

**PROJECT MANUAL**

**FOR**

**WAYNE TOWNSHIP SANITARY SEWER  
INTERCEPTOR – PHASE I**

FOR THE

HAMILTON SOUTHEASTERN UTILITIES, INC.

WESSLER ENGINEERING, INC.  
INDIANAPOLIS, INDIANA

January 2023



**PROJECT MANUAL  
FOR  
WAYNE TOWNSHIP SANITARY SEWER  
INTERCEPTOR – PHASE I**

FOR THE

HAMILTON SOUTHEASTERN UTILITIES, INC.

WESSLER ENGINEERING, INC.  
INDIANAPOLIS, INDIANA

Certified By:



A handwritten signature in black ink, appearing to read "Kathryn Rose Castro Jackson", written over a horizontal line.

Kathryn Rose Castro Jackson  
Professional Engineer No. 11900860

January 2023





## **TABLE OF CONTENTS**

### **A. CONTRACTUAL-LEGAL REQUIREMENTS**

#### **General Documents**

00102 – Title Page	1 Page
00110 – Table of Contents	2 Pages

#### **Bidding Forms**

00240 – Bid Attachment	7 Pages
00250 – Bid Bond	2 Pages
00260 – Drug Testing Plan Certification	1 Page

#### **Contracting Forms**

00310 – Notice of Award	1 Page
00320 – Performance Bond	3 Pages
00330 – Payment Bond	3 Pages
00340 – Maintenance Bond	2 Pages
00350 – Agreement (Sample Form)	7 Pages
00360 – E-Verify Affidavit	1 Page
00380 – Notice to Proceed	1 Page

#### **Construction Forms**

00410 – Field Transmittal Memorandum	1 Page
00420 – Change Order	1 Page
00430 – Certificate of Substantial Completion	1 Page

#### **Conditions of the Contract Forms**

00530 – Exhibit "A" – Duties, Responsibilities and Limitations of Authority of Resident Project Representative	5 Pages
--	---------

B. TECHNICAL SECTIONS OF THE SPECIFICATIONS

Section 00 – General Requirements	17 Pages
Section 01 – Pay Items Sanitary Sewers	5 Pages
Section 02 – Manholes, Piping, Valves Fittings	15 Pages
Section 03 – Stormwater Pollution Prevention and Erosion Control	14 Pages
Section 04 – Material Handling and Spill Prevention Plan	9 Pages
Section 05 – Slide Gates	6 Pages

C. Appendix A – Geotechnical Evaluation

Boden Road Borings	5 Pages
American Drilling Services Boden Logs	1 Pages
Noblesville Geotechnical Report	53 Pages
Noblesville Sanitary Geotechnical Report	45 Pages

Appendix B - Permits

IDEM Regional General Permit (RGP)	4 Pages
IDEM Water Quality Certification (QQC)	8 Pages
IDEM Construction General Permit (CSGP) – Pending Approval	
Hamilton County Surveyor's Office Legal Drain Crossing Requests – Pending Approval	
Stormwater Pollution Prevention Plan – Pending Approval	

-END-

## BID ATTACHMENT

### ARTICLE 1 – BID RECIPIENT

- 1.01 This Bid of \_\_\_\_\_ (Bidder) is submitted to Hamilton Southeastern Utilities, Inc. (HSEU) (Owner) for construction of Wayne Township Sanitary Sewer Interceptor – Phase 1 (Inclusive of Parts A and B)
- 1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

### ARTICLE 2 - BIDDER'S ACKNOWLEDGEMENTS

- 2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

### ARTICLE 3 - BIDDER'S REPRESENTATIONS

- 3.01 In submitting this Bid, Bidder represents that:

- A. Bidder has examined and carefully studied the Bidding Documents, and any data and reference items identified in the Bidding Documents, and hereby acknowledges receipt of the following Addenda:

<u>Addendum No.</u>	<u>Addendum, Date</u>
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

- B. Bidder has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfied itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
- C. Bidder is familiar with and has satisfied itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work.
- D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to

existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.

- E. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and any Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder's safety precautions and programs.
- F. Bidder agrees, based on the information and observations referred to in the preceding paragraph, that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.
- G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
- H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents and confirms that the written resolution thereof by Engineer is acceptable to Bidder.
- I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work.
- J. The submission of this Bid constitutes an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, and that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

#### **ARTICLE 4 - BIDDER'S CERTIFICATION**

##### **4.01 Bidder certifies that:**

- A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;
- B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;

- C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and
- D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:
1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process;
  2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
  3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and
  4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

## ARTICLE 5 - BASIS OF BID

- 5.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

### UNIT PRICE BASE BID – PART A

Item No.	Description	Unit	Estimated Quantity	Bid Unit Price	Bid Price
1	27" SS PVC (14'-15.9' depth)	LFT	479	\$ _____	\$ _____
2	27" SS PVC (16'-17.9' depth)	LFT	21	\$ _____	\$ _____
3	27" SS PVC (18'-19.9' depth)	LFT	400	\$ _____	\$ _____
4	27" SS PVC (20'-21.9' depth)	LFT	1086	\$ _____	\$ _____
5	27" SS PVC (22'- 23.9' depth)	LFT	516	\$ _____	\$ _____
6	27" SS PVC (24'- 25.9' depth)	LFT	527	\$ _____	\$ _____
7	27" SS PVC (26'-27.9' depth)	LFT	646	\$ _____	\$ _____
8	27" SS PVC (28'-29.9' depth)	LFT	0	\$ _____	\$ _____
9	Manhole, 60" dia. (12'-13.9' depth)	EACH	1	\$ _____	\$ _____
10	Manhole, 60" dia. (14'-15.9' depth)	EACH	1	\$ _____	\$ _____
11	Manhole, 60" dia. (16'-17.9' depth)	EACH	1	\$ _____	\$ _____
12	Manhole, 60" dia. (18'-19.9' depth)	EACH	2	\$ _____	\$ _____
13	Manhole, 60" dia. (20'-21.9' depth)	EACH	1	\$ _____	\$ _____
14	Manhole, 60" dia. (22'- 23.9' depth)	EACH	2	\$ _____	\$ _____
15	Manhole, 60" dia. (24'- 25.9' depth)	EACH	3	\$ _____	\$ _____
16	Manhole, 60" dia. (26'-27.9' depth)	EACH	1	\$ _____	\$ _____
17	Manhole, 60" dia. (28'-29.9' depth)	EACH	0	\$ _____	\$ _____
18	Outside Drop Manhole, 60" dia.	EACH	1	\$ _____	\$ _____
19	Steel Casing Pipe w/Carrier Pipe (Jack and Bore)	LFT	184	\$ _____	\$ _____
20	Junction Structure A0	LSUM	1	\$ _____	\$ _____

Item No.	Description	Unit	Estimated Quantity	Bid Unit Price	Bid Price
21	Over-Excavation of Poor Soils w/Granular Backfill (undistributed)	CYS	560	\$ _____	\$ _____
22	Erosion and Sediment Control	LSUM	1	\$ _____	\$ _____
23	Final Clean-Up and Restoration	LSUM	1	\$ _____	\$ _____
24	Maintenance of Traffic	LSUM	1	\$ _____	\$ _____
25	Mobilization, Demobilization, Bonds and Insurance	LSUM	1	\$ _____	\$ _____

### **TOTAL UNIT PRICE BASE BID – PART A**

Total Unit Price Base Bid (in figures) \$ \_\_\_\_\_

Total Unit Price Base Bid (in words) \_\_\_\_\_

\_\_\_\_\_ Dollars

### **UNIT PRICE BASE BID – PARTS A and B**

Item No.	Description	Unit	Estimated Quantity	Bid Unit Price	Bid Price
1	27" SS PVC (14'-15.9' depth)	LFT	479	\$ _____	\$ _____
2	27" SS PVC (16'-17.9' depth)	LFT	21	\$ _____	\$ _____
3	27" SS PVC (18'-19.9' depth)	LFT	400	\$ _____	\$ _____
4	27" SS PVC (20'-21.9' depth)	LFT	1,086	\$ _____	\$ _____
5	27" SS PVC (22'- 23.9' depth)	LFT	4,575	\$ _____	\$ _____
6	27" SS PVC (24'- 25.9' depth)	LFT	1,002	\$ _____	\$ _____
7	27" SS PVC (26'-27.9' depth)	LFT	646	\$ _____	\$ _____
8	27" SS PVC (28'-29.9' depth)	LFT	1,082	\$ _____	\$ _____
9	Manhole, 60" dia. (12'-13.9' depth)	EACH	1	\$ _____	\$ _____
10	Manhole, 60" dia. (14'-15.9' depth)	EACH	1	\$ _____	\$ _____
11	Manhole, 60" dia. (16'-17.9' depth)	EACH	1	\$ _____	\$ _____
12	Manhole, 60" dia. (18'-19.9' depth)	EACH	2	\$ _____	\$ _____
13	Manhole, 60" dia. (20'-21.9' depth)	EACH	2	\$ _____	\$ _____
14	Manhole, 60" dia. (22'- 23.9' depth)	EACH	9	\$ _____	\$ _____
15	Manhole, 60" dia. (24'- 25.9' depth)	EACH	5	\$ _____	\$ _____
16	Manhole, 60" dia. (26'-27.9' depth)	EACH	3	\$ _____	\$ _____
17	Manhole, 60" dia. (28'-29.9' depth)	EACH	1	\$ _____	\$ _____
18	Outside Drop Manhole, 60" dia.	EACH	1	\$ _____	\$ _____
19	Steel Casing Pipe w/Carrier Pipe (Jack and Bore)	LFT	184	\$ _____	\$ _____
20	Junction Structure A0	LSUM	1	\$ _____	\$ _____
21	Over-Excavation of Poor Soils w/Granular Backfill (undistributed)	CYS	1,400	\$ _____	\$ _____

Item No.	Description	Unit	Estimated Quantity	Bid Unit Price	Bid Price
22	Erosion and Sediment Control	LSUM	1	\$ _____	\$ _____
23	Final Clean-Up and Restoration	LSUM	1	\$ _____	\$ _____
24	Maintenance of Traffic	LSUM	1	\$ _____	\$ _____
25	Mobilization, Demobilization, Bonds and Insurance	LSUM	1	\$ _____	\$ _____

### **TOTAL UNIT PRICE BASE BID – PARTS A and B**

Total Unit Price Base Bid (in figures) \$ \_\_\_\_\_

Total Unit Price Base Bid (in words) \_\_\_\_\_

\_\_\_\_\_ Dollars

Bidder acknowledges that 1) each Bid Unit Price includes an amount considered by Bidder to be adequate to cover Contractor's overhead and profit for each separately identified item, and 2) estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all unit price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

All other Work, shown and specified but not described under the unit price items herein, necessary for a complete project shall be considered incidental. The cost for that incidental Work shall be included in the cost of lump sum and unit price items herein.

### **ARTICLE 6 - TIME OF COMPLETION**

6.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with General Requirements on or before the dates or within the number of calendar days indicated in the "Sample Form" Agreement.

6.02 Bidder accepts the provisions of the "Sample Form" Agreement as to liquidated damages.

### **ARTICLE 7 - ATTACHMENTS TO THIS BID**

7.01 With each copy of the Bidding Documents, a Bidder is furnished one separate unbound copy of the Bid Attachment, and if requested by Bidder, the Bid Bond Form. The unbound copy of the Bid Attachment is to be completed, signed, and submitted with the following:

A. Bid Form (Indiana State Board of Accounts Form 96)

- B. Bid Bond, bank money order, or certified check payable to the Owner in the amount of not less than 5% of the Total Bid Price, or the properly completed and signed Bid Bond form.
- C. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such license prior to Notice-to-Proceed;
- D. Financial Statement
- E. Employee Drug Testing Plan mandated by IC 5-16-13-11 and that complies with IC 4-13-18.
- F. Drug Testing Plan Certification form

## **ARTICLE 8 - DEFINED TERMS**

- 8.01 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.



## ARTICLE 9 - BID SUBMITTAL

BIDDER: *[Indicate correct name of bidding entity]*

By:

*[Signature]* \_\_\_\_\_

*[Printed name]* \_\_\_\_\_

*(If Bidder is a corporation, a limited liability company, a partnership, or a joint venture, attach evidence of authority to sign.)*

Attest:

*[Signature]* \_\_\_\_\_

*[Printed name]* \_\_\_\_\_

Title: \_\_\_\_\_

Submittal Date: \_\_\_\_\_

Address for giving notices:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Telephone Number: \_\_\_\_\_

Fax Number: \_\_\_\_\_

Contact Name and E-Mail Address: \_\_\_\_\_

\_\_\_\_\_

Bidder's License No: \_\_\_\_\_



## BID BOND

Any singular reference to Bidder, Surety, Owner or other party shall be considered plural where applicable.

BIDDER (*Name and Address*):

SURETY (*Name, and Address of Principal Place of Business*):

OWNER (*Name and Address*):

### BID

Bid Due Date:

Description (*Project Name— Include Location*):

### BOND

Bond Number:

Date:

Penal sum \_\_\_\_\_ \$ \_\_\_\_\_  
(Words) (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.

#### BIDDER

#### SURETY

\_\_\_\_\_  
Bidder's Name and Corporate Seal

(Seal)

\_\_\_\_\_  
Surety's Name and Corporate Seal

(Seal)

By: \_\_\_\_\_  
Signature

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Title

Attest: \_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

By: \_\_\_\_\_  
Signature (Attach Power of Attorney)

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Title

Attest: \_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

*Note: Addresses are to be used for giving any required notice.*

*Provide execution by any additional parties, such as joint venturers, if necessary.*

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond shall be Owner's sole and exclusive remedy upon default of Bidder.
2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.
3. This obligation shall be null and void if:
  - 3.1 Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
  - 3.2 All Bids are rejected by Owner, or
  - 3.3 Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from the Bid due date without Surety's written consent.
6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after the Bid due date.
7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

## DRUG TESTING PLAN CERTIFICATION

I, \_\_\_\_\_, the duly authorized representative of  
(name of representative)

\_\_\_\_\_, certify under penalty of perjury that the  
(name of firm)

Employee Drug Testing Plan submitted with this Bid complies with the requirements set forth in  
IC 4-13-18.

NAME OF FIRM

By: \_\_\_\_\_

Printed Name: \_\_\_\_\_

Title: \_\_\_\_\_

STATE OF \_\_\_\_\_ )  
COUNTY OF \_\_\_\_\_ ) SS:

Before me, a Notary Public for said County and State personally appeared \_\_\_\_\_  
\_\_\_\_\_, who acknowledged the truth of the statements in the  
foregoing affidavit on this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

\_\_\_\_\_, Notary Public  
Resident of \_\_\_\_\_ County

My Commission Expires:

\_\_\_\_\_

DRUG TESTING PLAN CERTIFICATION

00260-1



---

## NOTICE OF AWARD

---

Date of Issuance:

Owner:

Owner's Contract No.:

Engineer:

Engineer's Project No.:

Project:

Contract Name:

Bidder:

Bidder's Address:

### TO BIDDER:

You are notified that Owner has accepted your Bid dated [ ] for the above Contract, and that you are the Successful Bidder and are awarded a Contract for:

\_\_\_\_\_  
*[describe Work, alternates, or sections of Work awarded]*

The Contract Price of the awarded Contract is: \$ [ ] *[note if subject to unit prices, or cost-plus]*

[ ] unexecuted counterparts of the Agreement accompany this Notice of Award, and one copy of the Contract Documents accompanies this Notice of Award, or has been transmitted or made available to Bidder electronically. *[revise if multiple copies accompany the Notice of Award]*

☐ a set of the Drawings will be delivered separately from the other Contract Documents.

You must comply with the following conditions precedent within 15 days of the date of receipt of this Notice of Award:

1. Deliver to Owner [ ] counterparts of the Agreement, fully executed by Bidder.
2. Deliver with the executed Agreement(s) the Contract security *[e.g., performance and payment bonds]* and insurance documentation as specified in the Instructions to Bidders, Article 20, and General Conditions, Articles 2 and 6.
3. Other conditions precedent (as applicable):
  - a. Enroll in and verify the work eligibility status of all its newly hired employees through the E-Verify Program. Submit completed E-Verify Affidavit form to Owner.
  - b. Submit E-Verify case verification numbers for each individual required to be verified under IC 22-5-1.7 that will be working on this project.
  - c. Submit completed Indiana Iran Investment Certification to Owner.

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award, and declare your Bid security forfeited.

Within ten days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Agreement, together with any additional copies of the Contract Documents as indicated in Paragraph 2.02 of the General Conditions.

---

Owner:

Authorized Signature

By:

Title:

Copy: Engineer





## PERFORMANCE BOND

CONTRACTOR *(name and address):*

SURETY *(name and address of principal place of business):*

OWNER *(name and address):*

### CONSTRUCTION CONTRACT

Effective Date of the Agreement:

Amount:

Description *(name and location):*

### BOND

Bond Number:

Date *(not earlier than the Effective Date of the Agreement of the Construction Contract):*

Amount:

Modifications to this Bond Form: ☐ None ☐ See Paragraph 16

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

### CONTRACTOR AS PRINCIPAL

### SURETY

\_\_\_\_\_  
Contractor's Name and Corporate Seal

\_\_\_\_\_  
Surety's Name and Corporate Seal

By: \_\_\_\_\_  
Signature

By: \_\_\_\_\_  
Signature *(attach power of attorney)*

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

Attest: \_\_\_\_\_  
Signature

Attest: \_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

**Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.**

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after:

3.1 The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

3.2 The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

3.3 The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract,

arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:

7.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

7.2 additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and

7.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.

9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced

or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.

10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

11. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

#### 14. Definitions

14.1 Balance of the Contract Price: The total amount payable by the Owner to the Contractor under the Construction

Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

14.2 Construction Contract: The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

14.3 Contractor Default: Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

14.4 Owner Default: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

14.5 Contract Documents: All the documents that comprise the agreement between the Owner and Contractor.

15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

16. Modifications to this Bond are as follows:



## PAYMENT BOND

CONTRACTOR *(name and address)*:

SURETY *(name and address of principal place of business)*:

OWNER *(name and address)*:

### CONSTRUCTION CONTRACT

Effective Date of the Agreement:

Amount:

Description *(name and location)*:

### BOND

Bond Number:

Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:

Amount:

Modifications to this Bond Form: ☐ None ☐ See Paragraph 18

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

### CONTRACTOR AS PRINCIPAL

### SURETY

\_\_\_\_\_  
*(seal)*

Contractor's Name and Corporate Seal

By: \_\_\_\_\_

Signature

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Title

Attest: \_\_\_\_\_

Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
*(seal)*

Surety's Name and Corporate Seal

By: \_\_\_\_\_

Signature *(attach power of attorney)*

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Title

Attest: \_\_\_\_\_

Signature

\_\_\_\_\_  
Title

*Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.*

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.
2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.
4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.
5. The Surety's obligations to a Claimant under this Bond shall arise after the following:
  - 5.1 Claimants who do not have a direct contract with the Contractor,
    - 5.1.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
    - 5.1.2 have sent a Claim to the Surety (at the address described in Paragraph 13).
  - 5.2 Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).
6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.
7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:
  - 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and
  - 7.2 Pay or arrange for payment of any undisputed amounts.
  - 7.3 The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.
8. The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.
9. Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.
10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.

11. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.
12. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.
13. Notice and Claims to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.
14. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.
15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.
16. **Definitions**
  - 16.1 **Claim:** A written statement by the Claimant including at a minimum:
    1. The name of the Claimant;
    2. The name of the person for whom the labor was done, or materials or equipment furnished;
    3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
    4. A brief description of the labor, materials, or equipment furnished;
    5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
  - 16.2 **Claimant:** An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.
  - 16.3 **Construction Contract:** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.
  - 16.4 **Owner Default:** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.
  - 16.5 **Contract Documents:** All the documents that comprise the agreement between the Owner and Contractor.
17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.
18. Modifications to this Bond are as follows:
6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
7. The total amount of previous payments received by the Claimant; and
8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.





MAINTENANCE BOND  
HAMILTON SOUTHEASTERN UTILITIES, INC.

Instructions:

Successful Bidder must use this form or other form containing the same material conditions and provisions as approved in advance by Engineer.

Date of Bond must not be prior to date of Contract. If Contractor is a Partnership, all partners should execute bond.

Surety company executing this bond shall appear on the most current list of "Surety Companies Acceptable on Federal Bonds," as specified in the U.S. Treasury Department Circular 570, as amended, and be authorized to transact business in the State of Indiana.

KNOW ALL MEN BY THESE PRESENTS: that

"Contractor" \_\_\_\_\_

and

"Surety": [name] \_\_\_\_\_  
[address] \_\_\_\_\_

a corporation chartered and existing under the laws of the State of \_\_\_\_\_, and authorized to do business in the State of Indiana,

are held and firmly bound unto Hamilton Southeastern Utilities, Inc. hereinafter called OWNER, in the penal sum of \_\_\_\_\_ Dollars, (\$\_\_\_\_\_) in lawful money of the United States, for the payment of which sum well and truly to be made, together with interest at the maximum legal rate from date of demand and any attorney fees and court costs incurred by Obligee to enforce this instrument, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Contractor has entered into a certain Agreement with the OWNER, dated as of the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, by which Contractor has agreed to perform and furnish certain work for or in furtherance of construction of public improvements described generally as \_\_\_\_\_, which Agreement, and the "Contract Documents" as referred to therein, are hereby incorporated herein by reference;

WHEREAS, the Contractor has installed and completed and met all improvements, installations and requirements applicable to the above described work, but said improvements and installations have not yet been accepted for public maintenance; and

WHEREAS, the Owner requires a guarantee from the Contractor against defective materials and workmanship in connection with such maintenances.

NOW, THEREFORE, Contractor warrants the workmanship and all materials used in the construction, installation and completion of said Work, to be of good quality and completed in a workmanlike manner in accordance with the Agreement and Contract Documents and all laws, ordinances, rules, standards and regulations applicable to said Work;

FURTHERMORE, the conditions of the Surety's obligation hereunder are such that if Contractor at his own expense, for a period of three years after said Work, improvements and installations are accepted for public maintenance by the Owner, shall make all repairs or replacements thereto which may become necessary by reason of improper or defective workmanship or materials, or any failure thereof to conform to the provisions of the Agreement or Contract Documents, then Surety's obligation is to be null and void; otherwise such obligation shall remain in full force and effect. Any repairs or replacements made under this Bond shall in like manner be subject to the terms and conditions hereof.

Contractor and Surety covenant that all action required by law to be taken by them to authorize the execution and delivery of this bond have been previously been taken, that the officers whose signatures appear below have been fully empowered to execute and deliver this instrument and that once executed and delivered, it shall represent the lawful and binding obligation of the parties.

IN WITNESS WHEREOF, this instrument is executed in duplicate counterparts, each one of which shall be deemed an original, this the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

CONTRACTOR:\_\_\_\_\_

By:\_\_\_\_\_ [signature] \_\_\_\_\_ [printed name]

ATTEST:

\_\_\_\_\_, Secretary  
[signature]

SURETY:\_\_\_\_\_

By:\_\_\_\_\_, Attorney-in-Fact  
[signature]

\_\_\_\_\_ [printed name] \_\_\_\_\_ [address]

\_\_\_\_\_

**"SAMPLE FORM"**

**AGREEMENT**

THIS AGREEMENT is dated this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, by  
and between \_\_\_\_\_ ("Owner") and \_\_\_\_\_  
\_\_\_\_\_ ("Contractor").

Owner and Contractor, in consideration of the mutual covenants hereinafter set forth, agree as follows:  
owner

**ARTICLE 1 – WORK**

- 1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

**WAYNE TOWNSHIP SANITARY SEWER INTERCEPTOR – PHASE I**

**ARTICLE 2 – ENGINEER**

- 2.01 The Project has been designed by Wessler Engineering, Inc. The Owner has retained the following firms to act as Owner's representative, assume all duties and responsibilities of Engineer, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

Engineer (Design): Wessler Engineering, Inc.

Engineer (Construction): Wessler Engineering, Inc.

Resident Project Representative: SAMCO, Inc.

**ARTICLE 3 – CONTRACT TIMES**

- 3.01 All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.
- 3.02 The Work, should Parts A and B be performed in continuum, will be substantially completed within 270 days after the date when the Contract Times commence to run, and completed and ready for final payment in accordance with the General Requirements within 360 days after the date when the Contract Times commence to run. Material supply shortages or delays identified prior to construction can be considered for revisions or extensions to the contract dates stated above.

### 3.03 Liquidated Damages

- A. Contractor and Owner recognize that time is of the essence of this Agreement and that Owner will suffer financial and other losses if the Work is not completed within the times specified in Paragraph 3.02 above, plus any extensions thereof allowed in accordance with the Contract Documents. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), the Owner, in the form of a Change Order, shall deduct from the monies due the Contractor \$1,400.00 for each calendar day that expires after the time specified in Paragraph 3.02 for Substantial Completion until the Work is substantially complete. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, the Owner, in the form of a Change Order, shall deduct from the monies due the Contractor \$1,400.00 for each day that expires after the time specified in Paragraph 3.02 for completion and readiness for final payment until the Work is completed and ready for final payment.

## ARTICLE 4 – CONTRACT PRICE

- 4.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds as follows:

_____	(\$ _____)
(words)	(figure)

For all Work, at the prices stated in Contractor's Bid, assuming Parts A and B completed in continuum.

The Bid prices for Unit Price Work set forth as of the Effective Date of the Agreement are based on estimated quantities. Estimated quantities are not guaranteed, and Engineer will determinate the actual quantities and classifications of Unit Price Work performed by the Contractor.

## ARTICLE 5 – PAYMENT PROCEDURES

- 5.01 Submittal and Processing of Payments

- A. Contractor shall submit Applications for Payment in accordance with Part 2 of the General Requirements. Applications for Payment will be processed by Engineer as provided in the General Requirements.

- 5.02 Progress Payments; Retainage

- A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment as recommended by Engineer on a monthly basis during performance of the Work as provided in Paragraph 5.02.A.1 below. All such payments will be measured by the schedule of values established as provided in the

General Requirements (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided elsewhere in the Contract Documents.

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract Documents.
  2. The Owner shall withhold five percent (5%) of the dollar value for all Work for the project. The retainage to be withheld will be either five percent (5%) of all Work satisfactorily completed until. When the Work is substantially complete (operational or beneficial occupancy), the retained amount may be reduced below five percent (5%) to only that amount necessary to assure completion. On completion and acceptance on a part of the Work on which the price is stated separately in the Contract Documents, payment may be made in full, including retained percentages, less authorized deductions.
- B. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to one hundred percent (100%) of the Work completed, less such amounts set off by Owner, and less two hundred percent (200%) of Engineer's estimate of the value of Work to be completed or corrected as shown on the punch list of items to be completed or corrected prior to final payment.

#### 5.03 Final Payment

- A. Upon final completion and acceptance of the Work in accordance with the General Requirements, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph.

### ARTICLE 6 – CONTRACTOR'S REPRESENTATIONS

6.01 In order to induce Owner to enter into this Contract, Contractor makes the following representations:

- A. Contractor has examined and carefully studied the Contract Documents and any data and reference items identified in the Contract Documents.
- B. Contractor has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
- C. Contractor is familiar with and is satisfied as to all Laws and Regulations that may affect cost, progress, and performance of the Work.
- D. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site, especially with respect to Technical Data in such reports and drawings.

- E. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (3) Contractor's safety precautions and programs.
- F. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.
- G. Contractor is aware of the general nature of Work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
- H. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
- I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
- J. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

## **ARTICLE 7 – CONTRACT DOCUMENTS**

### **7.01 Contents**

- A. The Contract Documents consist of the following:
  - 1. Contractor's Bid
  - 2. Bid Bond
  - 3. Drug Testing Plan Certification
  - 4. Agreement
  - 5. E-Verify Affidavit
  - 6. Performance Bond
  - 7. Payment Bond
  - 8. Maintenance Bond

9. General Requirements

10. Specifications as contained in Project Manual dated January 2023.

11. Drawings consisting of 20 sheets dated January 2023.

12. Addenda

a. No. \_\_\_\_\_ dated \_\_\_\_\_

b. No. \_\_\_\_\_ dated \_\_\_\_\_

c. No. \_\_\_\_\_ dated \_\_\_\_\_

d. No. \_\_\_\_\_ dated \_\_\_\_\_

13. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:

a. Notice to Proceed

b. Change Order(s).

c. Certificate of Substantial Completion

B. There are no Contract Documents other than those listed above in this Article 7.

C. The Contract Documents may only be amended, modified, or supplemented as provided in the General Requirements.

## **ARTICLE 8 – MISCELLANEOUS**

### **8.01 Terms**

A. Terms used in this Agreement will have the meanings stated in the General Requirements.

### **8.02 Assignment of Contract**

A. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, money that may become due and money that is due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

### **8.03 Successors and Assigns**

A. Owner and Contractor each binds itself, its successors, assigns, and legal representatives to the other party hereto, its successors, assigns, and legal

representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

#### 8.04 Severability

- A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

#### 8.05 Contractor's Certifications

- A. Contractor certifies that is has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 8.05:
  - 1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process or in the Contract execution;
  - 2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
  - 3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and
  - 4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.



IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement. This Agreement may be executed in counterparts, each of which shall be deemed to be an original, and all such counterparts together shall constitute one and the same Agreement. An electronic, telecopied, or facsimile signature shall be equivalent to and as binding as an original signature.

This Agreement will be effective on \_\_\_\_\_ (which is the Effective Date of the Agreement).

OWNER:

CONTRACTOR:

By: \_\_\_\_\_

By: \_\_\_\_\_

Title: \_\_\_\_\_

Title: \_\_\_\_\_

[CORPORATE SEAL]

[CORPORATE SEAL]

Attest: \_\_\_\_\_

Attest: \_\_\_\_\_

Title: \_\_\_\_\_

Title: \_\_\_\_\_

Address for giving notices:

Address for giving notices:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

License No.:

\_\_\_\_\_  
(Where applicable)

(If Contractor is a corporation or a partnership or a joint venture, attach evidence of authority to sign.)



**E-Verify Affidavit**

Pursuant to Indiana Code 22-5-1.7-11, the Contractor entering into a contract with the Owner is required to enroll in and verify the work eligibility status of all its newly hired employees through the E-Verify program. The Contractor is not required to verify the work eligibility status of all its newly hired employees through the E-Verify program if the E-Verify program no longer exists.

The undersigned, on behalf of the Contractor, being first duly sworn, deposes and states that the Contractor does not knowingly employ an unauthorized alien. The undersigned further affirms that, prior to entering into its contract with the Owner, the undersigned Contractor will enroll in and agrees to verify the work eligibility status of all its new hired employees through the E-Verify program.

(Contractor)\_\_\_\_\_

By (Written Signature)\_\_\_\_\_

(Printed Name)\_\_\_\_\_

(Title)\_\_\_\_\_

*Important – Notary Signature and Seal Required in the Space Below*

STATE OF \_\_\_\_\_

SS:

COUNTY OF \_\_\_\_\_

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_,  
20\_\_\_\_.

My commission expires: \_\_\_\_\_ (Signed)\_\_\_\_\_

Residing in \_\_\_\_\_ County, State of \_\_\_\_\_



---

**NOTICE TO PROCEED**

---

Owner:	Owner's Contract No.:
Contractor:	Contractor's Project No.:
Engineer:	Engineer's Project No.:
Project:	Contract Name:
	Effective Date of Contract:

---

**TO CONTRACTOR:**

Owner hereby notifies Contractor that the Contract Times under the above Contract will commence to run on [ ], 20[ ]. *[see Paragraph 4.01 of the General Conditions]*

On that date, Contractor shall start performing its obligations under the Contract Documents. No Work shall be done at the Site prior to such date. In accordance with the Agreement, [the date of Substantial Completion is \_\_\_\_\_, and the date of readiness for final payment is \_\_\_\_\_] **or** [the number of days to achieve Substantial Completion is \_\_\_\_\_, and the number of days to achieve readiness for final payment is \_\_\_\_\_].

Before starting any Work at the Site, Contractor must comply with the following:  
*[Note any access limitations, security procedures, or other restrictions]*

---

Owner:

Authorized Signature

By:

Title:

Date Issued:

Copy: Engineer



WESSLER ENGINEERING, INC.  
WAYNE TOWNSHIP SANITARY SEWER INTERCEPTOR - PHASE I  
FIELD TRANSMITTAL MEMORANDUM

CONTRACTOR

MONTH	DAY	YEAR

**SUBJECT:**

**REFERENCE:**

---

---

cc: Owner  
SAMCO RPR

Wessler Project Manager  
Wessler File

WESSLER ENGINEERING, INC.

By
Name: Title:





Change Order No. \_\_\_\_\_

Date of Issuance:

Effective Date:

Owner:

Owner's Contract No.:

Contractor:

Contractor's Project No.:

Engineer:

Engineer's Project No.:

Project:

Contract Name:

The Contract is modified as follows upon execution of this Change Order:

Description:

Attachments: *[List documents supporting change]*

CHANGE IN CONTRACT PRICE	CHANGE IN CONTRACT TIMES <i>[note changes in Milestones if applicable]</i>
Original Contract Price: \$ _____	Original Contract Times: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
[Increase] [Decrease] from previously approved Change Orders No. ____ to No. ____: \$ _____	[Increase] [Decrease] from previously approved Change Orders No. ____ to No. ____: Substantial Completion: _____ Ready for Final Payment: _____ days
Contract Price prior to this Change Order: \$ _____	Contract Times prior to this Change Order: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
[Increase] [Decrease] of this Change Order: \$ _____	[Increase] [Decrease] of this Change Order: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
Contract Price incorporating this Change Order: \$ _____	Contract Times with all approved Change Orders: Substantial Completion: _____ Ready for Final Payment: _____ days or dates

RECOMMENDED:	ACCEPTED:	ACCEPTED:
By: _____ Engineer (if required)	By: _____ Owner (Authorized Signature)	By: _____ Contractor (Authorized Signature)
Title: _____	Title: _____	Title: _____
Date: _____	Date: _____	Date: _____

Approved by Funding Agency (if applicable)

By: \_\_\_\_\_ Date: \_\_\_\_\_  
Title: \_\_\_\_\_



## CERTIFICATE OF SUBSTANTIAL COMPLETION

Owner: Contractor: Engineer: Project:	Owner's Contract No.: Contractor's Project No.: Engineer's Project No.: Contract Name:
--	---

**This [preliminary] [final] Certificate of Substantial Completion applies to:**

☐ All Work
 ☐ The following specified portions of the Work:

### Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Work or portion thereof designated above is hereby established, subject to the provisions of the Contract pertaining to Substantial Completion. The date of Substantial Completion in the final Certificate of Substantial Completion marks the commencement of the contractual correction period and applicable warranties required by the Contract.

A punch list of items to be completed or corrected is attached to this Certificate. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance, and warranties upon Owner's use or occupancy of the Work shall be as provided in the Contract, except as amended as follows: *[Note: Amendments of contractual responsibilities recorded in this Certificate should be the product of mutual agreement of Owner and Contractor; see Paragraph 15.03.D of the General Conditions.]*

Amendments to Owner's responsibilities: ☐ None  
☐ As follows

Amendments to Contractor's responsibilities: ☐ None  
☐ As follows:

The following documents are attached to and made a part of this Certificate: *[punch list; others]*

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents, nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract.

EXECUTED BY ENGINEER:	RECEIVED:	RECEIVED:
By: _____ (Authorized signature)	By: _____ Owner (Authorized Signature)	By: _____ Contractor (Authorized Signature)
Title: _____	Title: _____	Title: _____
Date: _____	Date: _____	Date: _____



# EXHIBIT "A"

## DUTIES, RESPONSIBILITIES AND LIMITATIONS OF AUTHORITY OF RESIDENT PROJECT REPRESENTATIVE

*Prepared by*

ENGINEERS' JOINT CONTRACT DOCUMENTS COMMITTEE

and

*Issued and Published Jointly by*

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE  
*A practice division of the*  
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

*and by*

AMERICAN CONSULTING ENGINEERS COUNCIL

*and by*

AMERICAN SOCIETY OF CIVIL ENGINEERS

A LISTING OF THE DUTIES, RESPONSIBILITIES AND  
LIMITATIONS OF AUTHORITY OF THE RESIDENT PROJECT  
REPRESENTATIVE\*\*

\*\*unless otherwise noted

---

ENGINEER shall furnish a Resident Project Representative (RPR), assistants and other field staff to assist ENGINEER in observing performance of the Work of the CONTRACTOR.

Through more extensive on-site observations of the Work in progress and field checks of materials and equipment by the RPR and assistants, ENGINEER shall endeavor to provide further protection for OWNER against defects and deficiencies in the Work; but, the furnishing of such services will not make ENGINEER responsible for or give ENGINEER control over construction means, methods, techniques, sequences or procedures or for safety precautions or programs, or responsibility for CONTRACTOR's failure to perform the Work in accordance with the Contract Documents.

The duties and responsibilities of the RPR are limited to those of ENGINEER in ENGINEER's agreement with the OWNER and in the construction Contract Documents, and are further limited and described as follows:

A. General

RPR will be ENGINEER's employee or agent at the Site, will act as directed by and under the supervision of ENGINEER, and will confer with ENGINEER regarding RPR's actions. RPR's dealings in matters pertaining to the Work in general shall be with ENGINEER and CONTRACTOR. RPR's dealings with Subcontractors shall be through or with the full knowledge and approval of CONTRACTOR.

B. Duties and Responsibilities of RPR

1. *Schedules* – Review the Progress Schedule, Schedule of Shop Drawing and Sample submittals, and Schedule of Values prepared by CONTRACTOR and consult with ENGINEER concerning acceptability.
2. *Conferences and Meetings* – Attend meetings with CONTRACTOR, such as preconstruction conferences, progress meetings, job conferences and other project related meetings and prepare and circulate copies of minutes thereof.

3. *Liaison –*
  - a. Serve as ENGINEER's liaison with CONTRACTOR; working principally through CONTRACTOR's authorized representative and assist in providing information regarding the intent of the Contract Documents.
  - b. Assist ENGINEER in serving as OWNER's liaison with CONTRACTOR when CONTRACTOR's operations affect OWNER's on-Site operations.
  - c. Assist in obtaining from OWNER additional details or information, when required for proper execution of the Work.
4. *Interpretation of Contract Documents –*

Report to ENGINEER when clarifications and interpretations of the Contract Documents are needed and transmit to CONTRACTOR clarifications and interpretations as issued by ENGINEER.
5. *Shop Drawings and Samples –*
  - a. Record date of receipt of Samples and approved Shop Drawings.
  - b. Receive samples, which are furnished at the Site by CONTRACTOR, and notify ENGINEER of availability of Samples for examination.
6. *Modifications –*

Consider and evaluate CONTRACTOR'S suggestions for modifications in Drawings or Specifications and report such suggestions, together with RPR's recommendations, to ENGINEER. Transmit to CONTRACTOR in writing decisions as issued by ENGINEER.
7. *Review of Work, Rejection of Defective Work –*
  - a. Conduct on-site observations of CONTRACTOR's Work in progress to assist ENGINEER in determining if the Work is in general proceeding in accordance with the Contract Documents.
  - b. Report to ENGINEER whenever RPR believes that any part of CONTRACTOR's work in progress will not produce a completed Project that conforms generally to the Contract Documents or will imperil the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise ENGINEER of that part of work in progress that RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.
8. *Inspections, Tests, and System Startups-*
  - a. Verify that tests, equipment and systems startups and operating and maintenance training are conducted in the presence of appropriate OWNER's personnel, and that CONTRACTOR maintains adequate records thereof.

- b. Observe, record and report to ENGINEER appropriate details relative to the test procedures and systems startups.
- 9. *Records –*
  - a. Record names, addresses, fax numbers, e-mail addresses, web site locations, and telephone numbers of all CONTRACTORS, Subcontractors and major Suppliers of materials and equipment.
  - b. Maintain records for use in preparing Project documentation.
- 10. *Reports -*
  - a. Furnish to ENGINEER periodic reports as required of progress of the Work and of CONTRACTOR's compliance with the progress schedule and schedule of Shop Drawings and Sample submittals.
  - b. Draft and recommend to ENGINEER proposed Change Orders, Work Change Directives, and Field Orders. Obtain backup material from CONTRACTOR.
  - c. Immediately notify ENGINEER of the occurrence of any Site accidents, emergencies, acts of God endangering the Work, damage to property by fire or other causes, or the discovery of any Hazardous Environmental Condition.
- 11. *Payment Requests –*

Review Applications for Payment with CONTRACTOR for compliance with the established procedure for their submission and forward with recommendations to ENGINEER, noting particularly the relationship of the payment requested to the Schedule of Values, Work completed, and materials and equipment delivered at the Site but not incorporated in the Work.
- 12. *Certificates, Maintenance and Operation Manuals –*

During the course of the Work, verify that certificates, maintenance and operation manuals and other data required by the Specifications to be assembled and furnished by CONTRACTOR are applicable to the items actually installed and in accordance with Contract Documents, and have these documents delivered to ENGINEER for review and forwarding to OWNER prior to payment for that part of the Work.
- 13. *Completion –*
  - a. Participate in a Substantial Completion inspection, assist in the determination of Substantial Completion and the preparation of lists of items to be completed or corrected.
  - b. Participate in a final inspection in the company of ENGINEER, OWNER, and CONTRACTOR and prepare a final list of items to be completed and deficiencies to be remedied.



- c. Observe whether all items on final list have been completed or corrected and make recommendations to ENGINEER concerning acceptance and issuance of the Notice of Acceptability of the Work.

#### C. Limitations of Authority

Resident Project Representative shall not:

1. Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).
2. Exceed limitations of ENGINEER's authority as set forth in the Contract Documents.
3. Undertake any of the responsibilities of CONTRACTOR, Subcontractors, Suppliers, or CONTRACTOR's superintendent.
4. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of CONTRACTOR's work unless such advice or directions are specifically required by the Contract Documents.
5. Advise on, issue directions regarding, or assume control over safety practices, precautions, and programs in connection with the activities or operations of OWNER or CONTRACTOR.
6. Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by ENGINEER.
7. Accept Shop Drawing or Sample submittals from anyone other than CONTRACTOR.
8. Authorize OWNER to occupy the Project in whole or in part.



## SECTION 00 – GENERAL REQUIREMENTS

### PART 1 - GENERAL OVERVIEW

#### 1.01 Definitions

For the purposes of these Gravity Sanitary Sewer Specifications (“Specifications”), the following definitions shall apply:

- A. “HSE” shall mean Hamilton Southeastern Utilities, Inc., the public utility that provides sanitary sewer service in the Project (as hereafter defined) area. HSE’s address is 11901 Lakeside Drive, Fishers, Indiana 46038, and HSE’s phone number is (317) 577-2300.
- B. “Engineer” shall mean the engineer for HSE, which is Sanitary Management & Engineering Company, Inc. (“SAMCO”) or SAMCO’s engineers. SAMCO’s inspector shall be Engineer’s representative during construction of the Project. SAMCO’s address is 11905 Lakeside Drive, Fishers, Indiana 46038, and SAMCO’s phone number is (317) 577-1150.
- C. “Subscriber” shall mean those signatories identified as Subscribers under a Special Contract for extension of Sewer Mains and Facilities with HSE through which the Project is being undertaken. Subscriber is generally the Owner under a construction contract. This definition is intended to include all employees and/or agents acting in the interest of Subscriber.
- D. “Contractor” shall mean any construction contractor approved by HSE to construct, install, maintain, repair, and remove public or Private sanitary sewer facilities within the HSE service area. This definition is intended to include all employees, sub-contractors and/or agents acting for or on behalf of Contractor’s company.
- E. “Design Engineer” shall mean the engineer sealing the Construction Plans, as opposed to Engineer for HSE and Record Drawing Engineer, both of whom, are also defined under these Specifications. This definition is intended to include all employees, subcontractors and/or agents acting for or on behalf of Design Engineer’s company.
- F. “Record Drawing Engineer” shall mean the engineer who will certify the record drawings, as opposed to Engineer for HSE and Design Engineer, both of whom, are also defined under these Specifications. Record Drawing Engineer and Design Engineer may be the same person or represent the same company. This definition is intended to include all employees and/or agents acting for or on behalf of Record Drawing Engineer’s company.
- G. “Project” shall mean any sanitary sewer facilities constructed under a distinct set of contract documents and shall include all work necessary for the Complete (as hereafter defined) and operable installation of all sanitary sewer infrastructure and appurtenances in conformity with the HSE approved Construction Plans and the standards, specifications, and details of HSE.

- H. "Sanitary Sewer Facilities" shall mean any pipes, manholes, flow monitoring/metering manholes, clean-outs, grease traps, grit traps, oil/water separators, neutralization tanks, wyes, laterals, and any other appurtenances which convey or process sanitary sewage.
- I. "Conveyed", with regards to sanitary sewer facilities, means Projects for which HSE has received title.
- J. "Private", with regards to Projects, shall mean Projects from which sewage flows into HSE's sanitary sewer facilities, but for which title for the sanitary sewer facilities is not to be Conveyed to HSE.
- K. "Completed", with regards to Projects, shall mean any Projects which are acceptably constructed, tested, and through which customer service has been authorized by HSE, but for which HSE has not received title. All applicable fees must be paid to HSE prior to a Project being deemed Completed.
- L. "Construction Plans" shall mean primary plats, secondary plats, sets of construction drawings, architectural plans, shop drawings, landscaping plans, record drawings, easements, deeds, covenants and restrictions, and any other documentation to be submitted under these Specifications and HSE's "Design Specifications for Sanitary Sewer facilities". Construction Plans must meet the applicable standards in effect at the time documents are submitted.
- M. "Completion Documentation" shall mean record drawings and other documentation to be submitted under HSE's "Sanitary Sewer Completion Specifications". Completion Documentation must meet the applicable standards in effect at the time documents are submitted.

#### 1.02 Purpose

- A. The purpose of these Specifications is to define the standards for engineering design, construction specifications and construction practices related to the Project which will allow for the orderly and proper installation of sanitary sewer facilities constructed within HSE's service area.

#### 1.03 Applicability

- A. These Specifications are applicable for all Public and Private sanitary sewer facilities which will be connected to HSE's sanitary sewer system. This includes Private Projects which will not initially be connected to HSE's sanitary system sewer system but at some future date may be connected to the system.

#### 1.04 Liability and Costs for Project

- A. No direction, field directive or other instruction contemplated by these Specifications and/or conducted by others shall accrue any liability, charge, or cost to HSE, Engineer or Engineer's inspectors.

#### 1.05 Standards, Specifications and Details

- A. HSE's Gravity Sanitary Sewer Details sheet, Lift Station and Force Main Details sheet, Lift Station and Force Main Specifications sheets, Standards for Design and Construction of Building Sewers, Rules and Regulations, Master Plan, Design Specifications for Sanitary Sewer Facilities, and Sanitary Sewer Completion Specifications are integral parts of these Specifications. Contractor should become familiar with these documents prior to construction of any sanitary sewer facilities within HSE's service area.
- B. These Specifications, HSE's Gravity Sanitary Sewer Details sheet and HSE's Design Specifications for Sanitary Sewer Facilities are complementary in nature and should not be interpreted individually.
- C. These Specifications and HSE's Gravity Sanitary Sewer Details sheets, Master Plan, and other standards, specifications and details are subject to revision at any time prior to the start of construction of the Project. These documents are also subject to revision at any time during construction when, in Engineer's opinion, those revisions materially affect the maintenance, operation or life of the Project. All such revised documents must replace the corresponding documents in the Construction Plans at the time when provided to Contractor.
- D. HSE reserves the right to modify or waive any of these Specifications and/or its Master Plan and other standards, specifications, and details in its best interest.
- E. These Specifications are intended to define the construction requirements of sanitary sewer facilities which are constructed and operated under typical conditions in HSE's service area. Depending on field conditions and the composition and characteristics of the sanitary sewer flow, different or unusual conditions may occur which cannot be anticipated in a document of this nature. Engineer may impose additional or special construction requirements under these circumstances.

#### 1.06 Drawing Discrepancies and Omissions

- A. Prior to the start of construction, Contractor must notify Engineer of any conflicts between the Construction Plans, any supplemental information supplied by HSE, and/or these Specifications. Resolution of any such conflict will be at Engineer's sole discretion.
- B. Any items which are not covered in these Specifications, the Construction Plans or HSE's other standards, specifications, and details, but are required for construction of this Project, must be approved by Engineer prior to installation and must be made part of this contract.
- C. In the event construction practices are not described, but in Engineer's opinion, will affect the quality of construction or long-term maintainability of the sanitary sewer facilities, Engineer must approve any construction practices proposed by Contractor.

## 1.07 Governing Laws, Codes, and Regulations

- A. Construction practices must meet all applicable laws, codes, or regulations and be in accordance with the requirements of all governmental agencies and public entities having jurisdiction.
- B. These Specifications shall not be considered as a substitute, nor shall supersede any state or federal law, code, or regulation related to the Project. In the event of a conflict between any state or federal law, code, or regulation governing the Project and these Specifications, the more stringent requirement will apply.
- C. All persons on site must abide by all Indiana Occupational Safety and Health Administration (IOSHA) standards including but not limited to "General Construction Practices" and "Trench Safety Standards".

## 1.08 Notices

- A. All notices required by these Specifications must be given to both HSE and Engineer at their respective business offices.

# PART 2 - GENERAL CONSTRUCTION REQUIREMENTS

## 2.01 General

- A. These Specifications cover all work necessary for the installation of Sanitary Sewer Facilities, access drives and other appurtenances to convey sewage to the receiving sewer in an acceptable and operable manner.
- B. Contractor must provide all necessary work to install sanitary sewer facilities in a Complete manner in accordance with the Construction Plans.
- C. All pipe, fittings, and appurtenances must be the size, type, classification, and grade shown on the Construction Plans and must meet all requirements of these Specifications.
- D. Contractor must not substitute materials which differ from the approved Construction Plans unless approved by Engineer.
- E. All pipe and fittings sizes, and all references to pipe diameter on the Construction Plans or in these Specifications are intended to be nominal size or diameter and must be interpreted as such.
- F. If a material type is shown on the Construction Plans, the material type must describe a general category of materials meeting these Specifications.

## 2.02 Submittals

- A. Contractor must submit only one model number or type per item for approval. Multiple submittals of model number or type for a single item will be cause for rejection of the shop drawing.

- B. Before delivery of products to the site (for standard yard stocked items) or before fabrication (for items which are not standard yard stocked items), Contractor must provide submittals to, and obtain acceptance from Engineer. Submittals must be thoroughly reviewed by Contractor and certified to meet these Specifications (with all exceptions explicitly indicated) prior to submission to Engineer.
- C. Certified copies of test reports on factory tests.
  - 1. Where required by the applicable manufacturing standards provide a copy of the manufacturer's inspection or test report and a certified statement by the manufacturer that the material has been sampled, tested, and inspected in accordance with the applicable manufacturing standards.
  - 2. All factory inspections, tests and record keeping identified as mandatory or required under the applicable standards for each product are required under these Specifications. Factory inspections and test which are identified as optional under the applicable manufacturing standards, are not required unless otherwise specifically indicated in the Construction Plans or these Specifications.
  - 3. An authorized agent of the manufacturer or distributor must sign each certification and report.
- D. Catalog cuts with product data, including details of manufacture, for all manufactured items.
- E. Manufacturer's recommendations on all materials and methods of installation.
- F. Form of warranty.
- G. Operation and maintenance instructions for all mechanical and electrical equipment.
- H. Contractor must provide to HSE copies of all contracts, invoices, statements, material lists, payment requests, and all other related documents pertaining to the construction cost of Project. The above documents must be provided monthly, unless otherwise determined by HSE.
- I. Submit any other items required by Engineer.

## 2.03 Initiation of Construction

- A. Plan approval will be an authorization to proceed with construction of the Project, however, it shall not be construed as authority to violate, cancel, or set aside any of HSE's requirements or the laws, codes, regulations, and permit processes of governmental agencies or public entities. Approval will be evidenced by an "Approved Hamilton Southeastern Utilities, Inc." stamp on the Construction Plans.
- B. Plan approvals will be valid for a period of six (6) months from the date of the approval stamp. Extensions of this time limit may be requested from Engineer if extenuating circumstances exist. Engineer's decision regarding time extensions will be final.

- C. Prior to the start of construction, Design Engineer must receive formal written approval from Engineer. At this time, Design Engineer must supply Engineer with PDF and AutoCAD file of complete set of Construction Plans.
- D. Contractor will not be permitted to initiate construction until the Construction Plans are formally approved, and Subscriber has entered into all necessary agreements and authorizations with, and all required fees have been paid to HSE.
- E. Contractor will not be permitted to initiate construction until all applicable permits have been approved by and obtained from all affected governmental agencies and public entities. Copies of the permits must be submitted to Engineer for review.
- F. Contractor will not be permitted to initiate construction until all off-site easements have been reviewed, approved, and recorded by Engineer.
- G. Pipe layers and foreman (superintendent) assigned to the Project must be approved by HSE prior to the start of construction.
- H. Notice must be provided to Engineer twenty-one (21) days prior to the initiation of construction.
- I. A pre-construction meeting is required between Engineer and Contractor prior to the initiation of construction. The pre-construction meeting must be completed no more than fourteen (14) days prior to the start of construction.
- J. All rough grading (on and off site) must be finished to within one (1) foot of final grade and verified by Engineer prior to the start of construction of Sanitary Sewer Facilities.

#### 2.04 Continuity of Construction

- A. Once construction has commenced, the Project must be Completed promptly as directed by Engineer.
- B. Contractor cannot discontinue work on the Project, except for weather delays, without written approval from Engineer and in this case no sanitary sewer structures including manholes, clean-outs, flow monitoring/metering manholes, grease traps, grit traps, oil/water separators, neutralization tanks, etc. (Manholes) can be left open and incomplete.

#### 2.05 Stop Work Order

- A. Engineer has the authority to direct the issuance of an order requiring suspension of the pertinent construction activity (Stop Work Order) whenever it is determined that construction activity:
  - 1. Is proceeding in an unsafe manner.
  - 2. Is proceeding in violation of a requirement or specification of HSE.
  - 3. Is proceeding in a manner which is materially different from the application, plans, or supporting documents; or



4. For which a permit is required, and work is proceeding without such permit being in force. In such an instance, Stop Work Order shall indicate the effect of the order is terminated when required permit is issued.
5. Stop Work Order shall be in writing by HSE and shall state to what construction it is applicable and the reason for its issuance.
6. One (1) copy of Stop Work Order shall be conspicuously posted on the property, and one (1) copy shall be delivered via mail to the Owner of the property or their agent.
7. Stop Work Order shall state the conditions under which construction may be resumed.
8. If a Stop Work Order is issued, Contractor shall restore site to a safe condition prior to stopping work pursuant to the order.
9. The sanctions provided in this section shall in no way limit the imposition of penalties provided elsewhere in these Specifications.

#### 2.06 Confined Space Entry

- A. All persons, including but not limited to Subscribers, Contractors, sub-contractors, Design Engineers, Record Drawing Engineers, and surveyors must abide by HSE's "General Procedures for Manhole Opening and Entry" or the most recent IOSHA confined space entry standards, whichever is more stringent.

#### 2.07 Cleanliness

- A. The Project site must at all-time be kept free of trash, rubbish, unsightly materials, and other nuisances associated with sanitary infrastructure installation.

#### 2.08 Product Delivery, Handling, and Storage

- A. Contractor is responsible for the delivery, handling, and storage of products.
- B. Deliver products with manufacturer's tags and labels intact.
- C. Handle products in accordance with manufacturer's recommendations and with extreme care to not damage or shock. Load and unload all products by hoists or skidding. Do not drop products. Do not skid or roll products on or against other products. Slings, hooks, and pipe tongs must be padded.
- D. Keep stored products safe from damage or deterioration in accordance with manufacturer's recommendations. Keep interior of products free from dirt or foreign matter. Drain and store products in a manner that will protect them from freezing. Store electronic and electrical products in a manner that will protect them from freezing and weather. Do not stack products unless allowed by the manufacturer's requirements. Store gaskets and other products affected by sunlight in a cool location out of direct sunlight. Gaskets must not come in contact with petroleum products. Use gaskets on a first-in/first-out basis.
- E. Promptly remove damaged or defective products from the Project site. Replace damaged or defective products with acceptable products.

- F. Contractor is responsible for verifying that the materials are free of defects and are the proper type, classification, grade, etc. complying with the Construction Plans and/or HSE's standards, Specifications, and details.

## 2.09 Quality Assurance

- A. Contractor must test and perform quality assurance requirements on all Sanitary Sewer Facilities in accordance with these Specifications.
- B. Execute work in conformance with applicable sections of the latest published editions of American National Standards Institute (ANSI), American Society of Mechanical Engineers (ASME), American Society for Testing and Materials (ASTM), American Water Works Association (AWWA), and American Association of State Highway and Transportation Officials (AASHTO) standards or as indicated in these Specifications and/or the Construction Plans, whichever is more stringent.
- C. All sanitary sewer facilities must be new and unused.
- D. Line and grade requirements
  - 1. Contractor must provide assurance to Engineer that the sewer is laid accurately to the required line and grade as shown on the Construction Plans. Contractor must constantly check horizontal and vertical alignment of the gravity sewer. Contractor may install either main line pipe between three (3) manhole structures or to a manhole structure which is one thousand (1,000) lineal feet of main line pipe from an as-built manhole structure associated with an adjoining project Section or sanitary sewer interceptor which has been verified and reflected as complete on the HSE GIS infrastructure map, whichever is of the greater distance.
  - 2. Contractor must coordinate verification of Sanitary Sewer Facilities installation with Engineer to provide an as-built record, as described later in these Specifications, with the completion of every three manholes. Verification is defined as certification by Contractor's representative as to actual invert elevation, length of pipe, and slope. Construction is not permitted to continue until the above stated verification conditions are satisfied. Variations from uniform line and grade, as shown on the Construction Plans and as described below, are cause for the pipe to be rejected and re-laid in compliance with the Construction Plans.
  - 3. The variance from design line and grade between manhole structures cannot be greater than one thirty-second ( $1/32$ ) of an inch per inch of pipe diameter, not to exceed one-half ( $1/2$ ) inch total, provided that such variation does not result in a level or reverse sloping of the pipe between joints.
  - 4. Contractor's survey equipment (level, transit, GPS, etc) shall bear calibration certification documentation by the manufacturers approved service facility within six (6) months of it being in use.
  - 5. Engineer will not accept gravity sanitary sewers below minimum slope. Reconstruction of sanitary sewers may be required at the utility's discretion.

## 2.10 Inspection and Rejection of Materials

- A. The quality of all materials, process of manufacture, and finished product are subject to inspection and acceptance by Engineer. Such inspection may be made at the place of manufacture and/or on the work site after delivery. Products are subject to rejection at any time for failure to meet any of the manufacturer's specifications, even though samples may have otherwise been accepted as satisfactory.
- B. Immediately prior to being incorporated into the Project, each product must be carefully inspected, and those not meeting these Specifications and HSE's Gravity Sanitary Sewer Details sheets must be rejected, immediately removed from the site, and replaced at Contractor's sole expense.
- C. Contractor must not repair, or permit manufacturer to repair, any pre-cast concrete structures with exposed steel or welded wire fabric reinforcement.
- D. Pre-cast reinforced concrete structures, risers, and tops are subject to rejection for failure to conform with, but not limited to, any of the following requirements:
  - 1. Fractures or cracks passing through the shell with a depth greater than or equal to one (1) inch.
  - 2. Defects that indicate imperfect proportioning, mixing, or molding.
  - 3. Surface defects indicating honeycombed or open texture.
  - 4. Damaged ends where such damage would prevent making a satisfactory joint.
  - 5. Infiltration into the structure.
  - 6. The internal diameter of the structure must not vary by more than one (1) percent from the nominal diameter.
  - 7. Not clearly marked with date of manufacture, trade name, size designation, ASTM number, etc.
  - 8. Having any visible steel bars or wire mesh along inside or outside surfaces of the structure.
  - 9. Evidence of patching.

## 2.11 Relation to Wells and Water Supplies

- A. Sewers must be laid at least ten (10) feet horizontally from any existing or proposed water main. The distance is to be measured edge to edge. Should specific conditions prevent this separation, Contractor must notify Engineer for specific instructions.
- B. Whenever the sewer crosses a water main, the sewer should be laid at least eighteen (18) inches below the water main.
- C. When the above conditions cannot be obtained, the sewer must be constructed of ANSI/AWWA C905 waterworks grade PVC pipe, SDR 21 PVC (ASTM D2241) pressure sewer pipe, or ANSI/AWWA C900 with compression fittings. The joints must be located equidistant in both directions from the water main. The sewer must be the type of pipe described above for a minimum of ten (10) feet beyond the cross point. Special structural support for the water main and sewer may be required.

- D. Sewer/water supply separations and pipe classifications must conform with the latest edition of the Ten States Standards, Indiana State Board of Health's (ISBH) "On-site Water Supply and Wastewater Disposal for Public and Commercial Establishments – Bulletin S.E. 13" and Indiana Department of Environmental Management (IDEM).

## 2.12 Utilities

- A. All existing utility systems which conflict with the construction of the Project, which can be temporarily removed and replaced, must be accomplished at the expense of Contractor. Work must be done by the respective utility unless the utility approved in writing that Contractor can do the work.
- B. Permanent relocation of Utilities
  - 1. Except as otherwise noted on the Construction Plans, it is the responsibility of Contractor to move or pay for moving all utility appurtenances, including but not limited to, water mains, storm sewer inlets, gas lines, wire lines, service connections, water and gas meter boxes, water and gas valve boxes, light and traffic standards, cable ways, signals, etc. located in the public right-of-way or private easement which would permanently interfere with the Project.
  - 2. It is understood and agreed that Contractor has considered in his bid all the permanent and temporary utility appurtenances shown or otherwise indicated on the Construction Plans. It is also understood and agreed that no additional compensation will be allowed for any delays, inconvenience, or damage sustained by Contractor due to any interference from said utility appurtenances or the operation of moving them either by the respective utility company or Contractor.
- C. Contractor must provide, at Contractor's expense, all electrical and gas energy, water service (including water for flushing and testing) and telephone service required for the Project until the Project is Complete.

## 2.13 Installation Service

- A. The service of an experienced installation representative of the manufacturer must be provided when Engineer deems it necessary at no additional cost to Subscriber. The representative must be available when installation problems arise, when requested by Engineer to resolve installation problems, and during testing of the Sanitary Sewer Facilities having equipment installed.
- B. The manufacturer of any Sanitary Sewer Facilities may be required to provide installation advice to Contractor's workforce. Engineer will determine the need for these services based on the experience of Contractor's workforce or job site conditions encountered during construction.

## 2.14 Product Installation

- A. Install all products in strict accordance with manufacturer's recommendations and these Specifications in a neat and workmanlike manner.

- B. Bring all conflicts between the manufacturer's recommendations and these Specifications to the attention of Engineer and obtain direction from Engineer as to the resolution of any conflict in installation directives.

#### 2.15 As-Built Record Set

- A. Contractor must maintain, during the course of the Project, an up-to-date plan set which accurately reflects the actual: as-built dimensions (horizontal location and vertical elevation), materials of construction, and other relevant information necessary to develop a set of as-built record drawing in accordance with HSE's "Sanitary Sewer Completion Specifications".
- B. As-built horizontal locations are required on all manholes, wyes, lateral markers, and end of stubs (if greater than 20 feet). As-built vertical elevations are required on all manhole top of casting and inverts, clean-out top of castings, and upstream inverts of stubs greater than 20 feet.
- C. Failure to provide as-built information as specified in HSE's "Sanitary Sewer Completion Specifications" may require excavation by Contractor to obtain this information.

#### 2.16 Completion Documentation

- A. HSE's "Sanitary Sewer Completion Specifications" specify the requirements which must be met prior to the time the Project is placed into service.
- B. Contractor must provide to HSE and Engineer, in Subscriber's name, the necessary Completion Documentation for the Project, including record drawings and a digital file at the end of sanitary sewer facilities construction. Engineer will provide a Record Drawing Notification to Subscriber and copies of certified as-built documentation for inclusion in HSE's GIS database. Costs associated with the final as-built documentation review by the Engineer and its inclusion to update HSE's GIS infrastructure database shall be at the Subscriber's expense. Any Field Changes made which, in the Engineer's opinion, materially affect the project are to be made by Design Engineer and amended digital plan sheets provided prior to completion of sanitary sewer infrastructure installation and operation.
- C. On a daily basis, Utility inspector and Contractor must digitally submit a HSE Lateral Location form to Engineer detailing all wye connections, pipe type, stationing, and pipe grade. Prior to being submitted, Utility Inspector and Contractor must digitally sign the Lateral Location Form. The as-built location of the wye station can be supplied by measuring along the pipe section and assigning a station to each connection from the nearest downstream manhole structure. An accuracy of two (2) +/- feet is required.
- D. Record Drawing Engineer must also submit Sanitary Sewer Record Drawing Information sheets or field notes for all manholes that have not been previously as-built. These sheets must be submitted to Engineer within fourteen (14) days of the Record Drawing Notification.

- E. Contractor must complete all outstanding items detailed in Engineer's correspondence and supply all necessary information (including construction cost documentation, with all applicable change orders, Sanitary Sewer Inventory form, Lateral Location forms, television logs, etc.) to Engineer within thirty (30) days.
- F. If a manhole top of casting is adjusted after as-built, then Contractor must supply Engineer with a new measure down to the flow line from the top of casting. If the new measure down is not provided to Engineer, Contractor must pay Engineer, at their current rate, for all time required obtaining this information.

#### 2.17 Inspection and Reimbursement

- A. Full time inspection by Engineer is required for all repairs and maintenance, to Sanitary Sewer Facilities prior to acceptance of the facilities by HSE as the owner. Engineer must approve, in writing, all methods of repair to Sanitary Sewer Facilities as recommended by Contractor and manufacturer. Failure to comply will be grounds for removal from HSE Approved Contractor List.
- B. If, for any reason, construction work is delayed or canceled, Contractor shall notify Engineer's inspector assigned to the Project and Engineer's chief inspector at least one hour (1) prior to the normal scheduled start time on the day the work is delayed or canceled. Contractor will be charged the prevailing rate for failure to notify Engineer's inspector and chief inspector per occurrence.
- C. Contractor must pay Engineer for all inspector's overtime cost. Contractors will be charged overtime costs at the prevailing rate per hour outside of SAMCO's normal business hours. The hourly rate for Sundays and holidays will be twice the hourly rate. The hourly rates are subject to change without notice, contact Engineer prior to starting construction for current rates.
- D. If, at the sole discretion of Engineer, construction volume is less than what is deemed acceptable, Contractor may be required to pay for additional inspection services.
- E. Engineer's decision on field changes or construction practices is final. Failure to comply is grounds for removal from the HSE Approved Contractor List.

### PART 3 - TESTING, PUNCH LISTS, AND CLEANING

#### 3.01 General Testing Requirements (Except Pump Factory Test)

- A. Notification must be provided at least five (5) days prior to any testing. All lines must be clean and free of any debris.
- B. At HSE's option, all testing within the HSE service area may be performed by HSE or their agent. Contractor shall reimburse HSE or its agent at HSE's current rate for all testing.

- C. All testing (except manhole vacuum testing) must be conducted after the backfill has been in place for at least thirty (30) days and after all other in ground utilities have been installed.
- D. At Engineer's discretion, testing may be delayed, or additional testing may be required, based upon weather conditions (inadequate precipitation to allow for adequate settlement, temperature variance between mandrel and pipe, etc.). Testing may also be delayed, or additional testing may be required due to the installation of site improvements (including but not limited to fencing, signage, landscaping, site lighting, and other sub-surface improvements).
- E. If Subscriber requires sanitary sewer service prior to final testing, a preliminary test may be performed, however, Subscriber must provide, in writing, a guarantee that all cleaning and testing will be performed per the Construction Plans and HSE's then current standards, specifications, and details.

### 3.02 Deflection Testing

- A. If testing is delayed per Section 3.01-E above, due to the lack of precipitation and, in the opinion of Engineer, the densification of the backfill is inadequate, Contractor may perform a mandrel test utilizing a mandrel sized to measure a deflection limit of three (3) percent. This may only be done with permission of Engineer, in writing, after all requirements of Section 3.01-D have been met.
- B. All PVC (non-lateral) pipe must be tested for deflection with an acceptable go-no-go mandrel. No pipe can exceed a deflection of five (5) percent. The deflection test must be conducted using a mandrel having a diameter equal to ninety-five (95) percent of the inside diameter of the pipe. The test must be performed without a mechanical pulling device and the rope used to pull the mandrel must be no stronger than one hundred-fifty (150) pound test. Tag/trail rope may be of any size to allow removal of mandrel. A single individual of average size, weight, and strength, without the use of tools to gain leverage, must pull the mandrel. All pipe exceeding the allowable deflection must be replaced or repaired and re-tested.
- C. Engineer reserves the right to require an additional mandrel test on sections of flexible pipe which are crossed by storm sewers any time prior to conveyance to HSE.
- D. Engineer will not accept sewers with "sags" greater than one thirty-second ( $1/32$ ) of an inch per inch of pipe diameter, not to exceed one-half ( $1/2$ ) inch total.

### 3.03 Sewer Water Tightness Testing

#### A. Acceptability Limits

- 1. Maximum infiltration/exfiltration limits for all new sanitary sewers will be fifty (50) gallons per inch of diameter per mile of pipe per twenty-four (24) hours. This standard is applicable to each discrete section of the Project and includes all manholes and lateral service connections. All sections of the sewer must be tested and any sections not meeting these limits must be repaired and re-tested.

2. In the presence of groundwater or poor soil conditions, and if required by Engineer, the sewer may be required to successfully complete a water tightness test before proceeding with any additional construction.
- B. Test for water tightness must be conducted on all sewers in the Project.
  - C. Where test results exceed allowable limits, Contractor must correct the construction of the sewer and retest so that the section tested is within allowable limits. All methods and materials used in the repair must be accepted by Engineer in writing. Grouting of joints is not an acceptable repair method.
  - D. If groundwater is present during installation of the sanitary sewer mainline, Contractor will install a dewatering well at each manhole. This well must be of sufficient size and capability to locally lower groundwater below the excavation. The dewatering well is to remain in place until all testing is satisfactorily completed. It will be utilized to determine the groundwater elevation at the time the air test is conducted. After all testing is completed, Contractor may remove the well or cut and cap the well eighteen (18) inches below finish grade. As with all aspects of construction, it is Contractor's responsibility to ensure all materials and modes of operation are properly secured and safe.
  - E. At Engineer's discretion, the following tests may be required:
    1. Air Test for Leakage per ASTM F1417
      - a. The ends of the pipe being tested must be sealed and properly braced for developed end thrust to prevent displacement while the line is under pressure and potential safety concerns. The air supply line will have an on/off valve and a pressure gauge (calibrated within the past 6-months) having a range from zero (0) to fifteen (15) psi. The gauge must have minimum divisions of five-hundredths (0.05) psi and an accuracy of +/- five hundredths (0.05) psi.
      - b. The pipe to be tested must be clean.
      - c. The groundwater level surrounding the section of pipe under testing must be determined from static dewatering well or prior observation. If the groundwater table is above the pipe, test pressures must be increased forty-three hundredths (0.43) psi for each foot of water over the lowest invert.
      - d. The air must be introduced slowly to the section of pipe under evaluation to enable equalization in the pipe section. Air pressure should be increased in small steps until the internal air pressure is five (5) psi greater than the hydrostatic pressure head created by the groundwater over the pipe section.
      - e. A minimum of two (2) minutes must be provided for the air pressure to stabilize to conditions within the pipe. Engineer shall determine the stabilization time based on field conditions and weather. The stabilization period is necessary for variations in temperature to adjust to the interior pipe conditions. Air can be added slowly during the stabilization period to maintain a minimum pressure of five (5) psi greater than the hydrostatic pressure created by groundwater.
      - f. After the stabilization period, when the pressure reaches exactly five (5) psi greater than the hydrostatic pressure created by groundwater, the



stopwatch must be started; and when the pressure reaches three and half (3 ½) psi greater than the hydrostatic pressure created by groundwater, the watch must be stopped. The portion of the line being tested will be acceptable if the time for the air pressure to decrease within the stated range is greater than the time shown below. If the pipe length is between the specified lengths below, the time must be based on the next greater length.

- g. Safety precautions during Air Test
  - 1) The air test may be dangerous if, because of ignorance or carelessness, a line is improperly prepared. It is extremely important that the various plugs be installed and braced in such a way to prevent blowouts. Contractor should realize the sudden expulsion of a poorly installed plug could be dangerous. Likewise, a plug that is partially deflated before the pipe pressure is released can be equally dangerous.
  - 2) As a safety precaution, pressurizing equipment should include a regulator set at ten (10) psi to avoid over pressurizing and damaging an otherwise acceptable line.
  - 3) No one is allowed in the manholes during testing.

#### 3.04 Manhole Testing

- A. All sanitary sewer manholes and flow monitoring/metering manholes must be vacuum tested per ASTM C1244 after installation, repair, or modification. Test to be performed by Contractor or HSE appointed agent and witnessed by Field Inspector prior to riser(s) and casting placement.
- B. Installation and operation of vacuum equipment and indicating devices must be in accordance with ASTM C1244.
- C. With the vacuum tester in place, draw a vacuum of ten (10) inches of mercury and close the valve.
- D. Acceptance standards for leakage will be established from the elapsed time for a negative pressure change from ten (10) inches to nine (9) inches of mercury. The maximum allowable leakage rate for a four (4) foot diameter manhole must be in accordance with the following:

Minimum Elapsed time for a Manhole Depth

Pressure change of 1-inch Mercury	
10 feet or less	60 seconds
>10 feet but < 15 feet	75 seconds
>15 feet but < 25 feet	90 seconds
>25 feet but < 30 feet	105 seconds
>30 feet but < 35 feet	120 seconds

- E. For manholes five (5) feet in diameter, add an additional fifteen (15) seconds and for manholes six (6) feet in diameter, add an additional thirty (30) seconds to the time requirements for four (4) foot diameter manholes. If manhole joints are pulled out during the vacuum test, manhole must be disassembled, and the joints replaced.
- F. Manholes will be subject to visual inspection with all visible leaks being repaired.

#### 3.05 Punch Lists

- A. After all tests have been successfully completed, Engineer will perform inspection of Sanitary Sewer Facilities and provide Contractor a written summary of items, or punch list, which require corrective action.
- B. Contractor Must complete all punch list items within twenty-one (21) days of issuance. If, in the opinion of Engineer, the punch list has not been completed, Contractor must pay HSE additional inspection fees per day until Engineer deems the punch list complete.

#### 3.06 Video Inspection

- A. Sections of sewer will be inspected at Engineer's discretion and at the expense of HSE prior to approving sanitary sewer availability for service.
- B. HSE Utilities Inc. will furnish all equipment and personnel to perform all work required in the inspection and video recording operation at Contractor's expense prior to conveyance of the infrastructure to the Utility.
- C. All new sewers must be cleaned by Contractor prior to any testing or video inspection of mainline sewers. Failure to adequately perform this task will delay work completion.

### PART 4 - OPERATION, CLEANING, AND FINAL INSPECTION PRIOR TO CONVEYANCE

#### 4.01 Operation

- A. No person, including but not limited to, Subscribers, maintenance workers, Contractors, sub-contractors, and engineers shall, directly or indirectly, allow flow to occur from any Project which is not Complete to a Completed Project.

#### 4.02 Cleaning

- A. The Project must be cleaned, as directed by Engineer at Subscriber's expense at least once prior to conveyance.

#### 4.03 Final Inspection

- A. Within six (6) months prior to conveyance, Engineer will conduct an inspection (Final Inspection) at Subscriber's expense. The Final Inspection will consist of a walk-through and video inspection of the Project to identify any defects. The Final

Inspection may also consist of flow monitoring, smoke, infiltration, deflection tests as determined by Engineer.

- B. After Final Inspection has been performed, Engineer will provide a written summary, or punch list, of items which require corrective action. Subscriber must complete all punch list items within sixty (60) days from the date of issuance of the punch list. If, after the sixty (60) day period, and in sole opinion of Engineer, the punch list items have not been corrected in entirety, Contractor and/or Subscriber may be required to pay HSE additional inspection fees until the items are corrected.
- C. Subscriber must rectify all defects identified during the Final Inspection in a manner acceptable to Engineer prior to Sanitary Sewer Facilities being conveyed to HSE.

-END-



## SECTION 01 - PAY ITEMS

### PART 1 - GENERAL

#### 1.01 Summary

##### A. Section Includes

1. Measurement and payment for unit price Work. Payments will be made to the Contractor for the actual quantities of Work performed or materials furnished in accordance with the Drawings and Specifications.
2. The scheduled quantities of Work to be completed and materials to be furnished may each be increased or decreased without invalidating the unit price bid.

#### 1.02 Unit Prices

##### A. Measurement and Payment

1. Make all measurements and check all dimensions necessary for the proper construction of the Work called for by the Drawings and Specifications. During the execution of the Work, make all necessary measurements to prevent nonconformity in said Work and record such accurate measurements to the construction on a set of construction drawings to be submitted to the Engineer.
2. The method of measuring the Work for payment under the various pay items shall be as indicated in Pay Items below. In any event, the unit or lump sum price stated in the Contract to be paid for the respective item shall include, and be payment in full for, the installation complete in all details and ready for use and operation as specified and as indicated on the Drawings. Payment will be made under each item only for such Work that is not specifically included under other items.
3. All items paid for on a price per linear foot basis will be measured and paid for to the nearest foot unless noted otherwise.

##### B. Incidental Work

1. The following Incidental Work shall be included in the unit price of each applicable pay item in this Section. No extra payment will be made for Incidental Work, which shall include the furnishing of all labor, material, and equipment necessary to complete the Work, including:
  - a. construction engineering; utility locating; supporting and protecting utility poles, conduits, and lines;
  - b. clearing and grubbing including tree and stump removal;
  - c. excavating; rock excavation; sheeting; shoring; dewatering, including treatment and disposal; bypass piping and pumping;
  - d. hauling; placing; spreading; compacting; testing of materials; and placing, maintaining, removing, and disposing of any temporary materials;

- e. pipe bedding; installation; jointing; haunching; initial backfilling; trench and final backfilling;
- f. core drilling; connecting piping to existing and new structures or pipes; locating, extending, providing fittings, and connecting existing pipes into the new drainage system; grouting and sealing pipe penetrations; installing tops and castings; abandoning existing structures and pipes;
- g. repairing/replacing existing sewers, laterals, drainage structures, water mains, service lines, irrigation system components, curbs and gutters, sidewalks, pavement, field tiles, and other items damaged or affected by the Work;
- h. flushing and cleaning pipes, appurtenances, and structures; pipe and structure testing;
- i. testing of pipes and structures, including but not limited to, hydrostatic testing; leakage testing; bacteriological tests; mandrel testing; vacuum testing; etc. as specified;
- j. removing and disposing of excess and demolished structures, piping, material, and debris;
- k. preparing concrete and asphalt surfaces; saw cutting; formwork; forming; reinforcing; doweling; placing materials; finishing, tooling, and jointing; curing; protecting; slump tests; compression tests; other specified testing; pavement markings;
- l. permitting; safety; maintenance of traffic; street cleaning;
- m. installing erosion control measures prior to and during construction; providing on-going maintenance of erosion control measures until seeding and paving are established; bank restoration at stream crossings;
- n. initial clean-up and restoration;
- o. installing and removing temporary structures, signs, and fencing; removing and replacing signs, mailboxes, fencing, landscaping, and other items; and
- p. other Incidental Work necessary to complete the Work as specified and as indicated on the Drawings.

### 1.03 Pay Items

#### **Items 1– 8 Sanitary Sewer Pipe (Varying Depths) (LFT)**

Payment for Sanitary Sewer Pipe will be made at the applicable Contract unit price per linear foot for the size, material type, and bury depth of each pipe segment as listed in the itemized Bid Attachment, which price shall include the furnishing of all labor, material, and equipment necessary to complete the Work, including excavation, clearing and grubbing, dewatering, pipe bedding, haunching, and initial backfill, pipe laying, jointing, backfilling (including granular backfill within any pavement loading zone), removing and disposing of excess material, supporting and protecting utility poles and lines, initial clean-up and restoration, connecting to new structures or pipes, cleaning and testing sewers, and incidental Work necessary to complete the sewers as specified and as indicated on the Drawings.

The cost of repair and/or replacement of existing drainage structures, water mains and service lines, power pole bracing, fence removal and replacement, mailbox relocation, and other miscellaneous items of construction shall be included in the unit

price per lineal foot of sewer, and no additional payment shall be made for these items.

The length of each pipe segment will be measured on a per linear foot basis horizontally along the centerline of the pipe from center of the upstream manhole to center of the downstream manhole. The depth of each pipe segment will be based on the average depth of the segment calculated by measuring the depth from the top of manhole casting to the pipe invert at the upstream and downstream ends of the pipe segment and dividing by 2. Pipe inverts for drop manholes shall be based on the upper pipe and not the drop pipe.

**Items 9 – 17 Standard Manhole, 60-inch DIA (Various Depths) (EACH)**

Payment for Manholes will be made at the applicable Contract unit price per each manhole for the diameter, type, and depth range as listed in the itemized Bid Attachment, which price shall include structure sections; sewer pipe stubs (if shown); adjusting rings; frame and casting; flexible watertight seals; non-shrink grout; joint materials; installation of and modification to flow channels and benchwalls; crushed stone base; granular backfill; and all Incidental Work necessary for a complete installation as specified and as indicated on the Drawings.

The depth of each manhole shall be measured from the invert elevation of the manhole effluent line to the top of casting or ground surface, whichever is greater.

**Items 18 Standard Manhole w/ Outside Drop, 60-inch DIA (EACH)**

Payment for Manholes will be made at the applicable Contract unit price per each manhole for the diameter, type, and depth range as listed in the itemized Bid Attachment, which price shall include structure sections; sewer pipe stubs (if shown); adjusting rings; frame and casting; flexible watertight seals; non-shrink grout; joint materials; installation of and modification to flow channels and benchwalls; crushed stone base; granular backfill; and all Incidental Work necessary for a complete installation as specified and as indicated on the Drawings.

The depth of each manhole shall be measured from the invert elevation of the manhole effluent line to the top of casting or ground surface, whichever is greater.

**Item 19 Steel Casing Pipe w/Carrier Pipe (LFT) (Jack and Bore)**

Payment for Steel Casing Pipe w/Carrier Pipe will be made at the applicable Contract unit price per linear foot for the size of steel casing pipe as listed in the itemized Bid Attachment, which price shall include steel casing pipe installed by auger bore; carrier pipe; casing spacers; casing end seals; bore and receiving pit excavation and backfilling; sheeting; dewatering; and all Incidental Work necessary for a complete installation as specified and as indicated on the Drawings.

**Item 20 Junction Structure A0 (LSUM)**

Payment for Junction Structure A0 will be made at the applicable Contract unit price the dimensions, material, and depth range as shown on the plans, which price shall

include structure sections; sewer pipe stubs (if shown); hatches; ladders; gates; vent pipes; flexible watertight seals; non-shrink grout; joint materials; installation of and modification to flow channels and benchwalls; crushed stone base; granular backfill; and all Incidental Work necessary for a complete installation as specified and as indicated on the Drawings.

**Item 21 Over-Excavation of Poor Soils w/Granular Backfill (Undistributed) (SYS)**

Payment for Over-Excavation of Poor Soils w/Granular Backfill will be made at the applicable Contract unit price per cubic yard (CYS) of actual material removed (below the depth specified for pipe bedding), as measured in the field during construction, and as listed in the itemized Bid Attachment, which price shall include excavation, removal, and disposal of existing poor soils as identified by the Owner or their designated representative; replacement of excavated material with granular backfill; and all Incidental Work necessary for complete removal and replacement as specified and as indicated on the Drawings.

Compensation will not be made for unauthorized work not agreed upon by the Owner prior to removal.

**Item 22 Erosion and Sediment Control (LSUM)**

Payment for Erosion and Sediment Control will be made at the applicable Contract lump sum price as listed in the itemized Bid Attachment, which price shall include preparation of areas to receive temporary erosion control measures including grading and removing undesirable debris such as construction materials, rocks, silt, etc.; temporary seeding; temporary erosion control measures including silt fence, straw bales, mulched seeding, check dams, inlet protection, erosion control blanket, construction entrances, concrete washout, etc.; installation and on-going maintenance of the erosion control measures until seeding or paving has been established; removing any temporary erosion control measures at the completion of the Work; and all Incidental Work necessary for a complete installation as specified and as shown on the Drawings. Payment will be based on the percentage of Work completed for this specific pay item in the opinion of the Engineer.

**Item 23 Final Clean-up and Restoration (LSUM)**

Include an amount equal to not less than 3% of the total bid price for Final Clean-up and Restoration. This pay item shall include the removal of excess material and debris; finish grading; topsoil; seed; fertilizer; mulch; permanent erosion control measures; and all Incidental Work necessary to restore disturbed areas; repair damage to and clean the project site as specified and as indicated on the Drawings. Payment will not be made until such time as the site restoration and clean-up are 100% complete in the opinion of the Engineer.

**Item 24 Maintenance of Traffic (LSUM)**

Payment for Maintenance of Traffic will be made at the applicable Contract lump sum price as listed in the itemized Bid Attachment, which price shall include signage, flaggers, barrels, barricades, and other temporary traffic control facilities; developing



detailed traffic control plans and detour plans (if required); and all Incidental Work necessary to maintaining traffic throughout the construction of the project in accordance with the Drawings, the Specifications, and the requirements of local, county, and state agencies having jurisdiction. Payment will be based on the percentage of Work completed for this specific pay item in the opinion of the Engineer.

**Item 25 Mobilization, Demobilization, Bonds, and Insurance (LSUM)**

Include an amount not to exceed 5% of the total bid price for mobilization, demobilization, bonds, and insurance. The costs associated with mobilization, demobilization, payment and performance bonds, and insurance as specified in the contract documents are included in this pay item. Not more than 60% of this pay item will be paid after the Contractor has mobilized and started the Work. The remaining 40% will be paid after the project has reached final completion and all equipment and materials have been demobilized.

**PART 2 - PRODUCTS**

Not Used.

**PART 3 - EXECUTION**

Not Used.

-END-



## SECTION 02 – MANHOLES, PIPING, VALVES, AND FITTINGS

### PART 1 - GENERAL

#### 1.01 General Requirements

- A. Under general laying conditions, sewer pipe can be any one of the pipe materials specified in these Specifications provided, the material is that pipe type and standard indicated on the Construction Plans.
- B. Markings
  - 1. All pipe and fittings must be clearly marked in accordance with the various standards under which they are manufactured. All pipe must be marked with durable printing according to ASTM/AWWA standards.
  - 2. A marking must be provided on the spigot of each pipe utilizing bell joints to indicate when the pipe is driven home.

#### 1.02 Polyvinyl Chloride ("PVC") Pipe

- A. PVC pipe and fittings must be smooth wall inside and out and must conform to ASTM D3034 and ASTM F1336 (SDR 26 or SDR 21), Type PSM or CAN/CSA-B182.2.M90, the more stringent must apply for sizes up to 15 inches; ASTM F679 (T-1; T-2 as approved by Engineer) or AASHTO M278 or CAN/CSA-B182.2.M90, the more stringent must apply for sizes greater than 15 inches; ASTM D2241 (SDR 21) for sizes up to 24 inches; ANSI/AWWA C900 (DR 18) for sizes 4 – 12 inches; ANSI/AWWA C905 (DR25 or DR 18) for sizes 14 – 24 inches.
- B. Minimum cell classification of pipe 15 inches or less in size must be 12454-B, 12454-C, 13364-B, or 12364-C as defined by ASTM D1784. Minimum cell classification of pipe greater than 15 inches in size must be 12454-C, 13364-B, or 12364-C as defined by ASTM D1784. All pipe must have a minimum tensile strength of 34.50 MPa as defined by ASTM D1784.
- C. Joints, on PVC sewer pipe, must be the integral bell type gasketed joint designed so when assembled, the elastomeric gasket inside the bell is compressed radially on the pipe spigot to form a positive seal. The joint must be designed to avoid displacement of the gasket when installed in accordance with manufacturer's recommendations. The joint must comply with ASTM F477 and ASTM F913 and the physical requirements of ASTM D3212 and Uni-Bell PVC Pipe Association's UNI-B-1 "Recommended Specifications for Thermoplastic Pipe Joints, Pressure and Non-Pressure Applications", the more stringent must apply. The gasket must be the only element depended upon to make the joint flexible and watertight.
- D. PVC pipe type ASTM D3034 (SDR 26) can be used to thirty (30) feet.

### 1.03 Fittings

- A. Fittings such as wyes, tees, and bends must be made in a manner that will provide strength and water tightness at least equal to the class of the adjacent mainline pipe to which they are joined. Fittings must conform to all other requirements specified for pipe of the corresponding class and diameter. Joints must be of the same type as used on the adjoining pipe. All fittings must be bell by bell. Bell by spigot fittings will not be permitted except at Engineer's discretion.
- B. Fabricated fittings (not molded as a single integral unit) and saddles will not be allowed. Plastic Trends, Inc. fittings are recognized as an acceptable alternate to this standard.
- C. If necessary, due to material shortage, water grade fittings may be substituted provided the application is clearly marked as sanitary sewer.

### 1.04 Manholes and Other Structures

- A. Manholes must be constructed of monolithic concrete or pre-cast manhole sections. Pre-cast manhole sections must conform to the requirements of ASTM C478 and manhole joints to the requirements of ASTM C443, except that the joint design of the pre-cast sections must consist of an overlapping joint joining section.
- B. Materials for Manholes and miscellaneous concrete structures must comply with the following:
  - 1. Concrete for pre-cast manhole sections and monolithic manholes must use four thousand (4000) psi concrete. Ready-mix concrete must conform to ASTM C94, alternate 2. Maximum size aggregate must be one and a half (1.5) inches. Slump must be between two (2) and four (4) inches with Penetron concrete admix by Penetron USA.
  - 2. Reinforcing steel must conform to ASTM A615, Grade 40 deformed bars or ASTM A616, Grade 40 deformed bars.
  - 3. Mortar materials:
    - a. Sand – ASTM C144, passing a #8 sieve.
    - b. Cement – ASTM C150, Type 1.
    - c. Water – must be potable.
  - 4. Joints on pre-cast manhole sections must utilize rubber gaskets meeting the requirements of ASTM C443 and these Specifications, the more stringent will apply. O-ring gaskets must be confined in a groove in the spigot end of the pre-cast manhole section. Profile gaskets must bear on a lateral face of the tongue to provide positive positioning. The joint must be further sealed as noted on HSE's Gravity Sanitary Sewer Details sheet.
  - 5. Manufacturer of pre-cast manholes must provide factory cut openings to produce a smooth, uniform, cylindrical hole of the proper size to accommodate the resilient connector. Resilient connectors can alternately be pre-cast-in-place by the manufacturer. All pipes entering and leaving manholes must have a resilient connector meeting the requirements of ASTM C923 firmly clamped around the pipe. The resilient connectors must be PSX gasket or Press Wedge

- II as manufactured by Press-Seal Gasket Corp. or similar flexible manhole sleeves as manufactured by Kor-N-Seal or equal.
6. Without prior written consent of Engineer, pre-cast manhole sections must be steam cured and cannot be shipped from point of manufacture for at least five (5) days after having been cast. Upon written consent of Engineer, pre-cast manhole sections can be shipped prior to five (5) days if they were manufactured of high-early strength concrete and are verified through testing to have achieved a strength acceptable to Engineer.
  7. Manhole sections are to have a waterproof exterior coating applied prior to installation as approved by Engineer.
  8. Manhole castings must be of good quality cast iron conforming to ASTM A48 or DI conforming to ASTM A536, Grade 65-45-12 with concealed rectangular pick-hole. Refer to HSE's Gravity Sanitary Sewer Details sheet for detailed information. Unless specifically designated otherwise, manhole castings must be the non-locking type.
  9. Manhole steps must be made from a steel reinforcing rod encapsulated in a copolymer polypropylene resin. The manhole steps must equal or exceed IOSHA requirements. Manhole steps manufactured by M.A. Industries, Inc., American Step Company, Inc., or equal are acceptable.
  10. Any special manhole or miscellaneous concrete structures must be constructed as detailed on the Construction Plans.
  11. Manhole bases must be combination pre-cast concrete base and first section as a single unit. Detailed drawings must be submitted to Engineer prior to casting or manufacture.
  12. No interior surface applied materials can be used.
  13. Concrete manhole joints are to be sealed by WrapidSeal.
  14. Riser rings are to be sealed by use of Kent Seal and exterior wrapped with WrapidSeal or combination of butyl and shrink-wrap.
  15. Fiber mesh reinforcement for Type 2 cleanouts: Application per cubic yard must equal a minimum of one and a half (1 ½) pounds. Fibers are for the control of cracking due to dry shrinkage and thermal expansion/contraction, to lower concrete permeability and to increase impact capacity, shatter resistance and abrasion resistance. Fiber mesh reinforcement must be manufactured by Fibermesh, 4019 Industry Drive, Chattanooga, TN 37416, or equal as approved by Engineer on a case-by-case basis.

## PART 2 - EXECUTION

### 2.01 Handling and Cutting Pipe

- A. Each product to be incorporated into the Project must be handled into its position, placed, and supported only in such manner and by such means as Engineer accepts as satisfactory.
- B. Pipe and fittings must be handled carefully to avoid cracking or abrasion of the coating. Handle in a manner to ensure installation in sound and undamaged condition. Do not drop or bump. Use slings, lifting lugs, hooks, and other devices designed to protect pipe, joint elements, and coatings. Ship, move, and store with

provisions to prevent movement or shock contact with adjacent units. Handle with equipment capable of performing the work with an adequate factor of safety against overturning or other unsafe procedures.

- C. Any fitting showing a crack and any fitting or pipe which received a severe blow which could have caused an incipient fracture, even though no such fracture can be seen, must be marked as rejected and removed at once from the site.
  - D. In any pipe showing a distinct crack and in which it is believed there is no incipient fracture beyond the limits of the visible crack, the cracked portion, if so approved, may be cut off by Contractor before the pipe is laid so that the pipe used is perfectly sound. The cut must be made in the barrel at a point at least twelve (12) inches from the visible limits of the crack.
  - E. All field cutting of pipe must be done in a neat, trim manner. Field cut pipe will only be allowed at manholes, tees, wyes, and at the connection of a new sanitary sewer to an existing sanitary sewer. The cut end must be beveled using a file or a wheel to produce a smooth bevel of approximately fifteen (15) degrees and a minimum depth of 1/3 of the pipe wall thickness.
- 1. PVC Pipe
    - a. PVC pipe must be cut with either a hand saw or power saw.
    - b. Smooth cut by power grinding to remove burrs and sharp edges.

## 2.02 Construction Staking

- A. Contractor shall contract with a Land Surveyor, registered in the State of Indiana, to furnish and set all line and grade stakes (HUB). Land Surveyor will be required to set, or oversee the setting, all benchmark stakes necessary for the installation of any sanitary sewer facility being constructed. Temporary construction benchmarks shall be set in strategic locations, but no more than one thousand (1,000) feet from the Project, to facilitate the installation of grade stakes. Horizontal and vertical control will be required to be provided with the Record Drawings to be submitted to HSE upon completion of the Project. A permanent Benchmark shall be installed by Contractor at the entrance of a new development.

## 2.03 Laying Pipe

- A. Unless approved by Engineer, Contractor must not install different sizes, types, classifications, and grades of pipe between Manholes.
- B. No construction work will be permitted after 8:00 PM or dusk, whichever is earlier.
- C. All rough grading (on-site and off-site) must be finished to within one (1) foot of final grade prior to the start of construction of the Sanitary Sewer Facilities. Contractor must provide and protect survey grade stakes that enable Engineer to verify compliance with the rough grading requirement at least 5-days prior to a scheduled preconstruction meeting for sanitary sewer related work.

- D. Contractor must install all off-site laterals with a minimum cover of six (6) feet from top of pipe to grade. Laterals will be considered off-site if they are constructed in an area that will not be platted immediately upon completion.
- E. The point of commencement for laying pipe is to be the lowest point in the proposed line. Provisions for beginning construction at other than the lowest point in the proposed line shall require approval by Engineer. All bell and spigot pipe shall be laid with bell end pointing up grade.
- F. The existing sewer segment downstream from any connection must be cleaned by a vacuor truck immediately after the connection to the existing sewer and plugging of the connection is finished.
- G. If, for any reason, live or in-service Sanitary Sewer Facilities must be plugged, the accumulated wastewater must be pumped out at the location of the plug and either conveyed to an available manhole with sufficient capacity or transported to a proper disposal site. Additionally, the upstream lines and manholes must be cleaned and flushed to the location of the plug on completion of the work.
- H. All pipe must be bedded as described in these Specifications under Pipe Bedding and Haunching and on HSE's Gravity Sanitary Sewer Details sheet. Bell recesses must be excavated in advance of pipe laying so the entire pipe barrel will bear uniformly on the prepared sub-grade.
- I. The supporting of pipe on block will be permitted only where the pipe is to receive total concrete encasement. Encased pipe must be accurately and effectively supported and secured on crossing "X" rebar.
- J. All pipe must be laid accurately to the required line and grade in the manner prescribed by the pipe manufacturer and appropriate ASTM/AWWA standards. Each section of pipe must be laid to form a close, concentric joint with the adjoining pipe at an elevation conforming to the required grade. PVC gravity sewer pipe and fittings must, at a minimum, be installed in accordance with the directions contained in ASTM D2321.
- K. Obtain approval of Engineer of method proposed for transfer of line and grade from control of work.
- L. At a minimum, Contractor must use laser beam equipment to maintain accurate line and grade. Before proceeding to the next joint, the last joint must be checked for proper line and grade. Survey instruments bearing proof of calibration within prior six (6) month and capable of third order accuracy must be used for checking alignment and grade throughout the Project. It is the Contractor's responsibility to regularly test all equipment to assure compliance with manufacturer's specifications.
- M. Clean interior of all pipe and fittings prior to installation.
- N. When bell and spigot pipe is laid, the bell of the pipe must be cleaned of mud, sand, and other obstructions before the clean spigot of the next pipe is inserted.

The joint must be made in a satisfactory manner in accordance with the recommendations of the manufacturer and the direction of Engineer. The new pipe must be shoved "home" firmly against the back of the bell and securely held until the joint has sealed. Experienced personnel must perform all joint work.

- O. Locate pipe joint to provide for differential movement at changes in type of pipe embedment or at changes in trench bottom material. Do not locate joint within eight (8) feet of Manhole walls, with full length pipe from up-stream connection. Clean and lubricate all joint and gasket surfaces with lubricant recommended by manufacturer. Check joint deflection for specified limits.
- P. No water in an excavation shall be permitted to enter the pipe. Contractor to have water under control prior to installing pipe and protect pipe interior from groundwater.
- Q. Perform pipe installation only when weather and trench conditions are suitable. Allow pipe to reach trench air temperature prior to installation. Contractor must discontinue pipe installation when there is a danger of the quality of work being impaired because of cold weather. Contractor is responsible for heating the pipe and jointing material to prevent freezing of joints. Pipe must not be laid on frozen ground. Pipe must not be installed unless the outside temperature is greater than thirty-two (32) degrees Fahrenheit.
- R. Install a temporary watertight plug at the end of the sewer when installed pipe is left unattended. Contractor must prevent all water, earth, or other material from entering Sanitary Sewer Facilities. An airtight, watertight plug must always be maintained in the Project at the point of connection with the existing sewer from the initiation of construction to the Completion of the Project. At least once a day, Contractor must inspect the plug for water tightness and pump out all accumulated water in excess of six (6) inches from the invert of the outgoing pipe. In the event any water, earth, or other material enters the downstream sewer, Contractor is responsible to HSE for the costs of sewage treatment, electrical power, equipment repairs, incidental damages, cleaning, and any other costs or expenses related to such entry. Contractor shall pay HSE damages per occurrence.
- S. Pipe must be installed to cross storm sewers and other utilities at approximately ninety (90) degrees and must maintain a minimum horizontal separation (measured from outer spring line of each pipe) of ten (10) feet from all storm and utility structures.

#### 2.04 Bores

- A. Casing wall thickness as per Section 716 – Jacked Pipe of the "Indiana Department of Transportation Standard Specifications" latest edition.
- B. All work within rights-of-way must be in accordance with the requirements of the governmental agency having jurisdiction. Where no procedures for a particular portion of the work are given, the recommendations of the "Indiana Department of Transportation Standard Specifications," latest edition, must be followed.



- C. The gravity-flow carrier pipe shall be shimmed to proper line, elevation, and grade and then the void between the two pipes shall be grouted with cellular grout following grade confirmation and testing.
- D. Engineer recommends preliminary low-pressure air and mandrel testing of the carrier pipe prior to grouting.
- E. Upon completion of the bore, Contractor must coordinate with Engineer to verify that the carrier pipe is online and grade. Contractor must submit invert elevations to Engineer.
- F. For further information refer to the HSE's Gravity Sanitary Sewer Detail sheet.
- G. Contractor may request alternate methods or materials such as the use of directional boring and/or PE pipe. In this case, Engineer must approve, in writing, the use of alternate methods or materials and Contractor performing the bore.

## 2.05 Pipe Bedding and Haunching

- A. Each pipe section must be laid on a firm foundation of bedding material, haunched, and backfilled with care. These materials must be placed and compacted in accordance with ASTM D2321- Underground Installation of Thermoplastic Pipe for Gravity Sewers.
- B. INDOT washed #8 crushed stone, as indicated on HSE's Gravity Sanitary Sewer Details sheet, must be shovel sliced or otherwise carefully placed and "walked" or hand tamped in to ensure compaction of the haunch area and complete filling of all voids. Material must be added in six (6) inch lifts.
- C. Prior to pipe installation, carefully bring bedding material to grade along the entire length of pipe. If, in opinion of Engineer, soil conditions are unstable, the trench must be undercut until stable soil is encountered and #2 stone must be placed below the bedding zone sufficiently deep enough to demonstrate compacted base support.
- D. When the bedding material is placed in a "fill" area, all such "fill" must be compacted to 95% standard proctor density prior to installing the sewer from undisturbed earth to the crown of the pipe.
- E. For flexible pipe, such as PVC, the placement of embedment material or haunching around pipe must be done with care. The ability of the pipe to withstand loading in a trench depends upon the method employed in its installation.
  - 1. Objects that may cause point loading on the pipe must be removed.
  - 2. Care should be taken to not compact directly over the top of the pipe or displace alignment.
- F. Where excavation occurs in rock or hard shale, the trench bottom must be undercut and a minimum of six (6) inches of #2 crushed stone must be placed below the bedding zone prior to pipe installation.

- G. All stone bedding above and below Sanitary Sewer Facilities must be free of dirt, organic matter, and frozen material.

2.06 Concrete, Concrete Caps, and Concrete Cradles.

- A. The strength of concrete indicated on all drawings, details, and specifications is twenty-eight (28) day compressive strength.
- B. Concrete caps, cradles, and encasement must be provided at all locations indicated on the Construction Plans. When so ordered by Engineer, concrete caps, cradles, and encasement not shown on the Construction Plans must be installed. When storm sewers cross Sanitary Sewer Facilities with less than eighteen (18) inches of vertical separation (from the outer edge of each pipe), the Sanitary Sewer Facilities must be supported with a concrete cradle.
- C. At Engineer's discretion, Contractor must take four (4) cylinders per five (5) cubic yards of concrete and provide certified test results to Engineer.
- D. If the outside temperature is between twenty (20) and thirty-two (32) degrees Fahrenheit and rising, Contractor must use a fifty (50) percent ethylene-glycol/water mixture. If the outside temperature is forecasted to be below thirty-two (32) degrees Fahrenheit during the curing of any concrete or grout application, the concrete must be protected from freezing with insulation blankets acceptable to Engineer. All concrete work must be performed at an outside temperature of over twenty (20) degrees Fahrenheit and rising.

2.07 Manholes and Other Structures

- A. All manhole structures to be coated on exterior with Tnemec Hi-Build Tnemec-Tar Series 46H-413 Polyamide Epoxy-Coal Tar for corrosion resistance. Recommended dry film thickness shall be no less than 16 to 20 mils. for all structures.
- B. All manholes, flow monitoring/metering manholes and cleanouts must be constructed in accordance with HSE's Gravity Sanitary Sewer Details sheet.
- C. In manholes with multiple influent pipes, Contractor must install all pipe from lowest to highest elevation. The lower elevation pipe must be extended to the next upstream manhole before commencing installation on the next higher sewer.
- D. Unless otherwise approved by Engineer in writing, all flow monitoring/metering manholes must be at least five (5) feet in diameter.
- E. Manhole channels must be formed and poured with concrete to the crown of the connecting pipe. The finished invert must be a semi-circular shaped, smooth channel directing flow to the downstream sewer. Changes in direction in base channels must be accomplished by smooth, constant radius turns in the channel joining the downstream channel tangentially. Concrete must be RE-CRETE twenty (20) minute set or approved equal and must use Dayton Superior's J-40 or R-40

or approved equal liquid bonding agent. Patches over one (1) thick must be cleaned to fresh concrete and filled with quickset high strength grout.

- F. Where approved by Engineer, manholes can be added to an existing sanitary sewer. No “doghouse” or “saddle” structures will be permitted. The upstream and downstream sanitary sewers between the new manhole and the existing manholes must be low-pressure air tested and deflection tested. The new manhole must also be vacuum tested while maintaining continuous service.
- G. Manholes must be placed and aligned to provide vertical sides within a tolerance not exceeding one (1) inch up to ten (10) feet in depth and two (2) inches up to twenty (20) feet in depth, plus one-eighth (1/8) inch per foot over twenty (20) feet in depth. Tolerance to be checked with a plumb line.
- H. All cored holes, penetrations, and/or other openings into a manhole or other sanitary structure must have a minimum separation of six (6) to eight (8) inches from any joint, as measured from the nearest joint shoulder (interior or exterior) to the penetration.
  - 1. Any holes cut in the field must be smoothly and cleanly drilled with a core-drill or in a manner acceptable to Engineer. All pipes entering and exiting manholes must utilize a resilient connector as previously described in these Specifications.
  - 2. For cored holes, penetrations, and/or other openings through manholes, a separation of greater than eighteen (18) inches between the outer edges of resilient connectors is recommended. If a separation of less than eighteen (18) inches exists, a larger manhole may be required.
- I. Contractor must install steps with a minimum horizontal separation of twelve (12) inches from all pipes entering and exiting manholes.
- J. Finished grade around manholes and castings must be set at an elevation to prevent surface water runoff from running over or ponding on top of the manhole.
- K. Manhole frames must be securely anchored to the cone or adjusting ring with bolts and concrete anchors adequate in length to penetrate the structure.
- L. Flat top structures are generally not permitted. If a flat top structure is permitted, Contractor must receive written approval from Engineer. No more than eight (8) inches of adjusting rings can be installed on flat top structures.
- M. Engineer has the right to cut cores from such pieces of concrete manholes as he desires for such inspection and tests as he may wish to apply. Holes left by the removal of cores must be filled in an acceptable manner to form a watertight and structurally sound repair.
- N. Engineer may, for inspection or testing purposes, take samples of concrete after it has been mixed or as it is being placed in the forms or molds.
- O. All grout used to seal or join structures must be non-shrink grout.

## 2.08 Laterals, Stubs, Connections, Bulkheads, and Miscellaneous Items

- A. Where existing sewers carrying sanitary sewage are encountered, Contractor must provide and maintain temporary or redundant pumping systems to prevent a nuisance.
- B. Where called for on the Construction Plans, lateral connections and stubs for future sewer connections must be provided. Lateral locations must be recorded on a HSE digital Lateral Locate Form. The upstream end of lateral connections and mainline stubs must be field marked with a two by four (2" X 4"), wrapped with #10 tracer wire. The depth of the lateral must be indicated on the marker.
- C. Without written permission from Engineer, Contractor cannot connect any existing sewers or house service into the Project prior to the Project being deemed Complete by HSE.
- D. Laterals must be installed to cross storm sewers and other utilities at approximately ninety (90) degrees and must maintain a minimum horizontal separation of ten (10) feet from exterior surface of all water lines, storm structures and utilities.
- E. Contractor must notify Engineer at least seventy-two (72) hours prior to any construction of storm sewers that may affect previously constructed Sanitary Sewer Facilities.
- F. All laterals must be installed with an insulated #10 tracer wire along the top of pipe from the wye to the terminus. The mainline Contractor shall install the wire from the wye to the lateral marker at the surface. The lateral Contractor shall extend the wire from the terminus to the cleanout adjacent to the building.
- G. All lateral tracer wire connections shall be soldered and DryConn Direct Bury Lug electrical insulating, corrosion resistant, wire splice kit to be used at ALL spliced locations.

## 2.09 Existing Utilities, Structures, Property, Etc.

- A. Prior to proceeding, all improvements, including but not limited to, poles, trees, fences, sewer, gas, water or other pipes, wires, conduits, manholes, railroad tracks, buildings, structures, property, etc. along the route of Sanitary Sewer Facilities must not be disturbed without the approval of the responsible representative. Following authorization by the associated owner's representative, the contractor is to support and protect from damage all potentially affected property.
- B. Moveable item such as mailboxes can be temporarily relocated during construction, provided their function is maintained. Place movable items back in their original location immediately after backfilling is finished, unless otherwise shown on the Construction Plans. Any movable items damaged during construction must be replaced by an item of equal or better quality.

- C. Contractor must proceed with caution in the excavation and preparation of trenches so the exact location of underground utilities and structures, both known and unknown, can be determined. Contractor is responsible for repair of utilities and structures when broken or otherwise damaged.
- D. Contractor must make explorations and excavations when, in the opinion of Engineer, it is necessary to determine the location of underground structures.
- E. Where pipes or conduits cross the trench, Contractor must support said pipes and conduits without damage to them and without interrupting their service. The manner of supporting such pipes, etc. is subject to approval by owner of the pipe or conduit.
- F. When utility lines must be removed or relocated for the Project, Contractor must notify Engineer and utility line owner in ample time for necessary measures to be taken to prevent interruption of the utility's service.
- G. Contractor must conduct the work so that no equipment, material, or debris will be placed or allowed to fall upon private property in the vicinity of the Project, unless Contractor has first obtained the property owner's written consent and provided a copy to Engineer.
- H. All excavated material must be piled in a manner that will avoid obstructing sidewalks, driveways, and thoroughfares. Hydrants under pressure, valve pit covers, valve boxes, curb stop boxes, fire and police call boxes, or other utility controls must be left unobstructed and accessible during the Project. Contractor must prevent runoff from stored piles of excavated material from entering ditches, waterways, gutters, or storm sewers.

## 2.10 Right-of-Way Guidelines/Restrictions

- A. All sanitary sewer related activity planned to transgress or potentially be located within the rights-of-way of any public governing body or utility located in same shall be reviewed by any and all utilities for potential concerns or conflicts in addition to an Asset Protection specialist to obtain prior written approval.

## 2.11 Excavating

### A. De-watering

- 1. Contractor must provide, install, and operate sufficient trenches, sumps, pumps, hoses, piping, well points, etc. to depress and maintain the groundwater level below the base of the excavation until all Sanitary Sewer Facilities are Completed. Provide sufficient dikes and de-watering equipment and make satisfactory arrangements for the disposal of the water without undue interference with other work, damage to property, or damage to the environment. Water disposal must comply with the regulations of the Environmental Protection Agency (EPA), Indiana Department of Environmental Management (IDEM), Soil Conservation Service (SCS), and all other applicable agencies.

2. Contractor must prevent all water from entering Sanitary Sewer Facilities. In the event any water enters Completed Sanitary Sewer Facilities, Contractor is responsible to HSE for the costs of sewage treatment, electrical power, equipment repairs, incidental damages, cleaning, and any other costs or expenses related to such entry. In addition, Contractor shall pay HSE damages per occurrence. Failure to comply with HSE within 60 days may (at the discretion of HSE) result in the suspension or termination from performing work in the utility's service area.
3. Operate de-watering equipment ahead of pipe laying to keep the water level below the excavation until structures are secured by backfill.
4. Contractor must provide de-watering equipment, shoring, or other construction practices to maintain dewatered excavations and safe construction conditions.
5. To measure the static water level; wells must be accessible until successful completion of the low-pressure air test. All wells (potable, non-potable, and de-watering) must be drilled, capped, and abandoned in accordance with the requirements of Engineer, the Indiana Administrative Code, Indiana Department of Natural Resources – Groundwater Section, Hamilton County Health Department, and all other governmental agencies and public entities having jurisdiction.
6. As directed by Engineer, Contractor must maintain the well casing in-place for all Sanitary Sewer Facilities which will be extended in the future.

#### B. Trenching

1. All excavation work must incorporate safety measures that comply with all applicable IOHSA regulations and these Specifications. In the event of a conflict, the more stringent requirement will apply.
2. Trees, boulders, and other surface encumbrances, located to create a hazard to employees involved in excavation work or in the vicinity thereof at any time during operations, must be removed or made safe before excavation begins.
3. Do not open more trench than necessary for the installation of each pipe section while complying with the manufacturer's requirements for optimum installation and performance.
4. Contractor must provide sloped side walls (provided that the bottom four (4) feet of trench will not be sloped), sheeting, shoring, or trench boxes as safety measures for all excavations in accordance with all applicable IOSHA regulations. Contractor is responsible for the determination of the angle of repose of the soil in which the trenching is to be done. Except for areas where solid rock allows for line drilling or pre-slitting or where sheeting, shoring, or trench boxes are to be used, excavate all slopes to beyond the angle of repose, but not steeper than a one (1) foot rise to each half (1/2) foot horizontally.
5. Sides, slopes, and faces of all excavations must meet accepted engineering requirements by scaling, benching, barricading, rock bolting, wire meshing, or other equally effective means. Give special attention to slopes that could be adversely affected by weather or moisture content.
6. Flatten the excavation sides when an excavation has water conditions, silty materials, loose boulders, and areas where erosion, deep frost action, and slide planes appear.

7. A competent Contractor's representative, as defined under OSHA regulations, must inspect excavations, and approve trench safety measures for the excavation after every rain event or other hazard increasing occurrence.
8. Do not store excavated or other material nearer than four (4) feet from the edge of any excavation. Store and retain materials to prevent materials from falling or sliding back into excavation. Install substantial stop logs or barricades when mobile equipment is utilized or allowed adjacent to excavations.
9. Minimize the amount of excavation around Manholes.
10. The design of the pipe and manholes are predicated upon the width of trench as specified by the manufacturer and these Specifications, the more stringent will apply. If the specified trench width is exceeded, Contractor is responsible for the provision and installation, at his own expense, of all remedial measures required by Engineer.
11. Test air in excavations where oxygen deficiency or gaseous conditions are possible. Establish controls to assure acceptable atmospheric conditions. Provide adequate ventilation and eliminate sources of ignition when flammable gases may be present. Emergency rescue equipment, such as a breathing apparatus, a safety harness, and line and basket stretcher must be readily available where adverse atmospheric conditions may exist or develop in an excavation.
12. Provide walkways or bridges with guardrails where employees or equipment are required or permitted to cross over excavations.
13. Provide ladders where employees are required to be in excavations four (4) feet deep or more. Ladders must extend from floor of excavation to at least three (3) feet above the top of the excavation. Locate ladders to provide means of exit without more than twenty-five (25) feet of lateral travel.
14. Provide adequate barriers and physically protect all excavations. Barricade or cover all wells, pits, shafts, and similar excavations. Backfill temporary wells, pits, shafts, and similar excavations upon termination of exploration and similar operations.

#### C. Backfilling

1. Backfilling must meet the requirements of ANSI/AWWA C605 unless otherwise specified in these Specifications.
2. Engineer retains the right to delay an excavation backfill to inspect workmanship if he deems necessary.
3. Place and tamp bedding and backfill in a manner that will not damage the pipe.
4. Excess dry replacement material without visible fines will not be acceptable.
5. When used in these Specifications, the term "clean backfill" shall mean backfill material of any type which is free of roots, brush, sticks, debris, junk, rocks, cinders, broken concrete or brick, large lumps of clay, frozen material, stones, etc. greater than three (3) inches in their largest dimension. Not more than fifteen (15) percent of the rocks or lumps can be larger than two and a half (2 1/2) inches in their largest diameter.
6. All job excavated materials which are used for trench backfill above pipe embedment and which are to be compacted by any method except settlement by water, must be "clean backfill".

7. Material excavated from an open trench can be used for backfilling from the pipe to six (6) inches below finished grade providing it meets the requirements of "clean backfill" and providing a different type of backfill material has not been specified or shown on the Construction Plans. Where excavated material is used for backfilling and there is a deficiency due to the rejection of a part thereof, Contractor, upon direction of Engineer, must remove the rejected material from the site and furnish an additional quantity of "clean backfill" at his own expense.
8. Excavated material must be placed immediately after the hand backfill in such a manner to prevent the formation of voids and potential damage to pipe. The earth backfill must be compacted to ninety-five (95) percent Proctor density at a minimum or mounded six (6) inches for settlement.
9. In no case must backfill be dropped from such height or in such volume that its impact damages Sanitary Sewer Facilities. Engineer reserves the right to regulate and control the manner of depositing such backfill. Contractor will be held liable for damage to the Sanitary Sewer Facilities.
10. Settling of backfill by flooding or puddling will not be permitted.
11. Excess trench material must be roughly graded over the trench in a timely manner soon after the pipe is installed. This material must be mounded over the trench with a crown height of no more than six (6) inches, feathered to existing grade, until final settlement has occurred, and the trench is ready for grading and cleanup. An exception to this would be trenches in traveled pathways. Any excess must be hauled off and disposed of or stored by Contractor.
12. After settlement of backfill, and immediately before restoration of vegetated areas, grade and remove excess earth in unpaved areas. Remove to a depth of six (6) inches below finished grade. Place six (6) inches of topsoil over entire area to be restored.

## 2.12 Restoration

- A. This section pertains to the restoration of the Project site upon Completion of the work.
  - B. Restoration of improvements on public and private property must be in-kind and acceptable to the owner.
  - C. Restoration of road surfaces, drainage ways and other similar improvements within the public right-of-way or acquired easements must be in accordance with the directions of the government agency or public entity having jurisdiction.
  - D. All vegetated areas disturbed or damaged during construction must be re-vegetated with a stand of grass. Agricultural areas and areas currently under construction do not require re-vegetation.
1. Backfills, fills, and embankments must be brought to a sub-grade level six (6) inches below finished grade. When sub-grades have settled, deposit and spread fine raked topsoil, ready for seeding, to a finished depth of at least six (6) inches.



2. Commercial fertilizer, 6-12-12 or equal, must be uniformly spread at the rate of thirty-five (35) pounds per one thousand (1,000) square feet over the topsoil by a mechanical spreader at least forty-eight (48) hours before seeding and mixed into the soil for a depth of two (2) inches.
  3. A grass seed mixture comprised of thirty-five (35) parts Kentucky Blue Grass, thirty (30) parts Perennial Rye, thirty (30) parts Kentucky 31 Fescue and no more than five (5) parts inert matter must be sown on the disturbed areas at a rate of three (3) pounds per one thousand (1,000) square feet. Seeding must be done only between April 1 and June 1 or August 15 and October 15.
  4. Seeded areas must be mulched with straw, hay, wood cellulose fiber, or cane fiber. Straw or hay must be applied at a rate of two and a half (2 ½) tons per acre. Wood cellulose or cane fiber mulch must be applied at a rate of one thousand (1,000) pounds per acre. On special areas of high-water concentration, unstable soils, or sloped surfaces, manufactured mulch materials such as soil retention blankets, erosion control netting or others may be required by Engineer. Manufactured mulch materials must be installed according to the manufacturer's recommendations.
  5. The seeded areas must be thoroughly watered with a fine spray to prevent wash out of the seed. Areas shall be maintained and patched as directed by Engineer. A satisfactory stand of grass at least one (1) inch in height, without bare spots, will be required.
- E. Within three (3) months after Project Completion, Contractor must correct defective work, such as settled areas, uneven road surfaces, bare spots in grass coverage, erosion, and gullies.

-END-



## SECTION 03 – STORMWATER POLLUTION PREVENTION AND EROSION CONTROL

### PART 1 - GENERAL

#### 1.01 Summary

##### A. Section Includes

1. Temporary and permanent control measures used during the life of the contract to control water pollution, soil erosion, and siltation using berms, dams, dikes, gravel, mulches, grasses, and other erosion control devices or methods.
2. Temporary erosion control may include Work outside the construction limits such as borrow pit operations, equipment and material storage sites, waste areas.

##### B. Related Sections

1. Section 04 – Material Handling and Spill Prevention Plan

#### 1.02 References

- A. Construction Stormwater General Permit (CSGP), INRA00000.
- B. INDOT Standard Specifications, latest edition - Section 918.02.

#### 1.03 Submittals

- A. Authorization under the CSGP is effective 48-hours after submittal of the Notice of Intent to IDEM by the OWNER.
- B. Prior to the start of construction, review the Erosion Control Schedule on the Drawings and revise as needed to phase construction activities to minimize the footprint of disturbed unstable areas. Submit a revised erosion control schedule as needed for temporary and permanent erosion control Work as applicable for clearing and grubbing, grading, construction, paving and structures at watercourses. Maintain revisions with the Project Management Log.
- C. Submit and maintain a plan for erosion and dust control on haul roads.
- D. Maintain a Project Management Log that contains information related to all off-site borrow areas, disposal areas, and staging areas. Submit a plan for disposal of waste materials. Refer to Specification 04 for practices for solid waste management.
- E. Complete soil testing when vegetation does not establish to determine nutrients needed. Refer to Paragraph 1.06.
- F. Provide the Owner all Project Management Log documentation per Part 3 of this Section including inspection forms and corrective actions at project closeout.

Maintain documentation during construction and for 3 years following approval of final payment.

- G. Provide notification to the Owner when land disturbing activities have been completed, the entire site has been stabilized (permanent vegetation established at 70% density of coverage), all temporary erosion control measures have been removed, all discharges of potential pollutants from construction activities have ceased, and all construction materials, wastes, and equipment have been removed. Refer to the CSGP for exceptions (Section 3.4).
- H. Once the notification in item G (above) has been received, Owner shall submit a Notice of Termination (NOT) to IDEM and the Hamilton County Surveyor's Office to terminate coverage under the CSGP.

#### 1.04 Quality Assurance

##### A. Regulatory Requirements

- 1. Comply with CSGP requirements and conditions until a NOT is submitted to close out the permit.
  - 2. Provide grass seed containers bearing a seed label tag in accordance with the requirements of the Indiana Seed Law.
  - 3. Provide fertilizer conforming to federal and state regulations and to the standards of the Association of Official Agricultural Chemists.
  - 4. Comply with all federal, state, and local erosion control and pollution prevention laws.
  - 5. Post the following information near the main entrance of the project site or at a publicly accessible location:
    - a. Notice of Intent (NOI) document
    - b. Copy of the public notice
    - c. National Pollution Discharge Elimination System (NPDES) permit number
    - d. Name, Address, and phone number of the local contact person
    - e. Location of a copy of the construction Drawings and Stormwater Pollution Prevention Plan (SWP3).
- B. Authority of Owner: The Owner has the authority to limit the surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow and fill operations, and to direct the Contractor to provide immediate permanent or temporary control measures to minimize contamination of adjacent streams or other watercourses, lakes, ponds, and areas of water impoundment.

#### 1.05 Delivery, Storage and Handling

- A. Deliver grass seed in new and unopened containers or bags.

1.06 Project Site Conditions

A. Field Measurements

1. Test the soil to determine the need for fertilizer, lime, or other soil amendments. Coordinate soil testing services and implement the resulting recommendations.

PART 2 - PRODUCTS

2.01 Materials

A. General: Provide materials in accordance with the requirements specified herein.

B. Temporary Grass Seed

1. Quick-growing species such as ryegrass, Italian ryegrass, or cereal grasses suitable to the area
2. Use grass species that will not compete with the grasses sown later for permanent cover
3. Application: temporary or permanent stabilization must be initiated by the end of the seventh day the area is left idle. The stabilization activity must be completed within fourteen (14) days after initiation. Apply temporary seeding to all disturbed areas to be left idle for 7-15 days or more during the growing season unless other erosion control measures are indicated on the Drawings.

C. Permanent Grass Seed

1. Type, mixture, and quantity to meet the application rate, as shown on the Drawings.
2. Contains no more than 5 percent inert matter.
3. Contains no objectionable weeds.

D. Sod

1. Type shown on the Drawings
2. Free of weeds
3. Use within 1 week of its cutting - do not allow to dry out
4. Strongly rooted sod, a minimum of 2 years old
5. Capable of growth upon planting
6. Water routinely to promote growth

E. Mulch

1. Hay, straw, fiber mats, netting, bark, or wood fiber
2. Straw mulch shall consist of threshed straw of cereal grain such as oats, wheat, barley, rye, and rice.
3. Free of objectionable weeds, seeds, or other material that may be detrimental to the planting being established.
4. Application: temporary or permanent stabilization must be initiated by the end of the seventh day the area is left idle. The stabilization activity must be

completed within fourteen (14) days after initiation. Apply mulch to all areas that have been seeded and to disturbed areas to be left idle for 7 days or more outside of the growing season unless other measures are indicated on the Drawings.

5. Application rates:
  - a. Straw/hay mulch: 92 pounds per 1,000 square feet (2 ton/acre)
  - b. Wood fiber mulch: 46 pounds per 1,000 square feet (1 ton/acre)
  - c. Wood chips: 230 pounds per 1,000 square feet (5 ton/acre)

F. Fertilizer

1. Contains the minimum percentage of available nutrients (Nitrogen, Phosphorus, and Potash) based on soil content, seed mix and local conditions.
2. If local conditions do not indicate otherwise and soil testing is not required, provide 12-12-12 analysis fertilizer.
3. Application rate: as specified by the supplier

G. Lime

1. When soil testing results require pH levels to be increased, apply agricultural lime to the soils. Produce a slightly acid soil (pH 6.5).
2. Other available forms of liming materials may be applied depending on their potential to neutralize soil acidity.
3. Provide agricultural lime from a dealer or manufacturer whose brands and grades are registered or licensed by the State of Indiana Department of Agriculture.
4. Changes to the lime requirements will be determined by the pH test, as indicated on soil analysis results.

H. Topsoil

1. Preserve and reuse topsoil.
2. Topsoil shall meet the following requirements:
  - a. Natural, fertile, agricultural soil, capable of sustaining vigorous plant and lawn growth.
  - b. Of uniform composition throughout without admixture of subsoil.
  - c. Free of stones, lumps, clods, sticks larger than one inch, sod, live plants and roots, and other extraneous matter.
  - d. Free of pollutant contamination.

I. Erosion Control Blanket: Provide North American Green SC150 or approved equal.

J. Fiber Filtration Tubes

1. Natural or man-made fiber filter media encased within cylindrical tubes composed of a photodegradable mesh.
2. Performance: slowing and filtering of suspended particles in stormwater runoff. The tubes shall allow water to flow freely while providing filtration of suspended particles.

K. Geotextile Fabric for Use Under Riprap, Crushed Stone or Aggregate

1. Provide non-woven needle punched or heat bonded geotextile fabric consisting of strong, rot resistant, chemically stable long-chain synthetic polymer materials which are dimensionally stable relative to each other. The geotextile plastic yarn or fibers shall consist of at least 85 percent by weight of polyolefins, polyesters, or polyamides and resist deterioration from ultraviolet and heat exposure.
2. Provide geotextile meeting or exceeding the following requirements (Source: INDOT Standard Specifications 2022, Section 918.02)

Test	Method, ASTM	Requirements				
		Type 1A	Type 1B	Type 2A	Type 2B	Type 3
Grab Tensile Strength, min.	D4632	200 lbs.	200 lbs.	250 lbs.	300 lbs.	250 lbs.
Grab Elongation	D4632	> 50%	< 50%	> 50%	< 50%	< 50%
CBR Puncture Strength, min.	D6241	500 lbs.	600 lbs.	625 lbs.	1,000 lbs.	875 lbs.
Trapezoid Tearing Strength, min.	D4533	80 lbs.	75 lbs.	100 lbs.	150 lbs.	60 lbs.
Deterioration in Tensile Strength due to UV degradation 500 hrs., min.	D4355 D6637	70% strength retained	70% strength retained	70% strength retained	70% strength retained	90% strength retained
Apparent Opening Size, AOS	D4751	≤ No. 80 sieve, for soils ≥ 40% passing the No. 200 sieve	≤ No. 40 sieve, for soils < 40% passing the No. 200 sieve	≤ No. 100 sieve, for soils ≥ 40% passing the No. 200 sieve	≤ No. 40 sieve, for soils < 40% passing the No. 200 sieve	≤ No. 70 sieve
Permittivity	D4491	≥ 1.2 sec <sup>-1</sup>	≥ 2.1 sec <sup>-1</sup>	≥ 0.80 sec <sup>-1</sup>	≥ 0.90 sec <sup>-1</sup>	0.28 sec <sup>-1</sup>
Note: 1) All values are minimum average roll values (MARV) as determined in accordance with ASTM D4354 in the weaker direction, except AOS size is based on maximum average roll value.						

L. Silt Fence: Use materials specified on the Drawings.

M. Other: All other materials shall meet commercial grade standards and be approved by the Engineer before being incorporated into the project.

1. Anionic polymers are not to be used for stormwater runoff treatment unless approved by IDEM.
2. Cationic polymers are prohibited.

### PART 3 - EXECUTION

#### 3.01 Examination

##### A. Site Verification of Conditions

1. Coordinate soil testing services
2. Implement resulting recommendations

#### 3.02 Preparation

- ##### A. Do not start Work until the erosion and sediment control schedule and methods of operations for the applicable construction activities have been accepted by the Engineer.

- B. Coordinate and/or phase temporary erosion and sediment control measures contained herein with the permanent erosion control measures and soil stabilization methods as specified as part of this contract to assure economical, effective, and continuous erosion and sediment control throughout the construction and warranty period.
- C. Inform or train personnel associated with the project of the terms and conditions of the CSGP and the SWP3 requirements.
  - 1. Personnel include all contractors, management firms, chemical applicators, inspectors, and those responsible for management and maintenance of erosion and sediment control measures.
  - 2. Training may include written notification, contracts, pre-construction meetings, or other means.
  - 3. Document the training in the Project Management Log.

### 3.03 Protection

- A. Manage sediment-laden water with appropriate sediment control measures to minimize sedimentation to receiving waters and adjacent properties. Refer to Specification 04.
- B. Protect natural features (e.g., wetlands, sinkholes, karst features, floodways, etc.) with stormwater management or treatment measures to address pollutants that may discharge to these features.
- C. Minimize soil compaction in areas where permanent vegetation will be re-established and/or areas that are designated to infiltrate stormwater for the post-construction phase.
- D. Preserve existing natural buffers that are adjacent to waters of the state to promote infiltration and provide protection of the water resource as established on the Drawings, unless infeasible.
- E. Do not discharge pollutants such as sediments, fuels, lubricants, bitumen, raw sewage, or wash water from concrete mixing operations (concrete washout), water from trench or pit dewatering, and other harmful materials into or near stormwater conveyances, wetlands, rivers, streams, and impoundments or into natural or manmade channels leading thereto.
- F. Do not apply pesticides when working in or adjacent to a floodway, river, stream, ditch, or other stormwater conveyance.
- G. Properly dispose of all waste materials. Refer to Specification 04.
- H. Establish vegetation in accordance with the Seasonal Soil Protection Chart on the Drawings.
- I. Temporarily or permanently stabilize unvegetated areas that are scheduled or likely to be left inactive for 7 days or more with measures appropriate for the



season to minimize erosion potential. Initiate stabilization activities by the end of the seventh day the area is inactive. Complete stabilization activities within 14 days.

- J. Final stabilization for construction projects within agricultural land is accomplished by temporarily or permanently seeding as land disturbance progresses unless the agricultural landowner prefers to leave disturbed land un-stabilized for crop production. If agricultural land is left un-stabilized, coordinate within 7 days with the local authority when construction is completed for an inspection. Request that the area be deemed to not pose a threat of discharging sediment. When agreement and documentation is received by the local authority, maintain in the Project Management Log and proceed with construction.

#### 3.04 Installation - General

- A. Incorporate all permanent erosion control features into the project at the earliest practical time. Except where future construction operations will damage slopes, perform the permanent seeding, mulching and other slope protection Work in stages as soon as substantial areas of exposed slopes can be made available.
- B. Use temporary erosion and pollution control measures to correct conditions that develop during construction, that are needed prior to installation of permanent control features, or that are needed temporarily to control erosion that develops during normal construction practices.
- C. Schedule and perform clearing and grubbing operations so that grading operations and permanent erosion control features can follow immediately thereafter if the project conditions permit; otherwise, install temporary erosion control measures between successive construction stages.
- D. Limit the area of clearing and grubbing, excavation, borrow, and embankment operations in progress, commensurate with progress in completing the finish grading, seeding, mulching and other such permanent control measures in accordance with the accepted schedule. Should seasonal limitations make such coordination unrealistic, install temporary erosion control measures.
- E. In the event temporary erosion and pollution control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of the Work as scheduled or as ordered by the Engineer, perform such Work at Contractor's expense.
- F. Maintain all erosion and sediment control practices during the construction period.
- G. Whenever construction equipment must cross waterways at frequent intervals, and such crossings will adversely affect water quality in the waterway, provide temporary structures. Coordinate with Engineer regarding and prior to constructing such crossings. Comply with all regulations and permits for waterway crossings.

### 3.05 Installation - Erosion and Sediment Control Measures

#### A. Temporary Construction Entrance

1. Construct temporary construction entrances where needed to prevent tracking of soil or mud onto publicly or privately owned paved surfaces.
2. Place temporary construction entrances at locations where construction vehicles will repeatedly access a disturbed or unpaved area from a paved roadway.
3. Not all locations of construction entrances may be shown on the Drawings. The contractor is responsible for locating and placing construction entrances at all points of construction traffic ingress and egress to prevent tracking and to avoid disturbance to existing waterways.
4. Should tracking of soil occur, clear accumulated sediment from public and private driveways by the end of the day, as instructed by a regulatory authority, and/or more frequently as sediment is tracked onto roadways.
5. Redistribute or properly dispose of collected sediments in a manner that is in accordance with all applicable statutes and regulations.
6. Do not rinse tracked material with water unless water is collected and disposed of properly.
7. Do not clear sediment using mechanical methods that will mobilize dust off the project site.

#### B. Silt Fence

1. Install silt fence as shown on the Drawings to provide sediment control at the top of slopes, at the down-gradient project limits, as periodic filter breaks on down slopes, at project limits and other locations indicated.
2. Provide additional silt fence where the extents of land disturbance extend beyond the lengths of silt fence shown on the Drawings.

#### C. Fiber Filtration Tubes

1. Install in accordance with manufacturer's instructions.
2. Use fiber filtration tubes for the slowing and filtering of stormwater.
3. Use the appropriate tube size for the slope and the distance between tubes as specified by the manufacturer.
4. The tubes shall allow water to flow freely and provide filtration of suspended particles.

#### D. Dust Control

1. Use water to dampen surfaces to minimize dust and prevent wind erosion.
2. Do not rinse surfaces with water unless water is collected and disposed of properly.
3. Implement dust control methods on a routine basis where conditions warrant.
4. Provide water and dust suppression when requested by the Engineer.

E. Pumping Bags

1. Install pumping bags according to the Drawings.
2. Provide pumping bags to filter sediment from dewatering operations.
3. Properly dispose of used pumping bags.
4. Appropriately size the bags for the amount of flow.
5. Use pumping bags on an erosion resistant surface.
6. Do not discharge sediment-laden water from dewatering operations into or near stormwater conveyances, wetlands, rivers, streams, and impoundments or into natural or manmade channels leading thereto. Refer also to Section 04 for the disposal of sediment-laden water.

F. Concrete Washout Area: Refer to Section 04 for Concrete Washout requirements.

G. Grass

1. Restore all non-paved surfaces that were disturbed during construction with permanent seeding or sod unless shown otherwise on the Drawings.
2. Prior to seeding disturbed areas must be graded and receive a minimum of 6 inches of topsoil. Use excavated material which meets the specified requirements for topsoil, or if the quantity of suitable topsoil is not sufficient, use topsoil obtained from another source.
3. Scarify the planting area to a minimum depth of 6 inches. Mix soil amendments such as fertilizer and lime if required, in the top 2 to 4 inches of topsoil with a disk or rake operated across the slope.
4. Apply seed uniformly with a drill or cultipacker seeder, or by broadcasting. Cover seed with topsoil a minimum of 1/2 inch. Cover newly seeded areas with anchored mulch or erosion control blanket.
5. Keep seeded and fertilized areas adequately watered to a minimum of 1-inch depth per week until germination of all seed is complete and uniform grass cover is accomplished.
6. Immediately prior to installing sod, water the planting area with a fine spray to a minimum penetration of 1 inch.
7. Do not place frozen sod, and do not place sod on frozen or dry soil. Do not place sod when the air temperature is less than 32 degrees Fahrenheit.
8. Lay sod with closely fitted abutting joints without stretching and overlapping and stagger the ends of the strips. Trim and fit sod into irregular areas to eliminate gaps.
9. On slope areas, lay sod starting from the bottom of the slope and lay sod horizontal to the contour. Where slopes are greater than a horizontal to vertical ratio of 3 to 1, staple or stake each sod strip at the corners and in the middle.
10. After initial watering, tamp or roll sod with a roller to eliminate irregularities. Repeat watering at regular intervals to keep sod moist until it is rooted and to maintain growth until final acceptance.

H. Mulch: Anchor mulch unless held in place by a tackifier or netting.

I. Erosion Control Blanket

1. Where construction disturbs slopes equal or steeper than 3 to 1 or within drainage channels, protect bare slopes with an erosion control blanket as shown on the Drawings.
2. When vegetation is to be established, place erosion control blanket over the seed and anchor according to manufacturer's instructions to prevent the seed from washing away.
3. Place erosion control blankets on seedbeds free of sticks, rocks, and other objects larger than 1 inch.

3.06 Soil Stockpiles

- A. Manage soil stockpiles for wind erosion, stormwater erosion, and sediment control.
- B. Provide soil stockpiles with perimeter protection measures (silt fence, fiber filtration tube, etc.).
- C. Temporarily or permanently stabilize stockpiled soil that is scheduled or likely to be left inactive for 7 days or more with measures appropriate for the season to minimize erosion potential. Initiate stabilization activities by the end of the seventh day the area is inactive. Complete stabilization activities within 14 days.
- D. Position stockpiles away from any ditch, stream, wetland, or stormwater conveyance.
- E. Properly dispose of soil that will not be used for the project.

3.07 Trench Excavation

- A. Pile material from trench excavations in an area away from any ditch, stream, wetland, or stormwater conveyance and install silt fence around the material for sediment control.
- B. Install inlet protection within the project area when excavated material is placed on a paved surface.
- C. Following pipe installation, backfill trenches and temporarily or permanently stabilized all bare areas to prevent soil erosion.

3.08 Directional Drilling or Horizontal Boring Erosion and Sediment Control

- A. Install erosion and sediment control measures in accordance with the Drawings.
- B. Install silt fence around all Work areas at bore and receiving pits to control sediments.
- C. Pile materials from ditch excavation away from ditches, streams, wetlands, or stormwater conveyances.
- D. Properly dispose of material that is not used to back fill pits.

E. Filter pit dewatering discharge in accordance with Section 04 for the Disposal of Sediment-Laden Water

F. Seed and mulch disturbed soil surfaces

3.09 Work within a Waterway (Stream Crossing) or Floodway

A. Minimize tree removal and brush clearing within floodways and near waterways. When possible, maintain a 50-foot vegetated buffer from the top of bank of all waterways.

B. Avoid disturbing the ground within the drip line of any tree.

C. Install erosion and sediment control practices during and after construction to minimize impacts to a waterway or floodway.

D. Stabilize bare areas immediately following construction activities.

E. Reclaim all disturbed areas within a waterway or floodway that are to be revegetated, with native species.

F. Do not use tall fescue.

G. Install erosion control blanket to cover bare areas and seedbeds and to prevent erosion until vegetated species are established.

H. Stockpiling of soil, excavated materials, or stone is not permitted within or near a ditch, waterway, or floodway.

I. When installing pipe by open cutting a trench across a waterway, if the Work cannot be completed during dry conditions, bypass pump stream flows using the dam and pump method as shown on the Drawings.

J. Utilize existing roads to move equipment and materials from one side of the waterway to the other.

K. Do not exceed two (2) calendar days of construction activities within the waterway from April 1 through June 30 to minimize impacts during fish spawning season.

L. Do not exceed 30 feet of total length of waterway disturbance (parallel to the flow of the stream).

3.10 Working Near Karst Features or Water Wells

Karst features are underground geological formations that range from sinkholes, vertical shafts, and springs to complex underground drainage systems and caves. Underground karst features and water well aquifers are to be protected from construction activities and potential pollution sources.

A. Identify water wells and known karst features on the Drawings.

- B. Implement erosion and sediment control practices to reduce sedimentation introduction into karst features and groundwater.
- C. Position construction materials and equipment so that the area slopes away from karst features and wells.
- D. Provide secondary containment for all chemicals, fuels, or other liquids to capture spills or leaks.
- E. Clean up spills with absorbents or dry methods. Do not allow spills to soak into the ground and do not wash off with water or detergents.
- F. Properly dispose of waste materials.

### 3.11 Field Quality Control

#### A. Self-Monitoring Program – Inspections

1. Inspections are to be performed by a trained individual. One who is trained and experienced in the principles of stormwater management, including erosion and sediment control as is demonstrated by completion of coursework, state registration, professional certification or annual training that enables them to make judgments regarding stormwater management, treatment, and monitoring.
2. Conduct an inspection of the construction site to identify areas contributing to stormwater discharges from construction activity at the following frequency:
  - a. At least weekly if no qualifying precipitation event (greater than 0.5 inches) occurs.
  - b. 24-hours prior to a qualifying precipitation event or by the end of the next business day after a qualifying precipitation event.
  - c. No more than three inspections are required per week for multiple qualifying precipitations events occurring in one work week.
  - d. Monthly for areas stabilized with permanent vegetative cover at 70% density and/or where erosion resistant armoring is installed.
3. Inspect disturbed areas, material storage areas, and equipment storage areas that are exposed to precipitation for evidence of, or the potential for, pollutants leaving the project site or entering a storm drainage conveyance.
4. Inspect stormwater discharge locations and/or outfalls to determine if control measures are effective in preventing adverse impacts to receiving waters.
5. Observe erosion and sediment control devices to ensure that they are operating properly.
6. Inspect haul routes and construction entrance(s) daily for evidence of off-site vehicle tracking of sediments.
7. Inspect staging area to ensure that solid and liquid wastes are being properly disposed of and are not allowed to be discharged into stormwater runoff.

#### B. Self-Monitoring Program – Reports

1. Document and summarize the results of each inspection.

2. Include the following:
    - a. Name(s), title, signature, and qualifications of the trained individual completing the inspection.
    - b. Date(s) of the inspection.
    - c. Amount of precipitation when the inspection is completed after a qualifying precipitation event.
    - d. Implementation of the SWP3
    - e. Major observations relating to the implementation of the erosion and sediment control measures.
    - f. Identification of maintenance, repairs, sediment removal, failure of measures, erosion, debris, spills, or any incidents of noncompliance.
  3. Document an actual discharge visible during the inspection including the location, description, color, odor, floatables, settles/suspended solids, foam, oil sheen, and any other visible sign of pollution
  4. Provide a corrective action and implementation schedule for all identified issues and document completion on the inspection report.
  5. Implement corrective action(s) on the day of discovery, no later than 48 hours if temporary measures must be installed, and/or within 7 days for installation of new measures.
  6. Retain inspection reports for the project duration and submit to Owner at project close out.
  7. Make reports available to inspecting authority within 48 hours of a request.
- C. Project Management Log – Maintain the following documents at the project site office or by on-site individual(s) responsible for project management:
1. Permit documentation - Notice of Intent, public notice, IDEM submission, and Notice of Sufficiency.
  2. Revisions to Erosion Control Schedule.
  3. Plan for erosion and dust control on haul roads
  4. Plan for disposal of waste materials
  5. Self-Monitoring Program inspection reports and regulatory inspections
  6. Drawings
  7. SWP3 and dates of modifications
  8. Documentation of CSGP and SWPPP review with site personnel.
  9. Information related to off-site borrow sites, disposal areas, and staging areas.
  10. Retain Project Management Log for the project duration and submit to Owner at project close out.

### 3.12 Maintenance

- A. Maintain all erosion and sediment control measures and perform the following maintenance procedures throughout the project and until such time as the disturbed area has been completely stabilized or other provisions have altered the need for these measures.
1. Implement maintenance practices as specified in the Drawings.
  2. Replace mulch materials to their original level when the level has been substantially reduced due to decomposition of the organic mulches and displacement or disappearance of both the organic and inorganic mulches.

3. Remove rubbish and channel obstructions from bare and vegetated channels within the project limits. Repair damage from scour or bank failure, rodent holes, and breaching of diversion structures. Remove deposits of sediment.
4. Immediately repair excessive wear, movement, or failure of erosion control blankets.
5. Repair any damage to silt fence barriers immediately and monitor barriers daily during prolonged rainfall.
6. Repair or replace any filter fabric which has decomposed or become ineffective prior to its expected usable life.
7. Remove sediment deposits after each storm event. Remove sediment when deposits reach approximately half the height of a silt fence barrier.
8. Till and smooth to conform to the existing grade and reseed any sediment deposits remaining in place after erosion and sediment control measures are no longer required and have been removed.
9. Maintain construction entrances in a condition to prevent tracking or flowing of sediment onto roads. This could require periodic top dressing of the construction entrance with additional surface materials as conditions demand. Repair and clean out any features used to trap sediment and remove all sediment spilled, dropped, washed, or tracked onto road surfaces and dispose of properly.
10. Periodically remove concrete and residual liquid from the concrete washout area, as needed to maintain available space for the future washout and rainwater. Dispose of in accordance with Section 04.
11. Repair all rills that may appear. Re-grade to eliminate rill and stabilize ground by seeding or other approved methods.
12. Stabilize the site and reapply seed and mulch to achieve 70 percent density of cover on vegetated areas.
13. Remove and dispose of all temporary erosion and sediment control practices within 30 days after site stabilization is achieved or after the temporary practices are no longer needed.

3.13 Payment: Stormwater Pollution Prevention and Erosion Control Work will not be measured and paid for directly but be considered as a subsidiary obligation of the Contractor with costs included in the contract prices bid for the items to which they apply unless otherwise shown in the Itemized Bid Attachment.

-END-



## SECTION 04 – MATERIAL HANDLING AND SPILL PREVENTION PLAN

### PART 1 - GENERAL

#### 1.01 Summary

##### A. Section Includes: providing a plan outlining procedures to:

1. Help protect the health and safety of those working at the project site as well as the environment
2. Prevent the contamination of stormwater runoff by onsite pollutants
3. Help prevent fuel and chemical spills
4. Provide a response procedure should a spill occur

##### B. Related Sections

1. Section 03 – Stormwater Pollution Prevention and Erosion Control

#### 1.02 References

- A. 327 IAC 2-6.1 – Spills; Reporting, Containment, and Response
- B. 327 IAC 2-10 – Secondary Containment of Aboveground Storage Tanks Containing Hazardous Materials
- C. INRA00000 – Construction Stormwater General Permit (CSGP)

#### 1.03 Definitions

- A. Minor Spill: Approximately 10 gallons or less of pollutant with no contamination of ground or surface waters. Minor spills can generally be controlled by the first responder with help from other site personnel.
- B. Major or Hazardous Spill: More than 10 gallons with the potential for death, injury, or illness to humans or animals or has the potential for surface or groundwater pollution.
- C. Pollutants generated onsite may include gasoline, diesel fuel, oils, grease, paints, pesticides, nutrients, concrete and cementitious washout, soil, solvents, paper, plastic, Styrofoam, metals, glass, and other forms of liquid or solid wastes.

#### 1.04 Quality Assurance

##### A. Regulatory Requirements

1. Ensure material handling and storage associated with construction activity complies with the spill prevention and spill response requirements in Indiana Administrative Code 327 IAC 2-6.1.

2. Ensure aboveground storage tanks containing hazardous materials are stored appropriately according to the requirements in Indiana Administrative Code 327 IAC 2-10.
3. Dispose of contaminated soils, absorbents, and spill cleanup materials in accordance with all Federal, State, and local regulations.
4. Do not use water to flush spilled material unless authorized by a Federal, State, or local agency.
5. Additional regulation or requirements may be required. Consult a spill response professional to ensure all appropriate and required steps have been taken.
6. Do not remove contaminated material from the site until approval is given by Indiana Department of Environmental Management (IDEM), Office of Emergency Response (when emergency response is required).
7. Construction waste must be managed to prevent the discharge of pollutants and windblown materials. Waste containers (trash receptacles), when selected to manage waste, must be managed to reduce the discharge of pollutants and windblown debris.
8. Comply with CSGP requirements and conditions until a Notice of Termination is submitted to terminate the permit.

## PART 2 - PRODUCTS

Not Used.

## PART 3 - EXECUTION

### 3.01 Preparedness

- A. Prepare a contact list of First Responders and the chain of command in the event of a spill on the site. Include names, contact numbers, local agency contact numbers, and information on circumstances requiring the initiation of the contact list and chain of command. Include IDEM Emergency Spill Line (888) 233-7745 or (317) 233-7745.
- B. Maintain a list of qualified contractors, vacuum trucks, tank pumpers, and other equipment and businesses qualified to perform cleanup operations.
- C. Provide a list and quantity of absorbent materials and supplies the Contractor will make available onsite in sufficient quantities to address minor spills.
- D. Train construction personnel, equipment operators, subcontractors, and other employees on proper fueling procedures, prevention of spills, spill response procedures, and communication procedures.

### 3.02 Spill Response

#### A. Minor Spills

1. Contain the spill to prevent material from entering the waterways and the storm or groundwater systems. Immediately clean up the spill with absorbent materials.
2. Do not flush with water, bury, or allow soaking into the ground.
3. Tarps can be used to cover spilled material during rain events on land.
4. Use absorbent material to cleanup spills on land.
  - a. Contain spills on impervious surfaces with a dry absorbent.
  - b. Contain spills on clayey soils by constructing an earthen dike and dispose of spilled material as soon as possible to prevent migration deeper into the soil and groundwater. Remove contaminated soils.
5. Use containment booms to prevent the migration of spills on water.
  - a. Contain spills on water with a containment boom and absorb with an oil-only boom, mechanical skimmer, or other similar device.
  - b. Outside agencies will determine additional cleanup measures.
  - c. Report oil spills that cause a sheen upon the waters.
6. Gather contaminated materials and/or soils. Place contaminated absorbents and soils into a container for later disposal. Ensure the lid is closed and mark or label the container for identification purposes.
7. Contact 911 if the spill could be a safety issue.
8. Contact supervisors and designated inspectors immediately.
9. Dispose of waste appropriately.

#### B. Major or Hazardous Spills

1. Control or contain the spill without risking bodily harm.
2. Temporarily plug or cover storm drains if possible, to prevent migration of the spill into the stormwater system.
3. Use containment booms to prevent the migration of spills on water.
  - a. Contain spills on water with a containment boom and absorb with an oil-only boom, mechanical skimmer, or other similar device.
  - b. Outside agencies will determine additional cleanup measures.
  - c. Report oil spills that cause a sheen upon the waters.
4. Immediately contact the local Fire Department at 911 to report any hazardous material spill.
5. Contact supervisors and designated inspectors immediately. Contact county or municipal officials responsible for stormwater facilities. The Contractor is responsible for having these contact numbers available at the job site. Submit a written report to the Owner as soon as possible.
6. Contact IDEM, Office of Emergency Response as soon as possible, but within 2 hours of discovery at 1-888-233-7745. Note the following information for future reports to the IDEM or the National Response Center (1-800-424-8802):
  - a. Name, address, and phone number of person making the spill report
  - b. The location of the spill
  - c. The date and time of the spill
  - d. Identification of the spilled substance
  - e. Cause of the spill

- f. Approximate quantity of the substance that has been spilled or may be further spilled and the amount recovered
- g. The duration and source of the spill
- h. Name and location of the damaged waters
- i. Name of spill response organization
- j. Measures taken in the spill response
- k. Other pertinent information

### 3.03 Spill Prevention and Material Handling Practices

#### A. Vehicle and Equipment Fueling

1. Purpose: To prevent fuel spills and leaks and to reduce or eliminate contamination of stormwater and waterways.
2. Implementation
  - a. Use offsite commercial fueling stations when possible. Use onsite vehicle and equipment fueling only where it is impractical to send vehicles and equipment offsite to a commercial fueling station.
  - b. When performing fueling onsite, provide a designated fueling area.
  - c. Do not "top-off" fuel tanks.
  - d. Keep available absorbent spill cleanup materials and spill kits in fueling areas and on fueling trucks.
  - e. Inspect vehicles and equipment daily for leaks. Repair leaks immediately or remove them from the project site.
  - f. Use drip pans or absorbent pads during vehicle and equipment fueling, unless the fueling is performed over an impermeable surface in a dedicated fueling area.
  - g. Protect dedicated fueling areas from stormwater run-on and runoff and locate them at least 50 feet away from the downstream drainage facilities, stormwater conveyances or waterways.
  - h. Perform fueling on level-grade areas.
  - i. Protect fueling areas with berms and dikes to contain spills.
  - j. Equip nozzles used in vehicle and equipment fueling with an automatic shut off.
  - k. Do not leave fueling operations unattended.
  - l. Avoid mobile refueling of construction equipment; rather transport the equipment to the designated fueling area.
  - m. Store all petroleum products in tightly sealed containers which are clearly labeled.
  - n. Observe Federal, State, and local regulations for any stationary above ground storage tanks.

#### B. Vehicle Maintenance Areas

1. Purpose: To prevent stormwater exposure and spills during the normal maintenance of construction machinery.
2. Implementation:
  - a. As feasible, perform maintenance offsite in a covered facility with an impervious floor.
  - b. Use a dedicated site for machinery maintenance.

- c. Locate maintenance areas at least 50 feet from stormwater inlets or water bodies.
- d. Maintain spill kits and absorbent materials in close proximity to maintenance areas. Utilize drip pans and absorbent pads to prevent oils or other maintenance fluids from reaching the soil surfaces.
- e. Inspect equipment daily for leaks or worn hoses. Repair or replace as needed to prevent onsite spills.
- f. Properly dispose of all spilled fluids and fluids removed from machinery.

#### C. Equipment and Vehicle Washing

- 1. Purpose: To prevent or reduce the discharge of pollutants to waterways or stormwater from construction equipment and vehicle washing.
- 2. Implementation:
  - a. As feasible, perform washing offsite in a covered facility with an impervious floor and drains connected to the sanitary sewer.
  - b. Use a dedicated site for washing.
  - c. Locate wash areas at least 50 feet from stormwater inlets or water bodies.
  - d. Do not discharge wash water if using soaps, solvents, or detergents. Only non-contaminated wash water may be discharged to stormwater.
  - e. Inspect equipment and vehicles for leaks or worn hoses prior to washing.
  - f. Properly dispose of contaminated wash water.

#### D. Solid Waste Management

- 1. Purpose: To prevent or reduce the discharge of pollutants to waterways or stormwater from construction waste by providing designated waste collection areas and containers, arranging for regular disposal, and training employees and subcontractors.
- 2. Suitable Applications: Suitable for construction sites where the following wastes are generated or stored:
  - a. Solid waste generated from trees and shrubs removed during land clearing, demolition of existing structures (rubble), and building construction.
  - b. Packaging materials including wood, paper, and plastic.
  - c. Scrap or surplus building materials including scrap metals, rubber, plastic, glass pieces, and masonry products.
  - d. Domestic wastes including food containers such as beverage cans, coffee cups, paper bags, plastic wrappers, and cigarettes.
  - e. Construction waste including brick, mortar, timber, steel and metal scraps, pipe and electrical cuttings, non-hazardous equipment parts, Styrofoam, plastic, and other packaging for construction materials.
  - f. Sediments and other materials collected in erosion and sediment control measures (silt fence, inlet protection, catch basin sumps, etc.).
  - g. Natural debris such as excess soil, stone, sand, leaves, branches, brush, or wood.
- 3. Implementation
  - a. Develop a plan for proper waste disposal including the disposal of excess soil and excavated material. If a commercial disposal facility will not be utilized for soil disposal, then develop a Stormwater Pollution Prevention Plan for the selected disposal area.

- b. Select designated waste collection areas onsite.
- c. Inform trash-hauling contractors that only watertight dumpsters are acceptable for onsite use.
- d. Inspect dumpsters for leaks, and repair dumpsters that are not watertight.
- e. Provide an adequate number of containers with lids or covers to prevent loss of wastes from wind and to prevent the collection of rainwater.
- f. Waste that is not disposed of in trash receptacles must be protected from exposure to the weather and/or removed at the end of the day from the site and disposed of properly.
- g. Collect site trash daily or more frequent if needed during demolition Work. Do not allow containers to overflow. Clean up immediately if a container spills, leaks, or overflows.
- h. Remove solid waste promptly from erosion and sediment control devices.
- i. Ensure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acid, pesticides, additives, curing compounds) are not disposed of in dumpsters designed for construction debris.
- j. Do not hose out dumpsters on the construction site. Ensure that dumpster cleaning is conducted by the trash hauling contractor off site.
- k. Make sure that construction waste is collected, removed, and disposed of only at authorized disposal areas. Do not locate solid waste storage areas in areas prone to flooding or ponding.
- l. Locate solid waste dumpsters a minimum of 50 feet away from waterways, stormwater inlets or other drainage facilities.
- m. Minimize the potential for spills or leaks to drain immediately into a waterway or drainage facility.
- n. Do not bury construction waste onsite.
- o. Cover construction material hauled from the site in dump trucks with a tarpaulin.
- p. Inspect construction waste areas regularly.

#### E. Fluids, Paints, Solvents and Other Chemicals Storage and Use

- 1. Purpose: To prevent stormwater exposure and spills during the use and storage of the materials.
- 2. Implementation
  - a. Store materials in manufacturer's containers.
  - b. Maintain Safety Data Sheets (SDS) on all products.
  - c. Store materials in a weatherproof/vandal resistant locker or building.
  - d. Keep materials away from flammable sources.
  - e. Follow manufacturer's instructions for the proper use and storage of all materials.
  - f. Do not perform washing of applicators or containers of solvent, paint, grout, stucco, or other materials near or into a waterway or stormwater inlet. Wash water is to be disposed offsite as wastewater.
  - g. Tightly seal and store paint containers and curing compounds when not required for use.
  - h. Do not discharge excess paint to a waterway or storm system. Properly dispose of excess paint according to the manufacturer's instructions and in accordance with all Federal, State, and local regulations.

#### F. Secondary Containment

1. Provide secondary containment for aboveground storage tanks or storage areas containing hazardous materials that are located outside.
2. Provide secondary containment consistent with good engineering standards.
3. Provide secondary containment that is compatible with the hazardous materials being stored.
4. Provide secondary containment that will prevent a release from entering waters for a 72-hour period.
5. Secondary containment must meet one of the following:
  - a. Double-walled tank,
  - b. Dikes, berms, retaining walls, trenches, or
  - c. Diversionary system
6. Provide secondary containment with a capacity to contain at least 110% of the volume of the largest aboveground tank or the volume of the largest aboveground tank plus enough freeboard to contain precipitation generated by a 25 year/24-hour rain event.
7. Provide secondary containment with a minimum 120-gallon capacity for storage area holding only drums.
8. Maintain the secondary containment to protect the integrity and capacity of the area.
9. Remove collected liquid in the secondary containment area within 72 hours of its discovery to maintain the capacity. Remove ice as soon as weather permits. Liquid that collects within the secondary containment area must meet all applicable requirements of the Water Quality Standards if discharged to waters of the state.

#### G. Disposal of Sediment-Laden Water

1. Purpose: To prevent the purposeful discharge of sediment-laden water from the project site.
2. Implementation
  - a. Do not discharge sediment-laden water from pumping operations into or near stormwater conveyances, wetlands, rivers, streams, waterways, and impoundments or into natural or manmade channels leading thereto.
  - b. Discharge sediment-laden water from dewatering of trenches, or other excavations by means of a pump or similar means into a manufactured pumping bag for filtering in accordance with the manufacturer's instructions unless the pumped water is routed through another erosion control measure such as a sediment trap or outlets onto a well-established vegetated area without eroding.
  - c. Pumping operations moving clean water through a site are not required to have a pumping bag or similar device at the outlet.
  - d. Protect the point of discharge to prevent soil erosion.
  - e. Do not discharge water with a visible sheen and/or pollutants at a level that requires additional or alternate treatment.

#### H. Concrete Washout Area

1. Discuss the concrete management techniques (such as handling of concrete waste and washout) with the ready-mix concrete supplier before any deliveries are made.
2. Incorporate requirements for concrete waste management into material supplier and subcontractors' agreements. Inspect construction activities on a regular basis to ensure suppliers, contractors, and others are utilizing designated washout areas. If concrete waste is being disposed of improperly, identify the violators and take appropriate action.
3. Perform washout of concrete trucks either offsite or in designated areas only. Never dispose of washout from concrete trucks in a ditch, stream, wetland, waterway, or stormwater conveyance.
4. Provide a designated concrete washout area for use of washing out concrete trucks to contain potential stormwater pollutants. Use one of the following methods:
  - a. Construct a minimum 10-feet by 10-feet by 3-feet deep area (or larger as required to contain liquid and solid waste from concrete washout operations) with a polyethylene lining. Construct and prepare the base of the system so that it is free of rocks and other debris that may cause tears or punctures in the polyethylene lining.
  - b. Install and maintain a pre-fabricated containment system in accordance with the manufacturer's instructions.
  - c. Use a polyethylene-lined roll-off dumpster when other methods are not practicable.
  - d. Subcontract with a concrete supplier that collects all washout water and pumps it back into the mixer drum for proper disposal off-site. In this instance, a concrete washout area would not be required.
5. Install orange safety fencing around concrete washout area perimeter. Post signage directing contractors and suppliers to the designated concrete washout location.
6. Locate washout areas at least 50 feet from storm drains, open ditches, or water bodies.
7. Inspect concrete washout area daily and after each storm event.
  - a. Check to ensure that the washout has not reached or exceeded maximum capacity.
  - b. Inspect the integrity of the overall structure.
  - c. Inspect the polyethylene liner for failure. The liner may need to be replaced after every cleaning if removal of material has damaged the liner.
  - d. Repair the concrete washout structure, as needed, or construct a new system.
8. Concrete wastewater liquid shall be fully evaporated prior to the planned capacity of the washout structure capacity being exceeded. Liquid that collects in the washout area could be high in alkalinity and could contain pollutants. Liquid must be disposed of offsite as wastewater.
  - a. Concrete wastewater liquid that has not solidified may be pumped out into a secondary lined container or into a tanker and taken to an approved disposal facility.
  - b. Concrete wastewater shall not be allowed to leak onto the ground, run into storm drains, or into any body of water. Where washout wastewater leaks



onto the ground, all contaminated soils shall be excavated and disposed of properly.

9. Allow concrete wastes to set. Break up and properly dispose of hardened wastes. Upon removal of waste, inspect the structure.
10. Do not wash sweepings from exposed aggregate concrete into the street or storm drain. Collect and return sweepings to aggregate base stockpile or dispose of in the trash.
11. Do not dump excess concrete onsite, except in designated areas.
12. Provide a secondary concrete washout system onsite to be used in an emergency and that is of sufficient size to handle concrete washout wastewater from a minimum of one truck.
13. When concrete washout areas are no longer required, close the concrete washout systems. Dispose of all hardened concrete and other materials used to construct the system. Backfill, grade, and stabilize any holes, depressions, and other land disturbances associated with the system.

#### I. Fertilizers

1. Apply fertilizers only in the minimum amounts recommended by the manufacturer, as indicated from a soil test, or per the Indiana Stormwater Quality Manual.
2. Work fertilizers into the soil to limit exposure to stormwater.
3. Do not apply immediately prior to precipitation events.
4. Store fertilizers in a covered area and transfer partially used bags to a sealable container to avoid spills.

-END-



## SECTION 05 – SLIDE GATES

### PART 1 - GENERAL

#### 1.01 Description

A. Scope: Furnish and install slide gates and appurtenances in accordance with the latest version of AWWA C561 as modified herein and as necessary to complete the work shown or specified.

1. Each unit shall be complete with gate, frame, rising stem, manual operator, and appurtenances. All components shall be furnished by one manufacturer.

B. Codes, specifications, and standards referred to by number or title shall form a part of this specification to the extent required by the references thereto. Latest revisions shall apply, unless otherwise shown or specified.

#### 1.02 Quality Assurance

Upon installation, manufacturer shall inspect the slide gates for mechanical and structural correctness and actuators for electrical correctness.

#### 1.03 Performance

A. Slide Gates: Leakage shall not exceed 0.05 U.S. gallons per minute per foot of seal periphery under the design seating and unseating heads.

#### 1.04 Submittals

A. Submittals shall include information and materials specified in this Section, and the General Requirements.

B. Submit the following for the Engineer's review and approval:

1. Shop drawings with performance data, descriptive literature, weights and dimensions, and other physical characteristics verifying compliance with this Section. When numerous options and sizes are shown, the shop drawings shall be marked to clearly indicate the sizes and types specific to this Section and project;
2. Manufacturer's installation instructions and recommended testing procedures;
3. Manufacturer's operation and maintenance (O&M) manuals and materials. When numerous types and sizes are shown, the manuals shall be marked to clearly indicate the sizes and types specific to this project. Provide four (4) bound hard copy sets and two (2) CD's with complete electronic copy in pdf format.

#### 1.05 Product Delivery, Storage, and Handling

A. The Contractor shall be responsible for the delivery, storage, and handling of products.

- B. Promptly remove damaged products from the job site. Replace damaged products with undamaged products.

## PART 2 - PRODUCTS

### 2.01 Slide Gates

- A. Gate and Frame: The gates shall be rising stem with the guides designed to mount on the face of the concrete where indicated on the Drawings. Slide gates frame configuration shall be of the flush-bottom type.
  - 1. Guides and Seals: The guides shall be made of UHMWPE (ultra-high molecular weight polyethylene) and be of such length as to retain and support at least 2/3 of the vertical height of the slide in the fully open position. The vertical face of the seal shall be in contact with the seating surface of the guide to provide a proper seal at the corners. Gate, frame, and sealing shall be designed for seating and unseating head conditions as noted in the schedule.
    - a. Slide Gates: Side seals shall be made of UHMWPE of the self-adjusting type. A continuous compression cord shall ensure contact between the UHMWPE guide and the gate in all positions. The sealing system shall maintain efficient sealing in any position of the slide and let the water flow only in the open part of the gate.

The bottom seal shall be made of resilient neoprene set into the bottom member of the frame and shall form a flush-bottom.
  - 2. Guides: The guides shall be of 316L stainless steel incorporating a one-piece frame with gussets to transfer the load from unseating head conditions. The guides shall be equipped with a self-adjusting UHMWPE seal system. Upward opening gates shall be provided with an EPDM flush bottom invert seal. Top seals shall be self-adjusting UHMWPE. Downward-opening weir gates shall be provided with self-adjusting UHMWPE seals along the invert. The seal system shall be self-adjusting by means of a compression cord. All seals, including the invert seal, shall be bolted with stainless steel fasteners and shall be field replaceable without the need to remove the frame from the wall or remove concrete or grout. The guide slot shall accept the plate of the disc and the outermost portion of the reinforcing ribs of the disc. The guides shall be designed for maximum rigidity, shall have a weight of not less than 13 pounds per foot for wall-mounted gates and 6.5 lbs per foot for embedded and in-channel mounted gates, and shall be provided with holes for anchor bolts a minimum of every 18 inches. Where the guides extend above the mounting surface, they shall be sufficiently strong so that no further reinforcing will be required. Guide extensions shall have a weight of not less than 6.5 pounds per foot and shall be constructed of C-shaped or Z-shaped plate for rigidity.
  - 3. The yoke to support the operating bench stand shall be formed by two C-channels welded at the top of the guides to provide a one-piece rigid frame. The arrangement of the yoke shall be such that the disc and stem can be removed without disconnecting the yoke.
  - 4. The disc or sliding member shall be 316L stainless steel and consist of a flat plate reinforced with formed plates or structural members to limit deflection to 1/720 of the gate's span under the design head.

5. The portion of the disc that engages the frame shall have a minimum thickness of 1/2-inch.
6. All parts of the gate shall have a minimum thickness of 1/4-inch.
7. All necessary attaching bolts and anchor bolts shall be 316 stainless steel and shall be furnished by the slide gate manufacturer.

B. Operating Stem

1. The operating stem shall be Type 316 stainless steel designed to have an L/r of less than 200 and be designed to transmit in compression at least two times the rated output of the operating manual mechanism with a 40 lbs. effort on the lever crank or hand wheel.
2. The stem shall have a minimum diameter of 1-1/2 inches.
3. Stem guides shall be constructed of 316L stainless steel and shall be outfitted with adjustable UHMWPE bushings.
4. Bronze stop collars shall be provided on gates with manual actuators. Stop collars shall be internally threaded and mounted on the stem, secured by a stainless-steel set screw.
5. A clear butyrate or lexan weather-proof stem cover with position indication shall be provided. Vent holes shall be provided to prevent condensation.
6. Lubrication fittings shall be provided for all bearings.
7. Stems in more than one piece and a diameter equal to or greater than 1 3/4 inches are to be joined together by solid bronze couplings. Stems with a diameter smaller than 1 3/4 inches shall be pinned to an extension tube.

2.02 Manual Actuators

- A. All bearings and gears shall be totally enclosed in a weather tight ductile iron housing. The pinion shaft of crank-operated mechanisms shall be constructed of stainless steel and supported by roller or needle bearings.
- B. Each manual operator shall be designed to operate the gate under the maximum specified seating and unseating heads by using a maximum force of 40 lbs on the crank or hand wheel and be able to withstand without damage an effort of 80 lbs.
- C. The crank shall be removable and fitted with a corrosion resistant rotating handle. The maximum crank radius shall be 15 inches and the maximum hand wheel diameter shall be 24 inches.
- D. The actuators shall be pedestal mounted on non-self-contained gates. Pedestals shall be constructed of 316L stainless steel. The base plate and adaptor shall have a minimum thickness of 1/2 inch. The pedestal tube shall have a minimum diameter of 4 inches.

## PART 3 - EXECUTION

### 3.01 Installation

- A. Install gates in accordance with manufacturer's recommendations and as specified in this Section.
- B. Gates shall operate smoothly, not binding while operating in either direction. Leakage on gates shall meet the requirements of AWWA C-561 after installation. Gates which leak shall be adjusted, removed, reinstalled, or replaced until leakage is no longer present.

### 3.02 Manufacturer's Service and Start-Up Certification Report

- A. The Contractor shall provide the services of a qualified representative of the pump manufacturer for a minimum of one day per pump station to perform the following tasks:
  - 1. Inspect the installation of the equipment.
  - 2. Place the equipment in operation and make any necessary adjustments.
  - 3. Perform Field Tests specified above.
  - 4. Perform tests specified in this Section and recommended by the equipment manufacturer.
  - 5. Instruct Owner's personnel in the proper operation and maintenance (O & M) of the equipment (training).
- B. If equipment is not completed for proper start-up and training procedures, the representative shall reschedule another visit at no additional cost to the Owner. Training will not be permitted without proper start-up and testing tasks. An abstract or outline of the start-up, testing, and training procedures shall be provided to the Engineer at least five days prior to the scheduled visit. Manufacturer's operation and maintenance manuals and materials and audio-video cassette, when included under submittal requirements, shall be incorporated in the training procedures, with emphasis on items or materials of greatest importance.
- C. A typed, bound report covering the manufacturer's representative's findings shall be submitted to the Engineer for review and approval. The report shall (1) describe the start-up procedures taken; (2) include any inspections performed; (3) outline in detail any deficiencies observed along with the corrective measures taken; and (4) include the results of all field tests, including necessary graphs, charts, tables, etc., specified in this Section or required by the referenced standards. The report shall certify that the equipment is properly installed and functioning for the purpose intended. The report must be received and reviewed by the Engineer prior to the equipment being put into permanent operation.
- D. The Contractor shall bear all expenses associated with the start-up, testing, and training procedures and report described above, including labor, transportation, lodging, and material costs.

3.03      Warranty

- A. The Contractor shall guarantee the equipment to be free from defective material and workmanship for a period of two years from the date of acceptance of the equipment by the Owner. The Contractor shall replace any defective materials, components, or workmanship during this time, including but not limited to all materials, labor, shipping, and transportation, at no additional cost to the Owner. Any repair work performed during this two-year period shall also be guaranteed to be free from defective material or workmanship for a period of one year from the date the work is complete and shall be addressed in the same manner at no additional cost to the Owner.

3.04      Cleaning

- A. Clean excess grease, oil, or any other debris from exterior surfaces of the gates.

## SLIDE GATE SCHEDULE

1. Slide Gate No. 1
  - a. Location: Structure A0
  - b. Nominal Gate Size: 36" W x 36" H
  - c. Nominal Frame Size: 36" W x 60" H
  - d. Opening Direction: Upward
  - e. Frame Mounting: Flush Wall Mounted
  - f. Minimum Vertical Movement of Gate: 30"
  - g. Head Condition: Seating (14" measured from CL of gate)
  - h. Operator: Pedestal with Handwheel or Lever Crank
2. Slide Gate No. 2
  - a. Location: Structure A0
  - b. Nominal Gate Size: 50" W x 50" H
  - c. Nominal Frame Size: 50" W x 90" H
  - d. Opening Direction: Upward
  - e. Frame Mounting: Flush Wall Mounted
  - f. Minimum Vertical Movement of Gate: 45"
  - g. Head Condition: Seating (23" measured from CL of gate)
  - h. Operator: Pedestal with Handwheel or Lever Crank
3. Acceptable Manufacturers: RW Gate, Whipps, or WACO

-END-



## APPENDIX A

### GEOTECHNICAL EVALUATIONS

Boden Road Borings  
American Drilling Services Boden Logs  
Noblesville Geotechnical Report  
Noblesville Sanitary Geotechnical Report



**AMERICAN DRILLING SERVICES, INC.**  
**FOR**  
**HAMILTON SOUTHEASTERN UTILITIES, INC.**  
**Boden Rd. Borings - 2014**

<b>Project:</b> Sanitary Interceptor Evaluation - Wayne Twshp CTA <b>Project Location:</b> Boden Road (SR-38 to E. 166th St.) <b>Project Number:</b> SR-38	<b>Log of Boring</b> <u>B-9</u> Sheet 1 of <u>1</u>
--	--

Date(s) Drilled: 7/2014	Logged By:	Checked By:
Drilling Method: 6" Hallow stem auger	Drill Bit Size/Type:	Total Depth Drilled: 18 ft
Drill Rig Type:	Drilled By:	Hammer Weight/ Drop: Std.
Apparent Groundwater Depth: <u>6</u> ft ATD <u>    </u> ft after <u>    </u> hrs <u>    </u> ft after <u>    </u> hrs		Surface Elevation: 794.00 ft
Comments: Offset 150' south / Boring caved to 7' depth		Borehole Backfill: Auger spoil
		Elevation Datum:

Depth, ft.	SAMPLES				MATERIAL DESCRIPTION and other remarks	Elevation, ft.	Pocket Pen., kPa	Water Content, %	Liquid Limit	Plasticity Index	Other Tests
	Location	Type	Number	Sampling Resistance							
0					0 - 3" Topsoil						
		SS	1	7	3" - 4' Brown Gray silty sandy clay						
		SS	2	6	4' - 6' Brown Gray wet sandy clay						
		SS	3	37	6' - 12.5' Brown Gray wet fine to coarse sand & Gravel with cobbles or broken limestone						
10		SS	4	50/4							
		SS	5	60	12.5' - 18.0' Brown Gray weathered limestone						
20			6		18.0' Auger Refusal (two attempts to recover rock)						
30											
40											



**AMERICAN DRILLING SERVICES, INC.**  
**FOR**  
**HAMILTON SOUTHEASTERN UTILITIES, INC.**  
**Boden Rd. Borings - 2014**

**Project:** Sanitary Interceptor Evaluation - Wayne Twshp CTA  
**Project Location:** Boden Road (SR-38 to E. 166th St.)  
**Project Number:** SR-38

**Log of Boring** B-11

Sheet 1 of 1

Date(s) Drilled	7 / 2014	Logged By	Checked By
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type	Total Depth Drilled 23.0 ft
Drill Rig Type		Drilled By	Hammer Weight/ Drop Stnd.
Apparent Groundwater Depth	14.0 ft ATD	ft after hrs	ft after hrs
Comments	Boring cave depth 13.0 ft	Borehole Backfill	Auger spoils
			Elevation Datum

Depth, ft.	SAMPLES				Elevation, ft.	Pocket Pen., kPa	Water Content, %	Liquid Limit	Plasticity Index	Other Tests
	Location	Type	Number	Sampling Resistance						
0										
		ss	1	6						
		ss	2	5						
		ss	3	5						
		ss	4	5						
10										
		ss	5	26						
20		ss	6	40						
			7							
30			8							
			9							
40			10							



**AMERICAN DRILLING SERVICES, INC.**  
**FOR**  
**HAMILTON SOUTHEASTERN UTILITIES, INC.**  
**Boden Rd. Borings - 2014**

**Project:** Sanitary Interceptor Evaluation - Wayne Twshp CTA  
**Project Location:** Boden Road (SR-38 to E. 166th St.)  
**Project Number:** SR-38

**Log of Boring** B-13

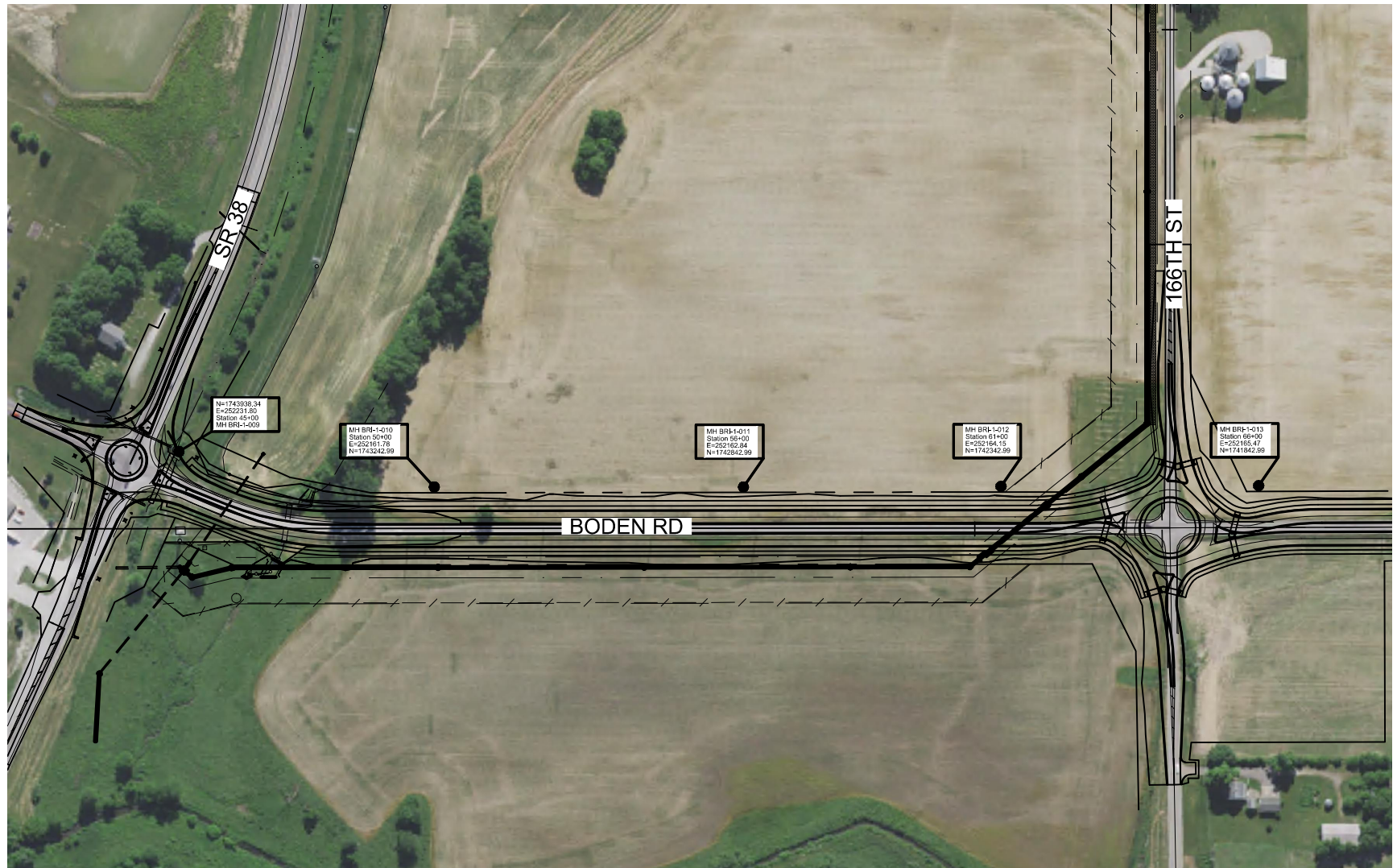
Sheet 1 of 1

Date(s) Drilled	7 / 2014	Logged By	Checked By
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type	Total Depth Drilled 27.5 ft
Drill Rig Type		Drilled By	Hammer Weight/ Drop Stnd.
Apparent Groundwater Depth	20.5 ft ATD	ft after hrs	ft after hrs
Comments	Boring cave depth 13.0 ft	Borehole Backfill Auger spoils	Surface Elevation 810.82
			Elevation Datum

Depth, ft.	SAMPLES				Elevation, ft.	Pocket Pen., kPa	Water Content, %	Liquid Limit	Plasticity Index	Other Tests
	Location	Type	Number	Sampling Resistance						
0										
		SS	1	7	0 - 7" Topsoil					
		SS	2	12	7" - 3.0' Brown gray silty sandy clay					
		SS	3	15						
10		SS	4	38	8.0' - 12.0' Brown gray silty clay with coarse gravel (glacial till)					
		SS	5	10	12.0' - 20.5' Gray silty clay with coarse gravel (glacial till) with sand seams					
20		SS	6	15	20.5' - 27.5' Gray wet fine to coarse sand					
			7	6						
30			8	25	27.5' - 30.0' Gray wet fine to coarse sand and gravel					
					Bottom of the boring - 30.0 ft					
			9							
40			10							







## PLAN - BORING LOCATION

SCALE: N/A'





# Geotechnical Engineering Report

---

**Boden Road Gravity Interceptor Sewer  
Noblesville, Indiana**

April 16, 2021

Terracon Project No. CJ215026

**Prepared for:**

CHA Consulting, Inc.  
Indianapolis, Indiana

**Prepared by:**

Terracon Consultants, Inc.  
Indianapolis, Indiana



April 16, 2021

CHA Consulting, Inc.  
300 South Meridian Street, Union Station  
Indianapolis, Indiana 46225



Attn: Mr. Jonathan Mirgeaux, P.E.  
P: (317) 780 7264  
E: jmirgeaux@chacompanies.com

Re: Geotechnical Engineering Report  
Boden Road Gravity Interceptor Sewer  
Noblesville, Indiana  
Terracon Project No. CJ215026

Dear Mr. Mirgeaux:

In accordance with your request, we have completed our Geotechnical Engineering evaluation for the referenced project. This evaluation was performed in general accordance with Terracon Proposal No. PCJ215026. This report presents the results of our subsurface exploratory and laboratory testing programs and provides geotechnical recommendations concerning earthwork and the design and construction of the sewer.

We have enjoyed working with you on this project. If you have any questions concerning this report or require further assistance, feel free to contact us.

Sincerely,  
**Terracon Consultants, Inc.**

  
Tanner Hill, P.E.  
Project Engineer



Richard D. Olson, P.E.  
Principal Engineer

## REPORT TOPICS

INTRODUCTION.....	1
SITE CONDITIONS.....	1
PROJECT DESCRIPTION.....	2
GEOTECHNICAL CHARACTERIZATION.....	3
GEOTECHNICAL OVERVIEW.....	5
DEWATERING AND EXCAVATION.....	5
CONVENTIONAL CUT-AND-COVER CONSIDERATIONS.....	6
TRENCHLESS METHOD CONSIDERATIONS.....	7
LATERAL EARTH PRESSURES.....	8
GENERAL COMMENTS.....	9
FIGURES.....	10

**Note:** This report was originally delivered in a web-based format. For more interactive features, please view your project online at [client.terracon.com](http://client.terracon.com).

## ATTACHMENTS

EXPLORATION AND TESTING PROCEDURES  
SITE LOCATION AND EXPLORATION PLANS  
EXPLORATION RESULTS  
SUPPORTING INFORMATION

**Note:** Refer to each individual Attachment for a listing of contents.

**Geotechnical Engineering Report**  
**Boden Road Gravity Interceptor Sewer**  
**Noblesville, Indiana**  
**Terracon Project No. CJ215026**  
**April 16, 2021**

## **INTRODUCTION**

This report presents the results of our subsurface exploration and geotechnical engineering services performed for the proposed gravity interceptor sewer to be located in Noblesville, Indiana. The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- Subsurface conditions
- Groundwater conditions
- Site preparation and earthwork
- Sewer construction considerations
- Excavation considerations
- Dewatering considerations

The geotechnical engineering Scope of Services for this project included the advancement of:

- Eighteen test borings to depths ranging from approximately 14 to 20 ft below existing site grades.
- Thirteen soundings to depths ranging from approximately 5½ to 14 ft below existing site grades.

Maps showing the site and boring and sounding locations are shown in the **Site Location** and **Exploration Plan** sections, respectively. The results of the laboratory testing performed on soil and rock samples obtained from the site during the field exploration are included on the boring logs in the **Exploration Results** section.

## **SITE CONDITIONS**

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

## Geotechnical Engineering Report

Boden Road Gravity Interceptor Sewer ■ Noblesville, Indiana

April 16, 2021 ■ Terracon Project No. CJ215026



Item	Description
<b>Parcel Information</b>	<ul style="list-style-type: none"><li>■ The project is located along State Road 38 in Noblesville, Indiana. The sewer line is proposed to extend westward along State Road 38 from the intersection of Boden Road for about <math>\frac{3}{4}</math> miles. The sewer line then extends south for about 0.2 miles.</li><li>■ Approximate center of project alignment is located near:<ul style="list-style-type: none"><li>○ Latitude: 40.0379</li><li>○ Longitude: -85.9430</li></ul></li><li>■ See Site Location.</li></ul>
<b>Current Ground Cover</b>	Grass, crushed stone, pavement, and wooded areas.
<b>Existing Topography</b> (Based on topographic information provided by CHA Consulting, Inc. (CHA))	Ground surface elevations at the exploratory locations ranged from about Elevation 770 to 799.
<b>Geology<sup>1</sup></b>	The project area is located in the western portion of the New Castle Till Plains and Drainageways physiographic region. The New Castle Till Plains and Drainageways consists of flat to gently rolling surface topography shaped by continental glaciation that is dissected in some areas by tunnel valley features. The sediments of the New Castle Till Plains and Drainageways are comprised of sand, silt, clay, glacial outwash, and glacial till deposits. The bedrock near the project area consists predominantly of limestone of the Bainbridge Formation. A review of publicly available water well information indicated the bedrock is typically about 16 to 80 ft below the surface at Indiana Department of Natural Resources (IDNR) well sites within $\frac{1}{4}$ miles of the project area.

1. Based on information obtained from the Indiana Geological and Water Survey (IGWS).

## PROJECT DESCRIPTION

Our understanding of the project is as follows:

Item	Description
<b>Information Provided</b>	<p>Information for the project was provided by Jonathan Mirgeaux of CHA</p> <ul style="list-style-type: none"><li>■ Scope of Work</li><li>■ Gravity Sewer and Force Main Profile Drawings dated December 10, 2020 (Sheets C-101 through C-103)</li><li>■ Field Logs performed by American Drilling Services</li><li>■ Boring Logs performed by Alt &amp; Witzig Engineering, Inc. (dated November 2018)</li><li>■ Topographic information at the exploratory locations</li></ul>



Item	Description
<b>Project Description</b>	<p>We understand that the project is in the preliminary stages and the final sewer alignment is not known at the time of this report. Based on the information provided, we understand the sewer improvements are anticipated to include:</p> <ul style="list-style-type: none"> <li>■ The installation of about 4,800 lineal-ft of gravity sewer pipe. The gravity sewer pipe is preliminarily planned with inverts in the range of about 7 to 22 ft below the existing ground surface (Elevation 756 to 785) and will be 36 to 48 in. in diameter.</li> <li>■ The installation of about 4,800 lineal-ft of a sanitary force main. The majority of the force main pipe is preliminarily planned with inverts generally in the range of 7 to 12 ft, but as deep as 17 ft below the existing ground surface beneath SR 38 and will be 30 in. in diameter.</li> <li>■ The sewer lines are planned to be constructed utilizing conventional cut-and-cover techniques and trenchless excavation. Specifically, the trenchless excavations are planned near Borings B-4 and B-5 (at SR 38) and Boring B-11 (at SR 38).</li> </ul>
<b>Below-Grade Structures</b>	We understand that the sewer improvements will include below grade vertical walls for utility vaults.
<b>Estimated Start of Construction</b>	The construction schedule was not available at the time of this report.

## GEOTECHNICAL CHARACTERIZATION

### Test Borings

We have developed a general characterization of the subsurface conditions based upon our review of the subsurface exploration, laboratory data, geologic setting and our understanding of the project. This characterization, termed GeoModel, forms the basis of our geotechnical calculations and evaluation of site preparation and foundation options. Conditions encountered at each exploration point are indicated on the individual logs. The individual logs can be found in the **Exploration Results** section and the GeoModel can be found in the **Figures** section of this report.

As part of our analyses, we identified the following model layers within the subsurface profile. For a more detailed view of the model layer depths at each boring location, refer to the GeoModel.

Model Layer	Layer Name	General Description
1	<b>Cohesive Soils</b>	Mixtures of lean clay, silt, and fat clay with varying amounts of sand; soft to hard; brown, gray, red
2	<b>Granular Soils</b>	Mixtures of sand with varying amounts of silt, clay, and gravel; loose to very dense; gray and brown
3	<b>Weathered Rock</b>	Limestone, dolomite, sandstone; soft to moderately hard; gray and brown



Groundwater level observations were made during, at completion of, and up to 72 hrs after the sampling process. The observed groundwater levels are noted on the borings logs and GeoModel. Groundwater was typically observed near depths of 2 to 10½ ft below existing grades at the boring locations.

A review of the *Soil Survey of Hamilton County, Indiana* indicates that the soils in the project area are prone to a seasonal high water level (i.e., perched) within about 1 to 4½ ft below the surface. As additional input, a review of publicly available water well information from the Indiana Map GIS system (<https://maps.indiana.edu>) indicated the groundwater level is typically near 17 to 40 ft below the surface at Indiana Department of Natural Resources (IDNR) monitored well sites (Well Reference Nos.: 15629, 149201, 149216, and 387503) located within about ½-mile of the project area.

It should be recognized that groundwater levels will fluctuate due to changes in precipitation, infiltration, surface run-off, and other hydrogeological factors. Therefore, groundwater levels during construction or at other times in the life of the structure may be higher or lower than the levels indicated on the boring logs. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project.

## Summary of Soundings

A summary of the top of rock depths and elevations observed at the sounding locations is shown below. For more detailed information at the sounding locations, refer to the Summary of Soundings in the **Exploration Results** section

Sounding Designation	Approximate Depth to Top of Rock (ft) <sup>1</sup>	Approximate Top of Rock Elevation (ft)	Approximate Depth to Auger Refusal (ft) <sup>1</sup>	Approximate Elevation to Auger Refusal (ft)
S-1	20 or below <sup>2</sup>	n/a	n/a	n/a
S-2	4½	770½	5½	769½
S-3	6½	771½	7	771
S-4	9½	777½	11	776
S-5	4	783	7½	779½
S-6	14	784	14	784
S-7	13	784	13	784
S-8	11	778	11	778
S-9	9½	782½	9½	782½
S-10	6½	766½	11	762
S-11	9	772	9½	771½
S-12	14	781	14	781
S-13	9	785	9	785

1. Below the existing ground surface.

2. Rock was not observed within the maximum depth explored (i.e., 20 ft below the existing grade).

## **GEOTECHNICAL OVERVIEW**

Based on our review of the information obtained from the exploratory locations, the subsurface conditions are suitable for support of the proposed elements provided the subgrade is prepared as discussed herein. It is understood that the gravity sewer and force main are planned to be installed using conventional cut-and-cover techniques and trenchless excavations with inverts established near Elevations 756 to 788. Based on information obtained at the boring locations, the subgrade at the invert is anticipated to be variable and consist of cohesive soils, granular soils, or rock. As such, rock excavation should be anticipated during construction of the sewer elements. In addition, groundwater is present near or above the planned inverts along a majority of the sewer alignment. Therefore, dewatering will be necessary to facilitate construction and prepare the subgrade of the proposed sewer elements.

The condition of the subgrade and performance of the sewer will be, in part, a function of the care and workmanship of the contractor in protecting the subgrade from water. Additional discussion and recommendations regarding design and construction are provided in the following paragraphs.

The **General Comments** section provides an understanding of the report limitations.

## **DEWATERING AND EXCAVATION**

Based on the groundwater conditions and soil types observed at the boring locations, dewatering will be necessary during the construction of the sewers. It should be noted that the soil conditions varied along the alignment. As such the dewatering requirements will vary. Within the cohesive soils, dewatering is anticipated to consist of multiple pumps and filtered sumps possibly in combination with collection trenches. However, when excavations extend into the wet granular soils, the use of multiple deep wells, well points, and/or sump pits outside the limits of the excavation will likely be required. It should be noted that the sands observed at the test borings will flow if excavated in the wet. This will cause poor subgrade conditions for support of the sewer. We recommend that the groundwater level be lowered a depth of 2 ft below the planned invert prior to the excavation activities. Note that groundwater if present in the rock, will enter the excavation via fractures and open joints.

The intent of our evaluation was to provide geotechnical-related recommendations for the new sewer elements. The scope of this evaluation was not to provide dewatering recommendations for contractors. Dewatering is a responsibility of the contractor based on their means and methods and considers the requirements of subgrade preparation discussed herein. It may be necessary for the dewatering contractor to obtain additional subsurface information to assist with the design of their dewatering plan. The effectiveness of the subgrade preparation activities discussed below will be directly dependent on the adequacy of the contractor's dewatering efforts.

Based on our understanding of the existing grades and the proposed invert elevation, rock excavation should be anticipated to a depth of approximately 10 ft below the rock surface during construction of both the gravity sewer and force main. It should be noted that this depth may vary rather significantly. More specifically, we anticipate rock excavation to be needed starting near the intersection of State Road 38 and Long Creek Drive to the intersection of Boden Road and State Road 38. Where our field exploration equipment and hollow-stem augers were able to penetrate the rock, the rock may be rippable and/or could possibly be broken with a hydraulic hammer or with conventional earthwork equipment with ripper teeth. From our experience with similar projects, methods have also included hydraulic hammers and heavier mechanical equipment. The actual method of rock removal to be used cannot be speculated with certainty. We recommend that the contractor be prepared to perform rock excavation.

Considering the anticipated inverts and pending the final sewer alignment, the use of excavation support may be needed in some areas. Where excavations are performed near existing structures, we recommend that the structures be observed prior to the excavation activities to document their condition. The type of excavation support utilized will be based on the contractor's means and methods. Excavation support typically includes trench boxes or temporary sheeting. The ability to drive sheeting at a majority of the alignment will be limited due to the presence of rock. In our opinion, boxes and sheeting should be placed in a manner not to disturb the embedment material. Our scope of work did not include excavation support design, however, we would be pleased to assist with designing a temporary excavation support system, if requested.

All excavations should comply with OSHA standards. Stockpiled soil should not be placed adjacent to the excavation. In addition, proper site drainage is recommended to help minimize unwanted surface water runoff into excavations during the construction process.

## **CONVENTIONAL CUT-AND-COVER CONSIDERATIONS**

As previously mentioned, the condition of the subgrade will be a function of the care and workmanship of the contractor in protecting the subgrade from water. The following subgrade preparation recommendations are provided assuming the subgrade has been dewatered prior to excavation, where necessary. The rock is anticipated to provide a suitable subgrade for sewer pipe support where encountered. Where granular soils are encountered at the subgrade, we recommend that the granular soils be compacted via several passes with a vibratory plate compactor. Where soft cohesive soil is present at the pipe inverts or if stiff conditions degrade due to exposure to moisture, we recommend that the sewer subgrades be undercut a maximum of 2 ft and grade be reestablished by placing an open-graded crushed aggregate such as INDOT No. 8 stone, possibly in conjunction with a geotextile. Undercutting in areas of poor subgrade conditions will require judgement in the field during construction. To reduce the potential for softening of the subgrade soils and additional undercutting, it is recommended that the construction activities be scheduled such that the sewer subgrade is undercut, then reestablished

as soon as practical. This will require having all backfill materials present during the excavation activities.

## Bedding and Backfill

In areas where the pipe crosses beneath or is adjacent to pavement or other utilities (settlement sensitive areas), granular fill is recommended for backfill. This is because of their ease of compaction as compared to cohesive soils which reduces the risk of settlement. In addition, periodic field density tests and observations by the Geotechnical Engineer are recommended during backfill placement to verify the adequacy of compactive effort. We recommend the following material properties and compaction requirements for the bedding material and soils used for structural backfill surrounding the pipe elements:

Item	Recommendation
Soil Type <sup>1</sup>	Granular soil satisfying a USCS symbol of SP, SW, SW-SM, SP-SM <sup>2</sup>
Maximum Lift Thickness	4 to 6 in. in loose thickness
Minimum Compaction Requirements	95 percent of the modified Proctor density (ASMT D 1557) at the base of the excavation, for bedding material, and soils used for structural backfill surrounding the pipe elements.
	90 percent of the modified Proctor density (ASMT D 1557) in other areas, provided some settlement of the backfill is tolerable.

1. The use of cohesive soils for backfill above the pipe, if considered, should be limited to areas outside of the pavement, other utilities, and non-settlement sensitive areas.

2. The soils classified using these designations at the test borings are anticipated to be suitable for this purpose. However, we recommend imported granular fill be planned. A significant quantity of backfill could be required if the excavation slopes are laid back.

In addition, we recommend that the pipe manufacturer be contacted to discuss special bedding and backfill requirements.

## TRENCHLESS METHOD CONSIDERATIONS

### Subgrade Preparation

As stated previously, we anticipate that trenchless excavations will be utilized near Borings B-4 and B-5 and B-11. The depths of the launch and receiver pits were not available at the time of this report. We recommend that the Geotechnical Engineer be retained to review our recommendations when this information is available.

However, based on our understanding of the preliminary sewer inverts, we anticipate the subgrade at the receiver pits to consist of granular soils and rock. Groundwater is anticipated to be present above the receiver pit subgrade. Dewatering on a continuous basis will be required

through the trenchless excavation activities and backfill of the trenchless pits. We recommend the groundwater level be lowered to a depth of at least 2 ft below the planned pit subgrade elevations prior to the excavation activities. Where granular soils are observed at the pit subgrades, we recommend that the pits be undercut 4 in. to accommodate a mud mat consisting of lean concrete to provide a working platform.

## Trenchless Excavation Considerations

We anticipate the trenchless activities will potentially encounter granular soils near Borings B-4 and B-5 and rock near Boring B-11. Due to the presence of rock, it may be necessary to increase the diameter of the bore to allow the carrier pipe to be installed and to reduce the risk of point loads on the utility due to rock fragments. If a carrier pipe is utilized, the annular space should be grouted.

As you are aware, trenchless methods require a specialty contractor, and we recommend details of the methods and techniques be selected by the contractor based on the subsurface conditions and project requirements (i.e., performance-based contract language that includes settlement monitoring). These methods and techniques may also be influenced by the requirements of 3<sup>rd</sup> parties (e.g., regulators). As such, we recommend that our exploratory information be provided to the prospective contractors for their interpretation and use in preparing an installation plan and developing their means and methods. The previous discussion about soil and rock conditions is from a geotechnical perspective for the benefit of you and the owner. Additional test borings by the contractor may be warranted, including rock coring. We recommend the trenchless excavation pits be backfilled in accordance with the bedding and backfill section of this report.

## LATERAL EARTH PRESSURES

We understand that the sewer improvements will include below grade vertical walls for utility vaults. The walls for the below grade structures should be designed to resist both hydrostatic and lateral earth pressures. Based on the nature of the structure, relatively rigid conditions are anticipated such that an at-rest condition will develop. For these conditions, we recommend the parameters provided in the table below.

Earth Pressure Condition	Backfill Type <sup>1</sup>	Maximum Unit Weight (pcf)	Angle of Internal Friction ( $\phi'$ ) (deg.)	Equivalent Fluid Pressure (pcf) <sup>2</sup>
At-Rest ( $K_0$ )	Clean well-graded granular soil	125	30	90

1. These values assume uniform horizontal backfill, compacted to at least 90 percent of the modified Proctor density (ASTM D 1557) in non-structural areas and 95 percent of the modified Proctor density in areas where the backfill will be required to support structures (i.e., drives, foundations, etc.). We recommend backfill behind walls be placed in loose lift thickness not exceeding 6 in.
2. No factor of safety is included in this value.

In addition to the lateral earth pressures, surcharges from temporary loads during construction (if any) or adjacent foundation should be taken into account in the wall design. Additionally, for the equivalent fluid pressure value provided in the table above to be valid, we recommend that clean well-graded granular backfill extend horizontally behind the wall a distance of at least  $\frac{1}{2}$  of the depth of the wall below grade. Compaction of backfill within 3 ft of the walls should be performed with a hand guided compactor to avoid over-stressing the walls.

## GENERAL COMMENTS

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Natural variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence or collaboration through this system are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly impact excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety, and cost estimating including, excavation support, and dewatering requirements/design are the responsibility of others. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

## FIGURES

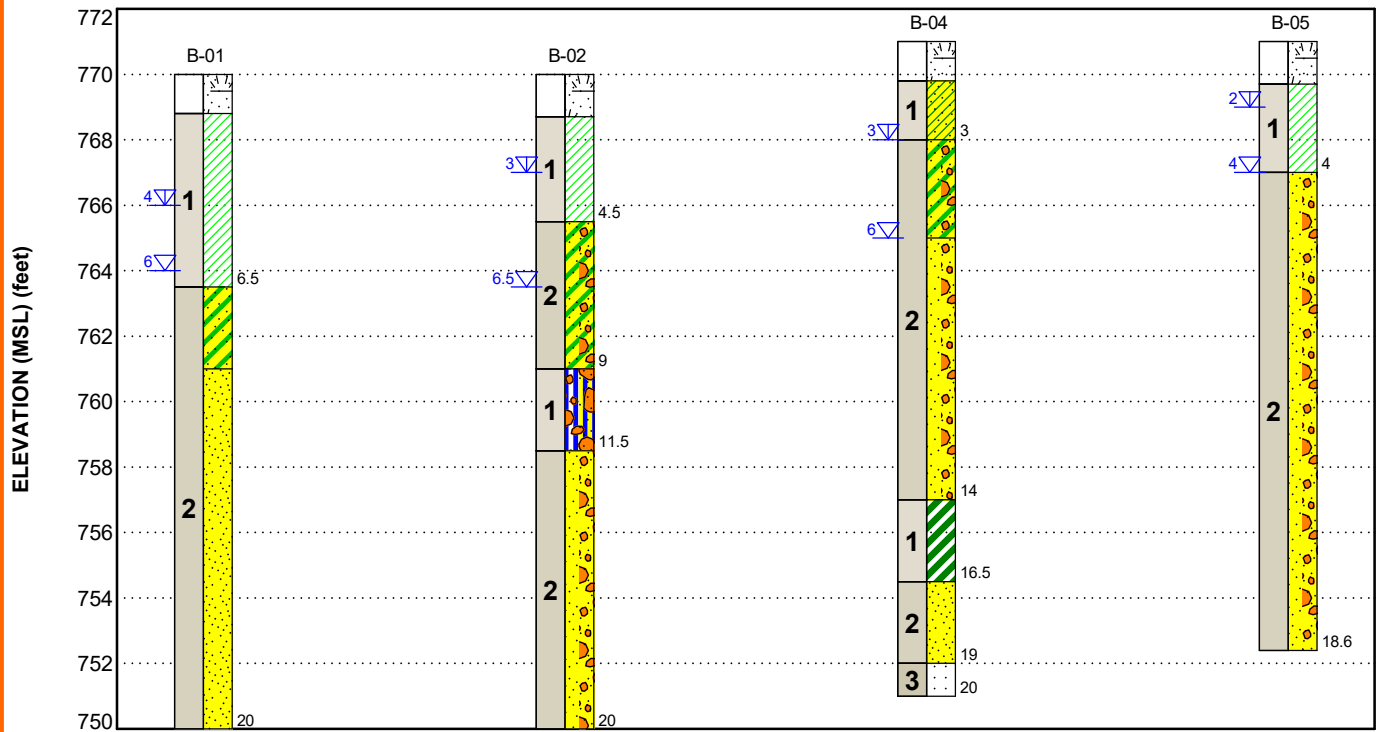
### Contents:

GeoModel

# GEOMODEL

Boden Road Gravity Interceptor Sewer ■ Noblesville, IN  
Terracon Project No. CJ215026

## SOUTH SIDE OF SR 38



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description
1	Cohesive Soils	Mixtures of lean clay, silt, and fat clay with varying amounts of sand; soft to hard; brown, gray, red
2	Granular Soils	Mixtures of sand with varying amounts of silt, clay, and gravel; loose to very dense; gray and brown
3	Weathered Rock	Limestone, dolomite, sandstone; soft to moderately hard; gray and brown

### LEGEND

Topsoil	Poorly-graded Sand	Poorly-graded Sand with Gravel	Sandstone
Lean Clay	Clayey Sand with Gravel	Sandy Lean Clay	
Clayey Sand	Gravelly Silt with Sand	Fat Clay	

- ▽ First Water Observation
- ▽ Second Water Observation
- ▽ Third Water Observation

Groundwater levels are temporal. The levels shown are representative of the date and time of our exploration. Significant changes are possible over time. Water levels shown are as measured during and/or after drilling. In some cases, boring advancement methods mask the presence/absence of groundwater. See individual logs for details.

### NOTES:

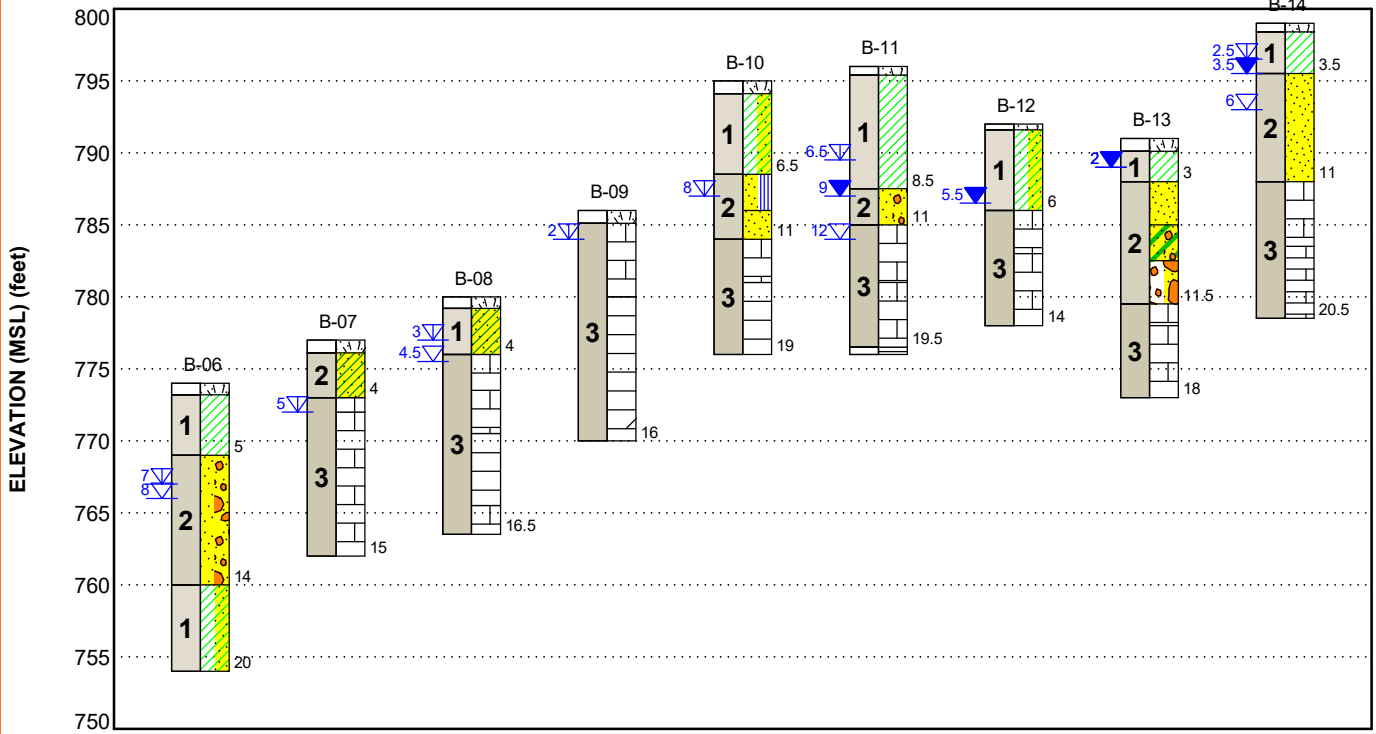
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project. Numbers adjacent to soil column indicate depth below ground surface.



## GEOMODEL

Boden Road Gravity Interceptor Sewer ■ Noblesville, IN  
Terracon Project No. CJ215026

### SOUTH SIDE OF SR 38



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description
1	Cohesive Soils	Mixtures of lean clay, silt, and fat clay with varying amounts of sand; soft to hard; brown, gray, red
2	Granular Soils	Mixtures of sand with varying amounts of silt, clay, and gravel; loose to very dense; gray and brown
3	Weathered Rock	Limestone, dolomite, sandstone; soft to moderately hard; gray and brown

### LEGEND

Topsoil	Lean Clay with Sand	Dolomite	Shale	Indiana DOT: Limestone
Lean Clay	Sandy Lean Clay	Poorly-graded Sand with Silt	Clayey Sand with Gravel	
Poorly-graded Sand with Gravel	Limestone	Poorly-graded Sand	Poorly-graded Gravel with Sand	

- First Water Observation
- Second Water Observation
- Third Water Observation

Groundwater levels are temporal. The levels shown are representative of the date and time of our exploration. Significant changes are possible over time. Water levels shown are as measured during and/or after drilling. In some cases, boring advancement methods mask the presence/absence of groundwater. See individual logs for details.

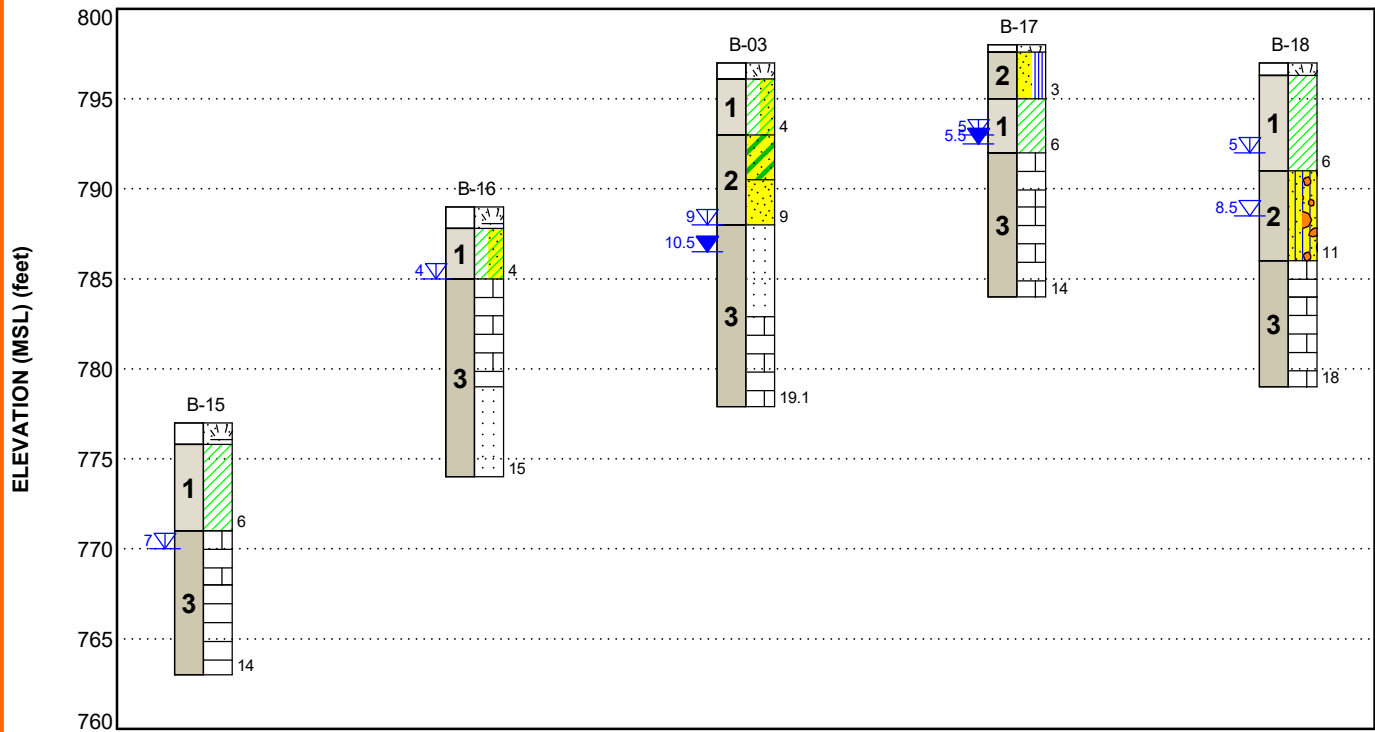
#### NOTES:

Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project. Numbers adjacent to soil column indicate depth below ground surface.

## GEOMODEL

Boden Road Gravity Interceptor Sewer ■ Noblesville, IN  
Terracon Project No. CJ215026

### NORTH SIDE OF SR 38



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description
1	Cohesive Soils	Mixtures of lean clay, silt, and fat clay with varying amounts of sand; soft to hard; brown, gray, red
2	Granular Soils	Mixtures of sand with varying amounts of silt, clay, and gravel; loose to very dense; gray and brown
3	Weathered Rock	Limestone, dolomite, sandstone; soft to moderately hard; gray and brown

### LEGEND

Topsoil	Poorly-graded Sand	Lean Clay	Silty Sand with Gravel
Lean Clay with Sand	Sandstone	Dolomite	
Clayey Sand	Limestone	Poorly-graded Sand with Silt	

- First Water Observation
- Second Water Observation
- Third Water Observation

Groundwater levels are temporal. The levels shown are representative of the date and time of our exploration. Significant changes are possible over time. Water levels shown are as measured during and/or after drilling. In some cases, boring advancement methods mask the presence/absence of groundwater. See individual logs for details.

### NOTES:

Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project. Numbers adjacent to soil column indicate depth below ground surface.

## ATTACHMENTS

## EXPLORATION AND TESTING PROCEDURES

### Field Exploration

Number of Explorations	Type of Exploration	Depth
18	SPT Boring	14 to 20 ft
13	Sounding	5½ to 14 ft

The number, location, and proposed depth of the borings and soundings were selected by Terracon and sent to CHA for concurrence.

**Boring Layout and Elevations:** The exploratory locations were staked in the field by Terracon personnel using hand held GPS equipment referencing coordinates obtained by overlaying the preliminary sewer alignment shown on an electronic drawing provided by CHA in Google Earth. Furthermore, ground surface elevations at the exploratory locations were estimated using topographic information provided by CHA.

**Subsurface Exploration Procedures:** We advanced the borings and soundings using ATV- and track-mounted equipment and hollow stem augers to advance the boreholes. Relatively disturbed samples of the soil strata were obtained at 2½-ft intervals within the soil strata with a split-spoon sampler. In the split-spoon sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon was driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths. In addition, rock samples were obtained using N-sized diamond core drilling methods. Following the completion of our exploratory activities, the boreholes were backfilled with auger cuttings and a bentonite chip plug with the exception of Borings B-4, B-15, and B-16, and Soundings S-10 and S-11 (performed in a cow pasture) which were backfilled with bentonite chips and a concrete plug near the surface.

The sampling depths, penetration distances, and other sampling information were recorded on the field logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification. Our exploration team prepares field logs as part of the drilling operations. These field logs include visual classifications of the soil and rock encountered during drilling and our interpretation of the subsurface conditions between samples.

### Laboratory Testing

Soil samples were reviewed by a geotechnical engineer who assigned laboratory tests. Soil classifications on the boring logs are according to the Unified Soil Classification System (USCS).

## Geotechnical Engineering Report

Boden Road Gravity Interceptor Sewer ■ Noblesville, Indiana

April 16, 2021 ■ Terracon Project No. CJ215026



Further details regarding the classification system are provided in **Supporting Information**. After classifying the samples, the following laboratory testing program was performed:

- Hand penetrometer readings (i.e.,  $q_p$ , which provide an indication of the shear strength characteristics of cohesive-type soils);
- Natural moisture content tests (W%);

Applicable ASTM standard procedures were followed in laboratory testing of the soil and rock samples. Upon completion of our laboratory testing program, boring logs were prepared and are provided in the attachments. The results of these tests are included on the test boring logs and/or laboratory test reports. It should be mentioned that the boring logs represent the approximate boundary between soil types; although the transitions may actually be gradual.

Rock classification was conducted using locally accepted practices for engineering purposes; petrographic analysis may reveal other rock types. Rock core samples typically provide an improved specimen for this classification. Boring log rock classification was determined using the Description of Rock Properties.

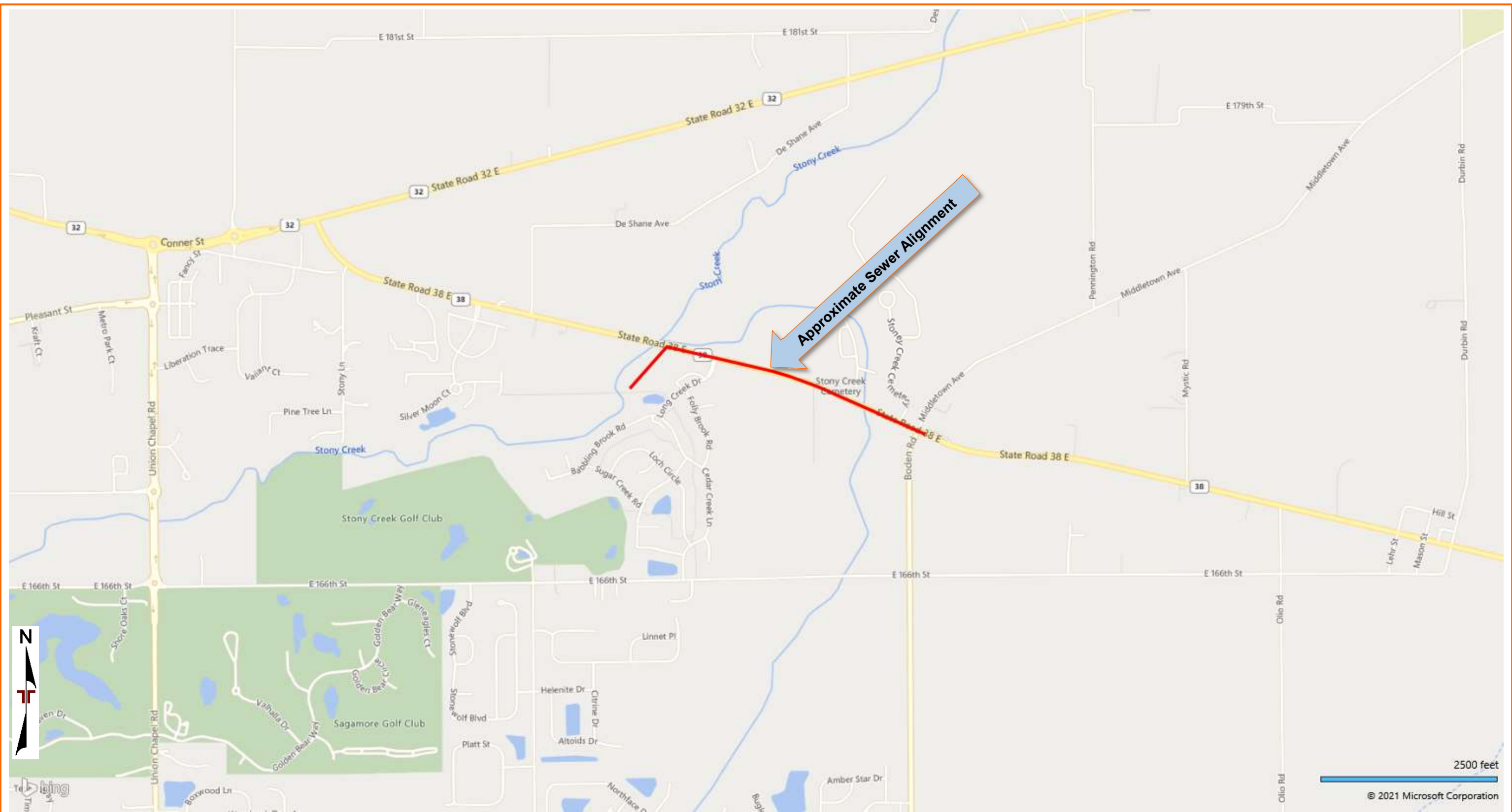
## **SITE LOCATION AND EXPLORATION PLANS**

### **Contents:**

Site Location

Exploration Plan

Note: All attachments are one page unless noted above.





EXPLORATION PLAN

Boden Road Gravity Interceptor Sewer ■ Noblesville, Indiana  
April 16, 2021 ■ Terracon Project No. CJ215026

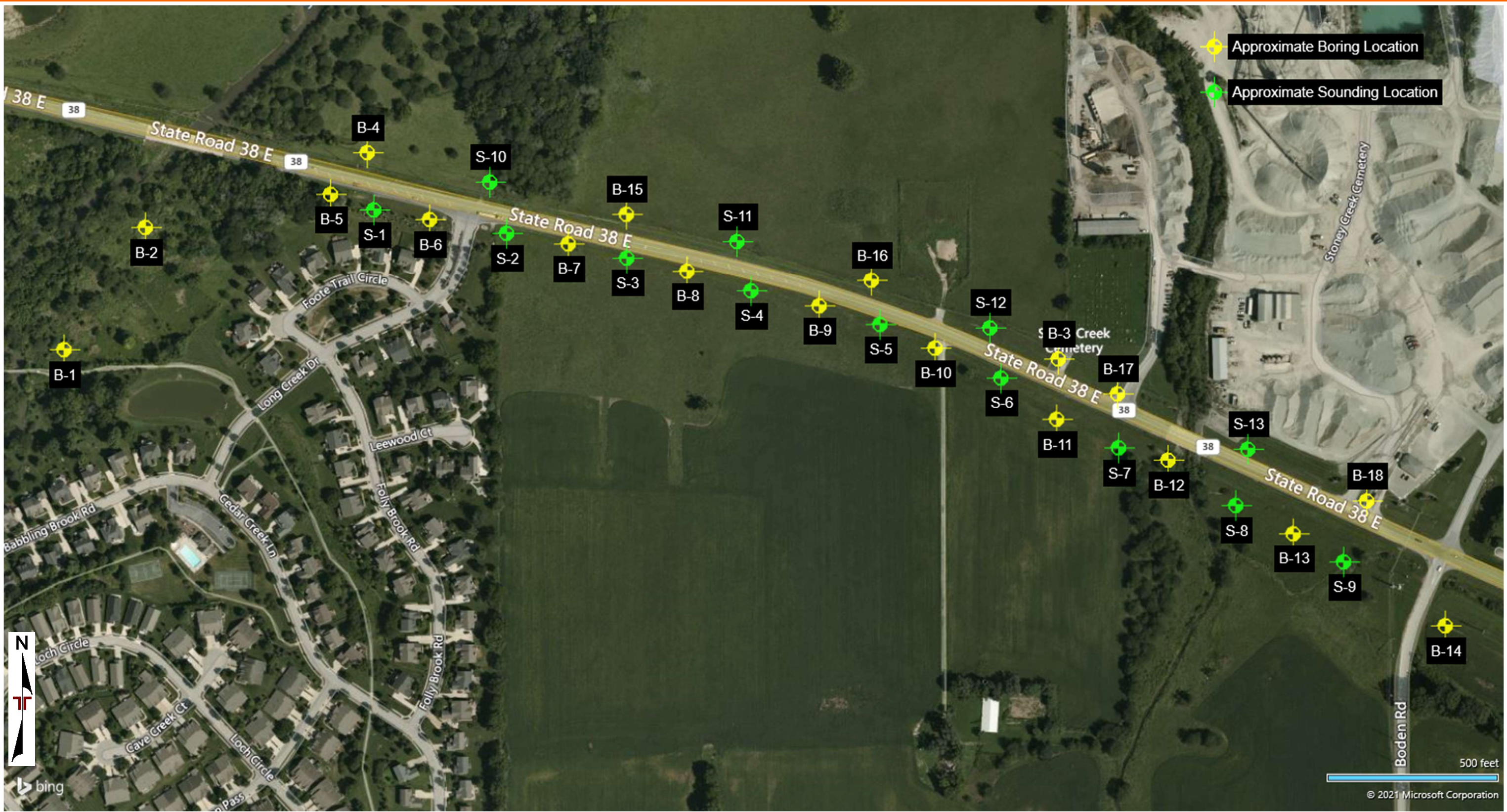


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS



## **EXPLORATION RESULTS**

### **Contents:**

Boring Logs (B-1 through B-18)

Rock Core Photography Log (7 pages)

Summary of Soundings

Note: All attachments are one page unless noted above.


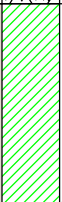



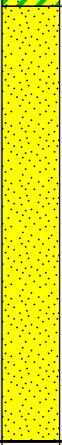
# BORING LOG NO. B-01

Page 1 of 1

**PROJECT:** Boden Road Gravity Interceptor Sewer

**CLIENT:** CHA Consulting Inc  
Indianapolis, IN

**SITE:** SR 38 and Boden Road  
Noblesville, IN

MODEL LAYER	GRAPHIC LOG	LOCATION See <a href="#">Exploration Plan</a> Latitude: 40.0379° Longitude: -85.9521°  Approximate Surface Elev.: 770 (Ft.) +/-	DEPTH DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	RQD%	LABORATORY HP (tsf)	WATER CONTENT (%)
		<b>TOPSOIL</b>	1.2	769+/-								
1		<b>LEAN CLAY (CL)</b> , trace sand, trace gravel, gray, soft to stiff						12	2-2-2 N=4		1.25 (HP)	37.8
			6.5	763.5+/-	5			12	2-2-2 N=4		0.25 (HP)	32.8
		<b>CLAYEY SAND (SC)</b> , trace gravel, fine to medium grained, gray, wet, loose						6	1-1-5 N=6			
2		<b>SAND (SP)</b> , fine to medium grained, gray, wet, medium dense, poorly graded, with limestone fragments near 11 ft to 20 ft	9.0	761+/-	10			6	5-6-6 N=12			
								12	7-12-7 N=19			
					15			12	8-12-13 N=25			
								12	13-11-12 N=23			
								12	10-11-13 N=24			
		<b>Boring Terminated at 20 Feet</b>	20.0	750+/-	20							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
3 1/4" HSA



See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).


Notes:

Abandonment Method:  
Boring backfilled with auger cuttings and bentonite chip plug.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

 While drilling  
 At completion of drilling

 Cave-in

**Terracon**  
7770 W New York St  
Indianapolis, IN

Boring Started: 04-07-2021

Boring Completed: 04-07-2021

Drill Rig: CME 750X

Driller: B.N.

Project No.: CJ215026

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CJ215026 BODEN ROAD GRAVIT.GPJ TERRACON\_DATATEMPLATE.GDT 4/16/21






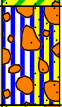

# BORING LOG NO. B-02

Page 1 of 1

**PROJECT:** Boden Road Gravity Interceptor Sewer

**CLIENT:** CHA Consulting Inc  
Indianapolis, IN

**SITE:** SR 38 and Boden Road  
Noblesville, IN

MODEL LAYER	GRAPHIC LOG	LOCATION See <a href="#">Exploration Plan</a> Latitude: 40.0389° Longitude: -85.9512°  Approximate Surface Elev.: 770 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	RQD%	LABORATORY HP (tsf)	WATER CONTENT (%)
		<b>TOPSOIL</b> 1.3 768.5+/-								
1		<b>LEAN CLAY (CL)</b> , trace sand, trace gravel, gray, soft to stiff, with organic matter near 4 ft 4.5 765.5+/-				16	2-3-3 N=6		1.25 (HP)	32.1
2		<b>CLAYEY SAND WITH GRAVEL (SC)</b> , fine to medium grained, gray, moist to wet below 6.5 ft, loose to medium dense 9.0 761+/-	5			4	2-2-2 N=4		<0.25	63.4
1		<b>SILT WITH SAND (ML)</b> , trace gravel, gray, very stiff 11.5 758.5+/-	10			12	4-7-8 N=15			
2		<b>SAND WITH GRAVEL (SP)</b> , medium to coarse grained, gray, wet, medium dense, poorly graded 20.0 750+/-	15			16	6-6-8 N=14		3.25 (HP)	13.7
		<b>Boring Terminated at 20 Feet</b>	20			16	13-13-13 N=26			
						16	13-14-15 N=29			
						16	15-13-13 N=26			
						16	13-13-9 N=22			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
3 1/4" HSA



See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).


Notes:

Abandonment Method:  
Boring backfilled with auger cuttings and bentonite chip plug.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

 While drilling  
 At completion of drilling

 Cave-in

**Terracon**  
7770 W New York St  
Indianapolis, IN

Boring Started: 04-07-2021

Boring Completed: 04-07-2021

Drill Rig: CME 750X

Driller: B.N.

Project No.: CJ215026

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CJ215026 BODEN ROAD GRAVITY GPJ TERRACON\_DATATEMPLATE.GDT 4/16/21

# BORING LOG NO. B-03

Page 1 of 1

PROJECT: Boden Road Gravity Interceptor Sewer

CLIENT: CHA Consulting Inc  
Indianapolis, IN

SITE: SR 38 and Boden Road  
Noblesville, IN

MODEL LAYER	GRAPHIC LOG	LOCATION See <a href="#">Exploration Plan</a> Latitude: 40.0379° Longitude: -85.9417°  Approximate Surface Elev.: 797 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	RQD%	LABORATORY HP (tsf)	WATER CONTENT (%)
		0.9 <b>TOPSOIL</b> 796+/-								
1		<b>LEAN CLAY WITH SAND (CL)</b> , trace gravel, brown, hard 793+/-				16	5-5-7 N=12		4.25 (HP)	18.1
		4.0 <b>CLAYEY SAND (SC)</b> , trace gravel, fine to medium grained, brown, moist, medium dense 790.5+/-	5			16	4-5-5 N=10			
2		6.5 <b>SAND (SP)</b> , fine to medium grained, brown, moist, medium dense, poorly graded 788+/-				16	10-9-8 N=17			
		9.0 <b>WEATHERED SANDSTONE</b> , brown, soft 783+/-	10			16	9-9-9 N=18			
		14.1 <b>WEATHERED LIMESTONE</b> , brown, soft to moderately hard, very low bedding planes, with pitting throughout 778+/-	15			6	44-50/1"			
3		19.1 <b>Boring Terminated at 19.1 Feet</b>				23		0		

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
3 1/4" HSA

NX CORE

Abandonment Method:  
Boring backfilled with auger cuttings and bentonite chip plug.

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

Auger refusal at 14 ft  
Water introduced during rock coring

## WATER LEVEL OBSERVATIONS

No water observed during drilling

At completion of drilling

72 hours

Cave-in

**Terracon**

7770 W New York St  
Indianapolis, IN

Boring Started: 04-01-2021

Boring Completed: 04-01-2021

Drill Rig: CME 750X

Driller: B.N.

Project No.: CJ215026

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CJ215026 BODEN ROAD GRAVIT.GPJ TERRACON\_DATATEMPLATE.GDT 4/16/21

# BORING LOG NO. B-04

Page 1 of 1

**PROJECT:** Boden Road Gravity Interceptor Sewer

**CLIENT:** CHA Consulting Inc  
Indianapolis, IN

**SITE:** SR 38 and Boden Road  
Noblesville, IN

MODEL LAYER	GRAPHIC LOG	LOCATION See <a href="#">Exploration Plan</a> Latitude: 40.0395° Longitude: -85.9489°  Approximate Surface Elev.: 771 (Ft.) +/-	DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	RQD%	LABORATORY HP (tsf)	WATER CONTENT (%)
		<b>TOPSOIL</b>	1.2	770+/-							
1		<b>SANDY LEAN CLAY (CL)</b> , trace gravel, brown, soft	3.0	768+/-			12	1-2-2 N=4		0.25 (HP)	24.0
		<b>CLAYEY SAND WITH GRAVEL (SC)</b> , fine to medium grained, brown, moist, medium dense	6.0	765+/-			5	4-5-7 N=12			
2		<b>SAND WITH GRAVEL (SP)</b> , fine to medium grained, brown, wet, loose to medium dense, poorly graded	14.0	757+/-			12	5-3-3 N=6			
							12	5-4-4 N=8			
							12	12-16-10 N=26			
1		<b>FAT CLAY (CH)</b> , trace gravel, trace sand, red, very stiff	16.5	754.5+/-			16	7-7-8 N=15		2.5 (HP)	32.1
2		<b>SAND (SP)</b> , trace gravel, fine to medium grained, brown, wet, very dense, poorly graded	19.0	752+/-			12	22-22-35 N=57			
3		<b>WEATHERED SANDSTONE</b> , gray, soft	20.0	751+/-			16	19-19-19 N=38			
		<b>Boring Terminated at 20 Feet</b>									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
3 1/4" HSA

See [Exploration and Testing Procedures](#) for a  
description of field and laboratory procedures  
used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with bentonite chips and concrete cap.

See [Supporting Information](#) for explanation of  
symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

While drilling  
 At completion of drilling

Cave-in

**Terracon**  
7770 W New York St  
Indianapolis, IN

Boring Started: 04-06-2021

Boring Completed: 04-06-2021

Drill Rig: CME 750X

Driller: B.N.


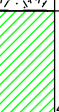




Project No.: CJ215026

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CJ215026 BODEN ROAD GRAVIT.GPJ TERRACON\_DATATEMPLATE.GDT 4/16/21

## Page 1 of 1

**CLIENT: CHA Consulting Inc**  
**Indianapolis, IN**

**SITE:** SR 38 and Boden Road  
Noblesville, IN

MODEL LAYER	GRAPHIC LOG	LOCATION See <a href="#">Exploration Plan</a> Latitude: 40.0392° Longitude: -85.9493°  Approximate Surface Elev.: 771 (Ft.) +/-	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	ROD%	LABORATORY HP (tsf)	WATER CONTENT (%)
		DEPTH ELEVATION (Ft.)								
		<b>TOPSOIL</b>	1.3 769.5+/-							
1		<b>LEAN CLAY (CL)</b> , trace sand, trace gravel, brown, stiff	4.0 767+/-		X	12	1-2-2 N=4		1.0 (HP)	31.0
2		<b>SAND WITH GRAVEL (SP)</b> , fine to medium grained, brown, wet, medium dense to very dense, poorly graded, with possible cobbles below 14.5 ft	18.6 752.5+/-	 	X	16	4-5-8 N=13			
					X	12	8-8-8 N=16			
					X	6	9-10-11 N=21			
					X	16	9-6-6 N=12			
					X	12	9-9-50 N=59			
							50/0"			
		<b>Boring Terminated at 18.6 Feet</b>					50/1"			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
3¼" HSA

See **Exploration and Testing Procedures** for a description of field and laboratory procedures used and additional data (If any).

See **Supporting Information** for explanation of symbols and abbreviations.

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings and bentonite chip plug.

## WATER LEVEL OBSERVATIONS

	While drilling
	At completion of drilling

 **Cave-in**

**Terracon**  
7770 W New York St  
Indianapolis, IN

Boring Started: 04-05-2021

Boring Completed: 04-05-2021

Drill Rig: CME 750X

Driller: B.N.

Project No.: CJ215026

# BORING LOG NO. B-06

Page 1 of 1

**PROJECT:** Boden Road Gravity Interceptor Sewer

**CLIENT:** CHA Consulting Inc  
Indianapolis, IN

**SITE:** SR 38 and Boden Road  
Noblesville, IN

MODEL LAYER	GRAPHIC LOG	LOCATION See <a href="#">Exploration Plan</a> Latitude: 40.0390° Longitude: -85.9483°  Approximate Surface Elev.: 774 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	RQD%	LABORATORY HP (tsf)	WATER CONTENT (%)
		0.8 <b>TOPSOIL</b> 773+/-								
1		<b>LEAN CLAY (CL)</b> , trace sand, trace gravel, brown, stiff to very stiff			X	12	2-3-4 N=7		2.0 (HP)	16.9
		5.0 769+/-	5		X	16	4-4-5 N=9		3.5 (HP)	29.8
2		<b>SAND WITH GRAVEL (SP)</b> , fine to medium grained, gray, moist to wet below 8 ft, medium dense to very dense, poorly graded, with cobbles near 6 ft and 11 ft				0	50/0"			
		14.0 760+/-	10		X	16	11-11-11 N=22			
						0	50/0"			
1		<b>LEAN CLAY WITH SAND (CL)</b> , trace gravel, brown, stiff to very stiff, with sand seam near 17 ft			X	16	5-7-7 N=14		2.75 (HP)	22.9
		20.0 754+/-	15		X	16	13-14-14 N=28			
			20		X	16	11-11-14 N=25		1.5 (HP)	21.1
		<b>Boring Terminated at 20 Feet</b>								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
3 1/4" HSA

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with auger cuttings and bentonite chip plug.

See [Supporting Information](#) for explanation of symbols and abbreviations.

## WATER LEVEL OBSERVATIONS

While drilling  
 At completion of drilling

Cave-in

**Terracon**  
7770 W New York St  
Indianapolis, IN

Boring Started: 04-05-2021

Boring Completed: 04-05-2021

Drill Rig: CME 750X

Driller: B.N.

Project No.: CJ215026

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CJ215026 BODEN ROAD GRAVIT.GPJ TERRACON\_DATATEMPLATE.GDT 4/16/21



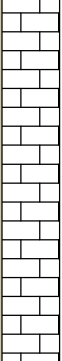
# BORING LOG NO. B-07

Page 1 of 1

**PROJECT:** Boden Road Gravity Interceptor Sewer

**CLIENT:** CHA Consulting Inc  
Indianapolis, IN

**SITE:** SR 38 and Boden Road  
Noblesville, IN

MODEL LAYER	GRAPHIC LOG	LOCATION See <a href="#">Exploration Plan</a> Latitude: 40.0388° Longitude: -85.9468°  Approximate Surface Elev.: 777 (Ft.) +/-	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	RQD%	LABORATORY HP (tsf)	WATER CONTENT (%)
			0.9	776+/-								
		<b>TOPSOIL</b>										
2		<b>SANDY LEAN CLAY (CL)</b> , trace gravel, brown, stiff						16	3-4-5 N=9		1.25 (HP)	18.3
			4.0	773+/-								
		<b>WEATHERED LIMESTONE</b> , gray, soft	5.0	772+/-	5			16	3-8-14 N=22			
		<b>WEATHERED LIMESTONE</b> , gray and brown, soft to moderately hard, very low bedding planes, with pitting near 14 ft						8		0		
3					10			55		0		
			15.0	762+/-	15							
		<b>Boring Terminated at 15 Feet</b>										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
3 1/4" HSA

NX CORE

Abandonment Method:  
Boring backfilled with auger cuttings and bentonite chip plug.

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

Auger refusal at 5 ft  
Water introduced during rock coring

## WATER LEVEL OBSERVATIONS

No water observed during drilling



At completion of drilling



Cave-in

**Terracon**

7770 W New York St  
Indianapolis, IN

Boring Started: 04-05-2021

Boring Completed: 04-05-2021

Drill Rig: CME 750X

Driller: B.N.

Project No.: CJ215026

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CJ215026 BODEN ROAD GRAVIT.GPJ TERRACON\_DATATEMPLATE.GDT 4/16/21



# BORING LOG NO. B-08

Page 1 of 1

**PROJECT:** Boden Road Gravity Interceptor Sewer

**CLIENT:** CHA Consulting Inc  
Indianapolis, IN

**SITE:** SR 38 and Boden Road  
Noblesville, IN

MODEL LAYER	GRAPHIC LOG	LOCATION See <a href="#">Exploration Plan</a> Latitude: 40.0386° Longitude: -85.9456°  Approximate Surface Elev.: 780 (Ft.) +/-	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	RQD%	LABORATORY HP (tsf)	WATER CONTENT (%)
			0.8	779+/-								
1		<b>TOPSOIL</b> <b>SANDY LEAN CLAY (CL)</b> , trace sand, trace gravel, brown, stiff						16	7-5-4 N=9		0.75 (HP)	22.3
			4.0	776+/-				10	5-7-8 N=15			
		<b>WEATHERED LIMESTONE</b> , gray, soft			5							
			6.5	773.5+/-				0	50/1"			
		<b>WEATHERED LIMESTONE</b> , brown, soft to moderately hard, very low bedding planes										
3		<b>WEATHERED DOLOMITE</b> , gray, moderately hard, very low bedding planes			10			60		0		
			14.5	765.5+/-				60		23		
		<b>WEATHERED LIMESTONE</b> , brown, moderately hard, very low bedding planes			15							
			16.5	763.5+/-								
		<b>Boring Terminated at 16.5 Feet</b>										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
3 1/4" HSA

NX CORE

Abandonment Method:  
Boring backfilled with auger cuttings and bentonite chip plug.

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

Auger refusal at 6.5 ft  
Water introduced during rock coring

## WATER LEVEL OBSERVATIONS

While drilling  
 At completion of drilling

Cave-in

**Terracon**  
7770 W New York St  
Indianapolis, IN

Boring Started: 04-02-2021

Boring Completed: 04-02-2021

Drill Rig: CME 750X

Driller: B.N.

Project No.: CJ215026

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CJ215026 BODEN ROAD GRAVIT.GPJ TERRACON\_DATATEMPLATE.GDT 4/16/21











































# BORING LOG NO. B-09

Page 1 of 1

**PROJECT:** Boden Road Gravity Interceptor Sewer

**CLIENT:** CHA Consulting Inc  
Indianapolis, IN

**SITE:** SR 38 and Boden Road  
Noblesville, IN

MODEL LAYER	GRAPHIC LOG	LOCATION See <a href="#">Exploration Plan</a> Latitude: 40.0383° Longitude: -85.9442°  Approximate Surface Elev.: 786 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	RQD%	LABORATORY HP (tsf)	WATER CONTENT (%)
		0.9 <b>TOPSOIL</b> 785+/-								
3		<b>WEATHERED LIMESTONE</b> , gray, soft				12	5-7-10 N=17			
						5	50/5"			
										
		6.0 <b>WEATHERED DOLOMITE</b> , gray and brown, soft to moderately hard, very low bedding planes, interbedded shale near 15 ft, with pitting near 13 ft and 14.5 ft 780+/-	5							
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
		<b>Boring Terminated at 16 Feet</b>								

# BORING LOG NO. B-10

Page 1 of 1

**PROJECT:** Boden Road Gravity Interceptor Sewer

**CLIENT:** CHA Consulting Inc  
Indianapolis, IN

**SITE:** SR 38 and Boden Road  
Noblesville, IN

MODEL LAYER	GRAPHIC LOG	LOCATION See <a href="#">Exploration Plan</a> Latitude: 40.0379° Longitude: -85.9430°  Approximate Surface Elev.: 795 (Ft.) +/-	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	RQD%	LABORATORY HP (tsf)	WATER CONTENT (%)
			0.9	794+/-								
		<b>TOPSOIL</b>										
		<b>LEAN CLAY WITH SAND (CL)</b> , trace gravel, brown, stiff to very stiff						16	4-4-5 N=9		2.0 (HP)	21.8
1					5			16	3-4-3 N=7		1.75 (HP)	18.3
			6.5	788.5+/-				16	3-2-3 N=5			
		<b>SAND WITH SILT (SP-SM)</b> , trace gravel, fine to medium grained, brown, moist, loose, poorly graded										
2			9.0	786+/-				16	4-4-6 N=10			
		<b>SAND (SP)</b> , trace gravel, fine to medium grained, brown, moist, medium dense, poorly graded			10							
			11.0	784+/-				6	50-50/1"			
		<b>WEATHERED LIMESTONE</b> , gray, soft										
			14.0	781+/-				1	50/1"			
3					15			28		0		
		<b>WEATHERED DOLOMITE</b> , brown, soft to moderately hard, very low bedding planes, with pitting throughout										
			19.0	776+/-								
		<b>Boring Terminated at 19 Feet</b>										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
3 1/4" HSA

NX CORE

Abandonment Method:  
Boring backfilled with auger cuttings and bentonite chip plug.

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

Auger refusal at 14 ft  
Water introduced during rock coring

## WATER LEVEL OBSERVATIONS

No water observed during drilling  
At completion of drilling

Cave-in

**Terracon**  
7770 W New York St  
Indianapolis, IN

Boring Started: 04-01-2021

Boring Completed: 04-01-2021

Drill Rig: CME 750X

Driller: B.N.

Project No.: CJ215026

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL. CJ215026 BODEN ROAD GRAVIT.GPJ TERRACON\_DATATEMPLATE.GDT 4/16/21







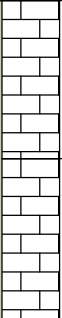
# BORING LOG NO. B-11

Page 1 of 1

**PROJECT:** Boden Road Gravity Interceptor Sewer

**CLIENT:** CHA Consulting Inc  
Indianapolis, IN

**SITE:** SR 38 and Boden Road  
Noblesville, IN

MODEL LAYER	GRAPHIC LOG	LOCATION See <a href="#">Exploration Plan</a> Latitude: 40.0374° Longitude: -85.9417°  Approximate Surface Elev.: 796 (Ft.) +/-	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	LABORATORY HP (tsf)	WATER CONTENT (%)
			0.6	795.5+/-								
		<b>TOPSOIL</b>										
1		<b>LEAN CLAY (CL)</b> , trace sand, trace gravel, brown, medium stiff to very stiff						7	2-4-3 N=7		2.25 (HP)	21.2
					5			8	1-2-4 N=6		1.0 (HP)	18.2
								7	4-3-2 N=5		0.5 (HP)	23.8
			8.5	787.5+/-								
2		<b>SAND WITH GRAVEL (SP)</b> , fine to medium grained, brown, moist, medium dense, poorly graded			10			9	3-6-7 N=13			
			11.0	785+/-								
		<b>WEATHERED LIMESTONE</b> , gray, soft						5	37-50/2"			
												
								5	50/5"			
3		<b>WEATHERED LIMESTONE</b> , brown, soft to moderately hard, low bedding planes, with pitting near 17 ft and 19.5 ft			15			58		0		
			15.0	781+/-								
			19.5	776.5+/-								
		<b>SHALE</b> , gray, soft to moderately hard, low bedding planes	20.0	776+/-	20							
		<b>Boring Terminated at 20 Feet</b>										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
3 1/4" HSA

NX CORE

Abandonment Method:  
Boring backfilled with auger cuttings and bentonite chip plug.





See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

Auger refusal at 15 ft  
Water introduced during rock coring

## WATER LEVEL OBSERVATIONS

-  While drilling
-  At completion of drilling
-  24 hours
-  Cave-in

**Terracon**

7770 W New York St  
Indianapolis, IN

Boring Started: 03-30-2021

Boring Completed: 03-30-2021

Drill Rig: D-50

Driller: J.W.

Project No.: CJ215026

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL. CJ215026 BODEN ROAD GRAVIT.GPJ TERRACON\_DATATEMPLATE.GDT 4/16/21

# BORING LOG NO. B-12

Page 1 of 1

**PROJECT:** Boden Road Gravity Interceptor Sewer

**CLIENT:** CHA Consulting Inc  
Indianapolis, IN

**SITE:** SR 38 and Boden Road  
Noblesville, IN

MODEL LAYER	GRAPHIC LOG	LOCATION See <a href="#">Exploration Plan</a> Latitude: 40.0370° Longitude: -85.9405°  Approximate Surface Elev.: 792 (Ft.) +/-	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	RQD%	LABORATORY HP (tsf)	WATER CONTENT (%)
			0.4	791.5+/-								
		<b>TOPSOIL</b>										
1		<b>LEAN CLAY WITH SAND (CL)</b> , trace gravel, brown, very stiff						8	4-7-6 N=13		2.25 (HP)	16.3
					5			9	2-4-5 N=9		2.0 (HP)	19.3
		<b>WEATHERED LIMESTONE</b> , gray, soft	6.0	786+/-				12	20-40-26 N=66			
3		<b>LIMESTONE</b> , gray, moderately hard to hard, moderate weathering	9.0	783+/-				5	50/5"			
					10							
								60		0		
			14.0	778+/-								
		<b>Boring Terminated at 14 Feet</b>										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
3 1/4" HSA

NX CORE

Abandonment Method:  
Boring backfilled with auger cuttings and bentonite chip plug.

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

Auger refusal at 9 ft  
Water introduced during rock coring

## WATER LEVEL OBSERVATIONS

No water observed during drilling

No water observed at completion

24 hours

Cave-in

**Terracon**

7770 W New York St  
Indianapolis, IN

Boring Started: 03-30-2021

Boring Completed: 03-30-2021

Drill Rig: D-50

Driller: J.W.

Project No.: CJ215026

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CJ215026 BODEN ROAD GRAVIT.GPJ TERRACON\_DATATEMPLATE.GDT 4/16/21

# BORING LOG NO. B-13

Page 1 of 1

**PROJECT:** Boden Road Gravity Interceptor Sewer

**CLIENT:** CHA Consulting Inc  
Indianapolis, IN

**SITE:** SR 38 and Boden Road  
Noblesville, IN

MODEL LAYER	GRAPHIC LOG	LOCATION See <a href="#">Exploration Plan</a> Latitude: 40.0365° Longitude: -85.9392°  Approximate Surface Elev.: 791 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	RQD%	LABORATORY HP (tsf)	WATER CONTENT (%)
		0.9 <b>TOPSOIL</b> 790+/-								
1		<b>LEAN CLAY (CL)</b> , trace sand, trace gravel, brown, medium stiff 788+/-		▼	X	8	2-2-4 N=6		0.75 (HP)	32.9
		3.0 <b>SAND (SP)</b> , trace gravel, fine grained, brown, moist, medium dense, poorly graded 785+/-			X	8	2-4-7 N=11			
2		<b>CLAYEY SAND WITH GRAVEL (SC)</b> , fine to medium grained, brown, moist, dense 782.5+/-	5		X	10	14-19-18 N=37			
		8.5 <b>GRAVEL WITH SAND (GP)</b> , gray, moist, dense to very dense 779.5+/-	10		X	18	8-15-19 N=34			
		11.5 <b>WEATHERED LIMESTONE</b> , gray, soft 778+/-			X	9	40-50/2"			
3		<b>WEATHERED LIMESTONE</b> , brown, moderately hard, very low bedding planes 773+/-	15			60		0		
		18.0 <b>Boring Terminated at 18 Feet</b>								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
3 1/4" HSA

NX CORE

Abandonment Method:  
Boring backfilled with auger cuttings and bentonite chip plug.

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

Auger refusal at 13 ft  
Water introduced during rock coring

## WATER LEVEL OBSERVATIONS

No water observed during drilling

At completion of drilling

24 hours

Cave-in

**Terracon**

7770 W New York St  
Indianapolis, IN

Boring Started: 03-29-2021

Boring Completed: 03-29-2021

Drill Rig: D-50

Driller: J.W.

Project No.: CJ215026

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CJ215026 BODEN ROAD GRAVITY GPJ TERRACON\_DATATEMPLATE.GDT 4/16/21

# BORING LOG NO. B-14

Page 1 of 1

**PROJECT:** Boden Road Gravity Interceptor Sewer

**CLIENT:** CHA Consulting Inc  
Indianapolis, IN

**SITE:** SR 38 and Boden Road  
Noblesville, IN

MODEL LAYER	GRAPHIC LOG	LOCATION See <a href="#">Exploration Plan</a> Latitude: 40.0357° Longitude: -85.9376°  Approximate Surface Elev.: 799 (Ft.) +/-	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	LABORATORY HP (tsf)	WATER CONTENT (%)
			0.6	798.5+/-								
1		<b>TOPSOIL</b> <b>LEAN CLAY (CL)</b> , trace sand, trace gravel, brown, very stiff						10	2-3-4 N=7		2.0 (HP)	22.4
			3.5	795.5+/-	5			9	4-2-3 N=5			
2		<b>SAND (SP)</b> , trace gravel, fine to medium grained, gray, moist to wet below 6 ft, medium dense						10	11-14-12 N=26			
			11.0	788+/-	10			9	11-13-14 N=27			
		<b>WEATHERED LIMESTONE</b> , gray, soft						12	50/3"			
			15.5	783.5+/-	15			8	50/3"			
3		<b>WEATHERED LIMESTONE WITH INTERBEDDED SHALE</b> , brown to gray below 17.5 ft, soft to moderately hard, very low bedding planes, with pitting near 20 ft and 20.5 ft						60		0		
			20.5	778.5+/-	20							
		<b>Boring Terminated at 20.5 Feet</b>										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
3 1/4" HSA

NX CORE

Abandonment Method:  
Boring backfilled with auger cuttings and bentonite chip plug.

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

Auger refusal at 15.5 ft  
Water introduced during rock coring

## WATER LEVEL OBSERVATIONS

- While drilling
- At completion of drilling
- 24 hours
- Cave-in

**Terracon**  
7770 W New York St  
Indianapolis, IN

Boring Started: 03-29-2021

Boring Completed: 03-29-2021

Drill Rig: D-50

Driller: J.W.

Project No.: CJ215026

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CJ215026 BODEN ROAD GRAVIT.GPJ TERRACON\_DATATEMPLATE.GDT 4/16/21

# BORING LOG NO. B-15

Page 1 of 1

**PROJECT:** Boden Road Gravity Interceptor Sewer

**CLIENT:** CHA Consulting Inc  
Indianapolis, IN

**SITE:** SR 38 and Boden Road  
Noblesville, IN

MODEL LAYER	GRAPHIC LOG	LOCATION See <a href="#">Exploration Plan</a> Latitude: 40.0390° Longitude: -85.9462°  Approximate Surface Elev.: 777 (Ft.) +/-	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	RQD%	LABORATORY HP (tsf)	WATER CONTENT (%)
		<b>TOPSOIL</b>	1.2	776+/-								
1		<b>LEAN CLAY (CL)</b> , trace sand, trace gravel, brown, very stiff					X	12	2-3-4 N=7		3.0 (HP)	23.1
					5		X	12	3-3-3 N=6		2.0 (HP)	23.9
		<b>WEATHERED LIMESTONE</b> , brown, soft	6.0	771+/-				0	50/0"			
3		<b>WEATHERED DOLOMITE</b> , brown and gray, soft to moderately hard, very low bedding planes	9.0	768+/-	10			1	50/1"			
								23		0		
		<b>Boring Terminated at 14 Feet</b>	14.0	763+/-								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
3 1/4" HSA

NX CORE

Abandonment Method:  
Boring backfilled with bentonite chip plugs and capped with concrete.

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

Auger refusal at 9 ft  
Water introduced during rock coring

## WATER LEVEL OBSERVATIONS

No water observed during drilling

At completion of drilling

Cave-in

**Terracon**

7770 W New York St  
Indianapolis, IN

Boring Started: 04-06-2021

Boring Completed: 04-06-2021

Drill Rig: CME 750X

Driller: B.N.

Project No.: CJ215026

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CJ215026 BODEN ROAD GRAVIT.GPJ TERRACON\_DATATEMPLATE.GDT 4/16/21



# BORING LOG NO. B-16

Page 1 of 1

**PROJECT:** Boden Road Gravity Interceptor Sewer

**CLIENT:** CHA Consulting Inc  
Indianapolis, IN

**SITE:** SR 38 and Boden Road  
Noblesville, IN

MODEL LAYER	GRAPHIC LOG	LOCATION See <a href="#">Exploration Plan</a> Latitude: 40.0385° Longitude: -85.9436°  Approximate Surface Elev.: 789 (Ft.) +/-	DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	RQD%	LABORATORY HP (tsf)	WATER CONTENT (%)
		<b>TOPSOIL</b>	1.2 788+/-								
1		<b>LEAN CLAY WITH SAND (CL)</b> , trace gravel, brown, stiff	4.0 785+/-				12	7-6-6 N=12		1.0 (HP)	21.7
		<b>WEATHERED LIMESTONE</b> , brown, soft		5			12	47-42-20 N=62			
							3	50/3"			
3		<b>WEATHERED DOLOMITE WITH INTERBEDDED SANDSTONE</b> , brown, soft to moderately hard, very low bedding planes, interbedded limestone near 15 ft	10.0 779+/-				2	50/2"			
			15.0 774+/-	10			60		0		
		<b>Boring Terminated at 15 Feet</b>		15							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
3 1/4" HSA

NX CORE

Abandonment Method:  
Boring backfilled with bentonite chip plugs and capped with concrete.

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

Auger refusal at 10 ft  
Water introduced during rock coring

## WATER LEVEL OBSERVATIONS

No water observed during drilling

At completion of drilling

Cave-in

**Terracon**

7770 W New York St  
Indianapolis, IN

Boring Started: 04-06-2021

Boring Completed: 04-06-2021

Drill Rig: CME 750X

Driller: B.N.

Project No.: CJ215026

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CJ215026 BODEN ROAD GRAVITY GPJ TERRACON\_DATATEMPLATE.GDT 4/16/21

# BORING LOG NO. B-17

Page 1 of 1

**PROJECT:** Boden Road Gravity Interceptor Sewer

**CLIENT:** CHA Consulting Inc  
Indianapolis, IN

**SITE:** SR 38 and Boden Road  
Noblesville, IN

MODEL LAYER	GRAPHIC LOG	LOCATION See <a href="#">Exploration Plan</a> Latitude: 40.0376° Longitude: -85.9411°  Approximate Surface Elev.: 798 (Ft.) +/-	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	RQD%	LABORATORY HP (tsf)	WATER CONTENT (%)
			0.4	797.5+/-								
2		<b>TOPSOIL</b> <b>SAND WITH SILT AND GRAVEL (SP-SM)</b> , fine to medium grained, brown, moist, medium dense, poorly graded	3.0	795+/-				10	4-9-6 N=15			
1		<b>LEAN CLAY (CL)</b> , trace sand, trace gravel, brown, medium stiff	6.0	792+/-	5			10	2-3-2 N=5		0.75 (HP)	27.4
		<b>WEATHERED LIMESTONE</b> , gray, soft	9.0	789+/-				12	6-21-17 N=38			
3		<b>WEATHERED LIMESTONE</b> , brown, soft to moderately hard, very low bedding planes	14.0	784+/-	10			5	50/5"			
								40		0		
		<b>Boring Terminated at 14 Feet</b>										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
3 1/4" HSA

NX CORE

Abandonment Method:  
Boring backfilled with auger cuttings and bentonite chip plug.

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

Auger refusal at 9 ft  
Water introduced during rock coring

## WATER LEVEL OBSERVATIONS

No water observed during drilling

At completion of drilling

24 hours

Cave-in

**Terracon**

7770 W New York St  
Indianapolis, IN

Boring Started: 03-31-2021

Boring Completed: 03-31-2021

Drill Rig: D-50

Driller: J.W.

Project No.: CJ215026

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CJ215026 BODEN ROAD GRAVIT.GPJ TERRACON\_DATATEMPLATE.GDT 4/16/21

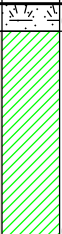

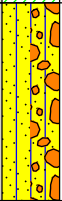

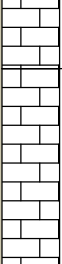
# BORING LOG NO. B-18

Page 1 of 1

**PROJECT:** Boden Road Gravity Interceptor Sewer

**CLIENT:** CHA Consulting Inc  
Indianapolis, IN

**SITE:** SR 38 and Boden Road  
Noblesville, IN

MODEL LAYER	GRAPHIC LOG	LOCATION See <a href="#">Exploration Plan</a> Latitude: 40.0367° Longitude: -85.9384°  Approximate Surface Elev.: 797 (Ft.) +/- DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	RQD%	LABORATORY HP (tsf)	WATER CONTENT (%)
		0.7 <b>TOPSOIL</b> 796.5+/-								
1		<b>LEAN CLAY (CL)</b> , trace sand, trace gravel, brown, stiff to hard, with sand seams near 2 ft and 4 ft				8	4-4-3 N=7		1.75 (HP)	19.6
		6.0 791+/-	5			11	15-16-6 N=22		4.5 (HP)	10.8
2		<b>SILTY SAND WITH GRAVEL (SM)</b> , fine to medium grained, brown, moist to wet below 8.5 ft, loose to dense				10	2-3-2 N=5			
		11.0 786+/-	10			8	2-8-31 N=39			
		<b>WEATHERED LIMESTONE</b> , gray, soft					50/5"			
3		<b>WEATHERED LIMESTONE</b> , brown, soft to moderately hard, very low bedding planes, with interbedded sandstone near 13.5 ft				30		0		
		13.0 784+/-	15							
		18.0 779+/-								
		<b>Boring Terminated at 18 Feet</b>								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
3 1/4" HSA

NX CORE

Abandonment Method:  
Boring backfilled with auger cuttings and bentonite chip plug.



See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).


See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

Auger refusal at 13 ft  
Water introduced during rock coring

## WATER LEVEL OBSERVATIONS

 While drilling  
 At completion of drilling

 Cave-in

**Terracon**  
7770 W New York St  
Indianapolis, IN

Boring Started: 04-01-2021

Boring Completed: 04-01-2021

Drill Rig: D-50

Driller: J.W.

Project No.: CJ215026

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL CJ215026 BODEN ROAD GRAVIT.GPJ TERRACON\_DATATEMPLATE.GDT 4/16/21

## ROCK CORE PHOTOGRAPHY LOG



Boring B-3, Rock Core No. RC-1, Depth 14.1 – 19.1 ft



Boring B-7, Rock Core No. RC-1 & 2, Depth 5 – 15 ft



## Geotechnical Engineering Report

Boden Road Gravity Interceptor Sewer ■ Noblesville, Indiana

April 16, 2021 ■ Terracon Project No. CJ215026



Boring B-8, Rock Core No. RC-1 & 2, Depth 6.5 – 16.5 ft



Boring B-9, Rock Core No. RC-1 & 2, Depth 6 to 16 ft



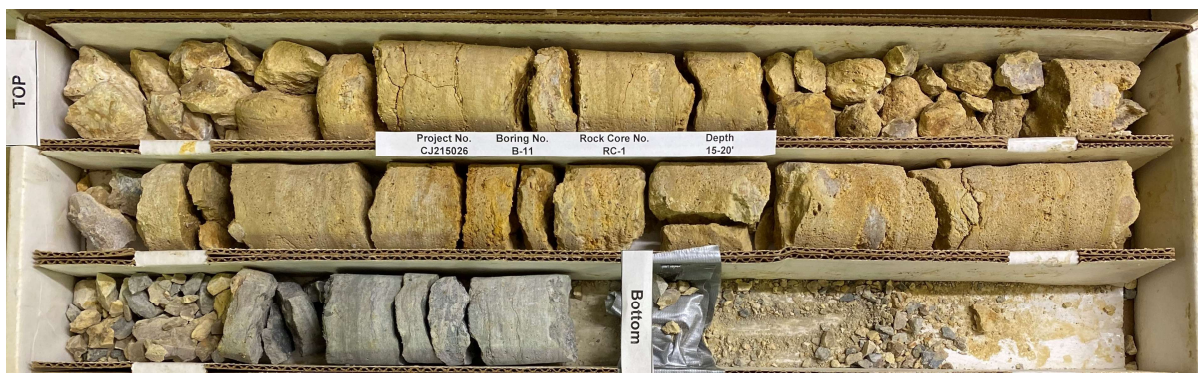
## Geotechnical Engineering Report

Boden Road Gravity Interceptor Sewer ■ Noblesville, Indiana

April 16, 2021 ■ Terracon Project No. CJ215026



Boring B-10, Rock Core No. RC-1, Depth 14 to 19 ft



Boring B-11, Rock Core No. RC-1, Depth 15 to 20 ft

## Geotechnical Engineering Report

Boden Road Gravity Interceptor Sewer ■ Noblesville, Indiana

April 16, 2021 ■ Terracon Project No. CJ215026



Boring B-12, Rock Core No. RC-1, Depth 9 to 14 ft



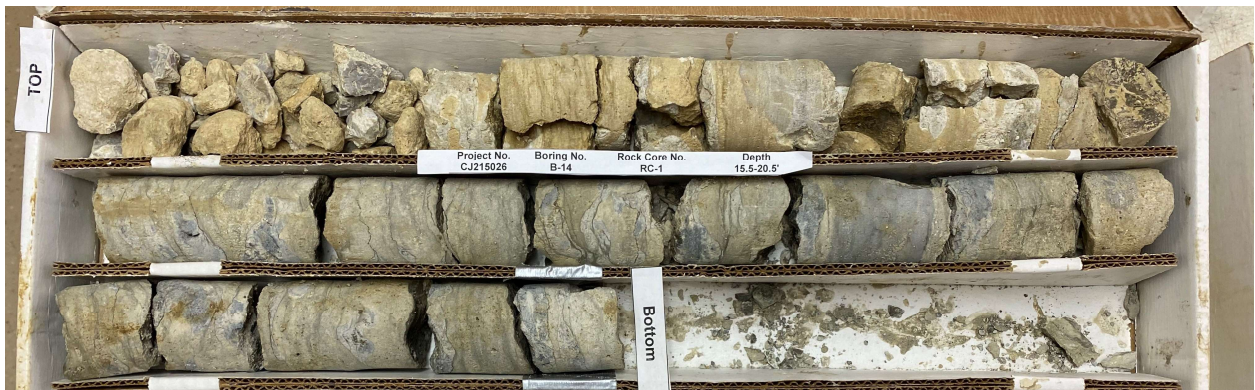
Boring B-13, Rock Core No. RC-1, Depth 13 to 18 ft



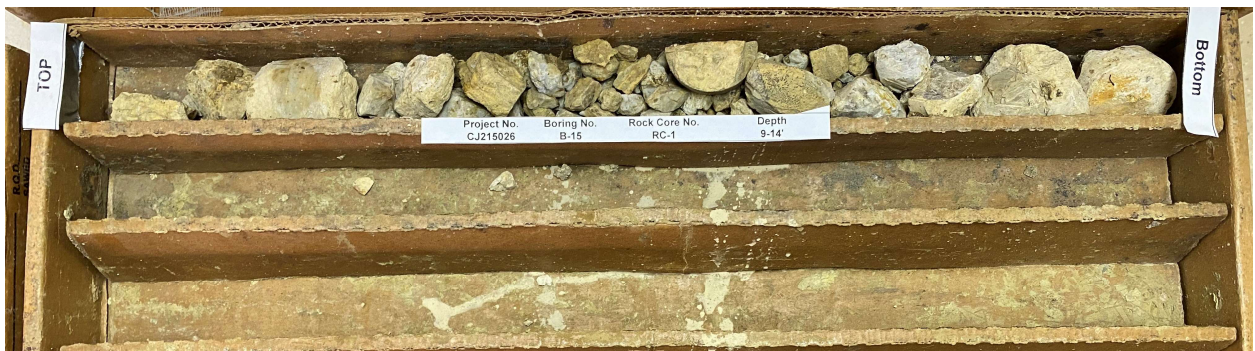
## Geotechnical Engineering Report

Boden Road Gravity Interceptor Sewer ■ Noblesville, Indiana

April 16, 2021 ■ Terracon Project No. CJ215026



Boring B-14, Rock Core No. RC-1, Depth 15.5 to 20.5 ft



Boring B-15, Rock Core No. RC-1, Depth 9 to 14 ft



## Geotechnical Engineering Report

Boden Road Gravity Interceptor Sewer ■ Noblesville, Indiana

April 16, 2021 ■ Terracon Project No. CJ215026



Boring B-16, Rock Core No. RC-1, Depth 10 to 15 ft



Boring B-17, Rock Core No. RC-1, Depth 9 to 14 ft

## Geotechnical Engineering Report

Boden Road Gravity Interceptor Sewer ■ Noblesville, Indiana

April 16, 2021 ■ Terracon Project No. CJ215026



Boring B-18, Rock Core No. RC-1, Depth 13 to 18 ft

**Geotechnical Engineering Report**

Boden Road Gravity Interceptor Sewer ■ Noblesville, Indiana

April 16, 2021 ■ Terracon Project No. CJ215026

**SUMMARY OF SOUNDINGS**

Sounding Designation	Latitude	Longitude	Approximate Depth to Top of Rock <sup>1</sup> (ft)	Approximate Top of Rock Elevation (ft)	Approximate Depth to Auger Refusal <sup>1</sup> (ft)	Approximate Elevation to Auger Refusal (ft)	Approximate Groundwater Depth (ft) <sup>1</sup>	
							During Drilling	Up to 24 hrs After Drilling
S-1	40.0391	-85.9488	20 or below <sup>2</sup>	n/a	n/a	n/a	3	4
S-2	40.0389	-85.9475	4½	770½	5½	769½	No water encountered	No water encountered
S-3	40.0387	-85.9462	6½	771½	7	771	No water encountered	No water encountered
S-4	40.0384	-85.9449	9½	777½	11	776	No water encountered	No water encountered
S-5	40.0381	-85.9435	4	783	7½	779½	No water encountered	3
S-6	40.0377	-85.9423	14	784	14	784	No water encountered	No water encountered
S-7	40.0371	-85.9410	13	784	13	784	No water encountered	No water encountered
S-8	40.0367	-85.9398	11	778	11	778	3½	-
S-9	40.0362	-85.9397	9½	782½	9½	782½	2½	2
S-10	40.0393	-85.9476	6½	766½	11	762	3	-
S-11	40.0388	-85.9450	9	772	9½	771½	No water encountered	-
S-12	40.0381	-85.9424	14	781	14	781	No water encountered	No water encountered
S-13	40.0371	-85.9397	9	785	9	785	No water encountered	No water encountered

<sup>1.</sup> Below the existing ground surface.<sup>2.</sup> Rock was not observed within the maximum depth explored (i.e., 20 ft below the existing grade).

## **SUPPORTING INFORMATION**

### **Contents:**

General Notes






Unified Soil Classification System

Description of Rock Properties

Note: All attachments are one page unless noted above.

# GENERAL NOTES

## DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

SAMPLING	 Shelby Tube  Split Spoon	WATER LEVEL	 Water Initially Encountered  Water Level After a Specified Period of Time  Water Level After a Specified Period of Time	FIELD TESTS	N Standard Penetration Test Resistance (Blows/Ft.) (HP) Hand Penetrometer (T) Torvane (DCP) Dynamic Cone Penetrometer (PID) Photo-Ionization Detector (OVA) Organic Vapor Analyzer
			Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.		

## DESCRIPTIVE SOIL CLASSIFICATION

Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

## LOCATION AND ELEVATION NOTES

Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS	RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance		CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance		
	Descriptive Term (Density)	Standard Penetration or N-Value Blows/Ft.	Descriptive Term (Consistency)	Unconfined Compressive Strength Qu, (tsf)	Standard Penetration or N-Value Blows/Ft.
	Very Loose	0 - 3	Very Soft	less than 0.25	0 - 1
	Loose	4 - 9	Soft	0.25 to 0.50	2 - 4
	Medium Dense	10 - 29	Medium Stiff	0.50 to 1.00	4 - 8
	Dense	30 - 50	Stiff	1.00 to 2.00	8 - 15
	Very Dense	> 50	Very Stiff	2.00 to 4.00	15 - 30
			Hard	> 4.00	> 30

## RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 15
With	15 - 29
Modifier	> 30

## GRAIN SIZE TERMINOLOGY

Major Component of Sample	Particle Size
Boulders	Over 12 in. (300 mm)
Cobbles	12 in. to 3 in. (300mm to 75mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm)
Silt or Clay	Passing #200 sieve (0.075mm)

## RELATIVE PROPORTIONS OF FINES

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 5
With	5 - 12
Modifier	> 12

## PLASTICITY DESCRIPTION

Term	Plasticity Index
Non-plastic	0
Low	1 - 10
Medium	11 - 30
High	> 30



Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests <sup>A</sup>					Soil Classification	
					Group Symbol	Group Name <sup>B</sup>
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	Gravels: More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels: Less than 5% fines <sup>C</sup>	$Cu \geq 4$ and $1 \leq Cc \leq 3$ <sup>E</sup>	GW	Well-graded gravel <sup>F</sup>	
			$Cu < 4$ and/or $[Cc < 1 \text{ or } Cc > 3.0]$ <sup>E</sup>	GP	Poorly graded gravel <sup>F</sup>	
		Gravels with Fines: More than 12% fines <sup>C</sup>	Fines classify as ML or MH	GM	Silty gravel <sup>F, G, H</sup>	
			Fines classify as CL or CH	GC	Clayey gravel <sup>F, G, H</sup>	
	Sands: 50% or more of coarse fraction passes No. 4 sieve	Clean Sands: Less than 5% fines <sup>D</sup>	$Cu \geq 6$ and $1 \leq Cc \leq 3$ <sup>E</sup>	SW	Well-graded sand <sup>I</sup>	
			$Cu < 6$ and/or $[Cc < 1 \text{ or } Cc > 3.0]$ <sup>E</sup>	SP	Poorly graded sand <sup>I</sup>	
		Sands with Fines: More than 12% fines <sup>D</sup>	Fines classify as ML or MH	SM	Silty sand <sup>G, H, I</sup>	
			Fines classify as CL or CH	SC	Clayey sand <sup>G, H, I</sup>	
Fine-Grained Soils: 50% or more passes the No. 200 sieve	Silts and Clays: Liquid limit less than 50	Inorganic:	$PI > 7$ and plots on or above “A”	CL	Lean clay <sup>K, L, M</sup>	
			$PI < 4$ or plots below “A” line <sup>J</sup>	ML	Silt <sup>K, L, M</sup>	
		Organic:	Liquid limit - oven dried	< 0.75	OL	Organic clay <sup>K, L, M, N</sup>
			Liquid limit - not dried			Organic silt <sup>K, L, M, O</sup>
	Silts and Clays: Liquid limit 50 or more	Inorganic:	$PI$ plots on or above “A” line	CH	Fat clay <sup>K, L, M</sup>	
			$PI$ plots below “A” line	MH	Elastic Silt <sup>K, L, M</sup>	
		Organic:	Liquid limit - oven dried	< 0.75	OH	Organic clay <sup>K, L, M, P</sup>
			Liquid limit - not dried			Organic silt <sup>K, L, M, Q</sup>
Highly organic soils:	Primarily organic matter, dark in color, and organic odor			PT	Peat	

<sup>A</sup> Based on the material passing the 3-inch (75-mm) sieve.

<sup>B</sup> If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

<sup>C</sup> Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

<sup>D</sup> Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.

$$E \quad Cu = D_{60}/D_{10} \quad Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$$

<sup>F</sup> If soil contains  $\geq 15\%$  sand, add "with sand" to group name.

<sup>G</sup> If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

<sup>H</sup> If fines are organic, add "with organic fines" to group name.

<sup>I</sup> If soil contains  $\geq 15\%$  gravel, add "with gravel" to group name.

<sup>J</sup> If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

<sup>K</sup> If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

<sup>L</sup> If soil contains  $\geq 30\%$  plus No. 200 predominantly sand, add "sandy" to group name.

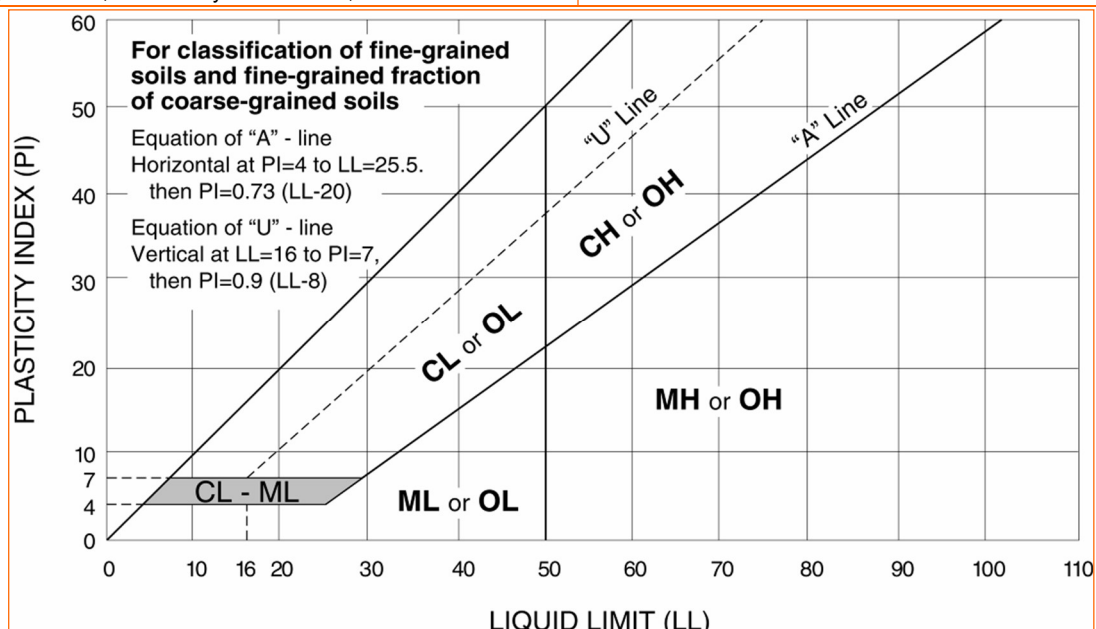
<sup>M</sup> If soil contains  $\geq 30\%$  plus No. 200, predominantly gravel, add "gravelly" to group name.

<sup>N</sup>  $PI \geq 4$  and plots on or above "A" line.

<sup>O</sup>  $PI < 4$  or plots below "A" line.

<sup>P</sup>  $PI$  plots on or above "A" line.

<sup>Q</sup>  $PI$  plots below "A" line.



WEATHERING	
Term	Description
<b>Unweathered</b>	No visible sign of rock material weathering, perhaps slight discoloration on major discontinuity surfaces.
<b>Slightly weathered</b>	Discoloration indicates weathering of rock material and discontinuity surfaces. All the rock material may be discolored by weathering and may be somewhat weaker externally than in its fresh condition.
<b>Moderately weathered</b>	Less than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discolored rock is present either as a continuous framework or as corestones.
<b>Highly weathered</b>	More than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discolored rock is present either as a discontinuous framework or as corestones.
<b>Completely weathered</b>	All rock material is decomposed and/or disintegrated to soil. The original mass structure is still largely intact.
<b>Residual soil</b>	All rock material is converted to soil. The mass structure and material fabric are destroyed. There is a large change in volume, but the soil has not been significantly transported.

STRENGTH OR HARDNESS		
Description	Field Identification	Uniaxial Compressive Strength, psi (MPa)
<b>Extremely weak</b>	Indented by thumbnail	40-150 (0.3-1)
<b>Very weak</b>	Crumbles under firm blows with point of geological hammer, can be peeled by a pocket knife	150-700 (1-5)
<b>Weak rock</b>	Can be peeled by a pocket knife with difficulty, shallow indentations made by firm blow with point of geological hammer	700-4,000 (5-30)
<b>Medium strong</b>	Cannot be scraped or peeled with a pocket knife, specimen can be fractured with single firm blow of geological hammer	4,000-7,000 (30-50)
<b>Strong rock</b>	Specimen requires more than one blow of geological hammer to fracture it	7,000-15,000 (50-100)
<b>Very strong</b>	Specimen requires many blows of geological hammer to fracture it	15,000-36,000 (100-250)
<b>Extremely strong</b>	Specimen can only be chipped with geological hammer	>36,000 (>250)

DISCONTINUITY DESCRIPTION			
Fracture Spacing (Joints, Faults, Other Fractures)		Bedding Spacing (May Include Foliation or Banding)	
Description	Spacing	Description	Spacing
<b>Extremely close</b>	< ¾ in (<19 mm)	<b>Laminated</b>	< ½ in (<12 mm)
<b>Very close</b>	¾ in – 2-1/2 in (19 - 60 mm)	<b>Very thin</b>	½ in – 2 in (12 – 50 mm)
<b>Close</b>	2-1/2 in – 8 in (60 – 200 mm)	<b>Thin</b>	2 in – 1 ft. (50 – 300 mm)
<b>Moderate</b>	8 in – 2 ft. (200 – 600 mm)	<b>Medium</b>	1 ft. – 3 ft. (300 – 900 mm)
<b>Wide</b>	2 ft. – 6 ft. (600 mm – 2.0 m)	<b>Thick</b>	3 ft. – 10 ft. (900 mm – 3 m)
<b>Very Wide</b>	6 ft. – 20 ft. (2.0 – 6 m)	<b>Massive</b>	> 10 ft. (3 m)

Discontinuity Orientation (Angle): Measure the angle of discontinuity relative to a plane perpendicular to the longitudinal axis of the core. (For most cases, the core axis is vertical; therefore, the plane perpendicular to the core axis is horizontal.) For example, a horizontal bedding plane would have a 0-degree angle.

ROCK QUALITY DESIGNATION (RQD) <sup>1</sup>	
Description	RQD Value (%)
<b>Very Poor</b>	0 - 25
<b>Poor</b>	25 – 50
<b>Fair</b>	50 – 75
<b>Good</b>	75 – 90
<b>Excellent</b>	90 - 100

1. The combined length of all sound and intact core segments equal to or greater than 4 inches in length, expressed as a percentage of the total core run length.

Reference: U.S. Department of Transportation, Federal Highway Administration, Publication No FHWA-NHI-10-034, December 2009  
Technical Manual for Design and Construction of Road Tunnels – Civil Elements





# **REPORT OF GEOTECHNICAL ENGINEERING INVESTIGATION**

**NOBLESVILLE SANITARY  
NOBLESVILLE, INDIANA**

**PREPARED FOR:**

**SAMCO, INC.  
11905 LAKESIDE DRIVE  
FISHERS, INDIANA 46038**

**Patriot Engineering and Environmental, Inc.  
6150 East 75<sup>th</sup> Street  
Indianapolis, Indiana 46250**

**August 15, 2022**





**PATRIOT ENGINEERING  
and ENVIRONMENTAL, Inc.**

*Engineering Value for Project Success*

August 15, 2022

Mr. Tom Kallio  
Samco, Inc.  
11905 Lakeside Drive  
Fishers, Indiana 46038

Re: Report of Geotechnical Engineering Exploration  
**Noblesville Sanitary**  
**East 166<sup>th</sup> Street**  
**Noblesville, Indiana**  
Patriot Project No.: 22-1017-01G

Dear Tom:

Attached is the report of our geotechnical engineering exploration for the above referenced project. This exploration was completed in general accordance with our Proposal No. P22-1148-01G dated June 14, 2022.

This report includes graphic logs of sixteen (16) soil borings drilled at the proposed project site. Also included in the report are the results of laboratory tests performed on samples obtained from the site, and geotechnical recommendations pertinent to the site development, foundation design, and construction.

We appreciate the opportunity to perform this geotechnical engineering exploration and are looking forward to working with you during the construction phase of the project. If you have any questions regarding this report or if we may be of any additional assistance regarding any geotechnical aspect of the project, please do not hesitate to contact our office.

Respectfully submitted,  
**Patriot Engineering and Environmental, Inc.**

**Ian Grafe, E.I.**  
Geotechnical Engineer



**William D. Dubois, P.E.**  
Senior Principal Engineer

## TABLE OF CONTENTS

<b>1.0 INTRODUCTION.....</b>	<b>1</b>
1.1 General .....	1
1.2 Purpose and Scope .....	1
<b>2.0 PROJECT INFORMATION .....</b>	<b>1</b>
<b>3.0 SITE AND SUBSURFACE CONDITIONS.....</b>	<b>2</b>
3.1 Site Conditions .....	2
3.2 General Subsurface Conditions .....	2
3.3 Groundwater Conditions .....	3
<b>4.0 DESIGN RECOMMENDATIONS .....</b>	<b>4</b>
4.1 Basis .....	4
4.2 Foundations .....	4
4.3 Lateral Earth Pressures .....	6
4.4 Excavation Slopes .....	8
4.5 Excavation Support System .....	8
4.6 Subsurface Utilities .....	9
<b>5.0 CONSTRUCTION CONSIDERATIONS .....</b>	<b>9</b>
5.1 Site Preparation.....	9
5.2 Foundation Excavations .....	10
5.3 Structural Fill and Fill Placement Control.....	11
5.4 Groundwater Considerations .....	12
<b>6.0 EXPLORATIONAL PROCEDURES.....</b>	<b>12</b>
6.1 Field Work .....	12
6.2 Laboratory Testing.....	13
<b>7.0 ILLUSTRATIONS .....</b>	<b>14</b>
<b>APPENDICES</b>	
Appendix A:	Site Vicinity Map      (Figure No. 1) Boring Location Map (Figure No. 2 and 3) Boring Logs Boring Log Key Unified Soil Classification System (USCS)
Appendix B:	General Qualifications Standard Clause for Unanticipated Subsurface Conditions

## **REPORT OF GEOTECHNICAL ENGINEERING EXPLORATION**

**Noblesville Sanitary  
East 166<sup>th</sup> Street  
Noblesville, Indiana  
Patriot Project No.: 22-1017-01G**

### **1.0 INTRODUCTION**

#### **1.1 General**

Samco, Inc. is planning the construction of a sanitary line to be located along East 166<sup>th</sup> Street and Olio Road in Noblesville, Indiana. The results of our geotechnical engineering exploration for the project are presented in this report.

#### **1.2 Purpose and Scope**

The purpose of this exploration is to determine the general near surface and subsurface conditions within the project area and to develop the geotechnical engineering recommendations necessary for the design and construction of the proposed sewer line. This was achieved by drilling soil borings, and by conducting laboratory tests on samples taken from the borings. This report contains the results of our findings, geotechnical engineering interpretation of these results with respect to the available project information, and recommendations to aid in the design and construction of the proposed sewer line.

### **2.0 PROJECT INFORMATION**

The proposed project is located along east 166<sup>th</sup> Street and Olio Road in Noblesville, Indiana. The project consists of a sewer line running along East 166<sup>th</sup> Street and Olio Road and a lift station located at the southeast corner of the Olio Road and East 156<sup>th</sup> Street intersection.

Based on information provided by Samco, Inc., we understand that the proposed lift station will bear at approximately 30 feet below the existing ground surface. No structural loading information is available to us at the time of this report.

## 3.0 SITE AND SUBSURFACE CONDITIONS

### 3.1 Site Conditions

The project site is presently the right of way along multiple county roads outside the city of Noblesville. The surrounding area is generally an area of residential development and agricultural fields. The topography in the area proposed for construction is generally flat.

### 3.2 General Subsurface Conditions

Our interpretation of the subsurface conditions is based upon sixteen (16) soil borings drilled at the approximate locations shown on the Boring Location Map (Figure No. 2) in Appendix "A". All depths discussed below refer to depths below the existing ground surface. Based on the results of the soil borings completed at the site, the following subsurface profile is presented. A description of each general soil unit has been identified and is described below:

Topsoil – Topsoil, a surficial layer of material that is a blend of silts, sands, and clays, with varying amounts of organic matter, was encountered at the ground surface at the boring locations. The topsoil layer was about 7 to 9 inches thick in the borings.

Silty and/or Sandy Clay (CL) - The topsoil layer is generally underlain by soft to hard silty and/or sandy clay. The silty and/or sandy clay layers typically extends to depths of 8.5 to the termination of the borings at 26 feet below the existing ground surface. The natural moisture content of this material ranging from 7 to 29 percent (%). The silty and/or sandy clay layers have hand penetrometer values of 1.0 to greater than 4.5 tons per square foot (tsf). Standard Penetration Test N-values (blow counts) in this material varied from 3 to more than 50 blows per foot (bpf).

Sand (SP-SM) – Within the clay layers, loose to dense sand was encountered from 6 to 13.5 feet below existing grade at three (3) boring locations (B-6, B-11, and B-14). Standard Penetration Test N-values in this sand varied from 6 to 36 bpf.

The clay layers are generally underlain by loose to very dense sand was encountered from 8.5 to 30 feet below existing grade. Standard Penetration Test N-values in this sand varied from 2 to more than 50 bpf.

Clayey Sand (SC) - Below the silty and/or sandy clay layers in Boring B-9, very dense clayey sand was encountered from 28.5 to 29 feet below existing grade. The Standard Penetration Test N-value in this clayey sand was more than 50 bpf.

Gravel (GP-GM) - Below the silty and/or sandy clay layers, very dense gravel was encountered from 18.5 to 28.5 feet below existing grade in Borings B-10 and B-16. Standard Penetration Test N-values in this gravel were more than 50 bpf.

***As previously mentioned, unsuitable soft clays were encountered in five (5) of the sixteen (16) borings, at depths up to 6 feet below the existing ground surface.*** The following table presents the extent of the unsuitable soils encountered in the borings:

**Table No. 1: Summary of Unsuitable Soils Encountered in Borings**

<b>Boring Number</b>	<b>Soil Classification</b>	<b>Approximate Depth of Unsuitable Soils (feet)<sup>(1)</sup></b>
B-3	Soft Sandy Clay (CL)	3.5 to 6
B-6	Soft Sandy Clay (CL)	3.5 to 6
B-8	Soft Sandy Clay (CL)	3.5 to 6
B-11	Soft Sandy Clay (CL)	3.5 to 6
B-14	Soft Sandy Clay (CL)	3.5 to 6

<sup>(1)</sup> Represents depth below existing ground surface.

The soil conditions described above are general, and some variations in the descriptions should be expected; for more specific information, please refer to the boring logs presented in Appendix "A". It should be noted that the dashed stratification lines shown on the soil boring logs indicate approximate transitions between soil types. In-situ stratification changes could occur gradually or at different depths.

### **3.3 Groundwater Conditions**

The term groundwater pertains to any water that percolates through the soil found on site. This includes any overland flow that permeates through a given depth of soil, perched water, and water that occurs below the "water table", a zone that remains saturated and water-bearing year-round.

Groundwater was observed during drilling in fifteen (15) of the sixteen (16) soil borings performed at the site at depths between 3.5 and 23.5 feet below the existing ground

surface. Groundwater was not observed in the remaining boring during drilling. Immediately after the borings were completed and the augers were removed from the boreholes, groundwater was observed at depths between 7 and 25 feet below the existing ground surface in fifteen (15) of the sixteen (16) soil borings. The remaining boring was dry at the cave-in depths shown on the boring logs.

It should be recognized that fluctuations in the groundwater level should be expected over time due to variations in rainfall and other environmental or physical factors. ***The true static groundwater level can only be determined through observations made in cased holes over a long period of time, the installation of which was beyond the scope of this exploration.***

## 4.0 DESIGN RECOMMENDATIONS

### 4.1 Basis

Our recommendations are based on data presented in this report, which include soil borings, laboratory testing, and our experience with similar projects. Subsurface variations that may not be indicated by a dispersive exploratory boring program can exist on any site. If such variations or unexpected conditions are encountered during construction, or if the project information is incorrect or changed, we should be informed immediately since the validity of our recommendations may be affected.

### 4.2 Foundations

We understand that the proposed lift station will bear at approximately 30 feet below existing grade. Based on the above assumption and the soil conditions encountered at the borings, the proposed structure can be supported on spread footings bearing on the natural very dense sands or on new well-compacted structural fills overlying the same. These footings should be proportioned using a net allowable soil bearing pressure not exceeding 3,500 pounds per square foot (psf). ***The depth of the lift station was provided after the borings were completed. For higher soil pressures, we recommend that borings be extended beyond 30 feet.***

In using the above net allowable soil bearing pressures, the weight of the foundation and backfill over the foundation need not be considered. Hence, only loads applied at or above the minimum finished grade adjacent to the footing need to be used for dimensioning the foundations. Each new foundation should be positioned so it does not induce significant

pressure on adjacent foundations; otherwise the stress overlap must be considered in the design.

We estimate that the total foundation settlement should not exceed approximately 1 inch and that differential settlement should not exceed about  $\frac{3}{4}$  inch. Careful field control during construction is necessary to minimize the actual settlement that will occur.

*Positive drainage of surface water should be maintained away from structure foundations to avoid wetting and weakening of the foundation soils both during construction and after construction is complete.*

### **Below Grade Slabs and Hydrostatic Uplift Pressures**

Groundwater was encountered at depths of 3.5 to 23.5 feet below the existing ground surface. Therefore, the structure should be designed for appropriate uplift pressures (for periods when these structures will be empty) if no drainage or relief valves are provided to relieve the hydrostatic pressures from groundwater table. Uplift forces can be resisted by the weight of the foundation as well as the soils and other loads that are placed directly over the foundation elements. We recommend using a factor of safety of 1.25 for uplift resistance provided that the weight of the foundation, soil directly above the foundation and other resisting loads are used to resist the uplift pressure considering the empty condition of the tanks. If the uplift forces are too great to be resisted by the above components, it may necessary to enlarge the foundation.

For structures which can be flooded, pressure relief valves can be considered to relieve the hydrostatic pressures. When structures are empty during periods of high-water table levels, the valves open, allowing the water to enter the structure and increasing the forces resisting the uplift forces. It is recommended that these relief valves be automatically activated by excessive hydrostatic pressures when the groundwater table rises above certain level. The relief valves should be installed at an elevation which will prevent uplift of the structures when the total uplift forces are greater than the resisting force or weight of the structure, but will not flood the structure when the uplift forces are less than resisting force or weight of the structure. For the relief valves to be effective, the backfill around the units must be free draining enough to allow rapid adjustment of groundwater table. It is recommended a minimum of 9 inches thick granular blanket of clean, free-draining gravel material be used beneath the entire slab and up to the top of relief valve level.



We recommend that a perimeter drainage system be provided around the below grade walls unless the walls are designed to resist the hydrostatic forces and water proofed. These drains may flow by gravity to a storm sewer (if possible). The perimeter drains should consist of a 6-inch slotted, corrugated pipe surrounded by at least 6 inches of INDOT No. 5 or No. 8 stone. The stone should be completely wrapped in a drainage geotextile consisting of Mirafi 140N or an equivalent.

The below grade ground supported slab should be underlain by a 9-inch layer of open graded INDOT No. 5 or No. 8 stone that will serve as a drainage blanket beneath the entire slab, if the mat/slab system is not designed to resist hydrostatic pressures. A system of perforated drainpipes could also be installed into the granular fill if the hydrostatic pressure relieve valves are not installed. The drains should consist of 4 inch slotted corrugated pipes surrounded by at least 6 inches of No. 5 or No. 8 stone. The stone should be completely wrapped in a drainage geotextile consisting of Mirafi 140N or equivalent. Geotextile filter fabric should be placed between the drainage layer and native sandy soils to prevent clogging of the drainage layer.

We recommend that Patriot review the subgrade conditions prior to slab construction. Any unsuitable conditions encountered should be corrected prior to slab construction under the guidance of Patriot.

Provided that a minimum of 9 inches of granular base course is placed below the tank and floor slab, a modulus of subgrade reaction, "K<sub>30</sub>" value of 125 pounds per cubic inch (pci), is recommended for the design of ground supported floor slabs. It should be noted that the "K<sub>30</sub>" modulus is based on a 30-inch diameter plate load.

#### **4.3 Lateral Earth Pressures (Retaining Walls)**

For the design of retaining walls, lift station walls, the magnitude of the lateral earth pressure on the walls is dependent on the method of backfill placement behind the walls, the type of backfill soil, drainage provisions and whether or not the wall is permitted to yield during and/or after placement of the backfill. When a retaining wall is held rigidly against horizontal movement, the lateral pressure against the wall is greater than the "active" earth pressure that is typically used in the design of free-standing retaining walls. Therefore, rigid walls should be designed for higher "at-rest" pressures (using an at-rest lateral earth pressure coefficient, K<sub>o</sub>), while yielding walls can be designed for active pressures (using an active lateral earth pressure coefficient, K<sub>a</sub>).

The lift station walls proposed for the project are expected to be rigid walls. ***It should be noted that the on-site clayey soils are not suitable for use as backfill immediately against the walls.*** Therefore, provided ***a clean well-graded granular material is used for backfill***, a total soil unit weight ( $\gamma_t$ ) of 125 pounds per cubic foot (pcf), an at-rest lateral earth pressure coefficient ( $K_o$ ) of 0.45, an active lateral earth pressure coefficient ( $K_a$ ) of 0.30, and a passive lateral earth pressure coefficient ( $K_p$ ) of 3.4 can be used for calculating the lateral earth pressures. An equivalent fluid active pressure of 38 psf per foot of wall height is recommended for design purposes in conditions where the top of the wall is allowed to yield during backfilling. However, if the top of the wall will be fixed, an equivalent fluid at-rest pressure of 57 psf per foot of wall height is recommended for design purposes. This equivalent fluid pressure would increase linearly from zero (0) psf at the ground surface, to a maximum at the base of the wall.

When calculating passive earth pressure, the upper 3 feet of soil should be neglected due to the potential for frost disturbance or otherwise insufficiently compacted soil to appropriately generate the specified passive pressure. Additionally for design purposes, it should be recognized that in order for passive earth pressures to be fully developed, the wall must move laterally about 0.04H (where "H" equals the wall height). ***In most cases, passive earth pressures behind walls should not be considered in design.***

If hydrostatic pressure due to water build-up against the lift station walls is anticipated, the equivalent fluid pressure method will be changed for the soil. Rather, the lateral earth pressure should be computed using a total soil unit weight of 125 pcf above the highest anticipated water level, and a buoyant soil unit weight of 63 pcf below the highest anticipated water level. The earth pressure coefficient indicated above should be used above and below the water level to compute the lateral earth pressure. The hydrostatic pressure should be computed using the highest anticipated water level. The lateral earth pressure and hydrostatic pressure should be added to obtain the total lateral pressure on the wall.

Furthermore, in conjunction with and as a direct result of the lateral earth pressures defined above, the shear resistance against base sliding can be computed by multiplying the minimum normal force on the base of the footing times a coefficient of friction ( $\mu$ ) of 0.3. We recommend that for evaluation of sliding stability that a minimum factor of safety ( $F_s$ ) of 1.5 is utilized for design purposes. Additionally for design, the toe pressure for the lift station wall footings should not exceed the maximum allowable bearing pressure provided in Section 4.2 "*Foundations*".

**Table No. 1 Summary of Lateral Earth Design Pressures for Retaining Walls**

Soil Unit Weight ( $\gamma_t$ )	At-Rest Coefficient ( $K_o$ )	Active Coefficient ( $K_a$ )	Passive Coefficient ( $K_p$ )	Coefficient of Friction ( $\mu$ )	Minimum Factor of Safety ( $F_s$ )
125 pcf	0.45	0.30	3.4	0.3	1.5

#### 4.5 Excavation Slopes

Excavations for the proposed pump station will generally be through highly variable soils, including stiff to hard clay and medium dense sands. Based upon the high degree of variability, we recommend that all soils be treated as Type C soils based on OSHA criteria where pipe trench excavations will be performed. Therefore, as a preliminary assessment we recommend temporary unsupported slopes in these materials be no steeper than 1.5 (Hor.) to 1 (Vert.). **It should be noted that significant sloughing may occur in areas where excavation through native soft silty clay or loose sand occurs, particularly where excavations extend below the groundwater table. Utilization of temporary shoring will be required. It should be noted that excavations deeper than 20 feet require special consideration and should be designed by a registered professional (structural) engineer.**

We recommend that soils encountered during excavation of shallow trenches be inspected by a qualified competent person to determine the soil type and in-situ strength. Such evaluation should consist of visual evaluation of subgrade conditions and estimation of in-situ soil strength utilizing a torvane or hand penetrometer.

#### 4.6 Excavation Support System

Due to the proximity of public and private properties to the excavation, an excavation support system may be required to facilitate the excavation for foundations extending below the streets. The excavation support system should be designed with lateral earth pressures, hydrostatic pressures, traffic loads, and surcharge loads within a 1:1 (H:V) zone from the base of the excavation. In addition, it may be necessary to underpin any adjacent structures (such as utilities in the roads) to avoid any settlement associated with excavation and construction activities. The retention system should be designed by a

Registered Professional Engineer and should be installed by an experienced specialty contractor.

#### 4.7 Subsurface Utilities

We understand that the proposed sewer line will be installed using horizontal directional drilling. The invert elevation for the majority of the project will be between 10 and 20 feet below the existing ground surface.

In regards to bearing and support of the subsurface utilities, the soil conditions encountered in our borings generally consist of medium stiff to hard clays and loose to very dense sands. These soils are generally suitable for support of utilities; however, additional effort may be required to bore through very stiff to hard clays. ***Unsuitable soft clays were encountered in five (5) of the soil borings.*** These soft clays may expand or contract depending on the water content. The pipe should be flexible in order to prevent cracking and damage.

Groundwater was encountered as shallow as 3.5 feet below the existing ground surface. This is above the anticipated pipe invert elevation. While no excavations are planned for the majority of this project, groundwater flowing around the pipe could cause erosion issues after installation.

## 5.0 CONSTRUCTION CONSIDERATIONS

### 5.1 Site Preparation

All areas that will support foundations, floors, pavements, or newly placed structural fill must be properly prepared. All loose surficial soil or "topsoil" and other unsuitable materials must be removed. Unsuitable materials include frozen soil, relatively soft material, relatively wet soils, deleterious material, or soils that exhibit a high organic content.

Approximately seven (7) to nine (9) inches of loose surficial topsoil was encountered in the borings. The topsoil was measured at discrete locations as shown on the Boring Location Map (Figure No. 2) in Appendix "A". The topsoil thickness measured at the boring locations may or may not be representative of the overall average topsoil thickness at the site. Therefore, it is possible that the actual stripping depth could significantly vary from this data. The data presented should be viewed only as a guide to the minimum stripping depth that will be required to remove organic material at the surface. Additional field exploration by *Patriot* would be required to provide an accurate estimate of the stripping

depth. This limited data indicates that a minimum stripping depth will be required to remove the organic material at the surface, followed by the potential for additional stripping and/or scarification and recompaction as may be required to achieve suitable subgrade support. ***Additionally, if saturated conditions exist with the surface soils, light tracked equipment could be required to avoid pushing organics deeper into the suitable subgrade soils.*** A *Patriot* representative should verify the stripping depth at the time grading operations occur.

Care must be exercised during grading and fill placement operations. ***The combination of heavy construction equipment traffic and excess surface moisture can cause pumping and deterioration of the near surface soils. The severity of this potential problem depends to a great extent on the weather conditions prevailing during construction.*** The contractor must exercise discretion when selecting equipment sizes and also make a concerted effort to control construction traffic and surface water while the subgrade soils are exposed. We recommend that heavy construction equipment (i.e. dump trucks, scrapers, etc.) be rerouted away from the building and pavement areas. If such problems do arise, the operations in the affected area should be halted and the *Patriot* representative contacted to evaluate the condition.

## 5.2 Foundation Excavations

***Excavation will be performed on sandy soils that can be easily disturbed. If the subgrade soil is disturbed, it should be re-compacted or a crushed stone layer should be placed at the subgrade level.***

Upon completion of the foundation excavations and prior to the placement of reinforcing steel, a *Patriot* representative should check the exposed subgrade to confirm that a bearing surface of adequate strength has been reached. Any localized soft soil zones encountered at the bearing elevations should be further excavated until adequate support soils are encountered. The cavity should be backfilled with structural fill as defined below, or the footing can be poured at the excavated depth. Structural fill used as backfill beneath footings should be limited to lean concrete, well-graded sand and gravel, or crushed stone placed and compacted in accordance with Section 5.3 “*Structural Fill and Fill Placement Control*”.

If it is necessary to support spread footings on structural fill, the fill pad must extend laterally a minimum distance beyond the edge of the footing. The minimum structural pad width would correspond with a point at which an imaginary line extending downward from

the outside edge of the footing at a 1H:2V (horizontal: vertical) slope intersects the surface of the natural soils. For example, if the depth to the bottom of excavation is 4 feet below the bottom of the foundation, the excavation would need to extend laterally beyond the edge of the footing at least 2 feet, as shown in Illustration "A" found at the conclusion of this report.

Excavation slopes should be maintained within all requirements set-forth by the Occupational Safety and Health Standards (OSHA), but specifically Section 1926 Subpart "P" – "Excavations". We recommend that any surcharge fill or heavy equipment be kept at least 5 feet away from the edge of the excavation.

Construction traffic on the exposed surface of the bearing soil will potentially cause some disturbance of the subgrade and consequently loss of bearing capacity. However, the degree of disturbance can be minimized by proper protection of the exposed surface.

### 5.3 Structural Fill and Fill Placement Control

Structural fill, defined as any fill which will support structural loads, should be clean and free of organic material, debris, deleterious materials, and frozen soils. Samples of the proposed fill materials should be tested prior to initiating the earthwork and backfilling operations to determine the classification, the natural and optimum moisture contents and maximum dry density and overall suitability as a structural fill. ***Structural fill should have a liquid limit less than 40 and a plasticity index less than 20.***

All structural fill adjacent to foundations and over foundations, should be compacted to at least 95 percent (%) of its maximum Standard Proctor dry density (ASTM D-698). This minimum compaction requirement should be increased to 100 percent (%) of the maximum Standard Proctor dry density for fill supporting footings, provided these are designed as outlined Section 4.0 "Design Recommendations".

Structural fill supporting, around and over utilities should be compacted to at least 95 percent (%) of its maximum Standard Proctor dry density (ASTM D-698) for utilities underlying structural areas (i.e. buildings, pavements, sidewalks, etc.). However, the minimum compaction requirement can be reduced for backfill around and over the utilities to 90 percent (%) of the maximum Standard Proctor dry density where utilities underlie greenbelt areas (i.e. grassy lawns, landscaping, etc.). It is recommended that a clean well-graded granular material be utilized as the bedding material, as well as the backfill material around and over the utility lines.

To achieve the recommended compaction of the structural fill, we suggest that the fill 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 range of 2 percentage (%) points below or above the optimum moisture content value. All fill placement should be monitored by a *Patriot* representative. ***Each lift should be tested for proper compaction at a frequency of at least one (1) test every 2,500 square feet (ft<sup>2</sup>) per lift for the building areas, at least one (1) test every 10,000 square feet (ft<sup>2</sup>) per lift for the parking and roadway areas, and at a frequency of at least one (1) test for every 50 lineal feet of utility installation.***

## 5.5 Groundwater Considerations

Groundwater was observed during our field activities at depths between about 3.5 and 23.5 feet below the existing ground surface; which is expected to be below the anticipated foundation excavation depths, though the groundwater observations could potentially be within trench excavation depths for subsurface utilities. Therefore, groundwater infiltration should be expected into the subsurface utility excavations, and depending on seasonal conditions, localized and sporadic groundwater infiltration may occur into the building foundation excavations on this site.

Groundwater inflow into shallow excavations **above** the groundwater table is expected to be adequately controlled by conventional methods such as gravity drainage and/or pumping from sumps. More significant inflow can be expected in deeper excavations **below** the groundwater table requiring more aggressive dewatering techniques, such as well or wellpoint systems. For groundwater to have minimal effects on the construction, foundation excavations should be constructed and poured in the same day, if possible.

## 6.0 EXPLORATIONAL PROCEDURES

### 6.1 Field Work

A total of sixteen (16) soil borings were drilled, sampled, and tested at the project site between July 20 and 22, 2022 at the approximate locations shown on the Boring Location Map (Figure No. 2) in Appendix "A". The depths that the soil borings were advanced to are shown on the Boring Logs in Appendix "A". All depths are given as feet below the existing ground surface.

The borings were advanced using 3¼ inch inside diameter hollow-stem augers. Samples were recovered in the undisturbed material below the bottom of the augers using the standard drive sample technique in accordance with ASTM D 1586-74. A 2 inch outside diameter by 1⅜ inch inside diameter split-spoon sampler was driven a total of 18 inches with the number of blows of a 140-pound hammer falling 30 inches recorded for each 6 inches of penetration. The sum of blows for the final 12 inches of penetration is the Standard Penetration Test result commonly referred to as the N-value (or blow-count). Split-spoon samples were recovered at 2.5 feet intervals, beginning at a depth of 1 foot below the existing surface grade, extending to a depth of 10 feet, and at 5 feet intervals thereafter to the termination of the boring.

Water levels were monitored at each borehole location during drilling and upon completion of the boring. The boreholes were backfilled with auger cuttings prior to demobilization for safety considerations.

Upon completion of the boring program, of the samples retrieved during drilling were returned to *Patriot's* soil testing laboratory where they were visually examined and classified. A laboratory-generated log of each boring was prepared based upon the driller's field log, laboratory test results, and our visual examination. Test boring logs and a description of the classification system are included in Appendix "A" in this report. Indicated on each log are the primary strata encountered, the depth of each stratum change, the depth of each sample, the Standard Penetration Test results, groundwater conditions, and selected laboratory test data. The laboratory logs were prepared for each boring giving the appropriate sample data and the textural description and classification.

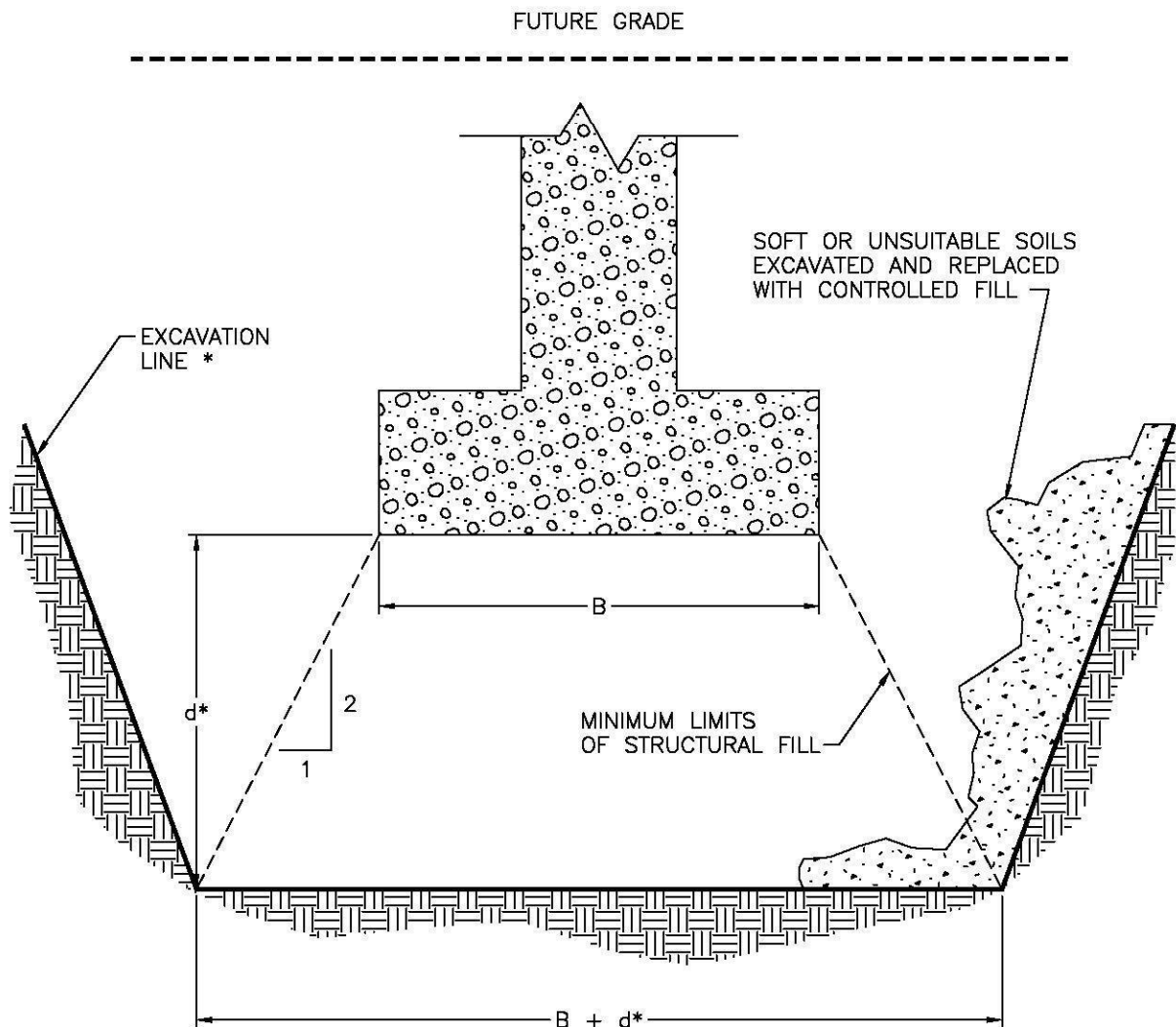
## 6.2 Laboratory Testing

Representative samples recovered in the borings were selected for testing in the laboratory to evaluate their physical properties and engineering characteristics. Laboratory analysis included natural moisture content determinations (ASTM D 2216) and an estimate of the cohesive soil strength was determined utilizing a hand penetrometer ( $q_p$ ). The results of laboratory tests are summarized in Section 3.2 "*General Subsurface Conditions*". Soil descriptions on the boring logs are in accordance with the Unified Soil Classification System (USCS).



## **7.0 ILLUSTRATIONS**

See Illustrations “A” and “B” on the following pages. These illustrations are presented to further visually clarify several of the construction considerations presented in Section 5.2 “*Foundation Excavations*”.



\*d IS DEPTH TO SUITABLE SOILS

\* IN COMPLIANCE WITH OSHA STANDARDS

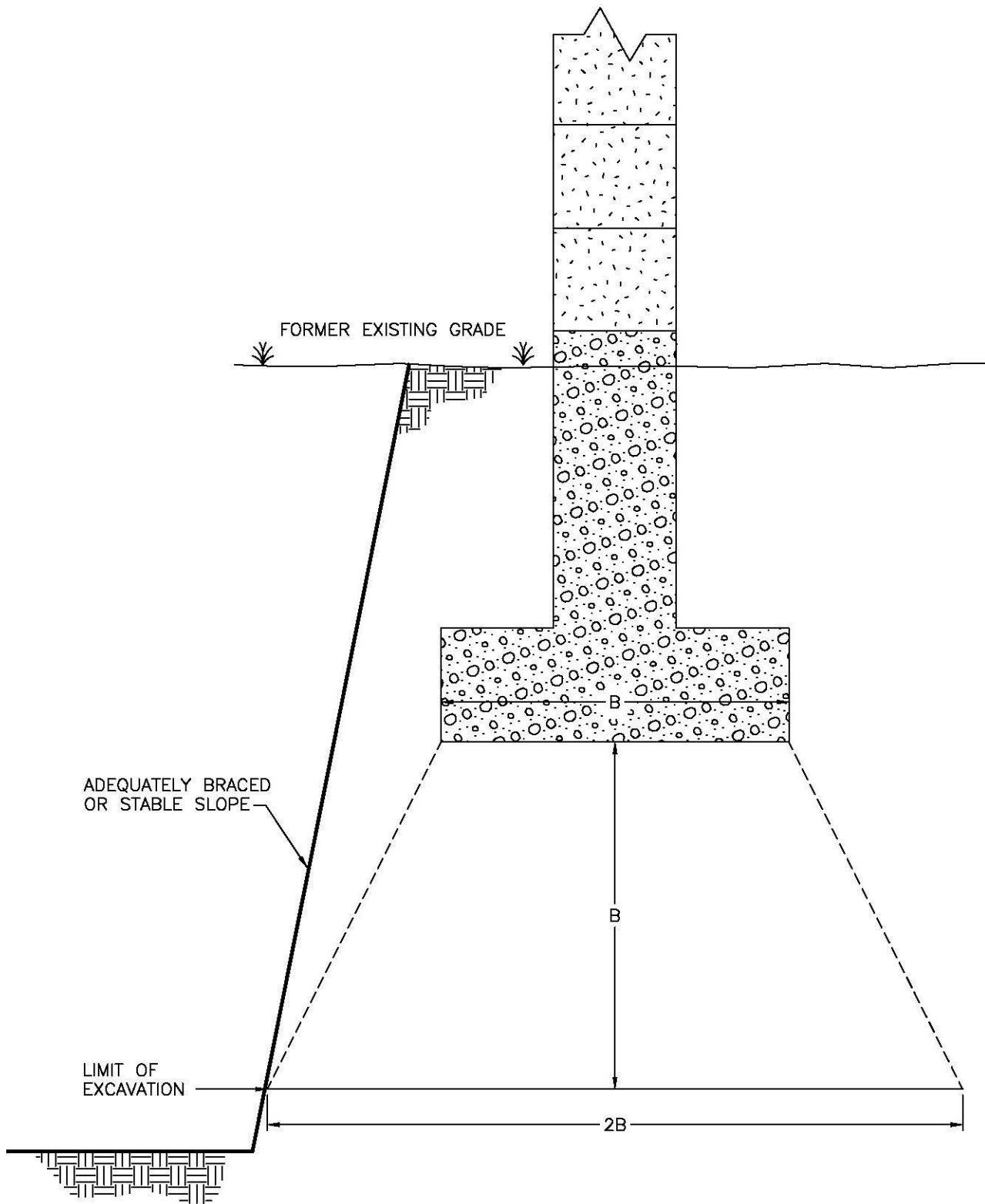
## Excavation for Footings In an Area of Fill ILLUSTRATION A

job. no.:

figure:



**PATRIOT ENGINEERING  
and Environmental, Inc.**  
Engineering Value for Project Success  
Consulting Environmental, Geotechnical  
and Materials Engineers



**PATRIOT ENGINEERING  
and Environmental, Inc.**  
Engineering Value for Project Success  
Consulting Environmental, Geotechnical  
and Materials Engineers

## Excavation Near Existing In Use Foundations ILLUSTRATION B

job. no.:

figure:

**APPENDIX A**

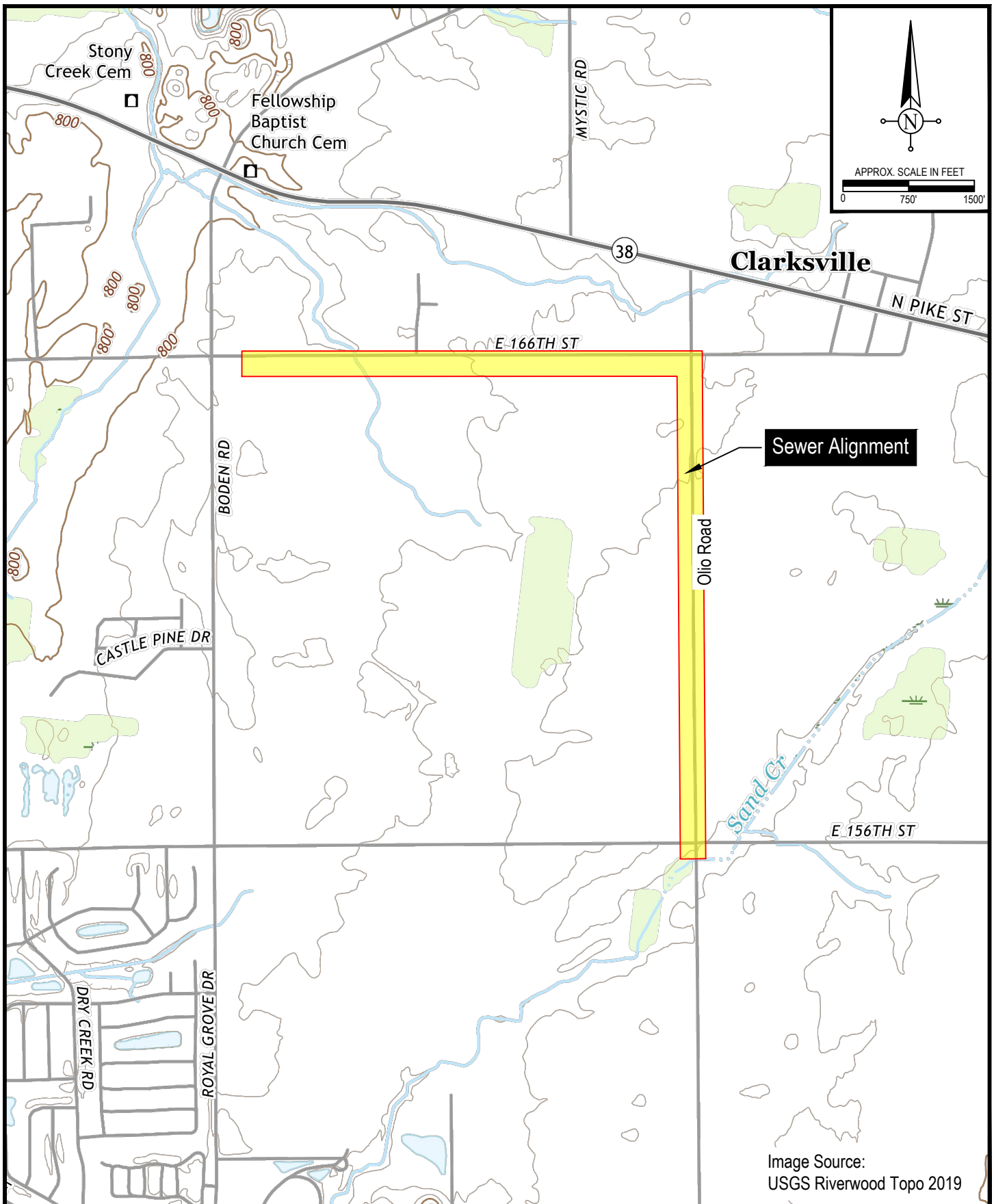
**SITE VICINITY MAP (FIGURE NO. 1)**

**BORING LOCATION MAP (FIGURE NO. 2)**

**BORING LOGS**

**BORING LOG KEY**

**UNIFIED SOIL CLASSIFICATION SYSTEM  
(USCS)**



Patriot Engineering &  
Environmental, Inc.

Project: Noblesville Sanitary  
East 166th Street & Olio Road  
Noblesville, Indiana

Project Number: 22-1017-01  
Date: August 15, 2022

Drawn By: J. DuMond  
Approved: I. Grafe  
DWG: 22-1017-01\_geo

Figure 1

Sewer Alignment Map



**LEGEND**  
● PATRIOT Soil Boring  
B-1 Soil Boring ID

- NOTES:**
- 1. Boring locations were staked by PATRIOT. All locations are shown as approximate.
  - 2. All locations were determined in the field with references to existing landmarks.
  - 3. Image Source: Google Earth
  - 4. Scale as shown.

Project: Noblesville Sanitary East 166th Street & Olio Road Noblesville, Indiana	
	Drawn By: J. DuMond
Project Number:22-1017-01	Approved: I. Grafe
Date: August 15, 2022	DWG: 22-1017-01_geo

**Figure 2**  
**Soil Boring Location Map**



© 2022 Microsoft Corporation © 2022 Maxar ©CNES (2022) Distribution Airbus DS



**LEGEND**  
● PATRIOT Soil Boring  
B-1 Soil Boring ID

- NOTES:**
1. Boring locations were staked by PATRIOT. All locations are shown as approximate.
  2. All locations were determined in the field with references to existing landmarks.
  3. Image Source: Google Earth
  4. Scale as shown.

Project: Noblesville Sanitary  
East 166th Street & Olio Road  
Noblesville, Indiana

	Drawn By: J. DuMond
Project Number:22-1017-01	Approved: I. Grafe
Date: August 15, 2022	DWG: 22-1017-01_geo

**Figure 3**  
**Soil Boring Location Map**





**PATRIOT ENGINEERING**  
and Environmental Inc.

Indianapolis, Terre Haute, Evansville,  
Fort Wayne, Lafayette, Bloomington  
Louisville, KY Dayton, Cincinnati, OH

**LOG OF BORING B-1**

(Page 1 of 1)

Noblesville Sanitary  
East 166th Street and Olio Road  
Fishers, Indiana

Client Name : Samco, Inc.  
Project Number : 22-1017-01G  
Logged By : E. Bergel  
Start Date : 07/20/2022  
Drilling Method : HSA

Driller : J. Boeche  
Sampling : Splitspoon  
Approx. Elevation : +/- 710 feet  
Latitude : 39°48'12.21"N  
Longitude : 86° 9'12.48"W

Depth (Feet)	Elevation (Feet) 710	Water Level	USCS	GRAPHIC	Water Levels ▼ During Drilling - 13.5 feet ▽ After Completion - 10.0 feet ◆ After 24 Hours - N/A	Samples	Rec %	SPT Results	qp tsf	w %	REMARKS
					DESCRIPTION						
0					TOPSOIL (8")						
			CL		Brown, very moist, medium stiff to stiff, SANDY CLAY with trace gravel	1	100	3/3/3	1.5	26	
			CL		Brown and gray, slightly moist, medium stiff, SANDY CLAY with trace gravel	2	100	2/3/4		14	
5	705					3	100	2/2/5		13	
		▽	CL		Brown, slightly moist, very stiff to hard, SANDY CLAY with trace gravel	4	100	3/7/10	>4.5	11	
10	700										
		▼									
					Brown, saturated, medium dense to dense, fine to medium grained, SAND with trace silt and trace to little gravel	5	100	5/6/7			
15	695		SP-SM								
						6	100	9/21/20			
20	690										
					Gray, saturated, medium dense to dense, fine to medium grained, SAND with trace silt and little gravel	7	89	14/14/15			
25	685		SP-SM								
						8	89	19/16/15			
30	680										
					Boring terminated at 30 feet.						
35	675										





**PATRIOT ENGINEERING**  
and Environmental Inc.

Indianapolis, Terre Haute, Evansville,  
Fort Wayne, Lafayette, Bloomington  
Louisville, KY Dayton, Cincinnati, OH

## LOG OF BORING B-2

(Page 1 of 1)

Noblesville Sanitary  
East 166th Street and Olio Road  
Fishers, Indiana

Client Name : Samco, Inc.  
Project Number : 22-1017-01G  
Logged By : E. Bergel  
Start Date : 07/20/2022  
Drilling Method : HSA

Driller : J. Boeche  
Sampling : Splitspoon  
Approx. Elevation : +/- 710 feet  
Latitude : 39°48'12.40"N  
Longitude : 86° 9'11.63"W

Depth (Feet)	Elevation (Feet) 710	Water Level	USCS	GRAPHIC	Water Levels ▼ During Drilling - 13.5 feet ▽ After Completion - 10.0 feet ◆ After 24 Hours - N/A	Samples	Rec %	SPT Results	qp tsf	w %	REMARKS
					DESCRIPTION						
0					TOPSOIL (8")						
			CL		Brown, moist, very stiff to hard, SILTY CLAY with trace sand	1	89	8/9/7	>4.5	20	
5	705		CL		Brown and gray, moist, medium stiff, SILTY CLAY with trace sand	2	100	3/3/4		20	
			CL		Brown, slightly moist, stiff to very stiff, SANDY CLAY with trace gravel	3	89	3/4/5	3.75	15	
10	700	▽	CL		Brown and gray, very moist, medium stiff to stiff, SANDY CLAY with trace gravel	4	100	3/2/4	1.25	27	
		▼									
15	695				Brown, saturated, medium dense, fine to medium grained, SAND with trace silt and trace to little gravel	5	89	11/14/15			
			SP-SM			6	78	9/13/11			
20	690										
			SP-SM		Gray, saturated, medium dense, fine to medium grained, SAND with trace silt and little gravel	7	100	8/9/13			
25	685										
					Auger refusal encountered at 25.5 feet.						
30	680										
35	675										



**PATRIOT ENGINEERING**  
and Environmental Inc.

Indianapolis, Terre Haute, Evansville,  
Fort Wayne, Lafayette, Bloomington  
Louisville, KY Dayton, Cincinnati, OH

## LOG OF BORING B-3

(Page 1 of 1)

Noblesville Sanitary  
East 166th Street and Olio Road  
Fishers, Indiana

Client Name : Samco, Inc.  
Project Number : 22-1017-01G  
Logged By : E. Bergel  
Start Date : 07/20/2022  
Drilling Method : HSA

Driller : J. Boeche  
Sampling : Splitspoon  
Approx. Elevation : +/- 711 feet  
Latitude : 39°48'11.76"N  
Longitude : 39°48'11.76"N

Depth (Feet)	Elevation (Feet) 711	Water Level	USCS	GRAPHIC	Water Levels ▼ During Drilling - 13.5 feet ▽ After Completion - 9.0 feet ◆ After 24 Hours - N/A	Samples	Rec %	SPT Results	qp tsf	w %	REMARKS
					DESCRIPTION						
0	710				TOPSOIL (7")						
			CL		Brown and gray, moist, medium stiff, SANDY CLAY with trace gravel	1	100	4/4/4		23	
5			CL		Brown and gray, moist, soft, SANDY CLAY with trace gravel	2	100	2/2/2		22	
	705		CL		Brown and gray, slightly moist, very stiff, SANDY CLAY with trace gravel	3	100	4/7/9	3.5	13	
10		▽	CL		Gray and brown, slightly moist, very stiff to hard, SANDY CLAY with trace gravel	4	100	5/8/9	>4.5	11	
	700		CL								Boring caved to 10 feet upon auger removal.
15		▼			Brown, saturated, dense to very dense, fine to medium grained, SAND with trace silt and gravel	5	100	5/19/25			
	695		SP-SM								
20						6	56	32/50-3"			
	690				Auger refusal encountered at 20 feet.						
25											
	685										
30											
	680										
35											



**PATRIOT ENGINEERING  
and Environmental Inc.**

Indianapolis, Terre Haute, Evansville,  
Fort Wayne, Lafayette, Bloomington  
Louisville, KY Dayton, Cincinnati, OH

## LOG OF BORING B-4

(Page 1 of 1)

Noblesville Sanitary  
East 166th Street and Olio Road  
Fishers, Indiana

Client Name : Samco, Inc.  
Project Number : 22-1017-01G  
Logged By : E. Bergel  
Start Date : 07/20/2022  
Drilling Method : HSA

Driller : J. Boeche  
Sampling : Splitspoon  
Approx. Elevation : +/- 710 feet  
Latitude : 39°48'10.96"N  
Longitude : 86° 9'11.57"W

Depth (Feet)	Elevation (Feet) 710	Water Level	USCS	GRAPHIC	Water Levels ▼ During Drilling - 18.5 feet ▽ After Completion - 14.0 feet ◆ After 24 Hours - N/A	Samples	Rec %	SPT Results	qp tsf	w %	REMARKS
					DESCRIPTION						
0					TOPSOIL (9")						
			CL		Brown and gray, slightly moist, stiff, SANDY CLAY with trace gravel	1	100	3/5/6		12	
5	705		CL		Brown, slightly moist, medium stiff, SANDY CLAY with trace gravel	2	100	3/4/4		14	
					Gray, slightly moist, medium stiff to very stiff, SANDY CLAY with trace gravel	3	100	3/4/6	3.5	11	
10	700		CL			4	67	3/4/6		13	
		▽				5	67	3/3/4	1.75	14	
15	695										
		▼				6	78	1/1/4			
20	690				Gray, saturated, loose to medium dense, fine to medium grained, SAND with trace silt and trace gravel						
			SP-SM			7	89	11/11/17			
25	685										
						8	100	11/15/21			
30	680										
					Boring terminated at 30 feet.						
35	675										



**PATRIOT ENGINEERING**  
and Environmental Inc.

Indianapolis, Terre Haute, Evansville,  
Fort Wayne, Lafayette, Bloomington  
Louisville, KY Dayton, Cincinnati, OH

**LOG OF BORING B-5**

(Page 1 of 1)

Noblesville Sanitary  
East 166th Street and Olio Road  
Fishers, Indiana

Client Name : Samco, Inc.  
Project Number : 22-1017-01G  
Logged By : E. Bergel  
Start Date : 07/20/2022  
Drilling Method : HSA

Driller : J. Boeche  
Sampling : Splitspoon  
Approx. Elevation : +/- 710 feet  
Latitude : 39°48'10.93"N  
Longitude : 86° 9'12.44"W

Depth (Feet)	Elevation (Feet) 710	Water Level	USCS	GRAPHIC	Water Levels ▼ During Drilling - 18.5 feet ▽ After Completion - 14.0 feet ◆ After 24 Hours - N/A	Samples	Rec %	SPT Results	qp tsf	w %	REMARKS
					DESCRIPTION						
0					TOPSOIL (8")						
			CL		Brown and gray, very moist, stiff to very stiff, SILTY CLAY with trace sand	1	67	3/5/7	3.5	26	
5	705		CL		Brown, slightly moist, stiff to very stiff, SANDY CLAY with some gravel	2	56	6/6/6	3.5	16	
					Gray, slightly moist, hard, SANDY CLAY with trace gravel	3	100	10/18/24	>4.5	8	
10	700		CL			4	100	7/14/17	>4.5	9	
		▽			Gray, slightly moist, stiff, SANDY CLAY with trace gravel	5	100	5/7/8		11	
15	695		CL								Boring caved to 16 feet upon auger removal.
		▼			Gray, saturated, very loose, fine to medium grained, SAND with trace silt and trace gravel	6	100	WOH/WOH/2			WOH- Weight of Hammer
20	690		SP-SM								
			SP-SM		Gray, saturated, very dense, fine to medium grained, SAND with trace silt and trace to little gravel	7	89	10/22/35			
25	685				Gray, saturated, very dense, fine to medium grained, SAND with trace silt and gravel	8	83	16/20/25			
			SP-SM								Sample No. 9: Two attempts were made to obtain a splitspoon sample. Classification is based on field observations.
30	680					9	0	50-5"			
					Boring terminated at 30 feet.						
35	675										



**PATRIOT ENGINEERING**  
and Environmental Inc.

Indianapolis, Terre Haute, Evansville,  
Fort Wayne, Lafayette, Bloomington  
Louisville, KY Dayton, Cincinnati, OH

**LOG OF BORING B-6**

(Page 1 of 1)

Noblesville Sanitary  
East 166th Street and Olio Road  
Fishers, Indiana

Client Name : Samco, Inc.  
Project Number : 22-1017-01G  
Logged By : E. Bergel  
Start Date : 07/20/2022  
Drilling Method : HSA

Driller : J. Boeche  
Sampling : Splitspoon  
Approx. Elevation : +/- 711 feet  
Latitude : 39°48'11.73"N  
Longitude : 86° 9'12.51"W

Depth (Feet)	Elevation (Feet) 711	Water Level	USCS	GRAPHIC	Water Levels ▼ During Drilling - 6.0 feet ▽ After Completion - 8.0 feet ◆ After 24 Hours - N/A	Samples	Rec %	SPT Results	qp tsf	w %	REMARKS
					DESCRIPTION						
0	710				TOPSOIL (8")						
			CL		Brown and gray, moist, medium stiff, SILTY CLAY with trace sand	1	100	3/3/4		24	
5			CL		Brown, moist, soft, SANDY CLAY with trace gravel	2	100	1/2/2		19	
	705	▼			Brown, saturated, loose to medium dense, fine to medium grained, SAND with trace silt and trace gravel	3	89	2/2/4			
		▽				4	78	5/9/12			Boring caved to 9 feet upon auger removal.
10	700		SP-SM								
					Gray, slightly moist, very stiff to hard, SANDY CLAY with trace gravel	5	100	9/12/15	>4.5	9	
15	695		CL								
					Brown and gray, slightly moist, very stiff to hard, SANDY CLAY with trace gravel	6	56	9/6/28	2.0	14	
20	690		CL								Auger refusal encountered at 23.5 feet.
						7	17	50-1"			
25	685				Splitspoon refusal encountered at 23.6 feet.						
30	680										
35											



**PATRIOT ENGINEERING**  
and Environmental Inc.

Indianapolis, Terre Haute, Evansville,  
Fort Wayne, Lafayette, Bloomington  
Louisville, KY Dayton, Cincinnati, OH

## LOG OF BORING B-7

(Page 1 of 1)

Noblesville Sanitary  
East 166th Street and Olio Road  
Fishers, Indiana

Client Name : Samco, Inc.  
Project Number : 22-1017-01G  
Logged By : E. Bergel  
Start Date : 07/21/2022  
Drilling Method : HSA

Driller : J. Boeche  
Sampling : Splitspoon  
Approx. Elevation : +/- feet  
Latitude :  
Longitude :

Depth (Feet)	Elevation (Feet)	Water Level	USCS	GRAPHIC	Water Levels ▼ During Drilling - 18.5 feet ▽ After Completion - 16.0 feet ◆ After 24 Hours - N/A	Samples	Rec %	SPT Results	qp tsf	w %	REMARKS
					DESCRIPTION						
0					TOPSOIL (9") Brown, moist to slightly moist, medium stiff to hard, SANDY CLAY with trace gravel	1	67	24/4		19	Sample No's.4 & 7: Two attempts were made to obtain splitspoon samples. Classifications are based on field observations.
						2	100	5/5/7		14	
5			CL			3	89	4/3/3	2.5	12	
						4	0	5/20/12			
10											Boring caved to 18 feet upon auger removal.
15		▽	CL		Gray, slightly moist, hard, SANDY CLAY with trace gravel	5	100	15/21/23		7	
											Auger refusal encountered at 23.5 feet.
20		▼			Gray, saturated, very dense, fine to medium grained, SAND with trace silt and little gravel	6	56	34/24/27			
			SP-SM			7	0	50-1"			
25					Splitspoon refusal encountered at 23.6 feet.						
30											
35											



**PATRIOT ENGINEERING  
and Environmental Inc.**

Indianapolis, Terre Haute, Evansville,  
Fort Wayne, Lafayette, Bloomington  
Louisville, KY Dayton, Cincinnati, OH

**LOG OF BORING B-8**

(Page 1 of 1)

Noblesville Sanitary  
East 166th Street and Olio Road  
Fishers, Indiana

Client Name : Samco, Inc.  
Project Number : 22-1017-01G  
Logged By : E. Bergel  
Start Date : 07/21/2022  
Drilling Method : HSA

Driller : J. Boeche  
Sampling : Splitspoon  
Approx. Elevation : +/- feet  
Latitude :  
Longitude :

Depth (Feet)	Elevation (Feet)	Water Level	USCS	GRAPHIC	Water Levels ▼ During Drilling - 3.5 feet ▽ After Completion - 13.0 feet ◆ After 24 Hours - N/A	Samples	Rec %	SPT Results	qp tsf	w %	REMARKS
					DESCRIPTION						
0					TOPSOIL (8")						
			CL		Brown, moist, medium stiff, SANDY CLAY with trace gravel	1	78	3/4/4		17	
		▼	CL		Brown, moist, soft, SANDY CLAY with trace gravel	2	78	1/2/2		19	
5			CL		Brown, slightly moist, stiff, SANDY CLAY with trace gravel	3	100	7/5/9		11	
			CL		Gray, slightly moist, hard, SANDY CLAY with trace gravel	4	100	13/22/25	>4.5	10	
10		▽	CL		Gray and brown, very moist, stiff to very stiff, SANDY CLAY with trace gravel	5	56	8/11/12	1.75	26	
15			CL		Gray, slightly moist, hard, SANDY CLAY with trace gravel	6	100	11/15/28	>4.5	11	Boring caved to 16 feet upon auger removal.
20			CL		Brown, saturated, dense, fine to medium grained, SAND with trace silt and trace to little gravel	7	100	47/20/19			
25						8	6	50 1"			Auger refusal encountered at 26 feet.
					Splitspoon refusal encountered at 26.1 feet.						
30											
35											



**PATRIOT ENGINEERING**  
and Environmental Inc.

Indianapolis, Terre Haute, Evansville,  
Fort Wayne, Lafayette, Bloomington  
Louisville, KY Dayton, Cincinnati, OH

**LOG OF BORING B-9**

(Page 1 of 1)

Noblesville Sanitary  
East 166th Street and Olio Road  
Fishers, Indiana

Client Name : Samco, Inc.  
Project Number : 22-1017-01G  
Logged By : E. Bergel  
Start Date : 07/21/2022  
Drilling Method : HSA

Driller : J. Boeche  
Sampling : Splitspoon  
Approx. Elevation : +/- feet  
Latitude :  
Longitude :

Depth (Feet)	Elevation (Feet)	Water Level	USCS	GRAPHIC	Water Levels ▼ During Drilling - Dry ▽ After Completion - 25.0 feet ◆ After 24 Hours - N/A	Samples	Rec %	SPT Results	qp tsf	w %	REMARKS
					DESCRIPTION						
0					TOPSOIL (9")						
			CL		Brown and gray, moist, stiff to very stiff, SILTY CLAY with trace sand	1	89	4/5/4	2.25	22	
			CL		Brown, slightly moist, stiff, SANDY CLAY with trace gravel	2	100	3/6/8		11	
5			CL		Gray, slightly moist, hard, SANDY CLAY and gravel	3	56	8/15/17		10	
			CL		Gray, slightly moist to moist, very stiff to hard, SANDY CLAY with trace gravel	4	78	9/21/18	>4.5	8	
10											
			CL			5	100	9/12/14	>4.5	11	
15											
			CL			6	100	7/10/13	>4.5	16	
20											
						7	100	8/11/13		20	
25		▽									
			SC		Brown, slightly moist, very dense, CLAYEY SAND with trace gravel	8	28	50-5"			
30											Boring caved to 27 feet upon auger removal.
					Boring terminated at 28.9 feet.						
35											





**PATRIOT ENGINEERING  
and Environmental Inc.**

Indianapolis, Terre Haute, Evansville,  
Fort Wayne, Lafayette, Bloomington  
Louisville, KY Dayton, Cincinnati, OH

**LOG OF BORING B-10**

(Page 1 of 1)

Noblesville Sanitary  
East 166th Street and Olio Road  
Fishers, Indiana

Client Name : Samco, Inc.  
Project Number : 22-1017-01G  
Logged By : E. Bergel  
Start Date : 07/21/2022  
Drilling Method : HSA

Driller : J. Boeche  
Sampling : Splitspoon  
Approx. Elevation : +/- feet  
Latitude :  
Longitude :

Depth (Feet)	Elevation (Feet)	Water Level	USCS	GRAPHIC	Water Levels ▼ During Drilling - 3.5 feet ▽ After Completion - 7.0 feet ◆ After 24 Hours - N/A	Samples	Rec %	SPT Results	qp tsf	w %	REMARKS
					DESCRIPTION						
0					TOPSOIL (9")						
			CL		Brown and gray, moist, stiff, SILTY CLAY with trace sand	1	78	6/6/8		21	
		▼	CL		Brown, very moist, soft, SANDY CLAY with trace gravel	2	100	2/2/2		26	
5		▽	CL		Brown, slightly moist, stiff to very stiff, SANDY CLAY with trace gravel	3	67	3/5/6	3.0	13	
			CL			4	89	2/7/8		11	
			CL		Gray, slightly moist, very stiff to hard, SANDY CLAY with trace gravel	5	100	7/10/12	4.0	10	
15			GP-GM		Brown, saturated, very dense, poorly-graded, GRAVEL with trace silt and trace sand	6	44	50-5"			
20											
25					Auger refusal encountered at 23.5 feet.						
30											
35											

Boring caved to 8 feet upon  
auger removal.



**PATRIOT ENGINEERING**  
and Environmental Inc.

Indianapolis, Terre Haute, Evansville,  
Fort Wayne, Lafayette, Bloomington  
Louisville, KY Dayton, Cincinnati, OH

**LOG OF BORING B-11**

(Page 1 of 1)

Noblesville Sanitary  
East 166th Street and Olio Road  
Fishers, Indiana

Client Name : Samco, Inc.  
Project Number : 22-1017-01G  
Logged By : E. Bergel  
Start Date : 07/22/2022  
Drilling Method : HSA

Driller : J. Boeche  
Sampling : Splitspoon  
Approx. Elevation : +/- feet  
Latitude :  
Longitude :

Depth (Feet)	Elevation (Feet)	Water Level	USCS	GRAPHIC	Water Levels ▼ During Drilling - 8.5 feet ▽ After Completion - 7.0 feet ◆ After 24 Hours - N/A	Samples	Rec %	SPT Results	qp tsf	w %	REMARKS
					DESCRIPTION						
0					TOPSOIL (8")						
			CL		Brown and gray, very moist, medium stiff to stiff, SILTY CLAY with trace sand	1	100	4/4/4	1.75	29	
			CL		Gray and brown, very moist, soft, SANDY CLAY with trace gravel	2	100	2/2/1		28	
5		▽	CL		Gray and brown, moist, very stiff to hard, SANDY CLAY with trace gravel	3	89	9/11/24	2.5	17	
		▼									Boring caved to 8 feet upon auger removal.
10			SP-SM		Gray, saturated, very stiff, fine to medium grained, SAND with trace silt and trace gravel	4	89	11/15/15			
15			CL		Gray, slightly moist, very stiff to hard, SANDY CLAY with trace gravel	5	78	8/9/7	>4.5	15	
20			CL		Gray, slightly moist, hard, SANDY CLAY with trace gravel	6	100	2/7/31	>4.5	8	Sample No. 7: Two attempts were made to obtain a splitspoon sample. Classification is based on field observations.
						7	0	50-5"			Auger refusal encountered at 23.5 feet.
25					Boring terminated at 23.9 feet.						
30											
35											



**PATRIOT ENGINEERING  
and Environmental Inc.**

Indianapolis, Terre Haute, Evansville,  
Fort Wayne, Lafayette, Bloomington  
Louisville, KY Dayton, Cincinnati, OH

**LOG OF BORING B-12**

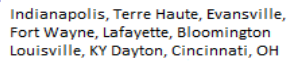
(Page 1 of 1)

Noblesville Sanitary  
East 166th Street and Olio Road  
Fishers, Indiana

Client Name : Samco, Inc.  
Project Number : 22-1017-01G  
Logged By : E. Bergel  
Start Date : 07/22/2022  
Drilling Method : HSA

Driller : J. Boeche  
Sampling : Splitspoon  
Approx. Elevation : +/- feet  
Latitude :  
Longitude :

Depth (Feet)	Elevation (Feet)	Water Level	USCS	GRAPHIC	Water Levels ▼ During Drilling - 8.5 feet ▽ After Completion - 8.0 feet ◆ After 24 Hours - N/A	Samples	Rec %	SPT Results	qp tsf	w %	REMARKS
					DESCRIPTION						
0					TOPSOIL (9")						
			CL		Brown and gray, moist, medium stiff to stiff, SILTY CLAY with trace sand and trace gravel	1	56	2/2/3		21	
						2	78	3/2/3	1.5	19	
5			CL		Gray, slightly moist, very stiff, SANDY CLAY with trace gravel	3	100	6/9/8	3.5	12	
			CL		Brown, slightly moist, very stiff, SANDY CLAY with trace gravel and interbedded sand seams	4	78	3/10/8	1.5	12	
10											Boring caved to 10 feet upon auger removal.
			SP-SM		Brown, saturated, medium dense to dense, fine to medium grained, SAND with trace silt and trace gravel	5	89	10/12/18			
15						6	100	10/16/23			
20			SP-SM		Gray, saturated, very dense, fine to medium grained, SAND with trace silt and trace gravel	7	22	50-3"			
25											Auger refusal encountered at 23.5 feet.
					Boring terminated at 23.8 feet.						
30											
35											



(Page 1 of 1)

Driller : J. Boeche  
Sampling : Splitspoon  
Approx. Elevation : +/- feet  
Latitude :  
Longitude :

C:\Users\igrafe\Patriot Engineering\GEO - Documents\2022 Mtech\2022 Mtech\1017-01G\b13.bor



**PATRIOT ENGINEERING**  
and Environmental Inc.

Indianapolis, Terre Haute, Evansville,  
Fort Wayne, Lafayette, Bloomington  
Louisville, KY Dayton, Cincinnati, OH

**LOG OF BORING B-14**

(Page 1 of 1)

Noblesville Sanitary  
East 166th Street and Olio Road  
Fishers, Indiana

Client Name : Samco, Inc.  
Project Number : 22-1017-01G  
Logged By : E. Bergel  
Start Date : 07/22/2022  
Drilling Method : HSA

Driller : J. Boeche  
Sampling : Splitspoon  
Approx. Elevation : +/- feet  
Latitude :  
Longitude :

Depth (Feet)	Elevation (Feet)	Water Level	USCS	GRAPHIC	Water Levels ▼ During Drilling - 18.5 feet ▽ After Completion - 14.0 feet ◆ After 24 Hours - N/A	Samples	Rec %	SPT Results	qp tsf	w %	REMARKS
					DESCRIPTION						
0					TOPSOIL (9")						
			CL		Brown and gray, moist, very stiff, SANDY CLAY with trace gravel	1	100	6/7/9	2.5	20	
			CL		Brown, very moist, soft, SANDY CLAY with trace gravel and interbedded sand seams	2	100	2/2/2		26	
5			CL		Brown, slightly moist, very stiff to hard, SANDY CLAY with trace gravel	3	100	5/9/10	4.25	13	
			SP-SM		Brown, slightly moist, dense, fine to medium grained, SAND with trace silt and trace gravel	4	89	9/15/21			
10											
		▽			Brown, moist to slightly moist, very stiff to hard, SANDY CLAY with trace gravel	5	67	24/31/34	2.5	16	
15			CL			6	67	WOH/9/25		13	WOH - Weight of Hammer
20		▼									
			CL		Gray, slightly moist, hard, SANDY CLAY with trace gravel	7	78	5/19/22	>4.5	10	Boring caved to 23 feet upon auger removal.
25			CL								
			SP-SM		Brown, saturated, very dense, fine to medium grained, SAND with trace silt and gravel	8	28	50-2"			
30											
					Boring terminated at 28.7 feet.						
35											



**PATRIOT ENGINEERING**  
and Environmental Inc.

Indianapolis, Terre Haute, Evansville,  
Fort Wayne, Lafayette, Bloomington  
Louisville, KY Dayton, Cincinnati, OH

**LOG OF BORING B-15**

(Page 1 of 1)

Noblesville Sanitary  
East 166th Street and Olio Road  
Fishers, Indiana

Client Name : Samco, Inc.  
Project Number : 22-1017-01G  
Logged By : E. Bergel  
Start Date : 07/21/2022  
Drilling Method : HSA

Driller : J. Boeche  
Sampling : Splitspoon  
Approx. Elevation : +/- feet  
Latitude :  
Longitude :

Depth (Feet)	Elevation (Feet)	Water Level	USCS	GRAPHIC	Water Levels ▼ During Drilling - 23.5 feet ▽ After Completion - 13.0 feet ◆ After 24 Hours - N/A	Samples	Rec %	SPT Results	qp tsf	w %	REMARKS
					DESCRIPTION						
0					TOPSOIL (9")						
					Brown, moist to slightly moist, stiff to hard, SANDY CLAY with trace gravel	1	67	3/4/6		19	
						2	89	3/10/12	>4.5	11	
5			CL			3	89	13/10/10	>4.5	9	
						4	89	6/10/12	>4.5	9	
10											
		▽			Brown, slightly moist, hard, SANDY CLAY with trace gravel	5	100	18/24/37		13	
15			CL								
					Gray, slightly moist, hard, SANDY CLAY with trace gravel	6	100	20/25/25		7	
20			CL								
					Brown, saturated, very dense, fine to medium grained, SAND with trace silt and little gravel	7	100	15/19/29			
25		▼	SP-SM								
						8	67	24/50-5"			
30					Boring terminated at 29.4 feet. Splitspoon Refusal						Boring caved to 22 feet upon auger removal.
35											



**PATRIOT ENGINEERING  
and Environmental Inc.**

Indianapolis, Terre Haute, Evansville,  
Fort Wayne, Lafayette, Bloomington  
Louisville, KY Dayton, Cincinnati, OH

## LOG OF BORING B-16

(Page 1 of 1)

Noblesville Sanitary  
East 166th Street and Olio Road  
Fishers, Indiana

Client Name : Samco, Inc.  
Project Number : 22-1017-01G  
Logged By : E. Bergel  
Start Date : 07/21/2022  
Drilling Method : HSA

Driller : J. Boeche  
Sampling : Splitspoon  
Approx. Elevation : +/- feet  
Latitude :  
Longitude :

Depth (Feet)	Elevation (Feet)	Water Level	USCS	GRAPHIC	Water Levels ▼ During Drilling - 3.5 feet ▽ After Completion - Dry ◆ After 24 Hours - N/A	Samples	Rec %	SPT Results	qp tsf	w %	REMARKS
					DESCRIPTION						
0					TOPSOIL (9") Brown, slightly moist, very stiff to hard, SANDY CLAY with trace gravel	1	100	5/7/11	>4.5	11	
5		▼	CL			2	100	6/12/13	>4.5	10	
					Auger refusal encountered at 6 feet.						
10											
15											
20											
25											
30											
35											



**PATRIOT ENGINEERING  
and Environmental Inc.**

Indianapolis, Terre Haute, Evansville,  
Fort Wayne, Lafayette, Bloomington  
Louisville, KY Dayton, Cincinnati, OH

**LOG OF BORING B-16A**

(Page 1 of 1)

Noblesville Sanitary  
East 166th Street and Olio Road  
Fishers, Indiana

Client Name : Samco, Inc.  
Project Number : 22-1017-01G  
Logged By : E. Bergel  
Start Date : 07/21/2022  
Drilling Method : HSA

Driller : J. Boeche  
Sampling : Splitspoon  
Approx. Elevation : +/- feet  
Latitude :  
Longitude :

Depth (Feet)	Elevation (Feet)	Water Level	USCS	GRAPHIC	Water Levels ▼ During Drilling - 3.5 feet ▽ After Completion - 8.5 feet ◆ After 24 Hours - N/A	Samples	Rec %	SPT Results	qp tsf	w %	REMARKS
					DESCRIPTION						
0					Blank drilled from 0 to 6 feet.  Refer to Boring B-16 for a description of soil strata.						
5						3	100	9/12/16	>4.5	9	
10			CL		Brown, slightly moist, very stiff to hard, SANDY CLAY with trace gravel	4	100	6/11/26	>4.5	10	Boring caved to 9 feet upon auger removal.
15						5	100	18/35/41	>4.5	10	
20			CL		Gray, slightly moist, hard, SANDY CLAY with trace gravel	6	100	11/18/24	>4.5	7	
25			GP-GM		Brown, saturated, very dense, poorly-graded, GRAVEL with trace silt and trace sand	7	56	6/19/50			
30			SP-SM		Brown, saturated, very dense, fine to medium grained, SAND with trace silt and trace gravel	8	17	50-5"			
35					Boring terminated at 28.9 feet. Splitspoon refusal.						Boring Offset 5 feet southwest of Boring B-6



## BORING LOG KEY

### UNIFIED SOIL CLASSIFICATION SYSTEM FIELD CLASSIFICATION SYSTEM FOR SOIL EXPLORATION

#### NON COHESIVE SOILS

(Silt, Sand, Gravel and Combinations)

Density		Grain Size Terminology		
		<u>Soil Fraction</u>	<u>Particle Size</u>	<u>US Standard Sieve Size</u>
Very Loose	-4 blows/ft. or less			
Loose	-5 to 10 blows/ft.			
Medium Dense	-11 to 30 blows/ft.	Boulders	Larger than 12"	Larger than 12"
Dense	-31 to 50 blows/ft.	Cobbles	3" to 12"	3" to 12"
Very Dense	-51 blows/ft. or more	Gravel: Coarse	¾" to 3"	¾" to 3"
		Small	4.76mm to ¾"	#4 to ¾"
		Sand: Coarse	2.00mm to 4.76mm	#10 to #4
		Medium	0.42mm to 2.00mm	#40 to #10
		Fine	0.074mm to 0.42mm	#200 to #40
		Silt	0.005mm to 0.074 mm	Smaller than #200
		Clay	Smaller than 0.005mm	Smaller than #200

#### RELATIVE PROPORTIONS FOR SOILS

<u>Descriptive Term</u>	<u>Percent</u>
Trace	1 - 10
Little	11 - 20
Some	21 - 35
And	36 - 50

#### COHESIVE SOILS

(Clay, Silt and Combinations)

<u>Consistency</u>	<u>Unconfined Compressive Strength (tons/sq. ft.)</u>	<u>Field Identification (Approx.) SPT Blows/ft.</u>
Very Soft	Less than 0.25	0 - 2
Soft	0.25 - < 0.5	3 - 4
Medium Stiff	0.5 - < 1.0	5 - 8
Stiff	1.0 - < 2.0	9 - 15
Very Stiff	2.0 - < 4.0	16 - 30
Hard	Over 4.0	> 30

**Classification** on logs are made by visual inspection.

**Standard Penetration Test** - Driving a 2.0" O.D., 1<sup>3/8</sup>" I.D., sampler a distance of 1.0 foot into undisturbed soil with a 140 pound hammer free falling a distance of 30.0 inches. It is customary for **Patriot** to drive the spoon 6.0 inches to seat into undisturbed soil, then perform the test. The number of hammer blows for seating the spoon and making the tests are recorded for each 6.0 inches of penetration on the drill log (Example - 6/8/9). The standard penetration test results can be obtained by adding the last two figures (i.e. 8 + 9 = 17 blows/ft.).

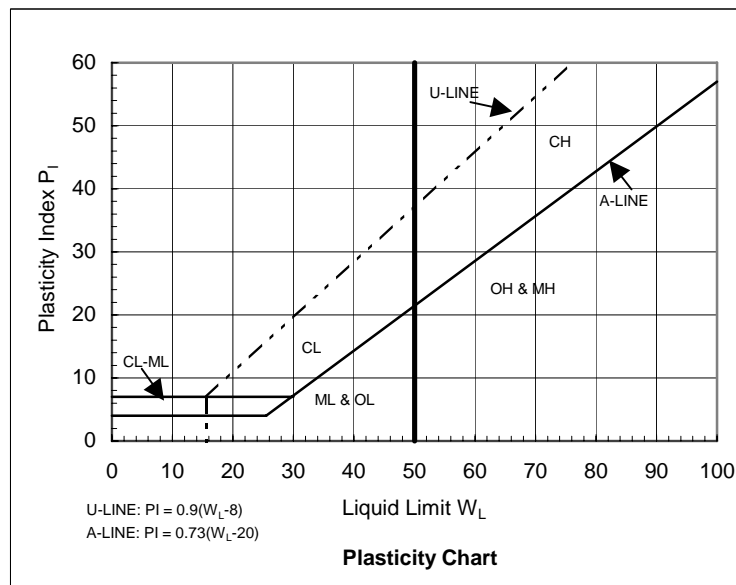
**Strata Changes** - In the column "Soil Descriptions" on the drill log the horizontal lines represent strata changes. A solid line (——) represents an actually observed change, a dashed line (- - - -) represents an estimated change.

**Groundwater** observations were made at the times indicated. Porosity of soil strata, weather conditions, site topography, etc., may cause changes in the water levels indicated on the logs.

**Groundwater symbols:** ▼-observed groundwater elevation, encountered during drilling; ∇-observed groundwater elevation upon completion of boring.

# Unified Soil Classification System

Major Divisions			Group Symbol		Typical Names	Classification Criteria for Coarse-Grained Soils		
Coarse-grained soils (more than half of material is larger than No. 200)	Gravels (more than half of coarse fraction is larger than No. 4 sieve size)	Clean gravels (little or no fines)	GW		Well-graded gravels, gravel-sand mixtures, little or no fines	$C_U \geq 4$ $1 \leq C_C \leq 3$	$C_U = \frac{D_{60}}{D_{10}}$	$C_C = \frac{D_{30}^2}{D_{10} D_{60}}$
			GP		Poorly graded gravels, gravel-sand mixtures, little or no fines	Not meeting all gradation requirements for GW ( $C_U < 4$ or $1 > C_C > 3$ )		
		Gravels with fines (appreciable amount of fines)	GM	$\frac{d_u}{u}$	Silty gravels, gravel-sand-silt mixtures	Atterberg limits below A line or $P_I < 4$		Above A line with $4 < P_I < 7$ are borderline cases requiring use of dual symbols
			GC		Clayey gravels, gravel-sand-clay mixtures	Atterberg limits above A line or $P_I > 7$		
	Sands (more than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (little or no fines)	SW		Well-graded sands, gravelly sands, little or no fines	$C_U \geq 6$ $1 \leq C_C \leq 3$	$C_U = \frac{D_{60}}{D_{10}}$	$C_C = \frac{(D_{30})^2}{D_{10} D_{60}}$
			SP		Poorly graded sands, gravelly sands, little or no fines	Not meeting all gradation requirements for SW ( $C_U < 6$ or $1 > C_C > 3$ )		
		Sands with fines (appreciable amount of fines)	SM	$\frac{d_u}{u}$	Silty sands, sand-silt mixtures	Atterberg limits below A line or $P_I < 4$		Limits plotting in hatched zone with $4 \leq P_I \leq 7$ are borderline cases requiring use of dual symbols
			SC		Clayey sands, sand-clay mixtures	Atterberg limits above A line with $P_I > 7$		
Fine-grained soils (more than half of material is smaller than No. 200)	Silt and clays (liquid limit <50)	ML		Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity	<div>1. Determine percentages of sand and gravel from grain size curve.</div> <div>2. Depending on percentages of fines (fraction smaller than 200 sieve size), coarse-grained soils are classified as follows: Less than 5% - GW, GP, SW, SP More than 12% - GM, GC, SM, SC 5-12% - Borderline cases requiring dual symbols</div>			
		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				
	Silt and clays (liquid limit >50)	MH		Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts				
		CH		Inorganic clays or high plasticity, fat clays				
		OH		Organic clays of medium to high plasticity, organic silts				
	Highly organic soils	PT		Peat and other highly organic soils				



**APPENDIX B**

**GENERAL QUALIFICATIONS**

**STANDARD CLAUSE FOR UNANTICIPATED  
SUBSURFACE CONDITIONS**

**GENERAL QUALIFICATIONS**  
**of Patriot Engineering's Geotechnical Engineering Investigation**

This report has been prepared at the request of our client for his use on this project. Our professional services have been performed, findings obtained, and recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. This warranty is in lieu of all other warranties either expressed or implied.

The scope of our services did not include any environmental assessment or investigation for the presence or absence of wetlands, hazardous or toxic materials in the soil, groundwater, or surface water within or beyond the site studied. Any statements in this report or on the test borings logs regarding vegetation types, odors or staining of soils, or other unusual conditions observed are strictly for the information of our client and the owner.

This report may not contain sufficient information for purposes of other parties or other uses. This company is not responsible for the independent conclusions, opinions or recommendations made by others based on the field and laboratory data presented in this report. Should there be any significant differences in structural arrangement, loading or location of the structure, our analysis should be reviewed.

The recommendations provided herein were developed from the information obtained in the test borings, which depict subsurface conditions only at specific locations. The analysis, conclusions, and recommendations contained in our report are based on site conditions as they existed at the time of our exploration. Subsurface conditions at other locations may differ from those occurring at the specific drill sites. The nature and extent of variations between borings may not become evident until the time of construction. If, after performing on-site observations during construction and noting the characteristics of any variation, substantially different subsurface conditions from those encountered during our explorations are observed or appear to be present beneath excavations, we must be advised promptly so that we can review these conditions and reconsider our recommendations where necessary.

If there is a substantial lapse of time between the submission of our report and the start of work at the site, or if conditions have changed due to natural causes or construction operations at or adjacent to the site, we urge that our report be reviewed to determine the applicability of the conclusions and recommendations considering the changed conditions and time lapse.

We urge that Patriot be retained to review those portions of the plans and specifications that pertain to earthwork and foundations to determine whether they are consistent with our recommendations. In addition, we are available to observe construction, particularly the compaction of structural backfill and preparation of the foundations, and such other field observations as may be necessary.

In order to fairly consider changed or unexpected conditions that might arise during construction, we recommend the following verbiage (Standard Clause for Unanticipated Subsurface Conditions) be included in the project contract.

## **STANDARD CLAUSE FOR UNANTICIPATED SUBSURFACE CONDITIONS**

"The owner has had a subsurface exploration performed by a soils consultant, the results of which are contained in the consultant's report. The consultant's report presents his conclusions on the subsurface conditions based on his interpretation of the data obtained in the exploration. The contractor acknowledges that he has reviewed the consultant's report and any addenda thereto, and that his bid for earthwork operations is based on the subsurface conditions as described in that report. It is recognized that a subsurface exploration may not disclose all conditions as they actually exist and further, conditions may change, particularly groundwater conditions, between the time of a subsurface exploration and the time of earthwork operations. In recognition of these facts, this clause is entered in the contract to provide a means of equitable additional compensation for the contractor if adverse unanticipated conditions are encountered and to provide a means of rebate to the owner if the conditions are more favorable than anticipated.

At any time during construction operations that the contractor encounters conditions that are different than those anticipated by the soils consultant's report, he shall immediately (within 24 hours) bring this fact to the owner's attention. If the owner's representative on the construction site observes subsurface conditions which are different than those anticipated by the consultant's report, he shall immediately (within 24 hours) bring this fact to the contractor's attention. Once a fact of unanticipated conditions has been brought to the attention of either the owner or the contractor, and the consultant has concurred, immediate negotiations will be undertaken between the owner and the contractor to arrive at a change in contract price for additional work or reduction in work because of the unanticipated conditions. The contract agrees that the following unit prices would apply for additional or reduced work under the contract. For changed conditions for which unit prices are not provided, the additional work shall be paid for on a time and materials basis."

Another example of a changed conditions clause can be found in paper No. 4035 by Robert F. Borg, published in ASCE Construction Division Journal, No. CO2, September 1964, page 37.



## APPENDIX B

### PERMITS

IDEM Regional General Permit (RGP)

IDEM Water Quality Certification (QQC)

IDEM Construction General Permit (CSGP) – Pending  
Approval

Hamilton County Surveyor's Office Legal Drain Crossing  
Requests – Pending Approval

Stormwater Pollution Prevention Plan – Pending Approval







# INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

*We Protect Hoosiers and Our Environment.*

100 N. Senate Avenue • Indianapolis, IN 46204  
(800) 451-6027 • (317) 232-8603 • [www.idem.IN.gov](http://www.idem.IN.gov)

**Eric J. Holcomb**  
*Governor*

**Brian C. Rockensuess**  
*Commissioner*

January 3, 2023

## VIA ELECTRONIC MAIL

Mr. Thomas A. Kallio, Director  
Hamilton Southeastern Utilities, Inc. (HSEU)  
11901 Lakeside Drive  
Fishers, Indiana 46038

Dear Mr. Kallio:

Re: Variance Request for Construction Permit  
Sanitary Sewer  
Wayne Township Interceptor – Phase 1  
Project No. M-25631  
Noblesville, Indiana  
Hamilton, County

You are hereby notified that your request for a variance, received by this office on October 25, 2022, pursuant to IC 13-14-8-8, from portions of 327 IAC 3-6-4 and 327 IAC 3-6-7, is granted in accordance with the provisions set forth in this letter. IDEM has determined that imposition of these rules at this time on Hamilton Southeastern Utilities, Inc., would cause an undue hardship or burden. Hamilton Southeastern Utilities, Inc. proposes to install sanitary sewers and interceptor for Wayne Township Interceptor – Phase I.

The variance being requested is to approve the construction of the proposed new sewer and interceptor prior to the completion of the downstream facilities, which is currently being constructed under IDEM Construction Permit # 24309. Representatives of Hamilton Southeastern Utilities, Inc. have confirmed that the estimated completion of The Silo Ridge Offsite is January 2023. This is assuming no issues bar the progression of construction.

The variance is to allow construction to commence on the gravity sewer and interceptor that will connect to the Silo Ridge Offsite. Prior to any development occurring in this area, the utility needs to have a sanitary sewer collection system in place to receive and convey flows to their downstream network and onto the Noblesville sanitary utility for treatment. In addition, road improvement projects along Boden Road are anticipated in the near future. If the interceptor project can be completed prior to road construction, it will lessen or eliminate the coordination between contractors for both projects. With rising lead times for material, the Utility would like to have a design and permit in hand to begin construction on Wayne Township Interceptor once the downstream connection point is constructed.

## Part A. Scope of Variance

1. This variance only applies to the following project:

### Development Granted

### Submitter

### Connections

Wayne Township Interceptor  
Phase 1

Hamilton Southeastern  
Utilities Inc.

9,573 Single Family  
Homes

2. This variance applies to 327 IAC 3-6-4, 327 IAC 3-6-7, and the following provisions of the certification statements in the wastewater facility construction permit rules:
  - a. 327 IAC 3-6-4(b) "Certification of Registered Professional Engineer or Land Surveyor":

"The sewer at the point of connection is physically in existence and operational. Based upon information provided by the owner of the Wastewater System, the ability for this collection system to comply with 327 IAC 3 is not contingent on downstream water pollution/control facility construction that has not been completed and put into operation."
  - b. 327 IAC 3-6-4(c) "Capacity Certification":

"I certify that the ability for this collection system to comply with 327 IAC 3 is not contingent on water pollution/control facility construction that has not been completed and put into operation"

## Part B. Conditions of Variance

1. Hamilton Southeastern Utilities must comply with all requirements of 327 IAC 3 other than those listed in Part A above.
2. Violation of any of the above conditions is grounds for revocation of the variance and may subject Hamilton Southeastern Utilities, Inc., and City of Noblesville to enforcement action.

## Notice of Right to Administrative Review

Anyone wishing to challenge this action must do so by filing a Petition for Administrative Review with the Office of Environmental Adjudication (OEA); and serving a copy of the petition upon IDEM. The requirements for filing a Petition for Administrative Review are found in IC 4-21.5-3-7 and 315 IAC 1-3-2. A summary of the requirements of these laws is provided below.

A Petition for Administrative Review must be filed with the Office of Environmental Adjudication (OEA) within fifteen (15) days of the issuance this notice (eighteen (18) days if notice was received by U.S. Mail), and a copy must be served upon IDEM. Addresses are:

Director  
Office of Environmental Adjudication  
Indiana Government Center North  
Room N103  
100 North Senate Avenue  
Indianapolis, Indiana 46204

Commissioner  
Indiana Department of Environmental  
Management  
Indiana Government Center North  
Room 1301  
100 North Senate Avenue  
Indianapolis, Indiana 46204

The petition must contain the following information:

1. The name, address and telephone number of each petitioner.
2. An identification of each petitioner's interest in the subject of the petition.
3. A statement of facts demonstrating that each petitioner is:
  - a. a person to whom the order is directed;
  - b. aggrieved or adversely affected by the determination; or
  - c. entitled to administrative review under any law.
4. The reasons for the request for administrative review.
5. The particular legal issues proposed for review.
6. The facts, terms or conditions of the action for which the petitioner requests review.
7. The identity of any persons represented by the petitioner.
8. The identity of the person against whom administrative review is sought.
9. A copy of the action that is the basis of the petition.
10. A statement identifying petitioner's attorney or other representative, if any.

Failure to meet the requirements of the law with respect to a Petition for Administrative Review may result in a waiver of the Petitioner's right to seek administrative review. Examples are:

1. Failure to file a Petition by the applicable deadline;
2. Failure to serve a copy of the Petition upon IDEM when it is filed; or
3. Failure to include the information required by law.

If Petitioner seeks to have an action stayed during the administrative review, he or she may need to file a Petition for a Stay of Effectiveness. The specific requirements for such a Petition can be found in 315 IAC 1-3-2 and 315 IAC 1-3-2.1.

Pursuant to IC 4-21.5-3-17, OEA will provide all parties with notice of any pre-hearing conferences, preliminary hearings, hearings, stays, or orders disposing of the review of this action. Those who are entitled to notice under IC 4-21.5-3-5(b) and would like to obtain notices of any pre-hearing conferences, preliminary hearings, hearings, stays, or

orders disposing of the review of this action without intervening in the proceeding must submit a written request to OEA at the address above.

More information on the review process is available at the website for the Office of Environmental Adjudication at <http://www.in.gov/oea>.

Granting of this variance does not relieve the applicant from the responsibility of obtaining any other permits or authorizations that may be required for this project or related activities from IDEM or any other agency or person. Granting of this variance does not represent a determination that subsequent requests will be considered an undue hardship under the situation, rules and orders that may exist at that time.

If you have any questions regarding this variance decision, please contact Missy Nunnery at 317-232-5579 or by e-mail at [munnery@idem.in.gov](mailto:munnery@idem.in.gov).

Sincerely,

A handwritten signature in dark ink, reading "Kevin D. Czerniakowski". The signature is written in a cursive, flowing style.

Kevin D. Czerniakowski, P.E.  
Section Chief  
Facility Construction and  
Engineering Support Section  
Office of Water Quality

cc: Ms. Kathryn Castro Jackson, P.E., Wessler Engineering, Inc.



## INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

*We Protect Hoosiers and Our Environment.*

100 N. Senate Avenue • Indianapolis, IN 46204  
(800) 451-6027 • (317) 232-8603 • [www.idem.IN.gov](http://www.idem.IN.gov)

**Eric J. Holcomb**  
*Governor*

**Brian C. Rockensuess**  
*Commissioner*

January 3, 2023

### VIA ELECTRONIC MAIL

Mr. Thomas A. Kallio, Director  
Hamilton Southeastern Utilities, Inc.  
11901 Lakeside Drive  
Fishers, Indiana 46038

Dear Mr. Kallio:

Re: 327 IAC 3 Construction  
Permit Application  
Wayne Township Interceptor – Phase 1  
Permit Approval No. 24845  
Noblesville, Indiana  
Hamilton County

The application, plans and specifications, and supporting documents for the above-referenced project have been reviewed and processed in accordance with rules adopted under 327 IAC 3. Enclosed is the Construction Permit (Approval No. 24845), which applies to the construction of the above-referenced proposed sanitary sewer system to be located along Boden Road between SR 38 and 166<sup>th</sup> Street, along 166<sup>th</sup> Street between Boden and Olio Road, and along Olio Road between 166<sup>th</sup> Street and 156<sup>th</sup> Street.

Please review the enclosed permit carefully and become familiar with its terms and conditions. In addition, it is imperative that the applicant, consulting architect/engineer (A/E), inspector, and contractor are aware of these terms, conditions, and reporting and testing requirements.

It should be noted that any person affected or aggrieved by the agency's decision in authorizing the construction of the above-referenced facility may, within fifteen (15) days from date of mailing, appeal this permit by filing a request with the Office of Environmental Adjudication for an adjudicatory hearing in accordance with IC 4-21.5-3-7 and IC 13-15-6. The procedure for appeal is outlined in more detail in Part III of the attached construction permit.

Plans and specifications were prepared by Wessler Engineering, certified by Kathryn Castro Jackson, P.E., and submitted for review on October 25, 2022 with additional information submitted on November 30, 2022.

Any questions concerning this permit may be addressed to Charity Dudley, P.E., of our staff, at 317/233-6683.

Sincerely,

A handwritten signature in dark ink, reading "Kevin D. Czerniakowski". The signature is written in a cursive, flowing style.

Kevin D. Czerniakowski, P.E.  
Section Chief  
Facility Construction and  
Engineering Support Section  
Office of Water Quality

Project No. M-25631

Enclosures

cc: Hamilton County Health Department

Jonathan Mirgeaux, Utilities Director, City of Noblesville

Kathryn Castro Jackson, P.E., Wessler Engineering

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT  
AUTHORIZATION FOR CONSTRUCTION OF  
SANITARY SEWER SYSTEM  
UNDER 327 IAC 3

DECISION OF APPROVAL

Hamilton Southeastern Utilities, Inc., in accordance with the provisions of IC 13-15 and 327 IAC 3 is hereby issued a permit to construct the sanitary sewer system to be located along Boden Road between SR 38 and 166<sup>th</sup> Street, along 166<sup>th</sup> Street between Boden Road and Olio Road, and along Olio Road between 166<sup>th</sup> Street and 156<sup>th</sup> Street. The permittee is required to comply with requirements set forth in Parts I, II and III hereof. The permit is effective pursuant to IC 4-21.5-3-4(d). If a petition for review and a petition for stay of effectiveness are filed pursuant to IC 13-15-6, an Environmental Law Judge may be appointed for an adjudicatory hearing. The force and effect of any contested permit provision may be stayed at that time.

NOTICE OF EXPIRATION DATE

Authorization to initiate construction of this sanitary sewer system shall expire at midnight one year from the date of issuance of this construction permit. In order to receive authorization to initiate construction beyond this date, the permittee shall submit such information and forms as required by the Indiana Department of Environmental Management. It is requested that this information be submitted sixty (60) days prior to the expiration date to initiate construction. This permit shall be valid for a period of five (5) years from the date below for full construction completion.

Issued on January 3, 2023, for the Indiana Department of Environmental Management.



---

Kevin D. Czerniakowski, P.E.  
Section Chief  
Facility Construction and  
Engineering Support Section  
Office of Water Quality

### SANITARY SEWER SYSTEM DESCRIPTION

The proposed project consists of approximately 9,282 feet of 27-inch PVC gravity sewer (ASTM F679, SDR-26) and approximately 180 feet of 27-inch PVC gravity sewer (ASTM F679, SDR-26) installed via jack and bore under 166<sup>th</sup> Street to provide sanitary service to 9,573 proposed single-family homes. The average design flow is 2,967,552 gallons per day, and the sewer will discharge to a proposed 27-inch sewer located approximately 150 feet south of SR 38 and approximately 125 feet west of Boden Road.

The proposed 27-inch sewer that the new interceptor will connect to is currently under construction as part of the Silo Ridge Offsite Sanitary Sewer project (IDEM Permit No. 24309) and expected to be completed in January 2023. The engineer requested and was granted a variance to 327 IAC 3-6-4 and 327 IAC 3-6-7 to proceed with the project before the downstream infrastructure is operational. With rising material lead times, the Utility would like to be able to start construction as soon as the downstream connection point is installed to facilitate development. In addition, road improvement projects along Boden Road are anticipated in the near future, and having the interceptor already installed will minimize or eliminate coordination between the contractors.

Inspection during construction and maintenance after completion will be provided by Sanitary Management & Engineering Company, Inc. (SAMCO). Flows generated by this project will be transported to the Noblesville WWTP for treatment.

### CONDITIONS AND LIMITATIONS TO THE AUTHORIZATION FOR CONSTRUCTION OF SANITARY SEWERS

During the period beginning on the effective date of this permit and extending until the expiration date, the permittee is authorized to construct the above-described sanitary sewer system. Such construction shall conform to all provisions of State Rule 327 IAC 3 and the following specific provisions:

#### PART I

#### SPECIFIC CONDITIONS AND LIMITATIONS TO THE CONSTRUCTION PERMIT

Unless specific authorization is otherwise provided under the permit, the permittee shall comply with the following conditions:

1. Any local permits required for this project, along with easement acquisition, shall be obtained before construction is initiated.
2. If pollution or nuisance conditions are created, immediate corrective action will be taken by the permittee.



3. The separation of sanitary sewers from water mains and drinking water wells must comply with 327 IAC 3-6-9.
4. All gravity sewer pipe must be leak tested using either a hydrostatic test or air test in accordance with 327 IAC 3-6-19(d). If using a hydrostatic test, the rate of exfiltration or infiltration shall not exceed 200 gallons per inch of pipe diameter per linear mile per day. Air test shall be as prescribed.
5. The results of the gravity sewer leakage test and/or force main leakage test on the completed sewer shall be submitted to this office within three months of completion of construction.
6. Deflection tests must be performed on all flexible\* pipe after the final backfill has been in place at least 30 days. No pipe shall exceed a vertical deflection of 5%. Deflection test results shall be submitted with the infiltration/exfiltration test results. (\*The following are considered nonflexible pipes: vitrified clay pipe, concrete pipe, ductile iron pipe, cast iron pipe, asbestos cement pipe.)
7. Manholes shall be air tested in accordance with ASTM C1244-93, Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test. The manhole test results shall be submitted with the gravity sewer leakage test results.

Failure to submit test results within the allotted time period or failure to meet guidelines as set forth in the above conditions could be subject to enforcement proceedings as provided by 327 IAC 3-5-3.

## PART II

### GENERAL CONDITIONS

1. No significant or material changes in the scope of the plans or construction of this project shall be made unless the following provisions are met:
  - a. Request for permit modification is made 60 days in advance of the proposed significant or material changes in the scope of the plans or construction;
  - b. Submit a detailed statement of such proposed changes;
  - c. Submit revised plans and specifications including a revised design summary; and
  - d. Obtain a revised construction permit from this agency.
2. This permit may be modified, suspended, or revoked for cause including, but not limited to the following:
  - a. Violation of any term or conditions of this permit:
  - b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts.
3. Nothing herein shall be construed as guaranteeing that the proposed sanitary sewer system shall meet standards, limitations or requirements of this or any other agency of state or federal government, as this agency has no direct control over the actual construction and/or operation of the proposed project.

PART III

NOTICE OF RIGHT TO ADMINISTRATIVE REVIEW

Anyone wishing to challenge this construction permit must do so by filing a Petition for Administrative Review with the Office of Environmental Adjudication (OEA) and serving a copy of the petition upon IDEM. The requirements for filing a Petition for Administrative Review are found in IC 4-21.5-3-7, IC 13-15-6-1 and 315 IAC 1-3-2. A summary of the requirements of these laws is provided below.

A Petition for Administrative Review must be filed with the Office of Environmental Adjudication (OEA) within fifteen (15) days of the issuance of this notice (eighteen (18) days if notice was received by U.S. Mail), and a copy must be served upon IDEM. Addresses are:

Director  
Office of Environmental Adjudication  
Indiana Government Center North  
Room 103  
100 North Senate Avenue  
Indianapolis, Indiana 46204

Commissioner  
Indiana Department of Environmental  
Management  
Indiana Government Center North  
Room 1301  
100 North Senate Avenue  
Indianapolis, Indiana 46204

The petition must contain the following information:

1. The name, address and telephone number of each petitioner.
2. A description of each petitioner's interest in the permit.
3. A statement of facts demonstrating that each petitioner is:
  - a. a person to whom the order is directed;
  - b. aggrieved or adversely affected by the permit; or
  - c. entitled to administrative review under any law.
4. The reasons for the request for administrative review.
5. The particular legal issues proposed for review.
6. The alleged environmental concerns or technical deficiencies of the permit.
7. The permit terms and conditions that the petitioner believes would be appropriate and would comply with the law.
8. The identity of any persons represented by the petitioner.
9. The identity of the person against whom administrative review is sought.
10. A copy of the permit that is the basis of the petition.
11. A statement identifying petitioner's attorney or other representative, if any.

Failure to meet the requirements of the law with respect to a Petition for Administrative Review may result in a waiver of the Petitioner's right to seek administrative review of the permit. Examples are:

1. Failure to file a Petition by the applicable deadline;
2. Failure to serve a copy of the Petition upon IDEM when it is filed; or
3. Failure to include the information required by law.

If Petitioner seeks to have a permit stayed during the administrative review, he or she may need to file a Petition for a Stay of Effectiveness. The specific requirements for such a Petition can be found in 315 IAC 1-3-2 and 315 IAC 1-3-2.1.

Pursuant to IC 4-21.5-3-17, OEA will provide all parties with notice of any pre-hearing conferences, preliminary hearings, hearings, stays, or orders disposing of the review of this action. Those who are entitled to notice under IC 4-21.5-3-5(b) and would like to obtain notices of any pre-hearing conferences, preliminary hearings, hearings, stays, or orders disposing of the review of this action without intervening in the proceeding must submit a written request to OEA at the address above.

More information on the review process is available at the website for the Office of Environmental Adjudication at <http://www.in.gov/oea>.