



March 29, 2013

Illinois Department of Public Health
Division of Environmental Health
525 West Jefferson Street
Springfield, Illinois 62761

**Subject: Groundwater Monitoring Well Construction Report
Village of Roxana and WRB Refining LP Wood River Refinery
Roxana, Illinois**

To Whom it May Concern;

URS Corporation, on behalf of Shell Oil Products US (SOPUS), is submitting the boring logs and well construction diagrams for groundwater monitoring wells installed within the investigation area in Roxana, Illinois. Enclosed are the boring logs and well completion diagrams for the following wells recently installed at the site:

- MW-16 through MW-22
- MW-24
- ROST-3-MW replacement well
- P-55 replacement well

If you have any questions or require further information please contact Bob Billman at 314-429-0100.

Regards;

Wendy Pennington
Task Manager

Bob Billman
Senior Project Manager

Cc:
Kevin Dyer (SOPUS)
Repositories (Village Hall, Library, Website)
Project File

LOG OF BORING MW-16

Starting Date: 2/4/ 2
 Completion Date: 2/5/ 2
 Cas ng E evat on: 443 39
 Ground E evat on: 443 76

Quadrangle Sec:34 (E - center of NE /4)
 T:5N
 R:9W
 UTM (or State Plane) Coord
 N: (X):792976 80
 E: (Y):232203 87

Depth In feet	Inches Dr ven	Inches Recovered	B ow Counts	PID (ppm)	Samp er Graph c	Symbo	USCS
0						ASPHALT	
5							CL
10							ML
							SM
15	36	36		0.2			SP
				0.2			
	60	45		0.3			
				0.2			
20	60	47		0.3			
				0.2			
				0.1			
				0.2			

DESCRIPTION

Asphalt cover

Stiff, moist, brown, Silty CLAY (CL)

Dense, moist, brown, Clayey SILT (ML)

Becomes wet

Dense, moist, brown, fine grained, Silty SAND (SM)

Loose to medium dense, moist to dry, brown, fine to medium grained SAND (SP)

NOTES

Air knifed to 10' bgs to clear utilities.

Sample MW 16 14 for VOC at 1440

Completion Depth: 49.0 Ft bgs
 Project No.: 21562850.15000
 Project Name: Roxana/WRR Well Drilling
 Drilling Contractor: Roberts Environmental Drilling Inc.
 Driller Name: P. Seymour
 Drilling Method: Direct Push/HSA
 Drill Rig Type: 8040 DT
 Logged by: R. Hart, W. Pennington
 County: Madison
 Site ID No.: 1191150002
 Federal ID No.: ILD 080 012 305

Water Depth: 41.5 ft., After ATD hrs.
 Water Depth: _____ ft., After _____ hrs.
 Water level at time of drilling
 Water level after drilling
 ATD At time of drilling
 NE None Encountered
 NA Not Applicable

Geoprobe
 Air Knife/Hand Auger Sampler
 Air Rotary
 Sonic
 Splitspoon Sampler
 Hollow Stem Auger
 Soil samples not collected



USC based on field visual observations

URS (ENV/RO) LOG (EPA FORM 1) 21562850.15000 (ROXANA MW 2013) GPJ URSS LEV GD 2/6/13

LOG OF BORING MW-16

Starting Date: 2/4/ 2 Completion Date: 2/5/ 2 Cas ng E evat on: 443 39 Ground E evat on: 443 76	Quadrangle Sec:34 (E - center of NE /4) T:5N R:9W UTM (or State Plane) Coord N: (X):792976 80 E: (Y):232203 87
--	--

Depth In feet	Inches Dr ven	Inches Recovered	B ow Counts	PID (ppm)	Sampler Graphic	Symbo	USCS
30	60	45		0.1			
35	60	52		0.1			
				0.1			
40	60	47		0.2		SP	
				0.2			
45	60	48		0.2			
				6.9			
	60	50		3.4			
				1.5			

DESCRIPTION	NOTES
Same: Loose to medium dense, moist to dry, brown, fine to medium grained SAND (SP) Trace black banding (1 ft) Becomes moist, medium to coarse grained	Sample MW 16 27 for VOC at 1450
Trace black banding (6")	Sample MW 16 37 for VOC at 1455
Becomes wet, trace black banding (4") Becomes dark brown	Geoprobe sampling ended at 48 ft bgs due to sand blow in issues. Soil to 49 ft logged via auger cuttings.
Bottom of boring at 49 ft bgs	

URS (ENV/RO) LOG (EPA FORM 1) 21562850.15000 (ROXANA MW 2013) GPJ URSS LEV GD 2/6/13

Completion Depth: 49.0 Ft bgs
 Project No.: 21562850.15000
 Project Name: Roxana/WRR Well Drilling
 Drilling Contractor: Roberts Environmental Drilling Inc.
 Driller Name: P. Seymour
 Drilling Method: Direct Push/HSA
 Drill Rig Type: 8040 DT
 Logged by: R. Hart, W. Pennington
 County: Madison
 Site ID No.: 1191150002
 Federal ID No.: ILD 080 012 305

Water Depth: 41.5 ft., After ATD hrs.
 Water Depth: _____ ft., After _____ hrs.
 Water level at time of drilling
 Water level after drilling
 ATD At time of drilling
 NE None Encountered
 NA Not Applicable

Geoprobe
 Air Knife/Hand Auger Sampler
 Air Rotary
 Sonic
 Splitspoon Sampler
 Hollow Stem Auger
 Soil samples not collected



USC based on field visual observations

Monitoring Well Installation Details
Flush Mount Monitoring Well Construction Diagram



Project:	Roxana Monitoring Well Drilling and Installation			Well D:	MW-16
Project Location:	Roxana, Illinois	Date Started:	12/4/2012		
Well Location:	On East 5th St about 1/2-way between Chaffer Ave and the N-S alley	Date Completed:	12/5/2012	Boring ID:	MW-16
Drilling Contractor:	Roberts Environmental Drilling, Inc.	Time Seal Set:	0923	Northing:	792976.78
Driller:	P. Seymour	Type of Rig:	8040 DT	Easting:	2322031.87
Consulting Firm:	URS Corporation	Drilling Method:	HSA (4 25" ID)	Elevation Datum:	443.76
Geologist:	W. Pennington	Owner:	Equilon Enterprises LLC d/b/a Shell Oil Products US	Township, Range, Section	T5N, R9W, Section 34 (E-central portion of NE 1/4)

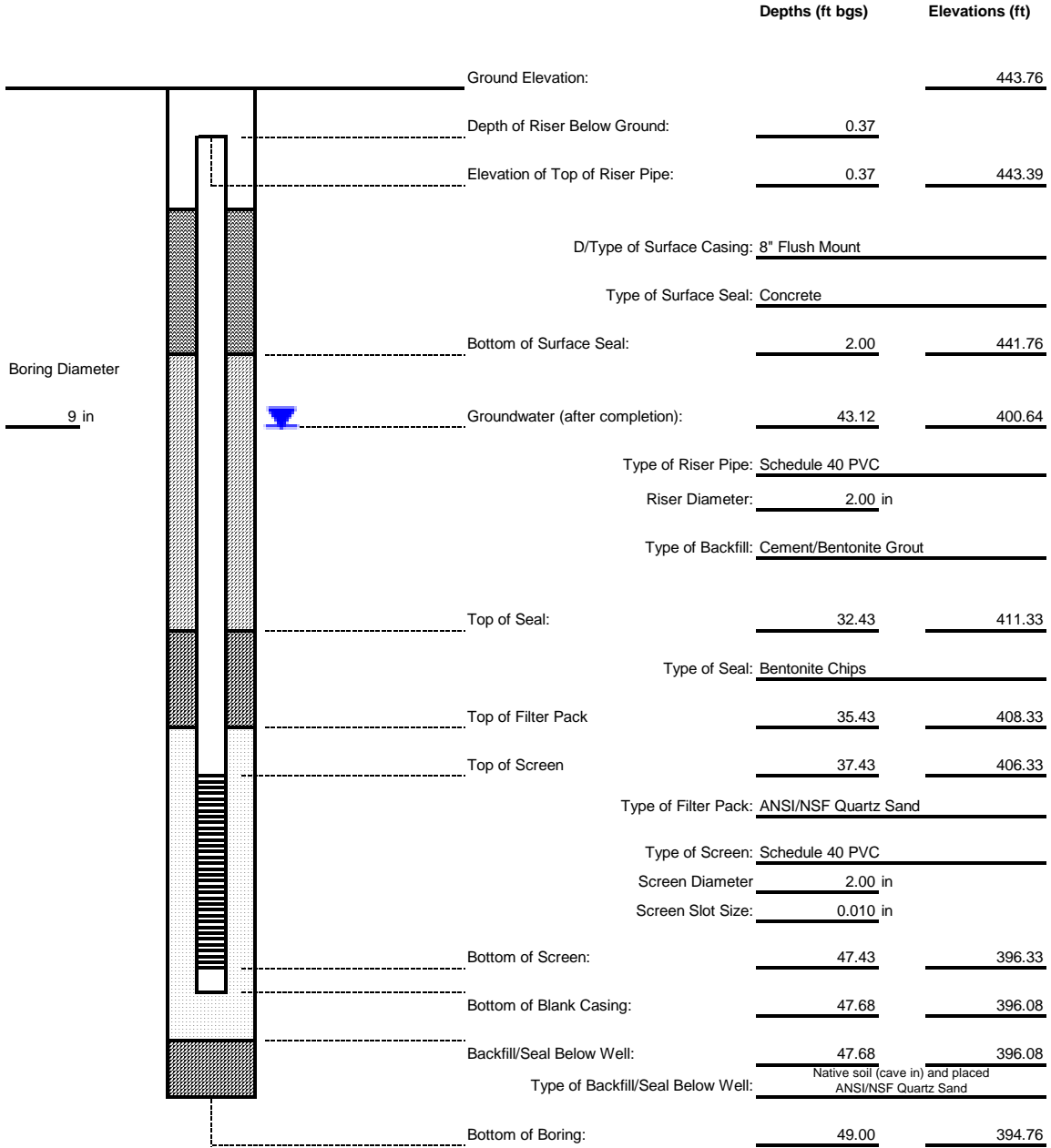


DIAGRAM IS NOT TO SCALE

LOG OF BORING MW-17

Start ng _____ Date: /26/ 2
 Comp et on _____ Date: /26/ 2
 Cas ng E evat on: 44 57
 Ground E evat on: 44 83

Quadrangle _____
 Sec:34 (NE /4 of NE /4)
 T:5N
 R:9W
 UTM (or State Plane) Coord
 N: (X):793347 04
 E: (Y):2322247 29

Depth In feet	Inches Dr ven	Inches Recovered	B ow Counts	PID (ppm)	Samp er Graph c	Symbo	USCS
5				0.2		ASPHALT	ASPHALT
				0.0		FILL	FILL
				0.0		SC	SC
				0.0		SP	SP
10				0.5		SP	SP
	36	32		0.6		SP	SP
15				0.6		SP	SP
	60	32		0.6		SP	SP
20				1.4		SP	SP
	60	32		4.1		SP	SP
				3.6		SP	SP
				3.1		SP	SP

DESCRIPTION	NOTES
Asphalt cover	Air knifed to 10' bgs to clear utilities.
Sandy FILL, trace clay and gravel (FILL)	
Loose, moist, brown, fine grained clayey SAND (SC)	
Clay grades out	
Loose, moist, brown, fine grained SAND (SP)	
Becomes fine to medium grained	
3" seam gray, with silt	Sample MW 17 14 for VOC at 1120
Becomes medium dense, fine grained	Sample MW 17 21 for VOC at 1100

URS (ENV/RON) LOG (EPA FORM 1) 21562850.15000 (ROXANA MW 2013) GPJ URSS LEV GD 2/6/13

Completion Depth: 50.0 Ft bgs
 Project No.: 21562850.15000
 Project Name: Roxana/WRR Well Drilling
 Drilling Contractor: Roberts Environmental Drilling Inc.
 Driller Name: P. Seymour
 Drilling Method: Direct Push/HSA
 Drill Rig Type: 8040 DT
 Logged by: M. Miller, W. Pennigton
 County: Madison
 Site ID No.: 1191150002
 Federal ID No.: ILD 080 012 305

Water Depth: 35 ft., After ATD hrs.
 Water Depth: _____ ft., After _____ hrs.
 Water level at time of drilling
 Water level after drilling
 ATD At time of drilling
 NE None Encountered
 NA Not Applicable

Geoprobe
 Air Knife/Hand Auger Sampler
 Air Rotary
 Sonic
 Splitspoon Sampler
 Hollow Stem Auger
 Soil samples not collected



USC based on field visual observations

LOG OF BORING MW-17

Depth In feet	Inches Driven	Inches Recovered	Blow Counts	PID (ppm)	Sampler Graphic	Symbol	USCS	Starting Date: /26/ 2 Completion Date: /26/ 2 Case Elev on: 44 57 Ground Elev on: 44 83	Quadrangle Sec: 34 (NE 1/4 of NE 1/4) T: 5N R: 9W UTM (or State Plane) Coord N: (X): 793347 04 E: (Y): 2322247 29
---------------	---------------	------------------	-------------	-----------	-----------------	--------	------	--	---

Depth In feet	Inches Driven	Inches Recovered	Blow Counts	PID (ppm)	Sampler Graphic	Symbol	USCS	DESCRIPTION	NOTES
30	60	41		1.6			SP	Same: Medium dense, moist, brown, fine grained SAND (SP)	
				1.8				Becomes loose, fine to medium grained	
35	60	48		2.0			SP	Becomes medium dense	
				6.0					
40	60	60		56.4			SP	Becomes wet, gray, fine grained, trace silt	Sample MW 17 35 for VOC at 1110
				153.4					
45	60	60		703.1			SP	Becomes brown, coarse grained, silt grades out	Geoprobe sampling ended at 43 ft bgs due to sand blow in issues. Soil to 50 ft logged via auger cuttings
				421.8					
								Bottom of boring at 50 ft bgs	

Completion Depth: 50.0 Ft bgs
 Project No.: 21562850.15000
 Project Name: Roxana/WRR Well Drilling
 Drilling Contractor: Roberts Environmental Drilling Inc.
 Driller Name: P. Seymour
 Drilling Method: Direct Push/HSA
 Drill Rig Type: 8040 DT
 Logged by: M. Miller, W. Pennigton
 County: Madison
 Site ID No.: 1191150002
 Federal ID No.: ILD 080 012 305

Water Depth: 35 ft., After ATD hrs.
 Water Depth: _____ ft., After _____ hrs.
 Water level at time of drilling
 Water level after drilling
 ATD At time of drilling
 NE None Encountered
 NA Not Applicable

Geoprobe
 Air Knife/Hand Auger Sampler
 Air Rotary
 Sonic
 Splitspoon Sampler
 Hollow Stem Auger
 Soil samples not collected



USC based on field visual observations

URS (ENV/RO) LOG (EPA FORM 1) 21562850.15000 (ROXANA MW 2013) GPJ URSS LEV GD 2/6/13

Monitoring Well Installation Details
Flush Mount Monitoring Well Construction Diagram



Project:	Roxana Monitoring Well Drilling and Installation			Well D:	MW-17
Project Location:	Roxana, Illinois	Date Started:	11/26/2012		
Well Location:	On Chaffer Ave just north of East 4th St	Date Completed:	11/26/2012	Boring ID:	MW-17
Drilling Contractor:	Roberts Environmental Drilling, Inc.	Time Seal Set:	1420	Northing:	793347.04
Driller:	P. Seymour	Type of Rig:	8040 DT	Easting:	2322247.29
Consulting Firm:	URS Corporation	Drilling Method:	HSA (4 25" ID)	Elevation Datum:	441.83
Geologist:	W. Pennington	Owner:	Equilon Enterprises LLC d/b/a Shell Oil Products US	Township, Range, Section	T5N, R9W, Section 34 (NE1/4 of NE 1/4)

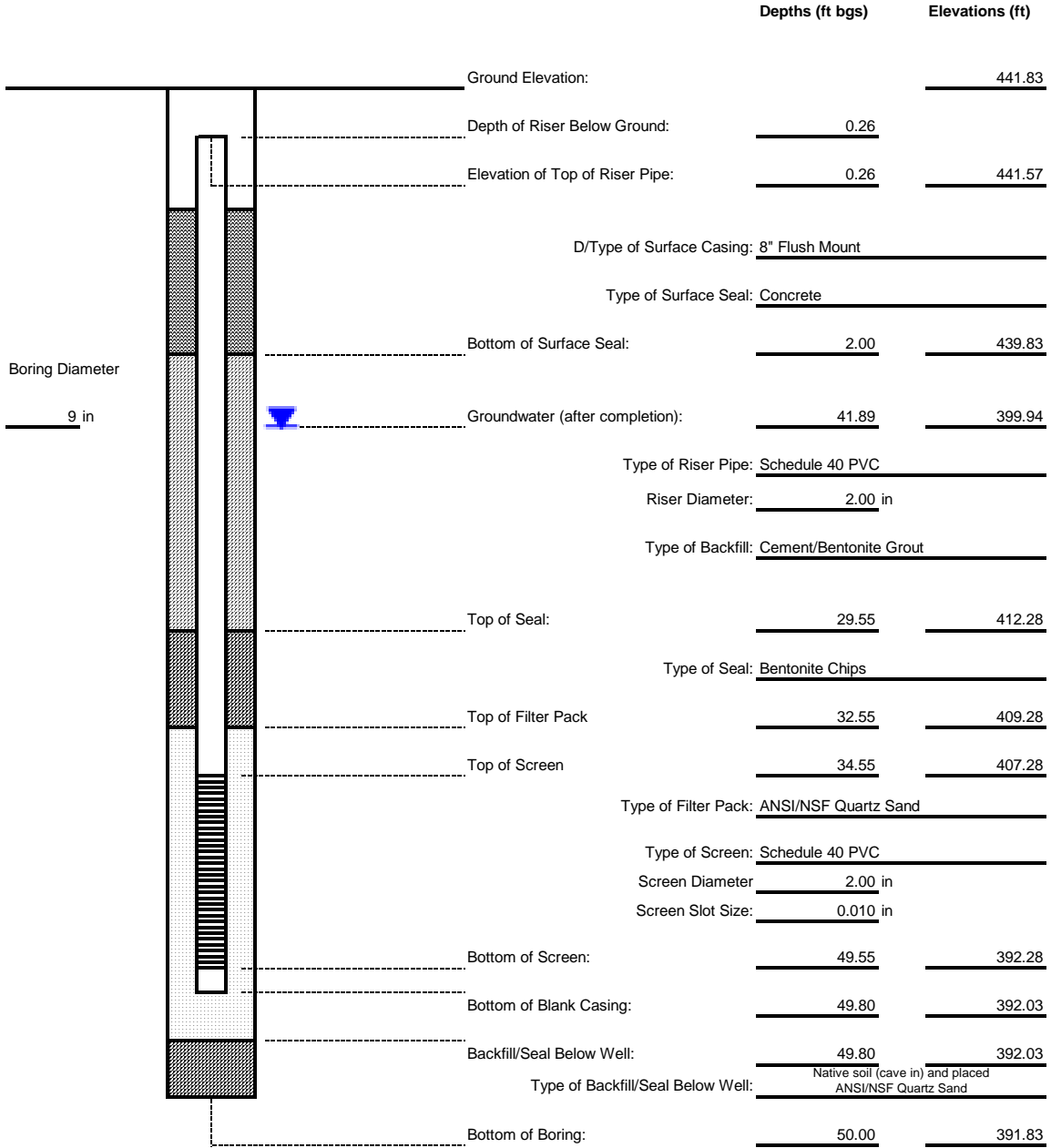


DIAGRAM IS NOT TO SCALE

**LOG OF BORING
MW-18**

Start ng Date: /28/ 2
 Comp et on Date: /29/ 2
 Cas ng E evat on: 442 04
 Ground E evat on: 442 37

Quadrangle
 Sec:34 (NE /4 of NE /4)
 T:5N
 R:9W
 UTM (or State Plane) Coord
 N: (X):793 6 68
 E: (Y):2322252 27

Depth In feet	Inches Dr ven	Inches Recovered	B ow Counts	PID (ppm)	Samp er Graph c	Symbo	USCS	DESCRIPTION		NOTES
							ASPHALT	Asphalt cover		Air knifed to 11' bgs to clear utilities.
				1.7			FILL	Dense, dry, dark brown, Sandy FILL, with clay and gravel (FILL)		
				0.0			CL	Medium stiff, moist, brown Sandy CLAY (CL)		
				0.0				Loose, moist, brown, fine grained SAND (SP)		Sample MW 18 12 for VOC at 1325
5				0.0						
				0.0						
				0.0						
				0.0						
				0.0						
				0.0						
				0.0						
				0.0						
				0.0						
	24	19		0.0			SP			Sample MW 18 18 for VOC at 1340
				0.0						
15	60	40		0.0						
				0.7				Becomes wet, gray		
				748.9						
20	60	45		39.1			CL	Medium stiff, moist, gray, low plastic, Silty CLAY (CL)		
				5.6			SP	Medium dense, moist, brown, medium to coarse grained sand (SP)		
				13.7						

Completion Depth: 52.0 Ft bgs
 Project No.: 21562850.15000
 Project Name: Roxana/WRR Well Drilling
 Drilling Contractor: Roberts Environmental Drilling Inc.
 Driller Name: P. Seymour
 Drilling Method: Direct Push/HSA
 Drill Rig Type: 8040 DT
 Logged by: M. Miller, W. Pennigton
 County: Madison
 Site ID No.: 1191150002
 Federal ID No.: ILD 080 012 305

Water Depth: 40 ft., After ATD hrs.
 Water Depth: _____ ft., After _____ hrs.
 Water level at time of drilling
 Water level after drilling
 ATD At time of drilling
 NE None Encountered
 NA Not Applicable

Geoprobe
 Air Knife/Hand Auger Sampler
 Air Rotary
 Sonic
 Splitspoon Sampler
 Hollow Stem Auger
 Soil samples not collected



USC based on field visual observations

URS (ENV/RO) LOG (EPA FORM 1) 21562850.15000 (ROXANA MW 2013) GPJ URSS LEV.GD 2/6/13

**LOG OF BORING
MW-18**

Start ng Date: /28/ 2
 Comp et on Date: /29/ 2
 Cas ng E evat on: 442 04
 Ground E evat on: 442 37

Quadrangle Sec:34 (NE /4 of NE /4)
 T:5N R:9W
 UTM (or State Plane) Coord
 N: (X):793 6 68
 E: (Y):2322252 27

Depth In feet	Inches Dr ven	Inches Recovered	B ow Counts	PID (ppm)	Samp er Graph c	Symbo	USCS
30	60	48		10.2			
				13.3			
	60	42		14.3			
				13.3			
35	60	46		12.8			
				14.8			SP
40	60	60		86.8			
				51.3			
				76.7			
45							

DESCRIPTION
 Same: Medium dense, moist, brown, medium to coarse grained sand (SP)

NOTES
 Sample MW 18 39 for VOC at 1345
 Becomes wet
 Geoprobe sampling ended at 43 ft bgs due to issue with sand blow in. Soil to 52 ft logged via auger cuttings.

URS (ENV/RO) LOG (EPA FORM 1) 21562850.15000 (ROXANA MW 2013) GPJ URSS LEV GD 2/6/13

Completion Depth: 52.0 Ft bgs
 Project No.: 21562850.15000
 Project Name: Roxana/WRR Well Drilling
 Drilling Contractor: Roberts Environmental Drilling Inc.
 Driller Name: P. Seymour
 Drilling Method: Direct Push/HSA
 Drill Rig Type: 8040 DT
 Logged by: M. Miller, W. Pennigton
 County: Madison
 Site ID No.: 1191150002
 Federal ID No.: ILD 080 012 305

Water Depth: 40 ft., After ATD hrs.
 Water Depth: _____ ft., After _____ hrs.

Water level at time of drilling
 Water level after drilling
 ATD At time of drilling
 NE None Encountered
 NA Not Applicable

Geoprobe
 Air Knife/Hand Auger Sampler
 Air Rotary
 Sonic
 Splitspoon Sampler
 Hollow Stem Auger
 Soil samples not collected



USC based on field visual observations

LOG OF BORING MW-18

Depth In feet	Inches Driven	Inches Recovered	Blow Counts	PID (ppm)	Sampler Graphic	Symbol	USCS
---------------	---------------	------------------	-------------	-----------	-----------------	--------	------

Start ng Date: /28/ 2
 Completion Date: /29/ 2
 Cas ng E evat on: 442 04
 Ground E evat on: 442 37

Quadrangle Sec:34 (NE /4 of NE /4)
 T:5N R:9W
 UTM (or State Plane) Coord
 N: (X):793 6 68
 E: (Y):2322252 27

Depth (ft)	Inches Driven	Inches Recovered	Blow Counts	PID (ppm)	Sampler Graphic	Symbol	USCS	DESCRIPTION	NOTES
55							SP	Same: Medium dense, wet, brown, medium to coarse grained sand (SP)	
60								Bottom of boring at 52 ft bgs	
65									
70									

URS (ENV/RO) LOG (EPA FORM 1) 21562850.15000 (ROXANA MW 2013) GPJ URSS LEV GD 2/6/13

Completion Depth: 52.0 Ft bgs
 Project No.: 21562850.15000
 Project Name: Roxana/WRR Well Drilling
 Drilling Contractor: Roberts Environmental Drilling Inc.
 Driller Name: P. Seymour
 Drilling Method: Direct Push/HSA
 Drill Rig Type: 8040 DT
 Logged by: M. Miller, W. Pennigton
 County: Madison
 Site ID No.: 1191150002
 Federal ID No.: ILD 080 012 305

Water Depth: 40 ft., After ATD hrs.
 Water Depth: _____ ft., After _____ hrs.
 Water level at time of drilling
 Water level after drilling
 ATD At time of drilling
 NE None Encountered
 NA Not Applicable

Geoprobe
 Air Knife/Hand Auger Sampler
 Air Rotary
 Sonic
 Splitspoon Sampler
 Hollow Stem Auger
 Soil samples not collected



USC based on field visual observations

Monitoring Well Installation Details
Flush Mount Monitoring Well Construction Diagram



Project:	Roxana Monitoring Well Drilling and Installation			Well D:	MW-18
Project Location:	Roxana, Illinois	Date Started:	11/28/2012		
Well Location:	On Chaffer Ave just north of alley between East 4th and East 5th Sts	Date Completed:	11/29/2012	Boring ID:	MW-18
Drilling Contractor:	Roberts Environmental Drilling, Inc.	Time Seal Set:	1005	Northing:	793161.68
Driller:	P. Seymour	Type of Rig:	8040 DT	Easting:	2322252.27
Consulting Firm:	URS Corporation	Drilling Method:	HSA (4 25" ID)	Elevation Datum:	442.37
Geologist:	W. Pennington	Owner:	Equilon Enterprises LLC d/b/a Shell Oil Products US	Township, Range, Section	T5N, R9W, Section 34 (NE1/4 of NE 1/4)

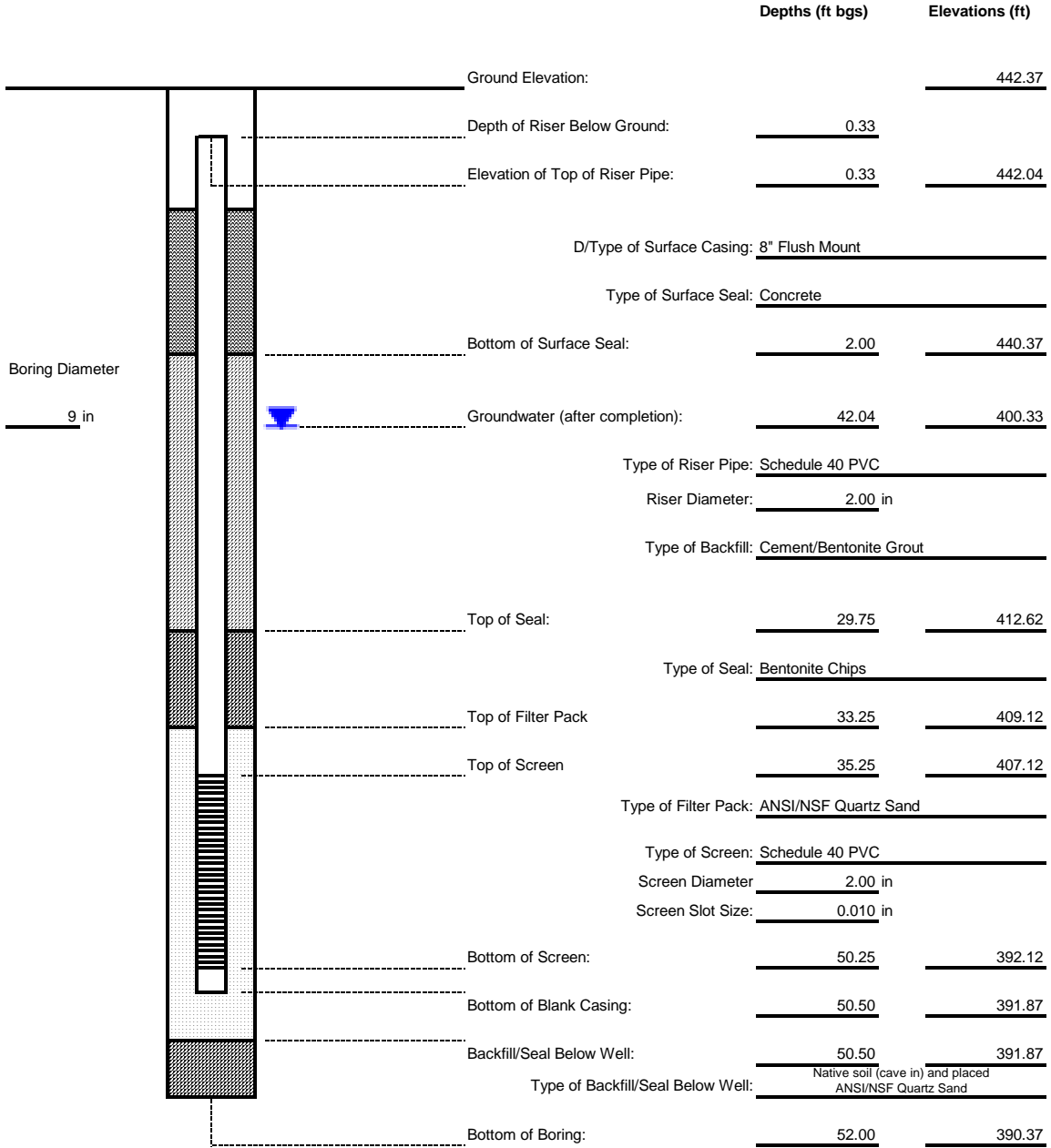


DIAGRAM IS NOT TO SCALE

**LOG OF BORING
MW-19**

Start ng Date: 2/3/ 2
 Comp et on Date: 2/4/ 2
 Cas ng E evat on: 442 77
 Ground E evat on: 443 3

Quadrangle Sec:34 (E - center of NE /4)
 T:5N
 R:9W
 UTM (or State Plane) Coord
 N: (X):793022 82
 E: (Y):2322256 05

Depth In feet	Inches Dr ven	Inches Recovered	B ow Counts	PID (ppm)	Samp er Graph c	Symbo	USCS
0.0						ASPHALT	ASPHALT
0.0						FILL	FILL
0.0						SC	SC
0.0						CL	CL
5							
10							
12.6							
285							
1301							
15							
567.9	36	36					
1471							
715.4	60	48					
1017							
20							
349.4	60	60					
22.3							
32.7							
34.5							

DESCRIPTION	NOTES
Asphalt cover	Air knifed to 10' bgs to clear utilities.
Dense, dry, dark brown, Sandy FILL, trace clay and gravel (FILL)	
Loose, moist, dark brown, fine grained clayey SAND (SC)	
Soft, moist, dark brown, low plasticity, Sandy CLAY (CL)	
Becomes gray with black	Hydrocarbon odor
Loose, moist to dry, gary, fine grained SAND (SP)	
Becomes light gray	
Becomes loose to medium dense, gray and light brown	Sample MW 19 13 for VOCs at 1320
Soft, moist to wet, brown SILT (ML), with fine sand	
Becomes wet	Sample MW 19 20 for VOCs at 1325
Soft, moist, gray, low plastic CLAY (CL), with silt	
Loose, moist, brown, medium grained SAND (SP)	

Completion Depth: 53.0 Ft bgs
 Project No.: 21562850.15000
 Project Name: Roxana/WRR Well Drilling
 Drilling Contractor: Roberts Environmental Drilling Inc.
 Driller Name: P. Seymour
 Drilling Method: Direct Push/HSA
 Drill Rig Type: 8040 DT
 Logged by: M. Miller, W. Pennington
 County: Madison
 Site ID No.: 1191150002
 Federal ID No.: ILD 080 012 305

Water Depth: 42 ft., After ATD hrs.
 Water Depth: _____ ft., After _____ hrs.

Water level at time of drilling
 Water level after drilling
 ATD At time of drilling
 NE None Encountered
 NA Not Applicable

Geoprobe
 Air Knife/Hand Auger Sampler
 Air Rotary
 Sonic
 Splitspoon Sampler
 Hollow Stem Auger
 Soil samples not collected



USC based on field visual observations

LOG OF BORING MW-19

Starting Date: 2/3/ 2 Completion Date: 2/4/ 2 Casing Elevation: 442.77 Ground Elevation: 443.3	Quadrangle Sec: 34 (E - center of NE 1/4) T: 5N R: 9W UTM (or State Plane) Coord N: (X): 793022.82 E: (Y): 2322256.05
---	--

Depth In feet	Inches Driven	Inches Recovered	Blow Counts	PID (ppm)	Sampler Graphic	Symbol	USCS
30	60	48		11.3	◆	●	
				144.8	◆	●	
	60	60		208.4	◆	●	
				377.0	◆	●	
35	60	48		172.8	◆	●	
				4.3	◆	●	SP
40	60	48		15.6	◆	●	
				4.3	◆	●	
45				885.4	◆	●	
				938.6	◆	●	
				715.8	◆	●	
				769.1	◆	●	

DESCRIPTION	NOTES
Same: Loose, moist, brown, medium grained SAND (SP)	
Becomes medium dense	
2" silty clay seam	
3" silty clay seam	Sample MW 19 32 for VOCs at 1335
Becomes wet	▽
	Geoprobe sampling ended at 43 ft bgs due to sand blow in issues. Soil to 53 ft bgs logged via auger cuttings

URS (ENV/RO) LOG (EPA FORM 1) 21562850.15000 (ROXANA MW 2013) GPJ URSS LEV.GD 2/6/13

Completion Depth: 53.0 Ft bgs
 Project No.: 21562850.15000
 Project Name: Roxana/WRR Well Drilling
 Drilling Contractor: Roberts Environmental Drilling Inc.
 Driller Name: P. Seymour
 Drilling Method: Direct Push/HSA
 Drill Rig Type: 8040 DT
 Logged by: M. Miller, W. Pennington
 County: Madison
 Site ID No.: 1191150002
 Federal ID No.: ILD 080 012 305

Water Depth: 42 ft., After ATD hrs.
 Water Depth: _____ ft., After _____ hrs.
 Water level at time of drilling
 Water level after drilling
 ATD At time of drilling
 NE None Encountered
 NA Not Applicable

Geoprobe
 Air Knife/Hand Auger Sampler
 Air Rotary
 Sonic
 Splitspoon Sampler
 Hollow Stem Auger
 Soil samples not collected



USC based on field visual observations

LOG OF BORING MW-19

Starting Date: 2/3/ 2 Completion Date: 2/4/ 2 Cas ng E evat on: 442 77 Ground E evat on: 443 3	Quadrangle Sec:34 (E - center of NE /4) T:5N R:9W UTM (or State Plane) Coord N: (X):793022 82 E: (Y):2322256 05
---	--

Depth In feet	Inches Dr ven	Inches Recovered	B ow Counts	PID (ppm)	Samp er Graph c	Symbo	USCS	DESCRIPTION	NOTES
55				1177			SP	Same: Medium dense, wet, brown, medium grained SAND (SP)	
60				1159				Bottom of boring at 53 ft bgs	
65									
70									

Completion Depth: 53.0 Ft bgs
 Project No.: 21562850.15000
 Project Name: Roxana/WRR Well Drilling
 Drilling Contractor: Roberts Environmental Drilling Inc.
 Driller Name: P. Seymour
 Drilling Method: Direct Push/HSA
 Drill Rig Type: 8040 DT
 Logged by: M. Miller, W. Pennington
 County: Madison
 Site ID No.: 1191150002
 Federal ID No.: ILD 080 012 305

Water Depth: 42 ft., After ATD hrs.
 Water Depth: _____ ft., After _____ hrs.
 Water level at time of drilling
 Water level after drilling
 ATD At time of drilling
 NE None Encountered
 NA Not Applicable

- Geoprobe
- Air Knife/Hand Auger Sampler
- Air Rotary
- Sonic
- Splitspoon Sampler
- Hollow Stem Auger
- Soil samples not collected



USC based on field visual observations

Monitoring Well Installation Details
Flush Mount Monitoring Well Construction Diagram



Project:	Roxana Monitoring Well Drilling and Installation			Well D:	MW-19
Project Location:	Roxana, Illinois	Date Started:	12/3/2012		
Well Location:	On Chaffer Ave just north of East 5th St	Date Completed:	12/4/2012	Boring ID:	MW-19
Drilling Contractor:	Roberts Environmental Drilling, Inc.	Time Seal Set:	0930	Northing:	793022.82
Driller:	P. Seymour	Type of Rig:	8040 DT	Easting:	2322256.05
Consulting Firm:	URS Corporation	Drilling Method:	HSA (4 25" ID)	Elevation Datum:	443.13
Geologist:	W. Pennington	Owner:	Equilon Enterprises LLC d/b/a Shell Oil Products US	Township, Range, Section	T5N, R9W, Section 34 (E-central portion of NE 1/4)

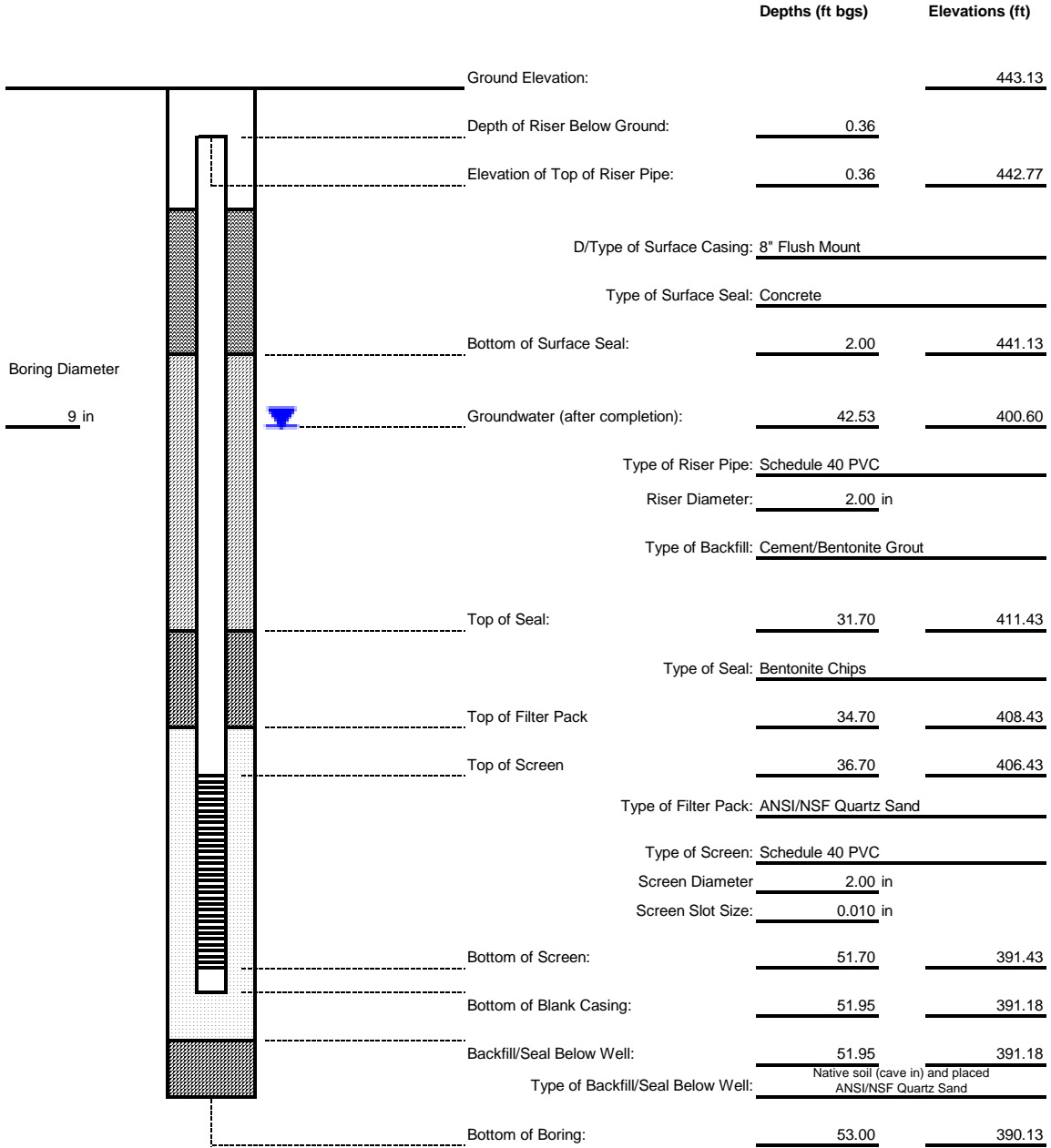


DIAGRAM IS NOT TO SCALE

LOG OF BORING MW-20

Starting Date: 2/5/ 2
 Completion Date: 2/6/ 2
 Cas ng E evat on: 443 67
 Ground E evat on: 444 02

Quadrangle Sec:34 (SE /4 - of NE /4)
 T:5N R:9W
 UTM (or State Plane) Coord
 N: (X):792820 76
 E: (Y):232226 0

Depth In feet	Inches Dr ven	Inches Recovered	B ow Counts	PID (ppm)	Samp er Graph c	Symbo	USCS
0.0							ASPHALT
0.0							FILL
0.0							SP
5.0							SP
10.0	36	30		0.0			CL
15.0	60	40		0.0			SP
20.0	60	50		260.1			CL
				5.8			CL
				3.2			CL

DESCRIPTION	NOTES
Asphalt cover	Air knifed to 10' bgs to clear utilities.
Loose, brown, moist, clayey Sand FILL, trace gravel (FILL)	
Gravel grades out	
Loose, dry to moist, reddish brown, fine grained SAND (SP), trace clay	
Clay grades out	
Becomes light brown, dry	
Becomes brown	Sampled MW 20 11 for VOC at 1325
Soft to medium dense, moist to dry, brown and gray, Silty CLAY (CL)	
Loose, moist, brown, fine to medium grained SAND (SP)	
Becomes gray, wet	Sampled MW 20 21 for VOC at 1335
Soft, moist to wet, light brown to gray, low plastic CLAY (CL), trace sand	

URS (ENV/RO) LOG (EPA FORM 1) 21562850.15000 (ROXANA MW 2013) GPJ URSS LEV GD 2/6/13

Completion Depth: 53.0 Ft bgs
 Project No.: 21562850.15000
 Project Name: Roxana/WRR Well Drilling
 Drilling Contractor: Roberts Environmental Drilling Inc.
 Driller Name: P. Seymour
 Drilling Method: Direct Push/HSA
 Drill Rig Type: 8040 DT
 Logged by: M. Miller, W. Pennigton
 County: Madison
 Site ID No.: 1191150002
 Federal ID No.: ILD 080 012 305

Water Depth: 42 ft., After ATD hrs.
 Water Depth: _____ ft., After _____ hrs.
 Water level at time of drilling
 Water level after drilling
 ATD At time of drilling
 NE None Encountered
 NA Not Applicable

Geoprobe
 Air Knife/Hand Auger Sampler
 Air Rotary
 Sonic
 Splitspoon Sampler
 Hollow Stem Auger
 Soil samples not collected



USC based on field visual observations

LOG OF BORING MW-20

Start ng Date: 2/5/ 2
 Comp et on Date: 2/6/ 2
 Cas ng E evat on: 443 67
 Ground E evat on: 444 02

Quadrangle Sec:34 (SE /4 - of NE /4)
 T:5N R:9W
 UTM (or State Plane) Coord
 N: (X):792820 76
 E: (Y):232226 0

Depth In feet	Inches Dr ven	Inches Recovered	B ow Counts	PID (ppm)	Samp er Graph c	Symbo	USCS
	60	46		2.3			SP
				3.3			CL
30	60	60		0.5			
				0.3			
				0.2			
35	60	48		0.2			
				0.2			
				0.2			
40	60	48		0.2			SP
				29.1			
				67.4			
45	60	54		400.5			
				67.5			

DESCRIPTION	NOTES
Loose, moist, brown, medium grained SAND (SP)	
Medium stiff, moist, brown, low plastic CLAY (CL)	
Loose to medium dense, moist, brown, medium to coarse grained SAND (SP)	
<p style="text-align: center;">Becomes wet</p> <p style="text-align: center;">▽</p>	<p style="text-align: center;">Sampled MW 20 41 for VOC at 1340</p> <p style="text-align: center;">▽</p>
	<p>Geoprobe sampling ended at 48 ft bgs due to sand blow in issues. Soil to 53 ft bgs logged via auger cuttings.</p>

URS (ENV/RO) LOG (EPA FORM 1) 21562850.15000 (ROXANA MW 2013) GPJ URSS LEV GD 2/6/13

Completion Depth: 53.0 Ft bgs
 Project No.: 21562850.15000
 Project Name: Roxana/WRR Well Drilling
 Drilling Contractor: Roberts Environmental Drilling Inc.
 Driller Name: P. Seymour
 Drilling Method: Direct Push/HSA
 Drill Rig Type: 8040 DT
 Logged by: M. Miller, W. Pennigton
 County: Madison
 Site ID No.: 1191150002
 Federal ID No.: ILD 080 012 305

Water Depth: 42 ft., After ATD hrs.
 Water Depth: _____ ft., After _____ hrs.

Water level at time of drilling
 Water level after drilling
 ATD At time of drilling
 NE None Encountered
 NA Not Applicable

Geoprobe
 Air Knife/Hand Auger Sampler
 Air Rotary
 Sonic
 Splitspoon Sampler
 Hollow Stem Auger
 Soil samples not collected



USC based on field visual observations

LOG OF BORING MW-20

Start ng Date: 2/5/ 2 Comp et on Date: 2/6/ 2 Cas ng E evat on: 443 67 Ground E evat on: 444 02	Quadrangle Sec:34 (SE /4 - of NE /4) T:5N R:9W UTM (or State Plane) Coord N: (X):792820 76 E: (Y):232226 0
--	--

Depth In feet	Inches Dr ven	Inches Recovered	B ow Counts	PID (ppm)	Samp er Graph c	Symbo	USCS	DESCRIPTION	NOTES
55				70.1		[Symbol: Dotted pattern]	SP	Same: Loose to medium dense, wet, brown, medium to coarse grained SAND (SP)	
60				89.8				Bottom of boring at 53 ft bgs	
65									
70									

Completion Depth: 53.0 Ft bgs
 Project No.: 21562850.15000
 Project Name: Roxana/WRR Well Drilling
 Drilling Contractor: Roberts Environmental Drilling Inc.
 Driller Name: P. Seymour
 Drilling Method: Direct Push/HSA
 Drill Rig Type: 8040 DT
 Logged by: M. Miller, W. Pennigton
 County: Madison
 Site ID No.: 1191150002
 Federal ID No.: ILD 080 012 305

Water Depth: 42 ft., After ATD hrs.
 Water Depth: _____ ft., After _____ hrs.
 Water level at time of drilling
 Water level after drilling
 ATD At time of drilling
 NE None Encountered
 NA Not Applicable

Geoprobe
 Air Knife/Hand Auger Sampler
 Air Rotary
 Sonic
 Splitspoon Sampler
 Hollow Stem Auger
 Soil samples not collected



USC based on field visual observations

Monitoring Well Installation Details
Flush Mount Monitoring Well Construction Diagram



Project:	Roxana Monitoring Well Drilling and Installation			Well D:	MW-20
Project Location:	Roxana, Illinois	Date Started:	12/5/2012		
Well Location:	On Chaffer Ave just south of alley between East 5th and East 6th Sts.	Date Completed:	12/6/2012	Boring ID:	MW-20
Drilling Contractor:	Roberts Environmental Drilling, Inc.	Time Seal Set:	1510	Northing:	792820.76
Driller:	P. Seymour	Type of Rig:	8040 DT	Easting:	2322261.01
Consulting Firm:	URS Corporation	Drilling Method:	HSA (4 25" ID)	Elevation Datum:	444.02
Geologist:	W. Pennington	Owner:	Equilon Enterprises LLC d/b/a Shell Oil Products US	Township, Range, Section	T5N, R9W, Section 34 (SE 1/4 of NE 1/4)

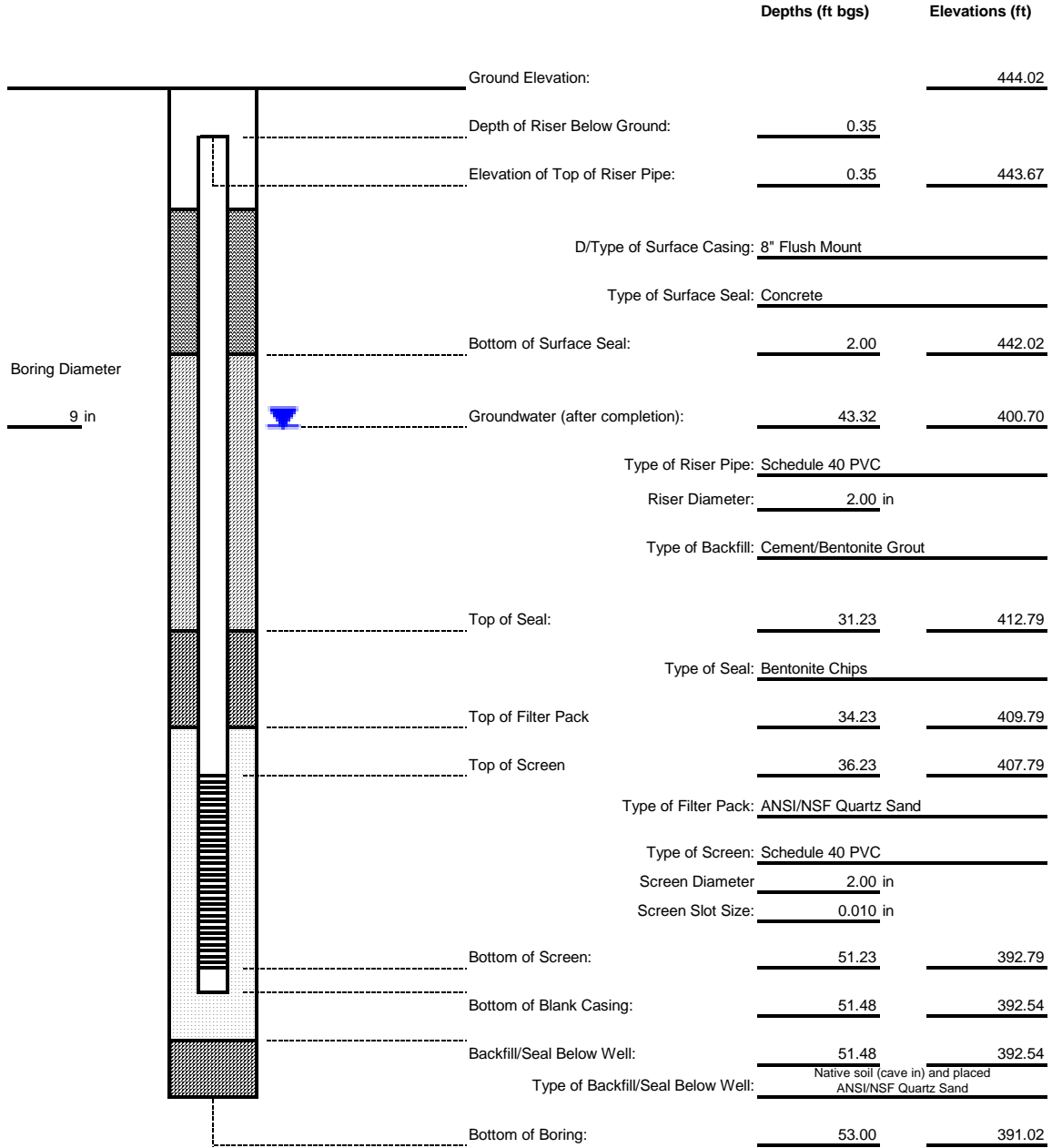


DIAGRAM IS NOT TO SCALE

**LOG OF BORING
MW-21**

Start ng Date: 2/6/ 2
 Comp et on Date: 2/7/ 2
 Cas ng E evat on: 443 8
 Ground E evat on: 444 0

Quadrangle Sec:34 (SE /4 - of NE /4)
 T:5N R:9W
 UTM (or State Plane) Coord
 N: (X):792288 33
 E: (Y):2322275 06

Depth In feet	Inches Dr ven	Inches Recovered	B ow Counts	PID (ppm)	Samp er Graph c	Symbo	USCS
0							ASPHALT
5							ML
							CL
							SC
10	36	30		0.2			SP
15	60	36		0.2			
				43.5			
				49.0			
20	60	40		63.4			
				15.7			
				11.8			

DESCRIPTION	NOTES
Asphalt cover	Air knifed to 10' bgs to clear utilities.
Moist, reddish brown, Clayey SILT (ML)	
Stiff, moist, reddish brown, Silty CLAY (CL)	
Moist, reddish brown, fine grained Clayey SAND (SC), trace silt	
Loose, moist, brown, fine to medium grained SAND (SP)	
Becomes moist to wet	Sample MW 21 21 for VOCs at 1155
1" gray and black low plastic clay seam Becomes moist	
Trace black banding (2")	

URS (ENV/RON) LOG (EPA FORM 1) 21562850.15000 (ROXANA MW 2013) GPJ URSS LEV GD 2/6/13

Completion Depth: 52.0 Ft bgs
 Project No.: 21562850.15000
 Project Name: Roxana/WRR Well Drilling
 Drilling Contractor: Roberts Environmental Drilling Inc.
 Driller Name: P. Seymour
 Drilling Method: Direct Push/HSA
 Drill Rig Type: 8040 DT
 Logged by: E. Arthur, W. Pennington
 County: Madison
 Site ID No.: 1191150002
 Federal ID No.: ILD 080 012 305

Water Depth: 41 ft., After ATD hrs.
 Water Depth: _____ ft., After _____ hrs.

Water level at time of drilling
 Water level after drilling
 ATD At time of drilling
 NE None Encountered
 NA Not Applicable

Geoprobe
 Air Knife/Hand Auger Sampler
 Air Rotary
 Sonic
 Splitspoon Sampler
 Hollow Stem Auger
 Soil samples not collected

URS
 USC based on field visual observations

**LOG OF BORING
MW-21**

Starting Date: 2/6/2012
 Completion Date: 2/7/2012
 Casings Elevations: 443.8
 Ground Elevation: 444.0
 Quadrangle: Sec:34 (SE 1/4 - of NE 1/4)
 T:5N R:9W
 UTM (or State Plane) Coord
 N: (X):792288.33
 E: (Y):2322275.06

Depth In feet	Inches Driven	Inches Recovered	Blow Counts	PID (ppm)	Sampler Graphic	Symbol	USCS
30	60	44		182.3			SP
	60	48		282.3			
35	60	50		397.1			SP
	60	50		14.0			
40	60	50		30.1			SP
	60	50		4.7			
45	60	52		1.4			SP
	60	52		69.4			
				224.2			
				511.5			
				3681			
				1779			

DESCRIPTION	NOTES
Same: Loose, moist, brown, fine to medium grained SAND (SP)	
Trace black banding (3") 2" brown and gray low plastic clay seam	Sample MW 21 31 for VOCs at 1200
Trace black banding (2")	
Becomes wet, gray	▽ Sample MW 21 41 for VOCs at 1205
	Geoprobe sampling ended at 48 ft bgs due to rods getting locked up. Soil to 52 ft bgs logged via auger cuttings.

URS (ENV/RO) LOG (EPA FORM 1) 21562850.15000 (ROXANA MW 2013) GPJ URSS LEV GD 2/6/13

Completion Depth: 52.0 Ft bgs
 Project No.: 21562850.15000
 Project Name: Roxana/WRR Well Drilling
 Drilling Contractor: Roberts Environmental Drilling Inc.
 Driller Name: P. Seymour
 Drilling Method: Direct Push/HSA
 Drill Rig Type: 8040 DT
 Logged by: E. Arthur, W. Pennington
 County: Madison
 Site ID No.: 1191150002
 Federal ID No.: ILD 080 012 305

Water Depth: 41 ft., After ATD hrs.
 Water Depth: _____ ft., After _____ hrs.
 Water level at time of drilling
 Water level after drilling
 ATD At time of drilling
 NE None Encountered
 NA Not Applicable

Geoprobe
 Air Knife/Hand Auger Sampler
 Air Rotary
 Sonic
 Splitspoon Sampler
 Hollow Stem Auger
 Soil samples not collected

URS
 USC based on field visual observations

**LOG OF BORING
MW-21**

Depth In feet	Inches Driven	Inches Recovered	Blow Counts	PID (ppm)	Sampler Graphic	Symbol	USCS	LOG OF BORING MW-21	
								DESCRIPTION	NOTES
				1757			SP	Start ng Date: 2/6/ 2 Completion Date: 2/7/ 2 Cas ng E evat on: 443 8 Ground E evat on: 444 0	Quadrangle Sec:34 (SE /4 - of NE /4) T:5N R:9W UTM (or State Plane) Coord N: (X):792288 33 E: (Y):2322275 06
55								Same: Loose, wet, gray, fine to medium grained SAND (SP)	
60								Bottom of boring at 52 ft bgs	
65									
70									

URS (ENV/RO) LOG (EPA FORM 1) 21562850.15000 (ROXANA MW 2013) GPJ URSS LEV GD 2/6/13

Completion Depth: 52.0 Ft bgs
 Project No.: 21562850.15000
 Project Name: Roxana/WRR Well Drilling
 Drilling Contractor: Roberts Environmental Drilling Inc.
 Driller Name: P. Seymour
 Drilling Method: Direct Push/HSA
 Drill Rig Type: 8040 DT
 Logged by: E. Arthur, W. Pennington
 County: Madison
 Site ID No.: 1191150002
 Federal ID No.: ILD 080 012 305

Water Depth: 41 ft., After ATD hrs.
 Water Depth: _____ ft., After _____ hrs.
 Water level at time of drilling
 Water level after drilling
 ATD At time of drilling
 NE None Encountered
 NA Not Applicable

Geoprobe
 Air Knife/Hand Auger Sampler
 Air Rotary
 Sonic
 Splitspoon Sampler
 Hollow Stem Auger
 Soil samples not collected



USC based on field visual observations

Monitoring Well Installation Details
Flush Mount Monitoring Well Construction Diagram



Project:	Roxana Monitoring Well Drilling and Installation			Well D:	MW-21
Project Location:	Roxana, Illinois	Date Started:	12/6/2012		
Well Location:	On Chaffer Ave between East 7th St and the alley to the south	Date Completed:	12/7/2012	Boring ID:	MW-21
Drilling Contractor:	Roberts Environmental Drilling, Inc.	Time Seal Set:	1500	Northing:	792288.33
Driller:	P. Seymour	Type of Rig:	8040 DT	Easting:	2322275.06
Consulting Firm:	URS Corporation	Drilling Method:	HSA (4 25" ID)	Elevation Datum:	444.10
Geologist:	W. Pennington	Owner:	Equilon Enterprises LLC d/b/a Shell Oil Products US	Township, Range, Section	T5N, R9W, Section 34 (SE 1/4 of NE 1/4)

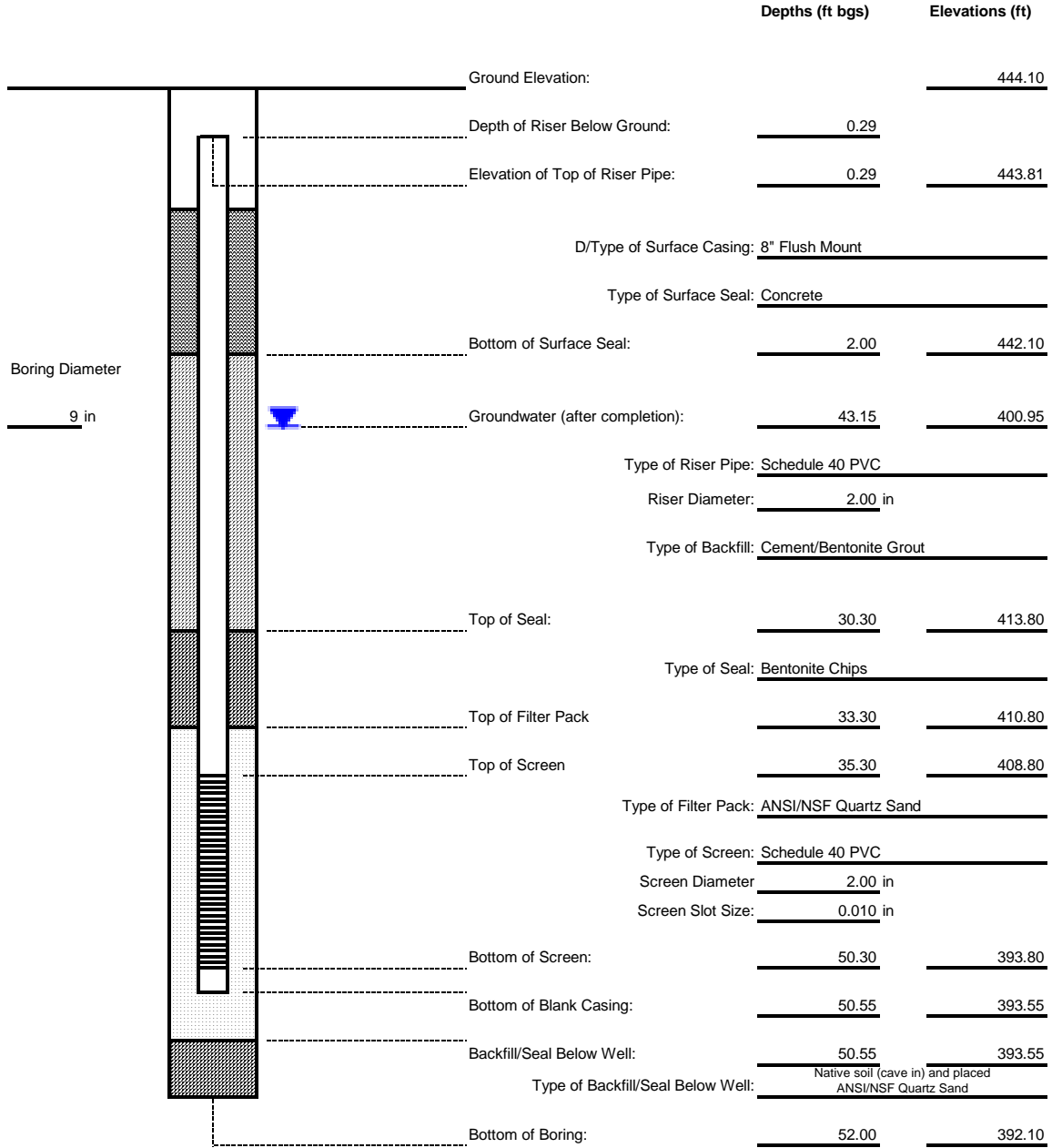


DIAGRAM IS NOT TO SCALE

LOG OF BORING MW-22

Start ng Date: /29/ 2 Comp et on Date: /30/ 2 Cas ng E evat on: 442 6 Ground E evat on: 442 49	Quadrangle Sec:34 (NE /4 - of NE /4) T:5N R:9W UTM (or State Plane) Coord N: (X):79328 59 E: (Y):232 996 63
---	---

DESCRIPTION

NOTES

Depth In feet	Inches Dr ven	Inches Recovered	B ow Counts	PID (ppm)	Samp er Graph c	Symbo	USCS	DESCRIPTION	NOTES
							ASPHALT	Asphalt cover	Air knifed to 10' bgs to clear utilities.
						FILL	Gravel and dry, dark brown, Silty CLAY (FILL)		
						CL	Loose, moist, reddish brown, Silty CLAY (CL)		
5						SP	Loose, moist, reddish brown, fine grained SAND (SP) Becomes brown, fine to medium grained		
	36	36		0.0					Sampled MW 22 12 for VOCs at 1345
				0.1					
15	60	46		0.5			SM	Loose, wet, brown and gray, fine grained Silty SAND (SM)	
				93.3					
20	60	48		2.7			SP	Loose, dry, light brown, fine to medium grained SAND (SP) Becomes moist Becomes gray, fine grained Becomes fine to medium grained Becomes wet	Sampled MW 22 23 for VOCs at 1440
				101.8					
				1147					
				753.8					

Completion Depth: 50.0 Ft bgs
 Project No.: 21562850.15000
 Project Name: Roxana/WRR Well Drilling
 Drilling Contractor: Roberts Environmental Drilling Inc.
 Driller Name: P. Seymour
 Drilling Method: Direct Push/HSA
 Drill Rig Type: 8040 DT
 Logged by: E. Arthur, W. Pennington
 County: Madison
 Site ID No.: 1191150002
 Federal ID No.: ILD 080 012 305

Water Depth: 41.25 ft., After ATD hrs.
 Water Depth: _____ ft., After _____ hrs.
 Water level at time of drilling
 Water level after drilling
 ATD At time of drilling
 NE None Encountered
 NA Not Applicable

- Geoprobe
- Air Knife/Hand Auger Sampler
- Air Rotary
- Sonic
- Splitspoon Sampler
- Hollow Stem Auger
- Soil samples not collected



USC based on field visual observations

URS (ENV/RO) LOG (EPA FORM 1) 21562850.15000 (ROXANA MW 2013) GPJ URSS LEV GD 2/6/13

LOG OF BORING MW-22

Start ng Date: /29/ 2 Comp et on Date: /30/ 2 Cas ng E evat on: 442 6 Ground E evat on: 442 49	Quadrangle Sec:34 (NE /4 - of NE /4) T:5N R:9W UTM (or State Plane) Coord N: (X):79328 59 E: (Y):232 996 63
---	---

Depth In feet	Inches Dr ven	Inches Recovered	B ow Counts	PID (ppm)	Samp er Graph c	Symbo	USCS
30	60	60		448.9			SP
				795.1			SM
35	60	60		583.7			SP
				534.6			
40	60	50		463.8			SP
				943.2			
45				821.9			SP
				45.0			
				207.9			

DESCRIPTION	NOTES
Same: Loose, wet, gray, fine to medium grained SAND (SP)	
Dense, wet, light brown, fine grained, Silty SAND (SM)	
Medium dense, dry, brown, fine to medium grained SAND (SP)	
Becomes gray brown	
Becomes medium grained	
Becomes brown	Sampled MW 22 39 for VOCs at 1450
Becomes wet	▽
Bottom of boring at 50 ft bgs	Geoprobe sampling ended at 43 ft bgs due to blow in issues with the sand. Soil to 50 ft bgs logged via auger cuttings.

URS (ENV/RON) LOG (EPA FORM 1) 21562850.15000 (ROXANA MW 2013) GPJ URSS LEV GD 2/6/13

Completion Depth: 50.0 Ft bgs
 Project No.: 21562850.15000
 Project Name: Roxana/WRR Well Drilling
 Drilling Contractor: Roberts Environmental Drilling Inc.
 Driller Name: P. Seymour
 Drilling Method: Direct Push/HSA
 Drill Rig Type: 8040 DT
 Logged by: E. Arthur, W. Pennington
 County: Madison
 Site ID No.: 1191150002
 Federal ID No.: ILD 080 012 305

Water Depth: 41.25 ft., After ATD hrs.
 Water Depth: _____ ft., After _____ hrs.
 ▽ Water level at time of drilling
 ▼ Water level after drilling
 ATD At time of drilling
 NE None Encountered
 NA Not Applicable

Geoprobe
 Air Knife/Hand Auger Sampler
 Air Rotary
 Sonic
 Splitspoon Sampler
 Hollow Stem Auger
 Soil samples not collected



USC based on field visual observations

Monitoring Well Installation Details
Flush Mount Monitoring Well Construction Diagram



Project:	Roxana Monitoring Well Drilling and Installation			Well D:	MW-22
Project Location:	Roxana, Illinois	Date Started:	11/29/2012		
Well Location:	On East 4th St about 1/2-way between Chaffer Ave and the N-S alley	Date Completed:	11/30/2012	Boring ID:	MW-22
Drilling Contractor:	Roberts Environmental Drilling, Inc.	Time Seal Set:	1200	Northing:	793281.59
Driller:	P. Seymour	Type of Rig:	8040 DT	Easting:	2321996.63
Consulting Firm:	URS Corporation	Drilling Method:	HSA (4 25" ID)	Elevation Datum:	442.49
Geologist:	W. Pennington	Owner:	Equilon Enterprises LLC d/b/a Shell Oil Products US	Township, Range, Section	T5N, R9W, Section 34 (NE 1/4 of NE 1/4)

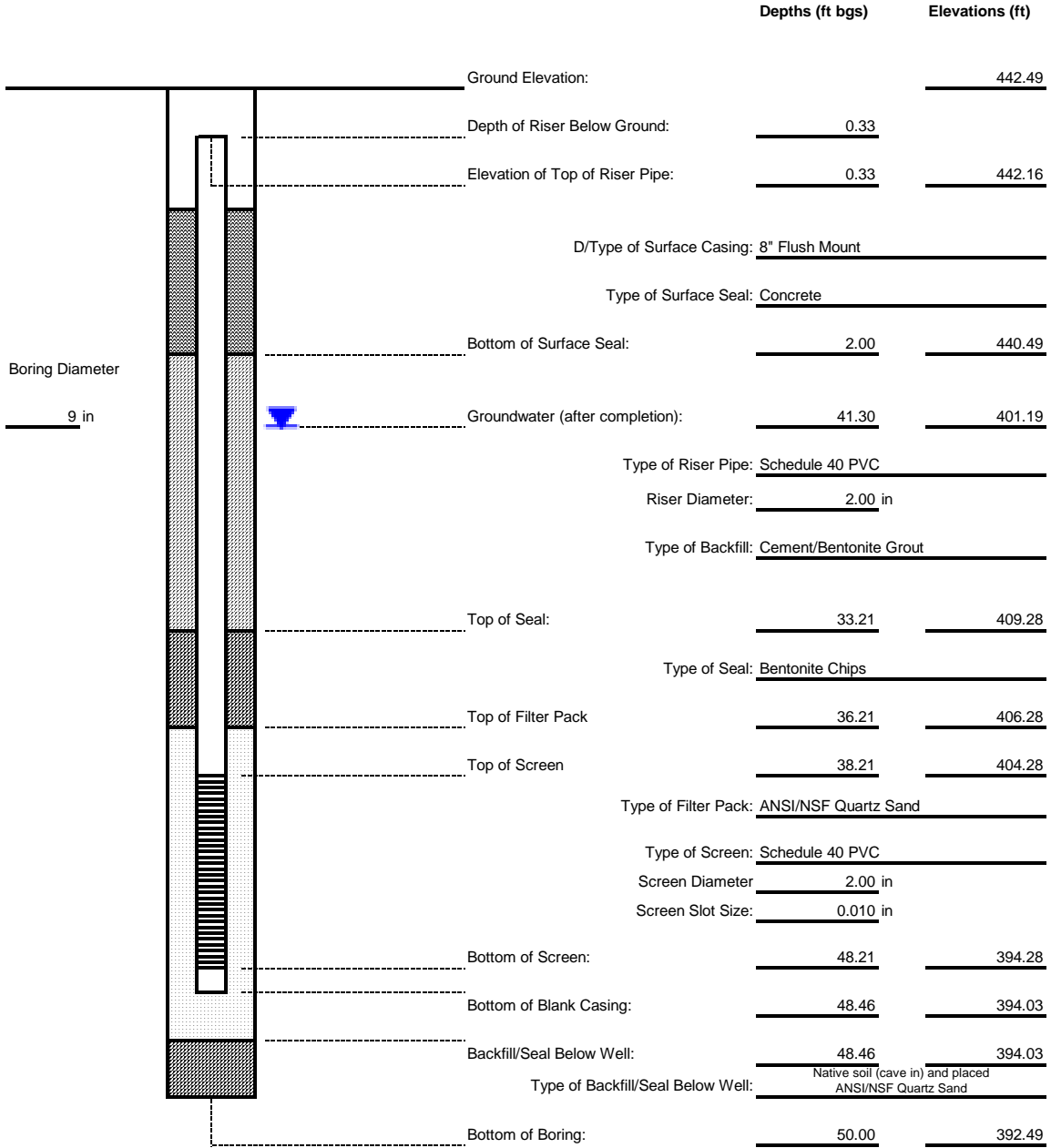


DIAGRAM IS NOT TO SCALE

LOG OF BORING AND WELL CONSTRUCTION DETAIL

MW-24

Page Of 2

Stationing Date: 3/7/ 3
 Completion Date: 3/8/ 3
 Casting Elevation: 443.42
 Ground Elevation: 443.80

Quadrangle Sec: 34 (Center of NE 1/4)
 T: 5N
 R: 9W
 UTM (or State Plane) Coord
 N: (X): 793286.49
 E: (Y): 232 700.49

Depth In feet	We Construct on	Inches Driven	Inches Recovered	PID (ppm)	Sampler Graphic	Symbol	USCS
0.4				0.4			ASPHALT
0.1				0.1			FILL
0.0				0.0			CL
0.2			0.2				
0.1			0.1				
0.2				0.2			SP
0.1			0.1				
0.1			0.1				
0.2		24	6	0.2			
		24	24	0.8			
		24	22	0.5			
		24	20	0.7			
		24	19	0.5			
		24	20	0.7			
		24	18	0.8			
		24	18	0.7			

DESCRIPTION	NOTES
Asphalt and gravel	Air knifed to 10' bgs to clear utilities.
Dark brown, sand and clay FILL (FILL)	
Medium stiff, moist, brown, low plastic CLAY (CL)	Sample MW-24-12 for VOCs at 0955
Becomes light brown	
Becomes sandy	
Loose to medium dense, dry to moist, brown, fine grained SAND (SP)	
Becomes medium dense, dry Trace black banding (1")	
Trace black banding (1")	

URS (EV-RON) LOG (EPA FORM 1) - 1 WELL 21562850-15000 (ROXANA MW 2013) GPJ URSS LEV.GD 3/18/13

Completion Depth: 50.0 Ft bgs
 Project No.: 21562850.15000
 Project Name: Roxana/WRR Well Drilling
 Drilling Contractor: Roberts Environmental Drilling Inc.
 Driller Name: E. Wetzel
 Drilling Method: HSA
 Drill Rig Type: CME 75
 Logged by: W. Pennington, M. Miller
 County: Madison
 Site ID No.: 1191150002
 Federal ID No.: ILD 080 012 305

Water Depth: 42 ft., After ATD hrs.
 Water Depth: _____ ft., After _____ hrs.

Water level at time of drilling
 Water level after drilling
 ATD At time of drilling
 NE None Encountered
 NA Not Applicable

Geoprobe
 Air Knife/Hand Auger Sampler
 Air Rotary
 Sonic
 Splitspoon Sampler
 Hollow Stem Auger-
 Soil samples not collected



USC based on field visual observations

LOG OF BORING AND WELL CONSTRUCTION DETAIL

MW-24

Page 2 Of 2

Sta t ng Date: 3/7/ 3
 Comp et on Date: 3/8/ 3
 Cas ng E evat on: 443 42
 Ground E evat on: 443 80

Quadrangle Sec:34 (Center of NE /4)
 T:5N R:9W
 UTM (or State Plane) Coord
 N: (X):793286 49
 E: (Y):232 700 49

Depth In feet	We Construct on	Inches Dr ven	Inches Recovered	PID (ppm)	Samp er Graph c	Symbo	USCS	DESCRIPTION	NOTES
30		24	19	0.7				Same: Medium dense, dry, brown, fine grained SAND (SP)	Sample MW-24-25 for VOCs at 1115
		24	19	0.7				Trace black banding (3")	
		24	19	0.7					
		24	20	0.4					
35		24	20	0.6				Trace gravel Gravel grades out	
		24	20	0.5			SP	Trace black banding (3")	
		24	20	0.4				Trace black banding (2")	
40		24	20	0.4					
		24	21	0.5				Becomes wet	▽
		24	21	0.8				Trace black banding (1") Becomes fine to medium grained, trace fine gravel	
45		24	21	1.1				Trace black banding (3")	Sample MW-24-47 for VOCs at 1215
		24	24	0.5					
								Bottom of boring at 50 ft bgs	

URS (EV RON) LOG (EPA FORM 1) -1 WELL 21562850-15000 (ROXANA MW 2013) GPJ URSS LEV GD 3/18/13

Completion Depth: **50.0 Ft bgs**
 Project No.: **21562850.15000**
 Project Name: **Roxana/WRR Well Drilling**
 Drilling Contractor: **Roberts Environmental Drilling Inc.**
 Driller Name: **E. Wetzel**
 Drilling Method: **HSA**
 Drill Rig Type: **CME 75**
 Logged by: **W. Pennington, M. Miller**
 County: **Madison**
 Site ID No.: **1191150002**
 Federal ID No.: **ILD 080 012 305**

Water Depth: 42 ft., After ATD hrs.
 Water Depth: _____ ft., After _____ hrs.
 Water level at time of drilling
 Water level after drilling
 ATD At time of drilling
 NE None Encountered
 NA Not Applicable

Geoprobe
 Air Knife/Hand Auger Sampler
 Air Rotary
 Sonic
 Splitspoon Sampler
 Hollow Stem Auger-Soil samples not collected

URS
 USC based on field visual observations

Monitoring Well Installation Details
Flush Mount Monitoring Well Construction Diagram



Project:	Roxana Monitoring Well Drilling and Installation			Well D:	MW-24
Project Location:	Roxana, Illinois	Date Started:	3/7/2013		
Well Location:	On East 4th St between N-S alley and Route 111	Date Completed:	3/8/2013	Boring ID:	MW-24
Drilling Contractor:	Roberts Environmental Drilling, Inc.	Time Seal Set:	1410	Northing:	793286.49
Driller:	E. Wetzal	Type of Rig:	CME-75	Easting:	2321700.59
Consulting Firm:	URS Corporation	Drilling Method:	HSA (4 25" ID)	Elevation Datum:	443.8
Geologist:	M. Miller	Owner:	Equilon Enterprises LLC d/b/a Shell Oil Products US	Township, Range, Section	T5N, R9W, Section 34 (central portion of NE 1/4)

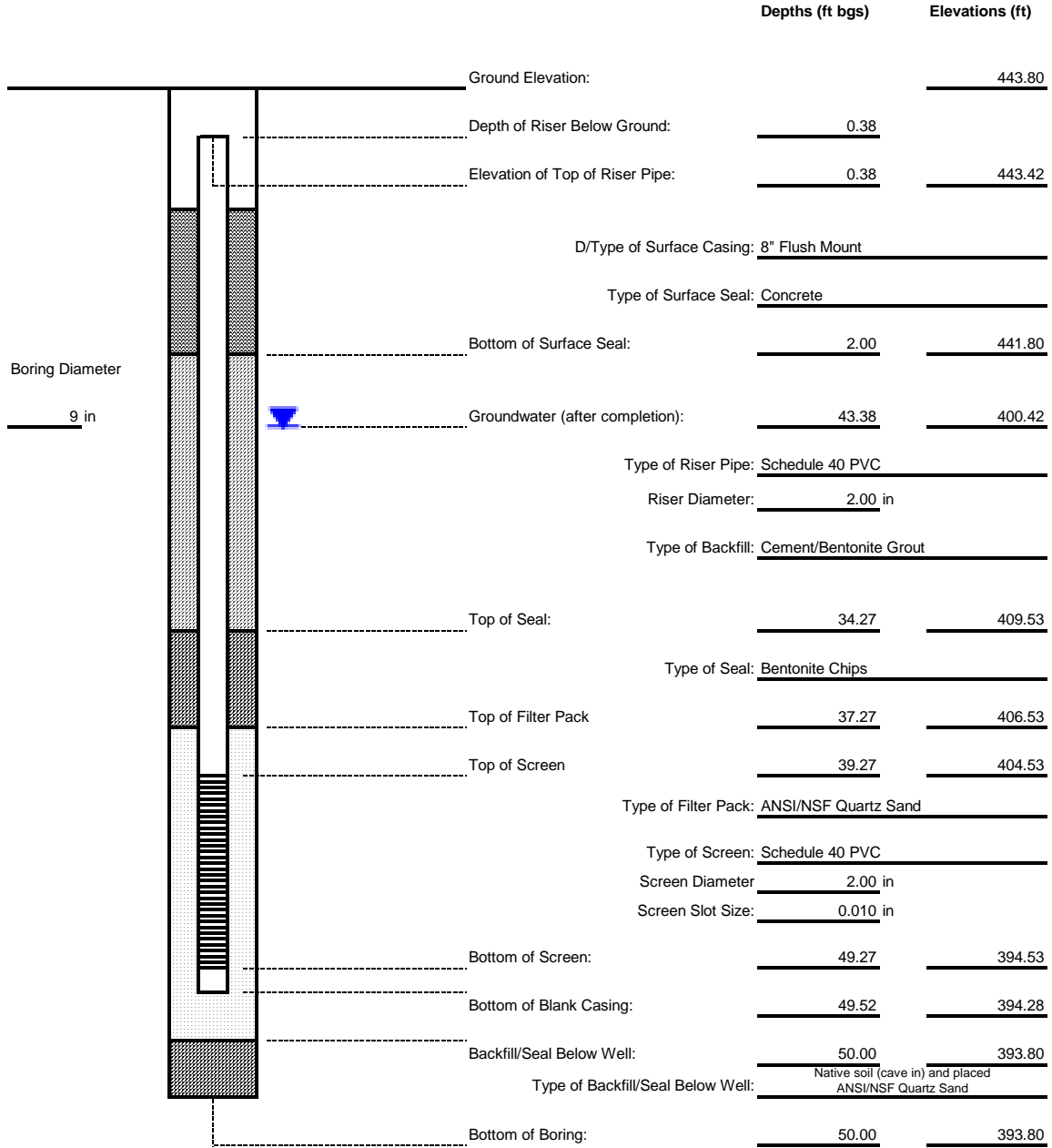
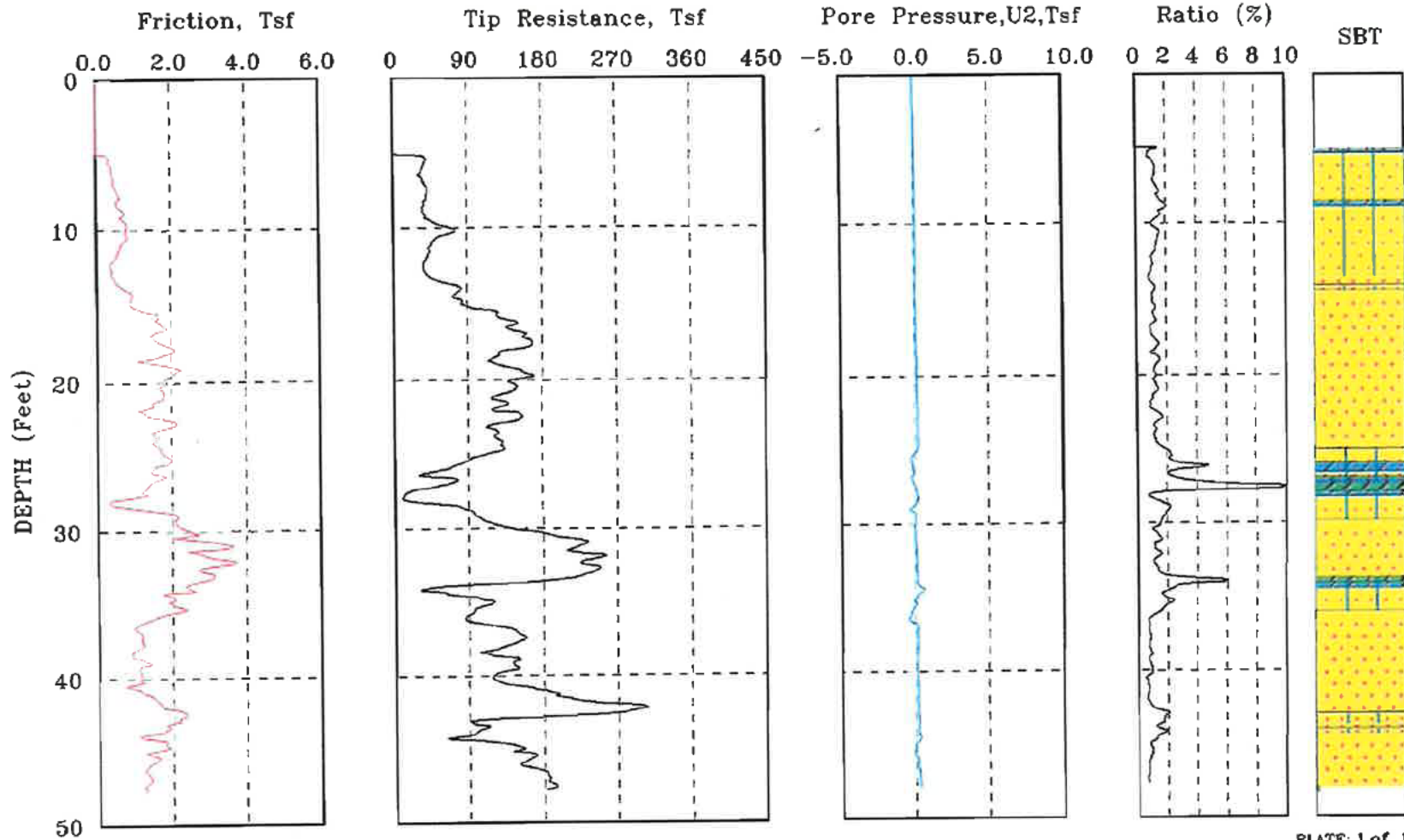


DIAGRAM IS NOT TO SCALE

FUGRO GEOSCIENCES, INC.

CPT No : ROST-03
JOB No : 04.1909-0044
CONE No : F7.5CKE2HAW21344

SITE : Roxana, IL
CLIENT : URS Corporation
OPERATOR : DANIEL GARZA
DATE : 27-Aug-2009



Monitoring Well Installation Details
Flush Mount Monitoring Well Construction Diagram



Project:	Roxana Monitoring Well Drilling and Installation			Well D:	ROST-3-MW
Project Location:	Roxana, Illinois	Date Started:	11/27/2012	(Replacement well for ROST-3-PZ)	
Well Location:	East 3rd St - Replacement well for ROST-3-PZ to facilitate sampling	Date Completed:	11/27/2012	Boring ID:	ROST-3
Drilling Contractor:	Roberts Environmental Drilling, Inc.	Time Seal Set:	1330	Northing:	793594.6
Driller:	P. Seymour	Type of Rig:	8040 DT	Easting:	2321943.19
Consulting Firm:	URS Corporation	Drilling Method:	HSA (4 25" ID)	Elevation Datum:	442.66
Geologist:	M. Miller	Owner:	Equilon Enterprises LLC d/b/a Shell Oil Products US	Township, Range, Section	T5N, R9W, Section 34 (NE 1/4 of NE 1/4)

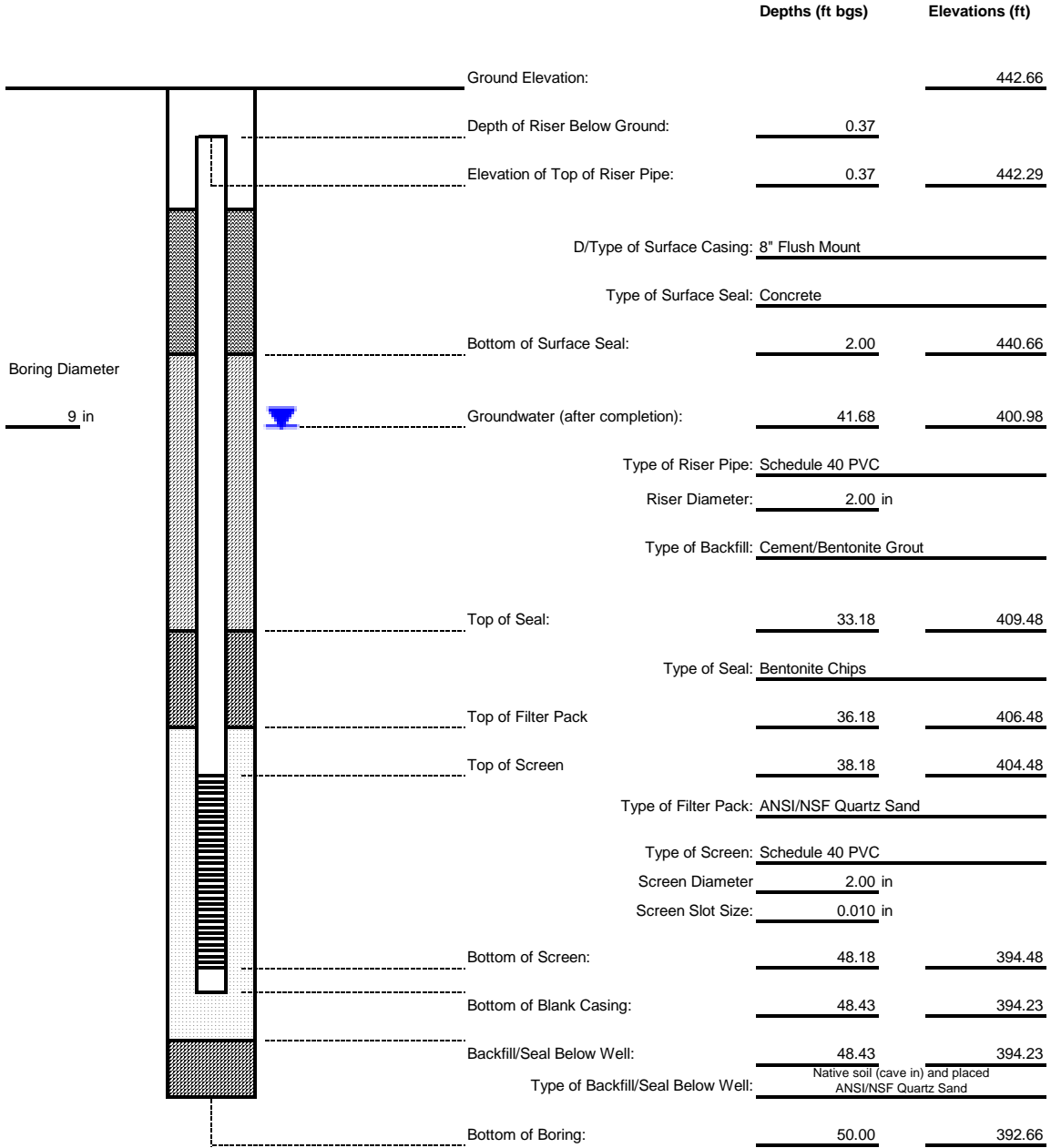


DIAGRAM IS NOT TO SCALE

LOG OF BORING P-55 Replacement Well

Starting Date: 1/10/13 Completion Date: 1/10/13 Casing Elevation: 443.78 Ground Elevation: 444.20	Quadrangle Sec:34 (E - center of NE 1/4) T:5N R:9W UTM (or State Plane) Coord N: (X):793803.04 E: (Y):2322278.76
--	--

Depth In feet	Inches Dr ven	Inches Recovered	B ow Counts	PID (ppm)	Samp er Graph c	Symbo	USCS
5				1.1			FILL
				1.5			
				1.4			
				1.4			
				1.8			
				2.2			
				1.7			
				2.0			
				1.5			
10				1.2			SP
	36	27		0.8			
				1.2			
				1.6			
15	60	54		3.0			
				1.5			
				1.5			
				2.2			
20	60	57		1.9			

DESCRIPTION	NOTES
Gravel (FILL) Soft, moist, brown, low plastic sandy CLAY (FILL), trace gravel	Air knifed to 10' bgs to clear utilities.
Loose, moist, brown, fine grained SAND (SP), with clay Clay grades out	
Becomes medium dense, brown with gray, silty Becomes brown	
Silt grades out	
3" seam of dark gray Becomes fine to medium grained	

URS (ENV/RO) LOG (EPA FORM 1) 21562850.15000 (ROXANA MW 2013) GPJ URSS LEV.GD 2/11/13

Completion Depth: 53.0 Ft bgs
 Project No.: 21562850.15000
 Project Name: Roxana/WRR Well Drilling
 Drilling Contractor: Roberts Environmental Drilling Inc.
 Driller Name: P. Seymour
 Drilling Method: Direct Push
 Drill Rig Type: 8040 DT
 Logged by: W. Pennington
 County: Madison
 Site ID No.: 1191150002
 Federal ID No.: ILD 080 012 305

Water Depth: 43 ft., After ATD hrs.
 Water Depth: _____ ft., After _____ hrs.
 Water level at time of drilling
 Water level after drilling
 ATD At time of drilling
 NE None Encountered
 NA Not Applicable

Geoprobe
 Air Knife/Hand Auger Sampler
 Air Rotary
 Sonic
 Splitspoon Sampler
 Hollow Stem Auger
 Soil samples not collected



USC based on field visual observations

LOG OF BORING P-55 Replacement Well

Starting Date: 1/10/13 Completion Date: 1/10/13 Casing Elevation: 443.78 Ground Elevation: 444.20	Quadrangle Sec: 34 (E - center of NE 1/4) T: 5N R: 9W UTM (or State Plane) Coord N: (X): 793803.04 E: (Y): 2322278.76
--	--

DESCRIPTION **NOTES**

Depth In feet	Inches Dr ven	Inches Recovered	B ow Counts	PID (ppm)	Samp er Graph c	Symbo	USCS	DESCRIPTION	NOTES
30	60	54		2.2		SP	SP	Same: Medium dense, moist, brown, fine to medium grained Silty SAND (SP)	
				1.8					
	60	54		1.6				Becomes gray	
				2.0					
35				244.6		CL	CL	Medium stiff, moist, brown, low plastic CLAY (CL)	
	60	59		19.3		SP	SP	Medium dense, moist, gray, fine to medium dense, SAND (SP) Becomes brown	
40				39.2			ML	Soft to medium stiff, moist, gray SILT (ML)	
				397.2		SP	SP	Medium dense to dense, wet, brown, medium to coarse grained SAND (SP)	
	60	60				ML-CL	ML-CL	Soft to medium stiff, moist, gray, low plastic Clayey SILT (ML CL)	
				1024		SP	SP	Medium dense, moist, gray, fine grained SAND (SP)	
45				805.2		CL	CL	Soft to medium stiff, moist, gray, low plastic CLAY (CL)	Sample P 55R 43 for VOCs at 1305
				389.8		SP	SP	Medium dense to dense, wet, brown, medium to coarse grain SAND (SP)	
	60	54		104.7		ML	ML	Medium stiff, wet, gray, low plastic, SILT (ML), with clay	
				134.5		SP	SP	Medium dense to dense, wet, grayish brown, medium to coarse grained SAND (SP) Becomes dark gray	

Completion Depth: 53.0 Ft bgs
 Project No.: 21562850.15000
 Project Name: Roxana/WRR Well Drilling
 Drilling Contractor: Roberts Environmental Drilling Inc.
 Driller Name: P. Seymour
 Drilling Method: Direct Push
 Drill Rig Type: 8040 DT
 Logged by: W. Pennington
 County: Madison
 Site ID No.: 1191150002
 Federal ID No.: ILD 080 012 305

Water Depth: 43 ft., After ATD hrs.
 Water Depth: _____ ft., After _____ hrs.
 Water level at time of drilling
 Water level after drilling
 ATD At time of drilling
 NE None Encountered
 NA Not Applicable

- Geoprobe
- Air Knife/Hand Auger Sampler
- Air Rotary
- Sonic
- Splitspoon Sampler
- Hollow Stem Auger
- Soil samples not collected



USC based on field visual observations

URS (ENV/RO) LOG (EPA FORM 1) 21562850.15000 (ROXANA MW 2013) GPJ URSS LEV.GD 2/11/13

LOG OF BORING P-55 Replacement Well

Starting Date: 1/10/13 Completion Date: 1/10/13 Casing Elevation: 443.78 Ground Elevation: 444.20	Quadrangle Sec:34 (E - center of NE 1/4) T:5N R:9W UTM (or State Plane) Coord N: (X):793803.04 E: (Y):2322278.76
--	--

DESCRIPTION **NOTES**

Depth In feet	Inches Dr ven	Inches Recovered	B ow Counts	PID (ppm)	Samp er Graph c	Symbo	USCS	DESCRIPTION	NOTES
60	30			244.7	▲	●	SP	Same: Medium dense to dense, wet, dark gray, medium to coarse grained SAND (SP)	Sample P 55R 51 for VOCs at 1310
55								Bottom of boring at 53 ft bgs	
60									
65									
70									

Completion Depth: 53.0 Ft bgs
 Project No.: 21562850.15000
 Project Name: Roxana/WRR Well Drilling
 Drilling Contractor: Roberts Environmental Drilling Inc.
 Driller Name: P. Seymour
 Drilling Method: Direct Push
 Drill Rig Type: 8040 DT
 Logged by: W. Pennington
 County: Madison
 Site ID No.: 1191150002
 Federal ID No.: ILD 080 012 305

Water Depth: 43 ft., After ATD hrs.
 Water Depth: _____ ft., After _____ hrs.
 Water level at time of drilling
 Water level after drilling
 ATD At time of drilling
 NE None Encountered
 NA Not Applicable

- Geoprobe
- Air Knife/Hand Auger Sampler
- Air Rotary
- Sonic
- Splitspoon Sampler
- Hollow Stem Auger
- Soil samples not collected



USC based on field visual observations

Monitoring Well Installation Details
Flush Mount Monitoring Well Construction Diagram



Project:	Wood River Refinery	Well D:	P-55 (replacement well)
Project Location:	Roxana, Illinois	Date Started:	1/10/2013
Well Location:	Along west fence line of refinery, across from alley N of East 3rd St	Date Completed:	1/10/2013
Drilling Contractor:	Roberts Environmental Drilling, Inc.	Time Seal Set:	1315
Driller:	P. Seymour	Type of Rig:	8040 DT
Consulting Firm:	URS Corporation	Drilling Method:	direct push (3.75" D rods)
Geologist:	W. Pennington	Owner:	Equilon Enterprises LLC d/b/a Shell Oil Products US
		Boring ID:	P-55R
		Northing:	793803.04
		Easting:	2322278.76
		Elevation Datum:	444.2
		Township, Range, Section	15N, R9W, Section 34 (E-central portion of NE 1/4)

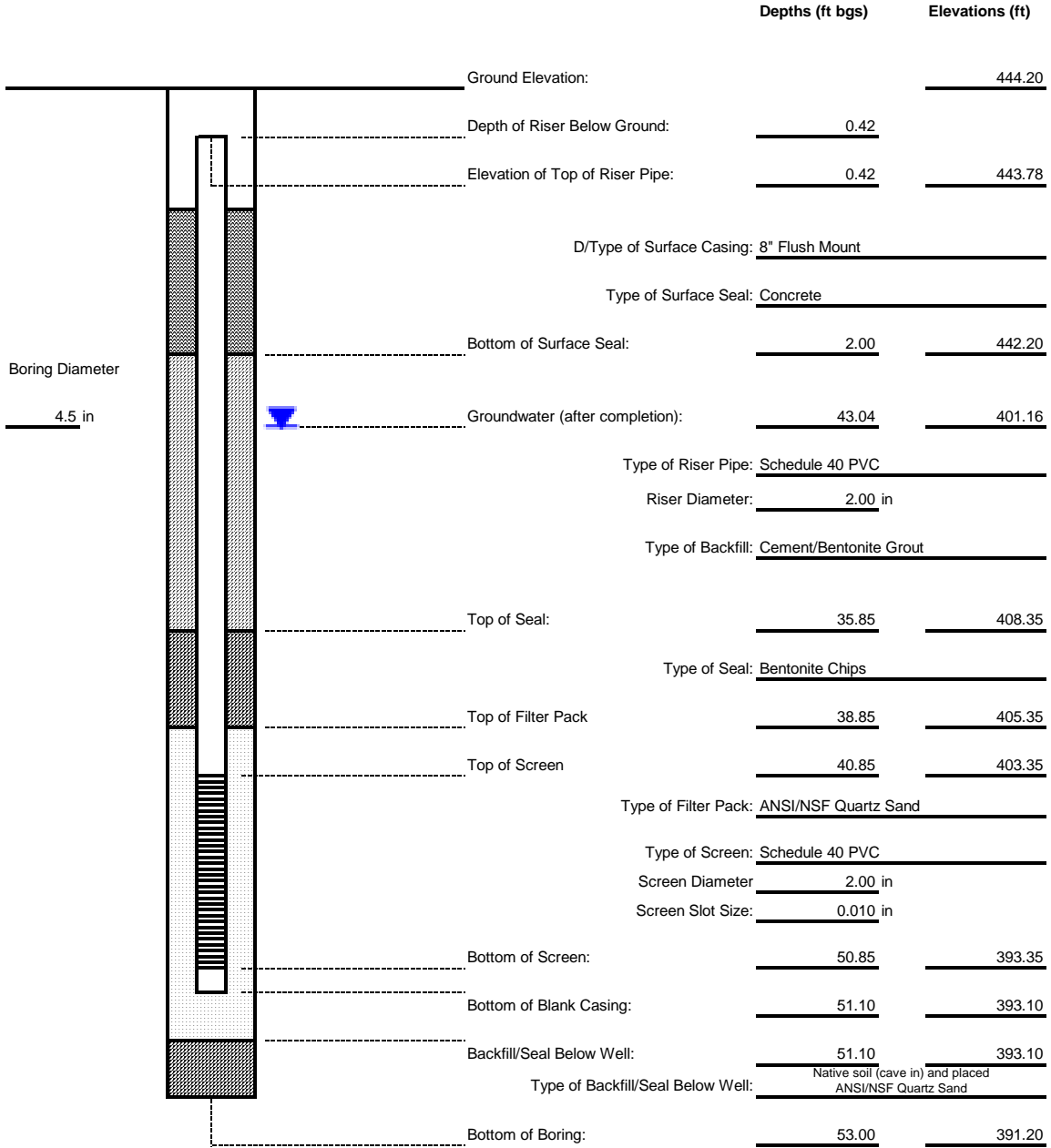


DIAGRAM IS NOT TO SCALE