STRUCTURE GEOTECHNICAL REPORT
CIRCLE INTERCHANGE RECONSTRUCTION
RETAINING WALL 38 (PROPOSED SN 016-1827)
F.A.I. ROUTE 290 (EISENHOWER EXPRESSWAY)
STATION 1315+37.04 TO STATION 1318+74.91
IDOT D-91-227-13/PTB 163-001
COOK COUNTY, ILLINOIS

For

AECOM

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11. Abstract

A 333-foot long, 21.5 feet maximum retained height new retaining wall will be constructed extending from Station 1318+74.91 to Station 1315+37.04 to accommodate the proposed Ramp SW realignment to Eisenhower Expressway. This report provides geotechnical recommendations for the design and construction of the proposed retaining wall.

Based on Borings 38-RWB-01, 38-RWB-02, 38-RWB-01HA, and 38-RWB-02HA drilled along the wall alignment and Borings 2055-B-06 and 1702-B-01 from Van Buren Street and Jackson Boulevard Bridges, the foundation soils consists of up to 1.5 feet of fill, up to 3.5 feet stiff to very stiff clay crust, up to 38.5 feet of very soft to medium stiff silty clay, up to 20 feet of stiff to hard silty clay to silty clay loam, about 35 feet of hard silty clay loam, and dense to very dense silty loam to silt extending to the boring termination depths or bedrock. Bedrock was encountered at an elevation of about 480 feet at nearby deep boring. Water-bearing layers may be present at deeper levels within the granular materials and weathered dolostone.

The retaining wall is a semi cut and fill wall. Our wall type evaluation shows the most technically feasible type of wall is a drilled shaft with lagging wall, or other non-gravity walls such as tangent and secant walls. Geotechnical parameters for design are presented in this report. The settlement estimate of maximum backfill height is 1.5 inches which is adequate for landscaping. Global stability analyses performed for the maximum height of wall system showed satisfactory factor of safety against slope failure with a critical wall bottom elevation of 530 feet or lower.

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1.0 INTRODUCTION

This report presents the results of Wang Engineering, Inc. (Wang) subsurface investigation, laboratory testing, and geotechnical engineering evaluations for the proposed wall SN 016-1827 (Retaining Wall 38) along the proposed southwest ramp (Ramp SW) to F.A.I Route 290 (Eisenhower expressway) in the City of Chicago, Cook County, Illinois. A *Site Location Map* is presented as Exhibit 1.

The purpose of our investigation was to characterize the site soil and groundwater conditions, perform geotechnical engineering analyses, and provide recommendations for the design and construction of the new wall structure.

1.1 Project Description

The Circle Interchange is over 50 years old and has significant congestion and safety problems. The project is aiming to improve safety and mobility as well as upgrade the mainline and interchange facilities. The project will also improve other modes of transportation such as transit, pedestrians and bicyclists within the same corridor.

The Circle Interchange Reconstruction project is along Interstate 90/94 (I-90/94) from south of Roosevelt Road to north of Lake Street, along Interstate 290 (I-290) from Loomis Street to the Circle Interchange; and along Congress Parkway from the Circle Interchange to Canal Street/Old Post Office. The routes typically have three lanes of traffic in each direction with mostly one lane ramp at interchanges. Locally, the north leg is known as the Kennedy Expressway, the south leg as

the Dan Ryan Expressway and the west leg as the Eisenhower Expressway. Within the project area, there are several cross street bridges over I-90/94 and I-290 considered for reconstruction. Along I-90/94, from south to north, the cross street overpasses include Taylor Street, Van Buren Street, Jackson Boulevard, and Adams Street. Along I-290, from west to east, the cross street overpasses include Morgan Street, Peoria Street, and Halsted Street.

The proposed improvements include additional through lanes in each direction on I-90/94. The horizontal alignment and vertical profiles throughout the interchange will be improved. A new two-lane flyover, Ramp NW (Flyover) will be constructed for I-90/94 northbound to I-290 westbound traffic. Cross street bridges, Morgan Street, Harrison Street, Halsted Street, Peoria Street, Taylor Street, Adams Street, Jackson Boulevard, and Van Buren Street will be reconstructed. Various existing ramps will be reconstructed and up to fifty new retaining walls will be constructed.

1.2 Proposed Structure

Based on TSL dated November 19, 2015 provided by TranSystems, the proposed retaining wall (SN 016-1827) will be about 333-foot long measured along wall's front face extending from Station 1315+37.04 to Station 1318+74.91 along the newly realigned Ramp SW and will have a maximum retained height of about 21.5 feet. The maximum wall height measured from the finished grade behind the wall to the bottom of concrete facing is 23.5 feet. There will be a 4-foot concrete parapet on top of the wall. The cross sections provided by TranSystems show an existing ground behind the proposed wall backslopes approximately 4H:1V from Station 1318+74.81 to 1317+37.50, about 135-foot long section which will require up to 14 feet of backfill at the maximum height of the cone; therefore, it will be semi cut and fill wall. From Station 1317+37.50 to 1315+37.04, about 200-foot long section, the existing ground back of the wall is mostly flat, and will require minor landscaping fill near to the Jackson Boulevard; therefore it will be mostly a cut wall.

The wall will start about 40 feet north of Van Buren Street Bridge north abutment and will extend north along the proposed Ramp SW to about 50 feet south of Jackson Boulevard south abutment towards I-90 westbound. The new wall will retain the cut for the realigned Ramp SW. The latest TSL is shown in the *Type Size Location Plan* (Appendix C).

1.3 Existing Structure

There is an existing approximately 3 to 4 feet high barrier wall along the Ramp SW that will be removed.

2.0 SITE CONDITIONS AND GEOLOGICAL SETTING

The site is located within the City of Chicago at the I-90/94 and I-290 Circle Interchange. On the USGS *Chicago Loop 7.5 Minute Series* map, the bridge is located in the NW¼ of Section 16, Tier 39 N, Range 14 E of the Third Principal Meridian.

The following review of published geologic data, with emphasis on factors that might influence the design and construction of the proposed engineering works, is meant to place the project area within a geological framework and confirm the dependability and consistency of the present subsurface investigation results. For the study of the regional geologic framework, Wang considered northeastern Illinois in general and Cook County in particular. Exhibit 2 illustrates the *Site and Regional Geology*.

2.1 Physiography

The site is situated within the northern section of the Chicago/Calumet lacustrine plain (Chrzatowsky and Thompson 1992). The area's flat, lakeward-sloping surface is a wave-scoured groundmoraine covered by thin and discontinuous lacustrine offshore silt and clay (Willman 1971).

Along the proposed retaining wall, the southbound I-90/94 exit ramp to westbound I-290 roadway alignment is constructed within a 20- to 25-foot deep cut. Elevations along the proposed wall range from 574 feet at the south end to 577 feet at the north end.

2.2 Surficial Cover

Within the project area, 75-foot thick or more, Wisconsinan-age glacial drift covers the bedrock (Leetaru et al. 2004). The glacial cover is made up of clay and silt of the Equality Formation of the Mason Group and diamictons of the Wadsworth and Lemont Formations of the Wedron Group (Hansel and Johnson 1996). The Equality Formation is made up of bedded silt and clay, locally laminated, with lenses and/or thin beds of sand and gravel. The Wadsworth Formation consists of relatively homogenous, massive, gray till with clay to silty clay matrix, with dolostone and shale clasts and occasional lenses of sorted and stratified silt. The Wadsworth Formation is underlain by the

pebbly silty clay loam to silty loam diamicton of the Yorkville Member of the Lemont Formation, known informally as the Chicago "hardpan."

From a geotechnical viewpoint, the Equality Formation is characterized by low strength, medium to high plasticity, and medium to high moisture content, whereas the Wadsworth Formation is characterized by low plasticity, medium to low moisture content, medium to very stiff consistency, poor permeability, and low compressibility. The Yorkville Member hardpan is characterized by low plasticity, high blow counts, and low moisture content (Bauer et al. 1991; Peck and Reed 1954).

2.3 Bedrock

In the project area, the glacigenic deposits rest unconformably over a 350-foot thick Silurian-age dolostone. The top of bedrock may be encountered at elevations lower than 500 feet or 75 to 100 feet below ground surface (bgs). The Silurian dolostone dips gently eastward at a pace of 15 feet per mile. Only inactive faults are known in the area, and the seismic risk to the proposed structure from the existing faults is minimal (Leetaru et al. 2004; Willman 1971). There are no records of mining activity in the area, but deep tunnel excavations are known to exist. Just south of the beginning of wall 38, on the north side of Van Buren Street Bridge, there is an existing 60-inch diameter inverted siphon with an approximate invert elevation of 566.9 feet which is to remain. This appears to be outside of the proposed wall alignment footprint thus no interference with any deep foundations.

Our subsurface investigation results fit into the local geologic context. The borings drilled in the project area revealed the native sediments consist of silty clay lacustrine deposits of the Equality Formation and silty clay diamicton of the Wadsworth Formation resting on top of more competent silty clay loam diamicton (hardpan) of the Lemont Formation. Bedrock was not encountered in any of the borings drilled for the retaining wall; however, based on nearby borings in the area, bedrock is estimated to be at approximately 480 feet elevation.

3.0 EXISTING GEOTECHNICAL DATA

Boring 2055-B-06 performed for the Van Street Bridge pier and Boring 1702-B-01 performed for the Jackson Boulevard Bridge west abutment were used in analysis for the wall design.

4.0 METHODS OF INVESTIGATION

The following sections outline the subsurface and laboratory investigations. All elevations in this report are based on NAVD 1988.

4.1 Subsurface Investigation

In addition to the existing geotechnical data mentioned in Section 3.0, Wang drilled two structure borings designated as 38-RWB-01 and 38-RWB-02, and two hand-augers designated as 38-RWB-01HA and 38-RWB-02HA, from August 19 to 28, 2014 along the proposed wall alignment. The as-drilled boring locations were surveyed by Dynasty Group Inc. and station and offset information for each boring were provided by AECOM. The station and offset referenced the wall alignment. Boring location data are presented in the *Boring Logs* (Appendix A). The as-drilled boring locations are shown in the *Boring Location Plan* (Exhibit 3).

A truck-mounted drilling rig equipped with hollow stem augers, was used to advance and maintain open boreholes from 10 to 15 feet depths after that mud rotary was used to the boring termination depths. Soil sampling was performed according to AASHTO T 206, "*Penetration Test and Split Barrel Sampling of Soils*." The soil was sampled at 2.5-foot intervals to 30 feet below ground surface (bgs) and at 5-foot intervals to boring termination depths. Soil samples collected from each sampling interval were placed in sealed jars and transported to Wang Geotechnical Laboratory in Lombard, Illinois for further examination and laboratory testing.

Field boring logs, prepared and maintained by a Wang engineer or geologist, include lithological descriptions, visual-manual soil/rock classifications, results of Rimac and pocket penetrometer unconfined compressive strength tests, results of Standard Penetration Tests (SPT) recorded as blows per 6 inches of penetration. The SPT N value, shown on the soil profile, is the sum of the second and third blows per 6 inches. The soils were described and classified according to Illinois Division of Highways (IDH) Textural Classification system. The field logs were finalized by an experienced engineering geologist after verifying the field visual classifications and laboratory test results.

Groundwater observations were made during and at the end of drilling operations. Due to safety considerations, boreholes were grouted immediately upon completion.

4.2 Vane Shear Tests

Wang performed vane shear tests in a separate borehole designated as Boring 39-VST-01 to determine in-situ shear strength of very soft to soft silty clay. This borehole was performed without soil sampling below 10 feet. After drilling to the desired depth, casing was installed and vane shear test was performed using Acker Vane Shear Test Kit. Tests were performed in undisturbed and remolded conditions. The sensitivity is the ratio of shear strength in undisturbed and remolded conditions. In general, the vane shear values for soft clays were significantly higher than the corresponding values from unconfined compressive strength tests using the RIMAC apparatus. The vane shear test results were used for analyses.

4.3 Laboratory Testing

All soil samples were tested in the laboratory for moisture content (AASHTO T-265). Field visual descriptions of the soil samples were verified in the laboratory. Laboratory test results are shown in the *Boring Logs* (Appendix A) and in the *Soil Profile* (Exhibit 4). Rock core photograph is shown on also in Appendix A.

The soil samples will be retained in our laboratory for 60 days following this report submittal. After that time, soil samples will be discarded unless a specific written request is received as to their disposition.

5.0 RESULTS OF FIELD AND LABORATORY INVESTIGATIONS

Detailed descriptions of the soil conditions encountered during our subsurface investigation are presented in the attached *Boring Logs* (Appendix A) and in the *Soil Profile* (Exhibit 4). Please note that strata contact lines represent approximate boundaries between soil types. The actual transition between soil types in the field may be gradual in horizontal and vertical directions.

5.1 Soil Conditions

Along the proposed wall, pavement structure consists of 4.5- to 6.0-inch asphalt over 12.0-inch concrete underlain by 1.0- to 1.4-foot sandy gravel to crushed stone. In descending order, the general lithologic succession encountered beneath the pavement includes 1) man-made ground (fill); 2) medium stiff to very stiff silty clay to clay; 3) very soft to medium stiff clay to silty clay; 4) stiff to hard silty clay to silty clay loam diamicton; 5) hard silty clay loam or dense to very dense silty loam to silt and sand; and 6) strong dolostone bedrock.

1) Man-made ground (fill)

Underneath the pavement structure, at elevations of 580.7 to 592.9 feet, the borings encountered 1.5 to 7.3 feet of cohesive or granular fill. The granular fill consists of loose, brown and gray sand, and silty loam with SPT N-value of 6 blows/foot and moisture content (MC) value of 19%. The cohesive fill consists of stiff, brown and gray silty clay loam to silty clay and has unconfined compressive strength (Q_u) values of 1.25 to 2.50 tsf with an average of 2.06 tsf and moisture content (MC) values of 16 to 23% averaging 18%.

2) Medium stiff to very stiff silty clay to clay

Below the fill, a 2.5- to 3.5-foot thick layer of stiff to very stiff, gray and brown silty clay to clay was sampled in the borings starting at elevations of 583.3 to 584.8 feet. This layer has Q_u values of 0.75 to 2.5 tsf and MC values of 19 and 20%. This layer is commonly known as the "crust."

3) Very soft to medium stiff clay to silty clay

At elevations of 572.5 to 581.3 feet, the borings encountered up to 38.5 feet of very soft to medium stiff, gray clay to silty clay with Qu values of 0.08 to 1.00 tsf with an average of 0.35 tsf and MC values of 16 to 28% averaging 24%. This layer is commonly known as the "Chicago Blue Clay."

4) Stiff to hard silty clay to silty clay loam diamicton

The borings advanced through up to 35 feet of stiff to hard, gray silty clay to silty clay loam at elevations of 538.5 to 552.1 feet. It has Qu values of 1.39 to 4.1 tsf with an average value of 2.3 tsf and MC values of 13 to 30% averaging 20%.

5) Hard silty clay loam or medium dense to very dense silty loam and sand and silt

At elevations of 516.3 to 518.8 feet, the borings advanced through hard, gray silty clay loam or medium to very dense silty loam and sand and silt. This layer has Qu values of 4.43 to 10.3 tsf, MC values of 12 to 17%, and SPT N values of 18 and more than 50 blows/foot. This layer is commonly known as the "Chicago Hardpan."

6) Strong dolostone bedrock

Dolostone bedrock was confirmed by coring at 96.0 feet bgs in Boring 2055-B-06 corresponding to an elevation of 479.5 feet. Based on a 10-foot rock core taken, RQD is about 72% corresponding to fair quality rock. Dolostone bedrock was strong, light gray, bedded fresh, and moderately vuggy. The unconfined compressive strength of rock was tested at 10,330 psi. Possible weathered dolostone

was encountered at 481.5 feet, resting on top of the fair quality rock at 479.5 feet. The weathered dolostone layer may be water-bearing.

5.2 Groundwater Conditions

Groundwater was not observed during drilling due to mud rotary drilling from 10 to 15 feet bgs. Water-bearing layers may be present at deeper levels within the sand and silt to sandy gravel at elevation of 517.1 and within weathered dolostone layer encountered and 481.5. The possibility of encountering groundwater bearing layer at deeper levels should be accounted for during design and construction of the wall foundations.

5.3 Seismic Design Considerations

The retaining wall is located in Seismic Performance Zone (SPZ) 1 and is not required to be designed for seismic forces as per 2012 IDOT Bridge Manual (IDOT, 2012B).

6.0 ANALYSIS AND RECOMMENDATIONS

6.1 Retaining Wall Type Evaluation

The proposed retaining wall will be a cut wall to allow the realignment of Ramp SW carrying southbound I-90/94 traffic to westbound I-290.

The soils below the finished grade in front of the wall at elevation of about 574 to 577 feet are very soft to medium stiff clay and silty clay extending to elevation 536 feet. The top of the proposed retaining wall will be about 594 to 596 feet elevation. The maximum exposed wall height will be about 21.5 feet. The maximum wall height measured from the finished grade behind the wall to the bottom of concrete facing is 23.5 feet. The existing ground surface elevation varies from 581.41 to 591.16 feet; finished grade at front face panel varies from 574.42 to 577.10, and finished grade back face of panel varies from 592.99 to 595.31 feet. We estimate that a maximum of 14 feet of backfill will be required behind the wall at Station 1318+74.91.

Consideration was given in using standard cast-in-place cantilever concrete (T-type) walls with spread footings or an MSE wall, however, it was ruled out due to low bearing resistance, excessive settlements unless drilled shaft support or ground improvement is performed. In addition, the construction of these wall types would require a temporary soil retention system to retain the slope during construction for excavation of the foundations

Finally, a drilled shaft with lagging type retaining wall system was considered. Other non-gravity walls such as tangent or secant wall may also be used. The lateral movement of this type of wall is relatively small compared to more flexible walls. The geotechnical parameters developed for drilled shaft with lagging wall in the next section may be used for these walls.

On the front side of the proposed wall, there is an existing 16-inch water main that will be relocated, as well as proposed storm sewers that will cross through the wall at Station 1318+00. The impact of these proposed utilities must be included in the design of the wall.

6.2 Drilled Shaft with Lagging Wall

The tip elevation of the drilled shafts will be determined by the lateral resistance. The design embedment depth of the wall sections should include a minimum FOS of 1.5 against earth pressure failure for walls in the long-term (drained) condition using the soil parameters as shown in Table 1. The design of the wall should ignore 3 feet of soil in front of the wall measured from the finished ground surface elevation in providing passive pressure due to excavation required for installation of concrete facing, drainage system and frost-heave condition. In developing the design lateral pressure, the lateral pressure due to construction equipment surcharge load should be added to the lateral earth pressure. Drainage behind the wall and underdrain should be as per 2012 IDOT Bridge Manual (IDOT, 2012B). The water pressure should be added to the earth pressure if drainage is not provided. The simplified earth pressure distributions shown in 2014 AASHTO LRFD Bridge Design Specifications should be used.

Table 1: Earth Pressure Parameters for Embedment Design of Wall
(Borings 38-RWB-01, 38-RWB-02, 2055-B-06, and 1702-B-01)

Layer Elevations/ Soil Description	Unit Weight	Drained Shear Strength Properties		Earth Pressure coefficients[1]	
		Cohesion Cu	Friction Angle, φ'	Active Pressure	Passive Pressure
	(pcf)	(psf)	(Degree)		
581.0[2] to 560.6 Clay to Silty Clay	110	50	28	0.36	2.77
560.6 to 550.6 Clay to Silty Clay	110	50	28	0.36	2.77
550.6 to 541.8 Clay to Silty Clay	110	50	29	0.35	2.88

541.8 to 536.1 Clay to Silty Clay	120	80	29	0.35	2.88
536.1 to 524.3 Clay to Silty Clay	120	100	30	0.33	3.00
524.3 to 519.3 Silty Clay to Silty Clay Loam	120	100	30	0.33	3.00
519.3 to 516.3 Silty Clay Loam	125	100	30	0.33	3.00
516.3 to 511.1 Silty Loam	120	0	31	0.32	3.12
511.1 to 498.4 Silty Clay Loam	125	100	30	0.33	3.00
498.4 to 481.5 Silty Loam to Silt	125	0	32	0.31	3.25

(1) Earth pressure coefficients for straight backfill
(2) Existing grade elevation at wall

Design considerations should include deflection control at the top of the wall. The lateral deformation of the wall should be designed using the parameters shown in Table 2 via p-y curve (COMP624) method. The incremental parameters for the soft silty clay (**Layer 3**) undrained shear values were obtained from vane shear testing conducted at Boring 39-VST-01 and others. In addition, the results of nearby vane shear tests, unconfined compressive test results from Shelby tube samples, and undrained shear strength (cohesion) results from triaxial UU tests were also considered in soil parameter development.

Table 2: Geotechnical Parameters for Design of Wall
(Borings 38-RWB-01, 38-RWB-02, 2055-B-06, and 1702-B-01)

Layer Elevations/ Soil Description	Moist Unit Weight (pcf)	Shear Strength Properties			Estimated Lateral Soil Modulus Parameter(2), k (pci)	Estimated Soil Strain Parameter(2), ε_{50}
		Short Term		Long Term		
		Cohesion Cu (psf)	Friction Angle, φ (Degree)	Friction Angle, φ' (Degree)		
581.0(1) to 560.6 Clay to Silty Clay	110	540	0	28	100	0.0100
560.6 to 550.6 Clay to Silty Clay	110	750	0	28	100	0.0100
550.6 to 541.8	110	1070	0	29	500	0.0070

Clay to Silty Clay						
541.8 to 536.1 Clay to Silty Clay	120	1300	0	29	500	0.0070
536.1 to 524.3 Clay to Silty Clay	120	2500	0	30	1000	0.0050
524.3 to 519.3 Silty Clay to Silty Clay Loam	120	2100	0	30	1000	0.0050
519.3 to 516.3 Silty Clay Loam	125	4500	0	30	2000	0.0040
516.3 to 511.1 Silty Loam	120	0	31	31	60	--
511.1 to 498.4 Silty Clay Loam	125	8000	0	30	2000	0.0040
498.4 to 481.5 Silty Loam to Silt	125	0	32	32	60	--

[(1)]Existing grade elevation at wall
[(2)]Based on L-Pile Technical Manual 2012

The potential pressure/load from existing buildings and parking lots on the proposed wall must be considered in design of the wall. The type of foundations that these buildings are supported is not known.

6.3 Settlement Analyses

Based on the TSL plan, to reach the design finished grade at the back of the wall, we estimate that up to 14 feet of fill may be required creating s a surcharge load behind the wall. Settlement analyses were performed using IDOT Design Guide "*Cohesive Soil Settlement Estimate and spreadsheet"* dated December 9, 2014 estimated a maximum settlement of 1.5 inches for the maximum surcharge of 14 feet which is adequate for the landscaping.

It should be noted that the surcharge is applied at the upper levels of the backwall where the existing ground is located, and is far away from adjoining Van Buren Street and Jackson Boulevard bridge abutments, thus we do not anticipate the new fill to have any settlement effect on the adjacent bridge abutments.

The nearest existing building (333 S. Halsted) is about 60 feet away from the proposed wall. The surface movement induced adjacent to the building by the installation of the proposed wall is estimated to be less than 0.25 inches.

6.4 Global Stability Analyses

Global stability analysis was performed for the maximum wall height with up to 21.5 feet at Station 1315+37.04 for both short-term (undrained) and long-term (drained) soil conditions as presented in Appendix B. The soil parameters used for the stability analysis were based on the shear strength parameters developed from the unconfined compressive strength (Qu) values derived from RIMAC test which are more conservative.

We estimate the maximum semi cut and wall section has a short-term FOS of 1.5 and a long-term FOS of 4.5 (Appendix B-1, B-2), therefore satisfying the minimum IDOT FOS requirements. The analysis basically shows the wall configuration needed to achieve a minimum 1.5 FOS against global instability for the most critical case. We estimate that the bottom of the wall should be at or below elevation of 530 feet to achieve a minimum FOS of 1.5 against global stability failure based on the short-term conditions. Additional embedment and lateral analyses will also be performed to establish final wall design.

7.0 CONSTRUCTION CONSIDERATIONS

7.1 Excavation and Dewatering

Foundation 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 be considered during construction.

Based on the results of our investigation and proposed excavation in front of the wall, perched water is likely to be encountered during construction within the fill. The water accumulated in excavation should be removed through conventional sump and pump methods. Intermittent water-bearing layers may also be present at deeper levels within the proposed drilled shafts. These layers may locally impact drilled shaft installations. Casing will be required to seal these interbeds off in the event that they are exposed. Casing will also be necessary to prevent shaft squeeze within the soft and deformable clays encountered (**Layer 3**). Moreover, during drilling we encountered hard drilling which indicates the possibility of cobbles or boulders.

7.2 Filling and Backfilling

All fill and backfill materials will be as per IDOT Standard Specification.

7.3 Wall Construction

The wall should be constructed as per IDOT Standard Specifications and the current special provision developed by IDOT for construction of drilled shaft with lagging wall. The impact of the presence of existing buildings, parking lots, and utilities on the construction of the proposed wall 38 should be evaluated.

7.4 Drilled Shafts

Soldier piles will be encased in drilled shafts. After a drilled shaft is completed to the required elevation, the base should be cleaned and inspected, the flange placed, and the concrete discharged at the base using a tremie pipe or concrete pump. The drilled shafts should be constructed in accordance with Section 516 Drilled Shafts of 2012 or IDOT Standard Specifications for Road and Bridge Construction (IDOT, 2012A).

As mentioned in section 7.1 casing will be required to seal-off water and/or prevent squeezing of soft clays. Casings will be required to maintain an open borehole at these locations. Failure to anticipate the challenges posed by the groundwater may result in caving or heaving sand and weakening of the foundation soils, as well as the potential for shaft squeeze in the soft clay. Shaft squeeze and heavy dewatering can result in ground loss around the perimeter of the shaft, affecting adjacent roadways and facilities.

7.5 Construction Monitoring

There is no need of a special construction monitoring for the retaining wall except normally required by the IDOT Standard Specifications for roadway and Bridge Construction and special provisions.

8.0 QUALIFICATIONS

The analysis and recommendations submitted in this report are based upon the data obtained from the borings drilled at the locations shown on the boring logs and in Exhibit 3. This report does not reflect any variations that may occur between the borings or elsewhere on the site, variations whose nature and extent may not become evident until the course of construction. In the event that any changes in the design and/or location of Retaining Wall 38 (SN016-1827) are planned, we should be timely informed so that our recommendations can be adjusted accordingly.

It has been a pleasure to assist AECOM and the Illinois Department of Transportation on this project. Please call if there are any questions, or if we can be of further service.

Respectfully Submitted,
WANG ENGINEERING, INC.

exp. 11/30/2017

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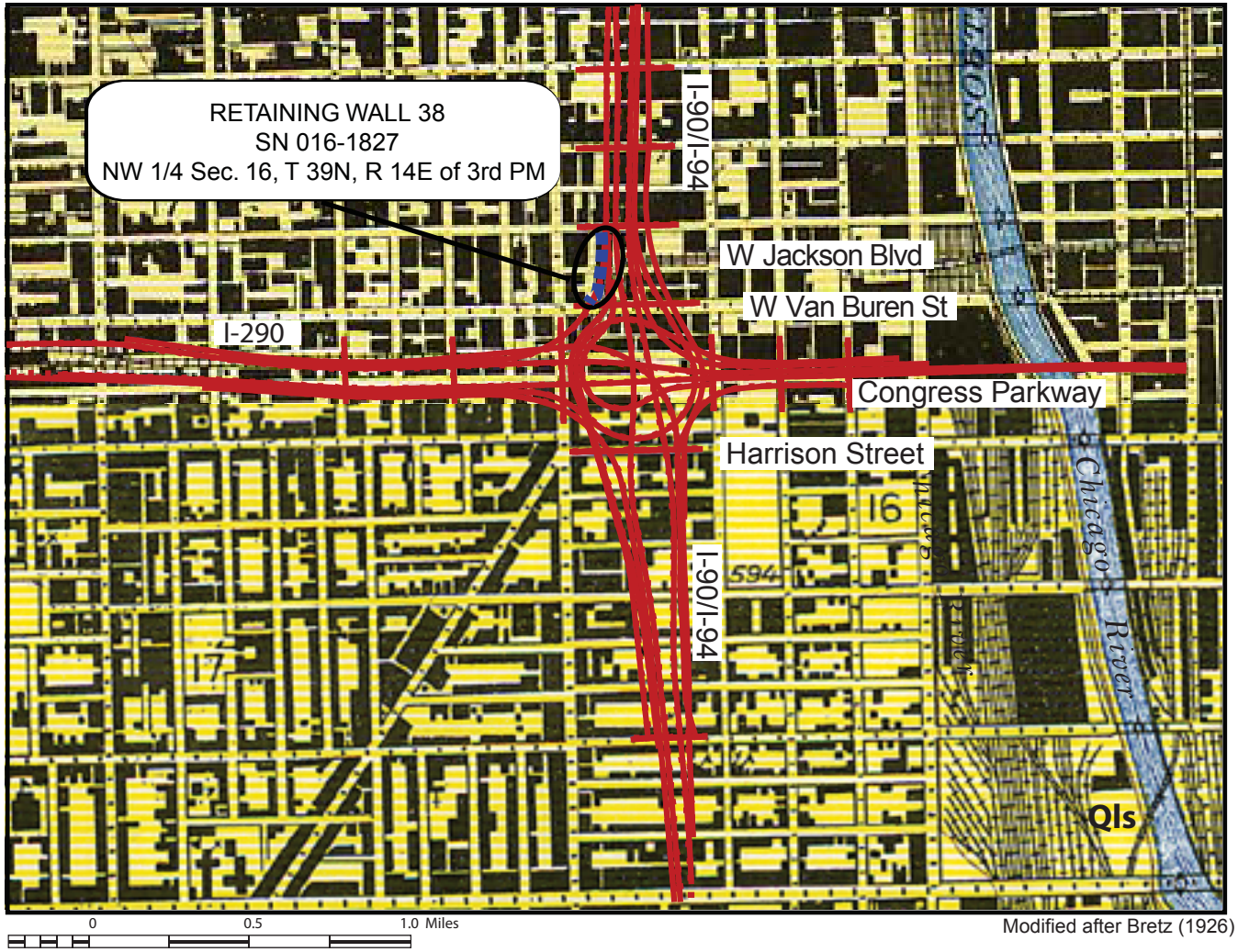
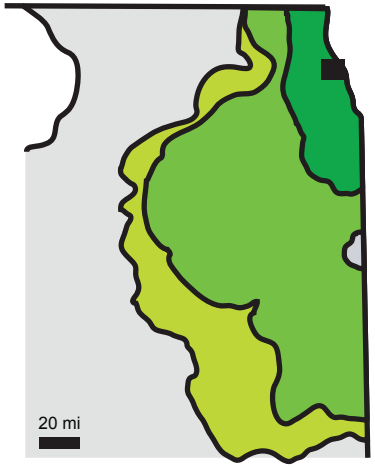
EXHIBITS



Modified after Bretz (1926)

N

REGIONAL GEOLOGY



Wedron Group

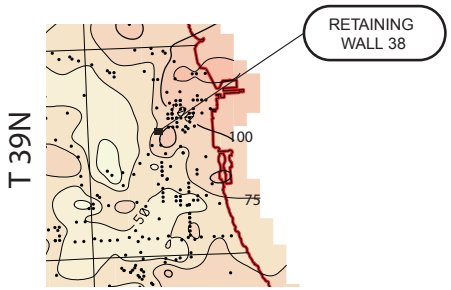
- Wadsworth Formation
- Lemont Formation
- Tiskilwa Formation

Modified after Hansel and Johnson (1996)

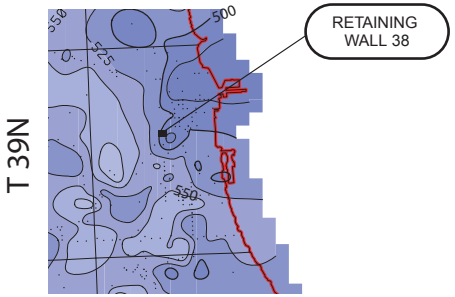
Legend

Qls — Glacial lake bottom
(Covered by lacustrine deposits)

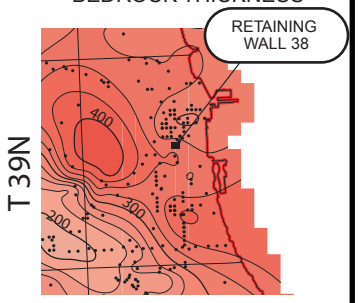
DRIFT THICKNESS



BEDROCK TOPOGRAPHY



BEDROCK THICKNESS



Modified after Leetaru et. al. (2004)

0 2 4 8 miles

SITE AND REGIONAL GEOLOGY: CIRCLE INTERCHANGE RECONSTRUCTION, RETAINING WALL 38, SN 016-1827, CHICAGO, IL

SCALE: GRAPHICAL	EXHIBIT 2	DRAWN BY: H. Bista CHECKED BY: M. Seyhun

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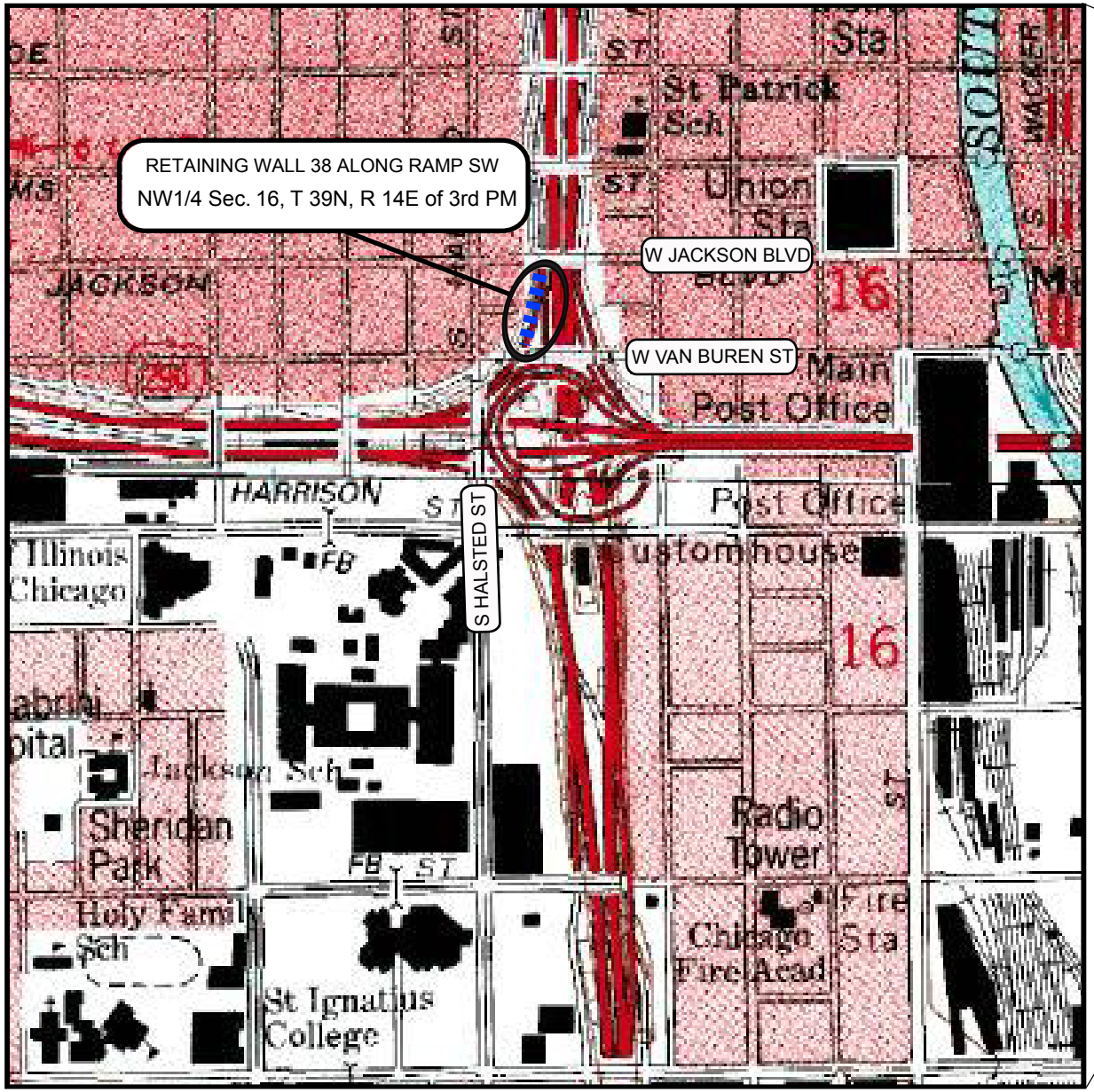

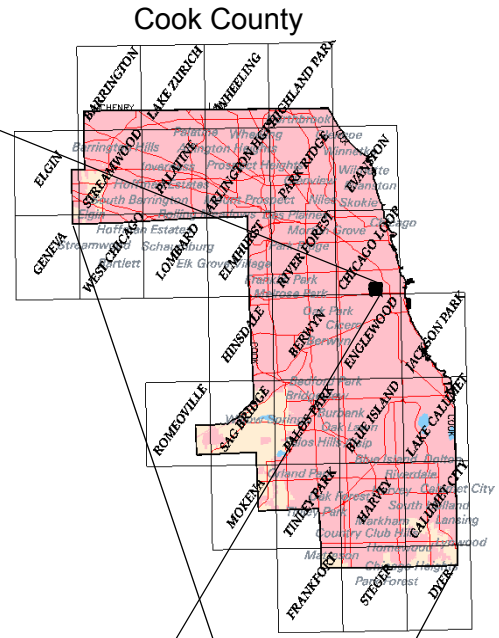

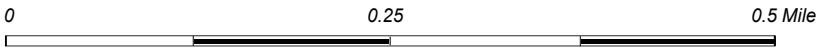

SITE LOCATION MAP: CIRCLE INTERCHANGE RECONSTRUCTION, RETAINING WALL 38, SN 016-1827, CHICAGO, IL

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

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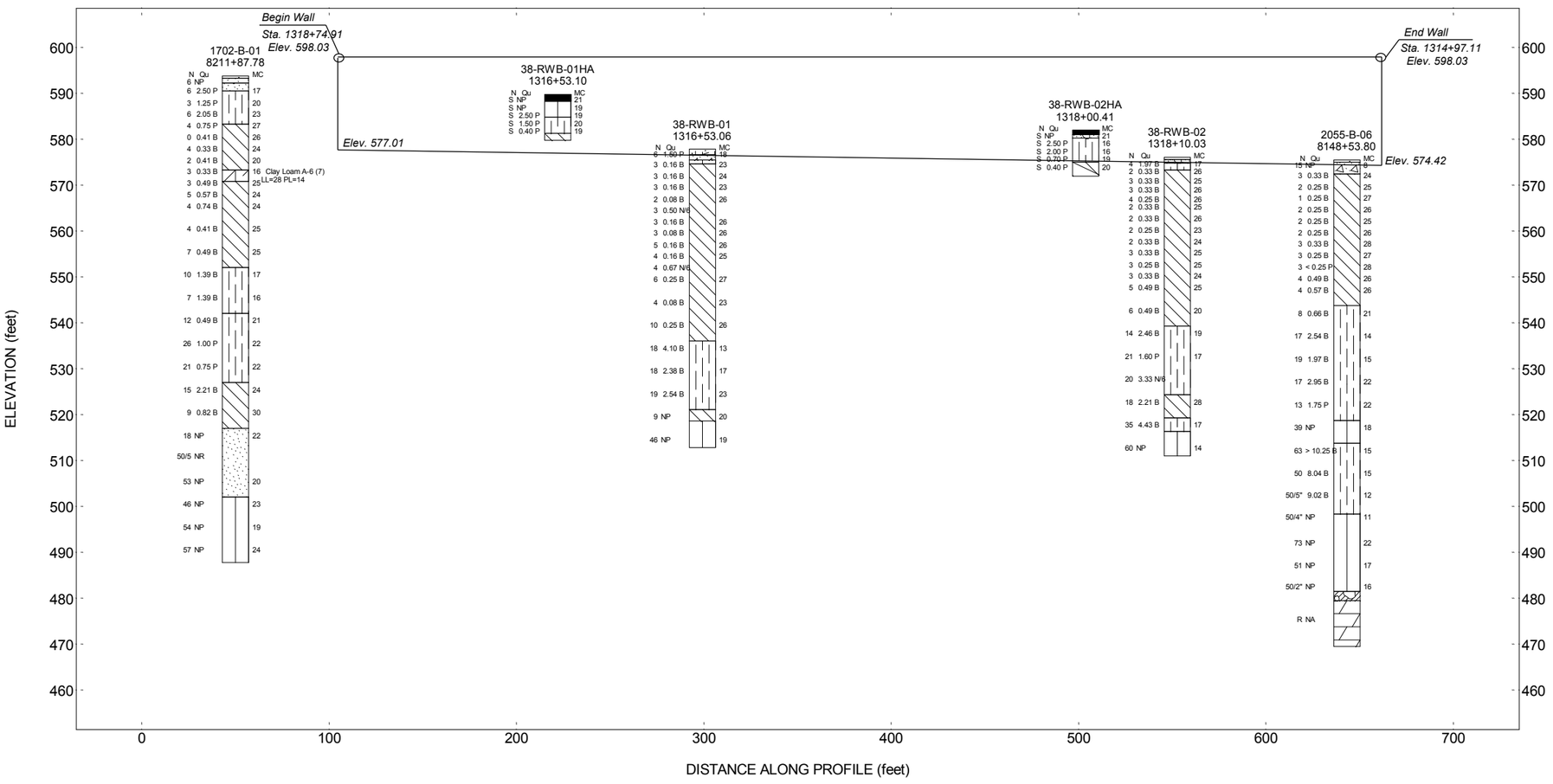
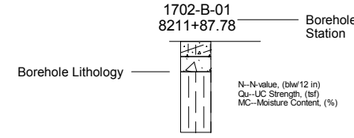


Lithology Graphics

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

Site Map Scale 1 inch equals 255 feet

Explanation:



Water Level Reading at time of drilling.

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

0 70

Horizontal Scale (feet)

Vertical Exaggeration: 2.5x

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Soil Profile
Retaining Wall 38

WEI SINCE 1982

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

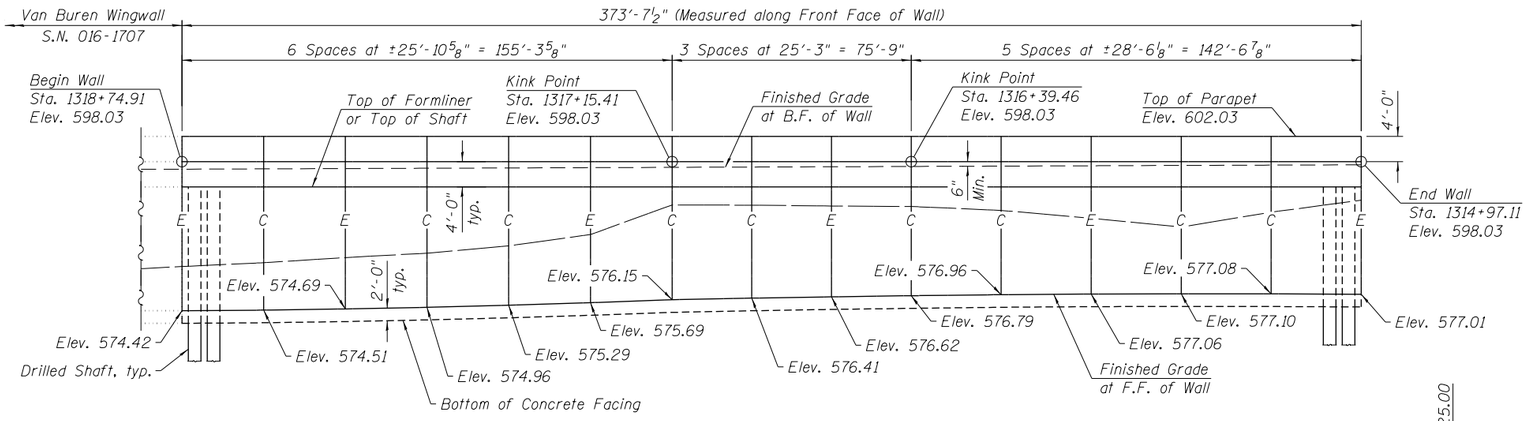
JOB NUMBER	PLATE NUMBER
1100-04-01	EXHIBIT 4

WEI 11X17 1100401.GPJ WANGENG.GDT 5/12/15

Bench Mark: Cut "X" on ℄ of East Pier at ℄ Van Buren. Elev. 582.68.

Existing Structure: None.

Traffic is to be maintained during construction.



ELEVATION
(Looking Northwest at F.F. of Wall)

CURVE DATA
(Ramp SW)

Prop. Curve P-CIR-SW-3
P.I. Sta. = 1322+16.98
Δ = 83° 35' 08" (RT)
D = 10° 03' 07"
R = 570.00'
T = 509.51'
L = 831.54'
E = 194.53'
e = NA
T.R. = NA
S.E. Run = NA
P.C. Sta. = 1317+07.47
P.T. Sta. = 1325+39.01

HIGHWAY CLASSIFICATION

Ramp SW
Functional Class: Interstate
ADT: 24,500 (2012); 23,000 (2040)
ADTT: 907 (2012); 851 (2040)
DHV: 1,720 (2040)
Design Speed: 35 m.p.h.
Posted Speed: 35 m.p.h.
One-Way Traffic
Directional Distribution: NA

DESIGN SPECIFICATIONS

2014 AASHTO LRFD Bridge
Design Specifications 7th Edition

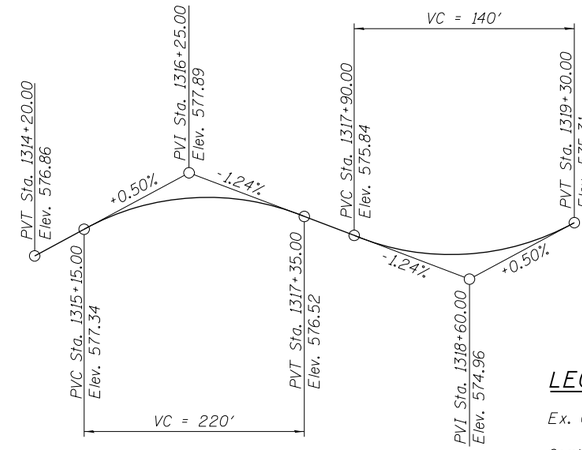
DESIGN STRESSES

FIELD UNITS

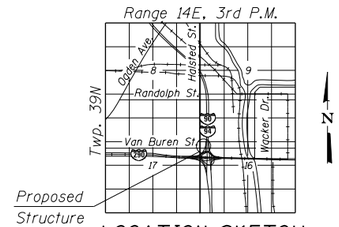
f'c = 3,500 psi
fy = 60,000 psi (Reinforcement)

Notes:
1.) Wall offsets are measured from the ℄ of Ramp SW to the front face of wall.
2.) F.F. denotes Front Face.
3.) B.F. denotes Back Face.
4.) Wall to be built along straight chords between construction joints.
5.) Shaft diameter, spacing and top elevation to be determined during final design.

GENERAL PLAN AND ELEVATION
RETAINING WALL 38 ALONG RAMP SW
F.A.I. RTE. 290 (EISENHOWER EXPRESSWAY)
SECTION xxxx-xxxx
COOK COUNTY
STATION 1314+97.11 TO STATION 1318+74.91
STRUCTURE NO. 016-1827



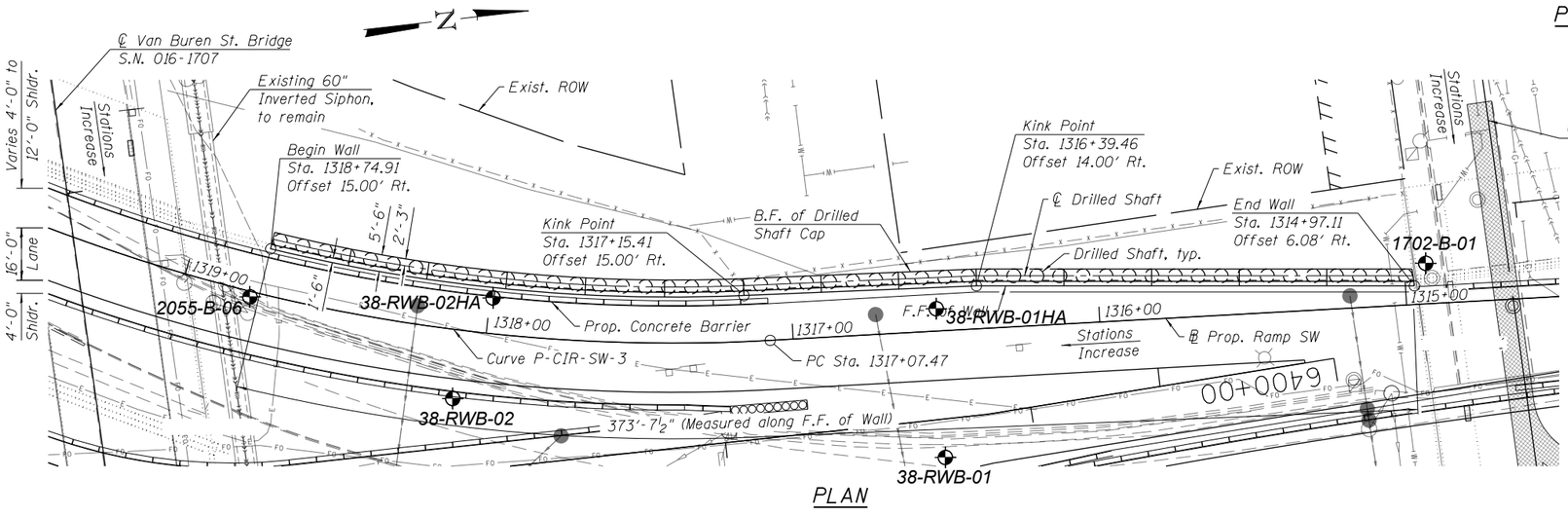
PROFILE GRADE
(Along ℄ Ramp SW)



LOCATION SKETCH

LEGEND:

Ex. Chain Link Fence — X — X — X — X
Combined Sewer
Electric — E — E — E
Water — W — W — W
Fiber Optic — FO — FO — FO
Ex. Storm Sewer
Prop. Storm Sewer
Soil Boring



PLAN

BORING LOCATION PLAN: CIRCLE INTERCHANGE RECONSTRUCTION, RETAINING WALL 38, SN 016-1827, CHICAGO, IL

SCALE: GRAPHICAL | EXHIBIT 3 | DRAWN BY: H. Bista | CHECKED BY: M. Seyhun

Wang Engineering
1145 N. Main Street
Lombard, IL 60148
www.wangeng.com

FOR AECOM | 1100-04-01

TranSystems

USER NAME = wjcolletti	DESIGNED - WJC	REVISED -
	CHECKED - DL	REVISED -
PLOT SCALE = 48.00 ' / in.	DRAWN - WJC	REVISED -
PLOT DATE = 4/29/2015	CHECKED - DL	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SHEET NO. 1 OF 2 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
290	xxxx-xxxx	COOK	2	1
		CONTRACT NO. 60X99		
		ILLINOIS FED. AID PROJECT		

2:3:49 PM - pw:\\Bi7479-PWNT.aecomonline.local:AECOM_DS02_NA\Documents\01 Americas\Transportation\60269938 Circle\Phase_IN\000_CAD\008 Structural\Structure.016-1827\TSL\Sheets\016827-60X99-SHT-TSL-001

APPENDIX A

0 3 6 9 12 inch

Boring 2055-B-06
Run #1, 96' to 106', RECOVERY = 97.5% , RQD = 71.67%

ROCKCORE: CIRCLE INTERCHANGE RECONSTRUCTION, RETAINING WALL 38, SN 016-1827, CHICAGO, IL		
SCALE: GRAPHICAL	2055-B-06	DRAWN BY: H. Bista CHECKED BY: M. Seyhun
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FOR AECOM		1100-04-01

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Lombard, IL 60148
Telephone: 630 953-9928
Fax: 630 953-9938

BORING LOG 1702-B-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: 593.83 ft
North: 1898849.46 ft
East: 1171361.60 ft
Station: 8211+87.78
Offset: 18.3545 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	593.3	6-inch thick, ASPHALT --PAVEMENT--						
	592.3	12-inch thick, CONCRETE --PAVEMENT--						
		Loose, brown and gray, fine and			1	3 3 3	NP	
	590.6	medium SAND, trace gravel --FILL--						
		Stiff to very stiff, brown and gray SILTY CLAY LOAM, trace gravel and sand layers	5		2	3 3 3	2.50 P	17
		--FILL--			3	2 1 2	1.25 P	20
			10		4	2 2 4	2.05 B	23
	583.3	Soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel			5	3 2 2	0.75 P	27
			15		6	0 0 0	0.41 B	26
					7	0 2 2	0.33 B	24
			20		8	0 0 2	0.41 B	20
	573.3	Soft, gray CLAY LOAM, trace gravel --L_L(%)=28, P_L(%)=14-- --%Gravel=5.4-- --%Sand=23.0-- --%Silt=46.7-- --%Clay=24.8-- --A-6 (7)--			9	1 1 2	0.33 B	16
	570.8		25		10	1 1 2	0.49 B	25
		Soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel	30		11	0 3 2	0.57 B	24
					12	0 2 2	0.74 B	24
			35		13	1 2 2	0.41 B	25
			40		14	2 3 4	0.49 B	25
	552.1	Stiff, gray SILTY CLAY LOAM to SILTY LOAM, trace gravel						
			45		15	3 4 6	1.39 B	17
			50		16	2 4 3	1.39 B	16

GENERAL NOTES

Begin Drilling: **06-17-2014** Complete Drilling: **06-17-2014**
Drilling Contractor: **Wang Testing Services** Drill Rig: **B-57 TMR**
Driller: **N&K** Logger: **A. Happel** Checked by: **C. Marin**
Drilling Method: **3.25"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 5/12/15

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Lombard, IL 60148
Telephone: 630 953-9928
Fax: 630 953-9938

BORING LOG 1702-B-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: 593.83 ft
North: 1898849.46 ft
East: 1171361.60 ft
Station: 8211+87.78
Offset: 18.3545 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	542.1							
		Soft to stiff, gray SILTY CLAY, trace gravel						
			55		17	4 6 6	0.49 B	21
			60		18	5 9 17	1.00 P	22
			65		19	5 7 14	0.75 P	22
	527.1							
		Medium stiff to very stiff, gray CLAY, trace gravel						
			70		20	5 7 8	2.21 B	24
			75		21	3 4 5	0.82 B	30
	517.1							
		Medium dense to very dense, gray, fine SAND and SILT laminations						
		--Moist--	80		22	10 7 11	NP	22
			85		23	50/5	NR	
			90		24	20 21 32	NP	20
	502.1							
		Dense to very dense, gray SILTY LOAM						
		--Moist--	95		25	22 23 23	NP	23
			100		26	18 27 27	NP	19

GENERAL NOTES

Begin Drilling: **06-17-2014** Complete Drilling: **06-17-2014**
Drilling Contractor: **Wang Testing Services** Drill Rig: **B-57 TMR**
Driller: **N&K** Logger: **A. Happel** Checked by: **C. Marin**
Drilling Method: **3.25"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 1702-B-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: 593.83 ft
North: 1898849.46 ft
East: 1171361.60 ft
Station: 8211+87.78
Offset: 18.3545 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
			105		27	23 32 25	NP	24
		--DIFFICULT DRILLING--						
	487.8	--AUGER REFUSAL--						
		Boring terminated at 106.00 ft						
			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 **06-17-2014** Complete Drilling **06-17-2014**
Drilling Contractor **Wang Testing Services** Drill Rig **B-57 TMR**
Driller **N&K** Logger **A. Happel** Checked by **C. Marin**
Drilling Method **3.25"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 2055-B-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: 575.52 ft
North: 1898460.17 ft
East: 1171341.21 ft
Station: 8148+53.80
Offset: 57.3869 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	575.1	5.5-inch thick ASPHALT --PAVEMENT--						
		Medium dense, gray CRUSHED STONE --BASE COURSE--			1	4 7 8	NP	8
	572.5	Very soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel	5		2	1 1 2	0.33 B	24
					3	0 1 1	0.25 B	25
			10		4	0 0 1	0.25 B	27
					5	0 1 1	0.25 B	26
			15		6	0 1 1	0.25 B	25
					7	1 1 1	0.25 B	26
			20		8	0 1 2	0.33 B	28
					9	0 1 2	0.25 B	27
			25		10	1 1 2	< 0.25 P	28
	543.8	Medium stiff to very stiff, gray SILTY CLAY to CLAY, trace gravel	30		11	1 2 2	0.49 B	26
					12	1 2 2	0.57 B	26
			35		13	1 2 6	0.66 B	21
			40		14	6 8 9	2.54 B	14
			45		15	4 7 12	1.97 B	15
			50		16	5 7 10	2.95 B	22

GENERAL NOTES

Begin Drilling **05-13-2013** Complete Drilling **05-15-2013**
Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**
Driller **P/N** 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 ▽ **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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Fax: 630 953-9938

BORING LOG 2055-B-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: 575.52 ft
North: 1898460.17 ft
East: 1171341.21 ft
Station: 8148+53.80
Offset: 57.3869 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		Possible cobble-rich layer	55		17	4 6 7	1.75 P	22
	518.8	Dense, gray SILTY LOAM, trace gravel	60		18	8 16 23	NP	18
	513.8	Hard, gray SILTY CLAY LOAM, trace to little gravel	65		19	13 25 38	> 10.25 B	15
		--HARD DRILLING--	70		20	14 23 27	8.04 B	15
			75		21	47 50/5"	9.02 B	12
	498.4	--HARD DRILLING--	80		22	50/4"	NP	11
		Very dense, gray SILTY LOAM to SILT, trace to some gravel	85		23	29 40 33	NP	22
			90		24	19 23 28	NP	17
	481.5	Probably weathered DOLOSTONE	95		25	25 50/2"	NP	16
	479.5	--AUGER REFUSAL--						
		Strong, light gray, good rock mass quality, bedded fresh DOLOSTONE, with shale partings, up to 18-inch beds, 1- to 18-inch spaced joints, horizontal and oblique joints with less than 0.2- to 1-inch greenish	100			CORE		

GENERAL NOTES

Begin Drilling **05-13-2013** Complete Drilling **05-15-2013**
Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**
Driller **P/N** Logger **F. Bozga** Checked by **C. Marin**
Drilling Method **2.25" HSA to 15', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

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Depth to Water ▼ **NA**

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BORING LOG 2055-B-06

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Station: 8148+53.80
Offset: 57.3869 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		gray silty infilling, hard joint wall, with stylolitic surfaces, and moderately vuggy porosity. Run 1 - RECOVERY = 98% RQD = 72% 97.5ft-Qu=10330 psi --->	105		1			
	469.5	Boring terminated at 106.00 ft	110					
			115					
			120					
			125					

GENERAL NOTES

Begin Drilling **05-13-2013** Complete Drilling **05-15-2013**
Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**
Driller **P/N** 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 ▽ **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 38-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: 577.87 ft
North: 1898674.22 ft
East: 1171408.18 ft
Station: 1316+53.06
Offset: 42.7366 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	576.6	4.5-inch thick, ASPHALT over 10.5-inch thick, CONCRETE --PAVEMENT--						
	575.6	13-inch thick SANDY GRAVEL --BASE COURSE--						
	574.6	Stiff, gray SILTY CLAY, trace gravel --FILL--						
		Very soft to soft, gray CLAY to SILTY CLAY, trace gravel	5		1	8 3 3	1.50 P	18
					2	1 1 2	0.16 B	23
					3	1 1 2	0.16 B	24
			10		4	0 1 2	0.16 B	23
					5	1 1 1	0.08 B	26
			15		6	1 1 2	0.50 N/6	
					7	1 1 2	0.16 B	26
			20		8	1 1 2	0.08 B	26
					9	1 2 3	0.16 B	26
			25		10	1 2 2	0.16 B	25
			30		11	1 2 2	0.67 N/6	
					12	2 3 3	0.25 B	27
			35		13	1 1 3	0.08 B	23
			40		14	2 4 6	0.25 B	26
	536.1	Very stiff to hard, gray SILTY CLAY to SILTY CLAY LOAM, trace gravel						
			45		15	6 8 10	4.10 B	13
			50		16	4 6 12	2.38 B	17

GENERAL NOTES

Begin Drilling: **08-19-2014** Complete Drilling: **08-19-2014**
Drilling Contractor: **Wang Testing Services** Drill Rig: **CME-55 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 38-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: 577.87 ft
North: 1898674.22 ft
East: 1171408.18 ft
Station: 1316+53.06
Offset: 42.7366 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
			55		17	5 9 10	2.54 B	23
	521.1	Very soft (0.16B), gray CLAY						
	518.6	Dense, gray SILTY LOAM, trace gravel	60		18	2 3 6	NP	20
	512.9		65		19	15 21 25	NP	19
		Boring terminated at 65.00 ft	70					
			75					

GENERAL NOTES

Begin Drilling **08-19-2014** Complete Drilling **08-19-2014**
Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 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 38-RWB-01HA

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
Elevation: 589.82 ft
North: 1898677.09 ft
East: 1171357.96 ft
Station: 1316+53.10
Offset: 7.5636 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		Black LOAM, trace gravel, w/roots, w/wood chips			1	PUSH	NP	21
	588.3	--TOPSOIL--						
		Gray SILTY LOAM to SILTY CLAY LOAM, trace gravel --FILL--			2	PUSH	NP	19
	584.8		5		3	PUSH	2.50 P	19
		Stiff to very stiff, gray SILTY CLAY, trace gravel			4	PUSH	1.50 P	20
	581.3							
		Soft, gray CLAY to SILTY CLAY, trace gravel			5	PUSH	0.40 P	19
	579.8		10					
		Boring terminated at 10.00 ft						
			15					
			20					
			25					

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 **08-28-2014** Complete Drilling **08-28-2014**
Drilling Contractor **Wang Testing Services** Drill Rig **Geoprobe HA**
Driller **R&J** Logger **S. Woods** Checked by **C. Marin**
Drilling Method **1" IDA Pneumatic Geoprobe LB Sampler**

WATER LEVEL DATA

While Drilling ▽ **DRY**
At Completion of Drilling ▼ **DRY**
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 38-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: 576.09 ft
North: 1898515.97 ft
East: 1171368.28 ft
Station: 1318+10.03
Offset: 21.6181 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	575.6	5-inch thick, ASPHALT --PAVEMENT--						
	574.8	10-inch thick, gray SANDY GRAVEL --FILL--						
	573.3	Stiff, gray SILTY CLAY to SILTY CLAY LOAM, trace gravel --FILL--						
		Soft, gray CLAY to SILTY CLAY, trace gravel	5		1	1 2 2	1.97 B	17
					2	1 1 1 2	0.33 B	26
					3	1 1 2 2	0.33 B	25
					4	0 1 2 2	0.33 B	26
			10		5	2 2 2 2	0.25 B	26
					6	1 1 1	0.33 B	25
			15		7	1 1 1	0.33 B	26
					8	1 1 1	0.25 B	23
			20		9	1 1 1	0.33 B	24
					10	1 1 2	0.33 B	25
			25		11	1 1 2	0.25 B	25
			30		12	1 1 2	0.33 B	24
					13	1 2 3	0.49 B	25
			35		14	2 3 3	0.49 B	20
	539.3	Stiff to very stiff, gray SILTY CLAY to SILTY CLAY LOAM, trace gravel	40		15	5 6 8	2.46 B	19
			45		16	5 9 12	1.60 P	17
			50		17	9 10 10	3.33 N/6	

GENERAL NOTES

Begin Drilling: **08-20-2014** Complete Drilling: **08-20-2014**
Drilling Contractor: **Wang Testing Services** Drill Rig: **CME-55 TMR**
Driller: **R&J** Logger: **S. Woods** Checked by: **C. Marin**
Drilling Method: **Solid flight auger to 11', 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 38-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: 576.09 ft
North: 1898515.97 ft
East: 1171368.28 ft
Station: 1318+10.03
Offset: 21.6181 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	524.3							
		Very stiff, gray CLAY to SILTY CLAY, trace gravel			18	6 7 11	2.21 B	28
	519.3		55					
		Hard, gray SILTY CLAY LOAM, trace gravel						
	516.3				19	8 13 22	4.43 B	17
		Very dense, gray SILTY LOAM, trace gravel --DRY--	60					
	511.1		65		20	15 28 32	NP	14
		Boring terminated at 65.00 ft						
			70					
			75					

GENERAL NOTES

Begin Drilling **08-20-2014** Complete Drilling **08-20-2014**
Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**
Driller **R&J** Logger **S. Woods** Checked by **C. Marin**
Drilling Method **Solid flight auger to 11', 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 38-RWB-02HA

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
Elevation: 582.04 ft
North: 1898532.77 ft
East: 1171339.09 ft
Station: 1318+00.41
Offset: 10.6331 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	581.0	12-inch thick, black LOAM, trace gravel and brick fragments			1	PUSH	NP	21
	580.3	--TOPSOIL--						
		Brown, SANDY GRAVEL, trace brick fragments			2	PUSH	2.50 P	16
		--FILL--						
		Very stiff, gray SILTY CLAY LOAM to SILTY CLAY, trace gravel	5		3	PUSH	2.00 P	16
		--FILL--						
	575.0				4	PUSH	0.70 P	19
		Soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel						
	572.0		10		5	PUSH	0.40 P	20
		Boring terminated at 10.00 ft						
			15					
			20					
			25					

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 **08-28-2014** Complete Drilling **08-28-2014**
Drilling Contractor **Wang Testing Services** Drill Rig **Geoprobe HA**
Driller **R&J** Logger **S. Woods** Checked by **C. Marin**
Drilling Method **1" IDA Pneumatic Geoprobe LB Sampler**

WATER LEVEL DATA

While Drilling ▽ **DRY**
At Completion of Drilling ▼ **DRY**
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 39-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: 574.85 ft
North: 1898266.68 ft
East: 1171202.33 ft
Station: 1321+07.61
Offset: 5.7540' RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	574.5	4.5-inch thick ASPHALT --PAVEMENT--						
	573.9							
	573.4	7.5-inch thick CONCRETE --PAVEMENT--						
		5-inch thick, brown SANDY GRAVEL, crushed stone --SUB-BASE--						
		Stiff to very stiff, brown to gray SILTY CLAY LOAM, trace gravel			1	6 6 4	2.00 P	17
					2	4 3 4	1.00 P	20
	569.4	--FILL--	5					
		Medium stiff, gray CLAY to SILTY CLAY, trace gravel			3	2 2 2	0.90 B	25
			10		4	1 2 2	0.82 B	22
		--In-Situ Vane Shear, 13.0 feet-- --$S_{u\ undis}$ = 1551.0-- --$S_{u\ remold}$ = 878.9-- --Sensitivity = 1.76--	15		1	VS		
		--In-Situ Vane Shear, 18.0 feet-- --$S_{u\ undis}$ = 827.2-- --$S_{u\ remold}$ = 517.0-- --Sensitivity = 1.60--	20		2	VS		
		--In-Situ Vane Shear, 23.0 feet-- --$S_{u\ undis}$ = 1240.8-- --$S_{u\ remold}$ = 775.5-- --Sensitivity = 1.60--	25		3	VS		
		--In-Situ Vane Shear, 28.0 feet-- --$S_{u\ undis}$ = 1654.4-- --$S_{u\ remold}$ = 1137.4-- --Sensitivity = 1.45--	30		4	VS		
	544.1	Very stiff, gray SILTY CLAY LOAM, trace gravel						
		--In-Situ Vane Shear, 33.0 feet-- --$S_{u\ undis}$ = 2533.3-- --$S_{u\ remold}$ = 1912.9-- --Sensitivity = 1.32--	35		5	VS		
			40					
	529.9	Boring terminated at 45.00 ft	45		5	3 6 8	2.79 B	15
			50					

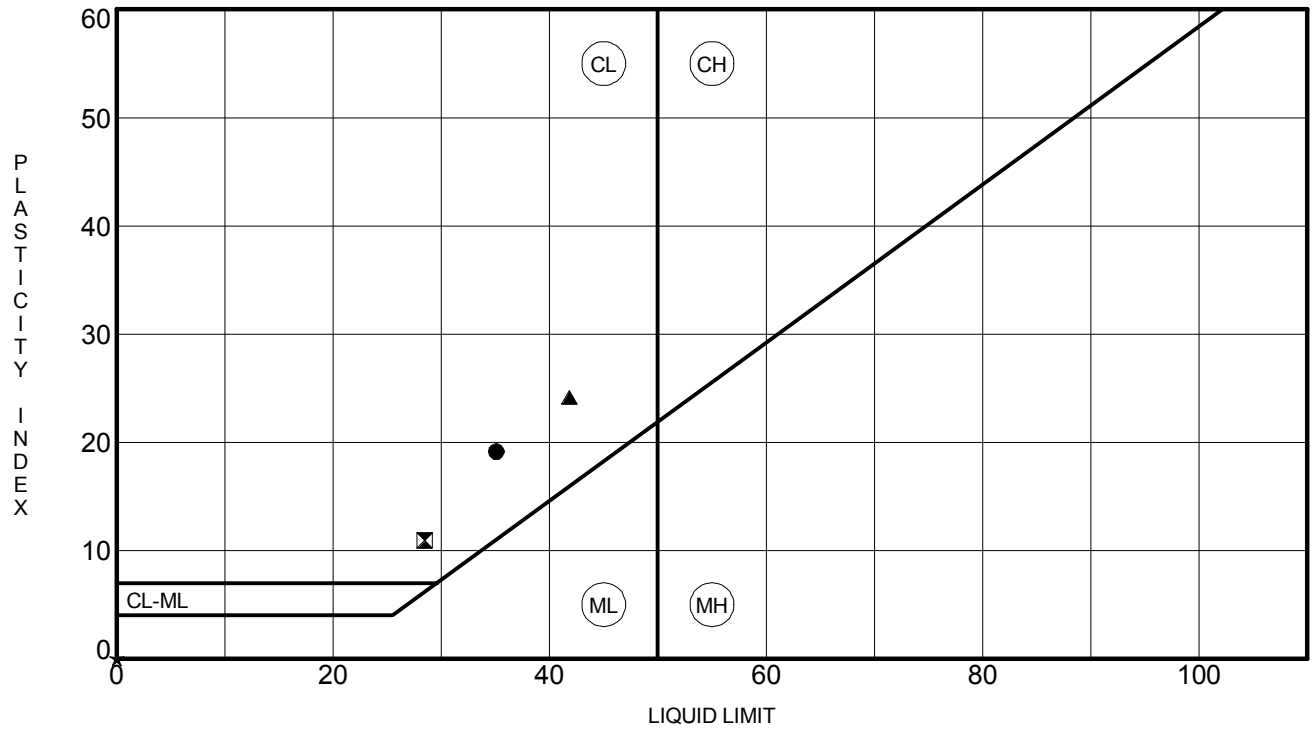
GENERAL NOTES

Begin Drilling **10-15-2014** Complete Drilling **10-19-2014**
Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**
Driller **R&J** Logger **F. Bozga** Checked by **CLM (-coord)**
Drilling Method **2.25" IDA HSA, 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.



	Specimen Identification		LL	PL	PI	Fines	IDH Classification
●	2081-B-06#11	26.0 ft	35	16	19	80	Silty Clay
⧓	2081-B-06#18	58.5 ft	28	18	10	95	Silty Clay Loam
▲	2081-B-06#21	73.5 ft	42	18	24	94	Clay
★	2081-B-06#25	93.5 ft	NP	NP	NP	58	Silty Loam

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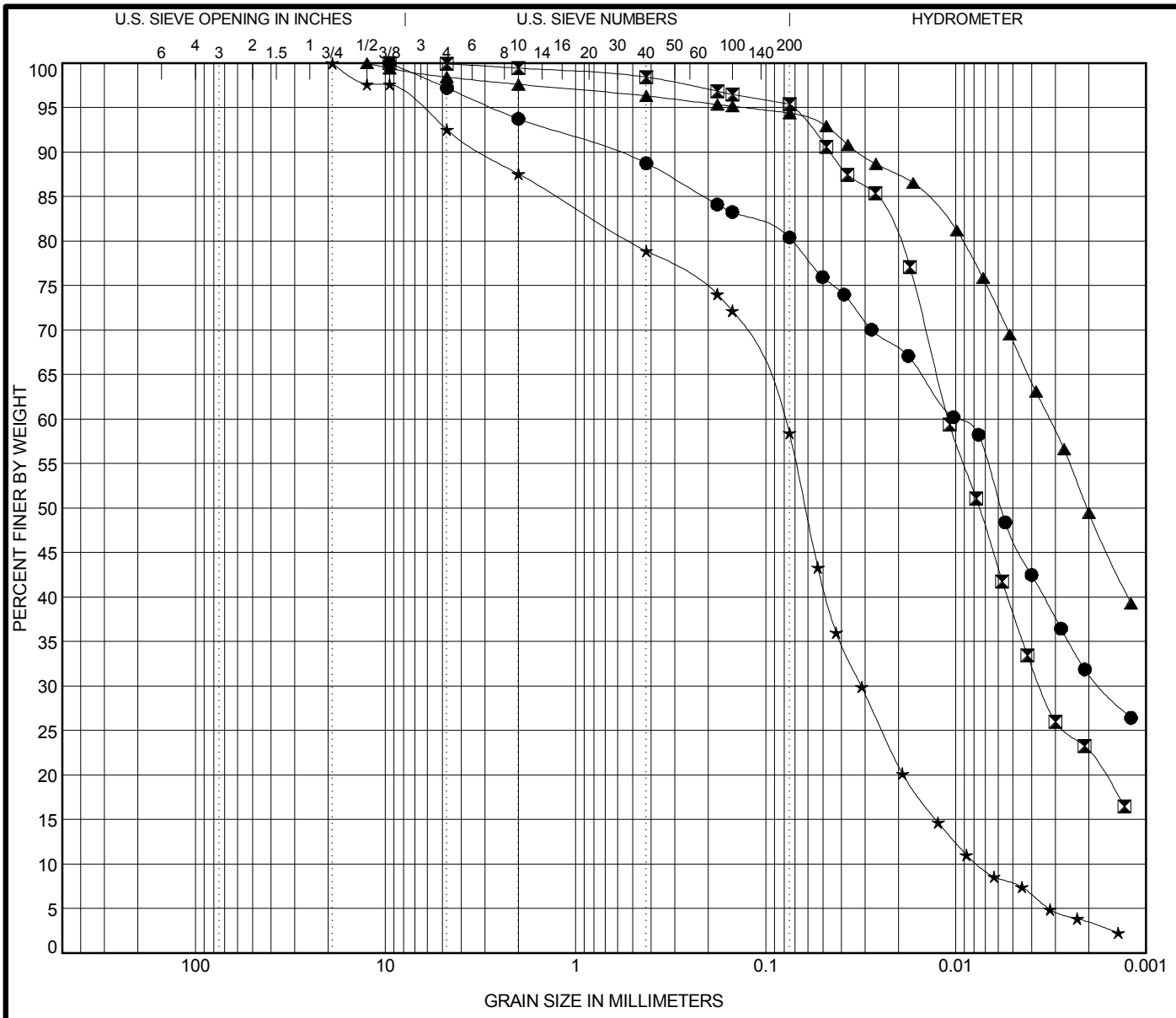
ATTERBERG LIMITS' RESULTS

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
●	2081-B-06#11	26.0 ft	**Silty Clay**	**35**	**16**	**19**		
⊠	2081-B-06#18	58.5 ft	**Silty Clay Loam**	**28**	**18**	**10**		
▲	2081-B-06#21	73.5 ft	**Clay**	**42**	**18**	**24**		
★	2081-B-06#25	93.5 ft	**Silty Loam**	**NP**	**NP**	**NP**	**1.59**	**10.60**

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	2081-B-06#11	26.0 ft	**9.5**	**0.01**	**0.002**		**6.3**	**13.5**	**48.9**	**31.4**
⊠	2081-B-06#18	58.5 ft	**9.5**	**0.011**	**0.004**		**0.6**	**4.2**	**72.7**	**22.6**
▲	2081-B-06#21	73.5 ft	**12.5**	**0.003**			**2.4**	**3.3**	**44.8**	**49.5**
★	2081-B-06#25	93.5 ft	**19**	**0.081**	**0.031**	**0.008**	**12.4**	**29.7**	**54.4**	**3.4**

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GRAIN SIZE DISTRIBUTION

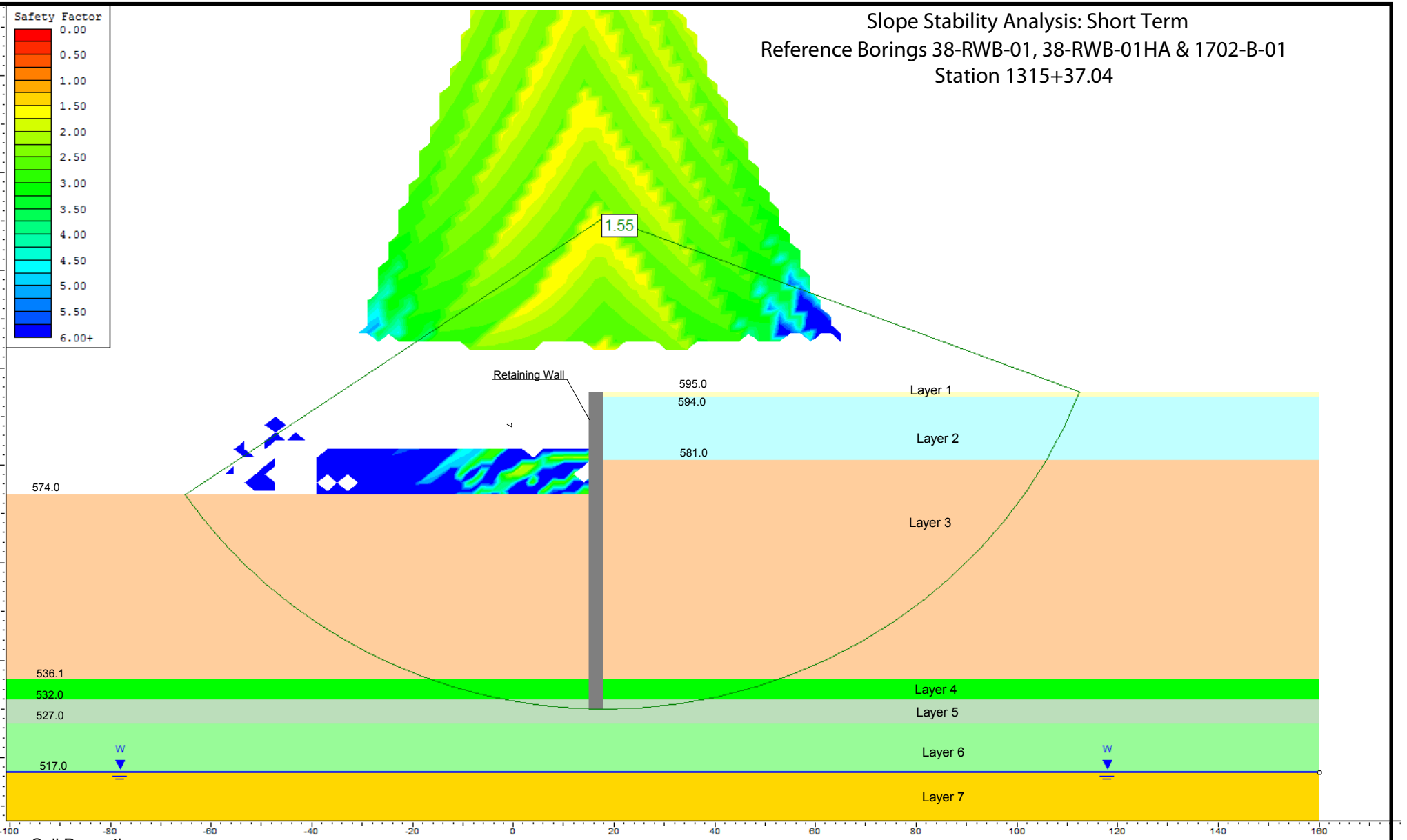
Project: Circle Interchange Reconstruction

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

Number: 1100-04-01

APPENDIX B

Slope Stability Analysis: Short Term
Reference Borings 38-RWB-01, 38-RWB-01HA & 1702-B-01
Station 1315+37.04



Soil Properties:

Layer ID	Soil Type	Unit Weight (pcf)	Undrained Parameter C_u (psf)	Undrained Parameter ϕ (deg.)
1	Medium Dense SILTY LOAM	115	0	31
2	Stiff to Very Stiff SILTY LOAM to SILTY CLAY LOAM	120	1900	0
3	Very Soft to Soft CLAY to SILTY CLAY	100	280	0
4	Medium Stiff CLAY to SILTY CLAY	110	760	0
5	Stiff SILTY CLAY to SILTY CLAY LOAM	120	1400	0
6	Very Stiff CLAY to SILTY CLAY	120	2200	0
7	Medium Dense to Very Dense SILT to SAND	120	0	35

SLOPE STABILITY ANALYSIS: CIRCLE INTERCHANGE RECONSTRUCTION
RETAINING WALL 38, SN 016-1827, CHICAGO, IL

SCALE: GRAPHIC | APPENDIX B-1 | DRAWN BY: H. Bista | CHECKED BY: M. Seyhun

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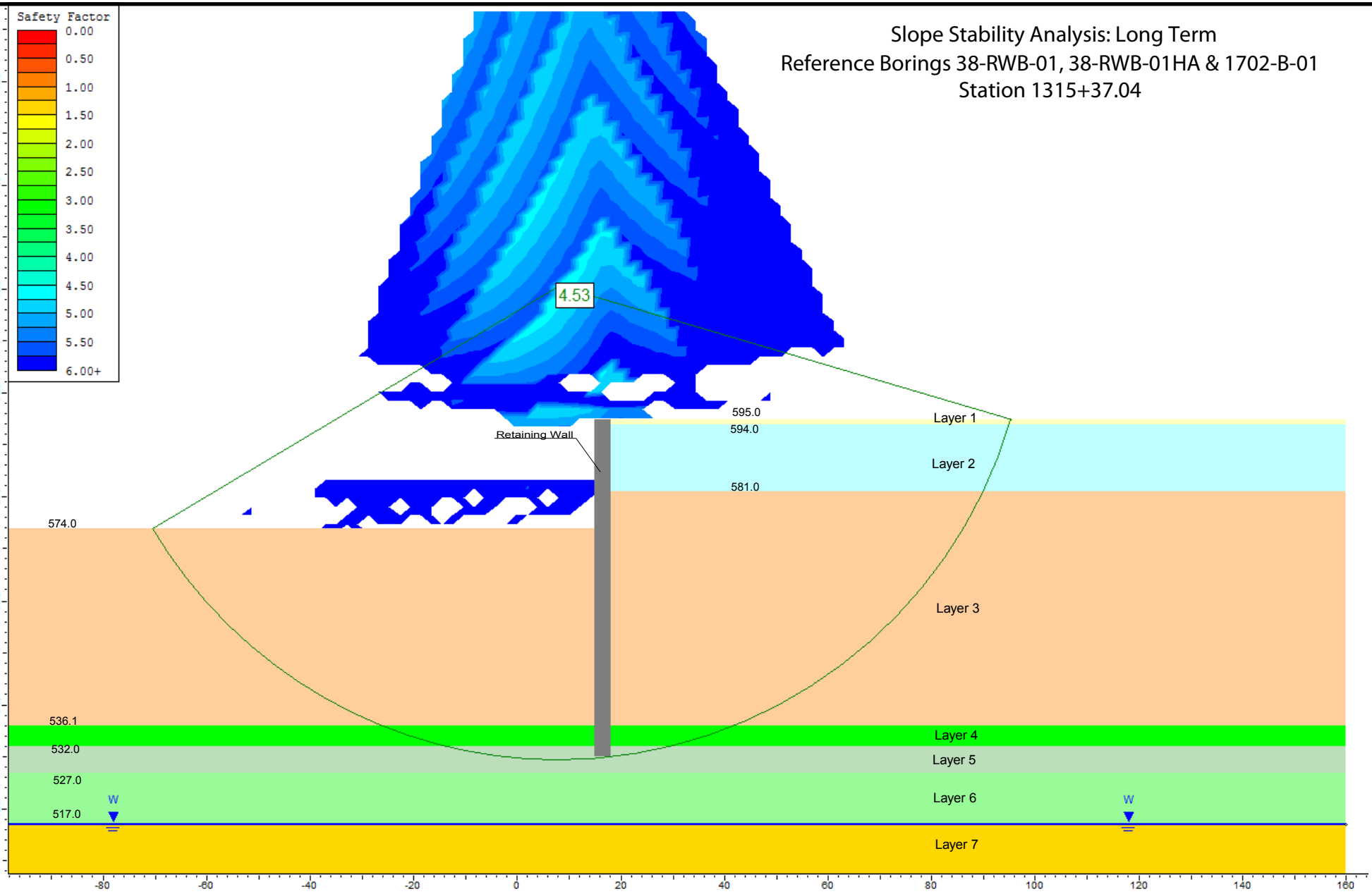
FOR AECOM | 1100-04-01

Slope Stability Analysis: Long Term
Reference Borings 38-RWB-01, 38-RWB-01HA & 1702-B-01
Station 1315+37.04



Soil Properties:

Layer ID	Soil Type	Unit Weight	Drained Parameter	
		(pcf)	C' (psf)	ϕ (deg.)
1	Medium Dense SILTY LOAM	115	0	31
2	Stiff to Very Stiff SILTY LOAM to SILTY CLAY LOAM	120	100	30
3	Very Soft to Soft CLAY to SILTY CLAY	100	30	26
4	Medium Stiff CLAY to SILTY CLAY	110	50	28
5	Stiff SILTY CLAY to SILTY CLAY LOAM	120	100	29
6	Very Stiff CLAY to SILTY CLAY	120	100	30
7	Medium Dense to Very Dense SILT to SAND	120	0	35

SLOPE STABILITY ANALYSIS: CIRCLE INTERCHANGE RECONSTRUCTION
RETAINING WALL 38, SN 016-1827, CHICAGO, IL

SCALE: GRAPHIC | APPENDIX B- 2 | DRAWN BY: H. Bista | CHECKED BY: M. Seyhun

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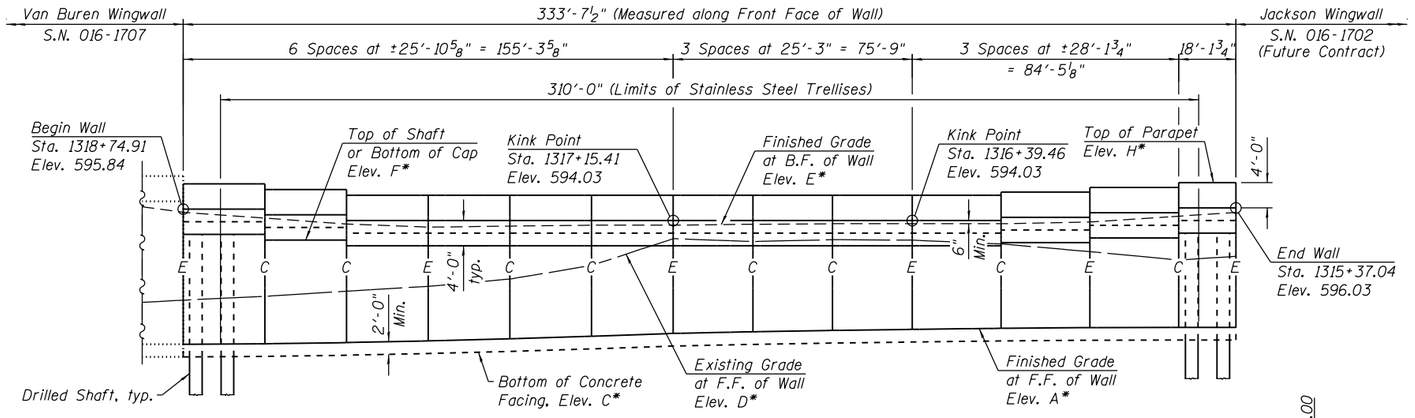
FOR AECOM | 1100-04-01

APPENDIX C

Bench Mark: Cut "X" at SE Corner of Van Buren and Halsted Streets. Elev. 593.24.

Existing Structure: Barrier Wall Along Existing Ramp SW.

Traffic is to be maintained during construction.



* For elevations, see Table 1 on Sheet 3 of 3.

ELEVATION

(Looking Northwest at F.F. of Wall. Proposed Concrete Barrier not shown for clarity.)

Notes:

1.) Wall offsets are measured from the ℄ Prop. Ramp SW to the front face of precast panels.
2.) C denotes Construction Joint
3.) E denotes Expansion Joint
4.) F.F. denotes Front Face.
5.) B.F. denotes Back Face.
6.) Wall to be built along straight chords between construction joints.
7.) Shaft diameter, spacing and top elevation to be determined during final design.
8.) Stainless Steel Trellises to be installed on the face of the wall.
9.) 16" Water main to remain. Water main relocation and riser shaft construction as part of future Jackson Boulevard bridge reconstruction.

CURVE DATA

(Ramp SW)
Prop. Curve P-CIR-SW-3
P.I. Sta. = 1322+16.98
Δ = 83° 35' 08" (RT)
D = 10° 03' 07"
R = 570.00'
T = 509.51'
L = 831.54'
E = 194.53'
e = 5.40%
T.R. = NA
S.E. Run = 101'
P.C. Sta. = 1317+07.47
P.T. Sta. = 1325+39.01

HIGHWAY CLASSIFICATION

Ramp SW
Functional Class: Interstate
ADT: 24,500 (2012); 23,000 (2040)
ADTT: 907 (2012); 851 (2040)
DHV: 1,720 (2040)
Design Speed: 35 m.p.h.
Posted Speed: 35 m.p.h.
One-Way Traffic
Directional Distribution: NA

DESIGN SPECIFICATIONS

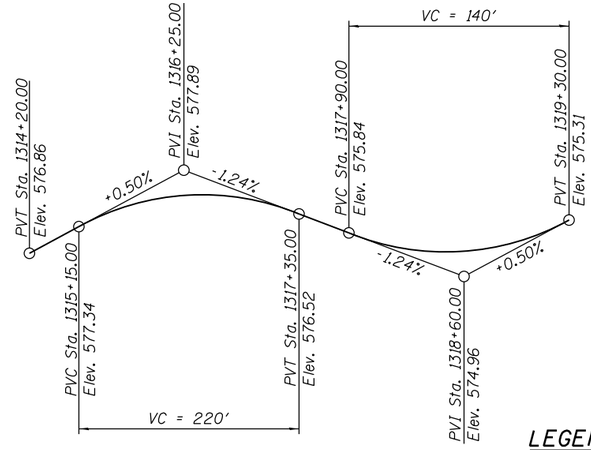
2014 AASHTO LRFD Bridge Design Specifications 7th Edition with 2015 Interim

DESIGN STRESSES

FIELD UNITS

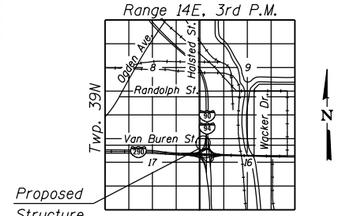
f'c = 7,000 psi (Drilled Shafts)**
f'c = 3,500 psi (All other concrete)
fy = 60,000 psi (Reinforcement)

** Final concrete strength will be determined during final design



PROFILE GRADE

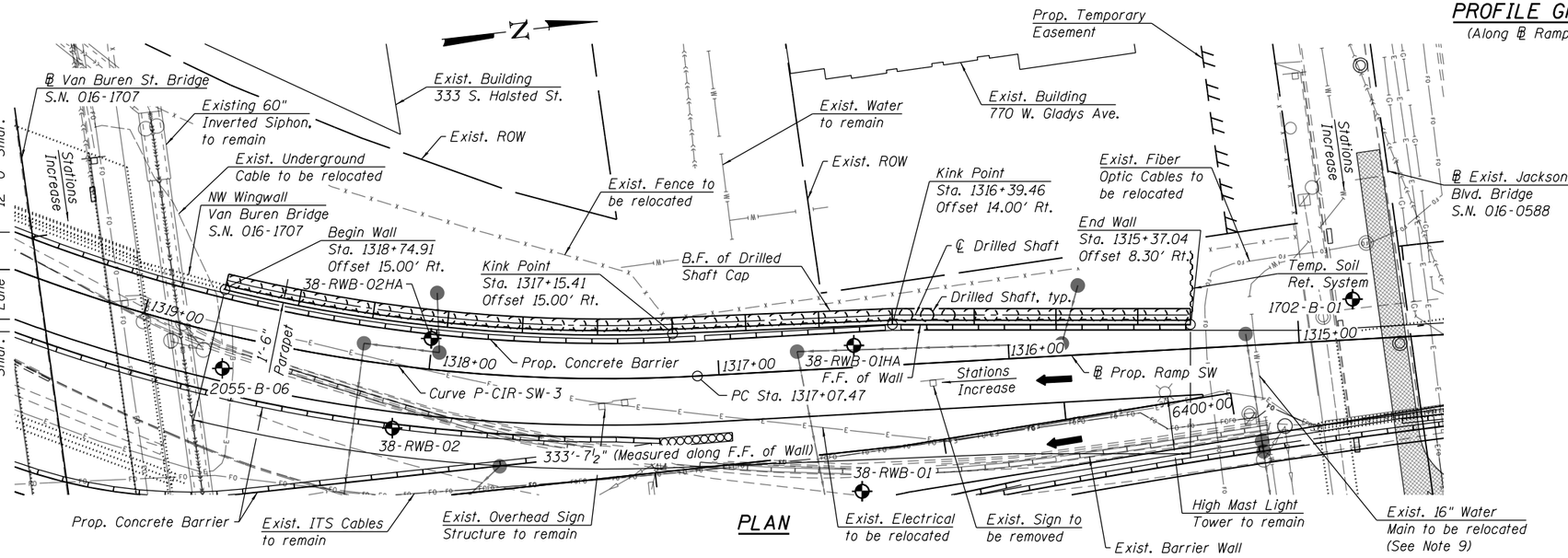
(Along ℄ Ramp SW)



LOCATION SKETCH

LEGEND:

Ex. Chain Link Fence — X — X — X — X
Combined Sewer
Electric — E — E — E
Water — W — W
Fiber Optic — FO — FO — FO
Ex. Storm Sewer
Prop. Storm Sewer
Soil Boring



PLAN

GENERAL PLAN AND ELEVATION
RETAINING WALL 38 ALONG RAMP SW
F.A.I. RTE. 290 (EISENHOWER EXPRESSWAY)
SECTION xxxx-xxxx
COOK COUNTY
STATION 1315+37.04 TO STATION 1318+74.91
STRUCTURE NO. 016-1827

USER NAME = wjcolletti	DESIGNED - WJC	REVISED -	
	CHECKED - DL	REVISED -	
PLOT SCALE = 48.00 ' / in.	DRAWN - WJC	REVISED -	
PLOT DATE = 11/19/2015	CHECKED - DL	REVISED -	

TranSystems

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SHEET NO. 1 OF 3 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
290	xxxx-xxxx	COOK	3	1
		CONTRACT NO. 60X99		
	ILLINOIS FED. AID PROJECT			

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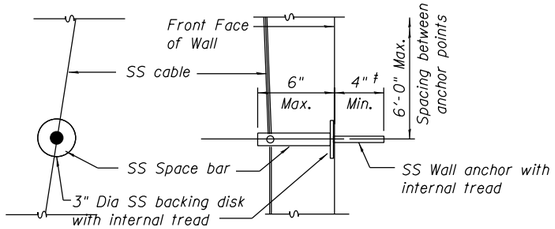
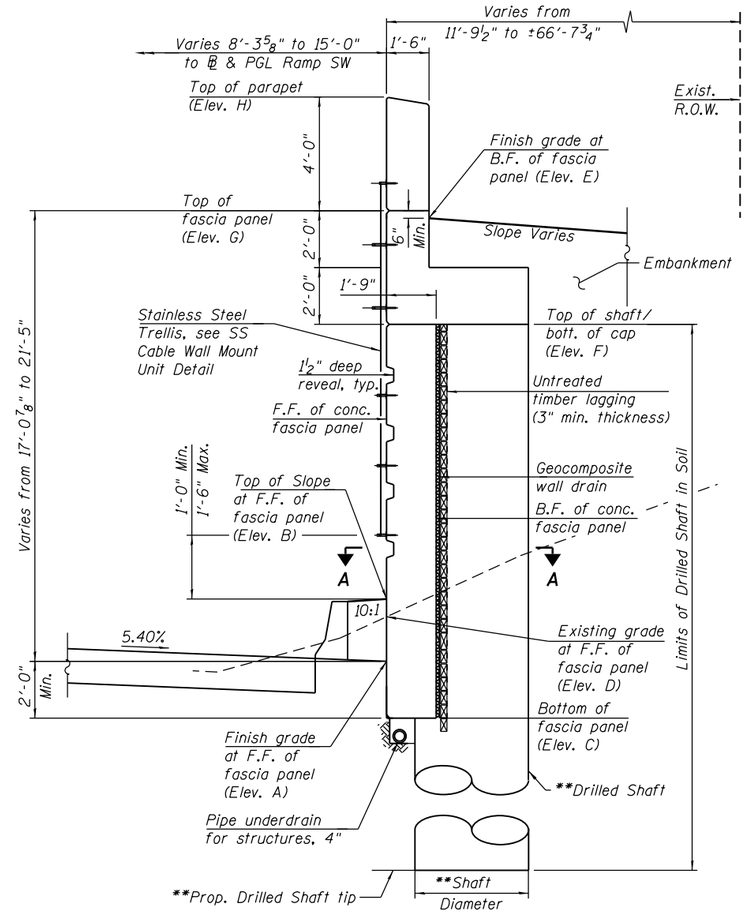


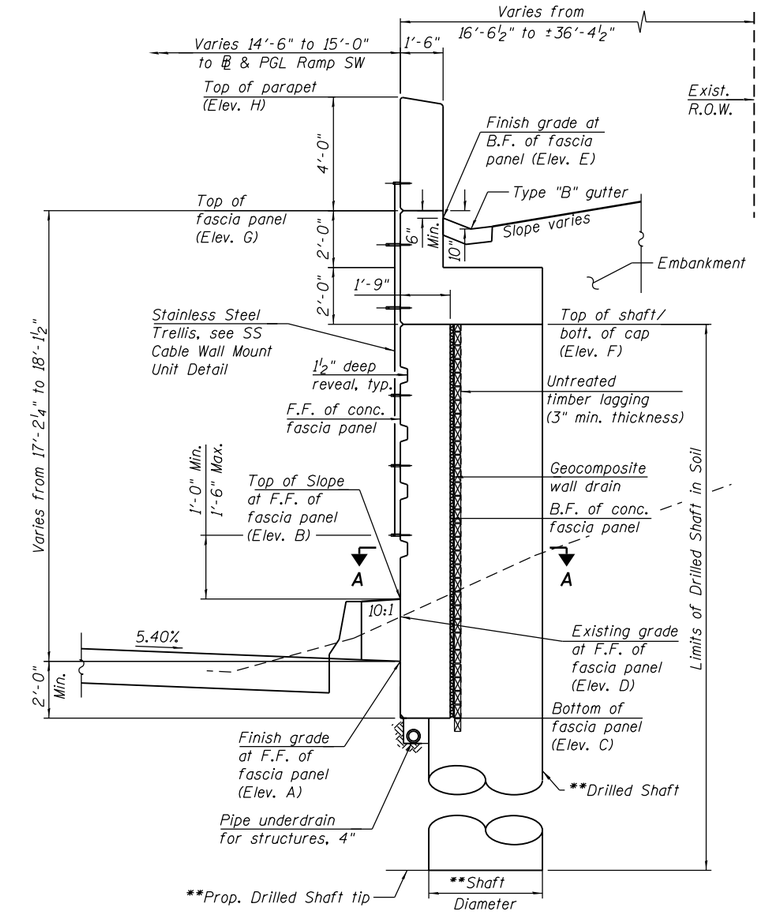
† For size and type of wall anchor follow Manufacturer's instructions and installation guide.

SS CABLE WALL MOUNT UNIT DETAIL



TYPICAL CROSS SECTION

(Looking Upstation)
(From Sta. 1315+37.04 to Sta. 1316+75.00
and Sta. 1317+25.00 to Sta. 1318+74.91)



TYPICAL CROSS SECTION

(Looking Upstation)
(From Sta. 1316+75.00 to Sta. 1317+25.00)

Notes:

1.) The geocomposite wall drain shall be constructed according to Section 591 of the Standard Specifications.

2.) The Contractor is responsible for the design and performance of the lagging system, using no less than a 3 in. nominal rough-sawn thickness and timber with a minimum allowable bending stress of 1000 psi, until the concrete facing is installed. The Contractor shall submit design calculations and details prepared by an Illinois Licensed Structural Engineer for the attachment of the lagging to the shaft for approval by the Engineer. Alternative equivalent systems may be submitted for approval by the Engineer.

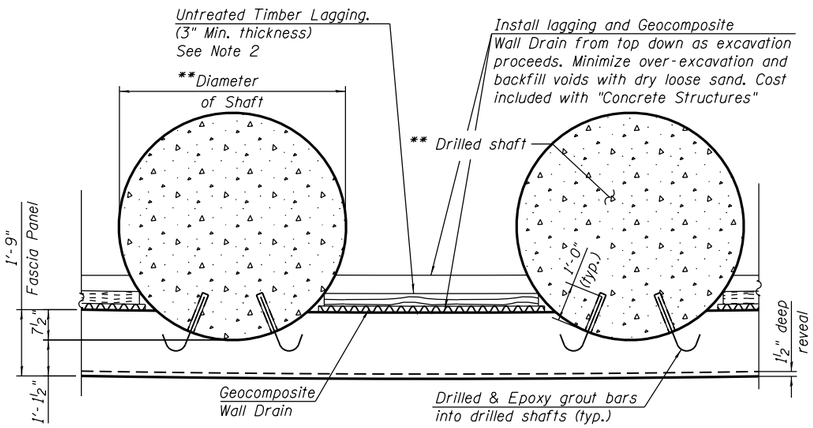
3.) For wall elevations, see Table 1 on Sheet 3 of 3.

4.) SS wall anchor location and SS cable layout to be determined in final design.

**Drilled shaft diameter, spacing and tip elevation to be determined during final design.

LEGEND:

B.F. - denotes Back Face.
E.F. - denotes Each Face.
F.F. - denotes Front Face.
SS - denotes Stainless Steel.



SECTION A-A

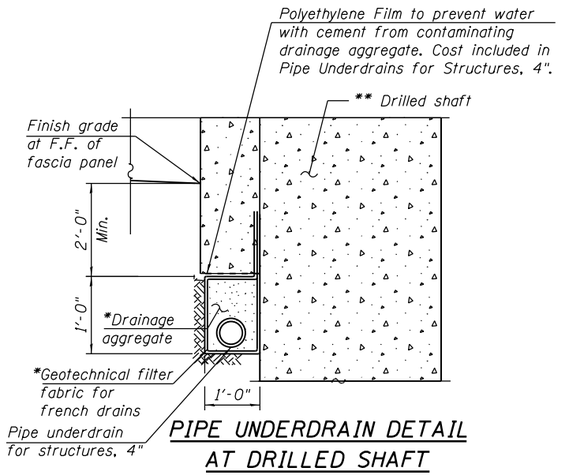
(Shaft Reinforcement not shown for clarity)

CROSS SECTION AND DETAILS I
RETAINING WALL 38 ALONG RAMP SW
F.A.I. RTE. 290 (EISENHOWER EXPRESSWAY)
SECTION xxxx-xxxx
COOK COUNTY
STATION 1315+37.04 TO STATION 1318+74.91
STRUCTURE NO. 016-1827

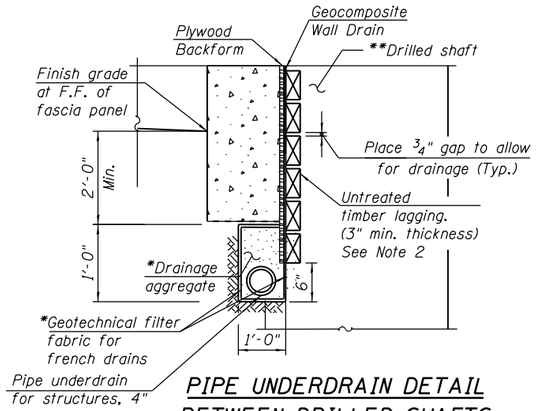
USER NAME = wjcolletti	DESIGNED - WJC	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION
	CHECKED - DL	REVISED -	
PLOT SCALE = 0.17 ' / in.	DRAWN - WJC	REVISED -	
PLOT DATE = 11/19/2015	CHECKED - DL	REVISED -	

SHEET NO. 2 OF 3 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
290	xxxx-xxxx	COOK	3	2
		CONTRACT NO. 60X99		
		ILLINOIS FED. AID PROJECT		



PIPE UNDERDRAIN DETAIL AT DRILLED SHAFT

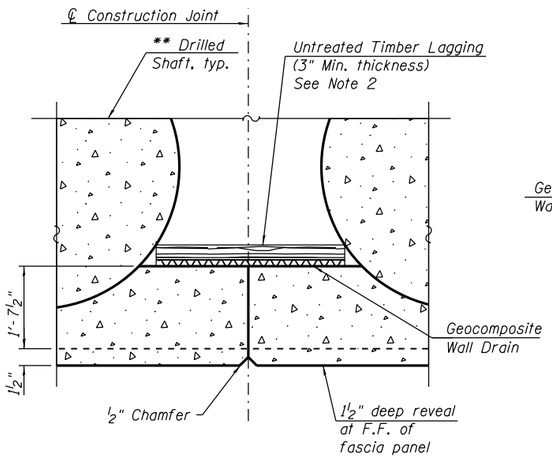


PIPE UNDERDRAIN DETAIL BETWEEN DRILLED SHAFTS

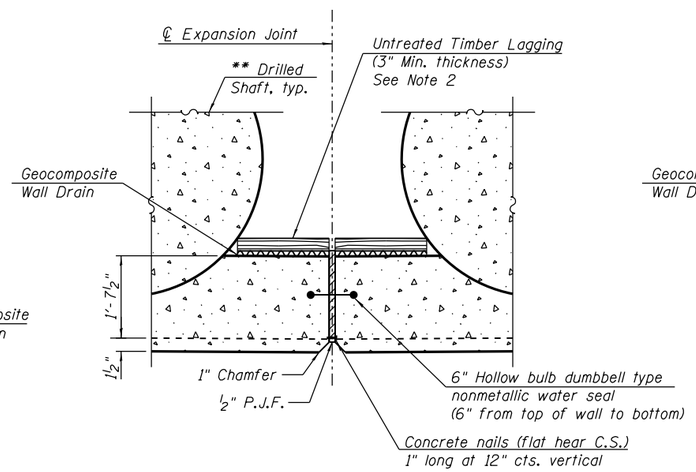
TABLE 1 - WALL ELEVATIONS

	Station	Offset	Elevation A	Elevation B	Elevation C	Elevation D	Elevation E	Elevation F	Elevation G	Elevation H
	1315+37.04	8'-3 5/8"	577.10	580.68	575.10	588.36	595.31	592.03	596.03	600.03
†	1315+55.16	9'-3 3/4"	577.10	580.68	575.10	587.77	594.72	592.03	596.03	600.03
††	1315+55.16	9'-3 3/4"	577.10	580.68	575.10	587.77	594.72	591.28	595.28	599.28
†	1315+83.26	10'-10 1/2"	577.06	580.64	575.06	589.10	593.80	591.28	595.28	599.28
††	1315+83.26	10'-10 1/2"	577.06	580.64	575.06	589.10	593.80	590.53	594.53	598.53
†	1316+11.36	12'-5 1/4"	576.96	580.54	574.96	590.33	593.53	590.53	594.53	598.53
††	1316+11.36	12'-5 1/4"	576.96	580.54	574.96	590.33	593.53	590.03	594.03	598.03
	1316+39.46	14'-0"	576.79	580.37	574.79	590.93	593.53	590.03	594.03	598.03
	1316+64.70	14'-4 1/4"	576.62	580.22	574.62	591.00	593.53	590.03	594.03	598.03
	1316+89.95	14'-8 3/8"	576.41	580.02	574.41	590.71	593.45	590.03	594.03	598.03
	1317+15.41	15'-0"	576.15	579.87	574.15	591.16	593.31	590.03	594.03	598.03
	1317+41.99	15'-0"	575.69	579.44	573.69	586.92	593.30	590.03	594.03	598.03
	1317+68.58	15'-0"	575.29	579.05	573.29	584.76	593.15	590.03	594.03	598.03
	1317+95.16	15'-0"	574.96	578.72	572.96	583.61	592.99	590.03	594.03	598.03
†	1318+21.74	15'-0"	574.69	578.46	572.69	582.83	593.48	590.03	594.03	598.03
††	1318+21.74	15'-0"	574.69	578.46	572.69	582.83	593.48	590.95	594.95	598.95
†	1318+48.33	15'-0"	574.51	578.27	572.51	582.02	594.42	590.95	594.95	598.95
††	1318+48.33	15'-0"	574.51	578.27	572.51	582.02	594.42	591.84	595.84	599.84
	1318+74.91	15'-0"	574.42	578.18	572.42	581.41	595.34	591.84	595.84	599.84

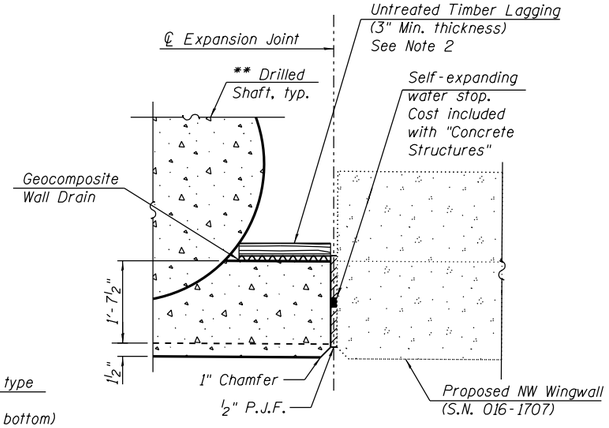
Elevation A- Finish Grade at Front Face of Fascia Panel
Elevation B- Top of Slope at Front Face of Fascia Panel
Elevation C- Bottom of Fascia Panel
Elevation D- Existing Grade at Front Face of Fascia Panel
Elevation E- Finish Grade at Back Face of Fascia Panel
Elevation F- Top of Shaft / Bottom of Cap
Elevation G- Top of Fascia Panel
Elevation H- Top of Parapet
† Elevations just to the right of joint.
†† Elevations just to the left of joint.



CONSTRUCTION JOINT DETAILS



EXPANSION JOINT DETAILS



EXPANSION JOINT DETAIL AT VAN BUREN WINGWALL

*Cost included with "Pipe Underdrains for Structures, 4".

**Drilled shaft diameter, spacing and tip elevation to be determined during final design.

LEGEND:

B.F. - denotes Back Face.
E.F. - denotes Each Face.
F.F. - denotes Front Face.

CROSS SECTION AND DETAILS II
RETAINING WALL 38 ALONG RAMP SW
F.A.I. RTE. 290 (EISENHOWER EXPRESSWAY)
SECTION xxxx-xxxx
COOK COUNTY
STATION 1315+37.04 TO STATION 1318+74.91
STRUCTURE NO. 016-1827

TranSystems

USER NAME = wjcollett	DESIGNED - WJC	REVISED -	
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PLOT SCALE = 0.17 ' / in.	DRAWN - WJC	REVISED -	
PLOT DATE = 11/19/2015	CHECKED - DL	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SHEET NO. 3 OF 3 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
290	xxxx-xxxx	COOK	3	3
		CONTRACT NO. 60X99		
		ILLINOIS FED. AID PROJECT		

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