



Whale Tail Mine - Landfarm

Agnico Eagle Mines Limited

Construction Summary Report

6129-696-132-REP-001

January 19, 2023

Prepared by:

Gabriel Comtois, P. Eng.
Mechanical

Reviewed by:

Israël Gagnon, P. Eng.
Mechanical

LIST OF REVISIONS

Revision			Pages revised	Comments
#	Par	Date		
0	G.C. & I.G.	2023-01-19		Final Emission

Acronyms

AEM	Agnico Eagle Mines Limited
CIRNAC	Crown-Indigenous Relations and Northern Affairs Canada
GN	Government of Nunavut
LDMP	Landfarm Design and Management Plan
NIRB	Nunavut Impact Review Board
NPAG	Non-Potentially Acid Generating
NWB	Nunavut Water Board
PAG	Potentially Acid Generating
PHC	Petroleum Hydrocarbon
PID	Photoionization Detector
RMMS	Responsible Mining Management System
TSF	Tailings Storage Facility
WRSF	Waste Rock Storage Facility

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1. Introduction

Agnico Eagle Mines Limited, Meadowbank Complex (AEM) is operating the Whale Tail Mine, a satellite deposit located on the Amaruq property (Kivalliq Region of Nunavut, Canada). As authorized by Water License 2AM-WTP1830, a landfarm has been built on-site for the storage and treatment of petroleum hydrocarbon contaminated soils.

This document presents the Whale Tail Mine landfarm construction summary report, as required by the Water License 2AM-WTP1830, Part D Item 16.

This report contains the final design and construction drawings, as well as a summary of construction activities, including photographic records before, during and after construction. The as-built drawings, detailed explanation of field decision to reflect any deviations from the original construction drawings/plans and a discussion of the mitigation measures implemented during construction are also presented.

This report is based on the Design and Management Report for the landfarm project 6129-696-132-REP-001. See the Design and Management Report for more information and references, such as the design summary and key parameters.

SNC-Lavalin was not involved in the construction process of the landfarm, and all data presented in this report were provided by AEM.

2. Project Description Summary

2.1 Site Location and Access

Agnico Eagle Mine Limited (AEM) Meadowbank Complex is developing the Whale Tail Mine in the Kivalliq Region of Nunavut (65°24'25" N, 96°41'50" W). The 99,878-hectare Amaruq property is located on Inuit-owned and federal crown land, approximately 55 km north of the Meadowbank Mine. The Meadowbank Mine is accessible from Baker Lake, located 70 kilometres to the south. The Whale Tail Mine, a Meadowbank satellite deposit located on the Amaruq property, is an expansion to the Approved Project (Nunavut Impact Review Board (NIRB) Project Certificate No. 008 and Nunavut Water Board (NWB) Type A Water License 2AM-WTP1830). The location of the landfarm at the mine site is shown on Figure 1.



Figure 1 Landfarm Location

2.2 Design Basis

Engineering of the landfarm was performed by SNC-Lavalin and is described in detail in the Design and Management Report document (AEM Reference 6129-696-132-REP-001). The landfarm has an elevated sloped base with perimeter containment berms, built on the original ground without excavation to avoid disturbing the permafrost foundation. A geomembrane liner system is enclosed in the landfarm base and perimeter berms to contain drainage / leachate and runoff water from the Petroleum Hydrocarbon (PHC) soils and thawing snow/ice in the landfarm.

3. Construction Summary – Activities & Schedule

3.1 Roles and Responsibilities

Table 1 presents the roles and responsibilities of different parties working on this project.

Table 1: List of roles & responsibilities

Company	Role	Responsibility	Key personnel	Position
AEM	Owner	Project management	Jennifer Pyliuk	Civil Lead, construction
			Bruno Roy	Engineering superintendent, construction
		QA/QC during construction	Isaac Charbonneau Beaulieu	Civil resident engineer
		As-built drawings and site surveying	Jean-François Landreville, Kevin Brisebois	Surveyors
KCG	Contractor	Supervise work and carry construction activities	Nicolas Tremblay, François-Alexis Provost	Site manager, Site manager assistant
FC Liner	Subcontractor	Install liners and perform QC on membranes	Vincent Languedoc	QC Inspector
SNC Lavalin	Designers	Construction drawings	Richard Marcoux	Design Engineer

3.2 Project Schedule and Construction Steps

Key moments of construction are listed below. The work was completed over two seasons in order to reduce the risk of installing the geomembrane under winter conditions. Photographs of the construction process are available in Appendix C.

1. November 9th to December 11th, 2021: Backfill of all layers required under the membrane.
2. July 19th and 22nd, 2022: Final grading before membrane installation (mostly doing minor repairs following winter).
3. August 13th to August 17th, 2022: Membrane installation and certification.
4. August 18th to September 24th, 2022: Backfill above membrane.

3.3 Quality Control and Quality Assurance

A Quality Control Final Report was done to attest to the quality of the geomembrane. The report contains a description as well as a certification of all work conducted by FC Liners, who installed the geosynthetics. It also contains the record drawing of the geomembrane installation for the landfarm. All installation work conducted on the geosynthetics took place between August 13 and August 17, 2022. This report can be consulted in Appendix D, while the technical data sheets for the geomembrane are in Appendix E.

3.4 Design Changes

Two deviations from the original design drawings were implemented during construction, with the approval of the AEM Construction Team:

1. The ES-2 Coletanche was replaced by the approved equivalent of 60 mil HDPE geomembrane, with the geomembrane sandwiched between two layers of geotextile. The geomembrane was replaced due to concerns regarding the potential interaction of hydrocarbons with the bituminous core and to bring the design in-line with other landfarms in operation at AEM sites. This modification was approved by SNC-Lavalin prior to implementation and is not expected to impact the performance of the facility.
2. Transition rockfill (0-200 mm) was removed from the side slopes and only placed between the bedding (0-20 mm) and 0-600 mm rockfill on the level portion of the facility. This decision was based on the low risk of fine migrations between the bedding and rockfill due to the slope and the lack of any loading applied to the material. See **Table 2** for the estimated design and actual quantities of rockfill used in the construction. Any deviations in rockfill quantities are not expected to impact the performance of the facility.

Table 2: Estimated and actual quantities of NPAG Rockfill

Material	Estimated In-Place Quantity after Compaction and Installation (m ³)	Actual Quantity (m ³)
Rockfill (0-1000 mm)	13 962	16 804
Bedding (0-200 mm)	3 892	2 530
Granular Fill or Esker Sand (0-20 mm)	4 538	5 653

3.5 Field Decisions and Mitigation Measures

During backfilling operations, a small section of the top geotextile was damaged. An inspection conducted by FC Liners showed the underlying HDPE membrane was unaffected and the geotextile was successfully repaired. The backfill was closely monitored afterward to avoid a recurrence.

3.6 List of Equipment Used

Table 3 shows the different equipment used for this project.

Table 3: List of Equipment Used

Equipment	Manufacturer	Model
Compactor	Caterpillar	CS-76XT
Compactor	Wacker Neuson	P10000
Dozer	Caterpillar	D6
Dozer	Caterpillar	D8
Excavator	Caterpillar	345
Excavator	Caterpillar	352
Excavator	Komatsu	PC1250
Excavator	Komatsu	PC450
Excavator	Komatsu	PC200
Haul truck	Caterpillar	773
Haul truck	Komatsu	HD605
Loader	Caterpillar	980H
Loader	Caterpillar	990K
Loader	Komatsu	WA500
Loader	Komatsu	WA600

3.7 Design Parameters Comparison

Table 4 compares the value of design parameters with the actual parameter value after construction. The after-construction values were calculated based on as-built drawing 6129-696-142 (Appendix B). Values listed as “By AEM” will be supplied by AEM.

Table 4: List of design and after construction parameters

Parameter	Design Value	Actual Value
Total Capacity	5 500 m ³	5652 m ³
Facility Structure	2.0 m	2.0 m
Facility base thickness	350 mm	350 mm
Side Slopes of Berm (inside)	2 (H):1 (V)	1.8 (H):1 (V)
Side Slopes of Berm (outside)	3 (H):1 (V)	3.4 (H):1 (V)
Berm Crest Width	4 m	3.6 m
Berm Height	2.6 to 4.8 m	3 to 5.2 m
Berm Crest Elevation	270.000	170.000
Geomembrane Liner Crest Elevation	269.650	169.600
Landfarm Footprint Area	10 000 m ²	10 084 m ²

3.8 Construction and As-Built Drawings and Pictures

The construction and final drawings are available in Appendix A. As-built drawings are available in Appendix B, and construction pictures are available in Appendix C.

3.9 Monitoring undertaken in compliance with Part D of the Licence

No monitoring was required during construction.

3.10 Blast vibration monitoring for quarrying activities carried out near fish-bearing waters

Non-applicable to this project.

3.11 Monitoring for sediment release from Construction areas

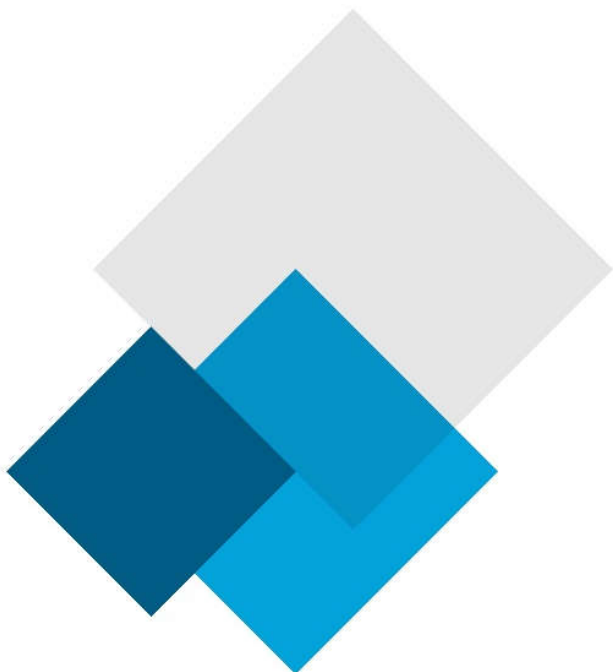
No sediment control was required, if any runoff did occur, it would have flowed naturally to the IVR Attenuation Pond.

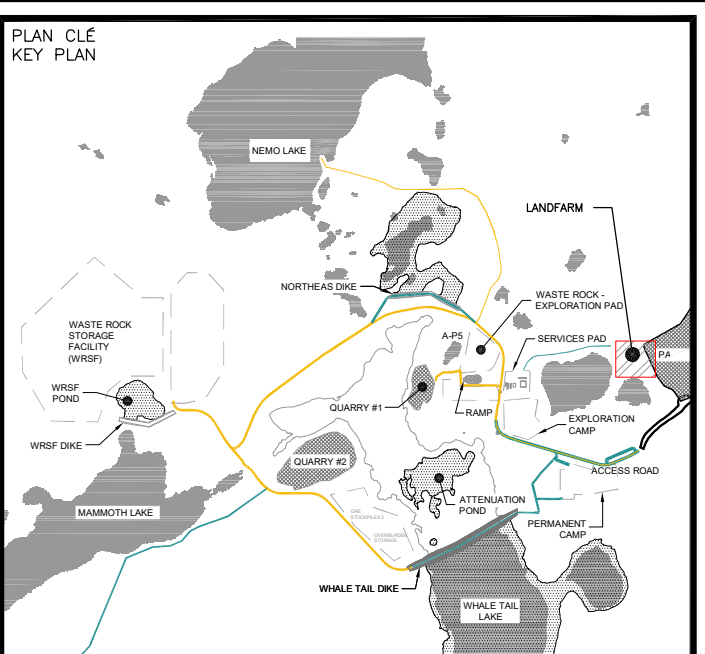
3.12 Monitoring and reporting on use of Water to manage dust emissions from crushing and Construction activity

Non applicable to this project.

Appendix A

Construction Drawings





CONSTRUCTION ROADS 2017: ———

NOTES GÉNÉRALES / GENERAL NOTES



Project # : 671087-0000

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REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT	

REVISIONS

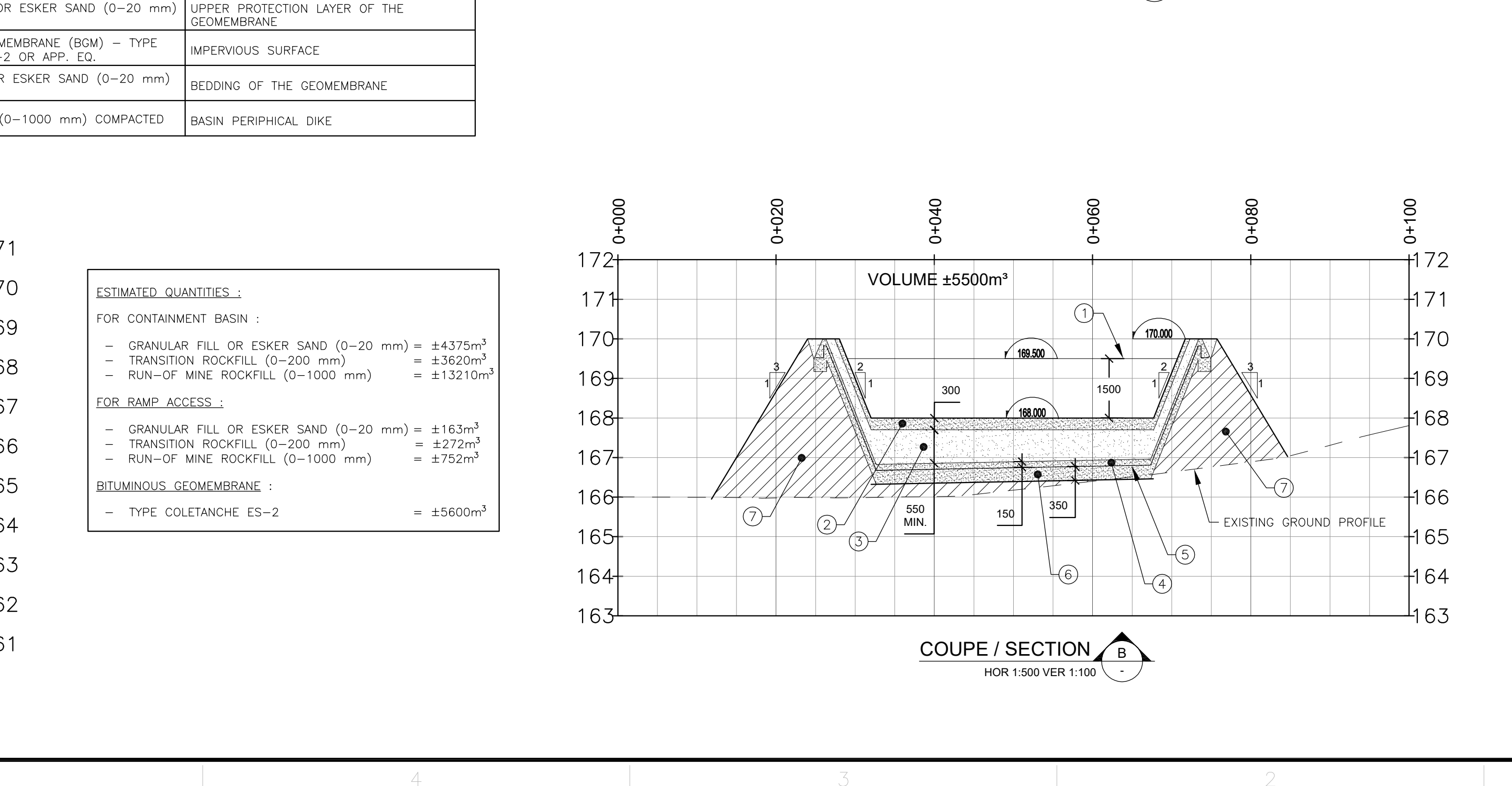
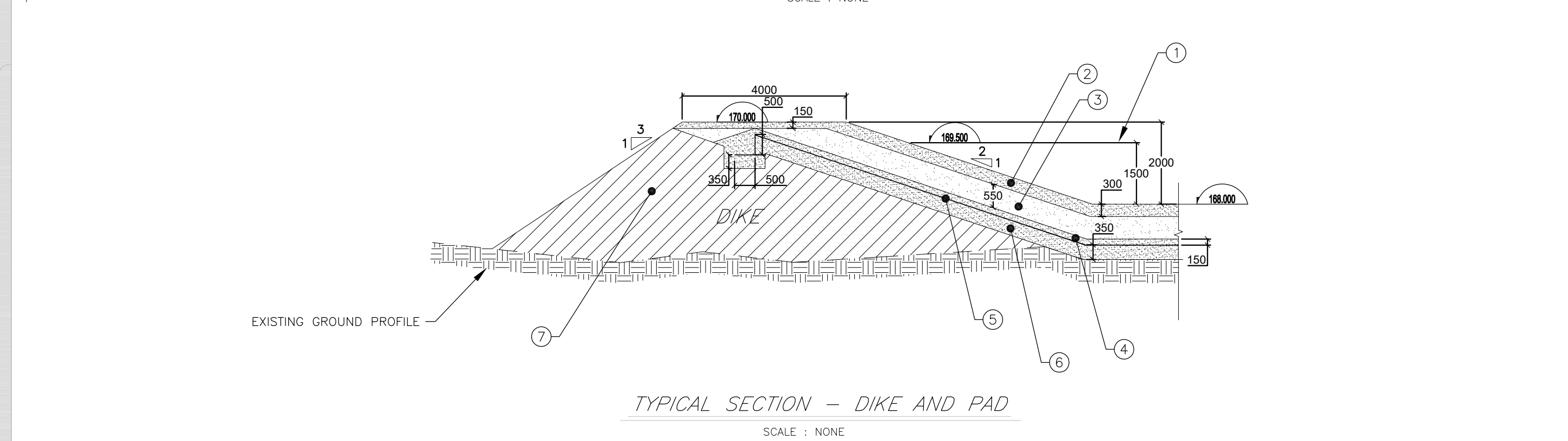
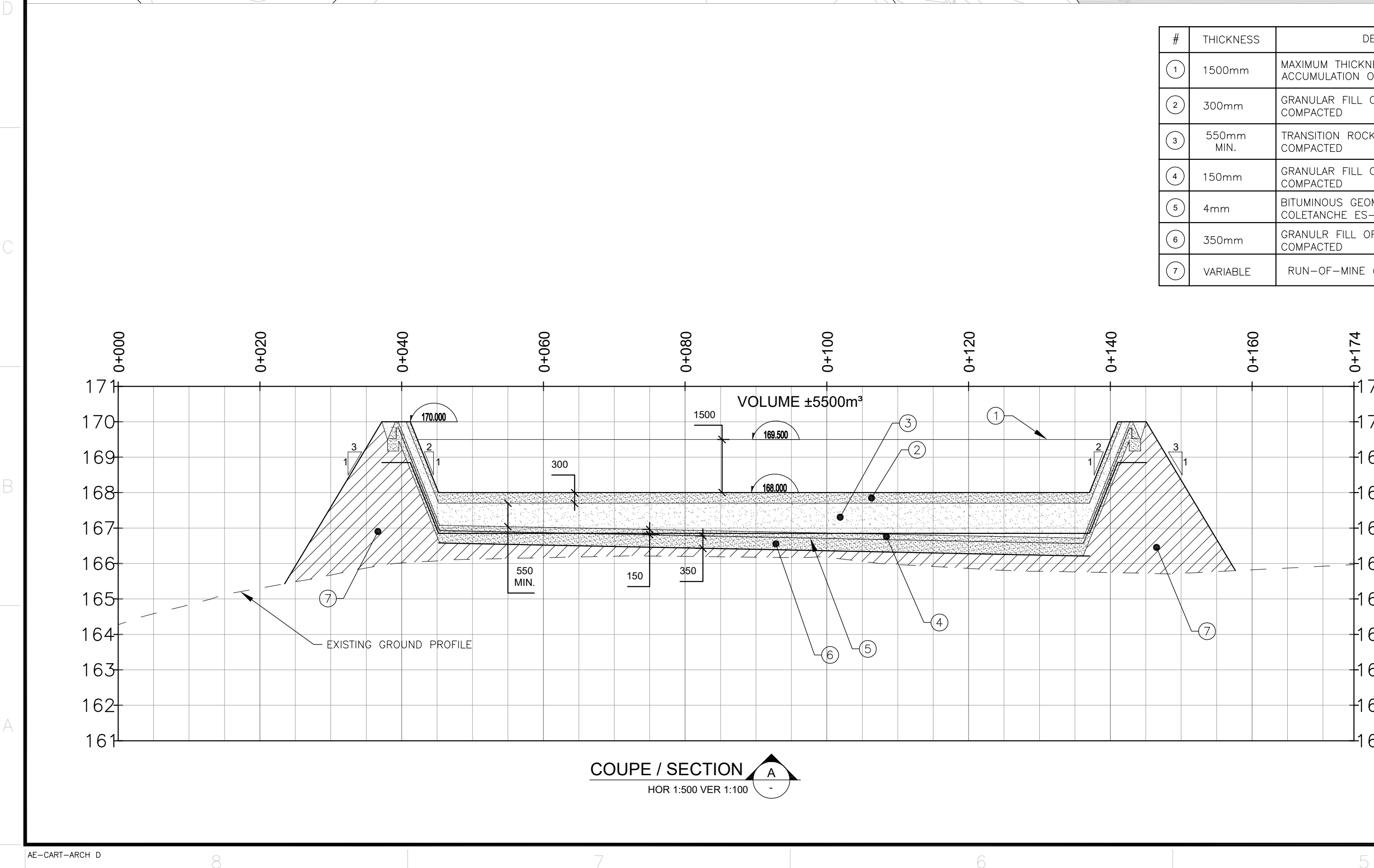
TITRE / TITLE
AGNICO EAGLE - WHALE TAIL (AMARUQ)
CONTAMINATED SOIL MANAGEMENT
LANDFARM
GENERAL VIEW

DESSINÉ PAR DRAWN BY	FRANCIS ROSE, T.P	DATE 2018-04-01
VÉRIFIÉ PAR CHECKED BY	RICHARD MARCOUX, ING.	2018-04-01
APPROUVÉ PAR APPROVED BY	RICHARD MARCOUX, ING.	2018-04-01

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61	0	1 / 1



#	THICKNESS	DESCRIPTION	UTILITY
①	1500mm	MAXIMUM THICKNESS DESIGN HEIGHT FOR ACCUMULATION OF CONTAMINATED SOIL	USEFUL HEIGHT OF CONTAMINATED SOIL STORAGE FOR THE LANDFARM
②	300mm	GRANULAR FILL OR ESKER SAND (0-20 mm) COMPACTED	SURFACE LAYER FOUNDATION
③	550mm MIN.	TRANSITION ROCKFILL (0-200 mm) COMPACTED	PROTECTION LAYER AGAINST PERFORATION OF THE GEOMEMBRANE BY HEAVY MACHINERY
④	150mm	GRANULAR FILL OR ESKER SAND (0-20 mm) COMPACTED	UPPER PROTECTION LAYER OF THE GEOMEMBRANE
⑤	4mm	BITUMINOUS GEOMEMBRANE (BGM) – TYPE COLETOANCHE ES-2 OR APP. EQ.	IMPERVIOUS SURFACE
⑥	350mm	GRANULAR FILL OR ESKER SAND (0-20 mm) COMPACTED	BEDDING OF THE GEOMEMBRANE
⑦	VARIABLE	RUN-OF-MINE (0-1000 mm) COMPACTED	BASIN PERIPHERAL DIKE

ESTIMATED QUANTITIES :

FOR CONTAINMENT BASIN :

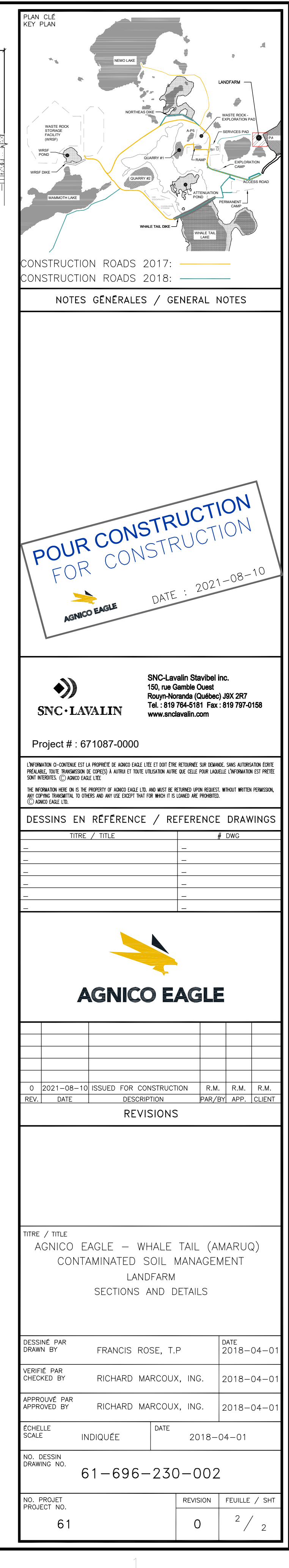
- GRANULAR FILL OR ESKER SAND (0-200 mm) = $4375m^3$
- TRANSITION ROCKFILL (0-200 mm) = $3620m^3$
- RUN-OF MINE ROCKFILL (0-1000 mm) = $13121m^3$

FOR RAMP ACCESS :

- GRANULAR FILL OR ESKER SAND (0-200 mm) = $1613m^3$
- TRANSITION ROCKFILL (0-200 mm) = $4722m^3$
- RUN-OF MINE ROCKFILL (0-1000 mm) = $7521m^3$

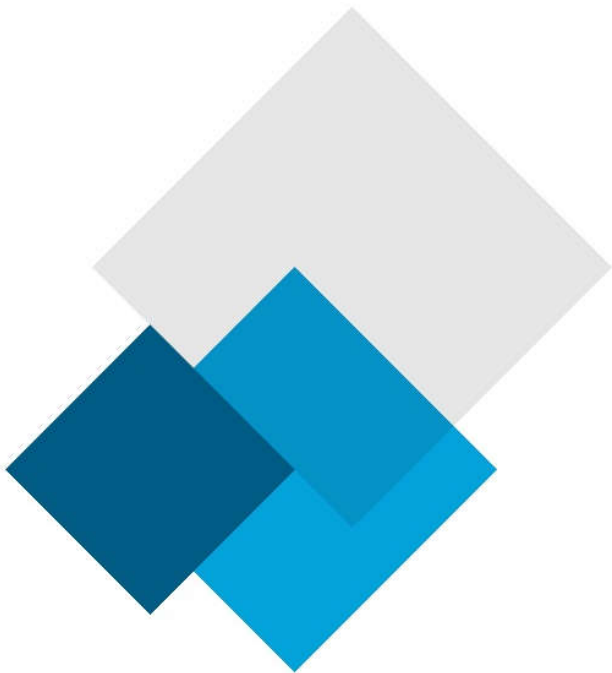
BITUMINOUS GEOMEMBRANE :

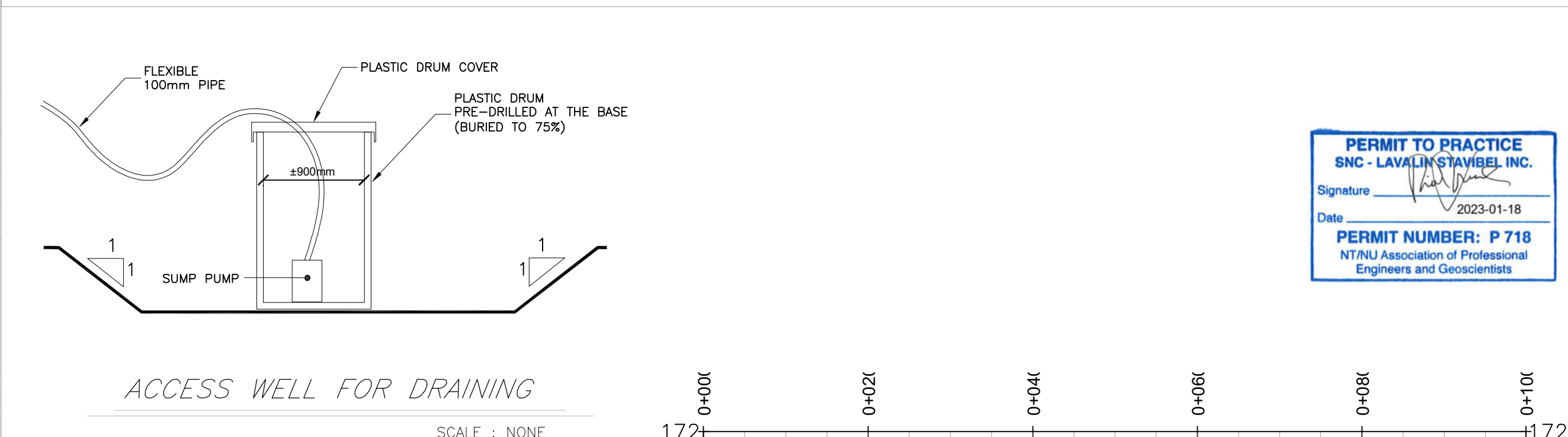
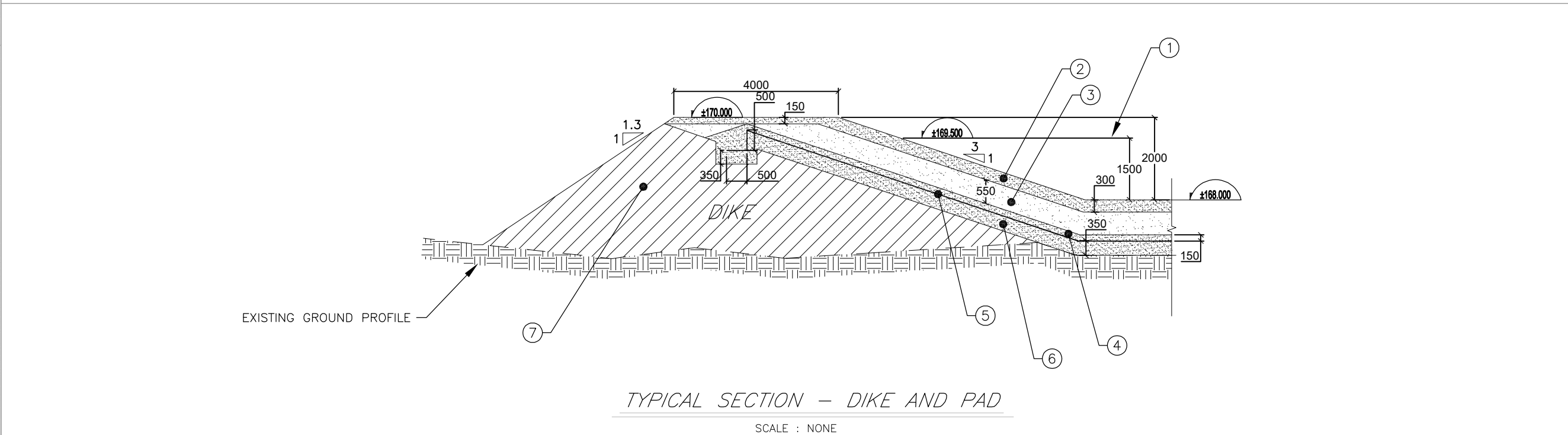
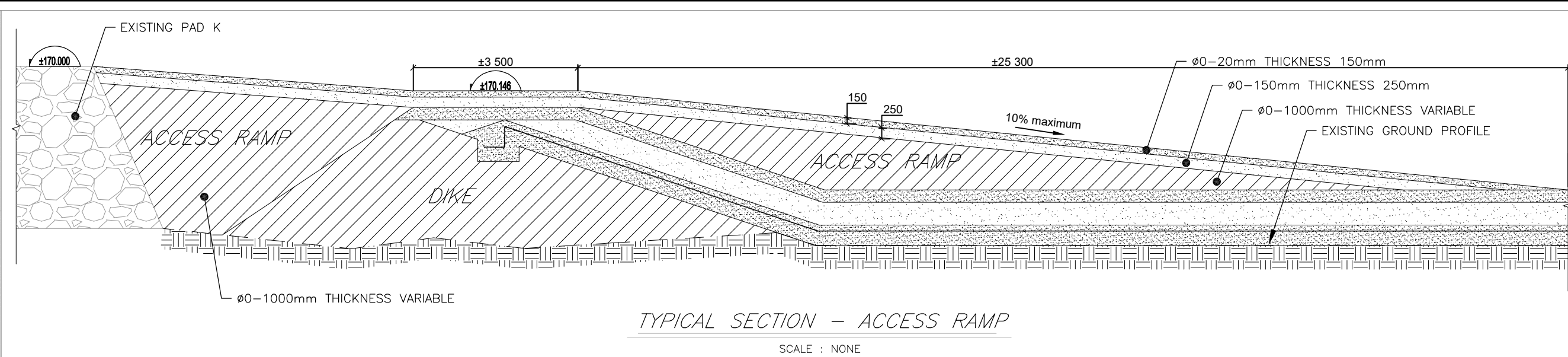
- TYPE COLETANCHE ES-2 = $56600m^3$



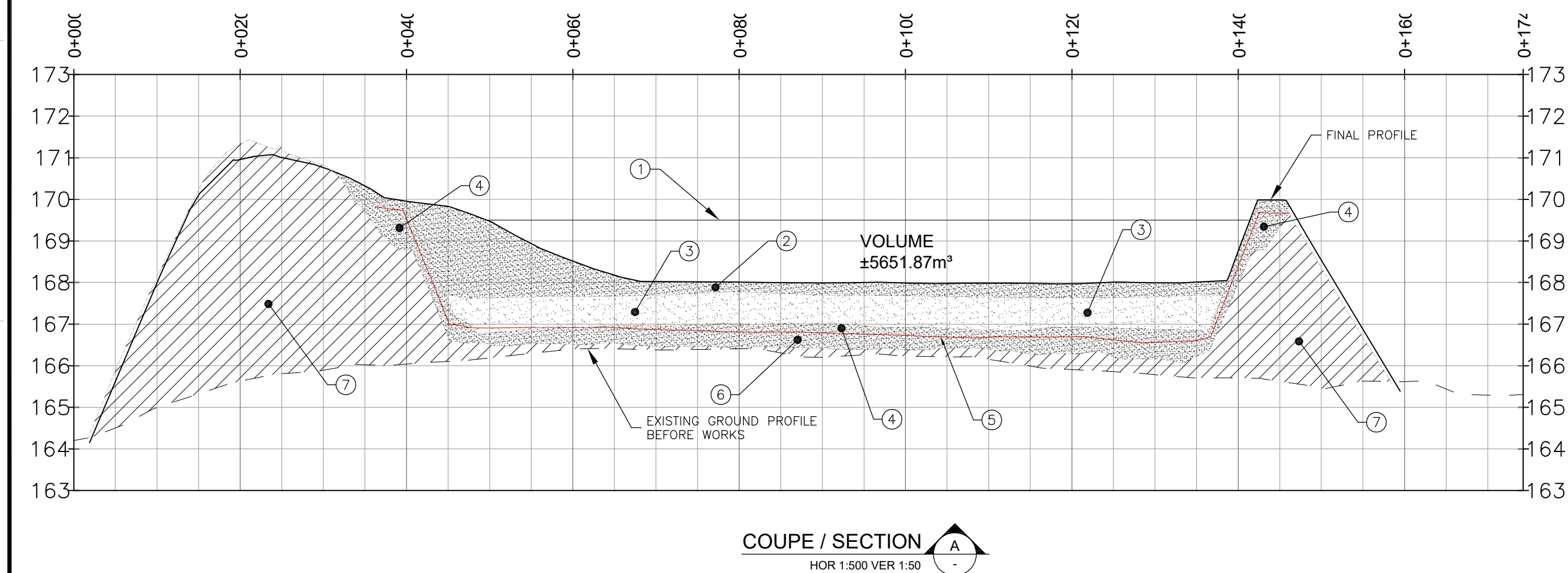
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As-Built Drawings

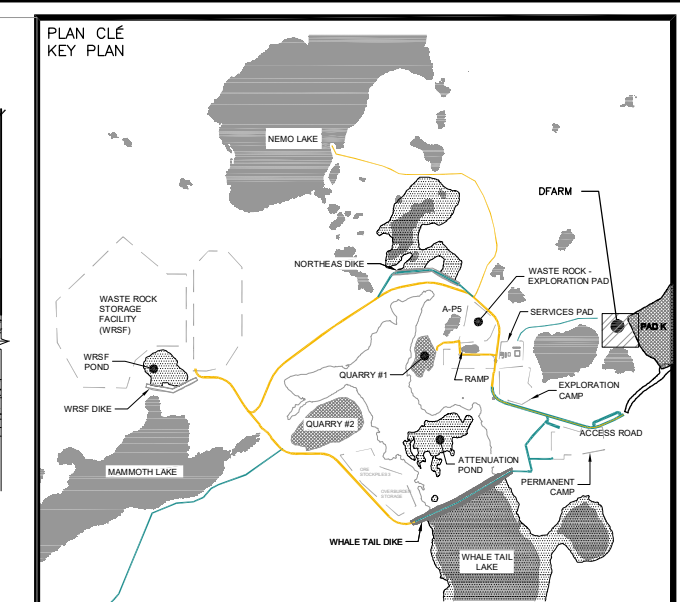
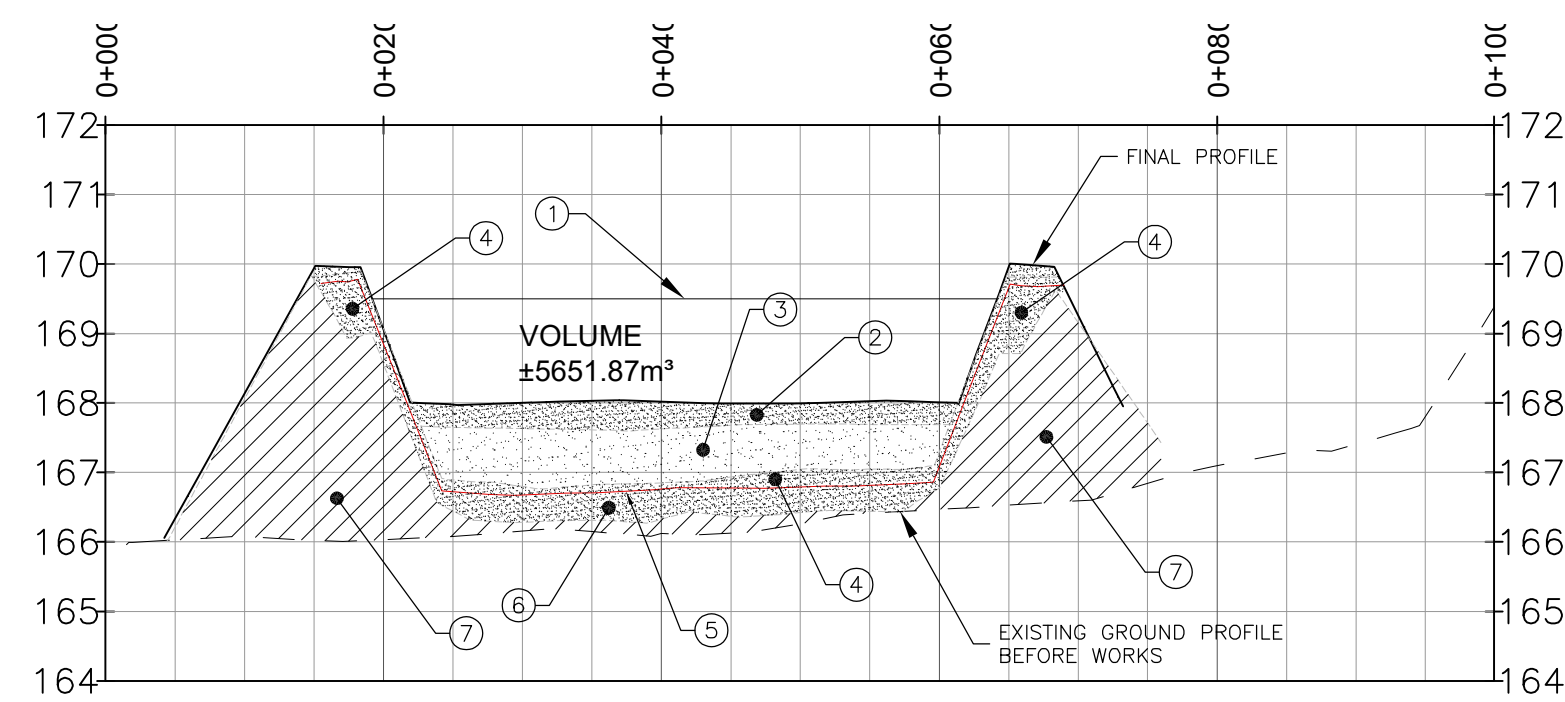
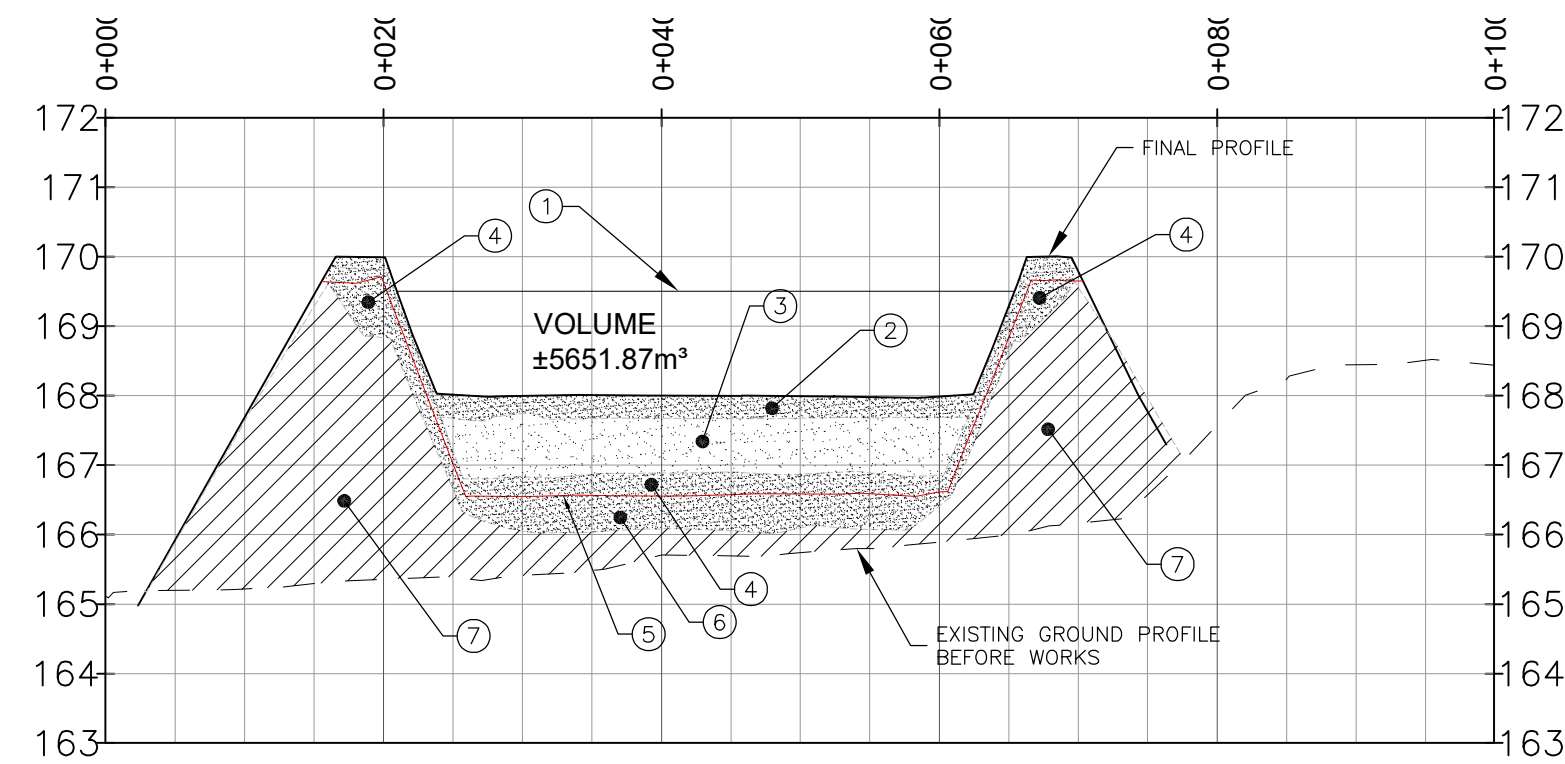




#	THICKNESS	DESCRIPTION	UTILITY
1	1500mm	MAXIMUM THICKNESS DESIGN HEIGHT FOR ACCUMULATION OF CONTAMINATED SOIL	USEFUL HEIGHT OF CONTAMINATED SOIL STORAGE FOR THE LANDFARM
2	300mm	Ø0-20mm COMPACTED	SURFACE LAYER FOUNDATION
3	550mm MIN.	Ø0-200mm BACKFILL MATERIALS COMPACTED	PROTECTION LAYER AGAINST PERFORATION OF THE GEOMEMBRANE BY HEAVY MACHINERY
4	150mm	Ø0-20mm COMPACTED	UPPER PROTECTION LAYER OF THE GEOMEMBRANE
5	4mm	BITUMINOUS GEOMEMBRANE (BGM) - TYPE COLETANCHE ES-2 OR APP. EQ.	IMPERVIOUS SURFACE
6	350mm	Ø0-20 mm COMPACTED	BEDDING OF THE GEOMEMBRANE
7	VARIABLE	0-1000mm SUBGRADE BACKFILL MATERIALS	BASIN PERIPHERAL DIKE



AS FINAL SURVEY VOLUMES :
FOR CONTAINMENT BASIN AND ACCESS RAMP :
- CRUSHED STONE Ø0-20mm = ±5 653.34m³
- BACKFILL MATERIAL Ø0-200mm = ±2 530.26m³
- BACKFILL MATERIAL Ø0-1000mm = ±16 804.5m³



CONSTRUCTION ROADS 2017:
CONSTRUCTION ROADS 2018:

NOTES GÉNÉRALES / GENERAL NOTES

ÉMISSION FINALE
NE PAS UTILISER POUR CONSTRUCTION
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NOT TO BE USED FOR CONSTRUCTION
DATE : 2023-01-18
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SNC-Lavalin Stantec Inc.
150, rue Gamble Ouest
Rouyn-Noranda (Québec) J8X 3K7
Tel. : 819 784-0181 Fax : 819 787-0158
www.snc-lavalin.com

Project # : 644819-0000 ref.664310-0000

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2	2019-05-01	ISSUED FOR CONSTRUCTION		R.M.	R.M.
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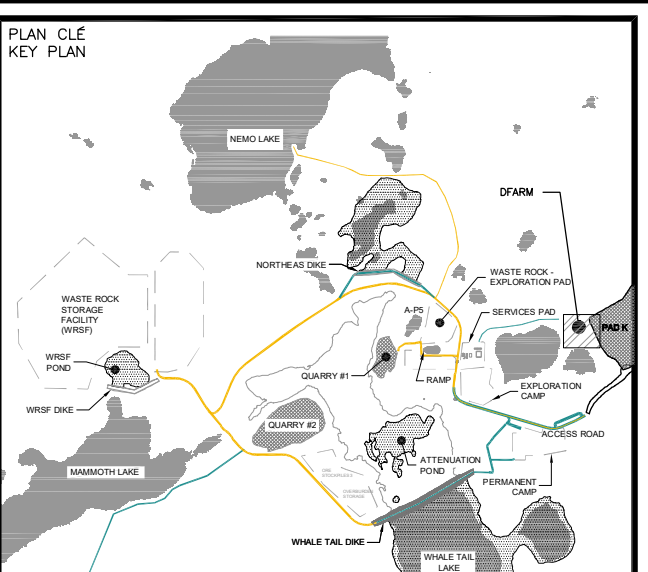
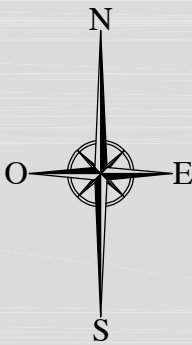
REVISIONS

AGNICO EAGLE - WHALE TAIL (AMARUQ)
CONTAMINATED SOIL MANAGEMENT
LANDFARM
SECTIONS AND TYPICAL DETAILS
BITUMINOUS GEOMEMBRANE (BGM)

DESIGNÉ PAR : FRANCIS ROSE, T.P.
VÉRIFIÉ PAR : RICHARD MARCOUX, ING.
APPROUVÉ PAR : RICHARD MARCOUX, ING.
ÉCHELLE : 1:1000/1:100
NO. DESSIN : 61-696-230-002

DATE : 2018-04-01
DATE : 2018-04-01
DATE : 2018-04-01
DATE : 2018-04-01

NO. PROJET : 61
REVISION : 3
FEUILLE / SHEET : 2 / 2



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CONSTRUCTION ROADS 2018: —

NOTES GÉNÉRALES / GENERAL NOTES



SNC-LAVALIN
SNC-Lavalin Staveland Inc.
150, rue Gambelle Ouest
Rouyn-Noranda (Québec) J8X 2P7
Tel.: 819-764-0101 Fax: 819-797-0158
www.snc-lavalin.com

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2	2019-05-01	ISSUED FOR CONSTRUCTION		R.M.	R.M.
1	2019-04-29	ISSUED FOR APPROVAL		R.M.	R.M.
0	2018-04-15	ISSUED FOR APPROVAL		R.M.	R.M.

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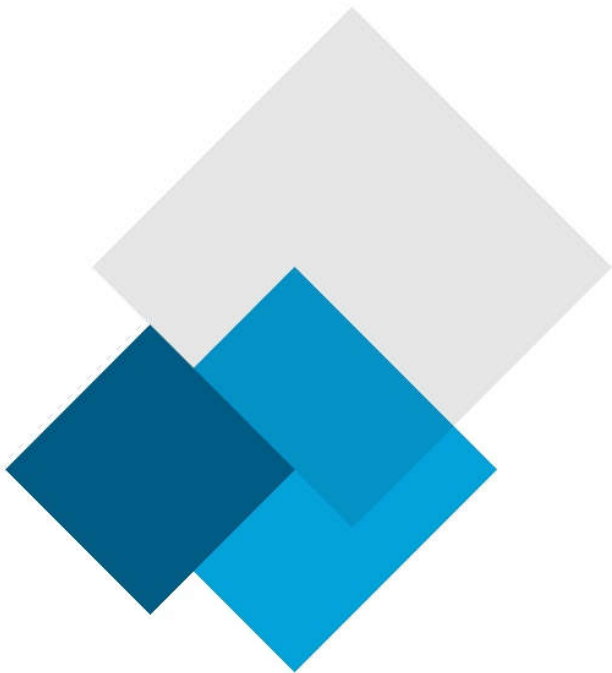
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CONTAMINATED SOIL MANAGEMENT
LANDFARM
GENERAL VIEW

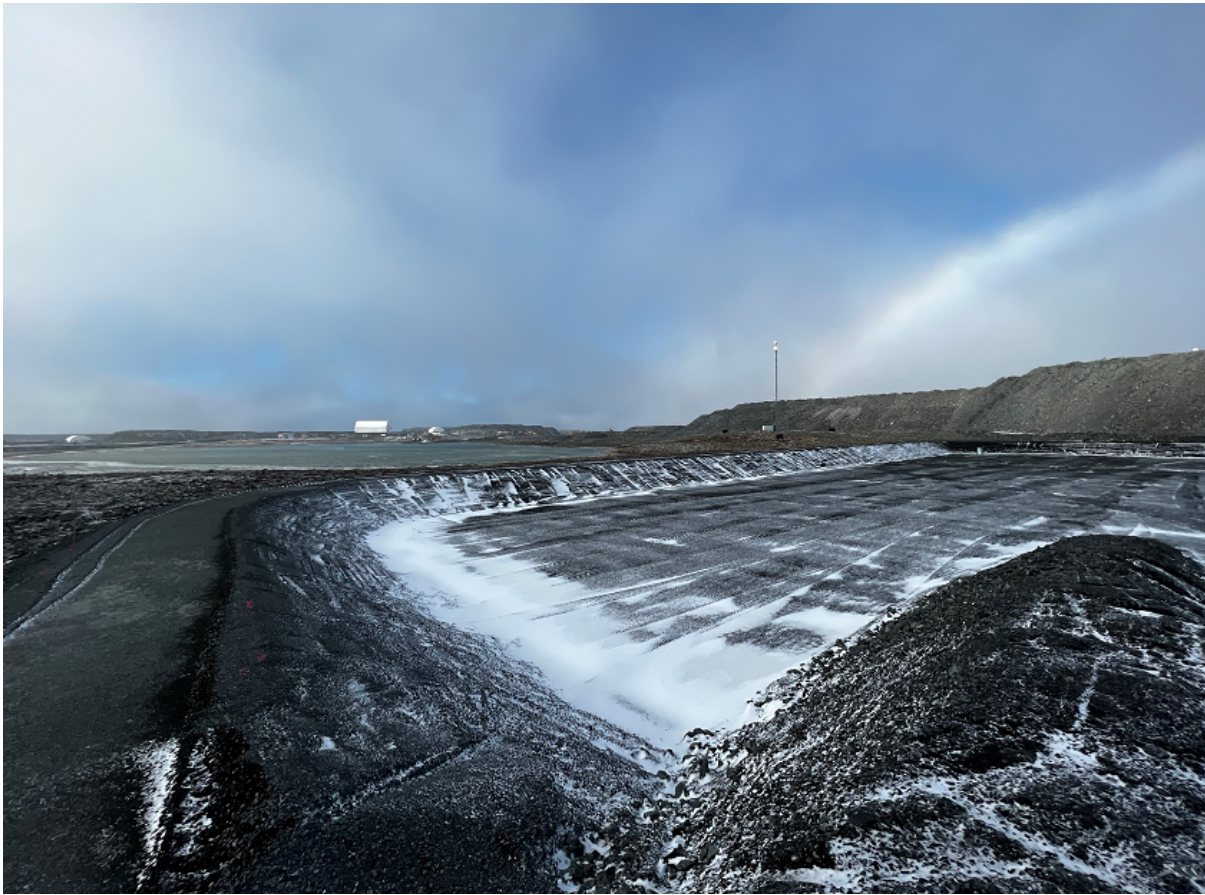
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SNC - LAVALIN STAVELAND INC.
Signature
Date 2023-01-18
PERMIT NUMBER: P 718
NTNU Association of Professional
Engineers and Geoscientists

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APPROUVÉ PAR APPROVED BY	RICHARD MARCOUX, ING.	2018-04-01
ÉCHELLE SCALE	1:1000	DATE 2018-04-01
NO. DESSIN DRAWING NO.	61-696-230-001	
NO. PROJET PROJECT NO.	61	REVISION 3 FEUILLE / SHEET 1 / 1

Appendix C

Construction Pictures





Landfarm Membrane Backfilling



Landfarm Vehicle Ramp



Geomembrane Installation



Geomembrane Installation

Appendix D

Quality Assurance Report



**AGNICO EAGLE AMARUQ LAND FARM
AGNICO EAGLE MINES LIMITED
Amaruq, Meadowbank mine, Nunavut
FC Liners Project No. C-21221**

**QUALITY CONTROL FINAL REPORT
BY FC LINERS**

Prepared for:

FERNAND GILBERT LTÉE

By:



August, 2022

**AGNICO EAGLE AMARUQ LAND FARM
AGNICO EAGLE MINES LIMITED
Amaruq, Meadowbank mine, Nunavut
FC Liners Project No. C-21221**

**QUALITY CONTROL FINAL REPORT
BY FC LINERS**

Prepared for:

**FERNAND GILBERT LTÉE
1700 Boulevard Talbot, Bureau 300
Chicoutimi, Québec, Canada
G7H 7Y1**

By :

**FC LINERS
950 rue de la Concorde, bureau 202
Lévis, Québec, Canada
G6W 8A8**

August, 2022

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1. INTRODUCTION

The following report was prepared by FC Liners, for Fernand Gilbert Ltée.

This report contains a description as well as a certification of all work conducted by FC Liners, installer of all the geosynthetics. It also contains the record drawing of the geomembrane installation for the Amaruq Fuel Farm. All installation work conducted on the geosynthetics took place between August 13 and August 17, 2022.

2. HUMAN RESOURCES

The following list identifies the key personnel involved with the physical realization of this project

FC LINERS (Geosynthetic Installer)

- Mr. François Thivierge, General Manager
- Mr. Jacques St-Gelais, Operation Manager
- Mr. Francis Salois-Long, Project Manager
- Mr. Miguél Desjardins, Site Foreman
- Mr. Vincent Languedoc, Field QC Inspector
- Mr. Pascal Bédard et Tommy Mitchell, Technicians

FERNAND GILBERT LTÉE (General Contractor - Client)

- Mr. Nicolas Trenblay, Project Manager

AGNICO EAGLE MINES LIMITED (Quality Assurance)

3. GEOMEMBRANE INSTALLATION

This section includes a description of the work and the installation procedures used during the deployment of the geomembrane.

3.1. Description of the work

The scope of the installation was to completely cover the Amaruq Land Farm with a geosynthetic lining system. FC Liners installed approximately 5077.07 sm of 60mil HDPE smooth geomembrane. All the installation, seaming and repair procedures were conducted according to the project plans and specifications, and manufacturer's recommendations.

3.2. Installation Procedures

The geomembrane rolls were deployed and installed by FC Liners as prescribed in the specifications. Panels were placed to minimize seams across the side slope and the tie-in seams. The panels were overlapped about 125 to 150 mm, allowing adequate double fusion welding and leaving enough material to perform peel and shear tests on seam samples (see section 3.3.1.1 for a description of these tests).

All seams between panels were made using an automated polymer fusion process, the fusion being obtained through a double hot wedge. These parallel welds create an air channel which allow air-pressure testing of the continuity of the seam (see Fig. 1).

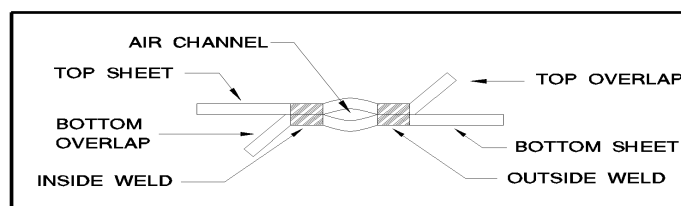


Figure 1 - Double -Track Geomembrane Weld

In restrictive areas where this process could not be adequately applied, such as corners, repair work and pipe penetrations, a manual extrusion fillet welding was employed (see Fig. 2).

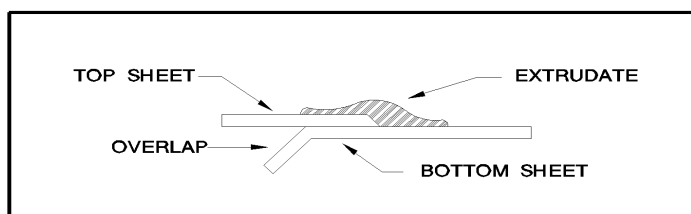


Figure 2 - Fillet-Extruded Geomembrane Weld

3.3. Geomembrane quality controls

3.3.1. On-site geomembrane installation

3.3.1.1 Welding trial tests

Trial tests were performed prior to any on-site seaming in order to quantify the calibration of the welding equipment. On each sample, three peel tests and two shear tests were performed. A peel adhesion test is conducted by submitting a one inch-wide seam specimen to a tensile effort on a calibrated, portable tensiometer and trying to “peel”, or open the seam (see Fig. 3). A shear strength test is similar, but the tension is applied in the plane of the seam (see Fig. 4). The peel test gives an indication of the quality of the seam while the shear test demonstrates the actual behavior of the seam in service.

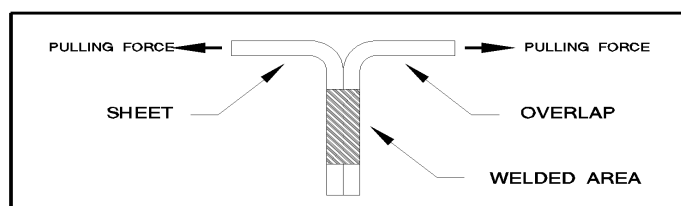


Figure 3 - Peel Adhesion Test

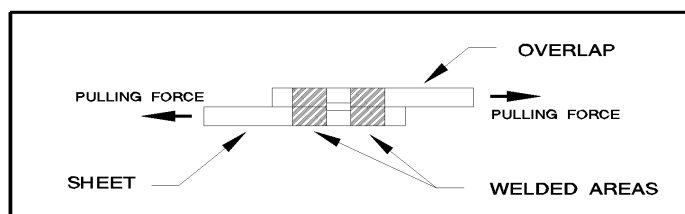


Figure 4 - Shear Strength Test

For each trial test, the QC Inspector recorded the date, time, ambient and operating temperatures, equipment number, speed setting, operator's initials, peel and shear values and corresponding type of break. The only type of break acceptable is designated as "FTB", as per the US-EPA classification for types of breaks, available in appendix III. The seams were made only after a satisfactory trial test had been obtained. All the results of these tests are also included in appendix I.

3.3.1.2 On-site non-destructive testing

The continuity of all seams (100%) was verified by non-destructive methods. These methods include the air-pressure test and the vacuum-box test. Any seam that failed one of these tests was rebuilt or repaired until a satisfactory result was obtained. All the results of these tests are included in Appendix I of this report.

a) Air-Pressure Testing

Air-pressure testing was employed as the primary test method. This non-destructive test method consists of injecting air at a predetermined pressure in the center air channel of fusion-welded seams (see Fig. 5). If the seam is continuous there will be very little or no drop of pressure. If a leak is present within the area under pressure, it is located and repaired. This type of non-destructive test is faster than the vacuum-box test, less observer-dependent and represents a supplementary mechanical resistance test since the geomembrane sheets are pulled away from each other by the air pressure in the channel.

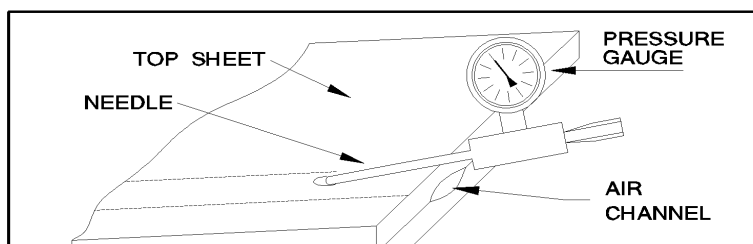


Figure 5 - Air-Pressure Test

b) Vacuum-box test

Wherever the air-pressure test could not be used, the vacuum-box test was employed. In this test, a film of soapy water is sprinkled over the area to be tested. A box fitted with a transparent upper cover and a neoprene lower rim is placed over that same area and connected to a vacuum pump; a negative pressure of 5 psi is then applied (see Fig. 6). If there is a puncture or discontinuous seam within this area, bubbles will appear and be detected by the observer.

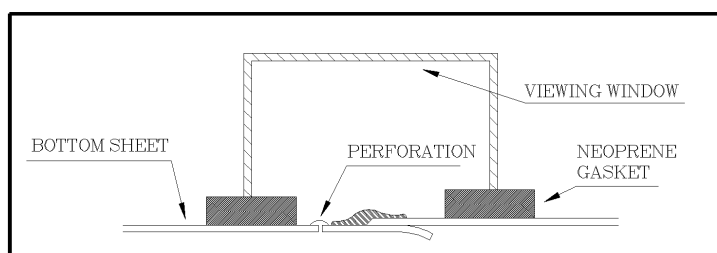
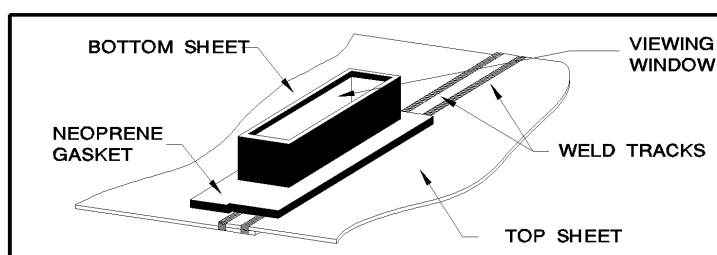


Figure 6 - Vacuum-Box Test

3.3.1.3 On-site destructive tests

Finally, a destructive testing program was applied, where seam samples taken from the installed geomembrane were tested for peel adhesion and shear strength on a calibrated, portable tensiometer. On each sample, three peel tests and two shear tests were performed. All the results from these tests are included in Appendix I of this report.

3.4. Repair Procedures

All materials were visually inspected for blemishes, punctures and other defects or damages that may have occurred during transport or panel placement. Any defect or damage was repaired as per the procedures described in this section.

Demobilization was not authorized until FC Liners, Fernand Gilbert Ltée and Agnico Eagle mines limited completed a last visual inspection of the installation work. Any defect revealed by any step of the Quality Control Program was repaired and verified according to the prescribed procedures:

- All pockmarks, pinholes, T-seams, etc., smaller than the tip of the extruder were covered with an extrusion bead;
- All punctures, holes, tears, etc., wider than the tip of the extruder were repaired with extrusion-welded patches;
- Any seam revealed as defective by the CQC or CQA Programs was entirely rebuilt through a fusion and/or extrusion seaming process.

Prior to any fillet extrusion welding, the geomembrane was buffed to insure better adhesion of the extruded material. All repairs were visually inspected and verified by a non-destructive testing method, as described in section 3.3.1.2.

3.5. Record Drawing

The record drawing of the geomembrane installation, showing all panels, panel identification, pipe penetrations, repairs and destructive test locations, is included in Appendix IV of this report.

4. GEOTEXTILE QUALITY CONTROL

Approximately 10 155.94 sm of non-woven geotextile (LP16ES) was installed by FC Liners according to the project plans and specifications. The geotextile panels were overlapped approximately 100 to 150 mm and thermally bonding by hot air in order to ensure the continuity of the cushion layer.

Any holes or tears in the geotextile were repaired according to the project specifications. All geotextile materials were installed by FC Liners.

5. CERTIFICATION

FC Liners certifies having installed all geosynthetic materials according to the project plans and specifications provided by the consultant Agnico Eagle mines limited, for Fernand Gilbert Ltée. All installation work conducted by FC Geosynthetic Inc meets or exceeds the standards of the geosynthetic industry.



Francis Salois-Long CPI, Project Manager
FC LINERS

08-23-2022

Date
(mm-dd-yy)

APPENDIX I

QUALITY CONTROL PROCEDURES CONDUCTED ON SITE BY FC LINERS



GÉOSYNTHÉTIQUES



Fusion Trial Tests Calibration par Fusion

Project Name / Nom de Projet: Land Farm Amaruq

Project No. / No. de Projet: C-21221

QC Inspector / Inspecteur CQ: Vincent Languedoc

Trial Test No. No. de Calibration	Date (mm/dd/yy)	Time Heure	Ambient Temp. Temp. Ambiante	Equipment No. No. Équipement	Equipment Temp. Temp. Équipement	Equipment Speed Vitesse Équipement	Peel Resistance Résistance Pelage "A" (ppi)	Peel Type of Break Type de Brisure	Peel Resistance Résistance Pelage "B" (ppi)	Peel Type of Break Type de Brisure	Shear Resistance Résist. Cisaillement (ppi)	Shear Type of Break Type de Brisure	Tech.-Welder Soudeur	Tensiometer No. No. Tensiomètre
F-1	08-14-22	7:40	11°C	MD-006	860 °F	500	145	SE1	147	SE1	174	BRK	PB	T-9708
"	"	"	"	"	"	"	125	SE1	153	SE1	172	BRK	"	"
"	"	"	"	"	"	"	145	SE1	153	SE1	N/A	N/A	"	"
F-2	08-14-22	12:40	20°C	MD-006	860 °F	650	123	SE1	117	SE1	167	BRK	PB	T-9708
"	"	"	"	"	"	"	116	SE1	109	SE1	155	BRK	"	"
"	"	"	"	"	"	"	121	SE1	131	SE1	N/A	N/A	"	"
F-3	08-15-22	6:30	12°C	MD-006	860 °F	550	138	SE1	128	SE1	158	BRK	PB	T-9708
"	"	"	"	"	"	"	129	SE1	123	SE1	148	BRK	"	"
"	"	"	"	"	"	"	131	SE1	132	SE1	N/A	N/A	"	"



GÉOSYNTHÉTIQUES



Extrusion Trial Tests Calibration par Extrusion

*Project Name / Nom de Projet:***Land Farm Amaruk***Project No. / No. de Projet:***C-21221***QC Inspector / Inspecteur CQ:***Vincent Languedoc**

Trial Test No. No. de Calibration	Date (mm/dd/yy)	Time Heure	Ambient Temp. Temp. Ambiante	Equipment No. No. Équipement	Equipment Temp. Temp. Équipement	Pre-Heat Temp. Temp. Pré-Chauf.	Peel Resistance Résistance Pelage (ppi)	Peel Type of Break Type de Brisure	Shear Resistance Résist. Cisaillement (ppi)	Shear Type of Break Type de Brisure	Tech.-Welder Soudeur	Tensiometer No. No. Tensiomètre
E-1	08-15-22	13:20	25°C	EX-E	240 °C	240 °C	145	SE3	151	BRK	PB	T9708
"	"	"	"	"	"	"	129	SE3	153	BRK	"	"
"	"	"	"	"	"	"	141	SE3	N/A	N/A	"	"



GÉOSYNTHÉTIQUES

Seaming Procedures Procédures de Soudures

Project Name / Nom de Projet: Land Farm AmaruqQC Inspector / Inspecteur CQ: Vincent LanguedocProject No. / No. de Projet: C-21221

Seaming Procedures / Procédures de Soudures						Non-Destructive Testing / Essai Non-Destructif							
Seam No. No. de Soudure	Date of Seaming Date de Soudure (mm/dd/yy)	Time of Seaming Heure de Soudure	Seam Length Longueur Soudure (m)	Trial Test No. No. Calibration	Technician-Welder Soudureur	Test Date Date de l'essai (mm/dd/yy)	Time Heure	Air-Pressure Pressurisation	Vacuum Box Boîte à Vide	Starting Pressure Pression Départ (psi)	Ending Pressure Pression Fin (psi)	Testing Details/Location/Détails de l'essai/Localisation	Approved (Yes/No) Approuvé (Oui/Non)
1-2	08-14-22	7:34	51.9	F-1	PB	08-14-22	7:56	X	-	35	35	Full seam	O
2-3	08-14-22	8:07	41.1	F-1	PB	08-14-22	8:32	X	-	35	35	Full seam	O
2-4	08-14-22	8:07	10.7	F-1	PB	08-14-22	8:32	X	-	35	35	Full seam	O
3-4	08-14-22	7:56	6.65	F-1	PB	08-14-22	8:02	X	-	35	35	Full seam	O
3-5	08-14-22	8:45	41.3	F-1	PB	08-14-22	9:08	X	-	35	35	Full seam	O
4-5	08-14-22	8:45	11	F-1	PB	08-14-22	9:08	X	-	35	35	Full seam	O
5-6	08-14-22	9:10	52	F-1	PB	08-14-22	9:32	X	-	35	35	Full seam	O
6-7	08-14-22	9:40	36.8	F-1	PB	08-14-22	10:45	X	-	35	35	Full seam	O
6-8	08-14-22	9:40	15.7	F-1	PB	08-14-22	10:45	X	-	35	35	Full seam	O
7-8	08-14-22	9:30	6.65	F-1	PB	08-14-22	9:40	X	-	35	35	Full seam	O
7-9	08-14-22	10:40	36.8	F-1	PB	08-14-22	11:03	X	-	35	35	West 0m up to 16,4m	O
"	"	"	"	"	"	08-14-22	11:13	X	-	35	35	16,4m up to 36,8m	O
8-9	08-14-22	10:40	15.2	F-1	PB	08-14-22	11:06	X	-	35	35	Full seam	O



GÉOSYNTHÉTIQUES

Seaming Procedures Procédures de Soudures

Project Name / Nom de Projet: Land Farm AmaruqQC Inspector / Inspecteur CQ: Vincent LanguedocProject No. / No. de Projet: C-21221

Seaming Procedures / Procédures de Soudures						Non-Destructive Testing / Essai Non-Destructif							
Seam No. No. de Soudure	Date of Seaming Date de Soudure (mm/dd/yy)	Time of Seaming Heure de Soudure	Seam Length Longueur Soudure (m)	Trial Test No. No. Calibration	Technician-Welder Soudeur	Test Date Date de l'essai (mm/dd/yy)	Time Heure	Air-Pressure Pressurisation	Vacuum Box Boîte à Vide	Starting Pressure Pression Départ (psi)	Ending Pressure Pression Fin (psi)	Testing Details/Location/Détails de l'essai/Localisation	Approved (Yes/No) Approuvé (Oui/Non)
9-10	08-14-22	11:15	51.8	F-1	PB	08-14-22	11:43	X	-	35	35	Full seam	O
10-11	08-14-22	11:52	30.9	F-1	PB	08-14-22	13:03	X	-	35	35	Full seam	O
10-12	08-14-22	11:52	21.1	F-1	PB	08-14-22	13:03	X	-	35	35	Full seam	O
11-12	08-14-22	11:47	6.65	F-1	PB	08-14-22	11:52	X	-	35	35	Full seam	O
11-13	08-14-22	13:25	31.5	F-1	PB	08-14-22	13:55	X	-	35	35	Full seam	O
12-13	08-14-22	13:25	20.8	F-1	PB	08-14-22	13:55	X	-	35	35	Full seam	O
13-14	08-14-22	13:44	51.5	F-1	PB	08-14-22	14:03	X	-	35	35	Full seam	O
14-15	08-14-22	14:15	31.5	F-1	PB	08-14-22	14:34	X	-	35	35	Full seam	O
14-16	08-14-22	14:15	20.2	F-1	PB	08-14-22	14:34	X	-	35	35	Full seam	O
15-16	08-14-22	14:03	6.65	F-1	PB	08-14-22	14:15	X	-	35	35	Full seam	O
15-17	08-14-22	14:45	30.6	F-2	PB	08-14-22	15:05	X	-	35	35	Full seam	O
16-17	08-14-22	14:45	20.3	F-2	PB	08-14-22	14:56	X	-	35	35	West 0m up to 9,3m	O
"	"	"	"	"	"	08-14-22	15:05	X	-	35	35	9,3m up to 20,3m	O



GÉOSYNTHÉTIQUES

Seaming Procedures Procédures de Soudures

Project Name / Nom de Projet: Land Farm AmaruqQC Inspector / Inspecteur CQ: Vincent LanguedocProject No. / No. de Projet: C-21221

Seaming Procedures / Procédures de Soudures						Non-Destructive Testing / Essai Non-Destructif							
Seam No. No. de Soudure	Date of Seaming Date de Soudure (mm/dd/yy)	Time of Seaming Heure de Soudure	Seam Length Longueur Soudure (m)	Trial Test No. No. Calibration	Technician-Welder Soudureur	Test Date Date de l'essai (mm/dd/yy)	Time Heure	Air-Pressure Pressurisation	Vacuum Box Boîte à Vide	Starting Pressure Pression Départ (psi)	Ending Pressure Pression Fin (psi)	Testing Details/Location/Détails de l'essai/Localisation	Approved (Yes/No) Approuvé (Oui/Non)
18-19	08-14-22	15:41	10.7	F-2	PB	08-14-22	16:05	X	-	35	35	Full seam	O
19-20	08-14-22	15:48	10.7	F-2	PB	08-14-22	16:12	X	-	35	35	Full seam	O
21-18	08-14-22	15:55	10.2	F-2	PB	08-14-22	16:08	X	-	35	35	Full seam	O
21-22	08-14-22	16:15	9.6	F-2	PB	08-14-22	16:28	X	-	35	35	Full seam	O
17-22	08-14-22	16:32	9.1	F-2	PB	08-14-22	16:44	X	-	35	35	West 0m up to 4,3m	O
"	"	"	"	"	"	08-14-22	16:50	X	-	35	35	4,3m up to 9,1m	O
17-21	08-14-22	16:32	0.4	F-2	PB	08-14-22	16:50	X	-	35	35	Full seam	O
17-18	08-14-22	16:32	6.65	F-2	PB	08-14-22	16:50	X	-	35	35	Full seam	O
17-19	08-14-22	16:32	6.65	F-2	PB	08-14-22	16:50	X	-	35	35	Full seam	O
17-20	08-14-22	16:32	6.65	F-2	PB	08-14-22	16:50	X	-	35	35	Full seam	O
24-25	08-15-22	7:00	11.1	F-3	PB	08-15-22	7:35	X	-	35	35	North 0m up to 3m	O
"	"	"	"	"	"	08-15-22	7:28	X	-	35	35	3m up to 11,1m	O
25-26	08-15-22	7:20	10.9	F-3	PB	08-15-22	7:30	X	-	35	35	Full seam	O



GÉOSYNTHÉTIQUES

Seaming Procedures Procédures de Soudures

Project Name / Nom de Projet: Land Farm AmaruqQC Inspector / Inspecteur CQ: Vincent LanguedocProject No. / No. de Projet: C-21221

Seaming Procedures / Procédures de Soudures						Non-Destructive Testing / Essai Non-Destructif							
Seam No. No. de Soudure	Date of Seaming Date de Soudure (mm/dd/yy)	Time of Seaming Heure de Soudure	Seam Length Longueur Soudure (m)	Trial Test No. No. Calibration	Technician-Welder Soudureur	Test Date Date de l'essai (mm/dd/yy)	Time Heure	Air-Pressure Pressurisation	Vacuum Box Boîte à Vide	Starting Pressure Pression Départ (psi)	Ending Pressure Pression Fin (psi)	Testing Details/Location/Détails de l'essai/Localisation	Approved (Yes/No) Approuvé (Oui/Non)
26-27	08-15-22	7:35	11.5	F-3	PB	08-15-22	7:42	X	-	35	35	Full seam	O
27-28	08-15-22	7:50	11	F-3	PB	08-15-22	7:55	X	-	35	35	Full seam	O
28-29	08-15-22	8:00	8.8	F-3	PB	08-15-22	8:04	X	-	35	35	Full seam	O
23-29	08-15-22	8:10	8.3	F-3	PB	08-15-22	8:18	X	-	35	35	Full seam	O
23-28	08-15-22	8:10	1.9	F-3	PB	08-15-22	8:18	X	-	35	35	Full seam	O
24-31	08-15-22	8:35	11.1	F-3	PB	08-15-22	8:44	X	-	35	35	Full seam	O
30-31	08-15-22	8:45	10.5	F-3	PB	08-15-22	8:50	X	-	35	35	North-East 0m up to 1,2m	O
"	"	"	"	"	"	08-15-22	9:02	X	-	35	35	1,2m up to 10,5m	O
1-30	08-15-22	9:10	10.6	F-3	PB	08-15-22	9:38	X	-	35	35	Full seam	O
1-31	08-15-22	9:10	0.2	F-3	PB	08-15-22	9:38	X	-	35	35	Full seam	O
1-24	08-15-22	9:10	6.65	F-3	PB	08-15-22	9:35	X	-	35	35	East 0m up to 0,3m	O
"	"	"	"	"	"	08-15-22	9:35	X	-	35	35	0,3m up to 6,65m	O
1-25	08-15-22	9:10	6.65	F-3	PB	08-15-22	9:35	X	-	35	35	Full seam	O



GÉOSYNTHÉTIQUES

Seaming Procedures Procédures de Soudures

Project Name / Nom de Projet: Land Farm AmaruqQC Inspector / Inspecteur CQ: Vincent LanguedocProject No. / No. de Projet: C-21221

Seaming Procedures / Procédures de Soudures						Non-Destructive Testing / Essai Non-Destructif							
Seam No. No. de Soudure	Date of Seaming Date de Soudure (mm/dd/yy)	Time of Seaming Heure de Soudure	Seam Length Longueur Soudure (m)	Trial Test No. No. Calibration	Technician-Welder Soudeur	Test Date Date de l'essai (mm/dd/yy)	Time Heure	Air-Pressure Pressurisation	Vacuum Box Boîte à Vide	Starting Pressure Pression Départ (psi)	Ending Pressure Pression Fin (psi)	Testing Details/Location/Détails de l'essai/Localisation	Approved (Yes/No) Approuvé (Oui/Non)
1-26	08-15-22	9:10	6.65	F-3	PB	08-15-22	9:35	X	-	35	35	Full seam	O
1-27	08-15-22	9:10	6.65	F-3	PB	08-15-22	9:35	X	-	35	35	Full seam	O
1-28	08-15-22	9:10	6.65	F-3	PB	08-15-22	9:35	X	-	35	35	Full seam	O
1-23	08-15-22	9:10	6.65	F-3	PB	08-15-22	9:35	X	-	35	35	Full seam	O
20-32	08-15-22	11:05	11.6	F-3	PB	08-15-22	11:10	X	-	35	35	Full seam	O
32-33	08-15-22	11:13	10.8	F-3	PB	08-15-22	11:20	X	-	35	35	East 0m up to 2,3m	O
"	"	"	"	"	"	08-15-22	11:28	X	-	35	35	2,3m up to 10,8	O
33-34	08-15-22	11:25	10.4	F-3	PB	08-15-22	11:34	X	-	35	35	Full seam	O
17-34	08-15-22	11:42	6.8	F-3	PB	08-15-22	11:55	X	-	35	35	Full seam	O
17-33	08-15-22	11:42	6.65	F-3	PB	08-15-22	11:55	X	-	35	35	Full seam	O
17-32	08-15-22	11:42	6.65	F-3	PB	08-15-22	11:55	X	-	35	35	Full seam	O



GÉOSYNTHÉTIQUES



Destructive Testing Essai Destructif

Project Name / Nom de Projet:

Land Farm Amaruq

Project No. / No. de Projet:

C-21221

QC Inspector / Inspecteur CQ:

Vincent Languedoc

Destructive Test No. No. Essai Destructif	Seam No. No. de Soudure	Date (mm/dd/yy)	Sample Location Localisation de l'échantillon	Peel Resistance Résistance Pelage (ppi)	Peel Type of Break Type de Brisure	Peel Resistance Résistance Pelage (ppi)	Peel Type of Break Type de Brisure	Shear Resistance Résist. Cisaillement (ppi)	Shear Type of Break Type de Brisure	Date Repaired Date Réparée (mm/dd/yy)	Date Repair Verified Date Réparée Vérifiée (mm/dd/yy)	Lab. Testing (P/F) Lab. Indép. (A/R)	Tensimeter No. No. Tensiomètre
DT-1	7-9	08-14-22	At 3m of WEOS	128	SE1	108	SE1	153	BRK	08-15-22	08-15-22	N/A	T9708
"	"	"	"	117	SE1	120	SE1	160	BRIK	"	"	"	"
"	"	"	"	119	SE1	133	SE1	N/A	N/A	"	"	"	"
DT-2	15-17	08-14-22	At 0,3m of WEOS	111	SE1	94	SE1	168	BRK	08-15-22	08-15-22	N/A	T9708
"	"	"	"	121	SE1	112	SE1	168	BRIK	"	"	"	"
"	"	"	"	121	SE1	114	SE1	N/A	N/A	"	"	"	"
DT3	1-27	08-15-22	At 3,3m of int. 1-26-27	121	SE1	112	SE1	155	BRK	08-15-22	08-15-22	N/A	T9708
"	"	"	"	117	SE1	125	SE1	142	BRIK	"	"	"	"
"	"	"	"	131	SE1	132	SE1	N/A	N/A	"	"	"	"



GÉOSYNTHÉTIQUES



Repair Report Rapport de Réparation

Project Name / Nom de Projet:

Land Farm Amaruk

Project No. / No. de Projet:

C-21221

QC Inspector / Inspecteur CQ:

Vincent Languedoc

Repair No. No. Réparation	Type & Dimensions Type et Dimensions			Location of Repair Localisation de la Réparation				Date Repaired Date Réparée (mm/dd/yy)	Date Repair Verified Date Réparée Vérifiée (mm/dd/yy)	Approved (Yes/No) Approuvé (Oui/Non)
	Patch Empiècement	Extrusion Weld or Bead Soudure Extrusion	Pipe Boot Manchon d'étanchéité	On Panel No. Sur Panneau No.	On Seam No. Sur Soudure No.	Intersection of Panels Intersection des Panneaux	Sample Location Localisation de l'échantillon			
R-1		E				2-3-4		08-15-22	08-15-22	Y
R-2		E				3-4-5		08-15-22	08-15-22	Y
R-3	P1			3			At 7,3m of EEOP and 0,7m SEOP	08-15-22	08-15-22	Y
R-4	P1					6-7-8		08-15-22	08-15-22	Y
R-5	P1					7-8-9		08-15-22	08-15-22	Y
R-6	P1				7-9		At 16,4m of WEOS	08-15-22	08-15-22	Y
R-7		E				10-11-12		08-15-22	08-15-22	Y
R-8		E				11-12-13		08-15-22	08-15-22	Y
R-9		E				14-15-16		08-15-22	08-15-22	Y
R-10		E				15-16-17		08-15-22	08-15-22	Y
R-11		E				17-21-22		08-15-22	08-15-22	Y
R-12		E				17-18-21		08-15-22	08-15-22	Y
R-13		E				17-18-19		08-15-22	08-15-22	Y
R-14		E				17-19-20		08-15-22	08-15-22	Y
R-15	P1				16-17		At 9,3m WEOS	08-15-22	08-15-22	Y
R-16	P1				17-22		At 4,3m WEOS	08-15-22	08-15-22	Y
R-17		E			24-25		At 3m NEOS	08-15-22	08-15-22	Y
R-18	P1				30-31		At 1,2m NEEOS	08-15-22	08-15-22	Y
R-19	P1				1-24		At 0,3m EEOS	08-15-22	08-15-22	Y
R-20		E				1-30-31		08-15-22	08-15-22	Y
R-21		E				1-24-31		08-15-22	08-15-22	Y
R-22		E				1-24-25		08-15-22	08-15-22	Y



GÉOSYNTHÉTIQUES



Repair Report Rapport de Réparation

Project Name / Nom de Projet:

Land Farm Amaruq

Project No. / No. de Projet:

C-21221

QC Inspector / Inspecteur CQ:

Vincent Languedoc

Repair No. No. Réparation	Type & Dimensions Type et Dimensions			Location of Repair Localisation de la Réparation				Date Repaired Date Réparée (mm/dd/yy)	Date Repair Verified Date Réparée Vérifiée (mm/dd/yy)	Approved (Yes/No) Approuvé (Oui/Non)
	Patch Empiècement	Extrusion Weld or Bead Soudure Extrusion	Pipe Boot Manchon d'étanchéité	On Panel No. Sur Panneau No.	On Seam No. Sur Soudure No.	Intersection of Panels Intersection des Panneaux	Sample Location Localisation de l'échantillon			
R-23		E				1-25-26		08-15-22	08-15-22	Y
R-24		E				1-26-27		08-15-22	08-15-22	Y
R-25		E				1-27-28		08-15-22	08-15-22	Y
R-26		E				23-28-29		08-15-22	08-15-22	Y
R-27		E				1-23-28		08-15-22	08-15-22	Y
R-28	P1					17-20-32		08-15-22	08-15-22	Y
R-29		E				17-32-33		08-15-22	08-15-22	Y
R-30		E				17-33-34		08-15-22	08-15-22	Y

CHARTRE/CHART : Empiècement/Patch (**P1** 0.3m à/to 0.6m; **P2** 0.6m à/to 1m; **P3** over 1m et plus), Extrusion (**E**), Embout/Pipe Boot (**B**), Cap strip (**CS**), Doublure/Reinforcement (**DB**) et/and Reconstruction

APPENDIX II

-FIELD MEMOS AND COMMUNICATIONS



GÉOSYNTHÉTIQUES

**CERTIFICAT D'ACCEPTATION PROVISOIRE /
PROVISIONAL ACCEPTATION CERTIFICATE**

Nom du projet /
Project name :

Bassin Amaruq

Date / Date :

16/08/22

N° du projet /

Project # :

C21221

Endroit / Location :

Amaruq

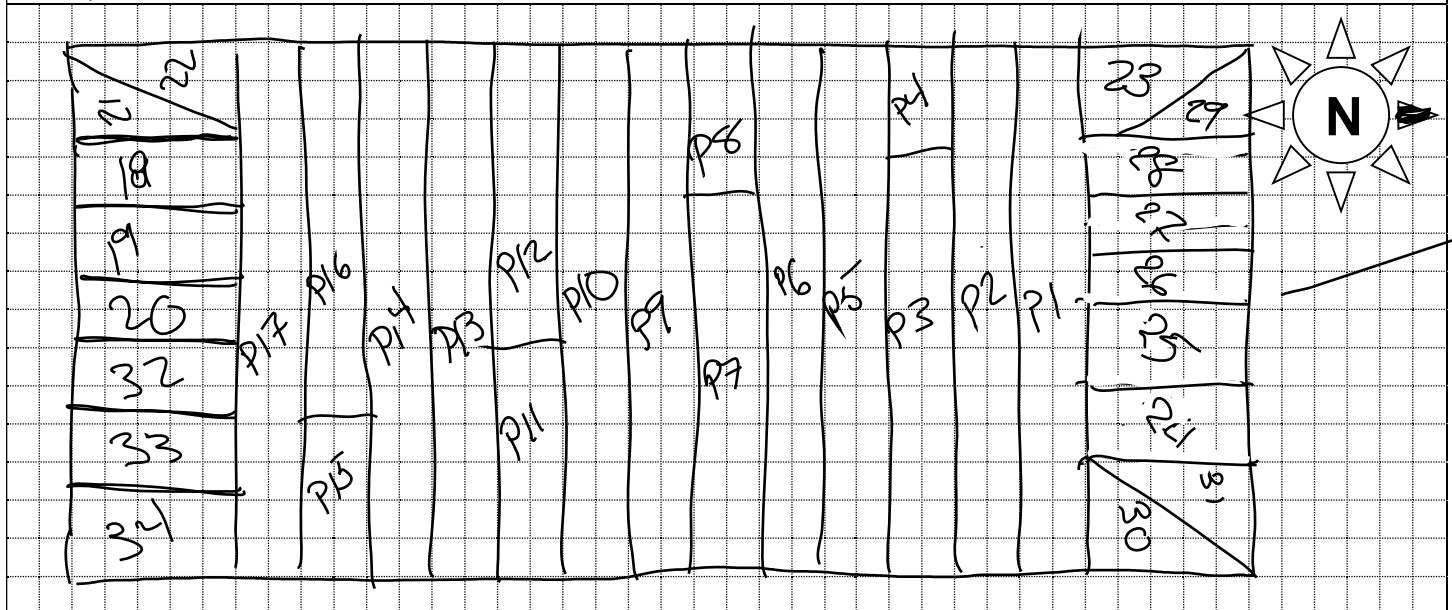
% des travaux exécutés /

% of completion :

100%

MATÉRIAU / MATERIAL	QUANTITÉ / QUANTITY	DESCRIPTION / DESCRIPTION
Géomembrane	5 077,97 m ²	Panneau 1 à 34
Textile.	10 155,94 m ²	Sur deux couches

CROQUIS / SKETCH



Je, soussigné, représentant dûment autorisé de (Client) : _____, accepte, par la présente, les travaux décrits ci-haut et confirme, qu'au meilleur de ma connaissance, ces travaux ont été complétés selon les spécifications, termes et conditions du contrat et qu'il n'y a pas de dommage apparent aux matériaux utilisés. Le site a été nettoyé de tous les déchets à la satisfaction de l'entrepreneur. FC Géosynthétiques inc s'engage à réparer tout dommage provenant de matériaux défectueux ou d'installation défectueuse en accord avec les garanties du contrat. /

I, the undersigned, duly authorized representative of (Client) : _____, do hereby take over and accept the work described above from the date hereof and confirm to the best of my knowledge the work has been completed in accordance with specifications and the terms and conditions of the contract. There is no apparent damage to the plastic lining nor any unacceptable interference within or without the surrounding works. Scrap and offcuts have been removed and the works left in a clean and tidy condition to the contractor satisfaction. FC Liners undertakes to rectify any damage resulting from defective materials or workmanship within compliance of contract guarantees.

Nom / Name : Vincent Languedoc	Nom / Name : Claude Languedoc	Nom / Name :
Signature : <i>Vincent Languedoc</i>	Signature : <i>Claude Languedoc</i>	Signature :
Date : 16 août 2022	Date : 16-08-2022	Date :

FC Géosynthétiques inc /
FC Liners
(BLANCHE/WHITE)

Entrepreneur / Client / Propriétaire
Contractor / Client / Owner
(JAUNE/YELLOW)

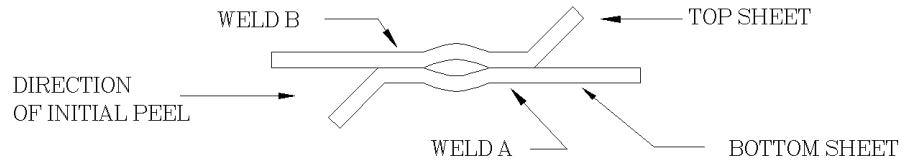
Ingénieur / Engineer
(ROSE/PINK)

APPENDIX III

-US-EPA CLASSIFICATION FOR TYPES OF BREAK

TYPES OF RUPTURE US-EPA

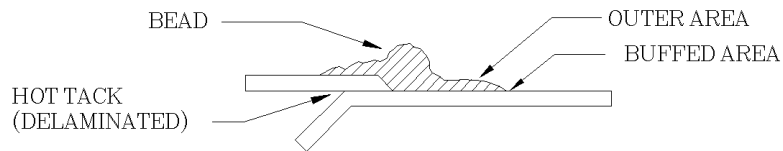
DOUBLE-TRACK GEOMEMBRANE WELD



TYPES OF BREAK	CODE	BREAK DESCRIPTION	CLASSIFICATION ^a
	AD	ADHESION FAILURE	NON-FTB
	BRK	BREAK IN SHEETING. BREAK CAN BE IN EITHER TOP OR BOTTOM SHEET.	FTB
	SE1	BREAK AT OUTER EDGE OF SEAM. BREAK CAN BE IN EITHER TOP OR BOTTOM SHEET.	FTB
	SE2	BREAK AT INNER EDGE OF SEAM THROUGH BOTH SHEETS	FTB
	AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE. BREAK CAN BE IN EITHER THE TOP OR BOTTOM SHEET.	FTB

^a FTB="FILM-TEAR BOND."

FILLET-EXTRUDED GEOMEMBRANE WELD



<u>TYPES OF BREAKS</u>	<u>CODE</u>	<u>BREAK DESCRIPTION</u>	<u>CLASSIFICATION ^a</u>
	AD1	FAILURE IN ADHESION. SPECIMENS MAY ALSO DELAMINATE UNDER THE BEAD AND BREAK THROUGH THE THIN EXTRUDED MATERIAL IN THE OUTER AREA.	NON-FTB
	AD2	FAILURE IN ADHESION.	NON-FTB
	AD-WLD	BREAK THROUGH THE FILLET. BREAKS THROUGH THE FILLET RANGE FROM BREAKS STARTING AT THE EDGE OF THE TOP SHEET TO BREAKS THROUGH THE FILLET AFTER SOME ADHESION FAILURE BETWEEN THE FILLET AND THE BOTTOM SHEET.	NON-FTB ^b
	SE	BREAK AT SEAM EDGE. INDICATE LOCATION BY 1, 2 OR 3	FTB
	BRK	BREAK IN THE SHEET. USE 1 TO INDICATE BOTTOM SHEET AND 2 TO INDICATE TOP SHEET. IF BREAK IS IN BUFFED AREA, INDICATE WITH "(B)".	FTB
	AD-BRK	BREAK IN THE BOTTOM SHEETING AFTER SOME ADHESION FAILURE BETWEEN THE FILLET AND THE BOTTOM SHEET. (APPLICABLE TO PEEL ONLY).	FTB
	HT	BREAK AT THE EDGE OF THE HOT TACK FOR SPECIMENS WHICH COULD NOT BE DELAMINATED IN THE HOT TACK.	NO TEST

^a FTB="FILM-TEAR BOND."

^b ACCEPTANCE OF AD-WLD BREAKS MAY DEPEND ON WHETHER TEST VALUES MEET A MINIMUM SPECIFICATION VALUE AND NOT ON CLASSIFICATION AS A FTB OR NON-FTB BREAK.

APPENDIX IV

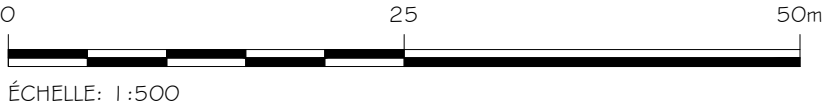
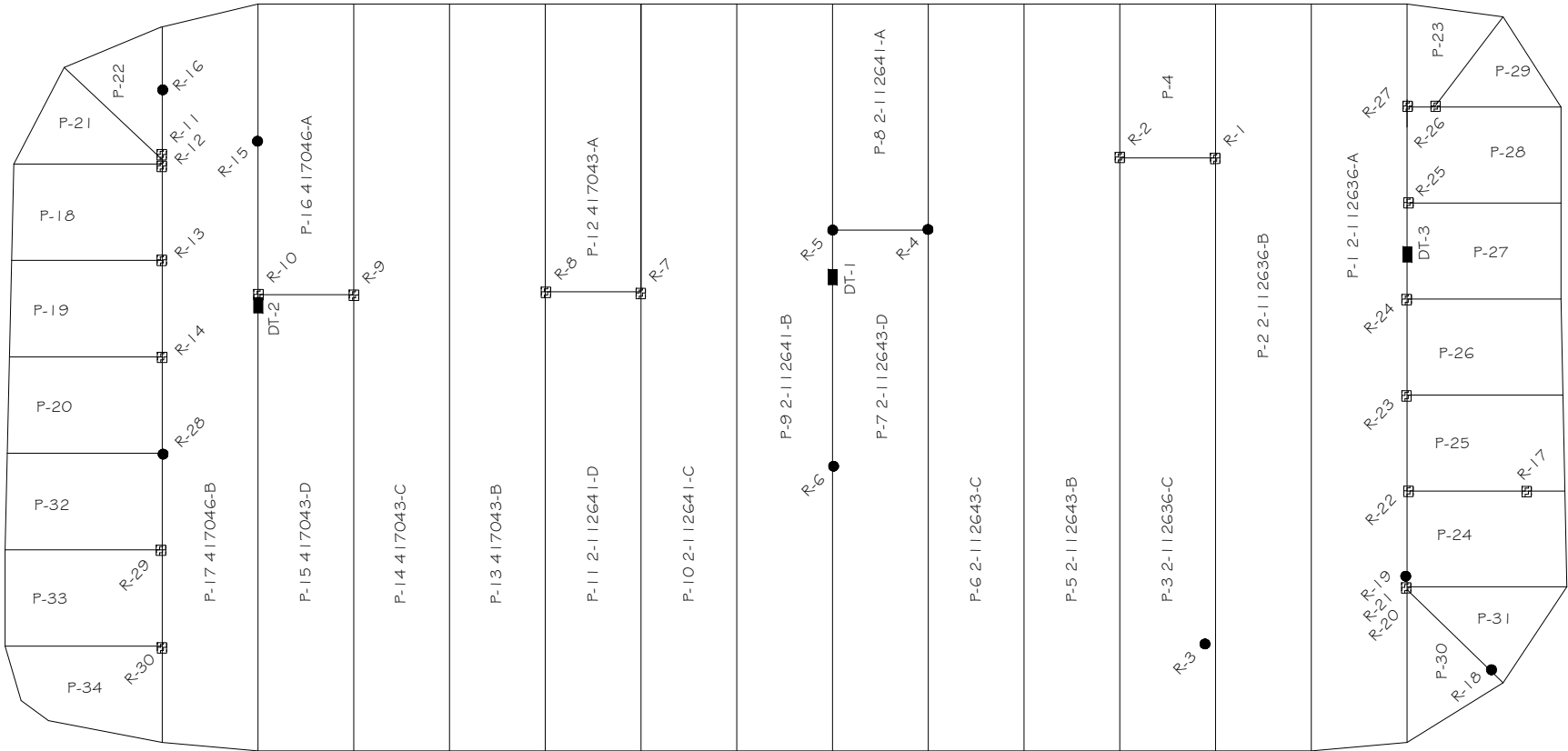
-RECORD DRAWING



INGÉNIEUR / ENGINEER :

AGNICO EAGLE
MINES LIMITED

C-21221 AGNICO EAGLE LAND FARM 2022



LÉGENDE / LEGEND:

- EMPIÈCEMENT / PATCH
- ⊕ MANCHON TUYAU / PIPE BOOT
- DESTRUCTIF / DESTRUCTIVE
- ▨ SOUDURE EXTRUSION / EXTRUSION WELD
- I PANNEAU NO. / PANEL NO.
- I-30474 ROULEAU NO. / ROLL NO.
- ||||| ANCRAGE MÉCANIQUE / MECHANICAL ANCHORAGE
- SOUDURE EXISTANTE / EXISTING SEAM

CLIENT / CUSTOMER:

FERNAND GILBERT LTÉE

TYPE DE PRODUIT INSTALLÉ / PRODUCT TYPE
INSTALLED

GEOMÉMBRANÉ HDPE 460 (GOMIL)

TYPE DE PROJET / PROJECT TYPE

AMARUQ LAND FARM LINING
A5-BUILT

NOM DU PROJET / PROJECT NAME

AGNICO EAGLE AMARUQ LAND FARM



GÉOSYNTHÉTIQUES

950, Rue de la Concorde, bur 202
Lévis, QC, Canada
GGW 8A8

NO. PROJET / PROJECT NO.: C-21221

FICHIER AUTOCAD: C-21221.dwg

AUTOCAD FILE:

DATE (jj-mm-aa): 23/08/22

DATE (dd-mm-yy):

DESSINÉ PAR / DRAWN BY: E.B.

VÉRIFIÉ PAR / VERIDIED BY: E.B.

APPROUVÉ PAR / APPROVED BY: F.S-L

ÉCHELLE / SCALE: 1/500

DESSIN NO / DRAWING NO: 1/1

NO PANNEAU / PANEL NO	ROULEAU NO / ROLL NO	
P-4	2-112643	A
P-18	417046	C
P-19	417046	D
P-20	417046	E
P-21	417046	F
P-22	417046	G
P-23	417-46	H
P-24	417046	I
P-25	417-46	J
P-26	417051	A
P-27	417051	B
P-28	417051	C
P-29	417046	K
P-30	417051	D
P-31	417051	E
P-32	417051	F
P-33	417051	G
P-34	417051	H

Appendix E

Technical Sheets





LAYFIELD

Leaders in Film & Geosynthetic Technology

Mill Certification Report

Job # E0012345
Stock Code 605270060
Start Date 1/27/2021
Result Pass

Customer Name LAYFIELD GEO EDMONTON - 368927
Description HDPE 270"x520' 60MIL
Inspection Number 45192

Serial	Result	Roll Length (ft)	Roll Weight - Net lbs	Sheet Width (270 in +/- 2.7 in)	Roll Area m2	Thickness - Average ASTM D5994 (60 mils min.)	Thickness - Minimum ASTM D5994 (54 mils min.)
605270060-E0012345-001	Pass	520	3521	269.80	1087.0	61.3	59.9
605270060-E0012345-002	Pass	520	3526	269.50	1087.0	60.9	59.6
605270060-E0012345-003	Pass	520	3531	269.50	1087.0	61.1	60.0
605270060-E0012345-004	Pass	520	3524	269.50	1087.0	60.2	59.2
605270060-E0012345-005	Pass	520	3528	269.80	1087.0	60.1	58.9
605270060-E0012345-006	Pass	520	3437	269.00	1087.0	60.4	59.1
605270060-E0012345-007	Pass	520	3560	269.50	1087.0	60.7	59.2
605270060-E0012345-008	Pass	520	3564	269.50	1087.0	60.1	58.5
605270060-E0012345-009	Pass	520	3564	269.80	1087.0	60.5	59.5
605270060-E0012345-010	Pass	520	3564	269.30	1087.0	60.6	59.7
605270060-E0012345-011	Pass	520	3564	269.00	1087.0	61.5	60.0
605270060-E0012345-012	Pass	520	3564	269.80	1087.0	60.2	58.9
605270060-E0012345-013	Pass	520	3566	269.50	1087.0	60.9	58.6
605270060-E0012345-014	Pass	520	3561	269.80	1087.0	61.3	59.3
605270060-E0012345-015	Pass	520	3556	269.50	1087.0	61.2	59.8
605270060-E0012345-016	Pass	520	3556	269.50	1087.0	61.1	59.0
605270060-E0012345-017	Pass	520	3556	269.30	1087.0	61.2	59.3
605270060-E0012345-018	Pass	520	3561	269.50	1087.0	61.3	60.3
605270060-E0012345-019	Pass	520	3561	269.50	1087.0	61.1	59.5
605270060-E0012345-020	Pass	520	3556	269.80	1087.0	61.5	59.3
605270060-E0012345-021	Pass	520	3540	270.00	1087.0	60.0	59.8
605270060-E0012345-022	Pass	520	3526	269.80	1087.0	60.2	59.2
605270060-E0012345-023	Pass	520	3518	270.00	1087.0	60.1	59.4
605270060-E0012345-024	Pass	520	3526	270.00	1087.0	60.2	59.6
605270060-E0012345-025	Pass	520	3520	270.00	1087.0	60.3	59.2
605270060-E0012345-026	Pass	520	3520	270.30	1087.0	60.0	59.4
605270060-E0012345-027	Pass	520	3522	270.00	1087.0	60.3	59.5
605270060-E0012345-028	Pass	520	3524	270.00	1087.0	60.4	59.5
605270060-E0012345-029	Pass	520	3522	270.30	1087.0	60.3	58.4
605270060-E0012345-030	Pass	520	3536	270.50	1087.0	60.9	59.9
605270060-E0012345-031	Pass	520	3551	270.50	1087.0	60.9	59.4
605270060-E0012345-032	Pass	520	3551	270.50	1087.0	60.8	59.9
605270060-E0012345-033	Pass	520	3556	269.80	1087.0	60.7	58.8
605270060-E0012345-034	Pass	520	3551	270.00	1087.0	60.7	59.9
605270060-E0012345-035	Pass	520	3546	269.50	1087.0	60.7	59.5
605270060-E0012345-036	Pass	520	2551	269.50	1087.0	60.7	60.0
605270060-E0012345-037	Fail	520	3591	270.00	1087.0	64.4	63.7
605270060-E0012345-038	Pass	520	3621	270.00	1087.0	61.0	58.3
605270060-E0012345-039	Pass	520	3606	269.50	1087.0	61.3	59.7
605270060-E0012345-040	Pass	520	3596	270.00	1087.0	60.7	59.3
605270060-E0012345-041	Pass	520	3591	270.50	1087.0	60.8	59.5
605270060-E0012345-042	Pass	520	3601	270.50	1087.0	61.3	60.6
605270060-E0012345-043	Pass	520	3606	270.10	1087.0	61.0	59.4
605270060-E0012345-044	Pass	520	3596	270.30	1087.0	61.1	59.8
605270060-E0012345-045	Pass	520	3601	270.30	1087.0	61.2	59.9
605270060-E0012345-046	Pass	520	3601	270.10	1087.0	60.9	59.9



LAYFIELD

Leaders in Film & Geosynthetic Technology

Mill Certification Report

Job # E0012345
Stock Code 605270060
Start Date 1/27/2021
Result Pass

Customer Name LAYFIELD GEO EDMONTON - 368927
Description HDPE 270"x520' 60MIL
Inspection Number 45192

Serial	Strength at Yield - MD Average ASTM D6693 IV (126 lbs/in min.)	Elongation at Yield - MD Average ASTM D6693 IV (12 % min.)	Strength at Break - MD Average ASTM D6693 IV (228 lbs/in min.)	Elongation at Break - MD Average ASTM D6693 IV (700 % min.)	Strength at Yield - TD Average ASTM D6693 IV (126 lbs/in min.)	Elongation at Yield - TD Average ASTM D6693 IV (12 % min.)	Strength at Break - TD Average ASTM D6693 IV (228 lbs/in min.)
605270060-E0012345-001	161	18	258	743	156	18	282
605270060-E0012345-002	161	18	258	743	156	18	282
605270060-E0012345-003	161	18	258	743	156	18	282
605270060-E0012345-004	161	18	258	743	156	18	282
605270060-E0012345-005	161	18	258	743	156	18	282
605270060-E0012345-006	168	19	312	798	176	17	315
605270060-E0012345-007	168	19	312	798	176	17	315
605270060-E0012345-008	168	19	312	798	176	17	315
605270060-E0012345-009	168	19	312	798	176	17	315
605270060-E0012345-010	168	19	312	798	176	17	315
605270060-E0012345-011	152	19	256	747	151	18	284
605270060-E0012345-012	152	19	256	747	151	18	284
605270060-E0012345-013	152	19	256	747	151	18	284
605270060-E0012345-014	152	19	256	747	151	18	284
605270060-E0012345-015	152	19	256	747	151	18	284
605270060-E0012345-016	158	19	255	737	159	18	286
605270060-E0012345-017	158	19	255	737	159	18	286
605270060-E0012345-018	158	19	255	737	159	18	286
605270060-E0012345-019	158	19	255	737	159	18	286
605270060-E0012345-020	158	19	255	737	159	18	286
605270060-E0012345-021	144	19	276	818	151	17	281
605270060-E0012345-022	144	19	276	818	151	17	281
605270060-E0012345-023	144	19	276	818	151	17	281
605270060-E0012345-024	144	19	276	818	151	17	281
605270060-E0012345-025	144	19	276	818	151	17	281
605270060-E0012345-026	151	18	262	761	153	17	274
605270060-E0012345-027	151	18	262	761	153	17	274
605270060-E0012345-028	151	18	262	761	153	17	274
605270060-E0012345-029	151	18	262	761	153	17	274
605270060-E0012345-030	151	18	262	761	153	17	274
605270060-E0012345-031	152	18	273	799	156	17	274
605270060-E0012345-032	152	18	273	799	156	17	274
605270060-E0012345-033	152	18	273	799	156	17	274
605270060-E0012345-034	152	18	273	799	156	17	274
605270060-E0012345-035	152	18	273	799	156	17	274
605270060-E0012345-036	141	18	266	818	141	17	259
605270060-E0012345-037	141	18	266	818	141	17	259
605270060-E0012345-038	141	18	266	818	141	17	259
605270060-E0012345-039	141	18	266	818	141	17	259
605270060-E0012345-040	141	18	266	818	141	17	259
605270060-E0012345-041	155	18	263	768	161	17	270
605270060-E0012345-042	155	18	263	768	161	17	270
605270060-E0012345-043	155	18	263	768	161	17	270
605270060-E0012345-044	155	18	263	768	161	17	270
605270060-E0012345-045	155	18	263	768	161	17	270
605270060-E0012345-046	157	18	257	728	161	17	291



LAYFIELD

Leaders in Film & Geosynthetic Technology

Mill Certification Report

Job # E0012345
Stock Code 605270060
Start Date 1/27/2021
Result Pass

Customer Name LAYFIELD GEO EDMONTON - 368927
Description HDPE 270"x520' 60MIL
Inspection Number 45192

Serial	Elongation at Break - TD Average ASTM D6693 IV (700 % min.)	Tear Strength - MD Average ASTM D1004 (42 lbs min.)	Tear Strength - TD Average ASTM D1004 (42 lbs min.)	Puncture Strength - Average ASTM D4833 (108 lbs min.)	Carbon Black Content ASTM D4218 (2 % to 3 %)	Density ASTM D1505 (0.94 g/cc to 0.96 g/cc)	Carbon Black Dispersion ASTM D5596
605270060-E0012345-001	834	46	48	158	2.50	0.947	>= 9 in Category 1 or 2
605270060-E0012345-002	834	46	48	158	2.50	0.947	>= 9 in Category 1 or 2
605270060-E0012345-003	834	46	48	158	2.50	0.947	>= 9 in Category 1 or 2
605270060-E0012345-004	834	46	48	158	2.50	0.947	>= 9 in Category 1 or 2
605270060-E0012345-005	834	46	48	158	2.50	0.947	>= 9 in Category 1 or 2
605270060-E0012345-006	840	46	48	158	2.36	0.947	>= 9 in Category 1 or 2
605270060-E0012345-007	840	46	48	158	2.36	0.947	>= 9 in Category 1 or 2
605270060-E0012345-008	840	46	48	158	2.36	0.947	>= 9 in Category 1 or 2
605270060-E0012345-009	840	46	48	158	2.36	0.947	>= 9 in Category 1 or 2
605270060-E0012345-010	840	46	48	158	2.36	0.947	>= 9 in Category 1 or 2
605270060-E0012345-011	860	45	48	156	2.42	0.947	>= 9 in Category 1 or 2
605270060-E0012345-012	860	45	48	156	2.42	0.947	>= 9 in Category 1 or 2
605270060-E0012345-013	860	45	48	156	2.42	0.947	>= 9 in Category 1 or 2
605270060-E0012345-014	860	45	48	156	2.42	0.947	>= 9 in Category 1 or 2
605270060-E0012345-015	860	45	48	156	2.42	0.947	>= 9 in Category 1 or 2
605270060-E0012345-016	872	45	48	156	2.48	0.947	>= 9 in Category 1 or 2
605270060-E0012345-017	872	45	48	156	2.48	0.947	>= 9 in Category 1 or 2
605270060-E0012345-018	872	45	48	156	2.48	0.947	>= 9 in Category 1 or 2
605270060-E0012345-019	872	45	48	156	2.48	0.947	>= 9 in Category 1 or 2
605270060-E0012345-020	872	45	48	156	2.48	0.947	>= 9 in Category 1 or 2
605270060-E0012345-021	871	50	51	152	2.30	0.947	>= 9 in Category 1 or 2
605270060-E0012345-022	871	50	51	152	2.30	0.947	>= 9 in Category 1 or 2
605270060-E0012345-023	871	50	51	152	2.30	0.947	>= 9 in Category 1 or 2
605270060-E0012345-024	871	50	51	152	2.30	0.947	>= 9 in Category 1 or 2
605270060-E0012345-025	871	50	51	152	2.30	0.947	>= 9 in Category 1 or 2
605270060-E0012345-026	834	50	51	152	2.41	0.947	>= 9 in Category 1 or 2
605270060-E0012345-027	834	50	51	152	2.41	0.947	>= 9 in Category 1 or 2
605270060-E0012345-028	834	50	51	152	2.41	0.947	>= 9 in Category 1 or 2
605270060-E0012345-029	834	50	51	152	2.41	0.947	>= 9 in Category 1 or 2
605270060-E0012345-030	834	50	51	152	2.41	0.947	>= 9 in Category 1 or 2
605270060-E0012345-031	867	48	48	156	2.60	0.947	>= 9 in Category 1 or 2
605270060-E0012345-032	867	48	48	156	2.60	0.947	>= 9 in Category 1 or 2
605270060-E0012345-033	867	48	48	156	2.60	0.947	>= 9 in Category 1 or 2
605270060-E0012345-034	867	48	48	156	2.60	0.947	>= 9 in Category 1 or 2
605270060-E0012345-035	867	48	48	156	2.60	0.947	>= 9 in Category 1 or 2
605270060-E0012345-036	857	48	48	156	2.10	0.947	>= 9 in Category 1 or 2
605270060-E0012345-037	857	48	48	156	2.10	0.947	>= 9 in Category 1 or 2
605270060-E0012345-038	857	48	48	156	2.10	0.947	>= 9 in Category 1 or 2
605270060-E0012345-039	857	48	48	156	2.10	0.947	>= 9 in Category 1 or 2
605270060-E0012345-040	857	48	48	156	2.10	0.947	>= 9 in Category 1 or 2
605270060-E0012345-041	812	52	51	152	2.20	0.947	>= 9 in Category 1 or 2
605270060-E0012345-042	812	52	51	152	2.20	0.947	>= 9 in Category 1 or 2
605270060-E0012345-043	812	52	51	152	2.20	0.947	>= 9 in Category 1 or 2
605270060-E0012345-044	812	52	51	152	2.20	0.947	>= 9 in Category 1 or 2
605270060-E0012345-045	812	52	51	152	2.20	0.947	>= 9 in Category 1 or 2
605270060-E0012345-046	865	52	51	152	2.48	0.947	>= 9 in Category 1 or 2



LAYFIELD

Leaders in Film & Geosynthetic Technology

Mill Certification Report

Job # E0012345
Stock Code 605270060
Start Date 1/27/2021
Result Pass

Customer Name LAYFIEL.D GEO EDMONTON - 368927
Description HDPE 270"x520' 60MIL
Inspection Number 45192

Serial	OIT - High Pressure ASTM D5885
605270060-E0012345-001	Pass > 400 mins
605270060-E0012345-002	Pass > 400 mins
605270060-E0012345-003	Pass > 400 mins
605270060-E0012345-004	Pass > 400 mins
605270060-E0012345-005	Pass > 400 mins
605270060-E0012345-006	Pass > 400 mins
605270060-E0012345-007	Pass > 400 mins
605270060-E0012345-008	Pass > 400 mins
605270060-E0012345-009	Pass > 400 mins
605270060-E0012345-010	Pass > 400 mins
605270060-E0012345-011	Pass > 400 mins
605270060-E0012345-012	Pass > 400 mins
605270060-E0012345-013	Pass > 400 mins
605270060-E0012345-014	Pass > 400 mins
605270060-E0012345-015	Pass > 400 mins
605270060-E0012345-016	Pass > 400 mins
605270060-E0012345-017	Pass > 400 mins
605270060-E0012345-018	Pass > 400 mins
605270060-E0012345-019	Pass > 400 mins
605270060-E0012345-020	Pass > 400 mins
605270060-E0012345-021	Pass > 400 mins
605270060-E0012345-022	Pass > 400 mins
605270060-E0012345-023	Pass > 400 mins
605270060-E0012345-024	Pass > 400 mins
605270060-E0012345-025	Pass > 400 mins
605270060-E0012345-026	Pass > 400 mins
605270060-E0012345-027	Pass > 400 mins
605270060-E0012345-028	Pass > 400 mins
605270060-E0012345-029	Pass > 400 mins
605270060-E0012345-030	Pass > 400 mins
605270060-E0012345-031	Pass > 400 mins
605270060-E0012345-032	Pass > 400 mins
605270060-E0012345-033	Pass > 400 mins
605270060-E0012345-034	Pass > 400 mins
605270060-E0012345-035	Pass > 400 mins
605270060-E0012345-036	Pass > 400 mins
605270060-E0012345-037	Pass > 400 mins
605270060-E0012345-038	Pass > 400 mins
605270060-E0012345-039	Pass > 400 mins
605270060-E0012345-040	Pass > 400 mins
605270060-E0012345-041	Pass > 400 mins
605270060-E0012345-042	Pass > 400 mins
605270060-E0012345-043	Pass > 400 mins
605270060-E0012345-044	Pass > 400 mins
605270060-E0012345-045	Pass > 400 mins
605270060-E0012345-046	Pass > 400 mins

**LAYFIELD***Leaders in Film & Geosynthetic Technology***Mill Certification Report**

Job # E0012345
Stock Code 605270060
Start Date 1/27/2021
Result Pass

Customer Name LAYFIELD GEO EDMONTON - 368927
Description HDPE 270"x520' 60MIL
Inspection Number 45192

Serial	Result	Roll Length (ft)	Roll Weight - Net lbs	Sheet Width (270 in +/- 2.7 in)	Roll Area m2	Thickness - Average ASTM D5994 (60 mils min.)	Thickness - Minimum ASTM D5994 (54 mils min.)
605270060-E0012345-047	Pass	520	3596	270.30	1087.0	61.0	59.8
605270060-E0012345-048	Pass	520	3591	270.50	1087.0	61.0	60.0
605270060-E0012345-049	Pass	520	3601	270.00	1087.0	60.7	59.9

**LAYFIELD***Leaders in Film & Geosynthetic Technology***Mill Certification Report**

Job # E0012345
Stock Code 605270060
Start Date 1/27/2021
Result Pass

Customer Name LAYFIELD GEO EDMONTON - 368927
Description HDPE 270"x520' 60MIL
Inspection Number 45192

Serial	Strength at Yield - MD Average ASTM D6693 IV (126 lbs/in min.)	Elongation at Yield - MD Average ASTM D6693 IV (12 % min.)	Strength at Break - MD Average ASTM D6693 IV (228 lbs/in min.)	Elongation at Break - MD Average ASTM D6693 IV (700 % min.)	Strength at Yield - TD Average ASTM D6693 IV (126 lbs/in min.)	Elongation at Yield - TD Average ASTM D6693 IV (12 % min.)	Strength at Break - TD Average ASTM D6693 IV (228 lbs/in min.)
605270060-E0012345-047	157	18	257	728	161	17	291
605270060-E0012345-048	157	18	257	728	161	17	291
605270060-E0012345-049	157	18	257	728	161	17	291

**LAYFIELD***Leaders in Film & Geosynthetic Technology***Mill Certification Report**

Job # E0012345
Stock Code 605270060
Start Date 1/27/2021
Result Pass

Customer Name LAYFIELD GEO EDMONTON - 368927
Description HDPE 270"x520' 60MIL
Inspection Number 45192

Serial	Elongation at Break - TD Average ASTM D6693 IV (700 % min.)	Tear Strength - MD Average ASTM D1004 (42 lbs min.)	Tear Strength - TD Average ASTM D1004 (42 lbs min.)	Puncture Strength - Average ASTM D4833 (108 lbs min.)	Carbon Black Content ASTM D4218 (2 % to 3 %)	Density ASTM D1505 (0.94 g/cc to 0.96 g/cc)	Carbon Black Dispersion ASTM D5596
605270060-E0012345-047	865	52	51	152	2.48	0.947	>= 9 in Category 1 or 2
605270060-E0012345-048	865	52	51	152	2.48	0.947	>= 9 in Category 1 or 2
605270060-E0012345-049	865	52	51	152	2.48	0.947	>= 9 in Category 1 or 2



LAYFIELD

Leaders in Film & Geosynthetic Technology

Mill Certification Report

Job # E0012345
Stock Code 605270060
Start Date 1/27/2021
Result Pass

Customer Name LAYFIELD GEO EDMONTON - 368927
Description HDPE 270"x520' 60MIL
Inspection Number 45192

Serial	OIT - High Pressure ASTM D5885
605270060-E0012345-047	Pass > 400 mins
605270060-E0012345-048	Pass > 400 mins
605270060-E0012345-049	Pass > 400 mins



SKAPS Industries (Nonwoven Division)
335, Athena Drive
Athens, GA 30601 (U.S.A.)
Phone (706) 354-3700 Fax (706) 354-3737
E-mail: contact@skaps.com

July 7, 2021

Layfield Canada Ltd.

17720 - 129 Avenue NW

Edmonton, AB, T5V 0C4

PO : E82519

BOL : 082749

Dear Sir/Madam:

This is to certify that SKAPS GE116 (Layfield LP16E) is a high quality needle-punched nonwoven geotextile made of 100% polypropylene staple fibers, randomly networked to form a high strength dimensionally stable fabric. SKAPS GE116 (Layfield LP16E) resists ultraviolet deterioration, rotting, biological degradation. The fabric is inert to commonly encountered soil chemicals. Polypropylene is stable within a pH range of 2 to 13. SKAPS GE116 (Layfield LP16E) conforms to the property values listed below:

PROPERTY	TEST METHOD	UNITS	M.A.R.V. Minimum Average Roll Value
Weight	ASTM D 5261	oz/sy (g/m ²)	16.00 (543)
Grab Tensile	ASTM D 4632	lbs (kN)	425 (1.89)
Grab Elongation	ASTM D 4632	%	50
Trapezoidal Tear	ASTM D 4533	lbs (kN)	150 (0.67)
CBR Puncture	ASTM D 6241	lbs (kN)	1200 (5.34)
Permittivity*	ASTM D 4491	sec ⁻¹	0.57
Water Flow*	ASTM D 4491	gpm/ft ² (l/min/m ²)	45 (1834)
AOS*	ASTM D 4751	US Sieve (mm)	100 (0.15)
UV Resistance	ASTM D 4355	%/hrs	70/500

Notes:

* At the time of manufacturing. Handling may change these properties.

KOUROSH SABZEVARI
QUALITY CONTROL MANAGER

www.skaps.com

Product : GE116-180 (Layfield LP16E)

ROLL # ASTM METHOD UNITS TARGET	WEIGHT D5261 oz/sq yd 16.00	MD TENSILE D4632 lbs. 425	MD ELONG D4632 % 50	XMD TENSILE D4632 lbs 425	XMD ELONG D4632 % 50	MD TRAP D4533 lbs. 150	XMD TRAP D4533 lbs 150	CBR PUNCTURE D6241 lbs. 1200	AOS D4751 US Sieve 100	WATER FLOW D4491 gpm/ft2 45	PERMITTIVITY D4491 sec-1 0.57
030748886	16.12	527	73	455	98	216	261	1534	100	49	0.65
030748905	16.86	578	74	491	98	242	289	1568	100	49	0.65
030748906	16.86	578	74	491	98	242	289	1568	100	49	0.65
030748912	16.86	578	74	491	98	242	289	1568	100	49	0.65
030748914	16.86	578	74	491	98	242	289	1568	100	49	0.65
030748915	16.86	578	74	491	98	242	289	1568	100	49	0.65
030748916	16.01	553	78	479	105	290	318	1548	100	49	0.65
030748917	16.01	553	78	479	105	290	318	1548	100	49	0.65
030748919	16.01	553	78	479	105	290	318	1548	100	49	0.65
030748920	16.01	553	78	479	105	290	318	1548	100	49	0.65
030748922	16.01	553	78	479	105	290	318	1548	100	49	0.65
030748923	16.01	553	78	479	105	290	318	1548	100	49	0.65
030748924	16.01	553	78	479	105	290	318	1548	100	49	0.65
030748925	16.01	553	78	479	105	290	318	1548	100	49	0.65
030751984	16.93	433	93	451	129	293	320	1804	100	49	0.65

* All values are MARV.

FICHE TECHNIQUE

COLETANCHE ES 2



PRESENTATION

COLETANCHE ES 2 est une géomembrane bitumineuse, à base de bitume élastomère.
Les dimensions nominales des rouleaux sont 5.10m x 80m. - Autres largeurs sur demande.

UTILISATION

Sollicitations mécaniques moyennes :
- Terrils de grandes hauteurs,
- Bassins hydrauliques,
- Bassins pour effluents individuels,
- Canaux,
- Aires industrielles.

La validation de votre choix de produit doit se faire sur consultation.

MISE EN ŒUVRE

Par soudure au chalumeau ou autre procédé similaire.

STOCKAGE

En aucun cas stockés à même le sol. Prévoir des supports adaptés (parpaings, glissières, madriers de bois) d'une hauteur minimale de 35 cm à placer sous les extrémités du mandrin.

COMPOSITION

(à titre indicatif)

Armature (g/m²) :	Voile de Verre	50
Armature (g/m²) :	Géotextile	250
Liant (g/m²) :	Elastomère	4300
Finitions surface (g/m²) :	Sable	250
Finitions sous-face (g/m²) :	Polyester	15

CARACTERISTIQUES

		NORME	UNITES	MOYENNE	Minimum
Dimensions	Longueur	-	m	80	79
	Largeur		m	5.10	5.01
Epaisseur sur produit fini		ASTM D 5199	mm	4.00	3.60
Masse surfacique		ASTM D 3776	kg/m²	4.85	4.30
Résistance à la déchirure	Sens Long	ASTM D 4073	N	825	619
	Sens Travers			700	525
Propriété en traction :	Sens Long	ASTM D 7275	kN/m	27	20.3
	Sens Travers			24	15
Propriété en traction : Allongement maximal	Sens Long		%	50	35
	Sens Travers			50	35
Résistance au poinçonnement statique		ASTM D 4833	N	530	477
Souplesse à basse température	Sens Long	ASTM D 5147	°C	-20	-15
	Sens Travers			-20	-15
Transmission de la vapeur d'eau		ASTM E 96	m/s	6.10 ⁻¹⁴	
Perméabilité aux gaz		ASTM D 1434-82	m³/m²/j/atm	< 3.10 ⁻¹⁴	

NOTE : AXTER COLETANCHE INC se réserve le droit, en fonction de l'évolution des connaissances et des techniques, de modifier sans préavis la composition et les conditions d'utilisation de ses matériaux. En conséquence, toute commande ne sera acceptée qu'aux conditions et aux spécifications techniques en vigueur au jour de la réception de celle-ci.





US 866-375-9749
CAN 800-841-0836

High Density Polyethylene (HDPE)

1. Product Description

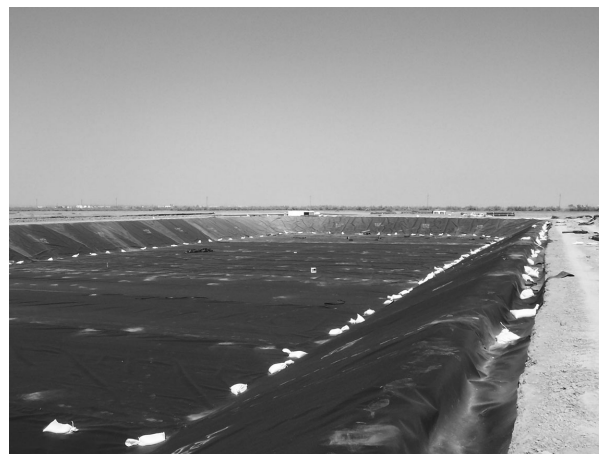
The popularity of High Density Polyethylene (HDPE) is primarily due to its low initial material cost and excellent chemical resistance. This allows thicker sections to be used compared to other geomembrane materials. A thick, durable, HDPE liner can be placed in exposed applications where the cost of other materials may be prohibitive. HDPE has excellent chemical resistance, which is often the driving force behind its selection. HDPE is a field assembled lining material that cannot be practically fabricated in the shop. All HDPE projects, regardless of size, must be installed by trained installers. HDPE is a versatile material that is used widely across all applications. One of the primary uses of HDPE is to line the base of landfills, where its chemical resistance is put to use. HDPE can also be used in a multitude of secondary containments, pond linings, and water containment projects. HDPE is best used as an exposed lining material and has the UV resistance required for many years of outstanding service.

2. Technical Data

Materials information is on page 2.

3. Installation

HDPE is a field fabricated material with all welding and testing taking place in the field. This opens up issues of weather and temperature during installation. HDPE installations need to be completed by skilled installers working with great care and attention to detail. Field welds on HDPE are made with two techniques; wedge welding and extrusion welding. Weather is a major factor in all HDPE lining installations. Precipitation in any form, whether rain, snow, dew, or fog can bring HDPE installation to a halt. Cold weather can slow down an installation, however HDPE has been installed in temperatures as low as -40°C (-40°F). The presence of moisture in the form of frost, snow, and ice are bigger problems than outside air temperatures.



4. Availability and Cost

Available from Layfield or distributors. Call
425-254-1075 Pacific time
780-453-6731 Mountain time, or
905-761-9123 Eastern time

5. Manufactured For

Layfield USA Corp.
Layfield Canada Ltd.

6. Warranty

Products sold will meet Layfield's published specifications. Any extended warranty required by the buyer must be negotiated at the time of order. Extended warranties may be available on this product and may be at extra cost. Full warranty details are available from Layfield.

7. Maintenance

Geomembranes should be inspected at least once per year for damage, stress, or any other detrimental condition. The entire containment area should be visually inspected annually. Layfield provides geomembrane maintenance services on request.

8. Designed and Installed By

Layfield USA Corp.
Layfield Canada Ltd.

9. Filing Systems

10.

10 May 2018	HDPE Minimum Material Properties, Black					
Style	ASTM	HDPE 40 Smooth	HDPE 60 Smooth	HDPE 80 Smooth	HDPE 60 Textured	HDPE 80 Textured
Nominal Thickness	D5199	40 mil 1.0 mm	60 mil 1.5 mm	80 mil 2.0 mm	57 mil 1.45 mm	76 mil 1.90 mm
Asperity Height	D7466				16 mil 0.4 mm	16 mil 0.4 mm
Density	D792	≥ 0.94 mg/l	≥ 0.94 mg/l	≥ 0.94 mg/l	≥ 0.94 mg/l	≥ 0.94 mg/l
Tensile Strength Type IV Die	D6693 Yield Strength	84 ppi 15 kN/m	126 ppi 22 kN/m	168 ppi 29 kN/m	126 ppi 22 kN/m	168 ppi 29 kN/m
	Break Strength	152 ppi 27 kN/m	228 ppi 40 kN/m	304 ppi 53 kN/m	90 ppi 16 kN/m	120 ppi 21 kN/m
	Yield Elongation 33 mm Gauge Length	12%	12%	12%	12%	12%
	Break Elongation 50 mm Gauge Length	700%	700%	700%	100%	100%
Tear Resistance	D1004	28 lbs 125 N	42 lbs 187 N	56 lbs 249 N	42 lbs 187 N	56 lbs 249 N
Stress Cracking	D5397	500 Hours	500 Hours	500 Hours	500 Hours	500 Hours
Puncture Resistance	D4833	72 lbs 320 N	108 lbs 480 N	144 lbs 640 N	90 lbs 400 N	120 lbs 534 N
Carbon Black Content	D6370	2.0-3.0 %	2.0-3.0 %	2.0-3.0 %	2.0-3.0 %	2.0-3.0 %
Carbon Black Dispersion	D5596	Cat 1 or 2	Cat 1 or 2	Cat 1 or 2	Cat 1 or 2	Cat 1 or 2
HPOIT	D5885	400 mins	400 mins	400 mins	400 mins	400 mins
Oven aging at 85° C HPOIT - % retained after 90 days	D5721 D5885	80%	80%	80%	80%	80%
UV Resistance High Pressure OIT (min. ave.)- % retained after 90 days	D7238 D5885	50%	50%	50%	50%	50%
Maximum Continuous use Temperature ¹		60°C	60°C	60°C	60°C	60°C

¹Please contact Layfield Technical Services for more information

11.

17 Oct 2016	HDPE Minimum Field Seam Strengths					
Style	ASTM D6392	HDPE 40 Smooth	HDPE 60 Smooth	HDPE 80 Smooth	HDPE 60 Textured	HDPE 80 Textured
Bonded Seam Strength Test Temp 23°C, 73°F	25.4 mm (1") Strip	80 ppi 14 N/mm	120 ppi 21 N/mm	160 ppi 28 N/mm	120 ppi 21 N/mm	160 ppi 28 N/mm

Peel Adhesion Strength (Extrusion Welds)	25.4 mm (1") Strip	52 ppi 9 N/mm	78 ppi 14 N/mm	104 ppi 18 N/mm	78 ppi 14 N/mm	104 ppi 18 N/mm
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WE PROTECT

www.LayfieldContainment.com
Containment@layfieldgroup.com