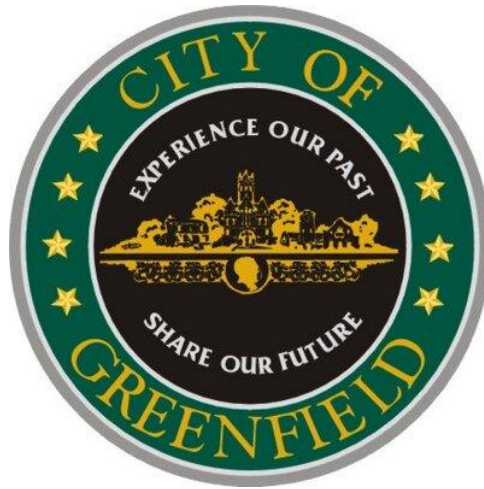


# PROJECT MANUAL

## City of Greenfield Utilities Waterview Sanitary Sewer System Lining Project June 14, 2023



Prepared By:



American Structurepoint, Inc.  
116 E. Berry Street, Suite 1515  
Fort Wayne, IN 46815  
Tel: 317-547-5580



AMERICAN  
**STRUCTUREPOINT**  
INC.

**CONTRACT DOCUMENTS**

**FOR**

**WATERVIEW SANITARY SEWER LINING PROJECT**

**Department of Engineering  
City of Greenfield**

**Chuck Fewell.....Mayor  
Jason Koch, PE.....City Engineer**

Bv1 - 08/2018

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**NOTICE TO BIDDERS**  
**City of Greenfield**

Department: **Department of Engineering**  
**10 S. State Street**  
**Greenfield, Indiana 46140**

Project/Work: **Waterview Sanitary Sewer System Lining**

Notice is hereby given that the City of Greenfield will receive sealed bids for the above described "Project/Work" at Clerk-Treasurer's Office, 10 S. State Street, Greenfield, Indiana, until 9:30 a.m. prevailing local time, 10 S. State Street, on **July 11, 2023** and commencing as soon as practicable thereafter on the same date such bids will be publicly opened. No late Bids will be accepted.

A Bid Bond or certified check in an amount not less than five percent (5%) of the amount bid must be submitted with each Bid. A one hundred percent (100%) Performance and Payment Bond will also be required of the successful Bidder.

The Work consists of, but is not necessarily limited to the following:

**Rehabilitating approximately 9,100 linear feet of 8-inch, 10-inch, and 12-inch sanitary sewers using cured-in-place lining (CIPP), 374 vertical feet of manhole lining, sewer cleaning and root removal, bypass pumping as required, six partial replacements of sewers, manhole rehabilitation, and associated site restoration.**

**There is a mandatory alternate bid for lining up to 5 feet of each of the 151 laterals.**

Contract Documents for the Project/Work have been assembled into one or more bound Project Manuals which, together with Drawings, may be examined at the Clerk-Treasurer's Office or the Department of Engineering at 10 S. State Street, Greenfield, Indiana 46140.

Electronic copies of the Drawings and Project Manuals will be available on the City of Greenfield website at <https://www.greenfieldin.org/government/engineering>. Bidders will be responsible to contact the Clerk-Treasurers office to be added to the plan-holders list if downloading electronic contract documents.

Bidders shall assure that they have obtained complete sets of drawings and Contract Documents and shall assume the risk of any errors or omissions in Bids prepared in reliance on incomplete sets of drawings and Contract Documents.

A pre-bid conference will be held at **2:00 p.m. (local time) on June 27, 2023**, at the Richard J. Pasco Council Chambers, 10 South State Street, Greenfield, Indiana to familiarize Bidders with this project.

For accommodations needed by persons with disabilities to attend the public bid opening meeting, please call (317) 477-4320.

The City of Greenfield reserves the right to reject any or all bids or to waive any informalities and to accept the bid which it deems most favorable to the interests of the City after all bids have been examined and canvassed.

# **INSTRUCTIONS TO BIDDERS**

## **City of Greenfield**

Department (“Owner”): **Department of Engineering**  
**10 S. State Street**  
**Greenfield, Indiana 46140**

Project/Work: **Waterview Sanitary Sewer System Lining**

Owner’s Representative: **American Structurepoint**  
**116 E. Berry Street, Suite 1515**  
**Fort Wayne, IN 46802**

Engineer: **Bryan Hood, PE** **Sam Sutter, PE**  
[bhood@structurepoint.com](mailto:bhood@structurepoint.com) [ssutter@structurepoint.com](mailto:ssutter@structurepoint.com)  
**260-417-6312** **260-373-0600**

## **1. GENERAL**

- 1.1 Submission of a Bid shall constitute an unconditional agreement and acknowledgment by the Bidder to be bound by all terms and conditions set forth herein and in any of the documents assembled or referred to in the bound Project Manual of which these Instructions to Bidders are a part.
- 1.2 Sample forms are included in the Project Manual to acquaint Bidders with the form and provisions of various Bid Documents and other documentation required by the Contract Documents to be executed, completed and submitted by some or all Bidders, either as part of a Bid Submission or after the Bid Date. Such sample forms are not to be detached from the Project Manual, or filled out or executed. Separate copies of such forms and any other required documentation prescribed by the Contract Documents have been or will be furnished separately by the Owner and must be obtained directly from the City.
- 1.3 Instructions and requirements printed on any sample form included in the Project Manual or any form not so included but required to be completed, signed or furnished by a Bidder as part of a Bid Submission or after receipt and opening of Bids shall be deemed requirements established by these Instructions to Bidders to the same extent as if fully restated herein.
- 1.4 By submitting bid the Bidder agrees the bid proposal and price(s) contained herein shall be valid for ninety (90) days from bid opening.

## **2. DEFINITIONS**

The following definitions shall apply to these Instructions to Bidders (ITB):

- 2.1 Bidder - Any person or entity who submits a Bid.
- 2.2 Bid - A written proposal submitted by a Bidder as part of the form prescribed herein offering to perform and complete the Work and to fulfill all other requirements of the Contract Documents for one or more specified prices.

- 2.3 Bid Documents - All documents and completed forms required to be submitted by a Bidder with and as integral parts of a Bid Submission, whether or not included as sample forms assembled in the Project Manual of which these Instructions to Bidders are a part. Such Bid Documents are listed and more fully described in ITB Section 5.3 hereof.
- 2.4 Bid Date - The date when Bids are to be received, opened and publicly read aloud as established by the Notice to Bidders as may be modified by Addenda.
- 2.5 Bid Submission - All documents presented by a Bidder for receipt and opening on the Bid Date.
- 2.6 Contract Documents - The Agreement and any exhibits thereto, Addenda (which pertain to the Contract Documents), Instructions to Bidders, Advertisement, Notice to Bidders, Bidder's Bid (including documentation accompanying the Bid and any post-Bid documentation submitted prior to the Notice of Award), Notice to Proceed, the Bonds, the General Conditions, the Additional Requirements Section, any supplemental or special conditions, the Specifications and the Drawings, as the same are more specifically identified in the Agreement.
- 2.7 E-Verify Program - An electronic verification of work authorization program of the Illegal Immigration Reform and Immigration Responsibility Act of 1996 (P.L. 104-208), Division C, Title IV, s.403(a), as amended, operated by the United States Department of Homeland Security or successor work authorization program designated by the United States Department of Homeland Security or other federal agency authorized to verify the work authorization status of newly hired employees under the Immigration Reform and control Act of 1986 (P.L. 99-603).
- 2.8 Owner - The City of Greenfield acting by and through the Department or other agency designated above.
- 2.9 Project Manual - The bound set of documents, sample forms, and Contract Documents (excluding plans and Addenda) approved by the Owner for the Work and/or Project described in the Notice to Bidders and of which these Instructions to Bidders are a part.

In all other respects, terms used herein shall have the meanings as stated in the General Conditions or other Contract Documents.

### **3. EXAMINATION OF SITE AND DOCUMENTS**

- 3.1 Before the Bid Date, all Bidders shall carefully and thoroughly examine and inspect the entire site of the proposed Work and adjacent premises and the various means of approach and access thereto by means of a site inspection visit, and make all necessary investigations to inform themselves thoroughly as to the facilities necessary for delivering, placing and operating the necessary construction equipment, and for delivering and handling materials at the site, and shall inform themselves thoroughly as to any and all actual or potential difficulties, hindrances, delays and constraints involved in the commencement, prosecution and completion of the proposed Work in accordance with the requirements of the Contract Documents.
- 3.2 It shall be the sole responsibility of Bidders to make borings, test pits and to conduct such other investigations at or near the site of the proposed Work as they deem necessary to determine the character, location, and amount of materials to be encountered or other subsurface conditions which could affect the manner, cost or time required to perform the Work.

- 3.3 Bidders shall carefully and thoroughly examine the plans, specifications and other Contract and/or Project Manual Documents and shall assume the full risk of their own judgments as to the nature, quality and amount of the whole of the Work to be done, and for the price bid must assume all risk of any and all variances or errors in any computation or statement of amounts or quantities necessary to complete the Work in strict compliance with the Contract Documents.
- 3.4 Elevations of the existing ground surface or structures at the site of the Work as shown on the plans are believed to be reasonably correct but are not guaranteed to be absolutely so and are presented only as an approximation. Bidders shall satisfy themselves as to the correctness of all elevations.
- 3.5 Information stated or depicted on plans concerning the location, dimensions, depth and other characteristics of underground structures and utilities is given only as general information and shall not be construed or relied upon by Bidders as a representation or assurance that such structures or utilities will be found or encountered as plotted, or that such information is complete or accurate. Bidders, therefore, shall satisfy themselves by such means as they may deem proper as to the location of all structures and utilities that may be encountered in construction of the Work and shall bear the risk of the number, type, location, dimensions and depth of all structures and utilities thus encountered.
- 3.6 The City of Greenfield Standard General Conditions for Construction Contracts, August 2018, is incorporated by reference as part of this bid. Copy of General Conditions are available at <https://www.greenfieldin.org/government/engineering>.

#### **4. CLARIFICATIONS AND ADDENDA**

- 4.1 If a Bidder finds conflicts, errors, discrepancies or ambiguities in the Contract Documents or any sample form, or if the Bidder is in doubt as to the intended meaning of any portion or provision therein, the Bidder shall at once give written notice thereof to the Owner's Representative, at least seven (7) consecutive calendar days prior to the Bid Date. No Bidder shall be allowed any extra compensation or time extension by reason of any conflict, error, discrepancy or ambiguity of which the Bidder had actual knowledge or reasonably should have known and which he/she failed to report within the period and in the manner required by these Instructions to Bidders.
- 4.2 No material changes, clarifications or interpretations of the Contract Documents will be issued except by written or graphic Addenda mailed or delivered to record holders of Contract Documents not less than three (3) days prior to the Bid Date. All such Addenda must be acknowledged by the Bidder and will become a part of the Contract Documents. The Owner will not be responsible for or bound by any oral or written interpretations or clarifications of the Contract Documents which anyone presumes to make on its behalf, except by an Addendum issued in accordance with this Section.

#### **5. BID SUBMISSION**

- 5.1 All Bid Documents shall be placed within a sealed envelope which shall be plainly labeled on the outside with the name and address of the Bidder, Project name and number (if applicable) and Due Date. If forwarded by mail, the sealed envelope must be enclosed in another envelope addressed to: City of Greenfield, Clerk-Treasurer, 10 S. State Street, Greenfield, Indiana 46140.
- 5.2 All Bid Documents as herein prescribed must be submitted with and as integral parts of each Bid Submission and shall be subject to all requirements of the Contract Documents, including

drawings and these Instructions to Bidders. Bid Documents must be properly filled in and completed in every material respect and without interlineations, excisions, special conditions, qualifications or exceptions. Each Bid Document requiring a signature shall be signed by an individual duly authorized to execute such document on Bidder's behalf. A bid executed by a corporation, joint venture, or other entity with an assumed name shall have the legal and correct name thereof followed by the word "by" and the signature and title of the officer or other person authorized to sign for it.

5.3 The Bid Documents to be thus submitted by each Bidder shall consist of all of the following (5.3.1, 5.3.2, 5.3.3):

.1 Bidder's Itemized Proposal and Declarations. A sample of this form is included in the Project Manual and must be utilized by all Bidders. Such document includes and consists of the following constituent "Parts":

"Part 1 - Bidder Information"

"Part 2 - Proposal (Bid)"

"Part 3 - Contract Items and Unit Prices"

"Part 4 - Contract Documents and Addenda"

"Part 5 - Exceptions"

"Part 6 - Nepotism Disclosure Form"

"Part 7 - Additional Declarations, including certification required by IC 5-22-16.5"

"Part 8 - Drug Testing"

"Part 9 - Non-Collusion Affidavit"

"Part 10 - E-Verify Affidavit"

"Part 11 - Signatures"

.2 Bid Security in the form of a Bid Bond or Certified Check in an amount not less than five percent (5%) of the bid price. Such Bid Security shall serve as security to insure the execution of the Agreement and the furnishing of other required documents by the successful Bidder, including Performance and Payment Bonds. A sample Bid Bond form is included in the Project Manual and such form, or such other form as may be approved in advance by Owner, shall be utilized if such a bond is furnished as Bid Security. A Bid Bond shall be executed by a surety company licensed to transact such business in the State of Indiana and qualified as a surety under the underwriting limitations on the current list of "Surety Companies Acceptable on Federal Bonds" as published in the U.S. Treasury Department Circular No. 570; the Bidder shall also furnish as part of the Bid Submission a signed power of attorney establishing the authority of the person executing such Bid Bond on behalf of the surety. Bid Security shall be held until the Contract is executed with the successful Bidder. In the event that all bids are rejected, the Bid Security of all Bidders will be returned upon request. No "Annual" bid bonds, cash deposits or cashiers' checks will be accepted.

.3 Contractor's Bid for Public Work (State Form 96). Such form is included in this Project Manual on pages BID-10 to BID-15 and shall be used in consideration of a Bidder's ability to perform its obligations under the terms of the contract Documents and in determining other material factors bearing upon a Bidder's responsibility. If Bid is under \$150,000 either of these forms may be submitted as a Post-Bid submittal under Section 6, Post Bid Requirements.



- 5.4 Bids may be withdrawn in person by a Bidder during normal hours of business prior to the time fixed for opening of Bids. In the event of a valid withdrawal of a Bid, the Bid Security of the withdrawing Bidder will be returned promptly. No Bid may be withdrawn after opening of Bids has commenced except after expiration of such period following the Bid Date as specifically provided by law, plus any extension thereof as provided elsewhere in these Instructions to Bidders. Bidder's failure to provide all completed documentation as required in ITB Section 5.3 may result in Bid being deemed non-responsive.

## 6. POST-BID REQUIREMENTS

Within five (5) business days of notification by Owner, the apparent lowest responsive Bidder will be required to submit additional documents and satisfy additional requirements as conditions to such Bidder being found by the Owner to be a responsible Bidder, as follows:

- 6.1 Proof of Insurability. The Bidder shall furnish: (1) proof of insurance showing existing coverage in accordance with the terms and amounts stated in the General Conditions, or (2) a letter or statement certifying that, in the event that the bid is awarded by the Owner, an insurance company will provide the required coverage to the Bidder submitting the bid. Such proof of insurance or the letter/statement shall be issued by a financially responsible insurance company authorized to do business in the State of Indiana.
- 6.2 Surety Letter of Intent. The Bidder shall furnish a written statement or letter from a Surety company licensed to transact such business in the State of Indiana and qualified as a surety under the underwriting limitations on the current list of "Surety Companies Acceptable on Federal Bonds" as published in U.S. Treasury Department Circular No. 570, which assures the Owner that, in the event the Bid is accepted and a contract is awarded by Owner, said Surety will execute and deliver both a Performance Bond and Payment Bond as required by the Contract Documents.
- 6.3 Joint Venture Agreement. If the Bidder is a joint venture, partnership or other combination of two or more persons or entities, the Bidder shall submit a copy of the joint venture or other agreement by which such joint venture, partnership or other association has been formed, executed by all such participating persons or entities. If the Bid is signed by less than all parties that comprise the Bidder, suitable written evidence of the authority of such signing party to bind all such parties must also be furnished.
- 6.4 Subcontractor/Supplier List. The Bidder shall submit all subcontractors and suppliers that will be used on the project, as required (POST-BID-1).
- 6.5 Manufacturers List. The Bidder shall submit a complete list of all equipment and supplies that are listed in the Manufacturer's List (POST-BID-2).
- 6.6 E-Verify Documentation. - The Bidder shall submit verification that it is enrolled in and participating in the E-Verify program (POST-BID-3).

## 7. BID EVALUATION AND AWARD

- 7.1 **Award of the Contract will be made to the lowest, responsive and responsible Bidder, where the Bid is reasonable and does not exceed the funds available for the project.** The Owner reserves the right to reject all Bids and may waive or allow a Bidder to correct errors,

omissions or other irregularities in Bid Documents that are found not to have afforded the Bidder a substantial competitive advantage over other Bidders.

- 7.2 The Owner shall have the right to reject any Bid if investigation of the Bidder fails to satisfy the Owner that such Bidder is properly qualified to carry out the obligations and complete the Work. Any or all Bids will be rejected if there is reason to believe that collusion exists among Bidders.
- 7.3 For unit price Contract Items, estimated quantities and unit prices will serve as the basis for determining the proposed price of each Bid. Patent math errors in statements of Bid prices or totals may be corrected by the Owner or Engineer, in which case the corrected amounts will be used for the purpose of Bid evaluation, comparison and other award considerations. However, neither the Owner nor the Engineer shall be required to discover or correct any error or omission in a Bid and the Bidder shall assume the risk of and be bound to the consequences of any such error or omission.
- 7.4 The Owner may, at its sole option, award the Contract to a Bidder on a conditional basis to afford the Bidder additional time and opportunity to submit required documents or to fulfill other requirements. In such case, the Owner will furnish to the Bidder a notice of conditional award which will establish (i) the additional conditions to be fulfilled for the award to become effective, and (ii) the time limit within which such conditions shall be satisfied. If the Bidder fails to satisfy the conditions in the manner and within the time specified in such notice, the Owner may declare such Bidder to be non-responsible and award the Contract, conditionally or unconditionally, to another Bidder. Time limitations governing the Owner's award of the Contract shall be extended for such additional period as may be required to effectuate the conditional award procedure set forth in this sub-section, and no Bid may be withdrawn during such period of extension.

## **8. CONTRACT EXECUTION; SUBMITTALS**

- 8.1 Within five (5) business days after the award notice, the successful Bidder shall sign and deliver at least three (3) counterparts of the Agreement, utilizing the form thereof included in the Project Manual and make delivery thereof to the Owner, along with other documents as prescribed by the Contract Documents. After execution and delivery of the Agreement and other required documents, and acceptance thereof by the Owner, the Bid Security furnished by each Bidder will be returned to the respective Bidders upon request.
- 8.2 If the Bidder fails or neglects to execute and deliver the Agreement and other required documents as prescribed by the preceding sub-section, the Bidder shall be deemed to have repudiated the Contract and thereupon the award shall be null and void; and the Bid Security provided by the Bidder shall be forfeited to and retained by the Owner as liquidated damages for such failure of the Bidder to execute the Contract, it being understood and agreed that the character and amount of actual damages sustained by the Owner cannot reliably be ascertained and measured and that the amount of the Bid Security is intended as a reasonable prospective estimate of such actual damages.
- 8.3 Concurrently with the execution and delivery of the Agreement to the Owner, or within such other period as the Owner may prescribe, the successful Bidder (Contractor) shall submit the following as conditions to the Bidder's right to proceed with and receive payment for any Work:
  - .1 Proof of all required insurance coverage, a one hundred percent (100%) Performance Bond and a one hundred percent (100%) Payment Bond as prescribed by the General Conditions or other Contract Documents. Such bonds shall be executed utilizing the

sample forms included in the Project Manual or alternative forms approved in advance by the Owner. Indemnification clauses between successful Bidder and the Surety shall not be binding upon the Owner;

- .2 The preliminary schedules required by Paragraph 2.7 of the General Conditions;
- .3 Other Post-Bid submittals required by the Contract Documents.

## **9. LIQUIDATED DAMAGES**

- 9.1 The Contract Documents provide for the payment of liquidated damages in the event of unexcused failure by the Contractor to complete the Work within the time required by the Contract Documents. **Such liquidated damages are to be assessed and recovered at the rate of \$500 per day for delay in achieving the Substantial Completion date of May 10, 2024 and at the rate of \$100 per day for delay in achieving the Final Completion date of June 2, 2024.**
- 9.2 The per diem rate(s) of liquidated damages established by the preceding sub-section have been determined and are intended as reasonable prospective estimate(s) of the type and amount of actual damages which the Owner may sustain in the event of such delay(s). Submission of a Bid shall constitute an unconditional acknowledgment and agreement by the Bidder that such liquidated damages are fair and reasonable and do not and will not constitute a penalty, and that such liquidated damages may be assessed and recovered by the Owner as against the successful Bidder/Contractor and its Surety in lieu of actual damages for delayed completion.

## **10. CHANGE ORDERS**

- 10.1 During the course of the Work, should the Owner or Bidder determine that additional work which was foreseeable is required, such work shall not be automatically awarded through change orders. However, the Owner reserves the right to award additional work which was foreseeable to the original Bidder where doing so is in the best interest of the Owner. All such awards are and will remain subject to necessary approvals.

## **END OF INSTRUCTIONS TO BIDDERS**

**PART 1**  
**BIDDER'S ITEMIZED PROPOSAL**  
**AND DECLARATIONS**  
City of Greenfield

*Instructions to Bidders:*

*This form shall be utilized by all Bidders. Except as otherwise specifically provided, all Parts shall be fully and accurately filled in and completed and notarized.*

Project: Waterview Sanitary Sewer System Lining

Proposal For Construction of: **Rehabilitating approximately 9,100 linear feet of 8-inch, 10-inch, and 12-inch sanitary sewers using cured-in-place lining (CIPP), 374 vertical feet of manhole lining, sewer cleaning and root removal, bypass pumping as required, six partial replacements of sewers, manhole rehabilitation, and associated site restoration.**

**There is a mandatory alternate bid for lining up to 5 feet of each of the 151 laterals.**

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

To: **City of Greenfield, Department of Engineering**  
**10 S. State Street, Greenfield, Indiana 46140**

**PART 1**  
**BIDDER INFORMATION**  
**(Print)**

1.1 Bidder Name: \_\_\_\_\_

1.2 Bidder Address:      Street Address: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
Phone #: (    ) \_\_\_\_\_ Fax #: (    ) \_\_\_\_\_

1.3 Former Business names of Bidder: \_\_\_\_\_

1.4 Bidder is a/an [mark one]:  
\_\_\_ Individual    \_\_\_ Partnership    \_\_\_ Indiana Corporation  
\_\_\_ Foreign (Out of State) Corporation  
\_\_\_ Joint Venture  
Other: \_\_\_\_\_

**PART 2**  
**PROPOSAL (BID)**

- 2.1 The undersigned Bidder proposes to furnish all necessary labor, machinery, tools, apparatus, materials, equipment, service and other necessary supplies, and to perform and fulfill all obligations incident thereto in strict accordance with and within the time(s) provided by the terms and conditions of the Contract Documents for the above described Work and Project, including any and all addenda thereto, for the total lump sum as noted below.
- 2.2 By submitting bid the Bidder agrees the bid proposal and price(s) contained herein shall be valid for ninety (90) days from bid opening.

**PART 3**  
**CONTRACT ITEMS AND UNIT PRICES**

<b>Bid Item</b>	<b>Description</b>	<b>Quantity</b>	<b>Unit</b>	<b>Unit Price</b>	<b>Item Total</b>
0001	MOBILIZATION AND DEMOBILIZATION	1	LS		
0002	CONSTRUCTION ENGINEERING	1	LS		
0003	MAINTENANCE OF TRAFFIC	1	LS		
0004	BYPASS PUMPING	1	LS		
0005	8-INCH DIAMETER CIPP LINING	4,348	LF		
0006	10-INCH DIAMETER CIPP LINING	3,803	LF		
0007	12-INCH DIAMETER CIPP LINING	933	LF		
0008	ROOT REMOVAL	1,830	LF		
0009	CUT PROTRUDING TAP	3	EA		
0010	SANITARY SEWER, LATERAL REINSTATEMENT IN CURED-IN-PLACE PIPE	151	EA		
0011	SANITARY SEWER, PARTIAL REPLACEMENT UP TO 5' ,10" PVC SDR 35, 10'-15' DEEP	2	EA		
0012	SANITARY SEWER, PARTIAL REPLACEMENT UP TO 5', 10" PVC SDR 35, 15'-21' DEEP	2	EA		
0013	SANITARY SEWER, PARTIAL REPLACEMENT UP TO 5', 8" PVC SDR 35, 5'-10' DEEP	1	EA		
0014	SANITARY SEWER, PARTIAL REPLACEMENT UP TO 5', 8" PVC SDR 35, 15'-20' DEEP	1	EA		
0015	LINE MANHOLE	374	VF		
0016	REPLACE MANHOLE FRAME AND LID (Assumed Quantity)	5	EA		
0017	MANHOLE BENCH REPLACEMENT (Assumed Quantity)	4	EA		

A. Total of Base Bid Items (in words):

(In figures)

\$

## Mandatory Alternate Bid

0018	6-INCH LATERAL LINER, UP TO 5'	151	EA		
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<i>B. Total Base Bid with Mandatory Alternate Bid (in words)</i>	<i>(In figures)</i>
	\$

**PART 4**  
**CONTRACT DOCUMENTS AND ADDENDA**

4.1 The Bidder agrees to be bound by the terms and provisions of all Contract Documents as defined in the General Conditions and incorporates such Contract Documents herein by reference

4.2 The Bidder acknowledges receipt of the following addenda:

Addendum Number

Date

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



**PART 5**  
**EXCEPTIONS**

*Instructions to Bidders:*

- 5.1 *The Bidder shall fully state each exception taken to the Specifications or other Contract Documents in Section 5.3 of this Part.*
  
- 5.2 *Bidder is cautioned that any exception taken by Bidder and deemed by Owner to be a material qualification or variance from the terms of the Contract Documents may result in this Bid being rejected as non-responsive.*
  
- 5.3 *Exceptions:*

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**PART 6**  
**NEPOTISM DISCLOSURE**

Contractor: \_\_\_\_\_

Project: \_\_\_\_\_

For purposes of compliance with Indiana Code Chap. 36-1-21, please specify below whether Contractor (individual), or a person who wholly or partially owns Contractor (business), is a relative, as that term is defined by Indiana Code § 36-1-21-3, of either the Mayor of Greenfield, Indiana, or a member of the City Council of Greenfield, Indiana.

- Contractor (individual) or Contractor (business) does NOT have a relative who is either the Mayor of Greenfield, Indiana or a member of the City of Greenfield, Indiana.
- Contractor (individual) or Contractor (business) DOES have a relative who is either the Mayor of Greenfield, Indiana or member of the City Council of Greenfield, Indiana (must specify all relatives below):

\_\_\_\_\_

- Mayor Chuck Fewell
- City Councilor [please specify name of Councilor(s)]

\_\_\_\_\_

Name of Authorized Representative (Printed)

\_\_\_\_\_

Signature of Authorized Representative:

\_\_\_\_\_

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

**PART 7**  
**ADDITIONAL DECLARATIONS**

- 7.1 Bidder certifies for itself and all its subcontractors compliance with existing laws of the City of Greenfield, the State of Indiana and the United States regarding (a) prohibition of discrimination in employment practices on the basis of race, sex, disability, religion, national origin, disabled veteran status and Vietnam-era veteran status.
- 7.2 Bidder certifies that it has thoroughly examined the site of the Work and informed itself fully regarding all conditions under which it will be obligated to operate and that in any way affect the Work, and knows, understands and accepts the existing conditions. Bidder further certifies that it has thoroughly reviewed the Contract Documents, including all Addenda, and has had the opportunity to ask questions and obtain interpretations or clarifications concerning Contract Documents.
- 7.3 Hiring Practices. The Bidder shall, upon request of the Owner, make available its policies, practices and standards for the hiring of applicants, except as prohibited under Indiana Code section 22-2-17-3, to the extent such information is related to the provision of services under this Bid.
- 7.4 Bidder Qualifications. Bidder certifies to Owner the following:
- .1 That Bidder is eligible to work in the State of Indiana;
  - .2 That Bidder's labor force participates in apprenticeship or training programs approved by and registered with the United States Department of Labor's Office of Apprenticeship, or its successor organization;
  3. That Bidder has implemented an employee drug testing plan that meets, or exceeds, the requirements set forth in IC 36-1-12-24;
  - .4 That Bidder will utilize project managers and superintendents with sufficient relevant management experience to complete bidder's scope of work;
  - .5 That Bidder and its management personnel possess any and all professional trade licenses required by law for any trade or specialty area in which Bidder is seeking a contract award, and said licensures have not been suspended or revoked within the previous five (5) years;
  - .6 That Bidder is utilizing a surety company which is on the United States Department of Treasury's listing of approved sureties; and
  - .7 For contracts estimated to be over \$300,000.00, that Bidder and sub-contractors expected to be awarded at least \$300,000 for the project are qualified under IC 4-13.6-4 or IC 8-23-10.

Violation of this certification shall constitute a material breach of the contract to result from this Bid, and upon such a violation Owner may terminate the contract. In addition, upon a violation of this certification, Owner shall report such violation to the City Legal Department who may, at its discretion, debar the Bidder from eligibility for future city purchasing, bids, contracts, quotes and/or projects.

**PART 8**  
**DRUG PROGRAM**

- 8.1 Pursuant to IC 4-13-18-5, the Bidder must submit with the Bid a written plan for a program to test the Bidder's employees for drugs. A contractor that is subject to a collective bargaining agreement that establishes an employee drug testing program shall only submit a copy of the relevant part of the collective bargaining agreement establishing the program. Failure to submit a written plan for an employee drug testing program, or relevant parts of a collective bargaining agreement establishing an employee drug testing program shall result in the Bid being rejected as non-responsive.
- 8.2 Attach a copy of your drug testing program or the relevant parts of your collective bargaining agreement establishing a drug testing program to this page.

**PART 9**  
**NON-COLLUSION AFFIDAVIT**

The individual person(s) executing this Proposal, being first duly sworn, depose(s) and state(s) that the Bidder has not directly or indirectly entered into a combination, collusion, undertaking or agreement with any other bidder or person (i) relative to the price(s) proposed herein or to be bid by another person, or (ii) to prevent any person from bidding, or (iii) to induce a person to refrain from bidding; and furthermore, this Bid Proposal is made and submitted without reference to any other bids and without agreement, understanding or combination, either directly or indirectly, with any persons with reference to such bidding in any way or manner whatsoever.

**PART 10**  
**E-VERIFY PROGRAM**

Pursuant to Indiana Code 22-5-1.7-11.1, the contractor awarded the Bid is required to enroll in and verify the work eligibility status of all its newly hired employees through the E-Verify program. The contractor who is awarded the Bid 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 individual person(s) executing this Proposal, being first duly sworn, depose(s) and state(s) that the Bidder does not knowingly employ an unauthorized alien. The undersigned further affirms that, prior to entering into an agreement for this Bid, the undersigned business entity will enroll in and agrees to verify the work eligibility status of all its newly hired employees through the E-Verify program.

**PART 11**  
**SIGNATURES**

*[Signature by or on behalf of the Bidder in the spaces provided below shall constitute execution of each and every Part of this Itemized Proposal and Declarations document. SIGNATURE MUST BE PROPERLY NOTARIZED.]*

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 \_\_\_\_\_



# CONTRACTOR'S BID FOR PUBLIC WORK – FORM 96

State Form 52414 (R2 / 2-13) / Form 96 (Revised 2013)  
Prescribed by State Board of Accounts

## PART I

(To be completed for all bids. Please type or print)

Date (month, day, year): \_\_\_\_\_

1. Governmental Unit (Owner): **City of Greenfield, Indiana** \_\_\_\_\_
2. County: **Hancock** \_\_\_\_\_
3. Bidder (Firm): \_\_\_\_\_  
Address: \_\_\_\_\_  
City/State/ZIP code: \_\_\_\_\_
4. Telephone Number: \_\_\_\_\_
5. Agent of Bidder (if applicable): \_\_\_\_\_

Pursuant to notices given, the undersigned offers to furnish labor and/or material necessary to complete the public works project of \_\_\_\_\_  
(Governmental Unit) in accordance with plans and specifications prepared by \_\_\_\_\_  
\_\_\_\_\_ and dated \_\_\_\_\_ for the sum of  
\_\_\_\_\_ \$ \_\_\_\_\_

The undersigned further agrees to furnish a bond or certified check with this bid for an amount specified in the notice of the letting. If alternative bids apply, the undersigned submits a proposal for each in accordance with the notice. Any addendums attached will be specifically referenced at the applicable page.

If additional units of material included in the contract are needed, the cost of units must be the same as that shown in the original contract if accepted by the governmental unit. If the bid is to be awarded on a unit basis, the itemization of the units shall be shown on a separate attachment.

The contractor and his subcontractors, if any, shall not discriminate against or intimidate any employee, or applicant for employment, to be employed in the performance of this contract, with respect to any matter directly or indirectly related to employment because of race, religion, color, sex, national origin or ancestry. Breach of this covenant may be regarded as a material breach of the contract.

### CERTIFICATION OF USE OF UNITED STATES STEEL PRODUCTS (If applicable)

I, the undersigned bidder or agent as a contractor on a public works project, understand my statutory obligation to use steel products made in the United States (I.C. 5-16-8-2). I hereby certify that I and all subcontractors employed by me for this project will use U.S. steel products on this project if awarded. I understand that violations hereunder may result in forfeiture of contractual payments.

ACCEPTANCE

The above bid is accepted this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, subject to the following conditions: \_\_\_\_\_

Contracting Authority Members:


PART II  
(For projects of \$150,000 or more - IC 36-1-12-4)

Governmental Unit:           **City of Greenfield, Indiana**          

Bidder (Firm): \_\_\_\_\_

Date (month, day, year): \_\_\_\_\_

These statements to be submitted under oath by each bidder with and as a part of his bid. Attach additional pages for each section as needed.

SECTION I EXPERIENCE QUESTIONNAIRE

1. What public works projects has your organization completed for the period of one (1) year prior to the date of the current bid?

Contract Amount	Class of Work	Completion Date	Name and Address of Owner

2. What public works projects are now in process of construction by your organization?

Contract Amount	Class of Work	Expected Completion Date	Name and Address of Owner

3. Have you ever failed to complete any work awarded to you? \_\_\_\_\_ If so, where and why?

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4. List references from private firms for which you have performed work.

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SECTION II PLAN AND EQUIPMENT QUESTIONNAIRE

1. Explain your plan or layout for performing proposed work. *(Examples could include a narrative of when you could begin work, complete the project, number of workers, etc. and any other information which you believe would enable the governmental unit to consider your bid.)*

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2. Please list the names and addresses of all subcontractors *(i.e. persons or firms outside your own firm who have performed part of the work)* that you have used on public works projects during the past five (5) years along with a brief description of the work done by each subcontractor.

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3. If you intend to sublet any portion of the work, state the name and address of each subcontractor, equipment to be used by the subcontractor, and whether you will require a bond. However, if you are unable to currently provide a listing, please understand a listing must be provided prior to contract approval. Until the completion of the proposed project, you are under a continuing obligation to immediately notify the governmental unit in the event that you subsequently determine that you will use a subcontractor on the proposed project.

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4. What equipment do you have available to use for the proposed project? Any equipment to be used by subcontractors may also be required to be listed by the governmental unit.

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5. Have you entered into contracts or received offers for all materials which substantiate the prices used in preparing your proposal? If not, please explain the rationale used which would corroborate the prices listed.

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### SECTION III CONTRACTOR'S FINANCIAL STATEMENT

Attachment of bidder's financial statement is mandatory. Any bid submitted without said financial statement as required by statute shall thereby be rendered invalid. The financial statement provided hereunder to the governing body awarding the contract must be specific enough in detail so that said governing body can make a proper determination of the bidder's capability for completing the project if awarded.



**BID OF**

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

\_\_\_\_\_  
(Address)

**FOR  
PUBLIC WORKS PROJECTS  
OF**

\_\_\_\_\_  
Filed \_\_\_\_\_, \_\_\_\_\_

\_\_\_\_\_  
Action taken \_\_\_\_\_

**POST-BID SUBMITTAL**  
**SUBCONTRACTOR/SUPPLIER PARTICIPATION**

**A. SUBCONTRACTORS AND SUPPLIERS LIST**

*Instructions to Bidders: The Bidder shall submit a completed Subcontractor/Supplier list (see below) as required in ITB 6.4.*

*The Bidder shall enter the names, the type of work to be done, and the price, in the Subcontractors/Suppliers List for each subcontractor/supplier that the Bidder proposes to use for any part of the Work for the Project at an agreed price of \$\_\_\_\_\_ or greater, as part of the total amount bid as stated above in Part 2.*

*Only one subcontractor/supplier shall be listed for each line. Upon award of a contract, the named subcontractors/suppliers shall be employed to perform the work, unless changes are specifically authorized by the Owner. Failure to furnish all information requested may render the bid non-responsive if it is determined that such omission materially affords the Bidder a substantial advantage over other Bidders.*

*Except as otherwise specifically stated by the Bidder in this Part, omission of any names of subcontractors/suppliers herein shall constitute an affirmative representation and statement that the Bidder proposes to use its own work force for that portion of the Work*

*Bidder's attention is directed to paragraphs 6.8, 6.9, and 6.11 of the City of Greenfield Standard General Conditions for Construction Contracts as they relate to use of subcontractors/suppliers.*

Subcontractor Name	Work	Price
		\$
		\$
		\$
		\$
		\$
		\$
		\$
Supplier Name	Work	Price
		\$
		\$
		\$
		\$
		\$
		\$

(please duplicate and use this form, if additional sheets are necessary)

**POST-BID SUBMITTAL**  
**MANUFACTURERS LIST**

*Instructions to Bidders:*

*The Bidder shall enter, in the spaces provided below, the name of the manufacturer for ALL material and equipment listed below, to be incorporated into the Work.*

***Failure to furnish all information for each listed material or equipment item(s) may render the bid non-responsive.***

*Preliminary acceptance of equipment listed by the manufacturer's name shall not in any way constitute a waiver of the Drawing and Specification requirements covering such equipment. Acceptance will be based on full conformity with the Drawings and Specifications covering the equipment.*

***The information submitted on this Post-Bid-2 page does not alleviate the Bidder from submitting the required Subcontractor/Supplier Information on the Post-Bid-1 page.***

<u>Material/Equipment Item</u>	<u>Manufacturer</u>
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**POST BID SUBMITTAL**  
**E-VERIFY DOCUMENTATION**  
**SEE ITB SECTION 6.6**

Pursuant to Indiana Code 22-5-1.7-11.1 the Contractor shall provide documentation that it has enrolled and is participating in the E-Verify program. Contractor is required to submit proof from the E-Verify Program that it is currently enrolled in the Program. An example of confirmation is the confirmation e-mail received from E-Verify that the Contractor has successfully enrolled in E-Verify.

**BID BOND**  
**City of Greenfield**

*Instructions to Bidders*

*Bidders may use this form or other form containing the same material conditions and provisions as approved in advance by Owner/Obligee.*

*Bidder/Surety must attach a signed, certified and effective dated copy of the Power of Attorney or Attorney-In-Fact establishing the authority of the person(s) signing this Bid Bond on behalf of the Surety.*

*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 the undersigned

"Bidder": \_\_\_\_\_  
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 the City of Greenfield, Indiana ("Owner/Obligee") in the full and just sum equal to five percent (5%) of the price stated in the Bid Proposal described below, including accepted alternates, if any, to be paid upon demand of the Owner/Obligee, together with interest at the maximum legal rate from date of demand and any attorney fees and court costs incurred by Owner/Obligee to enforce this instrument, to which payment well and truly to be made we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally and firmly by these presents.

WHEREAS, the Owner/Obligee has solicited bids for certain Work for or in furtherance of construction of public improvements described generally as:

**Waterview Sanitary Sewer System Lining Project**

pursuant to plans, specifications and other "Contract Documents" included as parts of and designated by such solicitation; and

WHEREAS, the Bidder has submitted to the Owner/Obligee a Bid Proposal to perform such Work.

NOW THEREFORE: The conditions of this obligation are such that if the Bid Proposal be accepted, with or without conditions, the Bidder shall within such time thereafter as prescribed by the Contract Documents (i) fulfill all conditions of such award that remain to be fulfilled, (ii) execute a Contract in accordance with the Bid Proposal and in the form and manner required by the Contract Documents, and (iii) thereafter provide all bonds, and other documentation required by the Contract Documents to be delivered to Owner/Obligee prior to commencing Work, including without limitation a sufficient and satisfactory Performance Bond and Payment Bond payable to Owner/Obligee, each in an amount of one hundred percent (100%) of the total Contract price as awarded and in form and with surety satisfactory to said Owner/Obligee, then this obligation to be void; otherwise to be and remain in full force and virtue in law, and the Surety shall, upon failure of the Bidder to comply with any or all of the foregoing requirements within the time specified above and as prescribed by the Contract Documents, immediate pay to the Owner/Obligee, upon demand, the amount hereof, in good and lawful money of the United States of America, not as a penalty, but as liquidated damages.

IN TESTIMONY THEREOF, the Bidder and Surety have caused this instrument to be duly signed and sealed this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

***This Bid Bond shall bind the undersigned Surety whether or not also signed by the Bidder.***

“Bidder”

“Surety”

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

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

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

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



**WARRANTY BOND**  
**City of Greenfield**

*Instructions:*

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

*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 the City of Greenfield, Indiana hereinafter called Owner/Obligee, 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 Owner/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/Obligee, 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

**Waterview Sanitary Sewer System Lining Project**

which Agreement, and the "Contract Documents" as referred to therein, are hereby incorporated herein by reference;

WHEREAS, 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/Obligee requires a guarantee from the Contractor against defective materials and workmanship in connection with such maintenance.

NOW, THEREFORE, Contractor warrants the workmanship and all materials used in the construction, installation and completion of said Work, including all improvements and installations thereof, to be of good quality and constructed and completed in a workmanlike manner in accordance with the Agreement and Contract Documents and all local, state and federal 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 3 years, commencing on the date of Substantial Completion, 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 \_\_\_\_\_ (number) counterparts, each one of which shall be deemed an original, this the \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

CONTRACTOR: \_\_\_\_\_  
[name]

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

ATTEST: \_\_\_\_\_, Secretary  
[signature]

SURETY: \_\_\_\_\_  
[name]

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

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

**PAYMENT BOND**  
**City of Greenfield**

*Instructions:*

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

*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 the City of Greenfield, Indiana hereinafter called Owner/Obligee, 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, plus interest at the maximum legal rate from date of demand and any attorney fees and court costs incurred by Owner/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/Obligee, 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

**Waterview Sanitary Sewer System Lining Project**

which Agreement, and the "Contract Documents" as referred to therein, are hereby incorporated herein by reference.

NOW, THEREFORE, the conditions of this obligation are such that if the Contractor shall promptly make payments of all amounts due to all Claimants, then this obligation shall be void; otherwise to remain in full force and effect. "Claimant" shall mean any subcontractor, material supplier or other person, firm, or corporation furnishing materials or equipment for or performing labor or services in the prosecution of the Work provided for in such Agreement, including lubricants, oil, gasoline, coal and coke, repairs on machinery, and tools, whether consumed or used in connection with the construction of such work, and all insurance premiums on said work, and for all labor, performed in such work.

PROVIDED, FURTHER, that the said Surety, for value received, hereby stipulates and agrees:

1. that no defect or irregularity in the contract or in the proceedings preliminary to the letting of the contract will operate to release or discharge Surety.
2. that no change, omission, extension of time, alteration or addition to the terms of the Agreement, Contract Documents or to any Work to be furnished thereunder, and no delay by the Owner/Obligee in enforcement of the Agreement or this Bond shall in any way affect its obligation on this Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Agreement, Contract Documents or to the Work.
3. that no final settlement between the Owner/Obligee and the Contractor shall abridge any right of the Owner/Obligee hereunder as to any claim that may remain unsatisfied.
4. that this Payment Bond and Surety shall not be released until one (1) year after the Owner/Obligee's final settlement with the Contractor.

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

CONTRACTOR: \_\_\_\_\_  
[name]

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

ATTEST: \_\_\_\_\_, Secretary  
[signature]

SURETY: \_\_\_\_\_  
[name]

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

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

**PERFORMANCE BOND**  
**City of Greenfield**

*Instructions:*

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

*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 the City of Greenfield, Indiana hereinafter called Owner/Obligee, 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 Owner/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/Obligee, 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

**Waterview Sanitary Sewer System Lining Project**

which Agreement, and the "Contract Documents" as referred to therein, are hereby incorporated herein by reference;

NOW, THEREFORE, the conditions of this obligation are such that if the Contractor shall well, truly and faithfully perform his duties, all the undertakings, covenants, terms and conditions of said Agreement whether during the original term thereof, and any extensions thereof which may be granted by the Owner/Obligee, with or without notice to the Surety and during any period of guaranty or warranty provided therein or arising thereunder, and if he shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the Owner/Obligee from all costs and damages which he may suffer by reason of failure to do so, and shall reimburse and repay the

Owner/Obligee all outlay and expense which the Owner/Obligee may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety, for value received, hereby stipulates and agrees:

1. that no defect or irregularity in the contract or in the proceedings preliminary to the letting of the contract will operate to release or discharge Surety.
2. that no change, omission, extension of time, alteration or addition to the terms of the Agreement, Contract Documents or to any Work to be furnished thereunder, and no delay by the Owner/Obligee in enforcement of the Agreement or this Bond shall in any way affect its obligation on this Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Agreement, Contract Documents or to the Work.
3. that no final settlement between the Owner/Obligee and the Contractor shall abridge any right of the Owner/Obligee hereunder as to any claim that may remain unsatisfied.
4. that this Performance Bond and Surety shall not be released until one (1) year after the Owner/Obligee's final settlement with the Contractor.

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

CONTRACTOR: \_\_\_\_\_  
[name]

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

ATTEST: \_\_\_\_\_, Secretary  
[signature]

SURETY: \_\_\_\_\_  
[name]

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

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

**AGREEMENT**  
**City of Greenfield**

THIS AGREEMENT is made and entered into as of the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

by and between

“OWNER”: City of Greenfield, Indiana, by and through its Board of Public Works  
10 S. State Street, Greenfield, Indiana 46140

and

“CONTRACTOR”:

concerning the following:

“PROJECT”: Waterview Sanitary Sewer System Lining Project

“WORK”: Rehabilitating approximately 9,100 linear feet of 8-inch, 10-inch, and 12-inch sanitary sewers using cured-in-place lining (CIPP), 374 vertical feet of manhole lining, sewer cleaning and root removal, bypass pumping as required, six partial replacements of sewers, manhole rehabilitation, and associated site restoration.

There is a mandatory alternate bid for lining up to 5 feet of each of the 151 laterals.

“ENGINEER”: **American Structurepoint Inc.**

RECITALS:

- A. The OWNER has heretofore caused to be prepared certain plans, specifications and other “Contract Documents” as hereinafter listed pertaining to the above described Project and Work, and the CONTRACTOR has filed Proposal to furnish said labor, tools, material, equipment, services, and perform said Work upon the terms and for the price(s) therein fully stated and set forth;
- B. The said Contract Documents accurately and fully describe the terms and conditions upon which the CONTRACTOR is willing to furnish the labor, tools, material, equipment, services, and perform the Work called for by the Contract Documents and in the manner and time and for the price(s) set forth herein.

THE OWNER AND CONTRACTOR AGREE AS FOLLOWS:

1. Contract Documents

1.1 This Agreement consists of the following Contract Documents all of which are as fully a part of this Agreement as if set out verbatim herein or attached hereto and the same do in all particulars become the Agreement between the parties hereto in all matters and things set forth herein and described:

- .1 This Agreement;
- .2 All Addenda issued prior to receipt of Bids, whether or not receipt thereof has been acknowledged by CONTRACTOR in its Bid;
- .3 Special Conditions;
- .4 General Conditions;
- .5 CONTRACTOR's Itemized Proposal and Declarations;
- .6 Technical Specifications;
- .7 Plans;
- .8 City Standards and Specifications;
- .9 Additional Requirements Section of the Bid Documents (change order forms, Indiana Code 5-16-13, etc.);
- .10 Instructions to Bidders;
- .11 Advertisement or Notice to Bidders; and
- .12 Performance, Payment and Warranty Bonds.

1.2 In resolving conflicts, errors, discrepancies and disputes concerning the nature, character, scope or extent of Work to be performed or furnished by the CONTRACTOR, or other rights and obligations of the OWNER and CONTRACTOR, arising from or prescribed by one or more of the Contract Documents, the following rules shall govern:

- .1 A requirement occurring in one Contract Document is as binding as though occurring in all Contract Documents;
- .2 Calculated dimensions shall govern over scaled dimensions;
- .3 The Contract Documents shall be given precedence in the order listed in Paragraph 1.1 above; and
- .4 In documents of equal priority, if any such conflict, error, discrepancy or dispute cannot be resolved or reconciled by application of the rules stated in Subparagraphs 1.2.1 through 1.2.3, then the provision expressing the greater quantity, quality, or scope of work, or



imposing the greater obligation upon the CONTRACTOR or affording the greater right or remedy to the OWNER shall govern, without regard to the party who drafted such provision.

2. Contract Price

- 2.1 The CONTRACTOR shall, in strict conformity with the Contract Documents, furnish all labor, tools, materials, equipment, services, assume and fulfill all obligations and perform all Work required to construct, complete, and make ready for use by the OWNER for the lump sum of \_\_\_\_\_ Dollars (\$\_\_\_\_\_).
- 2.2 The above stated Contract Sum will be paid to the CONTRACTOR in the manner and at such times as set forth in the Contract Documents.

3. Contract Time

- 3.1 It is hereby understood and mutually agreed, by and between the CONTRACTOR and OWNER, that the date of commencement and the time for completion of the Work as specified in the Contract Documents are ESSENTIAL CONDITIONS of this Agreement.
- 3.2 The CONTRACTOR agrees that the Work shall be commenced no later than the date indicated in the Notice to Proceed and that the Work shall be prosecuted regularly, diligently and uninterruptedly at such a rate of progress as will insure **Substantial Completion on or before May 10, 2024, and Final Completion on or before June 4, 2024.**
- 3.3 The CONTRACTOR and OWNER acknowledge and agree that the time allotted by this Agreement for the performance and completion of the Work is reasonable and takes into account any and all risks and adverse conditions assumed by CONTRACTOR hereunder.

[REST OF PAGE INTENTIONALLY LEFT BLANK]

4. Liquidated Damages

The CONTRACTOR and OWNER recognize and contemplate that unexcused failure by the CONTRACTOR to complete the Work within the Contract Time will cause the OWNER and the Public to suffer financial losses or inconvenience the full and exact extent and character of which cannot be measured as a basis for recovery by the OWNER of actual damages, and that liquidated damages as prescribed in the Contract Documents represent a fair, reasonable and appropriate estimate thereof. Accordingly, the CONTRACTOR agrees that such liquidated damages may be assessed and recovered by the OWNER, as against CONTRACTOR and its Surety, in the event of delayed completion and without the OWNER being required to present any evidence of the amount or character of actual damages sustained by reason thereof. **Such liquidated damages shall be assessed and recovered at the rate of \$500 per day for delay in achieving Substantial Completion and at the rate of \$100 per day in achieving Final Completion of the Work.**

6. Effective Date

This Agreement shall be deemed effective as of the date and year first above written notwithstanding the date on which this Agreement has been executed by the respective parties or their representatives as stated below.

[REST OF PAGE INTENTIONALLY LEFT BLANK]

“CONTRACTOR” SIGNATURE:

IN TESTIMONY THEREOF, the CONTRACTOR has hereunder set his hand this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

Firm Name \_\_\_\_\_

Address \_\_\_\_\_

Telephone No. \_\_\_\_\_ Fax No. \_\_\_\_\_

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

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

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

“OWNER” SIGNATURES:

IN WITNESS WHEREOF, the OWNER does hereby accept the foregoing Agreement, and has herewith set his/her hand this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

For and on behalf of the City of Greenfield by its Board of Public Works.

\_\_\_\_\_  
Chuck Fewell, Mayor,

\_\_\_\_\_  
Kelly McClarnon, Member

\_\_\_\_\_  
Larry J. Breese, Member

\_\_\_\_\_  
Katherine N. Locke, Member

\_\_\_\_\_  
Glenna Shelby, Member

ATTEST:

\_\_\_\_\_  
Lori Elmore, Clerk Treasurer

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

## ADDITIONAL REQUIREMENTS

### TABLE OF CONTENTS

City of Greenfield Sample Change Order Forms	AR-2
Additional Indiana Code (IC) Requirements	AR-7
IC 5-16-13	AR-7
IC 4-13-18	AR-9

Following are specimen forms proposed to be used for the issuance of change orders, field orders, and work directive changes. Procedure for the development, submittal and processing of these forms will be discussed during the preconstruction conference.

CITY OF GREENFIELD

OWNER: CITY OF GREENFIELD

FIELD ORDER NUMBER: \_\_\_\_\_

DATE: \_\_\_\_\_

PROJECT NAME: \_\_\_\_\_

PROJECT NO: \_\_\_\_\_

---

You are hereby directed to execute promptly this Field Order which interprets the Contract Documents or orders minor changes in the Work without change in Contract Sum or Contract Time.

If you consider that a change in Contract Sum or Contract Time is required, please submit your itemized proposal to the Engineer immediately and before proceeding with this Work. If your proposal is found to be satisfactory and in proper order, this Field Order will in that event be superseded by a Change Order.

---

Description:

Attachments:

---

PROJECT MANAGER:

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

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

CITY OF GREENFIELD

TO:

WORK DIRECTIVE CHANGE NO. \_\_\_\_\_

DATE: \_\_\_\_\_

PROJECT NAME: \_\_\_\_\_

PROJECT NO.: \_\_\_\_\_

Specification Reference: \_\_\_\_\_

Drawing Reference: \_\_\_\_\_

DESCRIPTION OF WORK COVERED BY THIS DIRECTIVE CHANGE:

REASON FOR THIS ORDER:

AUTHORIZATION:

THIS WORK DIRECTIVE CHANGE AUTHORIZES THE WORK TO BE COMPLETED AS OUTLINED. A Contract Change Order in the amount of \$\_\_\_\_\_ will be issued to you in the near future to cover this Work Directive Change.

PROJECT COMPLETION DATE: ADD/DEDUCT/UNCHANGED \_\_\_\_\_ DAYS.

By: \_\_\_\_\_  
Project Manager

By: \_\_\_\_\_  
City Engineer

CITY OF GREENFIELD

TO: REQUEST FOR PROPOSAL NO.: \_\_\_\_\_  
DATE: \_\_\_\_\_  
PROJECT NAME: \_\_\_\_\_  
PROJECT NO.: \_\_\_\_\_

Specification Reference: \_\_\_\_\_

Drawing Reference: \_\_\_\_\_ Drawing Date: \_\_\_\_\_

Identification of Attachments: \_\_\_\_\_

Please submit within fifteen calendar days of this request date a proposal showing increase, decrease or no change in contract price and/or contract time. Proposal shall be accompanied by four (4) copies of breakdown showing quantities, cost of material, equipment, labor, overhead, profit and basis for the additional time if any.

DESCRIPTION OF PROPOSED CHANGE COVERED BY THIS REQUEST:

REASON FOR CHANGE:

SPECIAL INSTRUCTIONS:

THIS REQUEST DOES NOT AUTHORIZE YOU TO PROCEED WITH THE ABOVE WORK NOR STOP PREVIOUSLY SCHEDULED WORK. Upon approval a Contract Change Order and a Notice to Proceed will be issued.

Please state in your proposal the effect the acceptance of this REQUEST will have on the project completion, if accepted within \_\_\_ days of proposal due date.

YOUR PROPOSAL DUE DATE: \_\_\_\_\_

By: \_\_\_\_\_  
Project Manager Date

CITY OF GREENFIELD

TO: CONTRACT CHANGE REQUEST NO.: \_\_\_\_\_  
DATE: \_\_\_\_\_  
PROJECT NAME: \_\_\_\_\_

FROM: \_\_\_\_\_

IT IS REQUESTED THAT A CONTRACT CHANGE BE MADE TO THE ABOVE REFERENCED CONTRACT.

1. SCOPE OF WORK (USE ADDITIONAL PAGES IF REQUIRED. ALSO LIST OTHER CONTRACTS INVOLVED.)

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

2. REASON FOR CHANGE:

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

3. APPROXIMATE COST CHANGE TO CONTRACT PRICE: \_\_\_\_\_

4. WILL THE CONTRACT NEED ADDITIONAL CONTRACT TIME TO COMPLETE THE CHANGE IN WORK SCOPE? \_\_\_\_\_ -YES \_\_\_\_\_ -NO \_\_\_\_\_ -(CALENDAR DAYS)

5. WILL THE CONTRACTOR NEED ADDITIONAL PERSONNEL TO COMPLETE THE CHANGE IN WORK SCOPE? \_\_\_\_\_ -YES \_\_\_\_\_ -NO

IF NO, TRADE(S): \_\_\_\_\_

NO. OF PERSONNEL: \_\_\_\_\_

DURATION: \_\_\_\_\_

6. IDENTIFICATION OF ATTACHMENTS:

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

DATE: \_\_\_\_\_ DATE: \_\_\_\_\_

PREPARED BY: \_\_\_\_\_ REVIEWED BY: \_\_\_\_\_  
Project Manager

Comments and Recommendation:

\_\_\_\_\_



CITY OF GREENFIELD

TO: CONTRACT CHANGE ORDER NO.: \_\_\_\_\_  
DATE: \_\_\_\_\_  
PROJECT NAME: \_\_\_\_\_  
ORIGINAL CITY P.O. NO.: \_\_\_\_\_

I. You are directed to make the following changes in this contract:

<u>ITEM</u>	<u>AMOUNT</u>	<u>SCHEDULED ADJUSTMENT</u> <u>(+) OR (-) DAYS</u>
-------------	---------------	---

II. The following referenced documents further describe the changes outlined in Paragraph I, and are to be considered a part of this Change Order:

R.F.P.: \_\_\_\_\_ W.D.C.: \_\_\_\_\_

The changes result in the following adjustment of Contract Price and Contract Time:

Contract Sum prior to this Change Order	\$ _____
Contract Sum will be increased/decreased by this Change Order	\$ _____
New Contract Sum including this Change Order	\$ _____
Contract Time Prior to this Change Order _____	Substantial Completion Date _____
	Final Completion Date _____
Net increased/decreased resulting from this Change Order _____ Days	
Current Contract Time including this Change Order _____	Substantial Completion Date _____
	Final Completion Date _____

This Change Order is for full and final settlement of all direct, indirect, impact costs and time extension incurred at any time resulting from the performance of the changed work.

The Above Changes Are Recommended:

The Above Changes Are Accepted:

Approved:

\_\_\_\_\_  
Engineer

\_\_\_\_\_  
Contractor

\_\_\_\_\_  
Owner

\_\_\_\_\_  
Address

\_\_\_\_\_  
Address

\_\_\_\_\_  
Address

\_\_\_\_\_  
City/State/Zip

\_\_\_\_\_  
City/State/Zip

\_\_\_\_\_  
City/State/Zip

By \_\_\_\_\_

By \_\_\_\_\_

By \_\_\_\_\_

Phone \_\_\_\_\_

Phone \_\_\_\_\_

Phone \_\_\_\_\_

Date \_\_\_\_\_

Date \_\_\_\_\_

Date \_\_\_\_\_

## INDIANA CODE (IC) ADDITIONAL REQUIREMENTS

### I. IC 5-16-13

1. The definitions in IC 5-16-3 are incorporated by reference into this Section.
2. In accordance with IC 5-16-13-9, the Bidder, as a “Tier 1 contractor” (as defined in IC 5-16-3-4), if awarded a contract for the Work contemplated by this Bid must contribute:
  - (a) Work performed by the tier 1 contractor’s employees;
  - (b) Materials supplied directly by the tier 1 contractor;
  - (c) Services supplied directly by the tier 1 contractor’s employees; or
  - (d) Any combination of subdivisions (a) through (d);at least fifteen percent (15%) of the tier 1 contractor’s total contract price as determined at the time the contract is awarded.

**NOTE:** In accordance with Subsection 6.8.1 of the City of Greenfield Standard General Conditions for Construction Contracts (August 2018), the successful Bidder is required to perform with its own organization Work amounting to **not less than thirty percent (30%)** of the original or revised contract amount, whichever is less.

3. In accordance with IC 5-16-13-10, if awarded a contract for the Work contemplated by this Bid, the Bidder, as a “Tier 1 contractor”, and each “Tier 2 contractor” and “Tier 3 contractor” (as defined in IC 5-16-3-4 (i.e., subcontractors and sub-subcontractors)) employed to perform Work on the Project must maintain general liability insurance in at least the following amounts:
  - (a) For the each occurrence limit, one million dollars (\$1,000,000).
  - (b) For the general aggregate limit, two million dollars (\$2,000,000).

**NOTE:** The successful Bidder, its subcontractors and sub-subcontractors, are required to maintain all insurance coverage as provided for in Article 5 of the City of Greenfield Standard General Conditions for Construction Contracts (August 2018).

4. In accordance with IC 5-16-13-11, if awarded a contract for the Work contemplated by this Bid, the Bidder as a “Tier 1 contractor” and each “Tier 2 contractor” and “Tier 3 contractor” employed to perform Work on the Project:
  - (a) Shall submit, before Work begins, the E-Verify case verification number for each individual who is required to be verified under IC 22-5-1.7. An individual who is required to be verified under IC 22-5-1.7 whose final case result is final non-confirmation may not be employed on the Project.
  - (b) May not pay cash to any individual employed by the contractor for Work done by the individual on the Project.
  - (c) Must be in compliance with the federal Fair Labor Standards Act of 1938, as amended (29 U.S.C. 201-209) and IC 22-2-2-1 through IC 22-2-2-8.
  - (d) Must be in compliance with IC 22-3-5-1 and IC 22-3-7-34.
  - (e) Must be in compliance with IC 22-4-1 through IC 22-4-39.5.
  - (f) Must be in compliance with IC 4-13-18-1 through IC 4-13-18-7.
  - (g) Must comply with IC 5-16-13-12, if applicable.

5. In accordance with IC 5-16-13-12, if awarded a contract for the Work contemplated by this Bid, the Bidder as a “Tier 1 contractor” and each “Tier 2 contractor” employed to perform Work on the Project, if they employ fifty (50) or more journeymen:

- (a) Must provide access to a training program applicable to the tasks to be performed in the normal course of the employee's employment with the contractor.
  - (b) Shall participate in an apprenticeship training program that meets the standards established by the United States Department of Labor, Bureau of Apprenticeship and Training.
  - (c) May comply with this section through any of the following:
    - (1) An apprenticeship program.
    - (2) A program offered by Ivy Tech Community College of Indiana.
    - (3) A program offered by Vincennes University.
    - (4) A program established by or for the contractor.
    - (5) A program offered by an entity sponsored by the United States Department of Labor, Bureau of Apprenticeship and Training.
    - (6) A program that results in the award of an industry recognized portable certification.
6. In accordance with IC 5-16-13-13, if awarded a contract for the Work contemplated by this Bid, the payroll and related records of the Bidder as a "Tier 1 contractor" and each "Tier 2 contractor" and "Tier 3 contractor" employed to perform Work on the Project, must be:
- (a) Preserved by the contractor for a period of three (3) years after completion of the Project Work; and
  - (b) Open to inspection by the Indiana Department of Workforce Development (DWD).

In accordance with IC 5-16-13-14, if the City of Greenfield suspects a misclassification of one (1) or more workers by a contractor in any contractor tier working on the Project may request in writing that DWD investigate the suspected worker misclassification, and in so doing shall provide to DWD any information or records that the City has concerning the misclassification. DWD may investigate such a request, and if it finds information or records that support a finding that worker misclassification has occurred, DWD may refer the matter to the appropriate agency or official for further action.

7. In accordance with IC 5-16-13-15, if the City of Greenfield reasonably suspects the Bidder awarded a contract for the Work contemplated by this Bid or any "Tier 2 contractor" and "Tier 3 contractor" employed to perform Work on the Project has violated a provision of IC 5-16-13, the City is required to do one (1) of the following:
- (a) If the suspected violation concerns or is related to any of the following provisions, the City shall refer the matter to the appropriate agency as follows:
    - (1) For a suspected violation of IC 5-16-13-11(1) (E-Verify), the Indiana Department of Labor.
    - (2) For a suspected violation of IC 5-16-13-11(3) (the federal FLSA or state minimum wage law), the Indiana Department of Labor.
    - (3) For a suspected violation of IC 5-16-13-11(4) (worker's compensation or occupational diseases), the Worker's Compensation Board of Indiana.
    - (4) For a suspected violation of IC 5-16-13-11(5) (unemployment insurance), the Department of Workforce Development.
  - (b) If the suspected violation concerns a provision of IC 5-16-13 other than a provision listed in subdivision (a), the City shall require the contractor to remedy the violation not later than thirty (30) days after the City notifies the contractor of the violation in accordance with IC 5-16-13-15(b)(2). During the thirty (30) day period, the contractor may continue to work on the Project; however, if the contractor fails to remedy the violation within the thirty (30) day period, the City shall find the contractor not responsible and shall determine the length of time the contractor is considered not responsible by the City based on the severity of the violation. The period during which a contractor is considered not responsible:
    - (1) May not exceed forty-eight (48) months; and

(2) Begins on the date of substantial completion of the Project.

A finding by the City that a contractor is not responsible under this section may not be used by another public agency in making a determination as to whether the contractor is responsible for purposes of that public agency's award of a public works contract to that contractor.

II. IC 4-13-18 (A response to "Part 11—Drug Testing" of the "Bidder's Itemized Proposal and Declarations" fulfills this requirement)

1. IC 4-13-18 applies if the Bid is one hundred fifty thousand dollars (\$150,000) or more.
2. The definitions in IC 4-13-18 are incorporated by reference into this Section.
3. In accordance with IC 4-13-18-5, the Bidder must submit with the Bid a written plan for a program to test the Bidder's employees for drugs. A contractor that is subject to a collective bargaining agreement that establishes an employee drug testing program shall only submit a copy of the relevant part of the collective bargaining agreement establishing the program. Failure to submit a written plan for an employee drug testing program, or relevant parts of a collective bargaining agreement establishing an employee drug testing program shall result in the Bid being rejected as non-responsive.
4. The Bidder's employee drug testing program must satisfy all of the following requirements:
  - (a) In accordance with IC 4-13-18-4, if the Bidder's employee drug testing program is established by a collective bargaining agreement it shall include the following:
    - (1) Provides for the random testing of the contractor's employees.
    - (2) Contains a five (5) drug panel that tests for the following substances:
      - (A) amphetamines;
      - (B) cocaine;
      - (C) opiates (2000 ng/ml);
      - (D) PCP;
      - (E) THC
    - (3) Imposes disciplinary measures on an employee who fails a drug test which includes at a minimum all of the following:
      - (A) the employee is subject to suspension or immediate termination;
      - (B) the employee is not eligible for reinstatement until the employee tests negative on a five (5) panel test certified by a medical review officer;
      - (C) the employee is subject to unscheduled sporadic testing for at least one (1) year after reinstatement; and
      - (D) the employee successfully completes a rehabilitation program recommended by a substance abuse professional if the employee fails more than one (1) drug test.
  - (b) In accordance with IC 4-13-18-5, if the Bidder has its own employee drug testing program (which is not included as part of a collective bargaining unit), the Bidder's program shall include the following:
    - (1) Subject each of the contractor's employees to a drug test at least one (1) time each year.
    - (2) Provide for random employee testing, with at least two percent (2%) of the contractor's employees randomly selected each month for testing.
    - (3) Contain at least a five (5) drug panel that tests for:
      - (A) amphetamines;
      - (B) cocaine;
      - (C) opiates (2000 ng/ml);
      - (D) PCP;
      - (E) THC.

- (4) Impose progressive discipline on an employee who fails a drug test with at least the following progression:
- (A) after the first positive test, an employee must be:
    - (i) suspended from work for 30 days;
    - (ii) directed to a program of treatment or rehabilitation; and
    - (iii) subject to unannounced drug testing for one (1) year from the day the employee returns to work.
  - (B) after a second positive test, an employee must be:
    - (i) suspended from work for 90 days;
    - (ii) directed to a program of treatment or rehabilitation; and
    - (iii) subject to unannounced drug testing for one (1) year from the day the employee returns to work.
  - (C) after a third or subsequent positive test, an employee must be:
    - (i) suspended from work for one (1) year;
    - (ii) directed to a program of treatment or rehabilitation; and
    - (iii) subject to unannounced drug testing for one (1) year from the day the employee returns to work.

The program may require dismissal of the employee after any positive drug test or other discipline more severe than described above. An employer complies with the requirement to direct an employee to a program of treatment or rehabilitation if the employer either advised the employee of any such program covered by employer-provided insurance, or, if the employer's insurance does not provide insurance coverage, the employer advises the employee of agencies that provide such programs.

5. In accordance with IC 4-13-18-7, if awarded a contract for the Project, the Bidder must implement the employee drug testing program as described in the plan or collective bargaining agreement. The City of Greenfield shall cancel the contract with the successful Bidder if it:
- (a) Fails to implement its employee drug testing program during the term of the contract;
  - (b) Fails to provide information regarding implementation of the employee drug testing program at the request of the City; or
  - (c) Provides the City with false information regarding the contractor's employee drug testing program.

### III. IC 8-23-10 or IC 4-13.6-4

1. The requirements of this Section III are effective for Bids awarded by the City of Greenfield **after December 31, 2016**.
2. The definitions in IC 5-16-3 are incorporated by reference into this Section.
3. In accordance with IC 8-23-10-0.5, if the total amount of the contract awarded under this Bid is **three hundred thousand dollars (\$300,000) or more** and the Project is for the construction, improvement, alteration, repair, or maintenance of a road (as defined by IC 8-23-1-23), highway, street, or alley, then the Bidder, as a "Tier 1 contractor" (as defined in IC 5-16-3-4), and each "Tier 2 contractor" and "Tier 3 contractor" (as defined in IC 5-16-3-4 (i.e., subcontractors and sub-subcontractors)) employed to perform Work on the Project must be qualified by the Indiana Department of Transportation under IC 8-23-10 before performing any Work on the Project.
4. In accordance with IC 4-13.6-4-2.5, if the total amount of the contract awarded under this Bid is **three hundred thousand dollars (\$300,000) or more** and the Project is for any work other than for the construction, improvement, alteration, repair, or maintenance of a road (as defined by IC

8-23-1-23), highway, street, or alley, then the Bidder, as a “Tier 1 contractor” (as defined in IC 5-16-3-4), and each “Tier 2 contractor” and “Tier 3 contractor” (as defined in IC 5-16-3-4 (i.e., subcontractors and sub-subcontractors)) employed to perform Work on the Project must be qualified under IC 4-13.6-4 by the Indiana Certification Board established by IC 4-13.6-3-3 before performing any Work on the Project.

## SECTION 01 10 00 - SUMMARY

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Contract description.
  - 2. Work by Owner or other Work at the Site.
  - 3. Contractor's Use of Site.
  - 4. Work Sequence
  - 5. Specification conventions.

#### 1.2 CONTRACT DESCRIPTION

- A. Work of the Project includes the rehabilitation and relocation of sanitary sewers in City of Greenfield, Indiana. Work will include rehabilitation of 8-inch, 10-inch and 12-inch sewers using cured-in-place pipe (CIPP) and associated lateral lining as part of alternate bid, partial replacement of sewers, bypass pumping as required, rehabilitating 48-inch diameter manholes using manhole lining, manhole bench replacement as needed, replacing manhole frame and lids as needed and associated site restoration.
- B. Perform Work of Contract under unit price Contract with Owner according to General Conditions of Contract.

#### 1.3 WORK BY OWNER OR OTHERS

- A. Work is at various locations throughout City. If Contractor encounters other Work or Contractors on a Site, the Contractor should coordinate with other Contractor.
- B. If Owner-awarded contracts interfere with each other due to work being performed at the same time or at the same Site, Owner will determine the sequence of work under all contracts according to "Work Sequence" and "Contractor's Use of Site" Articles in this Section.
- C. Coordinate Work with utilities of Owner and public or private agencies.
- D. Work under this Contract includes:
  - 1. Work as indicated on Drawings.

#### 1.4 CONTRACTOR'S USE OF SITE

- A. Time Restrictions for Performing Work: Any work performed on or near a business or homeowner's property shall be coordinated with the business owner or homeowner.

## 1.5 WORK SEQUENCE

- A. Construction Plan: Before start of construction, submit electronic copy of construction plan regarding access to Work, use of Site, and utility outages for acceptance by Owner. After acceptance of plan, construction operations shall comply with accepted plan unless deviations are accepted by Owner in writing.

## 1.6 SPECIFICATION CONVENTIONS

- A. These Specifications are written in imperative mode and streamlined form. This imperative language is directed to the Contractor unless specifically noted otherwise. The words "shall be" are included by inference where a colon (:) is used within sentences or phrases.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION



## SECTION 01 20 00 - PRICE AND PAYMENT PROCEDURES

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Contingency allowances.
- B. Schedule of Values.
- C. Application for Payment.
- D. Change procedures.
- E. Defect assessment.
- F. Unit prices.

#### 1.2 CONTINGENCY ALLOWANCES

- A. Contingency allowances are for unforeseen Work or Work requested by the Owner. The Contractor shall carry out the Work only after approval by the Owner.
- B. Contractor's costs for products, delivery, installation, labor, insurance, payroll, taxes, bonding, equipment rental, overhead, and profit will be included in Change Orders authorizing expenditure of funds from this contingency allowance.
- C. Funds will be drawn from contingency allowance only by Change Order upon approval by the Owner.
- D. At closeout of Contract, funds remaining in contingency allowance will be credited to Owner by Change Order.

#### 1.3 SCHEDULE OF VALUES

- A. The Unit Prices submitted as the Bid and incorporated into the Agreement shall serve as the Schedule of Values.

#### 1.4 APPLICATION FOR PAYMENT

- A. Submit three copies of each Application for Payment on EJCDC C-620 - Contractor's Application for Payment.
- B. Content and Format: Use Schedule of Values for listing items in Application for Payment.
- C. Submit updated construction schedule with each Application for Payment.
- D. Payment Period: Submit at intervals stipulated in the Agreement.

- E. Submit submittals with transmittal letter as specified in Section 01 33 00 - Submittal Procedures.
- F. Submit three copies of all waivers requested by Owner.
- G. Substantiating Data: When Engineer requires substantiating information, submit data justifying dollar amounts in question. Include the following with Application for Payment:
  - 1. Record Documents as specified in Section 01 70 00 - Execution and Closeout Requirements, for review by Owner, which will be returned to Contractor.
  - 2. Affidavits attesting to off-Site stored products.
  - 3. Construction Progress Schedule, revised and current as specified in Section 01 33 00 - Submittal Procedures.

## 1.5 CHANGE PROCEDURES

- A. Submittals: Submit name of individual who is authorized to receive change documents and is responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.
- B. Carefully study and compare Contract Documents before proceeding with fabrication and installation of Work. Promptly advise Engineer of any error, inconsistency, omission, or apparent discrepancy.
- C. Requests for Interpretation (RFI) and Clarifications: Allot time in construction scheduling for liaison with Engineer; establish procedures for handling queries and clarifications.
  - 1. Use an approved RFI form for requesting interpretations.
  - 2. Engineer may respond with a direct answer on the Request for Interpretation form EJCDC C-942 - Field Order, or Proposal Request.
- D. Engineer will advise of minor changes in the Work not involving adjustment to Contract Sum/Price or Contract Time by issuing supplemental instructions on EJCDC C-942.
- E. Owner may issue Request for Proposal (RFP) including a detailed description of proposed change with supplementary or revised Drawings and Specifications, a change in Contract Time for executing the change. Contractor will prepare and submit estimate within 7 days to the Owner for review and approval.
- F. Stipulated Sum/Price Change Order: Based on Request for Proposal and Contractor's fixed price quotation.
- G. Unit Price Change Order: For Contract unit prices and quantities, the Change Order will be executed on a fixed unit price basis. For unit costs or quantities of units of that which are not predetermined, execute Work under **Work Directive Change**. Changes in Contract Sum/Price or Contract Time will be computed as specified for Time and Material Change Order.
- H. Work Directive Change: Owner may issue directive and signed by Owner, instructing Contractor to proceed with change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work and designate method of determining any change in Contract Sum/Price or Contract Time. Promptly execute change.

- I. Time and Material Change Order: Submit itemized account and supporting data after completion of change, within time limits indicated in Conditions of the Contract. Owner will determine change allowable in Contract Sum/Price and Contract Time as provided in Contract Documents.
- J. Maintain detailed records of Work done on time and material basis. Provide full information required for evaluation of proposed changes and to substantiate costs for changes in the Work.
- K. Document each quotation for change in Project Cost or Time with sufficient data to allow evaluation of quotation.
- L. Change Order Forms: EJCDC C-941 - Change Order.
- M. Execution of Change Orders: Engineer will issue Change Orders for signatures of parties as provided in Conditions of the Contract.
- N. Correlation of Contractor Submittals:
  - 1. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as separate line item and adjust Contract Sum/Price.
  - 2. Promptly revise Progress Schedules to reflect change in Contract Time, revise subschedules to adjust times for other items of Work affected by the change, and resubmit.
  - 3. Promptly enter changes in Record Documents.

#### 1.6 DEFECT ASSESSMENT

- A. Replace the Work, or portions of the Work, not conforming to specified requirements at no cost to the Owner.
- B. If, in the opinion of Engineer, it is not practical to remove and replace the Work, Engineer will direct appropriate remedy or adjust payment.
- C. The defective Work may remain, but unit sum/price will be adjusted to new sum/price at discretion of Owner.
- D. Defective Work will be partially repaired according to instructions of Owner, and unit sum/price will be adjusted to new sum/price at discretion of Owner.
- E. Individual Specification Sections may modify these options or may identify specific formula or percentage sum/price reduction.
- F. Authority of Owner to assess defects and identify payment adjustments is final.
- G. Nonpayment for Rejected Products: Payment will not be made for rejected products for any of the following reasons:
  - 1. Products wasted or disposed of in a manner that is not acceptable.
  - 2. Products determined as unacceptable before or after placement.
  - 3. Products not completely unloaded from transporting vehicle.
  - 4. Products placed beyond lines and levels of the required Work.

5. Products remaining on hand after completion of the Work.
6. Loading, hauling, and disposing of rejected products.

## 1.7 UNIT PRICES

- A. Authority: Measurement methods are delineated in individual Specification Sections.
- B. Measurement methods delineated in individual Specification Sections complement criteria of this Section. In event of conflict, requirements of individual Specification Section govern.
- C. Take measurements and compute quantities. Engineer will verify measurements and quantities.
- D. Unit Quantities: Quantities and measurements indicated on Bid Form are for Contract purposes only. Actual quantities provided shall determine payment.
  1. When actual Work requires more or fewer quantities than those quantities indicated, provide required quantities at contracted unit sum/prices.
  2. When actual Work requires 25 percent or greater change in quantity than those quantities indicated, Owner or Contractor may claim a Contract Price adjustment.
- E. Payment Includes: Full compensation for required labor, products, tools, equipment, plant and facilities, transportation, services and incidentals; erection, application, or installation of item of the Work; overhead and profit.
- F. Final payment for Work governed by unit prices will be made on basis of actual measurements and quantities accepted by Engineer multiplied by unit sum/price for Work incorporated in or made necessary by the Work.
- G. Measurement of Quantities:
  1. Weigh Scales: Inspected, tested, and certified by applicable State of Indiana weights and measures department within past year.
  2. Platform Scales: Of sufficient size and capacity to accommodate conveying vehicle.
  3. Metering Devices: Inspected, tested, and certified by applicable State of Indiana department within past year.
  4. Measurement by Weight: Concrete reinforcing steel, rolled or formed steel, or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weight.
  5. Measurement by Volume: Measured by cubic dimension using mean length, width, and height or thickness.
  6. Measurement by Area: Measured by square dimension using mean length and width or radius.
  7. Linear Measurement: Measured by linear dimension, at item centerline or mean chord.
  8. Stipulated Sum/Price Measurement: Items measured by weight, volume, area, or linear means or combination, as appropriate, as completed item or unit of the Work.
- H. Unit Price Schedule:
  1. Item 0001: Mobilization / Demobilization; Section 01 50 50.
  2. Item 0002: Construction Contingency;

- a. Description: This Work shall consist of all labor, equipment, and materials necessary to provide Project management, including, but not necessarily limited to: establishing and maintaining surveying and project control; project management and supervision; participation in project meetings and public involvement; notices to the public; submittals, including value engineering proposals and requests for information, shop drawings; project scheduling; construction photographs; As-Built Drawings; street cleaning; snow removal; dust and mud control; and all other incidentals not directly engaged in construction of the Project but which are necessary to support the Work. This Work shall include all tasks.
  - b. Basis of Payment: Construction Engineering shall be paid for at the Contract LUMP SUM price as shown in the Itemized Proposal and Declarations.
- 3. Item 0003: Maintenance and Protection of Traffic;
  - a. Description: This Work shall consist of all labor, equipment, and materials necessary for traffic control as described in Section 01 50 00.
  - b. Basis of Payment: Traffic Control shall be paid for at the Contract LUMP SUM price as shown in the Itemized Proposal and Declarations.
  - c. Payment Details: Item includes the cost of traffic control materials (Barricades, signs, signals); furnishing, installing, maintaining, and removing traffic control materials; temporary pavement marking; clean up; preparation and submittal of temporary signal designs and traffic control plans to State and local agencies; revisions to traffic control plans and signal designs requested by Owner, state or county; furnishing, installing, maintaining, and removing temporary pavement required for traffic rerouting due to traffic control; maintenance of temporary traffic signals and maintenance of remainder of signalized intersection altered by temporary traffic signals; flag persons; replacement of permanent pavement markings, signs, or signals removed or damaged by construction operations; and other pertinent and incidental work.
- 4. Item 0004: Bypass Pumping; Section 01 51 00.
- 5. Item 0005: 8-Inch Diameter CIPP Lining; Section 33 01 30.72.
- 6. Item 0006: 10-Inch Diameter CIPP Lining; Section 33 01 30.72.
- 7. Item 0007: 12-Inch Diameter CIPP Lining; Section 33 01 30.72.
- 8. Item 0008: Root Removal; Section 33 01 30.10.
- 9. Item 0009: Cut Protruding Tap; Section 33 01 30.72.
- 10. Item 0010: Sanitary Sewer, Lateral Reinstatement in Cured-In-Place Pipe; Section 33 01 30.72.

11. Item 0011: Lateral Liner using Full Mainline Circumference Connection, 6", up to 5 feet;  
Section 33 01 30.74.
12. Item 0012: Sanitary Sewer, Partial Replacement up to 5', 10" PVC SDR 35; 10'-15' Deep;  
Section 33 31 11.00.
13. Item 0013: Sanitary Sewer, Partial Replacement up to 5', 10" PVC SDR 35; 15'-21' Deep;  
Section 33 31 11.00.
14. Item 0014: Sanitary Sewer, Partial Replacement up to 5', 8" PVC SDR 35; 5'-10' Deep;  
Section 33 31 11.00.
15. Item 0015: Sanitary Sewer, Partial Replacement up to 5', 8" PVC SDR 35, 15'-20' Deep;  
Section 33 31 11.00.
16. Item 0016: Line Manhole Section 33 31 11.00.
17. Item 0017: Replace Manhole Frame and Lid; Section 33 01 30.76.
18. Item 0018: Manhole Bench Replacement; Section 33 01 30.76.
19. Item 0019: Owner's Contingency
  - a. Description: The Contractor shall furnish all labor, materials, equipment, and services to perform unforeseen work not included in the other bid items that may be requested and approved by the Owner.
  - b. Basis of Payment: The cost of this additional work shall be agreed upon in writing and approved by the Owner prior to commencement of the work. The Contractor shall be paid on the percent completion of approved work.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

## SECTION 01 30 00 - ADMINISTRATIVE REQUIREMENTS

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Coordination and Project conditions.
- B. Preconstruction meeting.
- C. Site mobilization meeting.
- D. Progress meetings.
- E. Closeout meeting.

#### 1.2 COORDINATION AND PROJECT CONDITIONS

- A. Coordinate scheduling, submittals, and Work of various Sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Verify that utility requirements and characteristics of operating equipment are compatible with utilities. Coordinate Work of various Sections having interdependent responsibilities for installing, connecting to, and placing operating equipment in service.
- C. Coordination Meetings: In addition to other meetings specified in this Section, hold coordination meetings with personnel and Subcontractors to ensure coordination of Work.
- D. Coordinate completion and clean-up of Work of separate Sections in preparation for Substantial Completion.
- E. After Owner's occupancy of premises, coordinate access to Site for correction of defective Work and Work not complying with Contract Documents, to minimize disruption of Owner's activities.

#### 1.3 PRECONSTRUCTION MEETING

- A. Engineer will schedule and preside over meeting after Notice of Award.
- B. Attendance Required: Engineer, Owner, Resident Project Representative, major Subcontractors, and Contractor.
- C. Minimum Agenda:
  - 1. Execution of Owner-Contractor Agreement.
  - 2. Submission of executed bonds and insurance certificates.
  - 3. Distribution of Contract Documents.

4. Submission of list of Subcontractors, list of products, schedule of values, and Progress Schedule.
5. Designation of personnel representing parties in Contract, and Engineer.
6. Communication procedures.
7. Procedures and processing of requests for interpretations, field decisions, field orders, submittals, substitutions, Applications for Payments, proposal request, Change Orders, and Contract closeout procedures.
8. Scheduling.
9. Critical Work sequencing.
10. Scheduling activities of Geotechnical Engineer.

D. Contractor: Record minutes and distribute copies to participants within two days after meeting, to Engineer, Owner, and those affected by decisions made.

#### 1.4 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at maximum bi-monthly intervals.
- B. Make arrangements for meetings, prepare agenda with copies for participants, and preside over meetings.
- C. Attendance Required: Job superintendent, major Subcontractors and suppliers, and Engineer, Owner, as appropriate to agenda topics for each meeting.
- D. Minimum Agenda:
  1. Review minutes of previous meetings.
  2. Review of Work progress.
  3. Field observations, problems, and decisions.
  4. Identification of problems impeding planned progress.
  5. Review of submittal schedule and status of submittals.
  6. Review of off-Site fabrication and delivery schedules.
  7. Maintenance of Progress Schedule.
  8. Corrective measures to regain projected schedules.
  9. Planned progress during succeeding work period.
  10. Coordination of projected progress.
  11. Maintenance of quality and work standards.
  12. Effect of proposed changes on Progress Schedule and coordination.
  13. Other business relating to Work.
- E. Contractor: Record minutes and distribute copies to participants within two days after meeting, to Engineer, Owner, and those affected by decisions made.

#### 1.5 CLOSEOUT MEETING

- A. Schedule Project closeout meeting with sufficient time to prepare for requesting Substantial Completion. Preside over meeting and be responsible for minutes.



- B. Attendance Required: Contractor, major Subcontractors, Engineer, Owner, and others appropriate to agenda.
- C. Notify Engineer four days in advance of meeting date.
- D. Minimum Agenda:
  - 1. Start-up of facilities and systems.
  - 2. Operations and maintenance manuals.
  - 3. Testing, adjusting, and balancing.
  - 4. System demonstration and observation.
  - 5. Operation and maintenance instructions for Owner's personnel.
  - 6. Contractor's inspection of Work.
  - 7. Contractor's preparation of an initial "punch list."
  - 8. Procedure to request Engineer inspection to determine date of Substantial Completion.
  - 9. Completion time for correcting deficiencies.
  - 10. Inspections by authorities having jurisdiction.
  - 11. Certificate of Occupancy and transfer of insurance responsibilities.
  - 12. Partial release of retainage.
  - 13. Final cleaning.
  - 14. Preparation for final inspection.
  - 15. Closeout Submittals:
    - a. Project record documents.
    - b. Operating and maintenance documents.
    - c. Operating and maintenance materials.
    - d. Affidavits.
  - 16. Final Application for Payment.
  - 17. Contractor's demobilization of Site.
  - 18. Maintenance.
- E. Contractor: Record minutes and distribute copies to participants within two days after meeting, to Engineer, Owner, and those affected by decisions made.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION – Not Used

END OF SECTION

## SECTION 01 32 16 - CONSTRUCTION PROGRESS SCHEDULE

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Submittals.
- B. Bar chart schedules.
- C. Review and evaluation.
- D. Updating schedules.
- E. Distribution.

#### 1.2 SUBMITTALS

- A. Schedule Updates:
  - 1. Overall percent complete, projected and actual.
  - 2. Completion progress by listed activity and sub-activity, to within five working days prior to submittal.
  - 3. Changes in Work scope and activities modified since submittal.
  - 4. Delays in submittals or resubmittals, deliveries, or Work.
  - 5. Adjusted or modified sequences of Work.
  - 6. Other identifiable changes.
  - 7. Revised projections of progress and completion.
- B. Narrative Progress Report:
  - 1. Submit with each monthly submission of Progress Schedule.
  - 2. Summary of Work completed during the past period between reports.
  - 3. Work planned during the next period.
  - 4. Explanation of differences between summary of Work completed and Work planned in previously submitted report.
  - 5. Current and anticipated delaying factors and estimated impact on other activities and completion milestones.
  - 6. Corrective action taken or proposed.

#### 1.3 BAR CHART SCHEDULES

- A. Format: Bar chart Schedule, to include at least:
  - 1. Identification and listing in chronological order of those activities reasonably required to complete the Work, including:
    - a. Subcontract Work.
    - b. Major equipment design, fabrication, factory testing, and delivery dates including required lead times.
    - c. Move-in and other preliminary activities.

- d. Equipment and equipment system test and startup activities.
  - e. Project closeout and cleanup.
  - f. Work sequences, constraints, and milestones.
- 2. Listings identified by Specification Section number.
  - 3. Identification of the following:
    - a. Horizontal time frame by year, month, and week.
    - b. Duration, early start, and completion for each activity and sub-activity.
    - c. Critical activities and Project float.
    - d. Sub-schedules to further define critical portions of Work.

#### 1.4 REVIEW AND EVALUATION

- A. Participate in joint review and evaluation of schedules with Engineer at each submittal.
- B. Evaluate Project status to determine Work behind schedule and Work ahead of schedule.
- C. After review, revise schedules incorporating results of review, and resubmit within 10 days.

#### 1.5 UPDATING SCHEDULES

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity. Update schedules to depict current status of Work.
- C. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- D. Upon approval of a Change Order, include the change in the next schedule submittal.
- E. Indicate changes required to maintain Date of Total Completion.
- F. Prepare narrative report to define problem areas, anticipated delays, and impact on schedule. Report corrective action taken or proposed and its effect.

#### 1.6 DISTRIBUTION

- A. Following joint review, distribute copies of updated schedules to Contractor's Project site file, to Subcontractors, suppliers, Engineer, and Owner.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

## SECTION 01 33 00 - SUBMITTAL PROCEDURES

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Definitions.
- B. Submittal procedures.
- C. Construction progress schedules.
- D. Proposed product list.
- E. Product data.
- F. Shop Drawings.
- G. Other submittals.
- H. Certificates.
- I. Manufacturer's instructions.
- J. Construction photographs.
- K. Contractor review.
- L. Engineer review.

#### 1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Engineer's responsive action.
- B. Informational Submittals: Written and graphic information and physical Samples that do not require Engineer's responsive action. Submittals may be rejected for not complying with requirements.

#### 1.3 SUBMITTAL PROCEDURES

- A. Transmit each submittal with Engineer-accepted form.
- B. Sequentially number transmittal forms. Mark revised submittals with original number and sequential alphabetic suffix.
- C. Identify: Project, Contractor, Subcontractor and supplier, pertinent Drawing and detail number, and Specification Section number appropriate to submittal.

- D. Apply Contractor's stamp, signed or initialed, certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is according to requirements of the Work and Contract Documents.
- E. Schedule submittals to expedite Project and submit electronic submittals via email as PDF electronic files. Coordinate submission of related items.
- F. For each submittal for review, allow 7 days excluding delivery time to and from Contractor.
- G. Identify variations in Contract Documents and product or system limitations that may be detrimental to successful performance of completed Work.
- H. Allow space on submittals for Contractor and Engineer review stamps.
- I. When revised for resubmission, identify changes made since previous submission.
- J. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report inability to comply with requirements.
- K. Submittals not requested will not be recognized nor processed.
- L. Incomplete Submittals: Engineer will not review. Complete submittals for each item are required. Delays resulting from incomplete submittals are not the responsibility of Engineer.

#### 1.4 CONSTRUCTION PROGRESS SCHEDULES

- A. Comply with Section 01 32 16 - Construction Progress Schedule

#### 1.5 PROPOSED PRODUCT LIST

- A. Within 5 days after date of Owner-Contractor Agreement, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
- B. For products specified only by reference standards, indicate manufacturer, trade name, model or catalog designation, and reference standards.

#### 1.6 PRODUCT DATA

- A. Product Data: Action Submittal: Submit to Engineer for review for assessing conformance with information given and design concept expressed in Contract Documents.
- B. Submit electronic submittals via email as PDF electronic files.
- C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- D. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

- E. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 01 70 00 - Execution and Closeout Requirements.
  - 1. Receiver shall not hold Engineer responsible for such viruses or their consequences, and shall hold Engineer harmless against costs, losses, or damage caused by presence of computer virus in files or media.

#### 1.7 SHOP DRAWINGS

- A. Shop Drawings: Action Submittal: Submit to Engineer for assessing conformance with information given and design concept expressed in Contract Documents.
- B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. When required by individual Specification Sections, provide Shop Drawings signed and sealed by a professional Engineer responsible for designing components shown on Shop Drawings.
  - 1. Include signed and sealed calculations to support design.
  - 2. Submit Shop Drawings and calculations in form suitable for submission to and approval by authorities having jurisdiction.
  - 3. Make revisions and provide additional information when required by authorities having jurisdiction.
- D. Submit electronic submittals via email as PDF electronic files.
- E. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 01 70 00 - Execution and Closeout Requirements.

#### 1.8 OTHER SUBMITTALS

- A. Closeout Submittals: Comply with Section 01 70 00 - Execution and Closeout Requirements.

#### 1.9 CERTIFICATES

- A. Informational Submittal: Submit certification by manufacturer, installation/application Subcontractor, or Contractor to Engineer, in quantities specified for Product Data.
- B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or product but must be acceptable to Engineer.

#### 1.10 MANUFACTURER'S INSTRUCTIONS

- A. Informational Submittal: Submit manufacturer's installation instructions for Engineer's knowledge as Contract administrator or for Owner.
- B. Submit printed instructions for delivery, storage, assembly, installation, adjusting, and finishing, to Engineer in quantities specified for Product Data.

- C. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

#### 1.11 CONSTRUCTION PHOTOGRAPHS

- A. Provide photographs of Site and construction throughout progress of Work produced by photographer acceptable to Engineer.
- B. Once monthly submit photographs.
- C. Take a minimum of two Site photographs from different directions and one from both upstream and downstream manholes indicating relative progress of the Work. Additionally, take at least 4 photographs of each partial replacement and photographs at least every 30 linear feet of pipe replacement.
- D. Take photographs as evidence of existing Project conditions as follows:
  - 1. Sewer Replacement: document site conditions before breaking ground. Also photograph segments before and after replacement.
- E. Digital Images: Deliver complete set of digital image electronic files on USB flash drive to Owner with Project record documents. Identify electronic media with date photographs were taken. Submit images that have same aspect ratio as sensor, uncropped.
  - 1. Digital Images: Uncompressed TIFF format, produced by digital camera with minimum sensor size of 4.0 megapixels, and image resolution of not less than 1024 by 768 pixels.
  - 2. Date and Time: Include date and time in filename for each image.
  - 3. Labels: Name the photographs with the manhole ID number as shown on the Contract Documents.

#### 1.12 CONTRACTOR REVIEW

- A. Review for compliance with Contract Documents and approve submittals before transmitting to Engineer
- B. Contractor: Responsible for:
  - 1. Determination and verification of materials including manufacturer's catalog numbers.
  - 2. Determination and verification of field measurements and field construction criteria.
  - 3. Checking and coordinating information in submittal with requirements of Work and of Contract Documents.
  - 4. Determination of accuracy and completeness of dimensions and quantities.
  - 5. Confirmation and coordination of dimensions and field conditions at Site.
  - 6. Construction means, techniques, sequences, and procedures.
  - 7. Safety precautions.
  - 8. Coordination and performance of Work of all trades.
- C. Stamp, sign or initial, and date each submittal to certify compliance with requirements of Contract Documents.
- D. Do not fabricate products or begin Work for which submittals are required until approved submittals have been received from Engineer.



### 1.13 ENGINEER REVIEW

- A. Do not make "mass submittals" to Engineer. "Mass submittals" are defined as six or more submittals or items in one day or 15 or more submittals or items in one week. If "mass submittals" are received, Engineer's review time stated above will be extended as necessary to perform proper review. Engineer will review "mass submittals" based on priority determined by Engineer after consultation with Owner and Contractor.
- B. Informational submittals and other similar data are for Engineer's information, do not require Engineer's responsive action, and will not be reviewed or returned with comment.
- C. Submittals made by Contractor that are not required by Contract Documents may be returned without action.
- D. Submittal approval does not authorize changes to Contract requirements unless accompanied by Change Order or Work Change Directive.
- E. Owner may withhold monies due to Contractor to cover additional costs beyond the second submittal review.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

## SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Temporary Utilities:
  - 1. Temporary electricity.
  - 2. Temporary lighting for construction purposes.
  - 3. Temporary water service.
  - 4. Temporary sanitary facilities.
  
- B. Construction Facilities:
  - 1. Field offices and sheds.
  - 2. Vehicular access.
  - 3. Parking.
  - 4. Progress cleaning and waste removal.
  - 5. Traffic regulation.
  - 6. Fire-prevention facilities.
  
- C. Temporary Controls:
  - 1. Security.
  - 2. Water control.
  - 3. Dust control.
  - 4. Erosion and sediment control.
  - 5. Pollution control.
  
- D. Removal of utilities, facilities, and controls.

#### 1.2 REFERENCES

- A. ASTM International:
  - 1. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
  - 2. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
  - 3. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

#### 1.3 TEMPORARY ELECTRICITY

- A. Provide and pay for power service required from utility source as needed for construction operation.
  
- B. Complement existing power service capacity and characteristics as required for construction operations.

#### 1.4 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

- A. Provide and maintain lighting for construction operations.
- B. Permanent building lighting shall not be used during construction.

#### 1.5 TEMPORARY WATER SERVICE

- A. Greenfield Utilities will provide the Contractor with a temporary hydrant meter and there will be no associated fees or charges. The provided meter shall be used for all connections and water use associated with the Project.
- B. Greenfield Utilities shall select the hydrants for use during construction.

#### 1.6 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Existing facility use is not permitted. Provide facilities at time of Project mobilization.

#### 1.7 FIELD OFFICES AND STAGING AREA

- A. These spaces may be used for field offices and / or for lay down:
  - 1. In available right-of-way within project site.

#### 1.8 VEHICULAR ACCESS

- A. Contractor shall utilize existing right-of-way and utility easements to access manholes. Any disturbed areas shall be restored back to original or better condition.
- B. Temporary access roads: Locate as approved by Owner.
- C. Extend and relocate vehicular access as Work progress requires and provide detours as necessary for unimpeded traffic flow.
- D. Provide means of removing mud from vehicle wheels before entering streets.

#### 1.9 PARKING

- A. Locate as approved by Engineer.
- B. Use of existing on-Site streets and driveways used for construction traffic is permitted. Tracked vehicles are not allowed on paved areas.
- C. Use of existing parking facilities used by construction personnel is permitted.
- D. Maintenance:
  - 1. Maintain traffic and parking areas in sound condition free of excavated material, construction equipment, products, mud, snow, ice, and the like.

2. Maintain existing paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original condition.

E. Removal, Repair:

1. Remove temporary materials and construction at Substantial Completion.
2. Repair existing facilities damaged by use, to original condition.

- F. Mud from Site vehicles: Provide means of removing mud from vehicle wheels before entering streets.

#### 1.10 PROGRESS CLEANING AND WASTE REMOVAL

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain Site in clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, before enclosing spaces.
- C. Broom and vacuum clean interior areas before starting surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and rubbish from Site and dispose of off-Site.

#### 1.11 TRAFFIC REGULATION

- A. Maintenance of traffic shall be the sole responsibility of the Contractor.
- B. Traffic Control Conditions
  1. Keep work areas open to pedestrian and vehicular traffic to maximum extent practical.
    - a. Unless otherwise directed or permitted by the Engineer, schedule the Work to maintain two-way traffic at all times. If two-way traffic cannot be maintained at any point during construction, provide minimum of two uniformed flaggers or two CONTRACTOR employees with suitable training, orange vest, paddleboards and any other required or needed items.
    - b. Provide at least one access to all residences and businesses at all times during construction. Notify property owners at least 48 hours in advance of any construction that will impact or change their access, even if it is temporary.
  2. Provide minimum of 7-day notice before implementation of traffic restrictions.
  3. Provide safe passage to vehicular and pedestrian traffic at all times when traffic is allowed.
  4. Provide continuous access for emergency vehicles.
- C. Signs, Signals, and Devices:
  1. Traffic Cones, Drums, Flares, and Lights: As approved by authorities having jurisdiction.
    - a. Use traffic cones to channel traffic into the appropriated lane channel with resurfacing roadways with three or more lanes.
  2. Flag Person Equipment: As required by authorities having jurisdiction.

- D. Flag Persons: Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes. Use flaggers for the restriction of lanes on roadways with two or more lanes.
- E. Flares and Lights: Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.
- F. Haul Routes:
  - 1. Consult with authorities having jurisdiction and establish public thoroughfares to be used for haul routes and Site access.
- G. Milled Surfaces:
  - 1. A milled surface shall not be left open to traffic longer than five calendar days for mainline pavement and ten days for approaches. If the milled surface is not overlaid after five calendar days for mainline pavement and ten calendar days for approaches, a \$200.00 per calendar day per street shall be assessed as liquidated damages, not as a penalty, but as damages sustained for each calendar day that the milled area remains left open to traffic.
- H. Maintaining Traffic During Winter Months:
  - 1. Except as otherwise expressly provided in the contract, existing OWNER-maintained roads and other public roads and streets within the limits of the contract shall be kept open to two-way traffic between the dates of December 1 and April 1.
  - 2. Where the surface on an existing road or street is disturbed, and the entire depth of the new surface is not completed prior to December 1, two-way traffic shall be maintained between the above dates on the partially completed new surface or on a temporary surface satisfactory for two-way traffic. Such surfaces shall be maintained between the above dates with no additional payment. Precautions shall be taken to prevent unnecessary damage to partially completed surfaces. All portions which become damaged shall be repaired with no additional payment.
  - 3. Public roads, commercial and private drives, and mailbox approaches which are disturbed, and on which the surfacing has not been completed, shall be maintained in a condition satisfactory for use during the time Work is suspended.
  - 4. Where such approaches have been constructed to grade and drainage structures installed, the approaches shall be surfaced with the compacted aggregate, size No. 53, to a depth as directed. Such surfacing material, which is incorporated in the finished Work, will be paid for at the contract unit price. The following season, the surfacing on the approaches shall be completed to the compacted depth shown on the plans by the addition of the surfacing material specified in the contract. During suspension of the Work where such approaches have not been constructed to grade, a satisfactory temporary surface shall be provided with no additional payment.
- I. Removal:
  - 1. Remove equipment and devices when no longer required.
  - 2. Repair damage caused by installation.

#### 1.12 FIRE-PREVENTION FACILITIES

- A. Prohibit smoking within buildings under construction and demolition. Designate area on Site where smoking is permitted. Provide approved ashtrays in designated smoking areas.
- B. Establish fire watch for cutting, welding, and other hazardous operations capable of starting fires. Maintain fire watch before, during, and after hazardous operations until threat of fire does not exist.
- C. Portable Fire Extinguishers: NFPA 10; 10-pound capacity, 4A-60B: C UL rating.
  - 1. Provide minimum of one fire extinguisher in every construction trailer and storage shed.

#### 1.13 BARRIERS

- A. Tree and Plant Protection: Preserve and protect existing trees and plants designated to remain.
  - 1. Protect areas within drip lines from traffic, parking, storage, dumping, chemically injurious materials and liquids, ponding, and continuous running water.
  - 2. Replace trees and plants damaged by construction operations.
- B. Protect non-owned vehicular traffic, stored materials, Site, and structures from damage.

#### 1.14 SECURITY

- A. Security will not be provided by Owner.
- B. Contractor shall be responsible for loss or injury to persons or property where Work is involved, and shall provide security and take precautionary measures to protect Contractor's and Owner's interests.
- C. Provide and maintain temporary fencing of design and type needed to prevent entry onto Site by public.

#### 1.15 WATER CONTROL

- A. Grade Site to drain. Maintain excavations free of water. Provide, operate, and maintain necessary pumping equipment.
- B. Protect Site from puddles or running water.

#### 1.16 DUST CONTROL

- A. Execute Work by methods that minimize raising dust from construction operations.
- B. Provide positive means to prevent airborne dust from dispersing into atmosphere.
- C. While a slight misting is acceptable to prevent dust from becoming airborne, ensure dust control measures do not flush dirt and dust into the area storm sewers.

#### 1.17 EROSION AND SEDIMENT CONTROL

- A. Plan and execute construction by methods to control surface drainage from cuts and fills from borrow and waste disposal areas. Prevent erosion and sedimentation.
- B. Minimize surface area of bare soil exposed at one time.
- C. Provide temporary measures including berms, dikes, drains, and other devices to prevent water flow.
- D. Construct fill and waste areas by selective placement to avoid erosive surface silts and clays.
- E. Periodically inspect earthwork to detect evidence of erosion and sedimentation. Promptly apply corrective measures.

#### 1.18 POLLUTION CONTROL

- A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances and pollutants produced by construction operations.
- B. Comply with pollution and environmental control requirements of authorities having jurisdiction.

#### 1.19 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, and materials before Substantial Completion inspection.
- B. Clean and repair damage caused by installation or use of temporary Work.
- C. Restore existing and permanent facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

## SECTION 015050 – MOBILIZATION AND DEMOBILIZATION

### PART 1 GENERAL

#### 1.2 SUMMARY

- A. Section includes but not limited to:
  - 1. Mobilization and demobilization details.
- B. Related Sections:
  - 1. Section 01 10 00 – Summary.
  - 2. Section 01 33 00 –Submittal Procedures.
  - 3. Section 01 50 00 – Temporary Facilities and Controls.
  - 4. Section 31 10 00 – Site Clearing.

#### 1.3 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Section 01 20 00 - Price and Payment Procedures.
- B. Item 0001: Mobilization and Demobilization:
  - 1. Basis of Measurement: Lump Sum.
    - a. The lump sum unit price for this item shall not be more than five percent (5%) of the total of all other bid items of the original proposal, EXCLUDING the Owner’s Contingency bid item.
  - 2. Basis of Payment: Shall include, but is not limited to the following principal items as required for the proper performance and completion of the Work.
    - a. Obtain all required permits, bonds, and insurance.
    - b. Move on to the site all of CONTRACTOR’s material, equipment, and personnel.
    - c. Install temporary construction utilities, as needed.
    - d. Install erosion control measures.
    - e. Provide on-site sanitary facilities and potable water facilities.
    - f. Construct and implement security features and requirements including fencing.
    - g. Have all OSHA required notices, and establish safety programs.
    - h. Complete initial submittal requirements, including preparing schedules.
    - i. Remove all temporary utilities, field office trailer(s) and furnishings away from project site at project completion as directed by OWNER.
    - j. Restore surfaces damaged as a result of construction activities, including mobilization and demobilization, which are not included under other Items and as directed by OWNER.
  - 3. Payment Details
    - a. For the purpose of payment, the pay quantity for the mobilization portion of the Work will be limited to seventy-five percent (75%) of the total



contract bid amount for this Work Item, which will be included in the first partial payment estimate.

- b. The balance of the bid price shall be considered as demobilization and will be paid for when all work is completed on the job and final clean-up is completed.
- c. No additional payment will be made for demobilization and remobilization, initiated by the CONTRACTOR, due to shutdowns, suspensions of the Work, or for other mobilization activities.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

## SECTION 01 51 00 – BYPASS PUMPING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes bypass pumping required to maintain operation of the existing sewer flow while completing the Work.
  - 1. Provide all labor, supervision, tools, equipment, and materials to perform all operations in connection with pumping of sewage and wet weather flows, if required, around the existing connection points.
  - 2. Maintain sewage flow in the construction area in order to prevent backup or overflow into upstream pipe segments and laterals.

#### 1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Section 012000 - Price and Payment Procedures: Contract Sum/Price modification procedures.
- B. Item 0004: Bypass Pumping:
  - 1. Measurement: Work specified in this section is measured as a lump sum cost.
  - 2. Basis of Payment: Includes pumps, labor, flow diversion equipment, and any other equipment incidental to bypassing sections of pipe when bypass pumping is deemed necessary by the contractor.

#### 1.3 SUBMITTALS

- A. Sequence and Setup: Submit bypass pumping plan that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation. Information shall include, at a minimum, the following information:
  - 1. Setup area for all bypass equipment including approximate dimensions of bypass pumping layout and proposed discharge piping layout.
  - 2. Description of bypass pumping discharge point including any structure modifications required to connect to proposed discharge point.
  - 3. Description of pumps, flow controls, and rated flow capacity.
  - 4. Operations sequence of pumps based upon bypass pumping flow requirements.
  - 5. Source of power (i.e. power feed, diesel generator, etc.).
  - 6. Description of piping (i.e. sizes, type, lengths).
  - 7. Use of ramps or other means of protecting bypass piping from local (if applicable) and construction traffic.

## PART 2 - PRODUCTS

### 2.1 BYPASS PUMPING SYSTEM

- A. General: Provide and maintain adequate pumping equipment, force mains and other necessary appurtenances in order to maintain reliable sanitary sewer service as required for construction of the Project.
1. Bypass pump system shall be reviewed by OWNER and ENGINEER. However, the CONTRACTOR shall be responsible for the proper sizing and maintenance of the bypass pump system.
  2. CONTRACTOR shall be responsible for all incidental costs and work related to the bypass pumping effort including, but not limited to: required permits, equipment and piping costs, installation of all equipment and piping, temporary traffic control, power and/or fuel costs associated with equipment, labor costs necessary to provide reliable 24 hours per day/7 days a week operation, modifications to suction and discharge structures for temporary connections including repair of structures at end of bypass pumping process, providing equipment that meets local noise ordinances, servicing of pumps and equipment, and necessary site work at end of pumping period (i.e. repair stone drives, asphalt, sidewalks, and grassed areas).
  3. Demonstrate that the pumping system is in good working order and is sufficiently sized to successfully handle flows by performing a test run during peak flow hours (7:00 am to 9:00 am, Monday through Friday) prior to beginning the work. The CONTRACTOR is responsible for providing equipment that will handle peak flow in the pipe. CONTRACTOR may choose to complete the work during dry weather but shall make sure that all connections are completed prior to wet weather occurrences.
  4. Backups or overflows as the result of inadequate equipment are the responsibility of the CONTRACTOR (refer to 3.1 G. below). Damages caused by overflow or backups shall be repaired by the CONTRACTOR at the no additional cost to the OWNER.
  5. Provide required bulkheads, pumping equipment, piping, hoses and appurtenances, to accomplish the sequence of pumping.
  6. All piping, hose, joints and accessories shall be designed to withstand at least twice the maximum system pressure.

## PART 3 - EXECUTION

### 3.1 CONSTRUCTION REQUIREMENTS

- A. Provide bypass pumping of sewage and, if necessary, wet weather flows around the connection points as necessary to complete the installation of the Work.
- B. Sequence of construction and phasing of the Project shall be determined by the CONTRACTOR.
- C. Complete the Work and satisfactorily pass all tests, inspections and repair all deficiencies prior to discontinuing bypass pumping operations and routing flow to new sewers or structures.
- D. During bypass pumping, no sewage shall be leaked, dumped, or spilled in or onto, any area outside of the existing sanitary sewer system. When bypass pumping operations are complete,

all components of the bypass pumping system shall be drained into the sanitary sewer prior to disassembly.

- E. Plug off and pump down the sewer manhole, line segment, or sanitary sewer structure in the immediate work area and maintain the sanitary sewer system so that surcharging does not occur. Where work requires the line to be blocked beyond working hours, CONTRACTOR shall operate bypass pumping and man the system twenty-four (24) hours a day.
- F. Ensure that no damage will be caused to surrounding property as a result of bypass pumping operations.
- G. In the event that sewage accidentally drains onto the ground or creek, immediately stop the overflow, notify the OWNER and the Indiana Department of Environmental Management (IDEM), and take the necessary action to clean up and disinfect the spillage to the satisfaction of the OWNER and IDEM. If the CONTRACTOR is unable to remedy the situation, suspend or terminate the Work until overflows have been controlled. Damage to materials or equipment that is intended for use on the job or adjacent property caused by surcharges as a result of the Work shall be corrected by the CONTRACTOR at no additional cost to the OWNER. If sewage is spilled onto public or private property, CONTRACTOR shall wash down, clean up and disinfect the spillage to the satisfaction of the OWNER and IDEM. It shall be the CONTRACTOR's responsibility to contact IDEM in a timely manner in the case of an accidental spill. CONTRACTOR shall be responsible for any and all fines that may be charged due to the spills. Notification information to IDEM's Emergency Response Section has been attached to this specification section for use by the CONTRACTOR.
- H. Locate bypass pumping suction and discharge lines so as to not cause undue interference with the use of Site or surrounding area to remain open for local use.
- I. It is the intent of these specifications to require the CONTRACTOR to establish adequate bypass pumping as required regardless of the flow conditions.

END OF SECTION 01 51 00

## SECTION 01 70 00 - EXECUTION AND CLOSEOUT REQUIREMENTS

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Field engineering.
- B. Closeout procedures.
- C. Project record documents.
- D. Product warranties and product bonds.
- E. Examination.
- F. Preparation.
- G. Execution.
- H. Cutting and patching.
- I. Protecting installed construction.
- J. Final cleaning.

#### 1.2 FIELD ENGINEERING

- A. Verify setbacks and easements; confirm Drawing dimensions and elevations.
- B. Provide field engineering services. Establish elevations, lines, and levels using recognized engineering survey practices.
- C. Maintain complete and accurate log of control and survey Work as Work progresses.

#### 1.3 CLOSEOUT PROCEDURES

- A. Prerequisites to Substantial Completion: Complete following items before requesting Certification of Substantial Completion, either for entire Work or for portions of Work:
  - 1. Submit maintenance manuals, Project record documents, digital images of construction photographs, and other similar final record data in compliance with this Section.
  - 2. Conduct inspection to establish basis for request that Work is substantially complete. Create comprehensive list (initial punch list) indicating items to be completed or corrected, value of incomplete or nonconforming Work, reason for being incomplete, and date of anticipated completion for each item. Include copy of list with request for Certificate of Substantial Completion.

3. Obtain and submit releases enabling Owner's full, unrestricted use of Project and access to services and utilities. Include certificate of occupancy, operating certificates, and similar releases from authorities having jurisdiction and utility companies.
4. Deliver tools, spare parts, extra stocks of material, and similar physical items to Owner.
5. Discontinue or change over and remove temporary facilities and services from Project Site, along with construction tools, mockups, and similar elements.
6. Perform final cleaning according to this Section.

B. Substantial Completion Inspection:

1. When Contractor considers Work to be substantially complete, submit to Engineer:
  - a. Written certificate that Work, or designated portion, is substantially complete.
  - b. List of items to be completed or corrected (initial punch list).
2. Within seven days after receipt of request for Substantial Completion, Engineer and Owner will make inspection to determine whether Work or designated portion is substantially complete.
3. Should Engineer determine that Work is not substantially complete:
  - a. Engineer will promptly notify Contractor in writing, stating reasons for its opinion.
  - b. Contractor shall remedy deficiencies in Work and send second written request for Substantial Completion to Engineer.
  - c. Engineer and Owner will reinspect Work.
  - d. Redo and Inspection of Deficient Work: Repeated until Work passes Engineer's and Owner's inspection.
4. When Engineer finds that Work is substantially complete, Engineer will:
  - a. Prepare Certificate of Substantial Completion on EJCDC C-625 - Certificate of Substantial Completion, accompanied by Contractor's list of items to be completed or corrected as verified and amended by Engineer and Owner (final punch list).
  - b. Submit Certificate to Owner and Contractor for their written acceptance of responsibilities assigned to them in Certificate.
5. After Work is substantially complete, Contractor shall:
  - a. Allow Owner occupancy of Project under provisions stated in Certificate of Substantial Completion.
  - b. Complete Work listed for completion or correction within time period stipulated.

C. Prerequisites for Final Completion: Complete following items before requesting final acceptance and final payment.

1. When Contractor considers Work to be complete, submit written certification that:
  - a. Contract Documents have been reviewed.
  - b. Work has been examined for compliance with Contract Documents.
  - c. Work has been completed according to Contract Documents.
  - d. Work is completed and ready for final inspection.
2. Submittals: Submit following:
  - a. Final punch list indicating all items have been completed or corrected.
  - b. Final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
  - c. Specified warranties, workmanship/maintenance bonds, maintenance agreements, and other similar documents.
  - d. Accounting statement for final changes to Contract Sum.
3. Perform final cleaning for Contractor-soiled areas according to this Section.

- D. Final Completion Inspection:
  - 1. Within seven days after receipt of request for final inspection, Engineer and Owner will make inspection to determine whether Work or designated portion is complete.
  - 2. Should Engineer consider Work to be incomplete or defective:
    - a. Engineer will promptly notify Contractor in writing, listing incomplete or defective Work.
    - b. Contractor shall remedy stated deficiencies and send second written request to Engineer that Work is complete.
    - c. Engineer and Owner will re-inspect Work.
    - d. Redo and Inspection of Deficient Work: Repeated until Work passes Engineer's inspection.

#### 1.4 PROJECT RECORD DOCUMENTS

- A. Maintain on Site one set of the following record documents; record actual revisions to the Work:
  - 1. Drawings.
  - 2. Specifications.
  - 3. Addenda.
  - 4. Change Orders and other modifications to the Contract.
  - 5. Reviewed Shop Drawings, product data, and Samples.
  - 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress, not less than weekly.
- E. Specifications: Legibly mark and record, at each product Section, description of actual products installed, including the following:
  - 1. Manufacturer's name and product model and number.
  - 2. Product substitutions or alternates used.
  - 3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction as follows:
  - 1. Include Contract modifications such as Addenda, supplementary instructions, change directives, field orders, minor changes in the Work, and change orders.
  - 2. Include locations of concealed elements of the Work.
  - 3. Identify depth of buried utility lines and provide dimensions showing distances from permanent facility components that are parallel to utilities.
  - 4. Dimension ends, corners, and junctions of buried utilities to permanent facility components using triangulation.
  - 5. Identify and locate existing buried or concealed items encountered during Project.
  - 6. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
  - 7. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
  - 8. Field changes of dimension and detail.

9. Details not on original Drawings.
  10. Note length lined on both Main Line segments and Laterals in the Sanitary Pipe Rehabilitation Table and Sanitary Lateral Rehabilitation Table respectively.
- G. Submit PDF electronic files of marked-up documents to Engineer with claim for final Application for Payment.
- a. Originals of warranties and bonds.

## 1.5 PRODUCT WARRANTIES AND PRODUCT BONDS

- A. Obtain warranties and bonds executed in duplicate by responsible Subcontractors, suppliers, and manufacturers within ten days after completion of applicable item of Work.
- B. Execute and assemble transferable warranty documents and bonds from Subcontractors, suppliers, and manufacturers.
- C. Verify documents are in proper form, contain full information, and are notarized.
- D. Co-execute submittals when required.
- E. Include table of contents and assemble in three D side ring binder with durable plastic cover.
- F. Submit prior to final Application for Payment.
- G. Time of Submittals:
  1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
  2. Make other submittals within ten days after date of Substantial Completion, prior to final Application for Payment.
  3. For items of Work for which acceptance is delayed beyond Substantial Completion, submit within ten days after acceptance, listing date of acceptance as beginning of warranty or bond period.

## PART 2 PRODUCTS - Not Used

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify that existing Site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.
- C. Examine and verify specific conditions described in individual Specification Sections.
- D. Verify that utility services are available with correct characteristics and in correct locations.



### 3.2 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance according to manufacturer's instructions.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer-required or -recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

### 3.3 EXECUTION

- A. Comply with manufacturer's installation instructions, performing each step in sequence. Maintain one set of manufacturer's installation instructions at Project Site during installation and until completion of construction.
- B. When manufacturer's installation instructions conflict with Contract Documents, request clarification from Engineer before proceeding.
- C. Verify that field measurements are as indicated on approved Shop Drawings or as instructed by manufacturer.
- D. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.
  - 1. Secure Work true to line and level and within specified tolerances, or if not specified, industry-recognized tolerances.
  - 2. Physically separate products in place, provide electrical insulation, or provide protective coatings to prevent galvanic action or corrosion between dissimilar metals.
- E. Allow for expansion of materials and building movement.
- F. Climatic Conditions and Project Status: Install each unit of Work under conditions to ensure best possible results in coordination with entire Project.
  - 1. Isolate each unit of Work from incompatible Work as necessary to prevent deterioration.
  - 2. Coordinate enclosure of Work with required inspections and tests to minimize necessity of uncovering Work for those purposes.
- G. Adjust operating products and equipment to ensure smooth and unhindered operation.
- H. Clean and perform maintenance on installed Work as frequently as necessary through remainder of construction period. Lubricate operable components as recommended by manufacturer.

### 3.4 CUTTING AND PATCHING

- A. Employ skilled and experienced installers to perform cutting and patching.
- B. Submit written request in advance of cutting or altering elements affecting:
  - 1. Structural integrity of element.
  - 2. Integrity of weather-exposed or moisture-resistant elements.

3. Efficiency, maintenance, or safety of element.
  4. Visual qualities of sight-exposed elements.
  5. Work of Owner or separate contractor.
- C. Execute cutting, fitting, and patching including excavation and fill to complete Work and to:
1. Fit the several parts together, to integrate with other Work.
  2. Uncover Work to install or correct ill-timed Work.
  3. Remove and replace defective and nonconforming Work.
  4. Remove samples of installed Work for testing.
  5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.
- D. Execute Work by methods to avoid damage to other Work and to provide proper surfaces to receive patching and finishing.
- E. Cut masonry and concrete materials using masonry saw or core drill.
- F. Restore Work with new products according to requirements of Contract Documents.
- G. Fit Work tight to pipes, sleeves, ducts, conduits, and other penetrations through surfaces.
- H. Identify hazardous substances or conditions exposed during the Work to Engineer for decision or remedy.

### 3.5 PROTECTING INSTALLED CONSTRUCTION

- A. Protect installed Work and provide special protection where specified in individual Specification Sections.
- B. Provide temporary and removable protection for installed products. Control activity in immediate Work area to prevent damage.
- C. Prohibit traffic from landscaped areas.

### 3.6 FINAL CLEANING

- A. Execute final cleaning prior to final Project assessment.
- B. Clean Site; sweep paved areas, rake clean landscaped surfaces.
- C. Remove waste and surplus materials, rubbish, and construction facilities from Site.

END OF SECTION

**DIVISION 31**  
**EARTHWORK**

## SECTION 31 10 00 - SITE CLEARING

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section includes but not limited to:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above- and below-grade site improvements.
6. Temporary erosion- and sedimentation-control measures.

B. Related Sections:

1. Section 01 50 00 - Temporary Facilities and Controls, for temporary utility services, construction and support facilities, security and protection facilities, and temporary erosion- and sedimentation-control measures.

C. Payment Procedures:

1. Work specified in this Section is considered incidental and will be include as part of appropriate Unit Price stated in Bid.

#### 1.2 SUBMITTALS

- A. Submit coordinates and elevation of each located underground pipe.

#### 1.3 DEFINITIONS

- A. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
- B. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.
- C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil and is the zone where plant roots grow.
- D. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, as indicated on Drawings.
- E. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

#### 1.4 MATERIAL OWNERSHIP

- A. Except for stripped topsoil and other materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.
  - 1. Use sufficiently detailed photographs or videotape.
  - 2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

#### 1.6 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
  - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
  - 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- B. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises as determined by Owner.
- C. Utility Locator Service: Notify Utility locator service for area where Project is located before site clearing.
- D. Do not commence site clearing operations until temporary erosion- and sedimentation-control are in place.
- E. The following practices are prohibited within plant protection zones:
  - 1. Storage of construction materials, debris, or excavated material.
  - 2. Parking vehicles or equipment.
  - 3. Foot traffic.
  - 4. Erection of sheds or structures.
  - 5. Impoundment of water.
  - 6. Excavation or other digging unless otherwise indicated.
  - 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- F. Do not direct vehicle or equipment exhaust towards plant protection zones.
- G. Prohibit heat sources, flames, ignition sources, and smoking within or near plant protection zones.

## PART 2 - PRODUCTS (NOT USED)

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Call Local Utility Line Information service at 811 not less than three working days before performing Work.
  - 1. Request underground utilities to be located and marked within and surrounding construction areas.
- B. Protect existing site improvements to remain from damage during construction.
  - 1. Restore damaged improvements to their original condition, as acceptable to Owner.
  - 2. Minimize vegetative and ground disturbance for access and construction activities.

### 3.2 PROTECTION

- A. Protect utilities indicated to remain, from damage.
- B. Protect trees, plant growth, and features designated to remain, as final landscaping.
- C. Protect benchmarks and existing structures from damage or displacement.
- D. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.
- E. Maintain access to site.

### 3.3 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.
- B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
- D. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

### 3.4 EXISTING UTILITIES

- A. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
1. Notify Owner not less than 2 days in advance of proposed utility interruptions.
  2. Do not proceed with utility interruptions without Owners written permission.

### 3.5 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, and other vegetation to permit access for rehabilitation work.
1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
  2. Do not cut or remove trees greater than 5-inches in diameter at breast height.
  3. Grind down stumps and remove roots, obstructions, and debris to a depth of 18 inches below exposed subgrade.
  4. Use only hand methods for grubbing within protection zones.
  5. Chip removed tree branches and dispose of off-site.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

### 3.6 REMOVAL

1. Remove obstructions such as mounds of dirt, stones, or debris located within construction limits.
2. Remove surface features including pavements, curb and gutter, signs, posts, mailboxes, fences, shrubs, landscaping features, and other miscellaneous items. Street signs, culverts, advertising signs, mailboxes, etc. shall be replaced to original condition.
3. Full depth saw cut all pavement, sidewalk and curving to be removed.

### 3.7 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

END OF SECTION 31 10 00

## SECTION 31 23 17 - TRENCHING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Trenching and backfilling to the elevations shown on the Drawings and as needed for installation of underground piping and utilities associated with the Work and to meet the requirements of the Contract Documents.
- B. Payment Procedures:
  - 1. Work specified in this Section is considered incidental and will be include as part of appropriate Unit Price stated in Bid.

#### 1.2 DEFINITIONS

- A. Influence Zone Under Foundations, Pavements, or Sidewalks: Area below foundation or pavement or sidewalk subbase bounded by 1 horizontal to 2 vertical slope extending outward from 1-ft beyond outer edge of foundation or pavement or sidewalk subbase.
- B. Influence Zone Under Piping or Electrical Ducts: Area below limits bounded by line 6 in. below pipe or electrical duct and by 1 horizontal to 2 vertical slope extending outward from that line 1-ft beyond outer edge of pipe or duct.
- C. Unsuitable Material: Topsoil, peat, organic soils, and materials containing slag, cinders, foundry sand, debris, and rubble or soil with less than required bearing capacity as determined by Engineer.
- D. INDOT: Indiana Department of Transportation Standard Specifications, Current Edition.

#### 1.3 SUBMITTALS

- A. Test Results.
  - 1. Compaction test results.
  - 2. Gradation of bedding, cover, and backfill.
- B. Miscellaneous Submittals.
  - 1. Test results to verify fill materials and bedding and cover materials meet Specifications.
- C. Submit in accordance with Section 01 33 00.

#### 1.4 QUALITY ASSURANCE

- A. Testing shall be provided by CONTRACTOR in accordance with this Section.



- B. Sheeting, shoring, and bracing shall conform to safety requirements of federal, state, and local agencies.

## 1.5 PROJECT / SITE CONDITIONS

- A. Notify owners of above or below ground utilities encountered during trenching operations.
- B. Cap and remove or relocate services in accordance with instructions of owners of such utilities.
- C. Protect, support, and maintain conduits, wires, pipes or other utilities that are to remain in accordance with requirements of owners of such utilities.
- D. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.
- E. Maintain access to adjacent areas at all times.

## PART 2 - PRODUCTS

### 2.1 BEDDING MATERIALS

- A. Subgrade stabilizing aggregate, if required, shall be INDOT No. 53 crushed stone.
- B. Pipe bedding material shall be INDOT No. 8 crushed stone or fractured face aggregate.
- C. Bedding for manholes shall be INDOT No. 2 crushed stone.

### 2.2 COVER MATERIALS (INITIAL BACKFILL)

- A. To the extent shown on the drawings, INDOT No. 8 crushed stone or fractured face aggregate shall be used as initial backfill for all pipe materials.

### 2.3 BACKFILL MATERIALS

- A. To the extent shown on the drawing, INDOT No. 8 Granular Backfill or No. 24 Sand shall be used for final backfill (above the cover or initial backfill) for all areas subject to vehicular traffic.
- B. For areas 5 feet outside of pavement limits, backfill shall include the use of native soil backfill (to the extent shown on the drawings). Native soil backfill material shall contain no more than 5% organic material, no particles larger than four inches and shall be free of trash, rubble and debris. The Plastic Index of the fraction passing the no. 40 sieve shall not be more than 25. Native soil material not meeting these requirements shall be replaced with INDOT Granular Backfill (B-Borrow).

## 2.4 FILTER FABRIC

A. Porous non-woven fabric with multiple layers of randomly arranged fibers, min 4.0 oz/sq yd (typical).

B. Manufacturers:

1. Mirafi 140N by Mirafi, Inc.
2. Typar 340I by DuPont.
3. Supac 5P by Phillips Fibers Corp.
4. Propex 4545 by Amoco Fabrics Co.
5. Or Equal.

## 2.5 SHEETING, SHORING, AND BRACING

A. Type, design, detail, and installation of sheeting, shoring, and bracing shall be determined by and sole responsibility of CONTRACTOR.

## 2.6 SOURCE QUALITY CONTROL

A. Testing:

1. One sieve analysis, plasticity index, and uniformity coefficient for each source of structural fill.
2. One sieve analysis for each source of bedding material and cover material.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work such as areas loosened by frost action or softened by flooding or weather, or existence of unsuitable materials. Do not proceed until unsatisfactory conditions are corrected.

### 3.2 PREPARATION

A. Natural soils or fill softened by frost, flooding or weather shall be removed and replaced.

B. Remove unsuitable material from within trenches.

### 3.3 SHEETING, SHORING, AND BRACING

A. Whenever necessary to prevent caving during excavation and to protect adjacent, piping, structures, property, workers, and public; trenches shall be sheeted, shored, and braced.

B. When sheeting, shoring, and bracing is required, install to prevent soil from entering excavation below or through sheeting.

- C. Remove sheeting, shoring, and bracing after backfilling, or when approved by ENGINEER as backfill is being placed.
- D. Remove sheeting, shoring, and bracing in manner not damaging to facility. Fill voids remaining after sheeting is pulled with sand or other approved material.
- E. Fill settled areas after sheeting, shoring, and bracing has been removed.

### 3.4 DEWATERING

- A. CONTRACTOR shall dewater excavation site prior to starting trenching and shall maintain groundwater minimum of 12 in. below bottom of trench.
- B. CONTRACTOR is responsible for choosing method of groundwater control.
- C. If CONTRACTOR chooses to use deep wells or well points, wells and well points shall be designed, installed, and operated to prevent removal of in-situ materials.
- D. Keep construction site free-draining. Keep trenches free of water.
- E. Remove soil disturbed by pressure or flow of groundwater.
- F. Maintain dewatering system to prevent uplifting of or damage to facilities.
- G. Protect adjacent utilities, structures, and properties from damage resulting from dewatering operations.
- H. Drill, maintain, and abandon dewatering wells in accordance with federal, state, and local ordinances.

### 3.5 EXCAVATION

- A. Excavate to the lines, grades, and elevations indicated and necessary to complete construction.
- B. Method of excavation shall be consistent with soil types encountered and result in undisturbed subgrade. Loosened soils shall be re-compacted or removed and replaced.
- C. Trench Tolerances:
  - 1. Maximum width of trench at top of pipe shall be outside diameter of pipe plus 24 in. When sheeting, shoring, and bracing required, width of trench may be increased to allow for their use, provided provisions for excess width of trench are met.
  - 2. Where trench width below top of pipe exceeds specified limit, Contractor shall furnish pipe with strength adequate for actual trench width.
  - 3. Minimum trench width shall be outside diameter of pipe plus 18 in.
  - 4. Top of concrete encasement for electrical duct or top of conduit shall be minimum of 24 in. below final grade or as shown on Drawings.
- D. Do not advance excavation of trenches more than 300 ft. ahead of completed pipe installation.

E. Do not excavate within influence zone of existing footings or foundations without prior approval of ENGINEER.

F. Excavation through Rigid Pavement:

1. Remove pavement min 1 ft. beyond anticipated edge of excavation.
2. Saw cut pavement to ensure straight joint.
3. Pavement replacement shall match existing.

G. Excavation, backfill, and pavement replacement of roadways shall conform to requirements of local highway authority. In no case shall the replacement pavement edges bear on less than 12 in. of undisturbed soil.

### 3.6 FILL USAGE

A. Bedding Material:

1. Bedding material shall be placed over the entire width of the trench bottom such that after the pipe has been placed thereon, imbedded to grade and aligned, there remains a 4-inch minimum depth of material below the pipe barrel and a minimum of 3 inches below the bell.
2. The bell holes shall be excavated so that the entire pipe barrel rests on the bedding.

B. Cover Material:

1. Cover material shall be placed to the limits shown on the drawings.

C. Within trenches under pavements and sidewalks and within piping or electrical duct influence zone, INDOT B-Borrow shall be used.

D. Earth Fill: Other areas not previously specified.

### 3.7 PLACING FILL

A. Notify ENGINEER before placing fill material.

B. Do not use frozen material or place fill on frozen subgrade.

C. Do not backfill until concrete is properly cured and has reached design strength, coatings approved, and required tests accepted.

D. Place fill simultaneously on both sides of freestanding structures.

E. Where pipes or electrical ducts cross, protect piping or ducts at higher elevation by backfilling trench within influence zone of higher pipe or duct with INDOT B-Borrow.

F. Where pipes or electrical ducts leave structures, protect by backfilling within influence zone of pipe or duct with INDOT B-Borrow.

G. Provide mechanical compaction. Jetting, flooding, puddling, or vibroflotation methods shall not be used for compaction.

H. Place and compact bedding material and cover material in lift thickness and to densities listed.

1. Degree of compaction: ASTM D1557, Modified Proctor or ASTM D4253 (Relative Density).
2. Moisture Content: Within 3% of optimum.

<b>Location</b>	<b>Maximum Lift Thickness (in.)</b>	<b>Modified Proctor (%)</b>	<b>Relative Density (%)</b>
Bedding Material or Cover Material	6	95 min	70 min

### 3.8 FIELD QUALITY CONTROL

A. Testing:

1. One field density test for each 25 cu yds. of granular fill, bedding material and cover material, minimum one each lift.
2. One field density test for each 500 cu yds. of earth fill.
3. Determine in-place density of fill at maximum intervals specified in accordance with ASTM D1556, D2167, D2922 or D2937.

END OF SECTION

**DIVISION 32**  
**EXTERIOR IMPROVEMENTS**

## SECTION 32 12 16 - ASPHALT PAVING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Provide asphalt pavement where shown on Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Provide milling to a depth of 1.5” and resurfacing to the area designated on the drawings.
- C. Repair driveways damaged in the course of the work.

#### 1.2 DEFINITIONS

- A. INDOT Specifications: Indiana Department of Transportation Standard Specification, latest edition
- B. ASTM: American Society for Testing and Materials
- C. AASHTO: American Association of State Highway and Transportation Officials

#### 1.3 GENERAL REQUIREMENTS

- A. Contractor shall be responsible for any damage to drives, roads, sidewalks, culverts, and other structures whether existing and/or new as constructed as part of Contractor’s work. Any repairs made due to damage caused by Contractor shall be at Contractor’s expense.
- B. Contractor shall comply with all City of Greenfield and latest approved and adopted edition of the Indiana Department of Transportation (INDOT) Standard Specifications for materials and execution of pavement construction.
- C. Contractor shall comply with all City of Greenfield and Indiana Department of Transportation traffic control and safety requirements and regulations for all work along public roads.
- D. Contractor shall keep all pavements completely clean from mud, loose aggregate and other debris and objectionable materials by the end of each workday.
- E. Contractor shall store and protect miscellaneous items on the Project site so they do not interfere with the property owners or the general public.
- F. Any damaged areas prior to acceptance are to be restored including clean-up, at no additional cost to owner.

#### 1.4 SUBMITTALS

- A. General:
  - 1. Submit Product Data in sufficient detail to confirm compliance with requirements of this Section. Submit Product Data and Shop Drawings in one complete submittal package. Partial submittals are unacceptable.
- B. Source of Aggregates showing use on previous local Department of Transportation Projects.
- C. Asphalt Mix Design, including aggregate gradation, showing use on previous local Department of Transportation Projects.
- D. Test Results of Quality Assurance Testing
- E. Submit in accordance with Section 01 33 00.

#### 1.5 QUALITY ASSURANCE

- A. Asphalt supplier shall have a minimum of 5 years of experience producing asphalt mixes for the Department of Transportation.
- B. Do not commence placement of asphalt until mix design has been reviewed and approved by Engineer. Contractor shall employ an independent testing laboratory to perform specific services and verify that proper asphalt mix designs are in compliance with the specifications.
- C. Testing shall be provided by Contractor in accordance with this section.

#### 1.6 MEASUREMENT AND PAYMENT

- A. Items 0023-0025: Asphalt Pavement Replacement for Road Restoration
  - 1. Measurement: Work specified in this Section is measured per ton of raw material used for paving or resurfacing.
  - 2. Basis of Payment: This contract item shall consist of all material, labor and equipment to provide and install Asphalt Hot Mix Asphalt (HMA) aggregate base, intermediate, and surface as trench restoration and resurfacing as shown on the plans, including, but not necessarily limited to: removal and proper disposal of existing and temporary pavement; asphalt pavement; surface preparation; tack coat; replacement or repair of utilities, drainage systems, structures, and miscellaneous property; removal and replacement of all snow plowable raised pavement markers and blue hydrant markings as directed by Owner; and clean-up, as shown in the Contract Documents.
- B. Item 0029: Milling
  - 1. Measurement: Work specified in this section is measured per square yard of pavement milled at a depth of 1.5 inches.
  - 2. Basis of Payment: This contract item shall consist of all material, labor and equipment to prepare a foundation for resurfacing by removing existing pavement surfaces as shown in the Contract Documents including but not limited to: disposal of material and clean-up in accordance with the Contract Documents.



## PART 2 - PRODUCTS

### 2.1 PAVEMENT MATERIALS

#### A. Aggregate:

1. Furnish coarse aggregate from local Department of Transportation approved sources.
2. Aggregate for Bituminous Base:
  - a. Sound, angular crushed stone, crushed gravel, or crushed slag, sand, stone or slag screenings.
  - b. Uncrushed gravel may be used in base course mixture if required to suit local material availability.
  - c. Gradation: Well graded between limits specified and shall conform to INDOT Specs Subsection 402.04, gradation No. 5, Class D or higher.
3. Aggregate for Bituminous Binder:
  - a. Sound, angular crushed stone, crushed gravel, or crushed slag, sand, stone or slag screenings.
  - b. Gradation: Well graded between limits specified and shall conform to INDOT Specs Subsection 402.04, gradation No. 8, Class C or higher.
4. Aggregate for Bituminous Surface:
  - a. Crushed stone, crushed gravel, crushed slag, and sharp-edged natural sand.
  - b. Sand prepared from stone, blast-furnace slag, gravel, or combinations thereof may be used if required to suit local material availability.
  - c. Gradation: Well graded between limits specified and shall conform to INDOT Specs Subsection 402.04, gradation No. 11, Class B or higher.
5. Mineral Filler: Rock or slag dust, hydraulic cement, or other inert material complying with ASTM D242.

#### B. Bituminous Materials:

1. Asphalt Cement: Penetration Grade PG 58-28 in accordance with ASTM D946.

#### C. Mix Design:

1. Conform to Section 401.04 of INDOT Specifications.
2. ESAL Category 1.

#### D. Prime Coat and Tack Coat

1. Prime Coat: Emulsified asphalt Type AE-PMP per AASHTO M 140.
2. Tack Coat: Emulsified asphalt meeting the one of the following Types per AASHTO M 140: AE-T, AE-PMT, SS-1h

## PART 3 - EXECUTION

### 3.1 WEATHER LIMITATION

- A. Apply prime and tack coats when ambient temperature is above 35 degrees Fahrenheit. Do not apply when base is wet or contains standing water.
- B. Place asphalt material when atmospheric temperature is above 35 degrees Fahrenheit and rising, and when base is dry.

- C. Do not place asphalt material on frozen subgrade or base.

### 3.2 PREPARATION

- A. Check base course for soundness, outline, and contour. Prepare base course for areas to be paved by scraping down or filling irregularities. Compact base course prior to paving.
- B. Prime Coat:
  - 1. Apply at rate of 0.25 to 0.80 gallon per square yard, over compacted aggregate base.
  - 2. Apply material to penetrate and seal, but not flood, surface.
  - 3. Cure and dry as long as necessary to attain penetration and evaporation of volatile.
- C. Tack Coat:
  - 1. Apply to contact surfaces of previously paved surfaces abutting or projecting into areas to be paved.
  - 2. Apply to surface free of loose dirt, dust or other foreign matter.
  - 3. Apply at a rate of 0.025 gallon per square yard of surface.
  - 4. Apply only to areas expected to be paved in the same day.
  - 5. Allow to dry prior to paving.
  - 6. Avoid tracking or smearing bituminous materials onto adjoining surfaces. Remove material tracked or smeared to adjoining surfaces.
- D. The milling or scarification of existing pavements shall be done in accordance with the current version of the Indiana Department of Transportation (INDOT) Standard Specifications Section 306 – MILLING.

- 3.3 Contractor shall remove the minimum amount of existing pavement, curbing, driveway, and other roadway and paved area appurtenances necessary for construction unless otherwise required, or as directed by Owner. MILLING UP TO 1 ½ INCHES

This work consists of preparing a foundation for resurfacing by removing the existing bituminous surface as specified in the typical cross section.

Milling shall be milled one and one half (1 ½) inches. All work shall be in accordance with Section 202.05 of the INDOT Standard Specifications. Transitions shall be provided between existing pavements and new HMA surfaces. A minimum 10-foot long transition shall be provided.

The equipment for removing the bituminous surface shall be a power operated planing machine or grinder. The equipment shall be capable of accurately establishing profile grades by referencing from either the existing pavement or from independent grade control. The equipment shall have a positive means for controlling cross slope elevations and have an effective means for removing excess material from the surface finish and shall not vary longitudinally more than ½ inch from a ten foot straight edge. The equipment shall be capable of providing for a good bond to the new overlay. Sufficient cutting teeth will be required on the cutting drum such that 100% of the conglomerate particles will pass a 1-1/2" sieve.

The road shall be left broom clean before being opened to traffic. All work shall be done in a workman like manner and all loose material shall be removed as soon as possible so as not to inconvenience traffic flow. If the milling operation results in a vertical or near vertical

longitudinal face exceeding 1 ¼” in height, this longitudinal face shall be sloped in a manner acceptable to construction inspector so as not to create a hazard to traffic using the facility. Transverse faces that are present at the end of a working period will be tapered in a manner approved by construction inspector to avoid creating a hazard for traffic.

The removed surface material shall be disposed of by contractor.

### 3.4 DELIVERY, STORAGE, AND HANDLING

- A. Transport asphalt materials in covered trucks during rainy weather and when air temperature falls below 65 degrees F.
- B. Adjust weight, type, capacity, haul routes, and method of operation of hauling vehicles such that no damage results to existing streets, subgrade, or base course.
- C. Owner has final authority to designate haul routes, procedures, and operation times.

### 3.5 PLACING ASPHALT MIX

- A. Place asphalt mixture on prepared surface, spread, and strike-off. Spread mixture at a temperature within 20 degrees Fahrenheit of temperature the asphalt material supplier recommends.
- B. Place using a self-propelled paver to ensure uniform spreading and strike-off of mix. Provide a smooth mixture free of tearing and segregation. Place mixture to required grade, cross-section, and compacted thickness.
- C. Place inaccessible and small areas by hand. Place mixture to required grade, cross-section, and compacted thickness.
- D. Joints: Place asphalt continuously to limit the number of joints. Make joints between old and new pavements and between successive days' work, to ensure continuous bond between adjoining work. Clean contact surfaces and apply tack coat. Construct joints to have same texture, density, and smoothness as other sections of asphalt pavement.

### 3.6 COMPACTION

- A. Compact asphalt mix while still hot. Compact each layer by uniformly rolling.
- B. In small areas not accessible by a roller, compact using mechanical tampers.
- C. Compact until no further consolidation is visible under action of the compaction equipment.
- D. Keep roller wheels moistened to avoid sticking.

### 3.7 FIELD QUALITY CONTROL

#### A. Pavement Testing:

1. General: Test in-place asphalt courses for compliance with requirements for surface smoothness and thickness. Repair or remove and replace unacceptable paving.
2. Thickness Tolerance: In-place compacted thickness will not be acceptable if actual thickness exceeds the following allowable variation from required thickness:
  - a. Binder Course: 1/4 inch.
  - b. Surface Course: 1/8 inch.
3. Surface Smoothness Tolerances: Test finished surface of each asphalt concrete course for smoothness, using 10 foot straight edge applied parallel with, and at right angles to, the centerline of paved area. Surfaces will not be acceptable if deviations exceed 1/8 inch.

END OF SECTION 321216

## SECTION 32 16 23 - SIDEWALKS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Provide portland cement concrete sidewalk including form work and reinforcement, base materials with compaction, where shown on Drawings, as specified herein, and as needed for a complete and proper installation.

#### 1.2 REFERENCES

- A. ASTM: American Society for Testing and Materials
- B. CRSI: Concrete Reinforcing Steel Institute
- C. NRMCA: National Ready Mixed Concrete Association
- D. INDOT: Indiana Department of Transportation Standard Specifications, latest edition.

#### 1.3 SUBMITTALS

- A. General:
  - 1. Submit Product Data in sufficient detail to confirm compliance with requirements of this section.
- B. Product Data:
  - 1. Verification of concrete mix design.
- C. Test Results:
  - 1. Tests indicating compliance of reinforcement with referenced standards.
  - 2. Concrete test results.
  - 3. Base material test results.
  - 4. Concrete delivery tickets: With each load of concrete delivered, provide duplicate tickets, one for Contractor, one for Engineer, with following information.
    - a. Serial number of ticket.
    - b. Date and truck number.
    - c. Name of supplier.
    - d. Class of concrete.
    - e. Type of cement and cement content in bags/cubic yard.
    - f. Admixture brand names.
    - g. Aggregate size.
    - h. Time loaded.
    - i. Amount of concrete in load.
    - j. Gallons of water added at site and slump of concrete after addition of water.
    - k. Temperature of concrete at delivery.
    - l. Time unloaded.

5. Certified reports of field tests and observations.

D. Submit in accordance with Section 01 33 00.

#### 1.4 QUALITY ASSURANCE

- A. Plant Certification: Plant or concrete supplier shall comply with requirements of NRMCA certification plan as regards material storage and handling, batching equipment, central mixer, truck mixers with counters, agitators, non-agitating units, and ticketing system.
- B. Do not commence placement of concrete until mix designs have been reviewed and approved by Engineer.
- C. Concrete Testing: Testing shall be provided by Contractor in accordance this Section.
  - 1. Conduct tests on sample material in accordance with methods listed below:
    - a. Slump: ASTM C143.
    - b. Air-Entrainment: ASTM C231.
    - c. Compressive Strength: ASTM C31 and ASTM C39.

#### 1.5 MEASUREMENT AND PAYMENT

- A. Unit Pricing:
  - 1. Work specified in this Section is considered incidental and payment shall be included as part of appropriate unit prices included in Bid Form.

### PART 2 - PRODUCTS

#### 2.1 BASE MATERIAL

- A. Crushed Aggregate Base Course shall be a 4" thickness of dense grade aggregate size 53 in accordance with Section 302 of INDOT Specs.

#### 2.2 FORMS

- A. Construct forms to exact sizes, shapes, lines, and dimensions shown, and as required to obtain accurate alignment, location, grades, and level and plumb work in finished concrete. All forms must be inspected and approved by Engineer, prior to placement of concrete.
- B. Forms shall be straight and of sufficient strength to resist pressure of concrete without bending, tipping, or other deformation. Bracing and staking of forms shall be such that the forms remain in both horizontal and vertical alignment until their removal.
- C. Forms shall not be removed from freshly placed concrete until it has hardened sufficiently to resist spalling, cracking or any other damage.
- D. Slip form machines may be used provided sidewalk can be constructed to the requirements of specifications.

## 2.3 CONCRETE

- A. A.Conform to INDOT 702, Class A.

## 2.4 OTHER MATERIALS

- A. Curing Compounds:
  - 1. AASHTO M148, Type 2.
- B. Preformed Expansion Joint Material:
  - 1. Meet requirements of ASTM D 1751.
  - 2. 1/2 inch thick and premolded.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Place base material in accordance with INDOT standards.
- B. Check base course outline, and contour. Scrape down or fill irregularities.
- C. Compact base course prior to paving.
- D. Set castings and frames of manholes, catch basins, clean outs, etc. to required alignment and grade. Hand vibrate concrete adjacent to structures.
- E. Remove foreign matter accumulated in formwork. Forms may be oiled, if necessary.
- F. Remove excess material not required by Owner, material not suitable for backfilling or site grading, and unsuitable materials from site. Dispose of excavated material in accordance with local, state, and federal requirements.

### 3.2 MIXING AND DELIVERY

- A. Use ready mixed concrete conforming to ASTM C94.
- B. Deliver and complete discharge within 1-1/2 hours of commencing of mixing. Limitations may be waived by Engineer if concrete slump, after 1-1/2 hours, is sufficient so that concrete can be placed without addition of water. In hot weather, time criteria may be reduced by Engineer.
- C. Do not use concrete that has stood for over 30 minutes after leaving the mixer.

### 3.3 CONVEYING CONCRETE

- A. Perform concrete placement at such a rate that concrete which is being integrated with fresh concrete is still plastic.

- B. Deposit concrete as nearly as practicable in its final location so as to avoid separation due to rehandling and flowing.
- C. Do not use concrete which becomes non-plastic and unworkable, does not meet required quality control limits, or has been contaminated by foreign materials.
- D. Remove rejected concrete from job site.

### 3.4 CONCRETE PLACEMENT

- A. Deposit concrete in a continuous operation, within limits of construction joints, until placing of a section is complete.
- B. Consolidate concrete immediately after placing by use of internal concrete vibrators supplemented by hand spading, rodding, or tamping.
- C. Do not vibrate forms or reinforcement.
- D. Do not use vibrators to transport concrete inside the forms.
- E. Bring surfaces to correct level with straightedge, and then strike off.
- F. Use bullfloats or darbies to smooth surface, leaving surface free from bumps and hollows.

### 3.5 CONCRETE FINISHING

- A. Check sidewalk with 10-foot straight edge. For areas showing irregularities of 0.25 inches or more cut down high areas or fill depressions with freshly mixed concrete and strike off, consolidate and refinish concrete. Do not add water to correct surface deficiencies.
- B. Provide a light broom finish perpendicular to direction of travel.
- C. Expansion joints:
  1. Extend entire width of sidewalk, at intervals not to exceed 100 feet.
  2. Install full depth of sidewalk.
  3. Install at all construction joints and where sidewalk abuts castings or other rigid structures.
  4. Place expansion joints perpendicular to sidewalk.
- D. Control Joints:
  1. Spacing: Maximum intervals of 6 feet.
  2. Formed control joints:
    - a. Depth of not less than 1/4 the sidewalk depth
    - b. Use 0.25 inch radius jointing tool.
  3. Sawed joints:
  4. Not less than 2 inches deep
  5. Make within 24 hours after concrete placement.
- E. Finish all edges with 0.25 inch radius edging tool.



- F. Apply curing compound to all exposed surfaces immediately after finishing operations have been completed and surface water has disappeared.

### 3.6 PROTECTION FROM FREEZING

- A. These provisions shall be followed when the atmospheric temperature is 35°F, or is expected to drop below 35°F during the curing period.
- B. Heating of aggregates and water:
  - 1. Concrete temperature shall be at least 50°F and not more than 80°F at the time of placing.
  - 2. Heating equipment or methods which alter or prevent the entrainment of the required amount of air in the concrete shall not be used.
  - 3. The equipment shall be capable of heating the materials uniformly.
  - 4. Neither aggregates nor water used for mixing shall be heated to a temperature exceeding 150°F.
  - 5. Materials containing frost or lumps of frozen material shall not be used.
  - 6. When either aggregates or water are heated to 100°F, they shall be combined first in the mixer before cement is added.
- C. Immediately after a pour is completed, the freshly placed concrete and forms shall be covered so as to form a protective enclosure and the air in the enclosure kept at a temperature above 50°F for at least 72 hours.

### 3.7 FIELD QUALITY CONTROL

- A. Conform to INDOT Standard Specifications.
- B. If tests verify Work in-place is not in conformance with Specifications, Engineer will determine if Work in-place is adequate for intended use. If Work in-place is determined to be inadequate, Contractor shall follow such remedial or replacement measures which Engineer may require. Contractor shall bear costs associated with testing, engineering analysis, remedial work, and replacement required under terms of this paragraph

END OF SECTION 321623

## SECTION 32 92 19 - SEEDING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Preparing ground surface.
  - 2. Turf Seed.
  - 3. Fertilizer.
  - 4. Mulch.
  - 5. Maintenance.
  - 6. Erosion Control Blankets.
- B. All areas of the site, except as noted herein, which are disturbed and not restored with other surfacing, shall be top-soiled, fertilized, mulched, and seeded. Contractor staging areas are included in this requirement.
- C. Seeded surfaces on less than 3H to 1V slope shall be protected from erosion with mulching materials as specified. Surfaces equal to or steeper than 3H to 1V slope shall be seeded and protected from erosion with erosion control blankets.

#### 1.2 SUBMITTALS

- A. Certifications:
  - 1. Seed mix (INDOT Type U)
  - 2. Fertilizer.
- B. Product information
  - 1. Erosion control Blankets
  - 2. Mulch
- C. Submit in accordance with Section 01 33 00.

#### 1.3 QUALITY ASSURANCE

- A. Meet or exceed the specifications of Federal, State, and local laws requiring inspection for plant disease and insect control.
- B. Seed shall conform to U.S. Department of Agriculture Rules and Regulations under Federal Seed Act and requirements of state seed laws.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Provide seed mixture in sealed containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.

- B. Deliver fertilizer to site in waterproof bags showing weight, chemical analysis, and name of manufacturer.
- C. Deliver erosion control blankets in manufacturer's original containers/wrapping. Do not allow materials to become contaminated with mud or soil prior to installation.

## 1.5 WARRANTY

- A. Warranty lawn areas for period of 1 yr. after acceptance of seeding to be alive and in satisfactory growth at end of warranty period.
  - 1. For purpose of establishing acceptable standard, scattered bare spots, none larger than 1 sq. ft., will be allowed up to a max of 3% of lawn.
  - 2. If an area of seeding is found to be damaged or destroyed due to vandalism, malicious mischief, vehicle ruts and tracks, or acts of God such as flooding and storm debris, then the Owner shall have the responsibility of replacing those lawn areas without cost or responsibility to the Contractor.

## 1.6 MEASUREMENT AND PAYMENT

- A. Unit Pricing:
  - 1. Work specified in this Section is considered incidental and payment shall be included as part of appropriate unit prices included in Bid Form.

## PART 2 - PRODUCTS

### 2.1 SEED

- A. Fresh, re-cleaned, new crop seed in specified varieties and proportions indicated.
- B. Weed content shall not exceed 0.25%.
- C. Mulched Seeding Seed mixture shall conform to the requirements for Seed Mixture U as described in Section 621.06 (a) of the INDOT Specifications.
- D. Temporary Erosion Control seed mixture shall consist of oats for spring application or winter wheat for fall application. Seed Mixture U may also be used.

### 2.2 FERTILIZER

- A. Commercial balanced, uniform in composition, free flowing, conforming to state and federal laws.
- B. Contain percentage by weight as follows, or as modified by topsoil test recommendations.
  - 1. Prior to seeding: 6-24-24.
  - 2. After seeding: 12-12-12.
- C. 50% of elements shall be derived from organic sources.

## 2.3 ACCESSORIES

- A. Mulch: Dry oat or wheat straw or wood cellulose fiber free of weeds and foreign matter detrimental to plant life. Hay or chopped corn stalks are not acceptable. Mulch to be applied at two (2) tons per acre and placed within 24 hours after seeding. The mulch shall have a uniform density of at least 75% over the soil surface.
- B. Water: Furnished by Owner from existing on-site source. Provide pumps, tankage, hose, piping, and attachments as required to bring water to point of use.
- C. Erosion Control Blanket shall conform to Section 621.05 (d), 621.05 (f), or 621.05 (g) of the INDOT Standard Specifications.
  - 1. Roll type, consistent thickness with even fiber distribution over entire area.
  - 2. Approximately 1 in. sq. mesh, nominal weight 1 lb./sq. yd.

## PART 3 - EXECUTION

### 3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

### 3.2 PLANTING SEASONS

- A. Seeding and sodding shall conform to the schedules and requirements set forth in Section 621.11 of the INDOT Specifications except as follows:
  - 1. Erosion control seeding shall occur when required
- B. Perform planting of seed only when weather conditions and soil conditions are acceptable.
- C. Planting season limits may be changed when approved by Engineer.

### 3.3 PREPARATION

- A. Finish grading and topsoiling shall be completed prior to sodding.
- B. Do not plant seed until trees, shrubs, and other landscaping are completed.
- C. Scarify existing topsoil where grade is not being raised, or where topsoil is over compacted, to depth of 2 in. In excess excavated spoil material disposal piles (including prairie grass and wildflower areas) scarify top surface of stockpiled materials.
- D. Grade, rake, and roll with roller weighing not more than 100 lbs./ft. or less than 25 lbs./ft.
- E. Maximum variation from correct elevation is 1/2 in. in 10 ft.

### 3.4 FERTILIZING

- A. Before seeding, apply 6-24-24 fertilizer at uniform rate of 20 lbs./1000 sq. ft. (or as recommended by prairie grass and wildflower seed supplier). Make 2 passes at right angles. Incorporate fertilizer into soil to depth of at least 2 inches by discing, harrowing, or other approved method.
- B. In areas with turf grass after completion of required interim mowings, apply 12-12-12 fertilizer at rate of 15 lbs./1000 sq. ft. Make 2 passes at right angles. Apply fertilizer as recommended by prairie grass and wildflower seed supplier.
- C. Lightly water to aid dissipation of fertilizer.

### 3.5 SEEDING

- A. Apply Type U seed mix at a total rate of not less than 4 lbs./1000 sq. ft. Make 2 passes at right angles.
- B. Seeding method shall establish smooth, uniform turf and may distribute mulch simultaneously if hydroseeding is performed.
- C. Cover seed with 1/8 in. of soil by light raking unless hydroseeding used.
- D. Do not seed following rain, if soil has been compacted by rain, or if ground is too dry.
- E. Do not seed when wind velocity exceeds 6 mph.
- F. Do not seed areas in excess of that which can be mulched on same day.
- G. Immediately after seeding, apply mulch to areas less than 4H:1V slope (unless hydroseeded) and erosion control blanket to slopes equal to or steeper than 4H:1V.
- H. Place mulch loose to allow some sunlight to penetrate and air to circulate, but thick enough to shade ground, conserve soil moisture, and prevent erosion.
- I. Butt ends and edges of erosion control blanket snugly and staple to ground surface with 6 in. staples.
- J. Apply water with fine spray immediately after area has been mulched or application of erosion control blanket. Leave area thoroughly soaked at close of each working day.

### 3.6 PROTECTION

- A. Protect turf areas by erecting temporary fences, barriers, signs, and similar protection as necessary to prevent trampling until acceptance by Owner.
- B. Replace, repair, or replant damaged seeding.
- C. Protect slopes and embankments against erosion until Work is accepted. Repair eroded areas by refilling, reseeding, and re-mulching as required.

### 3.7 FIELD QUALITY CONTROL

- A. Acceptance:
  - 1. Notify Engineer when lawn areas are ready for final inspection.
  - 2. Substantial completion will be granted for turf areas upon conformance with the following;
    - a. Turf reasonable free from weeds, diseases or other visible imperfections.
    - b. Turf displays uniform color, quality and coverage.
    - c. Min 3 mowings performed except on excess excavated material spoil pile where only 1 mowing is required.
    - d. Fertilizer application performed after mowing.
  - 3. Substantial completion will be granted to Prairie Grass and wildflower mix areas upon conformance with the following;
    - a. Areas are reasonably free from unsightly weeds, diseases or other visible imperfections.
    - b. Turf displays uniform quality and coverage
  - 4. After substantial completion, Owner will be responsible for maintenance.

### 3.8 MAINTENANCE

- A. Maintenance shall begin immediately following installation of seed. Continue until substantial completion. If Contractors staging area is not restored prior to substantial completion, staging area shall be maintained until final completion with a minimum of one cutting performed.
- B. Maintain lawns by watering, mowing, and repairing or replanting as may be necessary to produce uniform stand of grass or grass and wildflowers until Work accepted.
- C. Perform first mowing to turf areas when average height of grass reaches 4 in. Perform interim mowings, 2 minimum, as needed to maintain grass height at 3 to 3-1/2 in. Do not remove more than 1/3 of leaf blade by mowing. Do not mow prairie grass and wildflower seeded areas.
- D. After completion of required interim mowings, apply 12-12-12 fertilizer as specified for turf areas and in accordance with prairie grass and wildflower seed supplier recommendations.
- E. Control weed growth. Apply herbicide in accordance with manufacturer's instructions in turf areas only.
- F. Top dress excessive cracks appearing upon soil shrinkage.

END OF SECTION 329219

**DIVISION 33**

**UTILITIES**

## SECTION 33 01 30.10 –SEWER LINE CLEANING

### PART 1 PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. The cleaning of non-man entry pipelines intended to receive closed-circuit television inspection and/or sewer line rehabilitation. Pipes shall be clean to allow for a closed-circuit television camera to discern 95% of the internal pipe surface, to discern all pipeline defects and to facilitate installation of rehabilitation materials.

##### B. Related Requirements:

1. Section 33 01 30.13 – Sewer and Manhole Testing.
2. Section 33 01 30.72 – Relining Sewers.
3. Section 33 01 30.74- Lateral Lining.

#### 1.2 SCOPE OF WORK

- A. CONTRACTOR shall clean and/or heavy clean all sewer segments designated for inspection and/or rehabilitation prior to performing Work. CONTRACTOR shall be solely responsible for his means and methods of sewer cleaning. Cleaning of the sewers shall consist of the removal of all grease, sand, silt, solids, rags, roots, and other debris from each sewer segment, including sags within any sewer segment and including manholes. Selection of cleaning equipment and the method for cleaning shall be based on the condition and/or pipe material of the sewer segment at the time work commences, and shall comply with this Specification.

#### 1.3 MEASUREMENT AND PAYMENT

##### A. Cleaning and Flushing:

1. Work specified in this section shall be considered incidental and payment shall be included as part of appropriate unit prices included in the Bid Form.

##### B. Item 0008: Root Removal:

1. Basis of Measurement: Work specified in this section will be paid on a lineal foot of roots removed basis as specified by the Main Line Table in the Contract Documents.
2. Basis of Payment: Payment will be made for root removal by remote cutting tool.

#### 1.4 SAFETY

- A. CONTRACTOR shall be solely responsible for safety during the performance of all Work. CONTRACTOR shall take satisfactory precautions to protect the sewer segments and appurtenances from damage that might be inflicted upon them by the use of cleaning equipment. Any damage inflicted upon a sewer segment or other public or private property as a result of the CONTRACTOR's cleaning operations, regardless of the cleaning method used and regardless of any other circumstance which may contribute to the damage, shall be repaired by CONTRACTOR at his sole expense.
- B. CONTRACTOR shall not enter into any sewer segment where hazardous conditions may exist until such time as the source of those conditions is identified and eliminated by



CONTRACTOR and/or OWNER. CONTRACTOR shall perform all work in accordance with the latest OSHA confined space entry regulations. CONTRACTOR shall coordinate his work with local fire, police and emergency rescue units. Whenever hydraulically propelled cleaning tools, which depend upon water pressure to provide their cleaning force, or any tools which retard the flow of water in the sewer segment are used, precautions shall be taken by CONTRACTOR to ensure that the water pressure utilized does not result in any damage or flooding to public or private property being served by the sewer segment(s) involved.

## PART 2 PART 2 - PRODUCTS (NOT USED)

## PART 3 PART 3 - EXECUTION

### 3.1 EQUIPMENT FOR SEWER SEGMENT CLEANING

A. Only hydraulic and/or mechanical equipment shall be used by CONTRACTOR to accomplish cleaning activities. Accuracy of equipment and operating method for cleaning shall be judged by the results obtained. When hydraulic or high velocity cleaning equipment is used, a suitable sand trap, weir, or dam shall be constructed in the downstream manhole in such a manner that all solids and debris are trapped and removed thereby preventing such material from passing into the next sewer segment reach. The following are general equipment and performance requirements:

1. Hydraulically Propelled Equipment: The equipment used shall be of a movable dam type and be constructed in such a way that a portion of the dam may be collapsed at any time during the cleaning operation to protect against flooding of the sewer, damage to the sewer, and/or damage to public or private property. The moveable dam shall be equal in diameter to the pipe being cleaned and shall provide a flexible scraper around the outer periphery to ensure removal of grease, sewer cleaning balls or other equipment, which cannot be collapsed shall not be permitted for use.
2. High-Velocity Jet Equipment: All high-velocity sewer cleaning equipment shall be constructed for ease and safety of operation. The equipment shall have a selection of two or more high-velocity nozzles. The nozzles shall be capable of producing a scouring action from 15 to 45 degrees in all sizes of line designated to be cleaned. Equipment shall also include a high-velocity gun for washing and scouring manhole walls and floor. The gun shall be capable of producing flows from a fine spray to a solid stream. The equipment shall carry its own water tank, auxiliary engines, pumps, and hydraulically driven hose reel.
  - a. Liquid decanted or separated from the solids shall be returned to the sewer and shall not contain solids having greater than a 1/2-inch.
3. Mechanically Powered Equipment: Power rodding machines shall be either a sectional or continuous rod type capable of holding a minimum of 750 feet of rod. The rod shall be specifically heat-treated steel. To insure safe operation, the machine shall be fully enclosed and have an automatic safety clutch or relief valve.
4. Buckets, scrapers, scooters, porcupines, brushes and other mechanical equipment may also be utilized. All equipment and devices shall be operated by experienced personnel so that sewer lines are not damaged in the process of cleaning.

### 3.2 ROOT REMOVAL

- A. Remove roots in the designated sewer sections. Ensure complete removal of roots to the joints. Use mechanical equipment that can be operated remotely, such as rodding machines, bucket machines, winches using root cutters and porcupines, and equipment such as high-velocity jet cleaners. Capture and remove roots from the sewerline at the downstream manhole or structure.

### 3.3 ACCESS

- A. Access for cleaning purposes shall only be via existing manhole or pipe openings.

### 3.4 BLOCKAGES PREVENTING CLEANING

- A. If cleaning of an entire sewer section cannot be successfully performed from one manhole, equipment shall be set up on the other manhole and cleaning again attempted. No additional payment allowance shall be made for reverse set-ups. If on reverse set-up successful cleaning also cannot be performed or equipment fails to traverse entire sewer line section, it shall be assumed that a major blockage or defect exists and cleaning effort shall be abandoned.
- B. CONTRACTOR shall determine the location of major blockage(s) by measuring length of hose or rod inserted from manholes at each end and immediately report location of blockage(s) to ENGINEER and CONTRACTOR shall note these conditions in its field log.
- C. CONTRACTOR shall recognize that there are some conditions such as broken pipe and major blockages that prevent cleaning from being accomplished or where damage could result if cleaning were attempted or continued. ENGINEER shall be immediately notified by CONTRACTOR of any and all conditions which in the opinion of CONTRACTOR warrant termination of cleaning activities. If CONTRACTOR's cleaning equipment becomes lodged in a sewer, it shall be removed by CONTRACTOR at CONTRACTOR's expense. This shall include excavation and repair of the sewer, underground utilities, backfilling, and surface restoration.

### 3.5 DEBRIS REMOVAL AND DISPOSAL

- A. CONTRACTOR shall remove all sludge, dirt, sand, rocks, grease and other solid or semisolid material and debris resulting from the cleaning operations from the downstream manhole of the sewer segment being cleaned. If a sewer segment has only one access point, all material shall be removed via the single access. Passing material from sewer segment to sewer segment shall not be permitted. In the event that sludge, dirt, sand, rocks, grease and other solid or semisolid material or debris resulting from the cleaning operations are observed and/or detected by ENGINEER as passing to downstream sewer segment(s), CONTRACTOR shall be responsible for cleaning such downstream sewer segment(s) at no additional cost to OWNER.

B. CONTRACTOR shall be responsible for the handling, hauling and disposal of all debris, silt, and accumulated solids removed from the sewer. All debris, silt and solids removed by CONTRACTOR shall be disposed of at a facility licensed for the handling and disposal of such materials in accordance with all appropriate codes, rules and regulations for the handling and disposal of such materials. Under no circumstances shall the removed sewage or solids be dumped onto streets or into ditches, catch basins, drains, sanitary or combined sewer manholes, or otherwise improperly disposed. If sewage is unintentionally spilled, discharged, leaked or otherwise deposited in the open environment, CONTRACTOR shall be responsible for any clean-up and disinfection of the affected area. CONTRACTOR shall comply with all local, State and Federal regulatory requirements regarding spills including notification of IDEM. Improper disposal of sewage or solids removed from the sewers may subject CONTRACTOR to fines imposed by OWNER or other regulatory entities. In addition, CONTRACTOR may be subject to civil and/or criminal penalties for improper disposal of removed materials under the law.

### 3.6 ACCEPTANCE

A. Acceptance of sewer line cleaning will be based on inspection at manholes and viewing of video tape completed following cleaning. A line will be considered clean if the depth of debris remaining after cleaning is less than or equal to the following:

<u>Pipe Size</u>	<u>Maximum Debris Remaining</u>
Greater than or equal to 8 inches	Negligible

B. If cleaning is deemed unsatisfactory, CONTRACTOR shall re-clean and re-inspect the sewer line until cleaning is shown to be satisfactory.

END OF SECTION

## SECTION 330130.13 - SEWER AND MANHOLE TESTING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Testing of Gravity Sewer Piping:
    - a. Low pressure air testing.
  - 2. Deflection testing of plastic sewer piping.
  - 3. Testing of Manholes:
    - a. Vacuum testing.
- B. Related Requirements:
  - 1. Section 330130.72 - Relining Sewers: Relining of sanitary sewer piping and associated preparatory Work.
  - 2. Section 333111 – Public Sanitary Sewerage Gravity Piping.
  - 3. Section 330513.16 – Public Manholes and Structures.

#### 1.2 REFERENCE STANDARDS

- A. ASTM International:
  - 1. ASTM C1244-11a - Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill.
  - 2. ASTM F1417-11a – Standard Practice for Installation Acceptance of Plastic Non-Pressure Sewer Lines using Low-Pressure Air
  - 3. ASTM D2122 - Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings.

#### 1.3 MEASUREMENT AND PAYMENT

- A. Unit Pricing:
  - 1. Work specified in this section shall be considered incidental and payment shall be included as part of appropriate unit prices included in the Bid Form.

#### 1.4 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Submit following items prior to start of testing:
  - 1. Testing procedures.

2. List of test equipment.
3. Testing sequence schedule.
4. Provisions for disposal of flushing and test water.
5. Certification of test gage calibration.

C. Test and Evaluation Reports: Indicate results of manhole and piping tests.

## PART 2 - PRODUCTS

### 2.1 AIR TESTING

#### A. Equipment:

1. Air compressor.
2. Air supply line.
3. Shutoff valves.
4. Pressure regulator.
5. Pressure relief valve.
6. Stopwatch.
7. Plugs.
8. Pressure Gage: Calibrated to 0.1 psi.

### 2.2 DEFLECTION TESTING

#### A. Equipment:

1. "Go, no go" mandrels.
2. Pull/retrieval ropes.

### 2.3 VACUUM TESTING

#### A. Equipment:

1. Vacuum pump.
2. Vacuum line.
3. Vacuum Tester Base:
  - a. Compression band seal.
  - b. Outlet port.
4. Shutoff valve.
5. Stopwatch.
6. Plugs.
7. Vacuum Gage: Calibrated to 0.1 in. Hg.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.
- B. Verify that manholes and piping are ready for testing.
- C. Verify that trenches are backfilled.

### 3.2 PREPARATION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for preparation.
- B. Plugs:
  - 1. Plug outlets, wye branches, and laterals.
  - 2. Brace plugs to resist test pressures.

### 3.3 FIELD QUALITY CONTROL

- A. Section 017000 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.
- B. Low-Pressure Air Testing:
  - 1. Test each reach of gravity sewer piping between manholes.
  - 2. Introduce air pressure slowly to approximately 4 psig.
  - 3. Determine ground water elevation above spring line of piping.
  - 4. For every foot of ground water above spring line of piping, increase starting air test pressure by 0.43 psi.
  - 5. Do not increase pressure above 10 psig.
  - 6. Allow pressure to stabilize for at least five minutes.
  - 7. Adjust pressure to 3.5 psig or to increased test pressure as determined above when ground water is present.
  - 8. Do not make allowance for laterals.
  - 9. Minimum Testing Duration in Minutes per 100 feet:
    - a. Pipe Size 3 Inches: 0.2.
    - b. Pipe Size 4 Inches: 0.3.
    - c. Pipe Size 6 Inches: 0.7.
    - d. Pipe Size 8 Inches: 1.2.
    - e. Pipe Size 10 Inches: 1.5.
    - f. Pipe Size 12 Inches: 1.8.
    - g. Pipe Size 15 Inches: 2.1.

- h. Pipe Size 18 Inches: 2.4.
  - i. Pipe Size 21 Inches: 3.0.
  - j. Pipe Size 24 Inches: 3.6.
  - k. Pipe Size 27 Inches: 4.2.
  - l. Pipe Size 30 Inches: 4.8.
  - m. Pipe Size 33 Inches: 5.4.
  - n. Pipe Size 36 Inches: 6.0.
10. Record drop in pressure during testing period.
  11. If air pressure drops more than 1.0 psi during testing period, piping has failed.
  12. If 1.0 psi air pressure drop has not occurred during testing period, piping is acceptable; discontinue testing.
  13. If piping fails, test reach of piping in incremental stages until leaks are isolated, repair leaks, and retest entire reach between manholes.

C. Deflection Testing of Plastic Sewer Piping:

1. Perform vertical ring deflection testing on PVC and acrylonitrile butadiene styrene sewer piping after backfilling has been in place for at least 30 days but not longer than 12 months.
2. Allowable maximum deflection for installed plastic sewer pipe is no greater than five percent of original vertical internal diameter.
3. Perform deflection testing using properly sized rigid ball or "go, no go" mandrel.
4. Furnish rigid ball or mandrel with diameter not less than 95 percent of base or average inside diameter of pipe, as determined by ASTM standard to which pipe is manufactured; measure pipe diameter in compliance with ASTM D2122.
5. Perform testing without mechanical pulling devices.
6. Locate, excavate, replace, and retest piping that exceeds allowable deflection.

D. Manhole Testing:

1. If air testing, test whenever possible prior to backfilling in order to more easily locate leaks.
2. Repair both outside and inside of joint to ensure permanent seal.
3. Test 100% of manholes with manhole frame set in place.
4. Vacuum Testing:
  - a. Comply with ASTM C1244.
  - b. Plug pipe openings; securely brace plugs and pipe.
  - c. Inflate compression band to create seal between vacuum base and structure.
  - d. Connect vacuum pump to outlet port with valve open, then draw vacuum to 10 in. Hg.
  - e. Close valve.
  - f. Manhole Test Duration in Seconds:
    - 1) Diameter 4 Feet; 60.
    - 2) Diameter 5 Feet; 75.
    - 3) Diameter 6 Feet; 90.
  - g. Record vacuum drop during test period.

- h. If vacuum drop is greater than 1 in. Hg during testing period, repair and retest manhole.
  - i. If vacuum drop of 1 in. Hg does not occur during test period, manhole is acceptable; discontinue testing.
  - j. If vacuum test fails to meet 1 in. Hg drop in specified time after repair, repair and retest manhole.
- 5. If unsatisfactory testing results are achieved, repair manhole and retest until result meets criteria.
  - 6. Repair visible leaks regardless of quantity of leakage.

END OF SECTION 330130.13



## SECTION 330130.72 - RELINING SEWERS

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Cleaning and flushing existing sanitary sewers.
2. Taking video of existing sewers and analyzing their condition.
3. Liners for existing sewers:
  - a. Inverted, resin-impregnated tube pipe liner
4. Reestablishing service connections.

##### B. Related Requirements:

1. Section 33 01 30.10 – Sewer Line Cleaning.
2. Section 33 01 30.74 – Lateral Lining.
3. Section 33 05 13.16 – Public Manholes and Structures.

#### 1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

##### A. Section 012000 - Price and Payment Procedures: Contract Sum/Price modification procedures.

##### B. Item 0005: 8-inch Diameter CIPP Lining:

1. Basis of Measurement: By linear foot, measuring horizontally.
2. Basis of Payment: Includes pipe cleaning and flushing; TV inspection and videography; elimination of active infiltration prior to liner installation; lining materials necessary for installation, and liner installation.

##### C. Item 0006: 10-inch Diameter CIPP Lining:

1. Basis of Measurement: By linear foot, measuring horizontally.
2. Basis of Payment: Includes pipe cleaning and flushing; TV inspection and videography; elimination of active infiltration prior to liner installation; lining materials necessary for installation, and liner installation.

##### D. Item 0007: 12-inch Diameter CIPP Lining:

1. Basis of Measurement: By linear foot, measuring horizontally.
2. Basis of Payment: Includes pipe cleaning and flushing; TV inspection and videography; elimination of active infiltration prior to liner installation; lining materials necessary for installation, and liner installation.

##### E. Item 0009: Cut Protruding Tap:

1. Basis of Measurement: By each protruding tap cut.
2. Basis of Payment: Includes the cutting of any taps that would interfere with lining the sewers. Dispose of excess material. See Contract Documents.

##### F. Item 0010: Sanitary Sewer, Lateral Reinstatement, In Cured-In-Place Pipe:

1. Basis of Measurement: By each active lateral connection that must be reinstated after CIPP lining of the main line pipe.
2. Basis of Payment: Work includes the reinstatement of all laterals not capped along the mainline sewers lined with CIPP in the course of the work. See Contract Documents.

### 1.3 REFERENCE STANDARDS

#### A. ASTM International:

1. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics.
2. ASTM D543 – Test Method for Resistance of Plastics to Chemical Reagents.
3. ASTM D638 - Standard Test Method for Tensile Properties of Plastics.
4. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
5. ASTM D1693 - Standard Test Method for Environmental Stress-Cracking of Ethylene Plastics.
6. ASTM D2837 - Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products.
7. ASTM D3350 - Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
8. ASTM D5260 – Standard Classification for Chemical Resistance of Poly (Vinyl Chloride) (PVC) Homopolymer and Copolymer Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
9. ASTM D5813 – Standard Specification for Cured-in Place Thermosetting Resin Sewer Pipe.
10. ASTM F1216 - Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube.

### 1.4 COORDINATION

- A. Section 013000 - Administrative Requirements: Requirements for coordination.
- B. Coordinate Work of this Section with users connected to system.
- C. Notify home owners and businesses at least 48 hours in advance of expected disruption of sanitary service.
- D. Limit disruption of service to individual properties to one-time occurrence for maximum of eight hours.
- E. Provide and maintain temporary facilities, including piping and pumps, to meet requirements.

### 1.5 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit manufacturer information on liner material, curing chemicals, and lubricants. Also include:

- CIPP system data,
  - Manufacturer's resin data test results
  - Resin enhancer manufacturer's data
  - Bond enhancer manufacturer data, certification of applicability of resin
  - Complete description of proposed wet-out procedures.
- C. CIPP liner installation plan: Document proposed pre-lining preparation methods to address at a minimum, liner inversion locations, required excavation locations and broken/collapsed laterals and manholes.
- D. Shop Drawings: Indicate liner dimensions for each pipe size to be relined.
- E. CCTV RECORDINGS:
1. Submit video recordings of piping sections as follows:
    - a. Show condition of existing pipe and pipe joints and location of existing service connections after root cutting, cleaning and prior to relining.
    - b. Show cured liner and reestablished service connections after relining Work is complete.
- F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
1. Liner manufacturer shall have in place a quality management system which complies with the requirements of ISO 9000. Submit certification of compliance.
- G. Delegated Design Submittals: Submit signed and sealed Shop Drawings with structural design calculations and assumptions for liner thickness. The engineering design calculations for the liner thickness used for installation of the CIPP performed and certified by a Registered Professional Engineer in the State of Indiana.
- H. Test and Evaluation Reports: Submit reports certifying liner material meets ASTM testing standards listed in this Section.
- I. Manufacturer Instructions:
1. Submit detailed description of liner placement and curing procedures for piping.
  2. Include description of procedures for sealing liner material at manholes and reestablishing service connections.
  3. Submit manufacturer's requirements for receiving, handling, and storage of materials.
- J. Source Quality-Control Submittals: Indicate results of factory tests and inspections.
- K. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
- L. Qualifications Statements:

1. Submit qualifications for manufacturer, installer, licensed professional, pipeline assessor, and inspector.
2. Submit manufacturer's approval of installer.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual locations of each service connection.

#### 1.7 QUALITY ASSURANCE

- A. Perform Work according to lining manufacturer's standards.

#### 1.8 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience.
- B. Installer: Company specializing in performing Work of this Section with minimum three years' documented experience in installation of liner materials and licensed or certified by manufacturer.
- C. Licensed Professional: Professional engineer experienced in design of specified Work and licensed in State of Indiana.
- D. Pipeline Assessor:
  1. Person specializing in assessing condition of sewer pipelines prior to and following relining.
  2. Currently certified in Pipeline Assessment and Certification Program (PACP) of the National Association of Sewer Service Companies (NASSCO).
- E. Inspector:
  1. Person specializing in inspection of sewer pipeline rehabilitation.
  2. Currently certified in Inspector Training and Certification Program (ITCP) of NASSCO.

#### 1.9 DELIVERY, STORAGE, AND HANDLING

- A. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- B. Store liner material according to manufacturer instructions.
- C. Protect liner material from moisture, sunlight (if applicable) and other potential damage. Any liner damaged in shipment shall be replaced as directed by the ENGINEER at no additional cost to OWNER.

## 1.10 EXISTING CONDITIONS

### A. Field Measurements:

1. Verify field measurements prior to fabrication.
2. Indicate field measurements on Shop Drawings.

## 1.11 WARRANTY

- ### A. Furnish three-year manufacturer's warranty for liner.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE AND DESIGN CRITERIA

- #### A. Design lining material to have sufficient structural strength to support dead loads, live loads, and groundwater load imposed, assuming existing pipe cannot share loading or contribute to structural integrity of liner. Design of circular portions of the liner shall be based on the condition of the existing pipe which shall be classified as fully deteriorated based upon the definitions contained in ASTM F1216 Appendix X1.
1. Assume groundwater is five feet below ground surface for design calculations.
  2. For circular portions of the existing sewer, the ovality is considered to be 5 percent in circumference.
- #### B. **Design lining material for pipe segment from Manhole 02121049 to Manhole 02121050 to use CTM (Continuous Temperature Monitoring) technology to ensure complete cure at all points along the sewer.**
- #### C. Design liner to least possible thickness to minimize decreasing interior pipe diameter.
- #### D. Design liner material to provide jointless, continuous, watertight and structurally sound construction able to withstand imposed static, dynamic, and hydrostatic loads on a long-term basis. The proposed cured-in-place pipe liner to be used shall be designed for a minimum fifty-year service life under continuous loading conditions.
- #### E. General Corrosion Requirements: The cured-in-place pipe system shall utilize resins which will withstand the corrosive effect of the existing residential, commercial, and industrial effluents, liquids, and/or gases containing hydrogen sulfide, carbon monoxide, carbon dioxide, methane, dilute sulfuric acid and external exposure to soil bacteria and chemical attack which may be due to materials in the surrounding ground and sewage within.

### 2.2 SIZING

- #### A. The liner shall be fabricated to a size that when installed shall neatly and tightly fit the internal perimeter of the pipe being rehabilitated as specified by Engineer.
- #### B. Contractor shall verify all lengths in the field prior to fabrication of the tube.

## 2.3 INVERTED, RESIN-IMPREGNATED TUBE PIPE LINER

A. Furnish materials according to the latest versions of ASTM F1216, including appendices.

B. Description:

1. Fabric Tube:

- a. One or more layers of absorbent, non-woven felt fabric, felt/fiberglass, or fiberglass.
- b. Comply with ASTM D5813, F1216, F1743, and F2019.
- c. Capable of absorbing and carrying resins.

2. Resin: Corrosion-resistant polyester or vinyl ester resin and catalyst system that, when properly cured within tube composite, meets requirements of ASTM F1216, and has the following minimum physical properties for the cured pipe, while still meeting the Performance and Design Criteria in paragraph 2.1.A in this specification:

- |   |             |
|---|-------------|
| a. Tensile Strength (minimum)                         | 3,000 psi   |
| b. Flexural Strength (minimum)                        | 4,500 psi   |
| c. Flexural Modulus of Elasticity (minimum)           | 250,000 psi |
| d. Long-term Flexural Modulus of Elasticity (minimum) | 125,000 psi |

3. Wet-Out Fabric Tube: Uniform thickness and excess resin distribution that, when compressed at installation pressure, will meet or exceed design thickness after cure.

4. End Sealing: Each end of the CIPP shall be sealed to provide a watertight seal between the original pipe and the CIPP liner. Sealing materials shall be compatible with the original pipe material and shall be suitable for application to moist surfaces.

a. Acceptable end sealing products include:

- 1) Hydrophilic O-rings by Insignia or Approved equal.
- 2) Hydrophilic strip waterstop, non-bentonite, modified chloroprene rubber expandable gasket complying with ASTM D412 and ASTM D2240 as manufactured by Western Textile Co., Greenstreak Division, or approved equal.
- 3) Hydraulic grout – shall be quick-setting, non-shrink hydraulic grout.

## 2.4 CHEMICAL GROUT

A. Chemical Grout:

1. Products: Avanti, Sauereisen, Sealing Systems, Inc., DeNeef or Approved Equal.
2. Materials, additives, mixture ratios, and procedures utilized for the grouting process shall be in accordance with manufacturer's recommendations and shall be appropriate for the application.
3. Chemical grout used to stop very active infiltration and fill voids.

## 2.5 SOURCE QUALITY CONTROL

- A. Inspect extruded material for defects and physical properties according to ASTM D1785. Verify liner material is homogeneous and free of defects, cracks, holes, blisters, protrusions, foreign materials, or other deleterious faults.
- B. Chemical and Physical Testing: Test cured samples according to ASTM D5260.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.
- B. Verify location of piping to be relined or replaced.

### 3.2 PREPARATION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for installation preparation.
- B. Coordination with Collection System Customers
  - 1. CONTRACTOR shall notify and coordinate with all collection system customers connected to the sewer to be rehabilitated whose building sewer laterals will be out of service during the cured-in-place pipe installation, curing and restoration processes. Notifications shall be in writing via door hanger, door flier or U.S. mail given 24-hours but no more than 48 hours in advance of loss of service, (excluding weekends and holidays). Notification shall clearly state the purpose of the work, shall advise all affected customers against water usage until the sewer line is placed back in service, and shall clearly state the potential consequences of use of residential wastewater generating facilities during the time when the building sewer service will be out of service (i.e. sewer back-up). The notice shall include a local 24-hour contact telephone number for residents to call if they have questions regarding the work.
  - 2. The maximum time of no service shall be eight (8) hours for any property served by the sewer.
- C. Cleaning: Clean pipeline per Specification 33 01 30.10 – Sewer Line Cleaning.  
In addition to the requirements of Section 33 01 30.10, CONTRACTOR shall be responsible for clearing the designated sewer line of obstructions such as dropped joints, protruding lateral connections, and broken pipe/crushed pipe which reduces the cross-sectional area by more than 40% and/or which will prevent the insertion of liner. If pre-installation television inspection required to be performed by the CONTRACTOR reveals an obstruction that cannot be removed by conventional cleaning and/or cutting equipment, CONTRACTOR shall Notify Engineer immediately.
- D. Initial Video Inspection and Repair:

1. Conduct closed-circuit video inspection as specified in Section 33 01 30.10 – Sewer Line Cleaning.
2. Determine condition of existing piping, degree of offset of joints, crushed walls, and obstructions.
3. Determine sizes and locations of service entrances and connections.
4. Evaluation of pipe conditions to be done by a pipeline assessor.
5. Inspection of Work to be done by an ITCP-certified inspector.
6. Clear obstructions, service piping protrusions, and other materials from bottom of existing pipe to ensure inserted pipe liner directly contacts existing pipe wall.

E. Seal Leaks

1. Seal any and all active leaks identified during video inspection using chemical grout. If the Contractor encounters any defects, which in their opinion need to be fixed by chemical grouting in addition to the active infiltration, these repairs will be subject to the Engineer's review and approval prior to execution.

F. Cut Taps

1. Cut any protruding taps that will impact the Work lining the sewers.

### 3.3 INSTALLATION

A. Perform relining and reestablish service connections without need for excavation while minimizing disruptions to adjacent occupied buildings, traffic and railroad.

1. The CIPP shall be installed in accordance with the practices given in ASTM F1216 (for direct inversion installations) or ASTM F1743 (for pulled-in-place installations).
2. Prior to installation, the liner shall be free of all tears, holes, cuts, foreign materials, and other defects.
3. Coat outside or inside layer of fabric tube (before inversion) with an impermeable, flexible membrane that will contain resin and facilitate, vacuum impregnation and monitoring of resin saturation during resin impregnation (wet-out) procedure. A vacuum impregnation process shall be used in conjunction with a roller system to achieve a uniform distribution of the resin throughout the CIPP tube.
4. Prior to installation, place remote temperature gages or sensors inside host pipe to monitor temperature during cure cycle.
5. Position wet-out tube in pipeline using method specified by manufacturer. Care should be exercised not to damage tube during installation.
6. CTM- Continuous Temperature Monitoring Technology

### 3.4 CURING

1. After the CIPP liner installation is completed the Installation Contractor shall supply a suitable heat source and recirculation equipment (if required). The equipment shall be capable of delivering hot water or steam throughout the section to uniformly raise the temperature above the temperature required to affect a cure of the resin.
2. The heat source shall be fitted with suitable monitors to gauge the temperature of the incoming and outgoing heat supply (for water cure) and outgoing heat supply (for steam



cure). Water or air temperature in the pipe during the cure period shall be as recommended by the resin Manufacturer.

3. Temperature monitoring shall be end of liner or continuous as described below.
  - a. End of liner temperature monitoring shall be required for all installations and shall be incidental to bid. Prior to installation remote temperature gauges (thermocouple wires) shall be placed inside the host pipe and the CIPP liner at the invert level and crown (6- and 12- o'clock positions) of each end to monitor the temperatures during the cure cycle. Liner and host pipe interface temperature shall be monitored and logged during cure and cool down.
  - b. Continuous liner temperature monitoring shall be required in addition to end of liner temperature monitoring for **pipe segment from Manhole 02121049 to Manhole 02121050**. Sensors shall be strategically placed at points where a significant heat sink is likely to be anticipated. The fiber optic system shall be connected to a laptop computer and collect temperature readings and log data for continuous monitoring during cure and cool-down, as well as, future analysis and documentation of the temperature gradients during all aspects of the curing process, including heating, exotherm, curing, and cool-down of the CIPP installation. The system shall also provide a secure web-based application that will allow 2 seats for the Owner and Engineer to log in from a computer and/or smartphone and monitor the cure and cool down process remotely for the entire duration. Such access shall be provided through cellular service. Contractor shall provide end of the liner temperature monitoring in accordance with these specifications with all continuous temperature monitoring (CTM).
4. Initial cure shall be deemed to be completed when inspection of the exposed portions of CIPP appears to be hard and sound and the remote temperature sensor(s) indicates that the temperature is of a magnitude to realize an exotherm. The cure period shall be of a duration recommended by the resin Manufacturer, as modified for the installation process, during which time the recirculation of the heat and/or cycling of the heat exchanger to maintain the temperature continues.

### 3.5 COOLING

1. Cool down may be accomplished by the introduction of cool water or air to replace water or pressurized air being relieved. Care shall be taken in the release of the hydrostatic head so that a vacuum will not be developed.

### 3.6 FINISH

- A. The finished CIPP shall be continuous over the entire length of an insertion run and be as free as commercially practical from visual defects such as foreign inclusions, dry spots, pinholes, and delamination. The CIPP shall be homogeneous and free of any leakage from the surrounding ground to the inside of the CIPP.
- B. Where the CIPP is installed through an intermediate manhole uninterrupted, the invert shall be maintained smooth through the manhole, with approximately the bottom half of the CIPP continuous through the manhole. The invert of the manhole shall be shaped and grouted as necessary to support the liner. The cost of this work shall be included in the CIPP unit price.

- C. During the warranty period, any defects which will affect the integrity or strength of the CIPP, collect solids, or reduce hydraulic flow capabilities of the product shall be repaired at the Installation Contractor's expense in a manner mutually agreed upon by the Owner and the Installation Contractor.

### 3.7 LATERAL REINSTATEMENT:

- 7. Reestablish existing sewer service connections through use of closed-circuit television camera and remote-controlled cutting device.
- 8. Match invert of reestablished service with previously existing invert. Maintain minimum of 95 percent to maximum of 100 percent of original service connection opening.
- 9. After re-establishing service connection, flush piping clean.
- 10. All cut lateral and service connections shall be free of burrs, frayed edges, or any restriction preventing free flow of wastewater. Laterals shall be reinstated to a minimum of 90% of their original diameter and no more than 100% of their minimum diameter. The CIPP shall be tightly sealed at the cut openings with no gaps.

### 3.8 FIELD QUALITY CONTROL

- B. Section 017000 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.
- C. For every two thousand five hundred (2,500) lineal feet of liner installed, two (2) flat plate samples shall be processed and tested. For pipe diameters less than 18 inches, restrained end samples may also be utilized. The CIPP physical properties shall be tested in accordance with ASTM F1216, Section 8, using either allowed sampling method.
- D. Testing shall be completed by an accredited, independent laboratory. Testing results shall be provided to the Owner within 7 days of receipt of such results.
- E. CIPP installation shall be inspected by post-lining video inspection. Variations from true line and grade may be inherent because of the conditions of the original piping. No infiltration of groundwater should be observed. All service entrances should be unobstructed and accounted for.
- F. Flexural testing of the collected samples shall be conducted in accordance with ASTM D790, latest version, with only the structural portion of the CIPP being tested.
- G. Wall thickness of samples shall be determined in a manner consistent with 8.1.2 of ASTM D5813.
- H. If liner fails to re-form or cure, remove failed liner and install new liner.
- I. Conduct closed-circuit video inspection of completed relining Work.
- J. No infiltration of groundwater is permitted.
- K. Acceptance:

1. No visual defects, including foreign inclusions, dry spots, pinholes, cracks, or delamination.
2. Confirm that service connections are complete and unobstructed.

END OF SECTION 330130.72

## SECTION 33 01 30.74 – LATERAL LINING

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. This specification covers requirements and test methods for the reconstruction of a sewer service lateral pipe and a portion of the mainline pipe without excavation accomplished using a cured in place liner such as the T-Liner® by LMK Enterprises, Service Connection Seal + Lateral by BLD Services LLC, Perma-Lateral Lining System by Perma-Liner Industries, Inc., or approved equal. The lateral pipe shall be remotely accessed from the mainline pipe. The lining shall be accomplished by the installation of a resin impregnated one-piece lateral liner by means of air inflation and inversion. The liner shall be pressed against the host pipe by pressurizing a bladder that is held in place until the thermo-set resins have cured. When cured, the liner shall extend over a predetermined length of the service lateral and a particular section of the main pipe as a continuous, one piece (stitched or flame bonded), tight fitting, corrosion resistant and non-leaking cured in-place pipe. There is no implied guarantee as to the quantity of work as quantities are an approximation and may be adjusted during the contract period.
2. The CONTRACTOR shall furnish all labor, components, materials, tools, and appurtenances necessary for the performance and completion of the contract.
3. When the main line sewer is to be rehabilitated by CIPP or replaced, mainline CIPP and lateral reinstatements or reconstruction shall be completed prior to lining of laterals.

##### B. Related Requirements:

1. Section 33 01 30.10 – Sewer Line Cleaning.
2. Section 33 01 30.72 – Relining Sewers.

#### 1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

##### A. Section 012000 - Price and Payment Procedures: Contract Sum/Price modification procedures.

##### B. Item 0011: Lateral Liner Using Full Mainline Circumference Connection, 6”, Up to 5 Feet:

1. Basis of Measurement: By EACH one piece main connection and lateral liner up to five feet in length as measured from the upstream side of the lateral liner to the connection with the sewer line.
2. Basis of Payment: Work includes, but is not necessarily limited to, all labor, equipment, transportation and materials required to rehabilitate sections of 6-inch laterals up to 5 feet in length, in gravity sewers that are being partially replaced or rehabilitated by CIPP; bypass pumping; cleaning; spoil removal and legal hauling and disposal; pre- and post-construction televising of connection and

lateral; labor; equipment; cured-in-place pipe materials; hydrophilic materials; installation; safety; dust/erosion control; removal of surplus excavated material; and clean-up, and all other work specified or not which is reasonably required to provide a completed installation, all in accordance with the Contract Documents.

C. Item 0012: Lateral Liner, 6", Additional Length:

1. Basis of Measurement: By LINEAR FEET of lateral lined measured from the upstream side of the lateral liner to the mainline connection LESS 5 feet.
2. Basis of Payment: This Work shall include all labor, equipment, transportation and materials required to rehabilitate sections of 6-inch laterals in gravity sanitary sewers, at all depths, in all diameters of mainline sewer by trenchless methods using a one-piece main and lateral lining product including, but not necessarily limited to: all bypass pumping, cleaning, spoil removal and legal hauling and disposal, pre- and post-construction televising of connection and lateral, labor, equipment, cured-in-place pipe materials, installation, safety, dust/erosion control, testing, site restoration not included in other bid items, and all other work specified or not which is reasonably required to provide a completed installation, all in accordance with the Contract Documents. CONTRACTOR shall include all incidental cost in the unit price for the Lateral Liner up to 5 Feet item.

1.3 NOTIFICATION

- A. CONTRACTOR shall notify and coordinate with all collection system customers whose building sewer laterals will be out of service during the lateral lining installation, curing and restoration processes. Notifications shall be in writing via door hanger, door flier or U.S. mail given 24-hours but no more than 48 hours in advance of loss of service, (excluding weekends and holidays). Notification shall clearly state the purpose of the work, shall advise all affected customers against water usage until the sewer line is placed back in service, and shall clearly state the potential consequences of use of residential wastewater generating facilities during the time when the building sewer service will be out of service (i.e. sewer back-up). The notice shall include a local 24-hour contact telephone number for residents to call if they have questions regarding the work.
  1. CONTRACTOR shall notify homeowner when the lateral is ready for service again. This notice may be by door hanger or personal contact.
- B. The maximum time of no service shall be eight (8) hours for any property served by the sewer.

1.4 RELATED SPECIFICATIONS AND STANDARDS

- A. This specification references American Society for Testing and Materials (ASTM) Standard Specification F1216, F1743, F2561, F3240, D790, D5831, D618 (latest editions) and their reference standards, which are made a part hereof by such reference and shall be the latest edition and revision thereof. All work shall comply with the reference standard unless specifically stated otherwise in this Specification.
- B. City of Greenfield Utilities Standards

## 1.5 MINIMUM QUALIFICATIONS

- A. A qualified CONTRACTOR for installing a mainline/lateral connection and lateral repair system shall use a Manufactured System that has a minimum of a five-year history of satisfactory performance and the Manufactured System shall have performed a minimum of 5,000 successful installations during this time period in the U.S., including 100,000 feet of lateral lining. CONTRACTOR shall submit a list of installation projects, numbers of connections sealed and lateral footage lined providing Owner's contact names, addresses, and telephone numbers for reference.
- B. Lateral Lining Field Supervisor/Foreman: Minimum five (5) years as a foreman/superintendent for a cured-in-place lateral lining crew.

## 1.6 SUBMITTALS

- A. Pre-construction Submittals: The CONTRACTOR shall submit the following information to the OWNER prior to the commencement of any work. No changes shall be allowed without written approval from the OWNER.
  - 1. List of Installation projects, numbers of connections sealed and lateral footage lined. Provide owner's contact name, address, and telephone number for references. Provide minimum of 5 references.
  - 2. Fully detailed shop drawings and/or legible catalog cuts of all items included within this Section.
  - 3. Detailed installation procedures and specific procedures for rehabilitation of sanitary service laterals.
  - 4. Product data (including Material Safety Data Sheets (MSDS)) covering all the materials of construction to include resin, chemical grout, hydrophilic O-Rings or hydrophilic caulk, and liner materials.
  - 5. Statement of Warranty – An unconditional, non-prorated warranty covering all labor and materials, to stop infiltration, material failures, deterioration, defects – including sliding out of the lateral, etc. shall be required by the CONTRACTOR and the manufacturer for the time period specified below:
    - a. Three year warranty.
    - b. All other additional warranties as provided by the manufacturers will be applicable.
  - 6. CONTRACTOR Certification - Applicators shall be factory trained and provide certification from the manufacturer that the CONTRACTOR is an approved product applicator.
  - 7. Manufacturer's Resin Data Test Results
  - 8. Resin Enhancer Manufacturer's Data

9. Bond Enhancer Manufacturer's Data

10. Certification of Applicability of Resin

B. Post-Construction Submittals:

1. CCTV Media

- a. CONTRACTOR shall provide CCTV videos of lateral after lining is completed to OWNER utilizing a lateral launch camera.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Unless otherwise specified in the Contract Documents, CONTRACTOR shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance and completion of the Work.
- B. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.
- C. The CONTRACTOR shall protect, store, and handle the materials during transportation, while on-site and during installation in accordance with manufacturer's recommendations to ensure that they are not damaged.
- D. If any materials become damaged before or during installation, they shall be replaced at the CONTRACTOR's expense before proceeding further.

### PART 2 - PRODUCTS

#### 2.1 GENERAL

- A. The LATERAL LINER rehabilitation system shall be T-Liner® by LMK Enterprises, Service Connection Seal + Lateral by BLD Services LLC, Perma-Lateral Lining System by Perma-Liner Industries, Inc., or OWNER approved equal.

#### 2.2 RESIN

- A. The resin/liner system shall conform to ASTM D5813 Section 8.2.2 - 10,000-hour test.
- B. The resin shall be a corrosion resistant polyester, vinylester, epoxy or silicate resin and catalyst system that when properly cured within the composite liner assembly, meets the requirements of ASTM F1216.
- C. The resin shall produce LATERAL LINER, which shall comply with the structural and chemical resistance requirements of ASTM F1216.

Table 1 LATERAL LINER INITIAL STRUCTURAL PROPERTIES

Physical Property	ASTM Standard, Latest Revision	Minimum Value
Flexural Stress	ASTM D-790	4,500 psi
Flexural Modulus of Elasticity	ASTM D-790	250,000 psi

2.3 SIZING OF LINER

- A. The liner shall be fabricated to a size that when installed shall neatly and tightly fit the internal circumference of the pipe being rehabilitated. Allowance for circumferential and longitudinal stretching during insertion shall be made per manufacturer's standards. The diameters indicated in the BID documents are approximate based on review of CCTV videos. It is the responsibility of the CONTRACTOR to verify the actual lateral diameters prior to construction.
- B. The length shall be that deemed necessary by CONTRACTOR to effectively span the distance between the connection with the main sewer pipeline and the edge of the public right-of-way. The parcel lines shown on the Plans shall be assumed to be the right-of-way. CONTRACTOR shall verify lengths in the field before impregnation of the tube with resin.

2.4 LINER ASSEMBLY

- A. The liner assembly shall be continuous in length and consist of one or more layers of absorbent textile material i.e. needle punched felt, circular knit or circular braid that meet the requirements of ASTM F1216 and ASTM D5813 Sections 6 and 8. The textile tube and sheet shall be constructed to withstand installation pressures, have sufficient strength to bridge missing pipe segments, and flexibility to fit irregular pipe sections. The wet-out textile tube and sheet shall meet ASTM F 1216, 7.2 as applicable, and shall have a uniform thickness and 5% to 10% excess resin distribution that when compressed at installation pressures shall meet or exceed the design thickness after cure.
- B. Bladder Assembly: The outside layer of the textile tube (before inversion) and interior of the textile sheet shall be coated with an impermeable, translucent flexible membrane. The textile sheet before insertion shall be permanently marked as a “Lateral Identification” correlating to the address of the building and the lateral pipe services. The sheet and tube shall be surrounded by a second impermeable, flexible translucent membrane (translucent bladder) that shall contain the resin and facilitate vacuum impregnation while monitoring of the resin saturation during the resin impregnation (wet-out) procedure.
- C. Full Circumference Mainline Connection: Acceptable for all laterals to be lined. The mainsheet and lateral tube shall be a one-piece assembly formed in the shape of a “T” or WYE. A “one-size fits all” type of liner shall not be accepted. No intermediate or encapsulated elastomeric layers shall be in the textile that may cause de-lamination in the cured in-place pipe. The main sheet shall be flat with one end overlapping the second end and sized accordingly to create a circular lining equal to the inner diameter of the



main pipe. The lateral tube shall be continuous in length and the wall thickness shall be uniform. The lateral tube shall be capable of conforming to offset joints, bells, and disfigured pipe sections. The tube shall be continuous in length and consist of one or more layers of absorbent non-woven felt fabric and meet the requirements of ASTM F1216 and ASTM D5812 Sections 6 and 8. In the event of a discrepancy between the referenced ASTM requirements and this Specification, this Specification governs.

- D. The wall color of the interior liner surface after installation shall be a light-reflective color so that a clear, detailed inspection with closed-circuit television equipment may be conducted.
- E. The liner tube utilized for sanitary sewer service laterals shall be continuous between the main sanitary sewer pipeline and the termination point at the right-of-way. No sectionalized or overlapping liner segments will be allowed.

## 2.5 HYDROPHILIC MATERIAL

- A. Hydrophilic materials shall expand when exposed to water to create a positive compression seal to prevent water migrating between the liner and host pipe. Hydrophilic materials shall be O-Rings by Insignia, Adeka hydrophilic caulk, or approved equal product. When using hydrophilic caulk, it shall be applied in consistent and continuous beads of 0.25 inches by 0.50 inches or as recommended by manufacturer.

## 2.6 DESIGN REQUIREMENTS

- A. The CONTRACTOR shall submit liner thickness calculations to the Engineer for review. The LATERAL LINER shall be designed in accordance with the applicable provisions of F1216, Appendix X1 and D2412 for “fully deteriorated gravity pipe conditions” and shall meet the following design conditions:
  - a. AASHTO H-20 Live Load with two trucks passing for LATERAL LINERS in streets (16,000 lbs.)
  - b. A soil modulus of elasticity of 600 psi, soil weight of 120 pounds per cubic foot and a coefficient of friction of  $K_u = 0.130r$ .
  - c. Short-term flexural modulus of 250,000 psi and long-term modulus of 125,000 psi. Flexural strength of 4,500 psi.
  - d. Safety factor of 2.0 shall be used.
  - e. Groundwater elevation one foot below ground surface.
  - f. Pipe ovality of 2%.
  - g. Poisson ratio of 0.3.
  - h. Enhancement factor (K) of 7.
  - i. Service temperature range shall be 40 to 140 degrees F.
  - j. Maximum long-term deflection shall be 5%.

- k. The installed, cured thickness shall be the largest thickness as calculated for deflection, bending, buckling and minimum stiffness.
- B. The LATERAL LINER shall also conform to the minimum requirements demonstrated in the following table:

<b>Physical Property</b>	<b>ASTM Standard, Latest Revision</b>	<b>Minimum Value</b>
Flexural Stress	ASTM D-790	4,500 psi
Flexural Modulus of Elasticity	ASTM D-790	250,000 psi

- C. OWNER understands that the CONTRACTOR submitted his bid based on the appropriate length, size, and existing pipe parameters designated in the Bid Item and that the deterioration of sewers is an on-going process. Should pre-construction inspections reveal the sewers to be in substantially different conditions than those in the design considerations, the CONTRACTOR shall request such changes in reconstruction liner thickness, supporting such requests with design data. The deviation, if approved, shall be incorporated into a change order.
- D. The CONTRACTOR shall submit his proposed plan for ensuring that the installed LATERAL LINER meets the above minimum thickness requirements. The plan shall include the proposed LATERAL LINER thickness to be installed (pre-installation thickness) and detailed inversion procedures to reduce stretching and resin loss.

**PART 3 - EXECUTION**

**3.1 LATERAL LINER**

- A. Prior to installation, the service lateral shall be cleaned and inspected by personnel certified in PACP and LACP standards. In cases where lateral defects prevent installation of lateral lining product, the video and report shall be submitted to the ENGINEER for review. Normal cleaning shall be included in the unit price cost for service lateral lining. Cleaning shall constitute removal of all debris, solids, roots, and other deposits in the lateral line. OWNER shall be notified for all laterals that require heavy cleaning. Heavy cleaning shall be considered when standard flush nozzles cannot penetrate or where root removal cannot be accomplished without special cutters and equipment at the discretion of the inspector.
- B. OWNER shall be notified for all service laterals that were not reinstated 100%.
- C. If the pipe (either main line or lateral) is in a condition which cannot be lined, ENGINEER shall be notified and an open cut partial replacement may be required at the discretion of the OWNER.
- D. If there is active infiltration severe enough to inhibit the installation of the LATERAL LINER then chemical grout shall be used to stop the leaks. ENGINEER shall be notified of such cases and approve prior to any grouting.

- E. The existing service lateral shall be clear of obstructions that prevent the proper insertion and expansion of the lining system. Obstructions may include dropped or offset joints of no more than 20% of the inside pipe diameter, grease deposits, or roots.
- F. Changes in pipe size shall be accommodated, if the lateral tube is sized according to the pipe diameter and condition. The lateral lining tube shall be custom manufactured to accommodate a diameter transition if applicable. A liner designed for a four-inch inside diameter shall not be stretched to fit six-inch lateral. CONTRACTOR shall verify the existing pipe size prior to construction.
- G. The lateral tube and mainline sheet shall be encapsulated within the translucent bladder (liner/bladder assembly) and shall be vacuum impregnated with resin (wet-out) under controlled conditions. The volume of resin used shall be sufficient to fill all voids in the textile lining material at nominal thickness and diameter. The volume shall be adjusted by adding 5% to 10% excess resin for the change in resin volume due to polymerization and to allow for any migration of resin into the cracks and joints in the original pipe. No dry or unsaturated area in the mainline sheet or lateral tube shall be acceptable upon visual inspection.
- H. The lateral tube and inversion bladder shall be inserted into the carrying device. The mainline liner is wrapped around the launching device and held firmly in place. A two-part 100% solid epoxy shall be applied to the main/lateral interface. The epoxy is applied to the main liner, adjacent the lateral opening and shall consist of a two-inch wide band, 300 mls. in volume. Both the launching and carrying device shall be pulled into the pipe using a cable winch. The pull is complete when the open port of the launching device is aligned with the interface of the service connection and mainline pipe. The lateral tube shall be completely protected during the pull. The mainline sheet shall be supported on a rigid launcher that is elevated above the pipe invert through the use of a rotating skid system. The liner assembly shall not be contaminated or diluted by exposure to dirt, debris, or water during the pull.
- I. The main sheet in a tubular shape shall be unfolded and the hydrophilic material shall be expanded coming in contact with the main pipe by action of the main inflation bladder. The lateral tube shall be inverted by the action of the lateral bladder through the center of the main line containing the wrapped main sheet up into an existing lateral pipe fully extending to the designated termination point. Two hydrophilic O-rings or beads of hydrophilic caulk shall be placed near the upstream terminus of the lateral portion of the liner. The main and lateral bladders shall extend past all ends of the liner forcing the ends to remain open so no cutting for reinstatement is required.
- J. After liner placement is complete; pressure shall be maintained pressing the liner firmly against the inner pipe wall. The liner shall be chemically cured at ambient temperatures or by a suitable heat source. The heating equipment shall be capable of delivering a mixture of steam and air throughout the liner bladder assembly to uniformly raise the temperature above the temperature required to cure the resin. The curing of the LATERAL LINER shall take into account the existing pipe material, the resin system, and ground conditions (temperature, moisture level, and thermal conductivity of the soil). The heat source temperatures shall be monitored and logged during the cure and cool down cycles. The manufacturer's recommended cure schedule shall be submitted.
- K. Curing shall be done without pressure interruption with air or a mixture of air and steam for the proper duration of time in strict accordance with ASTM standards and manufacturer's

recommendations. Where water is utilized in the curing process, a potable water source shall be used. Initial cure shall be deemed to be completed when inspection of the exposed portions of the cured-in-place pipe appear to be hard and sound and the thermocouples indicate that an exothermic reaction has occurred. The cure and post-cure period and temperature shall be as recommended by the resin manufacturer, modified for the cured-in-place process being used. The curing process shall take into account the existing pipe material, the resin system, and ground conditions (temperature, moisture content, thermal conductivity, etc.).

- L. The finished LATERAL LINER shall be continuous over the entire length of the rehabilitated sewer service lateral and minimum of 16-inch of the main pipe for full-circumference mainline connections. The LATERAL LINER shall provide a smooth bore interior with a Manning's co-efficient factor of  $n=0.011$ . The LATERAL LINER shall be free of dry spots, lifts, and delaminated portions. The LATERAL LINER shall taper at each end so as to accept video equipment, cleaning equipment, and maintain a proper flow. After the work is completed, the CONTRACTOR shall provide the OWNER with video footage documenting the repair (mainline and lateral). The finished product shall provide an airtight/watertight non-leaking connection between the main sewer and sewer service lateral.
- M. The CONTRACTOR shall carry out operations in strict accordance with all applicable OSHA standards. Particular attention is drawn to those safety requirements involving work on an elevated platform and entry into a confined space.
- N. All surfaces, which have been damaged by the CONTRACTOR's operations, shall be restored to a condition at least equal to that in which they were found immediately prior to the beginning of the CONTRACTOR's operations. Suitable materials and methods shall be used for such restoration. The restoration of existing property or structures shall be done as promptly as practicable and shall not be left until the end of the construction period. Compensation for this work shall be included in the rehabilitation item to which it pertains.

### 3.2 PARTIAL REPLACEMENTS

CONTRACTOR shall be responsible for clearing the designated sewer line of obstructions such as dropped joints and broken pipe/crushed pipe which reduces the cross-sectional area by more than 20% of the inside pipe diameter and/or which will prevent the insertion of liner. If pre-installation television inspection required to be performed by the CONTRACTOR reveals an obstruction that cannot be removed by conventional cleaning and/or cutting equipment, CONTRACTOR shall Notify Engineer immediately.

END OF SECTION 33 01 30.74

## SECTION 33 01 30.76 - MANHOLE REHABILITATION

### PART 1 GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Manhole rehabilitation to stop inflow, infiltration, and exfiltration; repair voids; and restore structural integrity. A monolithic, fiber-reinforced, structurally enhanced, cementitious-based liner material is spray or hand applied to the wall and bench surfaces of the manhole with an epoxy coating. Internal or external chimney seals are also included.

##### B. Related Requirements:

1. Section 33 05 13.16 – Public Manholes and Structures: Replacement of manholes and chimneys.

#### 1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

##### A. Section 01 20 00 - Price and Payment Procedures.

##### B. Item 0026: Line Manhole:

1. Basis of Measurement: Depth of manhole measured from bottom of invert to top of ring seat of manhole cover.
2. Basis of Payment: Based on a vertical foot basis. Includes site clearing, removal of any loose or unsound material; cleaning and surface preparation of manhole; repair and filling of voids; the elimination of active infiltration prior to liner application; spray or hand application of cementitious product to form a monolithic liner from bottom of invert to top of ring seat of manhole cover; spray application of epoxy liner protective coating; sealing of manhole frame to chimney section.

##### C. Item 0027: Replace Manhole Frame and Lid:

1. Basis of Measurement: By EACH.
2. Basis of Payment: Includes site preparation including sawcutting, removing of street pavement, curb and gutters, sidewalks, and driveways, if required; excavating and disposing of surplus excavated materials including existing structures; protecting existing utilities, site objects, and new work which are to remain in service after completion of structures; removal and disposal of existing frame and cover, providing and installing new manhole frame and cover; bedding, cover and backfill materials, and placement and compaction; joint sealant; restoration of pavement surfaces, curb and gutter, sidewalks or ground cover; other pertinent and incidental work.
  - a. Payment does not include traffic control, or work included in other bid items.

##### D. Item 0028: Manhole Bench Replacement:

1. Basis of Measurement: By EACH manhole bench replacement.

2. Basis of Payment: Includes flow control and bypass pumping if required, cleaning of manhole, bench repair or replacement including materials and installation, other pertinent and incidental work. See Standard Manhole Benches detail in Contract Drawings.

### 1.3 REFERENCE STANDARDS

#### A. ASTM International:

1. ASTM C109 – Compressive Strength of Hydraulic Cement Mortars
2. ASTM C267 – Chemical Resistance of Mortars, Grouts, and Monolithic Surfacing's
3. ASTM C 1244 – Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test.

### 1.4 PREINSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Requirements for pre-installation meeting.
- B. Convene minimum one week prior to commencing Work of this Section.

### 1.5 SCHEDULING

- A. Section 01 32 16 - Construction Progress Schedule: Requirements for scheduling.
- B. Schedule Work of this Section to coincide with manhole grout sealing, if applicable.

### 1.6 SEQUENCING

- A. Section 01 10 00 - Summary: Requirements for sequencing.

### 1.7 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit manufacturer's product data, including physical properties, surface preparation, repair, application, curing, and field quality control.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Test and Evaluation Reports: Indicate vacuum testing results.
- E. Manufacturer Instructions: Submit detailed instructions on application requirements, including storage and handling procedures.
- F. Qualifications Statements:
  1. Submit qualifications for manufacturer and applicator.
  2. Submit manufacturer's approval of applicator and include list of recently completed manhole rehabilitation projects.

## 1.8 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for closeout procedures.
- B. Project Record Documents: Record actual locations of sealed manholes.

## 1.9 QUALITY ASSURANCE

- A. Perform Work according to City of Greenfield standards.

## 1.10 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' experience.
- B. Applicator: Company specializing in performing Work of this Section with minimum three years' documented experience and approved by manufacturer.

## 1.11 ENVIRONMENTAL CONDITIONS

- A. Apply materials at manufacturer recommended temperature.
- B. Do not apply materials to frozen surfaces or if freezing is expected within substrate within 24 hours after application.
- C. Keep mix temperature at time of application below 90 degrees F.
- D. Do not exceed water temperature of 80 degrees F.

## 1.12 EXISTING CONDITIONS

- A. Field Measurements:
  - 1. Verify field measurements prior to fabrication.

## 1.13 WARRANTY

- 1. Contractor shall provide a minimum five (5) year warranty for manhole lining in material and workmanship.

## PART 2 PRODUCTS

### 2.1 MANUFACTURER

- A. General:
  - 1. Materials from single manufacturer.
  - 2. Materials compatible with substrate and with each other.
  - 3. Materials approved by manufacturer.
- B. Patching Material: Rapid-setting, high-early-strength, corrosion-resistant, hand-mixed and hand-applied, calcium aluminate based cementitious material with the following

minimum requirements. Mainstay ML-10, Sherwin-Williams, Sauereisen Underlayment F-120FS or approved equal.

1. Cement: Calcium aluminate cement.
2. Compressive Strength ASTM C 109: 1,800 psi at 1 hour; 2,600 psi at 24 hours.
3. Bond ASTM C 882: 1,600 psi at 28 days.
4. Applied Density: 105 plus or minus 5 pounds per cubic foot.
5. Shrinkage ASTM C 596: 0 percent at 90 percent relative humidity.

C. Chemical Grout:

1. Products: Avanti, DeNeef or Approved Equal.
2. Materials, additives, mixture ratios, and procedures utilized for the grouting process shall be in accordance with manufacturer's recommendations and shall be appropriate for the application.
3. Chemical grout shall be used to stop very active infiltration (weepers and gushers) and fill voids.

D. Liner Material: Fiber-reinforced, spray-applied or hand-applied, cementitious mortar.

Mainstay ML-72, Strong Seal MS-2A, Sauereisen Sewergard, Quadex Aluminaliner, Sherwin-Williams, or approved Equal.

1. Cement: Portland cement.
2. Minimum Compressive Strength ASTM C 109: 9,000 psi at 28 days.
3. Minimum Tensile Strength ASTM C 496: 800 psi at 28 days.
4. Minimum Flexural Strength ASTM C 293: 1,200 psi at 28 days.
5. Shrinkage, ASTM C 596: 0 percent at 28 days, 90 percent relative humidity.
6. Minimum Bond ASTM C 882: 2,000 psi at 28 days.
7. Applied Density: 134 plus or minus 5 pounds per cubic foot.
8. Freeze/Thaw Resistance ASTM C 666 Method A: 300 cycles, no visible damage.
9. Factory Blended: Requires only addition of water at site.
10. Minimum Cement Content: 70 percent of total bag weight.
11. Dry Bulk Density: 82 to 85 pounds per cubic foot.
12. Fiber Reinforcement

E. Epoxy Liner Protective Coating Material: Epoxy coating used to form a monolithic liner to cover and protect all interior cementitious lined manhole surfaces subjected to municipal wastewater service conditions, including associated abrasive physical attack and chemical attack mechanisms related to hydrogen sulfide and organic acids generated by microbial sources and shall have the following minimum requirements. Mainstay DS-5, Sauereisen SewerGard 210-S, or Approved Equal. The coating material shall have excellent chemical resistance.

1. Minimum Compressive Strength ASTM D 695: 13,000 psi at 28 days.
2. Minimum Tensile Strength ASTM D638: 6,500 psi.
3. Minimum Flexural Strength ASTM D790: 12,500 psi.
4. Flexural Modulus shall be per ASTM D-790 and be a minimum of 750,000 psi initially and 375,000 psi long term.
5. Durometer Hardness ASTM D2240: 98.

F. Water: Clean and potable.



## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine surfaces to receive manhole rehabilitation. Notify the Engineer in writing if surfaces are not acceptable. Do not begin surface preparation, repair, or application until unacceptable conditions have been corrected.

### 3.2 SURFACE PREPARATION FOR LINING MANHOLES

- A. Prepare surfaces in accordance with manufacturer's instructions.
- B. Protection: Place covers over invert to prevent extraneous material from entering sewer lines.
- C. Cleaning: Clean manhole walls and bench by using a minimum of 1,500 psi water spray to remove contaminants, dirt, debris, and other foreign materials.
- D. Remove loose, unsound, and protruding brick, mortar, and concrete.
- E. Inspection by NACE certified inspector: Before application of each material, surfaces to be sprayed or coated will be inspected by the NACE certified inspector. Correct defects or deficiencies identified by the NACE certified inspector before application of subsequent material.
- F. Voids: Repair and fill voids greater than ½ inch with Patching Material. Apply Patching Material in accordance with manufacturer's instructions.
- G. Visible/Active Leaks:
  - 1. Stop visible leaks with chemical grout. Apply material in accordance with manufacturer's instruction.
  - 2. Drill as required to pressure grout using a chemical grout. Apply grout in accordance with manufacturer's instructions.

### 3.3 APPLICATION OF LINER MATERIAL

- A. Apply liner material in accordance with manufacturer's instructions.
- B. Equipment: Spray apply or hand apply liner material using approved equipment designed and manufactured by material manufacturer for the specific application.
- C. Mixing:
  - 1. Mix liner material with water in accordance with manufacturer's instructions.
  - 2. Discharge prepared mix into hopper.
  - 3. Continue mixing as liner material is continuously sprayed or hand applied.
- D. Cleaning: Ensure surface is clean and free of foreign material.
- E. Saturated Surface: Ensure surface is damp and totally saturated with water without noticeable free water droplets or running water, just before application of liner material.

F. Liner Application: Spray or hand apply liner material in 1 or more passes from bottom of wall to bottom of frame to form a structurally enhanced monolithic liner.

1. Minimum total thickness: **1 inch**.

G. Finishing:

1. Trowel surface of sprayed liner material to relatively smooth finish. Do not over trowel.
2. Apply brush finish to trowel finished surface.

H. Follow manufacturer's instructions whenever more than 24 hours have elapsed between applications.

I. Application to Bench:

1. Remove wood covers.
2. Spray or hand apply bench with liner material mixed in accordance with manufacturer's instructions.
3. Spray or hand apply liner material to produce a gradual slope from walls to invert to form a structurally enhanced monolithic liner. Minimum thickness at invert of 3/4 inch.
4. Round full circumference of intersection of wall and bench to a uniform radius.

### 3.4 CURING

A. Cure materials in accordance with manufacturer's instructions.

B. Exposure:

1. Minimize exposure of applied materials to sunlight and air movement.
2. Cover structure if time between application of additional coats is to be longer than 15 minutes.
3. Do not expose finished materials to sunlight or air movement for longer than 15 minutes before covering or closing access.

C. Concrete Curing Compound:

1. Prepare surface with bonding agent in accordance with manufacturer's instructions.

D. Cure Time: Allow a minimum of 4 hours cure time before application of epoxy liner material.

### 3.5 APPLICATION OF EPOXY LINER PROTECTIVE COATING MATERIAL

A. Apply epoxy liner protective coating material in accordance with manufacturer's instructions.

B. Mixing:

1. Epoxy lining is a two component liquid system. Follow manufacturer's recommendation for temperature requirements. The entire contents of each component should be thoroughly mixed individually before combining separate components together. The premeasured quantities of both components should be poured into a clean container and blend thoroughly using a power agitator, such as a "Jiffy" type mixer and a high strength industrial drill, for five (5) minutes. Do not mix more material than can be used within stated working times.

C. Installation:

1. Epoxy lining shall be applied by spray method to a **minimum thickness of 80 mils** in a single application from the bottom of the manhole frame to the bench, including the bench and invert. Application should be done with a 50% overlap in a “cross hatch” pattern to reduce the possibility of pinholes and to assure complete coverage. Application equipment shall be approved by the Applicator, in accordance with the protective coating manufacturer’s recommendations.

D. Curing:

1. Allow a minimum of 8 hours prior to any top coating at a temperature of 70 degrees F, and in accordance with manufacturer’s recommendations for application temperatures above or below 70 degrees F. Do not allow water or chemicals on the material surface for a minimum of 24 hours. For temperatures below 70 degrees F, cure a minimum of 72 hours prior to water or chemical exposure.

3.6 FIELD QUALITY CONTROL

- A. Inspection by the Engineer or the waiver of inspection of any portion of the work shall not relieve the Contractor of responsibility to perform the work as specified.
- B. Leaks: Visually verify absence of leaks.

3.7 PROTECTION

- A. Do not allow traffic for a minimum of 24 hours after final application of liner material.

END OF SECTION

## SECTION 330505.41 - AIR TESTING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes: Low-pressure air testing of gravity sewer piping.
- B. Related Requirements:
  - 1. Section 333111 - Public Sanitary Sewerage Gravity Piping: Pipe materials, manholes, and accessories normally encountered with gravity sewerage piping.

#### 1.2 MEASUREMENT AND PAYMENT

- A. Unit Price:
  - 1. All work specified in this section shall be considered incidental and payment shall be included as part of the applicable unit prices included in the Bid Form.

#### 1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Submit following items prior to start of testing:
  - 1. Testing procedures.
  - 2. List of test equipment.
  - 3. Testing sequence schedule.
  - 4. Provisions for disposal of flushing and test water.
  - 5. Certification of test gage calibration.
- C. Test and Evaluation Reports: Indicate results of piping tests.
- D. Qualifications Statement:
  - 1. Submit qualifications for applicator.

#### 1.4 QUALITY ASSURANCE

- A. Perform Work according to City of Greenfield standards.

#### 1.5 QUALIFICATIONS

- A. Applicator: Company specializing in performing Work of this Section with minimum three years' experience.

## PART 2 - PRODUCTS

### 2.1 AIR TESTING

#### A. Equipment:

1. Air compressor.
2. Air supply line.
3. Shutoff valves.
4. Pressure regulator.
5. Pressure relief valve.
6. Stopwatch.
7. Plugs.
8. Pressure Gage: Calibrated to 0.1 psi.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.
- B. Verify that piping is ready for testing.
- C. Verify that trenches are backfilled.

### 3.2 PREPARATION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for preparation.
- B. Lamping:
  1. Lamp gravity piping after flushing and cleaning.
  2. Perform lamping operation by shining light at one end of each pipe section between manholes.
  3. Observe light at other end.
  4. Pipe not installed with uniform line and grade will be rejected.
  5. Remove and reinstall rejected pipe sections.
  6. Clean and lamp until pipe section is installed to uniform line and grade.
- C. Plugs:
  1. Plug outlets, wye branches, and laterals.
  2. Brace plugs to resist test pressures.

### 3.3 FIELD QUALITY CONTROL

- A. Section 017000 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.
- B. Low-Pressure Air Testing:
  - 1. Test each reach of gravity sewer piping between manholes.
  - 2. Introduce air pressure slowly to approximately 4 psig.
  - 3. Determine ground water elevation above spring line of piping.
  - 4. For every foot of ground water above spring line of piping, increase starting air test pressure by 0.43 psi.
  - 5. Do not increase pressure above 10 psig.
  - 6. Allow pressure to stabilize for at least five minutes.
  - 7. Adjust pressure to 3.5 psig or to increased test pressure as determined above when ground water is present.
  - 8. Do not make allowance for laterals.
  - 9. Minimum Testing Duration in Minutes Per 100 Feet:
    - a. Pipe Size 3 Inches: 0.2.
    - b. Pipe Size 4 Inches: 0.3.
    - c. Pipe Size 6 Inches: 0.7.
    - d. Pipe Size 8 Inches: 1.2.
    - e. Pipe Size 10 Inches: 1.5.
    - f. Pipe Size 12 Inches: 1.8.
    - g. Pipe Size 15 Inches: 2.1.
    - h. Pipe Size 18 Inches: 2.4.
    - i. Pipe Size 21 Inches: 3.0.
    - j. Pipe Size 24 Inches: 3.6.
    - k. Pipe Size 27 Inches: 4.2.
    - l. Pipe Size 30 Inches: 4.8.
    - m. Pipe Size 33 Inches: 5.4.
    - n. Pipe Size 36 Inches: 6.0.
  - 10. Record drop in pressure during testing period.
  - 11. If air pressure drops more than 1.0 psi during testing period, piping has failed.
  - 12. If 1.0-psi air pressure drop has not occurred during testing period, piping is acceptable; discontinue testing.
  - 13. If piping fails, test reach of piping in incremental stages until leaks are isolated, repair leaks, and retest entire reach between manholes.
  - 14. If unsatisfactory testing results are achieved, make necessary repairs and retest until result meets criteria.
  - 15. Repair visible leaks regardless of quantity of leakage.

END OF SECTION 330505.41

## SECTION 330505.43 - MANDREL TESTING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes: Deflection testing of plastic sewer piping.
- B. Related Requirements:
  - 1. Section 33 05 13.16 – Public Manholes and Structures
  - 2. Section 33 31 11 – Public Sanitary Sewerage Gravity Piping

#### 1.2 REFERENCE STANDARDS

- A. ASTM International:
  - 1. ASTM D2122 - Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings.

#### 1.3 MEASUREMENT AND PAYMENT

- A. Unit Price:
  - 1. All work specified in this section shall be considered incidental and payment shall be included as part of the appropriate unit prices included in the Bid Form.

#### 1.4 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Submit following items prior to start of testing:
  - 1. Testing procedures.
  - 2. List of test equipment.
  - 3. Testing sequence schedule.
  - 4. Provisions for disposal of flushing and test water.
  - 5. Certification of test gage calibration.
  - 6. Deflection mandrel drawings and calculations.
- C. Test and Evaluation Reports: Indicate results of piping tests.

## PART 2 - PRODUCTS

### 2.1 DEFLECTION TESTING

#### A. Equipment:

1. Properly sized "go, no go" mandrel.
2. Pull/retrieval ropes.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.
- B. Verify that piping is ready for testing.
- C. Verify that trenches are backfilled.

### 3.2 PREPARATION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for preparation.
- B. Lamping:
  1. Lamp gravity piping after flushing and cleaning.
  2. Perform lamping operation by shining light at one end of each pipe section between manholes.
  3. Observe light at other end.
  4. Pipe not installed with uniform line and grade will be rejected.
  5. Remove and reinstall rejected pipe sections.
  6. Clean and lamp until pipe section is installed to uniform line and grade.
- C. Plugs:
  1. Plug outlets, wye branches, and laterals.
  2. Brace plugs to resist test pressures.

### 3.3 FIELD QUALITY CONTROL

- A. Section 017000 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.
- B. Deflection Testing of Plastic Sewer Piping:
  1. Perform vertical ring deflection testing on PVC and ABS sewer piping after backfilling has been in place for at least 30 days, but not longer than 12 months.
  2. Allowable maximum deflection for installed plastic sewer pipe is no greater than five percent of original vertical internal diameter.



3. Perform deflection testing using "go, no go" mandrel.
4. Mandrel Diameter:
  - a. Not less than 95 percent of base or average ID of pipe.
  - b. Pipe Diameter: Comply with ASTM D2122.
5. Perform testing without mechanical pulling devices.
6. Locate, excavate, replace, and retest piping that exceeds allowable deflection.

END OF SECTION 330505.43

## SECTION 33 05 13.16 - PUBLIC MANHOLES AND STRUCTURES

### PART 1 GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Modular precast concrete manholes and structures with tongue-and-groove joints and transition to cover frame, covers, anchorage, and accessories.
2. Bedding and cover materials.

##### B. Related Requirements:

1. Section 31 23 17 - Trenching: Backfilling after manhole and structure installation.
2. Section 33 01 30.13 - Sewer and Manhole Testing
3. Section 33 01 30.76 – Manhole Rehabilitation

#### 1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Section 01 20 00 - Price and Payment Procedures: Contract Sum/Price modification procedures.

#### 1.3 REFERENCE STANDARDS

##### A. ASTM International:

1. ASTM A48 - Standard Specification for Gray Iron Castings.
2. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
3. ASTM C478 - Standard Specification for Precast Reinforced Concrete Manhole Sections.
4. ASTM C497 - Standard Test Methods for Concrete Pipe, Manhole Sections, or Tile.
5. ASTM C923 - Standard Specification for Resilient Connectors between Reinforced Concrete Manhole Structures, Pipes, and Laterals.

#### 1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

- B. Product Data: Submit data for manhole covers, component construction, features, configuration, and dimensions.

##### C. Shop Drawings:

1. Indicate structure locations and elevations.
2. Indicate sizes and elevations of piping and penetrations.

- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

- E. Buoyancy calculation: For each manhole, documenting that buoyancy is not a problem. Criteria for buoyancy calculations are as follows:

1. Minimum safety factor 1.2.

2. Surface friction with backfill materials shall not be included
3. Submerged soil weight of 55 pounds per cubic foot where soil weight is used to help hold down the manhole. Only soil directly above manhole or any anti-floatation devices may be included.
4. Water table at grade
5. No water weight to be included inside structure
6. Weights for castings, all precast components and any manufacturer supplied fillets in bottom of manhole may be included.

F. Manufacturer Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures.

G. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

H. Qualifications Statements:

1. Submit qualifications for manufacturer and installer.
2. Submit manufacturer's approval of installer.

#### 1.5 QUALITY ASSURANCE

A. Perform Work according to City of Greenfield standards.

#### 1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' experience.

B. Installer: Company specializing in performing Work of this Section with minimum three years' experience and approved by manufacturer.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

C. Comply with precast concrete manufacturer's instructions for unloading, storing, and moving precast manholes and drainage structures.

D. Storage:

1. Store precast concrete manholes and drainage structures to prevent damage to Owner's property or other public or private property.
2. Repair property damaged from materials storage.

## PART 2 PRODUCTS

### 2.1 MANHOLES AND STRUCTURES

- A. Precast Concrete Manholes
  - 1. Furnish materials according to City of Greenfield Utilities standards.

### 2.2 PIPE TO MANHOLE CONNECTIONS

- A. All connections shall provide for a watertight seal between pipe and manhole.
  - 1. Connect sanitary sewer pipe by means of boot-type or compression-type connector, meeting the requirements of ASTM C923.
    - a. Kor-n-Seal, by Trelleborg.
    - b. A-Lok, by A-Lok Products, Inc.
    - c. Z-Lok Cast in Boots, by A-Lok Products, Inc.
    - d. PSC Direct Drive, by Press-Seal Gasket Corporation
    - e. Or Equal.
  - 2. Boot type connections are not required for existing structures where grout repair and/or manhole lining is required per the Drawings.

### 2.3 FRAMES AND COVERS

- A. Manufacturers:
  - 1. Furnish materials according to City of Greenfield Utilities standards.

### 2.4 ADJUSTING RINGS

- A. Furnish materials according to City of Greenfield Utilities standards.

### 2.5 STEPS

- A. Conform to requirements of ASTM C478 and U.S. Department of Labor Occupational Safety and Health Standards.
  - 1. Furnish materials according to City of Greenfield Utilities standards.

### 2.6 MATERIALS

- A. Cover and Bedding: see Section 31 23 17 – Trenching.

### 2.7 ACCESSORIES

- 1. Provide integral anti-floatation collars (extended bases) with a minimum width of 6 inches around bottom of all manholes. Provide larger collars for manholes that calculations indicate have buoyancy safety factors less than 1.2 so that required factor of safety is achieved. Other methods of buoyancy control may also be acceptable upon Engineer's approval.
- 2. Top Surface: Level.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for installation examination.
- B. Verify correct size of manhole and structure excavation.

### 3.2 PREPARATION

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for installation preparation.
- B. Mark each precast structure by indentation or waterproof paint showing date of manufacture, manufacturer, and identifying symbols and numbers as indicated on Drawings to indicate its intended use.
- C. Inspect precast concrete manholes and structures immediately prior to placement in excavation to verify that they are internally clean and free from damage; remove and replace damaged units.

### 3.3 INSTALLATION

- A. Install sanitary sewer manholes per City of Greenfield Utilities standards.
- B. Castings:
  - 1. Set frames as indicated on Drawings.
  - 2. Set frame and cover 2 inches above finished grade for manholes and other structures with covers located within unpaved areas to allow area to be graded away from cover beginning 1 inch below top surface of frame.

### 3.4 FIELD QUALITY CONTROL

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.
- B. Vacuum test all new concrete manholes according to ASTM C1244 and Section 33 01 30.13.
- C. Vertical Adjustment of Existing Manholes and Structures:
  - 1. If required, adjust top elevation of existing manholes and structures to finished grades as indicated on Drawings.
  - 2. Frames, Grates, and Covers:
    - a. Carefully remove frames, grates, and covers cleaned of mortar fragments.
    - b. Reset to required elevation according to requirements specified for installation of castings.

END OF SECTION 33 05 13.16

## SECTION 333111 - PUBLIC SANITARY SEWERAGE GRAVITY PIPING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Sanitary sewerage piping.
  - 2. Manholes
  - 3. Flexible Repair Couplings
  - 4. Connection to existing manholes.
  - 5. Laterals and wye branches.
  - 6. Bedding and cover materials.
  
- B. Related Requirements:
  - 1. Section 31 23 17- Trenching: Execution requirements for trenching and fill required by this Section.
  - 2. Section 33 01 30.13 – Sewer and Manhole Testing.
  - 3. Section 33 05 05.41 – Air Testing.
  - 4. Section 33 05 05.43 - Mandrel Testing: Deflection testing of plastic sewerage piping.
  - 5. Section 33 05 13.16 – Public Manholes and Structures

#### 1.2 DEFINITIONS

- A. Bedding: Fill placed under, beside, and directly over pipe, prior to subsequent backfill operations.

#### 1.3 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Section 012000 - Price and Payment Procedures: Contract Sum/Price modification procedures.
  
- B. Item 0013: Sanitary Sewer Partial Replacement up to 5' with Wye, Granular Backfill, 8" PVC SDR 35, 8-12' Deep
  - 1. Basis of Measurement: This item is measured by each Partial Replacement up to 5' with Wye installed.
  - 2. Basis of Payment: Includes all excavation; permanent and temporary shoring of the excavation; existing pavement saw cutting, removal, and disposal; groundwater control, treatment and disposal; furnishing and installing pipe, fittings and wye; bedding, haunching, cover, flowable fill, granular material, backfill and compaction; testing; watertight plugs; bypass pumping; televising; protection, replacement or repair of utilities, drainage systems, structures, and miscellaneous property; maintaining service; removal, replacement, and reconnection of all existing lateral lines as part of the Work; support of any utility crossings; removal and legal disposal of surplus excavated material;

erosion control; seeding and grading; and clean up, all in accordance with the Contract Documents.

- C. Item 0014: Sanitary Sewer Partial Replacement up to 5' with Wye, Granular Backfill, 10" PVC SDR 35, 8-12' Deep
1. Basis of Measurement: This item is measured by each Partial Replacement up to 5' with Wye installed.
  2. Basis of Payment: Includes all excavation; permanent and temporary shoring of the excavation; existing pavement saw cutting, removal, and disposal; groundwater control, treatment and disposal; furnishing and installing pipe, fittings and wye; bedding, haunching, cover, flowable fill, granular material, backfill and compaction; testing; watertight plugs; bypass pumping; televising; protection, replacement or repair of utilities, drainage systems, structures, and miscellaneous property; maintaining service; removal, replacement, and reconnection of all existing lateral lines as part of the Work; support of any utility crossings; removal and legal disposal of surplus excavated material; erosion control; seeding and grading; and clean up, all in accordance with the Contract Documents.
- D. Item 0015: Sanitary Sewer, Partial Replacement up to 6', Granular Backfill, 8" PVC SDR 35, 8-12' Deep
1. Basis of Measurement: By each partial replacement up to six (6) linear feet horizontally along the centerline of the sewer measured from the pipe cut made on the upstream side to the pipe cut made on the downstream side.
  2. Basis of Payment: Includes all excavation; permanent and temporary shoring of the excavation; existing pavement saw cutting, removal, and disposal; groundwater control, treatment and disposal; furnishing and installing pipe and fittings, PVC repair couplings, non-shear couplings; bedding, haunching, cover, flowable fill, granular material, backfill and compaction; testing; watertight plugs; bypass pumping; televising; protection, replacement or repair of utilities, drainage systems, structures, and miscellaneous property; maintaining service; removal, replacement, and reconnection of all existing lateral lines which were moved as part of the Work; support of utility crossings; removal and legal disposal of surplus excavated material; connection of new sanitary sewer to existing manholes; erosion control; seeding and grading; and clean up, all in accordance with the Contract Documents.
- E. Item 0016: Sanitary Sewer, Partial Replacement up to 6', Granular Backfill, 10" PVC SDR 35, 8-12' Deep
1. Basis of Measurement: By each partial replacement up to six (6) linear feet horizontally along the centerline of the sewer measured from the pipe cut made on the upstream side to the pipe cut made on the downstream side.
  2. Basis of Payment: Includes all excavation; permanent and temporary shoring of the excavation; existing pavement saw cutting, removal, and disposal; groundwater control, treatment and disposal; furnishing and installing pipe and fittings, PVC repair couplings, non-shear couplings; bedding, haunching, cover, flowable fill, granular material, backfill and compaction; testing; watertight plugs; bypass pumping; televising; protection, replacement or repair of utilities, drainage systems, structures, and miscellaneous property; maintaining service, removal, replacement, and reconnection of all existing lateral lines which were moved as part of the Work; support of utility crossings; removal

and legal disposal of surplus excavated material; Connection of new sanitary sewer to existing manholes; erosion control; seeding and grading; and clean up, all in accordance with the Contract Documents.

- F. Item 0017: Partial Replacement for Segment 02182010 – 02182037:
1. Basis of Measurement: Lump Sum.
  2. Basis of Payment: Includes all excavation; permanent and temporary shoring of the excavation; existing pavement saw cutting, removal, and disposal; groundwater control, treatment and disposal; furnishing and installing pipe and fittings, PVC repair couplings, non-shear couplings; bedding, haunching, cover, flowable fill, granular material, backfill and compaction; testing; watertight plugs; bypass pumping; televising; protection, replacement or repair of utilities, drainage systems, structures, and miscellaneous property; maintaining service, removal, replacement, and reconnection of all existing lateral lines which were moved as part of the Work; support of utility crossings; removal and legal disposal of surplus excavated material; Connection of new sanitary sewer to existing manholes; erosion control; seeding and grading; and clean up, all in accordance with the Contract Documents.
- G. Item 0018: Sanitary Sewer, 8-inch PVC SDR 35, Granular Backfill, 8-12' Deep:
1. Basis of Measurement: By linear foot.
  2. Basis of Payment: Includes all excavation; permanent and temporary shoring of the excavation; existing pavement saw cutting, removal, and disposal; groundwater control, treatment and disposal; furnishing and installing pipe and fittings, bedding, haunching, cover, flowable fill, granular material, backfill and compaction; testing; watertight plugs; bypass pumping; televising; protection, replacement or repair of utilities, drainage systems, structures, and miscellaneous property; maintaining service, removal, replacement, and reconnection of all existing water service lines which were moved for CONTRACTOR's convenience; support of utility crossings; removal and legal disposal of surplus excavated material; Connection of new sanitary sewer to existing manholes; sidewalk and driveway replacement; erosion control; seeding and grading; and clean up, all in accordance with the Contract Documents.
- H. Item 0019: Sanitary Sewer, 10-inch PVC SDR 35, Granular Backfill, 8-12' Deep:
1. Basis of Measurement: By linear foot.
  2. Basis of Payment: Includes all excavation; permanent and temporary shoring of the excavation; existing pavement saw cutting, removal, and disposal; groundwater control, treatment and disposal; furnishing and installing pipe and fittings, bedding, haunching, cover, flowable fill, granular material, backfill and compaction; testing; watertight plugs; bypass pumping; televising; protection, replacement or repair of utilities, drainage systems, structures, and miscellaneous property; maintaining service, removal, replacement, and reconnection of all existing water service lines which were moved for CONTRACTOR's convenience; support of utility crossings; removal and legal disposal of surplus excavated material; Connection of new sanitary sewer to existing manholes; sidewalk and driveway replacement; erosion control; seeding and grading; and clean up, all in accordance with the Contract Documents.
- I. Item 0020: 8" x 6" Wye, PVC SDR 26, Sanitary Sewer, Open Cut, All Depths:
1. Basis of Measurement: This item is measured by each Wye installed.



2. Basis of Payment: Includes all excavation; permanent and temporary shoring of the excavation; existing pavement saw cutting, removal, and disposal; groundwater control, treatment and disposal; furnishing and installing fittings, bedding, haunching, cover, flowable fill, granular material, backfill and compaction; testing; watertight plugs; bypass pumping; televising; protection, replacement or repair of utilities, drainage systems, structures, and miscellaneous property; maintaining service, support of any utility crossings; removal and legal disposal of surplus excavated material; sidewalk and driveway replacement; erosion control; seeding and grading; and clean up, all in accordance with the Contract Documents.

J. Item 0021: 10" x 6" Wye, PVC SDR 26, Sanitary Sewer, Open Cut, All Depths:

1. Basis of Measurement: This item is measured by each Wye installed.
2. Basis of Payment: Includes all excavation; permanent and temporary shoring of the excavation; existing pavement saw cutting, removal, and disposal; groundwater control, treatment and disposal; furnishing and installing fittings, bedding, haunching, cover, flowable fill, granular material, backfill and compaction; testing; watertight plugs; bypass pumping; televising; protection, replacement or repair of utilities, drainage systems, structures, and miscellaneous property; maintaining service, support of any utility crossings; removal and legal disposal of surplus excavated material; sidewalk and driveway replacement; erosion control; seeding and grading; and clean up, all in accordance with the Contract Documents.

K. Item 0022: Sanitary Lateral, Open Cut, 6" PVC SDR 35, All Depths, Granular Backfill.

1. Basis of Measurement: This portion of the work shall be paid by lineal feet placed of sanitary lateral up to the right of way.
2. Basis of Payment: Includes all excavation; existing pavement saw cutting, removal, and disposal; groundwater control, treatment and disposal; furnishing and installing pipe and fittings, PVC repair couplings, non-shear couplings, bedding, haunching, cover, flowable fill, granular material, backfill and compaction; permanent and temporary shoring of the excavation; testing; watertight plugs; bypass pumping; televising; protection, replacement or repair of utilities, drainage systems, structures, and miscellaneous property; maintaining service, support of any utility crossings; removal and legal disposal of surplus excavated material; connection of new sanitary lateral to existing lateral; erosion control; seeding and grading; sidewalk and driveway replacement; and clean up, all in accordance with the Contract Documents.

#### 1.4 REFERENCES

A. ASTM International:

1. ASTM C443 - Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
2. ASTM D2241- Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series)
3. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.

4. ASTM D2729 - Standard Specification for Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
5. ASTM D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
6. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

#### 1.5 COORDINATION

- A. Section 013000 - Administrative Requirements: Requirements for coordination.
- B. Coordinate Work of this Section with City of Greenfield Utilities.
- C. Notify affected utility companies at least 72 hours prior to construction.

#### 1.6 PREINSTALLATION MEETINGS

- A. Section 013000 - Administrative Requirements: Requirements for preinstallation meeting.

#### 1.7 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit manufacturer information indicating proposed materials, accessories, details, and construction information.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Test and Evaluation Reports: Submit reports indicating field tests made and results obtained.
- E. Manufacturer Instructions:
  1. Indicate special procedures required to install specified products.
- F. Source Quality-Control Submittals: Indicate results of factory tests and inspections.
- G. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
- H. Qualifications Statement:
  1. Submit qualifications for manufacturer and installer.

#### 1.8 CLOSEOUT SUBMITTALS

- A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.

- B. Project Record Documents: Record invert elevations and actual locations of pipe runs, connections, manholes, and cleanouts.
- C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

#### 1.9 QUALITY ASSURANCE

- A. Perform Work according to City of Greenfield standards.
- B. Maintain one copy of each standard affecting Work of this Section on Site.

#### 1.10 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' experience.
- B. Installer: Company specializing in performing Work of this Section with minimum three years' experience and approved by manufacturer.

#### 1.11 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- C. Storage:
  - 1. Store materials according to manufacturer instructions.
  - 2. Store valves in shipping containers with labeling in place.
- D. Protection:
  - 1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
  - 2. Block individual and stockpiled pipe lengths to prevent moving.
  - 3. Provide additional protection according to manufacturer instructions.

#### 1.12 EXISTING CONDITIONS

- A. Field Measurements:
  - 1. Verify field measurements prior to fabrication.
  - 2. Indicate field measurements on Shop Drawings.

## PART 2 - PRODUCTS

### 2.1 SANITARY SEWERAGE PIPING

#### A. Plastic Pipe:

1. Material: PVC.
2. Comply with ASTM D3034, SDR-35.
3. Inside Nominal Diameter: 8 inches, 10 inches.
4. End Connections: Bell-and-spigot style, with rubber-ring-sealed gasket joint.
5. Fittings: PVC.
6. Minimum Cell Class: 12454 or 12364.

#### B. Joints

1. Flexible gasket joints shall be compression type so that when assembled, the gasket inside the bell will be compressed radially on the pipe spigot to form a watertight seal. The assembly of joints shall be in accordance with the pipe manufacturer's recommendations and ASTM D-3212 for pipe conforming to ASTM D-3034 or joints shall meet the requirements of ASTM D-3139 for pipe conforming to ASTM D-2241. The gaskets sealing the joint shall be made of rubber of special composition having a texture to assure a watertight and permanent seal and shall be the product of a manufacturer having at least five (5) years of experience in the manufacture of rubber gaskets for pipe joints. The gasket shall be a continuous ring of flexible joint rubber of a composition and texture which is resistant to common ingredients of sewage, industrial wastes and groundwater and which will endure permanently under the conditions imposed by this service.
2. The gasket shall conform to the requirements of ASTM F-477.

### 2.2 MANHOLES

- A. As specified in Section 33 05 13.16 – Public Manholes and Structures.

### 2.3 FLEXIBLE REPAIR COUPLINGS

#### A. Manufacturers:

1. Furnish materials according to City of Greenfield standards.

#### B. Description:

1. Comply with ASTM C1173, elastomeric, sleeve type, reducing or transition coupling, for joining underground nonpressure piping. Include ends to match same sizes of main line piping and install corrosion-resistant metal tension bands and tightening mechanism on each end.
2. Sleeve Materials:
  - a. For Plastic Pipes: ASTM F477, elastomeric seal.
  - b. For Dissimilar Pipes: PVC or other material compatible with pipe materials being joined.

3. Non-Shear, Flexible Couplings:
  - a. Couplings shall be elastomeric sleeve with stainless steel shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.

#### 2.4 FLEXIBLE PIPE BOOTS FOR MANHOLE PIPE ENTRANCES

- A. Manufacturers:
  1. Furnish materials according to City of Greenfield standards.

#### 2.5 LATERALS AND WYES

- A. Manufacturers:
  1. Furnish materials according to City of Greenfield standards.
- B. Description:
  1. Laterals shall be PVC SDR 35.
  2. Laterals shall be laid at a minimum of 1.00% slope from the sewer main to the right of way line.
  3. Wyes shall be PVC SDR 26.

#### 2.6 MATERIALS

- A. Bedding and Cover:
  - a. Bedding and cover shall be per City of Greenfield Utilities standard details.

#### 2.7 SOURCE QUALITY CONTROL

- A. Provide shop inspection and testing of pipe.
- B. Owner Inspection:
  1. Make completed pipe sections available for inspection at manufacturer's factory prior to packaging for shipment.
  2. Notify Owner at least seven days before inspection is allowed.
- C. Certificate of Compliance:
  1. If manufacturer is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at manufacturer's facility conforms to Contract Documents.
  2. Specified shop tests are not required for Work performed by approved manufacturer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.
- B. Verify that trench cut is ready to receive Work of this Section.
- C. Verify that excavations, dimensions, and elevations are as indicated on Drawings.

### 3.2 PREPARATION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for installation preparation.
- B. Correct over-excavation with #8 stone.
- C. Remove large stones (greater than 6-inch) or other hard materials that could damage pipe or impede consistent backfilling or compaction.
- D. Protect and support existing sewer lines, utilities, and appurtenances.
- E. Utilities:
  - 1. Maintain profiles of utilities.
  - 2. Coordinate with other utilities to eliminate interference.
  - 3. Notify Engineer if crossing conflicts occur.

### 3.3 INSTALLATION

- A. Bedding:
  - 1. Excavate pipe trench as specified in Section 312317 - Trenching.
  - 2. Excavate to lines and grades as indicated on Drawings, or as required to accommodate installation of encasement.
  - 3. Dewater excavations to maintain dry conditions and to preserve final grades at bottom of excavation.
  - 4. Placement:
    - a. Place bedding material at trench bottom.
    - b. Level materials in continuous layer not exceeding 6-inch compacted depth.
    - c. Compact to 95 percent of maximum density.
- B. Piping:

1. Installation Standards: Install Work according to City of Greenfield standards.
- C. Manholes: As specified in Section 33 05 13.16 – Public Manholes and Structures.
- D. Wye Branches:
  1. Concurrent with pipe-laying operations, install wye branches at locations indicated on Drawings.
  2. Use PVC SDR 26.
- E. Sanitary Laterals:
  1. Construct laterals from wye branch to right-of-way.
  2. Where depth of main pipeline warrants, construct riser-type laterals from wye branch.
  3. Minimum Depth of Cover over Piping: 2 feet.
  4. Minimum Separation Distance between Laterals: 5 feet.
  5. Connect new lateral to existing lateral at the edge of trench utilizing a flexible repair coupling.
- F. Backfilling: As specified in Section 31 23 17 - Trenching.

#### 3.4 FIELD QUALITY CONTROL

- A. Section 017000 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.
- B. Request inspection by Engineer prior to placing bedding.
- C. Testing:
  1. If tests indicate that Work does not meet specified requirements, remove Work, replace, and retest.
  2. Pipe Testing:
    - a. Pressure Testing: As specified in Section 330505.41 - Air Testing.
    - b. Deflection Testing: As specified in Section 330505.43 - Mandrel Testing.
  3. Compaction Testing:
    - a. Comply with ASTM D698.

#### 3.5 PROTECTION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for protecting finished Work.

- B. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.
- C. Cap open ends of piping during periods of Work stoppage.

END OF SECTION 333111