Project Proposal

Carmacks Copper Project
Yukon Territory

Appendix G3

EBA Engineering Consultants Ltd., Response to Review Questions – Waste Rock Storage Area (May 2006)

May 29, 2006 EBA File: 1200133

Access Consulting Group
Unit 3, 151 Industrial Road
Whitehorse, YT
Y1A 2V3

Attention: Mr. Dan Cornett

Subject: Response to Review Questions – Waste Rock Storage Area Carmack Copper Project – near Carmacks, YT

1.0 INTRODUCTION

This letter has been prepared by EBA Engineering Consultants Ltd. (EBA) to address comments made by the Government of Yukon (YTG) and SRK Consulting Inc. (SRK), during the review of the Waste Rock Storage Area (WRSA) design component of the Carmacks Copper Project. The initial design for the WRSA was completed by Knight Piesold Ltd. (KP) and titled "Report on Detailed Design of Waste Rock Storage Area (Ref. No. 1785/2)" dated May 30, 1997.

Sources for the review comments involving the WRSA design are as follows:

- *SRK, "Technical Memorandum (Draft), Carmacks Copper Environmental Assessment Report – Review Comments", February 20, 2006,*
- *SRK, "Appendix A (Draft), Technical Memorandum, Review of Heap Leach Pad and Waste Rock Dump Design, Carmacks Copper Project", February 16, 2006, and*
- *YTG, "Proposed Carmacks Copper Mining Project: Yukon Environmental Assessment Act (EAA) Additional Information Requirements", December 16, 2005.*

For clarity, review comments are presented in the following sections with a subsequent workplan to mitigate the concerns raised.

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2.0 REVIEW COMMENTS FROM SRK

Review comments from both SRK reports have been compiled and are addressed below.

- MCE and PGA earthquakes. *The minimum static and pseudo-static FOS values are different than that developed for the heap leach pad. In addition to confirming consistent design criteria across the site, the PGA values should be evaluated to determine if they represent current seismic requirements and data. SRK suggests that reference be made to the May 2004 report prepared by Gail Atkinson on the "Seismic Hazard Assessment for Faro, YK". The stability analysis should then be performed for the PGA noted in the design criteria to determine if an acceptable FOS can be achieved.*

A site-specific seismic hazard assessment, according to the 2005 edition of the National Building Code of Canada, will be completed for the Carmacks Copper site. This assessment will provide current PGA values for stability analysis. The initial WRSA design will then be reviewed to confirm an acceptable FOS is achieved using the current PGA value associated with this facility.

- Stability Analysis. *KP, 1997 incorporated a shear strength of 39.5° for the foundation soils, which is higher than the value used for the waste rock. The shear strength should be based on lower residual shear strength parameters. This should result in a shear strength less than that assumed for the waste rock, which would then change the critical slope surface from a circular failure to a wedge failure, which would result in lower FOS values. Therefore, the stability analysis should be performed with more appropriate foundation shear strength values.*

The WRSA will be reanalyzed assuming a lower foundation shear strength value to confirm an acceptable FOS is achieved. The lower shear strength value will be used for both the static and pseudostatic case. This shear strength value will be based on the foundation soils observed and tested during the 2006 geotechnical drilling program (program outlined below in the next comment).

- Foundation conditions. *The majority of geotechnical investigations in the WRSA have involved only test pits, and there is little data on the depth to bedrock. The test pits show that permafrost is relatively close to surface, and that the majority of the WRSA footprint will be situated over permafrost soils. It is unclear as to the short and long term impact that the WRSA will have on the permafrost area.*

A geotechnical drilling program within the WRSA will be completed in the summer of 2006 to characterize the soil stratigraphy, presence/ground ice content of the permafrost, and depth to competent bedrock. This program will include approximately nine boreholes within the WRSA up to depths of 40 m. An auger drill rig capable of completing standard penetration tests (SPT), and CRREL barrel coring of permafrost will be used.

If permafrost is encountered during the program, two ground temperature cables will be installed to monitor changes to the permafrost regime throughout the life of the WRSA.

This drilling program, along with ongoing monitoring of the ground temperature cables, will help model short and long term impacts of the WRSA on the ground conditions within the area.

- Hydrogeology. *KP, 1997 assumed minor impacts to the local hydrogeological regime. This should be evaluated in further detail.*

The drilling program will provide detailed soil stratigraphy of the WRSA. This information will provide data required to determine whether any hydrogeology issues will arise with the construction of the WRSA.

Ongoing monitoring of MW96-F through –H will also be completed to evaluate any changes to the local hydrogeological regime.

- Monitoring: *Vibrating wire piezometers have been proposed for monitoring the waste rock dump. These can be very unreliable and need to be calibrated on regular intervals after installation. An alternative approach should be incorporated into the design.*

The requirement for piezometers will be reevaluated upon completion of the 2006 geotechnical drilling program. The use of vibrating wire, pneumatic and/or Casagrande piezometers will be evaluated at that time.

3.0 REVIEW COMMENTS FROM YTG

Review comments from the EAA report regarding the WRSA have been compiled and are addressed below.

- *The proponent's proposal for waste rock disposal relies on placement of rock on ground that contains potentially thaw unstable soils. The EAR identifies uncertainties about constructing a waste rock dump in the proposed location due to this instability. Should the proponent choose to use this location for waste rock disposal, further information is required regarding their plans for managing the potential instability of this site.*

The 2006 drilling program would provide subsurface stratigraphy information that will be used to identify potential instability issues associated with presence of thaw unstable soils should permafrost be encountered. Again, if permafrost is encountered, two ground temperature cables will be installed and monitored to evaluate the degradation of the permafrost during construction of the WSRA.

As indicated in the initial design (and outlined in Section 4.0), an additional geotechnical investigation is scheduled for Year 3 of fill placement to evaluate the subsurface conditions at that time. This investigation along with the data provided by the ground temperature cables, if installed, will be used to evaluate and deal with any future concerns regarding stability of the WRSA and confirm whether the assumptions made during the detailed design are still valid.

- *The EAR suggests that the waste rock dump will include a buffer zone that provides sufficient clearances to excavate and construct a waste rock key trench to stabilize slopes, or flatten slopes if necessary. However, it appears that this buffer will be filled with waste rock during Year 4 of operations and could therefore not be used for the purposed described. Clarification is required as to the practicality of this approach to stabilizing the heap as required.*

The Year 3 investigation along with the ground temperature data, if installed, will be used to address the requirement of the buffer zone. Should no stability concerns arise at that time, the buffer zone will be filled in Year 4 as planned. Any stability concerns will be dealt with on an issue by issue basis. These issues will to be resolved prior to filling the buffer zone in the specific area of question.

Additional clarification of the initial design is presented in Section 4.0.

- *The EAR references design criteria for the waste dump. Clarification is required as to what set of design criteria will be used for this portion of the project.*

Design criteria used in the detailed design would form a part of the detailed design report for the WRSA.

4.0 KP 1997 WRSA DESIGN REPORT – CONSTRUCTION METHODOLOGY

The following construction methodology has been summarized from the initial KP 1997 WRSA detailed design report. Drawings 1784.303 and 1784.304, attached, present the loading plan and sections for Years 1,2, 4 and 6 of the WRSA.

Pre-Production

- Clear and strip the entire waste rock storage area down to mineral soil.
- Stockpile stripped material at the designated areas north east of the facility.
- Construct surface drainage ditches, surface drainage collection ditch, perimeter collection ditch, and waste rock storage outlet ditch.
- Construct sediment control pond and related structures.

Production

- Place waste rock material by end-dumping from the face of the advancing lift.
- The surface elevation of the first lift is to be maintained at Elevation 840 m until a lift thickness of 25 m has been obtained.
- Continue advancement of first lift parallel to topography until the limits of the 100 m wide contingency buffer zone are reached. This will take approximately three years at which time a geotechnical investigation program within the contingency buffer zone will be undertaken. The objective on this program will be to confirm foundation conditions and update the stability assessment prior to Year 4 waste rock placement. If foundation conditions are not as

anticipated then remedial loading plans and contingency measures will be developed including stability berms and slope reduction.

- The surface elevation of second lift is to be maintained at Elevation 840 m until a lift thickness of 25 m has been obtained, the lift is then to be advanced parallel to topography.
- Level off the top of the entire waste dump at Elevation 840 m using a maximum 25 metre thick lift followed by a 15 m thick lift.
- Constuct the final 30 m lift to elevation 870 m.

EBA finds this construction methodology acceptable based on the reported foundation conditions within the WRSA to date. The stripping operation in the pre-production stage along with the 100 m buffer zone for Years 1 through 3 will help address any stablility concerns for the WRSA from thaw unstable soils (given permafrost is present). The Year 3 geotechnical investigation will provide the necessary information to address any further instability concerns for the WRSA prior to the filling in the buffer zone in Year 4.

Upon the completion of the 2006 geotechnical drilling program, this construction methodology will be reviewed and revised to incorporate the current foundation conditions present within the WRSA.

5.0 CLOSURE

If additional information or clarification is required, please contact the undersigned.

Respectfully submitted,
EBA Engineering Consultants Ltd.

PROFESSIONAL ENGINEER YUKON J.P.W. BERKERS TERRITORY
May 29/06

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May 29/06

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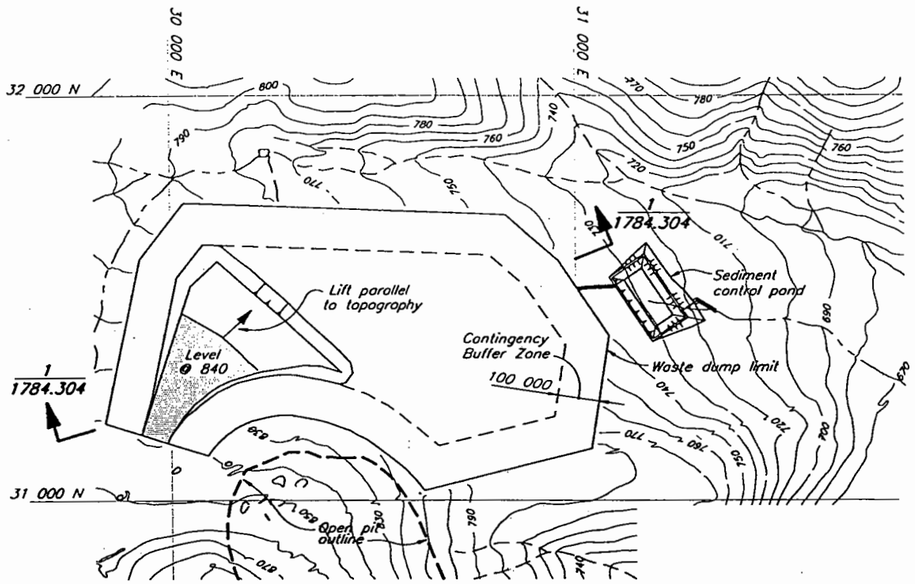
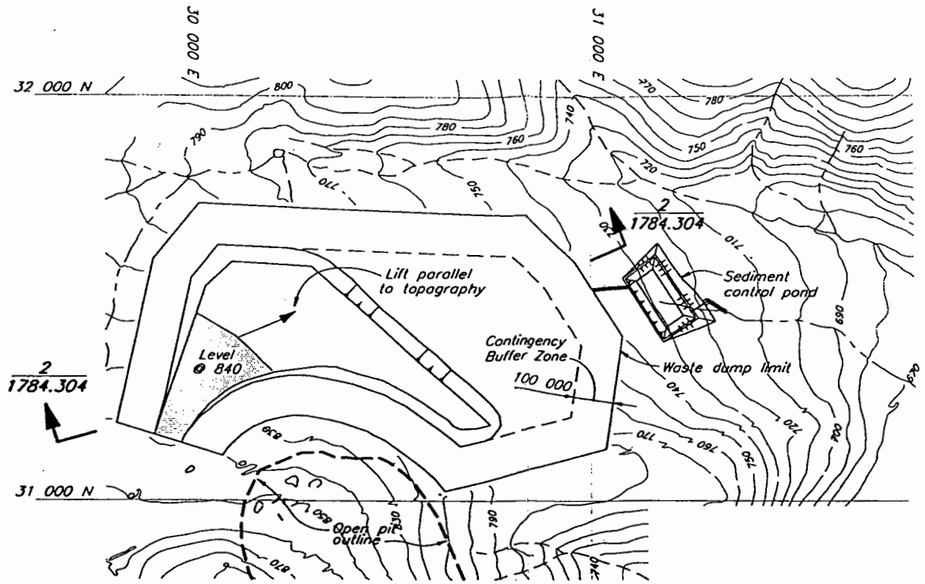
Attachments:
Drg. No. 1784.303: Waste Rock Storage Area Loading Plan
Drg. No. 1784.304: Waste Rock Storage Area Loading Sections

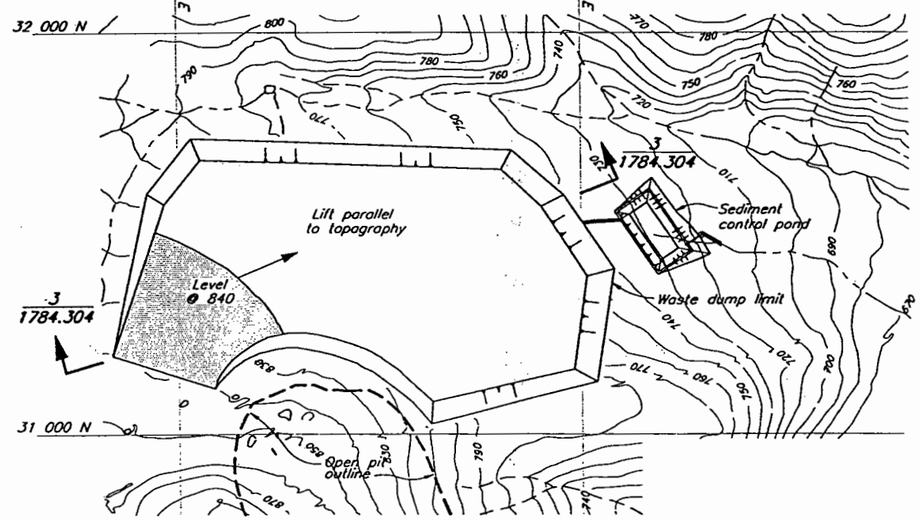
PERMIT TO PRACTICE
EBA ENGINEERING CONSULTANTS LTD.
SIGNATURE
Date May 29/06
PERMIT NUMBER PP003
Association of Professional Engineers of Yukon



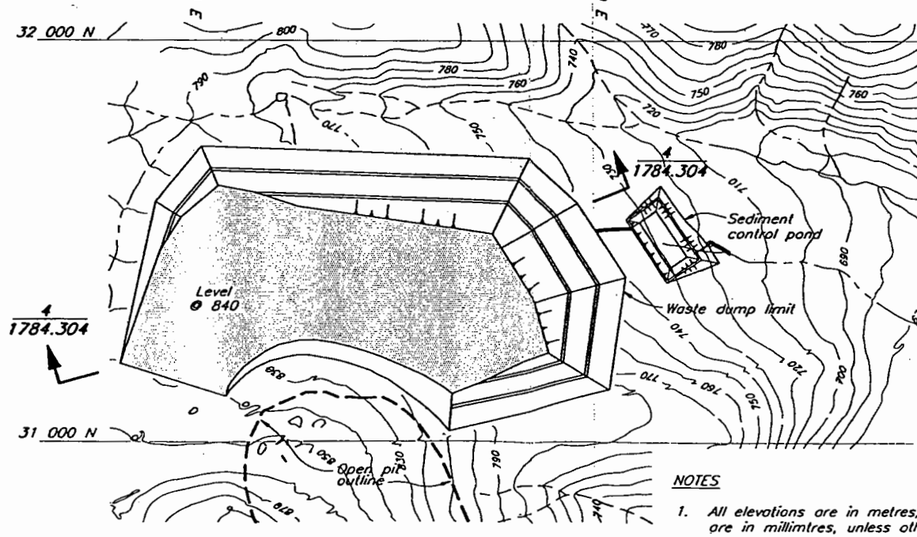
YEAR 1
15% OF 1ST LIFT COMPLETE



YEAR 2
30% OF 1ST LIFT COMPLETE



YEAR 4
1ST LIFT COMPLETE



YEAR 6
3RD LIFT COMPLETE

NOTES

1. All elevations are in metres, and dimensions are in millimtres, unless otherwise noted.
2. All drawings are to be read in conjunction with the Detailed Design Report, REF. NO. 1784/2.

Scale 200 100 0 200 400 600 800 1000 m

REFERENCE DRAWINGS			REVISIONS				REVISIONS			
1784.304	WASTE ROCK STORAGE – SECTIONS AND DETAILS					0	JUNE 21/96	ISSUED FOR DESIGN REPORT	
DRG. NO.	DESCRIPTION	REV.	DATE	DESCRIPTION	APPROVED	REV.	DATE	DESCRIPTION	APPROVED

KNIGHT PIESOLD LIMITED
CONSULTING ENGINEERS – VANCOUVER, B.C.

PROFESSIONAL ENGINEER – BRUNO BORNTRAEGER – TERRITORY

DESIGNED	LG
DRAWN	AW
CHECKED	BSB
APPROVED	

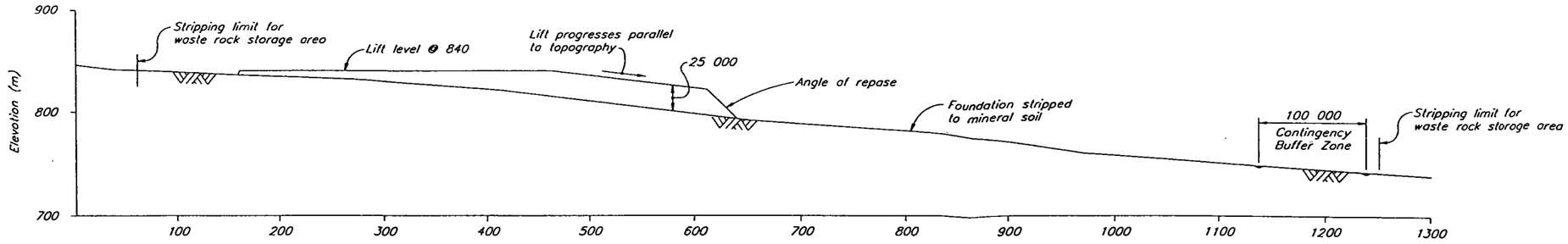
WESTERN COPPER HOLDINGS LIMITED

CARMACKS COPPER PROJECT

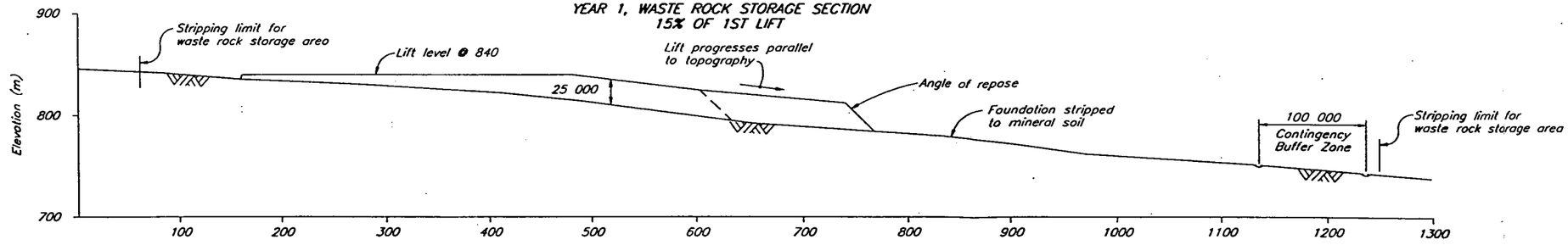
WASTE ROCK STORAGE AREA LOADING PLAN

DATE JUNE 21, 1996 | SCALE AS SHOWN | DRG. NO. 1784.303 | REV. 0

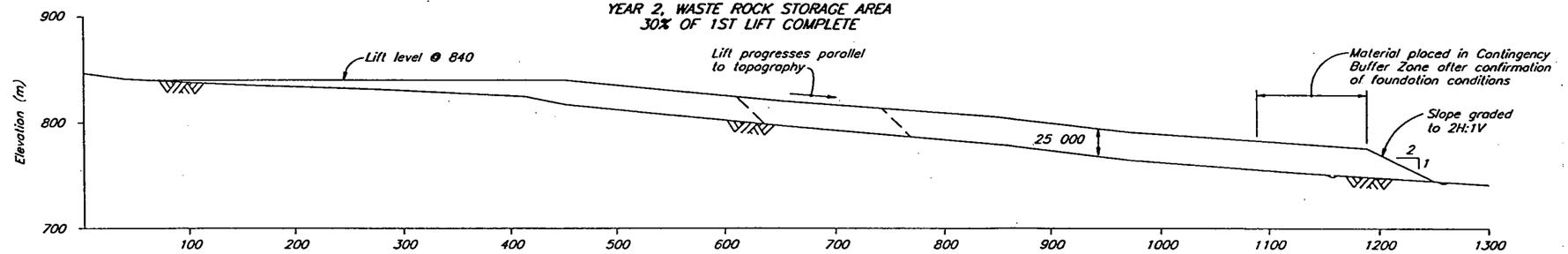
CAD FILE: \1784\01\D012 1:2500 Plot 1=2.5 JUNE 18, 1996



1
SECTION 1784.303
YEAR 1, WASTE ROCK STORAGE SECTION
15% OF 1ST LIFT



2
SECTION 1784.303
YEAR 2, WASTE ROCK STORAGE AREA
30% OF 1ST LIFT COMPLETE



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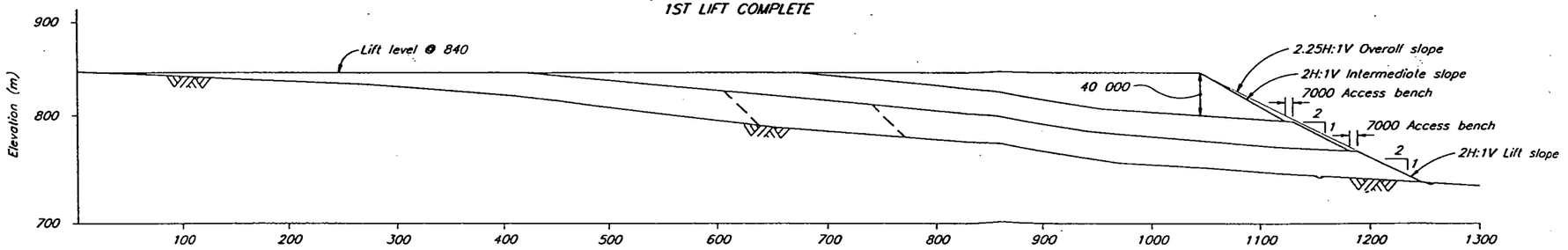
SECTION 1784.303
YEAR 4, WASTE ROCK STORAGE AREA
1ST LIFT COMPLETE



4
SECTION 1784.303
YEAR 6, WASTE ROCK STORAGE AREA
3RD LIFT COMPLETE

NOTES

1. All elevations are in metres, and dimensions are in millimetres, unless otherwise noted.
2. All drawings are to be read in conjunction with the Detailed Design Report, REF. NO. 1784/2.

Scale 100 50 0 100 200 metres

REFERENCE DRAWINGS		REVISIONS				REVISIONS			
1784.303	WASTE ROCK STORAGE AREA – LOADING PLAN	REV.	DATE	DESCRIPTION	APPROVED	0	JUNE 21/96	ISSUED FOR DESIGN REPORT	APPROVED
DRG. NO.	DESCRIPTION					REV.	DATE	DESCRIPTION	

KNIGHT PIESOLD LIMITED
CONSULTING ENGINEERS – VANCOUVER, B.C.

PROFESSIONAL ENGINEER YUKON BRUNO BORTOLOTTI TERRITORY

DESIGNED LG
DRAWN AW
CHECKED BSB
APPROVED

WESTERN COPPER HOLDINGS LIMITED

CARMACKS COPPER PROJECT

WASTE ROCK STORAGE AREA
LOADING SECTIONS

DATE JUNE 21, 1996 | SCALE AS SHOWN | DRG. NO. 1784.304 | REV. 0

C:\0_DATA\784\DWG\1784304.Dgn 23-JUN-1996 JUNE 19, 1996