

**Appendix 3 Mine Site and Dunka Road Earthwork Permit Application Support
Drawings**

Errata Sheet

Poly Met Mining, Inc. NorthMet Project

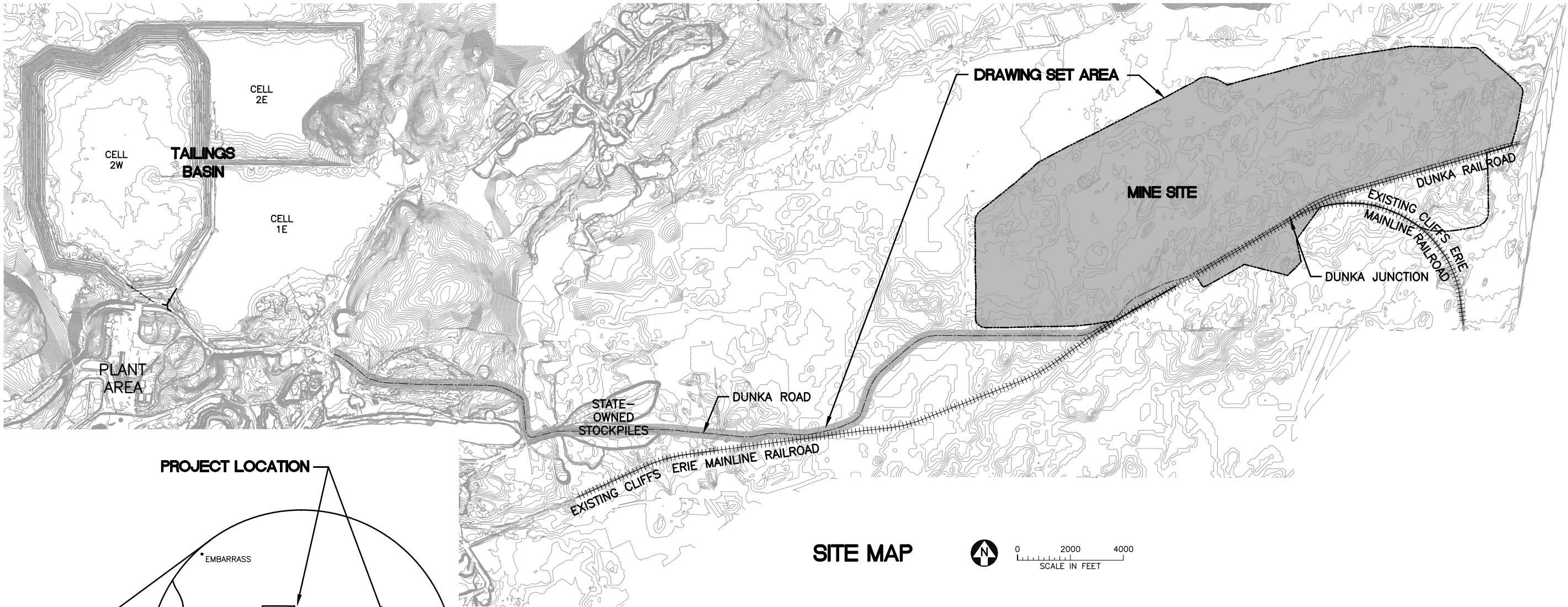
Permit Application Support Drawings: Mine Site and Dunka Road Earthwork

July 2016 (version 2)

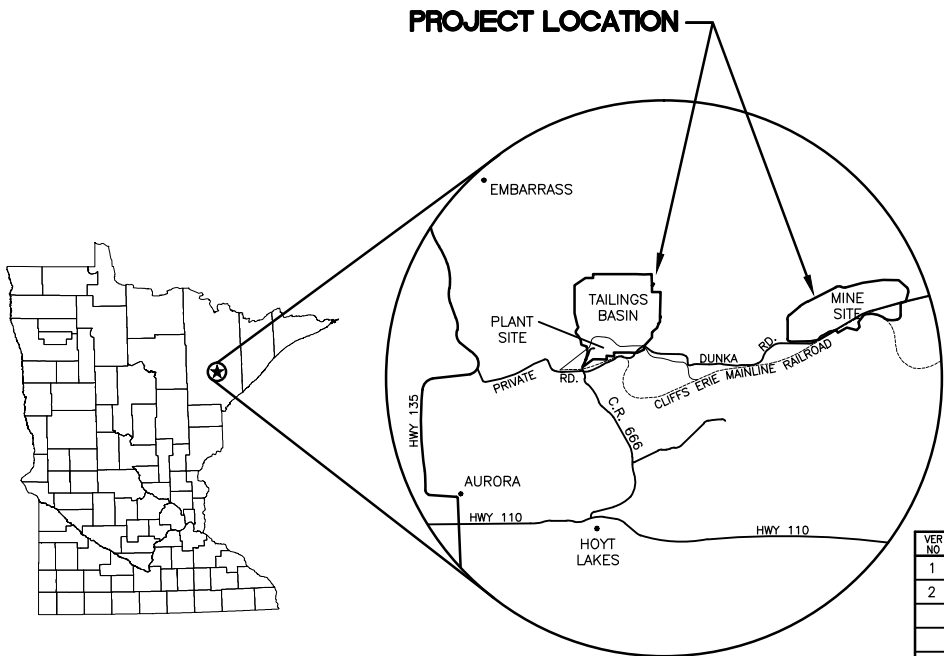
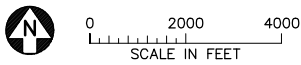
Engineering design is currently in progress. The table below lists changes that have been identified to-date and have not yet been incorporated in the attached permit application support drawings within this set. Final design will incorporate these changes along with additional site-specific information (e.g., supplementary geotechnical data); therefore, additional adjustments may be made during final design that will be incorporated into the final design drawing set.

Drawing Sheet(s)	Change
Global change to all sheets, as needed	The terminology "mine drainage" as noted in these drawings will be changed to "mine water".
EW-003	Temporary sedimentation basins or stormwater infiltration basins may be added to meet construction stormwater requirements along Dunka Road. These construction stormwater features require additional site-specific data and will be evaluated in final design.

POLY MET MINING, INC. NORTHMET PROJECT
PERMIT APPLICATION SUPPORT DRAWINGS
MINE SITE AND DUNKA ROAD EARTHWORK
HOYT LAKES, MINNESOTA



SITE MAP



LOCATION MAP
NOT TO SCALE



VICINITY MAP
NOT TO SCALE

VER. NO.	DATE	DESCRIPTION	ISSUE STATUS		
			ISSUED	VERSION	DATE
1	5/21/15	ISSUED FOR INCLUSION IN PERMIT APPLICATION	ISSUED		
2	8/10/16	CORRECTION ON EW-009	FOR PERMITTING	2	8/10/16
			FOR CONSTRUCTION		
			NOT APPROVED FOR CONSTRUCTION.		

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINTED NAME: PAUL T. SWENSON
SIGNATURE:
DATE: 5/21/15 LICENSE# 20533

DRAWN: KKB
CHECKED: ATS
BARR PROJECT NO.: 23/69-OC29
SCALE: AS SHOWN

PLANT DRAWING NUMBER:	
MINE SITE & DUNKA ROAD EARTHWORK LOCATION MAP AND SITE MAP	
	POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA
	BARR ENGINEERING COMPANY 4700 WEST 77TH STREET MINNEAPOLIS, MN. Ph: 1-800-632-2277
DWG. NO. EW-001	REV

CADD USER: Terrt J. Toms FILE: K:\DESIGN\23690C29.10\PERMIT_LEW-002.DWG PLOT SCALE: 1:2 PLOT DATE: 5/29/2015 10:19 AM

INCHES

1

2

GENERAL LEGEND

EXISTING

—1000—

EXISTING CONTOUR – MAJOR

— — — — —

EXISTING CONTOUR – MINOR

⊗

EXISTING POWER POLE

+ + + + + + + + +

EXISTING RAILROAD

— · · · — · · · —

WATER EDGE/CREEK CENTER LINE

=====

EXISTING ROAD

- - - - -

EXISTING TRAIL

- - - - -

EXISTING UNIMPROVED TRAIL

— R/W —

RIGHT OF WAY

=====

PROPERTY LINE

— - - - —

MINE SITE BOUNDARY

EXISTING STRUCTURES

TREE LINE

WETLAND BOUNDARY

— OE —

EXISTING OVERHEAD ELECTRIC

— UE —

EXISTING UNDERGROUND ELECTRIC

EXISTING VALVE

EXISTING CULVERT

PROPOSED MINE DRAINAGE CULVERT

PROPOSED

—1000—

PROPOSED CONTOUR – MAJOR

— — — — —

PROPOSED CONTOUR – MINOR

=====

PROPOSED ROADS

PROPOSED OTHER FACILITY

—1000—

OTHER FACILITY PROPOSED CONTOUR – MAJOR

— — — — —

OTHER FACILITY PROPOSED CONTOUR – MINOR

ABBREVIATIONS

CATEGORY 1 STOCKPILE – CATEGORY 1 WASTE ROCK STOCKPILE

CATEGORY 2/3 STOCKPILE – CATEGORY 2/3 WASTE ROCK STOCKPILE

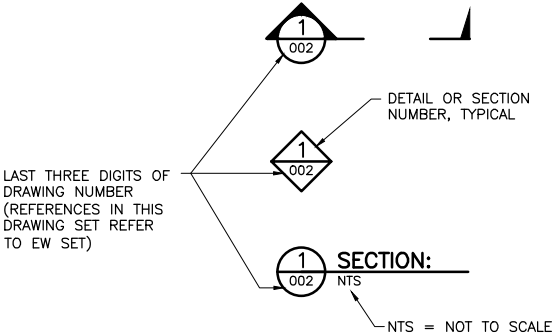
EW – EARTHWORK

SHEET INDEX

SHEET NO. TITLE

GENERAL DRAWINGS	
EW-001	LOCATION MAP AND SITE MAP
EW-002	LEGEND AND SHEET INDEX
EW-003	DUNKA ROAD UPGRADE GENERAL LAYOUT
EW-004	DUNKA ROAD UPGRADE TYPICAL SECTION
EW-005	HAUL ROADS GENERAL LAYOUT – MINE YEAR 11
EW-006	HAUL ROADS TYPICAL SECTIONS AND DETAILS
EW-007	HAUL ROADS TYPICAL SECTIONS AND DETAILS
EW-008	PRE-STRIPPING PIT TYPICAL SECTION
EW-009	OVERBURDEN STORAGE AND LAYDOWN AREA GRADING PLAN
EW-010	HAUL ROAD CLOSURE PLAN MINE YEARS 1-11
EW-011	HAUL ROAD CLOSURE PLAN MINE YEARS 11-20

DRAWING NUMBERING



NOTES

- COORDINATE SYSTEM IS MINNESOTA STATE PLANE NORTH ZONE, NAD83.
- ELEVATIONS ARE BASED ON MEAN SEA LEVEL (MSL), NAVD88.
- EXISTING TOPOGRAPHIC INFORMATION SHOWN ON THE DRAWINGS WAS PREPARED BY AEROMETRIC, INC. FROM LIDAR DATA COLLECTED ON MARCH 17, 2010.

VER NO		DATE	DESCRIPTION	ISSUE STATUS			DRAWN:		CHECKED:		BARR PROJECT NO.:		SCALE:		DWG. NO.		REV
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				FOR PERMITTING	1	5/21/15	PRINTED NAME PAUL T. SWENSON		ATS								
				FOR CONSTRUCTION			SIGNATURE										
				NOT APPROVED FOR CONSTRUCTION.			DATE 5/21/15 LICENSE# 20533										

PLANT DRAWING NUMBER:

MINE SITE & DUNKA ROAD EARTHWORK
LEGEND AND SHEET INDEX

POLYMET MINING

POLY MET MINING, INC.

NORTHMET PROJECT

HOYT LAKES, MINNESOTA

BARR

BARR ENGINEERING COMPANY

4700 WEST 77TH STREET

MINNEAPOLIS, MN.

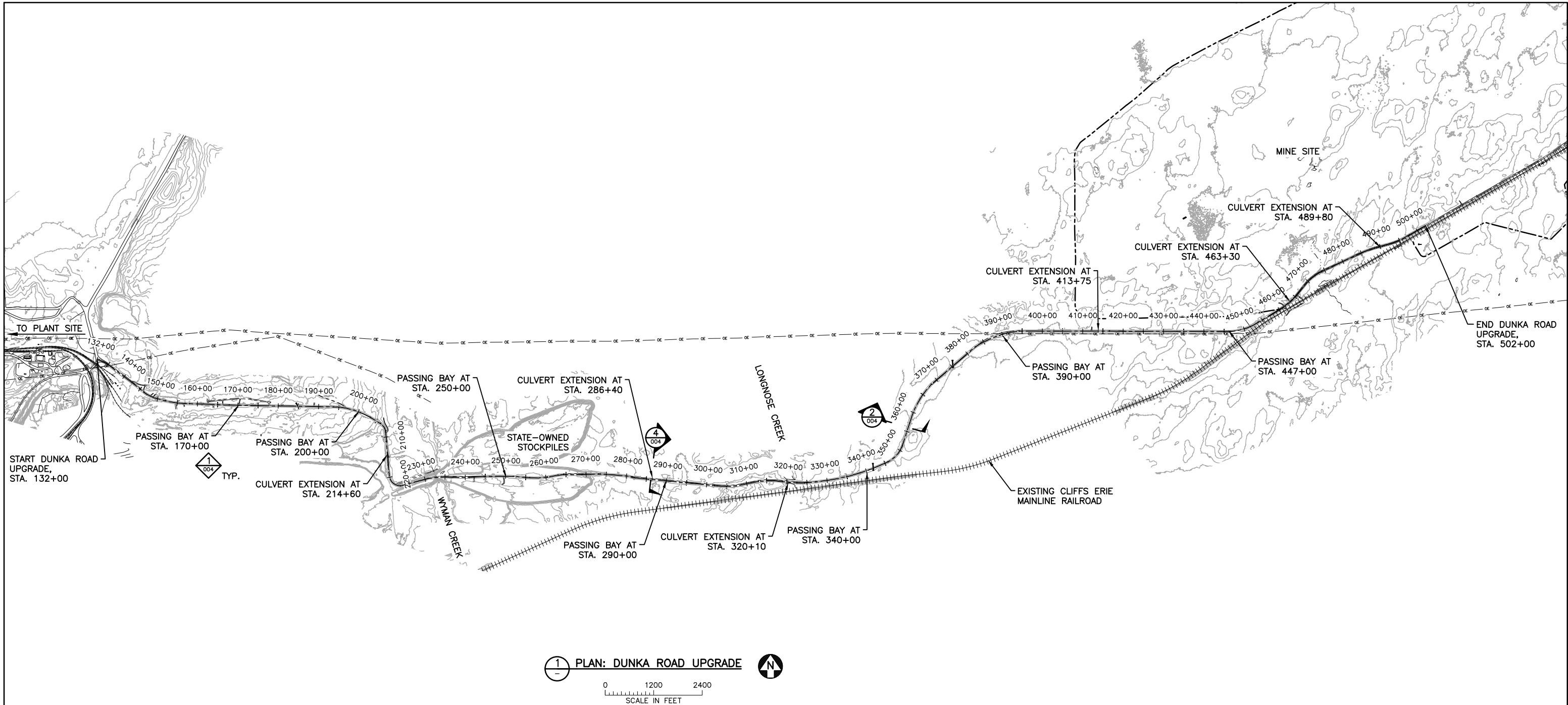
Ph: 1-800-632-2277


CADD USER: Terr J. Toms FILE: K:\DESIGN\23690C29.10\PERMIT_MND-03-CS-001.DWG PLOT SCALE: 1:2 PLOT DATE: 5/29/2015 10:00 AM

2

1

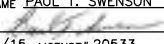
INCHES



PLANT DRAWING NUMBER:	
MINE SITE & DUNKA ROAD EARTHWORK DUNKA ROAD UPGRADE GENERAL LAYOUT	
	POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA
	BARR ENGINEERING COMPANY 4700 WEST 77TH STREET MINNEAPOLIS, MN. Ph: 1-800-632-2277
DRAWN: KKB	DATE: 5/21/15
CHECKED: ATS	DATE: 5/21/15
BARR PROJECT NO.: 23/69-0C29	DATE: 5/21/15
SCALE: AS SHOWN	DATE: 5/21/15
DWG. NO. EW-003	REV

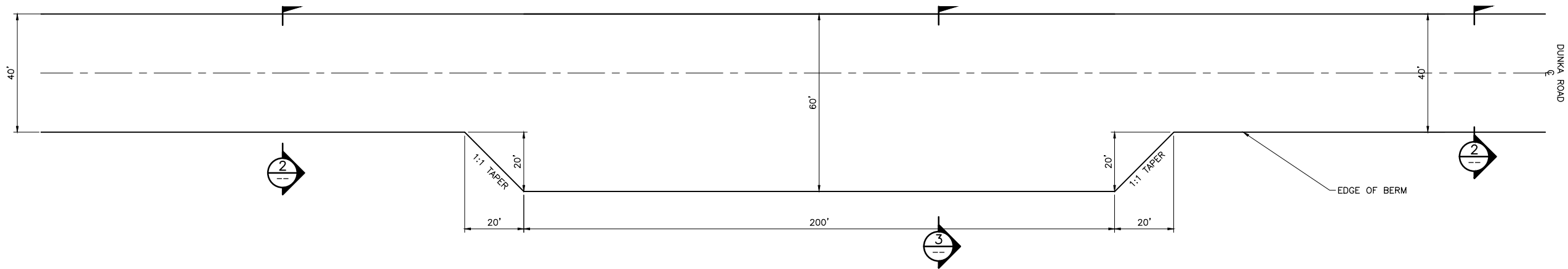
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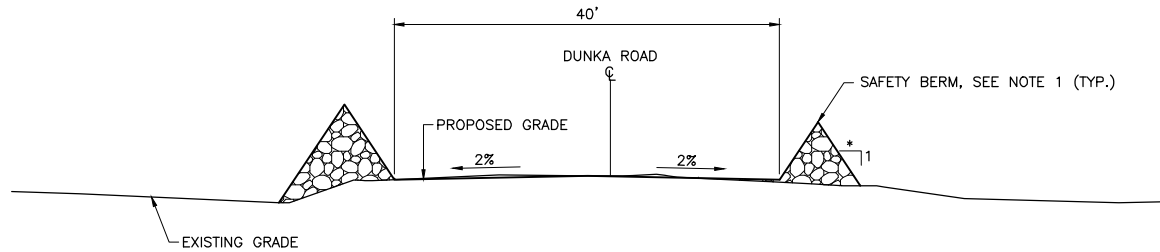
INCHES
1
2



1
003
DETAIL: DUNKA ROAD PASSING BAY
0 20 40
SCALE IN FEET

APPROXIMATE PASSING BAY LOCATIONS

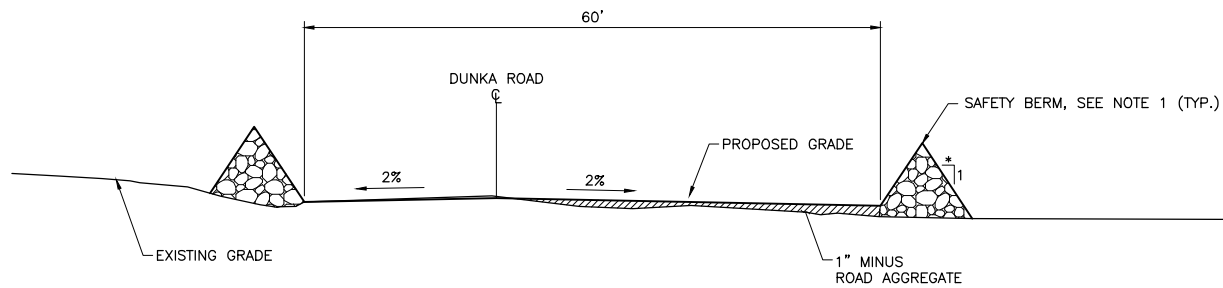
STA 170+00
STA 200+00
STA 250+00
STA 290+00
STA 340+00
STA 390+00
STA 447+00



2
003
SECTION: TYPICAL DUNKA ROAD
0 10 20
SCALE IN FEET

NOTES:

1. WHERE BERMS ARE REQUIRED.
2. * = ANGLE OF REPOSE



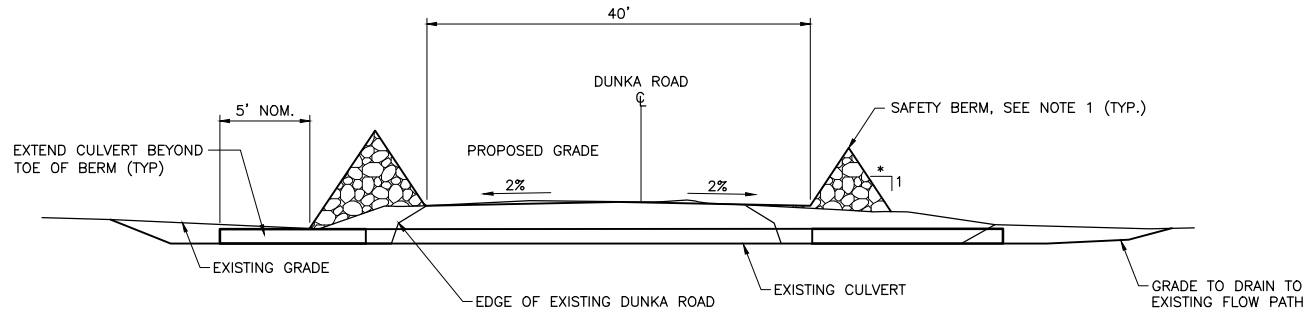
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SECTION: TYPICAL DUNKA ROAD PASSING BAY
0 10 20
SCALE IN FEET

NOTES:

1. WHERE BERMS ARE REQUIRED.
2. * = ANGLE OF REPOSE

APPROXIMATE CULVERT EXTENSION LOCATIONS

STA 214+60
STA 286+40
STA 320+10
STA 413+75
STA 463+30
STA 489+80



4
003
SECTION: TYPICAL DUNKA ROAD CULVERT EXTENSION
0 10 20
SCALE IN FEET

NOTES:

1. WHERE BERMS ARE REQUIRED.
2. * = ANGLE OF REPOSE

PLANT DRAWING NUMBER:


MINE SITE & DUNKA ROAD EARTHWORK
DUNKA ROAD UPGRADE
TYPICAL SECTION



POLY MET MINING, INC.
NORTHMET PROJECT
HOYT LAKES, MINNESOTA



BARR ENGINEERING COMPANY
4700 WEST 77TH STREET
MINNEAPOLIS, MN.
Ph: 1-800-632-2277

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MINNESOTA.
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SIGNATURE: 
DATE: 5/21/15 LICENSE# 20533

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CHECKED: ATS
BARR PROJECT NO.: 23/69-0C29
SCALE: AS SHOWN

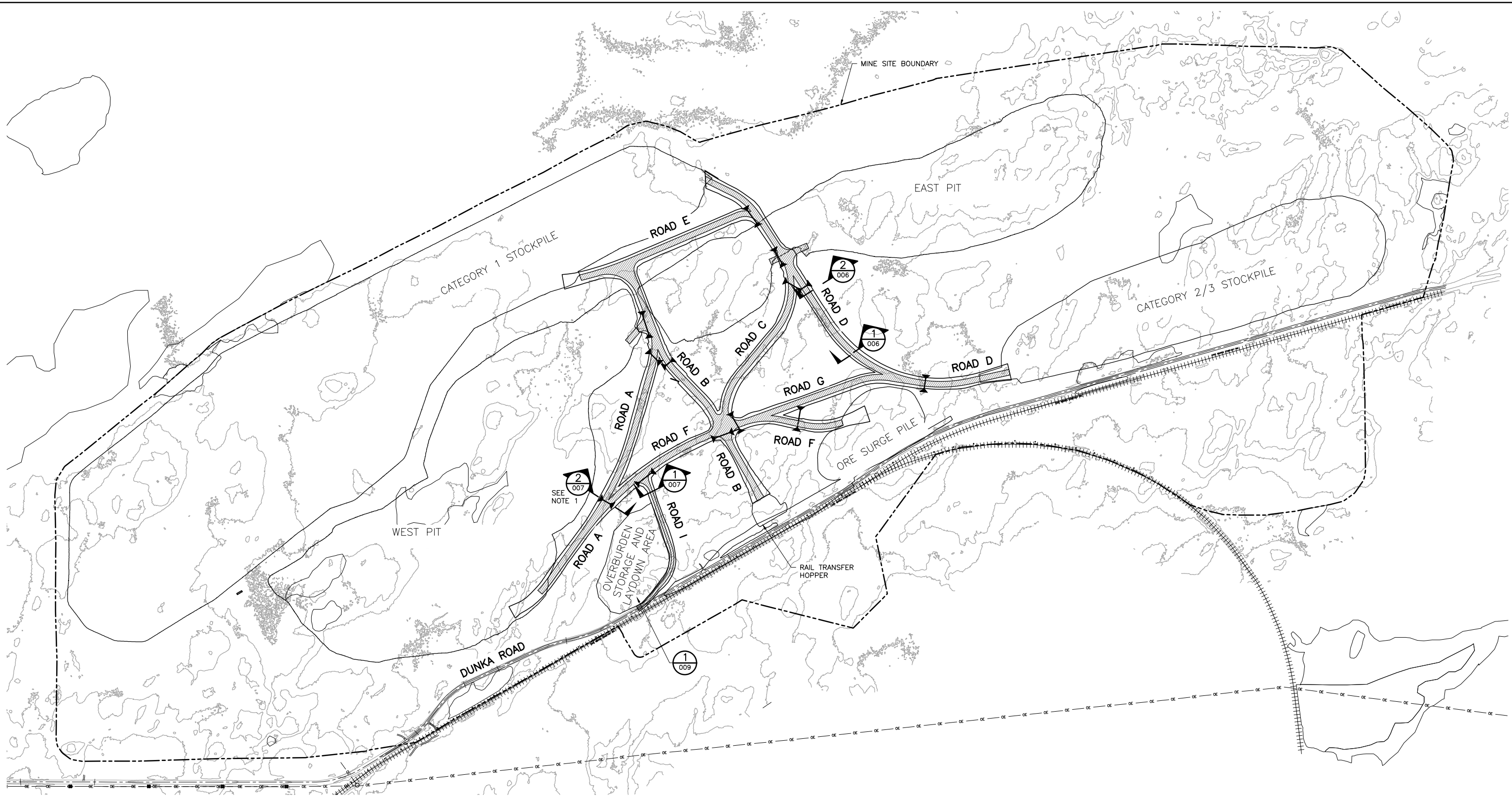
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INCHES
1
2



NOTES

1. CULVERT SECTION SHOWN AS TYPICAL CALLOUT. ALL CULVERTS THAT CROSS THE HAUL ROADS, SHOWN ON THIS DRAWING WILL BE CONSTRUCTED AS SHOWN ON

2
007

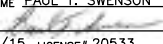
1
PLAN: HAUL ROADS GENERAL LAYOUT – MINE YEAR 11

0 700 1400
SCALE IN FEET



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PLANT DRAWING NUMBER:

MINE SITE & DUNKA ROAD EARTHWORK
HAUL ROADS GENERAL LAYOUT
MINE YEAR 11



POLY MET MINING, INC.
NORTHMET PROJECT
HOYT LAKES, MINNESOTA



BARR ENGINEERING COMPANY
4700 WEST 77TH STREET
MINNEAPOLIS, MN.
Ph: 1-800-632-2277

DWG. NO. EW-005

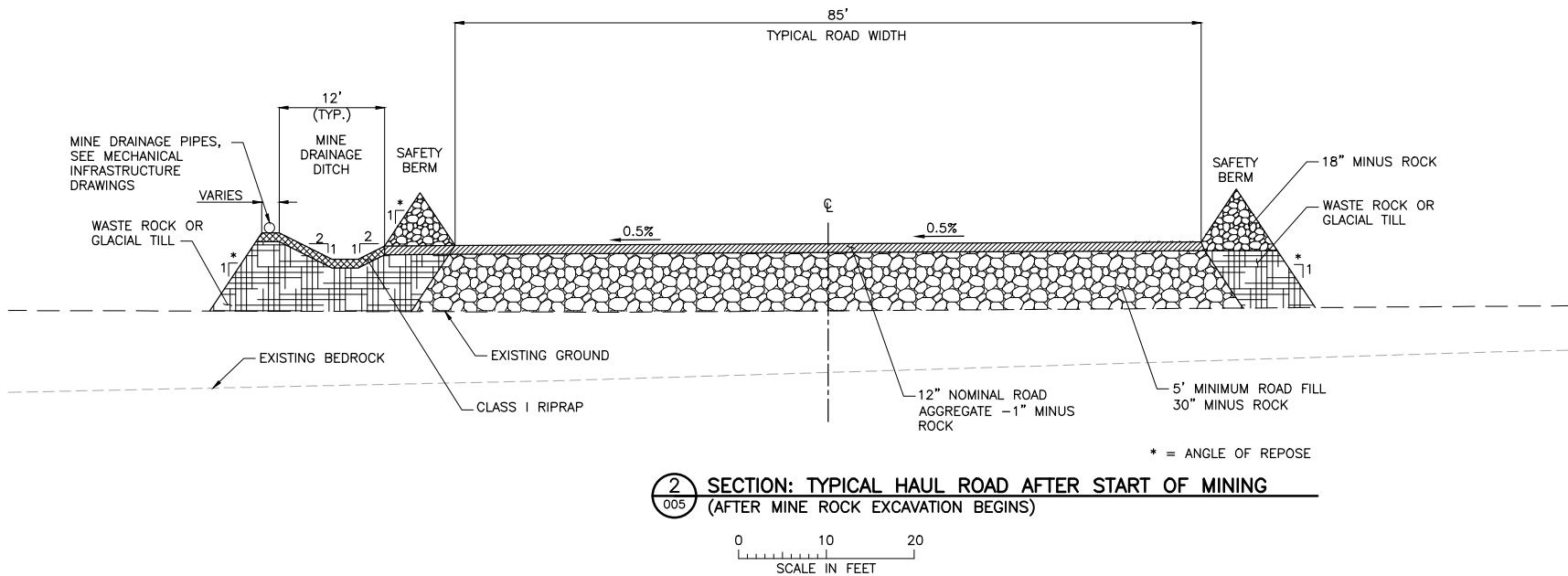
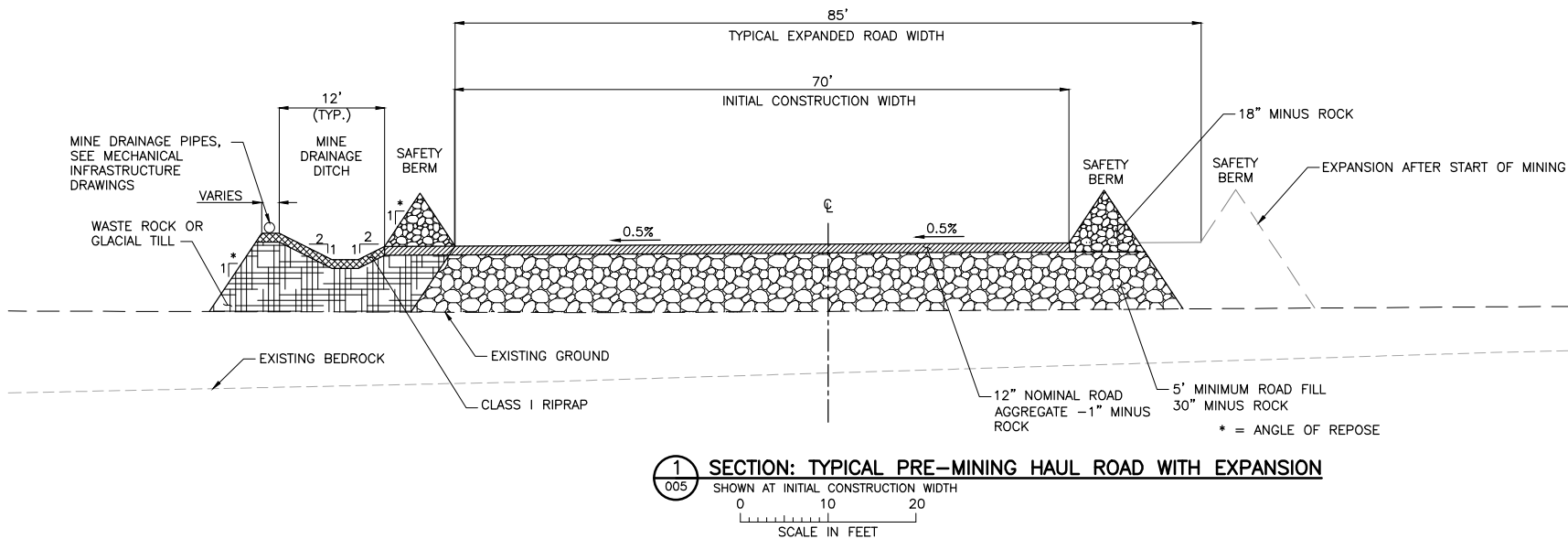
REV

CADD USER: Terr J. Toms FILE: K:\DESIGN\23690C29.10\PERMIT_NMM-EW-006.DWG PLOT SCALE: 1:2 PLOT DATE: 5/29/2015 10:02 AM

2

1

INCHES



NOTES:



1. MINE DRAINAGE DITCH TO BE CONSTRUCTED WHERE NEEDED. DITCH MAY BE LOCATED ON EITHER OR BOTH SIDES OF ROAD.
2. SAFETY BERMS TO BE CONSTRUCTED OF WASTE ROCK OBTAINED FROM STATE-OWNED STOCKPILE (PRIOR TO START OF MINING) OR FROM CATEGORY 1 WASTE ROCK (AFTER START OF MINING).
3. DESIGN GRADE OF DITCHES BASED ON HYDRAULIC DESIGN REQUIREMENTS STARTING AT STORAGE POND ELEVATION.
4. ROAD GRADE ESTABLISHED TO PROVIDE POSITIVE DRAINAGE INTO DITCH WITH NO BACKUP OF WATER ONTO THE ROAD FOR THE 10-YEAR, 24-HOUR STORM.
5. DRAINAGE SYSTEM DESIGNED TO CONTROL/CONTAIN THE 100-YEAR, 24-HOUR STORM.
6. DRAINAGE PATH MUST BE PROVIDED THROUGH BERM BETWEEN ROAD AND DITCH. THIS CAN BE ACCOMPLISHED BY THE FOLLOWING OPTIONS IN APPROPRIATELY SPACED LOCATIONS.
 - A. COARSE WASTE ROCK FROM STATE-OWNED STOCKPILE (PRIOR TO START OF MINING) OR FROM CATEGORY 1 WASTE ROCK (AFTER START OF MINING) (NO FINES)
 - B. CULVERTS
 - C. LARGE BOULDERS FROM PRE-STRIPPING
 - D. GAP IN BERM
7. ROAD FILL TO BE CONSTRUCTED OF WASTE ROCK OBTAINED FROM STATE-OWNED STOCKPILE (PRIOR TO START OF MINING) OR FROM CATEGORY 1 WASTE ROCK (AFTER START OF MINING).
8. DISTURBED SOIL AREAS SHALL BE VEGETATED IN ACCORDANCE WITH THE CONSTRUCTION SWPPP.

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SIGNATURE: *Paul T. Swenson*
DATE: 5/21/15 LICENSE# 20533

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BARR PROJECT NO.: 23/69-0C29
SCALE: AS SHOWN

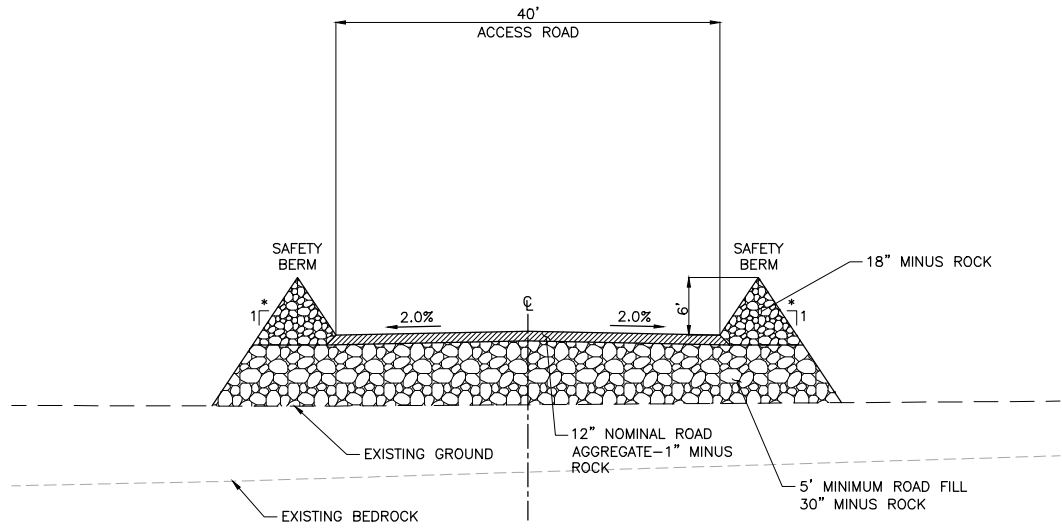
PLANT DRAWING NUMBER:	
MINE SITE & DUNKA ROAD EARTHWORK HAUL ROADS TYPICAL SECTIONS AND DETAILS	
	POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA
	BARR ENGINEERING COMPANY 4700 WEST 77TH STREET MINNEAPOLIS, MN. Ph: 1-800-632-2277
DWG. NO. EW-006	REV

CADD USER: Terri J. Toms FILE: K:\DESIGN\23690C29.10\PERMIT_NMM-EW-007.DWG PLOT SCALE: 1:2 PLOT DATE: 5/29/2015 10:06 AM

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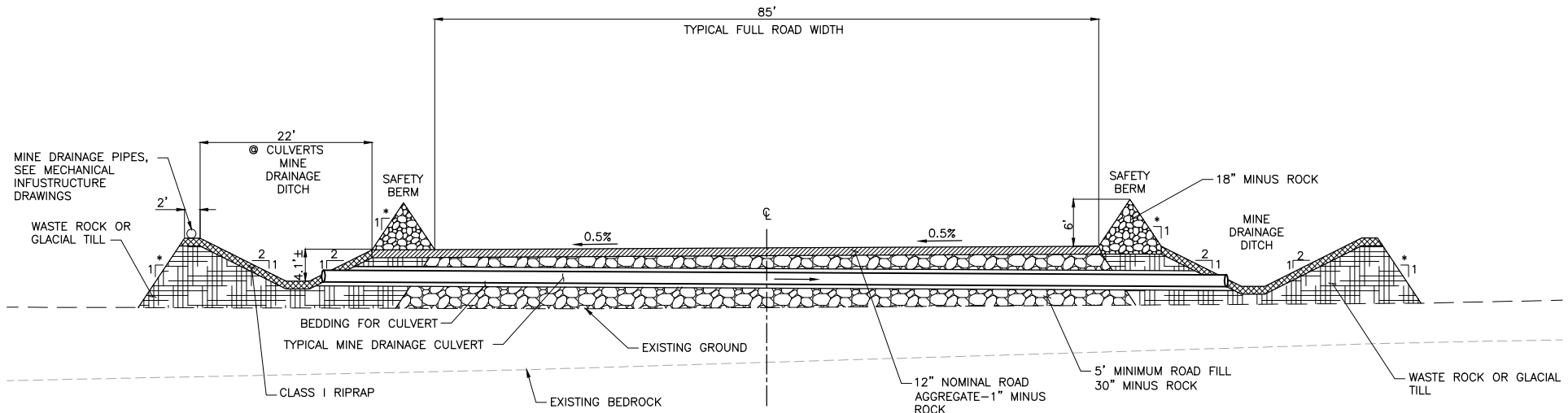
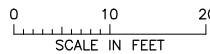
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INCHES



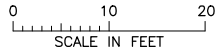
NOTES:
* - ANGLE OF REPOSE

1 SECTION: TYPICAL ACCESS ROAD (ROAD 1)



NOTES:
* - ANGLE OF REPOSE

2 SECTION: TYPICAL HAUL ROAD WITH MINE DRAINAGE CULVERT CROSSING



NOTES:

1. CULVERT AND MINE DRAINAGE DITCH ON DOWNSTREAM SIDE OF CULVERTS SHOWN FOR VISUAL PURPOSES ONLY. ACTUAL DESIGN WILL BE A TRANSITION OF ROAD SLOPE AND MINE DRAINAGE DITCH LOCATION.
2. REFER TO MINE SITE MINE DRAINAGE DRAWINGS FOR LOCATIONS.

VER NO	DATE	DESCRIPTION	ISSUE STATUS		
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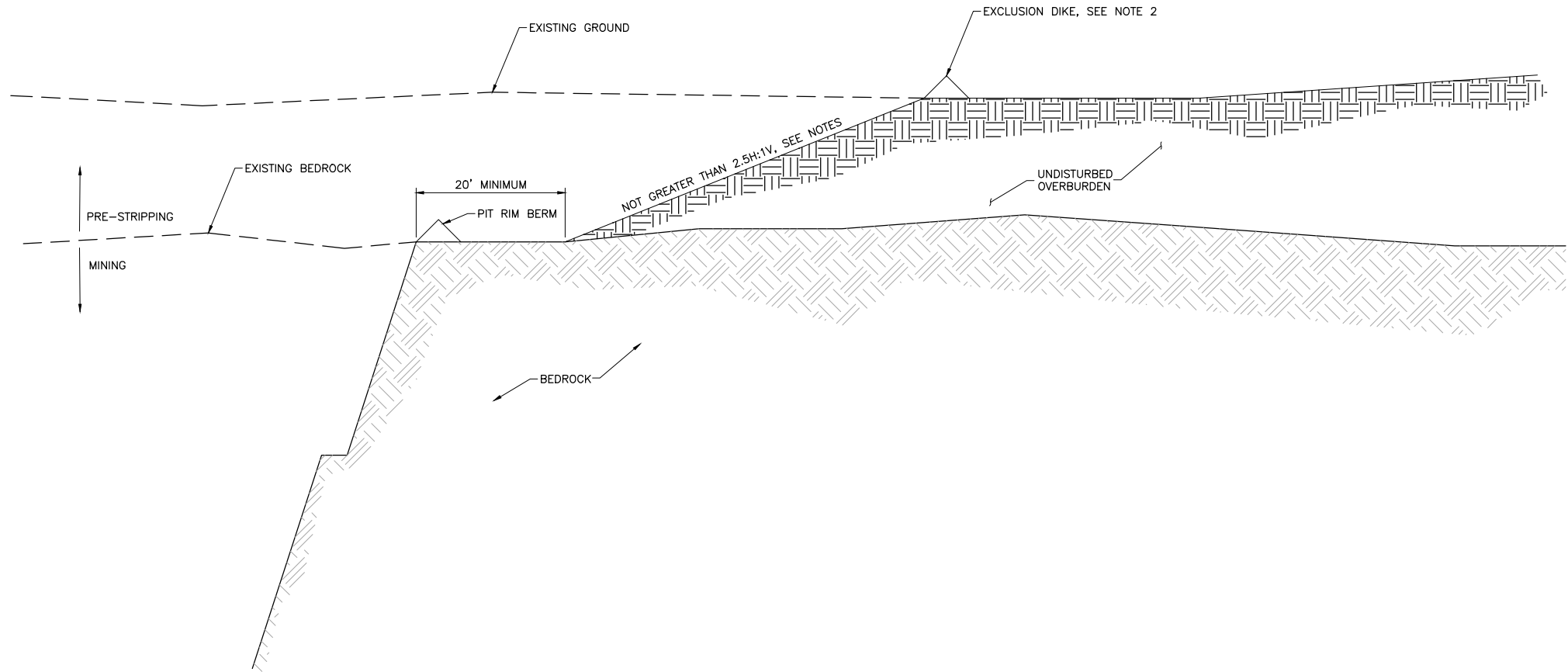
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BARR PROJECT NO.: 23/69-0C29
SCALE: AS SHOWN

PLANT DRAWING NUMBER:	
MINE SITE & DUNKA ROAD EARTHWORK HAUL ROADS TYPICAL SECTIONS AND DETAILS	
	POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA
	BARR ENGINEERING COMPANY 4700 WEST 77TH STREET MINNEAPOLIS, MN. Ph: 1-800-632-2277
DWG. NO. EW-007	REV

CADD USER: Terr J. Toms FILE: K:\DESIGN\23690C29.1\PERMIT_NMM-EW-008.DWG PLOT SCALE: 1:2 PLOT DATE: 5/29/2015 10:14 AM



1 SECTION: TYPICAL EDGE OF PIT TO UNDISTURBED GROUND

- NOTES:
1. PROPOSED FINISHED GRADE WITHIN PRE-STRIPPING AREA REFLECTS BEDROCK DATA PROVIDED BY POLYMET.
 2. CONSTRUCT EXCLUSION DIKE AROUND PIT PERIMETER TO DIVERT SURFACE RUNOFF AWAY FROM PIT.
 3. FINAL PIT SLOPES SHALL ADHERE TO CHAPTER 6132.23 OVERBURDEN PORTION OF PITWALLS OF MINNESOTA DNR STANDARDS.
 4. SLOPES IN AREAS WHERE ORGANIC SOILS AND WETLANDS ARE PRESENT MAY BE SLOPED AS NECESSARY TO MAINTAIN A STABLE SLOPE.
 5. 20' BENCH SHALL BE ESTABLISHED FROM THE TOE OF THE OVERBURDEN TO THE FUTURE CREST OF ROCK IN ACCORDANCE WITH MINNESOTA DNR SIDEWALL DESIGN STANDARDS.
 6. CONTRACTOR SHALL LEAVE TEMPORARY HAUL ROADS WITHIN PRE-STRIPPING LIMITS IN PLACE FOR OWNER'S ACCESS.
 7. CONTRACTOR SHALL STOCKPILE OVERBURDEN IN LOCATIONS AND AT QUANTITIES TO BE APPROVED BY OWNER.

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SCALE: AS SHOWN

PLANT DRAWING NUMBER:

MINE SITE & DUNKA ROAD EARTHWORK
PRE-STRIPPING
PIT TYPICAL SECTION

POLYMET
MINING

POLY MET MINING, INC.
NORTHMET PROJECT
HOYT LAKES, MINNESOTA

BARR

BARR ENGINEERING COMPANY
4700 WEST 77TH STREET
MINNEAPOLIS, MN.
Ph: 1-800-632-2277


DWG. NO. **EW-008**

REV



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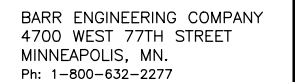
SIGNATURE 

DATE 5/21/15 LIC# NSF# 20533

DRAWN: 1115BARR PROJECT NO.:
03 / 60 0000

SCALE: AS SHOWN

MINE SITE & DUNKA ROAD EARTHWORK
OVERBURDEN STORAGE AND LAYDOWN AREA
GRADING PLAN

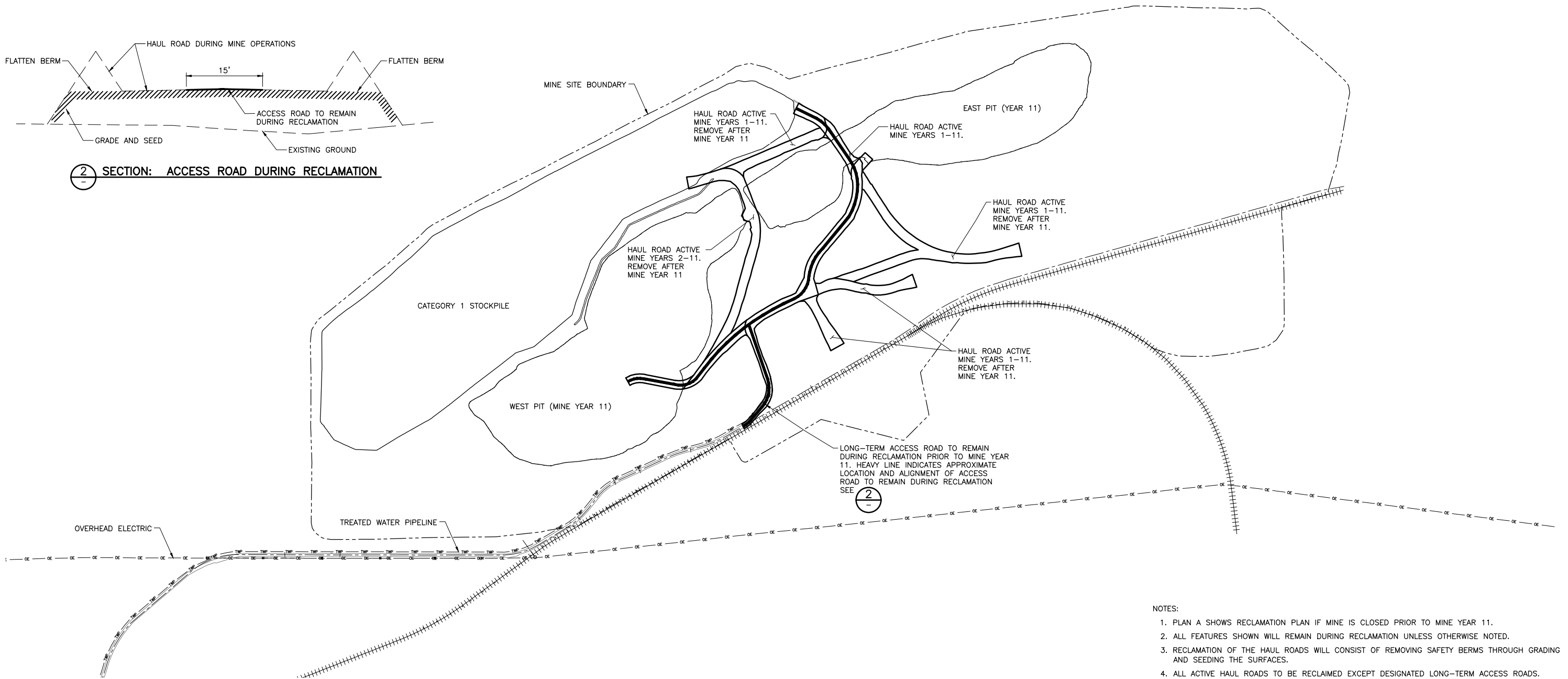
DWG. NO.

EW-009

V

CADD USER: Terri J. Toms FILE: K:\DESIGN\23690C29.10\PERMIT_MNG-05-CS-FIGURE 2.DWG PLOT SCALE: 1:2 PLOT DATE: 5/29/2015 10:13 AM

INCHES
1
2




- NOTES:
1. PLAN A SHOWS RECLAMATION PLAN IF MINE IS CLOSED PRIOR TO MINE YEAR 11.
 2. ALL FEATURES SHOWN WILL REMAIN DURING RECLAMATION UNLESS OTHERWISE NOTED.
 3. RECLAMATION OF THE HAUL ROADS WILL CONSIST OF REMOVING SAFETY BERMS THROUGH GRADING AND SEEDING THE SURFACES.
 4. ALL ACTIVE HAUL ROADS TO BE RECLAIMED EXCEPT DESIGNATED LONG-TERM ACCESS ROADS.

1 PLAN: HAUL ROAD RECLAMATION PLAN A


0 1000 2000
SCALE IN FEET


N

VER NO	DATE	DESCRIPTION	ISSUE STATUS			I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA. PRINTED NAME <u>PAUL T. SWENSON</u> SIGNATURE <u></u> DATE <u>5/21/15</u> LICENSE# <u>20533</u>	DRAWN: KKB		CHECKED: ATS		BARR PROJECT NO.: 23/69-0C29		SCALE: AS SHOWN		DWG. NO. EW-010		REV
1	5/21/15	ISSUED FOR INCLUSION IN PERMIT APPLICATION	ISSUED	VERSION	DATE												
			FOR PERMITTING	1	5/21/15												
			FOR CONSTRUCTION														
			NOT APPROVED FOR CONSTRUCTION.														

PLANT DRAWING NUMBER:

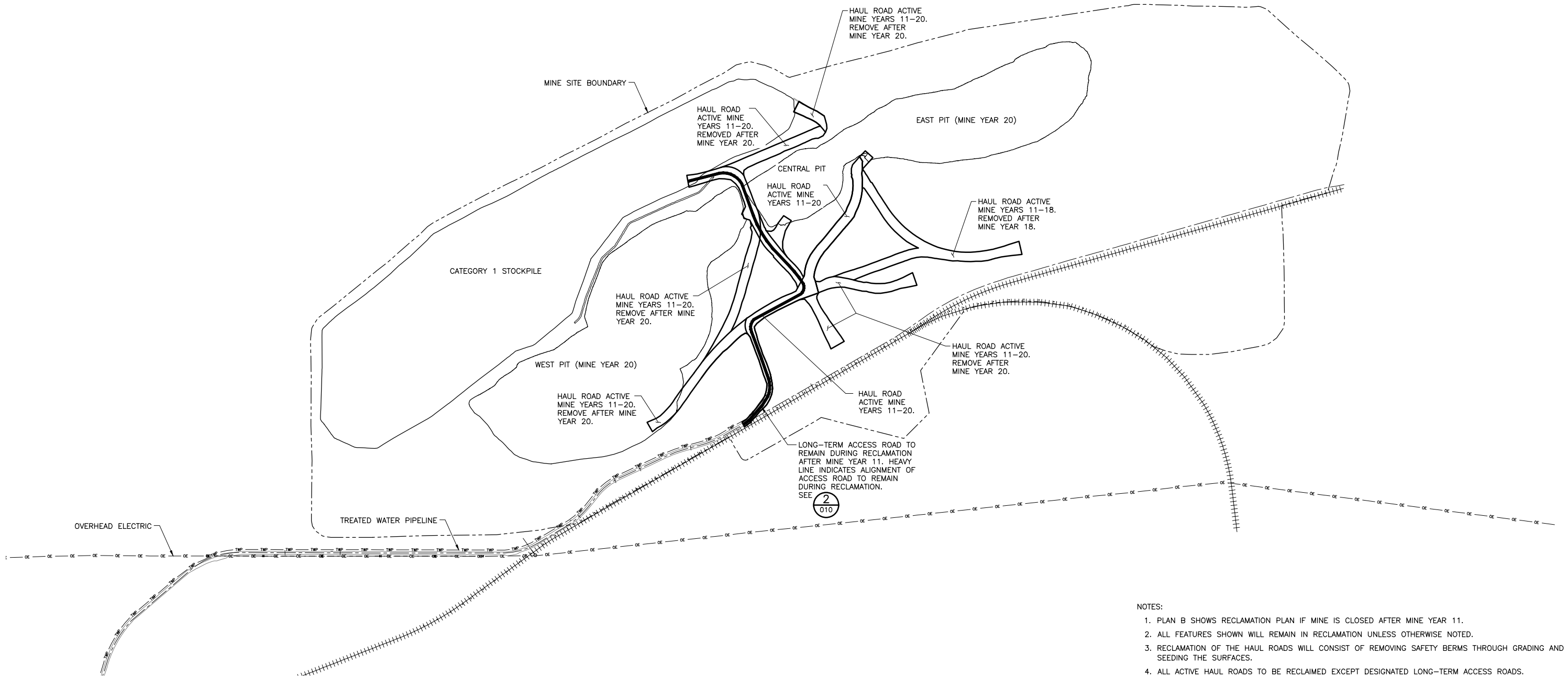
**MINE SITE & DUNKA ROAD EARTHWORK
HAUL ROAD RECLAMATION PLAN A
MINE YEARS 1-11**

 **POLYMET MINING** POLY MET MINING, INC.
NORTHMET PROJECT
HOYT LAKES, MINNESOTA

 **BARR** BARR ENGINEERING COMPANY
4700 WEST 77TH STREET
MINNEAPOLIS, MN.
Ph: 1-800-632-2277

CADD USER: Terri J. Toms FILE: K:\DESIGN\23690C29.10\PERMIT_MNG-05-CS-FIGURE 3.DWG PLOT SCALE: 1:2 PLOT DATE: 5/29/2015 10:25 AM





INCHES
1
2



- NOTES:
1. PLAN B SHOWS RECLAMATION PLAN IF MINE IS CLOSED AFTER MINE YEAR 11.
 2. ALL FEATURES SHOWN WILL REMAIN IN RECLAMATION UNLESS OTHERWISE NOTED.
 3. RECLAMATION OF THE HAUL ROADS WILL CONSIST OF REMOVING SAFETY BERMS THROUGH GRADING AND SEEDING THE SURFACES.
 4. ALL ACTIVE HAUL ROADS TO BE RECLAIMED EXCEPT DESIGNATED LONG-TERM ACCESS ROADS.

1 PLAN: HAUL ROAD RECLAMATION PLAN B
0 1000 2000
SCALE IN FEET



VER NO		DATE	DESCRIPTION	ISSUE STATUS			DRAWN: KKB		 POLYMET MINING POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA	
				ISSUED	VERSION	DATE				
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							SCALE: AS SHOWN			
									DWG. NO. EW-011	
									REV	