

TRANSMITTAL

Amaruq Project - IVR Deposit Feasibility Level Open Pit Slope Recommendations

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		Cont. No.:	NB19-00738
To:	Agnico Eagle Mines Limited - Meadowbank Division - Nunavut Baker Lake, Nunavut Canada, X0C 0A0		
Attention:	Jesse Clark and Christian Tremblay		


Document Items

Item No.	Description
1.	Figure 1, Rev A - IVR Deposit - Summary of Preliminary Open Pit Slope Recommendations
2.	Table 1, Rev A - Summary of Preliminary Open Pit Slope Recommendations
3.	Figure 2, Rev A - IVR Deposit - Typical V0 and V2 Open Pit Cross Sections

Remarks

Remarks	Please find attached the summary of preliminary feasibility level open pit slope recommendations for the V2 and V0 open pits at the IVR deposit. A figure showing typical cross sections is also included.
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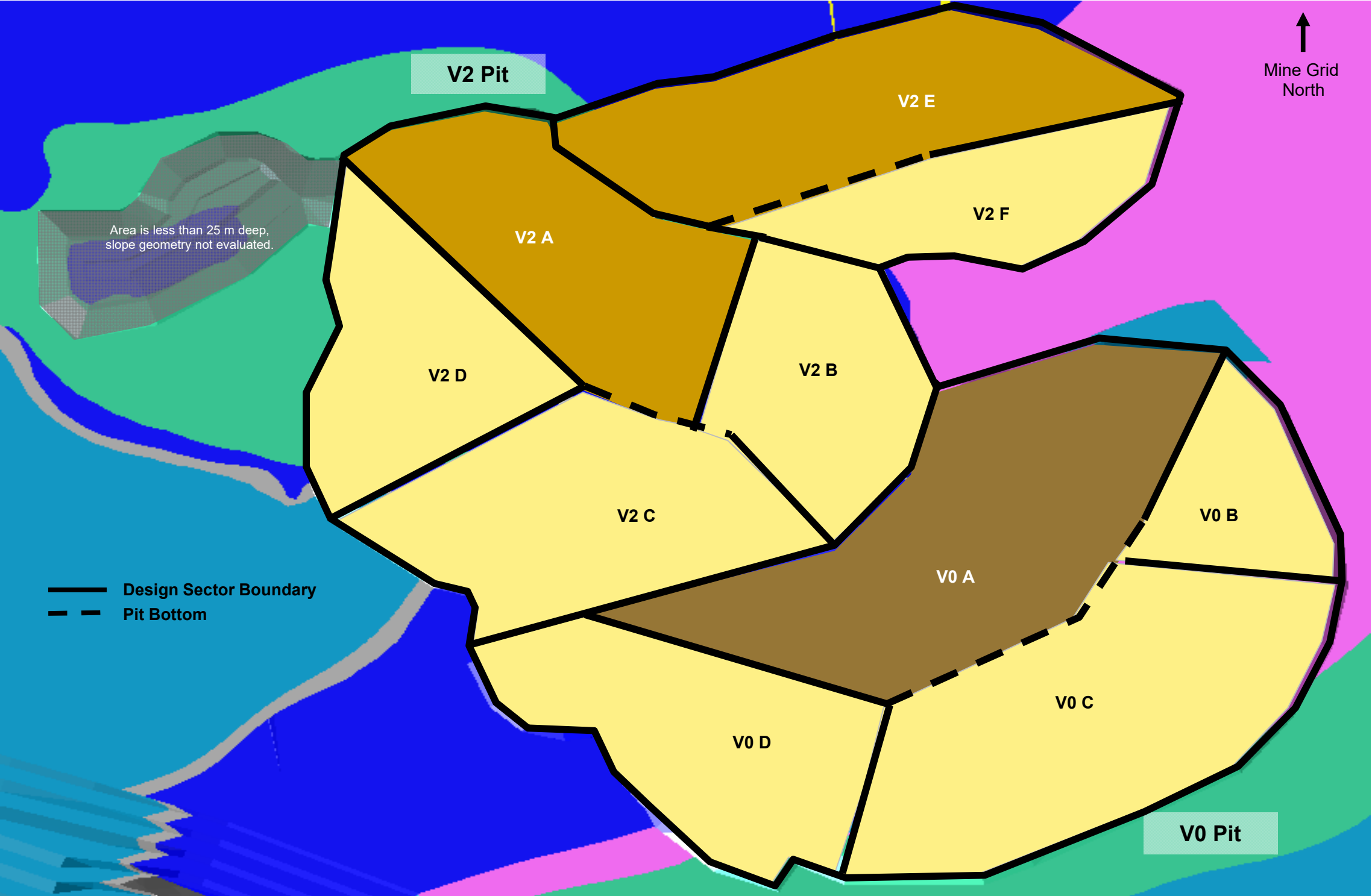
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Reviewed: 
 Madison Raddatz

Approval that this document adheres to the Knight Piésold Quality System:



/mr



Mine Grid North

Base Bench Geometry

KOMATIITE
BFA: 75°
Bench Width: 10.5 m
Bench Height: 21 m
IRA: 52°

Bench Geometry Controlled by Bench-Scale Failures

V2 A & V2 E
BFA: 65°
Bench Width: 13.5 m
Bench Height: 14 m
IRA: 35°

V0 A
BFA: 65°
Bench Width: 16 m
Bench Height: 14 m
IRA: 32°

- NOTES:
- 1. OPEN PIT (IVR-001-004C) PROVIDED BY AEM (JANUARY 25, 2019).
 - 2. LITHOLOGY MODEL PROVIDED BY AEM (JANUARY 31, 2019).

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AGNICO EAGLE MINES LTD. MEADOWBANK DIVISION

AMARUQ PROJECT

IVR DEPOSIT
SUMMARY OF PRELIMINARY OPEN PIT
SLOPE RECOMMENDATIONS



P/A NO.
NB101-622/23

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NB19-00738

FIGURE 1

REV
A

TABLE 1
AGNICO EAGLE MINES LTD. MEADOWBANK DIVISION
AMARUQ PROJECT
IVR DEPOSIT FEASIBILITY LEVEL OPEN PIT SLOPE RECOMMENDATIONS
SUMMARY OF PRELIMINARY OPEN PIT SLOPE RECOMMENDATIONS

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Open Pit	Open Pit Design Sector	Dominant Domain (See Note 1 & 2)	Nominal Bench Face Dip Direction (See Note 3)	Total Slope Height (See Note 3)	Dominant Potential Failure Mode	Bench Configurations							Inter-Ramp Slope Configurations				Overall Slope Configuration		Comments	
						Design Bench Face Angle (BFA)	Potential Kinematic Back-Break Angle (See Note 4)	Design Bench Width	Base Bench Width	Potential Kinematic Back-Break	Operational Back-Break (See Note 5)	Bench Height (See Note 6)	Inter-Ramp Angle (IRA)			Max. Inter-Ramp Slope Height (m)	Achievable Based on LE	Expected OSA Performance Based on Precedent Practice		
													From Design Bench Configuration	Achievable Based on Kinematics	Achievable Based on LE					
			(°)	(m)		(°)	(°)	(m)	(m)	(m)	(m)	(m)	(°)				(m)			
V2	A	Komatite and Mafic Volcanics	190	125	Planar	65	-	13.5	8.0	5.5	Accounted for in Potential Kinematic Back-Break	14.0	35	Yes (Limits)	Yes	150	Yes	FoS > 1.3	- Bench height reduced and bench width increased to accommodate planar failures on Joint Set A (Foliation). - Bench and inter-ramp slope performance sensitive to the frictional strength and orientation of the foliation. Recommended slope geometry considers the sector as a whole; local bench performance may differ substantially from the design (e.g. bench face could fail back to 35° or stand sub-vertically). - Additional monitoring is recommended in this sector.	
	B	Komatite and Mafic Volcanics	255	125	None	75	-	10.5	8.0	0.0	2.5	21.0	52	Yes	Yes	150	Yes	FoS > 1.3	- No particular concerns.	
	C	Komatite and Mafic Volcanics	20	125	Toppling	75	-	10.5	8.0	0.0	2.5	21.0	52	Yes	Yes	150	Yes	FoS > 1.3	- Toppling failure is not expected to significantly affect slope performance. However, additional monitoring is recommended in this sector.	
	D	Komatite and Mafic Volcanics	110	125	None	75	-	10.5	8.0	0.0	2.5	21.0	52	Yes	Yes	150	Yes	FoS > 1.3	- No particular concerns.	
	E	Komatite and Mafic Volcanics	160	60	Planar (See Comments)	65	-	13.5	8.0	5.5	Accounted for in Potential Kinematic Back-Break	14.0	35	Yes	Yes	150	Yes	FoS > 1.3	- The modelled ore bodies for this sector are rotated relative to the ore bodies in the remainder of the V2 open pit. The ore bodies are sub-parallel to the open pit slope in this sector and the foliation is expected to have a similar orientation. As a result, planar failures on the foliation are expected to limit the achievable bench geometry. - The slope geometry recommendations are based on the orientation of the ore bodies in this sector as discontinuity orientation data specific to the sector are not available. The recommendations from the V2A sector have been applied. - Additional monitoring is recommended in this sector.	
	F	Komatite and Mafic Volcanics	340	60	None	75	-	10.5	8.0	0.0	2.5	21.0	52	Yes	Yes	150	Yes	FoS > 1.3	- No particular concerns.	
V0	A	Komatite	150	105	Planar	65	45	15.5	8.0	7.5	Accounted for in Potential Kinematic Back-Break	14.0	32	Yes	Yes	150	Yes	FoS > 1.3	- Bench height reduced and bench width increased to accommodate planar failures on Joint Set A (Foliation). - Bench and inter-ramp slope performance sensitive to the frictional strength and orientation of the foliation. Recommended slope geometry considers the sector as a whole. - Brittle Structures 1 & 5 and the North-South Fault intersect the sector obliquely and will locally affect the slope performance. The faults are largely mined out. It is recommended that they be entirely mined out. - Additional monitoring is recommended in this sector.	
	B	Komatite	250	105	None	75	-	10.5	8.0	0.0	2.5	21.0	52	Yes	Yes	150	Yes	FoS > 1.3	- No particular concerns.	
	C	Komatite and Mafic Volcanics	330	105	Toppling	75	-	10.5	8.0	0.0	2.5	21.0	52	Yes	Yes	150	Yes	FoS > 1.3	- Toppling failure is not expected to significantly affect slope performance. However, additional monitoring is recommended in this sector.	
	D	Komatite	50	105	None	75	-	10.5	8.0	0.0	2.5	21.0	52	Yes	Yes	150	Yes	FoS > 1.3	- No particular concerns.	

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- NOTES:**
1. DOMINANT OPEN PIT WALL DOMAINS BASED ON LITHOLOGY MODEL PROVIDED BY AEM (JANUARY 31, 2019).
2. THE KOMATIITE IS A WEAKER UNIT OF VARIABLE ROCK MASS QUALITY AND IS EXPECTED TO BE SUSCEPTIBLE TO RAVELLING.
3. TOTAL SLOPE HEIGHT AND WALL ORIENTATIONS BASED ON THE IVR-001-004C OPEN PIT DESIGN PROVIDED BY AEM (JANUARY 25, 2019). SLOPE HEIGHT MEASURED FROM THE TOE OF THE SLOPE IN THE DEEPEST PORTION OF THE SECTOR TO THE CREST WHERE INTERSECTED BY THE TOPOGRAPHY. THE DIP DIRECTION IS IN MINE GRID.
4. BENCH FACE ANGLE RECOMMENDATIONS BASED ON THE RESULTS OF KINEMATIC ANALYSES. DESIGN BENCH FACE ANGLE LIMITED TO ±65° BASED ON GUIDANCE FROM AEM.
5. OPERATIONAL BACK-BREAK SPECIFIED BY AEM BASED ON OBSERVED SLOPE PERFORMANCE AT THE MEADOWBANK MINE. OPERATIONAL BACK-BREAK EXPECTED TO BE 2.5 m IN THE KOMATIITE AND 2.0 m IN ALL OTHER DOMAINS.
6. BENCH HEIGHTS BASED ON A 7 m BENCH IN A TRIPLE-BENCH CONFIGURATION. SOME SECTORS HAVE BEEN LIMITED TO A DOUBLE BENCH CONFIGURATION.
7. OVERALL SLOPE PERFORMANCE EVALUATED USING LIMIT-EQUILIBRIUM METHODS FOR THE DEEPEST LOCATION WITHIN THE SECTOR.
8. OVERBURDEN TO BE SET BACK 10 m FROM OPEN PIT SLOPE CREST TO ALLOW SUFFICIENT SPACE FOR THE INSTALLMENT OF SEDIMENT CONTROL BERM AND THE COLLECTION OF ANY MOBILIZED MATERIAL. ALTERNATIVELY, A THERMAL CAP MUST BE INSTALLED AND OFFSET FROM THE CREST BY A MINIMUM OF 2 m.

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