# STRUCTURE GEOTECHNICAL REPORT
# CIRCLE INTERCHANGE RECONSTRUCTION
# RETAINING WALL 46
# IDOT D-91-227-13, PTB 163/ITEM 001
# COOK COUNTY, ILLINOIS

**for**

**AECOM**

**303 East Wacker Drive**

**Chicago, IL 60601**

**(312) 938-0300**

**submitted by**

**Wang Engineering, Inc.**

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**Lombard, IL 60148**

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**Original Report: August 16, 2017**
**Revised Report: October 20, 2017**

**Technical Report Documentation Page**

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|---|---|---|
| **1. Title and Subtitle**<br>Structure Geotechnical Report<br>Circle Interchange Reconstruction<br>Retaining Wall 46, F.A.I. Route 90/94/290 | | **2. Report Date**<br>Original: August 16, 2017<br>Revised: October 20, 2017<br>**3. Report Type** ☒ SGR ☐ RGR<br>☐ Draft ☒ Final ☒ Revised |
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| **6. PTB / Item No.**<br>163/001 | **7. Existing Structure Number(s)**<br>No existing wall | **8. Proposed Structure Number(s)**<br>016-1833 |
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**11. Abstract**

A new retaining wall will be constructed to support the north approach of Ramp WN over I-90/94 NB Bypass/Ramp EN in connection with the Circle Interchange Reconstruction program. The proposed Mechanically Stabilized Earth (MSE) type retaining wall is a 99' long fill wall with a maximum total height of 11.5'. This report provides geotechnical recommendations for the design of the proposed new retaining wall.

Beneath the pavement, the subsurface soils consists of 4.7 feet of granular and cohesive fill, 38.8 feet of very soft to medium stiff silty clay, 30 feet of very stiff to hard silty clay to silty clay loam, 12.2 feet of very dense gravelly loam, and 12 feet of hard silty clay loam /very dense silty loam extending to the top of weathered bedrock. Sound bedrock was encountered at elevations of about 477.4 feet. Groundwater may be encountered within the fill layers at the upper 3 to 7 feet, during times of heavy precipitation.

Based on the encountered subsoil conditions and the wall height, the proposed MSE wall is feasible. However, the MSE wall will require IDOT D1 Class IV LCCF materials to have sufficient foundation bearing resistance in the back to back portion of the wall, and the portion extending beyond. The wall will have sufficient resistance against sliding and overturning.

The maximum long-term consolidation settlement of foundation soils with Class IV LCCF is estimated to be about 0.8 inches near Station 1105+03.64. We estimate the soil will achieve 50% of primary consolidation settlement in 28 months and 90% of primary consolidation in 120 months.


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# STRUCTURE GEOTECHNICAL REPORT
# CIRCLE INTERCHANGE RECONSTRUCTION
# RETAINING WALL 46 (PROPOSED SN 016-1833)
# F.A.I. ROUTE 90/94/290
# SECTION 2014-013R&B-R
# IDOT D-91-227-13, PTB 163-001
# COOK COUNTY, ILLINOIS
# FOR
# AECOM

## 1.0 INTRODUCTION

This report presents the results of Wang Engineering, Inc. (Wang) subsurface investigation, laboratory testing, geotechnical engineering evaluations, and recommendations for the new retaining wall designated as SN 016-1833 (Retaining Wall 46) proposed along the north approach of Ramp WN (SN 016-1706) in connection with the Circle Interchange Reconstruction program 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 retaining wall.

### 1.1 Project Description

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 ramps 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 alignments and vertical profiles throughout the interchange will be improved. A new two-lane flyover will be constructed to carry I-90/94 northbound traffic to I-290 westbound. Cross street bridges including, 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 realigned and reconstructed and up to 50 new retaining walls will be constructed.

### 1.2 Proposed Structure

Retaining Wall 46 (SN 016-1833) is proposed to support the north approach for Ramp WN over I-90/94 NB Bypass/Ramp EN (SN 016-1706). Based on the Type, Size, and Location (TSL) plan dated October 20, 2017 provided by AECOM, the wall is proposed to be a MSE wall, 99' long with a maximum total height of approximately 11.5'. The proposed wall starts at Station 1105+30.00, offset 21.25' LT on west of the Ramp WN north approach, wraps the proposed Ramp WN west abutment, and ends at Station 1105+60.00, offset 7.25' RT on east side of Ramp WN north approach. The total wall height increases gradually from 3.5 to 11.3 feet over the length of approximately 27.6 feet on the south side and from 3.5 to 11.5 feet over length of approximately 37.5 feet on the north side. There will be a 3.5-foot concrete parapet on top of the wall. The TSL plan is included in the *Type Size Location Plan* (Appendix C).

### 1.3 Existing Structure

There is no existing structure at this location.

## 2.0 SITE CONDITIONS AND GEOLOGICAL SETTING

The project area is located within the City of Chicago limits. On the USGS *Chicago Loop 7.5 Minute Series* map, the retaining wall is located in the NW¼ of Section 16, Tier 39 N, Range 14 E of the Third Principal Meridian. A *Site Location Map* is presented as Exhibit 1.

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 general topography of the project area slopes gently southeast toward Lake Michigan. The ramp bridge is situated within the Chicago Lake Plain Physiographic Subsection. The area is characterized by a flat surface that slopes gently toward the lake, largely made of ground moraine till covered by thin and discontinuous lacustrine silt and clay.

The proposed bridge carrying the Ramp WN that connects WB I-290 with NB I-90/94 starts at existing Pier C1 part of SN 016-0461 from an approximate elevation of 605.5 feet. The ground elevation along the Ramp WN Bridge ranges from 586 feet at east end to 587 feet at west end.

## 2.2 Surficial Cover

The project area was shaped during the Wisconsinian-age glaciation and a 90-foot thick drift or more 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 underlined by the pebbly silty clay loam to silty loam diamicton of the Yorkville Member of the Lemont Formation, informally known 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 unconformably rest over approximately 350-foot thick Silurian-age dolostone (Leetaru et al 2004). The top of bedrock may be encountered at 475 to 500 feet elevation or 95 feet below ground surface (bgs) or more. 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.

Our subsurface investigation results fit into the local geologic context. The borings drilled in the project area revealed the native sediments consist of clay to silty clay diamicton of the Wadsworth Formation resting on top of more competent silty clay loam diamicton (hardpan) of the Lemont Formation, which in turn is underlain by bedrock. Sound dolostone bedrock was sampled or inferred at depths ranging from 93 to 109 feet bgs or 486.0 to 477.4 feet elevation, within the range predicted based on published geological data.

## 3.0 METHODS OF INVESTIGATION

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

### 3.1 Subsurface Investigation

Wang performed Boring 1706-B-01 for the Ramp WN abutment in March 2014. Other nearby borings performed are 1703-B-04 and 1715-B02. Wang also performed Boring VST-06 approximately 140 southeast of the Ramp WN abutment to obtain in-situ vane shear strength in soft clay.

The as-drilled boring locations were surveyed by Dynasty Group Inc. and station and offset information for each boring was provided by AECOM. 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 an open borehole to 10 feet depth after that mud rotary was used to the boring termination depth.
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 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, the boreholes were backfilled with grout immediately upon completion.

### 3.2 Vane Shear Tests

Wang performed vane shear strength tests in Boring VST-06. Vane shear strength tests were performed using calibrated RocTest vane shear equipment in undisturbed and remolded soil conditions. The sensitivity shown on the VST-06 log 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. Vane shear test results were used for analyses.

### 3.3 Laboratory Testing

All soil samples were tested in the laboratory for moisture content (AASHTO T 265). Atterberg limits (AASHTO T 89 and T 90) and particle size (AASHTO T 88) analyses were performed on selected soil samples representing the main soil units encountered during the investigation. Field visual descriptions of the soil samples were verified in the laboratory. Laboratory test results are shown in the *Boring Logs* (Appendix A), in the *Subsurface Data Profile* (Exhibits 4), and in the *Laboratory Test Results* (Appendix B).

## 4.0 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.

### 4.1 Soil Conditions

The pavement structure measured shows 3.0 inches of asphalt pavement overlying 10.0 inches of concrete pavement followed by crushed stone base course. In descending order, the general lithologic

succession encountered beneath the pavement structure includes: 1) man-made ground (fill); 2) very soft to medium stiff clay to silty clay (Chicago blue clay); 3) very stiff to hard silty clay to silty clay loam diamicton; 4) very dense gravelly silty loam; 5) hard silty clay loam to silty loam; and 6) strong dolostone bedrock.

*1) Man-made ground (fill)*

Below the pavement structure 4.7 feet of granular and cohesive fill was encountered. The granular fill consisted of medium dense, brown, fine sand with a SPT N value of 11 blows/foot and a moisture content (MC) value of 23%. The cohesive fill included 0.8 feet of very stiff, brown and gray silty clay loam with an unconfined compressive strength (Qu) of 2.5 tsf and a moisture content value of 16%.

*(2) Very soft to medium stiff clay to silty clay (Chicago Blue Clay)*

At an elevation of 578.4 feet, very soft to medium stiff, gray clay to silty clay of 38.8 feet thickness was encountered. The unit is characterized by Qu values of 0.25 to 0.74 tsf and MC values of 13 to 27%. This layer is commonly known as the "Chicago Blue Clay." In-Situ Vane undisturbed shear strength obtained in Boring VST-06 between elevation 576.7 and 542.2 varied from 600 psf to 982 psf.

*(3) Very stiff to hard silty clay to silty clay loam diamicton*

At an elevation of 539.6 feet, very stiff to hard, gray silty clay loam to silty loam of 30 feet in thickness was encountered. This layer has Qu values of 3.61 to more than 10.25 tsf and MC values of 9 to 21%. At an elevation of 529.4 feet, Boring 1706-B-01 also encountered 5.0 feet of interbedded very dense, gray gravelly loam with a SPT N value of 65 blows/foot and a MC value of 10%.

*(4) Very dense gravelly silty loam*

At an elevation of 504.6 feet, very dense gravelly silty loam of 12.2 feet in thickness was encountered with SPT N values of more than 50 blows/foot and MC values of 11 and 12%. Particle size analyses performed in this sample show gravel, sand, silt and clay content of 19.6, 26.3, 51.0 and 3.1%, respectively.

*(6) Hard silty clay loam/Very dense silty loam*

At an elevation of 492.4 feet, Boring 1706-B-01 encountered 12 feet of hard, gray silty clay loam to silty loam, with Qu values of 4.9 to 5.0 tsf and MC values of 11 to 17%.

Underneath silty loam at an elevation of 480.4 feet, boring sampled 3.0 feet of weathered bedrock with hard drilling conditions.

*(7) Strong dolostone bedrock*

Dolostone bedrock was encountered at an elevation of 477.4 feet (109.0 feet bgs) and the top 10 feet show a strong rock, good rock quality (RQD of 76%), bedded, joint breaks with little or no fill, and moderately vuggy.

### 4.2 Groundwater Conditions

During drilling, groundwater was encountered in Boring 1706-B-01 at an elevation of 529.4 feet (57 feet bgs). After drilling, mud was recorded in the borehole due to mud rotary drilling. Although groundwater was not observed within upper fill layers, we anticipate perched water may be encountered during times of heavy precipitation. Therefore, the design and construction of the wall should consider the perched water between 579 and 583 feet elevations within the fill layers.

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### 4.3 Seismic Design Considerations

Seismic design is not required as per 2012 IDOT *Bridge Manual* and 2014 AASHTO *LRFD Bridge Design Specifications*.

## 5.0 ANALYSIS AND RECOMMENDATIONS

### 5.1 Retaining Wall Type Evaluation

Based on the TSL plan, the proposed Retaining Wall 46 (SN 016-1833) is a fill wall supporting the north approach of the Ramp WN (SN 016-1706). The wall will have a maximum total height ("H") of approximately 11.5 feet.

Consideration was given in using cast-in-place concrete cantilever (T-type) with spread footings; however, it was ruled out due to low bearing resistance and excessive settlements of foundation soils. The wall could be supported on driven piles or drilled shafts. Driven piles are not considered suitable due to noise and vibration concerns. The cast-in-place concrete wall could be supported on drilled shafts established on hardpan. However, we concur with the proposed MSE wall option since it will be most economical wall type.

The following sections present the results of our geotechnical engineering analyses and recommendations for the MSE wall design and construction.

### 5.2 Bearing Resistance and External Stability Analyses

The MSE retaining wall base (top of levelling pad) should be established at a depth of 3.5 feet below the front face finished grade. Based on the TSL plan, the proposed MSE wall base elevations varies from 577.61 to 587.07 feet. Based on our boring data, the foundation soils at the MSE wall base elevations includes soft to medium stiff clay to silty clay. We estimate the foundation soils will have a nominal bearing resistance of 3,000 psf and a factored bearing resistance of 2,000 psf based on a geotechnical resistance factor of 0.65 (AASHTO 2014) for MSE wall.

We analyzed the following options to satisfy the factored bearing resistance available, external stability, and settlement. A reinforcement length equal to 70 percent of the total wall height or a minimum of 8 feet was used.

1. Using regular fill material (unit weight of 125 pcf) for the MSE wall zone and fill area;
2. Using IDOT District One Class IV Lightweight Cellular Concrete Fill (LCCF) for the MSE wall zone and fill area between the walls, and the embankment fill material for the wall beyond the back to back portion.

For the Option 1, at the highest portion of the wall near Station 1105+21.97, the wall will apply a maximum factored equivalent bearing pressure of 3,600 psf with a regular MSE wall fill material (unit weight is 125 pcf) considering Load Factor of 1.35 for the MSE wall and 1.75 for the traffic live load. This exceeds the factored soil bearing resistance available of 2,000 psf.

For Option 2, to reduce the applied wall pressure, we have considered IDOT District One Class IV LCCF with unit weight of 42 pcf for the MSE wall zone as well as fill area in the back-to-back wall between Stations 1105+03.64 and 1105+50.00. There are no lateral forces pushing the wall; therefore, eccentricity is not a concern. We have also considered Class IV LCCF for the MSE wall zone and embankment material for the wall along the north side that extends beyond the back-to-back portion.

We estimate the wall backfilled with Class IV LCCF will apply a maximum equivalent factored bearing pressure of 1,350 psf, thus the foundation soils will have sufficient bearing resistance to support the wall. We have considered Class IV LCCF for the MSE wall zone and fill area between

the back-to-back wall sections, and the embankment material beyond the back to back portion of the wall.

The nominal sliding resistance between clay soil and MSE base may be taken as per AASHTO LRFD Section 10.6.3.4. The estimated cohesion of the soft clay is 600 psf. The estimated friction angle between an MSE wall base and underlying cohesive soil is 27º, and the corresponding friction coefficient is 0.50. The friction coefficient of 0.60 can be considered if at least 12-inch thick granular material (CA-6 or CA-7) is provided below MSE base. MSE retaining walls are designed based on a geotechnical sliding resistance factor of 1.0 for soil-on-soil contact (AASHTO 2014).

For the portion of the wall that extends beyond the back to back portion, we performed external stability analysis at Sta. 1105+30. The following are our results and recommendations. We considered cutback slope of 1:2.5 (V:H) as shown on revised TSL plan.

- To satisfy sliding resistance and overturning stability, we recommend width of the MSE reinforced zone to be 0.9 times total height of the wall (H).
- Lightweight cellular concrete fill (LCCF) Class IV as per IDOT District One Special Provision should be used in MSE reinforced zone and in the cut area behind the MSE reinforced zone.
- The factor of safety for the global slope stability analysis is 2.49 for undrained condition and 2.15 for the drained condition. This satisfies IDOT requirement of minimum FOS of 1.50. Details of global stability analysis are presented in Appendix C.

### 5.3 Settlement Analyses

We performed settlement analyses using soil information from the borings 1706-B-01 and VST-06. The corresponding long-term settlement of underlying cohesive foundation soils was calculated using IDOT *Spreadsheet for Cohesive Soils* dated December 9, 2014. It should be noted that in calculating the net service pressure for settlement evaluation, the effect of excavation required to the MSE base level was taken into consideration. For the location of maximum new fill, at Station 1105+21.97 (total wall height of 11.5 feet), we estimate the maximum net service pressure of 520 psf.

Under the maximum service pressure, our settlement analyses indicate the wall will undergo about 0.8 inches of long-term settlement from the underlying cohesive soils. We estimate the soil will achieve 50% of primary consolidation settlement in 28 months and 90% of primary consolidation in 120 months.

### 5.4 Global Stability Analyses

With the Class IV LCCF being used as a fill material in reinforced zone and in between the walls, the whole mass will act as a rigid body with significant reduction of the driving forces, we do not anticipate global stability concerns for the proposed retaining wall.

Results of global stability analysis for the portion of the wall beyond the back to back portion are discussed in the previous section and are presented in Appendix C.

## 6.0 CONSTRUCTION CONSIDERATIONS

### 6.1 Excavation

Any required excavations should be performed in accordance with local, state, and federal regulations including current OSHA regulations. The potential effect of ground movements upon nearby structures and utilities should also be taken into consideration. Any temporary open excavation to a depth of 4 feet should have a slope of 1:2 (V: H) for cohesive soils and 1:2.5 (V: H) for granular soils or flatter.

It is understood that the maximum excavation required from exiting Ramp WN pavement to the MSE base will be approximately 12.0 feet. A Temporary Soil Retention System will be required if the open excavation is not feasible. The Contractor should submit design computation and shop drawings for the IDOT review. The Contractor should evaluate site ground, grading and underground utility condition at the time of construction to determine excavation depth along the wall and type of suitable support system.

### 6.2 Dewatering

Groundwater was encountered at an elevation of 529.4 feet in Boring 1706-B-01 which is below the proposed excavation depths for the placement of the MSE wall. However, perched water may be present in the granular fill within the excavation level. We do not anticipate any special methods will be needed for dewatering efforts other than the sump-pump method. During times of heavy precipitation, water allowed to accumulate in open excavations should be immediately removed by the sump and pump method.

### 6.3 Filling and Backfilling

All fill and backfill materials required other than for the MSE wall zones should be as per IDOT Standard Specification for Road and Bridge Construction (IDOT 2016).

### 6.4 Wall Construction

The wall should be constructed as per IDOT Standard Specification for Road and Bridge Construction (IDOT 2016) and IDOT District One Special Provision for LCCF Class IV.

### 6.5 Construction Monitoring

There is no need for special construction monitoring for the retaining wall except normally required by the IDOT *Standard Specification for Road and Bridge Construction* (IDOT 2016).

## 7.0 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 the proposed retaining wall 46 (SN 016-1833) 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,

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062-040483
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**WANG ENGINEERING, INC.**

MKothawala 10-20-2017

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Senior Geotechnical Engineer

License expires 11-30-2017

Mickey Snider, P.E.
QA/QC Reviewer

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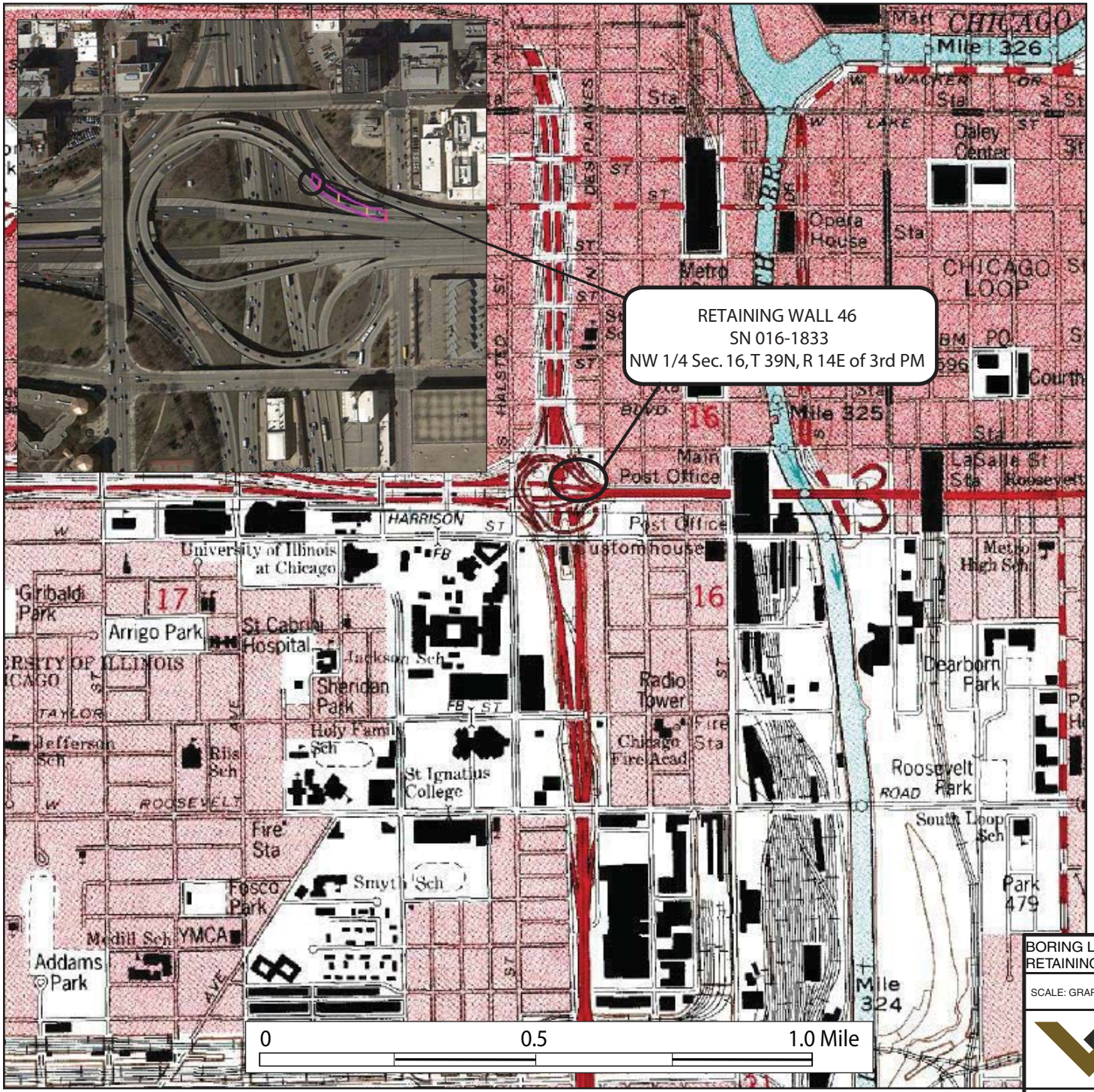
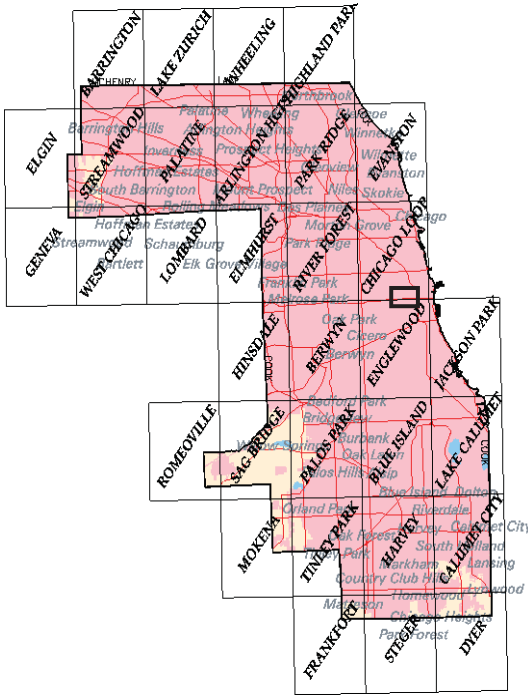
# EXHIBITS




Cook County

BORING LOCATION PLAN: CIRCLE INTERCHANGE RECONSTRUCTION
RETAINING WALL 46, SN 016-1833, COOK COUNTY

| | | |
|---|---|---|
| SCALE: GRAPHICAL | EXHIBIT 1 | DRAWN BY: B. Wilson<br>CHECKED BY: M.Kothawala |

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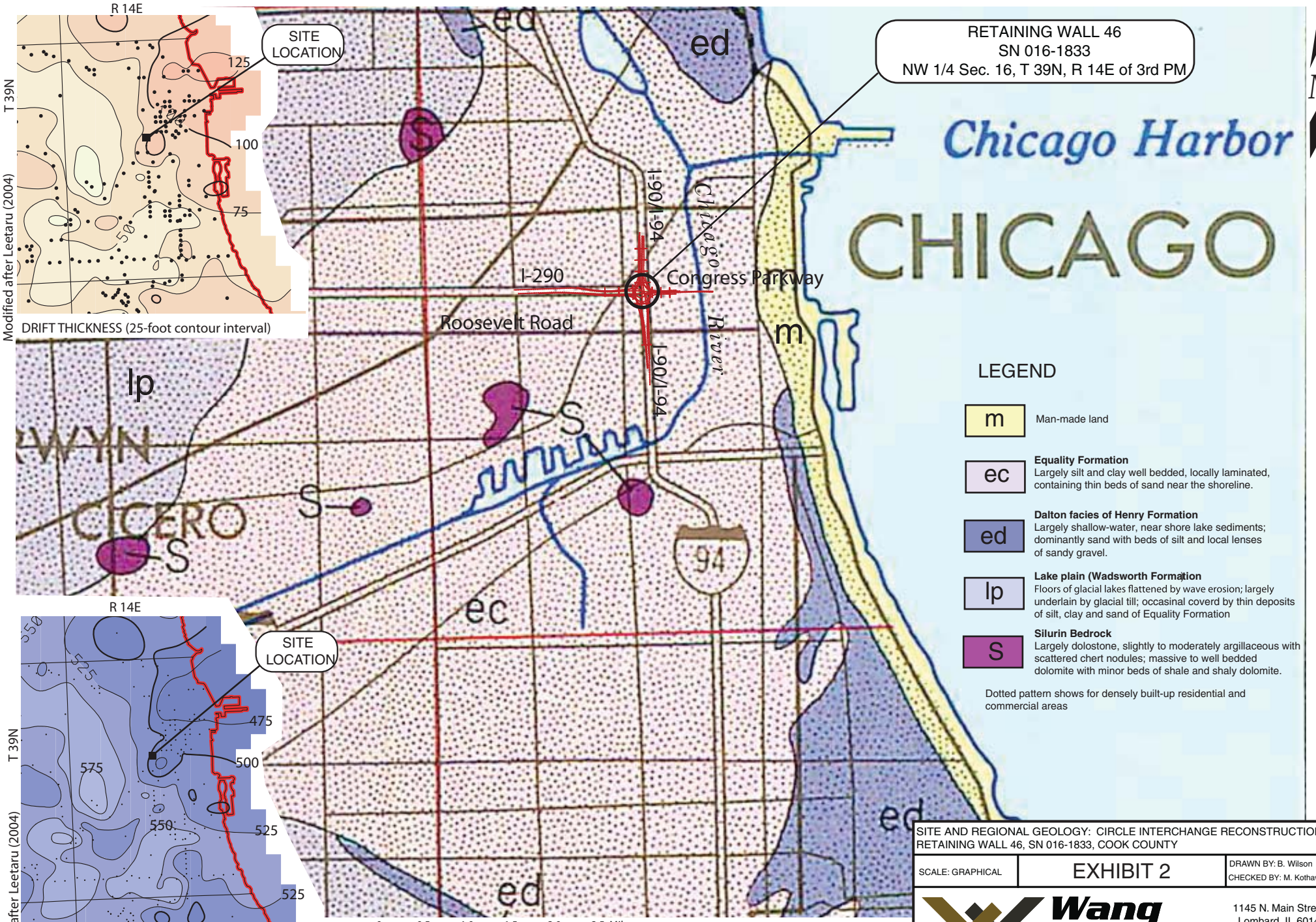


SITE AND REGIONAL GEOLOGY: CIRCLE INTERCHANGE RECONSTRUCTION
RETAINING WALL 46, SN 016-1833, COOK COUNTY

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|---|---|---|
| SCALE: GRAPHICAL | EXHIBIT 2 | DRAWN BY: B. Wilson<br>CHECKED BY: M. Kothawala |

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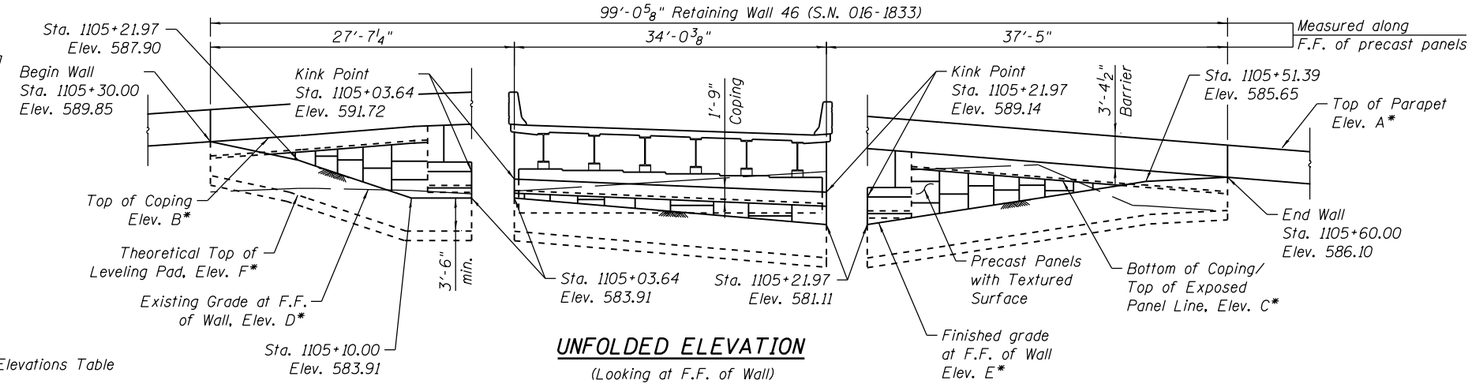
|---|---|
| FOR AECOM | 1100-04-01 |

Bench Mark: Square cut at center of door entrance to 707 W. Harrison St; South side of Harrison St. ±90' west of west line of Des Plaines. Elev. 597.47.

Existing Structure: None.

Traffic Control: Exist. Ramp WN & Ramp WS will be closed and traffic will be detoured during construction. Traffic on Ramp EN, I-290 and I-90/94 will be maintained with stage construction.

No Salvage.




* For Elevations, see Elevations Table on Sheet 2 of 2.

## UNFOLDED ELEVATION

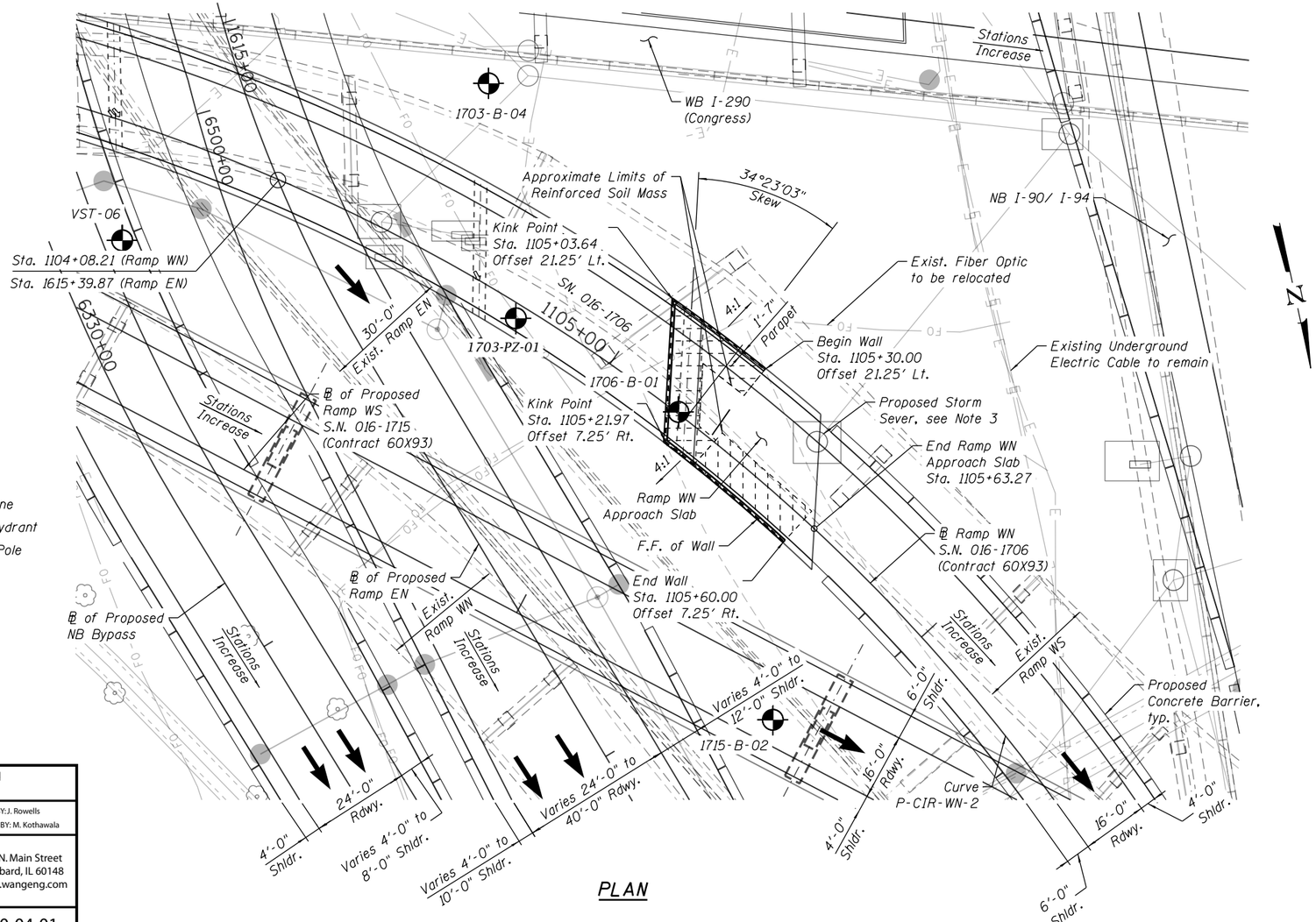
(Looking at F.F. of Wall)

## NOTES:

1. Stations and offsets are measured along ℄ Ramp WN to the front face of precast panels.
2. F.F. denotes Front Face.
3. Conceptual proposed drainage information is shown. Proposed drainage will be redesigned to avoid any conflict with the proposed structure during final design.

## LEGEND:

- Soil Boring Location
- Storm Sewer
- Gas Line
- Electric
- Fire Hydrant
- Fiber Optic
- Light Pole




## PLAN

## HIGHWAY CLASSIFICATION

Ramp WN
Functional Class: Interstate
ADT: 7,200 (2012); 9,000 (2040)
ADTT: 204 (2012); 255 (2040)
DHV: 790 (2040)
Design Speed: 30 m.p.h.
Posted Speed: 30 m.p.h.
One-Way Traffic
Directional Distribution: 100%

## DESIGN STRESSES

FIELD UNITS

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

PRECAST UNITS

f'c = 4,500 psi

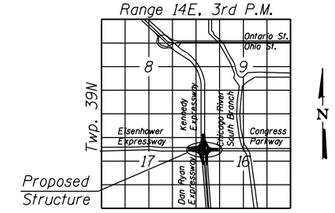
## DESIGN SPECIFICATIONS

2014 AASHTO LRFD Bridge Design Specifications, 7th Edition with 2015 & 2016 Interim Revisions

## CURVE DATA

(Ramp WN)

PROP. CURVE P-CIR-WN-2
P.I. Sta. = 1105+88.67
Δ = 69° 00' 44" (Rt.)
D = 12° 43' 57"
R = 450.00'
T = 309.35'
L = 542.02'
E = 96.07'
e = 5.20%
T.R. = NA
S.E. Run = 46'
P.C. Sta. = 1102+79.32
P.T. Sta. = 1108+21.34
DS = 30




## LOCATION SKETCH

## GENERAL PLAN & ELEVATION
## RETAINING WALL 46
## ALONG RAMP WN
## F.A.I. RTE. 90/94/290
## SECTION 2014-013R&B-R
## COOK COUNTY
## STA. 1105+30.00 TO STA. 1105+60.00
## STRUCTURE NO. 016-1833

BORING LOCATION PLAN: CIRCLE INTERCHANGE RECONSTRUCTION
RETAINING WALL 46, SN 016-1833, COOK COUNTY

SCALE: GRAPHICAL | EXHIBIT 3 | DRAWN BY: J. Rowells | CHECKED BY: M. Kothawala

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

FOR AECOM | 1100-04-01

AECOM

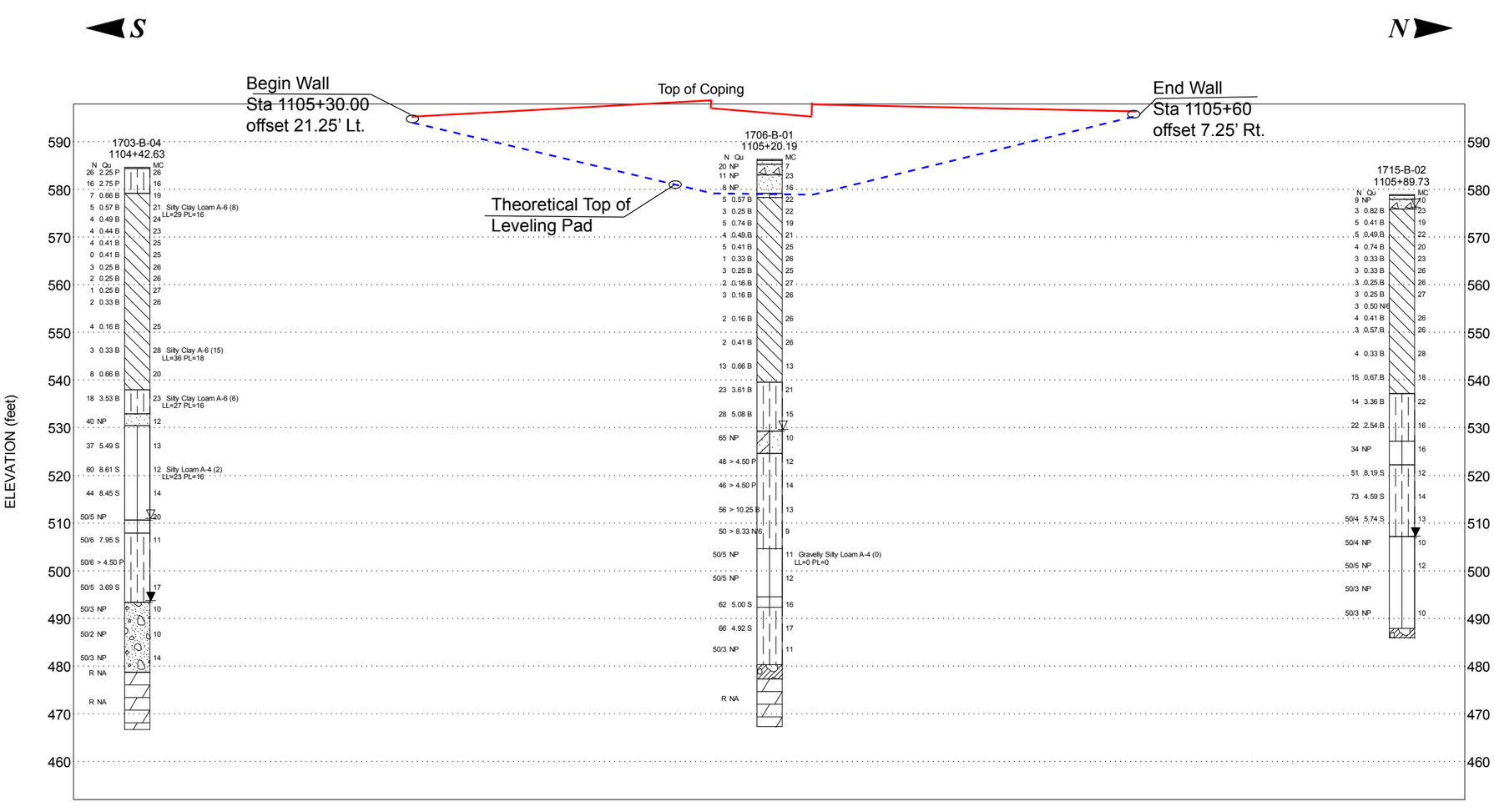
| | | | |
|---|---|---|---|
| USER NAME = keserovicm | DESIGNED - MK | REVISED | |
| | CHECKED - ATB | REVISED | |
| PLOT SCALE = N.T.S. | DRAWN - MK | REVISED | |
| PLOT DATE = 10/20/2017 | CHECKED - ATB | REVISED | |

**STATE OF ILLINOIS**
**DEPARTMENT OF TRANSPORTATION**

SHEET NO. 1 OF 2 SHEETS

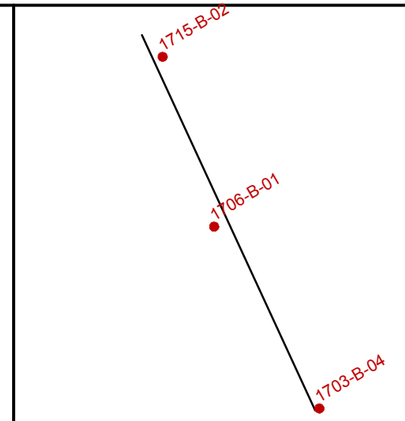
| F.A.I. RTE. | SECTION | COUNTY | TOTAL SHEETS | SHEET NO. |
|---|---|---|---|---|
| 90/94/290 | 2014-013R&B-R | COOK | 2 | 1 |
| | | CONTRACT NO. 60X93 | | |
| | | ILLINOIS FED. AID PROJECT | | |

016-1833-CIRCLE100-SHT-ACM-ST-TSL-001.dgn




## Lithology Graphics

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




Site Map Scale 1 inch equals 65 feet

## Explanation:

1703-B-04
1104+42.63 — 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 — 18

Horizontal Scale (feet)

Vertical Exaggeration: 0.5x

**Wang Engineering**
1145 N Main Street
Lombard, IL 60148

**Soil profile**

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 BEARING-TRIAL.GDT 8/15/17

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# APPENDIX A

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# BORING LOG 1703-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: 584.72 ft
North: 1898071.44 ft
East: 1171813.94 ft
Station: 1104+42.63
Offset: 42.6570 LT

| Profile | Elevation (ft) | SOIL AND ROCK DESCRIPTION | Depth (ft) | Sample Type / recovery | Sample No. | SPT Values (blw/6 in) | Qu (tsf) | Moisture Content (%) |
|---|---|---|---|---|---|---|---|---|
| | 584.5 | 3-inch thick CRUSHED STONE --FILL-- | | | | | | |
| | | Very stiff, dark brown and gray SILTY CLAY LOAM, trace gravel, brick and glass fragments --FILL-- | | | 1 | 5 11 15 | 2.25 P | 26 |
| | | | 5 | | 2 | 3 7 9 | 2.75 P | 16 |
| | 579.2 | Very soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel | | | 3 | 2 3 4 | 0.66 B | 19 |
| | | --$L_L$(%)=29, $P_L$(%)=16-- --%Gravel=3.8-- --%Sand=16.9-- --%Silt=54.2-- --%Clay=25.1-- --A-6(8)-- | 10 | | 4 | 2 2 3 | 0.57 B | 21 |
| | | | | | 5 | 0 1 3 | 0.49 B | 24 |
| | | | 15 | | 6 | 0 2 2 | 0.44 B | 23 |
| | | | | | 7 | 0 2 2 | 0.41 B | 25 |
| | | | 20 | | 8 | 0 0 0 | 0.41 B | 25 |
| | | | | | 9 | 0 1 2 | 0.25 B | 26 |
| | | | 25 | | 10 | 0 0 2 | 0.25 B | 26 |
| | | | 30 | | 11 | 0 0 1 | 0.25 B | 27 |
| | | | | | 12 | 0 0 2 | 0.33 B | 26 |
| | | | 35 | | 13 | 0 2 2 | 0.16 B | 25 |
| | | --$L_L$(%)=36, $P_L$(%)=18-- --%Gravel=1.8-- --%Sand=10.7-- --%Silt=50.0-- --%Clay=37.5-- --A-6(15)-- | 40 | | 14 | 0 1 2 | 0.33 B | 28 |
| | | | 45 | | 15 | 3 4 4 | 0.66 B | 20 |
| | 538.0 | Very stiff, gray SILTY CLAY, trace gravel | | | | | | |
| | | --$L_L$(%)=27, $P_L$(%)=16-- --%Gravel=6.1-- --%Sand=20.1-- | 50 | | 16 | 4 7 11 | 3.53 B | 23 |

## GENERAL NOTES

Begin Drilling: **10-10-2013** Complete Drilling: **10-17-2013**
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: **74.00 ft**
At Completion of Drilling: **91.25 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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Fax: 630-953-9938

# BORING LOG 1703-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: 584.72 ft
North: 1898071.44 ft
East: 1171813.94 ft
Station: 1104+42.63
Offset: 42.6570 LT

| Profile | Elevation (ft) | SOIL AND ROCK DESCRIPTION | Depth (ft) | Sample Type / recovery | Sample No. | SPT Values (blw/6 in) | Qu (tsf) | Moisture Content (%) |
|---|---|---|---|---|---|---|---|---|
| | | --%Silt=50.9--<br>--%Clay=22.9--<br>--A-6(6)-- | | | | | | |
| | 533.0 | Dense, gray SANDY LOAM, trace gravel | | | | | | |
| | 530.5 | Hard, gray SILTY LOAM, trace gravel | 55 | | 17 | 11<br>14<br>26 | NP | 12 |
| | | | 60 | | 18 | 18<br>15<br>22 | 5.49<br>S | 13 |
| | | --$L_L$(%)=23, $P_L$(%)=16--<br>--%Gravel=7.7--<br>--%Sand=23.1--<br>--%Silt=55.2--<br>--%Clay=14.0--<br>--A-4(2)-- | 65 | | 19 | 15<br>25<br>35 | 8.61<br>S | 12 |
| | | | 70 | | 20 | 14<br>19<br>25 | 8.45<br>S | 14 |
| | 510.7 | Very dense, gray SILTY LOAM, trace gravel | 75 | | 21 | 18<br>36<br>50/5 | NP | 20 |
| | | --Saturated-- | | | | | | |
| | 508.0 | Hard, gray SILTY CLAY LOAM to SILTY LOAM, trace gravel | | | | | | |
| | | | 80 | | 22 | 34<br>50/6 | 7.95<br>S | 11 |
| | | | 85 | | 23 | 50/6 | > 4.50<br>P | |
| | | --HARD DRILLING--<br>*--Possible Cobbles--* | | | | | | |
| | | | 90 | | 24 | 28<br>50/5 | 3.69<br>S | 17 |
| | | --HARD DRILLING--<br>*--Possible Cobbles--* | | | | | | |
| | 493.5 | Very dense, gray GRAVELLY SAND<br>--Saturated-- | 95 | | 25 | 50/3 | NP | 10 |
| | | | 100 | | 26 | 19<br>50/2 | NP | 10 |

## GENERAL NOTES

Begin Drilling: **10-10-2013** Complete Drilling: **10-17-2013**
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: **74.00 ft**
At Completion of Drilling: **91.25 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 1703-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: 584.72 ft
North: 1898071.44 ft
East: 1171813.94 ft
Station: 1104+42.63
Offset: 42.6570 LT

| 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 | 21<br>50/3 | NP | 14 |
| | 478.7 | Strong, light gray, poor to excellent rock mass quality, bedded fresh DOLOSTONE, up to 30-inch beds, 17-inch spaced joints, horizontal joints with less than 0.2-inch infilling, hard joint wall, with stylolitic surfaces, and moderately vuggy porosity. | 110 | | 1 | CORE | | |
| | | --Run 1 - RECOVERY=88%--<br>--RQD=26%--<br>109.5ft-Qu=10990 psi ---><br>--Run 2 - RECOVERY=99%--<br>--RQD=92%--<br>113.0ft-Qu=9060 psi ---> | 115 | | 2 | CORE | | |
| | 466.7 | Boring terminated at 118.00 ft | 120 | | | | | |
| | | | 125 | | | | | |

## GENERAL NOTES

Begin Drilling: **10-10-2013** Complete Drilling: **10-17-2013**
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: **74.00 ft**
At Completion of Drilling: **91.25 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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Fax: 630-953-9938

# BORING LOG 1706-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: 586.37 ft
North: 1898150.62 ft
East: 1171768.12 ft
Station: 1105+20.19
Offset: 0.3840' LT

| 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 ASPHALT --PAVEMENT-- | | | | | | |
| | 585.3 | 10-inch thick CONCRETE --PAVEMENT-- | | | | | | |
| | | Medium dense, brown CRUSHED STONE --BASE COURSE-- | | | 1 | 7 12 8 | NP | 7 |
| | 583.1 | Medium dense, brown, fine SAND --FILL-- | 5 | | 2 | 4 4 7 | NP | 23 |
| | | | | | 3 | 3 4 4 | NP | 16 |
| | 579.2 | Very stiff (2.5P), brown and gray SILTY CLAY LOAM, trace gravel --FILL-- | | | | | | |
| | 578.4 | Very soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel | 10 | | 4 | 1 2 3 | 0.57 B | 22 |
| | | | | | 5 | 2 1 2 | 0.25 B | 22 |
| | | | 15 | | 6 | 1 2 3 | 0.74 B | 19 |
| | | | | | 7 | 2 2 2 | 0.49 B | 21 |
| | | | 20 | | 8 | 1 2 3 | 0.41 B | 25 |
| | | | | | 9 | 0 0 1 | 0.33 B | 26 |
| | | | 25 | | 10 | 1 2 1 | 0.25 B | 25 |
| | | | 30 | | 11 | 0 1 1 | 0.16 B | 27 |
| | | | | | 12 | 2 1 2 | 0.16 B | 26 |
| | | | 35 | | 13 | 0 1 1 | 0.16 B | 26 |
| | | | 40 | | 14 | 1 1 1 | 0.41 B | 26 |
| | | | 45 | | 15 | 3 5 8 | 0.66 B | 13 |
| | 539.6 | Very stiff to hard, gray SILTY CLAY LOAM, trace gravel | | | | | | |
| | | | 50 | | 16 | 5 8 15 | 3.61 B | 21 |

## GENERAL NOTES

Begin Drilling: **03-16-2014** Complete Drilling: **03-18-2014**
Drilling Contractor: **Wang Testing Services** Drill Rig: **B-57 TMR [100%]**
Driller: **P&P** Logger: **D. Kolpacki** Checked by: **C. Marin**
Drilling Method: **3.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

## WATER LEVEL DATA

While Drilling: **57.00 ft**
At Completion of Drilling: **mud in the borehole**
Time After Drilling: **NA hours**
Depth to Water: **NA ft**

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

WANGENGINC 11000401.GPJ WANGENG.GDT 8/16/17

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Telephone: 630-953-9928
Fax: 630-953-9938

# BORING LOG 1706-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: 586.37 ft
North: 1898150.62 ft
East: 1171768.12 ft
Station: 1105+20.19
Offset: 0.3840' LT

| Profile | Elevation (ft) | SOIL AND ROCK DESCRIPTION | Depth (ft) | Sample Type / recovery | Sample No. | SPT Values (blw/6 in) | Qu (tsf) | Moisture Content (%) |
|---|---|---|---|---|---|---|---|---|
| | 529.4 | Very dense, gray GRAVELLY LOAM | | | | | | |
| | | | 55 | | 17 | 8<br>9<br>19 | 5.08<br>B | 15 |
| | | | 60 | | 18 | 15<br>40<br>25 | NP | 10 |
| | | --HARD DRILLING--<br>*--Possible Cobbles--* | | | | | | |
| | 524.6 | Hard, gray SILTY CLAY LOAM to SILTY LOAM, trace gravel | | | | | | |
| | | | 65 | | 19 | 18<br>27<br>21 | > 4.50<br>P | 12 |
| | | --HARD DRILLING--<br>*--Possible Cobbles--* | | | | | | |
| | | | 70 | | 20 | 15<br>22<br>24 | > 4.50<br>P | 14 |
| | | | 75 | | 21 | 15<br>24<br>32 | > 10.25<br>B | 13 |
| | 504.6 | Very dense, gray GRAVELLY SILTY LOAM | | | | | | |
| | | | 80 | | 22 | 32<br>50 | > 8.33<br>N/6 | 9 |
| | | --Wet--<br>--%Gravel=19.6--<br>--%Sand=26.3--<br>--%Silt=51.0--<br>--%Clay=3.1--<br>--A-4 (0)--<br>--HARD DRILLING--<br>*--Possible Cobbles--* | 85 | | 23 | 50/5 | NP | 11 |
| | | | 90 | | 24 | 50/5 | NP | 12 |
| | 494.6 | Gray SILT<br>--Wet-- | | | | | | |
| | 492.4 | Hard, gray SILTY CLAY LOAM, to SILTY LOAM, trace gravel | 95 | | 25 | 27<br>24<br>38 | 5.00<br>S | 16 |
| | | | 100 | | 26 | 13<br>26<br>40 | 4.92<br>S | 17 |

## GENERAL NOTES

Begin Drilling: **03-16-2014** Complete Drilling: **03-18-2014**
Drilling Contractor: **Wang Testing Services** Drill Rig: **B-57 TMR [100%]**
Driller: **P&P** Logger: **D. Kolpacki** Checked by: **C. Marin**
Drilling Method: **3.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

## WATER LEVEL DATA

While Drilling: **57.00 ft**
At Completion of Drilling: **mud in the borehole**
Time After Drilling: **NA hours**
Depth to Water: **NA ft**

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

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# BORING LOG 1706-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: 586.37 ft
North: 1898150.62 ft
East: 1171768.12 ft
Station: 1105+20.19
Offset: 0.3840' LT

| Profile | Elevation (ft) | SOIL AND ROCK DESCRIPTION | Depth (ft) | Sample Type / recovery | Sample No. | SPT Values (blw/6 in) | Qu (tsf) | Moisture Content (%) |
|---|---|---|---|---|---|---|---|---|
| | | | | | 27 | 50/3 | NP | 11 |
| | | | 105 | | | | | |
| | | --HARD DRILLING-- | | | | | | |
| | 480.4 | *--Possible Cobbles--* | | | | | | |
| | | --WEATHERED BEDROCK-- | | | | | | |
| | | --VERY HARD DRILLING-- | | | | | | |
| | 477.4 | | | | | | | |
| | | Strong, light gray, good rock mass quality, bedded fresh DOLOSTONE, up to 18-inch beds, 8-inch joints spacing, horizontal and vertical joints with none to more than 0.2-inch infilling, up to 4-inch greenish gray argillaceous partings, hard joint wall, with stylolitic surfaces, and moderately vuggy porosity. | 110 | | | CORE | | |
| | | | | | 1 | | | |
| | | --Run 1 - RECOVERY=100%-- | 115 | | | | | |
| | | --RQD=76%-- | | | | | | |
| | 467.4 | | | | | | | |
| | | Boring terminated at 119.00 ft | | | | | | |
| | | | 120 | | | | | |
| | | | 125 | | | | | |

## GENERAL NOTES

Begin Drilling: **03-16-2014** Complete Drilling: **03-18-2014**
Drilling Contractor: **Wang Testing Services** Drill Rig: **B-57 TMR [100%]**
Driller: **P&P** Logger: **D. Kolpacki** Checked by: **C. Marin**
Drilling Method: **3.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

## WATER LEVEL DATA

While Drilling: **57.00 ft**
At Completion of Drilling: **mud in the borehole**
Time After Drilling: **NA hours**
Depth to Water: **NA ft**

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

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# BORING LOG 1715-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: 578.98 ft
North: 1898224.57 ft
East: 1171745.64 ft
Station: 1105+89.73
Offset: 39.7965 RT

| Profile | Elevation (ft) | SOIL AND ROCK DESCRIPTION | Depth (ft) | Sample Type recovery | Sample No. | SPT Values (blw/6 in) | Qu (tsf) | Moisture Content (%) |
|---|---|---|---|---|---|---|---|---|
| | 578.8 | 2-inch thick ASPHALT | | | | | | |
| | 578.0 | --PAVEMENT-- | | | | | | |
| | | 10-inch thick CONCRETE | | | 1 | 4 5 4 | NP | 10 |
| | | --PAVEMENT-- | | | | | | |
| | 576.0 | Loose, light brown CRUSHED STONE | | | | | | |
| | | --BASE COURSE-- | | | | | | |
| | | Soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel | 5 | | 2 | 0 1 2 | 0.82 B | 23 |
| | | | | | 3 | 2 2 3 | 0.41 B | 19 |
| | | | 10 | | 4 | 2 2 3 | 0.49 B | 22 |
| | | | | | 5 | 1 2 2 | 0.74 B | 20 |
| | | | 15 | | 6 | 0 1 2 | 0.33 B | 23 |
| | | | | | 7 | 1 1 2 | 0.33 B | 26 |
| | | | 20 | | 8 | 1 1 2 | 0.25 B | 26 |
| | | | | | 9 | 0 1 2 | 0.25 B | 27 |
| | | | 25 | | 10 | 1 1 2 | 0.50 N/6 | |
| | 537.2 | Very stiff, gray SILTY CLAY LOAM, trace gravel | 30 | | 11 | 0 2 2 | 0.41 B | 26 |
| | | | | | 12 | 1 1 2 | 0.57 B | 26 |
| | | | 35 | | 13 | 2 2 2 | 0.33 B | 28 |
| | | | 40 | | 14 | 4 6 9 | 0.67 B | 18 |
| | | | 45 | | 15 | 7 7 7 | 3.36 B | 22 |
| | | | 50 | | 16 | 6 10 12 | 2.54 B | 16 |

## GENERAL NOTES

Begin Drilling: **02-23-2014** Complete Drilling: **03-23-2014**
Drilling Contractor: **Wang Testing Services** Drill Rig: **B-57 TMR [100%]**
Driller: **P&P** Logger: **D. Kolpacki** Checked by: **C. Marin**
Drilling Method: **3.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

## WATER LEVEL DATA

While Drilling: **3.00 ft**
At Completion of Drilling: **mud in the borehole**
Time After Drilling: **24 hours**
Depth to Water: **72.00 ft**

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

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# BORING LOG 1715-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: 578.98 ft
North: 1898224.57 ft
East: 1171745.64 ft
Station: 1105+89.73
Offset: 39.7965 RT

| Profile | Elevation (ft) | SOIL AND ROCK DESCRIPTION | Depth (ft) | Sample Type recovery | Sample No. | SPT Values (blw/6 in) | Qu (tsf) | Moisture Content (%) |
|---|---|---|---|---|---|---|---|---|
| | 527.2 | Dense, gray SILT<br>--Wet-- | 55 | | 17 | 14<br>16<br>18 | NP | 16 |
| | 522.2 | Hard, gray SILTY CLAY LOAM to SILTY LOAM, trace gravel | 60 | | 18 | 18<br>24<br>27 | 8.19<br>S | 12 |
| | | | 65 | | 19 | 20<br>31<br>42 | 4.59<br>S | 14 |
| | | | 70 | | 20 | 20<br>50/4 | 5.74<br>S | 13 |
| | 507.2 | Very dense, gray SILTY LOAM, trace to some gravel<br>--WET-- | 75 | | 21 | 30<br>50/4 | NP | 10 |
| | | --HARD DRILLING--<br>*--Possible Cobbles--* | 80 | | 22 | 50/5 | NP | 12 |
| | | --HARD DRILLING--<br>*--Possible Cobbles--* | 85 | | 23 | 50/3 | NP | |
| | | --HARD DRILLING--<br>*--Possible Cobbles--* | 90 | | 24 | 50/3 | NP | 10 |
| | 488.0 | --VERY HARD, STEADY DRILLING--<br>--WEATHERED BEDROCK--<br>--ROLLER BIT REFUSAL--<br>Boring terminated at 93.00 ft | 95 | | | | | |
| | 486.0 | | 100 | | | | | |

## GENERAL NOTES

Begin Drilling: **02-23-2014** Complete Drilling: **03-23-2014**
Drilling Contractor: **Wang Testing Services** Drill Rig: **B-57 TMR [100%]**
Driller: **P&P** Logger: **D. Kolpacki** Checked by: **C. Marin**
Drilling Method: **3.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

## WATER LEVEL DATA

While Drilling: **3.00 ft**
At Completion of Drilling: **mud in the borehole**
Time After Drilling: **24 hours**
Depth to Water: **72.00 ft**

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

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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 | | |
| | | --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 | | |
| | | --In-Situ Vane Shear, 15.5 feet-- --$S_{u\ undis}$ = 873.7 psf-- --$S_{u\ remold}$ = 513.3 psf-- --Sensitivity = 1.7-- | | | 3 | VS | | |
| | | --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 | | |
| | | --In-Situ Vane Shear, 20.5 feet-- --$S_{u\ undis}$ = 775.4 psf-- --$S_{u\ remold}$ = 360.4 psf-- --Sensitivity = 2.2-- | | | 5 | VS | | |
| | | --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 | | |
| | | --In-Situ Vane Shear, 25.5 feet-- --$S_{u\ undis}$ = 578.8 psf-- --$S_{u\ remold}$ = 316.7 psf-- --Sensitivity = 1.8-- | | | 7 | VS | | |
| | | --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 | | |
| | | --In-Situ Vane Shear, 30.5 feet-- --$S_{u\ undis}$ = 786.3 psf-- --$S_{u\ remold}$ = 382.2 psf-- --Sensitivity = 2.1-- | | | 9 | VS | | |
| | | --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 | | |
| | | --In-Situ Vane Shear, 35.5 feet-- --$S_{u\ undis}$ = 808.1 psf-- --$S_{u\ remold}$ = 502.4 psf-- --Sensitivity = 1.6-- | | | 11 | VS | | |
| | | --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 | | |
| | | --In-Situ Vane Shear, 40.5 feet-- --$S_{u\ undis}$ = 906.4 psf-- --$S_{u\ remold}$ = 524.2 psf-- --Sensitivity = 1.7-- | | | 13 | VS | | |
| | 542.2 | --In-Situ Vane Shear, 43.0 feet-- --$S_{u\ undis}$ = 677.1 psf-- --$S_{u\ remold}$ = 393.1 psf-- --Sensitivity = 1.7-- | 45 | | 14 | VS | | |
| | | Boring terminated at 43.50 ft | | | | | | |
| | | | 50 | | | | | |

## 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.

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# BORING LOG 1703-PZ-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: 582.49 ft
North: 1898127.96 ft
East: 1171807.47 ft
Station: 1104+74.81
Offset: 3.30157 RT

| Profile | Elevation (ft) | SOIL AND ROCK DESCRIPTION | Depth (ft) | Sample Type recovery | Sample No. | SPT Values (blw/6 in) | Qu (tsf) | Moisture Content (%) |
|---|---|---|---|---|---|---|---|---|
| | | *--Drilled without sampling--* | 5 | | | | | |
| | | | 10 | | | | | |
| | | | 15 | | | | | |
| | | Piezometer Data:<br>*--Installed in Nov. 12, 2014*<br>*--Bentonite Seal 70 to 72 feet*<br>*--Top of Sand Pack at 72 feet*<br>*--Top of Screen at 75.3 feet*<br>*--Screen Length 20 feet*<br>*--Bottom of Screen at 95.3 feet* | 20 | | | | | |
| | | | 25 | | | | | |
| | | | 30 | | | | | |
| | | --piezometer stabilized water level reading --<br>--reading during well development (11/20/2014) = 32.00 feet bgs--<br>--reading date: 12/05/2014 = 31.10 feet bgs-- | 35 | | | | | |
| | | | 40 | | | | | |
| | | | 45 | | | | | |
| | | | 50 | | | | | |

## GENERAL NOTES

Begin Drilling: **11-10-2014** Complete Drilling: **11-12-2014**
Drilling Contractor: **Wang Testing Services** Drill Rig: **B-57 TMR [100%]**
Driller: **P&P** Logger: **S. Woods** Checked by: **C. Marin**
Drilling Method: **4.25" HSA, monitoring water well**

## WATER LEVEL DATA

While Drilling: **78.00 ft**
At Completion of Drilling: **NA**
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 1703-PZ-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: 582.49 ft
North: 1898127.96 ft
East: 1171807.47 ft
Station: 1104+74.81
Offset: 3.30157 RT

| Profile | Elevation (ft) | SOIL AND ROCK DESCRIPTION | Depth (ft) | Sample Type recovery | Sample No. | SPT Values (blw/6 in) | Qu (tsf) | Moisture Content (%) |
|---|---|---|---|---|---|---|---|---|
| | | Piezometer Data:<br>*--Installed in Nov. 12, 2014*<br>*--Bentonite Seal 70 to 72 feet*<br>*--Top of Sand Pack at 72 feet*<br>*--Top of Screen at 75.3 feet*<br>*--Screen Length 20 feet*<br>*--Bottom of Screen at 95.3 feet* | 55<br>60<br>65<br>70<br>75 | | | | | |
| | 482.5 | Very dense, gray SILTY LOAM, trace gravel<br>--Dry--<br>*--Dolostone fragments--*<br>Boring terminated at 100.00 ft | 80<br>85<br>90<br>95<br>100 | | 1<br>2<br>3 | 40<br>42<br>18/3<br>10<br>23<br>50/3<br>15<br>30/2 | NP<br>NP<br>NP | 13<br>20<br>14 |

## GENERAL NOTES

Begin Drilling: **11-10-2014** Complete Drilling: **11-12-2014**
Drilling Contractor: **Wang Testing Services** Drill Rig: **B-57 TMR [100%]**
Driller: **P&P** Logger: **S. Woods** Checked by: **C. Marin**
Drilling Method: **4.25" HSA, monitoring water well**

## WATER LEVEL DATA

While Drilling: **78.00 ft**
At Completion of Drilling: **NA**
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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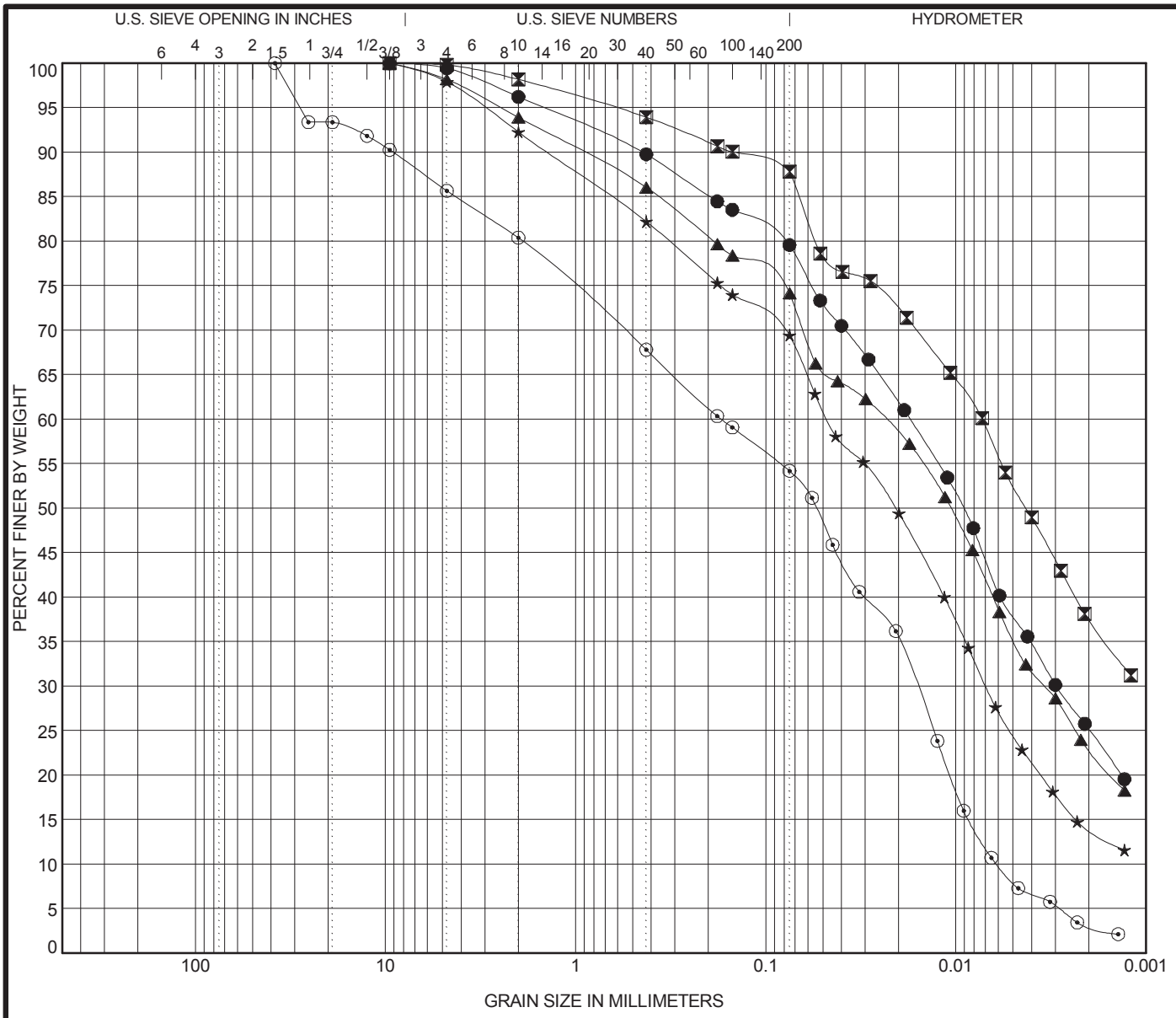
# APPENDIX B




| COBBLES | GRAVEL | SAND | | SILT AND CLAY |
|---|---|---|---|---|
| | | coarse | fine | |

| Specimen Identification | | IDH Classification | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|
| ● 1703-B-04#4 | 8.5 ft | **Silty Clay Loam** | **29** | **16** | **13** | | |
| ⊠ 1703-B-04#14 | 38.5 ft | **Silty Clay** | **36** | **18** | **18** | | |
| ▲ 1703-B-04#16 | 48.5 ft | **Silty Clay Loam** | **27** | **16** | **11** | | |
| ★ 1703-B-04#19 | 63.5 ft | **Silty Loam** | **23** | **16** | **7** | | |
| ⊙ 1706-B-01#23 | 83.5 ft | **Gravelly Silty Loam** | **NP** | **NP** | **NP** | **0.25** | **28.20** |

| Specimen Identification | | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|---|---|
| ● 1703-B-04#4 | 8.5 ft | **9.5** | **0.017** | **0.003** | | **3.8** | **16.9** | **54.2** | **25.1** |
| ⊠ 1703-B-04#14 | 38.5 ft | **9.5** | **0.007** | | | **1.8** | **10.7** | **50.0** | **37.5** |
| ▲ 1703-B-04#16 | 48.5 ft | **9.5** | **0.024** | **0.003** | | **6.1** | **20.1** | **50.9** | **22.9** |
| ★ 1703-B-04#19 | 63.5 ft | **9.5** | **0.047** | **0.007** | | **7.7** | **23.1** | **55.2** | **14.0** |
| ⊙ 1706-B-01#23 | 83.5 ft | **38.1** | **0.171** | **0.016** | **0.006** | **19.6** | **26.3** | **51.0** | **3.1** |

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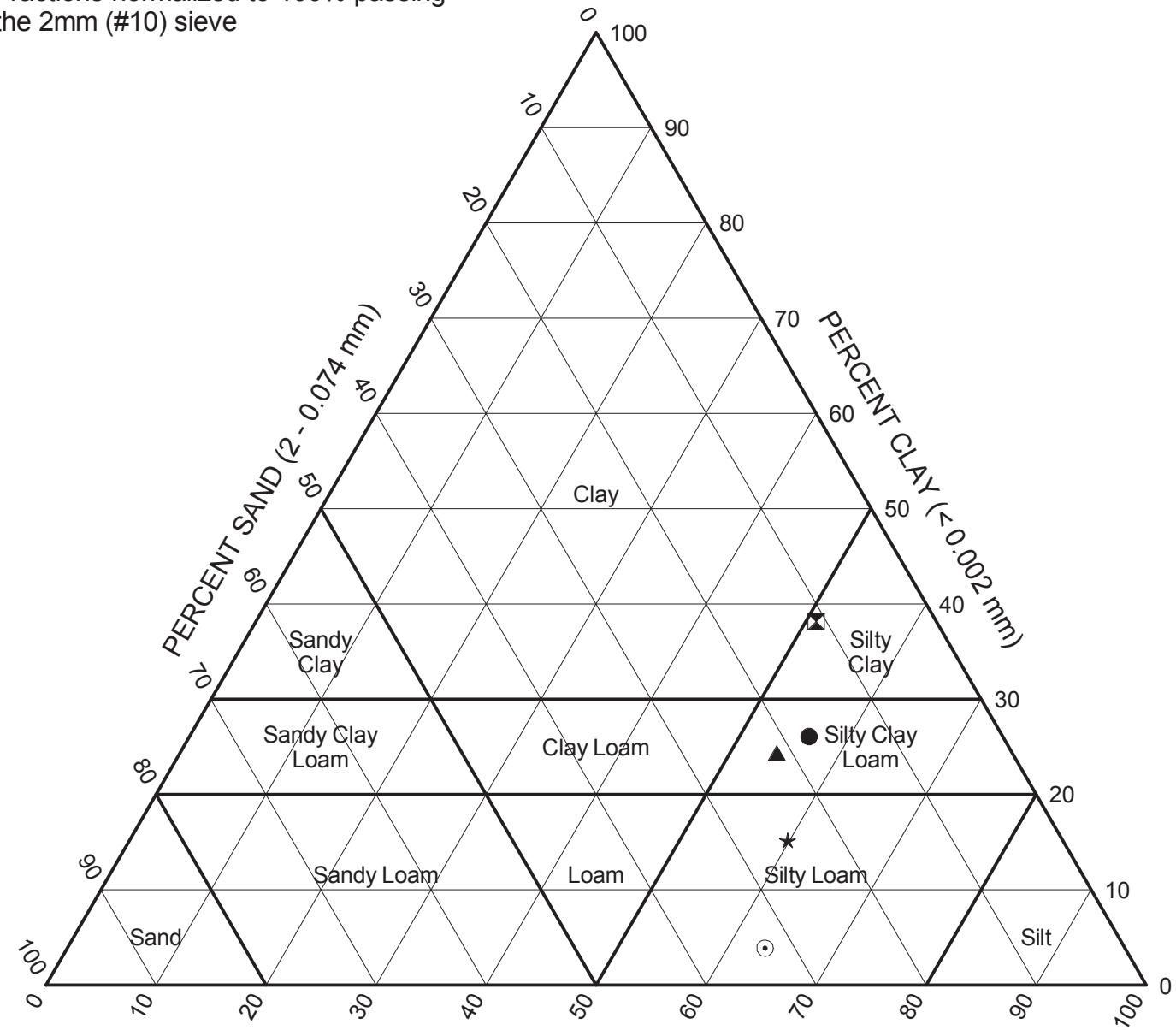
# GRAIN SIZE DISTRIBUTION

Project: Circle Interchange Reconstruction

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

Number: 1100-04-01

Fractions normalized to 100% passing the 2mm (#10) sieve




| | Sample | Depth (ft) | Sand (%) | Silt (%) | Clay (%) | Classification | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | IL DOT | AASHTO | ASTM |
| ● | 1703-B-04#4 | 8.5 | 17.6 | 56.3 | 26.1 | Silty Clay Loam | A-6 (8) | CL |
| ⧓ | 1703-B-04#14 | 38.5 | 10.9 | 50.9 | 38.2 | Silty Clay | A-6 (15) | CL |
| ▲ | 1703-B-04#16 | 48.5 | 21.4 | 54.2 | 24.4 | Silty Clay Loam | A-6 (6) | CL |
| ★ | 1703-B-04#19 | 63.5 | 25.0 | 59.8 | 15.2 | Silty Loam | A-4 (2) | CL-ML |
| ⊙ | 1706-B-01#23 | 83.5 | 32.7 | 63.4 | 3.9 | Gravelly Silty Loam | A-4 (0) | ML |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |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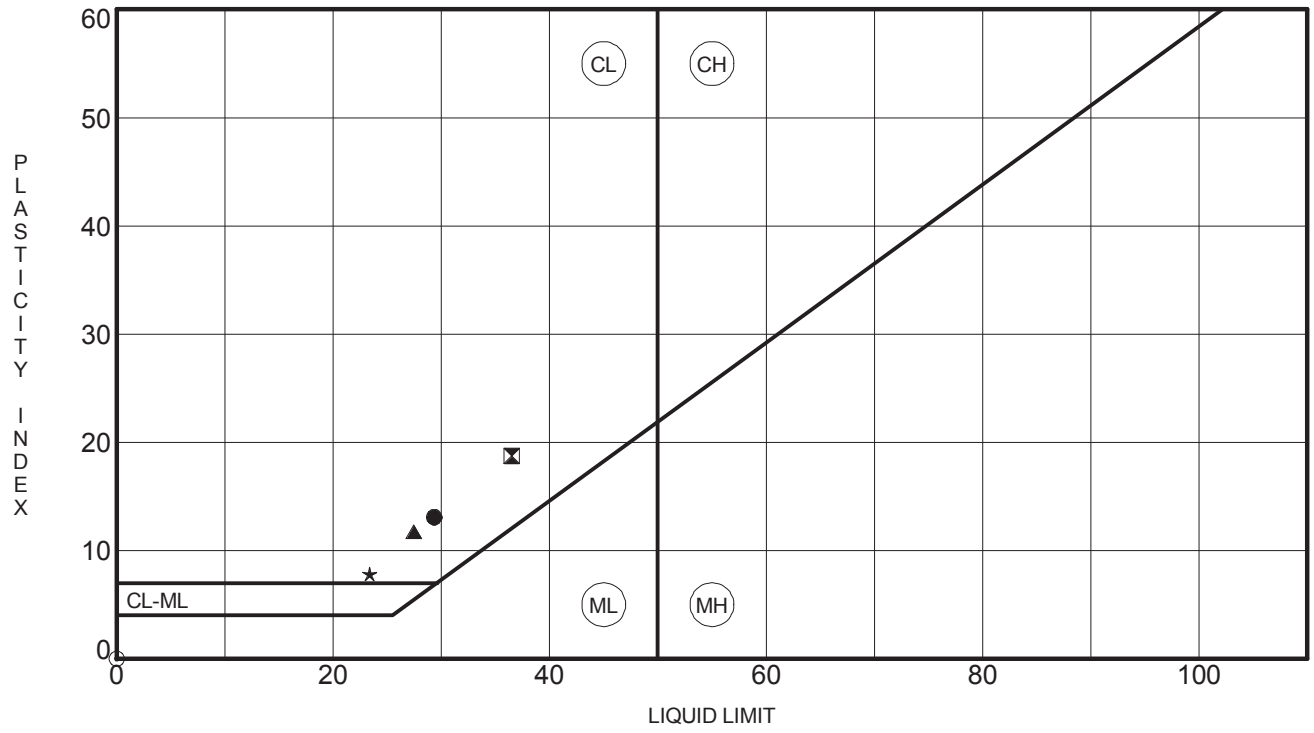
## IDH Textural Classification Chart

Project: Circle Interchange Reconstruction

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

Number: 1100-04-01




| Specimen Identification | | | LL | PL | PI | Fines | IDH Classification |
|---|---|---|---|---|---|---|---|
| ● | 1703-B-04#4 | 8.5 ft | 29 | 16 | 13 | 80 | Silty Clay Loam |
| ⊠ | 1703-B-04#14 | 38.5 ft | 36 | 18 | 18 | 88 | Silty Clay |
| ▲ | 1703-B-04#16 | 48.5 ft | 27 | 16 | 11 | 74 | Silty Clay Loam |
| ★ | 1703-B-04#19 | 63.5 ft | 23 | 16 | 7 | 69 | Silty Loam |
| ⊙ | 1706-B-01#23 | 83.5 ft | NP | NP | NP | 54 | Gravelly 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

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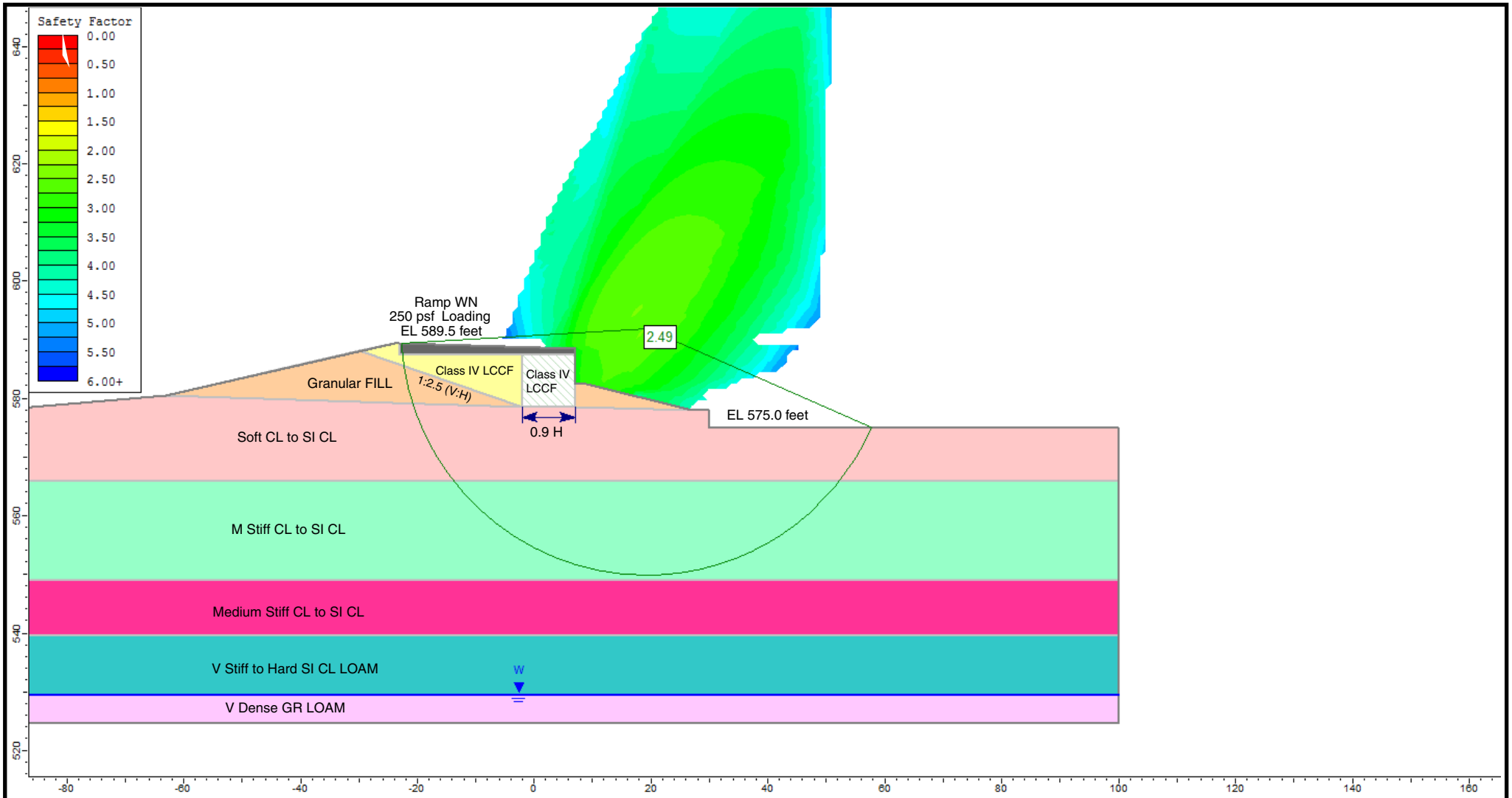
# APPENDIX C




Undrained Analysis for MSE Retaining Wall at Sta. 1105+30, Ref Borings 1706-B-01 & VST-06

| Layer ID | Description | Unit Weight (pcf) | Undrained Cohesion (psf) | Undrained Friction Angle (degrees) |
|---|---|---|---|---|
| 1 | Granular FILL | 120 | 0 | 30 |
| 2 | Soft to M Stiff CL to SI CL | 110 | 800 | 0 |
| 3 | Soft Cl to SI CL | 110 | 600 | 0 |
| 4 | M Stiff CL to SI CL | 110 | 800 | 0 |
| 5 | V Stiff to Hard SI CL LOAM | 125 | 4000 | 0 |
| 6 | V Dense GR LOAM | 125 | 0 | 36 |

GLOBAL STABILITY ANALYSIS: CIRCLE INTERCHANGE RECONSTRUCTION, RETAINING WALL 46, SN 016-1833, CHICAGO, IL

SCALE: GRAPHICAL | APPENDIX C-1 | DRAWN BY: NSB CHECKED BY: MAK

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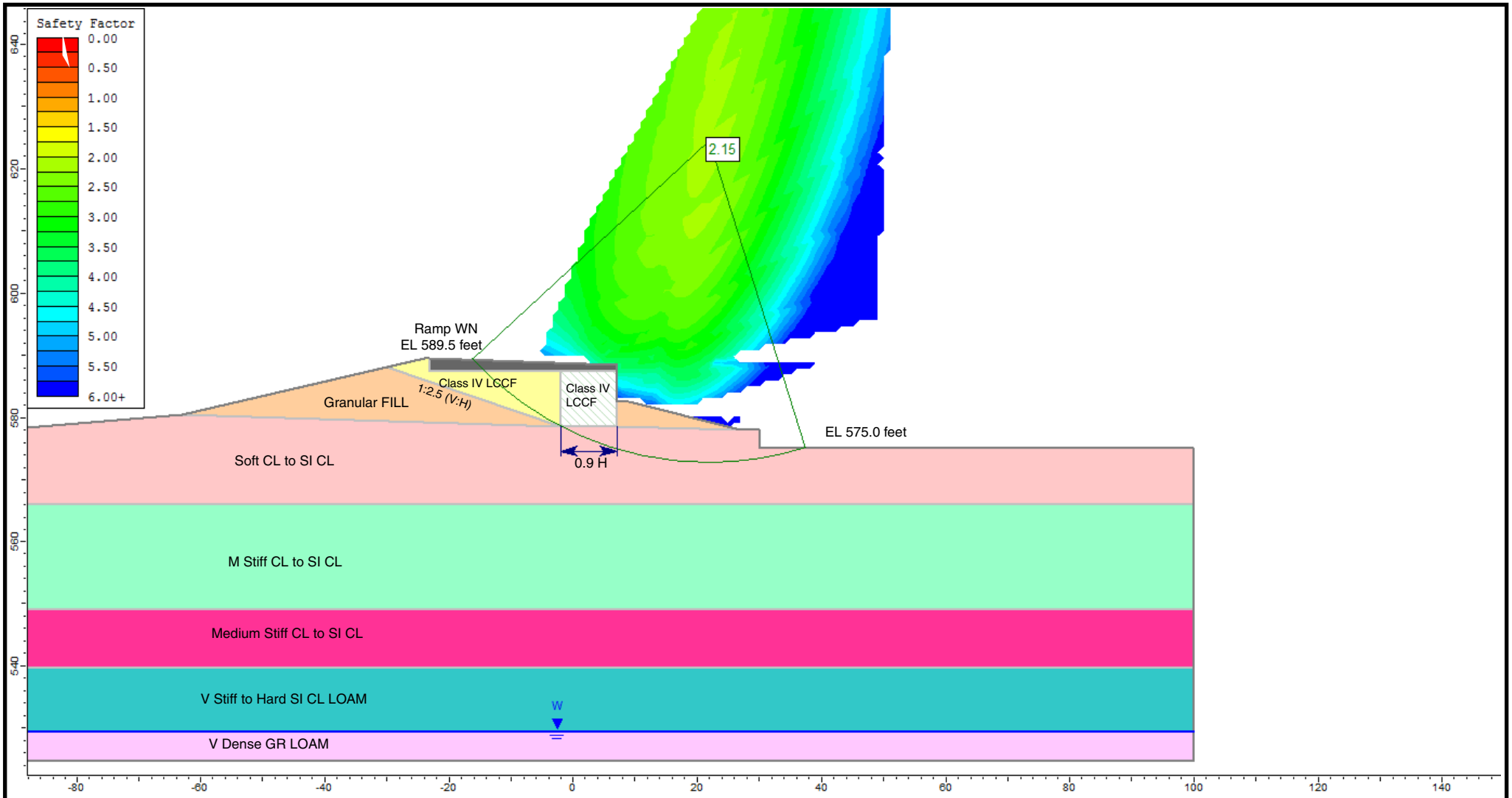
FOR AECOM | 1100-04-01




Drained Analysis for MSE Retaining Wall at Sta. 1105+30, Ref Borings 1706-B-01 & VST-06

| Layer ID | Description | Unit Weight (pcf) | Drained Cohesion (psf) | Drained Friction Angle (degrees) |
|---|---|---|---|---|
| 1 | Granular FILL | 120 | 0 | 30 |
| 2 | Soft to M Stiff CL to SI CL | 110 | 0 | 28 |
| 3 | Soft Cl to SI CL | 110 | 0 | 28 |
| 4 | M Stiff CL to SI CL | 110 | 0 | 28 |
| 5 | V Stiff to Hard SI CL LOAM | 125 | 100 | 30 |
| 6 | V Dense GR LOAM | 125 | 0 | 36 |

GLOBAL STABILITY ANALYSIS: CIRCLE INTERCHANGE RECONSTRUCTION, RETAINING WALL 46, SN 016-1833, CHICAGO, IL

SCALE: GRAPHICAL | APPENDIX C-2 | DRAWN BY: NSB CHECKED BY: MAK

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FOR AECOM | 1100-04-01

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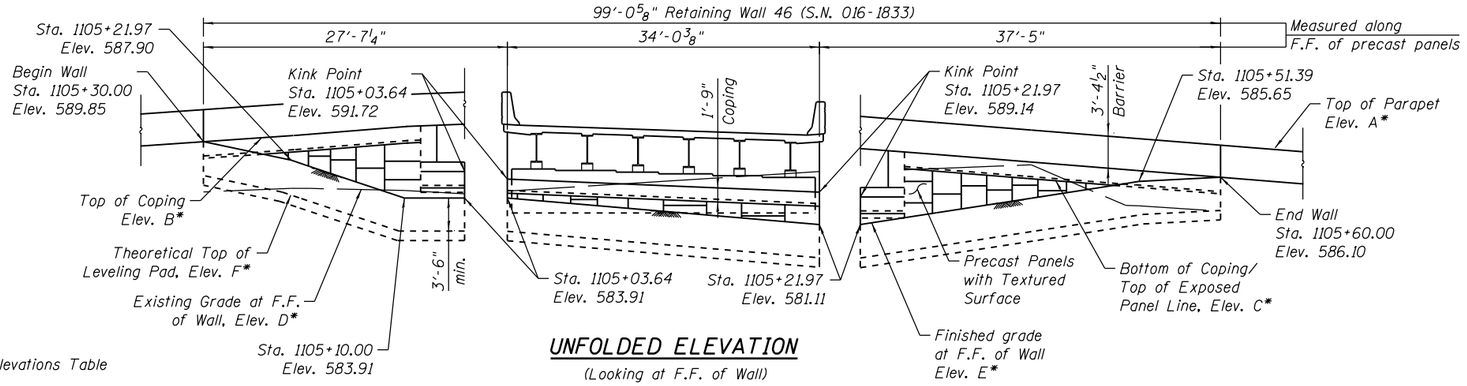
# APPENDIX D

Bench Mark: Square cut at center of door entrance to 707 W. Harrison St; South side of Harrison St. ±90' west of west line of Des Plaines. Elev. 597.47.

Existing Structure: None.

Traffic Control: Exist. Ramp WN & Ramp WS will be closed and traffic will be detoured during construction. Traffic on Ramp EN, I-290 and I-90/94 will be maintained with stage construction.

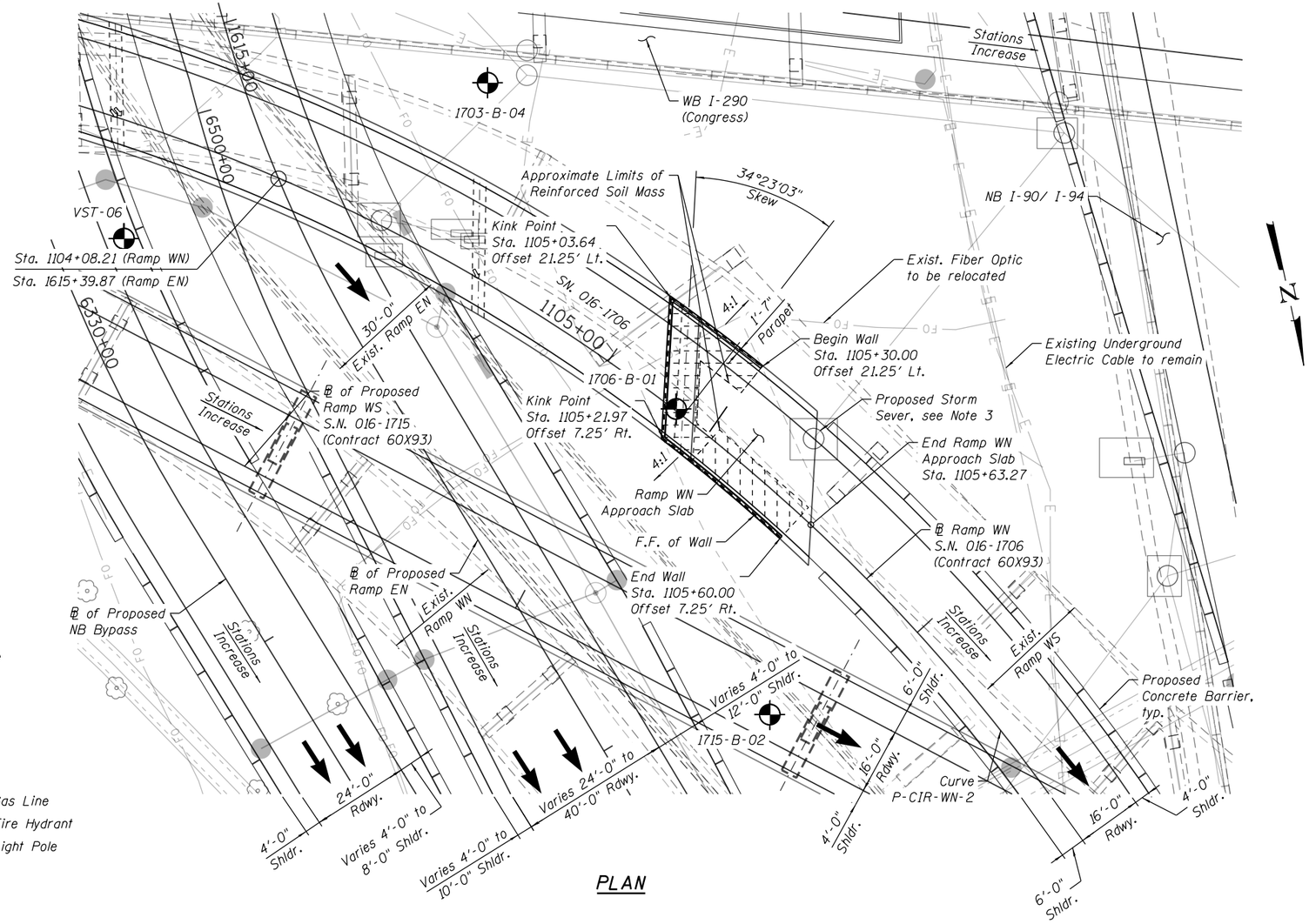
No Salvage.




* For Elevations, see Elevations Table on Sheet 2 of 2.

## UNFOLDED ELEVATION

(Looking at F.F. of Wall)




## PLAN

## NOTES:

1. Stations and offsets are measured along ℄ Ramp WN to the front face of precast panels.
2. F.F. denotes Front Face.
3. Conceptual proposed drainage information is shown. Proposed drainage will be redesigned to avoid any conflict with the proposed structure during final design.

## LEGEND:

- Soil Boring Location
- Storm Sewer
- E — Electric
- FO — Fiber Optic
- G — Gas Line
- Fire Hydrant
- Light Pole

## HIGHWAY CLASSIFICATION

Ramp WN
Functional Class: Interstate
ADT: 7,200 (2012); 9,000 (2040)
ADTT: 204 (2012); 255 (2040)
DHV: 790 (2040)
Design Speed: 30 m.p.h.
Posted Speed: 30 m.p.h.
One-Way Traffic
Directional Distribution: 100%

## DESIGN STRESSES

FIELD UNITS

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

PRECAST UNITS

f'c = 4,500 psi

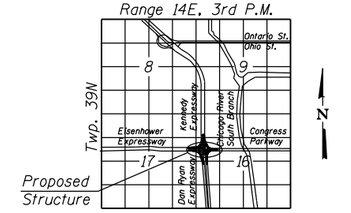
## DESIGN SPECIFICATIONS

2014 AASHTO LRFD Bridge Design Specifications, 7th Edition with 2015 & 2016 Interim Revisions

## CURVE DATA

(Ramp WN)

PROP. CURVE P-CIR-WN-2
P.I. Sta. = 1105+88.67
Δ = 69° 00' 44" (Rt.)
D = 12° 43' 57"
R = 450.00'
T = 309.35'
L = 542.02'
E = 96.07'
e = 5.20%
T.R. = NA
S.E. Run = 46'
P.C. Sta. = 1102+79.32
P.T. Sta. = 1108+21.34
DS = 30




## LOCATION SKETCH

# GENERAL PLAN & ELEVATION
# RETAINING WALL 46
# ALONG RAMP WN
# F.A.I. RTE. 90/94/290
# SECTION 2014-013R&B-R
# COOK COUNTY
# STA. 1105+30.00 TO STA. 1105+60.00
# STRUCTURE NO. 016-1833

AECOM

| | | | |
|---|---|---|---|
| USER NAME = keserovicm | DESIGNED - MK | REVISED | |
| | CHECKED - ATB | REVISED | |
| PLOT SCALE = N.T.S. | DRAWN - MK | REVISED | |
| PLOT DATE = 10/20/2017 | CHECKED - ATB | REVISED | |

**STATE OF ILLINOIS**
**DEPARTMENT OF TRANSPORTATION**

SHEET NO. 1 OF 2 SHEETS

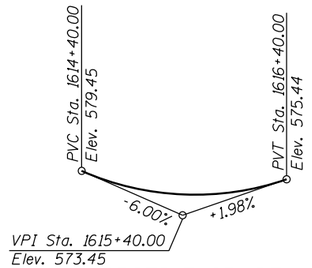
| F.A.I. RTE. | SECTION | COUNTY | TOTAL SHEETS | SHEET NO. |
|---|---|---|---|---|
| 90/94/290 | 2014-013R&B-R | COOK | 2 | 1 |
| | | CONTRACT NO. 60X93 | | |
| | | ILLINOIS FED. AID PROJECT | | |

016-1833-CIRCLE100-SHT-ACM-ST-TSL-001.dgn

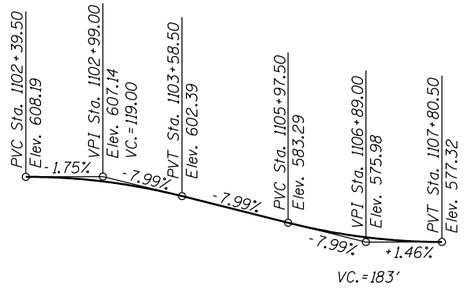
## ELEVATIONS TABLE

| STATION | OFFSET | ELEVATION A | ELEVATION B | ELEVATION C | ELEVATION D | ELEVATION E | ELEVATION F |
|---|---|---|---|---|---|---|---|
| 1105+03.64 | 21'-3" Lt. | 595.09 | 591.72 | 589.97 | 584.63 | 583.91 | 580.41 |
| 1105+10.00 | 21'-3" Lt. | 594.83 | 591.45 | 589.70 | 584.71 | 583.91 | 580.41 |
| 1105+20.00 | 21'-3" Lt. | 594.03 | 590.65 | 588.90 | 584.92 | 587.24 | 583.74 |
| 1105+21.97 | 21'-3" Lt. | 593.87 | 590.49 | 588.74 | 584.95 | 587.90 | 584.40 |
| 1105+30.00 | 21'-3" Lt. | 593.23 | 589.85 | 588.10 | 584.55 | 590.57 | 587.07 |
| 1105+21.97 | 7'-3" Rt. | 592.52 | 589.14 | 587.39 | 586.71 | 581.11 | 577.61 |
| 1105+30.00 | 7'-3" Rt. | 591.88 | 588.50 | 586.75 | 587.01 | 582.35 | 578.85 |
| 1105+40.00 | 7'-3" Rt. | 591.08 | 587.70 | 585.95 | 587.41 | 583.89 | 580.39 |
| 1105+50.00 | 7'-3" Rt. | 590.28 | 586.90 | 585.15 | 583.12 | 585.43 | 581.93 |
| 1105+51.39 | 7'-3" Rt. | 590.17 | 586.79 | 585.04 | 583.08 | 585.65 | 582.15 |
| 1105+60.00 | 7'-3" Rt. | 589.48 | 586.10 | 584.35 | 582.52 | 586.98 | 583.48 |

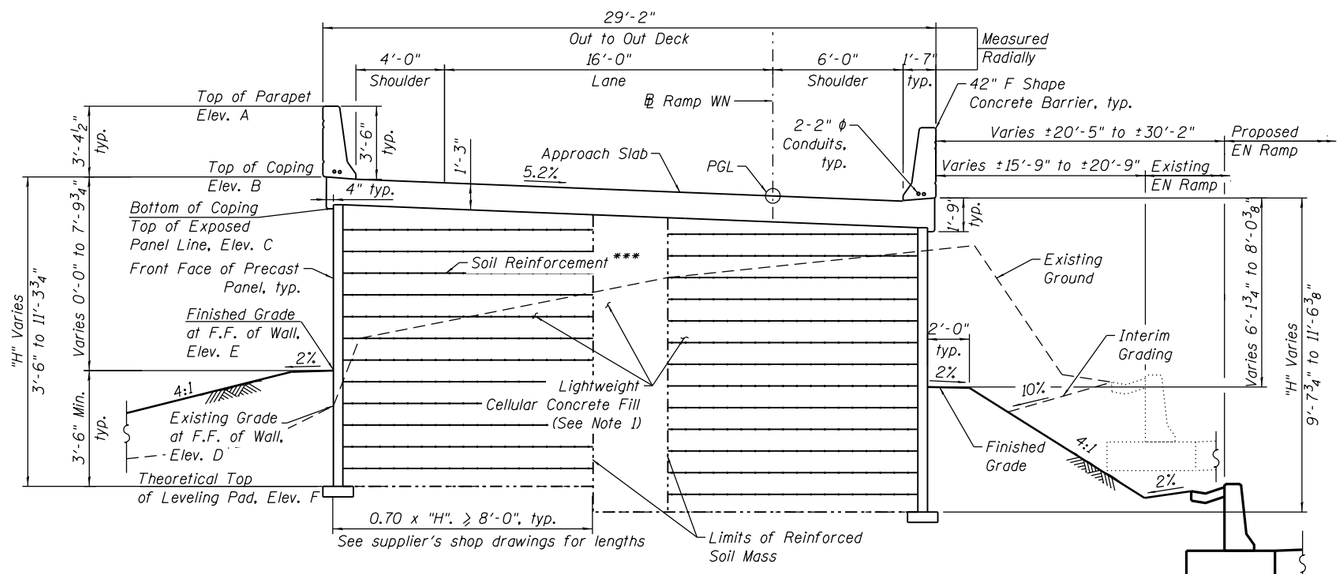
Elevation A: Top of Parapet
Elevation B: Top of Coping
Elevation C: Bottom of Coping / Top of Exposed Panel Line
Elevation D: Existing Grade at F.F. of Wall
Elevation E: Finished Grade at F.F. of Wall
Elevation F: Theoretical Top of Leveling Pad




PROFILE GRADE
(Along ℄ Ramp EN)



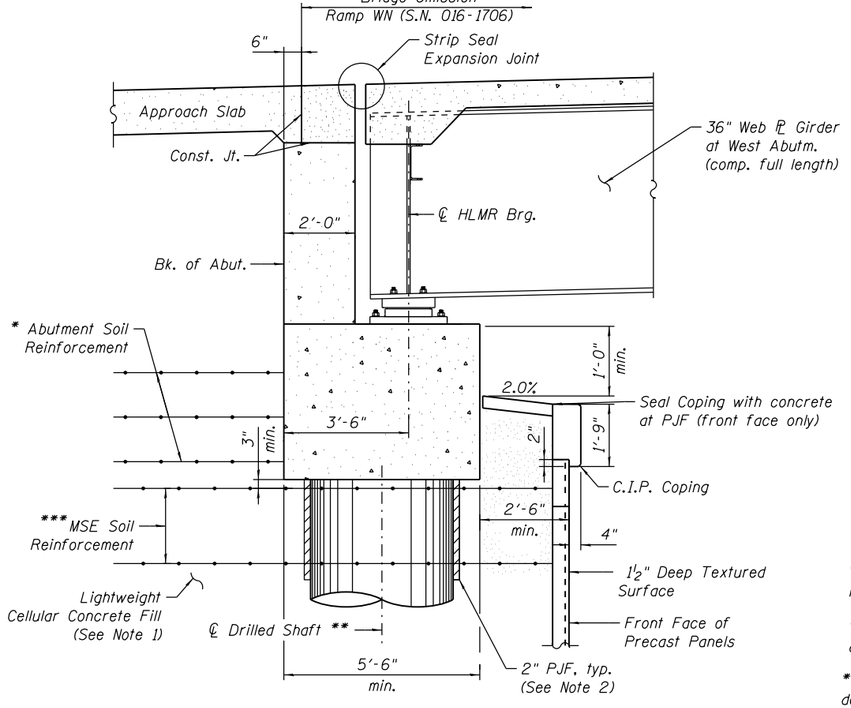

PROFILE GRADE
(Along ℄ Ramp WN)




## TYPICAL SECTION
(Sta. 1105+03.64 to Sta. 1105+30.00)




## TYPICAL SECTION
(Sta. 1105+30.00 to Sta. 1105+60.00)




## SECTION THROUGH ABUTMENT
(Horiz. Dim. @ Rt. L's)

* Abutment Soil Reinforcement to resist lateral loads in lieu of drilled shafts.

** Size, spacing and number to be determined in design.

*** The MSE Wall supplier's internal stability design shall account for the approach slab's bearing pressure surcharge of 1.0 ksf and horizontal sliding force of 0.83 kips/ft of wall.

## NOTES:

1. Lightweight Cellular Concrete fill shall be Class IV (District 1) Lightweight Cellular Concrete Fill.
2. Install 2" PJF from bottom of abutment to top of leveling pad. Cost is included with Lightweight Cellular Concrete Fill.

# GENERAL PLAN & ELEVATION
# RETAINING WALL 46
# ALONG RAMP WN
# F.A.I. RTE. 90/94/290
# SECTION 2014-013R&B-R
# COOK COUNTY
# STA. 1105+30.00 TO STA. 1105+60.00
# STRUCTURE NO. 016-1833

AECOM

| | | | |
|---|---|---|---|
| USER NAME = keserovicm | DESIGNED - MK | REVISED | |
| | CHECKED - ATB | REVISED | |
| PLOT SCALE = N.T.S. | DRAWN - MK | REVISED | |
| PLOT DATE = 10/20/2017 | CHECKED - ATB | REVISED | |

**STATE OF ILLINOIS**
**DEPARTMENT OF TRANSPORTATION**

SHEET NO. 2 OF 2 SHEETS

| F.A.I. RTE. | SECTION | COUNTY | TOTAL SHEETS | SHEET NO. |
|---|---|---|---|---|
| 90/94/290 | 2014-013R&B-R | COOK | 2 | 2 |
| | | CONTRACT NO. 60X93 | | |
| | | ILLINOIS FED. AID PROJECT | | |

016-1833-CIRCLE100-SHT-ACM-ST-TSL-002.dgn