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Memo

To:	Joh Roberts, TMAC	**Client:**	TMAC Resources Inc.
From:	Lowell Wade Maritz Rykaart	**Project No:**	1CT022.001.410
Cc:		**Date:**	November 27, 2014
Subject:	Hope Bay Project: Madrid North Bulk Sample: Surface Infrastructure		

1 Introduction

TMAC Resources Inc. is currently in the process of constructing their Doris North Project (Project) in the Kitikmeot region of Nunavut, Canada. Concurrent with this, TMAC is carrying out regional exploration and have identified the Madrid North area as a potential high quality exploration target. However, advanced exploration and extraction of a bulk sample is needed to verify economic feasibility and milling process methods.

The Madrid North area is located about 9 km south of the Project, along the Doris-Windy All-Weather Road. An access road will turn off the Doris-Windy All-Weather Road at kilometre 8+600 and head west up to the portal and infrastructure pad, as well as waste the rock pile and ore stockpile. At kilometre 9+000 a second turn off, on the west side of the Doris-Windy All-Weather Road, will lead to the vent raise pad.

This memo provides complete details of the Madrid North surface infrastructure pads and access roads. This should be read in conjunction with the attached set of conceptual level engineering drawings (Attachment 1). Water management at Madrid South has been discussed in SRK (2014a) and closure activities have been discussed in SRK (2014b).

2 Design Concept

All of the infrastructure pads and all-weather access roads associated with the Hope Bay Project are located on Inuit Owned Land (IOL), administered by the Kitikmeot Inuit Association (KIA).

The design concept of the Madrid North pads are based on the same principles as adopted for elsewhere on the Project which is to construct all facilities either on bedrock or on rock fill pads at least 1 m thick to preserve permafrost. Site layouts are designed to minimize the overall footprint and all attempts are made to minimize the volume of contact water. Contact water is captured and contained in secure ponds for appropriate disposal.

Site access roads are considered private roads, administered and controlled entirely by TMAC. Although none of these access roads are used as, or classified as mine haul roads in accordance with the Nunavut Mine Safety Act pertaining to haul roads, TMAC has opted to ensure that all site roads are designed in accordance with the minimum requirements as set out for mine haul roads in the Nunavut Mine Safety Act.

All site roads use the same primary design criteria as the 10 km long Doris-Windy All-Weather Road, which includes allowing for dual lane traffic for frequently travelled vehicles such as trucks and crew busses, while allowing single lane traffic for occasional oversize vehicles. Strategically placed road turnouts are provided to facilitate single lane use.

3 Site Layout Alternatives

TMAC considered three surface infrastructure alternatives for the waste rock pile at the Madrid North portal location:

- South Waste Rock Pile. The waste rock pile would be placed in the gully located to the southwest of the portal. The pollution control pond berm, required to capture the contact water, would be located on disturbed ground that has experienced permafrost degradation and would tie into the Doris-Windy All-Weather Road. To provide containment capacity the berm would need to be up to 7 m in height. This option was not selected because of the berm height.

- East Waste Rock Pile. The waste rock pile would be placed in the gully located to the south east of the portal. The pollution control pond berm required to capture the contact water would be located in proximity to the vent raise pad with access from the Doris-Windy All-Weather Road. To provide containment capacity the berm would need to be up to 6 m in height. This option was not selected because of the berm height and the proximity to the vent raise pad.

- North Waste Rock Pile. The waste rock pile as well as the ore stockpile would be placed in the large open area north of the portal. The pollution control pond berm required to capture the contact water would only need to be 3 m in height. This option also provides suitable grades for access road construction to the pollution control pond. This option was the preferred option.

4 System Design

4.1 Design Criteria

The infrastructure associated with the underground activities at Madrid North consists of roads, a waste rock pad, an ore stockpile pad, a portal and portal upper pad, a fuel transfer station pad and a vent raise pad.

The infrastructure components associated with operations, the underground portal and the vent raise are summarized in Table 1.

Table 1: Surface Infrastructure Facilities Associated With the Portal and Vent Raise

Infrastructure Component	Surface Area	Limitations	Comments
Waste Rock Pad	21,530 m^2	Within 500 m haul distance from portal; haul road cannot exceed 7% grade	Storage for 285,000 tonnes minimum of waste rock
Ore Stockpile Pad	5,560 m^2	Within 500 m haul distance from portal; haul road cannot exceed 7% grade	Storage for 50,000 tonnes minimum of ore
Shop	450 m^2 (15x30 m)	Horizontal pad of rectangular shape	
Laydown Area	1,000 m^2 (20x50 m) minimum		
Diesel Power Generator	19 m^2 (2.5x7.5 m)		Seacan container at the portal entrance
Site Office Trailer	30 m^2 (3x10m)		ATCO Trailer
Emergency Shelter	30 m^2 (3x10m)		Trailer
Brine Mixing Facility (BMF)	19 m^2 (2.5x7.5 m)	Required at portal	Seacan container. Also includes area for CaCl laydown
Water Storage Tank with Containment	144 m^2 (12x12m)	Required at portal	50,000L water tank assumed (tank radius ~4.4m)
Air Heating Facility	19 m^2 (2.5x7.5 m)	Required immediately adjacent to vent raise	
Fuel Tanks	Requires lined containment	(Fuel Transfer Station) (Fuel Containment Area)	75,000 L Fuel Tank 60,000 L Fuel Tank
Fuel Transfer Station Fuel Containment Area	1,258 m^2 (34x37 m) 441 m2 (21x21 m)	Drive-through facility (lined containment)	Each holds one Fuel Tank

4.2 Survey Data

The design of the Madrid North infrastructure pads and access roads are based on topographic contour maps produced from 2008 aerial photography supplied by Hope Bay Mining Limited (HBML). No detailed ground surveys have been completed.

4.3 Foundation Conditions

Comprehensive geotechnical investigations have been carried out at the Hope Bay Site (SRK 2009). This information confirms that the area lies within the zone of continuous permafrost, with the permafrost being up to 550 m deep. Permafrost temperature at the surface is about -8ºC and the active layer is generally less than 1 m thick. Laboratory and in-situ tests on disturbed and undisturbed samples indicate that the overburden soils are predominantly comprised of marine silts and clays, and the pore-water in these soils has high salinity, depressing the freezing point to -2ºC. The ice-rich overburden soils are typically between 5 and 20 m deep, before encountering competent bedrock, predominantly basalt. Bedrock is frequently exposed, rising columnar 5 to 100 m above the surrounding landscape.

Thermal modelling has determined that a 1 m minimum of rock fill cover would be required over the tundra to preserve the permafrost under the infrastructure pads (SRK 2006). Since all pads are designed to have a flat surface with minor grading for drainage, the run of quarry (ROQ) fill thickness reaches up to 7 m at places due to underlying topography.

The geotechnical design parameters for Hope Bay have been summarized in SRK (2011a).

4.4 Waste Rock Pile and Ore Stockpile

4.4.1 Design Criteria

The waste rock pad is designed to accommodate a minimum of 285,000 tonnes of waste rock while the ore stockpile pad is designed to accommodate a minimum of 50,000 tonnes of ore. Both the waste rock pad and ore stockpile pad will be a minimum of 1 m thick ROQ material placed over the original ground. The waste rock pile and ore stockpile have a haul distance of less than 500 m; avoids archaeological sites; and are more than 31 m from neighbouring water bodies.

4.4.2 Design

The overall waste rock pile design, at this location, has not been finalized; however, the waste rock pile will be constructed with an overall slope angle of 2H:1V. The waste rock pile has a base area of 21,530 m^2.

The overall ore stockpile design, at this location, has not been finalized but will be constructed with an overall slope angle of 2H:1V. The ore stockpile has a base area of 5,560 m^2.

4.5 Pollution Control Pond

4.5.1 Design Criteria

The pollution control pond has the capacity to contain contact water from the overall drainage area and 25% of annual snow coverage combined with a 100-year, 24-hour storm event which is 14,940 m^3 of water.

4.5.2 Design

There is a single pollution control pond at Madrid North. This fully lined pond is located downstream of the portal, waste rock and ore stockpile pads. The pond will be contained by a 6 m wide berm. This berm has been designed to allow for light vehicle access around the pond for regular inspection; to assist in accommodating any required maintenance; and to allow for a vacuum truck to remove any retained water. The containment berm will be constructed using ROQ material. The surface area of the pollution control pond is 13,900 m^2.

4.6 Madrid North Pads

4.6.1 Design Criteria

The design criteria for the Madrid North pads are as follows:

- Minimum 1 m fill thickness must be maintained;
- 1.5H:1.0V slopes are utilized with fill thickness less than 2 m;
- 2.0H:1.0V slopes are utilized with fill thickness greater than 2 m;
- The maximum particle size for ROQ is 500 mm for fill thickness of 850 mm, and 900 mm for fill thickness exceeding 850 mm. All material shall be free from organic matter, soil, snow and ice;
- No cut is allowed, except in designated rock quarries; and
- Safety barricades (oversize ROQ boulders, Jersey Barriers, or Berms) are to be placed along the crest where fill thicknesses are greater than 3 m.

4.6.2 Design

Pads are to be constructed using a minimum 1 m thick fill material. Typically the fill is expected to consist of minimum 0.85 m of ROQ overlain by a minimum 0.15 m thick surfacing material layer. The waste rock pad and ore stockpile pad do not require surfacing material; however, the 1 m minimum fill thickness must be maintained for permafrost protection and to allow for adequate seep drainage. All pads will be graded at 0.5% towards the pollution control pond or to assist in promoting sediment control measures.

4.7 Access and Haul Roads

4.7.1 Design Criteria

There are three road alignments within Madrid North. The first road alignment, portal pad haul road, is a 243 m long by 9.5 m wide haul road to the portal which extends from kilometre 8+600 along the Doris-Windy All-Weather Road west to the portal and infrastructure pad. The second road alignment, pond access road, is a 448 m long by 6 m wide access road which extends from the portal and infrastructure pad to the pollution control pond berm. The third road alignment, access road, is the 70 m long by 6 m wide vent raise access road which extends from kilometre 9+000 along the Doris-Windy All-Weather Road to the vent raise and infrastructure pad.

The design criteria for the access and haul roads are the same as for the Doris-Windy All-Weather Road (SRK 2012). The key design criteria are:

- Access and haul roads have a maximum grade of 7%;
- A minimum thickness of 1 m over tundra must be maintained and 0.3 m over bedrock;
- The roadway will be crowned to promote drainage by means of 0.5% surface grading in both directions from the centreline of the roadway;

- Road shoulders will be graded to 2H:1V in areas where fill thickness is at least 1.5 m and 1.5H:1V in zones where fill thickness is less than 1.5 m; and
- No cut is allowed, except in designated rock quarries, and then only to a grade at least 0.5 m above the surrounding tundra elevation.

4.7.2 Design

The all-weather roads will be constructed from ROQ material obtained from local approved and permitted rock quarries. This material will be placed in lift thicknesses that do not exceed 0.85 m and compacted using a vibratory drum compactor using a site specific compaction specification. The surfacing layer of the road consists of a 150 mm thick layer of 1¼ inch crush.

The portal pad haul road is 9.5 m wide to allow for two-way traffic, of larger vehicles, to and from the waste rock pile and ore stockpile. The pond access road and the access road to the vent raise pad have been designed with a final road crest width of 6 m to allow for one-way traffic.

4.8 Fuel Storage

4.8.1 Design Criteria

There will be two locations where fuel will be stored at Madrid North. A 75,000 L fuel transfer station, with a 75,000 L fuel tank, will be located on the fuel storage facility pad and a fuel containment area, with a 60,000 L fuel tank, will be located at the vent raise pad.

The fuel transfer station and fuel containment area are designed to contain 110% of the entire volume of the fuel tank plus 10% of the fuel transport truck as well as 25% of annual snow cover combined with a 1-in-100 year 24-hour storm event.

Each facility will consist of a fuel tank containment area and a fuel transfer apron which will contain fuel lines as well as the fuel transport truck. The entire footprint of each facility will be lined with a HDPE membrane sandwiched between two layers of 12 oz. non-woven geotextile. The floor of the containment area will be sunk into the ROQ fill of the pad, such that the crest of the liner is flush with the pad surface, and a slightly raised berm (0.3 m high above the pad surface elevation) will enclose the perimeter of the containment area and the fuel transfer apron, to prevent spills outside of the lined area. A bedding layer 0.2 m thick consisting of ¾ inch crushed rock will be placed and compacted prior to liner deployment. The liner will be covered by a lift of ¾ inch crushed rock over its entire surface, including the floor and the slopes of the containment. A second lift, 0.3 m thick, of 1 ¼ inch crushed rock will be placed on the floor of the containment, while a third lift of 1 ¼ inch crush will be placed over the footprint of the fuel transfer apron.

A sump will be installed in one corner of the containment area, and the surface of the containment area will be graded to drain toward the sump.

In addition, the fuel storage facilities will be designed to the following codes and guidelines:

- NFPA 30 – Flammable and Combustible Liquids Code 2008 Edition;
- Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products - Canadian Council of Ministers of the Environment; and
- Canada Gazette Part 1, Vol. 141, No. 14 April 7, 2007.

5 Construction Methodology

The pads and roads will be constructed with ROQ material excavated from permitted and approved quarries along the Doris-Windy All-Weather Road (Quarry A, B, and D). SRK (2008) discusses the complete details pertaining to geochemical characterization of these rock quarries confirming their suitability for use in construction. The management and monitoring of quarry development for the construction of the infrastructure pads and access roads is discussed in SRK (2010).

Surface grade material for both the surface infrastructure pads as well as access and haul roads will be from Quarry #2 and the crusher located in Quarry #2. Complete material quantities are included in Attachment 1.

All roads and pads will be constructed in accordance to SRK's Technical Specifications (SRK 2011b.

6 References

SRK Consulting (Canada) Inc., 2006. Doris North Project – Thermal modeling to support design thickness for granular pads. Technical Memorandum, Prepared for Miramar Hope Bay Limited, Project Number: 1CM014.008, August 20, 2006.

SRK Consulting (Canada) Inc., 2008. Geochemical Characterization of Quarry Materials for the Doris-Windy All-Weather Road. Hope Bay Project. Report Prepared for Hope Bay Mining Limited, Project Number 1CH008.000.300. August 2008.

SRK Consulting (Canada) Inc., 2009. Hope Bay Gold Project: Stage 2 Overburden Characterization Report, Prepared for Hope Bay Mining Limited, Project Number: 1CH008.002, September, 2009.

SRK Consulting (Canada) Inc., 2010. Hope Bay Project. Quarry A, B & D Management and Monitoring Plan – Revision 01. Report Prepared for Hope Bay Mining Limited. Project Number 1CH008.038.002. October 2010.

SRK Consulting (Canada) Inc., 2011a. Hope Bay Project – Geotechnical Design Parameters. Revision 0. Report Prepared for Hope Bay Mining Limited. Project Number: 1CH008.033.216. October 2011.

SRK Consulting (Canada) Inc., 2011b. Technical Specifications Earthworks and Geotechnical Engineering. Hope Bay Project, Nunavut, Canada. Revision G – Issued for Construction. Report Prepared for Hope Bay Mining Ltd. Project Number: 1CH008.027. March 2011

SRK Consulting (Canada) Inc., 2012. Engineering Drawings for the Doris-Windy All-Weather Road, Doris Infrastructure Project, Nunavut, Canada. Revision 1 - As-Built. Drawing Package Prepared for Hope Bay Mining Ltd. Project Number 1CH008.033/.058. May 11, 2012.

SRK Consulting (Canada) Inc., 2014a. Madrid North Water Management Plan. Technical Memorandum Prepared for TMAC Resources Inc., Project Number: 1CT022.001.410. November 14, 2014.

SRK Consulting (Canada) Inc., 2014b. Hope Bay Project: Madrid Advanced Exploration Program: Conceptual Closure and Reclamation Plan. Technical Memorandum Prepared for TMAC Resources Inc., Project Number: 1CT022.001.410. October 31, 2014.

Attachment 1
Engineering Drawings for the Madrid North Surface Infrastructure

Engineering Drawings for the Madrid North Surface Infrastructure, Hope Bay Project, Nunavut, Canada

ACTIVE DRAWING STATUS

DWG NUMBER	DRAWING TITLE	REVISION	DATE	STATUS
MNP-01	Engineering Drawings for the Madrid North Surface Infrastructure, Hope Bay Project, Nunavut, Canada	E	Oct. 31, 2014	Minor Edits
MNP-02	General Arrangement Doris North Camp to Madrid North Portal	C	Oct. 31, 2014	Minor Edits
MNP-03	Site Layout Portal	D	Oct. 31, 2014	Minor Edits
MNP-04	Portal Access Road and Pond Access Road Profiles	B	Oct. 31, 2014	Minor Edits
MNP-05	Sections A and B	D	Oct. 31, 2014	Minor Edits
MNP-06	Typical Fuel Transfer Station	D	Oct. 31, 2014	Minor Edits
MNP-07	Typical Fuel Transfer Station Sections	D	Oct. 31, 2014	Minor Edits
MNP-08	Site Layout Vent Raise	D	Oct. 31, 2014	Minor Edits
MNP-09	Vent Raise Section and Profile	C	Oct. 31, 2014	Minor Edits
MNP-10	Berm and Barrier Details	C	Oct. 31, 2014	Minor Edits
MNP-11	Animal Crossing Plan and Section and Culvert Section	C	Oct. 31, 2014	Minor Edits
MNP-12	Material List and Quantity Estimates	D	Oct. 31, 2014	Minor Edits

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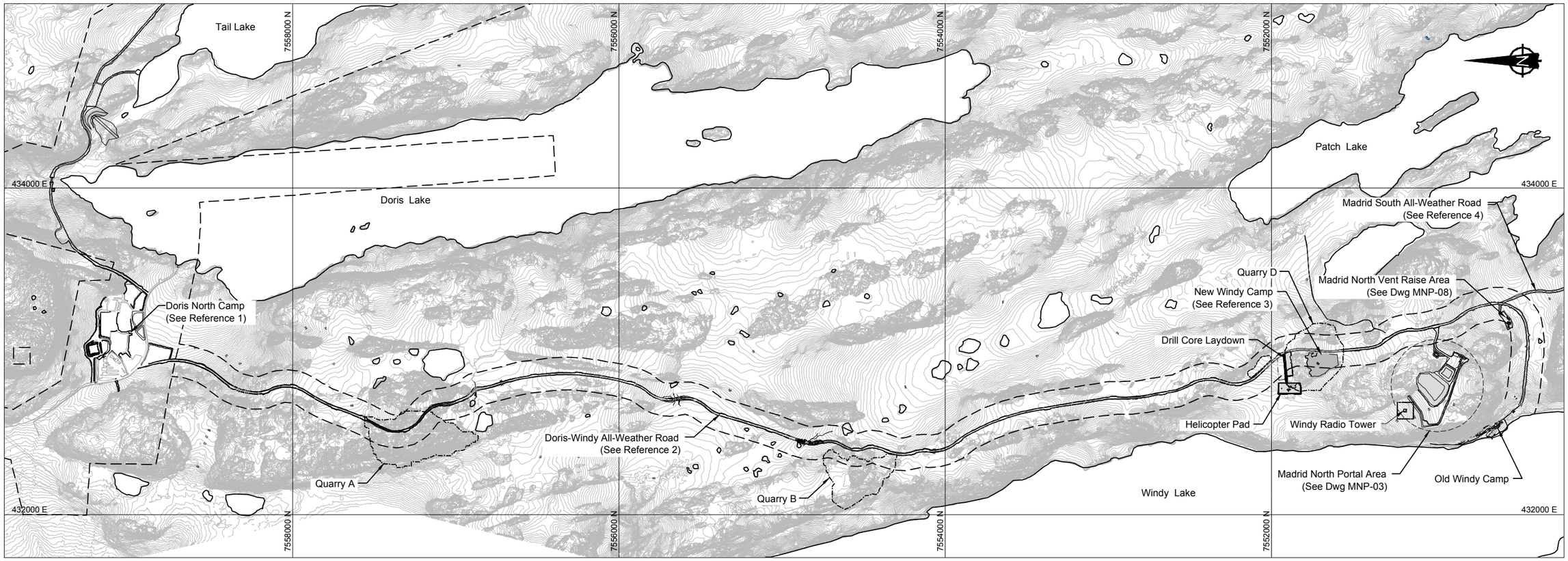
PROJECT NO: 1CT022.001
Revision E
October 31, 2014
Drawing MNP-01



NOTES

1. Topographic contour data for the terrain model were provided by Hope Bay Mining, and is based on 2007 Aerial Photography. Contour intervals are 0.5m.
2. The co-ordinate system is UTM NAD 83, Zone 13.
3. All dimensions are in metric units, unless specifically mentioned.
4. Notes in this drawing apply to all other active drawings.

REFERENCES

1) Engineering Drawings for the Doris North Camp Area, Doris North Project, Nunavut, Canada. Revision AB1. As-Built Drawings Prepared for Hope Bay Mining Limited. Project Number 1CH008.033. May 18, 2012
2) Engineering Drawings for the Doris-Windy All-Weather Road, Doris Infrastructure Project, Nunavut, Canada. Revision AB1. As-Built Drawings Prepared for Hope Bay Mining Ltd. Project Number: 1CH008.033/.058. May 11, 2012
3) Engineering Drawings for the New Windy Camp, Doris North Project, Nunavut, Canada. Revision 3. Issued for Construction Drawings Prepared for Hope Bay Mining Ltd. Project Number 1CH008.033. October 17, 2011
4) Engineering Drawings for the Madrid South All-Weather Road, Hope Bay Project, Nunavut, Canada. Revision D. Issued for Discussion Drawings Prepared for TMAC Resources Inc. Project Number 1CT022.001.410. October 31, 2014

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Scale in Metres

DRAWING NO.	DRAWING TITLE	DRAWING NO.	DRAWING TITLE

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
C	Minor Edits	LW	EMR	31Oct14
B	Minor Edits	LW	EMR	12June14
A	Issued for Discussion	LW	EMR	14Mar14

REVISIONS

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DESIGN:	DRAWN:	REVIEWED:
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LW/EMR	EMR	Oct. 2014

FILE NAME: 1CT022.001_Madrid_North_Portal Overview.dwg

TMAC RESOURCES

HOPE BAY PROJECT

SRK JOB NO.: 1CT022.001

Madrid North Surface Infrastructure

DRAWING TITLE:
General Arrangement
Doris North Camp to Madrid North Portal

DRAWING NO.	SHEET	REVISION NO.
MNP-02	2 OF 11	C

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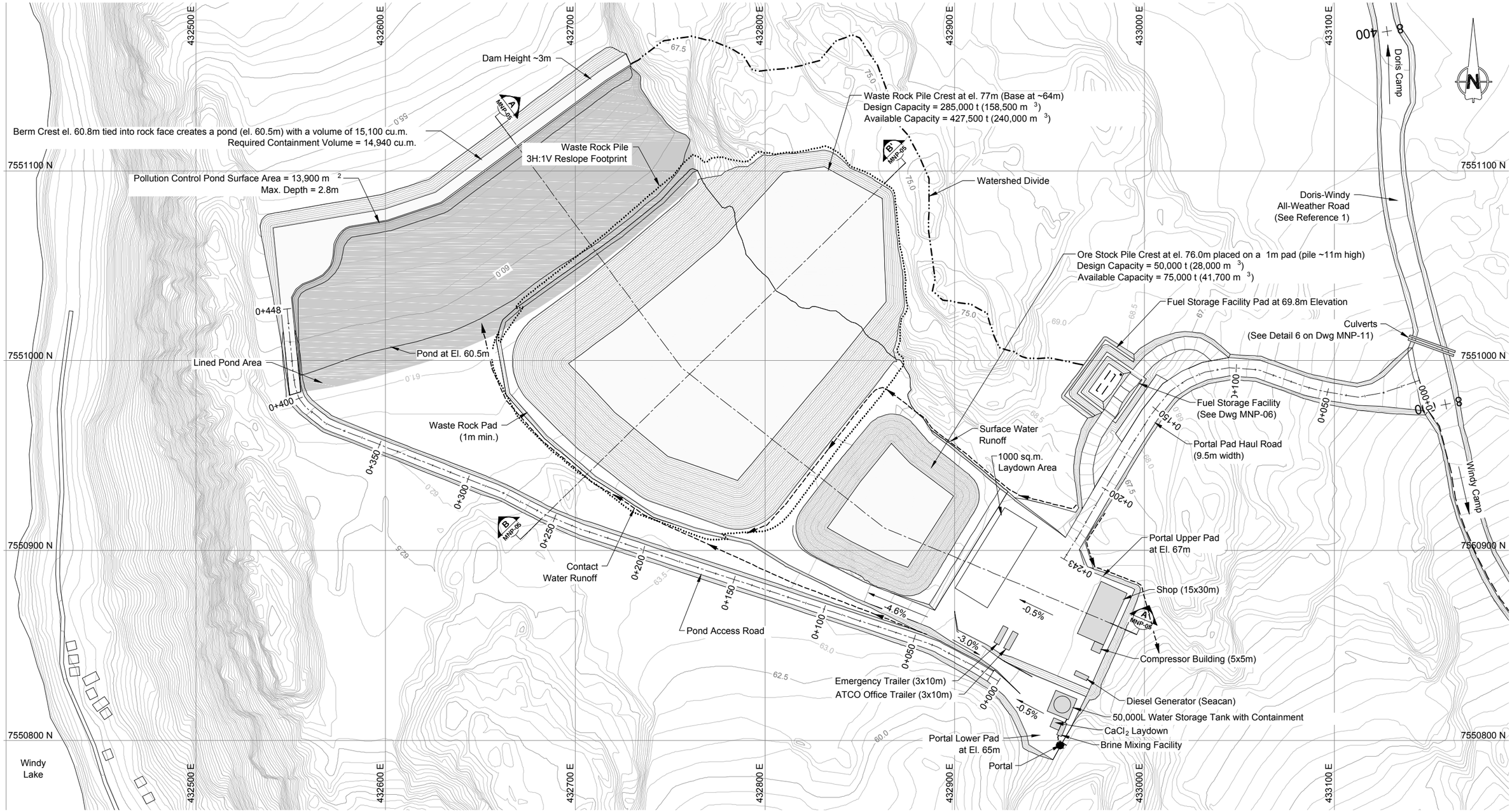

NOTES

1. All dimensions in metres unless noted otherwise.
2. Notes in this drawing apply to all other active drawings.

REFERENCE

1) Engineering Drawings for the Doris-Windy All-Weather Road, Doris Infrastructure Project, Nunavut, Canada. Revision AB1. As-Built Drawings Prepared for Hope Bay Mining Ltd. Project Number: 1CH008.033/.058. May 11, 2012

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NO.	DESCRIPTION	CHK'D	APP'D	DATE
D	Minor Edits	LW	EMR	31Oct14
C	Minor Edits	LW	EMR	17Sep14
B	Minor Edits	LW	EMR	25Apr14
A	Issued for Discussion	LW	EMR	14Mar14

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TMAC RESOURCES

HOPE BAY PROJECT

SRK JOB NO.: 1CT022.001

Madrid North Surface Infrastructure

DRAWING TITLE:

Site Layout Portal

DRAWING NO.	SHEET	REVISION NO.
MNP-03	3 OF 11	D

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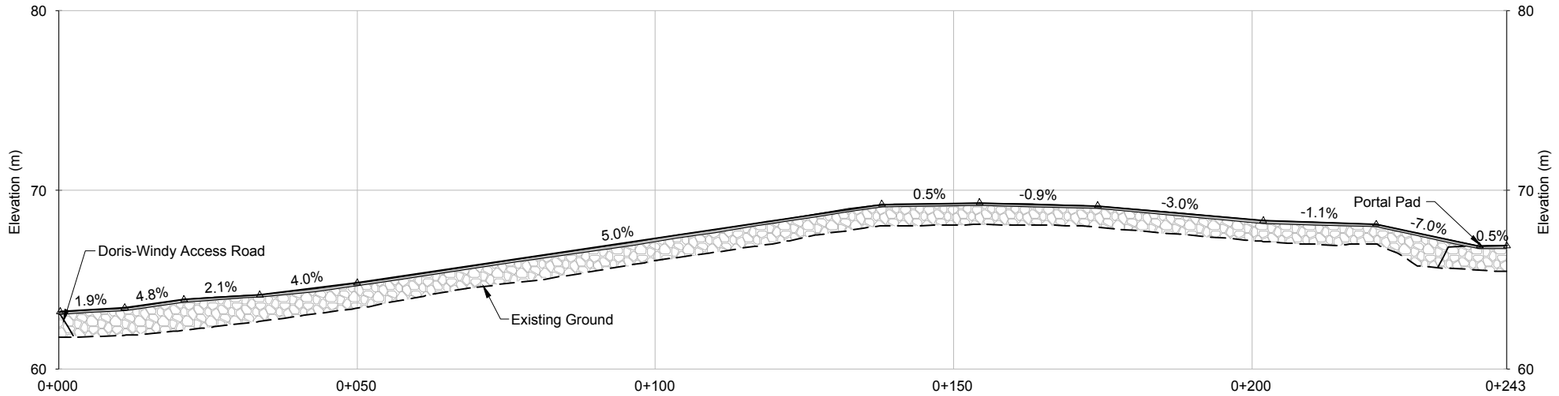

PORTAL HAUL ROAD PROFILE

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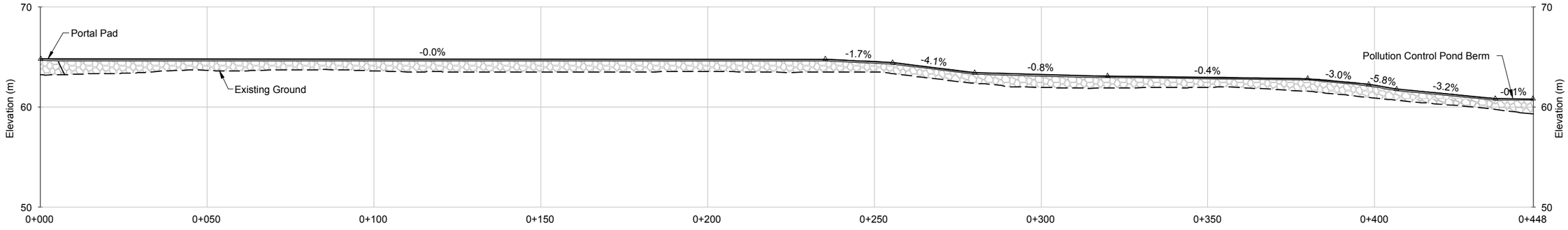

POND ACCESS ROAD PROFILE

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Horizontal Scale in Metres
Vertical Exaggeration 3X

LEGEND

- Existing ground surface
- Surfacing Material
- Run of Quarry Material
- Point of Intersection
- 6.1% Grade

NOTES

1. All dimensions in metres unless noted otherwise.
2. Notes in this drawing apply to all other active drawings.

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REFERENCE DRAWINGS			

NO.	DESCRIPTION	CHK'D	APP'D	DATE
B	Minor Edits	LW	EMR	31Oct14
A	Issued for Discussion	LW	EMR	14Mar14
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HOPE BAY PROJECT

SRK JOB NO.: 1CT022.001

Madrid North Surface Infrastructure

DRAWING TITLE:
Portal Access Road and
Pond Access Road Profiles

DRAWING NO.	SHEET	REVISION NO.
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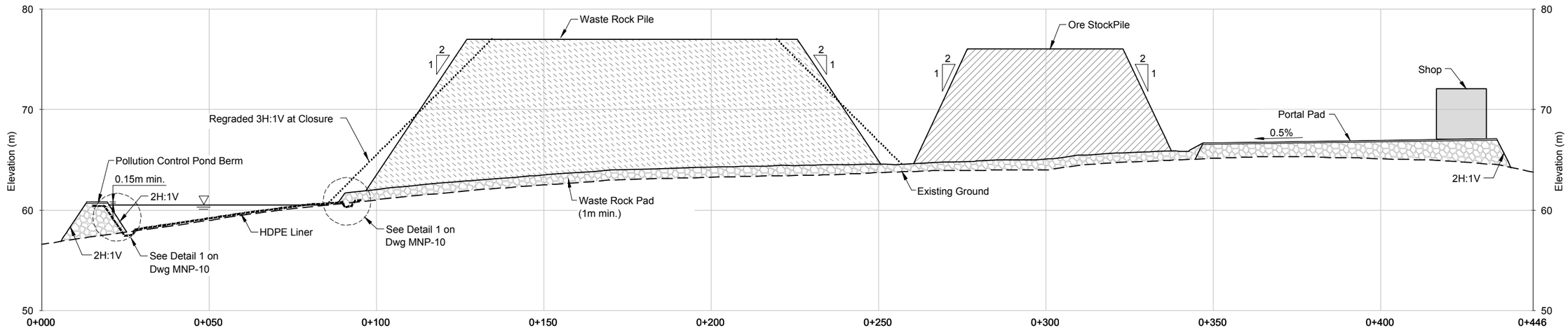

A MNP-03 **SECTION A**

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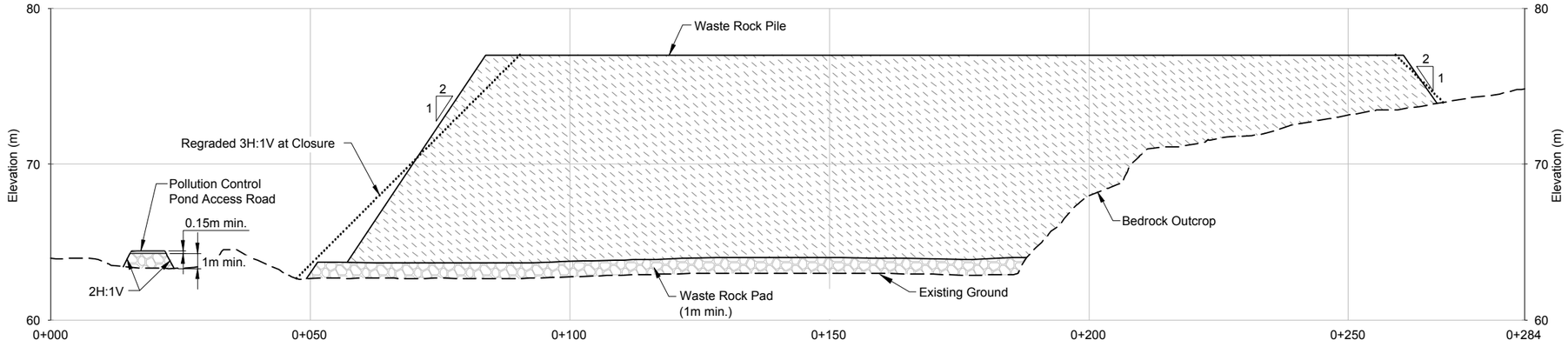

B MNP-03 **SECTION B**

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Horizontal Scale in Metres
Vertical Exaggeration 3X

LEGEND

- Existing ground surface
- Surfacing Material
- Run of Quarry Material
- Waste Rock
- Ore Stockpile

NOTES

1. All dimensions in metres unless noted otherwise.
2. Where the thickness of the pads is greater than 3.0m allow for the placement of barriers.
3. The barriers are to consist of boulders larger than 1m in diameter, jersey-barriers (1.82 long X 1.37m high X 0.61m wide) or a rock fill berm 0.5m high. Maximum spacing between barriers is 3.3m.
4. Notes in this drawing apply to all other active drawings.

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B	Minor Edits	LW	EMR	25Apr14
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FILE NAME: 1CT022.001_Madrid_North_Portal.dwg

TMAC RESOURCES

HOPE BAY PROJECT

SRK JOB NO.: 1CT022.001

Madrid North Surface Infrastructure

DRAWING TITLE:

Sections A and B

DRAWING NO.	SHEET	REVISION NO.
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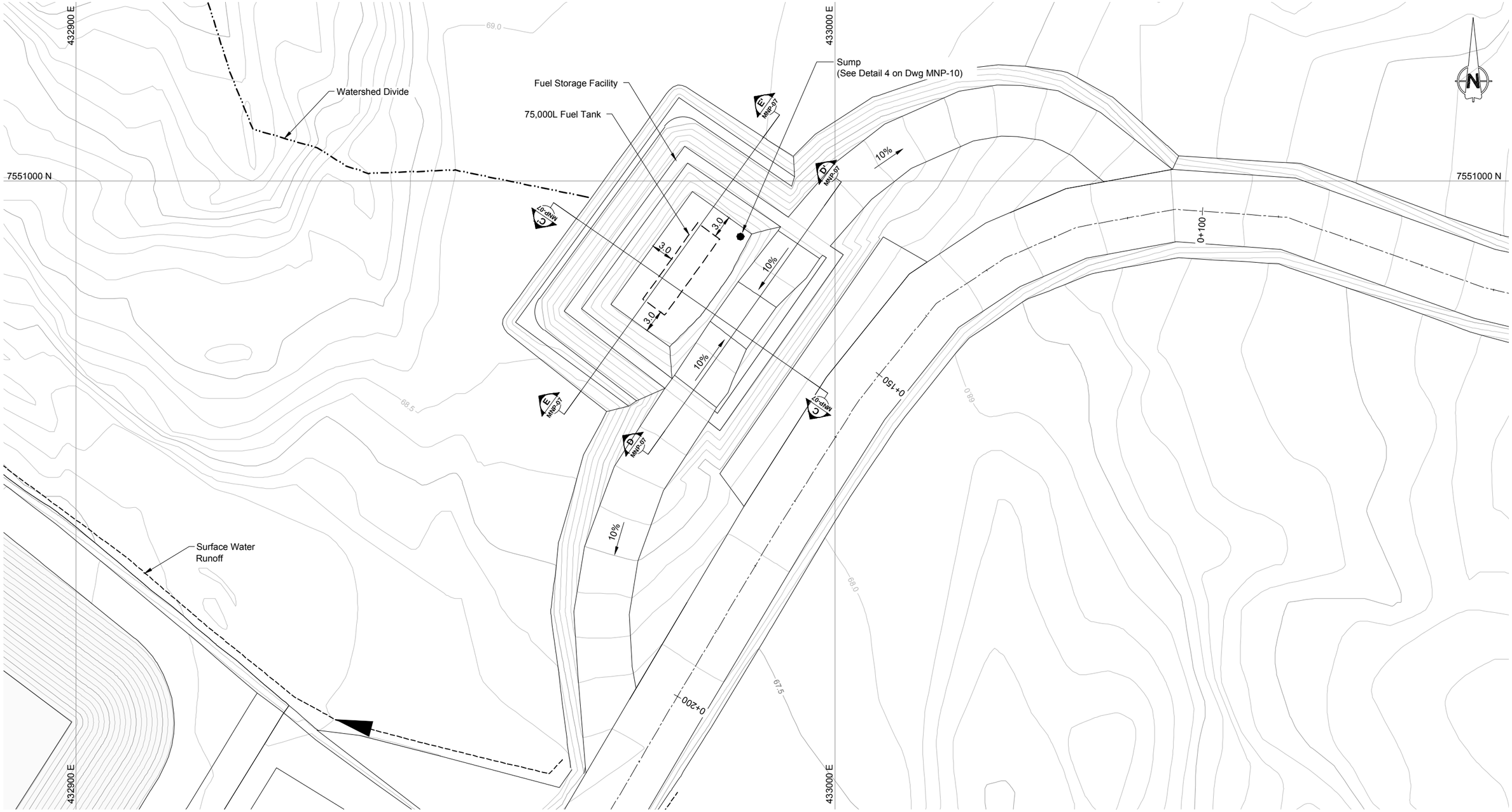

NOTES

1. All dimensions in metres unless noted otherwise.
2. Notes in this drawing apply to all other active drawings.

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Scale in Metres

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B	Minor Edits	LW	EMR	25Apr14
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LW/EMR	EMR	Oct. 2014

FILE NAME: 1CT022.001_Madrid_North_Portal.dwg

TMAC RESOURCES

HOPE BAY PROJECT

SRK JOB NO.: 1CT022.001

Madrid North Surface Infrastructure

DRAWING TITLE:

Typical Fuel Transfer Station

DRAWING NO.	SHEET	REVISION NO.
MNP-06	6 OF 11	D

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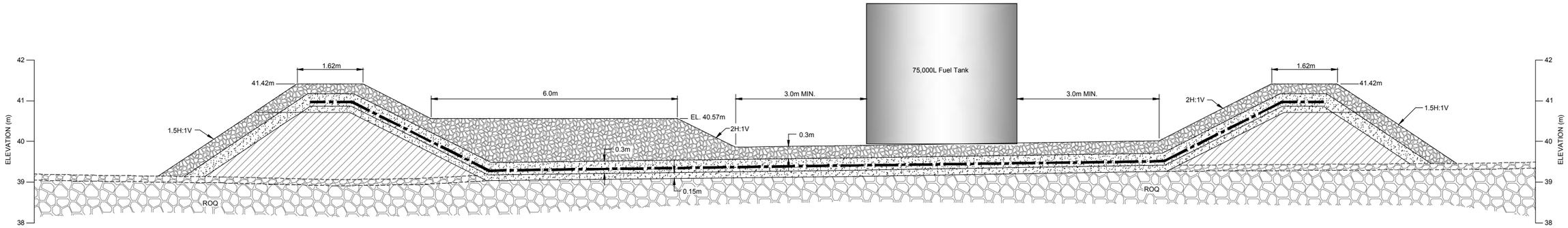

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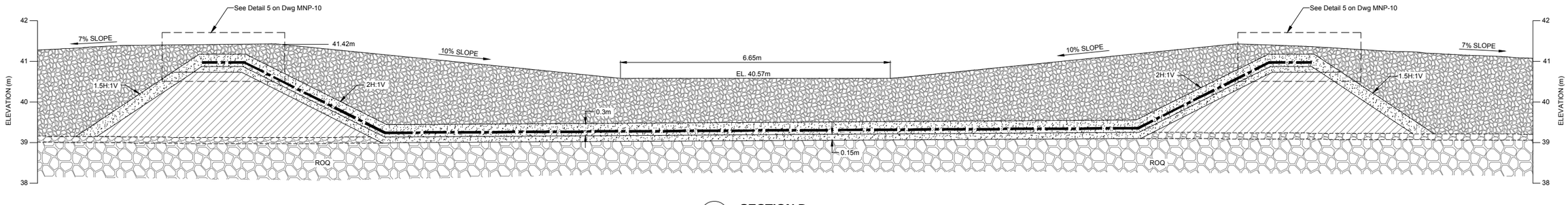

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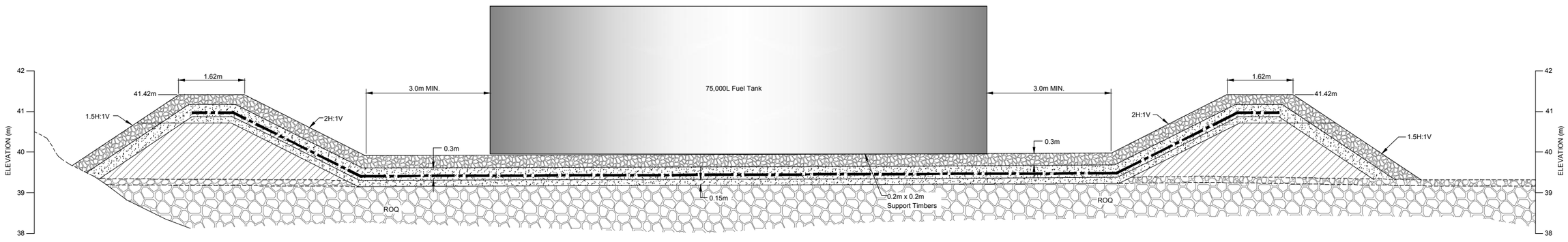

E MNP-06 **SECTION E**

LEGEND

- ¾" Crush Finishing Material
- 1 ¼" Crushed Material
- 6" Compacted Jaw-Run Material
- Run of Quarry Material
- Liner System

0 0.5 1 1.5 2 2.5
Scale in Metres

DRAWING NO.	DRAWING TITLE	DRAWING NO.	DRAWING TITLE

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
D	Minor Edits	LW	EMR	31Oct14
C	Minor Edits	LW	EMR	17Sep14
B	Minor Edits	LW	EMR	12June14
A	Issued for Discussion	LW	EMR	14Mar14

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LW/EMR	EMR	Oct. 2014

FILE NAME: 1CT022.001_Madrid_North_Fuel Transfer Section.dwg

TMAC RESOURCES

HOPE BAY PROJECT

SRK JOB NO.: 1CH008.027/033/058

Madrid North Surface Infrastructure

DRAWING TITLE:

Typical Fuel Transfer Station Sections

DRAWING NO.	SHEET	REVISION NO.
MNP-07	7 OF 12	D

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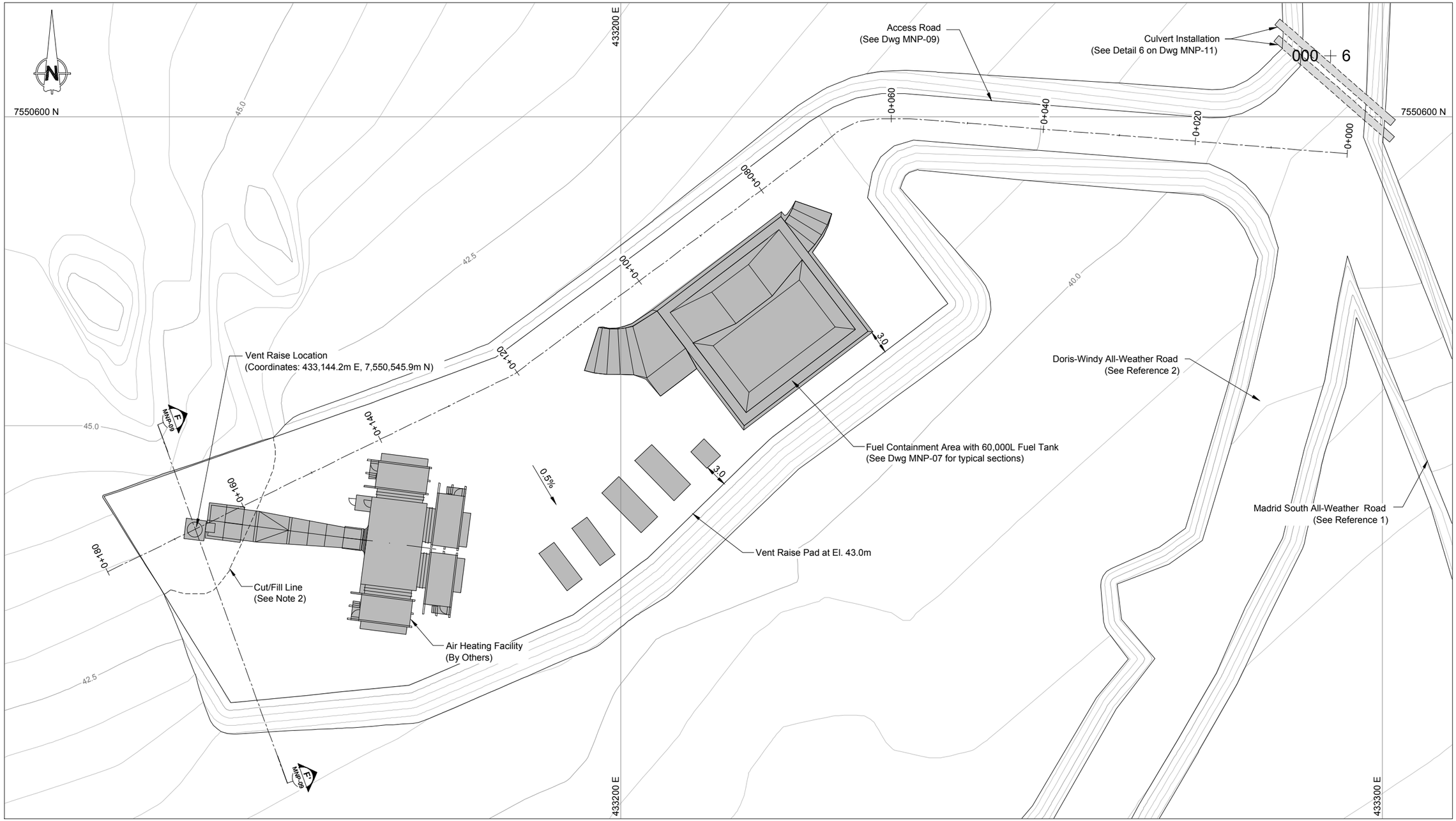

NOTES

1. All dimensions in metres unless noted otherwise.
2. Cut into bedrock outcrop required for construction of vent raise collar.
3. Notes in this drawing apply to all other active drawings.

REFERENCES

1) Engineering Drawings for the Madrid South All-Weather Road, Hope Bay Project, Nunavut, Canada. Revision D. Issued for Discussion Drawings Prepared for TMAC Resources Inc. Project Number 1CT022.001.410. October 31, 2014

2) Engineering Drawings for the Doris-Windy All-Weather Road, Doris Infrastructure Project, Nunavut, Canada. Revision AB1. As-Built Drawings Prepared for Hope Bay Mining Ltd. Project Number: 1CH008.033/.058. May 11, 2012

0 2 4 6 8 10
Scale in Metres

DRAWING NO.	DRAWING TITLE	DRAWING NO.	DRAWING TITLE

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
D	Minor Edits	LW	EMR	31Oct14
C	Minor Edits	LW	EMR	17Sep14
B	Minor Edits	LW	EMR	25Apr14
A	Issued for Discussion	LW	EMR	14Mar14

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CHECKED: LW/EMR	APPROVED: EMR	DATE: Oct. 2014

FILE NAME: 1CT022.001_Madrid_North_Portal.dwg

TMAC RESOURCES

HOPE BAY PROJECT

SRK JOB NO.: 1CT022.001

Madrid North Surface Infrastructure

DRAWING TITLE:

Site Layout Vent Raise

DRAWING NO.	SHEET	REVISION NO.
MNP-08	8 OF 11	D

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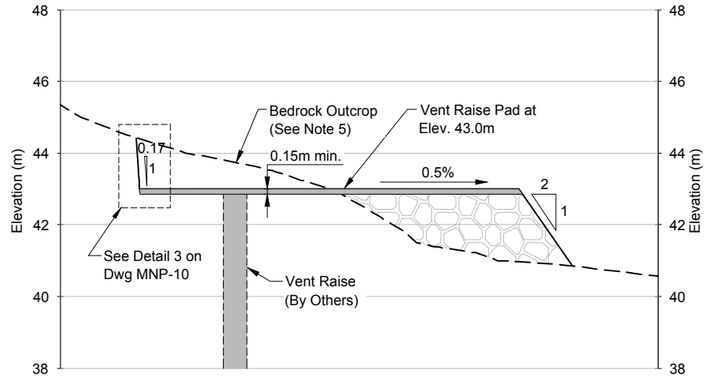
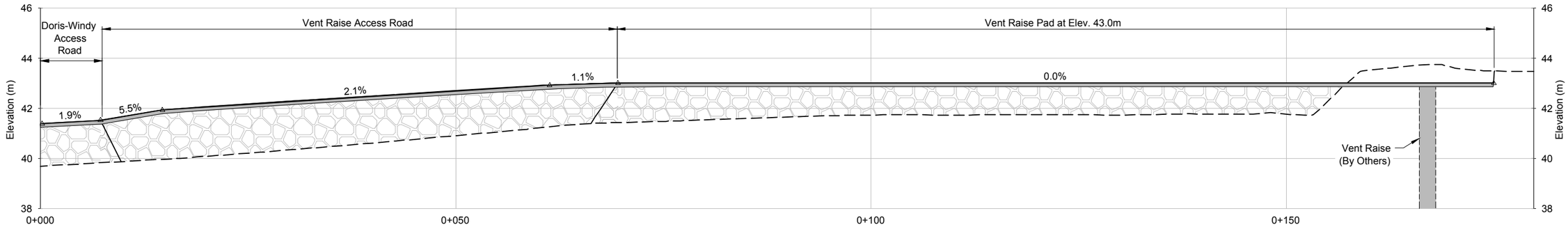


F MNP-08 **SECTION F**

0 2 4 6 8 10
Horizontal Scale in Metres
Vertical Exaggeration 3X



VENT RAISE PAD AND ACCESS ROAD PROFILE

0 2 4 6 8 10
Horizontal Scale in Metres
Vertical Exaggeration 3X

LEGEND

- Existing ground surface
- Surfacing Material
- Run of Quarry Material

NOTES

1. All dimensions in metres unless noted otherwise.
2. Where the thickness of the pads is greater than 3.0m allow for the placement of barriers.
3. The barriers are to consist of boulders larger than 1m in diameter, jersey-barriers (1.82 long X 1.37m high X 0.61m wide) or a rock fill berm 0.5m high. Maximum spacing between barriers is 3.3m.
4. Extents of bedrock outcrop are based on 2007 aerial orthophoto and ground inspection. To ensure layouts match site conditions exact extents of bedrock outcrops are to be surveyed prior to any construction activities.
5. Cut into bedrock outcrop required for construction of vent raise collar.
6. Notes in this drawing apply to all other active drawings.

REFERENCE DRAWINGS				REVISIONS				
DRAWING NO.	DRAWING TITLE	DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
				C	Minor Edits	LW	EMR	31Oct14
				B	Minor Edits	LW	EMR	17Sep14
				A	Issued for Discussion	LW	EMR	14Mar14

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CHECKED: LW/EMR | APPROVED: EMR | DATE: Oct. 2014
FILE NAME: 1CT022.001_Madrid_North_Portal.dwg

TMAC RESOURCES

HOPE BAY PROJECT
SRK JOB NO.: 1CT022.001

Madrid North Surface Infrastructure

DRAWING TITLE:
Vent Raise Section and Profile

DRAWING NO. MNP-09 | SHEET 9 OF 11 | REVISION NO. C

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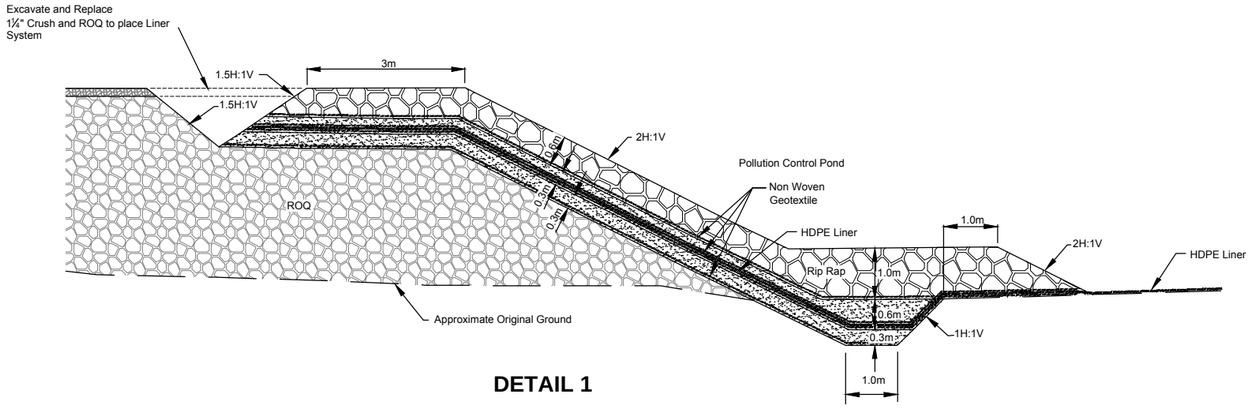
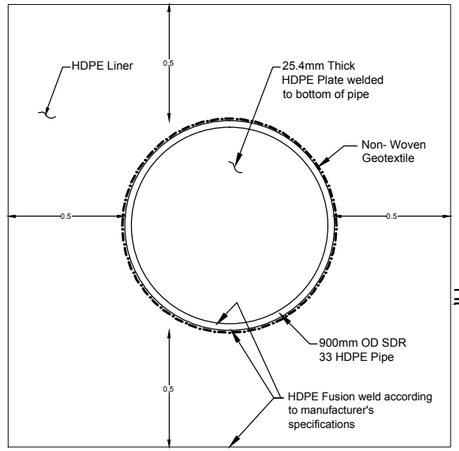
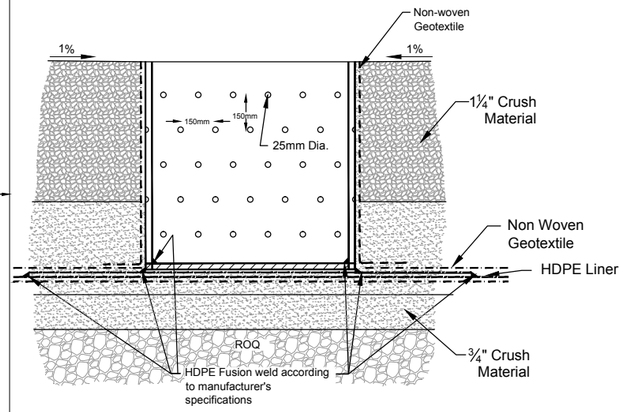


DETAIL 1

TYPICAL LINED KEY TRENCH SECTION

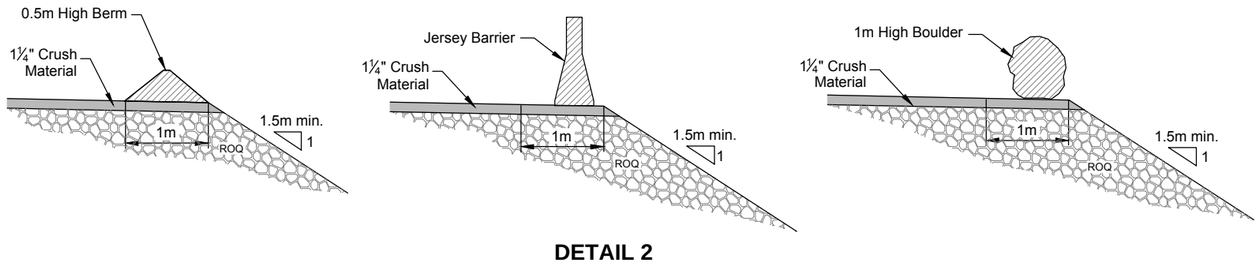
NTS





DETAIL 4 - SUMP

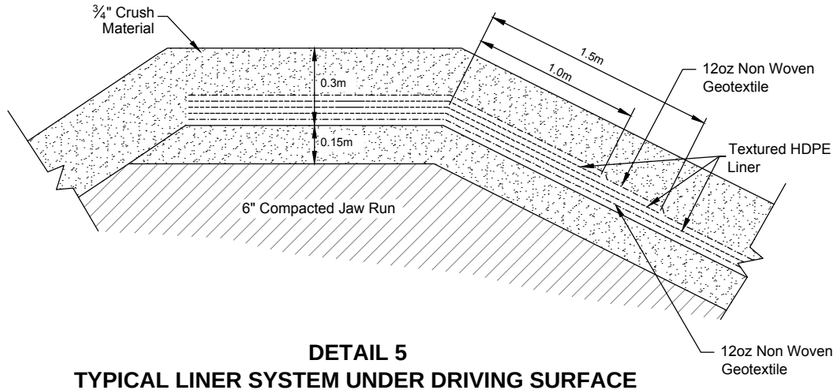
NTS



DETAIL 2

TYPICAL BERM BARRIER OPTIONS

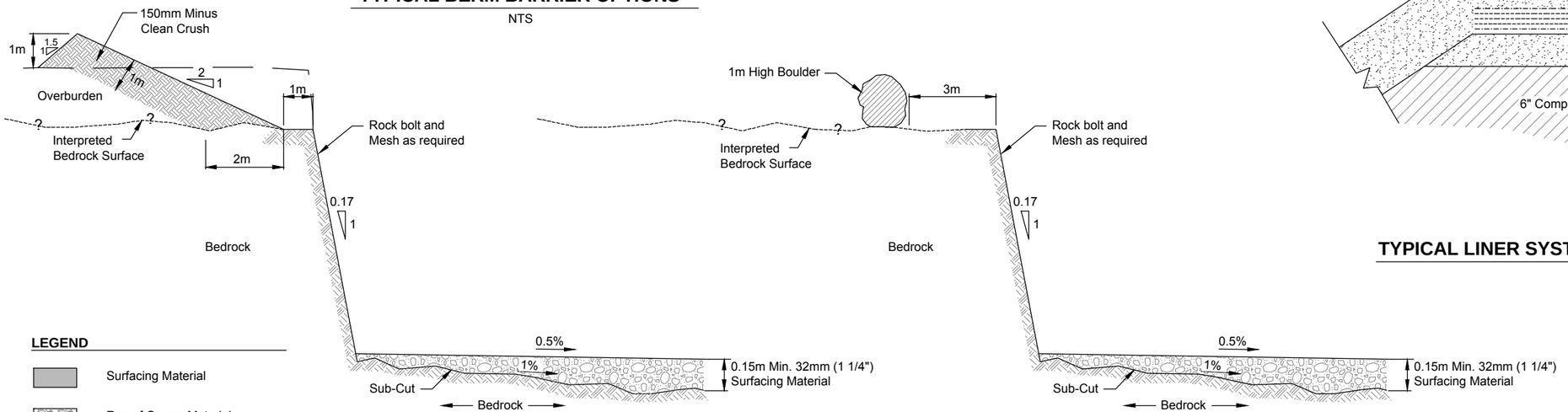
NTS



DETAIL 5

TYPICAL LINER SYSTEM UNDER DRIVING SURFACE

NTS



DETAIL 3

TYPICAL SECTIONS OF HIGHWALL SAFETY BERM/BARRIER

NTS

DRAWING NO.	DRAWING TITLE	DRAWING NO.	DRAWING TITLE

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
C	Minor Edits	LW	EMR	31Oct14
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LW/EMR	EMR	Oct. 2014

FILE NAME: 1CT022.001_Madrid_North_Pad-Berm Details.dwg

TMAC RESOURCES

HOPE BAY PROJECT

SRK JOB NO.: 1CT022.001

Madrid North Surface Infrastructure

DRAWING TITLE:

Berm and Barrier Details

DRAWING NO.	SHEET	REVISION NO.
MNP-10	10 OF 12	C

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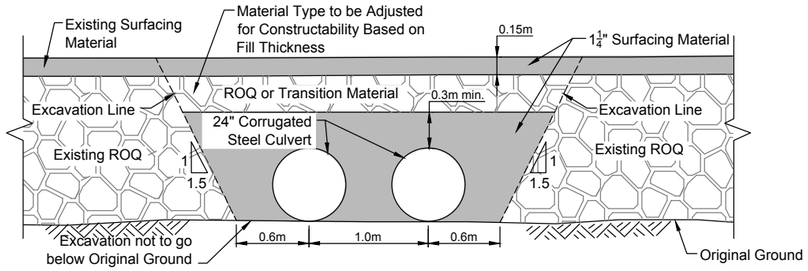
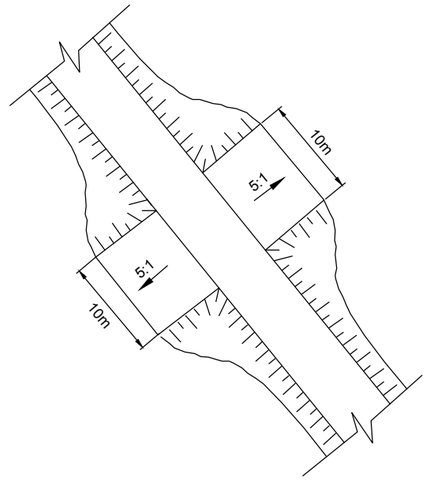
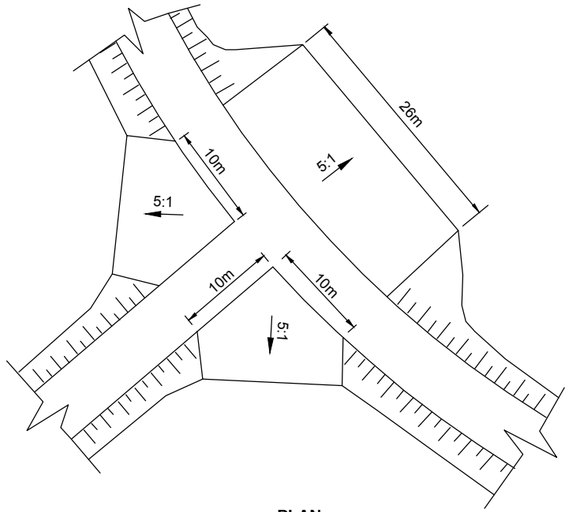


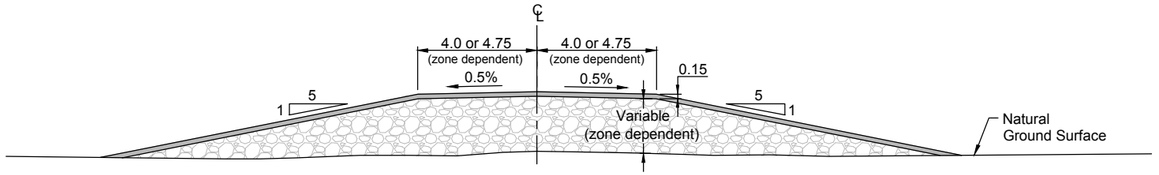
DETAIL 6
6 TYPICAL CROSS SECTION OF CULVERT CROSSING
NOT TO SCALE



PLAN
7 TYPICAL ANIMAL CROSSING
NTS



PLAN
7 TYPICAL ANIMAL CROSSING AT ROAD JUNCTION
NTS



DETAIL 7
7 TYPICAL ANIMAL CROSSING SECTION
0 1 2 3 4 5
Scale in Metres

LEGEND

- Surfacing Material
- Run of Quarry Material

NOTES

1. All dimensions in metres unless noted otherwise.
2. Locations for animal crossings will be identified by Land Owner and Elders once road construction is completed.

DRAWING NO.	DRAWING TITLE	DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS			

NO.	DESCRIPTION	CHK'D	APP'D	DATE
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A	Issued for Discussion	LW	EMR	14Mar14
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FILE NAME: 1CT022.001_Madrid_North_Mat_Specs.dwg

TMAC RESOURCES

HOPE BAY PROJECT

SRK JOB NO.: 1CT022.001

Madrid North Surface Infrastructure

DRAWING TITLE:
Animal Crossing Plan and Section and Culvert Section

DRAWING NO.	SHEET	REVISION NO.
MNP-11	11 OF 12	C

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Materials List and Quantity Estimates

Item	Quantity / Area / Volume	ROQ (cu.m.)	Cut (cu.m.)	Description
1. Run of Quarry Material	Upper/Lower Portal Pads	12,210		Approximate In-Place Neat-line Volume (3D volume based on Civil 3D surfaces - no allowance has been made for losses and/or tundra embedment)
	Fuel Storage Facility Pad	2,020		
	Waste Rock Pad	31,000		
	Doris-Windy Rd to Upper Portal Pad Road	3,590		
	Lower Portal to Pollution Control Berm Road	3,660		
	Ramp from Upper Portal Pad to Waste Rock Pile	140		
	Pollution Control Berm	11,380		
	Vent Raise Pad	6,400	170	
	Doris-Windy Rd to Vent Raise Pad Road	1,280		
	Total	71,570		
2. Surface Grade Material	Pads:			Approximate In-Place Neat-line Volume
	Upper Portal Pad	900		
	Lower Portal Pad	190		
	Vent Raise Pad	530		
	Roads:			
	Doris-Windy Rd to Upper Portal Pad	390		
	Lower Portal to Pollution Control Berm	390		
	Pollution Control Berm	330		
	Ramp from Upper Portal Pad to Waste Rock Pad	150		
	Doris-Windy Rd to Vent Raise Pad	60		
	Total	2,940		

Materials List and Quantities for Pollution Control Berm Pond

Item	Quantity / Area / Volume		Description
Rip Rap	Rip Rap on Berm Face and Over Downstream Key Trench	2640 m³	Volumes approximated by typical section and key trench lengths
Finishing Material (¾" Crush)	OverLiner at Downstream Key Trench	1480 m³	
	OverLiner at Upstream Key Trench	880 m³	
	UnderLiner at Downstream Key Trench	940 m³	
	UnderLiner at Upstream Key Trench	320 m³	
Geotextile (2 Layers)	Geotextile OverLiner	8800 m²	12oz. Non Woven
	Geotextile UnderLiner	8800 m²	
Liner	Geomembrane Liner on Berm Face and in Downstream Key Trench	4400 m²	Textured HDPE 60 or Equivalent
	Geomembrane Liner in Pond Area and in Upstream Key Trench	16530 m²	

Materials List and Quantities (Fuel Facilities at Portal and Vent Raise)

Item	Quantity / Area / Volume		Description
6" Compacted Jaw Run Material	Berm Walls (FSF at Portal)	575 m³	Volumes derived by Eagle Point 7.2. - Side slopes 2H:1V Unless otherwise noted
	Berm Walls (FCA at Vent Raise)	575 m³	
Finishing Material (¾" Crush)	OverLiner (FSF at Portal)	350 m³	
	OverLiner (FCA at Vent Raise)	350 m³	
	UnderLiner (FSF at Portal)	120 m³	
	UnderLiner (FCA at Vent Raise)	120 m³	
Surfacing Material (1¼" Crush)	Final Surface (FSF at Portal)	1260 m³	
	Final Surface (FCA at Vent Raise)	1260 m³	
Geotextile (2 Layers)	Geotextile OverLiner (FSF at Portal)	750 m²	12oz. Non Woven
	Geotextile OverLiner (FCA at Vent Raise)	750 m²	
	Geotextile UnderLiner (FSF at Portal)	750 m²	
	Geotextile UnderLiner (FCA at Vent Raise)	750 m²	
	Sump (FSF at Portal)	5 m²	
	Sump (FCA at Vent Raise)	5 m²	
Liner	Geomembrane Liner 1 Base (FSF at Portal)	750 m²	Textured HDPE 60 or Equivalent
	Geomembrane Liner 1 Base (FCA at Vent Raise)	750 m²	
	Geomembrane Liner 2 Under Driving Surface (FSF at Portal)	25 m²	
	Geomembrane Liner 2 Under Driving Surface (FCA at Vent Raise)	25 m²	
	Geomembrane Liner 3 Under Driving Surface (FSF at Portal)	17 m²	
	Geomembrane Liner 3 Under Driving Surface (FCA at Vent Raise)	17 m²	
	Sump (FSF at Portal)	5 m²	
	Sump (FCA at Vent Raise)	5 m²	

Tolerances Road Material Placement:

Location	Fill (mm)	Excavation (mm)
Vertical Tolerance on Roads	0 to +75	n/a
Horizontal Tolerance on Roads	-150 to +150	

Note: Grade shall not be uniformly high or low.

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TMAC RESOURCES

HOPE BAY PROJECT

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Madrid North Surface Infrastructure

DRAWING TITLE:

Material List and Quantity Estimates

DRAWING NO.	SHEET	REVISION NO.
MNP-12	12 OF 12	D