Midwest Engineering and Testing, Inc.
geotechnical - environmental - materials engineers
1701 West Market Street
Bloomington, IL 61701
309-821-0430
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May 1, 2023

Mr. Brian Martin, P.E.
MECO Engineering Co. Inc.
3120 Palmyra Road
Hannibal, MO 63401
bmartin@mecoengineering.com

Re: Subsurface Exploration and Geotechnical Evaluation
Proposed Raw Water Line Transmission Main
Illinois Alluvial Regional Water Company
Jersey County, Illinois
MET Project No. B33017

Dear Mr. Martin:

In accordance with your request, Midwest Engineering and Testing, Inc. (MET) has completed a geotechnical exploration and evaluation of the subsurface conditions for the above-referenced project. Our geotechnical report in .pdf format, which includes our findings and recommendations regarding design and construction of raw water line, is being submitted via e-mail. Hard copies of the report can also be provided, if so desired.

MET appreciates the opportunity to be of service during this phase of the project. If there are any questions or comments you may have regarding the content of this report, or if we may be of any further service, please contact us at your convenience.

Sincerely,

Midwest Engineering and Testing, Inc.

Kelsey R. Mueller
Project Engineer

Daniel E. Tappendorf

Digitally signed by Daniel E. Tappendorf
DN: cn=Daniel E. Tappendorf, o=Midwest Engineering and Testing, Inc., ou=MET, email=dtappendorf@metgeotech.com, c=US
Date: 2023.05.01 14:59:16 -05'00'

Daniel E. Tappendorf, P.E.
President

SUBSURFACE EXPLORATION
AND
GEOTECHNICAL EVALUATION

Proposed Raw Water Line Transmission Main
Illinois Alluvial Regional Water Company
Jersey County, Illinois

Prepared For

MECO Engineering Co. Inc.
3120 Palmyra Road
Hannibal, MO 63401

May 1, 2023

MET File No. B33017

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INTRODUCTION

General

This report presents the results of a geotechnical exploration completed for the proposed raw water line transmission main to be installed for the Illinois Alluvial Regional Water Company (IARWC) in Jersey County, Illinois. A Vicinity Map, Figure 1, has been included in the Appendix. The purpose of this study was to determine and evaluate the subsurface conditions existing at the subject site, and to establish related parameters for use by the design engineers and architects. Included herein are the results of the subsurface exploration, field and laboratory soil test data, and recommendations regarding design and construction of the raw water line.

Scope

The scope of services included a reconnaissance of the site, subsurface exploration, field and laboratory testing of the soil samples collected, and engineering analysis and evaluation of the data. In addition, geological maps and literature related to the area were reviewed. A previous soil exploration report completed by Ramsey Geotechnical Engineering (RGE Job 20-117) on July 23, 2020 was also reviewed.

Authorization

Authorization to perform this subsurface exploration and analysis was in the form of a fully executed proposal agreement between MECO Engineering Co. Inc. and Midwest Engineering and Testing, Inc. (MET). The proposal (MET Proposal No. B23004, dated on January 19, 2023) outlined the scope of services and conditions for performance of the work and was signed by Mr. Max Middendorf, Vice President of MECO Engineering Co. Inc. on March 10, 2023.

SITE AND PROJECT DESCRIPTION

The project involves the installation of a 30-inch diameter raw water line transmission main in Jersey County, Illinois. The raw water line will generally run in the west-east direction parallel to State Highway 16. The project begins on the west side of State Highway 100 and ends approximately 2 miles east at the new water treatment plant site. There is a significant change in ground surface elevation. The elevation begins at 421.6 feet on the west end and ends at 694.8 feet on the east end. The planned depth of the raw water line will range between approximately 10 to 30 feet below grade. The raw water line will be installed using a combination of trenching and horizontal directional drilling (HDD) techniques. Ten ft. deep earthen backwash basins are planned near the east end of the line.

Two crossings are planned under Branch Creek. The first crossing involves a directional bore 12 feet below the existing flowline of the creek to place a carrier pipe with no casing. The second crossing involves a directional bore at least 6 feet below the existing flowline of the creek to place a carrier pipe with no casing. Two crossings are planned under the State Highways. The first crossing occurs under State Highway 100 and involves a directional bore to place an outer casing with a 38-inch diameter. The second crossing occurs under State Highway 16 and involves a directional bore to place an outer casing with a 36-inch diameter. Additional directional bores are planned up steep slopes or through wooded areas. The raw water line will be installed at least 24-inches below the existing 4-inch PVC potable water main that it crosses twice.

GEOLOGY OF THE AREA

Bedrock Geology

The western edge of Jersey County is located in a major bedrock valley formed by the Ancient Mississippi River. Along the western portion of the project, bedrock consists of Devonian Age deposits consisting primarily of shale and sandstone and is mapped to depths of up to 100 to 200 feet below the surface. Moving toward the eastern portion of the project, the bedrock transitions to Mississippian Age deposits consisting primarily of limestone, shale, and siltstone encountered at depths between 25 and 50 feet below the surface.

Surficial Geology

The surficial geology on the western portion of the project likely consists of Cahokia Alluvium, which is poorly sorted sand, silt, or clay deposits in the floodplain of the modern Illinois River. On the eastern portion of the project, the surficial geology likely consists of more than 15 feet of Peoria Loess and Roxana Silt, that is, wind deposited and water worked loessial material. The loess overlies glacial drift associated with the Vandalia Till Member of the Glasford Formation, which is characterized by hard, compact sandy glacial till with sand and gravel.

Karst Terrain

The project area is mapped in the Lincoln Hills karst region. Karst terrain is susceptible to features such as caves, sinkholes, and springs in the predominately carbonate bedrock located near the surface.

Seismic Considerations

Based upon soil strength and density information encountered in the borings and lacking soil information through a depth of 100 feet in the area of the project site, it is our opinion that **Site Class D** as defined in Table 1613.5.2 of the International Building Code (IBC) – 2015 be utilized for design. The project site is located at approximate latitude 39.40599°N and longitude 90.55995°W. At this location, the 0.2 second period (S_S) and 1.0 second period (S_1) spectral acceleration values, as determined from the USGS U.S. Seismic Design Maps Web Application, are 0.272g and 0.125g, respectively.

FIELD EXPLORATION

Scope

In order to determine the significant engineering characteristics of the soils, a field exploratory program was undertaken. A total of sixteen (16) borings were advanced for this project at the approximate locations shown on the Test Bore Location Maps included in the Appendix. The borings were advanced to depths ranging from 10 feet to 40 feet below ground surface. The borings were staked in the field by a representative of MECO Engineering Co. Inc.

Drilling and Sampling Procedures

The soil borings were performed with a track-mounted drilling rig equipped with a rotary head. Conventional, continuous-flight, hollow-stem augers were used to advance the holes with representative samples obtained employing split-barrel sampling techniques in general accordance with ASTM Procedure D-1586. A sampling interval of 2.5 feet was used through a depth of 15 feet, with 5 feet intervals thereafter.

Field Tests and Measurements

Standard Penetration Tests: During the sampling procedure, Standard Penetration Tests (SPTs) were performed at regular intervals through the depth of the borings. The SPT value ("N" or blow counts) is defined as the number of blows required to advance a 2-inch O.D., split-barrel sampler a distance of one foot by a 140-pound hammer falling 30-inches. These values provide a useful preliminary indication of the consistency or relative density of most soil deposits and are included on the Soil Boring Logs.

Water Level Measurements: Water level observations were made during the soil boring operations. Groundwater information is noted on the Soil Boring Logs.

Ground Surface Elevations: The ground surface elevation at each boring location was determined by MECO Engineering Co. Inc. personnel. The elevation information is provided on the Soil Boring Logs.

LABORATORY TESTING

General

Additional significant characteristics of the soil were determined in the laboratory to provide data on which to classify and quantitatively assess the engineering properties of the soil samples obtained. The types of soils encountered were identified and logged on the boring record. The results of the field and laboratory tests are presented on the Soil Boring Logs found in the appendix.

Laboratory Tests and Measurements

Visual Classification: A soils engineer visually classified all samples in accordance with the Unified Soil Classification System (ASTM D-2488) terminology. An explanation of the symbols used in this system is included in the Appendix.

Moisture Content Tests: The natural moisture content of all samples was determined by ASTM method D-2216 and is recorded on the Soil Boring Logs as a percentage of the dry weight of the soil.

Hand Penetrometer Tests: Cohesive specimens extracted from the split-barrel sampler were tested in the laboratory with a calibrated soil penetrometer. This device provides an approximation of the unconfined compressive strength of the soils, and is useful, along with other soil parameters, in evaluating the soil strength characteristics. The results are denoted with on the Soil Boring Logs beneath the column labeled "Q_P".

Unconfined Compression Tests: The undrained shear strength of the cohesive soils was determined from unconfined compression tests on specimens obtained from the split-barrel samplers. Soil strength values of samples obtained by the SPT method must also be considered, recognizing that this sampling method provides a representative, but somewhat disturbed sample. The results are listed on the Soil Boring Logs beneath the column labeled "Q_U".

Dry Density Determination: The dry density was determined on the cohesive soils where intact samples were available. The results are listed on the Soil Boring Logs beneath the column labeled "Dd".

Electrical Resistivity and Soil Corrosivity Test: Five (5) select soil samples were shipped to Midwest Laboratories in Omaha, Nebraska to be tested for electrical resistivity, concentration of soluble chloride and sulfate, pH, sulfides and oxidation reduction potential. The report from Midwest Laboratories is included in the Appendix.

The laboratory testing was performed in general accordance with the respective ASTM Methods, as applicable. The results are included on the Soil Boring Logs. Unless notified to the contrary, all samples will be disposed of after one (1) month.

DESCRIPTION OF SUBSURFACE CONDITIONS

General

The types of foundation materials encountered at the test boring locations are described on the Soil Boring Logs. The lines delineating the changes in strata on the logs represent an approximate boundary between the various soil classifications. It must be recognized that the soil descriptions are considered representative for the specific test-hole location, but that variation may occur between the sampling intervals and boring locations. A summary of the major soil profile components is described in the following paragraph. A more detailed description and supporting data for each boring location can be found on the individual Soil Boring Logs.

Soil Conditions

In borings B-1 to B-4 the borings generally encountered very soft to soft silty clays and very loose to loose clayey silts with moisture contents between 20 and 29 percent. A clayey sand to sandy clay seam was encountered in borings B-1, B-3 and B-4 between depths ranging from 3 to 10 feet. Borings B-3 and B-4 encountered soil with higher moisture contents of 27 to 52 percent beneath the depth where water was found.

In Borings B-5 to B-14 and B-23 to B-24 the surface was generally covered with 3 to 5 feet of brown silty clay underlain by silt or clayey silt through the termination depths in the majority of the borings. The silt generally possessed a loose to medium dense relative density and moisture contents in the range of 8 to 22 percent. Some of the borings encountered silty clays beneath depths of 17 to 27 feet. Limestone fragments with a dense to very dense relative density were encountered in boring B-14 from 32 to 40 feet deep and boring B-23 was terminated at a depth of 28.5 feet due to auger refusal conditions on apparent limestone bedrock.

Groundwater Observations

Water was encountered during drilling and upon completion at depths between 2 and 9 feet in borings B-1, B-3, and B-4 near the depth of the sand seam. All other borings remained dry while drilling and upon completion and removal of the augers. It must be recognized that groundwater levels fluctuate with time due to variations in seasonal precipitation, lateral drainage conditions, and soil permeability characteristics.

GEOTECHNICAL EVALUATION

General

As mentioned previously, it is understood that the raw water line will be installed using a combination of trenching and horizontal directional drilling (HDD) techniques. The soil encountered at the site appears to be suitable for the intended plan. The following sections discuss the soils anticipated near the various crossings and slopes.

Crossings and Slopes

First Creek Crossing (Station 60+60 to 54+00)

Boring B-1 was located near the first creek crossing on the west side of Branch Creek. In B-1, the upper 5 feet of silty clay was underlain by sandy clay to clayey sand through a depth of 10 feet. Beneath this layer, a very loose clayey silt was encountered with N-values of 1 to 4 through a depth of 20 feet. Groundwater was encountered at 9 feet below grade. Based on the soil conditions encountered on the west side, it is likely that groundwater will be encountered during the 340 ft. directional bore.

State Highway 100 Crossing (Station 64+80 to 66+60)

Boring B-2 was located near the State Highway 100 crossing on the west side of the highway. In B-2, the upper 7 feet of silty clay was underlain by very loose clayey silts and soft silty clays through a depth of 20 feet. This crossing involves a 180 ft. directional bore.

Second Creek Crossing (Station 71+10 to 73+50)

Boring B-3 was located near the second creek crossing on the west side of the Branch Creek. In B-3, the upper 3 feet of silty clay was underlain by clayey sand with a medium dense relative density through a depth of 10 feet. Below the sand, soft gray clay with high moisture contents of 33 to 52 percent were encountered through a depth of 15 feet. Groundwater was encountered at 7 feet below grade. Based on the soil conditions encountered on the west side, it is likely that groundwater will be encountered during the 240 ft. directional bore.

State Highway 16 Crossing (Station 75+90 to 78+70)

Borings B-4 and B-5 were located on opposite sides of the State Highway 16 Crossing. On the south side in B-4, the upper 3 feet of clayey silty was underlain by 3 feet of sandy clay. Groundwater was encountered in this layer at a depth of 4 feet while drilling. The sandy clay was underlain by loose clayey silt and soft silty clays through a depth of 10 feet. On the north side in B-5, loose to medium dense silts and clayey silts were encountered through a depth of 17 feet. The silt was underlain by soft silty clays. This crossing involves a 280 ft. directional bore.

First Slope (Station 80+80 to 87+20)

A 640 ft. directional bore will begin at the bottom of the slope and ends at the top of the bluff between borings B-5 and B-6. There is an elevation change of approximately 90 feet along the slope. As mentioned in the previous section, in boring B-5, loose to medium dense silts and clayey silts were encountered through a depth of 17 feet, and the silt was underlain by soft silty clays. In boring B-6, loose to medium dense silt was encountered from 3 to 30 feet.

4-Inch PVC Waterline Crossing (Station 95+80 and Station 119+30)

The proposed raw water line will cross the existing Jersey County 4-inch PVC potable waterline at two locations near borings B-7 and B-12. Both of these borings consisted of loose to medium dense silt from 3 to 5 feet through the termination depth of 15 feet. The raw water line must be installed with a minimum of 24-inch separation from the existing line.

Second Slope (Station 126+75 to 133+75)

A 700 ft. directional bore will occur between borings B-13 and B-14. In these borings, loose to medium dense silt and clayey silts were encountered to a depth of 17 to 22 feet. The silt was underlain by silty and sandy clay. In boring B-14, dense to very dense limestone fragments were encountered at 32 to 40 feet below grade.

Trench Excavations

All excavations should be performed in accordance with the requirements detailed in the **OSHA Excavation Regulations and Procedures, Section 1926 Subpart P**. Based upon the soil boring data, primarily Type B and Type C soils were encountered through the expected excavation depths.

The maximum allowable slopes for all soil types are shown in the following table.

Soil Type	Maximum Allowable Slopes for Excavations Less than 20 ft. deep Horizontal : Vertical (H:V)
A	¾ : 1
B	1: 1
C	1½:1

Where site constraints prevent proper sloping of the excavation, appropriate shoring should be provided. All excavations should be monitored by a Competent Person, as defined by the OSHA standard, and appropriate shoring or sloping techniques used to prevent cave-ins.

Fill Placement

It is anticipated that native excavated soils will be utilized to backfill typical excavations and that granular backfill or flowable fill will be used below settlement sensitive areas. The granular soils includes those that can be categorized as GW, GP, SW or SP under the Unified Soil Classification System. These materials are typically easier to place and compact in confined spaces. The evaluation of selection of fill materials for various applications should be done in consultation with the soils engineer. Similarly, the placement and compaction of fill should be monitored and tested by a qualified representative of the soils engineer.

All excavations should be backfilled in a controlled manner with engineered backfill. As a matter of standard practice, backfill should be placed in lift thicknesses not exceeding 8 inches in a loose state and compacted to 95 percent of the maximum dry density as determined by ASTM D-698 (Standard Proctor) method of test.

Proper moisture control is essential to reduce the amount of compactive effort necessary to achieve the desired densities. This is especially true of cohesive soils, where scarification and aeration may be required to achieve near-optimum moisture levels prior to compaction. A sheepsfoot roller is generally required for compaction of clayey soils, whereas, a vibratory smooth drum roller is preferred for granular and silty material. Granular backfill compacted with small hand-operated equipment should be used in confined areas.

Groundwater Control

As mentioned in the previous section, it is anticipated that groundwater seepage will be experienced near borings B-1, B-3, and B-4. It is not anticipated that significant groundwater seepage will be experienced in the remaining excavations. Should any seepage be encountered, filtered sump pumps or other dewatering devices should be made available to control the water and maintain reasonably dry conditions.

Earthen Backwash Basins

We understand that 10 ft. deep earthen backwash basins are planned near borings B-23 and B-24. The soils from the surface through a depth of about 10 ft. were comprised of silty clay and silts and a bentonite liner or other commercially available liners may be required to limit seepage out of the basin.

Corrosivity

The corrosivity potential of the soil to steel was evaluated using the AWWA C105/A.21.5-10 soil-test evaluation. In this “Ten-Point System”, ten points or greater indicates that soil is corrosive to ductile-iron pipe and protection is needed. The soil electrical resistivity at the site ranged from 1100 ohm-cm to 2090 ohm-c. The pH ranged from 8.17 to 8.49; the

redox potential ranged from 266 to 294 mV; sulfides were absent; and there was fair drainage on site. The test data indicates that there is a potential for corrosion from the soil and protection is needed.

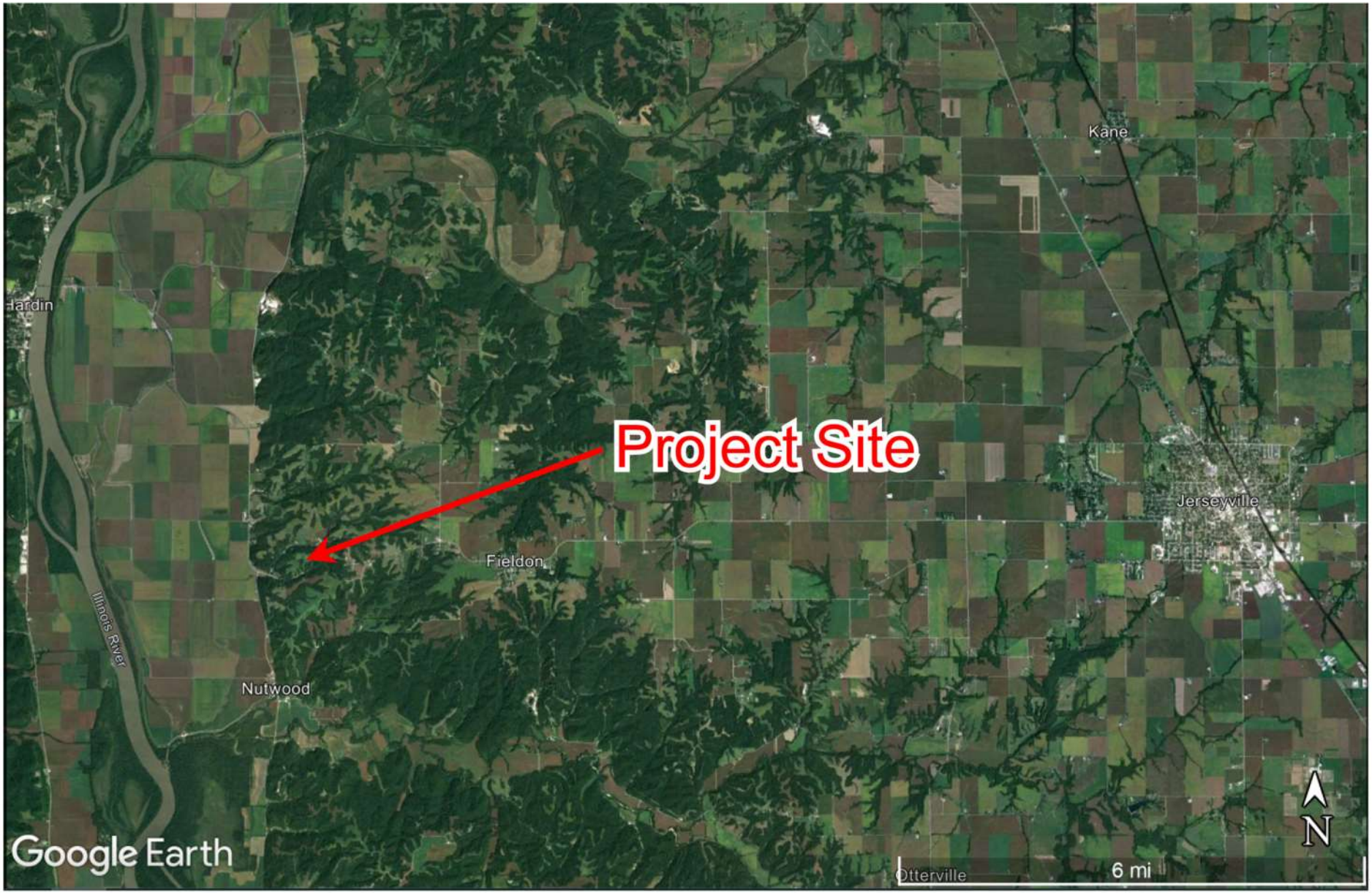
	B-3 (10-12 ft.)		B-6 (13–15 ft.)		B-9 (13-15ft)		B-12 (10-12 ft.)		B-23 (13-15 ft.)	
Soil Resistivity (ohm-cm)	1100	10	2090	5	1980	5	1840	5	1200	10
Soil pH	8.3	0	8.59	3	8.36	0	8.17	0	8.42	0
Redox Potential (mV)	281	0	266	0	267	0	294	0	272	0
Sulfides	absent	0	absent	0	absent	0	absent	0	absent	0
Drainage	poor	2	fair	1	fair	1	fair	1	fair	1
Total Points		12		9		6		6		11

GENERAL COMMENTS

This geotechnical exploration and foundation analysis has been conducted to aid in the evaluation of the soil conditions for the proposed raw water line transmission main to be constructed in Jersey County, Illinois. The recommendations presented herein are based on the available soil information obtained and the design information provided. Any changes in the soil conditions encountered during construction, or in the design or location, should be brought to the attention of the soils engineer to determine if modifications in the recommendations are required. The final design plans and specifications should also be reviewed by the soils engineer to determine that the recommendations presented herein have been interpreted and implemented as intended. It is recommended that the earthwork operations be monitored by the soils engineer, to test and evaluate the selection, placement, and compaction of controlled fills.

This geotechnical study has been conducted in a manner consistent with that level of care ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions. The findings, recommendations, and opinions contained herein have been promulgated in accordance with generally accepted practice in the fields of foundation engineering, soils mechanics, and engineering geology. No other representations, expressed or implied, and no warranty or guarantee is included or intended in this report.

APPENDIX



Midwest Engineering and Testing, Inc.

geotechnical*environmental*materials engineers

Figure 1 - Vicinity Map

Raw Water Line Transmission Main
Illinois Alluvial Regional Water Company
Jersey County, Illinois

SCALE:	Shown Above
PROJECT NO.:	B33017
DATE:	March 29, 2023
DRAWN BY:	KRM

RAW WATER TRANSMISSION MAIN
OVERALL TEST BORE LOCATION MAP

TEST BORE LOCATION SYMBOL

JERSEY COUNTY, ILLINOIS
TOWNSHIP 8 NORTH,
RANGE 13 WEST

TO HARDIN

TO NUTWOOD

TO FIDDLON & JERSEYVILLE

STATE HIGHWAY 100/16

STATE HIGHWAY 16

STATE HIGHWAY 100

CEN. SEC. 28±

TEST BORE LOCATION #1 GRND EL=437.4 20' DEEP (MIN)

TEST BORE LOCATION #2 GRND EL=440.0 20' DEEP (MIN)

TEST BORE LOCATION #3 GRND EL=446.0 15' DEEP (MIN)

TEST BORE LOCATION #4 GRND EL=450.4 10' DEEP (MIN)

TEST BORE LOCATION #5 GRND EL=485.1 30' DEEP (MIN)

TEST BORE LOCATION #6 GRND EL=592.0 30' DEEP (MIN)

TEST BORE LOCATION #7 GRND EL=609.9 15' DEEP (MIN)

TEST BORE LOCATION #8 GRND EL=638.6 25' DEEP (MIN)

TEST BORE LOCATION #9 GRND EL=640.9 30' DEEP (MIN)

TEST BORE LOCATION #10 GRND EL=631.0 15' DEEP (MIN)

TEST BORE LOCATION #11 GRND EL=645.4 15' DEEP (MIN)

TEST BORE LOCATION #12 GRND EL=638.2 15' DEEP (MIN)

TEST BORE LOCATION #13 GRND EL=633.6 25' DEEP (MIN)

TEST BORE LOCATION #14 GRND EL=664.1 40' DEEP (MIN)

TEST BORE LOCATION #15 GRND EL=674.8 40' DEEP (MIN)

TEST BORE LOCATION #16 GRND EL=685.0 10' DEEP (MIN)

TEST BORE LOCATION #17 GRND EL=694.3 10' DEEP (MIN)

TEST BORE LOCATION #18 GRND EL=688.4 40' DEEP (MIN)

TEST BORE LOCATION #19 GRND EL=688.0 40' DEEP (MIN)

TEST BORE LOCATION #20 GRND EL=680.4 40' DEEP (MIN)

TEST BORE LOCATION #21 GRND EL=681.9 40' DEEP (MIN)

TEST BORE LOCATION #22 GRND EL=682.5 40' DEEP (MIN)

TREATMENT PLANT SITE 695.0±

FUTURE WELL #6 419.0

WELL #5 421.5

WELL #4 418.0

WELL #3 416.8

WELL #1 415.4

WELL FIELDS

GRAPHIC SCALE
0 250 500
1 inch = 500 feet.

MECO-HENEGHAN ENGINEERS, LLC
www.meco-heneghan.com

DESIGN FIRM NUMBERS:
IL: 184.007845-0010
035.003949
EXPIRES: APRIL 30, 2021
MO: 2018004041
EXPIRES: DECEMBER 31, 2020

400 N. FIFTH STREET
SUITE 107
ST. CHARLES, MO 63301
P: (636) 395-7055

REVISIONS | DATE | NO.

PRELIMINARY

CONTRACT "B"
RAW WATER TRANSMISSION MAIN
OVERALL TEST BORE LOCATION MAP

ILLINOIS ALLUVIAL REGIONAL WATER COMPANY
JERSEY & MACOUPIN COUNTIES, ILLINOIS

DRAWN BY: B.FOHEY
CHECKED BY: XXX
APPROVED BY: XXX
HORIZONTAL SCALE: 1"=500'
VERTICAL SCALE: NO SCALE
PROJECT NO. 700-003
DATE: 12/20/19
SHEET NO. 1
1 OF 1 SHEETS

PATH=i:\700\700 illinois alluvial regional water company\003 iarwc basic services\contract b - rw transmission main\700003 rw wells to plant.dwg
PLOTTED: 1/17/2023 @ 3:45:59 PM BY: richard hayes

MECO-HENEGHAN ENGINEERS, LLC

www.meco-heneghan.com

DESIGN FIRM NUMBERS:
IL: 184.007845-0010
035.003949
EXPIRES: APRIL 30, 2021
MO: 2018004041
EXPIRES: DECEMBER 31, 2020

400 N. FIFTH STREET
SUITE 107
ST. CHARLES, MO 63301
P: (636) 395-7055

NO.	DATE	REVISIONS

PRELIMINARY

CONTRACT "B"
RAW WATER TRANSMISSION MAIN
WATER PLANT SITE
TEST BORE LOCATION MAP

ILLINOIS ALLUVIAL REGIONAL WATER COMPANY
JERSEY & MACOUPIN COUNTIES, ILLINOIS

DRAWN BY: B.F.
CHECKED BY: XXX
APPROVED BY: XXX

HORIZONTAL SCALE: 1"=100'

VERTICAL SCALE: NO SCALE

PROJECT NO. 700-003

DATE: ??/??/??

SHEET NO. ??

? OF ? SHEETS

SOIL BORING LOG

MET Midwest Engineering and Testing, Inc.

Project Name: Raw Water Line Transmision Main
Location: Illinois Alluvial Regional Water Company
Jersey County, Illinois

Boring: B-1
Project No. : B33017
Date of Boring: March 31, 2023
Field Representative: Dusty Crump

VISUAL SOIL CLASSIFICATION Ground Surface Elevation: 437.4	Feet	Sample No.	N	Q_p (tsf)	Q_u (tsf)	MC (%)	Dd (pcf)	Remarks
Brown silty CLAY (CL)		1-SS	4	-	-	20	-	
Brown silty CLAY (CL) trace coal	5	2-SS	1	-	-	26	-	
Brown sandy CLAY (CL) with small gravel		3-SS	6	-	-	19	-	
Brown clayey SAND (SC) with small gravel	10	4-SS	10	-	-	17	-	▼ Drilling: 9 ft. Completion: 9 ft.
		5-SS	1	-	-	27	-	
		6-SS	1	-	-	28	-	
Brown clayey SILT (ML)	15							
	20	7-SS	4	-	-	27	-	
END OF BORING @ 20.0 FEET								
	25							

Lines of Demarcation represent an approximate boundary between soil types. Variations may occur between sampling intervals and between boring locations, and the transition may be gradual. Dashed lines are indicative of potentially erratic or unknown changes, such as fill-to-natural soil zone transitions.

SOIL BORING LOG

MET Midwest Engineering and Testing, Inc.

Project Name: Raw Water Line Transmission Main
Location: Illinois Alluvial Regional Water Company
Jersey County, Illinois

Boring: B-2
Project No. : B33017
Date of Boring: March 31, 2023
Field Representative: Dusty Crump

VISUAL SOIL CLASSIFICATION Ground Surface Elevation: 439.9 Feet	Sample No.	N	Q_p (tsf)	Q_u (tsf)	MC (%)	Dd (pcf)	Remarks
	1-SS	5	1.0	1.0	23	97	
Brown silty CLAY (CL)	2-SS	3	0.5	0.5	29	97	Dry during and upon completion of drilling
5	3-SS	1	0.3	-	29	-	
	4-SS	1	0.3	-	25	-	
10 Brown and gray clayey SILT (ML)	5-SS	3	0.5	-	28	-	
	6-SS	4	0.5	0.8	25	113	
Brown silty CLAY (CL) 15							
Gray clayey SILT (ML)	7-SS	3	0.5	-	26	-	
20							
END OF BORING @ 20.0 FEET							
25							

Lines of Demarcation represent an approximate boundary between soil types. Variations may occur between sampling intervals and between boring locations, and the transition may be gradual. Dashed lines are indicative of potentially erratic or unknown changes, such as fill-to-natural soil zone transitions.

SOIL BORING LOG

MET Midwest Engineering and Testing, Inc.

Project Name: Raw Water Line Transmission Main
Location: Illinois Alluvial Regional Water Company
Jersey County, Illinois

Boring: B-3
Project No. : B33017
Date of Boring: March 31, 2023
Field Representative: Dusty Crump

VISUAL SOIL CLASSIFICATION Ground Surface Elevation: 446.2 FT.	SAMPLE NO.	N	Q_p (tsf)	Q_u (tsf)	MC (%)	Dd (pcf)	REMARKS
Brown silty CLAY (CL)	1-SS	3	0.5	0.6	21	103	
	2-SS	6	-	-	13	-	
5							
Brown medium to coarse clayey SAND (SC) with small gravel	3-SS	10	-	-	15	-	▼ Drilling: 7 ft. Completion: 7 ft.
	4-SS	7	-	-	12	-	
10							
Gray CLAY (CL)	5-SS	4	1.0	-	33	-	
	6-SS	4	0.5	0.4	52	60	
15							
END OF BORING AT 15.0 FEET							
20							

Lines of Demarcation represent an approximate boundary between soil types. Variations may occur between sampling intervals and between boring locations, and the transition may be gradual. Dashed lines are indicative of potentially erratic or unknown changes, such as fill-to-natural soil zone transitions.

SOIL BORING LOG

MET Midwest Engineering and Testing, Inc.

Project Name: Raw Water Line Transmission Main
Location: Illinois Alluvial Regional Water Company
Jersey County, Illinois

Boring: B-4
Project No. : B33017
Date of Boring: March 30, 2023
Field Representative: Dusty Crump

VISUAL SOIL CLASSIFICATION Ground Surface Elevation: 450.4 Feet	Sample No.	N	Q_p (tsf)	Q_u (tsf)	MC (%)	Dd (pcf)	Remarks
Brown clayey SILT (ML)	1-SS	2	-	-	24	-	▼ Completion: 2 ft.
Brown sandy CLAY (CL) with small gravel	2-SS	6	-	-	14	-	▼ Drilling: 4 ft.
Brown and gray clayey SILT (ML)	3-SS	6	-	-	32	-	
Gray silty CLAY (CL)	4-SS	3	1.0	0.6	27	100	
END OF BORING @ 10.0 FEET							

Lines of Demarcation represent an approximate boundary between soil types. Variations may occur between sampling intervals and between boring locations, and the transition may be gradual. Dashed lines are indicative of potentially erratic or unknown changes, such as fill-to-natural soil zone transitions.

SOIL BORING LOG

MET Midwest Engineering and Testing, Inc.

Project Name: Raw Water Line Transmission Main
Location: Illinois Alluvial Regional Water Company
Jersey County, Illinois

Boring: B-5
Project No. : B33017
Date of Boring: March 30, 2023
Field Representative: Dusty Crump

VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 485.2	Feet	Sample No.	N	Q_p (tsf)	Q_u (tsf)	MC (%)	Dd (pcf)	Remarks
Light brown clayey SILT (ML)		1-SS	4	2.0	-	19	-	
	5	2-SS	8	1.5	-	20	-	Dry during and upon completion of drilling
Light brown SILT (ML)		3-SS	8	1.0	-	20	-	
	10	4-SS	6	0.8	-	21	-	
		5-SS	4	1.5	-	20	-	
Light brown clayey SILT (ML)	15	6-SS	4	-	-	22	-	
	20	7-SS	4	1.5	1.2	24	107	
Light brown silty CLAY (CL)								
	25	8-SS	4	0.8	0.9	23	105	
No recovery	30	9-SS	10	-	-	-	-	
END OF BORING @ 30 FEET								

Lines of Demarcation represent an **approximate** boundary between soil types. Variations may occur between sampling intervals and between boring locations, and the transition may be gradual. Dashed lines are indicative of potentially erratic or unknown changes, such as fill-to-natural soil zone transitions.

SOIL BORING LOG

MET Midwest Engineering and Testing, Inc.

Project Name: Raw Water Line Transmission Main
Location: Illinois Alluvial Regional Water Company
Jersey County, Illinois

Boring: B-6
Project No. : B33017
Date of Boring: March 29, 2023
Field Representative: Dusty Crump

VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 592.1 Feet	Sample No.	N	Q_p (tsf)	Q_u (tsf)	MC (%)	Dd (pcf)	Remarks
Brown silty CLAY (CL)	1-SS	6	3.0	1.8	22	96	
5	2-SS	4	-	-	8	-	Dry during and upon completion of drilling
	3-SS	6	-	-	9	-	
10	4-SS	6	-	-	12	-	
	5-SS	4	-	-	13	-	
15 Light brown SILT (ML)	6-SS	4	-	-	12	-	
20	7-SS	3	-	-	14	-	
25	8-SS	8	-	-	13	-	
30	9-SS	8	-	-	14	-	
END OF BORING @ 30 FEET							

Lines of Demarcation represent an **approximate** boundary between soil types. Variations may occur between sampling intervals and between boring locations, and the transition may be gradual. Dashed lines are indicative of potentially erratic or unknown changes, such as fill-to-natural soil zone transitions.

SOIL BORING LOG

MET Midwest Engineering and Testing, Inc.

Project Name: Raw Water Line Transmission Main
Location: Illinois Alluvial Regional Water Company
Jersey County, Illinois

Boring: B-7
Project No. : B33017
Date of Boring: March 29, 2023
Field Representative: Dusty Crump

VISUAL SOIL CLASSIFICATION Ground Surface Elevation: 603.9 FT.	SAMPLE NO.	N	Q_p (tsf)	Q_u (tsf)	MC (%)	Dd (pcf)	REMARKS
Brown silty CLAY (CL)	1-SS	5	3.0	1.6	23	96	
	2-SS	5	1.3	1.2	23	97	Dry during and upon completion of drilling
5							
	3-SS	3	-	-	13	-	
	4-SS	5	-	-	15	-	
10							
Light brown SILT (ML)	5-SS	6	-	-	12	-	
	6-SS	7	-	-	11	-	
15							
END OF BORING AT 15.0 FEET							
20							

Lines of Demarcation represent an approximate boundary between soil types. Variations may occur between sampling intervals and between boring locations, and the transition may be gradual. Dashed lines are indicative of potentially erratic or unknown changes, such as fill-to-natural soil zone transitions.

SOIL BORING LOG

MET Midwest Engineering and Testing, Inc.

Project Name: Raw Water Line Transmission Main
Location: Illinois Alluvial Regional Water Company
Jersey County, Illinois

Boring: B-8
Project No. : B33017
Date of Boring: March 29, 2023
Field Representative: Dusty Crump

VISUAL SOIL CLASSIFICATION Ground Surface Elevation: 638.6	Feet	Sample No.	N	Q_p (tsf)	Q_u (tsf)	MC (%)	Dd (pcf)	Remarks
Brown silty CLAY (CL)		1-SS	6	2.5	-	23	-	
		2-SS	5	2.0	-	12	-	Dry during and upon completion of drilling
	5	3-SS	9	2.0	-	12	-	
Light brown SILT (ML)		4-SS	7	-	-	10	-	
	10	5-SS	9	1.0	-	13	-	
		6-SS	9	-	-	13	-	
	15							
		7-SS	8	3.0	-	15	0	
	20							
Brown SILT (ML)								
		8-SS	6	3.5	-	18	-	
	25							
END OF BORING @ 25.0 FEET								

Lines of Demarcation represent an approximate boundary between soil types. Variations may occur between sampling intervals and between boring locations, and the transition may be gradual. Dashed lines are indicative of potentially erratic or unknown changes, such as fill-to-natural soil zone transitions.

SOIL BORING LOG

MET Midwest Engineering and Testing, Inc.

Project Name: Raw Water Line Transmission Main
Location: Illinois Alluvial Regional Water Company
Jersey County, Illinois

Boring: B-9
Project No. : B33017
Date of Boring: March 29, 2023
Field Representative: Dusty Crump

VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 641.1	Feet	Sample No.	N	Q_p (tsf)	Q_u (tsf)	MC (%)	Dd (pcf)	Remarks
Brown silty CLAY (CL)		1-SS	6	2.0	1.4	23	93	
	5	2-SS	2	-	-	12	-	Dry during and upon completion of drilling
		3-SS	8	-	-	13	-	
	10	4-SS	6	-	-	13	-	
Light brown SILT (ML)		5-SS	9	-	-	13	-	
	15	6-SS	9	-	-	13	-	
	20	7-SS	6	-	-	15	-	
Brown SILT (ML) with small gravel	25	8-SS	6	-	-	16	-	
Brown silty SLAY (CL)	30	9-SS	5	2.0	1.1	21	98	
END OF BORING @ 30 FEET								

Lines of Demarcation represent an **approximate** boundary between soil types. Variations may occur between sampling intervals and between boring locations, and the transition may be gradual. Dashed lines are indicative of potentially erratic or unknown changes, such as fill-to-natural soil zone transitions.

SOIL BORING LOG

MET Midwest Engineering and Testing, Inc.

Project Name: Raw Water Line Transmission Main
Location: Illinois Alluvial Regional Water Company
Jersey County, Illinois

Boring: B-10
Project No. : B33017
Date of Boring: March 29, 2023
Field Representative: Dusty Crump

VISUAL SOIL CLASSIFICATION Ground Surface Elevation: 630.8 FT.	SAMPLE NO.	N	Q_p (tsf)	Q_u (tsf)	MC (%)	Dd (pcf)	REMARKS
Brown silty CLAY (CL)	1-SS	6	2.5	1.6	25	93	
	2-SS	2	0.5	-	25	-	Dry during and upon completion of drilling
5							
	3-SS	7	-	-	14	-	
	4-SS	7	-	-	16	-	
10							
Light brown SILT (ML)	5-SS	8	-	-	16	-	
	6-SS	9	-	-	18	-	
15							
END OF BORING AT 15.0 FEET							
20							

Lines of Demarcation represent an approximate boundary between soil types. Variations may occur between sampling intervals and between boring locations, and the transition may be gradual. Dashed lines are indicative of potentially erratic or unknown changes, such as fill-to-natural soil zone transitions.

SOIL BORING LOG

MET Midwest Engineering and Testing, Inc.

Project Name: Raw Water Line Transmission Main
Location: Illinois Alluvial Regional Water Company
Jersey County, Illinois

Boring: B-11
Project No. : B33017
Date of Boring: March 29, 2023
Field Representative: Dusty Crump

VISUAL SOIL CLASSIFICATION Ground Surface Elevation: 645.4 FT.	SAMPLE NO.	N	Q_p (tsf)	Q_u (tsf)	MC (%)	Dd (pcf)	REMARKS
Brown silty CLAY (CL)	1-SS	5	1.0	1.6	24	92	
Brown clayey SILT (ML	2-SS	4	3.0	-	16	-	Dry during and upon completion of drilling
5							
	3-SS	8	-	-	13	-	
	4-SS	8	-	-	14	-	
10							
Light brown SILT (ML)	5-SS	9	-	-	14	-	
	6-SS	9	-	-	16	-	
15							
END OF BORING AT 15.0 FEET							
20							

Lines of Demarcation represent an approximate boundary between soil types. Variations may occur between sampling intervals and between boring locations, and the transition may be gradual. Dashed lines are indicative of potentially erratic or unknown changes, such as fill-to-natural soil zone transitions.

SOIL BORING LOG

MET Midwest Engineering and Testing, Inc.

Project Name: Raw Water Line Transmission Main
Location: Illinois Alluvial Regional Water Company
Jersey County, Illinois

Boring: B-12
Project No. : B33017
Date of Boring: March 30, 2023
Field Representative: Dusty Crump

VISUAL SOIL CLASSIFICATION Ground Surface Elevation: 638.2 FT.	SAMPLE NO.	N	Q_p (tsf)	Q_u (tsf)	MC (%)	Dd (pcf)	REMARKS
Brown silty CLAY (CL)	1-SS	6	1.5	1.7	23	94	
	2-SS	3	-	-	18	-	Dry during and upon completion of drilling
5							
	3-SS	8	-	-	15	-	
Light brown SILT (ML)							
	4-SS	8	-	-	13	-	
10							
	5-SS	10	-	-	17	-	
	6-SS	-	-	-	18	-	
15							
END OF BORING AT 15.0 FEET							
20							

Lines of Demarcation represent an approximate boundary between soil types. Variations may occur between sampling intervals and between boring locations, and the transition may be gradual. Dashed lines are indicative of potentially erratic or unknown changes, such as fill-to-natural soil zone transitions.

SOIL BORING LOG

MET Midwest Engineering and Testing, Inc.

Project Name: Raw Water Line Transmission Main
Location: Illinois Alluvial Regional Water Company
Jersey County, Illinois

Boring: B-13
Project No. : B33017
Date of Boring: March 30, 2023
Field Representative: Dusty Crump

VISUAL SOIL CLASSIFICATION Ground Surface Elevation: 634.0 Feet	Sample No.	N	Q_p (tsf)	Q_u (tsf)	MC (%)	Dd (pcf)	Remarks
Brown silty CLAY (CL)	1-SS	6	2.5	1.6	23	94	
5	2-SS	2	-	-	27	-	Dry during and upon completion of drilling
	3-SS	7	-	-	18	-	
10	4-SS	8	-	-	17	-	
Light brown SILT (ML)	5-SS	11	-	-	18	-	
15	6-SS	10	-	-	18	-	
Reddish brown clayey SILT (ML) 20	7-SS	5	-	-	22	-	
Reddish brown silty CLAY (CL)							
25	8-SS	6	2.0	2.0	23	98	
END OF BORING @ 25.0 FEET							

Lines of Demarcation represent an approximate boundary between soil types. Variations may occur between sampling intervals and between boring locations, and the transition may be gradual. Dashed lines are indicative of potentially erratic or unknown changes, such as fill-to-natural soil zone transitions.

SOIL BORING LOG

MET Midwest Engineering and Testing, Inc.

Project Name: Raw Water Line Transmission Main
Location: Illinois Alluvial Regional Water Company
Jersey County, Illinois

Boring: B-14
Project No. : B33017
Date of Boring: March 30, 2023
Field Representative: Dusty Crump

VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 664.3	Feet	Sample No.	N	Q_p (tsf)	Q_u (tsf)	MC (%)	Dd (pcf)	Remarks
Brown silty CLAY (CL)		1-SS	7	3.0	2.0	23	96	
	5	2-SS	4	0.8	-	26	-	
		3-SS	6	-	-	18	-	
Light brown SILT (ML)	10	4-SS	8	-	-	18	-	
		5-SS	10	-	-	16	-	
Brown SILT (ML)	15	6-SS	7	-	-	19	-	Dry during and upon completion of drilling
Brown clayey SILT (ML)	20	7-SS	6	-	-	21	-	
Brown silty CLAY (CL)	25	8-SS	5	2.0	1.4	19	103	
Reddish brown, light brown, and black sandy CLAY (CL)	30	9-SS	7	-	-	14	-	
	35	10-SS	35	-	-	21	-	
Limestone fragments	40	11-SS	42	-	-	12	-	
END OF BORING @ 40.0 FEET	45							
	50							

Lines of Demarcation represent an approximate boundary between soil types. Variations may occur between sampling intervals and between boring locations, and the transition may be gradual. Dashed lines are indicative of potentially erratic or unknown changes, such as fill-to-natural soil zone transitions.

SOIL BORING LOG

MET Midwest Engineering and Testing, Inc.

Project Name: Raw Water Line Transmission Main
Location: Illinois Alluvial Regional Water Company
Jersey County, Illinois

Boring: B-23
Project No. : B33017
Date of Boring: March 31, 2023
Field Representative: Dusty Crump

VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 652.76	Feet	Sample No.	N	Q_p (tsf)	Q_u (tsf)	MC (%)	Dd (pcf)	Remarks
Brown silty CLAY (CL)		1-SS	4	1.8	1.4	24	95	
	5	2-SS	4	1.0	1.9	23	103	Dry during and upon completion of drilling
Brown SILT (ML)		3-SS	8	-	-	17	-	
	10	4-SS	10	-	-	17	-	
		5-SS	14	-	-	20	-	
Brown clayey SILT (ML)	15	6-SS	10	1.0	0.7	22	97	
	20	7-SS	9	1.0	1.2	23	96	
Reddish brown silty CLAY (CL)	25	8-SS	5	2.0	-	23	-	
Reddish brown silty CLAY (CL) with limestone fragments		9-SS	66	4.0	-	23	-	
END OF BORING @ 28.5 FEET **UPON BEDROCK REFUSAL**	30							

Lines of Demarcation represent an **approximate** boundary between soil types. Variations may occur between sampling intervals and between boring locations, and the transition may be gradual. Dashed lines are indicative of potentially erratic or unknown changes, such as fill-to-natural soil zone transitions.

SOIL BORING LOG

MET Midwest Engineering and Testing, Inc.

Project Name: Raw Water Line Transmission Main
Location: Illinois Alluvial Regional Water Company
Jersey County, Illinois

Boring: B-24
Project No. : B33017
Date of Boring: March 31, 2023
Field Representative: Dusty Crump

VISUAL SOIL CLASSIFICATION Ground Surface Elevation: 639.07	Feet	Sample No.	N	Q_p (tsf)	Q_u (tsf)	MC (%)	Dd (pcf)	Remarks
	1							
	2	1-SS	5	2.0	1.6	24	93	Dry during and upon completion of drilling
Brown silty CLAY (CL)	3							
	4	2-SS	4	-	-	28	-	
	5							
	6							
	7	3-SS	7	-	-	19	-	
Light brown SILT (ML)	8							
	9	4-SS	11	-	-	21	-	
	10							
END OF BORING @ 10.0 FEET	11							
	12							
	13							

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REPORT NUMBER
23-103-4303

REPORT DATE
Apr 13, 2023

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68894

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ISSUE DATE
Apr 13, 2023

Midwest Engineering and Testin
Kelsey Mueller
501 Mercury Dr
Champaign IL 61822-9649

REPORT OF ANALYSIS

For: (68894) Midwest Engineering and Testin
IARWC
Jersey County, Illinois
B33017

Analysis	Level Found As Received	Level Found Dry Weight	Units	Reporting Limit	Method	Analyst-Date	Verified-Date
Sample ID: **B-3 (10-12 feet)** Lab Number: **70268461** Date Sampled: **2023-03-31**							
Oxidation reduction potential	281		mV	1	SM 2580 B-(2009) *	drp0-2023/04/11	mgn8-2023/04/12
Resistivity	1100		ohm-cm	0.1	SM 2510 B-(1997)	jdb5-2023/04/11	mgn8-2023/04/12
Percent solids	88.7		%	0.01	SM 2540 G-(2015) *	Ppj2-2023/04/11	mgn8-2023/04/12
Sulfide qualitative	absent		n/a	n/a	Commission Analytical Reactions *	kfw9-2023/04/06	mgn8-2023/04/12
Chloride	8.3		mg/L	5.0	EPA 300.0	jsp9-2023/04/11	mgn8-2023/04/12
Sulfate	18.9		mg/L	1	EPA 300.0	jsp9-2023/04/11	mgn8-2023/04/12
Conductivity	906		µS/cm	2	SM 2510 B-(1997)	Ppj2-2023/04/12	mgn8-2023/04/12
pH	8.30		S.U.	0.10	SM 4500-H+ B-(2011)	drp0-2023/04/11	mgn8-2023/04/12
Sample ID: **B-23 (13-15 feet)** Lab Number: **70268462** Date Sampled: **2023-03-31**							
Oxidation reduction potential	272		mV	1	SM 2580 B-(2009) *	drp0-2023/04/11	mgn8-2023/04/12
Resistivity	1200		ohm-cm	0.1	SM 2510 B-(1997)	jdb5-2023/04/11	mgn8-2023/04/12
Percent solids	84.5		%	0.01	SM 2540 G-(2015) *	Ppj2-2023/04/11	mgn8-2023/04/12
Sulfide qualitative	absent		n/a	n/a	Commission Analytical Reactions *	kfw9-2023/04/06	mgn8-2023/04/12
Chloride	8.1		mg/L	5.0	EPA 300.0	jsp9-2023/04/11	mgn8-2023/04/12
Sulfate	20.8		mg/L	1	EPA 300.0	jsp9-2023/04/11	mgn8-2023/04/12
Conductivity	833		µS/cm	2	SM 2510 B-(1997)	Ppj2-2023/04/12	mgn8-2023/04/12
pH	8.42		S.U.	0.10	SM 4500-H+ B-(2011)	drp0-2023/04/11	mgn8-2023/04/12

The result(s) issued on this report only reflect the analysis of the sample(s) submitted.

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Midwest Engineering and Testin
Kelsey Mueller
501 Mercury Dr
Champaign IL 61822-9649

REPORT OF ANALYSIS

For: (68894) Midwest Engineering and Testin
IARWC
Jersey County, Illinois
B33017

Analysis	Level Found As Received	Level Found Dry Weight	Units	Reporting Limit	Method	Analyst-Date	Verified-Date
Sample ID: **B-6 (13-15 feet)** Lab Number: **70268463** Date Sampled: **2023-03-29**							
Oxidation reduction potential	266		mV	1	SM 2580 B-(2009) *	drp0-2023/04/11	mgn8-2023/04/12
Resistivity	2090		ohm-cm	0.1	SM 2510 B-(1997)	jdb5-2023/04/11	mgn8-2023/04/12
Percent solids	92.1		%	0.01	SM 2540 G-(2015) *	Ppj2-2023/04/11	mgn8-2023/04/12
Sulfide qualitative	absent		n/a	n/a	Commission Analytical Reactions *	kfw9-2023/04/06	mgn8-2023/04/12
Chloride	8.8		mg/L	5.0	EPA 300.0	jsp9-2023/04/11	mgn8-2023/04/12
Sulfate	9.6		mg/L	1	EPA 300.0	jsp9-2023/04/11	mgn8-2023/04/12
Conductivity	480		µS/cm	2	SM 2510 B-(1997)	Ppj2-2023/04/12	mgn8-2023/04/12
pH	8.59		S.U.	0.10	SM 4500-H+ B-(2011)	drp0-2023/04/11	mgn8-2023/04/12
Sample ID: **B-9 (13-15 feet)** Lab Number: **70268464** Date Sampled: **2023-03-29**							
Oxidation reduction potential	267		mV	1	SM 2580 B-(2009) *	drp0-2023/04/11	mgn8-2023/04/12
Resistivity	1980		ohm-cm	0.1	SM 2510 B-(1997)	jdb5-2023/04/11	mgn8-2023/04/12
Percent solids	88.9		%	0.01	SM 2540 G-(2015) *	Ppj2-2023/04/11	mgn8-2023/04/12
Sulfide qualitative	absent		n/a	n/a	Commission Analytical Reactions *	kfw9-2023/04/06	mgn8-2023/04/12
Chloride	10.9		mg/L	5.0	EPA 300.0	jsp9-2023/04/11	mgn8-2023/04/12
Sulfate	9.3		mg/L	1	EPA 300.0	jsp9-2023/04/11	mgn8-2023/04/12
Conductivity	506		µS/cm	2	SM 2510 B-(1997)	Ppj2-2023/04/12	mgn8-2023/04/12
pH	8.36		S.U.	0.10	SM 4500-H+ B-(2011)	drp0-2023/04/11	mgn8-2023/04/12

The result(s) issued on this report only reflect the analysis of the sample(s) submitted.

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ISSUE DATE
Apr 13, 2023

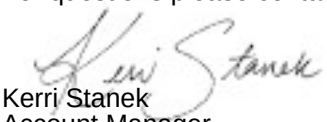
Midwest Engineering and Testin
Kelsey Mueller
501 Mercury Dr
Champaign IL 61822-9649

REPORT OF ANALYSIS

For: (68894) Midwest Engineering and Testin
IARWC
Jersey County, Illinois
B33017

Analysis	Level Found As Received	Level Found Dry Weight	Units	Reporting Limit	Method	Analyst-Date	Verified-Date
Sample ID: **B-12 (10-12 feet)** Lab Number: **70268465** Date Sampled: **2023-03-30**							
Oxidation reduction potential	294		mV	1	SM 2580 B-(2009) *	drp0-2023/04/13	mgn8-2023/04/13
Resistivity	1840		ohm-cm	0.1	SM 2510 B-(1997)	mgn8-2023/04/13	mgn8-2023/04/13
Percent solids	85.0		%	0.01	SM 2540 G-(2015) *	Ppj2-2023/04/11	mgn8-2023/04/13
Sulfide qualitative	absent		n/a	n/a	Commission Analytical Reactions *	kfw9-2023/04/06	mgn8-2023/04/13
Chloride	9.9		mg/L	5.0	EPA 300.0	jsp9-2023/04/12	mgn8-2023/04/13
Sulfate	9.2		mg/L	1	EPA 300.0	jsp9-2023/04/12	mgn8-2023/04/13
Conductivity	542		µS/cm	2	SM 2510 B-(1997)	drp0-2023/04/13	mgn8-2023/04/13
pH	8.17		S.U.	0.10	SM 4500-H+ B-(2011)	Ppj2-2023/04/12	mgn8-2023/04/13

For questions please contact:



Kerri Stanek
Account Manager
kstanek@midwestlabs.com (402)590-2982

GENERAL NOTES

SAMPLE IDENTIFICATION

Visual soil classifications are made in general accordance with the Unified Soil Classification System on the basis of textural and particle size categorization, and various soil behavior characteristics. Visual classifications should be substantiated by appropriate laboratory testing when a more exact soil identification is required to satisfy specific project applications criteria.

PARTICLE SIZE ±

Boulders: 8 inches Cobbles: 3 to 8 inches Gravel: 5 mm to 3 inches	Coarse Sand: 2 mm to 4 mm Medium Sand: 0.42 mm to 2 mm Fine Sand: 0.074 to 0.42 mm	Silt: 0.005 mm to 0.074 mm Clay: - 0.005 mm

DRILLING & SAMPLING SYMBOLS

SS: Split-spoon, 2" O.D. by 1 3/8" I.D.
ST: Shelby Tube, 2" O.D. or 3" O.D., as noted in test
AU: Auger Sample
DB: Diamond Bit
CB: Carbide Bit
RB: Roller Bit
WS: Wash Sample
BS: Bag Sample
HA: Hand Auger

SOIL PROPERTY SYMBOLS

N: Standard penetration count, indicating number of blows of a 140 lb. Hammer with a 30-inch drop, required to advance a split-spoon sampler one (1) foot.
Qu: Unconfined compressive strength, tons per square foot (tsf).
Qp: Calibrated hand penetrometer resistance, tsf.
MC: Moisture Content, %
LL: Liquid Limit PL: Plastic Limit PI: Plasticity Index
Dd: Dry density, pounds per cubic foot (pcf).
PID Photoionization Detector (Hnu meter) volatile vapor level, ppm

SOIL RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION

NON-COHESIVE SOILS		COHESIVE SOILS		
Classifier	N-Value Range	Classifier	Qu Range (tsf)	N-Value Range
very loose	0 – 3	very soft	0 – 0.25	0 – 2
loose	3 – 7	soft	0.25 – 0.5	2 – 5
medium dense	7 – 15	medium stiff	0.5 – 1.0	5 – 10
dense	15 – 38	stiff	1.0 – 2.0	10 – 14
very dense	38 +	very stiff	2.0 – 4.0	14 – 32
		hard	4.0 +	32 +

GROUNDWATER

Approximate Groundwater level at time noted on soil boring log, measured in open bore hole unless otherwise noted. Groundwater levels often vary with time, and are affected by soil permeability characteristics, weather conditions, and lateral drainage conditions.

UNIFIED SOIL CLASSIFICATION

MAJOR DIVISIONS			SYMBOL	TYPICAL DESCRIPTION
COARSE GRAINED SOILS	Gravel and Gravelly Soils	Clean Gravels	GW	Well-graded gravels and gravel-sand mixtures
			GP	Poorly-graded gravels and gravel-sand mixtures
		Gravels with Fines	GM	Silty gravels and gravel-sand-silt mixtures
			GC	Clayey gravels and gravel-sand-clay mixtures
	Sand and Sandy Soils	Clean Sands	SW	Well-graded sands and gravelly sands
			SP	Poorly-graded sands and gravelly sands
		Sands with Fines	SM	Silty sands and sand-silt mixtures
			SC	Clayey sands and sand-clay mixtures
FINE GRAINED SOILS	Silts and Clays of Low Plasticity		ML	Inorganic silts or clayey silts of slight plasticity
			CL	Inorganic clays of low to medium plasticity
			OL	Organic silts and organic silty clays of low plasticity
	Silts and Clays of High Plasticity		MH	Inorganic silts of high plasticity
			CH	Inorganic clays of medium to high plasticity
			OH	Organic clays of medium to high plasticity
Highly Organic Soils			PT	Peat, humus and swamp soils with high organic contents

Note: Dual symbols are used to indicate borderline classifications.