# Roadway Geotechnical Report

IDOT PTB 204-001
Michigan City Road Bridge over I-94
Cook County, Illinois

Prepared for

Illinois Department of Transportation
Contract Number: D-91-158-22

Project Design Engineer Team
Delta Engineering Group, LLC

Geotechnical Consultant

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November 22, 2023

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November 22, 2023

Muhammad Arif, P.E, PTOE.
Senior Civil Engineer
Delta Engineering Group, LLC
111 West Jackson Blvd, Suite 910
Chicago, Illinois 60604

Roadway Geotechnical Report
PTB 204-001
Michigan City Road Bridge over I-94
Cook County, IL

Dear Mr. Arif:

Attached is a copy of the Roadway Geotechnical Report for the above referenced project. The report provides a description of the site investigation, site conditions, and recommendations. The site investigation for the proposed shared-use path, sidewalk, and pavement reconstruction included advancing three (3) soil borings to a depth of 10 feet each and three (3) pavement cores.

Should you have any questions or require additional information, please call us at 630-994-2600.

Sincerely,

A. Alyousef

Abdulaziz Alyousef, E.I.T.
Staff Engineer

Dawn Edgell.

Dawn Edgell, P.E.
Geotechnical Department Manager

## TABLE OF CONTENTS



**Appendices**

Roadway Geotechnical Report
IDOT PTB 204-001
Michigan City Road over I-94
Cook County, Illinois

## 1.0 INTRODUCTION

GSG Consultants, Inc. (GSG) completed a geotechnical investigation for the shared-use path and sidewalk construction as part of the Michigan City Road Bridge over I-94 improvement project in the City of Dolton in Cook County, Illinois. The purpose of the investigation was to explore the subsurface conditions, to determine engineering properties of the subsurface soil, and develop design and construction recommendations for the proposed improvements. **Exhibit 1**, Site Location Map, shows the project location on a U.S. Geological Survey map.

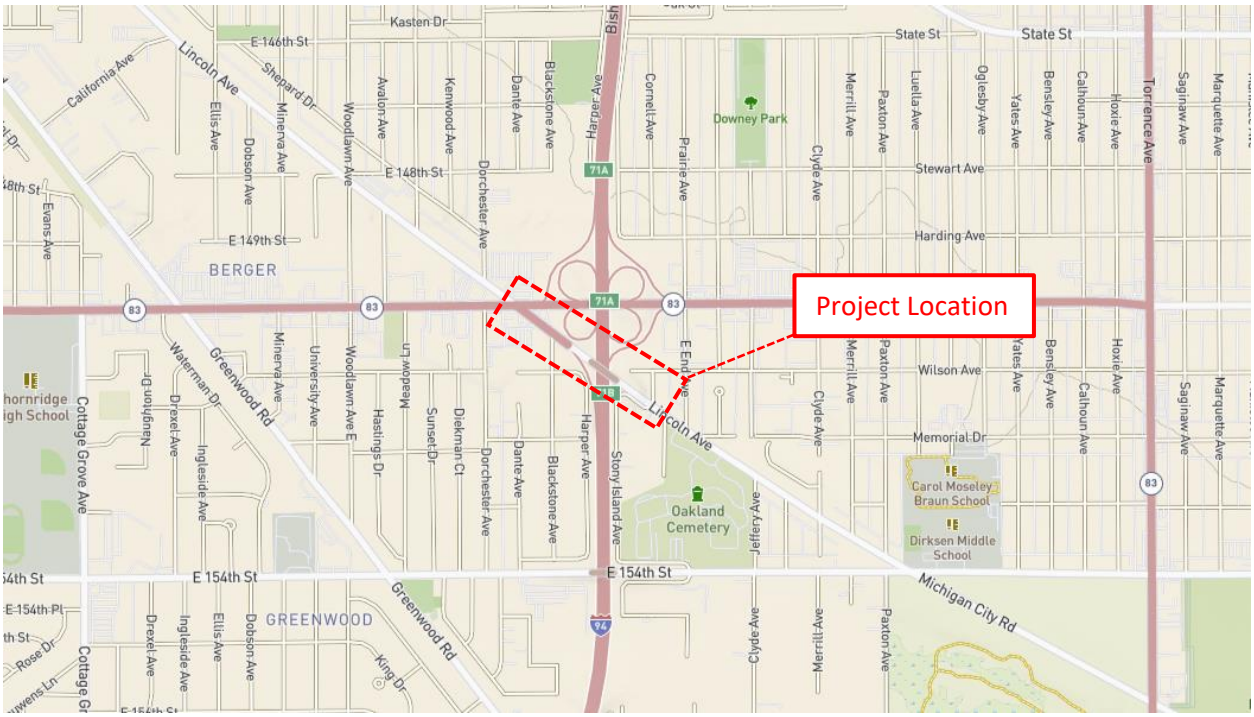



**Exhibit 1 – Project Location Map**
**(Source: USGS Topographic Maps, usgs.gov)**

### 1.1 Proposed Project Information

Based on preliminary profile information provided by Delta Engineering Group, LLC. (**Appendix A**), the project will include the construction of a new shared-use path on the north side of the bridge, beginning near Blackstone Avenue to the west extending to Cornell Avenue to the east. Additionally, the project will include the construction of a sidewalk on the south side of the bridge connecting Blackstone Avenue to Stony Island Avenue. There existing roadway for Michigan City

Road will also be reconstructed, covering approximately 106 feet west of the bridge and 140 feet east of the bridge.

### 1.2 Regional Geology

GSG reviewed several published documents in an effort to determine the regional geological setting in the area of the site. The subject area is in the southeast portion of Cook County, in Dolton, Illinois. The surficial geologic deposits in this area are typically glacial drift deposited during the Wisconsin Glacial Age and sediments deposited by the Calumet River and various high-level states of Lake Michigan. The subsurface profile in the area consists of deposits of silty clay, sand and gravel extending to approximately 50 to 100 feet below ground surface, at which point bedrock is encountered.

The subject area consists of deposits from the Dolton Member of the Equality Formation. The Dolton Member of the Equality Formation consists of largely shallow-water, near-shore lake sediments in beaches, bars, spits, and deltas; dominantly medium-grained sand; contains beds of silt where gradational to Carmi Member; and local lenses of sandy gravel along beaches. Underlying the surficial deposits, the bedrock consists of the Devonian System, Muscatatuck Group, which consists of various kinds of carbonates and evaporative lithologies.

### 1.3 Climate Conditions

The geotechnical field exploration was performed on August 1, 2023. The climate conditions for the months of May 2023 through August 2023 are summarized in **Table 1**. The data in this table was obtained from the National Weather Service Forecast Office website for Chicago, Illinois and the surrounding area. The data was evaluated to determine any effects of temperature and precipitation on the water table level and soil moisture content that was encountered at the site at the time the borings were performed.

For the months included in the study, the precipitation rate was higher in July, but below average in May, June, and August. The average monthly temperature was higher than the normal monthly average temperatures in all four months. It is our opinion that the climatic conditions for the site at the time the exploration was performed did not have a direct impact on the soil moisture contents or water table levels that were recorded during the field exploration.

**Table 1 – Climate Conditions**

| Date (M-Y) | Precipitation (in.) | | Temperature (°F) | |
|---|---|---|---|---|
| | Total | Departure | Average | Departure |
| May – 2023 | 0.71 | -3.78 | 62.4 | +1.8 |
| June – 2023 | 2.36 | -1.74 | 70.8 | +0.2 |
| July – 2023 | 7.61 | +3.9 | 75.7 | +0.3 |
| August – 2023 | 1.33 | -2.92 | 74.3 | +0.5 |

## 2.0 SITE SUBSURFACE EXPLORATION PROGRAM

This section describes the subsurface exploration program and laboratory testing program completed as part of this project. The subsurface exploration program was performed in accordance with applicable IDOT geotechnical manuals and procedures.

### 2.1 Subsurface Exploration Program

The subsurface exploration for proposed shared-use path and sidewalk was conducted on August 1, 2023. The investigation included advancing three (3) borings to a depth of 10 feet each and three (3) pavement cores. The locations of the soil borings were adjusted in the field as necessary based on utilities and access. Elevations and as-drilled locations for the borings were gathered by GSG's field crew using GPS surveying equipment and available google earth information. The approximate as-drilled locations of the soil borings are shown on the Soil Boring Location Plan **(Appendix B)**. **Table 2** presents a summary of the borings and pavement cores completed for the investigation.

**Table 2 – Summary of Subsurface Exploration Borings and Pavement Cores**

| Soil Boring | Existing Ground Elevation (ft) | Northing (ft) | Easting (ft) |
|---|---|---|---|
| SGB-1 | 606.84 | 1805621.974 | 1190131.4 |
| SGB-2 | 607.51 | 1805129.940 | 1190817.0 |
| SGB-3 | 605.60 | 1805049.019 | 1190939.2 |
| PCB-1 | 605.77 | 1805789.695 | 1189979.5 |
| PCB-2 | 613.21 | 1805473.969 | 1190338.5 |
| PCB-3 | 613.09 | 1805236.906 | 1190663.4 |

The soil borings were drilled using truck-mounted CME-75 drill rig, equipped with 3¼-inch I.D. hollow stem augers and an automatic hammer. Soil sampling was performed according to AASHTO T 206, "Penetration Test and Split Barrel Sampling of Soils." Soil samples were obtained at 2.5-foot intervals to the termination depth of the borings. Water level measurements were made in each boring when evidence of free groundwater was detected on the drill rods or in the samples. The boreholes were also checked for free water immediately after auger removal, and before filling the open boreholes with soil cuttings and surface patching with asphalt or concrete where necessary to match the existing pavement.

GSG's field representative inspected, visually classified, and logged the soil samples during the subsurface exploration activities and performed unconfined compressive strength tests on cohesive soil samples using a calibrated hand penetrometer. Representative soil samples were collected from each sample interval and were placed in jars and returned to the laboratory for further testing and evaluation.

## 2.2 Laboratory Testing Program

All samples were inspected in the laboratory to verify the field classifications. A laboratory testing program was undertaken to characterize and determine engineering properties of the subsurface soils. Moisture content tests (ASTM D2216 / AASHTO T-265) were performed on representative soil samples.

The laboratory tests were performed in accordance with test procedures outlined in the IDOT Geotechnical Manual (2020), and per ASTM and AASHTO requirements. Based on the laboratory test results, the soils encountered were classified according to the AASHTO and the Illinois Division of Highways (IDH) classification systems. The results of the laboratory testing program are shown along with the field test results in the Soil Boring Logs (**Appendix C**).

## 2.3 Existing Pavement Conditions

The borings and pavement cores were performed along Michigan City Road. **Table 3** presents a summary of the type of pavement and pavement layer thicknesses encountered at each boring location. The pavement core photos from PCB-01 through PCB-03 are presented in **Appendix D**.

**Table 3 – Summary of Pavement Thickness**

| Boring | Asphalt Thickness (in.) | Concrete Thickness (in.) | Aggregate Base (in.) | Total Thickness (in.) |
|---|---|---|---|---|
| SGB-01 | NA | 11.0 | 2.0 | 12.0 |
| SGB-02 | NA | 11.0 | 2.0 | 12.0 |
| SGB-03 | 3.0 | 7.5 | 1.5 | 12.0 |
| PCB-01 | NA | 10.0 | 0.25 | 10.25 |
| PCB-02 | NA | 9.25 | 1.0 | 10.25 |
| PCB-03 | 0.75 | 8.25 | NA | 9.0 |

The pavement generally consisted of concrete with a thickness of 7.5 to 11 inches. Boring SGB-03 encountered 3 inches of asphalt followed by 7.5 inches of concrete. Pavement core PCB-03

encountered 0.75 inches of asphalt followed by 8.25 inches of concrete. An aggregate base layer was observed in all locations except at PCB-03.

### 2.4 Subsurface Conditions

This section provides a brief description of the soil encountered in the borings performed in the vicinity of the proposed shared-use path and sidewalk. Detailed descriptions of the subsurface soils are provided in the soil boring logs. The soil boring logs provide specific conditions encountered at each boring location and include soil descriptions, stratifications, penetration resistance, elevations, location of the samples, and laboratory test data. Unless otherwise noted, soil descriptions indicated on boring logs are visual identifications. The stratifications shown on the boring logs represent the conditions only at the actual boring locations and represent the approximate boundary between subsurface materials; however, the actual transition may be gradual.

Underlying the pavement sections, brown sand fill was noted to depths between 3.5 to 6 feet followed by loose to medium dense light brown sand to the termination depth of the borings. Trace organic material was noted within the sand fill. The sand fill had SPT blow counts 'N' values ranging from 9 to 32 blows per foot (bpf). The brown, loose to medium dense sand had SPT blow counts 'N' values ranging between 8 and 29 bpf with an average blow count of 14 bpf.

### 2.5 Groundwater Conditions

Water levels were checked in each boring to determine the general groundwater conditions present at the site and were measured while drilling and after each boring was completed. Water was encountered in boring SGB-03 while drilling at a depth of 6.0 feet (Elevation 599.6 feet). Groundwater was not encountered during or immediately after drilling in the remaining borings.

Based on the overall lack of color change from brown and gray to gray observed in the soil borings, it is anticipated that the long-term groundwater level is below the depth of the borings. Water level readings were made in the boreholes at times and under conditions shown on the boring logs and stated in the text of this report. However, it should be noted that fluctuations in groundwater level may occur due to variations in the rainfall, other climatic conditions, or other factors not evident at the time measurements were made and reported herein.

# 3.0 GEOTECHNICAL ANALYSES

This section provides GSG's geotechnical analysis and recommendations for the design of the proposed shared-use path, sidewalk, and pavement reconstruction based on the results of the field exploration, and laboratory testing.

## 3.1 Settlement

Based on preliminary plans provided by Delta Engineering and existing conditions of the roadway, it is anticipated that minimal fill would be required to raise the grade along proposed shared-use path and the sidewalk. The shared-use path northwest of the bridge will be constructed on top of a proposed retaining wall, which will retain the soil for widening of the roadway. Settlement of this path will be consistent with the retaining wall and is discussed further in the SGR for the retaining wall dated 10/17/2023.

## 3.2 Drainage Characteristics

The drainage characteristics of the site were evaluated per the IDOT Geotechnical Manual (2020), Section 6.3.4.1, based on the subgrade soil type and moisture condition, depth of water table, project topography, the anticipated profile grade line for the proposed project, and depth and grade of drainage structures along the pathway. The proposed project will be supported on subgrade soils consisting of existing sand or clayey sand fill and new engineered granular fill.

Based on the preliminary information and existing conditions, GSG anticipates shallow ditches will be constructed with a grade greater than 0.5%. GSG utilized Table 6.3.4.1-1, Drainage Classification in the IDOT Geotechnical Manual, to assign the drainage classes for the site. The drainage class should be taken as Fair.

## 3.3 Frost Susceptibility

The frost susceptibility of the subgrade soils was evaluated per Section 6.3.2.2.3 of the IDOT Geotechnical Manual. The maximum anticipated frost penetration depth below pavement in northern Illinois is 45 to 60 inches for extreme weather conditions. The frost susceptibility was evaluated for the soils encountered that would be within the proposed pathway subgrade. The frost class for the subgrade soils in these areas was assigned using Table 6.3.2.2.3-1, Frost Susceptibility Classification of Soils, in the IDOT Geotechnical Manual. The subgrade soils along the proposed project area were found to be sand or clayey sand fill and have a Frost Class of F2 to F3 (medium to high frost susceptibility).

Water trapped in the soil layers closer to the pavement section is susceptible to frost action and should be considered when designing the proposed path. Treatment measures, such as maintaining proper drainage of the subgrade soils through underdrains could be considered.

### 3.4 Subgrade Support Rating.

The subgrade support rating (SSR) was determined based on the physical properties of in-situ soils present beneath the proposed pavement section per Section 7.3.3.5 of the IDOT Geotechnical Manual. The SSR includes three categories (poor, fair, and granular), and is used to determine the depth of soil treatment to provide a stable working platform that is required to prevent excessive rutting, and moisture related problems during construction activities. Granular soils have the highest rating and provide a stable working platform that may require less than a 12-inch improved subgrade layer, while poor subgrade may require more than 12 inches to provide a stable subgrade during construction activities. The anticipated subgrade soils encountered in the borings at the proposed pathway grades were generally granular, consisting of existing fill and new engineered structural fill. These soils have a Subgrade Support Rating (SSR) of Poor to Granular.

### 3.5 Organic Content

Typically, Soils with an organic content in excess of 10 percent are considered unsuitable to remain below proposed pavement areas. The sample tested at boring SGB-02 showed an organic content of 1.9%. Soils encountered at the other boring locations showed trace organic materials in the fill section, however, the moisture content fell within the normal range. Based on the soil borings and moisture laboratory testing performed, it is not anticipated that highly organic soils will be encountered in subgrade soils for the proposed pathway.

# 4.0 GEOTECHNICAL ROADWAY DESIGN RECOMMENDATIONS

This section provides GSG's geotechnical recommendations for the design of the proposed shared-use path , a sidewalk and roadway reconstruction based on the results of the field exploration, laboratory testing, and geotechnical analysis. The proposed pavement section for the roadway reconstruction should be designed according to the IDOT Mechanistic Pavement Design (MPD) and IDOT recommends providing a minimum of 12 inches of improved subgrade beneath the pavement section to ensure a stable construction platform. Subgrade improvements including any undercuts or compaction of existing soils should be completed to the proposed elevations in the design plan and in accordance with **Section 5.0** of this report.

## 4.1 Subgrade Preparation

The topsoil and landscaping should be cleared and stripped where the new path will be constructed. Undercuts of the subgrade soils and backfilling should be based on the recommendations provided in this report, and field evaluation of the materials encountered during construction. Any unstable or unsuitable materials encountered during construction activities should be removed and replaced with compacted structural fill.

## 4.2 Subgrade Treatment and Recommendations

The suitability of the existing subgrade soils for the area of the proposed project was evaluated in terms of frost susceptibly, stability, settlement, and drainage. The evaluation included determining the presence of unstable, compressible deposits, low-strength soils, and soils with high-moisture content immediately below the proposed pavement section.

The choice of a specific treatment option depends on several factors, including soil type; required treatment depth; construction variables (cost, availability, and time); project location; and treatment objective. Treatment options for unsuitable subgrade soils include mechanical stabilization, chemical stabilization, or soil modification. Mechanical stabilization includes removal and replacement with approved structural fill or using geosynthetics (geotextiles and/or geogrids) to stabilize the subgrade.

## 4.3 Drainage Recommendations

The drainage classification of Fair should be used for the project design. Groundwater was noted in boring SGB-03 at a depth of 6.0 feet, which was likely a perched water condition. The long-term water level was anticipated to be below the boring termination depths of 10 feet below grade. The overall groundwater depth is assumed deeper than the anticipated frost depth of 45

to 60 inches for the northern Illinois region. However, pavement systems could become saturated following periods of precipitation. GSG recommends installing lateral and longitudinal underdrain systems as recommended in Section 6.3.4.2 of the IDOT Geotechnical Manual to maintain the subgrade from deteriorating. These underdrains should be installed at undercut areas and low points in the profile, and along the edge of pavement throughout the site.

# 5.0 CONSTRUCTION CONSIDERATIONS

All work performed for the proposed project should conform to the requirements in the IDOT Standard Specifications for Road and Bridge Construction (SSRBC). Any deviation from the requirements in the manuals above should be approved by the design engineer.

## 5.1 Site Preparation

The contractor should not mix any existing base course materials with existing subgrade soils during the stripping and stockpiling activities. The subgrade below the base course should be evaluated in accordance with the Subgrade Preparation section of this report. Where possible, the engineer may require proof-rolling of the subgrade with a 20 to 30-ton loaded truck or other pneumatic-tired vehicle of similar size and weight. The purpose of the proof-rolling is to locate soft, weak, or excessively wet soils present at the time of construction. Proof-rolling should be performed during a time of good weather and not while the site is wet, frozen, or severely desiccated. Any unsuitable materials observed during the evaluation and proof-rolling operations should be undercut and replaced with compacted structural fill and/or stabilized in-place. The possible need for, and extent of, undercutting and/or in-place stabilization required can best be determined by the geotechnical engineer at the time of construction.

## 5.2 Existing Utilities

Based on the existing site conditions, utilities exist along the project corridor that may interfere with the proposed construction. Before proceeding with construction, all existing underground utility lines that will interfere with construction should be completely relocated from beneath the proposed areas. Where possible, existing utility lines that are to be abandoned in place should be removed and/or plugged with a minimum of 2 feet of cement grout. All excavations resulting from underground utilities removal activities should be cleaned of loose and disturbed materials, including all previously placed backfill, and backfilled with suitable fill materials in accordance with the requirements of this section. During the clearing and stripping operations, positive surface drainage should be maintained to prevent the accumulation of water.

## 5.3 Site Excavations

The contractor will be responsible for providing safe excavations during the construction activities of the project. All excavations should be conducted in accordance with applicable federal, state, and local safety regulations, including, but not limited to the Occupational Safety and Health Administration (OSHA) excavation safety standards. Excavation stability and soil pressures on temporary shoring are dependent on soil conditions, depth of excavations,

installation procedures, and the magnitude of any surcharge loads on the ground surface adjacent to the excavation. Excavation near existing structures and underground utilities should be performed with extreme care to avoid undermining existing structures. Excavations should not extend below the level of adjacent existing foundations or utilities unless underpinning or other support is installed. It is the responsibility of the contractor for field determinations of applicable conditions and providing adequate shoring for all excavation activities.

### 5.4 Borrow Material and Compaction Requirements

If borrow material is to be used for onsite construction, it should conform to Section 204 "Borrow and Furnish Excavations" of the latest IDOT Construction Manual. GSG recommends that subgrade preparation, and structural fill placement and compaction be inspected by a GSG geotechnical engineer to verify the type and strength of soil materials present at the site and their conformance with the geotechnical recommendations in this report.

The fill material should be free of organic matter and debris and should be placed and compacted in accordance with Section 205, Embankment, of the IDOT SSRBC (2022). Earth-moving operations should be avoided during excessively cold or wet weather to avoid freezing of softening subgrade soils. Fill should be placed in lifts and compacted according to Section 205, Embankment (IDOT, 2022). Backfill materials for undercut areas should be placed in 8 inches loose lifts and should be compacted to 95% of the maximum dry density as determined by AASTHO T 99, Standard Proctor Method.

### 5.5 Groundwater Management

It is anticipated that the long-term water table is deeper than 10.0 feet below the existing ground surface. If rainwater run-off or groundwater is accumulated at the base of excavations, the contractor should remove accumulated water using conventional sump pit and pump procedures and maintain a dry and stable excavation. The location of the sump should be determined by the contractor based on field conditions. During earthmoving activities at the site, grading should be performed to ensure that drainage is maintained throughout the construction period. Water should not be allowed to accumulate in the excavation area either during or after construction. Undercut and excavated areas should be sloped toward one corner to facilitate removal of any collected rainwater or surface run-off. Grades should be sloped away from the excavations to minimize runoff from entering.

If water seepage occurs during excavations or where wet conditions are encountered such that the water cannot be removed with conventional sumping, we recommend placing open grade stone similar to IDOT CA-7 to stabilize the bottom of the excavation below the water table. The CA-7 stone should be placed to 12 inches above the water table, in 12-inch lifts, and should be compacted with the use of a heavy smooth drum roller or heavy vibratory plate compactor until stable.

## 6.0 LIMITATIONS

This report has been prepared for the exclusive use of the Illinois Department of Transportation (IDOT) and its Design Section Engineer consultant. The recommendations provided in the report are specific to the project described herein and are based on the information obtained from the soil borings located within the project limits. The analyses performed and the recommendations provided in this report are based on subsurface conditions determined at the location of the borings. This report does not reflect all variations that may occur between boring locations or at some other time, the nature and extent of which may not become evident until during the time of construction. If variations in subsurface conditions become evident after submission of this report, it will be necessary to evaluate their nature and review the recommendations presented herein.

# APPENDIX A

# PROPOSED PLANS

PROJECT BEGINS
STA 393+29.7

EX ℄ MICHIGAN CITY ROAD

RELOCATE LIGHTING

TAPER AT 10:1

PROPOSED RETAINING WALL

RELOCATE LIGHTING

REMOVE AND REPLACE CHAIN LINK FENCE, 260 FT

PROPOSED MULTI-USE PATH

PROPOSED GUARDRAIL

+10.14

+72.64

CHAIN LINK GATE

EX ROW

PROPOSED SIDEWALK

REMOVE AND REPLACE CHAIN LINK FENCE, 60 FT

LIMITS OF CONSTRUCTION (TYP)

+81.4

BLACKSTONE AVENUE

EX ROW

EX SN: 016-1068

+98.30

PROPOSED GUARDRAIL

EX ℄ I-94 (BISHOP FORD FREEWAY)

EX ℄ NB I-94
(BISHOP FORD FREEWAY)

EX ROW

LIMITS OF CONSTRUCTION (TYP)

TAPER AT 20:1

PROPOSED GUARDRAIL
PR ROW

PROJECT ENDS
STA 405+67.7

PROPOSED MULTI-USE PATH

EX CONCRETE CURB AND GUTTER B-6.24

+59.4

+22.10

CORNELL AVENUE

EX ROW

STONY ISLAND AVENUE

EX ROW

PROPOSED SIDEWALK

REMOVE & REPLACE GUARDRAIL

PROPOSED GUARDRAIL

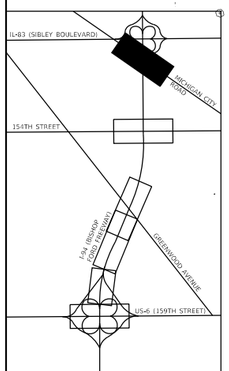
+66.94

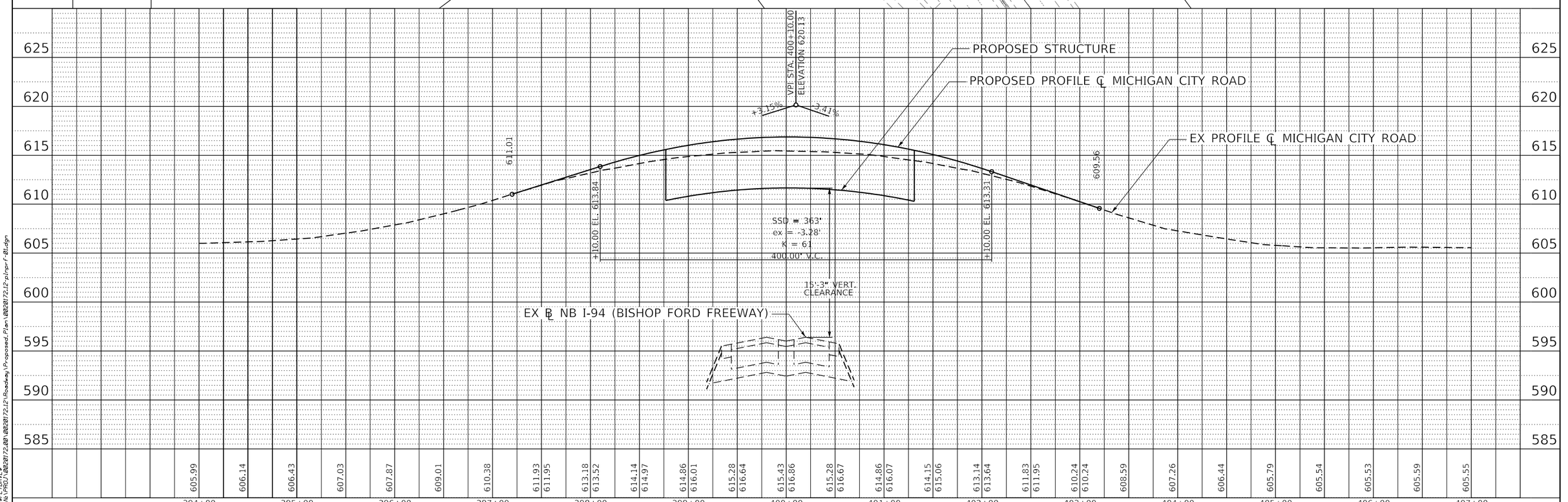
+04.44

EX ROW

LEGEND:
TREE REMOVAL

0 50' 100'
GRAPHIC SCALE

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CiorbaGroup
8725 W. Higgins Road, Suite 600, Chicago, IL 60631 | 773.775.4009 | www.ciorba.com

| | | |
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| | DRAWN - AEC | REVISED - |
| PLOT SCALE = 100.0000 ' / in. | CHECKED - AMH | REVISED - |
| PLOT DATE = 2/21/2022 | DATE - 1/18/2022 | REVISED - |

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

**I-94 (BISHOP FORD FREEWAY)**
**AT MICHIGAN CITY, 154TH, GREENWOOD, LITTLE CALUMET RIVER & US 6**
**PROPOSED PLAN AND PROFILE SHEET**

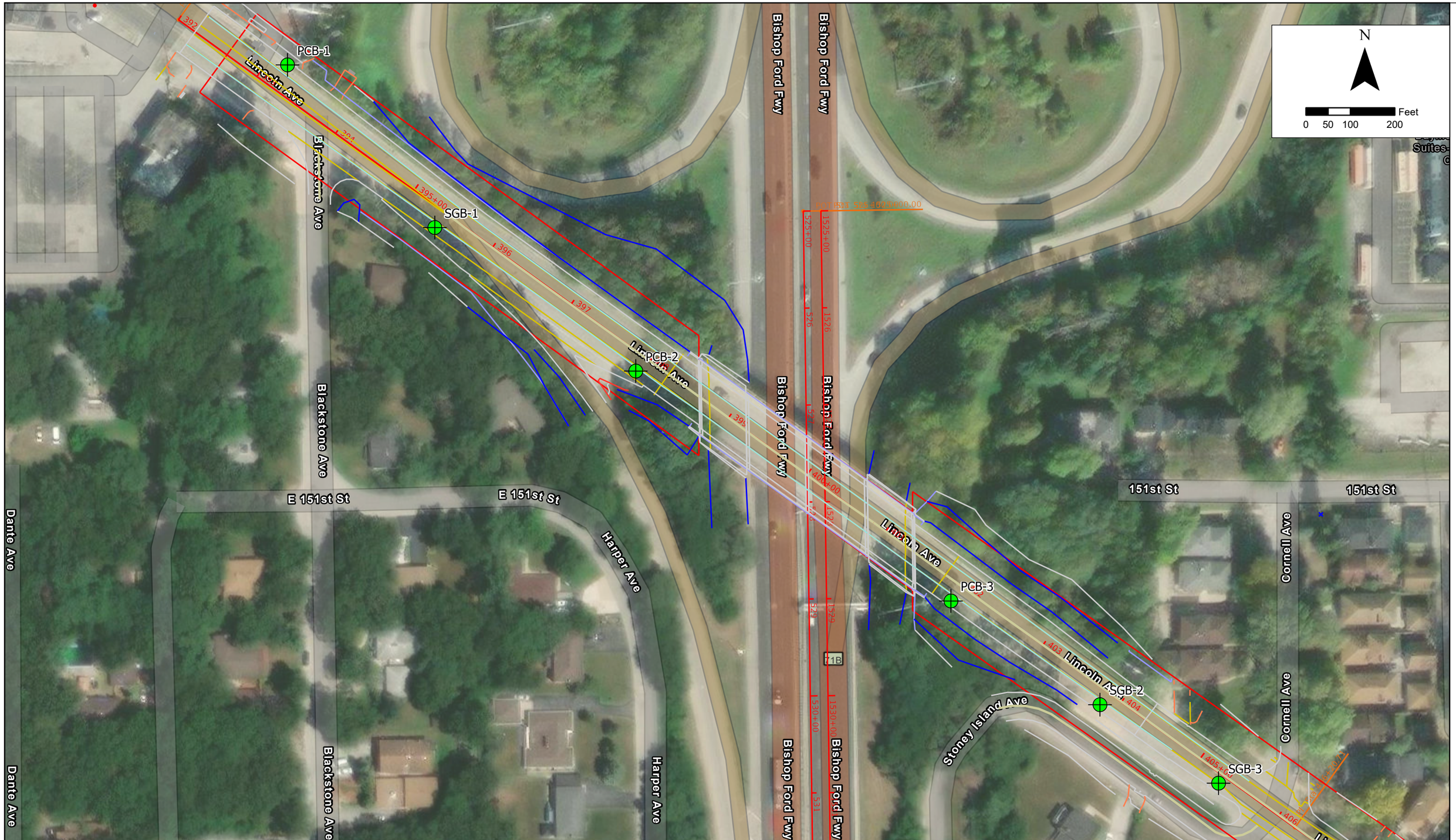
SCALE: 1" = 50' | SHEET NO. OF SHEETS | STA. | TO STA.

| RTE. | SECTION | COUNTY | TOTAL SHEETS | SHEET NO. |
|---|---|---|---|---|
| FAI-94 | 1975-079-BR | COOK | 7 | 1 |
| | | CONTRACT NO. | | |
| FED. ROAD DIST. NO. 1 | ILLINOIS | FED. AID PROJECT | | M-4003(173) |

# APPENDIX B

# SOIL BORING LOCATION PLAN AND

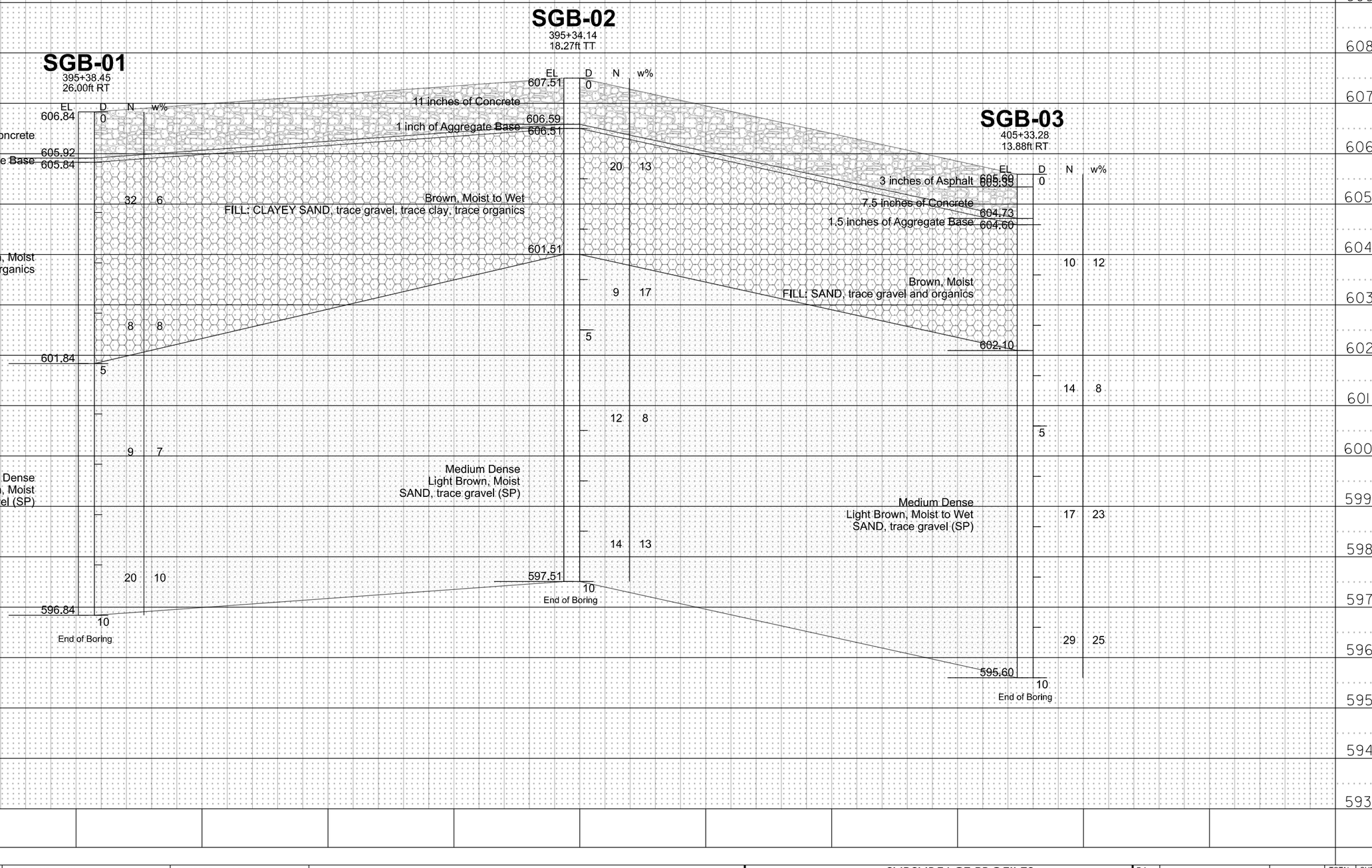
# SUBSURFACE PROFILES




| | | | | | |
|---|---|---|---|---|---|
| ***DRAWN BY*** KN | ***DATE*** 11/10/2023 | GSG CONSULTANTS, INC.<br>735 Remington Road, Schaumburg, IL 60173<br>Tel: 630.994.2600, www.gsg-consultants.com | Illinois Department of Transportation<br>DELTA ENGINEERING GROUP | **MICHIGAN CITY ROAD OVER I-94** | SHEET NO.<br>- |
| ***CHECKED BY*** MZ | ***DATE*** 11/10/2023 | | | **EXHIBIT 3: ROADWAY BORING LOCATION PLAN** | |

## LEGEND

| | | | | | |
|---|---|---|---|---|---|
| PAVEMENT | | FILL: SAND / GRAVEL | | SANDY CLAY / LOAM | |
| BASE COURSE | | SILTY CLAY | | CLAYEY SAND / SILT | |
| TOPSOIL | | SAND | | ORGANIC SILTY CLAY | |
| FILL: CLAY / SILTY CLAY | | SILT / SILTY LOAM | | BEDROCK | |

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GSG CONSULTANTS, INC.
735 E. REMINGTON RD, SCHAUMBURG, IL 60173
TEL: +1630.994.2600 | WWW.GSG-CONSULTANTS.COM

| | | | |
|---|---|---|---|
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| PLOT SCALE | = NTS | CHECKED - | AA |
| PLOT DATE | = 10.16.2023 | DATE - | 10.16.2023 |

DELTA ENGINEERING 204-001

SUBSURFACE PROFILES

MICHIGAN CITY ROAD OVER I-94

SCALE: XX | SHEET OF SHEETS | STA. | TO STA.

| F.A. RTE. | SECTION | COUNTY | TOTAL SHEETS | SHEET NO. |
|---|---|---|---|---|
| | | | | |

CONTRACT NO.

ILLINOIS | FED. AID PROJECT

# APPENDIX C

# SOIL BORING LOGS

**Illinois Department of Transportation**
Division of Highways
GSG

# SOIL BORING LOG



Date 8/1/23

**ROUTE** Michigan City Rd **DESCRIPTION** Subgrade Boring **LOGGED BY** TS

**SECTION** Michigan City Rd **LOCATION** , **SEC.** , **TWP.** , **RNG.** ,

**Latitude** 41.6216528, **Longitude** -087.5803415

**COUNTY** COOK **DRILLING RIG** CME 75 **HAMMER TYPE** AUTO

**DRILLING METHOD** HSA **HAMMER EFF (%)** 79.8

**STRUCT. NO.** N/A
**Station**

**BORING NO.** SGB-01
**Station** 395+38.45
**Offset** 26.00ft RT
**Ground Surface Elev.** 606.84 **ft**

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

**Groundwater Elev.:**
**First Encounter** None **ft**
**Upon Completion** N/A **ft**
**After** N/A **Hrs.** N/A **ft**

| | DEPTH (ft) | BLOWS (/6") | UCS Qu (tsf) | MOIST (%) |
|---|---|---|---|---|
| 11 inches of Concrete | | | | |
| 605.92 | | | | |
| 1 inch of Aggregate Base 605.84 | | 18 | | |
| Brown, Moist FILL: SAND, trace gravel and organics | | 19<br>13 | | 6 |
| | | 4 | | |
| | | 3<br>5 | | 8 |
| 601.84 | -5 | | | |
| Loose to Medium Dense Light Brown, Moist SAND, trace gravel (SP) | | 5 | | |
| | | 4<br>5 | | 7 |
| | | 8 | | |
| | | 8<br>12 | | 10 |
| 596.84 | -10 | | | |
| 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
GSG Consultants, Inc.

# SOIL BORING LOG



Date 8/1/23

**ROUTE** Michigan City Rd **DESCRIPTION** Subgrade Boring **LOGGED BY** TS

**SECTION** Michigan City Rd **LOCATION** , **SEC.** , **TWP.** , **RNG.** ,

**Latitude** 41.6202861, **Longitude** -087.5778500

**COUNTY** COOK **DRILLING RIG** CME 75 **HAMMER TYPE** AUTO

**DRILLING METHOD** HSA **HAMMER EFF (%)** 79.8

**STRUCT. NO.** N/A
**Station**

**BORING NO.** SGB-02
**Station** 395+34.14
**Offset** 18.27ft RT
**Ground Surface Elev.** 607.51 ft

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

**Groundwater Elev.:**
**First Encounter** None ft
**Upon Completion** N/A ft
**After** N/A **Hrs.** N/A ft

| DEPTH (ft) | BLOWS (/6") | UCS Qu (tsf) | MOIST (%) | Description |
|---|---|---|---|---|
| | | | | 11 inches of Concrete |
| | | | | 606.59 |
| | 9 | | | 1 inch of Aggregate Base 606.51 |
| | 13<br>7 | | 13 | Brown, Moist to Wet<br>FILL: CLAYEY SAND, trace gravel and organics |
| | | | | 604.01 |
| | 10 | | | Medium Dense<br>Light Brown, Moist<br>SAND, trace gravel (SP) |
| | 4<br>5 | | 17 | |
| -5 | | | | |
| | 6 | | | |
| | 7<br>5 | | 8 | |
| | 7 | | | |
| | 7<br>7 | | 13 | |
| 597.51 -10 | | | | 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
GSG

# SOIL BORING LOG



Date 8/1/23

**ROUTE** Michigan City Rd **DESCRIPTION** Subgrade Boring **LOGGED BY** TS

**SECTION** Michigan City Rd **LOCATION** , **SEC.** , **TWP.** , **RNG.** ,

**Latitude** 41.6200611, **Longitude** -087.5774057

**COUNTY** COOK **DRILLING RIG** CME 75 **HAMMER TYPE** AUTO

**DRILLING METHOD** HSA **HAMMER EFF (%)** 79.8

**STRUCT. NO.** N/A
**Station**

**BORING NO.** SGB-03
**Station** 405+33.28
**Offset** 13.88ft RT
**Ground Surface Elev.** 605.60 ft

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

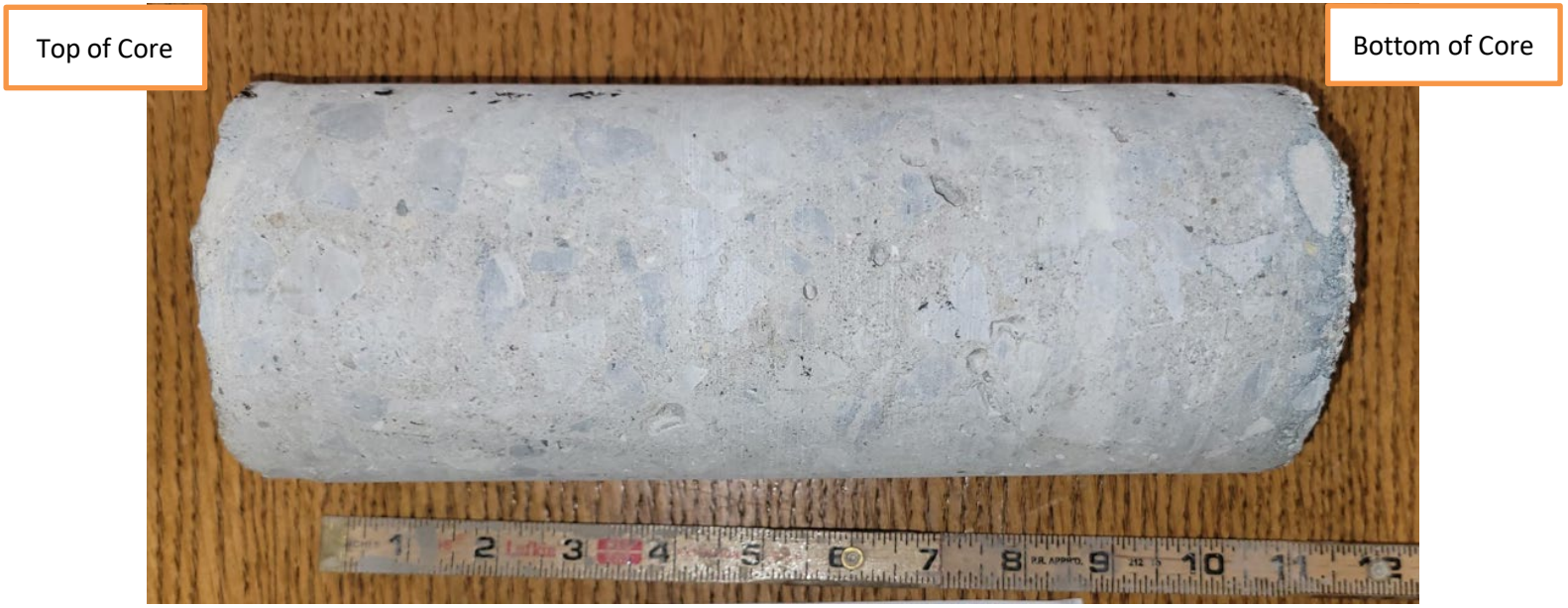
**Groundwater Elev.:**
**First Encounter** 599.6 ft ▼
**Upon Completion** N/A ft
**After** N/A **Hrs.** N/A ft

| | DEPTH (ft) | BLOWS (/6") | UCS Qu (tsf) | MOIST (%) |
|---|---|---|---|---|
| 3 inches of Asphalt 605.35<br>7.5 inches of Concrete 604.73<br>1.5 inches of Aggregate Base 604.60 | | 4 | | |
| Brown, Moist<br>FILL: SAND, trace gravel and organics | | 5<br>5 | | 12 |
| 602.10 | | 6 | | |
| Medium Dense<br>Light Brown, Moist to Wet<br>SAND, trace gravel (SP) | -5 | 7<br>7 | | 8 |
| ▼ | | 7 | | |
| | | 7<br>10 | | 23 |
| | | 8 | | |
| | | 12<br>17 | | 25 |
| 595.60 | -10 | | | |
| 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)**

# APPENDIX D

# PAVEMENT CORE LOGS




PCB–1 –Pavement Core

| Core Location | Asphalt Thickness (in.) | Concrete Thickness (in.) | Aggregate Subbase (in.) | Total Thickness (in.) |
|---|---|---|---|---|
| PCB-1 | N/A | 10.0 | 0.25 | 10.25 |

*Pictures of the core measurements may differ from measured values


PCB–2 –Pavement Core

| Core Location | Asphalt Thickness (in.) | Concrete Thickness (in.) | Aggregate Subbase (in.) | Total Thickness (in.) |
|---|---|---|---|---|
| PCB-2 | N/A | 9.25 | 1.0 | 10.25 |

*Pictures of the core measurements may differ from measured values


PCB–3 –Pavement Core

| Core Location | Asphalt Thickness (in.) | Concrete Thickness (in.) | Aggregate Subbase (in.) | Total Thickness (in.) |
|---|---|---|---|---|
| PCB-3 | 0.75 | 8.25 | N/A | 9.0 |

*Pictures of the core measurements may differ from measured values