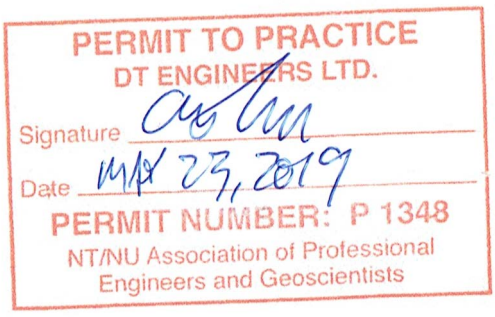
Sabina
GOLD & SILVER CORP.

BACK RIVER PROJECT
Fuel Storage Tanks and Containment Facilities

Design Report and Drawings



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BACK RIVER PROJECT

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1. Introduction

The Back River Project (the Project) is a gold project owned by Sabina Gold & Silver Corp. (Sabina) within the West Kitikmeot region of south-western Nunavut. It is situated approximately 400 kilometres (km) southwest of Cambridge Bay, 95 km southeast of the southern end of Bathurst Inlet, and 520 km northeast of Yellowknife, Northwest Territories. The Project is located predominantly within the Queen Maud Gulf Watershed (Nunavut Water Regulations, Schedule 4).

The Project is comprised of two main areas with interconnecting winter ice roads: Goose Property and the Marine Laydown Area (MLA) situated along the western shore of southern Bathurst Inlet. The majority of annual resupply will be completed using the MLA, and an approximately 160 km long winter ice road will interconnect these sites.

1.1 PURPOSE OF THE REPORT

This report is intended to present the design basis and considerations, engineering design and drawings related to the fuel storage and containment facilities that will be installed for the Back River Projects MLA.

In accordance with Sabina's Type A Water Licence (No. 2AM-BRP1831), Sabina shall submit to the Nunavut Water Board (the Board) for review, at least sixty (60) days prior to Construction, final design and Construction drawings accompanied with a detailed report for the bulk fuel storage facilities (Part D, Item 2c). The detailed reports referred to in Part D, Item 2 shall include:

a)	Design rationale, requirements, criteria, parameters, standards analysis, methods, assumptions and limitations;	Section 2, 4
b)	Site specific data and analysis to support the design and management decisions;	Section 4, 5
c)	Geochemical analysis of Waste Rock and fill, demonstrating their Acid Rock Drainage and Metal Leaching characteristics;	Section 5.2
d)	Construction methods and procedures regarding how infrastructure will be put in place, including quality assurance and quality control measures and equipment to be used;	Section 4, 5, Appendix E
e)	Technical specifications for sedimentation, erosion control and bank stabilization measures, including proposed materials, location and extent, place methods and quantities required;	Section 4, 5, Appendix C
f)	Timetable for submission, including date of Construction and proposed date of commissioning of infrastructure; and	Section 1.3

g)	Where required, signature and seal by the appropriately qualified Engineer.	Appendix C

1.2 SCOPE OF WORK

Sabina has retained SRK Consulting Inc. to design civil and structural components of the bulk fuel storage facilities, and DT Engineers Ltd. to design the mechanical and electrical components of the bulk fuel storage facilities at the MLA.

The report includes an overview of the Codes and Regulations that apply, the design criteria and construction details as well as site-specific considerations for the following facilities:

- One (1) fuel farm containing
  - 2019 construction: one (1) field-erected fuel storage tank (10 M) complete with a pumping station and ancillaries;
  - Future construction: Five (5) field erected fuel storage tanks, two (2) 10 M liters storage tank, one (1) 5 M liters tank and two (2) 2.5 M liters tanks with piping manifold and all ancillaries. These drawings are stamped “hold for future construction”.
- Secondary containment for the fuel farm will be done during the 2019 construction.

Sabina will submit to the Board for review, within ninety (90) days of completion of the 10 M liter tank, a Construction Summary Report prepared by a qualified Engineer(s) in accordance with Schedule D, Item 1 of 2AM-BRP1831.

1.3 SCHEDULE

The construction and installation of the tank will begin in 2019. Construction of the secondary containment will begin in June 2019. Installation of the tanks and the installation of the pumping station and the piping network will not begin until late July 2019. The other tanks will be constructed during 2020 summer program. The commissioning of this 10 M liter tank will not occur in 2019, but prior to first fill scheduled for Q3, 2020.

1.4 INCLUSIONS

The following items are included in the design report:

- 2019 Construction
  - Field erection of one (1) new vertical 10 M liter fuel storage tank;
  - Accessories such as couplings, nozzles, stairs, steps, railings, fixed suction and piping;
  - Earthworks;
  - Tank foundations;
  - Fuel farm secondary containment system with liner.
- 2020 Construction
  - Five (5) field erected fuel storage tanks, two (2) 10 M liter storage tank, one (1) 5 M liter tank and two (2) 2.5 M liter storage tank;

- Accessories such as couplings, nozzles, stairs, steps, railings, fixed suction and piping;
- Pumping station;
- Piping network;
- Dispensing building;
- Testing, calibration and inspection requirements;
- Instrumentation and control;
- Tank foundations;
- Fuel farm secondary containment system with liner.

1.5 ENGINEERING DOCUMENTS

Table 1. Engineering Documents List

Engineering documents	
Mechanical	General Arrangement (GA) drawings Process and Instrumentation Diagram (PID) drawings
Tank Fabrication drawings	Tanks
Electrical	Grounding Drawings
Civil / Foundation	Fuel Tank Farm - General Arrangement Plan Layout – Final Arrangement Foundation Preparation Plan Containment Berm Plan Liner Subgrade Plan Subgrade Sections and Details Plan Layout – Without Ramp Sections and Details – Sheet 1 of 2 Cross Sections and Access Ramp Profile Sections and Details – Sheet 2 of 2 Final Arrangement Survey Layout Points

2. Codes and Standards

2.1 COMPLIANCE FOR FIELD ERECTED FUEL TANK

The system complies with the latest editions of the Codes and Standards relating to this project (Federal, Territorial, Municipal, NBCC, NFCC, CEC, CSA, NFPA, and API) as well as the directives of the authorities having jurisdiction over this project. Specific codes and standards as: Canadian Council of Ministers of Environment (CCME), National Fire Code of Canada (2015), R-125-95 NWT and Nunavut Mine Health and Safety Regulations (Mine Health and Safety Act) and RRNWT 1990, c F-12 Fire Prevention Regulations shall apply.

Additionally, the design and field-erected vertical fuel storage Tank shall conform to API Std. 650 Twelfth Edition - Welded Tank for Oil Storage, including Errata 1 (2013), Errata 2 (2014), Addendum 1 (2014), Addendum 2 (2016) and applicable Appendices.

- NBCC National Building Code of Canada
- NFCC National Fire Code of Canada
- CEC Canadian Electrical Code
- CSA Canadian Standards Association
- NFPA National Fire Protection Association
- API American Petroleum Institute
- R-125-95 NWT Consolidated Mine Health and Safety Act
- CCME Canadian Council of Ministers of the Environment – National Guidelines for the Landfilling of Hazardous Waste Landfills.

2.2 CODE ANALYSIS FOR FIELD-ERECTED FUEL TANK

The Field-erected Storage Tank System and pumping station design are first based on the compliance with the Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations (SOR/2008-197). Article 14 (1) of this regulation mentions that for the installation of a fuel storage system, the system has to comply with the applicable requirements set out in the CCME Code of Practice (CCME PN1326).

Under the CCME, the main design criteria that apply to the design and installation of a new aboveground storage tank are defined in Part 3 and Part 5 applicable to the design and installation of new piping systems.

The Field-erected Storage Tank System design will comply with requirements of CCME 3.6.1(1) for aboveground storage Tank, more specifically API Std 650 for vertical single wall Tank.

In accordance with CCME section 3.3 and 3.4, the storage Tank will be equipped with an overfill protection to prevent spills.

In accordance with CCME section 5.4, all underground piping will be double-walled and installed such that leaks will be collected into an accessible sump.

In NFCC latest edition, the main design criteria are defined in Part 4 regarding flammable and combustible liquids. More specifically applicable are Section 4.1 which provides general information and requirements for fire protection and spill control of flammable and combustible liquid storage systems, Section 4.3 which provides the tank design and construction minimum requirements and Section 4.5 on piping and transfer systems.

The majority of the NFCC requirements for tank and piping systems are covered by CCME requirements but some additional ones exist such as Table 4.3.2.1 defining the minimum requirements for the location of aboveground storage Tank; Point 4.3.2.2 defining the minimum requirements for spacing between Tanks; or point 4.3.6.4.2 requesting that connections for filling or emptying storage Tank shall be kept closed to prevent leakage when not in use.

2.3 COMPLIANCE FOR SECONDARY CONTAINMENT

The secondary containment for the aboveground storage Tank will conform to NFCC. The base and walls of a secondary containment will be designed, constructed and maintained to withstand full hydrostatic head and provide a permeability of not more than 10-6 cm/s to the flammable liquids or combustible liquids contained in the storage Tank (art. 4.3.7.2). The Tank located in the fuel farms are placed entirely within a dyke area, with an impermeable barrier in the floor of the containment area and in the dyke walls. A liner will provide the appropriate level of impermeability.

See also section 4.5 of this report for more details.

A secondary containment will have the minimum volumetric capacity stated in art.4.3.7.3. The fuel farm secondary containment has a greater volumetric capacity than required (see more details in section 4.4 of this report).

3. Design – Field-Erected Fuel Tank

3.1 GENERAL

This section describes the criteria used to design the field-erected fuel storage tank, prepare general arrangements and select equipment and/or materials.

3.1.1 Field-erected Fuel Storage Tank – MLA Fuel Farm

The fuel storage tank will be installed at the MLA fuel farm. The site location of the 10 M liter Tank is shown on Figure 1 below.

Fuel will be transported in tanker ships and/or barges, and then will be transferred through floating hose to the MLA fuel farm. Fuel may also be flown to site and transferred to the MLA fuel farm via fuel trucks.

All surfaces on which the fuel tank and manoeuvring areas of the machinery are located are protected from accidental spills by a watertight membrane (geomembrane) that directs the flow to a low point of recovery. This recovery point is built inside the bermed secondary containment area.

Construction drawings for the MLA fuel farm are included in Appendix C.

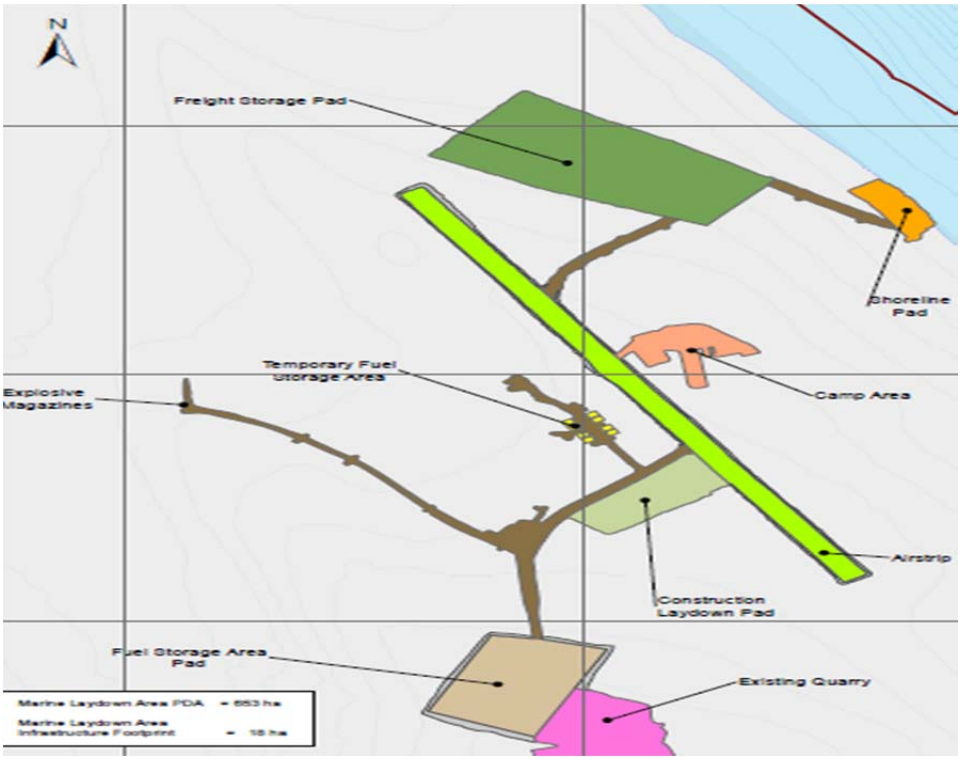

Figure 1 – MLA Fuel Farm Site Overview

3.2 COMMISSIONING

The fabrication, erection, inspection, testing, welding and labelling of the vertical Tank will be to the latest edition of API Standard 650. Prior to putting a fuel storage tank in service, the tank will pass quality control checks as per API 650 requirements; finally, the tank will be cleaned, dried, strapped and closed to be ready for service.

A list of equipment at the MLA is provided in Appendix E.

3.3 SYSTEM OPERATION

System operation for the fuel farm consists of tank loading and unloading and fuel distribution. The following sections describe the operations for the MLA fuel farm.

3.3.1 3.3.1 MLA – Fuel Farm

Fuel will be transferred to the MLA via tanker ships and/or barges. The tanker trucks will be connected to a bottom loading arm and the pumping station will allow the operator to transfer fuel to the tank. The storage tank will be equipped with an overfill alarm system to notify the operator and to automatically stop the pumping operation.

For the loading operation, a pumping station will transfer fuel from the tank to the tanker trucks. The tanker trucks will be connected to a top loading arm and the pumping station will allow the operator to transfer fuel from tank.

For the distribution operation, the pumping station located at the MLA site will be connected to a dispensing building. Equipment located inside the dispenser building will be used to refuel equipment.

3.4 MAINTENANCE / INSPECTION

A qualified maintenance team will inspect the system (mechanical equipment and piping) on a regular basis as per regulations and codes. Part of the distribution piping will be installed above ground which means any leaks can be detected during the periodic visual inspection. The underground piping is comprised of double walled pipe, and transition sumps will allow for periodic visual inspection.

The field-erected storage Tank shall be inspected externally and internally as per CCME section 8.4 and API 653 standard.

Inspection and commissioning are discussed in Section 4.8.

4. Design of Fuel Storage Tank Farm

4.1 DESCRIPTION OF THE FUEL STORAGE TANK FARM

The Project includes the development of one (1) fuel storage tank farm on the mine site: MLA Fuel Farm.

The table below presents the tank main dimensions.

Table 2 – Description of the fuel farm

Fuel farm Description	MLA Fuel Farm
Product	Diesel
Volume (liter)	10 M
Diameter (m)	33.7
Height (m)	12.2

The detailed design of the Fuel Farm is presented in drawings in Appendix C.

4.2 TANK FOUNDATIONS DESIGN

The tank foundation pad will be 400 mm higher than the surrounding ground with a minimum total thickness of 900 mm of compacted material which includes the liner system. A 1 m shoulder will surround the tank with a slope of 1V:50H away from the tank. The embankments of the foundation pad will be no steeper than 1V:2H.

The table below presents the design parameters for the tank foundations.

Table 3 – Design parameters for the tank foundations

Tank Foundation Pad	
Tank Diameter (m)	33.7
Tank foundation pad top Diameter (m)	35.7
Tank foundation pad average thickness, above surrounding ground (m)	0.35
Slope on shoulder	1V:50H
Embankment slope	1V:2H

4.3 BERMS DESIGN

The storage tank is enclosed inside Berms in order to contain accidental spillage of fuel product. The Berms are made of granular material and are made impervious with a geomembrane.

The design parameters for the Berms surrounding the fuel Tank are presented in the table below.

Table 4 - Design parameters for fuel farm Berms

Tank Farm Berms	
Berms length (distance between the outer sides of the Berms) (m)	175
Berms width (distance between the outer sides of the Berms) (m)	120
Berms height (min) (m)	3
Containment height (m)	2.9
Berms flat top width (m)	3
Berms embankment slope	1V:2H
Impervious area (m^2)	± 17 600

4.4 SECONDARY CONTAINMENT CAPACITY

The required capacity of the fuel farms is calculated based on the following codes and regulations:

- National Fire Code of Canada (NFCC);
- National Fire Protection Association (NFPA); and
- Design Rationale for Fuel Storage and Distribution Facility (DRFS).

As per the latest edition of NFCC, art. 4.3.7.3, the required secondary containment capacity for a fuel farm with more than one storage tank must have a volumetric capacity of not less than the sum of:

a) The capacity of the largest storage tank located in the contained space, and;

b) 10% of the greater of:

   i. The capacity specified in Clause (a), or;
   ii. The aggregate capacity of all other storage Tanks located in the contained space.

The volume occupied by the Tank foundations, and roadway berm is taken into account in the total secondary containment capacity.

The height of the secondary containment capacity is 100 mm lower than the Berms' maximum elevation.

Based on the above mentioned, the secondary containment capacity requirements and the available capacity for fuel farms are summarized in the following table.

Table 5 – Fuel farm containment capacity

Fuel farm	
Volume (liter)	10 M
Required Containment Capacity (liter)	13.8 M
Available Containment Capacity (liter)	15.8 M
Is Available containment > Required containment	YES

4.5 SECONDARY CONTAINMENT IMPERVIOUSNESS

As per NFCC art. 4.3.7.2, the base and walls of the fuel farms secondary containment are designed and will be constructed and maintained to withstand full hydrostatic head and provide a permeability of not more than 10-6 cm/s to the flammable liquids or combustible liquids contained in the storage tank. The Berms area will be impervious in order to avoid any seepage into the environment. A SOLMAX HDPE liner will provide adequate imperviousness. Technical specifications for the liner are provided in section 5 of this report.

4.6 SECONDARY CONTAINMENT DRAINAGE

The finished grade of the secondary containment is sloped away from the Tank in order to drain the runoff water. The bottom of the Berms surface must be built with slopes that will allow accidental spills to be concentrated at a low point. A drainage basin located at the low point allows the recovery by pumping accumulations of rainwater and accidental spills.

Due to melting snow that accumulates over the winter and precipitation, contact water will be collected inside the secondary containment Berms. During visual inspections, the quantity of contact water collected inside the secondary containment Berms will be evaluated. If there is a visible sheen on the contact water or if water withdrawal is deemed necessary, water samples will be collected and analyzed. Accumulated water will be released into the receiving environment only if it meets discharge criteria.

4.7 DISTANCE RESTRICTIONS

4.7.1 Minimum Clearances for Tank Farm Design

The minimum clearances that were taken into account in the design of the Tank Farm are:

- The distance between the tank and the toe of the Berms shall not be less than 1.5 m (NFCC, art. 4.3.7.4);
- The distance between the tank and the centerline of the Berms shall not be less than ½ the height of the tank (DRFS art. 4.5);
- The distance between the property limit and the tank shall not be less than 160 ft (48 m) (NFPA 30, table 22.4.1.1);
- The distance between the property limit and the exterior toe of the Berms shall not be less than 3 m (NFPA 30, art. 22.11.2.3);
- The Tank must be located 9 m away from the public roads and buildings (NFCC, art.4.3.2.1).

4.8 INSPECTION AND COMMISSIONING

The manufacture and supply of the liner system for the fuel farm will comply with ASTM standard. The manufacturer will provide a certification stating that the material proposed has physical properties that meet the required values. The rolls of liner will be labelled, packaged, shipped, off-loaded, stored and handled by appropriate means to prevent damage to the material.

The subgrade surface will be inspected by the Engineer to verify suitability prior to installation of the liner system. A minimum thickness of fill covering the liner will be maintained for operating equipment over the liner to prevent any damage. The installation of the liner system will be performed by a qualified technician. All seaming, patching, welding operations, and testing will be performed by a qualified technician. Joints/seams between liners panels will be field welded using the manufacturer's recommended procedures and equipment. Any welds that have been rejected will be remedied to satisfactory requirements. The backfill material will be placed in accordance with the drawings and specifications for the maximum lift thickness, compaction requirements and final grade levels. The fuel farm including its liner system installation and testing documentation will be accepted by the Engineer prior to the filling of the storage tank.

A quality control program for seams is proposed during and after installation. This program includes the following procedures:

- Test seams shall be prepared and tested by the Geomembrane Installer to verify that seaming parameters (speed, temperature and pressure of welding equipment) are adequate.
- Field Seam testing (non-destructive): All field seams shall be non-destructively tested by the Geomembrane Installer over the full length of the seam before the seams are covered. Testing shall be done as the seaming work progresses. Non-destructive testing shall be performed using vacuum box (per ASTM D 4437 and D 5641) or air pressure (per ASTM D 5820 and D 4437) methods.
- Destructive testing or mechanical resistance of the seams: One destructive test sample per 150 linear m seam length shall be taken by the Geomembrane Installer from a location specified by the Owner's Representative. Seam testing shall be conducted in accordance with ASTM 5820 or D 4437.
- Each defective location shall be marked, numbered and repaired. Defective seams, tears or holes shall be re-seamed or repaired by applying an extrusion welded cap strip. Blisters, larger holes and contamination by foreign matter shall be repaired by patches and/or extrusion weld beads as required. All patching shall extend a minimum of 150 mm beyond all edges of defects.
- Each repair shall be non-destructively tested per the methods above.

5. Earth Works

5.1 CONSTRUCTION MATERIAL QUANTITIES

The table below presents the estimated in-place material quantities for the construction of the Fuel farms.

Table 6 - Material estimated in-place quantities for the construction of the Fuel farm

Item	
Levelling fill (m^3)	15 100
General Fill (m^3)	11 750
Crush Fill (m^3)	19 550
SOLMAX Liner (m^2)	18 100
Total Fill Material Volume (m^3)	**46 400**

5.2 CONSTRUCTION MATERIAL SPECIFICATIONS

The general requirements for the materials are specified below. The requirements for each of the materials can vary slightly for a specific earth structure to meet specific design intents.

Preliminary geochemical characterization was completed on surface outcrop samples, deep bedrock, and sandy gravel representing quarry material that will be excavated during construction of the MLA Fuel Storage Area (MLA Quarry). These samples were described as weathered quartzite conglomerate, quartz arenite/quartzite (sandstone), and sandy gravel. The test results showed that these materials have a negligible potential for ML/ARD. Additional deep bedrock sampling and testing was completed in 2018 during quarry blasting; results reported low sulphur content and ARD potential.

5.2.1 Levelling Fill

The levelling fill material shall consist of competent, non-acid-generating material from the quarries or foundation excavations and that is free from organic matter, frozen soil, snow and ice.

The material shall have a particle size distribution falling within the limits presented in Table 7.

Table 7 – Levelling Fill – Particle size distribution limits

Particle size (mm)	% Passing
200	100
100	60 - 100
50	40 – 70
20	20 – 50
10	0 - 30

5	0 -10

5.2.2 Crush Fill

Crush Fill shall consist of competent non-acid-generating rock from the quarries or foundation excavations, and that is free of organic matter, frozen soil, snow and ice.

The material shall have a particle size distribution falling within the limits presented in Table 8.

Table 8 – Crush Fill – Particle size distribution limits

Particle size (mm)	% Passing
38.0	100
25.0	60 - 100
12.5	25 – 100
5.0	10 – 50
0.63	2 - 20
0.08	1 - 15

5.2.3 General Fill (Run of Quarry)

Run-of-Quarry (ROQ) material shall consist of competent non-acid generating rock sourced from the quarries or foundation excavations, and that is free of organic matter, frozen soil, snow and ice.

ROQ material shall be well-graded, containing sufficient quantities of unfrozen gravel, sand and silt sized material to allow the material to be compacted. In areas where the overall ROQ fill thickness is less than 0.85 m, the maximum boulder size shall not exceed 500 mm, as measured in any direction. In areas where the overall ROQ fill thickness is greater than 0.85 m, the maximum boulder size shall not exceed 900 mm as measured in any direction.

Basic screening, or crushing and screening may be used to achieve the desired gradation.

The ROQ material shall be washed to remove blast residue, unless otherwise directed.

5.2.4 Liner – SOLMAX HDPE

An impervious SOLMAX HDPE geomembrane will be placed on granular material of varying thickness in order to contain the area in case of a spill. The liner will be a continuous membrane to ensure its imperviousness. The geomembrane is HDPE based in combination with a non-woven geotextile for mechanical resistance and specifically designed to guarantee waterproofing, chemical resistance and ageing behaviour.

Table 9 - Geomembrane specifications

Characteristics				Tolerance	
	Standard	Units	Values	Min	Max
Thickness (on finished product)	ASTM D 5994	mm	1.5	1.28	-
Resistance to Puncture	ASTM D 4833	N	535	535	-
Resistance to tearing	ASTM D 1004	N	200	200	-
Tensile properties: strength at yield	ASTM D 6693	kN/m	-	23	-
Tensile properties: elongation at yield		%	13	-	-
Tensile properties: strength at break		kN/m	-	23	-
Tensile properties: elongation at break		%	150	-	-

Table 10- Geomembrane specifications (cont'd)

Characteristics				Tolerance	
	Standard	Units	Values	Min	Max
Dimensional Stability	ASTM D 1204	%	-	-2	+2
Low Temperature Brittleness	ASTM D 746	°C	-77	-	
Stress Crack Resistance	ASTM D 5397	hr	500	-	
UV Resistance	ASTM D 5885	%	50	-	

Appendix A - Functional Description

FUNCTIONAL DESCRIPTION – MLA FUEL FARM

Unloading barge or fuel tanker (filling tank no. *XX-TK-01*)

a. The barge static grounding confirmation energizes the system;
b. Connect the unloading arm/or hose assemblies;
c. A Microload allows the transaction (ID and volume are required) before pumping starts;
d. The operator selects either or both pumps;
e. The operator pushes the start button. The motorized valve of pump skid and tank opens. The pump(s) starts after an adjustable time lag;
f. If one pump is selected and does not start, an indicator lights and the other pump starts. If both pumps are selected and one or none of the pumps start, the motorized valve closes, the tank selector returns to the neutral position and a system fail signal appears on the control panel;
g. A light for each pump are located on the control panel and indicate which pump is running;
h. Pumping stops at selected volume or when tank is full or after an adjustable operation time;
i. Stopping the pump(s) closes the motorized valve tank after an adjustable time lag;
j. Position (OPEN/CLOSED) of motorized valves are indicated on the control panel;
k. A flow control valve automatically controls fuel flow rate during dispensing;
l. Pump emergency button stops everything but lighting and cannot be by passed;
m. Pump interlocks:
    a. Starting condition that cannot be by passed:
        i. Truck must be grounded; and
        ii. Maximum level of diesel not to be exceeded in the selected storage tank.
    b. Running conditions that can be by-passed:
        i. Microload;
    c. Safety trip conditions (cannot be by passed):
        i. Emergency stop button.
n. Overfill protection of tanks:
    a. Overfill alarm is composed of one strobe light and one horn installed near the electrical container (operating area);
    b. When 95% of a tank capacity is reached (high level from the varec level transmitter), an overfill alarm is activated. Tank strobe light and the horn are activated;
    c. A tank level high high message will appear on local level indicator; and
    d. The horn can be manually by-passed.
o. Alarms transmission:

a. At least, 4 different alarms must be transmitted to client's remote monitoring system, including but not limited to: Overfill alarm, Emergency stop activated, temperature alarm, pumps and valves malfunction alarm; and
b. Use network system with the PLC to transmit alarm signals to the control room.

Loading tanker truck

a. The truck grounding energizes the system;
b. Connect the top loading arm(s);
c. A Microload allows the transaction (ID and volume are required) before pumping starts;
d. The operator pushes the start button. The motorized valves at fuel transfer pump moduel and the tank are activated and opens. The pump starts after an adjustable time lag;
e. If one pump does not start, an indicator lights, the motorized valve closes, the tank selector returns to the neutral position and a system fail signal appears on the control panel;
f. Pumps run independently. Lights for each pump are located on the control panel and indicate which pump is running;
g. Pumping stops at selected volume or when tanker is full (tanker level determined visually by the operator) or after an adjustable operation time;
h. Stopping the pump closes of the motorized valve at tank and the fuel transfer pump module after an adjustable time lag;
i. Position (OPEN/CLOSED) of motorized valves are indicated on the control panel;
j. Pumping stops when the minimum level of diesel is reached (550mm) inside the tank. In case of emergency (lack of fuel), a manual bypass of these level switches will allow pump to restart. ;
k. A flow control valve automatically controls fuel flow rate during dispensing;
l. Pump emergency button stops everything but lighting cannot be bypassed;
m. Pump interlocks:
    a. Starting condition that cannot be by passed:
        i. Truck must be grounded.
    b. Starting conditions that can be by passed:
        i. Minimum level of diesel in the storage tank.
    c. Running conditions that can be by-passed:
        i. Microload; and
        ii. Minimum level of diesel in the storage tank.
    d. Safety trip conditions (cannot be by passed):
        i. Emergency stop button.

Dispensing fuel light vehicles

a. Connect the dispensing nozzle to the vehicle
b. The start button energizes the system;
c. A Microload allows the transaction (ID required) before pumping starts;
d. The operator activates and holds the nozzle lever. The pump starts after an adjustable time lag; and the solenoid valves opens.
e. If one pump does not start, an indicator lights, the motorized valve closes, the tank selector returns to the neutral position and a system fail signal appears on the control panel;
f. Pumps run independently. Lights for each pump are located on the control panel and indicate which pump is running;
g. Pumping stops when vehicle is full (vendor system);
h. Stopping the pump closes the solenoid valve after an adjustable time lag;
i. Pump run status (RUNNING/STOPPED) are indicated on the control panel;
j. Pumping stops when the minimum level of diesel is reached (vendor specified) inside the tank. In case of emergency (lack of fuel), a manual bypass of the level switches will allow pump to restart;
k. When Minimum level of diesel is reached; operator manually opens handvalve to refill day tank; motor operated valve opens at MOV;
l. Tank is filled until full (visually by operator); and operator manual closes handvalve; when handvalve is closed; Motor operated valve at tank closes;
m. Level high alarm close motor operated valve at tank if tank is overfilled;
n. Pump emergency button stops everything but lighting cannot be bypassed;
o. Pump interlocks:
    a. Starting condition that cannot be by passed:
        i. The start button must be energized
    b. Starting conditions that can be by passed:
        i. Minimum level of diesel in the day tank.
    c. Running conditions that can be by-passed:
        i. Microload; and
        ii. Minimum level of diesel in the day tank.
    d. Safety trip conditions (cannot be by passed):
        i. Emergency stop button.

Appendix B - Engineering Drawings List

The following list of drawings covers the technical requirements for this package.

Drawings	Title	Rev
7310-E-GAD-0001.001	FUEL TANK GROUNDING	R0
7310-P-PFD-0001.001	FUEL STORAGE AND DISTRIBUTION FLOWSHEET	R0
7310-P-PID-0001.001	FUEL PUMP OFFLOAD MODULE P&ID	R0
7310-P-PID-0002.001	TANK FARM P&ID	R0
7310-P-PID-0003.001	FUEL PUMP TRANSFER MODULE P&ID	R0
7310-M-GAD-0001.001	FUEL SYSTEM OVERVIEW	R0
MLA-TF-01	GENERAL ARRANGEMENT	R0
MLA-TF-02	FINAL ARRANGMENET WITH FUEL TRANSFER RAMP	R0
MLA-TF-03	FOUNDATION PREPARATION PLAN	R0
MLA-TF-04	CONTAINMENT BERM PLAN	R0
MLA-TF-05	LINER SUBGRADE PLAN	R0
MLA-TF-06	SUBGRADE SECTIONS AND DETAILS	R0

MLA-TF-07	FINAL LAYOUT PLAN – WITHOUT RAMP	R0
MLA-TF-08	SECTIONS AND DETAILS – SHEET 1	R0
MLA-TF-09	TYPICAL CROSS SECTIONS AND ACCESS RAMP PROFILE	R0
MLA-TF-10	SECTIONS AND DETAILS – SHEET 2	R0
MLA-TF-11	FINAL ARRANGEMENT SURVEY LAYOUT POINTS	R0

Appendix C - Engineering Drawings

NOTES:

1. TEST SYSTEM GROUND RESISTANCE AND SUBMIT TO ENGINEER FOR APPROVAL PRIOR TO FILLING ANY TANKS WITH FUEL.
2. IF SOIL CONDITIONS DO NOT ALLOW THE DRIVING OF GROUND RODS, GROUND PLATES MAY BE SUBSTITUTED AT THE ENGINEER'S DISCRETION.
3. BURIED CONDUCTORS TO BE INSTALLED AT A NOMINAL 300mm BELOW FINISHED GRADE WITHIN CONTAINMENT AREA, AND 600mm OUTSIDE CONTAINMENT AREA.
4. PROVIDE 19ø RPVC SLEEVE WHERE PIGTAILS RISE FOR CONNECTION TO EQUIPMENT/STRUCTURE. EXTEND SLEEVE FROM 300mm BELOW GRADE TO 300mm ABOVE GRADE.

SYMBOL LEGEND

- 2/0 AWG BURIED BARE COPPER GROUND CONDUCTOR
- 2/0 AWG GREEN INSULATED GROUND CONDUCTOR
- COMPRESSION GROUND CONNECTION
- PIGTAIL (MIN 5m) FOR CONNECTION TO EQUIPMENT AND STRUCTURES
- 3m TINNED COPPER GROUND ROD

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DT ENGINEERS LTD.
Signature
Date MAY 27, 2019
PERMIT NUMBER: P 1348
NT/NU Association of Professional Engineers and Geoscientists

STAMP/SEAL

REGISTERED PROFESSIONAL ENGINEER
W. JOHNSON
LICENSEE
L4403
NUNAVUT
2019/05/23

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REV NO.	ISSUED FOR	DATE	BY	APP	APP
0	CONSTRUCTION	22MAY2019	MD	AT	
A	REVIEW	21MAY2019	MD	AT	

REVISION HISTORY

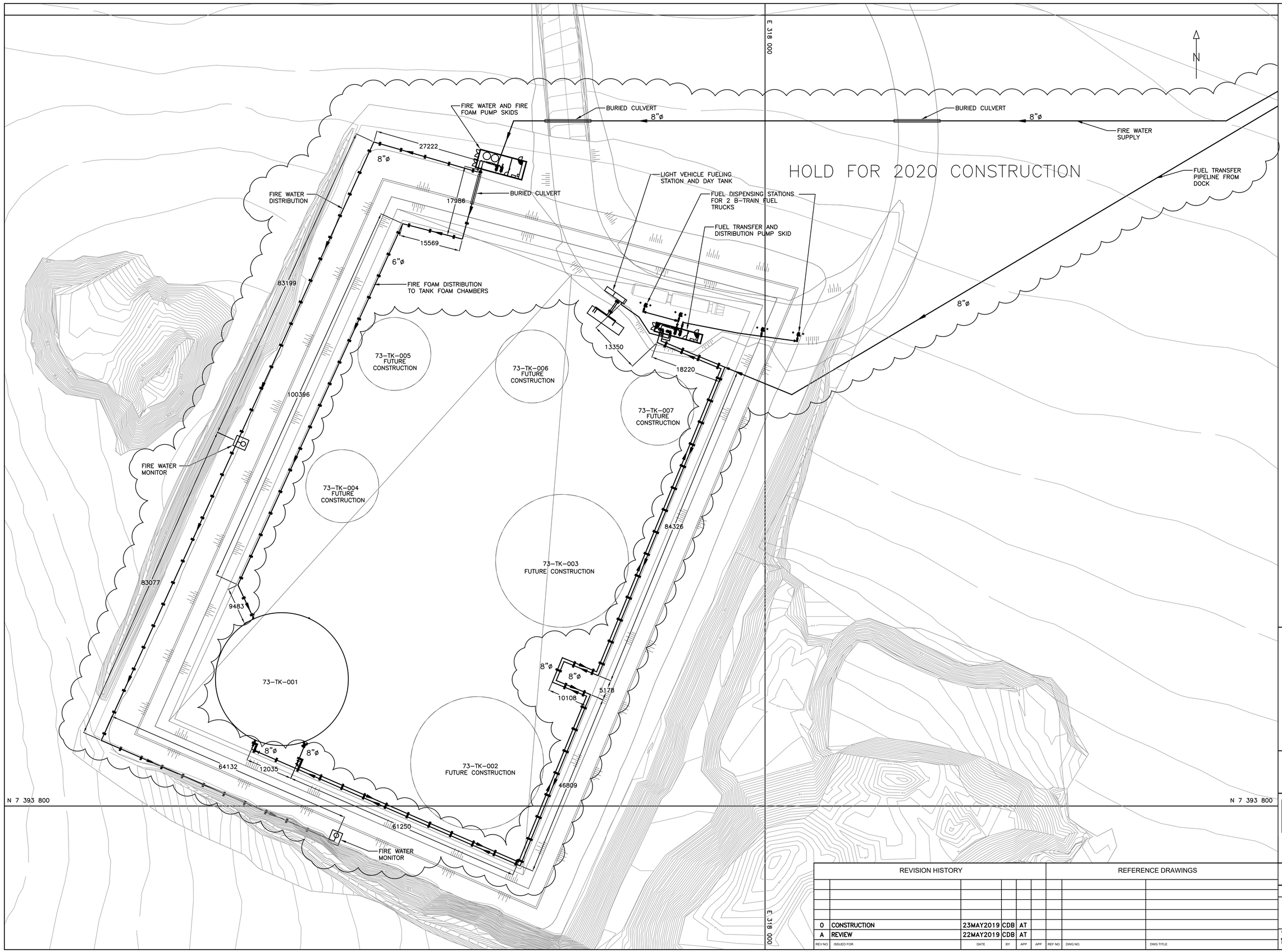
REF NO.	DWG NO.	DWG TITLE
6		
5		
4		
3		
2		
1		

REFERENCE DRAWINGS

PROJECT NO.	DRAWN BY	DATE
219073	MD	22MAY2019

BACK RIVER PROJECT
MARINE LAYDOWN AREA
FUEL TANK GROUNDING

SCALE	DRAWING NO.	REVISION
1:500	7310-E-GAD-0001.001	0



GENERAL NOTES:

1. ALL PIPING, FITTINGS & VALVES SHALL TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.
2. ALL DIMENSIONS ARE IN mm. PIPE SIZES ARE IN IMPERIAL.
3. ALL PIPE SUPPORTS SHALL BE KEPT CLEAR OF DYKE WALL LINER PANELS.
4. MAXIMUM SUPPORT SPACING FOR 6" AND 8" PIPE SHALL BE 6000mm EXCEPT ON SLOPE OF BERMS.
5. ALL DIMENSIONS SHOWN TO BE FIELD VERIFIED PRIOR TO INSTALLATION.
6. PIPE ELEVATIONS SHOWN ARE AT CTR. OF PIPE UNLESS OTHERWISE NOTED.
7. PIPING IS NOT TO BE TIED TO PIPE SUPPORTS UNLESS NOTED OTHERWISE.
8. FLEXIBLE CONNECTIONS:

   8" DIA. x 40" F/F FLEXON
   A-1 T321SS SNGL. BRD. ASSY. C/W
   150# RFWN A350LF2 FLANGES W/E/E
9. FUEL DISPENSING STATIONS ARMS TO BE VENDOR SUPPLIED OR APPROVED EQUIVALENT WITH COMPONENTS FOR -50°C SERVICE.

PIPING LEGEND

GATE VALVE

FLEXIBLE CONNECTOR

PIPE SUPPORT PS-X PS-X

THIS CONTRACT

FUTURE PIPING

FIRE WATER MONITOR 1000USGPM AT 100PSIG

PERMIT TO PRACTICE
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NT/NU Association of Professional Engineers and Geoscientists

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REGISTERED PROFESSIONAL ENGINEER
13841
C.D. BLOUW
TERRASSE
NT/NU
MAY 23, 2019

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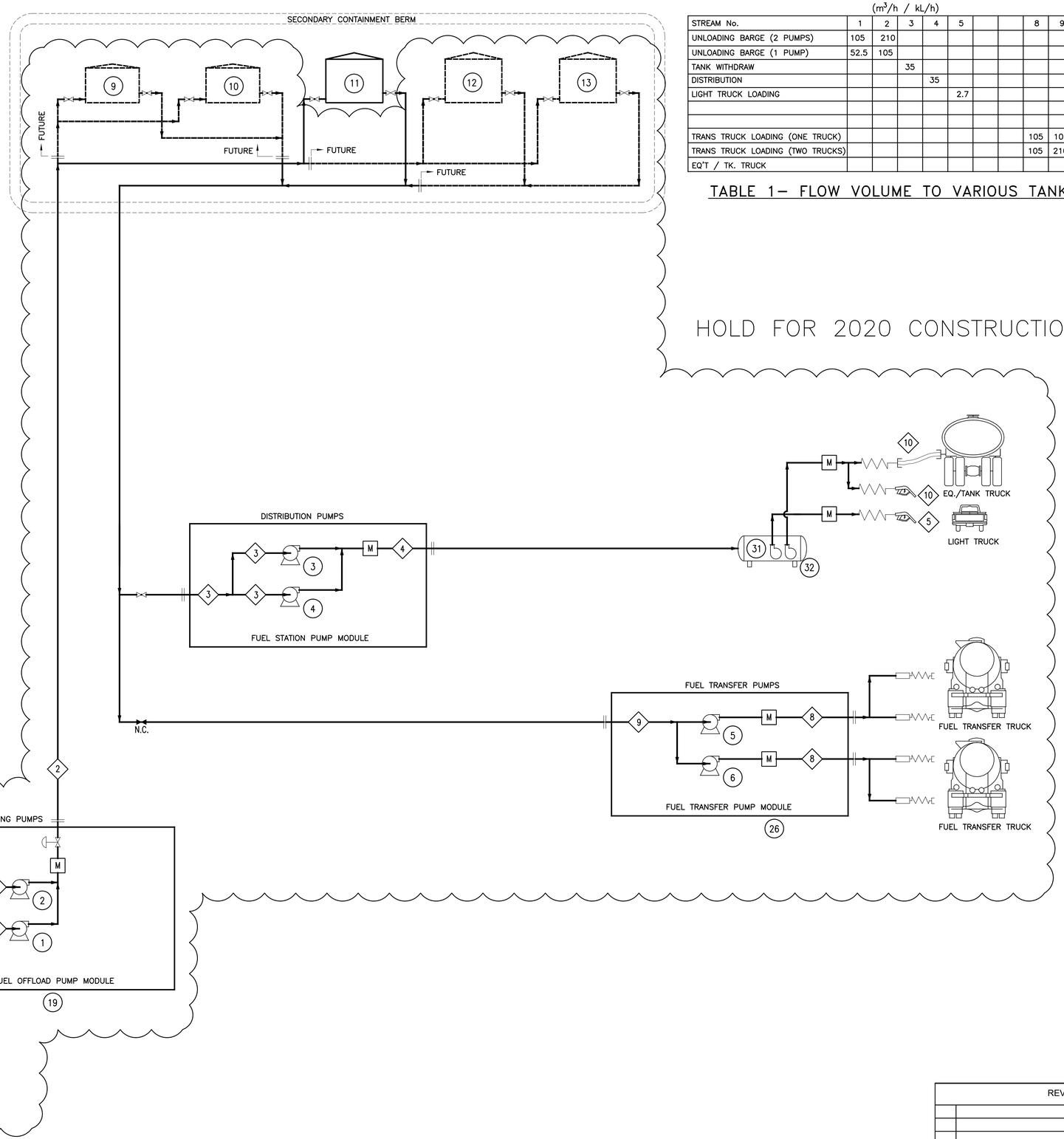
0	CONSTRUCTION	23MAY2019	CDB	AT				
A	REVIEW	22MAY2019	CDB	AT				
REV NO.	ISSUED FOR	DATE	BY	APP	APP	REF NO.	DWG NO.	DWG TITLE

PROJECT NO	DRAWN BY	DATE
219073	CDB	23MAY2019

BACK RIVER PROJECT
MARINE LAYDOWN AREA
FUEL SYSTEM OVERVIEW

SCALE	DRAWING NO.	REVISION
1:400	7310-M-GAD-0001.001	0



(m^3/h / kL/h)

STREAM No.	1	2	3	4	5			8	9	10
UNLOADING BARGE (2 PUMPS)	105	210								
UNLOADING BARGE (1 PUMP)	52.5	105								
TANK WITHDRAW			35							
DISTRIBUTION				35						
LIGHT TRUCK LOADING					2.7					
TRANS TRUCK LOADING (ONE TRUCK)								105	105	
TRANS TRUCK LOADING (TWO TRUCKS)								105	210	
EQ'T / TK. TRUCK										23

TABLE 1– FLOW VOLUME TO VARIOUS TANKS

EQUIP. No.	ITEM	QTY.	DESCRIPTION		kW
73–PP–01	1	1	PUMP–FUEL UNLOADING	1 OR 2 OPERATING	
73–PP–02	2	1	PUMP–FUEL UNLOADING		
73–PP–03	3	1	PUMP–FUEL DISTRIBUTION	1 OPERATING / 1 STANDBY	
73–PP–04	4	1	PUMP–FUEL DISTRIBUTION		
73–PP–05	5	1	PUMP–FUEL TRANSFER	1 OR 2 OPERATING	
73–PP–06	6	1	PUMP–FUEL TRANSFER		
73–TK–01	9	1	TANK–BULK FUEL STORAGE (2,500,000 L) FUTURE		–
73–TK–02	10	1	TANK–BULK FUEL STORAGE (2,500,000 L) FUTURE		–
73–TK–03	11	1	TANK–BULK FUEL STORAGE (10,000,000 L)		–
73–TK–04	12	1	TANK–BULK FUEL STORAGE (10,000,000 L) FUTURE		–
73–TK–05	13	1	TANK–BULK FUEL STORAGE (10,000,000 L) FUTURE		–
					–
					–
					–
					–
73–MO–01	19	1	FUEL OFFLOAD PUMP MODULE		
73–MO–02	26	1	FUEL TRANSFER PUMP MODULE		
73–TK–07	31	1	DAY TANK–GENERAL MLA FUEL DISPENSER (XXX,XXX L)		
73–PP–07/08	32	2	PUMP–GENERAL MLA FUEL DISPENSER		

SYMBOLS LEGEND

- FDO — MAIN PROCESS LINE (DIESEL OIL)
- FUTURE PIPING
- WEDGE GATE VALVE – NORMALLY OPEN
- WEDGE GATE VALVE – NORMALLY CLOSED
- BALL VALVE
- GLOBE VALVE
- CHECK VALVE
- F.C. — 2–POSITION CONTROL VALVE (FAIL CLOSED)
- F.C. — THROTTLING CONTROL VALVE (FAIL CLOSED)
- PRESSURE SAFETY RELIEF VALVE
- BACK PRESSURE CONTROL VALVE (SELF CONTAINED)
- PRESSURE REDUCING CONTROL VALVE
- FLOAT OPERATED OVERFLOW CUT–OFF VALVE
- FLANGE CONNECTION
- FLEXIBLE CONNECTOR – FLANGED

LINE No. DESIGNATION

AREA
LINE No.
SERVICE CODE
MATERIAL CODE
LINE SIZE (INCHES)
INSULATION SPEC.
NN–NNN–XXX–XXN–NN–XX(IF APPLICABLE)

- REDUCER – CONCENTRIC
- REDUCER (FLAT ON BOTTOM)
- GAUGE SEAL
- PUMP (CENTRIFUGAL OR PDP)
- M — FLOW METER
- BASKET STRAINER WITH AIR ELIMINATOR (VENTED)
- COARSE STRAINER
- FUEL DISPENSER

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MAY 23, 2019

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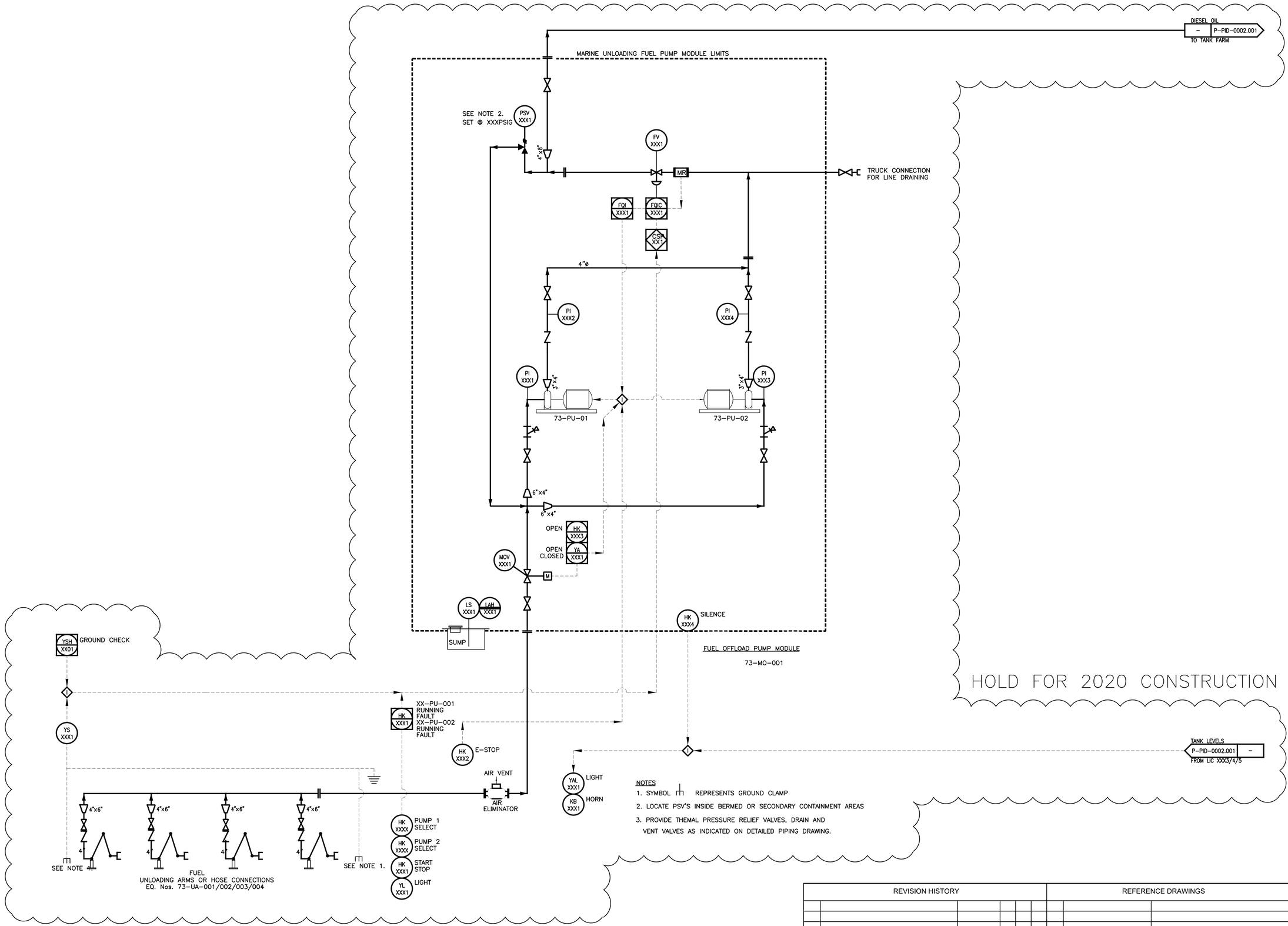
A	REVIEW	16MAY2019	CDB	MD				
REV NO.	ISSUED FOR	DATE	BY	APP	APP	REF NO.	DWG NO.	DWG TITLE

PROJECT NO.	DRAWN BY	DATE
219073	CDB	23MAY2019

BACK RIVER PROJECT
MARINE LAYDOWN AREA
FUEL STORAGE AND DIST. FLOWSHEET

SCALE	DRAWING NO.	REVISION
NTS	7310–P–PFD–0001.001	0



NOTES

1. SYMBOL ⏚ REPRESENTS GROUND CLAMP
2. LOCATE PSV'S INSIDE BERMED OR SECONDARY CONTAINMENT AREAS
3. PROVIDE THEMAL PRESSURE RELIEF VALVES, DRAIN AND VENT VALVES AS INDICATED ON DETAILED PIPING DRAWING.

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A	REVIEW	17MAY2019	CDB	MD				
REV NO.	ISSUED FOR	DATE	BY	APP	APP	REF NO.	DWG NO.	DWG TITLE

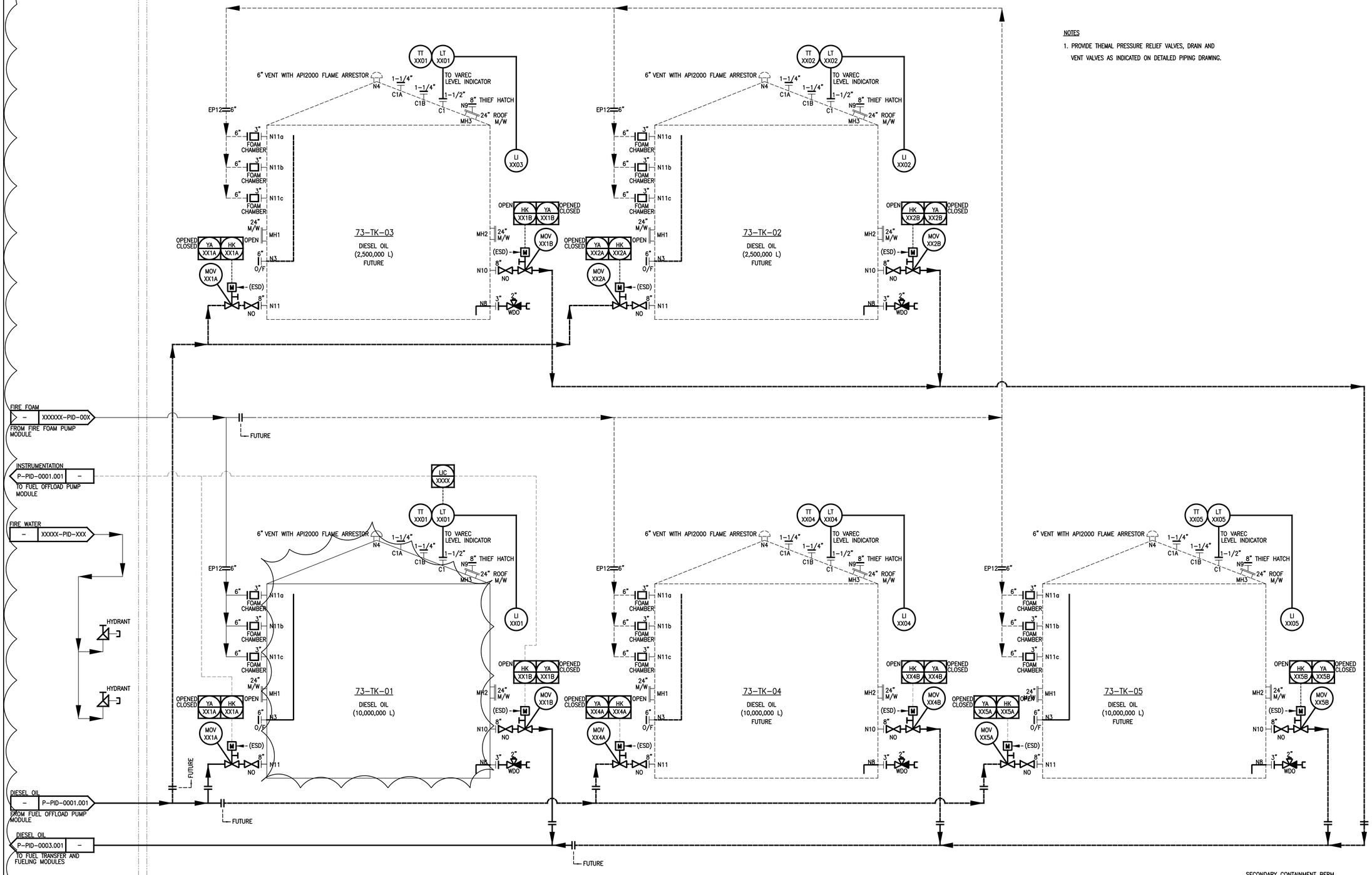
PROJECT NO.	DRAWN BY	DATE
219073	CDB	23MAY2019

BACK RIVER PROJECT
MARINE LAYDOWN AREA
FUEL PUMP OFFLOAD MODULE

SCALE	DRAWING NO.	REVISION
NTS	7310–P–PID–0001.001	0

NOTES

1. PROVIDE THEMAL PRESSURE RELIEF VALVES, DRAIN AND VENT VALVES AS INDICATED ON DETAILED PIPING DRAWING.



HOLD FOR 2020 CONSTRUCTION

REVISION HISTORY						REFERENCE DRAWINGS		
0	CONSTRUCTION	23MAY2019	CDB	MD				
A	REVIEW	17MAY2019	CDB	MD				
REV NO.	ISSUED FOR	DATE	BY	APP	APP	REF NO.	DWG NO.	DWG TITLE

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PROJECT NO.	DRAWN BY	DATE
219073	CDB	23MAY2019

BACK RIVER PROJECT
MARINE LAYDOWN AREA
TANK FARM

SCALE	DRAWING NO.	REVISION
NTS	7310-P-PID-0002.001	0

FUEL TRANSFER PUMP MODULE

SEE NOTE 2.
SET @ XXXPSIG
PSV XXXX

YSH XX01 GROUND CHECK
YS XXX1
SEE NOTE 1.
SEE NOTE 1.
BY VENDOR
FUEL TRANSFER TRUCK

HK XXXX XX-PU-001 RUNNING FAULT XX-PU-002 RUNNING FAULT
HK XXXX START STOP
YL XXXX LIGHT
HK XXXX E-STOP

CSP XXX
FQI XXXX
FQIC XXXX
FV XXXX
MR

OPEN HK XXXX
OPEN CLOSED YA XXXX
MOV XXXX M
PI XXXX

3"x4"
PI XXXX
73-PP-05
4"
6"x4"
8"x6"
8"x3"

DIESEL OIL
P-PID-0002.001
FROM TANK FARM

YSH XX01 GROUND CHECK
YS XXX1
SEE NOTE 1.
SEE NOTE 1.
BY VENDOR
FUEL TRANSFER TRUCK

HK XXXX XX-PU-001 RUNNING FAULT XX-PU-002 RUNNING FAULT
HK XXXX START STOP
YL XXXX LIGHT
HK XXXX E-STOP

CSP XXX
FQI XXXX
FQIC XXXX
FV XXXX
MR

OPEN HK XXXX
OPEN CLOSED YA XXXX
MOV XXXX M
PI XXXX

3"x4"
PI XXXX
73-PP-06
4"
6"x4"

SET @ XXXPSIG
SEE NOTE 2.
XXXX PSV

FUEL TRANSFER PUMP MODULE
73-MO-02

NOTES
1. SYMBOL ⏚ REPRESENTS GROUND CLAMP
2. LOCATE PSV'S INSIDE BERMED OR SECONDARY CONTAINMENT AREAS
3. PROVIDE THEMAL PRESSURE RELIEF VALVES, DRAIN AND VENT VALVES AS INDICATED ON DETAILED PIPING DRAWING.

E-STOP HK XXXX
HK XXXX START STOP
FQI XXXX
CSP XXX
FQIC XXXX
OPEN CLOSED YS XXXX
HV XXXX
BY VENDOR
S
MR
PI XXXX
LAH XXXX
LSL XXXX
LSH XXXX
73-PP-07/08
73-TK-07

LIGHT VEHICLE FUELING STATION

HOLD FOR 2020 CONSTRUCTION

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L3841
C.D. BLOUW
LICENSEE
NT/NU
MAY 23, 2019

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REV NO.	ISSUED FOR	DATE	BY	APP	APP	REF NO.	DWG NO.	DWG TITLE
0	CONSTRUCTION	23MAY2019	CDB	MD				
A	REVIEW	17MAY2019	CDB	MD				

PROJECT NO.	DRAWN BY	DATE
219073	CDB	23MAY2019

BACK RIVER PROJECT
MARINE LAYDOWN AREA
FUEL PUMP TRANSFER MODULE

SCALE	DRAWING NO.	REVISION
NTS	7310-P-PID-0003.001	0

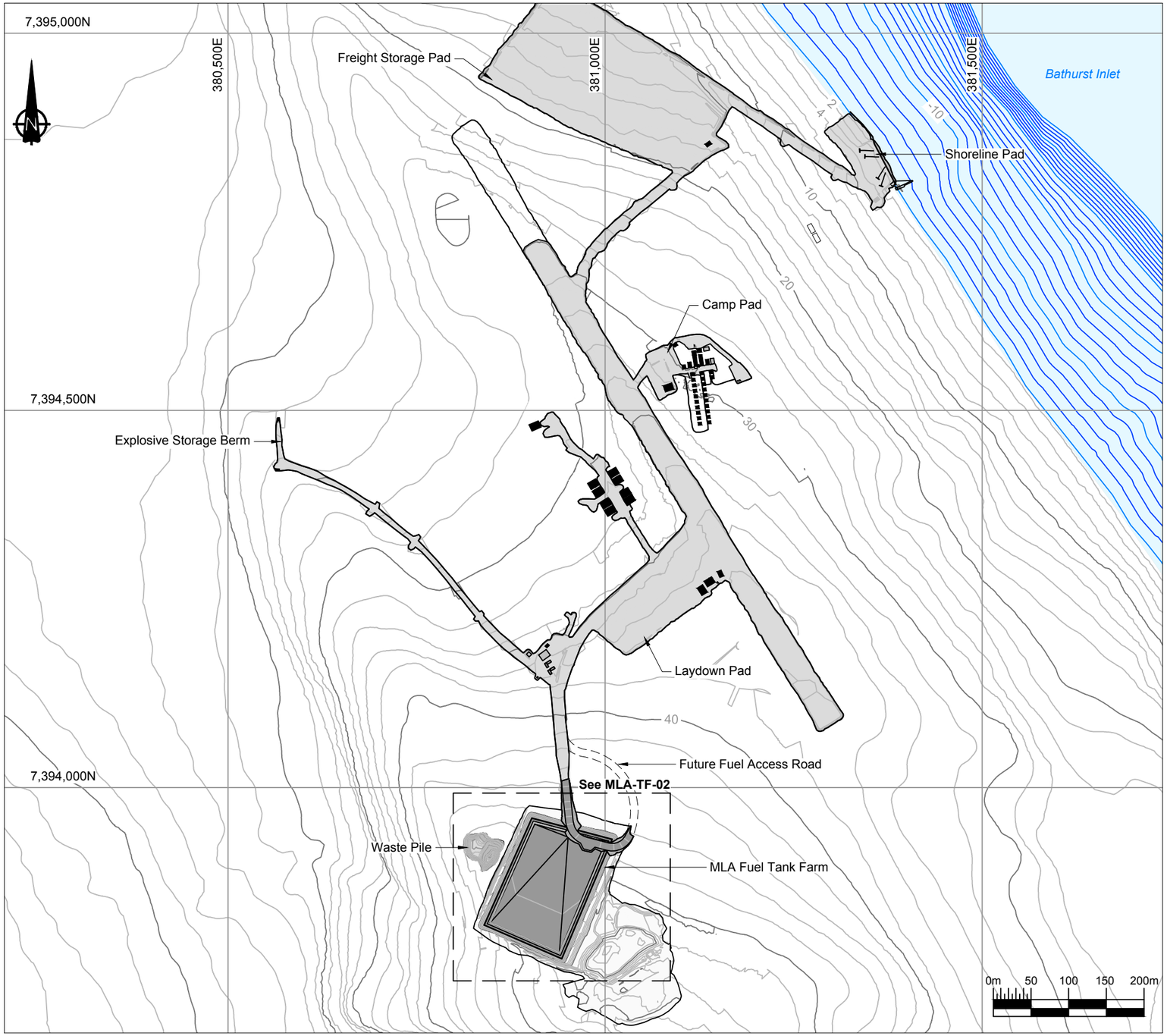
Sabina Gold & Silver Corp.

Back River - Marine Laydown Area

Engineering Drawings for the MLA Fuel Tank Farm

Drawing Number	Drawing Title	Issue	Date	Revision
MLA-TF-01	Fuel Tank Farm - General Arrangement	Issued for Construction	2019/05/24	0
MLA-TF-02	Plan Layout - Final Arrangement with Fuel Transfer Ramp	Issued for Construction	2019/05/24	0
MLA-TF-03	Foundation Preparation Plan Base Pad	Issued for Construction	2019/05/24	0
MLA-TF-04	Containment Berm Plan	Issued for Construction	2019/05/24	0
MLA-TF-05	Liner Subgrade Plan	Issued for Construction	2019/05/24	0
MLA-TF-06	Subgrade Sections and Details	Issued for Construction	2019/05/24	0
MLA-TF-07	Final Layout Plan - Without Ramp	Issued for Construction	2019/05/24	0
MLA-TF-08	Sections and Details - Sheet 1	Issued for Construction	2019/05/24	0
MLA-TF-09	Typical Cross Sections and Access Ramp Profile	Issued for Construction	2019/05/24	0
MLA-TF-10	Sections and Details - Sheet 2	Issued for Construction	2019/05/24	0
MLA-TF-11	Final Arrangement Survey Layout Points	Issued for Construction	2019/05/24	0

srk consulting



LEGEND

Fuel Tank Farm Area

2018 MLA As-Built

NOTES

1. Regional topographic contour data for the terrain model was provided by the Owner (Sabina). The shown design topography is based on available LiDAR information and the provided August 2018 as-built information. See Reference for additional details on the data sources.
2. Contour intervals are shown at 2m on this figure.
3. All drawings are scaled appropriately for B-size construction drawings. Scales may not be correct if these drawings are reproduced and presented in other size formats.
4. Construction is expected be in accordance with latest site Technical Specifications - with any variations approved and documented by the Engineer. See the latest Issued For Construction (IFC) "Earthworks and Geotechnical Engineering - Back River Gold Project, Nunavut, Canada" document for more details.
5. Typical details are not to scale (NTS) unless specifically mentioned.
6. These works must be executed in accordance with the standard Sabina health and safety, and environmental standards and protocols. It is the Contractors responsibility to familiarize themselves with these documents.
7. The Contractor and Construction Manager shall familiarize themselves with all appropriate Licenses and / or Permits pertaining to the execution of the Works.
8. The scope of work, for this drawing package, is specifically is focused on the earthwork components of the MLA Tank Farm areas only. No other pads or roads have been looked at or designed by SRK. These drawings exclude all electrical and mechanical elements.
9. Before any construction is carried out on site a geotechnical Engineer (or Engineers' representative) need to visit site and confirm the foundation conditions are bedrock, specifically important below the planned tank locations. Proceeding with construction, as noted on this IFC drawing, is contingent on the Engineer conducting a physical inspection of the foundation conditions to confirm that the facility will be founded on a competent bedrock foundation as opposed to unconsolidated fill, frozen sand, or overburden. Construction may only proceed with written approval from the Engineer.
10. All dimensioned are in meters unless otherwise stated.
11. Notes on this drawing apply to all other drawings in this issue / package.

REFERENCE

- Coordination system: NAD83 UTM Zone 13.
- Base topographic contours generated from data provided by Sabina Gold and Silver Corp. File name: *'bathurst_inlet_1m_dem_tile26 to tile39.xyz'*, dated 2012-20-13.
- Available bathymetric data (blue contours) provided by Sabina on 2018/04/19. File name: *BathymetryBathurst.dwg*. This data set was collected by ERM (formerly Rescan).
- As-Built Shoreline Pad survey provided by Sabina. File name: *Site 180818MLA Jetty.dwg, dated* 2018-08-18
- As-Built Quarry survey provided by Sabina May 8, 2019. File name: *CAB180818 Quarry.dwg, dated* 2018-08-18
- As-Built data for existing earthworks (pads and roads) and building and infrastructures provided by Sabina May 8, 2019. File name: *Site 180818MLA Status map.dwg*, *dated* 2018-08-18

MATERIALS LIST AND QUANTITIES

Item	Volume or Area	
Crush Material (above and below liner) See 'Surfacing Material' in the Tech Specs	Underliner	9,690m³
	Overliner	9,870m³
	Total	**19,560m³**
Levelling Material See 'Transition Material' description in the Tech Specs	Base Pad	15,110m³
	Access Ramp	3,010m³
	Total	**18,120m³**
Rockfill (Run of Quarry - ROQ)	Berms (bulk fill)	8,750m³
Geotextile: Non-woven Needle Punched LP16 or Propex Geotext 1601 or equivalent	Above and Below HDPE	36,300m²
Liner: HDPE Textured 60mil (~1.5mm thick) or equivalent	Main liner element	18,150m³

1. All reported volumes are calculated to neat lines. No bulking / shrinking factors or potential settlement losses have been utilized in the volume determination.
2. Areas do not account for overlaps, excess required for installation, or for any deviations from the neat design lines. For the liner quantities an allowance of at least 20% is suggested.
3. All volumes derived from AutoCAD Civil 3D 2018.
4. Note that the materials outlines above should be checked against the Technical Specification and or should get written approval from the engineer to confirm suitability.
5. The required crushed quantities required for the tank pedestals not shown / included in the current design.

REFERENCE DRAWINGS		REVISIONS									
DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
MLA-TF-11	Final Arrangement Survey Layout Points										
MLA-TF-10	Sections and Details - Sheet 2										
MLA-TF-09	Typical Cross Sections and Access Ramp Profile										
MLA-TF-08	Sections and Details - Sheet 1						0	Issued for Construction	RW	JBK	19/05/24
MLA-TF-02	Plan Layout - Final Arrangement with Fuel Transfer Ramp	- -	- -	- -	- -	- -	A	Issued for Permit	RW	JBK	19/05/23

Original Drawings Stamped and Signed by Engineer

This drawing is uncontrolled when printed unless stamped / certified in accordance with the requirements of the applicable jurisdiction and recorded on a Distribution Register.

PROFESSIONAL ENGINEERS STAMP

srk consulting

DESIGN:	DRAWN:	REVIEWED:
JBK	TH	VB
CHECKED:	APPROVED:	DATE:
RW	JBK	2019/05/24

FILE NAME: 1CS020.017 - GA.dwg

Sabina GOLD & SILVER CORP.

Back River Project

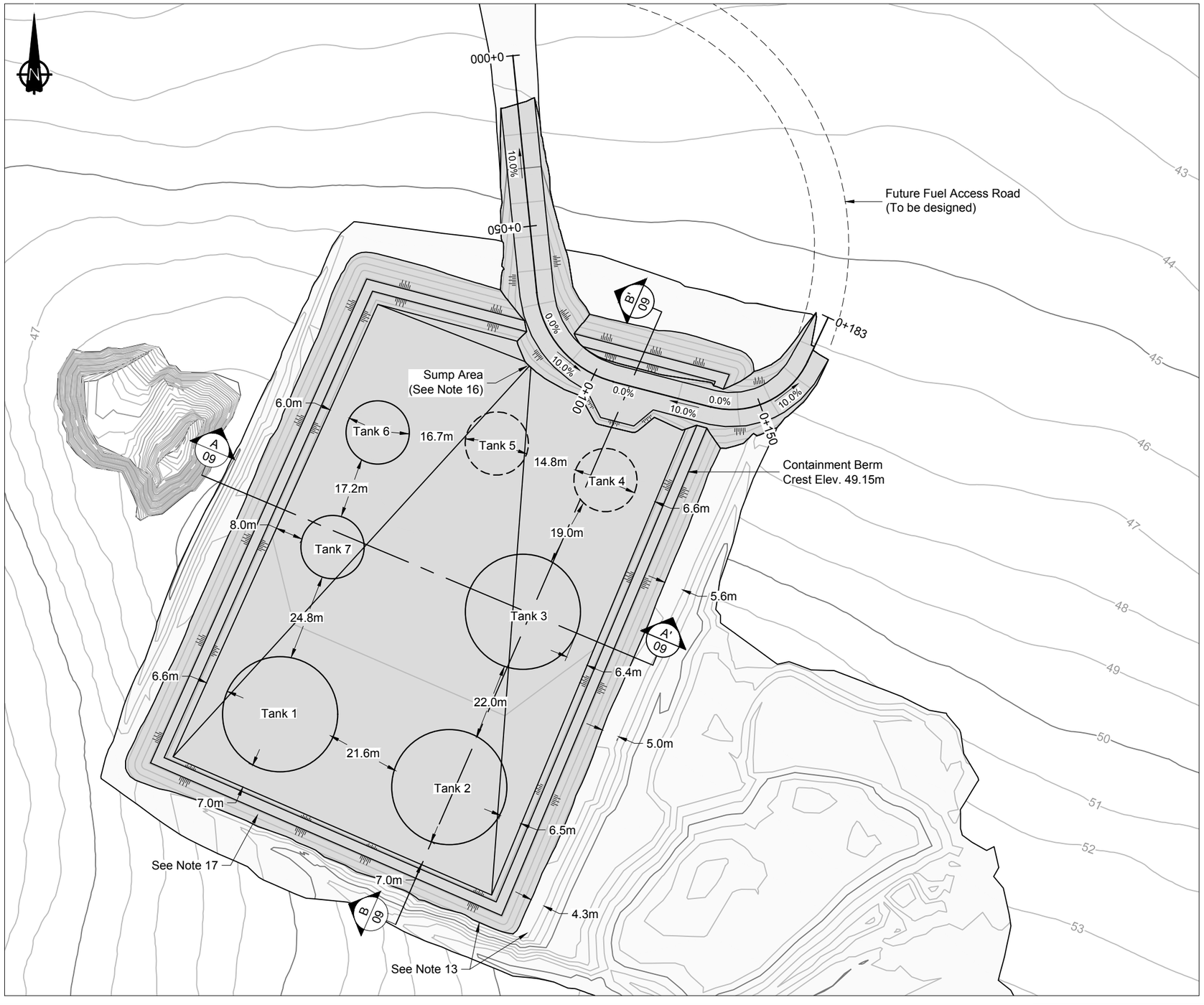
SRK JOB NO.: 1CS020.017

Marine Laydown Area

DRAWING TITLE: Fuel Tank Farm - General Arrangement

DRAWING NO.	SHEET	REVISION NO.
MLA-TF-01	1 OF 11	0

P:\01_SITES\Back River\040_AutoCAD\Marine Laydown Area\IFC\Tank Farm\Rev 0\1CS020.017 - GA.dwg



LEGEND

Fuel Tank Farm Area - Final Layout

NOTES

1. Contour intervals are shown at 1m on this figure.
2. Original ground to be re-surveyed on site (at the quarry) prior to construction of the MLA Fuel Tank Farm. This would be done to confirm the design thicknesses, arrangement and geometry presented in these IFC drawings.
3. The MLA Fuel Tank Farm is to be constructed on a thin graded engineered fill pad that is constructed immediately over an intact bedrock surface. This foundation pad should be generally sloping from the South to North to help promote better drainage of surface water.
4. The Contractor shall aim to ensure that the blasted floor has some form of natural drainage to minimize the potential for ponding water.
5. Tanks 1, 2 and 3 are all expected to be 10ML tanks that will be designed and constructed by Others. At this time only one 10ML tank is expected to be erected in 2019 (with the remaining tanks to be erected in future years).
6. Tanks 6 and 7 are expected to be 2.5ML tanks that will also be designed and constructed by Others.
7. At the time of this drawing issue, the Owner (Sabina) was unsure as to if Tanks 4 and 5 would be constructed as two 2.5ML tanks or as one 5ML tank. This will be determined at a later date by the Owner. To provide flexibility the current MLA Tank Farm arrangement has been sized to accommodate either of these option in the northeast corner of the bunded area (i.e. could accommodate two 2.5ML tanks or one 5ML tank around the Tanks 4 and 5 area). The Engineer should be notified when the decision on the tank size for this final 5ML of fuel storage is constrained. Checks can then be done to provide final confirmation that the current bund design is suitable.
8. The grounding of the tanks will be designed and installed by Others.
9. All tanks will only be operational once the appropriate regulatory approvals have been put in place.
10. The owner will install appropriate signage and barricades to prevent a vehicle access within the secondary containment area (bunded area). Once fully constructed the primary access will be only over the designed fuel transfer ramp.
11. The MLA Fuel Tank Farm Design (including tank spacing and containment volume) is based on, an meets the standards from the Canadian Council of Ministers of Environment (CCME), National Fire Code of Canada (2015) and the Sabina Gold and Silver Corporation Environmental Standards.
12. All drawings should be read in conjunction with the latest IFC technical specifications document ('Technical Specifications Earthworks and Geotechnical Engineering - Back River Gold Project, Nunavut, Canada - Issued for Construction').
13. Rockfall safety measures such as rock bolts and mesh may be required pending the final surface of the bedrock highwall. An inspection by the Engineer / an Engineers' representative to inspect and map the quarry highwall should be complete. In consultation with the Owner, proper safety measures should be implemented at or around the high wall. As a preliminary measure a slight offset has been left from the top of the containment berm (bund) crest and the largest highwall to allow for a small 'catch bench' area to be formed.
14. If permafrost / overburden is exposed during any quarry development activities (drilling, blasting ad excavation) then standard procedures of constructing a minimum 1m thick thermal insulating cover shall be implement (e.g. at areas such as at the top of the highwall excavation).
15. Before any cranes are used on site (such as within the bunded areas to help place or erect the tanks), calculations should be complete to check that the crane loads are adequately spread as to not negatively impact / damage the underlying HDPE liner.
16. Proceeding with construction, as noted on this IFC drawing, is contingent on the Engineer conducting a physical inspection of the foundation conditions to confirm that the facility will be founded on a competent bedrock foundation as opposed to unconsolidated fill, frozen sand, or overburden. Construction may only proceed with written approval from the Engineer. All dimensioned are in meters unless otherwise stated.
17. Notes on this drawing apply to all other drawings in this issue / package.

REFERENCES

- Coordination system: NAD83 UTM Zone 13.
- Base topographic contours generated from data provided by Sabina Gold and Silver Corp. File name: *'bathurst_inlet_1m_dem_tile26 to tile39.xyz'*, dated 2012-20-13.
- As-Built Quarry survey provided by Sabina May 8, 2019. File name: *CAB180818 Quarry.dwg, dated* 2018-08-18

0m 10 20 30 40 50

REFERENCE DRAWINGS		REVISIONS									
DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
MLA-TF-11	Final Arrangement Survey Layout Points										
MLA-TF-10	Sections and Details - Sheet 2										
MLA-TF-09	Typical Cross Sections and Access Ramp Profile										
MLA-TF-08	Sections and Details - Sheet 1						0	Issued for Construction	RW	JBK	19/05/24
MLA-TF-02	Plan Layout - Final Arrangement with Fuel Transfer Ramp	- -	- -	- -	- -	- -	A	Issued for Permit	RW	JBK	19/05/23

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RW	JBK	2019/05/24

FILE NAME: 1CS020.017 - Site LO.dwg

Sabina GOLD & SILVER CORP

Back River Project

SRK JOB NO.: 1CS020.017

Marine Laydown Area

DRAWING TITLE:
Plan Layout - Final Arrangement with Fuel Transfer Ramp

DRAWING NO.	SHEET	REVISION NO.
MLA-TF-02	2 OF 11	0

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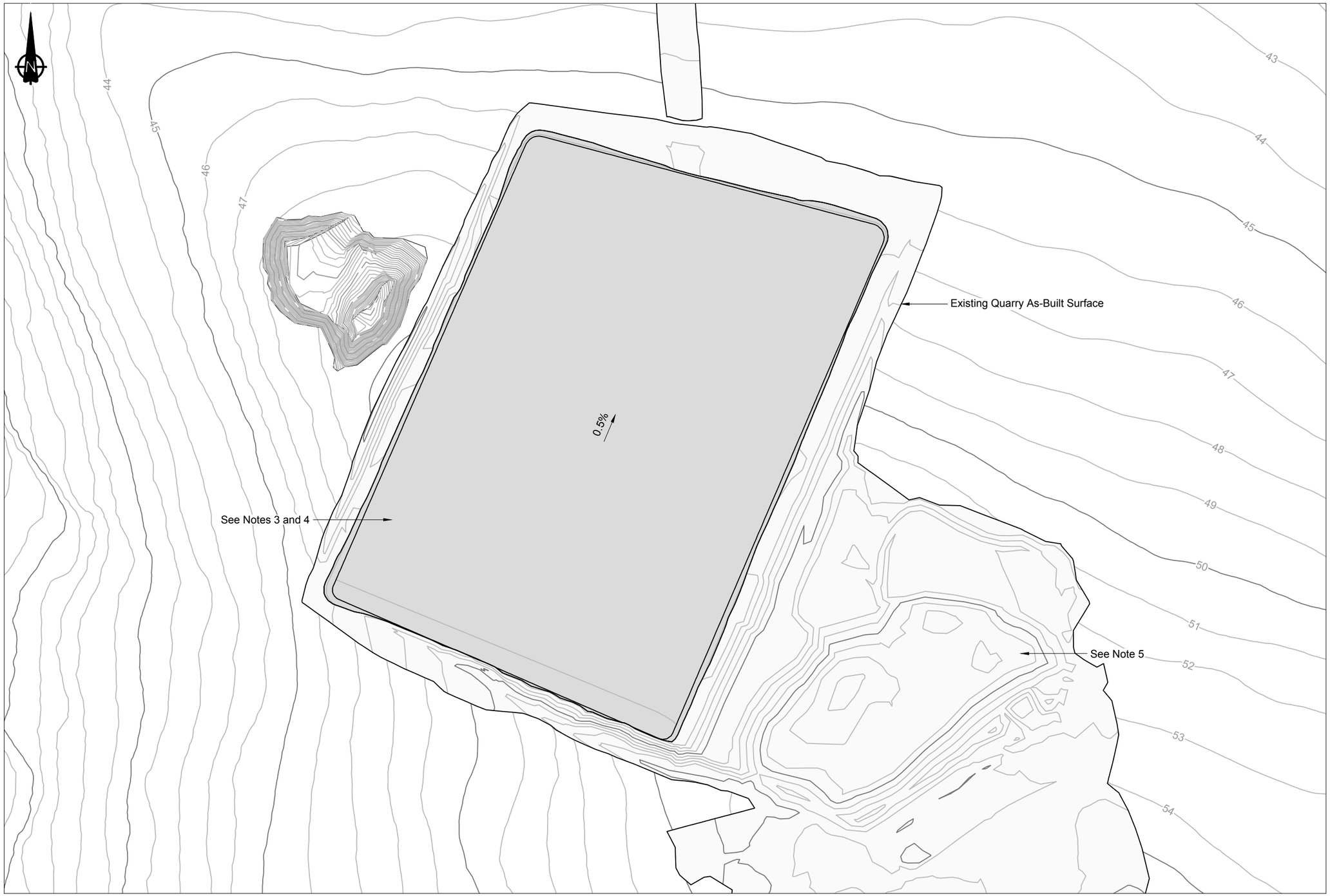

LEGEND

Fuel Tank Farm - Foundation Base

NOTES

1. Contour intervals are shown at 1m on this figure.
2. The MLA Fuel Tank Farm is to be constructed on a thin graded engineered fill pad that is constructed immediately over an intact bedrock surface. Generally, this foundation pad should be sloping from the South to North to help promote better drainage of surface water.
3. All blasted material shall be excavated to the exposed intact rock surface for the survey and approval from the Engineer.
1. Before any construction (before the foundation preparation pad is constructed) the Engineer (or engineers' representative) must inspect the blasted quarry foundation to confirm that the foundation conditions are in fact bedrock. Proceeding with construction, as noted on this IFC drawing, is contingent on the Engineer conducting a physical inspection of the foundation conditions to confirm that the facility will be founded on a competent bedrock foundation as opposed to unconsolidated fill, frozen sand, or overburden. Construction may only proceed with written approval from the Engineer. All dimensioned are in meters unless otherwise stated.
4. The stability of stockpiles above the highwall should be checked to ensure that these piles are stable and that a failure of these piles would not negatively impact the tanks / tank farm area. If stockpile are to remain long term above the tank farm areas then a stockpile management plant should be developed.
5. All dimensioned are in meters unless otherwise stated.
6. Notes on this drawing apply to all other drawings in this issue / package.

REFERENCES

- Coordination system: NAD83 UTM Zone 13.
- Base topographic contours generated from data provided by Sabina Gold and Silver Corp. File name: *'bathurst_inlet_1m_dem_tile26 to tile39.xyz'*, dated 2012-20-13.
- As-Built Quarry survey provided by Sabina May 8, 2019. File name: *CAB180818 Quarry.dwg, dated* 2018-08-18

0m 10 20 30 40 50

REFERENCE DRAWINGS		REVISIONS								
DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
MLA-TF-06	Subgrade Sections and Details						0	Issued for Consturction	RW	JBK	19/05/24
MLA-TF-04	Containment Berm Plan (Bulk Fill)	- -	- -	- -	- -	- -	A	Issued for Permit	RW	JBK	19/05/23

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FILE NAME: 1CS020.017 - Foundation Prep.dwg

Sabina GOLD & SILVER CORP

Back River Project

SRK JOB NO.: 1CS020.017

Marine Laydown Area

DRAWING TITLE:

Foundation Preparation Plan
Base Pad

DRAWING NO.	SHEET	REVISION NO.
MLA-TF-03	3 OF 11	0

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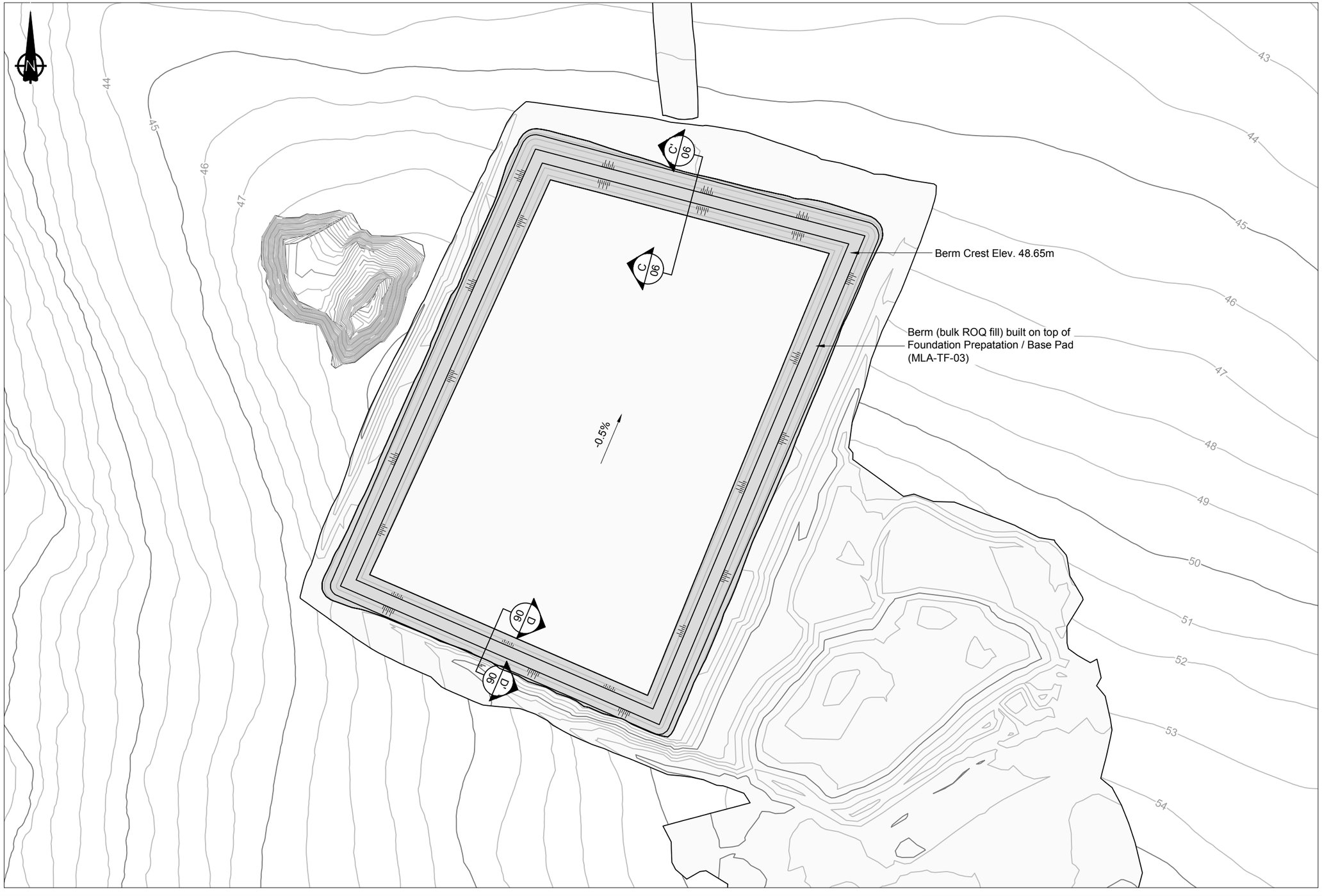

LEGEND

Fuel Tank Farm - Berm

NOTES

1. Contour intervals are shown at 1m on this figure.
2. All dimensioned are in meters unless otherwise stated.
3. Proceeding with construction, as noted on this IFC drawing, is contingent on the Engineer conducting a physical inspection of the foundation conditions to confirm that the facility will be founded on a competent bedrock foundation as opposed to unconsolidated fill, frozen sand, or overburden. Construction may only proceed with written approval from the Engineer. All dimensioned are in meters unless otherwise stated.
4. Notes on this drawing apply to all other drawings in this issue / package.

REFERENCES

- Coordination system: NAD83 UTM Zone 13.
- Base topographic contours generated from data provided by Sabina Gold and Silver Corp. File name: *'bathurst_inlet_1m_dem_tile26 to tile39.xyz'*, dated 2012-20-13.
- As-Built Quarry survey provided by Sabina May 8, 2019. File name: *CAB180818 Quarry.dwg, dated* 2018-08-18

0m 10 20 30 40 50

REFERENCE DRAWINGS		REVISIONS								
DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
MLA-TF-06	Subgrade Sections and Details						0	Issued for Construction	RW	JBK	19/05/24
MLA-TF-03	Foundation Preparation Plan Base Pad	--	--	--	--	--	A	Issued for Permit	RW	JBK	19/05/23

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JBK	TH	VB
CHECKED:	APPROVED:	DATE:
RW	JBK	2019/05/24

FILE NAME: 1CS020.017 - Liner Subgrade.dwg

Sabina GOLD & SILVER CORP.

Back River Project

SRK JOB NO.: 1CS020.017

Marine Laydown Area

DRAWING TITLE: Containment Berm Plan (Bulk Fill)

DRAWING NO.	SHEET	REVISION NO.
MLA-TF-04	4 OF 11	0

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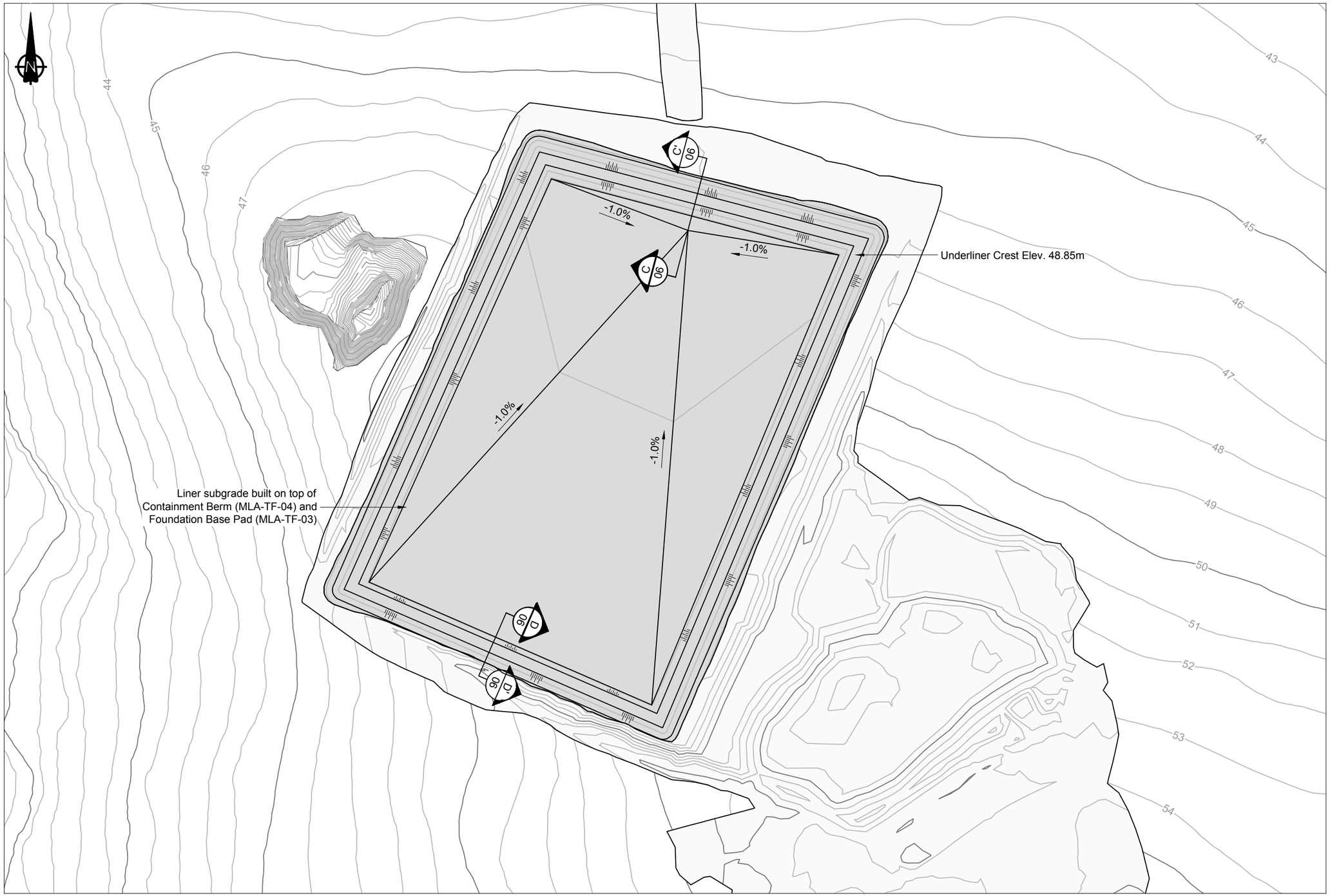

LEGEND

Fuel Tank Farm - Underliner Material

NOTES

1. Contour intervals are shown at 1m on this figure.
2. All dimensioned are in meters unless otherwise stated.
3. Proceeding with construction, as noted on this IFC drawing, is contingent on the Engineer conducting a physical inspection of the foundation conditions to confirm that the facility will be founded on a competent bedrock foundation as opposed to unconsolidated fill, frozen sand, or overburden. Construction may only proceed with written approval from the Engineer. All dimensioned are in meters unless otherwise stated.
4. Notes on this drawing apply to all other drawings in this issue / package.

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- As-Built Quarry survey provided by Sabina May 8, 2019. File name: *CAB180818 Quarry.dwg, dated* 2018-08-18

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REFERENCE DRAWINGS		REVISIONS								
DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
MLA-TF-06	Subgrade Sections and Details										
MLA-TF-04	Containment Berm Plan (Bulk Fill)						0	Issued for Construction	RW	JBK	19/05/24
MLA-TF-03	Foundation Preparation Plan Base Pad	- -	- -	- -	- -	- -	A	Issued for Permit	RW	JBK	19/05/23

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FILE NAME: 1CS020.017 - Liner Subgrade.dwg

Sabina GOLD & SILVER CORP.

Back River Project

SRK JOB NO.: 1CS020.017

Marine Laydown Area

DRAWING TITLE: Liner Subgrade Plan

DRAWING NO.	SHEET	REVISION NO.
MLA-TF-05	5 OF 11	0

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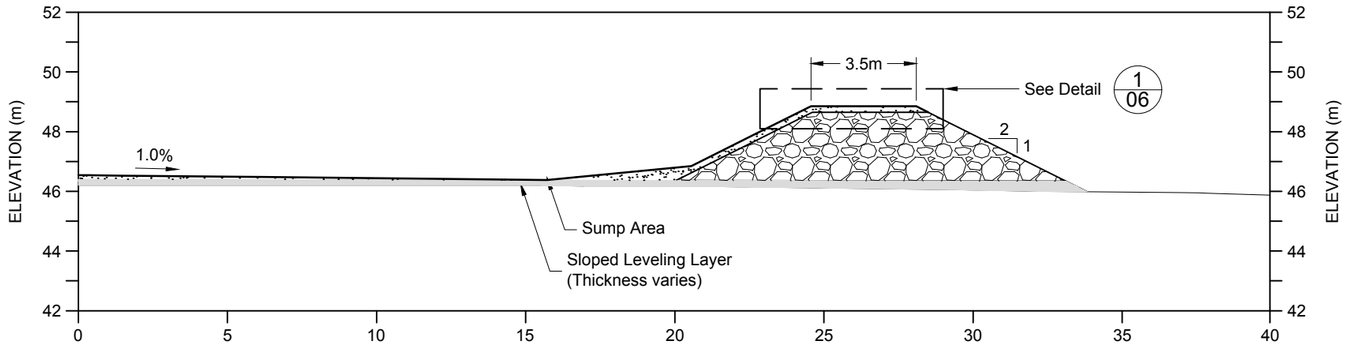
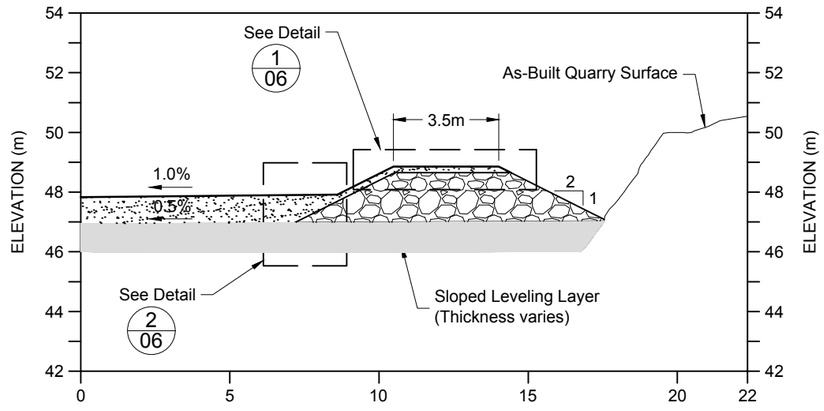


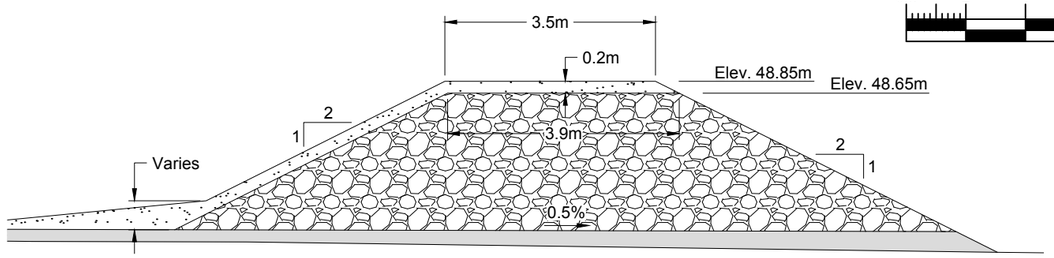
C 04,05 **Cross Section C-C'**

0m 2 4 6 8



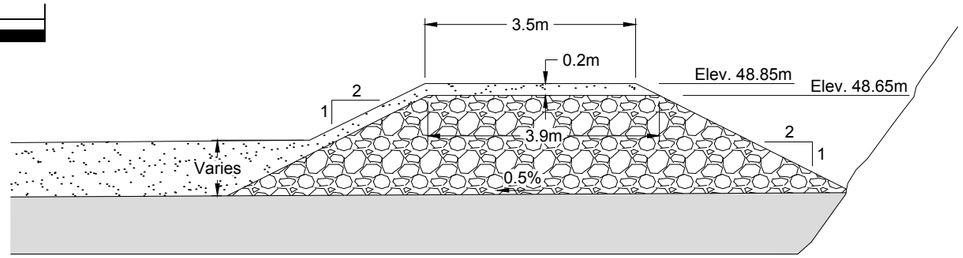
D 04,05 **Cross Section D-D'**

0m 2 4 6 8



1/06 **Detail 1 -**

0m 1 2 3 4



2/06 **Detail 2 -**

0m 1 2 3 4

LEGEND

- Crushed Rock (underliner / surfacing)
- Leveling Layer (transition)
- Rockfill (ROQ)

NOTES

1. All dimensioned are in meters unless otherwise stated.
2. Proceeding with construction, as noted on this IFC drawing, is contingent on the Engineer conducting a physical inspection of the foundation conditions to confirm that the facility will be founded on a competent bedrock foundation as opposed to unconsolidated fill, frozen sand, or overburden. Construction may only proceed with written approval from the Engineer. All dimensioned are in meters unless otherwise stated.
3. Notes on this drawing apply to all other drawings in this issue / package.

DRAWING NO.	DRAWING TITLE
MLA-TF-05	Liner Subgrade Plan
MLA-TF-04	Containment Berm Plan (Bulk Fill)
MLA-TF-03	Foundation Preparation Plan Base Pad

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
- -	- -	- -	- -	- -

NO.	DESCRIPTION	CHK'D	APP'D	DATE
0	Issued for Construction	RW	JBK	19/05/24
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RW	JBK	2019/05/24

FILE NAME: 1CS020.017 - Liner Subgrade.dwg

Sabina GOLD & SILVER CORP.

Back River Project

SRK JOB NO.: 1CS020.017

Marine Laydown Area

DRAWING TITLE:

Subgrade Sections and Details

DRAWING NO.	SHEET	REVISION NO.
MLA-TF-06	6 OF 11	0

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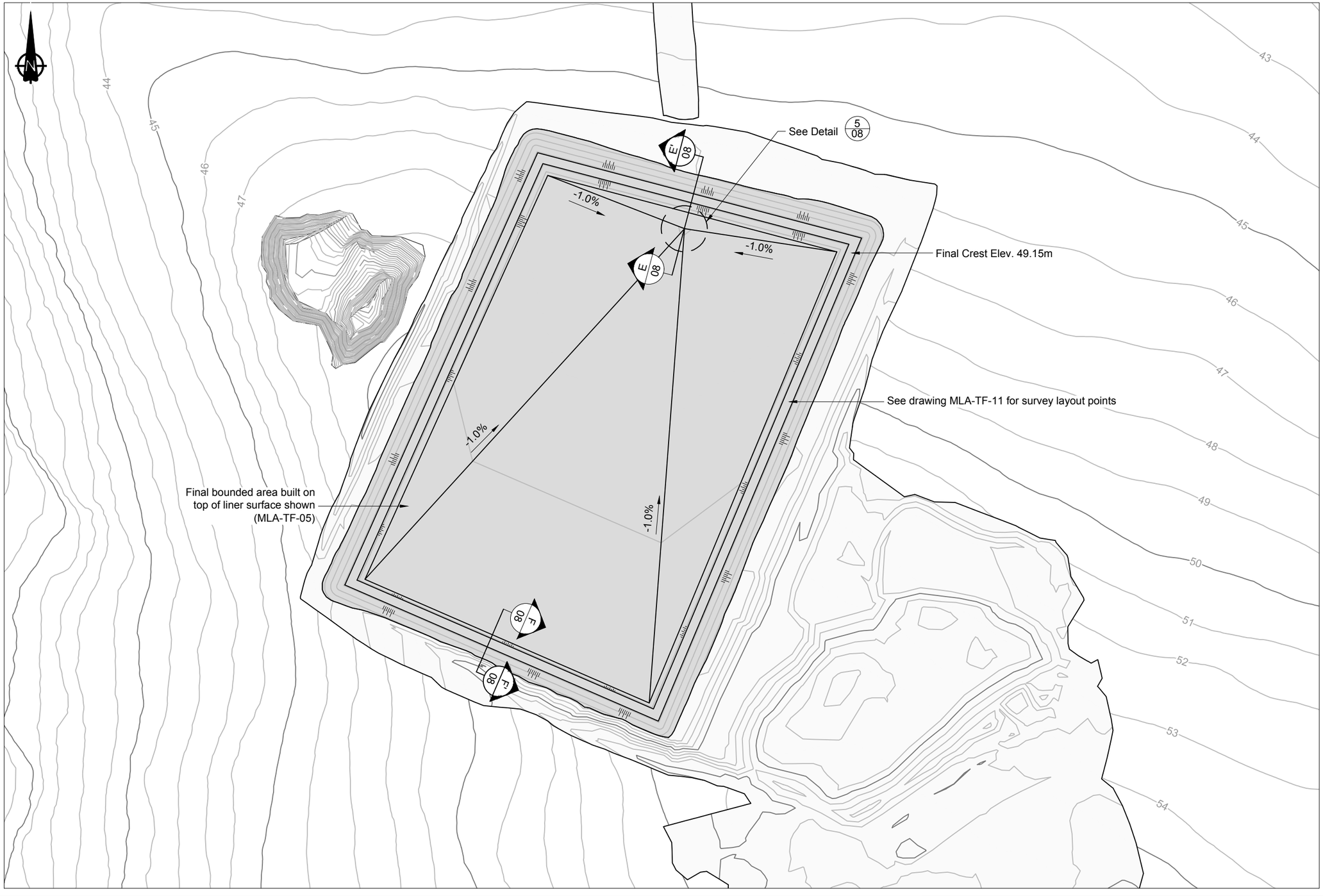

LEGEND

Fuel Tank Farm - Overliner Material

NOTES

1. Contour intervals are shown at 1m on this figure.
2. All dimensions are in meters unless otherwise stated.
3. Notes on this drawing apply to all other drawings in this package.

REFERENCES

- Coordination system: NAD83 UTM Zone 13.
- Base topographic contours generated from data provided by Sabina Gold and Silver Corp. File name: *'bathurst_inlet_1m_dem_tile26 to tile39.xyz'*, dated 2012-20-13.
- As-Built Quarry survey provided by Sabina May 8, 2019. File name: *CAB180818 Quarry.dwg, dated* 2018-08-18

0m 10 20 30 40 50

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DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
MLA-TF-11	Final Arrangement Survey Layout Points					
MLA-TF-08	Sections and Details - Sheet 1					
MLA-TF-05	Liner Subgrade Plan	--	--	--	--	--

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
0	Issued for Construction	RW	JBK	19/05/24
A	Issued for Permit	RW	JBK	19/05/23

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RW	JBK	2019/05/24

FILE NAME: 1CS020.017 - Final Layout.dwg

Sabina GOLD & SILVER CORP.

Back River Project

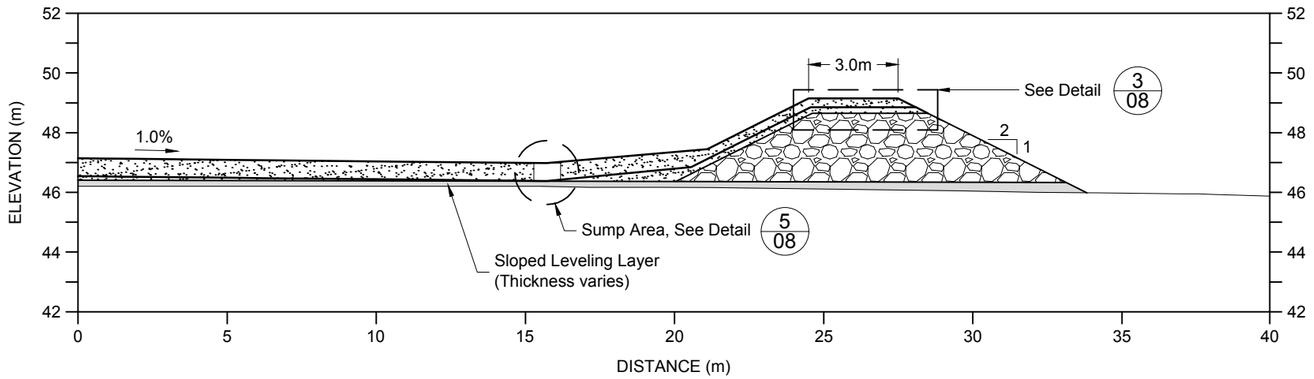
SRK JOB NO.: 1CS020.017

Marine Laydown Area

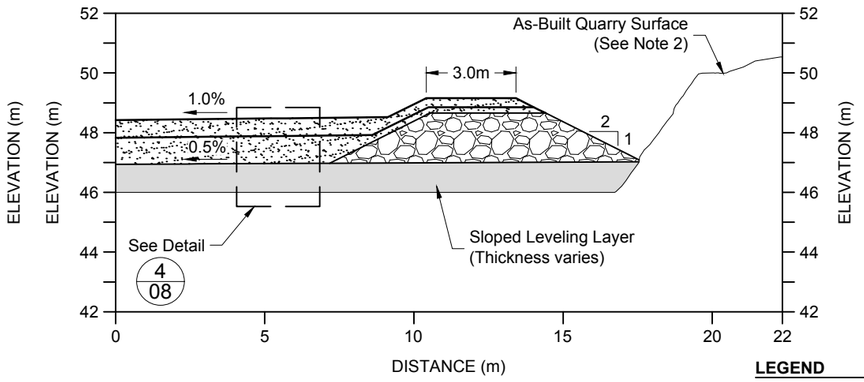
DRAWING TITLE:

Final Layout Plan - Without Ramp

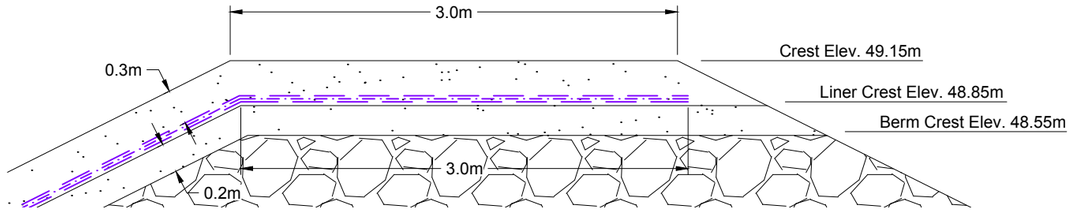
DRAWING NO.	SHEET	REVISION NO.
MLA-TF-07	7 OF 11	0



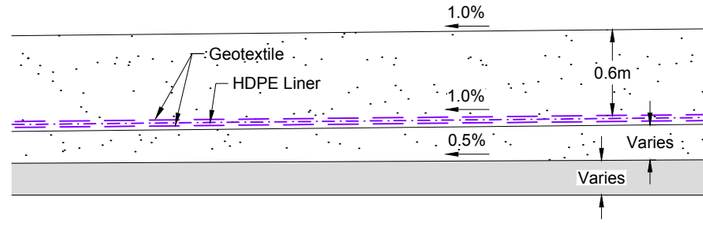
D/07 **Cross Section D-D'**



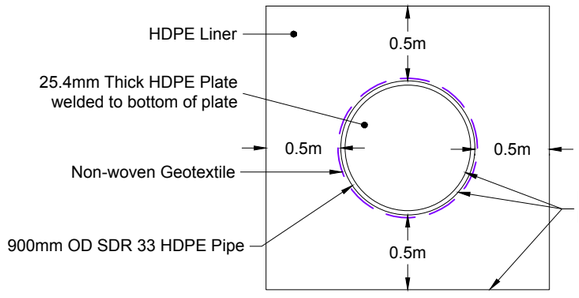
E/07 **Cross Section E-E'**

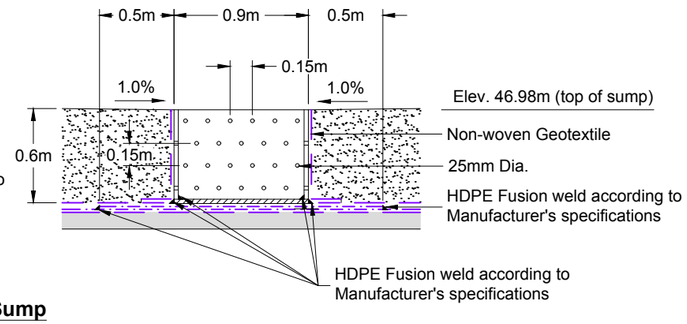


3/08 **Typical Detail 3 - Final Tank Farm Berm Crest & Slope**



4/08 **Typical Detail 4 - Final Tank Farm Base**





5/07,08 **Detail 5 - Typical Sump**

LEGEND

- Geotextile (non-woven)
- HDPE Liner
- Crushed Rock (above / below liner)
- Leveling Layer (transition)
- Rockfill (ROQ)

NOTES

1. All dimensioned are in meters unless otherwise stated.
2. Rockfall safety measures such as rock bolts and mesh may be required pending the final surface of the bedrock highwall. In consultation with the Owner, proper safety measures should be implemented at or around the high wall.
3. Proceeding with construction, as noted on this IFC drawing, is contingent on the Engineer conducting a physical inspection of the foundation conditions to confirm that the facility will be founded on a competent bedrock foundation as opposed to unconsolidated fill, frozen sand, or overburden. Construction may only proceed with written approval from the Engineer. All dimensioned are in meters unless otherwise stated.
4. Notes on this drawing apply to all other drawings in this issue / package.

REFERENCE DRAWINGS		REVISIONS									
MLA-TF-11	Final Arrangement Survey Layout Points										
MLA-TF-10	Sections and Details - Sheet 2										
MLA-TF-09	Typical Cross Sections and Access Ramp Profile										
MLA-TF-05	Liner Subgrade Plan										
MLA-TF-02	Plan Layout - Final Arrangement with Fuel Transfer Ramp	- -	- -	- -	- -	- -	0	Issued for Construction	RW	JBK	19/05/24
DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE	NO.	DESCRIPTION	CHK'D	APP'D	DATE

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FILE NAME: 1CS020.017 - Final Layout.dwg

Sabina GOLD & SILVER CORP.

Back River Project

SRK JOB NO.: 1CS020.017

Marine Laydown Area

DRAWING TITLE:

Sections and Details - Sheet 1

DRAWING NO.	SHEET	REVISION NO.
MLA-TF-08	8 OF 11	0

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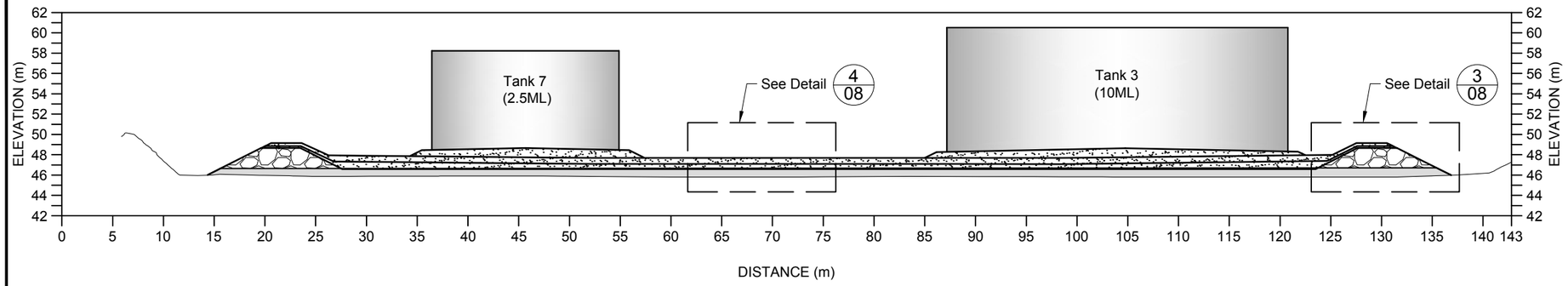


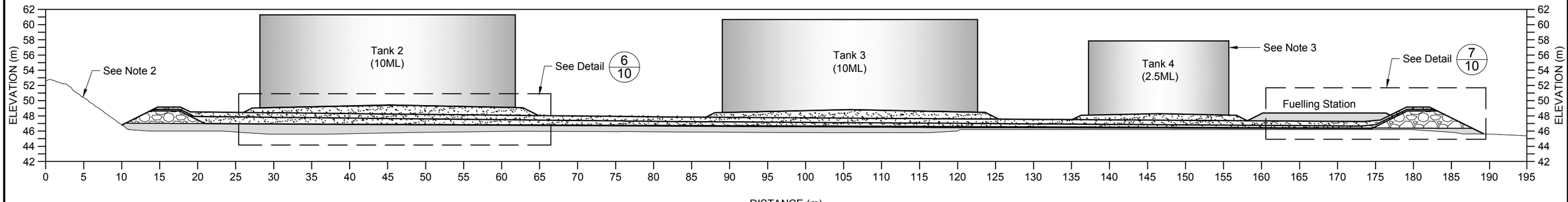
A/02 **Cross Section A-A'**

LEGEND

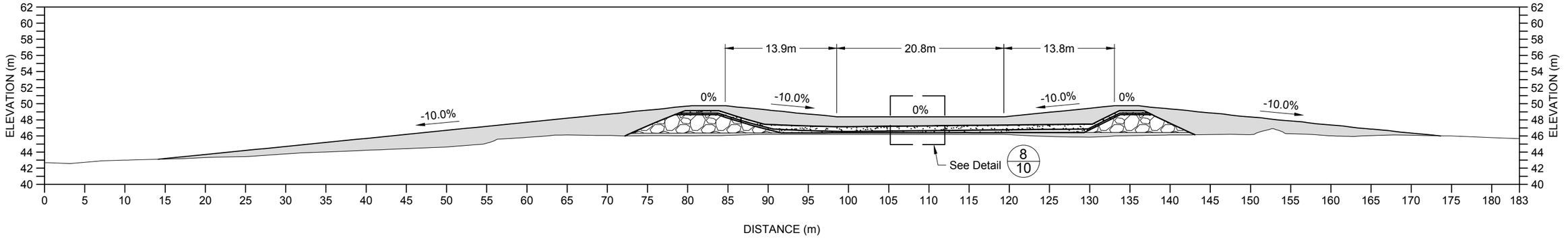
- Geotextile (non-woven)
- HDPE Liner
- Crushed Rock (above / below liner)
- Leveling Layer (transition)
- Rockfill (ROQ)

NOTES

1. All dimensioned are in meters unless otherwise stated.
2. Rockfall safety measures such as rock bolts and mesh may be required pending the final surface of the bedrock highwall. In consultation with the Owner, proper safety measures should be implemented at or around the high wall.
3. Proceeding with construction, as noted on this IFC drawing, is contingent on the Engineer conducting a physical inspection of the foundation conditions to confirm that the facility will be founded on a competent bedrock foundation as opposed to unconsolidated fill, frozen sand, or overburden. Construction may only proceed with written approval from the Engineer. All dimensioned are in meters unless otherwise stated.
4. Notes on this drawing apply to all other drawings in this issue / package.



B/02 **Cross Section B-B'**



Fuelling Transfer Access Ramp Profile

0m 5 10 15 20

DRAWING NO.	DRAWING TITLE
	Final Arrangement Survey Layout Points
MLA-TF-11	Sections and Details - Sheet 2
MLA-TF-10	Typical Cross Sections and Access Ramp Profile
MLA-TF-08	Sections and Details - Sheet 1
MLA-TF-02	Plan Layout - Final Arrangement with Fuel Transfer Ramp

REFERENCE DRAWINGS

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- -	- -	- -	- -	- -

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FILE NAME: 1CS020.017 - Site LO.dwg

Sabina GOLD & SILVER CORP.

Back River Project

SRK JOB NO.: 1CS020.017

Marine Laydown Area

DRAWING TITLE: Typical Cross Sections and Access Ramp Profile

DRAWING NO. MLA-TF-09 | SHEET 9 OF 11 | REVISION NO. 0

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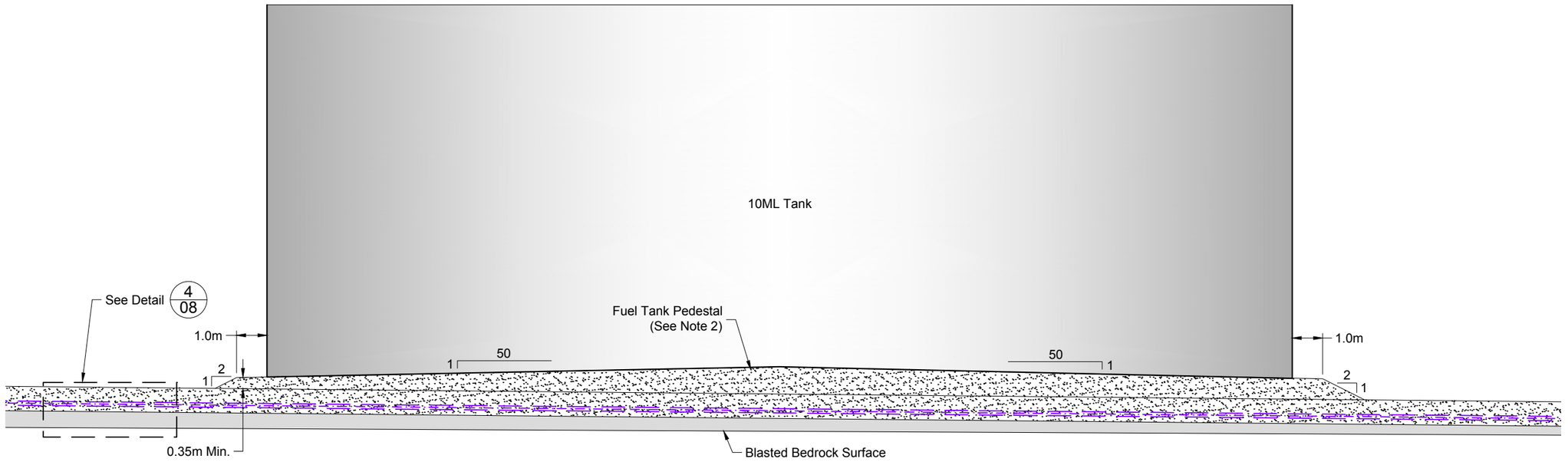
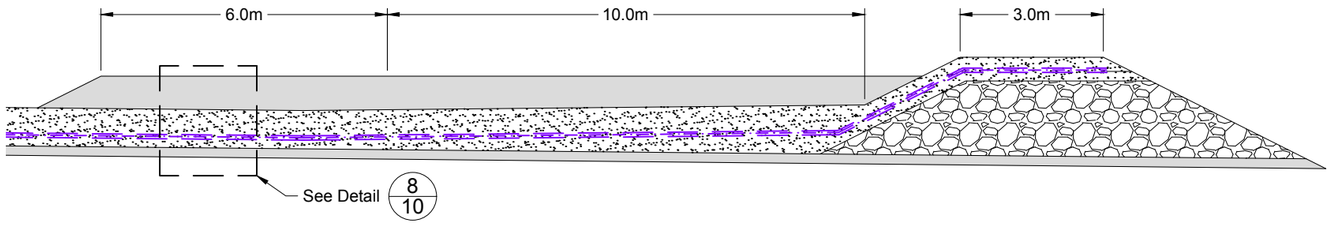


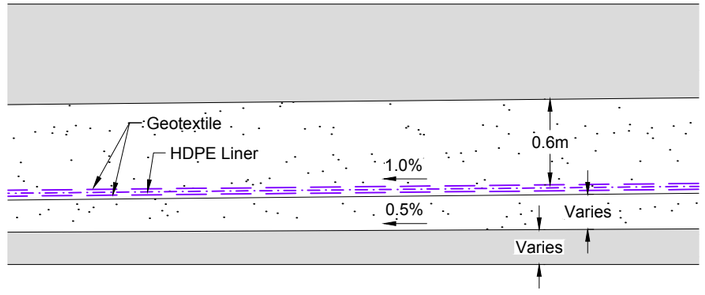
6/02 **Typical Detail 6 - Fuel Tank Pedestal**

0m 1 2 3 4 5 6



7/02 **Detail 7 - Fuel Transfer Station**

0m 1 2 3 4



8/10 **Typical Detail 8 - Access Ramp**

0m 0.5 1.0 1.5

LEGEND

- Geotextile (non-woven)
- HDPE Liner
- Crushed Rock (above / below liner)
- Leveling Layer (transition)
- Rockfill (ROQ)

NOTES

1. All dimensioned are in meters unless otherwise stated.
2. Pedestals must ensure the Fuel Tank is level. The Contractor is to work with the tank erection team to set the required pedestals.
3. Proceeding with construction, as noted on this IFC drawing, is contingent on the Engineer conducting a physical inspection of the foundation conditions to confirm that the facility will be founded on a competent bedrock foundation as opposed to unconsolidated fill, frozen sand, or overburden. Construction may only proceed with written approval from the Engineer. All dimensioned are in meters unless otherwise stated.
4. Notes on this drawing apply to all other drawings in this issue / package.

REFERENCE DRAWINGS		REVISIONS								
DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
MLA-TF-02	Plan Layout - Final Arrangement with Fuel Transfer Ramp	- -	- -	- -	- -	- -	0	Issued for Construction	RW	JBK	19/05/24
MLA-TF-08	Sections and Details - Sheet 1										
MLA-TF-09	Typical Cross Sections and Access Ramp Profile										
MLA-TF-11	Final Arrangement Survey Layout Points										

Original Drawings Stamped and Signed by Engineer

This drawing is uncontrolled when printed unless stamped / certified in accordance with the requirements of the applicable jurisdiction and recorded on a Distribution Register.

PROFESSIONAL ENGINEERS STAMP

srk consulting

DESIGN:	DRAWN:	REVIEWED:
JBK	TH	VB
CHECKED:	APPROVED:	DATE:
RW	JBK	2019/05/24

FILE NAME: 1CS020.017 - Final Layout.dwg

Sabina GOLD & SILVER CORP.

Back River Project

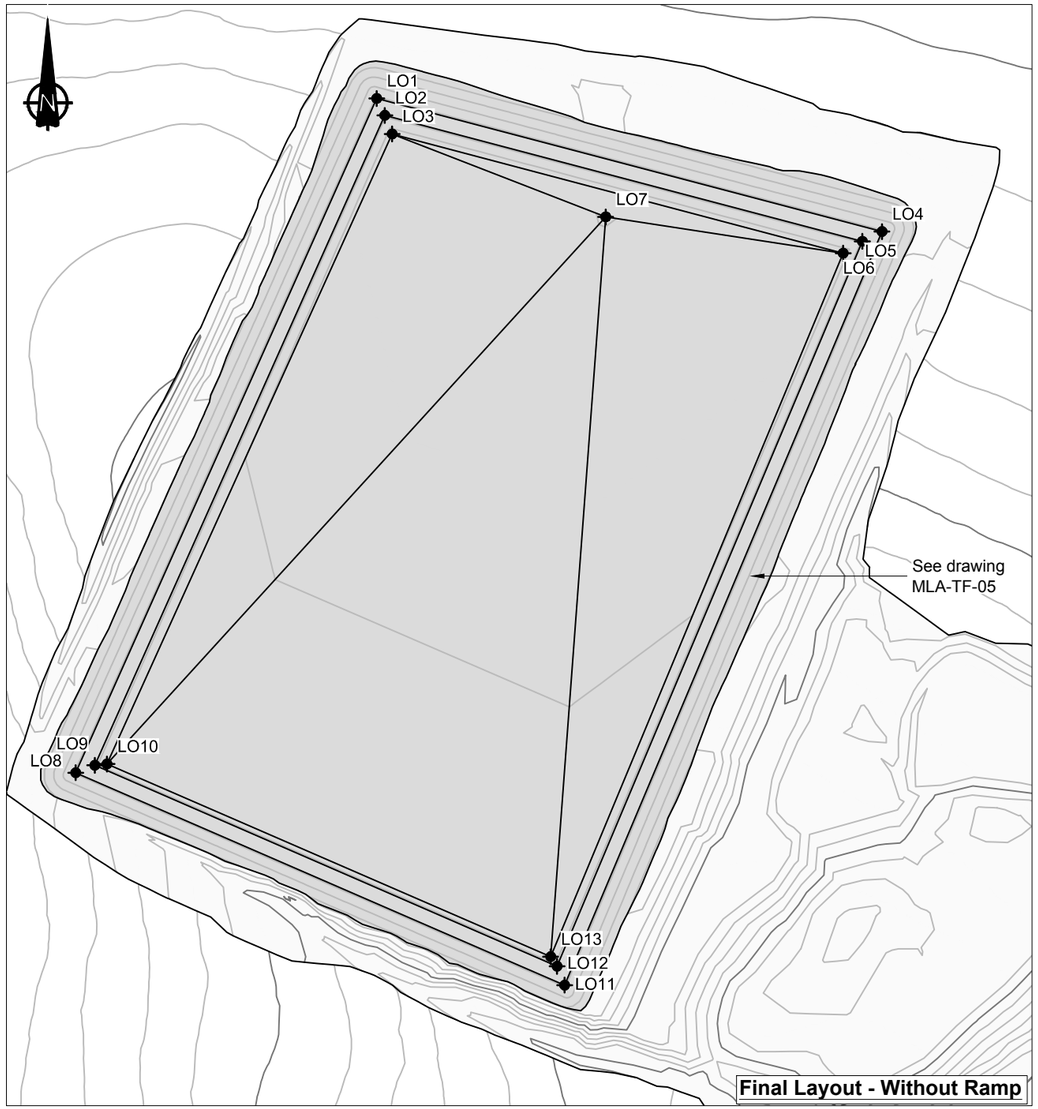
SRK JOB NO.: 1CS020.017

Marine Laydown Area

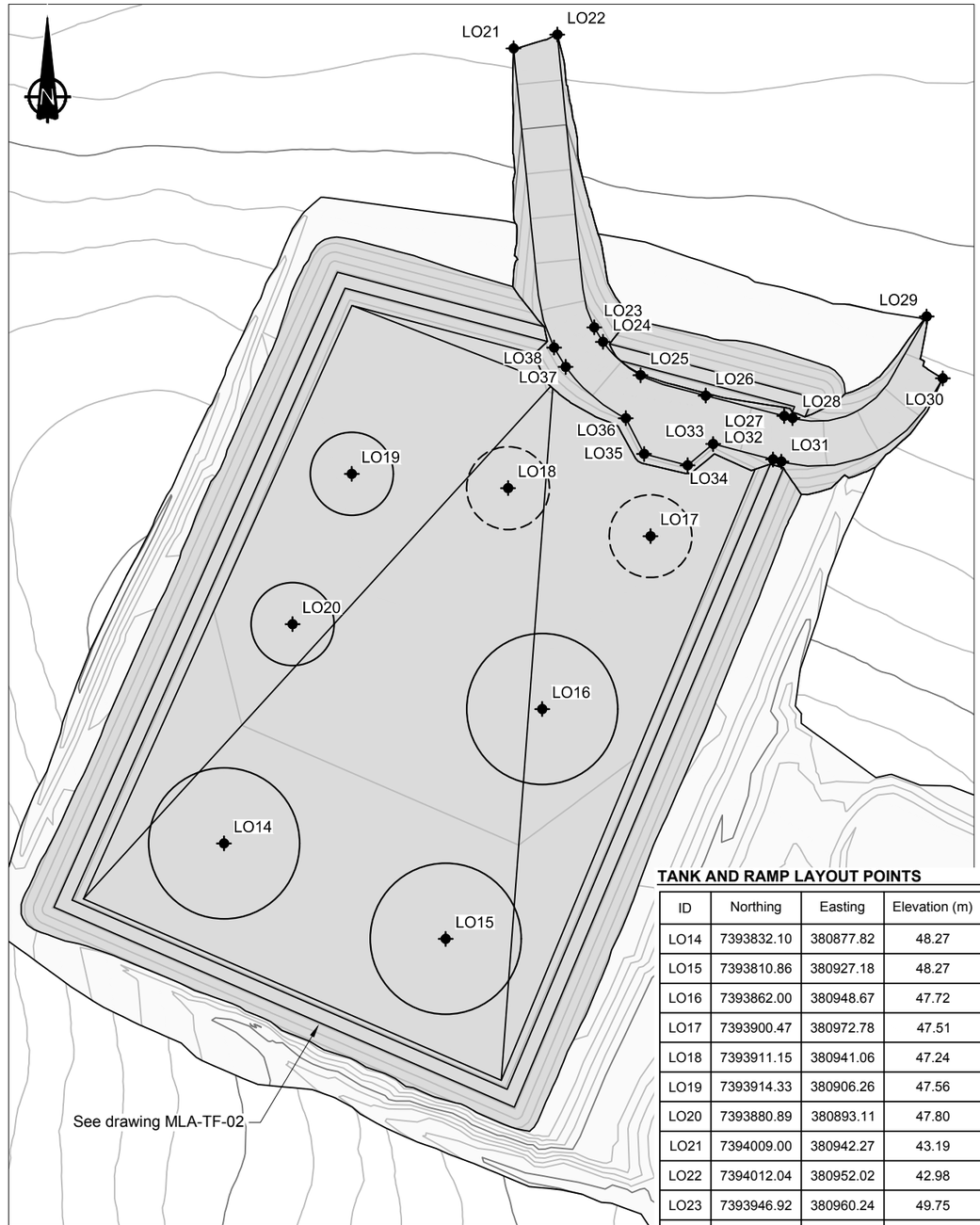
DRAWING TITLE: Sections and Details - Sheet 2

DRAWING NO.	SHEET	REVISION NO.
MLA-TF-10	10 OF 11	0

P:\01_SITES\Back River\1040_AutoCAD\Marine Laydown Area\IFC\Tank Farm\Rev 0\1CS020.017 - Final Layout.dwg



Final Layout - Without Ramp



Final Layout - With Ramp

LEGEND

- Stakeout Point
- Fuel Tank Farm Area - Final Layout

NOTES

1. Contour intervals are shown at 1m on this figure.
2. All dimensioned are in meters unless otherwise stated.
3. Survey layout points (stake-outs) are provided for the final top surface only (i.e. top surface above the liner system). The Contractor must make the appropriate adjustments for the different fill types when setting out the work. To assist with setting out the work, the Surveyors will be provided with digital files of all drawings in this set by the Engineer.
4. Proceeding with construction, as noted on this IFC drawing, is contingent on the Engineer conducting a physical inspection of the foundation conditions to confirm that the facility will be founded on a competent bedrock foundation as opposed to unconsolidated fill, frozen sand, or overburden. Construction may only proceed with written approval from the Engineer. All dimensioned are in meters unless otherwise stated.
5. Notes on this drawing apply to all other drawings in this issue / package.

REFERENCES

- Coordination system: NAD83 UTM Zone 13.
- Base topographic contours generated from data provided by Sabina Gold and Silver Corp. File name: *'bathurst_inlet_1m_dem_tile26 to tile39.xyz'*, dated 2012-20-13.
- As-Built Quarry survey provided by Sabina May 8, 2019. File name: *CAB180818 Quarry.dwg, dated* 2018-08-18

FINAL LAYOUT POINTS

ID	Northing	Easting	Elevation (m)
LO1	7393959.18	380903.09	49.15
LO2	7393955.63	380904.79	49.15
LO3	7393951.76	380906.33	47.45
LO4	7393931.29	381008.95	49.15
LO5	7393929.27	381004.84	49.15
LO6	7393926.78	381000.82	47.45
LO7	7393934.37	380951.08	46.98

ID	Northing	Easting	Elevation (m)
LO8	7393817.94	380840.03	49.15
LO9	7393819.48	380844.01	49.15
LO10	7393819.76	380846.59	48.52
LO11	7393773.42	380942.47	49.16
LO12	7393777.38	380940.88	49.16
LO13	7393779.37	380939.54	48.52

TANK AND RAMP LAYOUT POINTS

ID	Northing	Easting	Elevation (m)
LO14	7393832.10	380877.82	48.27
LO15	7393810.86	380927.18	48.27
LO16	7393862.00	380948.67	47.72
LO17	7393900.47	380972.78	47.51
LO18	7393911.15	380941.06	47.24
LO19	7393914.33	380906.26	47.56
LO20	7393880.89	380893.11	47.80
LO21	7394009.00	380942.27	43.19
LO22	7394012.04	380952.02	42.98
LO23	7393946.92	380960.24	49.75
LO24	7393943.70	380962.19	49.73
LO25	7393936.27	380970.54	48.37
LO26	7393931.73	380985.03	48.37

ID	Northing	Easting	Elevation (m)
LO27	7393927.21	381002.54	49.75
LO28	7393926.73	381004.39	49.75
LO29	7393949.33	381034.24	45.08
LO30	7393935.56	381037.83	46.13
LO31	7393917.04	381001.89	49.75
LO32	7393917.52	381000.03	49.75
LO33	7393920.97	380986.70	48.37
LO34	7393916.24	380981.02	48.37
LO35	7393918.75	380971.34	48.37
LO36	7393926.71	380967.26	48.37
LO37	7393938.13	380953.88	49.75
LO38	7393942.42	380951.32	49.75

DRAWING NO.	DRAWING TITLE
MLA-TF-10	Sections and Details - Sheet 2
MLA-TF-09	Typical Cross Sections and Access Ramp Profile
MLA-TF-08	Sections and Details - Sheet 1
MLA-TF-05	Liner Subgrade Plan
MLA-TF-02	Plan Layout - Final Arrangement with Fuel Transfer Ramp

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
- -	- -	- -	- -	- -
0	Issued for Construction	RW	JBK	19/05/24

REVISIONS

Original Drawings Stamped and Signed by Engineer

This drawing is uncontrolled when printed unless stamped / certified in accordance with the requirements of the applicable jurisdiction and recorded on a Distribution Register.

PROFESSIONAL ENGINEERS STAMP

srk consulting

DESIGN: JBK | DRAWN: TH | REVIEWED: VB
CHECKED: RW | APPROVED: JBK | DATE: 2019/05/24
FILE NAME: 1CS020.017 - Layout Points.dwg

Sabina GOLD & SILVER CORP

Back River Project

SRK JOB NO.: 1CS020.017

Marine Laydown Area

DRAWING TITLE:
Final Arrangement Layout Points

DRAWING NO.: MLA-TF-11 | SHEET: 11 OF 11 | REVISION NO.: 0

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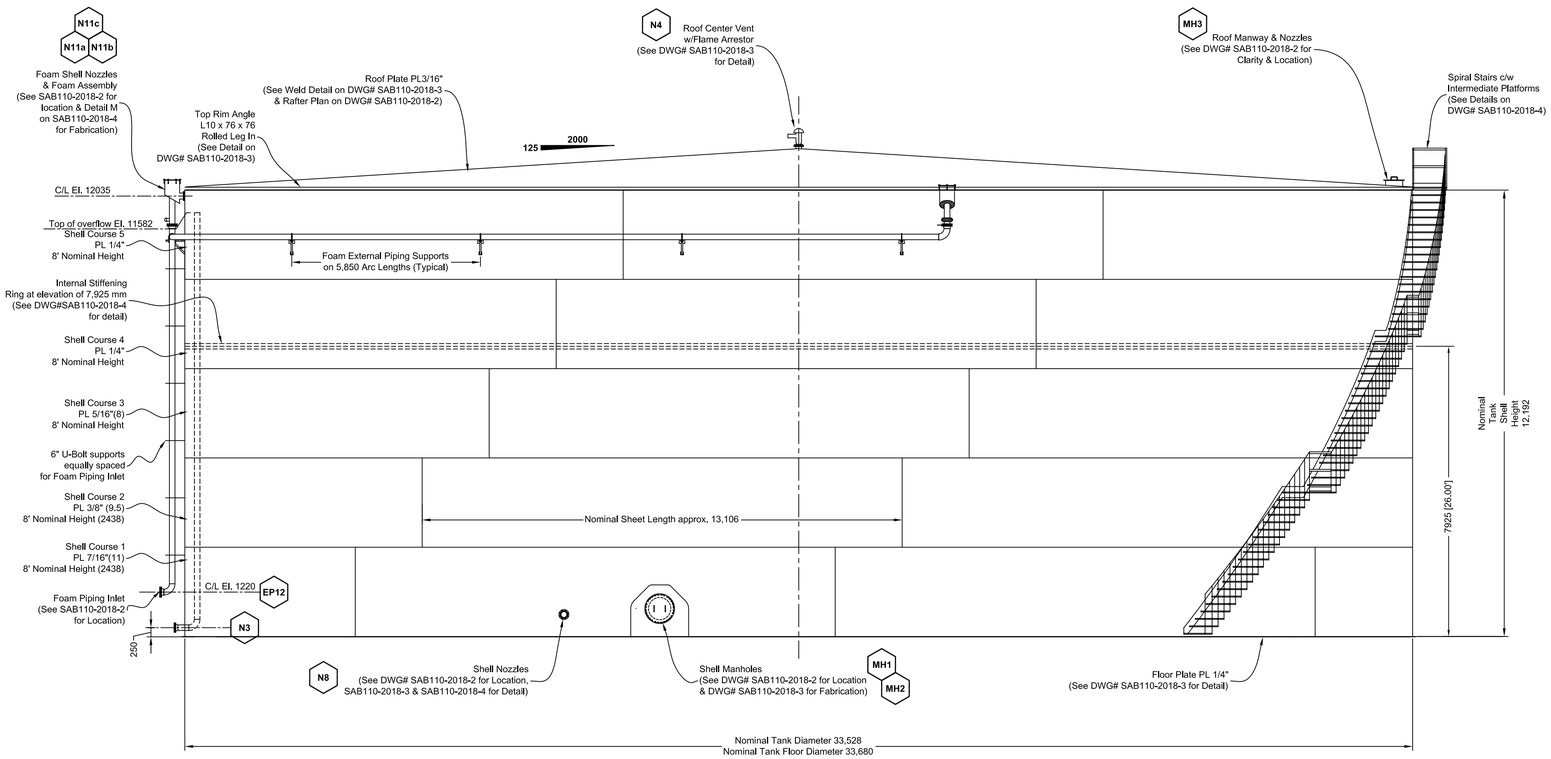
Appendix D - Tank Drawings by Gem Steel Edmonton Ltd.

BILL OF MATERIALS (Quantity Per Tank)

MARK	DESCRIPTION	QTY.
BM1	Floor Plate (PL 1/4")	1
BM2	Shell Course 1 (PL 7/16")	1
BM3	Shell Course 2 (PL 3/8")	1
BM4	Shell Course 3 (PL 5/16")	1
BM5	Shell Course 4 (PL 1/4")	1
BM6	Shell Course 5 (PL 1/4")	1
BM7	Roof Plate (PL 3/16")	1
BM8	Outer Roof Support Column Assemblies (12"Ø STD Pipe) (Structural Grade) 40'-8" lg c/w 3/4" Cap Plate	8
BM9	Center Pole Assembly (12"Ø STD Pipe) (Structural Grade) Length to be field cut & capped	1
BM10	Girders (W410 x 54 x 6,400 Long)	8
BM11	Internal Roof Rafters (W250 x 22 x 9,144 Long)	84
BM12	Spiral Staircase c/w Intermediate & Top Platforms (3 Sections total)	1
BM13	Foam External Piping Assembly (3"Ø STD Pipe & Fittings)	1



ELEVATION

(SEE DWG. SAB110-2018-2 FOR TRUE ORIENTATION)

GENERAL NOTES

Design

1. Code of Construction: API-650, 12 Edition March 2013
2. All dimensions are in mm unless noted otherwise.
3. Product Stored: Diesel Fuel
4. Diameter: 33,528 mm Ø
5. Height: 12,192 mm
6. Nominal Capacity: 10,760,000 litres
7. Working Capacity: 10,000,000 litres
8. Design Metal Temp: -50° C
9. Product Specific Gravity: 0.9 @ 15 °C

Materials

1. Bolts: A-325
2. Pipe Nozzles: A333 Gr. 6
3. Forged Flanges & Couplings: A350M, Gr. LF 2 & ANSI B16.5 LF2 Class D
4. Pipe Fittings: A420 Gr. WPG-6
5. Structural Steel: G40.21-300W
6. Shell Steel Plate: G40.21M-260WT, Killed and Fine-Grain Practice, Impact Energy 20 ft.lbs @ -50° F
7. Floor & Roof Steel Plate: G40.21M-260WT
8. Tank Manways: Structural Grade Pipe or better.

Inspection

1. Vacuum Testing: Floor
2. Radiography: Vertical Shell Welds - Spot as per API 650
3. Air Test: Re-pads
4. Vacuum and Diesel Test: Shell Welds

TANK ID 53-TK-01 - Goose Site
TANK ID 73-TK-01 - MLA Site

#	REVISION DESCRIPTION	DATE	BY
B	Re-issued for Review	Aug 7 2018	JOC
A	Issued for Review	Feb 25 2018	JOC

GEM STEEL
9060 - 24 Street
Edmonton, Alberta
Canada T6P1X8
Ph. (780) 449-0000
Fax. (780) 449-0001

ENGINEER:

TITLE: **GENERAL TANK ELEVATION**

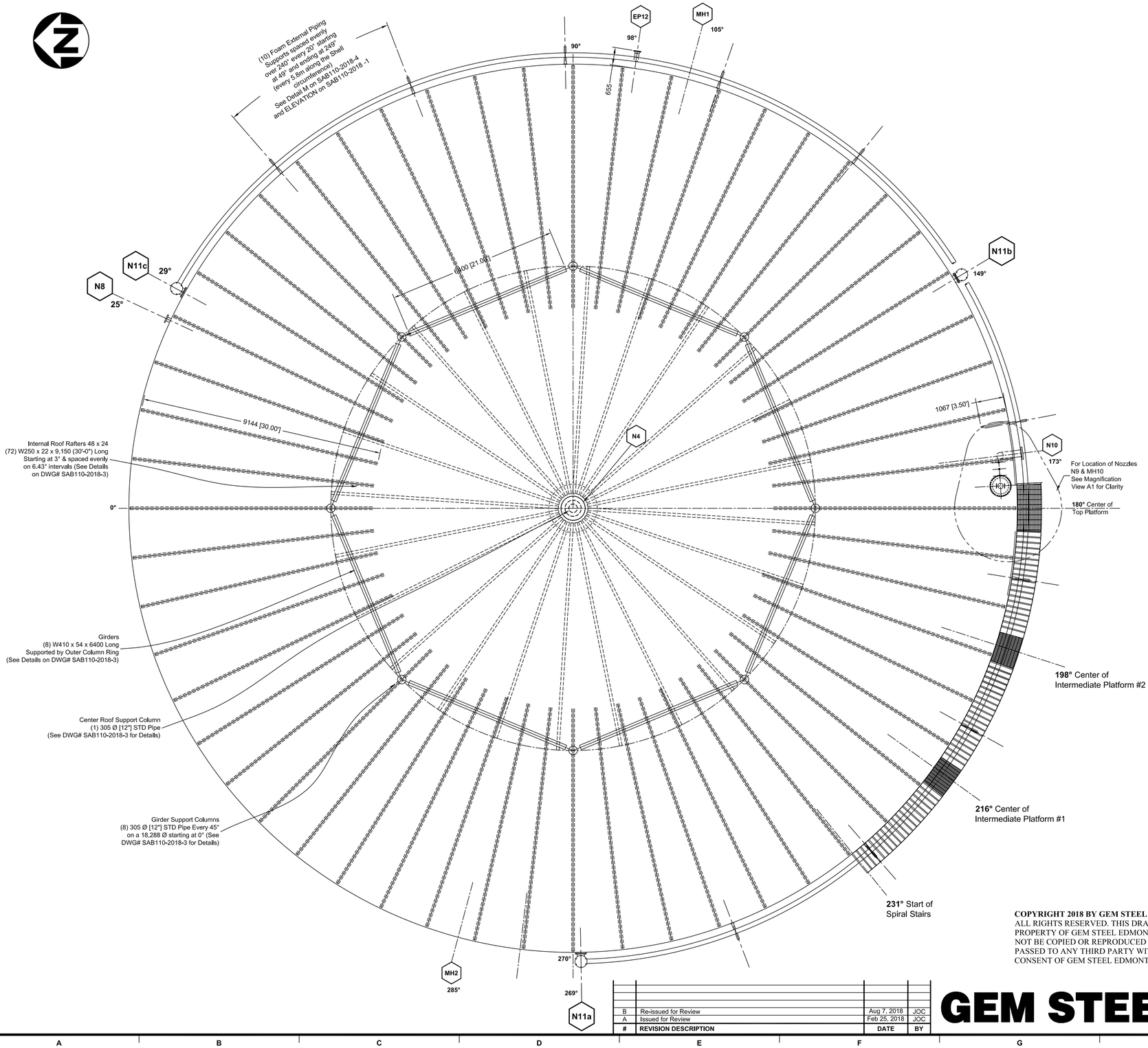
PROJECT: **Tanks 1 & 2, 110' Ø x 40' High Diesel Fuel Storage Tanks**

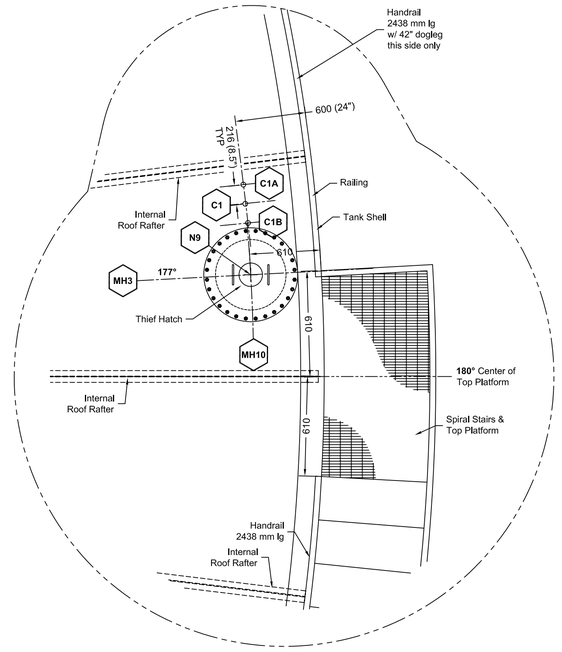
CLIENT: **Sabina Gold and Silver Corp.**
Back River Project, Bathhurst Inlet, Nunavut

CHK'D BY:	DATE:	CADFILE:
B.K.G.	FEB 2018	1
DRAWN BY:	APP'D BY:	SCALE:
J.O.C.	-	N.T.S.
DRAWING #		REVISION #
SAB110-2018-1		B

NOZZLE SCHEDULE

MARK	DESCRIPTION	SIZE	PROJ.	INT. PROJ.	TYPE	RATING	RPD.	LOC.	ELEV.
MH1	Shell Manway	24"	Det.		RFSO	API650	Det.	105°	762
MH2	Shell Manway	24"	Det.		RFSO	API650	Det.	285°	762
MH3	Roof Manway	24"	Det.		RFSO	API650	Det.	Det.	N/A
N3	Overflow	6"	200		RFSO	150#	15 3/4"	173°	11582
N4	Vent c/w Flame Arrestor as per API 2000 Emergency Venting	6"	200		RFSO	150#	N/A	Roof	N/A
N8	Water Draw-off	3"	150		RFSO	150#	10 1/2"	25°	250
N9	Jayco JT8 Thief Hatch	8"	200		Fab	150#	15 3/4"	173°	N/A
N11a	Foam	3"					N/A	269°	See Det.
N11b	Foam	3"					N/A	149°	See Det.
N11c	Foam	3"					N/A	29°	See Det.
EP12	External Foam Piping Inlet c/w blind flg	6"	N/A		RFSO	150#	N/A	98°	1500
C1	Varec 2500 Level Indicator	1 1/2"	Det.		CPLG	1500#	N/A	N/A	N/A
C1A/B	Varec Wire Guides	1 1/4"	Det.						





View A1
Magnification 3x

TANK ID 53-TK-01 - Goose Site
TANK ID 73-TK-01 - MLA Site

#	REVISION DESCRIPTION	DATE	BY
B	Re-issued for Review	Aug 7, 2018	JOC
A	Issued for Review	Feb 25, 2018	JOC

GEM STEEL
9060 - 24 Street
Edmonton, Alberta
Canada T6P1X8
Ph. (780) 449-0000
Fax. (780) 449-0001

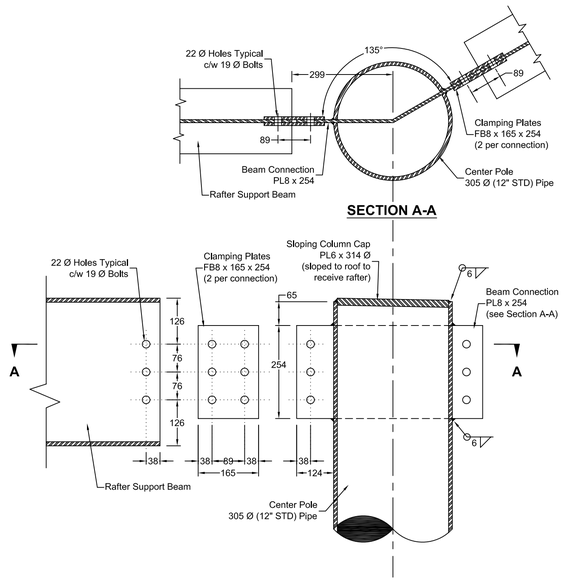
ENGINEER:

TITLE: **ROOF & NOZZLE PLAN**

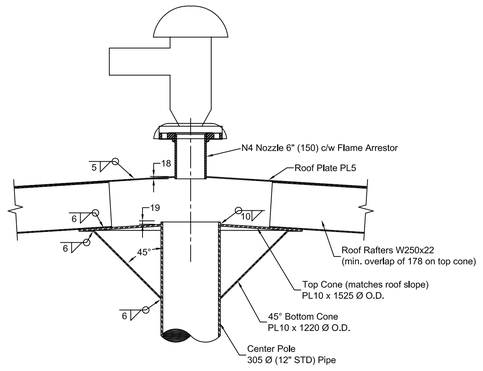
PROJECT: **Tanks 1 & 2, 110' Ø x 40' High Diesel Fuel Storage Tanks**

CLIENT: **Sabina Gold and Silver Corp.**
Back River Project, Bathhurst Inlet, Nunavut

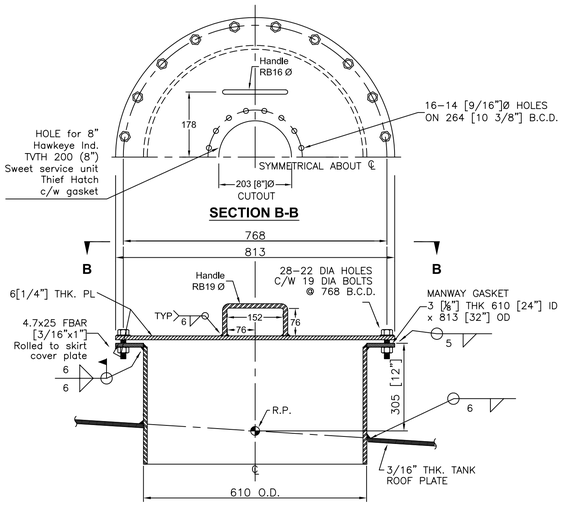
CHK'D BY:	DATE:	CADFILE:
B.K.G.	FEB 2018	2
DRAWN BY:	APP'D BY:	SCALE:
J.O.C.	-	N.T.S.
DRAWING #		REVISION #
SAB110-2018-2		B



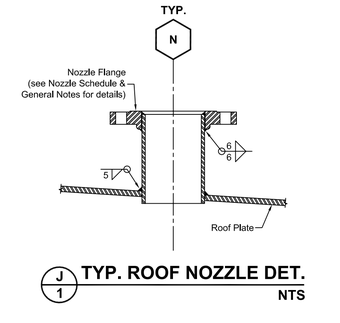
A/2 COLUMN TO ROOF BEAM DET. NTS



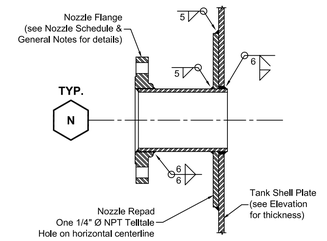
C/2 CENTER SUPPORT & VENT DET. NTS



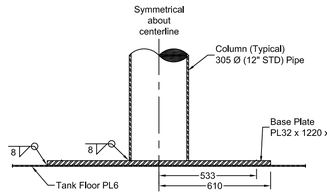
G/1 ROOF MANWAY DET. NTS



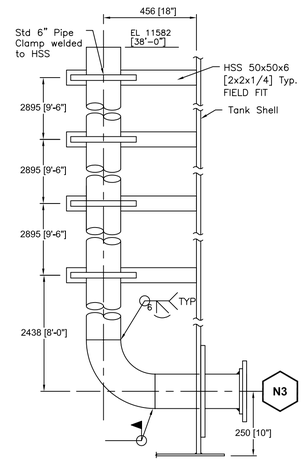
J/1 TYP. ROOF NOZZLE DET. NTS



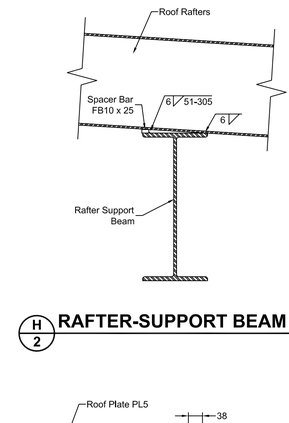
L/1 TYP. SHELL NOZZLE DETAIL ABOVE 300 EL. NTS



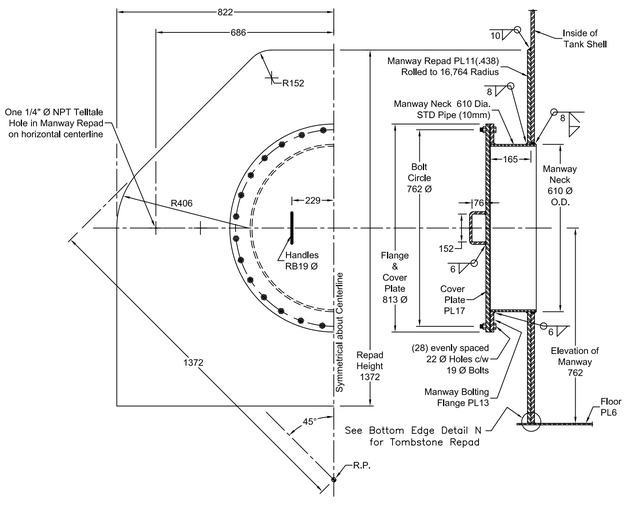
D/2 COLUMN BASE PLATE DET. NTS



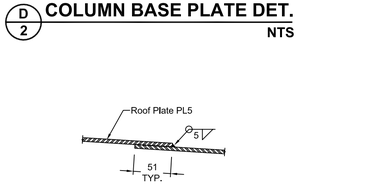
N/1 SHELL NOZZLE N3 DETAIL NTS



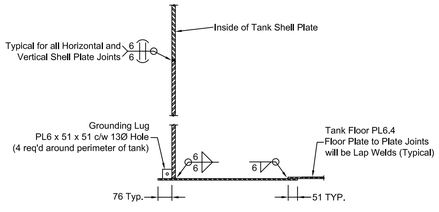
H/2 RAFTER-SUPPORT BEAM DET. NTS



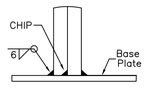
B/1 610 Ø SHELL MANWAY DETAIL NTS



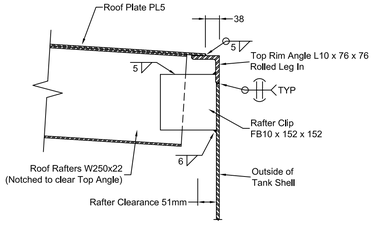
E/1 ROOF PLATE WELD DET. NTS



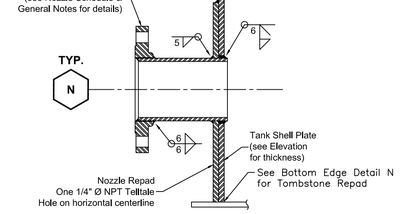
F/1 FLOOR, SHELL WELD DET. NTS



N/- BOTTOM EDGE DETAILS TOMBSTONE REPAD



I/2 ROOF-RAFTER-RIM DETAIL NTS



M/1 TYP. SHELL NOZZLE DETAIL 300 EL. AND BELOW NTS

TANK ID 53-TK-01 - Goose Site
TANK ID 73-TK-01 - MLA Site

#	REVISION DESCRIPTION	DATE	BY
B	Re-issued for Review	Aug 7, 2018	JOC
A	Issued for Review	Feb 25, 2018	JOC

GEM STEEL
9060 - 24 Street
Edmonton, Alberta
Canada T6P1X8
Ph. (780) 449-0000
Fax. (780) 449-0001

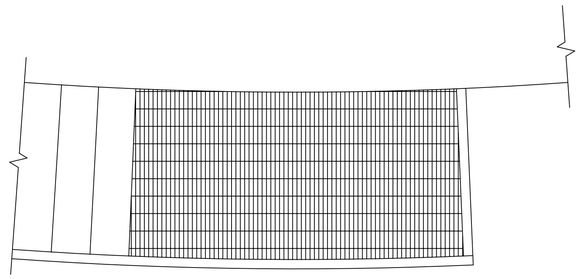
ENGINEER:

TITLE: **GENERAL TANK DETAILS**

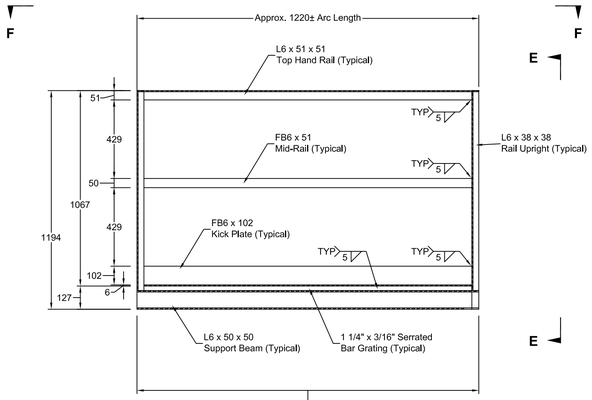
PROJECT: **Tanks 1 & 2, 110' Ø x 40' High Diesel Fuel Storage Tanks**

CLIENT: **Sabina Gold and Silver Corp.**
Back River Project, Bathhurst Inlet, Nunavut

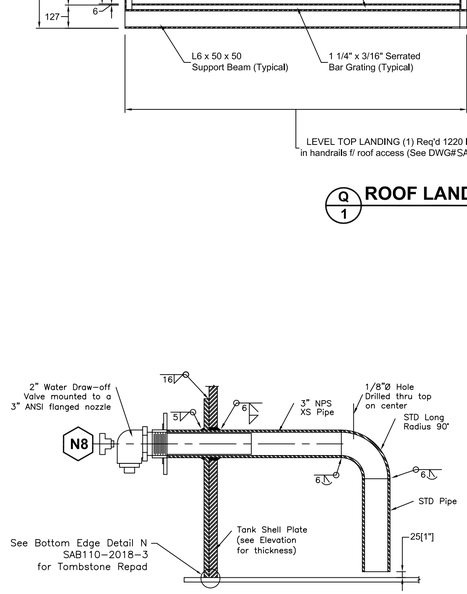
CHK'D BY:	DATE:	CADFILE:
B.K.G.	FEB 2018	3
DRAWN BY:	APP'D BY:	SCALE:
J.O.C.	-	N.T.S.
DRAWING #		REVISION #
SAB110-2018-3		B



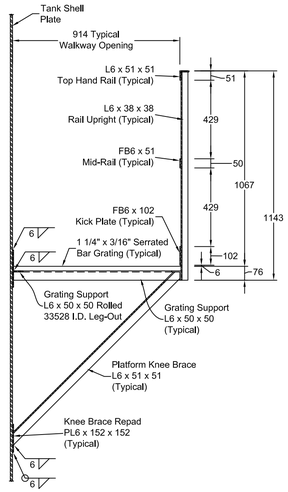
SECTION F-F



Q 1 ROOF LANDING NTS



P 1 WATER DRAW OFF AND DRAIN DET. NTS



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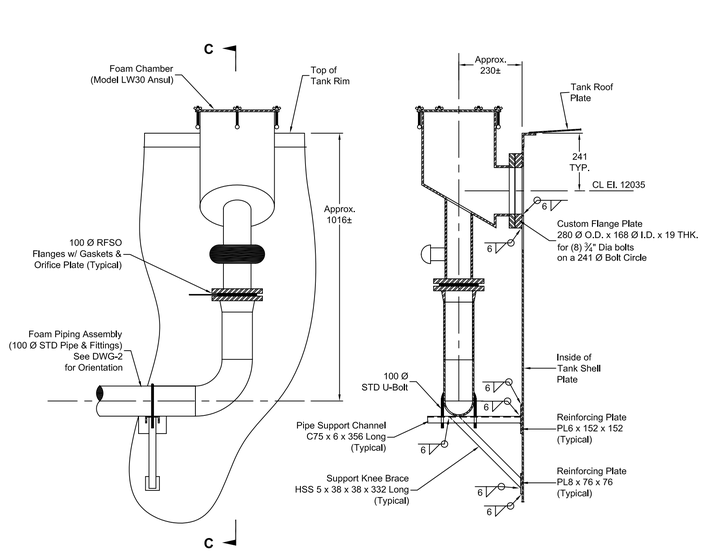
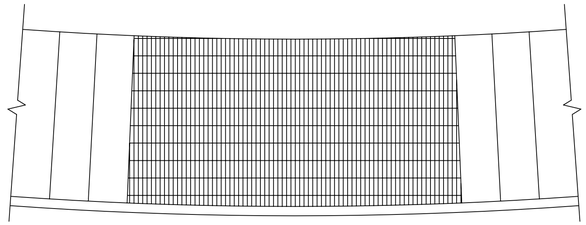
STAIRS REMOVED

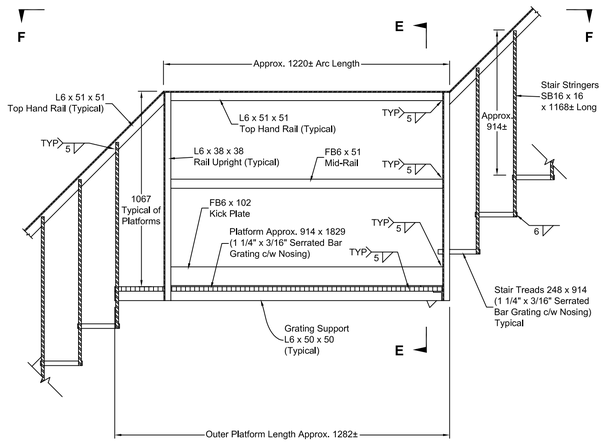


SECTION C-C

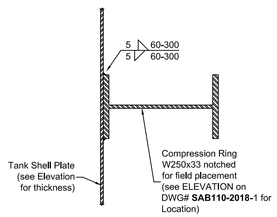
M 1 FOAM OUTLET DET. NTS



SECTION F-F



R 1 SPIRAL STAIRS & INTERMEDIATE PLATFORM DET. NTS



T 1 INTERNAL COMPRESSION RING NTS

#	REVISION DESCRIPTION	DATE	BY
B	Re-issued for Review	Aug 7, 2018	JOC
A	Issued for Review	Feb 25, 2018	JOC

GEM STEEL
9060 - 24 Street
Edmonton, Alberta
Canada T6P1X8
Ph. (780) 449-0000
Fax. (780) 449-0001

TANK ID 53-TK-01 - Goose Site
TANK ID 73-TK-01 - MLA Site

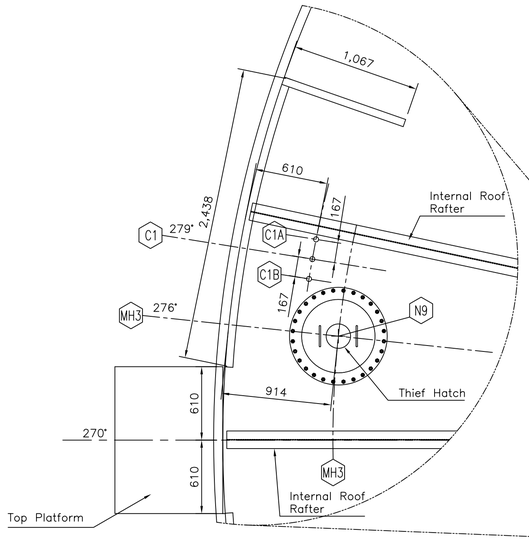
ENGINEER:

TITLE: **GENERAL TANK DETAILS**

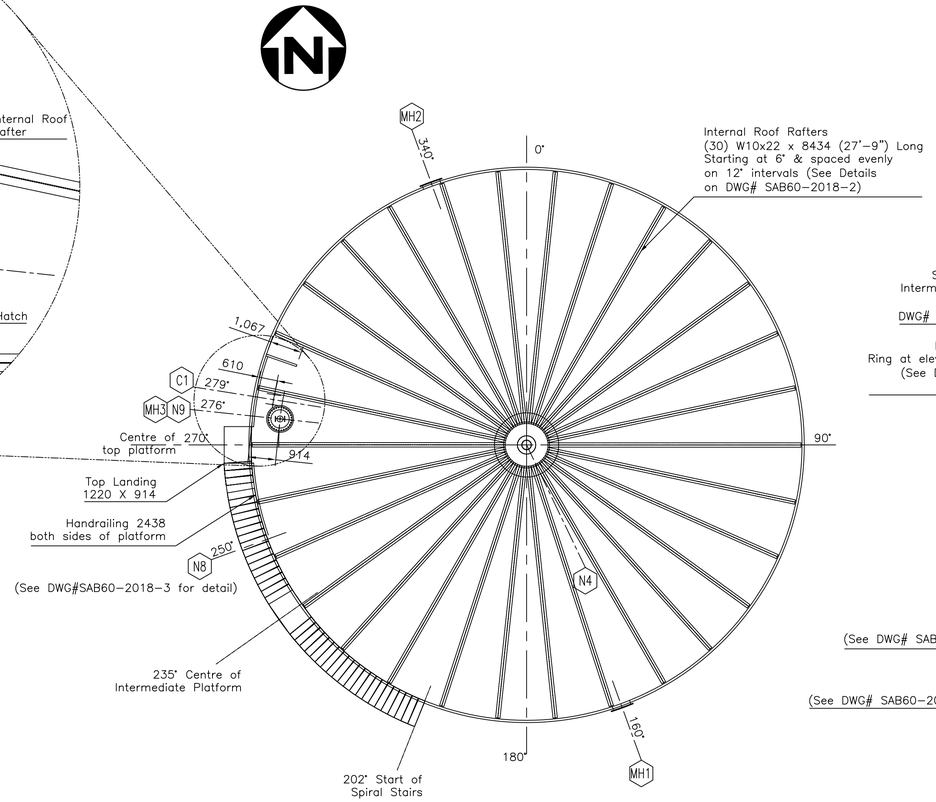
PROJECT: **Tanks 1 & 2, 110' Ø x 40' High Diesel Fuel Storage Tanks**

CLIENT: **Sabina Gold and Silver Corp.**
Back River Project, Bathhurst Inlet, Nunavut

CHK'D BY:	DATE:	CADFILE:
B.K.G.	FEB 2018	4
DRAWN BY:	APP'D BY:	SCALE:
J.O.C.	-	N.T.S.
DRAWING #		REVISION #
SAB110-2018-4		B



View A1
Magnified 4X



TOP VIEW A-A

ELEVATION

GENERAL NOTES

Design

1. Code of Construction: API–650, 12 Edition March 2013
2. All dimensions are in mm unless noted otherwise.
3. Product Stored: Diesel Fuel
4. Diameter: 18293 mm
5. Height: 9756 mm
6. Nominal Capacity: 2562 cu.m.
7. Product Specific Gravity: 0.9 @ 15° C
8. Design Metal Temperature: –50° C

Inspection

1. Vacuum Testing: Floor
2. Radiography: Vertical Shell Welds – Spot as per API 650
3. Air Test: Repads
4. Vacuum and Diesel Test: Shell Welds

Materials

1. Bolts: A–235
2. Pipe Nozzles: A333 Gr. 6
3. Forged Flanges & Couplings: A350M, Gr. LF 2 & ANSI B16.5 LF2 Class D
4. Pipe Fittings: A420 Gr. WPG–6
5. Structural Steel: G40.21–300W
6. Shell Steel Plate: G40.21M–260WT, Killed and Fine–Grain Practice, Impact Energy 20 ft./lbs @ –50° F
7. Floor & Roof Steel Plate: G40.21M–260WT
8. Tank Manways: Structural Grade Pipe or better.

#	REVISION DESCRIPTION	DATE	BY
B	Re–issued for Review	05/08/18	JOC
A	Issued for Review	25/02/18	JOC

NOZZLE SCHEDULE

MARK	DESCRIPTION	SIZE	TYPE	RATING		LOC.	ELEV.
MH1	Shell Manway	24"	API		See Det.	160°	762
MH2	Shell Manway	24"	API		See Det.	340°	762
MH3	Roof Manway	24"	API		See Det.	276°	N/A
N4	Roof Vent	12"			See Det.	Roof	N/A
N8	Water Draw–Off	3"	RFSO	150#	See Det.	250°	250
N9	Jayco JT8 Thief Hatch	8"			See Det.	276°	
C1	Varec 2500 Level Indicator	1 1/2"	CPLG	1500#		279°	N/A
C1A/B	Varec Wire Guides	1 1/4"	CPLG	1500#		N/A	N/A

HOLD FOR FUTURE CONSTRUCTION

GEM STEEL
9060 - 24 Street
Edmonton, Alberta
Canada T6P 1X8
Ph. (780) 449-0000
Fax. (780) 449-0001

TANK ID 53-TK-02; 53-TK-03 - Goose Site
TANK ID 73-TK-02; 73-TK-03 MLA Site

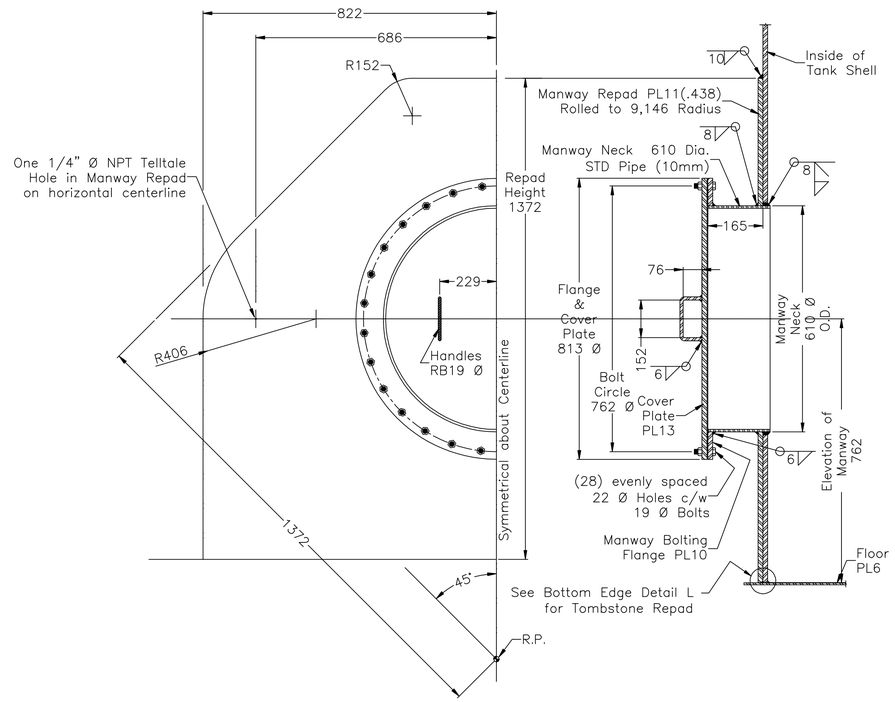
ENGINEER:

TITLE: **GENERAL TANK LAYOUT**

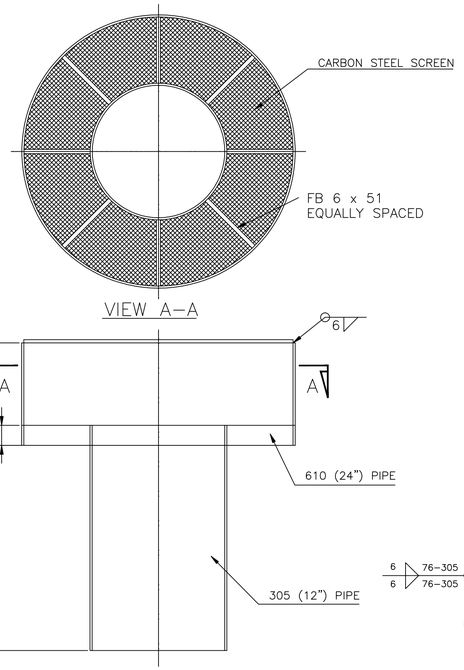
PROJECT: **Tanks 3,4,5 & 6, 60' DIA x 32' HIGH DIESEL FUEL STORAGE TANK**

CLIENT: **Sabina Gold and Silver Corp. Back River Project, Bathhurst Inlet, Nunavut**

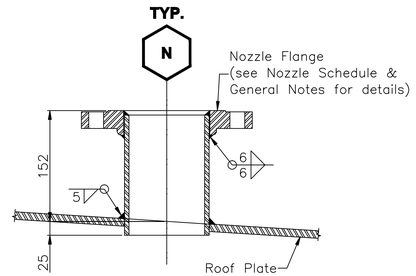
CHK'D BY:	DATE:	CADFILE:
B.K.G.	FEB, 2018	1
DRAWN BY:	APP'D BY:	SCALE:
J.O.C.	-	N.T.S.
DRAWING #		REVISION #
SAB60-2018-01		B



A/1 610 Ø SHELL MANWAY DETAIL
NTS

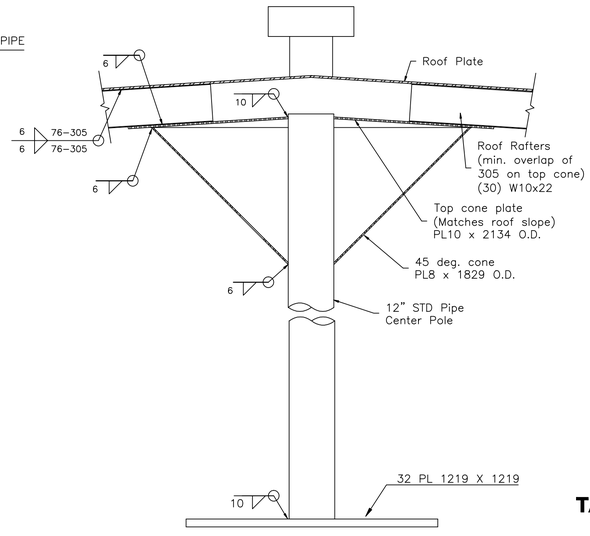


C/1 TOP HAT VENT DETAIL R1
NTS

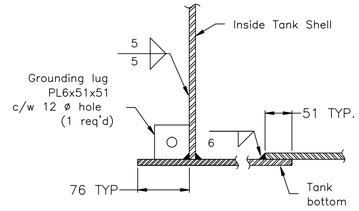


E/1 TYP. ROOF NOZZLE DET.
NTS

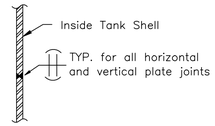
ALL ROOF NOZZLE PIPES ARE CUT 178 LG EXCEPT MANWAYS OR VENTS



D/1 BASE PLATE & CENTER CONE DETAILS
NTS

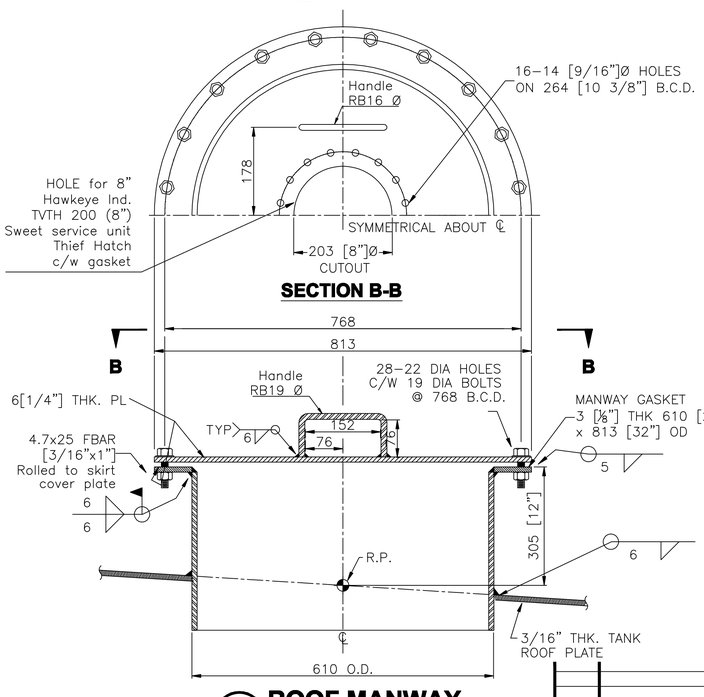


J/1 FLOOR PLATE WELD JOINT DETAIL
NTS



K/1 SHELL WELD DETAIL
NTS

HOLD FOR FUTURE CONSTRUCTION



B/1 ROOF MANWAY
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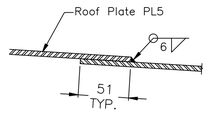
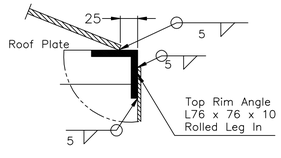
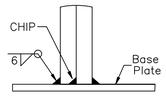


F/1 ROOF PLATE WELD DET.
NTS



G/1 RIM ANGLE DETAIL
NTS



L/- BOTTOM EDGE DETAILS TOMBSTONE REPAD

#	REVISION DESCRIPTION	DATE	BY
B	Re–issued for Review	06/05/19	JOC
A	Issued for Review	25/02/18	JOC

GEM STEEL
9060 - 24 Street
Edmonton, Alberta
Canada T6P 1X8
Ph. (780) 449-0000
Fax. (780) 449-0001

TANK ID 53-TK-02; 53-TK-03 - Goose Site
TANK ID 73-TK-02; 73-TK-03 MLA Site

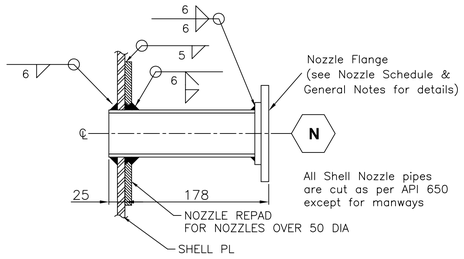
ENGINEER:

TITLE: **GENERAL TANK DETAILS**

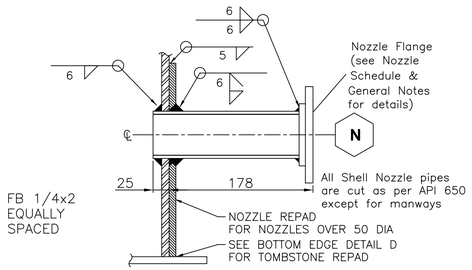
PROJECT: **Tanks 3,4,5 & 6, 60' DIA x 32' HIGH DIESEL FUEL STORAGE TANK**

CLIENT: **Sabina Gold and Silver Corp. Back River Project, Bathhurst Inlet, Nunavut**

CHK'D BY:	DATE:	CADFILE:
B.K.G.	FEB, 2018	2
DRAWN BY:	APP'D BY:	SCALE:
J.O.C.	-	N.T.S.
DRAWING #		REVISION #
SAB60-2018-02		B

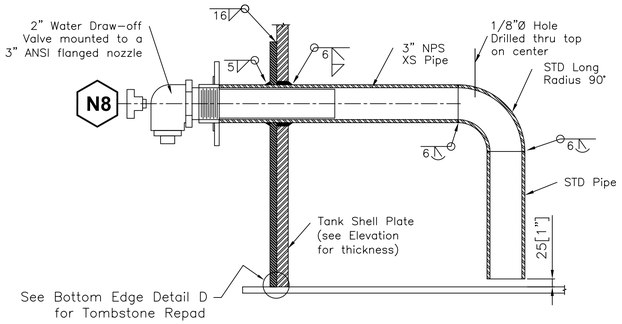


A / - **SHELL NOZZLE DETAIL OVER EL. 300** NTS

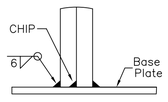


C / 1 **SHELL NOZZLE DETAIL EL 300 AND LOWER** NTS

HOLD FOR FUTURE CONSTRUCTION



B / 1 **WATER DRAW OFF AND DRAIN DET.** NTS



D / - **BOTTOM EDGE DETAILS TOMBSTONE REPAD**

TANK ID 53-TK-02; 53-TK-03 - Goose Site
TANK ID 73-TK-02; 73-TK-03 MLA Site

ENGINEER:

TITLE: **GENERAL TANK DETAILS**

PROJECT: **Tanks 3,4,5 & 6, 60' DIA x 32' HIGH DIESEL FUEL STORAGE TANK**

CLIENT: **Sabina Gold and Silver Corp. Back River Project, Bathhurst Inlet, Nunavut**

CHK'D BY:	DATE:	CADFILE:
B.K.G.	FEB, 2018	3
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J.O.C.	-	N.T.S.
DRAWING #		REVISION #
SAB60-2018-03		B

#	REVISION DESCRIPTION	DATE	BY
B	Re-issued for Review	05/08/18	JOC
A	Issued for Review	25/02/18	JOC

GEM STEEL

9060 - 24 Street
Edmonton, Alberta
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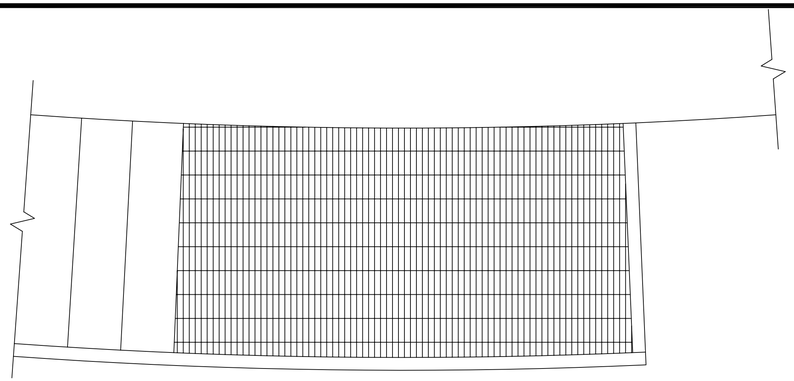
Ph. (780) 449-0000
Fax. (780) 449-0001



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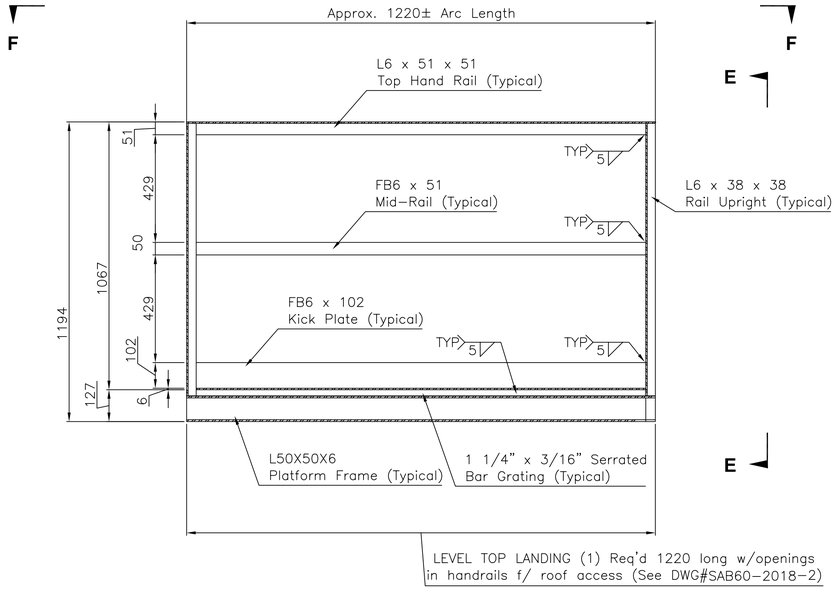
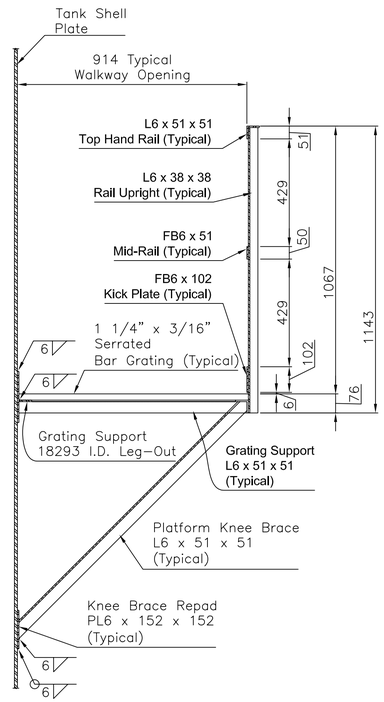


Q/1 ROOF LANDING
NTS



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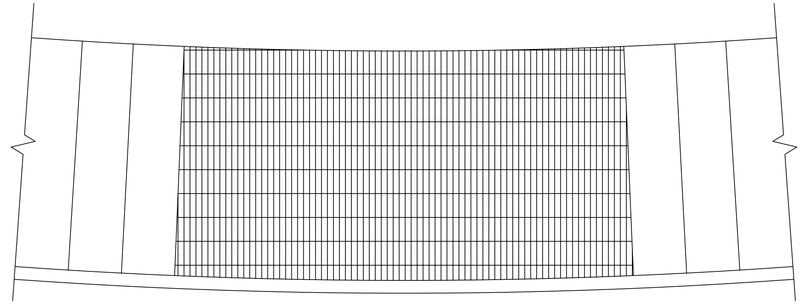

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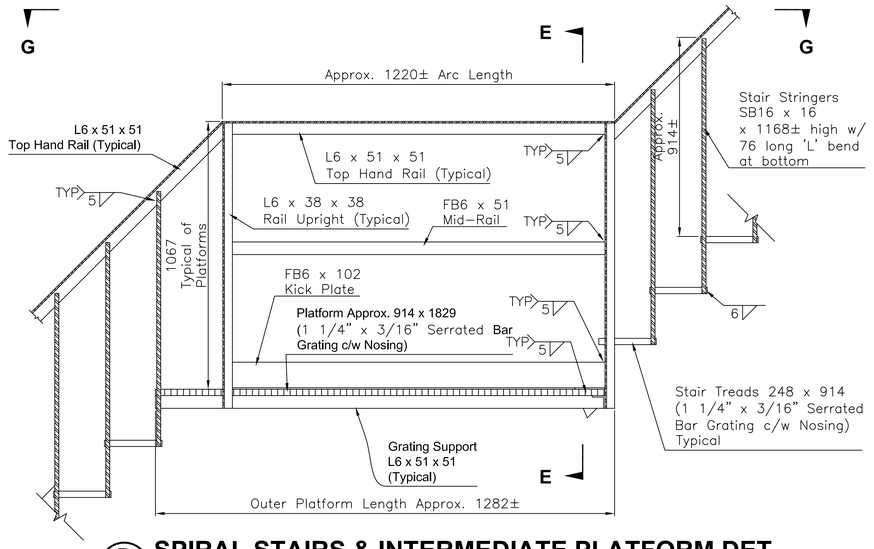
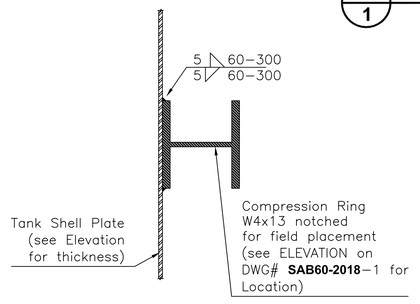


R/1 SPIRAL STAIRS & INTERMEDIATE PLATFORM DET.
NTS



T/1 INTERNAL COMPRESSION RING
NTS

HOLD FOR FUTURE CONSTRUCTION

TANK ID 53-TK-02; 53-TK-03 - Goose Site
TANK ID 73-TK-02; 73-TK-03 MLA Site

#	REVISION DESCRIPTION	DATE	BY
B	Re-issued for Review	05/08/18	JOC
A	Issued for Review	25/02/18	JOC

GEM STEEL
9060 - 24 Street
Edmonton, Alberta
Canada T6P 1X8
Ph. (780) 449-0000
Fax. (780) 449-0001

ENGINEER:

TITLE: **SPIRAL STAIRWAY & LANDING DETAILS**

PROJECT: **Tanks 3,4,5 & 6, 60' DIA x 32' HIGH DIESEL FUEL STORAGE TANK**

CLIENT: **Sabina Gold and Silver Corp.**
Back River Project, Bathhurst Inlet, Nunavut

CHK'D BY:	DATE:	CADFILE:
B.K.G.	FEB, 2018	4
DRAWN BY:	APP'D BY:	SCALE:
J.O.C.	-	N.T.S.
DRAWING #:		REVISION #:
SAB60-2018-04		B

Appendix E – MLA Equipment Inventory

Table 1. MLA Equipment Inventory

Description	Manufacturer	Serial No.	Current Location
PC200LC-8	Komatsu	KMTPC180LHC358456	MLA
WA470-8 Loader	Komatsu	PFA 100026	MLA
D6M LGP	Caterpillar	4JN02783	MLA
IT28G	Caterpillar	DBT01285	MLA
299D Skid Steer	Caterpillar	HCL00343	MLA
F350 Pick Up	Ford	1FT8W3BT2FED00953	MLA
F350 Pick Up	Ford	1FT8W3BT3BEB50877	MLA
Challenger MT755B	Caterpillar	CO755KNTBD1036	MLA
BR350 Snow Cat	Prinoth	908911200	MLA
BR350 Snow Cat	Prinoth	908911262	MLA
Dodge 5500 Service Truck	Dodge		MLA
2013 MLT4060, 6kW	Magnum	232293	MLA
2013 MLT4060, 6kW	Magnum	230060	MLA
2014 MLT5080, 20kW	Magnum	232495	MLA
2014 MLT5080, 20kW	Magnum	232488	MLA
IDF 350	Frost Fighter		MLA
IDF 350	Frost Fighter		MLA
Terex RT780 Mobile Crane	Terex	160512	MLA
1997 8-53' Triaxle FlatDeck Trailer	Great Dane	1GRDM0634VM025027	MLA
2000 8-53' Triaxle FlatDeck Trailer	Manac	2M5131616Y1069209	MLA
1995 8-53' Triaxle FlatDeck Trailer	Manac	2M513161xs1035457	MLA
1997 8-53' Triaxle FlatDeck Trailer	Manac	2M513165V1046483	MLA
730 Rock Truck	Caterpillar	B1M03339	MLA
730 Rock Truck	Caterpillar	B1M03340	MLA
DI-550	Sandvik	112H23115-1	MLA
DX-800	Sandvik	49931	MLA
F550 Blower Truck	Ford	1FDUF5HT7BEA19643	MLA
SJ1056 Telehandler	Skyjack	87310550	MLA
2008 MLT5080, 8kW	Magnum	230463	MLA
HI400D	Wacker Neuson		MLA
HI400D	Wacker Neuson		MLA
HI400D	Wacker Neuson		MLA
HI400D	Wacker Neuson		MLA
IDF 350	Frost Fighter		MLA
349E Excavator	Caterpillar	TFG01014	MLA
336 Excavator	Caterpillar	RZA00604	MLA
730 Rock Truck	Caterpillar	B1M03914	**MLA**
D8T Track Dozer cw Rear Ripper	Caterpillar	0FMC01173	MLA
T800B Fuel Truck 17.5 kL	Kenworth	1XKDDB9X4YR958717	MLA

C500B 50T winch tractor	Kenworth	1XKCDBOX05R978046	MLA
T800B Water Truck 14.5 kL	Kenworth	1XKDDB9X6YR958721	MLA
JLG4500AJ - 45 FT Man-Lift	JLG	211962	MLA
JLG800AJ - 80 FT Man-Lift	JLG	212157	MLA
2015 Ford F350 XLT 4WD Crewcab Longbox	Ford	1FT8W3BT9FEA90903	MLA
2015 Ford F350 XL 4WD Crewcab Longbox	Ford	1FT8W3BT8FEA72585	MLA
2015 Ford F350 XLT 4WD Crewcab longbox	Ford	1FT8W3BT8FEB27468	MLA
2015 Ford F350 XLT 4WD Crewcab longbox	Ford	1FT8W3BT6FED00955	MLA
2015 Ford F350 XLT 4WD Crewcab longbox	Ford	1FT8W3BT7GEA74751	MLA
2016 Ford F-350SD XL Crew Cab 172" WB 4X4 w/8' Box, 18" Wheels, 6.7L Power Stroke Diesel V8	Ford	1FT8W38T0GEC93146	MLA
2016 Ford F-350SD XLT Crew Cab 172" WB 4X4 w/8' Box, 18" Wheels, 6.7L Power Stroke Diesel V8	Ford	1FT8W3BT9GEBO8494	MLA
2008 53', 50 Ton Trailer, scissor neck	Aspen	2A9LB50348N125224	MLA
1999 8-53' Triaxle FlatDeck Trailer	Lode King	2LDPF5337X9032685	MLA
1999 8-53' Triaxle FlatDeck Trailer	Lode King	2LDPF5339X9032686	MLA
1998 8-53' Triaxle FlatDeck Trailer	Lode King	2LDPF533XW9028788	MLA
1999 8-53' Triaxle FlatDeck Trailer	Lode King	2LDPF5337X9031548	MLA
2012 International 24 Passenger - 24 pax	International	1HVXWSKK7CJ455332	MLA
JLG4500AJ - 45 FT Man-Lift	JLG	211836	MLA
JLG800AJ - 80 FT Man-Lift	JLG	212162	MLA
Frost Fighters			MLA
IDF 350 Heaters , 2016	Frost Fighter		MLA
IDF 350 Heaters , 2016	Frost Fighter		MLA
IDF 350 Heaters , 2016	Frost Fighter		MLA
Light Tower - 8KW, MLT5080	Magnum	232412	MLA
Light Tower - 8KW, MLT5080	Magnum	232444	MLA
Light Tower- 20KW, MLT5200	Magnum	232491	MLA
Light Tower - 20KW, MLT5200, 2014	Magnum	232635	MLA