

1

2

3

4

5

6

7

8

9

10

11

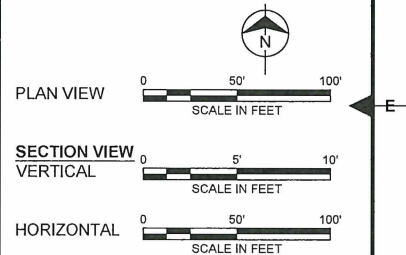
12

13

no.	date	by	ckd	description
A	08/16/22	MRC	JRH	ISSUED FOR PRELIMINARY DESIGN

NOTES:

- SUBSURFACE INFORMATION SHOWN IS BASED ON LIMITED INVESTIGATION AND IS PROJECTED TO THE TRENCH ALIGNMENT AT THE PROPOSED CONSTRUCTION LOCATION. SUBSURFACE INFORMATION SHOWN SHOULD BE CONSIDERED APPROXIMATE.
- 4" PERFORATED HDPE PIPE SHALL BE SLOPED TO PROVIDE POSITIVE DRAINAGE TO SUMPS.
- REFER TO SHEET M101 FOR EXACTION WELL CONSTRUCTION DETAILS.
- WHERE SILICA GRAVEL BACKFILL IS PROPOSED, TRENCH SHALL BE DEVELOPED BY JETTING WALLS WITH POTABLE WATER, AS DIRECTED BY CONTRACTOR.
- STATIC GROUNDWATER ELEVATION ESTIMATES ARE PROJECTED FROM MONITOR WELLS IN CLOSEST PROXIMITY, AND VARY BASED ON WET/DRY PERIODS.
- EXISTING GRADE SURVEYED 09/06/16.
- SUMP LOCATIONS SHOWN ARE APPROXIMATE, FIELD VERIFY LOW POINT IN EXCAVATIONS FOR ACTUAL SUMP LOCATIONS.



PRELIMINARY - NOT FOR CONSTRUCTION

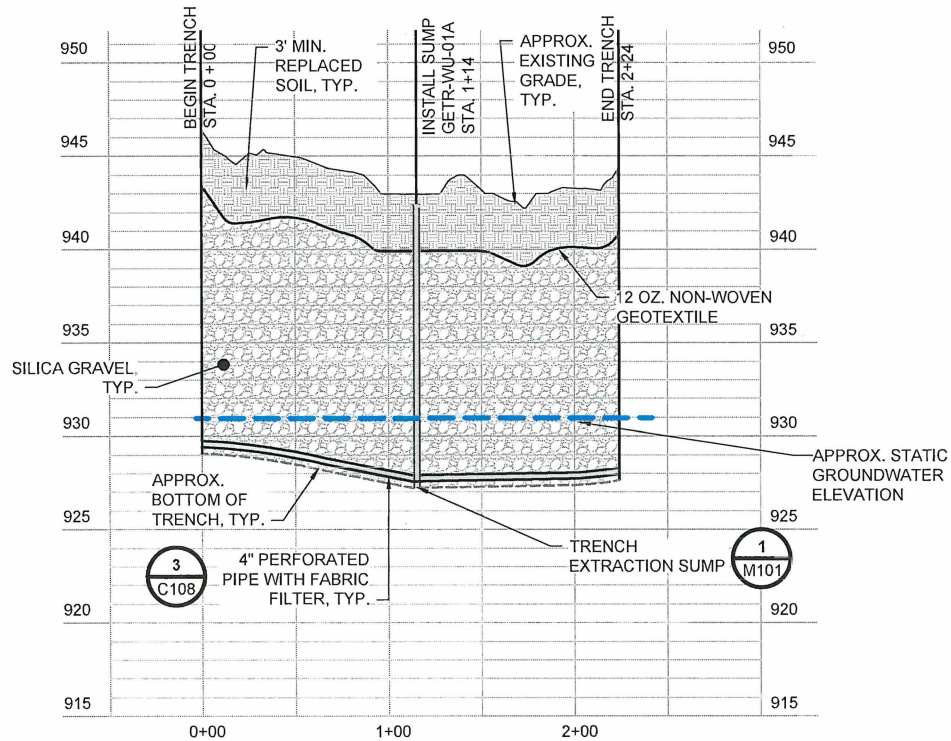
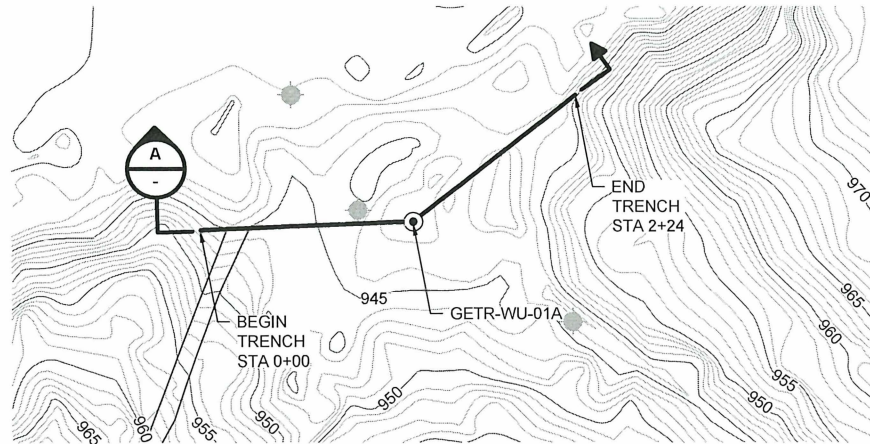
**BURNS
MCDONNELL**

9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
OKLAHOMA FIRM LICENSE NO. 421

date	SEPTMBER 2022	detailed	M. CARLIN
designed	B. WEIS	checked	J. HESEMANN

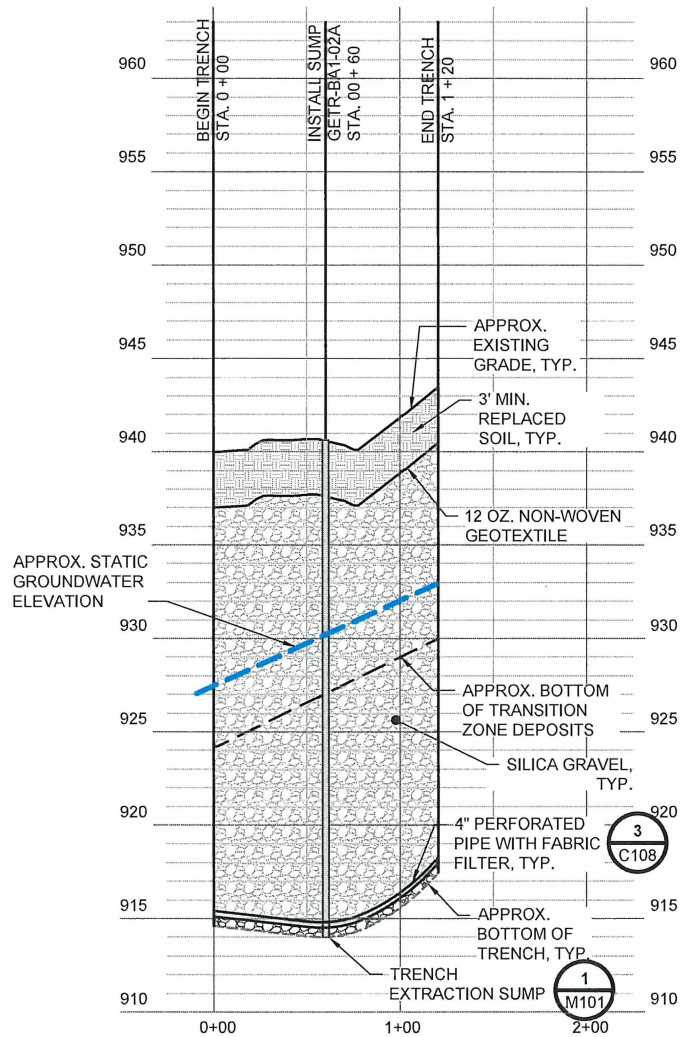
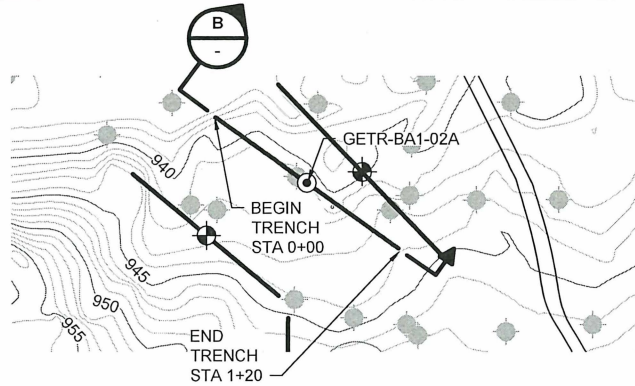
Cimarron Environmental Response Trust
EXTRACTION TRENCH DETAILS

project	142089	contract	-
drawing	BMCD-GWREMED-C101	rev.	A
sheet	of	sheets	
file	C101 EXT TRN DET 1.DWG		



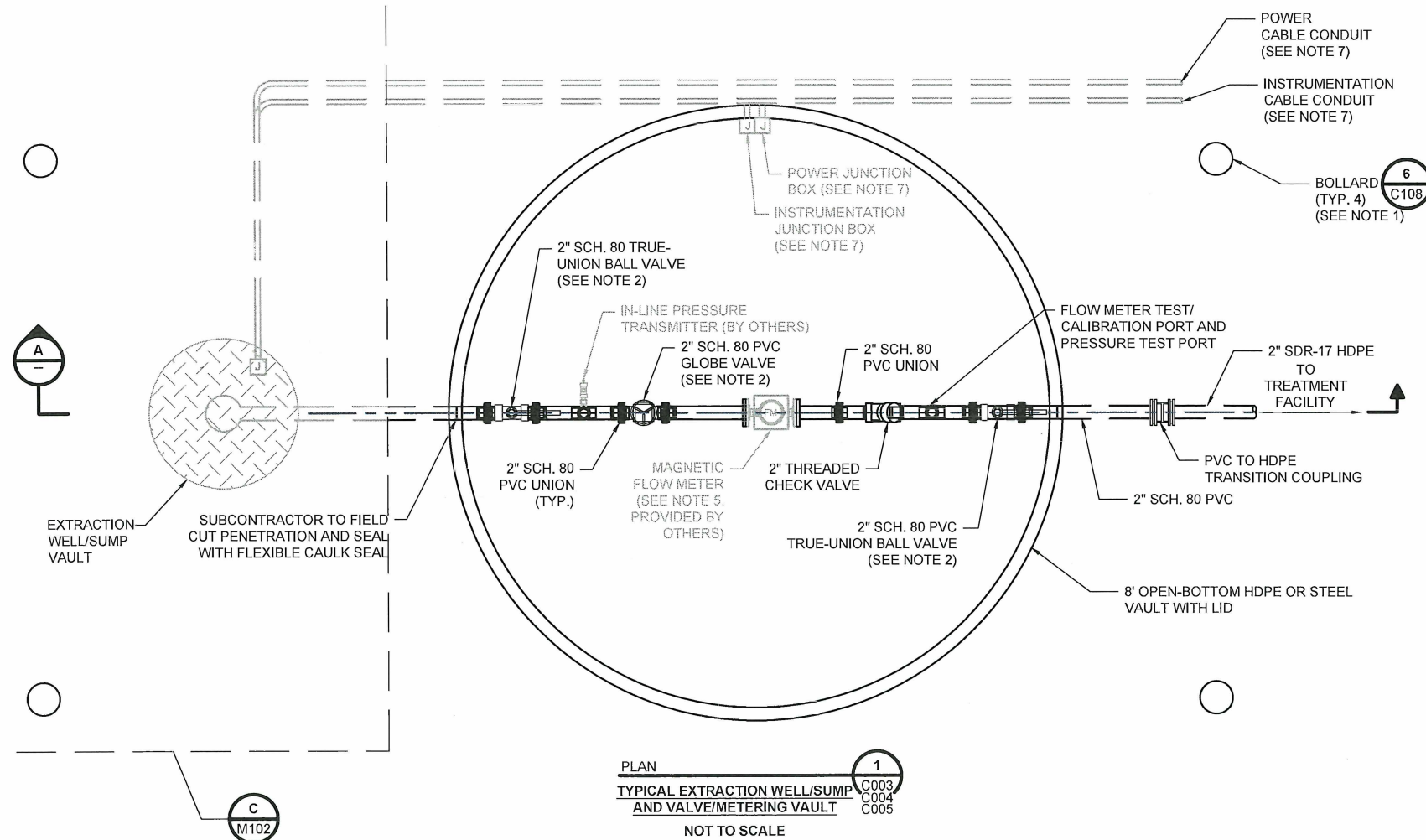
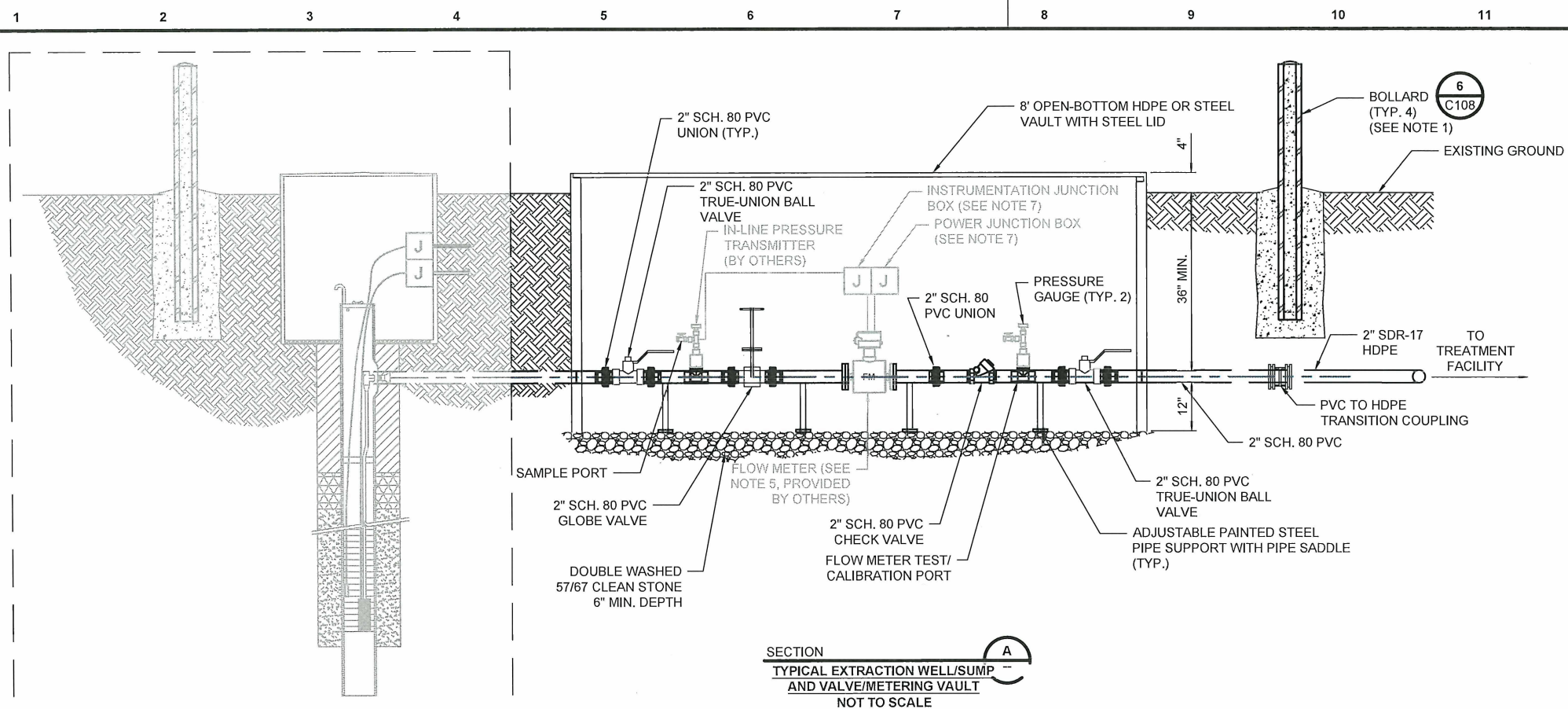
GETR-WU-01

TRENCH COORDINATES GEOMETRY TABLE		
NORTHING	EASTING	DESCRIPTION
321269	2091642	BEGIN TRENCH
321274	2091756	GETR-WU-01A
321341	2091843	END TRENCH



GETR-BA1-02

TRENCH COORDINATES GEOMETRY TABLE		
NORTHING	EASTING	DESCRIPTION
322841	2095396	BEGIN TRENCH
322839	2095445	GETR-BA1-02A
322804	2095494	END TRENCH



- | no. | date | by | ckd | description |
|---------------|---|----|-----|-------------------------------|
| A | 08/22/22 | EP | RH | ISSUED FOR PRELIMINARY DESIGN |
| NOTES: | | | | |
| | <p>1. SUBCONTRACTOR SHALL VERIFY QUANTITY AND LOCATION OF BOLLARDS WITH ENGINEER PRIOR TO CONSTRUCTION.</p> <p>2. SUBCONTRACTOR SHALL ORIENT VALVE OPERATORS TO PREVENT INTERFERENCES WITH ADJACENT VAULT, PIPE, VALVES, AND FITTINGS.</p> <p>3. EXTRACTION WELL AND TRENCH SUMP SCREEN AND CASING LENGTHS AND MATERIALS VARY. REFER TO DRAWINGS M102 AND M201 FOR EXTRACTION WELL AND TRENCH SUMP CONSTRUCTION DETAILS. REFER TO DRAWING C101 FOR TYPICAL EXTRACTION TRENCH PROFILES.</p> <p>4. REFER TO PROCESS DRAWINGS FOR ADDITIONAL PIPE FITTINGS AND LAYOUT DETAILS.</p> <p>5. INSTALL FLOW METER WITH A MINIMUM OF 5 STRAIGHT PIPE DIAMETERS UPSTREAM AND 2 STRAIGHT PIPE DIAMETERS DOWNSTREAM FROM THE ELECTRODE PLANE.</p> <p>6. REFER TO SPECIFICATIONS FOR ADDITIONAL PIPE FITTINGS AND LAYOUT DETAILS.</p> <p>7. REFER TO ELECTRICAL DRAWINGS FOR DETAILS.</p> | | | |

PRELIMINARY - NOT FOR CONSTRUCTION



9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
OKLAHOMA FIRM LICENSEE NO. 421

date SEPTEMBER 2022	detailed E. PULCHER
designed E. DULLE	checked R. HORMELL

Cimmarron Environmental Response Trust
EXTRACTION WELL/SUMP AND VAULT
DETAILS

project	142089	contract
drawing		rev.
BMCD-GWREMED-M101		A
sheet	of	sheets
file M101.DWG		

1

2

3

4

5

6

7

8

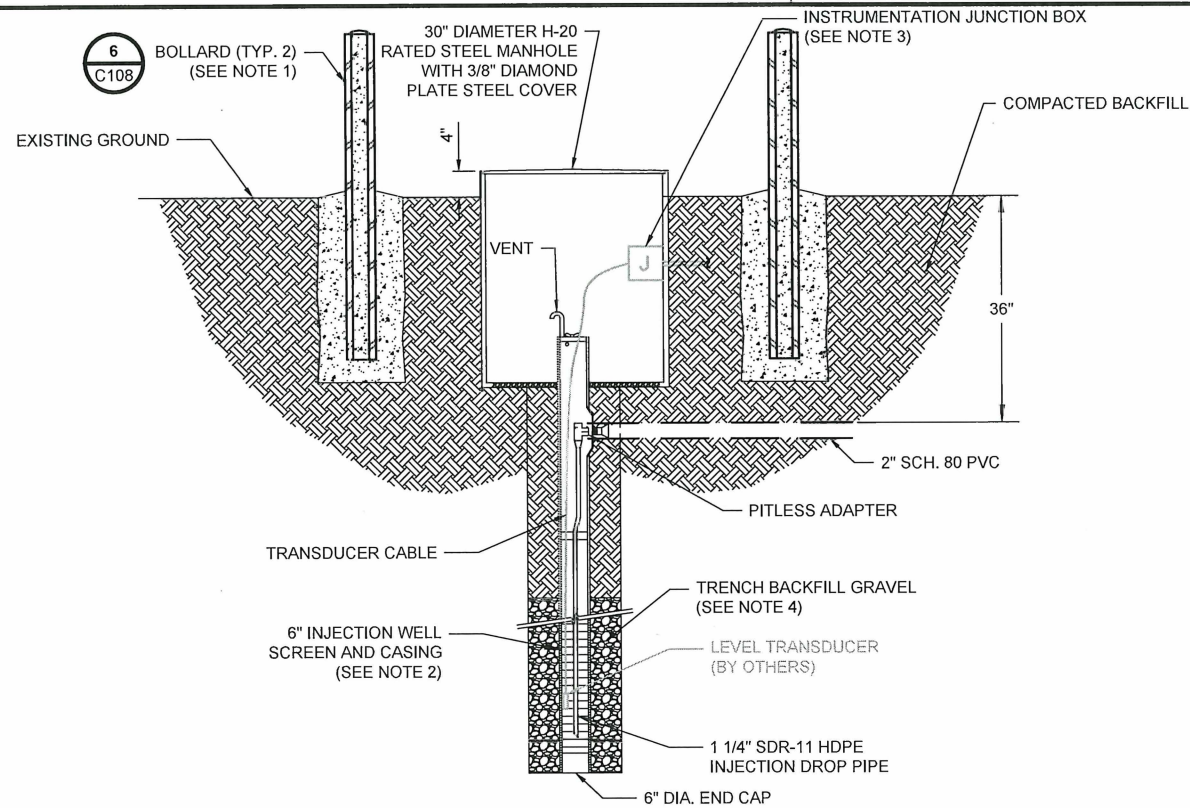
9

10

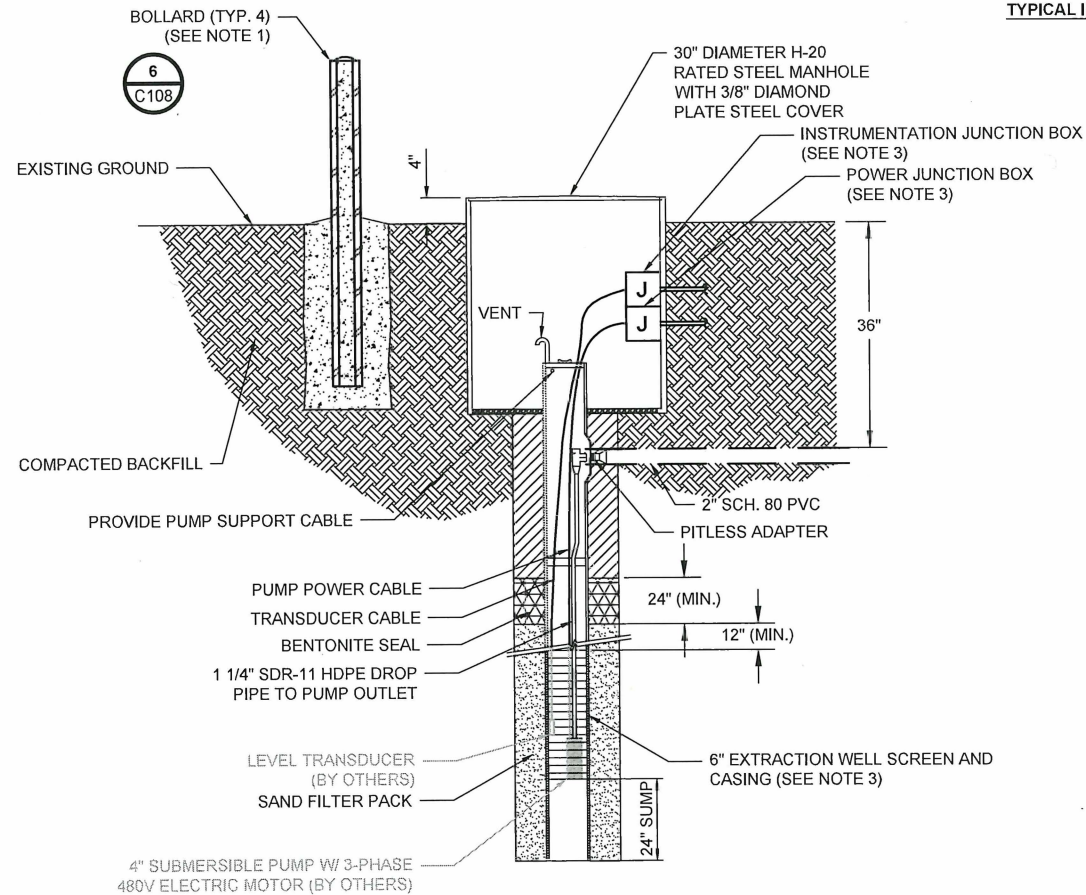
11

12

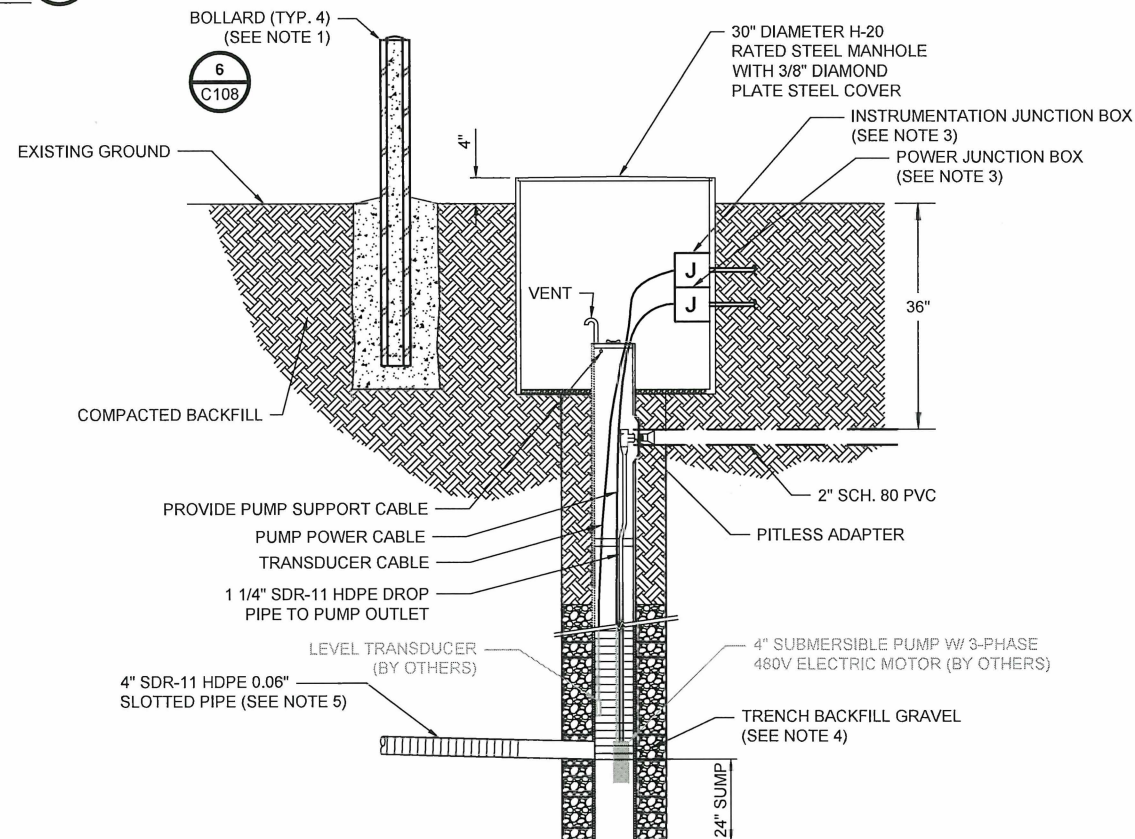
13



SECTION

TYPICAL INJECTION TRENCH WELL
NOT TO SCALEA
C005

SECTION

TYPICAL EXTRACTION WELL
NOT TO SCALEB
C005

SECTION

TYPICAL EXTRACTION SUMP
NOT TO SCALEC
C005

no.	date	by	ckd	description
A	08/22/22	EP	RH	ISSUED FOR PRELIMINARY DESIGN

NOTES:

- SUBCONTRACTOR SHALL VERIFY QUANTITY AND LOCATION OF BOLLARDS WITH ENGINEER PRIOR TO CONSTRUCTION.
- INJECTION WELL SCREEN AND CASING LENGTHS VARY. REFER TO DRAWING M202 FOR INJECTION WELL CONSTRUCTION DETAILS. REFER TO DRAWINGS C102 THROUGH C104 FOR TYPICAL INJECTION TRENCH PROFILES.
- REFER TO ELECTRICAL DRAWINGS FOR DETAILS.
- REFER TO DRAWING C101 THROUGH C104 FOR TRENCH CONSTRUCTION DETAILS.
- A CAPPED 1-INCH GALVANIZED STEEL PIPE (NOT DEPICTED) SHALL EXTEND FROM APPROXIMATELY 5 FT BELOW GRADE TO 5-FT ABOVE GRADE AT EACH WELL. A METAL TAG DISPLAYING THE WELL IDENTIFICATION WILL BE FASTENED TO THE STEEL PIPE.

PRELIMINARY - NOT
FOR CONSTRUCTIONBURNS
MCDONNELL9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
OKLAHOMA FIRM LICENSE NO. 421

date	detailed
SEPTEMBER 2022	E. PULCHER
designed	checked
E. DULLE	R. HORMELL

Cimarron Environmental Response Trust
INJECTION AND EXTRACTION WELL DETAILS

project	contract
142089	
drawing	rev.
BMCD-GWREMED-M102	A
sheet	of
M102.DWG	sheets

WA Extraction Trench Construction Details								
Extraction Trench Sump ID	Total Depth of Sump (ft bgs)	Sump Diameter (inches)	Drop Pipe Diameter (inches)	Sump Material	Trench Drain Pipe Material	Trench Drain Pipe Diameter (inches)	Trench Drain Pipe Screen Slot Size (in)	Filter Pack
GETR-WU-01A	17	6	1.25	HDPE	SDR-11 HDPE	4	0.06	Gravel Backfill

BA1 Extraction Trench Construction Details								
Extraction Trench Sump ID	Total Depth of Sump (ft bgs)	Sump Diameter (inches)	Drop Pipe Diameter (inches)	Sump Material	Trench Drain Pipe Material	Trench Drain Pipe Diameter (inches)	Trench Drain Pipe Screen Slot Size (in)	Filter Pack (see note 3)
GETR-BA1-01A	24	6	1.25	HDPE	SDR-11 HDPE	4	0.06	Gravel Backfill
GETR-BA1-01B	19	6	1.25	HDPE	SDR-11 HDPE	4	0.06	Gravel Backfill
GETR-BA1-02A	25	6	1.25	HDPE	SDR-11 HDPE	4	0.06	Gravel Backfill

WA Extraction Well Construction Details							
Extraction Well ID	Total Depth of Well (ft bgs)	Diameter (inches)	Drop Pipe Diameter (inches)	Well Material	Screened Interval Elevations (ft amsl)	Screen Slot Size (in)	Filter Pack
					(see note 1)		
GE-WAA-02	30	6	1.25	PVC	910-911.5; 915.5-929.5	0.020	Cemex 20x40
GE-WAA-03	25	6	1.25	PVC	919-929.25	0.020	Cemex 20x40
GE-WAA-04	30	6	1.25	PVC	913.5-927	0.020	Cemex 20x40
GE-WAA-05	30	6	1.25	PVC	910-913; 917.5-927	0.025	Cemex 16x30

BA1 Extraction Well Construction Details							
Extraction Well ID	Total Depth of Well (ft bgs)	Diameter (inches)	Drop Pipe Diameter (inches)	Well Material	Screened Interval Elevations (ft amsl)	Screen Slot Size (in)	Filter Pack
					(see note 1)		
GE-BA1-02	20	6	1.25	PVC	916.5-927	0.025	Cemex 16x30
GE-BA1-03	23	6	1.25	PVC	919-924	0.020	Cemex 20x40
GE-BA1-04	27	6	1.25	PVC	910-923	0.020	Cemex 20x40

no.	date	by	ckd	description
A	08/22/22	AA	ED	ISSUED FOR PRELIMINARY DESIGN

- NOTES:
- WELLS WITH MULTIPLE SCREENED INTERVAL ELEVATIONS ARE SEPARATED BY A ZERO SLOT SCREEN.
 - ACTUAL EXTRACTION TRENCH SCREEN LENGTHS AND DRAIN PIPE LENGTHS WILL BE DETERMINED AT TIME OF CONSTRUCTION. REFER TO DRAWING C101 THROUGH C104 FOR TRENCH CONSTRUCTION DETAILS.
 - EXTRACTION TRENCH SUMPS GETR-BA1-01A AND B WERE INSTALLED DURING THE 2017 PILOT STUDY.

PRELIMINARY - NOT FOR CONSTRUCTION



9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
OKLAHOMA FIRM LICENSE NO. 421

date	detailed
SEPTEMBER 2022	A. ANSTAETT
designed	checked
E. DULLE	E. DULLE

Cimarron Environmental Response Trust
CONSTRUCTION DETAILS INDEX
EXTRACTION WELLS/SUMPS

project	contract
142089	
drawing	rev.
BMCD-GWREMED-M201	A
sheet	of sheets
file	M201.DWG

WA Extraction Pump Selections			
Extraction Well/Sump ID	Pump Selection	Motor Size (HP)	Pump Inlet Set Depth (ft amsl)
GETR-WU-01A	Grundfos 16S07-8	0.75	928.0
GE-WAA-02	Grundfos 25S10-7	1.0	922.5
GE-WAA-03	Grundfos 25S15-9	1.5	926.0
GE-WAA-04	Grundfos 25S15-9	1.5	915.0
GE-WAA-05	Grundfos 25S15-9	1.5	918.5

BA1 Extraction Pump Selections			
Extraction Well/Sump ID	Pump Selection	Motor Size (HP)	Pump Inlet Set Depth (ft amsl)
GE-BA1-02	Grundfos 25S07-5	0.75	925.0
GE-BA1-03	Grundfos 25S07-5	0.75	920.5
GE-BA1-04	Grundfos 25S07-5	0.75	915.5
GETR-BA1-01A	Grundfos 16S05-5	0.50	919.5
GETR-BA1-01B	Grundfos 16S05-5	0.50	919.5
GETR-BA1-02A	Grundfos 16S05-5	0.50	914.5

no.	date	by	ckd	description
A	08/22/22	AA	ED	ISSUED FOR PRELIMINARY DESIGN

- NOTES:
- REFER TO DRAWING P203 FOR ESTIMATED FLOW RATES.
 - EACH PUMP SHALL BE EQUIPPED WITH A SHROUD.

PRELIMINARY - NOT FOR CONSTRUCTION

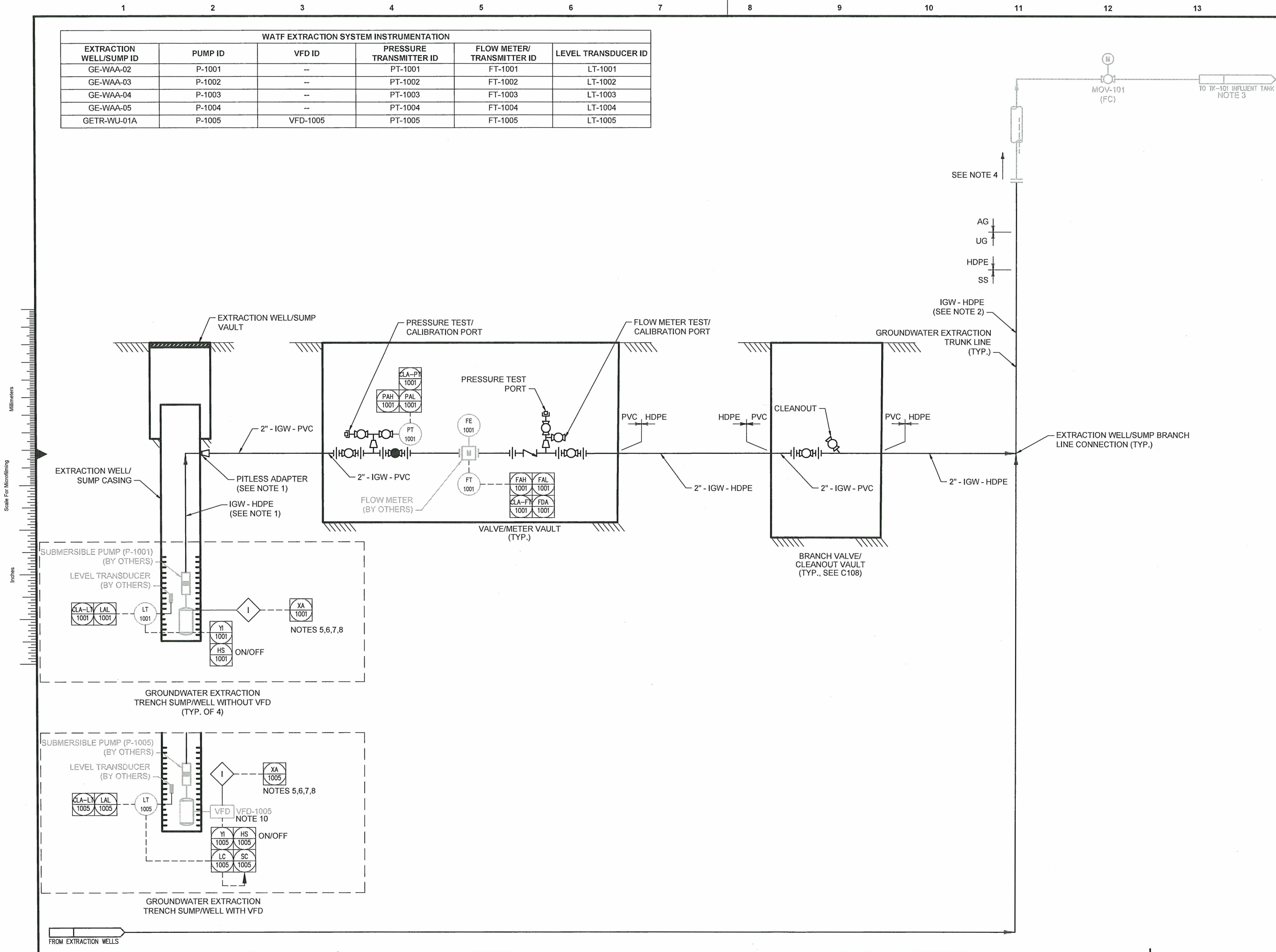


9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
OKLAHOMA FIRM LICENSEE NO. 421

date	designed	detailed	checked
SEPTEMBER 2022	E. DULLE	A. ANSTAETT	E. DULLE

Cimarron Environmental Response Trust
PUMP SELECTION INDEX
EXTRACTION WELLS/SUMPS

project	contract
142089	
drawing	rev.
BMCD-GWREMED-M203	A
sheet	of sheets
file M203.DWG	



no.	date	by	ckd	description
A	08/19/22	AA	ED	ISSUED FOR PRELIMINARY DESIGN

NOTES:

- REFER TO DRAWING M201 AND M203 FOR PUMP AND PIPING SPECIFICATIONS.
- PIPE DIAMETERS VARY, REFER TO DRAWINGS C003 AND C004 FOR SPECIFIC PIPE DIAMETER INFORMATION.
- REFER TO VFS-EPM-000-DWG-P-110 AND P-115, LOCATED IN APPENDICES J2 AND J3, RESPECTIVELY.
- REFER TO VFS-EPM-000-DWG-P-115, LOCATED IN APPENDIX J3.
- LOW WELL WATER LEVEL; SHUT DOWN SUBMERSIBLE PUMP.
- LOW/HIGH PRESSURE; SHUT DOWN SUBMERSIBLE PUMP.
- LOW/HIGH WATER FLOW RATE; SHUT DOWN SUBMERSIBLE PUMP.
- CEASE GROUNDWATER EXTRACTION MODE SIGNAL FROM TREATMENT BUILDING; SHUT DOWN SUBMERSIBLE PUMP.
- THE FOLLOWING WILL BE PROVIDED BY OTHERS: SUBMERSIBLE PUMPS, VARIABLE FREQUENCY DRIVES, LEVEL TRANSDUCERS, PRESSURE TRANSMITTERS, AND FLOW METERS/TRANSMITTERS.
- P-1005 IS EQUIPPED WITH A VARIABLE FREQUENCY DRIVE.

PRELIMINARY - NOT FOR CONSTRUCTION

BURNS & MCDONNELL

9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
OKLAHOMA FIRM LICENSE NO. 421

date	detailed
SEPTEMBER 2022	A. ANSTAETT

designed	checked
E. DULLE	E. DULLE

Cimmaron Environmental Response Trust
WESTERN AREA GROUNDWATER EXTRACTION SYSTEM P&ID

project	contract
142089	

drawing	rev.
BMCD-GWREMED-P101	A

sheet	of	sheets
file P101.DWG		

1

2

3

4

5

6

7

8

9

10

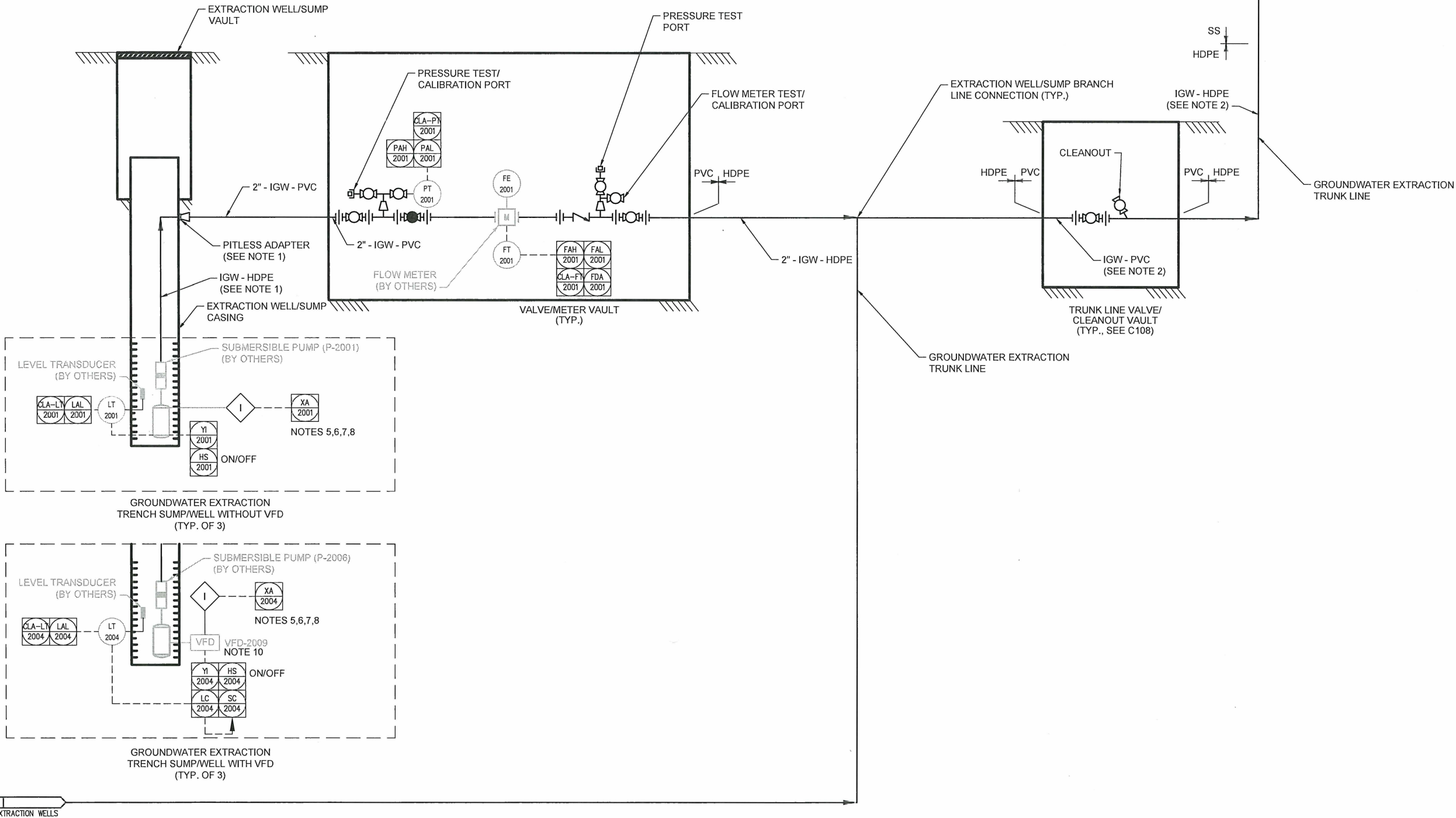
11

12

13

BA1 EXTRACTION SYSTEM INSTRUMENTATION

EXTRACTION WELL/SUMP ID	PUMP ID	VFD ID	PRESSURE TRANSMITTER ID	FLOW METER/ TRANSMITTER ID	LEVEL TRANSDUCER ID
GE-BA1-02	P-2001	--	PT-2001	FT-2001	LT-2001
GE-BA1-03	P-2002	--	PT-2002	FT-2002	LT-2002
GE-BA1-04	P-2003	--	PT-2003	FT-2003	LT-2003
GETR-BA1-01A	P-2004	VFD-2004	PT-2004	FT-2004	LT-2004
GETR-BA1-01B	P-2005	VFD-2005	PT-2005	FT-2005	LT-2005
GETR-BA1-02A	P-2006	VFD-2006	PT-2006	FT-2006	LT-2006



no.	date	by	ckd	description
-----	------	----	-----	-------------

A	08/19/22	AA	ED	ISSUED FOR PRELIMINARY DESIGN
---	----------	----	----	-------------------------------

NOTES:

1. REFER TO DRAWING M201 AND M203 FOR PUMP AND PIPING SPECIFICATIONS.
2. PIPE DIAMETERS VARY. REFER TO DRAWING C005 FOR SPECIFIC PIPE DIAMETER INFORMATION.
3. REFER TO VFS-EPM-000-DWG-P-210 AND P-215, LOCATED IN APPENDIX J5.
4. REFER TO VFS-EPM-000-DWG-P-215, LOCATED IN APPENDIX J5.
5. LOW WELL WATER LEVEL; SHUT DOWN SUBMERSIBLE PUMP.
6. LOW/HIGH PRESSURE; SHUT DOWN SUBMERSIBLE PUMP.
7. LOW/HIGH WATER FLOW RATE; SHUT DOWN SUBMERSIBLE PUMP.
8. CEASE GROUNDWATER EXTRACTION MODE SIGNAL FROM TREATMENT BUILDING; SHUT DOWN SUBMERSIBLE PUMP.
9. THE FOLLOWING WILL BE PROVIDED BY OTHERS: SUBMERSIBLE PUMPS, LEVEL TRANSDUCERS, PRESSURE TRANSMITTERS, AND FLOW METERS/TRANSMITTERS.
10. P-2006, P-2007 AND P-2008 ARE EQUIPPED WITH VARIABLE FREQUENCY DRIVES.

PRELIMINARY - NOT FOR CONSTRUCTION

**BURNS
MCDONNELL**

9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
OKLAHOMA FIRM LICENSE NO. 421

date	SEPTEMBER 2022	detailed	A. ANSTAETT
designed	E. DULLE	checked	E. DULLE

Cimmaron Environmental Response Trust
BURIAL AREA 1 GROUNDWATER
EXTRACTION SYSTEM P&ID

project	142089	contract	
drawing		rev.	A
sheet		of	sheets
file	P102.DWG		

WA Extraction Well/Trench Flow Rate Summary			
Extraction Well/Trench ID	Minimum Flow Rate (gpm)	Maximum Flow Rate (gpm)	Nominal Flow Rate (gpm)
GETR-WU-01	3	15	8
GE-WAA-02	15	30	30
GE-WAA-03	15	30	24
GE-WAA-04	15	30	20
GE-WAA-05	15	30	25

BA1 Extraction Well/Trench Flow Rate Summary			
Extraction Well/Trench ID	Minimum Flow Rate (gpm)	Maximum Flow Rate (gpm)	Nominal Flow Rate (gpm)
GE-BA1-02	10	32	31
GE-BA1-03	10	32	24
GE-BA1-04	10	32	31
GETR-BA1-01	5	13	7
GETR-BA1-02	5	13	7


WA Injection Well/Trench Flow Rate Summary			
Injection Well/Trench ID	Minimum Flow Rate (gpm)	Maximum Flow Rate (gpm)	Nominal Flow Rate (gpm)
GWl-WU-01	3	28	8

BA1 Injection Well Flow Rate Summary			
Injection Well/Trench ID	Minimum Flow Rate (gpm)	Maximum Flow Rate (gpm)	Nominal Flow Rate (gpm)
GWl-BA1-01	5	32	10
GWl-BA1-02	2	12	4
GWl-BA1-03	2	12	4
GWl-BA1-04	5	12	10



no.	date	by	ckd	description
A	08/19/22	AA	ED	ISSUED FOR PRELIMINARY DESIGN

PRELIMINARY - NOT FOR CONSTRUCTION

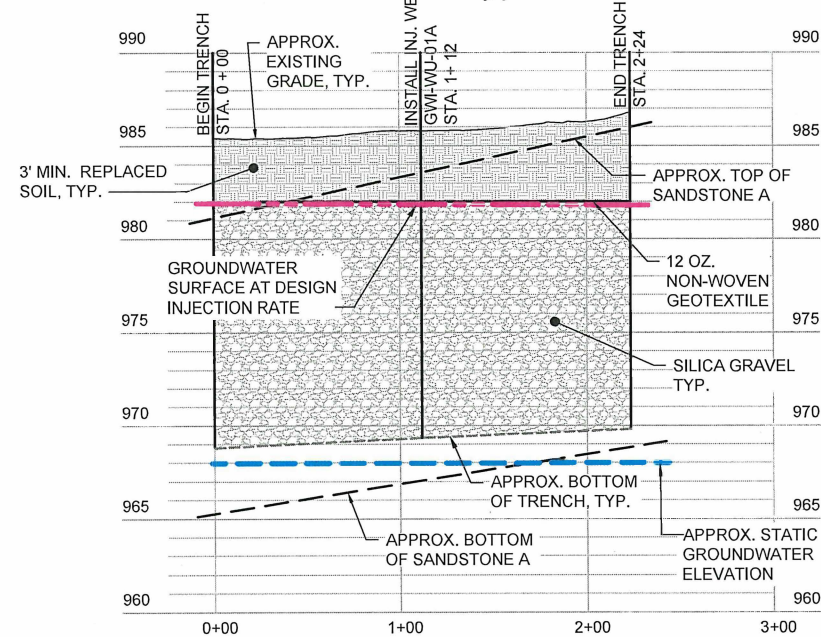
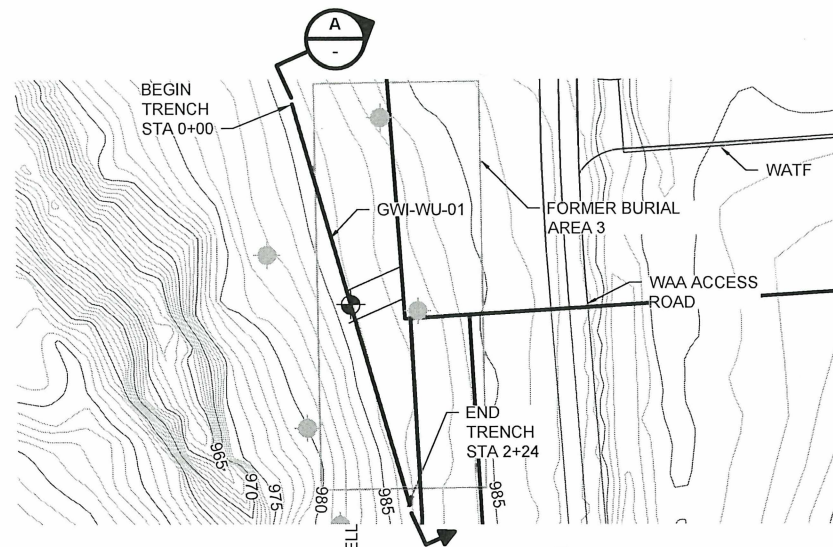


9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
OKLAHOMA FIRM LICENSEE NO. 421

date	SEPTMBER 2022	detailed	A. ANSTAETT
designed	E. DULLE	checked	E. DULLE

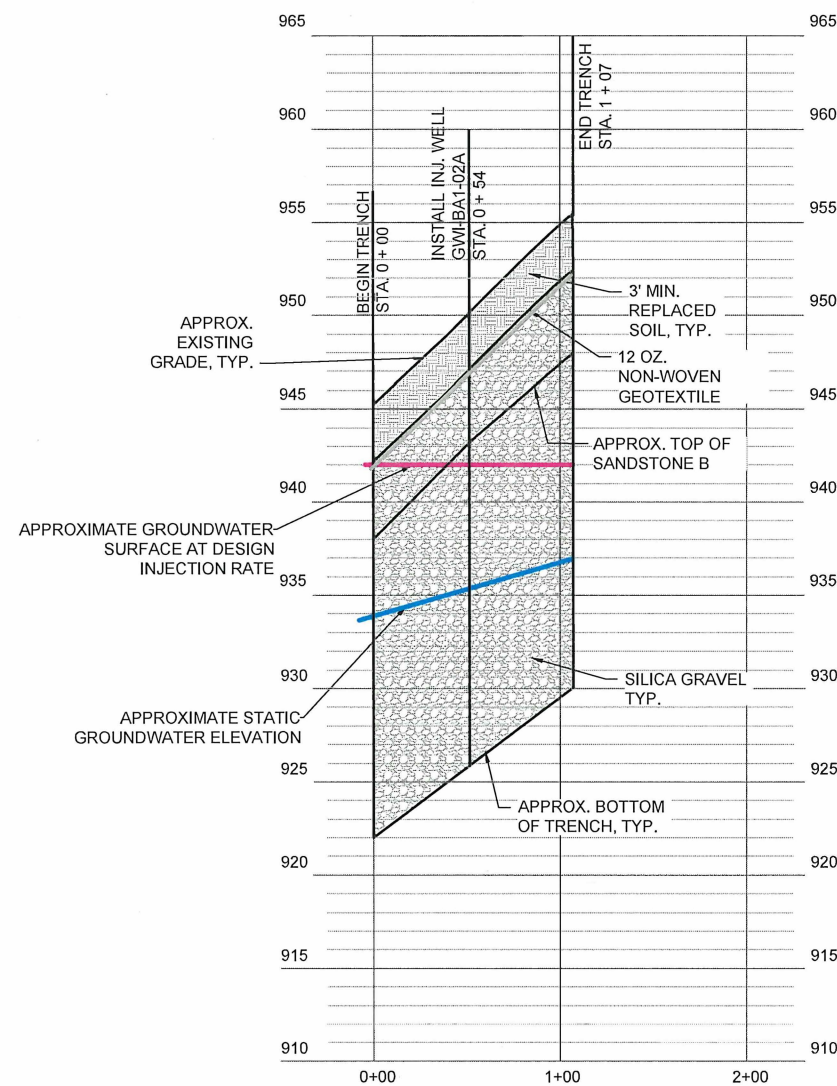
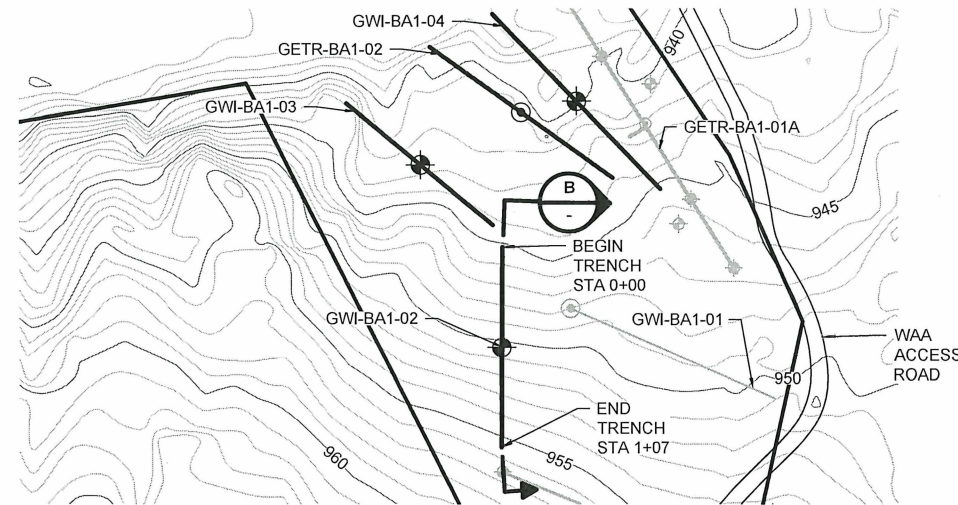
Cimmaron Environmental Response Trust
GROUNDWATER EXTRACTION AND INJECTION
FLOW RATE SUMMARY

project	142089	contract	
drawing	BMCD-GWREMEDI-P205	rev.	A
sheet	of	sheets	
file	P205.DWG		



GWI-WU-01

TRENCH COORDINATES GEOMETRY TABLE		
NORTHING	EASTING	DESCRIPTION
320800	2092461	BEGIN TRENCH
320693	2092492	GWI-WU-01
320585	2092523	END TRENCH



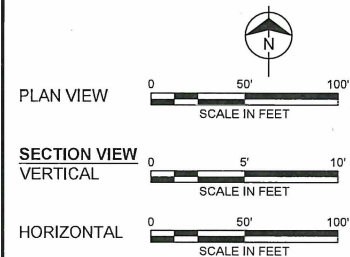
GWI-BA1-02

TRENCH COORDINATES GEOMETRY TABLE		
NORTHING	EASTING	DESCRIPTION
322767	2095435	BEGIN TRENCH
322713	2095435	GWI-BA1-02A
322660	2095435	END TRENCH

no.	date	by	ckd	description
A	08/19/22	MRC	JRH	ISSUED FOR PRELIMINARY DESIGN

NOTES:

- SUBSURFACE INFORMATION SHOWN IS BASED ON LIMITED INVESTIGATION AND IS PROJECTED TO THE TRENCH ALIGNMENT AT THE PROPOSED CONSTRUCTION LOCATION. SUBSURFACE INFORMATION SHOW SHOULD BE CONSIDERED APPROXIMATE.
- REFER TO SHEET M102 FOR INJECTION WELL CONSTRUCTION DETAILS.
- WHERE SILICA GRAVEL BACKFILL IS PROPOSED, TRENCH SHALL BE DEVELOPED BY JETTING WALLS WITH POTABLE WATER, AS DIRECTED BY ENGINEER.
- STATIC GROUNDWATER ELEVATION ESTIMATES ARE PROJECTED FROM MONITOR WELLS IN CLOSE PROXIMITY, AND VARY BASED ON WET/DRY PERIODS.
- THE CALCULATED GROUNDWATER SURFACE AT DESIGN INJECTION RATE DOES NOT CONSIDER GEOMEMBRANE INSTALLATION ON THE ENDS AND SOUTHERN SIDE OF INJECTION TRENCHES.
- EXISTING GRADE SURVEYED 09/06/16.



PRELIMINARY - NOT FOR CONSTRUCTION

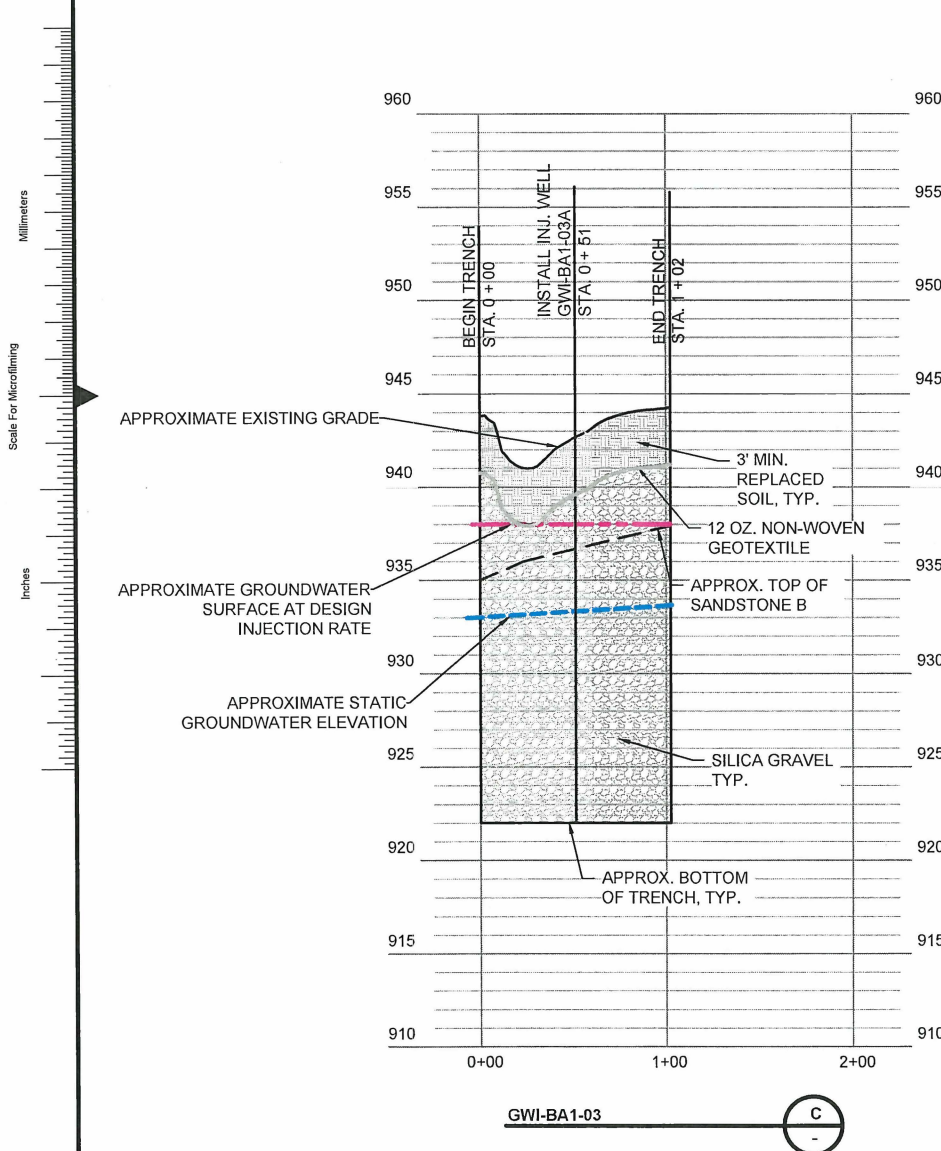
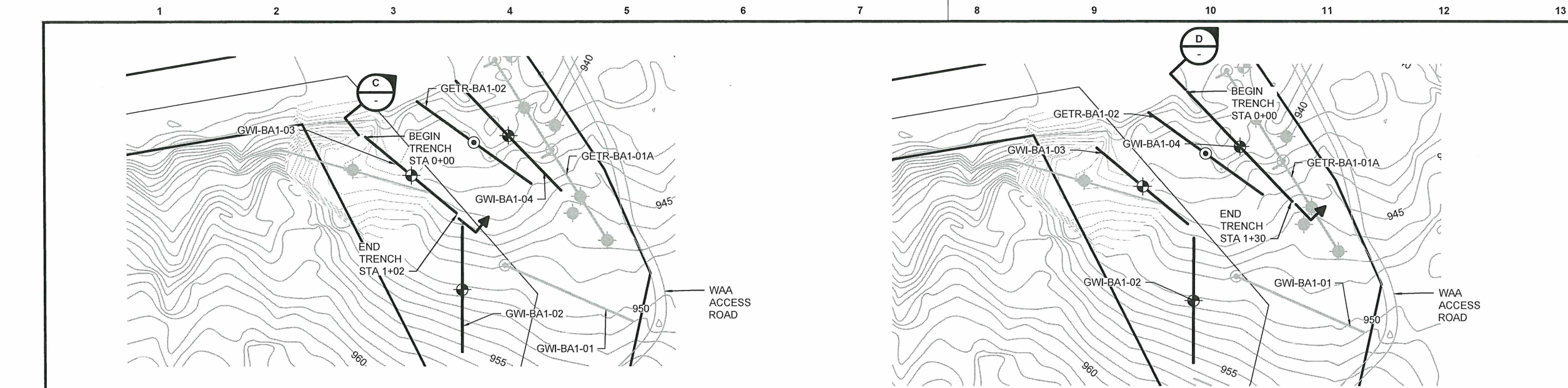
**BURNS
MCDONNELL**

9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
OKLAHOMA FIRM LICENSE NO. 421

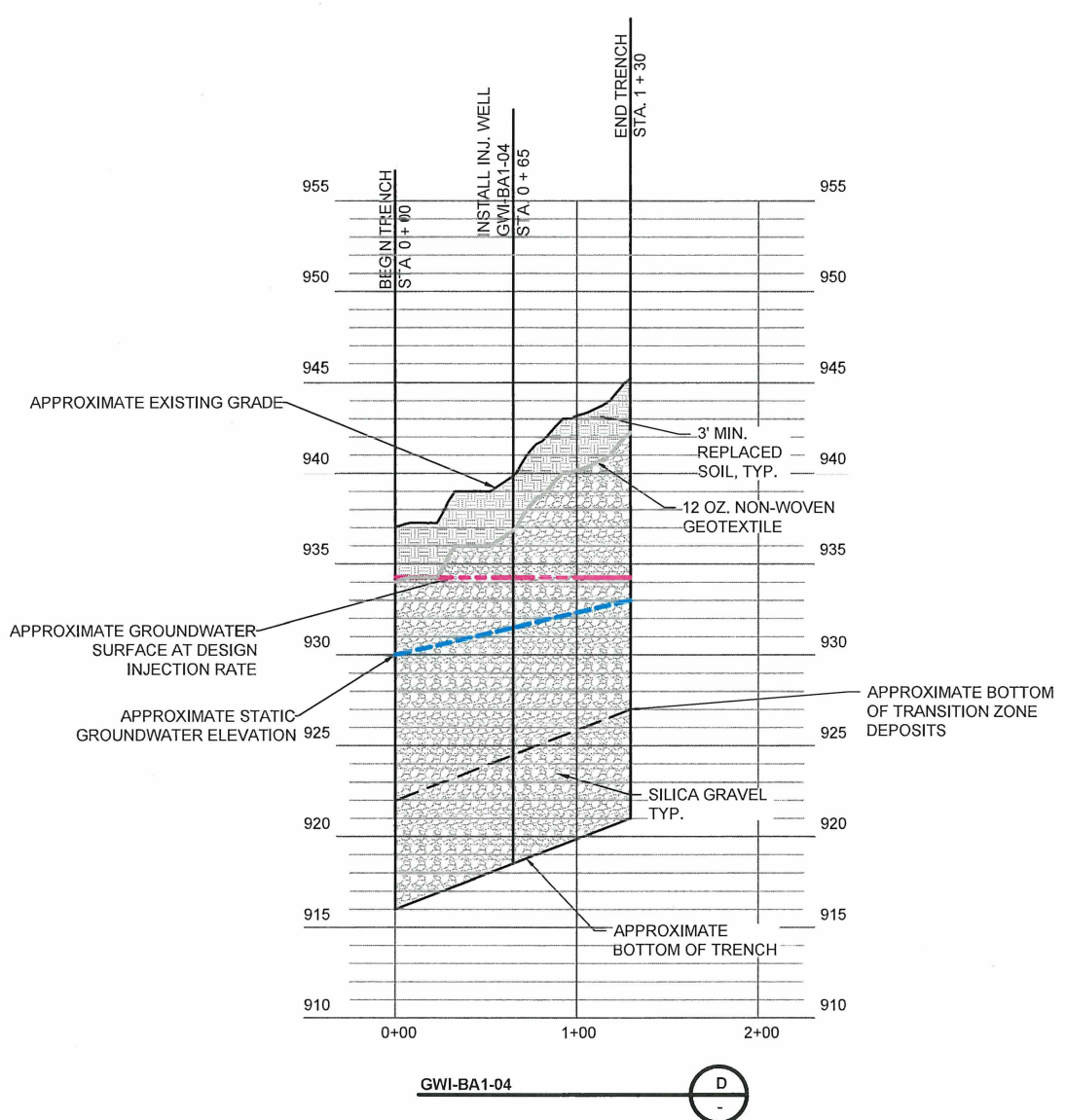
date	detailed
SEPTEMBER 2022	M. CARLIN
designed	checked
B. WEIS	J. HESEMANN

Cimarron Environmental Response Trust
INJECTION TRENCH DETAILS - SHEET 1

project	contract	
142089	-	
drawing	rev.	
BMCD-GWREMED-C102	A	
sheet	of	sheets
file	C102 INJ TRN DET 1.DWG	



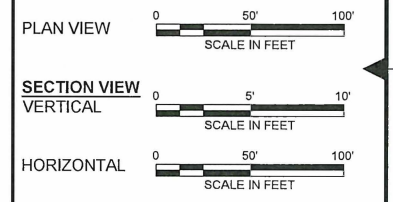
TRENCH COORDINATES GEOMETRY TABLE		
NORTHING	EASTING	DESCRIPTION
322844	2095352	BEGIN TRENCH
322811	2095391	GWI-BA1-03A
322779	2095430	END TRENCH



TRENCH COORDINATES GEOMETRY TABLE		
NORTHING	EASTING	DESCRIPTION
322892	2095430	BEGIN TRENCH
322845	2095475	GWI-BA1-04
322798	2095519	END TRENCH

no.	date	by	ckd	description
A	08/25/22	EAP	JRH	ISSUED FOR PRELIMINARY DESIGN

- NOTES:**
- SUBSURFACE INFORMATION SHOWN IS BASED ON LIMITED INVESTIGATION AND IS PROJECTED TO THE TRENCH ALIGNMENT AT THE PROPOSED CONSTRUCTION LOCATION. SUBSURFACE INFORMATION SHOW SHOULD BE CONSIDERED APPROXIMATE.
 - REFER TO SHEET M102 FOR INJECTION WELL CONSTRUCTION DETAILS.
 - WHERE SILICA GRAVEL BACKFILL IS PROPOSED, TRENCH SHALL BE DEVELOPED BY JETTING WALLS WITH POTABLE WATER, AS DIRECTED BY ENGINEER.
 - STATIC GROUNDWATER ELEVATION ESTIMATES PROJECTED FROM MONITOR WELLS IN CLOSE PROXIMITY, AND VARY BASED ON WET/DRY PERIODS..
 - EXISTING GRADE SURVEYED 09/06/16.



PRELIMINARY - NOT FOR CONSTRUCTION

BURNS McDONNELL

9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
OKLAHOMA FIRM LICENSE NO. 421

date	SEPTEMBER 2022	detailed	M. CARLIN
designed	B. WEIS	checked	J. HESEMANN

Cimarron Environmental Response Trust
INJECTION TRENCH DETAILS - SHEET 2

project	142089	contract	-
drawing		rev.	A
sheet	of	sheets	
file	C103 INJ TRN DET 2.DWG		

1

2

3

4

5

6

7

8

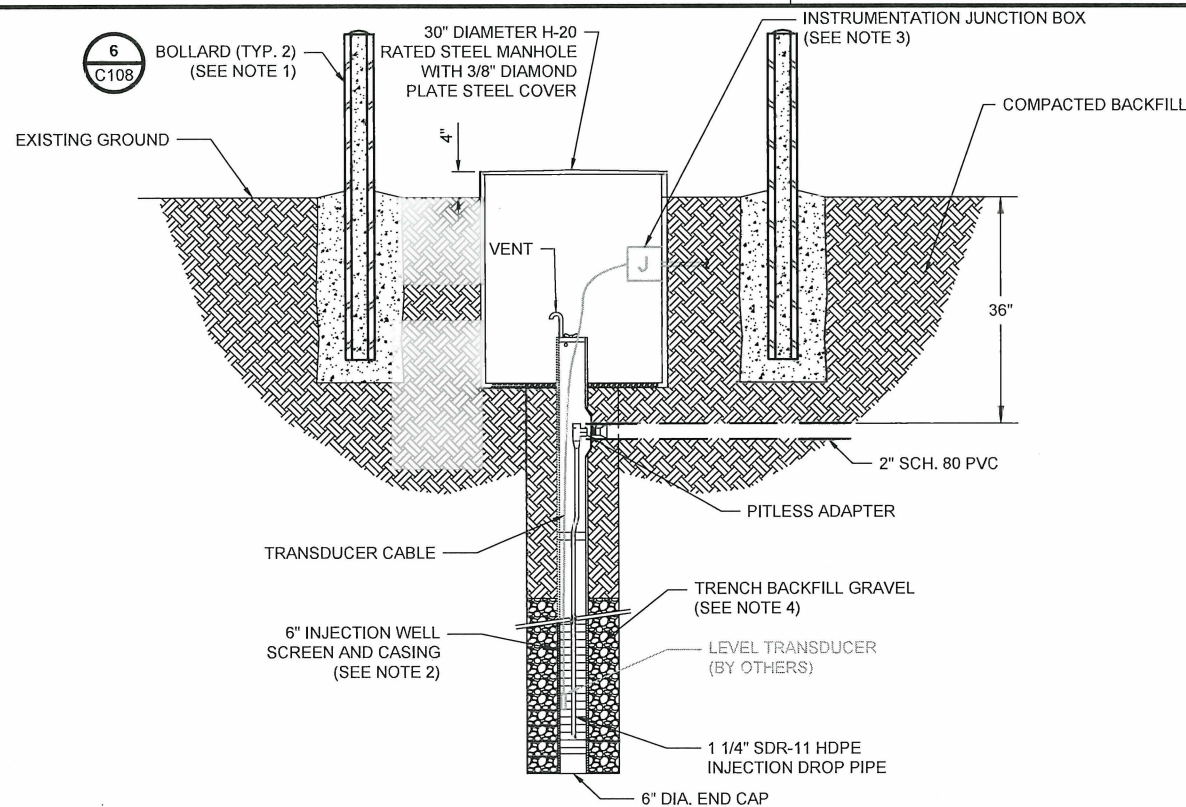
9

10

11

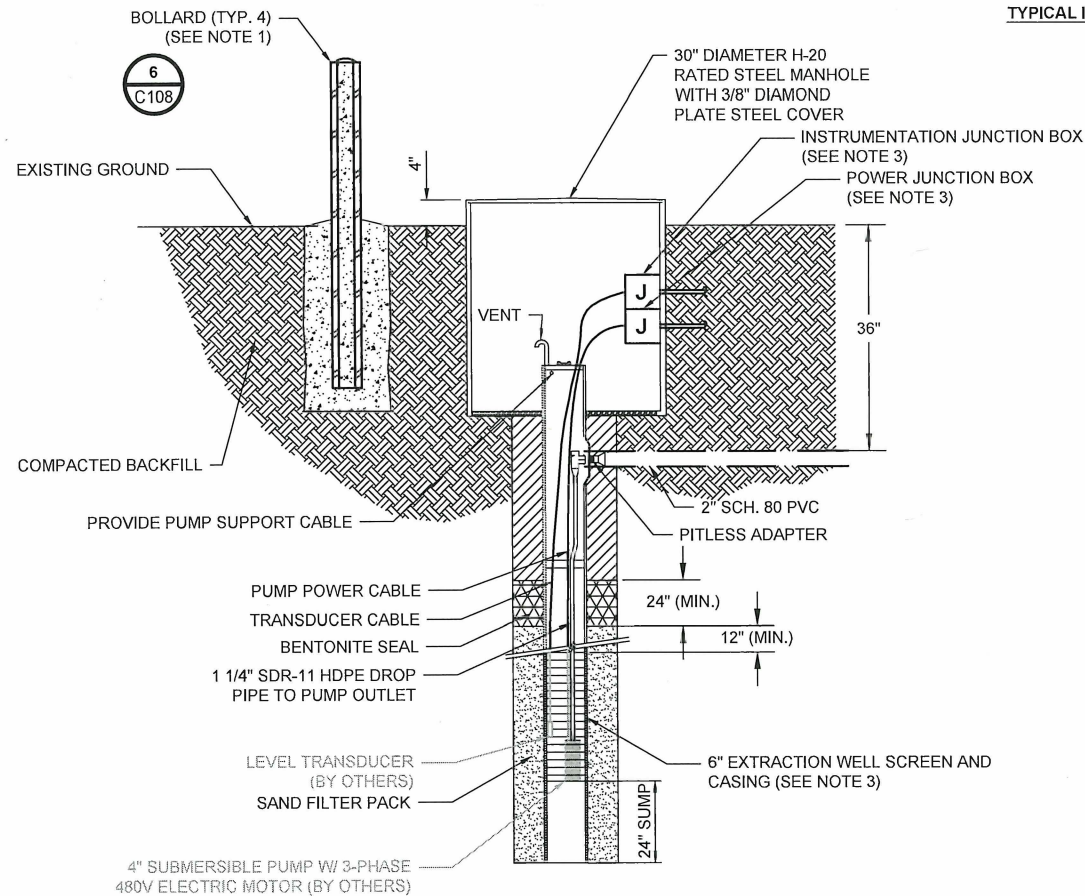
12

13



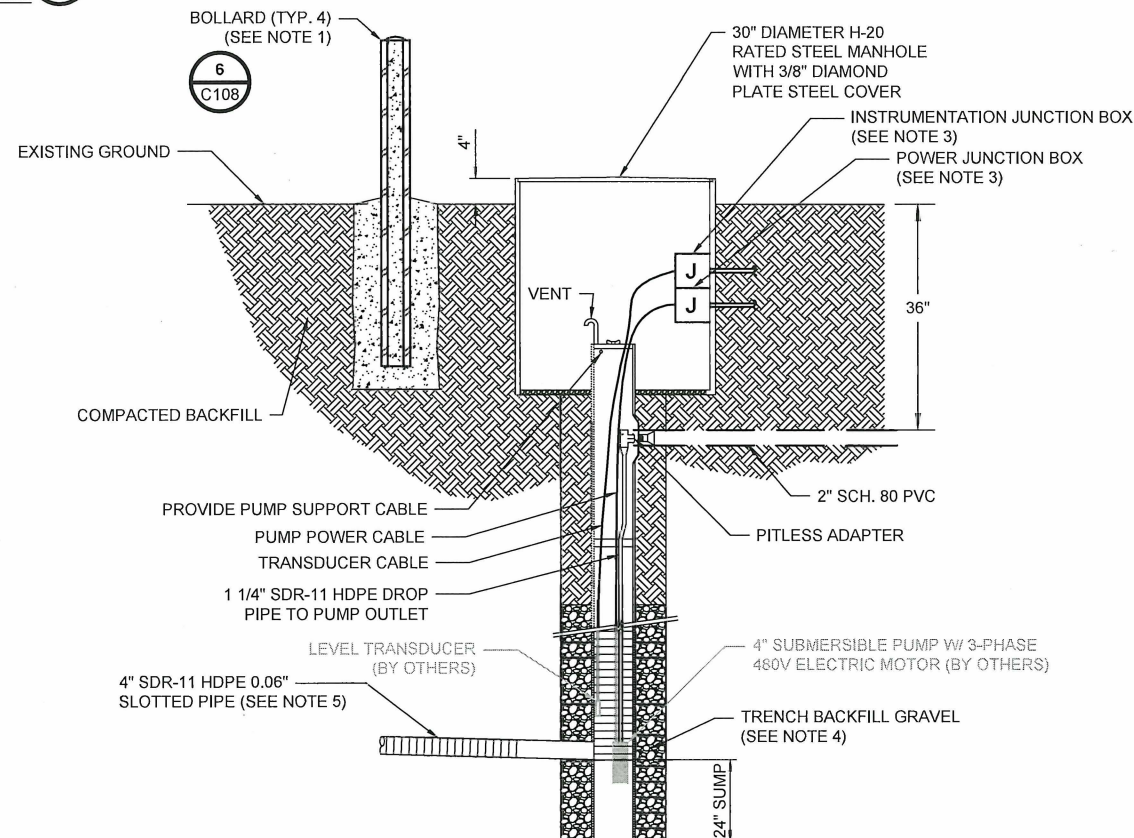
SECTION

A

TYPICAL INJECTION TRENCH WELL
NOT TO SCALE

SECTION

B

TYPICAL EXTRACTION WELL
NOT TO SCALE

SECTION

C

TYPICAL EXTRACTION SUMP
NOT TO SCALE

no.	date	by	ckd	description
A	08/22/22	EP	RH	ISSUED FOR PRELIMINARY DESIGN

NOTES:

- SUBCONTRACTOR SHALL VERIFY QUANTITY AND LOCATION OF BOLLARDS WITH ENGINEER PRIOR TO CONSTRUCTION.
- INJECTION WELL SCREEN AND CASING LENGTHS VARY. REFER TO DRAWING M202 FOR INJECTION WELL CONSTRUCTION DETAILS. REFER TO DRAWINGS C102 THROUGH C104 FOR TYPICAL INJECTION TRENCH PROFILES.
- REFER TO ELECTRICAL DRAWINGS FOR DETAILS.
- REFER TO DRAWING C101 THROUGH C104 FOR TRENCH CONSTRUCTION DETAILS.
- A CAPPED 1-INCH GALVANIZED STEEL PIPE (NOT DEPICTED) SHALL EXTEND FROM APPROXIMATELY 5 FT BELOW GRADE TO 5-FT ABOVE GRADE AT EACH WELL. A METAL TAG DISPLAYING THE WELL IDENTIFICATION WILL BE FASTENED TO THE STEEL PIPE.

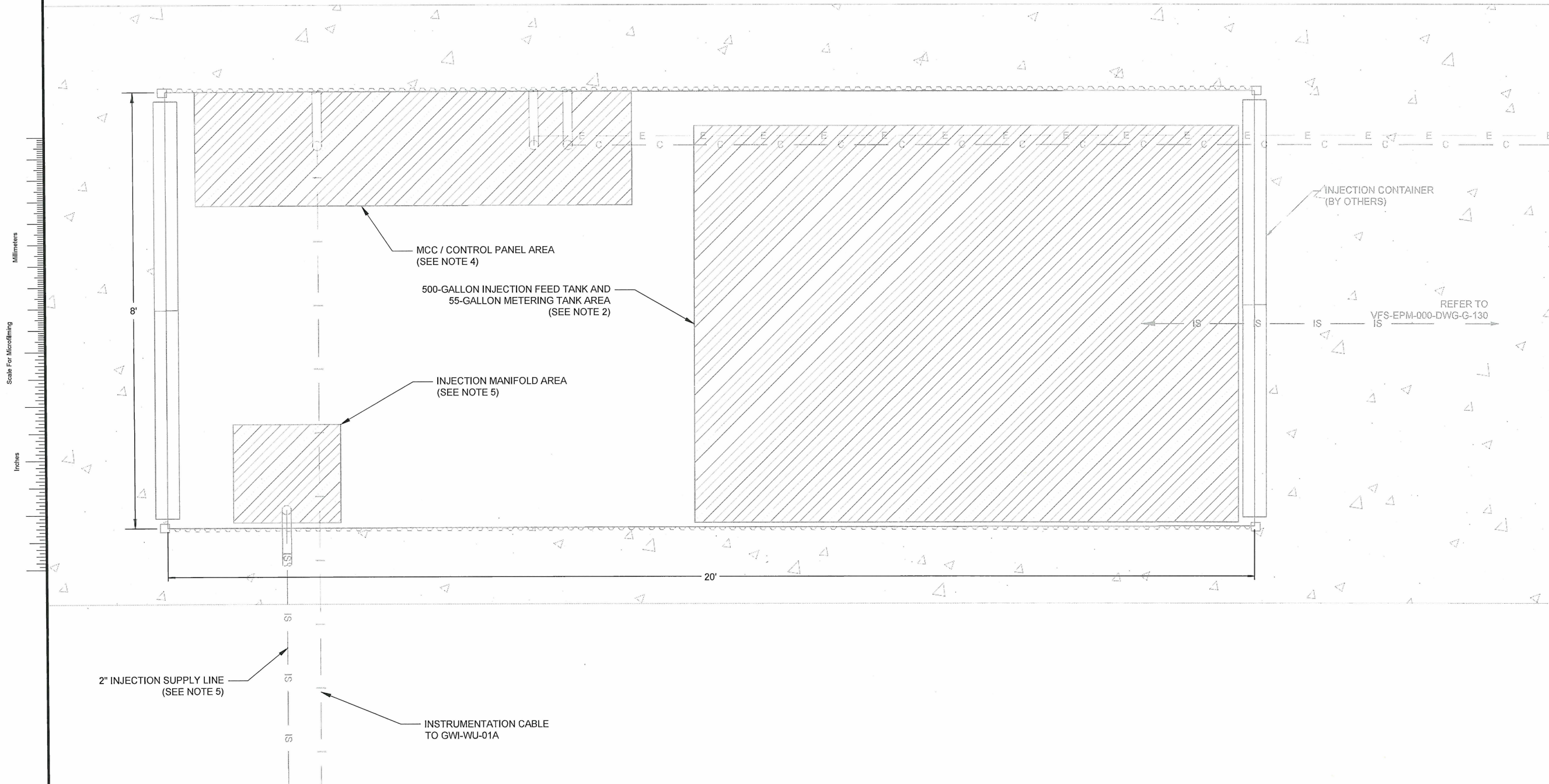
PRELIMINARY - NOT
FOR CONSTRUCTIONBURNS
MCDONNELL9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
OKLAHOMA FIRM LICENSE NO. 421

date	detailed
SEPTEMBER 2022	E. PULCHER
designed	checked
E. DULLE	R. HORMELL

Cimarron Environmental Response Trust
INJECTION AND EXTRACTION WELL DETAILS

project	contract
142089	
drawing	rev.
BMCD-GWREMED-M102	A
sheet	of
file M102.DWG	sheets

1 2 3 4 5 6 7 8 9 10 11 12 13



no.	date	by	ckd	description
A	08/22/22	EP	RH	ISSUED FOR PRELIMINARY DESIGN

- NOTES:**
1. INJECTION INFLUENT WATER STREAM WILL BE SUPPLIED FROM THE NORTH SIDE OF THE INJECTION CONTAINER. INSTALL FLANGED CONNECTIONS THROUGH CONTAINER WALL TO FACILITATE PIPE CONNECTIONS. FLANGES SHALL BE 4", 250# RATED.
 2. 55-GALLON CHEMICAL FEED DRUMS WILL REQUIRE FREQUENT REPLACEMENT. DRUMS SHALL BE STAGED NEAR THE DOUBLE DOORS AND PLUMBING/EQUIPMENT SHALL BE INSTALLED TO FACILITATE DRUM REMOVAL/REPLACEMENT.
 3. REFER TO VFS-EPM-000-DWG-E-113 FOR POWER AND COMMUNICATION CABLE ROUTING DETAILS.
 4. BURIED POWER AND COMMUNICATION CABLE WILL BE SUPPLIED FROM NORTHEAST OF THE INJECTION CONTAINER AND STUBBED UP NEAR THE NORTHERN EXTERIOR WALL. SUPPLIER SHALL PROVIDE AND INSTALL LOCATIONS FOR POWER SUPPLY CONNECTION AND ALL ASSOCIATED APPURTENANCES FOR CONNECTIONS, PENETRATIONS, AND ROUTING AS NECESSARY.
 5. BURIED INJECTION SUPPLY PIPING WILL BE SUPPLIED FROM SOUTH OF INJECTION CONTAINER AND STUBBED UP THROUGH FLOOR OF CONTAINER. LOCATIONS ARE SHOWN FOR INFORMATION ONLY. INJECTION SKID SUPPLIER SHALL PROVIDE LOCATIONS FOR INJECTION FLOOR PENETRATION LOCATIONS FOLLOWING DETAILED DESIGN.
 6. REFER TO K-EPM-DWG-C-110 FOR WATF SITE PLAN.
 7. REFER TO DRAWINGS P103 AND P104 FOR PROCESS AND INSTRUMENTATION DIAGRAMS.
 8. INSTALL FLOW METER WITH A MINIMUM OF 5 STRAIGHT PIPE DIAMETERS UPSTREAM AND 2 STRAIGHT PIPE DIAMETERS DOWNSTREAM FROM THE ELECTRODE PLANE.

**PRELIMINARY - NOT
FOR CONSTRUCTION**



9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
OKLAHOMA FIRM LICENSE NO. 421

date	SEPTEMBER 2022	detailed	E. PULCHER
designed	E. DULLE	checked	R. HORMELL

Cimarron Environmental Response Trust
WESTERN AREA TREATMENT
INJECTION SYSTEM LAYOUT

project	142089	contract	
drawing	BMCD-GWREMED-M103	rev.	A
sheet	of	sheets	
file	M103.DWG		

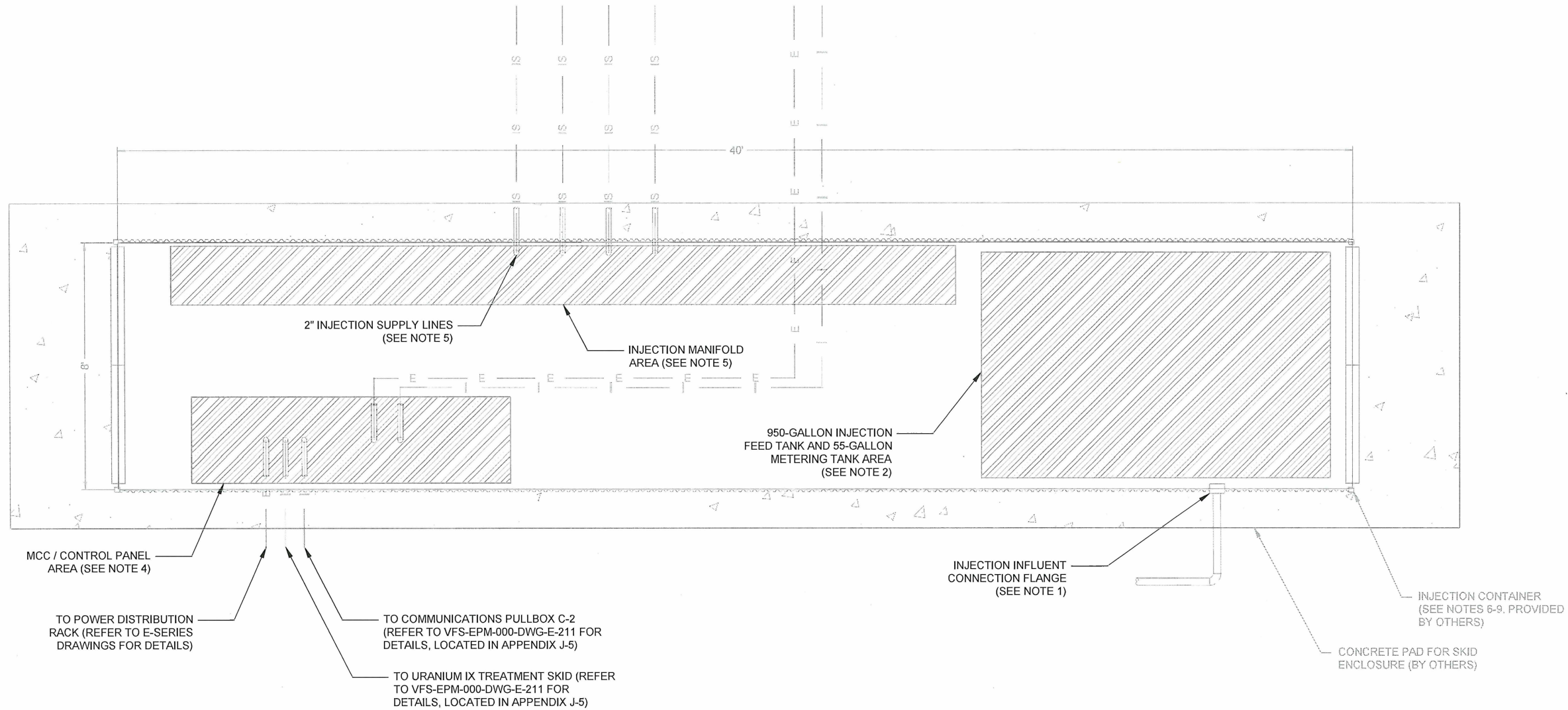
PLAN
WESTERN AREA TREATMENT
INJECTION SYSTEM LAYOUT

0 1' 2'
SCALE IN FEET



1
C008

1 2 3 4 5 6 7 8 9 10 11 12 13



PLAN
BURIAL AREA 1 GROUNDWATER
INJECTION SYSTEM LAYOUT
SCALE IN FEET
0 2 4
1
C009

no.	date	by	ckd	description
A	08/22/22	EP	RH	ISSUED FOR PRELIMINARY DESIGN

- NOTES:
1. INJECTION INFLUENT WATER STREAM WILL BE SUPPLIED FROM THE SOUTHEAST SIDE OF THE INJECTION SKID ENCLOSURE. INSTALL FLANGED CONNECTIONS THROUGH ENCLOSURE WALL TO FACILITATE PIPE CONNECTIONS. FLANGES SHALL BE 2", 250# RATED.
 2. 55-GALLON CHEMICAL FEED DRUMS WILL REQUIRE FREQUENT REPLACEMENT. DRUMS SHALL BE STAGED NEAR THE DOUBLE DOORS AND PLUMBING/EQUIPMENT SHALL BE INSTALLED TO FACILITATE DRUM REMOVAL/REPLACEMENT.
 3. REFER TO VFS-EPM-000-DWG-E-113 FOR POWER AND CONTROL CABLE ROUTING DETAILS, LOCATED IN APPENDIX J-2.
 4. BURIED POWER AND INSTRUMENTATION CABLE WILL BE SUPPLIED FROM SOUTHWEST OF THE INJECTION SKID ENCLOSURE AND STUBBED UP NEAR THE SOUTHWESTERN EXTERIOR WALL. SUPPLIER SHALL PROVIDE AND INSTALL LOCATIONS FOR POWER SUPPLY CONNECTION AND ALL ASSOCIATED APPURTENANCES FOR CONNECTIONS, PENETRATIONS, AND ROUTING AS NECESSARY.
 5. BURIED INJECTION SUPPLY PIPING WILL BE SUPPLIED FROM NORTHWEST OF THE INJECTION SKID ENCLOSURE AND STUBBED UP THROUGH THE FLOOR OF THE CONTAINER. LOCATIONS ARE SHOWN FOR INFORMATION ONLY. SUPPLIER SHALL PROVIDE LOCATIONS FOR INJECTION FLOOR PENETRATION LOCATIONS FOLLOWING DETAILED DESIGN.
 6. INJECTION SKID ENCLOSURE HEIGHT SHALL BE 9' 6".
 7. ENCLOSURE SHALL BE INSULATED TO OBTAIN MINIMUM U-FACTOR OF 0.065.
 8. REFER TO P104 FOR PROCESS AND INSTRUMENTATION DIAGRAM.
 9. REFER TO K-EPM-DWG-G-200 FOR BA1 GENERAL ARRANGEMENT PLAN, LOCATED IN APPENDIX J-5.

**PRELIMINARY - NOT
FOR CONSTRUCTION**



9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
OKLAHOMA FIRM LICENSE NO. 421

date	detailed
SEPTEMBER 2022	E. PULCHER
designed	checked
E. DULLE	R. HORMELL

Cimarron Environmental Response Trust
BURIAL AREA 1 TREATMENT
INJECTION SYSTEM LAYOUT

project	contract
142089	
drawing	rev.
BMCD-GWREMED-M104	A
sheet	of sheets
file M104.DWG	

WA Injection Well Construction Details								
Injection Well ID	Total Depth of Well (ft bgs)	Well Diameter (inches)	Drop Pipe Diameter (inches)	Drop Pipe Length (ft)	Well Material	Screen Length	Screen Slot Size (in)	Filter Pack
GW1-WU-01A	17	6	1.25	16	PVC	10	0.06	Gravel Backfill

BA1 Injection Well Construction Details								
Injection Well ID	Total Depth of Well (ft bgs)	Well Diameter (inches)	Drop Pipe Diameter (inches)	Drop Pipe Length (ft)	Well Material	Screen Length	Screen Slot Size (in)	Filter Pack
GW1-BA1-01A	26	6	1.25	28	PVC	21	0.06	Gravel Backfill
GW1-BA1-02A	24	6	1.25	23	PVC	10	0.06	Gravel Backfill
GW1-BA1-03A	21	6	1.25	20	PVC	10	0.06	Gravel Backfill
GW1-BA1-04A	24	6	1.25	23	PVC	10	0.06	Gravel Backfill

no.	date	by	ckd	description
A	08/22/22	AA	ED	ISSUED FOR PRELIMINARY DESIGN

- NOTES:
1. ACTUAL INJECTION WELL DEPTHS, TRENCH SCREEN LENGTHS, AND DRAIN PIPE LENGTHS WILL BE DETERMINED AT TIME OF CONSTRUCTION. REFER TO DRAWING C101 THROUGH C104 FOR TRENCH CONSTRUCTION DETAILS.
 2. INJECTION TRENCH WELL GWI-BA1-01A WAS INSTALLED DURING THE 2017 PILOT STUDY.

PRELIMINARY - NOT FOR CONSTRUCTION

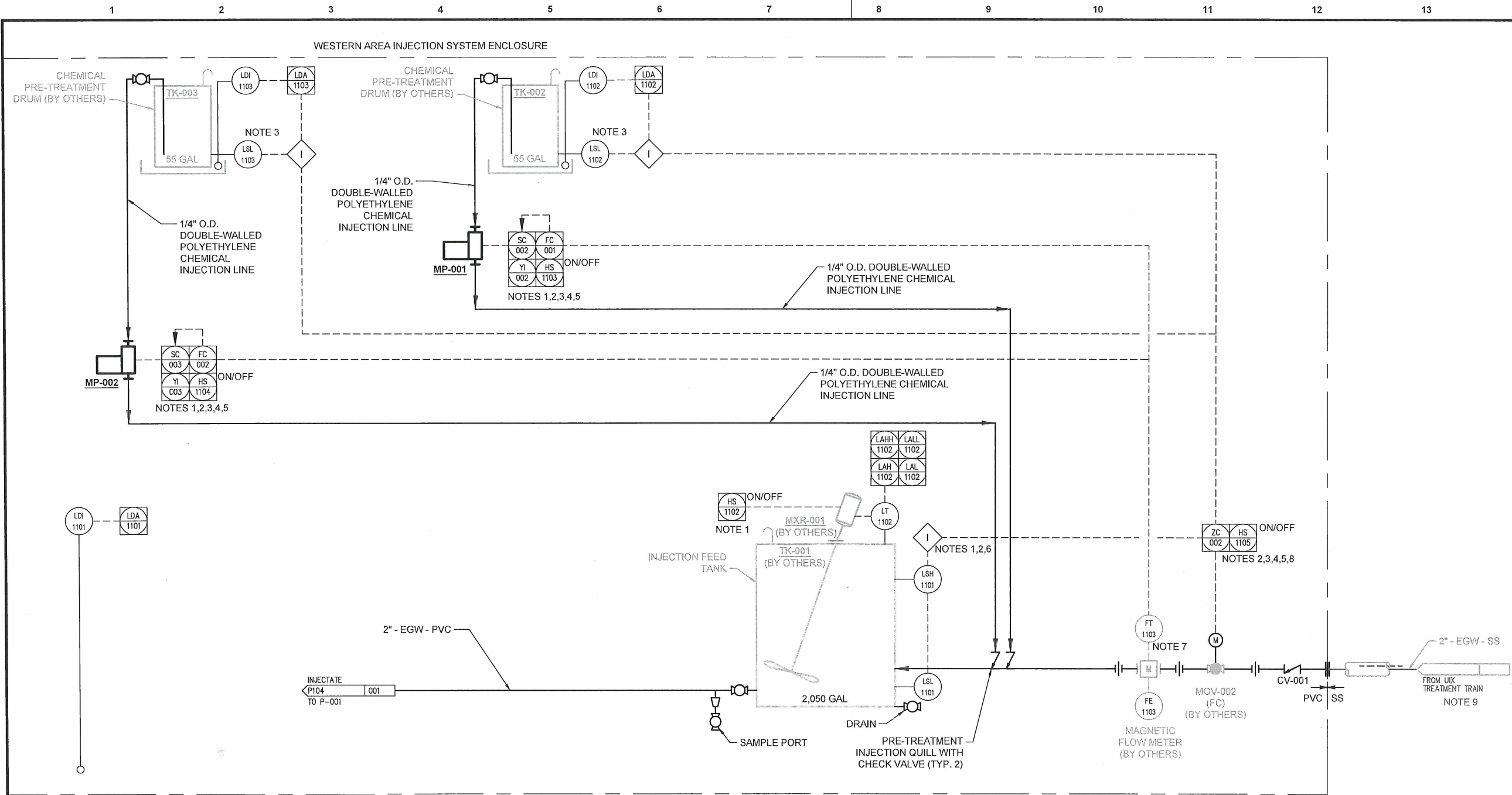


9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
OKLAHOMA FIRM LICENSEE NO. 421

date	SEPTMBER 2022	detailed	A. ANSTAETT
designed	E. DULLE	checked	E. DULLE

Cimarron Environmental Response Trust
CONSTRUCTION DETAILS INDEX
INJECTION WELLS

project	142089	contract	
drawing	BMCD-GWREMED-M202	rev.	A
sheet	of	sheets	
file	M202.DWG		



no.	date	by	ckd	description
A	08/19/22	EAA	JRH	ISSUED FOR PRELIMINARY DESIGN

- NOTES:
1. LEVEL SWITCH LOW; CEASE TREATED WATER INJECTION MODE. FORCE MXR-001 OFF VIA HARDWIRE ACTION. FORCE MOV-002 CLOSED VIA HARDWIRE ACTION.
 2. LEVEL SWITCH HIGH; CEASE TREATED WATER INJECTION MODE. FORCE MOV-002 CLOSED VIA HARDWIRE ACTION.
 3. LEVEL SWITCH LOW; CEASE TREATED WATER INJECTION MODE. FORCE MOV-002 CLOSED VIA HARDWIRE ACTION.
 4. HIGH/LOW FLOW RATE; CEASE TREATED WATER INJECTION MODE.
 5. HIGH PRESSURE AT PT-1102; SHUT DOWN P-001, MP-001, AND MP-002 AND CLOSE VALVE MOV-002.
 6. MOV-002 POSITION MODULATES ON TK-001 FLUID LEVEL.
 7. CONTROLS MP-001 AND MP-002 FEED RATE.
 8. LEAK DETECTED; SHUT VALVE MOV-002.
 9. REFER TO VFS-EPM-DWG-P-110 AND VFS-EPM-DWG-P-115, LOCATED IN APPENDICES J2 AND J3, RESPECTIVELY.
 10. SPECIFICATIONS FOR APPLICABLE PUMPS, PIPING, AND APPURTENANCES ARE SUBJECT TO CHANGE DURING PHASE I 90% DESIGN.

PRELIMINARY - NOT FOR CONSTRUCTION



9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
OKLAHOMA FIRM LICENSEE NO. 421

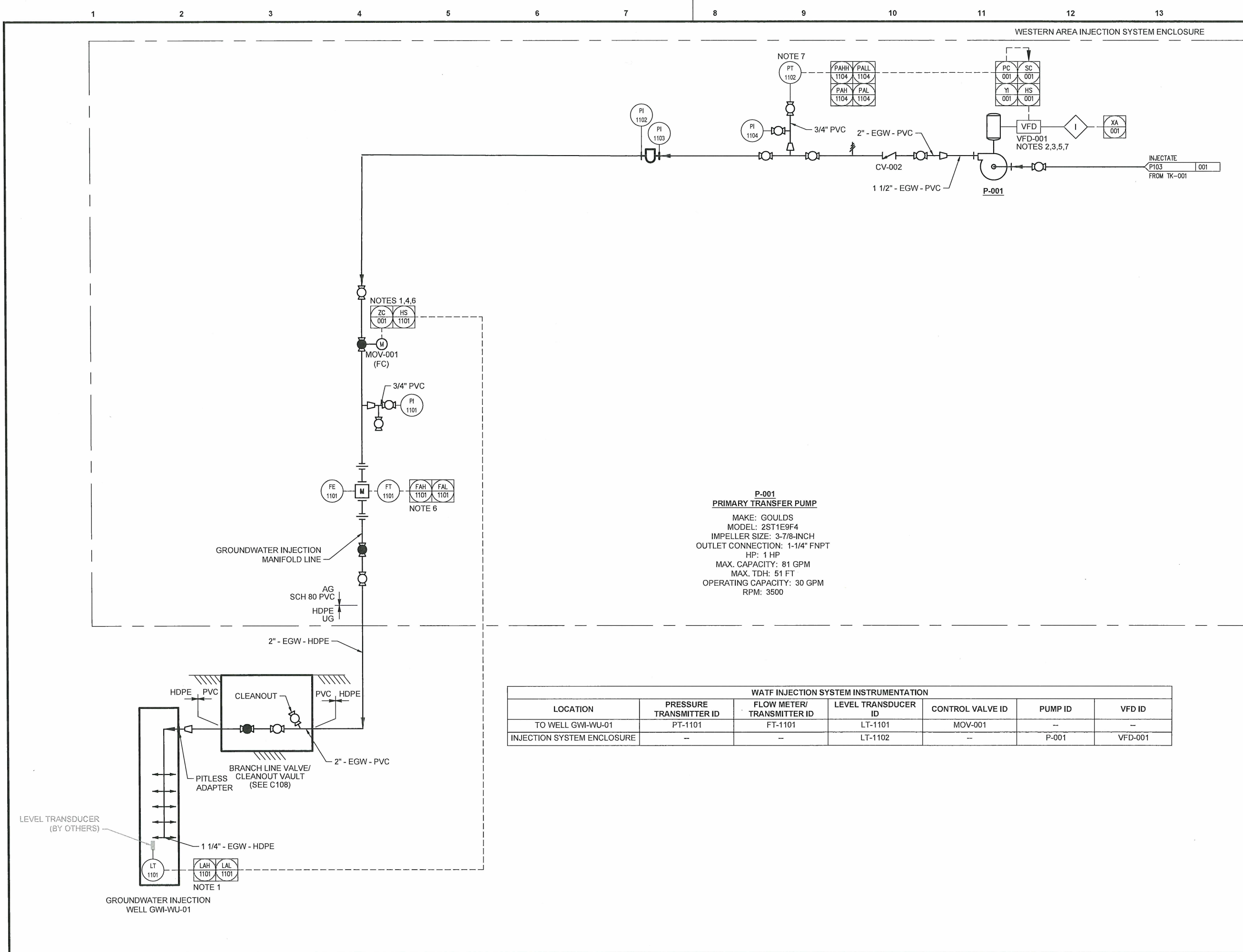
date	detailed
SEPTEMBER 2022	A. ANSTAETT
designed	checked
E. DULLE	E. DULLE

WATF INJECTION SYSTEM INSTRUMENTATION						
LOCATION	PUMP ID	LEAK DETECTION INDICATOR ID	FLOW METER/ TRANSMITTER ID	LEVEL SWITCH ID	LEVEL TRANSDUCER ID	CONTROL VALVE ID
TANK INFLUENT PIPING	--	--	FT-1103	--	--	MOV-002
INJECTION FEED TANK	--	--	--	LSL-1101	LT-1102	--
	--	--	--	LSH-1101	--	--
CHEMICAL DOSING SYSTEM	MP-001	LDI-1102	--	LSL-1102	LT-1103	--
	MP-002	LDI-1103	--	LSL-1103	LT-1104	--
INJECTION SYSTEM ENCLOSURE	--	LDI-1101	--	--	--	--

**MP-001
METERING PUMP**
MAKE: STENNER
MODEL: S3001AA101N
OUTLET TUBING SIZE: 1/4"
POWER: 120 VAC
MAX. CAPACITY: 5.0 GPD
MAX. PRESSURE: 100 PSI

**MP-002
METERING PUMP**
MAKE: STENNER
MODEL: S3001AA101N
OUTLET TUBING SIZE: 1/4"
POWER: 120 VAC
MAX. CAPACITY: 5.0 GPD
MAX. PRESSURE: 100 PSI

Cimmaron Environmental Response Trust WESTERN AREA GROUNDWATER INJECTION SYSTEM P&ID - SHEET 1	
project	contract
142089	
drawing	rev.
BMCD-GWREMEDI-P103	A
sheet	of sheets
1	
file	P103.DWG



no.	date	by	ckd	description
A	08/19/22	AA	ED	ISSUED FOR PRELIMINARY DESIGN

NOTES:

1. HIGH WELL WATER LEVEL; CLOSE VALVE MOV-001. LOW WELL WATER LEVEL; ADJUST INJECTION FLOW RATE AS ALLOWABLE.
2. LEVEL SWITCH LOW; CEASE TREATED WATER INJECTION MODE. FORCE MXR-001 OFF VIA HARDWIRE ACTION. FORCE MOV-002 CLOSED VIA HARDWIRE ACTION.
3. LEVEL SWITCH HIGH; CEASE TREATED WATER INJECTION MODE. FORCE MOV-002 CLOSED VIA HARDWIRE ACTION.
4. HIGH/LOW PRESSURE; CLOSE VALVE MOV-001.
5. HIGH/LOW FLOW RATE; CEASE TREATED WATER INJECTION MODE.
6. HIGH/LOW FLOW RATE; CLOSE VALVE MOV-001.
7. HIGH PRESSURE; SHUT DOWN P-001, MP-001, AND MP-002 AND CLOSE VALVE MOV-002.
8. SPECIFICATIONS FOR APPLICABLE PUMPS, PIPING, AND APPURTENANCES ARE SUBJECT TO CHANGE DURING PHASE I 90% DESIGN.

PRELIMINARY - NOT FOR CONSTRUCTION

BURNS MEDONNELL

9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
OKLAHOMA FIRM LICENSE NO. 421

date	detailed
SEPTEMBER 2022	A. ANSTAETT

designed	checked
E. DULLE	E. DULLE

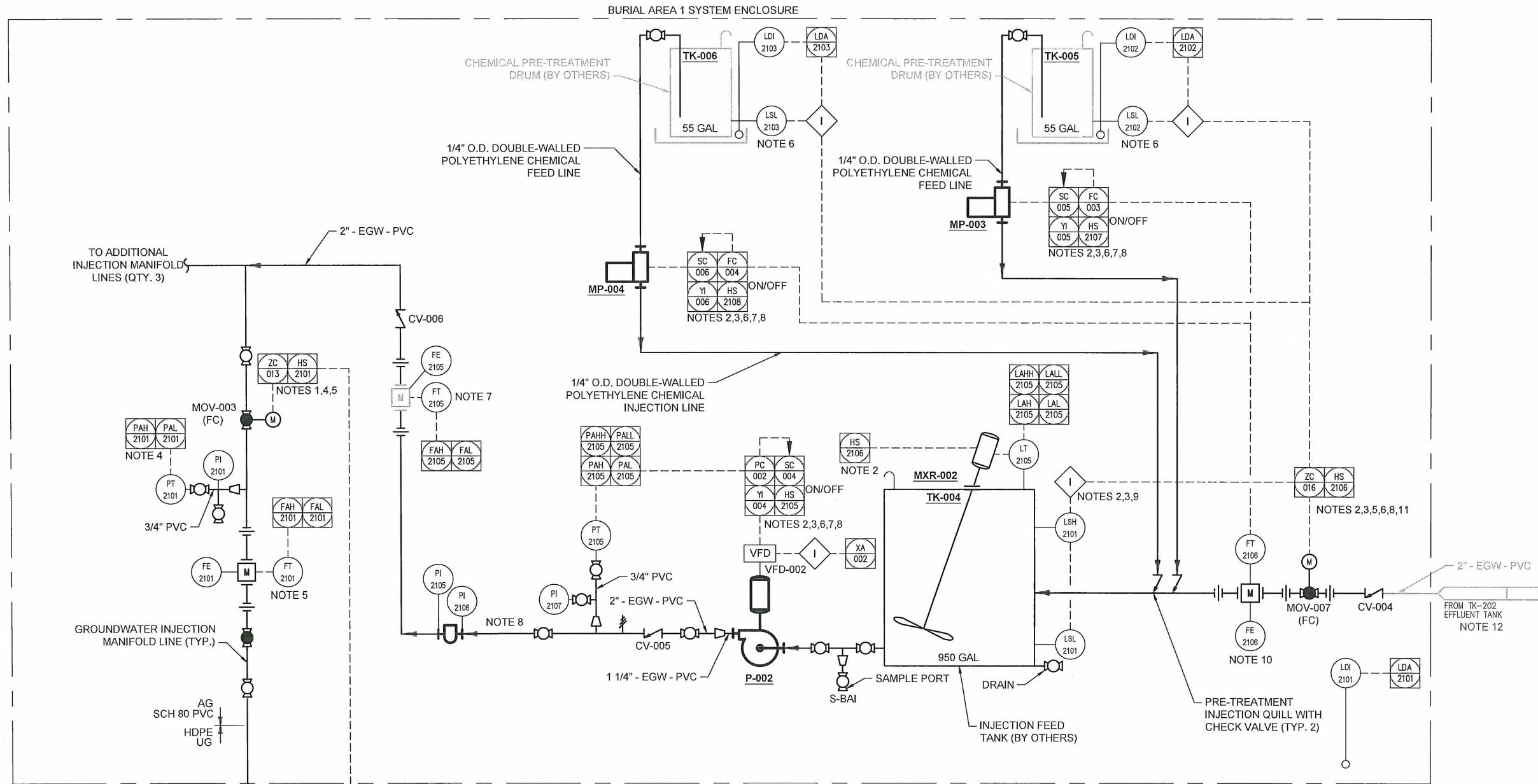
Cimmaron Environmental Response Trust
WESTERN AREA GROUNDWATER INJECTION SYSTEM P&ID II - SHEET 2

project	contract
142089	

drawing	rev.
BMCD-GWREMED-P104	A

sheet	of	sheets
file P104.DWG		

Scale For Microfilming
Inches
Millimeters



- | no. | date | by | ckd | description |
|-----|----------|----|-----|-------------------------------|
| A | 08/19/22 | AA | ED | ISSUED FOR PRELIMINARY DESIGN |
- NOTES:**
1. HIGH WELL WATER LEVEL; CLOSE VALVE MOV-003. LOW WATER LEVEL; ADJUST INJECTION FLOW RATE AS ALLOWABLE.
 2. LEVEL SWITCH LOW; CEASE TREATED WATER INJECTION MODE. FORCE MXR-002 OFF VIA HARDWIRE ACTION. FORCE MOV-006 CLOSED VIA HARDWIRE ACTION.
 3. LEVEL SWITCH HIGH; CEASE TREATED WATER INJECTION MODE. FORCE MOV-006 CLOSED VIA HARDWIRE ACTION.
 4. HIGH/LOW PRESSURE; CLOSE VALVE MOV-003.
 5. HIGH/LOW FLOW RATE. CLOSE VALVE MOV-003.
 6. LEVEL SWITCH LOW; CEASE TREATED WATER INJECTION MODE. FORCE MOV-006 CLOSED VIA HARDWIRE ACTION.
 7. HIGH/LOW FLOW RATE; CEASE TREATED WATER INJECTION MODE.
 8. HIGH PRESSURE; CEASE TREATED WATER INJECTION MODE.
 9. MOV-006 POSITION MODULATES ON TK-004 FLUID LEVEL.
 10. CONTROLS MP-003 AND MP-004 FEED RATE.
 11. LEAK DETECTED; CLOSE VALVE MOV-006.
 12. REFER TO VFS-EPM-DWG-P-110 AND VFS-EPM-DWG-P-215, LOCATED IN APPENDICES J2 AND J5, RESPECTIVELY.
 13. REFER TO DRAWING M203 FOR PIPING SPECIFICATIONS.

PRELIMINARY - NOT FOR CONSTRUCTION



9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
OKLAHOMA FIRM LICENSEE NO. 421

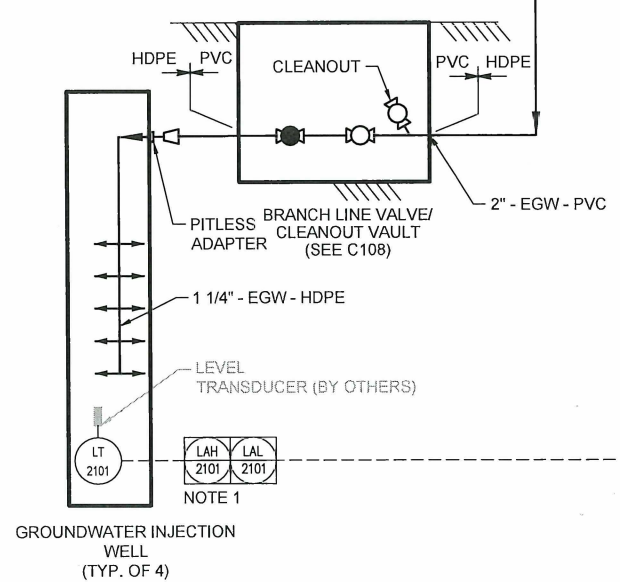
date	detailed
SEPTEMBER 2022	A. ANSTAETT
designed	checked
E. DULLE	E. DULLE

BA1 INJECTION SYSTEM INSTRUMENTATION								
LOCATION	PRESSURE TRANSMITTER ID	FLOW METER/ TRANSMITTER ID	LEVEL TRANSDUCER ID	CONTROL VALVE ID	PUMP ID	VFD ID	LEAK DETECTION INDICATOR ID	LEVEL SWITCH ID
TO WELL GWI-BA1-01	PT-2101	FT-2101	LT-2101	MOV-003	--	--	--	--
TO WELL GWI-BA1-02	PT-2102	FT-2102	LT-2102	MOV-004	--	--	--	--
TO WELL GWI-BA1-03	PT-2103	FT-2103	LT-2103	MOV-005	--	--	--	--
TO WELL GWI-BA1-04	PT-2104	FT-2104	LT-2104	MOV-006	--	--	--	--
INJECTION SYSTEM ENCLOSURE INFLUENT PIPING	PT-2105	FT-2105	--	--	P-002	VFD-002	LDI-2101	--
INJECTION FEED TANK	--	--	LT-2105	--	--	--	--	LSL-2101
CHEMICAL DOSING SYSTEM	--	--	--	--	MP-003	--	LDI-2102	LSL-2102
					MP-004	--	LDI-2103	LSL-2103

**P-002
PRIMARY TRANSFER PUMP**
MAKE: GOULDS
MODEL: 2ST1E9F4
IMPELLER SIZE: 3-7/8-INCH
OUTLET CONNECTION: 1-1/4" FNPT
HP: 1 HP
MAX. CAPACITY: 81 GPM
MAX. TDH: 51 FT
OPERATING CAPACITY: 68 GPM
RPM: 3500

**MP-003
METERING PUMP**
MAKE: STENNER
MODEL: S3001AA101N
OUTLET TUBING SIZE: 1/4"
POWER: 120 VAC
MAX. CAPACITY: 5.0 GPD
MAX. PRESSURE: 100 PSI

**MP-004
METERING PUMP**
MAKE: STENNER
MODEL: S3001AA101N
OUTLET TUBING SIZE: 1/4"
POWER: 120 VAC
MAX. CAPACITY: 5.0 GPD
MAX. PRESSURE: 100 PSI



1

2

3

4

5

6

7

8

9

10

11

12

13

WA Extraction Well/Trench Flow Rate Summary			
Extraction Well/Trench ID	Minimum Flow Rate (gpm)	Maximum Flow Rate (gpm)	Nominal Flow Rate (gpm)
GETR-WU-01	3	15	8
GE-WAA-02	15	30	30
GE-WAA-03	15	30	24
GE-WAA-04	15	30	20
GE-WAA-05	15	30	25

BA1 Extraction Well/Trench Flow Rate Summary			
Extraction Well/Trench ID	Minimum Flow Rate (gpm)	Maximum Flow Rate (gpm)	Nominal Flow Rate (gpm)
GE-BA1-02	10	32	31
GE-BA1-03	10	32	24
GE-BA1-04	10	32	31
GETR-BA1-01	5	13	7
GETR-BA1-02	5	13	7

WA Injection Well/Trench Flow Rate Summary			
Injection Well/Trench ID	Minimum Flow Rate (gpm)	Maximum Flow Rate (gpm)	Nominal Flow Rate (gpm)
GWl-WU-01	3	28	8

BA1 Injection Well Flow Rate Summary			
Injection Well/Trench ID	Minimum Flow Rate (gpm)	Maximum Flow Rate (gpm)	Nominal Flow Rate (gpm)
GWl-BA1-01	5	32	10
GWl-BA1-02	2	12	4
GWl-BA1-03	2	12	4
GWl-BA1-04	5	12	10



no.	date	by	ckd	description
A	08/19/22	AA	ED	ISSUED FOR PRELIMINARY DESIGN

PRELIMINARY - NOT FOR CONSTRUCTION



9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
OKLAHOMA FIRM LICENSEE NO. 421

date	SEPTMBER 2022	detailed	A. ANSTAETT
designed	E. DULLE	checked	E. DULLE

Cimmaron Environmental Response Trust
GROUNDWATER EXTRACTION AND INJECTION
FLOW RATE SUMMARY

project	142089	contract	
drawing	BMCD-GWREMEDI-P205	rev.	A
sheet		of	sheets
file	P205.DWG		