pierre Gauthier, Patrice Ouellet, Christopher Gilbert

QA: Samuel Barbeau

QC: Cédrick Tremblay

Health & Safety:

Blast in BB Phaser, Make sure to give your blast clearance to the Drill&Blast supervisor

Nothing to report

Daily Advance:

SANA: North Cell - No rockfill, Compaction from 1+625 to 2+625

Central Dike - No activity due to strong wind

QA:

OWNER:

General Planning/Comments:

SANA: Central Dike - Start trenching on the upstream side and snow clean-up by cyanide burn

North Cell - Compaction starting at 2+700. On-going. No rockfill

QA:

OWNER: AEM reiterate to SANA to send them the calibration certificate of the tensiometer used by ZTG for their tests.

Report By: Roch Chabot

DAILY CONSTRUCTION MEETING

Central Dike

AGNICO EAGLE
MEADOWBANK

Date: 6/18/2018

Time: 8h00am

Presents:

AEM: Olivier Jacques, Pier-Eric McDonald, Justine Petrucci

SANA: Sabin Larouche

QA:

QC:

Health & Safety:

No Blast

Nothing to report

Daily Advance:

SANA: North Cell - Start of the Coarse Filter Bacfill 2+542 @ 2+437, 105m, 22 loads for a production of 79m3/hr

North Cell - 3:1 Sloping and snow removal

North Cell - Reworks on the access over the dewatering pipe at the entrance of the north cell to smooth it.

QA:

OWNER:

General Planning/Comments:

SANA: Continue the coarse filter backfill and the 3:1 Sloping

Foundation Preparation at the toundra Island to expose the rock

SANA will look to optimize the coarse filter backfill team and see if it is benefict to add a 2nd truck today.

QA:

OWNER: The tailing near the cyanide burn area is at the evelation 148.0 @ 148.5m. For the compaction efficiency, it is decide to go with two lift there. Elv. 148 @ 150 and 150 @ 152. Surveyor need to do a follow-up to ramp down at elv. 150.

AEM needs to move the pipe coming from the china sump because the deposition point is 50m in front of the actual rockfill front. This needs to be done as soon as possible.

Report By: Olivier Jacques

DAILY CONSTRUCTION MEETING

Central Dike

AGNICO EAGLE
MEADOWBANK

Date: 6/19/2018

Time: 8h00am

Presents:

AEM: Olivier Jacques, Pier-Eric McDonald

SANA: Sabin Larouche, Luc Blanchette

QA:

QC:

Health & Safety:

Blast : 12h45 PM Vault

Nothing to report

Daily Advance:

SANA: North Cell - Coarse Filter Backfill 2+437 @ 2+280, 157m, 34 loads for a production of 81m3/hr

North Cell - 3:1 Sloping

Central Dike - Till Preparation

QA:

OWNER: AEM is moving the discharge point of the china sump near saddle dam 1. Sana to provide a zoom boom and an excavator operator all day.

3 sections of 200ft of 8" pipes were brought to the north cell by Operation during the night.

General Planning/Comments:

SANA: North Cell - Continue the coarse filter backfill

North Cell - Foundation Preparation at the toundra Island to expose the rock tomorrow

QA:

OWNER:

Report By: Olivier Jacques

DAILY CONSTRUCTION MEETING

NORTH CELL - INTERNAL STRUCTURE

AGNICO EAGLE
MEADOWBANK

Date: 6/22/2018

Time: 8h00am

Presents:

AEM: Olivier Jacques, Pier-Eric McDonald

SANA: Sabin Larouche, Pierre Gautier

QA: Marion Habersetzer

QC: Hugues Potvin

Health & Safety:

Blast : No blast

Near Miss was reported yesterday by the Dewatering Crew. A pick-up passed near the excavator working on Central Dike without advise the operator.

Daily Advance:

SANA: North Cell - Coarse Filter Backfill 1+930 @ 1+715, 215m, 46 loads for a production of 110m3/hr with 2 trucks

North Cell - Coarse Filter Compaction between 2+524 @ 2+450, 92m

North -Cell - 3:1 Slope 1+860 @ 1+750

Rockfill from Pit E5 during night shift, 44 loads for 5935 tonnes

QA:

OWNER: AEM asked Sana this morning to do 100m of fine filter and compact it to see the results.

General Planning/Comments:

SANA: North Cell - Continue the coarse filter compaction

North Cell - Fine Filter backfill and compaction

QA:

OWNER:

Report By: Olivier Jacques

DAILY CONSTRUCTION MEETING

NORTH CELL - INTERNAL STRUCTURE

Date: 6/23/2018

Time: 8h00am

Presents:

AEM: Olivier Jacques, Pier-Eric McDonald, Alexandre Lavallee

SANA: Sabin Larouche, Pierre Gautier

QA: Marion Habersetzer

QC:

Health & Safety:

Blast : Pit E5, 12h45 PM, 5046680

Nothing to Report

Daily Advance:

SANA: Coarse Filter Backfill - 1+715 @ 1+570 and 1+425 @ 1+480, 200m, 32 loads of 6" NPAG 800m3, Prod = 167 m3/hr (two shovel, 3 HTR)

Compaction of the coarse filter slope between 2+450 @ 1+805, 645m

Fine Filter Backfill - 2+542 @ 2+475, 67m, 17 loads of 0-3/4" 425m3, Prod = 94m3/hr

Compaction of the fine filter slope between 2+542 @ 2+475, 67m

QA: Samples test (granulometry) on-going on the coarse and fine filter

OWNER: Rockfill from PIT E5, Day Shift Only, 15 Loads 2040 Tonnes

AEM changed before yesterday the aligment of the North Cell caping to avoid the cyanide burn area due to the presence of scrap

General Planning/Comments:

SANA: North Cell - Coarse Filter backfill with 2 excavators

North Cell - Fine Filter backfill

North Cell - Continue the coarse filter compaction

Survey on-going on the 0-6" stockpile to do an update on the remaining quantities vs remaining backfill to do

QA: QA/QC to do granulometry test on a old 0-6" stockpile at the Sana crusher

OWNER: Compaction to be done on the rockfill at Elv. 150m under the berm downstream and upstream and on each side of the traffic lane of the Haul truck.

Berms will be pushed in the slope and boulders will be placed on each side of the traffic lane for the Haul truck driver.

AEM checked with there Geogology department to call a part of the 5046670 pit E5 as NPAG even they haven't received the result yet.

The rockfill start to be critical since no rockfill from Pit E5 is going to North Cell Caping.

Report By: Olivier Jacques

DAILY CONSTRUCTION MEETING

NORTH CELL - INTERNAL STRUCTURE

Date: 6/24/2018

Time: 8h00am

Presents:

AEM: Olivier Jacques, Pier-Eric McDonald

SANA: Sabin Larouche, Pierre Gautier

QA: Marion Habersetzer

QC: Hugues Potvin

Health & Safety:

Blast : Pit E5, 12h45 PM,

A lot of dust at the north cell this morning, stay ou of the dust when going out of equipment/pic-up truck

Daily Advance:

SANA: Coarse Filter Backfill - 1+480 @ 1+570 & 1+420 @ 1+425, 95 m, 21 loads of 6" NPAG 525m3, Prod = 141 m3/hr (2 exc.) = 50m3/hr (1 exc.)

Compaction in coarse filter slope between 1+805 @ 1+420, 385m

Fine Filter Backfill - 1+980 @ 2+065 & 2+460 @ 2+475, 100 m, 32 loads of 0-3/4" NPAG 800m3, Prod = 133 m3/hr (2 exc.) = 88m3/hr (1 exc.)

Rockfill from PIT E5, Night Shift Only, 40 Loads 5440 Tonnes

Note : 2 hours lost with excavator 13-0301 on coarse compaction for fixing the A/C

QA:

OWNER: Rockfill from PIT E5, Night Shift Only, 40 Loads 5440 Tonnes

General Planning/Comments:

SANA: North Cell - Fine Filter backfill with 2 excavators

Sana surveyor to check the rockfill platform width if everything is good at the front.

Sana-AEM to check the best work method for the area after 2+777 where the road access is.

North Cell - Compaction of the rockfill at Elv. 150 planned tomorrow.

QA/QC: QC to perform a gradation test everyday on fine filter when doing fine filter backill instead of 1 per 1000m3.

QC ask to have the cumulative quantites of coarse filter done since the beginning of the activity. A drawing will be sent by Sana shortly.

OWNER: AEM to confirm the east and west limit where to stop the rockfill.

Report By: Olivier Jacques

DAILY CONSTRUCTION MEETING

NORTH CELL - INTERNAL STRUCTURE

AGNICO EAGLE
MEADOWBANK

Date: 6/25/2018

Time: 8h00am

Presents:

AEM: Olivier Jacques, Pier-Eric McDonald

SANA: Sabin Larouche, Pierre Gautier, Christopher Gilbert, Marie-Ève Giguère

QA: Marion Habersetzer

QC: Hugues Potvin

Health & Safety:

Blast : No Blast

Really slippery and muddy this morning due to the last night rain. Pay attention when driving.

Daily Advance:

SANA: Fine Filter Backfill - 1+980 @ 1+835 & 2+460 @ 2+305, 300 m, 71 loads of 0-3/4" NPAG 1775m3, Prod = 169 m3/hr (2 exc.)

Note : LOAD12 down, at 8h30, Parking break issue, We took Sana loader #278 from Sana shop.

QA:

OWNER: Rockfill from PIT E5, Day/Night, 92 Loads 12512 Tonnes

3W meeting after the daily meeting. Yesterday meeting was postponed.

General Planning/Comments:

SANA: North Cell - Fine Filter backfill with 1 excavators

North Cell - Compaction of the rockfill at Elv. 150 on-going

Sana crew-change today

Move the geotextile seacan on central dike to Saddle Dam 3

QA/QC: QC to perform a gradation test everyday on fine filter when doing fine filter backill instead of 1 per 1000m3. Two test to be done if 2 excavators backfilling

OWNER: Geotechnial Engineer to provide south east and south west limit for the rockfill today

Report By: Olivier Jacques

DAILY CONSTRUCTION MEETING

NORTH CELL - INTERNAL STRUCTURE

AGNICO EAGLE
MEADOWBANK

Date: 6/26/2018

Time: 8h00am

Presents:

AEM: Olivier Jacques, Pier-Eric McDonald

SANA: Pierre Gautier, Patrice Ouellet

QA: Marion Habersetzer

QC: Hugues Potvin

Health & Safety:

Blast : No Blast

Use of radio channel : MBDykes when working inside the bumper near the slope and PortOp when circulating in the mine haul truck traffic lane

Daily Advance:

SANA: Fine Filter Backfill - 2+305 @ 2+040, 265 m, 47 loads of 0-3/4" NPAG 1175 m3

Rockfill Compaction 1+320 @ 1+220

Built 2 pick-up truck access for E&I dewatering crew at 2+245 downstream

6 loads of 0-2" at AEM Dispatch

QA:

OWNER: Rockfill from PIT E5, Day/Night, 101 Loads 13589 Tonnes, 1+150 this morning the rockfill started to turn the edge near the cyanide burn area

General Planning/Comments:

SANA: North Cell - Coarse Filter backfill around 2+600

North Cell - Compaction of the rockfill at Elv. 150

North Cell - 3:1 rockfill sloping around 2+800

QA/QC:

OWNER: AEM presents the new deposition plan sent yesterday according to the Water and Tailing Engineer

New Rockfill boundaries : Elv. 152.0 - 1+100 @ 3+260, Elv. 154.0 - 1+660 @ 2+750

A coordination needs to be in-place with the E&I Dewatering crew for the pipe at 2+750 during the rockfill and coars/fine filter backfill.

Report By: Olivier Jacques

DAILY CONSTRUCTION MEETING

NORTH CELL - INTERNAL STRUCTURE

AGNICO EAGLE
MEADOWBANK

Date: 2018-06-28

Time: 8h00am

Presents:

AEM: Roch Chabot, Alexandre Lavallee

SANA: Patrice Ouellet

QA: Marion Habersetzer

QC: Hugues Potvin

Health & Safety:

Blast : No Blast

Dusty conditions, call for water truck if needed

Daily Advance:

SANA: Fine Filter Backfill - 6 loads

Coarse filter - 34 loads

Slope : 2+815 to 2+860

Shaved 154 elevation to 152 elevation from 2+840 to 2+980

Rockfill Compaction 1+320 @ 1+220

QA:

OWNER: No rockfill activities because of lack of material

General Planning/Comments:

SANA: North Cell - Coarse Filter backfill compaction

North Cell - 3:1 rockfill sloping

North Cell - Fine filter

QA/QC:

OWNER:

Report By: Roch Chabot

DAILY CONSTRUCTION MEETING

NORTH CELL - INTERNAL STRUCTURE

AGNICO EAGLE
MEADOWBANK

Date: 2018-06-29

Time: 8h00am

Presents:

AEM: Roch Chabot, Alexandre Lavallee, Nicolas

SANA: Patrice Ouellet

QA: Marion Habersetzer

QC: Hugues Potvin

Health & Safety:

Blast : No Blast

Dusty conditions, call for water truck if needed

Daily Advance:

SANA: Fine Filter Backfill - 43 loads

Slope compaction

Slope : 2+815 to 2+860

QA:

OWNER: Rockfill from Pit E5: 16 loads

General Planning/Comments:

SANA: North Cell - Coarse Filter backfill compaction

North Cell - 3:1 rockfill sloping

North Cell - Fine filter

QA/QC:

OWNER: Rockfill from Pit E5: Finish 150 elevation and move to 152 elevation

Report By: Roch Chabot

DAILY CONSTRUCTION MEETING

NORTH CELL - INTERNAL STRUCTURE

AGNICO EAGLE
MEADOWBANK

Date: 2018-06-30

Time: 8h00am

Presents:

AEM: Roch Chabot, Alexandre Lavallee, Nicolas Blackburn

SANA: Patrice Ouellet, Pierre Gauthier

QA: Marion Habersetzer

QC: Hugues Potvin

Health & Safety:

Blast : No Blast

Co-activity, use good communication

Daily Advance:

SANA: Fine Filter Backfill - 23 loads from 1+330 to 1+260 and from 1+595 to 1+550

Slope rockfill from 1+140 to 1+340 at elevation 150

Compaction downstream 1+240 to 1+270 at elevation 150

Compaction coarse filter from 1+340 to 1+270 at elevation 150

Coarse filter 38 loads from 1+340 to 1+270 at elevation 152

Fine filter from 1+330 to 1+260 and from 1+595 to 1+550 at elevation 152

QA:

OWNER: Rockfill from Pit E5: 120 loads to 1+340 at elevation 152

General Planning/Comments:

SANA: Downstream compaction

Coarse and fine filter at elevation 150

QA/QC:

OWNER: Rockfill from Pit E5 ongoing on elevation 152

Report By: Roch Chabot

DAILY CONSTRUCTION MEETING

NORTH CELL - INTERNAL STRUCTURE

Date: 2018-07-01

Time: 8h00am

Presents:

AEM: Roch Chabot, Alexandre Lavallee, Nicolas Blackburn

SANA: Patrice Ouellet, Pierre Gauthier

QA: Marion Habersetzer

QC: Hugues Potvin

Health & Safety:

Blast : No Blast

Don't leave the work area you are assigned to without your supervisor knowing.

Daily Advance:

SANA: Fine Filter Backfill - 18 loads from 1+260 to 1+100 at elevation 150

Slope rockfill from 1+100 to 1+340 at elevation 150

Compaction downstream 1+240 to 1+270 at elevation 150

Compaction coarse filter from 1+270 to 1+100 at elevation 150

Coarse filter- 38 loads from 1+270 to 1+100 at elevation 150

Fine filter from 1+330 to 1+260 and from 1+595 to 1+550 at elevation 152

QA:

OWNER: Rockfill from Pit E5: 120 loads to 1+200 at elevation 152

General Planning/Comments:

SANA: Complete fine filter compaction at 150 elevation

Complete touch up for rockfill at elevation 152

QA/QC:

OWNER: Rockfill from Pit E5 ongoing on elevation 152

Report By: Roch Chabot

DAILY CONSTRUCTION MEETING

~~SADDLE DAMS 3 - CENTRAL DIKE~~ 2018 North Cell

AGNICO EAGLE
MEADOWBANK

Date: 2018-07-02

Time: 8h00

Presents:

AEM: AL, NB

SANA: PO, P

QA: MH

QC: HP

Health & Safety:

-> Sampling of Asbestos / Silica / noise for QC
-> Tomorrow also sampling on NC - SANA employee

-> Spill ± 10 l loader - hydraulic hose leak
↳ Mine

Daily Advance:

SANA: -> Rockfill slope 2+860 -> 2+975

-> FF (152) 1+080 -> 1+100
-> FF comp. 1+335 -> 1+100
-> FF (152) 2+660 -> 2+630

QA: -> RF (152) -> 1+160

OWNER:

General Planning/Comments:

SANA: -> complete FF up to 2+820
-> ~ FF in 2+620 zone
-> compaction 2+820 -> 2+ ...

QA:

4000m3 CF left in 2018 stockpile

OWNER: Pipe EI -> Meet with Nelson
Evaluate SD3 rockfill needed

Report By:

DAILY CONSTRUCTION MEETING

~~SADDLE DAMS 3~~ - CENTRAL DIKE 2018 North cell ink Street

AGNICO EAGLE
MEADOWBANK

Date: July 3rd, 2018

Time: 8h00

Presents:

AEM: AL, JG

SANA: LB, M-AB

QA: MH, SB

QC: HP, DR

Health & Safety:

&

-> Keep distance from Shovel - compactor setup. In case align break.

Daily Advance:

SANA: Sloping 2+975 3+070

FF (152) 1+550 1+320 1+630 1+610 61 loads.

& RF

QA:

OWNER:

General Planning/Comments:

SANA: -> compact. FF

-> CF south east. + compact.

-> Sloping FF west completed.

QA:

OWNER:

Report By:

DAILY CONSTRUCTION MEETING
~~SADDLE DAMS 3-4-5~~ NC inl. Struc.

Date: 2018-07-04

Time: 8h00

Presents:

AEM: AL - JL

SANA: LB

QA: SB

QC: DR

Health & Safety:

-> Loss time accident AEM.

Daily Advance:

SANA: FF (152) 1+320 -> 1+300 ~~4~~ 2 loads

FF compact. 2+810 -> 2+095

CF placem. 2+815 -> 2+980 46 loads

Ø RF

QA:

OWNER:

General Planning/Comments:

SANA: -> Ø RF planned

-> Continue CF 2+815 -> 3+160

-> RF Sloping 1+300

QA: -> Pipe from NP2 need a crossing.

OWNER:

Report By:

DAILY CONSTRUCTION MEETING

~~SADDLE DAMS 3-4-5~~ NC m/ Sh

AGNICO EAGLE
MEADOWBANK

Date: 2017-07-05

Time: 8h06

Presents:

AEM: AL, JL

SANA: LB, PO

QA: SB

QC: DR

Health & Safety:

→ Incident.

Daily Advance:

SANA: FF 2+810 → 2+800 placem.

CF 2+980 → 3+160 ~

2+15 → 2+925 compact.

RF Slop. 1+300 → 1+175 3+070 → 3+160

QA: 35 CF loads

4 FF "

OWNER:

General Planning/Comments:

SANA: complete FF zone 1

compact. CF

continue FF

QA:

OWNER: → Fred coming on site today. Alex leaving.

→

Report By:

DAILY CONSTRUCTION MEETING

SADDLE DAMS 3-4-5 + NC

AGNICO EAGLE
MEADOWBANK

Date: 2018-07-06

Time: 8 h00

Presents:

AEM: FLB, JL

SANA: PO

QA: SB

QC: DR

Health & Safety:

NA

Daily Advance: Last 24

SANA: R/F slope 1+175 to 1+200 El. 152

CF 1+300 to 1+200 Load 26

FF 2+800 to 2+940 Load 23

Compaction CF: 2+925 to 3+160 and 1+300 to 1+200

FF: 2+095 to 2+000

QA:

NA

OWNER: NA

General Planning/Comments: Next 24

SANA: Complete FF 2+940 to 3+160 and 1+300 to 1+200

QA:

OWNER:

Report By: Frédérick L. Boldue

DAILY CONSTRUCTION MEETING
SADDLE DAMS 3-4-5

AGNICO EAGLE
MEADOWBANK

Date: 7/7/2018
Time: 8:00 - 8:20

Presents:

AEM: Frederick Bolduc, Nicholas Blackburn, Jason Laforce, Alain Hince
SANA: Patrice Ouelette, Luc Blanchette
QA: Samuel Barbeau
QC: Daniel Roy

Health & Safety:

· A worker from Sana dropped a tool on ~~it~~ his foot. Broken bones. change of duty
· Sana's worker burned his hand with mechanical equipment. He was brought to the medical clinic.

Daily Advance:

SANA: · 0-3/4" from 1-300 to 1+210 and 2+940 to 3-120

QA: —

OWNER: —

General Planning/Comments:

SANA: · Complete 3/4" before Lunch
· SD access to SD3
· No rockfill material for now. Maybe tomorrow

QA: —

OWNER: —

Report By: Nicholas Blackburn

DAILY CONSTRUCTION MEETING

SADDLE DAMS 3-4-5

AGNICO EAGLE
MEADOWBANK

Date: 2018 / 07 /08

Time: 8 : 00 - 8:15

Presents:

AEM: Nicholas Blackburn, Jason Laforce, Alain Hince, Frederick Bolduc

SANA: Patrice Ouelette, Luc Blanchette

QA: Samuel Barbeau

QC: Daniel Roy

Health & Safety:

- No event for last 24hours
- Wolverine spotted at the barning pad.

Daily Advance:

SANA:
- 3/4" at North cell: 3+120 at 3-160
- rock fill at SD3 : 20+730 - 20-785 (for access)
- rock fill (NC) at 1+170

QA: -

OWNER: -

General Planning/Comments:

SANA:
- Complete rock fill extension + geotextile (2 layers) for next 24 hours (at SD3).

owner ~~QA~~
- Discuss and plan downstream ditches at North Cell with designer and contractor.

QA ~~OWNER:~~ -

Report By: Nicholas Blackburn

DAILY CONSTRUCTION MEETING

SADDLE DAMS 3-4-5

AGNICO EAGLE
MEADOWBANK

Date: 2018-07-08

Time: 8:00 09

Presents:

AEM: Nicholas Blackburn, Jason Laforce, Frederick Bolduc

SANA: Patrice Ouelette

QA: Samuel Barbeau

QC: Daniel Roy

Health & Safety:

- Pick up passed beside a 6x6 without calling on the radio on the West Road.

Daily Advance:

SANA:
- Complete access raod 20+730 - 20+610 (SD3)
- put the mucle protection 20+630 - 20+610 (SD3)
- Rock fill at NorthCell 1+140

QA.

OWNER:

General Planning/Comments:

SANA:
- Start the till protection after completing the geotextile.
- Gotextile to start this morning.

QA.

OWNER:
- AEM to meet with ditches designer today.

Report By: Nicholas Blackburn

DAILY CONSTRUCTION MEETING

SADDLE DAMS 3-4-5

AGNICO EAGLE
MEADOWBANK

Date: 2018/07/10

Time: 8:00

Presents:

AEM: Nicholas Blackburn, Frederick Bolduc, Jason Laforce, Alain Hince

SANA: Sabin Larouche, Pierre Gauthier

QA: Samuel Barbeau

QC: Daniel Roy

Health & Safety:

· Nothing to report

Daily Advance:

SANA:
- Started the geotextile installation
- till at 20+610 → 20-715
- 24 load of till
- 1st lift completed ~~an~~

QA:

OWNER:

General Planning/Comments:

SANA:
- Complete placement of till at SD3
- Put the second layer of geotextile at SD3
- Finish first lift of till

QA:

OWNER:

Report By: Nicholas Blackburn

DAILY CONSTRUCTION MEETING

SADDLE DAMS 3-4-5

AGNICO EAGLE
MEADOWBANK

Date: 11/07/2018

Time: 8h00

Presents:

AEM: Justine Petrucci, Frederick Bolduc, Denis Gosselin

SANA: Sabin Larouche, François Gravel-Grenier

QA: Samuel Barbeau

QC: Daniel Roy

Health & Safety:

· Stay hydrated
· Dust control

Daily Advance:

SANA: · till : + 20 + 715 @ 20 + 760
+ 4 loads
+ 80 m^3.

· 2 load class 1 ~~abut~~ abutment ($40 m^3$)

· NoPag protection : → 20 + 616 @ 20 + 760
· Pumped water hole at SD3

QA:

OWNER:

General Planning/Comments:

SANA: · Compactor down at SD3
· Slope + 6" placement at North cell

· Muck stockpile

QA:

OWNER:

Report By: Justine Petrucci

DAILY CONSTRUCTION MEETING

SADDLE DAMS 3-4-5

AGNICO EAGLE
MEADOWBANK

Date: 12/07/2018

Time: 8h00

Presents:

AEM: Justine Petrucci, Frederick Bolduc, Denis Gosselin

SANA: Sabin Larouche, François Gravel Grenier, Pierre Gautier

QA: Samuel Barbeau

QC: Daniel Roy

Health & Safety:

Plane landing on dike operation

Dust control

Weather (hot)

Daily Advance:

SANA: abutment muck compaction + till compaction

3 loads of NP → 60 m³

1 loads 6" → 20 m³

20+775 @ 20+800

finish second lift till 20+610 @ 20+760 23 loads 460 m³

QA: compaction north cell (≈20 m)

till

OWNER:

General Planning/Comments:

SANA:
- Muck Protection
- Compaction north cell
- lift compaction
- South abutment
- Change of alignment

- Fill hole SD3 (Tailing side)
- 2200 m³ 143.5
- 2900 m³ 144
- → needed volume
- Make sure pipe at 154 is not covered

QA:

OWNER: Ditch meeting

Report By: Justine Petrucci

DAILY CONSTRUCTION MEETING
SADDLE DAMS 3-4-5

AGNICO EAGLE
MEADOWBANK

Date: 13/07/2018
Time: 8h00

Presents:

AEM: Justine Petrucci, Denis Gosselin, Frederick Bolduc
SANA: Sabin Larouche, François Gravel Grenier
QA: Samuel Barbeau
QC: Daniel Roy

Health & Safety:

Airport controler call the plane arrival

Daily Advance:

SANA: • compaction north cell (fine fiter) 1+650 @ 2+028
• Lift 143 No Pag 20+610 @ 20+760
→ 35 loads
+ compaction (till ⊕ muck)
South abutment → 4 loads class 1 till (SD3)

QA: → 2 loads 3/4
→ 1 load 6"
→ 20+775 @ 20+800

OWNER: fallow-up landmark (Picket) North cell

General Planning/Comments:

SANA: • South abudment
• next lift 143.5 (class 2 Till)

QA: Remove bolders before sloping

OWNER:

Report By: Justine Petrucci

DAILY CONSTRUCTION MEETING

SADDLE DAMS 3-4-5

AGNICO EAGLE
MEADOWBANK

Date: 14/07/2018

Time: 8h00

Presents:

AEM: Justine Petrucci, Frédérick Bolduc, ~~Denis Gosselin~~

SANA: Sabin Larouche, François Gravel Grenier

QA: Samuel Barbeau

QC: Daniel Roy

Health & Safety:

Dust control → water

Daily Advance:

SANA: South abutment 20+470 @ 20+800

6 loads on NP → 120 cum

5 loads 6" → 100 cum

2 loads 0→3/4 → 80 cu.m

14 loads till → 180 cu.m

· 2+455 @ 2+870

· Rockfill to high

QA: Compaction is complete

OWNER:

General Planning/Comments:

SANA: finish south abutment

start north abutment + compaction

last lift → 143.5

QA:

OWNER: Check up to respect the volume (limited quantity) of rock fill

Report By: Justine Petrucci

DAILY CONSTRUCTION MEETING

SADDLE DAMS 3-4-5

AGNICO EAGLE
MEADOWBANK

Date: 15/07/2018

Time: 8h00

Presents:

AEM: Justine Petrucci, Frédérick Bolduc, Denis Gosselin

SANA: Sabin Larouche, François Gravel Grenier

QA: Samuel Barbeau

QC: Daniel Roy

Health & Safety:

N/A

Daily Advance:

SANA: · Dozer, North cell 2+289 @ 2+370
· Lift => OK (154)
· Finish South abutment 20+770 @ 20+800
· North abudment 1 lift till + compaction
· 11 loads till class 1 220 cum

QA:
· 5 loads 6" 100 cum
· 5 loads 3/4 100 cum
· Start Geotextile
· Slope North cell 1+134 @ 1+183

OWNER: QA: Big rocks upstream.

General Planning/Comments:

SANA: · Complete North abutment
· lift 143 → 143.5
· Slope North cell

QA:

OWNER: Controle lift elevation

Report By: Justine Petrucci

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DAILY CONSTRUCTION MEETING

SADDLE DAMS 3-4-5

AGNICO EAGLE
MEADOWBANK

Date: 16/07/2018

Time: 8h00

Presents:

AEM: Frédérick Bolduc, Justine Petrucci, ~~Denis Gosselin~~

SANA: Sabin Larouche, François Gravel Grenier, Pierre Gautier

QA: Samuel Barbeau

QC: Daniel Roy

Health & Safety:

Nothing to report

Daily Advance:

SANA: Bull north cell 2+278 @ 2+289

Slope north cell 2+547 @ 2+720

finish 152 part (slope muck) 1+115 @ 1+134

SD3 : north abutment

4 load class 1 fill 80 cm

QA: 9 load class 2 fill 180 cum

4 load 6" 80 cum

4 load 0-3/4 80 cum

OWNER: 7 loads muck 140 cum

General Planning/Comments:

SANA: finish fill hole SD3

· lift 143.5 (1 1/2 to 2 DAYS)

· Slope north cell

· Pipe SD3 to move ?

QA:

OWNER:

Report By: Justine Petrucci

DAILY CONSTRUCTION MEETING

SADDLE DAMS 3-4-5

AGNICO EAGLE
MEADOWBANK

Date: 17/07/2018

Time: 8h00

Presents:

AEM: Frédérick Bolduc, Justine Petrucci

SANA: Sabin Larouche, François Gravel Granier,

QA: Marion H

QC: Mathieu

Health & Safety:

Tell airport controller to call the plane

Daily Advance:

SANA: North abutment 20+568 @ 20+599 Muck backfill
Hole north 20+569 @ 20+691 29 loads class 2 till
Sloping NC 2+409 @ 2+547
600 m to go for 154

QA:

OWNER:

General Planning/Comments:

SANA: Finish protection layer class 2 till
Compactor still down
Ditch + capping → follow the plan

QA:

OWNER: 8000 T of muck
The pipe needs to be moved

Report By:

DAILY CONSTRUCTION MEETING

SADDLE DAMS 3-4-5 NORTH CELL AND CENTRAL DIKE

AGNICO EAGLE
MEADOWBANK

Date: 18/07/2018

Time: 8h00

Presents:

AEM: Frédérick Bolduc, Justine Petrucci, Denis Gosselin

SANA: Sabin Larouche, François Gravel Grenier

QA: Marion Habersetzer

QC: Mathieu Côté

Health & Safety:

Blast vault 12:45

Surveyor twist anckle on north cell, went at the clinic => OK!

Airport controler need to call on Dike chanel

Daily Advance:

SANA: NC : 2+190 @ 2+278 (night shift)

SD3: Rockfilled protection layer 13 loads 260 cum 20+668 @ 20+777

NPAG 20+668 @ 20+777

Till 20+619 @ 20+777

QC: Compaction north abutment 20+569 @ 20+595

QA: Re do the compaction on the same chainage

OWNER:

General Planning/Comments:

SANA: Finish NoPag protection

Finish SD3

Switch to North cell (152 for august 1st)

QA:

OWNER:

Report By: Justine Petrucci

DAILY CONSTRUCTION MEETING

SADDLE DAMS 3 - CENTRAL DIKE 2018

AGNICO EAGLE
MEADOWBANK

Date: 19/07/2018

Time: 8h06

Presents:

AEM: Frédérick Bolduc, Justine Petrucci, Denis Gosselin

SANA: Sabin Larouche

QA: Marion Habersetzer

QC: Mathieu Côté

Health & Safety:

Nothing to report

Daily Advance:

SANA: NC : 2+103

443 m to go

SD3 : protection backfill 20+708 @ 20+777

finish backfill south abutment 20+777 @ 20+807 + 2 loads class 1 till

8 loads 0-3/4 (160 cu.m)

~~QA~~ 8 loads 6" (160 cum)

2 Non Pay loads (40 cu.m)

North abutment 20+599 @ 20+613

~~OWNER:~~ 2 loads 0-3/4 (40 cu.m)

General Planning/Comments:

SANA: finish north and south abutment

move to North cell (august 1st)

QA:

OWNER:

Report By: Justine Petrucci

DAILY CONSTRUCTION MEETING

SADDLE DAMS 3 - CENTRAL DIKE 2018

AGNICO EAGLE
MEADOWBANK

Date: 2017/07/20

Time: 8h00

Presents:

AEM: DG, AL

SANA: MG, SL, LB, FGG

QA: MH

QC: MC

Health & Safety:

-> Near miss 2 haul truck AEM waiting SANA truck passing
-> Specific Risk: communic before passing.

Daily Advance: NC

SANA: -> 1+984 rockfill 154 (324m left)
-> CoarseF 1+113 -> 1+200 26 loads 650m3
-> Compac 1+200 -> 1+170
-> FF 1+205 -> 1+215 4 loads 100 m3

QA: SD3 20+599 -> 20+613 plug
CF 20m3
RF 60m3

OWNER: compaction

General Planning/Comments:

SANA: -> complete FF 152

QA:

OWNER:

Report By:

DAILY CONSTRUCTION MEETING
SADDLE DAMS 3 - CENTRAL DIKE 2018

AGNICO EAGLE
MEADOWBANK

Date: 2018/07/21
Time: 8h00

Presents:

AEM: AL,
SANA: SL, MG, FGG
QA: MH
QC: MC

Health & Safety:

-> Near miss Ame with backhoe
-> Beth

-> Blast Vault

Daily Advance:

SANA: FF 1+113 -> 1+265 (152) 29 loads 725m3
CF 2+575 -> 2+710 (154)
2+411 -> 2+460 } 28 loads 700 m3
Compact
CF 1+513 -> 1+143

QA: RF -> 1+947

OWNER:

General Planning/Comments:

SANA: CF placement 154
Compact EF
Placement FF

QA:

OWNER:

Report By:

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DAILY CONSTRUCTION MEETING

SADDLE DAMS 3 - CENTRAL DIKE 2018, NORTH CELL

AGNICO EAGLE
MEADOWBANK

Date: 22/07/2018

Time: 8h00

Presents:

AEM: Justine Petrucci

SANA: Sabin Larouche, François Gravel Grenier, Luc Blanchette, Mickael Gagnon

QA: Marion Habersetzer

QC: Mathieu Côté

Health & Safety:

SLOW DOWN WHEN PASSING CLOSE TO THE PERSON THAT ARE WALKING, LOT OF DUST

Daily Advance:

SANA: ROCKFILL NC 1+863

FINE FILTER 2+770 @ 2+445 39 loads 975 cu.m

CF 0-6" 2+575 @ 2+460 6 loads 150 cu.m

COMPACTION 6" 2+770 @ 2+411

COMPACTION 0-3/4 1+251 @ 1+660

QA:

OWNER:

General Planning/Comments:

SANA: CD: TILL, 3/4, 6", MUCK COMPACTION NORTH CELL

1 SLOPE NC

FINISH CENTRAL DIKE

QA:

OWNER: Rockfill volume needed NC: ≈15000 cu.m

Report By: Justine Petrucci

DAILY CONSTRUCTION MEETING

SADDLE DAMS 3 - CENTRAL DIKE 2018, North Cell

AGNICO EAGLE MEADOWBANK

Date: 23/07/2018

Time: 8h00

Presents:

AEM: Justine Petrucci, Alex Lavallée, Denis Gosselin

SANA: Sabin Larouche, François Gravel Grenier, Mickael Gagnon

QA: Marion Habersetzer

QC: Mathieu Côté

Health & Safety:

wildlife

Airport controller do not call on Dike channel since the work at SD3 are complete

Daily Advance:

SANA: complete CD 0+147 @ 0+177

till, 0-3/4, 0-6

5 loads till 100 cu.m

4 loads 6" 80

3 loads 0-3/4 60 cu.m

Slope 2+459 @ 2+409

~~North~~ cell:

~~Coarse~~ filter

Rockfill (no advance)

QA: 9 loads muck

OWNER:

General Planning/Comments:

SANA: NC: · rock fill · crew change

· coarse filter

· compaction

QA: NC: 0,5 for the ditch

OWNER: Priority for muck is for the dike (NC)

QA need to define deposition point with AEM

Report By: Justine Petrucci

DAILY CONSTRUCTION MEETING

~~SADDLE DAMS 2 - CENTRAL DIKE 2018~~ NORTH CELL

AGNICO EAGLE
MEADOWBANK

Date: 24/07/2018

Time: 8h00

Presents:

AEM: Justine Petrucci, Alex Lavallée,

SANA: ~~Patricia~~ Ouellette, Luc Blanchette

QA: Marion Habersetzer

QC: Mathieu Côté

Health & Safety:

Nothing to report

Daily Advance:

SANA: Slope rockfill 2+159 + 2+600 — 0-6" 27 loads

CF 2+293 @ 2+080 — 0-3/4 22 loads

FF 2+460 @ 2+300 — CD - complete

Compaction CF 2+093 @ 2+080

Compaction FF 2+700 @ 2+650

QA:

OWNER:

General Planning/Comments:

SANA: • Rockfill slope

• Sump NC QA on the field

Ditch:

QA: Sump localisation

OWNER: Ditch + Sump need to be complete on 08/01

+ Deposition point

Report By: Justine Petrucci

DAILY CONSTRUCTION MEETING

~~**SADDLE DAMS 3 - CENTRAL DIKE 2018**~~ NORTH CELL

AGNICO EAGLE
MEADOWBANK

Date: July 25th, 2018

Time: 8h00

Presents:

AEM: Nicholas Blackburn, Alexandre Lavallée

SANA: Luc Blanchette, Patrice Ouellette

QA: Marion Habersetzer

QC: Mathieu Côté

Health & Safety:

- Dust Control. Keep a proper distance between vehicules when driving on the North Cell.
- DS slope for sump: Loose material

Daily Advance: (july 24th)

SANA:
- Slope rockfill 2+159@1+185
- 0-6" - 21 loads
- 0-3/4" - 23 loads
- CF 2+080 @ 1+910
- FF 2+300 @ 2+090
- Compaction CF 2+080@2+000
- Compaction FF 2+650@2+520
- Ditch: 1+700 @ 1+650
- Sump: 0+010 @ 0+030

OWNER:

General Planning/Comments:

SANA:
- Complete 0-6" compaction (rockfill completed)
- Continue work @ ditch on East side
- Fingers for deposition points

QA:

OWNER:
- Coordinates for deposition points required.

Report By: Nicholas Blackburn

DAILY CONSTRUCTION MEETING

SADDLE DAMS 3 - CENTRAL DIKE 2018

AGNICO EAGLE
MEADOWBANK

Date: 2018-07-26

Time: 8h00

Presents:

AEM: AL

SANA: LB, PO

QA: MH

QC: MC

Health & Safety:

ϕ

Daily Advance:

SANA: RF @ 1+830 ~~[illegible]~~ (1+947)

CF 1+910 → 1+850 (3 loads) 2+000 1+890 compa 3 loc

FF 2+090 → 1+890 (24 loads)

Depos. 1+455 / 1+985 } 23 from NPAG 135

QA:

Trench 1+455 → 1+985

OWNER:

General Planning/Comments:

SANA: → Fingers

→ Trench (culvert)

→ Pipe

→ CF, FF, RF

QA:

OWNER:

Report By:

DAILY CONSTRUCTION MEETING
SADDLE DAMS 3 - CENTRAL DIKE 2018

AGNICO EAGLE
MEADOWBANK

Date: July 27th, 2018
Time: 8:00

Presents:

AEM: NB, AL, AH,
SANA: LB, MG
QA: MH
QC: MC

Health & Safety:

· Focus on dust control

Daily Advance: (july 26th)

SANA: · Slope backfill: 1+930 · 0-6" :
· CF: — · 0-3/4" :
· FF: —
· Compaction CF : —
· Compaction FF : 1+251 1+240
QA: · Ditch : 1+470 @ 1+4100 → excavation ~8m deep
· Sump : Excavation ~0.5m @ sump @ 3+010 to 3+030
· Deposition point at : 5+ 2+240, 2+440, 2+610,
OWNER: 2+790 and 1+725

General Planning/Comments:

SANA: · Other sump excavation
· Continue Ditch excavation if sump work is completed

QA: Sump need reject material at bottom and slope

OWNER:

Report By: Nicholas Blackburn

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DAILY CONSTRUCTION MEETING

SADDLE DAMS 3 - CENTRAL DIKE 2018

AGNICO EAGLE MEADOWBANK

Date: July 28th, 2018

Time: 8:00 am

Presents:

AEM: NB, JC, AH

SANA: MG

QA: MH

QC: MC

Health & Safety:

The heavy rain from yesterday reduced the dust @ NC.

Daily Advance: (July 27th)

SANA:
- Rockfill (154 m) sta. 1+830 to 1+860 + Remove excess RF
- CF compaction @ 1+240 to 1+100 and ~~+5~~ 3+141 + 2+220
- ~~CF~~ Excavation of ditch from 1+400 to 1+380 + culvert installed @ 1+460
- North sump correction (erosion protection)

QA:
- Excavation of the other sump (south) + reject mo.

OWNER:

General Planning/Comments:

SANA:
- Rock fill slope progress
- Fine filter progress
- Tarmarap on deposition point
- Coarse filter

QA:

OWNER: Jerome Collard to go with MG for instrument at SD3

Report By: NBlackburn

DAILY CONSTRUCTION MEETING

SADDLE DAMS 3 - CENTRAL DIKE 2018

AGNICO EAGLE
MEADOWBANK

Date: July 29th, 2018

Time: 8:00 am

Presents:

AEM:

SANA:

QA:

QC:

Health & Safety:

Daily Advance:

SANA: No meeting occured on july 29th. No SANA Foreman could attend the meeting

QA:

OWNER:

General Planning/Comments:

SANA:

QA:

OWNER:

Report By:

DAILY CONSTRUCTION MEETING

SADDLE DAMS 3 - CENTRAL DIKE 2018

AGNICO EAGLE
MEADOWBANK

Date: July 30th

Time: 8:00 am

Presents:

AEM: NB, AL

SANA: MB, LB

QA: MH

QC: MC

Health & Safety:

- Haul truck and pick up incident will be investigated. The event occured on July 28th ~11:40 am

Daily Advance:

SANA:
- CF placement and compaction 1+940 - 1+926 (12 loads)
- Rock fill slope 1+780 - 1+700
- FF placement + compaction 1+920 - 1+830 (11 loads)
- Built access to work on trench

QA:

OWNER:

General Planning/Comments:

SANA:
- ~~Built an access to work on the trench~~
- Coarse filter
- Terra nap
- Excavation of the trench to be done this afternoon.

QA:

OWNER:

Report By: Nicholas Blackburn

DAILY CONSTRUCTION MEETING

SADDLE DAMS 3 - CENTRAL DIKE 2018

AGNICO EAGLE
MEADOWBANK

Date: 2018/07/31

Time: 8:00

Presents:

AEM: AL, NB

SANA: MG

QA: MH

QC:

Health & Safety:

- Nothing to be reported

Daily Advance:

SANA:
- Finger done with terranap
- 21 loads of 6" (625 m²) → 1+826 1+660
- 13 loads 3/4" (325 m²) → 1+800 1+700
- Slopping → 1+740 1+640
- No work done on the trench

QA:

OWNER:

General Planning/Comments:

SANA:
- Reject material to be placed in the trench
- Continue excavation of the trench

QA:

OWNER:

Report By: Nicholas Blackburn

DAILY CONSTRUCTION MEETING

SADDLE DAMS 3 - CENTRAL DIKE 2018

AGNICO EAGLE
MEADOWBANK

Date: 2018/08/01

Time: 8:00

Presents:

AEM: AL, NB

SANA: MG, LB

QA: MH

QC: HP

Health & Safety:

Loader scrapped the road for better access

Daily Advance:

SANA:
- Ditch excavation ~1+200
- Till reject is placed in the ditch
- Filter (Fine) 1+700 to 1+660
- Tera nap installed on all deposition point

QA:
- Compaction completed below last deposition point

OWNER:

General Planning/Comments:

SANA:
- Ditch (excavation + till reject)

QA:

OWNER:

Report By: Nicholas Blackburn

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DAILY CONSTRUCTION MEETING

SADDLE DAMS 3 - CENTRAL DIKE 2018

AGNICO EAGLE
MEADOWBANK

Date: 8/03/2018

Time: 8:00

Presents:

AEM: FLB, PP

SANA: René Collard

QA: –

QC:

Health & Safety:

- NA

Daily Advance:

SANA: ditch NC. Some corrective work to be done to ensure gravity drainage

QA:

OWNER:

General Planning/Comments:

SANA: Ditch and sump

QA:

OWNER:

Report By: Frédérick L. Bolduc

APPENDIX E

QA Reporting

APPENDIX E-1

QA Weekly Reports

QA WEEKLY REPORT

DATE May 21st 2018 1897439-1577-TM-Rev0

TO Patrice Gagnon, Pier-Éric McDonald
Agnico Eagle Mines Ltd, Meadowbank Division

CC Frédérick Bolduc, Alexandre Lavallée

FROM Marion Habersetzer **EMAIL mhabersetzer@golder.com**

QA WEEKLY REPORT FROM MAY 19TH TO MAY 20TH – TSF NORTH CELL CONSTRUCTION MEADOWBANK (1897439)

This document summarizes QA activities performed by Golder from May 19th to 20th, 2018 inclusively, related to the construction activities of the North Cell Internal Structure at the Meadowbank mine site.

Unless otherwise specified, the construction activities use the centreline of the structures for a dike crest elevation of 152 m for reference (refer to the Drawings). The description of activities refers to the stations and offsets from the centreline (e.g., Sta. 0+500/-50 m). The “+” and “-” symbols indicate the location of the work downstream and upstream of the centreline, respectively.

1.0 GOLDER PERSONNEL ON SITE

Golder personnel on site during this reporting period is summarized in Table 1.

Table 1: Golder Personnel on Site

Name	Comments
Marion Habersetzer	QA Manager (on site since May 14th)

2.0 HEALTH AND SAFETY

H&S meetings were held with AEM and FGL/SANA during the daily construction meetings. Minutes from these meetings are recorded and stored in Golder’s on-site office. The key H&S elements for the reporting period were as follows:

- Cold weather and ice: apply caution when driving or walking on icy surfaces, wear appropriate clothing.

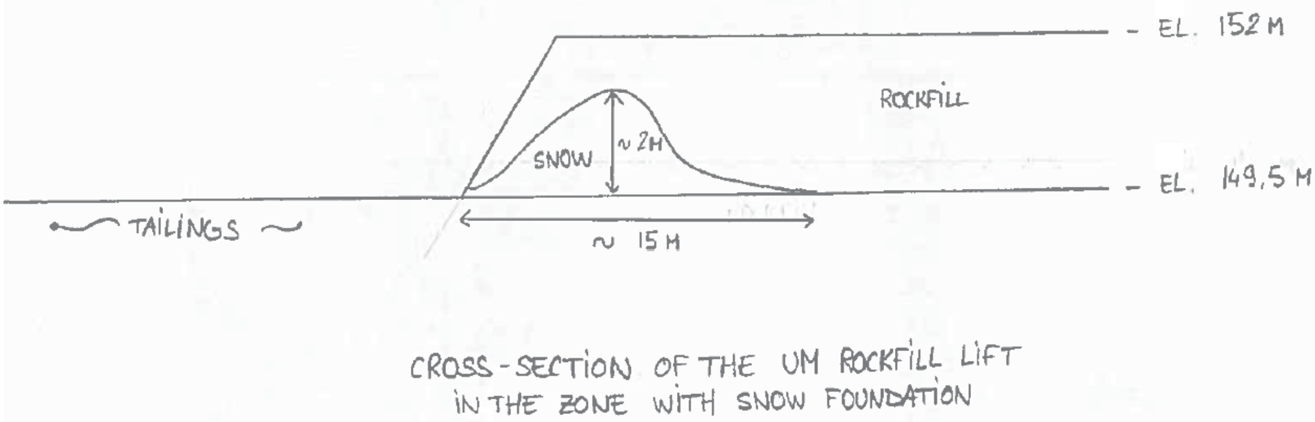
- Dust is still an issue on the construction field; be vigilant by staying out of the dust cloud near construction activities and road circulation. The personnel working on foot has to wear a mask due to the toxicity of the dust (fine tailings dust).
- Coactivity on the dike: be aware of blind spots and safe spots, keep good communication and visual contact with the operators.
- The test pits excavated in the UM rockfill have steep slopes and some rockfill is falling as the walls dry. Do not enter an unsupported excavation that is more than 1.2 m deep.

3.0 SUMMARY OF MAIN DISCUSSIONS IN CONSTRUCTION MEETINGS

Construction meetings were held daily during the reporting period and were attended by the QA Manager. The following items were discussed:

General

- Works of the North Cell Internal Structure have begun on May 19th.
- The rockfill used for the North Cell Internal Structure is well-graded non-AG material. AEM indicated that both intermediate volcanic (IV) and ultramafic volcanic (UM) rockfill have been used, although the majority of the material is UM rockfill.
- The upstream toe of the rockfill capping has been mapped to perform a field fitting of the design, as the Internal Structure will be offset towards the center of the North Cell compared to the initial plans. This has been agreed with the Designer. A new centerline will be provided by SANA's surveyor. In the meantime, the locations of works and photographs in this report are indicated on the enclosed plans.
- It was pointed out that an elevation guide was required for the dozer operator for rockfill placement, as the D9 dozer is not equipped with a GPS to control the elevation of the rockfill lift. The current elevation of the lift is variable (approx. 152 m) and will be surveyed by SANA.
- It was noticed that the 2-m thick UM rockfill at El. 152 m (approx.) was placed on an important layer of hard snow (up to 2 m thick) without QA/QC supervision earlier in the season (see photographs and sketch below), over a distance of approx. 100 m along the dike. It is required to remove this rockfill and clear the snow before placing rockfill again, as the presence of an underlying snow layer will cause excessive settlement in the structure. It was reiterated that per the design, the foundation of the structure must be snow-free, compacted rockfill material constituting the capping of the North Cell.



- Test pits were excavated to identify the extent of the snow layer. Since snow was not observed in the northern part of the UM rockfill lift, which appears to be built directly on the North Cell capping, it was decided to move the operations there and progress towards the north. The excavator removes the snow-rich toe of the UM rockfill lift until snow is no longer observed (a 2-3 m wide zone in average), and a dozer pushes the excavated material (UM rockfill mixed with snow) toward the center of the North Cell to clear the upstream toe.
- The QA Manager noticed several oversize boulders on the UM rockfill lift at El. 152 m and reiterated that the maximum allowable size on the dikes is 1.3 m. AEM forwarded the information to the operators in the pit and on the dikes. If an oversize boulder is delivered on the dikes, it will be pushed aside in the downstream slope by the dozer during placement. The QA Manager reiterated that oversize boulders already in place in the upstream slope of the structure must be removed during sloping operations. The boulders will be moved into the tailings of the North Cell.
- In order to guide the dozer operator during UM rockfill placement, a surveyor checks the elevation of the lift throughout the day. The surveyor also provides guidance to the excavators profiling the upstream slope of the UM rockfill lift from El. 150 m to 152 m.

Follow up

- Oversize boulders removal and quality of the UM rockfill.
- Review the new alignment of the Internal Structure.

4.0 SUMMARY OF CONSTRUCTION ACTIVITIES AND TEST RESULTS

Periodic QA inspections to monitor the construction activities and progress were performed by the QA Manager; these are summarized in the tables below. For the location and extent of the construction works, refer to the enclosed plans.

Table 2: QA Observations for the North Cell Internal Structure

Activity or Area	Comments
Upstream	■ Excavation of 2 test pits in the UM rockfill lift placed at El. 152 m to estimate the extent and thickness of the underlying snow layer. ■ Excavation of the snow-rich upstream toe material on an average width of 2 to 3 m with an excavator. ■ Removal of the excavated material, pushed with a dozer toward the center of the North Cell to clear the upstream toe. ■ Placement of UM rockfill material from safety berms on the crest in the upstream slope with a dozer. ■ Profiling of the upstream slope (3H:1V) from El. 150 to 152 m with an excavator. ■ Placement a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer. The material is of good quality and is well graded.

5.0 SAMPLING, LABORATORY AND FIELD TESTING

Table 3 and

Table 4 present the samples collected or tested by the QA and QC as well as PNG field results.

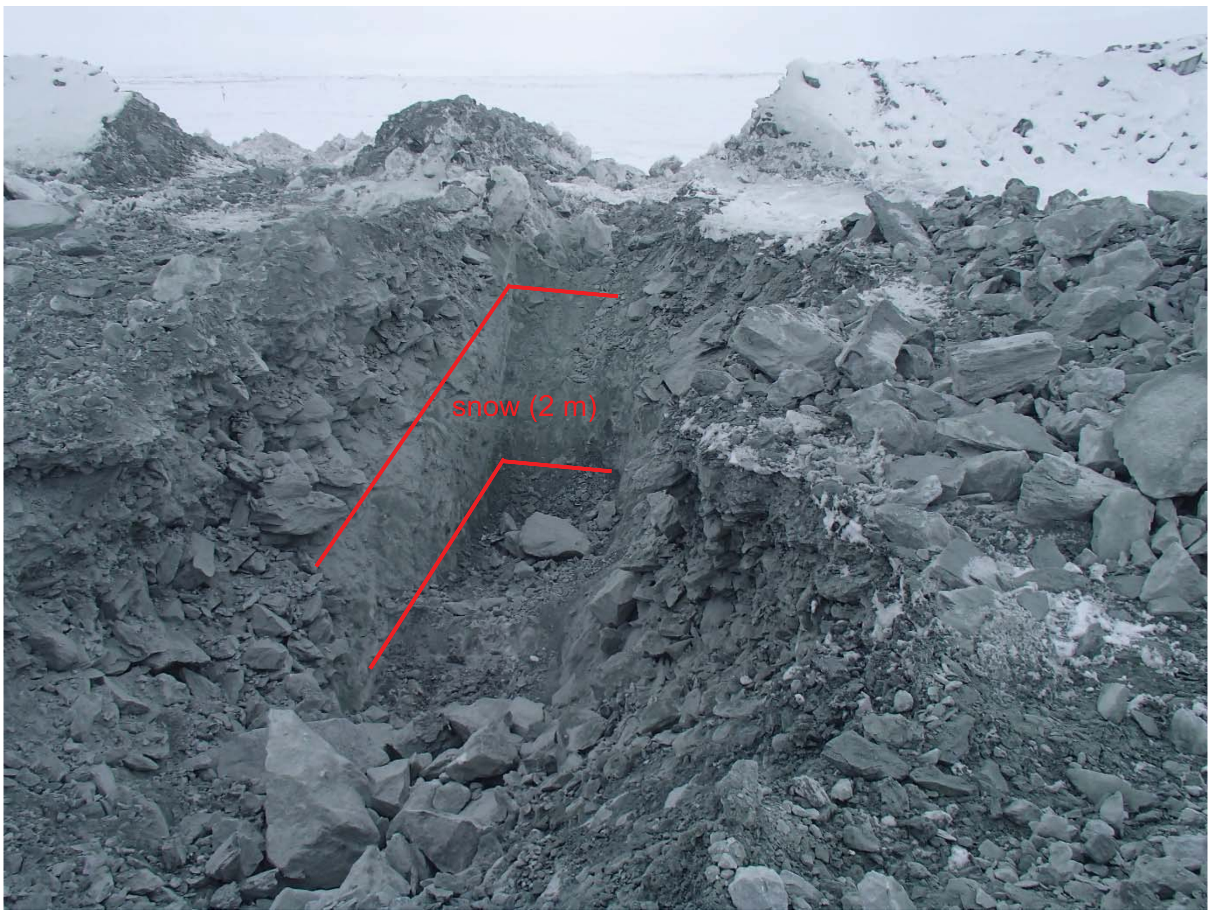
Table 3: Samples Taken by the QC

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result

Table 4: Samples Taken by the QA

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result

6.0 PHOTOGRAPHS



Photograph NCIS-001: View of a test pit in the UM rockfill lift at El. 152 m: a thick layer (2 m) of snow underlies the rockfill.

Photograph NCIS-002: View of the scraped upstream side of the UM rockfill lift at El. 152 m: a thick layer of snow (1.5 m) underlies the rockfill.

Photograph NCIS-003: Excavation of the snow-rich upstream toe material on an average width of 2 to 3 m with an excavator.

Photograph NCIS-004: View of the scraped upstream side of the UM rockfill lift at El. 152 m further to the north: the snow layer is only observed at the toe and is approximately 0.5 m thick.

Photograph NCIS-005: Removal of the excavated material, pushed with a dozer towards the center of the North Cell to clear the upstream toe.

Photograph NCIS-006: View of oversize boulders on the UM rockfill lift at El. 152 m.

Photograph NCIS-007: Profiling of the upstream slope (3H:1V) from El. 150 to 152 m with an excavator.

Photograph NCIS-008: Placement a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer. The material is of good quality and is well graded.

Marion Habersetzer, M.Sc.
Mine Waste Group

REGISTERED PROFESSIONAL ENGINEER
Y. BOULIANNE
LICENSEE
2018-05-21
NT/NU

Yves Boulianne, P.Eng.
Associate, Senior Geotechnical Engineer

Attachments: Daily progress drawings for May 19th to 20th

MH/YB/

https://golderassociates.sharepoint.com/sites/1897439/preparation of deliverables/weekly reports/2018-05-14 to 2018-05-20/north cell/1897439-1577-tm-rev0 qa weekly report north cell 2018-05-19 to 2018-05-20.docx

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PERMIT NUMBER: P 049
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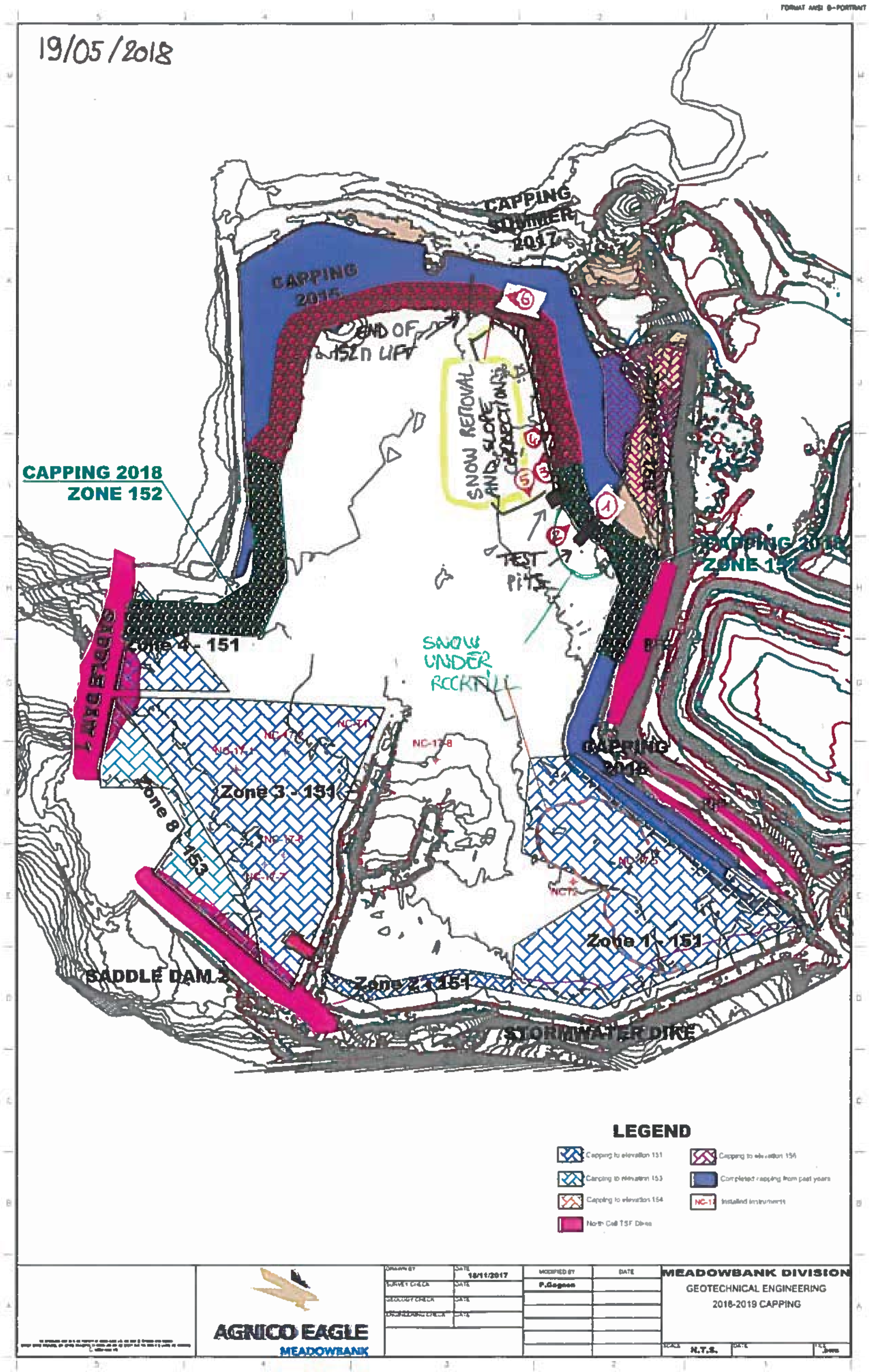
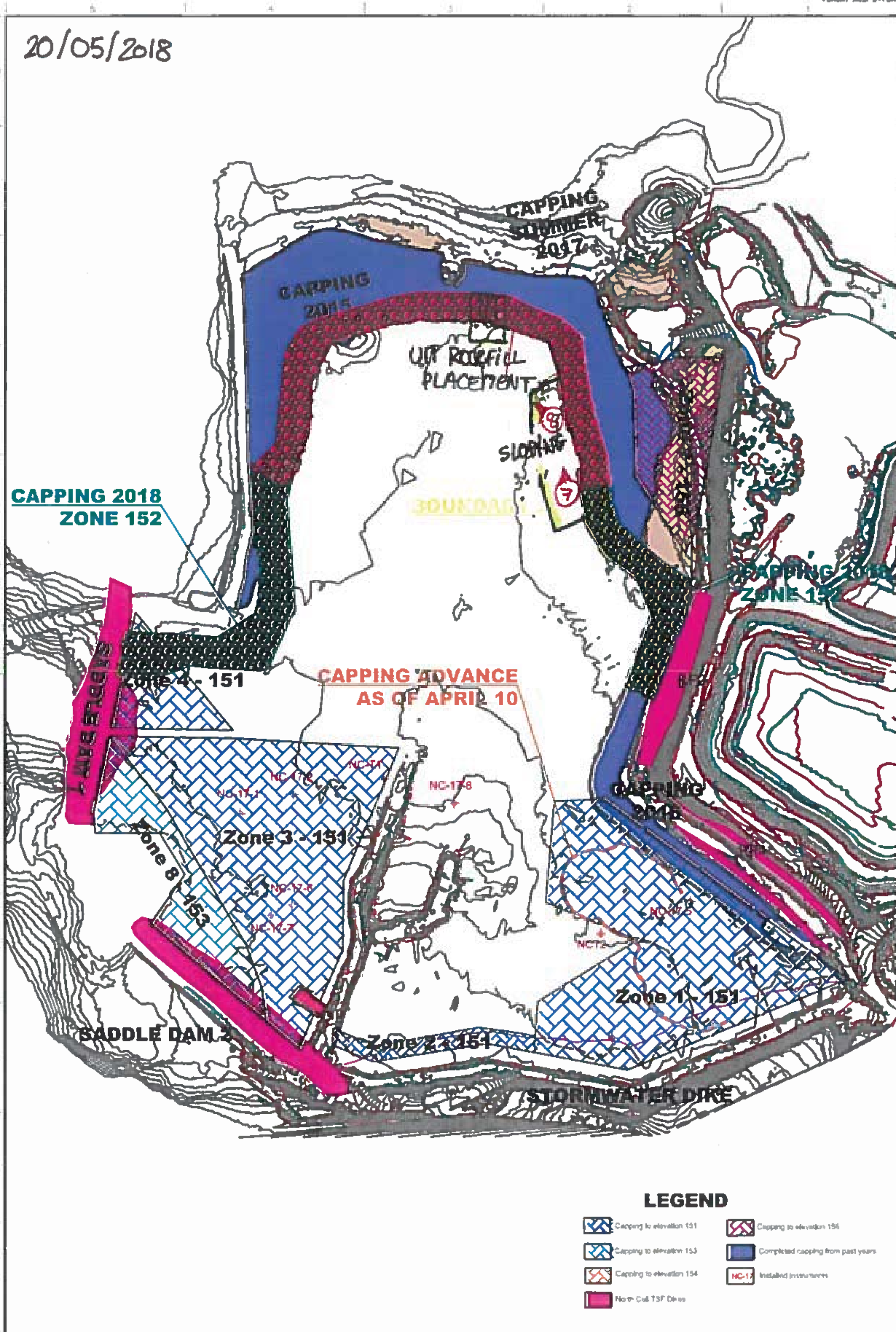

19/05/2018
CAPPING SUMMER 2017
CAPPING 2015
END OF 152m LIFT
SNOW REMOVAL AND SLOPE CORRECTION
CAPPING 2018 ZONE 152
TEST PITS
SNOW UNDER ROCKFILL
Zone 4 - 151
Zone 3 - 151
Zone 8 - 153
CAPPING 2018
Zone 1 - 151
Zone 2 - 151
SADDLE DAM 2
STORMWATER DIKE
LEGEND
Capping to elevation 151
Capping to elevation 153
Capping to elevation 154
North Cell TSF Dikes
Capping to elevation 156
Completed capping from past years
Installed instruments
AGNICO EAGLE
MEADOWBANK
18/11/2017
P.Gagnon
MEADOWBANK DIVISION
GEOTECHNICAL ENGINEERING
2018-2019 CAPPING
N.T.S.



AGNICO EAGLE
MEADOWBANK

DRAWN BY	DATE 18/11/2017	MODIFIED BY	DATE
SURVEY CHECK	DATE	P.Gagnon	
GEOTECH CHECK	DATE		
ENGINEERING CHECK	DATE		

MEADOWBANK DIVISION

GEOTECHNICAL ENGINEERING

2018-2019 CAPPING

SCALE N.T.S.

GOLDER

QA WEEKLY REPORT

DATE May 28th 2018 1897439-1577-TM-Rev0

TO Patrice Gagnon, Pier-Éric McDonald
Agnico Eagle Mines Ltd, Meadowbank Division

CC Frédérick Bolduc, Alexandre Lavallée

FROM Marion Habersetzer **EMAIL mhabersetzer@golder.com**

QA WEEKLY REPORT FROM MAY 21ST TO MAY 27TH – TSF NORTH CELL CONSTRUCTION MEADOWBANK (1897439)

This document summarizes QA activities performed by Golder from May 21st to 27th, 2018 inclusively, related to the construction activities of the North Cell Internal Structure at the Meadowbank mine site.

Unless otherwise specified, the construction activities use the centreline of the structures for a dike crest elevation of 152 m for reference (refer to the Drawings). The description of activities refers to the stations and offsets from the centreline (e.g., Sta. 0+500/-50 m). The “+” and “-” symbols indicate the location of the work downstream and upstream of the centreline, respectively.

1.0 GOLDER PERSONNEL ON SITE

Golder personnel on site during this reporting period is summarized in Table 1.

Table 1: Golder Personnel on Site

Name	Comments
Marion Habersetzer	QA Manager (on site since May 14th)

2.0 HEALTH AND SAFETY

H&S meetings were held with AEM and FGL/SANA during the daily construction meetings. Minutes from these meetings are recorded and stored in Golder’s on-site office. The key H&S elements for the reporting period were as follows:

- Cold weather and ice: apply caution when driving or walking on icy surfaces, wear appropriate clothing.

- Dust is still an issue on the construction field; be vigilant by staying out of the dust cloud near construction activities and road circulation.

3.0 SUMMARY OF MAIN DISCUSSIONS IN CONSTRUCTION MEETINGS

Construction meetings were held daily during the reporting period and were attended by the QA Manager. The following items were discussed:

General

- A field-fitted design has been proposed by SANA (see plan enclosed) and approved by AEM and Golder for the alignment of the North Cell Internal Structure. The stations of the new alignment are marked on the UM rockfill lift as it progresses. However, the QA Manager has not received the centerline for the portable GPS yet; as a result, offsets measurements for daily progression and photographs locations are not available yet.
- The footprint of the North Cell Internal Structure at approx. Sta. 1+700 m, marked on the field with stakes to guide the UM rockfill placement, has been adjusted as it was too wide due to a surveying inaccuracy. The whole alignment of the North Cell Internal Structure will be marked on the field and the snow in the footprint removed, so no further access to the tailings surface is required, as it will soon thaw and become soft.
- According to the survey done on the existing UM rockfill lift at El. 152 m (approx.), it appears that the actual lift thickness varies from 0.9 m to 3.5 m. The elevations of the crest range from 151.9 m to 153.9 m. The foundation (North Cell capping) is variable in elevation. Only one section of the UM rockfill lift was thicker than 2.8 m: this section was corrected with the dozer. The UM rockfill lift is now lowered to maximum El. 153 m, corresponding to a maximum lift thickness of 2.5 m. It has been agreed with the Designer that a lift thickness of maximum 2.5 m could be left as is, as it is not expected to affect the maximum achievable compaction significantly with special attention paid to compaction (6 passes of the compactor). A closer follow-up in the UM rockfill lift elevation is required to ensure the lift is built uniformly at El. 152 m.
- Following discussions with AEM and the Designer, it should be noted that the downstream slopes of the internal structure which were originally designed with a 2.5H:1V on a tailings foundation, expected to thaw in summer, can be built with a 1.5H:1V provided AEM is aware of the probability of shallow failures. Analyses show that the potential failure paths associated with FoS values of 1.2 and 1.5 are limited to the area of the 2.3 m high safety berm and do not penetrate into the vehicle path itself on the crest. The risk of these potential shallow failures is tolerable as long as there is a regime in place to monitor for localized failures and to repair them if they occur.
- A small amount of Iron Formation (IF) rockfill was mistakenly placed on the North Cell Internal Structure (see photograph below). IF rockfill is a PAG material and is not suitable for dike construction; it was therefore removed before further placement of UM rockfill.
- The QA Manager reiterated that the rockfill should be placed by the dozer and not unloaded directly in the slope of the lift by the haul trucks. The purpose is to limit segregation of the rockfill particles during placement.

- The QA Manager asked to know the total volume of UM rockfill placed on the North Cell Internal Structure at the end of the construction for as-built reporting.
- The QC representative marked some oversize boulders on the upstream slope with paint. The boulders need to be removed during sloping operations.
- The UM rockfill lift at El. 152 m included a portion where the 2015 North Cell rockfill capping is built on the natural soil (thin layer of organic soil overlying till), between Sta. 1+800 m and 1+900 m approximately. The toe of the UM rockfill lift reaches beyond the toe of the capping, meaning the dike is partially founded on unprepared natural soil. The filter zone is also expected to extend on the natural soil. A test pit has been excavated to estimate the thickness of the soil layer; however, the frozen conditions prevented the excavator from reaching deeper than about 200 mm (see photograph below). The QA Manager asked that the surveyor estimate the width of the lift that lies beyond the capping. The upstream slope in this section was not profiled and further discussions will follow regarding actions to take.
- Profiling of the upstream slope has reached the maximum progress. Due to a shortage of UM rockfill at the moment, sloping operations were interrupted on May 27th and will resume when rockfill placement has progressed.
- If there are operators available, compaction of the UM rockfill lift at El. 152 m could be done over the next few weeks. The zone which will be raised to El. 145 m will be compacted in priority.
- Many different operators are working on the North Cell Internal Structure depending on the days. Instructions need to be repeated to each new worker when they arrive on the structure.
- The downstream ditches excavation will require drilling and blasting, as the ground is frozen.

Follow up

- The quality and gradation of the UM rockfill placed on the structure is now satisfactory.
- The alignment of the Internal Structure has been reviewed (see plan enclosed).
- Centerline to be obtained from SANA for QA follow-up of activities using the portable GPS.
- Decision to make with AEM about the foundation of the section of the structure between Sta. 1+800 m and 1+900 m, built on unprepared natural soil.

4.0 SUMMARY OF CONSTRUCTION ACTIVITIES AND TEST RESULTS

Periodic QA inspections to monitor the construction activities and progress were performed by the QA Manager; these are summarized in the tables below. For the location and extent of the construction works, refer to the enclosed plans.

Table 2: QA Observations for the North Cell Internal Structure

Activity or Area	Comments
Upstream	■ Profiling of the upstream slope (3H:1V) from El. 150 to 152 m with an excavator from Sta. 2+777 m to 1+638 m. The portion between Sta. 1+900 m and 1+800 m, where the structure is built on the natural ground, was not profiled. ■ Placement of a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+880 m to 1+535 m (offset unavailable). The material is of good quality and is well graded. ■ Removal of the safety berms (UM rockfill), pushed with a dozer into the upstream slope or with the excavator during slope profiling, from Sta. 2+777 m to 1+678 m (approx.). Safety berms were replaced by blocks to mark the edge. ■ Correction of the crest elevation with a dozer and an excavator to achieve a closer elevation to 152 m around Sta. 2+650 m and 2+000 m. ■ Removal of PAG material placed on the structure at approx. Sta. 1+770 m with an excavator.

5.0 SAMPLING, LABORATORY AND FIELD TESTING

Table 3 and Table 4 present the samples collected or tested by the QA and QC.

Table 3: Samples Taken by the QC

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result

Table 4: Samples Taken by the QA

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result

6.0 PHOTOGRAPHS

Photograph NCIS-009: Placement of a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+880 m to 1+825 m (offset unavailable).

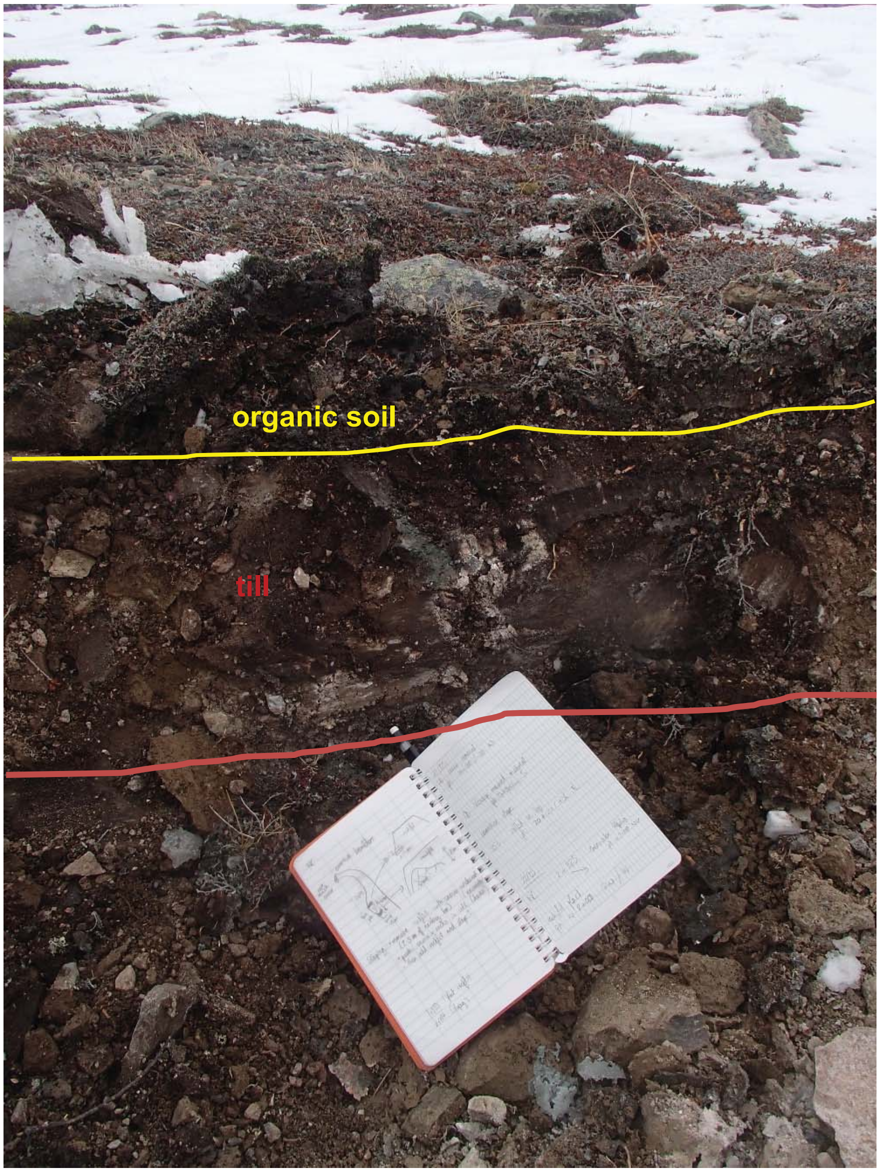
Photograph NCIS-010: Profiling of the upstream slope (3H:1V) from El. 150 to 152 m with an excavator from Sta. 2+777 m to 2+400 m (approx.).

Photograph NCIS-011: From Sta. 2+000 m (approx.), looking SW. Placement a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+880 m to 1+767 m (offset unavailable).

Photograph NCIS-012: From Sta. 2+000 m (approx.), looking NW. Profiling of the upstream slope (3H:1V) from El. 150 to 152 m with an excavator from Sta. 2+325 m to 2+275 m (approx.).

Photograph NCIS-013: From Sta. 2+600 m (approx.), looking NE. Correction of the crest elevation with an excavator to achieve a closer elevation to 152 m around Sta. 2+650 m.

Photograph NCIS-014: From Sta. 1+900 m (approx.), looking SE. View of the natural soil on which the 2015 capping is built.



Photograph NCIS-015: From Sta. 1+850 m (approx.), looking S. View of the 200 mm deep test pit excavated into the natural soil. A thin layer or organic soil overlies frozen till.

Photograph NCIS-016: From Sta. 1+750 m (approx.), looking SE. View of the Iron Formation rockfill (PAG material) piles on the North Cell Internal Structure to be cleaned from the structure embankment.

Photograph NCIS-017: From Sta. 2+290 m (approx.), looking SW. Profiling of the upstream slope (3H:1V) from El. 150 to 152 m with an excavator from Sta. 2+138 m to 1+989 m.

Photograph NCIS-018: From Sta. 2+310 m (approx.), looking NW. Profiling of the upstream slope (3H:1V) from El. 150 to 152 m with an excavator from Sta. 1+989 m to 1+860 m.

Photograph NCIS-019: From Sta. 2+100 m (approx.), looking SW. Profiling of the upstream slope (3H:1V) from El. 150 to 152 m with an excavator from Sta. 1+860 m to 1+678 m. The portion between Sta. 1+900 m and 1+800 m, where the structure is built on the natural ground, was not profiled.

Photograph NCIS-020: From Sta. 1+570 m (approx.), looking S. Placement of a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+564 m to 1+535 m (offset unavailable).

REGISTERED PROFESSIONAL ENGINEER
Y. BOULIANNE
LICENSEE
2018-05-28

Marion Habersetzer, M.Sc.
Mine Waste Group

Yves Boulianne, P.Eng.
Associate, Senior Geotechnical Engineer

Attachments: Construction Progress Drawings from AEM as of May 26th 2018

MH/YB/

https://golderassociates.sharepoint.com/sites/1897439/preparation of deliverables/weekly reports/2018-05-21 to 2018-05-27/north cell/1897439-1577-tm-rev0 qa weekly report north cell 2018-05-21 to 2018-05-27.docx

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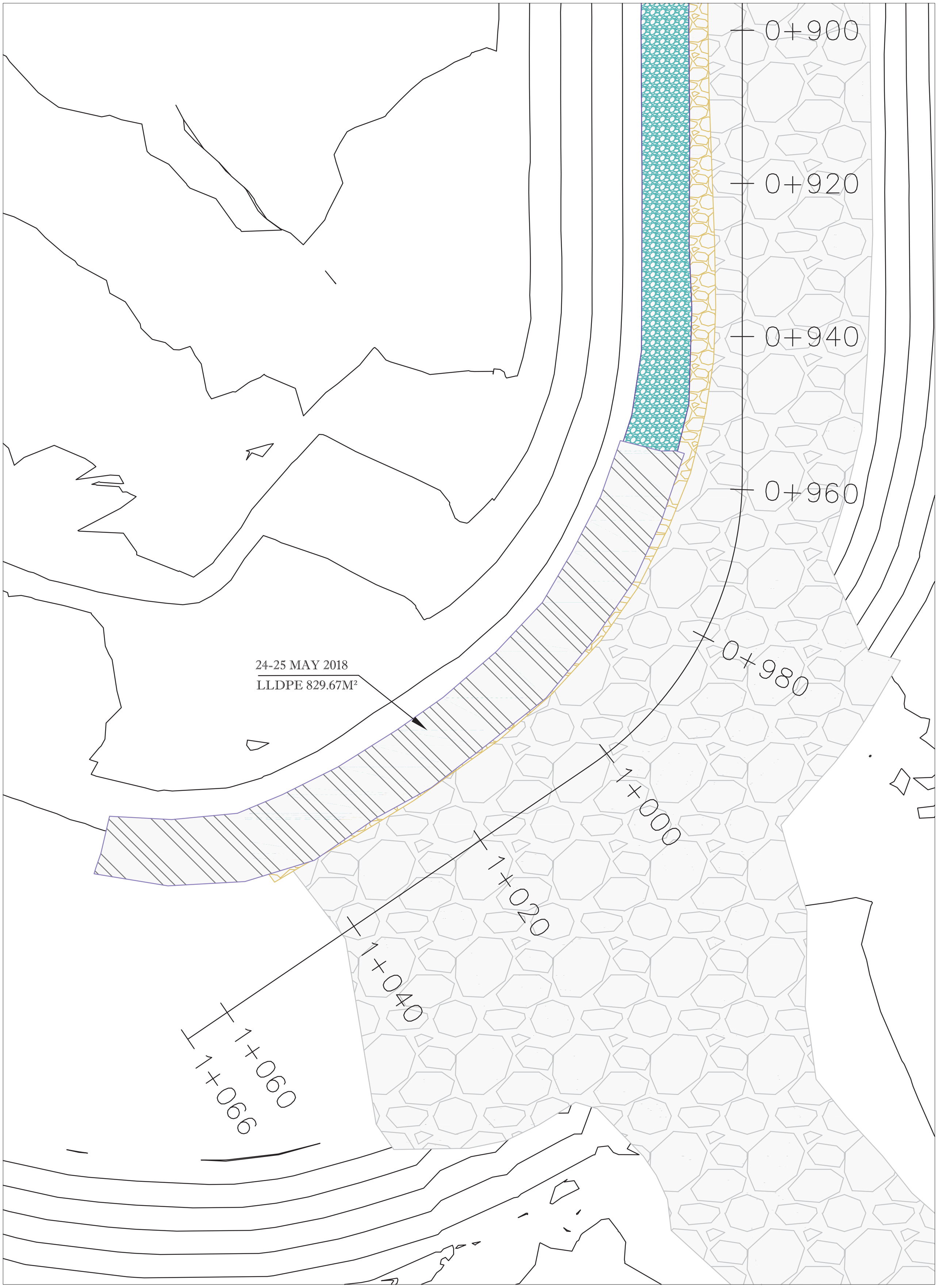
Signature
Date 2018-05-28
PERMIT NUMBER: P 049
NT/NU Association of Professional Engineers and Geoscientists

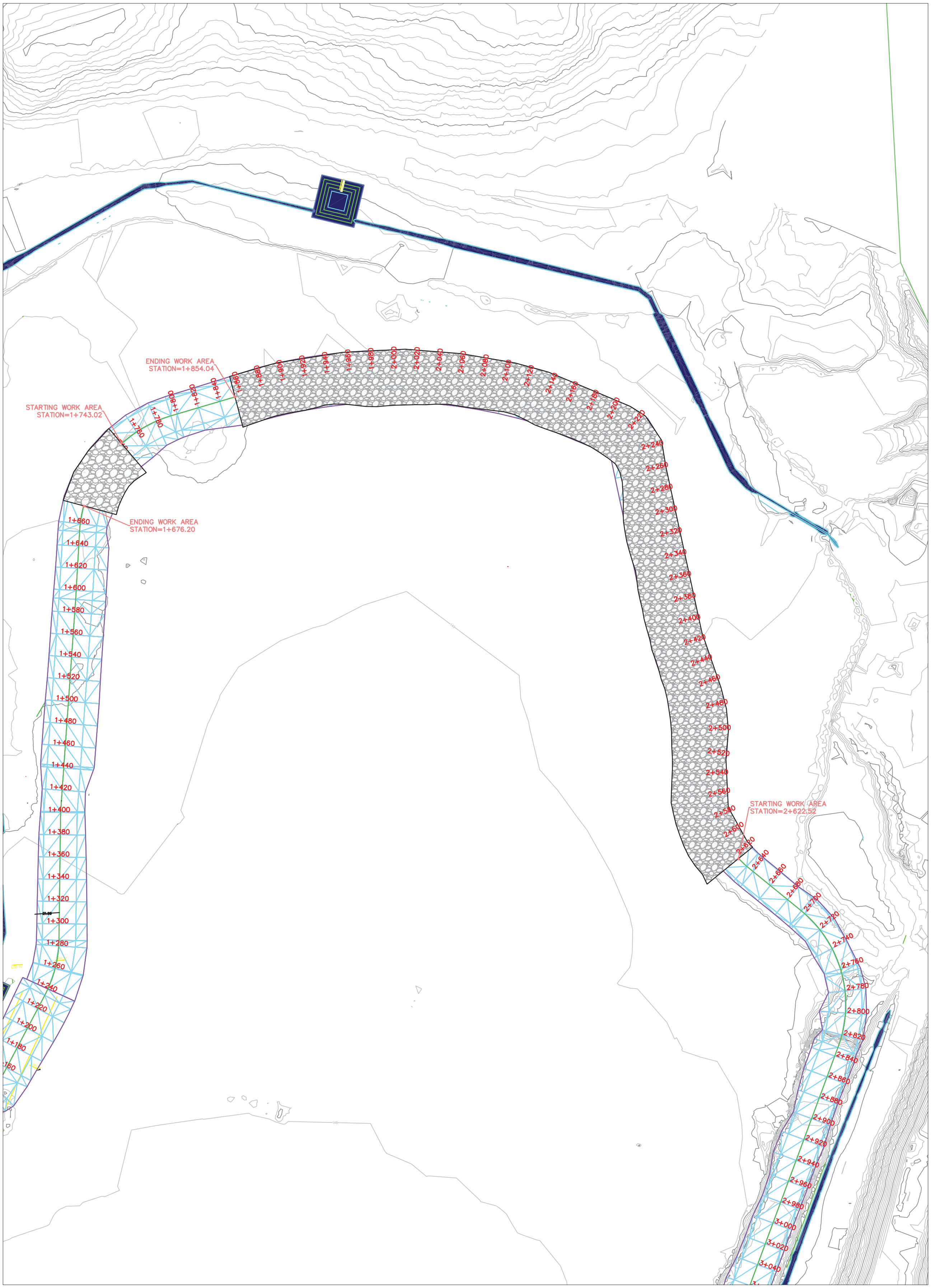
WEEKLY PROGRESS
CENTRAL DIKE CONSTRUCTION
CONTRACT # 11-505



KIVALLIQ CONTRACTORS GROUP LTD

PREPARED BY : MARC-ANDRÉ BLACKBURN
DATE : 27-05-2018
CON-DR-013_CD_WP20180527

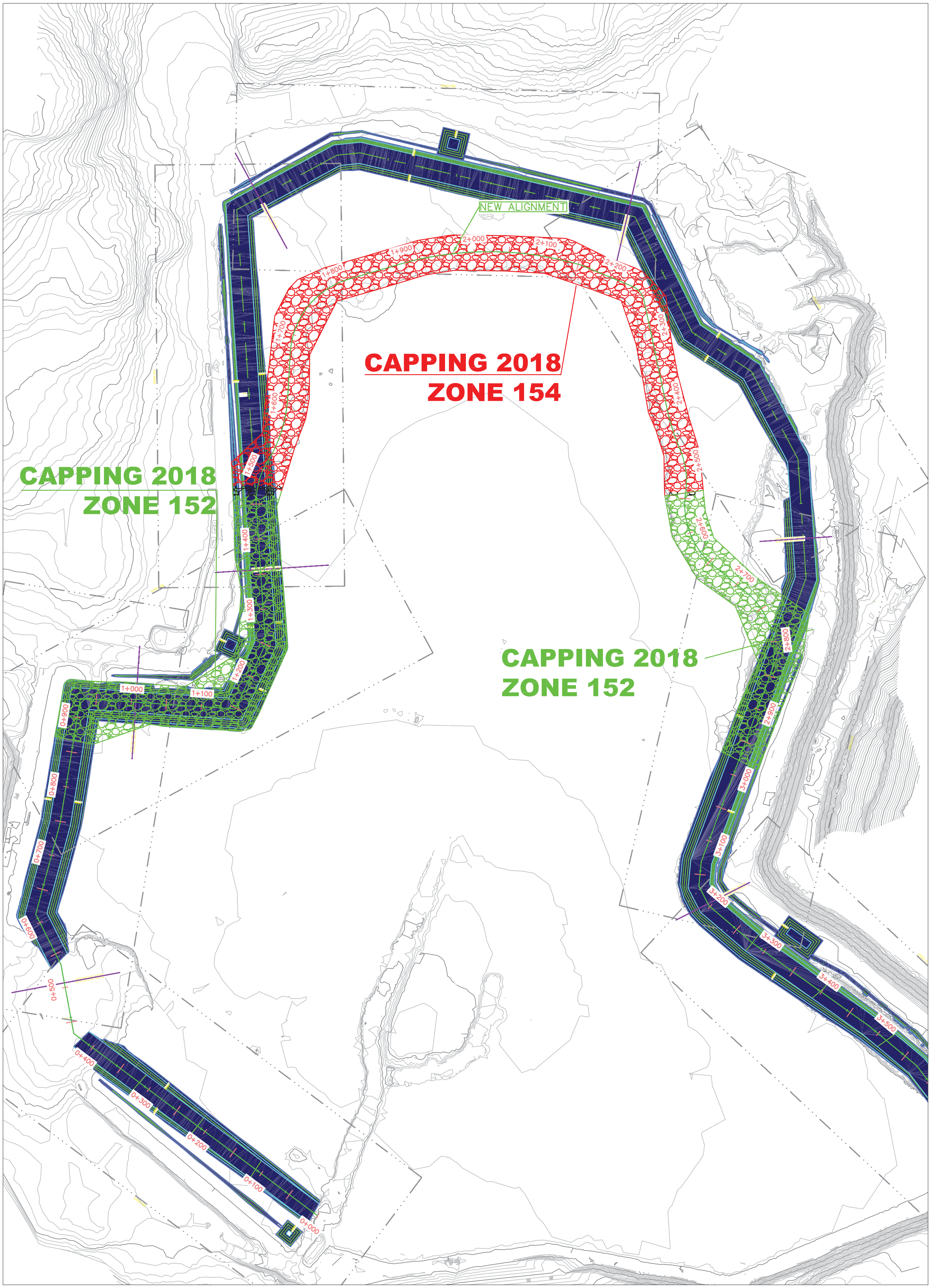
WORKING PROGRESS
NORTH CELL CAPPING 2018
CONTRACT # 11-505



KIVALLIQ CONTRACTORS
GROUP LTD

PREPARED BY : MARC-ANDRÉ BLACKBURN
DATE : 26-05-2018
CON-DR-011_NC_WP20180526

NEW ALIGNMENT
NORTH CELL CAPPING 2018
CONTRACT # 11-505



KIVALLIQ CONTRACTORS
GROUP LTD

PREPARED BY : MIKAËL LÉVESQUE
DATE : 21-05-2018
CON-SK-005_NC ALIGNMENT

QA WEEKLY REPORT

DATE June 4th 2018 — 1897439-1577-TM-Rev0

TO Patrice Gagnon, Pier-Éric McDonald
Agnico Eagle Mines Ltd, Meadowbank Division

CC Frédérick Bolduc, Alexandre Lavallée

FROM Samuel Barbeau — **EMAIL sbarbeau@golder.com**

QA WEEKLY REPORT FROM MAY 28TH TO JUNE 3RD – TSF NORTH CELL CONSTRUCTION MEADOWBANK (1897439)

This document summarizes QA activities performed by Golder from May 28th to June 3rd, 2018 inclusively, related to the construction activities of the North Cell Internal Structure at the Meadowbank mine site.

Unless otherwise specified, the construction activities use the centreline of the structures for a dike crest elevation of 152 m for reference (refer to the Drawings). The description of activities refers to the stations and offsets from the centreline (e.g., Sta. 0+500/-50 m). The "+" and "-" symbols indicate the location of the work downstream and upstream of the centreline, respectively.

1.0 GOLDER PERSONNEL ON SITE

Golder personnel on site during this reporting period is summarized in Table 1.

Table 1: Golder Personnel on Site

Name	Comments
Marion Habersetzer	QA Manager (departure on May 29th)
Samuel Barbeau	QA Manager (arrival on May 28th)

2.0 HEALTH AND SAFETY

H&S meetings were held with AEM and FGL/SANA during the daily construction meetings. Minutes from these meetings are recorded and stored in Golder's on-site office. The key H&S elements for the reporting period were as follows:

- Cold weather and ice: apply caution when driving or walking on icy surfaces, wear appropriate clothing.
- Dust is still an issue on the construction field; be vigilant by staying out of the dust cloud near construction activities and road circulation.
- Fog in the morning: reduce speed while driving and increase distance with other vehicles.
- Following a near miss during night shift between a truck and a grader, it was reiterated to have a clear visual or radio communication with the operator of the grader before overtaking a grader.

3.0 SUMMARY OF MAIN DISCUSSIONS IN CONSTRUCTION MEETINGS

Construction meetings were held daily during the reporting period and were attended by the QA Manager. The following items were discussed:

General

- Updated material quantities were issued with the new alignment of the North Cell Internal Structure.
- Regarding the rockfill lift founded on unprepared natural soil (Sta. 1+800 m to 1+900 m, approx.), AEM decided that the rockfill will be removed and the natural soils excavated within the footprint to reach a good quality bedrock. The frozen natural soil material will need to be exposed and excavated as it thaws.
- The limits of the downstream slope of the lift at El. 154 m are within the lift at El. 152 m. As a result, safety berms placed on the downstream side of this limit do not need to be removed for compaction. Compaction will be done on the portion of the lift that has not been trafficked by loaded haul trucks, as the haul truck traffic lane is considered to have been compacted sufficiently by the passage of the loaded haul trucks.
- The boulders acting as the upstream berm were relocated at the limit of the traffic lane and the surface was smoothed with an excavator to allow for the compaction of the underlying lift of UM rockfill at El. 152 m.
- The top of the upstream slope of the lift at El. 152 m was marked on the section where the snow foundation was encountered. A loader pushed inside the North Cell the material that was on the top of the lift at El. 152 m to prepare the working area for the profiling of the upstream slope by the excavator.
- The QA Manager reported a few loads with coarser heterogeneous ultramafic (UM) rockfill yesterday. The QA Manager asked the bulldozer operator to mix the coarser rockfill with finer rockfill to obtain a well graded material.
- An accumulation of boulders was noticed on the first ultramafic (UM) rockfill lift near Sta. 1+425 m at El. 152 m on the upstream slope side. The QA Manager required that those boulders be scattered to ensure that no boulder nest occurs in the lift.
- The QA Manager noticed several oversize boulders on the UM rockfill lift at El. 152 m and reiterated that the maximum allowable size on the dikes is 1.3 m. AEM forwarded the information to the operators in the pit and on the dikes. As it is impracticable to sort the oversized boulders with the pit equipment, if the rockfill load

presents more than 70% of oversized blocks, the load will be sent to the waste dump. Otherwise, if an oversize boulder is delivered on the dikes, it will be pushed aside in the downstream slope by the dozer during placement.

- The cyanide burning area lies within the North Cell Internal Structure alignment and will be moved upstream of the structure following the placement of the coarse and fine filters, where a rockfill pad will be built for that purpose.
- The QA Manager reiterated the need to receive the centerline for the portable GPS. SANA surveyor sent the GPX file to the QA Manager.

Follow up

- Ensure that the layer of hard snow (up to 2 m thick) under the 2 m thick UM rockfill at El. 152 m (approx.) is not within the footprint of the dike, or that it is removed during the profiling of the slope. The foundation of the structure must be snow-free, compacted rockfill material constituting the capping of the North Cell.

4.0 SUMMARY OF CONSTRUCTION ACTIVITIES AND TEST RESULTS

Periodic QA inspections to monitor the construction activities and progress were performed by the QA Manager; these are summarized in the tables below. For the location and extent of the construction works, refer to the enclosed plans.

Table 2: QA Observations for the North Cell Internal Structure

Activity or Area	Comments
Crest	■ Placement of a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+535 m to 1+390 m (offset unavailable). The material is of good quality and is well graded. ■ Compaction of the 2 m lift (approx.) of ultramafic (UM) rockfill at El. 152 m with a 10-tonne smooth-drum compactor with vibration (6 passes) between the haul truck traffic lane and the upstream slope from Sta. 2+625 to 1+625 m (offset unavailable). ■ Removal of the snow bank in the footprint with an excavator from Sta. 1+160 m to 1+060 m (approx.).
Upstream	■ Profiling of the upstream slope (3H:1V) from El. 150 to 152 m with an excavator from Sta. 1+638 m to 1+580 m.

5.0 SAMPLING, LABORATORY AND FIELD TESTING

Table 3 and Table 4 present the samples collected or tested by the QA and QC.

Table 3: Samples Taken by the QC

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result

Table 4: Samples Taken by the QA

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result

6.0 PHOTOGRAPHS

Photograph NCIS-021: From Sta. 1+550 m (approx.), looking S. Placement a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+535 m to 1+500 m (offset unavailable).

Photograph NCIS-022: From Sta. 2+245 m (approx.), looking SE. Compaction of the 2 m lift (approx.) of ultramafic (UM) rockfill at El. 152 m with a 10-tonne smooth-drum compactor with vibration (6 passes) between the haul truck traffic lane and the upstream slope from Sta. 2+625 to 1+625 m (offset unavailable).

Photograph NCIS-023: From Sta. 2+570 m (approx.), looking W. Placement of a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+500 m to 1+450 m (offset unavailable). The material is of good quality and is well graded.

Photograph NCIS-024: From Sta. 2+570 m (approx.), looking SW. Removal of the snow bank in the footprint with an excavator from Sta. 1+160 m to 1+120 m (approx.).

Photograph NCIS-025: From Sta. 1+475 m (approx.), looking SE. Placement of a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+450 m to 1+390 m (offset unavailable). The material is of good quality and is well graded.

Marion Habersetzer

for: Samuel Barbeau
Mine Waste Group

REGISTERED PROFESSIONAL ENGINEER
Y. BOULIANNE
LICENSEE
NT/NU
2018-06-04

Yves Boulianne, P.Eng.
Associate, Senior Geotechnical Engineer

SB/YB/

https://golderassociates.sharepoint.com/sites/1897439/preparation of deliverables/weekly reports/2018-05-28 to 2018-06-03/1897439-1577-tm-rev0 qa weekly report north cell 2018-05-28 to 2018-06-03.docx

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GOLDER ASSOCIATES LTD.
Signature
Date 2018-06-04
PERMIT NUMBER: P 049
NT/NU Association of Professional Engineers and Geoscientists

GOLDER

QA WEEKLY REPORT

DATE June 11th 2018

1897439-1577-TM-Rev0

TO Patrice Gagnon, Pier-Éric McDonald
Agnico Eagle Mines Ltd, Meadowbank Division

CC Frédérick Bolduc, Alexandre Lavallée

FROM Samuel Barbeau

EMAIL sbarbeau@golder.com

QA WEEKLY REPORT FROM JUNE 4TH TO JUNE 11TH – TSF NORTH CELL CONSTRUCTION MEADOWBANK (1897439)

This document summarizes QA activities performed by Golder from June 4th to June 11th, 2018 inclusively, related to the construction activities of the North Cell Internal Structure at the Meadowbank mine site.

Unless otherwise specified, the construction activities use the centreline of the structures for a dike crest elevation of 152 m for reference (refer to the Drawings). The description of activities refers to the stations and offsets from the centreline (e.g., Sta. 0+500/-50 m). The “+” and “-” symbols indicate the location of the work downstream and upstream of the centreline, respectively.

1.0 GOLDER PERSONNEL ON SITE

Golder personnel on site during this reporting period is summarized in Table 1.

Table 1: Golder Personnel on Site

Name	Comments
Samuel Barbeau	QA Manager (departure on June 12th)

2.0 HEALTH AND SAFETY

H&S meetings were held with AEM and FGL/SANA during the daily construction meetings. Minutes from these meetings are recorded and stored in Golder’s on-site office. The key H&S elements for the reporting period were as follows:

- Cold weather and ice: apply caution when driving or walking on icy surfaces, wear appropriate clothing.

- Dust is still an issue on the construction field; be vigilant by staying out of the dust cloud near construction activities and road circulation.
- Fog in the morning: reduce speed while driving and increase distance with other vehicles.
- Grizzlies were spotted near Vault on June 11th. AEM informed their personnel by email and shared the information on the radio. As the QA and QC were in the lab wearing ear protection, they did not hear the radio communication. Next time wildlife is spotted on site, AEM will share the email with the QA and QC personnel.

3.0 SUMMARY OF MAIN DISCUSSIONS IN CONSTRUCTION MEETINGS

Construction meetings were held daily during the reporting period and were attended by the QA Manager. The following items were discussed:

General

- The QA Manager and QC personnel departure of the site is planned for June 12th. After that day, there won't be QA/QC supervision for the work on the North Cell Internal Structure.
- AEM installed a pipe across the North Cell Internal Structure at elevation 152 m in the footprint of the raise at El. 154 m. It will need to be moved before the raise to El. 154 m.
- The QA Manager observed that the UM rockfill lift was about 3.2 m thick around Sta. 1+340 m and asked for the elevation of the tailings ahead of the UM rockfill lift advancement front. AEM consulted the LIDAR survey and reported a 148.8 m elevation (approx.) that is declining towards the direction of the rockfill lift advancement and reaches 148 m around Sta. 1+200 m. Based on the 152 m elevation of the rockfill lift, the lift thickness is of 3.2 m around Sta. 1+340 m and would increase to 4 m around Sta. 1+200 m. Furthermore, as the tailings are thawing at the surface, the expected settling of soft tailings below the rockfill will increase the lift thickness. Considering that the lift maximum thickness was 2 m per design, it is not recommended to continue placement of UM rockfill in a single lift thicker than 2 m, as the compaction quality will be compromised. A maximum lift thickness of 2.8 m had previously been agreed by the Designer. AEM will have a meeting regarding this situation.

Follow up

- Ensure that the layer of hard snow (up to 2 m thick) under the 2 m thick UM rockfill at El. 152 m (approx.) is not in the footprint of the dike, or that it is removed during the profiling of the slope. The foundation of the structure must be snow-free, compacted rockfill material constituting the capping of the North Cell.
- Thickness of the UM rockfill lift to be limited to 2.8 m.

4.0 SUMMARY OF CONSTRUCTION ACTIVITIES AND TEST RESULTS

Periodic QA inspections to monitor the construction activities and progress were performed by the QA Manager; these are summarized in the tables below. For the location and extent of the construction works, refer to the enclosed plans.

Table 2: QA Observations for the North Cell Internal Structure

Activity or Area	Comments
Crest	■ Placement of a 2 to 3.2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+390 m to 1+350 m (+9 m to -29 m). The material is of good quality and is well graded.

5.0 SAMPLING, LABORATORY AND FIELD TESTING

Table 3 and Table 4 present the samples collected or tested by the QA and QC.

Table 3: Samples Taken by the QC

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result

Table 4: Samples Taken by the QA

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result

6.0 PHOTOGRAPHS

Photograph NCIS-026: From Sta. 1+440/+2 m, looking S. Placement of a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+390 m to 1+365 m (offset +10 m to -29 m).

Photograph NCIS-027: From Sta. 1+360/+67 m, looking S. Placement of a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+365 m to 1+360 m (offset +9 m to -28 m).

Photograph NCIS-028: From Sta. 1+340/+3 m, looking E. View of the UM rockfill lift approximately 3.2 m thick.

Marion Haberstzer
for: Samuel Barbeau
Mine Waste Group

REGISTERED PROFESSIONAL ENGINEER
Y. BOULIANNE
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2018-06-11

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Date 2018 - 06 - 11
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QA WEEKLY REPORT

DATE June 25th 2018 1897439-1577-TM-Rev0

TO Patrice Gagnon, Pier-Éric McDonald
Agnico Eagle Mines Ltd, Meadowbank Division

CC Frédérick Bolduc, Alexandre Lavallée

FROM Marion Habersetzer **EMAIL mhabersetzer@golder.com**

QA WEEKLY REPORT FROM JUNE 19TH TO JUNE 24TH– TSF NORTH CELL CONSTRUCTION

MEADOWBANK (1897439)

This document summarizes QA activities performed by Golder from June 19th to June 24th, 2018 inclusively, related to the construction activities of the North Cell Internal Structure at the Meadowbank mine site.

Unless otherwise specified, the construction activities use the centreline of the structures for a dike crest elevation of 152 m for reference (refer to the Drawings). The description of activities refers to the stations and offsets from the centreline (e.g., Sta. 0+500/-50 m). The "+" and "-" symbols indicate the location of the work downstream and upstream of the centreline, respectively.

1.0 GOLDER PERSONNEL ON SITE

Golder personnel on site during this reporting period is summarized in Table 1.

Table 1: Golder Personnel on Site

Name	Comments
Marion Habersetzer	QA Manager (arrival on June 19th)

2.0 HEALTH AND SAFETY

H&S meetings were held with AEM and FGL/SANA during the daily construction meetings. Minutes from these meetings are recorded and stored in Golder's on-site office. The key H&S elements for the reporting period were as follows:

- Dust is still an issue on the construction field; be vigilant by staying out of the dust cloud near construction activities and road circulation.
- As tailings have thawed and become very soft, it is now unsafe to walk or traffic on the tailings of the North Cell.
- It was reiterated not to pass behind heavy equipment without calling on the radio first.
- Personnel on foot must stay at a safe distance from the compactor attached to the excavator with a cable, in case the cable should break.

3.0 SUMMARY OF MAIN DISCUSSIONS IN CONSTRUCTION MEETINGS

Construction meetings were held daily during the reporting period and were attended by the QA Manager. The following items were discussed:

General

- The QA Manager arrived on site on June 19th for supervision of the North Cell Internal Structure construction. QC personnel arrived on site on June 20th.
- The QA Manager accompanied the Dike supervisor and AEM's representatives on June 19th to review work done without QA/QC supervision and to discuss the construction planning of the North Cell Internal Structure. Follow-up will be done on the system of peripheral ditches and sumps.
- The QA Manager asked to receive a weekly follow-up of the volumes of materials placed on the structure, in order to check that the QA/QC sampling rate is adequate.
- The coarse and fine filters are placed on the upstream slope of the North Cell Internal Structure each in a single lift, ranging from the upstream toe to the crest, with a thickness of 0.5 m perpendicular to the slope. Given the gentle 3H:1V slope, compaction is done on each lift with a smooth-drum compactor directly on the slope (attached to an excavator) rather than raising horizontal lifts. Placement in horizontal lifts would be problematic due to the limited reach of the excavator, and the fact that the tailings at the bottom of the slope are now too soft to be trafficked safely. Due to the soft foundation, the compactor is unable to reach the bottom of the slope (about 1 m from the toe), without deforming the slope. The lower portion of the slope will be flattened and compacted with the bucket of the excavator afterwards.
- The foundation has been exposed in the section where the structure is built on natural ground (approx. Sta. 1+800 to 1+900 m). The natural soil was constituted of a shallow layer of till and organic soil overlying bedrock. Till removal down to the bedrock with an excavator was done to ensure a sound foundation for the filters and reduce the risk of settlement. The foundation was approved by the QA Manager. No foundation approval forms are required for the North Cell Internal Structure.
- The alignment of the North Cell Internal Structure was slightly modified in the south-western section in order to avoid the cyanide burning area. This will avoid removal of material which would be difficult for accessibility

reasons. There will be no new centerline issued at the moment, but only a field fitting done. The crest width is checked during rockfill placement to ensure that the design is respected. The UM rockfill platform around Sta. 1+200 m was too narrow and will be widened to 48 m, as required for the crest width at El. 150 m.

- Given that a large amount of UM rockfill is expected to arrive on the structure very soon, priority was given to compaction of the crest (including underneath the safety berms) of the portion of lift at El. 150 m, in order to be ready to place the second lift at El. 152 m. Berms will be pushed downstream and replaced by boulders after compaction. If there is not enough time to complete the compaction, the placement activities might also be relocated to the portion of the structure that needs to be raised to El. 154 m.
- Coarse and fine filters are currently placed on the section of the structure that will be raised at 154 m, and will be extended to the rest of the structure while the second lift of UM rockfill from El. 152 m to 154 m is placed.
- Stockpiles will be surveyed to evaluate remaining quantities of coarse and fine filters. Another stockpile of coarse filter may be used if needed.
- The southeastern and southwestern limits of the North Cell Internal Structure will be confirmed with AEM based on the deposition plan.

Follow up

- After profiling of the upstream slope of the dike, it was confirmed that the layer of hard snow (up to 2 m thick) observed under the 2 m thick UM rockfill of the capping is not within the footprint of the dike, thus the foundation of the structure is free of snow and constituted of compacted rockfill only. The snow and UM rockfill were excavated to have sufficient space to place the filters, and the remainder was left in place inside the North Cell. Tailings deposition will be done from another spot, or the tailings pipe will be extended over the material left in place.
- The thickness of the UM rockfill cannot exceed 2.8 m as per the Designer’s criteria.The UM rockfill is placed in 2 lifts where in order to avoid exceeding 2 m in thickness, as the tailings elevation is around 148 m in the southern part of the North Cell.
- Ditches and sumps to be constructed will be discussed between Golder and AEM.

4.0 SUMMARY OF CONSTRUCTION ACTIVITIES AND TEST RESULTS

Periodic QA inspections to monitor the construction activities and progress were performed by the QA Manager; these are summarized in the tables below. For the location and extent of the construction works, refer to the enclosed plans.

Table 2: QA Observations for the North Cell Internal Structure

Activity or Area	Comments
Crest	■ Compaction of the 2 m lift (approx.) of ultramafic (UM) rockfill at El. 152 m with a 10-tonne smooth-drum compactor with vibration (6 passes) between the haul truck traffic lane and the upstream slope from Sta. 1+660 to 1+380 m (offset -45 to -24 m). ■ Placement of a 1.5 to 2 m thick (approx.) lift of UM rockfill from El. 148 m to El. 150 m (approx.) with a dozer from Sta. 1+350 m to 1+150 m (-41 m to +9 m). The material is of good quality and is well graded.
Upstream	■ Final clean-up of the dike footprint with an excavator to reach a good quality bedrock from Sta. 1+850 to 1+750 m (offset -42 to -33 m). ■ Profiling of the upstream slope (3H:1V) from El. 150 to 152 m with an excavator from Sta. 1+860 m to 1+750 m. ■ Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 2+280 m to 1+420 m. The material visually seemed well graded and of good quality. ■ Compaction of the 0.5 m lift (approx.) of coarse filter between El. 150 and 152 m with a 10-tonne smooth-drum compactor (4 passes) in the upstream slope from Sta. 2+524 m to 1+480 m. Vibration is used except for the first pass down the slope in order to stabilize the material and limit deformation of the lift. ■ Placement of a 0.5 m thick lift of fine filter over the coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 2+542 m to 2+305 m and from Sta. 2+065 m to 1+835 m. The material visually seemed well graded and of good quality. ■ Compaction of the 0.5 m lift (approx.) of fine filter between El. 150 and 152 m with a 10-tonne smooth-drum compactor (4 passes) in the upstream slope from Sta. 2+542 m to 2+475 m. Vibration is used except for the first pass down the slope in order to stabilize the material and limit deformation of the lift.

5.0 SAMPLING, LABORATORY AND FIELD TESTING

Table 3 and Table 4 present the samples collected or tested by the QA and QC.

Table 3: Samples Taken by the QC

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result
CF-380-2018	2018-06-21	2018-06-22	Coarse Filter	North Cell Internal Structure, Sta. 1+920/-23 m, El. 152 m	Gradation	Compliant
					Water content	2.50%
CF-382-2018	2018-06-21		Coarse filter	SANA crusher stockpile		
CF-383-2018	2018-06-21		Coarse filter	SANA crusher stockpile		
CF-384-2018	2018-06-21		Coarse filter	SANA crusher stockpile		
FF-392-2018	2018-06-21		Fine filter	SANA crusher stockpile		
FF-393-2018	2018-06-21		Fine filter	SANA crusher stockpile		
FF-394-2018	2018-06-21		Fine filter	SANA crusher stockpile		
FF-395-2018	2018-06-21		Fine filter	SANA crusher stockpile		
FF-396-2018	2018-06-21		Fine filter	SANA crusher stockpile		
FF-397-2018	2018-06-21		Fine filter	SANA crusher stockpile		
FF-398-2018	2018-06-21		Fine filter	SANA crusher stockpile		
FF-399-2018	2018-06-21		Fine filter	SANA crusher stockpile		

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result
FF-400-2018	2018-06-21		Fine filter	SANA crusher stockpile		
FF-401-2018	2018-06-21		Fine filter	SANA crusher stockpile		
FF-402-2018	2018-06-21		Fine filter	SANA crusher stockpile		
FF-406-2018	2018-06-22		Fine Filter	North Cell Internal Structure, Sta. 2+500/-22 m, El. 152 m		
CF-386-2018	2018-06-23		Coarse Filter	North Cell Internal Structure, Sta. 1+400/-24 m, El. 150 m		
FF-408-2018	2018-06-24		Fine Filter	North Cell Internal Structure, Sta. 2+380/-21 m, El. 150 m		

Table 4: Samples Taken by the QA

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result
CF-381-2018	2018-06-21	2018-06-23	Coarse Filter	North Cell Internal Structure, Sta. 1+920/-23 m, El. 152 m	Gradation	Compliant
					Water content	2.12%
CF-385-2018	2018-06-21		Coarse filter	SANA crusher stockpile		

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result
FF-403-2018	2018-06-21		Fine filter	SANA crusher stockpile		
FF-404-2018	2018-06-21		Fine filter	SANA crusher stockpile		
FF-405-2018	2018-06-21		Fine filter	SANA crusher stockpile		
FF-407-2018	2018-06-22		Fine Filter	North Cell Internal Structure, Sta. 2+500/-22 m, El. 152 m		

6.0 PHOTOGRAPHS

Photograph NCIS-029: From Sta. 2+120/-27 m (approx.), looking SE. Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 2+280 m to 2+105 m.

Photograph NCIS-030: From Sta. 2+140/-29 m (approx.), looking W. Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 2+105 m to 1+930 m. Notice the presence of water ponding at the bottom of the slope.

Photograph NCIS-031: From Sta. 1+880/-21 m (approx.), looking SW. Final clean-up of the dike footprint with an excavator to reach a good quality bedrock from Sta. 1+800 to 1+850 m (offset -42 to -33 m).

Photograph NCIS-032: From Sta. 1+400/-24 m (approx.), looking N. Compaction of the 2 m lift (approx.) of ultramafic (UM) rockfill at El. 152 m with a 10-tonne smooth-drum compactor with vibration (6 passes) between the haul truck traffic lane and the upstream slope from Sta. 1+660 to 1+380 m (offset -45 to -24 m).

Photograph NCIS-033: From Sta. 1+900/-21 m (approx.), looking E. Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 1+930 m to 1+715 m.

Photograph NCIS-034: From Sta. 1+900/-21 m (approx.), looking W. Profiling of the upstream slope (3H:1V) from El. 150 to 152 m with an excavator from Sta. 1+860 m to 1+750 m.

Photograph NCIS-035: From Sta. 2+550/-25 m (approx.), looking N. Compaction of the 0.5 m lift (approx.) of coarse filter between El. 150 and 152 m with a 10-tonne smooth-drum compactor (4 passes) in the upstream slope from Sta. 2+524 m to 2+450 m.

Photograph NCIS-036: From Sta. 1+900/-21 m (approx.), looking SE. Placement of a 0.5 m thick lift of fine filter over the coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 2+542 m to 2+475 m.

Photograph NCIS-037: From Sta. 1+550/-25 m (approx.), looking NW. Compaction of the 0.5 m lift (approx.) of coarse filter between El. 150 and 152 m with a 10-tonne smooth-drum compactor (4 passes) in the upstream slope from Sta. 2+450 to 1+805 m.

Photograph NCIS-038: From Sta. 2+510/-28 m (approx.), looking SE. Compaction of the 0.5 m lift (approx.) of fine filter between El. 150 and 152 m with a 10-tonne smooth-drum compactor (4 passes) in the upstream slope from Sta. 2+542 m to 2+475 m.

Photograph NCIS-039: From Sta. 2+200/-24 m (approx.), looking W. Placement of a 0.5 m thick lift of fine filter over the coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 2+460 m to 2+475 m and from Sta. 2+065 m to 1+980 m.

Photograph NCIS-040: From Sta. 2+185/-25 m (approx.), looking W. Placement of a 0.5 m thick lift of fine filter over the coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 2+305 m to 2+460 m and from Sta. 1+980 m to 1+835 m.

Photograph NCIS-041: From Sta. 1+220/-7 m (approx.), looking S. Placement of a 1.5 to 2 m thick (approx.) lift of UM rockfill from El. 148 m to El. 150 m (approx.) with a dozer from Sta. 1+197 m to 1+150 m (-7 m to -41 m).

Marion Habersetzer, M.Sc.
Mine Waste Group

REGISTERED PROFESSIONAL ENGINEER
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2018-06-25

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https://golderassociates.sharepoint.com/sites/1897439/preparation of deliverables/weekly reports/2018-06-19 to 2018-06-24/1897439-1577-tm-rev0 qa weekly report north cell 2018-06-19 to 2018-06-24.docx

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Signature
Date 2018-06-25
PERMIT NUMBER: P 049
NT/NU Association of Professional Engineers and Geoscientists

QA WEEKLY REPORT

DATE July 2nd 2018 1897439-1577-TM-Rev0

TO Patrice Gagnon, Pier-Éric McDonald
Agnico Eagle Mines Ltd, Meadowbank Division

CC Frédérick Bolduc, Alexandre Lavallée

FROM Marion Habersetzer **EMAIL mhabersetzer@golder.com**

QA WEEKLY REPORT FROM JUNE 25TH TO JULY 1ST – TSF NORTH CELL CONSTRUCTION MEADOWBANK (1897439)

This document summarizes QA activities performed by Golder from June 25th to July 1st, 2018 inclusively, related to the construction activities of the North Cell Internal Structure at the Meadowbank mine site.

Unless otherwise specified, the construction activities use the centreline of the structures for a dike crest elevation of 152 m for reference (refer to the Drawings). The description of activities refers to the stations and offsets from the centreline (e.g., Sta. 0+500/-50 m). The "+" and "-" symbols indicate the location of the work downstream and upstream of the centreline, respectively.

1.0 GOLDER PERSONNEL ON SITE

Golder personnel on site during this reporting period is summarized in Table 1.

Table 1: Golder Personnel on Site

Name	Comments
Marion Habersetzer	QA Manager

2.0 HEALTH AND SAFETY

H&S meetings were held with AEM and FGL/SANA during the daily construction meetings. Minutes from these meetings are recorded and stored in Golder's on-site office. The key H&S elements for the reporting period were as follows:

- Dust is still an issue on the construction field; be vigilant by staying out of the dust cloud near construction activities and road circulation.

- Coactivity on the dike: be aware of blind spots and safe spots, keep good communication and visual contact with the operators.
- A haul truck nearly went off the road on June 25th on the North Cell Internal Structure.
- Radio channels on the North Cell Internal Structure: Portage Operations must be used on the traffic lane, whereas MBDykes must be used when working behind the boulders (e.g., excavators working on the slope).
- It was reiterated that no one should leave their work station without notifying their supervisor, for safety reasons.

3.0 SUMMARY OF MAIN DISCUSSIONS IN CONSTRUCTION MEETINGS

Construction meetings were held daily during the reporting period and were attended by the QA Manager. The following items were discussed:

General

- The limits of the North Cell Internal Structure have been modified by AEM based on the most recent deposition plan. The section at El. 154 m has been shifted toward the east (see Figure 1 below). Updated material quantities were issued.
- The contractor asked whether PAG rockfill could be used on the upstream side of the North Cell Internal Structure, since UM rockfill is not available in large quantities at the moment. This would not be compatible with the closure plans of the North Cell, therefore it is not an acceptable option.
- AEM indicated that the downstream slope of the structure would not be profiled with an excavator like the other dikes, but left at the angle of repose. With a 1.5H:1V slope, this is not expected to affect global stability, but minor rockfalls are possible.
- There were communication issues with the night shift staff, who do not have a supervisor on the North Cell Internal Structure. The upstream toe of the second lift of UM rockfill must be carefully marked on the first lift by the surveyor, in order to avoid rockfill falling onto the coarse and fine filters during placement. A slight offset is advisable to keep a safety distance, and the toe of the second lift will be completed by the excavator during slope profiling.
- The tailings surface has dried out and become harder underneath the filters. As a result, compaction of the filters is now possible with the compactor on the entire length of the slope using vibration without deforming the slope.
- Most of the UM rockfill surface between the haul truck traffic lane and the upstream edge of the crest has been compacted with the 10 t smooth-drum compactor. It was agreed that since 50 t loaded haul trucks continuously traffic on this surface for filter placement operations, the remainder of the surface will not require additional compaction with the smooth-drum compactor. It is estimated that haul truck traffic achieves a satisfactory compaction of the UM rockfill.

Follow-up

- Ditches and sumps to be constructed will be discussed between Golder and AEM.
- The tensiometer calibration certificate has been received from ZTG.
- AEM confirmed that the North Cell Internal Structure will be built to the design elevation, between 152 m and 154 m. The option to build it only to El. 153 m is discarded.

4.0 SUMMARY OF CONSTRUCTION ACTIVITIES AND TEST RESULTS

Periodic QA inspections to monitor the construction activities and progress were performed by the QA Manager; these are summarized in the tables below. For the location and extent of the construction works, refer to the enclosed plans.

Table 2: QA Observations for the North Cell Internal Structure

Activity or Area	Comments
Crest	■ Placement of a 1.5 to 2 m thick (approx.) lift of UM rockfill from El. 148 m to El. 150 m (approx.) with a dozer from Sta. 1+150 m to 1+100 m (-107 m to +10 m). The material is of good quality and is well graded. ■ Compaction of the 1.5 to 2 m lift (approx.) of ultramafic (UM) rockfill at El. 150 m with a 10-tonne smooth-drum compactor with vibration (6 passes) between the haul truck traffic lane and the upstream slope from Sta. 1+330 to 1+130 m (offset -91 to -24 m), and between the haul truck traffic lane and the downstream slope from Sta. 1+330 to 1+100 m (offset -47 to +13 m). ■ Removing of UM rockfill material from the capping with a dozer to level the surface to El. 152 m from Sta. 2+760 m to 3+150 m (offset -38 to -17 m). ■ Placement of a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+340 m to 1+160 m (-65 m to +16 m). The material is of good quality and is well graded.
Upstream	■ Removal of till material mixed with the UM rockfill of the capping (about 1 to 2 m thick along the slope) with an excavator from Sta. 2+760 m to 2+850 m (offset -35 to -17 m). ■ Profiling of the upstream slope (3H:1V) from El. 152 to 154 m with a dozer from Sta. 2+840 to 2+980 m.

Activity or Area	Comments
	■ Profiling of the upstream slope (3H:1V) from El. 148 to 150 m with an excavator from Sta. 1+410 m to 1+100 m. ■ Profiling of the upstream slope (3H:1V) from El. 150 to 152 m with an excavator from Sta. 2+715 m to 2+975 m. ■ Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 2+560 m to 2+815 m. The material visually seemed well graded and of good quality. ■ Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 148 m to 152 m with an excavator from Sta. 1+340 m to 1+100 m. The material visually seemed well graded and of good quality. ■ Compaction of the 0.5 m lift of coarse filter between El. 150 and 152 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 2+560 m to 2+815 m. ■ Compaction of the 0.5 m lift of coarse filter between El. 148 and 152 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 1+340 m to 1+100 m. ■ Placement of a 0.5 m thick lift of fine filter over the coarse filter in the upstream slope from El. 148 m to 150 m with an excavator from Sta. 1+330 m to 1+100 m. The material visually seemed well graded and of good quality. ■ Placement of a 0.5 m thick lift of fine filter over the coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 2+560 m to 2+630 m, from Sta. 2+305 m to 2+040 m and from Sta. 1+840 m to 1+550 m. The material visually seemed well graded and of good quality. ■ Compaction of the 0.5 m lift of fine filter between El. 148 and 150 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 1+335 m to 1+100 m.

5.0 SAMPLING, LABORATORY AND FIELD TESTING

Table 3 and Table 4 present the samples collected or tested by the QA and QC.

Table 3: Samples Taken by the QC

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result
CF-382-2018	2018-06-21	2018-06-24	Coarse filter	SANA crusher stockpile	Gradation	Compliant
					Water content	-
CF-386-2018	2018-06-23	2018-06-25	Coarse Filter	North Cell Internal Structure, Sta. 1+400/-24 m, El. 150 m	Gradation	Compliant
					Water content	4.40%
FF-392-2018	2018-06-21	2018-06-26	Fine filter	SANA crusher stockpile	Gradation	The material lack a little sand-sized particles but is still acceptable.
					Water content	1.40%
FF-393-2018	2018-06-21	2018-06-28	Fine filter	SANA crusher stockpile	Gradation	Compliant
					Water content	2.10%
FF-394-2018	2018-06-21	2018-06-27	Fine filter	SANA crusher stockpile	Gradation	The material is lacking a little sand-sized particles but is still acceptable.
					Water content	1.60%
FF-395-2018	2018-06-21	2018-06-28	Fine filter	SANA crusher stockpile	Gradation	Compliant
					Water content	1.50%

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result
FF-396-2018	2018-06-21	2018-06-28	Fine filter	SANA crusher stockpile	Gradation	Compliant
					Water content	2.50%
FF-397-2018	2018-06-21	2018-06-29	Fine filter	SANA crusher stockpile	Gradation	Compliant
					Water content	-
FF-398-2018	2018-06-21	2018-06-29	Fine filter	SANA crusher stockpile	Gradation	Compliant
					Water content	2.30%
FF-400-2018	2018-06-21	2018-07-01	Fine filter	SANA crusher stockpile	Gradation	Compliant
					Water content	2.80%
FF-406	2018-06-22	2018-06-24	Fine Filter	North Cell Internal Structure, Sta. 2+500/-22 m, El. 152 m	Gradation	Compliant
					Water content	2.80%
FF-408-2018	2018-06-24	2018-06-27	Fine Filter	North Cell Internal Structure, Sta. 2+380/-21 m, El. 150 m	Gradation	Compliant
					Water content	2.10%
FF-409-2018	2018-06-25	2018-06-27	Fine Filter	North Cell Internal Structure, Sta. 2+262/-21 m, El. 152 m	Gradation	Compliant
					Water content	4%
FF-410-2018	2018-06-28	2018-06-30	Fine Filter	North Cell Internal Structure, Sta. 1+750/-24 m, El. 152 m	Gradation	Compliant
					Water content	2.50%

Sample ID	**Date Sampled**	**Date Tested**	**Fill Material Type**	**Location (Station/Offset Elevation)**	**Test**	**Testing Result**
FF-411-2018	2018-06-29	2018-07-01	Fine Filter	North Cell Internal Structure, Sta. 1+590/-37 m, El. 152 m	Gradation	Compliant
					Water content	2.30%

Table 4: Samples Taken by the QA

Sample ID	**Date Sampled**	**Date Tested**	**Fill Material Type**	**Location (Station/Offset Elevation)**	**Test**	**Testing Result**
CF-385-2018	2018-06-21	2018-06-29	Coarse filter	SANA crusher stockpile	Gradation	The material contains slightly too much fines particles, but is acceptable provided it is well graded.
					Water content	2.09%
FF-403-2018	2018-06-21	2018-06-25	Fine filter	SANA crusher stockpile	Gradation	Slightly too many large particles, but accepted provided the material is well-graded
					Water content	1.65%
FF-404-2018	2018-06-21	2018-06-26	Fine filter	SANA crusher stockpile	Gradation	Compliant
					Water content	2.75%

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result
FF-405-2018	2018-06-21	2018-06-27	Fine filter	SANA crusher stockpile	Gradation	Compliant
					Water content	2.12%
FF-407-2018	2018-06-22	2018-06-28	Fine Filter	North Cell Internal Structure, Sta. 2+500/-22 m, El. 152 m	Gradation	Compliant
					Water content	2.82%
FF-412-2018	2018-07-01		Fine Filter	North Cell Internal Structure, Sta. 1+120/-102 m, El. 150 m		

6.0 PHOTOGRAPHS

Photograph NCIS-042: From Sta. 2+210/-27 m (approx.), looking SE. Placement of a 0.5 m thick lift of fine filter over the coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 2+305 m to 2+040 m.

Photograph NCIS-043: From Sta. 1+250/-38 m (approx.), looking N. Compaction of the 1.5 to 2 m lift (approx.) of ultramafic (UM) rockfill at El. 150 m with a 10-tonne smooth-drum compactor with vibration (6 passes) between the haul truck traffic lane and the upstream slope from Sta. 1+330 to 1+200 m (offset -53 to -24 m).

Photograph NCIS-044: From Sta. 1+200/-19 m (approx.), looking S. Placement of a 1.5 to 2 m thick (approx.) lift of UM rockfill from El. 148 m to El. 150 m (approx.) with a dozer from Sta. 1+150 m to 1+120 m (-92 m to +10 m). The material is of good quality and is well graded.

Photograph NCIS-045: From Sta. 2+760/-40 m (approx.), looking S. Profiling of the upstream slope (3H:1V) from El. 150 to 152 m with an excavator from Sta. 2+715 m to 2+825 m.

Photograph NCIS-046: From Sta. 2+680/-18 m (approx.), looking SE. Removal of till material mixed with the UM rockfill of the capping (about 1 to 2 m thick along the slope) with an excavator from Sta. 2+760 m to 2+850 m (offset -35 to -17 m).

Photograph NCIS-047: From Sta. 2+580/-35 m (approx.), looking N. Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 2+560 m to 2+640 m.

Photograph NCIS-048: From Sta. 1+120/-92 m (approx.), looking SW. Placement of a 1.5 to 2 m thick (approx.) lift of UM rockfill from El. 148 m to El. 150 m (approx.) with a dozer from Sta. 1+125 m to 1+115 m (-92 m to -47 m). The material is of good quality and is well graded.

Photograph NCIS-049: From Sta. 2+870/-28 m (approx.), looking N. Removing of UM rockfill material from the capping with a dozer to level the surface to El. 150 m from Sta. 2+760 m to 2+850 m (offset -29 to -17 m).

Photograph NCIS-050: From Sta. 1+230/-55 m (approx.), looking S. Compaction of the 1.5 to 2 m lift (approx.) of ultramafic (UM) rockfill at El. 150 m with a 10-tonne smooth-drum compactor with vibration (6 passes) between the haul truck traffic lane and the upstream slope from Sta. 1+220 to 1+130 m (offset -91 to -44 m).

Photograph NCIS-051: From Sta. 2+630/-34 m (approx.), looking SE. Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 2+640 m to 2+815 m.

Photograph NCIS-052: From Sta. 1+120/-87 m (approx.), looking SW. Placement of a 1.5 to 2 m thick (approx.) lift of UM rockfill from El. 148 m to El. 150 m (approx.) with a dozer from Sta. 1+115 m to 1+100 m (-107 m to -45 m). The material is of good quality and is well graded.

Photograph NCIS-053: From Sta. 2+840/-37 m (approx.), looking S. Removing of UM rockfill material from the capping with a dozer to level the surface to El. 152 m from Sta. 2+850 m to 2+980 m (offset -38 to -24 m).

Photograph NCIS-054: From Sta. 2+580/-31 m (approx.), looking SE. Compaction of the 0.5 m lift (approx.) of coarse filter between El. 150 and 152 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 2+560 m to 2+815 m.

Photograph NCIS-055: From Sta. 1+730/-42 m (approx.), looking NE. Placement of a 0.5 m thick lift of fine filter over the coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 1+820 m to 1+595 m.

Photograph NCIS-056: From Sta. 1+290/-39 m (approx.), looking S. Profiling of the upstream slope (3H:1V) from El. 148 to 150 m with an excavator from Sta. 1+340 m to 1+130 m.

Photograph NCIS-057: From Sta. 3+010/-15 m (approx.), looking SW. Removing of UM rockfill material from the capping with a dozer to level the surface to El. 152 m from Sta. 2+980 m to 3+050 m (offset -30 to -20 m).

Photograph NCIS-058: From Sta. 1+340/-34 m (approx.), looking S. Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 148 m to 152 m with an excavator from Sta. 1+340 m to 1+270 m.

Photograph NCIS-059: From Sta. 1+330/-34 m (approx.), looking S. Placement of a 1.5 to 2 m thick (approx.) lift of UM rockfill from El. 148 m to El. 150 m (approx.) with a dozer from Sta. 1+120 m to 1+100 m (-96 m to -60 m). The material is of good quality and is well graded.

Photograph NCIS-060: From Sta. 1+365/-35 m (approx.), looking SW. Placement of a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+340 m to 1+320 m (-19 m to +16 m). The material is of good quality and is well graded.

Photograph NCIS-061: From Sta. 1+365/-35 m (approx.), looking S. Compaction of the 0.5 m lift of coarse filter between El. 148 and 152 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 1+340 m to 1+270 m.

Photograph NCIS-062: From Sta. 1+525/-33 m (approx.), looking N. Placement of a 0.5 m thick lift of fine filter over the coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 1+330 m to 1+260 m and from Sta. 1+595 m to 1+550 m.

Photograph NCIS-063: From Sta. 1+200/-65 m (approx.), looking SW. Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 148 m to 152 m with an excavator from Sta. 1+270 m to 1+100 m.

Photograph NCIS-064: From Sta. 1+200/-65 m (approx.), looking W. Placement of a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+320 m to 1+235 m (-65 m to -45 m). The material is of good quality and is well graded.

Photograph NCIS-065: From Sta. 1+140/-96 m (approx.), looking NE. Compaction of the 0.5 m lift of coarse filter between El. 148 and 152 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 1+270 m to 1+100 m.

Photograph NCIS-066: From Sta. 1+400/-34 m (approx.), looking N. Placement of a 0.5 m thick lift of fine filter over the coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 1+595 m to 1+550 m.

Photograph NCIS-067: From Sta. 2+880/-26 m (approx.), looking SW. Profiling of the upstream slope (3H:1V) from El. 150 to 152 m with an excavator from Sta. 2+860 m to 2+975 m.

Photograph NCIS-068: From Sta. 1+150/-62 m (approx.), looking S. Placement of a 0.5 m thick lift of fine filter over the coarse filter in the upstream slope from El. 148 m to 150 m with an excavator from Sta. 1+180 m to 1+100 m.

Photograph NCIS-069: From Sta. 1+180/-56 m (approx.), looking NW. Placement of a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+235 m to 1+160 m (-60 m to -44 m). The material is of good quality and is well graded.

Photograph NCIS-070: From Sta. 1+160/-89 m (approx.), looking S. Compaction of the 0.5 m lift of fine filter between El. 150 and 152 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 1+335 m to 1+100 m.

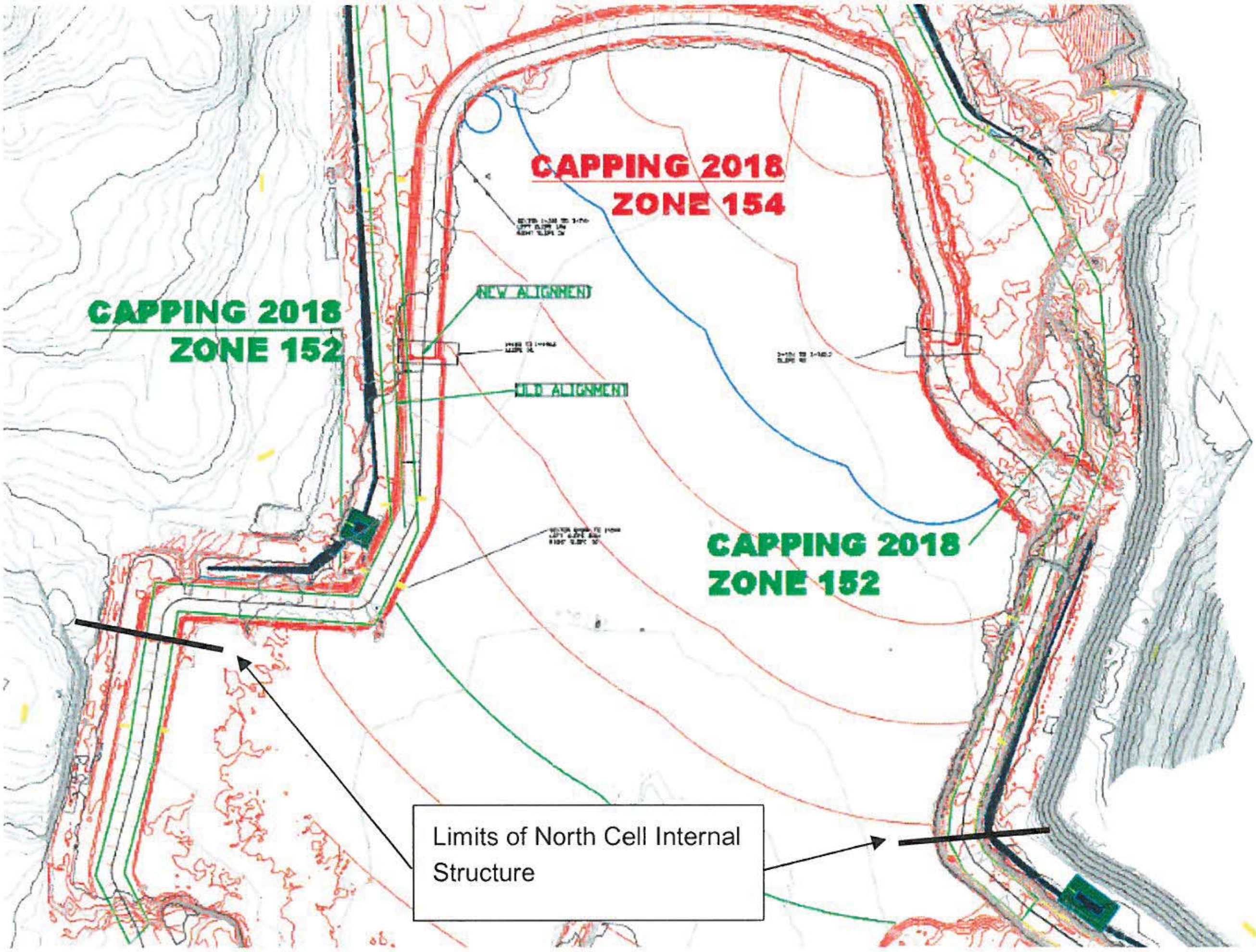

Figure 1: New proposed configuration for the North Cell Internal Structure and planned deposition

REGISTERED PROFESSIONAL ENGINEER
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2018-07-02

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https://golderassociates.sharepoint.com/sites/1897439/preparation of deliverables/weekly reports/2018-06-25 to 2018-07-01/1897439-1577-tm-rev0 qa weekly report north cell 2018-06-25 to 2018-07-01.docx

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Date 2018 - 07 - 02
PERMIT NUMBER: P 049
NT/NU Association of Professional Engineers and Geoscientists

GOLDER

QA WEEKLY REPORT

DATE July 9th 2018 1897439-1577-TM-Rev0

TO Patrice Gagnon, Pier-Éric McDonald
Agnico Eagle Mines Ltd, Meadowbank Division

CC Frédérick Bolduc, Alexandre Lavallée

FROM Samuel Barbeau **EMAIL sbarbeau@golder.com**

QA WEEKLY REPORT FROM JULY 2ND TO JULY 8TH – TSF NORTH CELL CONSTRUCTION MEADOWBANK (1897439)

This document summarizes QA activities performed by Golder from July 2nd to July 8th, 2018 inclusively, related to the construction activities of the North Cell Internal Structure at the Meadowbank mine site.

Unless otherwise specified, the construction activities use the centreline of the structures for a dike crest elevation of 152 m for reference (refer to the Drawings). The description of activities refers to the stations and offsets from the centreline (e.g., Sta. 0+500/-50 m). The “+” and “-” symbols indicate the location of the work downstream and upstream of the centreline, respectively.

1.0 GOLDER PERSONNEL ON SITE

Golder personnel on site during this reporting period is summarized in Table 1.

Table 1: Golder Personnel on Site

Name	Comments
Marion Habersetzer	QA Manager (departure on July 3rd)
Samuel Barbeau	QA Manager (arrival on July 2nd)

2.0 HEALTH AND SAFETY

H&S meetings were held with AEM and FGL/SANA during the daily construction meetings. Minutes from these meetings are recorded and stored in Golder’s on-site office. The key H&S elements for the reporting period were as follows:

- Dust is still an issue on the construction field; be vigilant by staying out of the dust cloud near construction activities and road circulation.
- Coactivity on the dike: be aware of blind spots and safe spots, maintain good communication and visual contact with the operators.
- Keep a safe distance from the compactor as it is towed in the slope by an excavator, in case of a failure of the steel cable.
- An off-duty employee was killed by a polar bear. A psychologist will be present on site to support employees affected by the tragedy.
- The fog causes a visibility issue on the roads and on the dikes. Reduce driving speed and keep safety distances between vehicles. Make sure to be visible by the equipment operators.
- The rain is an issue, as the muddy and very slippery ground causes a high risk of slips and falls. Extra caution must be applied when walking or driving on wet surfaces.
- It was iterated to wear proper PPE and to report any incident as soon as possible.
- Radio channels on the North Cell Internal Structure were reiterated: Portage Operations must be used on the traffic lane, whereas MBDykes must be used when working behind the boulders (e.g., excavators working on the slope).

3.0 SUMMARY OF MAIN DISCUSSIONS IN CONSTRUCTION MEETINGS

Construction meetings were held daily during the reporting period and were attended by the QA Manager. The following items were discussed:

General

- The coarse and fine filters first stockpiles were finished. Stockpiles from last year (crushed UM material) were then used. QA and QC personnel sampled the other stockpiles for gradations.
- Following discussion with AEM, SANA will build an enlarged access ramp for the El. 154 m lift over the water pipe crossing the dike at El. 152 m around Sta. 2+780 (approx.), as the current access is too narrow for the passage of two haul trucks.
- The QA Manager observed a few holes up to 0.1 m deep and 0.2 m (approx.) wide in the fine filter surface around Sta. 1+360 m. According to the SANA foreman, they may result from the thawing of ice blocks in the filter material. This section of fine filter is yet to be compacted. According to the SANA foreman, the compaction should fill the holes. If holes remain they will be filled with fine filter material.
- No compactor was available to compact the fine filter from July 6th to July 8th as it was used to compact the airstrip. The activity was postponed for latter.

- AEM asked for details regarding the location, spacing of the captors and depth of the planned thermistors on the North Cell Internal Structure. The question was forwarded to the Designer.
- On July 7th, rockfill came from the remains of the intermediate volcanic (IV) rockfill stockpile used for the construction of Central Dike.

Follow-up

- Ditches and sumps to be constructed will be discussed between Golder and AEM. A meeting is scheduled on July 9th.

4.0 SUMMARY OF CONSTRUCTION ACTIVITIES AND TEST RESULTS

Periodic QA inspections to monitor the construction activities and progress were performed by the QA Manager; these are summarized in the tables below. For the location and extent of the construction works, refer to the enclosed plans.

Table 2: QA Observations for the North Cell Internal Structure

Activity or Area	Comments
Crest	■ Placement of a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+160 m to 1+130 m (-55 m to -102 m). The material is of good quality and is well graded. ■ Placement of a 2 m thick (approx.) lift of IV rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+160 m to 1+140 m (-64 m to -111 m). The material is of good quality and is well graded.
Upstream	■ Profiling of the upstream slope (3H:1V) from El. 150 to 152 m with an excavator from Sta. 2+975 m to 3+160 m and from 1+300 m to 1+165 m. ■ Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 2+815 m to 3+160 m and from 1+300 m to 1+200 m. The material visually seemed well graded and of good quality. ■ Placement of a 0.5 m thick lift of fine filter over the coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 1+210 m to 1+550 m, from Sta. 1+610 m to 1+630 m and from Sta. 2+800 m to 3+160 m. The material visually seemed well graded and of good quality.

Activity or Area	Comments
	■ Compaction of the 0.5 m lift (approx.) of coarse filter between El. 150 and 152 m with a 10-tonne smooth-drum compactor (4 passes) in the upstream slope from Sta. 2+810 m to 3+160 m and from Sta. 1+300 m to 1+200 m. ■ Compaction of the 0.5 m lift of fine filter between El. 150 and 152 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 1+335 m to 1+100 m and from Sta. 2+095 m to 2+000 m. ■ Compaction of the 0.5 m lift (approx.) of fine filter between El. 150 and 152 m with a 10-tonne smooth-drum compactor (4 passes) in the upstream slope from Sta. 2+810 m to 2+095 m. Vibration is used except for the first pass down the slope in order to stabilize the material and limit deformation of the lift.

5.0 SAMPLING, LABORATORY AND FIELD TESTING

Table 3 and Table 4 present the samples collected or tested by the QA and QC.

Table 3: Samples Taken by the QC

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result
FF-399-2018	2018-06-21	2018-07-02	Fine filter	SANA crusher stockpile	Gradation	Compliant
					Water content	2.90%
FF-401-2018	2018-06-21	2018-07-02	Fine filter	SANA crusher stockpile	Gradation	Compliant
					Water content	4.30%
FF-402-2018	2018-06-21	2018-07-03	Fine Filter	SANA Crusher Stockpile	Gradation	Compliant
					Water content	3.80%
CF-383-2018	2018-06-21	2018-07-04	Coarse filter	SANA crusher stockpile	Gradation	Compliant
					Water content	Not noted

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result
CF-387-2018	2018-07-02	2018-07-05	Coarse Filter	SANA Crusher Second Stockpile	Gradation	Compliant
					Water content	1.23%
FF-413-20108	2018-07-02	2018-07-05	Fine Filter	North Cell Internal Structure, Sta. 1+100/-102 m, El. 150 m	Gradation	Compliant
					Water content	3.20%
CF-387-2018	2018-07-02	2018-07-05	Coarse Filter	SANA Crusher Second Stockpile	Gradation	Compliant
					Water content	1.23%
CF-384-2018	2018-06-21	2018-07-06	Coarse filter	SANA crusher stockpile	Gradation	Compliant
					Water content	0.76%
FF-414-2018	2018-07-02	2018-07-06	Fine Filter	SANA Crusher Second Stockpile	Gradation	Compliant
					Water content	5.38%
FF-414-2018	2018-07-02	2018-07-06	Fine Filter	SANA Crusher Second Stockpile	Gradation	Compliant
					Water content	5.38%
FF-416-2018	2018-07-05	2018-07-07	Fine Filter	North Cell Internal Structure, Sta. 2+900/-31 m, El. 152 m	Gradation	Compliant
					Water content	2.30%
FF-417-2018	2018-07-06	2018-07-08	Fine Filter	North Cell Internal Structure, Sta. 3+100/-33 m, El. 152 m	Gradation	Compliant
					Water content	2.00%

Table 4: Samples Taken by the QA

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result
FF-412-2018	2018-07-01	2018-07-03	Fine Filter	North Cell Internal Structure, Sta. 1+120/-102 m, El. 150 m	Gradation	Compliant
					Water content	2.58 %
FF-415-2018	2018-07-02	2018-07-04	Fine Filter	SANA Crusher Second Stockpile	Gradation	Slightly too many large particles, but accepted provided the material is well-graded
					Water content	3.56%
CF-388-2018	2018-07-02	2018-07-03	Coarse Filter	SANA Crusher Second Stockpile	Gradation	The material contains slightly too much sand particles, but is acceptable provided it is well graded.
					Water content	1.13 %

6.0 PHOTOGRAPHS

Photograph NCIS-071: From Sta. 2+670/-28 m (approx.), looking SE. Placement of a 0.5 m thick lift of fine filter over the coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 1+550 m to 1+320 m and 1+630 m to 1+610 m.

Photograph NCIS-072: From Sta. 2+790/-38 m (approx.), looking W. Profiling of the upstream slope (3H:1V) from El. 150 to 152 m with an excavator from Sta. 2+975 m to 3+070 m.

Photograph NCIS-073: From Sta. 1+300/-33 m (approx.), looking N. Placement of a 0.5 m thick lift of fine filter over the coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 1+320 m to 1+300 m.

Photograph NCIS-074: From Sta. 2+750/-37 m (approx.), looking SE. Compaction of the 0.5 m lift (approx.) of fine filter between El. 150 m and 152 m with a 10-tonne smooth-drum compactor (4 passes) in the upstream slope from Sta. 2+810 m to 2+095 m. Vibration is used except for the first pass down the slope in order to stabilize the material and limit deformation of the lift.

Photograph NCIS-075: From Sta. 2+860/-36 m (approx.), looking S. Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 2+815 m to 2+980 m.

Photograph NCIS-076: From Sta. 2+940/-15 m (approx.), looking SW. Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 2+980 m to 3+160 m.

Photograph NCIS-077: From Sta. 1+310/-32 m (approx.), looking S. Profiling of the upstream slope (3H:1V) from El. 150 to 152 m with an excavator from Sta. 1+300 m to 1+175 m and from 3+070 m to 3+160 m.

Photograph NCIS-078: From Sta. 2+760/-39 m (approx.), looking S. Placement of a 0.5 m thick lift of fine filter over the coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 2+800 m to 2+980 m.

Photograph NCIS-079: From Sta. 1+280/-39 m (approx.), looking SW. Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 1+300 m to 1+200 m.

Photograph NCIS-080: From Sta. 2+800/-38 m (approx.), looking S. Compaction of the 0.5 m lift (approx.) of coarse filter between El. 150 and 152 m with a 10-tonne smooth-drum compactor (4 passes) in the upstream slope from Sta. 2+925 m to 3+160 m and from Sta. 1+300 m to 1+200 m.

Photograph NCIS-081: From Sta2+975/-37 m (approx.), looking SE. Placement of a 0.5 m thick lift of fine filter over the coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 1+300 m to 1+210 m and from Sta. 2+940 m to 3+120 m.

Photograph NCIS-082: From Sta 3+060/-33 m (approx.), looking S. Placement of a 0.5 m thick lift of fine filter over the coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 3+120 m to 3+160 m.

Photograph NCIS-083: From Sta 1+140/-52 m (approx.), looking SW. Placement of a 2 m thick (approx.) lift of IV rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+160 m to 1+170 m (-64 m to -111 m). The material is of good quality and is well graded.

Photograph NCIS-084: From Sta 1+080/+47 m (approx.), looking E. Placement of a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+160 m to 1+130 m (-55 m to -102 m).

REGISTERED PROFESSIONAL ENGINEER
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LICENSEE
NT/NU
2018-07-09

Marion Habersetzer
for: Samuel Barbeau
Mine Waste Group

Yves Boulianne, P.Eng.
Associate, Senior Geotechnical Engineer

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https://golderassociates.sharepoint.com/sites/1897439/preparation of deliverables/weekly reports/2018-07-02 to 2018-07-08/1897439-1577-tm-rev0 qa weekly report north cell 2018-07-02 to 2018-07-08.docx

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GOLDER ASSOCIATES LTD.
Signature
Date 2018-07-09
PERMIT NUMBER: P 049
NT/NU Association of Professional Engineers and Geoscientists

GOLDER

QA WEEKLY REPORT

DATE July 16th 2018 1897439-1577-TM-Rev0

TO Patrice Gagnon, Pier-Éric McDonald
Agnico Eagle Mines Ltd, Meadowbank Division

CC Frédérick Bolduc, Alexandre Lavallée

FROM Samuel Barbeau **EMAIL** sbarbeau@golder.com

QA WEEKLY REPORT FROM JULY 9TH TO JULY 15TH– TSF NORTH CELL CONSTRUCTION MEADOWBANK (1897439)

This document summarizes QA activities performed by Golder from July 9th to July 15th, 2018 inclusively, related to the construction activities of the North Cell Internal Structure at the Meadowbank mine site.

Unless otherwise specified, the construction activities use the centreline of the structures for a dike crest elevation of 152 m for reference (refer to the Drawings). The description of activities refers to the stations and offsets from the centreline (e.g., Sta. 0+500/-50 m). The "+" and "-" symbols indicate the location of the work downstream and upstream of the centreline, respectively.

1.0 GOLDER PERSONNEL ON SITE

Golder personnel on site during this reporting period is summarized in Table 1.

Table 1: Golder Personnel on Site

Name	Comments
Samuel Barbeau	QA Manager

2.0 HEALTH AND SAFETY

H&S meetings were held with AEM and FGL/SANA during the daily construction meetings. Minutes from these meetings are recorded and stored in Golder's on-site office. The key H&S elements for the reporting period were as follows:

- Dust is still an issue on the construction field; be vigilant by staying out of the dust cloud near construction activities and road circulation.
- Coactivity on the dike: be aware of blind spots and safe spots, keep good communication and visual contact with the operators.
- A pickup passed a haul truck on the west road without calling on the radio. It was reiterated to never pass a haul truck on the west road and, where acceptable, to always call on the radio when passing a vehicle.
- It was reminded to drink a lot of water to stay hydrated despite the heat.

3.0 SUMMARY OF MAIN DISCUSSIONS IN CONSTRUCTION MEETINGS

Construction meetings were held daily during the reporting period and were attended by the QA Manager. The following items were discussed:

General

- A meeting was conducted between the AEM and the Designer to discuss a strategy regarding the sump and ditch construction around the North Cell Internal Structure. The strategy consisted of phasing the construction of the ditch through time and to manage water in the low points with pumping equipment. AEM wished to construct only ditch 2 this season and to deviate it back into the North Cell rather than building sump 2, as the North Cell Internal Structure construction is limited to Sta. 1+100 m. AEM raised the questions to know why the ditch 2 was planned to be lined. Following discussion with AEM, the water management works planned for this construction season consist of:
  - Clearing a channel through the area near the cyanide burning pad to allow water to flow gravitationally inside the North Cell Internal Structure.
  - Digging a ditch west of the North Cell Internal Structure (NCIS), flowing southbound towards the interior of the NCIS, without installing a liner.
  - Improving the water management capacities by deepening the low points in the tailings east of the NCIS; installing rockfill to prevent erosion of the tailings and create an access for the pumping crew. The QA/QC personnel will be required to closely follow up on the excavation in the tailings as the underlying RF2 till plug must not be excavated.
- The placement of the rockfill lift was completed for El. 152 m.
- An access for the UM rockfill lift at elevation 154 on the North Cell Internal Structure was constructed with UM rockfill from Sta. 2+780 m to 2+750 m.
- The QA Manager observed large deformations in the fine filter surface on the North Cell Internal Structure around Sta. 1+940 m following the compaction. According to the SANA foreman, the deformations are due to

a new operator on the excavator towing the compactor. The surface was corrected with the compactor on the following day.

- The SANA surveyor reports that the lift is 0.3 m to 0.5 m too thick around Sta. 2+610 m (approx.) as it was placed during the night shift. The SANA surveyor will install pickets at the end of the day shift to guide the bulldozer during the night shift.
- The UM rockfill lift installed on July 13th was thicker than required by 300 mm to 700 mm even though the surveyor installed guide pickets. The SANA surveyor will increase the frequency of the follow-ups with the bulldozer operator from the Mine, as the non-AG rockfill quantities are low and limited. The elevation will be corrected to 154 m by an excavator to have a smooth surface for the compactor as well as to limit the extent of the filters.
- The UM rockfill lift elevation at the North Cell Internal Structure is henceforth closely followed by the SANA surveyor.
- An approx. 30 m shift between the station measured by the SANA surveyor and the QA Manager was noted. A new alignment for the North Cell Internal Structure centerline at El. 154 m had been issued around 2 weeks ago. The new GPX file was provided to the QA Manager on July 12th.
- With the new alignment, the water pipe around Sta. 2+730 m (approx.) is crossing the North Cell Internal Structure footprint at El. 152 m. The water pipe is included in the footprint for the elevation 154 m. The water pipe will need to be displaced before raising this area to El. 154 m.
- Boulders acting as a berm on the North Cell Internal Structure were moved by mistake on the top of the upstream slope at El 152 m. They were scattered with an excavator to prevent honeycombing.
- The QA Manager observed oversized boulders at the North Cell Internal Structure in the lift close to the upstream slope. AEM mine supervisor was informed of the situation. The loader operator in the pit will hence informed the haul truck if a boulder is present in is load and transfer this information to the bulldozer operator. The haul truck will drop is load on the downstream side of the pad and the bulldozer operator shall push the oversized boulders downstream.

4.0 SUMMARY OF CONSTRUCTION ACTIVITIES AND TEST RESULTS

Periodic QA inspections to monitor the construction activities and progress were performed by the QA Manager; these are summarized in the tables below. For the location and extent of the construction works, refer to the enclosed plans.

Table 2: QA Observations for the North Cell Internal Structure

Activity or Area	Comments
Crest	■ Placement of a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+130 m to 1+100 m (-55 m to -78 m). The material is of good quality and is well graded. ■ Placement of a 2 m thick (approx.) lift of UM rockfill from El. 152 m to El. 154 m (approx.) with a dozer from Sta. 2+750 m to 2+280 m (+9 m to -26 m). The material is of good quality and is well graded.
Upstream	■ Compaction of the 0.5 m lift (approx.) of fine filter between El. 150 m and 152 m with a 10-tonne smooth-drum compactor (4 passes) in the upstream slope from Sta. 2+028 m to 1+650 m. Vibration is used except for the first pass down the slope in order to stabilize the material and limit deformation of the lift. ■ Profiling of the upstream slope (3H:1V) from El. 150 to 152 m with an excavator from Sta. 1+185 m to 1+100 m. ■ Profiling of the upstream slope (3H:1V) from El. 152 to 154 m with an excavator from Sta. 2+720 m to 2+545 m.

5.0 SAMPLING, LABORATORY AND FIELD TESTING

Table 3 and Table 4 present the samples collected or tested by the QA and QC.

Table 3: Samples Taken by the QC

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result

Table 4: Samples Taken by the QA

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result

6.0 PHOTOGRAPHS

Photograph NCIS-085: From Sta 1+150/-67m (approx.), looking SW. Placement of a 2 m thick (approx.) lift of UM rockfill from El. 150 m to El. 152 m (approx.) with a dozer from Sta. 1+130 m to 1+100 m (-55 m to -78 m).

Photograph NCIS-086: From Sta 2+750/+14 m (approx.), looking E. Placement of a 2 m thick (approx.) lift of UM rockfill from El. 152 m to El. 154 m (approx.) with a dozer from Sta. 2+780 m to 2+760 m (-60 m to -44 m).

Photograph NCIS-087: From Sta 1+950/-34 m (approx.), looking W. Compaction of the 0.5 m lift (approx.) of fine filter between El. 150 and 152 m with a 10-tonne smooth-drum compactor (4 passes) in the upstream slope from Sta. 2+000 m to 1+930 m. Vibration is used except for the first pass down the slope in order to stabilize the material and limit deformation of the lift.

Photograph NCIS-088: From Sta 2+000/-35 m (approx.), looking W. Compaction of the 0.5 m lift (approx.) of fine filter between El. 150 m and 152 m with a 10-tonne smooth-drum compactor (4 passes) in the upstream slope from Sta. 2+028 m to 1+650 m.

Photograph NCIS-089: From Sta 2+525/+4 m (approx.), looking S. Placement of a 2 m thick (approx.) lift of UM rockfill from El. 152 m to El. 154 m (approx.) with a dozer from Sta. 2+605 m to 2+455 m (+3 m to -23 m).

Photograph NCIS-090: From Sta 2+440/-1 m (approx.), looking SE. Placement of a 2 m thick (approx.) lift of UM rockfill from El. 152 m to El. 154 m (approx.) with a dozer from Sta. 2+455 m to 2+370 m (+4 m to -24 m).

Photograph NCIS-091: From Sta 2+330/+13 m (approx.), looking S. Placement of a 2 m thick (approx.) lift of UM rockfill from El. 152 m to El. 154 m (approx.) with a dozer from Sta. 2+370 m to 2+290 m (+9 m to -22 m). The material is of good quality and is well graded.

Photograph NCIS-092: From Sta 1+160/-77 m (approx.), looking S. Profiling of the upstream slope (3H:1V) from El. 150 to 152 m with an excavator from Sta. 1+185 m to 1+135 m.

Photograph NCIS-093: From Sta 2+260/+12 m (approx.), looking S. Placement of a 2 m thick (approx.) lift of UM rockfill from El. 152 m to El. 154 m (approx.) with a dozer from Sta. 2+290 m to 2+280 m (+9 m to -22 m).

Photograph NCIS-094: From Sta 1+125/-109 m (approx.), looking SW. Profiling of the upstream slope (3H:1V) from El. 150 to 152 m with an excavator from Sta. 1+135 m to 1+100 m.

Marion Haberselzer
for: Samuel Barbeau
Mine Waste Group

REGISTERED PROFESSIONAL ENGINEER
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LICENSEE
NT/NU
2018-07-16

Yves Boulianne, P.Eng.
Associate, Senior Geotechnical Engineer

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https://golderassociates.sharepoint.com/sites/1897439/preparation of deliverables/weekly reports/2018-07-09 to 2018-07-15/1897439-1577-tm-rev0 qa weekly report north cell 2018-07-09 to 2018-07-15.docx

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QA WEEKLY REPORT

DATE July 23rd 2018 1897439-1577-TM-Rev0

TO Patrice Gagnon, Pier-Éric McDonald
Agnico Eagle Mines Ltd, Meadowbank Division

CC Frédérick Bolduc, Alexandre Lavallée

FROM Marion Habersetzer **EMAIL mhabersetzer@golder.com**

QA WEEKLY REPORT FROM JULY 16TH TO JULY 22ND – TSF NORTH CELL CONSTRUCTION MEADOWBANK (1897439)

This document summarizes QA activities performed by Golder from July 16th to July 22nd, 2018 inclusively, related to the construction activities of the North Cell Internal Structure at the Meadowbank mine site.

Unless otherwise specified, the construction activities use the centreline of the structures for a dike crest elevation of 152 m for reference (refer to the Drawings). The description of activities refers to the stations and offsets from the centreline (e.g., Sta. 0+500/-50 m). The "+" and "-" symbols indicate the location of the work downstream and upstream of the centreline, respectively.

1.0 GOLDER PERSONNEL ON SITE

Golder personnel on site during this reporting period is summarized in Table 1.

Table 1: Golder Personnel on Site

Name	Comments
Samuel Barbeau	QA Manager (departure on July 16th)
Marion Habersetzer	QA Manager (arrival on July 16th)

2.0 HEALTH AND SAFETY

H&S meetings were held with AEM and FGL/SANA during the daily construction meetings. Minutes from these meetings are recorded and stored in Golder's on-site office. The key H&S elements for the reporting period were as follows:

- Dust is still an issue on the construction field; be vigilant by staying out of the dust cloud near construction activities and road circulation.
- Coactivity on the dike: be aware of blind spots and safe spots, keep good communication and visual contact with the operators.
- A haul truck passed by 2 larger haul trucks yesterday on the North Cell Internal Structure without obtaining the radio clearance beforehand. It was reiterated to wait for confirmation before taking over heavy equipment and to make sure to always use the correct radio channel.
- A near-miss incident happened in Amaruq where a suspended load (boulder) dropped near workers.
- A caribou was spotted on the North Cell on July 21st. Activities were slowed down as a precaution.
- It is required to slow down when passing near workers on foot, as vehicles lift a large quantity of dust.

3.0 SUMMARY OF MAIN DISCUSSIONS IN CONSTRUCTION MEETINGS

Construction meetings were held daily during the reporting period and were attended by the QA Manager. The following items were discussed:

General

- The water pipe crossing the North Cell Internal Structure around Sta. 2+730 m will need to be moved. AEM will inform SANA on who will move the pipe and where will it be moved to.
- The works on the portion of the North Cell Internal Structure at El. 152 m are prioritized. Ditches and sumps as well as deposition points should be completed by August 1st to allow for deposition from that date on.
- AEM asked to know the volume of rockfill needed to complete the North Cell Internal Structure (NCIS). An estimated 15 000 m^3 is required to finish the crest, and additional UM rockfill will be used to prepare deposition points.
- The QA Manager and the foreman reviewed the works to be done for the ditch (west of the NCIS and through the Cyanide Burning Pad) and the sumps (east of the NCIS, near the rock storage facility) planned for this year.

Follow-up

- Deposition points design to be discussed between AEM and Golder.

4.0 SUMMARY OF CONSTRUCTION ACTIVITIES AND TEST RESULTS

Periodic QA inspections to monitor the construction activities and progress were performed by the QA Manager; these are summarized in the tables below. For the location and extent of the construction works, refer to the enclosed plans.

Table 2: QA Observations for the North Cell Internal Structure

Activity or Area	Comments
Crest	■ Placement of a 2 m thick (approx.) lift of UM rockfill from El. 152 m to El. 154 m (approx.) with a dozer from Sta. 2+190 m to 1+863 m (+14 m to -26 m). The material is of good quality and is well graded.
Upstream	■ Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 1+113 m to 1+200 m. The material visually seemed well graded and of good quality. ■ Compaction of the 0.5 m lift (approx.) of coarse filter between El. 150 m and 152 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 1+113 m to 1+200 m. ■ Placement of a 0.5 m thick lift of fine filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 1+113 m to 1+215 m. The material visually seemed well graded and of good quality. ■ Compaction of the 0.5 m lift (approx.) of fine filter between El. 150 m and 152 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 1+251 m to 1+660 m. ■ Profiling of the upstream slope (3H:1V) from El. 152 to 154 m with an excavator from Sta. 2+545 m to 2+159 m. Oversize boulders were removed. ■ Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 152 m to 154 m with an excavator from Sta. 2+293 m to 2+710 m. The material visually seemed well graded and of good quality. ■ Compaction of the 0.5 m lift (approx.) of coarse filter between El. 152 m and 154 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 2+710 m to 2+411 m. ■ Placement of a 0.5 m thick lift of fine filter in the upstream slope from El. 152 m to 154 m with an excavator from Sta. 2+710 m to 2+445 m. The material visually seemed well graded and of good quality.

5.0 SAMPLING, LABORATORY AND FIELD TESTING

Table 3 and Table 4 present the samples collected or tested by the QA and QC.

Table 3: Samples Taken by the QC

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result
CF-389-2018	2018-07-20	2018-07-22	Coarse Filter	North Cell Internal Structure (in place) 2+720/-22 m, El. 154 m	Gradation	Compliant
					Water content	0.5%
FF-419-2018	2018-07-21		Fine Filter	North Cell Internal Structure (in place) 2+690/-13 m, El. 154 m		

Table 4: Samples Taken by the QA

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result
FF-420-2018	2018-07-21		Fine Filter	North cell Internal Structure (in place) 2+690/-13 m, El. 154 m		

6.0 PHOTOGRAPHS

Photograph NCIS-096: From Sta 2+355/+9 m (approx.), looking N. Placement of a 2 m thick (approx.) lift of UM rockfill from El. 152 m to El. 154 m (approx.) with a dozer from Sta. 2+190 m to 2+103 m (+7 m to -22 m). The material is of good quality and is well graded.

Photograph NCIS-095: From Sta 2+375/-18 m (approx.), looking S. Profiling of the upstream slope (3H:1V) from El. 152 to 154 m with an excavator from Sta. 2+545 m to 2+410 m.

Photograph NCIS-097: From Sta. 1+180/-75 m (approx.), looking SW. Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 1+200 m to 1+113 m.

Photograph NCIS-098: From Sta. 2+040/-9 m (approx.), looking E. Placement of a 2 m thick (approx.) lift of UM rockfill from El. 152 m to El. 154 m (approx.) with a dozer from Sta. 2+103 m to 1+984 m (+7 m to -22 m). The material is of good quality and is well graded.

Photograph NCIS-099: From Sta. 1+180/-76 m (approx.), looking SE. Compaction of the 0.5 m lift (approx.) of coarse filter between El. 150 m and 152 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 1+200 m to 1+170 m.

Photograph NCIS-100: From Sta. 1+960/+10 m (approx.), looking E. Placement of a 2 m thick (approx.) lift of UM rockfill from El. 152 m to El. 154 m (approx.) with a dozer from Sta. 1+984 m to 1+947 m (+14 m to -26 m). The material is of good quality and is well graded.

Photograph NCIS-101: From Sta. 1+120/-89 m (approx.), looking N. Placement of a 0.5 m thick lift of fine filter in the upstream slope from El. 150 m to 152 m with an excavator from Sta. 1+113 m to 1+205 m.

Photograph NCIS-102: From Sta. 2+680/-21 m (approx.), looking W. Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 152 m to 154 m with an excavator from Sta. 2+575 m to 2+710 m and from Sta. 2+411 m to 2+460 m.

Photograph NCIS-103: From Sta. 2+420/-27 m (approx.), looking NE. Profiling of the upstream slope (3H:1V) from El. 152 to 154 m with an excavator from Sta. 2+400 m to 2+410 m. Oversize boulders were removed.

Photograph NCIS-104: From Sta. 2+650/-23 m (approx.), looking SE. Placement of a 0.5 m thick lift of fine filter in the upstream slope from El. 152 m to 154 m with an excavator from Sta. 2+710 m to 2+445 m.

Photograph NCIS-105: From Sta. 2+630/-34 m (approx.), looking NW. Compaction of the 0.5 m lift (approx.) of coarse filter between El. 152 m and 154 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 2+710 m to 2+411 m.

Photograph NCIS-106: From Sta. 2+620/-35 m (approx.), looking NW. Placement of a 2 m thick (approx.) lift of UM rockfill from El. 152 m to El. 154 m (approx.) with a dozer from Sta. 1+947 m to 1+863 m (+14 m to -26 m). The material is of good quality and is well graded.

Photograph NCIS-107: From Sta. 1+380/-38 m (approx.), looking S. Compaction of the 0.5 m lift (approx.) of fine filter between El. 150 m and 152 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 1+251 m to 1+1+660 m.

Photograph NCIS-108: From Sta. 2+490/-32 m (approx.), looking N. Profiling of the upstream slope (3H:1V) from El. 152 to 154 m with an excavator from Sta. 2+159 m to 2+409 m.

Photograph NCIS-109: From Sta. 2+450/-21 m (approx.), looking N. Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 152 m to 154 m with an excavator from Sta. 2+293 m to 2+411 m.

REGISTERED PROFESSIONAL ENGINEER
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2018-07-23

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QA WEEKLY REPORT

DATE July 30th 2018

1897439-1577-TM-Rev0

TO Patrice Gagnon, Pier-Éric McDonald
Agnico Eagle Mines Ltd, Meadowbank Division

CC Frédérick Bolduc, Alexandre Lavallée

FROM Marion Habersetzer

EMAIL mhabersetzer@golder.com

QA WEEKLY REPORT FROM JULY 23RD TO JULY 29TH– TSF NORTH CELL CONSTRUCTION MEADOWBANK (1897439)

This document summarizes QA activities performed by Golder from July 23rd to July 29th, 2018 inclusively, related to the construction activities of the North Cell Internal Structure at the Meadowbank mine site.

Unless otherwise specified, the construction activities use the centreline of the structures for a dike crest elevation of 152 m for reference (refer to the Drawings). The description of activities refers to the stations and offsets from the centreline (e.g., Sta. 0+500/-50 m). The "+" and "-" symbols indicate the location of the work downstream and upstream of the centreline, respectively.

1.0 GOLDER PERSONNEL ON SITE

Golder personnel on site during this reporting period is summarized in Table 1.

Table 1: Golder Personnel on Site

Name	Comments
Marion Habersetzer	QA Manager

2.0 HEALTH AND SAFETY

H&S meetings were held with AEM and FGL/SANA during the daily construction meetings. Minutes from these meetings are recorded and stored in Golder's on-site office. The key H&S elements for the reporting period were as follows:

- Dust is still an issue on the construction field; be vigilant by staying out of the dust cloud near construction activities and road circulation.
- Coactivity on the dike: be aware of blind spots and safe spots, keep good communication and visual contact with the operators.
- Possible ground instability and rockfalls can happen in the downstream slope of the North Cell Internal Structure, which is not profiled. Workers on foot in the slope and at the toe must be careful.
- The rain is an issue, the muddy and very slippery ground causes a high risk of slips and falls. Extra caution must be applied when walking or driving on wet surfaces.

3.0 SUMMARY OF MAIN DISCUSSIONS IN CONSTRUCTION MEETINGS

Construction meetings were held daily during the reporting period and were attended by the QA Manager. The following items were discussed:

General

- The QA Manager and the foreman defined on the field the footprint of the ditch and the sumps.
- The QA and QC personnel were present during the excavation of the sumps. The QA Manager required that the width of the sumps (perpendicular to the North Cell Internal Structure and RF1/RF2) and its depth be limited in order to avoid risking damaging the till and erosion protection layers placed on the upstream slope of RF1/RF2, below the tailings. Instead, the sumps were lengthened (parallel to the dikes) to provide the same volume.
- The sumps were excavated over several days, in order to leave time for the frozen bottom of the excavation to thaw. Corrections were made to the north sump to obtain a correct depth after the thawed tailings had slightly moved.
- The granular material placed as erosion protection in the sumps and ditch excavated in the tailings is till sieving reject material. A 0.3 m thick layer was placed over the slopes and bottom of the excavations. This is an adaptation for the operation stage from the original design requiring 0.5 m of coarse filter in the sumps, and 0.3 m of fine filter in the ditches. This material is considered good quality for this use, and this adjustment will save some coarse filter material.
- A culvert was installed in the ditch at Sta. 1+450 m to rebuild the access to the North Cell Internal Structure over the ditch.
- Given a shortage of UM rockfill, at the request of AEM, the UM rockfill coming from the pit was used in priority on the deposition points, while stockpiled UM rockfill was used on deposition points when no pit feed was available, in order to be ready for deposition on August 1st. Rockfill placement on the crest of the dike resumed once the deposition points were completed.

- The QA Manager noticed boulder nests on the upstream slope of the rockfill around Sta. 1+830 m (see photograph below). Fine material was subsequently mixed in during slope profiling of this section.
- Haul trucks have trafficked the entire width of the UM rockfill platform at El. 154 m except the downstream berm. Since the downstream berms represent a smaller width than trafficable safely by the compactor, and since no further raise is planned above El. 154 m, it is acceptable not to compact the portion of the UM rockfill platform underneath the downstream berms.
- The pipe which crosses the North Cell Internal Structure will not be moved, instead the deposition will be slightly adjusted to avoid raising this section of the dike to El. 154 m.
- At the request of the QA Manager, the ditch was excavated deeper in the southern section on the rockfill capping, as water was ponding around the culvert and did not seem to flow out southwards.

Follow-up

- The deposition points design by AEM was forwarded to the construction team for construction. Each point consists in a 5x6 m UM rockfill pad.

4.0 SUMMARY OF CONSTRUCTION ACTIVITIES AND TEST RESULTS

Periodic QA inspections to monitor the construction activities and progress were performed by the QA Manager; these are summarized in the tables below. For the location and extent of the construction works, refer to the enclosed plans.

Table 2: QA Observations for the North Cell Internal Structure

Activity or Area	Comments
Crest	■ Placement of a 2 m thick (approx.) lift of UM rockfill from El. 152 m to El. 154 m (approx.) with a dozer from Sta. 1+863 m to 1+660 m (+14 m to -31 m). The material is of good quality and is well graded. The placement of UM rockfill on the structure is complete. ■ Construction of a UM rockfill ramp at the end of the lift at El. 154 m at Sta. 1+660 m with a loader. ■ Removal of excess UM rockfill left on the crest after profiling of the upstream slope. The material was pushed in the downstream slope.
Upstream	■ Compaction of the 0.5 m lift (approx.) of fine filter between El. 150 m and 152 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 1+251 m to 1+100 m.

Activity or Area	Comments
	■ Profiling of the upstream slope (3H:1V) from El. 152 to 154 m with an excavator from Sta. 2+159 m to 1+660 m. ■ Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 152 m to 154 m with an excavator from Sta. 2+293 m to 1+826 m. The material visually seemed well graded and of good quality. ■ Compaction of the 0.5 m lift (approx.) of coarse filter between El. 152 m and 154 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 2+293 m to 1+826 m. ■ Placement of a 0.5 m thick lift of fine filter in the upstream slope from El. 152 m to 154 m with an excavator from Sta. 2+460 m to 1+830 m. The material visually seemed well graded and of good quality. ■ Compaction of the 0.5 m lift (approx.) of fine filter between El. 152 m and 154 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 3+141 m to 1+830 m. ■ Construction of the deposition points (UM rockfill) at Sta. 2+220 m, 2+440 m, 2+610 m, 2+790 m, 1+985 m, 1+725 m and 1+455 m.
Downstream	■ Placement of UM rockfill to build an access ramp on the tailings downstream of the North Cell Internal Structure to provide access to the sumps area (eastern side of the structure). The rockfill was taken in the downstream slope of the dike and from the material removed from the upstream slope. ■ Construction of a UM rockfill access ramp on the tailings to excavate the ditch (western side of the structure). ■ Excavation of a 0.8 m (approx.) deep, 1 m wide shallow ditch in the rockfill capping and the tailings with an excavator from Sta. 1+650 m to 1+300 m. A culvert was installed at Sta. 1+460 m. ■ Excavation of a 1.5 m (approx.) sump in the tailings (north sump) with an excavator from Sta. 3+010 m to 3+030 m (o.s. +27 to +30 m). The bottom of the excavation was frozen. ■ Excavation of a 1.5 m (approx.) deep sump (south sump) in the tailings with an excavator from Sta. 3+345 m to 3+365 m (o.s. +24 to +32 m). The bottom of the excavation was frozen.

Activity or Area	Comments
	■ Profiling of the slopes of the two sumps with an excavator to approx. 2H:1V and placement of a 0.3 m thick (approx.) layer of till sieving reject material on the bottom and on the slopes of the sumps. The material visually seemed well graded and of good quality. ■ Corrections to the north sump: removal of approx. 0.5 m of tailing and till sieving reject material on the bottom of the excavation.

5.0 SAMPLING, LABORATORY AND FIELD TESTING

Table 3 and Table 4 present the samples collected or tested by the QA and QC.

Table 3: Samples Taken by the QC

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result
FF-419-2018	2018-07-21	2018-07-23	Fine Filter	North cell Internal Structure (in place) 2+690/-13 m, El. 154 m	Gradation	Compliant
					Water content	2.9%
FF-421-2018	2018-07-24	2018-07-25	Fine Filter	North Cell Internal Structure (in place) Sta. 2+160/-25 m, El. 154 m	Gradation	Compliant
					Water content	2.66%
FF-422-2018	2018-07-25	2018-07-27	Fine Filter	North Cell Internal Structure (in place) Sta. 2+040/-19 m, El. 154 m	Gradation	Compliant
					Water content	2.93%

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result
FF-423-2018	2018-07-25		Fine Filter	North Cell Internal Structure (in place) Sta. 2+060/-19 m, El. 154 m	Gradation	Compliant
					Water content	1.90%

Table 4: Samples Taken by the QA

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result
FF-420-2018	2018-07-21	2018-07-23	Fine Filter	North cell Internal Structure (in place) 2+690/-13 m, El. 154 m	Gradation	Slightly too many large particles, but accepted provided the material is well-graded.
					Water content	3.35%

6.0 PHOTOGRAPHS

Photograph NCIS-110: From Sta. 2+320/-22 m (approx.), looking N. Compaction of the 0.5 m lift (approx.) of coarse filter between El. 152 m and 154 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 2+293 m to 2+080 m.

Photograph NCIS-111: From Sta. 2+320/-22 m (approx.), looking NW. Profiling of the upstream slope (3H:1V) from El. 152 to 154 m with an excavator from Sta. 2+159 m to 2+000 m and placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 152 m to 154 m with an excavator from Sta. 2+293 m to 2+080 m.

Photograph NCIS-112: From Sta. 2+610/-29 m (approx.), looking N. Compaction of the 0.5 m lift (approx.) of coarse filter between El. 152 m and 154 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 2+080 m to 2+000 m.

Photograph NCIS-113: From Sta. 2+220/-26 m (approx.), looking SW. Profiling of the upstream slope (3H:1V) from El. 152 to 154 m with an excavator from Sta. 2+000 m to 1+185 m and placement of a 0.5 m thick lift of fine filter in the upstream slope from El. 152 m to 154 m with an excavator from Sta. 2+300 m to 2+090 m.

Photograph NCIS-114: From Sta. 1+700/-34 m (approx.), looking N. Excavation of a 0.8 m (approx.) deep, 1 m wide shallow ditch in the rockfill capping with an excavator from Sta. 1+500 m to 1+650 m.

Photograph NCIS-115: From Sta. 3+040/-33 m (approx.), looking NE. Excavation of a 1 m (approx.) sump in the tailings with an excavator from Sta. 3+010 m to 3+030 m (o.s. +27 to +30 m). The bottom of the excavation was frozen.

Photograph NCIS-116: From Sta. 1+700/+37 m (approx.), looking SE. Excavation of a 0.8 m (approx.) deep, 1 m wide shallow ditch in the rockfill capping with an excavator from Sta. 1+500 m to 1+455 m.

Photograph NCIS-117: From Sta. 2+050/-25 m (approx.), looking SW. Placement of a 0.5 m thick lift of fine filter in the upstream slope from El. 152 m to 154 m with an excavator from Sta. 2+090 m to 1+890 m.

Photograph NCIS-118: From Sta. 1+500/-37 m (approx.), looking S. View of a deposition point.

Photograph NCIS-119: From Sta. 1+430/-22 m (approx.), looking N. Excavation of a 0.8 m (approx.) deep, 1 m wide shallow ditch in the rockfill capping with an excavator from Sta. 1+455 m to 1+400 m.

Photograph NCIS-120: From Sta. 1+830/-27 m (approx.), looking NE. View of an accumulation of boulders on the upstream slope of the NCIS.

Photograph NCIS-121: From Sta.3+050/+26 m (approx.), looking NE. Placement of a 0.3 m thick (approx.) layer of till sieving reject material on the bottom and on the slopes of the sump.

Photograph NCIS-122: From Sta. 1+960/-6 m (approx.), looking W. Placement of a 2 m thick (approx.) lift of UM rockfill from El. 152 m to El. 154 m (approx.) with a dozer from Sta. 1+830 m to 1+860 m (+8 m to -23 m).

Photograph NCIS-123: From Sta. 3+340/+33 m (approx.), looking S. Excavation of a 1 m (approx.) deep sump (south sump) in the tailings with an excavator from Sta. 3+345 m to 3+365 m (o.s. +24 to +32 m). The bottom of the excavation was frozen.

Photograph NCIS-124: From Sta. 3+340/+33 m (approx.), looking S. Placement of a 0.3 m thick (approx.) layer of till sieving reject material on the bottom and on the slopes of the south sump.

Photograph NCIS-125: From Sta. 3+050/+26 m (approx.), looking NE. Corrections to the north sump: removal of approx. 0.5 m of tailing and till sieving reject material on the bottom of the excavation. The erosion protection material was replaced.

Photograph NCIS-126: From Sta. 1+140/-98 m (approx.), looking W. Compaction of the 0.5 m lift (approx.) of coarse filter between El. 150 m and 152 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 1+240 m to 1+100 m.

Photograph NCIS-127: From Sta. 1+470/+20 m (approx.), looking SW. View of the culvert installed in the ditch at Sta. 1+460 m.

Photograph NCIS-128: From Sta. 1+680/-42 m (approx.), looking NE. Placement of a 2 m thick (approx.) lift of UM rockfill from El. 152 m to El. 154 m (approx.) with a dozer from Sta. 1+830 m to 1+660 m (+8 m to -31 m) and profiling of the upstream slope (3H:1V) from El. 152 to 154 m with an excavator from Sta. 1+880 m to 1+780 m.

Photograph NCIS-129: From Sta. 2+450/-21 m (approx.), looking S. Compaction of the 0.5 m lift (approx.) of fine filter between El. 152 m and 154 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 2+220 m to 1+940 m.

Photograph NCIS-130: From Sta. 1+446/+16 m (approx.), looking S. Excavation of a 0.8 m (approx.) deep, 1 m wide shallow ditch in the rockfill capping with an excavator from Sta. 1+380 m to 1+300 m.

Photograph NCIS-131: From Sta. 1+940/-20 m (approx.), looking W. Compaction of the 0.5 m lift (approx.) of coarse filter between El. 152 m and 154 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 1+890 m to 1+826 m.

Photograph NCIS-132: From Sta. 1+940/-20 m (approx.), looking W. Profiling of the upstream slope (3H:1V) from El. 152 to 154 m with an excavator from Sta. 1+780 m to 1+660 m.

Photograph NCIS-133: From Sta. 1+820/-28 m (approx.), looking W. Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 152 m to 154 m with an excavator from Sta. 1+890 m to 1+826 m.

REGISTERED PROFESSIONAL ENGINEER
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2018-07-30

Marion Habersetzer, M.Sc.
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GOLDER ASSOCIATES LTD.
Signature
Date 2018-07-30
PERMIT NUMBER: P 049
NT/NU Association of Professional Engineers and Geoscientists

GOLDER

QA WEEKLY REPORT

DATE August 6th 2018 1897439-1577-TM-Rev0

TO Patrice Gagnon, Pier-Éric McDonald
Agnico Eagle Mines Ltd, Meadowbank Division

CC Frédérick Bolduc, Alexandre Lavallée

FROM Marion Habersetzer **EMAIL mhabersetzer@golder.com**

QA WEEKLY REPORT FROM JULY 30TH TO AUGUST 2ND– TSF NORTH CELL CONSTRUCTION MEADOWBANK (1897439)

This document summarizes QA activities performed by Golder from July 30th to August 2nd, 2018 inclusively, related to the construction activities of the North Cell Internal Structure at the Meadowbank mine site.

Unless otherwise specified, the construction activities use the centreline of the structures for a dike crest elevation of 152 m for reference (refer to the Drawings). The description of activities refers to the stations and offsets from the centreline (e.g., Sta. 0+500/-50 m). The "+" and "-" symbols indicate the location of the work downstream and upstream of the centreline, respectively.

1.0 GOLDER PERSONNEL ON SITE

Golder personnel on site during this reporting period is summarized in Table 1.

Table 1: Golder Personnel on Site

Name	Comments
Marion Habersetzer	QA Manager (departure on August 2nd)

2.0 HEALTH AND SAFETY

Health and safety meetings were held with AEM and FGL/SANA during the daily construction meetings. Minutes from these meetings are recorded and stored in Golder's on-site office. The key health and safety elements for the reporting period were as follows:

- The rain is an issue; the muddy and very slippery ground causes a high risk of slips and falls. Extra caution must be applied when walking or driving on wet surfaces.
- Coactivity on the dike: be aware of blind spots and safe spots, maintain good communication and visual contact with the operators.
- On July 28th, a haul truck hit a pick-up truck parked in its blind spot. It was reiterated to always perform a walkaround inspection of the vehicle before starting the work shift, or resuming work after lunch.
- Dust is an issue on the construction field; be vigilant by staying out of the dust cloud near construction activities and road circulation.

3.0 SUMMARY OF MAIN DISCUSSIONS IN CONSTRUCTION MEETINGS

Construction meetings were held daily during the reporting period and were attended by the QA Manager. The following items were discussed:

General

- The QA Manager reiterated that filter materials must be placed with the excavator in the upstream slope in a way to limit segregation as much as possible.
- Teranap liner panels were installed on the deposition points.
- The QA and QC personnel left the site on August 2nd. Only minor fine filter compaction works and corrections to the south sump remained to be done and should be completed on that day.

4.0 SUMMARY OF CONSTRUCTION ACTIVITIES AND TEST RESULTS

Periodic QA inspections to monitor the construction activities and progress were performed by the QA Manager; these are summarized in the tables below. For the location and extent of the construction works, refer to the enclosed plans.

Table 2: QA Observations for the North Cell Internal Structure

Activity or Area	Comments
Upstream	■ Completion of the profiling of the upstream slope (3H:1V) from El. 152 to 154 m with an excavator from Sta. 1+740 m to 1+640 m. ■ Placement of a 0.5 m thick lift of coarse filter in the upstream slope from El. 152 m to 154 m with an excavator from Sta. 1+826 m to 1+660 m. The material visually seemed well graded and of good quality.

Activity or Area	Comments
	■ Compaction of the 0.5 m lift (approx.) of coarse filter between El. 152 m and 154 m with a 10-tonne smooth-drum compactor with vibration (4 passes) in the upstream slope from Sta. 1+826 m to 1+660 m. ■ Placement of a 0.5 m thick lift of fine filter in the upstream slope from El. 152 m to 154 m with an excavator from Sta. 1+830 m to 1+660 m. The material visually seemed well graded and of good quality.
Downstream	■ Construction of a UM rockfill access ramp on the tailings to excavate the ditch. ■ Excavation of a 0.8 m (approx.) deep, 1 m wide shallow ditch in the tailings with an excavator from Sta. 1+300 m to 1+100 m. ■ Placement of a 0.3 m thick (approx.) layer of till sieving reject material on the bottom and on the slopes of the ditch with an excavator from Sta. 1+300 m to 1+000 m. The material visually seemed well graded and of good quality.

5.0 SAMPLING, LABORATORY AND FIELD TESTING

Table 3 and Table 4 present the samples collected or tested by the QA and QC.

Table 3: Samples Taken by the QC

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result
FF-424-2018	2018-07-30	2018-07-01	Fine Filter	North Cell Internal Structure (in place) Sta. 1+820/-22, El. 154 m	Gradation	Slightly too much fines, but still acceptable
					Water content	2.83%

Table 4: Samples Taken by the QA

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result

6.0 PHOTOGRAPHS

Photograph NCIS-134: From Sta. 1+630/-32 m (approx.), looking NE. Completion of the profiling of the upstream slope (3H:1V) from El. 152 to 154 m with an excavator from Sta. 1+700 m to 1+660 m.

Photograph NCIS-135: From Sta. 1+860/-12 m (approx.), looking SW. Placement of a 0.5 m thick lift of fine filter in the upstream slope from El. 152 m to 154 m with an excavator from Sta. 1+830 m to 1+700 m.

Photograph NCIS-136: From Sta. 1+800/-33 m (approx.), looking SW. Placement of a 0.5 m thick lift of fine filter in the upstream slope from El. 152 m to 154 m with an excavator from Sta. 1+700 m to 1+660 m.

Photograph NCIS-137: From Sta. 1+380/+14 m (approx.), looking SW. Excavation of a 0.8 m (approx.) deep, 1 m wide shallow ditch in the tailings with an excavator from Sta. 1+300 m to 1+200 m.

Photograph NCIS-138: From Sta. 1+365/+15 m (approx.), looking SW. Excavation of a 0.8 m (approx.) deep, 1 m wide shallow ditch in the tailings and placement of a 0.3 m thick (approx.) layer of till sieving reject material on the bottom and on the slopes of the ditch from Sta. 1+200 m to 1+100 m.

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GOLDER ASSOCIATES LTD.
Signature
Date 2018-08-06
PERMIT NUMBER: P 049
NT/NU Association of Professional Engineers and Geoscientists

GOLDER

QA WEEKLY REPORT

DATE April 30th 2018 **Reference No.** 1897439-1577-TM-Rev0

TO Patrice Gagnon, Pier-Éric McDonald
Agnico Eagle Mines Ltd, Meadowbank Division

CC Frédérick Bolduc, Alexandre Lavallée

FROM Marion Habersetzer **EMAIL** mhabersetzer@golder.com

QA WEEKLY REPORT FROM APRIL 23 TO 29 – TSF SOUTH CELL CONSTRUCTION

MEADOWBANK (1897439)

This document summarizes QA activities performed by Golder from 23 to 29 April 2018, inclusively, related to the construction activities of Saddle Dams 3, 4, and 5 (SD) and Central Dike at the Meadowbank mine site.

Unless otherwise specified, the construction activities use the centreline of the structures for a dike crest elevation of 150 m for reference (refer to the Drawings). The description of activities refers to the stations and offsets from the centreline (e.g., Sta. 0+500/-50 m). The "+" and "-" symbols indicate the location of the work downstream and upstream of the centreline, respectively.

1.0 GOLDER PERSONNEL ON SITE

Golder personnel on site during this reporting period is summarized in Table 1.

Table 1: Golder Personnel on Site

Name	Comments
Marion Habersetzer	QA Engineer

2.0 HEALTH AND SAFETY

H&S meetings were held with AEM and FGL/SANA during the daily construction meetings. Minutes from these meetings are recorded and stored in Golder's on-site office. The key H&S elements for the reporting period were as follows:

- Cold weather and ice: apply caution when driving or walking on icy surfaces, wear appropriate clothing.
- The blast clearance procedures were reiterated.
- The snow banks on the north access of Central Dike were lowered to improve visibility for the haul trucks.
- Dust is an issue on the construction field; be vigilant by staying out of the dust cloud near construction activities and road circulation.

- It was reiterated that everyone on the field must have a portable radio with them and be on the correct radio channel. New workers must be informed of this as soon as they arrive.
- The season is prone to tailings dust being carried by the strong winds, due to the very dry surfaces. If this situation goes on or worsen, work methods may have to be adapted or work stopped if visibility or workers' health become of concern.
- Repeated wildlife activity (wolves, caribous, wolverine) was reported on site. Driving speed is limited for that reason.
- Coactivity on the dikes: be aware of blind spots and safe spots, keep good communication and visual contact with the operators. It is recommended to call on the radio when entering Central Dike on either side when heavy equipment is working in the area.

3.0 SUMMARY OF MAIN DISCUSSIONS IN CONSTRUCTION MEETINGS

Construction meetings were held daily during the reporting period and were attended by the QA manager. The following items were discussed:

General

- Arrival of the QA (Marion Habersetzer) and QC (Cédrick Fillon-Tremblay) personnel on site on 23 April.
- A debriefing session took place on 23 April with AEM's representative to review the planning of the construction season and the operations that had already taken place. Access ramps to Central Dike are in place and rockfill placement started on 21 April. No QA or QC personnel was on site for this placement.
- The QA engineer noted that the new LLDPE rolls are stored on trailers outside near the waste rock storage facility. There is snow and ice on some rolls but they seem in good condition. A closer inspection will be done after the snow has melted.
- It was reiterated that no vehicle can drive on the exposed geomembrane.
- The sampling and lab program was reviewed with SANA and AEM. SANA indicated that an estimated volume of 3,600 m^3 of coarse filter and 3,600 m^3 of fine filter is expected to be placed on the dikes in 2018.
- Construction is progressing ahead of schedule. However, the frozen deposition fingers on Central Dike cannot be removed prior to the planned date without risking damaging the LLDPE liner on the upstream slope.
- The QA Engineer reiterated that the stations used on foundation approval drawings should be those for the centerline at El. 150 m, consistent with what was done during construction of the north abutment of Central Dike and the Saddle Dams.

Central Dike

- The LLDPE liner installed on the upstream slope of Central Dike has been damaged near the deposition finger at approx. Sta. 0+650 m during snow removal operations. The amount of repairs required will be estimated when the deposition finger is removed entirely before installation of the new liner at El. 145 m.
- AEM indicated that only good quality intermediate volcanic (IV) rockfill will be used for the Central Dike raise to El. 145 m this year. The stockpiles are ready and will provide the required quantity.
- Sampling of the fine filter and coarse filter stockpiles was done on April 25 using a loader to prepare a pad. The stockpiles are made from crushed good quality Non-AG intermediate volcanic (IV) rock.
- The access ramp at the southern extremity of Central Dike will need to be lengthened to ensure a smooth slope in the ramp and the required crest width at El. 145 m. The ramp itself is located within the footprint of Saddle Dam 5 and is built with ultramafic volcanic (UM) rockfill.
- Since intermediate volcanic (IV) rockfill was placed on the south extremity of Central Dike with an excavator and haul trucks delivering the rockfill close to the ultramafic volcanic (UM) rockfill access ramp, the QA Engineer ensured that no UM rockfill was mixed with the IV rockfill while the material was taken with the bucket of the excavator.
- Central Dike needs to be widened at its south end to the footprint corresponding to El. 145 m. The foundation was approved in 2016; however, because it had since been exposed to the weather and debris for an extended period of time, the QA Engineer completed a new foundation approval before placement of rockfill.
- The QA Engineer ensured that the foundation and the existing dike slope were snow-free before placing rockfill to complete the footprint El. 145 m at the southern extremity of Central Dike.
- Because of a restrained access, completion of the 145 m footprint at the southern end of Central Dike near SD5 is done by placing and compacting the intermediate volcanic (IV) rockfill with an excavator instead of a dozer. Care is taken to limit segregation during placement.
- Following advice from the QA Engineer, some oversize boulders (>1.3 m in diameter) were removed from the slope of the dike before placement of rockfill at these elevations on the south part of Central Dike where the footprint was widened (see photograph in Section 7.0).
- The intermediate volcanic (IV) rockfill placement will be done from the south side of Central Dike once the progression of the lift from the north side had reached the instruments on the crest, in order to avoid backing up of haul trucks on a narrow crest near the instruments.
- Regarding the compaction underneath the safety berms on the downstream side of the Central Dike crest, a safety concern about driving the compactor so close to the edge was raised, given the considerable height of the downstream slope. It was thus decided with AEM that no compaction under the berms would be done this year. This point will be highlighted in the as-built report and, should Central Dike be raised to El. 150 m, this surface would be compacted once the dike is built at the El. 145 m to its final footprint.
- Profiling of the slopes of the intermediate volcanic (IV) rockfill lift on Central Dike from El. 143 to 145 m is planned to begin on 30 April.

Follow-up

- Evaluate the LLDPE liner damages on the upstream slope of Central Dike.
- Inspect the LLDPE rolls stored on trailers outside once the snow has melted.

4.0 SUMMARY OF CONSTRUCTION ACTIVITIES AND TEST RESULTS

Periodic QA inspections to monitor the construction activities and progress were performed by the QA Engineer, as summarized in the tables below.

Table 2: QA Observations for Saddle Dam 3

Activity or Area	Comments
None	

Table 3: QA Observations for Central Dike

Activity or Area	Comments
Crest	■ Placement of a 2 m thick (approx.) lift of intermediate volcanic (IV) rockfill from El. 143 m to El. 145 m from 0+250 to 0+835 m (o.s. -28 to 3 m). The material is of good quality and is well graded. The material was placed with the excavator around the 2 instruments present on the crest of the dike. ■ Compaction of the 2 m lift (approx.) of IV rockfill at El. 145 m with a 10-tonne smooth-drum compactor with vibration (6 passes) from Sta. 0+150 to 0+280 m (o.s. -21 to 3 m).
Downstream	■ Removal of snow to expose the foundation bedrock with an excavator between approx. Sta. 40+780 and 40+805 m (o.s. 7 to 10 m). The downstream slope was cleared of snow as well. ■ Final clean-up of footprint with an excavator to reach a good quality bedrock from Sta. 40+780 to 40+805 m (o.s. -6 to 9 m). The foundation was approved. ■ Placement of IV rockfill on the north side of the south access ramp to allow access to the foundation. ■ Placement a first 1.5 m thick (approx.) lift of intermediate volcanic (IV) rockfill from approx. Sta. 40+780 to 40+805 m (o.s. -6 to 9 m). The material is of good quality and is well graded. The slope of the existing dike was scarified at the elevation of the lift to ensure a good contact with the new material. ■ Compaction of the 1.5 m lift (approx.) of IV rockfill with a 10-tonne smooth-drum compactor with vibration (8 passes) from Sta. 40+780 to 40+800 m (o.s. -6 to 9 m).

5.0 FOUNDATION APPROVALS

One foundation approval was carried out during the reporting period.

Table 4: Details of the Foundation Approvals

Name	Structure	Sta. and Offset	Date of Approval	Comment
FND-CD-139	Central Dike	Sta. 40+780.88 to 0+981.22 m (o.s. 2.02 to 14.16 m)	2018-04-28	Approved

6.0 SAMPLING, LABORATORY AND FIELD TESTING

Table 5 and Table 6 present the samples collected or tested by the QA and QC as well as PNG field results.

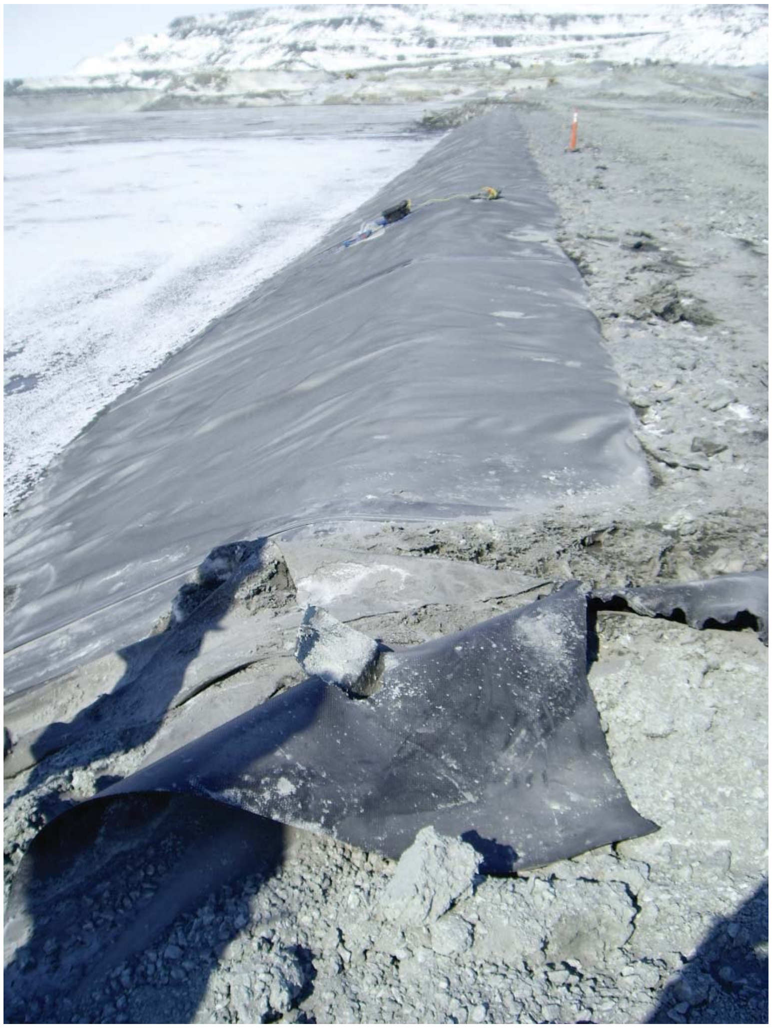
Table 5: Samples Taken by the QC

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result
CF-01-2018	2018-04-25	2018-04-26	Coarse filter	Stockpile (SANA Crusher)	Gradation	Compliant
					Water content	1.6%
FF-01-2018	2018-04-25	2018-04-26	Fine filter	Stockpile (SANA Crusher)	Gradation	Compliant
					Water content	4.3%

Table 6: Samples Taken by the QA

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result
CF-02-2018	2018-04-25		Coarse filter	Stockpile (SANA Crusher)		
FF-02-2018	2018-04-25		Fine filter	Stockpile (SANA Crusher)		

7.0 PHOTOGRAPHS



Photograph CD-1796: From Sta. 0+650/-28 m, looking N. Damaged geomembrane near a deposition finger on Central Dike.

Photograph CD-1797: From Sta. 0+320/-20 m, looking N. Placement of a 2 m thick (approx.) lift of intermediate volcanic (IV) rockfill from El. 143 m to El. 145 m from 0+250 to 0+400 m (o.s. -28 to -18 m).

Photograph CD-1798: From Sta. 0+500/-15 m looking N. Placement of a 2 m thick (approx.) lift of intermediate volcanic (IV) rockfill from El. 143 m to El. 145 m from 0+340 to 0+435 m (o.s. -28 to -18 m).

Photograph CD-1799: From Sta. 0+080/-25 m looking S. Placement of a 2 m thick (approx.) lift of intermediate volcanic (IV) rockfill from El. 143 m to El. 145 m from 0+340 to 0+435 m (o.s. -28 to -18 m).

Photograph CD-1800: From Sta. 0+500/-14 m looking N. Placement of a 2 m thick (approx.) lift of intermediate volcanic (IV) rockfill from El. 143 m to El. 145 m from 0+435 to 0+535m (o.s. -28 to -18 m).

Photograph CD-1801: From Sta. 0+650/-10 m looking N. Placement of a 2 m thick (approx.) lift of intermediate volcanic (IV) rockfill from El. 143 m to El. 145 m from 0+535 to 0+625m (o.s. -28 to -18 m).

Photograph CD-1802: From Sta. 0+770/-16 m looking N. Placement of a 2 m thick (approx.) lift of intermediate volcanic (IV) rockfill from El. 143 m to El. 145 m from approx. Sta. 0+525 to 0+710 m (o.s. -28 to -18 m).

Photograph CD-1803: From Sta. 40+750/27 m looking NE. Removal of snow to expose the foundation bedrock with an excavator between approx. Sta. 40+780 and 40+800 m (o.s. 7 to 10 m).

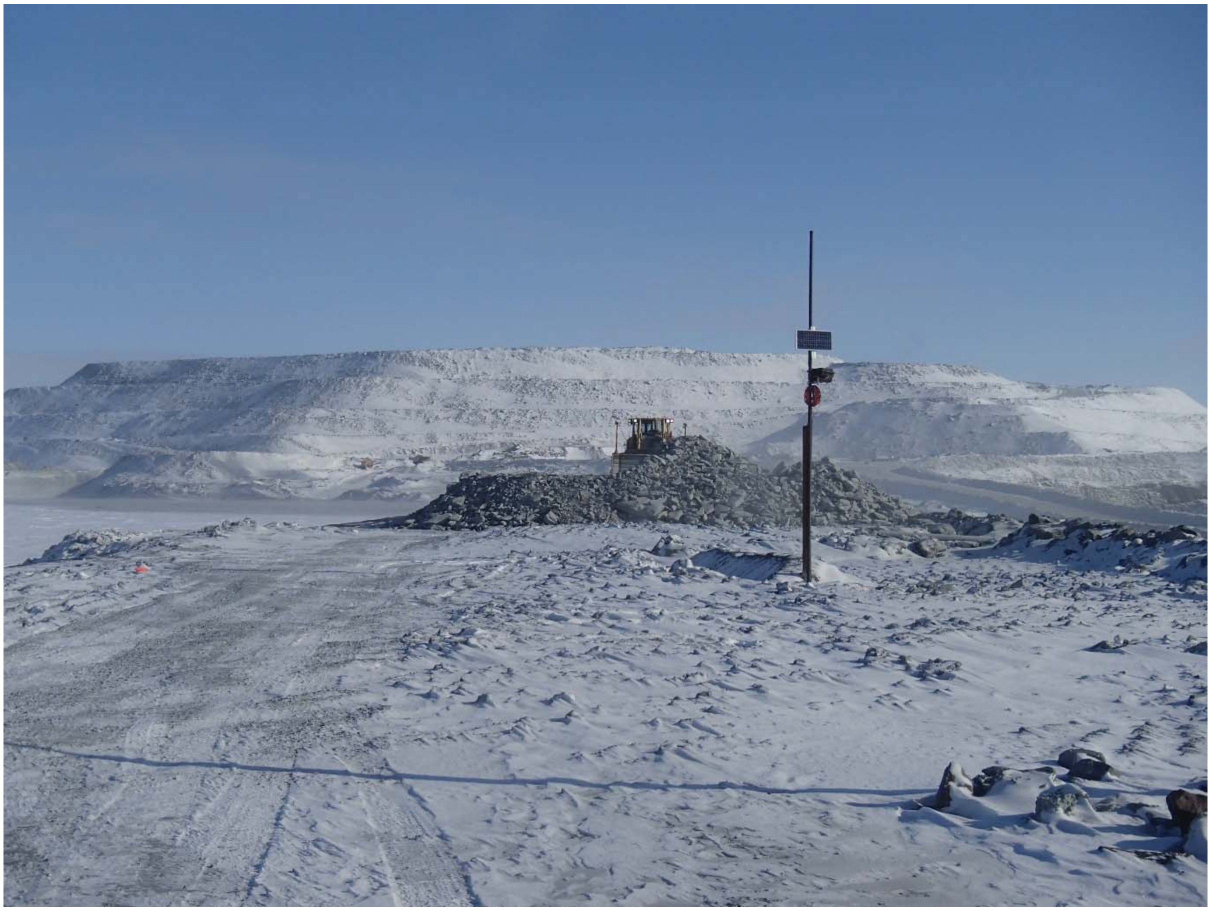
Photograph CD-1804: From Sta. 40+790/-2 m looking S. Presence of oversize boulders on the existing slope at the junction between SD5 and Central Dike.

Photograph CD-1805: From Sta. 40+780/2 m looking NE. Final clean-up of footprint with an excavator to reach a good quality bedrock from Sta. 40+780 to 40+805 m (o.s. -6 to 9 m).

Photograph CD-1806: From Sta. 0+800/-27 m looking N. Placement a 2 m thick (approx.) lift of intermediate volcanic (IV) rockfill from El. 143 m to El. 145 m from approx. Sta. 0+710 to 0+760 m (o.s. -28 to 3 m).

Photograph CD-1807: From Sta. 0+200/-15 m looking S. Compaction of the 2 m lift (approx.) of IV rockfill at El. 145 m with a 10-tonne smooth-drum compactor with vibration (6 passes) from Sta. 0+150 to 0+280 m (o.s. -21 to 11 m).

Photograph CD-1808: From Sta. 40+790/-14 m looking E. Placement of a 1.5 m thick (approx.) lift of intermediate volcanic (IV) rockfill from approx. Sta. 40+780 to 40+805 m (o.s. -6 to 9 m).



Photograph CD-1809: From Sta. 0+870/-16 m looking N. Placement of a 2 m thick (approx.) lift of intermediate volcanic (IV) rockfill from El. 143 m to El. 145 m from approx. Sta. 0+760 to 0+835 m (o.s. -28 to 3 m).

Golder Associates Ltd.

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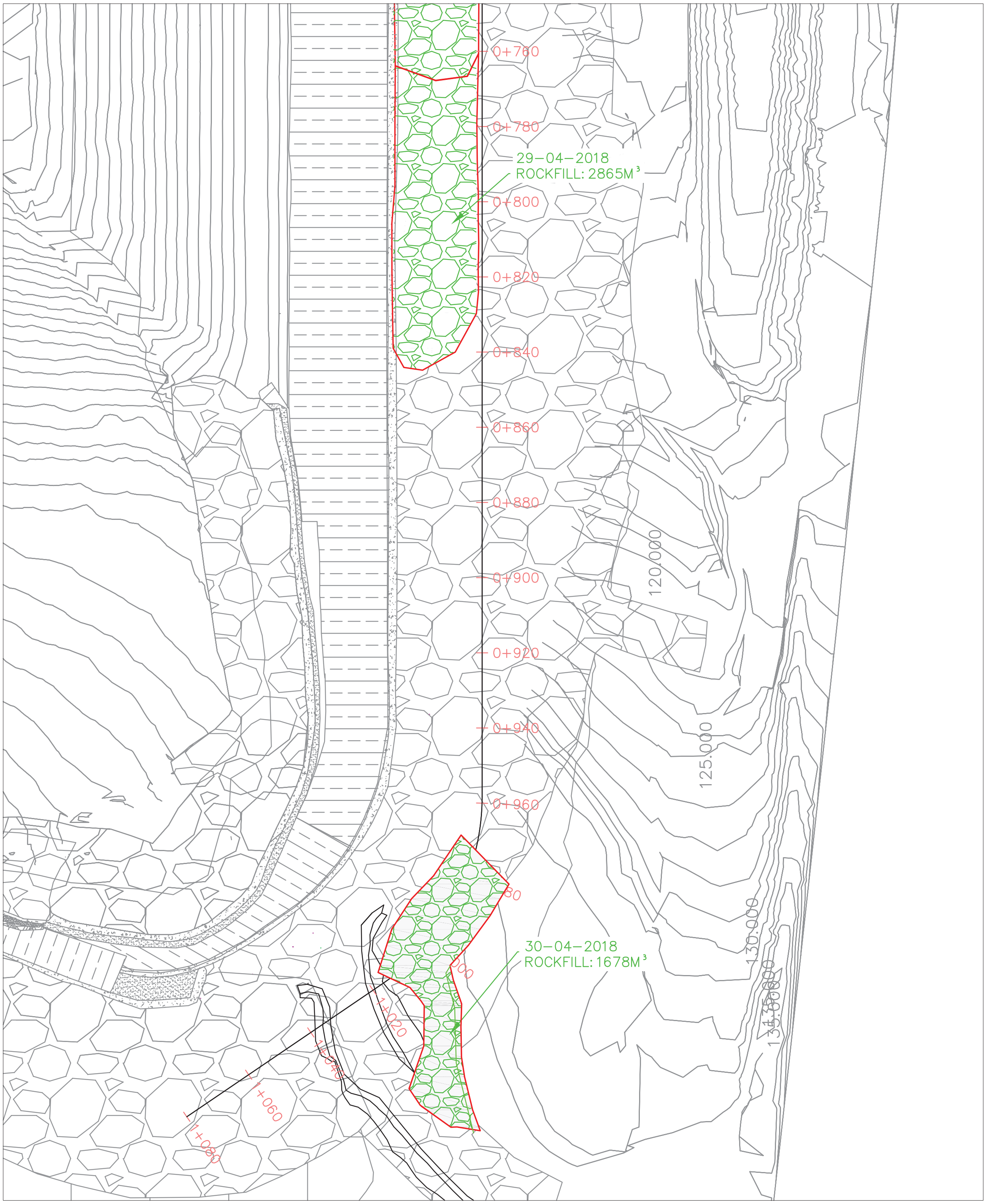
MH/YB/jlm/it

Attachments: Construction Progress Drawings from AEM as of 29 April 2018

https://golderassociates.sharepoint.com/sites/1897439/preparation of deliverables/weekly reports/2018-04-23 to 2018-04-29/1897439-1577-tm-rev0 qa weekly report 2018-04-23 to 2018-04-29.docx

PERMIT TO PRACTICE
GOLDER ASSOCIATES LTD.
Signature
Date 2018-04-30
PERMIT NUMBER: P 049
NT/NU Association of Professional Engineers and Geoscientists

DAILY PROGRESS
CENTRAL DIKE AND SD5
CONTRACT # 11-505



VOLUMETRY DETAIL

29-04-2018 - ROCKFILL : 2865m³

30-04-2018 - ROCKFILL : 1678m³

KIVALLIQ CONTRACTORS GROUP LTD

PREPARED BY : MARC-ANDRE BLACKBURN
DATE : 30-04-2018
CON-QT-011-CD_DP_300418

GOLDER

QA WEEKLY REPORT

DATE May 7th 2018 1897439-1577-TM-Rev0

TO Patrice Gagnon, Pier-Éric McDonald
Agnico Eagle Mines Ltd, Meadowbank Division

CC Frédérick Bolduc, Alexandre Lavallée

FROM Marion Habersetzer **EMAIL mhabersetzer@golder.com**

QA WEEKLY REPORT FROM APRIL 30TH TO MAY 6TH – TSF SOUTH CELL CONSTRUCTION MEADOWBANK (1897439)

This document summarizes QA activities performed by Golder from 30 April to 6 May 2018 inclusively, related to the construction activities of Saddle Dams 3, 4, and 5 (SD) and Central Dike at the Meadowbank mine site.

Unless otherwise specified, the construction activities use the centreline of the structures for a dike crest elevation of 150 m for reference (refer to the Drawings). The description of activities refers to the stations and offsets from the centreline (e.g., Sta. 0+500/-50 m). The "+" and "-" symbols indicate the location of the work downstream and upstream of the centreline, respectively.

1.0 GOLDER PERSONNEL ON SITE

Golder personnel on site during this reporting period is summarized in Table 1.

Table 1: Golder Personnel on Site

Name	Comments
Marion Habersetzer	QA Manager
Samuel Barbeau	QA Manager

Name	Comments
Marion Habersetzer	QA Manager, planned departure 7 May 2018.
Samuel Barbeau	QA Manager, arrival 30 April 2018.

2.0 HEALTH AND SAFETY

H&S meetings were held with AEM and FGL/SANA during the daily construction meetings. Minutes from these meetings are recorded and stored in Golder’s on-site office. The key H&S elements for the reporting period were as follows:

- Cold weather and ice: apply caution when driving or walking on icy surfaces, wear appropriate clothing.
- Dust is still an issue on the construction field; be vigilant by staying out of the dust cloud near construction activities and road circulation.
- The fog causes a visibility issue on the roads and on the dikes. Reduce driving speed and keep safety distances between vehicles, call on the radio when entering Central Dike.
- Coactivity on the dikes: be aware of blind spots and safe spots, keep good communication and visual contact with the operators. It is recommended to call on the radio when entering Central Dike on either side when heavy equipment is working in the area.
- Tires can burst on haul trucks: keep a safe distance of 40 m away from haul trucks at all time.
- It was reiterated to verify the back-up alarm, beacon light and buggy whip on pick-up before use.

3.0 SUMMARY OF MAIN DISCUSSIONS IN CONSTRUCTION MEETINGS

Construction meetings were held daily during the reporting period and were attended by the QA Manager. The following items were discussed:

General

- Arrival of the QA (Samuel Barbeau) personnel on site on 30 April.
- The procedures for bringing a portable nuclear gauge (PNG) in site for the QC program were discussed.
- The QA and QC personnel went with SANA’s foreman and the AEM dike supervisor to inspect the compacted sieved till material (Type 1) stockpile at the SANA crusher site. The available quantities are less than what is required for this year’s construction. In addition, the stockpile may have been mixed with other materials, as large rocks are visible. Following discussions with AEM, it was discussed that the available quantities should be used in priority in the upstream toe liner tie-ins on SD3, and that the erosion protection cover need an adjustment to replace the compacted sieved till. The retained option was to replace compacted sieved till by fine filter material (0-20 mm) mixed with 6% bentonite by mass and one layer of geotextile on the LLDPE liner.
- Following discussions with AEM, as the SD5 footprint is for elevation 150 m while the CD footprint is for elevation 145 m, the downstream curve toe was adjusted on the field to achieve a smooth transition.
- A transition zone is required for the filters thickness at the junction of Saddle Dam 5 and Central Dike, as it is 0.5 m thick on Saddle Dam 5 and 1.0 m thick on Central Dike.

Central Dike

- The QA Manager pointed out that snow has accumulated (approx. 0.5 m thick) on some parts of the crest of Central Dike at El. 143 m and should be removed before rockfill placement is continued.
- It was observed that when using the D9 bulldozer, which does not have a GPS to monitor elevation, the intermediate volcanic (IV) rockfill lift thickness was slightly in excess of 2 m (approx. 2.5 m) on Central Dike, at the junction with Saddle Dam 5. The bulldozer was replaced with the GPS-equipped D8 bulldozer used in the previous days, which ensured that the elevation of the lift was at 145m.
- Following discussions with AEM, as the SD5 footprint is for elevation 150 m while the CD footprint is for elevation 145 m, the downstream curve toe will need to be adjusted on the field to achieve a smooth transition.
- An accumulation of boulders was noticed on the first intermediate volcanic (IV) rockfill lift of the junction of Central Dike and Saddle Dam 5 at El. 143m. The QA Manager required that those boulders be scattered to ensure that no boulder nest occurs in the lift.
- The intermediate volcanic (IV) rockfill placement on Central Dike is complete.
- The QA Manager reiterated that the A.B. Gensets (model #1D008K4NACU) frost fighters used to defrost the 0,4 m (approx.) thick deposition fingers materials on the LLDPE liner must not be applied directly on the LLDPE as intense heat may damage it.

Saddle Dam 3

- The QA and QC personnel went with SANA’s foreman and the AEM dike supervisor to inspect the 0-50 mm compacted sieved till material stockpile at the SANA crusher site. The available quantities are less than what is required for this year’s construction. In addition, the stockpile may have been mixed with other materials, as large rocks are visible. Following discussions with AEM, it was discussed that the available quantities should be used in priority in the upstream toe liner tie-ins on SD3, and that the erosion protection cover need an adjustment to replace the compacted sieved till. Several options were discussed:
  - Sieving low quality till with an excavator to obtained 0-50 mm till (this would likely be difficult);
  - Using a rougher till (0-150 mm) and one or two layers of thick geotextile (minimum type 934 or equivalent) on the LLDPE liner to protect it;
  - Replacing compacted sieved till by fine filter material (Type 2, 0-20 mm) mixed with 6% bentonite by mass and one layer of geotextile on the LLDPE liner.
- Following discussions with AEM regarding the shortage in 0-50 mm compacted sieved till material, the selected option is to replace the compacted sieved till by fine filter material (Type 2, 0-20 mm) mixed with 6% bentonite in mass and one layer of geotextile on the LLDPE liner. It is expected that this alternative will achieve both purposes of the compacted sieved till layer, namely liner protection and additional low permeability.

Follow-up

- Evaluate the LLDPE liner damages on the upstream slope of Central Dike.
- Inspect the LLDPE rolls stored on trailers outside once the snow has melt.

4.0 SUMMARY OF CONSTRUCTION ACTIVITIES AND TEST RESULTS

Periodic QA inspections to monitor the construction activities and progress were performed by the QA Manager; these are summarized in the tables below.

Table 2: QA Observations for Saddle Dam 3

Activity or Area	Comments
None	

Table 3: QA Observations for Central Dike

Activity or Area	Comments
Crest	■ Compaction of the 2 m lift (approx.) of intermediate volcanic (IV) rockfill at El. 145 m with a 10-tonne smooth-drum compactor with vibration (6 passes) from Sta. 0+350 to 0+830 m (o.s. -19 to -7 m). ■ Placement of intermediate volcanic (IV) rockfill around the instruments at approx. Sta. 0+830 m with the excavator. ■ Placement of a 2 m thick (approx.) lift of intermediate volcanic (IV) rockfill from El. 143 m to El. 145 m from approx. Sta. 40+740 (SD5) to 0+830 m (o.s. -28 to -11 m). The material is of good quality and is well graded.
Downstream	■ Placement the second, third, fourth and fifth 1 m thick (approx.) lifts of intermediate volcanic (IV) rockfill from approx. Sta. 0+985 to 40+780 m (o.s. -8 to 8 m) with the excavator. The material is of good quality and is well graded. The lifts were compacted with the excavator only. ■ Placement of intermediate volcanic (IV) rockfill on the existing downstream slope up to approx. El. 143 m, from approx. Sta. 0+980 to 40+780 m. The existing slope (frozen) was scarified as much as possible with the excavator beforehand. The footprint correction is now complete. ■ Placement of a 1.5 m thick (approx.) of intermediate volcanic (IV) rockfill on the access ramp at the south of Central Dike to correct the slope for rockfill placement up to El. 143 m on the crest. ■ Profiling of the downstream slope (1.5H:1V) from El. 143 to 145 m with an excavator between Sta. 0+175 m and 0+440 m and between Sta. 0+530 m and 0+745 m.

Activity or Area	Comments
Upstream	■ Profiling of the upstream slope (2H:1V) from El. 143 to 145 m with an excavator between Sta. 0+175 and 40+730 m. ■ Placement of a 0.5 m thick lift of coarse filter from El. 143 m to 143.5 m with an excavator from Sta. 40+730 m to 0+ 775 m and Sta. 0+170 m to 0+460 m. The material visually seemed well graded and of good quality. ■ Placement of a 0.5 m thick lift of fine filter from El. 143 m to 143.5 m upstream of the coarse filter with an excavator from Sta. 40+730 m to 0+ 835 m and Sta. 0+170 m to 0+380 m. The material visually seemed well graded and of good quality. ■ Defrosting of the deposition finger materials with two Frost Fighters at Sta. 0+390 m.
Junction of Central Dike and Saddle Dam 5	■ Placement of two 2 m thick (approx.) lifts of intermediate volcanic (IV) rockfill from El. 141 m to El. 145 m from approx. Sta. 40+720 m to 40+750 m (o.s. -10 to +10 m). ■ Compaction of the two 2 m lifts (approx.) of intermediate volcanic (IV) rockfill at El. 143 and at El. 145 m with a 10-tonne smooth-drum compactor with vibration (6 passes) from Sta. 40+720 m to 40+750 m (o.s. -10 to +10 m).

5.0 FOUNDATION APPROVALS

No foundation approval was carried out during the reporting period.

Table 4: Details of the Foundation Approvals

Name	Structure	Sta. and Offset	Date of Approval	Comment

6.0 SAMPLING, LABORATORY AND FIELD TESTING

Table 5 and Table 6 present the samples collected or tested by the QA and QC as well as PNG field results.

Table 5: Samples Taken by the QC

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result
CF-03-2018	2018-05-06		Coarse Filter	Sta. 0+270m, El. 143.5m		

Table 6: Samples Taken by the QA

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result
CF-02-2018	2018-04-25	2018-05-04	Coarse filter	Stockpile (SANA Crusher)	Gradation	Compliant
					Water content	2.0 %
FF-02-2018	2018-04-25	2018-05-03	Fine filter	Stockpile (SANA Crusher)	Gradation	Compliant
					Water content	4.3 %
CF-04-2018	2018-05-06		Coarse filter	Sta. 0+980m, El. 143.5m		

7.0 PHOTOGRAPHS

Photograph CD-1810: From Sta. 0+335/-15 m looking S. Compaction of the 2 m lift (approx.) of IV rockfill at El. 145 m with a 10-tonne smooth-drum compactor with vibration (6 passes) from Sta. 0+350 to 0+540 m (o.s. -19 to -7 m).

Photograph CD-1811: From Sta. 0+985/-11 m looking SE. Placement the second, third, fourth and fifth 1 m thick (approx.) lifts of intermediate volcanic (IV) rockfill from approx. Sta. 0+985 to 40+780 m (o.s. -8 to 8 m) with the excavator.

Photograph CD-1812: From Sta. 0+985/-11 m looking SE. Placement of intermediate volcanic (IV) rockfill on the existing downstream slope up to approx. El. 140 m, from approx. Sta. 0+985 to 40+780 m.

Photograph CD-1813: From Sta. 0+980/-2, looking S. Placement of intermediate volcanic (IV) rockfill on the existing downstream slope up to approx. El. 143 m, from approx. Sta. 0+980 to 40+780 m.

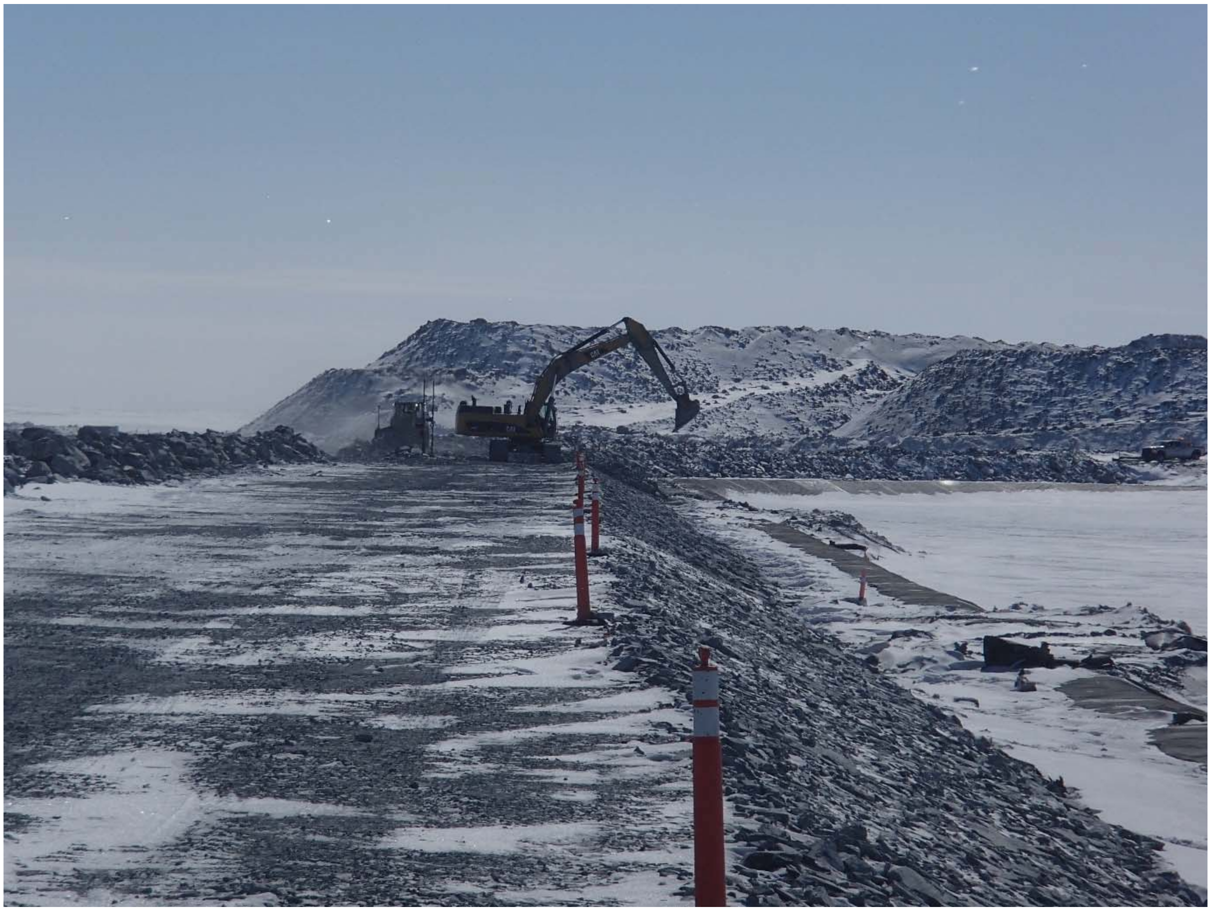
Photograph CD-1814: From Sta. 0+970/-10, looking NE. Placement of intermediate volcanic (IV) rockfill around the instruments at approx. Sta. 0+830 m with the excavator.

Photograph CD-1815: From Sta. 0+920/-25, looking S. Placement of a 2 m thick (approx.) lift of intermediate volcanic (IV) rockfill from El. 143 m to El. 145 m from approx. Sta. 40+740 to 0+980 m (o.s. -28 to -11 m).

Photograph CD-1816: From Sta. 0+175/-27, looking S. Profiling of the upstream slope (2H:1V) from El. 143 to 145 m with an excavator between Sta. 0+175 and 0+560 m.

Photograph CD-1817: From Sta. 40+700/-10, looking NE. View of the rockfill lift thickness at the junction of Saddle Dam 5 and Central Dike, approx. 2.5 m thick.

Photograph CD-1818: From Sta. 40+770/-25, looking NE. Placement of a 2 m thick (approx.) lift of intermediate volcanic (IV) rockfill from El. 143 m to El. 145 m from approx. Sta. 0+980 m to 0+880 m (o.s. -28 to -11 m).



Photograph CD-1819: From Sta. 0+560/-21, looking S. Profiling of the upstream slope (2H:1V) from El. 143 to 145 m with an excavator between Sta. 0+560 m and 0+830 m.

Photograph CD-1820: From Sta. 0+790/-7, looking S. Placement of a 2 m thick (approx.) lift of intermediate volcanic (IV) rockfill from El. 143 m to El. 145 m from approx. Sta. 0+880 m to 0+830 m (o.s. -28 to -11 m).

Photograph CD-1821: From Sta. 0+175/+3, looking S. Profiling of the downstream slope (1.5H:1V) from El. 143 to 145 m with an excavator between Sta. 0+250 m and 0+330 m.

Photograph CD-1822: From Sta. 40+725/+7, looking N. Placement of two 2 m thick (approx.) lifts of intermediate volcanic (IV) rockfill from El. 141 m to El. 145 m from approx. Sta. 40+720 m to 40+750 m (o.s. -10 to +10 m) and profiling of the upstream slope (2H:1V) from El. 143 to 145 m with an excavator between Sta. 0+830 m and 0+980 m.

Photograph CD-1823: From Sta. 0+175/+8, looking NE. Compaction of the two 2 m lifts (approx.) of intermediate volcanic (IV) rockfill at El. 143 and at El. 145 m with a 10-tonne smooth-drum compactor with vibration (6 passes) from Sta. 40+720 m to 40+750 m (o.s. -10 to +10 m).

Photograph CD-1824: From Sta 40+760/-25 m, looking NE. Profiling of the upstream slope (2H:1V) from El. 143 to 145 m with an excavator between Sta. 0+830 m and 40+730 m.

Photograph CD-1825: From Sta 0+430/+9 m, looking S. Profiling of the downstream slope (1.5H:1V) from El. 143 to 145 m with an excavator between Sta. 0+330 m and 0+440 m and between Sta. 0+530 m and 0+745 m.

Photograph CD-1826: From Sta 40+770/-27 m, looking NE. Placement of a 0.5 m thick lift of coarse filter from El. 143 m to 143.5 m with an excavator from Sta. 40+730 m to 0+ 775 m.

Photograph CD-1827: From Sta 0+940/-16 m, looking SW. Placement of a 0.5 m thick lift of fine filter from El. 143 m to 143.5 m with an excavator from Sta. 40+730 m to 0+ 835 m.

Photograph CD-1828: From Sta 0+410/-22 m, looking N. Defrosting of the deposition finger materials with two Frost Fighters at Sta. 0+390 m.

Photograph CD-1829: From Sta 0+410/-22 m, looking N. Placement of a 0.5 m thick lift of coarse filter from El. 143 m to 143.5 m with an excavator from Sta. 0+170 m to 0+460 m and placement of a 0.5 m thick lift of fine filter from Sta. 0+170 m to 0+380 m.

Golder Associates Ltd.

REGISTERED PROFESSIONAL ENGINEER
Y. BOULIANNE
LICENSEE
NT/NU
2018-05-07

Marion Habersetzer, M. Sc.
Mine Waste Group

Yves Boulianne, P.Eng.
Associate, Senior Geotechnical Engineer

Marion Habersetzer

for: Samuel Barbeau
Mine Waste Group

MH/YB/it

Attachments: Construction Progress Drawings from AEM as of 6 May 2018

https://golderassociates.sharepoint.com/sites/1897439/preparation of deliverables/weekly reports/2018-04-30 to 2018-05-06/1897439-1577-tm-rev0 qa weekly report 2018-04-30 to 2018-05-06.docx

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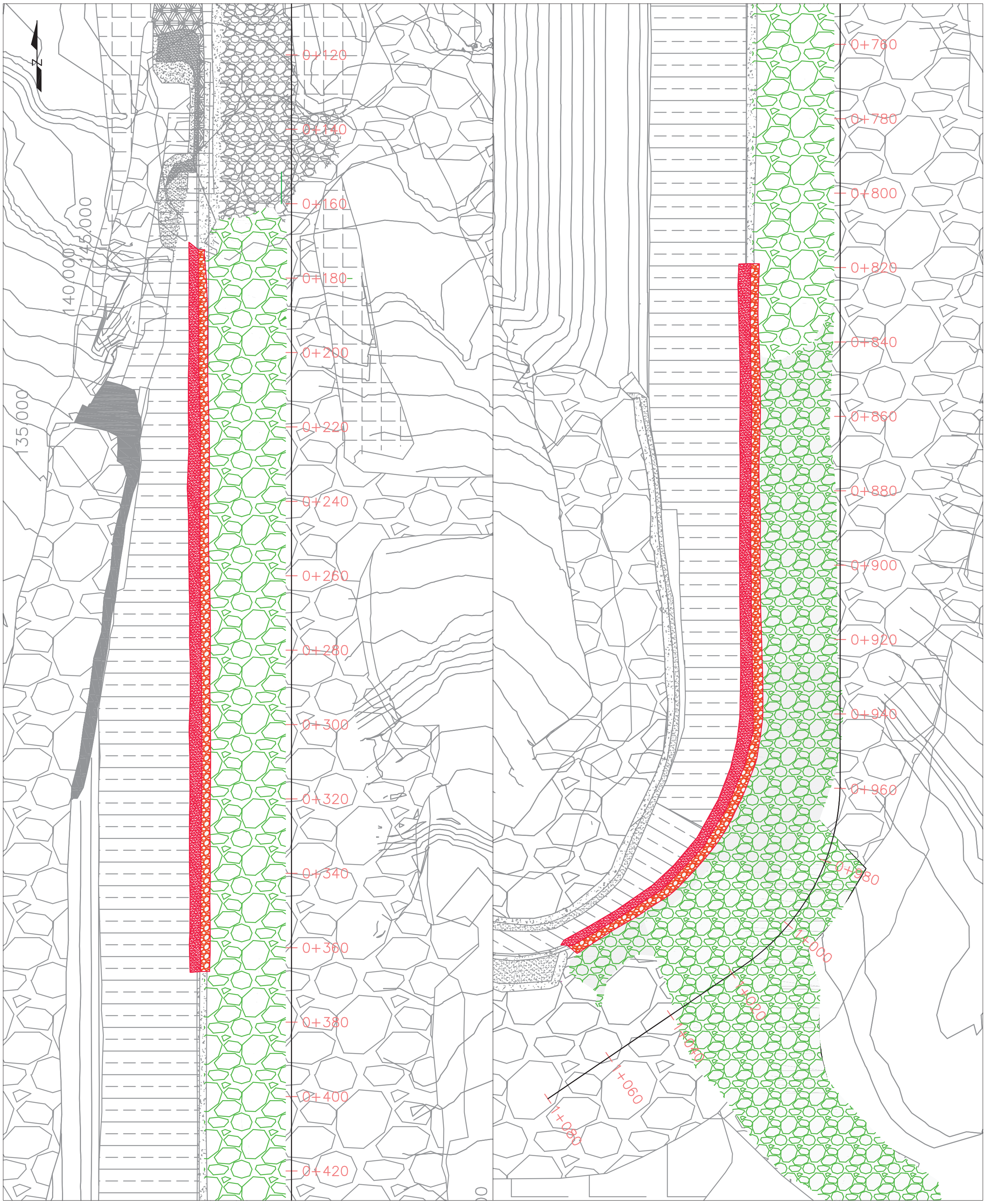
Signature
Date 2018-05-07
PERMIT NUMBER: P 049
NT/NU Association of Professional Engineers and Geoscientists

DAILY PROGRESS
CENTRAL DIKE AND SD5
CONTRACT # 11-505



VOLUMETRY DETAIL

06-05-2018 - COARSE FILTER : 524.28m³
06-05-2018 - FINE FILTER : 513.25m³

KIVALLIQ CONTRACTORS GROUP LTD

PREPARED BY : MIKAËL LÉVESQUE
DATE : 06-05-2018
CON-QT-016-CD_DP_060518

GOLDER

QA WEEKLY REPORT

DATE May 14th 2018 1897439-1577-TM-Rev0

TO Patrice Gagnon, Pier-Éric McDonald
Agnico Eagle Mines Ltd, Meadowbank Division

CC Frédérick Bolduc, Alexandre Lavallée

FROM Samuel Barbeau **EMAIL sbarbeau@golder.com**

QA WEEKLY REPORT FROM MAY 7TH TO MAY 13TH – TSF SOUTH CELL CONSTRUCTION

MEADOWBANK (1897439)

This document summarizes QA activities performed by Golder from May 7th to 13th, 2018 inclusively, related to the construction activities of Saddle Dams 3 (SD3) and Central Dike (CD) at the Meadowbank mine site.

Unless otherwise specified, the construction activities use the centreline of the structures for a dike crest elevation of 150 m for reference (refer to the Drawings). The description of activities refers to the stations and offsets from the centreline (e.g., Sta. 0+500/-50 m). The "+" and "-" symbols indicate the location of the work downstream and upstream of the centreline, respectively.

1.0 GOLDER PERSONNEL ON SITE

Golder personnel on site during this reporting period is summarized in Table 1.

Table 1: Golder Personnel on Site

Name	Comments
Samuel Barbeau	QA Manager (on site since April 30th)

2.0 HEALTH AND SAFETY

H&S meetings were held with AEM and FGL/SANA during the daily construction meetings. Minutes from these meetings are recorded and stored in Golder's on-site office. The key H&S elements for the reporting period were as follows:

- Cold weather and ice: apply caution when driving or walking on icy surfaces, wear appropriate clothing.
- Dust is still an issue on the construction field; be vigilant by staying out of the dust cloud near construction activities and road circulation.

- The fog causes a visibility issue on the roads and on the dikes. Reduce driving speed and keep safety distances between vehicles, call on the radio when entering Central Dike.
- Coactivity on the dikes: be aware of blind spots and safe spots, keep good communication and visual contact with the operators. It is recommended to call on the radio when entering Central Dike on either side when heavy equipment is working in the area.
- An artic fox was spotted on Central Dike near the equipment. Operators were advised of the presence of the fox and used extra caution.
- Fresh snow layers make surfaces slippery: apply caution when driving or walking on snowy surfaces.
- The snow bank at the intersection of the saddle road and the west road blocked the views when driving southbound on the west road going toward the saddle road. The snow bank was corrected with a loader.

3.0 SUMMARY OF MAIN DISCUSSIONS IN CONSTRUCTION MEETINGS

Construction meetings were held daily during the reporting period and were attended by the QA Manager. The following items were discussed:

General

- The QA manager reiterated the need to receive the Surveyor's daily report as the quantities are required to determine when to sample the coarse and fine filters.
- The QA manager reiterated the need to bring a portable nuclear gauge (PNG) on site for the QC program.
- Following discussion with AEM, the samples numbers were modified to follow the sequential number of the previous years.

Central Dike

- Six passes of compactor were needed for the compaction of the first lift of coarse and fine filters at El. 143.5 m on Central Dike to achieve the maximum compaction (assessed visually). No watering of the filter materials was possible as water would have frozen inside the lift. The compaction was followed closely by the QC and QA personnel. Compaction of the filters is not optimal. However, the placed filter materials are not expected to settle significantly and will provide a good foundation for the geosynthetics.
- The removal of the material on the four deposition fingers to expose 1 m of liner is complete. Only the first deposition finger materials at approx. Sta. 0+390 m were heated before their removal. It was noticed that the materials could be easily removed without heating, since a protection layer (Teranap) had been put in place prior to the construction of the deposition finger.
- Punctures were noticed on the top of the LLDPE liner around the four deposition fingers which were removed with the excavator. The holes all seem to be located above El. 142 m, where the horizontal extrusion weld for the raise of the liner is planned to be done. An inspection to assess the damages to the LLDPE liner on the upstream slope of Central Dike will be performed by the QA Manager.
- The QC personnel mentioned that the compactor was slightly tilted while compacting the fine filter. SANA's foreman reviewed how to compact the filters uniformly with the compactor operator.

- The QA manager reiterated that the compaction of the filters must be done on the same day as the placement to prevent the filter materials from freezing before compaction. On May 9th, a section of the third lift was placed but not compacted. The compactor operator had left the construction site. The foreman had to operate the compactor to complete the second lift but did not have the time to compact the section of the third lift on the same day as the placement.
- An approx. 50-100 mm thick strip of snow had accumulated locally on the upstream side of the first lift of fine filter at elevation 143.5 m, near Sta. 40+750 m. The QA manager required that the snow be removed with an excavator before placing the second 0.5 m thick lift of fine filter from El. 143.5 m to 144 m.
- The placement, compaction, and profiling of the four lifts of coarse and fine filter from Sta. 0+170 m to 40+730 m at El. 143 m to El 145 m are completed.
- The fine filter upstream surface was rolled in preparation for the LLDPE liner installation.
- The QA manager required that the LLDPE geomembrane crest anchoring trench be re-excavated from Sta. 40+730 m to 0+830 m, as it was shallower and less wide than intended in the design.

Saddle Dam 3

- As the compacted sieved till (Type 1) stockpile is expected to remain frozen until August approximately, AEM asked if fine filter material (0-20 mm) mixed with 6% bentonite by mass and one layer of geotextile on the LLDPE liner could replace the compacted sieved till of the SD3 upstream toe liner tie-in, as it is planned to replace the compacted sieved till of the erosion protection layer.

  Following discussions with the Designer, the QA manager reiterated that the compacted sieved till class was required for the upstream toe liner tie-in for the following reasons:

  - The low permeability required for that part of the design may not be as homogenous as it should be with bentonite amended fine filter.
  - It is planned that water will be directly ponding on the SD3 toe liner tie-in. Last year, it was expected that the water elevation in summer 2018 would reach 142 m. If AEM has revised his water management plan, the Designer would require the details of the water management plan and a confirmation that the dike would never be raised to El. 150 m.
  - With the possibility of a raise of the south cell if the in-pit deposition plans are delayed, the water level could increase significantly and pond against the unprotected LLDPE liner.
- Following discussion with AEM, the SD3 toe liner tie-in is expected to be built in August approximately, as the compacted sieved till (Type 1) stockpile is expected to remain frozen until then.

  Following discussion with AEM, options were considered to replace the low quality till of the protection cover for the LLDPE geomembrane on SD3, as the low quality till is also expected to remain frozen until August approximately. AEM asked whether the low quality till could be replaced by coarse filter material or by fine filter material (0-20 mm) mixed with 6% bentonite by mass. The question was forwarded to the Designer.
- Regarding the raise of the protection layer on SD3, the QA manager asked for an update on the planned water level in the TSF South Cell.

Follow up

- Evaluate the LLDPE liner damages on the upstream slope of Central Dike.
- Inspect the LLDPE rolls stored on trailers outside once the snow has melted.
- Make a decision regarding the design changes to apply to the SD3 LLDPE liner protection cover.

4.0 SUMMARY OF CONSTRUCTION ACTIVITIES AND TEST RESULTS

Periodic QA inspections to monitor the construction activities and progress were performed by the QA Manager; these are summarized in the tables below.

Table 2: QA Observations for Saddle Dam 3

Activity or Area	Comments
Saddle road	■ Snow removal on saddle road.

Table 3: QA Observations for Central Dike

Activity or Area	Comments
Upstream	■ Removal of the materials covering the 4 deposition fingers with an excavator and hand shovels at Sta. 0+390 m, 0+520 m, 0+660 m and 0+800 m. ■ Placement of a first 0.5 m thick lift of coarse filter from El. 143 m to 143.5 m with an excavator from Sta. 0+170 m to 40+730 m. The material visually seemed well graded and of good quality. ■ Placement of a first 0.5 m thick lift of fine filter from El. 143 m to 143.5 m upstream of the coarse filter with an excavator from Sta. 0+170 m to 40+730 m. The material visually seemed well graded and of good quality. ■ Compaction of the first 0.5 m lift (approx.) of fine and coarse filters material at El. 143.5 m with a 10-tonne smooth-drum compactor with vibration (6 passes) from Sta. 0+170 m to 40+730 m. ■ Placement of a second 0.5 m thick lift of coarse and fine filters from El. 143.5 m to 144 m with an excavator from Sta. 0+170 m to 40+730 m. The materials visually seemed well graded and of good quality. ■ Compaction of the second 0.5 m lift (approx.) of fine and coarse filters material at El. 144 m with a 10-tonne smooth-drum compactor with vibration (4 passes) from Sta 0+170 to 40+730 m.

	■ Placement of a third 0.5 m thick lift of coarse and fine filters from El. 144 m to 144.5 m with an excavator from Sta. 0+170 m to 40+730 m. The materials visually seemed well graded and of good quality. ■ Compaction of the third 0.5 m lift (approx.) of fine and coarse filters material at El. 144.5 m with a 10-tonne smooth-drum compactor with vibration (4 passes) from Sta. 0+170 m to 40+730 m. ■ Placement of a fourth 0.5 m thick lift of coarse filter from El. 144.5 m to 145 m with an excavator from Sta. 0+170 m to 40+730 m. The material visually seemed well graded and of good quality. ■ Profiling of the upstream slope (2H:1V) from El. 143 to 145 m with an excavator between Sta. 0+170 m and 40+735 m. The removed material was placed with material from the fine filter stockpile on the fourth 0.5 m thick lift of fine filter from El. 144.5 m to 145 m upstream of the coarse filter with an excavator from Sta. 0+170 m to 40+730 m. ■ Compaction of the fourth 0.5 m lift (approx.) of fine and coarse filters material at El. 145 m with a 10-tonne smooth-drum compactor with vibration (4 passes) from Sta 0+170 m to 40+730 m. ■ Final rolling of the upstream slope in view of the LLDPE geomembrane installation from Sta. 0+170 m to 40+730 m. ■ Excavation of the LLDPE geomembrane crest anchoring trench from Sta. 40+730 m to 0+830 m.
Downstream	■ Profiling of the downstream slope (1.5H:1V) from El. 143 to 145 m with an excavator between Sta. 0+440 m and 0+530 m and between Sta. 0+745 m and 0+835 m.

5.0 FOUNDATION APPROVALS

No foundation approval was carried out during the reporting period.

Table 4: Details of the Foundation Approvals

Name	Structure	Sta. and Offset	Date of Approval	Comment

6.0 SAMPLING, LABORATORY, AND FIELD TESTING

Table 5 and Table 6 present the samples collected or tested by the QA and QC as well as PNG field results.

Table 5: Samples Taken by the QC

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result
CF-377-2018	2018-05-06	2018-05-09	Coarse Filter	Sta. 0+270m, El. 143.5m	Gradation	Compliant[(a)]
					Water content	2.3%
FF-383-2018	2018-05-09	2018-05-10	Fine filter	Central Dike, Sta. 0+835 m, El. 144 m.	Gradation	Compliant
					Water content	3.4%
FF-385-2018	2018-05-09	2018-05-10	Fine filter	Central Dike, Sta. 0+275 m, El. 144.5 m.	Gradation	Compliant
					Water content	2.6%
FF-386-2018	2018-05-09	2018-05-10	Fine filter	Central Dike, Sta. 0+775 m, El. 144 m.	Gradation	Compliant
					Water content	2.9%
FF-387-2018	2018-05-09	2018-05-10	Fine filter	Stockpile (SANA Crusher)	Gradation	Compliant
					Water content	3.6%
FF-388-2018	2018-05-10	2018-05-12	Fine filter	Stockpile (SANA Crusher)	Gradation	Compliant
					Water content	3.0%
FF-389-2018	2018-05-11	2018-05-12	Fine filter	Central Dike, Sta. 0+235 m, El. 145 m	Gradation	Compliant
					Water content	3.1%
FF-390-2018	2018-05-11	2018-05-12	Fine filter	Stockpile (SANA Crusher)	Gradation	Compliant
					Water content	2.9%

(a) The fine part of the curve exceeds the recommended proportions. However, the material is acceptable provided it is well graded.

Table 6: Samples Taken by the QA

Sample ID	Date Sampled	Date Tested	Fill Material Type	Location (Station/Offset Elevation)	Test	Testing Result
CF-378-2018	2018-05-06	2018-05-10	Coarse filter	Central Dike, Sta. 0+980m, El. 143.5m	Gradation	Compliant[(a)]
					Water content	4.3%
FF-384-2018	2018-05-09	2018-05-11	Coarse filter	Central Dike, Sta. 0+835 m, El. 144 m.	Gradation	Compliant
					Water content	3.3%

(a) The fine part of the curve exceeds the recommended proportions. However, the material is acceptable provided it is well graded.

7.0 PHOTOGRAPHS

Photograph CD-1830: From Sta. 0+420/-26 m, looking N. Removal of the deposition point finger materials with an excavator at Sta. 0+390 m.

Photograph CD-1831: From Sta. 40+730/-24 m, looking NE. Compaction of the first 0.5 m lift (approx.) of fine and coarse filters material at El. 143.5 m with a 10-tonne smooth-drum compactor with vibration (6 passes) from Sta. 40+730 m to 0+830 m and from Sta. 0+175 m to 0+490 m.

Photograph CD-1832: From Sta. 0+280/-25 m, looking N. Placement of a second 0.5 m thick lift of coarse filter from El. 143.5 m to 144 m with an excavator from Sta. 0+175 m to 0+280 m.

Photograph CD-1833: From Sta. 0+390/-25 m, looking S. Damaged geomembrane near a deposition finger on Central Dike at Sta. 0+390 m.

Photograph CD-1834: From Sta. 40+760/-23 m, looking NE. Placement of a first 0.5 m thick lift of coarse filter from El. 143 m to 143.5 m on length of approx. 5 m with an excavator at the location of the deposition finger at Sta. 0+520 m and 0+660 m.

Photograph CD-1835: From Sta. 0+830/-20 m, looking N. Compaction of the first 0.5 m lift (approx.) of fine and coarse filters material at El. 143.5 m with a 10-tonne smooth-drum compactor with vibration (6 passes) from Sta. 0+490 to 0+835 m.

Photograph CD-1836: From Sta. 0+830/-20 m, looking N. Placement of a first 0.5 m thick lift of fine filter from El. 143 m to 143.5 m upstream of the coarse filter with an excavator from Sta. 0+490 to 0+835 m.

Photograph CD-1837: From Sta. 0+940/-25 m, looking N. Placement of a second 0.5 m thick lift of coarse filter from El. 143.5 m to 144 m with an excavator from Sta. 0+290 to 0+500 m and from Sta. 0+835 to 0+930 m.

Photograph CD-1838: From Sta. 40+750/-31 m, looking NE. Placement of a second 0.5 m thick lift of fine filter from El. 143.5 m to 144 m upstream of the coarse filter with an excavator from Sta. 0+500 m to 0+835 m and from Sta. 0+930 to 40+730 m.