

**Appendix 6 Flotation Tailings Basin and FTB Seepage Containment and
Stream Augmentation Systems Permit Application Support
Drawings**

Errata Sheet

Poly Met Mining, Inc. NorthMet Project

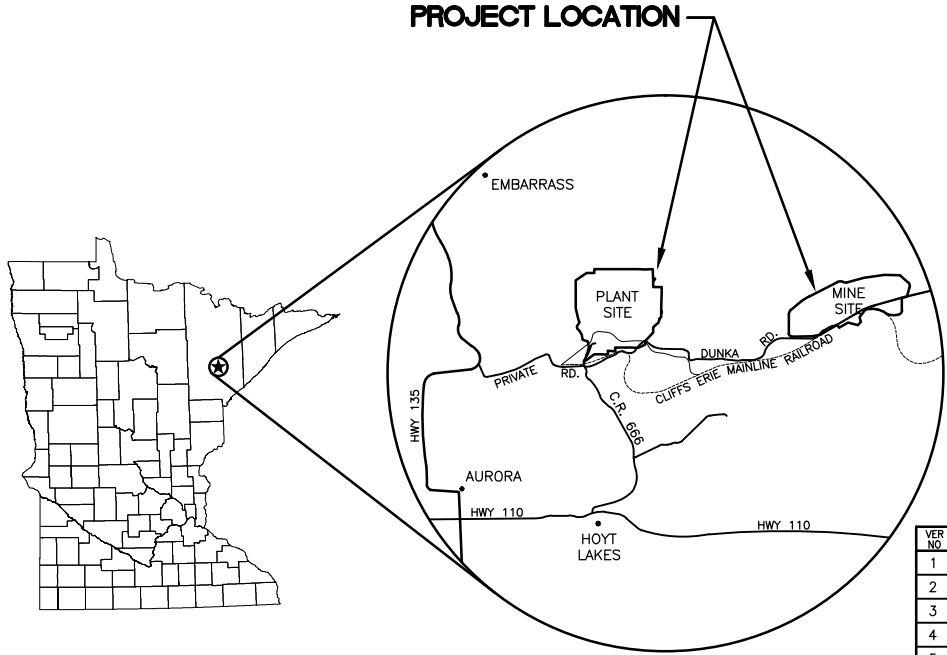
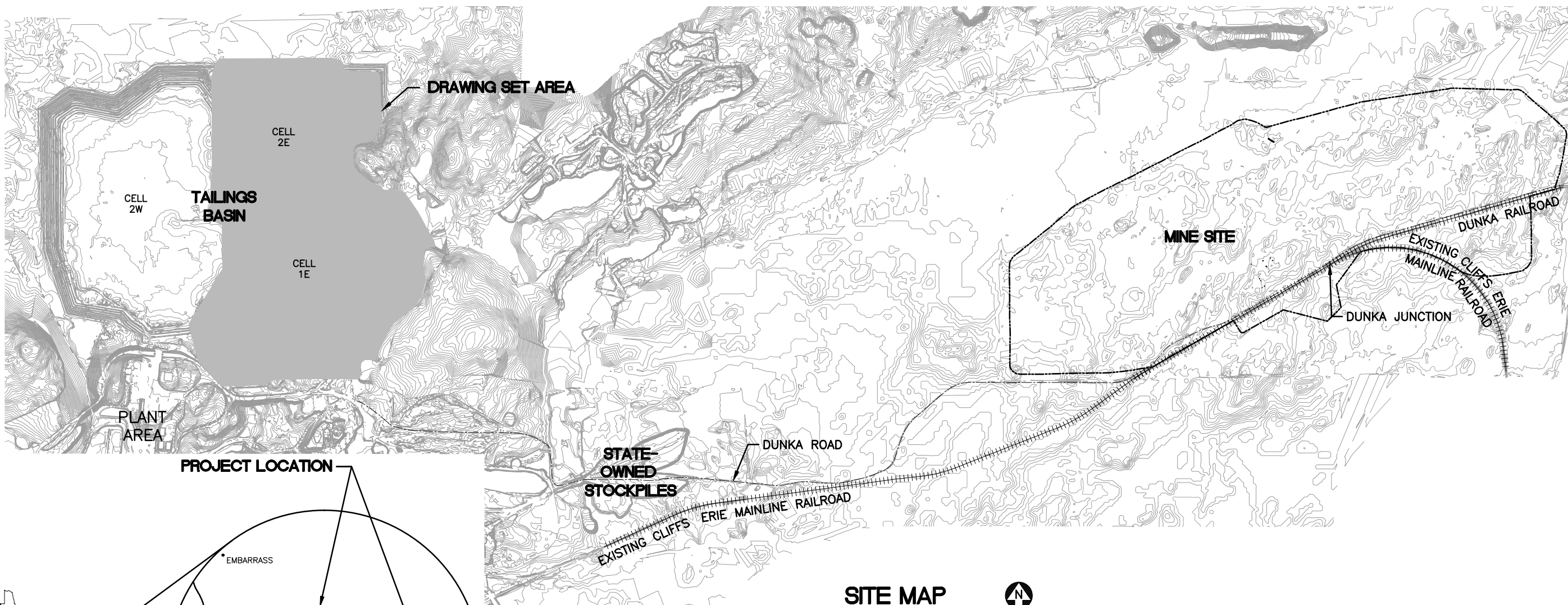
Permit Application Support Drawings: FTB Seepage Containment and Stream Augmentation Systems

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
FTBCA-002	A note 5 will be added to say: The term "stream augmentation" in this drawing set is synonymous with "surface water discharge"; these terms are used in the Water Appropriations Consolidated Permit Application and the NPDES/SDS Permit Application, respectively.
FTBCA-013, FTBCA-015	The cross slope on the perimeter access road surface will be revised so that it slopes entirely towards the FTB, instead of being crowned in the center.
FTBCA-013, FTBCA-015	To eliminate additional fill in wetlands, the monitoring wells located outside of the perimeter access road will be moved to within the road embankment.
FTBCA-004 through FTBCA-010	The final location and number of discharge locations to Unnamed Creek and Trimble Creek will be determined in permitting and final design.

POLY MET MINING, INC. NORTHMET PROJECT
PERMIT SUPPORT DRAWINGS
FLOTATION TAILINGS BASIN
HOYT LAKES, MINNESOTA



SITE MAP



0 2000 4000
SCALE IN FEET

LOCATION MAP
NOT TO SCALE



VICINITY MAP
NOT TO SCALE

VER NO	DATE	DESCRIPTION	ISSUE STATUS		
1	10/14/11	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 1 – ATTACHMENT A	ISSUED	VERSION	DATE
2	12/07/12	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 2 – ATTACHMENT A	FOR PERMITTING	6	5/20/15
3	04/12/13	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 3 – ATTACHMENT A			
4	11/25/14	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 4 – ATTACHMENT A			
5	03/03/15	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 5 – ATTACHMENT A	FOR CONSTRUCTION	–	–
6	5/20/15	ISSUED FOR INCLUSION IN PERMIT APPLICATIONS			
			NOT APPROVED FOR CONSTRUCTION.		

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PRINTED NAME THOMAS J. RADUE
SIGNATURE *Thomas J. Radue*
DATE 5/20/15 LICENSE# 20951

DRAWN: CAD
CHECKED: TJR
BARR PROJECT NO.: 23/69-0C29
SCALE: AS SHOWN

PLANT DRAWING NUMBER:

FLOTATION TAILINGS BASIN
LOCATION MAP AND SITE MAP

POLYMET
MINING

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. FTB-001

REV

CADD USER: Adeptuser FILE: \\PVEDINA\EDINA PW\EDINA PW IN\1863ECE6-BFF8-4ADD-A31A-2092BF3DDE7C\04F82749-CF37-40F7-A4D3-E4ED4F6CA07A\PERMIT_NMT-02-US-002.DWG PLOT SCALE: 1:2 PLOT DATE: 6/8/2015 4:11 PM

GENERAL LEGEND

	EXISTING CONTOUR - MAJOR
	EXISTING CONTOUR - MINOR
	PROPOSED CONTOUR - MAJOR
	PROPOSED CONTOUR - MINOR
	EXISTING POWER POLE
	EXISTING RAILROAD
	EXISTING ROAD
	EXISTING TRAIL
	EXISTING UNIMPROVED TRAIL
	EXISTING STRUCTURES
	TREE LINE
	WETLAND BOUNDARY
	EXISTING CULVERT
	EXISTING PIPELINE
	OVERHEAD ELECTRIC
	DISCHARGE POINT
	DEWATERING OUTLET POINT
	RETURN PUMP PAD
	DEWATERING PUMP
	SURFACE DRAINAGE
	DRAINAGE COLLECTION STRUCTURE AND PIPE
	DRAINAGE AREA BOUNDARY
	PROPOSED DAMS
	PROPOSED DEWATERING PIPE
	PROPOSED DISCHARGE PIPELINE
	PROPOSED RETURN PIPELINE
	PROPOSED CULVERT (NON-MINE DRAINAGE)
	PROPOSED SEEPAGE COLLECTION DRAIN
	PROPOSED STORMWATER DRAIN
	PROPOSED MANHOLE
	PROPOSED WICK DRAIN LATERAL PIPE
	PROPOSED RIP RAP
	FILL SLOPE
	CUT SLOPE

ABBREVIATIONS

APPROX.	- APPROXIMATE
CDSM	- CEMENT DEEP SOIL MIX
CMP	- CORRUGATED METAL PIPE
CPEP	- CORRUGATED POLYETHYLENE PIPE
CY	- CUBIC YARD
DR	- DIMENSION RATIO
DWG	- DRAWING
EL.	- ELEVATION
F	- DIAMETER
FTB	- FLOTATION TAILINGS BASIN
GCL	- GEOSYNTHETIC CLAY LINER
HDPE	- HIGH DENSITY POLYETHYLENE
HRF	- HYDROMETALLURGICAL RESIDUE FACILITY
LDPE	- LOW DENSITY POLYETHYLENE
LF	- LINER FEET
LTVSMC	- LTV STEEL MINING COMPANY
MCY	- MILLION CUBIC YARDS
mil	- one thousandth of an inch
MIN	- MINIMUM
MSL	- MEAN SEA LEVEL
NTS	- NOT TO SCALE
SCH.	- SCHEDULE
DR	- DIMENSION RATIO
TYP.	- TYPICAL

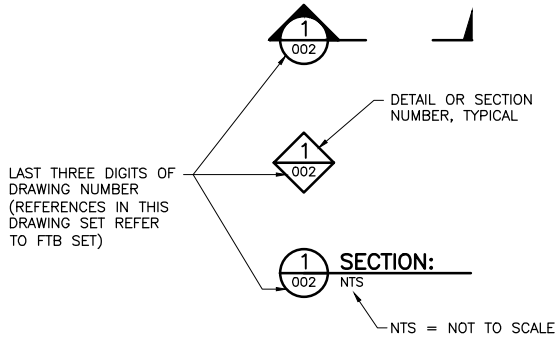
SHEET INDEX

SHEET NO. TITLE

GENERAL DRAWINGS



FTB-001	LOCATION MAP AND SITE MAP
FTB-002	LEGEND AND SHEET INDEX
FTB-003	EXISTING CONDITIONS
FTB-004	LAYOUT MINE YEAR 20
FTB-005	LAYOUT MINE YEAR 1
FTB-006	LAYOUT MINE YEAR 5
FTB-007	LAYOUT MINE YEAR 7
FTB-008	NORTH DAM - MINE YEAR 20 LAYOUT
FTB-009	NORTH DAM - TYPICAL CROSS SECTION
FTB-010	NORTH DAM - STAGED CONSTRUCTION
FTB-011	EAST AND WEST DAMS - MINE YEAR 20 LAYOUT
FTB-012	EAST AND WEST DAMS - TYPICAL CROSS SECTIONS AND DRAINAGE SWALE
FTB-013	SOUTH DAM - MINE YEAR 20 LAYOUT
FTB-014	SOUTH DAM - TYPICAL CROSS SECTION
FTB-015	EMERGENCY OVERFLOW CHANNEL - LAYOUT
FTB-016	EMERGENCY OVERFLOW CHANNEL - SECTIONS
FTB-017	EMERGENCY OVERFLOW CHANNEL - DETAILS
FTB-018	EMERGENCY OVERFLOW CHANNEL - SEQUENCING
FTB-019	PIPING LAYOUT CELL 2E
FTB-020	PIPING LAYOUT CELL 1/2E
FTB-021	DETAILS
FTB-022	TRANSFER PUMP RAFT
FTB-023	TAILINGS DISPOSAL DIFFUSER RAFT
FTB-024	CLOSURE PLAN

DRAWING NUMBERING



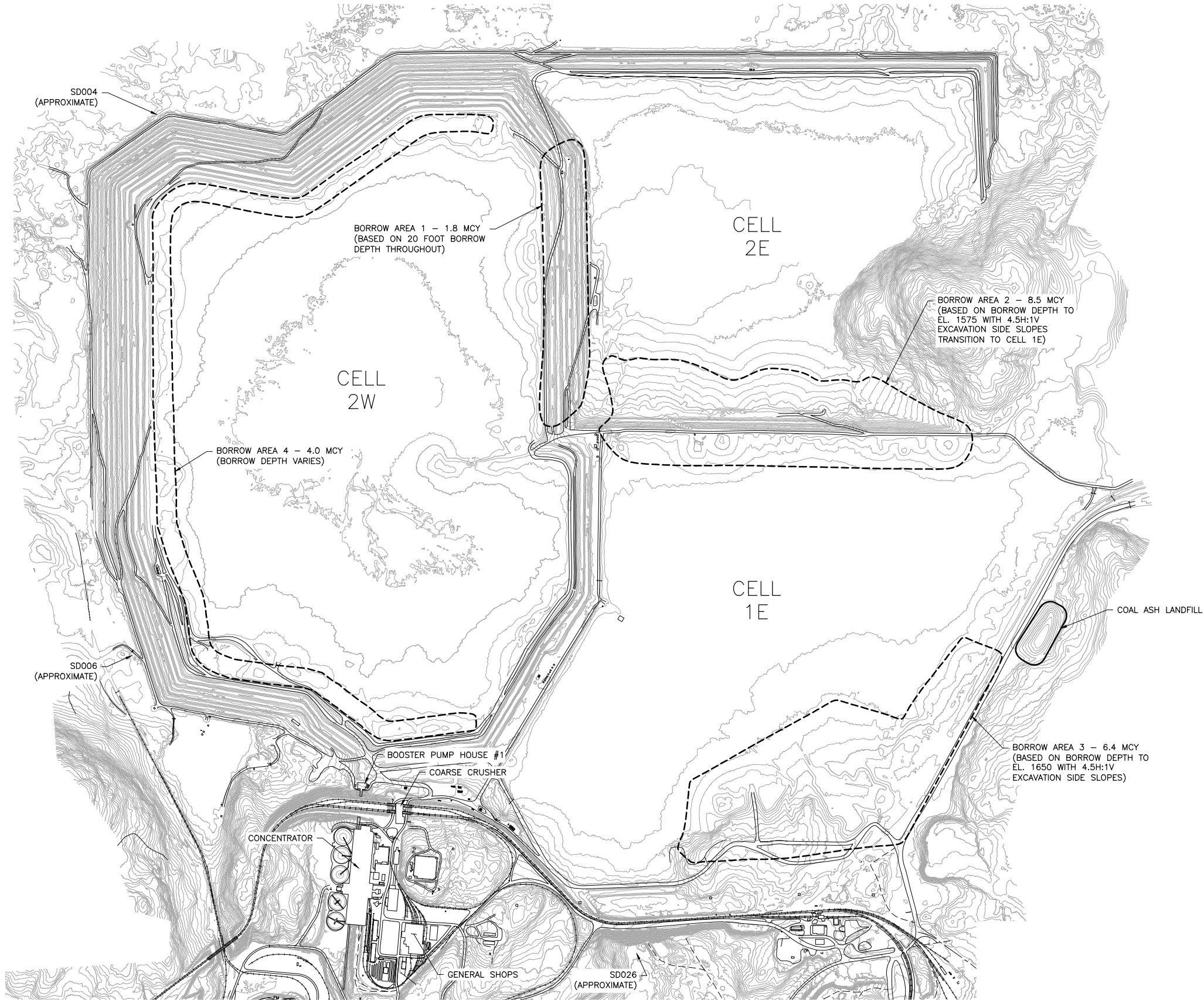
NOTES

- COORDINATE SYSTEM IS MINNESOTA STATE PLANE NORTH ZONE, NAD83.
- ELEVATIONS ARE 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.
- EXISTING TOPOGRAPHIC INFORMATION WAS UPDATED FOR AREAS SOUTH EAST OF COAL ASH LANDFILL AND EAST OF OUTCROP BETWEEN CELLS 1E AND 2E USING CONTOURS FROM DATA COLLECTED IN 1999.
- FLOTATION TAILINGS BASIN DESIGN WAS BASED ON CONTOURS FROM DATA COLLECTED IN 1999. PROPOSED DAM LAYOUTS MAY NOT EXACTLY MATCH THE EXISTING TOPOGRAPHY FROM 2010 LIDAR.

VER NO	DATE	DESCRIPTION	ISSUE STATUS			<div>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.</div> <div>PRINTED NAME <u>THOMAS J. RADUE</u></div> <div>SIGNATURE <u>Thomas J. Radue</u></div> <div>DATE <u>5/20/15</u> LICENSE# <u>20951</u></div>	DRAWN: CAD		<div>POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA</div>	
1	10/14/11	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 1 – ATTACHMENT A	FOR PERMITTING	6	5/20/15		CHECKED: TJR		<div>BARR ENGINEERING COMPANY 4700 WEST 77TH STREET MINNEAPOLIS, MN. Ph: 1–800–632–2277</div>	
2	12/07/12	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 2 – ATTACHMENT A					BARR PROJECT NO.: 23/69–0C29			
3	04/12/13	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 3 – ATTACHMENT A								
4	11/25/14	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 4 – ATTACHMENT A	FOR CONSTRUCTION	–	–		SCALE: AS SHOWN		DWG. NO. FTB–002	
5	03/03/15	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 5 – ATTACHMENT A								
6	5/20/15	ISSUED FOR INCLUSION IN PERMIT APPLICATIONS	NOT APPROVED FOR CONSTRUCTION				REV			

CADD USER: AdeptUser FILE: \\PVEDINA\EDINA PW\EDINA PW IN\1863ECE6-BFF8-4ADD-A31A-2092BF3D0E7C\66BB1E2-9444-49B2-BD26-70B540643BAC\PERMIT_MNT-02-CS-003.DWG PLOT SCALE: 1:2 PLOT DATE: 6/8/2015 4:12 PM

INCHES
1
2



- NOTES:**
1. CONTOURS DO NOT REFLECT BORROW REMOVAL.
 2. BORROW LTVSMC COARSE TAILINGS IN THE NUMERICAL SEQUENCE SHOWN.
 3. COAL ASH LANDFILL TO BE RELOCATED TO HYDROMET RESIDUE FACILITY OR ALTERNATE PERMITTED FACILITY PRIOR TO TAILINGS DEPOSITION IN CELL 1E.

1 PLAN: EXISTING CONDITIONS
0 800 1600
SCALE IN FEET





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1	10/14/11	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 1 - ATTACHMENT A			
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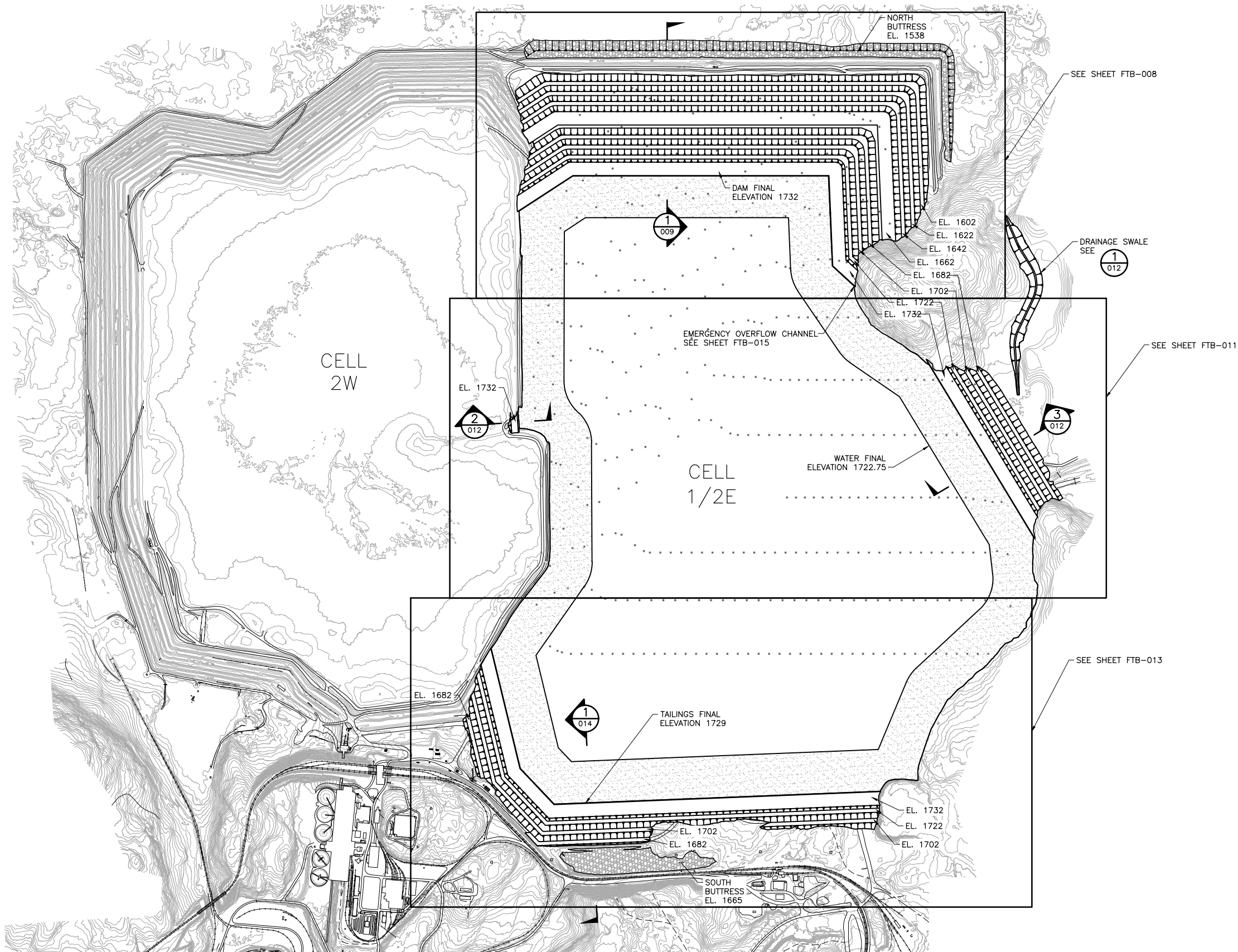
PRINTED NAME THOMAS J. RADUE
SIGNATURE *Thomas J. Radue*
DATE 5/20/15 LICENSE# 20951

DRAWN: CAD
CHECKED: TJR
BARR PROJECT NO.: 23/69-0C29
SCALE: AS SHOWN

PLANT DRAWING NUMBER:	
FLOTATION TAILINGS BASIN EXISTING CONDITIONS	
	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. FTB-003	REV

CADD USER: Adeptuser FILE: \\PWNEDNA\EDINA PW\EDINA PW IN\1863E016-BFFB-44DD-A31A-2092BF3D0E7C\3E0A4B65-86CF-4E3F-880A-4234E139BC2F\PERMIT_NMT-02-CS-004.DWG PLOT SCALE: 1:2 PLOT DATE: 6/8/2015 4:14 PM

INCHES
1
2



- NOTE:**
1. CEMENT DEEP SOIL MIX (CDSM) ZONE NOT SHOWN.
SEE SHEETS FTB-003 AND FTB-009.
 2. LOCATION AND DIMENSIONS OF CDSM SHEAR WALL
MAY CHANGE AS DESIGNS ARE FINALIZED.



1 PLAN: TAILINGS BASIN LAYOUT MINE YEAR 20
0 800 1600
SCALE IN FEET
N

VER NO	DATE	DESCRIPTION	ISSUE STATUS		
1	10/14/11	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 1 – ATTACHMENT A	ISSUED	VERSION	DATE
2	12/07/12	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 2 – ATTACHMENT A	FOR PERMITTING	6	5/20/15
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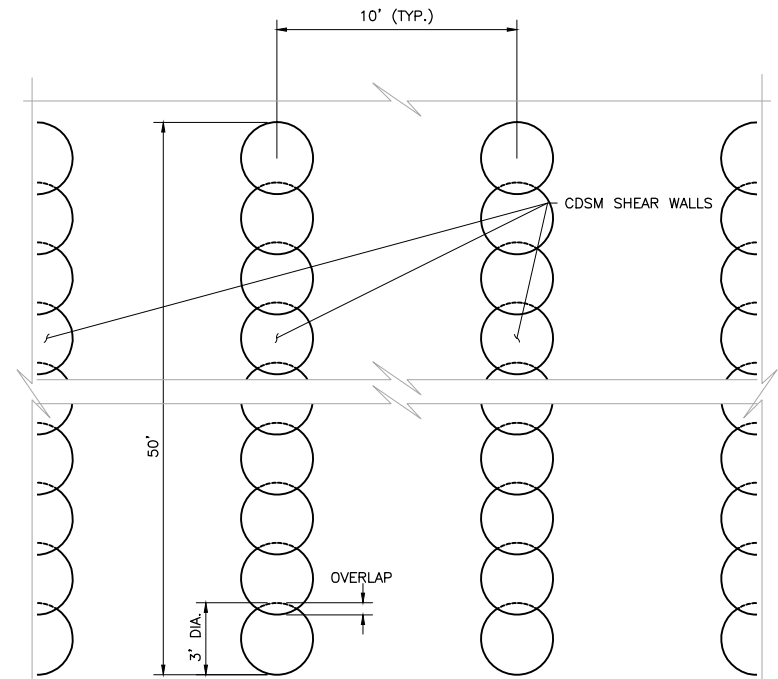
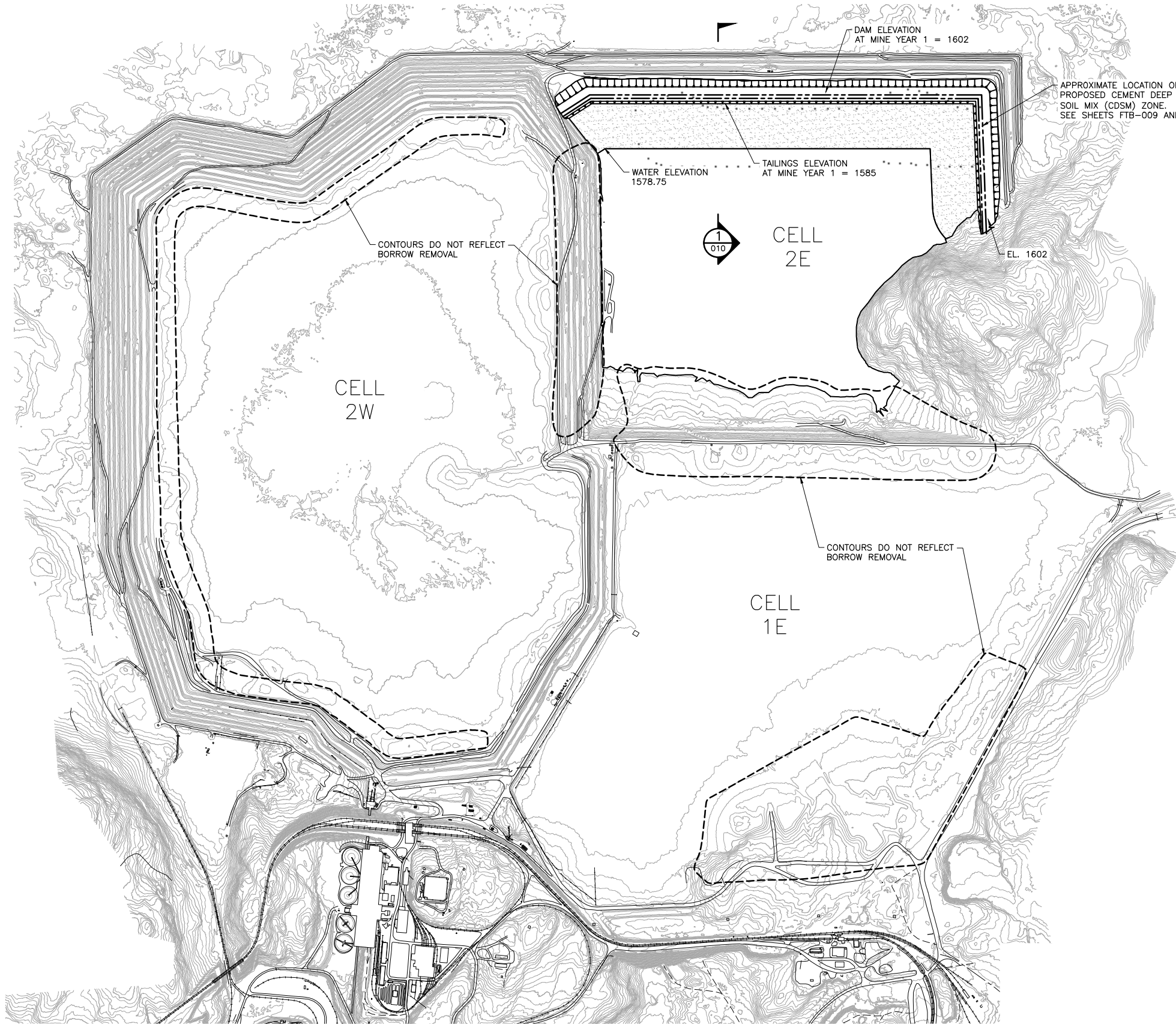
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SIGNATURE *Thomas J. Radue*
DATE 5/20/15 LICENSE# 20951

DRAWN: CAD
CHECKED: TJR
BARR PROJECT NO.: 23/69-0C29
SCALE: AS SHOWN

PLANT DRAWING NUMBER:	
FLOTATION TAILINGS BASIN LAYOUT MINE YEAR 20	
 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. FTB-004	REV

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INCHES
1
2



2 PLAN: CEMENT DEEP SOIL MIX (CDSM) SHEAR WALLS
0 4 8
SCALE IN FEET

NOTES:



1. SEE SHEET FTB-015 FOR OPERATIONS-PHASE EMERGENCY OVERFLOW CHANNEL.
2. CDSM TO BE CONSTRUCTED PRIOR TO TAILINGS PLACEMENT.

1 PLAN: TAILINGS BASIN LAYOUT MINE YEAR 1
0 800 1600
SCALE IN FEET

VER NO	DATE	DESCRIPTION	ISSUE STATUS		
1	10/14/11	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 1 – ATTACHMENT A	ISSUED	VERSION	DATE
2	12/07/12	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 2 – ATTACHMENT A	FOR PERMITTING	6	5/20/15
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			NOT APPROVED FOR CONSTRUCTION		

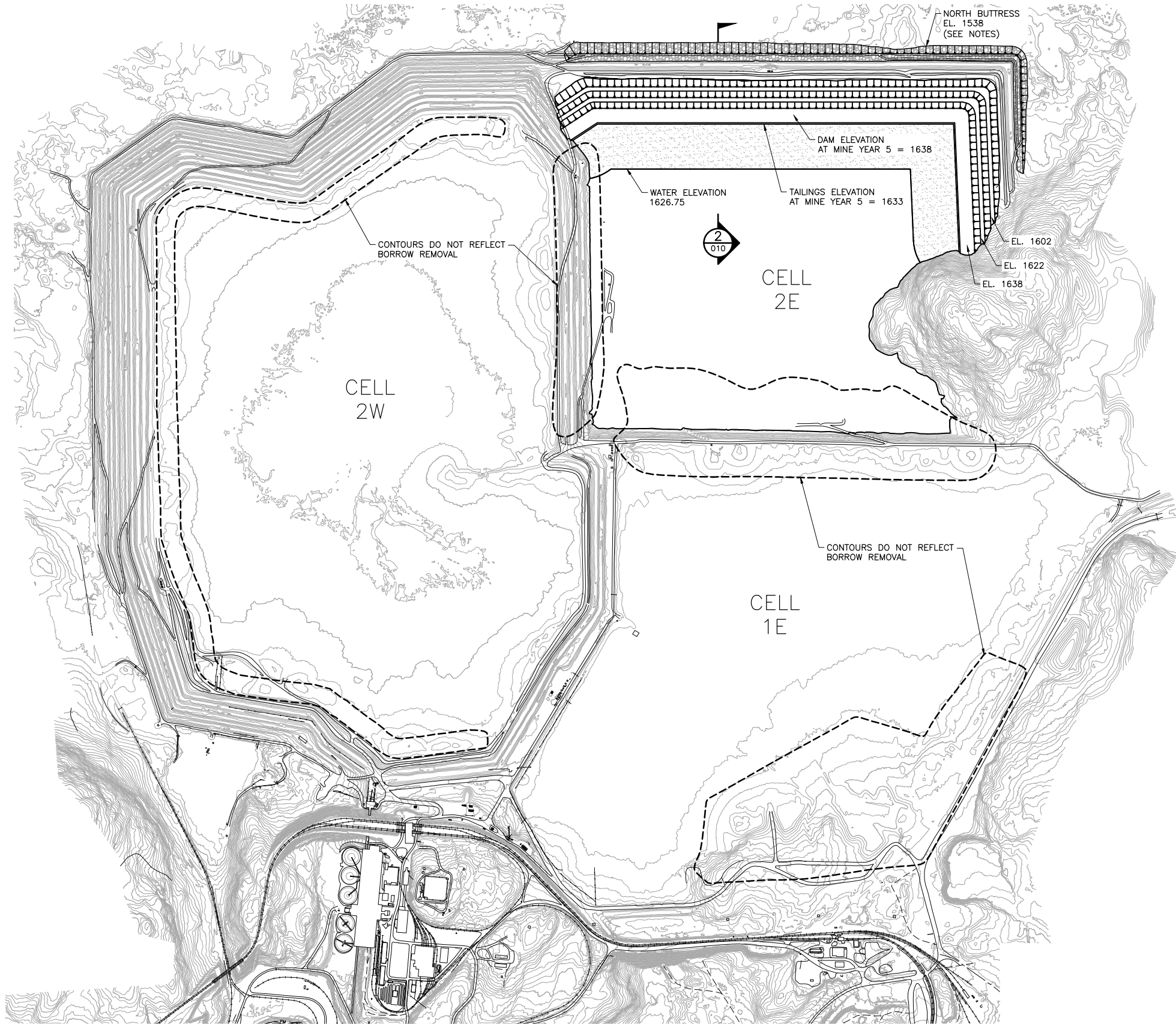
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DATE 5/20/15 LICENSE# 20951

DRAWN: CAD
CHECKED: TJR
BARR PROJECT NO.: 23/69-0C29
SCALE: AS SHOWN

PLANT DRAWING NUMBER:		
FLOTATION TAILINGS BASIN LAYOUT MINE YEAR 1		
	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.	FTB-005	REV

CADD USER: Adeptuser FILE: \\PVEDINA\EDINA PW\EDINA PW IN\1863ECE6-BFF8-4ADD-A31A-2092BF3D0E7C\1BB2E1FD-6C46-4F4D-92D0-6A166A1F5FEE\PERMIT_NMT-02-US-006.DWG PLOT SCALE: 1:2 PLOT DATE: 6/9/2015 4:17 PM

INCHES
1
2



NOTES:

1. SEE SHEET FTB-015 FOR OPERATIONS-PHASE EMERGENCY OVERFLOW CHANNEL.
2. CDSM ZONE NOT SHOWN. SEE SHEETS FTB-003 AND FTB-009.

1 PLAN: TAILINGS BASIN LAYOUT MINE YEAR 5



0 800 1600
SCALE IN FEET

VER NO	DATE	DESCRIPTION	ISSUE STATUS		
			ISSUED	VERSION	DATE
1	10/14/11	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 1 - ATTACHMENT A			
2	12/07/12	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 2 - ATTACHMENT A			
3	04/12/13	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 3 - ATTACHMENT A	FOR PERMITTING	6	5/20/15
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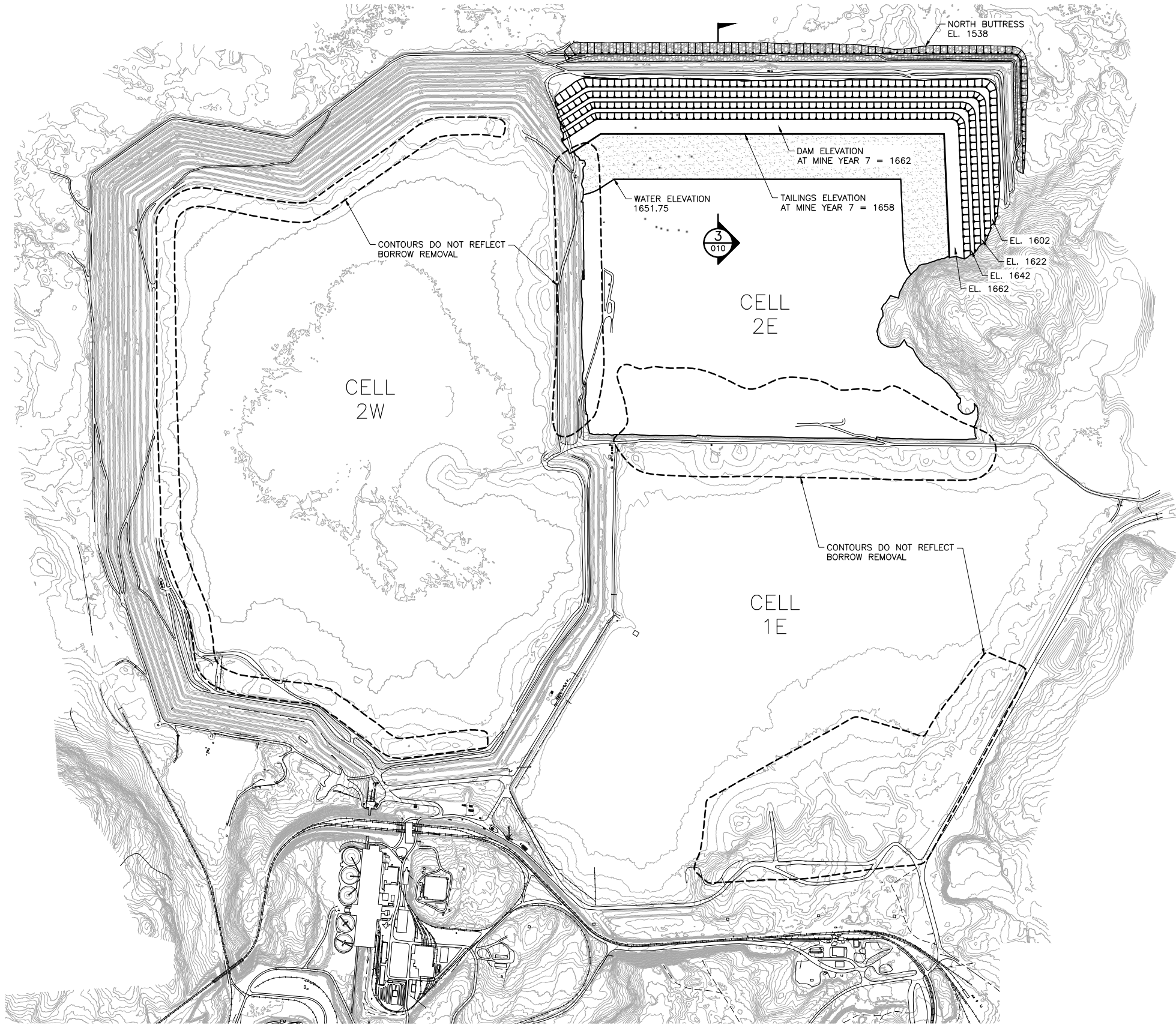
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SIGNATURE *Thomas J. Radue*
DATE 5/20/15 LICENSE# 20951

DRAWN: CAD
CHECKED: TJR
BARR PROJECT NO.: 23/69-0C29
SCALE: AS SHOWN

PLANT DRAWING NUMBER:	
FLOTATION TAILINGS BASIN LAYOUT MINE YEAR 5	
 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. FTB-006	REV

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INCHES
1
2



- NOTES:**
1. LAST YEAR BEFORE COMBINING CELLS 2E AND 1E FOR TAILINGS.
 2. SEE SHEET FTB-015 FOR OPERATIONS-PHASE EMERGENCY OVERFLOW CHANNEL.
 3. CDSM ZONE NOT SHOWN. SEE SHEETS FTB-003 AND FTB-009.



1 PLAN: TAILINGS BASIN LAYOUT MINE YEAR 7
0 800 1600
SCALE IN FEET
N

VER NO	DATE	DESCRIPTION	ISSUE STATUS		
			ISSUED	VERSION	DATE
1	10/14/11	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 1 - ATTACHMENT A			
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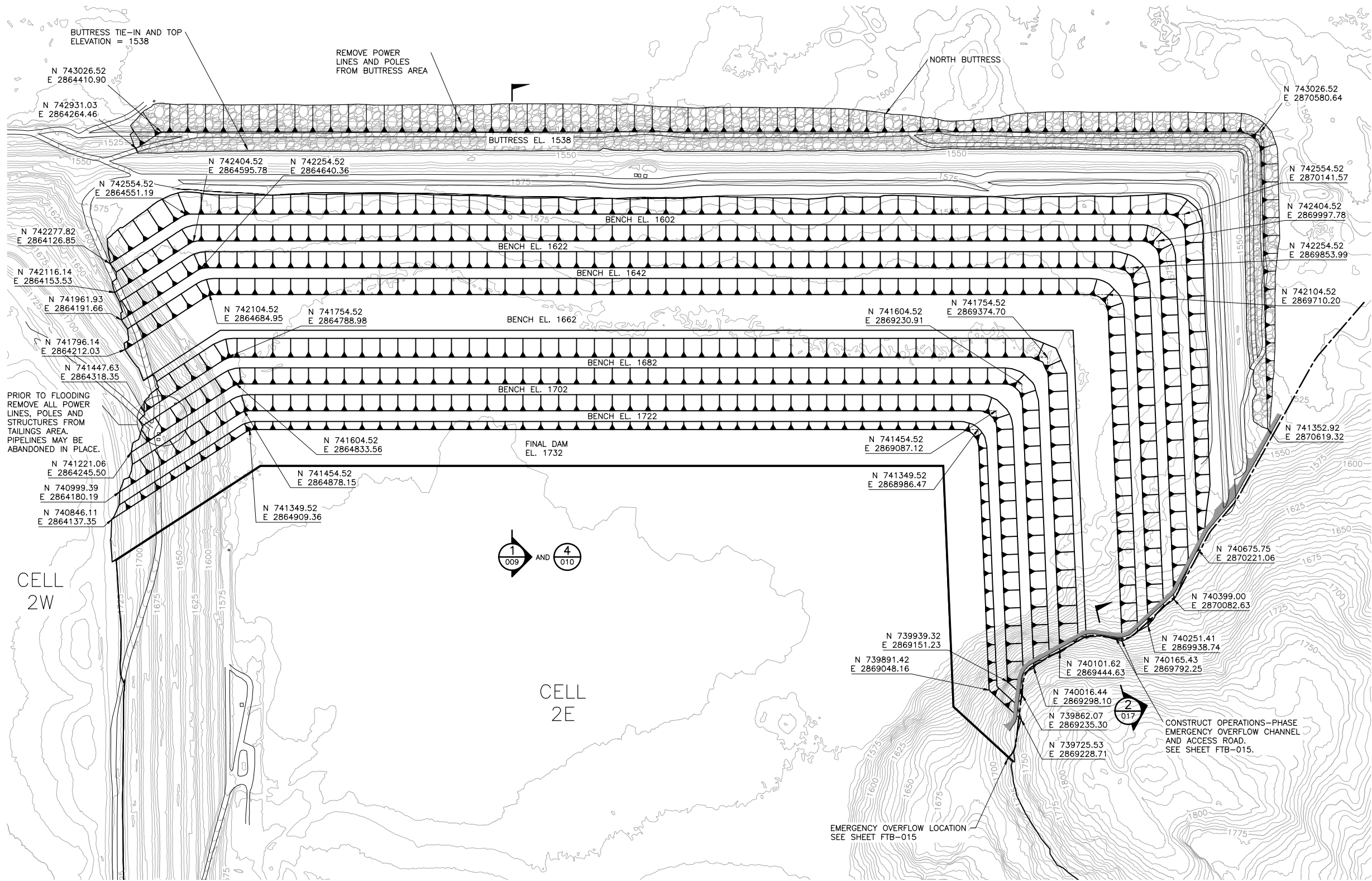
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SIGNATURE *Thomas J. Radue*
DATE 5/20/15 LICENSE# 20951

DRAWN: CAD
CHECKED: TJR
BARR PROJECT NO.: 23/69-0C29
SCALE: AS SHOWN

PLANT DRAWING NUMBER:	
FLOTATION TAILINGS BASIN LAYOUT MINE YEAR 7	
 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. FTB-007	REV

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INCHES
1
2



1 PLAN: NORTH DAM LAYOUT

0 300 600
SCALE IN FEET

VER NO	DATE	DESCRIPTION	ISSUE STATUS		
1	10/14/11	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 1 – ATTACHMENT A	ISSUED	VERSION	DATE
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DRAWN: CAD
CHECKED: TJR
BARR PROJECT NO.: 23/69-0C29
SCALE: AS SHOWN

NOTES:

- DAM ACCESS ROAD LOCATION IS APPROXIMATE. FIELD LOCATE TO PROVIDE PREFERRED SLOPE AND DRAINAGE.
- EXTEND ACCESS ROAD TO AREA 5 STOCKPILES AND TO PLANT (NOT SHOWN).
- CDSM ZONE NOT SHOWN. SEE SHEETS FTB-003 AND FTB-009.

PLANT DRAWING NUMBER:

FLOTATION TAILINGS BASIN
NORTH DAM
MINE YEAR 20 LAYOUT



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

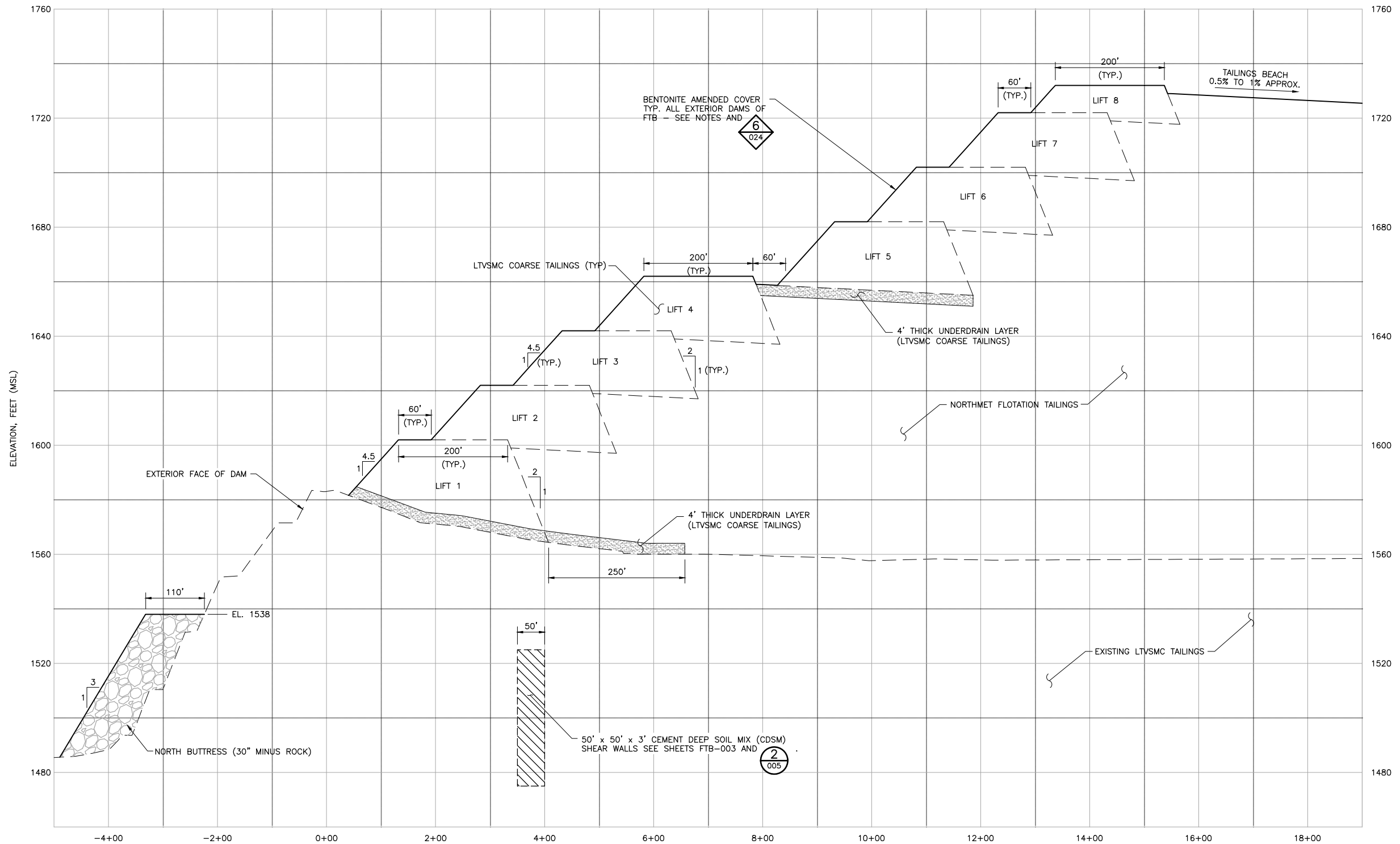


BARR ENGINEERING COMPANY
4700 WEST 77TH STREET
MINNEAPOLIS, MN.
Ph: 1-800-632-2277

DWG. NO. FTB-008

REV

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1 ELEVATION: NORTH DAM TYPICAL CROSS SECTION

0 100 200
HORZ. SCALE IN FEET

NOTES:

1. DAMS AND BUTTRESS DIMENSIONS MAY CHANGE WITH EVALUATION OF FUTURE DAM STABILITY PERFORMANCE DATA.
2. LOCATION AND DIMENSIONS OF CDSM SHEAR WALLS MAY CHANGE AS DESIGNS ARE FINALIZED.

VER NO	DATE	DESCRIPTION
1	10/14/11	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 1 – ATTACHMENT A
2	12/07/12	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 2 – ATTACHMENT A
3	04/12/13	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 3 – ATTACHMENT A
4	11/25/14	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 4 – ATTACHMENT A
5	03/03/15	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 5 – ATTACHMENT A
6	5/20/15	ISSUED FOR INCLUSION IN PERMIT APPLICATIONS


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	THOMAS J. RADUE	
SIGNATURE	<i>Thomas J. Radue</i>	
DATE	5/20/15	LICENSE# 20951


DRAWN:	CAD
CHECKED:	TJR
BARR PROJECT NO.:	23/69-0C29
SCALE:	AS SHOWN

DWG. NO.	FTB-009
REV	

PLANT DRAWING NUMBER:

FLOTATION TAILINGS BASIN
NORTH DAM
TYPICAL CROSS SECTION

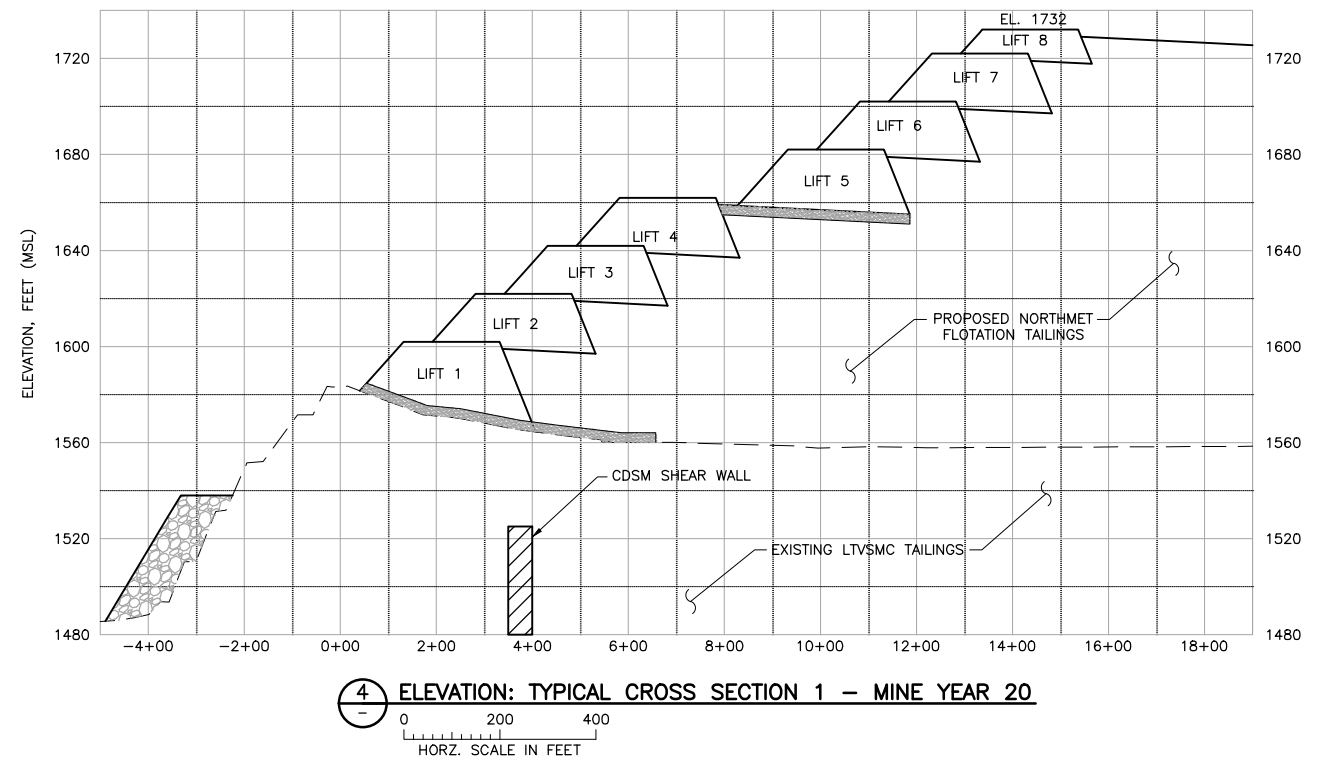
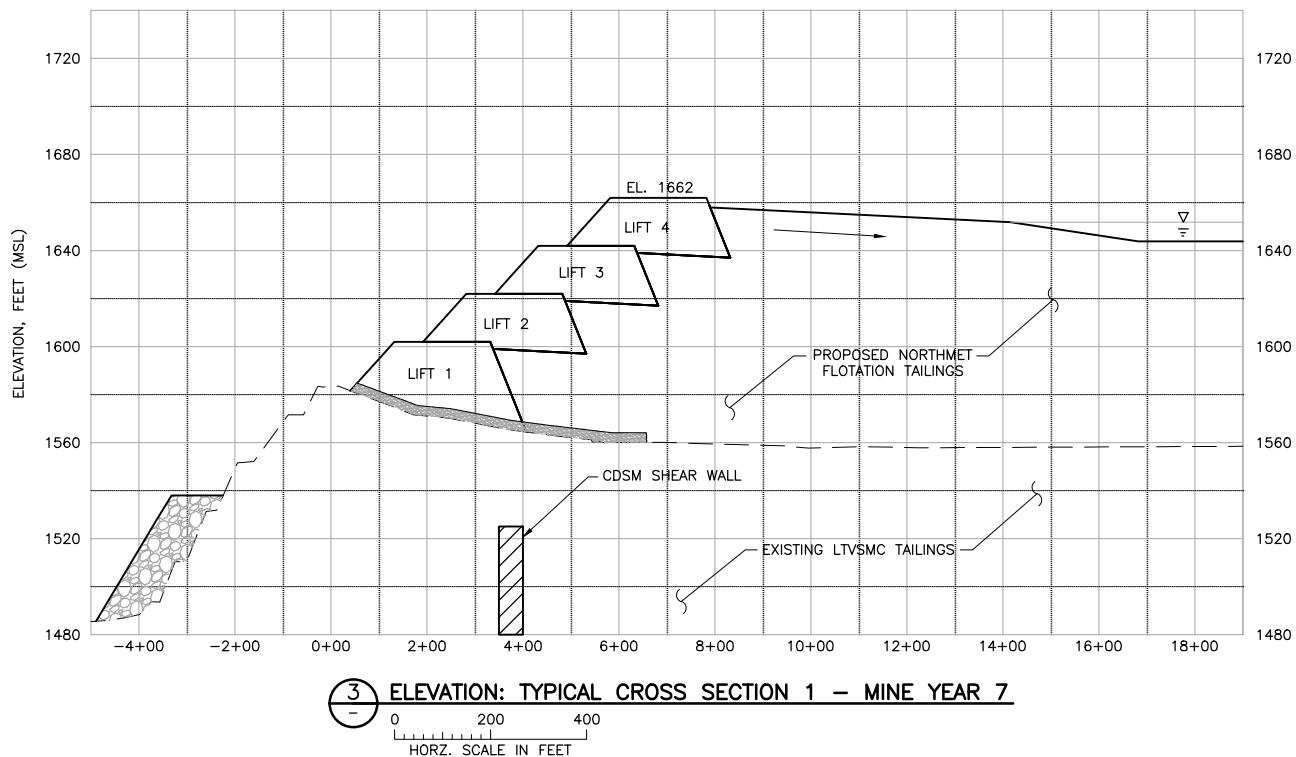
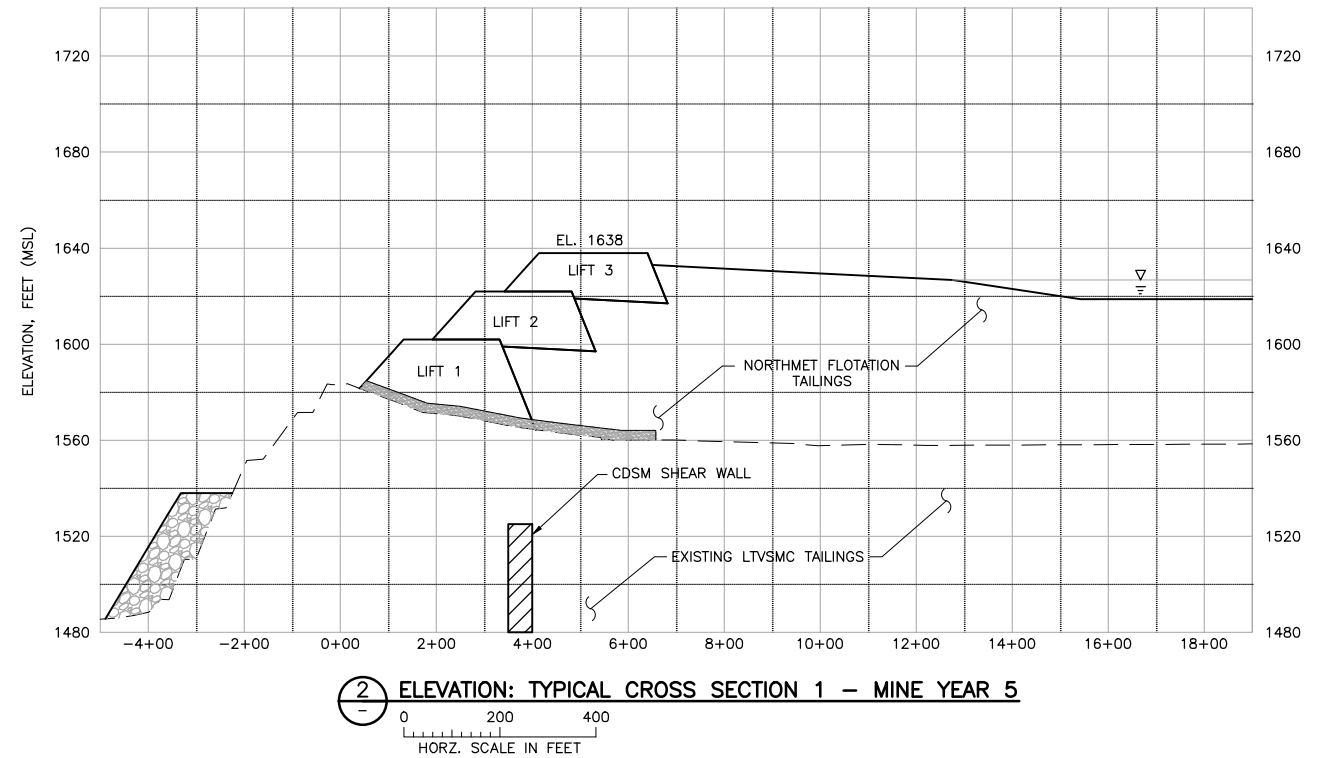
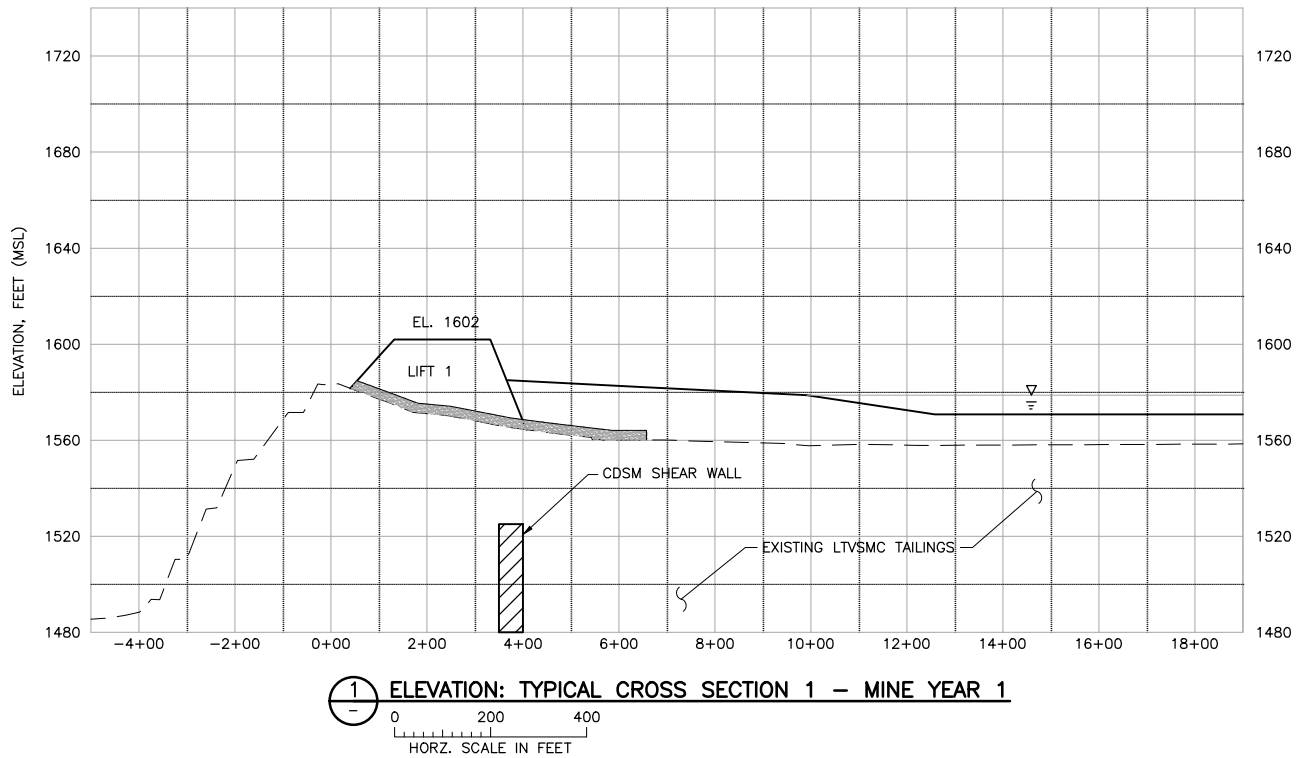
**POLYMET**
MINING

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

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

INCHES
1
2

CADD USER: AdeptUser FILE: \\PMEDINA\EDINA_PW\EDINA_PW\IN\1863ECE6-BFF8-4ADD-A31A-2092BF3D0E7C\AD9A45DB-A9BE-4A28-80F5-75E9C057E0B3\PERMIT_NMT-02-C5-C5-010.DWG PLOT SCALE: 1:2 PLOT DATE: 6/8/2015 4:24 PM



NOTE:

1. DAM AND BUTTRESS DIMENSIONS MAY CHANGE WITH EVALUATION OF FUTURE DAM STABILITY PERFORMANCE DATA.
2. PLACE BENTONITE AMENDED SOIL COVER ON OUTSIDE FACE OF NEW DAMS.

VER NO	DATE	DESCRIPTION	ISSUE STATUS		
1	10/14/11	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 1 – ATTACHMENT A	ISSUED	VERSION	DATE
2	12/07/12	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 2 – ATTACHMENT A	FOR PERMITTING	6	5/20/15
3	04/12/13	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 3 – ATTACHMENT A			
4	11/25/14	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 4 – ATTACHMENT A			
5	03/03/15	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 5 – ATTACHMENT A	FOR CONSTRUCTION	–	–
6	5/20/15	ISSUED FOR INCLUSION IN PERMIT APPLICATIONS			
			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 THOMAS J. RADUE
SIGNATURE *Thomas J. Radue*
DATE 5/20/15 LICENSE# 20951

DRAWN: CAD
CHECKED: TJR
BARR PROJECT NO.: 23/69-0C29
SCALE: AS SHOWN

PLANT DRAWING NUMBER:

FLOTATION TAILINGS BASIN
NORTH DAM
STAGED CONSTRUCTION

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. **FTB-010**

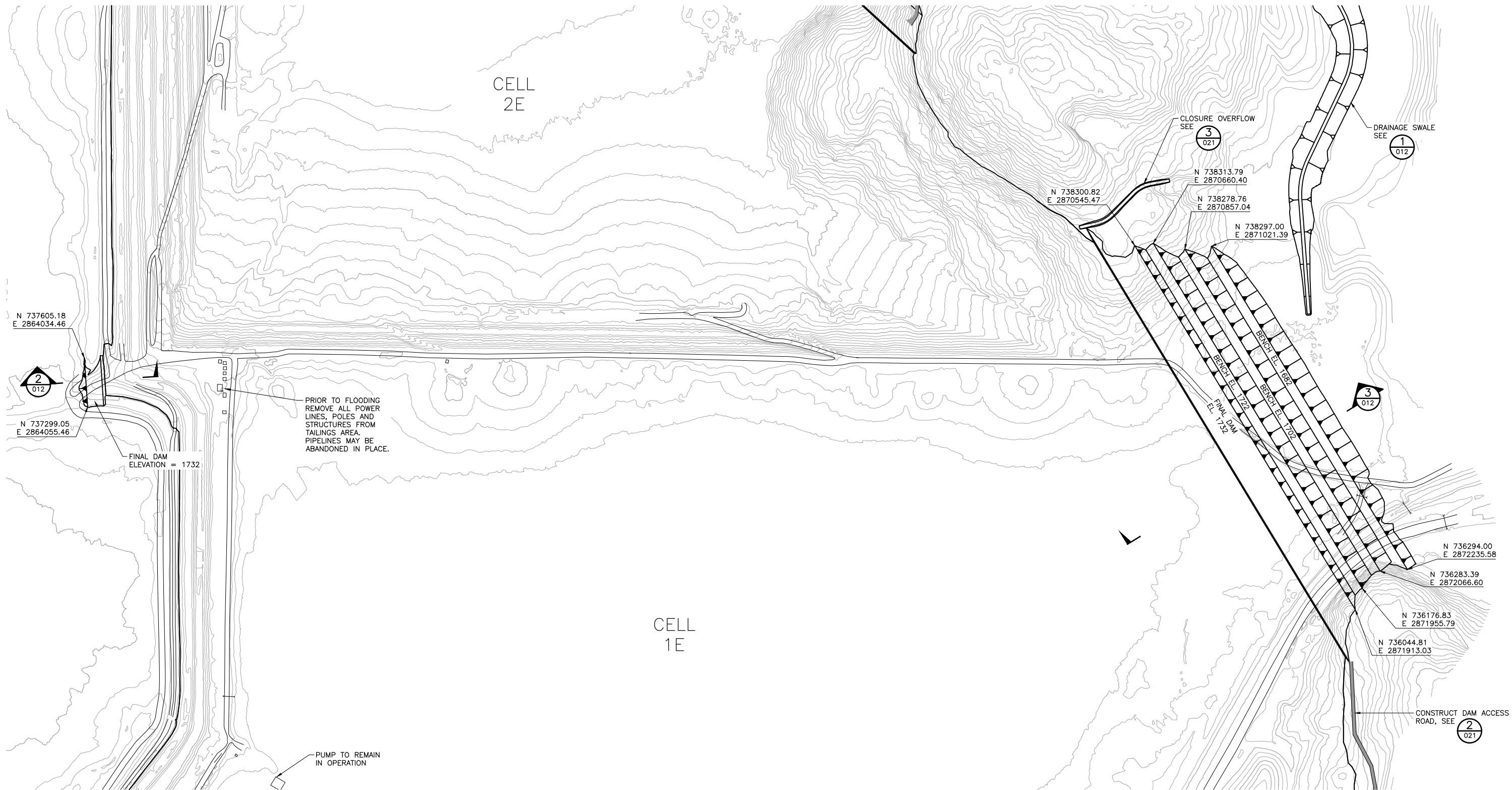
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2

1

INCHES



1 PLAN: EAST AND WEST DAM LAYOUTS

0 300 600



SCALE IN FEET

VER NO	DATE	DESCRIPTION	ISSUE STATUS		
1	10/14/11	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 1 - ATTACHMENT A	ISSUED	VERSION	DATE
2	12/07/12	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 2 - ATTACHMENT A	FOR PERMITTING	6	5/20/15
3	04/12/13	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 3 - ATTACHMENT A			
4	11/25/14	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 4 - ATTACHMENT A			
5	03/03/15	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 5 - ATTACHMENT A	FOR CONSTRUCTION	-	-
6	5/20/15	ISSUED FOR INCLUSION IN PERMIT APPLICATIONS	NOT APPROVED FOR CONSTRUCTION		

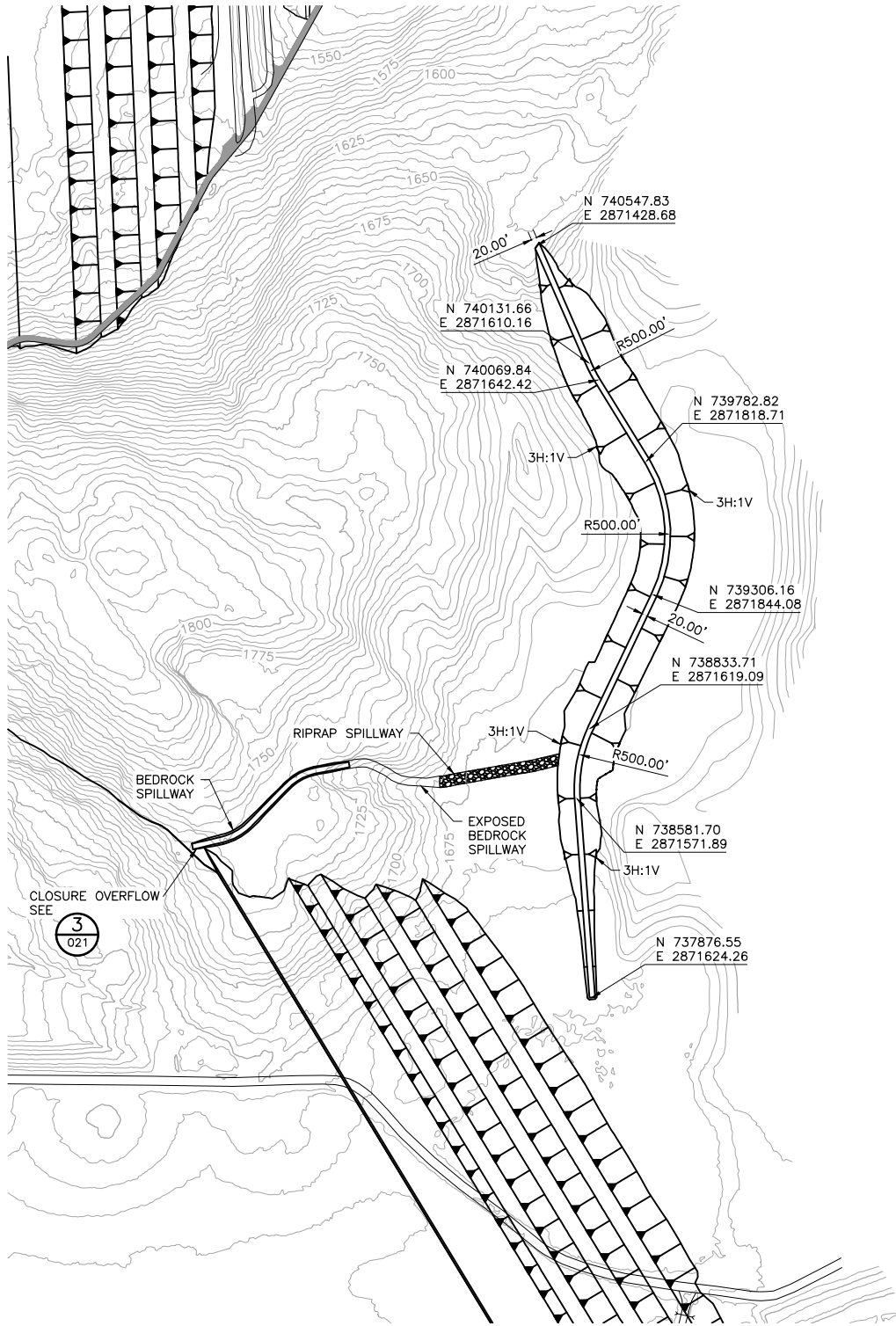
I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINTED NAME THOMAS J. RADUE
SIGNATURE *Thomas J. Radue*
DATE 5/20/15 LICENSE# 20951

DRAWN: CAD
CHECKED: TJR
BARR PROJECT NO.: 23/69-0C29
SCALE: AS SHOWN

PLANT DRAWING NUMBER:	
FLOTATION TAILINGS BASIN EAST AND WEST DAMS MINE YEAR 20 LAYOUT	
 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. FTB-011	REV

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1 PLAN: DRAINAGE SWALE LAYOUT

0 300 600
SCALE IN FEET

NOTES:

1. CLOSURE OVERFLOW IS FOR EMERGENCY OVERFLOW ONLY UNTIL POND WATER QUALITY MEETS DISCHARGE WATER QUALITY REQUIREMENTS.
2. DAM DIMENSIONS MAY CHANGE WITH EVALUATION OF FUTURE DAM STABILITY PERFORMANCE DATA.

VER NO	DATE	DESCRIPTION	ISSUE STATUS		
1	10/14/11	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 1 – ATTACHMENT A	ISSUED	VERSION	DATE
2	12/07/12	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 2 – ATTACHMENT A	FOR PERMITTING	6	5/20/15
3	04/12/13	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 3 – ATTACHMENT A			
4	11/25/14	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 4 – ATTACHMENT A			
5	03/03/15	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 5 – ATTACHMENT A	FOR CONSTRUCTION	–	–
6	5/20/15	ISSUED FOR INCLUSION IN PERMIT APPLICATIONS			
			NOT APPROVED FOR CONSTRUCTION		

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PRINTED NAME THOMAS J. RADUE
SIGNATURE *Thomas J. Radue*
DATE 5/20/15 LICENSE# 20951

DRAWN: CAD
CHECKED: TJR
BARR PROJECT NO.: 23/69-0C29
SCALE: AS SHOWN

PLANT DRAWING NUMBER:

FLOTATION TAILINGS BASIN
EAST AND WEST DAMS TYPICAL CROSS
SECTIONS AND DRAINAGE SWALE

POLYMET MINING

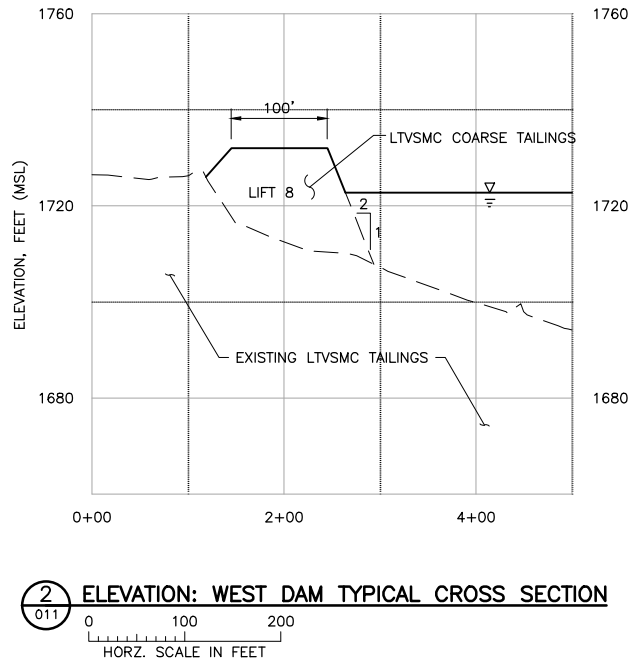
POLY MET MINING, INC.
NORTHMET PROJECT
HOYT LAKES, MINNESOTA

BARR

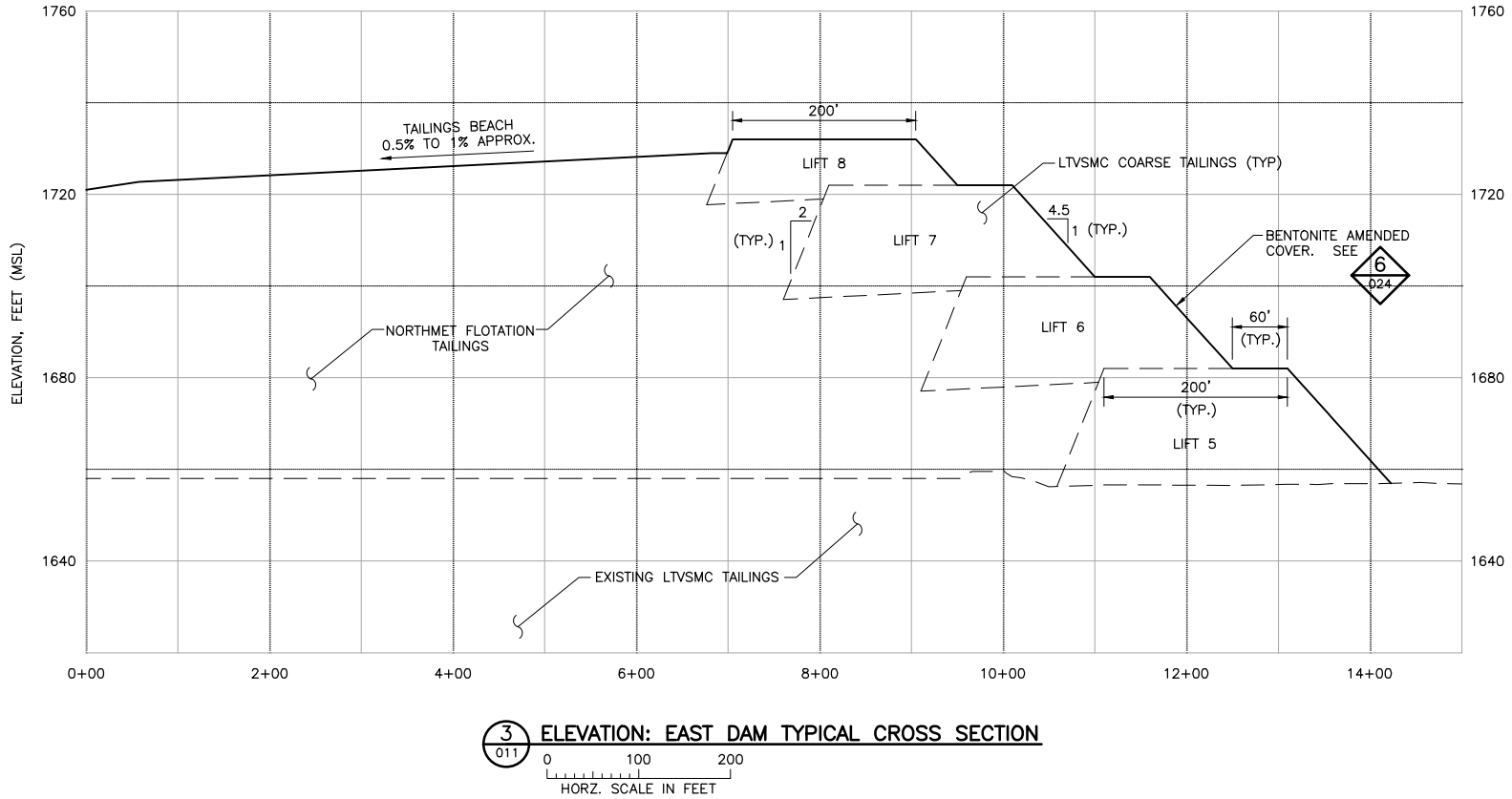
BARR ENGINEERING COMPANY
4700 WEST 77TH STREET
MINNEAPOLIS, MN.
Ph: 1-800-632-2277

DWG. NO. FTB-012

REV



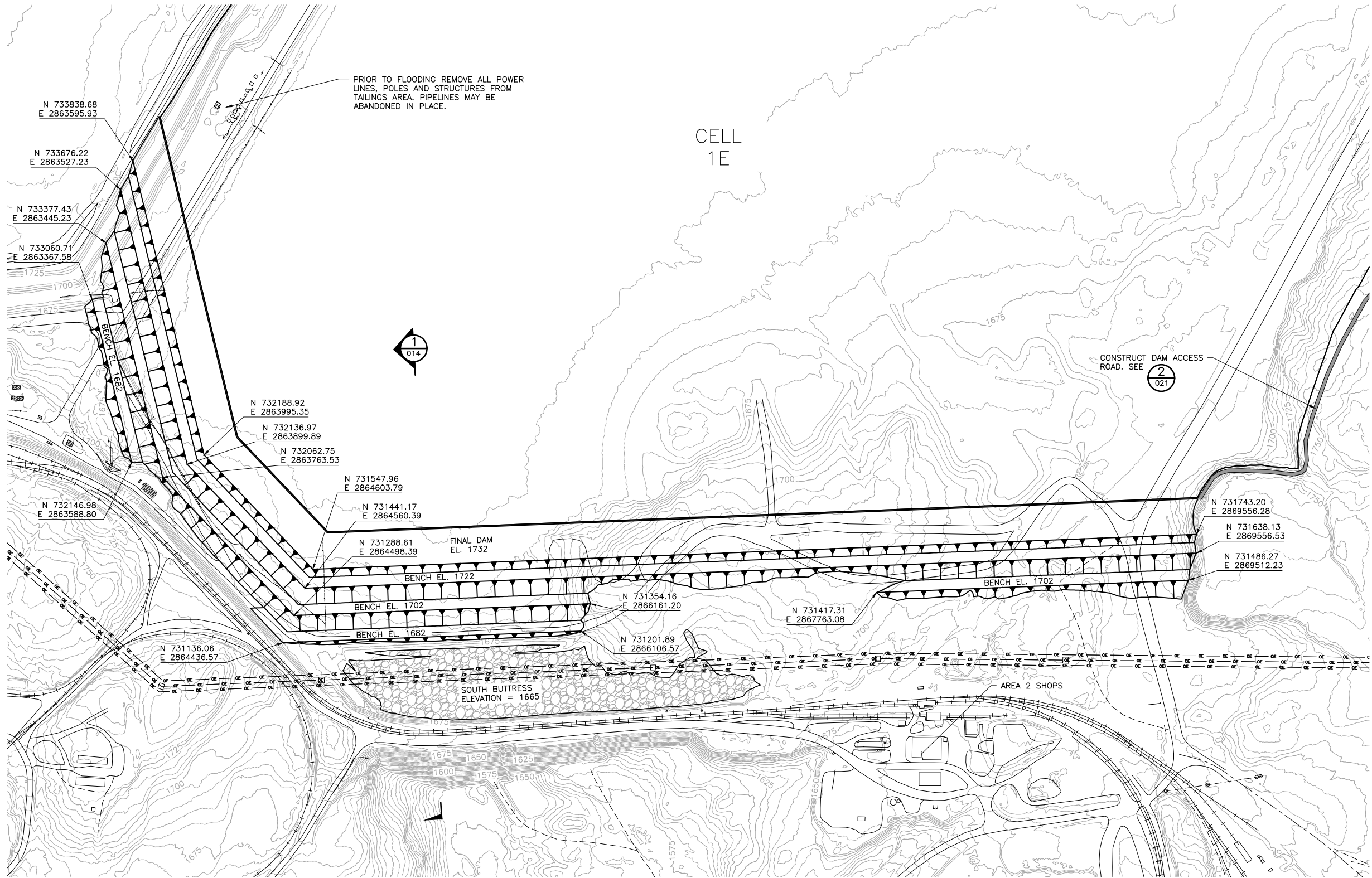
2 ELEVATION: WEST DAM TYPICAL CROSS SECTION



3 ELEVATION: EAST DAM TYPICAL CROSS SECTION

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INCHES
1
2





1 PLAN: SOUTH DAM LAYOUT
0 300 600
SCALE IN FEET

VER NO	DATE	DESCRIPTION	ISSUE STATUS		
			ISSUED	VERSION	DATE
1	10/14/11	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 1 - ATTACHMENT A			
2	12/07/12	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 2 - ATTACHMENT A			
3	04/12/13	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 3 - ATTACHMENT A	FOR PERMITTING	6	5/20/15
4	11/25/14	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 4 - ATTACHMENT A			
5	03/03/15	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 5 - ATTACHMENT A			
6	5/20/15	ISSUED FOR INCLUSION IN PERMIT APPLICATIONS	FOR CONSTRUCTION	-	-
			NOT APPROVED FOR CONSTRUCTION		

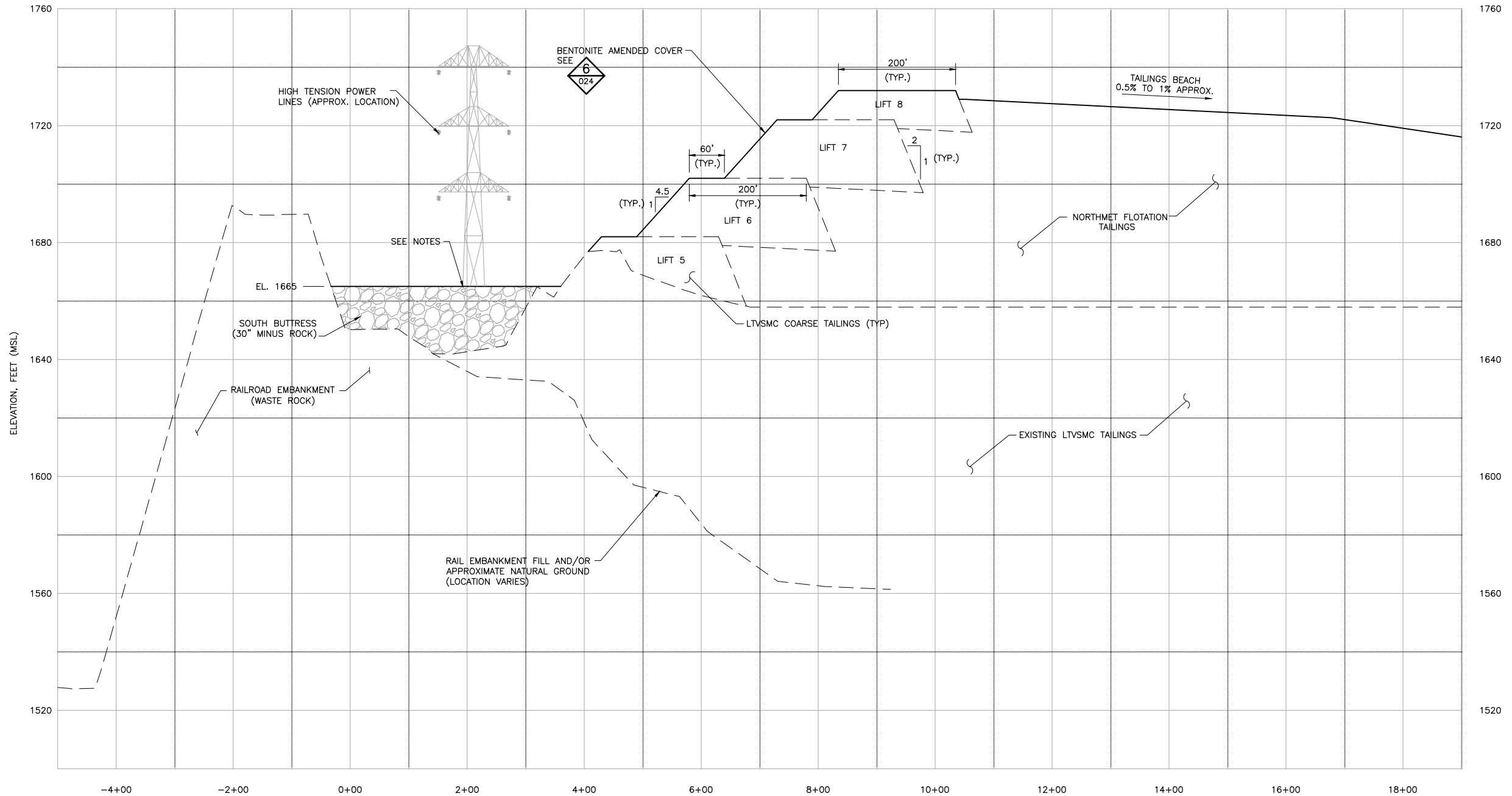
I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINTED NAME THOMAS J. RADUE
SIGNATURE *Thomas J. Radue*
DATE 5/20/15 LICENSE# 20951

DRAWN: CAD
CHECKED: TJR
BARR PROJECT NO.: 23/69-0C29
SCALE: AS SHOWN

PLANT DRAWING NUMBER:	
FLOTATION TAILINGS BASIN SOUTH DAM YEAR 20 LAYOUT	
	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. FTB-013	REV

CADD USER: Adeptuser FILE: \\PVEDINA\EDINA PW\EDINA PW IN\1863ECE6-BFF8-4ADD-A31A-2092BF3D0E7C\6522F697-25BB-480F-8E1975C5D780\PERMIT_NMT-02-CS-014.DWG PLOT SCALE: 1:2 PLOT DATE: 6/8/2015 4:30 PM



1 ELEVATION: SOUTH DAM TYPICAL CROSS SECTION

0 100 200
HORZ. SCALE IN FEET

NOTES:



1. DAM DIMENSIONS MAY CHANGE WITH EVALUATION OF FUTURE PERFORMANCE DATA.
2. HIGH TENSION POWER LINES SHOWN FOR REFERENCE. TOWER FOUNDATIONS ARE LOCATED OUTSIDE OF THE AREA COVERED BY THE BUTTRESS.

VER NO	DATE	DESCRIPTION	ISSUE STATUS				
1	10/14/11	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 1 – ATTACHMENT A	FOR PERMITTING	6	5/20/15		
2	12/07/12	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 2 – ATTACHMENT A					
3	04/12/13	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 3 – ATTACHMENT A					
4	11/25/14	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 4 – ATTACHMENT A					
5	03/03/15	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 5 – ATTACHMENT A	FOR CONSTRUCTION	–	–		
6	5/20/15	ISSUED FOR INCLUSION IN PERMIT APPLICATIONS					
			NOT APPROVED FOR CONSTRUCTION				

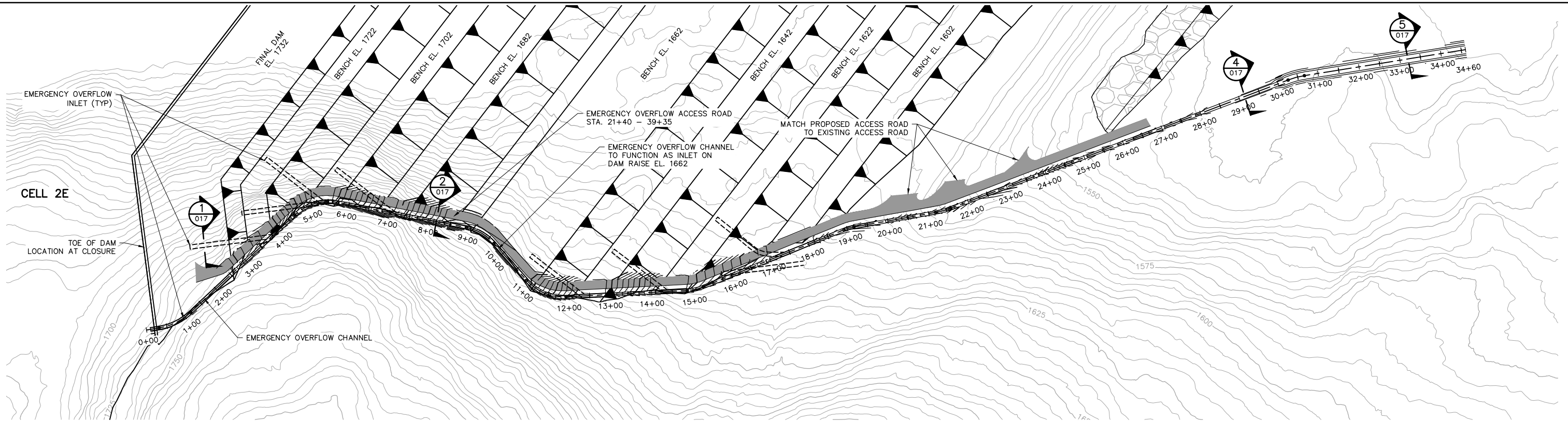
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PRINTED NAME THOMAS J. RADUE
SIGNATURE *Thomas J. Radue*
DATE 5/20/15 LICENSE# 20951

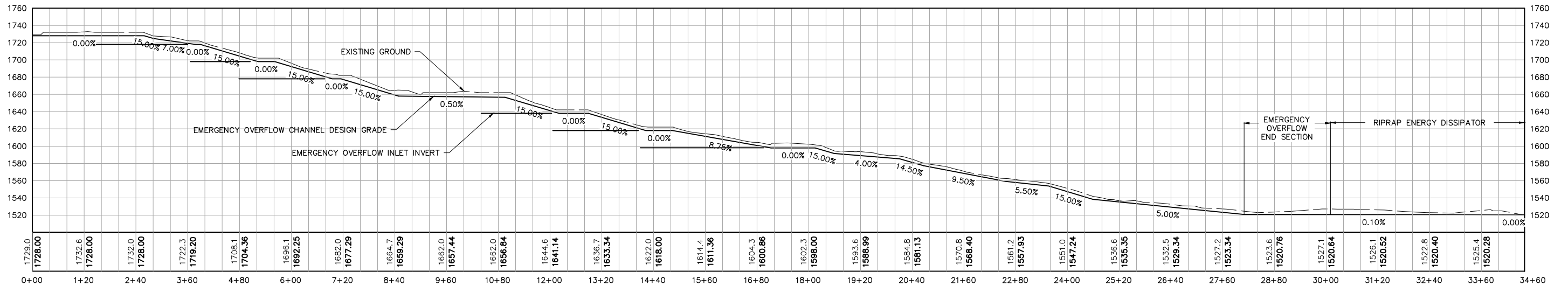
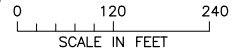
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BARR PROJECT NO.: 23/69-0C29
SCALE: AS SHOWN

PLANT DRAWING NUMBER:	
FLOTATION TAILINGS BASIN SOUTH DAM TYPICAL CROSS SECTIONS	
	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. FTB-014	REV

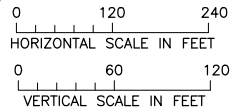
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1 PLAN: EMERGENCY OVERFLOW CHANNEL (OPERATIONS-PHASE)




2 PROFILE: EMERGENCY OVERFLOW CHANNEL (OPERATIONS-PHASE)




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>THOMAS J. RADUE</u> SIGNATURE <u><i>Thomas J. Radue</i></u> DATE <u>5/20/15</u> LICENSE# <u>20951</u>			 POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA		
			ISSUED	VERSION	DATE		DRAWN:	CAD	 BARR	BARR ENGINEERING COMPANY 4700 WEST 77TH STREET MINNEAPOLIS, MN. Ph: 1-800-632-2277	
1	10/14/11	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 1 – ATTACHMENT A					CHECKED:	TJR			
2	12/07/12	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 2 – ATTACHMENT A					BARR PROJECT NO.:	23/69–0C29			
3	04/12/13	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 3 – ATTACHMENT A	FOR PERMITTING	6	5/20/15		SCALE:	AS SHOWN	DWG. NO.	FTB–015	REV
4	11/25/14	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 4 – ATTACHMENT A									
5	03/03/15	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 5 – ATTACHMENT A	FOR CONSTRUCTION	–	–						
6	5/20/15	ISSUED FOR INCLUSION IN PERMIT APPLICATIONS	NOT APPROVED FOR CONSTRUCTION								

PLANT DRAWING NUMBER:

FLOTATION TAILINGS BASIN
EMERGENCY OVERFLOW CHANNEL
LAYOUT

**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

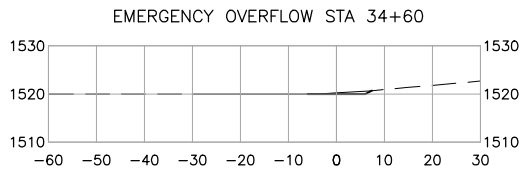
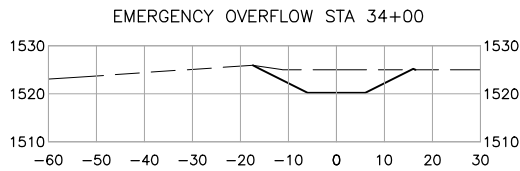
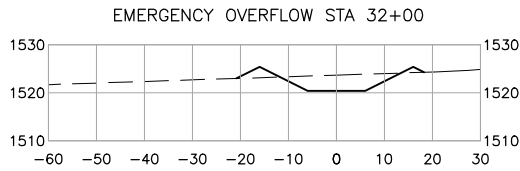
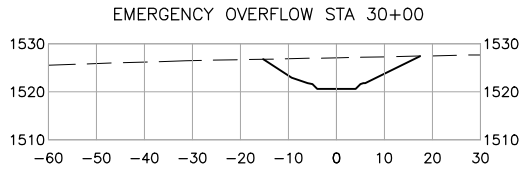
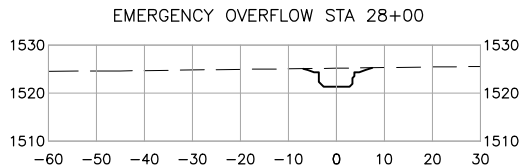
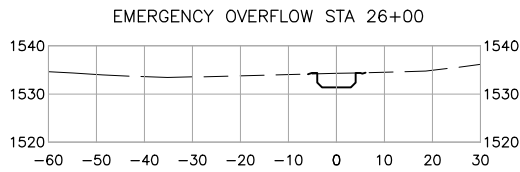
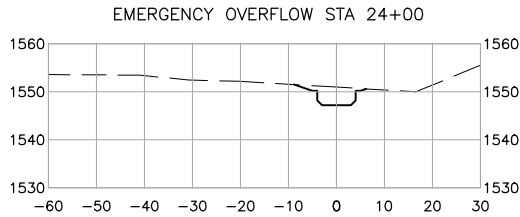
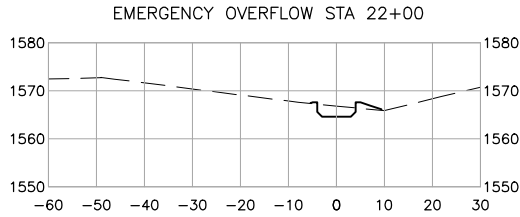
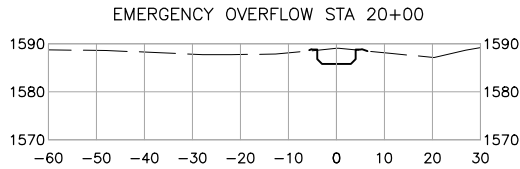
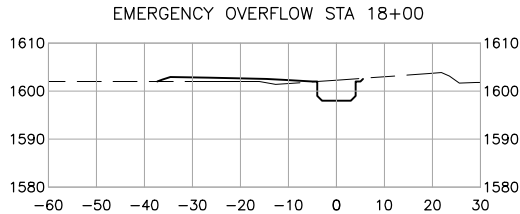
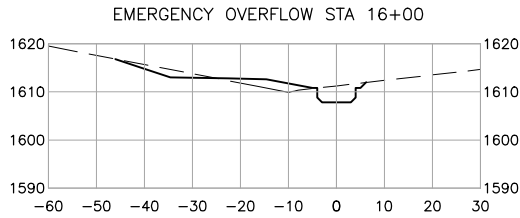
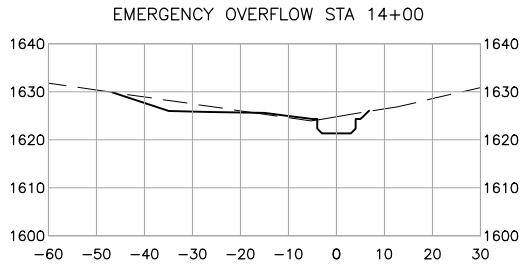
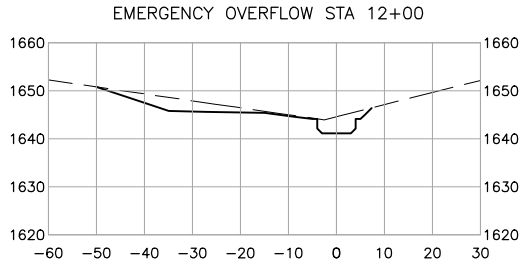
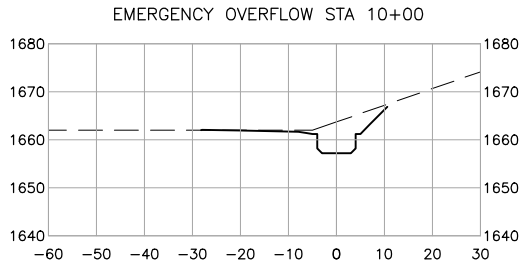
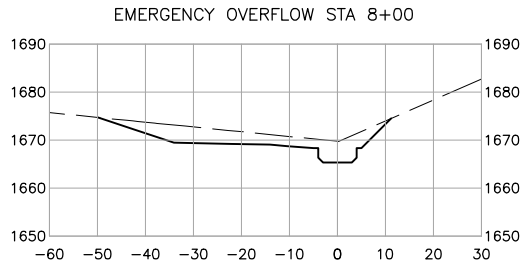
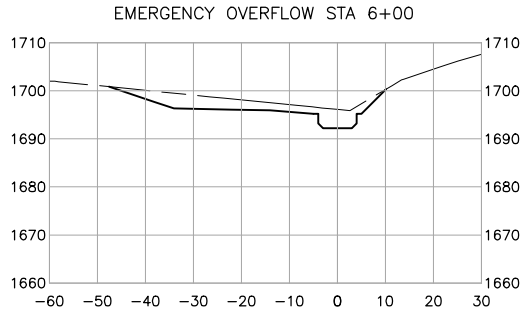
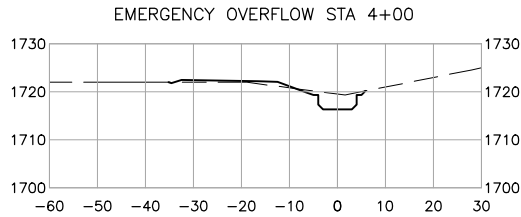
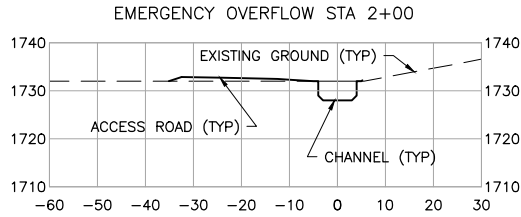
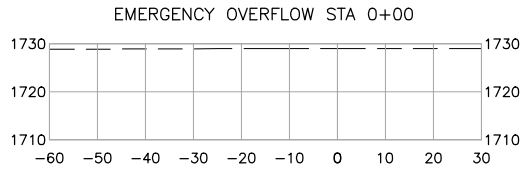
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2

1

INCHES



1
-

SECTIONS: EMERGENCY OVERFLOW CHANNEL

0 20 40
SCALE IN FEET

VER NO	DATE	DESCRIPTION	ISSUE STATUS		
1	10/14/11	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 1 - ATTACHMENT A	ISSUED	VERSION	DATE
2	12/07/12	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 2 - ATTACHMENT A	FOR PERMITTING	6	5/20/15
3	04/12/13	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 3 - ATTACHMENT A			
4	11/25/14	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 4 - ATTACHMENT A			
5	03/03/15	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 5 - ATTACHMENT A			
6	5/20/15	ISSUED FOR INCLUSION IN PERMIT APPLICATIONS	FOR CONSTRUCTION	-	-
			NOT APPROVED FOR CONSTRUCTION		

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PRINTED NAME THOMAS J. RADUE
SIGNATURE *Thomas J. Radue*
DATE 5/20/15 LICENSE# 20951

DRAWN: CAD
CHECKED: TJR
BARR PROJECT NO.: 23/69-0C29
SCALE: AS SHOWN

PLANT DRAWING NUMBER:

FLOTATION TAILINGS BASIN
EMERGENCY OVERFLOW CHANNEL
SECTIONS



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

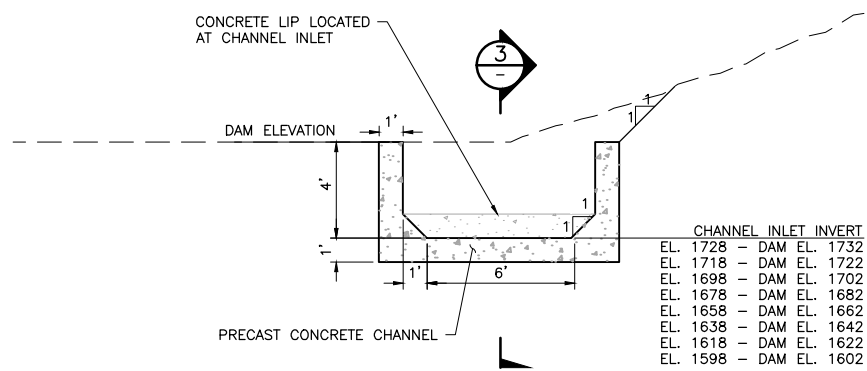


BARR ENGINEERING COMPANY
4700 WEST 77TH STREET
MINNEAPOLIS, MN.
Ph: 1-800-632-2277

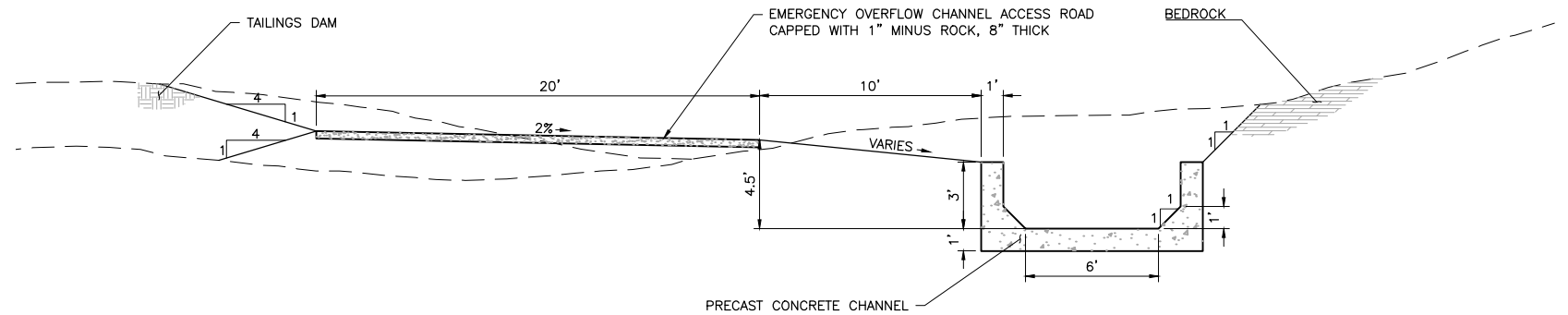
DWG. NO. FTB-016

REV

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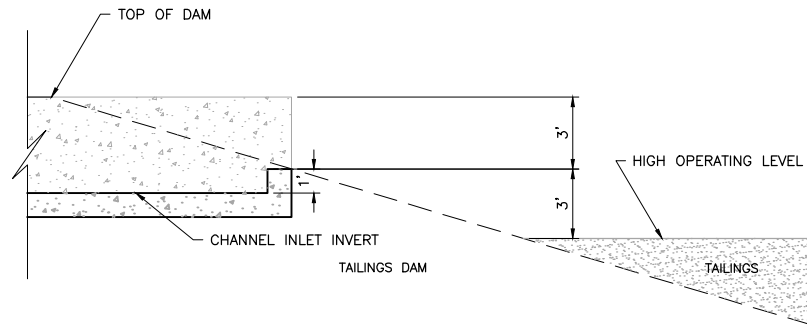


1 SECTION: TYPICAL EMERGENCY OVERFLOW CHANNEL INLET
015 NTS

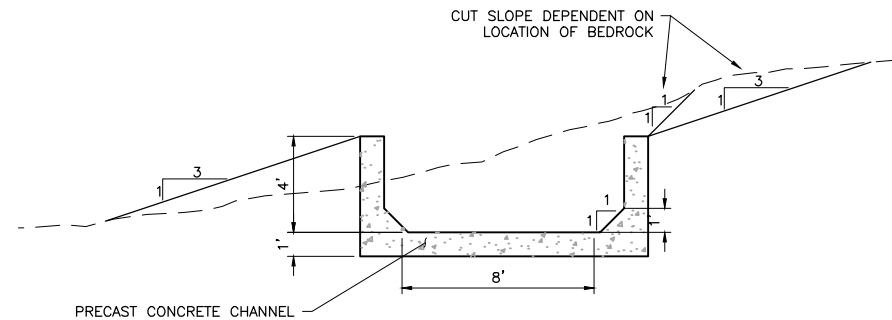


2 SECTION: EMERGENCY OVERFLOW CHANNEL
015 NTS

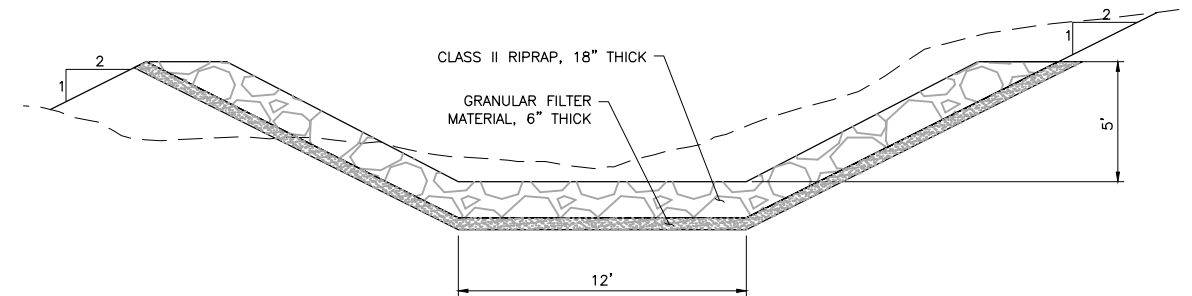
NOTE:
INCREASE EMERGENCY OVERFLOW CHANNEL DEPTH TO 4' WHEN CHANNEL SLOPE IS 0%





3 DETAIL: EMERGENCY OVERFLOW CHANNEL INLET
015 NTS



4 SECTION: EMERGENCY OVERFLOW CHANNEL END SECTION - STA. 28+10 - 30+10
015 NTS



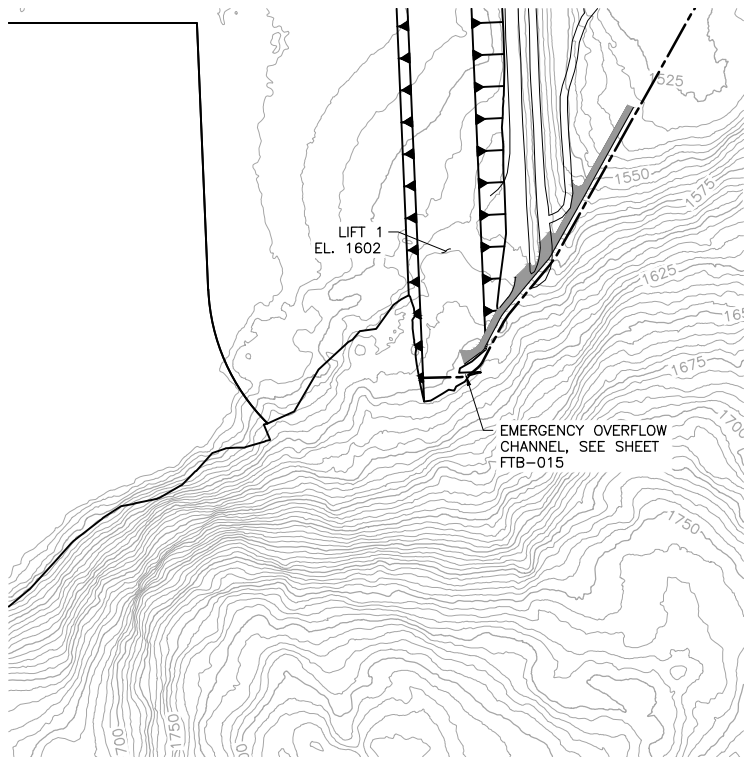
5 SECTION: RIPRAP OVERFLOW CHANNEL ENERGY DISSIPATOR - STA. 30+10 - 34+60
015 NTS

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>THOMAS J. RADUE</u> SIGNATURE <u><i>Thomas J. Radue</i></u> DATE <u>5/20/15</u> LICENSE# <u>20951</u>	DRAWN:	 POLYMET MINING  BARR	POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA		
1	10/14/11	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 1 – ATTACHMENT A	ISSUED	VERSION	DATE		CAD		BARR ENGINEERING COMPANY 4700 WEST 77TH STREET MINNEAPOLIS, MN. Ph: 1–800–632–2277		
2	12/07/12	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 2 – ATTACHMENT A	FOR PERMITTING	6	5/20/15		CHECKED:			REV	
3	04/12/13	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 3 – ATTACHMENT A					TJR				
4	11/25/14	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 4 – ATTACHMENT A					BARR PROJECT NO.: 23/69–0C29				
5	03/03/15	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 5 – ATTACHMENT A	FOR CONSTRUCTION	–	–		SCALE: AS SHOWN				DWG. NO. FTB–017
6	5/20/15	ISSUED FOR INCLUSION IN PERMIT APPLICATIONS	NOT APPROVED FOR CONSTRUCTION								

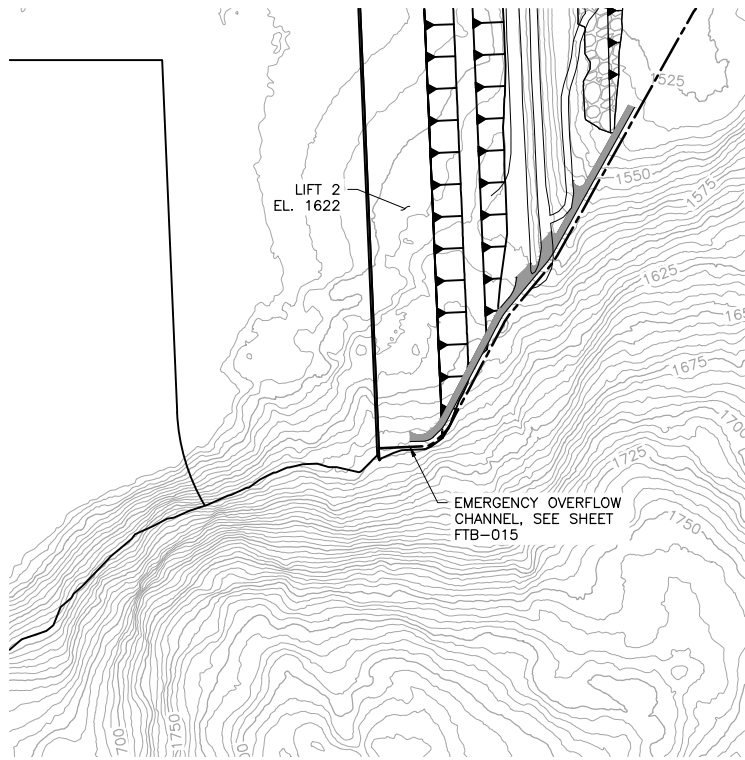
2
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INCHES

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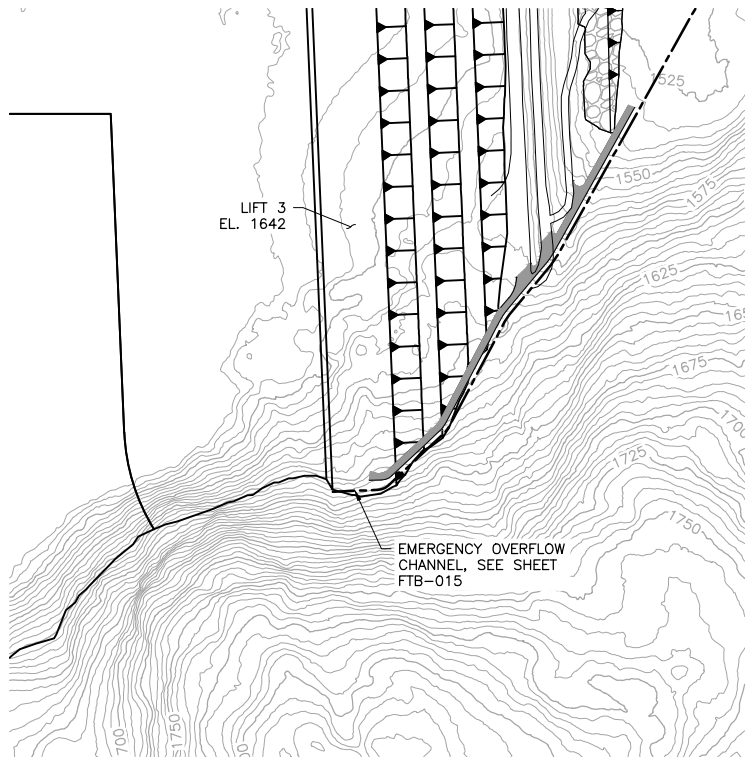
INCHES
1
2



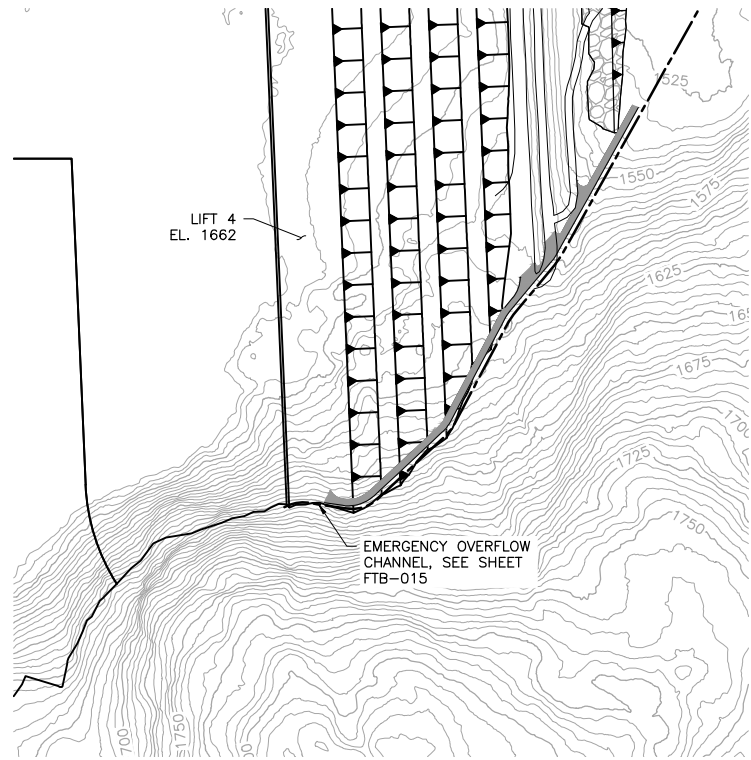
1 PLAN: EMERGENCY OVERFLOW CHANNEL - LIFT 1



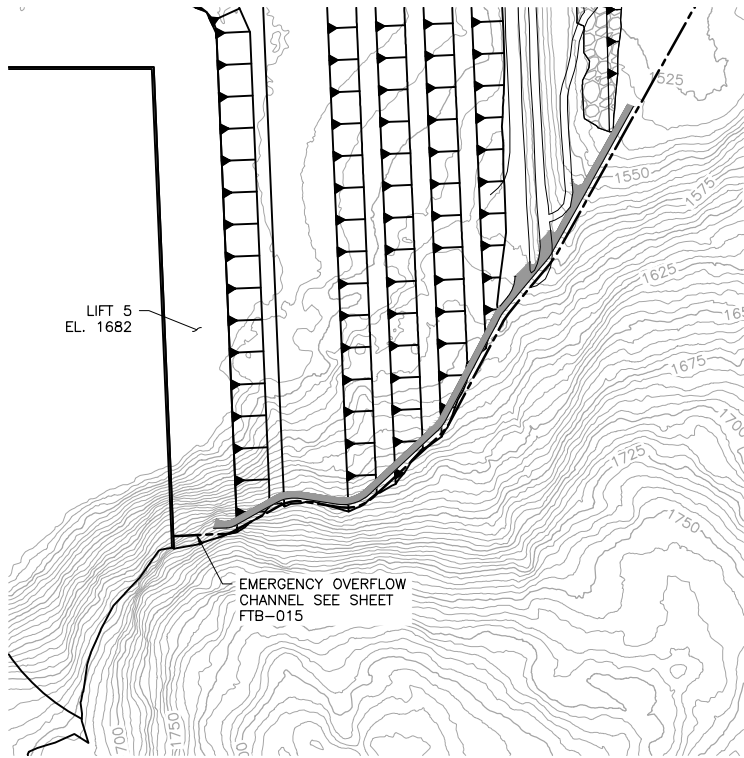
2 PLAN: EMERGENCY OVERFLOW CHANNEL - LIFT 2



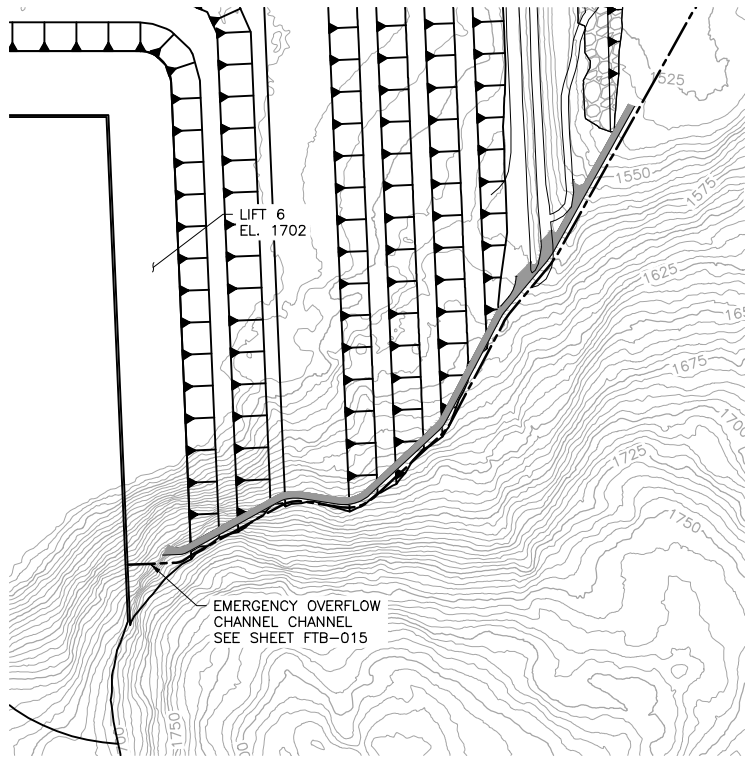
3 PLAN: EMERGENCY OVERFLOW CHANNEL - LIFT 3



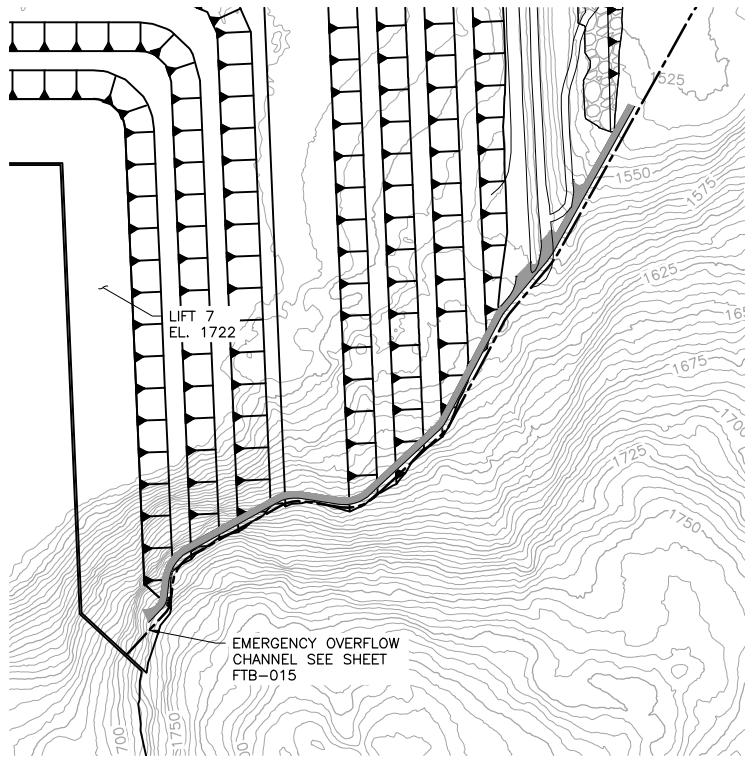
4 PLAN: EMERGENCY OVERFLOW CHANNEL - LIFT 4



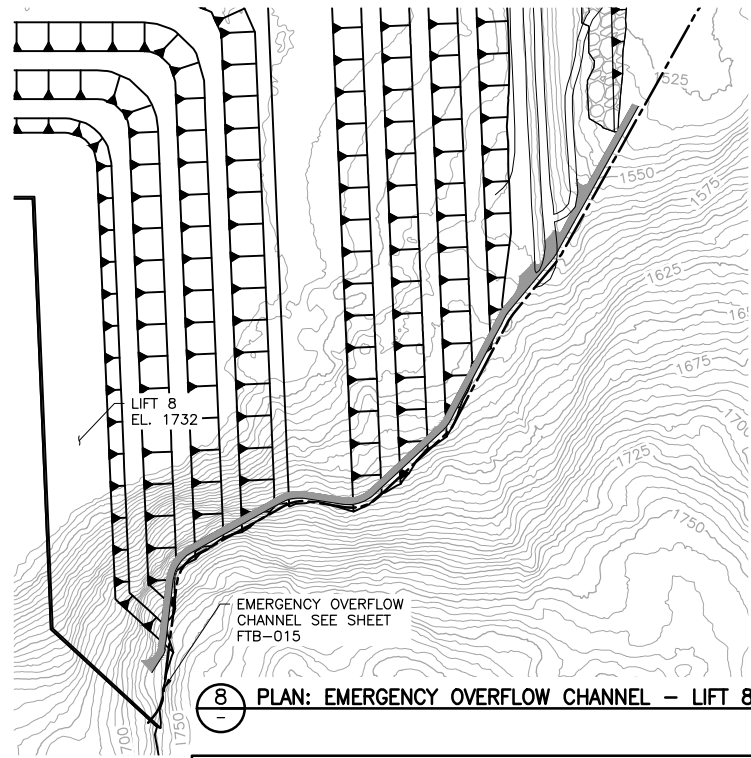
5 PLAN: EMERGENCY OVERFLOW CHANNEL - LIFT 5



6 PLAN: EMERGENCY OVERFLOW CHANNEL - LIFT 6



7 PLAN: EMERGENCY OVERFLOW CHANNEL - LIFT 7



8 PLAN: EMERGENCY OVERFLOW CHANNEL - LIFT 8

NOTES:

1. EMERGENCY OVERFLOW CHANNEL PLAN VIEW NOT SHOWN, SEE SHEET FTB-015 FOR REFERENCE.





0 300 600
SCALE IN FEET

VER NO	DATE	DESCRIPTION	ISSUE STATUS		
			ISSUED	VERSION	DATE
1	10/14/11	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 1 - ATTACHMENT A			
2	12/07/12	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 2 - ATTACHMENT A			
3	04/12/13	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 3 - ATTACHMENT A	FOR PERMITTING	6	5/20/15
4	11/25/14	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 4 - ATTACHMENT A			
5	03/03/15	FLOTATION TAILINGS MANAGEMENT PLAN - VERSION 5 - ATTACHMENT A	FOR CONSTRUCTION	-	-
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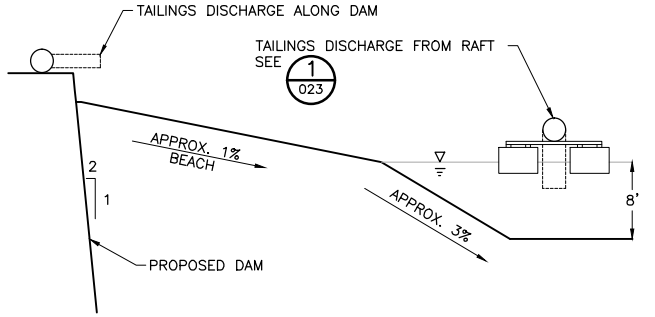
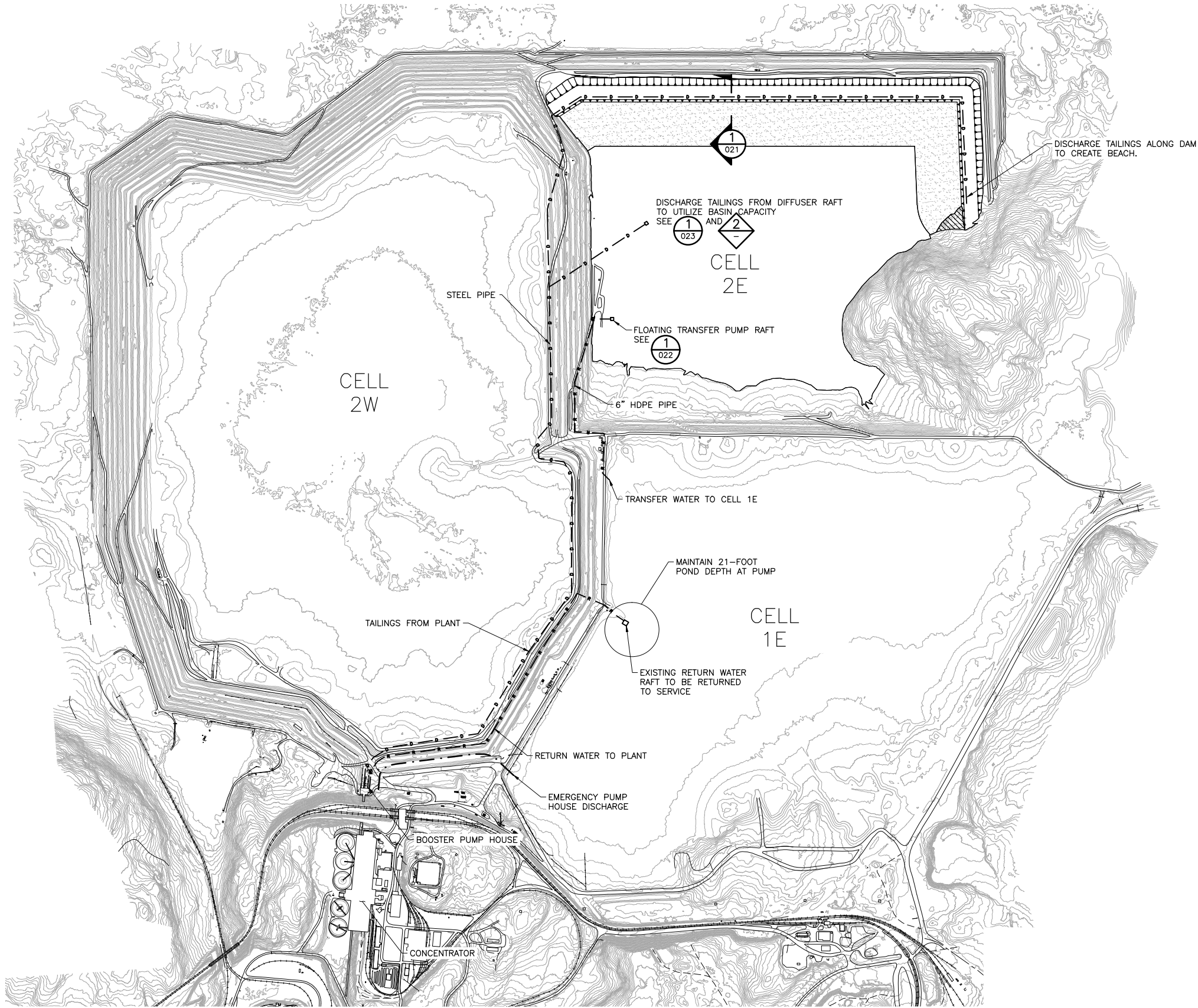
PRINTED NAME THOMAS J. RADUE
SIGNATURE *Thomas J. Radue*
DATE 5/20/15 LICENSE# 20951

DRAWN: CAD
CHECKED: TJR
BARR PROJECT NO.: 23/69-0C29
SCALE: AS SHOWN

PLANT DRAWING NUMBER:	
FLOTATION TAILINGS BASIN EMERGENCY OVERFLOW CHANNEL SEQUENCING	
 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. FTB-018	REV

CADD USER: Adeptuser FILE: \\PMEDINA\EDINA PW\EDINA PW IN\1863ECE6-BFF8-4ADD-A31A-2092BF3D0E7C\77B6B678-FD5A-4D19-A044-67364C6C06\PERMIT_MNT-02-CS-019.DWG PLOT SCALE: 1:2 PLOT DATE: 6/8/2015 4:39 PM

INCHES
1
2



2 **DETAIL: TAILINGS DISCHARGE ALONG DAM**
NTS

NOTES:

1. CONTOURS DO NOT REFLECT BORROW REMOVAL.
2. PIPELINE LOCATIONS ARE PRELIMINARY.

1 **PLAN: PIPING LAYOUT CELL 2E**
0 800 1600
SCALE IN FEET





VER NO	DATE	DESCRIPTION	ISSUE STATUS		
1	10/14/11	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 1 – ATTACHMENT A	ISSUED	VERSION	DATE
2	12/07/12	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 2 – ATTACHMENT A	FOR PERMITTING	6	5/20/15
3	04/12/13	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 3 – ATTACHMENT A			
4	11/25/14	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 4 – ATTACHMENT A			
5	03/03/15	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 5 – ATTACHMENT A	FOR CONSTRUCTION	–	–
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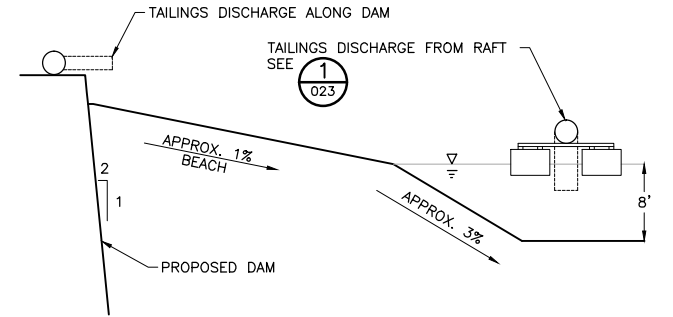
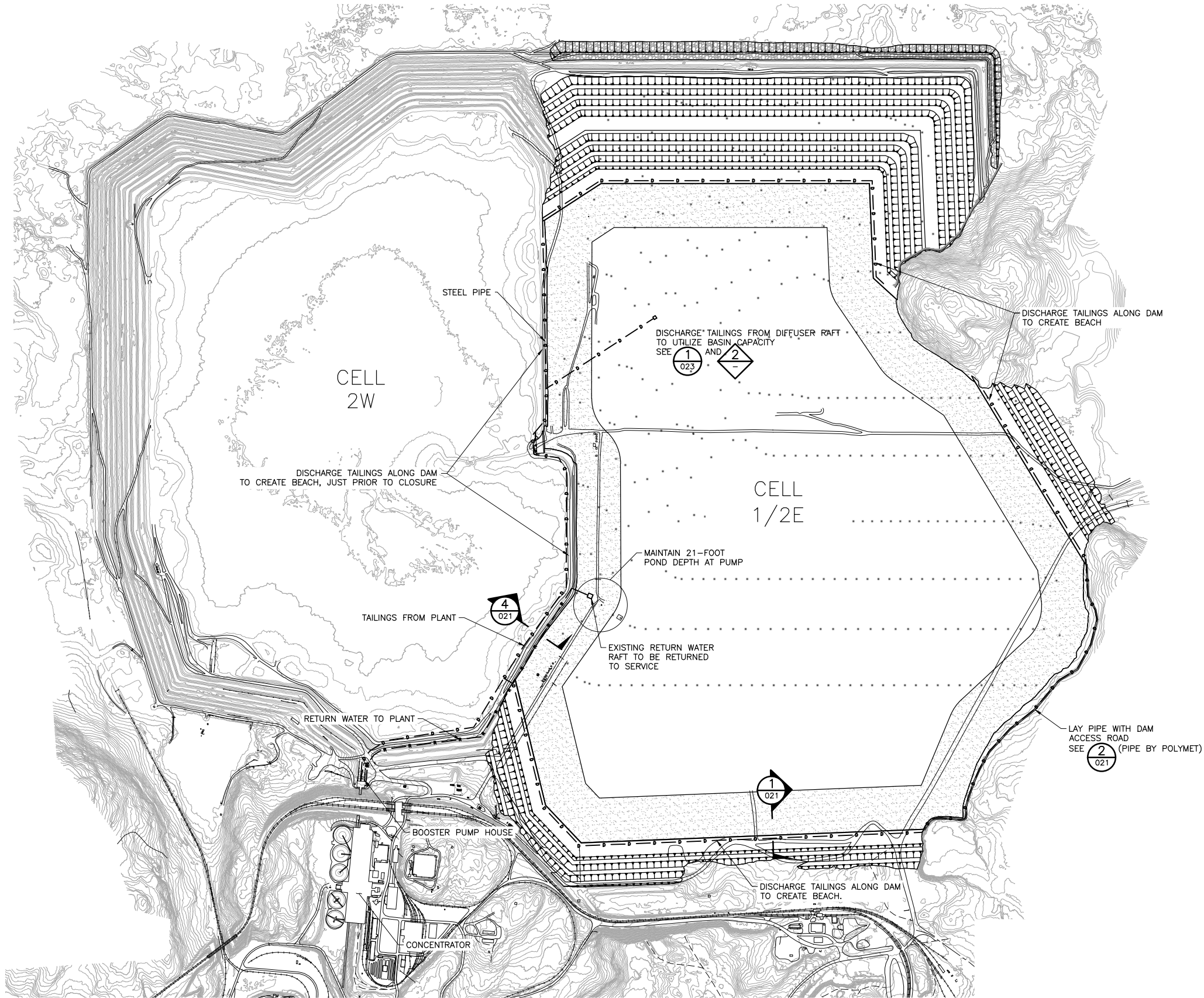
PRINTED NAME **THOMAS J. RADUE**
SIGNATURE *Thomas J. Radue*
DATE **5/20/15** LICENSE# **20951**

DRAWN: CAD
CHECKED: TJR
BARR PROJECT NO.: 23/69-0C29
SCALE: AS SHOWN

PLANT DRAWING NUMBER:	
FLOTATION TAILINGS BASIN PIPING LAYOUT CELL 2E	
	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. FTB-019	REV

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INCHES
1
2



2 DETAIL: TAILINGS DISCHARGE ALONG DAM
NTS

NOTES:



1. PIPELINE LOCATIONS ARE PRELIMINARY.

1 PLAN: PIPING LAYOUT CELL 1/2E
0 800 1600
SCALE IN FEET

VER NO	DATE	DESCRIPTION	ISSUE STATUS		
1	10/14/11	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 1 – ATTACHMENT A	FOR PERMITTING	6	5/20/15
2	12/07/12	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 2 – ATTACHMENT A			
3	04/12/13	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 3 – ATTACHMENT A			
4	11/25/14	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 4 – ATTACHMENT A			
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			NOT APPROVED FOR CONSTRUCTION		

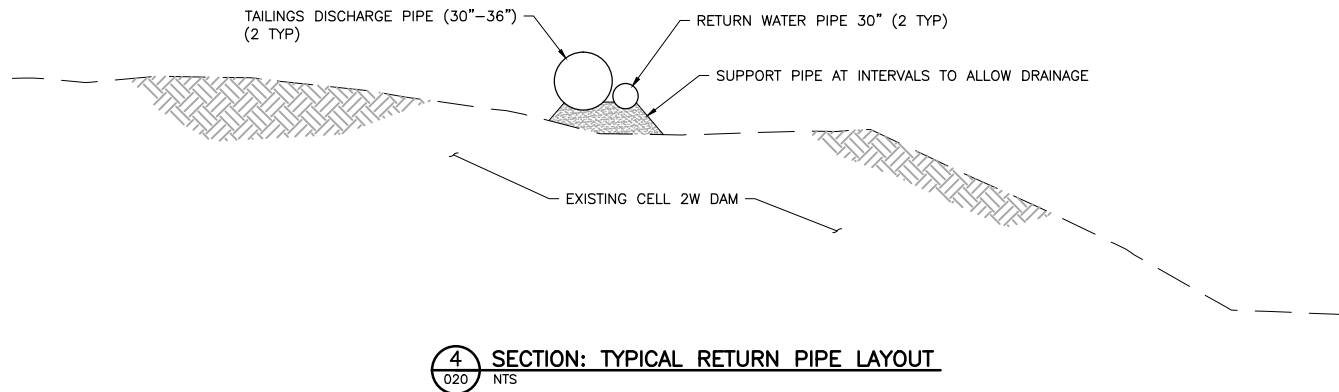
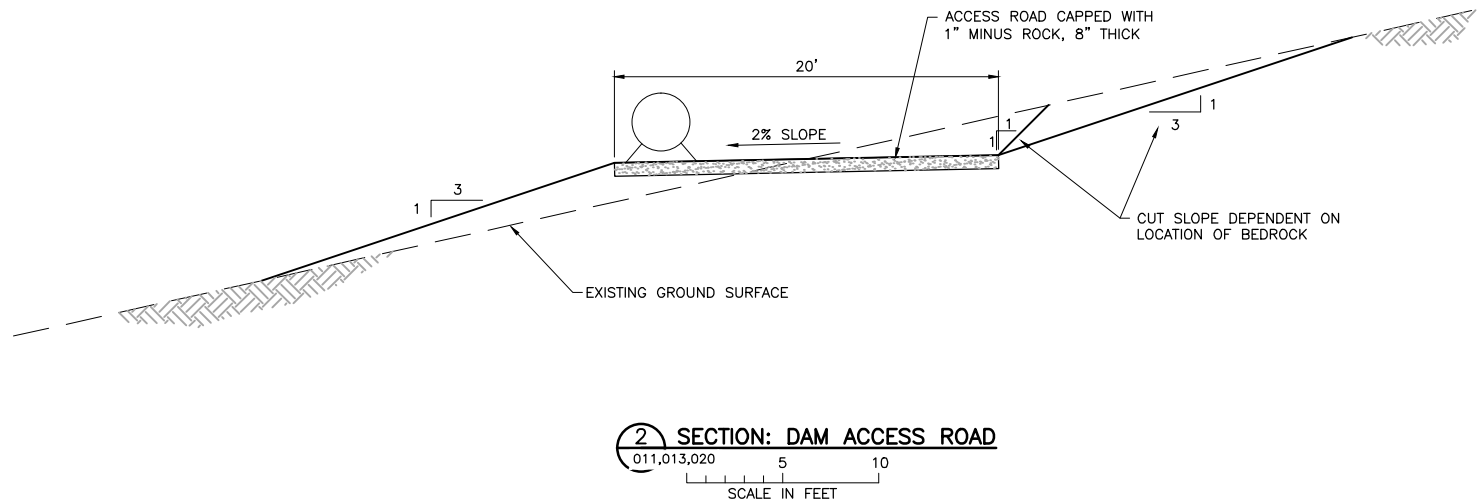
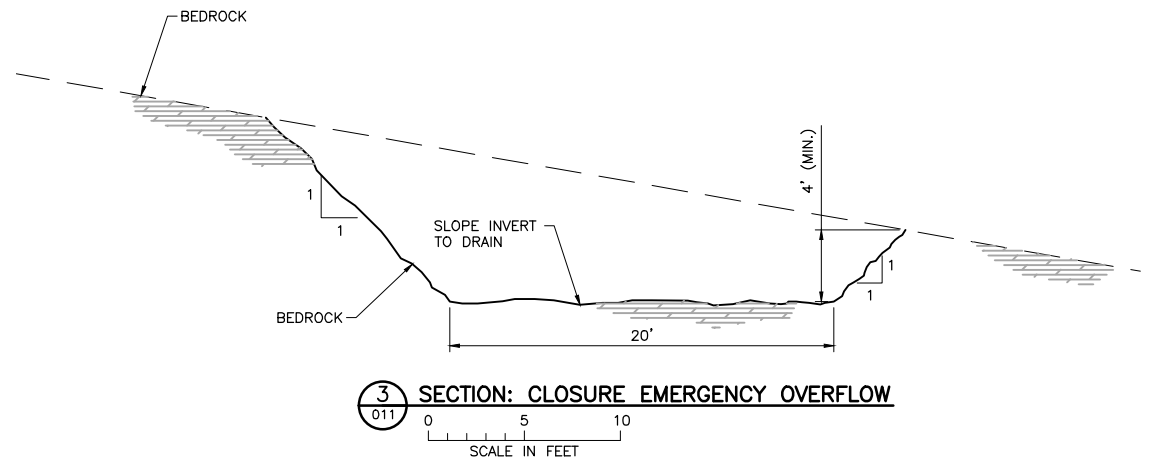
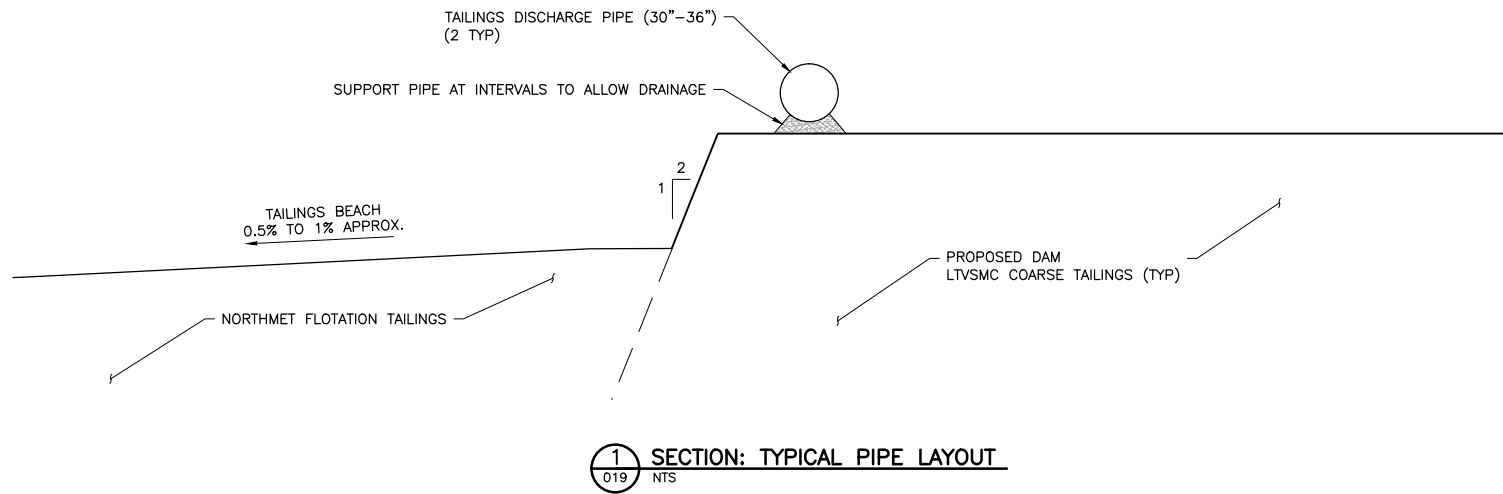
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PRINTED NAME THOMAS J. RADUE
SIGNATURE *Thomas J. Radue*
DATE 5/20/15 LICENSE# 20951

DRAWN: CAD
CHECKED: TJR
BARR PROJECT NO.: 23/69-0C29
SCALE: AS SHOWN

PLANT DRAWING NUMBER:	
FLOTATION TAILINGS BASIN PIPING LAYOUT CELL 1/2E	
	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. FTB-020	REV

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INCHES
1
2



NOTES:

1. EMERGENCY OVERFLOW SIZING AND CONFIGURATION IS PRELIMINARY.
2. PIPELINE INFORMATION IS PRELIMINARY.
3. CONSTRUCT CLOSURE EMERGENCY OVERFLOW AT CLOSURE. OPERATIONS-PHASE EMERGENCY OVERFLOW TO BE MAINTAINED OR REMOVED AT OWNER'S DETERMINATION.
4. ALL PIPE SIZES SHOWN ARE PRELIMINARY.

VER NO	DATE	DESCRIPTION	ISSUE STATUS				
1	10/14/11	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 1 – ATTACHMENT A	FOR PERMITTING	6	5/20/15		
2	12/07/12	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 2 – ATTACHMENT A					
3	04/12/13	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 3 – ATTACHMENT A					
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SIGNATURE *Thomas J. Radue*
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DRAWN: CAD

CHECKED: TJR

BARR PROJECT NO.: 23/69-0C29

SCALE: AS SHOWN

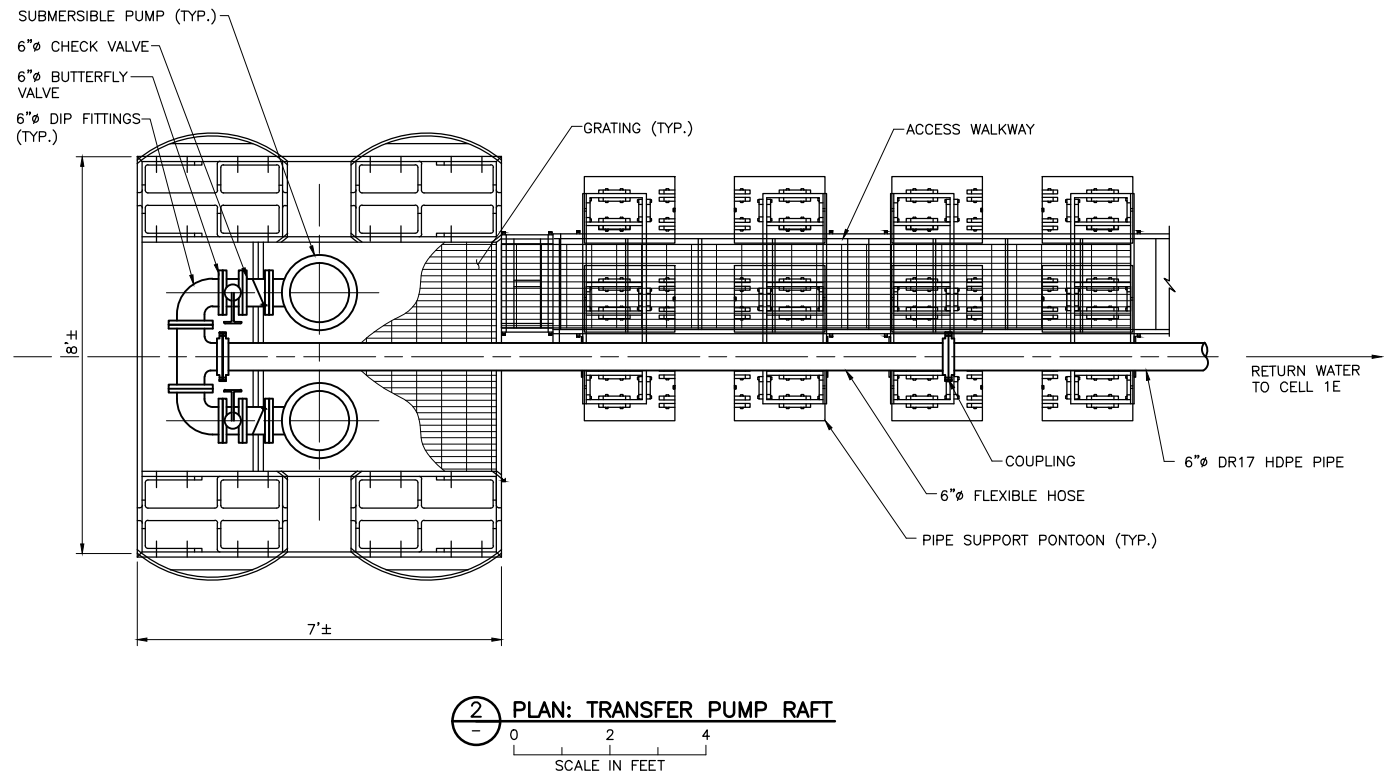
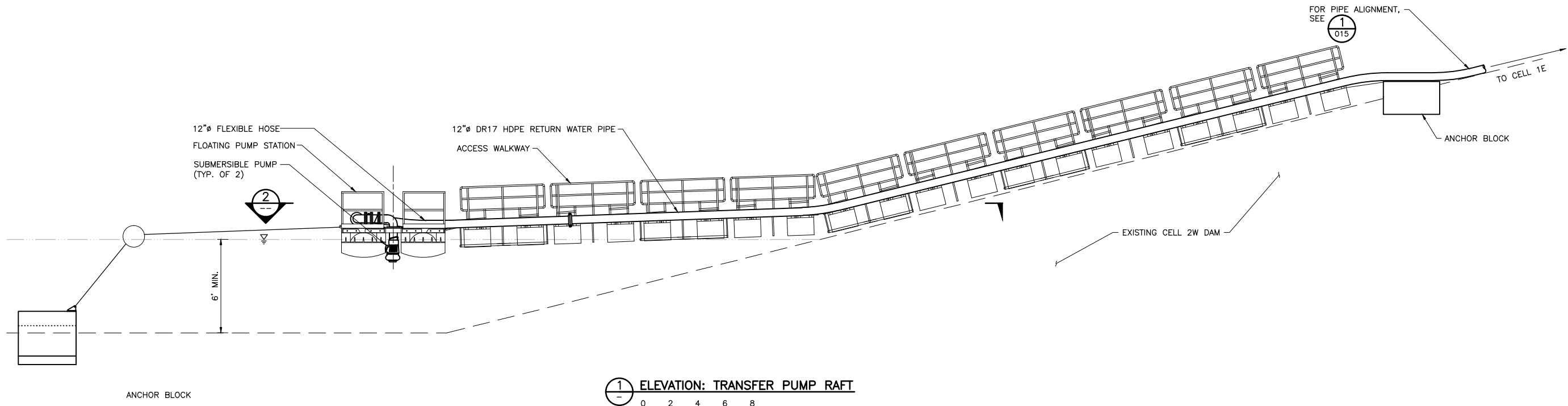
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	POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA
	BARR ENGINEERING COMPANY 4700 WEST 77TH STREET MINNEAPOLIS, MN. Ph: 1-800-632-2277
DWG. NO. FTB-021	REV

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2


1

INCHES



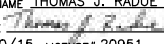
NOTES:

1. ALL PIPE SIZES SHOWN ARE PRELIMINARY.

PLANT DRAWING NUMBER:	
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	POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA
	BARR ENGINEERING COMPANY 4700 WEST 77TH STREET MINNEAPOLIS, MN. Ph: 1-800-632-2277
DRAWN: CAD	BARR PROJECT NO.: 23/69-0C29
CHECKED: TJR	
SCALE: AS SHOWN	DWG. NO. FTB-022
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VER NO	DATE	DESCRIPTION	ISSUE STATUS		
1	10/14/11	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 1 – ATTACHMENT A	ISSUED	VERSION	DATE
2	12/07/12	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 2 – ATTACHMENT A	FOR PERMITTING	6	5/20/15
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5	03/03/15	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 5 – ATTACHMENT A	FOR CONSTRUCTION	–	–
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PRINTED NAME THOMAS J. RADUE
SIGNATURE 
DATE 5/20/15 LICENSE# 20951

DRAWN:
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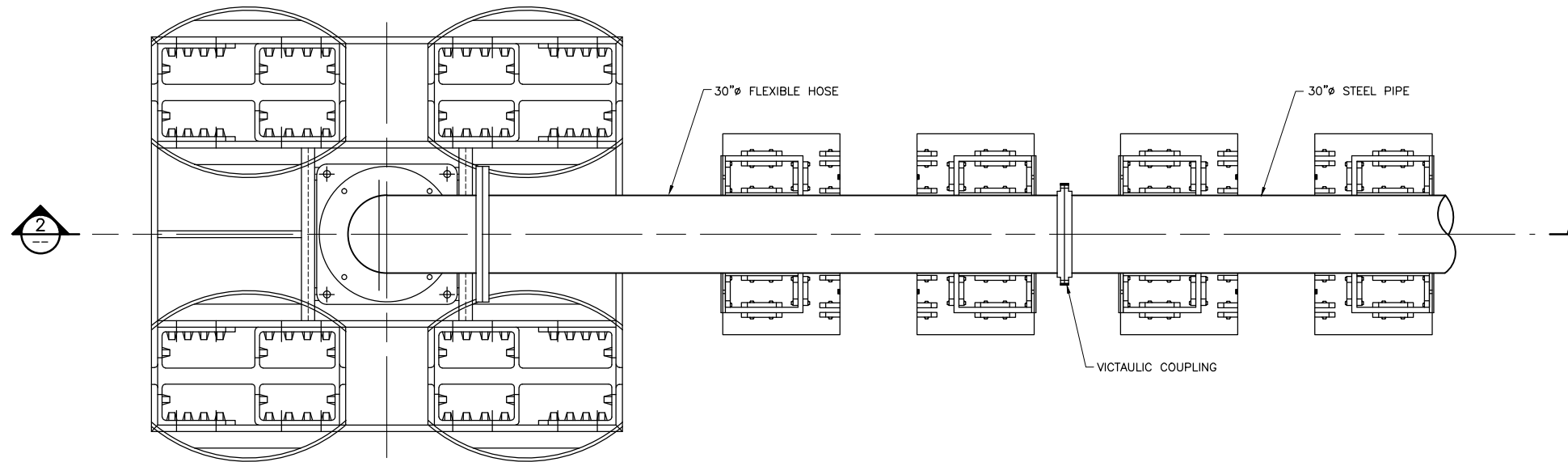
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TJR

BARR PROJECT NO.:
23/69-0C29

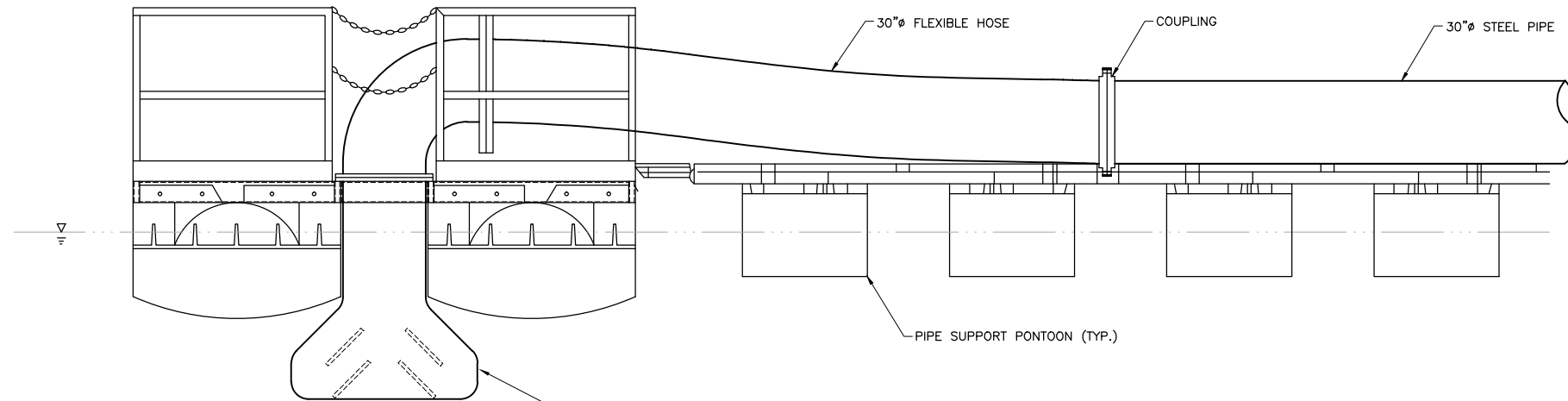
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AS SHOWN

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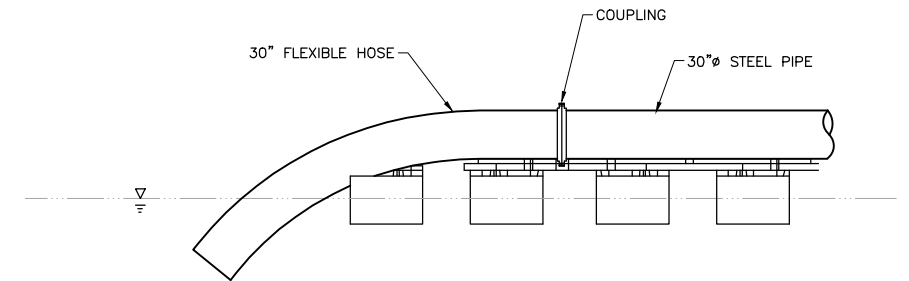
INCHES
1
2



1 PLAN: TAILINGS DISPOSAL DIFFUSER RAFT
NTS



2 ELEVATION: TAILINGS DISPOSAL DIFFUSER RAFT
NTS



3 ELEVATION: PIPE OPEN END OPTION
NTS

NOTES:



1. ALL PIPE SIZES SHOWN ARE PRELIMINARY.

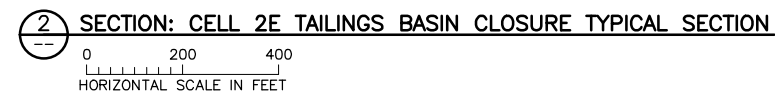
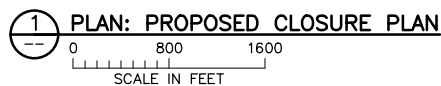
VER NO	DATE	DESCRIPTION	ISSUE STATUS		
1	10/14/11	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 1 – ATTACHMENT A	ISSUED	VERSION	DATE
2	12/07/12	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 2 – ATTACHMENT A	FOR PERMITTING	6	5/20/15
3	04/12/13	FLOTATION TAILINGS MANAGEMENT PLAN – VERSION 3 – ATTACHMENT A			
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PRINTED NAME THOMAS J. RADUE
SIGNATURE *Thomas J. Radue*
DATE 5/20/15 LICENSE# 20951

DRAWN: CAD
CHECKED: TJR
BARR PROJECT NO.: 23/69-0C29
SCALE: AS SHOWN

PLANT DRAWING NUMBER:		
FLOTATION TAILINGS BASIN TAILINGS DISPOSAL DIFFUSER RAFT		
	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.	FTB-023	REV



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PRINTED NAME THOMAS J. RADUE
SIGNATURE Thomas J. Radue
DATE 5/20/15 LICENSE# 20951

DRAWN:	CAD
CHECKED:	TJR
BARR PROJECT	23/69-0
SCALE:	AS SHOWN

PLANT DRAWING NUMBER:

FLOTATION TAILINGS BASIN CLOSURE PLAN



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.	
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FTB-024

REV

Errata Sheet

Poly Met Mining, Inc. NorthMet Project

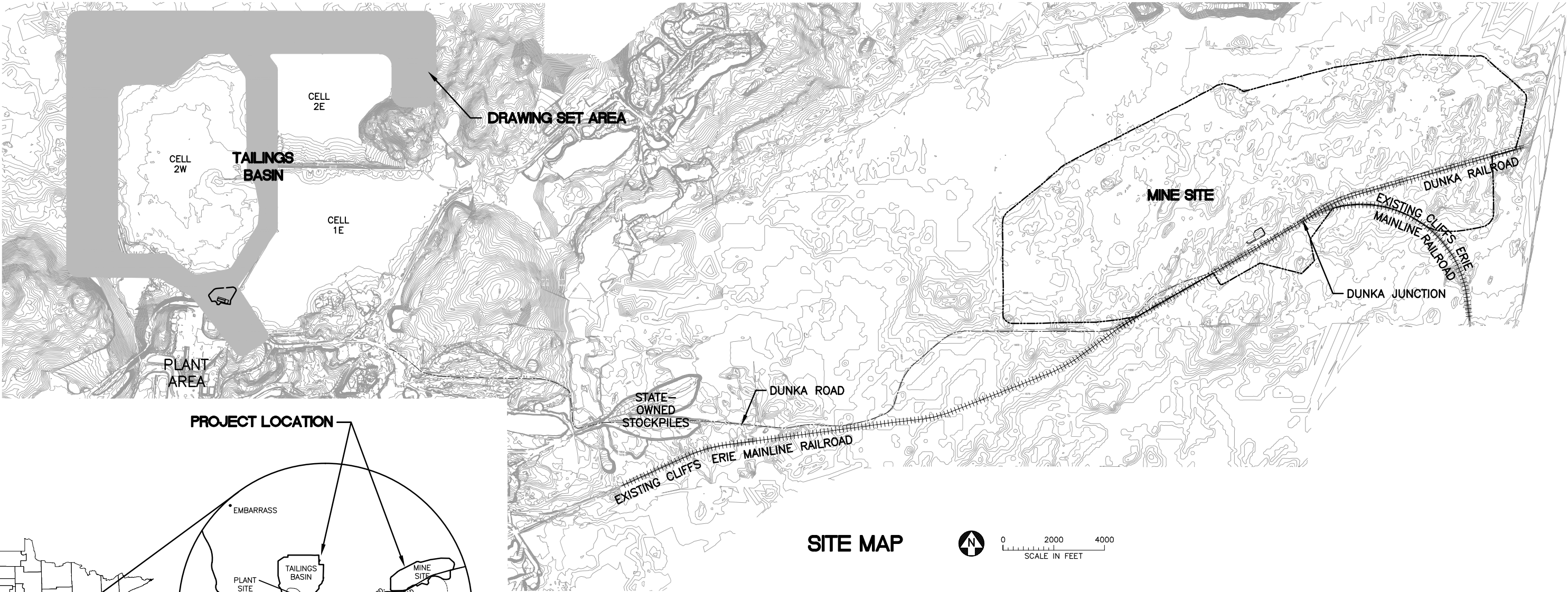
Permit Application Support Drawings: FTB Seepage Containment and Stream Augmentation Systems

July 2016 (version 2)

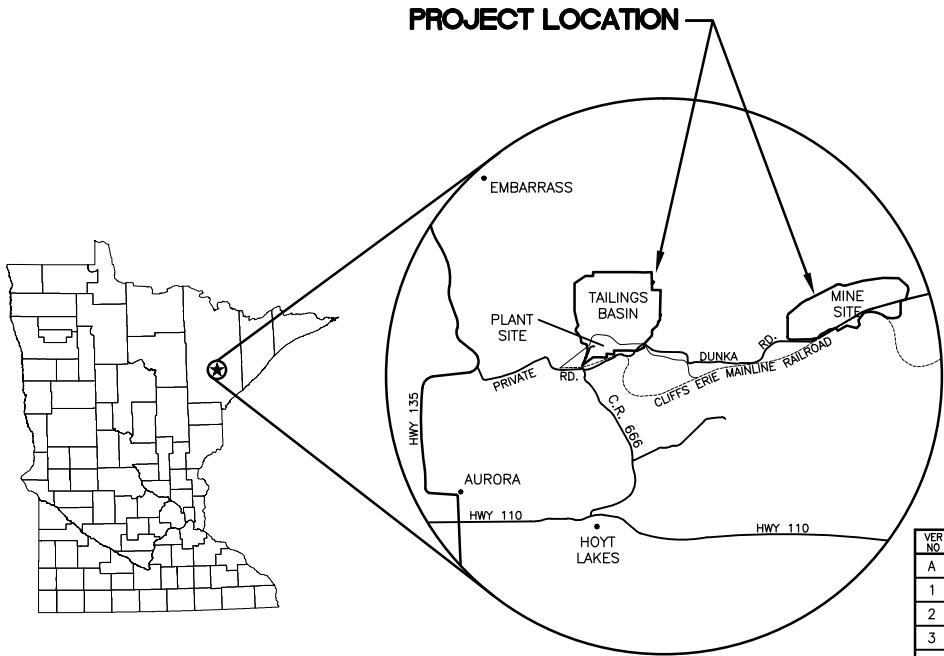
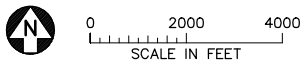
Engineering design is currently in progress. The table below lists changes that have been identified to-date and have not yet been incorporated in the attached permit application support drawings within this set. Final design will incorporate these changes along with additional site-specific information (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
FTBCA-002	A note 5 will be added to say: The term "stream augmentation" in this drawing set is synonymous with "surface water discharge"; these terms are used in the Water Appropriations Consolidated Permit Application and the NPDES/SDS Permit Application, respectively.
FTBCA-013, FTBCA-015	The cross slope on the perimeter access road surface will be revised so that it slopes entirely towards the FTB, instead of being crowned in the center.
FTBCA-013, FTBCA-015	To eliminate additional fill in wetlands, the monitoring wells located outside of the perimeter access road will be moved to within the road embankment.
FTBCA-004 through FTBCA-010	The final location and number of discharge locations to Unnamed Creek and Trimble Creek will be determined in permitting and final design.

POLY MET MINING, INC. NORTHMET PROJECT
FTB SEEPAGE CONTAINMENT
AND STREAM AUGMENTATION SYSTEMS
HOYT LAKES, MINNESOTA



SITE MAP



VER. NO.	DATE	DESCRIPTION	ISSUE STATUS		
			ISSUED	VERSION	DATE
A	09/28/12	WATER MANAGEMENT PLAN - PLANT- VERSION 2 - ATTACHEMENT B	ISSUED		
1	09/09/14	WATER MANAGEMENT PLAN - PLANT- VERSION 3 - ATTACHEMENT B	FOR PERMITTING	3	5/28/15
2	12/31/14	WATER MANAGEMENT PLAN - PLANT- VERSION 3,4 - ATTACHEMENT B			
3	5/28/15	ISSUED FOR INCLUSION IN PERMIT APPLICATIONS			
			FOR CONSTRUCTION	-	-
			NOT APPROVED FOR CONSTRUCTION.		

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PRINTED NAME THOMAS J. RADUE
SIGNATURE Thomas J. Radue
DATE 5/28/15 LICENSE# 20951

DRAWN: BDP
CHECKED: DVS/AMP
BARR PROJECT NO.: 23/69-0C29
SCALE: AS SHOWN

PLANT DRAWING NUMBER:

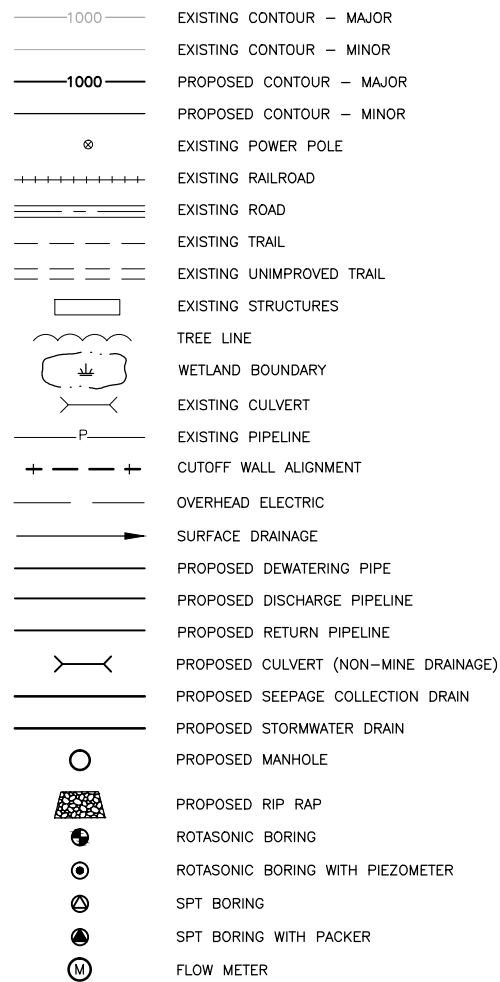
FTB SEEPAGE CONTAINMENT
AND STREAM AUGMENTATION SYSTEMS
LOCATION MAP AND SITE MAP

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. FTBCA-001 REV

GENERAL LEGEND



ABBREVIATIONS

APPROX.	—	APPROXIMATE
CDSM	—	CEMENT DEEP SOIL MIX
CMP	—	CORRUGATED METAL PIPE
CPEP	—	CORRUGATED POLYETHYLENE PIPE
CY	—	CUBIC YARD
DR	—	DIMENSION RATIO
DWG	—	DRAWING
EL.	—	ELEVATION
ø	—	DIAMETER
FTB	—	FLOTATION TAILINGS BASIN
GCL	—	GEOSYNTHETIC CLAY LINER
HDPE	—	HIGH DENSITY POLYETHYLENE
HRF	—	HYDROMETALLURGICAL RESIDUE FACILITY
LDPE	—	LOW DENSITY POLYETHYLENE
LF	—	LINER FEET
LTVSMC	—	LTV STEEL MINING COMPANY
MCY	—	MILLION CUBIC YARDS
mil	—	one thousandth of an inch
MIN	—	MINIMUM
MSL	—	MEAN SEA LEVEL
NTS	—	NOT TO SCALE
SCH.	—	SCHEDULE
DR	—	DIMENSION RATIO
TYP	—	TYPICAL
N-MH-XX	—	NORTH SECTION MANHOLE
NW-MH-XX	—	NORTHWEST SECTION MANHOLE
W-MH-XX	—	WEST SECTION MANHOLE
N-MH/PS-XX	—	NORTH SECTION MANHOLE/PUMP STATION
NW-MH/PS-XX	—	NORTHWEST SECTION MANHOLE
W-MH/PS-XX	—	WEST SECTION MANHOLE/PUMP STATION

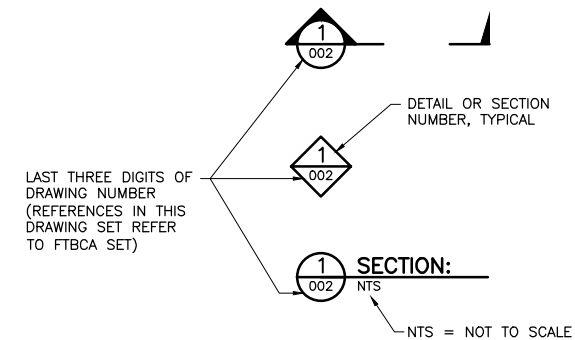
SHEET INDEX

<u>SHEET NO.</u>	<u>TITLE</u>
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GENERAL DRAWINGS



FTBCA-001	LOCATION MAP AND SITE MAP
FTBCA-002	LEGEND AND SHEET INDEX
FTBCA-003	PLAN SHEET LAYOUT
FTBCA-004	PLAN AND PROFILE— STATION 0+00 TO STATION 30+94
FTBCA-005	PLAN AND PROFILE— STATION 30+94 TO STATION 61+88
FTBCA-006	PLAN AND PROFILE— STATION 61+88 TO STATION 92+82
FTBCA-007	PLAN AND PROFILE— STATION 92+82 TO STATION 123+76
FTBCA-008	PLAN AND PROFILE— STATION 123+76 TO STATION 154+70
FTBCA-009	PLAN AND PROFILE— STATION 154+70 TO STATION 185+64
FTBCA-010	PLAN AND PROFILE— STATION 185+64 TO STATION 216+58
FTBCA-011	PLAN AND PROFILE— STATION 216+58 TO STATION 240+17
FTBCA-012	EAST SECTION PLAN & PROFILE STATION 0+00 TO STATION 25+43
FTBCA-013	DETAILS
FTBCA-014	DETAILS
FTBCA-015	DETAILS

DRAWING NUMBERING



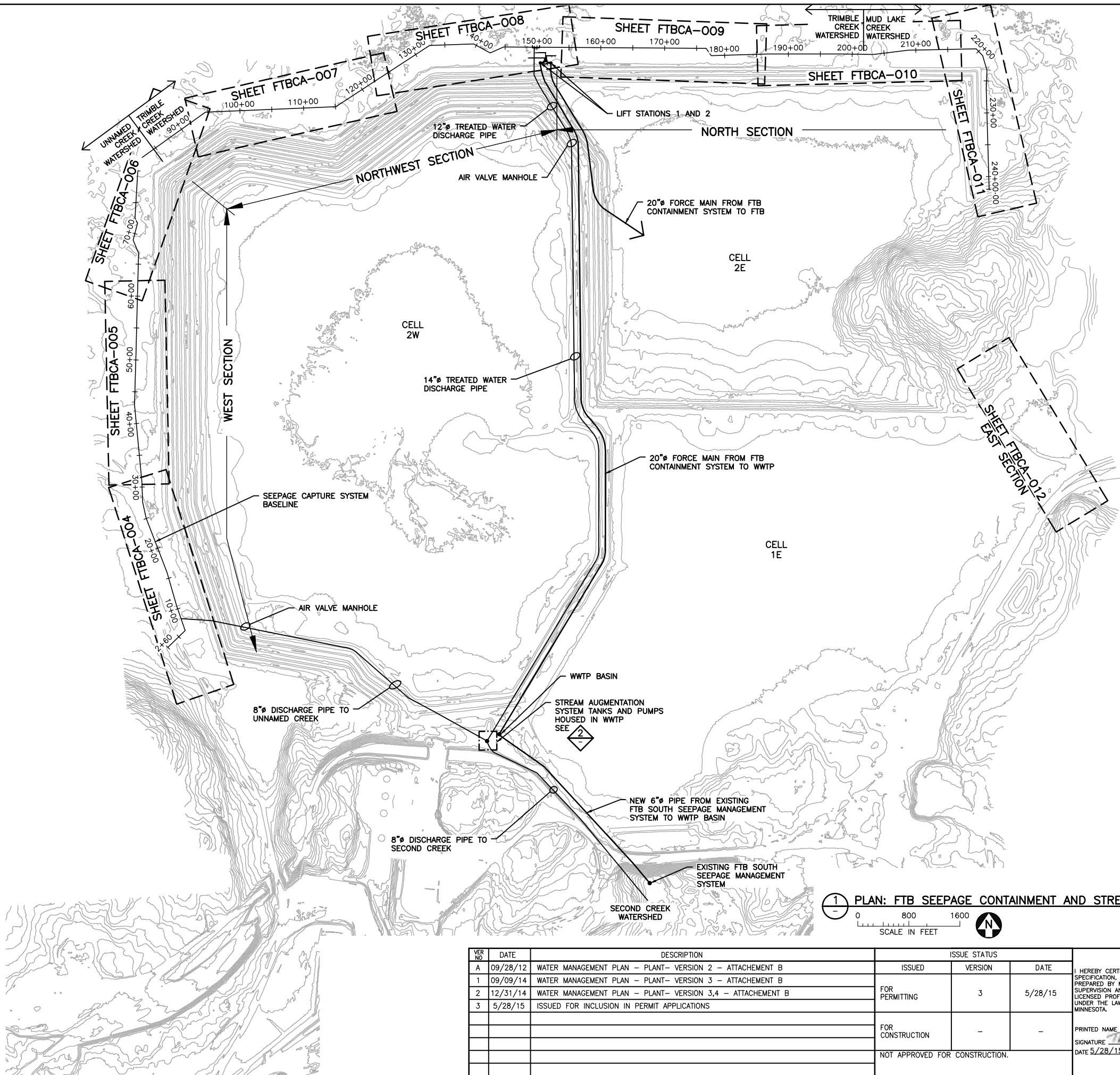
NOTES

1. COORDINATE SYSTEM IS MINNESOTA STATE PLANE NORTH ZONE, NAD83.
2. ELEVATIONS ARE MEAN SEA LEVEL (MSL), NAVD88.
3. EXISTING TOPOGRAPHIC INFORMATION SHOWN ON THE DRAWINGS WAS PREPARED BY AEROMETRIC, INC. FROM LIDAR DATA COLLECTED ON MARCH 17, 2010.
4. EXISTING TOPOGRAPHIC INFORMATION WAS UPDATED FOR AREAS SOUTH EAST OF COAL ASH LANDFILL AND EAST OF OUTCROP BETWEEN CELLS 1E AND 2E USING CONTOURS FROM DATA COLLECTED IN 1999.

VER NO		DATE	DESCRIPTION	ISSUE STATUS			<p>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.</p> <p>PRINTED NAME <u>THOMAS J. RADUE</u></p> <p>SIGNATURE <u>Thomas J. Radue</u></p> <p>DATE <u>5/28/15</u> LICENSE# <u>20951</u></p>	LEGEND AND SHEET INDEX			
A	09/28/12	WATER MANAGEMENT PLAN – PLANT– VERSION 2 – ATTACHEMENT B		ISSUED	VERSION	DATE		<p>DRAWN:</p> <p>BDP</p> <p>CHECKED:</p> <p>DVS/AMP</p> <p>BARR PROJECT NO.:</p> <p>23/69–0C29</p> <p>SCALE:</p> <p>AS SHOWN</p>	<p> POLY MET MINING, INC.</p> <p>NORTHMET PROJECT</p> <p>HOYT LAKES, MINNESOTA</p> <p> BARR ENGINEERING COMPANY</p> <p>4700 WEST 77TH STREET</p> <p>MINNEAPOLIS, MN.</p> <p>Ph: 1–800–632–2277</p>	DWG. NO.	REV
1	09/09/14	WATER MANAGEMENT PLAN – PLANT– VERSION 3 – ATTACHEMENT B	FOR PERMITTING	3	5/28/15	FTBCA-002					
2	12/31/14	WATER MANAGEMENT PLAN – PLANT– VERSION 3,4 – ATTACHEMENT B									
3	5/28/15	ISSUED FOR INCLUSION IN PERMIT APPLICATIONS	FOR CONSTRUCTION	–	–						
			NOT APPROVED FOR CONSTRUCTION.								

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2
1
INCHES



2 **DETAIL: CONCEPTUAL STREAM AUGMENTATION SYSTEM SUPPLY**
NOT TO SCALE

NOTES



1. SEEPAGE CAPTURE SYSTEMS INCLUDE THE FTB CONTAINMENT SYSTEM ALONG THE WEST, NORTH AND EAST SIDES OF THE FTB, THE SOUTH SEEPAGE MANAGEMENT SYSTEM ON THE SOUTH SIDE OF THE FTB AND CONVEYANCE TO THE WWTP EQUALIZATION BASIN.
2. STREAM AUGMENTATION SYSTEM INCLUDES TREATED WATER CONVEYANCE AND DISCHARGE TO UNNAMED CREEK, TRIMBLE CREEK, AND SECOND CREEK WATERSHEDS.
3. FTB SEEPAGE CONTAINMENT AND STREAM AUGMENTATION SYSTEMS DESIGN REFERENCE BASELINE SHOWN ON THIS SHEET. SEE SUBSEQUENT SHEETS FOR PROPOSED LAYOUT OF SYSTEMS ALONG BASELINE.

1 **PLAN: FTB SEEPAGE CONTAINMENT AND STREAM AUGMENTATION LAYOUT**
0 800 1600
SCALE IN FEET

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			NOT APPROVED FOR CONSTRUCTION.		

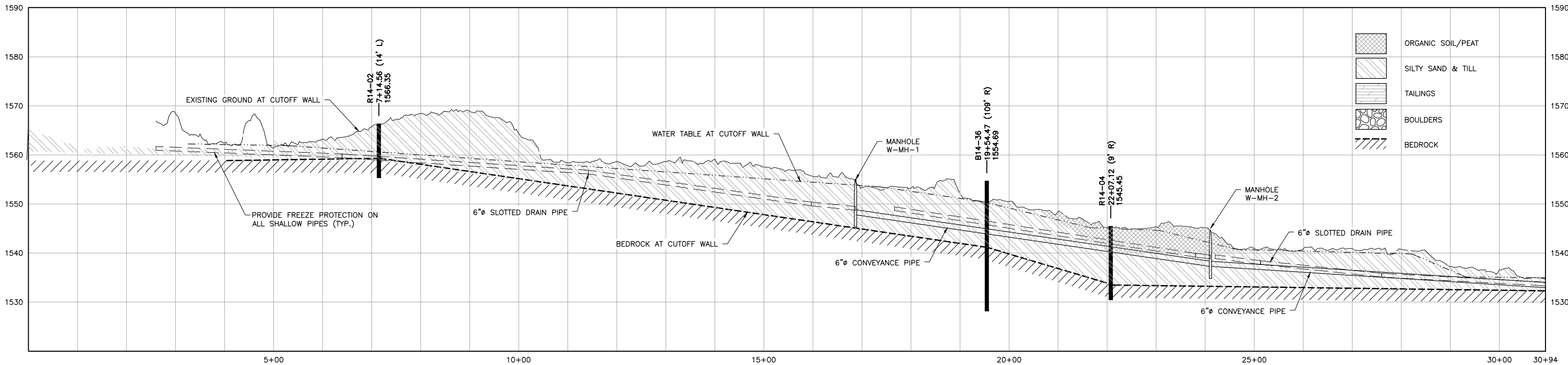
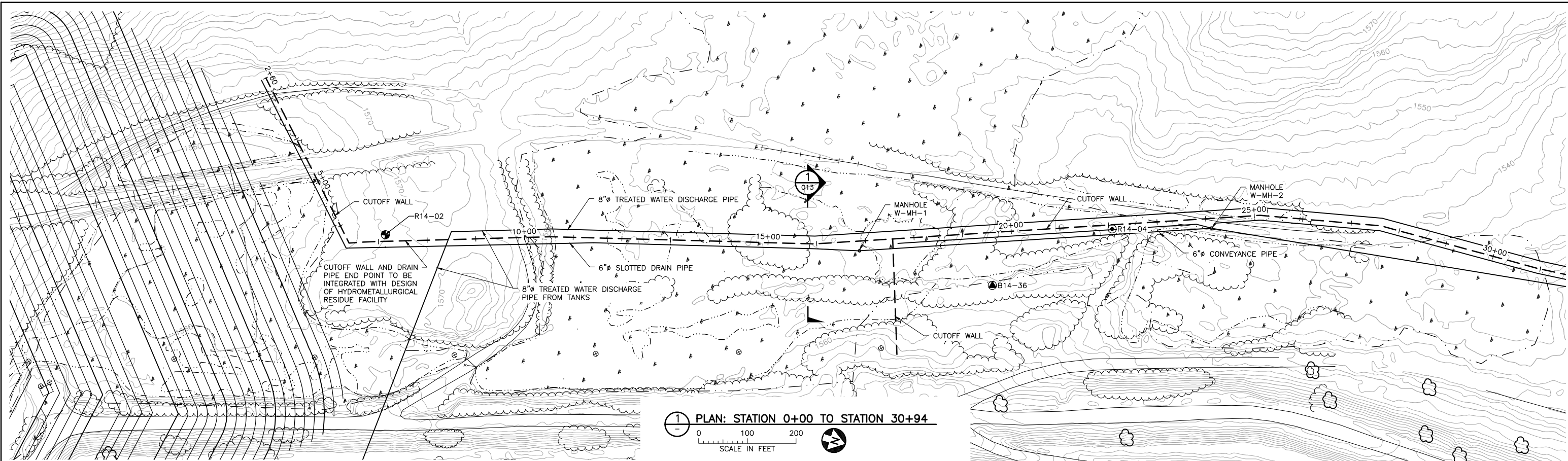
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DRAWN:	BDP
CHECKED:	DVS
BARR PROJECT NO.:	23/69-0C29
SCALE:	AS SHOWN

PLANT DRAWING NUMBER:	
FTB SEEPAGE CONTAINMENT AND STREAM AUGMENTATION SYSTEMS PLAN SHEET LAYOUT	
 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.	FTBCA-003
REV	

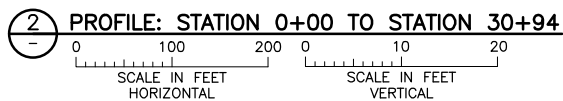
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2
1
INCHES



NOTES:

1. HORIZONTAL LOCATION OF FORCE MAIN, SEEPAGE CONVEYANCE PIPES AND STREAM AUGMENTATION PIPES/DISCHARGE POINTS ON THIS SHEET AND SUBSEQUENT SHEETS SHOWN FOR CLARITY. ACTUAL LOCATION TO BE DETERMINED DURING FINAL DESIGN.
2. MANHOLE LOCATIONS ON THIS SHEET AND SUBSEQUENT SHEETS ARE PRELIMINARY.
3. ACCESS ROAD NOT SHOWN ON THIS SHEET AND SUBSEQUENT SHEETS.
4. TREATED WATER DISCHARGE PIPES NOT SHOWN IN PROFILE ON THIS SHEET AND SUBSEQUENT SHEETS.
5. WATER TABLE ELEVATIONS ARE ESTIMATED BASED ON PIEZOMETERS, BORING LOGS, SOIL TYPES AND AERIAL PHOTOGRAPHY.
6. GROUND SURFACE ELEVATIONS ARE BASED ON 2010 LIDAR DATA (NAVD88). BORING ELEVATIONS SHOWN ARE BASED ON 2010 LIDAR DATA (NAVD88) ADJUSTED AFTER GEOTECHNICAL EXPLORATION (03-11-2014 THRU 05-20-2014). STRATIGRAPHY AND WATER TABLES ARE BASED ON THE 2014 FIELD INVESTIGATION LOGS.
7. BORING LOCATION OFFSETS FROM PROPOSED CUTOFF WALL ALIGNMENT ARE SHOWN. SUBSURFACE CONDITIONS ON WALL ALIGNMENT WILL DIFFER FROM THOSE SHOWN.
8. AREAS OF COBBLES AND BOULDERS BETWEEN BORING LOCATIONS AND ADJACENT BORING LOCATIONS SHOULD BE ASSUMED TO EXIST.



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

PLANT DRAWING NUMBER:

FTB SEEPAGE CONTAINMENT
AND STREAM AUGMENTATION SYSTEMS
PLAN & PROFILE STATION 0+00 TO 30+94

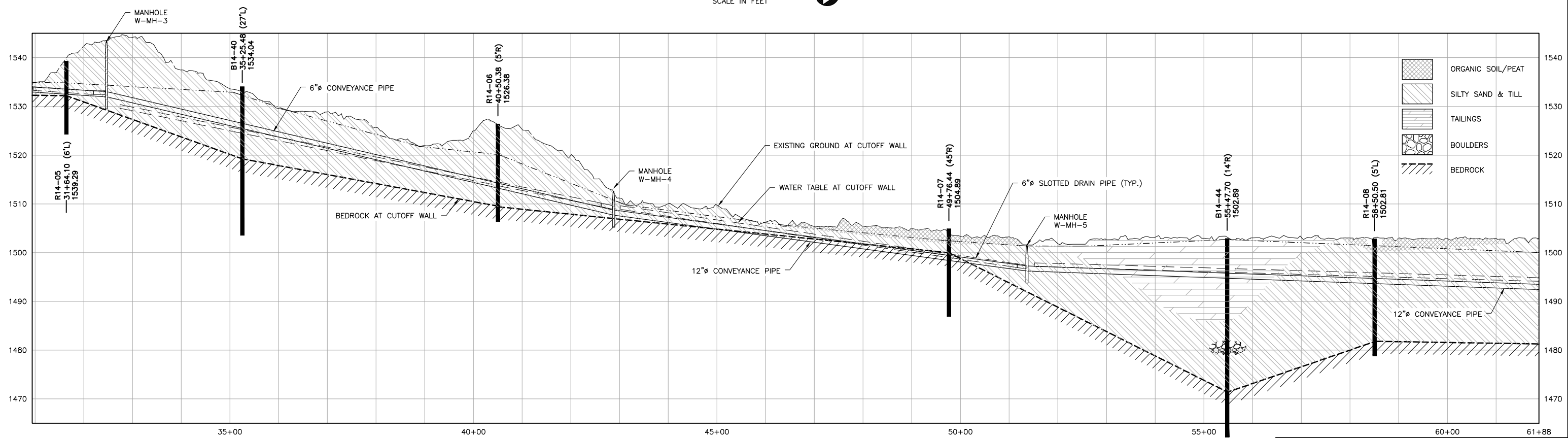
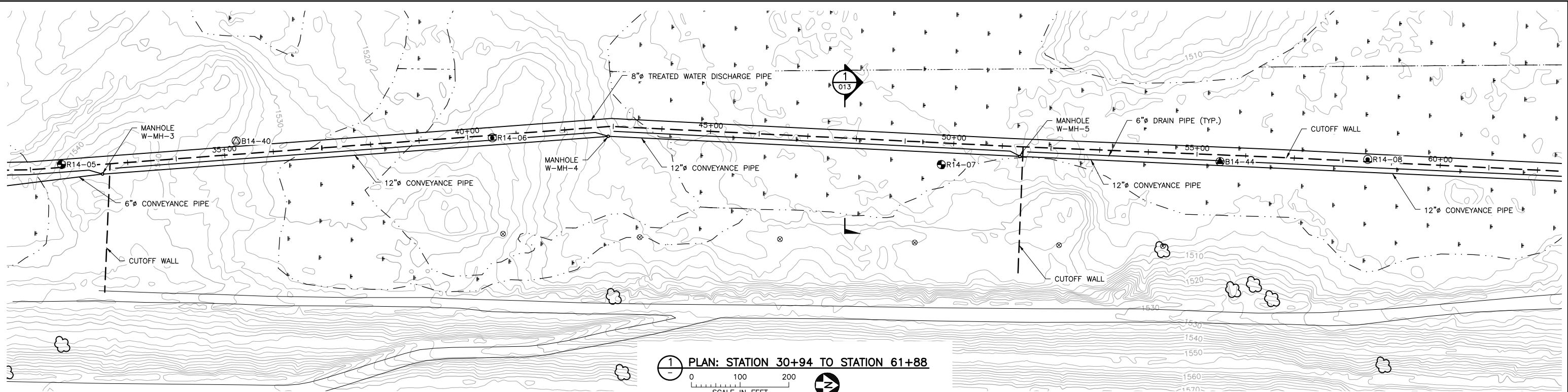
POLYMET MINING POLY MET MINING, INC.
NORTHMET PROJECT
HOYT LAKES, MINNESOTA

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

DWG. NO. FTBCA-004 REV

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INCHES
1
2



2 PROFILE: STATION 30+94 TO STATION 61+88

VER NO.	DATE	DESCRIPTION	ISSUE STATUS		
A	09/28/12	WATER MANAGEMENT PLAN - PLANT- VERSION 2 - ATTACHEMENT B	ISSUED	VERSION	DATE
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BARR PROJECT NO.: 23/69-OC29
SCALE: AS SHOWN

PLANT DRAWING NUMBER:

FTB SEEPAGE CONTAINMENT
AND STREAM AUGMENTATION SYSTEMS
PLAN & PROFILE STATION 30+94 TO 61+88

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

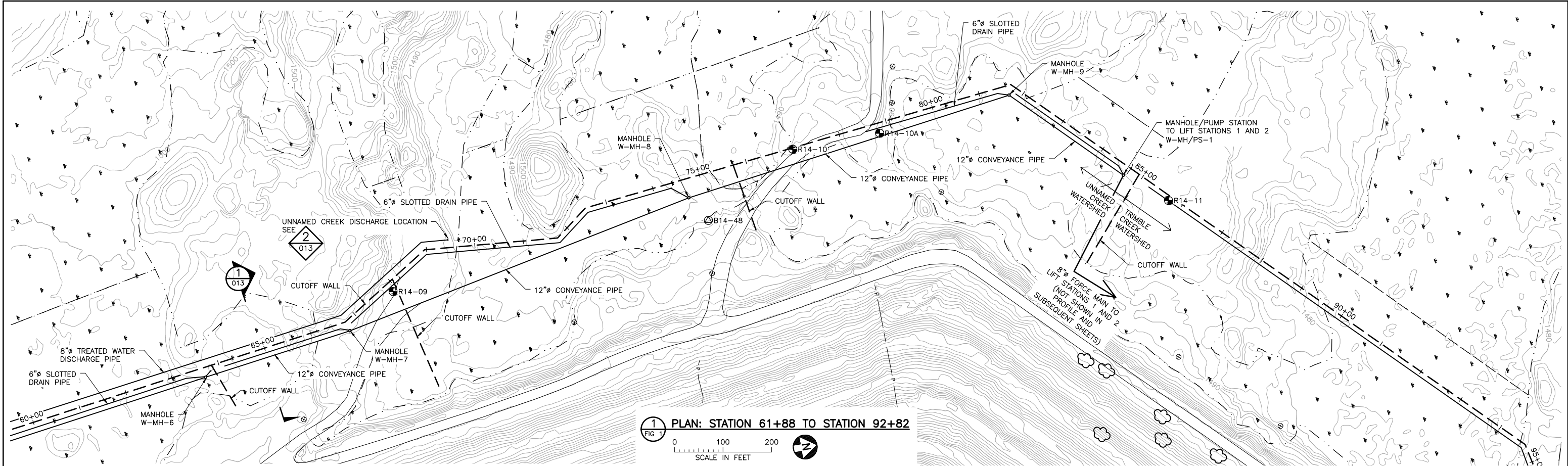
BARR BARR ENGINEERING COMPANY
4700 WEST 77TH STREET
MINNEAPOLIS, MN.
Ph: 1-800-632-2277

DWG. NO. FTBCA-005

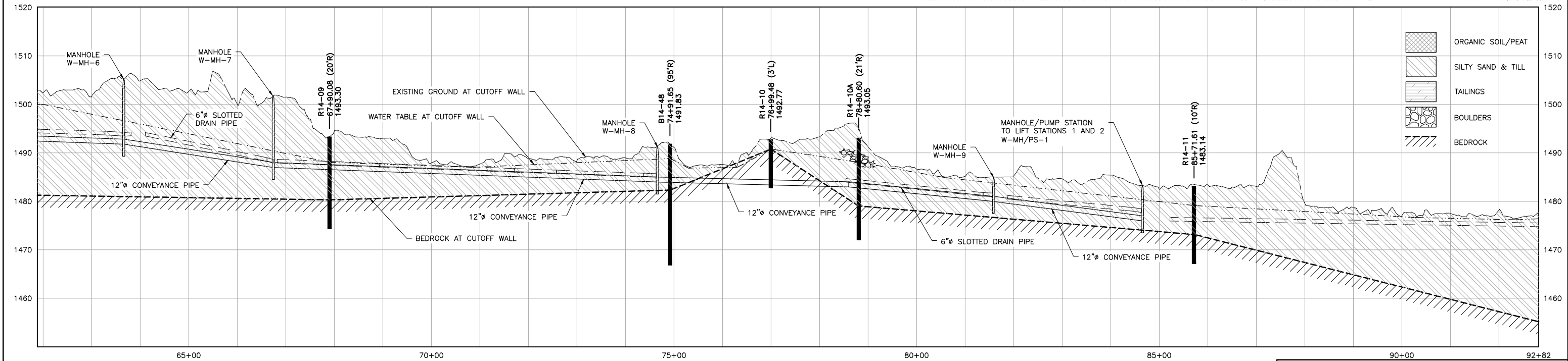
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INCHES
1
2



1
FIG 1
PLAN: STATION 61+88 TO STATION 92+82
0 100 200
SCALE IN FEET



2
-
PROFILE: STATION 61+88 TO STATION 92+82
0 100 200 0 10 20
SCALE IN FEET
HORIZONTAL VERTICAL

PLANT DRAWING NUMBER:

FTB SEEPAGE CONTAINMENT
AND STREAM AUGMENTATION SYSTEMS
PLAN & PROFILE STATION 61+88 TO 92+82

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. FTBCA-006

REV

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A	09/28/12	WATER MANAGEMENT PLAN – PLANT– VERSION 2 – ATTACHEMENT B	ISSUED	VERSION	DATE
1	09/09/14	WATER MANAGEMENT PLAN – PLANT– VERSION 3 – ATTACHEMENT B	FOR PERMITTING	3	5/28/15
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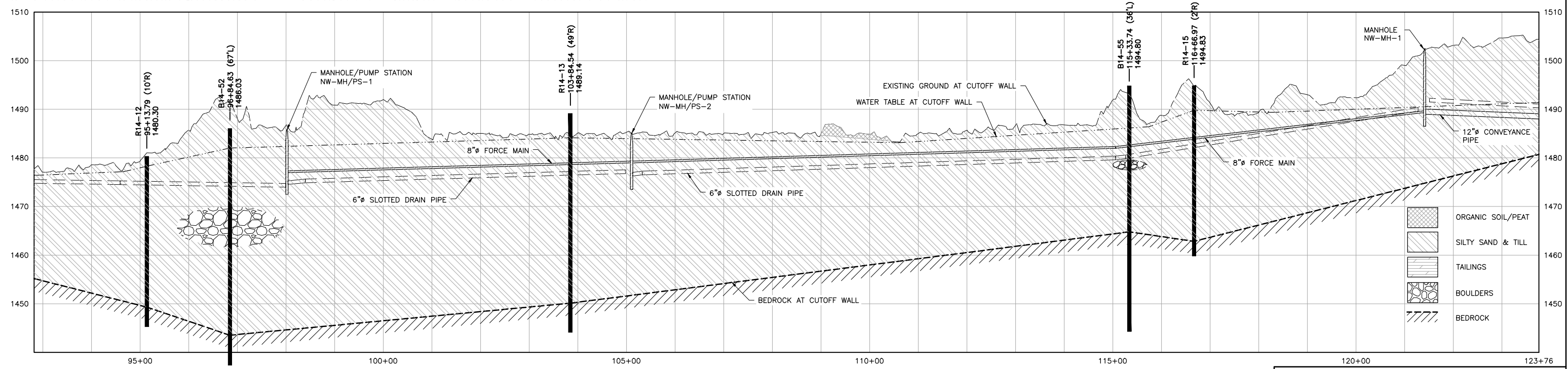
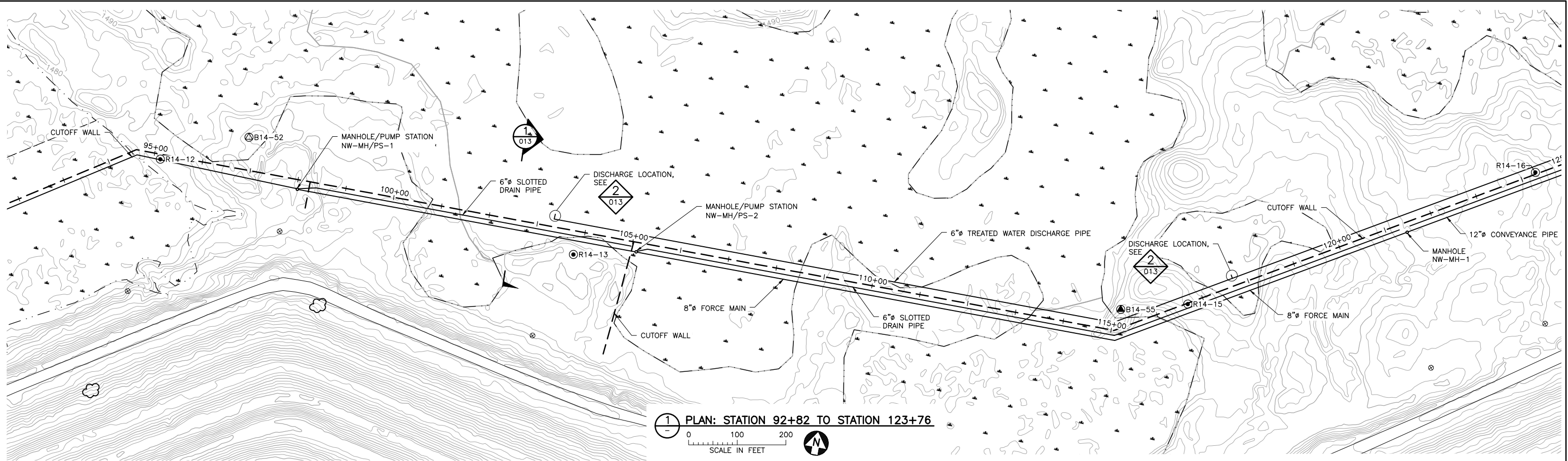
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CHECKED: DVS/AMP
BARR PROJECT NO.: 23/69-OC29
SCALE: AS SHOWN

CADD USER: Adeptuser FILE: \\PWEDINA\\EDINA PW\\EDINA PW\\IN\\186350E6-BF78-4ADD-A31A-2092BF3D0C7C\\04B075AA-6E82-47F7-8E76-9FA216AE348\\PERMIT_NMT-10-CU-007.DWG PLOT SCALE: 1:2 PLOT DATE: 6/9/2015 5:02 PM

INCHES
1
2



2 PROFILE: STATION 92+82 TO STATION 123+76
0 100 200 0 10 20
SCALE IN FEET HORIZONTAL SCALE IN FEET VERTICAL

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			ISSUED	VERSION	DATE							
A	09/28/12	WATER MANAGEMENT PLAN - PLANT- VERSION 2 - ATTACHEMENT B	FOR PERMITTING	3	5/28/15	PRINTED NAME THOMAS J. RADUE SIGNATURE <i>Thomas J. Radue</i> DATE 5/28/15 LICENSE# 20951						
1	09/09/14	WATER MANAGEMENT PLAN - PLANT- VERSION 3 - ATTACHEMENT B										
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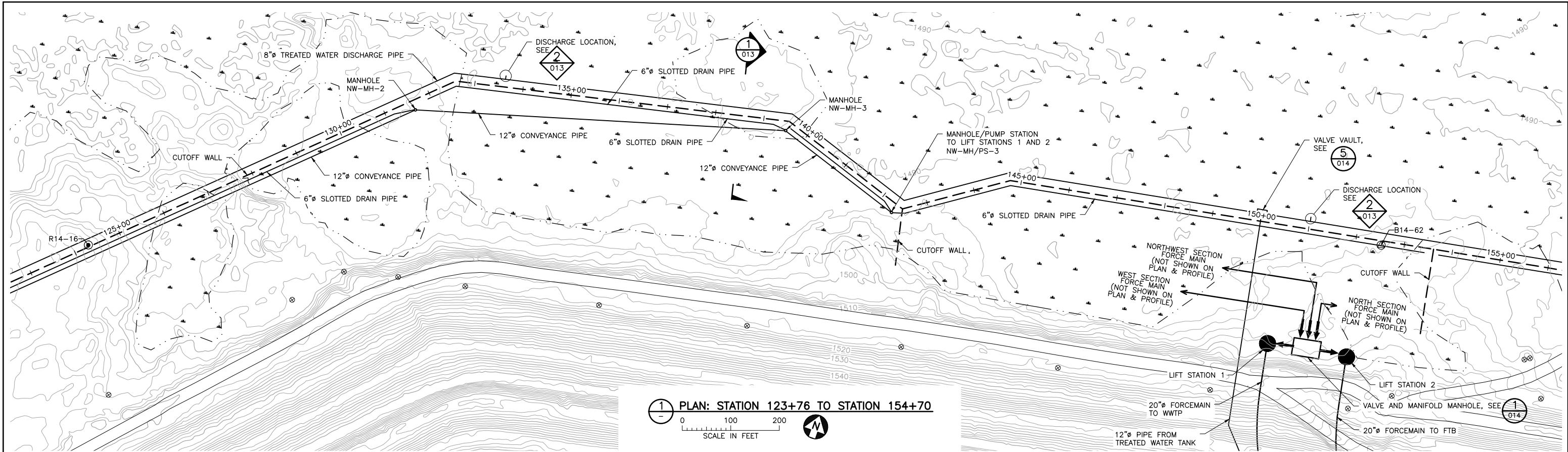
FTB SEEPAGE CONTAINMENT
AND STREAM AUGMENTATION SYSTEMS
PLAN & PROFILE STATION 92+82 TO 123+76

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

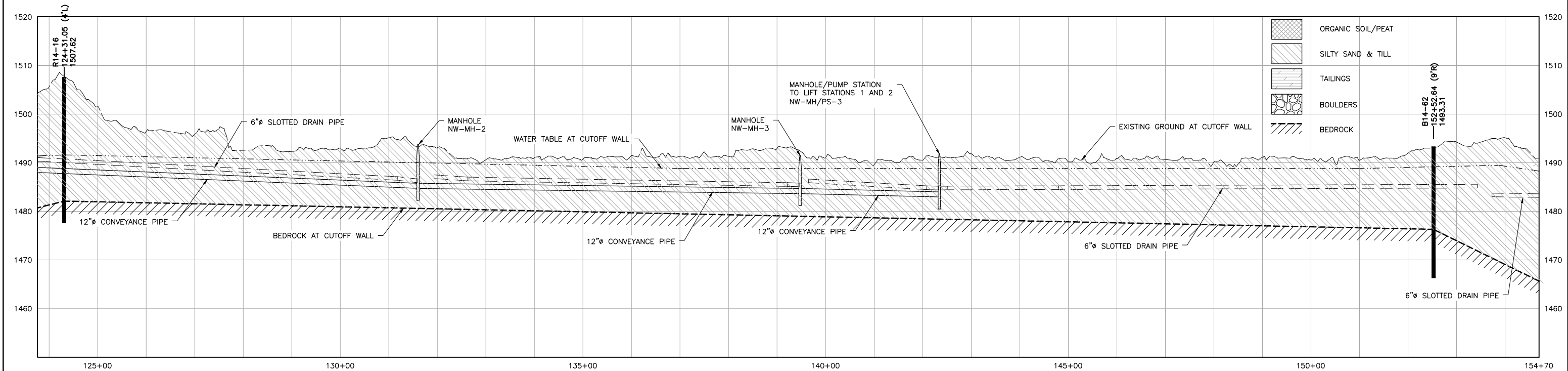
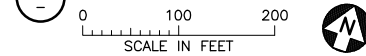
BARR
BARR ENGINEERING COMPANY
4700 WEST 77TH STREET
MINNEAPOLIS, MN.
Ph: 1-800-632-2277

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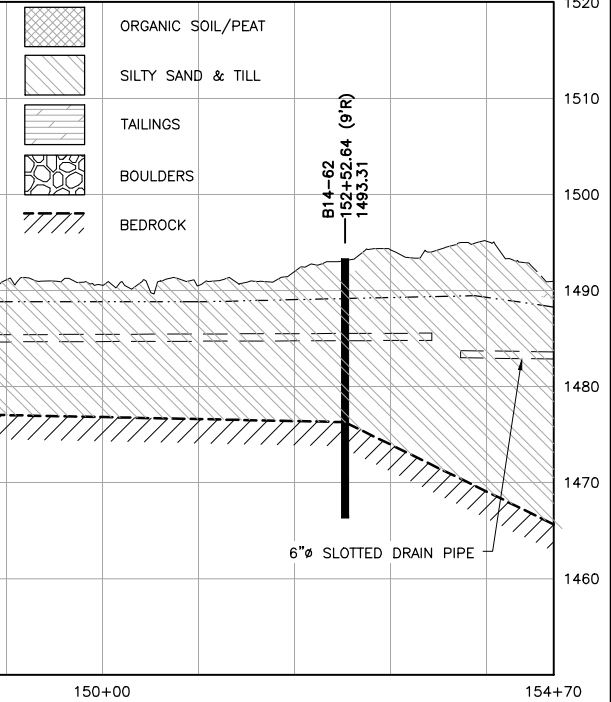
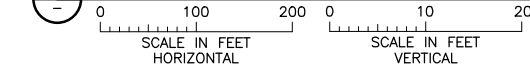
INCHES
1
2



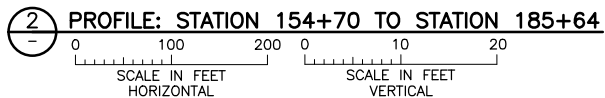
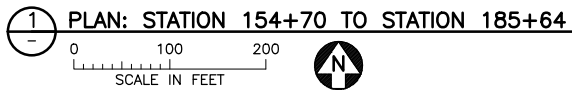
1 PLAN: STATION 123+76 TO STATION 154+70





2 PROFILE: STATION 123+76 TO STATION 154+70



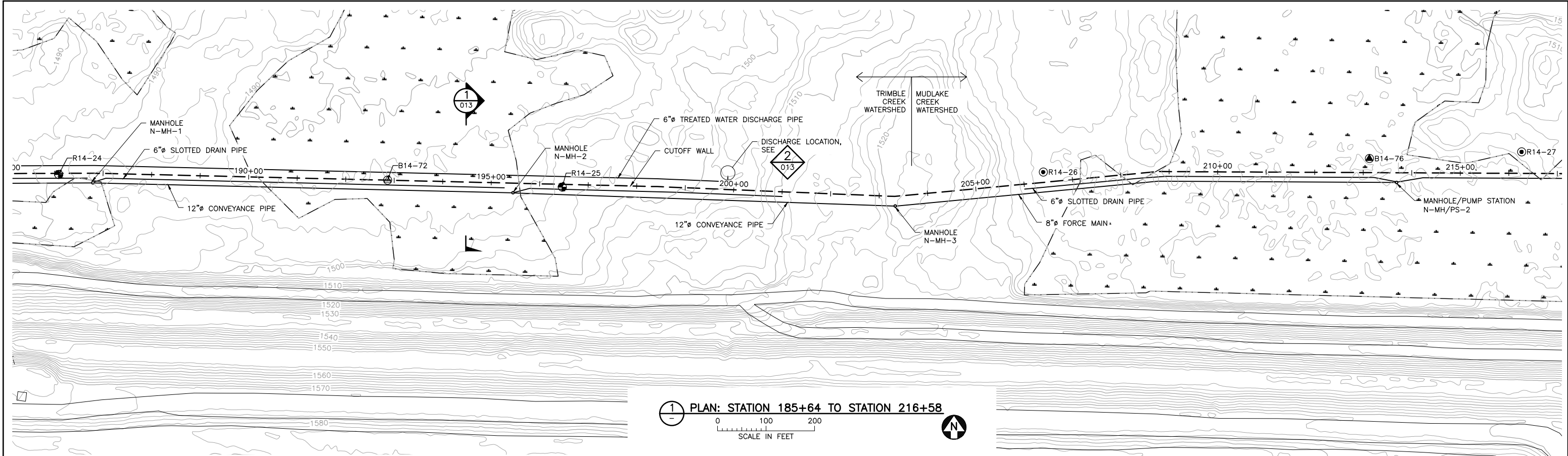
VER NO.	DATE	DESCRIPTION	ISSUE STATUS			I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA. PRINTED NAME THOMAS J. RADUE SIGNATURE <i>Thomas J. Radue</i> DATE 5/28/15 LICENSE# 20951	DRAWN:	POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA BARR ENGINEERING COMPANY 4700 WEST 77TH STREET MINNEAPOLIS, MN. Ph: 1-800-632-2277	
A	09/28/12	WATER MANAGEMENT PLAN - PLANT- VERSION 2 - ATTACHEMENT B	ISSUED	VERSION	DATE		BJH		
1	09/09/14	WATER MANAGEMENT PLAN - PLANT- VERSION 3 - ATTACHEMENT B	FOR PERMITTING	3	5/28/15		CHECKED:		
2	12/31/14	WATER MANAGEMENT PLAN - PLANT- VERSION 3,4 - ATTACHEMENT B	FOR CONSTRUCTION	-	-		BARR PROJECT NO:		
3	5/28/15	ISSUED FOR INCLUSION IN PERMIT APPLICATIONS	NOT APPROVED FOR CONSTRUCTION.	-	-		23/69-OC29		
							SCALE:	DWG. NO.	REV
							AS SHOWN	FTBCA-008	



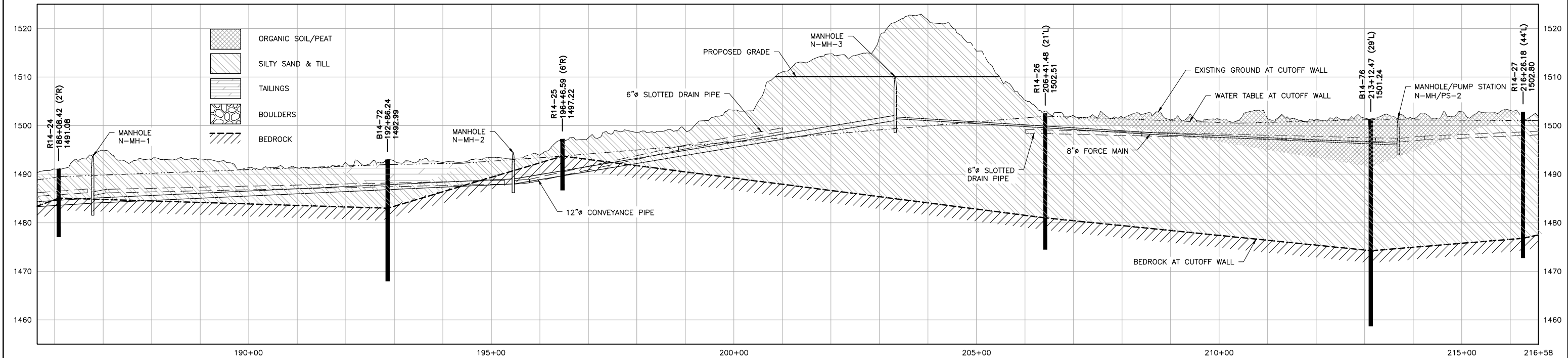
VER NO	DATE	DESCRIPTION	ISSUE STATUS			<p>I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.</p> <p>PRINTED NAME <u>THOMAS J. RADUE</u> SIGNATURE <u><i>Thomas J. Radue</i></u> DATE <u>5/28/15</u> LICENSE # <u>20951</u></p>	DRAWN: BJH		<p> POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA</p> <p> BARR ENGINEERING COMPANY 4700 WEST 77TH STREET MINNEAPOLIS, MN. Ph: 1-800-632-2277</p>	DWG. NO. FTBCA-009	REV
A	09/28/12	WATER MANAGEMENT PLAN - PLANT- VERSION 2 - ATTACHEMENT B	ISSUED	VERSION	DATE		CHECKED: DVS/AMP				
1	09/09/14	WATER MANAGEMENT PLAN - PLANT- VERSION 3 - ATTACHEMENT B	FOR PERMITTING	3	5/28/15		BARR PROJECT NO.: 23/69-OC29				
2	12/31/14	WATER MANAGEMENT PLAN - PLANT- VERSION 3,4 - ATTACHEMENT B									
3	5/28/15	ISSUED FOR INCLUSION IN PERMIT APPLICATIONS									
			FOR CONSTRUCTION	-	-						
			NOT APPROVED FOR CONSTRUCTION.			SCALE: AS SHOWN					

CADD USER: AdeptUser FILE: \\PVEDINA\\EDINA PW\\EDINA PW\\186350E6-BF78-4ADD-A31A-2092BF300C7C\\EBDD1DD-FBD4-4AB0-A7AA-7F86201DBD7D\\PERMIT\\NMT-10-CU-01.DWG PLOT SCALE: 1:2 PLOT DATE: 6/8/2015 5:12 PM

INCHES
1
2



1 PLAN: STATION 185+64 TO STATION 216+58
0 100 200
SCALE IN FEET



2 PROFILE: STATION 185+64 TO STATION 216+58
0 100 200 0 10 20
SCALE IN FEET
HORIZONTAL VERTICAL

PLANT DRAWING NUMBER:

FTB SEEPAGE CONTAINMENT
AND STREAM AUGMENTATION SYSTEMS
PLAN & PROFILE STATION 185+64 TO 216+58

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. FTBCA-010
REV

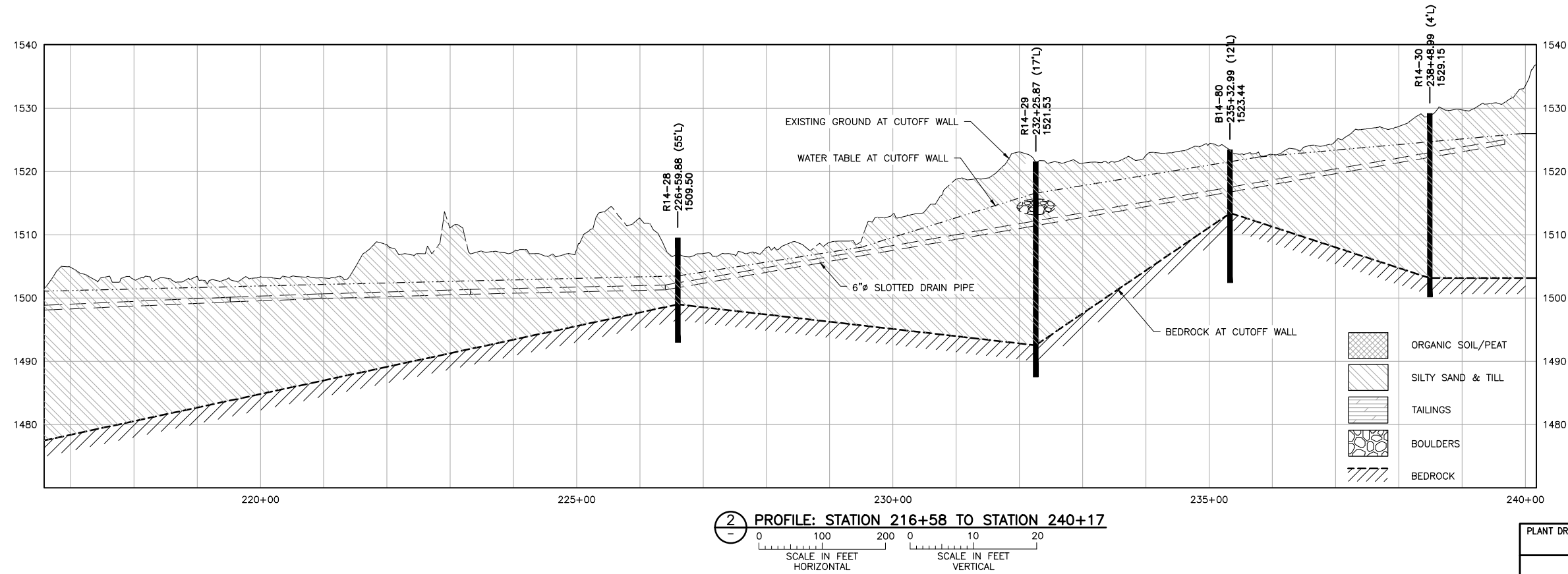
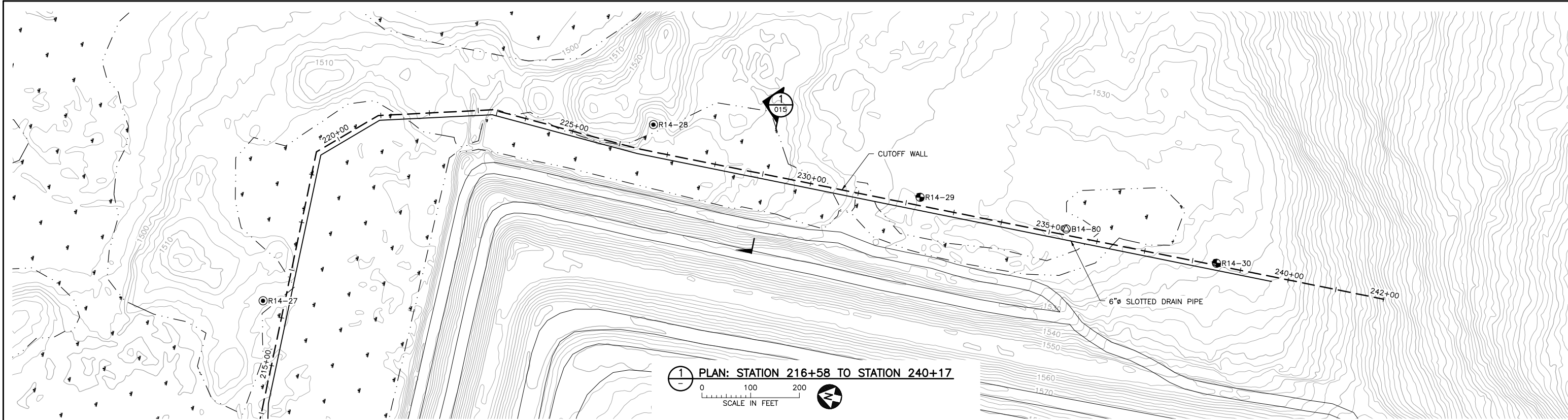
VER NO	DATE	DESCRIPTION	ISSUE STATUS		
A	09/28/12	WATER MANAGEMENT PLAN – PLANT– VERSION 2 – ATTACHEMENT B	ISSUED	VERSION	DATE
1	09/09/14	WATER MANAGEMENT PLAN – PLANT– VERSION 3 – ATTACHEMENT B	FOR PERMITTING	3	5/28/15
2	12/31/14	WATER MANAGEMENT PLAN – PLANT– VERSION 3,4 – ATTACHEMENT B			
3	5/28/15	ISSUED FOR INCLUSION IN PERMIT APPLICATIONS	FOR CONSTRUCTION	–	–
			NOT APPROVED FOR CONSTRUCTION.		

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PRINTED NAME THOMAS J. RADUE
SIGNATURE *Thomas J. Radue*
DATE 5/28/15 LICENSE# 20951

DRAWN: BJH
CHECKED: DVS/AMP
BARR PROJECT NO.: 23/69-OC29
SCALE: AS SHOWN

CADD USER: Adeptuser FILE: \\PWEDINA\\EDINA PW\\EDINA PW\\186350E6-BF78-4ADD-A31A-2092BF3D07C\\E9938597-73CE-4E16-84EB-0D722BET2F0\\PERMIT\\MT-10-CU-011.DWG PLOT SCALE: 1:2 PLOT DATE: 6/8/2015 5:16 PM

INCHES
1
2



VER NO	DATE	DESCRIPTION
A	09/28/12	WATER MANAGEMENT PLAN – PLANT– VERSION 2 – ATTACHEMENT B
1	09/09/14	WATER MANAGEMENT PLAN – PLANT– VERSION 3 – ATTACHEMENT B
2	12/31/14	WATER MANAGEMENT PLAN – PLANT– VERSION 3,4 – ATTACHEMENT B
3	5/28/15	ISSUED FOR INCLUSION IN PERMIT APPLICATIONS

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PRINTED NAME	THOMAS J. RADUE	
SIGNATURE	<i>Thomas J. Radue</i>	
DATE	5/28/15	LICENSE# 20951

DRAWN:	BJH
CHECKED:	DVS/AMP
BARR PROJECT NO.:	23/69-0C29
SCALE:	AS SHOWN

DWG. NO.	FTBCA-011
REV	

PLANT DRAWING NUMBER:

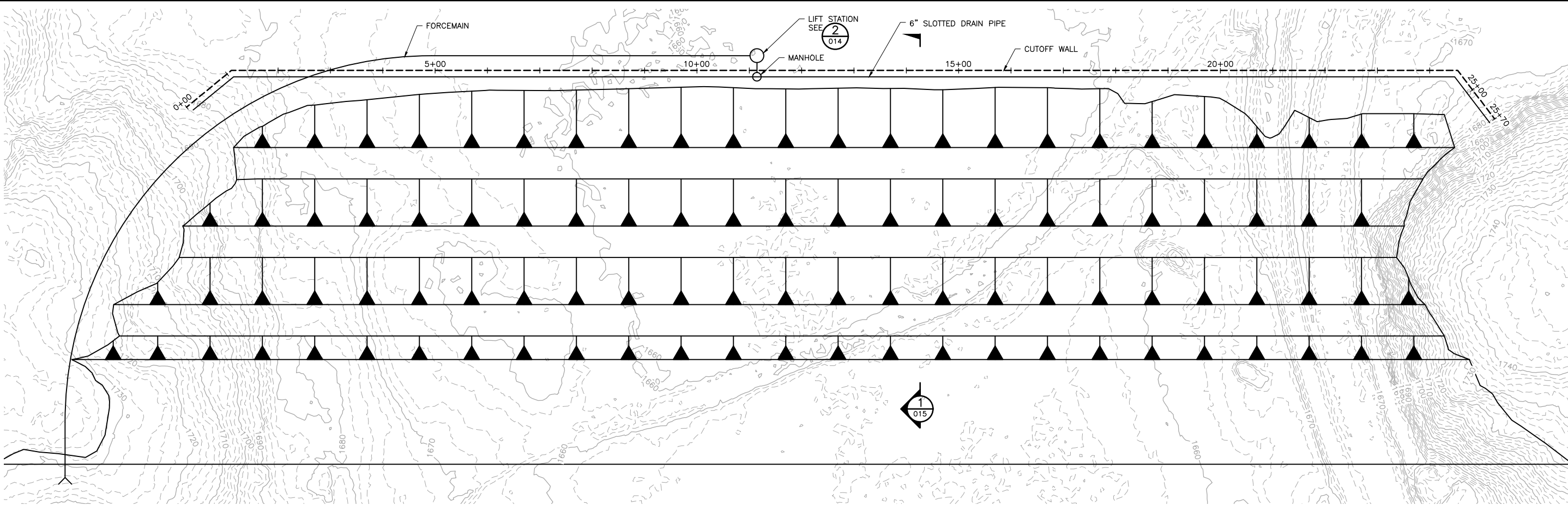
FTB SEEPAGE CONTAINMENT
AND STREAM AUGMENTATION SYSTEMS
PLAN & PROFILE STATION 216+58 TO 240+17

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

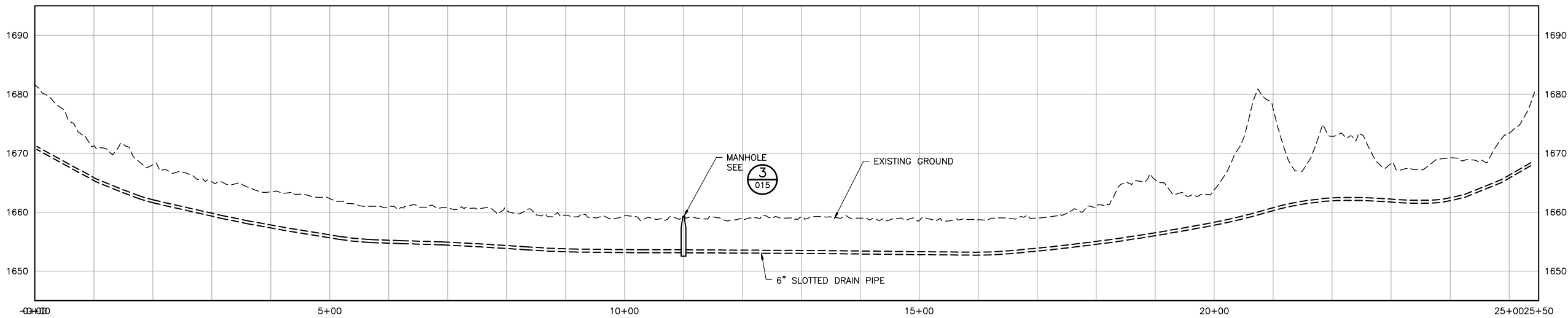
BARR BARR ENGINEERING COMPANY
4700 WEST 77TH STREET
MINNEAPOLIS, MN.
Ph: 1-800-632-2277

CADD USER: Terr J. Toms FILE: K:\DESIGN\23690C29.10\PERMIT_NMT-10-CU-012.DWG PLOT SCALE: 1:2 PLOT DATE: 6/9/2015 10:52 AM

INCHES
1
2



1 PLAN: STATION 0+00 TO STATION 23+33
0 100 200
SCALE IN FEET



1 PLAN: STATION 0+00 TO STATION 23+33
0 100 200 0 10 20
SCALE IN FEET
HORIZONTAL VERTICAL

VER NO	DATE	DESCRIPTION	ISSUE STATUS		
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PRINTED NAME THOMAS J. RADUE
SIGNATURE *Thomas J. Radue*
DATE 5/28/15 LICENSE# 20951

DRAWN: BDP
CHECKED: DVS/AMP
BARR PROJECT NO.: 23/69-OC29
SCALE: AS SHOWN

PLANT DRAWING NUMBER:

FTB SEEPAGE CONTAINMENT
AND STREAM AUGMENTATION SYSTEMS
PLAN & PROFILE STATION 0+00 TO 25+43

POLYMET MINING

BARR

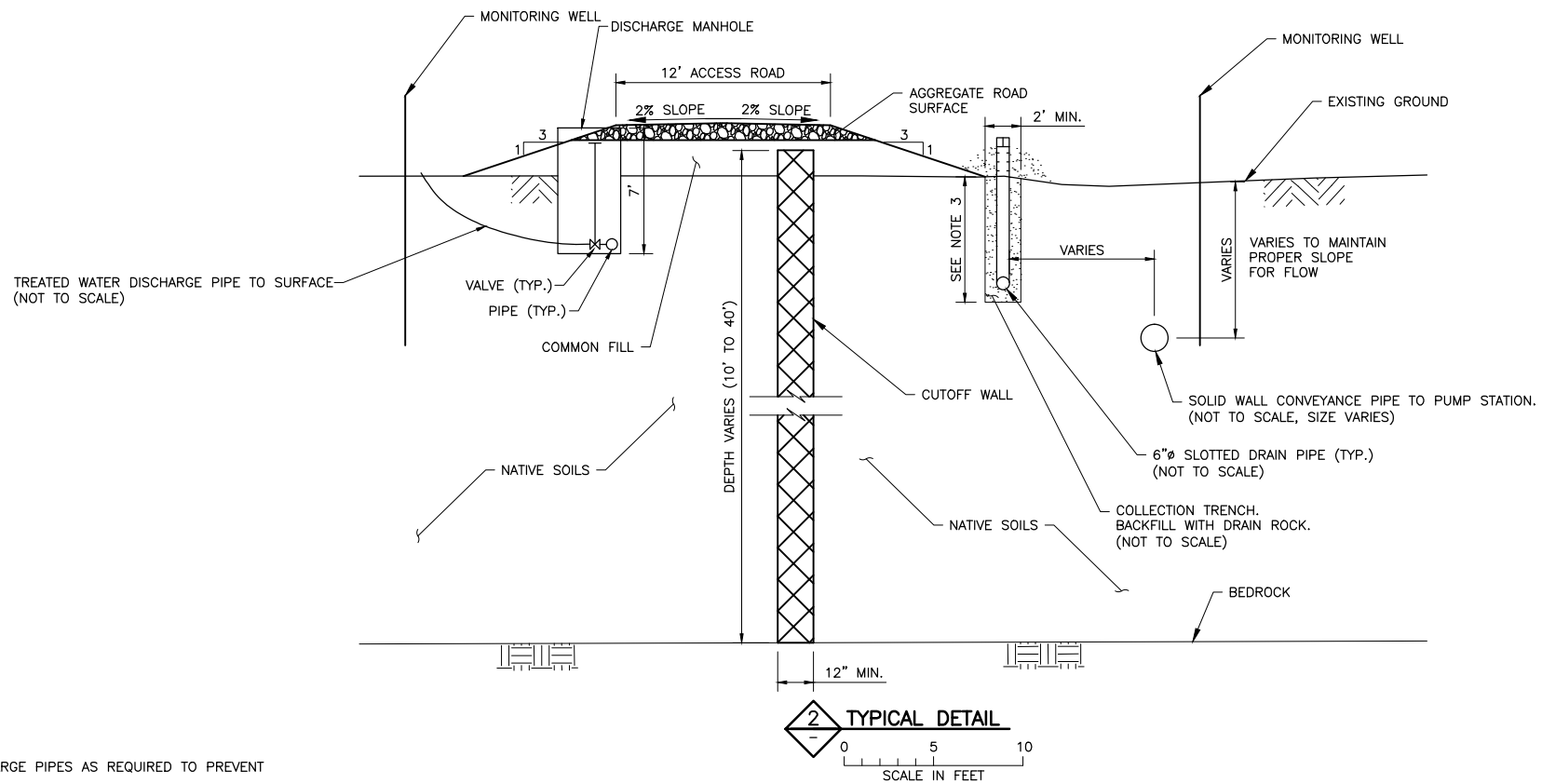
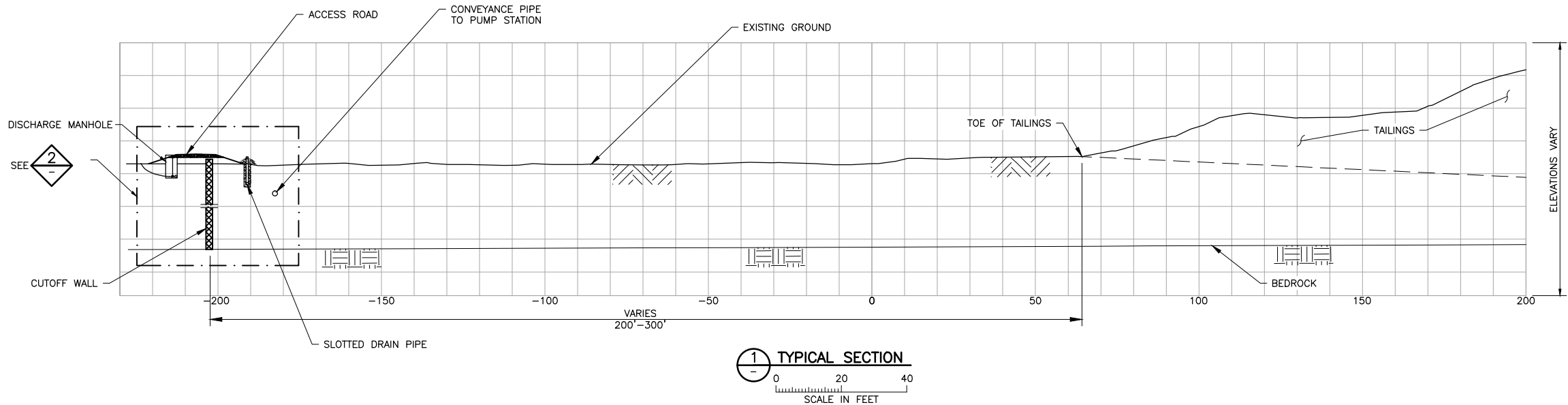
POLY MET MINING, INC.
NORTHMET PROJECT
HOYT LAKES, MINNESOTA

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

DWG. NO. FTBCA-012

REV

CADD USER: Adeptuser FILE: \\PMEDINA\EDINA PW\EDINA PW IN\1863ECE6-BFF8-4ADD-A31A-2092BF3DDE7C\39491C2E-ED6C-4268-B530-B5B0BF32B84E\PERMIT_MNT-10-CU-013.DWG PLOT SCALE: 1:2 PLOT DATE: 6/9/2015 5:18 PM



NOTES:



1. DIFFUSER TO BE INSTALLED ON DISCHARGE PIPES AS REQUIRED TO PREVENT EROSION.
2. CUTOFF WALL MAXIMUM DESIGN HYDRAULIC CONDUCTIVITY = 1×10^{-6} CM/SEC
3. 7' TYPICAL BUT MAY BE LESS IN AREAS WITH SHALLOW BEDROCK

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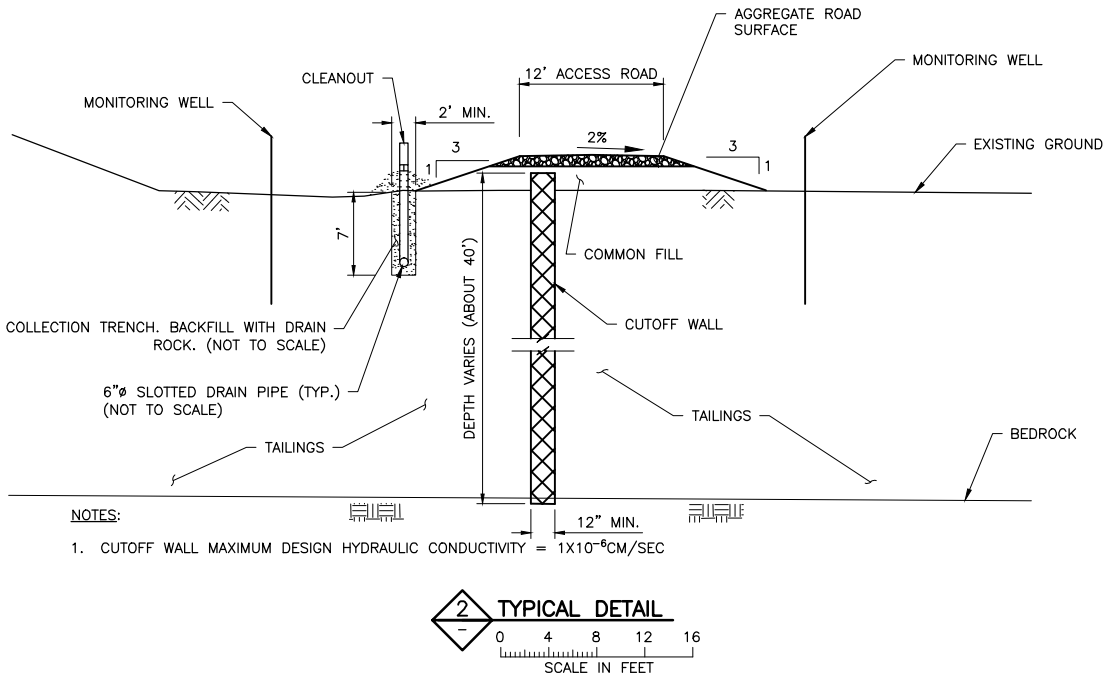
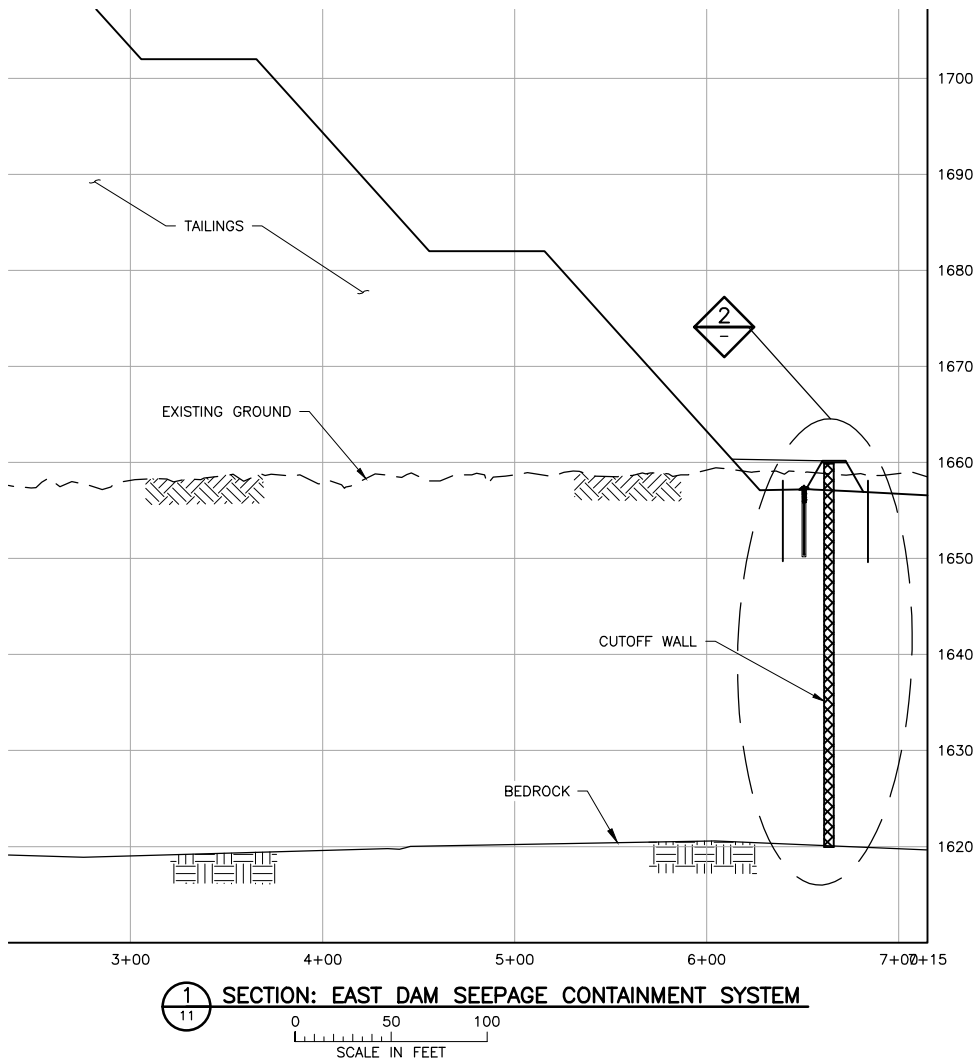
PRINTED NAME THOMAS J. RADUE
SIGNATURE *Thomas J. Radue*
DATE 5/28/15 LICENSE# 20951

DRAWN: BDP
CHECKED: DVS/AMP
BARR PROJECT NO.: 23/69-0C29
SCALE: AS SHOWN

PLANT DRAWING NUMBER:	
FTB SEEPAGE CONTAINMENT AND STREAM AUGMENTATION SYSTEMS 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. FTBCA-013	REV

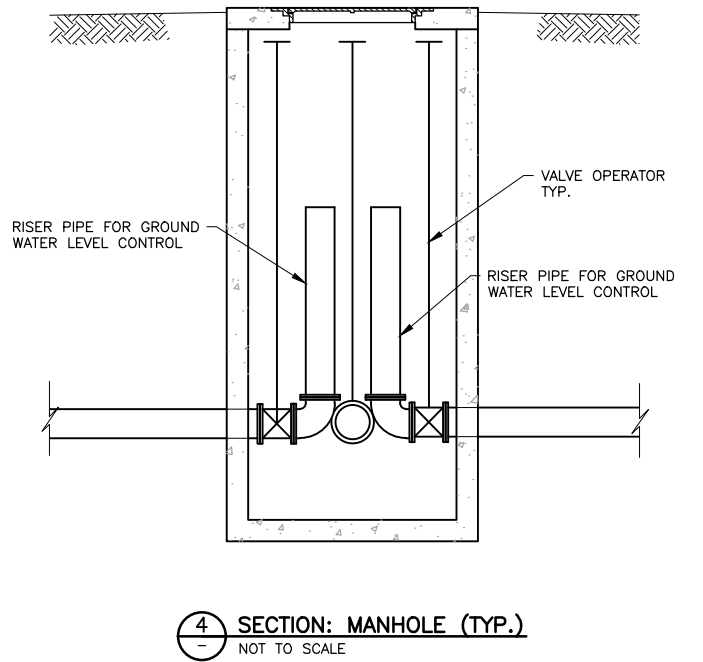
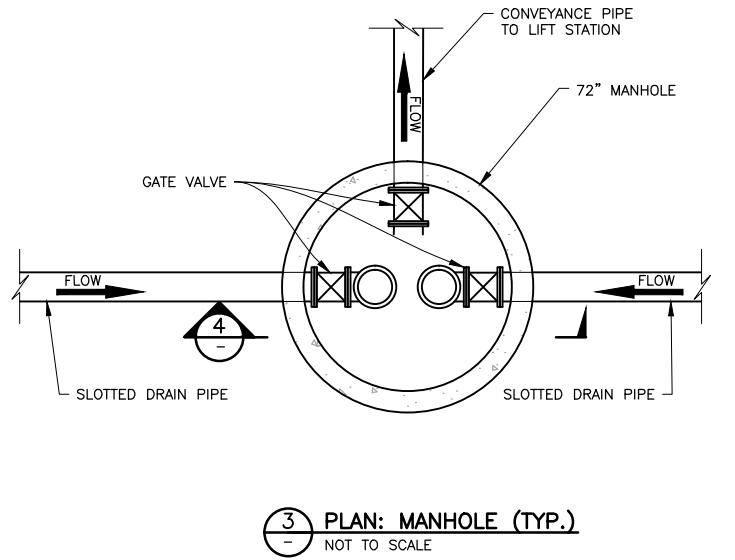
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2
1
INCHES



NOTES:

- LIFT STATION, MANHOLE AND VAULT CONFIGURATIONS SHOWN ON THIS SHEET ARE INTENDED TO BE REPRESENTATIVE OF TYPICAL FACILITIES NEEDED FOR OPERATION OF THE SEEPAGE CONTAINMENT SYSTEM. THE ACTUAL DESIGN FOR EACH LIFT STATION, PUMP STATION, MANHOLE, AND VAULT WILL BE DEVELOPED DURING DETAILED DESIGN TO REFLECT THE SPECIFIC EQUIPMENT REQUIREMENTS FOR EACH LOCATION.
- FLOW METERS WILL BE PROVIDED FOR DISCHARGE FROM ALL LIFT AND PUMP STATIONS AND AT OTHER LOCATIONS AS REQUIRED FOR OPERATIONS.



VER NO	DATE	DESCRIPTION	ISSUE STATUS		
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SIGNATURE *Thomas J. Radue*
DATE 5/28/15 LICENSE# 20951

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

PLANT DRAWING NUMBER:

FTB SEEPAGE CONTAINMENT AND STREAM AUGMENTATION SYSTEMS DETAILS

POLYMET MINING

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

BARR ENGINEERING COMPANY
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MINNEAPOLIS, MN.
Ph: 1-800-632-2277

DWG. NO. FTBCA-015

REV