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AMENDMENT #2 TO 6515-E-132-005-132-REP-006:

DESIGN REPORT FOR RANKIN INLET BYPASS ROAD CULVERTS C13 AND C14
MELIADINE PROJECT, NUNAVUT

PRESENTED TO
Agnico Eagle Mines Ltd.

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SEPTEMBER 2017
ISSUED FOR USE
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TABLE OF CONTENTS

APPENDICES

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1.0   INTRODUCTION

1.1   Site Location and Access

Agnico Eagle Mines Limited (Agnico Eagle) is developing the Meliadine Project (the Project), a gold mine located approximately 25 km north from Rankin Inlet, and 80 km southwest from Chesterfield Inlet in the Kivalliq Region of Nunavut. The proposed project site is located on the peninsula between the East South, and West basins of Meliadine Lake (63°01'23.8"N, 92°13'6.42"W) on Inuit Owned Land.

As presented in the Design Report 6515-E-132-005-132-REP-006 issued for use in March 2017, Agnico Eagle intents to build a bypass road to divert traffic around the community of Rankin Inlet to minimize impacts on the Community (dust, noise, traffic, etc…). The bypass road will be 6.1 km long.

Following the water management plan, several group of culverts will be installed along the road to allow surface water to drain properly,

From May to July 2017, some site visits and surveys were conducted, providing sufficient information to further define the west portion of the bypass road. It appears that two additional crossings are required in that portion to allow natural drainage, while there was 12 crossings analysed in the initial report.

The required culverts are Culvert C13 and Culvert C14, located on the west portion of the Rankin Inlet Bypass Road, north of Nipissak Lake and east of a small lake, in a section between an existing community road and the actual AWAR, as shown in the stations 5+900 and 6+200. The site location is shown in Figure 1 (Appendix A).

2.0   DESIGN

2.1   Culvert Design Basis and Water Management Strategy

The overall objective of the water management strategy of this project is to develop a practical and feasible site-wide water management plan to minimize the potential negative impacts of mining development on the surrounding environment including habitats for fish and wildlife, and to facilitate mine operation and long-term closure and reclamation of the mine site. To attain this objective, culverts are used to control and divert runoff crossing the road and new facilities.

The location of proposed Culvert C13 and Culvert C14 along the course of the Rankin Inlet Bypass Road are shown in Drawing 65-117-230-201 presented in Appendix B while Drawing 65-117-230-209 presents typical cross-sections of the culverts in Appendix C.

2.2   Hydraulic Analyses and Peak Flow Calculations

Hydrologic and hydraulic analyses were carried out to determine culvert sizes to accommodate a 25-year peak design flow.

The Rational Method was applied to calculate the peak flows. The Intensity-Duration-Frequency (IDF) curve developed by Environment and Climate Change Canada for Rankin Inlet Station was used (Environment Canada 2014). A 1 in 25 year rainfall intensity for a duration equivalent to the time of concentration of the catchment area was considered to determine the design peak flow for each culvert.

The time of concentration (T_C), which represents the time it takes for the most remote portion of the catchment to contribute to the flow at the outlet of the catchment, was calculated using the Kirpich equation (Akan, A. O., & Houghtalen, R. J.,2003). For catchments where TC < 10 min, a TC of 10 minutes was used for design purposes.

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The estimated peak flow, culvert capacity and characteristics of each culvert are summarized in Table 2.1.

Table 2.1: Characteristics of the culverts

CULVERT	C13	C14
Pipe's number and Ø (mm)	2 x Ø 800	3 x Ø 800
Length of each culvert (m)	23	19
Slope (%)	0.86	2.0
Corrugated profile (mm)	68x13	68x13
Thickness (mm)	2.8	2.8
Minimum cover over culvert (mm)	825	825
Estimated Peak Flow (m³/s)	0.75	0.93
Culvert Flow Capacity (m³/s)	1.33	3.04

2.3   Culvert Specifications

The proposed culverts will be in service for up to 15 years. The standard galvanized, corrugated steel pipe culvert, with a profile of 68 x13 mm and a minimum thickness of 2.8 mm is proposed.

A minimum of fill cover will be placed over the culverts according to the material thickness and the manufacturer's recommendations for heavy traffic as shown in the table provided on drawing 65-117-230-209 presented in Appendix C.

The backfill around the culverts will be granular fill 0-50 mm, or an approved equivalent, and will be placed in layers no greater than 0.3 m thickness and compacted to a minimum of 95% of Standard Proctor Maximum Dry Density (ASTM D698). Typical cross-section for the culverts are shown on drawing 65-117-230-209 provided in Appendix C.

Details and layout for the culverts are shown on drawings 65-117-230-209 and 65-117-203-212 presented in Appendix C.

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2.4   Erosion Control

To control erosion, rip-rap of diameter 50-300 mm will be installed around the inlet and outlet areas of culverts. The rip-rap material will come from a NPAG source of rock, see drawing 65-117-230-209 given in Appendix C.

During the installation of the culverts, if required, straw logs will be used in the work area to prevent total suspended solids from reaching downstream water bodies.

3.0   FIGURES AND DRAWINGS

Figure 1 in Appendix A shows the mine site location.

Drawing 65-117-230-201 in Appendix B shows a general overview of the Rankin Inlet Bypass Road plan/profile including the proposed culverts location.

The following construction drawings are presented in Appendix C and show details for the culverts construction:

> ➢ 65-117-230-209: RIBR Details/Sections including culverts installation details
> ➢ 65-117-230-212: RIBR Plan/Profile 5+900 to 6+312 showing Culvert C13 and Culvert C14

4.0   LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Agnico Eagle Mines Ltd. and their agents. Tetra Tech does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Agnico Eagle Mines Ltd., or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this report is subject to the terms and conditions stated in Tetra Tech's Services Agreement.
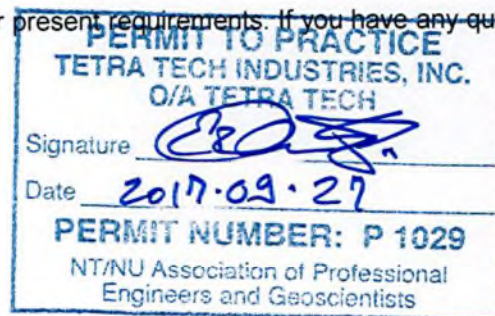
5.0   CLOSURE

We trust this report meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,
Tetra Tech

PERMIT TO PRACTICE
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O/A TETRA TECH
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