



**PROJECT MANUAL**

**2017 BOND ROAD DGR  
PROJECT**

**POLK TOWNSHIP  
JEFFERSON COUNTY, PENNSYLVANIA**

**July 2017**

**Project # Bond 554-2017**

## INVITATION TO BID

Sealed Proposals for the 2017 Bond Road DGR Project, will be received by Polk Township, Jefferson County, PA until **4:00 p.m.** prevailing time on **Tuesday, August 8, 2017** at the Polk Township Municipal Building.

The Work will include, but will not necessarily be limited to, providing all equipment, materials, labor, supervision, and testing services as further described in the bid documents. All Bid Documents and details are available at no cost online at [www.polktwp.com](http://www.polktwp.com). Click on the "Documents and Forms" tab then look under "Misc." for the "2017 Bond Road DGR Project" Bid Package.

A **mandatory pre-bid meeting** will be held at **9:00 AM.** on **Thursday, July 13, 2017** at the Polk Township Municipal Building. Hard copy bid packages will be available at this meeting upon request.

Each proposal shall be accompanied by a Bid Bond in the required form, certified check, bank cashier's check, or other security acceptable to the Owner in the amount of 10% of the total Bid. Bids will be effective for 60 calendar days from the Bid opening date except as permitted by law, and may not be withdrawn during this period. Bidders must Bid on all items listed on the Bid Form. The successful Bidder shall be required to furnish performance and payment bonds in the amount of 100% of the Contract Price.

This project is subject to the Pennsylvania Prevailing Wage Act.

This Project is subject to the Federal Occupational Safety & Health Act of 1970 (OSHA) conditions.

This Project is subject to Pennsylvania Act 287 of 1974, as amended by Act 172 of 1986, as amended by Act 38 of 1991, as amended by Act 187 of 1996.

This Project is subject to the Public Works Employment Verification Act. This Contract is subject to Pennsylvania Human Relations Act 222 conditions.

This Contract is subject to the non-discrimination in Employment/Contract Compliance Regulations Conditions.

Polk Township reserves the right at its option to waive any informalities, irregularities, defects, errors or omissions in any or all of Bids and to accept or reject any or all parts of the Bids which in its judgment is in the best interest of the Polk Township.

Annie Chamberlin  
Secretary



**PROPOSAL & CONTRACT  
(WHEN EXECUTED)**

Instructions on Page 4

(THIS PROPOSAL INCLUDES  
INSTRUCTIONS TO BIDDERS)

**A. DEPOSIT OF PROPOSALS.**

**All sealed envelopes containing Bid proposals shall be clearly marked "2017 Bond Road DGR Proposal for Letting of August 8, 2017."**

**Sealed Proposals will be received on or before 4:00 PM, August 8, 2017.**

**Bids will be opened and read at approximately 7:30 PM, August 8, 2017.**

Polk Township, Jefferson County, PA

MUNICIPALITY (NAME & TYPE)

Annie Chamberlin

SECRETARY

11382 Richardsville Rd

Brookville, PA 15825

ADDRESS

1. The contractor proposes to furnish and deliver all materials and to do and perform all work on the following project as more specifically set forth in the Schedule of Prices (Attachment), in accordance with drawings and specifications on file at the Polk Township Municipal Building as well as the supplements and special requirements contained herein and/or attached hereto.
2. If designated as the successful bidder, the contractor will begin work on the date specified in the notice to proceed, or as otherwise provided in the special requirements, and will complete all work on or before **September 30, 2017**. If all work is not completed on time, liquidated damages will be assessed at the rate of **\$250.00** per additional calendar day.
3. Accompanying this proposal is a certified check or bid bond in the amount of **10% of the Bid Amount** made payable to the municipality as a proposal guarantee which, it is understood, will be forfeited in case the contractor fails to comply with the requirements of the proposal.

**B. PROPOSAL OF:**

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

NAME / ADDRESS OF CONTRACTOR

**CONTRACTOR'S CERTIFICATION**

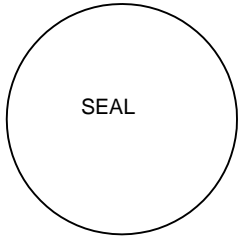
**It is hereby certified as follows:**

1. The only person(s) interested in this proposal as principal(s) is (are):

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

2. None of the above persons are employees of the municipality.
3. This proposal is made without collusion with any other person, firm or corporation.
4. All plans and specifications referred to above and the site of the work have been examined by the contractor. The contractor understands that the quantities indicated herein are approximate and are subject to change as may be required; and that all work is payable on the basis of the unit price listed on the Schedule of Prices (Attachment 1).

5. The contractor will comply with all requirements of the laws and implementing regulations of the Commonwealth of Pennsylvania and the United States relating to human relations, equal opportunity and non-discrimination in employment, and will pay to workmen employed in the performance of the contract the wages to which they may be entitled.
6. The contractor will provide the municipality with a performance bond, conditioned upon the faithful performance of the contract in accordance with the plans, specifications and conditions thereof, and a payment bond conditioned on the prompt payment of all material furnished and labor supplied or performed in the prosecution of the work.
7. Bidder acknowledges that this bid is for a public works contract and bidder is therefore subject to the provisions, duties, obligations, and penalties of the Public Works Employment Verification Act, 43 P.S. 167.1-167.11, which is incorporated herein by reference.



\_\_\_\_\_

CONTRACTOR

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

TITLE: \_\_\_\_\_

WITNESSED OR ATTESTED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

TITLE: \_\_\_\_\_

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**TO BE EXECUTED ONLY IN THE EVENT THE ABOVE PROPOSAL IS ACCEPTED**

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ACCEPTED ON: \_\_\_\_\_

DATE

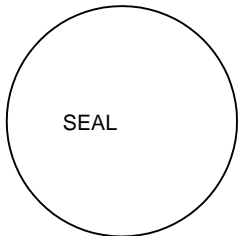
**POLK TOWNSHIP**

\_\_\_\_\_

MUNICIPALITY

BY: \_\_\_\_\_

TITLE: \_\_\_\_\_



BY: : \_\_\_\_\_

TITLE: \_\_\_\_\_

BY: : \_\_\_\_\_

TITLE: \_\_\_\_\_

ATTESTED BY: : \_\_\_\_\_

TITLE: \_\_\_\_\_





**SPECIAL PROVISIONS TO CONTRACT MS-944 (Attachment 1-A)  
CONTAINS IMPORTANT INFORMATION FOR THE CONTRACTOR**

The Prime Contractor and subcontractors must comply with all of the following provisions:

**General**

- **A mandatory pre-bid meeting is scheduled for 9:00 AM Thursday, July 13, 2017 at the Polk Township Municipal Building.**
- Each bid must be accompanied by bid security in the form of a certified check, bank cashier's check or bid bond in required form, amounting to (10%) ten percent of the total base bid.
- For project specific questions, bidders should contact Polk Township's roadmaster, Neal Davis at 814-328-2996.
- All work to be completed in accordance with the attached Technical Bulletins published by the PennState Center for Dirt and Gravel Road Studies.
- A pre-construction meeting will be mandatory and the Contractor's and any Sub-Contractor's on site foreman must attend. The contractor will schedule this meeting with Polk Township and the Jefferson County Conservation District at least 5 calendar days before the start of the project.
- Work schedule must be coordinated with Polk Township and work must be completed on or before **September 30, 2017**. If all work is not completed on time, Liquidated damages will be assessed at the rate of **\$250.00** per additional calendar day.
- Polk Township and Jefferson County Conservation District will inspect the project.
- Incidental preparation and clean up required.
- Contractor is responsible for defects that occur within one year of applications.
- The successful bidder must provide a 100% Performance Bond and a 100% Payment Bond within 10 days of the award of the contract.
- Construction projects, where the estimated cost of the total project exceeds \$25,000, are subject to the provisions of the Pennsylvania Prevailing Wage Act 442 and amended by Act 89 of 2013.
- The Municipality intends to award the contract to one bidder, the Municipality reserves the right to accept or reject any and or all proposals or portions thereof, and to delete projects and or portions of the project depending on budgetary constraints
- Final Completion Certificate & Notice of Completion required.
- Contractor, notify all residents of pending work to be performed.

**Insurance Requirements**

The awarded contractor shall purchase and maintain, at its expense, during the term of this contract and any renewals or extensions thereof, insurance issued by companies acceptable to Polk Township. Polk Township **MUST** be named as an additional insured on the policy.

**My signature signifies that I have read and understand the above special provisions to this contract, and by being authorized by this company to act as their authorized representative, and on their behalf hereby agree to adhere to any and all of the provisions pertaining to this contract.**

\_\_\_\_\_  
CONTRACTOR'S REPRESENTATIVE

\_\_\_\_\_  
DATE

\_\_\_\_\_  
POLK TOWNSHIP REPRESENTATIVE

\_\_\_\_\_  
DATE

\_\_\_\_\_  
COMPANY

\_\_\_\_\_  
Polk Township

# BID BOND

**BIDDER** (Name and Address):

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

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

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

**OWNER** (Name and Address):

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

**BID**

BID DUE DATE: \_\_\_\_\_

PROJECT (Brief Description Including Location):

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

**BOND**

BOND NUMBER: \_\_\_\_\_

DATE (Not later than Bid due date): \_\_\_\_\_

PENAL SUM: \_\_\_\_\_ (Words) \_\_\_\_\_ (Figures)

IN WITNESS WHEREOF, Surety and Bidder, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

BIDDER

SURETY

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

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

By: \_\_\_\_\_  
Signature and Title

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

Attest: \_\_\_\_\_  
Signature and Title

Attest: \_\_\_\_\_  
Signature and Title

Note: (1) Above addresses are to be used for giving required notice.  
(2) Any singular reference to Bidder, Surety, OWNER or other party shall be considered plural where applicable.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to pay to OWNER upon default of Bidder the penal sum set forth on the face of this Bond.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by OWNER) the executed Agreement required by the Bidding Documents and any performance and payment Bonds required by the Bidding Documents.

3. This obligation shall be null and void if:

3.1. OWNER accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by OWNER) the executed Agreement required by the Bidding Documents and any performance and payment Bonds required by the Bidding Documents, or

3.2. All Bids are rejected by OWNER, or

3.3. OWNER fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default by Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from OWNER, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of and any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by OWNER and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.

6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.

7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier or by United States Registered or Certified Mail, return receipt

requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this Bond a current and effective Power or Attorney evidencing the authority of the officer, agent or representative who executed this Bond on behalf of Surety to execute, seal and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term "Bid" as used herein includes a Bid, offer or proposal as applicable.

:

(DATE)



**ANTI-COLLUSION AFFIDAVIT**

County: Jefferson

Municipality: Polk Township

Project Number: 554-2017

State of: \_\_\_\_\_

Fed. Project No.: \_\_\_\_\_

(if Applicable)

County of: \_\_\_\_\_

The undersigned deponent deposes and says that he is the \_\_\_\_\_ of the \_\_\_\_\_ Company; that he is authorized to make this affidavit on behalf of said company in compliance with Section 102.06(e) of Department Specifications, Publication 408, as amended and that the said company has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with such contract.

\_\_\_\_\_  
(CONTRACTOR)

BY: \_\_\_\_\_

Sworn to and subscribed before me the undersigned Notary Public this \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_\_.

\_\_\_\_\_  
NOTARY PUBLIC

My commission expires:



**PERFORMANCE BOND**  
(With Corporate Surety)

KNOW ALL MEN BY THESE PRESENTS, That we, \_\_\_\_\_

\_\_\_\_\_  
(NAME AND ADDRESS OF CONTRACTOR)

as Principal and \_\_\_\_\_

\_\_\_\_\_  
(SURETY COMPANY)

a corporation incorporated under the laws of the State of \_\_\_\_\_ as Surety

\_\_\_\_\_  
(NAME OF STATE)

are held and firmly bound unto \_\_\_\_\_ in the full and just sum of

\_\_\_\_\_  
(NAME OF MUNICIPALITY)

\_\_\_\_\_ ( ) dollars

lawful money of the United States of America, to be paid to the above Municipality or its assigns, to which payment well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

**WHEREAS**, the above bounden Principal has entered into a contract with the above Municipality, bearing even date herewith, for the undertaking of certain obligations as therein set forth.

**NOW, THEREFORE**, the condition of this obligation is such that if the above bounden Principal, as Contractor, shall in all respects comply with and faithfully perform the terms and conditions of said Contract, including the Specifications and conditions referred to and made a part thereof, and such alterations as may be made in said Specifications as therein provided, and shall well and truly, and in a manner satisfactory to the municipality fulfill all obligations as therein set forth, then this Obligation shall be void, but otherwise the same shall be and remain in full force, virtue and effect.

It is further provided that any alteration which may be made in the terms of the contractor or its specifications with the express approval of the Municipality or the Principal to the other, shall not in any way release the Principal and the Surety or either or any of them, their heirs, executors, administrators, successors or assigns from their liability hereunder, notice to the Surety of any such alteration or forbearance being hereby waived.

**IN WITNESS WHEREOF**, the said Principal and Surety have duly executed this Bond under Seal, pursuant to due and legal action authorizing the same to be done on \_\_\_\_\_

\_\_\_\_\_  
(DATE OF BOND)



Attest/Witness:

\_\_\_\_\_  
CONTRACTOR

\_\_\_\_\_  
TITLE:

BY

\_\_\_\_\_  
TITLE:



Attest/Witness:

\_\_\_\_\_  
SURETY COMPANY

\_\_\_\_\_  
TITLE:

\_\_\_\_\_  
TITLE:



PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS, that we,

\_\_\_\_\_

as PRINCIPAL and

\_\_\_\_\_

a corporation incorporated under the laws of the State of

\_\_\_\_\_ as SURETY, are

held and firmly bound unto the

\_\_\_\_\_, in the full and just sum of

(\$ ) dollars,

lawful money of the United States of America, to be paid to the said \_\_\_\_\_ or its assigns, to which payment well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the above bounden Principal has entered into a contract with the above Municipality, hereinafter called Obligee, bearing even date herewith, for the improvement of a certain section of highway or bridge in said Municipality consisting of:

\_\_\_\_\_

for approximately the sum of

\_\_\_\_\_ (\$ ) dollars.

NOW, THEREFORE, the condition of this obligation is such that if the above bounden PRINCIPAL shall and will promptly pay or cause to be paid in full all sums of money which may be due by contract or otherwise to any individual, firm, partnership, association or corporation, for all material furnished or labor supplied or performed in the prosecution of the work, whether or not the said material or labor entered into and became component parts of the work and for rental of the equipment used and services rendered by public utilities in, or in connection with the prosecution of such work, then this obligation to be void, otherwise to remain in full force and effect.

The PRINCIPAL and SURETY, hereby, jointly and severally, agree with the Obligee herein that any individual firm, partnership, association or corporation, which has performed labor or furnished material in the prosecution of the work as provided, and any public utility which has not been paid in full therefore, may sue in assumpsit on this Payment Bond in his, their, or its own name and may prosecute the same to final for such sum or sums as may be justly due him, them or it, and have execution thereon. Provided, however, that the Obligee shall not be liable for the payment of any costs or expenses of such suit.

RECOVERY by any individual, firm, partnership, association or corporation hereunder shall be subject to the provisions of the "Public Works Contractors' Bond Law of 1967", Act No. 385, approved December 20, 1967, PL 869, which Act shall be incorporated herein and made a part hereof, as fully and completely as though its provisions were fully and at length herein recited.

It is further provided that any alterations which may be made in the terms of the contract or in the work to be done or materials to be furnished or labor to be supplied or performed under it or the giving by the Obligee of any extension of time for the performance of the contract or any other forbearance on the part of either the Obligee or the Principal to the other, shall not in any way release the PRINCIPAL and the SURETY or SURETIES of any such alteration, extension of forbearance being hereby waived.

IN WITNESS WHEREOF, the said PRINCIPAL and SURETY have duly executed this Bond under seal this

\_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_



WITNESS:

\_\_\_\_\_  
CONTRACTOR

BY:

\_\_\_\_\_  
TITLE:

TITLE:



WITNESS:

\_\_\_\_\_  
SURETY COMPANY

TITLE:

\_\_\_\_\_  
TITLE:



COMMONWEALTH OF PENNSYLVANIA

**PUBLIC WORKS EMPLOYMENT VERIFICATION FORM**

Date \_\_\_\_\_

Business or Organization Name (Employer) \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

**Contractor**

Contracting Public Body \_\_\_\_\_

Contract/Project No \_\_\_\_\_

Project Description \_\_\_\_\_

Project Location \_\_\_\_\_

As a contractor/subcontractor for the above referenced public works contract, I hereby affirm that as of the above date, our company is in compliance with the Public Works Employment Verification Act ('the Act') through utilization of the federal E-Verify Program (EVP) operated by the United States Department of Homeland Security. To the best of my/our knowledge, all employees hired post January 1, 2013 are authorized to work in the United States.

It is also agreed to that all public works contractors/subcontractors will utilize the federal EVP to verify the employment eligibility of each new hire within five (5) business days of the employee start date throughout the duration of the public works contract. Documentation confirming the use of the federal EVP upon each new hire shall be maintained in the event of an investigation or audit.

I, \_\_\_\_\_, authorized representative of the company above, attest that the information contained in this verification form is true and correct and understand that the submission of false or misleading information in connection with the above verification shall be subject to sanctions provided by law.

\_\_\_\_\_  
Authorized Representative Signature



**NOTICE TO PROCEED**

Project No.: 554 - 2017

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

\_\_\_\_\_ Re: Polk Township

\_\_\_\_\_ 2017 Bond Road DGR Project

Contractor:

Polk Township, hereinafter referred to as OWNER, and represented by the undersigned, received the executed Agreement, Performance Bond, Payment Bond, and Certificates of Insurance Coverage, and other documentation required and as listed in the Notice of Award, and found them to be in order. You are hereby notified to proceed with the Work on \_\_\_\_\_.

All Work shall be completed and ready for final inspection and payment on or before **September 30, 2017**.

Please return an accepted copy of this Notice to Proceed to the attention of the undersigned.

ACCEPTANCE OF NOTICE

Receipt of this Notice to Proceed is hereby acknowledged this \_\_\_\_\_ day of \_\_\_\_\_

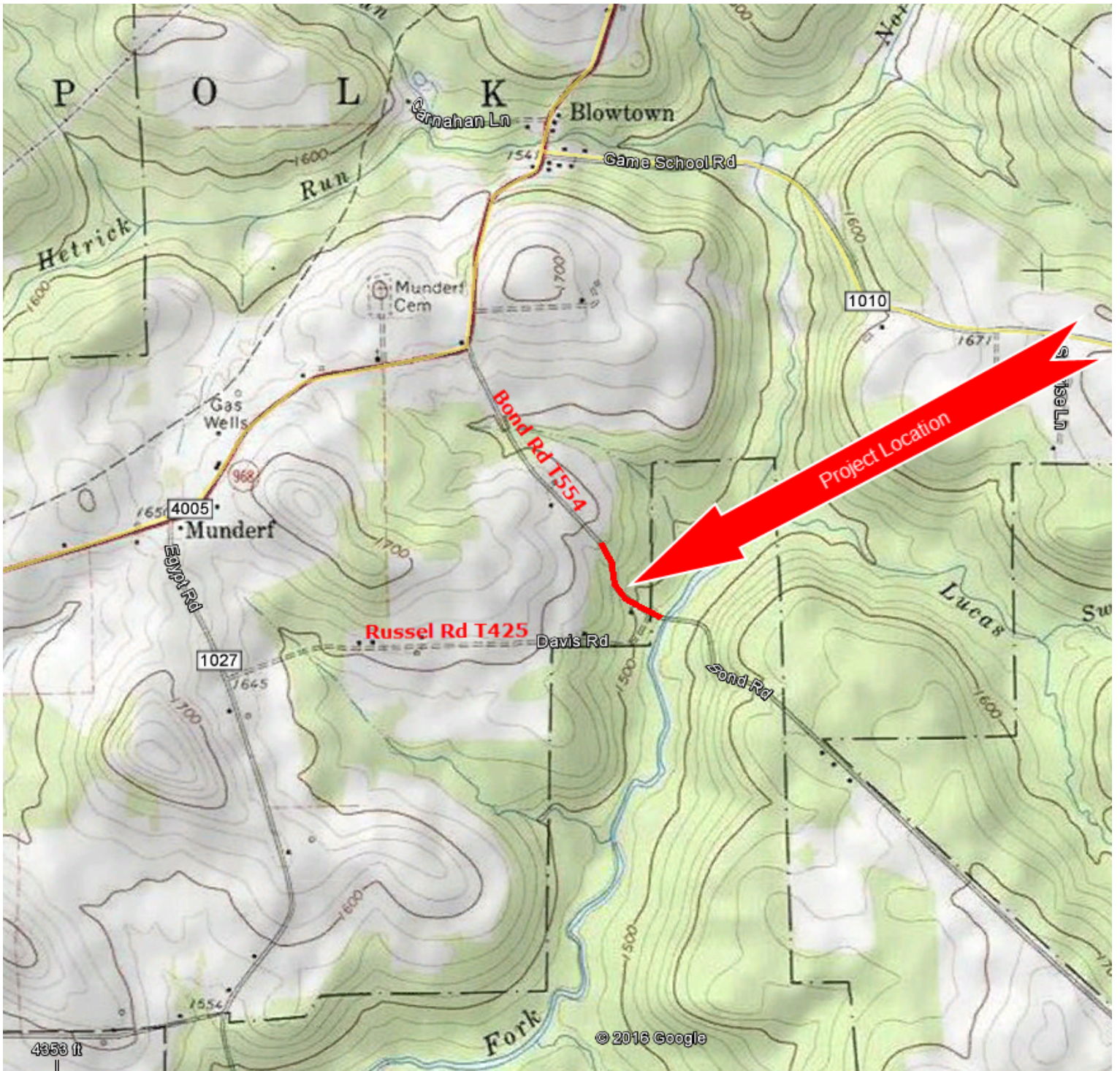
By: \_\_\_\_\_

For: Polk Township

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

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

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



SECTION 9106 OF THE PENNSYLVANIA VEHICLE CODE  
DIRT, GRAVEL AND LOW VOLUME ROAD MAINTENANCE  
PROJECT WORK PLAN

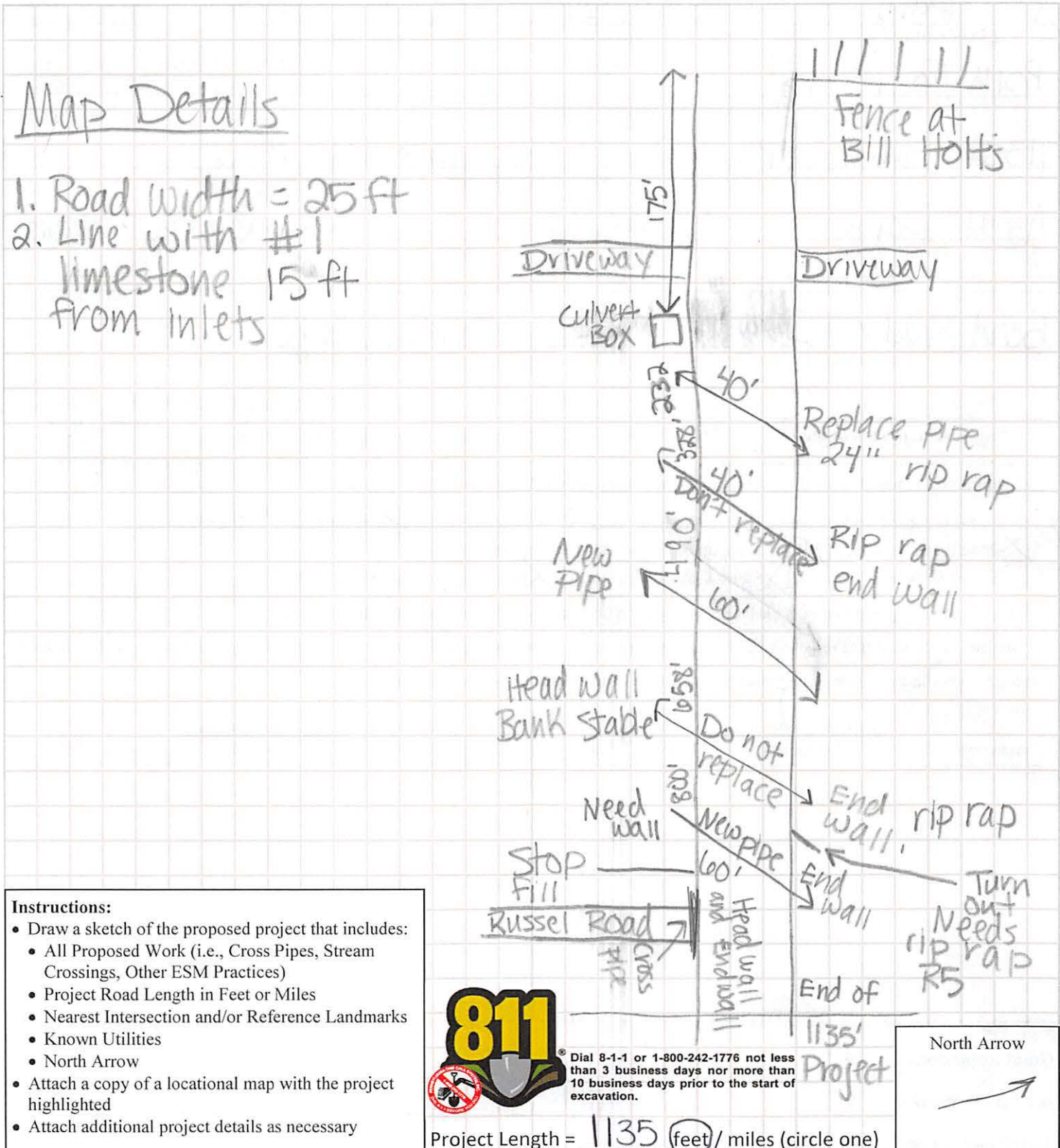
Polk Township  
Applicant

Bond Road/T554  
Road Name / ID Num

\_\_\_\_\_  
Date

Map Details

1. Road width = 25 ft
2. Line with #1 limestone 15 ft from inlets

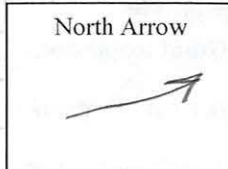


- Instructions:**
- Draw a sketch of the proposed project that includes:
    - All Proposed Work (i.e., Cross Pipes, Stream Crossings, Other ESM Practices)
    - Project Road Length in Feet or Miles
    - Nearest Intersection and/or Reference Landmarks
    - Known Utilities
    - North Arrow
  - Attach a copy of a locational map with the project highlighted
  - Attach additional project details as necessary



® Dial 8-1-1 or 1-800-242-1776 not less than 3 business days nor more than 10 business days prior to the start of excavation.

Project Length = 1135 (feet) / miles (circle one)



**CROSSPIPE INSTALLATION** - This technical bulletin deals with techniques for proper crosspipe installation (drainage culverts, not stream pipes). Please see related technical bulletins for general pipe information or details of a “Shallow Pipe Installation”.

**PIPE ELEVATION** – When possible, try to outlet pipes at the elevation of the natural ground. This will eliminate the need for long “tail ditches” at pipe outlets that are a constant source of maintenance and erosion. More information on pipe elevation can be found in the “Shallow Pipe Installation” Tech Bulletin.

**PIPE LENGTH AND ANGLE** – Pipes should be installed at an angle across the road that lines up with natural drainage patterns. This has many advantages over installing pipes straight across a road: (*Figure 1*)

- Reduces erosion around pipe inlet and outlet that is caused when water “turns” to enter or exit the pipe.
- Pipe efficiency and flow capacity are increased when water does not have to turn 90° to enter the inlet.
- Traffic loading on the pipe is decreased since only one vehicle tire at a time is directly over the pipe.
- Often with longer pipes installed at an angle, it is possible to keep pipe joints away from wheel tracks.

**BEDDING / FILL MATERIAL**– In selecting a material for use as bedding and fill around a crosspipe, frost action and compaction are the two most important concerns. When possible, the material that is excavated out of the pipe trench will make the best fill material. If this material has a lot of large rock in it, it will not compact properly and new material must be imported. Keep in mind the following when selecting a bedding material:

- Imported bedding material should be as similar as possible to existing road material. This will insure that the entire road will react in the same way to cycles of freeze and thaw.
- Any bedding material needs to be slightly moist to achieve the best compaction. Compaction is crucial both above and beside the pipe to provide proper pipe support and avoid excessive flexing.
- Some common fill materials include crushed bank run gravel, shale, and PENNDOT 2RC aggregate.

## OTHER CONSIDERATIONS

- When raising the road profile, fill should be placed and compacted prior to pipe placement. After road fill is in place, excavate pipe trench and proceed with installation.
- Insure that all pipes have at least a 1% fall.
- All pipes should have headwalls and endwalls to reduce erosion and improve pipe functionality.
- Drop-inlets (grates like on storm sewers) are not recommended for use on unpaved roads.



Photo 1. A plastic crosspipe is shown during installation. Notice the pipe bedding material, endwall, and stone at outlet.

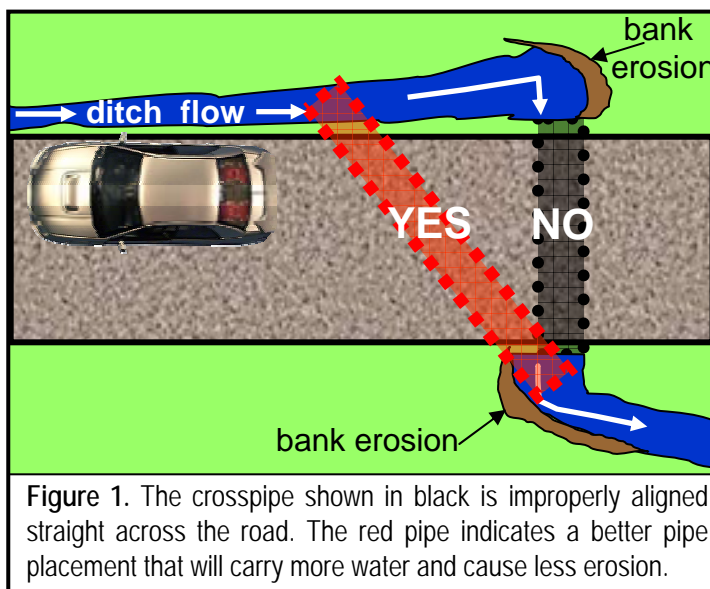


Figure 1. The crosspipe shown in black is improperly aligned straight across the road. The red pipe indicates a better pipe placement that will carry more water and cause less erosion.

## CROSSPIPE INSTALLATION

- 1) **Excavate Pipe Trench:** Trench should be wide enough to fit compaction device (*shown in "D"*) on both sides of pipe. Trench depth will depend on outlet elevation. Outlet pipe at natural ground elevation whenever possible to eliminate the need for a tail-ditch. Bottom of pipe inlet should be at the same elevation as the ditch. If needed, use a level to insure bottom of pipe trench has min 1% fall across entire length. (*See photo A*).
- 2) **Place Pipe Bedding:** Once trench is complete, place small amount of bedding material (~3") in bottom of trench if needed. Use bedding to smooth trench bottom and achieve proper slope. Some shovel and rake work is required to spread bedding evenly. If bedding material is used to level the trench, it should be compacted before pipe placement. Use level to find any uneven spots and double-check slope (*See photo B*).
- 3) **Place Pipe in Trench:** Place and align first section of pipe in trench. Pipe inlet should be located in the existing ditch line, with just enough room between the pipe and the bank for a headwall. Inlets that are too close to the road pose traffic hazards. Inlets that are too far off the road cause unnecessary bank erosion. Align additional pieces and secure together using provided collars or pipe adhesive. Look under pipe to make sure it is in constant contact with the bedding. Voids under the pipe will cause sagging upon compaction. If desired, headwall and endwall can be constructed at this time. Fill will be placed against the back of the walls in next step (*See photo 1 on front*). Otherwise, headwall and endwall can be constructed after pipe installation is complete.
- 4) **Place and compact fill material around pipe:** Place bedding material around pipe until approximately 8" of material is on each side of pipe. Pipe may need to be held in place so fill material does not push or lift pipe (*See photo C*). Use a Jumping-Jack to compact fill on both sides of pipe. Compaction of the first layer of bedding material is crucial because it packs material down around the base of the pipe for support (*See photo D*). The importance of compaction cannot be overstated! Unlike metal and concrete pipes which have structural strength, plastic pipes get their strength from the material compacted tightly around them. Be careful not to puncture pipe with the foot of the Jumping-Jack while compacting. Continue to fill and compact in stages, placing approximately 8" of fill before compaction. If too much fill is placed at once, proper compaction cannot be achieved. Continue to fill and compact over top of pipe (*See photo E*). Be sure to provide adequate fill over pipe. Adequate fill varies with pipe size and construction. Plastic pipes up to 24" in diameter require a minimum of 12" of compacted cover.



## Headwalls and Endwalls:

A wall built at a pipe opening to support the road and protect it from the erosive forces of flowing water. A wall at a pipe inlet is called a headwall. A wall at a pipe outlet is an endwall.

## Purposes

Headwalls and endwalls support the road and protect the ends of the pipe. Properly constructed headwalls and endwalls improve pipe capacity and efficiency while reducing erosion around pipe installations.

## Benefits of Headwalls and Endwalls

- Provide a low-cost, long-lasting solution to erosion problems at pipe openings.
- Prevent flowing water from damaging the road structure.
- Provide structural support for the road and prevent crushing of the pipe.
- Increase the flow capacity of pipes by reducing turbulence and directing flow.
- Visually identify pipe openings and protect them from traffic and maintenance equipment.

## Necessity for Protection at Pipe Openings

It is necessary to protect pipe openings for several reasons:

- Water is turbulent when it changes shape or direction, increasing its erosive potential.
- Water accelerates as it passes through a pipe creating the need for armor to prevent erosion.
- High flows erode unprotected areas directly causing soil erosion, sediment pollution, and maintenance costs.
- Physical support for the road may be necessary at pipe openings, depending on road width and pipe length.

## Materials

Headwalls and endwalls can be built with many different materials. Several factors influence the choice of materials including local availability, skill and time required for construction, durability, cost, and volume and velocity of water to be handled. Materials commonly used in Pennsylvania include\*:

- Native stone or boulders collected on-site
- Pre-cast concrete and cast-in-place concrete
- Molded plastic (Hartman Endwall System)
- Modular masonry products

\* Construction techniques using the materials listed will be covered in future technical bulletins.



Walls can be made with a variety of materials including native stone (a), boulders (b), or molded plastic (c).

*The publishers of this publication gratefully acknowledge the financial support of the Pennsylvania State Conservation Commission. For additional information or assistance, contact: Center for Dirt & Gravel Roads Studies, Penn State University, 207 Research Unit D, University Park, PA 16802 (Toll-Free Phone: 1-866-668-6683, Fax: 814-863-6787, Email: dirtandgravel@psu.edu). Additional copies available on our website at: [www.dirtandgravelroads.org](http://www.dirtandgravelroads.org)*

## Shape

The shape of headwalls and endwalls is important to direct water flow, to protect the road and banks from turbulent water, and improve drainage efficiency.

Headwalls and endwalls built in a rough trapezoidal/parabolic shape act to collect and funnel fast-moving water while protecting the ends of the pipe from erosion (Figure 1). At the pipe inlet, the headwall reduces turbulence, directs flow, and maximizes the flow capacity of the pipe during high flows. At the outlet, the endwall prevents erosive back eddy currents from undermining the pipe placement and the road structure.

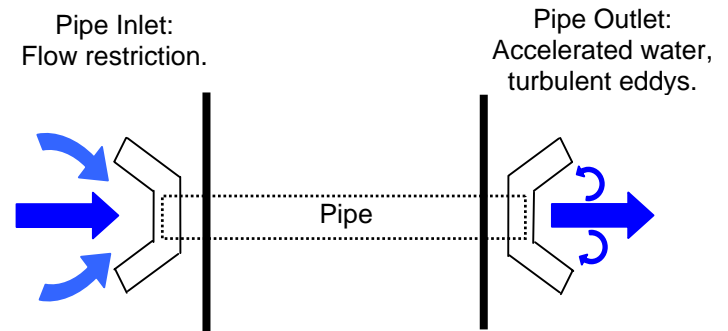


Figure 1: Plan or Bird's Eye View  
Figure not drawn to scale.

Water that must change direction to enter a pipe can be very erosive. Erosion and sediment deposition cause maintenance and pollution. An angle-shaped headwall directs flow and reduces turbulence, improving pipe capacity (Figure 2).

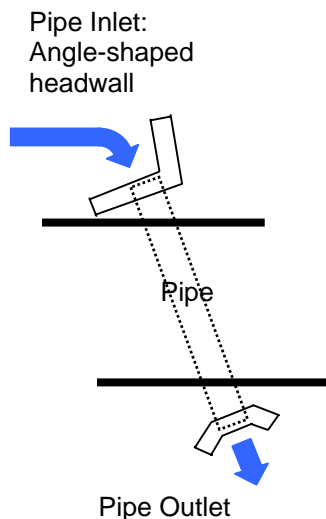


Figure 2: Plan or Bird's Eye View  
Figure not drawn to scale.



## Important Considerations

- Headwalls and endwalls should be built high enough to support the full depth of pipe cover recommended by the manufacturer: 12" of cover for plastic and corrugated steel pipe 24" in diameter and smaller (Figure 3).
- It is critically important to anticipate the forces of drainage water under heavy storm high flow conditions. Drainage structures should be built to conduct massive flows and provision for safe over flow should be provided. Headwalls and end walls built to the proper height not only improve pipe capacity during extremely high flows but also help prevent pipe blockage, road washouts and the resulting catastrophic effects.

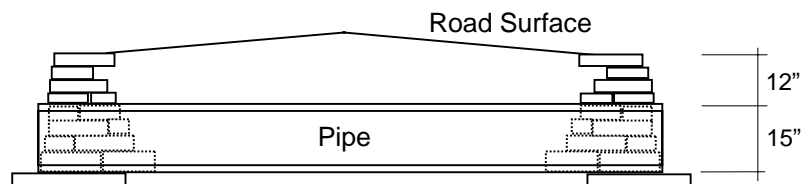


Figure 3: Longitudinal Section of Pipe Installation.  
The head- and endwalls are built 12" above the pipe to ensure proper cover, support the road, and improve pipe capacity.

Figure not drawn to scale.

**BUREAU OF LABOR LAW COMPLIANCE  
PREVAILING WAGES PROJECT RATES**

Project Name:	2017 Bond Road DGR Project
Awarding Agency:	Polk Township
Contract Award Date:	8/14/2017
Serial Number:	17-05073
Project Classification:	Heavy/Highway
Determination Date:	7/7/2017
Assigned Field Office:	Altoona
Field Office Phone Number:	(814)940-6224
Toll Free Phone Number:	
Project County:	Jefferson County

**BUREAU OF LABOR LAW COMPLIANCE  
PREVAILING WAGES PROJECT RATES**

<b>Project: 17-05073 - Heavy/Highway</b>	<b>Effective Date</b>	<b>Expiration Date</b>	<b>Hourly Rate</b>	<b>Fringe Benefits</b>	<b>Total</b>
Carpenter Welder	1/1/2017		\$33.10	\$17.14	\$50.24
Carpenter Welder	1/1/2018		\$33.87	\$17.77	\$51.64
Carpenter Welder	1/1/2019		\$34.72	\$18.42	\$53.14
Carpenters	1/1/2017		\$32.15	\$17.14	\$49.29
Carpenters	1/1/2019		\$33.77	\$18.42	\$52.19
Carpenters	1/1/2018		\$32.92	\$17.77	\$50.69
Cement Finishers	1/1/2018		\$31.04	\$19.90	\$50.94
Cement Finishers	1/1/2019		\$31.94	\$20.50	\$52.44
Cement Finishers	1/1/2017		\$30.14	\$19.40	\$49.54
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	6/1/2016		\$27.81	\$27.25	\$55.06
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	6/1/2017		\$28.02	\$28.36	\$56.38
Laborers (Class 01 - See notes)	1/1/2018		\$24.75	\$22.35	\$47.10
Laborers (Class 01 - See notes)	1/1/2019		\$24.75	\$23.85	\$48.60
Laborers (Class 01 - See notes)	1/1/2017		\$24.75	\$20.95	\$45.70
Laborers (Class 02 - See notes)	1/1/2017		\$24.91	\$20.95	\$45.86
Laborers (Class 02 - See notes)	1/1/2019		\$24.91	\$23.85	\$48.76
Laborers (Class 02 - See notes)	1/1/2018		\$24.91	\$22.35	\$47.26
Laborers (Class 03 - See notes)	1/1/2018		\$25.40	\$22.35	\$47.75
Laborers (Class 03 - See notes)	1/1/2019		\$25.40	\$23.85	\$49.25
Laborers (Class 03 - See notes)	1/1/2017		\$25.40	\$20.95	\$46.35
Laborers (Class 04 - See notes)	1/1/2018		\$25.85	\$22.35	\$48.20
Laborers (Class 04 - See notes)	1/1/2019		\$25.85	\$23.85	\$49.70
Laborers (Class 04 - See notes)	1/1/2017		\$25.85	\$20.95	\$46.80
Laborers (Class 05 - See notes)	1/1/2019		\$26.26	\$23.85	\$50.11
Laborers (Class 05 - See notes)	1/1/2017		\$26.26	\$20.95	\$47.21
Laborers (Class 05 - See notes)	1/1/2018		\$26.26	\$22.35	\$48.61
Laborers (Class 06 - See notes)	1/1/2017		\$23.10	\$20.95	\$44.05
Laborers (Class 06 - See notes)	1/1/2018		\$23.10	\$22.35	\$45.45
Laborers (Class 06 - See notes)	1/1/2019		\$23.10	\$23.85	\$46.95
Laborers (Class 07 - See notes)	1/1/2018		\$25.75	\$22.35	\$48.10
Laborers (Class 07 - See notes)	1/1/2019		\$25.75	\$23.85	\$49.60
Laborers (Class 07 - See notes)	1/1/2017		\$25.75	\$20.95	\$46.70
Laborers (Class 08 - See notes)	1/1/2017		\$27.25	\$20.95	\$48.20
Laborers (Class 08 - See notes)	1/1/2019		\$27.25	\$23.85	\$51.10
Laborers (Class 08 - See notes)	1/1/2018		\$27.25	\$22.35	\$49.60
Operators (Class 01 - see notes)	1/1/2018		\$31.29	\$20.78	\$52.07
Operators (Class 01 - see notes)	1/1/2019		\$31.89	\$21.68	\$53.57
Operators (Class 01 - see notes)	1/1/2017		\$30.69	\$19.98	\$50.67
Operators (Class 02 -see notes)	1/1/2019		\$31.63	\$21.68	\$53.31
Operators (Class 02 -see notes)	1/1/2017		\$30.43	\$19.98	\$50.41
Operators (Class 02 -see notes)	1/1/2018		\$31.03	\$20.78	\$51.81
Operators (Class 03 - See notes)	1/1/2018		\$27.38	\$20.78	\$48.16
Operators (Class 03 - See notes)	1/1/2017		\$26.78	\$19.98	\$46.76

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<b>Project: 17-05073 - Heavy/Highway</b>	<b>Effective Date</b>	<b>Expiration Date</b>	<b>Hourly Rate</b>	<b>Fringe Benefits</b>	<b>Total</b>
Operators (Class 03 - See notes)	1/1/2019		\$27.98	\$21.68	\$49.66
Operators (Class 04 - See notes)	1/1/2017		\$26.32	\$19.98	\$46.30
Operators (Class 04 - See notes)	1/1/2019		\$27.52	\$21.68	\$49.20
Operators (Class 04 - See notes)	1/1/2018		\$26.92	\$20.78	\$47.70
Operators (Class 05 - See notes)	1/1/2019		\$27.27	\$21.68	\$48.95
Operators (Class 05 - See notes)	1/1/2018		\$26.67	\$20.78	\$47.45
Operators (Class 05 - See notes)	1/1/2017		\$26.07	\$19.98	\$46.05
Painters Class 1 (see notes)	6/1/2016		\$31.58	\$17.58	\$49.16
Painters Class 1 (see notes)	6/1/2019		\$33.15	\$20.06	\$53.21
Painters Class 1 (see notes)	6/1/2017		\$31.85	\$18.66	\$50.51
Painters Class 1 (see notes)	6/1/2018		\$32.50	\$19.36	\$51.86
Painters Class 1 (see notes)	6/1/2017		\$31.98	\$18.43	\$50.41
Painters Class 2 (see notes)	6/1/2017		\$33.95	\$18.66	\$52.61
Painters Class 2 (see notes)	6/1/2016		\$31.58	\$17.58	\$49.16
Painters Class 2 (see notes)	6/1/2017		\$34.08	\$18.43	\$52.51
Painters Class 2 (see notes)	6/1/2019		\$35.25	\$20.06	\$55.31
Painters Class 2 (see notes)	6/1/2018		\$34.60	\$19.36	\$53.96
Painters Class 3 (see notes)	6/1/2016		\$33.68	\$17.58	\$51.26
Painters Class 3 (see notes)	6/1/2017		\$27.58	\$18.48	\$46.06
Painters Class 3 (see notes)	6/1/2018		\$34.60	\$19.36	\$53.96
Painters Class 3 (see notes)	6/1/2019		\$35.25	\$20.06	\$55.31
Painters Class 3 (see notes)	6/1/2017		\$33.95	\$18.66	\$52.61
Painters Class 4 (see notes)	6/1/2017		\$27.27	\$18.43	\$45.70
Painters Class 4 (see notes)	6/1/2017		\$27.16	\$18.66	\$45.82
Painters Class 4 (see notes)	6/1/2018		\$27.68	\$19.36	\$47.04
Painters Class 4 (see notes)	6/1/2019		\$28.20	\$20.06	\$48.26
Painters Class 4 (see notes)	6/1/2016		\$26.95	\$17.58	\$44.53
Painters Class 5 (see notes)	6/1/2017		\$22.07	\$18.66	\$40.73
Painters Class 5 (see notes)	6/1/2019		\$22.91	\$20.06	\$42.97
Painters Class 5 (see notes)	6/1/2018		\$22.49	\$19.36	\$41.85
Painters Class 5 (see notes)	6/1/2016		\$21.90	\$17.58	\$39.48
Painters Class 5 (see notes)	6/1/2017		\$22.16	\$18.43	\$40.59
Pile Driver Divers (Building, Heavy, Highway)	1/1/2019		\$51.45	\$19.30	\$70.75
Pile Driver Divers (Building, Heavy, Highway)	1/1/2018		\$50.33	\$18.55	\$68.88
Pile Driver Divers (Building, Heavy, Highway)	1/1/2017		\$49.13	\$17.95	\$67.08
Piledrivers	1/1/2017		\$32.75	\$17.95	\$50.70
Piledrivers	1/1/2018		\$33.55	\$18.55	\$52.10
Piledrivers	1/1/2019		\$34.30	\$19.30	\$53.60
Steamfitters (Heavy and Highway - Gas Distribution)	5/1/2017		\$40.98	\$32.53	\$73.51
Truckdriver class 1(see notes)	1/1/2018		\$28.52	\$18.40	\$46.92
Truckdriver class 1(see notes)	1/1/2017		\$28.10	\$17.42	\$45.52
Truckdriver class 1(see notes)	1/1/2019		\$28.99	\$19.43	\$48.42
Truckdriver class 2 (see notes)	1/1/2018		\$28.66	\$18.48	\$47.14
Truckdriver class 2 (see notes)	1/1/2017		\$28.24	\$17.50	\$45.74

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Truckdriver class 2 (see notes)	1/1/2019		\$29.13	\$19.51	\$48.64
Truckdriver class 3 (see notes)	1/1/2017		\$28.71	\$17.80	\$46.51
Truckdriver class 3 (see notes)	1/1/2018		\$29.13	\$18.78	\$47.91
Truckdriver class 3 (see notes)	1/1/2019		\$29.59	\$19.82	\$49.41