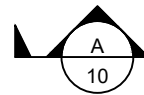




**GENERAL CONSTRUCTION NOTES**

1. UNLESS SPECIFICALLY SHOWN ON THE DRAWINGS, ALL WORK SHALL CONFORM TO MPWSS, LATEST EDITION AND THESE PLANS.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PERMITS REQUIRED AND CONSTRUCTION TESTING FOR CONSTRUCTION ACTIVITIES.
3. THE CONTRACTOR SHALL RESTORE ALL ROADWAY TO EQUAL OR BETTER CONDITION THAN EXISTED PRIOR TO CONSTRUCTION, AS DETERMINED BY THE OWNER AND THE ENGINEER.
4. THE LOCATION, DEPTH AND SIZE OF EXISTING UTILITIES SHOWN ON THESE PLANS ARE APPROXIMATE. THE CONTRACTOR SHALL FIELD VERIFY THE EXISTENCE, LOCATION, DEPTH, SIZE, LINE AND GRADE OF EXISTING UTILITY CONNECTIONS PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO THE EXISTING FACILITIES DUE TO FAILURE TO LOCATE OR PROVIDE PROPER PROTECTION WHEN LOCATION IS KNOWN.
5. THE CONTRACTOR SHALL SUPPLY ALL NECESSARY FITTINGS, COUPLINGS AND SPOOL PIECES FOR CONNECTING NEW UTILITIES TO EXISTING UTILITIES. THESE PLANS MAY NOT SHOW ALL REQUIRED COMPONENTS FOR MAKING THE CONNECTIONS.
6. ALL BACKFILL FOR UTILITY TRENCHES SHALL BE TYPE "A," UTILIZING TYPE 1 BEDDING, UNLESS DIRECTED OTHERWISE BY ENGINEER. SPECIFIED BEDDING SHALL BE FROM 4" BENEATH THE PIPE TO 6" ABOVE THE TOP OF PIPE (SEE MPWSS STANDARD DRAWING 02221-1). THE COST OF THIS ADDITIONAL BEDDING SHALL BE INCLUDED IN THE UNIT PRICE BID.
7. PIPE BEDDING (TYPE 1) AND TRENCH BACKFILL (TYPE B) SHALL BE IN ACCORDANCE WITH MPW STANDARD SPECIFICATION 02221, STANDARD DRAWING 02221-1.
8. THE CONTRACTOR IS RESPONSIBLE FOR CONTROLLING DUST AND EROSION DURING CONSTRUCTION AT CONTRACTOR'S EXPENSE. EROSION SHALL BE CONTROLLED IN ACCORDANCE WITH MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY REGULATIONS.
9. ALL PROFILES REPRESENT EXISTING GROUND (DASHED LINE) AND FINISHED GRADE (SOLID LINE) ALONG THE ALIGNMENTS INDICATED ON THE PLANS. ELEVATIONS ARE FINISHED GROUND ELEVATIONS.
10. ALL DISTURBED AREAS SHALL BE SEEDED BY THE CONTRACTOR USING A SEED MIX APPROVED BY THE OWNER OR THE LOCAL USDA OFFICE.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF UTILITY (PHONE/POWER/CATV) INSTALLATION WITH LOCAL UTILITY COMPANIES.
12. THE CONTRACTOR SHALL NOTIFY ONE CALL @ 1-800-424-5555 FOR ONSITE UTILITY LOCATION. ALL EXISTING UTILITIES SHALL BE MARKED BEFORE DIGGING.
13. THE CONTRACTOR SHALL MAINTAIN SERVICE OF ALL EXISTING UTILITIES. IF SAID SERVICE IS DAMAGED, THE CONTRACTOR SHALL IMMEDIATELY REPAIR THE DAMAGE AT THE CONTRACTOR'S EXPENSE.
14. THE CONTRACTOR SHALL NOTIFY THE ENGINEER A MINIMUM OF 48 HOURS PRIOR TO BEGINNING ANY WORK.
15. ALL UTILITY CONDUITS FOR IRRIGATION, ELECTRICAL, GAS, PHONE, CATV, ETC. SHALL BE BURIED A MINIMUM 24" FROM FINISHED GRADE WITH TYPE A BACKFILL, UTILIZING TYPE 1 BEDDING, UNLESS DIRECTED OTHERWISE BY ENGINEER.
16. IF THE CONTRACTOR DETERMINES THE NEED TO DISTURB MORE THAN 1.0 ACRE DURING THE CONSTRUCTION OF THE PROJECT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AN MPDES PERMIT AND COMPLYING WITH ALL TERMS OF THE PERMIT. NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK.
17. QUANTITIES SHOWN IN THESE PLANS ARE FOR INFORMATIONAL PURPOSES ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING ACTUAL QUANTITIES.

**DRAWING NOTATION**



INDICATES CROSS SECTION LOCATION. "A" REFERS TO THE CROSS SECTION DESIGNATION. "10" REFERS TO THE SHEET NUMBER WHERE THE SECTION IS CUT OR SHOWN.



INDICATES DETAIL LOCATION. "1" REFERS TO THE DETAIL DESIGNATION. "12" REFERS TO THE SHEET NUMBER WHERE THE DETAIL IS INDICATED OR SHOWN.

**ABBREVIATIONS**

ACI	AMERICAN CONCRETE INSTITUTE	HWY	HIGHWAY
BAR	REBAR	INV	INVERT ELEVATION
BMP	BEST MANAGEMENT PRACTICES	LF	LINEAR FEET
BOT	BOTTOM	MID	POINT, MIDPOINT OF CURVE
BVC	BEGIN VERTICAL CURVE	MH	MANHOLE
CFS	CUBIC FEET PER SECOND	MJ	MECHANICAL JOINT
CL	CENTERLINE	O.C.	ON CENTER
CMP	CORRUGATED METAL PIPE	O.C.E.F.	ON CENTER EACH FACE
CONC	CONCRETE OR CONCENTRIC	OHP	OVERHEAD POWER
CP	CONTROL POINT	PC	POINT, POINT OF CURVE
CSP	CORRUGATED STEEL PIPE	PI	POINT OF INTERSECTION
CTR	CENTER	POT	POINT ON TANGENT
CU FT	CUBIC FEET	PS	PIPE SUPPORT
CULV	CULVERT	PT	POINT, POINT OF TANGENCY
DI	DUCTILE IRON OR DRAIN INLET	PVC	POLYVINYL CHLORIDE
DIA	DIAMETER	PWR	POWER
EA	EACH	RCP	REINFORCED CONCRETE PIPE
E.F.	EACH FACE	R/W OR ROW	RIGHT OF WAY
EL, ELEV	ELEVATION	SAN	SANITARY
EOP	EDGE OF PAVEMENT	SST	STAINLESS STEEL
EVC	END VERTICAL CURVE	STA	STATION
FT	FOOT OR FEET	TBC	TOP BACK OF CURB
GPM	GALLONS PER MINUTE	TYP	TYPICAL
HP	HORSEPOWER	UG	UNDERGROUND
		WTR	WATER

**BLOCK LEGEND**

EXISTING PROPOSED

		SANITARY SEWER MANHOLE
		SANITARY SEWER CLEANOUT
		SANITARY SEWER CAP
		SANITARY SEWER METER VAULT
		SANITARY SEWER LIFT STATION
		SANITARY SEWER FM (TEE)
		SANITARY SEWER FM (11.25°)
		SANITARY SEWER FM (22.5°)
		SANITARY SEWER FM (45°)
		SANITARY SEWER FM (90°)
		SANITARY SEWER FM (CROSS)
		SANITARY SEWER FM FLANGE
		SANITARY SEWER FM VALVE
		SANITARY SEWER FM REDUCER
		SANITARY SEWER FM BF PREV.
		STORMWATER AREA INLET
		STORMWATER COMBO INLET
		STORMWATER FLARED END
		STORMWATER MANHOLE
		STORMWATER PUMP STATION
		STORM SEWER HEAD WALL
		WATER FITTING BEND 11.25°
		WATER FITTING BEND 22.5°
		WATER FITTING BEND 45°
		WATER FITTING BEND 90°
		WATER FITTING CAP
		WATER FITTING CROSS
		WATER FITTING FLANGE
		WATER FITTING TEE
		WATER FITTING VALVE

EXISTING PROPOSED

		WATER VENT
		WATER MANHOLE
		WATER REDUCER
		WATER MARKER
		FIRE HYDRANT
		WATER CURB STOP
		WATER METER
		WATER VAULT
		WATER BOOSTER STATION
		WATER WELL
		WATER MONITORING WELL
		WATER TEST STATION
		CABLE TELEVISION MARKER
		CABLE TELEVISION PULL BOX
		CABLE TELEVISION PEDESTAL
		CABLE TELEVISION VAULT
		POWER GUY ANCHOR
		POWER GUY POLE
		POWER MANHOLE
		POWER MARKER
		ELECTRIC POWER METER
		POWER POLE
		POWER TRANSFORMER
		POWER VAULT
		STREET LIGHT
		IRRIGATION PULL BOX
		IRRIGATION SPRINKLER HEAD
		IRRIGATION VALVE
		IRRIGATION VAULT

EXISTING PROPOSED

		FIBER OPTIC MANHOLE
		FIBER OPTIC MARKER
		FIBER OPTIC PULL BOX
		FIBER OPTIC PEDESTAL
		FIBER OPTIC VAULT
		NATURAL GAS MARKER
		NATURAL GAS METER
		NATURAL GAS VALVE
		TELEPHONE MANHOLE
		TELEPHONE MARKER
		TELEPHONE PULL BOX
		TELEPHONE PEDESTAL
		TELEPHONE VAULT
		TREE (DECIDUOUS)
		TREE (CONIFER)
		ADA RAMP
		SIGN
		BOLLARD
		MILEPOST
		CATTLE GUARD
		BORE LOCATION
		PROP CORNER ALUMINUM CAP
		PROP CORNER BRASS CAP
		PROP CORNER CHISELED X
		HIGHWAY ROW MONUMENT
		PROP CORNER IRON PIPE
		PROP CORNER LEAD & TACK
		PROP CORNER REBAR
		PROP CORNER STONE
		CONTROL POINT
		PROP CORNER PLASTIC CAP

**LINE STYLE LEGEND**

EXISTING

	MAJOR CONTOUR
	MINOR CONTOUR
	OVERHEAD TELEPHONE
	OVERHEAD POWER
	NATURAL GAS
	IRRIGATION LINE
	FIBER OPTIC
	FORCEMAIN
	FENCE [CHAIN]
	FENCE [BARBED]
	FENCE [PRIVACY]
	FIRE LINE
	OVERHEAD TV
	RAW WATER
	SEWER
	STORM
	UNDERGROUND POWER
	UNDERGROUND TELEPHONE
	UNDERGROUND TV
	WATER

PROPOSED

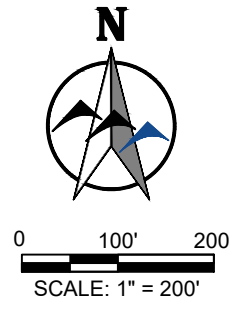
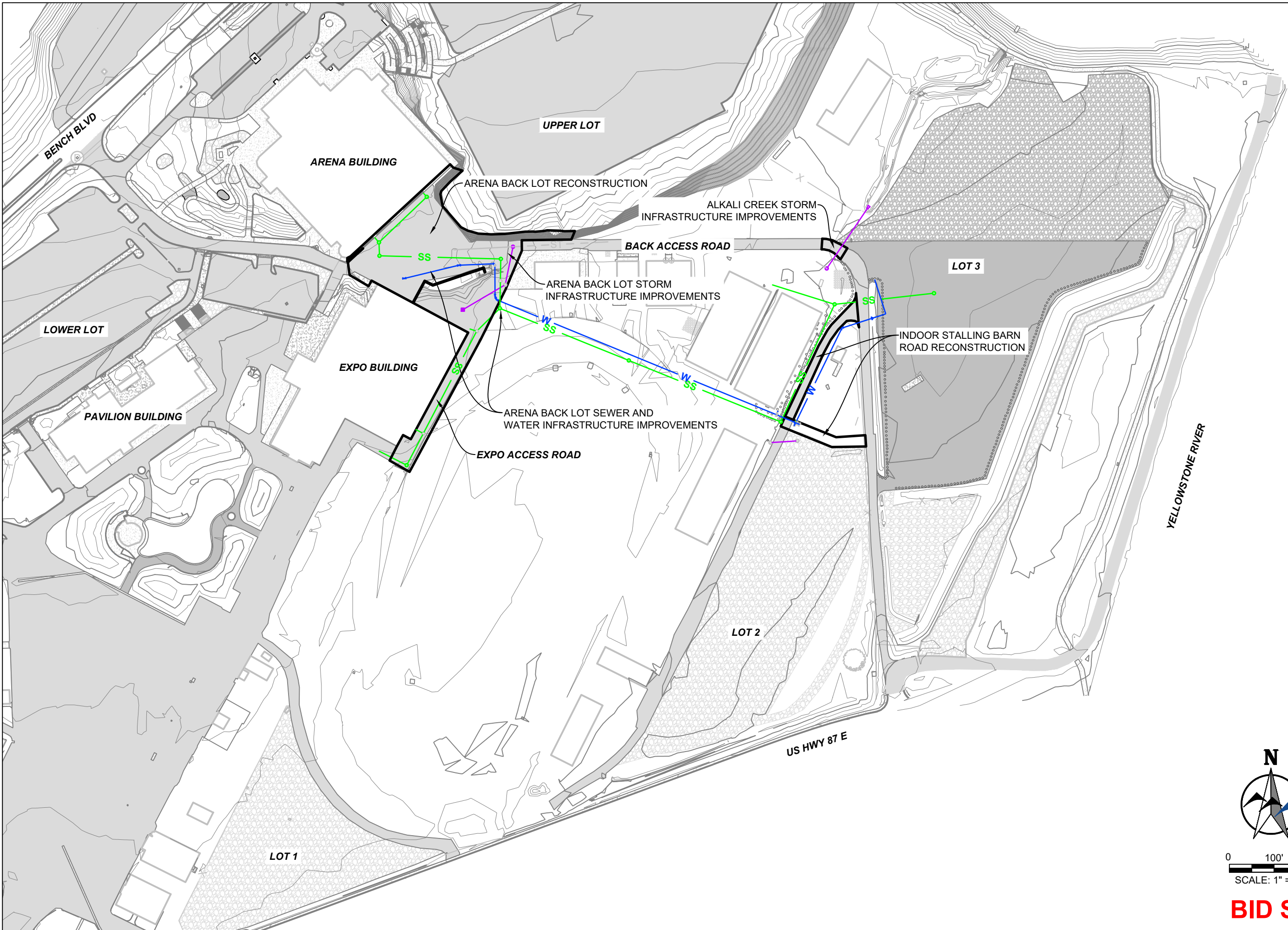
	MAJOR CONTOUR
	MINOR CONTOUR
	OVERHEAD TELEPHONE
	OVERHEAD POWER
	NATURAL GAS
	IRRIGATION LINE
	FIBER OPTIC
	FORCEMAIN
	FENCE [CHAIN]
	FENCE [BARBED]
	FENCE [PRIVACY]
	FIRE LINE
	OVERHEAD TV
	RAW WATER
	SEWER
	STORM
	UNDERGROUND POWER
	UNDERGROUND TELEPHONE
	UNDERGROUND TV
	WATER

**BID SET**

DATE	BY	REVISION	NO.							PROJECT NO. 2021-555
<p>YELLOWSTONE COUNTY</p> <p><b>ARENA BACK LOT CONSTRUCTION PROJECT</b></p> <p><b>GENERAL NOTES</b></p> <p>BILLINGS, MT</p>										
<p>DESIGNED BY: <u>KH</u></p> <p>DRAWN BY: <u>ZSL</u></p> <p>CHECKED BY: <u>GTR</u></p> <p>DATE: <u>1/18/2024</u></p>										
<p>SHEET</p> <p><b>2</b></p>										



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**BID SET**

NO.	REVISION	BY	DATE

PREPARED BY  
 **WWC** ENGINEERING  
 550 S. 24TH ST. W., SUITE 201  
 BILLINGS, MT 59102  
 (406) 894-2210  
 www.wwcengineering.com

YELLOWSTONE COUNTY  
**ARENA BACK LOT CONSTRUCTION PROJECT**  
**PROJECT SUMMARY SHEET**  
 BILLINGS, MT

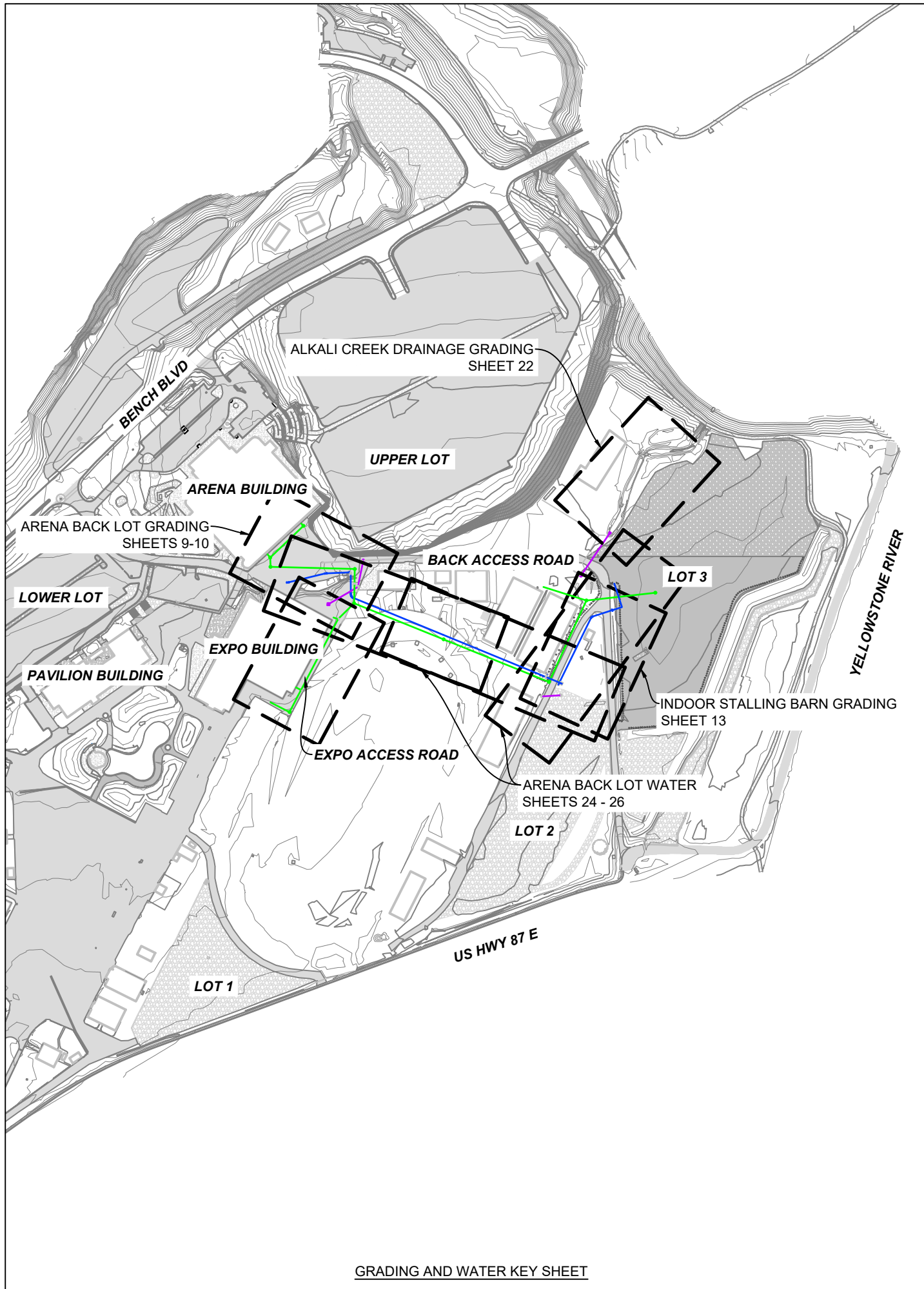
DESIGNED BY: KH  
 DRAWN BY: ZSL  
 CHECKED BY: GTR  
 DATE: 1/18/2024

SHEET  
**3**

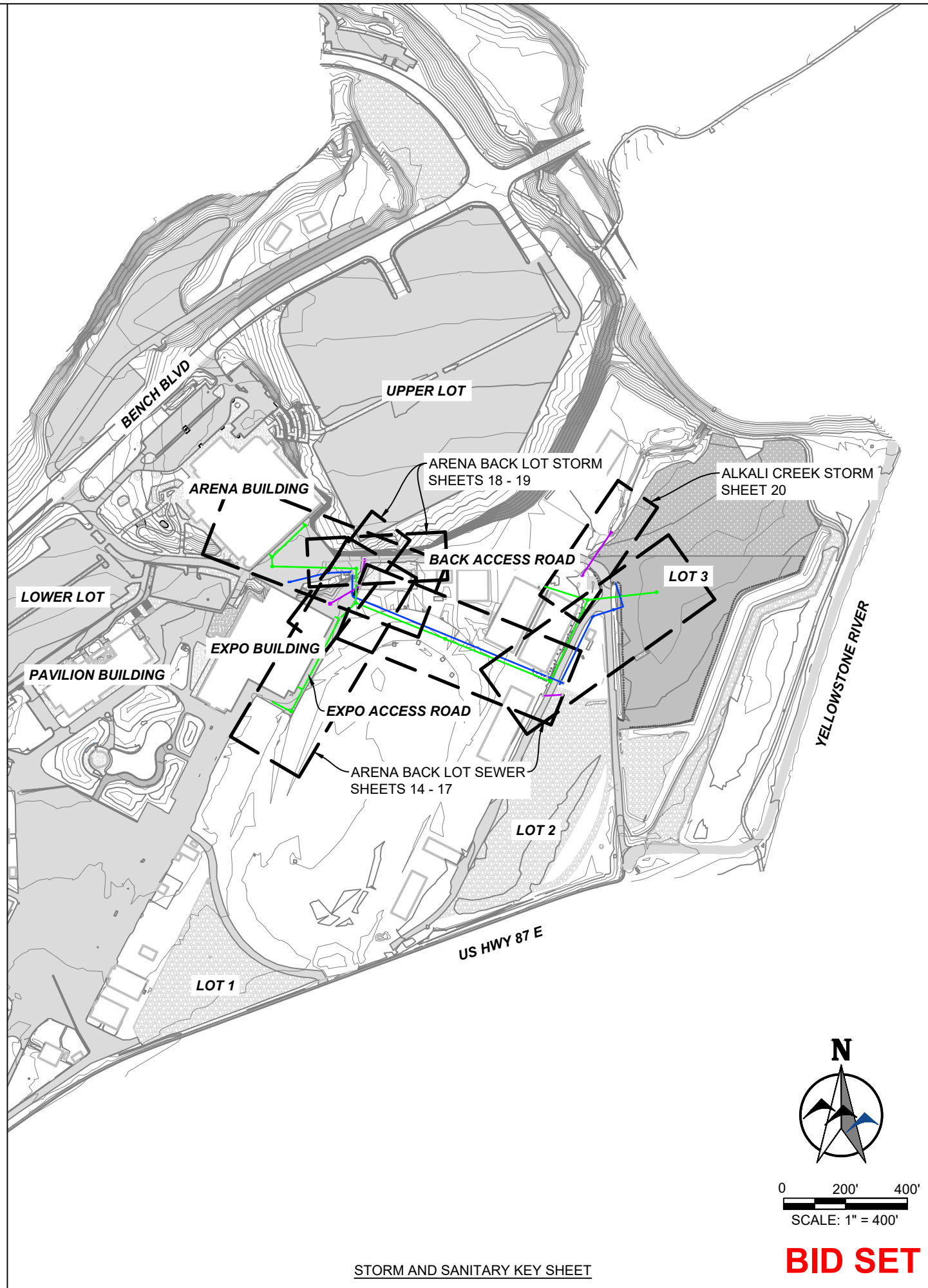
PROJECT NO. 2021-555



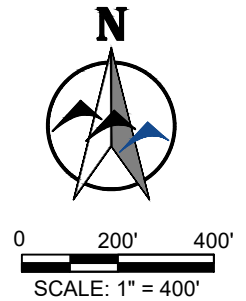
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GRADING AND WATER KEY SHEET



STORM AND SANITARY KEY SHEET



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PROJECT NO. 2021-555

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YELLOWSTONE COUNTY  
 ARENA BACK LOT CONSTRUCTION PROJECT  
**PROJECT OVERVIEW KEY SHEET**  
 BILLINGS, MT

DESIGNED BY: KH  
 DRAWN BY: ZSL  
 CHECKED BY: GTR  
 DATE: 1/18/2024

SHEET  
**4**



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GRADING					
ITEM	UNIT	QUANTITY			REMARKS
		FILL	CUT	MISC.	
INDOOR STALLING BARN (ABANDONED)	CY		76		ASPHALT REMOVAL.
INDOOR STALLING BARN (ABANDONED)	CY	269	48		CUT/FILL TO SUBGRADE.
INDOOR STALLING BARN (RELOCATED)	CY		206		CUT/FILL TO SUBGRADE.
ARENA BACKLOT	CY	441	3,752		CUT/FILL TO ASPHALT SUBGRADE. EXCLUDES CONCRETE CUT/FILL.
TOTAL	CY	710	4,082		

SURFACING			
ITEM	UNIT	QUANTITY	REMARKS
3" CRUSHED BASE - 12" PITRUN	SY	567	INDOOR STALLING BARN ROAD
3" ASPHALT PAVEMENT - 15" CRUSHED BASE	SY	219	TRENCH RESTORATION
4" ASPHALT PAVEMENT - 7" CRUSHED BASE	SY	8,352	ARENA BACK LOT

CONCRETE INSTALLATION				
ID	LOCATION	PLAN QUANTITY		REMARKS
		COMBINED CONCRETE CURB & GUTTER (LF)	CONCRETE FLATWORK (SF)	
INS-01	ARENA BACK LOT	37		CURB
INS-02	ARENA BACK LOT	37		CURB
INS-03	ARENA BACK LOT	46		CURB
INS-04	ARENA BACK LOT		1137	SIDEWALK
INS-05	ARENA BACK LOT	64		CURB
INS-06	ARENA BACK LOT		963	CONCRETE PAD
INS-07	ARENA BACK LOT		223	CONCRETE PAD
INS-08	ARENA BACK LOT	56		CONCRETE RIBBON
INS-09	ARENA BACK LOT		597	VALLEY GUTTER
INS-10	ARENA BACK LOT		750	REINFORCED CONCRETE PAD
INS-11	ARENA BACK LOT		63	CONCRETE PAD
INS-12	ARENA BACK LOT		1344	CONCRETE PAD

CONCRETE REMOVAL						
ID	LOCATION	PLAN DIMENSIONS		UNIT	QUANTITY	REMARKS
		LF	SF			
REM-01	ARENA BACK LOT		219	SY	24.3	CONCRETE PAD
REM-02	ARENA BACK LOT		474	SY	52.7	CONCRETE PAD
REM-03	ARENA BACK LOT	37		SY	8.2	CURB
REM-04	ARENA BACK LOT	37		SY	8.2	CURB
REM-05	ARENA BACK LOT	46		SY	10.2	CURB
REM-06	ARENA BACK LOT		1138	SY	126.4	SIDEWALK
REM-07	ARENA BACK LOT	64		SY	14.2	CURB
REM-08	ARENA BACK LOT		70	SY	7.8	CONCRETE PAD
REM-09	ARENA BACK LOT		1344	SY	149.3	CONCRETE PAD
ARENA BACK LOT TOTAL				SY	401	

	COMBINED CONCRETE CURB AND GUTTER (LF)	CONCRETE RIBBON (LF)	CONCRETE SIDEWALK (SF)	REINFORCED CONCRETE PAD (SF)	CONCRETE DRIVEWAY APRON (SF)	CONCRETE VALLEY GUTTER (SF)
TOTAL	184	56	1137	750	2593	597

NOTES:  
 1. DESCRIPTION IN THE REMARKS COLUMN CORRESPONDS TO THE LEGEND LABELS ON IMPROVEMENT SHEETS.  
 2. INSTALL ID NUMBERING MATCHES CONCRETE REMOVAL SUMMARY TABLE AS APPLICABLE.

NOTES:  
 1. ALL CURB & GUTTER REMOVAL IS MEASURED AS A STANDARD 2' WIDTH FOR SY CALCULATIONS.  
 2. DESCRIPTION IN THE REMARKS COLUMN CORRESPONDS TO THE LEGEND LABELS ON DEMO SHEETS.  
 3. ADDITIONAL 10% ADDED TO BID FORM QUANTITY FOR UNIDENTIFIED CONCRETE REMOVAL.

NO.	REVISION	BY	DATE

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YELLOWSTONE COUNTY  
**ARENA BACK LOT CONSTRUCTION PROJECT**  
**SUMMARY TABLES**  
 BILLINGS, MT

DESIGNED BY: KH  
 DRAWN BY: ZSL  
 CHECKED BY: GTR  
 DATE: 1/18/2024




BID SET







K:\Sheridan\Yellowstone County, MT\2021\555 MetraPark Infrastructure Improvements\UGCAD\Sheets\PLAN\_SET104\_Arena\_Back Lots\PHASE 1 - ARENA BACK LOT\103\_DEMO.dwg fence 1/22/2024 2:36:50 PM

LEGEND	
	FULL DEPTH REMOVAL
	CONCRETE DEMO
	FENCE REMOVAL



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YELLOWSTONE COUNTY  
**ARENA BACK LOT CONSTRUCTION PROJECT**  
**FENCE REMOVAL DEMO**  
 BILLINGS, MT

DESIGNED BY: KH  
 DRAWN BY: ZSL  
 CHECKED BY: GTR  
 DATE: 1/18/2024

SHEET  
**7**

0 25' 50'  
 SCALE: 1" = 50'

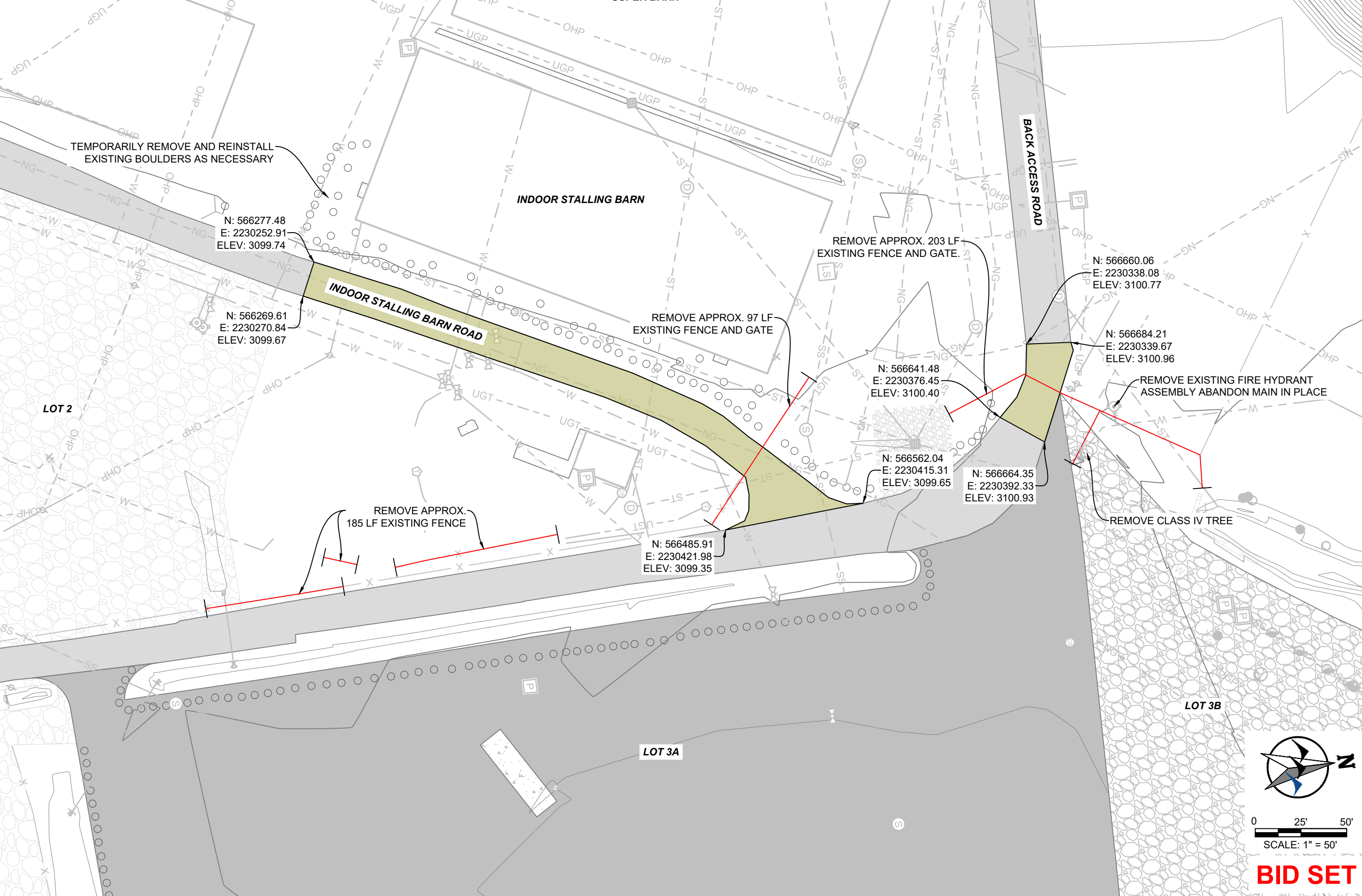
**BID SET**



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**LEGEND**

- ASPHALT REMOVAL
- FENCE REMOVAL



**BID SET**

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YELLOWSTONE COUNTY  
 ARENA BACK LOT CONSTRUCTION PROJECT  
**INDOOR STALLING BARN DEMO**  
 BILLINGS, MT

DESIGNED BY: KH  
 DRAWN BY: ZSL  
 CHECKED BY: GTR  
 DATE: 1/18/2024

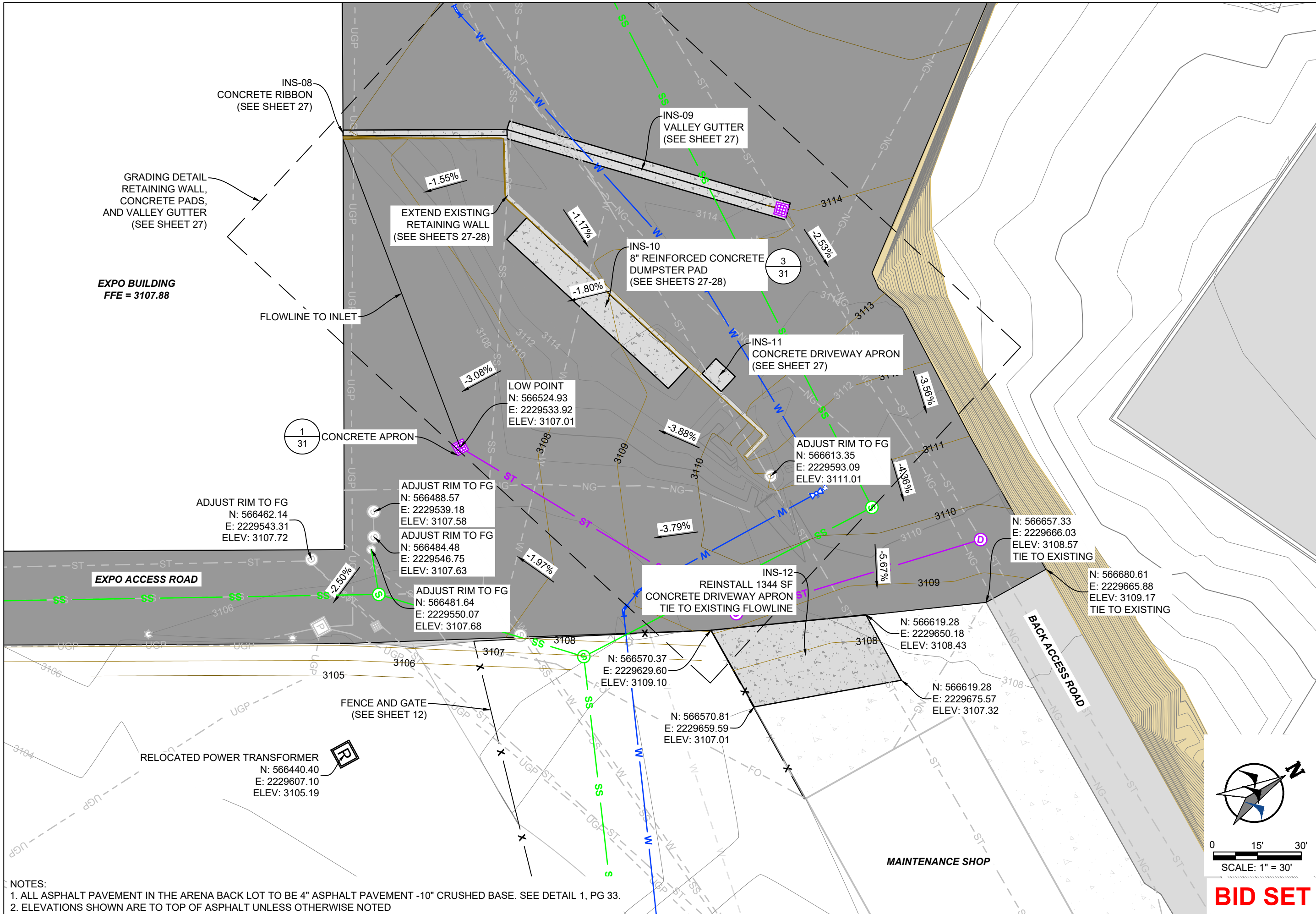
SHEET  
**8**

PROJECT NO. 2021-555

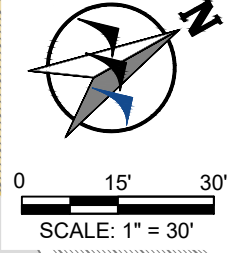




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NOTES:  
 1. ALL ASPHALT PAVEMENT IN THE ARENA BACK LOT TO BE 4" ASPHALT PAVEMENT -10" CRUSHED BASE. SEE DETAIL 1, PG 33.  
 2. ELEVATIONS SHOWN ARE TO TOP OF ASPHALT UNLESS OTHERWISE NOTED



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YELLOWSTONE COUNTY  
 ARENA BACK LOT CONSTRUCTION PROJECT  
**ARENA BACK LOT GRADING**  
 BILLINGS, MT

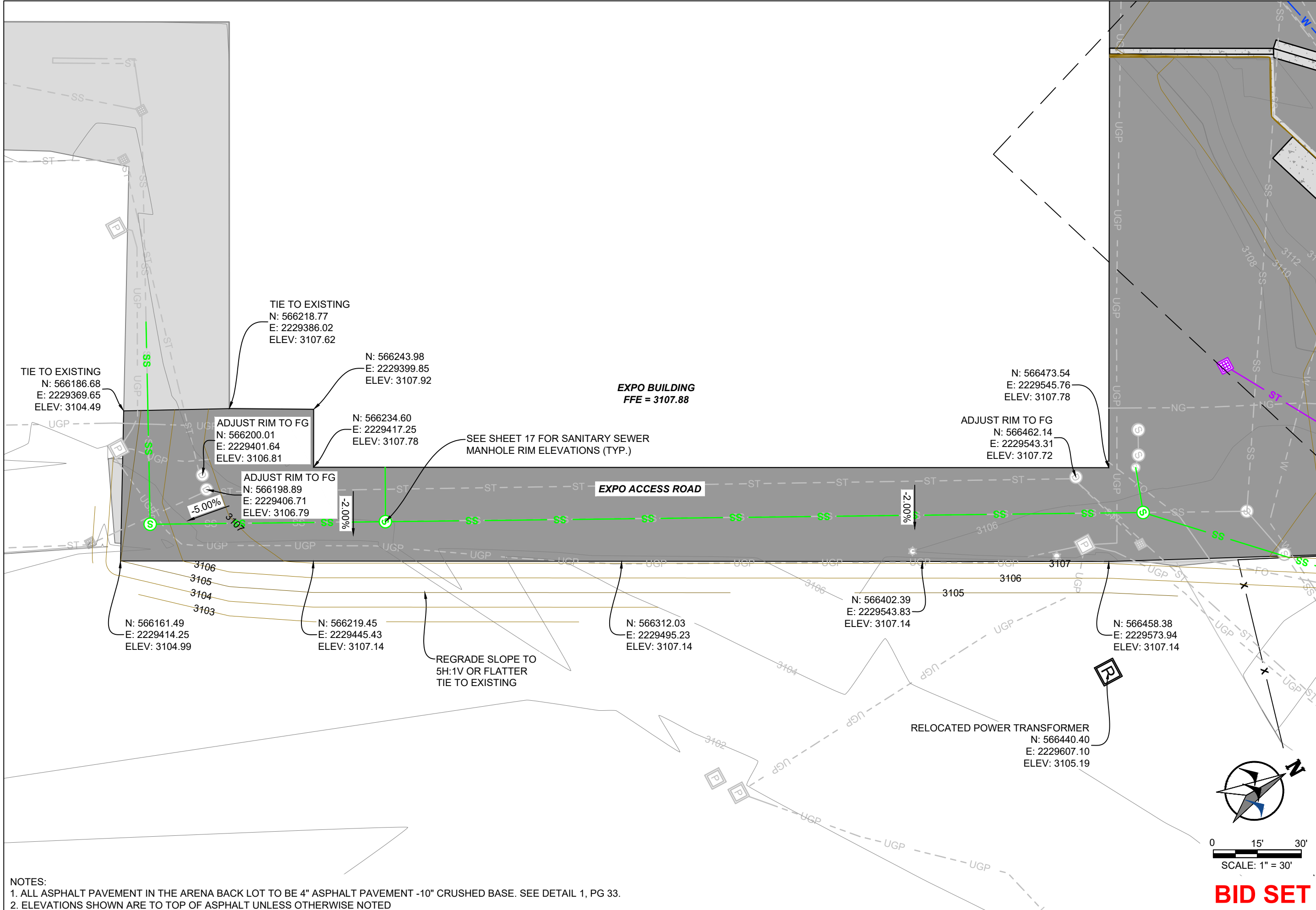
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 CHECKED BY: GTR  
 DATE: 1/18/2024

SHEET  
**10**

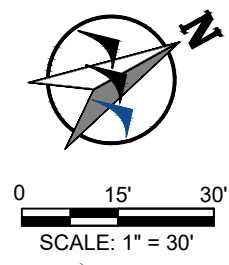
**BID SET**

PROJECT NO. 2021-555

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NOTES:  
 1. ALL ASPHALT PAVEMENT IN THE ARENA BACK LOT TO BE 4" ASPHALT PAVEMENT -10" CRUSHED BASE. SEE DETAIL 1, PG 33.  
 2. ELEVATIONS SHOWN ARE TO TOP OF ASPHALT UNLESS OTHERWISE NOTED



**BID SET**

NO.	REVISION	BY	DATE

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YELLOWSTONE COUNTY  
 ARENA BACK LOT CONSTRUCTION PROJECT  
**EXPO ACCESS ROAD GRADING**  
 BILLINGS, MT

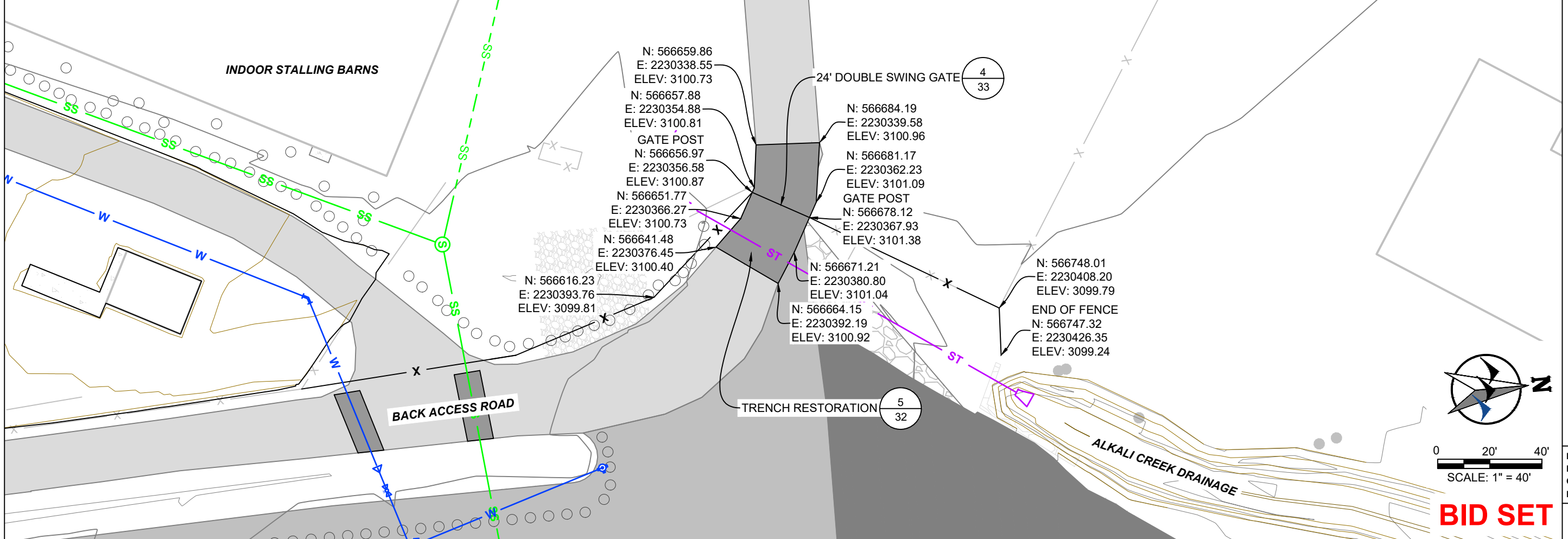
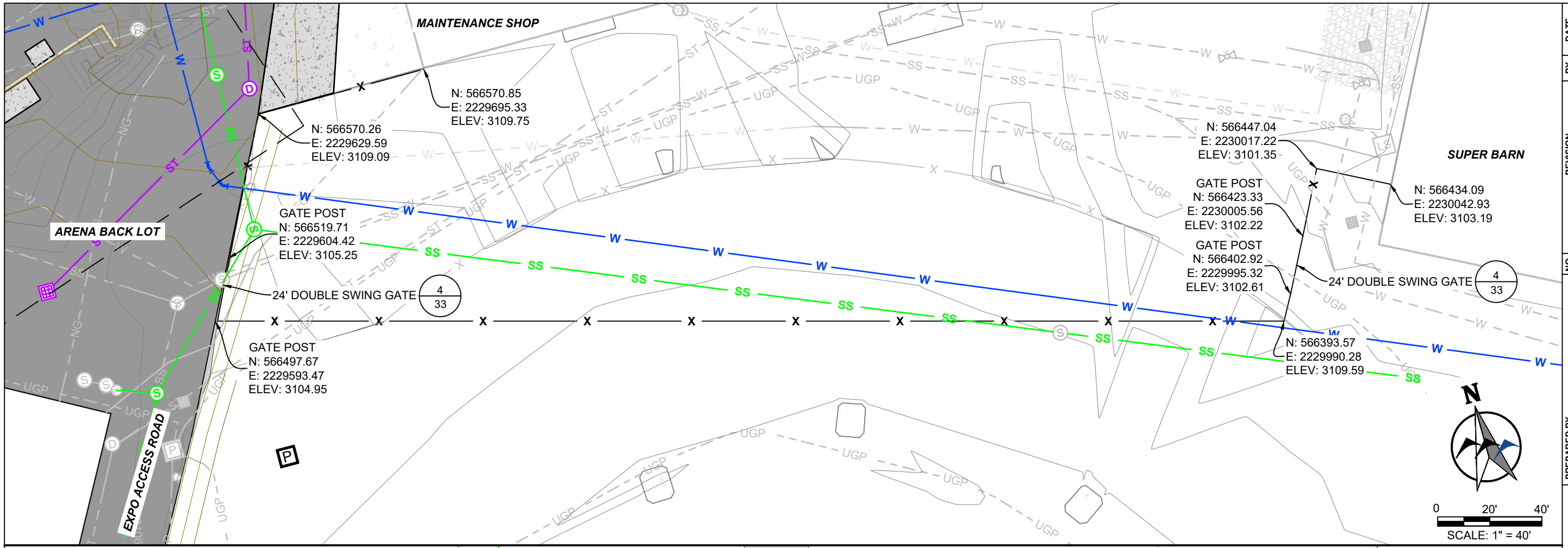
DESIGNED BY: KH  
 DRAWN BY: ZSL  
 CHECKED BY: GTR  
 DATE: 1/18/2024

SHEET  
**11**

PROJECT NO. 2021-555



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PROJECT NO. 2021-565

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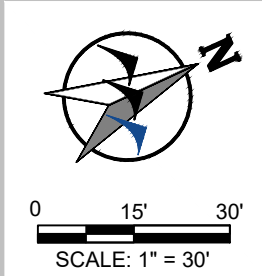
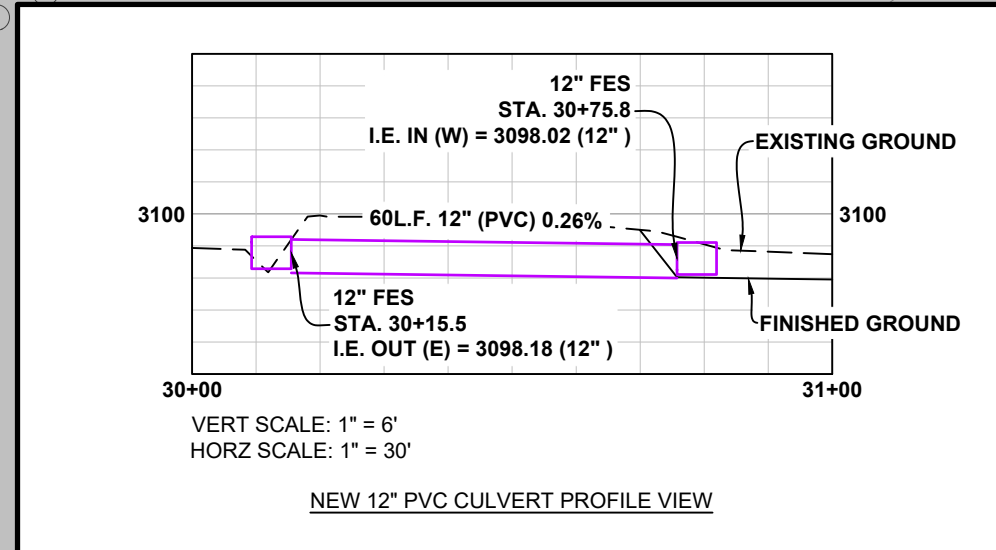
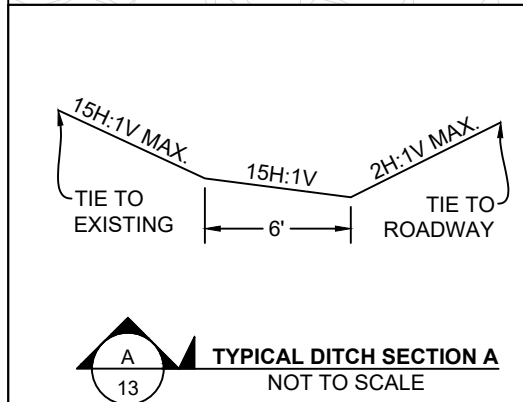
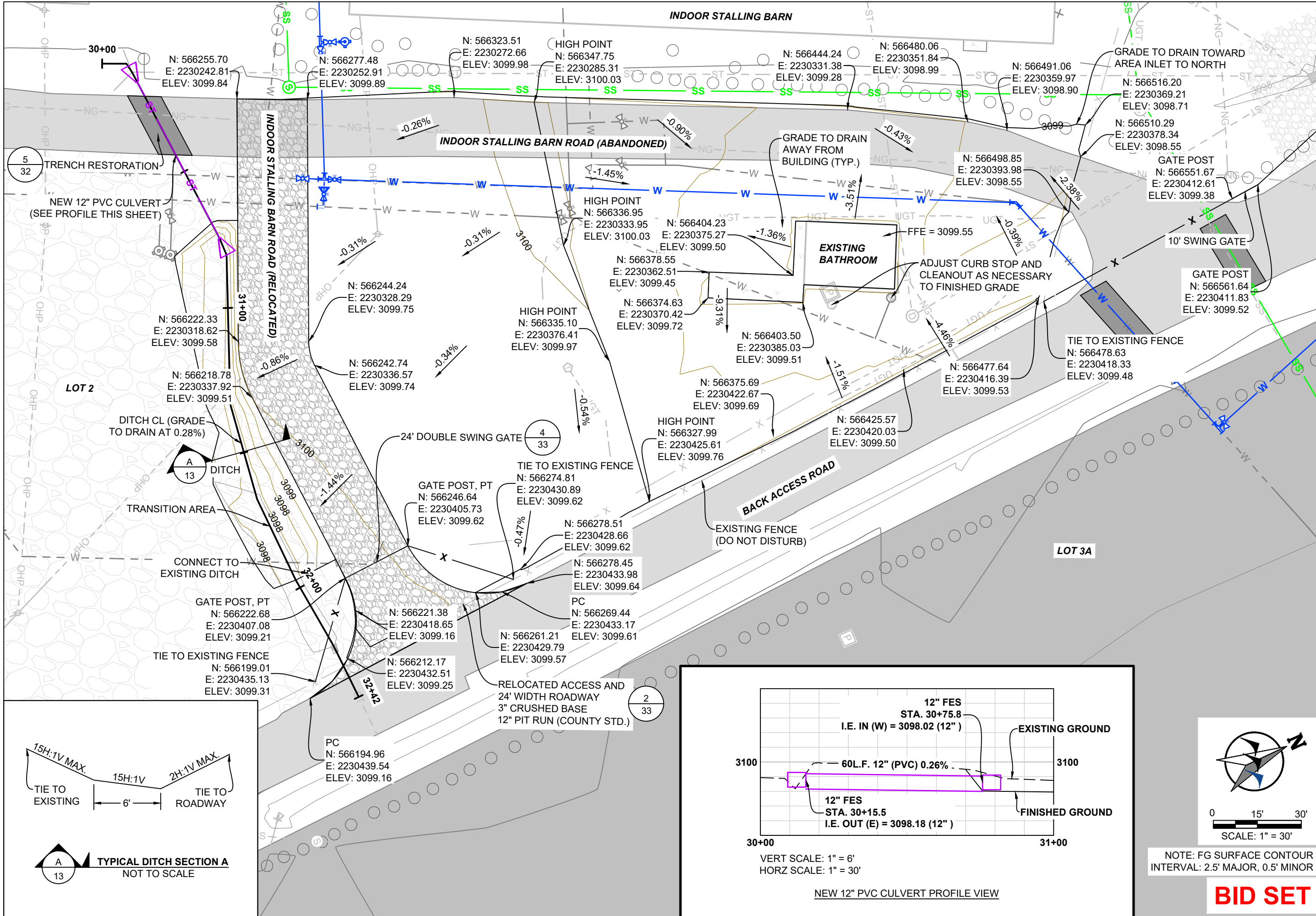
YELLOWSTONE COUNTY  
ARENA BACK LOT CONSTRUCTION PROJECT  
**FENCE INSTALLATION AND ROAD GRADING**  
BILLINGS, MT

DESIGNED BY: KH  
DRAWN BY: ZSL  
CHECKED BY: GTR  
DATE: 1/18/2024

SHEET  
**12**

**BID SET**

K:\Sheridan\Yellowstone County, MT\2021555 MetraPark Infrastructure Improvements\05CAD\Drawings\PLANS\SET04\_Arena\_Back Lots\PHASE 1 - ARENA BACK LOTS\LOT04\_IMPROVEMENTS\21555-ARENA-BACK-LOT\_IMPROV.dwg GRAD (6) 1/22/2024 5:22:19 PM



NOTE: FG SURFACE CONTOUR INTERVAL: 2.5' MAJOR, 0.5' MINOR

**BID SET**

NO.	REVISION	BY	DATE

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560 S. 24TH ST. W., SUITE 201  
BILLINGS, MT 59102  
(406) 894-2210  
www.wwcengineering.com

YELLOWSTONE COUNTY  
**ARENA BACK LOT CONSTRUCTION PROJECT**  
**INDOOR STALLING BARN GRADING**  
BILLINGS, MT

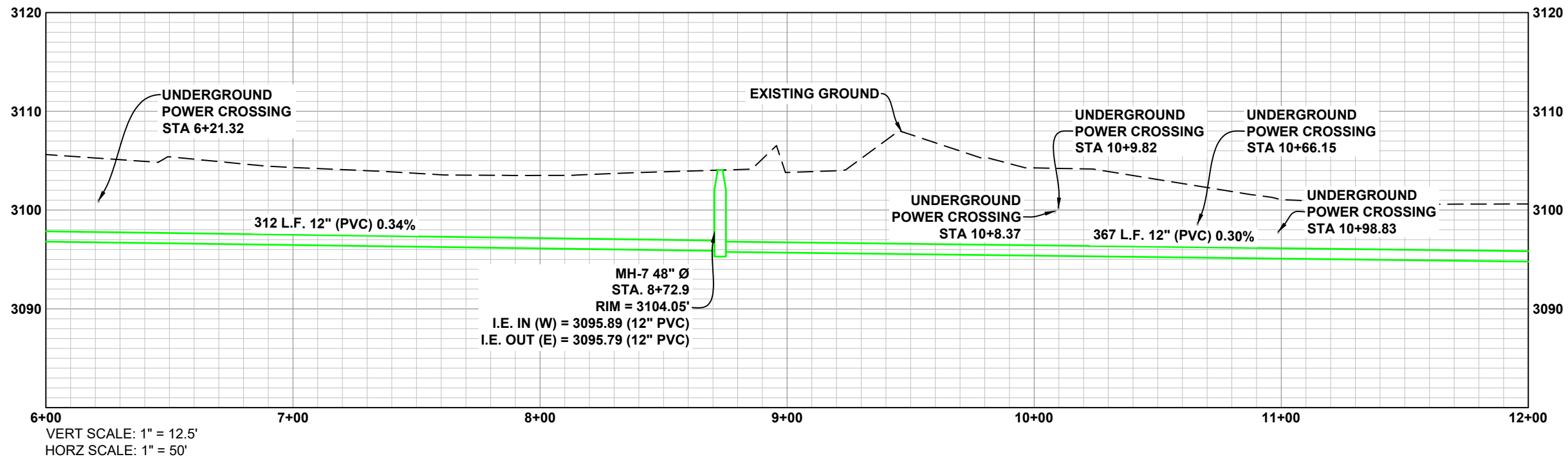
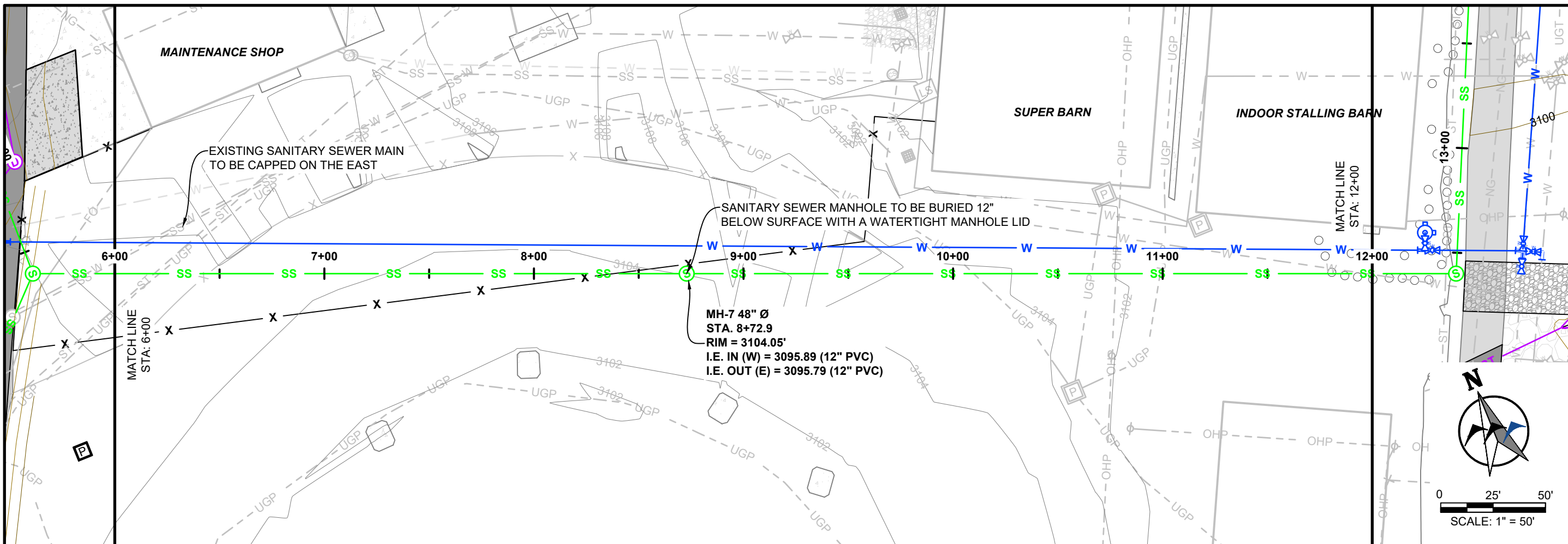
DESIGNED BY: KH  
DRAWN BY: ZSL  
CHECKED BY: GTR  
DATE: 1/18/2024  
SHEET  
**13**

PROJECT NO. 2021-555





K:\Sheridan\Yellowstone County.MT\2021555 MetraPark Infrastructure Improvements\05CAD\Sheets\PLAN\_SET04\_Arena\_Back\_Lots\PHASE 1 - ARENA BACK LOT\05 UTILITIES\21555-ARENA-BACK-LOT\_SSWR.dwg SSWR PP (2) 1/22/2024 2:47:15 PM



NO.	REVISION	BY	DATE

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YELLOWSTONE COUNTY  
ARENA BACK LOT CONSTRUCTION PROJECT  
**SANITARY SEWER PLAN AND PROFILE**  
BILLINGS, MT

DESIGNED BY: KH  
DRAWN BY: ZSL  
CHECKED BY: GTR  
DATE: 1/18/2024

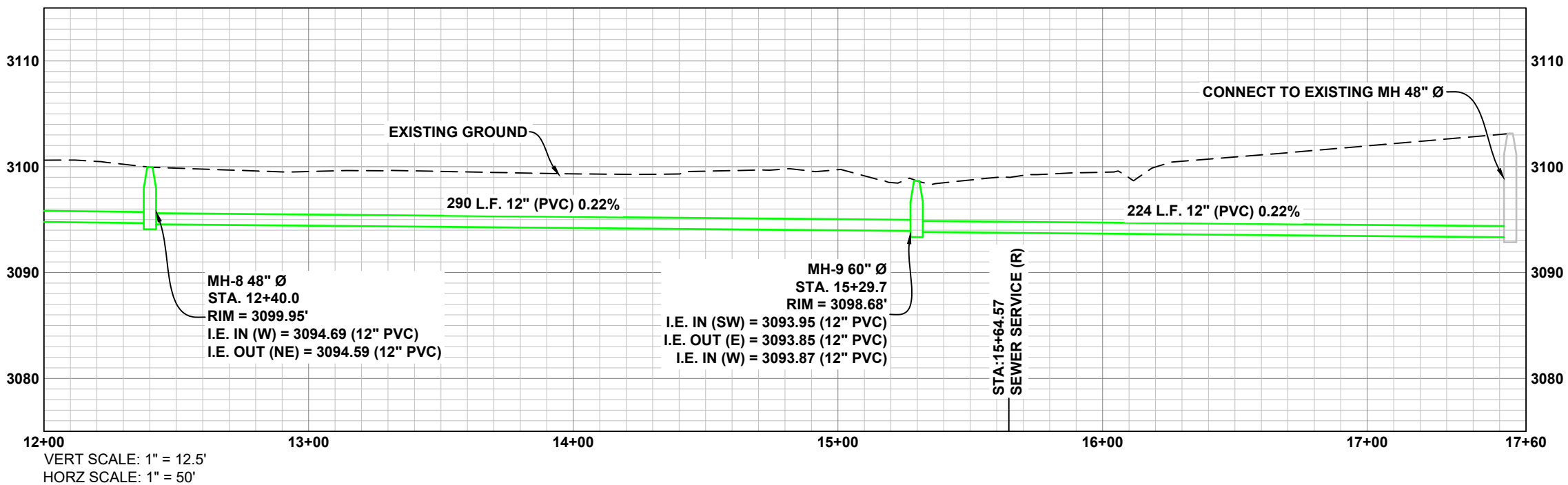
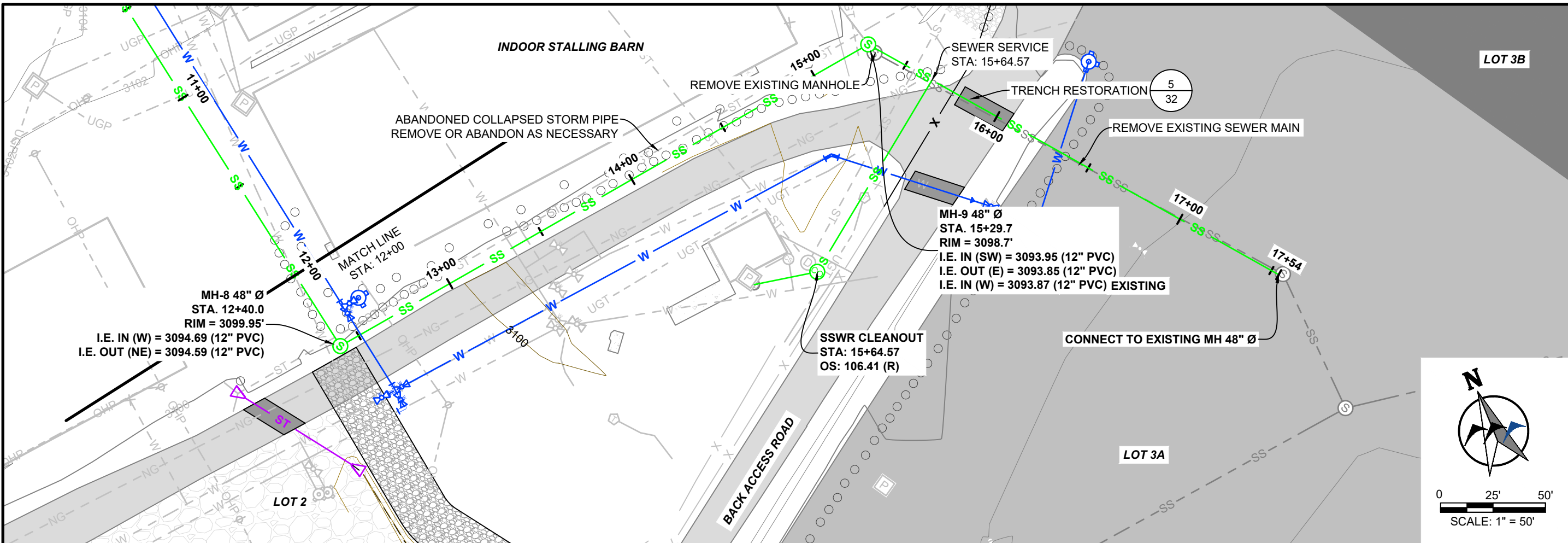
SHEET  
**15**

**BID SET**

PROJECT NO. 2021-555



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NOTE:  
ADD INSULATION ABOVE SANITARY SEWER PIPE WITH LESS THAN 4 FEET OF COVER.

**BID SET**

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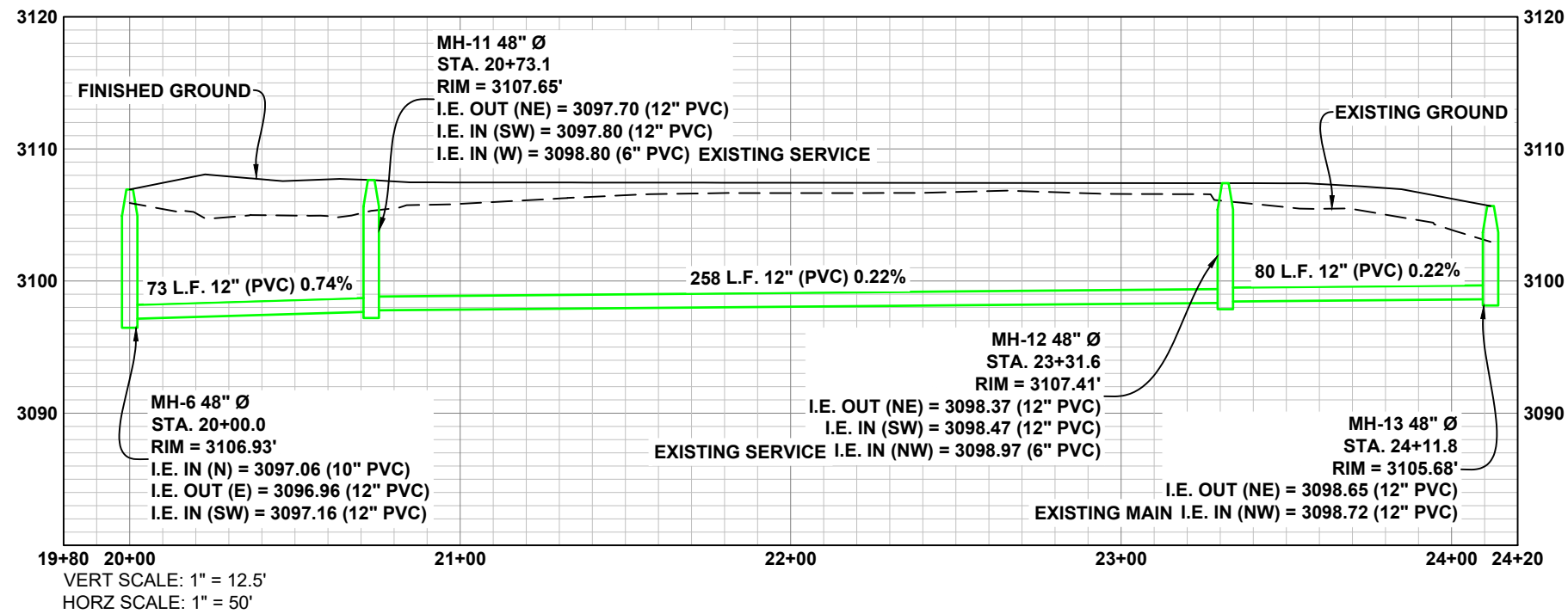
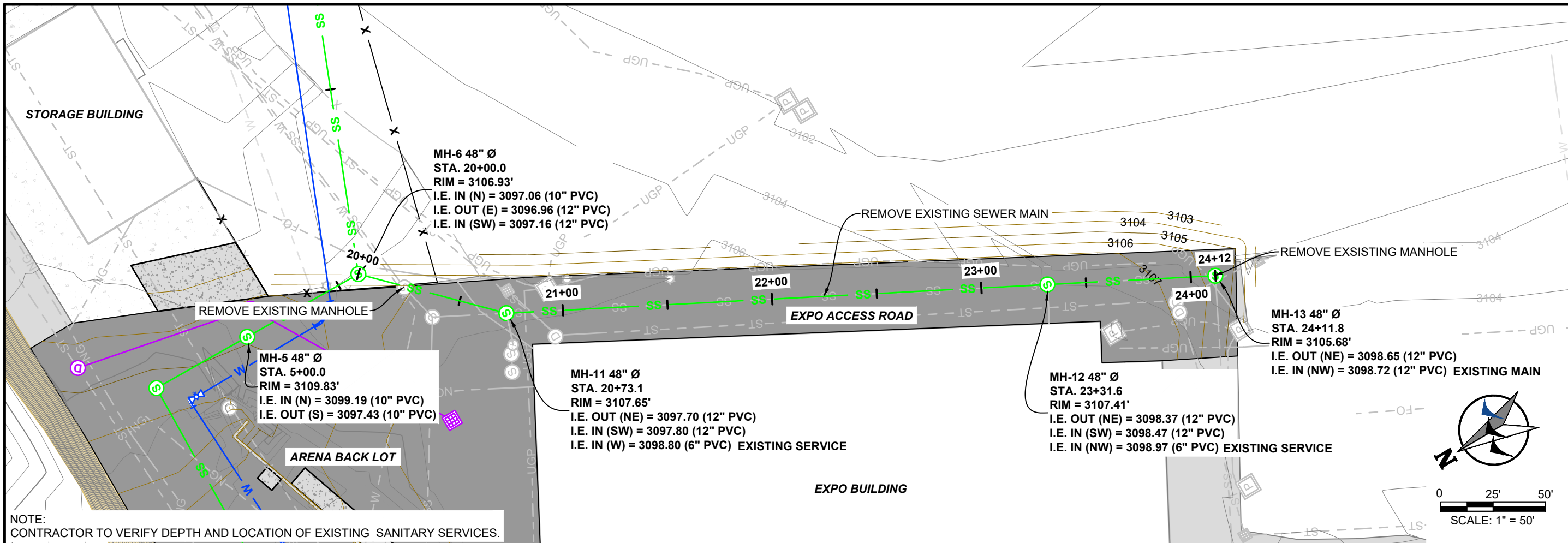
YELLOWSTONE COUNTY  
ARENA BACK LOT CONSTRUCTION PROJECT  
**SANITARY SEWER PLAN AND PROFILE**  
BILLINGS, MT

DESIGNED BY: KH  
DRAWN BY: ZSL  
CHECKED BY: GTR  
DATE: 1/18/2024

SHEET  
**16**

PROJECT NO. 2021-565

K:\Sheridan\Yellowstone County\_MIT2021555 MetraPark Infrastructure Improvements\05CAD\Sheets\PLAN\_SET04\_Arena\_Back\_Lots\PHASE 1 - ARENA BACK LOT\05 UTILITIES\21555-ARENA-BACK-LOT\_SSWR.dwg SSWR PP (4) 1/22/2024 2:47:15 PM



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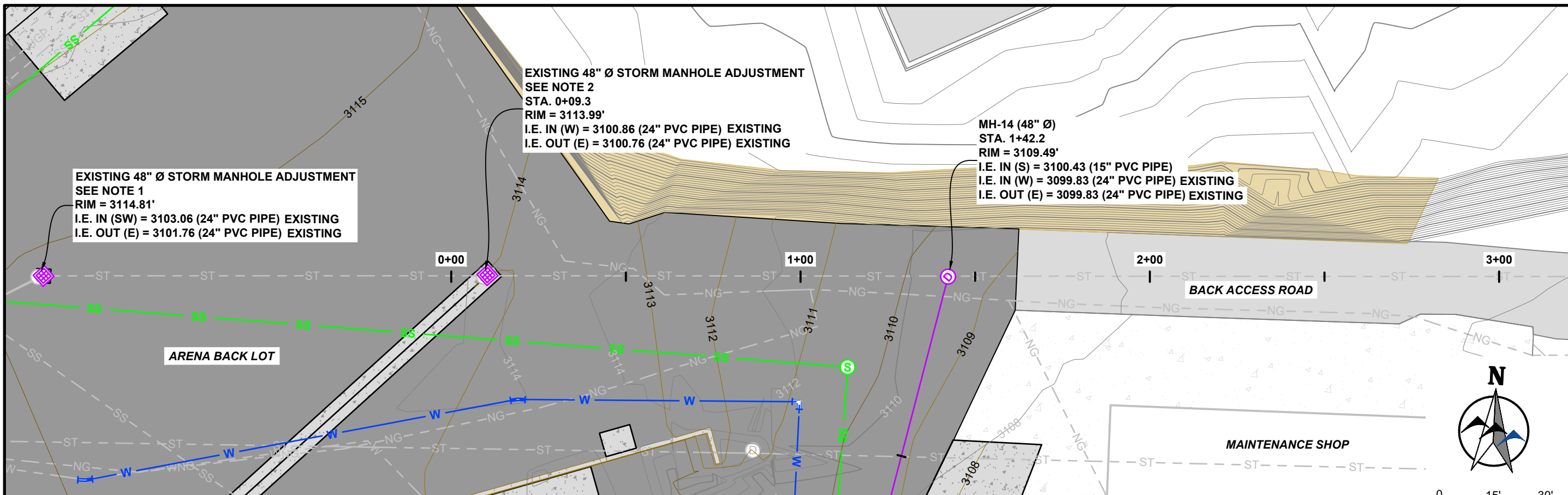
YELLOWSTONE COUNTY  
 ARENA BACK LOT CONSTRUCTION PROJECT  
**SANITARY SEWER PLAN AND PROFILE**  
 BILLINGS, MT

DESIGNED BY: KH  
 DRAWN BY: ZSL  
 CHECKED BY: GTR  
 DATE: 1/18/2024

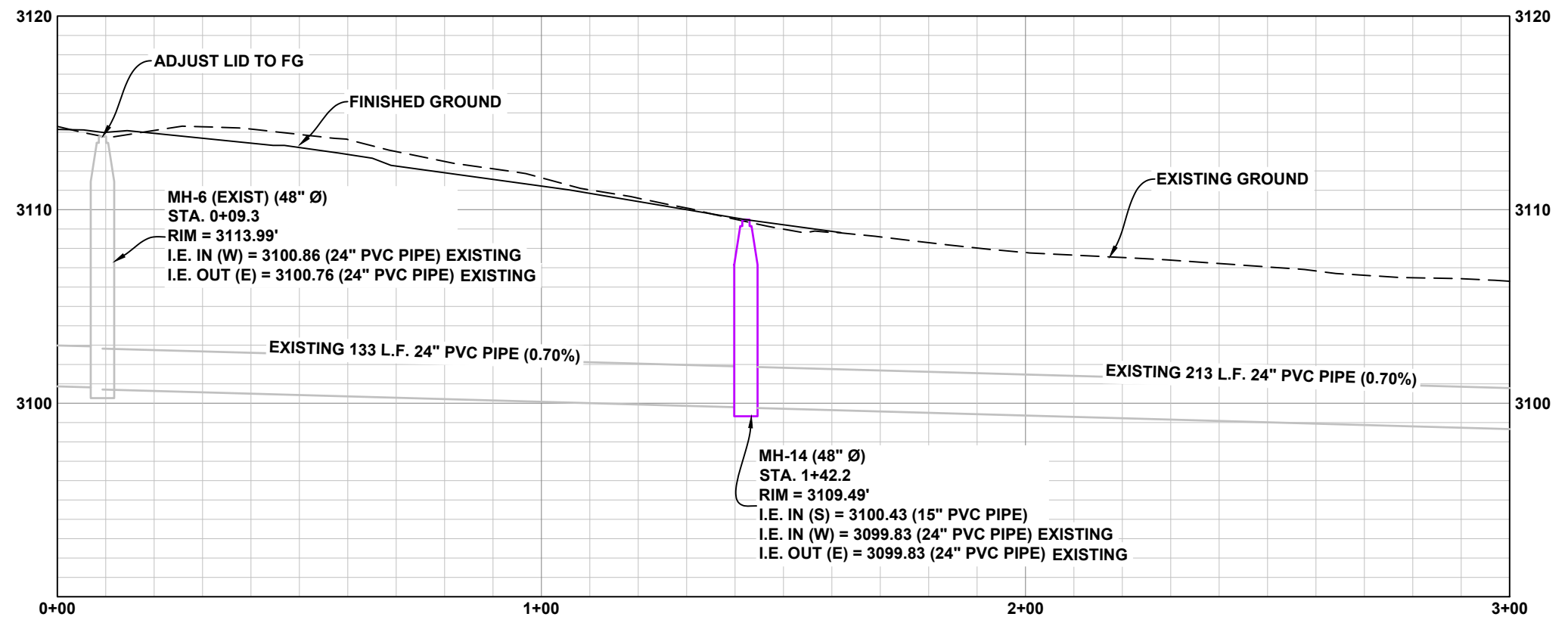
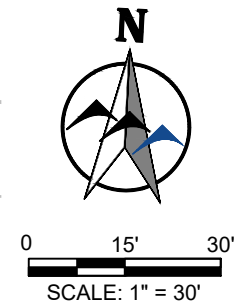
**BID SET**



K:\Sheridan\Yellowstone County, MT\2021555 MetraPark Infrastructure Improvements\05CAD\Sheets\PLAN\_SET\04\_Arena\_Back\_Lot\PHASE 1 - ARENA BACK LOT\05\_UTILITIES\21555-ARENA-BACK-LOT\_STRM.dwg STORM (1) 1/22/2024 2:39:22 PM



- NOTES:**
- REMOVE EXISTING ADJUSTMENT RINGS (3) AND MANHOLE LID. INSTALL NEW SMALL FLAT INLET. LOWER EXISTING RIM ELEVATION BY 0.5' TO ACHIEVE FINAL GRADE. CONTRACTOR TO VERIFY.
  - REMOVE EXISTING ADJUSTMENT RINGS (4) AND MANHOLE LID. INSTALL NEW VALLEY GUTTER GRATE. LOWER EXISTING RIM ELEVATION BY 0.667' TO ACHIEVE FINAL GRADE. CONTRACTOR TO VERIFY.



**BID SET**

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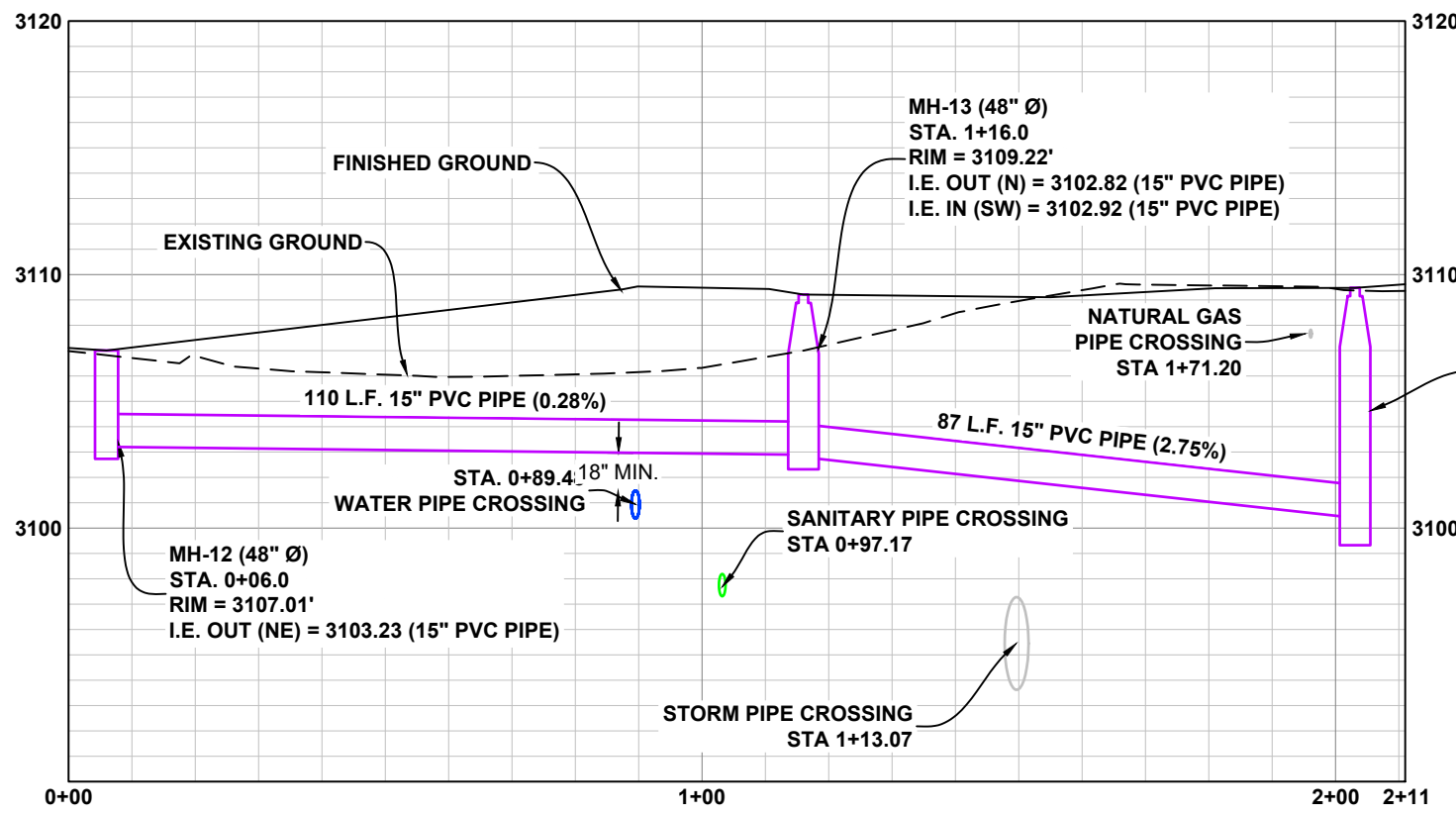
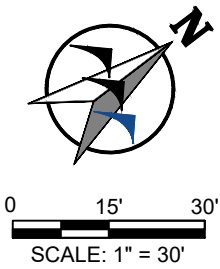
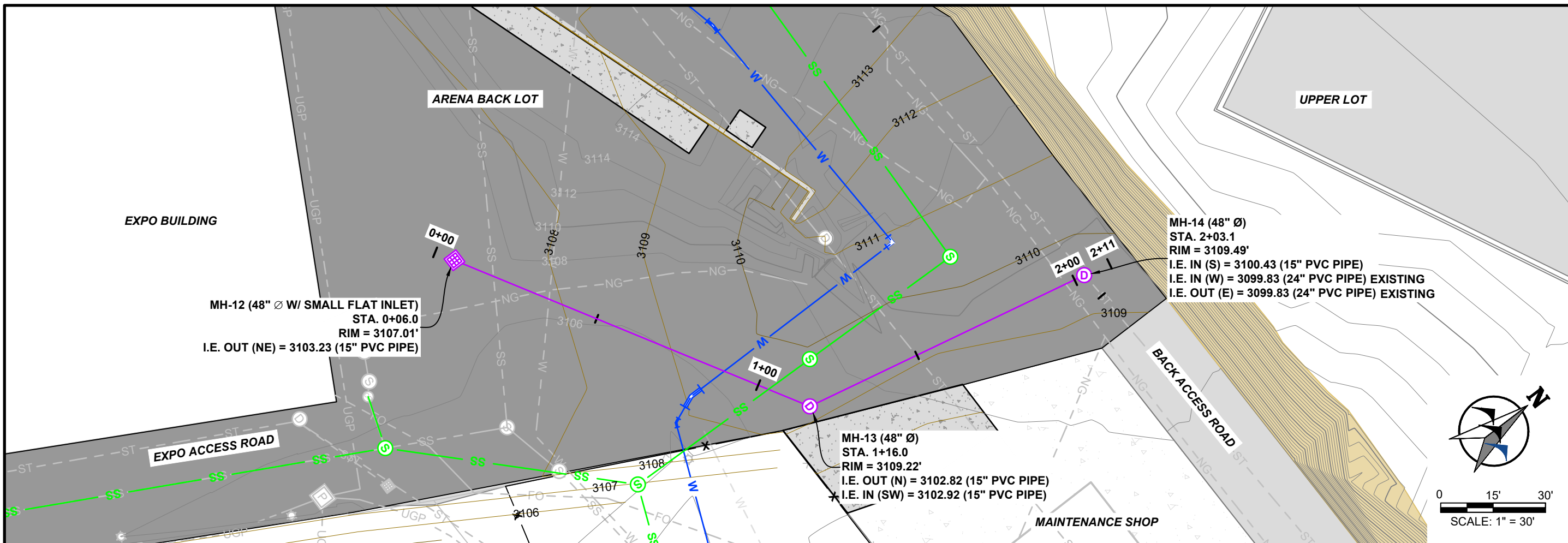
YELLOWSTONE COUNTY  
**ARENA BACK LOT CONSTRUCTION PROJECT**  
**ARENA BACK LOT STORM DRAINAGE PLAN AND PROFILE**  
 BILLINGS, MT

DESIGNED BY: KH  
 DRAWN BY: ZSL  
 CHECKED BY: GTR  
 DATE: 1/18/2024

SHEET  
**18**

PROJECT NO. 2021-555

K:\Sheridan\Yellowstone County, MT\2021555 MetraPark Infrastructure Improvements\05CAD\Sheets\PLAN\_SET04\_Arena\_Back Lot\PHASE 1 - ARENA BACK LOT\05 UTILITIES\21555-ARENA-BACK-LOT\_STRM.dwg STORM (2) 1/22/2024 2:38:22 PM



VERT SCALE: 1" = 7.5'  
 HORZ SCALE: 1" = 30'

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YELLOWSTONE COUNTY  
**ARENA BACK LOT CONSTRUCTION PROJECT**  
**ARENA BACK LOT STORM DRAINAGE PLAN AND PROFILE**  
 BILLINGS, MT

DESIGNED BY: KH  
 DRAWN BY: ZSL  
 CHECKED BY: GTR  
 DATE: 1/18/2024

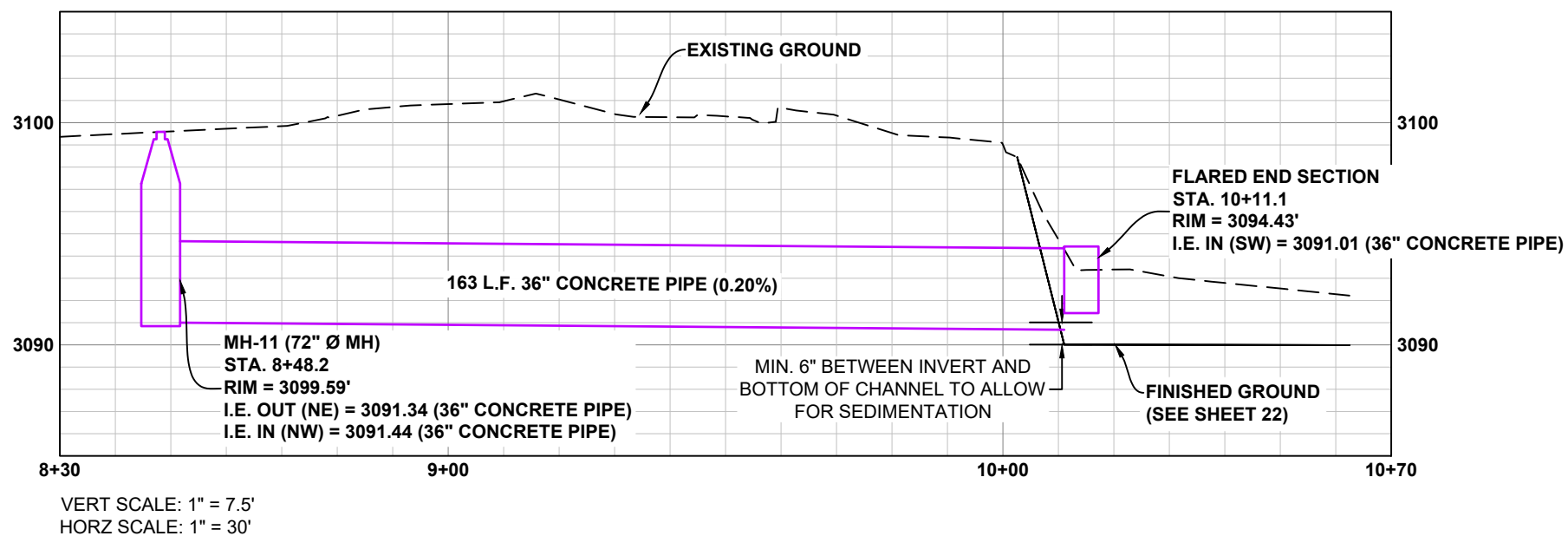
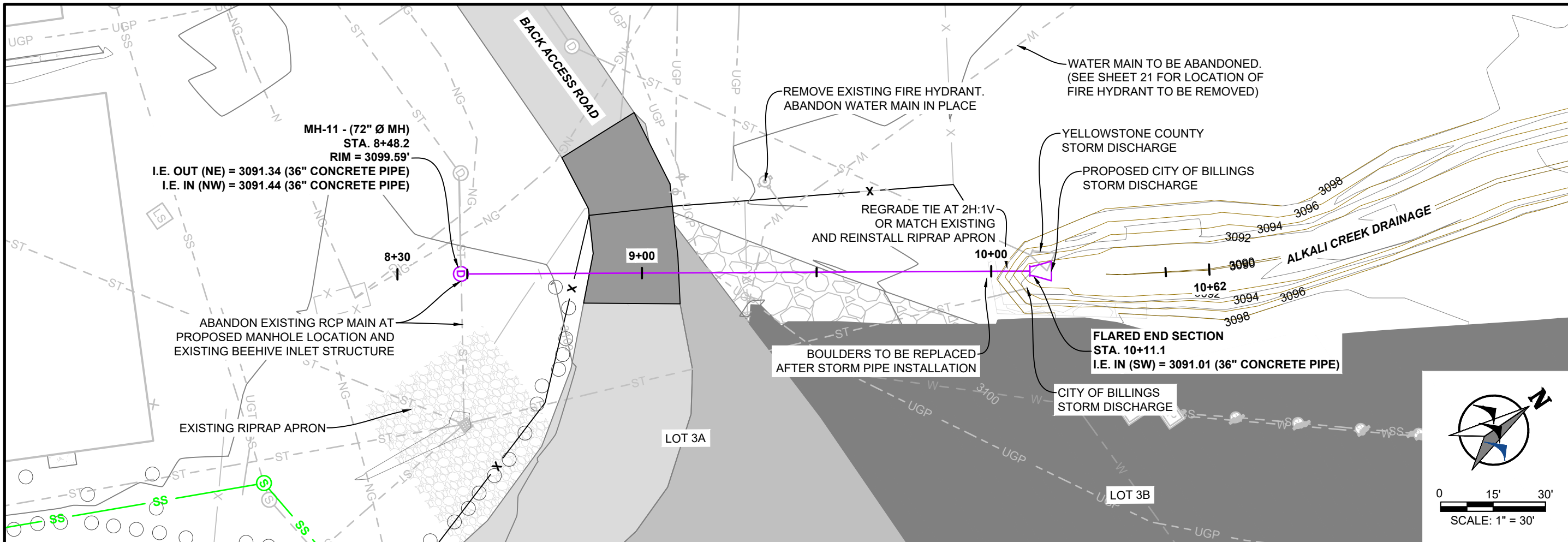
SHEET  
**19**

**BID SET**

PROJECT NO. 2021-555



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NOTE:  
 CONTRACTOR TO VERIFY DEPTH AND LOCATION OF EXISTING STORM MAIN.

**BID SET**

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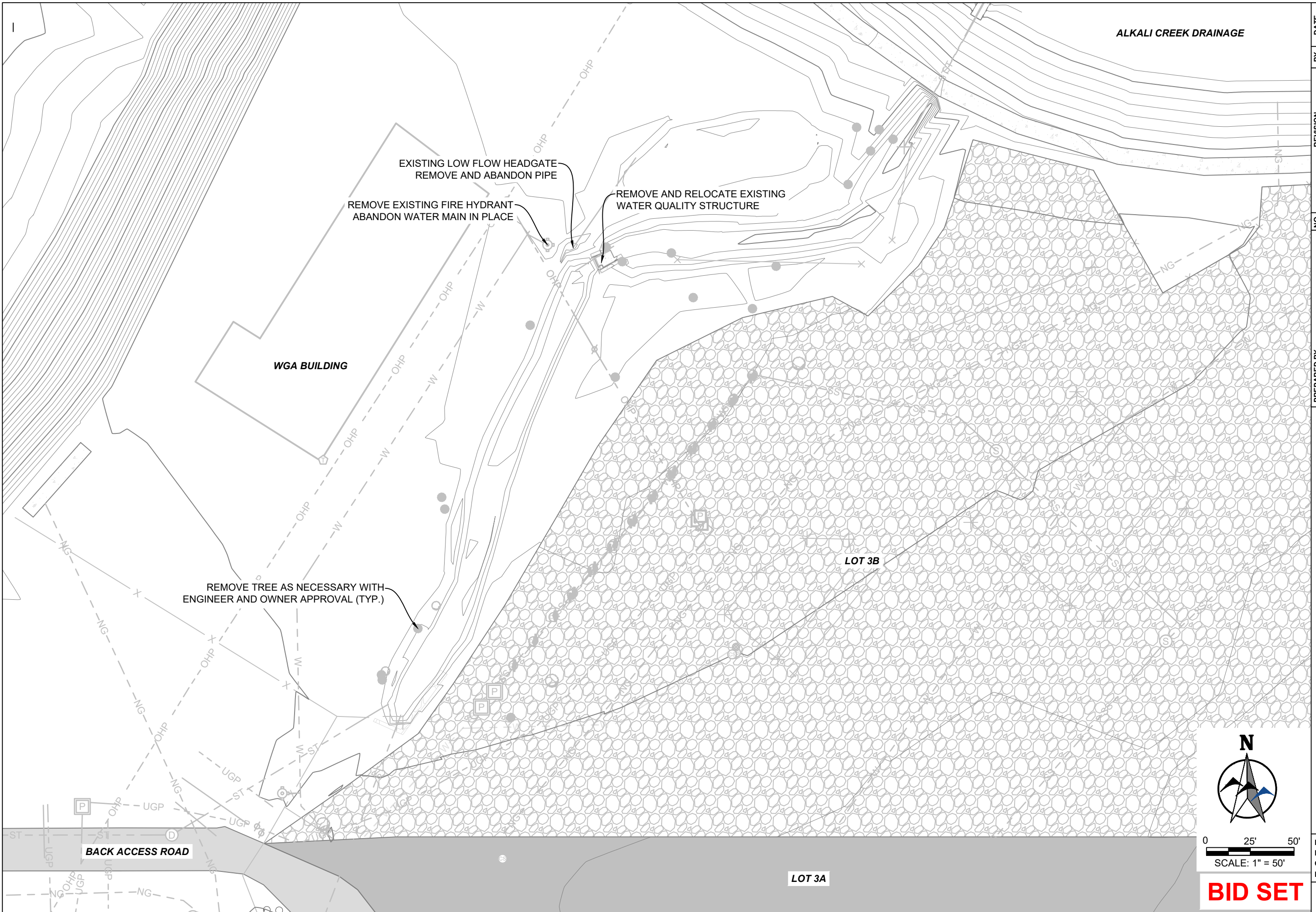
YELLOWSTONE COUNTY  
 ARENA BACK LOT CONSTRUCTION PROJECT  
**ALKAJI CREEK STORM DRAINAGE PLAN AND PROFILE**  
 BILLINGS, MT

DESIGNED BY: KH  
 DRAWN BY: ZSL  
 CHECKED BY: GTR  
 DATE: 1/18/2024

SHEET  
**20**

PROJECT NO. 2021-555

K:\Sheridan\Yellowstone County, MT\2021555 MetraPark Infrastructure Improvements\GIS\CAD\Sheets\PLAN\_SET04\_Arena\_BackLots\PHASE 1 - ARENA BACK LOT\03\_DEMO21555-ARENA-BACK-LOT\_DEMO.dwg ARENA BACK LOT DEMO (3) 1/22/2024 2:39:50 PM



ALKALI CREEK DRAINAGE

WGA BUILDING

LOT 3B

LOT 3A

EXISTING LOW FLOW HEADGATE  
REMOVE AND ABANDON PIPE

REMOVE EXISTING FIRE HYDRANT  
ABANDON WATER MAIN IN PLACE

REMOVE AND RELOCATE EXISTING  
WATER QUALITY STRUCTURE

REMOVE TREE AS NECESSARY WITH  
ENGINEER AND OWNER APPROVAL (TYP.)

BACK ACCESS ROAD



0 25' 50'  
SCALE: 1" = 50'

**BID SET**

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YELLOWSTONE COUNTY  
 ARENA BACK LOT CONSTRUCTION PROJECT  
**ALKALI CREEK DRAINAGE DEMO**  
 BILLINGS, MT

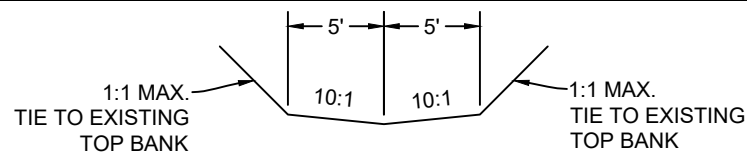
DESIGNED BY: KH  
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 CHECKED BY: GTR  
 DATE: 1/18/2024

SHEET  
**21**

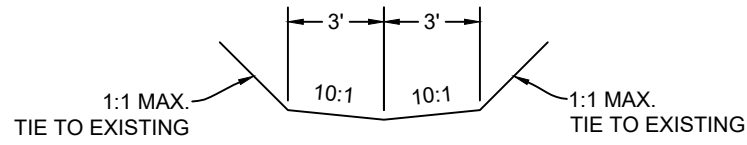
PROJECT NO. 2021-555



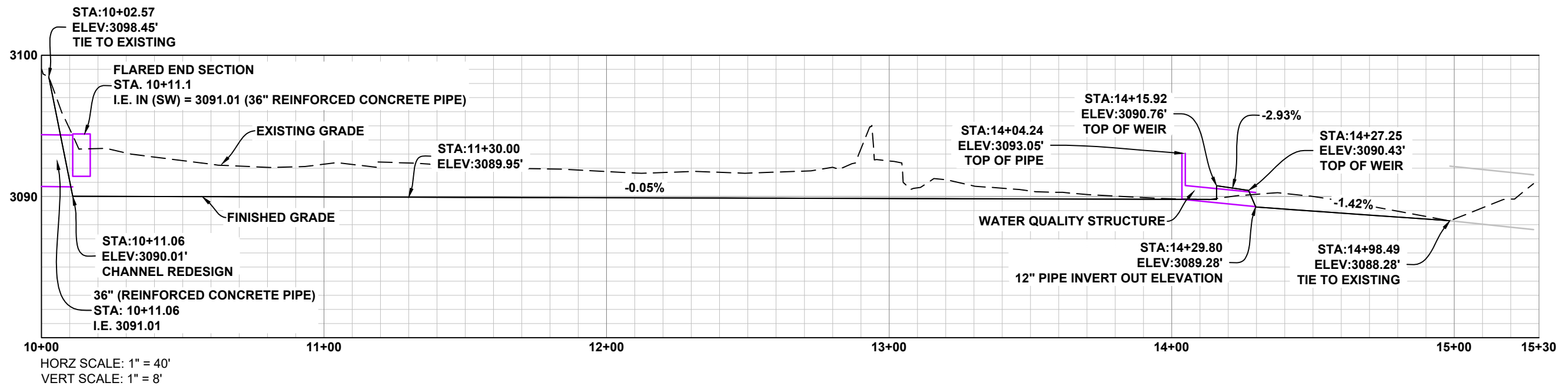
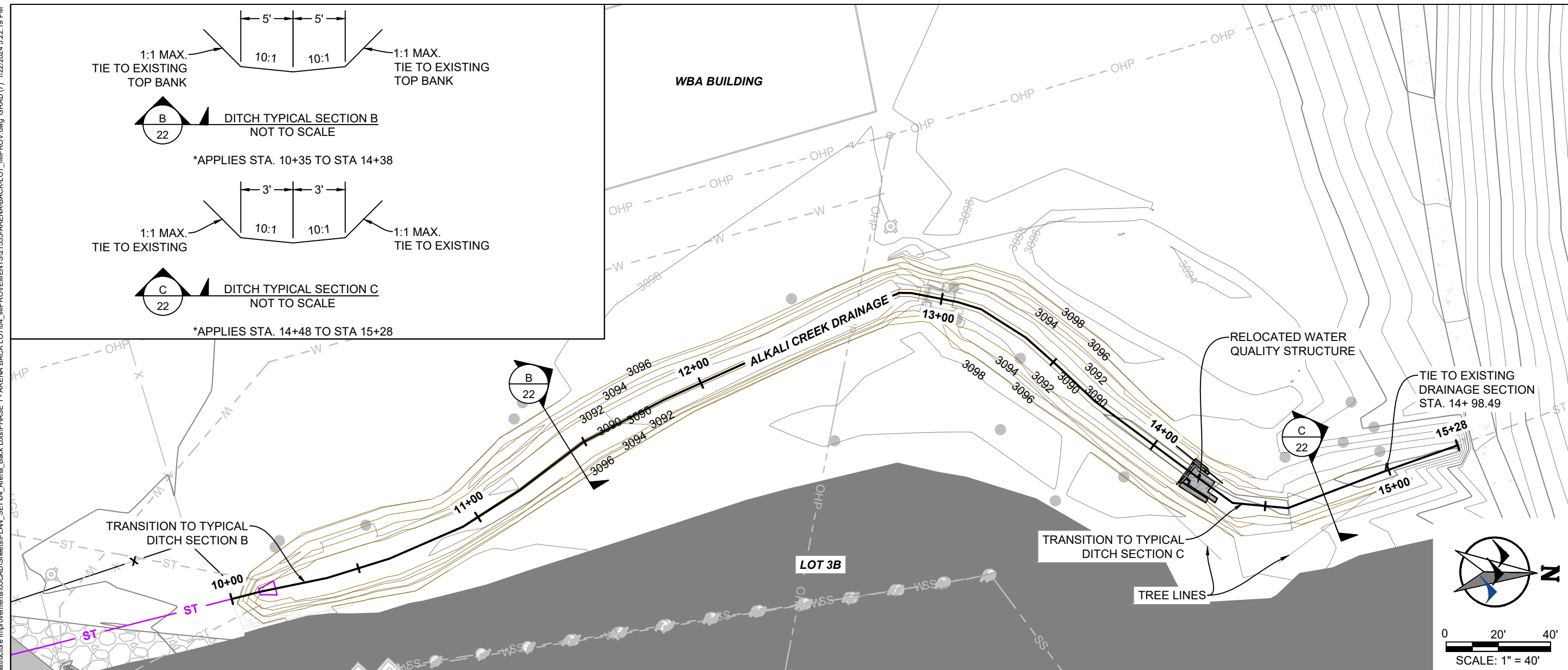
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\*APPLIES STA. 10+35 TO STA 14+38



\*APPLIES STA. 14+48 TO STA 15+28



NOTE:  
WEIR OF WATER QUALITY STRUCTURE SHOWN. REMAINING PIECES OF STRUCTURE NOT SHOWN FOR CLARITY BUT SHALL BE REINSTALLED ACCORDINGLY BASED ON PROPOSED STRUCTURE ELEVATIONS.

**BID SET**

NO.	REVISION	BY	DATE

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YELLOWSTONE COUNTY  
ARENA BACK LOT CONSTRUCTION PROJECT  
**ALKALI CREEK DRAINAGE PLAN AND PROFILE**  
BILLINGS, MT

DESIGNED BY: KH  
DRAWN BY: ZSL  
CHECKED BY: GTR  
DATE: 1/18/2024

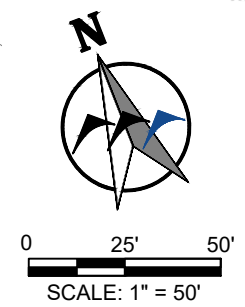
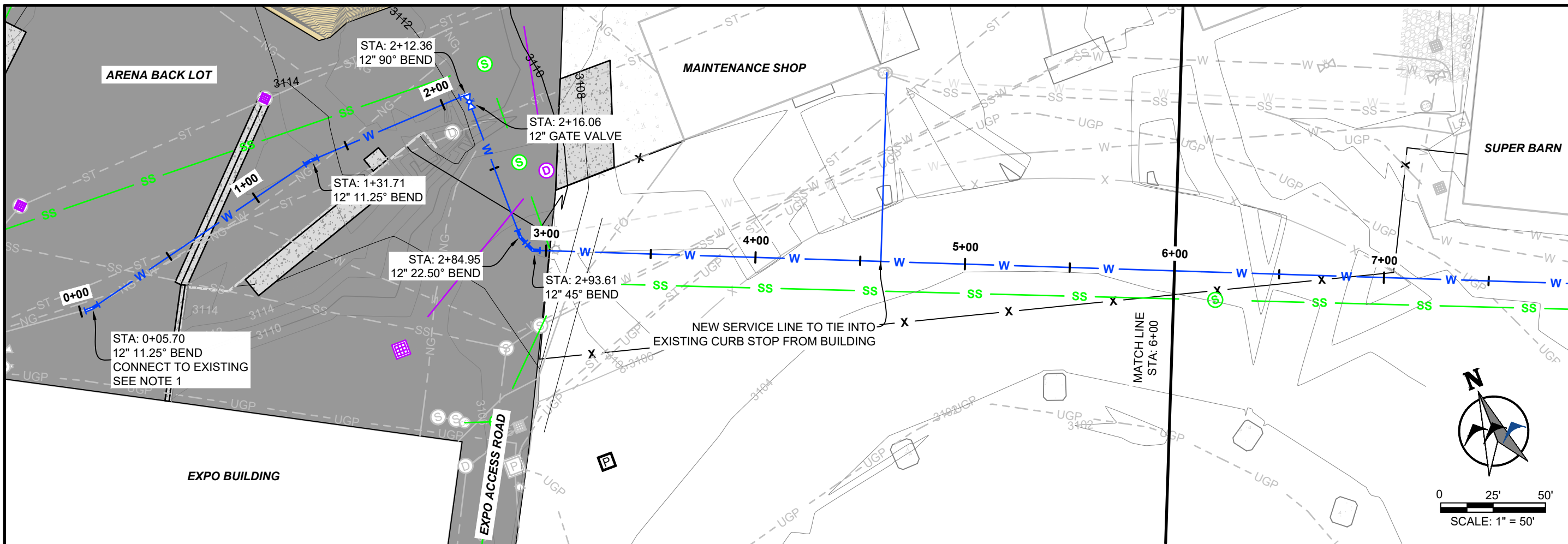
SHEET  
**22**







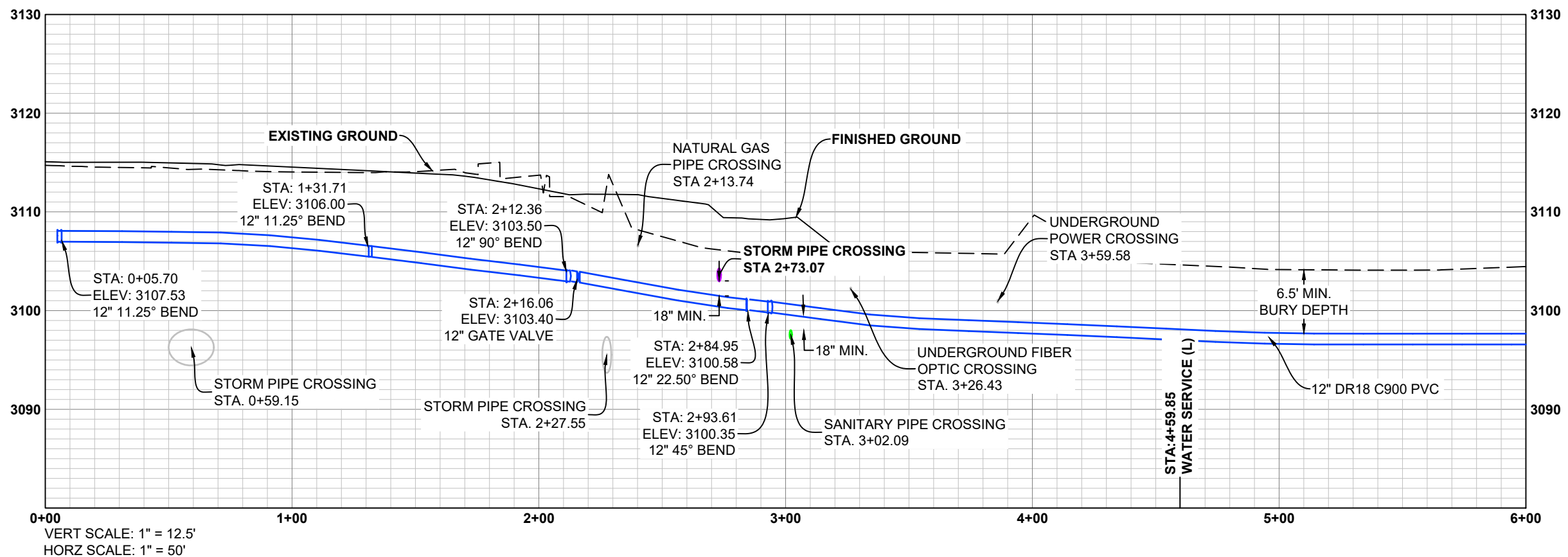
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NO.	REVISION	BY	DATE

PREPARED BY: **WWC ENGINEERING**  
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PROJECT NO. 2021-555



- NOTES:
- CONTRACTOR SHALL LOCATE THE EXISTING WATER MAIN AND ANY UTILITIES OF CONFLICT PRIOR TO CONSTRUCTION AT THE AREAS SPECIFIED ON THE PLANS TO VERIFY DEPTH AND ALIGNMENT OF EXISTING LINES.
  - ELEVATIONS SHOWN ARE TO CENTER OF FITTING OR APPURTENANCE.

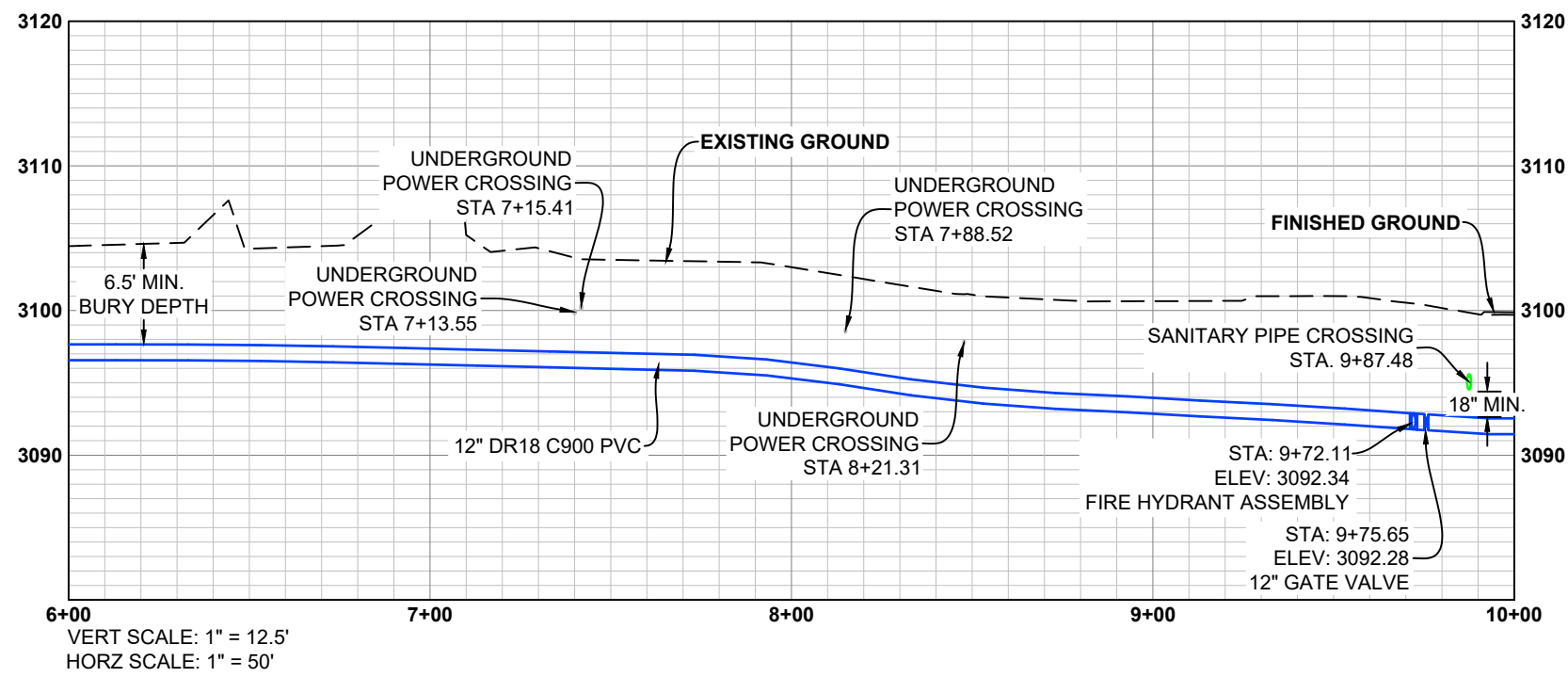
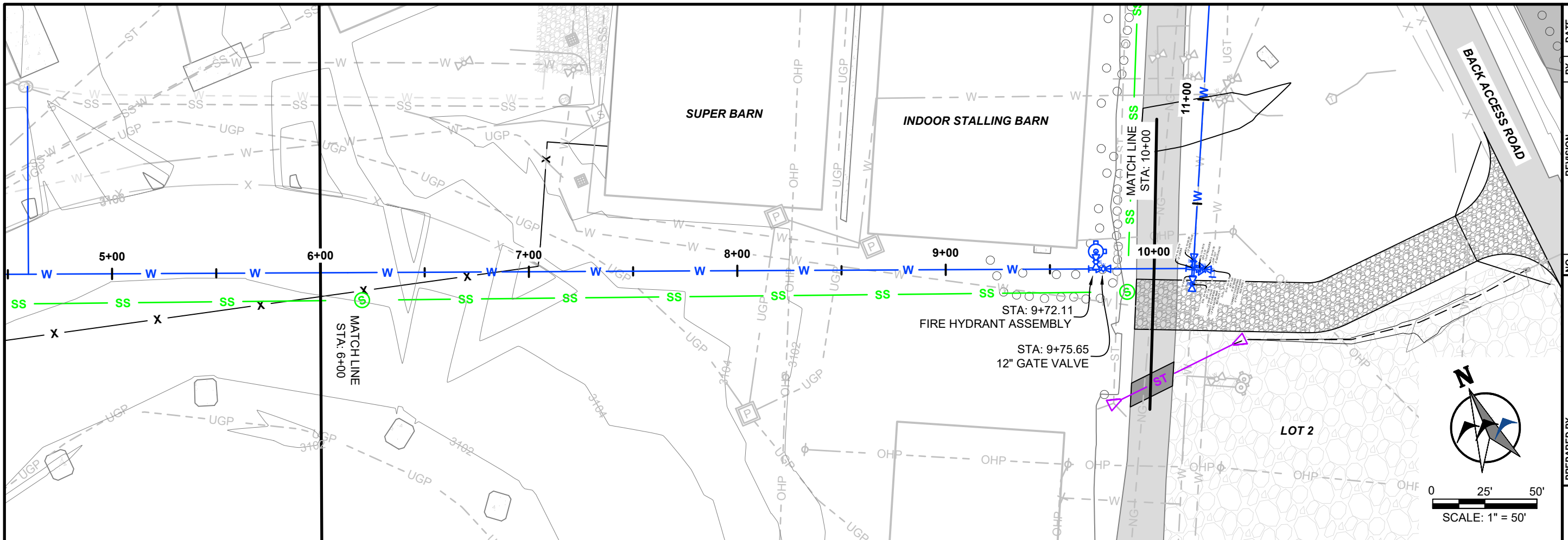
**BID SET**

YELLOWSTONE COUNTY  
**ARENA BACK LOT CONSTRUCTION PROJECT**  
**WATER PLAN AND PROFILE**  
 BILLINGS, MT

DESIGNED BY: KH  
 DRAWN BY: ZSL  
 CHECKED BY: GTR  
 DATE: 1/18/2024

SHEET  
**24**

K:\Sheridan\Yellowstone County, MT\2021555 MetraPark Infrastructure Improvements\05CAD\Sheets\PLAN\_SET\04\_Arena\_Back\_Lot\1555-ARENA-BACK-LOT\_WATER.dwg WATER PP (2) 1/22/2024 5:31:16 PM



NOTE:  
1. ELEVATIONS SHOWN ARE TO CENTER OF FITTING OR APPURTENANCE.

**BID SET**

NO.	REVISION	BY	DATE

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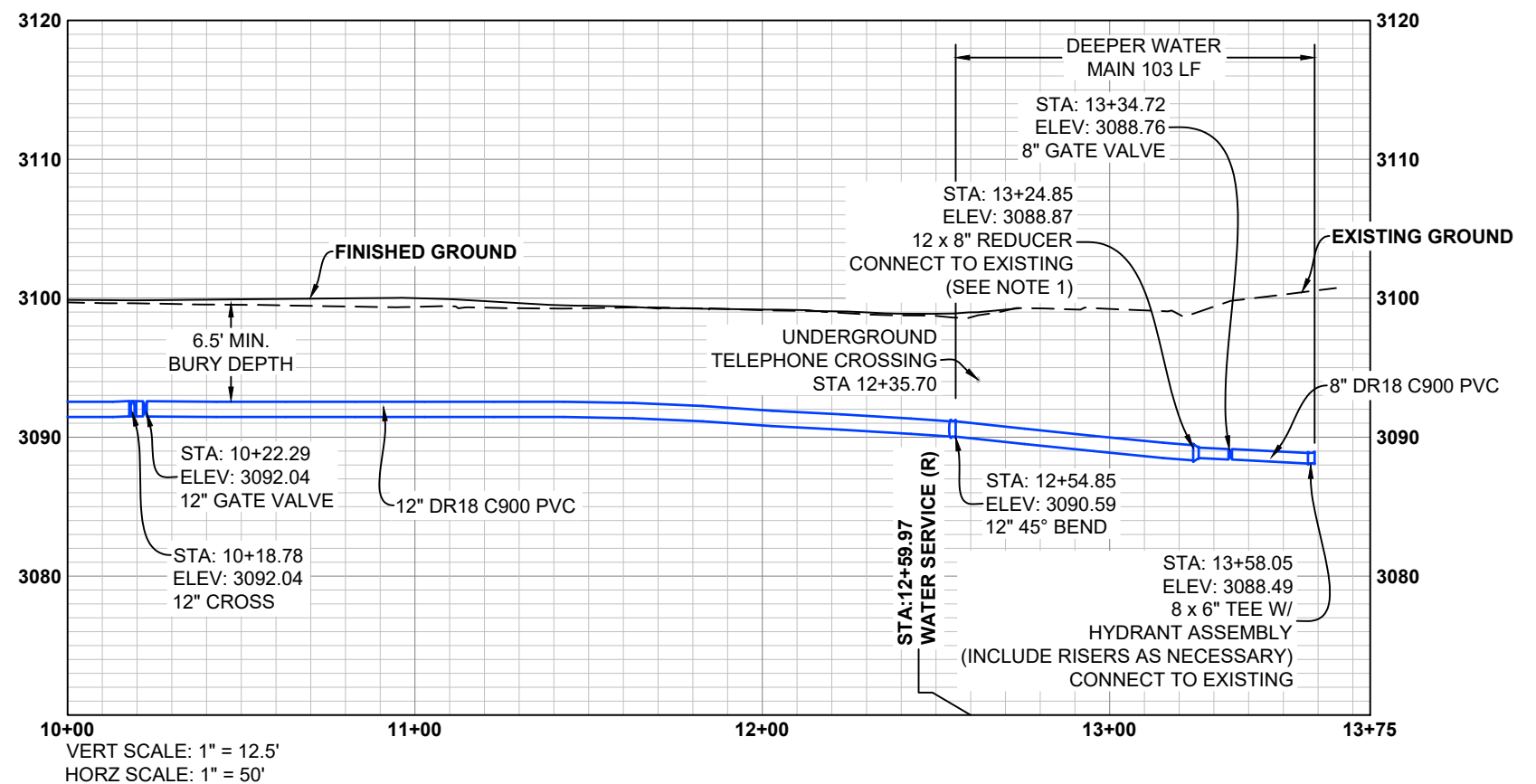
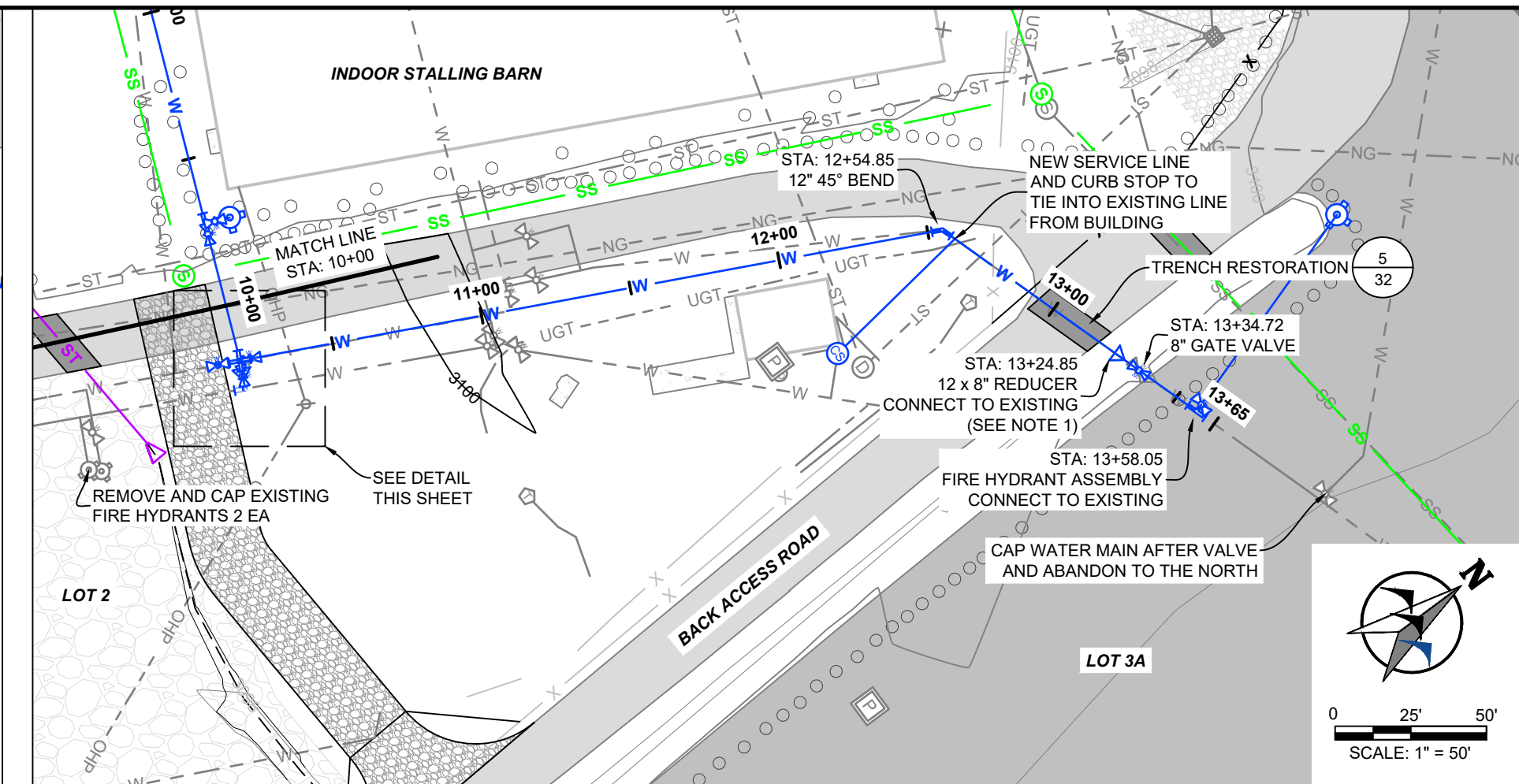
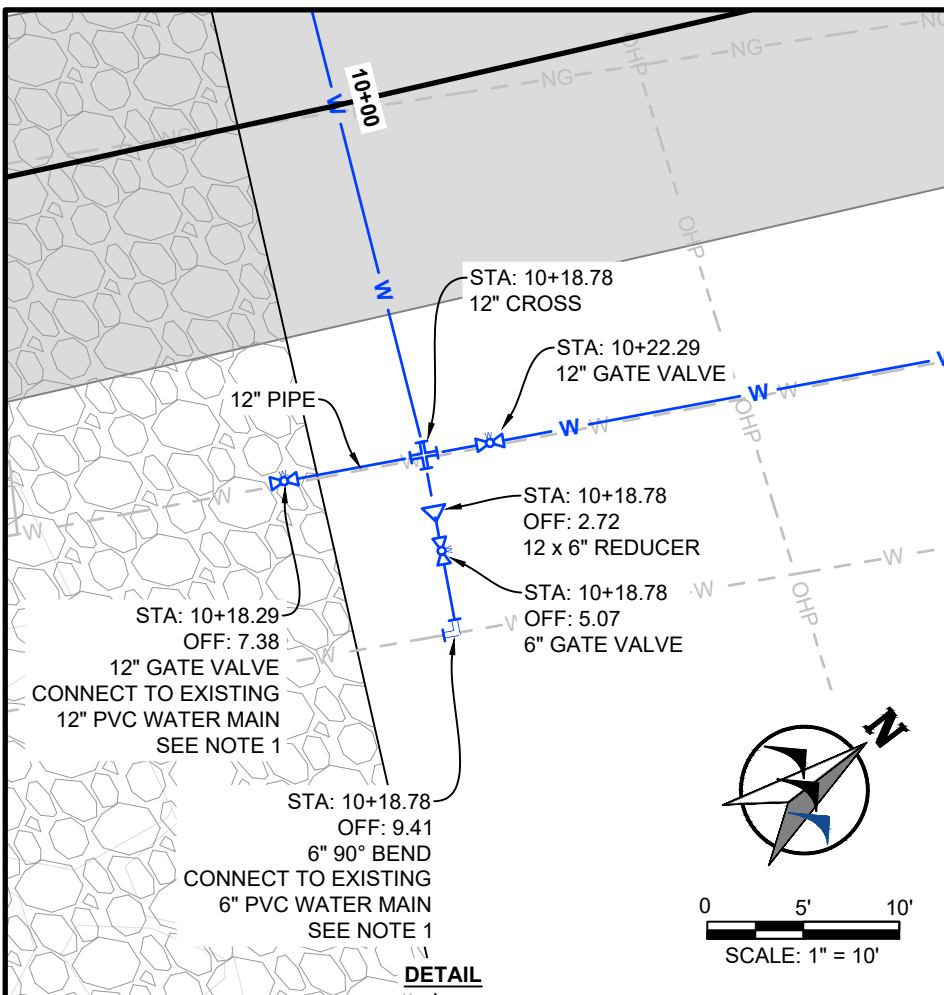
PROJECT NO. 2021-555

YELLOWSTONE COUNTY  
**ARENA BACK LOT CONSTRUCTION PROJECT**  
**WATER PLAN AND PROFILE**  
 BILLINGS, MT

DESIGNED BY: KH  
 DRAWN BY: ZSL  
 CHECKED BY: GTR  
 DATE: 1/18/2024



K:\Sheridan\Yellowstone County, MT\2021555 MetraPark Infrastructure Improvements\05CAD\Sheets\PLAN\_SET\04\_Arena\_Back\_Lot\Arena\_Back\_Lot\Utilities\1555-ARENA-BACK-LOT\_WATER.dwg WATER PP (3) 1/22/2024 5:31:16 PM



- NOTES:
- CONTRACTOR SHALL LOCATE THE EXISTING WATER MAIN AND ANY UTILITIES OF CONFLICT PRIOR TO CONSTRUCTION AT THE AREAS SPECIFIED ON THE PLANS TO VERIFY DEPTH AND ALIGNMENT OF EXISTING LINES.
  - ELEVATIONS SHOWN ARE TO CENTER OF FITTING OR APPURTENANCE.

**BID SET**

NO.	REVISION	BY	DATE

PROJECT NO. 2021-565

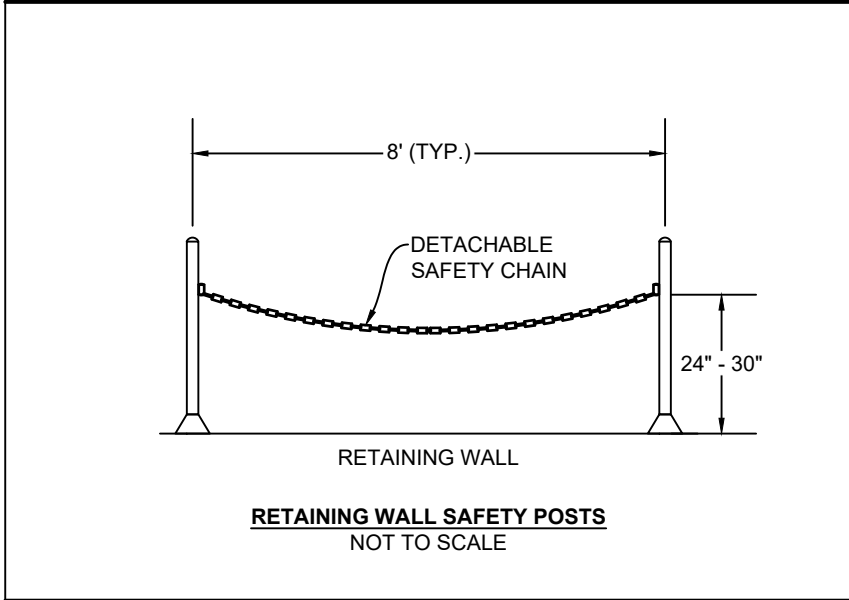
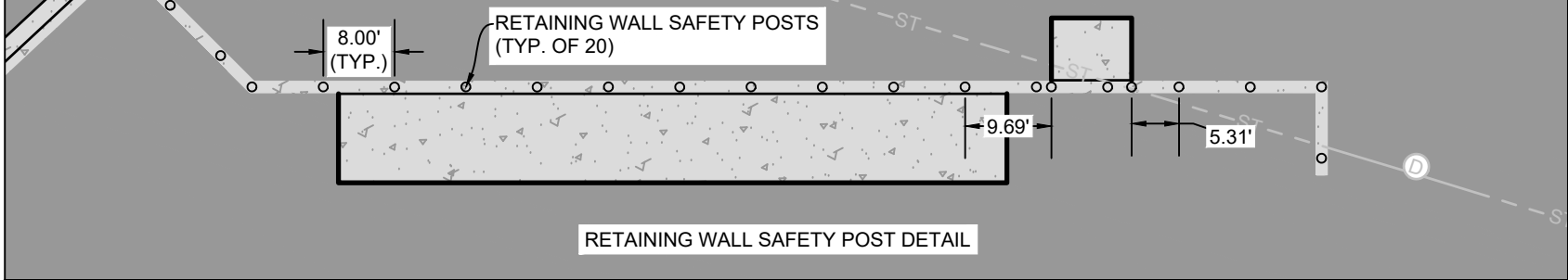
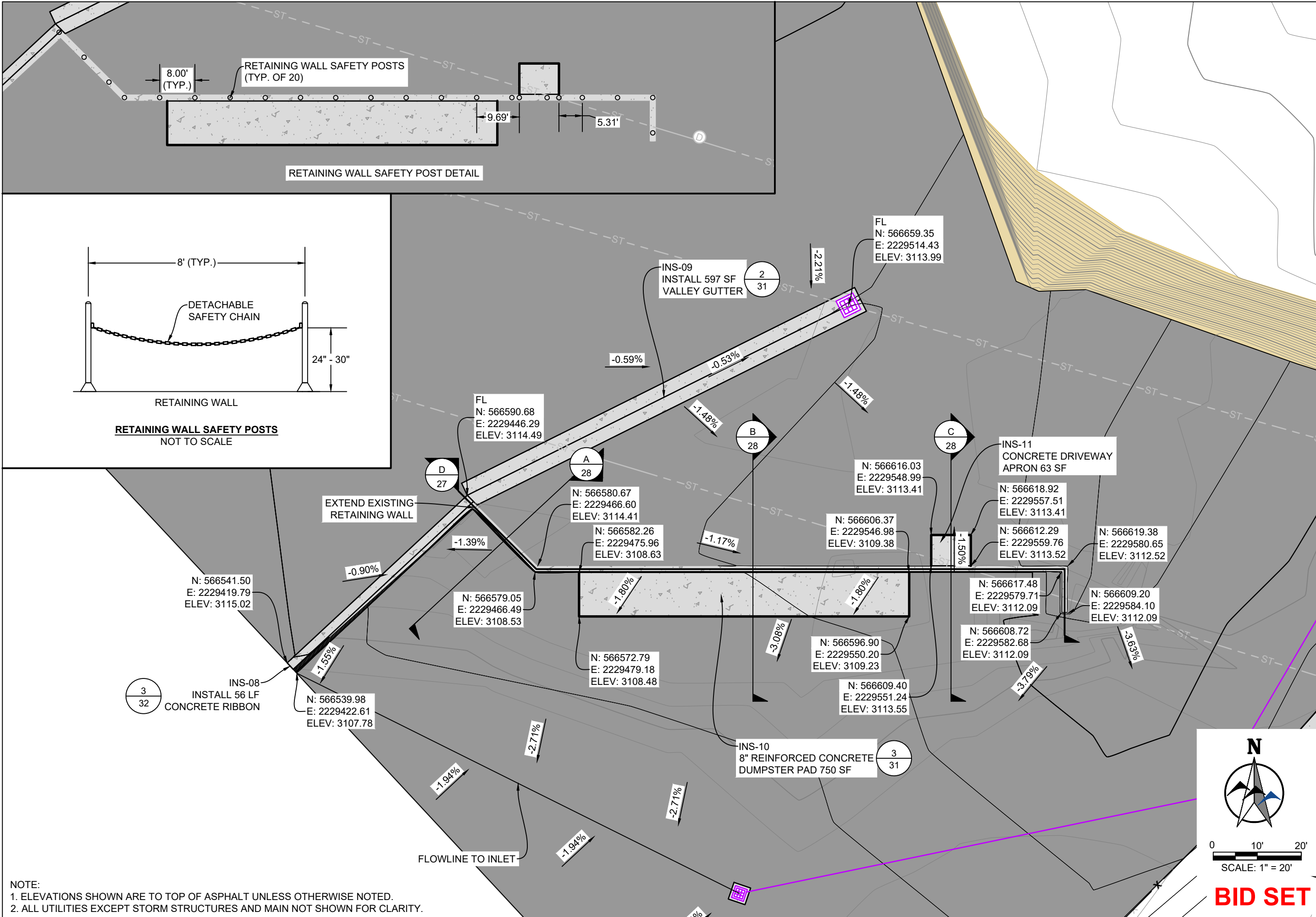
PREPARED BY: **WWC ENGINEERING**  
 550 S. 24TH ST. W., SUITE 201  
 BILLINGS, MT 59102  
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YELLOWSTONE COUNTY  
 ARENA BACK LOT CONSTRUCTION PROJECT  
**WATER PLAN AND PROFILE**  
 BILLINGS, MT

DESIGNED BY: KH  
 DRAWN BY: ZSL  
 CHECKED BY: GTR  
 DATE: 1/18/2024

SHEET  
**26**

K:\Sheridan\Yellowstone County, MT\2021555 MainPark Infrastructure Improvements\05CAD\Drawings\Exhibits\04\_Arena Back Lot\21555-RETWALL-XSECT.dwg 11X17 LANDSCAPE 1/22/2024 2:36:36 PM



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 www.wwcengineering.com

YELLOWSTONE COUNTY  
**ARENA BACK LOT CONSTRUCTION PROJECT**  
**RETAINING WALL LAYOUT**  
 BILLINGS, MT

DESIGNED BY: KH  
 DRAWN BY: KH  
 CHECKED BY: GTR  
 DATE: 1/18/2024

SHEET  
**27**

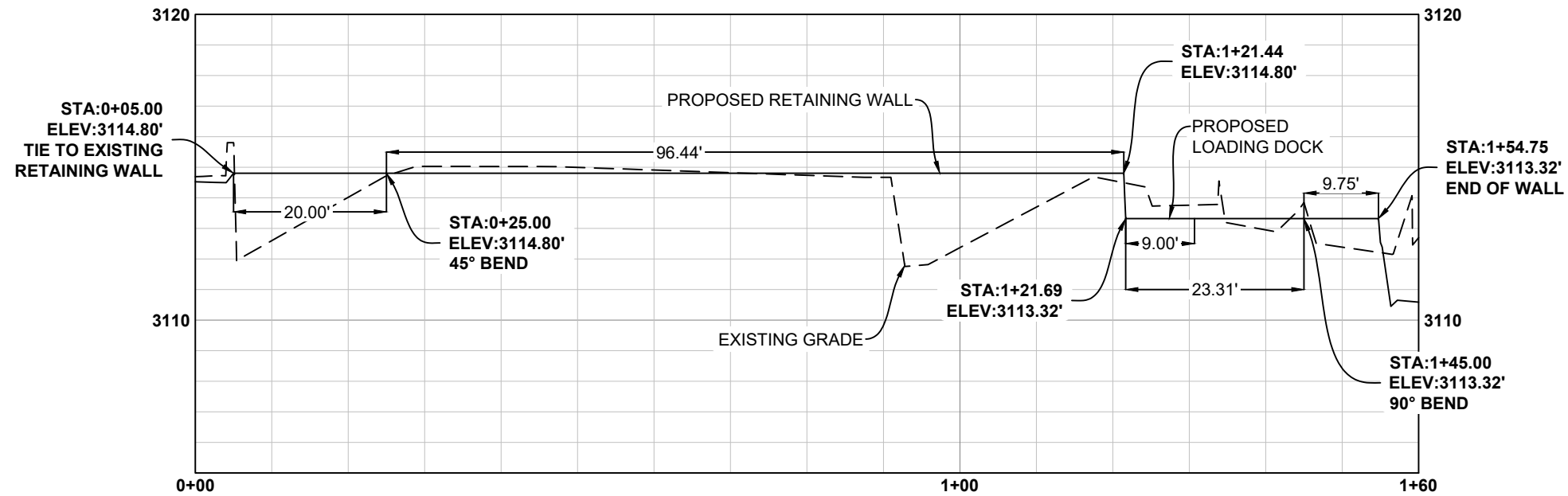
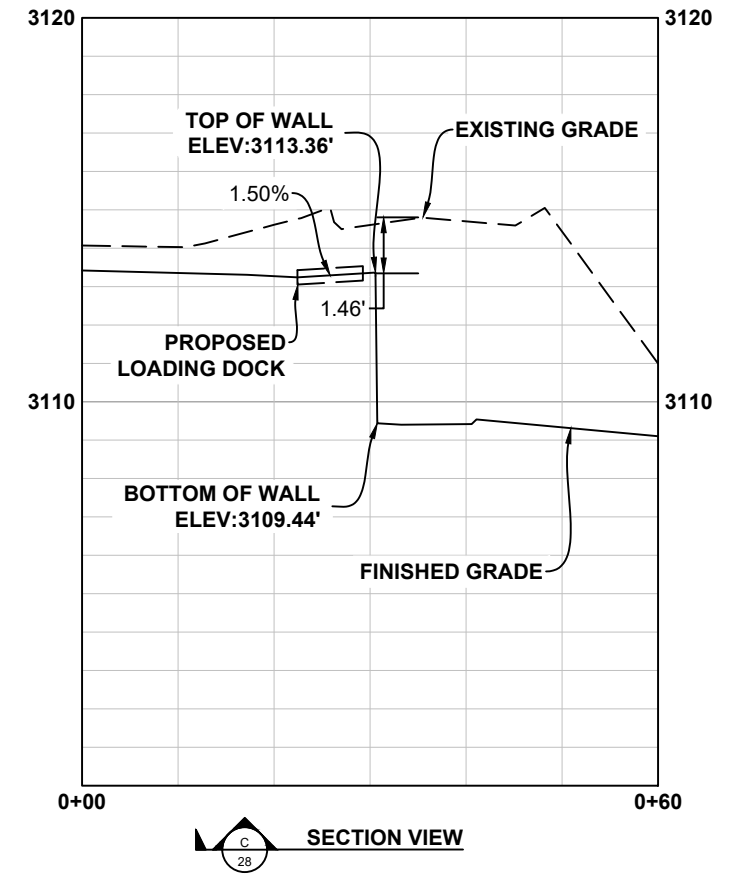
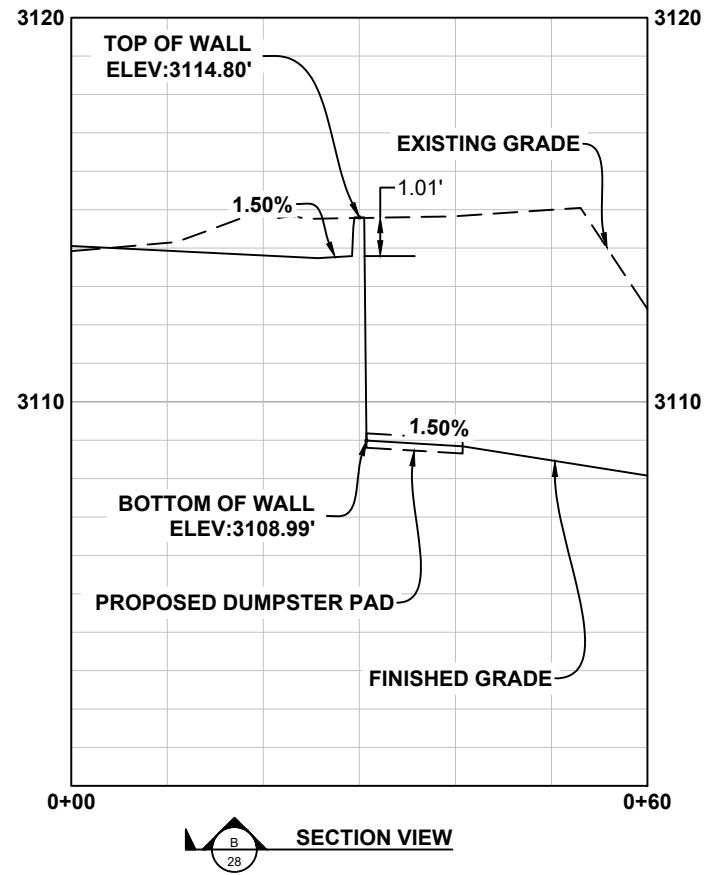
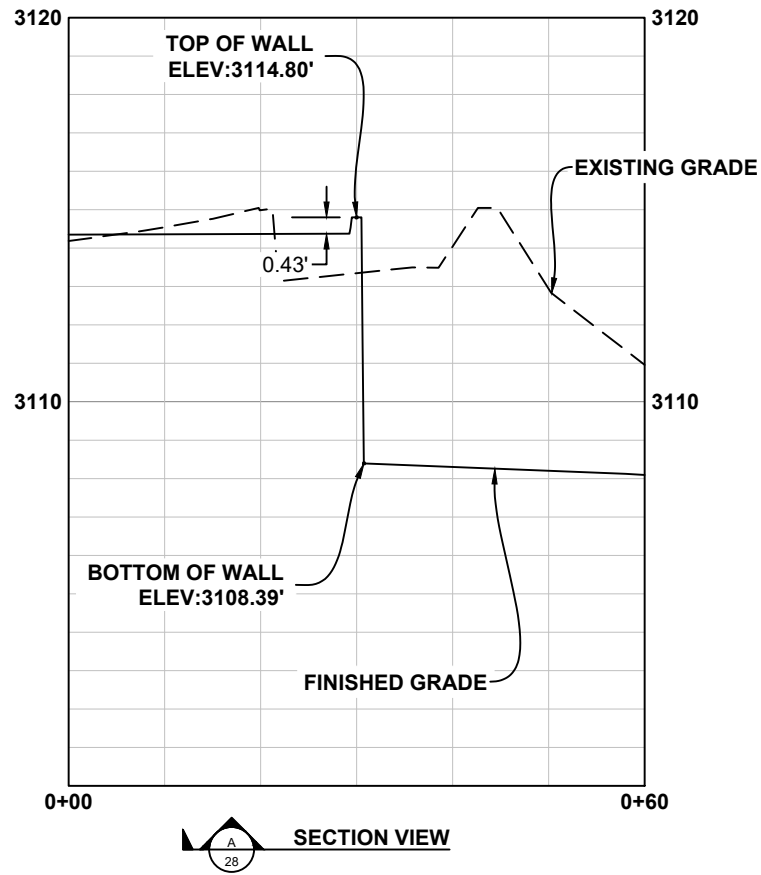
NOTE:  
 1. ELEVATIONS SHOWN ARE TO TOP OF ASPHALT UNLESS OTHERWISE NOTED.  
 2. ALL UTILITIES EXCEPT STORM STRUCTURES AND MAIN NOT SHOWN FOR CLARITY.

0 10' 20'  
 SCALE: 1" = 20'

**BID SET**



K:\Sheidani\Yellowstone County, MT\2021555-MetraPark-Infrastructure-Improvements\06\CAD\Sheets\Exhibits\04\_Arena Back Lots\1555-RET WALL-XSECT.dwg 11X17 PP 1/22/2024 2:35:36 PM



**PROPOSED RETAINING WALL CENTERLINE CROSS SECTION**

\*DISTANCES SHOWN ARE THROUGH CENTER OF WALL AND ARE FOR CONTRACTOR REFERENCE ONLY.

NOTE:  
ALL SECTION VIEWS HAVE A VERTICAL SCALE OF 1" = 5' AND A HORIZONTAL SCALE OF 1" = 20'

NO.	REVISION	BY	DATE

PROJECT NO. 2021-555

PREPARED BY  
**WVC ENGINEERING**  
550 S. 24TH ST. W., SUITE 201  
BILLINGS, MT 59102  
(406) 894-2210  
www.wvcengineering.com

YELLOWSTONE COUNTY  
ARENA BACK LOT CONSTRUCTION PROJECT  
**RETAINING WALL CROSS SECTIONS**  
BILLINGS, MT

DESIGNED BY: KH  
DRAWN BY: KH  
CHECKED BY: GTR  
DATE: 1/18/2024

**BID SET**

**CODES, DESIGN LOADS, AND ENVIRONMENTAL CRITERIA:**

**1. GOVERNING CODES**

- 1.1. IBC 2021
- 1.2. ASCE 7-16
- 1.3. ACI 318-19

**2. DESIGN LOADS AND CRITERIA**

- 2.1. **LIVE LOADS:**  
SIDEWALKS, VEHICULAR DRIVEWAYS, AND YARDS, SUBJECT TO TRUCKING 250 PSF
- 2.2. **SNOW LOAD:**  
GROUND SNOW LOAD 30 PSF  
SNOW IMPORTANCE FACTOR 1.0  
EXPOSURE FACTOR 1.0  
THERMAL FACTOR 1.0  
ROOF SNOW LOAD 30 PSF
- 2.3. **SEISMIC LOAD:**  
SEISMIC DESIGN RISK CATEGORY II  
SEISMIC IMPORTANCE FACTOR 1.0  
SITE CLASS D  
DSR ACCELERATION, SDS 0.131 G  
SEISMIC DESIGN CATEGORY A
- 2.4. **WIND LOAD:**  
ULTIMATE DESIGN WIND SPEED 108 MPH  
EXPOSURE CATEGORY B  
RISK CATEGORY II

**MATERIAL AND INSTALLATION NOTES:**

**1. CONCRETE**

- 1.1. **CONCRETE TYPE I OR III**  
PORTLAND CEMENT ASTM C150, TYPE I OR III  
FLY ASH ASTM C615 C OR F  
WATER / CEMENT RATIO 0.40 MAX  
COMPRESSIVE STRENGTH, F'c 4,000 PSI  
ENTRAINED AIR 3% TO 5%  
SLUMP 4 IN +/- 1 IN
- 1.2. **REINFORCEMENT:**  
DEFORMED BAR ASTM A-615  
GRADE 40 OR BETTER
- 1.3. **GROUT:**  
NON-SHRINK METALLIC ASTM C1107, NON  
COMPRESSIVE STRENGTH 3 DAY F'c = 5,000 PSI
- 1.4. **CONCRETE ANCHORS**

- 1.4.1. ALL ANCHORS SHALL BE INSTALLED WITH HEAVY HEX NUTS CONFORMING TO ASTM A563 AND WASHERS ACCORDING TO THE FOLLOWING LIST. THE CONFIGURATION AND QUANTITIES ARE GIVEN IN THE APPLICABLE DETAILS.  
ANCHOR MIN. DIA. MIN. THICKNESS  
1/2" 1" 1/8"  
3/8" 1 1/4" 3/8"  
1/2" 1 1/2" 1/2"  
5/8" 1 3/4" 5/8"  
1" 2" 3/4"  
1 1/4" 2 1/2" 1"  
1 1/2" 2 3/4" 1 1/2"
- 1.4.2. ALL CONCRETE ANCHORS SHALL BE CAST IN PLACE UNLESS NOTED OTHERWISE
- 1.4.3. GALVANIZED ANCHORS SHALL BE USED IN CONJUNCTION WITH GALVANIZED HEAVY HEX NUTS AND WASHERS. ALL COMPONENTS OF THE ANCHOR SHALL GALVANIZED BY THE SAME PROCESS AS ALLOWED BY EACH SPECIFICATION
- 1.4.4. **CAST-IN-PLACE ANCHORS**  
ANCHOR ASTM F1554 GRADE 36
- 1.4.5. **ADHESIVE ANCHORS**  
INSTALL ADHESIVE ANCHORS IN ACCORDANCE WITH MANUFACTURERS' INSTRUCTIONS.  
ANCHOR ASTM F1554 GRADE 36  
ADHESIVE HILTI HIT-HY 200-R OR A

**1.5. CONCRETE NOTES:**

- 1.5.1. PERFORM CONCRETE WORK IN ACCORDANCE WITH CURRENT ACI 301 "STANDARD SPECIFICATIONS FOR STRUCTURAL CONCRETE" UNLESS MORE STRINGENT REQUIREMENTS ARE INDICATED.
- 1.5.2. MECHANICALLY VIBRATE ALL CONCRETE PLACEMENTS.
- 1.5.3. MINIMUM REINFORCING BAR COVER:  
3" AT UNFORMED SURFACES EXPOSED TO EARTH  
2" AT FORMED SURFACES EXPOSED TO EARTH  
1" AT SLABS AND WALLS NOT EXPOSED TO EARTH OR WEATHER
- 1.5.4. SPLICE REINFORCING BARS BY LAPPING ACCORDING TO THE SCHEDULE BELOW. PLACE MECHANICAL CONNECTORS WHERE SHOWN. SPLICE WWF SHEETS BY LAPPING AT LEAST ONE PANEL WIDTH (TWO LONGITUDINAL BARS IN CONTACT).

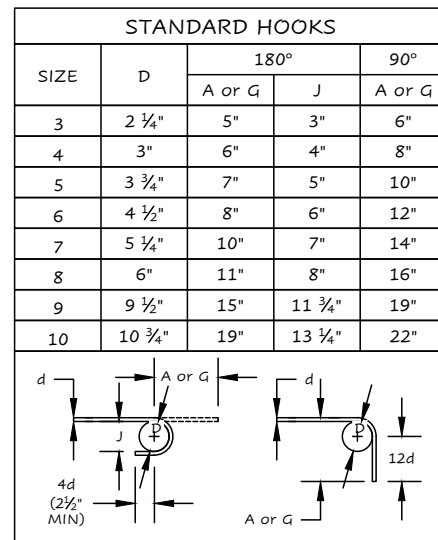
REBAR SIZE	CLASS A		CLASS B	
	VERT / HORZ	TOP	VERT / HORZ	TOP
#3	14"	18"	19"	24"
#4	19"	25"	25"	32"
#5	24"	31"	31"	40"
#6	28"	37"	37"	48"
#7	41"	54"	54"	70"
#8	45"	62"	62"	80"

- 1.5.5. WELDING OF REINFORCING BARS IS NOT PERMITTED WITHOUT A PROCEDURE APPROVED BY THE ENGINEER OF RECORD.
- 1.5.6. SECURE ALL REINFORCING, INCLUDING WWF, IN POSITION WITH CHAIRS OR DOBIES BEFORE CONCRETE PLACEMENT.
- 1.5.7. TIE DOWELS IN PLACE BEFORE PLACING CONCRETE. DO NOT STAB DOWELS.
- 1.5.8. PROVIDE CORNER BARS TO MATCH HORIZONTAL BARS IN ALL WAYS.
- 1.5.9. CHAMFER ALL EXPOSED EDGES 1/4".

**FOUNDATION NOTES**

- 1.6. SOIL DATA PER SK GEOTECHNICAL REPORT DATED 01/12/24  
MAX ALLOWABLE SOIL BEARING PRESSURE 2,000 PSF  
ALLOWABLE SLIDING FRICTION COEFFICIENT 0.50

- 1.6.1. BACKFILL AND COMPACT FILL PER GEOTECHNICAL REPORT. PREPARE SUBGRADE PER GEOTECHNICAL.



**2. STRUCTURAL STEEL:**

- 2.1. **STRUCTURAL STEEL:**  
WIDE FLANGE SHAPES ASTM A992  
CHANNELS, ANGLES, PLATES ASTM A36  
HSS TUBULAR SHAPES ASTM A500 GRADE B  
HIGH STRENGTH BOLTS ASTM A325, TYPE 1  
THREADED ANCHOR ROD ASTM F1554 GRADE
- 36 WELDING ELECTRODES AWS D1.1 E70XX
- 2.2. **BOLTS**  
2.2.1. ALL BOLTS SHALL BE INSTALLED WITH HEAVY HEX NUTS CONFORMING TO ASTM A563 AND WASHERS AS LISTED BELOW. THE CONFIGURATION AND QUANTITIES ARE GIVEN IN THE APPLICABLE DETAILS.  
BOLT DIA. MIN. NUT DIA. MIN. WASHER THICK.  
1/2" 1" 1/8"  
5/8" 1 1/4" 3/16"  
3/4" 1 1/2" 3/16"  
7/8" 1 3/4" 3/16"  
1" 2" 1/4"  
1 1/4" 2 1/2" 1/4"  
1 1/2" 2 3/4" 1/2"
- 2.3. GALVANIZED ANCHORS SHALL BE USED IN CONJUNCTION WITH GALVANIZED HEAVY HEX NUTS AND WASHERS. ALL COMPONENTS OF THE ANCHOR SHALL GALVANIZED BY THE SAME PROCESS AS ALLOWED BY EACH SPECIFICATION

**SITE NOTES:**

**1. CONTRACTOR NOTES:**

- 1.1. IF SITE CONDITIONS ARE FOUND TO BE INCONSISTENT WITH DRAWING, CONTRACTOR TO STOP WORK AND CALL ENGINEER IMMEDIATELY
- 1.2. REFER TO DISPLAYED DIMENSIONS - DO NOT SCALE DRAWINGS. CONTACT EOR TO REQUEST UNKNOWN DIMENSIONS IF NEEDED.
- 1.3. CONTRACTOR SHALL VERIFY ALL SITE DIMENSIONS AND LOCATION PRIOR TO CONSTRUCTION:  
1.3.1. VERIFY EXISTING CONDITIONS AND COORDINATE WITH ENGINEER SHOULD THEY BE DIFFERENT THAN AS DRAWN.  
1.3.2. DRAWING DIMENSIONS ARE FOR ESTIMATION AND BUDGETARY PURPOSES. CONTRACTOR IS TO ASCERTAIN ALL ACTUAL DIMENSIONS PRIOR TO ORDERING MATERIALS OR BEGINNING CONSTRUCTION.  
1.3.3. CONTRACTOR IS RESPONSIBLE FOR DETERMINING CONSTRUCTION MEANS AND METHODS.  
1.3.4. VERIFY THAT ALL INFORMATION WITHIN THIS PLAN SET IS CONGRUENT WITH OBSERVED EXISTING CONDITIONS.  
1.3.5. ENSURE COMPLIANCE WITH LOCAL CODES AND ORDINANCES AS IT PERTAINS TO THE SITE LOCATION.
- 1.4. CONTRACTOR TO VERIFY PRIOR TO CONSTRUCTION OF ALL FOOTING SIZES, LOAD REQUIREMENT, SOIL BEARING DATA, AND REQUIREMENTS
- 1.5. CONTRACTOR TO VERIFY LOCATION OF ALL SOLID SURFACES THAT REQUIRE FOUNDATION ADJUSTMENTS.
- 1.6. CONTRACTOR IS RESPONSIBLE FOR ALL MATERIAL DETAILS REGARDING PRODUCT SPECIFICATIONS, INSTALLATION AND ENGINEERING DATA THAT MAY BE REQUIRED BY OWNER OR BUILDING DEPARTMENT WHEN OBTAINING PERMITS

**ABBREVIATIONS**

AB	ANCHOR BOLT	MANF	MANUFACTURER
ADD'L	ADDITIONAL	MATL	MATERIAL
ALT	ALTERNATE	MAX	MAXIMUM
@	AT	MECH	MECHANICAL
BLDG	BUILDING	MIN	MINIMUM
BM	BEAM	MK	MARK
BOT	BOTTOM	N	NORTH
BOF	BOTTOM OF FOOTING	NS	NEAR SIDE
C	STEEL CHANNEL	NTS	NOT TO SCALE
CIP	CAST IN PLACE	NO. OR #	NUMBER
CJ	CONSTRUCTION JOINT	OC	ON CENTER
CLR	CLEAR	OCEW	ON CENTER EACH WAY
CL	CENTERLINE	OD	OUTSIDE DIAMETER
CMU	CONCRETE MASONRY UNIT	O.F.	OUTSIDE FACE
COL	COLUMN	OPNG	OPENING
CONC	CONCRETE	OPP	OPPOSITE
CONN	CONNECTION	PEMB	PRE-ENGINEERED METAL BUILDING
CONST	CONSTRUCTION	PL	PLATE
CONT	CONTINUOUS	PLTF	PLATFORM
DBL	DOUBLE	PLCS	PLACES
DET	DETAIL	PNL	PANEL
DIA OR Ø	DIAMETER	PROJ	PROJECTION
DIM	DIMENSION	R	RISER
DN	DOWN	RAD	RADIUS
DWG	DRAWING	REINF	REINFORCEMENT
DWL	DOWEL	RO	ROUGH OPENING
E	EAST	S	SOUTH
EA	EACH	SEC	SECTION
EF	EACH FACE	SIM	SIMILAR
EJ	EXPANSION JOINT	SJ	SAW/CUT CONTROL JOINT
EL	ELEVATION	SPCS	SPACES
EQ	EQUAL	SQ	SQUARE
EQUIP	EQUIPMENT	STD	STANDARD
EXIST	EXISTING	STL	STEEL
EXP	EXPANSION	STR	STRUCTURAL
EXT	EXTERIOR	SYM	SYMMETRICAL
EW	EACH WAY	T	THREAD
FD	FLOOR DRAIN	TBD	TO BE DETERMINED
FDN	FOUNDATION	T&B	TOP AND BOTTOM
FF	FINISH FLOOR	T.O.	TOP OF
FLR	FLOOR	TOB	TOP OF BOLT
FS	FS	TOC	TOP OF CONCRETE
GA	GAUGE	TOG	TOP OF GRATING
GALV	GALVANIZED	TOR	TOP OF ROOF
GL	GIRT LINE	TOS	TOP OF STEEL
GRTG	GRATING	TOW	TOP OF WALL
H	HIGH	TYP	TYPICAL
HNDRL	HANDRAIL	UNO	UNLESS NOTED OTHERWISE
HORZ	HORIZONTAL	U/S	UNDERSIDE
HP	HIGH POINT	VERT	VERTICAL
HSS	STEEL TUBE	W/	WITH
HS	HIGH STRENGTH	W	WEST
ID	INSIDE DIAMETER	WF	STEEL WIDE FLANGE
INF	INSIDE FACE	WP	WORK POINT
INT	INTERIOR	WWF	WELDED WIRE FABRIC
JT	JOINT		
L	STEEL ANGLE		
LAD	LADDER		
LLH	LONG LEG HORIZONTAL		
LLV	LONG LEG VERTICAL		
LP	LOW POINT		

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NO.:	DATE:	DRAWN:	ISSUE / REVISION DESCRIPTION:

11" x 17" ORIGINAL

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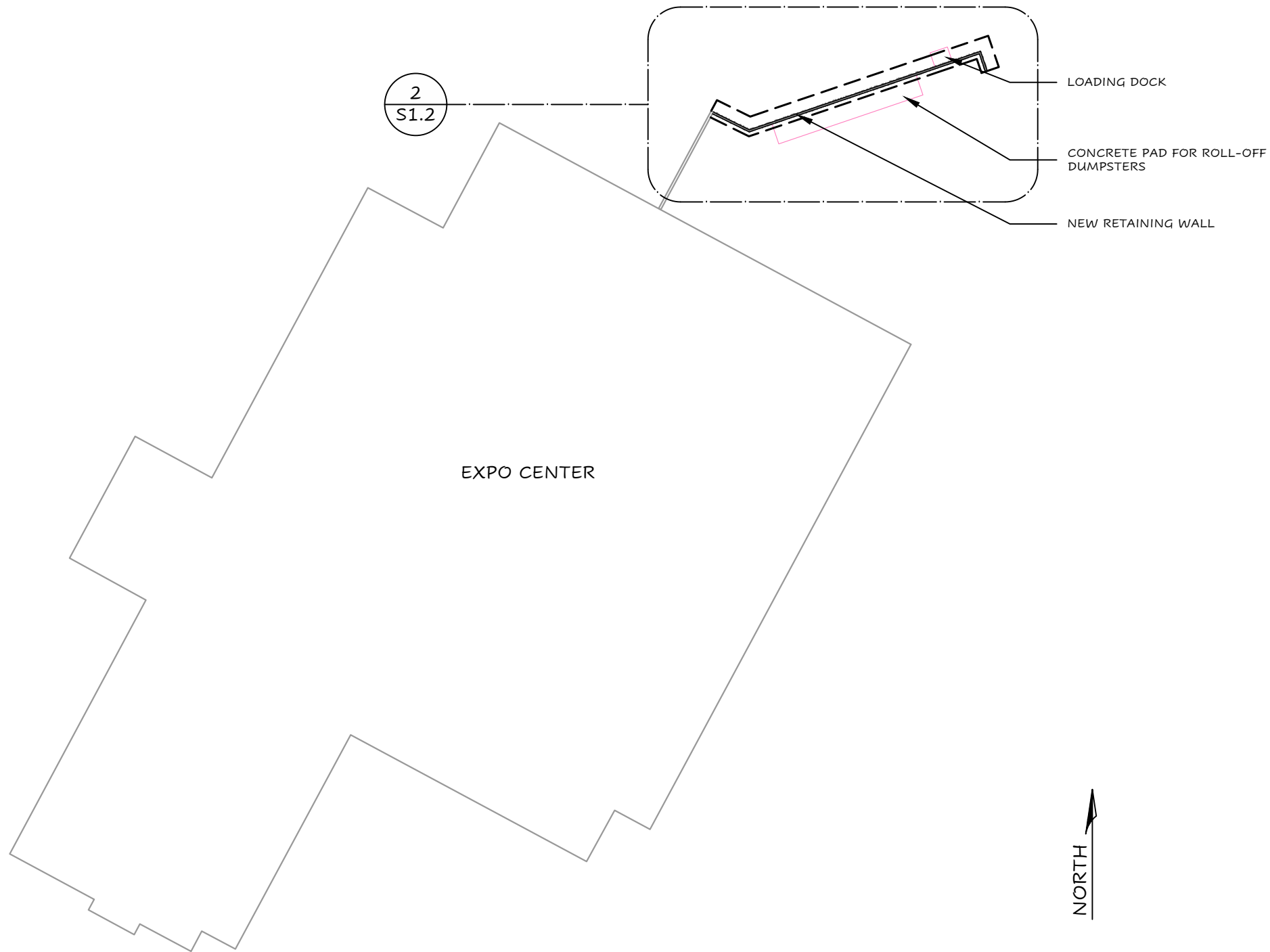
PROJECT NO.: 12E-0101  
DRAWN BY: CJH  
REVIEWED BY: STH  
SAVE DATE: January 17, 2024

**METRA PARK RETAINING WALL  
GENERAL STRUCTURAL NOTES**

**WWC ENGINEERING  
METRA PARK, BILLINGS, MT**

SHEET NO. **S0.1**





**1**  
**S1.1** SITE LAYOUT  
SCALE: 1/64" = 1'-0"  
NOTES:

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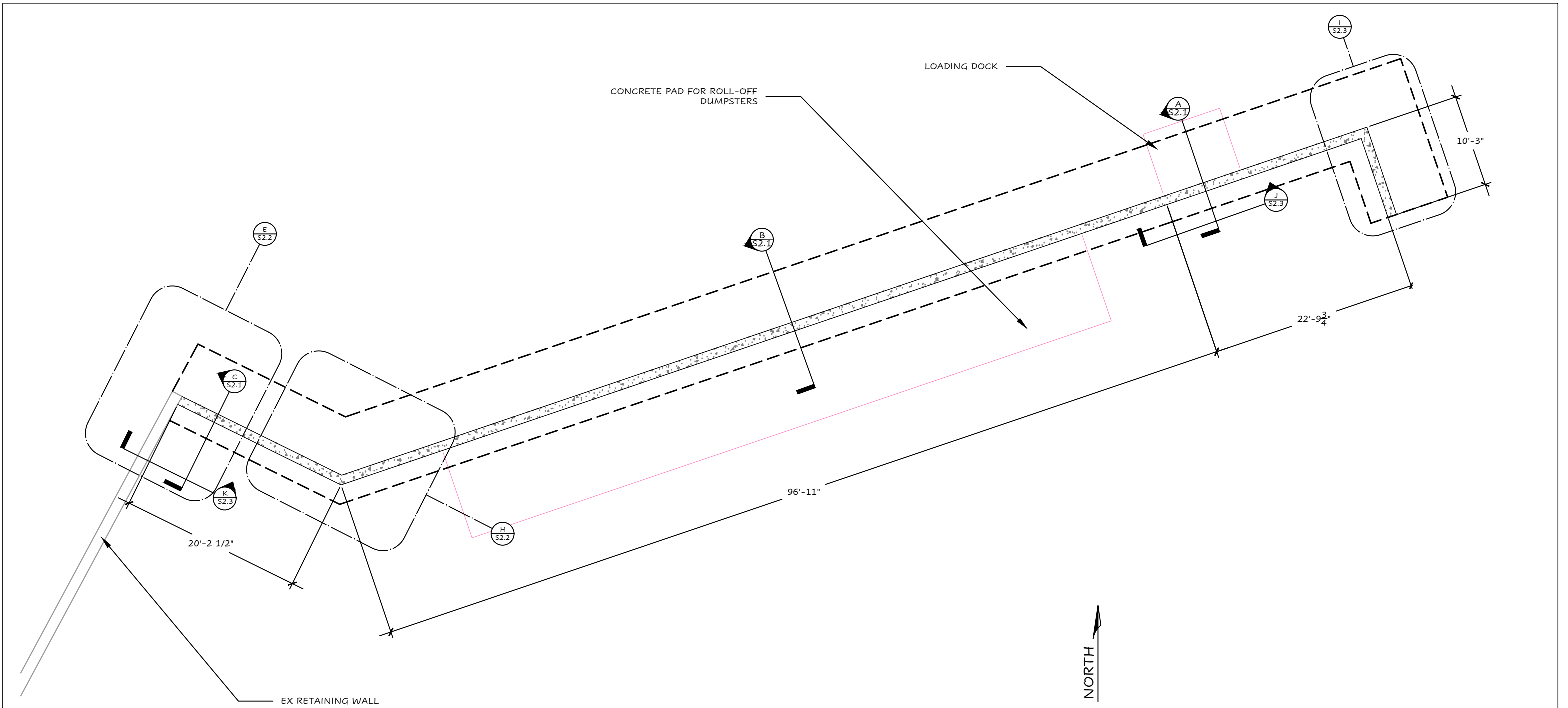
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12E-0101	CJH	STH	January 17, 2024	
<b>SITE LAYOUT</b> <b>METRA PARK RETAINING WALL</b> <b>WWC ENGINEERING</b> <b>METRA PARK, BILLINGS, MT</b>				<b>S1.1</b>



**2**  
**S1.2** RETAINING WALL LAYOUT  
SCALE: 3/32" = 1'-0"  
NOTES:

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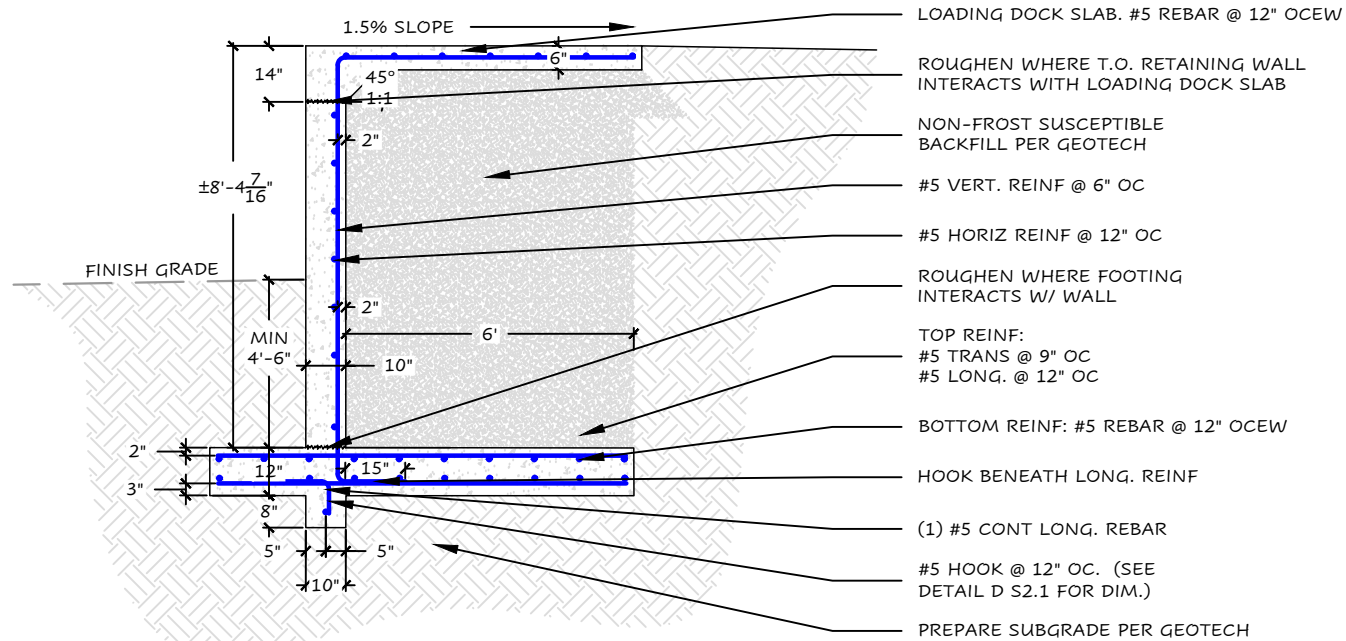
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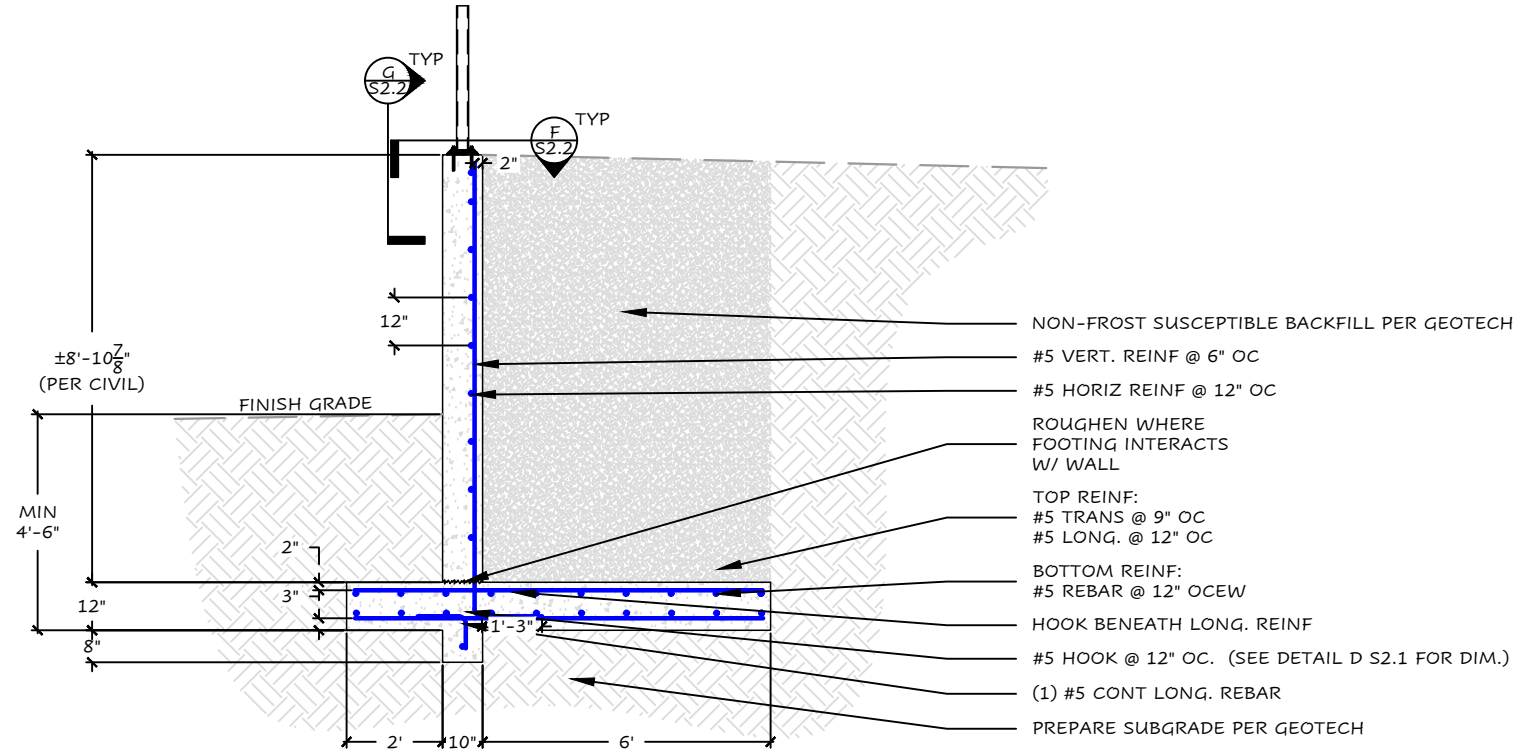
PROJECT NO.:	DRAWN BY:	REVIEWED BY:	SAVE DATE:
12E-0101	CJH	STH	January 17, 2024
<b>WALL LAYOUT</b> <b>METRA PARK RETAINING WALL</b> <b>WWC ENGINEERING</b> <b>METRA PARK, BILLINGS, MT</b>			

SHEET NO.
<b>S1.2</b>





- LOADING DOCK SLAB. #5 REBAR @ 12" OCEW
- ROUGHEN WHERE T.O. RETAINING WALL INTERACTS WITH LOADING DOCK SLAB
- NON-FROST SUSCEPTIBLE BACKFILL PER GEOTECH
- #5 VERT. REINF @ 6" OC
- #5 HORIZ REINF @ 12" OC
- ROUGHEN WHERE FOOTING INTERACTS W/ WALL
- TOP REINF: #5 TRANS @ 9" OC #5 LONG. @ 12" OC
- BOTTOM REINF: #5 REBAR @ 12" OCEW
- HOOK BENEATH LONG. REINF
- (1) #5 CONT LONG. REBAR
- #5 HOOK @ 12" OC. (SEE DETAIL D S2.1 FOR DIM.)
- PREPARE SUBGRADE PER GEOTECH



- NON-FROST SUSCEPTIBLE BACKFILL PER GEOTECH
- #5 VERT. REINF @ 6" OC
- #5 HORIZ REINF @ 12" OC
- ROUGHEN WHERE FOOTING INTERACTS W/ WALL
- TOP REINF: #5 TRANS @ 9" OC #5 LONG. @ 12" OC
- BOTTOM REINF: #5 REBAR @ 12" OCEW
- HOOK BENEATH LONG. REINF
- #5 HOOK @ 12" OC. (SEE DETAIL D S2.1 FOR DIM.)
- (1) #5 CONT LONG. REBAR
- PREPARE SUBGRADE PER GEOTECH

**A** RETAINING WALL SECTION @ LOADING DOCK

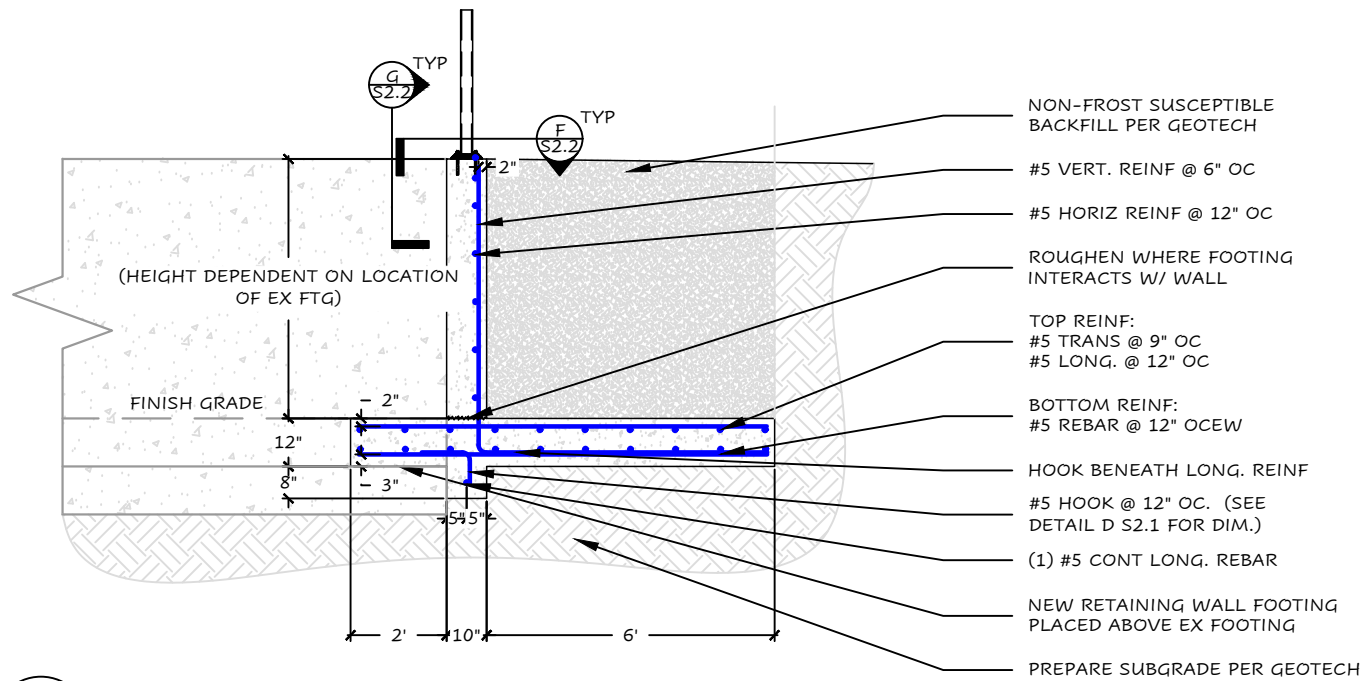
SCALE: 1/4" = 1' - 0"

NOTES:

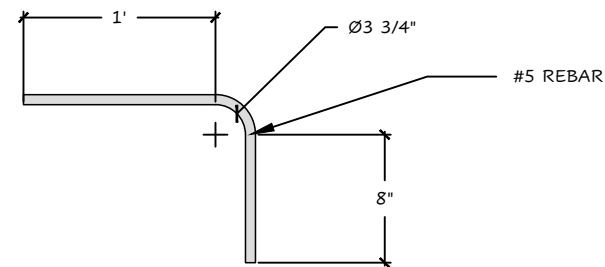
**B** RETAINING WALL SECTION @ FULL HEIGHT WALL

SCALE: 1/4" = 1' - 0"

NOTES:



- NON-FROST SUSCEPTIBLE BACKFILL PER GEOTECH
- #5 VERT. REINF @ 6" OC
- #5 HORIZ REINF @ 12" OC
- ROUGHEN WHERE FOOTING INTERACTS W/ WALL
- TOP REINF: #5 TRANS @ 9" OC #5 LONG. @ 12" OC
- BOTTOM REINF: #5 REBAR @ 12" OCEW
- HOOK BENEATH LONG. REINF
- #5 HOOK @ 12" OC. (SEE DETAIL D S2.1 FOR DIM.)
- (1) #5 CONT LONG. REBAR
- NEW RETAINING WALL FOOTING PLACED ABOVE EX FOOTING
- PREPARE SUBGRADE PER GEOTECH



**D** KEY HOOK DIMENSIONS

SCALE: 1" = 1' - 0"

NOTES:

**C** RETAINING WALL SECTION @ EXISTING WALL

SCALE: 1/4" = 1' - 0"

NOTES:

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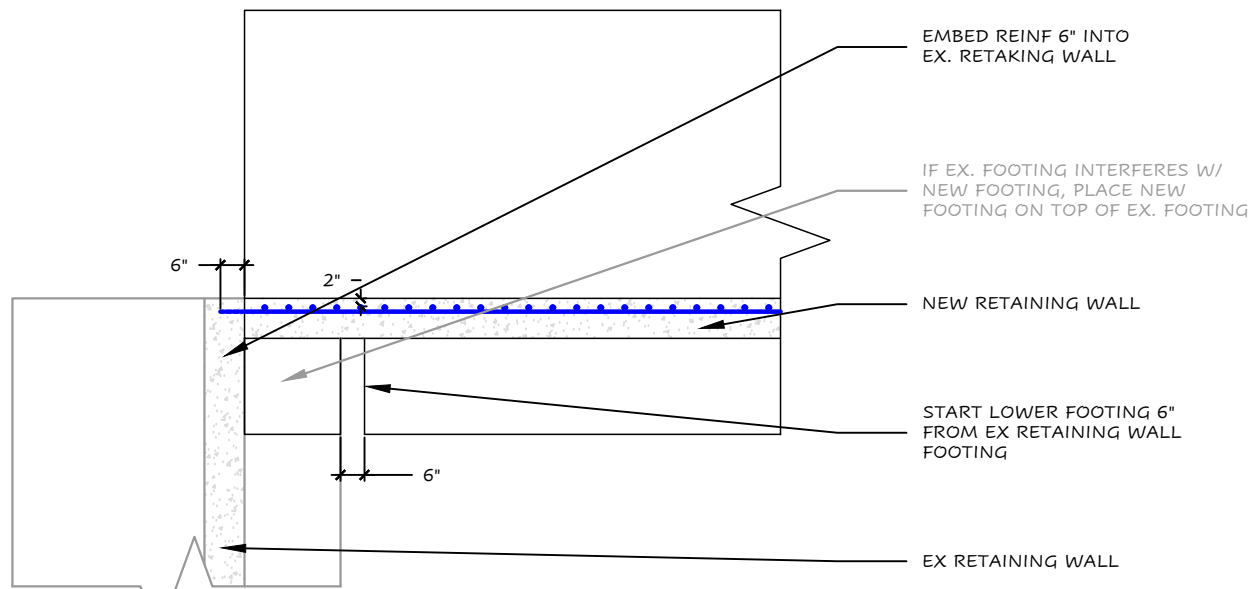
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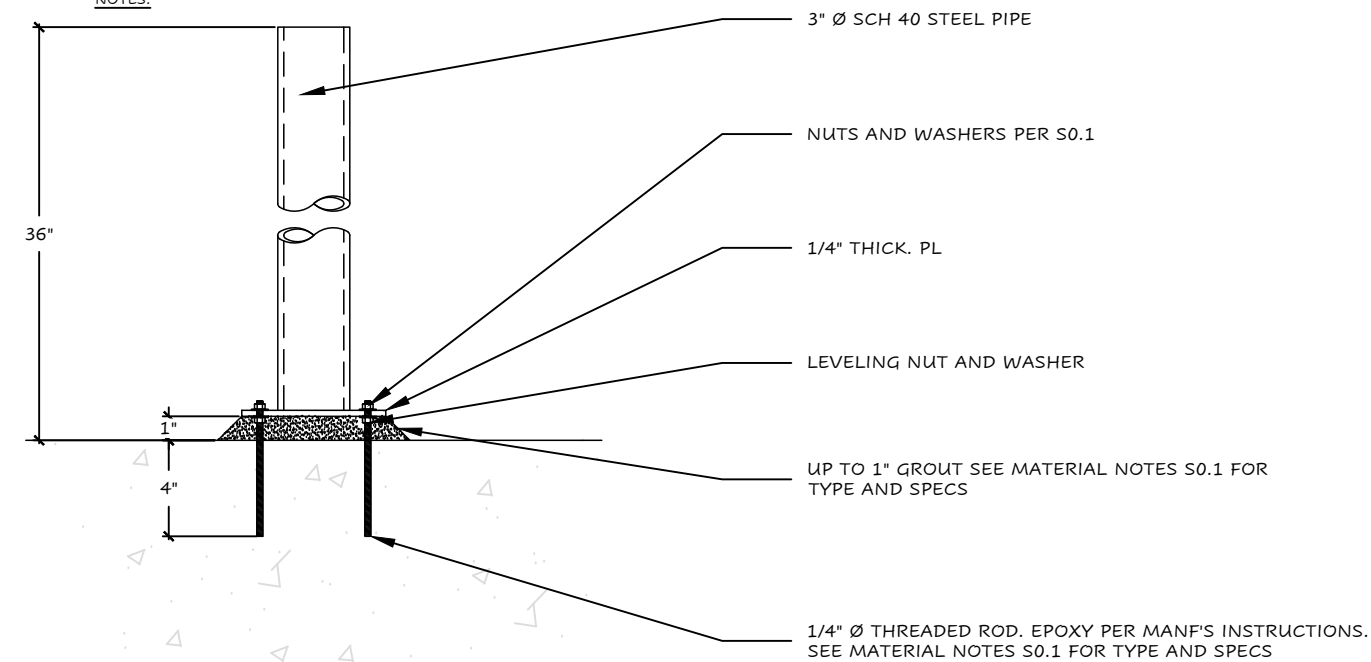
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12E-0101	CJH	STH	January 17, 2024	
<b>DETAILS</b> <b>METRA PARK RETAINING WALL</b> <b>WWC ENGINEERING</b> <b>METRA PARK, BILLINGS, MT</b>				<b>S2.1</b>



**E** RETAINING WALL DETAIL @ EXISTING WALL

SCALE: 1/4" = 1' - 0"

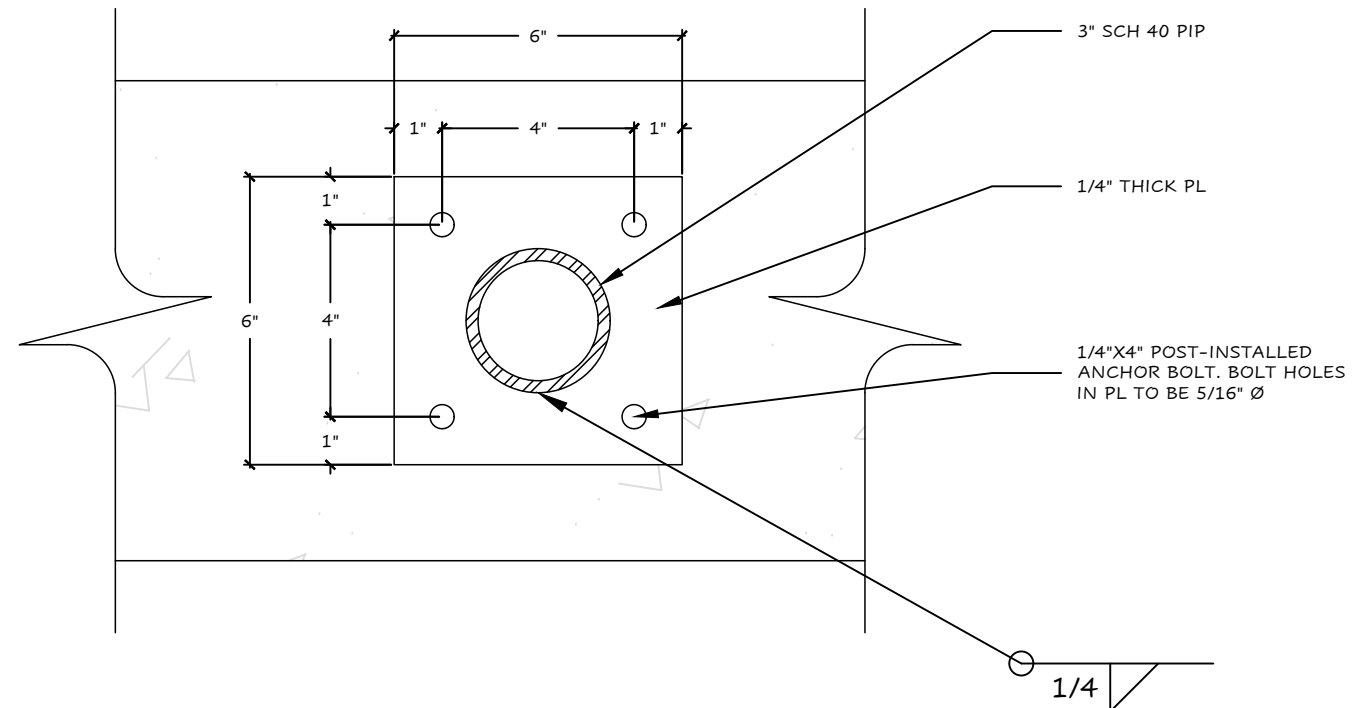
NOTES:



**G** GUARD POST DETAIL

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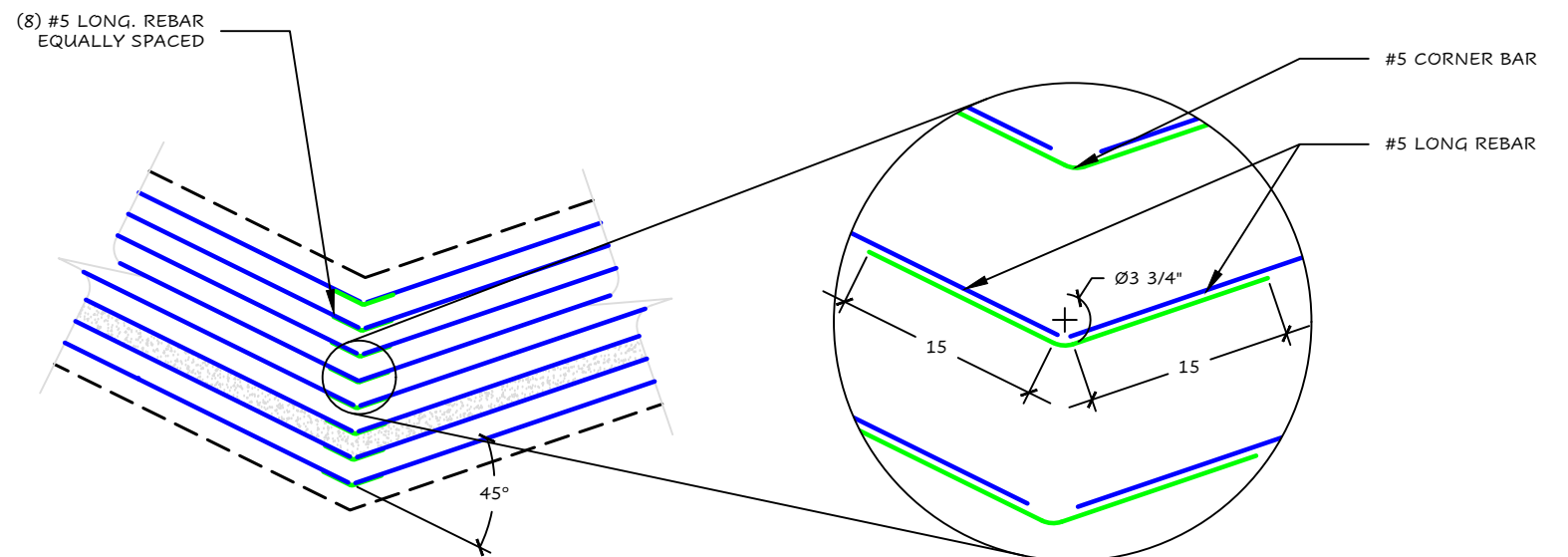
NOTES:



**F** RETAINING WALL SECTION @ FULL HEIGHT WALL

SCALE: 3" = 1' - 0"

NOTES:



**H** FOOTING REINFORCEMENT @ 45° CORNER

SCALE: NTS

NOTES:

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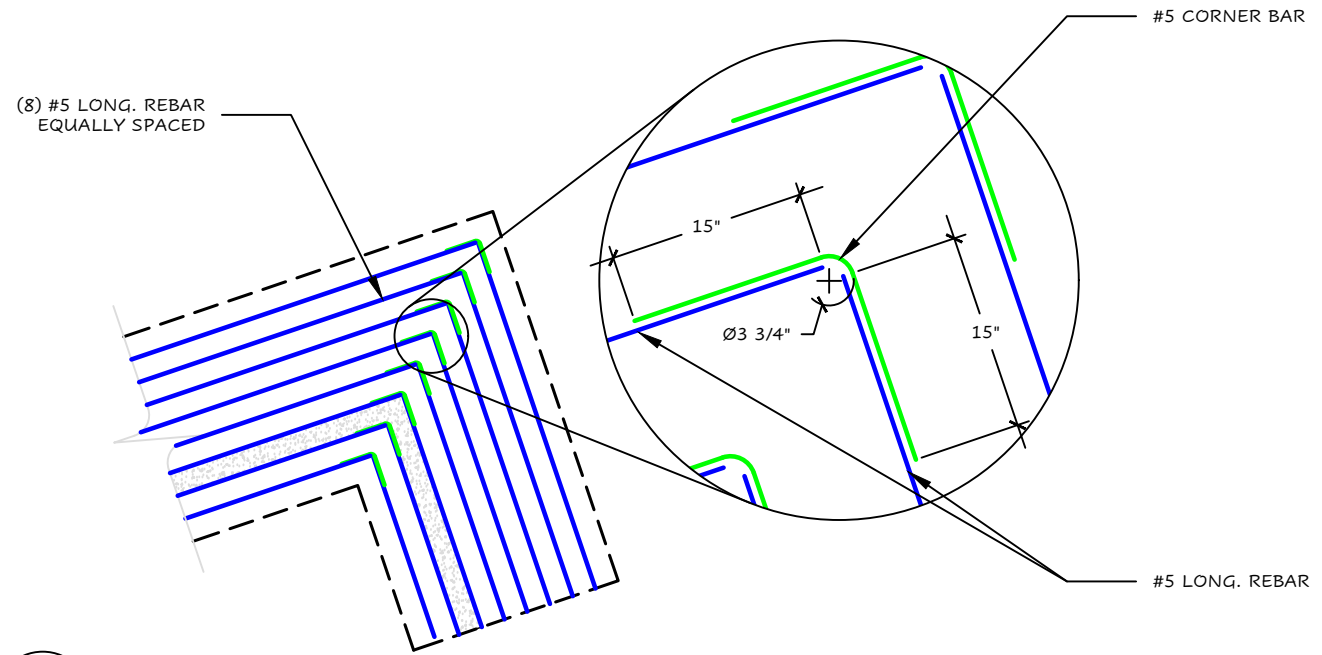
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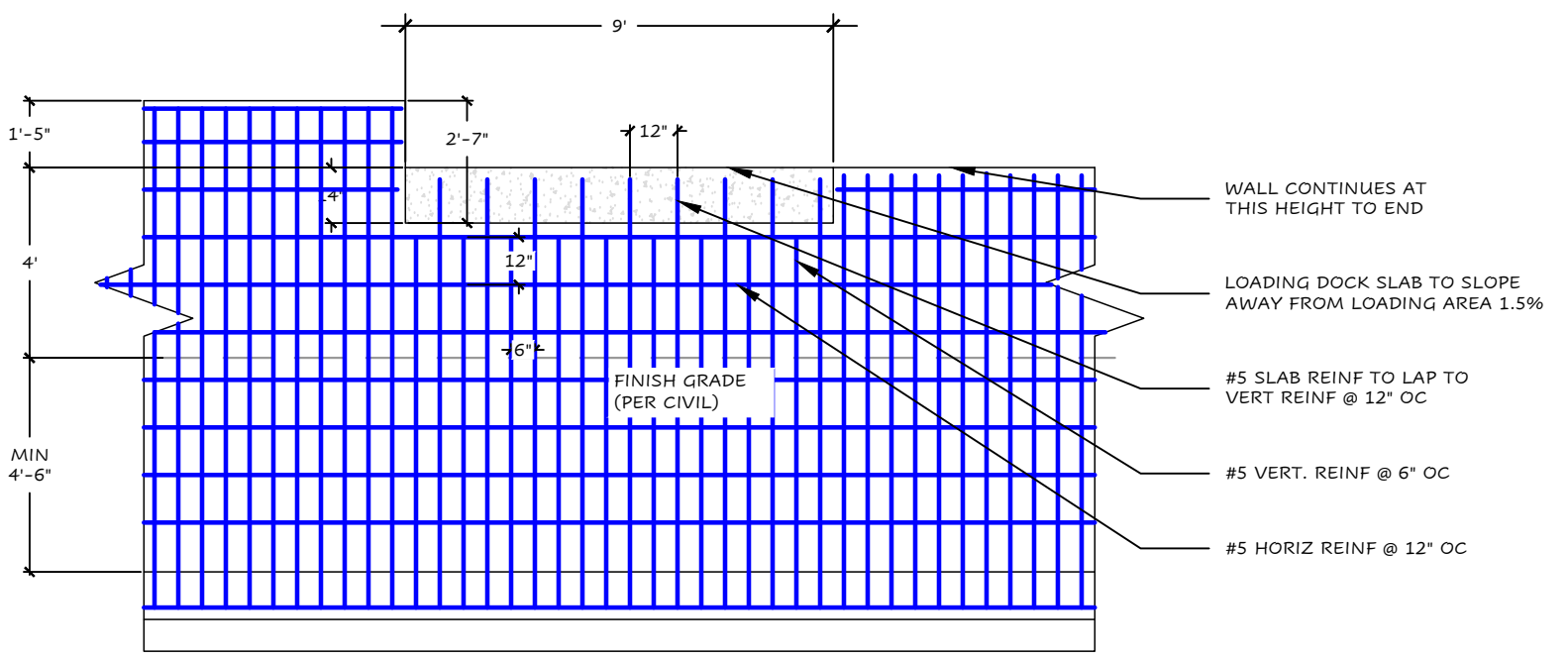
**DETAILS**  
METRA PARK RETAINING WALL  
WWC ENGINEERING  
METRA PARK, BILLINGS, MT





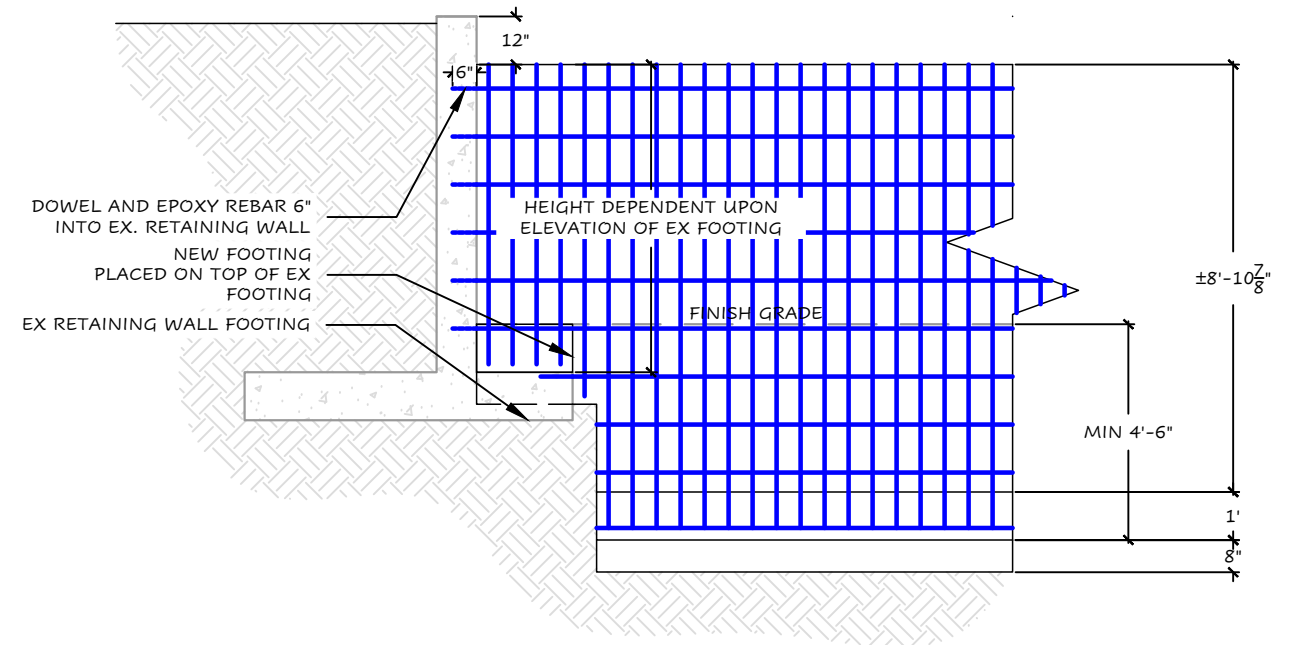
**I** FOOTING REINFORCEMENT @ 90° CORNER

S2.3 SCALE: NTS  
NOTES:



**J** RETAINING WALL DETAIL @ LOADING DOCK

S2.3 SCALE: 1/4" = 1' - 0"  
NOTES:



**K** RETAINING WALL DETAIL @ EXISTING WALL

S2.3 SCALE: 1/4" = 1' - 0"  
NOTES:

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12E-0101	CJH	STH	January 17, 2024	

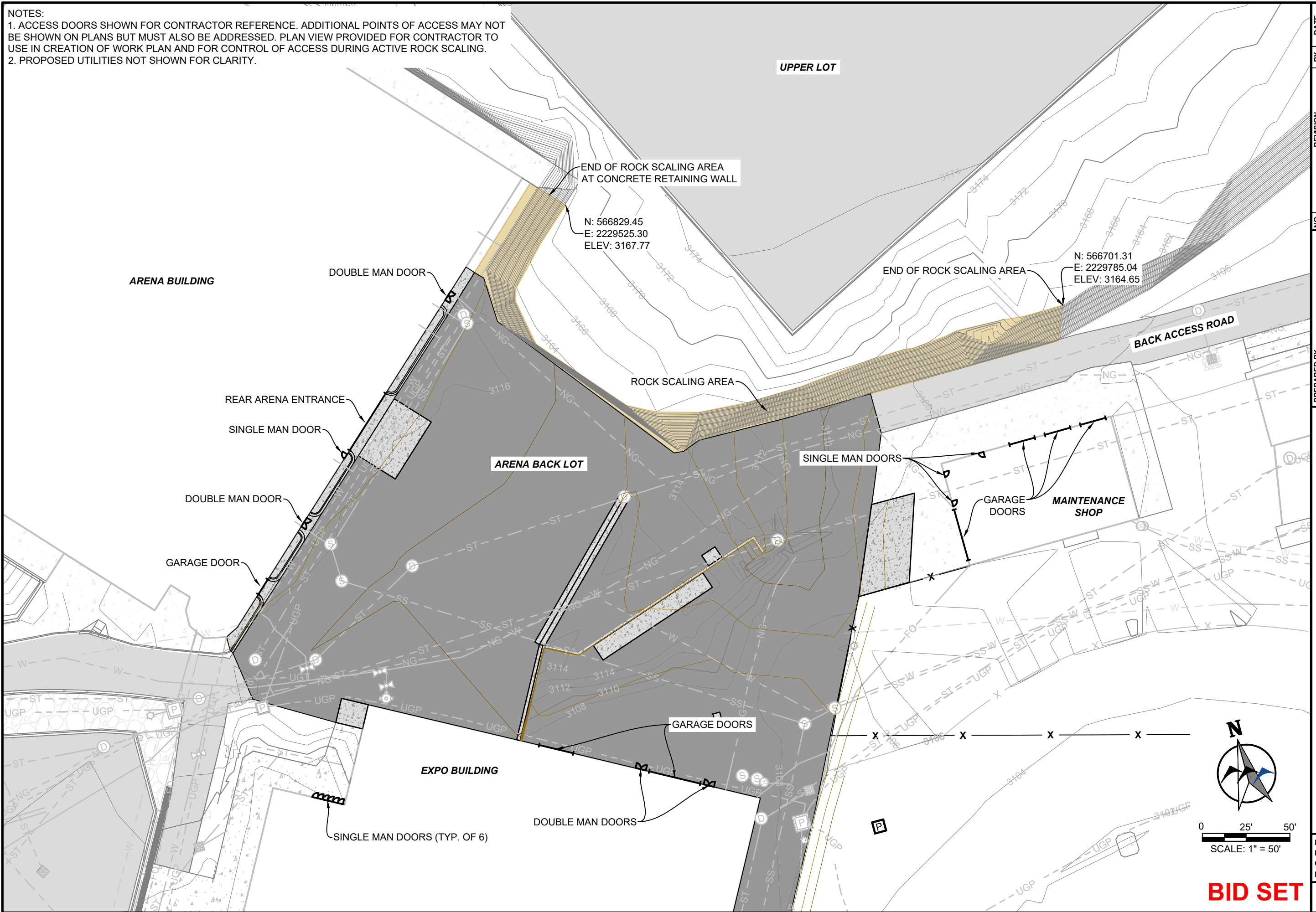
**DETAILS**  
**METRA PARK RETAINING WALL**  
**WWC ENGINEERING**  
**METRA PARK, BILLINGS, MT**

**S2..3**

K:\Sheridan\Yellowstone County, MT\2021555 MetraPark Infrastructure Improvements\05CAD\Sheets\PLAN\_SET\04\_Arena\_Back\_Lot\Rock Wall Maintenance\21555-ROCK-WALL-PP.dwg ROCK WALL PP 1/22/2024 2:39:20 PM

**NOTES:**

- 1. ACCESS DOORS SHOWN FOR CONTRACTOR REFERENCE. ADDITIONAL POINTS OF ACCESS MAY NOT BE SHOWN ON PLANS BUT MUST ALSO BE ADDRESSED. PLAN VIEW PROVIDED FOR CONTRACTOR TO USE IN CREATION OF WORK PLAN AND FOR CONTROL OF ACCESS DURING ACTIVE ROCK SCALING.
- 2. PROPOSED UTILITIES NOT SHOWN FOR CLARITY.



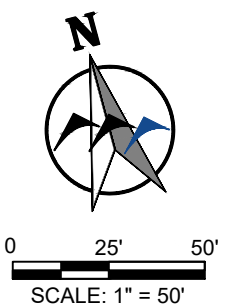
NO.	REVISION	BY	DATE

PREPARED BY  
**WVC** ENGINEERING  
 550 S. 24TH ST. W., SUITE 201  
 BILLINGS, MT 59102  
 (406) 894-2210  
 www.wvcengineering.com

YELLOWSTONE COUNTY  
**ARENA BACK LOT CONSTRUCTION PROJECT**  
**ROCK SCALING PLAN**  
 BILLINGS, MT

DESIGNED BY: KH  
 DRAWN BY: ZSL  
 CHECKED BY: GTR  
 DATE: 1/18/2024

SHEET  
**29**

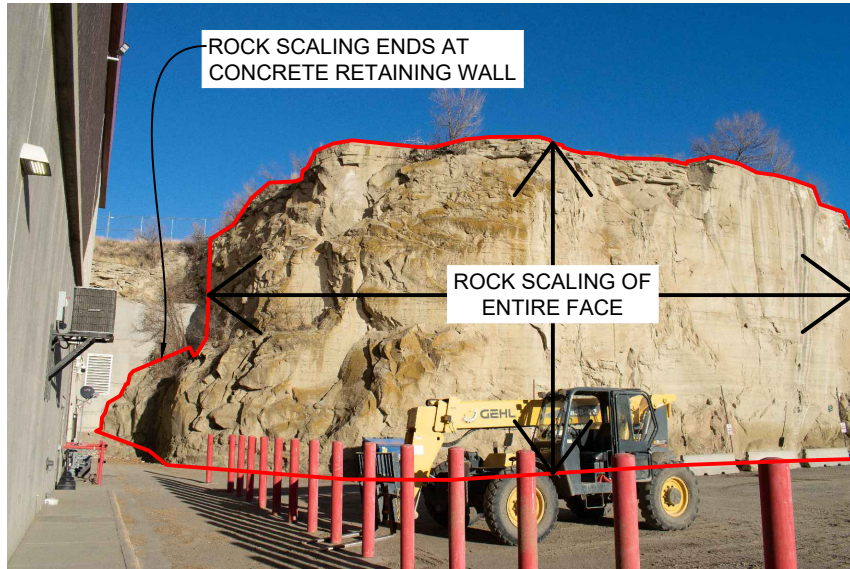


**BID SET**

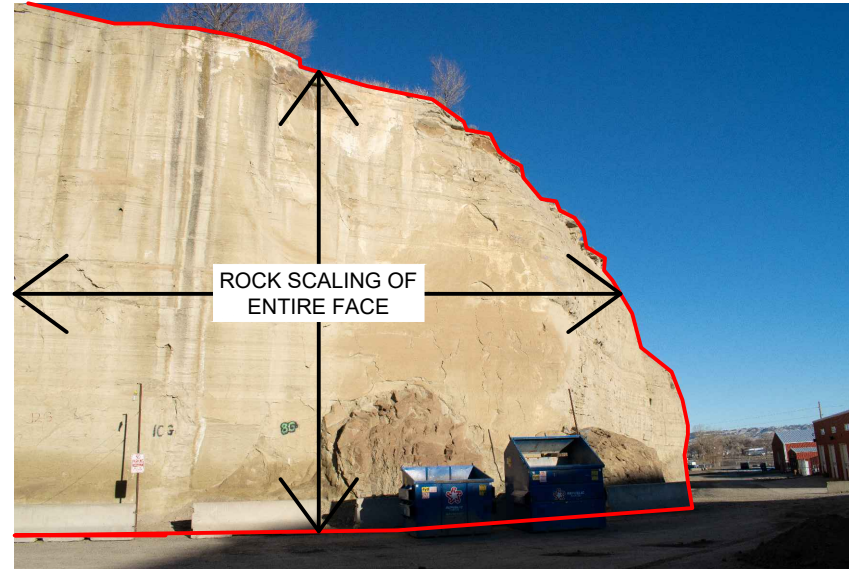


K:\Sheridan\Yellowstone County, MT\2021555 MetaPark Infrastructure Improvements\06CAD\Sheets\PLAN\_SET\04\_Arena\_Back Lot\PHASE 1 - ARENA BACK LOT\07\_ROCK WALL MAINTENANCE\21555-ROCK-WALL-PP.dwg ROCK WALL PP (2) 1/22/2024 2:38:20 PM

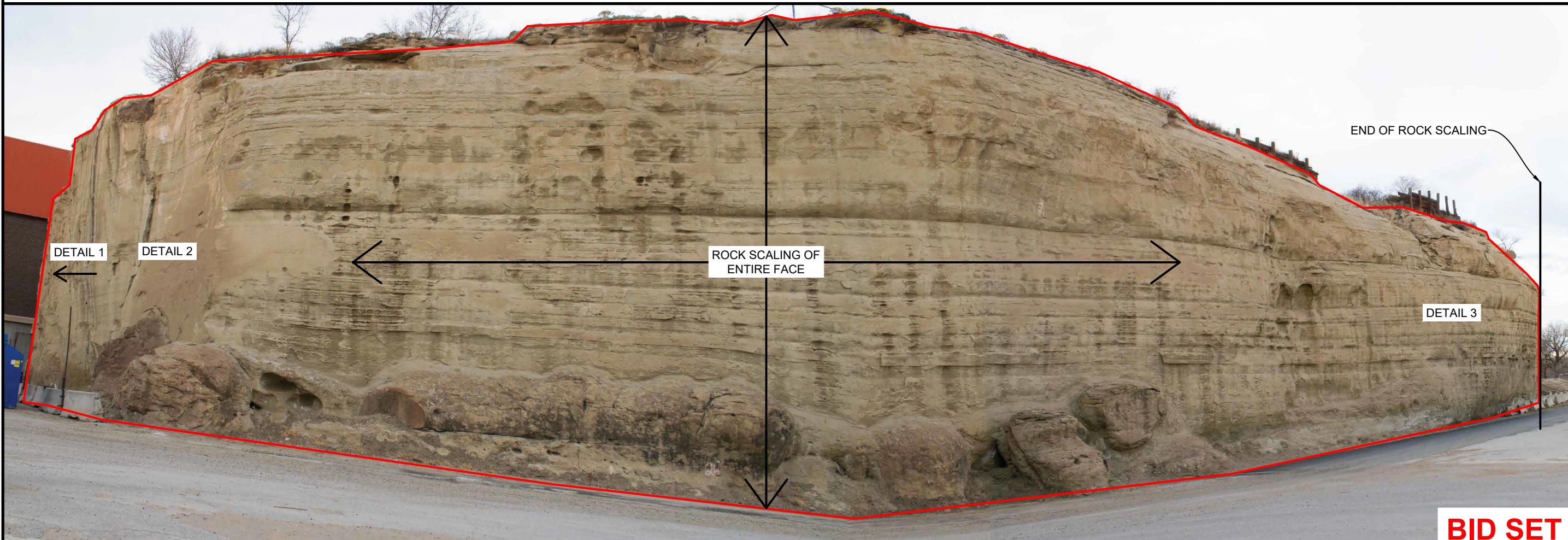
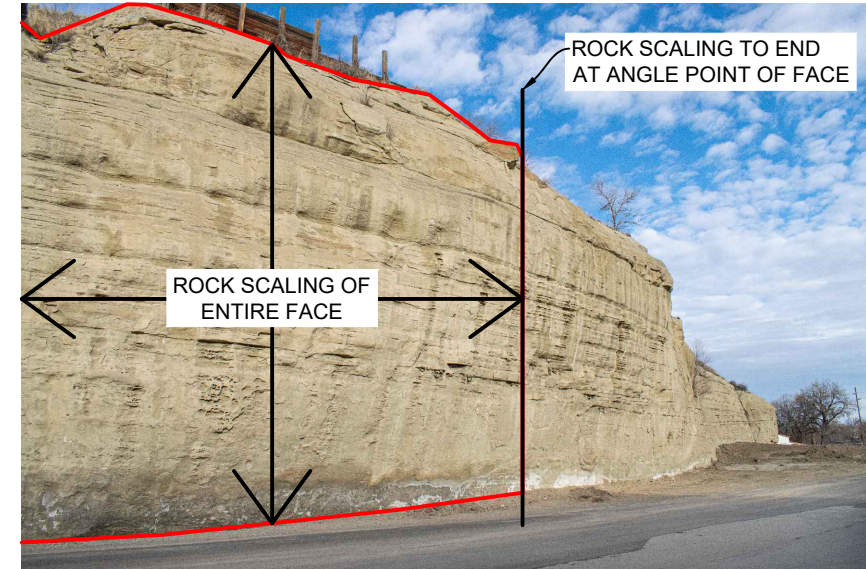
DETAIL 1



DETAIL 2



DETAIL 3



NO.	REVISION	BY	DATE

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 PROJECT NO. 2021-555

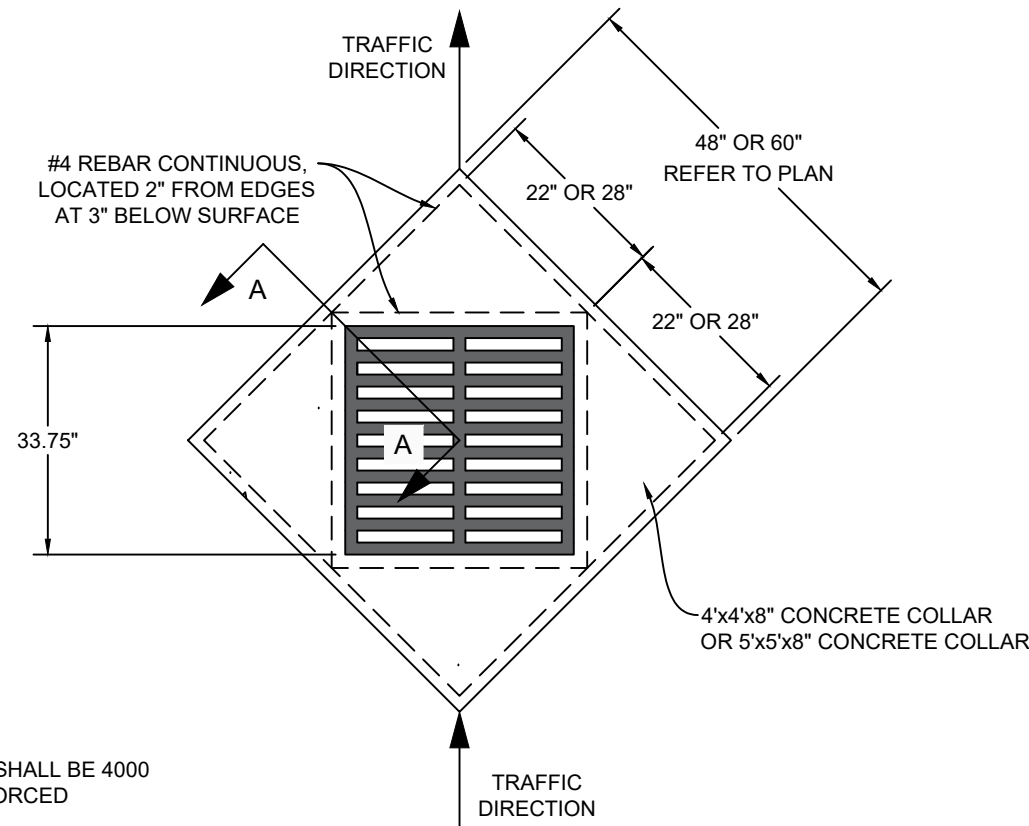
YELLOWSTONE COUNTY  
 ARENA BACK LOT CONSTRUCTION PROJECT  
**ROCK SCALING PLAN**  
 BILLINGS, MT

DESIGNED BY: KH  
 DRAWN BY: ZSL  
 CHECKED BY: GTR  
 DATE: 1/18/2024

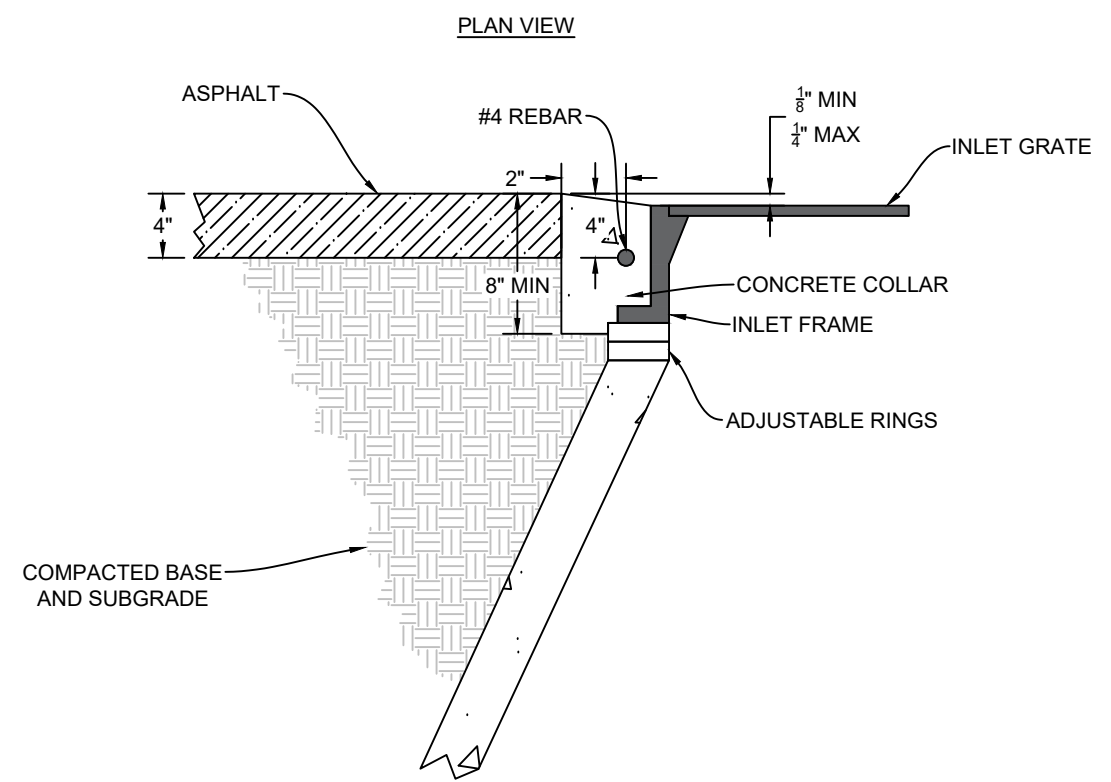
**BID SET**



K:\Sheridan\Yellowstone County, MT\2021555 MetraPark Infrastructure Improvements\06CAD\Sheets\PLAN\_SET\04\_Arena\_Back\_Lot\PHASE 1 - ARENA BACK LOT\06\_DETAILS\21555-ROAD-STORM-XSEC-DET.dwg CONCRETE APRON 1/22/2024 5:35:31 PM

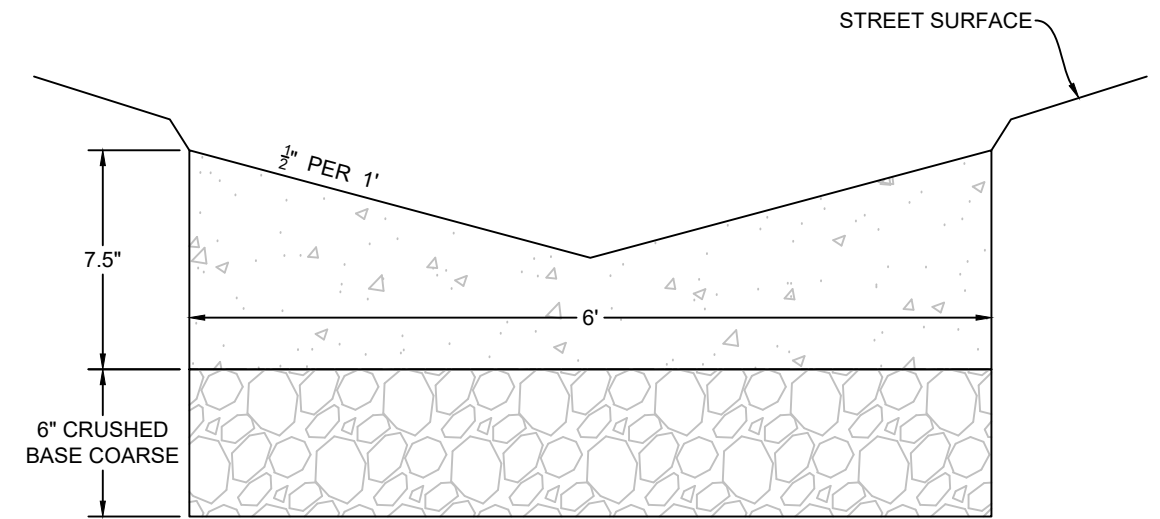


NOTE:  
THE CONCRETE SHALL BE 4000  
PSI FIBER REINFORCED



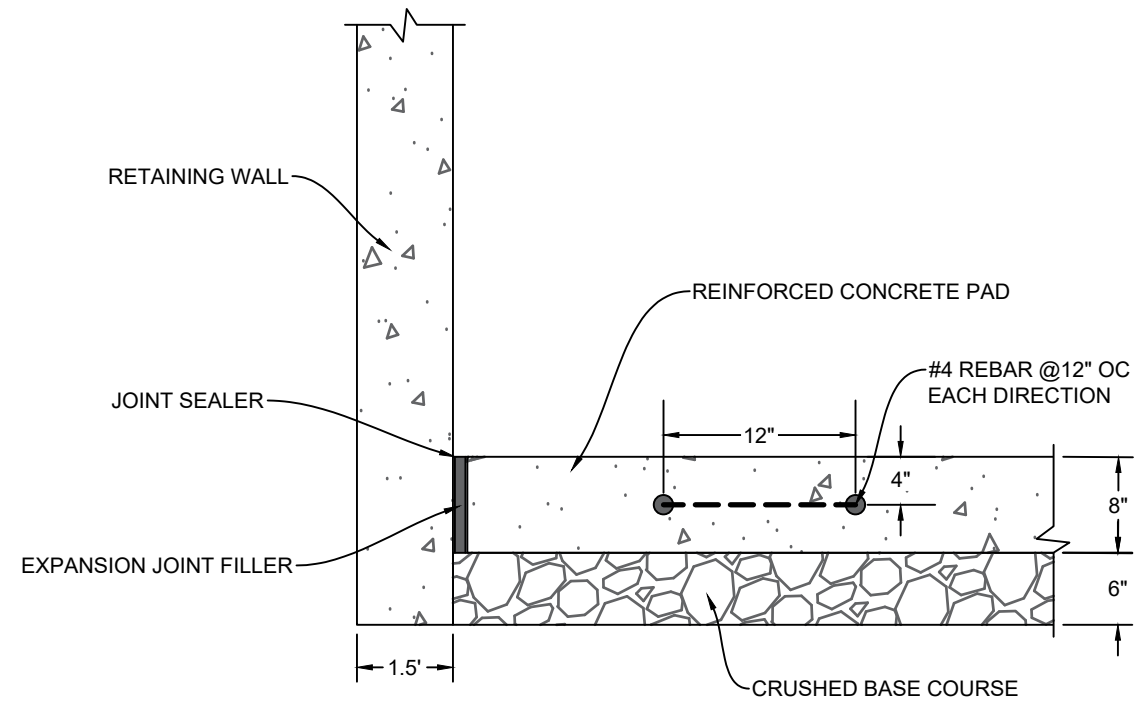
1  
31 CONCRETE APRON DETAIL  
NOT TO SCALE

NOTE: CONCRETE COLLAR FOR CIRCULAR INLET GRATES SHALL CONFORM WITH CITY OF BILLINGS STANDARD MODIFICATIONS TO MPWSS 6TH EDITION, DRAWING SM\_M02213-3



2  
31 6' TYPICAL VALLEY GUTTER DETAIL  
NOT TO SCALE

NOTE:  
FINISHED STREET SURFACE TO BE 1/8" TO 1/4" ABOVE EDGES OF VALLEY GUTTER



3  
31 8" REINFORCED CONCRETE DUMPSTER PAD DETAIL  
NOT TO SCALE

- NOTES:
1. M-4500 8" REINFORCED CONCRETE PAD (MPWSS 03310.2.1.1) OVER 6" CRUSHED BASE
  2. #4 BARS, 60 KSI (GRADE 60) AT 12" O.C. BOTH DIRECTIONS
  3. MINIMUM 2" REINFORCEMENT COVER FROM ALL SURFACE EDGES
  4. PREFORMED EXPANSION JOINT FILLER WITH POURABLE JOINT SEALER AGAINST RETAINING WALL (PER MPWSS)

NO.	REVISION	BY	DATE

PREPARED BY  
**WWC** ENGINEERING  
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YELLOWSTONE COUNTY  
ARENA BACK LOT CONSTRUCTION PROJECT  
**STORM STRUCTURES AND CONCRETE PAD DETAILS**  
BILLINGS, MT

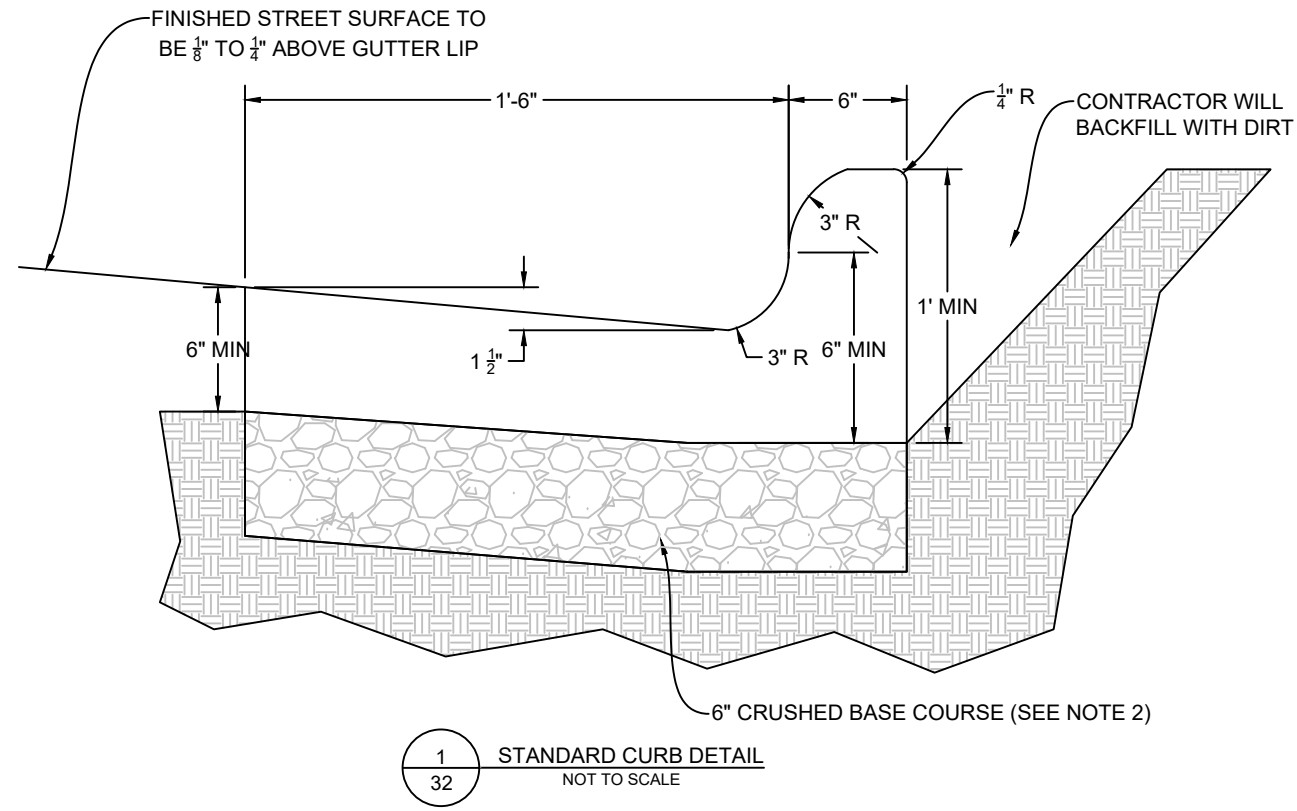
DESIGNED BY: KH  
DRAWN BY: ZSL  
CHECKED BY: GTR  
DATE: 1/18/2024

**BID SET**

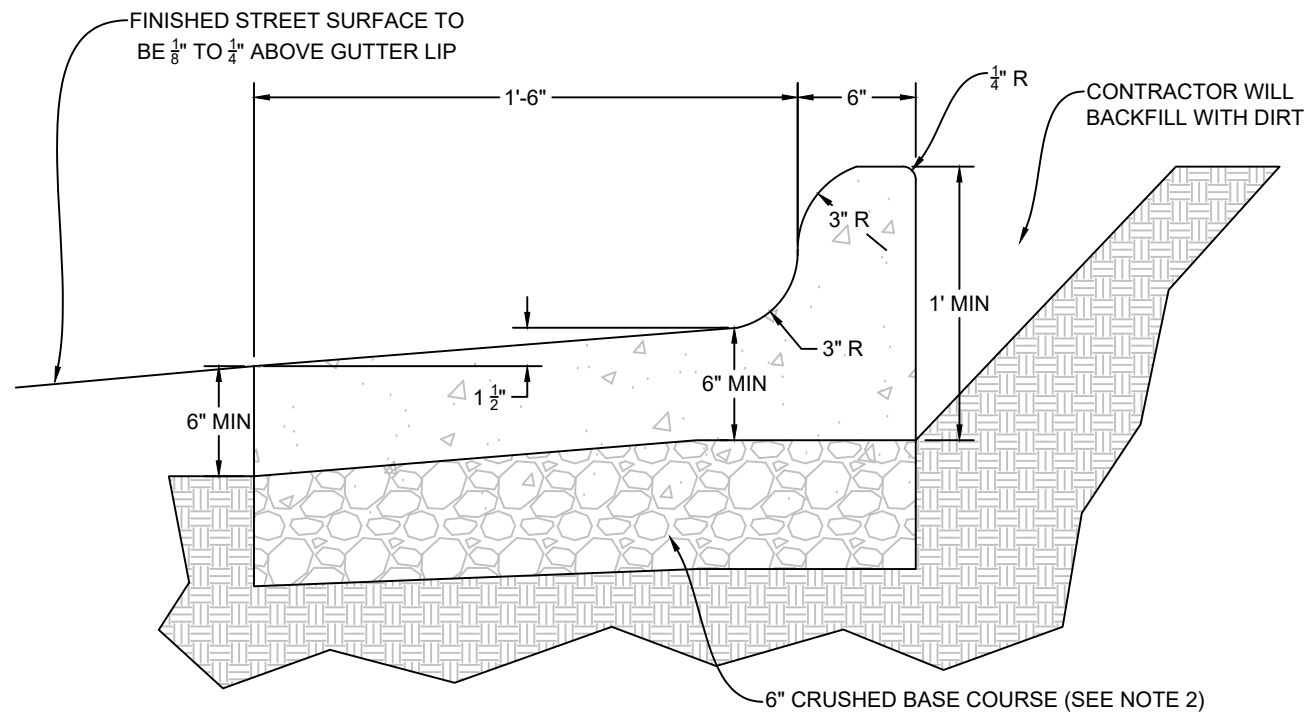
PROJECT NO. 2021-555



K:\Sherridan\Yellowstone County, MT\2021555 MetraPark Infrastructure Improvements\06CAD\Sheets\PLAN\_SET\04\_Arena\_Back\_Lot\PHASE 1 - ARENA BACK LOT\06\_DETAILS\21555-ROAD-STORM-XSEC-DETL.dwg ROAD SECTIONS 1/22/2024 5:35:31 PM



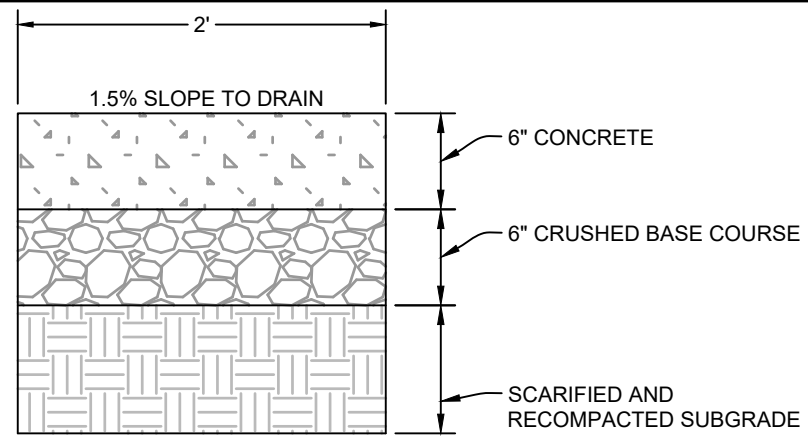
1  
32 STANDARD CURB DETAIL  
NOT TO SCALE



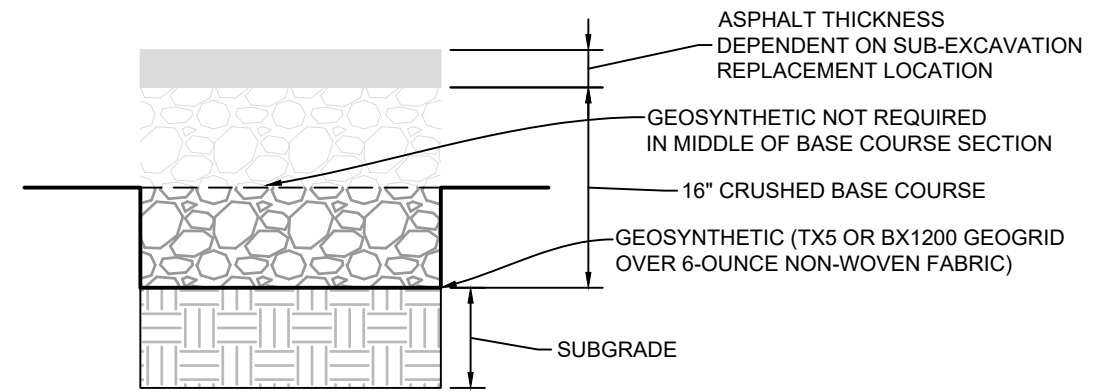
2  
32 SPILL CURB SECTION DETAIL  
NOT TO SCALE

**NOTES:**

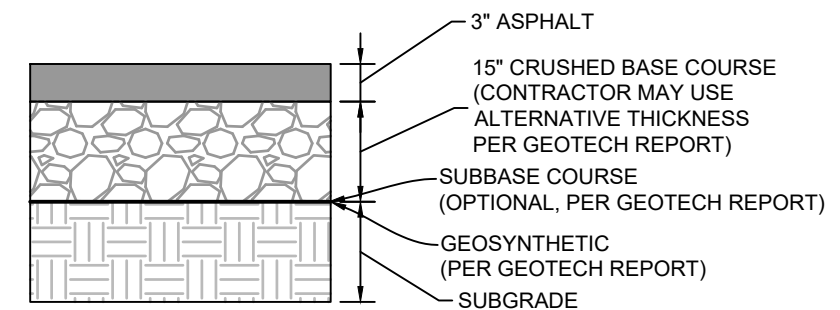
- EXCAVATION REQUIRED FOR CURB AND GUTTER SHALL BE INCIDENTAL TO THE "COMBINED CONCRETE CURB AND GUTTER" BID ITEM AS OUTLINED IN THE SPECIAL PROVISIONS.
- FOR NEW STREET CONSTRUCTION, EXTEND CRUSHED BASE COURSE TO THE BACK OF THE CURB. MINIMUM THICKNESS OF CRUSHED BASE COURSE BENEATH CURB AND GUTTER SHALL BE 6". FOR CURB AND GUTTER REPLACEMENT PROJECTS, PROVIDE A MINIMUM OF 6" OF CRUSHED BASE COURSE BENEATH NEW CURB AND GUTTER.



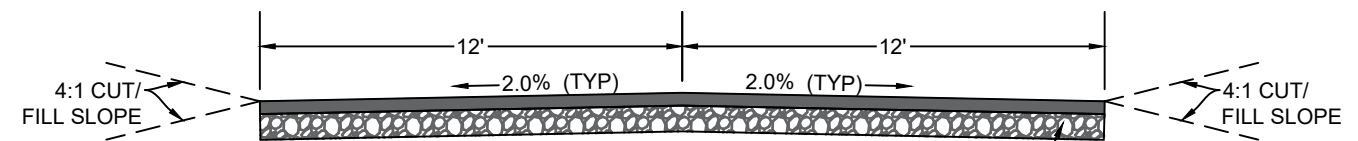
3  
32 CONCRETE RIBBON DETAIL  
NOT TO SCALE



4  
32 SUB-EXCAVATION/REPLACEMENT BELOW SUBGRADE  
NOT TO SCALE



5  
32 3" ASPHALT PAVEMENT - 15" CRUSHED BASE  
NOT TO SCALE



5  
32 ASPHALT AND CRUSHED BASE

6  
32 BACK ACCESS ROAD TYPICAL SECTION  
NOT TO SCALE

PREPARED BY  
**WWC** ENGINEERING  
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(406) 894-2210  
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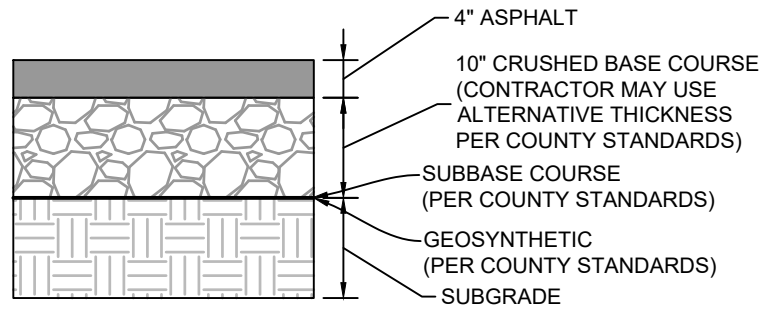
YELLOWSTONE COUNTY  
**ARENA BACK LOT CONSTRUCTION PROJECT**  
**STANDARD CURB AND SURFACING SECTION DETAILS**  
BILLINGS, MT

DESIGNED BY: KH  
DRAWN BY: ZSL  
CHECKED BY: GTR  
DATE: 1/18/2024

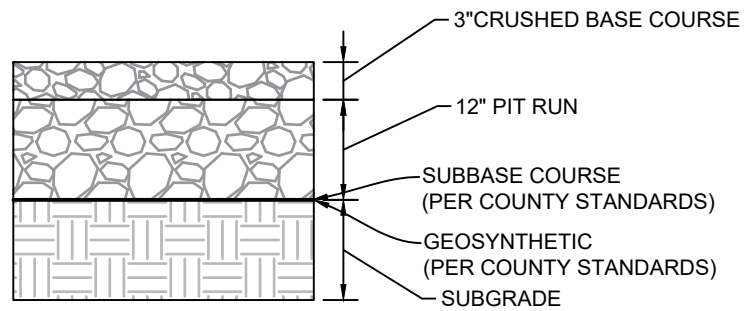
SHEET  
**32**

**BID SET**

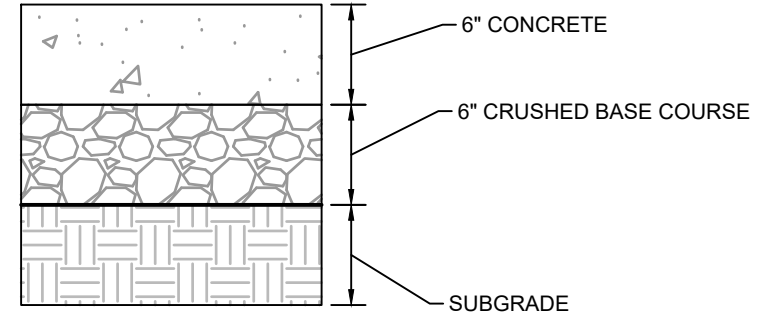
PROJECT NO. 2021-555



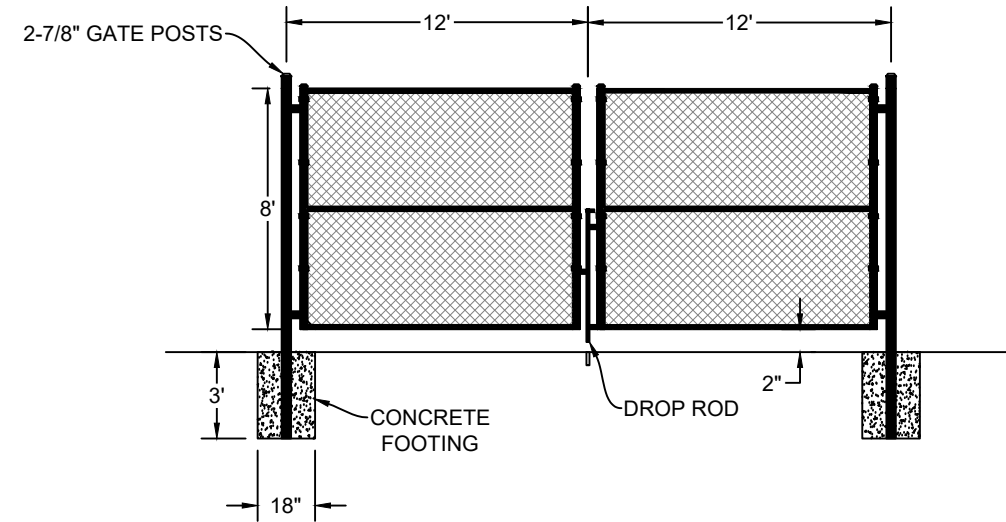
1  
33 4" ASPHALT PAVEMENT - 10" CRUSHED BASE  
NOT TO SCALE



2  
33 3" CRUSHED BASE - 12" PIT RUN  
NOT TO SCALE



3  
33 CONCRETE DRIVEWAY APRON  
NOT TO SCALE



4  
33 24' DOUBLE SWING GATE  
NOT TO SCALE

PREPARED BY  
**WVC** ENGINEERING  
550 S. 24TH ST. W., SUITE 201  
BILLINGS, MT 59102  
(406) 894-2210  
www.wvcengineering.com

YELLOWSTONE COUNTY  
**ARENA BACK LOT CONSTRUCTION PROJECT**  
**SURFACING AND GATE DETAILS**  
BILLINGS, MT

DESIGNED BY: KH  
DRAWN BY: ZSL  
CHECKED BY: GTR  
DATE: 1/18/2024

SHEET  
**33**

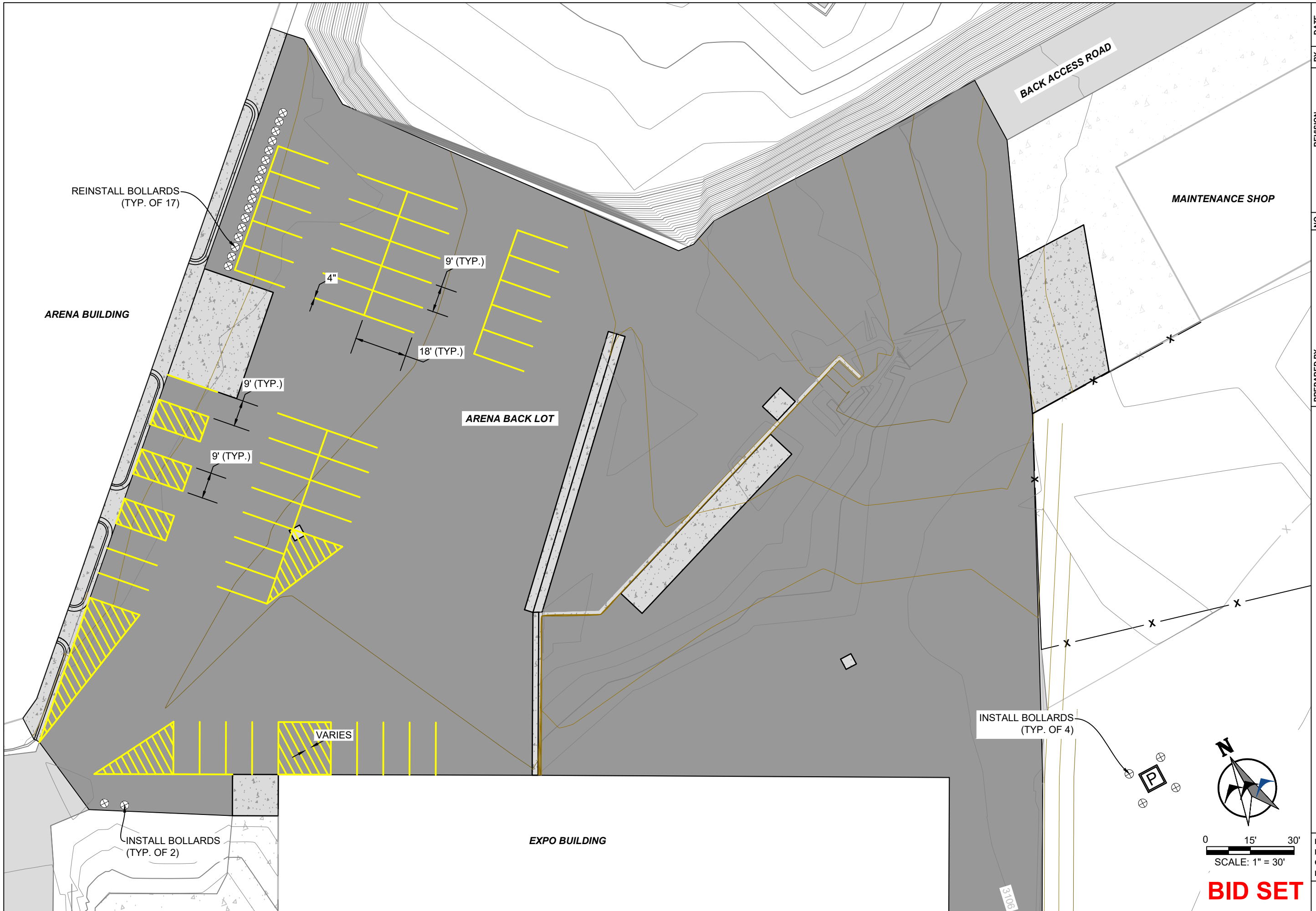
**BID SET**

NO.	REVISION	BY	DATE

PROJECT NO. 2021-555



K:\Sheridan\Yellowstone County, MT\2021555 MetraPark Infrastructure Improvements\05CAD\Sheets\PLAN\_SET\04\_Arena\_Back\_Lots\PHASE 1 - ARENA BACK LOT\04\_IMPROVEMENTS\21555-ARENA-BACK-LOT\_STRIPING.dwg STRIPING 1/22/2024 2:38:47 PM



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 www.wwcengineering.com

YELLOWSTONE COUNTY  
**ARENA BACK LOT CONSTRUCTION PROJECT**  
**ARENA BACK LOT STRIPING LAYOUT**  
 BILLINGS, MT

DESIGNED BY: KH  
 DRAWN BY: ZSL  
 CHECKED BY: GTR  
 DATE: 1/18/2024

SHEET  
**34**

0 15' 30'  
 SCALE: 1" = 30'

**BID SET**

3106