Wang Engineering

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Lombard, Illinois 60148
Phone (630) 953-9928
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May 23, 2018

Mr. Amish T. Bhatt, S.E., P.E.
AECOM
303 East Wacker Drive, Suite 1400
Chicago, IL 60601

Re: Geotechnical Letter Report
High Mast Light Towers 6 ZEF2, 6 ZGH1, and 6 ZMN1
Jane Byrne Interchange Contract 60X79
Wang No. 1100-04-01

Dear Mr. Bhatt,

This letter report presents our geotechnical recommendations for the design and construction of high mast light tower (HMLT) foundations designated as 6 ZEF2, 6 ZGH1, and 6 ZMN1. The HMLTs to be constructed under Contract 60X79 are proposed at the following locations.

- HMLT 6 ZEF2 is proposed at southwest corner of Van Buren and DesPlaines Street.
- HMLT 6 ZGH1 is proposed at southwest corner of DesPlaines Street and existing Ramp NE.
- HMLT 6 ZMN1 is proposed between I-90/94 SB and NB; North of Ramp EN.

No specific boring was performed at the HMLT locations. However, Wang Engineering, Inc. (Wang) completed several structure borings in the proximity of the proposed tower locations. The HMLT locations and reference borings are shown in Table 1.

Table 1: HMLT Locations and Reference Borings

HMLT ID	Station	Offset (feet)	Reference Borings
6 ZEF2	1211+94.9 (Ramp WS)	83 RT	22-RWB-03, 22-RWB-04, PS-5-CCTV, and VST-06
6 ZGH1	6326+95.0 (PR NB C-D Road)	43 RT	1710-B-04, 21-RWB-03, 21-RWB-04, and VST-06
6 ZMN1	1609+69.8 (Ramp EN)	119 LT	1712-B-02, 1714-B-04, and VST-06

HMLT 6 ZEF2

Boring revealed 3 to 6-inch thick topsoil at the surface. Beneath the topsoil, the borings encountered granular and cohesive fills consisting of loose to medium dense, brown sand to sandy loam to hard silty clay loam. Underlying the fill, the borings encountered soft to very stiff, gray clay to silty clay. At elevations of 570.9 to 582.1 feet, the borings encountered very soft to medium stiff, gray clay to silty clay. The clay to silty clay has unconfined compressive strength (Q_u) of 0.2 to 0.9 tsf, moisture content of 21 to 29%. At elevation of 540.9 to 548.1 feet, the borings encountered stiff to very hard, gray silty clay to silty clay loam with Qu values of 1.5 to 4.9 tsf, moisture content values of 13 to 22%. At an elevation of 525.9 to 529.6 feet, the borings encountered very dense sand to sandy with N-values of 50 to 54 blows per foot, and moisture content values of 11 to 20%. At elevations of 523.3 feet, the borings encountered, hard, gray silty loam to silty clay loam with Qu values of 4.5 to 7.3 tsf, moisture content values of 13 to 17%. Very dense, gray sandy gravel to silty loam soil lying above bedrock has N-values greater than 50, and moisture content values of 11 to 16%. Boring 22-RWB-03 encountered dolostone bedrock at an elevation of 487.6 feet, 100 feet bgs.

Rotary drilling technique was used. Boring 22-RWB-03 encountered groundwater while drilling at elevation of 525.6 feet, 62 feet bgs.

HMLT 6 ZGH1

Boring revealed 5-inch thick, black silty loam topsoil or 4-inch thick asphalt over 8-inch thick concrete. Beneath the topsoil and pavement, the borings encountered granular and cohesive fills consisting of dense, brown and gray sand; very stiff to hard silty clay loam. Underlying the fill,

borings encountered 3 to 6 feet thick, medium stiff to stiff, gray silty clay to silty clay loam. At elevations of 578.0 to 579.9 feet, the borings encountered very soft to medium stiff, gray clay to silty clay. The clay to silty clay has Q_u values of 0.2 to 0.9 tsf, moisture content values of 20 to 27%. At elevation of 536.1 to 541.8 feet, the borings encountered stiff to hard, gray silty clay to silty clay loam with Qu values of 1.6 to 8.5 tsf, and moisture content values of 16 to 22%. At elevation of 520.2 to 531.1 feet, the borings encountered dense to very dense silt, sandy gravel to gravelly sand with N-values of 44 to 64 blows per foot, and moisture content values of 9 to 21%. Borings 21-RWB-03 and 1710-B-04 encountered dolostone bedrock at elevations of 485.5 to 490.2 feet, 102 to 103 feet bgs.

The groundwater was encountered while drilling at an elevation of 585 feet, 3.5 feet bgs in Boring 1710-B-04. At completion of drilling, the groundwater was measured at an elevation of 499 feet, 90 feet bgs.

HMLT 6 ZMN1

Boring revealed 2 to 4-inch thick asphalt and 12 to 13.5-inch thick concrete. Beneath the pavement, the borings encountered granular fill consisting of medium dense sandy loam to sandy gravel. At elevations of 569.9 to 574.8 feet, the borings encountered very soft to medium stiff, gray clay to silty clay. The soil has unconfined compressive strength (Q_u) of 0.2 to 0.9 tsf, moisture content of 17 to 28%. At elevations of 541.6 to 543.6 feet, the borings encountered stiff to hard, gray silty clay to silty clay loam with Qu values of 1.0 to 7.5 tsf, moisture content values of 15 to 27%. At elevations of 521.6 to 523.6 feet, the borings encountered medium dense to very dense silty loam, sandy loam to gravelly sand with SPT N-values of 23 to 84 blows per foot, and moisture content values of 11 to 23%. Borings encountered bedrock at an elevation of 485 to 487 feet, 90 to 91 feet bgs.

Borings encountered groundwater while drilling at elevation 521 to 523 feet, 52 to 57 feet bgs. At completion of drilling, boring encountered groundwater at elevation of 496 feet, 82 feet bgs.

Our analysis and recommendation were based on generalized *Subsurface Data Profile* (Exhibit 2), Vane Shear Test from VST-06, and *Laboratory Test Result* (Appendix B). The recommended soil parameters for lateral load analysis via the p-y curve (LPILE) method are provided in Tables 2, 3, and 4. The shear strength of very soft to medium stiff clay was obtained from vane shear test (VST) conducted in VST-06. The VST is a more accurate in-situ shear strength test for low strength cohesive soils. The boring and tower locations are shown on the attached Exhibit 1. Boring logs and

laboratory test results are shown in the *Boring Logs* (Appendix A) and *Laboratory Test Results* (Appendix B).

Table 2: Recommended Soil Parameters for Laterally Loaded Drilled Shaft Analysis for HMLT 6 ZEF2
Ref. Borings: PS-5-CCTV, 22-RWB-03, 22-RWB-04, and VST-06

Soil Type / Layer Elevation	Moist Unit Weight, γ (pcf)	Undrained Shear Strength, c_u (psf)	Estimated Friction Angle, Φ (°)	Estimated Lateral Soil Modulus Parameter, k (pci)	Estimated Soil Strain Parameter, ε_{50} (%)
Loose to M Dense SAND FILL EL 592 to 584 feet	120	0	30	30	--
M Stiff to Stiff SILTY CLAY EL 584 to 581 feet	120	1200	0	1000	0.7
Soft to M Stiff CLAY to SILTY CLAY EL 581 to 576 feet	115	900[(1)]	0	100	1.0
Soft to M Stiff CLAY to SILTY CLAY EL 576 to 564 feet	110	600[(1)]	0	80	1.0
M Stiff CLAY to SILTY CLAY EL 564 to 548 feet	115	800[(1)]	0	100	1.0
V Stiff SILTY CLAY to SILTY CLAY LOAM EL 548 to 540 feet	120	1800	0	500	0.7
V Stiff to Hard SILTY CLAY to SILTY CLAY LOAM EL 540 to 526 feet	125	3400	0	1000	0.5
V Dense SAND EL 526[(2)] to 523 feet	63[(3)]	0	37	125	--
Hard SILTY CLAY LOAM to SILTY LOAM EL 523 to 511 feet	63[(3)]	5000	0	2000	0.4
V Dense SILTY LOAM EL 511 to 491 feet	63[(3)]	0	36	120	--
V Dense SANDY GRAVEL EL 491[(4)] to 485 feet	68[(3)]	0	38	125	--

[(1)]From vane shear test result in Boring VST-06, [(2)]Groundwater Elevation, [(3)]Submerged Unit Weight, and [(4)]Top of weathered bedrock

Table 3: Recommended Soil Parameters for Laterally Loaded Drilled Shaft Analysis for HMLT 6 ZGH1
Ref. Borings: 1710-B-04, 21-RWB-03, 21-RWB-04, and VST-06

Soil Type / Layer Elevation	Moist Unit Weight, γ (pcf)	Undrained Shear Strength, c_u (psf)	Estimated Friction Angle, Φ (°)	Estimated Lateral Soil Modulus Parameter, k (pci)	Estimated Soil Strain Parameter, ε_{50} (%)
Granular FILL EL 588 to 584 feet	120	0	30	30	--
M Stiff to Stiff SILTY CLAY to SILTY CLAY LOAM EL 584 to 578 feet	120	1200	0	500	0.7
Soft to M Stiff CLAY to SILTY CLAY EL 578 to 566 feet	115	900[(1)]	0	100	1.0
Soft to M Stiff CLAY to SILTY CLAY EL 566 to 556 feet	110	600[(1)]	0	80	1.0
M Stiff CLAY to SILTY CLAY EL 556 to 542 feet	115	800[(1)]	0	100	1.0
Stiff SILTY CLAY EL 542 to 538 feet	120	1600	0	500	0.7
Stiff to Very Stiff SILTY CLAY EL 538 to 527 feet	120	2700	0	1000	0.5
Hard SILT to SILTY LOAM EL 527 to 499 feet	125	8000	0	2000	0.4
V Dense GRAVELLY SAND to SANDY LOAM EL 499[(2)] to 486[(4)] feet	63[(3)]	0	37	125	--

[(1)]From vane shear test result in Boring VST-06, [(2)]Groundwater Elevation, [(3)]Submerged Unit Weight, and [(4)]Top of bedrock

Table 4: Recommended Soil Parameters for Laterally Loaded Drilled Shaft Analysis for HMLT 6 ZMN1
Ref. Borings: 1712-B-02, 1714-B-04, and VST-06

Soil Type / Layer Elevation	Moist Unit Weight, γ (pcf)	Undrained Shear Strength, c_u (psf)	Estimated Friction Angle, Φ (°)	Estimated Lateral Soil Modulus Parameter, k (pci)	Estimated Soil Strain Parameter, ε_{50} (%)
Medium Dense GRANULAR FILL EL 578 to 575 feet	120	0	30	30	--
Soft to M Stiff CLAY to SILTY CLAY EL 575 to 565 feet	115	900[(1)]	0	100	1.0
Soft to M Stiff CLAY to SILTY CLAY EL 565 to 553 feet	110	600[(1)]	0	80	1.0
M Stiff CLAY to SILTY CLAY EL 553 to 542 feet	115	800[(1)]	0	100	1.0
Stiff to Very Stiff SILTY CLAY EL 542 to 534 feet	120	1700	0	500	0.7
Very Stiff to Hard CLAY to SILTY CLAY LOAM EL 534 to 521 feet	125	5000	0	2000	0.4
Medium Dense to V Dense SILTY LOAM to SANDY GRAVEL EL 521[(2)] to 487[(4)] feet	63[(3)]	0	35	125	--

[(1)]From vane shear test result in Boring VST-06, [(2)]Groundwater Elevation, [(3)]Submerged Unit Weight, and [(4)]Top of bedrock

Before performing the lateral analysis via p-y curve, we recommend estimating the minimum depth for drilled shaft foundations in accordance with the procedure outlined in the IDOT "*Drilled Shaft Overturning & Torsion Design Guide"* and accompanying excel spreadsheet titled "*Brom's Overturning & Torsional Shaft Analysis*" as per IDOT Geotechnical Manual (IDOT 2015). If the minimum required shaft depth determined according to IDOT design guide terminates within the soft to medium stiff clay to silty clay layer as shown on the SPT borings or above elevation 542 feet, a

lateral load shaft analysis via p-y curve shall be done to confirm moment and displacement fixity of the shaft base.

During drilled shaft installation, casing will be necessary to prevent shaft squeeze within soft clay layers and the collapse of intermittent water-bearing granular layers. The required length and type of casing shall be determined based on actual field conditions.

It has been a pleasure to assist AECOM in this phase of the project. If you have any questions, please do not hesitate to contact us.

Respectfully Submitted,

WANG ENGINEERING, INC.

Mohammed Kothawala, P.E., D.GE.
Senior Geotechnical Engineer

Corina T. Farez, P.E., P.G.
QA/QC Reviewer

Ramesh KC, EIT
Geotechnical Engineer

Attachments:
Exhibit: Boring and HMLT Locations Plan
: Subsurface Data Profile
Appendix A: Boring Logs
Appendix B: Laboratory Test Result

EXHIBIT

MATCH LINE STA 1613+00 (PR ℄ RAMP EN)
SEE SHEET NO.306

MATCH LINE STA 1618+50 (PR ℄ RAMP EN)
SEE SHEET NO.308

EX EB CONGRESS PKWY

EX WB CONGRESS PKWY

PR ℄ RAMP SE

PR ℄ RAMP EN

PR ℄ RAMP WN

PR ℄ RAMP WS

RAMP EN

RAMP WN

RAMP WS

PR ℄ WB I-290

PROPOSED IDOT LIGHTING CONTROLLER 'Z' SEE DRAWING E-13

NOTE 3

22-RWB-03, 587.62
Sta. 1212+29.37, 21.97 RT

22-RWB-04, 586.35
Sta. 1212+66.85, 28.47 RT

VST-06, 585.69
Sta. 1103+77.7, 27.38 RT

PS-5-CCTV, 592.38
Sta. 1212+37.64, 85.06 RT

CKTS ZE&ZF:
3-1/C NO. 2 &
1/C NO. 4 GND
CABLES IN 3"
PVCC RGC ATS

PROPOSED RETAINING WALL 22B
(SN 016-1839)
SEE STRUCTURAL PLANS

JB, SS, 18"x18"x8", ATS

JB, SS, 18"x18"x8", ATS

DES PLAINES STREET

PR ℄ EB I-290

PUMP STATION #5

VAN BUREN STREET

CKTS ZE & ZF:
3-1/C NO. 2 & 1/C NO. 4 GND. CABLES
IN 3" PVCC RGC ATS

CKTS ZE & ZF: 3-1/C
NO. 2 & 1/C NO. 4 GND
CABLES IN 1-1/2" UD

6 ZEF2
STA. 1211+94.9
83' RT.
(PR RAMP WS ℄)

EXISTING IDOT CAMERA TOWER

N

SCALE: 1"=20'
0 20 40

Legend

Soil Borings

NOTES:

1. SEE DRAWING E-01 FOR IDOT ELECTRICAL SYMBOLS.
2. ALL WORK SHOWN ON THIS DRAWING MUST BE COORDINATED WITH THIS CONTRACT'S CONSTRUCTION WORK AND STAGING.
3. DRILL THE EXISTING JUNCTION BOX ATTACHED TO STRUCTURE AND ROUTE A 3" CONDUIT ACROSS THE BRIDGE STRUCTURE TO THE PROPOSED JUNCTION BOX. SPLICE THE NEW LIGHTING CIRCUITS TO THE EXISTING LIGHTING CIRCUITS LOCATED WITHIN THE EXISTING JUNCTION BOX.

BORING AND HMLT LOCATION PLAN : CIRCLE INTERCHANGE RECONSTRUCTION, HMLT 6 ZEF2, 6 ZMN1, 6ZGH1, CONTRACT 60X79, COOK COUNTY, ILLINOIS

SCALE: GRAPHICAL | EXHIBIT 1-1 | DRAWN BY: R. KC | CHECKED BY: M. Kothawala

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FOR AECOM | 1100-04-01

KEY PLAN

N

SB NB

INTERSTATE 290

WB EB

WB EB

RAMP EN

SB NB

INTERSTATE 90 94

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

D160X79-sht-Light-10	DESIGNED - TJL	REVISED -
USER NAME = myersc	DRAWN - CAM	REVISED -
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PLOT DATE = 4/19/2018	DATE - 4-20-2018	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

PROPOSED LIGHTING PLAN
RAMP EN

SCALE: 1"=20' | SHEET 10 OF 23 SHEETS | STA. 1613+00 TO STA. 1618+50

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2014-005R&B	COOK	597	307
		CONTRACT NO. 60X79		
	ILLINOIS	FED. AID PROJECT		

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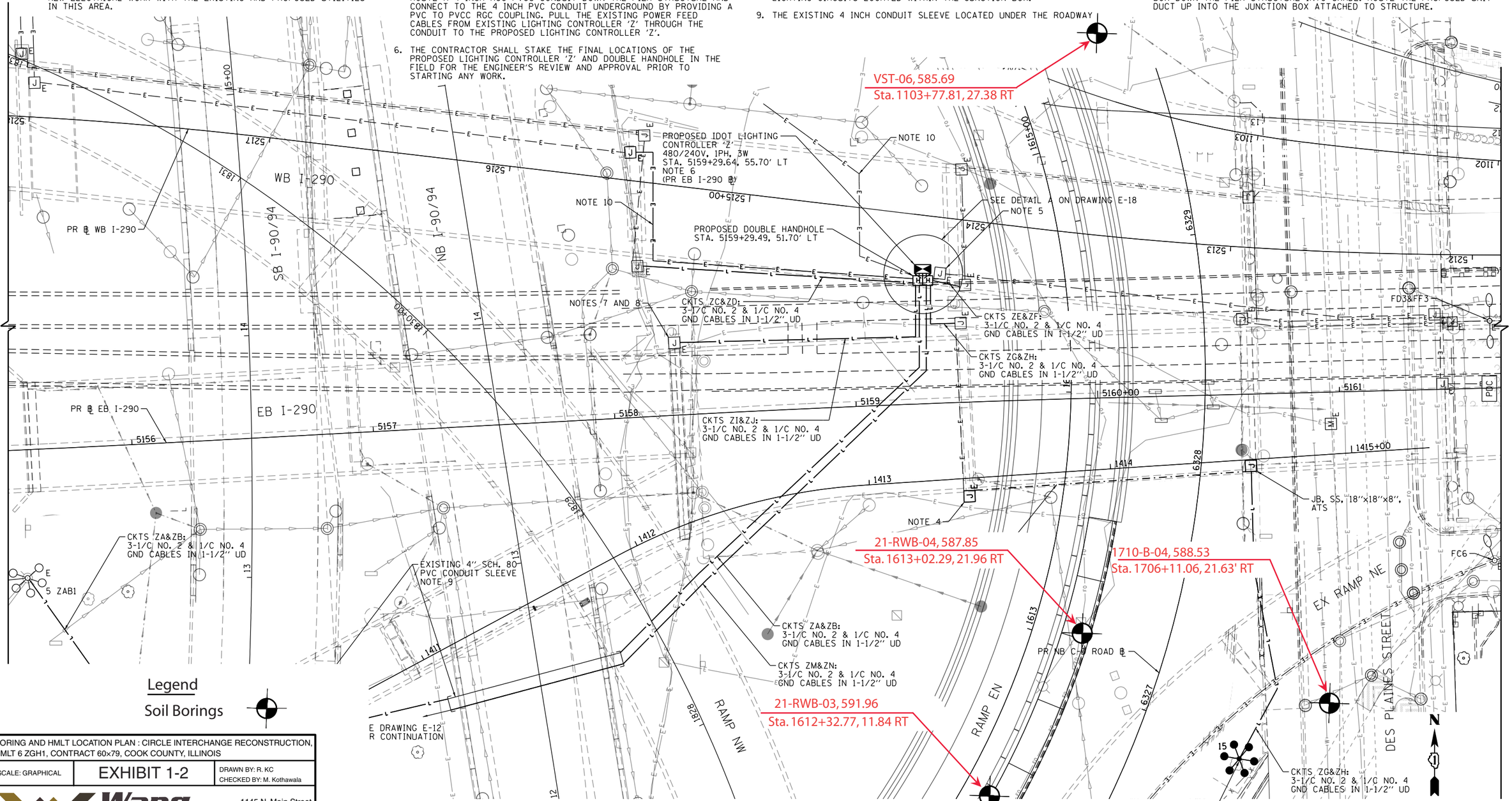
NOTES:

1. SEE DRAWING E-01 FOR IDOT ELECTRICAL SYMBOLS.
2. ALL WORK SHOWN ON THIS DRAWING MUST BE COORDINATED WITH THIS CONTRACT'S CONSTRUCTION WORK AND STAGING.
3. THE EXISTING UTILITIES ARE NOT SHOWN ON THIS SHEET FOR CLARITY. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING ALL NEW ELECTRICAL WORK WITH THE EXISTING AND PROPOSED UTILITIES IN THIS AREA.
4. DRILL THE EXISTING JUNCTION BOX ATTACHED TO STRUCTURE AND ROUTE A 3 INCH CONDUIT ACROSS THE BRIDGE STRUCTURE TO THE PROPOSED JUNCTION BOX AS SHOWN. SPLICE THE NEW LIGHTING CIRCUITS TO THE EXISTING LIGHTING CIRCUITS LOCATED WITHIN THE EXISTING JUNCTION BOX.
5. DRILL THE EXISTING JUNCTION BOX ATTACHED TO STRUCTURE AND ROUTE A 4 INCH RGC PVCC CONDUIT DOWN THE PIER STRUCTURE AND CONNECT TO THE 4 INCH PVC CONDUIT UNDERGROUND BY PROVIDING A PVC TO PVCC RGC COUPLING. PULL THE EXISTING POWER FEED CABLES FROM EXISTING LIGHTING CONTROLLER 'Z' THROUGH THE CONDUIT TO THE PROPOSED LIGHTING CONTROLLER 'Z'.
6. THE CONTRACTOR SHALL STAKE THE FINAL LOCATIONS OF THE PROPOSED LIGHTING CONTROLLER 'Z' AND DOUBLE HANDHOLE IN THE FIELD FOR THE ENGINEER'S REVIEW AND APPROVAL PRIOR TO STARTING ANY WORK.
7. REMOVE THE EXISTING LIGHTING CIRCUIT CABLES AND CLEAN THE EXISTING VERTICAL CONDUIT RISERS ATTACHED TO STRUCTURE PRIOR TO INSTALLING THE NEW CABLES.
8. ROUTE NEW UNIT DUCT UP THE INTO THE EXISTING CONDUITS ATTACHED TO STRUCTURE INTO THE EXISTING JUNCTION BOX ATTACHED TO STRUCTURE AND SPLICE THE NEW CIRCUIT CABLES TO THE EXISTING LIGHTING CIRCUITS LOCATED WITHIN THE JUNCTION BOX.
9. THE EXISTING 4 INCH CONDUIT SLEEVE LOCATED UNDER THE ROADWAY
10. CONTRACTOR COORDINATION IS REQUIRED BETWEEN CONTRACTS 60X79 AND 60X93 IN ORDER TO INSTALL THE LIGHTING CIRCUIT FEEDS FROM THE PROPOSED IDOT LIGHTING CONTROLLER $^{3}/_{32}$ $Z^{3}/_{32}$ TO THE PROPOSED LIGHTING EQUIPMENT BEING INSTALLED IN CONTRACT 60X93.
11. SEE THE VERTICAL CONDUIT ATTACHED TO STRUCTURE DETAIL FOR ROUTING A 3 INCH PVCC RGC CONDUIT FROM THE PROPOSED JUNCTION BOX DOWN THE PIER STRUCTURE INTO GRADE. ROUTE THE PROPOSED UNIT DUCT UP INTO THE JUNCTION BOX ATTACHED TO STRUCTURE.



Legend

Soil Borings

BORING AND HMLT LOCATION PLAN : CIRCLE INTERCHANGE RECONSTRUCTION, HMLT 6 ZGH1, CONTRACT 60x79, COOK COUNTY, ILLINOIS

SCALE: GRAPHICAL	EXHIBIT 1-2	DRAWN BY: R. KC CHECKED BY: M. Kothawala

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FOR AECOM | 1100-04-01

E-13

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

D160X79-Sht-Light-13	DESIGNED - TJL	REVISED -
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PLOT DATE = 4/19/2018	DATE - 4-20-2018	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

PROPOSED LIGHTING PLAN LIGHTING CIRCUIT CONNECTIONS TO NEW CONTROLLER Z RAMP EN

SCALE: 1"=20' | SHEET 13 OF 23 SHEETS | STA. | TO STA.

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2014-005R&B	COOK	597	310
		CONTRACT NO. 60X79		
	ILLINOIS FED. AID PROJECT			

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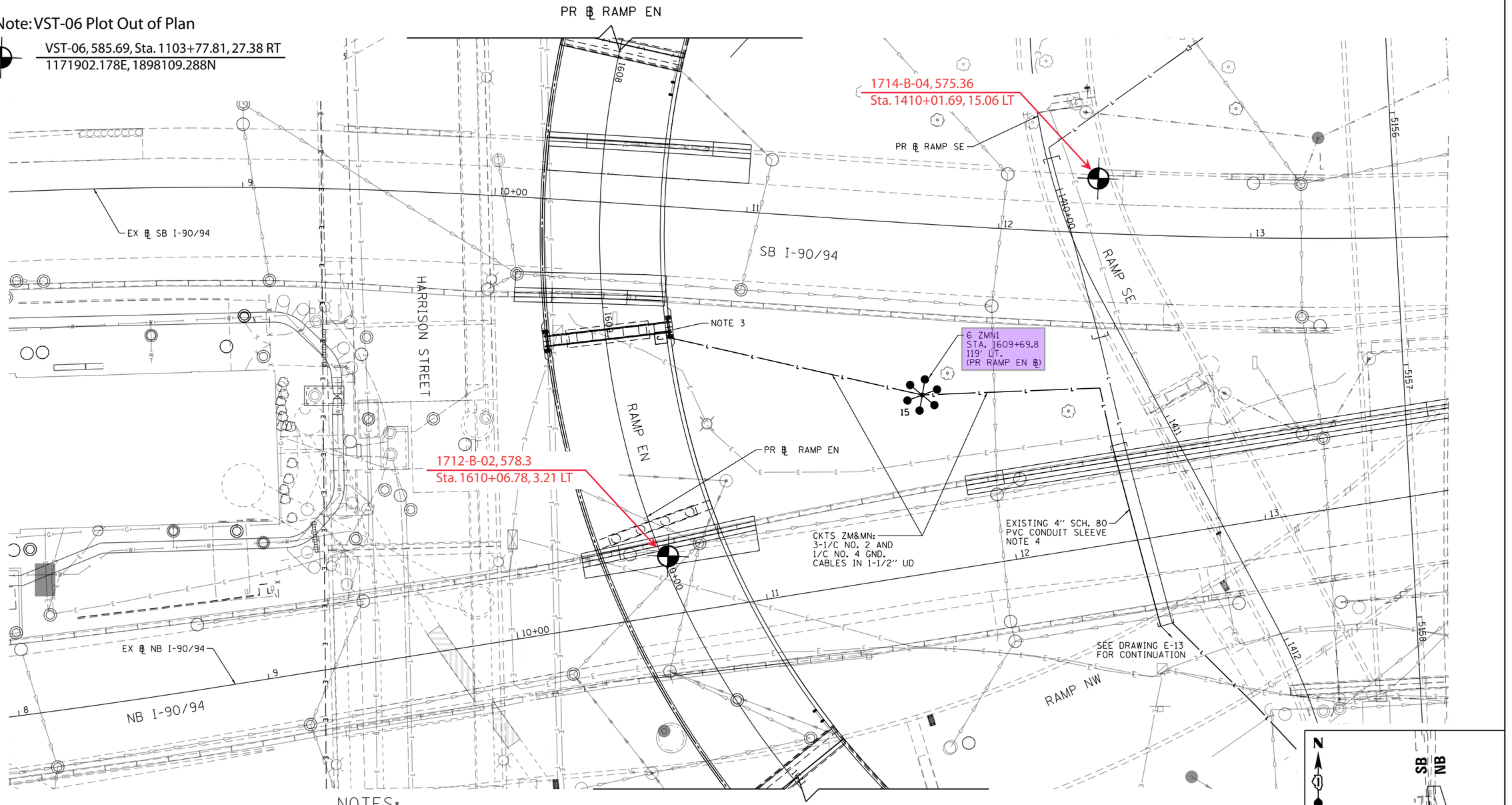
*Note: VST-06 Plot Out of Plan

VST-06, 585.69, Sta. 1103+77.81, 27.38 RT
1171902.178E, 1898109.288N



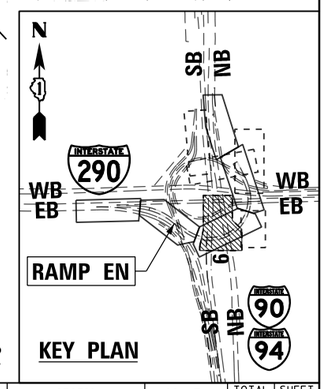
NOTES:

1. SEE DRAWING E-01 FOR IDOT ELECTRICAL SYMBOLS.
2. ALL WORK SHOWN ON THIS DRAWING MUST BE COORDINATED WITH THIS CONTRACT'S CONSTRUCTION WORK AND STAGING.
3. SEE DRAWING E-14 FOR CONTINUATION OF THE LIGHTING CIRCUITS.
4. THE EXISTING 4 INCH CONDUIT SLEEVE LOCATED UNDER THE ROADWAY SHALL BE REUSED FOR THE PROPOSED LIGHTING CIRCUIT FEEDS. IF THE SLEEVES HAVE BEEN DAMAGED OR CANNOT BE REUSED THE CONTRACTOR SHALL INSTALL A SLEEVE OF THE SAME SIZE AND TYPE AS THE EXISTING AT NO ADDITIONAL COST TO THE CONTRACT.

Legend

Soil Borings

0 20 40
SCALE: 1"=20'



E-12

BORING AND HMLT LOCATION PLAN : CIRCLE INTERCHANGE RECONSTRUCTION, HMLT 6 ZMN1, CONTRACT 60x79, COOK COUNTY, ILLINOIS

SCALE: GRAPHICAL	EXHIBIT 1-3	DRAWN BY: R. KC CHECKED BY: M. Kothawala

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FOR AECOM | 1100-04-01

AECOM
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PHONE: (312) 373-7700 FAX: (312) 373-6800

D160X79-Sht-Light-12	DESIGNED - TJL	REVISED -
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PLOT SCALE = 40.0000 ' / in.	CHECKED - WDS	REVISED -
PLOT DATE = 4/19/2018	DATE - 4-20-2018	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

PROPOSED LIGHTING PLAN

SCALE: 1"=20' | SHEET 12 OF 23 SHEETS | STA. 1608+00 | TO STA. 1611+00

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2014-005R&B	COOK	597	309
		CONTRACT NO. 60X79		
	ILLINOIS FED. AID PROJECT			

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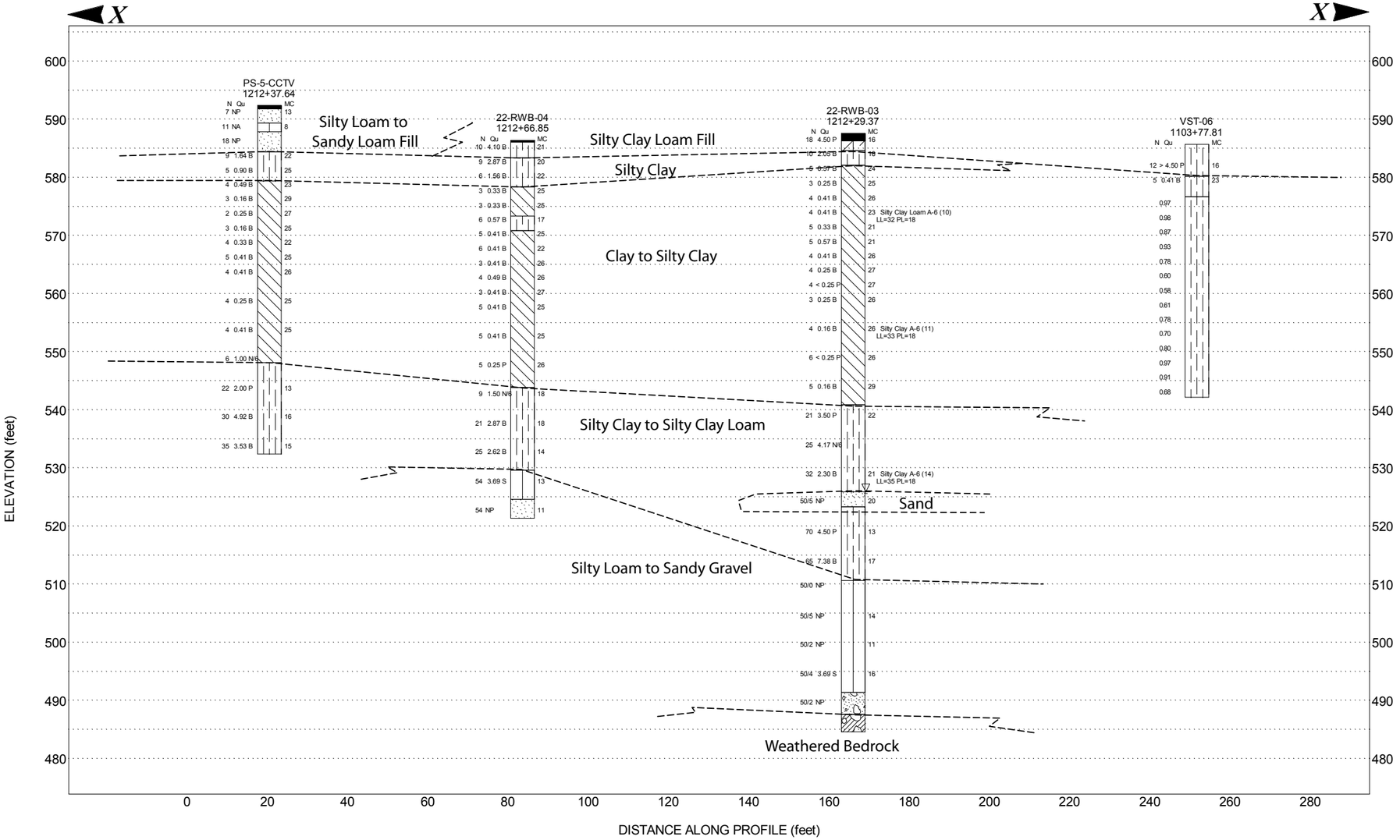
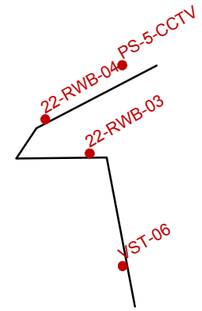


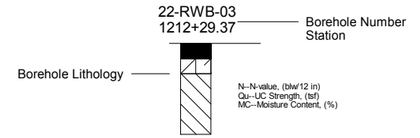
Lithology Graphics

- Topsoil
- IDH Clay Loam
- IDH Silty Clay, Silty Clay Loam
- IDH Clay
- IDH Sand, Sandy Loam
- IDH Silt, Silty Loam
- Gravelly sand, sandy gravel
- Weathered bedrock



Site Map Scale 1 inch equals 105 feet

Explanation:



- Water Level Reading at time of drilling.
- Water Level Reading 24-hr after drilling or at end of drilling

0 — 29

Horizontal Scale (feet)

Vertical Exaggeration: 1.5x

Wang Engineering, Inc.
1145 N Main Street
Lombard, IL 60148

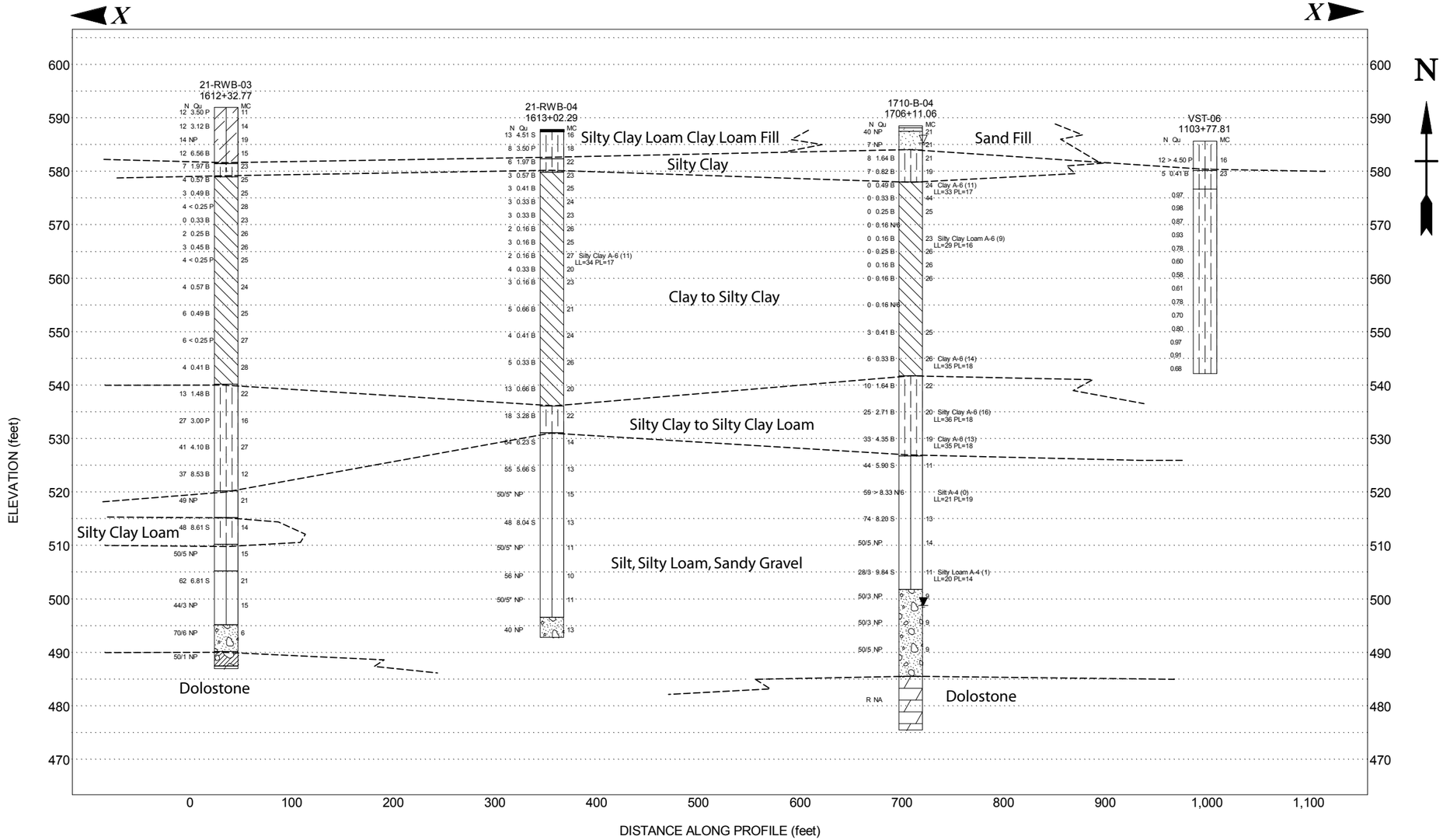
Subsurface Data Profile
HMLT 6 ZEF2, CONTRACT 60×79

WEI SINCE 1982

Circle Interchange Reconstruction
Section 17, T39N, R14E of 3rd PM

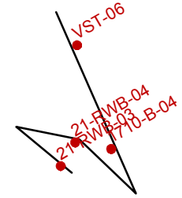
JOB NUMBER	PLATE NUMBER
1100-04-01	EXHIBIT 2-1

WEI 11X17 1100401.GPJ WANGENG.GDT 4/26/18



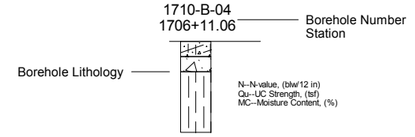
Lithology Graphics

- Pavement
- Concrete
- IDH Sand, Sandy Loam
- IDH Silty Clay, Silty Clay Loam
- IDH Clay
- IDH Silt, Silty Loam
- Gravelly sand, sandy gravel
- Dolomite or Dolomitic Limestone
- IDH Clay Loam
- Weathered bedrock
- Topsoil



Site Map Scale 1 inch equals 405 feet

Explanation:



- Water Level Reading at time of drilling.
- Water Level Reading 24-hr after drilling or at end of drilling

0 — 116

Horizontal Scale (feet)

Vertical Exaggeration: 5.5x

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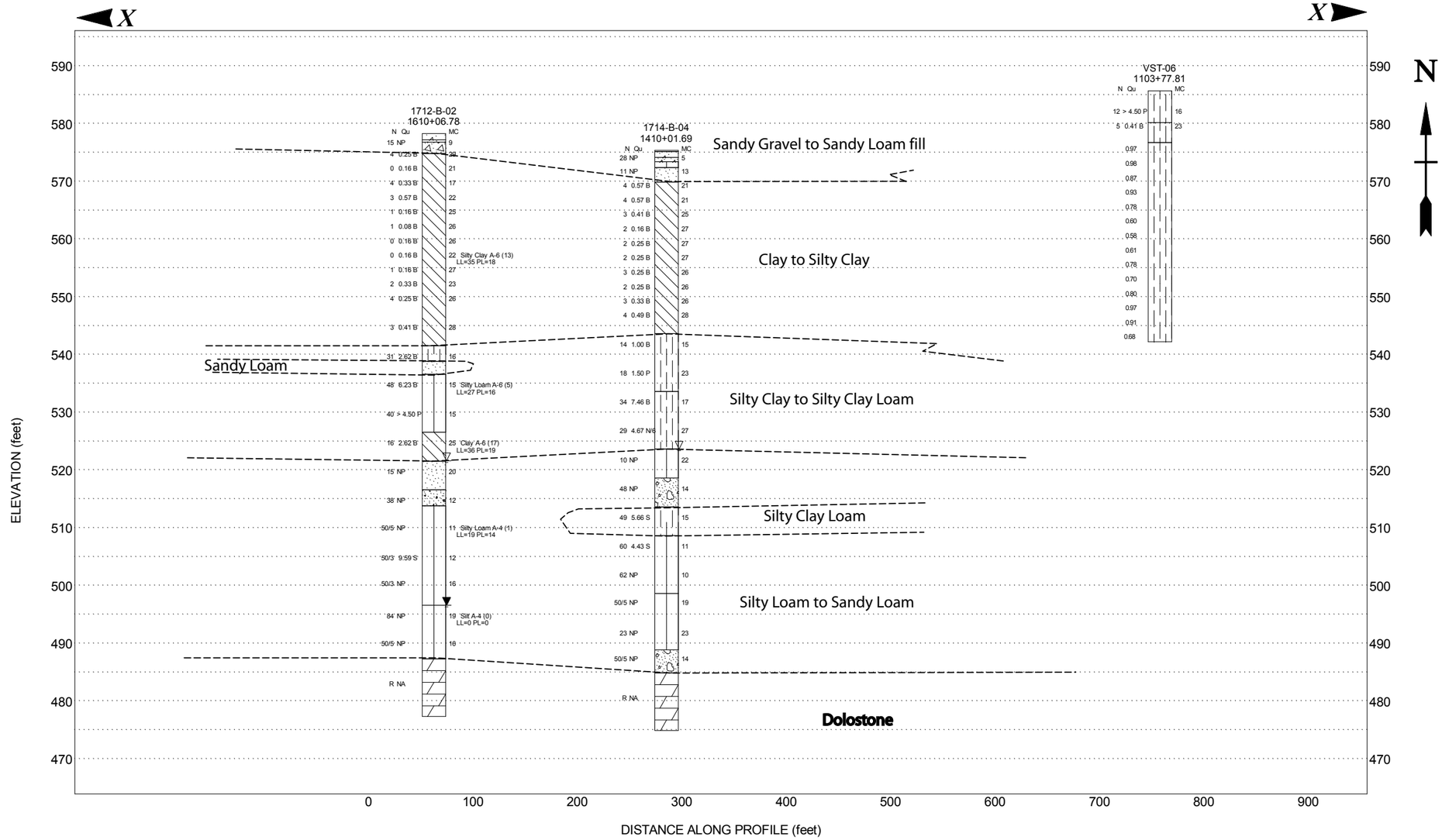
Subsurface Data Profile
HMLT 6 ZGH1, CONTRACT 60×79

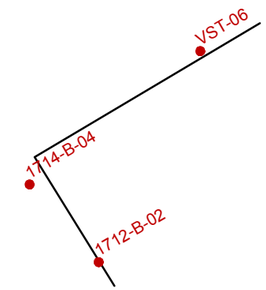
WEI SINCE 1982

Circle Interchange Reconstruction
Section 17, T39N, R14E of 3rd PM

JOB NUMBER	PLATE NUMBER
1100-04-01	EXHIBIT 2-2

WEI 11X17 1100401.GPJ WANGENG.GDT 4/26/18





N

Site Map Scale 1 inch equals 330 feet

Explanation:

1712-B-02
1610+06.78 — Borehole Number Station

Borehole Lithology

N--N-value, (blw/12 in)
Qu--UC Strength, (tsf)
MC--Moisture Content, (%)

Water Level Reading at time of drilling.

Water Level Reading 24-hr after drilling or at end of drilling

0 — 113

Horizontal Scale (feet)

Vertical Exaggeration: 5.5x

Lithology Graphics

- Concrete
- Pavement
- Crushed stone
- IDH Clay
- IDH Silty Clay, Silty Clay Loam
- IDH Sand, Sandy Loam
- IDH Silt, Silty Loam
- Coarse sand
- Dolomite or Dolomitic Limestone
- Gravelly sand, sandy gravel

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Subsurface Data Profile
HMLT 6 ZMN1, CONTRACT 60×79

Circle Interchange Reconstruction
Section 17, T39N, R14E of 3rd PM

JOB NUMBER	PLATE NUMBER
1100-04-01	EXHIBIT 2-3

WEI 11X17 1100401.GPJ WANGENG.GDT 4/26/18

APPENDIX A

Wang Engineering

LEGEND FOR BORING LOG

Relative Density of Non-Cohesive Soils	
N-Blows/ 12 inches	**Relative Density Term**
0-3	Very Loose
4-9	Loose
10-29	Medium Dense
30-49	Dense
50-80+	Very Dense

Consistency of Cohesive Soils	
Unconfined Compressive Strength Qu, tsf	**Consistency Term**
<0.25	Very Soft
0.25-0.49	Soft
0.50-0.99	Medium Stiff
1.00-1.99	Stiff
2.00-3.99	Very Stiff
>4.00	Hard

Relative Drilling Resistance (RDR)	
1	No Chatter - Very Easy Drilling
2	No Chatter - Easy Drilling
3	Some Chatter - Moderate Advancement
4	Frequent Chatter - Slow Advancement
5	Constant Chatter - Very Slow Advanement

Proportional Terms		
Trace	1-9	Percent of Dry Weight
Little	10-19	
Some	20-34	
And	35-50	

Gradation Terminology	
Boulders	>200mm
Cobbles	200mm to 75mm
Gravel	75mm to 2mm
Sand	2-0mm to 0.074mm
Silt	0.074mm to 0.002mm
Clay	<0.002mm

SS = Split Spoon

ST = Shelby Tube

SPT = Standard Penetration Test

Q_u = Unconfined Compressive Strength

NP = Non Plastic

P = Pocket Penetrometer

S = Shear failure of sample, Rimac test

B = Bulge failure of sample, Rimac test

SSA = Solid Stem Augers,

HSA = Hollow Stem Augers,

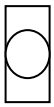
Rock Quality Designation (RQD)	
0-25%	Very Poor
25-50%	Poor
50-75%	Fair
75-90%	Good
90-100%	Excelent

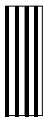
Sample Type Symbols


Split Spoon


Rock Core


In-situ Vane Shear Test


No Recovery


Shelby Tube

SPT = Standard Penetration Test
N Value is the sum of the second and the third numbers


Geoprobe


Auger Cuttings

(Rev. 04/09/2018)

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BORING LOG 1710-B-04

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
Elevation: 588.53 ft
North: 1897833.15 ft
East: 1171993.09 ft
Station: 1706+11.06
Offset: 21.6348' RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	588.2	4-inch thick, ASPHALT --PAVEMENT--						
	587.5	8-inch thick, CONCRETE --SUB BASE-- Dense, brown and gray, fine SAND, little gravel --FILL--			1	12 22 18	NP	21
					2	4 4 3	NP	21
	584.0	Medium stiff to stiff, gray SILTY CLAY to SILTY CLAY LOAM, trace gravel	5		3	3 3 5	1.64 B	21
			10		4	2 3 4	0.82 B	19
	578.0	Very soft to soft, gray CLAY to SILTY CLAY, trace gravel --L_L(%)=33, P_L(%)=17-- --%Gravel=2.5-- --%Sand=18.0-- --%Silt=47.9-- --%Clay=31.6-- --A-6 (11)--			5	0 0 0	0.49 B	24
			15		6	0 0 0	0.33 B	44
					7	0 0 0	0.25 B	25
			20		8	0 0 0	0.16 N/6	
		--L_L(%)=29, P_L(%)=16-- --%Gravel=2.7-- --%Sand=13.8-- --%Silt=56.2-- --%Clay=27.3-- --A-6 (9)--			9	0 0 0	0.16 B	23
			25		10	0 0 0	0.25 B	26
					11	0 0 0	0.16 B	26
			30		12	0 0 0	0.16 B	26
			35		13	0 0 0	0.16 N/6	
			40		14	0 1 2	0.41 B	25

GENERAL NOTES

Begin Drilling: **02-19-2014** Complete Drilling: **02-21-2014**
Drilling Contractor: **Wang Testing Services** Drill Rig: **CME-55 TMR [85%]**
Driller: **R&N** Logger: **D. Kolpacki** Checked by: **C. Marin**
Drilling Method: **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling: **3.50 ft**
At Completion of Drilling: **90.00 ft**
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 1710-B-04

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
Elevation: 588.53 ft
North: 1897833.15 ft
East: 1171993.09 ft
Station: 1706+11.06
Offset: 21.6348' RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		--L_L(%)=35, P_L(%)=18-- --%Gravel=2.4-- --%Sand=12.5-- --%Silt=45.9-- --%Clay=39.2-- --A-6 (14)--	45		15	0 3 3	0.33 B	26
	541.8	Stiff to hard, gray SILTY CLAY, trace gravel						
			50		16	5 5 5	1.64 B	22
		--L_L(%)=36, P_L(%)=18-- --%Gravel=1.4-- --%Sand=8.1-- --%Silt=49.8-- --%Clay=40.7-- --A-6 (16)--	55		17	10 11 14	2.71 B	20
		--L_L(%)=35, P_L(%)=18-- --%Gravel=2.7-- --%Sand=14.6--	60		18	7 13 20	4.35 B	19

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		--%Silt=46.6-- --%Clay=36.1-- --A-6 (13)--						
	526.8	Hard, gray SILT to SILTY LOAM, trace gravel						
			65		19	14 19 25	5.90 S	11
		--L_L(%)=21, P_L(%)=19-- --%Gravel=1.7-- --%Sand=10.5-- --%Silt=80.1-- --%Clay=7.6-- --A-4 (0)--	70		20	19 26 33	> 8.33 N/6	
			75		21	16 32 42	8.20 S	13
			80		22	~~50/5~~	NP	14

GENERAL NOTES

Begin Drilling: **02-19-2014** Complete Drilling: **02-21-2014**
Drilling Contractor: **Wang Testing Services** Drill Rig: **CME-55 TMR [85%]**
Driller: **R&N** Logger: **D. Kolpacki** Checked by: **C. Marin**
Drilling Method: **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling: **3.50 ft**
At Completion of Drilling: **90.00 ft**
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 1710-B-04

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
Elevation: 588.53 ft
North: 1897833.15 ft
East: 1171993.09 ft
Station: 1706+11.06
Offset: 21.6348' RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		--L_L(%)=20, P_L(%)=14--						
		--%Gravel=7.6--						
		--%Sand=21.8--						
		--%Silt=58.4--	85		23	32 40 28/3	9.84 S	11
	501.8	--%Clay=12.1--						
		--A-4 (1)--						
		Very dense, gray GRAVELLY SAND to SANDY LOAM						
					24	50/3	NP	9
			90					
					25	50/3	NP	9
			95					
					26	50/5	NP	9
			100					

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	485.5	Strong, light gray and white, fair rock mass quality, bedded, moderately vuggy porosity, fresh DOLOSTONE, up to 11-inch beds, 6-inch spaced joints, horizontal joints with 0.05 to more than 0.2-inch infilling, hard joint wall, with greenish gray argillaceous infill, and stylolitic surfaces.	105		1	C O R E		
		--Run 1 - RECOVERY=93%--						
		--RQD=55%--	110					
	475.5	Boring terminated at 113.00 ft	115					
			120					

GENERAL NOTES

Begin Drilling **02-19-2014** Complete Drilling **02-21-2014**
Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR [85%]**
Driller **R&N** Logger **D. Kolpacki** Checked by **C. Marin**
Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling ▽ **3.50 ft**
At Completion of Drilling ▼ **90.00 ft**
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 1712-B-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: 578.30 ft
North: 1897649.82 ft
East: 1171680.84 ft
Station: 1610+06.78
Offset: 3.2187 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	577.2	13.5-inch thick CONCRETE --PAVEMENT--						
	576.8	4-inch thick ASPHALT --PAVEMENT--						
		Medium dense, brown SANDY GRAVEL --BASE COURSE--			1	12 11 4	NP	9
	574.8	Very soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel						
			5		2	1 2 2	0.25 B	29
					3	0 0 0	0.16 B	21
			10		4	0 1 3	0.33 B	17
					5	1 1 2	0.57 B	22
			15		6	0 0 1	0.16 B	25
					7	0 0 1	0.08 B	26
			20		8	0 0 0	0.16 B	26
		--L_L(%)=35, P_L(%)=18-- --%Gravel=3.5-- --%Sand=14.0-- --%Silt=50.3-- --%Clay=32.2-- --A-6(13)--			9	0 0 0	0.16 B	22
			25		10	0 0 1	0.16 B	27
					11	0 0 2	0.33 B	23
			30		12	1 2 2	0.25 B	26
			35		13	1 2 1	0.41 B	28
	541.6	Very stiff, gray SILTY CLAY, trace gravel						
	538.8	Gray SANDY LOAM	40		14	5 13 18	2.62 B	16

GENERAL NOTES

Begin Drilling: **10-15-2013** Complete Drilling: **10-16-2013**
Drilling Contractor: **Wang Testing Services** Drill Rig: **D-50 TMR [78%]**
Driller: **R&R** Logger: **D. Kolpacki** Checked by: **C. Marin**
Drilling Method: **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling: **57.00 ft**
At Completion of Drilling: **82.00 ft**
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 1712-B-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: 578.30 ft
North: 1897649.82 ft
East: 1171680.84 ft
Station: 1610+06.78
Offset: 3.2187 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		--Moist--						
	536.6	Hard, gray SILTY LOAM to SILTY CLAY LOAM, trace gravel						
		--L_L(%)=27, P_L(%)=16--						
		--%Gravel=8.1--						
		--%Sand=26.9--						
		--%Silt=51.7--	45					
		--%Clay=13.3--						
		--A-6(5)--						
					15	9 22 26	6.23 B	15
			50		16	12 17 23	> 4.50 P	15
	526.6	Very stiff, gray CLAY						
		--L_L(%)=36, P_L(%)=19--						
		--%Gravel=0.1--						
		--%Sand=2.0--						
		--%Silt=49.4--	55					
		--%Clay=48.5--						
		--A-6(17)--						
					17	4 7 9	2.62 B	25
	521.6	Medium dense, gray SANDY LOAM, trace gravel						
		--Saturated--						
			60		18	4 6 9	NP	20

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	516.6	Gray, coarse SAND, some gravel						
	513.8	Very dense, gray SILTY LOAM, trace gravel	65		19	20 20 18	NP	12
		--L_L(%)=19, P_L(%)=14--						
		--%Gravel=7.4--						
		--%Sand=21.3--						
		--%Silt=59.7--	70					
		--%Clay=11.7--						
		--A-4(1)--						
					20	32 50/5	NP	11
			75		21	24 44 50/3	9.59 S	12
			80		22	50/3	NP	16

GENERAL NOTES

Begin Drilling: **10-15-2013** Complete Drilling: **10-16-2013**
Drilling Contractor: **Wang Testing Services** Drill Rig: **D-50 TMR [78%]**
Driller: **R&R** Logger: **D. Kolpacki** Checked by: **C. Marin**
Drilling Method: **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling: **57.00 ft**
At Completion of Drilling: **82.00 ft**
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 1712-B-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: 578.30 ft
North: 1897649.82 ft
East: 1171680.84 ft
Station: 1610+06.78
Offset: 3.2187 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	496.6	Very dense, gray SILT --Saturated--						
		--%Gravel=0.0-- --%Sand=1.7-- --%Silt=91.5-- --%Clay=6.8-- --A-4(0)--	85		23	20 34 50	NP	19
		--HARD DRILLING-- *--Possible Cobbles--*						
					24	30 50/5	NP	16
		--HARD DRILLING-- *--Possible Cobbles--*	90					
	487.3	Strong, light gray, fair rock mass quality, thin bedded, fresh DOLOSTONE, 2- to 44-inch beds, 2- to 44-inch spaced joints, horizontal and vertical joints with less than 0.2-inch infilling, hard joint wall, with stylolitic surfaces, and moderately vuggy porosity, <0.5 inch vugs.				C O R E		
		--Run 1 - RECOVERY=100%-- --RQD=71%--	95		1			
			100					

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	477.3	Boring terminated at 101.00 ft						
			105					
			110					
			115					
			120					

GENERAL NOTES

Begin Drilling: **10-15-2013** Complete Drilling: **10-16-2013**
Drilling Contractor: **Wang Testing Services** Drill Rig: **D-50 TMR [78%]**
Driller: **R&R** Logger: **D. Kolpacki** Checked by: **C. Marin**
Drilling Method: **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling: **57.00 ft**
At Completion of Drilling: **82.00 ft**
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 1714-B-04

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
Elevation: 575.37 ft
North: 1897818.98 ft
East: 1171530.45 ft
Station: 1410+01.69
Offset: 15.0642 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	575.2	2-inch thick ASPHALT --PAVEMENT--						
	574.2	12-inch thick CONCRETE --PAVEMENT--						
	573.4	10-inch thick CRUSHED STONE --BASE COURSE--						
	572.4	Brown SILTY LOAM --FILL--						
		Medium dense, gray SANDY LOAM --FILL--	5		1	13 19 9	NP	5
					2	7 6 5	NP	13
	569.9	Very soft to soft, gray CLAY to SILTY CLAY, trace gravel			3	1 2 2	0.57 B	21
			10		4	1 2 2	0.57 B	21
					5	0 1 2	0.41 B	25
			15		6	0 1 1	0.16 B	27
					7	0 1 1	0.25 B	27
			20		8	1 1 1	0.25 B	27
			25		9	0 1 2	0.25 B	26
					10	1 1 1	0.25 B	26
			30		11	1 1 2	0.33 B	26
					12	1 2 2	0.49 B	28
	543.6	Stiff, gray SILTY CLAY, trace gravel	35		13	3 6 8	1.00 B	15
			40		14	6 5 13	1.50 P	23

GENERAL NOTES

Begin Drilling: **10-27-2013** Complete Drilling: **10-28-2013**
Drilling Contractor: **Wang Testing Services** Drill Rig: **CME-55 TMR [85%]**
Driller: **R&J** Logger: **A. Tomaras** Checked by: **C. Marin**
Drilling Method: **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling: **52.00 ft**
At Completion of Drilling: **mud in the borehole**
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 1714-B-04

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
Elevation: 575.37 ft
North: 1897818.98 ft
East: 1171530.45 ft
Station: 1410+01.69
Offset: 15.0642 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	533.6	Hard, gray SILTY CLAY LOAM, trace gravel	45		15	7 10 24	7.46 B	17
			50		16	9 11 18	4.67 N/6	27
	523.6	Medium dense, gray SILTY LOAM --Saturated--	55		17	6 5 5	NP	22
	518.6	Dense, gray GRAVELLY SAND --Saturated--	60		18	18 40 8	NP	14
	513.6	Hard. gray SILTY CLAY LOAM, trace gravel	65		19	12 16 33	5.66 S	15
	508.6	Very dense, gray SILTY LOAM, trace gravel	70		20	22 27 33	4.43 S	11
	498.6	Medium dense to dense, gray SILT --Saturated--	75		21	15 27 35	NP	10
			80		22	29 50/5	NP	19

GENERAL NOTES

Begin Drilling **10-27-2013** Complete Drilling **10-28-2013**
Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR [85%]**
Driller **R&J** Logger **A. Tomaras** Checked by **C. Marin**
Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling ▽ **52.00 ft**
At Completion of Drilling ▼ **mud in the borehole**
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 1714-B-04

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
Elevation: 575.37 ft
North: 1897818.98 ft
East: 1171530.45 ft
Station: 1410+01.69
Offset: 15.0642 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
			85		23	15 8 15	NP	23
	488.9	Very dense, gray GRAVELLY SANDY LOAM						
			90		24	50/5	NP	14
		--HARD DRILLING-- *--Possible Cobbles--*						
	484.9	Strong, light gray, fair rock quality, bedded DOLOSTONE, beds up to 12 inch, vuggy, joint spacing up to 12 inch, joints with less than 0.2 inch or no infilling, and stylolitic surfaces. --Run 1 - RECOVERY= 100%-- --RQD= 63%--				C O R E		
			95		1			
			100					
	474.9	Boring terminated at 100.50 ft	105					
			110					
			115					
			120					

GENERAL NOTES

Begin Drilling **10-27-2013** Complete Drilling **10-28-2013**
Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR [85%]**
Driller **R&J** Logger **A. Tomaras** Checked by **C. Marin**
Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling ▽ **52.00 ft**
At Completion of Drilling ▼ **mud in the borehole**
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 21-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: 591.97 ft
North: 1897787.89 ft
East: 1171858.64 ft
Station: 1612+32.77
Offset: 11.8407 RT

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 to hard, brown CLAY LOAM, trace brick fragments --FILL--			1	3 4 8	3.50 P	11
			5		2	5 5 7	3.12 B	14
		--3-inch thick, red, crushed Brick--			3	13 8 6	NP	19
			10		4	5 5 7	6.56 B	15
	581.5							
		Stiff, gray SILTY CLAY, trace gravel			5	2 3 4	1.97 B	23
	579.0							
		Very soft to medium stiff, gray CLAY, trace gravel			6	2 1 3	0.57 B	25
			15		7	2 1 2	0.49 B	25
					8	2 2 2	< 0.25 P	28
			20					
			25		9	0 0 0	0.33 B	23
					10	0 0 2	0.25 B	26
					11	0 1 2	0.45 B	26
			30		12	2 2 2	< 0.25 P	25
			35		13	1 2 2	0.57 B	24
			40		14	2 3 3	0.49 B	25

GENERAL NOTES

Begin Drilling **09-23-2013** Complete Drilling **09-23-2013**
Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR [85%]**
Driller **R&J** Logger **A. Tomaras** Checked by **L. Iordache**
Drilling Method **3.25" HSA, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling ▽ **Rotary wash**
At Completion of Drilling ▼ **mud in the borehole**
Time After Drilling **NA**
Depth to Water ▼ **NA**

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BORING LOG 21-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: 591.97 ft
North: 1897787.89 ft
East: 1171858.64 ft
Station: 1612+32.77
Offset: 11.8407 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
			45		15	2 3 3	< 0.25 P	27
			50		16	0 2 2	0.41 B	28
	540.2	Very stiff to hard, SILTY CLAY to SILTY CLAY LOAM, trace gravel	55		17	4 5 8	1.48 B	22
			60		18	14 12 15	3.00 P	16
	520.2	Dense, gray SILT	65		19	15 17 24	4.10 B	27
			70		20	16 17 20	8.53 B	12
	515.2	Hard, gray SILTY CLAY LOAM, trace gravel	75		21	20 26 23	NP	21
			80		22	19 20 28	8.61 S	14

GENERAL NOTES

Begin Drilling **09-23-2013** Complete Drilling **09-23-2013**
Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR [85%]**
Driller **R&J** Logger **A. Tomaras** Checked by **L. Iordache**
Drilling Method **3.25" HSA, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling ▽ **Rotary wash**
At Completion of Drilling ▼ **mud in the borehole**
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 21-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: 591.97 ft
North: 1897787.89 ft
East: 1171858.64 ft
Station: 1612+32.77
Offset: 11.8407 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	510.2	Very dense, gray SILT --HARD DRILLING--						
					23	31 32 50/5	NP	15
			85					
	505.2	Very dense, gray SILTY LOAM, trace gravel						
					24	23 33 29	6.81 S	21
			90					
					25	66/6 44/3	NP	15
			95					
	495.2	--HARD DRILLING-- Very dense, brown SANDY GRAVEL --possibly underpressure groundwater bearing--						
					26	30 70/6	NP	6
			100					

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	490.2	Very dense, weathered DOLOSTONE fragments --WEATHERED BEDROCK--						
					27	50/1	NP	
	487.5	--ROLLER BIT REFUSAL--						
	487.0	--BEDROCK--	105					
		Boring terminated at 104.50 ft						
			110					
			115					
			120					

GENERAL NOTES

Begin Drilling **09-23-2013** Complete Drilling **09-23-2013**
Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR [85%]**
Driller **R&J** Logger **A. Tomaras** Checked by **L. Iordache**
Drilling Method **3.25" HSA, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling ▽ **Rotary wash**
At Completion of Drilling ▼ **mud in the borehole**
Time After Drilling **NA**
Depth to Water ▼ **NA**

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BORING LOG 21-RWB-04

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
Elevation: 587.85 ft
North: 1897850.59 ft
East: 1171897.08 ft
Station: 1613+02.29
Offset: 21.9615 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	587.4	5 -inch thick, black SILTY LOAM --TOPSOIL--						
		Very stiff to hard, brown SILTY CLAY LOAM, trace gravel --FILL--			1	5 6 7	4.51 S	16
			5		2	5 3 5	3.50 P	18
	582.4							
		Stiff, brown and gray SILTY CLAY, trace gravel			3	3 3 3	1.97 B	22
	579.9							
		Very soft to medium stiff, brown CLAY to SILTY CLAY, trace gravel			4	1 1 2	0.57 B	23
			10		5	1 1 2	0.41 B	25
					6	1 1 2	0.33 B	24
			15		7	1 1 2	0.33 B	23
					8	0 1 1	0.16 B	26
			20					
		--L_L(%)=34, P_L(%)=17-- --%Gravel=7.3-- --%Sand=16.1-- --%Silt=47.5-- --%Clay=29.0-- --AASHTO--	25		9	1 1 2	0.16 B	25
					10	1 1 1	0.16 B	27
					11	1 2 2	0.33 B	20
					12	1 1 2	0.16 B	23
			30		13	1 2 3	0.66 B	21
			35		14	2 2 2	0.41 B	24
			40					

GENERAL NOTES

Begin Drilling **09-23-2013** Complete Drilling **09-23-2013**
Drilling Contractor **K&S** Drill Rig **D-120 TMR**
Driller **R&E** Logger **F. Bozga** Checked by **L. Iordache**
Drilling Method **4.25" HSA, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling ▽ **Rotary wash**
At Completion of Drilling ▼ **mud in the borehole**
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 21-RWB-04

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
Elevation: 587.85 ft
North: 1897850.59 ft
East: 1171897.08 ft
Station: 1613+02.29
Offset: 21.9615 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
			45		15	1 2 3	0.33 B	26
			50		16	3 5 8	0.66 B	20
	536.1	Very stiff, gray SILTY CLAY, trace gravel						
			55		17	4 7 11	3.28 B	22
	531.1	Dense to very dense, gray SILTY LOAM to SILTY CLAY LOAM, trace to little gravel						
			60		18	16 26 38	6.23 S	14

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
			65		19	26 25 30	5.66 S	13
		--HARD DRILLING-- *--Possible Cobbles--*						
			70		20	38 50/5"	NP	15
			75		21	12 19 29	8.04 S	13
			80		22	22 50/5"	NP	11

GENERAL NOTES

Begin Drilling **09-23-2013** Complete Drilling **09-23-2013**
Drilling Contractor **K&S** Drill Rig **D-120 TMR**
Driller **R&E** Logger **F. Bozga** Checked by **L. Iordache**
Drilling Method **4.25" HSA, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling ▽ **Rotary wash**
At Completion of Drilling ▼ **mud in the borehole**
Time After Drilling **NA**
Depth to Water ▼ **NA**

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BORING LOG 21-RWB-04

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
Elevation: 587.85 ft
North: 1897850.59 ft
East: 1171897.08 ft
Station: 1613+02.29
Offset: 21.9615 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
			85		23	19 25 31	NP	10
			90		24	50/5"	NP	11
	496.6	Dense, gray SANDY GRAVEL						
	492.9		95		25	11 21 19	NP	13
		Boring terminated at 95.00 ft						
			100					

GENERAL NOTES

Begin Drilling **09-23-2013** Complete Drilling **09-23-2013**
Drilling Contractor **K&S** Drill Rig **D-120 TMR**
Driller **R&E** Logger **F. Bozga** Checked by **L. Iordache**
Drilling Method **4.25" HSA, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling ▽ **Rotary wash**
At Completion of Drilling ▼ **mud in the borehole**
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 22-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: 587.62 ft
North: 1898185.65 ft
East: 1171879.86 ft
Station: 1212+29.37
Offset: 21.9731 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		15-inch thick, black and brown SILTY LOAM						
	586.4	--TOPSOIL--						
		Hard, brown CLAY LOAM, trace gravel			1	7 8 10	4.50 P	16
		--FILL--						
	584.6							
		Very stiff, gray SILTY CLAY LOAM, trace gravel			2	3 4 6	2.05 B	18
			5					
	582.1							
		Very soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel			3	2 2 3	0.57 B	24
					4	1 1 2	0.25 B	25
			10					
					5	1 2 2	0.41 B	26
		--L_L(%)=32, P_L(%)=18--			6	1 2 2	0.41 B	23
		--%Gravel=2.5--						
		--%Sand=15.0--						
		--%Silt=57.1--	15					
		--%Clay=25.4--						
		--A-6 (10)--						
					7	2 2 3	0.33 B	21
					8	2 2 3	0.57 B	21
			20					

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
					9	1 2 2	0.41 B	26
			25		10	1 2 2	0.25 B	27
					11	2 2 2	< 0.25 P	27
			30		12	2 1 2	0.25 B	26
		--L_L(%)=33, P_L(%)=18--			13	1 2 2	0.16 B	26
		--%Gravel=2.7--						
		--%Sand=15.7--						
		--%Silt=57.1--	35					
		--%Clay=25.4--						
		--A-6 (11)--						
					14	2 2 4	< 0.25 P	26
			40					

GENERAL NOTES

Begin Drilling **03-07-2014** Complete Drilling **03-10-2014**
Drilling Contractor **Wang Testing Services** Drill Rig **D-25 ATV [93%]**
Driller **N&J** Logger **A. Happel** Checked by **C. Marin**
Drilling Method **2.25" HSA to 15', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling ▽ **62.00 ft**
At Completion of Drilling ▼ **mud in the borehole**
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 22-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: 587.62 ft
North: 1898185.65 ft
East: 1171879.86 ft
Station: 1212+29.37
Offset: 21.9731 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	540.9	Very stiff to hard, gray SILTY CLAY LOAM, trace gravel	45		15	2 2 3	0.16 B	29
			50		16	5 9 12	3.50 P	22
			55		17	10 9 16	4.17 N/6	
		--L_L(%)=35, P_L(%)=18-- --%Gravel=1.8-- --%Sand=10.2--	60		18	8 10 22	2.30 B	21
		--%Silt=54.1-- --%Clay=33.9-- --A-6 (14)--						
	525.9	Very dense, gray, coarse SAND, little gravel --Moist--						
	523.3	Hard, gray SILTY CLAY LOAM to SILTY LOAM, trace gravel	65		19	35 50/5	NP	20
			70		20	25 33 37	4.50 P	13
			75		21	16 27 38	7.38 B	17
		--HARD DRILLING from 77 ft-- *--Possible Cobbles--*						
	510.6	Very dense, gray SILTY LOAM, trace gravel			22	50/0	NP	
			80					

GENERAL NOTES

Begin Drilling: **03-07-2014** Complete Drilling: **03-10-2014**
Drilling Contractor: **Wang Testing Services** Drill Rig: **D-25 ATV [93%]**
Driller: **N&J** Logger: **A. Happel** Checked by: **C. Marin**
Drilling Method: **2.25" HSA to 15', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling: **62.00 ft**
At Completion of Drilling: **mud in the borehole**
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 22-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: 587.62 ft
North: 1898185.65 ft
East: 1171879.86 ft
Station: 1212+29.37
Offset: 21.9731 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	491.4	Very dense, gray SANDY GRAVEL; wet --possible water bearing--	85		23	50/5	NP	14
			90		24	50/2	NP	11
			95		25	50/4	3.69 S	16
	487.6		100		26	50/2	NP	
	484.6	--VERY HARD, STEADY DRILLING-- --WEATHERED BEDROCK-- --ROLLER BIT REFUSAL-- Boring terminated at 103.00 ft	105 110 115 120					

GENERAL NOTES

Begin Drilling **03-07-2014** Complete Drilling **03-10-2014**
Drilling Contractor **Wang Testing Services** Drill Rig **D-25 ATV [93%]**
Driller **N&J** Logger **A. Happel** Checked by **C. Marin**
Drilling Method **2.25" HSA to 15', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling ▽ **62.00 ft**
At Completion of Drilling ▼ **mud in the borehole**
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 22-RWB-04

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
Elevation: 586.36 ft
North: 1898208.77 ft
East: 1171849.77 ft
Station: 1212+66.85
Offset: 28.4715 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	586.1	3-inch thick, brown SILTY LOAM --TOPSOIL--						
		Hard, brown SILTY CLAY LOAM, trace gravel --FILL--			1	3 4 6	4.10 B	21
	583.4	Stiff to very stiff, gray SILTY CLAY, trace gravel	5		2	3 4 5	2.87 B	20
					3	2 3 3	1.56 B	22
	578.4	Soft, gray CLAY, trace gravel	10		4	1 1 2	0.33 B	25
					5	1 1 2	0.33 B	25
	573.4	Medium stiff, gray SILTY CLAY LOAM, trace gravel	15		6	1 2 4	0.57 B	17
	570.9	Soft, gray CLAY to SILTY CLAY, trace gravel			7	1 2 3	0.41 B	25
			20		8	2 2 4	0.41 B	22
			25		9	1 1 2	0.41 B	26
					10	2 2 2	0.49 B	26
					11	2 1 2	0.41 B	27
			30		12	1 2 3	0.41 B	25
			35		13	1 2 3	0.41 B	25
			40		14	1 2 3	0.25 P	26

GENERAL NOTES

Begin Drilling **08-05-2014** Complete Drilling **08-05-2014**
Drilling Contractor **Wang Testing Services** Drill Rig **D-25 ATV [93%]**
Driller **P&N** Logger **M. de los Reyes** 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 ▼ **mud in the borehole**
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 22-RWB-04

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
Elevation: 586.36 ft
North: 1898208.77 ft
East: 1171849.77 ft
Station: 1212+66.85
Offset: 28.4715 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 DRILLING at 42.5 ft-- *--Possible Cobbles--*						
	543.9	Stiff to very stiff, gray SILTY CLAY LOAM, trace gravel						
			45		15	2 4 5	1.50 N/6	18
			50		16	5 9 12	2.87 B	18
			55		17	9 11 14	2.62 B	14
	529.6	Very stiff, gray SILTY LOAM to SILTY CLAY LOAM, trace gravel and sand seams						
			60		18	13 19 35	3.69 S	13

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	524.6	Very dense, gray SANDY LOAM, trace gravel --Moist--						
	521.4	Boring terminated at 65.00 ft	65		19	13 19 35	NP	11
			70					
			75					
			80					

GENERAL NOTES

Begin Drilling **08-05-2014** Complete Drilling **08-05-2014**
Drilling Contractor **Wang Testing Services** Drill Rig **D-25 ATV [93%]**
Driller **P&N** Logger **M. de los Reyes** 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 ▼ **mud in the borehole**
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 PS-5-CCTV

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
Elevation: 592.39 ft
North: 1898245.34 ft
East: 1171901.91 ft
Station: 1212+37.64
Offset: 85.0667 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	591.9	6-inch thick dark brown SILTY LOAM --TOPSOIL-- Loose, brown and gray, fine SAND; damp --FILL--			1	5 4 3	NP	13
	589.4	Brown SILTY LOAM, trace gravel, glass, and cinders; damp --FILL--			2	5 5 6		8
	587.9	Medium dense, brown SANDY LOAM, trace gravel; damp --FILL--	5		3	11 11 7	NP	
	584.4	Medium stiff to stiff, gray SILTY CLAY, trace gravel; moist			4	3 4 5	1.64 B	22
			10		5	2 2 3	0.90 B	25
	579.4	Very soft to soft, gray CLAY to SILTY CLAY, trace gravel; moist to wet			6	1 2 2	0.49 B	23
			15		7	1 1 2	0.16 B	29
			20		8	1 1 1	0.25 B	27
			25		9	1 1 2	0.16 B	25
					10	2 2 2	0.33 B	22
					11	1 2 3	0.41 B	25
			30		12	1 2 2	0.41 B	26
			35		13	1 2 2	0.25 B	25
			40		14	2 2 2	0.41 B	25

GENERAL NOTES

Begin Drilling: **11-07-2013** Complete Drilling: **11-07-2013**
Drilling Contractor: **Wang Testing Services** Drill Rig: **D-25 ATV [93%]**
Driller: **P&N** Logger: **D. Kolpacki** 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: **mud in the borehole**
Time After Drilling: **NA**
Depth to Water: **NA**

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BORING LOG PS-5-CCTV

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
Elevation: 592.39 ft
North: 1898245.34 ft
East: 1171901.91 ft
Station: 1212+37.64
Offset: 85.0667 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	548.1	Very stiff to hard, gray SILTY CLAY to SILTY CLAY LOAM, trace to little gravel; damp	45		15	2 2 4	1.00 N/6	
			50		16	6 9 13	2.00 P	13
			55		17	8 14 16	4.92 B	16
	532.4	Boring terminated at 60.00 ft	60		18	11 14 21	3.53 B	15

GENERAL NOTES

Begin Drilling **11-07-2013** Complete Drilling **11-07-2013**
Drilling Contractor **Wang Testing Services** Drill Rig **D-25 ATV [93%]**
Driller **P&N** Logger **D. Kolpacki** 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 ▼ **mud in the borehole**
Time After Drilling **NA**
Depth to Water ▼ **NA**

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BORING LOG VST-06

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
Elevation: 585.69 ft
North: 1898109.29 ft
East: 1171902.18 ft
Station: 1103+77.81
Offset: 27.3835 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, brown SILTY CLAY LOAM, trace gravel --FILL--						
			5		1	7 6 6	> 4.50 P	16
	580.2							
		Soft, gray SILTY CLAY LOAM			2	1 2 3	0.41 B	23
	576.7		10					
		--In-Situ Vane Shear, 10.5 feet-- --$S_{u\ undis}$ = 972.0 psf-- --$S_{u\ remold}$ = 611.6 psf-- --Sensitivity = 1.6--			1	VS	0.97	
		--In-Situ Vane Shear, 13.0 feet-- --$S_{u\ undis}$ = 982.9 psf-- --$S_{u\ remold}$ = 589.7 psf-- --Sensitivity = 1.7--	15		2	VS	0.98	
		--In-Situ Vane Shear, 15.5 feet-- --$S_{u\ undis}$ = 873.7 psf-- --$S_{u\ remold}$ = 513.3 psf-- --Sensitivity = 1.7--			3	VS	0.87	
		--In-Situ Vane Shear, 18.0 feet-- --$S_{u\ undis}$ = 928.3 psf-- --$S_{u\ remold}$ = 360.4 psf-- --Sensitivity = 2.6--	20		4	VS	0.93	
		--In-Situ Vane Shear, 20.5 feet-- --$S_{u\ undis}$ = 775.4 psf-- --$S_{u\ remold}$ = 360.4 psf-- --Sensitivity = 2.2--			5	VS	0.78	
		--In-Situ Vane Shear, 23.0 feet-- --$S_{u\ undis}$ = 600.6 psf-- --$S_{u\ remold}$ = 305.8 psf-- --Sensitivity = 2.0--	25		6	VS	0.60	
		--In-Situ Vane Shear, 25.5 feet-- --$S_{u\ undis}$ = 578.8 psf-- --$S_{u\ remold}$ = 316.7 psf-- --Sensitivity = 1.8--			7	VS	0.58	
		--In-Situ Vane Shear, 28.0 feet-- --$S_{u\ undis}$ = 611.6 psf-- --$S_{u\ remold}$ = 338.5 psf-- --Sensitivity = 1.8--	30		8	VS	0.61	
		--In-Situ Vane Shear, 30.5 feet-- --$S_{u\ undis}$ = 786.3 psf-- --$S_{u\ remold}$ = 382.2 psf-- --Sensitivity = 2.1--			9	VS	0.78	
		--In-Situ Vane Shear, 33.0 feet-- --$S_{u\ undis}$ = 698.9 psf-- --$S_{u\ remold}$ = 404.1 psf-- --Sensitivity = 1.7--	35		10	VS	0.70	
		--In-Situ Vane Shear, 35.5 feet-- --$S_{u\ undis}$ = 808.1 psf-- --$S_{u\ remold}$ = 502.4 psf-- --Sensitivity = 1.6--			11	VS	0.80	
		--In-Situ Vane Shear, 38.0 feet-- --$S_{u\ undis}$ = 982.9 psf-- --$S_{u\ remold}$ = 546.0 psf-- --Sensitivity = 1.8--	40		12	VS	0.98	

GENERAL NOTES

Begin Drilling **12-09-2015** Complete Drilling **12-14-2015**
Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR [85%]**
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 ▼ **mud in the borehole**
Time After Drilling **NA**
Depth to Water ▼ **NA**

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BORING LOG VST-06

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
Elevation: 585.69 ft
North: 1898109.29 ft
East: 1171902.18 ft
Station: 1103+77.81
Offset: 27.3835 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		--In-Situ Vane Shear, 40.5 feet--			13	VS	0.91	
		--$S_{u\ undis}$ = 906.4 psf--						
		--$S_{u\ remold}$ = 524.2 psf--						
		--Sensitivity = 1.7--						
		--In-Situ Vane Shear, 43.0 feet--			14	VS	0.68	
	542.2	--$S_{u\ undis}$ = 677.1 psf--						
		--$S_{u\ remold}$ = 393.1 psf--						
		--Sensitivity = 1.7--						
		Boring terminated at 43.50 ft	45					
			50					
			55					
			60					

GENERAL NOTES

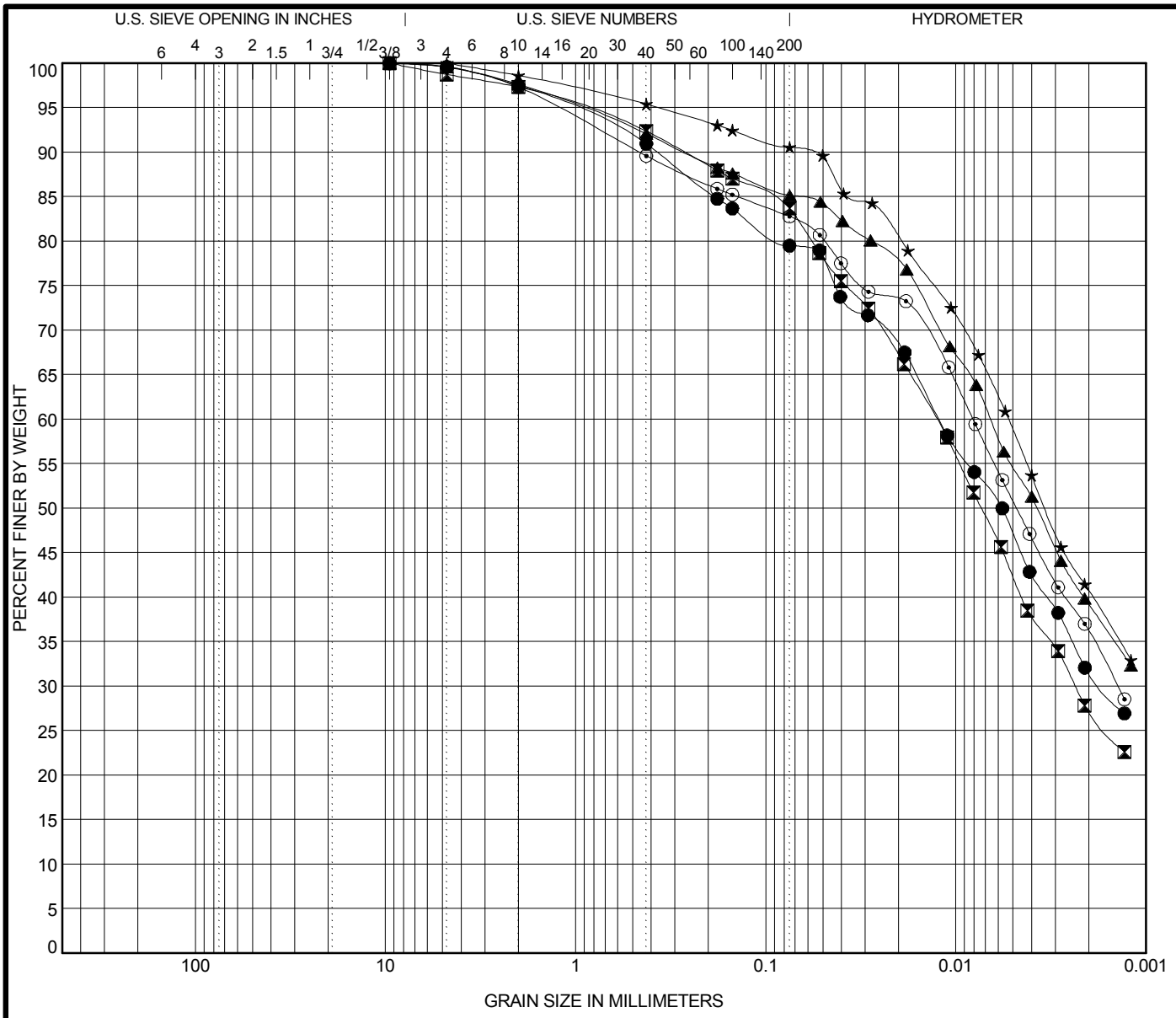
Begin Drilling **12-09-2015** Complete Drilling **12-14-2015**
Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR [85%]**
Driller **R&N** Logger **F. Bozga** Checked by **A. Kurnia**
Drilling Method **2.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling ▽ **Rotary wash**
At Completion of Drilling ▼ **mud in the borehole**
Time After Drilling **NA**
Depth to Water ▼ **NA**

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

APPENDIX B



COBBLES	GRAVEL	SAND		SILT AND CLAY
		coarse	fine	

	Specimen Identification		IDH Classification	LL	PL	PI	Cc	Cu
●	1710-B-04#5	11.0 ft	**Clay**	**33**	**17**	**16**		
⊠	1710-B-04#9	21.0 ft	**Silty Clay Loam**	**29**	**16**	**13**		
▲	1710-B-04#15	43.5 ft	**Clay**	**35**	**18**	**17**		
★	1710-B-04#17	53.5 ft	**Silty Clay**	**36**	**18**	**18**		
⊙	1710-B-04#18	58.5 ft	**Clay**	**35**	**18**	**17**		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	1710-B-04#5	11.0 ft	**9.5**	**0.012**	**0.002**		**2.5**	**18.0**	**47.9**	**31.6**
⊠	1710-B-04#9	21.0 ft	**9.5**	**0.013**	**0.002**		**2.7**	**13.8**	**56.2**	**27.3**
▲	1710-B-04#15	43.5 ft	**9.5**	**0.007**			**2.4**	**12.5**	**45.9**	**39.2**
★	1710-B-04#17	53.5 ft	**4.75**	**0.005**			**1.4**	**8.1**	**49.8**	**40.7**
⊙	1710-B-04#18	58.5 ft	**9.5**	**0.008**	**0.001**		**2.7**	**14.6**	**46.6**	**36.1**

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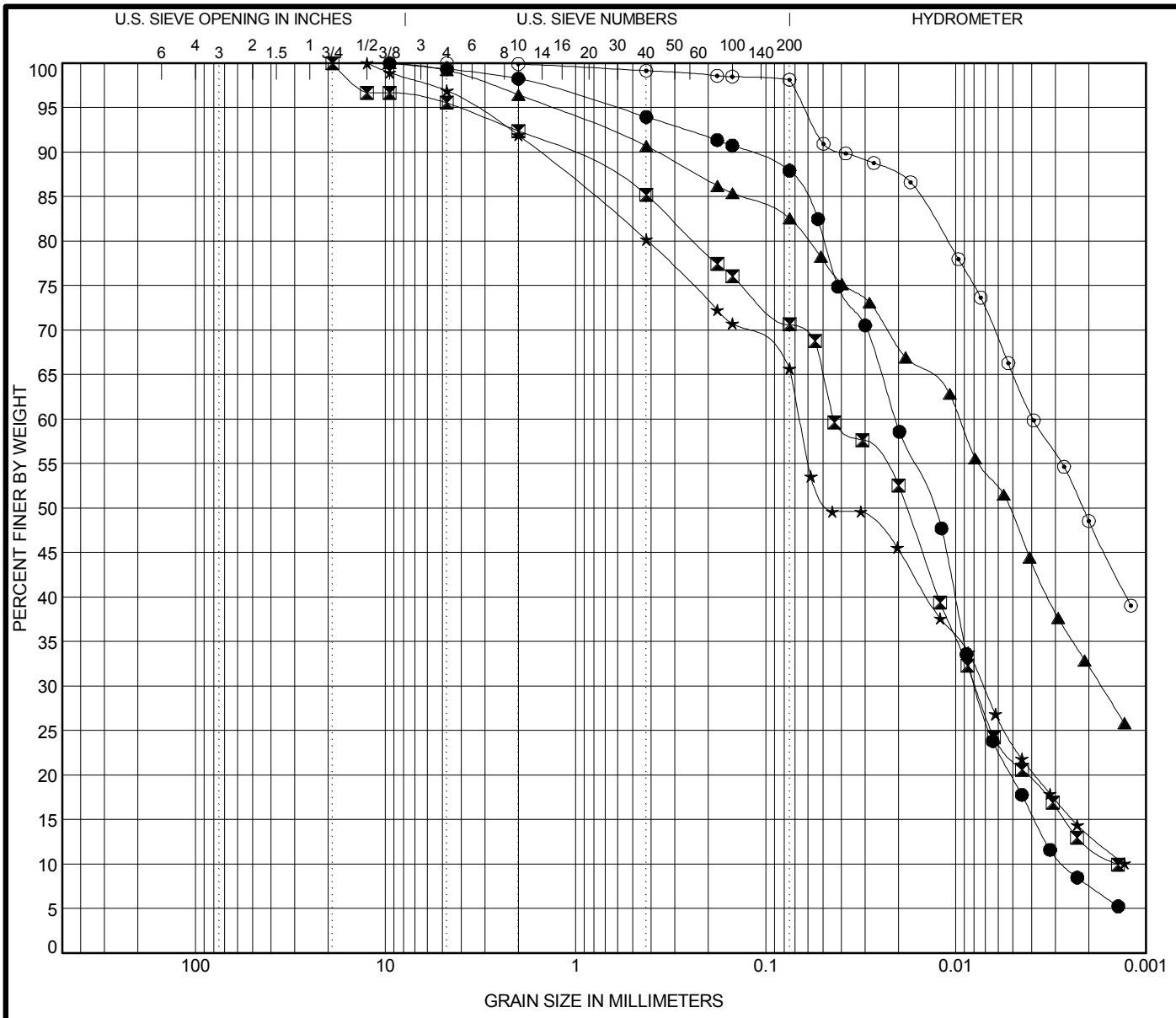
GRAIN SIZE DISTRIBUTION

Project: Circle Interchange Reconstruction

Location: Section 17, T39N, R14E of 3rd PM

Number: 1100-04-01



COBBLES	GRAVEL	SAND		SILT AND CLAY
		coarse	fine	

	Specimen Identification		IDH Classification	LL	PL	PI	Cc	Cu
●	1710-B-04#20	68.5 ft	**Silt**	21	19	2	1.09	7.70
⊠	1710-B-04#23	83.5 ft	**Silty Loam**	20	14	6	1.02	31.14
▲	1712-B-02#9	21.0 ft	**Silty Clay**	35	18	17		
★	1712-B-02#15	43.5 ft	**Silty Loam**	27	16	11		
⊙	1712-B-02#17	53.5 ft	**Clay**	36	19	17		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	1710-B-04#20	68.5 ft	9.5	0.021	0.008	0.003	1.7	10.5	80.1	7.6
⊠	1710-B-04#23	83.5 ft	19	0.044	0.008	0.001	7.6	21.8	58.4	12.1
▲	1712-B-02#9	21.0 ft	9.5	0.01	0.002		3.5	14.0	50.3	32.2
★	1712-B-02#15	43.5 ft	12.5	0.066	0.007		8.1	26.9	51.7	13.3
⊙	1712-B-02#17	53.5 ft	4.75	0.004			0.1	2.0	49.4	48.5

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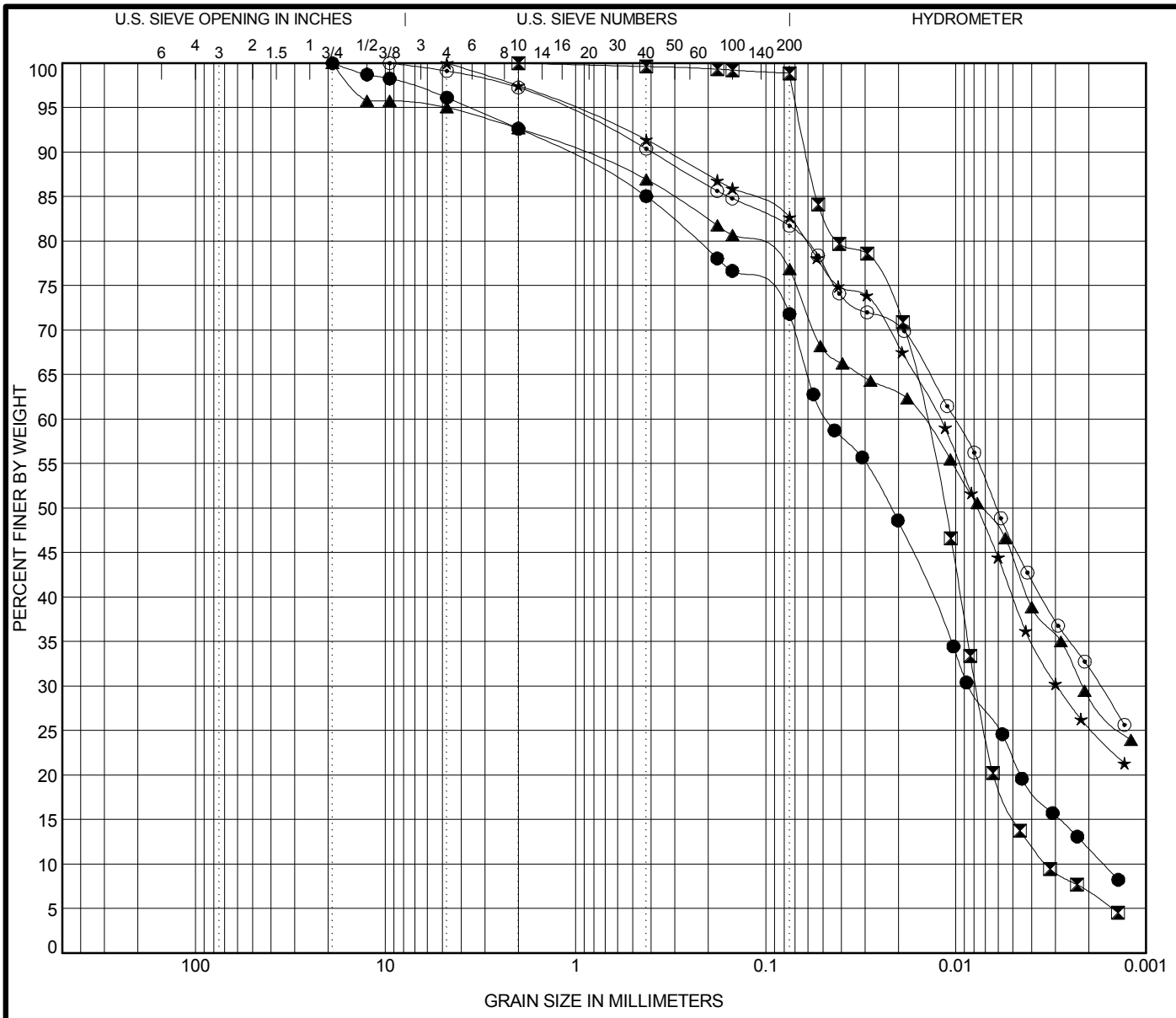
GRAIN SIZE DISTRIBUTION

Project: Circle Interchange Reconstruction

Location: Section 17, T39N, R14E of 3rd PM

Number: 1100-04-01



COBBLES	GRAVEL	SAND		SILT AND CLAY
		coarse	fine	

	Specimen Identification		IDH Classification	LL	PL	PI	Cc	Cu
●	1712-B-02#20	68.5 ft	**Silty Loam**	**19**	**14**	**5**	**0.92**	**28.12**
⊠	1712-B-02#23	83.5 ft	**Silt**	**NP**	**NP**	**NP**	**1.25**	**4.36**
▲	21-RWB-04#10	23.5 ft	**Silty Clay**	**34**	**17**	**17**		
★	22-RWB-03#6	13.5 ft	**Silty Clay Loam**	**32**	**18**	**14**		
⊙	22-RWB-03#13	33.5 ft	**Silty Clay**	**33**	**18**	**15**		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	1712-B-02#20	68.5 ft	**19**	**0.047**	**0.009**	**0.002**	**7.4**	**21.3**	**59.7**	**11.7**
⊠	1712-B-02#23	83.5 ft	**2**	**0.015**	**0.008**	**0.003**	**0.0**	**1.7**	**91.5**	**6.8**
▲	21-RWB-04#10	23.5 ft	**19**	**0.015**	**0.002**		**7.3**	**16.1**	**47.5**	**29.0**
★	22-RWB-03#6	13.5 ft	**4.75**	**0.012**	**0.003**		**2.5**	**15.0**	**57.1**	**25.4**
⊙	22-RWB-03#13	33.5 ft	**9.5**	**0.01**	**0.002**		**2.7**	**15.7**	**49.6**	**32.0**

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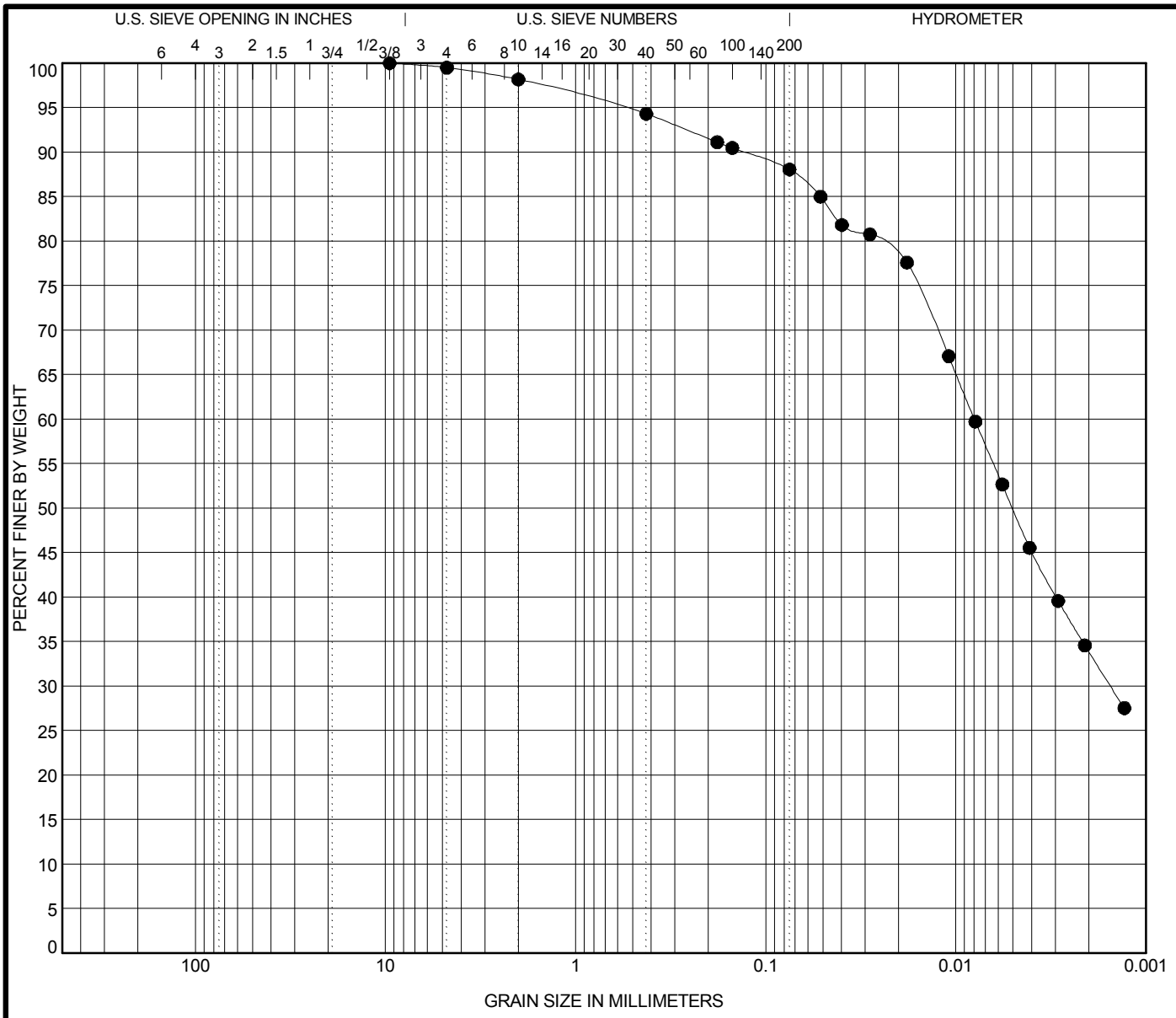
GRAIN SIZE DISTRIBUTION

Project: Circle Interchange Reconstruction

Location: Section 17, T39N, R14E of 3rd PM

Number: 1100-04-01



COBBLES	GRAVEL	SAND		SILT AND CLAY
		coarse	fine	

Specimen Identification	IDH Classification	LL	PL	PI	Cc	Cu
● **22-RWB-03#18 58.5 ft**	**Silty Clay**	**35**	**18**	**17**		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● **22-RWB-03#18 58.5 ft**	**9.5**	**0.008**	**0.002**		**1.8**	**10.2**	**54.1**	**33.9**

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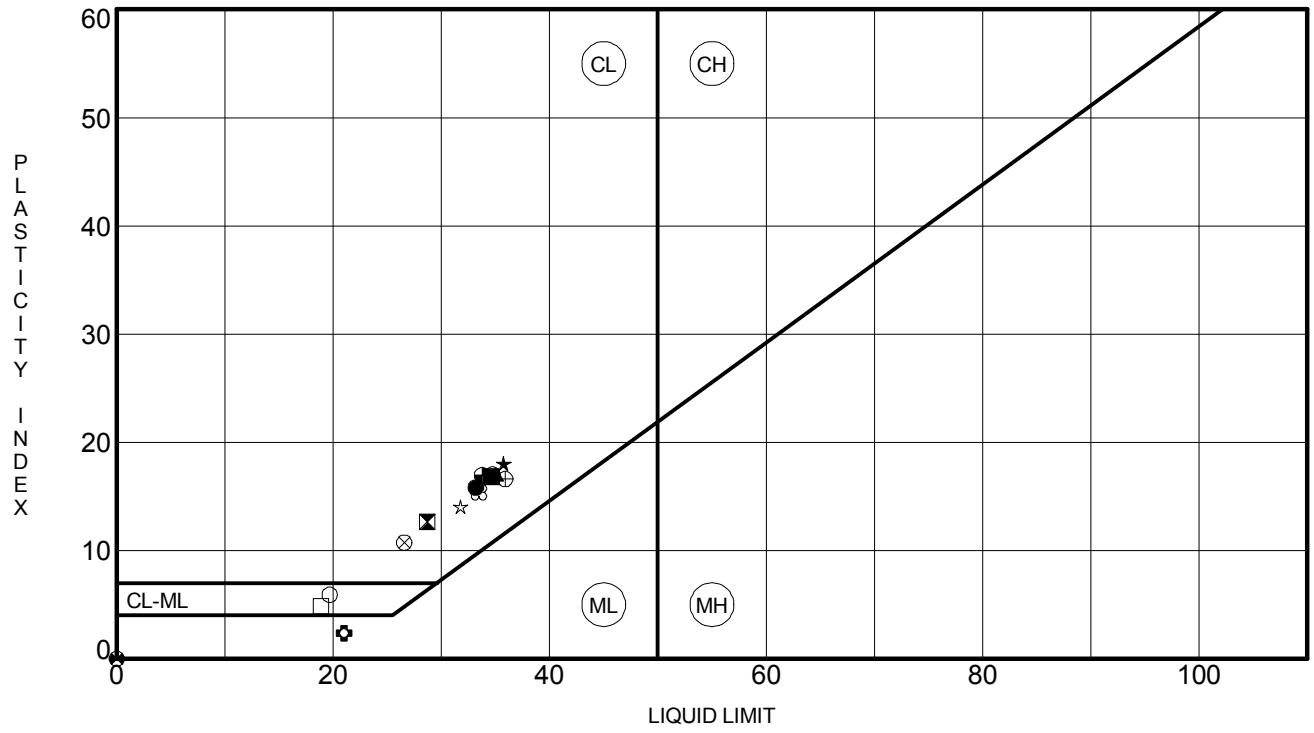
GRAIN SIZE DISTRIBUTION

Project: Circle Interchange Reconstruction

Location: Section 17, T39N, R14E of 3rd PM

Number: 1100-04-01



	Specimen Identification		LL	PL	PI	Fines	IDH Classification
●	1710-B-04#5	11.0 ft	33	17	16	79	Clay
⧓	1710-B-04#9	21.0 ft	29	16	13	84	Silty Clay Loam
▲	1710-B-04#15	43.5 ft	35	18	17	85	Clay
★	1710-B-04#17	53.5 ft	36	18	18	91	Silty Clay
⊙	1710-B-04#18	58.5 ft	35	18	17	83	Clay
✿	1710-B-04#20	68.5 ft	21	19	2	88	Silt
○	1710-B-04#23	83.5 ft	20	14	6	71	Silty Loam
△	1712-B-02#9	21.0 ft	35	18	17	83	Silty Clay
⊗	1712-B-02#15	43.5 ft	27	16	11	66	Silty Loam
⊕	1712-B-02#17	53.5 ft	36	19	17	98	Clay
□	1712-B-02#20	68.5 ft	19	14	5	72	Silty Loam
⊛	1712-B-02#23	83.5 ft	NP	NP	NP	99	Silt
◔	21-RWB-04#10	23.5 ft	34	17	17	77	Silty Clay
☆	22-RWB-03#6	13.5 ft	32	18	14	83	Silty Clay Loam
⊠	22-RWB-03#13	33.5 ft	33	18	15	82	Silty Clay
■	22-RWB-03#18	58.5 ft	35	18	17	88	Silty Clay

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ATTERBERG LIMITS' RESULTS

Project: Circle Interchange Reconstruction

Location: Section 17, T39N, R14E of 3rd PM

Number: 1100-04-01