Illinois Department of Transportation

Memorandum

To:	Fawad Aqueel	Attn:	Helen Pazon
From:	Stephen Jones	By:	Giancarlo Gierbolini
Subject:	Roadway Geotechnical Report*		
Date:	May 6, 2021		

*Route: FAU 3887 (Illinois Route 31)
Location: at United States Route 20
Section: 8HB-2
County: Kane
Contract: 62G41

Attached is the condensed Roadway Geotechnical Report prepared by the District One Geotechnical Section for the above referenced project. The report provides geotechnical soil information obtained during the field investigation, as well as recommendations for the proposed improvements.

Please note that this report contains information regarding the subgrade soil conditions, traffic signal foundations, and topsoil stripping depths.

If you have any questions regarding this report, please contact Robert Claussen, P.E. at (847)705-4735 or Giancarlo Gierbolini, P.E. at (847) 705-4003.

Cc: IDOT Soil Inspector

CONDENSED ROADWAY GEOTECHNICAL REPORT

Date: May 6, 2021

Route: FAU 3887 (Illinois Route 31)
Location: at United States Route 20
Section: 8HB-2
County: Kane
Contract: 62G41

LOCATION OF IMPROVEMENT

The proposed project will include improvements to Illinois Route 31 (IL 31) at the crossing with United States Route 20 (US 20). The project is located in the City of Elgin, on the east side of Kane County. A project location map has been attached at the end of this report for reference.

DESCRIPTION OF PROJECT

The proposed improvements to IL 31 at the crossing with US 20 will consist of replacing the existing bridge structure carrying IL 31 over US 20 with a wider bridge, which will include two through lanes in each direction, left turn lanes for access to the US 20 on-ramps, a sidewalk on the east side, and a shared use path on the west side. IL 31 will also be widened to the north and south side of the bridge to provide dedicated right turn lanes to the entrance ramps to US 20. Improvements to US 20 will include widening the inside shoulders and shifting the traffic lanes to the outside to accommodate these wider inside shoulders. The entrance and exit ramps for US 20 will also include minor improvements to accommodate the grading changes and improved curb radii, and new traffic signals structures where they cross IL 31. The project will also include storm sewer improvements including the construction of a storm line extending east from IL 31, along the south side of the parking lot for the Department of Motor Vehicles facility. The widened roadway will consist of full depth pavement and the existing pavement will be milled and resurfaced. The improvements on IL 31 will begin on the south side at Station 44+30 and will end on the north side at Station 64+75. The improvements on US 20 will begin on the west side at Station 373+00 and will end on the east side at Station 387+50.

PAVEMENT DESIGN

Based on the design plans, the proposed improvements will include full depth pavement in the widening areas and resurfacing for the existing pavement within the project limits. For the improvements to IL 31 and the entrance and exit ramps for US 20, the proposed full depth pavement will consist of 2 inches of Hot Mix Asphalt (HMA) surface course pavement over 2 ¼ inches of HMA binder course pavement, over 7 inches of HMA base course. For the improvements to US 20, the proposed full depth pavement will consist of 1 ¾ inches of HMA surface course pavement over ¾ inches of HMA binder course pavement, over 11 inches of HMA base course. All of the full depth pavement is to be supported on 12 inches of aggregate subgrade improvement, in accordance with the District One Special Provision. The pavement section for all areas of resurfacing will consist of 1 ¾ inches of HMA surface course pavement over ¾ inches of HMA binder course pavement.

SURROUNDING LAND USE

The existing land use within the vicinity of the project consists of developed land. The area north of US 20 consists of single family residential properties. The properties to the south of US 20 consist of commercial land use, with an Illinois Department of Motor Vehicles facility located on the southeast corner of the interchange, and an Illinois Department of Human Services Campus on the southwest corner. In general the existing and proposed pavement grades are approximately equal to the surrounding land area. The profile of IL 31 will be raised approximately 2 feet over US 20 to increase the bridge clearance. Only minor fills will be needed for the approaches and only minor cuts and fills will be necessary to match the existing grading on the sides of the roadway. The existing and proposed storm water drainage within the project limits consists of curb and gutter and piped storm sewer.

PEDOLOGICAL SETTING

According to the U.S. Department of Agriculture Soil Survey, Natural Resources Conservation Service (Web Soil Survey http://websoilsurvey.nrcs.usda.gov) for Kane County, the native, near surface pedological soil types within the project limits primarily consist of those listed below. The Pedological Map included at the end of this report shows the various soil types in relation to the project limits. It should be noted that the near surface water depths indicated for each soil type to not represent the long term water table.

<u>Waupecan silt loam, 0 to 2 percent slopes (369A)</u> – This well drained material is found in stream terraces and outwash plains at the summit of slopes. The parent material consists of loess or

other silty material and in underlying loamy and gravely outwash. The typical near surface soil profile consists of silt loam from 0 to 13 inches below existing ground. From 13 to 38 inches, the material consists of silty clay loam. From 38 to 55 inches, the material consists of stratified layers of gravelly sandy loam and clay loam, and from 55 inches to 70 inches, the material consists of stratified layers of gravelly loamy sand and gravelly coarse sand. The near surface water is normally deeper than 80 inches below the ground surface. Ponding and flooding do not typically occur. All areas are considered prime farmland.

Bowes silty loam, 2 to 4 percent slopes (792B) – This well drained material is found in outwash plains and stream terraces backslope and summit of slopes. The parent material consists loess or other silty materials and underlying loamy, gravelly outwash. The typical near surface soil profile consists of silt loam from 0 to 7 inches, underlain by silty clay loam from 7 to 37 inches. From 37 to 43 inches, the material consists of gravelly clay loam. From 43 to 60 inches below the surface, the material consists of stratified layers of gravelly cloarse sand and gravelly sandy loam. The near surface water is normally deeper than 80 inches below the ground surface. Flooding and ponding do not typically occur, and all areas are considered prime farmland.

GEOLOGICAL SETTING

According to the map titled SURFICIAL GEOLOGY OF THE CHICAGO REGION by H.B. Willman and Jerry A. Lineback (1970), the project area is located geographically within the Mackinaw Member of the Henry Formation. The near surface geology for this area is described as granular, consisting of generally well sorted, evenly bedded, sand and gravel from glacial outwash found in terraces. The soils encountered in the borings completed in the field at the project site and described in the boring logs included in this report, are in general agreement with this description. Soil descriptions specific to this site can be found in the Subsurface Conditions section of this report.

STORMWATER POLLUTION PREVENTION PLAN SITE DESCRIPTION

We understand that this project is subject to statewide general NPDES storm water permit for the construction site activities; therefore, a Storm Water Pollution Prevention Plan (SWPPP) will be required for this project. In order to complete the SWPPP (Form BDE 2342) a description of the project site must be provided, including the existing soil types and their erosion potential in addition to identifying the locations of any highly erodible soils. The erosion properties for the soil type present within the vicinity of the project limits are presented in Table 1 below. The erosion factors (K factors) are used to evaluate the erosion potential of the soils, with the soils being more susceptible to sheet and rill erosion as values increase. The K factor for the soils within the project limit had a value of 0.32. The Erosion Hazard Rating of each soil type is based on soil erosion factor (K), slope of the ground surface, and content of rock fragments, and represents the potential for surface erosion. The soils within the project limits have soil erosion rating of Slight to Severe. The NRCS Soil Erosion Factor (K) Map included at the end of this report shows the soil areas and the applicable K factor in relation to the project limits.

Table 1: Soil Erosion Properties

Soil Name	Slope (%)	K Factor	Erosion Hazard Rating	Hydric Rating
Waupecan silt loam (369A)	0 to 2	0.32	Slight	No
Bowes silt loam (792B)	2 to 4	0.32	Moderate	No

PAVEMENT CONDITION SURVEY

The general condition of the pavement within the project limits was observed at the time the field exploration was completed. The existing roadway consists of HMA pavement surface with concrete curb and gutter. The overall condition of the existing pavement is considered fair, with a majority of the pavement surface showing moderate wear, while still in adequate condition for vehicle use. Significant transverse cracking was observed throughout, and longitudinal cracking was observed at the pavement joints. Alligator cracking was observed along the edges of the roadway and along the longitudinal cracks. Increased cracking and rutting was observed at the signalized crossings on IL 31 at the entrance and exit ramps for US 20. This could suggest that weakening of the subgrade support due to water infiltration. The curb and gutter appeared to be in fair shape, with cracking observed at regular intervals throughout.

CLIMATOLOGICAL DATA

The field investigation for this project was completed in October of 2019. The monthly temperature and precipitation data for the month the field investigation was completed is not yet available at the time this report is being written. The months of July and August showed precipitation that was close to, or lower than, average for this time of year; however, the months of September and October showed precipitation that was significantly higher than normal. Based on the above normal precipitation for these months, it is our opinion that the water levels encountered in the borings and the moisture contents recorded for the near surface soils may be higher than normal for this area.

Table 2: Climate Conditions

Month	Precipitation (in.)		Temperature °F	
	Total	Departure from Normal	Average Temp.	Departure from Normal
July 2019	**3.9**	**0.2**	**77.1**	**3.1**
August 2019	**3.6**	**-1.3**	**72.9**	**0.5**
September 2019	**7.6**	**4.4**	**69.4**	**4.8**
October 2019	**6.8**	**3.6**	**50.9**	**-1.6**

The recording station for climatological data is located at O'Hare International Airport, which is approximately 20 miles east of the project site.

DRILLING AND SAMPLING

The subsurface exploration for this project consisted of a total of 12 soil borings. Nine (9) of the boring were completed by IDOT for the roadway improvements and 3 of the boring were completed by Rubino Engineering for the bridge structure. The soil borings were completed by IDOT were drilled in October 2019 using a truck mounted, Mobil B-57 drill rig with 3 ¼ inch I.D. hollow stem augers. Eight (8) of the borings were completed to a depth of 10 feet below the existing ground surface and one (1) was completed to a depth of 20 feet. The borings completed by Rubino Engineering consisted of three (3) borings to a depths of 70 to 75 feet. The information in these borings was also used for the roadway recommendations in this report.

Soils were collected in the borings with the use of a split barrel sampler, in accordance with AASHTO 206-09 (2013) "Penetration Test and Split-Barrel Sampling of Soils." In the split barrel sampling procedure, a split spoon sampler having a 2-inch outside diameter, an inside diameter of 1 ³/₈ inches, and a length of 1.5 feet is driven into the soil. This sampler is advanced by driving it with a 140-pound weight, falling freely from a height of 30 inches with the Standard Penetration Resistance being recorded as a number of blows required to advance the sampling spoon a depth of 12 inches after an initial driving of 6 inches used to seat the sampler.

Soil samples were collected at 2.5 foot intervals to a depth of 30 feet below the ground surface, and then at 5 foot intervals to the boring termination depth. The soils encountered were inspected, visually classified and logged. The unconfined compressive strength of cohesive soil samples was tested in the field using a RIMAC compression tester and were verified using a calibrated hand penetrometer. Representative soil samples were collected from each sample interval and returned to the laboratory for further testing. The locations of the soil borings in relation to the existing and proposed conditions are shown in the Soil Boring Location Plan at the end of this report.

SUBSURFACE CONDITIONS

Most of the borings were drilled in the grass areas adjacent to the existing roadway and encountered an average of 12 inches of topsoil, with some locations encountering up to 36 inches of topsoil. Two of the borings were completed in the existing pavement area and encountered 3 inches of Hot Mix Asphalt (HMA) over 9 inches of Portland Cement Concrete (PCC). Below the near surface materials, the borings completed for the roadway encountered approximately cohesive soils to depths of 3 to 9 feet. These cohesive soils consisted of medium stiff to stiff silty clay, clay, and loam. The cohesive soil layers were underlain by loose to dense granular soils consisting of sand and gravel, which were encountered to boring termination of 11.5 feet in the roadway borings. The borings completed for the bridge structure were extended deeper, and encountered layers of medium dense to very dense sand and gravel to boring termination at 75 feet below the existing ground surface. The soil boring logs have been included at the end of this report and can be referenced for information at specific locations. The Roadway Analysis and Recommendations section below provides information regarding the evaluation of the subgrade soils and determining if undercuts are warranted. Care should be taken when evaluating the exposed subgrade soils to determine the suitability of the soils present at this depth.

Water was encountered in the bridge borings at an elevation of 703 while drilling, and between elevations 702 and 716 after the borings were completed. Water was not encountered in any of the roadway borings while drilling and was not encountered in any of the borings directly after completion. Long term observations in cased borings or piezometers would be necessary to more accurately evaluate groundwater conditions. In general, it should be noted that the groundwater level may fluctuate based on seasonal precipitation, evaporation, surface run-off and other factors.

ROADWAY GEOTECHNICAL ANALYSIS AND RECOMMENDATIONS

Subgrade Support Rating and Illinois Bearing Ratio

Mechanistic pavement design procedures require that the subgrade soils be assigned a Subgrade Support Rating (SSR) based on the particle size distribution as depicted on the SSR chart. The subgrade soils encountered during the field exploration were primarily cohesive and have an SSR of rating Fair. Based on this, we recommend that an **SSR of <u>fair</u>** be used for the design of the proposed pavement section when using mechanistic design procedures.

AASHTO design procedures require that the subgrade soils be assigned an Illinois Bearing Ratio (IBR). This value can be determined by means of physical testing or by using an assumed value based on the soil type. Based on the soils encountered, we recommend using an assumed **IBR value of <u>5</u>** for the design of the proposed pavement when using AASHTO design procedures.

<u>Roadway Subgrade</u>

The proposed pavement section should be supported on 12 inches of improved subgrade consisting of AGGREGATE SUBGRADE IMPROVEMENT (SQ YD) in accordance with the District One Aggregate Subgrade Improvement Special Provision (April 1, 2016). This material will provide a stable subgrade for roadway construction.

Based on the soils encountered during the field investigation, the subgrade soils in the existing pavement and embankment area appear suitable to support the proposed pavement structure and no undercuts of the subgrade soils are recommended at this time. The actual need for any undercuts should be determined in the field at the time of construction by the geotechnical engineer or soils inspector. We recommend including a plan quantity of AGGREGATE SUBGRADE IMPROVEMENT (CU YD) equal 25% of the planned full depth pavement area, assuming a thickness of 12 inches. All potentially unstable soils should be tested with a cone penetrometer and treated in accordance with Article 301.04 of the Standard Specifications for Road and Bridge Construction (SSRBC) adopted April 1, 2016 and the undercut guidelines in the IDOT Subgrade Stability Manual. If unsuitable soils are encountered in the field during construction, it is recommended that the soil be removed and replaced with material meeting the District One Aggregate Subgrade Improvement Special Provision. Any Aggregate Subgrade Improvement material not needed for undercut replacement at the time of construction should be deleted from the contract with no extra compensation to the contractor.

Based on the above recommendation, there will be a need for two separate Aggregate Subgrade Improvement line items in the Schedule of Quantities (SOQ) included in the design plans:

- AGGREGATE SUBGRADE IMPROVEMENT 12” (SQ YD) – This will be used for the 12 inch aggregate subgrade improvement below new pavement sections and widening pavement sections.

- AGGREGATE SUBGRADE IMPROVEMENT (CU YD) – This will be used in locations where there are undercuts (below the 12 inch improved subgrade layer) where poor soils were removed.

Both of these line items reference back to the District One Aggregate Subgrade Improvement Special Provision.

We also recommend placing geotextile fabric at the base of all undercut areas where low strength subgrade soils are encountered. We recommend including a plan quantity of GEOTECHNICAL FABRIC FOR GROUND STABILIZATION (SQ YD) equal to 25% of the proposed full depth pavement area. The 12 inches of improved subgrade is not considered an undercut, and we do not recommend using geotextile fabric at the base of the proposed 12 inch improved subgrade layer unless it is determined to be necessary to achieve stability by the Geotechnical Engineer or soils inspector at the time of construction. Geotextile Fabric should meet the requirements of Article 210, Fabric for Ground Stabilization, of the SSRBC. Any material not needed at time of construction should be deleted from the contract with no extra compensation to the contractor.

Settlement Potential

Based on the proposed plans, it appears that the proposed grades will be close to the existing grades. Based on the limited grade change and the material encountered in the soil borings, settlement of the soils underlying is estimated to be less than one inch.

Underdrains

To provide drainage for the proposed pavement in areas where the roadway will be completely reconstructed, we recommend installing both longitudinal and transverse pipe underdrains below the pavement for the roadways. We recommend installing the transverse drains using a spacing of 300 feet. To provide drainage for the proposed pavement in widening areas, we recommend installing longitudinal pipe underdrains below the pavement for the roadways. Underdrains should also be installed in low areas and at the base of any undercuts. The underdrains should tie into the storm water drainage system and should be installed per Article 601 in the IDOT Standard Specifications and consist of Type 2 underdrains (Adopted January 1, 2016).

STRUCTURES – GEOTECHNICAL ANALYSIS AND RECOMMENDATIONS

Traffic Signal Foundations

Based on the information provided by the Bureau of Design, the proposed improvements will include the construction of new cantilever mast arm traffic signals. In general, the traffic signals consist of cantilever mast arms of variable design length, supported on a pole, which is in turn supported on a drilled shaft foundation. The diameter and depth of the drilled shaft are determined by the overall dimensions of the pole and mast arm. The preliminary traffic plans show 6 single mast arm traffic signals, 3 at each crossing between IL 31 and the US 20 ramps. The proposed traffic signal structures have mast arms with lengths between 32 feet and 48 feet.

The District One Standard Traffic Signal Design Details (TS-05) or Standard 878001-10 provide a chart with the dimensions for the drilled shaft foundation supporting single mast arm traffic signals. The standard foundation details require that the soils present along the foundation shaft be mostly cohesive in nature with unconfined compressive strengths of 1.0 ton per square foot (tsf) or greater. The soils encountered in the borings completed for this project were primarily granular, thus the drilled shaft foundations for the mast arm structures cannot be designed using the dimensions provided on the standards. Custom foundation dimensions were calculated for each traffic structure based on the anticipated force reactions and strength parameters for the soils encountered. The dimensions are provided in the table below.

Table 3: Traffic Signal Foundation Dimensions – Single Mast Arm

Mast Arm Length (feet)	Foundation Shaft Diameter (inches)	Foundation Shaft Depth (feet)
South side of bridge at Ramps L and M		
32	30	13.5
	36	11.0
42	36	13.0
46	36	13.0
North side of bridge at Ramps K and N		
38	30	13.5
	36	12.5
40	36	13.0
48	36	13.0

The drilled shaft construction should be completed in accordance with Section 516, Drilled Shafts, in the IDOT Standard Specifications for Road and Bridge Construction (adopted April 1, 2016). The contractor should review the attached boring logs, evaluate the soil conditions and depths, and determine the means and methods necessary for construction. The soils encountered within the design shaft depth were granular in nature and may be susceptible to caving. Although water bearing soils were not encountered within the design shaft depth during the soil boring exploration, existing fill materials and granular deposits can collect water and may be susceptible to caving or squeeze, resulting in deformation of the side of the drilled shaft. The contractor should be aware that wet-method drilling, temporary casing, or a combination may be needed to facilitate shaft construction in these situations.

CONSTRUCTION CONSIDERATIONS

This section provides the recommendations pertaining to the construction of the proposed improvements. It is recommended that work meet the requirements set forth in the IDOT Standard Specifications for Road and Bridge Construction (SSRBC) adopted April 1, 2016.

Site Preparation and Earthwork

All topsoil and any vegetation shall be removed from areas of proposed widening. In areas where topsoil will be removed to facilitate construction, we recommend using a topsoil stripping depth of 12 inches to determine contract quantities. Topsoil that is stripped should be stockpiled and reused once all roadway construction is completed. All earthwork shall be in accordance with Sections 204 and 205 of the IDOT SSRBC (Adopted April 1, 2016). District One currently uses a shrinkage factor of 15 percent.

Excavation Adjacent to Existing Embankment

All of the excavation and trenching operations should meet the requirements of IDOT and OSHA. The need for trench boxes, temporary earth retention, or bracing needed to install the proposed utility improvements should be evaluated prior to commencing earth work should be coordinated with the resident engineer.

Groundwater Management

Water was encountered in the deeper borings that were completed for the bridge structure. Water was encountered while drilling at depths of 34 to 54 feet below the ground surface (elevation 703) and at a depth of about 35 feet below the surface (elevations 702 to 717) after the borings were completed. It is not believed that groundwater related issues will be encountered during construction of the roadway improvements; however, the contractor should anticipate that the water may be perched (trapped) in fill materials and granular soils. Water should not be permitted to collect in excavations during or after construction and any water encountered should be removed to maintain dry, stable excavations. Water that is permitted to collect in excavations can soften the subgrade and bearing soils, which may result in the need to over excavate.

If you have any questions regarding this report, please contact either Robert J. Claussen, P.E. at (847) 705-4735 or Giancarlo Gierbolini, P.E. at (847) 705-4003.

Prepared by:
Robert J. Claussen, P.E.
Geotechnical Engineer

Attachments:

- Project Location Map
- NRCS Pedology Map
- NRCS Soil Erosion Factor (K) Map
- Soil Boring Location Plan
- Soil Boring Logs

PROJECT LOCATION MAP

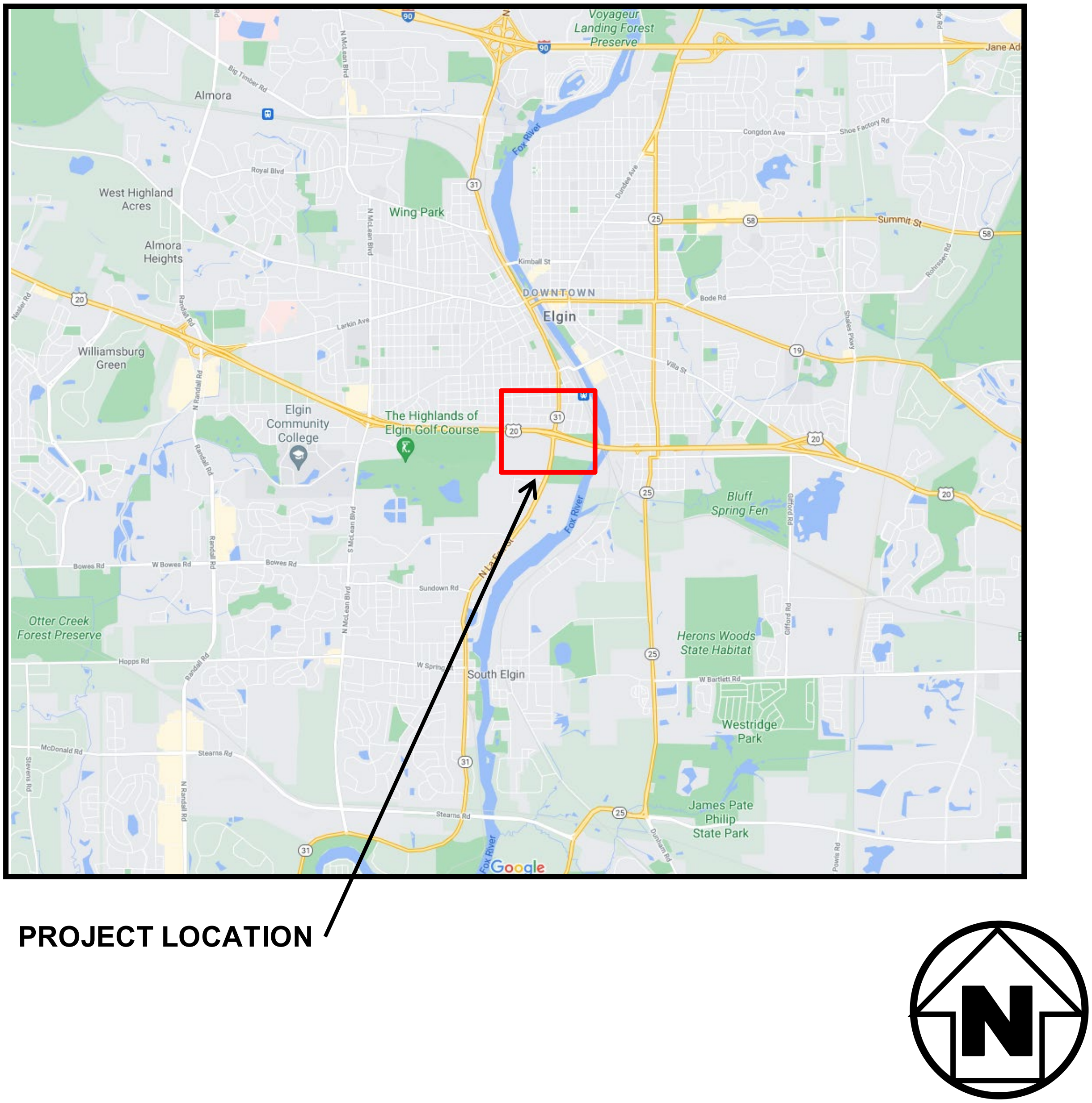
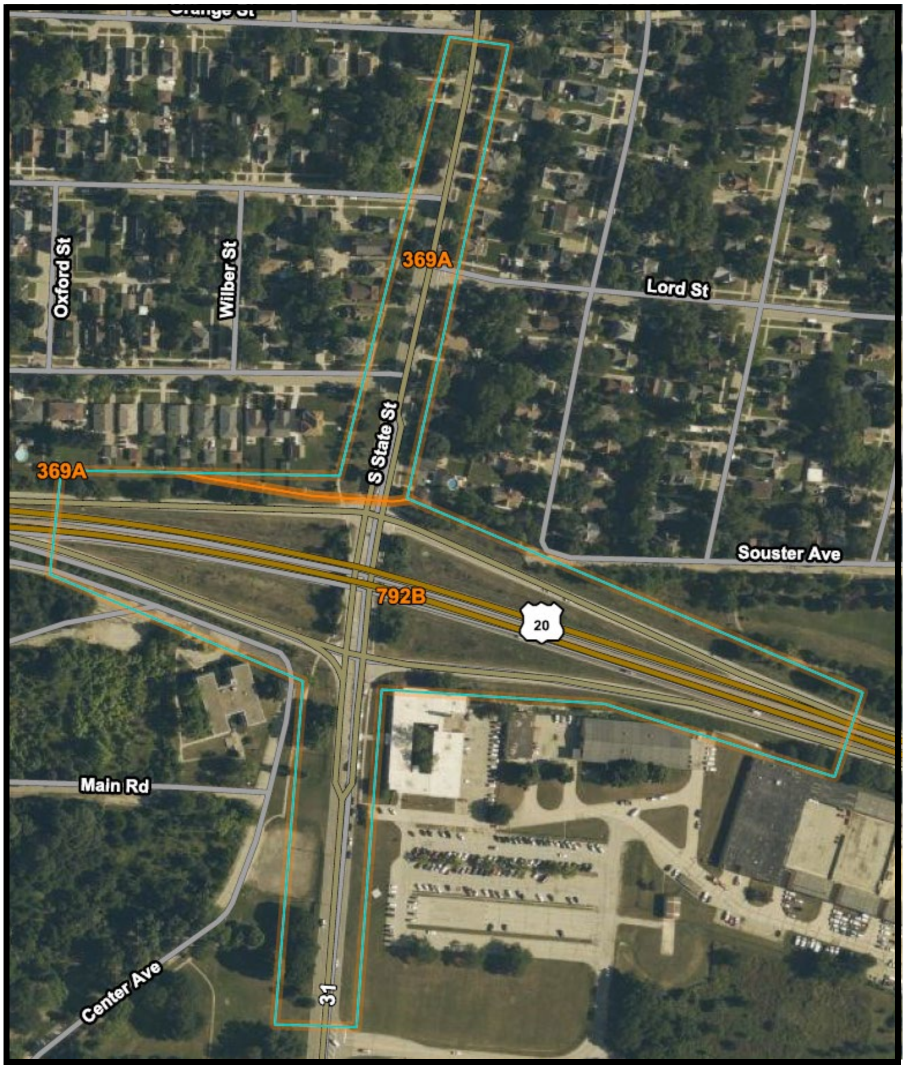


Exhibit 1 – Project Location Map
Route: FAU 3887 (Illinois Route 31)
Location: at United States Route 20
Section: 8HB-2
County: Kane
Contract: 62G41

NRCS PEDOLOGY MAP



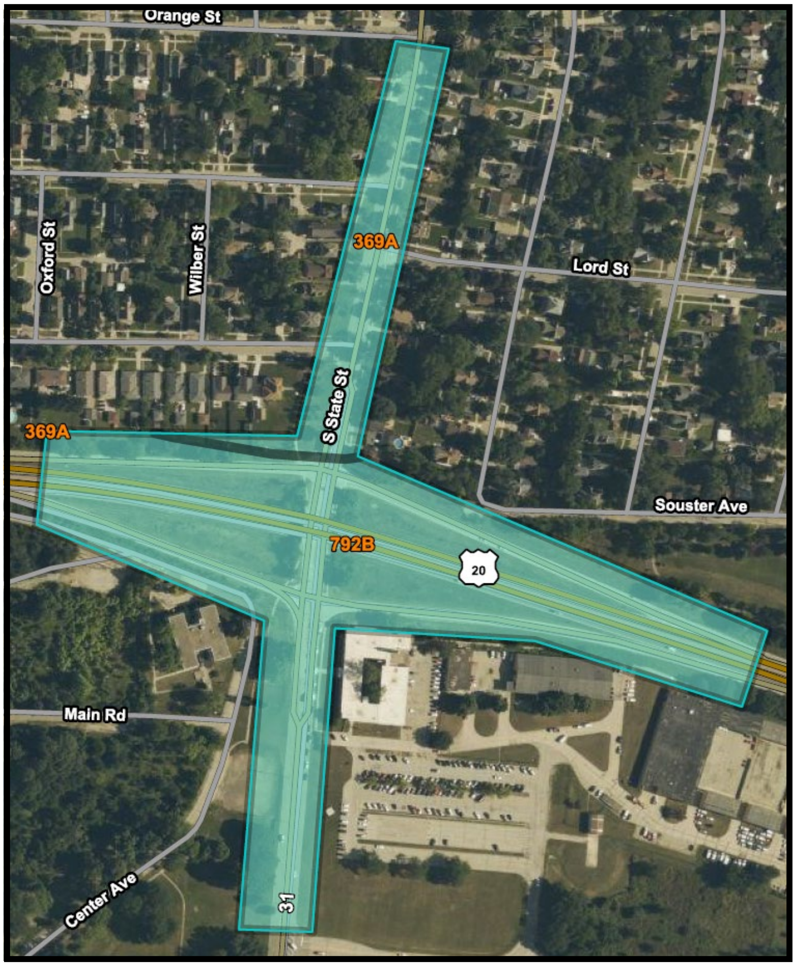
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
369A	Waupecan silt loam, 0 to 2 percent slopes	3.0	18.7%
792B	Bowes silt loam, 2 to 4 percent slopes	13.0	81.3%
Totals for Area of Interest		**15.9**	**100.0%**

Exhibit 2 – NRCS Pedology Map
Route: FAU 3887 (Illinois Route 31)
Location: at United States Route 20
Section: 8HB-2
County: Kane
Contract: 62G41

NRCS SOIL EROSION FACTOR (K) MAP

Soil Rating Points

- .02
- .05
- .10
- .15
- .17
- .20
- .24
- .28
- .32
- .37
- .43
- .49
- .55
- .64
- Not rated

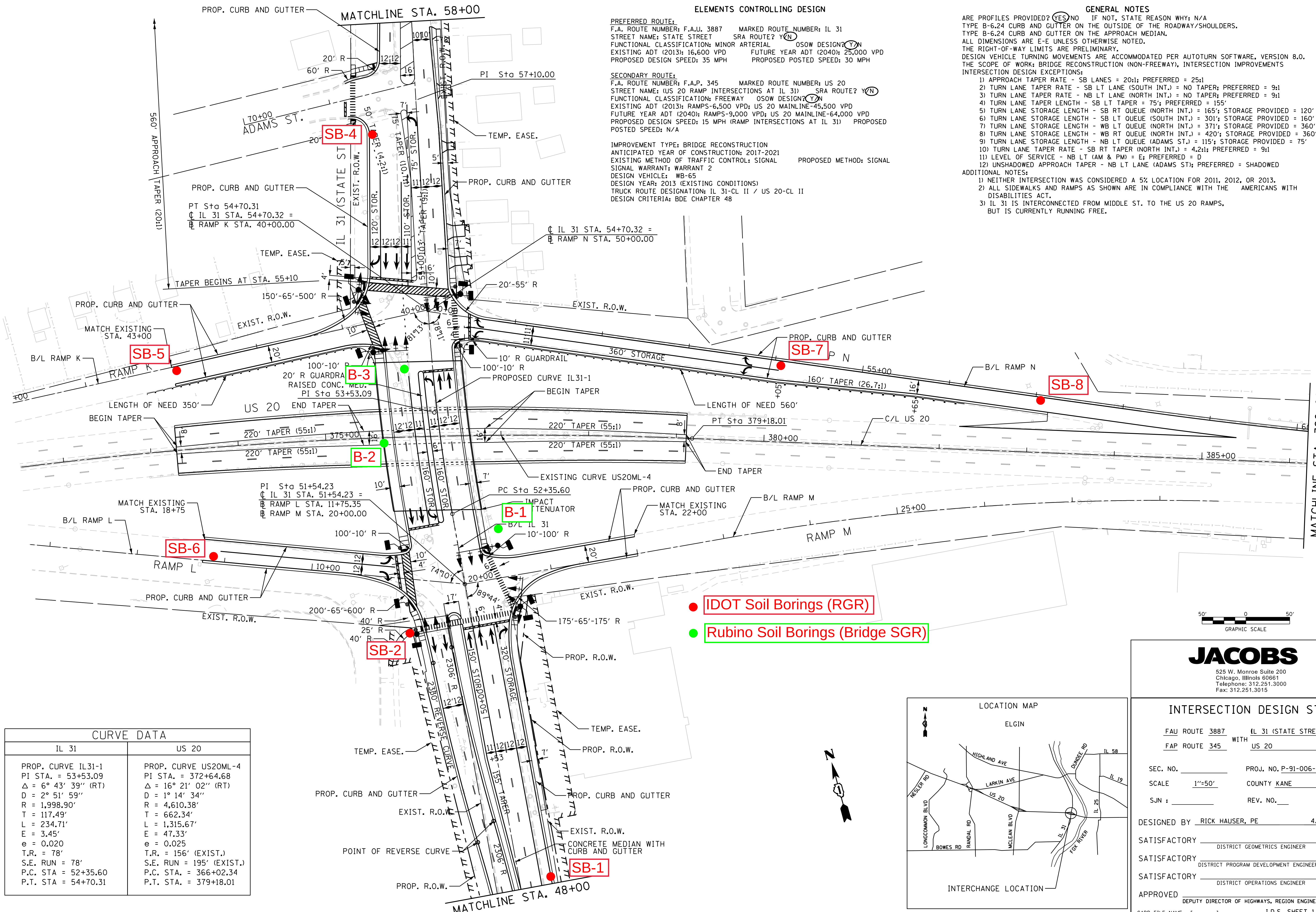


Table—K Factor, Whole Soil

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
369A	Waupecan silt loam, 0 to 2 percent slopes	.32	3.0	18.7%
792B	Bowes silt loam, 2 to 4 percent slopes	.32	13.0	81.3%
Totals for Area of Interest			**15.9**	**100.0%**

Exhibit 3 – NRCS Soil Erosion Factor (K) Map
Route: FAU 3887 (Illinois Route 31)
Location: at United States Route 20
Section: 8HB-2
County: Kane
Contract: 62G41

SOIL BORING LOCATION PLAN



ELEMENTS CONTROLLING DESIGN

PREFERRED ROUTE:
F.A. ROUTE NUMBER: F.A.U. 3887 MARKED ROUTE NUMBER: IL 31
STREET NAME: STATE STREET SRA ROUTE? Y/N
FUNCTIONAL CLASSIFICATION: MINOR ARTERIAL OSOW DESIGN? Y/N
EXISTING ADT (2013): 16,600 VPD FUTURE YEAR ADT (2040): 25,000 VPD
PROPOSED DESIGN SPEED: 35 MPH PROPOSED POSTED SPEED: 30 MPH

SECONDARY ROUTE:
F.A. ROUTE NUMBER: F.A.P. 345 MARKED ROUTE NUMBER: US 20
STREET NAME: (US 20 RAMP INTERSECTIONS AT IL 31) SRA ROUTE? Y/N
FUNCTIONAL CLASSIFICATION: FREEWAY OSOW DESIGN? Y/N
EXISTING ADT (2013): RAMPS-6,500 VPD; US 20 MAINLINE-45,500 VPD
FUTURE YEAR ADT (2040): RAMPS-9,000 VPD; US 20 MAINLINE-64,000 VPD
PROPOSED DESIGN SPEED: 15 MPH (RAMP INTERSECTIONS AT IL 31) PROPOSED POSTED SPEED: N/A

IMPROVEMENT TYPE: BRIDGE RECONSTRUCTION
ANTICIPATED YEAR OF CONSTRUCTION: 2017-2021
EXISTING METHOD OF TRAFFIC CONTROL: SIGNAL PROPOSED METHOD: SIGNAL
SIGNAL WARRANT: WARRANT 2
DESIGN VEHICLE: WB-65
DESIGN YEAR: 2013 (EXISTING CONDITIONS)
TRUCK ROUTE DESIGNATION: IL 31-CL II / US 20-CL II
DESIGN CRITERIA: BDE CHAPTER 48

GENERAL NOTES

ARE PROFILES PROVIDED? YES/NO IF NOT, STATE REASON WHY: N/A
TYPE B-6.24 CURB AND GUTTER ON THE OUTSIDE OF THE ROADWAY/SHOULDERS.
TYPE B-6.24 CURB AND GUTTER ON THE APPROACH MEDIAN.
ALL DIMENSIONS ARE E-E UNLESS OTHERWISE NOTED.
THE RIGHT-OF-WAY LIMITS ARE PRELIMINARY.
DESIGN VEHICLE TURNING MOVEMENTS ARE ACCOMMODATED PER AUTOTURN SOFTWARE, VERSION 8.0.
THE SCOPE OF WORK: BRIDGE RECONSTRUCTION (NON-FREEWAY), INTERSECTION IMPROVEMENTS
INTERSECTION DESIGN EXCEPTIONS:

1) APPROACH TAPER RATE - SB LANES = 20:1; PREFERRED = 25:1
2) TURN LANE TAPER RATE - SB LT LANE (SOUTH INT.) = NO TAPER; PREFERRED = 9:1
3) TURN LANE TAPER RATE - NB LT LANE (NORTH INT.) = NO TAPER; PREFERRED = 9:1
4) TURN LANE TAPER LENGTH - SB LT TAPER = 75'; PREFERRED = 155'
5) TURN LANE STORAGE LENGTH - SB RT QUEUE (NORTH INT.) = 165'; STORAGE PROVIDED = 120'
6) TURN LANE STORAGE LENGTH - SB LT QUEUE (SOUTH INT.) = 301'; STORAGE PROVIDED = 160'
7) TURN LANE STORAGE LENGTH - WB LT QUEUE (NORTH INT.) = 371'; STORAGE PROVIDED = 360'
8) TURN LANE STORAGE LENGTH - WB RT QUEUE (NORTH INT.) = 420'; STORAGE PROVIDED = 360'
9) TURN LANE STORAGE LENGTH - NB LT QUEUE (ADAMS ST.) = 115'; STORAGE PROVIDED = 75'
10) TURN LANE TAPER RATE - SB RT TAPER (NORTH INT.) = 4.2:1; PREFERRED = 9:1
11) LEVEL OF SERVICE - NB LT (AM & PM) = E; PREFERRED = D
12) UNSHADOWED APPROACH TAPER - NB LT LANE (ADAMS ST); PREFERRED = SHADOWED

ADDITIONAL NOTES:

1) NEITHER INTERSECTION WAS CONSIDERED A 5% LOCATION FOR 2011, 2012, OR 2013.
2) ALL SIDEWALKS AND RAMPS AS SHOWN ARE IN COMPLIANCE WITH THE AMERICANS WITH DISABILITIES ACT.
3) IL 31 IS INTERCONNECTED FROM MIDDLE ST. TO THE US 20 RAMPS, BUT IS CURRENTLY RUNNING FREE.

CURVE DATA

IL 31	US 20
PROP. CURVE IL31-1	PROP. CURVE US20ML-4
PI STA. = 53+53.09	PI STA. = 372+64.68
Δ = 6° 43' 39'' (RT)	Δ = 16° 21' 02'' (RT)
D = 2° 51' 59''	D = 1° 14' 34''
R = 1,998.90'	R = 4,610.38'
T = 117.49'	T = 662.34'
L = 234.71'	L = 1,315.67'
E = 3.45'	E = 47.33'
e = 0.020	e = 0.025
T.R. = 78'	T.R. = 156' (EXIST.)
S.E. RUN = 78'	S.E. RUN = 195' (EXIST.)
P.C. STA = 52+35.60	P.C. STA. = 366+02.34
P.T. STA = 54+70.31	P.T. STA. = 379+18.01

JACOBS
525 W. Monroe Suite 200
Chicago, Illinois 60661
Telephone: 312.251.3000
Fax: 312.251.3015

INTERSECTION DESIGN STUDY

FAU ROUTE 3887 IL 31 (STATE STREET)
WITH
FAP ROUTE 345 US 20

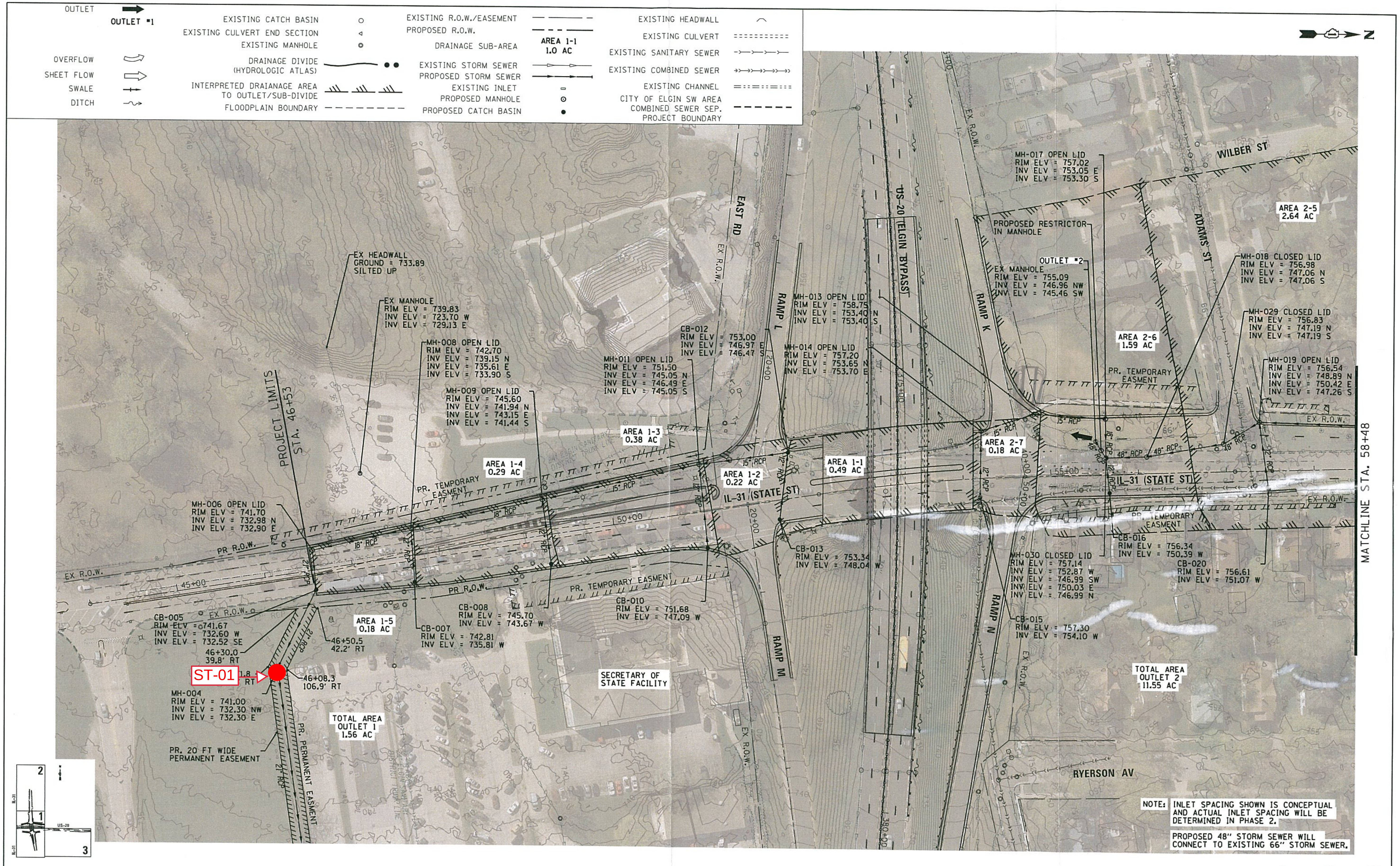
SEC. NO. ____ PROJ. NO. P-91-006-13
SCALE 1''=50' COUNTY KANE
SJN : ____ REV. NO. ___

DESIGNED BY RICK HAUSER, PE 4/19/2017 DATE
SATISFACTORY ____ DISTRICT GEOMETRICS ENGINEER ____ DATE
SATISFACTORY ____ DISTRICT PROGRAM DEVELOPMENT ENGINEER ____ DATE
SATISFACTORY ____ DISTRICT OPERATIONS ENGINEER ____ DATE
APPROVED ____ DEPUTY DIRECTOR OF HIGHWAYS, REGION ENGINEER ____ DATE

CADD FILE NAME : [ ] I.D.S. SHEET 1 OF 7

BDE-9908

PLOT DATE = 4/19/2017
USER NAME = hauserra



FILE NAME = Default	USER NAME = nmikolajczyk	DESIGNED - NPM	REVISED -
		DRAWN - NPM	REVISED -
	PLOT SCALE = 100.0000 ' / in.	CHECKED - JGM	REVISED -
	PLOT DATE = 7/12/2016	DATE - 12/10/2015	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

IL-31 (STATE ST) AT US-20 (ELGIN BYPASS)
PROPOSED DRAINAGE PLAN

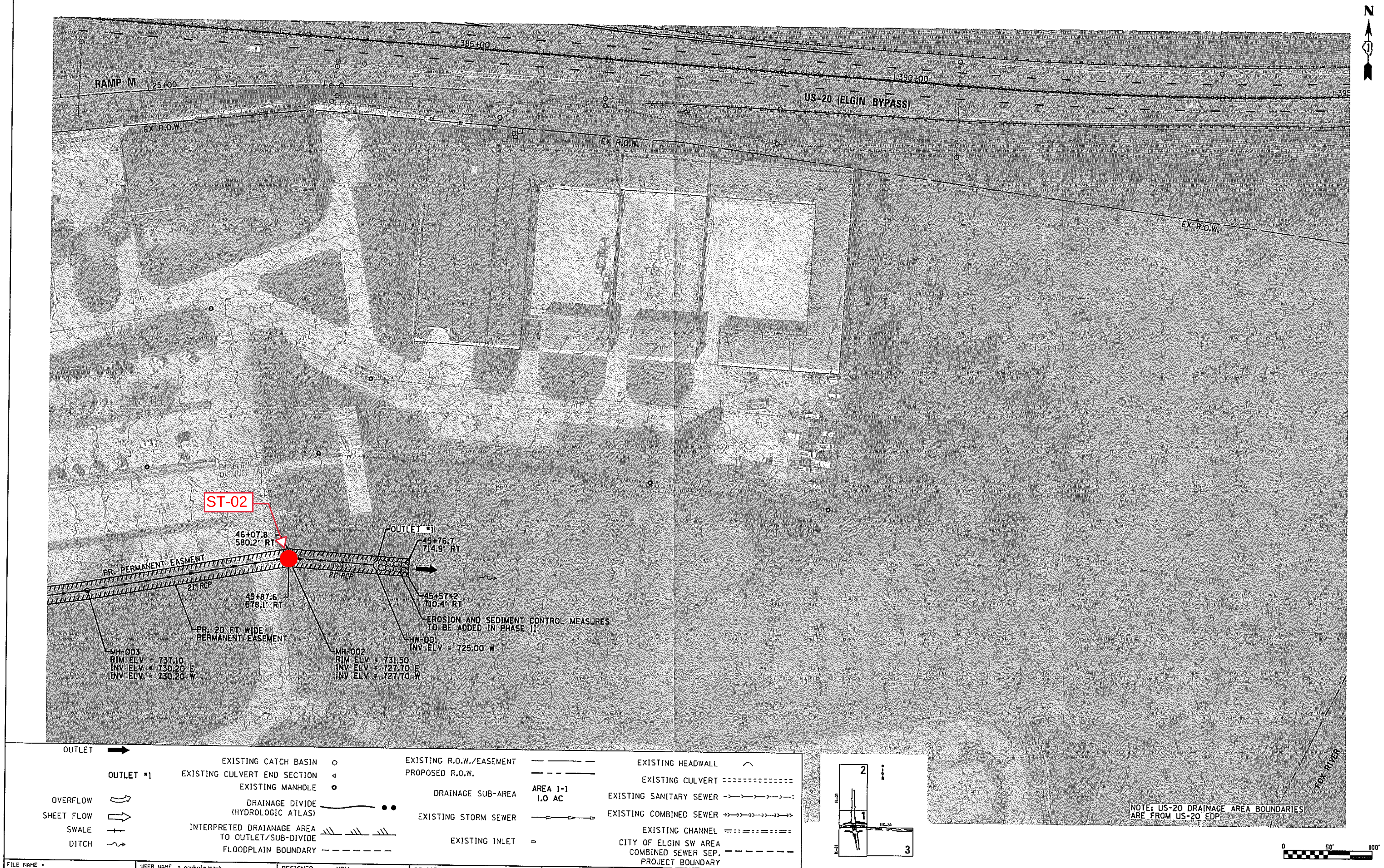
SCALE: 1"= 50' | SHEET 1 OF 4 SHEETS | STA. | TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
			4	1

CONTRACT NO.

ILLINOIS FED. AID PROJECT

Exhibit 2-00a



FILE NAME =	USER NAME = nmkolejczyk	DESIGNED - NPM	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	IL-31 (STATE ST) AT US-20 (ELGIN BYPASS) PROPOSED DRAINAGE PLAN
		DRAWN - NPM	REVISED -		
Default	PLOT SCALE = 100.0000 '/ in.	CHECKED - JGM	REVISED -		
	PLOT DATE = 7/12/2016	DATE - 12/10/2015	REVISED -		SCALE: 1" = 50' · SHEET 3 OF 4 SHEETS · STA. TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
			4	3
		CONTRACT NO.		
		ILLINOIS FED. AID PROJECT		

SOIL BORING LOGS

Illinois Department of Transportation
Division of Highways
Illinois Department of Transportation District

SOIL BORING LOG

Date 10/24/19

ROUTE FAU 3887 **DESCRIPTION** IL 31 at US 20 **LOGGED BY** M. Esposito

SECTION 8HB-2 **LOCATION** East side of, **SEC.** 23, **TWP.** 41N, **RNG.** 8E, 3rd **PM**, **Latitude** 42°1'13.8324", **Longitude** -88°17'0.8052"

COUNTY Kane **DRILLING METHOD** HSA **HAMMER TYPE** Auto

STRUCT. NO. -
Station -

BORING NO. SB-1
Station 47+87
Offset 39.0 ft RT
Ground Surface Elev. 741.95 ft

Surface Water Elev. NA ft
Stream Bed Elev. NA ft

Groundwater Elev.:
First Encounter None ft
Upon Completion None ft
After - **Hrs.** - ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Black, Silty Clay (TOPSOIL)	740.95				26
Medium Stiff to Stiff, Brown, Moist, SILTY CLAY, with gravel			2		
			3	0.8	23
			4	P	
		-5	2		
			2	1.5	19
			2	P	
	733.95		3		
Loose to Medium Dense, Brown, Moist, GRAVEL			3		13
			4		
		-10	2		
			3		7
	730.45		14		
End of Boring		-15			
		-20			

SOIL BORING IL 31 AT US 20.GPJ IL_DOT.GDT 5/6/21

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, form 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
Illinois Department of Transportation District

SOIL BORING LOG

Date 10/23/19

ROUTE FAU 3887 **DESCRIPTION** IL 31 at US 20 **LOGGED BY** M. Esposito

SECTION 8HB-2 **LOCATION** East side of, **SEC.** 23, **TWP.** 41N, **RNG.** 8E, 3rd **PM**, **Latitude** 42°1'17.0508", **Longitude** -88°17'1.4784"

COUNTY Kane **DRILLING METHOD** HSA **HAMMER TYPE** Auto

STRUCT. NO. -
Station -

BORING NO. SB-2
Station 50+75
Offset 68.0 ft LT
Ground Surface Elev. 751.76 ft

Surface Water Elev. NA ft
Stream Bed Elev. NA ft

Groundwater Elev.:
First Encounter None ft
Upon Completion None ft
After - **Hrs.** - ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Black, Silty Clay (TOPSOIL)	751.01				32
Stiff, Brown, Moist, SILTY CLAY, some gravel	748.76		2, 2, 5		18
Loose to Dense, Brown, Moist, GRAVEL		-5	4, 6, 6	1.8 P	4
			4, 8, 14		4
		-10	8, 12, 18		2
			11, 13, 18		4
		-15	9, 12, 9		4
			6, 13, 11		4
		-20			
Loose to Dense, Brown, Moist, GRAVEL *(continued)*	730.26		6, 15, 21		5
End of Boring		-25			
		-30			
		-35			
		-40			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, form 137 (Rev. 8-99)

SOIL BORING IL 31 AT US 20.GPJ IL_DOT.GDT 5/6/21

Illinois Department of Transportation
Division of Highways
Illinois Department of Transportation District

SOIL BORING LOG

Date 10/24/19

ROUTE FAU 3887 **DESCRIPTION** IL 31 at US 20 **LOGGED BY** M. Esposito

SECTION 8HB-2 **LOCATION** East side of, **SEC.** 23, **TWP.** 41N, **RNG.** 8E, 3rd **PM**, **Latitude** 42°1'22.5768", **Longitude** -88°17'0.1896"

COUNTY Kane **DRILLING METHOD** HSA **HAMMER TYPE** Auto

STRUCT. NO. -
Station -

BORING NO. SB-4
Station 56+54
Offset 51.0 ft LT
Ground Surface Elev. 756.93 ft

Surface Water Elev. NA ft
Stream Bed Elev. NA ft

Groundwater Elev.:
First Encounter None ft
Upon Completion None ft
After - **Hrs.** - ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Black, Silty Clay (TOPSOIL)	755.93				14
Stiff, Brown, Moist, SILTY CLAY with gravel			1 / 1 / 1	1.0	13
		-5			
encountered cobble at 5 feet			1 / 1 / 3		20
	747.93		1 / 1 / 3	1.3	18
End of Boring		-10			
		-15			
		-20			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
Illinois Department of Transportation District

SOIL BORING LOG

Date 10/24/19

ROUTE FAU 3887 **DESCRIPTION** IL 31 at US 20 **LOGGED BY** M. Esposito

SECTION 8HB-2 **LOCATION** East side of, **SEC.** 23, **TWP.** 41N, **RNG.** 8E, 3rd **PM**,
Latitude 42°1'20.5572", **Longitude** -88°17'4.3044"

COUNTY Kane **DRILLING METHOD** HSA **HAMMER TYPE** Auto

STRUCT. NO. -
Station -

BORING NO. SB-5
Station 36+60
Offset
Ground Surface Elev. 755.80 ft

Surface Water Elev. NA ft
Stream Bed Elev. NA ft

Groundwater Elev.:
First Encounter None ft
Upon Completion None ft
After - **Hrs.** - ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Black, Silty Clay (TOPSOIL)	754.80				21
Stiff, Brown, Moist, SILTY CLAY, some gravel	752.30		2 4 5	1.3 P	27
Medium Dense, Brown, Moist, GRAVEL		-5	6 9 10		6
			6 12 16		5
	744.30	-10	6 10 10		4
End of Boring		-15			
		-20			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, form 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
Illinois Department of Transportation District

SOIL BORING LOG

Date 10/25/19

ROUTE FAU 3887 **DESCRIPTION** IL 31 at US 20 **LOGGED BY** M. Esposito

SECTION 8HB-2 **LOCATION** East side of, **SEC.** 23, **TWP.** 41N, **RNG.** 8E, 3rd **PM**, **Latitude** 42°1'18.3684", **Longitude** -88°17'4.5384"

COUNTY Kane **DRILLING METHOD** HSA **HAMMER TYPE** Auto

STRUCT. NO. -
Station -

BORING NO. SB-6
Station 8+55
Offset
Ground Surface Elev. 749.63 ft

Surface Water Elev. NA ft
Stream Bed Elev. NA ft

Groundwater Elev.:
First Encounter None ft
Upon Completion None ft
After - **Hrs.** - ft

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Black, Silty Clay (TOPSOIL) 748.63				21
Loose to Dense, Brown, Moist, GRAVEL		6 7 5		10
	-5	7 12 13		4
		5 12 16		3
738.13	-10	7 13 18		3
End of Boring	-15			
	-20			

SOIL BORING IL 31 AT US 20.GPJ IL_DOT.GDT 5/6/21

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
Illinois Department of Transportation District

SOIL BORING LOG

Date 10/25/19

ROUTE FAU 3887 **DESCRIPTION** IL 31 at US 20 **LOGGED BY** M. Esposito

SECTION 8HB-2 **LOCATION** East side of, **SEC.** 23, **TWP.** 41N, **RNG.** 8E, 3rd **PM**,
Latitude 42°1'18.8976", **Longitude** -88°16'55.4916"

COUNTY Kane **DRILLING METHOD** HSA **HAMMER TYPE** Auto

STRUCT. NO. -
Station -

BORING NO. SB-7
Station 54+15
Offset
Ground Surface Elev. 742.05 ft

Surface Water Elev. NA ft
Stream Bed Elev. NA ft

Groundwater Elev.:
First Encounter None ft
Upon Completion None ft
After - **Hrs.** - ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Black, Silty Clay (TOPSOIL)				1.3	24
	740.55				
Medium Dense to Dense, Brown, Moist, GRAVEL			4 4 5		5
		-5	6 9 15		4
			5 8 14		4
		-10			
	731.55		50 for 5"		
End of Boring					
		-15			
		-20			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
Illinois Department of Transportation District

SOIL BORING LOG

Date 10/25/19

ROUTE FAU 3887 **DESCRIPTION** IL 31 at US 20 **LOGGED BY** M. Esposito

SECTION 8HB-2 **LOCATION** East side of, **SEC.** 23, **TWP.** 41N, **RNG.** 8E, 3rd **PM**, **Latitude** 42°1'17.652", **Longitude** -88°16'51.6252"

COUNTY Kane **DRILLING METHOD** HSA **HAMMER TYPE** Auto

STRUCT. NO. -
Station -

BORING NO. SB-8
Station 57+02
Offset
Ground Surface Elev. 727.84 ft

Surface Water Elev. NA ft
Stream Bed Elev. NA ft

Groundwater Elev.:
First Encounter None ft
Upon Completion None ft
After - **Hrs.** - ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Black, Silty Clay (TOPSOIL)					14
	724.84		4		
Stiff, Brown, Moist, LOAM			5		14
			6		
		-5			
	722.34		12	1.0	15
Medium Dense, Brown, Moist, GRAVEL			10		5
			12	B	
			8		
			16		4
			12		
		-10			
			6		
			8		4
	716.34		11		
End of Boring					
		-15			
		-20			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
Illinois Department of Transportation District

SOIL BORING LOG

Date 10/9/19

ROUTE FAU 3887 **DESCRIPTION** IL 31 at US 20 **LOGGED BY** M. Esposito

SECTION 8HB-2 **LOCATION** East side of, **SEC.** 23, **TWP.** 41N, **RNG.** 8E, 3rd **PM**, **Latitude** 42°1'11.802", **Longitude** -88°16'59.9664"

COUNTY Kane **DRILLING METHOD** HSA **HAMMER TYPE** Auto

STRUCT. NO. -
Station -

BORING NO. ST-1
Station 47+87
Offset 100.0 ft RT
Ground Surface Elev. 740.82 ft

Surface Water Elev. NA ft
Stream Bed Elev. NA ft

Groundwater Elev.:
First Encounter None ft
Upon Completion None ft
After - **Hrs.** - ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Black, Clay (TOPSOIL)					38
	737.82		8		
Medium Dense to Dense, Brown, Moist, GRAVEL			8 12		5
		-5	15		
			18 23		4
			13		
			25 28		3
		-10	11		
	729.32		21 29		4
End of Boring					
		-15			
		-20			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, form 137 (Rev. 8-99)

SOIL BORING IL 31 AT US 20.GPJ IL_DOT.GDT 5/6/21

Illinois Department of Transportation
Division of Highways
Illinois Department of Transportation District

SOIL BORING LOG

Date 10/8/19

ROUTE FAU 3887 **DESCRIPTION** IL 31 at US 20 **LOGGED BY** M. Esposito

SECTION 8HB-2 **LOCATION** East side of, **SEC.** 23, **TWP.** 41N, **RNG.** 8E, 3rd **PM**, **Latitude** 42°1'11.3916", **Longitude** -88°16'53.922"

COUNTY Kane **DRILLING METHOD** HSA **HAMMER TYPE** Auto

STRUCT. NO. -
Station -

BORING NO. ST-2
Station 46+02
Offset 554.0 ft RT
Ground Surface Elev. 732.15 ft

Surface Water Elev. NA ft
Stream Bed Elev. NA ft

Groundwater Elev.:
First Encounter None ft
Upon Completion None ft
After - **Hrs.** - ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Aggregate Shoulder	731.65				
Medium Stiff, Black and Gray, Moist, CLAY	730.15			0.5 P	17
Stiff, Black and Brown Mottled, Moist, CLAY, some gravel			2		
			4	1.8 B	26
			4		
		-5			
	726.65		10		
Medium Dense, Brown, Moist, GRAVEL			16		3
			18		
			15		
			18		3
			24		
		-10			
			7		
	721.15		18		4
			21		
End of Boring					
		-15			
		-20			

SOIL BORING IL 31 AT US 20.GPJ IL_DOT.GDT 5/6/21

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, form 137 (Rev. 8-99)

rubino
ENGINEERING INC.

SOIL BORING LOG

Date 7/16/19

ROUTE FAU 3887 (IL 31) **DESCRIPTION** IL 31 over US 20 **LOGGED BY** J. Ignarski

SECTION BR-HB-3 **LOCATION** SE 1/4 SEC, 23, TWP, 41N, RNG, 8E, 3RD PM
Latitude: 42.02158717, Longitude: -88.28334724

COUNTY Kane **DRILLING METHOD** 3 ½ inch Hollow Stem Auger **HAMMER TYPE** Automatic SPT

STRUCT. NO. 045-2106
Station

BORING NO. B-01
Station 376+98
Offset 115RT
Ground Surface Elev. 751.74 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter 48.5 ft ▼
Upon Completion 35 ft ▽
After ___ **Hrs.** Filled ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
TOPSOIL; brown silty clay with roots	750.74				
Stiff, brown to gray silty CLAY, trace sand and gravel, Possible fill — Dry			3 8 12	2.0 P	16
		-5	8 15 13		14
	745.74				
Dense to very dense, brown and gray SAND and gravel — Dry			27 25 26		3
		-10	8 17 25		3
	740.74				
Medium dense to dense, brown SAND and gravel — Dry			5 8 14		3
		-15	10 17 20		3
			22 22 19		4
		-20	10 13 14		4
	730.74				
Dense to very dense, brown SAND and gravel — Dry			10 13 23		4
		-25	19 35 30		3
			20 27 22		3
	723.24				
Medium dense, brown SAND and gravel — Moist		-30	10 10 9		4
	718.24				
Very dense, brown SAND and gravel — Moist		▽ -35	31 50/5"		3
		-40	44 46 50/5"		4

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

SOIL BORING LOG

Date 7/16/19

ROUTE FAU 3887 (IL 31) **DESCRIPTION** IL 31 over US 20 **LOGGED BY** J. Ignarski

SECTION BR-HB-3 **LOCATION** SE 1/4 SEC, 23, TWP, 41N, RNG, 8E, 3RD PM
Latitude: 42.02158717, Longitude: -88.28334724

COUNTY Kane **DRILLING METHOD** 3 ½ inch Hollow Stem Auger **HAMMER TYPE** Automatic SPT

STRUCT. NO. 045-2106
Station

BORING NO. B-01
Station 376+98
Offset 115RT
Ground Surface Elev. 751.74 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter 48.5 ft ▼
Upon Completion 35 ft ▽
After ____ **Hrs.** Filled ft

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Very dense, brown SAND and gravel Moist *(continued)*				
No Gravel	-45	20 41 36		3 3
Wet	▼ -50	3 47 50/4"		9
698.24				
Medium dense, brown SAND little gravel Wet	-55	17 10 8		9
693.24				
Dense to very dense, brown SAND and gravel	-60	20 37 42		7

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Dense to very dense, brown SAND and gravel *(continued)*				
Trace Gravel	-65	3 10 43		13
No Gravel	-70	11 29 14		15 8
Very dense, brown SAND and gravel Saturated				
And Gravel 676.74	-75	24 22 44		5
End of boring at approximately 75 feet below existing grade.	-80			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

rubino ENGINEERING INC.

SOIL BORING LOG

Date 7/2/19

ROUTE FAU 3887 (IL 31) **DESCRIPTION** US 20 at IL 31 **LOGGED BY** J. Ignarski

SECTION BR-HB-3 **LOCATION** SE 1/4 SEC, 23, TWP, 41N, RNG, 8E, 3RD PM
Latitude: 42.02195923 , Longitude: -88.28371459

COUNTY Kane **DRILLING METHOD** 3 ½ inch Hollow Stem Auger **HAMMER TYPE** Automatic SPT

STRUCT. NO. 045-2106
Station

BORING NO. B-02
Station 375+66
Offset 7RT
Ground Surface Elev. 737.17 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter 33.5 ft ▼
Upon Completion 35 ft ▽
After ___ **Hrs.** Filled ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Approximately 3 inches of ASPHALT	736.92				
Approximately 9 inches of CONCRETE	736.17				
FILL; brown sand and gravel, Dry			7 / 8 / 12		3
	733.67				
FILL; brown and gray silty clay	733.17				
Medium dense to dense, brown SAND some gravel, Dry		-5	4 / 14 / 19		12
			9 / 15 / 16		4
		-10	7 / 9 / 13		4
	726.17				
Very stiff, brown SILT, Moist			6 / 13 / 19	2.5 P	22
	723.17				
Dense to very dense, brown SAND, Damp		-15	9 / 13 / 19		4
Some Gravel			10 / 22 / 47		4
And Gravel		-20	20 / 50/6"		3

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Dense to very dense, brown SAND, Damp *(continued)*					
			31 / 50/5"		5
		-25	25 / 43 / 50/6"		4
			26 / 43 / 50/5"		4
Wet		-30	12 / 36 / 23		3
		▼			
		▽ -35	13 / 28 / 31		9
	698.67				
Medium dense, brown SAND some gravel, Saturated		-40	7 / 13 / 13		16

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

rubino ENGINEERING INC.

SOIL BORING LOG

Date 7/2/19

ROUTE FAU 3887 (IL 31) **DESCRIPTION** US 20 at IL 31 **LOGGED BY** J. Ignarski

SECTION BR-HB-3 **LOCATION** SE 1/4 SEC, 23, TWP, 41N, RNG, 8E, 3RD PM
Latitude: 42.02195923 , Longitude: -88.28371459

COUNTY Kane **DRILLING METHOD** 3 ½ inch Hollow Stem Auger **HAMMER TYPE** Automatic SPT

STRUCT. NO. 045-2106
Station

BORING NO. B-02
Station 375+66
Offset 7RT
Ground Surface Elev. 737.17 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter 33.5 ft ▼
Upon Completion 35 ft ▽
After _____ **Hrs.** Filled ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Medium dense, brown SAND some gravel Saturated *(continued)*	693.67				
Very dense, brown SAND little gravel Wet		-45	16 46 40		8
	688.67				
Medium dense, brown SAND and gravel Wet		-50	5 7 9		11
	683.67				
Dense to very dense, brown SAND and gravel Wet		-55	32 43 32		7
Trace Gravel		-60	19 17 25		11

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Dense to very dense, brown SAND and gravel Wet *(continued)*	673.67				
Medium dense, brown SAND trace gravel Wet		-65	4 4 15		18
	668.67				
Very dense, brown SAND and gravel Wet	667.17	-70	22 12 49		11
End of boring at approximately 70 feet below existing grade.		-75			
		-80			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

rubino ENGINEERING INC.

SOIL BORING LOG

Date 7/17/19

ROUTE	FAU 3887 (IL 31)	**DESCRIPTION**	IL 31 over US 20	**LOGGED BY**	J. Ignarski
SECTION	BR-HB-3	**LOCATION**	SE 1/4 SEC, 23, TWP, 41N, RNG, 8E, 3RD PM Latitude: 42.02217372 , Longitude: -88.28351539		
COUNTY	Kane	**DRILLING METHOD**	3 ½ inch Hollow Stem Auger	**HAMMER TYPE**	Automatic SPT

STRUCT. NO.	045-2106	**Surface Water Elev.**	N/A ft
Station		**Stream Bed Elev.**	N/A ft
BORING NO.	B-03	**Groundwater Elev.:**	
Station	376+00	**First Encounter**	53.5 ft ▼
Offset	81LT	**Upon Completion**	Washed ft
Ground Surface Elev.	756.07 ft	**After** 24 **Hrs.**	Caved @ 4 ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Approximately 2½ inches of ASPHALT	755.86				
Approximately 9½ inches of CONCRETE	755.07				
FILL; brown sand and gravel with concrete Dry			13 17 30		4
	752.57				
Medium dense to dense, brown SAND and gravel Damp		-5	5 18 12		4
			13 10 15		5
		-10	3 12 18		5
			8 12 10		4
		-15	8 13 16		5
			11 17 23		5
		-20	7 10 12		4

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Medium dense to dense, brown SAND and gravel Damp *(continued)*			12 16 17		3
		-25	11 14 14		4
	730.07				
Very dense, brown SAND and gravel Moist			50/5"		4
	727.57				
Stiff, brown SILT Wet		-30	24 29 36	1.0 P	20
		-35	9 19 38	1.3 S	22
	717.57				
Dense to very dense, brown SAND and gravel		-40	30 50/5"		4

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

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Date 7/17/19

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SECTION BR-HB-3 **LOCATION** SE 1/4 SEC, 23, TWP, 41N, RNG, 8E, 3RD PM
Latitude: 42.02217372 , Longitude: -88.28351539

COUNTY Kane **DRILLING METHOD** 3 ½ inch Hollow Stem Auger **HAMMER TYPE** Automatic SPT

STRUCT. NO. 045-2106
Station

BORING NO. B-03
Station 376+00
Offset 81LT
Ground Surface Elev. 756.07 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter 53.5 ft ▼
Upon Completion Washed ft
After 24 **Hrs.** Caved @ 4 ft

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Dense to very dense, brown SAND and gravel *(continued)*; Wet				
	-45	21 50/4"		4
	-50	24 29 34		3
▼ Heaving Sands, Flushed Augers; Some gravel, Saturated	-55	5 21 35		8
Little gravel, Heaving Sands	-60	5 14 26		16
Dense to very dense, brown SAND and gravel *(continued)*; Heaving Sands	-65	39 29 19		7
Heaving Sands	-70	17 21 27		8
681.07	-75	7 13 23		27
End of boring at approximately 75 feet below existing grade.	-80			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
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