

**MEMO**

**To:** Luke Moger  
Project Engineer

**From:** Luke Marquis, EIT  
Geotechnical Engineer

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**Date:** July 30, 2014

**Project No.:** KX05414

**cc:** Andrew Witte, P.Eng.  
Dmitri Ostritchenko, P.Eng.

**RE: MOUNT POLLEY MINE TAILINGS STORAGE FACILITY CORNER 5 REALIGNMENT TO CREST EL. 970 m**

**1.0 INTRODUCTION**

AMEC Environment & Infrastructure, a division of AMEC Americas Ltd. (AMEC), was retained to provide geotechnical site investigation and engineering design for Mount Polley Mining Corporation's (MPMC) Tailing Storage Facility (TSF). As per the AMEC report entitled "*Mount Polley Mine Tailings Storage Facility- Stage 9 2013 Construction Monitoring Manual*" dated 11 April, 2013 a test pit investigation was carried out by AMEC at corner 5 of the Tailings Storage Facility (TSF) on 10 July, 2014 to assess the abutment tie-in till thickness and bedrock depth and quality, if encountered. During the course of this investigation it was found that till coverage over bedrock did not meet the 2.0 m requirement stated in the 2013 Construction Monitoring Manual. An additional test pitting program was completed in order to determine the suitability of material for a possible change in alignment. The purpose of this memo is to provide recommendations on the realignment of the TSF at Corner 5 as determined from the test pitting program.

**2.0 CORNER 5 TEST PITTING PROGRAM**

The first test pitting investigation consisted of four test pits on 10 July 2014; three were conducted on the downstream side of the core (TP14-01, TP14-02, TP14-04) and one on the upstream side of the core approximately 10 m upstream of the upstream till design limit (TP14-03). Due to the quality of the bedrock encountered at the shallow depths (<2.0 m of till thickness) during this initial test pit investigation MPMC requested that realignment of the perimeter embankment as shown in Figure 1, to be considered. To support the design of the realignment, on 11 July, 2014, AMEC conducted additional test pits along the proposed realignment to assess the consistency and thickness of the native till and to assess the quality and depth of the bedrock / bedrock-till contact where encountered. Figure 1 shows the surveyed locations of the test pits and the stratigraphy noted is summarized in Table 1. The following material units were identified via the test pitting:

- **FILL:** Consisted of Zone C rock fill and/or organic rich material/previous organic stripping.
- **TILL:** Typically well graded sandy silt with some clay and trace gravel. The till was noted to be low plasticity, very stiff, brown and moist. The thickness of till ranged from 1.0 m to >3.9 m.
- **BEDROCK:** Weak, moderately to completely weathered.



Seepage was also noted to be present within the encountered bedrock fractures in all test pits along the original core alignment.

The test pits conducted in support of the realignment indicated that the till thickness increased from the current core location along the proposed realigned core.

Table 1, below presents the findings of the test pit investigations.

**Table 1 : Test Pit Summary Table**

Test Pit	Northing	Easting	Elevation (m)	Total Depth (m)	Fill Thickness (m)	Till Thickness (m)	Bedrock Elevation (m)	Bedrock Quality
TP14-01	5820058.2	594385.7	968.1	3.9	1.1	1.0	966.0	Completely weathered, high seepage noted
TP14-02	5820057.4	594369.6	969.6	3.7	1.1	1.9	966.6	Highly weathered, seepage noted
TP14-03	5820032.7	594371.7	969.1	4.5	1.5	2.8	964.8	Moderately weathered, seepage noted
TP14-04	5820069.8	594329.4	971.3	4.1	1.7	2.1	967.5	Moderately weathered, seepage noted
TP14-05	5920040.0	594384.8	968.0	3.4	0.9	2.3	964.8	Moderately weathered, seepage noted Weathered
TP14-06	5820013.7	594353.9	970.0	4.3	0.4	>3.9		Not encountered
TP14-07	5819999.0	594336.3	970.8	3.6	0.2	>3.4		Not encountered
TP14-08	5819973.5	594323.3	975.1	6.9	3.3	>3.6		Not encountered

## 2.1 REALIGNMENT RECOMMENDATIONS

AMEC understands that MPMC has decided to proceed with realignment of the dam to avoid existing unsuitable ground conditions encountered along the original design alignment that would necessitate detailed foundation preparation as outlined in Section 4.2 of the 2013 Construction Monitoring Manual<sup>1</sup>. To assist with the TSF realignment at corner 5 AMEC has provided new design points (P6A and P7) to be utilized during construction (refer to Figure 1). These points should enable MPMC to utilize the offsets currently in use for the perimeter embankment as shown in Figure 1.

The proposed core realignment rotates the original core counter-clockwise at stn.4+954 approximately 66°. To accommodate the sharp transition and maintain core integrity, the till core should be widened to the upstream side based on Points P8 and P9 (Figure 1) to an elevation of 970 m. The widened core in this area should be constructed on appropriately prepared and approved native till subgrade. The design of Corner 5 above 970 m will be the responsibility of others.

The observations and recommendations presented in this memo were based on site conditions observed during the geotechnical field assessment. Subsurface conditions may vary between test locations, and at depths greater than those investigated. Should the site conditions change or vary from those described and assumed within this memo, AMEC should be retained to review such conditions and revise our recommendations accordingly. This memo was prepared

<sup>1</sup> AMEC "Mount Polley Mine Tailings Storage Facility- Stage 9 2013 Construction Monitoring Manual" 11 April 2013.



in accordance with generally accepted geotechnical engineering principles and practice. No other warranty, expressed or implied, is made.

Should you have any questions or require further information, please do not hesitate to contact the undersigned at (250) 564-3243.

Respectfully Submitted,

**AMEC Environment & Infrastructure**  
**A division of AMEC Americas Limited**

Reviewed by:

A handwritten signature in cursive script, appearing to read "L. Marquis".

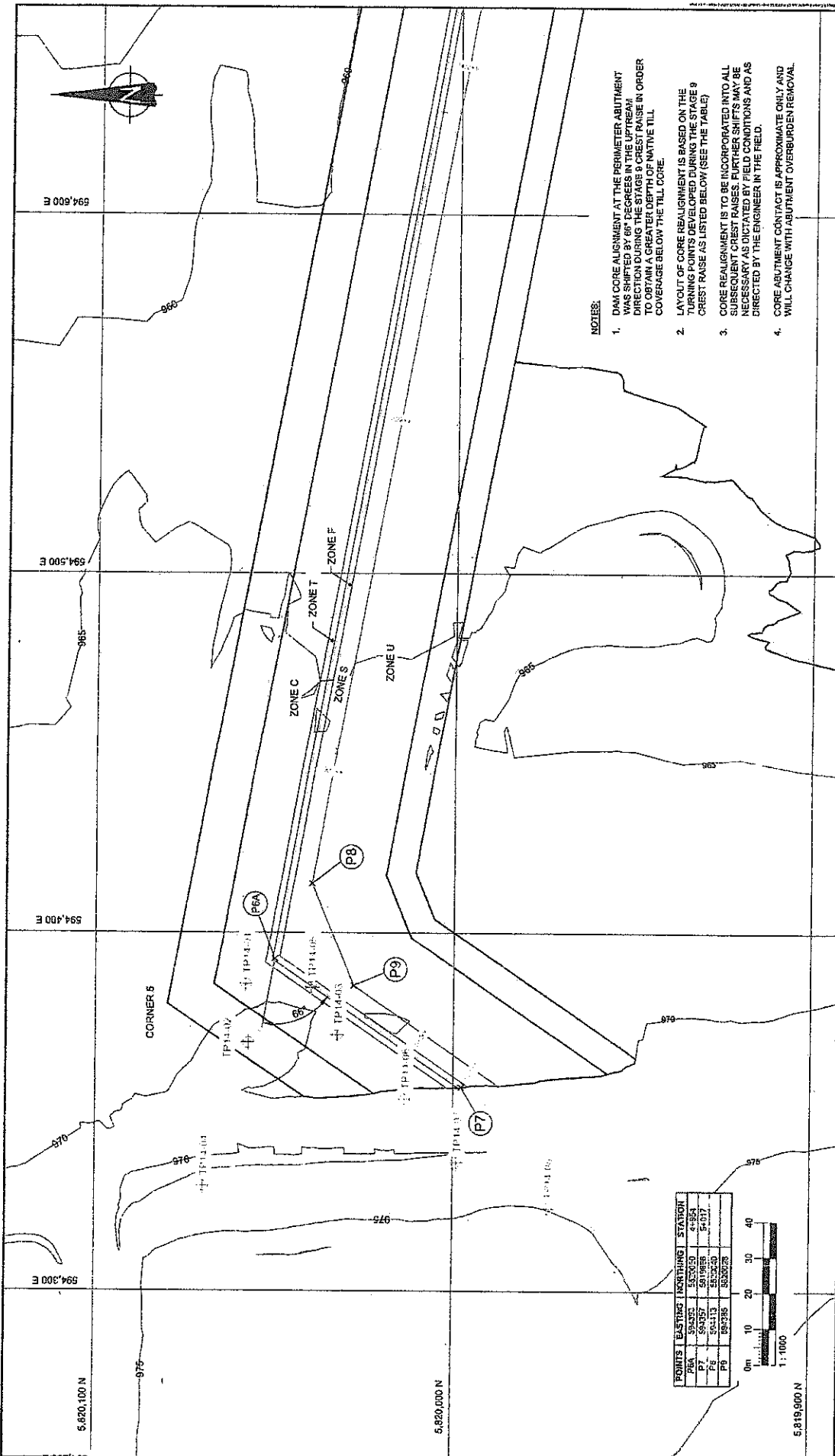
Luke Marquis, EIT  
Geotechnical Engineer

A handwritten signature in cursive script, appearing to read "Andrew Witte".

Andrew Witte, P. Eng  
Geotechnical Engineer

A handwritten signature in cursive script, appearing to read "Dmitri Ostritchenko".

Dmitri Ostritchenko, P. Eng  
Geotechnical Engineer



- NOTES:**
1. DAM CORE ALIGNMENT AT THE PERIMETER ABUTMENT WAS SHIFTED BY 66° DEGREES IN THE UPSTREAM DIRECTION DURING THE STAGE 9 CREST RAISE IN ORDER TO OBTAIN A GREATER DEPTH OF NATIVE TILL COVERAGE BELOW THE TILL CORE.
  2. LAYOUT OF CORE REALIGNMENT IS BASED ON THE TURNING POINTS DEVELOPED DURING STAGE 9 CREST RAISE AS LISTED BELOW (SEE THE TABLE).
  3. CORE REALIGNMENT IS TO BE INCORPORATED INTO ALL SUBSEQUENT CREST RAISES. FURTHER SHIFTS MAY BE NECESSARY AS DICTATED BY FIELD CONDITIONS AND AS DIRECTED BY THE ENGINEER IN THE FIELD.
  4. CORE ABUTMENT CONTACT IS APPROXIMATE ONLY AND WILL CHANGE WITH ABUTMENT OVERBURDEN REMOVAL.

POINTS	EASTING	NORTHING	STATION
P6A	594300	5820100	42351
P6B	594357	5819838	54137
P6C	594413	5819570	54137
P6D	594385	5820078	



**NOTES:**

1. TOPOGRAPHY BASED ON OCT 2012 FLYOVER DATA PROVIDED BY MPMC.

PROJECT	MOUNT POLLEY MINE TAILINGS STORAGE FACILITY
DATE	JULY 2014
BY	AMEC
FOR	CORNER 6 REALIGNMENT TO CREST EL. 970m

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