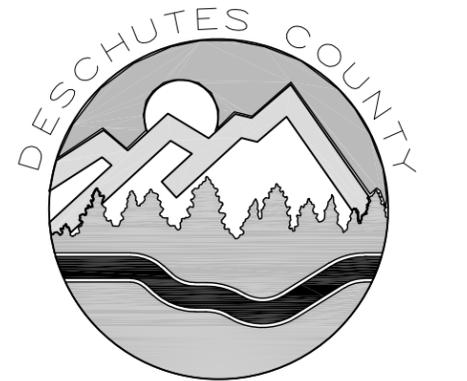
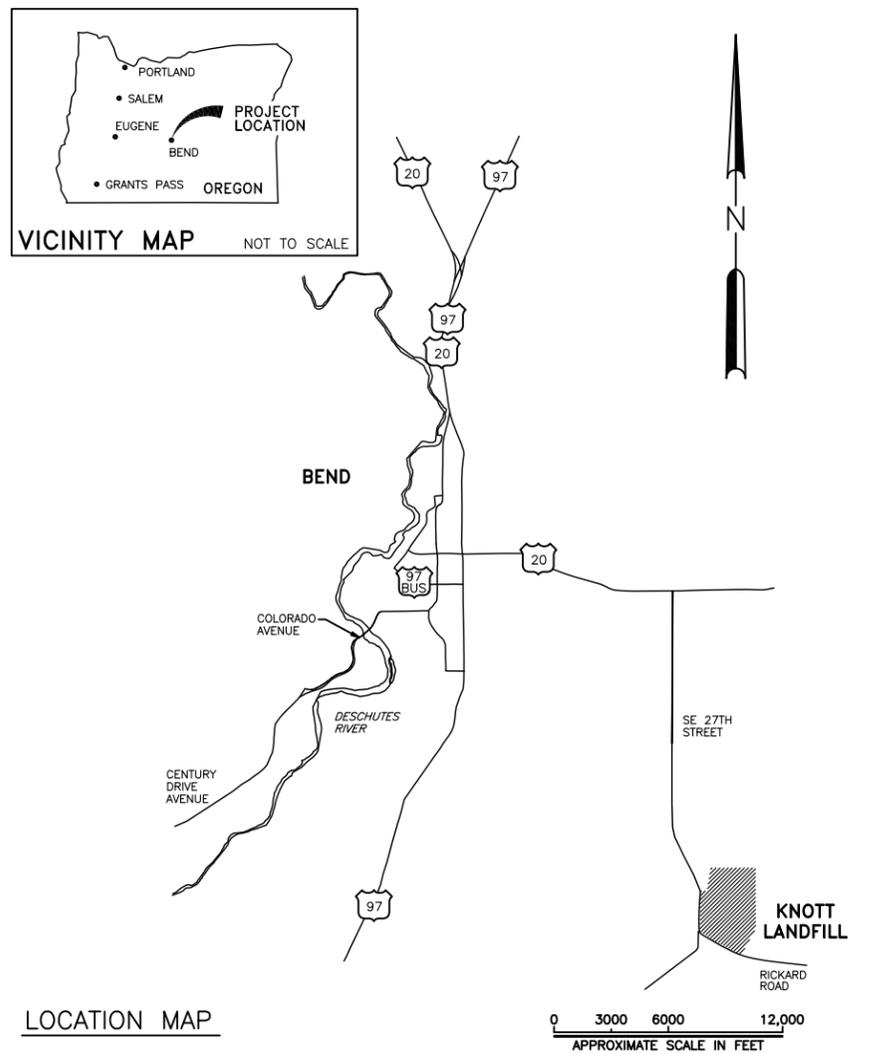


Contract Drawings for the Construction of

Knott Landfill

◆

Cell 7 Construction Project



DEPARTMENT OF SOLID WASTE
61050 SE 27th Street
Bend, Oregon 97702

County Commissioners

Tammy Baney
Anthony Debone
Phil Henderson

Director of Solid Waste

Timm Schimke

September, 2017

Project Directory

Owner

Deschutes County
Department of Solid Waste
61050 SE 27th Street
Bend, Oregon 97702
Phone: 541-317-3163
Director: Timm Schimke
Operations Mgr: Chad Centola

Project Engineer

Gerry Friesen PE
G. Friesen Associates, Inc.
4088 Orchard Drive
Lake Oswego, Oregon 97035
Phone: 503-635-1233

Geotechnical Engineer

Andy Siemens PE
Siemens & Associates
19134 River Woods Drive
Bend, Oregon 97702
Phone: 541-385-6500

Mechanical Engineer

William Song PE
ENERGYneering Solutions, Inc.
67247 Trout Lane
Sisters, Oregon 97701
Phone: 541-549-8766

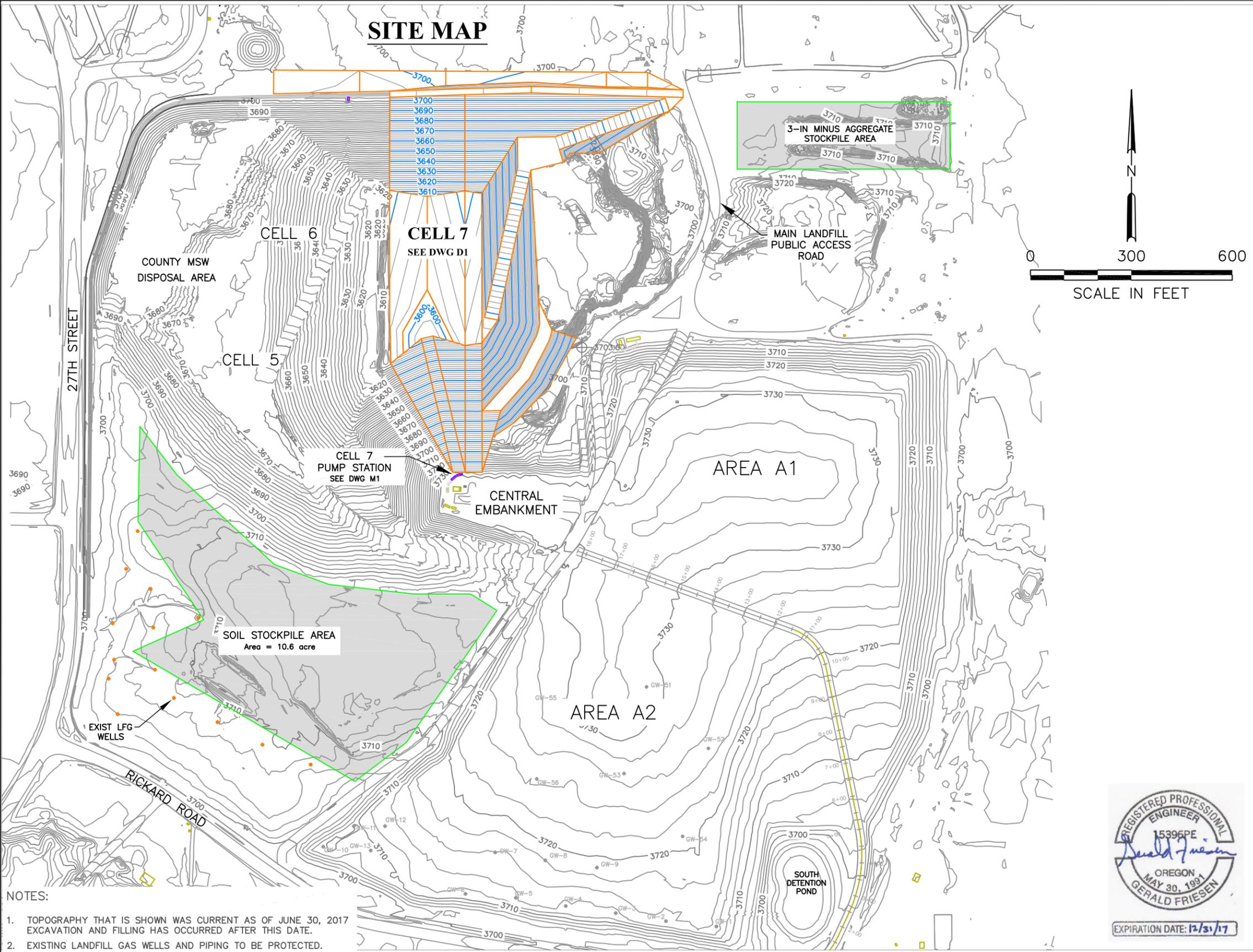
Surveying

John Thompson PLS
John Thompson & Associates, Inc.
PO Box 683
Bend, Oregon 97709
Phone: 541-312-9421

Geosynthetic CQA

John Stein
Peak Geosolutions
5060 SW Philomath Blvd. #303
Corvallis, Oregon 97339
Phone: 541-231-0779

SITE MAP



Drawing Index

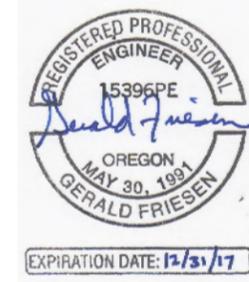
- Cover Sheet
- A1 Site Map and Drawing Index

- Cell 7**
- D1 Existing Site Plan
- D2 Subgrade Plan
- D3 Subgrade Plan - Cut and Fill Depths
- D4 Liner Sections and Details
- D5 Liner Sections and Details
- D6 Liner Sections and Details
- D7 Trench and Pipe Details
- D8 Sump Sections

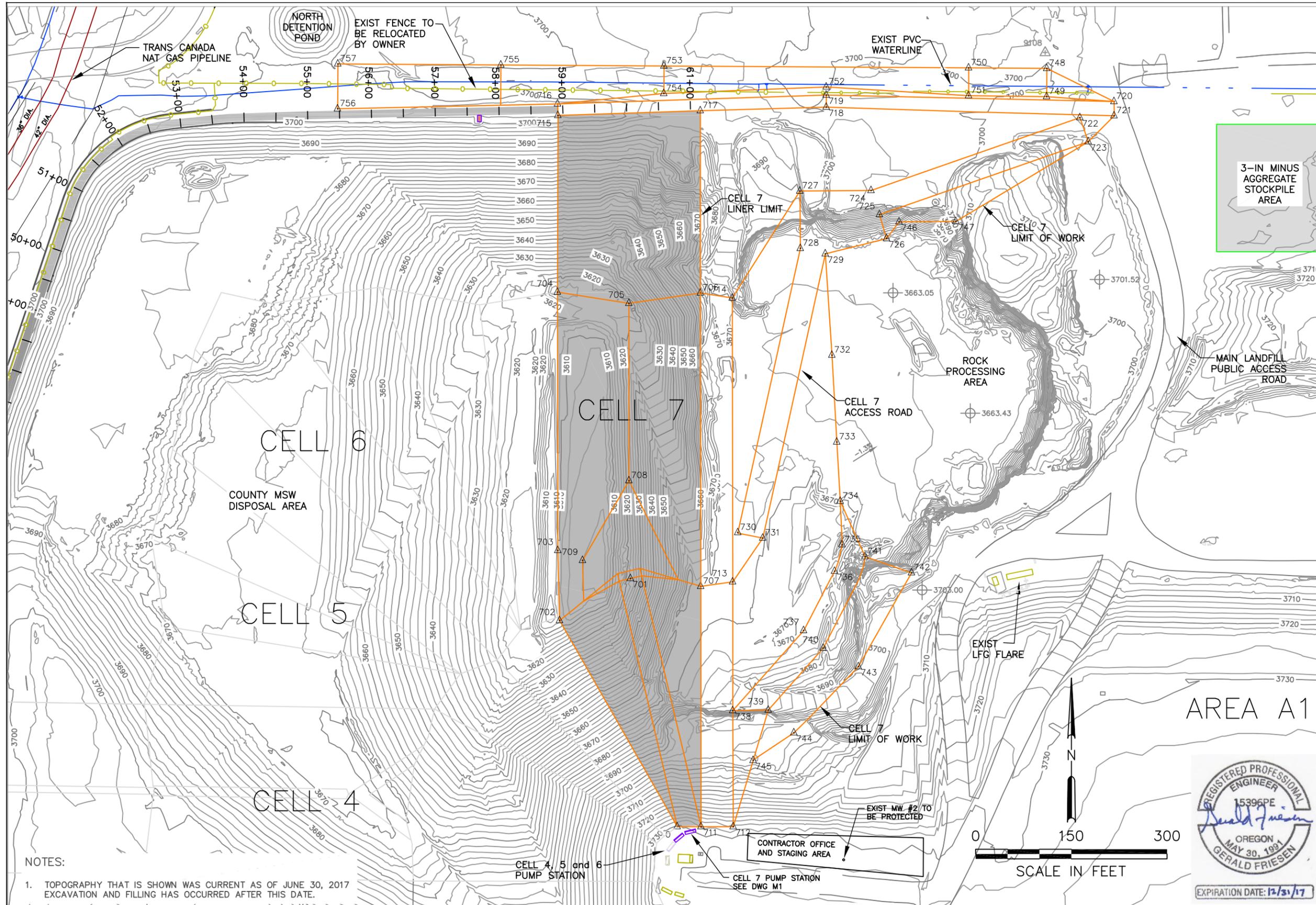
- Landfill Gas System**
- G1 Site Plan
- G2 Perimeter LFG Pipe Profile
- G3 LFG System Details I
- G4 LFG System Details II

- Cell 7 Pump Station**
- M1 Pump Station Layout
- M2 Pump Station Details I
- M3 Pump Station Details II
- M4 Leachate Riser Details
- M5 Cell 5 & 6 Pump Station Modifications

- NOTES:
- TOPOGRAPHY THAT IS SHOWN WAS CURRENT AS OF JUNE 30, 2017 EXCAVATION AND FILLING HAS OCCURRED AFTER THIS DATE.
 - EXISTING LANDFILL GAS WELLS AND PIPING TO BE PROTECTED.



		JOB No. 00177		DESIGNED: GF	PROJ. ENGINEER: GF	 G. Friesen Associates, Inc. 4088 Orchard Drive Lake Oswego, Oregon 97035 Tel: (503) 635-1233 Fax: (866) 533-5543	KNOTT LANDFILL CELL 7 CONSTRUCTION PROJECT DESCHUTES COUNTY, OREGON	CELL 7 EXISTING SITE PLAN	DRAWING NUMBER: A1	
		SCALE: AS SHOWN	DRAWN BY: GF	APPROVED BY: CC	CAD FILE NUMBER: A01					
			CHECKED BY: GF	DATE: 9/22/17	SHEET: 2 OF 19				REV. A	
A	9/22/17	GF	ISSUED FOR CONSTRUCTION							
No.	DATE	BY	REVISION							



Point Table			
Point #	Northing	Easting	Elevation
701	369342.02	3307472.87	3600.00
702	369276.27	3307361.88	3606.25
703	369385.78	3307359.06	3606.25
704	369789.55	3307358.47	3611.35
705	369772.08	3307470.50	3605.53
706	369788.18	3307582.48	3611.33
707	369329.81	3307583.16	3605.52
708	369494.95	3307470.55	3602.00
709	369370.33	3307397.81	3602.00
710	368954.19	3307546.29	3730.00
711	368954.22	3307583.58	3730.00
712	368954.21	3307633.97	3730.00
713	369336.80	3307633.15	3603.09
714	369780.37	3307632.49	3608.73
715	370065.68	3307359.22	3703.21
716	370083.68	3307358.79	3703.21
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718	370078.63	3307779.80	3707.42
719	370097.49	3307779.78	3707.42
720	370087.37	3308230.83	3702.92
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722	370062.27	3308177.30	3702.00
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724	369948.40	3307850.08	3664.00
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737	369260.72	3307744.38	3670.00
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740	369233.21	3307774.94	3670.52
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745	369057.71	3307665.22	3696.00
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756	370075.97	3307013.89	3701.48
757	370146.15	3307014.33	3700.00

NOTES:
 1. TOPOGRAPHY THAT IS SHOWN WAS CURRENT AS OF JUNE 30, 2017 EXCAVATION AND FILLING HAS OCCURRED AFTER THIS DATE.

No.	DATE	BY	REVISION
A	9/22/17	GF	ISSUED FOR CONSTRUCTION

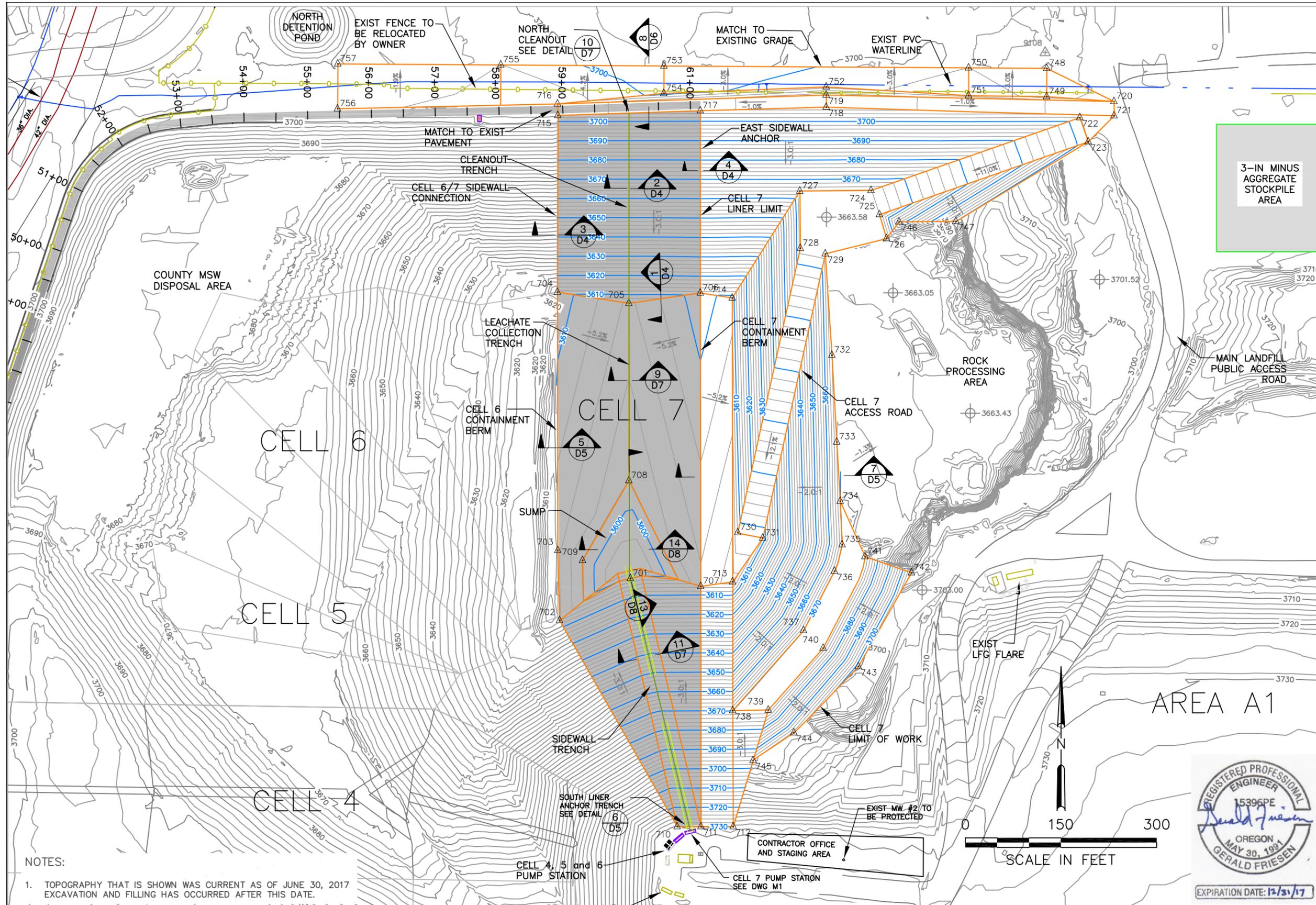
JOB No. 00177	DESIGNED: GF	PROJ. ENGINEER: GF
SCALE: AS SHOWN	DRAWN BY: GF	APPROVED BY: CC
	CHECKED BY: GF	DATE: 9/22/17

G. Friesen Associates, Inc.
 4088 Orchard Drive
 Lake Oswego, Oregon 97035
 Tel: (503) 635-1233
 Fax: (866) 533-5543

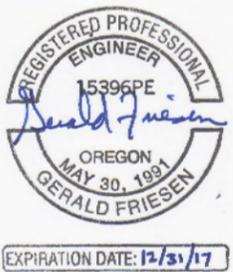
KNOTT LANDFILL
CELL 7 CONSTRUCTION
PROJECT
 DESCHUTES COUNTY, OREGON

CELL 7
EXISTING SITE PLAN

DRAWING NUMBER: D1	
CAD FILE NUMBER: D01	
SHEET: 3 of 19	REV. A



3-IN MINUS
AGGREGATE
STOCKPILE
AREA



NOTES:
1. TOPOGRAPHY THAT IS SHOWN WAS CURRENT AS OF JUNE 30, 2017
EXCAVATION AND FILLING HAS OCCURRED AFTER THIS DATE.

Point Table			
Point #	Northing	Easting	Elevation
701	369342.02	3307472.87	3600.00
702	369276.27	3307361.88	3606.25
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707	369329.81	3307583.16	3605.52
708	369494.95	3307470.55	3602.00
709	369370.33	3307397.81	3602.00
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714	369780.37	3307632.49	3608.73
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716	370083.68	3307358.79	3703.21
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718	370078.63	3307779.80	3707.42
719	370097.49	3307779.78	3707.42
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No.	DATE	BY	REVISION
A	9/22/17	GF	ISSUED FOR CONSTRUCTION

JOB No. 00177	DESIGNED: GF	PROJ. ENGINEER: GF
SCALE: AS SHOWN	DRAWN BY: GF	APPROVED BY: CC
	CHECKED BY: GF	DATE: 9/22/17

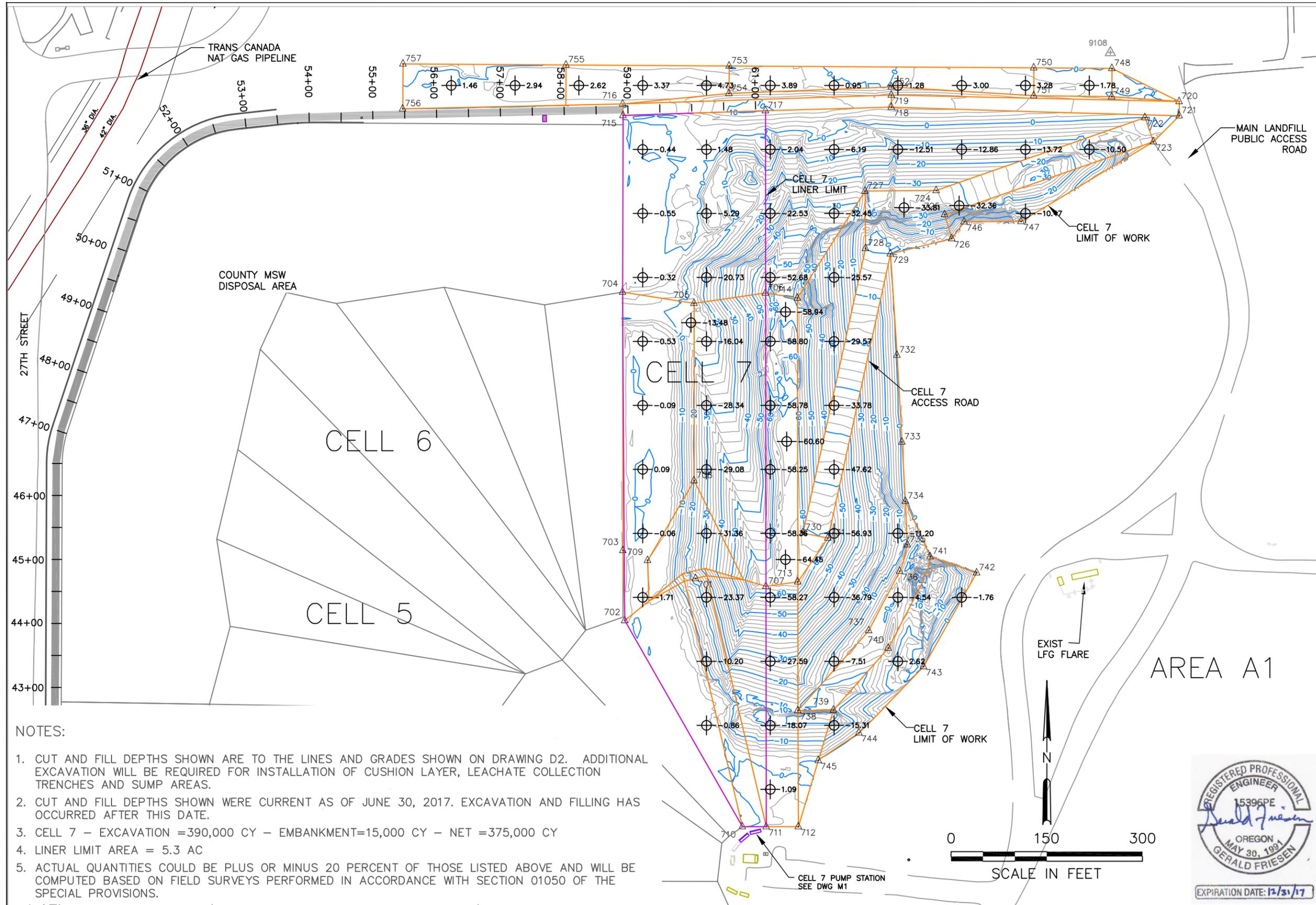
CONTRACTOR OFFICE AND STAGING AREA
CELL 7 PUMP STATION SEE DWG M1

G. Friesen Associates, Inc.
4088 Orchard Drive
Lake Oswego, Oregon 97035
Tel: (503) 635-1233
Fax: (866) 533-5543

KNOTT LANDFILL
CELL 7 CONSTRUCTION PROJECT
DESCHUTES COUNTY, OREGON

CELL 7
SUBGRADE PLAN

DRAWING NUMBER: D2	
CAD FILE NUMBER: D02	
SHEET: 4 of 19	REV. A



NOTES:

1. CUT AND FILL DEPTHS SHOWN ARE TO THE LINES AND GRADES SHOWN ON DRAWING D2. ADDITIONAL EXCAVATION WILL BE REQUIRED FOR INSTALLATION OF CUSHION LAYER, LEACHATE COLLECTION TRENCHES AND SUMP AREAS.
2. CUT AND FILL DEPTHS SHOWN WERE CURRENT AS OF JUNE 30, 2017. EXCAVATION AND FILLING HAS OCCURRED AFTER THIS DATE.
3. CELL 7 - EXCAVATION = 390,000 CY - EMBANKMENT = 15,000 CY - NET = 375,000 CY
4. LINER LIMIT AREA = 5.3 AC
5. ACTUAL QUANTITIES COULD BE PLUS OR MINUS 20 PERCENT OF THOSE LISTED ABOVE AND WILL BE COMPUTED BASED ON FIELD SURVEYS PERFORMED IN ACCORDANCE WITH SECTION 01050 OF THE SPECIAL PROVISIONS.

Point Table			
Point #	Northing	Easting	Elevation
701	369342.02	3307472.87	3600.00
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706	369788.18	3307582.48	3611.33
707	369329.81	3307583.16	3605.52
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709	369370.33	3307397.81	3602.00
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754	370100.09	3307525.23	3699.29
755	370144.55	3307269.83	3702.00
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757	370146.15	3307014.33	3700.00

A	9/22/17	GF	ISSUED FOR CONSTRUCTION
	REVISION		
JOB No.	00177	DESIGNED:	GF
SCALE:	AS SHOWN	DRAWN BY:	GF
PROJ. ENGINEER:	GF	APPROVED BY:	CC
CHECKED BY:	GF	DATE:	9/22/17



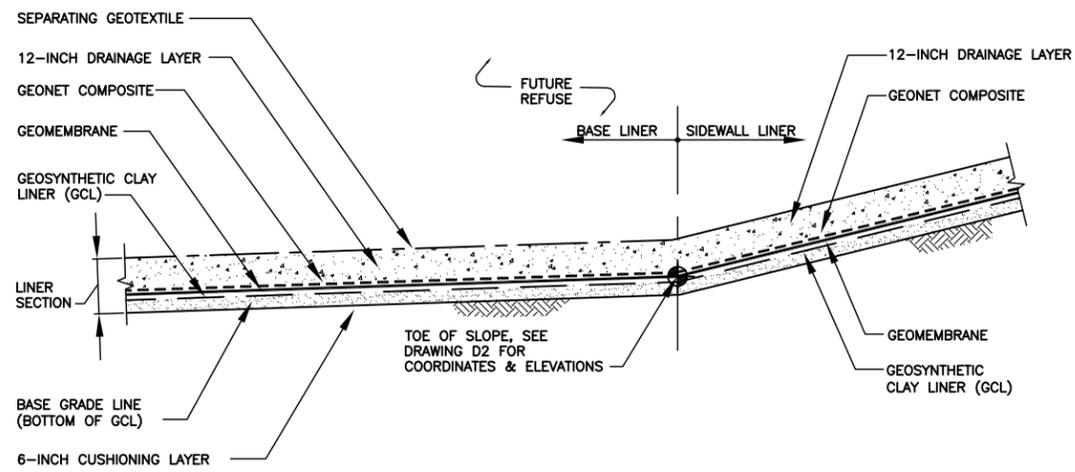
G. Friesen Associates, Inc.
 4088 Orchard Drive
 Lake Oswego, Oregon 97035
 Tel: (503) 655-1233
 Fax: (866) 533-5543

KNOTT LANDFILL
CELL 7 CONSTRUCTION
PROJECT
 DESCHUTES COUNTY, OREGON

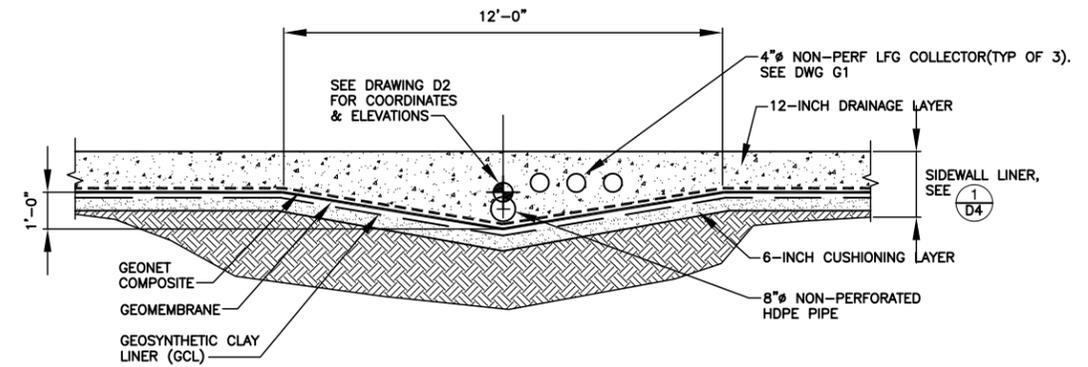


CELL 7
SUBGRADE PLAN - CUT AND FILL DEPTHS

DRAWING NUMBER:		D3
CAD FILE NUMBER:		D03
SHEET:	REV.	
5 of 19	A	



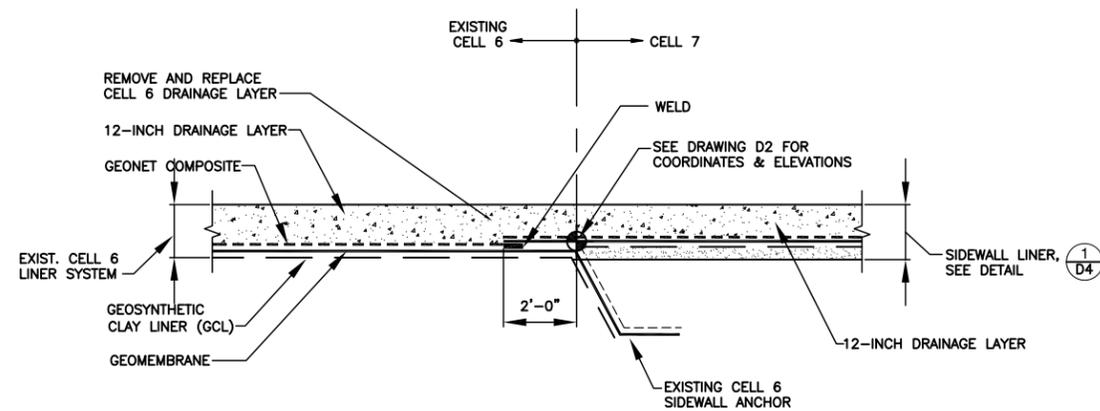
PRIMARY LINER SYSTEM ①
N.T.S.



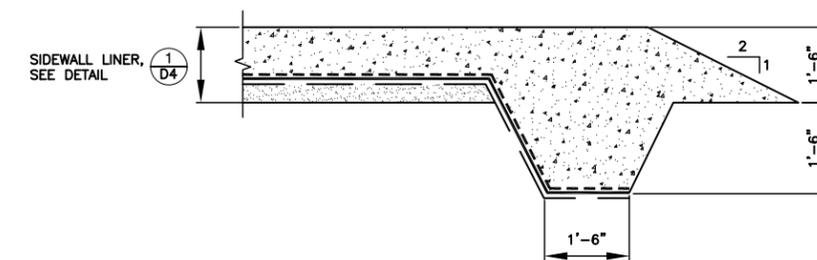
CLEANOUT TRENCH ②
N.T.S.

LEGEND

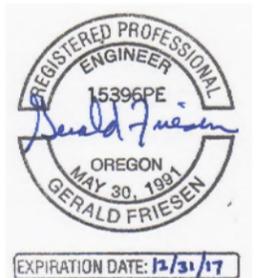
- GEOMEMBRANE
- - - - - CUSHIONING GEOTEXTILE
- GEOSYNTHETIC CLAY LINER (GCL)
- - - - - GEONET COMPOSITE
- - - - - SEPARATING GEOTEXTILE



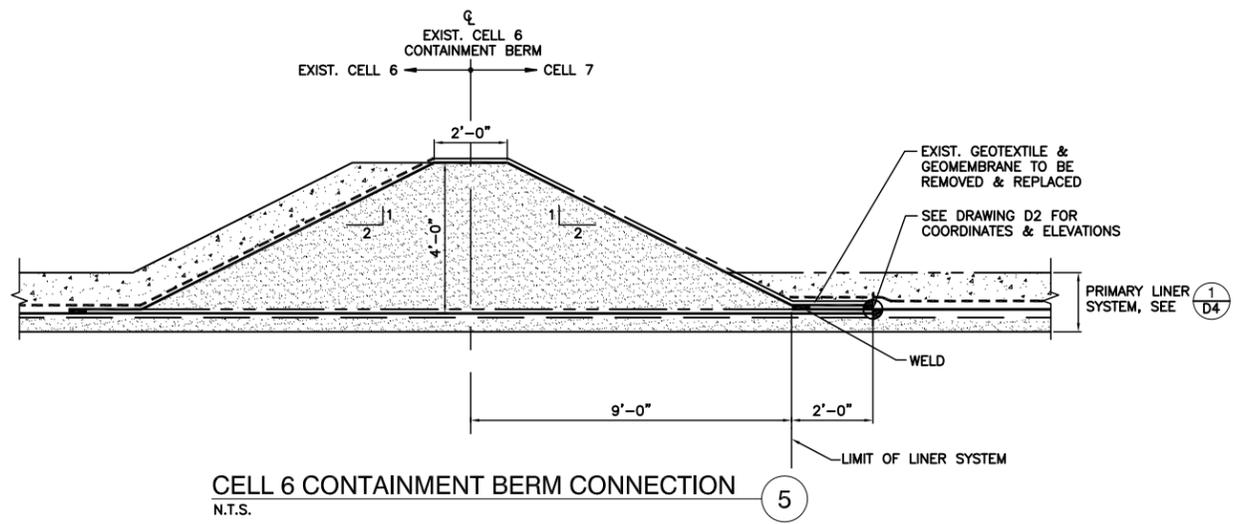
CELL 6 SIDEWALL CONNECTION ③
N.T.S.



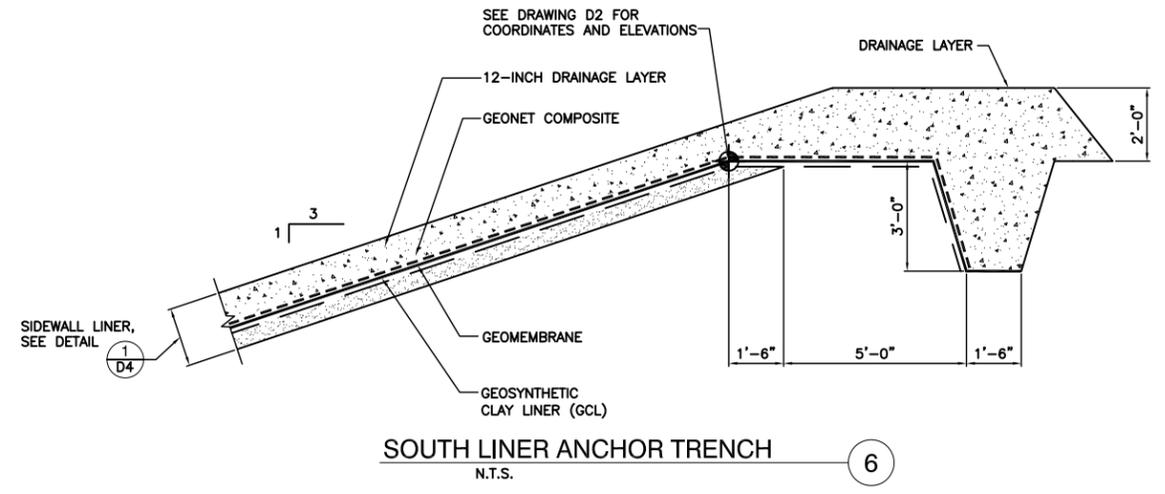
SIDEWALL ANCHOR ④
N.T.S.



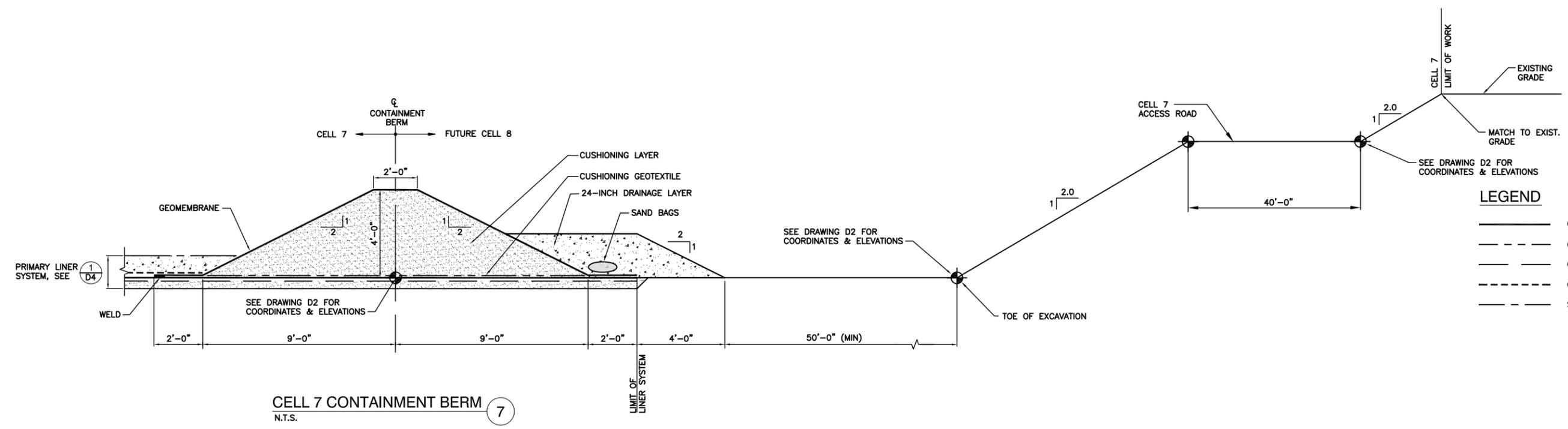
				JOB No. 00177	DESIGNED: GF	PROJ. ENGINEER: GF	 G. Friesen Associates, Inc. 4088 Orchard Drive Lake Oswego, Oregon 97035 Tel: (503) 635-1233 Fax: (866) 533-5543		KNOTT LANDFILL CELL 7 CONSTRUCTION PROJECT DESCHUTES COUNTY, OREGON		CELL 7 LINER SECTIONS AND DETAILS		DRAWING NUMBER: D4	
				SCALE: N.T.S.	DRAWN BY: GF	APPROVED BY: CC							CAD FILE NUMBER: D04	
				CHECKED BY: GF	DATE: 9/22/17	SHEET: 6 OF 19							REV. A	
A	9/22/17	GF	ISSUED FOR CONSTRUCTION											
No.	DATE	BY	REVISION											



CELL 6 CONTAINMENT BERM CONNECTION
N.T.S.

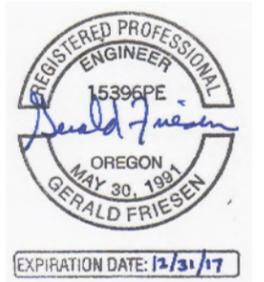


SOUTH LINER ANCHOR TRENCH
N.T.S.

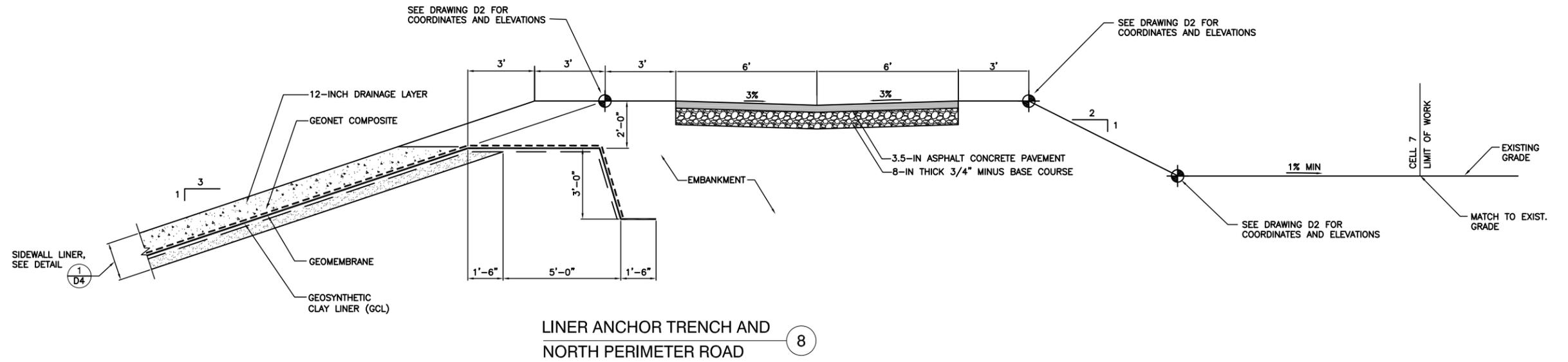


CELL 7 CONTAINMENT BERM
N.T.S.

- LEGEND**
- GEOMEMBRANE
 - - - - - CUSHIONING GEOTEXTILE
 - GEOSYNTHETIC CLAY LINER (GCL)
 - - - - - GEONET COMPOSITE
 - - - - - SEPARATING GEOTEXTILE



				JOB No. 00177	DESIGNED: GF	PROJ. ENGINEER: GF	 G. Friesen Associates, Inc. 4088 Orchard Drive Lake Oswego, Oregon 97075 Tel: (503) 635-1233 Fax: (866) 533-5543	KNOTT LANDFILL CELL 7 CONSTRUCTION PROJECT DESCHUTES COUNTY, OREGON	CELL 7 LINER SECTIONS AND DETAILS	DRAWING NUMBER: D5	
				SCALE: N.T.S.	DRAWN BY: GF	APPROVED BY: CC				CAD FILE NUMBER: D05	
					CHECKED BY: GF	DATE: 9/22/17				SHEET: 7 of 19	
A	9/22/17	GF	ISSUED FOR CONSTRUCTION							REV. A	
No.	DATE	BY	REVISION								

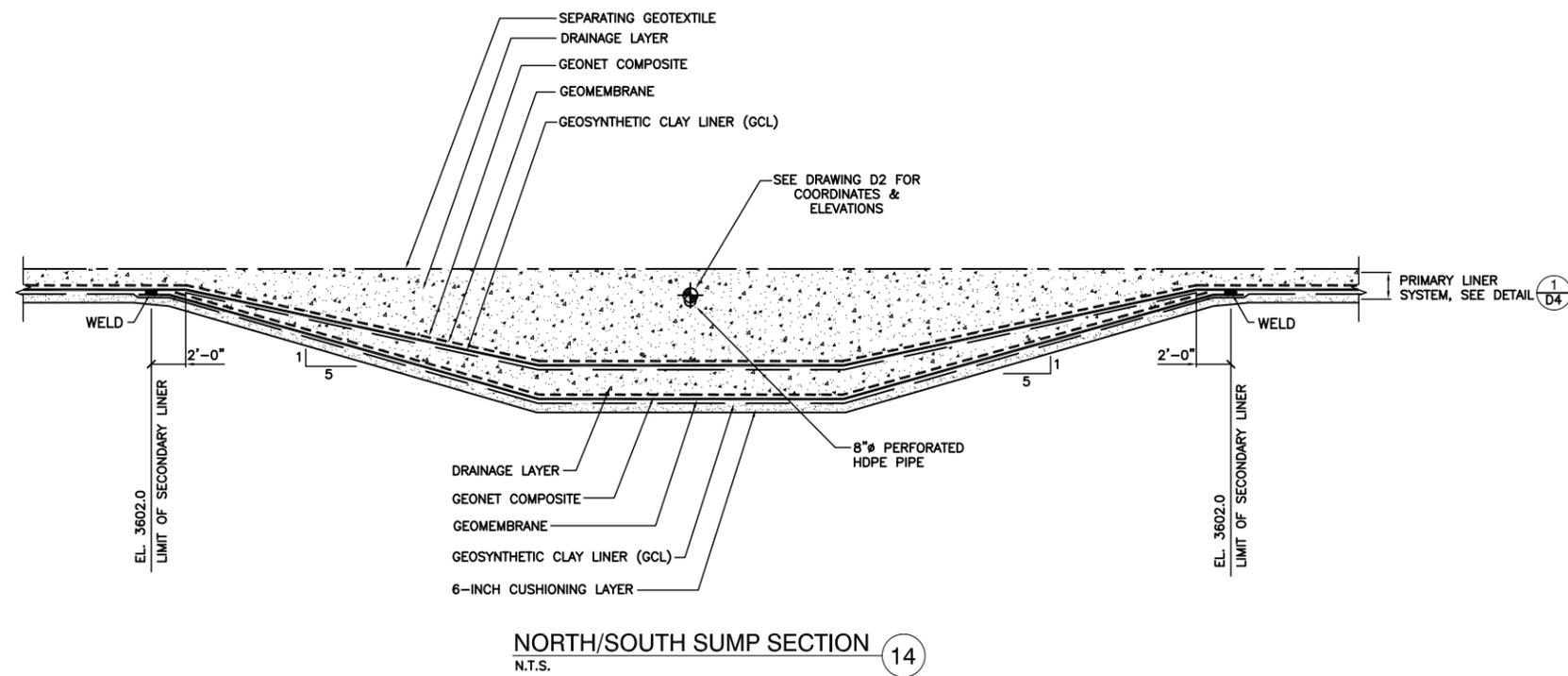
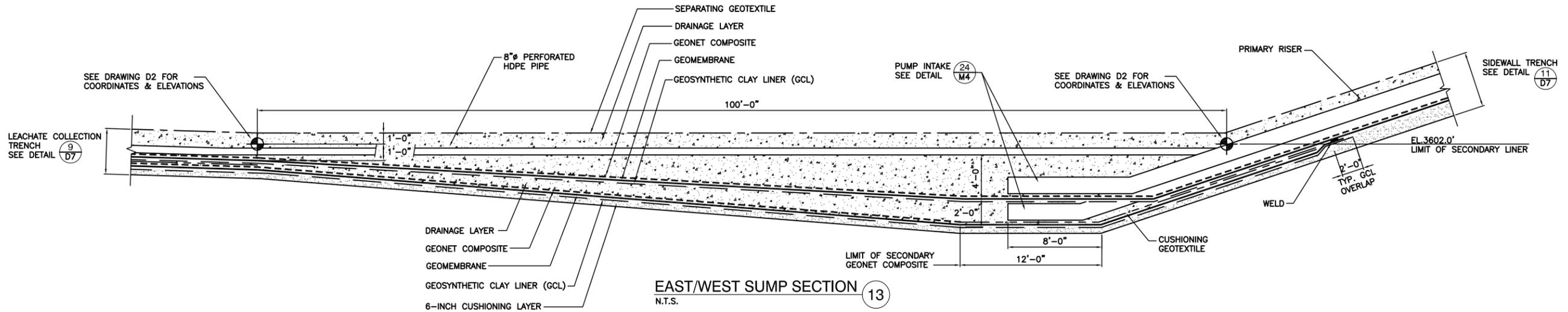


LEGEND

- GEOMEMBRANE
- - - - CUSHIONING GEOTEXTILE
- GEOSYNTHETIC CLAY LINER (GCL)
- - - - GEONET COMPOSITE
- - - - SEPARATING GEOTEXTILE

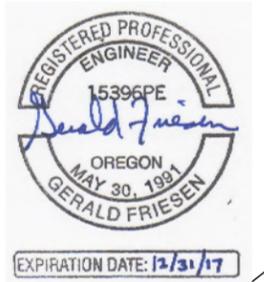


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			N.T.S.	DRAWN BY: GF	APPROVED BY: CC				SHEET: 8 OF 19	
A	9/22/17	GF	ISSUED FOR CONSTRUCTION			CHECKED BY: GF	DATE: 9/22/17			REV. A
No.	DATE	BY	REVISION							



LEGEND

—————	GEOMEMBRANE
- - - - -	CUSHIONING GEOTEXTILE
—————	GEOSYNTHETIC CLAY LINER (GCL)
- - - - -	GEONET COMPOSITE
- - - - -	SEPARATING GEOTEXTILE



A	09/22/17	GF	ISSUED FOR CONSTRUCTION
	No.	DATE	BY
			REVISION

JOB No. 00177	DESIGNED: GF	PROJ. ENGINEER: GF
SCALE: N.T.S.	DRAWN BY: GF	APPROVED BY: CC
	CHECKED BY: GF	DATE: 09/22/17



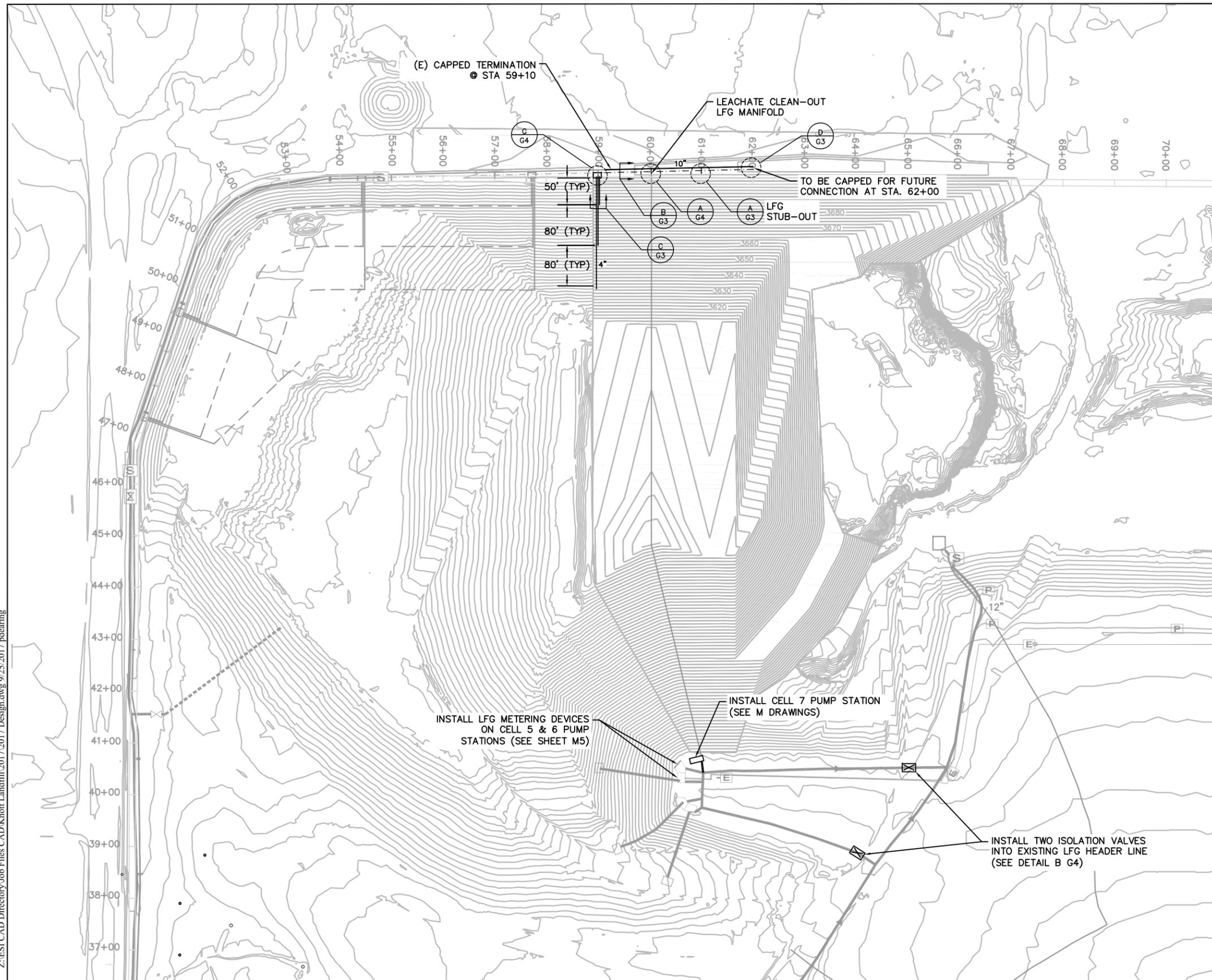
G. Friesen Associates, Inc.
4088 Orchard Drive
Lake Oswego, Oregon 97075
Tel: (503) 635-1233
Fax: (866) 533-5543

**KNOTT LANDFILL
CELL 7 CONSTRUCTION
PROJECT
DESCHUTES COUNTY, OREGON**

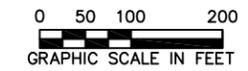
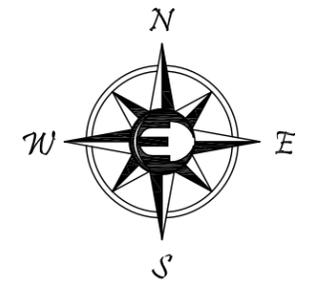
**CELL 7
SUMP SECTIONS**

DRAWING NUMBER: D8	
CAD FILE NUMBER: D08	
SHEET: 10 of 19	REV. A

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- LEGEND**
- 10" LFG PIPE AND SIZE
 - CONDENSATE PIPE (2" HDPE SDR11)
 - - - COMPRESSED AIR PIPE (1" HDPE SDR11)
 - LFG FLOW DIRECTION
 - 0.5% LFG PIPE SLOPE
 - - - (EXISTING) LFG PIPE AND SIZE
 - (EXISTING) CONDENSATE PIPE
 - - - (EXISTING) COMPRESSED AIR PIPE
 - CONDENSATE SUMP
 - ⊗ ISOLATION VALVE
 - - - [E] ELECTRICAL CONDUIT



A	09/22/17	CF	ISSUED FOR CONSTRUCTION
No.	DATE	BY	REVISION

JOB No. 018.005	DESIGNED: CF	PROJ. ENGINEER: CF
SCALE: AS SHOWN	DRAWN BY: PD	APPROVED BY: WS
	CHECKED BY: WS	DATE: 09/22/17

ENERGYNEERING SOLUTIONS INC
 15820 BARCLAY DRIVE SISTERS, OR 97759
 PHONE: (541) 549-8766
 FAX: (541) 549-1901

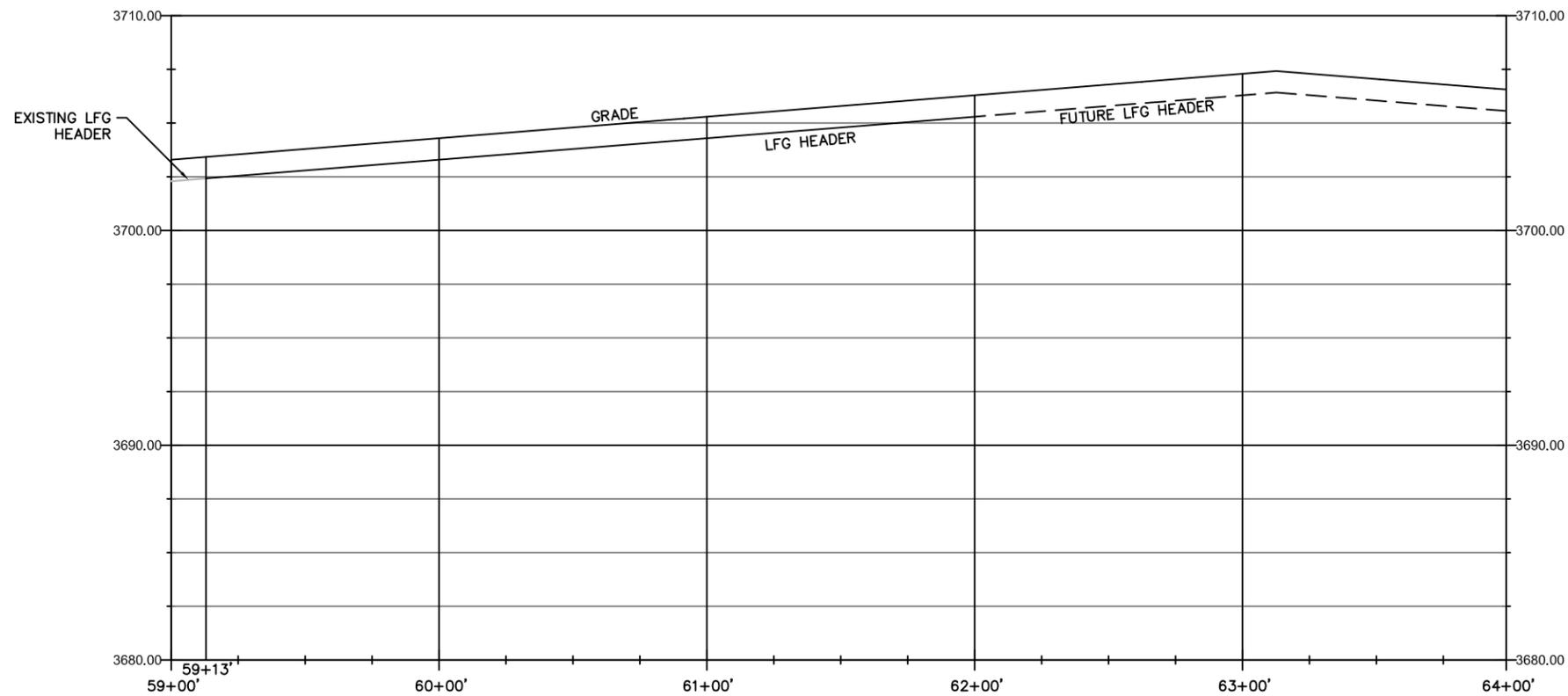
G. Friesen Associates, Inc.
 4088 Orchard Drive
 Lake Oswego, Oregon 97035
 Tel: (503) 635-1233
 Fax: (866) 533-5543

**KNOTT LANDFILL
 CELL 7 CONSTRUCTION
 PROJECT
 DESCHUTES COUNTY, OREGON**

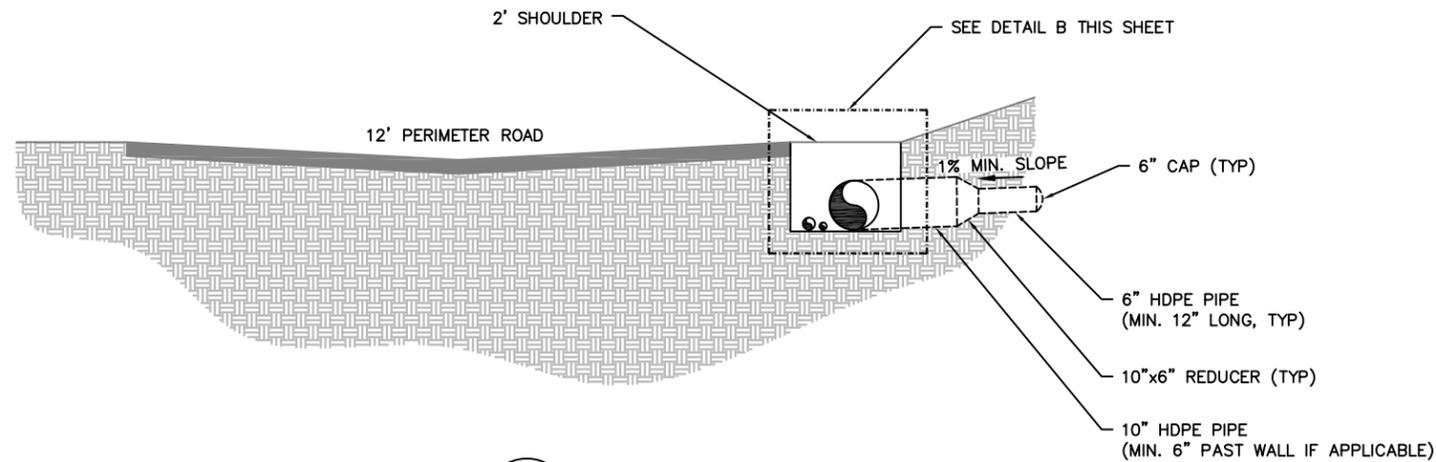
**CELL 7
 SITE PLAN**

DRAWING NUMBER: G1	
CAD FILE NUMBER: G01	
SHEET: 11 OF 19	REV. A

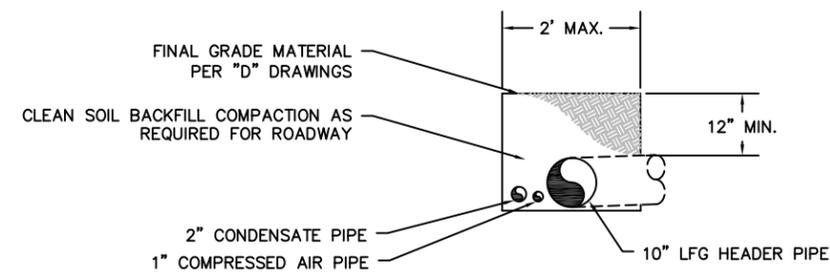
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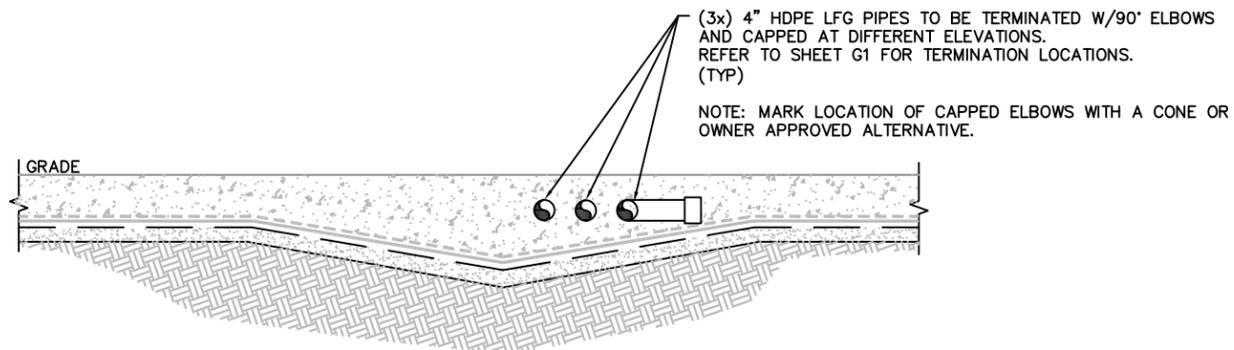
				JOB No. 018.005	DESIGNED: CF	PROJ. ENGINEER: CF	 15820 BARCLAY DRIVE SISTERS, OR 97759 PHONE: (541) 549-8766 FAX: (541) 549-1901	 G. Friesen Associates, Inc. 4088 Orchard Drive Lake Oswego, Oregon 97035 Tel: (503) 635-1233 Fax: (866) 533-5543	KNOTT LANDFILL CELL 7 CONSTRUCTION PROJECT DESCHUTES COUNTY, OREGON	CELL 7 PERIMETER LFG PIPE PROFILE	DRAWING NUMBER: G2
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				CHECKED BY: WS	DATE: 09/22/17	SHEET: 12 OF 19					REV. A
A	09/22/17	CF	ISSUED FOR CONSTRUCTION								
No.	DATE	BY	REVISION								



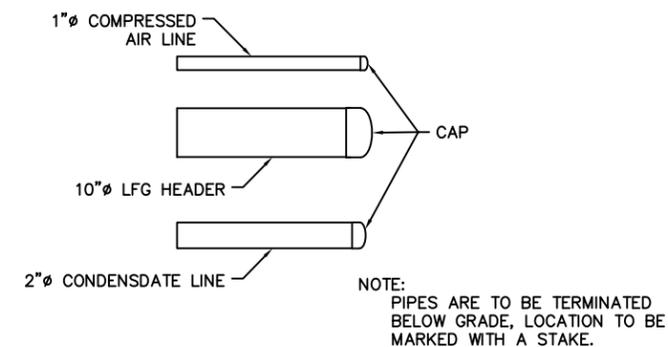
A
G3 LFG STUB-OUT DETAIL



B
G3 TRENCH DETAIL



C
G3 ODOR PREVENTION COLLECTORS



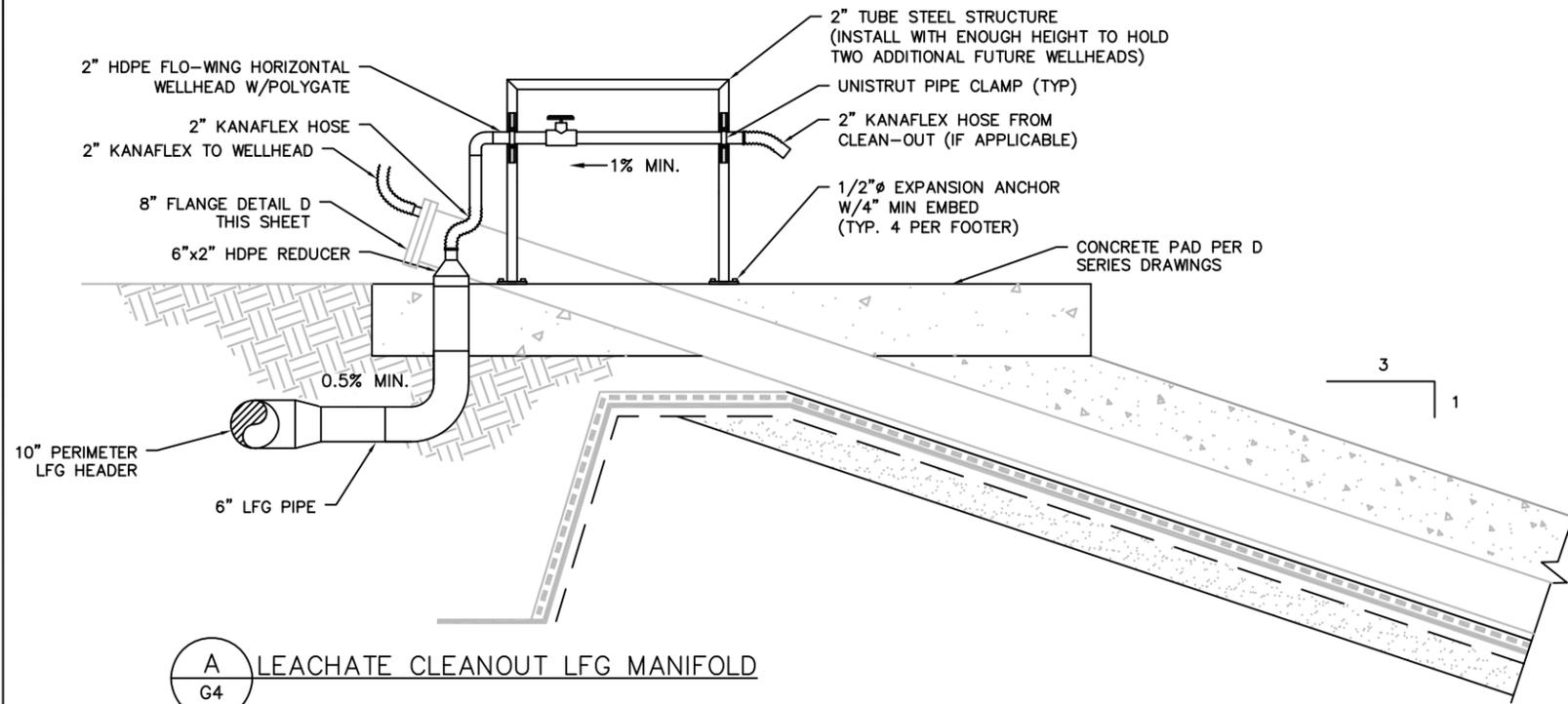
D
G3 TERMINATION DETAIL



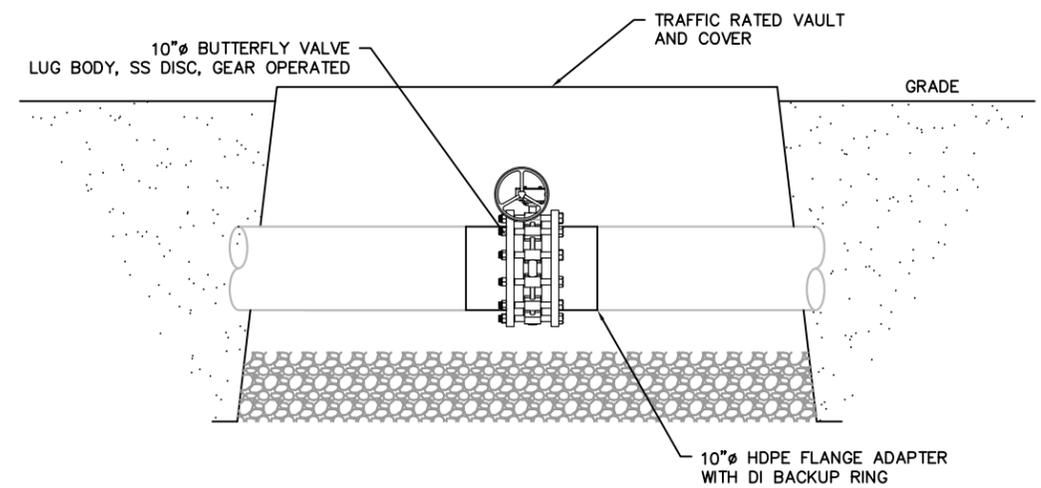
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				SCALE: AS SHOWN	DRAWN BY: PD	APPROVED BY: WS					CAD FILE NUMBER: G03
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A	09/22/17	CF	ISSUED FOR CONSTRUCTION								
No.	DATE	BY	REVISION								

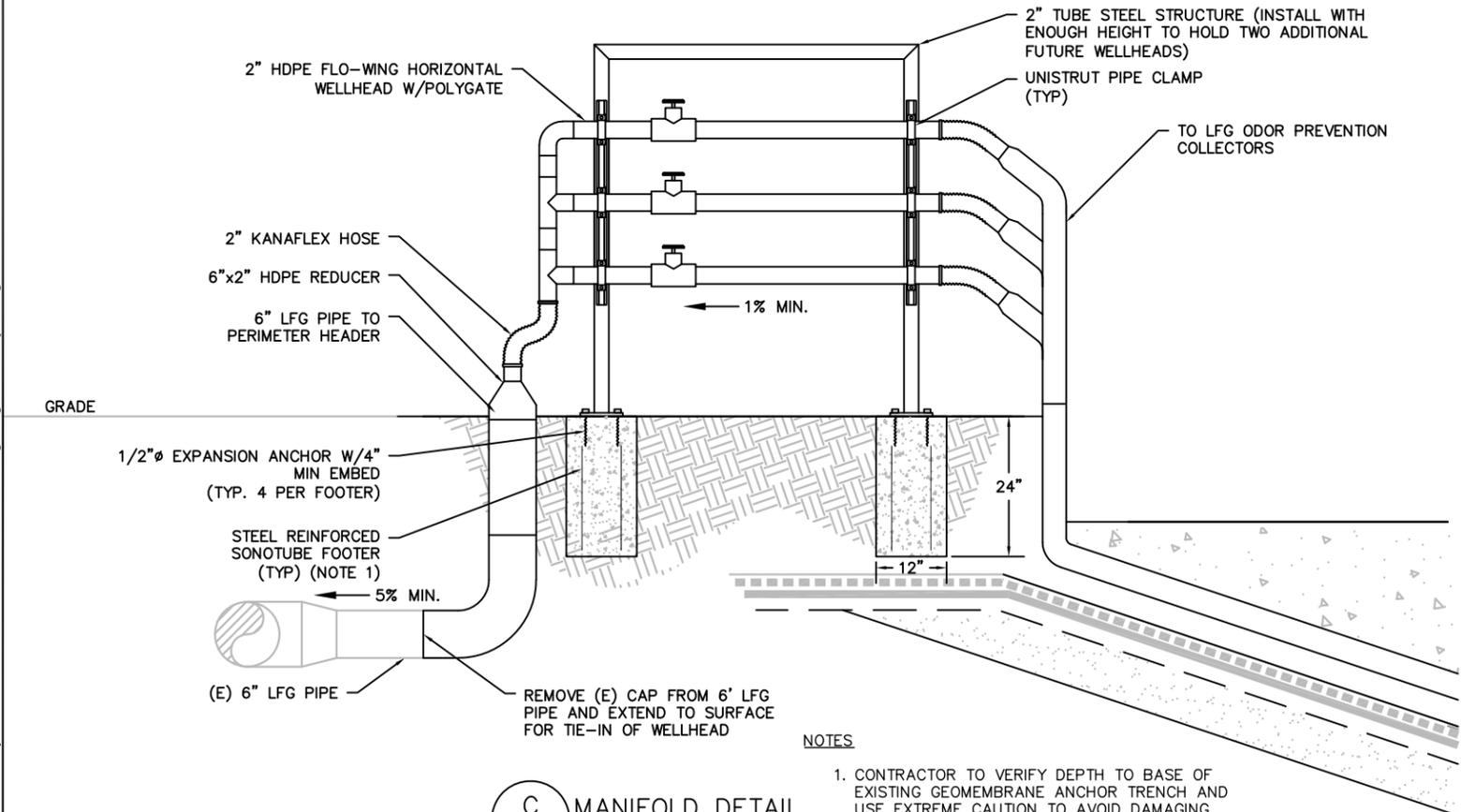
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A LEACHATE CLEANOUT LFG MANIFOLD
G4

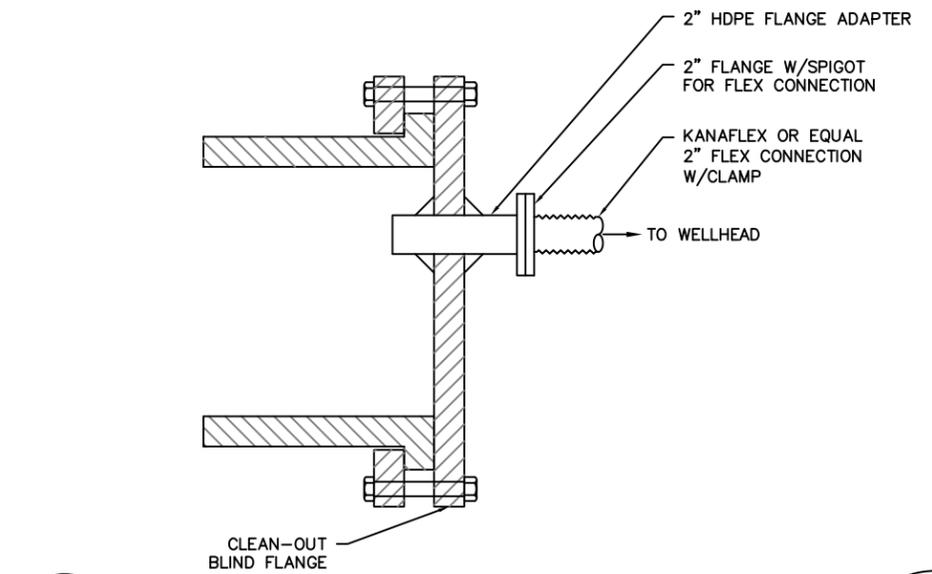


B VALVE VAULT
G4



C MANIFOLD DETAIL
G4

NOTES
1. CONTRACTOR TO VERIFY DEPTH TO BASE OF EXISTING GEOMEMBRANE ANCHOR TRENCH AND USE EXTREME CAUTION TO AVOID DAMAGING LINER AND HEADER INFRASTRUCTURE WHEN INSTALLING SONOTUBE FOOTERS..

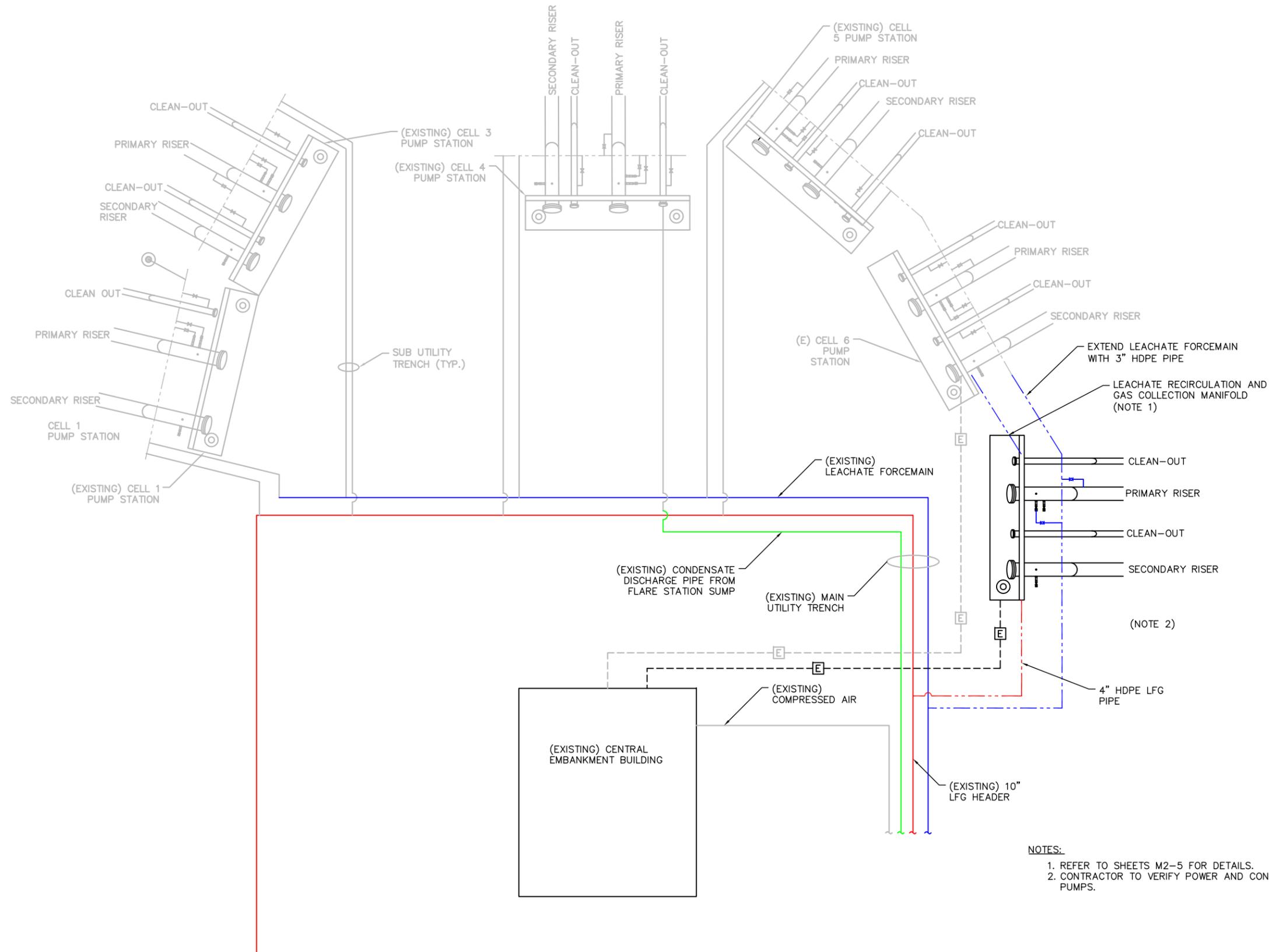


D LEACHATE CLEAN-OUT FLANGE DETAIL
G4



JOB No. 018.005		DESIGNED: CF	PROJ. ENGINEER: CF			KNOTT LANDFILL CELL 7 CONSTRUCTION PROJECT DESCHUTES COUNTY, OREGON	CELL 7 LFG SYSTEM DETAILS II	DRAWING NUMBER: G4
SCALE: AS SHOWN		DRAWN BY: PD	APPROVED BY: WS					CAD FILE NUMBER: G04
A 09/22/17 CF		ISSUED FOR CONSTRUCTION		15820 BARCLAY DRIVE SISTERS, OR 97759 PHONE: (541) 549-8766 FAX: (541) 549-1901	4088 Orchard Drive Lake Oswego, Oregon 97035 Tel: (503) 635-1233 Fax: (866) 533-5543	SHEET: 14 OF 19	REV. A	
No.	DATE	BY	REVISION					CHECKED BY: WS DATE: 09/22/17

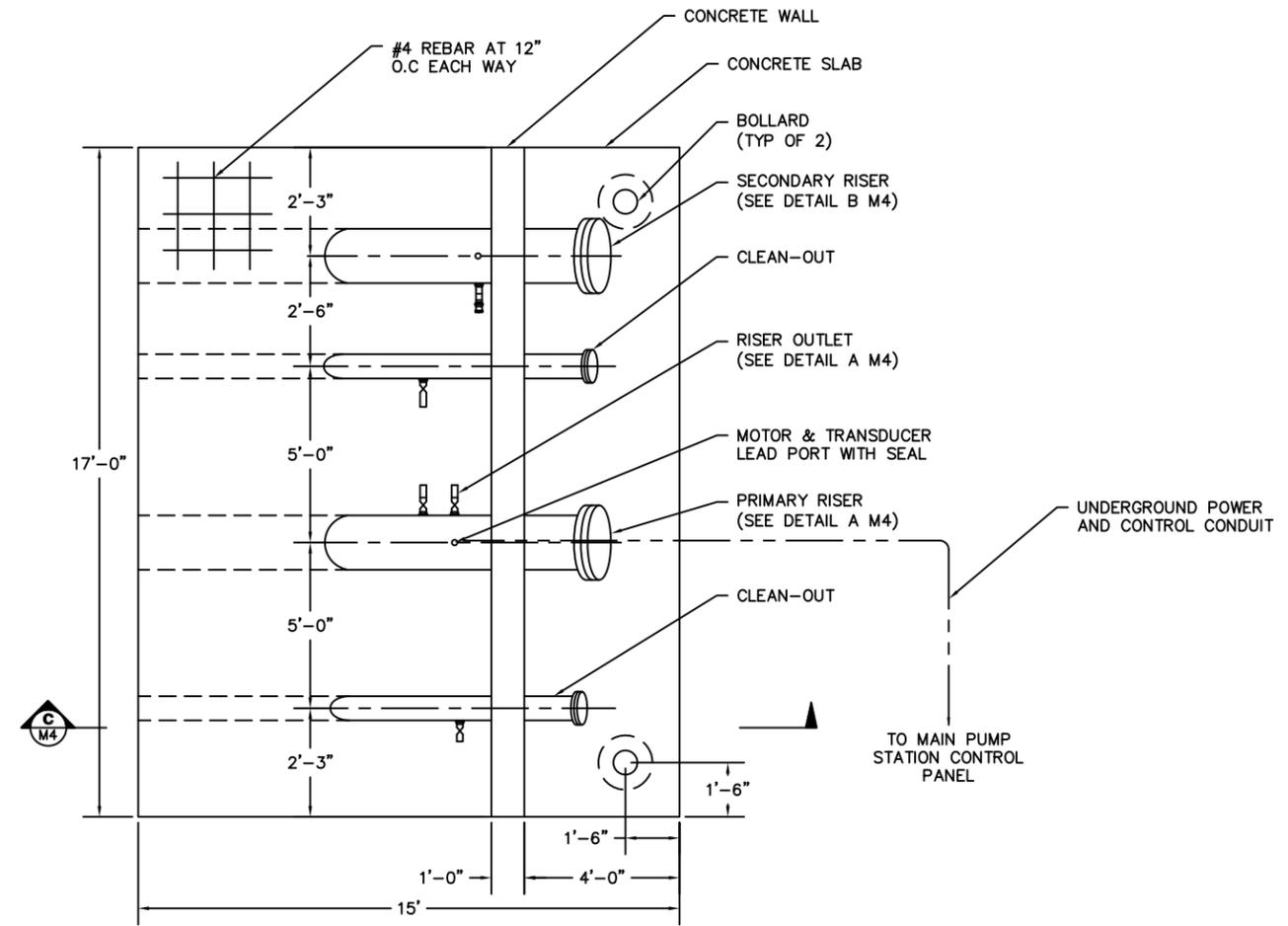
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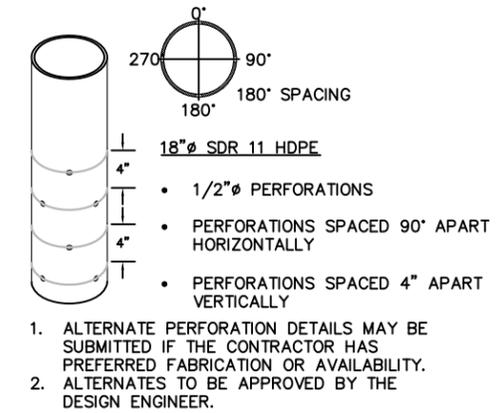
NOTES:
 1. REFER TO SHEETS M2-5 FOR DETAILS.
 2. CONTRACTOR TO VERIFY POWER AND CONTROL REQUIREMENTS FOR THE PUMPS.



				JOB No. 018.005 DESIGNED: CF PROJ. ENGINEER: CF		 15820 BARCLAY DRIVE SISTERS, OR 97759 PHONE: (541) 549-8766 FAX: (541) 549-1901	 G. Friesen Associates, Inc. 4088 Orchard Drive Lake Oswego, Oregon 97035 Tel: (503) 635-1233 Fax: (866) 533-5543	KNOTT LANDFILL CELL 7 CONSTRUCTION PROJECT DESCHUTES COUNTY, OREGON	CELL 7 PUMP STATION LAYOUT	DRAWING NUMBER: M1	
				SCALE: AS SHOWN DRAWN BY: PD APPROVED BY: WS						CAD FILE NUMBER: M01	
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A	09/22/17	CF	ISSUED FOR CONSTRUCTION								
No.	DATE	BY	REVISION								



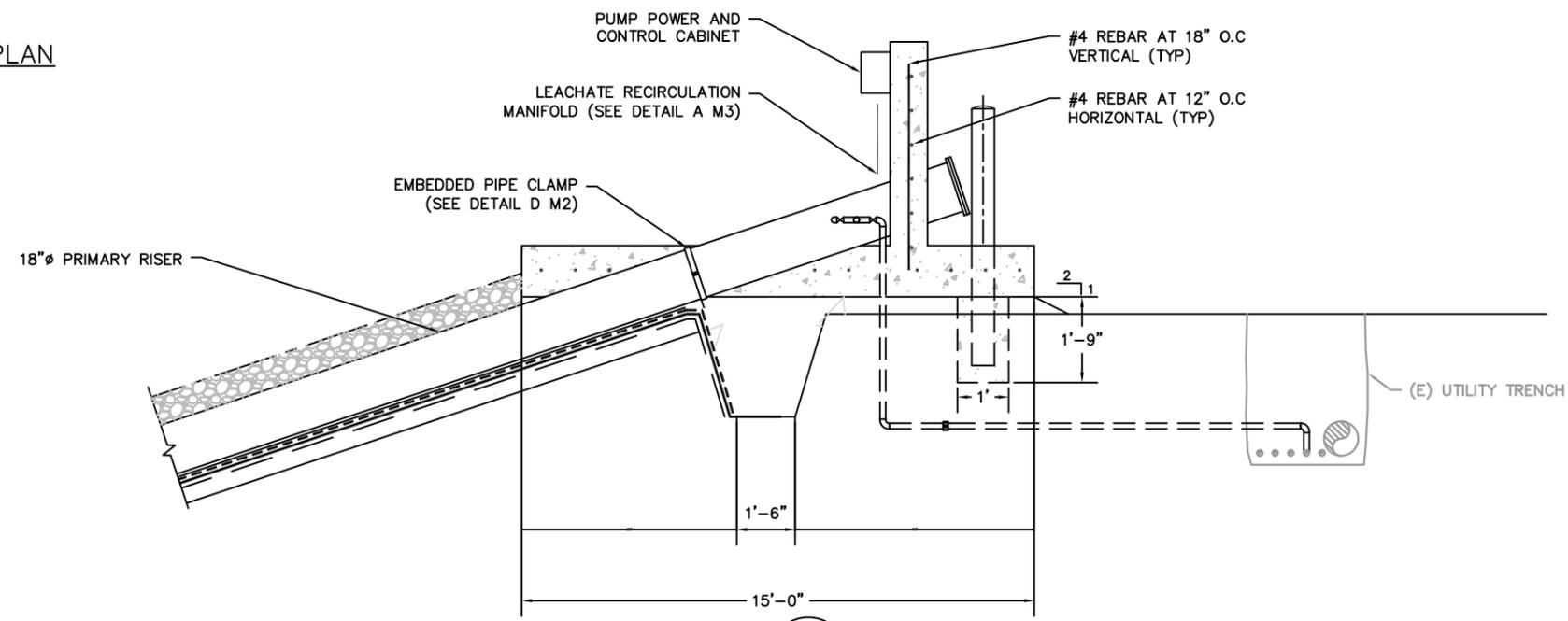
A PUMP STATION PLAN
M2



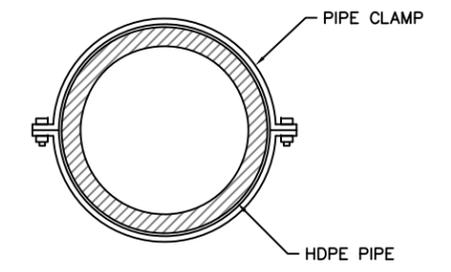
B PERFORATIONS DETAIL
M2

LEGEND

	GEOMEMBRANE
	CUSHIONING GEOTEXTILE
	GEOSYNTHETIC CLAY LINER (GCL)
	GEONET COMPOSITE
	SEPARATING GEOTEXTILE



C PUMP STATION DETAIL
M2



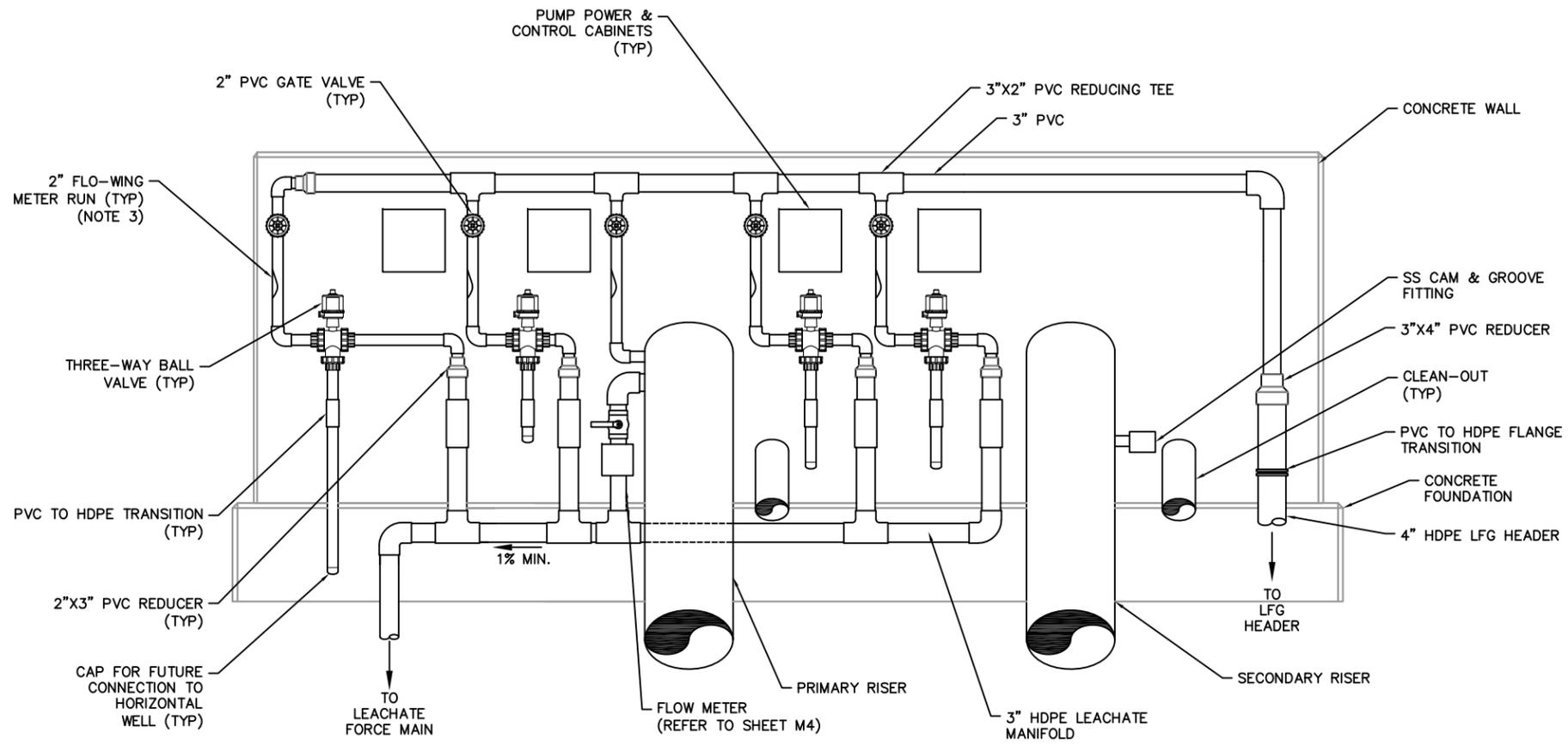
D PIPE CLAMPING DETAIL
M2



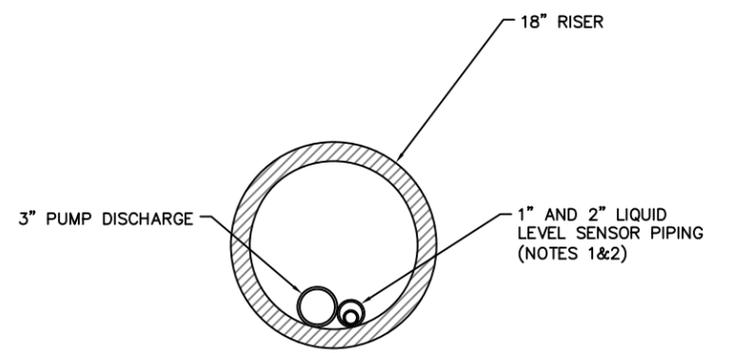
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A	09/22/17	CF	ISSUED FOR CONSTRUCTION							
No.	DATE	BY	REVISION							

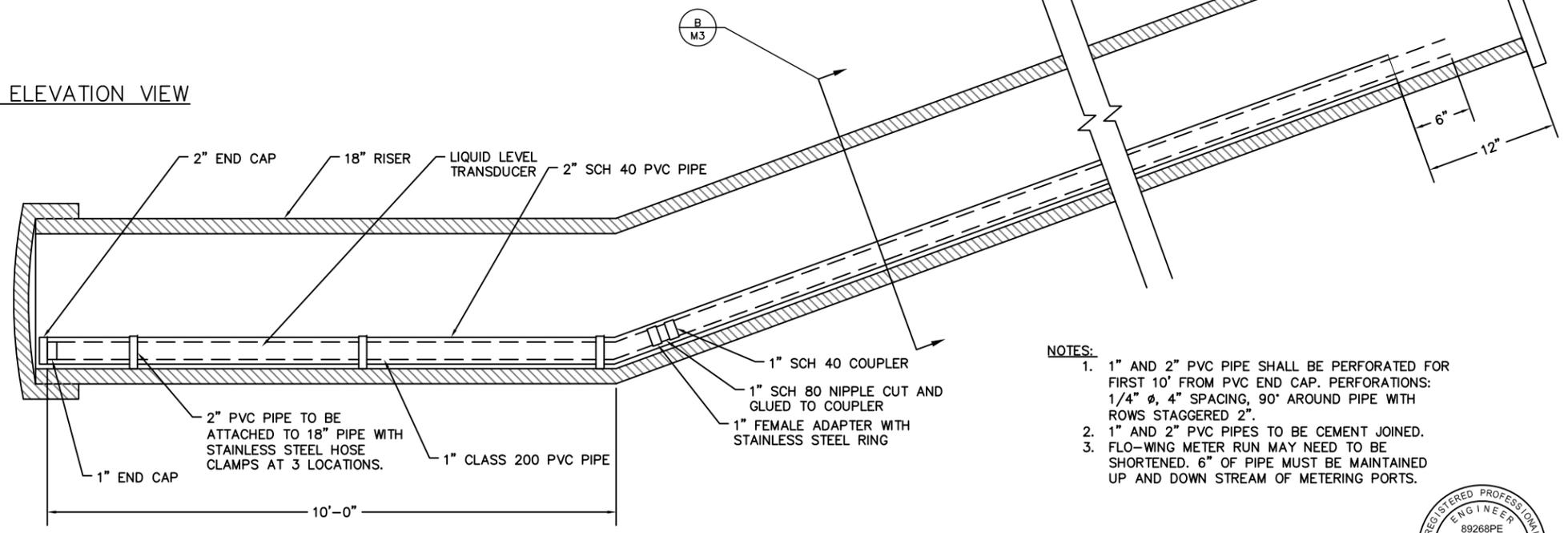
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A PUMP STATION ELEVATION VIEW
M3



B RISER CROSS SECTION
M3



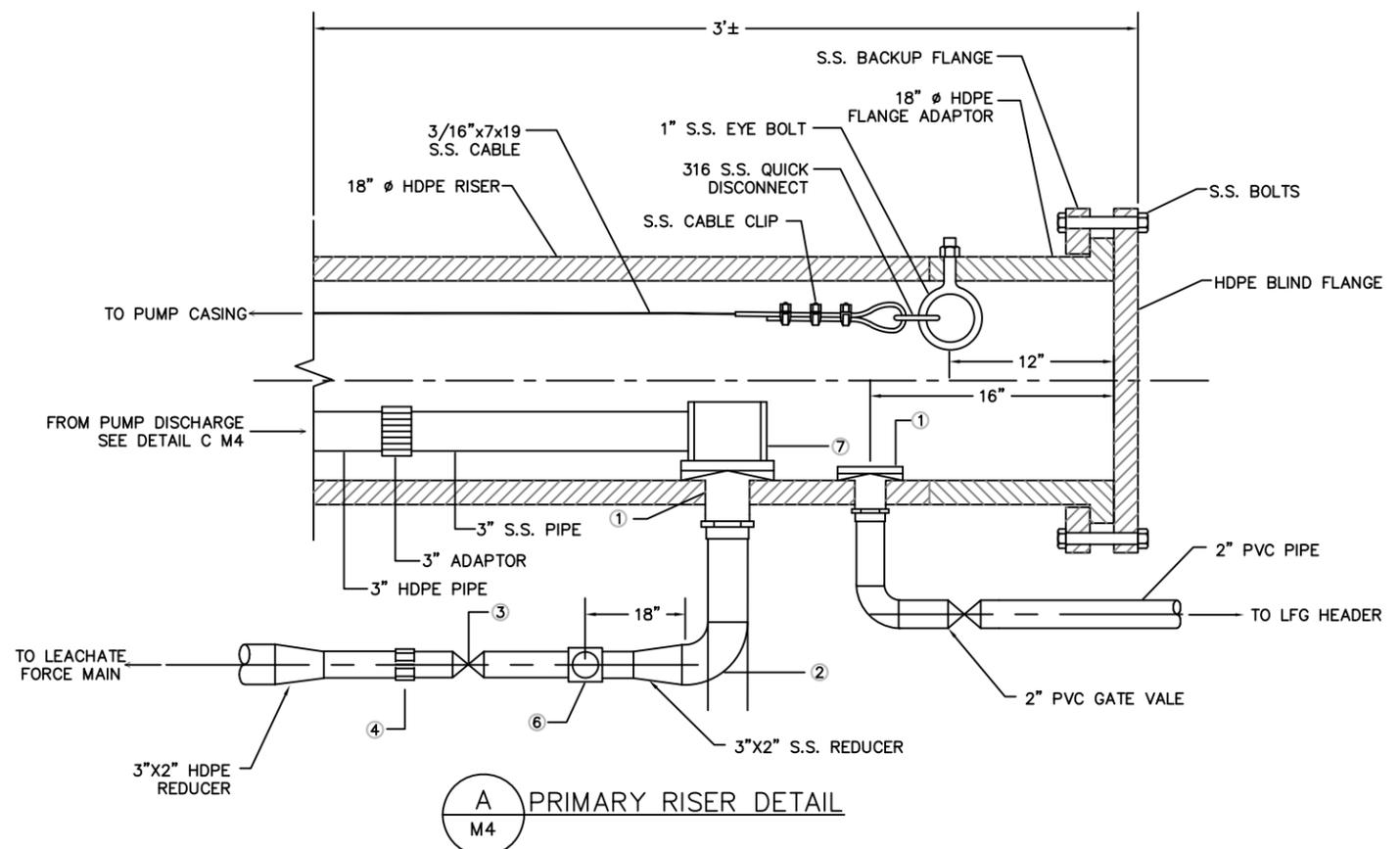
C RISER PROFILE
M3

- NOTES:**
- 1" AND 2" PVC PIPE SHALL BE PERFORMED FOR FIRST 10' FROM PVC END CAP. PERFORATIONS: 1/4" Ø, 4" SPACING, 90° AROUND PIPE WITH ROWS STAGGERED 2".
 - 1" AND 2" PVC PIPES TO BE CEMENT JOINED.
 - FLO-WING METER RUN MAY NEED TO BE SHORTENED. 6" OF PIPE MUST BE MAINTAINED UP AND DOWN STREAM OF METERING PORTS.

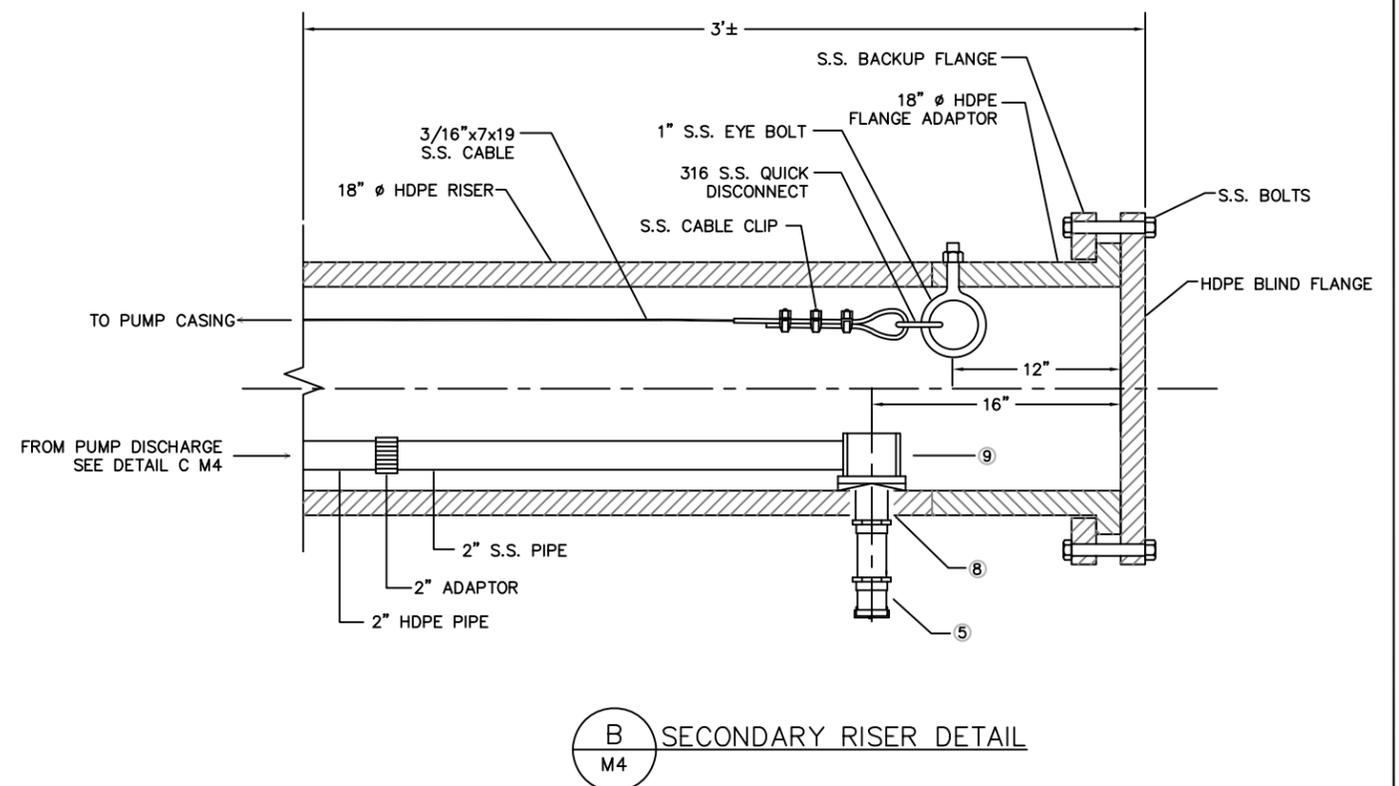


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		SCALE: AS SHOWN	DRAWN BY: PD	APPROVED BY: WS					CAD FILE NUMBER: M03
A	09/22/17	CF	ISSUED FOR CONSTRUCTION		CHECKED BY: WS DATE: 09/22/17				SHEET: 17 OF 19
No.	DATE	BY	REVISION						REV. A

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A PRIMARY RISER DETAIL
M4



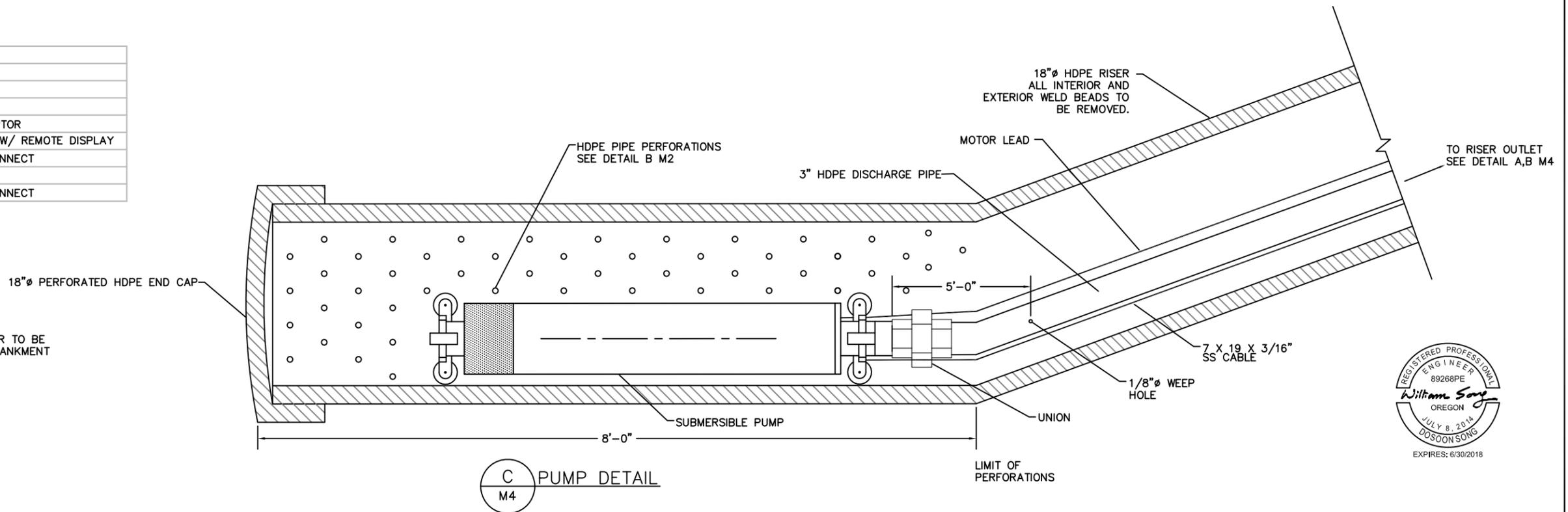
B SECONDARY RISER DETAIL
M4

MATERIAL LIST

1	3" S.S. BULKHEAD
2	3" S.S. ELBOW
3	2" BALL VALVE
4	2" SS/HDPE ADAPTER
5	2" SS CAM & GROVE ADAPTER
6	2" MAGNETIC FLOW METER W/ REMOTE DISPLAY
7	3" 90° ELBOW QUICK DISCONNECT
8	2" S.S. BULKHEAD
9	2" 90° ELBOW QUICK DISCONNECT

NOTE:

1. REMOTE DISPLAY OF FLOW METER TO BE INSTALLED IN THE CENTRAL EMBANKMENT BUILDING.

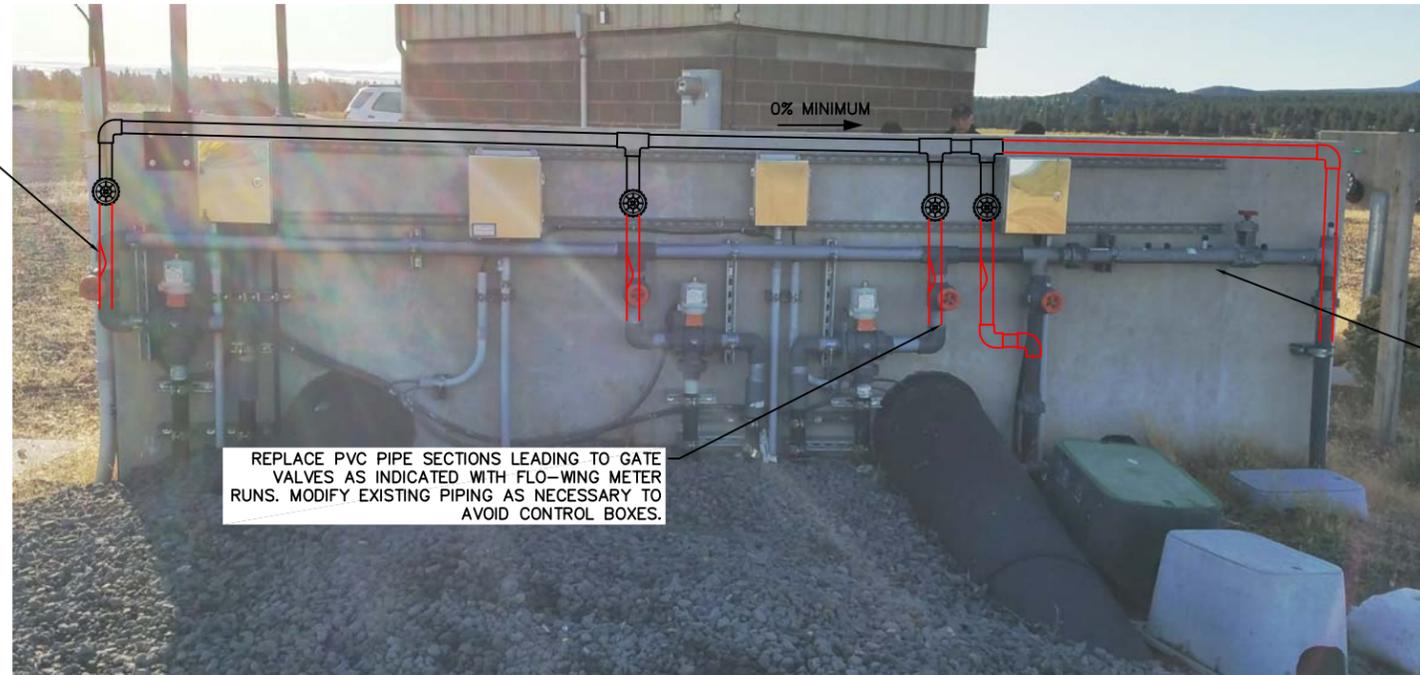


C PUMP DETAIL
M4



A	09/22/17	CF	ISSUED FOR CONSTRUCTION	JOB No. 018.005 SCALE: AS SHOWN	DESIGNED: CF	PROJ. ENGINEER: CF	 15820 BARCLAY DRIVE SISTERS, OR 97759 PHONE: (541) 549-8766 FAX: (541) 549-1901	 G. Friesen Associates, Inc. 4088 Orchard Drive Lake Oswego, Oregon 97035 Tel: (503) 635-1233 Fax: (866) 533-5543	KNOTT LANDFILL CELL 7 CONSTRUCTION PROJECT DESCHUTES COUNTY, OREGON	CELL 7 LEACHATE RISER DETAILS	DRAWING NUMBER: M4
	No.	DATE	BY		REVISION	CHECKED BY: WS					DATE: 09/22/17

2" FLO-WING
METER RUN (TYP)
(NOTE 1)

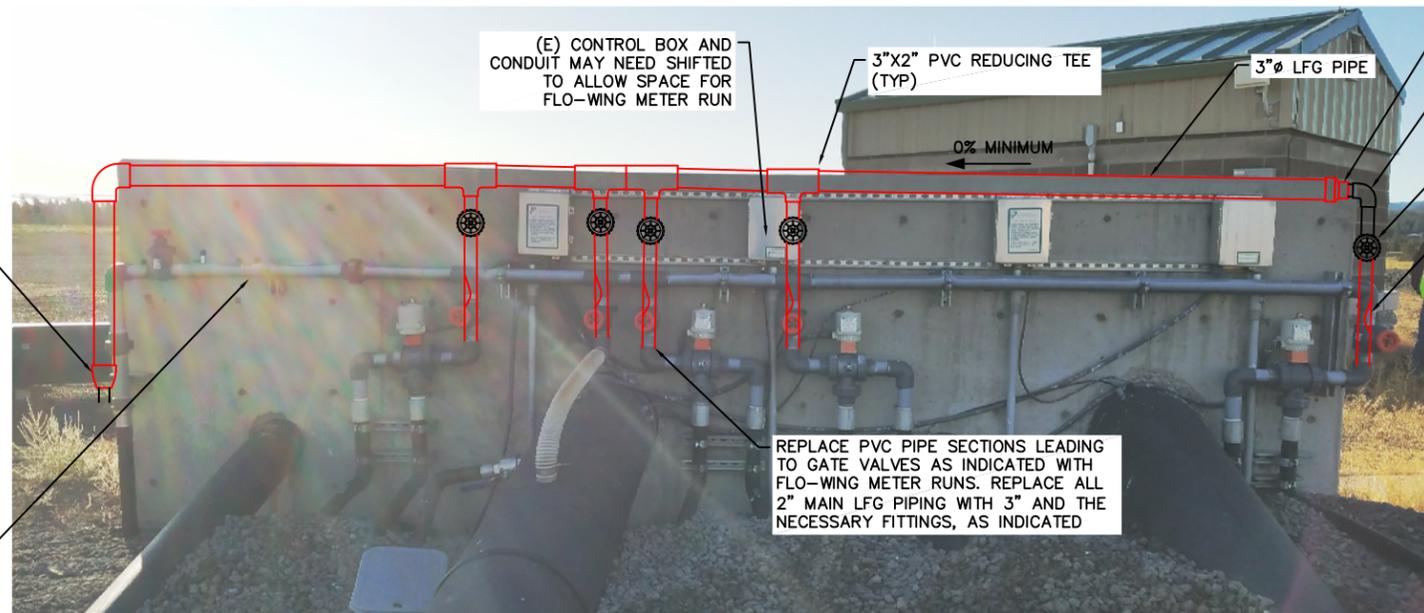


REMOVE EXISTING 2" FLOWING
METER AND REUSE WHERE NEEDED

REPLACE PVC PIPE SECTIONS LEADING TO GATE
VALVES AS INDICATED WITH FLO-WING METER
RUNS. MODIFY EXISTING PIPING AS NECESSARY TO
AVOID CONTROL BOXES.

A
M5
CELL 5 PUMP STATION

3"x2" PVC REDUCER



3"x2" PVC REDUCER
(E) 2" PVC ELBOW
(E) 2" PVC GATE
VALVE (TYP)
2" FLO-WING
METER RUN (TYP)
(NOTE 1)

REMOVE EXISTING 2" FLOWING
METER AND REUSE WHERE NEEDED

REPLACE PVC PIPE SECTIONS LEADING
TO GATE VALVES AS INDICATED WITH
FLO-WING METER RUNS. REPLACE ALL
2" MAIN LFG PIPING WITH 3" AND THE
NECESSARY FITTINGS, AS INDICATED

NOTES:

1. CUT FLO-WING METER RUNS DOWN IF NECESSARY; 6" OF PIPE MUST BE MAINTAINED UP AND DOWNSTREAM OF METERING PORTS.
2. ALL PIPE MODIFICATIONS SHOWN IN RED.



B
M5
CELL 6 PUMP STATION

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					CHECKED BY: WS	DATE: 09/22/17					SHEET: 19 OF 19	REV. A
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