GME TESTING

A UES Company

Geotechnical Report

GME Project No. G25-123285

Proposed Water Main Improvements Turkey Creek Regional Sewer District

Various Roadways and Streets
Syracuse, IN

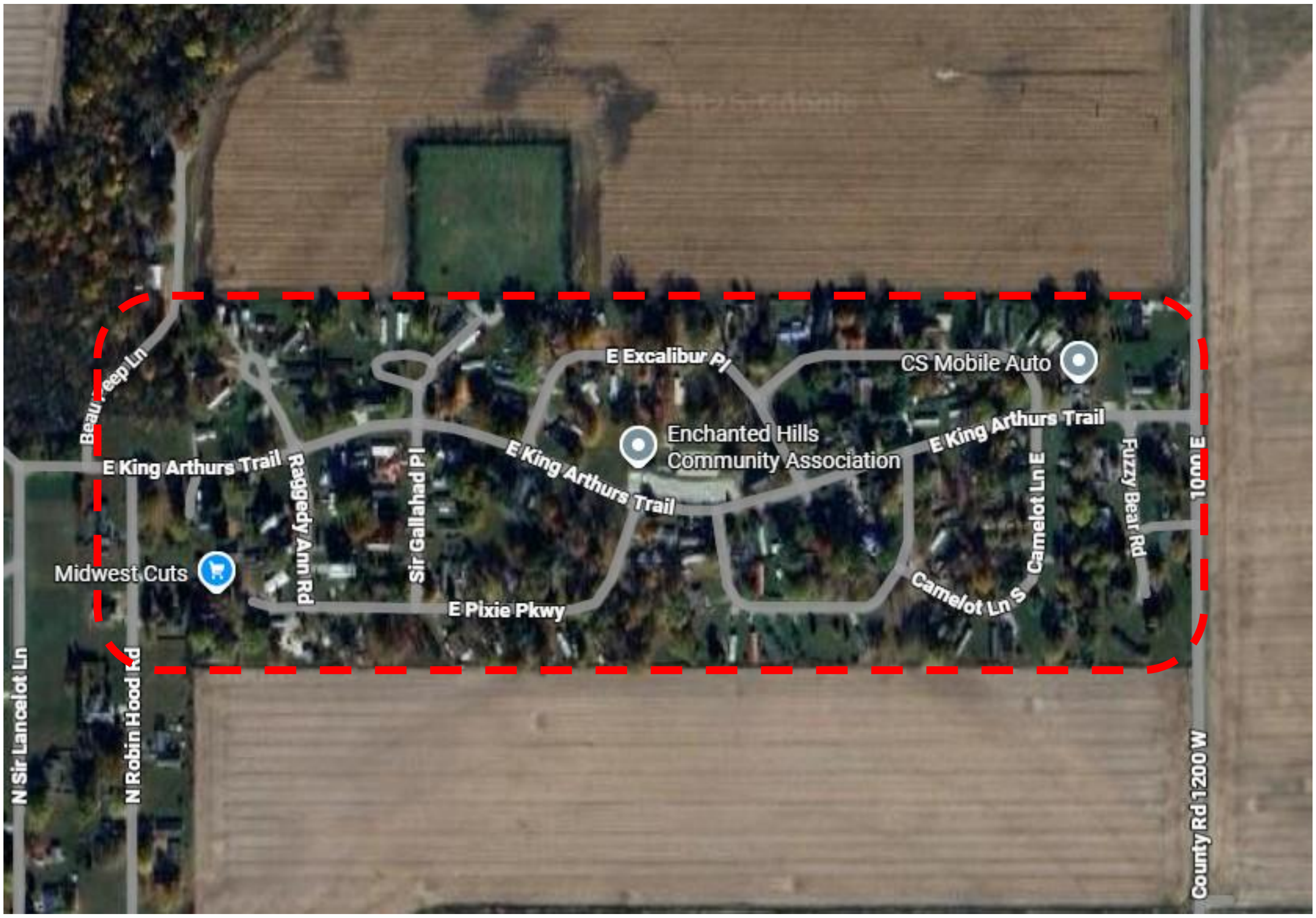
January 23, 2026

Prepared For:

Jones & Henry Engineers, Ltd.
1700 Magnavox Way, Suite 102
Fort Wayne, IN 46804
Attn: Mr. Mike Harkness, P.E., Senior Project Engineer

Prepared By:

GME Testing
3517 Focus Dr
Fort Wayne, IN 46818



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January 23, 2026
G25-123285

Jones & Henry Engineers, Ltd.
1700 Magnavox Way, Suite 102
Fort Wayne, IN 46804
Attn: Mr. Mike Harkness, P.E., Senior Project Engineer

REF: SUBSURFACE EXPLORATION AND RECOMMENDATIONS
Proposed Water Main Improvements
Turkey Creek Regional Sewer District
Various Roadways and Streets
Syracuse, IN

Dear Mr. Harkness:

In compliance with your recent request, ***GME Testing*** is pleased to submit our subsurface exploration and recommendations report for the design and construction of proposed water main improvements and utility construction planned at various streets in Syracuse, Indiana. Our work was performed in accordance with our proposal GMEP 25-120628 dated December 12, 2025, which was authorized on December 19, 2025.

GENERAL PROJECT DETAILS

Based on information provided by Mr. Mike Harkness, P.E., Senior Project Engineer with Jones & Henry Engineers, the proposed water main pipes will range in diameter from approximately 6, 8, and 12 inches and will generally replace existing aging water mains. The bottom of the new water main pipes is expected to be installed at an approximate depth of 5 feet below the existing ground surface. While the specific pipe material has not been finalized, it is anticipated that the new water mains will consist of ductile iron pipe.

The preferred installation method is conventional open-trench excavation and backfill, performed in accordance with OSHA regulations and project specifications. At locations where the proposed alignment crosses beneath the existing concrete drive at the water treatment plant, specifically near boring B-04, directional drilling is planned.

The excavation contractor shall adhere to the project plans and specifications, as well as the recommendations provided in this report. All construction activities shall comply with applicable local and state regulations.

Planned utility excavations shall include the proper identification and location of existing utilities. Where necessary, existing utilities within the work areas shall be appropriately abandoned or protected.

No free-standing structures are included in the proposed improvements.

If significant changes to the project occur, or if any assumptions presented in this report are found to be inaccurate, GME Testing shall be contacted to evaluate whether revisions to the recommendations are required.

SITE CONDITIONS

The ground cover and surface features along the proposed site are typical of suburban areas, including paved and aggregate shoulders, as well as overhead and underground utilities.

SITE GEOLOGY

According to the USDA Web Soil Survey, the site's existing near-surface soil groups are primarily composed of a variety of soil groups. Those will include Boyer loamy sand, Bronson sandy loam, Homer sandy loam, Kosciusko sandy loam, and Sebewa loam. A copy of the *Custom Soil Resource Report for Kosciusko County, Indiana*, is provided in Appendix D of this report.

FIELD INVESTIGATION

Field Coordination

Prior to initiating the geotechnical investigation, the appropriate roadway cut and right-of-way permits were obtained to facilitate the field work. Upon receipt of the required permits, traffic control personnel were coordinated and dispatched to the project site to support the investigation activities throughout the duration of the field operations.

Soil Test Borings

The field exploration program consisted of drilling ten (10) vertical soil test borings to planned depths of approximately 15 feet below the existing ground surface (bgs), as shown on the borehole logs. GME Testing personnel established the boring locations in the field based on the site plan provided by Jones & Henry Engineers. Adjustments to the planned locations were made as necessary to avoid existing utilities, accommodate site access constraints, and maintain appropriate clearances from private property. Accordingly, the boring locations shown in Exhibit A and presented in Appendix A of this report are approximate and intended for reference purposes only.

The stratification of soils, as shown in the accompanying boring logs in Appendix B of this report, represents the soil conditions at the drilled borehole locations. All samples were classified in general accordance with ASTM D-2487. Laboratory testing, including moisture content determination and visual soil classification, was performed, with results provided in Appendix B of this report.

Pavement Coring

To document existing pavement thicknesses and composition, GME Testing personnel mobilized coring equipment to the project site to obtain pavement core samples. A total of four (4) pavement cores were drilled and extracted for evaluation. The results of the pavement coring are presented in subsequent sections of this report and included in the appendices.

GENERALIZED SOIL AND GROUNDWATER CONDITIONS

Boring Results

The following discussion presents general subsurface conditions encountered during the subsurface exploration. More detailed descriptions of the soils at each test boring location are provided on the individual boring logs included in Appendix B of this report.

Surface Materials: Topsoil was encountered in borings B-02 and B-08 at a thickness of approximately 4 inches. In boring B-04, concrete pavement was encountered at the surface to a depth of approximately 6 inches. Asphalt pavement thicknesses measured at the boring locations ranged from approximately 1.5 to 4 inches and are shown on the individual boring logs.

Native Soils: The borings generally encountered granular soils extending to the termination depths. The upper approximately 3.5 to 6 feet consisted of loose to medium dense clayey sand and medium stiff to stiff clay. Underlying these materials, medium dense to dense granular soils consisting of fine to medium sand, fine sand, and sand and gravel extended to the termination depths of the borings. The existing sand soils were wet in most of the borings at depths of approximately 6 to 9 feet below ground surface.

Relative soil densities and consistencies were based on Standard Penetration Test (SPT) N-values in accordance with ASTM D-1586. The **General Notes** sheet, which follows the boring logs included in Appendix B, explains the soil consistency correlations.

Organic clay was encountered in boring B-09 to a depth of approximately 2.5 feet, and if encountered at the anticipated pipe invert, undercutting may be necessary.

Groundwater: Groundwater measurements were taken during our field operations by noting the depth of water on the rods and in open boreholes following the withdrawal of the drilling augers after the completion of drilling activities in test borings. Groundwater was encountered in most of the borings during or following our drilling program, except in boring B-07, as shown in Table 1 below, and the boring logs are included in Appendix B of this report.

Table 1: Groundwater Depths in the Borings at Time of Drilling

Boring Number	*Groundwater Depth, feet	
	During Drilling	At the Completion of Drilling
B-01	±8	±10.5
B-02	±9	±12
B-03	±7.5	±8.5
B-04	±6	±9.5
B-05	±8	±11
B-06	±8	±9.5
B-07	†NO	NO
B-08	±8.5	±8.5
B-09	±6.5	±7
B-10	±6	±7

**Depths referenced below the existing ground surface*
†*Not Observed (NO)*

The groundwater depths shown on the boring logs reflect groundwater levels only for the date on which the borings were drilled. Fluctuations in groundwater levels and the rate of seepage may occur due to variations in rainfall, water levels, and other factors.

Pavement Coring Thickness Investigation

As previously discussed, four (4) pavement cores were drilled for this project. Based on the results of the pavement cores performed for the project, the existing pavement surface is composed of asphalt concrete. The thicknesses of the existing pavement were summarized and are included below in Table 2 and Appendix C of this report.

Table 2: Approximate Thickness of Existing Pavement Cores

Coring Number	Associated Location	Existing Asphalt Pavement Thickness (inches)		
		Piece 1	Piece 2	Total
C-01 & B-01	Intersection of N Robin Hood Rd. and East King Arthurs Trail	±4⅛	--	±4⅛
C-02 & B-03	Intersection of E Pixie Pkwy. And Sir Gallahad Pl.	±1⅞	--	±1⅞
C-03 & B-05	Intersection of E King Arthurs Trail and E Pixie Pkwy.	±1⅜	±2½	±3⅞
C-04 & B-06	Intersection of E Excalibur Pl. and E Starry Eyed Ln.	±⅞	--	±⅞

Water Main Pipe Installation Recommendations

The following sections provide our recommendations for both the conventional open-cut and the trenchless directional installation methods.

Open-Cut Installation

The water main is planned to be found at a depth of about 5 feet in the borings. At this depth, stiff clays and medium dense clayey sands and sands were observed in test borings. Such soils should provide suitable pipe support, provided that any organic and compressible soils, if encountered, are first removed and replaced with engineered fill. This evaluation assumes that excavations are properly prepared, protected, and constructed in accordance with good construction practices, current OSHA requirements, the recommendations of this report, and the project plans, whichever is more stringent.

Soft, weak, organic, compressible, or otherwise unsuitable materials encountered during excavation shall be removed and replaced with approved bedding material to a thickness determined in the field by the Engineer. Where loose or weak soil layers are present, excavation instability, including sloughing and localized cave-ins, should be anticipated.

Pipe bedding shall consist of free-draining granular material, such as INDOT No. 53 or No. 8 stone, placed beneath and around the pipe to provide uniform and adequate support. The type and thickness of bedding material shall be determined by the Engineer, with a minimum bedding thickness of approximately 4 inches, provided groundwater conditions can be adequately controlled.

Backfill and bedding materials shall be compacted to the densities specified in this report and the project plans.

Field density testing shall be performed to verify compaction and to limit post-construction settlement.

When properly executed, open-cut excavations are expected to perform satisfactorily, with post-construction settlements remaining within acceptable limits. Ongoing field observation is recommended to identify and address conditions that could result in excessive settlement.

Groundwater-related difficulties should be anticipated for any excavations extending to or below the groundwater depths in borings.

Trenchless Pipe Installation

Trenchless pipe installation is a specialized construction method requiring specific experience and expertise. Construction shall be performed by a qualified specialty contractor capable of designing, installing, and warranting a proprietary trenchless system in accordance with Section 716 of the current INDOT Standard Specifications. The selection of construction methods and equipment shall be the responsibility of the specialty contractor.

A jacking pit shall be provided for the launch of the trenchless installation. The pit shall be braced or shored in accordance with applicable OSHA requirements and project-specific conditions and shall be designed to resist lateral earth pressures and any applicable surcharge loads.

Dewatering may be required depending on groundwater conditions at the jacking location. The Contractor shall maintain jacking pit stability throughout the installation.

Appropriate, well-maintained equipment shall be used to accommodate the subsurface conditions encountered at boring B-04. Soil parameters for boring B-04 are summarized in Table 3.

Table 3: Approximate Soil Parameters in Test Boring B-04 at Different Depths

Boring Number	Depth, feet	*Internal Angle of Friction (ϕ), deg	*Average Cohesion (c), psf	*Total Soil Unit Weight (γ), pcf
B-04	0 to 4	0	1,000	110
	4 to 6	30	--	120
	6 to 15	32	--	120

**Ultimate Soil Parameters*

General Discussion

All pipes and fittings shall comply with the more stringent of applicable local or state standards. Positive seals between pipe segments shall be provided in accordance with the manufacturer’s specifications to prevent fluid infiltration that could result in soil migration and void formation beneath or adjacent to the pipe.

Engineered Fill

Backfill used to replace unsuitable materials shall consist of non-organic, naturally occurring, non-expansive granular soils (e.g., INDOT No. 8 or INDOT No. 53). All backfill materials shall be approved by GME Testing and placed at a moisture content within ±2 percent of the Optimum Moisture Content (OMC).

Fill material should be mechanically compacted in uniform horizontal lifts at a relative compaction of 95 percent of the maximum Proctor density, in accordance with ASTM D-1557 (Modified Proctor). However, every effort should be made not to cause damage to the pipe due to over-compaction of fill materials. To achieve the recommended compaction limit of the fill, the fill material should be placed and compacted in layers not exceeding 8 inches in loose thickness (the loose lift thickness should be reduced to 6 inches when utilizing small hand compactors) and within the specified range of OMC. All fill placements should be monitored by a GME Testing representative.

Groundwater Control

It is recommended that the Contractor design and implement appropriate dewatering and lateral support systems to maintain dry and stable conditions during installation. Minor groundwater infiltration may be managed using sumps and pumps; however, the Contractor shall be responsible for selecting and implementing the appropriate dewatering methods necessary to control surface water and groundwater based on actual field conditions and to maintain relatively dry construction conditions.

Excavations and Trenches

Utility excavations shall be performed in accordance with the current INDOT Standard Specifications, and the Contractor shall be responsible for excavation safety and protection in compliance with applicable OSHA standards.

This study did not include a detailed excavation slope stability analysis. Temporary excavations, particularly those encountering groundwater seepage, may require shoring, bracing, or other lateral support to maintain stability. All excavations shall be inspected and monitored by a Competent Person, as defined by OSHA, and appropriate sloping or shoring methods shall be implemented to prevent cave-ins.

Exposed subgrade soils shall be protected from disturbance, moisture, freezing, and surface runoff. The Contractor shall be responsible for excavation protection and compliance with all applicable OSHA safety requirements. These recommendations are provided as general guidance only, and a qualified design engineer should be consulted for project-specific excavation and shoring design.

Restoration of Surfaces

Upon completion of the utility installation, all disturbed pavement surfaces and underlying subgrade materials shall be restored in accordance with the project specifications and Section 715.12 of the latest applicable INDOT Standard Specifications. Existing utilities and adjacent surfaces shall be protected in general accordance with applicable local ordinances and accepted construction practices.

Construction Monitoring

Based on our experience, subsurface conditions may vary significantly from those inferred from individual test borings. We recommend that a GME Testing geotechnical engineer or other qualified representative be retained to observe and evaluate subsurface materials during construction to verify design assumptions and ensure proper implementation of the recommendations.

GENERAL COMMENTS

This field evaluation, laboratory testing, and geotechnical analyses presented in this geotechnical investigation report have been conducted in general accordance with current practice and the standard of care exercised by geotechnical consultants performing similar tasks in the project area. Although individual test borings are representative of the subsurface conditions at the boring locations on the dates drilled, they are not necessarily representative of the subsurface conditions between boring locations or subsurface conditions during other seasons of the year.

The lines of demarcation shown on the logs represent approximate boundaries between the various classifications. The stratification of soils, as shown on the accompanying test borehole logs, represents the soil conditions at the drilled borehole locations, and variations may occur between the boreholes. In-situ strata changes could occur gradually or at different levels. Also, it should be noted that the boreholes depict conditions at the particular-locations and times indicated.

The report was prepared by GME Testing solely for the use of the Client in accordance with an executed contract. The Client's use of or reliance on this report is limited by the terms and conditions of the contract and by the qualifications and limitations stated in the report. It is also acknowledged that the Client's use of and reliance of this report is limited for reasons which include actual site conditions that may change with time; hidden conditions, not discoverable within the scope of the assessment may exist at the site; and the scope of the investigation may have been limited by time, budget and other constraints imposed by the client.

Neither the report nor its contents, conclusions or recommendations are intended for the use of any party other than the Client. GME Testing and the Client assume no liability for any reliance placed on this report by such party. The rights of the client under contract may not be assigned to any person or entity, without the consent of GME Testing which shall not be unreasonably withheld.

Our services have been provided consistent with its professional standards of care. No other warranties are made, either expressed or implied.

Sincerely,
GME Testing

S M Naziur Mahmud, E.I.T.

Rami M. Anabtawi, P.E., BC.GE

RAMI M. ANABTAWI
920294
REGISTERED PROFESSIONAL ENGINEER
STATE OF INDIANA

APPENDIX A

I. FIELD EXPLORATION

Drilling and Sampling Procedures

The test borings were drilled using conventional augers to advance the holes and representative samples of the soils were obtained employing split-barrel sampling techniques in accordance with ASTM procedures D-1586-84. After completion of the borings and water level readings, the auger holes were backfilled with auger cuttings.

The description and depths of soil strata encountered and levels at which samples were recovered are indicated on the accompanying borehole log sheets in the Appendix B. In the column “Soil/Material Description” on the drill borehole log, the horizontal lines represent stratum changes. A solid line represents an observed change, and a dashed line represents an estimated change. An explanation of the symbols and terms used on the boring log sheets is given in Appendix B of this report.

Field Tests and Measurements

Standard Penetration Test: During the sampling procedures, Standard Penetration Test (SPT) was performed at regular intervals through the depth of the borings. The SPT value (“N”-value) 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 Borehole Logs in Appendix B.

Water Level Measurements: Groundwater level observations were made in the boring holes during and upon completion of the boring operations. The groundwater level measurements are noted on the boring logs presented herein.

All recovered samples were returned to GME Testing laboratory for visual examination and subsequent laboratory testing.

II. LABORATORY TESTING

Selected soil samples obtained from the drilling and sampling program were tested in the laboratory to evaluate additional pertinent engineering characteristics of the foundation materials necessary in estimating the engineering properties of these materials.

Soil Laboratory Tests and Measurements

Visual Classification: All samples were visually classified by a geotechnical engineer in general accordance with ASTM D-2488, and on the Borehole Logs, which are located in Appendix B of this report.

Moisture Content Tests: The natural moisture content of selected samples was determined by ASTM method D-2216 and is recorded on the Borehole Logs as a percentage of dry weight of soil under the “MC”.

Hand Penetration Tests: Samples of cohesive soils obtained from the split spoon sampler were tested with a calibrated hand penetrometer to aid in evaluating the soil strength characteristics. The results from this testing are tabulated on the Borehole Logs under the heading “Q_P”.

Unconfined Compressive Strength Tests: The undrained shear strengths of the cohesive soils were evaluated utilizing unconfined compressive tests on specimens obtained from the split-barrel and/or thin wall tube sampler. The values of strength tests performed on soil samples obtained from the split-barrel sampler are considered approximate recognizing that the sampler provides a representative but somewhat disturbed sample. The test results are tabulated on the Borehole Logs under the heading “Q_u”.

VICINITY MAP (NOT TO SCALE)

NOTES

1. All boring and coring locations are approximate.
    a. B-01 thorugh B-10: Borings.
    b. C-01 through C-04: Pavement Corings.
2. Vicinity map generated using imagery from google.com/maps.

↑
N

LEGEND

● B-01
Test Boring Location and Designation

EXHIBIT A – APPROXIMATE BORING LOCATION MAP

Project Name: Proposed Water Main Improvements - Turkey Creek Regional Sewer District

Location: Various Roadways and Streets, Syracuse, IN

Client Name: Jones & Henry Engineers, Ltd.

GME Project Number: G25-123285

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APPENDIX B

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TEST BORING LOG

BORING NO.: **B-01**
SHEET 1 OF 1
GME PROJECT NO: G25-123285
STRUCTURE
DATUM :
DATE STARTED : 01-12-26
DRILLER/INSP : JS/AB/DW

CLIENT: Jones & Henry Engineers, Ltd.
PROJECT TYPE: Proposed Water Main Improvements - Turkey Creek Regional Sewer District
LOCATION: Various Roadways and Streets, Syracuse, IN

ELEVATION : 884.0
STATION :
OFFSET :
LINE :
DEPTH : 15.0 ft

BORING METHOD : ASTM D-1586
RIG TYPE : Skid
CASING DIA. : 3.3 in
HAMMER : Auto

LATITUDE : 41.408807
LONGITUDE : -85.663756

GROUNDWATER: ▽ Encountered at 8.0 ft ▼ At completion 10.5 ft

STRATUM ELEVATION	SAMPLE DEPTH	SOIL/MATERIAL DESCRIPTION	SAMPLE NUMBER	SPT per 6" (N)	% RECOVERY	% MOISTURE CONTENT	UNCONF. COMP., tsf	Qp (tsf)	REMARKS
883.7		±4.125" ASPHALT PRODUCT. 0.3							
	2.5	Brown, Moist, CLAYEY SAND with Gravel.	SS 1	6-5-5 (10)	50	10.6			
880.0		4.0							
	5.0		SS 2	4-6-7 (13)	100	13.8			
	7.5		SS 3	4-8-9 (17)	100	9.7			
▽									
	10.0	Brown and Gray, Very Moist to Wet, Fine to Medium Coarse SAND and GRAVEL.	SS 4	5-6-6 (12)	100				
▼									
	12.5								
869.0	15.0	15.0	SS 5	6-6-7 (13)	100				
		Bottom of Boring at 15.0 ft							
	17.5								
	20.0								
	22.5								
	25.0								
	27.5								
	30.0								

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TEST BORING LOG

BORING NO.: **B-02**
SHEET 1 OF 1
GME PROJECT NO: G25-123285
STRUCTURE
DATUM :
DATE STARTED : 01-12-26
DRILLER/INSP : JS/AB/DW

CLIENT: Jones & Henry Engineers, Ltd.
PROJECT TYPE: Proposed Water Main Improvements - Turkey Creek Regional Sewer District
LOCATION: Various Roadways and Streets, Syracuse, IN

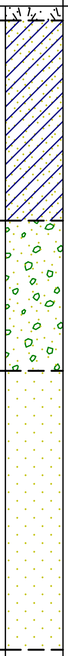
ELEVATION : 883.5
STATION :
OFFSET :
LINE :
DEPTH : 15.0 ft

BORING METHOD : ASTM D-1586
RIG TYPE : Skid
CASING DIA. : 3.3 in
HAMMER : Auto

LATITUDE : 41.408884
LONGITUDE : -85.66209

GROUNDWATER: ∇ Encountered at 9.0 ft ▼ At completion 12.0 ft

STRATUM ELEVATION	SAMPLE DEPTH	SOIL/MATERIAL DESCRIPTION	SAMPLE NUMBER	SPT per 6" (N)	% RECOVERY	% MOISTURE CONTENT	UNCONF. COMP., tsf	Qp (tsf)	REMARKS
883.2		±4" Dark Brown, Clayey Sandy TOPSOIL. 0.3							
	2.5	Dark Brown, Moist, CLAYEY SAND with Gravel.	SS 1	3-3-3 (6)	25	15.3			
878.5	5.0	5.0	SS 2	9-9-12 (21)	100	10.5			
	7.5	Brown, Wet, SAND and GRAVEL.	SS 3	11-15-13 (28)	100				
875.0		8.5							
∇	10.0		SS 4	9-8-12 (20)	100				
▼	12.5	Gray, Wet, SAND, Trace Fine Gravel.							
868.5	15.0	15.0	SS 5	11-15-18 (33)	100				
		Bottom of Boring at 15.0 ft							
	17.5								
	20.0								
	22.5								
	25.0								
	27.5								
	30.0								



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TEST BORING LOG

BORING NO.: **B-03**
SHEET 1 OF 1
GME PROJECT NO: G25-123285
STRUCTURE
DATUM :
DATE STARTED : 01-12-26
DRILLER/INSP : JS/AB/DW

CLIENT: Jones & Henry Engineers, Ltd.
PROJECT TYPE: Proposed Water Main Improvements - Turkey Creek Regional Sewer District
LOCATION: Various Roadways and Streets, Syracuse, IN

ELEVATION : 886.0
STATION :
OFFSET :
LINE :
DEPTH : 15.0 ft

BORING METHOD : ASTM D-1586
RIG TYPE : Skid
CASING DIA. : 3.3 in
HAMMER : Auto

LATITUDE : 41.407877
LONGITUDE : -85.660964

GROUNDWATER: ▽ Encountered at 7.5 ft ▼ At completion 8.5 ft ⊠ Caved in at 12.0 ft

STRATUM ELEVATION	SAMPLE DEPTH	SOIL/MATERIAL DESCRIPTION		SAMPLE NUMBER	SPT per 6" (N)	% RECOVERY	% MOISTURE CONTENT	UNCONF. COMP., tsf	Qp (tsf)	REMARKS
885.8		±1.875" ASPHALT PRODUCT.	0.2							
885.5		±4" GRAVEL.	0.5							
	2.5	Brown, Moist, CLAYEY SAND.		SS 1	4-4-5 (9)	100	11.2			
881.0	5.0		5.0	SS 2	5-7-12 (19)	100	9.3			
		Brown Moist, Fine to Medium Coarse SAND, Trace Gravel.		SS 3	5-9-15 (24)	100	6.5			
878.5 ▽	7.5		7.5							
▼										
	10.0			SS 4	7-8-9 (17)	100				
		Gray, Wet, Fine to Medium Coarse SAND and GRAVEL.								
⊠	12.5									
871.0	15.0		15.0	SS 5	9-11-12 (23)	100				
		Bottom of Boring at 15.0 ft								
	17.5									
	20.0									
	22.5									
	25.0									
	27.5									
	30.0									

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TEST BORING LOG

BORING NO.: **B-04**
SHEET 1 OF 1
GME PROJECT NO: G25-123285
STRUCTURE
DATUM :
DATE STARTED : 01-12-26
DRILLER/INSP : JS/AB/DW

CLIENT: Jones & Henry Engineers, Ltd.
PROJECT TYPE: Proposed Water Main Improvements - Turkey Creek Regional Sewer District
LOCATION: Various Roadways and Streets, Syracuse, IN

ELEVATION : 885.0
STATION :
OFFSET :
LINE :
DEPTH : 15.0 ft

BORING METHOD : ASTM D-1586
RIG TYPE : Skid
CASING DIA. : 3.3 in
HAMMER : Auto

LATITUDE : 41.409921
LONGITUDE : -85.660422

GROUNDWATER: ▽ Encountered at 6.0 ft ▼ At completion 9.5 ft

STRATUM ELEVATION	SAMPLE DEPTH	SOIL/MATERIAL DESCRIPTION	SAMPLE NUMBER	SPT per 6" (N)	% RECOVERY	% MOISTURE CONTENT	UNCONF. COMP., tsf	Qp (tsf)	REMARKS
884.5		±6" CONCRETE. 0.5							
	2.5	Dark Brown, Moist, SANDY CLAY, Trace Gravel.	SS 1	5-5-5 (10)	100	20.1			
881.0		4.0							
	5.0	Brown, Moist, CLAYEY SAND, Trace Fine Gravel.	SS 2	3-5-7 (12)	100	19.0			
879.0 ▽		6.0							
	7.5		SS 3	3-4-12 (16)	100				
▼	10.0	Brown, Wet, Fine to Medium Coarse SAND and GRAVEL.	SS 4	7-9-11 (20)	100				
	12.5								
871.5		13.5							
		Gray, Wet, Fine to Medium Coarse SAND.	SS 5	8-10-11 (21)	100				
870.0	15.0	15.0							
		Bottom of Boring at 15.0 ft							
	17.5								
	20.0								
	22.5								
	25.0								
	27.5								
	30.0								

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TEST BORING LOG

BORING NO.: **B-05**
SHEET 1 OF 1
GME PROJECT NO: G25-123285
STRUCTURE
DATUM :
DATE STARTED : 01-12-26
DRILLER/INSP : JS/AB/DW

CLIENT: Jones & Henry Engineers, Ltd.
PROJECT TYPE: Proposed Water Main Improvements - Turkey Creek Regional Sewer District
LOCATION: Various Roadways and Streets, Syracuse, IN

ELEVATION : 886.0
STATION :
OFFSET :
LINE :
DEPTH : 15.0 ft

BORING METHOD : ASTM D-1586
RIG TYPE : Skid
CASING DIA. : 3.3 in
HAMMER : Auto

LATITUDE : 41.4086
LONGITUDE : -85.658913

GROUNDWATER: ▽ Encountered at 8.0 ft ▼ At completion 11.0 ft

STRATUM ELEVATION	SAMPLE DEPTH	SOIL/MATERIAL DESCRIPTION	SAMPLE NUMBER	SPT per 6" (N)	% RECOVERY	% MOISTURE CONTENT	UNCONF. COMP., tsf	Qp (tsf)	REMARKS
885.7		±3.875" ASPHALT PRODUCT. 0.3							
885.4		±3" GRAVEL. 0.6							
	2.5	Dark Brown, Moist, SANDY SILTY CLAY.	SS 1	4-5-7 (12)	100	13.7		2.5	
883.0		3.0							
	5.0	Brown, Moist, CLAYEY SAND, Trace Fine Gravel.	SS 2	4-5-9 (14)	100	13.1			
880.0		6.0							
	7.5		SS 3	6-7-11 (18)	100	6.6			
▽		Brown, Moist to Wet, Fine SAND, Trace Fine Gravel.							
			SS 4	5-7-8 (15)	100				
876.0	10.0	10.0							
▼									
	12.5	Gray, Wet, Fine to Medium Coarse SAND with Gravel.							
			SS 5	7-8-9 (17)	100				
871.0	15.0	15.0							
		Bottom of Boring at 15.0 ft							
	17.5								
	20.0								
	22.5								
	25.0								
	27.5								
	30.0								

GME TESTING
A UES Company

TEST BORING LOG

BORING NO.: **B-06**
SHEET 1 OF 1
GME PROJECT NO: G25-123285
STRUCTURE
DATUM :
DATE STARTED : 01-12-26
DRILLER/INSP : JS/AB/DW

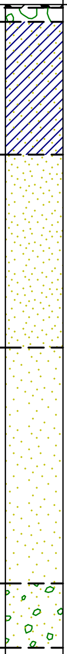
CLIENT: Jones & Henry Engineers, Ltd.
PROJECT TYPE: Proposed Water Main Improvements - Turkey Creek Regional Sewer District
LOCATION: Various Roadways and Streets, Syracuse, IN

ELEVATION : 887.0
STATION :
OFFSET :
LINE :
DEPTH : 15.0 ft

BORING METHOD : ASTM D-1586
RIG TYPE : Skid
CASING DIA. : 3.3 in
HAMMER : Auto

LATITUDE : 41.409358
LONGITUDE : -85.657708

GROUNDWATER: ▽ Encountered at 8.0 ft ▼ At completion 9.5 ft ⊠ Caved in at 11.5 ft



STRATUM ELEVATION	SAMPLE DEPTH	SOIL/MATERIAL DESCRIPTION	SAMPLE NUMBER	SPT per 6" (N)	% RECOVERY	% MOISTURE CONTENT	UNCONF. COMP., tsf	Qp (tsf)	REMARKS
886.9		±0.875" ASPHALT PRODUCT. 0.1							
886.6		±4" GRAVEL. 0.4							
	2.5	Brown, Moist, SANDY CLAY, Trace Fine Gravel.	SS 1	5-3-3 (6)	100	10.4		1.0	
883.5		3.5							
	5.0	Brown, Moist, Fine SAND.	SS 2	5-6-7 (13)	100	7.7			
	7.5		SS 3	6-7-7 (14)	100	7.1			
879.0 ▽		8.0							
▼	10.0	Gray, Wet, Fine to Medium Coarse SAND, Trace Fine Gravel.	SS 4	7-8-10 (18)	100				
⊠	12.5								
873.5		13.5							
872.0	15.0	Gray, Wet, SAND and GRAVEL. 15.0	SS 5	9-11-11 (22)	100				
		Bottom of Boring at 15.0 ft							
	17.5								
	20.0								
	22.5								
	25.0								
	27.5								
	30.0								

GME TESTING
A UES Company

TEST BORING LOG

BORING NO.: **B-07**
SHEET 1 OF 1
GME PROJECT NO: G25-123285
STRUCTURE
DATUM :
DATE STARTED : 01-12-26
DRILLER/INSP : JS/AB/DW

CLIENT: Jones & Henry Engineers, Ltd.
PROJECT TYPE: Proposed Water Main Improvements - Turkey Creek Regional Sewer District
LOCATION: Various Roadways and Streets, Syracuse, IN

ELEVATION : 887.0
STATION :
OFFSET :
LINE :
DEPTH : 15.0 ft

BORING METHOD : ASTM D-1586
RIG TYPE : Skid
CASING DIA. : 3.3 in
HAMMER : Auto

LATITUDE : 41.407771
LONGITUDE : -85.657084

GROUNDWATER: ∇ Encountered at Dry   ▼ At completion Dry   Caved in at 12.0 ft

STRATUM ELEVATION	SAMPLE DEPTH	SOIL/MATERIAL DESCRIPTION	SAMPLE NUMBER	SPT per 6" (N)	% RECOVERY	% MOISTURE CONTENT	UNCONF. COMP., tsf	Qp (tsf)	REMARKS
886.9		±1" ASPHALT PRODUCT. 0.1							
	2.5	Brown, Moist, SANDY CLAY, Trace Gravel.	SS 1	4-4-6 (10)	100	15.5			
884.0		3.0							
	5.0	Brown, Moist, CLAYEY SAND, Trace Gravel.	SS 2	6-7-9 (16)	100	10.7			
881.0		6.0							
	7.5	Brown, Moist, Fine to Medium Coarse SAND, Trace Fine Gravel.	SS 3	7-10-14 (24)	100	6.4			
878.5		8.5							
	10.0		SS 4	8-8-10 (18)	100	9.1			
	12.5	Gray, Very Moist, Fine to Medium Coarse SAND with Gravel.							
872.0	15.0	15.0	SS 5	10-16-7 (23)	100	13.3			
		Bottom of Boring at 15.0 ft							
	17.5								
	20.0								
	22.5								
	25.0								
	27.5								
	30.0								

GME TESTING
A UES Company

TEST BORING LOG

BORING NO.: **B-08**
SHEET 1 OF 1
GME PROJECT NO: G25-123285
STRUCTURE
DATUM :
DATE STARTED : 01-12-26
DRILLER/INSP : JS/AB/DW

CLIENT: Jones & Henry Engineers, Ltd.
PROJECT TYPE: Proposed Water Main Improvements - Turkey Creek Regional Sewer District
LOCATION: Various Roadways and Streets, Syracuse, IN

ELEVATION : 885.0
STATION :
OFFSET :
LINE :
DEPTH : 15.0 ft

BORING METHOD : ASTM D-1586
RIG TYPE : Skid
CASING DIA. : 3.3 in
HAMMER : Auto

LATITUDE : 41.409645
LONGITUDE : -85.656015

GROUNDWATER: ▽ Encountered at 8.5 ft ▼ At completion 8.5 ft ▨ Caved in at 9.0 ft

STRATUM ELEVATION	SAMPLE DEPTH	SOIL/MATERIAL DESCRIPTION		SAMPLE NUMBER	SPT per 6" (N)	% RECOVERY	% MOISTURE CONTENT	UNCONF. COMP., tsf	Qp (tsf)	REMARKS
884.7		±4" Dark Brown, Clayey Sandy TOPSOIL.	0.3							
	2.5	Brown, Moist, CLAYEY SAND.		SS 1	5-4-4 (8)	100	10.7			
881.5			3.5							
	5.0			SS 2	7-8-11 (19)	100	6.0			
		Brown, Moist to Very Moist, Fine to Medium Coarse SAND, Trace Fine Gravel.								
	7.5			SS 3	10-13-14 (27)	100	12.7			
876.5 ▼			8.5							
	10.0			SS 4	7-9-10 (19)	100				
	12.5	Brown, Wet, SAND and GRAVEL.								
870.0	15.0		15.0	SS 5	8-10-12 (22)	100				
		Bottom of Boring at 15.0 ft								
	17.5									
	20.0									
	22.5									
	25.0									
	27.5									
	30.0									

GME TESTING
A UES Company

TEST BORING LOG

BORING NO.: **B-09**
SHEET 1 OF 1
GME PROJECT NO: G25-123285
STRUCTURE
DATUM :
DATE STARTED : 01-12-26
DRILLER/INSP : JS/AB/DW

CLIENT: Jones & Henry Engineers, Ltd.
PROJECT TYPE: Proposed Water Main Improvements - Turkey Creek Regional Sewer District
LOCATION: Various Roadways and Streets, Syracuse, IN

ELEVATION : 884.0
STATION :
OFFSET :
LINE :
DEPTH : 15.0 ft

BORING METHOD : ASTM D-1586
RIG TYPE : Skid
CASING DIA. : 3.3 in
HAMMER : Auto

LATITUDE : 41.408839
LONGITUDE : -85.655086

GROUNDWATER: ∇ Encountered at 6.5 ft ▼ At completion 7.0 ft ▨ Caved in at 10.5 ft

STRATUM ELEVATION	SAMPLE DEPTH	SOIL/MATERIAL DESCRIPTION	SAMPLE NUMBER	SPT per 6" (N)	% RECOVERY	% MOISTURE CONTENT	UNCONF. COMP., tsf	Qp (tsf)	REMARKS
883.9		±1.5" ASPHALT PRODUCT. 0.1							
883.5		±4.5" GRAVEL. 0.5							
881.5	2.5	Gray, Moist, ORGANIC CLAY, Trace Shells. 2.5	SS 1	4-5-3 (8)	100	34.2		0.5	
	5.0	Brown, Very Moist to Wet, Fine to Medium Coarse SAND, Trace Fine Gravel.	SS 2	7-7-7 (14)	100	11.3			
	7.5		SS 3	6-7-9 (16)	100	10.8			
876.0		8.0							
	10.0		SS 4	5-6-8 (14)	100				
	12.5	Gray, Wet, SAND with Gravel.							
869.0	15.0	15.0	SS 5	7-7-7 (14)	100				
		Bottom of Boring at 15.0 ft							
	17.5								
	20.0								
	22.5								
	25.0								
	27.5								
	30.0								

GME TESTING
A UES Company

TEST BORING LOG

BORING NO.: **B-10**
SHEET 1 OF 1
GME PROJECT NO: G25-123285
STRUCTURE
DATUM :
DATE STARTED : 01-12-26
DRILLER/INSP : JS/AB/DW

CLIENT: Jones & Henry Engineers, Ltd.
PROJECT TYPE: Proposed Water Main Improvements - Turkey Creek Regional Sewer District
LOCATION: Various Roadways and Streets, Syracuse, IN

ELEVATION : 892.0
STATION :
OFFSET :
LINE :
DEPTH : 15.0 ft

BORING METHOD : ASTM D-1586
RIG TYPE : Skid
CASING DIA. : 3.3 in
HAMMER : Auto

LATITUDE : 41.408186
LONGITUDE : -85.654102

GROUNDWATER: ∇ Encountered at 6.0 ft ▼ At completion 7.0 ft ▨ Caved in at 10.5 ft

STRATUM ELEVATION	SAMPLE DEPTH	SOIL/MATERIAL DESCRIPTION		SAMPLE NUMBER	SPT per 6" (N)	% RECOVERY	% MOISTURE CONTENT	UNCONF. COMP., tsf	Qp (tsf)	REMARKS
891.9		±1" ASPHALT PRODUCT.	0.1							
889.0	2.5	Brown, Moist, CLAYEY SAND, Trace Gravel.	3.0	SS 1	5-4-4 (8)	100	14.1			
886.0 ∇ ▼	5.0	Brown, Moist, Fine to Medium Coarse SAND with Gravel.	6.0	SS 2	5-5-6 (11)	100	10.6			
	7.5			SS 3	6-7-10 (17)	100				
▨	10.0			SS 4	8-9-10 (19)	100				
877.0	12.5 15.0	Gray, Wet, Fine to Medium Coarse SAND, Trace Fine Gravel.	15.0	SS 5	10-10-12 (22)	100				
	17.5 20.0 22.5 25.0 27.5 30.0	Bottom of Boring at 15.0 ft								

GENERAL NOTES

SAMPLE IDENTIFICATION

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

RELATIVE PROPORTIONS OF COHESIONLESS SOILS

Term	Defining Range by % of Weight
Trace	1-10 %
Little	11-20 %
Some	21-35 %
And	36-50 %

WATER LEVEL MEASUREMENT

NE	No Water Encountered
BF	Backfilled upon Completion

DRILLING AND SAMPLING SYMBOLS

AS	Auger Sample
BS	Bag Sample
PID	Photo ionization Detector (Hnu meter) volatile vapor level,(PPM)
COA	Clean-Out Auger
CS	Continuous Sampling
FA	Flight Auger
HA	Hand Auger
HAS	Hollow Stem Auger
NR	No Recovery
PT	3” O.D. Piston Tube Sample
RB	Rock Bit
RC	Rock Coring
REC	Recovery
RQD	Rock Quality Designation
RS	Rock Sounding
S	Soil Sounding
SS	2”O.D. Split-Barrel Sample
2ST	2”O.D. Tin-Walled Tube Sample
3ST	3” O.D. Thin-Walled Tube Sample
VS	Vane Shear Test
DB	Diamond Bit
WS	Wash Sample
RB	Roller Bit
ST	Shelby Tube, 2” O.D. or 3” O.D.
CB	Carbide Bit
WOH	Weight of the Hammer

ORGANIC CONTENT BY COMBUSTION METHOD

Soil Description	LOI
w/ organic matter	4-15 %
Organic Soil (A-8)	16-30 %
Peat (A-8)	More than 30%

LABORATORY TESTS

Qp	Penetrometer Reading, tsf
Qu	Unconfined Strength, tsf
MC	Moisture Content, %
LL	Liquid Limit, %
PL	Plastic Limit, %
PI	Plastic Index
SL	Shrinkage Limit, %
pH	Measure of Soil Alkalinity/Acidity
γ	Dry Unit Weight, pcf
LOI	Loss of Ignition, %

GRAIN SIZE TERMINOLOGY

Soil fraction	Particle size	Us standard sieve size
Boulders	larger than 75 mm	Larger than 3”
Gravel	2mm to 75 mm	#10 to 75 mm
Coarse Sand	0.425 mm to 2 mm	#40 to #10
Fine Sand	0.075mm to 0.425 mm	#200 to #40
Silt	0.002 mm to 0.075 mm	Smaller than #200
Clay	Smaller than 0.002 mm	Smaller than #200

RELATIVE DENSITY

Term	“N” Value
Very Loose	0-5
Loose	6-10
Medium Dense	11-30
Dense	31-50
Very Dense	51+

CONSISTENCY

Term	“N” Value
Very Soft	0-3
Soft	4-5
Medium Stiff	6-10
Stiff	11-15
Very Stiff	16-30
Hard	31+

PLASTICITY

Term	Plastic Index
None to Slight	0-4
Slight	5-7
Medium	8-22
High/Very High	Over 22

Note(s):
The penetration resistance, “N” Value, is the summation of the number of blows required to effect two successive 6-inch penetrations of the 2-inch split-barrel sampler. The sampler is driven with a 140-lb. weight falling 30-inches and is seated to a depth of 6-inches before commencing the standard penetration test.
Water level measurements shown on the boring logs represent conditions at the time indicated and may not reflect static levels, especially in cohesive soils

GME TESTING
3517 Focus Drive
Fort Wayne, IN 46818
(260) 497- 8127▪ (877) 660-4GME• (260) 497- 0826 fax
Division of ***GEOTECHNICAL & MATERIALS ENGINEERS, INC.***
www.gmetesting.com

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)	●	GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
			○	GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	○	GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
			▨	GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)	⁙	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			⁙	SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	⁙	SM	SILTY SANDS, SAND - SILT MIXTURES
			▨	SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50	▥	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			▨	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			▤	OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50	▥	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
			▨	CH	INORGANIC CLAYS OF HIGH PLASTICITY
			≈	OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			ψ	PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

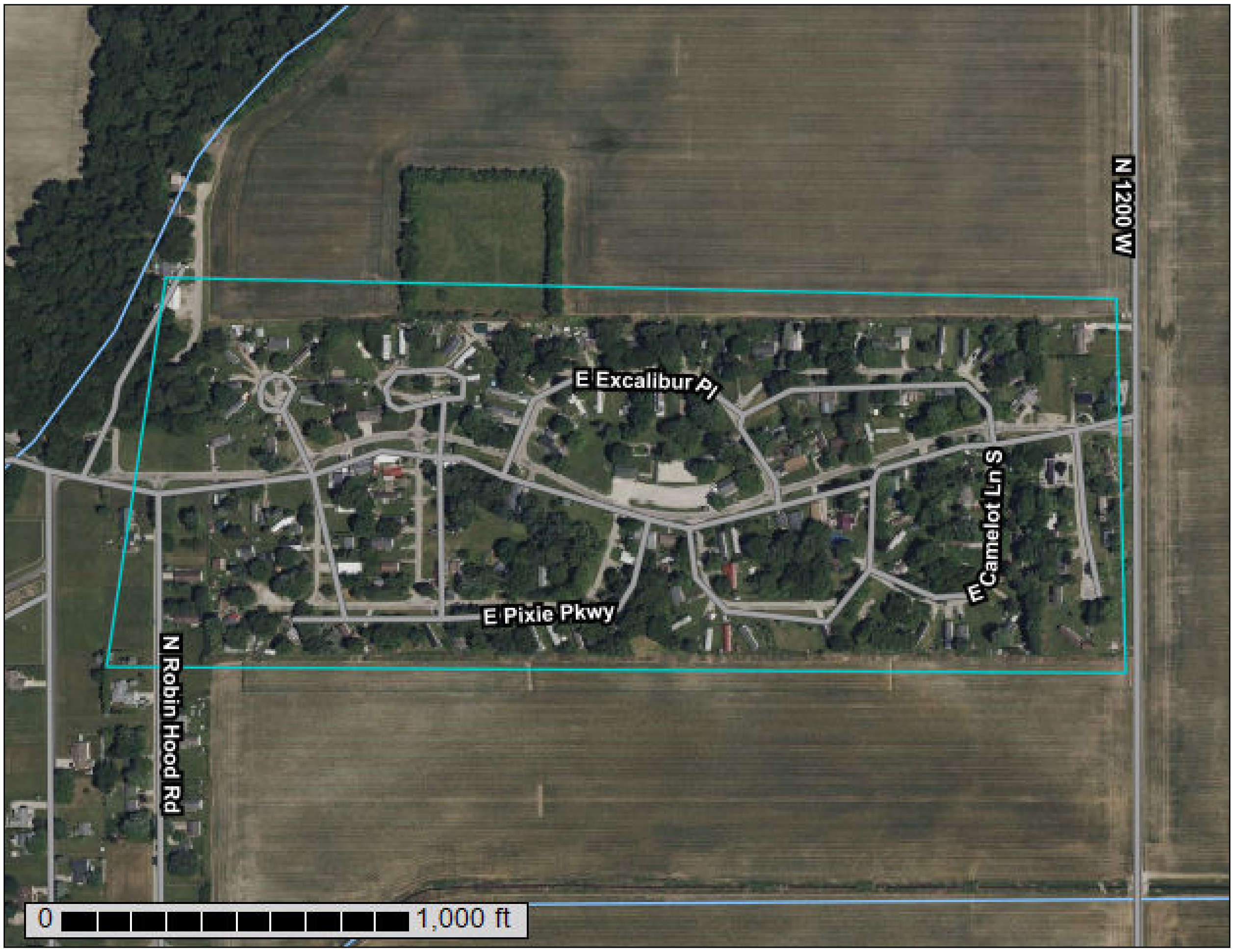
United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for
Kosciusko County, Indiana



January 20, 2026

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map

Map Scale: 1:4,910 if printed on A landscape (11" x 8.5") sheet.

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Kosciusko County, Indiana
Survey Area Data: Version 28, Sep 3, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 16, 2022—Jun 21, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BoB	Boyer loamy sand, 1 to 6 percent slopes	2.2	3.0%
BrA	Bronson sandy loam, 0 to 2 percent slopes	1.4	2.0%
Ho	Homer sandy loam	34.0	47.6%
KoA	Kosciusko sandy loam, 0 to 2 percent slopes	9.2	12.8%
KoB	Kosciusko sandy loam, 2 to 6 percent slopes	2.3	3.2%
Se	Sebewa loam, drained, 0 to 1 percent slopes	22.4	31.4%
Totals for Area of Interest		**71.5**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Kosciusko County, Indiana

BoB—Boyer loamy sand, 1 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2t6l4
Elevation: 700 to 1,250 feet
Mean annual precipitation: 32 to 40 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 120 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Boyer and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Boyer

Setting

Landform: Moraines, terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Head slope, tread
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loamy outwash and/or sandy outwash over sandy and gravelly outwash

Typical profile

Ap - 0 to 9 inches: loamy sand
E - 9 to 17 inches: loamy sand
Bt - 17 to 30 inches: sandy loam
2C - 30 to 79 inches: stratified coarse sand to gravelly sand to very gravelly sand

Properties and qualities

Slope: 1 to 6 percent
Depth to restrictive feature: 20 to 40 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Ecological site: F098XA014MI - Dry Sandy Drift Plains
Hydric soil rating: No

Minor Components

Oshtemo

Percent of map unit: 9 percent
Landform: Stream terraces, moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Convex, linear
Ecological site: F098XA015MI - Dry Loamy Drift Plains
Hydric soil rating: No

Bronson

Percent of map unit: 6 percent
Landform: Moraines, stream terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F098XA011MI - Moist Loamy Drift Plains
Hydric soil rating: No

BrA—Bronson sandy loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 5dcx
Elevation: 600 to 1,150 feet
Mean annual precipitation: 32 to 42 inches
Mean annual air temperature: 46 to 54 degrees F
Frost-free period: 130 to 185 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Bronson and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bronson

Setting

Landform: Moraines, outwash plains, stream terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy outwash over sandy and gravelly outwash

Typical profile

Ap - 0 to 9 inches: sandy loam
BE - 9 to 17 inches: sandy loam

Bt1 - 17 to 24 inches: sandy loam
Bt2 - 24 to 32 inches: sandy loam
Bt3,Bt4 - 32 to 59 inches: loamy sand
2C - 59 to 70 inches: gravelly coarse sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 45 percent
Available water supply, 0 to 60 inches: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: B
Ecological site: R098XB033IN - Kankakee Moist Drift Flats
Hydric soil rating: No

Minor Components

Ormas

Percent of map unit: 7 percent
Hydric soil rating: No

Gilford

Percent of map unit: 3 percent
Landform: Depressions
Hydric soil rating: Yes

Ho—Homer sandy loam

Map Unit Setting

National map unit symbol: 5ddc
Elevation: 600 to 1,200 feet
Mean annual precipitation: 34 to 40 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 140 to 170 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Homer and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Homer

Setting

Landform: Outwash plains, stream terraces
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy outwash over sandy and gravelly outwash

Typical profile

A - 0 to 16 inches: sandy loam
Bt - 16 to 22 inches: sandy clay loam
2Btg - 22 to 35 inches: gravelly sandy loam
3C - 35 to 80 inches: stratified sand to gravelly loamy coarse sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: 24 to 40 inches to strongly contrasting textural stratification
Drainage class: Somewhat poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 6 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 55 percent
Available water supply, 0 to 60 inches: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Ecological site: F098XA011MI - Moist Loamy Drift Plains
Hydric soil rating: No

Minor Components

Sebewa

Percent of map unit: 5 percent
Landform: Depressions on outwash plains
Landform position (two-dimensional): Footslope, toeslope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Matherton

Percent of map unit: 5 percent
Landform: Outwash plains, outwash terraces
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Brady

Percent of map unit: 5 percent
Landform: Outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

KoA—Kosciusko sandy loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 5ddg
Elevation: 600 to 1,150 feet
Mean annual precipitation: 34 to 40 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 140 to 185 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Kosciusko and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kosciusko

Setting

Landform: Outwash plains, moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy outwash over sandy and gravelly outwash

Typical profile

Ap - 0 to 8 inches: sandy loam
Bt1 - 8 to 13 inches: sandy loam
Bt2 - 13 to 22 inches: gravelly sandy clay loam
Bt3 - 22 to 34 inches: gravelly sandy clay loam
2BC - 34 to 39 inches: gravelly loamy sand
2C - 39 to 60 inches: stratified very gravelly coarse sand to coarse sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 24 to 40 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 45 percent
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: B
Ecological site: R111XC010IN - Well Drained Overflow
Hydric soil rating: No

KoB—Kosciusko sandy loam, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 5ddh
Elevation: 600 to 1,150 feet
Mean annual precipitation: 34 to 40 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 140 to 185 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Kosciusko and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kosciusko

Setting

Landform: Outwash plains, moraines
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy outwash over sandy and gravelly outwash

Typical profile

Ap - 0 to 8 inches: sandy loam
Bt1 - 8 to 13 inches: sandy loam
Bt2 - 13 to 22 inches: gravelly sandy clay loam
Bt3 - 22 to 34 inches: gravelly sandy clay loam
2BC - 34 to 39 inches: gravelly loamy sand
2C - 39 to 60 inches: stratified very gravelly coarse sand to coarse sand

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: 24 to 40 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 45 percent
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R111XC010IN - Well Drained Overflow
Hydric soil rating: No

Se—Sebewa loam, drained, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2v2cb
Elevation: 770 to 950 feet
Mean annual precipitation: 30 to 41 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 140 to 200 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Sebewa, drained, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sebewa, Drained

Setting

Landform: Drainageways, outwash fans
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave, linear
Parent material: Loamy drift over sandy and gravelly outwash

Typical profile

Ap - 0 to 11 inches: loam
Btg1 - 11 to 21 inches: clay loam
Btg2 - 21 to 33 inches: clay loam
2Cg - 33 to 80 inches: sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: 23 to 39 inches to strongly contrasting textural stratification
Drainage class: Poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 1.42 in/hr)

Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 45 percent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Sodium adsorption ratio, maximum: 3.0
Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Ecological site: F098XA012MI - Wet Loamy Depressions
Hydric soil rating: Yes

Minor Components

Rensselaer, drained

Percent of map unit: 10 percent
Landform: Depressions on outwash plains
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Homer

Percent of map unit: 5 percent
Landform: Outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

APPENDIX C

Pavement Core Data Sheet

Project Name:	Proposed Water Main Improvements - Turkey Creek Regional Sewer District			**Coring No.:**	C-1
Location:	Various Roadways and Streets, Syracuese, IN			**Core Diameter (inch):**	4.00
GME Project No.:	G25-123285			**Core Obtained By:**	JS
Latitude:	41.408807	**Longitude:**	-85.663756	**Date Obtained:**	1/12/2026

Core Composition											Comments/Remarks
Core Number	Thickness (inch)	Asphalt				Concrete	Aggregate/Granular Base	Other			
		Lift Number	Surface	Intermediate	Base						
C-1	4 1/8	1			✓						- Below ±4 1/8" of Asphalt Pavement, approximately 4' of clayey sand with gravel was observed

Thickness (inch)

Total Pavement	**Asphalt**	**Concrete**	**Aggregate/Granular Base**
4 1/8	**4 1/8**	**N/A**	**0**

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Pavement Core Data Sheet

Project Name:	Proposed Water Main Improvements - Turkey Creek Regional Sewer District			**Coring No.:**	C-2
Location:	Various Roadways and Streets, Syracuese, IN			**Core Diameter (inch):**	4.00
GME Project No.:	G25-123285			**Core Obtained By:**	JS
Latitude:	41.407877	**Longitude:**	-85.660964	**Date Obtained:**	1/12/2026

Core Composition											Comments/Remarks
Core Number	Thickness (inch)	Asphalt				Concrete	Aggregate/Granular Base	Other			
		Lift Number	Surface	Intermediate	Base						
C-2	1 7/8	1			✓						- Below ±1 7/8" of Asphalt Pavement, approximately 4" of gravel was observed

Thickness (inch)

Total Pavement	**Asphalt**	**Concrete**	**Aggregate/Granular Base**
1 7/8	**1 7/8**	**N/A**	**0**

Pavement Core Data Sheet

Project Name:	Proposed Water Main Improvements - Turkey Creek Regional Sewer District			**Coring No.:**	C-3
Location:	Various Roadways and Streets, Syracuese, IN			**Core Diameter (inch):**	4.00
GME Project No.:	G25-123285			**Core Obtained By:**	JS
Latitude:	41.635172	**Longitude:**	-85.200321	**Date Obtained:**	1/12/2026

Core Composition											Comments/Remarks
		Asphalt						Other			
Core Number	Thickness (inch)	Lift Number	Surface	Intermediate	Base	Concrete	Aggregate/Granular Base				
C-3	1 3/8	2			✓						- Below ±3 7/8" of Asphalt Pavement, ±3" of gravel was observed - Pavement Core was Observed to be Segmented
	2 1/2	1			✓						

Thickness (inch)

Total Pavement	Asphalt	Concrete	Aggregate/Granular Base
3 7/8	3 7/8	N/A	0

Pavement Core Data Sheet

Project Name:	Proposed Water Main Improvements - Turkey Creek Regional Sewer District	**Coring No.:**	C-4
Location:	Various Roadways and Streets, Syracuese, IN	**Core Diameter (inch):**	4.00
GME Project No.:	G25-123285	**Core Obtained By:**	JS
Latitude:	41.635081 **Longitude:** -85.200165	**Date Obtained:**	1/12/2026

Core Composition											Comments/Remarks
		Asphalt						Other			
Core Number	Thickness (inch)	Lift Number	Surface	Intermediate	Base	Concrete	Aggregate/Granular Base				
C-4	7/8	1			✓						- Below ±7/8" of Asphalt Pavement, ±4" of gravel was observed

Thickness (inch)

Total Pavement	**Asphalt**	**Concrete**	**Aggregate/Granular Base**
7/8	**7/8**	**N/A**	**0**