Wang Engineering

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Technical Memorandum

To:	Dan Manojlovski, P.E. AECOM
Copy To:	Amish Bhatt, AECOM; Corina Farez, Wang
From:	Mohammed (Mike) Kothawala, P.E., Sr. Geotechnical Engineer
Date:	January 4, 2017
Subject:	Water Main Thrust Restraints, Contract 62A74
	South West Water Main Replacement
Project:	Circle Interchange Reconstruction
	IDOT Job No. D-91-227-13, IDOT PTB 163, Item 01
	Wang Project No. 1100-04-01

INTRODUCTION

Wang Engineering, Inc. (Wang) understands that a section of existing 54-inch water main crossing I-90/94 and south of Harrison Street Bridge will be replaced under SB I-90/94. The work will be completed under Contract 62A74. It is understood that water main will be installed using trenchless technology at the I-90/94 crossing. The proposed water main will have two thrust restraints on the west side of Cermak pumping station. It is understood that thrust restraints are for the vertical pipe bends.

Since a subsurface investigation program was not carried out for the proposed water main, we have considered Borings 15-RWB-01, 14-RWB-01, 10-RWB-03, 14-RWB-02, and 10-RWB-02 completed for several nearby retaining walls. Boring locations relative to the water main alignment and thrust restraints are shown in the *Boring Location Plan* (Exhibit 1). In situ vane shear tests conducted in nearby Boring VST-01 was also considered for our engineering analysis and to develop recommendations. Detailed descriptions of the soil conditions encountered are presented in the attached *Boring Logs*. The following sections present our geotechnical recommendations for the design and construction of the proposed new thrust restraints.

ENGINEERING ANALYSIS AND RECOMMENDATIONS

Thrust Restraints Foundations

Information provided by AECOM indicates thrust restraints base will be approximately at depths of 22 and 10 feet below ground surface (bgs) or elevation of 565 feet and 585 feet,

respectively. The water main pipe invert below SB I-90/94 roadway will be approximately at a depth of 25 feet bgs or elevation of 565 feet. It is understood that due to high vertical and horizontal loads, the restraint thrusts concrete blocks are proposed to be supported on drilled shafts. Each concrete block will have two drilled shafts.

We recommend that either straight or belled drilled shafts should be established into the hard clay (Hardpan). We recommend establishing drilled shaft tip at approximate elevation 538.0 feet (Boring 14-RWB-01) for the east side thrust restraint and to approximate elevation 540.0 feet (Boring 15-RWB-01) for the west side thrust restraint. The drilled shafts can be designed considering maximum net allowable bearing pressure of 15.5 ksf with a factor of safety of 3.0. It should be noted that Boring 14-RWB-01 is approximately 17 feet from the east thrust restraint but was drilled to only a depth of 65 feet (elevation 515.8 feet). Boring 15-RWB-01 drilled to a depth of 90 feet bgs (elevation 503.5 feet) is approximately 75 feet feet from the west thrust restraint. The recommended bearing pressure for the drilled shaft refers to the total design loads, dead plus live and is a net pressure. Therefore, the weight of the concrete in the caissons and the weight of soil over the bells may be ignored in proportioning the caissons. We do not recommend establishing drilled shafts into the sand layer below this clay layer. The side resistance should be ingnored for the vertical downward capacity.

To resist uplift load, we recommend considering weight of the drilled shaft concrete and side resistance from the soils. Tables 1 and 2 show allowable side resistances for the soil layers. The sections of the drilled shaft to be neglected for the side resistance contribution should be as per Section 10.8.3.7 of the 2015 AASHTO Standard Specifications for Highway Bridges.

Lateral loads on drilled shafts should be analyzed for maximum moments and lateral deflections. No allowance should be made for the frictional resistance of the concrete cap on soil. The lateral load capacity analysis can be performed using computer program such as COMP 624P, L-pile, LATPILE, or any other similar programs. The estimated soil parameters that may be used to analyze stresses and deflections of drilled shafts under lateral loads are presented in Tables 3 and 4.

CONSTRUCTION CONSIDERATIONS

Any required excavations should be performed in accordance with local, state, and federal regulations including current OSHA regulations. The potential effect of ground movements upon nearby structures and utilities should also be taken into consideration. Drilled shafts should be constructed in accordance with the IDOT Special Provision GBSP 86 *Drilled Shafts*. We recommend providing temporary casing to estimated elevations of 542.0 and 540.0 for the drilled shafts supporting the east and west side thrust restraints respectively.

Attachments:

1. Boring Location Plan
2. Boring Logs
3. AECOM Drawing Sheet 59 of 173 dated 11/11/2016 Contract 62A74, 54" South West water Main Profile

54-Inch Water Main Replacement
Table 1: Recommended Side Resistance for Drilled Shafts
West Side Thrust Restraint
(Borings 15-RWB-01, 10-RWB-03 and VST-01)

Layer Elevations/ Soil Description	Shear Strength Properties			Ultimate Unit Side Resistance (psf)	Allowable Unit Side Resistance[4] (psf)
	Unit Weight (pcf)	Cohesion Cu (psf)	Friction Angle, φ (Degree)		
593.5[1] to 590.5 Loam Fill	120	0	30	239	120
590.5 to 584.8 Silty Loam Fill	120	0	30	821	411
584.8 to 580.5 Silty Clay	120	3200	0	1760	880
580.5 to 573.0 Clay to Silty Clay	110	550	0	303	152
573.0 to 561.8 Clay to Silty Clay	110	650	0	358	179
561.8 to 551.7 Clay to Silty Clay	110	750	0	413	206
551.7 to 541.8 Clay to Silty Clay	115	900	0	495	248
541.8 to 531.8 Silty Clay Loam	120	5000	0	2750	1375
531.8 to 516.8 Sand	63[2]	0	36	2835	1418
516.8 to 506.3 Silty Clay Loam to Silty Loam	63[2]	8000	0	4400	2200
506.3[3] to 495.6 Silty Loam	63[2]	0	35	1812	906

[1]Existing grade at boring location
[2]Submerged weight
[3] Based on Boring 10-RWB-03, about 50 feet south of Boring 15-RWB-01
[4]Factor of safety of 2.0

54-Inch Water Main Replacement
Table 2: Recommended Side Resistance for Drilled Shafts
East Side Thrust Restraint
(Borings 14-RWB-01 and VST-01)

Layer Elevations/ Soil Description	Shear Strength Properties			Ultimate Unit Side Resistance (psf)	Allowable Unit Side Resistance[4] (psf)
	Unit Weight (pcf)	Cohesion Cu (psf)	Friction Angle, φ (Degree)		
580.9[1] to 577.6 Crushed Stone Fill	125	0	32	273	137
577.6 to 567.9 Clay to Silty Clay	110	550	0	303	152
567.9 to 555.4 Clay to Silty Clay	110	750	0	413	207
555.4 to 549.1 Clay to Silty Clay	115	835	0	459	230
549.1 to 544.1 Clay to Silty Clay	115	1200	0	660	330
544.1 to 539.1 Silty Clay	120	3000	0	1650	825
539.1 to 534.1 Silty Clay	120	5000	0	2750	1375
534.1 to 529.1 Silty Loam to Silty Clay Loam	120	0	35	3121	1561
529.1 to 516.8[3] Sand to Sandy Loam	63[2]	0	37	2996	1498
516.8[3] to 506.3 Silty Clay Loam to Silty Loam	63[2]	8000	0	4400	2200
506.3 to 495.6 Silty Loam	63[2]	0	35	2299	1150

[1]Existing grade at boring location
[2]Submerged weight
[3] Based on Boring 10-RWB-03, about 70 feet south of Boring 14-RWB-01
[4]Factor of safety of 2.0

Table 3: Recommended Parameters for Lateral Load Analyses
West Side Thrust Restraint
(Borings 15-RWB-01, 10-RWB-03 and VST-01)

Layer Elevations/ Soil Description	Unit Weight (pcf)	Shear Strength Properties			Estimated Lateral Soil Modulus Parameter, k (pci)	Estimated Soil Strain Parameter, ε_{50}
		Short Term		Long Term		
		Cohesion Cu (psf)	Friction Angle, φ (Degree)	Friction Angle, φ' (Degree)		
593.5[1] to 590.5 Loam Fill	120	0	30	30	50	--
590.5 to 584.8 Silty Loam Fill	120	0	30	30	50	--
584.8 to 580.5 Silty Clay	120	3200	0	30	1150	0.0050
580.5 to 573.0 Clay to Silty Clay	110	550	0	29	50	0.0150
573.0 to 561.8 Clay to Silty Clay	110	650	0	29	100	0.0130
561.8 to 551.7 Clay to Silty Clay	110	750	0	29	150	0.0120
551.7 to 541.8 Clay to Silty Clay	115	900	0	30	200	0.0105
541.8 to 531.8 Silty Clay Loam	120	5000	0	31	1900	0.0035
531.8 to 516.8 Sand	63[2]	0	36	36	125	--
516.8 to 506.3 Silty Clay Loam to Silty Loam	63[2]	8000	0	32	2800	0.0030
506.3[3] to 495.6 Silty Loam	63[2]	0	35	35	125	--
495.6 to 490.1[4] Weathered Bedrock	65[2]	0	38	38	135	--

[1]Existing grade at boring location
[2]Submerged weight
[3] Based on Boring 10-RWB-03, about 50 feet south of Boring 15-RWB-01
[4] Possible bedrock elevation based on Boring 10-RWB-02, about 150 feet north of Boring 15-RWB-01

Table 4: Recommended Parameters for Lateral Load Analyses
East Side Thrust Restraint
(Borings 14-RWB-01 and VST-01)

Layer Elevations/ Soil Description	Unit Weight (pcf)	Shear Strength Properties			Estimated Lateral Soil Modulus Parameter, k (pci)	Estimated Soil Strain Parameter, ε_{50}
		Short Term		Long Term		
		Cohesion Cu (psf)	Friction Angle, φ (Degree)	Friction Angle, φ' (Degree)		
580.9[1] to 577.6 Crushed Stone Fill	125	0	32	32	60	--
577.6 to 567.9 Clay to Silty Clay	110	550	0	29	50	0.0150
567.9 to 555.4 Clay to Silty Clay	110	750	0	29	150	0.0120
555.4 to 549.1 Clay to Silty Clay	115	835	0	30	200	0.0105
549.1 to 544.1 Clay to Silty Clay	115	1200	0	30	300	0.0090
544.1 to 539.1 Silty Clay	120	3000	0	31	1000	0.0050
539.1 to 534.1 Silty Clay	120	5000	0	32	1900	0.0065
534.1 to 529.1 Silty Loam to Silty Clay Loam	120	0	35	35	200	--
529.1 to 516.8 Sand to Sandy Loam	63[2]	0	37	37	125	--
516.8[3] to 506.3 Silty Clay Loam to Silty Loam	63[2]	8000	0	32	2800	0.0030
506.3 to 495.6 Silty Loam	63[2]	0	35	35	125	--
495.6 to 490.1[4] Weathered Bedrock	65[2]	0	38	38	135	--

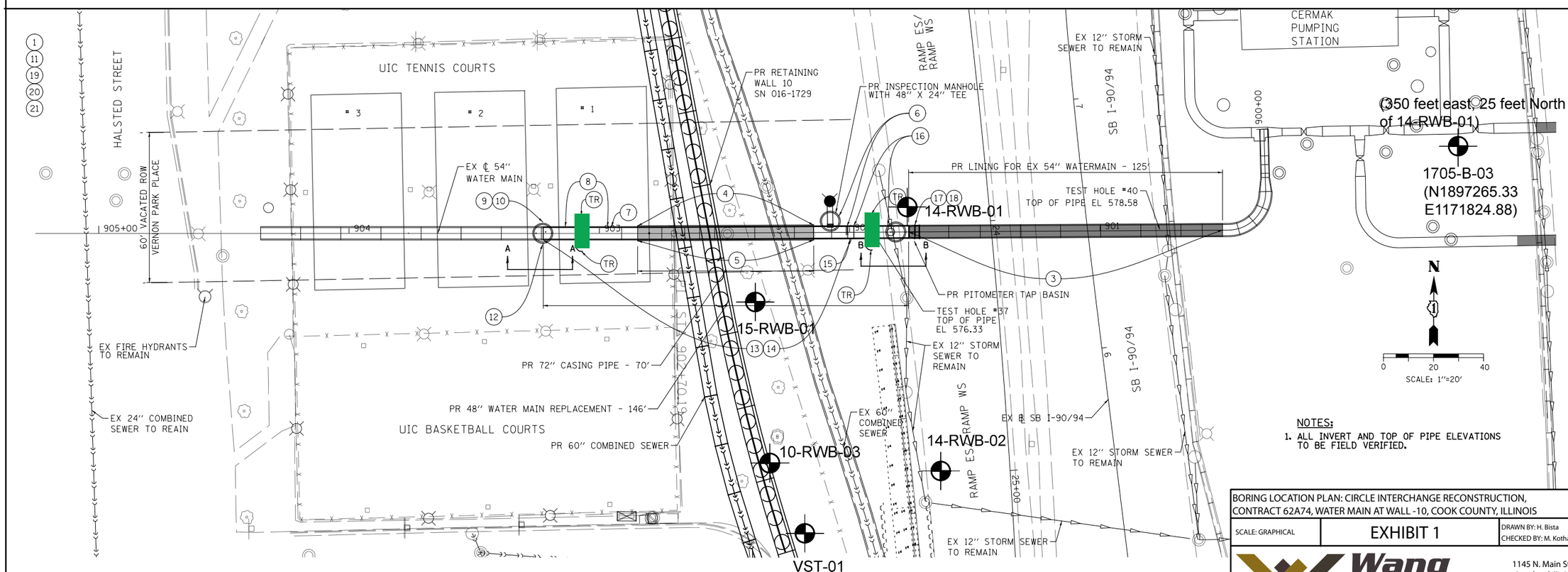
[1]Existing grade at boring location
[2]Submerged weight
[3] Based on Boring 10-RWB-03, about 70 feet south of Boring 14-RWB-01
[4] Possible bedrock elevation based on Boring 10-RWB-02, about 130 feet north of Boring 14-RWB-01

CONSTRUCTION SEQUENCING NOTES:

1. CONTACT CHICAGO DEPARTMENT OF WATER MANAGEMENT (CDWM) FOR SHUTDOWN OF WATER MAINS (312-744-5070). DEWATER EXISTING 54" WATER MAIN.
2. SEE SHEET $WM01
3. INSTALL CARBON FIBER LINING IN EXISTING 54" WATER MAIN BETWEEN STATION 900+51.09 AND STATION 901+76.45.
4. INSTALL 70' - 72" STEEL CASING PIPE BETWEEN STATIONS 902+14.43 AND 902+84.73 UNDER LOCATIONS OF EXISTING 60" COMBINED SEWER, PROPOSED RETAINING WALL AND PROPOSED 60" COMBINED SEWER.
5. INSTALL 48" WATER MAIN IN CASING PIPE USING CASING SPACERS.
6. INSTALL 1-48" X 24" TEE FOR INSPECTION MANHOLE AT APPROXIMATE STATION 902+07.73. TEMPORARILY PLUG AND BRACE EAST RUN OF TEE FOR PRESSURE TESTING. INSTALL TEMPORARY FLUSHING HYDRANT ON BRANCH OUTLET OF TEE.
7. INSTALL 2- 48" X 1/4 VERTICAL BENDS AT APPROXIMATE STATION 902+95.09 TO ADJUST THE VERTICAL ALIGNMENT OF PIPELINE.
8. INSTALL 48" PIPE TO THE WEST AS SHOWN. BUILD THRUST RESTRAINTS.
9. INSTALL 1-54"X 48" MJ SPIGOT STEEL REDUCER. WELD THE 54" JOINT.
10. INSTALL 1-48" BUTTERFLY VALVE AT STATION 903+22.41 AND 48" PIPE. CONNECT THE NEW 48" WATER MAIN WITH 1-48" MJ SLEEVE. INSTALL 2-2" TAPS AND BUILD BASINS PER THE DETAILS.
11. CONTACT CDWM TO OPEN THE VALVES TO THE WEST THAT WERE SHUTDOWN (312-744-5070).
12. SLOWLY OPEN THE NEW 48" BUTTERFLY VALVE (NOTE 10) AND FILL THE NEW WATER MAIN. FLUSH ALL AIR FROM THE SYSTEM.
13. CLOSE THE 48" BUTTERFLY VALVE AND PRESSURE TEST THE NEW 48" WATER MAIN SEGMENT IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
14. AFTER APPROVAL OF THE PRESSURE TEST, DEWATER THE NEW 48" WATER MAIN IN PREPARATION FOR MAKING THE FINAL CONNECTION.
15. REMOVE THE TEMPORARY PLUG AND FLUSHING HYDRANT FROM THE 48" TEE (NOTE 6). INSTALL 24" PLUG IN BRACH OUTLET. BUILD BASIN PER THE DETAILS.
16. INSTALL 48" PIPE AND 2 - 48" X 1/16 BENDS TO THE EAST AS SHOWN TO ADJUST THE VERTICAL ALIGNMENT OF THE PIPELINE. BUILD THRUST RESTRAINTS.
17. INSTALL 1-54"X 48" MJ SPIGOT STEEL REDUCER. WELD THE 54" JOINT
18. CONNECT TO THE NEW 48" WATER MAIN WITH 48" PIPE AND 1-48" MJ SLEEVE. INSTALL PITOMETER TAP AND BUILD BASIN PER THE DETAILS.
19. CONTACT CDWM TO OPERATE VALVES FOR FILLING AND FLUSHING THE WATER MAIN.
20. DISINFECT PER THE CONTRACT DOCUMENTS. AFTER APPROVAL OF DISINFECTION, WATER MAIN MAY BE PUT INTO SERVICE.
21. RESTORE ALL WATER MAIN TRENCHES PER THE DETAILED DRAWING.

Legend	Symbol
Soil Boring	⊕
Thrust Restraint	▮

10-RWB-02



NOTES:
1. ALL INVERT AND TOP OF PIPE ELEVATIONS TO BE FIELD VERIFIED.

PROPOSED SOUTH WEST WATER MAIN REPLACEMENT

BORING LOCATION PLAN: CIRCLE INTERCHANGE RECONSTRUCTION, CONTRACT 62A74, WATER MAIN AT WALL -10, COOK COUNTY, ILLINOIS

SCALE: GRAPHICAL	EXHIBIT 1	DRAWN BY: H. Bista CHECKED BY: M. Kothawala

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FOR AECOM | 1100-04-01

FILE PATH = $FILEL$

AECOM
303 EAST WACKER DRIVE, SUITE 1400
CHICAGO, IL 60601-5276
PHONE: (312) 373-7700 FAX: (312) 373-6800

D162A74-SHT-WM-02.dgn	DESIGNED - RBB	REVISED -
USER NAME = PIMSARNO	DRAWN - OPS	REVISED -
PLOT SCALE = 40.000'/in.	CHECKED - DBM	REVISED -
PLOT DATE = 10/04/2016	DATE - $DATE	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

PROPOSED SOUTH WEST WATER MAIN REPLACEMENT

SCALE: 1"=20' | SHEET 1 OF SHEETS | STA. | TO STA.

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2014-004R&B	COOK	$TOTAL	$WM01
		CONTRACT NO. 62A74		
		ILLINOIS FED. AID PROJECT		

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BORING LOG 10-RWB-02

WEI Job No.: 1100-04-01

Client: **AECOM**
Project: **Circle Interchange Reconstruction**
Location: **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88
Elevation: 593.54 ft
North: 1897333.82 ft
East: 1171374.94 ft
Station: 7311+57.22
Offset: 11.9525 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	593.0	6-inch thick, black and brown SILTY LOAM --TOPSOIL--						
		Loose to medium dense, brown, fine SAND --FILL--			1	3 5 6	NP	8
			5		2	3 4 7	NP	11
					3	8 7 6	NP	14
			10		4	4 4 4	NP	21
	583.0	Stiff to very stiff, gray SILTY CLAY LOAM, trace gravel			5	3 5 8	3.69 B	25
			15		6	4 6 5	2.30 B	16
					7	3 3 5	1.48 B	21
	575.5	Soft to stiff, gray CLAY to SILTY CLAY, trace gravel			8	2 2 3	0.66 B	28
			20		9	1 3 3	1.07 B	23
			25		10	2 2 2	0.49 B	28
			30		11	1 2 2	0.41 B	24
					12	1 2 2	0.67 N/6	
			35		13	0 1 2	0.33 B	26
			40		14	1 2 2	0.49 B	23
		--disturbed sample--	45		15	1 1 2	0.25 P	21
		--disturbed sample--	50		16	2 2 3	0.25 P	26

GENERAL NOTES

Begin Drilling: **02-26-2014** Complete Drilling: **03-03-2014**
Drilling Contractor: **Wang Testing Services** Drill Rig: **B-57 TMR**
Driller: **P&P** Logger: **F. Bozga** Checked by: **C. Marin**
Drilling Method: **2.25" HSA to 15', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling: **8.00 ft**
At Completion of Drilling: **mud at 7 ft**
Time After Drilling: **144 hours**
Depth to Water: **16.00 ft**

The stratification lines represent the approximate boundary between soil types; the actual transition may be gradual.

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BORING LOG 10-RWB-02

WEI Job No.: 1100-04-01

Client: **AECOM**
Project: **Circle Interchange Reconstruction**
Location: **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88
Elevation: 593.54 ft
North: 1897333.82 ft
East: 1171374.94 ft
Station: 7311+57.22
Offset: 11.9525 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	541.8							
		Hard, gray SILTY CLAY LOAM to SILTY LOAM, trace gravel						
			55		17	11 11 17	5.66 B	15
		--L_L(%)=23, P_L(%)=15-- --%Gravel=6.7-- --%Sand=26.9-- --%Silt=49.7-- --%Clay=16.7-- --A-4 (3)--	60		18	14 24 29	4.50 P	12
			65		19	11 19 23	8.12 B	15
	526.8							
		Dense to very dense, gray SILTY LOAM, trace gravel --Moist--						
			70		20	14 16 20	NP	18
			75		21	23 25 39	NP	12
	516.8							
		Hard, gray SILTY CLAY LOAM, trace gravel						
			80		22	16 26 31	9.68 B	15
			85		23	12 19 26	NP	18
	506.8							
		Very dense, gray SILT --Moist--						
			90		24	40 36 40	NP	19
	501.8							
		Hard, gray SILTY CLAY LOAM, trace gravel						
			95		25	20 28 50/5	9.18 B	14
	496.5							
		Very dense, gray GRAVELLY SILTY LOAM --Dry--						
			100		26	60/4	NP	10

GENERAL NOTES

Begin Drilling: **02-26-2014** Complete Drilling: **03-03-2014**
Drilling Contractor: **Wang Testing Services** Drill Rig: **B-57 TMR**
Driller: **P&P** Logger: **F. Bozga** Checked by: **C. Marin**
Drilling Method: **2.25" HSA to 15', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling: **8.00 ft**
At Completion of Drilling: **mud at 7 ft**
Time After Drilling: **144 hours**
Depth to Water: **16.00 ft**

The stratification lines represent the approximate boundary between soil types; the actual transition may be gradual.

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BORING LOG 10-RWB-02

WEI Job No.: 1100-04-01

Client: **AECOM**
Project: **Circle Interchange Reconstruction**
Location: **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88
Elevation: 593.54 ft
North: 1897333.82 ft
East: 1171374.94 ft
Station: 7311+57.22
Offset: 11.9525 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	493.0							
		--DIFFICULT DRILLING-- --WEATHERED BEDROCK--						
	491.5							
		Strong, light gray, very poor rock mass quality, bedded fresh DOLOSTONE, up to 8-inch beds, up to 4-inch spaced joints, horizontal and vertical joints with none to more than 0.2-inch greenish gray infilling, hard joint wall, with stylolitic surfaces, and moderately vuggy porosity.	105		1	CORE		
		--Run 1 - RECOVERY=97%-- --RQD=8%--				CORE		
		--Run 2 - RECOVERY=87%-- --RQD=20%--	110		2			
	481.5							
		Boring terminated at 68.50 ft	115					
			120					
			125					

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)

GENERAL NOTES

Begin Drilling: **02-26-2014** Complete Drilling: **03-03-2014**
Drilling Contractor: **Wang Testing Services** Drill Rig: **B-57 TMR**
Driller: **P&P** Logger: **F. Bozga** Checked by: **C. Marin**
Drilling Method: **2.25" HSA to 15', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling: **8.00 ft**
At Completion of Drilling: **mud at 7 ft**
Time After Drilling: **144 hours**
Depth to Water: **16.00 ft**

The stratification lines represent the approximate boundary between soil types; the actual transition may be gradual.

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BORING LOG 10-RWB-03

WEI Job No.: 1100-04-01

Client: **AECOM**
Project: **Circle Interchange Reconstruction**
Location: **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88
Elevation: 593.09 ft
North: 1897135.88 ft
East: 1171421.19 ft
Station: 7313+60.04
Offset: 3.9003 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	592.2	11-inch thick, dark brown SILTY LOAM						
		--TOPSOIL--						
		Medium dense, black and reddish brown SILTY LOAM, trace gravel			1	16 9 10	NP	25
		--FILL--						
	589.1							
		Loose to medium dense. brown SAND, trace gravel	5		2	5 7 10	NP	6
		--FILL--			3	2 2 2	NP	22
	584.3							
		Stiff to very stiff, gray CLAY, trace gravel	10		4	2 4 8	2.46 B	24
					5	4 4 5	2.46 B	28
		--L_L(%)=37, P_L(%)=19--			6	2 3 4	2.21 B	22
		--%Gravel=2.0--	15					
		--%Sand=15.8--						
		--%Silt= 39.6--						
		--%Clay=42.5--						
		--A-6 (14)--			7	3 4 5	1.72 B	29
	575.1							
		Very soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel	20		8	2 1 2	0.33 B	28
					9	1 1 1	0.16 B	31
			25		10	1 2 2	0.16 B	29
	543.8							
			30		11	2 2 2	0.16 B	27
					12	2 2 2	0.16 B	22
			35		13	2 1 3	0.16 B	26
			40		14	2 2 2	0.25 B	25
			45		15	2 3 4	0.16 B	24
			50		16	3 5 6	0.90 B	26

GENERAL NOTES

Begin Drilling: **02-21-2014** Complete Drilling: **02-25-2014**
Drilling Contractor: **Wang Testing Services** Drill Rig: **D-25 ATV**
Driller: **N&J** Logger: **A. Happel** Checked by: **C. Marin**
Drilling Method: **2.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling: **Rotary wash**
At Completion of Drilling: **unable to measure**
Time After Drilling: **NA**
Depth to Water: **NA**

The stratification lines represent the approximate boundary between soil types; the actual transition may be gradual.

WANGENGINC 11000401.GPJ WANGENG.GDT 1/4/17

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BORING LOG 10-RWB-03

WEI Job No.: 1100-04-01

Client: **AECOM**
Project: **Circle Interchange Reconstruction**
Location: **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88
Elevation: 593.09 ft
North: 1897135.88 ft
East: 1171421.19 ft
Station: 7313+60.04
Offset: 3.9003 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		Hard, gray SILTY CLAY, trace gravel	55		17	10 17 25	6.15 B	17
	534.1	Dense to very dense, gray, fine SAND and SILT laminations --Moist to wet--	60		18	16 28 34	NP	17
			65		19	12 21 27	NP	22
		--L_L(%)=NP, P_L(%)=NP-- --%Gravel=0.1-- --%Sand=44.4-- --%Silt=51.6-- --%Clay=4.0-- --A-4 (0)--	70		20	16 21 31	NP	21
			75		21	21 20 25	NP	22
	514.4	Hard, gray SILTY CLAY LOAM to SILTY LOAM, trace gravel	80		22	18 27 31	4.50 P	14
			85		23	20 27 46	4.92 S	14
	506.3	Very dense, gray SILTY LOAM, trace to little gravel --Damp to dry--	90		24	50/5	NP	12
		--HARD DRILLING--	95		25	50/5	NP	14
	495.6	Very dense, gray DOLOSTONE fragments -- WEATHERED BEDROCK--	100		26	50/1	NP	11

GENERAL NOTES

Begin Drilling: **02-21-2014** Complete Drilling: **02-25-2014**
Drilling Contractor: **Wang Testing Services** Drill Rig: **D-25 ATV**
Driller: **N&J** Logger: **A. Happel** Checked by: **C. Marin**
Drilling Method: **2.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling: **Rotary wash**
At Completion of Drilling: **unable to measure**
Time After Drilling: **NA**
Depth to Water: **NA**

The stratification lines represent the approximate boundary between soil types; the actual transition may be gradual.

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BORING LOG 10-RWB-03

WEI Job No.: 1100-04-01

Client: **AECOM**
Project: **Circle Interchange Reconstruction**
Location: **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88
Elevation: 593.09 ft
North: 1897135.88 ft
East: 1171421.19 ft
Station: 7313+60.04
Offset: 3.9003 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		--DIFFICULT DRILLING--						
		--AUGER REFUSAL--						
	490.1	Boring terminated at 103.00 ft						
			105					
			110					
			115					
			120					
			125					

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)

GENERAL NOTES

Begin Drilling: **02-21-2014** Complete Drilling: **02-25-2014**
Drilling Contractor: **Wang Testing Services** Drill Rig: **D-25 ATV**
Driller: **N&J** Logger: **A. Happel** Checked by: **C. Marin**
Drilling Method: **2.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling: ▽ **Rotary wash**
At Completion of Drilling: ▼ **unable to measure**
Time After Drilling: **NA**
Depth to Water: ▼ **NA**

The stratification lines represent the approximate boundary between soil types; the actual transition may be gradual.

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BORING LOG 14-RWB-01

WEI Job No.: 1100-04-01

Client: **AECOM**
Project: **Circle Interchange Reconstruction**
Location: **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88
Elevation: 580.85 ft
North: 1897238.90 ft
East: 1171475.76 ft
Station: 6232+11.89
Offset: 63.2525 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	579.6	15-inch thick CONCRETE --PAVEMENT--						
	579.3	3-inch thick ASPHALT						
		Medium dense, brownish white CRUSHED STONE			1	15 17 9	NP	15
	577.6	--BASE COURSE--						
		Soft, gray CLAY to SILTY CLAY, trace gravel	5		2	3 2 3	0.49 B	22
					3	1 2 2	0.57 B	28
			10		4	1 2 1	0.41 B	27
					5	2 1 2	0.41 B	23
			15		6	2 2 2	0.25 B	27
					7	2 1 3	0.25 B	26
			20		8	1 1 1	0.25 B	28
					9	1 2 1	0.16 B	23
			25		10	1 2 1	0.25 B	25
			30		11	0 2 2	0.33 B	26
					12	2 3 3	0.49 B	25
			35		13	2 3 4	0.25 B	21
	544.1	Very stiff to hard, gray SILTY CLAY, trace gravel						
			40		14	3 4 5	3.00 P	19
			45		15	12 18 47	5.17 B	17
	534.1	Very stiff, gray SILTY LOAM to SILTY CLAY LOAM, trace gravel						
			50		16	33 45 32/4	3.28 S	15

GENERAL NOTES

Begin Drilling: **07-28-2014** Complete Drilling: **07-29-2014**
Drilling Contractor: **Wang Testing Services** Drill Rig: **CME-55 TMR**
Driller: **R&J** Logger: **A. Happel** Checked by: **C. Marin**
Drilling Method: **2.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling: **52.00 ft**
At Completion of Drilling: **unable to measure**
Time After Drilling: **NA**
Depth to Water: **NA**

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BORING LOG 14-RWB-01

WEI Job No.: 1100-04-01

Client: **AECOM**
Project: **Circle Interchange Reconstruction**
Location: **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88
Elevation: 580.85 ft
North: 1897238.90 ft
East: 1171475.76 ft
Station: 6232+11.89
Offset: 63.2525 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	529.1	Very dense, gray SAND to SANDY LOAM, trace gravel						
			55		17	17 23 36	NP	18
			60		18	13 30 22	NP	19
					19	14 23 33	NP	17
	515.8	Boring terminated at 65.00 ft	65					
			70					
			75					

GENERAL NOTES

Begin Drilling: **07-28-2014** Complete Drilling: **07-29-2014**
Drilling Contractor: **Wang Testing Services** Drill Rig: **CME-55 TMR**
Driller: **R&J** Logger: **A. Happel** Checked by: **C. Marin**
Drilling Method: **2.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling: **52.00 ft**
At Completion of Drilling: **unable to measure**
Time After Drilling: **NA**
Depth to Water: **NA**

The stratification lines represent the approximate boundary between soil types; the actual transition may be gradual.

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BORING LOG 14-RWB-02

WEI Job No.: 1100-04-01

Client: **AECOM**
Project: **Circle Interchange Reconstruction**
Location: **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88
Elevation: 582.26 ft
North: 1897133.58 ft
East: 1171489.78 ft
Station: 6233+15.05
Offset: 62.0541 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	581.9	4-inch thick, ASPHALT --PAVEMENT--						
	580.8	14-inch thick, CONCRETE --PAVEMENT--						
		Dense, grayish white CRUSHED STONE			1	37 30 18	NP	5
	578.3	--FILL--						
		Soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel	5		2	1 2 3	0.41 B	24
					3	0 1 1	0.41 B	25
			10		4	0 0 1	0.25 B	27
					5	0 0 0	0.16 B	26
			15		6	0 0 2	0.49 B	24
					7	0 0 0	0.41 B	26
			20		8	0 0 0	0.25 B	20
					9	0 0 1	0.08 B	27
			25		10	0 0 1	0.57 B	25
			30		11	0 1 2	0.57 B	24
					12	0 0 2	0.41 B	25
			35		13	0 1 2	0.66 B	26
			40		14	0 0 1	0.25 B	37
	540.5	Hard, gray SILTY CLAY, trace gravel						
			45		15	6 11 19	7.13 B	19
	535.5	Gray SILTY LOAM, trace gravel						
	533.1	Medium dense, brown, fine	50		16	14 23 18	NP	17

GENERAL NOTES

Begin Drilling: **07-30-2014** Complete Drilling: **07-30-2014**
Drilling Contractor: **Wang Testing Services** Drill Rig: **D-50 TMR**
Driller: **R&J** Logger: **S. Woods** Checked by: **C. Marin**
Drilling Method: **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling: **Rotary wash**
At Completion of Drilling: **unable to measure**
Time After Drilling: **NA**
Depth to Water: **NA**

The stratification lines represent the approximate boundary between soil types; the actual transition may be gradual.

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BORING LOG 14-RWB-02

WEI Job No.: 1100-04-01

Client **AECOM**
Project **Circle Interchange Reconstruction**
Location **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88
Elevation: 582.26 ft
North: 1897133.58 ft
East: 1171489.78 ft
Station: 6233+15.05
Offset: 62.0541 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		SAND --Moist--						
			55		17	12 14 14	NP	27
	525.5							
		Dense, gray SILT --Moist--						
			60		18	11 17 19	NP	22
	520.5							
		Medium dense, brown fine SAND --Moist--						
	517.3		65		19	9 11 13	NP	21
		Boring terminated at 65.00 ft						
			70					
			75					

GENERAL NOTES

Begin Drilling **07-30-2014** Complete Drilling **07-30-2014**
Drilling Contractor **Wang Testing Services** Drill Rig **D-50 TMR**
Driller **R&J** Logger **S. Woods** Checked by **C. Marin**
Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling ▽ **Rotary wash**
At Completion of Drilling ▼ **unable to measure**
Time After Drilling **NA**
Depth to Water ▼ **NA**

The stratification lines represent the approximate boundary between soil types; the actual transition may be gradual.

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BORING LOG 15-RWB-01

WEI Job No.: 1100-04-01

Client: **AECOM**
Project: **Circle Interchange Reconstruction**
Location: **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88
Elevation: 593.54 ft
North: 1897200.61 ft
East: 1171415.26 ft
Station: 7312+95.51
Offset: 3.9204 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	592.4	14-inch thick, black SILTY LOAM --TOPSOIL--						
	590.5	Medium dense, black and brown LOAM, some gravel and brick fragments --FILL--			1	6 10 10	NP	15
		Medium dense to dense, black and brown SILTY LOAM, trace gravel and brick fragments --FILL--	5		2	3 17 14	NP	57
					3	9 6 5	NP	22
	585.5							
	584.8	Gray, medium SAND, trace gravel						
		Very stiff, gray SILTY CLAY, trace gravel	10		4	2 3 6	3.36 B	23
					5	5 6 7	3.03 B	26
	580.5							
		Very soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel	15		6	2 1 2	0.33 B	27
					7	1 1 1	0.16 B	24
			20		8	1 1 1	0.16 B	29
					9	2 1 3	0.16 B	24
			25		10	2 2 2	0.25 B	20
			30		11	2 1 2	0.33 B	24
					12	1 2 3	0.16 B	26
			35		13	1 2 2	0.16 B	25
			40		14	2 3 3	0.25 B	24
		--L_L(%)=34, P_L(%)= 18-- --%Gravel=4.4-- --%Sand=14.5--45 --%Silt=47.7-- --%Clay=33.3-- --A-6 (12)--			15	3 4 5	0.50 P	25
			50		16	2 2 2	0.82 B	27

GENERAL NOTES

Begin Drilling: **02-25-2014** Complete Drilling: **02-28-2014**
Drilling Contractor: **Wang Testing Services** Drill Rig: **D-25 ATV**
Driller: **N&J** Logger: **A. Happel** Checked by: **CLM**
Drilling Method: **2.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling: **Rotary wash**
At Completion of Drilling: **unable to measure**
Time After Drilling: **NA**
Depth to Water: **NA**

The stratification lines represent the approximate boundary between soil types; the actual transition may be gradual.

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BORING LOG 15-RWB-01

WEI Job No.: 1100-04-01

Client: **AECOM**
Project: **Circle Interchange Reconstruction**
Location: **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88
Elevation: 593.54 ft
North: 1897200.61 ft
East: 1171415.26 ft
Station: 7312+95.51
Offset: 3.9204 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	541.8	Hard, gray SILTY CLAY LOAM, trace gravel						
			55		17	14 18 30	5.33 S	13
			60		18	14 22 26	6.72 S	13
	531.8	Dense, gray, medium SAND, trace gravel						
		--Moist to wet--	65		19	13 20 25	NP	24
		--HARD DRILLING-- *--Possible Cobbles--*						
		--%Gravel=0.2-- --%Sand=79.5-- --%Silt=18.3-- --%Clay=2.0-- --A-2-4 (0)--	70		20	22 16 24	NP	24
			75		21	14 18 21	NP	19
	516.8	Hard, gray SILTY CLAY LOAM to SILTY LOAM, trace gravel						
			80		22	18 39 50	4.50 P	13
			85		23	22 32 50	9.02 S	13
		--L_L(%)=26, P_L(%)=16-- --%Gravel=0.1-- --%Sand=11.7-- --%Silt=62.6-- --%Clay=25.6--						
	503.5	--A-4 (7)--	90		24	25 33 48	10.25 S	13
		Boring terminated at 90.00 ft						
			95					
			100					

GENERAL NOTES

Begin Drilling: **02-25-2014** Complete Drilling: **02-28-2014**
Drilling Contractor: **Wang Testing Services** Drill Rig: **D-25 ATV**
Driller: **N&J** Logger: **A. Happel** Checked by: **CLM**
Drilling Method: **2.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling: **Rotary wash**
At Completion of Drilling: **unable to measure**
Time After Drilling: **NA**
Depth to Water: **NA**

The stratification lines represent the approximate boundary between soil types; the actual transition may be gradual.

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BORING LOG VST-01

WEI Job No.: 1100-04-01

Client: **AECOM**
Project: **Circle Interchange Reconstruction**
Location: **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88
Elevation: 593.55 ft
North: 1897108.36 ft
East: 1171435.63 ft
Station: 7313+90.29
Offset: 3.222 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		Very stiff, brown SILTY CLAY LOAM, trace gravel						
		--FILL--			1	3 5 7	2.75 P	14
	590.5							
		Medium dense, fine SAND			2	5 5 6	NP	7
	586.8		5					
		Medium stiff to stiff, gray SILTY CLAY			3	2 2 3	1.31 B	26
			10		4	2 2 3	0.98 B	28
	578.0		15					
		Soft, gray SILTY CLAY			5	1 2 2	0.25 P	29
	575.3							
		--In-Situ Vane Shear, 19.5 feet--	20		1	VS		
		$--S_{u\ undis}$ = 786.3 psf--						
		$--S_{u\ remold}$ = 371.3 psf--						
		--Sensitivity = 2.1--						
		--In-Situ Vane Shear, 22.0 feet--			2	VS		
		$--S_{u\ undis}$ = 742.6 psf--						
		$--S_{u\ remold}$ = 305.8 psf--						
		--Sensitivity = 2.4--						
		--In-Situ Vane Shear, 24.5 feet--	25		3			
		$--S_{u\ undis}$ = 578.8 psf--				VS		
		$--S_{u\ remold}$ = 382.2 psf--						
		--Sensitivity = 1.5--						
		--In-Situ Vane Shear, 27.0 feet--			4	VS		
		$--S_{u\ undis}$ = 742.6 psf--						
		$--S_{u\ remold}$ = 415.0 psf--						
		--Sensitivity = 1.8--						
		--In-Situ Vane Shear, 29.5 feet--	30		5	VS		
		$--S_{u\ undis}$ = 589.7 psf--						
		$--S_{u\ remold}$ = 283.9 psf--						
		--Sensitivity = 2.1--						
		--In-Situ Vane Shear, 32.0 feet--			6	VS		
		$--S_{u\ undis}$ = 1026.6 psf--						
		$--S_{u\ remold}$ = 447.8 psf--						
		--Sensitivity = 2.3--						
		--In-Situ Vane Shear, 34.5 feet--	35		7	VS		
		$--S_{u\ undis}$ = 764.5 psf--						
		$--S_{u\ remold}$ = 480.5 psf--						
		--Sensitivity = 1.6--						
		--In-Situ Vane Shear, 37.0 feet--			8	VS		
		$--S_{u\ undis}$ = 1026.6 psf--						
		$--S_{u\ remold}$ = 589.7 psf--						
		--Sensitivity = 1.7--						
			40					
		--Equipment Slipped--	45		9	VS		
		--In-Situ Vane Shear, 46.5 feet--			10	VS		
		$--S_{u\ undis}$ = 1070.2 psf--						
		$--S_{u\ remold}$ = 633.4 psf--						
		--Sensitivity = 1.7--						
	544.0	--In-Situ Vane Shear, 49.0 feet--			11	VS		
		$--S_{u\ undis}$ = 1157.6 psf--	50					

GENERAL NOTES

Begin Drilling: **12-01-2015** Complete Drilling: **12-01-2015**
Drilling Contractor: **Wang Testing Services** Drill Rig: **CME-55 TMR**
Driller: **R&N** Logger: **F. Bozga** Checked by: **A. Kurnia**
Drilling Method: **2.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling: **Rotary wash**
At Completion of Drilling: **unable to measure**
Time After Drilling: **NA**
Depth to Water: **NA**

The stratification lines represent the approximate boundary between soil types; the actual transition may be gradual.

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BORING LOG VST-01

WEI Job No.: 1100-04-01

Client: **AECOM**
Project: **Circle Interchange Reconstruction**
Location: **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88
Elevation: 593.55 ft
North: 1897108.36 ft
East: 1171435.63 ft
Station: 7313+90.29
Offset: 3.222 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		$--S_{u\ remold}$ = 611.6 psf-- --Sensitivity = 2.3--						
		Boring terminated at 49.50 ft						
			55					
			60					
			65					
			70					
			75					

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)

GENERAL NOTES

Begin Drilling: **12-01-2015** Complete Drilling: **12-01-2015**
Drilling Contractor: **Wang Testing Services** Drill Rig: **CME-55 TMR**
Driller: **R&N** Logger: **F. Bozga** Checked by: **A. Kurnia**
Drilling Method: **2.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling: **Rotary wash**
At Completion of Drilling: **unable to measure**
Time After Drilling: **NA**
Depth to Water: **NA**

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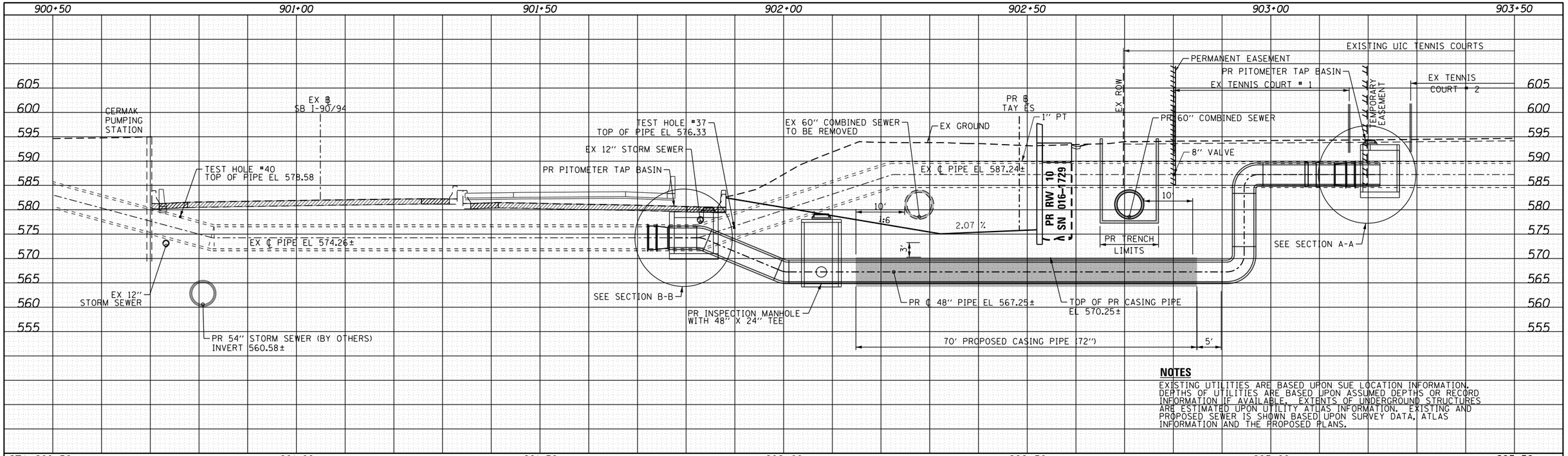
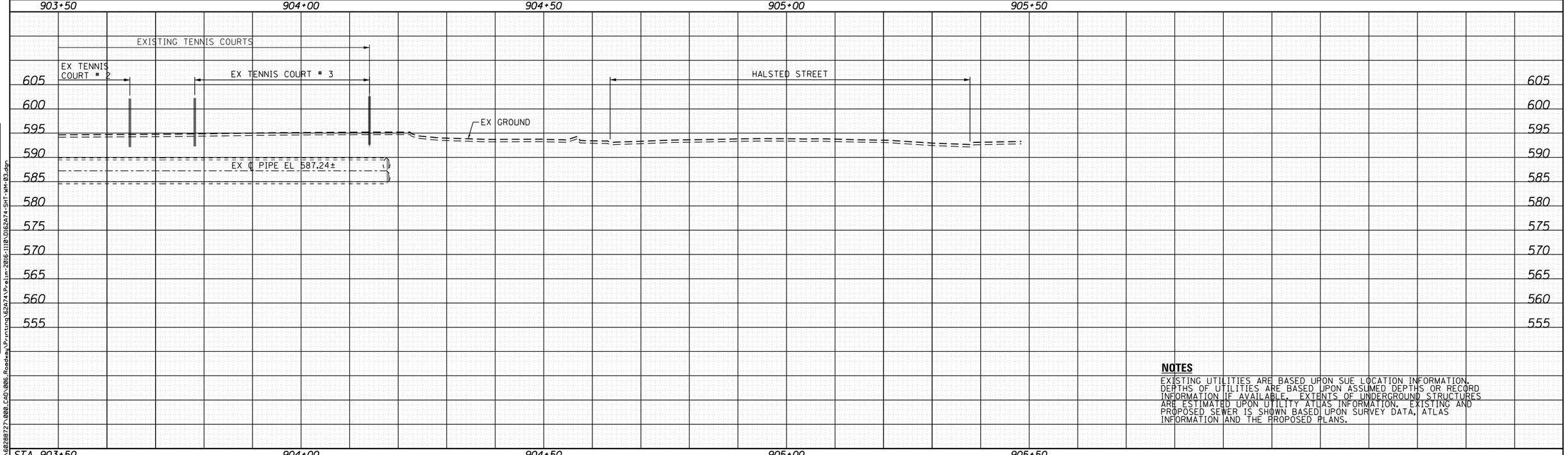


STA 900+50 | 901+00 | 901+50 | 902+00 | 902+50 | 903+00 | 903+50

54" SOUTH WEST WATER MAIN PROFILE
(EX ℄ 54" WATER MAIN)

NOTES

EXISTING UTILITIES ARE BASED UPON SUE LOCATION INFORMATION. DEPTHS OF UTILITIES ARE BASED UPON ASSUMED DEPTHS OR RECORD INFORMATION IF AVAILABLE. EXTENTS OF UNDERGROUND STRUCTURES ARE ESTIMATED UPON UTILITY ATLAS INFORMATION. EXISTING AND PROPOSED SEWER IS SHOWN BASED UPON SURVEY DATA, ATLAS INFORMATION AND THE PROPOSED PLANS.



STA 903+50 | 904+00 | 904+50 | 905+00 | 905+50

NOTES

EXISTING UTILITIES ARE BASED UPON SUE LOCATION INFORMATION. DEPTHS OF UTILITIES ARE BASED UPON ASSUMED DEPTHS OR RECORD INFORMATION IF AVAILABLE. EXTENTS OF UNDERGROUND STRUCTURES ARE ESTIMATED UPON UTILITY ATLAS INFORMATION. EXISTING AND PROPOSED SEWER IS SHOWN BASED UPON SURVEY DATA, ATLAS INFORMATION AND THE PROPOSED PLANS.

FINAL SURVEY / ORIGINAL SURVEY
NOTE BOOK
NO.
SURVEYED
PLOTTED
TEMPLATE
AREAS
AREAS CHECKED
BY
DATE

FILE PATH = P:\60288727\000.CAD\006.Roadway\Printing\62A74\Prelim-2016-1110\D162A74-SHT-WM-03.dgn

AECOM
303 EAST WACKER DRIVE, SUITE 1400
CHICAGO, IL 60601-5276
PHONE: (312) 373-7700 FAX: (312) 373-6800

D162A74-SHT-WM-03.dgn	DESIGNED - RBB	REVISED -
USER NAME = PIMSARNO	DRAWN - OPS	REVISED -
PLOT SCALE = 20.0000 ' / in.	CHECKED - DBM	REVISED -
PLOT DATE = 11/11/2016	DATE - 11/11/2016	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

54" SOUTH WEST WATER MAIN PROFILE
PROPOSED WATER MAIN REPLACEMENT AND LINING

SCALE: 1" = 10' | SHEET 1 OF 1 SHEETS | STA. | TO STA.

F.A.I RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2015-022-I	COOK	173	59
		CONTRACT NO. 62A74		
		ILLINOIS FED. AID PROJECT		