
**STRUCTURE GEOTECHNICAL REPORT
MAIN STREET OVER I & M CANAL TRIBUTARY B
CULVERT 4 AT STATION 65+69.81
PR SN 016-0917, SECTION 2020-142-C&DR
LEMONT, COOK COUNTY, ILLINOIS**

**For
Mott MacDonald
10 South LaSalle Street, Suite 2520
Chicago, IL 60603**

**Submitted by
Wang Engineering, Inc.
1145 North Main Street
Lombard, IL 60148**

**Original Report: December 13, 2021
Revised Report: May 11, 2022**

Technical Report Documentation Page

1. Title and Subtitle Structure Geotechnical Report, Culvert at Station 65+69.81 Main Street from Wheeler Road to Illinois 83 (Archer Avenue)		2. Original Date: December 13, 2021 Revised Date: May 11, 2022			
4. Route / Section / County/ District/ Region FA3587/ 2020-142-C &DR/ Cook/ 1/ 1		3. Report Type ☒ SGR ☐ RGR ☐ Draft ☒ Final ☒ Revised			
6. PTB / Item No. 196/006		7. Existing Structure Number(s) 016-xxxx			
8. Proposed Structure Number(s) 016-0917					
<table style="width: 100%; border: none;"> <tr> <td style="width: 33%; vertical-align: top;"> 9. Prepared by Wang Engineering, Inc. 1145 N Main Street Lombard, IL 60148 </td> <td style="width: 33%; vertical-align: top;"> Contributor(s) Authors: Nesam S. Balakumaran, P.Eng. Met Seyhun, P.E. QA/QC: Corina T. Farez, PG, PE PM: Met Seyhun, P.E </td> <td style="width: 33%; vertical-align: top;"> Contact (630) 953-9928 ext. 1018 mseyhun@wangeng.com </td> </tr> </table>			9. Prepared by Wang Engineering, Inc. 1145 N Main Street Lombard, IL 60148	Contributor(s) Authors: Nesam S. Balakumaran, P.Eng. Met Seyhun, P.E. QA/QC: Corina T. Farez, PG, PE PM: Met Seyhun, P.E	Contact (630) 953-9928 ext. 1018 mseyhun@wangeng.com
9. Prepared by Wang Engineering, Inc. 1145 N Main Street Lombard, IL 60148	Contributor(s) Authors: Nesam S. Balakumaran, P.Eng. Met Seyhun, P.E. QA/QC: Corina T. Farez, PG, PE PM: Met Seyhun, P.E	Contact (630) 953-9928 ext. 1018 mseyhun@wangeng.com			
<table style="width: 100%; border: none;"> <tr> <td style="width: 33%; vertical-align: top;"> 10. Prepared for Mott MacDonald 10 S. LaSalle Street, Suite 2520 Chicago, IL, 60603 </td> <td style="width: 33%; vertical-align: top;"> Design Engineer Kevin Bollinger, P.E. </td> <td style="width: 33%; vertical-align: top;"> Contact (312) 894-5368 kevin.bollinger@mottmac.com </td> </tr> </table>			10. Prepared for Mott MacDonald 10 S. LaSalle Street, Suite 2520 Chicago, IL, 60603	Design Engineer Kevin Bollinger, P.E.	Contact (312) 894-5368 kevin.bollinger@mottmac.com
10. Prepared for Mott MacDonald 10 S. LaSalle Street, Suite 2520 Chicago, IL, 60603	Design Engineer Kevin Bollinger, P.E.	Contact (312) 894-5368 kevin.bollinger@mottmac.com			
11. Abstract The existing single cell three-sided culvert with 11-foot wide and 4.5-high opening that carries Main Street over I&M Canal Tributary B will be replaced. The proposed culvert will be a cast-in-place three-cell box culvert with an interior opening of 12-foot wide and 4-foot high. The culvert will have a length of 54.8 feet, a total width of 42 feet, and up to 3 feet of embankment fill on the top. Beneath the surface and up to 3.0 feet of fill, the soil is made up of very dense gravelly sandy loam to gravel extending to sound bedrock. The sound dolostone bedrock is present at elevation of 600.4 feet or at 18 inches below the proposed invert elevations. Additionally, auger/sampler refusals were noted in two borings. Groundwater was encountered while drilling at elevations of 603 to 604 feet (3.75 to 5.5 feet bgs) and was measured at elevations of 602 to 603 feet (3.5 to 7.5 feet bgs) upon completion of drilling. Based on the subsurface investigation, the bottom of culvert is at 600.8 feet elevation with sound bedrock just 5 inches below it at 600.4 feet. The new culvert is anticipated to rest on the very dense sandy gravel, weathered bedrock or possibly sound bedrock. The culvert barrel can be designed with a factored bearing resistance of 8,000 psf. Since the groundwater encountered about 1 to 3 feet above culvert base slab elevations, the contractor should be prepared for dewatering measures. Depending upon prevailing climate conditions and the time of the year when wingwalls and east end culvert construction taken place, control runoff and maintenance of existing flows may require temporary water diversion and control. For the replacement of culvert and to maintain the traffic along Main Street, temporary soil retention system will be required. The TSRS can be included as Pay Item. Due to the very dense weathered bedrock followed by sound bedrock, temporary sheet piling design is not feasible using IDOT Design Guide 3.3.13 (IDOT 2012). Wang recommends that the impact of the proposed culvert on the existing gas line at the north end and a sanitary sewer line at the south end be undertaken for safety and construction reasons.					
12. Path to archived file N:_WANGLegacy\SHARED\Netprojects\2690201\Reports\Culvert_4_SGR\RPT_Wang_NSB_2690201_MainStreetCulvert4_v03_20220511.doc					

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**STRUCTURE GEOTECHNICAL REPORT
MAIN STREET OVER I & M CANAL TRIBUTARY B
CULVERT AT STATION 65+69.81
PR SN 016-0917, SECTION 2020-142-C&DR
LEMONT, COOK COUNTY, ILLINOIS
FOR
MOTT MACDONALD**

1.0 INTRODUCTION

This report presents the results of our subsurface investigation, laboratory testing, geotechnical evaluations, and recommendations to support the design and construction of replacement of culvert for Main Street over I & M Canal Tributary B at Station 65+69.81 in the Village of Lemont, Cook County, Illinois. On the USGS *Sag Bridge Quadrangle 7.5 Minute Series* map, the project site is generally located at NW¼ of Section 22, Township 37N, Range 11E of the Third Principal Meridian. A *Site Location Map* is presented as Exhibit 1.

The purpose of this investigation was to characterize the site soil and groundwater conditions, perform geotechnical analyses, and provide recommendations for the design and construction of the proposed culvert replacement.

1.1 Proposed Structure

Based on General Plan and Elevation (GPE) drawing dated November 17, 2021 provided by Mott MacDonald, Wang Engineering, Inc. (Wang) understands the existing single cell three-sided culvert will be removed and replaced with a cast-in-place three-cell box culvert with an interior opening of 12-foot wide and 4-foot high. The culvert has a proposed invert elevation of 601.95 feet at the upstream and downstream ends. The culvert will have a length of 54.8 feet and total width of 42 feet with up to 3 feet of embankment fill on the top. Culvert wingwalls type is yet to be determined. The culvert replacement will be done on staged construction to maintain traffic at Main Street.

1.2 Existing Structure and Land Use

The existing culvert is a single cell 11-foot wide and 4.5-foot high three sided culvert. The surrounding land of the culvert is generally wooded area with railway track and canal on the north side.

2.0 METHODS OF INVESTIGATION

The following sections outline the field and laboratory investigations performed by Wang.

2.1 Field Investigation

The field investigation consisted of three structure borings, designated as CUL-04-01 through CUL-04-03 drilled by Wang from October 8 to October 18, 2021. The as-drilled northings and eastings were obtained with a mapping-grade GPS unit. Elevations, station and offsets were provided by Mott MacDonald. As-drilled boring locations are presented in the *Boring Logs* (Appendix A) and are shown in the *Boring Location Plan* (Exhibit 2).

ATV and truck-mounted drilling rigs, equipped with hollow stem augers, were used to advance and maintain open boreholes. Soil sampling was performed according to AASHTO T206, "*Penetration Test and Split Barrel Sampling of Soils.*" The soil in the Borings CUL-04-02 and CUL-04-03 was sampled at 2.5-foot intervals to the boring termination depths or top of bedrock whereas the soil in Boring CUL-04-01 was sampled continuously to the boring termination depth. Bedrock cores were obtained in Boring CUL-04-02 in a 10-foot run with an NW4-sized core barrel. Soil samples collected from each sampling interval were placed in sealed jars and transported to the laboratory for further examination and laboratory testing. Additionally, a bulk sample was collected in Boring CUL-04-01.

Field boring logs, prepared and maintained by Wang geologists, include lithological descriptions, visual-manual soil (IDH Textural) classifications, results of Rimac and pocket penetrometer unconfined compressive strength tests, and results of Standard Penetration Tests (SPT) recorded as blows per 6 inches of penetration.

Groundwater levels were measured while drilling and at completion of each boring. Each borehole was backfilled upon completion with lean grout and bentonite chips.

2.2 Laboratory Testing

The soil samples were tested in the laboratory for moisture content (AASHTO T265). Particle size analyses (AASHTO T88) were performed on bulk sample. An unconfined compressive strength test (AASHTO T22) was performed on selected intact bedrock core. Tested samples were classified according to the IDH classification system. Field visual descriptions of the soil samples were verified in the laboratory. Laboratory test results are shown in the *Boring Logs* (Appendix A) and in the *Laboratory Test Results* (Appendix B).

3.0 INVESTIGATION RESULTS

Detailed descriptions of the soil conditions encountered during the subsurface investigation are presented in the attached *Boring Logs* (Appendix A) and in the *Soil Profile* (Exhibit 3). 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.

3.1 Lithological Profile

Boring CUL-04-01, drilled on the downstream end, encountered 2.3 feet of gravelly sand to sandy gravel. Boring CUL-04-02, drilled on the Main Street, encountered pavement consisting of 9 inches of asphalt overlying 9 inches of concrete followed by 3-inch thick sandy gravel. Boring CUL-04-03, drilled on the upstream end, encountered 12-inch thick, black silty clay loam topsoil. In descending order, the general lithologic succession encountered beneath the surface includes: 1) man-made ground (fill); 2) very dense gravelly sandy loam to sandy gravel (weathered bedrock); and 3) dolostone bedrock.

1) Man-made ground (fill)

Beneath the pavement, Boring CUL-04-02 encountered 2.7 feet of medium stiff to stiff, brown clay loam fill with unconfined compressive strength (Q_u) values of 0.5 and 1.5 tsf and moisture content values of 15 and 21%. Beneath the fill, Boring CUL-04-02 encountered 1.2 feet of brown and tan loam with gravel.

2) Very dense gravelly sandy loam to gravel (weathered bedrock)

At elevations of 607.3 to 604.0 feet, the borings encountered 1.7 to 3.5 feet of very dense, brown and gray to gray, dry to saturated gravelly sandy loam to gravel. The unit has N values of 50 blows for 2 to

5 inches of sampler penetration. Borings CUL-04-01 and CUL-04-03 encountered sampler and auger refusals at elevations of 602.3 and 604.3 feet, respectively.

3) *Dolostone bedrock*

At an elevation of 600.4 feet (9 feet bgs), Boring CUL-04-02 encountered strong and fair quality dolostone. The bedrock is slightly weathered with horizontal and oblique joints. The rock quality designation (RQD) is fair with 62%. Laboratory testing on an intact rock core specimen showed a uniaxial compressive strength of 4,852 psi. Bedrock core photograph is attached in Appendix C.

3.2 Groundwater Conditions

Groundwater was encountered while drilling at elevations of 603 and 604 feet (3.75 and 5.5 feet bgs) and was measured in open boreholes at elevations of 602 and 603 feet (3.75 and 7.5 feet bgs) upon completion of drilling. We estimate the long-term groundwater elevation at 603 feet.

4.0 ANALYSES AND RECOMMENDATIONS

In the following sections, we present the results of our analyses and recommendations for the proposed culvert and wingwalls.

4.1 Culvert Foundations

Based on the subsurface investigation, the bottom of culvert is at 600.8 feet elevation with sound bedrock just 5 inches below it at 600.4 feet. The new culvert is anticipated to rest on the very dense sandy gravel, weathered bedrock or possibly sound bedrock. If bedrock excavation is required for culvert base slab construction, all bedrock cracks, voids, seams, or other irregularities in the excavation should be cleaned and filled with concrete (IDOT 2022). It should be noted that the groundwater table can be as high as 604 feet elevation, thus water control will be needed during construction. We estimate the foundation soils will experience immediate settlement of 0.25 inches or less with a differential settlement of 0.25 inches or less.

4.2 Wingwalls

Wingwalls type is yet to be determined. For the cast-in-place culvert, horizontal cantilever and L-type wingwalls are typically used. The other wingwall types, such as cast-in-place T-type or precast apron end sections may also be considered.

If the proposed wingwalls is less than 16 feet in length, the horizontal cantilever wingwalls could be considered (IDOT 2017). The horizontal cantilever wingwalls which are supported by the culvert box rather than the foundation soils. Horizontal cantilever wingwalls should be designed based on the guidelines provided in Section 4.2 of the IDOT *Culvert Manual* (2017).

For the cast-in-place T-type walls, the footings should be established at a depth such that they would be at least 4 feet below culvert barrel invert elevation. Footing will be established at elevation of 597.5 feet at upstream and downstream ends. Since the bedrock is expected to be encountered at elevation of 600.4 feet and bedrock excavation required for footing construction. T-type wall at this culvert may not be economical.

If the precast apron end sections are selected, they should be designed IDOT Base sheet dated 2/17/2017 “MCB-AES, Multi-Cell Precast Concrete Box Culvert Apron End Section Details” and constructed based on IDOT Standard Specifications.

4.3 Global Stability

Since the horizontal cantilever walls are expected to be preferred wingwall type, we do not anticipate global instability concerns for wingwalls.

5.0 CONSTRUCTION CONSIDERATIONS

5.1 Site Preparation

The existing vegetation, surface topsoil, pavement, and debris should be cleared and stripped where the culvert foundations will be placed. Due to the closeness of the bedrock to the proposed culvert bottom, bedrock excavation is anticipated during construction, which should be performed in accordance with IDOT Standard Specifications (IDOT 2022).

5.2 Excavation, Dewatering, and Utilities

Excavations should be performed in accordance with local, state, and federal regulations. The potential effect of ground movements upon nearby roadways and utilities should be considered during construction. Any excavation that cannot be sloped 1:2.5 (V:H) should be properly shored using a Temporary Soil Retention Systems (TSRS). The TSRS can be included as *Pay Item*. Due to the very dense weathered bedrock followed by sound bedrock, temporary sheet piling design is not feasible using IDOT *Design Guide 3.3.13* (IDOT 2012).

The groundwater was observed at elevations 602 to 604 feet in borings about 1 to 3 feet above the proposed culvert base slab. The contractor should be prepared for dewatering measures. Depending upon prevailing climate conditions and the time of the year when wingwalls construction taken place, control runoff and maintenance of existing flows may require temporary water diversion and control. Any water that accumulates in open excavations by seepage or runoff should be immediately removed by sump pump.

Based on the preliminary plan drawings provided and the utilities shown on the plans, it appears that there is an existing gas line at the north end of this culvert and a sanitary sewer line at the south end. Wang recommends that the impact of the proposed culvert on all nearby existing utilities be undertaken for safety and construction reasons. The locations of the utilities should be clarified by each utility company with their opinions as to the proposed construction and the need for any permitting.

5.3 Filling and Backfilling

Fill used as embankment material and for replacement of any unstable or unsuitable soils encountered during construction should be pre-approved by the Engineer. The material used to backfill around and to a level at least 1 foot over the top of the culvert box, should be porous granular material conforming to the requirements specified in the IDOT 2020 Supplemental Special Provisions, *Granular Backfill of Structures*.

5.4 Earthwork Operations

The required earthwork can be accomplished with conventional construction equipment. Moisture and traffic will cause deterioration of exposed subgrade soils. Precautions should be taken by the Contractor to prevent water erosion of the exposed subgrade. A compacted subgrade will minimize water runoff erosion.

Earth moving operations should be scheduled to not coincide with excessive cold or wet weather (early spring, late fall or winter). Any soil allowed to freeze or soften due to the standing water should be removed. Wet weather can cause problems with subgrade compaction.

It is recommended that an experienced geotechnical engineer be retained to inspect the exposed subgrade, monitor earthwork operations, and provide material inspection services during the construction phase of this project.

6.0 QUALIFICATIONS

The analysis and recommendations submitted in this report are based upon the data obtained from the borings drilled at the locations shown on the boring logs and in Exhibit 2. 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. If changes are planned to the proposed improvements as described in this report, we should be timely informed so that our recommendations can be adjusted accordingly.

It has been a pleasure to assist Mott MacDonald and the Illinois Department of Transportation and Highways 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
Project Manager

Nesam S. Balakumaran, P.Eng.
Project Geotechnical Engineer

Corina T. Farez, P.E., P.G.
QA/QC Reviewer

REFERENCES

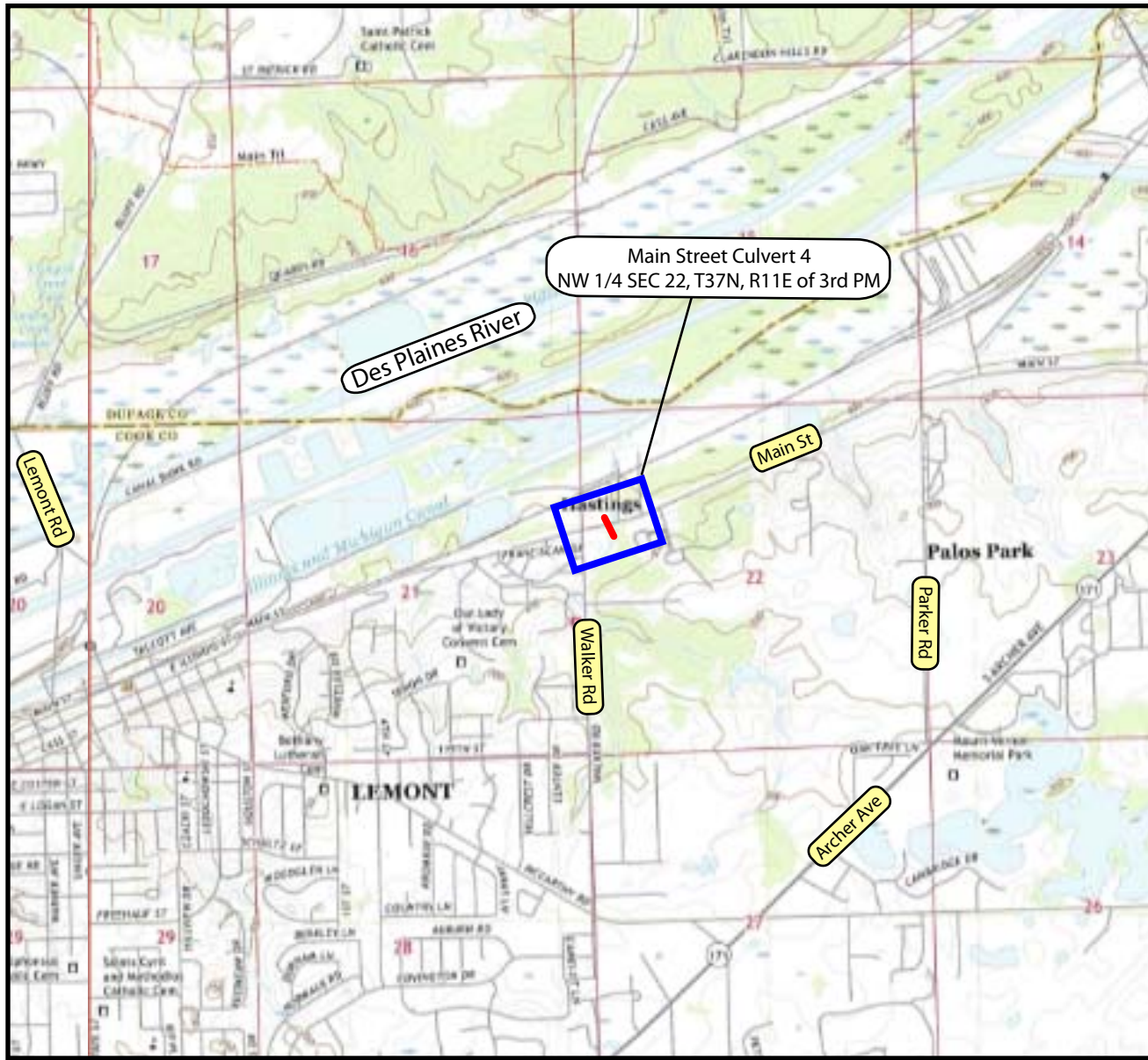
IDOT (2017) *Culvert Manual*. Illinois Department of Transportation.

IDOT (2022) *Standard Specifications for Road and Bridge Construction*. Illinois Department of Transportation. 1098 pp.

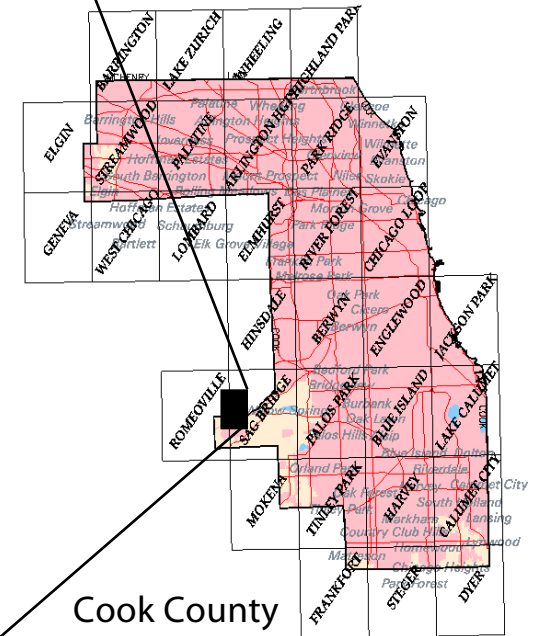
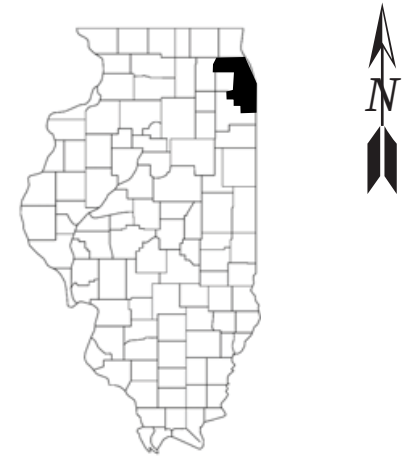
IDOT (2015) *Geotechnical Manual*, Illinois Department of Transportation.

IDOT (2021) *Supplemental Specifications and Recurring Special Provisions*

EXHIBITS



0 1.0 2.0 Miles



Cook County

SITE LOCATION MAP: MAIN STREET CULVERT 4; CONTRACT D-91-449-20, PTB 196-006, COOK COUNTY, ILLINOIS

SCALE: GRAPHICAL

EXHIBIT 1

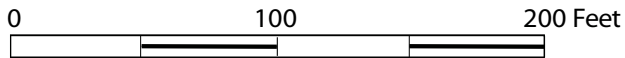
DRAWN BY: J. Bensen
CHECKED BY: M. Seyhun



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FOR MOTT MCDONALD

269-02-01



Legend

● Boring Location

BORING LOCATION PLAN: MAIN STREET CULVERT 4; CONTRACT D-91-449-20,
PTB 196-006, COOK COUNTY, ILLINOIS

SCALE: GRAPHICAL

EXHIBIT 2

DRAWN BY: J. Bensen
CHECKED BY: M. Seyhun

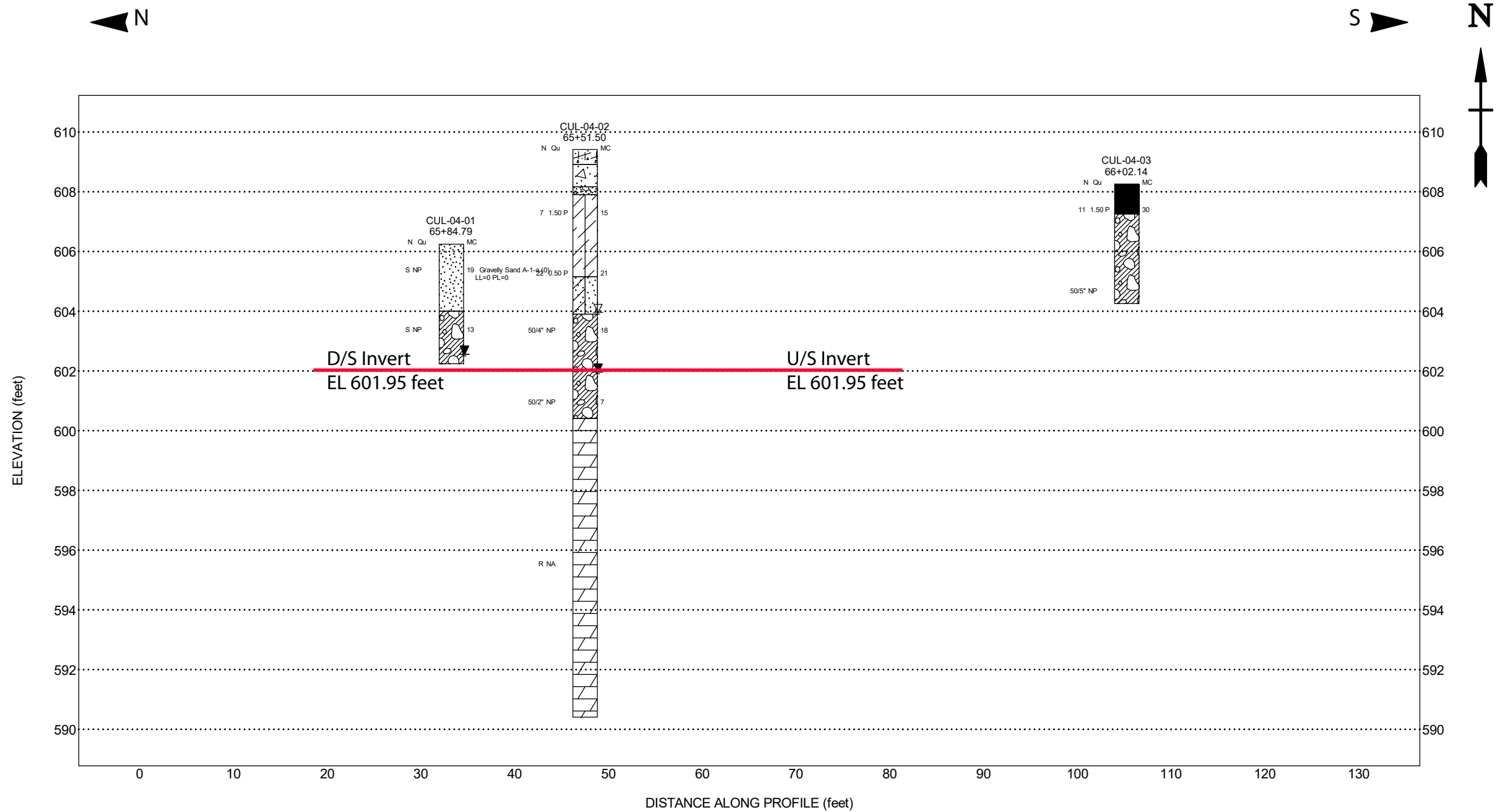


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FOR MOTT MCDONALD

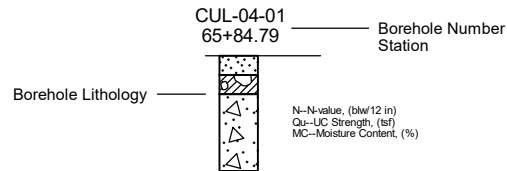
269-02-01

WEI 11X17 2690201.GPJ WANGENG.GDT 12/2/21



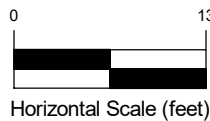
Site Map Scale 1 inch equals 50 feet

Explanation:



Water Level Reading at time of drilling.

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



Wang Engineering, Inc.
1145 N. Main Street
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Soil Profile
Main Street, Lemont over I & M Canal
Tributary B, SN 016-0917



Main Street Lemont from Wheeler RD to IL 83
Cook County, IL

JOB NUMBER	PLATE NUMBER
269-02-01	EXHIBIT 3

APPENDIX A



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BORING LOG CUL-04-01

WEI Job No.: 269-02-01

Client **Mott MacDonald**
Project **Main Street Lemont from Wheeler RD to IL 83**
Location **Cook County, IL**

Datum: NAVD 88
Elevation: 606.25 ft
North: 1826813.27 ft
East: 1083539.50 ft
Station: 65+84.79
Offset: 42.75' 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 (%)
	604.0	Brown SANDY LOAM to GRAVELLY SAND, trace organic matter, little gravel; dry to damp			1	PUSH	NP	19									
	602.3	Brown and gray SANDY GRAVEL; wet --Weathered BEDROCK--			2	PUSH	NP	13									
		--REFUSAL-- Boring terminated at 4.00 ft	5														
			10														
			15														
			20														

GENERAL NOTES

Begin Drilling **10-11-2021** Complete Drilling **10-11-2021**
Drilling Contractor **Wang Testing Services** Drill Rig **Geoprobe HA**
Driller **R&A** Logger **M. Sadowski** Checked by **C. Marin**
Drilling Method **1" ID HSA; boring backfilled upon completion**

WATER LEVEL DATA

While Drilling **3.75 ft**
At Completion of Drilling **3.75 ft**
Time After Drilling **NA**
Depth to Water **NA**

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



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BORING LOG CUL-04-02

WEI Job No.: 269-02-01

Client **Mott MacDonald**
Project **Main Street Lemont from Wheeler RD to IL 83**
Location **Cook County, IL**

Datum: NAVD 88
Elevation: 609.41 ft
North: 1826773.08 ft
East: 1083514.26 ft
Station: 65+51.50
Offset: 8.93' 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 (%)
	608.9	6-inch thick ASPHALT --PAVEMENT--															
	608.29	9-inch thick CONCRETE --PAVEMENT--															
	607.9	3-inch thick, brown SANDY GRAVEL --AGGREGATE BASE--			1	8 4 3	1.50 P	15									
	605.2	Medium stiff to stiff, brown CLAY LOAM, trace to some gravel; damp --FILL--			2	7 12 10	0.50 P	21									
	603.9	--RDR 2-3-- Brown and tan LOAM, some gravel; damp --RDR 3--			3	50/4"	NP	18									
	600.4	Very dense, gray Gravelly SANDY LOAM, some weathered DOLOSTONE fragments; saturated --Weathered BEDROCK--			4	50/2"	NP	7									
		Strong, light bluish gray, fair quality, DOLOSTONE; closely spaced, slightly weathered, horizontal and oblique joints, with <0.05 inch opening, slightly rough walls, and <0.2 inch thick sand infill. --Run 1: 9.0 to 19.0 feet-- --Recovery: 100%-- --RQD: 62%--	10		5												
		--Qu at 15.5 feet = 4852 psi--	15														
	590.4	Boring terminated at 19.00 ft	20														

GENERAL NOTES

Begin Drilling **10-08-2021** Complete Drilling **10-08-2021**
Drilling Contractor **Wang Testing Services** Drill Rig **20CME55T[81%]**
Driller **R&A** Logger **M. Sadowski** Checked by **C. Marin**
Drilling Method **3.25" ID HSA; boring backfilled upon completion**

WATER LEVEL DATA

While Drilling **5.50 ft**
At Completion of Drilling **7.50 ft**
Time After Drilling **NA**
Depth to Water **NA**

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



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BORING LOG CUL-04-03

WEI Job No.: 269-02-01

Client **Mott MacDonald**
Project **Main Street Lemont from Wheeler RD to IL 83**
Location **Cook County, IL**

Datum: NAVD 88
Elevation: 608.26 ft
North: 1826746.36 ft
East: 1083572.01 ft
Station: 66+02.14
Offset: 29.59' 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 (%)
	607.3	12-inch thick, stiff, black SILTY CLAY LOAM, trace gravel; damp --TOPSOIL--			1	3 4 7 10	1.50 P	30									
	604.3	Very dense, gray GRAVEL; dry to damp --Weathered BEDROCK-- --RDR 3--			2	50/5"	NP										
		--AUGER REFUSAL-- Boring terminated at 4.00 ft	5														
			10														
			15														
			20														

GENERAL NOTES

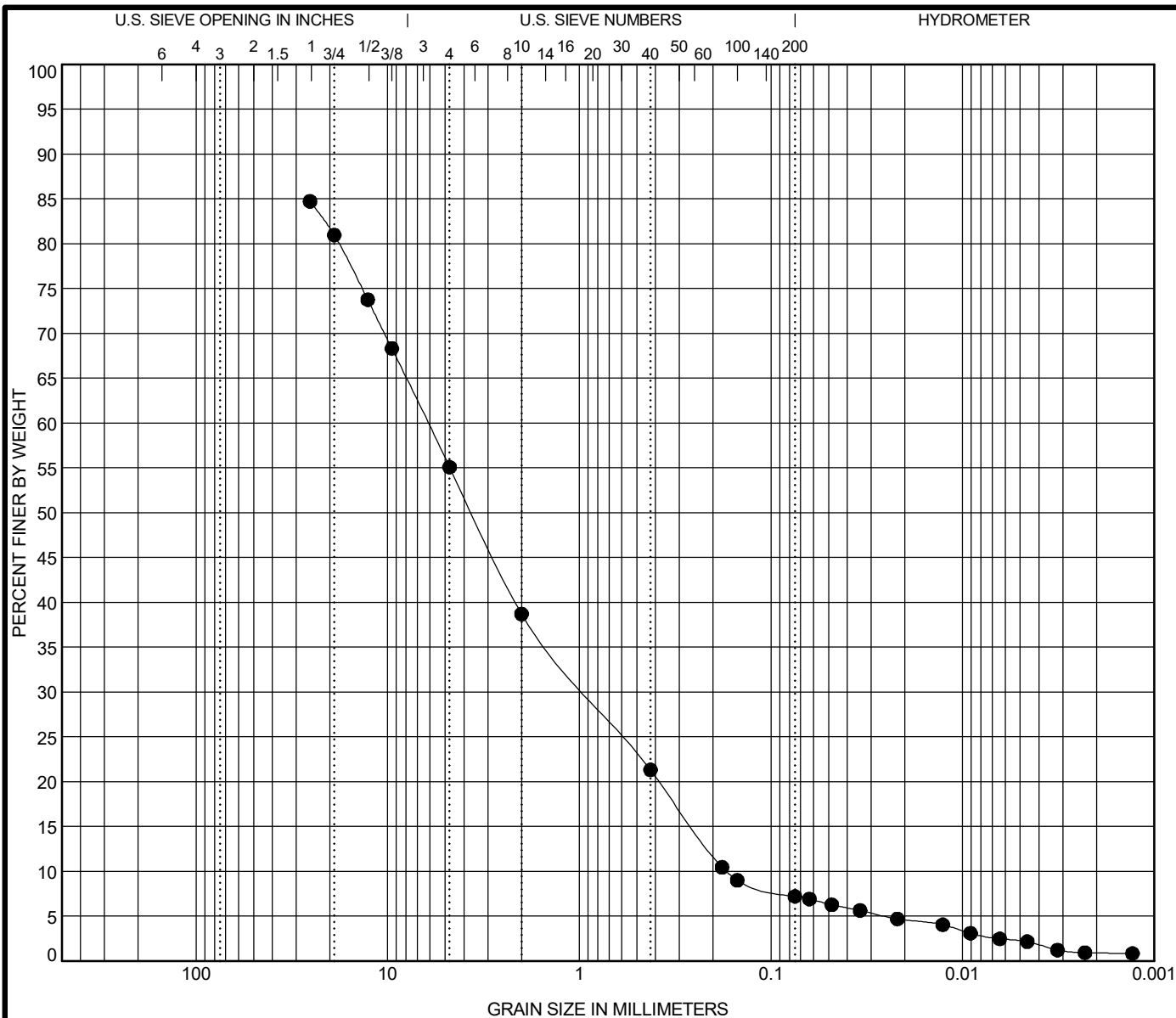
Begin Drilling **10-18-2021** Complete Drilling **10-18-2021**
Drilling Contractor **Wang Testing Services** Drill Rig **20D25A [83%]**
Driller **K&A** Logger **M. Sadowski** Checked by **C. Marin**
Drilling Method **2.25" ID HSA; boring backfilled upon completion**

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.

APPENDIX B



COBBLES	GRAVEL	SAND		SILT AND CLAY
		coarse	fine	

Specimen Identification			IDH Classification					LL	PL	PI	Cc	Cu
●	CUL-04-01#1	0.0 ft	Gravelly Sand					NP	NP	NP	0.81	36.14
Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
●	CUL-04-01#1	0.0 ft	25.4	6.143	0.921	0.17	61.3	31.5	6.3	0.9		



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

GRAIN SIZE DISTRIBUTION

Project: Main Street Lemont from Wheeler RD to IL 83

Location: Cook County, IL

Number: 269-02-01



Unconfined Compressive Strength of Intact Rock Core Specimens

Project: Main Street Culverts

Client: Mott MacDonald

WEI Job No.: 269-02-01

Field Sample ID	Run #	Depth (ft)	Location	Sample Description	Length (in)		Diameter (in)	Total Load (lbs)	Total Pressure (psi)	Fracture Type*	Break Date	Tested By	Area (in ²)
					Before Capping	After Capping							
CUL-1-2	1	26.0	Lemont, IL	Dolostone	4.25	NA	2.05	38020	11485	3	11/15/21	MAC	3.31
CUL-4-2	1	15.5	Lemont, IL	Dolostone	4.23	NA	2.05	16060	4852	3	11/15/21	MAC	3.31
CUL-10-3	1	22.0	Lemont, IL	Dolostone	4.24	NA	2.06	44990	13551	3	11/15/21	MAC	3.32

*** Fracture Types:**

- Type 1 - Reasonably well-formed cones on both ends, less than 1 in. [25 mm] of cracking through caps;
- Type 2 - Well-formed cone on one end, vertical cracks running through caps, no well defined cone on other end;
- Type 3 - Columnar vertical cracking through both ends, no well-formed cones;
- Type 4 - Diagonal fracture with no cracking through ends; tap with hammer to distinguish from Type 1;
- Type 5 - Side fractures at top or bottom (occur commonly with unbonded caps);
- Type 6 - Similar to Type 5 but end of cylinder is pointed.

Prepared by: _____

Checked by: _____

APPENDIX C

Run #1



Qu: 4,852 psi

BOTTOM

0 6 inches

Boring CUL-04-02:
Run #1, 9.0 to 19.0 feet, RECOVERY=100%, RQD=62%

BEDROCK CORE: MAIN STREET CULVERT 4; CONTRACT D-91-449-20, PTB 196-006,
COOK COUNTY, ILLINOIS

SCALE: GRAPHICAL

APPENDIX C-1

DRAWN BY: J. Bensen
CHECKED BY: M. Seyhun



1145 N. Main Street
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FOR MOTT MCDONALD

269-02-01

APPENDIX D

Existing Structure: "S.N. 016-0917 appears to have been constructed circa 1900. The original structure is a 11ft by 4.5ft single-span R.C. slab supported by stacked stone abutments. The structure was extended upstream with a 11ft x 4.5ft single cell CIP concrete box culvert. The structure was again extended upstream with a 11ft by 4.5ft single cell CIP concrete box culvert angled to meet the approach channel. Plans for the original construction and widening are not available. Structure to be removed and replaced with a triple-barrel box culvert. Road to be closed during construction."

No salvage



Note:
Geocomposite Wall Drain shall be according to
Section 591 of the Standard Specifications, except
that concrete nails shall not be used in areas where
it overlaps Membrane Waterproofing System for
Buried Structures.



	Soil boring location
	Existing underground gas main
	Existing underground fiber optic
	Existing underground sanitary sewer
	Existing aerial line
	Existing underground storm sewer
	Proposed underground storm sewer
	Remove & replace unsuitable material

FAU 3585 (Main Street)
Functional Class: Minor Arterial
ADT: 4,400 (2018); 11,300 (2030)
ADTT: 528 (2018); 1,356 (2030)
DHV: 1,130
Design Speed: 50 m.p.h.
Posted Speed: 40 m.p.h.

2020 AASHTO LRFD Bridge Design
Specifications, 9th Edition

Allow 50#/sq. ft. for future wearing surface

FIELD UNITS

$$\begin{aligned} f'_c &= 3,500 \text{ psi (Concrete)} \\ f_y &= 60,000 \text{ psi (Reinforcement)} \end{aligned}$$

GENERAL PLAN & ELEVATION
MAIN STREET OVER I & M
CANAL TRIBUTARY B
FAU 3585 - SEC. 2020-142-C & DP
COOK COUNTY
STATION 65+69.81
STRUCTURE NO. 016-0917

10-Year Velocity through Existing Structure = 5 ft/s
10-Year Velocity through Proposed Structure = 3 ft/s

MAIN STREET LEMONT FROM WHEELER RD TO IL 83 GENERAL PLAN AND ELEVATION OUTLET 4					F.A.U RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
					3585	2020-142-C&DR	COOK	278	129
SCALE: 1"=8.33'	SHEET	OF	SHEETS	STA.	TO STA.				
					ILLINOIS FED. AID PROJECT CONTRACT NO. 62L30				