Terrest	trial Ecosystem Management Plan Version 4, July 2017
	APPENDIX I
	Migratory Bird Mitigation Plan



TECHNICAL MEMORANDUM

DATE June 22, 2017

PROJECT No. 1658927.3100

TO Ryan Vanengen Agnico Eagle Mines Limited

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MIGRATORY BIRDS PROTECTION PLAN

1.0 INTRODUCTION

Agnico Eagle has planned two water diversions as part of water management activities for the proposed Whale Tail Project (the Project). The purpose of this Plan is to present the anticipated flooding area and schedule during the Whale Tail Lake (South Basin) and Northeast diversions and present appropriate mitigation measures to reduce impacts to nesting migratory birds.

The Whale Tail Lake (South Basin) diversion consists of construction of the Whale Tail Dike, from June 2018 to February 2019, to divert Whale Tail Lake (South Basin) and tributary lakes through Lake A45, just south of Lake A16 (Mammoth Lake). Flooded tributary lakes (light blue shading in Figure 1) include Lake A18, Lake A19, Lake A20, Lake A21, Lake A22, Lake A55, Lake A62, Lake A63, Lake A65, Pond A-P1, and Pond A-P53 (Figure 1). Active flooding from elevation 152.5 to 156.00 masl of the area will occur from 2019 until 2020 causing approximately 157 ha of flooding; this will active require migratory bird mitigation. The flooded area will remain at elevation 156.00 masl from July 2020 until 2023, during operations.

The Northeast diversion consists of construction of the Northeast dike, from February to March 2019, to divert Lake A46 and tributary lakes through Lake C44 in the Lake C38 (Nemo Lake) watershed. Flooded tributary lakes (light blue shading in Figure 2) include Lake A47, Lake A48, Lake A113, Pond A-P38, and Pond A-P68 (Figure 2). Flooding of this area will occur between February 2019 to July 2020, and during operations (July 2020 to 2023).

The flooding has the potential for incidental disturbance and destruction of migratory birds and their nests. This Migratory Bird Nest Mitigation Plan (the Plan) describes how these impacts will be mitigated; the mitigation will be focused between 2018 to July 2020, or until water levels reach their maximum flood plain.

The Migratory Birds Convention Act (1994) (MBCA) prohibits the harm of migratory birds and the disturbance or destruction of nests and eggs. The original aim of this legislation in the early 1900s was to conserve migratory bird populations from overharvest (CWS 2007). Inadvertent disturbance or destruction of migratory birds has been termed "Incidental Take" and Environment and Climate Change Canada (ECCC) currently lacks legal mechanisms to regulate Incidental Take (CWS 2007).

This Plan describes the likely effects pathways that may harm migratory birds (based on the Whale Tail FEIS, Agnico Eagle 2016), the mitigation options to reduce these impacts, and Agnico Eagle's preferred option for proceeding.



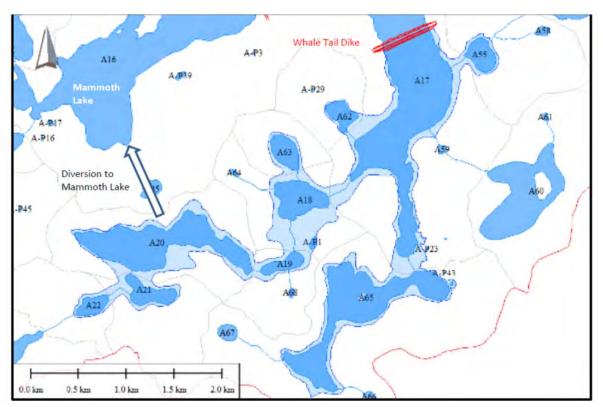


Figure 1: Whale Tail Lake (South Basin) Diversion Flooding occurring between February 2019 to July 2020, and during operation (July 2020 to 2023)

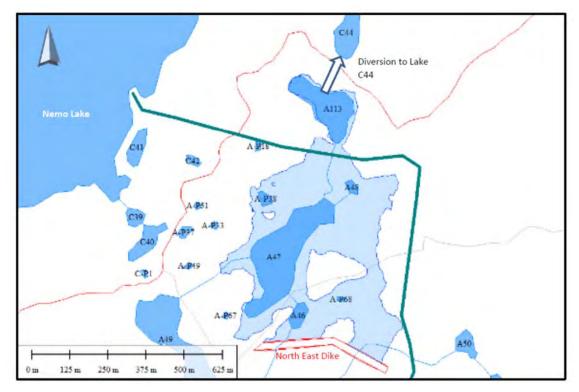


Figure 2: Northeast Diversion Flooding occurring between June 2019 to July 2020, and during operation (July 2020 to 2023)



2.0 EFFECTS PATHWAYS AND MITIGATION

The flooding resulting from the Whale Tail Project water diversions will lead to incidental disturbance and destruction of migratory birds and their nests.

2.1 Effects Pathway

Flooding at the Project site is anticipated due to the construction of new dikes in Whale Tail Lake (South Basin) and downstream of Lake A46 and Lake A50. Some of the flooding will occur during the nesting season and may lead to the loss of nests near the shoreline of the lake.

Shoreline surveys during the Project baseline field work examined 62.8 km of shoreline along lakes and streams (Agnico Eagle 2016, Volume 5, Appendix 5-C). In total, 24 species of birds and eight nests were observed including three semipalmated sandpiper nests, two semipalmated plover nests, one dunlin nest, one herring gull nest, and one cackling goose nest. Assuming that observers recorded nests that were observed within a 20 m swath surveyed by two people, the nest density for the Project is 0.06 nests per ha. Given the area of flooding expected to occur at the Project, and assuming densities are the same as that observed during baseline studies, approximately seven nests in 2019 and three nests in 2020 of the shorebirds, gulls and waterfowl groups may be displaced by flooding if no mitigation is undertaken (Table 1).

Upland birds have been surveyed at Meadowbank from 2003 to 2015 using PRISM protocols. The Project PRISM surveys found 3.8 pairs of breeding birds per plot during 2015. As PRISM plots are 16 ha in size this indicates a density of 0.24 pairs per ha. The average nests observed per PRISM plot was 0.6 nests, or 0.04 nests per ha. It is assumed that not all the nests or breeding pairs were detected during the 2015 baseline studies so a nest density of 0.5 nests per ha was used to calculate the number of nests displaced due to flooding. It is predicted that approximately 61 upland bird nests will be displaced in 2019 and approximately 27 nests in 2020 if no mitigation is undertaken at the Project (Table 1).

Table 1: Predicted Number of Bird Nests Displaced from Flooding

	Whale Tail Lake (South Basin) Diversion			Northeast Diversion		
Nesting Period	Change in Flooded	Predicted Number of Nests Displaced		Change in Flooded	Predicted Number of Nests Displaced	
Year ^a	Terrestrial Area (ha)	Shoreline Survey	PRISM Survey	Terrestrial Area (ha)	Shoreline Survey	PRISM Survey
2018	0.21	0.01	0.10	0	0	0
2019	115.96	6.96	57.98	6.58	0.42	3.29
2020	41.38	2.48	20.69	11.86	0.75	5.93
2021	0	0	0	0	0	0
2022	-64.94 ^b	0	0	-18.45 ^b	0	0

^a The nesting period used included the months of May, June, July, and August.

2.2 Mitigation

The following options have been considered to reduce the risk that flooding poses to migratory birds. The options fall under the general categories of deterrents, and habitat modification or exclusion.

Deploying visual and audio bird deterrents



^b Between May and August 2020 the total flooded habitat area and the flooded terrestrial area is expected to decrease in size. PRISM = Program for Regional and International Shorebird Monitoring; ha = hectare.

- Reducing habitat quality
- Covering key nesting habitat within the flood zones of tributary lakes
- Disturbing the soil and vegetation

Each of these mitigation options is discuss in greater detail below. Field studies planned for the summer of 2017 will provide information on the species and densities found in the flooded area to further develop and refine the mitigation proposed below. Results will be reported in the annual Terrestrial Ecosystem Monitoring Report, and evaluation of mitigation options will be completed in consultation with ECCC in early 2018.

2.2.1 Bird Deterrents

Agnico Eagle would consider hiring additional local staff from May to August 2019 and 2020 to actively deter by use of walking, rope drags, ATVs or boats in nesting areas.

Additionally, will investigate commercially available visual deterrents and noise makers, deployed parallel to and facing the shoreline of tributary lakes prior to nesting season and remain operational during the nesting season. A variety of predator type calls could be broadcast to prevent habituation for a variety of upland bird species. Noise makers can be equipped with a solar panel to provide power for continuous operation. Visual deterrents may include scare balloons, human, and predator effigies and other visual deterrents. Scare balloons have large predator eye designs that look threatening to the birds and reflective flash tape rustles in the breeze, preventing habituation in the area. Snow melt, ice melt and arrival of migratory birds will be documented in 2017 and 2018, prior to the flooding activities, to inform mitigation. The location and distribution of visual deterrents will be rearranged occasionally to maintain their effectiveness, and will be deployed prior to migratory bird nesting period (i.e., the beginning of May, or prior to 50% snow melt).

A list of possible deterrents and their effectiveness relevant to marine oil spills is under development by ECCC, to be considered prior to final selection of bird deterrents. In addition to deterrents, Agnico Eagle staff should regularly survey the flooding area to provide further disturbance and to maintain and relocate the deterrents.

Surveys to investigate the effectiveness of fox effigies used at the Gahcho Kué Project (De Beers 2016) where inconclusive. Transects terminating in a fox effigy were surveyed for bird activity in May 2015. The surveys indicated Sparrows were more commonly observed in the control transects (11 individuals on control transects versus 3 on deterrent transects). Statistical analysis could not be conducted due to study design and low sample size.

2.2.2 Reducing Habitat Quality

Efforts could be made to reduce habitat quality, either through standing vegetation removal or a controlled burn during construction in 2018 and 2019 to remove disturbed vegetation and reduce the quality of nesting habitat in specific areas scheduled for flooding. The areas subject to flooding are primarily tundra and exposed rock, with little standing vegetation. However, standing vegetation (including a few willows) provide preferred nesting habitat for migratory birds, and can be cleared by ground crews using hand tools. Additionally, low lying vegetation could also be removed through a controlled burn along the shores of tributary lakes could be undertaken prior to flooding in high priority nesting areas identified in 2016 and 2017. A controlled burn would be carried out by fire experts under specified weather conditions with appropriate permits and regulations. Although the existing tundra is not particularly flammable this could be considered a suitable option, as burns could be controlled in designated areas.



2.2.3 Covering

If vegetation removal and/or burning of potential nesting areas were unsuccessful in 2018, key habitats with high potential for nesting birds within the flood zones could be covered with tarps or other material to reduce access by birds in 2019. Although this will be logistically challenging as the total area of predicted flooding in 2019 is over 120 ha, and most of this area is without access for vehicles or heavy equipment to deploy the cover material. If cover material could be deployed by hand, Agnico Eagle will prioritize areas identified in 2017 as high nesting suitable areas to be candidate target sites for covering. This mitigation technique will require frequent maintenance to prevent the cover from blowing away and continual adjustments will be required as water levels rise.

2.2.4 Disturbing Vegetation and Soil

Disturbing vegetation and soil (grubbing) could be conducted to reduce the attractiveness of the area to ground nesting birds in the areas adjacent to the tributary lakes. This option is not considered to be feasible due to a lack of access for the required earth moving equipment. The area will not have the required road access for heavy equipment and support vehicles (e.g., fuel and lubricant trucks). Winter grubbing is not feasible as the ground would be too frozen to disturb. Further, grubbing would lead to soil erosion when flooding begins, likely triggering the *Fisheries Act* for the deposition of deleterious substances.

3.0 PREFERRED OPTIONS

The following section describes Agnico Eagle's preferred mitigation for the two pathways described.

3.1 Preferred Mitigation for Loss of Migratory Bird Nests during Flooding

Upon review of the available mitigation options, Agnico Eagle has selected the following list of mitigation options for implementation, contingent upon field investigations in 2017.

- Deploying visual and audio bird deterrents
- Regular sweeps by Agnico Eagle staff to discourage nesting through human activity, and to move the visual and audio deterrents

Furthermore, the feasibility of the following options will be considered. If deemed appropriate Agnico Eagle will also implement the following options:

 Habitat modification or exclusion the habitat in the flood zone, which may include vegetation removal, controlled burn, or covering key nesting habitat



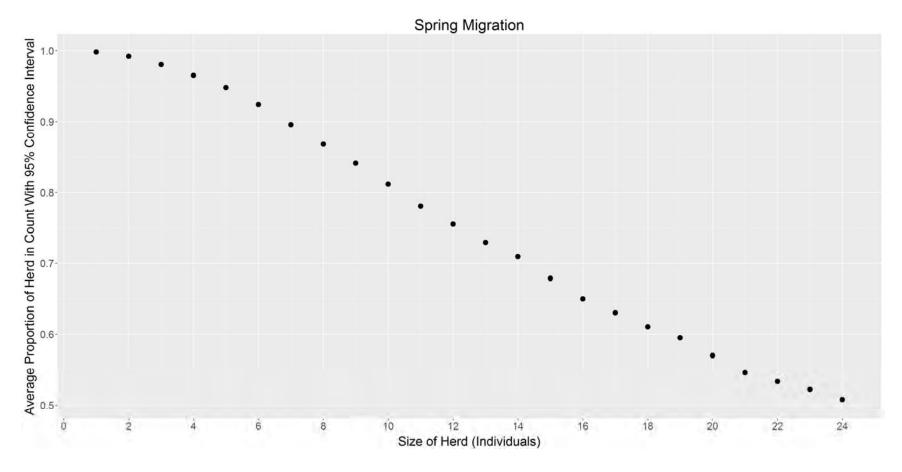
4.0 REFERENCES

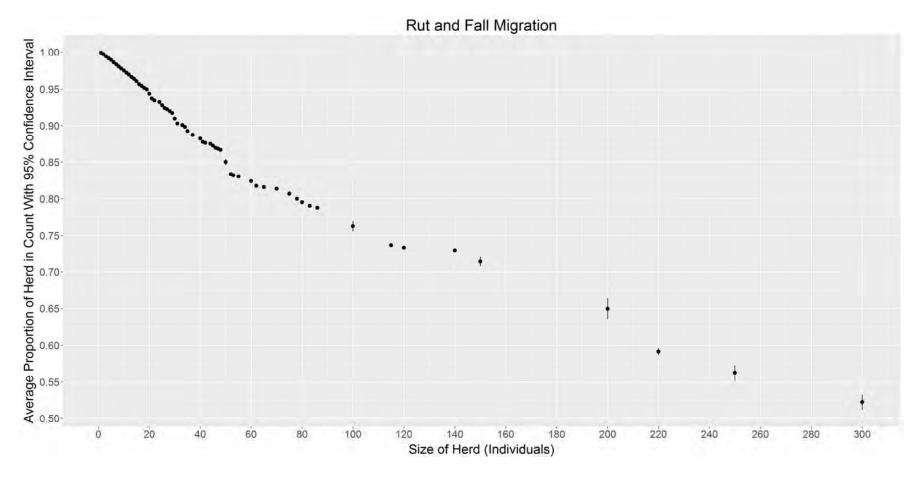
- Agnico Eagle (Agnico Eagle Mines Limited). 2016. Whale Tail Pit Final Environmental Impact Statement. Submitted to Nunavut Impact Review Board and Nunavut Water Board. June 2016.
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- Environment and Climate Change Canada (ECCC). Unpublished. Guidelines for deterrence and bird dispersal techniques used during pollution and non-pollution incidents in Canada. Appendix 1. Technical Overview of Recommended Hazing Devices.

 $https://capws.golder.com/sites/1658927 regulatoryaffairs/p3100_temp_and_workshops/temp/appendix\ i_migratorybirdmitigationplan_final.docx$



Terrestrial Ecosystem Management Plan
Version 4, July 2017
APPENDIX J
APPENDIX J Seasonal Group Size Threshold







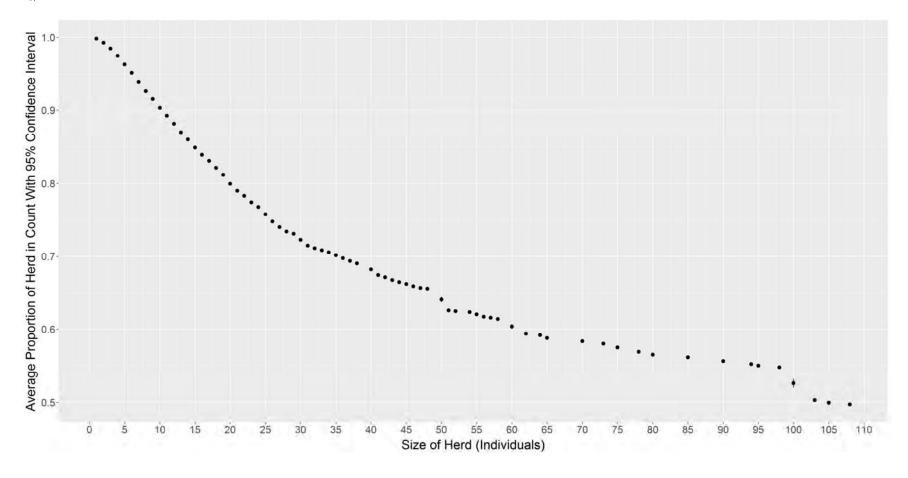
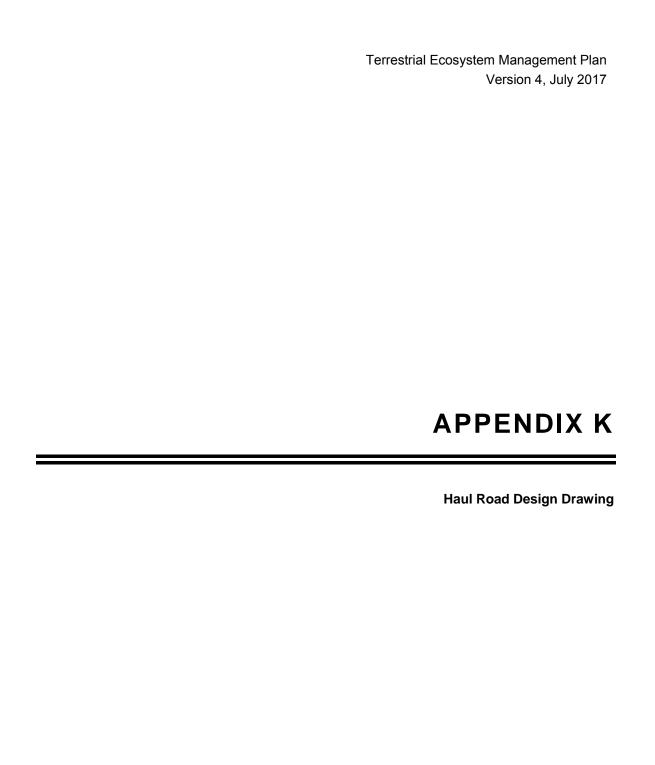


Figure J-1: Proportion of Caribou Observations by Season Presented by Group Size with 95% Confidence Intervals as follows: a) Spring Migration; b) Fall Rut/Fall Migration; and c) Early and Late Winter



PLAN CLÉ KEY PLAN

NOTES:

300mm

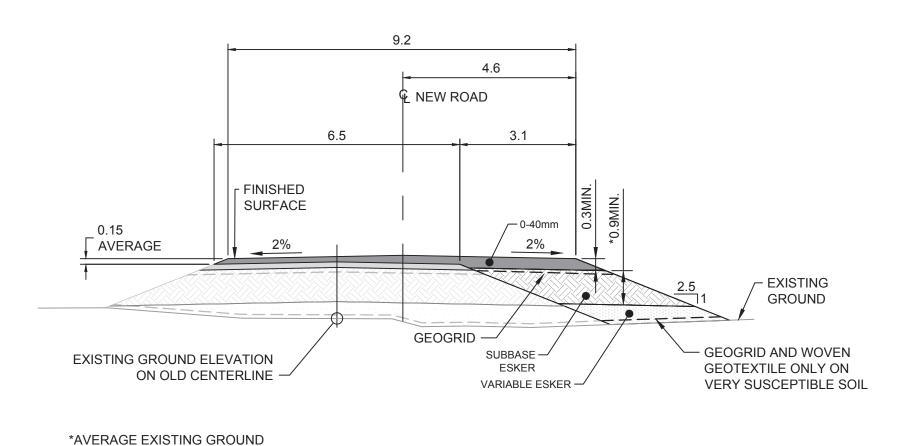
- 1. SOILS VERY SUSCEPTIBLE TO FREEZE AND THAW INDUCED SETTLEMENT WHERE THAWING OF THE NEAR-SURFACE SUB-GRADE IS EXPECTED TO RESULT IN SIGNIFICANT STRENGTH LOSS AND EXCESSIVE SETTLEMENTS.
- SOILS RELATIVELY SUSCEPTIBLE TO FREEZE AND THAW INDUCED SETTLEMENT WHERE THAWING OF THE NEAR-SURFACE SUB-GRADE IS EXPECTED TO RESULT IN SIGNIFICANT STRENGTH LOSS AND EXCESSIVE SETTLEMENTS.
- 3. SOILS RELATIVELY UNSUSCEPTABLE TO FREEZE AND THAW SETTLEMENT WHERE THAWING OF THE NEAR-SURFACE SUB-GRADE IS EXPECTED TO RESULT IN MINIMAL STRENGTH LOSS AND TOLERABLE SETTLEMENTS.
- 4. ALL DIMENSIONS IN METERS, UNLESS NOTED OTHERWISE.

9.2 4.6 NEW ROAD 6.5 3.1 VARIABLE 0-600mm SUBBASE 0-600mm

TYPICAL SECTION TYPE 1

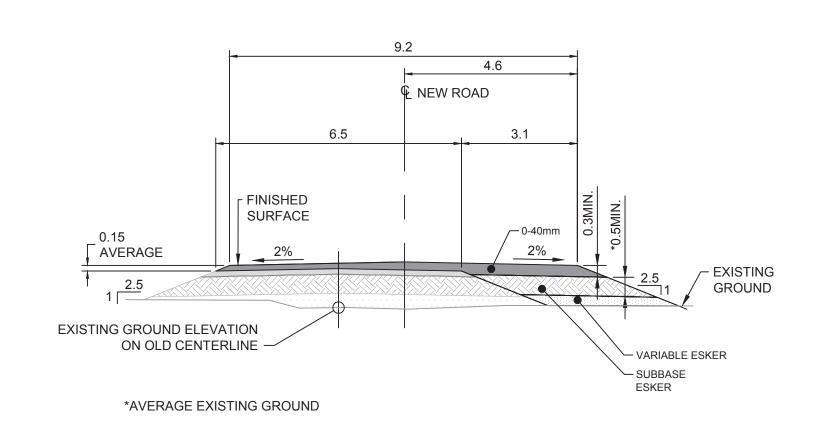
ROC SOIL
(SEE NOTE 3)

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TYPICAL SECTION TYPE 2
TUNDRA SOIL
(SEE NOTE 2)

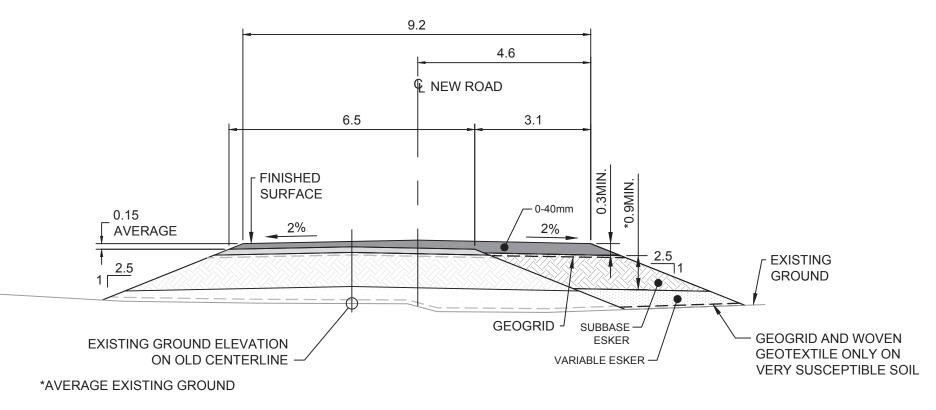
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TYPICAL SECTION TYPE 3

ROC SOIL
(SEE NOTE 3)

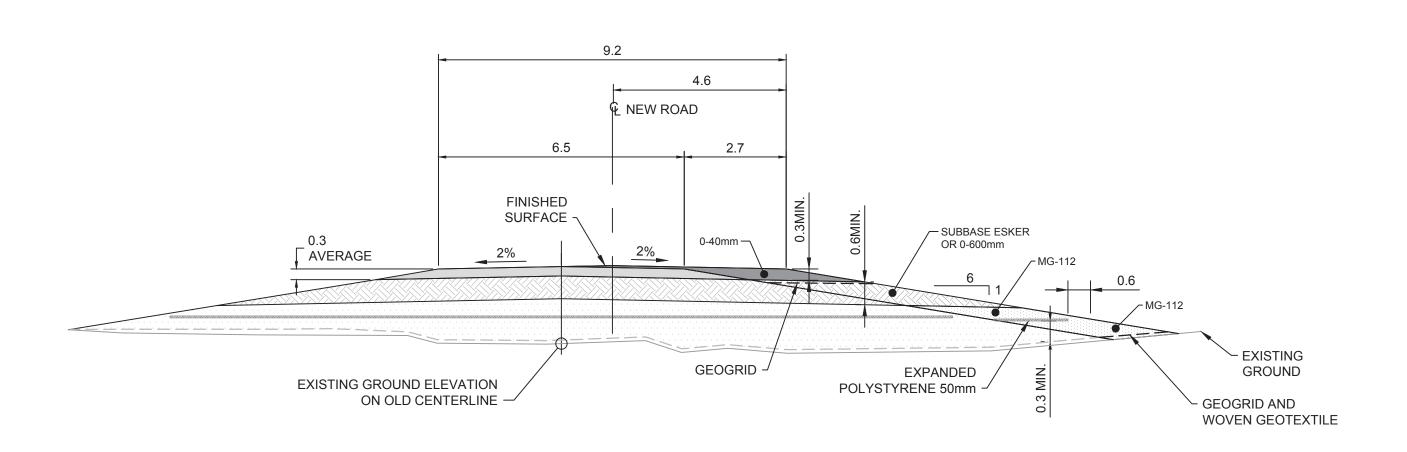
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TYPICAL SECTION TYPE 4
THAW SUSCEPTIBLE SOIL
(SEE NOTE 2)

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TYPICAL SECTION 5
ICE WEGDE AND VERY THAW SUSCEPTIBLE SOIL
(SEE NOTE 1)

HOR. 1:100
VERT. 1:100

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