
**STRUCTURE GEOTECHNICAL REPORT
CIRCLE INTERCHANGE RECONSTRUCTION
RETAINING WALL 52 (PROPOSED SN 016-Z051)
ALONG RANDOLPH EXIT RAMP
F.A.I ROUTE 90/94 (KENNEDY EXPRESSWAY)
IDOT D-91-227-13/ PTB 163-001
COOK COUNTY, ILLINOIS**

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11. Abstract <p>Retaining Wall 52 will be constructed along Randolph Exit Ramp to accommodate the proposed realignment of the ramp. The 160-foot long drilled soldier pile wall will have maximum retained height of 7.0 feet. There will be a 4.0-foot high concrete parapet on top of the wall. There is an existing wall designated as Wall 20, starting from Washington Boulevard bridge northeast wingwall, consisting of a 148-foot long deteriorating masonry wall and an 85-foot long cast-in-place (CIP) retaining wall with fence supported by metal shell piles. Based on the TSL plan, the masonry wall will be removed but the CIP wall will remain in place. This report provides geotechnical recommendations for the design and construction of the proposed retaining wall</p> <p>Based on the borings, beneath the pavement and surface, the subsurface soils consists of 2 to 15 feet of fill materials, up to 8 feet stiff to very stiff silty clay crust, up to 47 feet of very soft to medium stiff clay to silty clay, 34 feet of stiff to hard silty clay to silty clay loam, and medium dense to very dense silt, silty loam and sand extending to the boring termination depths or bedrock. Strong bedrock was encountered at elevation of 481.5 feet or 112.5 feet bgs. 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 578 and 593 feet elevations within the fill layers.</p> <p>Given that the location and geometry, the proposed drilled soldier pile wall is feasible and geotechnical parameters for design are presented in this report. Although, global stability analyses shows that the pile embedment of 568 feet adequate FOS, the tip of the soldier pile should not terminate above an elevation of 542 feet due to the presence of soft and medium stiff clay.</p> <p>We recommend providing TSRS to support the adjacent parking lot prior to the removal of the existing masonry wall to ensure no lateral displacements occur on the parking lot.</p>		
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1.0 INTRODUCTION

This report presents the results of our subsurface investigation, laboratory testing, geotechnical engineering evaluations and recommendations for a new retaining wall, designated as SN 016-Z051 (Retaining Wall 52) proposed along the Randolph Exit Ramp in connection with the Circle Interchange Reconstruction project in the City of Chicago, Cook County, Illinois. A *Site Location Map* is presented as Exhibit 1.

The purpose of Wang Engineering, Inc. (Wang) 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

Retaining wall 52 (SN 016-Z051) is proposed along the Randolph Street Exit Ramp. Based on the Type, Size, and Location (TSL) plan dated August 2, 2019 provided by TranSystems Corporation, the 160-foot long wall is proposed to be a drilled soldier pile wall. The wall will begin at Station 8741+25.42 at Washington Boulevard Bridge north east wingwall and will end at Station 8742+76.43. The wall will have maximum retained height of 7.0 feet. There will be a 4.0-foot high concrete parapet on top of the wall. The TSL plan is included in the Appendix D.

1.3 Existing Structure

There is an existing wall designated as Wall 20, starting from the Washington Boulevard bridge northeast wingwall, consisting of a 148-foot long deteriorating masonry wall and an 85-foot long cast-in-place (CIP) retaining wall supported on metal shell piles. Based on the TSL plan, the masonry wall will be removed but the CIP wall will remain in place.

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 wall is located in the NW $\frac{1}{4}$ 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 wall 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 groundmoraine till covered by thin and discontinuous lacustrine silt and clay. The ground elevation along the wall ranges from 586 feet to 591 feet.

2.2 Surficial Cover

The project area was shaped during the Wisconsin-age glaciation, and more than 75-foot thick 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 glacial 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 75 to 100 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

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 at a depth of 112.5 feet bgs, corresponding to 481.5 feet elevation, within the range predicted based on published geological data.

3.0 METHODS OF INVESTIGATION

The following sections outline the findings of previous investigations. All elevations in this report are based on NAVD 1988.

3.1 Subsurface Investigation

Wang drilled four structure borings, designated as Z051-RWB-01 through Z051-RWB-04 and three hand auger borings, designated as Z051-HA-01 through Z051-HA-03 from June 30 to July 1, 2019. Vane shear tests were performed in Boring Z051-RWB-04. Shelby tubes were also taken in Boring Z051-RWB-04. We also referenced two nearby structure borings; one designated as 33-RWB-02 drilled by Wang in July 2014 and another designated as B-06 drilled by SEECO Consultants in June 1996 for our evaluations. Wang Piezometer 30-PZ-01 was also used in our evaluations. The as-drilled boring location for Wang's borings station, offset, and elevation information for each boring were 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 to 15 feet depths after that mud rotary was used to the boring termination depth. Soil sampling was performed according to AASHTO T206, "*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 and continuously sampled in hand auger borings. 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 drilling to depths of 10 to 15 feet before using mud rotary method. Due to safety considerations, boreholes were backfilled with grout immediately upon completion. Groundwater levels in the piezometer were recorded autonomously at defined intervals by digital pressure loggers suspended within the water column. Barometric affects are compensated by a second in-air pressure logger installed in the riser pipe. Data is retrieved from loggers periodically, downloaded to a computer for analysis.

3.2 Vane Shear Tests

Wang performed vane shear tests in Boring Z051-RWB-04. Vane shear tests were performed using calibrated RocTest vane shear equipment in undisturbed and remolded conditions. The sensitivity shown on the boring logs is the ratio of shear strength in undisturbed and remolded conditions. In general, the vane shear strength 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 in our analyses.

3.3 Laboratory Testing

The soil samples were tested in the laboratory for moisture content (AASHTO T265). Atterberg limits (AASHTO T89/T90) and particle size analyses (AASHTO T88) tests were performed on selected soil samples representing the main soil layers encountered during the investigation. Shelby tube samples from Boring Z051-RWB-04 were tested for unconfined compressive strength (T208). 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 *Soil Profile* (Exhibit 4), and in the *Laboratory Test Results* (Appendix B).

4.0 RESULTS OF FIELD AND LABORATORY INVESTIGATIONS

Detailed descriptions of the soil conditions encountered by the nearby borings 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

Borings were drilled through existing roadway and ramp pavements, and consisted of 2 to 5 inches of asphalt over 7 to 12 inches of concrete followed by sandy gravel to crushed stone base course. Borings, drilled on the parking lot, encountered 2 inches of asphalt over sandy gravel aggregate base. Hand auger borings, drilled on the existing slope encountered black to brown loam fill. In descending order, the general lithologic succession encountered beneath the pavement structure includes: 1) man-made ground (fill); 2) stiff clay loam to silty clay; 3) very soft to medium stiff clay to silty clay; 4) stiff to hard silty clay to silty clay loam; 5) medium dense to very dense silt to silty loam and sand; and 6) strong dolostone bedrock.

1) *Man-made ground (fill)*

Underneath the pavement structure and at the surface, the borings encountered 2 to 15 feet of fill materials. Granular fill consists of loose to medium dense, grayish white sand to sandy gravel and black to brown loam. Cohesive fill includes soft brown silty clay loam. The granular fill layer has N-values of 4 to greater than 50 blows per foot and moisture content values of 3 to 18%. A high moisture content value of 74% was due to the presence of various debris in Boring Z051-RWB-02. The cohesive fill layer has unconfined compressive strength (Q_u) value of 0.40 tsf and moisture content value of 19%.

2) *Stiff clay loam to silty clay*

Beneath the fill, at elevations of 579 to 587 feet, the borings encountered 2.5- to 8-foot thick stiff to very stiff, brown to gray silty clay loam to silty clay. This layer has Q_u values of 1.23 to 2.5 tsf and moisture content values of 19 to 26%. This layer is commonly known as the “crust.”

3) *Very soft to medium stiff clay to silty clay*

At elevations of 577 to 584 feet, the borings revealed up to 47 feet of very soft to medium stiff, gray clay to silty clay with Rimac Q_u values of 0.08 to 0.82 tsf and moisture content values of 18 to 30%.

Laboratory Unconfined compressive strength (UC) testing on shelly tube samples showed Q_u values of 0.21 to 0.62 tsf. Laboratory index testing on samples from this layer showed liquid limit (L_L) values of 32 to 39% and plastic limit (P_L) values of 17 and 18%. This layer is commonly known as the “Chicago Blue Clay.”

As discussed in Section 3.2, undrained shear strength values from vane shear tests are generally higher than Rimac tests and even higher than Q_u values from the UC tests performed in shelly tubes. In-situ undisturbed vane shear strengths obtained in Boring Z051-RWB-04 between elevations 575 and 544 feet ranged from 560 to 1140 psf or Q_u values of 0.56 to 1.14 tsf.

4) Stiff to hard silty clay to silty clay loam

At elevations of 537 to 547 feet, the borings encountered up to 34 feet of medium stiff to hard silty clay to silty clay loam. The silty clay to silty clay loam has Q_u values of 0.9 to 10.3 tsf and moisture content values of 10 to 25%.

(5) Medium dense to very dense silt to silty loam and sand

At an elevation of 507 feet, Boring 33-RWB-02 encountered medium dense to very dense silt, silty loam and sand. These layers have N values of 24 to over 50 blows per foot extending to top of bedrock. It should be noted that at about 494 feet elevation, the boring encountered hard drilling through possible cobbles and boulders of a hardpan stratum. This stratum required coring to get through it.

(6) Strong dolostone bedrock

Boring 33-RWB-02 encountered strong dolostone bedrock at elevation of 481.5 feet or 112.5 feet bgs. There is a 1.5-foot thick weathered bedrock above it. Based on the 10-foot rock core obtained from the boring, the measured RQD value is 86% corresponding good rock quality. *Bedrock core photograph is shown in Appendix A.*

4.2 Groundwater Conditions

Groundwater was not observed during drilling or after drilling due to the mud rotary drilling from 10 to 15 feet bgs. Hand auger borings were dry during and upon completion of drilling. However, depending on the climate conditions, the groundwater may be perched within the granular fill layers. Water-bearing silt and gravel layers may also be present at deeper levels. A Piezometer 30-PZ-01 was installed at about 700 feet south of the Washington Boulevard on November 21, 2014 and monitored

until March 2017. The screen was placed with the top and bottom elevations at 503.7 and 493.7 feet (89.5 to 99.5 feet bgs), respectively within granular layers above bedrock. Piezometer readings show an average water table elevation of 545.8 feet indicating under hydrostatic pressure within the granular deposit encountered on top of the bedrock.

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 578 and 593 feet elevations within the fill layers.

4.3 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 2012).

5.0 ANALYSIS AND RECOMMENDATIONS

5.1 Retaining Wall Type Evaluation

Based on the TSL plan, the proposed Retaining Wall 52 is a 240-foot long drilled soldier pile wall with maximum retained height of 6.6 feet. The following sections present the results of our geotechnical engineering analyses and recommendations for the drilled soldier pile wall design and construction.

5.2 Drilled Soldier Pile Walls

We recommend drilled soldier piles should be designed for both lateral earth pressure and lateral deformation. The embedment depth in moment equilibrium for the wall section should be designed in accordance with the LRFD guidelines (AASHTO 2017). Generally, overconsolidated clayey soils, such as the stiff to very stiff clays and very dense silty loam will exhibit lower overall shear strength in the long-term condition; normally-consolidated clayey soils, however, such as the very soft to medium stiff clay to silty clay (Chicago blue clay) will likely exhibit significantly lower shear strength in the short-term condition. Therefore, the lateral earth pressure analysis should be performed for walls in both the short-term (undrained) and long-term (drained) condition using the soil parameters shown in Tables 1 and 2.

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 2012). The water pressure should be added to the earth pressure if drainage is not provided. The potential pressure/load from the existing parking lot on the proposed wall must be considered in design of the wall.

Table 1: Short-term (Undrained) Geotechnical Parameters for Design of Drilled Soldier Pile Wall
 (Reference Borings: Z051-RWB-01 thr. Z051-RWB-04, Z051-HA-1 thr. Z051-HA-3, and 33-RWB-02)

Soil Description (Layer)	Unit Weight, γ (pcf)	Undrained Shear Strength Properties		Earth Pressure Coefficients	
		Cohesion (psf)	Friction Angle ($^{\circ}$)	Active ⁽¹⁾ Pressure	Passive Pressure
NEW FILL Proposed Grade to EL 585 feet	120	0	30	0.31	--
Stiff to V Stiff SILTY CLAY EL 585 to 579 feet	120	1800	0	1.00	1.00
V Soft to M Stiff CLAY to SILTY CLAY EL 579 to 562 feet	110	600	0	1.00	1.00
Soft to M Stiff CLAY to SILTY CLAY EL 562 to 552 feet	110	750	0	1.00	1.00
Soft to M Stiff CLAY to SILTY CLAY EL 552 to 542 feet	115	900	0	1.00	1.00
M Stiff to Stiff CLAY to SILTY CLAY EL 542 to 537 feet	120	1200	0	1.00	1.00
Stiff to V Stiff SILTY CLAY to SILTY CLAY LOAM EL 537 to 530 feet	120	1500	0	1.00	1.00
V Stiff SILTY CLAY to SILTY CLAY LOAM EL 530 to 515 feet	125	2500	0	1.00	1.00
Hard SILTY CLAY LOAM to SILTY LOAM EL 515 to 507 feet	125	5000	0	1.00	1.00

Soil Description (Layer)	Unit Weight, γ (pcf)	Undrained Shear Strength Properties		Earth Pressure Coefficients	
		Cohesion (psf)	Friction Angle ($^{\circ}$)	Active ⁽¹⁾ Pressure	Passive Pressure
M Dense to V Dense SILT, SILTY LOAM, SAND EL 507 to 481.5 feet	125	0	36	0.26	3.85

(1) Active earth pressure coefficient for straight backfill.

Table 2: Long-term (Drained) Geotechnical Parameters for Design of Drilled Soldier Pile Wall
 (Reference Borings: Z051-RWB-01 thr. Z051-RWB-04, Z051-HA-1 thr. Z051-HA-3, and 33-RWB-02)

Soil Description (Layer)	Unit Weight, γ (pcf)	Drained Shear Strength Properties		Earth Pressure Coefficients	
		Cohesion (psf)	Friction Angle ($^{\circ}$)	Active ⁽¹⁾ Pressure	Passive Pressure
NEW FILL Proposed Grade to EL 585 feet	120	0	30	0.33	--
Stiff to V Stiff SILTY CLAY EL 585 to 579 feet	120	100	30	0.33	3.00
V Soft to M Stiff CLAY to SILTY CLAY EL 579 to 562 feet	110	0	27	0.38	2.66
Soft to M Stiff CLAY to SILTY CLAY EL 562 to 552 feet	110	0	27	0.38	2.66
Soft to M Stiff CLAY to SILTY CLAY EL 552 to 542 feet	115	0	27	0.38	2.66
M Stiff to Stiff CLAY to SILTY CLAY EL 542 to 537 feet	120	80	29	0.35	2.88
Stiff to V Stiff SILTY CLAY to SILTY CLAY LOAM EL 537 to 530 feet	120	100	30	0.33	3.00
V Stiff SILTY CLAY to SILTY CLAY LOAM EL 530 to 515 feet	125	100	30	0.33	3.00

Soil Description (Layer)	Unit Weight, γ (pcf)	Drained Shear Strength Properties		Earth Pressure Coefficients	
		Cohesion (psf)	Friction Angle ($^{\circ}$)	Active ⁽¹⁾ Pressure	Passive Pressure
Hard SILTY CLAY LOAM to SILTY LOAM EL 515 to 507 feet	125	100	30	0.33	3.00
M Dense to V Dense SILT, SILTY LOAM, SAND EL 507 to 481.5 feet	125	0	36	0.26	3.85

(1) Active earth pressure coefficient for straight backfill

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 3 using the p-y curve (COMP624) method.

Table 3: Recommended Parameters for Lateral Load Analysis of Drilled Soldier Pile Wall
 (Reference Borings: Z051-RWB-01 thr. Z051-RWB-04, Z051-HA-1 thr. Z051-HA-3, and 33-RWB-02)

Soil Type (Layer)	Unit Weight, γ (pcf)	Undrained Shear Strength, c_u (psf)	Estimated Friction Angle, Φ ($^{\circ}$)	Estimated Lateral Soil Modulus Parameter, k (pci)	Estimated Soil Strain Parameter, ϵ_{50} (%)
NEW FILL Proposed Grade to EL 585 feet	120	0	30	30	--
Stiff to V Stiff SILTY CLAY EL 585 to 579 feet	120	1800	0	500	0.7
V Soft to M Stiff CLAY to SILTY CLAY EL 579 to 562 feet	110	600	0	50	1.0
Soft to M Stiff CLAY to SILTY CLAY EL 562 to 552 feet	110	750	0	60	1.0
Soft to M Stiff CLAY to SILTY CLAY EL 552 to 542 feet	115	900	0	80	1.0
M Stiff to Stiff CLAY to SILTY CLAY EL 542 to 537 feet	120	1200	0	500	0.8

Soil Type (Layer)	Unit Weight, γ (pcf)	Undrained Shear Strength, c_u (psf)	Estimated Friction Angle, Φ ($^\circ$)	Estimated Lateral Soil Modulus Parameter, k (pci)	Estimated Soil Strain Parameter, ϵ_{50} (%)
Stiff to V Stiff SILTY CLAY to SILTY CLAY LOAM EL 537 to 530 feet	120	1500	0	500	0.7
V Stiff SILTY CLAY to SILTY CLAY LOAM EL 530 to 515 feet	125	2500	0	1000	0.5
Hard SILTY CLAY LOAM to SILTY LOAM EL 515 to 507 feet	125	5000	0	2000	0.4
M Dense to V Dense SILT, SILTY LOAM, SAND EL 507 to 481.5 feet	125	0	36	120	--

5.2.1 Settlement Analyses

Based on the *cross-section* drawings, to reach the design finished grade at backface of the drilled soldier pile wall, we estimate that up to 7 feet of new regular granular fill will be required creating a surcharge load behind the wall. Our settlement analyses show the soil will undergo less than 1.0 inch of settlement which is generally acceptable for landscaping areas.

5.2.2 Global Stability Analyses

Global stability analysis was performed at Station 8741+25 for the maximum wall retained height of about 16 feet including temporary excavation required for installation of underdrain and facing panel. Analysis was performed with SLIDE *Version 6* computer software. Pile embedment of 4 feet will provide factor of safety (FOS) of 1.6 in the undrained condition and 0.6 in the drained condition which are less than the minimum required FOS of 1.7. We estimate pile embedment at least to elevation of 552 feet is needed to obtain the FOS of 1.7. However, we recommend the pile should not be terminated above elevation of 542 feet due to soft to medium stiff Chicago Blue Clay. The designer should perform the lateral load analyses using earth pressure diagram and allowable deflection to determine the final embedment depth. Details of the global stability analysis are presented in Appendix C.

5.3 Ground Movement Potential

There is an existing wall designated as Wall 20, starting from Washington Boulevard bridge northeast

wingwall with a 148-foot long deteriorating masonry wall and an 85-foot long cast-in-place (CIP) retaining wall with fence supported by metal shell piles. The masonry wall portion is crumbling and is planned to be removed. We recommend providing TSRS to support the adjacent parking lot prior to the removal of the existing masonry wall to ensure no lateral displacements occur on the parking lot.

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 be considered during construction. Any 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.

6.2 Filling and Backfilling

All fill and backfill materials will be as per IDOT *Standard Specification for Road and Bridge Construction* (IDOT 2016).

6.3 Drilled Shaft Encasement

The groundwater is expected to be located within the granular fill soils layer. As a minimum, casing will be required in the upper surficial granular fill soils extending into clay to prevent groundwater from entering the shafts and prevent loss of ground around the shafts. The casing should be socketed a few feet into the clay soil to effectively seal the groundwater infiltration into the drilled shafts. Special care should be taken to prevent loss of ground during shaft installation adjacent to the existing buried utilities. It is recommended to advance the casing ahead of the excavation operation. Groundwater is also expected from granular layers within stiff to hard clay deposit and above the bedrock. Drilled shafts extending through and into these granular soils will require casing and/or a slurry method of excavation.

The soft soil layer with Q_u less than 0.5 tsf (500 psf cohesion) is prone to squeeze if left open for long period of time. Therefore, to minimize the squeeze potential, casing should be provided. Due to high squeeze potential, the following note should appear on the final plans:

'Due to the squeeze potential of the clay soils, the use of temporary casing will be required to properly construct the shafts. Casing may be pulled or remain in place, as determined by the Contractor at no cost to the Department.'

If the casing is not used or concreting in wet shafts, the structural integrity of concrete shaft should be verified by non-destructing integrity testing using the Crosshole Sonic Logging (CSL) method. The IDOT special provision "*Crosshole Sonic Logging*" dated March 9, 2010 or latest edition should be included for this inspection and testing requirements. Wang recommends providing CSL in one drilled shaft for every five soldier-pile drilled shafts.

6.4 Wall Construction

The wall should be constructed as per IDOT *Standard Specification for Road and Bridge Construction* (IDOT 2016).

6.5 Construction Monitoring

Given the proximity of the parking lot and utilities, Wang recommends special precautions should be taken during the construction not to undermine the existing walls, pavements and utilities.

To prevent any damage to the existing parking lot, we recommend establishing survey points on the parking surface and existing masonry wall to monitor the vertical and horizontal movements and installing inclinometers before the Wall 52 construction begins to monitor ground movement.

7.0 QUALIFICATIONS

The analysis and recommendations submitted in this report are based upon the data obtained from previous boring logs obtained near the wall site as shown 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 52 (SN016-Z051) 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.



Metin W. Seyhun, P.E.
Senior Geotechnical Engineer



Nesam S. Balakumaran
Project Geotechnical Engineer

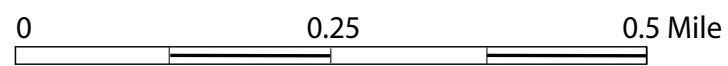
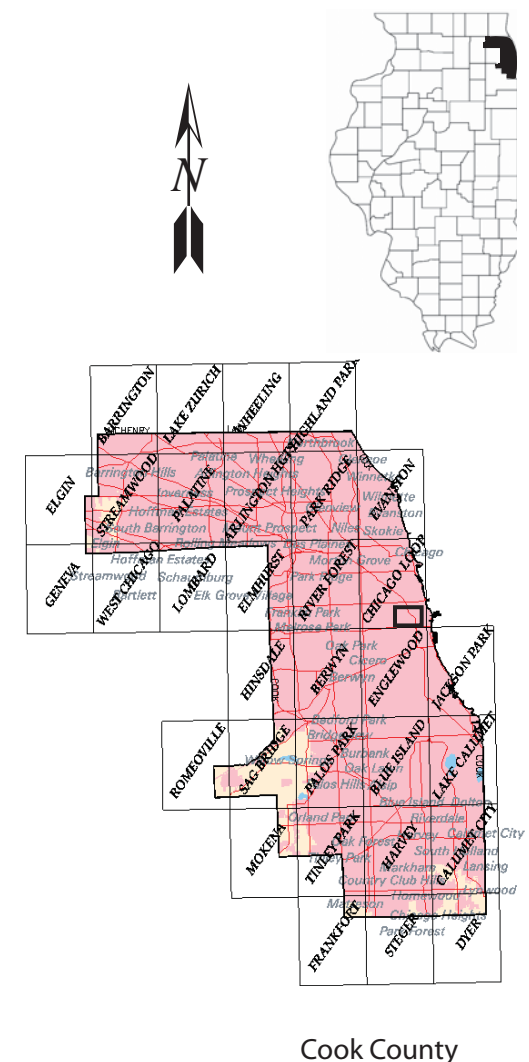



Corina T. Farez, P.E., P.G.
Vice President

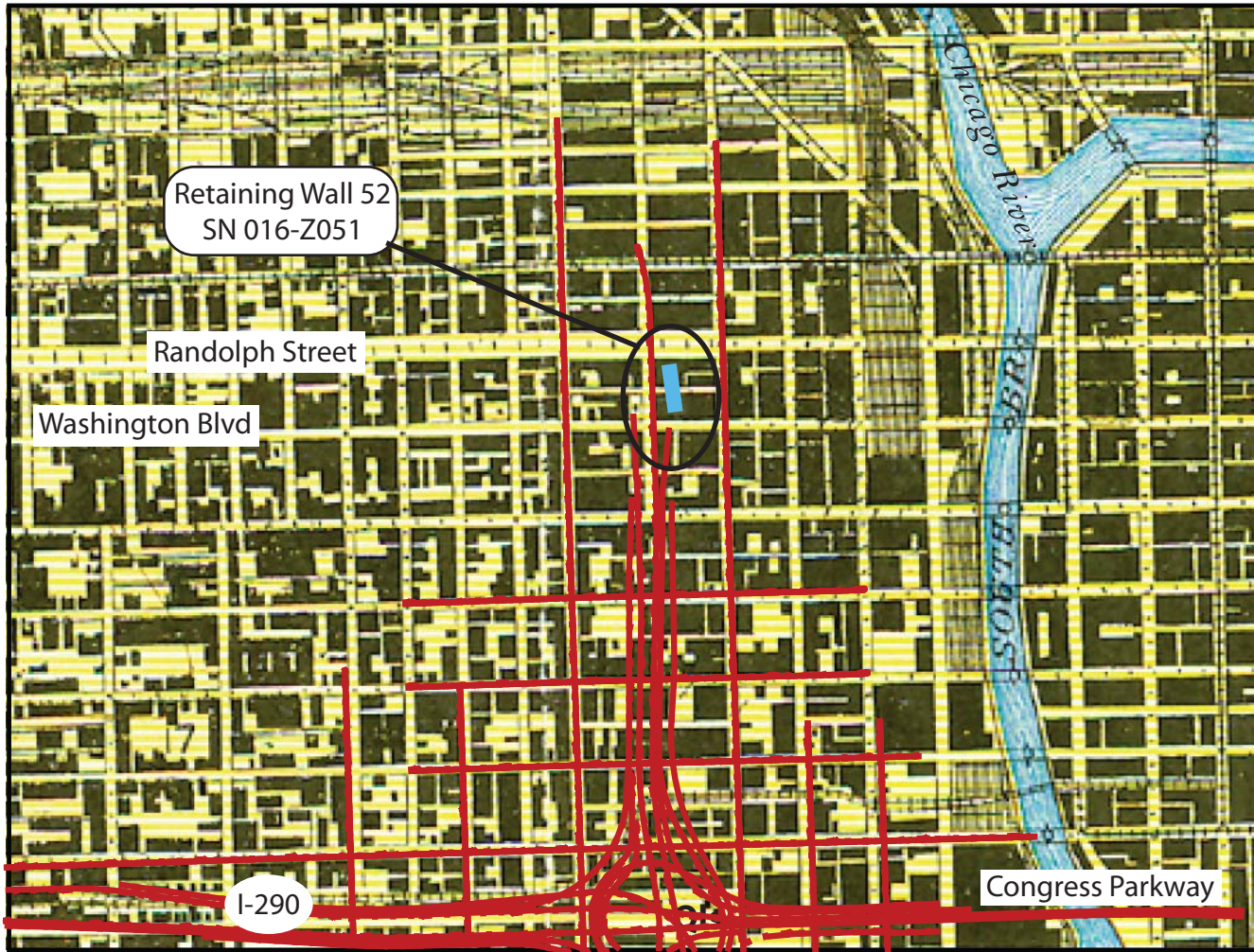
REFERENCES

- AMERICAN ASSOCIATION OF STATE HIGHWAY TRANSPORTATION OFFICIALS (2017) *LRFD Bridge Design Specifications*. United States Department of Transportation, Washington, D.C.
- BAUER, R.A., CURRY, B.B., GRAESE, A.M., VAIDEN, R.C., SU, W.J., and HASEK, M.J., 1991, *Geotechnical Properties of Selected Pleistocene, Silurian, and Ordovician Deposits of Northeastern Illinois*: Environmental Geology 139, Illinois State Geological Survey, 69 p.
- HANSEL, A.K., and JOHNSON, W.H. (1996) *Wedron and Mason Groups: Lithostratigraphic Reclassification of the Wisconsin Episode, Lake Michigan Lobe Area: ISGS Bulletin 104*. Illinois State Geological Survey, Champaign, IL. 116 p.
- LEETARU, H.E., SARGENT, M.L., AND KOLATA, D.R, 2004, *Geologic Atlas of Cook County for Planning Purposes*, ISGS, Champaign, IL
- ILLINOIS DEPARTMENT OF TRANSPORTATION (2015) *Geotechnical Manual*. IDOT Bureau of Materials and Physical Research, Springfield, IL.
- ILLINOIS DEPARTMENT OF TRANSPORTATION (2016) *Standard Specifications for Road and Bridge Construction*. IDOT Division of Highways, Springfield, IL.
- ILLINOIS DEPARTMENT OF TRANSPORTATION (2012) *Bridge Manual*. IDOT Bureau of Bridges and Structures, Springfield, IL.
- WILLMAN, H.B., 1971, *Summary of the Geology of the Chicago Area*, ISGS Circular C460: Urbana, Illinois State Geological Survey, p. 77.
- PECK, R.B., and REED, W.C., 1954, *Engineering Properties of Chicago Subsoils*: University of Illinois Engineering Experiment Station Bulletin No. 423: Urbana, University of Illinois, 62 p.

EXHIBITS



SITE LOCATION MAP: CIRCLE INTERCHANGE RECONSTRUCTION RETAINING WALL 52, SN 016-Z051, COOK COUNTY		
SCALE: GRAPHICAL	EXHIBIT 1	DRAWN BY: NSB CHECKED BY: MWS
		1145 N. Main Street Lombard, IL 60148 www.wangeng.com
FOR AECOM		1100-04-01



Modified after Bretz (1926)



REGIONAL GEOLOGY

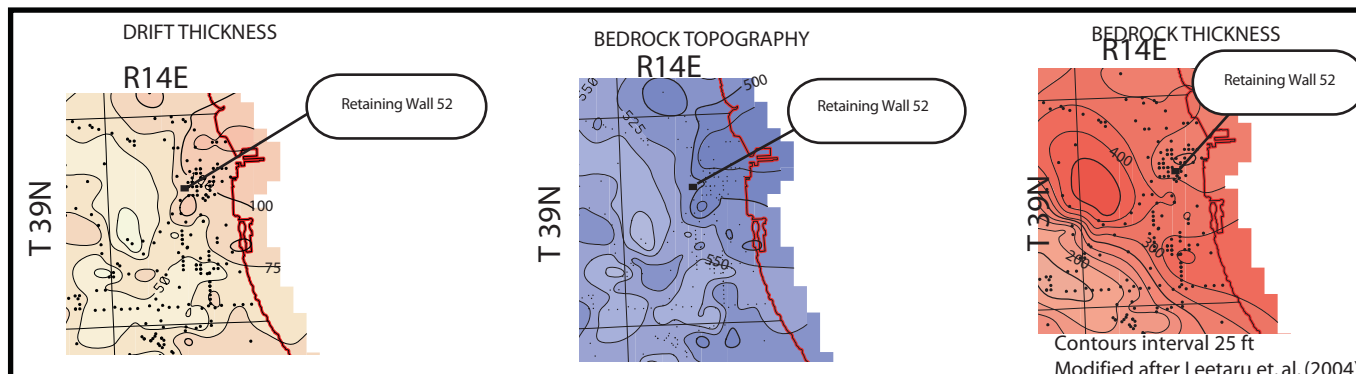


- Wedron Group
- Wadsworth Formation
 - Lemont Formation
 - Tiskilwa Formation

Modified after Hansel and Johnson (1996)

Legend

- Qls
Glacial lake bottom
(Covered by lacustrine deposits)



Contours interval 25 ft
Modified after Leetaru et. al. (2004)

SITE AND REGIONAL GEOLOGY: CIRCLE INTERCHANGE RECONSTRUCTION, RETAINING WALL 52, SN 016-Z051, COOK COUNTY, IL

SCALE: GRAPHICAL

EXHIBIT 2

DRAWN BY: R. KC
CHECKED BY: C. Marin



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

FOR AECOM

1100-04-01

9:18:37 AM P:\AECOM\NA\AWS1\AECOM\LOCAL\AECOM\DS02\NA\DOCUMENTS\01\AMERICAS\TRANSPORTATION\60269938_CIRCLE\PHASE_11\000_CAD\008_STRUCTURE\STRUCTURE_016-Z051\TSL\SHEETS\016Z051-TSL-SHT-001.DGN

Bench Mark: Set "X" on northwest corner of handhole along east edge of SB I-90/94 20 feet north of Madison Street. Elev. 596.13.

Existing Structure: Existing Retaining Wall 20. Masonry wall that measures 148'-0" from Washington Boulevard NE Wingwall north to cast-in-place concrete retaining wall on metal shell piles that measures 84'-9". Existing masonry wall is to be cut to 2' below grade and buried. Existing cast-in-place wall to remain.

Traffic on Randolph Exit Ramp will be detoured during construction.

No Salvage.

- Notes:
- 1.) Wall offsets are measured from the $\text{\textcircled{E}}$ of Randolph Exit Ramp to the front face of cast-in-place fascia panels.
 - 2.) C denotes construction joint.
 - 3.) E denotes expansion joint.
 - 4.) F.F. denotes Front Face.
 - 5.) B.F. denotes Back Face.

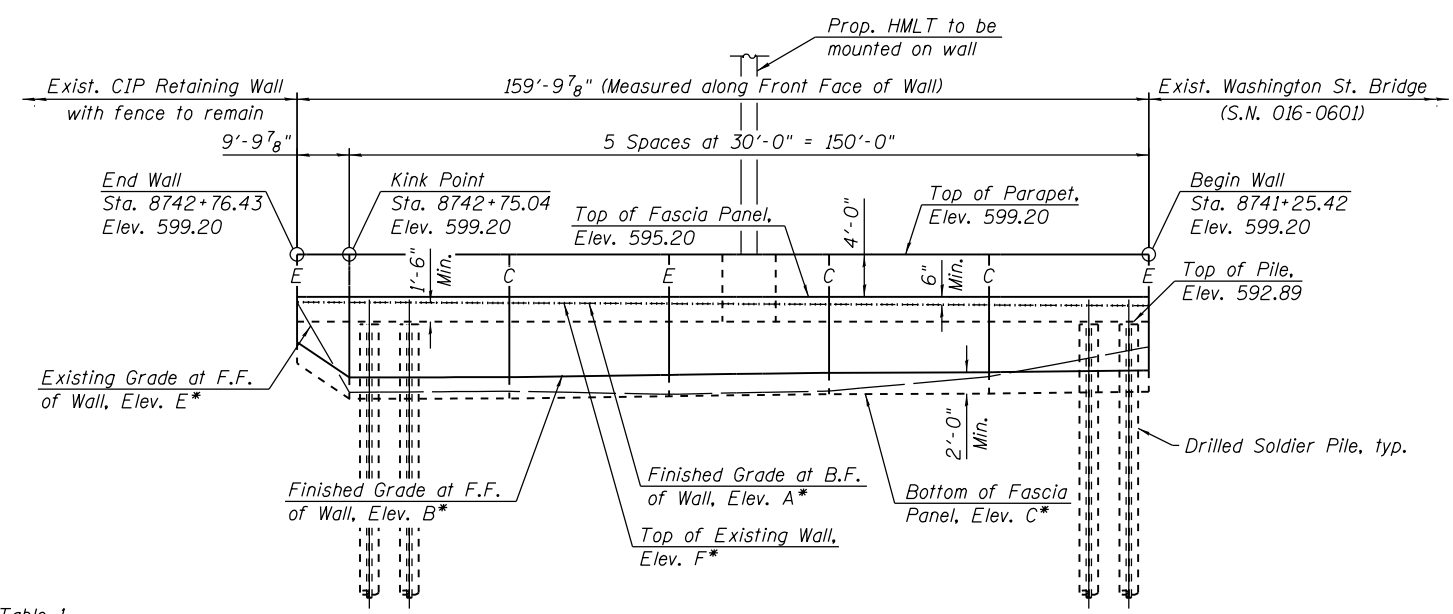
- 6.) Soldier pile section, shaft diameter, spacing and tip elevation to be determined during final design.
- 7.) Stainless Steel Trellises to be installed on the face of the wall. For details, see Typical Cross Section and SS Cable Wall Mount Unit Detail on Sheet 2 of 2.
- 8.) Proposed drainage information shown is conceptual and will be determined during final design.

CURVE DATA
(Randolph Exit Ramp)
Prop. Curve P-RAN-NX-1
P.I. Sta. = 8741+73.99
 $\Delta = 2^\circ 55' 46''$ (RT)
D = $1^\circ 49' 50''$
R = 3,130.00'
T = 80.03'
L = 160.03'
E = 1.02'
e = NA
T.R. = NA
S.E. Run = NA
P.C. Sta. = 8740+93.96
P.T. Sta. = 8742+53.98

HIGHWAY CLASSIFICATION

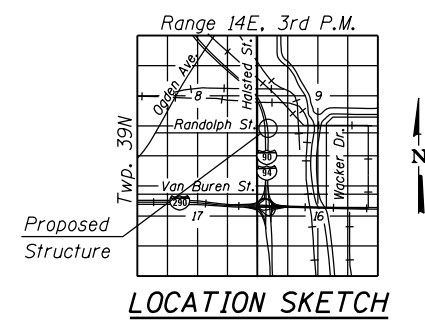
Randolph Exit Ramp
Functional Class: Interstate
ADT: 2,400 (2012); 3,000 (2040)
ADTT: 99 (2012); 123 (2040)
DHW: 340 (2040)
Design Speed: 30 m.p.h.
Posted Speed: 30 m.p.h.
One-Way Traffic
Directional Distribution: 100%

NB Lake Exit Ramp
Functional Class: Interstate
ADT: 8,200 (2012); 9,000 (2040)
ADTT: 312 (2012); 342 (2040)
DHW: 740 (2040)
Design Speed: 30 m.p.h.
Posted Speed: 30 m.p.h.
One-Way Traffic
Directional Distribution: 100%



* For elevations, see Table 1 on Sheet 2 of 2.

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



LOCATION SKETCH

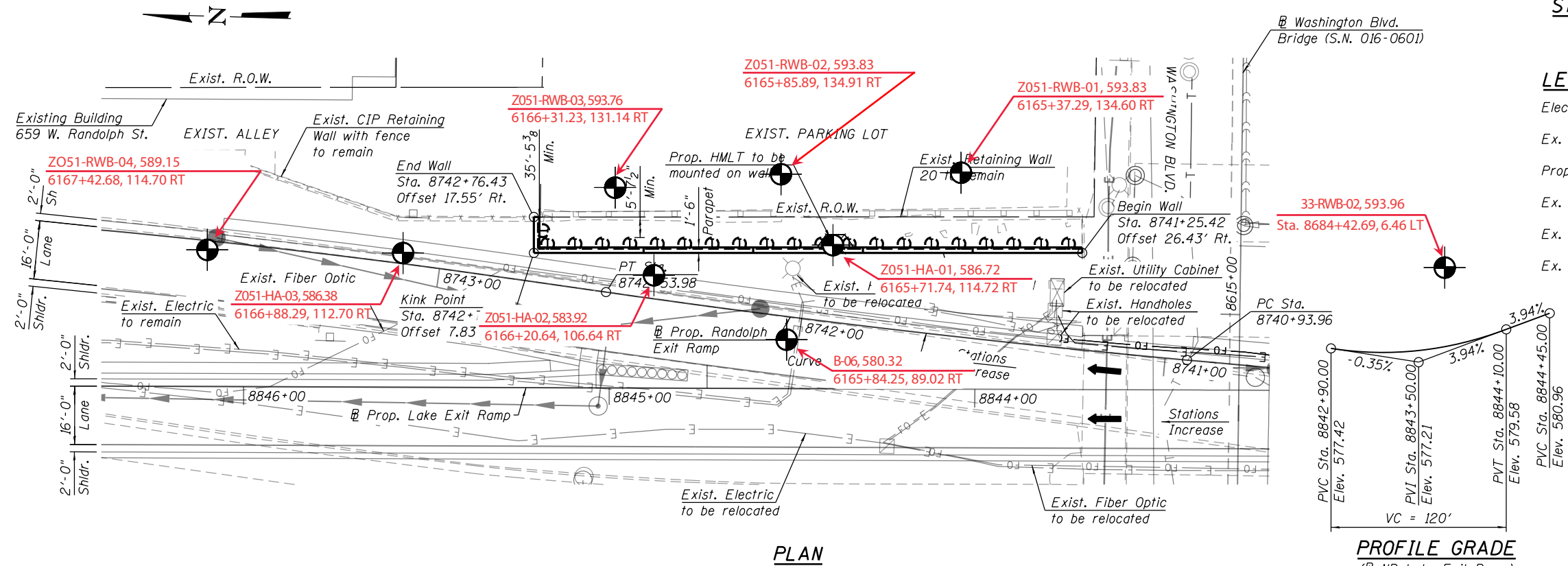
DESIGN SPECIFICATIONS
2017 AASHTO LRFD Bridge Design Specifications 8th Edition

DESIGN STRESSES

FIELD UNITS
 $f'_c = 3,500$ psi
 $f_y = 60,000$ psi (Reinforcement)

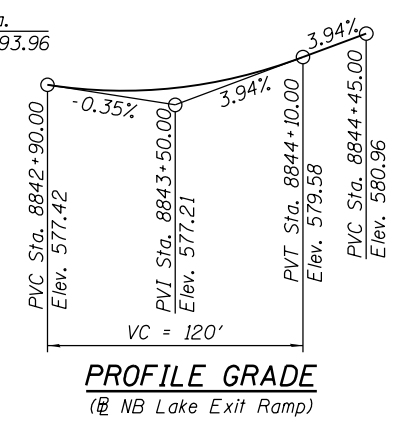
SOLDIER PILES
 $f_y = 50,000$ psi (AASHTO M270 Gr. 50)

GENERAL PLAN
RETAINING WALL 52 ALONG RANDOLPH EXIT RAMP
F.A.I. RTE. 90/94 (KENNEDY EXPRESSWAY)
SECTION 2015-019R
COOK COUNTY
STATION 8741+25.42 TO STATION 8742+76.43
STRUCTURE NO. 016-Z051



LEGEND:

Electric	— E —	Soil Boring	$\text{\textcircled{+}}$
Ex. Storm Sewer	— S —	Existing Catch Basin	$\text{\textcircled{O}}$
Prop. Storm Sewer	— S —	Proposed Catch Basin	$\text{\textcircled{●}}$
Ex. Telephone	— T —	Existing Manhole	$\text{\textcircled{○}}$
Ex. Fiber Optic	— FO —	Proposed Manhole	$\text{\textcircled{●}}$
Ex. Fence	— X — X —	Proposed Inlet	$\text{\textcircled{+}}$



PROFILE GRADE
(@ NB Lake Exit Ramp)

BORING LOCATION PLAN: RETAINING WALL 52 ALONG RANDOLPH EXIT RAMP, SEC. 2015-019R, SN. 016-Z051, COOK COUNTY, IL

SCALE: GRAPHICAL

EXHIBIT 3

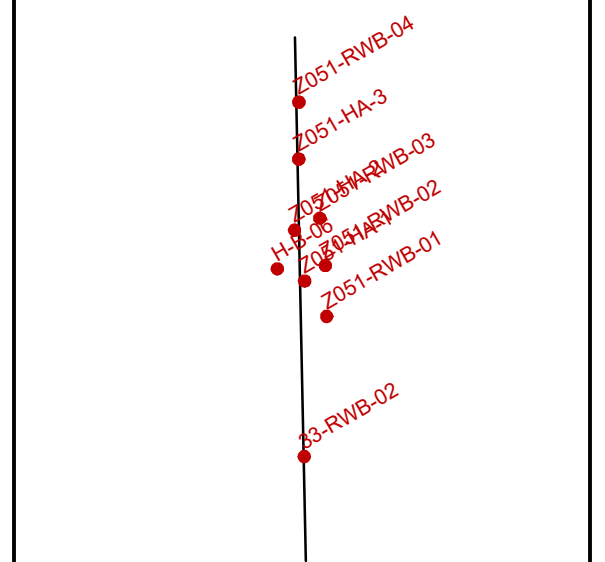
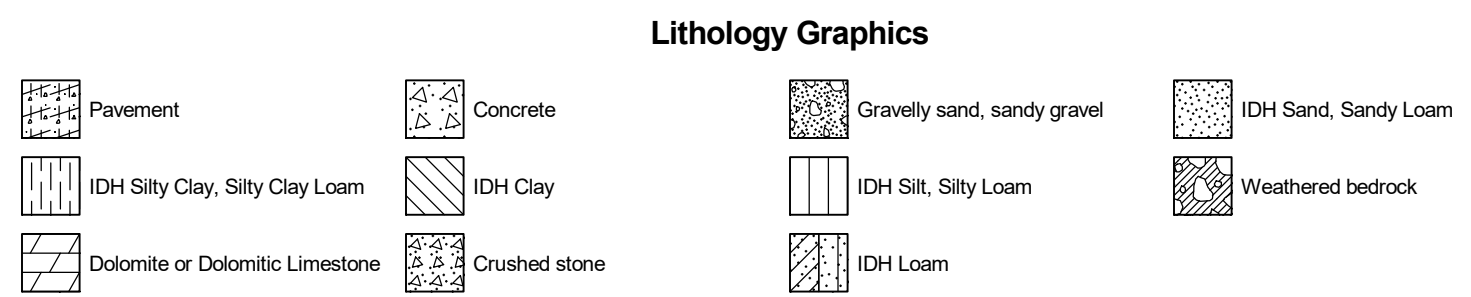
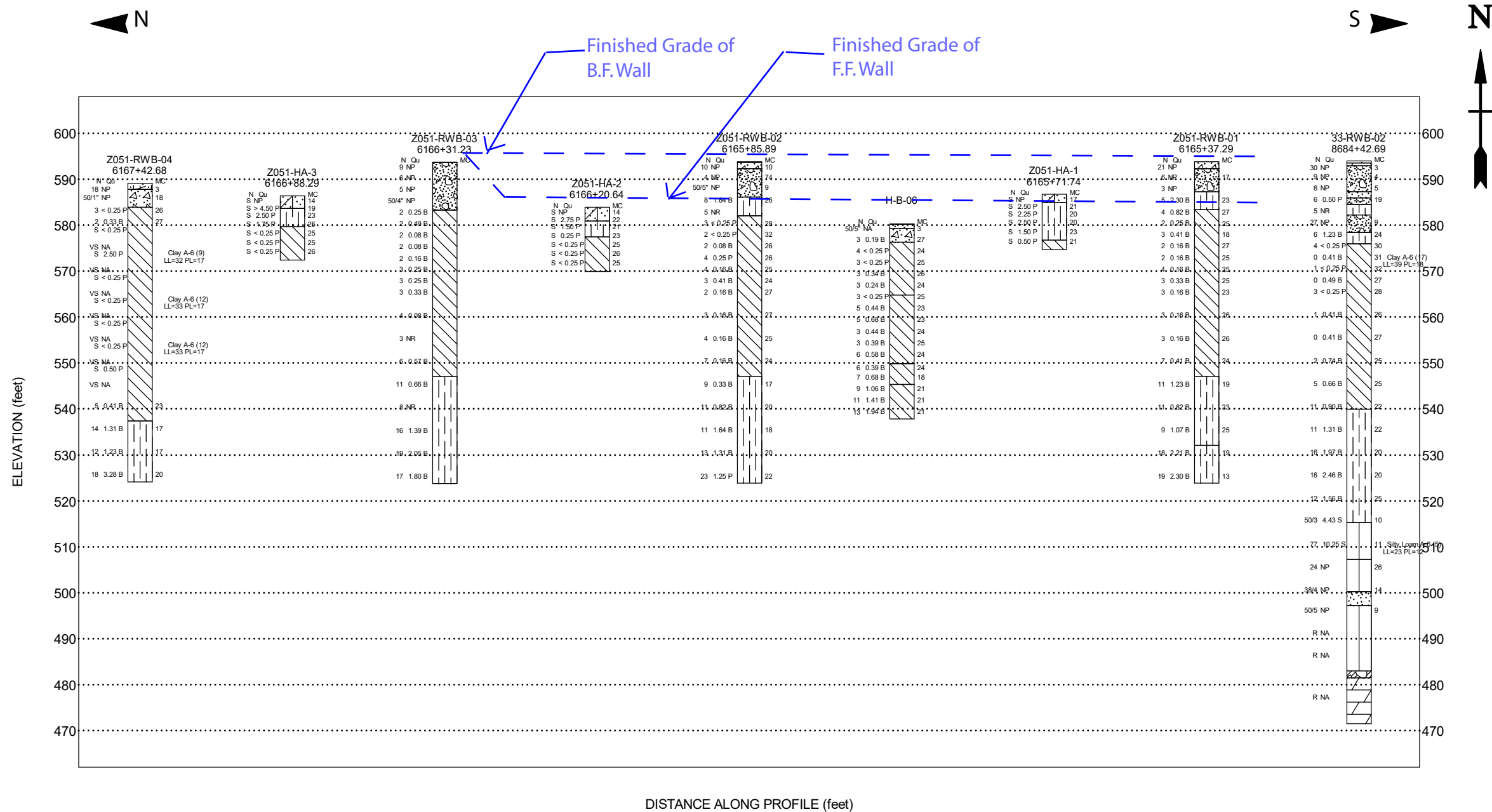
DRAWN BY: RKC
CHECKED BY: N. Balakumaran

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

FOR AECOM

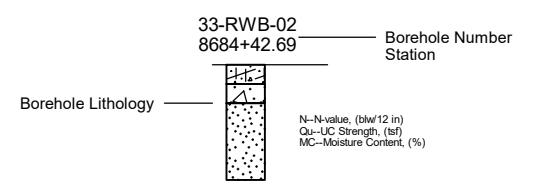
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WEI 11X17 11000401.GPJ BEARING-TRIAL_GDT 7/24/19

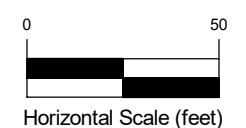


Site Map Scale 1 inch equals 185 feet

Explanation:



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



Vertical Exaggeration: 2x

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

Soil Profile Retaining Wall 52; SN 016-Z051



Jane Byrne Interchange
Section 17, T39N, R14E of 3rd PM

JOB NUMBER	PLATE NUMBER
1100-04-01	EXHIBIT 4

APPENDIX A



BORING LOG 33-RWB-02

wangeng@wangeng.com
 1145 N Main Street
 Lombard, IL 60148
 Telephone: 630 953-9928
 Fax: 630 953-9938

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 593.96 ft
 North: 1900708.05 ft
 East: 1171630.08 ft
 Station: 8684+42.69
 Offset: 6.4626 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	593.5	5-inch thick ASPHALT --PAVEMENT--															
	593.0	7-inch thick CONCRETE --PAVEMENT--															
		Medium dense, grayish white SANDY GRAVEL --FILL--			1	7 13 17	NP	3						9	0 0 0	0.41 B	31
					2	8 5 4	NP	4						10	0 0 1	< 0.25 P	32
	587.3	Loose, brown, fine SAND, trace gravel --FILL--			3	3 3 3	NP	5						11	0 0 0	0.49 B	27
	586.0	Grayish white SANDY GRAVEL --FILL--			4	3 3 3	0.50 P	19						12	0 1 2	< 0.25 P	28
	584.5	Medium stiff, brown SILTY CLAY LOAM, trace gravel --FILL--	10		5	3 2 3	NR										
	582.2	Medium dense, grayish white SANDY GRAVEL --FILL--			6	8 11 16	NP	9						13	0 0 1	0.41 B	26
	578.5	Stiff, brown and gray SILTY CLAY LOAM to SILTY CLAY, trace gravel			7	1 2 4	1.23 B	24									
	576.0	Very soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel			8	1 2 2	< 0.25 P	30						14	0 0 0	0.41 B	27

--L_L(%)=39, P_L(%)=18--
 --%Gravel=5.1--
 --%Sand=13.2--
 --%Silt=42.2--
 --%Clay=39.5--
 --A-6 (17)--

GENERAL NOTES

WATER LEVEL DATA

Begin Drilling **07-01-2014** Complete Drilling **07-02-2014**
 Drilling Contractor **Wang Testing Services** Drill Rig **D-50 TMR [78%]**
 Driller **R&J** Logger **S. Woods** Checked by **C. Marin**
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

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.

WANGENGINC 11000401.GPJ WANGENG.GDT 7/26/19



BORING LOG 33-RWB-02

wangeng@wangeng.com
 1145 N Main Street
 Lombard, IL 60148
 Telephone: 630 953-9928
 Fax: 630 953-9938

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 593.96 ft
 North: 1900708.05 ft
 East: 1171630.08 ft
 Station: 8684+42.69
 Offset: 6.4626 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	540.0	Stiff to very stiff, gray SILTY CLAY, trace gravel	45	✓	15	0 0 2	0.74 B	25		65	Hard, gray SILTY LOAM, trace gravel	65	✓	19	3 7 9	1.97 B	20
	50		✓	16	0 1 4	0.66 B	25	70		✓		20	3 7 9	2.46 B	20		
	55		✓	17	2 7 4	0.90 B	22	75		✓		21	2 5 7	1.56 B	25		
	60		✓	18	1 5 6	1.31 B	22	80		✓		22	39 50/3	4.43 S	10		

GENERAL NOTES

Begin Drilling **07-01-2014** Complete Drilling **07-02-2014**
 Drilling Contractor **Wang Testing Services** Drill Rig **D-50 TMR [78%]**
 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 **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.

WANGENGINC 11000401.GPJ WANGENG.GDT 7/26/19



BORING LOG 33-RWB-02

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 1145 N Main Street
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 Telephone: 630 953-9928
 Fax: 630 953-9938

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 593.96 ft
 North: 1900708.05 ft
 East: 1171630.08 ft
 Station: 8684+42.69
 Offset: 6.4626 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		--L ₁ (%)=23, P ₁ (%)=12-- --%Gravel=6.9-- --%Sand=20.1-- --%Silt=57.0-- --%Clay=15.9-- --A-6 (5)--			23	24 37 40	10.25 S	11			--HARD DRILLING-- --possible hardpan-- Run 1 - RECOVERY = 0% RQD = 0%	105		1			
	507.2	Medium dense, gray SILT --wet--			24	10 10 14	NP	26			--possible hardpan-- Run 2 - RECOVERY = 0% RQD = 0%	110		2			
	500.2	Very stiff, brown, fine SAND and SILT --wet--	95		25	22 44 38/4	NP	14		483.0	--HARD DRILLING-- --frequent rig chatter-- --possible WEATHERED BEDROCK--	115					
	497.2	Very dense, gray SILTY LOAM, trace gravel --damp-- --Dolostone fragments-- --possible cobbles and boulders--	100		26	50/5	NP	9		481.5	Strong, light gray, good rock mass quality, bedded fresh DOLOSTONE, up to 20-inch beds, 9-inch spaced joints, horizontal joints with none or less than <0.2-inch infilling, hard joint wall, with stylolitic surfaces, and moderately vuggy porosity. Run 3 - RECOVERY = 100% RQD = 86%	120		3			

GENERAL NOTES

Begin Drilling **07-01-2014** Complete Drilling **07-02-2014**
 Drilling Contractor **Wang Testing Services** Drill Rig **D-50 TMR [78%]**
 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 **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.

WANGENGINC 11000401.GPJ WANGENG.GDT 7/26/19



BORING LOG 33-RWB-02

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 1145 N Main Street
 Lombard, IL 60148
 Telephone: 630 953-9928
 Fax: 630 953-9938

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 593.96 ft
 North: 1900708.05 ft
 East: 1171630.08 ft
 Station: 8684+42.69
 Offset: 6.4626 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		--drilling water loss--															
	471.5	Boring terminated at 122.50 ft															
			125														
			130														
			135														
			140														

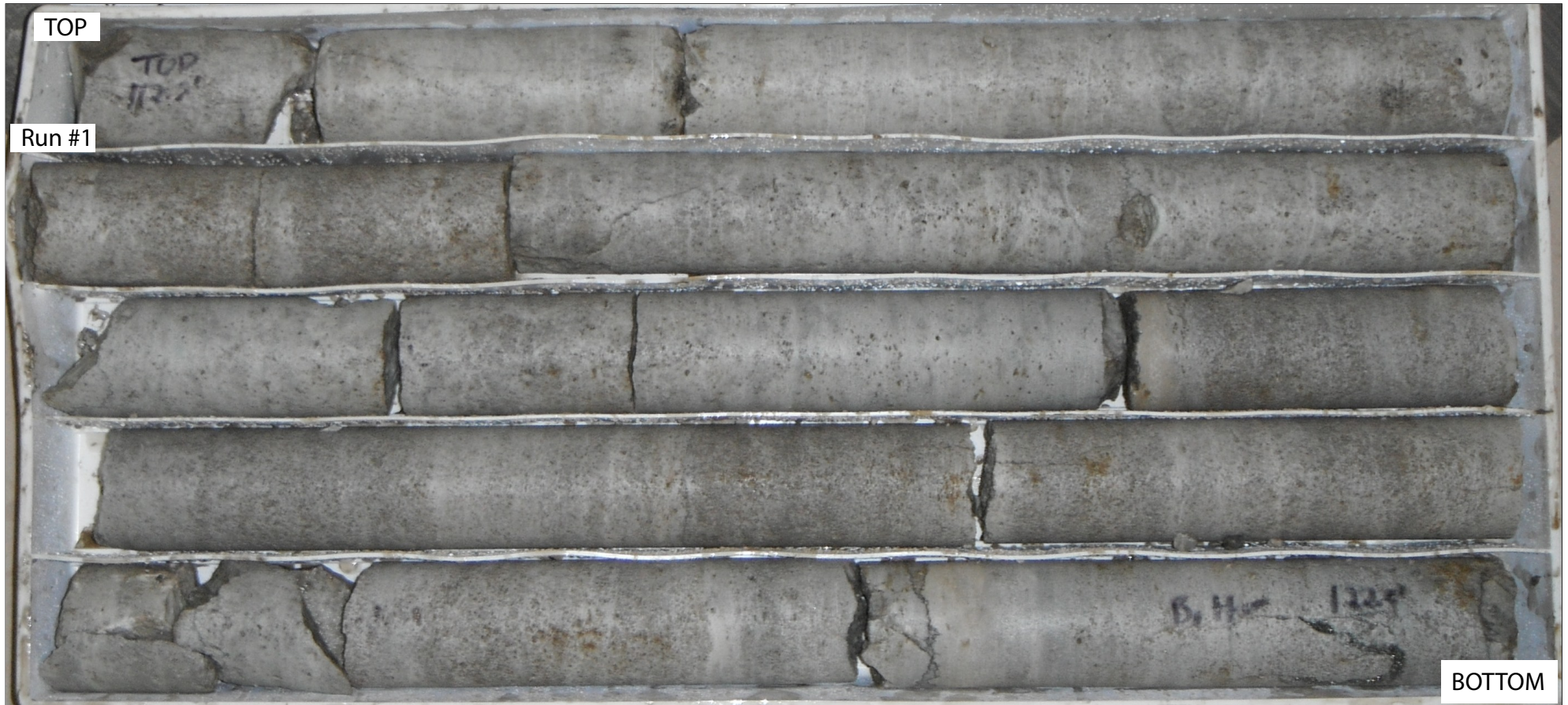
GENERAL NOTES

WATER LEVEL DATA

Begin Drilling **07-01-2014** Complete Drilling **07-02-2014**
 Drilling Contractor **Wang Testing Services** Drill Rig **D-50 TMR [78%]**
 Driller **R&J** Logger **S. Woods** Checked by **C. Marin**
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**


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.



0 3 6 9 12 inch

Boring 33-RWB-02:
Run #1, 112.5' to 122.5', RECOVERY = 100% , RQD = 86%

BEDROCK CORE: CIRCLE INTERCHANGE RECONSTRUCTION CHICAGO, IL		
SCALE : GRAPHIC	33-RWB-02	DRAWN BY: A. HAPPEL CHECKED BY: C. Marin
		1145 N. Main Street Lombard, IL 60148 www.wangeng.com
FOR AECOM		1100-04-01



BORING LOG Z051-HA-01

wangeng@wangeng.com
 1145 N Main Street
 Lombard, IL 60148
 Telephone: 630 953-9928
 Fax: 630 953-9938

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 586.72 ft
 North: 1900875.70 ft
 East: 1171630.53 ft
 Station: 6165+71.74
 Offset: 114.72 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	585.0	Black to brown, LOAM, little gravel, trace organics; damp --FILL--			1	P U S H	NP	17									
		Stiff to very stiff, gray SILTY CLAY, trace gravel; damp			2	P U S H	2.50 P	21									
			5		3	P U S H	2.25 P	20									
					4	P U S H	2.50 P	20									
					5	P U S H	1.50 P	23									
	576.7			10													
	574.7	Medium stiff, gray CLAY to SILTY CLAY, trace gravel; damp			6	P U S H	0.50 P	21									
		Boring terminated at 12.00 ft															
			15														
			20														

GENERAL NOTES

WATER LEVEL DATA

Begin Drilling **06-30-2019** Complete Drilling **06-30-2019**
 Drilling Contractor **Wang Testing Services** Drill Rig **Geoprobe HA**
 Driller **M&A** Logger **M. Sadowski** Checked by **C. Marin**
 Drilling Method **1" IDA Pneumatic Geoprobe LB Sampler**

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 Z051-HA-02

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 583.92 ft
 North: 1900924.31 ft
 East: 1171620.89 ft
 Station: 6166+20.64
 Offset: 106.64 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		Black and gray, LOAM, some gravel and brick fragments, trace organic matter; damp --FILL--			1	PUSH	NP	14									
	580.9	Stiff to very stiff, gray, SILTY CLAY LOAM, trace gravel; damp --FILL--			2	PUSH	2.75 P	22									
			5		3	PUSH	1.50 P	21									
	577.4	Very soft, gray, CLAY to SILTY CLAY, trace gravel; damp to moist			4	PUSH	0.25 P	23									
					5	PUSH	< 0.25 P	25									
			10		6	PUSH	< 0.25 P	26									
					7	PUSH	< 0.25 P	25									
	569.9	Boring terminated at 12.00 ft	15														

GENERAL NOTES

Begin Drilling **06-30-2019** Complete Drilling **06-30-2019**
 Drilling Contractor **Wang Testing Services** Drill Rig **Geoprobe HA**
 Driller **M&A** Logger **M. Sadowski** 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.



BORING LOG Z051-HA-03

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WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 586.38 ft
 North: 1900992.12 ft
 East: 1171624.78 ft
 Station: 6166+88.29
 Offset: 112.70 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		Black and brown, LOAM, some gravel, trace organic matter; damp --FILL--			1	PUSH	NP	14									
	583.6	Stiff to hard, gray, SILTY CLAY LOAM, trace gravel; damp			2	PUSH	> 4.50 P	19									
			5		3	PUSH	2.50 P	23									
	579.6	Very soft, gray, CLAY to SILTY CLAY, trace gravel; damp to moist			4	PUSH	1.75 P	25									
					5	PUSH	< 0.25 P	25									
			10		6	PUSH	< 0.25 P	25									
					7	PUSH	< 0.25 P	26									
	572.4	Boring terminated at 14.00 ft	15														
			20														

GENERAL NOTES

Begin Drilling **06-30-2019** Complete Drilling **06-30-2019**
 Drilling Contractor **Wang Testing Services** Drill Rig **Geoprobe HA**
 Driller **M&A** Logger **M. Sadowski** 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.



BORING LOG Z051-RWB-01

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WEI Job No.: 1100-04-01

Client **AECOM**
 Project **Jane Byrne Interchange**
 Location **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88
 Elevation: 593.83 ft
 North: 1900841.90 ft
 East: 1171651.51 ft
 Station: 6165+37.29
 Offset: 134.60 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)		
	592.3	Medium dense, black GRAVELLY coarse SAND; damp --AGGREGATE-- --FILL-- --RDR 3--	8	X	1	8 10 11	NP												
		Loose, gray and brown SANDY GRAVEL, brick fragments; damp --FILL-- --RDR 3 to 4--	4	X	2	4 3 3	NP	17											
		Very stiff, gray SILTY CLAY, trace gravel; damp to moist --RDR 2--	2	X	3	2 1 2	NP												
			2	X	4	2 2 3	2.30 B	23											
		Very soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel; damp to moist --RDR 2--	1	X	5	1 2 2	0.82 B	27											
			1	X	6	1 1 1	0.25 B	25											
			1	X	7	1 1 2	0.41 B	18											
			1	X	8	1 1 1	0.16 B	27											
	587.2																		

GENERAL NOTES

WATER LEVEL DATA

Begin Drilling **07-02-2019** Complete Drilling **07-02-2019**
 Drilling Contractor **Wang Testing Services** Drill Rig **B-57 TMR [91%]**
 Driller **N&A** Logger **M. Sadowski** Checked by **C. Marin**
 Drilling Method **3.25" IDA HSA, boring backfilled upon completion**

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.

WANGENGINC 11000401.GPJ WANGENG.GDT 7/26/19



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WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 593.83 ft
 North: 1900841.90 ft
 East: 1171651.51 ft
 Station: 6165+37.29
 Offset: 134.60 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	532.1									532.1	Very stiff, gray, damp SILTY CLAY, trace gravel --RDR 2--						
			45		15	2 2 5	0.41 B	24				65		19	5 8 10	2.21 B	19
	547.1	Medium stiff to stiff, gray SILTY CLAY, trace gravel; damp to moist --RDR 2--								523.8							
			50		16	3 5 6	1.23 B	19		523.8	Boring terminated at 70.00 ft	70		20	5 8 11	2.30 B	13
			55		17	3 4 7	0.82 B	23				75					
			60		18	3 4 5	1.07 B	25				80					

GENERAL NOTES

WATER LEVEL DATA

Begin Drilling **07-02-2019** Complete Drilling **07-02-2019**
 Drilling Contractor **Wang Testing Services** Drill Rig **B-57 TMR [91%]**
 Driller **N&A** Logger **M. Sadowski** Checked by **C. Marin**
 Drilling Method **3.25" IDA HSA, boring backfilled upon completion**

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.

WANGENGINC 11000401.GPJ WANGENG.GDT 7/26/19



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WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 593.83 ft
 North: 1900890.48 ft
 East: 1171650.26 ft
 Station: 6165+85.89
 Offset: 134.91 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	593.62	2-inch thick, ASPHALT --PAVEMENT--															
	592.3	Medium dense, black and gray, coarse SAND, trace gravel; damp --AGGREGATE BASE-- --RDR 2--			1	8 5 5	NP	10						9	1 2 2	0.25 P	26
		Loose to very dense, brown SANDY GRAVEL, some crushed concrete, brick fragments, debris; damp --FILL-- --RDR 2 to 3--			2	7 3 1	NP	74				25		10	1 2 2	0.16 B	25
					3	44 50/5"	NP	9						11	1 1 2	0.41 B	24
	586.1	Very stiff, gray SILTY CLAY, trace gravel; damp --RDR 3--			4	7 4 4	1.64 B	26						12	1 1 1	0.16 B	27
	582.1	Very soft to soft, gray CLAY to SILTY CLAY, trace gravel; damp to moist --RDR 2--			5	5 3 2	NR										
					6	2 1 2	< 0.25 P	28						13	1 1 2	0.16 B	27
					7	1 1 1	< 0.25 P	32									
					8	0 1 1	0.08 B	26						14	2 2 2	0.16 B	25

GENERAL NOTES

Begin Drilling **07-02-2019** Complete Drilling **07-02-2019**
 Drilling Contractor **Wang Testing Services** Drill Rig **B-57 TMR [91%]**
 Driller **N&A** Logger **M. Sadowski** Checked by **C. Marin**
 Drilling Method **3.25" IDA HSA, boring backfilled upon completion**

WATER LEVEL DATA

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

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

WANGENGINC 11000401.GPJ WANGENG.GDT 7/26/19



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WEI Job No.: 1100-04-01

Client **AECOM**
 Project **Jane Byrne Interchange**
 Location **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88
 Elevation: 593.83 ft
 North: 1900890.48 ft
 East: 1171650.26 ft
 Station: 6165+85.89
 Offset: 134.91 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	547.1	Medium stiff to stiff, gray SILTY CLAY to SILTY CLAY LOAM, trace gravel; damp --RDR 2--	45		15	2 3 4	0.16 B	24		523.8	Boring terminated at 70.00 ft	65		19	5 6 7	1.31 B	20
	50			16	4 4 5	0.33 B	17		70			20	6 10 13	1.25 P	22		
	55			17	4 4 7	0.82 B	20		75								
	60			18	4 5 6	1.64 B	18		80								

GENERAL NOTES

WATER LEVEL DATA

Begin Drilling **07-02-2019** Complete Drilling **07-02-2019**
 Drilling Contractor **Wang Testing Services** Drill Rig **B-57 TMR [91%]**
 Driller **N&A** Logger **M. Sadowski** Checked by **C. Marin**
 Drilling Method **3.25" IDA HSA, boring backfilled upon completion**

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.

WANGENGINC 11000401.GPJ WANGENG.GDT 7/26/19



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WEI Job No.: 1100-04-01

Client **AECOM**
 Project **Jane Byrne Interchange**
 Location **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88
 Elevation: 593.76 ft
 North: 1900935.68 ft
 East: 1171645.04 ft
 Station: 6166+31.23
 Offset: 131.14 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	593.62	2-inch thick, ASPHALT --PAVEMENT--															
		Loose to very dense, brown, damp SANDY GRAVEL, few brick fragments and crushed asphalt			1	5 4 5	NP	10						9	1 1 1	0.16 B	26
		--FILL-- --RDR 3 to 5--			2	5 4 2	NP	19				25		10	1 1 2	0.25 B	25
					3	5 2 3	NP	18						11	1 1 2	0.25 B	26
					4	50/4"	NP	5				30		12	1 1 2	0.33 B	26
	583.3	Very soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel; damp			5	0 1 1	0.25 B	28									
		--RDR 2 to 3--			6	2 1 1	0.49 B	29				35		13	1 2 2	0.08 B	26
					7	0 1 1	0.08 B	27									
					8	1 1 1	0.08 B	28				40		14	1 1 2	NR	

GENERAL NOTES

Begin Drilling **07-11-2019** Complete Drilling **07-11-2019**
 Drilling Contractor **Wang Testing Services** Drill Rig **B-57 TMR [91%]**
 Driller **N&A** Logger **M. Sadowski** Checked by **C. Marin**
 Drilling Method **4.25" HSA to 15', 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.

WANGENGINC 11000401.GPJ WANGENG.GDT 7/26/19



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WEI Job No.: 1100-04-01

Client **AECOM**
 Project **Jane Byrne Interchange**
 Location **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88
 Elevation: 593.76 ft
 North: 1900935.68 ft
 East: 1171645.04 ft
 Station: 6166+31.23
 Offset: 131.14 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	
	547.0	Medium stiff to very stiff, gray SILTY CLAY to SILTY CLAY LOAM, trace gravel; damp --RDR 2--	45	X	15	1 2 4	0.57 B	25				65	X	19	5 8 11	2.05 B	21	
			50	X	16	3 4 7	0.66 B	16				70	X	20	8 8 9	1.80 B	23	
				55	○	17	3 3 5	NR					75					
				60	X	18	5 7 9	1.39 B	18				80					
										523.8	Boring terminated at 70.00 ft							

GENERAL NOTES

Begin Drilling **07-11-2019** Complete Drilling **07-11-2019**
 Drilling Contractor **Wang Testing Services** Drill Rig **B-57 TMR [91%]**
 Driller **N&A** Logger **M. Sadowski** Checked by **C. Marin**
 Drilling Method **4.25" HSA to 15', 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.

WANGENGINC 11000401.GPJ WANGENG.GDT 7/26/19



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WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 589.15 ft
 North: 1901046.55 ft
 East: 1171625.03 ft
 Station: 6167+42.68
 Offset: 114.70 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	
	587.8	4-inch thick, ASPHALT over 12-inch thick, CONCRETE --PAVEMENT--									--S _u undis = 1141.9 psf-- --S _u remold = 797.2 psf-- --Sensitivity = 1.4--			9				
		Medium dense to very dense, brown to gray CRUSHED STONE and concrete; dry --FILL--			1	9 10 8	NP	3										
					2	5 9	NP	18										
	583.9	Very soft to soft, gray CLAY to SILTY CLAY, trace gravel; damp to moist --RDR 2--			3	2 1 2	< 0.25 P	26			--In-Situ Vane Shear, 24.5 feet-- --S _u undis = 840.3 psf-- --S _u remold = 452.7 psf-- --Sensitivity = 1.9-- --Q _u =0.62 tsf (UC test) --L _L (%)=32, P _L (%)=17-- --%Gravel=3.7-- --%Sand=14.7-- --%Silt=46.6-- --%Clay=35.0-- --A-6 (12)--			10 11				
					4	1 1 1	0.33 B	27			--In-Situ Vane Shear, 29.5 feet-- --S _u undis = 904.9 psf-- --S _u remold = 474.0 psf-- --Sensitivity = 1.9--			12				
					5		< 0.25 P	27						13				
					6						--In-Situ Vane Shear, 14.5 feet-- --S _u undis = 560.2 psf-- --S _u remold = 301.6 psf-- --Sensitivity = 1.9-- --Q _u =0.21 tsf (UC test) --L _L (%)=32, P _L (%)=17-- --%Gravel=6.8-- --%Sand=20.1-- --%Silt=43.4-- --%Clay=29.7-- --A-6 (9)--			14				
					7		0.25 P	26			--In-Situ Vane Shear, 34.5 feet-- --S _u undis = 667.9 psf-- --S _u remold = 344.7 psf-- --Sensitivity = 1.9-- --Q _u =0.31 tsf (UC test) --L _L (%)=33, P _L (%)=17-- --%Gravel=2.9-- --%Sand=13.8-- --%Silt=47.8-- --%Clay=35.5-- --A-6 (12)--			15				
					8						--In-Situ Vane Shear, 19.5 feet--			16				
											--In-Situ Vane Shear, 39.5 feet--							

GENERAL NOTES

WATER LEVEL DATA

Begin Drilling **06-30-2019** Complete Drilling **06-30-2019**
 Drilling Contractor **Wang Testing Services** Drill Rig **B-57 TMR [91%]**
 Driller **M&A** Logged by **M. Sadowski/F. Bozga** Checked by **C. Marin**
 Drilling Method **2.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

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.

WANGENGINC 11000401.GPJ WANGENG.GDT 7/26/19



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BORING LOG Z051-RWB-04

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
Elevation: 589.15 ft
North: 1901046.55 ft
East: 1171625.03 ft
Station: 6167+42.68
Offset: 114.70 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		--S _{u undis} = 840.3 psf-- --S _{u remold} = 387.8 psf-- --Sensitivity = 2.1--			17	VS P C S H	0.50	24									
		--In-Situ Vane Shear, 44.5 feet-- --S _{u undis} = 904.9 psf-- --S _{u remold} = 409.4 psf-- --Sensitivity = 2.2--	45		18	VS				524.2		65		22	5 7 11	3.28 B	20
											Boring terminated at 65.00 ft						
			50		19	2 2 3	0.41 B	23									
	537.4	Stiff to very stiff, gray SILTY CLAY, trace gravel; damp --RDR 2--															
			55		20	11 6 8	1.31 B	17									
			60		21	4 5 7	1.23 B	17									

WANGENGINC 11000401.GPJ WANGENG.GDT 7/26/19

GENERAL NOTES					WATER LEVEL DATA				
Begin Drilling	06-30-2019	Complete Drilling	06-30-2019		While Drilling	▽ Rotary wash			
Drilling Contractor	Wang Testing Services	Drill Rig	B-57 TMR [91%]		At Completion of Drilling	▼ mud in the borehole			
Driller	M&A	Loggers	M. Sadowski/F. Bozga		Time After Drilling	NA			
Drilling Method	2.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion				Depth to Water	▼ NA			
The stratification lines represent the approximate boundary between soil types; the actual transition may be gradual.									

**ILLINOIS DEPARTMENT OF TRANSPORTATION
STRUCTURE BORING LOG**

ROUTE I 90/94 DESCRIPTION East Side of I-90/94 (West Bound), Between Washington & Randolph

SECTION _____ STRUCTURE NO. _____ DRILLED BY SEECO Consultants/Bill Brun

COUNTY Cook LOCATION Chicago, Illinois

Boring No. B-06
Station _____
Offset 16' W
Surface El. 580.32

DEPTH T H	B L O W S	QU TSF	W %	Surf. Wat. El. <u>Dry</u>		D E P T H	B L O W S	QU TSF	W %
				When Drilling <u>Dry</u>	at Completion <u>Dry</u>				
2.5	50 / 5"		2.9			17.5	3	<0.25 P	24.8
5.0	3	0.19 B	26.5			20.0	5	0.44 B	22.9
7.5	4	<0.25 P	23.5			22.5	5	0.68 B	22.9
10.0	3	<0.25 P	24.6			25.0	3	0.44 B	24.1
12.5	3	0.34 B	26.0			27.5	3	0.39 B	25.1
15.0	3	0.24 B	24.1			30.0	6	0.58 B	24.7

2" BITUMINOUS CONCRETE PAVEMENT

10" CONCRETE PAVEMENT BASE COURSE

CRUSHED STONE SUB-BASE COURSE, Gray, Dry (A-1-a)

CLAY, Gray, Very Soft to Soft, Moist (A-6)

CLAY, Gray, Very Soft to Medium, Moist (A-6)

N=Standard Penetration Test-Blows per foot to drive 2" O.D. Split Spoon Sampler 12" with 140# hammer falling 30"

(Q)B=Bulge S=Shear P=Penetrometer Stations, Depths, Offset, and Elevations are in Feet

**ILLINOIS DEPARTMENT OF TRANSPORTATION
STRUCTURE BORING LOG**

ROUTE I 90/94 DESCRIPTION East Side of I-90/94 (West Bound), Between Washington & Randolph

SECTION _____ STRUCTURE NO. _____ DRILLED BY SEECO Consultants/Bill Brun

COUNTY Cook LOCATION Chicago, Illinois

Boring No. B-06
Station _____
Offset 16' W
Surface El. 580.32

D E P T H	B L O W S	QU TSF	W %	Surf. Wat. El. <u>Dry</u>	D E P T H	B L O W S	QU TSF	W %
				Groundwater Elev.:				
				When Drilling <u>Dry</u>				
				at Completion <u>Dry</u>				
After	Hrs							

CLAY, Gray, Soft to Medium, Moist (A-6)

32.5	6	0.39 B	24.1
35.0	7	0.68 B	18.2

CLAY, Gray, Stiff, Moist (A-6)

37.5	9	1.06 B	21.2
40.0	11	1.41 B	21.0
42.5	13	1.94 B	21.4

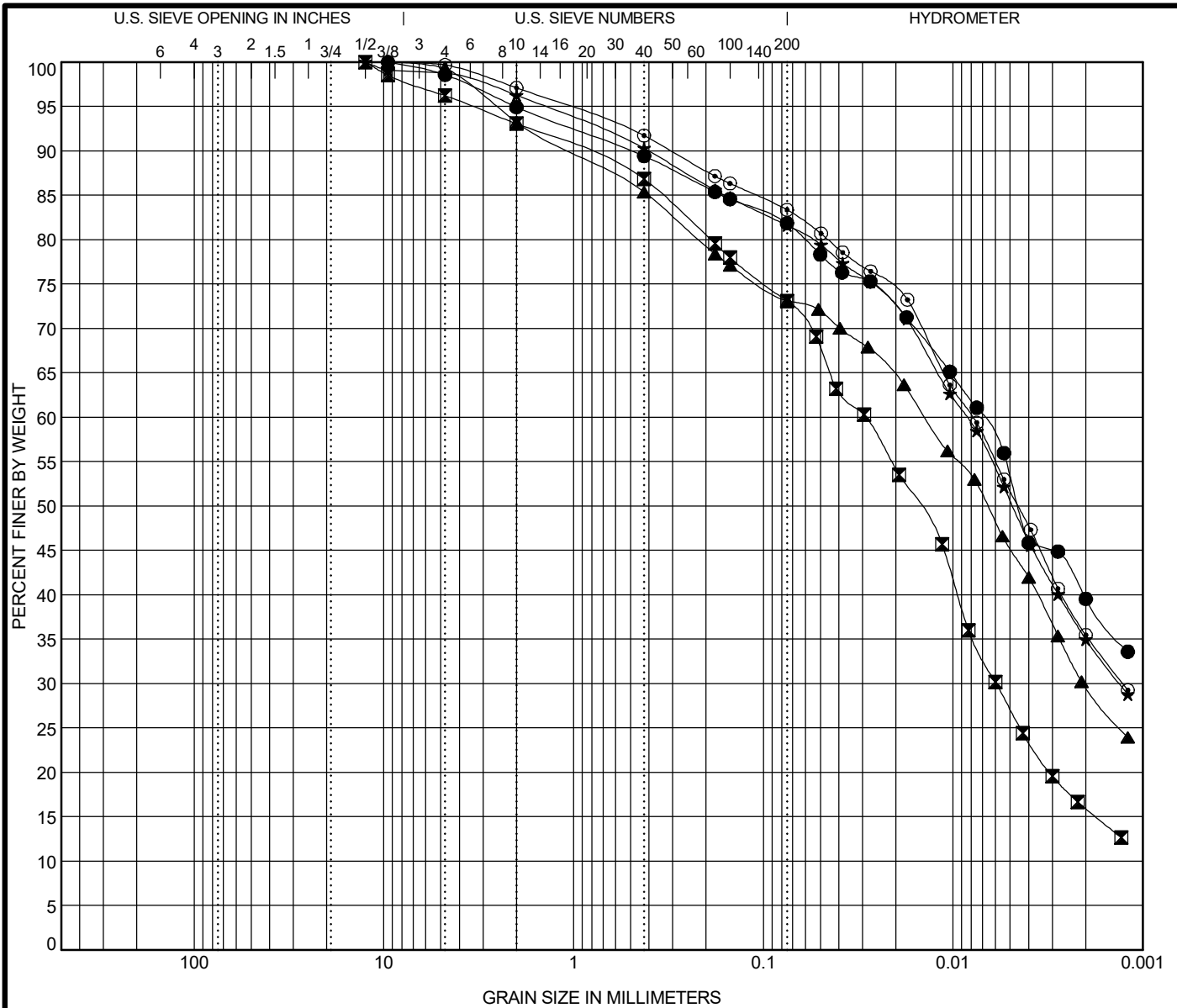
End of Boring @ 42.50 Feet

45.0			
------	--	--	--

N=Standard Penetration Test-Blows per foot to drive 2" O.D.
Split Spoon Sampler 12" with 140# hammer falling 30"

(QU)B=Bulge S=Shear P=Penetrometer
Stations, Depths, Offset, and Elevations are in Feet

APPENDIX B



COBBLES	GRAVEL	SAND		SILT AND CLAY
		coarse	fine	

Specimen Identification			IDH Classification					LL	PL	PI	Cc	Cu
●	33-RWB-02#9	21.0 ft	Clay					39	18	21		
■	33-RWB-02#23	83.5 ft	Silty Loam					23	12	11		
▲	Z051-RWB-04#7	15.0 ft	Clay					32	17	15		
★	Z051-RWB-04#11	25.0 ft	Clay					33	17	16		
◎	Z051-RWB-04#15	35.0 ft	Clay					33	17	16		
Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
●	33-RWB-02#9	21.0 ft	9.5	0.007			5.1	13.2	42.2	39.5		
■	33-RWB-02#23	83.5 ft	12.5	0.029	0.006		6.9	20.1	57.0	15.9		
▲	Z051-RWB-04#7	15.0 ft	9.5	0.014	0.002		6.8	20.1	43.4	29.7		
★	Z051-RWB-04#11	25.0 ft	12.5	0.008	0.001		3.7	14.7	46.6	35.0		
◎	Z051-RWB-04#15	35.0 ft	9.5	0.008	0.001		2.9	13.8	47.8	35.5		

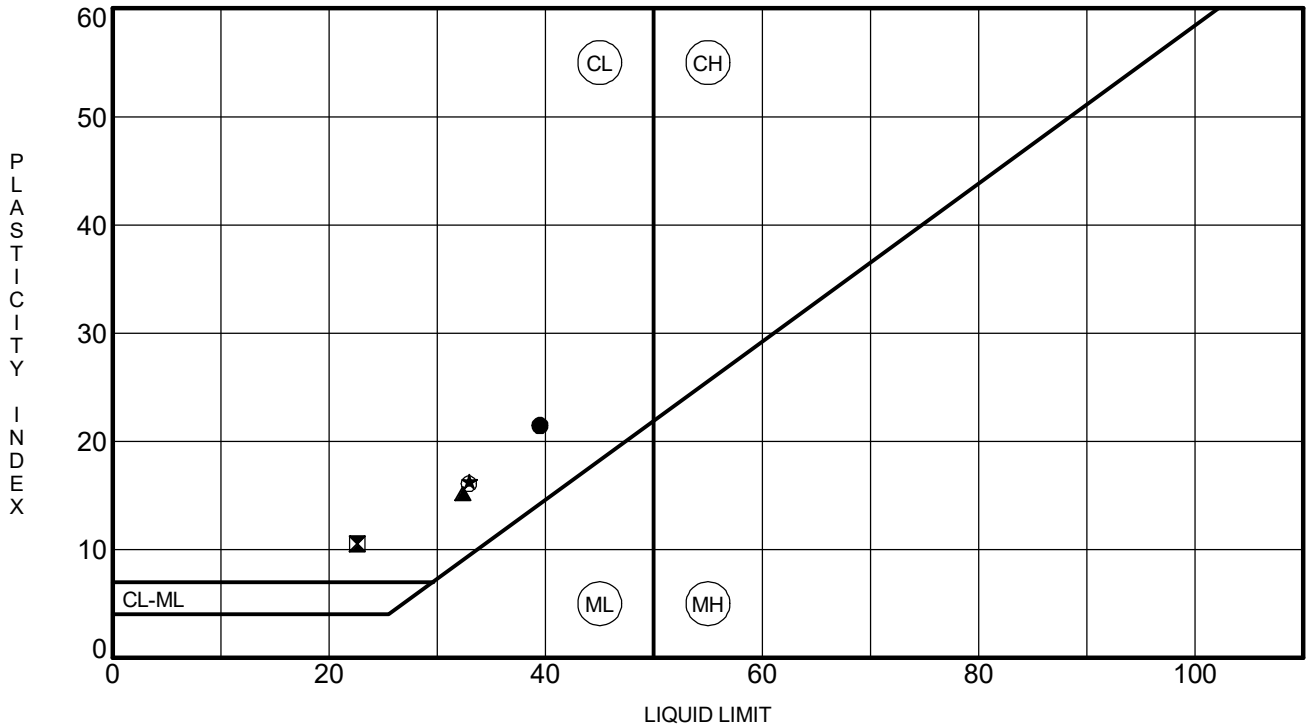
WEI GRAIN SIZE IDH 11000401.GPJ US_LAB.GDT 7/24/19



Wang Engineering, Inc.
 1145 N. Main Street
 Lombard/IL/60148
 Telephone: 6309539928
 Fax: 6309539938

GRAIN SIZE DISTRIBUTION

Project: Jane Byrne Interchange
 Location: Section 17, T39N, R14E of 3rd PM
 Number: 1100-04-01



Specimen Identification	LL	PL	PI	Fines	IDH Classification
● 33-RWB-02#9 21.0 ft 39 18 21 82 Clay					
☒ 33-RWB-02#23 83.5 ft 23 12 11 73 Silty Loam					
▲ Z051-RWB-04#7 15.0 ft 32 17 15 73 Clay					
★ Z051-RWB-04#11 25.0 ft 33 17 16 82 Clay					
◎ Z051-RWB-04#15 35.0 ft 33 17 16 83 Clay					

WEI ATTERBERG LIMITS IDH 11000401.GPJ US LAB.GDT 7/24/19

Wang Engineering, Inc.
 1145 N. Main Street
 Lombard/IL/60148
 Telephone: 6309539928
 Fax: 6309539938

ATTERBERG LIMITS' RESULTS

Project: Jane Byrne Interchange
 Location: Section 17, T39N, R14E of 3rd PM
 Number: 1100-04-01

UNCONFINED COMPRESSIVE STRENGTH of COHESIVE SOIL
(AASHTO T 208 / ASTM D 2166)

Project: Circle Interchange
Client: AECOM
WEI Job No.: 1100-04-01
Soil Sample ID: Z051-RWB-04 ST-02 (15-17ft)
Type/Condition: ST/Undisturbed
Liquid Limit (%): 32
Plastic Limit (%): 17

Analyst name: M. Ciapas
Date received: 6/30/2019
Test date: 7/9/2018
Sample description: Gray CLAY

Average initial height $h_0 = 6.25$ in
Average initial diameter $d_0 = 2.85$ in
Height to diameter ratio = 2.19
Mass of wet sample = 1314.25 g
Mass of dry sample and tare = 1230.50 g
Mass of tare = 187.74 g
Specific gravity = 2.75 (estimated)

Sand(%): 20.1
Silt(%): 43.4
Clay(%): 29.7
Initial water content $w = 26.04\%$ (specimen)
Initial unit weight $g = 125.36$ pcf
Initial dry unit weight $g_d = 99.46$ pcf
Initial void ratio $e_v = 0.73$
Initial degree of saturation $S_r = 99\%$
Average Rate of Strain = 1%/min
Unconfined compressive strength $q_u = 0.21$ tsf
Shear Strength = 0.10 tsf

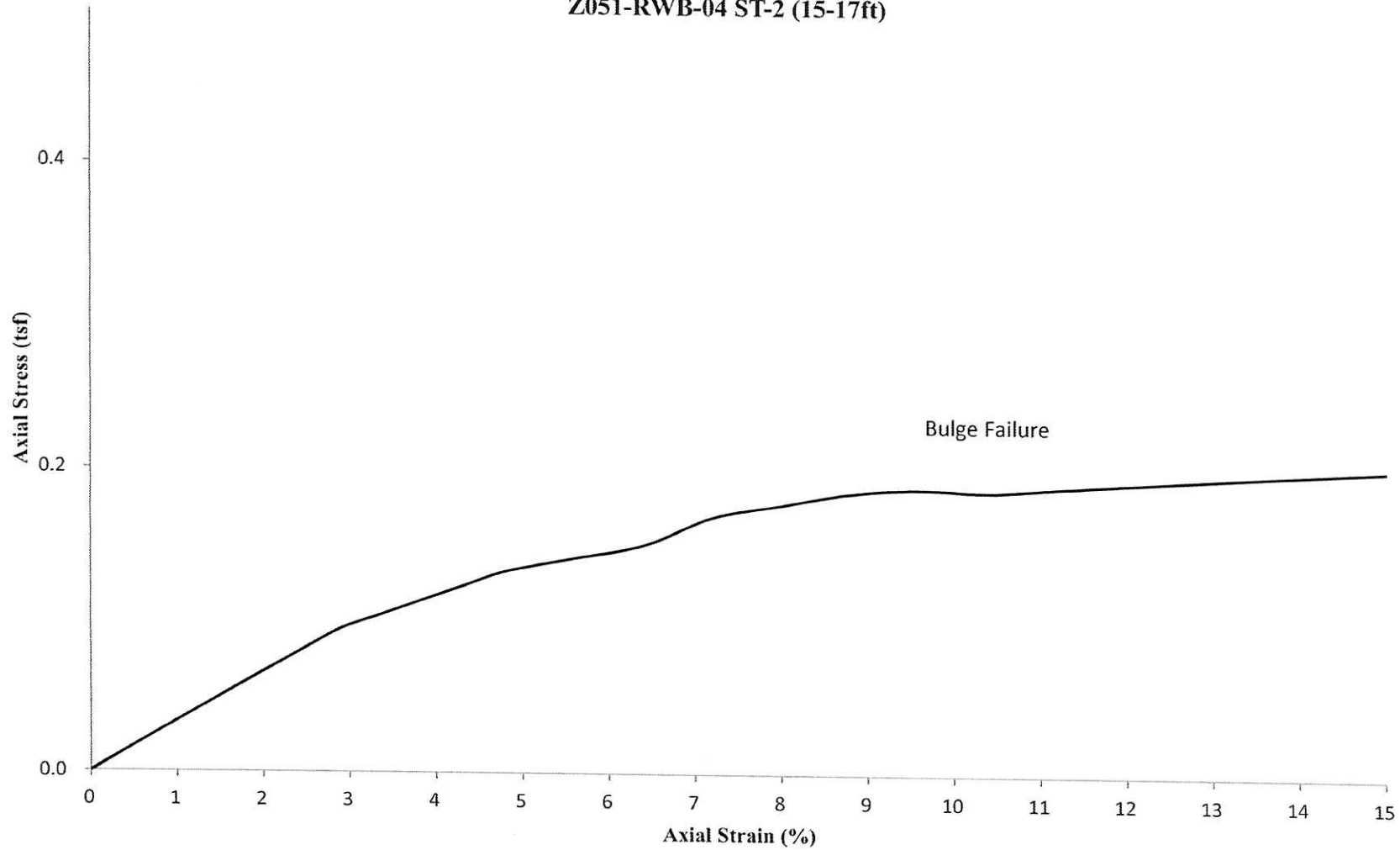
Displacement (in)	Force (lbs)	Strain (%)	Stress (tsf)
Δh	F	e	s
0.00	0.00	0.00	0.00
0.03	1.43	0.48	0.02
0.06	2.87	0.96	0.03
0.09	4.30	1.44	0.05
0.12	5.73	1.92	0.06
0.15	7.16	2.40	0.08
0.18	8.60	2.88	0.09
0.21	9.55	3.36	0.10
0.24	10.51	3.84	0.11
0.27	11.46	4.32	0.12
0.30	12.42	4.80	0.13
0.35	13.37	5.60	0.14
0.40	14.33	6.40	0.15
0.45	16.24	7.20	0.17
0.50	17.19	8.00	0.18
0.55	18.15	8.80	0.19
0.60	18.62	9.60	0.19
0.65	18.62	10.40	0.19
0.70	19.10	11.20	0.19
0.80	20.06	12.80	0.20
0.90	21.01	14.40	0.20
1.00	21.97	16.00	0.21



NOTES:

Prepared by: Jay Date: 8.1.19
Checked by: M. Seymour, P.E. Date: 08/01/19

Unconfined Axial Stress v. Axial Strain
Z051-RWB-04 ST-2 (15-17ft)



UNCONFINED COMPRESSIVE STRENGTH of COHESIVE SOIL
(AASHTO T 208 / ASTM D 2166)

Project: Circle Interchange
Client: AECOM
WEI Job No.: 1100-04-01
Soil Sample ID: Z051-RWB-04 ST-04 (25-27ft)
Type/Condition: ST/Undisturbed
Liquid Limit (%): 33
Plastic Limit (%): 17

Analyst name: M. Ciapas
Date received: 6/30/2019
Test date: 7/9/2018
Sample description: Gray CLAY

Average initial height $h_0 = 6.01$ in
Average initial diameter $d_0 = 2.85$ in
Height to diameter ratio = 2.11
Mass of wet sample = 1293.23 g
Mass of dry sample and tare = 1237.51 g
Mass of tare = 187.83 g
Specific gravity = 2.75 (estimated)

Sand(%): 14.7
Silt(%): 46.6
Clay(%): 35
Initial water content $w = 23.20\%$ (specimen)
Initial unit weight $\gamma = 128.58$ pcf
Initial dry unit weight $\gamma_{d1} = 104.37$ pcf
Initial void ratio $e_0 = 0.64$
Initial degree of saturation $S_r = 99\%$
Average Rate of Strain = 1%/min
Unconfined compressive strength $q_u = 0.62$ tsf
Shear Strength = 0.31 tsf

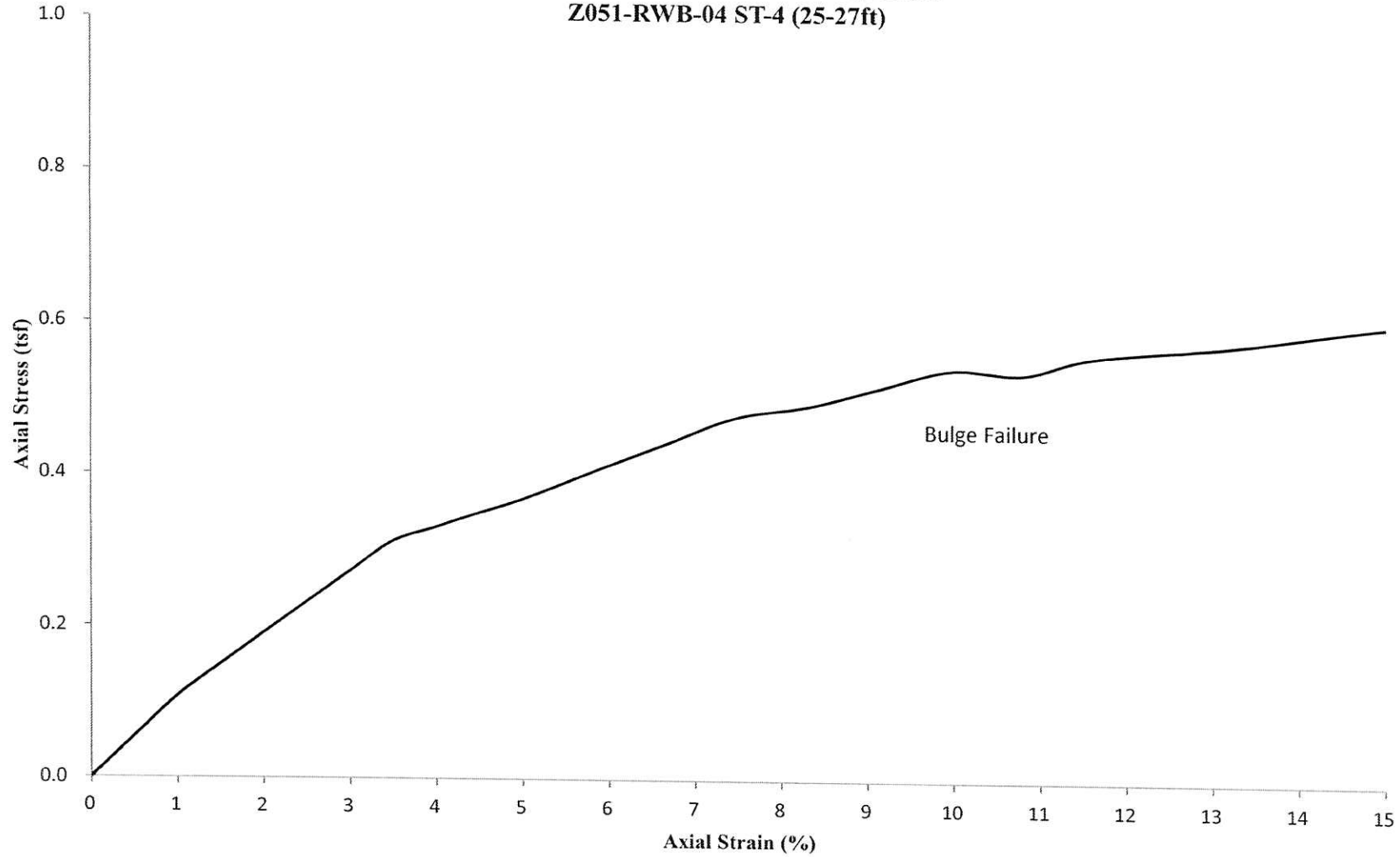
Displacement (in)	Force (lbs)	Strain (%)	Stress (tsf)
Δh	F	e	s
0.00	0.00	0.00	0.00
0.03	4.78	0.50	0.05
0.06	9.55	1.00	0.11
0.09	13.37	1.50	0.15
0.12	17.19	2.00	0.19
0.15	21.01	2.50	0.23
0.18	24.83	3.00	0.27
0.21	28.65	3.49	0.31
0.24	30.56	3.99	0.33
0.27	32.47	4.49	0.35
0.30	34.38	4.99	0.37
0.35	38.20	5.82	0.41
0.40	42.02	6.66	0.44
0.45	45.84	7.49	0.48
0.50	47.75	8.32	0.49
0.55	50.62	9.15	0.52
0.60	53.48	9.98	0.54
0.65	53.48	10.82	0.54
0.70	56.35	11.65	0.56
0.80	59.21	13.31	0.58
0.90	63.03	14.98	0.61
1.00	65.90	16.64	0.62



NOTES:

Prepared by: Jay Date: 8.1.19
Checked by: M. Seyhan Date: 08/01/19

Unconfined Axial Stress v. Axial Strain
Z051-RWB-04 ST-4 (25-27ft)



UNCONFINED COMPRESSIVE STRENGTH of COHESIVE SOIL
(AASHTO T 208 / ASTM D 2166)

Project: Circle Interchange
Client: AECOM
WEI Job No.: 1100-04-01
Soil Sample ID: Z051-RWB-04 ST-06 (35-37ft)
Type/Condition: ST/Undisturbed
Liquid Limit (%): 33
Plastic Limit (%): 17

Analyst name: M. Ciapas
Date received: 6/30/2019
Test date: 7/9/2018
Sample description: Gray CLAY

Average initial height $h_0 = 6.22$ in
Average initial diameter $d_0 = 2.86$ in
Height to diameter ratio = 2.17
Mass of wet sample = 1321.78 g
Mass of dry sample and tare = 1215.93 g
Mass of tare = 164.87 g
Specific gravity = 2.75 (estimated)

Sand(%): 13.8
Silt(%): 47.8
Clay(%): 35.5
Initial water content $w = 25.76\%$ (specimen)
Initial unit weight $g = 126.04$ pcf
Initial dry unit weight $g_d = 100.23$ pcf
Initial void ratio $e_0 = 0.71$
Initial degree of saturation $S_r = 99\%$
Average Rate of Strain = 1%/min
Unconfined compressive strength $q_u = 0.31$ tsf
Shear Strength = 0.16 tsf

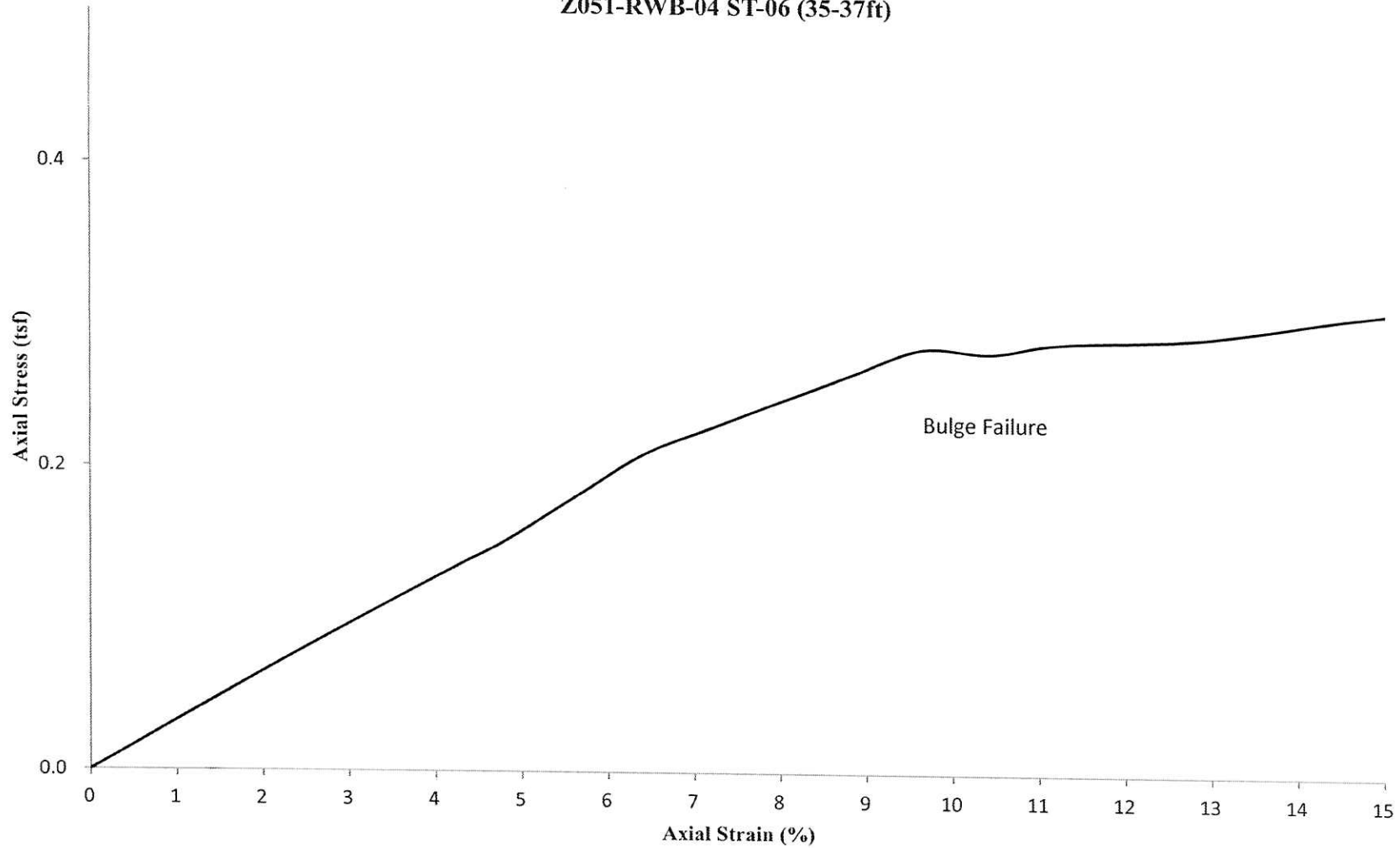
Displacement (in)	Force (lbs)	Strain (%)	Stress (tsf)
Δh	F	e	s
0.00	0.00	0.00	0.00
0.03	1.43	0.48	0.02
0.06	2.87	0.97	0.03
0.09	4.30	1.45	0.05
0.12	5.73	1.93	0.06
0.15	7.16	2.41	0.08
0.18	8.60	2.90	0.09
0.21	10.03	3.38	0.11
0.24	11.46	3.86	0.12
0.27	12.89	4.34	0.14
0.30	14.33	4.83	0.15
0.35	17.19	5.63	0.18
0.40	20.06	6.43	0.21
0.45	21.97	7.24	0.23
0.50	23.88	8.04	0.25
0.55	25.79	8.85	0.26
0.60	27.70	9.65	0.28
0.65	27.70	10.46	0.28
0.70	28.65	11.26	0.28
0.80	29.61	12.87	0.29
0.90	31.52	14.48	0.30
1.00	33.43	16.08	0.31



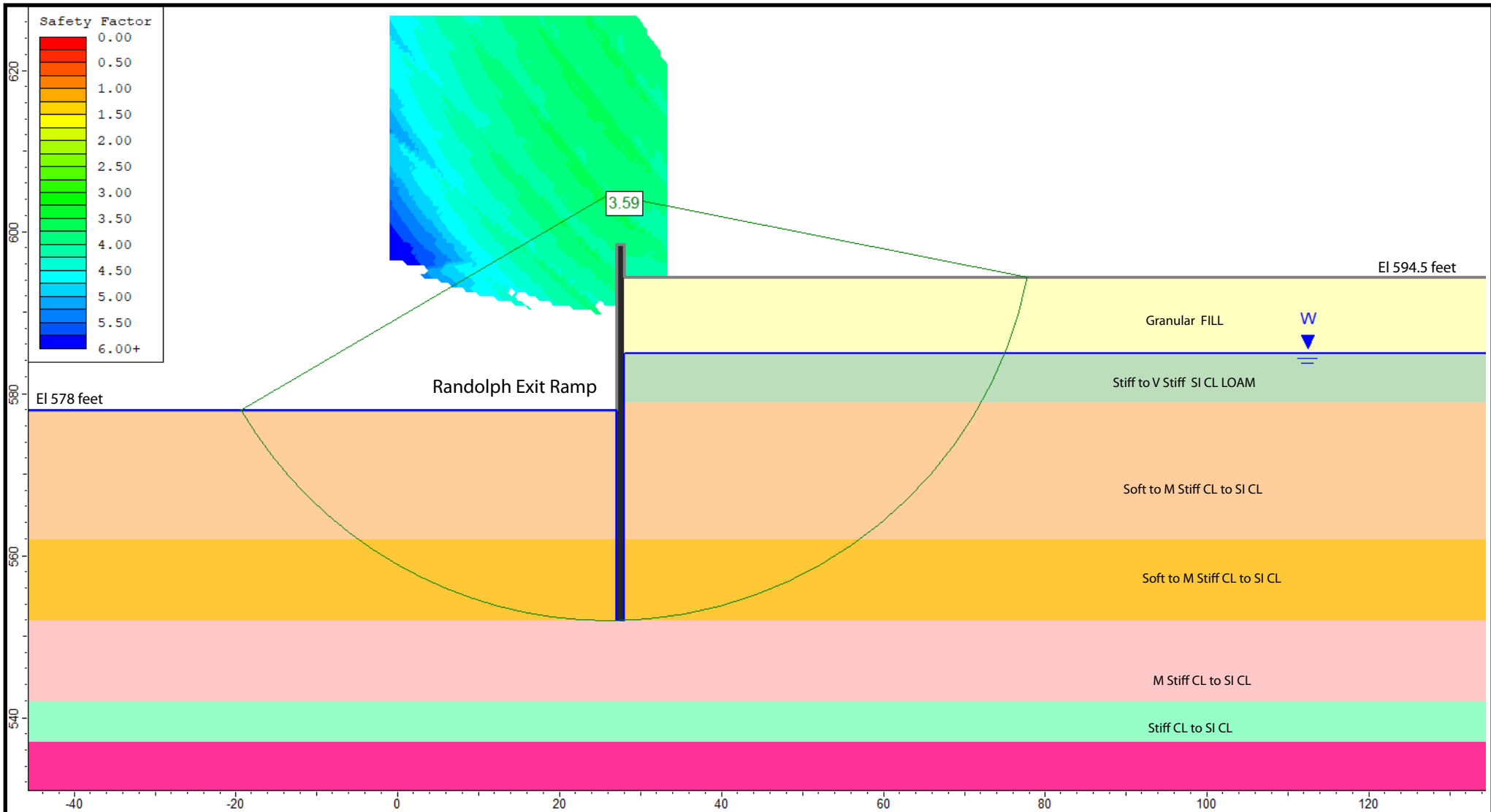
NOTES:

Prepared by: Fany Date: 8.1.19
Checked by: M. Seyhan, P.E. Date: 08/01/19

Unconfined Axial Stress v. Axial Strain
Z051-RWB-04 ST-06 (35-37ft)



APPENDIX C



Undrained Analysis at Station 8741+25, Ref Borings: Z051-HA-01, Z051-RWB-01, and Z051-RWB-04

Layer ID	Description	Unit Weight (pcf)	Undrained Cohesion (psf)	Undrained Friction Angle (degrees)
1	Granular FILL	120	0	30
2	Stiff to V Stiff SI CL LOAM	120	1800	0
3	Soft to M Stiff CL to SI CL	110	600	0
4	Soft to M Stiff CL to SI CL	110	750	0
5	Soft to M Stiff CL to SI CL	115	900	0
6	Stiff CL to SI CL	120	1200	0

GLOBAL STABILITY ANALYSIS: CIRCLE INTERCHANGE RECONSTRUCTION, RETAINING WALL 52, SN 016-Z051, CHICAGO, IL

SCALE: GRAPHICAL

APPENDIX C-1

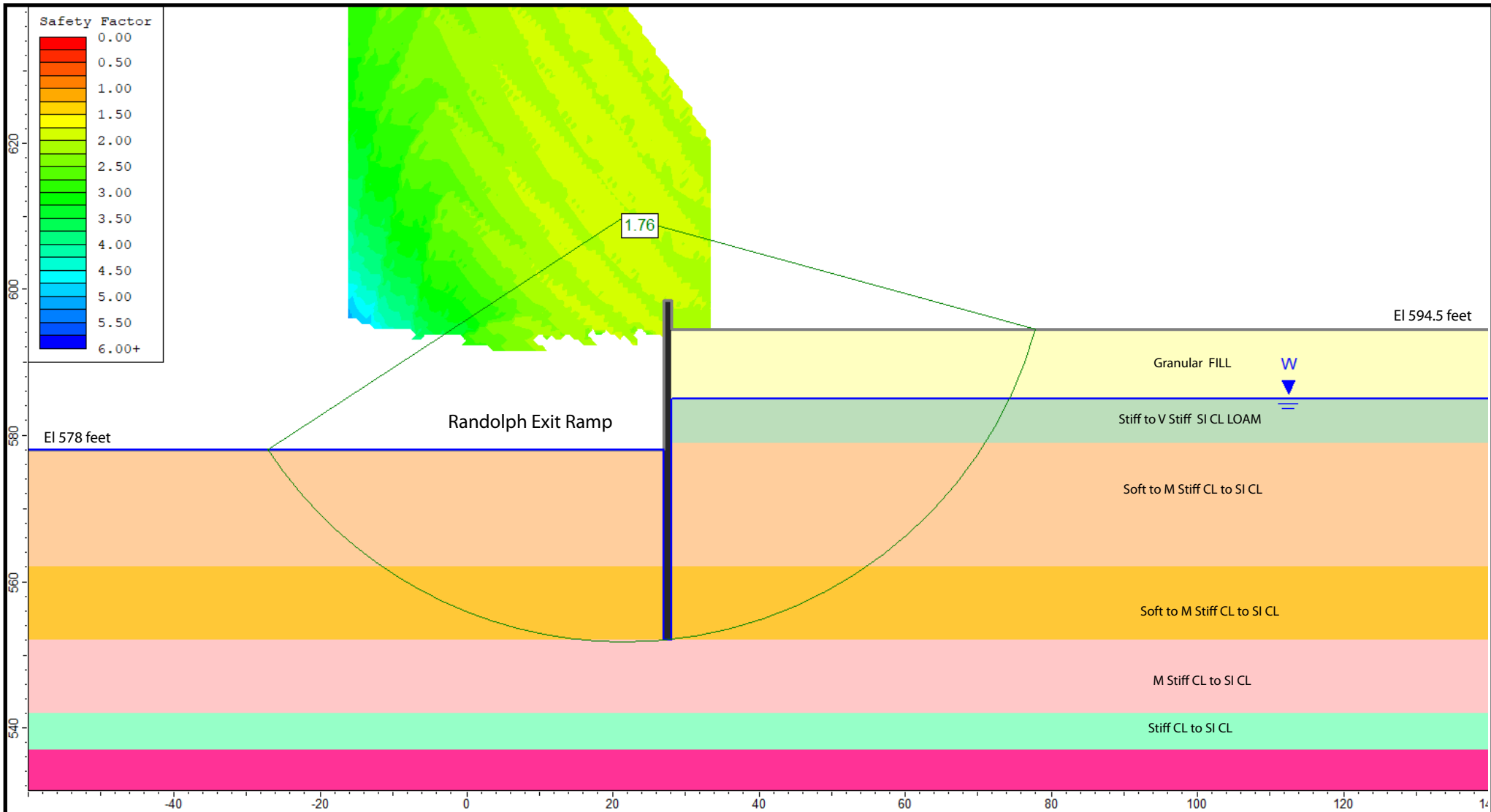
DRAWN BY: NSB
CHECKED BY: MWS



1145 N. Main Street
Lombard, IL 60148
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FOR AECOM

1100-04-01



Drained Analysis at Station 8741+25, Ref Borings: Z051-HA-01, Z051-RWB-01, and Z051-RWB-04

Layer ID	Description	Unit Weight (pcf)	Drained Cohesion (psf)	Drained Friction Angle (degrees)
1	Granular FILL	120	0	30
2	Stiff to V Stiff SI CL LOAM	120	100	30
3	Soft to M Stiff CL to SI CL	110	0	27
4	Soft to M Stiff CL to SI CL	110	0	27
5	Soft to M Stiff CL to SI CL	115	0	27
6	Stiff CL to SI CL	120	80	29

GLOBAL STABILITY ANALYSIS: CIRCLE INTERCHANGE RECONSTRUCTION,
RETAINING WALL 52, SN 016-Z051, CHICAGO, IL

SCALE: GRAPHICAL

APPENDIX C-2

DRAWN BY: NSB
CHECKED BY: MWS



1145 N. Main Street
Lombard, IL 60148
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FOR AECOM

1100-04-01

APPENDIX D

9:18:37 AM P:\AECOM\NA\AWS1\AECOM\LOCAL\AECOM\DS02\NA\DOCUMENTS\01\AMERICAS\TRANSPORTATION\60269938_CIRCLE\PHASE_11\000_CAD\008_STRUCTURE\STRUCTURE_016-Z051\TSL\SHEETS\016Z051-62A76-SHT-TSL-001.DGN

Bench Mark: Set "X" on northwest corner of handhole along east edge of SB I-90/94 20 feet north of Madison Street. Elev. 596.13.

Existing Structure: Existing Retaining Wall 20. Masonry wall that measures 148'-0" from Washington Boulevard NE Wingwall north to cast-in-place concrete retaining wall on metal shell piles that measures 84'-9". Existing masonry wall is to be cut to 2' below grade and buried. Existing cast-in-place wall to remain.

Traffic on Randolph Exit Ramp will be detoured during construction.

No Salvage.

Notes:

- 1.) Wall offsets are measured from the $\text{\textcircled{M}}$ of Randolph Exit Ramp to the front face of cast-in-place fascia panels.
- 2.) C denotes construction joint.
- 3.) E denotes expansion joint.
- 4.) F.F. denotes Front Face.
- 5.) B.F. denotes Back Face.
- 6.) Soldier pile section, shaft diameter, spacing and tip elevation to be determined during final design.
- 7.) Stainless Steel Trellises to be installed on the face of the wall. For details, see Typical Cross Section and SS Cable Wall Mount Unit Detail on Sheet 2 of 2.
- 8.) Proposed drainage information shown is conceptual and will be determined during final design.

CURVE DATA

(Randolph Exit Ramp)
 Prop. Curve P-RAN-NX-1
 P.I. Sta. = 8741+73.99
 $\Delta = 2^\circ 55' 46''$ (RT)
 $D = 1^\circ 49' 50''$
 $R = 3,130.00'$
 $T = 80.03'$
 $L = 160.03'$
 $E = 1.02'$
 $e = \text{NA}$
 $T.R. = \text{NA}$
 $S.E. \text{ Run} = \text{NA}$
 $P.C. \text{ Sta.} = 8740+93.96$
 $P.T. \text{ Sta.} = 8742+53.98$

HIGHWAY CLASSIFICATION

Randolph Exit Ramp
 Functional Class: Interstate
 ADT: 2,400 (2012); 3,000 (2040)
 ADTT: 99 (2012); 123 (2040)
 DHV: 340 (2040)
 Design Speed: 30 m.p.h.
 Posted Speed: 30 m.p.h.
 One-Way Traffic
 Directional Distribution: 100%

NB Lake Exit Ramp
 Functional Class: Interstate
 ADT: 8,200 (2012); 9,000 (2040)
 ADTT: 312 (2012); 342 (2040)
 DHV: 740 (2040)
 Design Speed: 30 m.p.h.
 Posted Speed: 30 m.p.h.
 One-Way Traffic
 Directional Distribution: 100%

DESIGN SPECIFICATIONS

2017 AASHTO LRFD Bridge Design Specifications 8th Edition

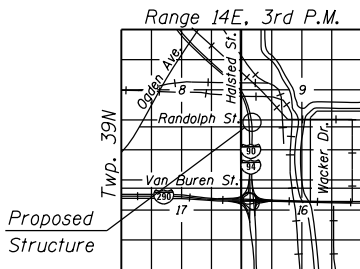
DESIGN STRESSES

FIELD UNITS

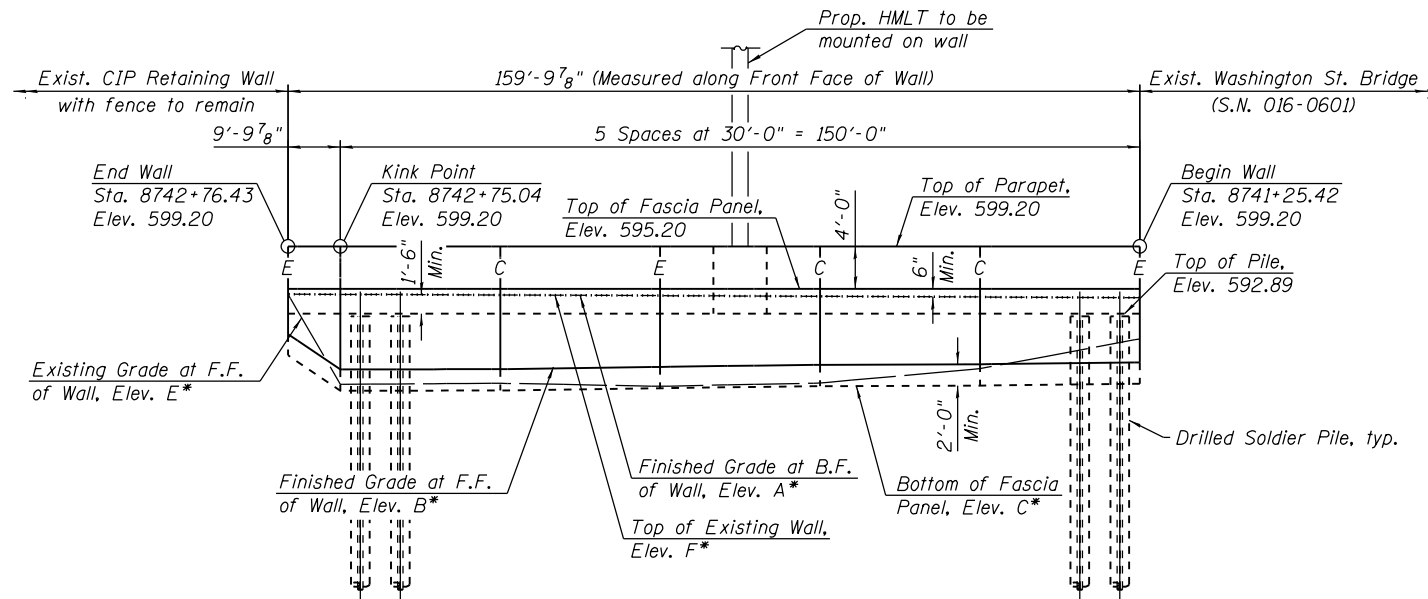
$f'_c = 3,500 \text{ psi}$
 $f_y = 60,000 \text{ psi}$ (Reinforcement)

SOLDIER PILES

$f_y = 50,000 \text{ psi}$ (AASHTO M270 Gr. 50)



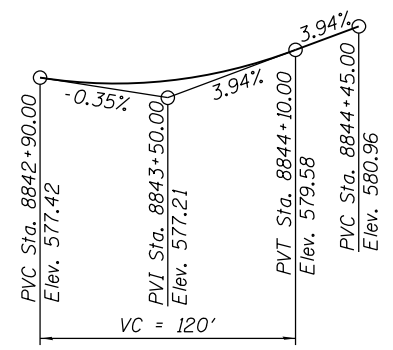
LOCATION SKETCH



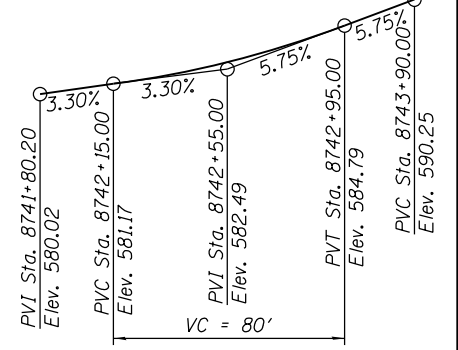
ELEVATION

(Looking East at F.F. of Wall)

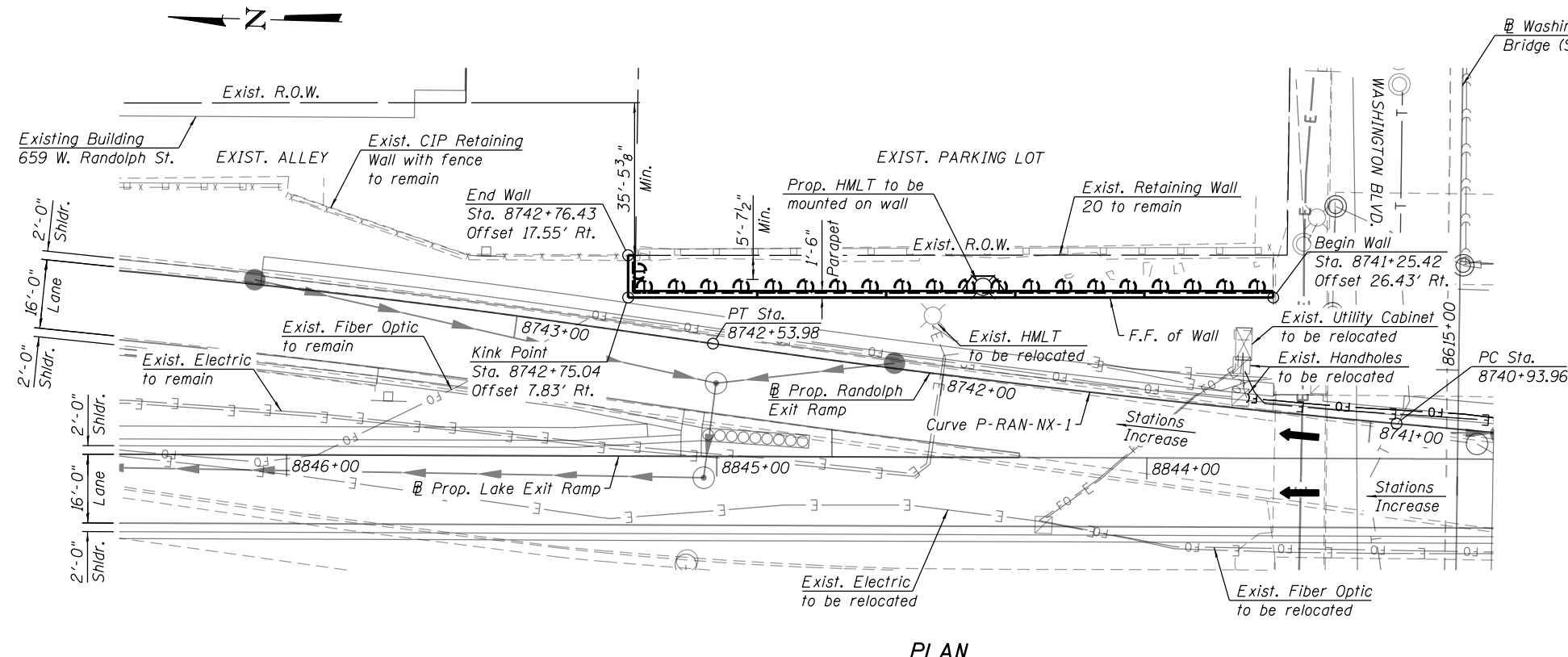
* For elevations, see Table 1 on Sheet 2 of 2.



PROFILE GRADE
(NB Lake Exit Ramp)



PROFILE GRADE
(Randolph Exit Ramp)



PLAN

LEGEND:

- Electric — E —
- Ex. Storm Sewer — S —
- Prop. Storm Sewer — S —
- Ex. Telephone — T —
- Ex. Fiber Optic — FO —
- Ex. Fence — X — X —
- Ex. Guardrail — G —
- Soil Boring — $\text{\textcircled{S}}$ —
- Existing Catch Basin — $\text{\textcircled{C}}$ —
- Proposed Catch Basin — \bullet —
- Existing Manhole — $\text{\textcircled{M}}$ —
- Proposed Manhole — $\text{\textcircled{M}}$ —
- Proposed Inlet — $\text{\textcircled{I}}$ —

GENERAL PLAN
RETAINING WALL 52 ALONG RANDOLPH EXIT RAMP
F.A.I. RTE. 90/94 (KENNEDY EXPRESSWAY)
SECTION 2015-019R
COOK COUNTY
STATION 8741+25.42 TO STATION 8742+76.43
STRUCTURE NO. 016-Z051



USER NAME = ehomedt	DESIGNED - JNP	REVISED -
	CHECKED - MDS/WJC	REVISED -
PLOT SCALE = 36.0000' / in.	DRAWN - JNP	REVISED -
PLOT DATE = 8/2/2019	CHECKED - MDS/WJC	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SHEET NO. #P52-00#P33-T0#SHEETS

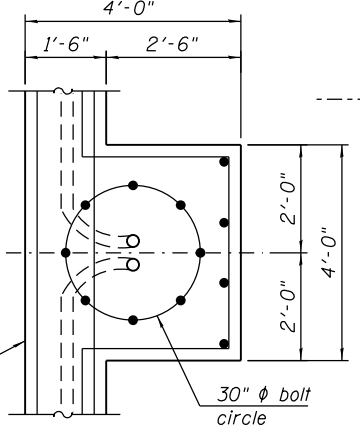
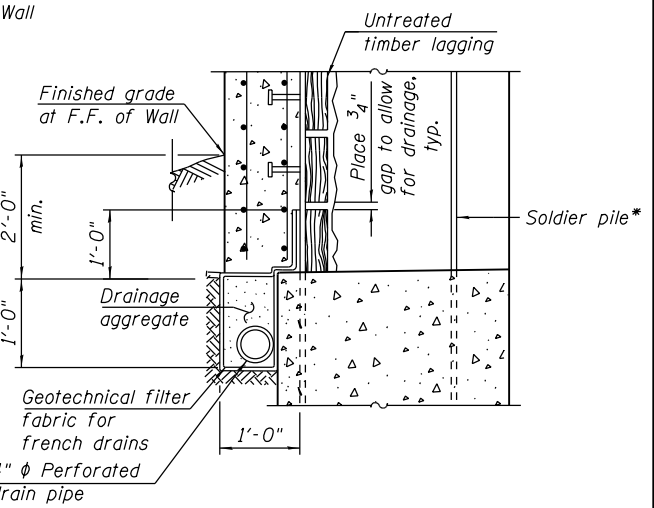
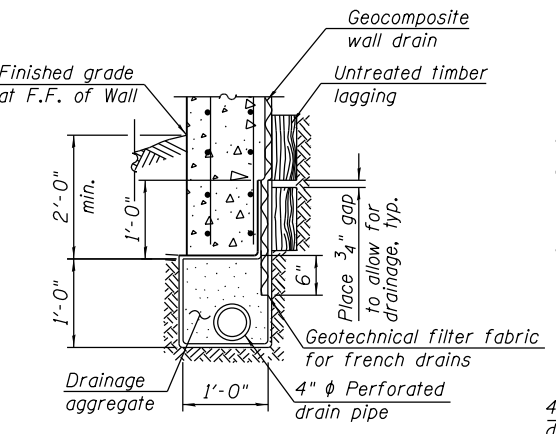
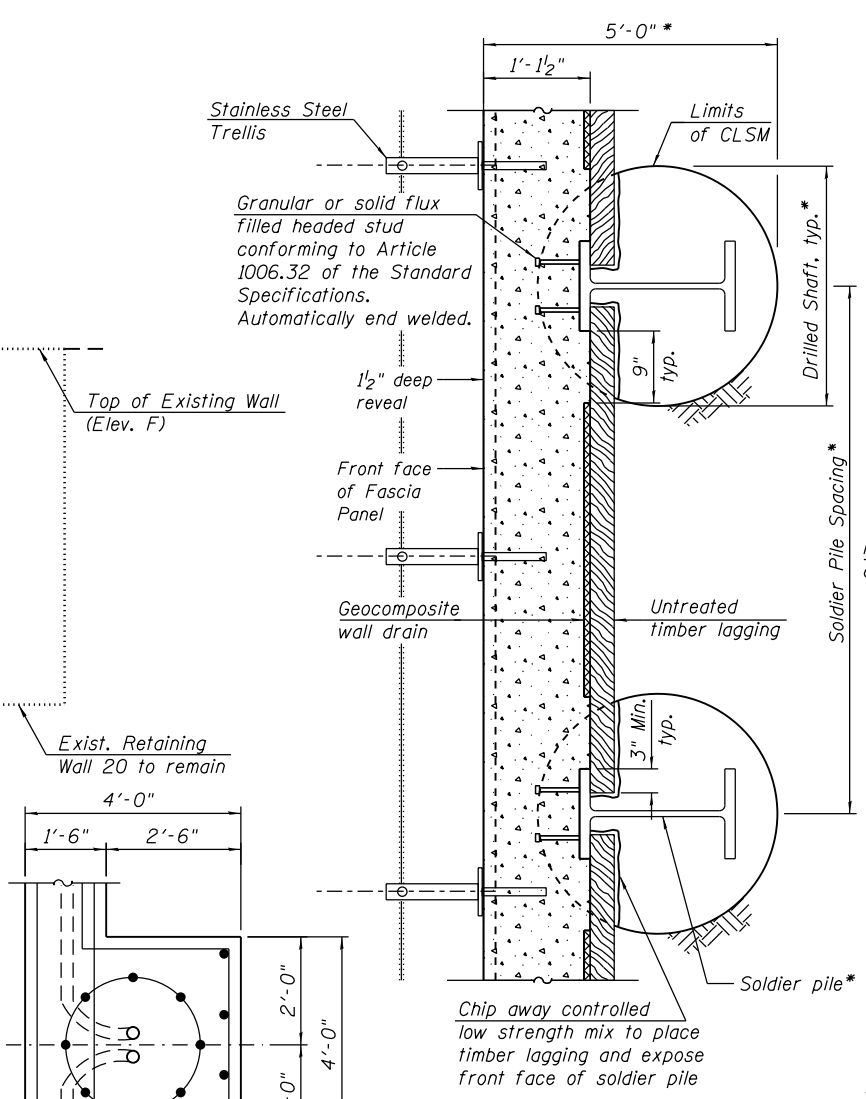
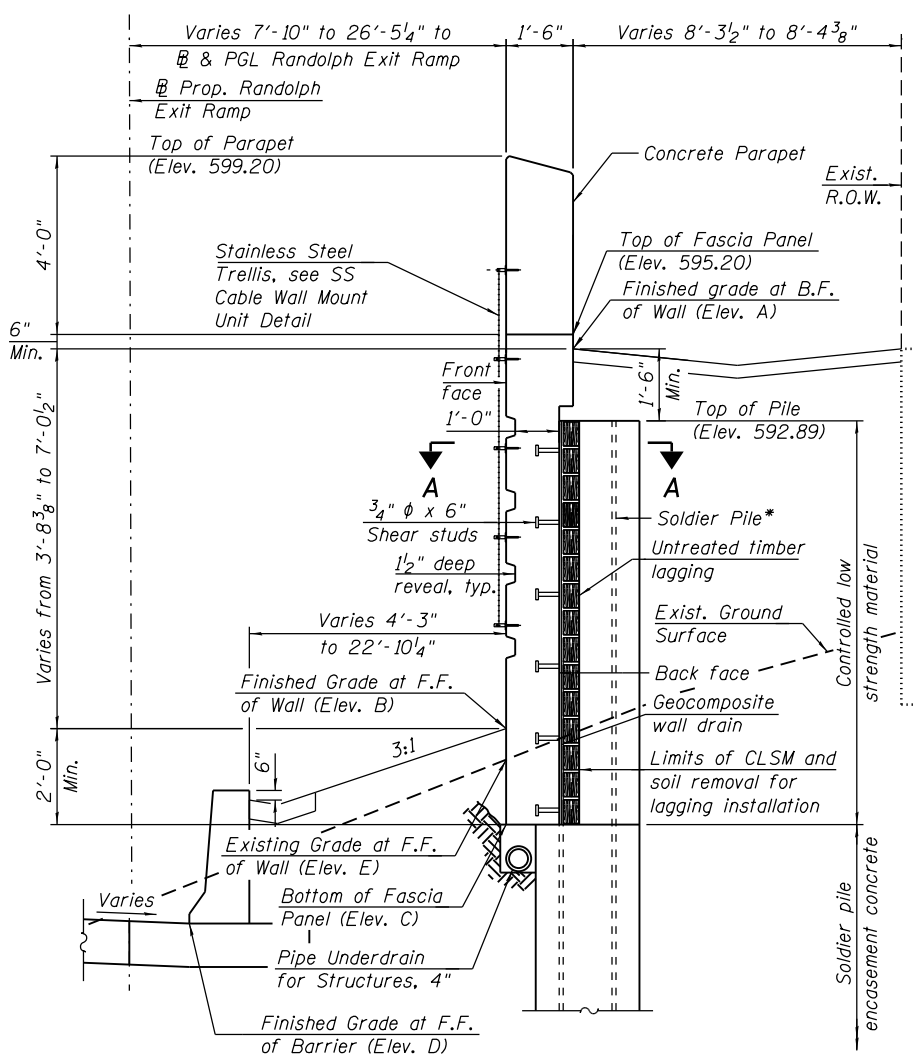
F.A.I. RTE. 90/94	SECTION 2015-019R	COUNTY COOK	TOTAL SHEETS #TOT 5	SHEET NO. #P52-00
CONTRACT NO. 62A76			ILLINOIS FED. AID PROJECT	

9:20:00 AM P:\AECOM\NA-AWS1\AECOM\NA-LOCAL\AECOM\DS02\NA\DOCUMENTS\01\AMERICAS\TRANSPORTATION\60269938\CIRCLE\PHASE_11\000\CAD\008_STRUCTURE\STRUCTURE_016-Z051\TSL\SHEETS\016Z051-62A76-SHT-TSL-002.DGN

TABLE 1 - WALL ELEVATIONS

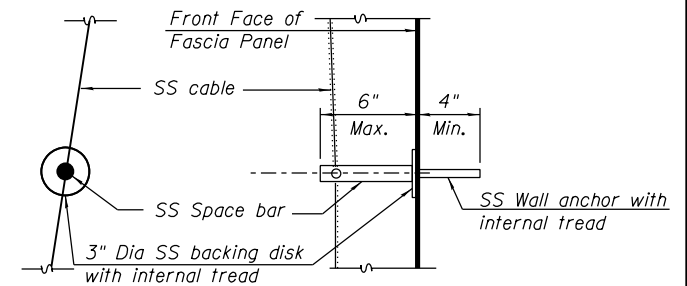
Station	Offset	Elevation A	Elevation B	Elevation C	Elevation D	Elevation E	Elevation F
8741+25.42	26.43' Rt.	594.39	588.31	586.31	578.07	590.52	594.39
8741+55.50	23.27' Rt.	594.45	588.14	586.14	578.96	587.73	594.45
8741+85.50	19.81' Rt.	594.51	588.09	586.09	580.06	586.38	594.51
8742+15.44	16.08' Rt.	594.58	587.89	585.89	581.10	586.08	594.58
8742+45.31	12.06' Rt.	594.64	587.68	585.68	582.23	586.36	594.64
8742+75.04	7.83' Rt.	594.70	587.66	585.66	583.62	586.26	594.70
8742+76.43	17.55' Rt.	594.70	590.97	588.97	583.69	594.70	594.70

Elevation A - Finished Grade at B.F. of Wall
 Elevation B - Finished Grade at F.F. of Wall
 Elevation C - Bottom of Fascia Panel
 Elevation D - Finished Grade at F.F. of Barrier
 Elevation E - Existing Grade at F.F. of Wall
 Elevation F - Top of Existing Wall

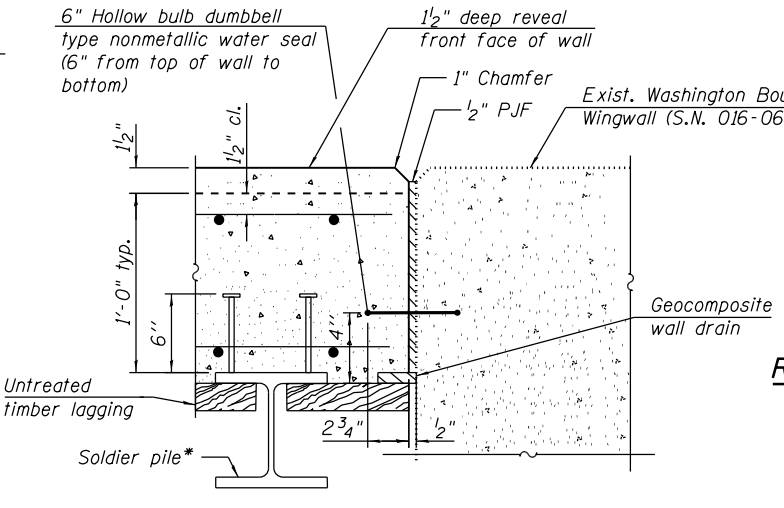
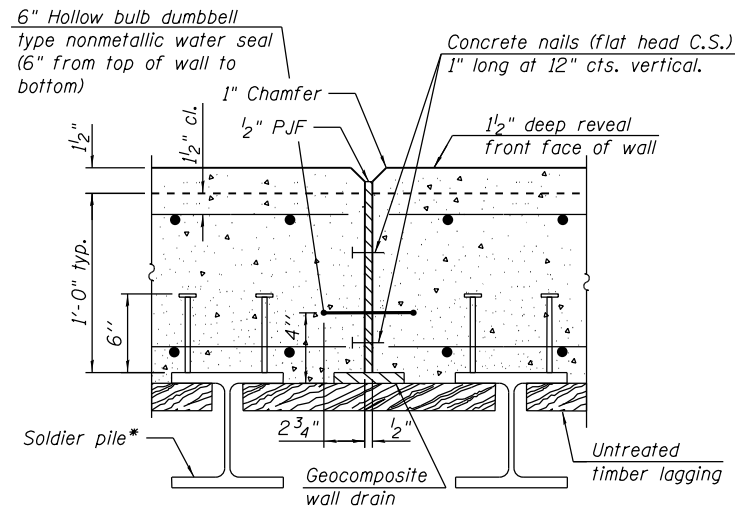
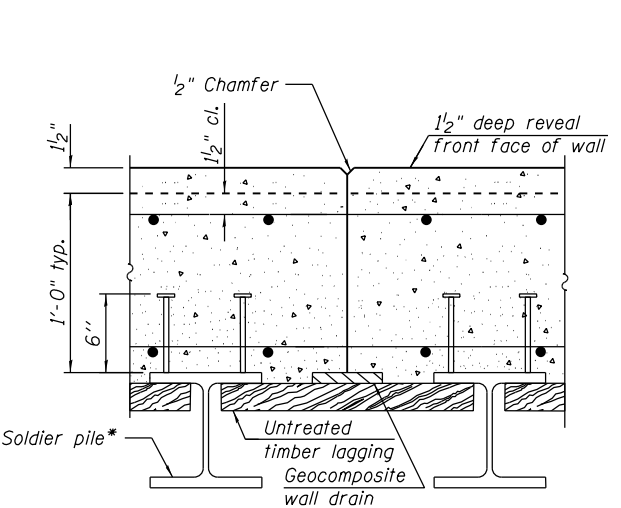


* Soldier Pile section, shaft diameter, spacing, and tip elevation to be determined during final design.

LEGEND:
 B.F. - denotes Back Face.
 F.F. - denotes Front Face.



Note:
 1.) Type, size and location of SS Wall Anchor shall be determined in final design.



CROSS SECTION AND DETAILS
RETAINING WALL 52 ALONG RANDOLPH EXIT RAMP
F.A.I. RTE. 90/94 (KENNEDY EXPRESSWAY)
SECTION 2015-019R
COOK COUNTY
STATION 8741+25.42 TO STATION 8742+76.43
STRUCTURE NO. 016-Z051



USER NAME = ehomedt	DESIGNED - JNP	REVISED -
CHECKED - WJC/MDS	REVISIONS -	
PLOT SCALE = 0.17' / in.	DRAWN - JNP	REVISED -
PLOT DATE = 8/2/2019	CHECKED - WJC/MDS	REVISED -

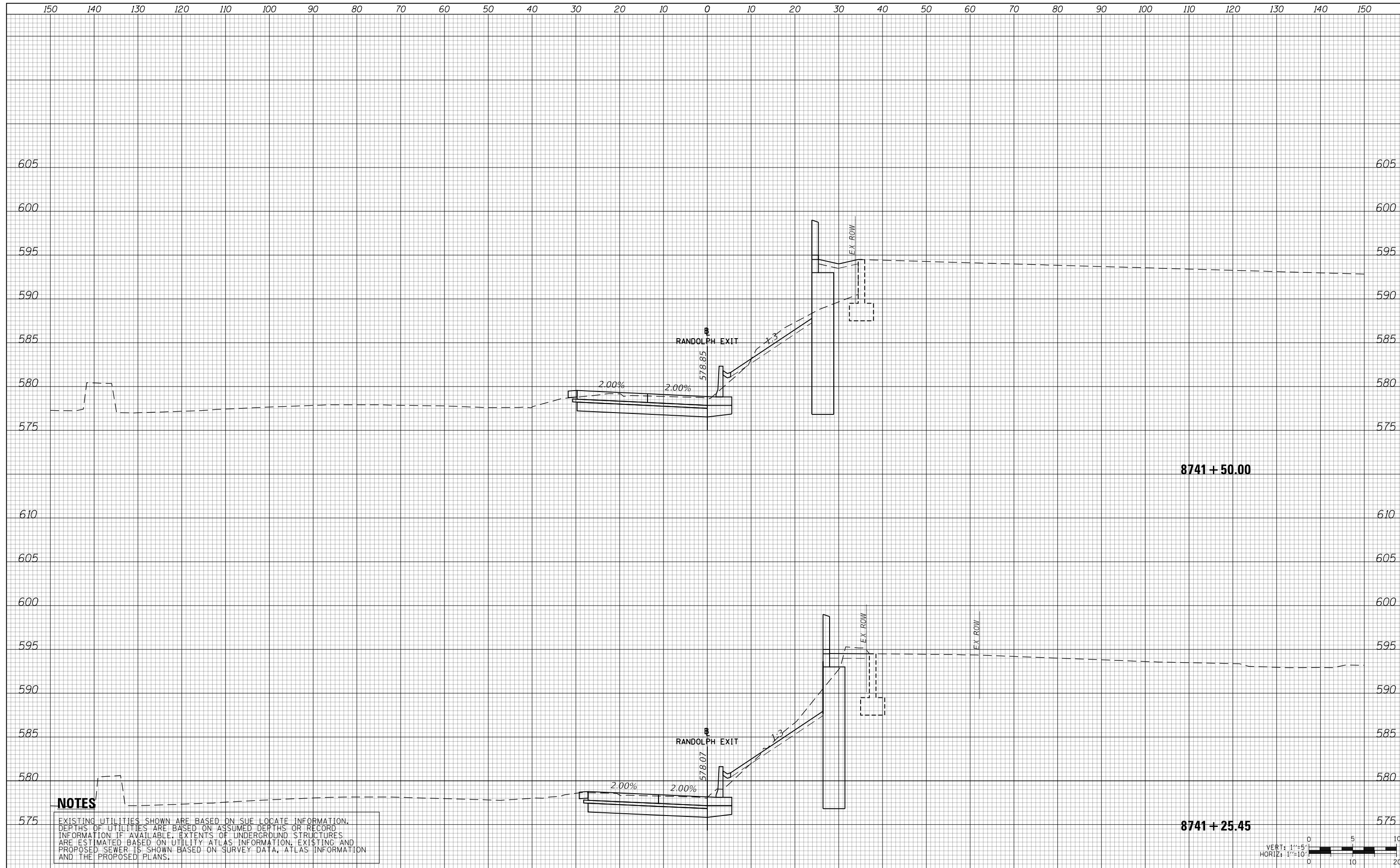
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SHEET NO. 016-Z051-01 OF 03 SHEETS

F.A.I. RTE. 90/94	SECTION 2015-019R	COUNTY COOK	TOTAL SHEETS 1	SHEET NO. 01
CONTRACT NO. 62A76			ILLINOIS FED. AID PROJECT	

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



NOTES

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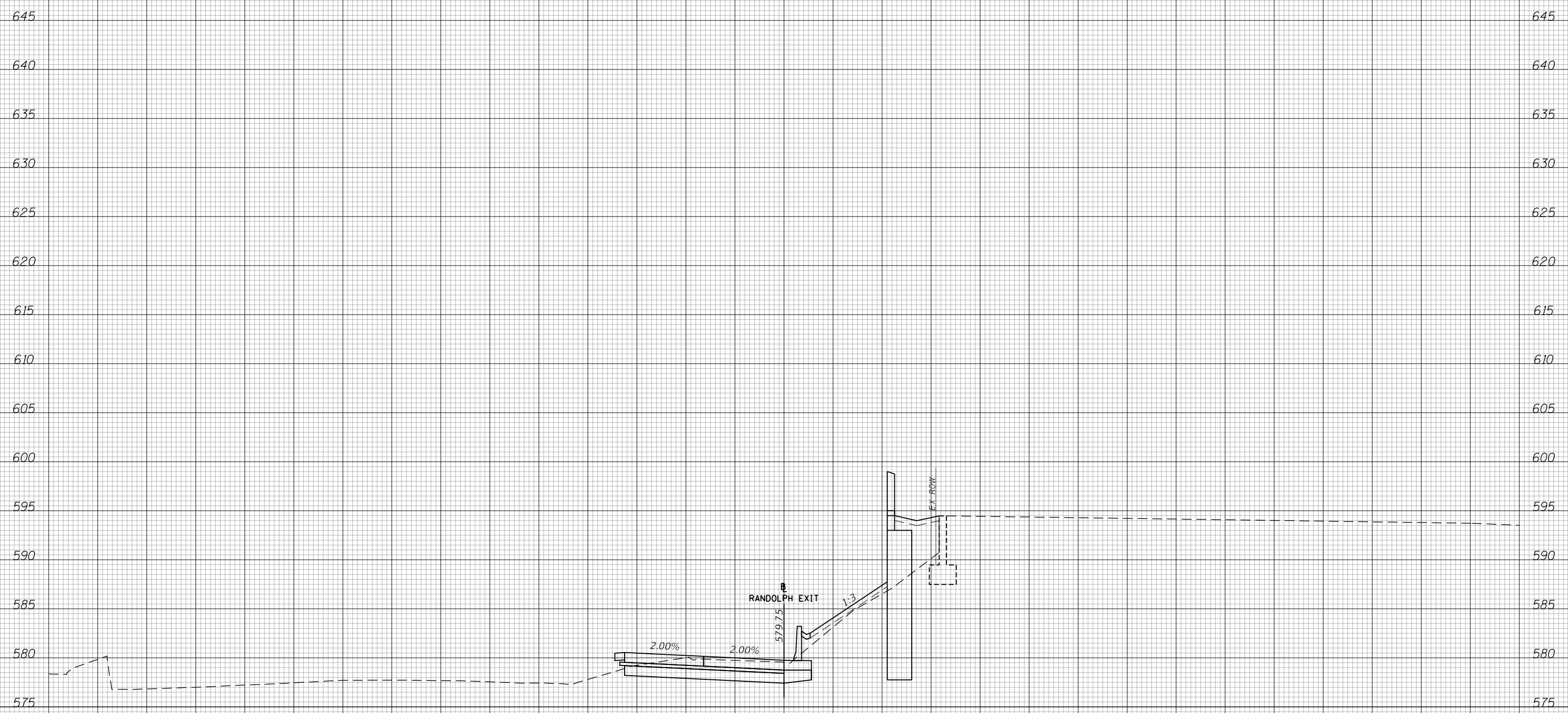
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PLOT DATE = 4/15/2019	DATE - 4-1-2019	REVISED -

**STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION**

RETAINING WALL NO. 52	
SCALE: 10:H 5:V	SHEET #ES1-1 OF #ES1-5 SHEETS
STA. 8741+25.45 TO STA. 8741+50.00	

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2015-D18R	COOK	2137	#ES1-1
CONTRACT NO. 62A76				
ILLINOIS FED. AID PROJECT				

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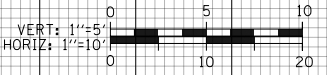
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PLOTTED	
TEMPLATE	
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FINAL SURVEY	
NOTE BOOK	
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CHECKED	
ORIGINAL SURVEY	
NOTE BOOK	
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8741 + 75.00



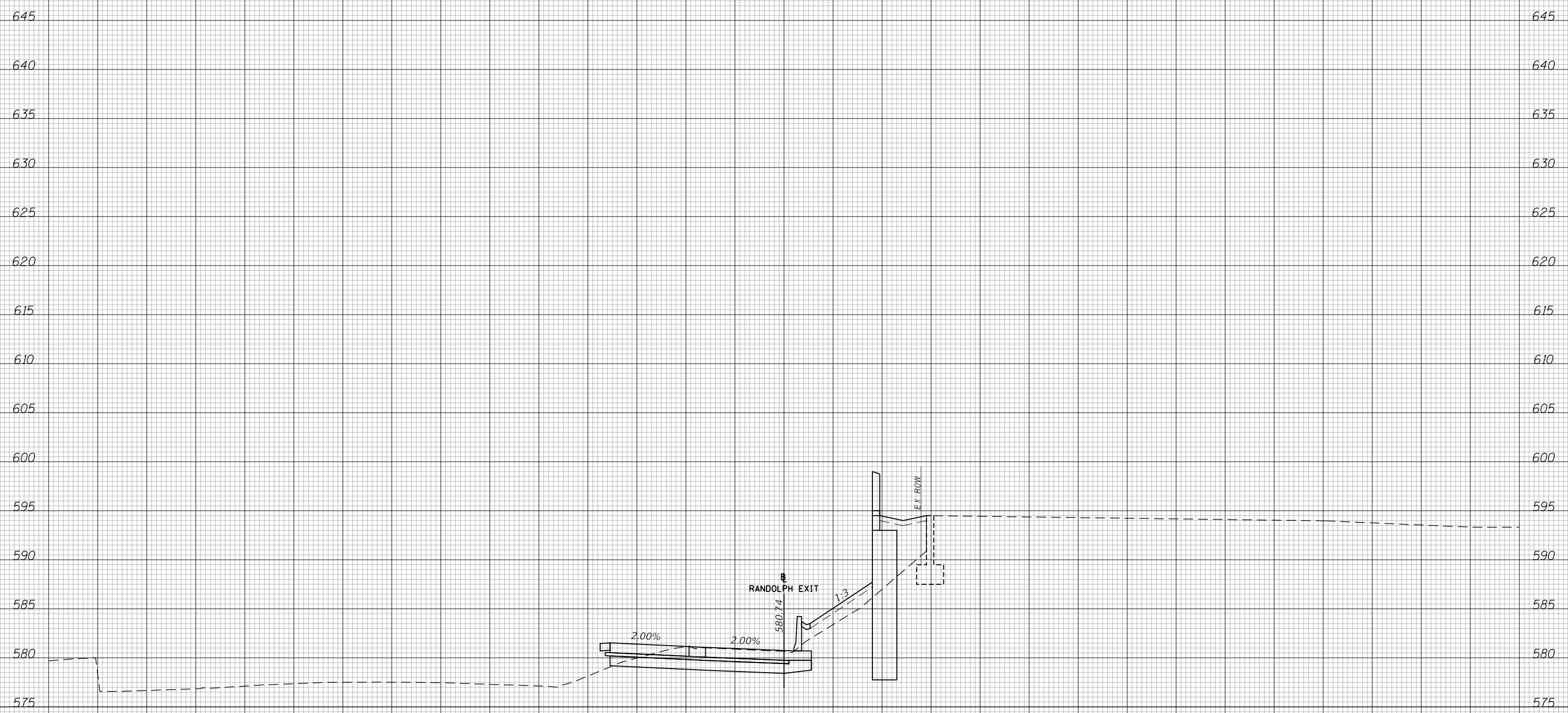
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PLOT DATE = 4/15/2019	DATE - 4-1-2019	REVISED -

**STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION**

RETAINING WALL NO. 52	
SCALE: 10:H 5:V	SHEET #ES1-2 OF #ES1-5 SHEETS
STA. 8741+75.00	TO STA. 8741+75.00

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2015-D18R	COOK	2137	#ES1-2
CONTRACT NO. 62A76				
ILLINOIS FED. AID PROJECT				

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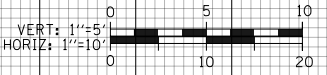
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FINAL SURVEY	
NOTE BOOK	
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SURVEYED	
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TEMPLATE	
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ORIGINAL SURVEY	
NOTE BOOK	
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NOTES

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8742 + 00.00



D162A76-Sht-XS-Rand-NX.dgn	DESIGNED -	REVISED -
USER NAME = zmaranko	DRAWN -	REVISED -
PLOT SCALE = 20.0000' / in.	CHECKED -	REVISED -
PLOT DATE = 4/15/2019	DATE - 4-1-2019	REVISED -

**STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION**

RETAINING WALL NO. 52

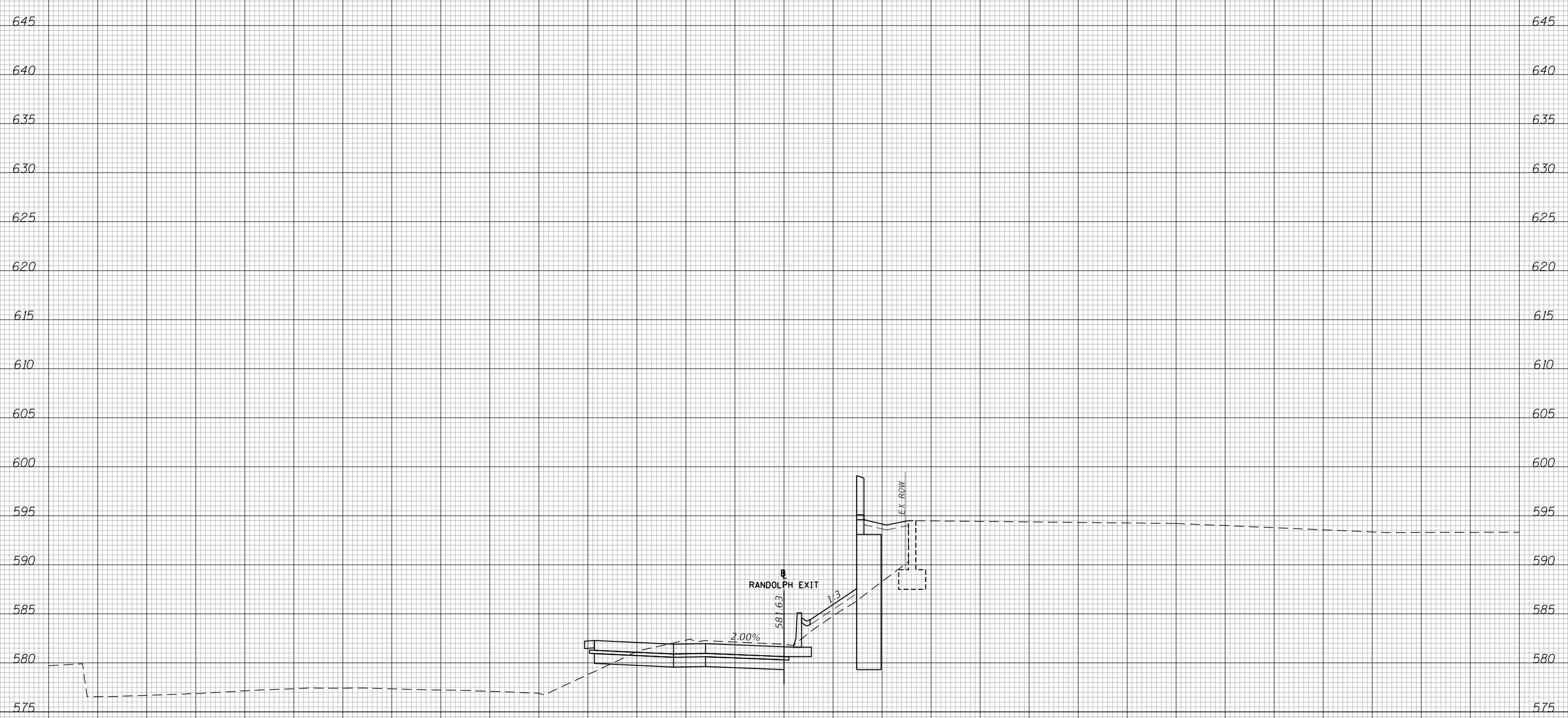
SCALE: 10:H 5:V SHEET #ES1-3 OF #ES1-5SHEETS STA. 8742+00.00 TO STA. 8742+00.00

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2015-D18R	COOK	2137	#ES1-3
CONTRACT NO. 62A76				
ILLINOIS FED. AID PROJECT				

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

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AREAS	
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FINAL SURVEY NOTE BOOK NO.	

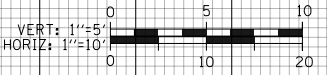
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ORIGINAL SURVEY NOTE BOOK NO.	



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8742 + 25.00



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USER NAME = zmaranko	DRAWN -	REVISED -
PLOT SCALE = 20.0000' / in.	CHECKED -	REVISED -
PLOT DATE = 4/15/2019	DATE - 4-1-2019	REVISED -

**STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION**

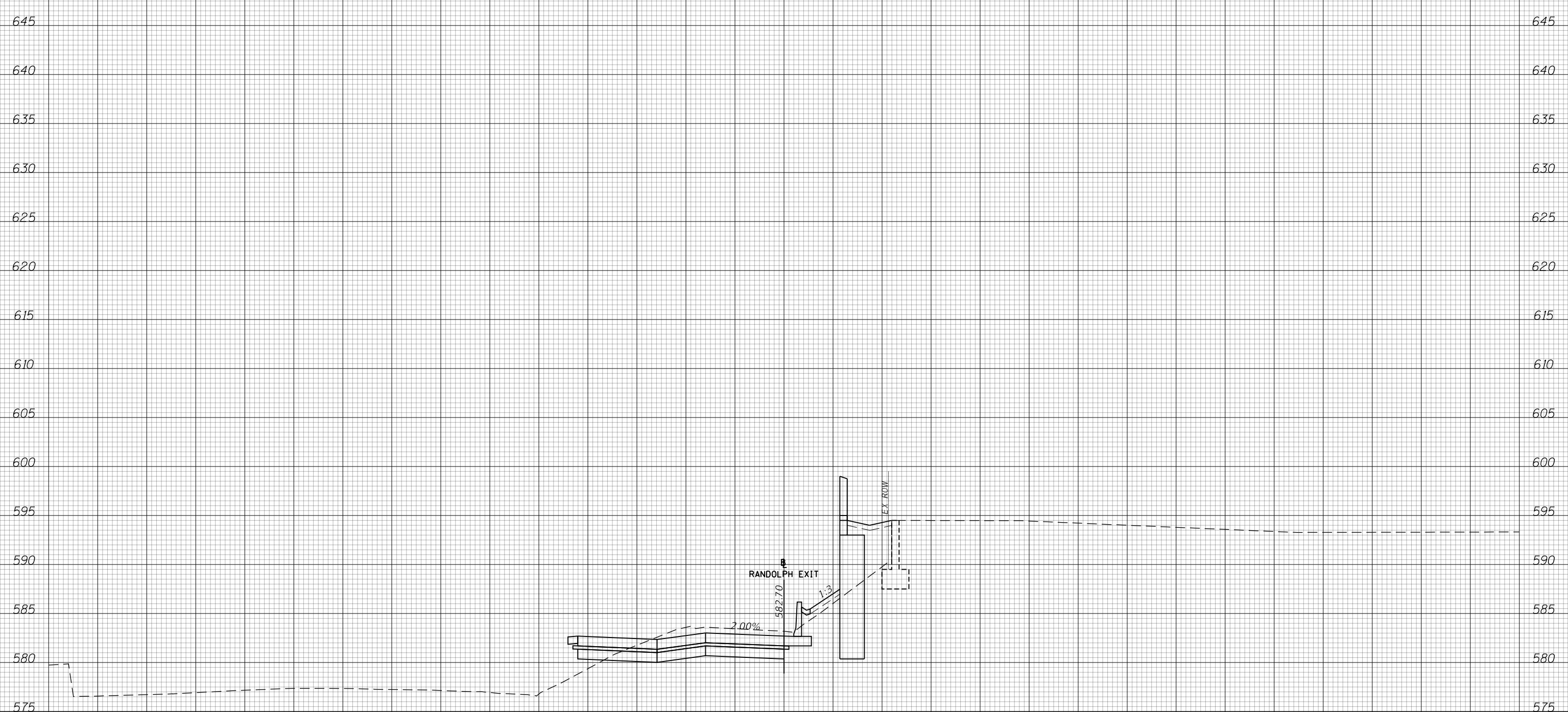
RETAINING WALL NO. 52
SCALE: 10:H 5:V SHEET #ES1-4 OF #ES1-5 SHEETS STA. 8742+25.00 TO STA. 8742+25.00

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2015-D18R	COOK	2137	#ES1-4
CONTRACT NO. 62A76				
ILLINOIS FED. AID PROJECT				

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

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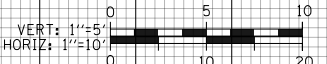
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ORIGINAL SURVEY NOTE BOOK NO.	



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8742 + 50.00



D162A76-Sht-XS-Rand-NX.dgn	DESIGNED -	REVISED -
USER NAME = zmaranko	DRAWN -	REVISED -
PLOT SCALE = 20.0000' / in.	CHECKED -	REVISED -
PLOT DATE = 4/15/2019	DATE - 4-1-2019	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

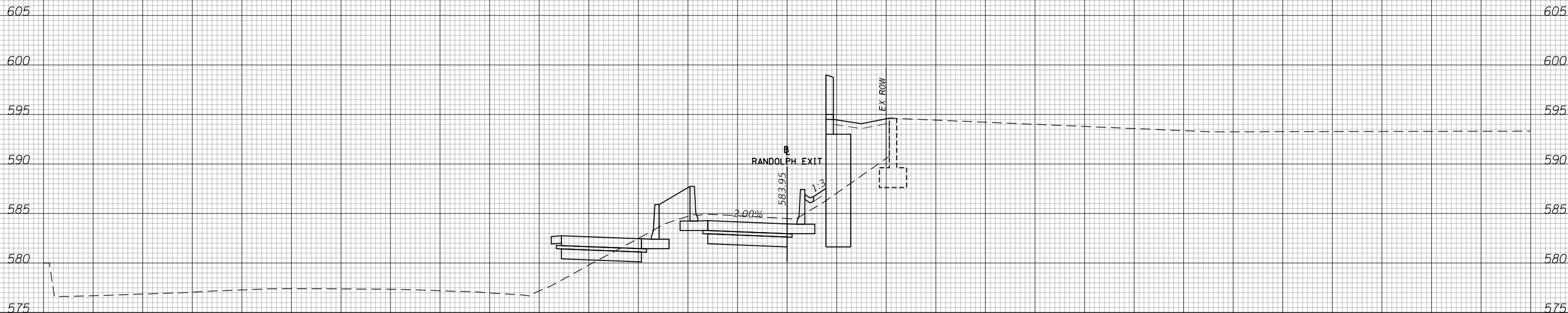
RETAINING WALL NO. 52
SCALE: 10:H 5:V SHEET #ES1-5 OF #ES1-5 SHEETS STA. 8742+50.00 TO STA. 8742+50.00

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2015-D18R	COOK	2137	#ES1-5
CONTRACT NO. 62A76				
ILLINOIS FED. AID PROJECT				

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

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FINAL SURVEY NOTE BOOK NO.	

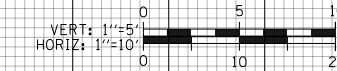
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8742 + 75.00



D162A76-Sht-XS-Rand-NX.dgn
 USER NAME = zmaranko
 PLOT SCALE = 20.0000' / in.
 PLOT DATE = 4/15/2019

DESIGNED -
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 CHECKED -
 DATE - 4-1-2019

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**STATE OF ILLINOIS
 DEPARTMENT OF TRANSPORTATION**

RETAINING WALL NO. 52

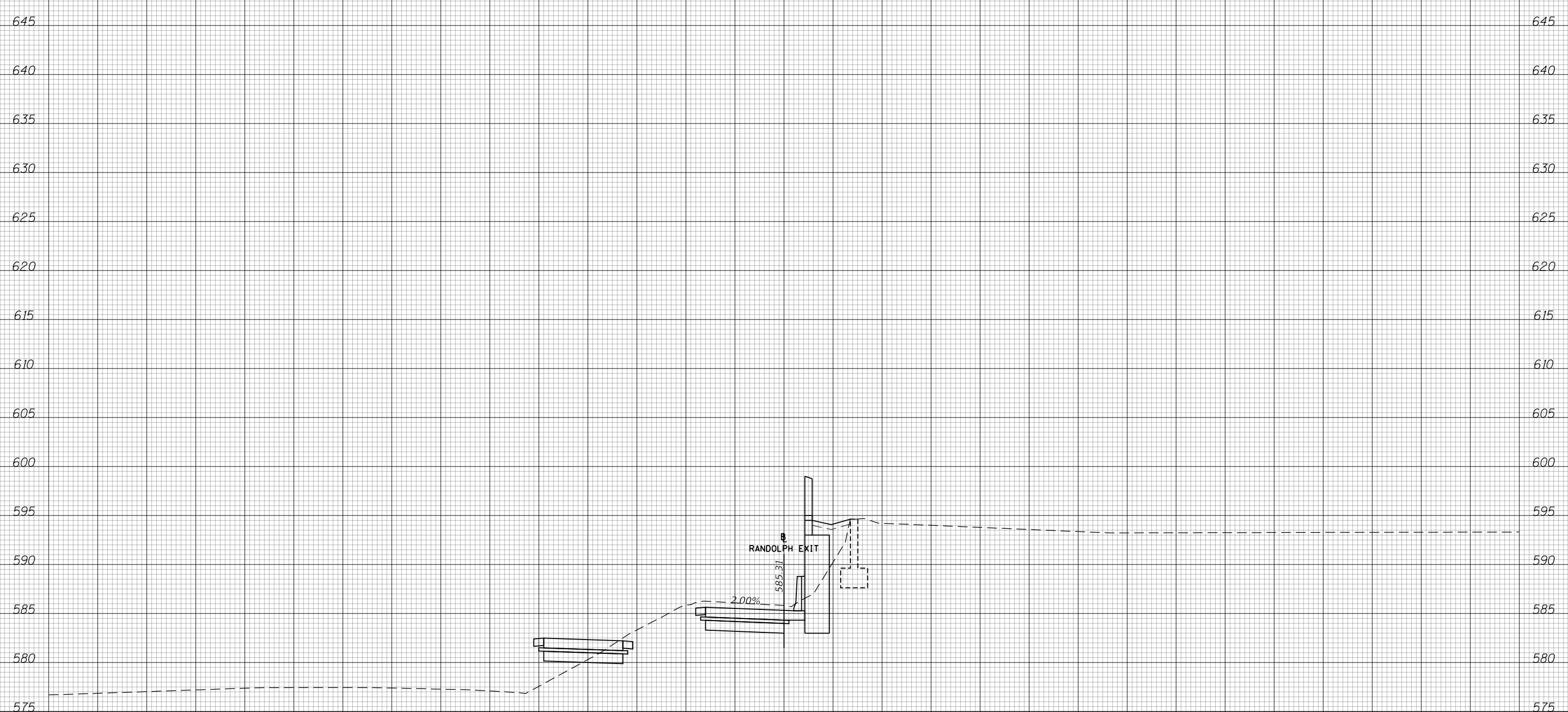
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F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2015-D18R	COOK	2137	#ES1-6
CONTRACT NO. 62A76				
ILLINOIS FED. AID PROJECT				

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

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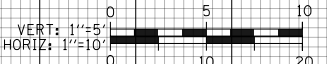
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8743 + 00.00



D162A76-Sht-XS-Rand-NX.dgn	DESIGNED -	REVISED -
USER NAME = zmzaranko	DRAWN -	REVISED -
PLOT SCALE = 20.0000' / in.	CHECKED -	REVISED -
PLOT DATE = 4/15/2019	DATE - 4-1-2019	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

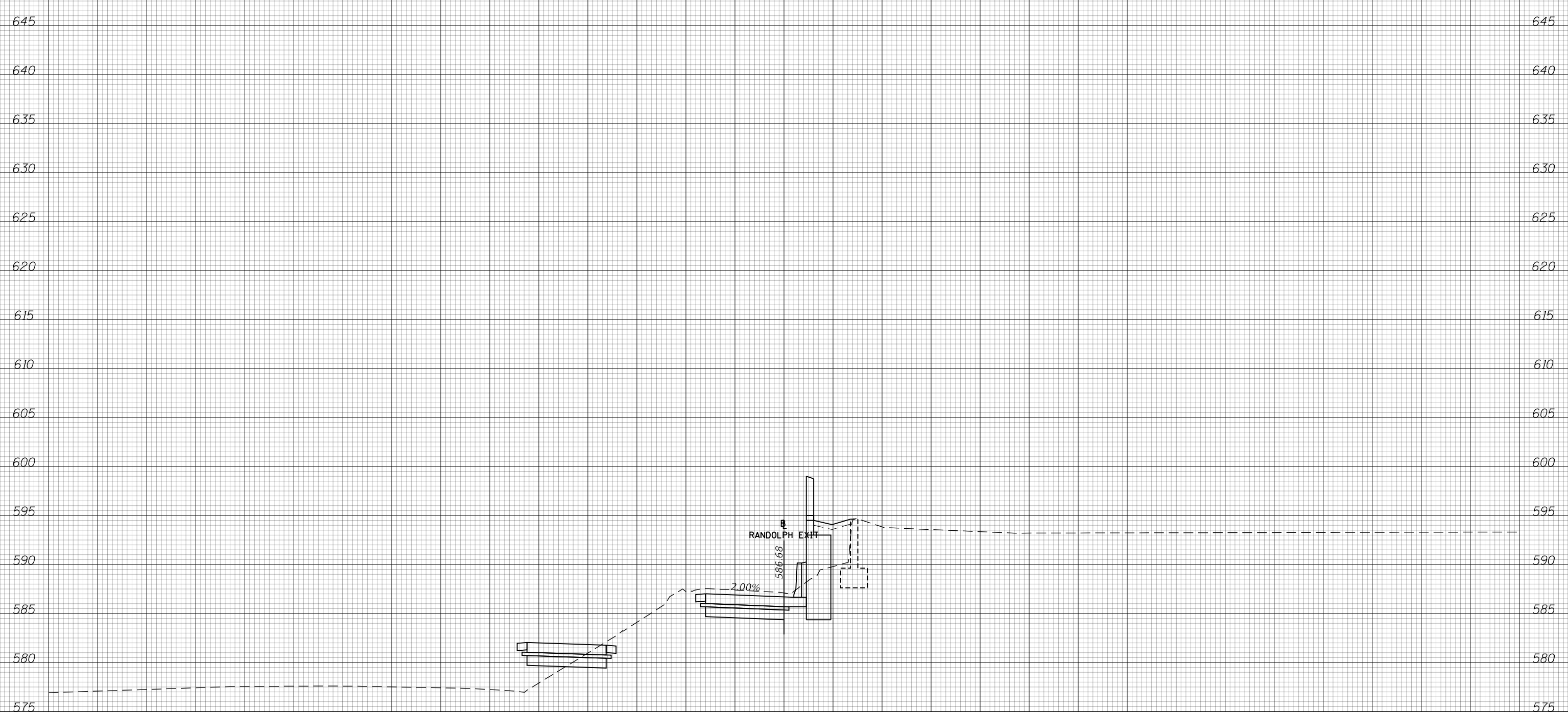
RETAINING WALL NO. 52
SCALE: 10:H 5:V SHEET #ES1-7 OF #ES1-5 SHEETS STA. 8743+00.00 TO STA. 8743+00.00

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2015-D18R	COOK	2137	#ES1-7
CONTRACT NO. 62A76				
ILLINOIS FED. AID PROJECT				

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

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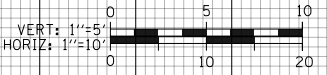
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8743 + 25.00



D162A76-Sht-XS-Rand-NX.dgn	DESIGNED -	REVISED -
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PLOT SCALE = 20.0000' / in.	CHECKED -	REVISED -
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STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

RETAINING WALL NO. 52

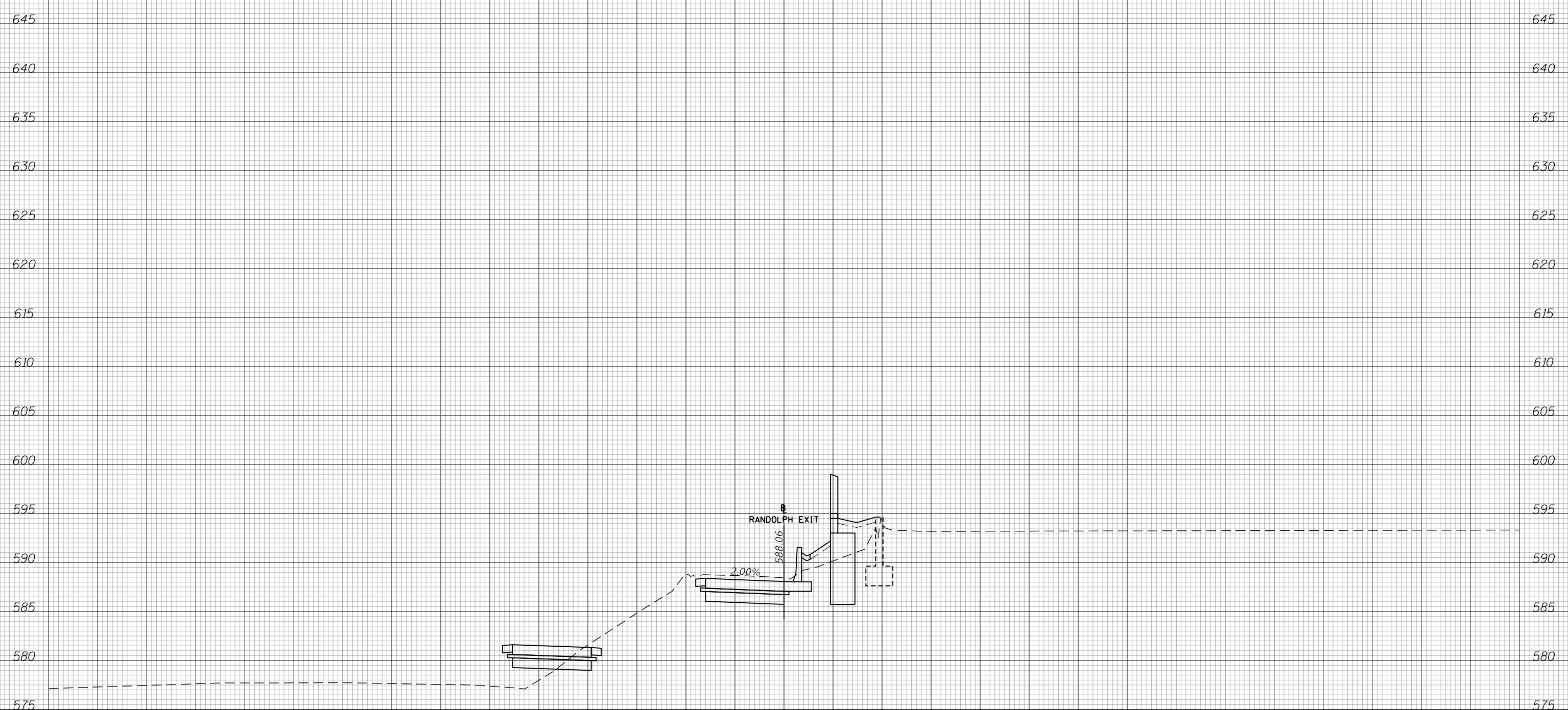
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F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2015-D18R	COOK	2137	#ES1-8
CONTRACT NO. 62A76				
ILLINOIS FED. AID PROJECT				

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

DATE	
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FINAL SURVEY NOTE BOOK NO.	

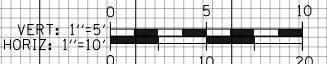
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ORIGINAL SURVEY NOTE BOOK NO.	



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8743 + 50.00



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**STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION**

RETAINING WALL NO. 52

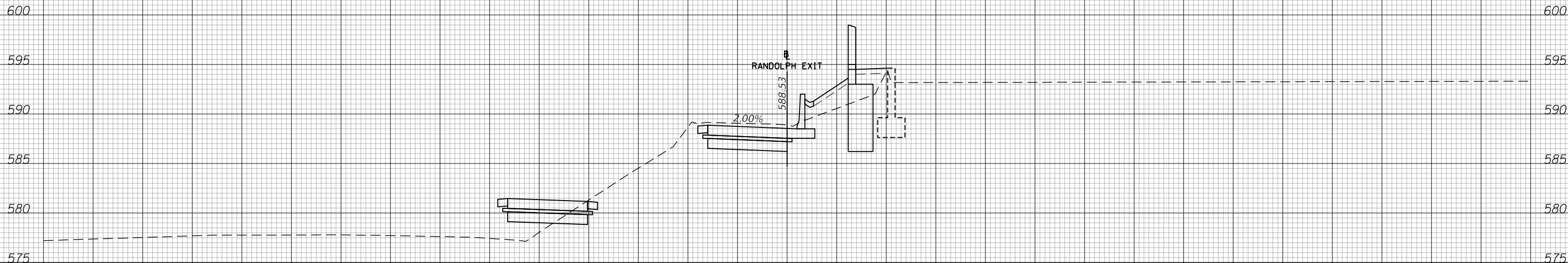
SCALE: 10:H 5:V SHEET #ES1-9 OF #ES1-50 SHEETS STA. 8743+50.00 TO STA. 8743+50.00

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2015-D18R	COOK	2137	#ES1-9
CONTRACT NO. 62A76				
ILLINOIS FED. AID PROJECT				

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

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FINAL SURVEY NOTE BOOK NO.	

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8743 + 58.66



D162A76-Sht-XS-Rand-NX.dgn
 USER NAME = zmaranko
 PLOT SCALE = 20.0000' / in.
 PLOT DATE = 4/15/2019

DESIGNED -
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 CHECKED -
 DATE - 4-1-2019

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 REVISED -
 REVISED -
 REVISED -

**STATE OF ILLINOIS
 DEPARTMENT OF TRANSPORTATION**

RETAINING WALL NO. 52

SCALE: 10:H 5:V SHEET #ES1-100F #ES1-500EETS STA. 8743+58.66 TO STA. 8743+58.66

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2015-D18R	COOK	2137	#ES1-10
CONTRACT NO. 62A76				
ILLINOIS FED. AID PROJECT				