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Violet Camsell-Blondin, Chair  
Wek'eezhii Land and Water Board  
#1, 4905 – 48<sup>th</sup> Street  
Yellowknife, NT X1A 3S3  
Canada

9 December 2015

Dear Ms. Camsell-Blondin:

**Subject: Processed Kimberlite Containment Facility Modification**

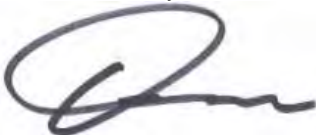
Diavik Diamond Mines (2012) Inc. (DDMI) is requesting approval for a modification to the North Dam of the Processed Kimberlite Containment Facility (PKC). This request is made under Water License W2015L2-0001 Part G Item 1.

DDMI will be placing a 5 meter lift of Type III waste rock from the Underground Mine along the North Dam. This lift would be used, if required, for the Phase VII Dam Raise and would be constructed using the Phase VI Design Specifications. DDMI confirms that once this modification is approved, the Waste Rock Management Plan (Version 7) will be revised and submitted for approval by March 31, 2016.

Attached is the engineering design in support of this request prepared by a Geotechnical Engineer as the Engineer of Record (Golder Associates Ltd.) for the Processed Kimberlite Containment Facility.

If you have any questions regarding the above, please contact the undersigned.

Yours sincerely



David Wells  
Superintendent - Environment

**DATE** December 7, 2015      **GOLDER REFERENCE No.** 1521339-1454-TM-Rev0-8000

**WORK PLAN No.** WP480

**DIAVIK PO No.** D03317

**TO** Nikolaus Auerboeck and Erik Bellefleur  
Diavik Diamond Mines (2012) Inc.

**FROM** Germán Pizarro and John Cunning      **EMAIL** gpizarro@golder.com;  
jcunning@golder.com

**TASK NORTH COUNTRY ROCK PILE - ROCKFILL PLACEMENT ALONG THE NORTH DAM  
DESCRIPTION CREST**

## 1.0 INTRODUCTION

Diavik Diamond Mines (2012) Inc. (DDMI) has requested Golder Associates Ltd. (Golder) to review DDMI's proposed design for placement of run-of-mine (ROM) rockfill in the North Country Rock Pile (NCRP) along the Processed Kimberlite Containment (PKC) Facility North Dam crest and prepare a construction drawing. This memorandum presents the design and construction drawing for ROM rockfill placement along the PKC Facility North Dam crest.

## 2.0 BACKGROUND

The ROM rockfill at Diavik Mine is classified based on total sulfur concentration into Type I (non-acid generating), Type II (low acid generating potential), and Type III (potentially acid generating). Ongoing underground operations will generate Type III ROM. ROM rockfill is stored in the NCRP however Type III ROM rockfill storage areas within the NCRP are nearing capacity.

To avoid enlarging the footprint of the Type III ROM rockfill storage areas within the NCRP and in anticipation to a potential PKC Facility dam raise, DDMI has proposed to place the Type III ROM rockfill originating from underground operations in the NCRP along the North Dam crest between approximate Sta. 63+650 and 64+700 (PKC Facility Phase 6 reference line) from elevation 465 to 470 m. DDMI estimates that the proposed area will provide storage for placement of Type III ROM rockfill for more than 18 months.

The NCRP closure design is currently being developed. Conceptual scenarios for raises of the PKC Facility dams above Phase 6 to accommodate the remaining Life-of-Mine (LOM) production of processed kimberlite are also being developed. DDMI completed the Phase 6 dam raise to crest elevation 465 m in 2015.



### 3.0 ROCKFILL PLACEMENT ALONG THE NORTH DAM CREST

Placement of Type III ROM rockfill along the North Dam crest is presented in plan and cross-section in Drawing 001 attached to this technical memorandum.

The rockfill layout comprises placement of a 5 m lift between approximate Sta. 63+650 and 64+700. A 2.65 m offset from the surveyed crest of the existing PKC Facility Phase 6 liner crest at elevation 465 m has been included in the design to allow for potential use of the upstream slope of the rockfill for future raises of the PKC Facility dam. The rockfill placement layout has been restricted to the limits of the North Dam Type III rockfill area and does not enlarge the area of the NCRP Type III ROM. The minimum rockfill crest width has been designed to allow one-way traffic of 785 haul trucks. A minimum width of 18.9 m east of approximate Sta. 64+250 (including a shoulder barrier on one side only) and 24.1 m west of approximate Sta. 64+250 (including shoulder barriers on both sides) is required for 785 haul truck one-way traffic. The minimum rockfill crest width east of Sta. 64+250 is about 26.3 m. The crest width west of Sta. 64+250 is more than 60 m wide.

The NCRP buttresses the downstream slope of the PKC Facility North Dam and placement of rockfill between Sta. 63+650 and 64+700 from elevation 465 to 470 m is not considered to negatively impact the stability of the North Dam. No stability analyses were completed as part of the North Dam rockfill placement design.

The Type III ROM rockfill to be placed along the North Dam within the NCRP may be used for potential future raises of the PKC Facility dams therefore it is recommended to follow the PKC Facility Phase 6 technical specifications for rockfill placement (Golder 2011). As such, the Type III ROM rockfill shall satisfy the specifications for Zone 5 material placement and compaction including:

- CPK and snow shall be removed within the footprint of the Type III ROM rockfill placement area, where greater than 200 mm and 100 mm, respectively.
- The maximum rockfill lift shall be 5 m when placed with 220 tonne haul trucks. The maximum lift shall be reduced to 2.5 m when placed using 100 tonne haul trucks.
- Effort should be made to sort the rockfill such that finer material is placed on the upstream side of the lift (PKC Facility side) and the coarser material is placed on the downstream side. The rockfill on the upstream side of the lift, within 35 m from the surveyed crest of the existing PKC Facility Phase 6 liner, shall have a maximum particle size of 900 mm.
- Routing of the loaded haul truck traffic on the rockfill shall be carried out such that compaction is obtained across the entire width of the fill.

Rockfill shall not be placed until the surface of the Type III ROM rockfill placement area has been inspected and approved in writing by the Quality Control (QC) manager and Quality Assurance (QA) manager. The PKC Facility Phase 6 technical specifications for rockfill placement (Golder 2011) include details of the QA and QC assurance plan to be implemented for Zone 5 rockfill placement. The construction checklist form to be prepared by the QC Manager to document the rockfill placement is included in the PKC Facility Phase 6 rockfill technical specifications (Golder 2011).

## 4.0 CLOSURE

The reader is referred to the Study Limitations, which follows the text and forms an integral part of this technical memorandum.

We trust this technical memorandum meets your present requirements. If you have any questions or concerns, please contact the undersigned.

**GOLDER ASSOCIATES LTD.**

**ORIGINAL SIGNED**

**ORIGINAL SIGNED & SEALED**

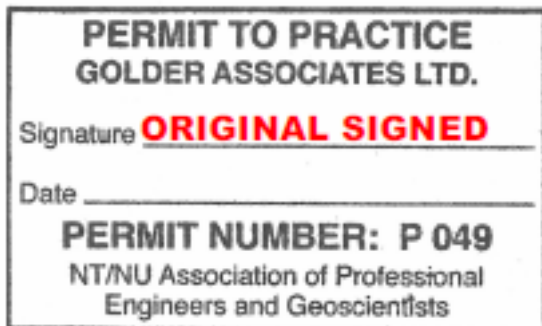
Germán Pizarro, P.Eng. (BC)  
Geotechnical Engineer

John Cunning, P.Eng.  
Principal, Senior Geotechnical Engineer

GP/JCC/kp/it/lb

Attachments: Study Limitations  
Drawing 001: North Dam Crest Rockfill Placement Plan and Section

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## REFERENCE

Golder (Golder Associates Ltd.). 2011. *PKC Facility Phase 6 Rockfill Shell Construction Technical Specifications*. Technical Specification 14111-41D1-6000 prepared for Diavik Diamond Mines (2012) Inc. Submitted June 24, 2011. Document #1059 Rev 0.

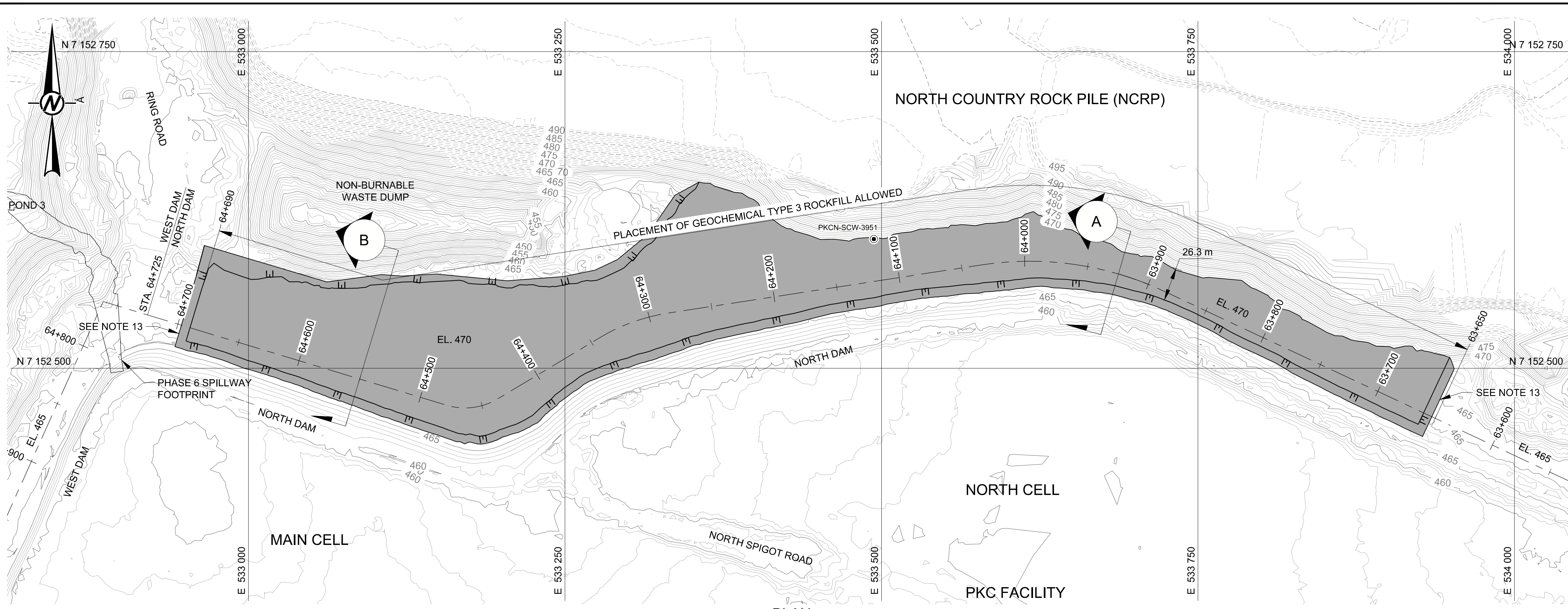
## STUDY LIMITATIONS

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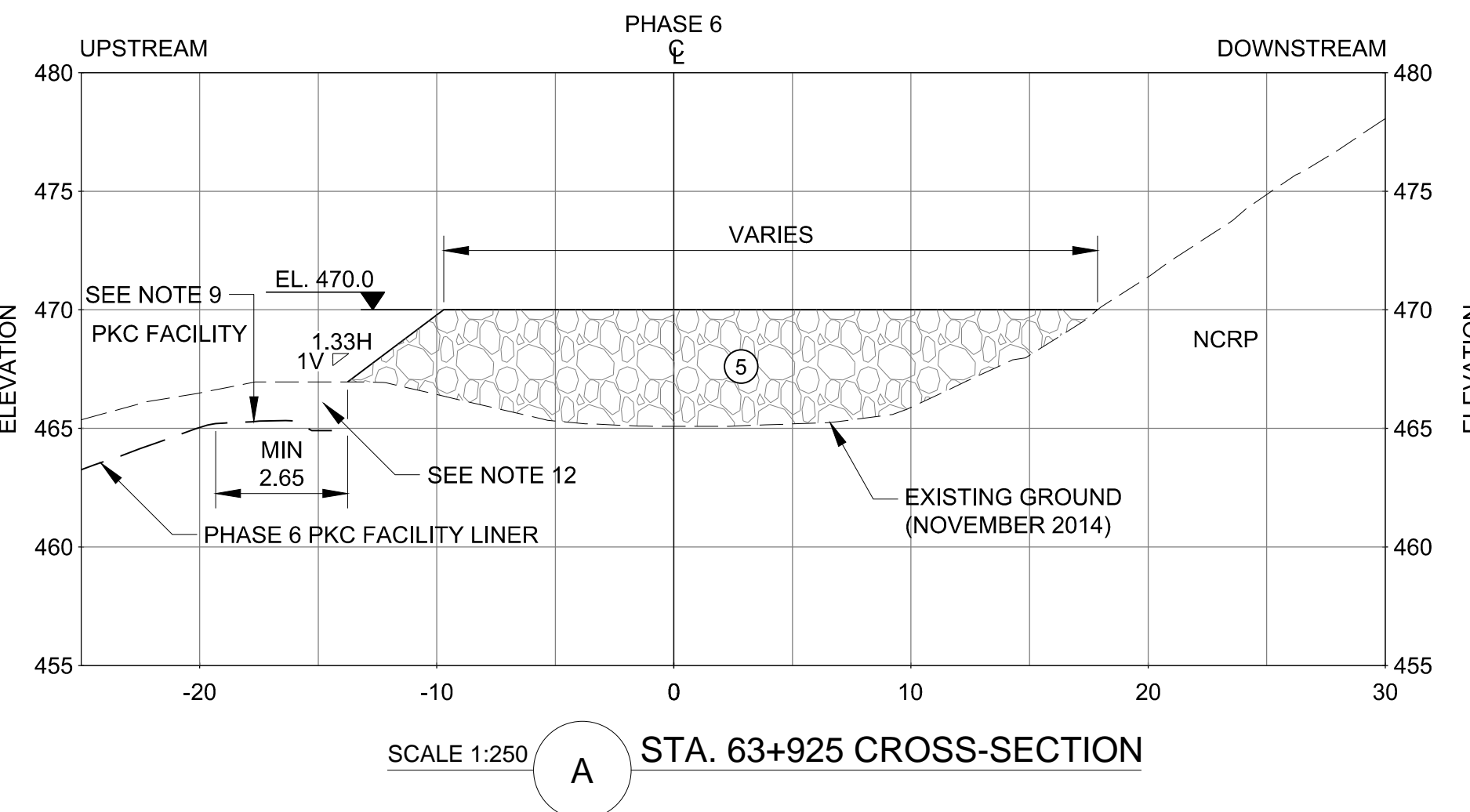


- LEGEND**
- EXISTING MAJOR CONTOUR (NOVEMBER 2014)
  - EXISTING MINOR CONTOUR (NOVEMBER 2014)
  - EXISTING MAJOR CONTOUR (SEPTEMBER 2015)
  - EXISTING MINOR CONTOUR (SEPTEMBER 2015)
  - PKC DAM PHASE 6 REFERENCE LINE
  - █ NORTH DAM ROCKFILL PLACEMENT EL. 470
  - ⊙ ROCKFILL
  - WELL LOCATION

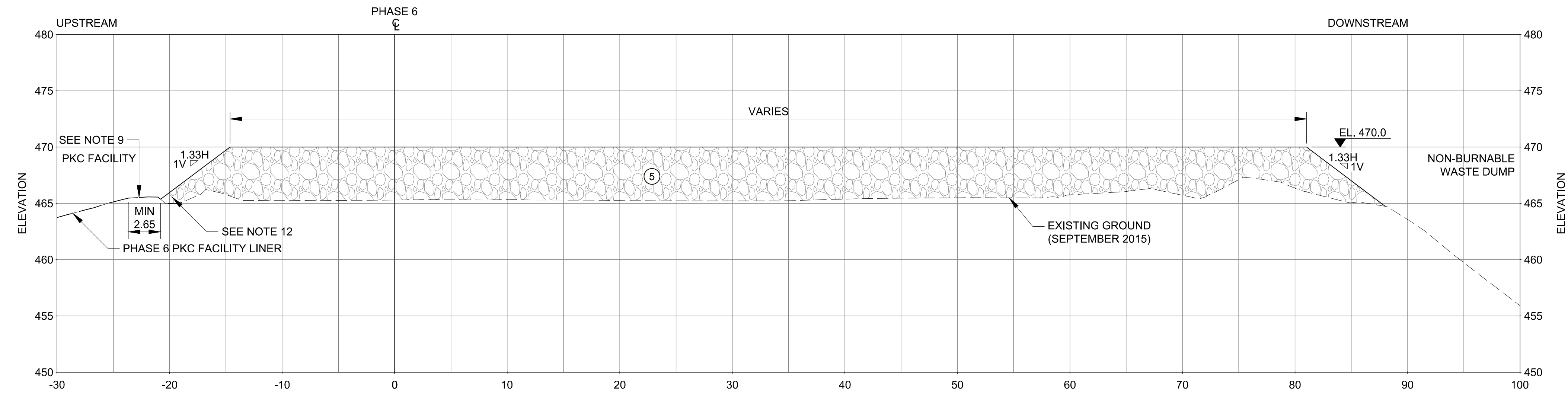
- NOTES**
1. COORDINATES ARE IN MINE GRID.
  2. ALL UNITS IN METRES UNLESS OTHERWISE NOTED.
  3. CONTOUR INTERVAL IS 1 m MINOR AND 5 m MAJOR.
  4. OTHERS TO PROVIDE PLAN FOR ACCESS TO NORTH SPIGOT ROAD WITHIN PKC FACILITY.
  5. INSTRUMENTATION PROTECTION AND EXTENSION PRIOR TO OR DURING ROCKFILL PLACEMENT IS THE RESPONSIBILITY OF DDMI.
  6. ROCKFILL PLACED IN MAXIMUM 5m LIFTS.
  7. DOWNSTREAM ROCKFILL SLOPES SHOWN AT 1.33H:1V AS THE ESTIMATED ANGLE OF REPOSE SLOPE FOR ZONE 5 MATERIAL.
  8. TO REDUCE SEGREGATION OF ROCKFILL ALONG THE UPSTREAM SIDE SLOPE, FINER ROCKFILL MATERIAL SHOULD BE DUMPED ON THE UPSTREAM SIDE AND THE COARSER ON THE DOWNSTREAM SIDE.
  9. ROCKFILL DUMPED AT ANGLE OF REPOSE TO BE SETBACK A NOMINAL 2.65m FROM THE CREST OF THE ELEVATION 465 m LINER.
  10. LINER BEDDING ZONES NOT SHOWN FOR CLARITY.
  11. SAFETY BERMS AT EL. 465 CREST NOT SHOWN.
  12. CPK LINER COVER IN EXCESS OF 0.2 m TO BE REMOVED DOWNSTREAM OF LINER CREST PRIOR TO ROCKFILL PLACEMENT.
  13. OTHERS TO PROVIDE RAMP ACCESS TO ROCKFILL PLACEMENT CREST FROM ELEVATION 465 m TO 470 m.
  14. REFER TO PKC FACILITY PHASE 6 ROCKFILL SHELL CONSTRUCTION TECHNICAL SPECIFICATIONS FOR ZONE 5 ROCKFILL MATERIAL PLACEMENT AND COMPACTION.
  15. INSTRUMENTATION WITHIN THE ROCKFILL PLACEMENT AREA IS TO BE RAISED AND PROTECTED TO PREVENT DAMAGING THE EXISTING INSTRUMENTATION DURING ROCKFILL PLACEMENT.
  16. THIS DRAWING TO BE READ IN CONJUNCTION WITH TECHNICAL MEMORANDUM 1521339-1454-TM-REV0-8000.

- REFERENCES**
1. EXISTING GROUND CONTOURS (NOVEMBER 2014) PROVIDED BY DDMI, RECEIVED JULY 4, 2015, FILE NAME: Comp-asb-og-Nov19-14.dwg.
  2. EXISTING GROUND CONTOURS (SEPTEMBER 2015) PROVIDED BY DDMI, RECEIVED NOVEMBER 23, 2015, FILE NAME: SRF-2015-ALL PKC.xml.

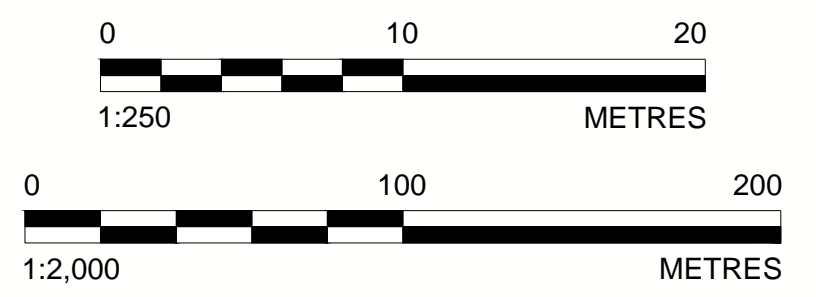
PLAN  
SCALE 1:2,000



A STA. 63+925 CROSS-SECTION  
SCALE 1:250



B STA. 64+550 CROSS-SECTION  
SCALE 1:250



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0	2015-12-07	ISSUED FOR CONSTRUCTION	JK	GP	GP	JCC			
B	2015-11-25	CLIENT REVIEW	MSH	GP	GP	JCC			
A	2015-11-16	INTERNAL REVIEW	MSH	GP	Á	Á			
REV.	YYYY-MM-DD	DESCRIPTION	DESIGNED	PREPARED	REVIEWED	APPROVED			

SEAL

**ORIGINAL SIGNED AND SEALED**

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PROJECT  
 DIAVIK DIAMOND MINES (2012) INC.  
 NORTH COUNTRY ROCK PILE  
 Á

TITLE  
**NORTH DAM CREST ROCKFILL PLACEMENT PLAN AND SECTION**

PROJECT NO. 1521339      PHASE/TASK/DOC 8000/8100/1454      REV. 0      Á of Á      DRAWING 001

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25 mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D